intel

INTEL® NUC SOFTWARE STUDIO

Intel® NUC 11 Performance, Enthusiast, Extreme
Intel® NUC 12 Enthusiast, Extreme
Intel® NUC 12 Pro X
Intel® NUC 13 Extreme/Extreme Kits

User Guide

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NUC Group
Client Computing Group, Intel® Corporation

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Revision History

Version	Date	Description of Changes
1.0	November 2020	Initial Release
1.1	August 2021	Updated document with support to Intel® NUC 11 Performance, Intel® NUC 11 Enthusiast, Intel® NUC 11 Extreme
1.5	December 2021	 Updated Supported Operating Systems to include Windows 11 version 21H2 Removed Performance Driver Uninstall directions (N/A for latest release) Updated Screenshots: Intel® NUC 11 Enthusiast NUC11PHK, Intel® NUC 11 Extreme NUC11BTM Updated Known Errata: Intel® NUC 11 Performance NUC11PAQ, NUC11PAH, NUC11PAK, Intel® NUC 11 Enthusiast NUC11PHK Added LED Behavior (all)
1.6	March 2022	 Updated Supported Products to include Intel® NUC 12 Extreme Intel® NUC 12 Pro X Updated Known Errata
1.7	September 2022	Updated Supported Products to include Intel® NUC 12 Enthusiast: NUC12SNK
1.8	December 2022	Added Intel® NUC 13 Extreme/Extreme Kits support NUC13SBB, NUC13RNG

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1 Introduction

1.1 Overview

The Intel® NUC Software Studio allows an end user with Intel® NUC 11 Performance Kit, Intel® NUC 11 Enthusiast Kit, Intel® NUC 11 Extreme Kit to monitor system settings and control and tune LED settings and Performance settings.

1.2 Supported Products

- Intel® NUC 11 Performance: NUC11PAQ, NUC11PAH, NUC11PAK
- Intel® NUC 11 Enthusiast: NUC11PHK
- Intel® NUC 11 Extreme: NUC11BTM
- Intel® NUC 12 Enthusiast: NUC12SNK
- Intel® NUC 12 Extreme: NUC12DCMi7, NUC12DCMi9
- Intel® NUC 12 Pro X: NUC12DCMx7, NUC12DCMx9
- Intel® NUC 13 Extreme/ Extreme Kits NUC13SBB, NUC13RNG

1.3 Supported Operating System

- Windows 11 version 21H2
- Windows 10 version 21H1

2 Installation

2.1 Performance Driver Installation

There are 2 options to install the Intel® NUC Software Studio Performance Driver:

Automated Installation (Recommended): On a system running Windows 11 or Windows 10, run Windows Update via the Windows Settings
Update & Security control panel to receive latest updates.

Note: The NSS application will also be automatically downloaded and installed through this process.

- 2. Manual Installation: From Intel Download Center https://downloadcenter.intel.com search for 'Intel® NUC Software Studio Performance Driver'. but I'd also
 - a. Click Download
 - b. Extract the package and double click the MSI installer
 - c. Click Yes to restart the system

2.2 Application Installation

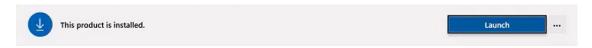
Note: This step can be skipped if the Performance driver was automatically installed through Windows Update (See 2.1).

- 1. Search for Intel® NUC Software Studio application in the Microsoft Store.
- 2. Click Get.



Note: Make sure that the system OS is in the whitelist as mentioned in Supported OS.

3. Once the application has been installed, you will see the following message:

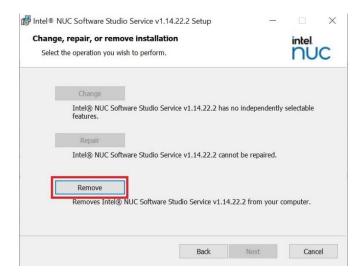


Note: If the system OS is not supported, an error message is displayed when the Launch button is clicked.

2.3 Performance Driver Uninstallation

To uninstall the Performance Driver installed per Manual Installation guidance is section 2.1:

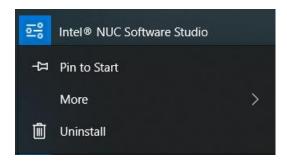
- 1. Locate and execute the MSI installer manually downloaded from Download Center used to install the driver per above
- 2. Select "Remove" in "Change, repair ore remove installation" and follow the prompt to Confirm



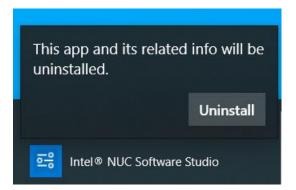
3. Restart the system as prompted

2.4 Application Uninstallation

- 1. Open the Windows Start Menu
- 2. Right Click on the Intel® NUC Software Studio icon.



3. Choose Uninstall.



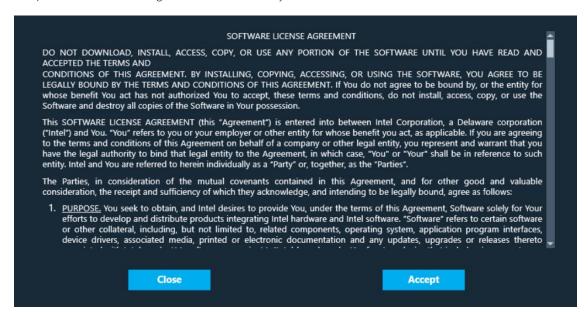
3 Intel® NUC Software Studio – Interface

3.1 Opening the Intel® NUC Software Studio

- 1. Click on the Windows Start menu icon
- 2. Select Intel® NUC Software Studio



Accept the Software License Agreement which redirects you to the Intel® NUC Software Studio home screen



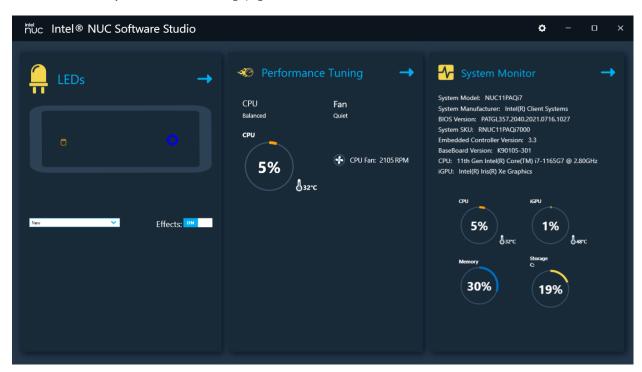
4 Intel® NUC 11 Performance

Intel® NUC Software Studio supports the below features on Intel® NUC 11 Performance Kit:

- 1. LED Manager
- 2. Performance Tuning
- 3. System Monitor

4.1 Home Screen

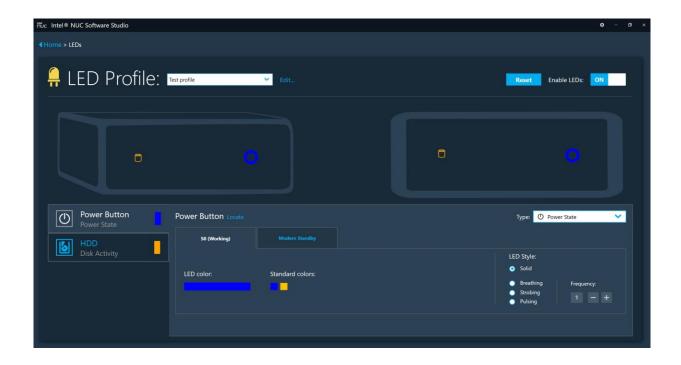
On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



4.2 LED Manager

This feature allows the end user to control the programmable LEDs on the system. Supported options are:

- 1. Change LED zone colors, style and indicator type
- 2. Create and edit LED profiles
- 3. Reset to default view
- 4. Enable and disable LEDs



On launch of the application, the current state of the LEDs is displayed in the UI. Every LED zone will load the default supported color on the hardware LED. The following table describes the supported options.

4.2.1 Supported LED zones, colors, style and indicators

LED Zone	Supported States	Supported Colors	Indicators	Supported Style
	SO (Working) State	Blue Amber	Power StateDisk ActivityDisable	 Solid Breathing (Frequency 1-10) Strobing (Frequency 1-10) Pulsing (Frequency 1-10)
Power Button	Modern Standby	• Blue • Amber	Power StateDisk ActivityDisable	 Solid Breathing (Frequency 1-10) Strobing (Frequency 1-10) Pulsing (Frequency 1-10)
HDD	N/A	 Red Orange Yellow Green Blue Indigo Violet White 	 Power State Disk Activity Disable 	Off to On On to Off

4.2.2 **LED Profiles**

User can create and load LED profiles based on different LED color, style and indicators as supported on the system. Click on Edit button to create, edit and delete profiles.



4.2.3 **Default states**

On click of Reset button, LED zones default to its original settings:

- Power Button: Power State
 - o SO (Working) State Blue, Solid
 - o Modern Standby Blue, Breathing, Frequency value 10
- **HDD**: HDD Activity
 - o Orange, Off to On

4.2.4 Enable and Disable LEDs

User can toggle the Enable LEDs to turn the LED lights On or Off on the system. LEDs are enabled by default.

4.2.5 **LED Behavior**

Restart	Hibernate	Shutdown	Hard Boot/AC Power Removed
Off: All LEDs Off	Off: Power LED Off, HDD On	Off : Power LED Off , HDD On	Off: All LEDs Off
On: All LEDs On (Default State)	On: All LEDs On (Default State)	On: All LEDs On (Default State)	On : All LEDs On (Default State)

4.3 Performance Tuning

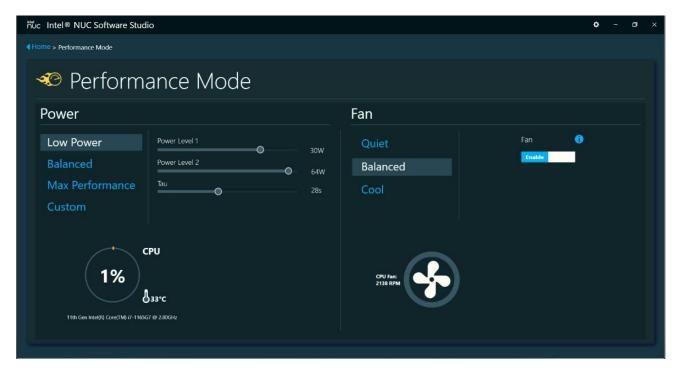
This feature allows the end user to customize Fan mode for a given performance mode.

Supported Performance modes are:

- 1. Balanced
- 2. Low Power
- 3. Max Performance
- 4. Custom enabled if power settings are customized through BIOS.

Supported Fan modes are:

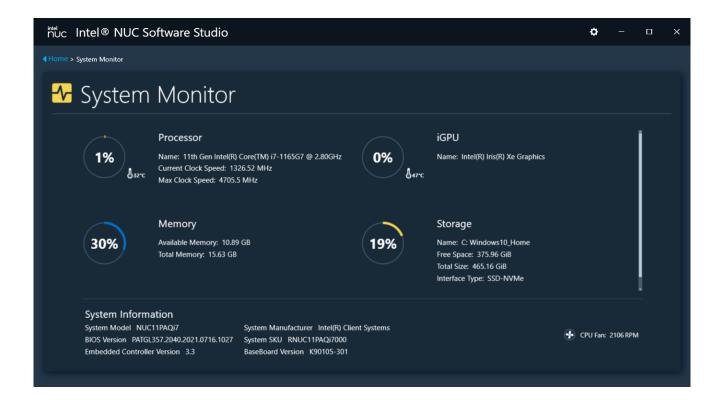
- 1. Quiet
- 2. Balanced
- 3. Cool



4.4 System Monitor

System Monitor displays the real time indication of the hardware's system settings. The System Monitor's data includes:

- CPU
- iGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System Fan speed



4.5 Known Errata

- 1. Performance mode is not retained following system restart
- 2. HDD LED color settings are note retained

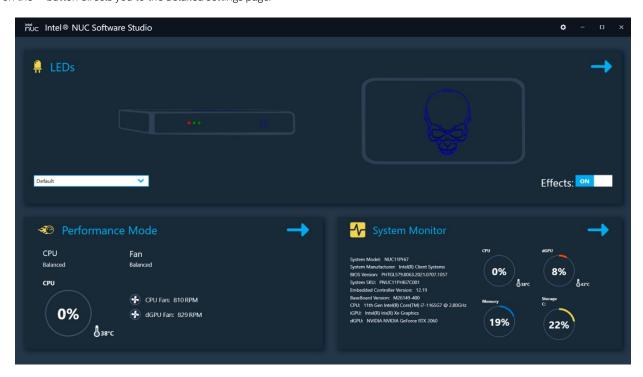
5 Intel® NUC 11 Enthusiast

Intel® NUC Software Studio supports the below features on Intel® NUC 11 Enthusiast Kit:

- 1. LED Manager
- 2. Performance Tuning
- 3. System Monitor

5.1 Home Screen

On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



5.2 LED Manager

This feature allows the end user to control the programmable LEDs on the system. Supported options are:

- 1. Change LED zone colors, style and indicator type
- 2. Create and edit LED profiles
- 3. Reset to default view
- 4. Enable and disable LEDs



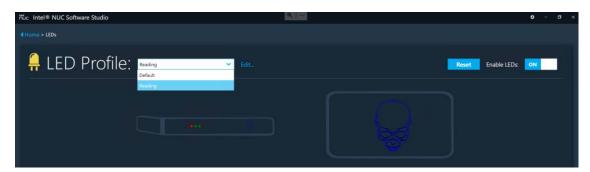
On launch of the application, the current state of the LEDs is displayed in the UI. Every LED zone will load the default supported color on the hardware LED. The following table describes the supported options.

5.2.1 Supported LED zones, colors, style and indicators

LED Zones	Supported States	Supported Colors	Indicators	Supported Style
Power Button Skull Front LED1 Front LED2	S0 (Working) StateModern Standby	 Red Orange Yellow Green Blue Indigo Violet 	Power State Power Limit Disk Activity	 Solid Breathing (Frequency 1-10) Strobing (Frequency 1-10) Pulsing (Frequency 1-10) Off to On On to Off
Front LED3		• White	Ethernet Activity Disable	N/A

5.2.2 **LED Profiles**

User can create and load LED profiles based on different LED color, style and indicators as supported on the system. Click on Edit button to create, edit and delete profiles.



5.2.3 **Default states**

On click of Reset button, LED zones default to its original settings:

- Power Button and Skull: Power State
 - o SO (Working) State Blue, Solid
 - o Modern Standby Blue, Breathing
- Front LED 1: Disk Activity
 - o Red, Off to On
- Front LED 2: Ethernet Activity
 - o Green
- Front LED 3: Power Limit
 - o Green to Red

5.2.4 Enable and Disable LEDs

User can toggle the Enable LEDs to turn the LED lights On or Off on the system. LEDs are enabled by default.

5.2.5 **LED Behavior**

Restart	Hibernate	Shutdown	Hard Boot/AC Power Removed
All LEDs On during restart, retain	Off: Power LED Off, HDD On	Off : Power All LEDs Off	Off: All LEDs Off
previous LED state	On: All LEDs On (Previous State))	On : All LEDs On (Default State)	On : All LEDs On (Default State)

5.3 Performance Mode

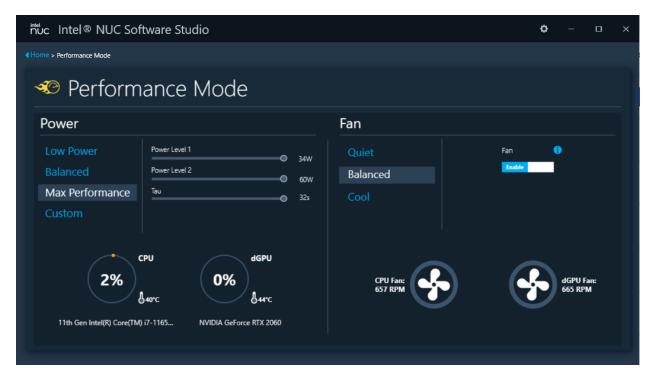
This feature allows the end user to customize power settings and fan settings.

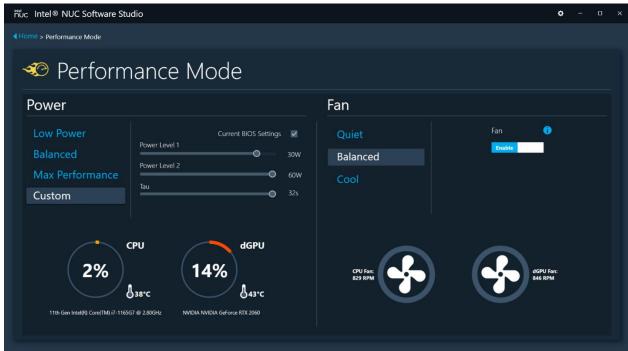
Supported Performance modes are:

- 1. Balanced
- 2. Low Power
- 3. Max Performance
- 4. Custom enabled if BIOS power settings are customized and saved before installing the NSS app.

Supported Fan modes are:

- 1. Quiet
- 2. Balanced
- 3. Cool

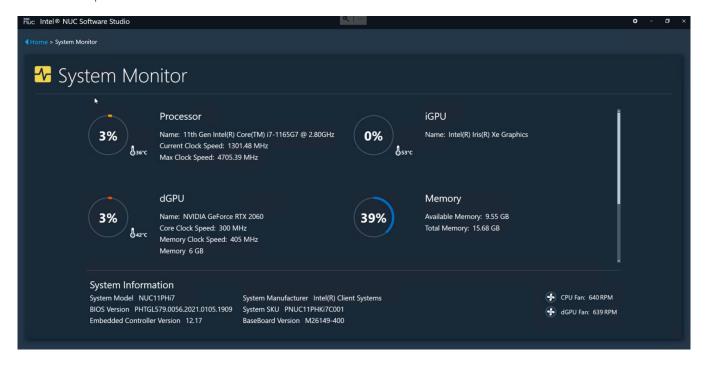




5.4 System Monitor

System Monitor displays the real time indication of the hardware's system settings. The System Monitor's data includes:

- CPU
- iGPU
- dGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System fan speed
- dGPU fan speed



6 Intel® NUC 12 Enthusiast

Intel® NUC Software Studio supports the below features on Intel® NUC 11 Enthusiast Kit:

- 1. LED Manager
- 2. Performance Tuning
- 3. System Monitor

6.1 Home Screen

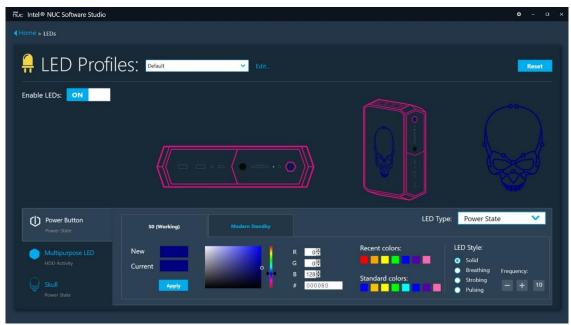
On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



6.2 LED Manager

This feature allows the end user to control the programmable LEDs on the system. Supported options are:

- Change LED zone colors, style and indicator type
- Create and edit LED profiles
- Reset to default view
- Enable and disable LEDs



On launch of the application, the current state of the LEDs is displayed in the UI. Every LED zone will load the default supported color on the hardware LED. The following table describes the supported options.

6.2.1 Supported LED zones, colors, style and indicators

LED Zones	Supported States	Supported Colors	Indicators	Supported Style
Power Button Multipurpose LED	SO (Working) StateModern Standby	RedOrangeYellowGreenCyan	Power StatePower LimitDisk Activity	 Solid Breathing (Frequency 1-10) Strobing (Frequency 1-10) Pulsing (Frequency 1-10) Disk Activity: Off to On
Skull		 Blue Indigo (appears Purple) Violet (appears Pink) 	Alexa Activity (refer to Alexa LED section 6.2.6)	Disk Activity: On to OffAlexa: OnAlexa: Off
			Ethernet ActivityDisable	N/A

6.2.2 **LED Profiles**

User can create and load LED profiles based on different LED color, style and indicators as supported on the system. Click on Edit button to create, edit and delete profiles.

6.2.3 **Default states**

On click of Reset button, LED zones default to its original settings:

- Power Button and Skull: Power State
 - o SO (Working) State Blue, Solid
 - o Modern Standby Blue, Breathing
- Multipurpose: Disk Activity
 - o Green, Off to On

6.2.4 Enable and Disable LEDs

User can toggle the Enable LEDs to turn the LED lights On or Off on the system. LEDs are enabled by default.

6.2.5 **LED Behavior**

Restart	Hibernate	Shutdown	Hard Boot/AC Power Removed
All LEDs On during restart, retain	Off: Power LED Off, HDD On	Off : Power All LEDs Off	Off: All LEDs Off
previous LED state	On: All LEDs On (Previous State))	On: All LEDs On (Default State)	On: All LEDs On (Default State)

6.2.6 Alexa LED (RGB)

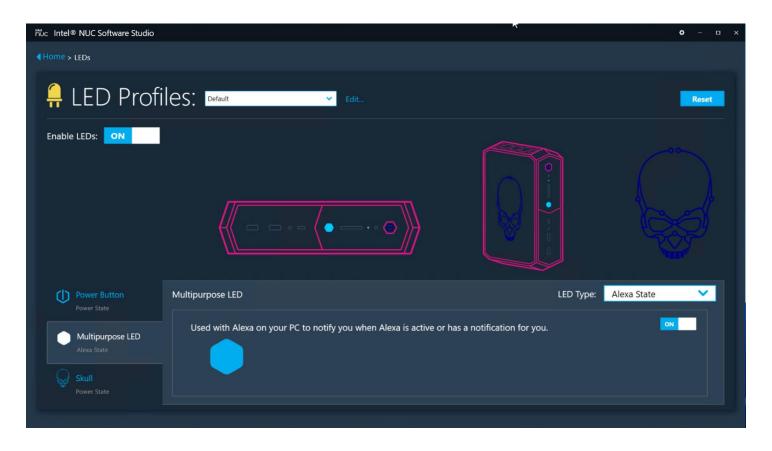
The Multipurpose LED can be set to Alexa State to notify when Alexa is active. Alexa effects can be enabled or disabled using the toggle button, this feature is set to ON by default.

The Multipurpose LED displays different effects based on the state of the Alexa for PC application.

The Alexa Light Bar supports the following Alexa application features:

- Idle No Alexa voice or LED Light Bar activity
- Listening Alexa app listening sound and animation, LED animation
- Thinking Alexa app thinking sound and animation, LED animation
- Speaking Alexa app speaks (ex: today's weather, tell me a joke, play music) and animation, LED animation
- Mic mute Windows mic mute: Alexa app red bar, LED red*
- Do not disturb Enable/Disable

^{*}Note: Alexa LED will display red when the microphone has been muted using the Windows Sound Settings control panel.



6.3 Performance Mode

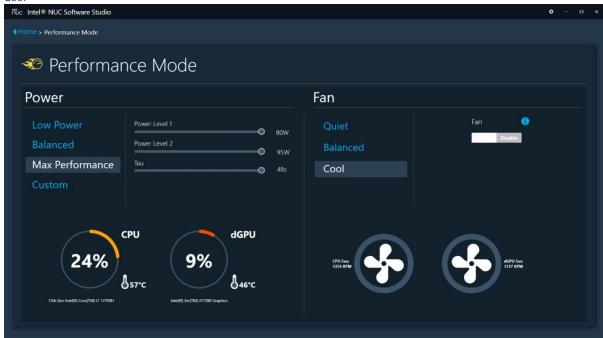
This feature allows the end user to customize power settings and fan settings.

Supported Performance modes are:

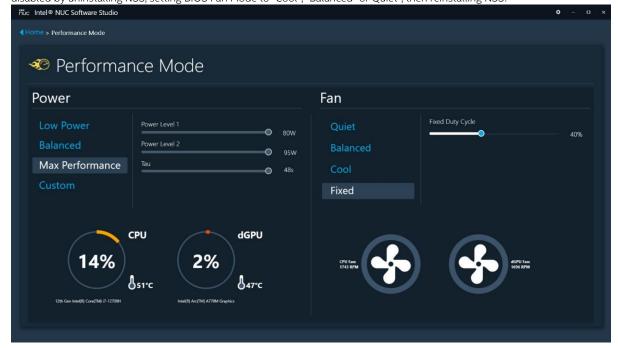
- Low Power
- Balanced
- Max Performance
- Custom enabled if BIOS power settings are customized and saved before installing the NSS app.

Supported Fan modes:

- Quiet
- Balanced
- Cool



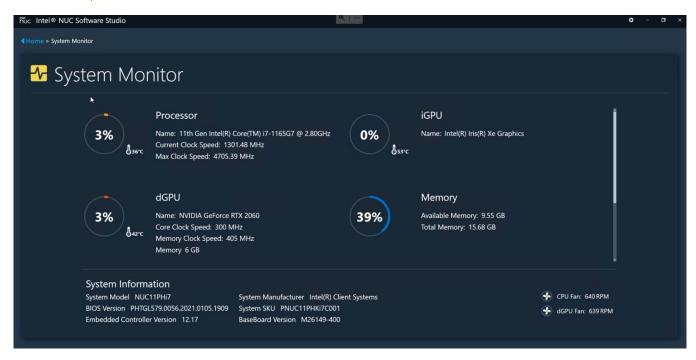
- Fixed enabled if BIOS Fan settings are customized to "Fixed Fan Mode" and saved before installing the NSS app. Fixed Mode is disabled by uninstalling NSS, setting BIOS Fan Mode to "Cool", "Balanced" or Quiet", then reinstalling NSS.
- Custom enabled if BIOS Fan settings are customized to "Custom Fan Mode" and saved before installing the NSS app. Custom Mode is disabled by uninstalling NSS, setting BIOS Fan Mode to "Cool", "Balanced" or Quiet", then reinstalling NSS.



6.4 System Monitor

System Monitor displays the real time indication of the hardware's system settings. The System Monitor's data includes:

- CPU
- iGPU
- dGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System fan speed
- dGPU fan speed



6.5 Known Errata

1. User must restart the NSS app after downloading the Alexa app, in order to use Alexa

7 Intel® NUC 11 Extreme, Intel® NUC 12 Extreme

Intel® NUC Software Studio supports the below features on Intel® NUC 11 Extreme and Intel® NUC 12 Extreme Kits:

- 1. LED Manager
- 2. Performance Tuning
- 3. System Monitor

7.1 Home Screen

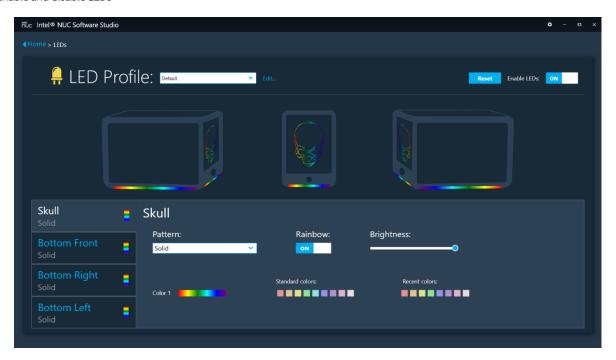
On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



7.2 LED Manager

This feature allows the end user to control the programmable LEDs on the system. Supported options are:

- 1. Change LED zone pattern, color, brightness and frequency
- 2. Create and edit LED profiles
- 3. Reset to default view
- 4. Enable and disable LEDs



On launch of the application, the current state of the LEDs is displayed in the UI. Every LED zone will load the default supported color on the hardware LED.

7.2.1 Supported LED zones

Intel® NUC 11 Extreme Kit supports the following 4 LED zones:

- 1. Skull
- 2. Bottom Front
- 3. Bottom Right
- 4. Bottom Left

Supported Arduino LED patterns are described in the table below:

Pattern	Description	Color(s)	Frequency	Brightness
Off	LED zone turned off	N/A	N/A	N/A
Solid	Allon	1 Color (Default: Red)	0-5	0 – 5
30tiu	All Off	Rainbow (Default)	Default: 3	Default: 5
Pulse	Mono-color hard flash	1 Color	0 – 5	0 – 5
ruise	Mono-color riard itasii	Rainbow (Default)	Default: 3	Default: 5
Breathing	Mono-color fading flash	1 Color	0 – 5	0 – 5
breatiling	Mono-color rading mash	Rainbow (Default)	Default: 3	Default: 5
Strobing	Mono-color flash with fade out	1 Color	0 – 5	0 – 5
Strobing		Rainbow (Default)	Default: 3	Default: 5
Pulse train 1	Color pulse from L to H	3 Colors	0 – 5	0 – 5
ruise trairi i		Red, Green, Blue	Default: 3	Default: 5
Pulse train 2	Color pulse from H to L	3 Colors	0 – 5	0 – 5
Pulse train 2		Red, Green, Blue	Default: 3	Default: 5
Pulse train 3	Bouncing color pulse	3 Colors	0 – 5	0 – 5
ruise trairi 3	Bounding color pulse	Red, Green, Blue	Default: 3	Default: 5
Rainbow 1	Synchronized rainbow train on all segments	Rainbow train	N/A	0 – 5
NairibOW I	Reset to default after change to other pattern	Nambow train	IN/A	Default: 5

7.2.2 **LED Profiles**

User can create and load LED profiles based on different LED color, style and indicators as supported on the system. Click on Edit button to create, edit and delete profiles.



7.2.3 Enable and Disable LEDs

User can toggle the Enable LEDs to turn the LED lights On or Off on the system. LEDs are enabled by default.

7.2.4 **LED Behavior**

Restart	Hibernate	Shutdown	Hard Boot/AC Power Removed
All LEDs On during restart, retain	Off: Power LED Off, HDD On	Off : Power All LEDs Off	Off: All LEDs Off
previous LED state	On: All LEDs On (Previous State))	On: All LEDs On (Default State)	On: All LEDs On (Previous State)

7.3 Performance Tuning

This feature allows the end user to customize power settings and fan settings.

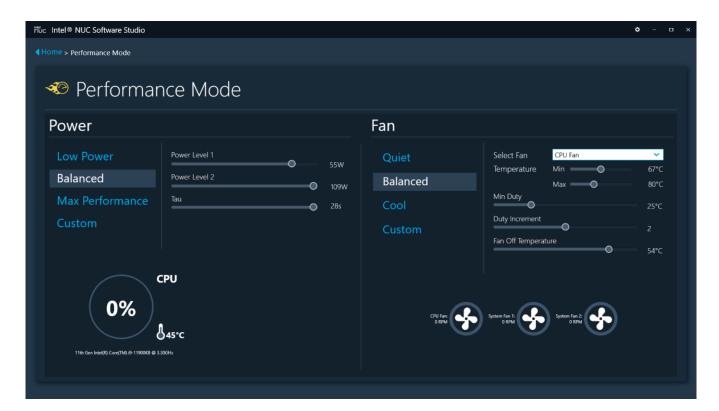
Supported Performance modes are:

- 1. Balanced
- 2. Low Power
- 3. Max Performance

4. Custom – enabled if power settings are customized through BIOS.

Supported Fan modes for CPU fans are:

- 1. Quiet
- 2. Balanced
- 3. Cool

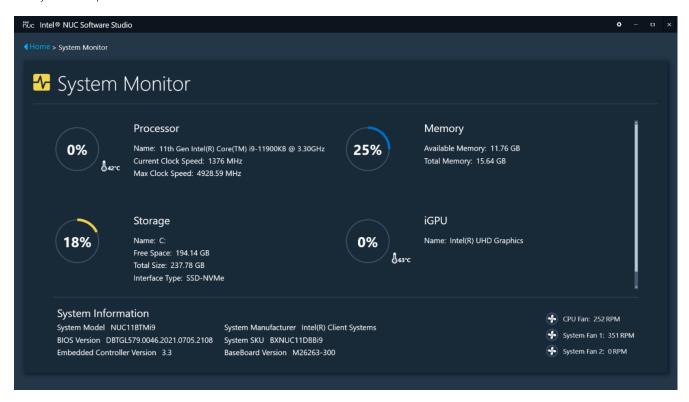




7.4 System Monitor

System Monitor displays the real time indication of the hardware's system settings. The System Monitor's data includes:

- CPU
- iGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System Fan speed



7.5 Known Errata

1. On Intel® NUC 11 Extreme, Home Screen Summary shows a placeholder for iGPU with values = 0, if the Intel integrated graphics (iGPU) driver is not installed

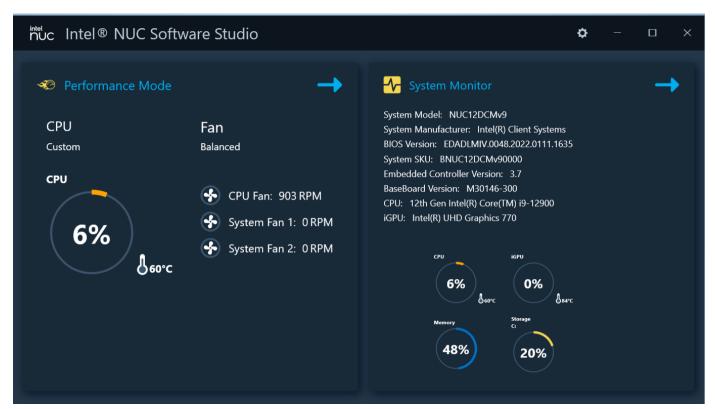
8 Intel® NUC 12 Pro X

Intel® NUC Software Studio supports the below features on Intel® NUC 12 Pro X Kit:

- 1. Performance Tuning
- 2. System Monitor

8.1 Home Screen

On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



8.2 Performance Tuning

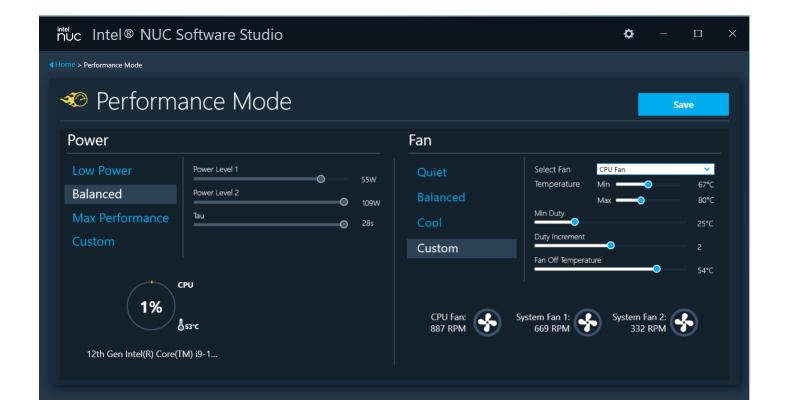
This feature allows the end user to customize Fan mode for a given performance mode.

Supported Performance modes are:

- 1. Balanced
- 2. Low Power
- 3. Max Performance
- 4. Custom enabled if power settings are customized through BIOS.

Supported Fan modes are:

- 1. Quiet
- 2. Balanced
- 3. Cool



8.3 System Monitor

System Monitor displays the real time indication of the hardware's system settings.

The System Monitor's data includes:

- CPU
- iGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System Fan speed



9 Intel® NUC 13 Extreme / Intel® NUC 13 Extreme Kits

Intel® NUC Software Studio supports the below features on Intel® NUC 13 Extreme and Intel® NUC 13 Extreme Kits:

- 1. LED Manager
- 2. Performance Tuning
- 3. System Monitor

9.1 Home Screen

On launch of the application, the home screen displays a summary of current settings. User can modify the supported settings from this page. Clicking on the \rightarrow button directs you to the detailed settings page.



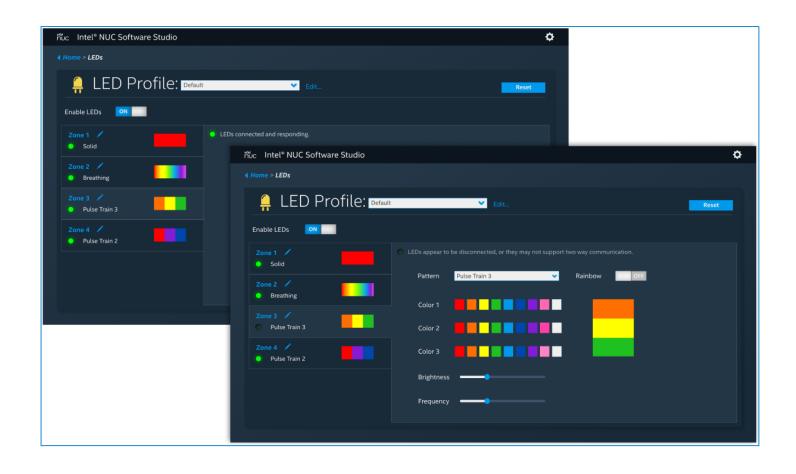
9.2 LED Manager

This feature allows the end user to control the programmable LEDs on the system. Supported options are:

- 1. Change LED zone pattern, color, brightness and frequency
- 2. Create and edit LED profiles
- 3. Reset to default view
- 4. Enable and disable LEDs

On launch of the application, the current state of the LEDs is displayed in the UI. Every LED zone will load the default supported color on the hardware LED.

•••



9.2.1 Supported LED zones

Intel® NUC 13 Extreme Kit supports 4 LED zones which are controlled through the ENE interface. Each zone's name is editable.

When LEDs are detected for a zone, a green LED icon is displayed by that zone name; and when LEDs are not detected, a gray, semi-transparent icon is displayed.

When LEDs are auto detected for a selected Zone, the message "LEDs connected and responding" is displayed in that LED Zone's UI.

When LEDs are NOT auto detected for a selected Zone, the message "LEDs appear to be disconnected, or they may not support two way communication" is displayed in that LED Zone's UI.

Supported LED patterns are described in the table below:

Pattern	Description	Color(s)	Frequency	Brightness
Off	LED zone turned off	N/A	N/A	N/A
Solid	All on	1 Color (Default: Red)	0-5	0 – 5
		Rainbow (Default)	Default: 3	Default: 5
Pulse	Mono-color hard flash	1 Color	0 – 5	0 – 5
		Rainbow (Default)	Default: 3	Default: 5
Breathing	Mono-color fading flash	1 Color	0 – 5	0 – 5
		Rainbow (Default)	Default: 3	Default: 5
Strobing	Mono-color flash with fade out	1 Color	0 – 5	0 – 5
		Rainbow (Default)	Default: 3	Default: 5
Pulse train 1	Color pulse from L to H	3 Colors	0 – 5	0 – 5
		Red, Green, Blue	Default: 3	Default: 5
Pulse train 2	Color pulse from H to L	3 Colors	0 – 5	0 – 5
		Red, Green, Blue	Default: 3	Default: 5
Pulse train 3	Bouncing color pulse	3 Colors	0 – 5	0 – 5
		Red, Green, Blue	Default: 3	Default: 5
Rainbow 1	Synchronized rainbow train on all segments	Rainbow train	N/A	0 – 5
	Reset to default after changing to another pattern			Default: 5

9.2.2 **LED Profiles**

User can create and load LED profiles based on different LED color, style and indicators as supported on the system. Click on Edit button to create, edit and delete profiles.

9.2.3 Enable and Disable LEDs

User can toggle the Enable LEDs to turn the LED lights On or Off on the system. LEDs are enabled by default.

9.2.4 LED Behavior

Restart	Hibernate	Shutdown	Hard Boot/AC Power Removed
All LEDs On during restart, retain	Off: Power LED Off	Off: Power All LEDs Off	Off: All LEDs Off
previous LED state	On: All LEDs On (Previous State))	On: All LEDs On (Default State)	On: All LEDs On (Previous State)

9.3 Performance Tuning

This feature allows the end user to customize power settings and fan settings.

Supported Power modes are:

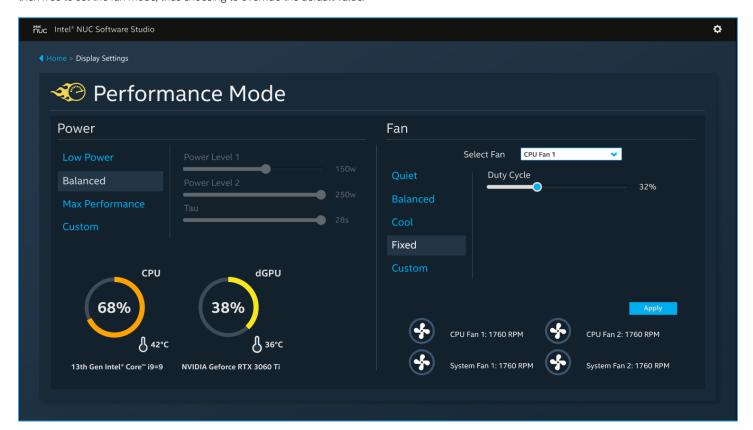
- 1. Balanced
- 2. Low Power
- 3. Max Performance
- 4. Custom enabled if power settings are customized through BIOS.

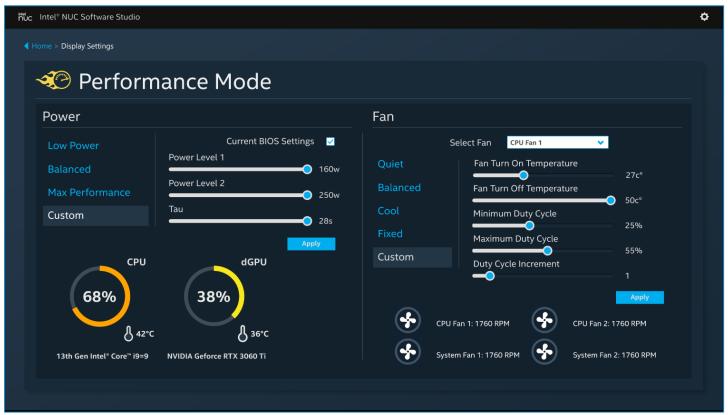
Supported Fan modes for CPU fans are:

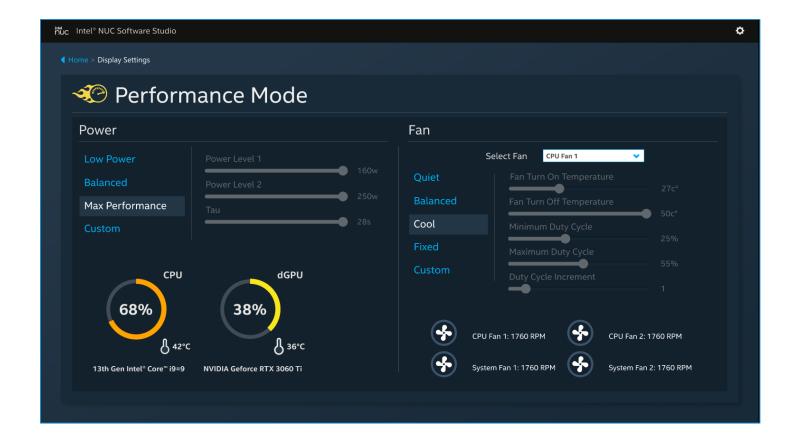
- 1. Ouiet
- 2. Balanced
- 3. Cool
- 4. Fixed
- 5. Custom

Apply button will be used for applying any change made on "Custom" settings, as well as "Fixed" Fan Mode. All other settings are applied on mode selection

"Cool" fan mode is the only mode that gets automatically set when "Power Mode" "Max Performance" get selected. After which, the application user is then free to set the fan mode, thus choosing to override the default value.







9.4 System Monitor

System Monitor displays the real time indication of the hardware's system settings. The System Monitor's data includes:

- CPU
- iGPU
- Memory
- Storage
- System information like Model, Manufacturer, BIOS and EC version
- System Fans

