# Network interfaces of Nuki products

## Introduction

The main aim of this document is to properly document all relevant network interfaces of all Nuki products within the Nuki ecosystem.

## Interface matrix

| Nuki Product | Bluetooth | Wi-Fi | Thread |
|---|---|---|---|
| Smart Lock 1.0<br>Smart Lock 2.0<br>Smart Lock 3.0<br>Smart Lock (4th Generation)<br>Smart Door<br>Opener | x | | |
| Smart Lock 3.0 Pro | x | x | |
| Smart Lock Pro (4th Generation)<br>Smart Lock Go<br>Smart Lock Pro (5th Generation)<br>Smart Lock Ultra | x | x | x |
| Bridge | x | x | |
| Fob<br>Keypad<br>Keypad 2<br>Door Sensor | x | | |

# Bluetooth

## Implemented Bluetooth Standard

- Bluetooth Low Energy; IEEE 802.15.1; 2.4 GHz ISM band
- Antenna: internal RF ceramic chip antenna
- Frequency range: 2402 MHz - 2480 MHz
- Max. transmission power: 10 dBm (10 mW)

## Services and Use Cases

### Condition as supplied to the customer

A newly delivered Nuki product operates in Deep Sleep mode. This is a power-saving state where the entire Bluetooth interface is disabled. Consequently, the device does not broadcast any information and cannot be connected to from an external source.

Note: This applies to all Nuki products!

### Initial setup flow

To initiate the initial setup, the user must wake the device from Deep Sleep mode. The Nuki App guides the user to press a physical button on the product to activate its Bluetooth module and begin advertising its services. The Nuki App then scans for Nuki products via Bluetooth and starts the setup process, which the user completes by following the app's instructions.

Note: This basic flow applies to all Nuki products!

### Main use cases

Once the initial setup is complete, the user can operate their Nuki product based on its category and intended purpose. Regardless of how the product is used, all Bluetooth communication is encrypted end-to-end, ensuring the highest level of security.

- **Nuki Actors (Smart Lock / Smart Door / Opener):** These devices can be operated locally using the Nuki App via Bluetooth, or through Nuki Accessories (listed below). Additionally, they can be operated using the physical button on the product, which requires no Bluetooth communication.
- **Nuki Accessories (Fob, Keypad, Keypad 2):** These accessories use physical input methods (buttons or the Keypad 2's fingerprint scanner) to initiate encrypted Bluetooth communication with a paired Nuki Actor.
- **Nuki Door Sensor:** The Door Sensor transmits encrypted Bluetooth messages to its paired Nuki Smart Lock, containing the current door state (open or closed).

- **Nuki Bridge:** The Nuki Bridge acts as a relay between a Nuki Actor and the Nuki Server. It forwards encrypted commands between these two entities without the ability to decrypt the messages itself.

### Maintenance and Reset

To delete any existing connection information (such as app pairings, accessory pairing information, device settings) all Nuki products can be easily factory reset by using the Nuki App. The Nuki App features a dedicated entry called ***Factory Reset*** in the Help section, which contains step-by-step instructions for performing the factory reset for every Nuki device.

# Wi-Fi

## Implemented Wi-Fi Standard

- WLAN; IEEE802.11 b/g/n; 2.4 GHz
- WLAN antenna: 2.4 GHz ceramic antenna
- WLAN frequency range: 2412 MHz - 2484 MHz
- WLAN max. transmission power: 17 dBm (50 mW)

## Services and Use Cases

### Condition as supplied to the customer

A newly delivered Nuki product operates in Deep Sleep mode. This is a power-saving state where the entire Wi-Fi interface is disabled. Consequently, the device does neither broadcast any information nor is connected to any given Wi-Fi network in range.

Note: This applies only to all Wi-Fi-capable Nuki products!

### Initial setup flow

To initiate the Wi-Fi setup, the Smart Lock has to be first set up as described above. In order to set up the Wi-Fi connection, the user has to be connected with the Nuki App and, if required, has to enter the PIN of the device, which is mandatory for all newer generation devices (Ultra, Pro, Go).
Based on that, the user is guided by the Nuki App to perform a Wi-Fi scan and to connect to the preferred Wi-Fi network in range by selecting the corresponding SSID (and by entering the password if required). From that point onwards the Nuki Smart Lock is connected to a Wi-Fi network and is using this interface to connect to the Nuki Server for further data exchange.

### Main use-case: Remote Access

Every Nuki Smart Lock with integrated Wi-Fi capabilities has the ability to be controlled and maintained remotely, which is achieved by utilizing this network interface. To do so, the Nuki App sends its commands via the Nuki Server, which then forwards the requests to the Smart Lock via Wi-Fi—instead of using the direct path via Bluetooth, which is obviously not available when not being nearby the Smart Lock device. This obviously creates an extended use case, as the user gets the ability to control (i.e. lock, unlock, open) and maintain (i.e. set/delete users and keypad codes, changing settings, checking activity log) the Smart Lock also when not being nearby the device.

### Maintenance and Reset

Hereby the same procedure applies as described above, as performing a factory reset will delete also all stored Wi-Fi connection related information (SSID, password) and disables the module to its initial state.

# Thread

## Implemented Thread Standard

- Thread; IEEE 802.15.4; 2.4 GHz ISM band
- Antenna: internal RF ceramic chip antenna
- Frequency range: 2405 MHz - 2480 MHz Thread
- Max. transmission power: 10 dBm (10 mW)

## Services and Use Cases

### Condition as supplied to the customer

A newly delivered Nuki product operates in Deep Sleep mode. This is a power-saving state where the entire Thread interface is disabled. Consequently, the device does neither broadcast any information nor is connected to any given Thread network in range.

Note: This applies only to all Matter-via-Thread-capable Nuki products!

### Initial setup flow

The Thread interface on any Matter-capabale Smart Lock is always bound to Matter and the integration of a Smart Lock into a Matter ecosystem. Thus, to initiate the Matter via Thread setup, the Smart Lock has to be first set up as described above. In order to perform the Matter pairing, the user has to be connected with the Nuki App and, if required, has to enter the PIN of the device, which is mandatory for all newer generation devices (Ultra, Pro, Go).
Based on that, the user is guided by the Nuki app to enable Matter (and thus the Thread interface) and to perform the Matter pairing via a given ecosystem (e.g. Apple Home, Google

Home, Samsung SmartThings, Amazon Alexa, Home Assistant), which takes care about adding the device into a given Thread network and also lists the device as part of the Matter ecosystem.

## Main use-case: Integration into a Matter ecosystem

Once a Smart Lock has been paired to a Matter ecosystem, the device is listed in the ecosystem-vendor-app and the main use case (locking and unlocking a door) is available for the user. The availability is dependent on the vendor and may thus vary depending on the available capabilities of the ecosystem.

## Secondary use-case: Remote Access

Every Nuki Smart Lock with Matter via Thread capabilities has the ability to be controlled and maintained remotely, which is achieved by utilizing this network interface. Prerequisite to this is, that the available Thread border router supports NAT64 in order to connect a paired Smart Lock to the Internet. To do so, the Nuki App sends its commands via the Nuki Server, which then forwards the requests to the Smart Lock via Thread—instead of using the direct path via Bluetooth, which is obviously not available when not being nearby the Smart Lock device. This obviously creates an extended use case, as the user gets the ability to control (i.e. lock, unlock, open) and maintain (i.e. set/delete users and keypad codes, changing settings, checking activity log) the Smart Lock also when not being nearby the device.

## Maintenance and Reset

Hereby the same procedure applies as described above, as performing a factory reset will delete also all stored Thread connection related information and disables the module to its initial state.