

# Nuki Smart Lock API

V2.1

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# 1. Introduction

This document describes the bluetooth protocol used by the Nuki Smart Lock, the encryption functions in use and provides some communication examples.

Check for the latest version of this document at our [Developer Platform](#).

## 2. Bluetooth GATT services

The Smartlock provides the following bluetooth GATT services.

### 2.1 Keyturner Initialization Service

Service-UUID: a92ee000-5501-11e4-916c-0800200c9a66

This service has no characteristics. It will only be used for advertising the uninitialized state of a Nuki Smart Lock.

### 2.2 Keyturner Pairing Service

Service-UUID: a92ee100-5501-11e4-916c-0800200c9a66

#### 2.2.1 General Data Input Output characteristic

The General Data Input Output characteristic is used to send data to or retrieve data from the Nuki Smart Lock. The central device can retrieve data manually by enabling indications in the client configuration. The client configuration will not be stored over subsequent connections.

Farther the central device can send data to the Nuki Smart Lock by using the GATT Write (Long) Characteristic Value sub-procedure.

All data sent to or read from this characteristic must be unencrypted.

## Value

UUID: a92ee101-5501-11e4-916c-0800200c9a66

Type: uint8 array (max size is 20 Bytes)

Properties: write (long), indicate

Client configuration

Properties: write

## 2.3 Keyturner Service

Service-UUID: a92ee200-5501-11e4-916c-0800200c9a66

### 2.3.1 General Data Input Output characteristic

The General Data Input Output characteristic is used to retrieve data from the Nuki Smart Lock. The central device can retrieve data by enabling indications in the client configuration. The client configuration will not be stored over subsequent connections.

Farther the central device can send data to the Nuki Smart Lock by using the GATT Write (Long) Characteristic Value sub-procedure.

## Value

UUID: a92ee201-5501-11e4-916c-0800200c9a66

Type: uint8 array (max size is 20 Bytes)

Properties: write (long), indicate

Client configuration

Properties: write

### 2.3.2 User-Specific Data Input Output characteristic

The User-Specific Data Input Output characteristic is used to send data to or retrieve data from the Nuki Smart Lock. The central device can retrieve data by enabling indications in the client configuration. The client configuration will not be stored over subsequent connections.

Farther the central device can send data to the Nuki Smart Lock by using the GATT Write (Long) Characteristic Value sub-procedure.

All data sent to or read from this characteristic must be encrypted with the shared secret key of the connected user.

**Value**

UUID: a92ee202-5501-11e4-916c-0800200c9a66

Type: uint8 array (max size is 20 Bytes)

Properties: write (long), indicate

Client configuration

Properties: write

## 3. Message Format

### 3.1 Terminology

ADATA (additional data) data that is not encrypted (e.g. protocol data)

PDATA (plaintext) data to be encrypted and authenticated

ADATA:

- nonce (number only used once, NEVER reused with same secret key)
- authorization identifier
- message length

PDATA:

- command identifier
- payload data depending on command
- CRC

### 3.2 Transfer format for encrypted messages

ADATA			PDATA			
nonce	authorization identifier	message length	authorization identifier	command identifier	payload	CRC
24 Byte	4 Byte	2 Byte	4 Byte	2 Byte	n Byte	2 Byte
unencrypted	unencrypted	unencrypted	encrypted			

### 3.3 Transfer format for unencrypted messages

PDATA		
command identifier	payload	CRC
2 Byte	n Byte	2 Byte
unencrypted		



## 3.4 CRC calculation

Algorithm: CRC-CCITT

Polynomial representation: normal (0x1021)

Initial remainder: 0xFFFF

## 4. Encryption

The Nuki Smartlock uses the NaCl Cryptography Toolbox (<http://nacl.cr.yp.to/>) to encrypt the transferred data.

The following functions are needed to communicate with the Nuki Smartlock:

### 4.1 The Diffie-Hellman key function dh1

```
crypto_scalarmult_curve25519(s,sk,pk)
```

Necessary for the initial key exchange between the Nuki Smartlock and the client device.

### 4.2 The key derivation function kdf1

```
static const unsigned char _0[16];
```

```
static const unsigned char sigma[16] = "expand 32-byte k";
```

```
crypto_core_hsalsa20(k,_0,s,sigma)
```

Used to derive a long term secret key out of the shared key calculated by dh1

### 4.3 The authentication function h1

HMAC-SHA256

Used to calculate the authenticator during the authorization process between the Nuki Smartlock and the client device.

## 4.4 The encryption function e1

crypto\_secretbox\_xsalsa20poly1305 (c,m,mlen,n,k)

Used to encrypt any data once the authorization process has been completed

## 5. Commands

Command identifier	Command
0x0001	<a href="#">Request Data</a>
0x0003	<a href="#">Public Key</a>
0x0004	<a href="#">Challenge</a>
0x0005	<a href="#">Authorization Authenticator</a>
0x0006	<a href="#">Authorization Data</a>
0x0007	<a href="#">Authorization-ID</a>
0x0008	<a href="#">Remove User Authorization</a>
0x0009	<a href="#">Request Authorization Entries</a>
0x000A	<a href="#">Authorization Entry</a>
0x000B	<a href="#">Authorization Data (Invite)</a>
0x000C	<a href="#">Keyturner States</a>
0x000D	<a href="#">Lock Action</a>
0x000E	<a href="#">Status</a>
0x000F	<a href="#">Most Recent Command</a>
0x0010	<a href="#">Openings Closings Summary</a>
0x0011	<a href="#">Battery Report</a>

0x0012	Error Report
0x0013	Set Config
0x0014	Request Config
0x0015	Config
0x0019	Set Security PIN
0x001A	Request Calibration
0x001D	Request Reboot
0x001E	Authorization-ID Confirmation
0x001F	Authorization-ID (Invite)
0x0020	Verify Security PIN
0x0021	Update Time
0x0025	Update User Authorization
0x0027	Authorization Entry Count
0x0031	Request Log Entries
0x0032	Log Entry
0x0033	Log Entry Count
0x0034	Enable Logging
0x0035	Set Advanced Config
0x0036	Request Advanced Config
0x0037	Advanced Config
0x0039	Add Time Control Entry

0x003A	Time Control Entry ID
0x003B	Remove Time Control Entry
0x003C	Request Time Control Entries
0x003D	Time Control Entry Count
0x003E	Time Control Entry
0x003F	Update Time Control Entry
0x0041	Add Keypad Code
0x0042	Keypad Code ID
0x0043	Request Keypad Codes
0x0044	Keypad Code Count
0x0045	Keypad Code
0x0046	Update Keypad Code
0x0047	Remove Keypad Code
0x0048	Keypad Action
0x0100	Simple Lock Action

Authenticator	Calculated for all parts of a table (including the parts with dashed border)
solid border	This row is part of the transferred message.
dashed border	This row is not part of the transferred message, but included in the calculation of the authenticator.

## Request Data (0x0001)

Name	Requirement	Format	Additional Information
Command identifier	M	uint16	The identifier of the command to be executed by the Smart Lock.
Additional Data	M	uint8[n]	Depending on the command identifier additional data of length n will be added or not. The format of the additional data is described in the command specification.

## Public Key (0x0003)

Name	Requirement	Format	Additional Information
Public Key	M	uint8[32]	The public key of the sender.

The Request Data command with the command identifier of the Public Key command initiates the authorization process of a new Nuki App or Nuki Bridge.

## Challenge (0x0004)

Name	Requirement	Format	Additional Information
Nonce nK	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

## Authorization Authenticator (0x0005)

Name	Requirement	Format	Additional Information
Authenticator	M	uint8[32]	The authenticator of the sender for the current message.
Public-Key A/B/F	M	uint8[32]	The public key of the Nuki App, Nuki Bridge or Nuki Fob to be authorized.
Public Key K	M	uint8[32]	The public key of the Smart Lock..
Nonce nK	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

## Authorization Data (0x0006)

Name	Requirement	Format	Additional Information
Authenticator	M	uint8[32]	The authenticator of the sender for the current message.
ID Type	M	uint8	The type of the ID to be authorized.  0 ... App 1 ... Bridge 2 ... Fob 3 ... Keypad

App-ID/Bridge-ID/Fob-ID	M	uint32	The ID of the Nuki App, Nuki Bridge or Nuki Fob to be authorized.
Name	M	uint8[32]	The name to be displayed for this authorization.
Nonce n A/B/F	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

### Authorization-ID (0x0007)

Name	Requirement	Format	Additional Information
Authenticator	M	uint8[32]	The authenticator of the sender for the current message.
Authorization-ID	M	uint32	The unique identifier of the recently authorized Nuki App or Nuki Bridge.
UUID	M	uint8[16]	Random identifier unique per Smart Lock and not altered until the Smart Lock is reset to factory defaults.
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

Nonce n A/B/F	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)
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### Authorization-ID Confirmation (0x001E)

Name	Requirement	Format	Additional Information
Authenticator	M	uint8[32]	The authenticator of the sender for the current message.
Authorization-ID	M	uint32	The unique identifier of the recently authorized Nuki App or Nuki Bridge.
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

### Remove Authorization Entry (0x0008)

Name	Requirement	Format	Additional Information
Authorization-ID	M	uint32	The Authorization-ID to be removed.
Nonce n K	M	uint8[32]	The nonce received from the challenge.



Security-PIN	M	uint16	The security pin.
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## Request Authorization Entries (0x0009)

Name	Requirement	Format	Additional Information
Offset	M	uint16	The start offset to be read.
Count	M	uint16	The number of authorizations to be read, starting at the specified offset.
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Authorization Entry (0x000A)

Name	Requirement	Format	Additional Information
Authorization-ID	M	uint32	The Authorization-ID.
ID Type	M	uint8	The type of the ID. 0 ... App 1 ... Bridge 2 ... Fob 3 ... Keypad
Name	M	uint8[32]	The Name of the Nuki App or Nuki Bridge.

Enabled	M	uint8	Flag indicating if this authorization is enabled.												
Remote allowed	M	uint8	Flag indicating if requests proxied by the nuki bridge shall be allowed.												
Date created	M	uint8[7]	The creation date.  <i>Format:</i> <table border="1" data-bbox="915 611 1203 911"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Date last active	M	uint8[7]	The date of the last received request from this authorization.  <i>Format:</i> <table border="1" data-bbox="915 1150 1203 1451"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Lock count	M	uint16	The lock counter.												
Time limited	M	uint8	Flag indicating if this authorization is restricted to access only at certain times. The following fields are appended only if this flag is set.												

Allowed from date	M	uint8[7]	<p>The start timestamp from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1" data-bbox="915 363 1203 661"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed until date	M	uint8[7]	<p>The end timestamp until access should be allowed.</p> <p><i>Format:</i></p> <table border="1" data-bbox="915 898 1203 1197"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:  0 0 0 0 0 0 0 0  -- MO TU WE TH FR SA SU</p> <p>If no bit is set, all weekdays are allowed.</p>												
Allowed from time	M	uint8[2]	<p>The start time per day from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1" data-bbox="915 1701 1203 1799"> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> </table>	Hour	uint8	Minute	uint8								
Hour	uint8														
Minute	uint8														

Allowed until time	M	uint8[2]	<p>The end time per day until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						

The Nuki Smart Lock will continue sending Authorization Entry commands until the requested count is reached or no more authorization entries are available.

The first returned authorization entry represents the own authorization.

## Authorization Data (Invite) (0x000B)

Name	Requirement	Format	Additional Information
Name	M	uint8[32]	The name to be displayed for this authorization.
ID Type	M	uint8	<p>The type of the ID to be authorized.</p> <p>0 ... App 1 ... Bridge 2 ... Fob 3 ... Keypad</p>
Shared Key	M	uint8[32]	The generated shared key for this authorization.
Remote allowed	M	uint8	Flag indicating if requests proxied by the nuki bridge shall be allowed.
Time limited	M	uint8	Flag indicating if this authorization is restricted to access only at certain times.
Allowed from date	M	uint8[7]	The start timestamp from which

			<p>access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed until date	M	uint8[7]	<p>The end timestamp until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:</p> <pre> 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> <p>If no bit is set, all weekdays are allowed.</p>												
Allowed from time	M	uint8[2]	<p>The start time per day from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8								
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Allowed until time	M	uint8[2]	The end time per day until access should be allowed.  <i>Format:</i> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nonce n K	M	uint8[32]	The nonce received from the challenge.				
Security-PIN	M	uint16	The security pin.				

### Authorization-ID (Invite) (0x001F)

Name	Requirement	Format	Additional Information												
Authorization-ID	M	uint32	The unique identifier of the recently authorized Nuki App or Nuki Bridge.												
Date created	M	uint8[7]	The creation date.  <i>Format:</i> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														

## Update Authorization Entry (0x0025)

Name	Requirement	Format	Additional Information												
Authorization-ID	M	uint32	The authorization id.												
Name	M	uint8[32]	The name to be displayed for this authorization.												
Enabled	M	uint8	Flag indicating if this authorization is enabled.												
Remote allowed	M	uint8	Flag indicating if requests proxied by the nuki bridge shall be allowed.												
Time limited	M	uint8	Flag indicating if this authorization is restricted to access only at certain times.												
Allowed from date	M	uint8[7]	<p>The start timestamp from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
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Allowed until date	M	uint8[7]	<p>The end timestamp until access should be allowed</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> </table>	Year	uint16										
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Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:  0 0 0 0 0 0 0 0  -- MO TU WE TH FR SA SU</p> <p>If no bit is set, all weekdays are allowed.</p>										
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Minute	uint8												
Allowed until time	M	uint8[2]	<p>The end time per day until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8						
Hour	uint8												
Minute	uint8												
Nonce n K	M	uint8[32]	The nonce received from the challenge.										
Security-PIN	M	uint16	The security pin.										



## Keyturner States (0x000C)

Name	Requirement	Format	Additional Information
Nuki State	M	uint8	<p>The current operation state of the Smart Lock</p> <p>0x00 Uninitialized            0x01 Pairing Mode            0x02 Door Mode            0x04 Maintenance Mode</p>
Lock State	M	uint8	<p>The current state of the locking mechanism within the Smart Lock</p> <p>0x00 uncalibrated            0x01 locked            0x02 unlocking            0x03 unlocked            0x04 locking            0x05 unlatched            0x06 unlocked (lock 'n' go active)            0x07 unlatching            0xFC calibration            0xFD boot run            0xFE motor blocked            0xFF undefined</p>
Trigger	M	uint8	<p>The trigger, that caused the state change of the unlock mechanism within the Smart Lock</p> <p>0x00 system</p> <ul style="list-style-type: none"> <li>via bluetooth command</li> </ul> <p>0x01 manual</p>

			<ul style="list-style-type: none"> <li>• by using a key from outside the door</li> <li>• by rotating the wheel on the inside</li> </ul> <p>0x02 button</p> <ul style="list-style-type: none"> <li>• by pressing the Smart Locks button</li> </ul> <p>0x03 automatic</p> <ul style="list-style-type: none"> <li>• Executed automatically (e.g. at a specific time) by the Smart Lock</li> </ul> <p>0x06 auto lock</p> <ul style="list-style-type: none"> <li>• Auto relock of the Smart Lock</li> </ul>												
Current Time	M	uint8[7]	<p>Current timestamp</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Timezone offset	M	sint16	The timezone offset (UTC) in minutes												
Critical Battery state	M	uint8	<p>This flag signals a critical battery state.</p> <p>0x00 ok 0x01 critical</p>												
Config update count	M	uint8	Current count of modifications to												

			the internal config
Lock 'n' Go timer	M	uint8	Current status of the lock 'n' go timer or 0 if no lock 'n' go is active
Last Lock Action	M	uint8	The most recent <a href="#">Lock Action</a> that has been performed
Last Lock Action trigger	M	uint8	The trigger that caused the most recent <a href="#">Lock Action</a>
Last Lock Action completion status	M	uint8	The <a href="#">Completion Status</a> of the most recent <a href="#">Lock Action</a>
Door sensor state	M	uint8	The current door sensor state  0x00 ... Unavailable 0x01 ... Deactivated 0x02 ... Door Closed 0x03 ... Door Opened 0x04 ... Door State Unknown 0x05 ... Calibrating

## Lock Action (0x000D)

Name	Requirement	Format	Additional Information
Lock Action	M	uint8	The action to be executed.  0x01 unlock 0x02 lock 0x03 unlatch 0x04 lock 'n' go 0x05 lock 'n' go with unlatch 0x06 full lock  0x81 fob action 1 0x82 fob action 2

			0x83 fob action 3
App-ID/Bridge-ID/Fob-ID	M	uint32	The ID of the Nuki App, Nuki Bridge or Nuki Fob sending the command.
Flags	M	uint8	Bitmask containing some flags: Bitmask for allowed weekdays: <pre> 0 0 0 0 0 0 0 0 -- -- -- -- -- -- -- F0 AU </pre> AU Auto Unlock FO Force  Other bits are reserved for future use.
Name suffix	O	uint8[20]	Optional parameter containing a suffix which should be appended to the log entry.
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

### Status (0x000E)

Name	Requirement	Format	Additional Information
Status	M	uint8	The status of the most recently executed action.

### Most Recent Command (0x000F)

Name	Requirement	Format	Additional Information

Command identifier	M	uint16	The identifier of the most recently executed command by the Smart Lock.
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## Openings Closings Summary (0x0010)

Name	Requirement	Format	Additional Information
Openings total	M	uint16	The number of openings in total
Closings total	M	uint16	The number of closings in total.
Openings since boot	M	uint16	The number of openings since the Smart Lock booted
Closings since boot	M	uint16	The number of closings since the Smart Lock booted

## Battery Report (0x0011)

Name	Requirement	Format	Additional Information
Battery Drain	M	uint16	The drain of the last lock action in Milliwattseconds (mWs).
Battery Voltage	M	uint16	The current battery voltage in Millivolts (mV).
Critical Battery state	M	uint8	This flag signals a critical battery state.  0x00 ok 0x01 critical
Lock Action	M	uint8	The type of the last executed

			lock action or 0x00 if no lock action has been executed  See <a href="#">Lock Action</a>
Start Voltage	M	uint16	The voltage (mV) at the beginning of the last lock action
Lowest Voltage	M	uint16	The lowest voltage (mV) reached during the last lock action
Lock Distance	M	uint16	The total distance (in degrees) during the last lock action
Start Temperature	M	sint8	The die temperature at the beginning of the last lock action
Max Turn Current	M	uint16	The highest current of the turn motor during the last lock action
Battery Resistance	M	uint16	The resistance of the batteries

## Error Report (0x0012)

Name	Requirement	Format	Additional Information
Error Code	M	sint8	The error code.
Command identifier	M	uint16	The identifier of the command.

## Set Config (0x0013)

Name	Requirement	Format	Additional Information
Name	M	uint8[32]	The name of the Smart Lock..
Latitude	M	float	The latitude of the Smart Locks geoposition.
Longitude	M	float	The longitude of the Smart Locks geoposition.
Auto unlatch	M	uint8	This flag indicates whether or not the door shall be unlatched by manually operating a door handle from the outside.
Pairing enabled	M	uint8	This flag indicates whether or not activating the pairing mode via button should be enabled.
Button enabled	M	uint8	This flag indicates whether or not the button should be enabled.
LED flash enabled	M	uint8	This flag indicates whether or not the flashing LED should be enabled to signal an unlocked door.

LED brightness	M	uint8	The LED brightness level. Possible values are 0 to 5  0 = off, ..., 5 = max
Timezone offset	M	sint16	The timezone offset (UTC) in minutes
DST mode	M	uint8	The desired daylight saving time mode.  0x00 disabled  0x01 european
Fob action 1	M	uint8	The desired action, if a Nuki Fob is pressed once.  0x00 no action 0x01 unlock 0x02 lock 0x03 lock 'n' go 0x04 intelligent (unlock if locked, lock if unlocked)  If the auto unlatch flag has been set, the Smart Lock shall perform the unlatch operation in any "unlock" case. (0x01, 0x03 and 0x04)
Fob action 2	M	uint8	The desired action, if a Nuki Fob is pressed twice.  See "Fob action 1" for possible values.
Fob action 3	M	uint8	The desired action, if a Nuki Fob is pressed three times.



			See “Fob action 1” for possible values.
Single Lock	M	uint8	Flag indicating, if only a single lock should be performed
Advertising Mode	M	uint8	The desired advertising mode. 0x00 Automatic  0x01 Normal 0x02 Slow  0x03 Slowest
Timezone ID	M	uint16	The id of the current timezone or 0xFFFF if timezones are not supported  See <a href="#">List of timezone IDs</a>
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Request Config (0x0014)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the

			challenge.
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## Config (0x0015)

Name	Requirement	Format	Additional Information
Nuki-ID	M	uint32	The unique identifier of the Smart Lock.
Name	M	uint8[32]	The name of the Smart Lock.
Latitude	M	float	The latitude of the Smart Locks geoposition.
Longitude	M	float	The longitude of the Smart Locks geoposition.
Auto unlatch	M	uint8	This flag indicates whether or not the door shall be unlatched by manually operating a door handle from the outside.
Pairing enabled	M	uint8	This flag indicates whether or not the pairing mode should be enabled.
Button enabled	M	uint8	This flag indicates whether or not the button should be enabled.

LED enabled	M	uint8	This flag indicates whether or not the LED should be enabled to signal an unlocked door.												
LED brightness	M	uint8	The LED brightness level. Possible values are 0 to 5 0 = off, ..., 5 = max												
Current Time	M	uint8[7]	Current timestamp  <i>Format:</i> <table border="1" data-bbox="971 814 1302 1138"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Timezone offset	M	sint16	The timezone offset (UTC) in minutes												
DST mode	M	uint8	The desired daylight saving time mode.  0x00 disabled  0x01 european												
Has fob	M	uint8	This flag indicates whether or not a Nuki Fob has been paired to this Nuki.												

Fob action 1	M	uint8	<p>The desired action, if a Nuki Fob is pressed once.</p> <p>0x00 no action  0x01 unlock  0x02 lock  0x03 lock 'n' go</p> <p>0x04 intelligent (unlock if locked, lock if unlocked)</p>
Fob action 2	M	uint8	<p>The desired action, if a Nuki Fob is pressed twice.</p> <p>See "Fob action 1" for possible values.</p>
Fob action 3	M	uint8	<p>The desired action, if a Nuki Fob is pressed three times.</p> <p>See "Fob action 1" for possible values.</p>
Single Lock	M	uint8	<p>Flag indicating, if only a single lock should be performed</p>
Advertising Mode	M	uint8	<p>The desired advertising mode.</p> <p>0x00 ... Automatic  0x01 ... Normal  0x02 ... Slow  0x03 ... Slowest</p>
Has keypad	M	uint8	<p>This flag indicates whether or not a Nuki Keypad has</p>

			been paired to this Nuki.
Firmware version	M	uint8[3]	The currently installed firmware version of the Smart Lock
Hardware revision	M	uint8[2]	The hardware revision number
HomeKit status	M	uint8	0x00 ... not available 0x01 ... disabled 0x02 ... enabled  0x03 ... enabled & paired
Timezone ID	M	uint16	The id of the current timezone or 0xFFFF if timezones are not supported  See <a href="#">List of timezone IDs</a>

## Set Security PIN (0x0019)

Name	Requirement	Format	Additional Information
PIN	M	uint16	The new security pin.
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Verify Security PIN (0x0020)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Request Calibration (0x001A)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Request Reboot (0x001D)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Update Time (0x0021)

Name	Requirement	Format	Additional Information												
Time	M	uint8[7]	Timestamp  <i>Format:</i> <table border="1" data-bbox="948 674 1289 995"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Nonce n K	M	uint8[32]	The nonce received from the challenge.												
Security-PIN	M	uint16	The security pin.												

## Authorization Entry Count (0x0027)

Name	Requirement	Format	Additional Information
Count	M	uint16	The total number of authorization entries

## Request Log Entries (0x0031)

Name	Requirement	Format	Additional Information
Start index	M	uint32	<p>The index where to start reading log entries. Log entries older or newer (based on sort order) than the provided index will be returned, not the entry for the provided index itself.</p> <p><i>If 0 the oldest or most recent [Count] entries are returned, based on [Sort order].</i></p>
Count	M	uint16	The number of log entries to be read, starting at the specified start index.
Sort order	M	uint8	<p>The desired sort order.</p> <p>0x00 ascending</p> <p>0x01 descending</p>
Total count	M	uint8	Flag indicating whether or not a Log Entry Count should be returned, prior sending the requested Log Entries
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.



## Log Entry (0x0032)

Name	Requirement	Format	Additional Information												
Index	M	uint32	The index of the log entry.												
Timestamp	M	uint8[7]	<p>The timestamp.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Auth-ID	M	uint32	The authorization id.												
Name	M	uint8[32]	The name of the authorization.												
Type	M	uint8	<p>0x01 Logging enabled/disabled</p> <p>0x02 Lock action</p> <p>0x03 Calibration</p> <p>0x04 Initialization run</p> <p>0x05 Keypad action</p> <p>0x06 Door sensor</p> <p>0x07 Door sensor logging enabled/disabled</p>												

Data	M	uint8[x]	<p><i>Type 0x01:</i></p> <p><b>x = 1</b></p> <p>0x00 Logging disabled</p> <p>0x01 Logging enabled</p> <p><i>Type 0x02, 0x03 and 0x04:</i></p> <p><b>x = 4</b></p> <p>byte 1: <a href="#">Lock Action</a></p> <p>byte 2: <a href="#">Trigger</a></p> <p>byte 3: <a href="#">Flags</a></p> <p>byte 4: Completion status</p> <p>0x00 ... Success</p> <p>0x01 ... Motor blocked</p> <p>0x02 ... Canceled</p> <p>0x03 ... Too recent</p> <p>0x04 ... Busy</p> <p>0x05 ... Low motor voltage voltage</p> <p>0x06 ... Clutch failure</p> <p>0x07 ... Motor power failure</p> <p>0x08 ... Incomplete failure</p> <p>0xFE ... Other error</p> <p>0xFF ... UNKNOWN</p> <p><i>Type 0x05:</i></p> <p><b>x = 5</b></p> <p>byte 1: <a href="#">Lock Action</a></p>
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			<p>byte 2: <a href="#">Source</a></p> <p>byte 3: Completion status</p> <p>Same as Type 0x04</p> <p>additionally:</p> <p>0xE0 ... Invalid Code</p> <p>bytes 4-5: Code ID (uint16)</p> <p><i>Type 0x06:</i></p> <p>x = 1</p> <p>0x00 Door opened</p> <p>0x01 Door closed</p> <p>0x02 Sensor jammed</p> <p><i>Type 0x07:</i></p> <p>x = 1</p> <p>0x00 Door Sensor Logging disabled</p> <p>0x01 Door Sensor Logging enabled</p>
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The Nuki Smart Lock will continue sending Log Entry commands until the requested count is reached or no more log entries are available.

## Log Entry Count (0x0033)

Name	Requirement	Format	Additional Information
Logging enabled	M	uint8	This flag indicates whether or not logging is enabled.
Count	M	uint16	Total number of log entries

			which are available with the given start index and sort order
Door Sensor Enabled	M	uint8	Flag indicating if door sensor should be enabled
Door Sensor Logging Enabled	M	uint8	Flag indicating if door sensor logging should be enabled

### Enable Logging (0x0034)

Name	Requirement	Format	Additional Information
Enabled	M	uint8	Flag indicating if logging should be enabled.
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

### Set Advanced Config (0x0035)

Name	Requirement	Format	Additional Information
Unlocked Position Offset Degrees	M	sint16	Offset that alters the unlocked position.

Locked Position Offset Degrees	M	sint16	Offset that alters the locked position.
Single Locked Position Offset Degrees	M	sint16	Offset that alters the single locked position.
Unlocked To Locked Transition Offset Degrees	M	sint16	Offset that alters the position where transition from unlocked to locked happens.
Lock 'n' Go timeout	M	uint8	Timeout for lock 'n' go
Single button press action	M	uint8	<p>The desired action, if the button is pressed once.</p> <p>0x00 no action  0x01 intelligent (unlock if locked, lock if unlocked)  0x02 unlock  0x03 lock  0x04 unlatch  0x05 lock 'n' go (without unlatch)  0x06 show status</p>
Double button press action	M	uint8	<p>The desired action, if the button is pressed twice.</p> <p>0x00 no action  0x01 intelligent (unlock if locked, lock if unlocked)  0x02 unlock  0x03 lock  0x04 unlatch  0x05 lock 'n' go (without unlatch)  0x06 show status</p>

Detached cylinder	M	uint8	Flag that indicates that the inner side of the used cylinder is detached from the outer side and therefore the Smart Lock won't recognize if someone operates the door by using a key
Battery type	M	uint8	The type of the batteries present in the smart lock.  0x00 Alkali 0x01 Accumulators  0x02 Lithium Batteries
Automatic battery type detection	M	uint8	Flag that indicates if the automatic detection of the battery type is enabled
Unlatch duration	M	uint8	Duration in seconds for holding the latch in unlatched position.
Auto lock timeout	M	uint16	Seconds until the smart lock relocks itself after it has been unlocked.No auto relock if value is 0.
Auto unlock disabled	M	uint8	Flag that indicates if auto unlock should be disabled in general.
Nightmode enabled	M	uint8	Flag that indicates if nightmode is enabled.
Nightmode start	M	uint8[2]	<i>Format:</i>

time			<table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nightmode end time	M	uint8[2]	<i>Format:</i> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nightmode auto lock enabled	M	uint8	Flag that indicates if auto lock should be enabled during nightmode.				
Nightmode auto unlock disabled	M	uint8	Flag that indicates if auto unlock should be disabled during nightmode.				
Nightmode immediate lock on start	M	uint8	Flag that indicates if door should be immediately locked on nightmode start.				
Nonce n K	M	uint8[32]	The nonce received from the challenge.				
Security-PIN	M	uint16	The security pin.				

## Request Advanced Config (0x0036)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the

			challenge.
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## Advanced Config (0x0037)

Name	Requirement	Format	Additional Information
Total Degrees	M	uint16	The absolute total position in degrees that has been reached during calibration.
Unlocked Position Offset Degrees	M	sint16	Offset that alters the unlocked position.
Locked Position Offset Degrees	M	sint16	Offset that alters the locked position.
Single Locked Position Offset Degrees	M	sint16	Offset that alters the single locked position.
Unlocked To Locked Transition Offset Degrees	M	sint16	Offset that alters the position where transition from unlocked to locked happens.
Lock 'n' Go timeout	M	uint8	Duration of the unlocked status during lock 'n' go
Single button press action	M	uint8	The desired action, if the button is pressed once. <b>Defaults to 0x01.</b>  0x00 no action <b>0x01 intelligent (unlock if</b>



			<p><b>locked, lock if unlocked)</b>  0x02 unlock  0x03 lock  0x04 unlatch  0x05 lock 'n' go (without unlatch)    0x06 show status</p>
Double button press action	M	uint8	<p>The desired action, if the button is pressed twice.  <b>Defaults to 0x05.</b></p> <p>0x00 no action  0x01 intelligent (unlock if locked, lock if unlocked)  0x02 unlock  0x03 lock  0x04 unlatch  <b>0x05 lock 'n' go (without unlatch)</b>    0x06 show status</p>
Detached cylinder	M	uint8	<p>Flag that indicates that the inner side of the used cylinder is detached from the outer side and therefore the Smart Lock won't recognize if someone operates the door by using a key</p>
Battery type	M	uint8	<p>The type of the batteries present in the smart lock.  <b>Defaults to 0x00.</b></p> <p><b>0x00 Alkali</b>  0x01 Akkumulators    0x02 Lithium Batteries</p>

Automatic battery type detection	M	uint8	Flag that indicates if the automatic detection of the battery type is enabled				
Unlatch duration	M	uint8	Duration in seconds for holding the latch in unlatched position.				
Auto lock timeout	M	uint16	Seconds until the smart lock relocks itself after it has been unlocked.No auto relock if value is 0.				
Auto unlock disabled	M	uint8	Flag that indicates if auto unlock should be disabled in general.				
Nightmode enabled	M	uint8	Flag that indicates if nightmode is enabled.				
Nightmode start time	M	uint8[2]	<i>Format:</i> <table border="1" data-bbox="940 1213 1269 1323"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nightmode end time	M	uint8[2]	<i>Format:</i> <table border="1" data-bbox="940 1478 1261 1587"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nightmode auto lock enabled	M	uint8	Flag that indicates if auto lock should be enabled during nightmode.				

Nightmode auto unlock disabled	M	uint8	Flag that indicates if auto unlock should be disabled during nightmode.
Nightmode immediate lock on start	M	uint8	Flag that indicates if door should be immediately locked on nightmode start.

### Add Time Control Entry (0x0039)

Name	Requirement	Format	Additional Information				
Weekdays	M	uint8	Bitmask for allowed weekdays: <pre> 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> If no bit is set, all weekdays are allowed.				
Time	M	uint8[2]	<i>Format:</i> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Lock action	M	uint8	The desired lock actionSee <a href="#">Lock Action</a>				
Nonce n K	M	uint8[32]	The nonce received from the challenge.				
Security-PIN	M	uint16	The security pin.				

## Time Control Entry ID (0x003A)

Name	Requirement	Format	Additional Information
Entry ID	M	uint8	The unique identifier of the recently created time control entry.

## Remove Time Control Entry (0x003B)

Name	Requirement	Format	Additional Information
Entry ID	M	uint8	The id of the entry to be removed.
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Request Time Control Entries (0x003C)

Name	Requirement	Format	Additional Information
Nonce n K	M	uint8[32]	The nonce received from the challenge.

Security-PIN	M	uint16	The security pin.
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### Time Control Entry Count (0x003D)

Name	Requirement	Format	Additional Information
Count	M	uint8	The total number of time control entries

### Time Control Entry (0x003E)

Name	Requirement	Format	Additional Information				
Entry ID	M	uint8	The id of the entry.				
Enabled	M	uint8	Flag indicating if this authorization is enabled.				
Weekdays	M	uint8	Bitmask for allowed weekdays: 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU  If no bit is set, all weekdays are allowed.				
Time	M	uint8[2]	<i>Format:</i> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						

Lock action	M	uint8	The desired lock action See <a href="#">Lock Action</a>
-------------	---	-------	--

## Update Time Control Entry (0x003F)

Name	Requirement	Format	Additional Information				
Entry ID	M	uint8	The id of the entry.				
Enabled	M	uint8	Flag indicating if this authorization is enabled.				
Weekdays	M	uint8	Bitmask for allowed weekdays: <pre> 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> If no bit is set, all weekdays are allowed.				
Time	M	uint8[2]	<i>Format:</i> <table border="1" data-bbox="948 1335 1284 1444"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Lock action	M	uint8	The desired lock action See <a href="#">Lock Action</a>				
Nonce n K	M	uint8[32]	The nonce received from the challenge.				

Security-PIN	M	uint16	The security pin.
--------------	---	--------	-------------------

## Add Keypad Code (0x0041)

Name	Requirement	Format	Additional Information												
Code	M	uint32	The code for this entry.												
Name	M	uint8[20]	The name to be displayed for this entry.												
Time limited	M	uint8	Flag indicating if this entry is restricted to access only at certain times.												
Allowed from date	M	uint8[7]	<p>The start timestamp from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed until date	M	uint8[7]	The end timestamp until access should be allowed.												

			<p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:</p> <pre> 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> <p>If no bit is set, all weekdays are allowed.</p>												
Allowed from time	M	uint8[2]	<p>The start time per day from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8								
Hour	uint8														
Minute	uint8														
Allowed until time	M	uint8[2]	<p>The end time per day until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8								
Hour	uint8														
Minute	uint8														



Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

### Keypad Code ID (0x0042)

Name	Requirement	Format	Additional Information												
Code ID	M	uint16	The unique identifier of the recently created Keypad code.												
Date created	M	uint8[7]	The creation date.  <i>Format:</i> <table border="1" data-bbox="950 1129 1286 1451"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														

### Request Keypad Codes (0x0043)

Name	Requirement	Format	Additional Information
------	-------------	--------	------------------------

Offset	M	uint16	The start offset to be read.
Count	M	uint16	The number of entries to be read, starting at the specified offset.
Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

### Keypad Code Count (0x0044)

Name	Requirement	Format	Additional Information
Count	M	uint16	The total number of Keypad codes

### Keypad Code (0x0045)

Name	Requirement	Format	Additional Information
Code ID	M	uint16	The id of this code.
Code	M	uint32	The code for this entry.
Name	M	uint8[20]	The name to be displayed for this entry.

Enabled	M	uint8	Flag indicating if this entry is enabled.												
Date created	M	uint8[7]	The creation date.  <i>Format:</i> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Date last active	M	uint8[7]	The date of the last received request from this entry.  <i>Format:</i> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Lock count	M	uint16	The lock counter.												
Time limited	M	uint8	Flag indicating if this entry is restricted to access only at certain times. The following fields are appended only if this flag is set.												

Allowed from date	M	uint8[7]	<p>The start timestamp from which access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed until date	M	uint8[7]	<p>The end timestamp until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr><td>Year</td><td>uint16</td></tr> <tr><td>Month</td><td>uint8</td></tr> <tr><td>Day</td><td>uint8</td></tr> <tr><td>Hour</td><td>uint8</td></tr> <tr><td>Minute</td><td>uint8</td></tr> <tr><td>Second</td><td>uint8</td></tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:</p> <pre> 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> <p>If no bit is set, all weekdays are allowed.</p>												
Allowed from time	M	uint8[2]	<p>The start time per day from which access should be</p>												

			<p>allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Allowed until time	M	uint8[2]	<p>The end time per day until access should be allowed.</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						

The Nuki Smart Lock will continue sending Keypad Code commands until the requested count is reached or no more entries are available.

## Update Keypad Code (0x0046)

Name	Requirement	Format	Additional Information
Code ID	M	uint16	The id of the code to be updated.
Code	M	uint32	The code.
Name	M	uint8[20]	The name to be displayed for this authorization.
Enabled	M	uint8	Flag indicating if this entry is enabled.

Time limited	M	uint8	Flag indicating if this entry is restricted to access only at certain times.												
Allowed from date	M	uint8[7]	<p>The start timestamp from which access should be allowed</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed until date	M	uint8[7]	<p>The end timestamp until access should be allowed</p> <p><i>Format:</i></p> <table border="1"> <tr> <td>Year</td> <td>uint16</td> </tr> <tr> <td>Month</td> <td>uint8</td> </tr> <tr> <td>Day</td> <td>uint8</td> </tr> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> <tr> <td>Second</td> <td>uint8</td> </tr> </table>	Year	uint16	Month	uint8	Day	uint8	Hour	uint8	Minute	uint8	Second	uint8
Year	uint16														
Month	uint8														
Day	uint8														
Hour	uint8														
Minute	uint8														
Second	uint8														
Allowed weekdays	M	uint8	<p>Bitmask for allowed weekdays:</p> <pre> 0 0 0 0 0 0 0 0 -- MO TU WE TH FR SA SU </pre> <p>If no bit is set, all weekdays</p>												

			are allowed.				
Allowed from time	M	uint8[2]	The start time per day from which access should be allowed.  <i>Format:</i> <table border="1" data-bbox="948 569 1294 674"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Allowed until time	M	uint8[2]	The end time per day until access should be allowed.  <i>Format:</i> <table border="1" data-bbox="948 963 1294 1068"> <tr> <td>Hour</td> <td>uint8</td> </tr> <tr> <td>Minute</td> <td>uint8</td> </tr> </table>	Hour	uint8	Minute	uint8
Hour	uint8						
Minute	uint8						
Nonce n K	M	uint8[32]	The nonce received from the challenge.				
Security-PIN	M	uint16	The security pin.				

## Remove Keypad Code (0x0047)

Name	Requirement	Format	Additional Information
Code ID	M	uint16	The id of the code to be removed.

Nonce n K	M	uint8[32]	The nonce received from the challenge.
Security-PIN	M	uint16	The security pin.

## Keypad Action (0x0048)

Name	Requirement	Format	Additional Information
Source	M	uint8	0x00 arrow key 0x01 code
Code	M	uint32	The code that has been entered on the keypad
Action	M	uint8	The action to be executed.  0x00 intelligent 0x01 unlock 0x02 lock 0x03 unlatch  0x04 lock 'n' go
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)



## Simple Lock Action (0x0100)

Name	Requirement	Format	Additional Information
Lock Action	M	uint8	The action to be executed.  <b>0x01 unlock</b> <b>0x02 lock</b>
Nonce n K	M	uint8[32]	An arbitrary number used only once to resist replay attacks. (unpredictable, probabilistic non-reuse)

## 6. Error codes

### General error codes

Code	Name	Usage
0xFD	ERROR_BAD_CRC	CRC of received command is invalid
0xFE	ERROR_BAD_LENGTH	Length of retrieved command payload does not match expected length
0xFF	ERROR_UNKNOWN	Used if no other error code matches

## Pairing service error codes

### P\_ERROR\_MAX\_USER

Code	Name	Usage
0x10	P_ERROR_NOT_PAIRING	Returned if public key is being requested via request data command, but the Smart Lock is not in pairing mode
0x11	P_ERROR_BAD_AUTHENTICATOR	Returned if the received authenticator does not match the own calculated authenticator
0x12	P_ERROR_BAD_PARAMETER	Returned if a provided parameter is outside of its valid range
0x13	P_ERROR_MAX_USER	Returned if the maximum number of users has been reached

## Keyturner service error codes

Code	Name	Usage
0x20	K_ERROR_NOT_AUTHORIZED	Returned if the provided authorization id is invalid or the payload could not be decrypted using the shared key for this authorization id

0x21	K_ERROR_BAD_PIN	Returned if the provided pin does not match the stored one.
0x22	K_ERROR_BAD_NONCE	Returned if the provided nonce does not match the last stored one of this authorization id or has already been used before.
0x23	K_ERROR_BAD_PARAMETER	Returned if a provided parameter is outside of its valid range.
0x24	K_ERROR_INVALID_AUTH_ID	Returned if the desired authorization id could not be deleted because it does not exist.
0x25	K_ERROR_DISABLED	Returned if the provided authorization id is currently disabled.
0x26	K_ERROR_REMOTE_NOT_ALLOWED	Returned if the request has been forwarded by the Nuki Bridge and the provided authorization id has not been granted remote access.
0x27	K_ERROR_TIME_NOT_ALLOWED	Returned if the provided authorization id has not been granted access at the current time.
0x28	K_ERROR_TOO_MANY_PIN_ATTEMPTS	Returned if an invalid pin has been provided too often

0x29	K_ERROR_TOO_MANY_ENTRIES	Returned if no more entries can be stored
0x2A	K_ERROR_CODE_ALREADY_EXISTS	Returned if a Keypad Code should be added but the given code already exists.
0x2B	K_ERROR_CODE_INVALID	Returned if a Keypad Code that has been entered is invalid.
0x2C	K_ERROR_CODE_INVALID_TIMEOUT_1	Returned if an invalid pin has been provided multiple times.
0x2D	K_ERROR_CODE_INVALID_TIMEOUT_2	Returned if an invalid pin has been provided multiple times.
0x2E	K_ERROR_CODE_INVALID_TIMEOUT_3	Returned if an invalid pin has been provided multiple times.
0x40	K_ERROR_AUTO_UNLOCK_TOO_RECENT	Returned on an incoming auto unlock request and if a lock action has already been executed within short time.
0x41	K_ERROR_POSITION_UNKNOWN	Returned on an incoming unlock request if the request has been forwarded by the Nuki Bridge and the Smart Lock is unsure about its actual lock position.
0x42	K_ERROR_MOTOR_BLOCKED	Returned if the motor blocks.

0x43	K_ERROR_CLUTCH_FAILURE	Returned if there is a problem with the clutch during motor movement.
0x44	K_ERROR_MOTOR_TIMEOUT	Returned if the motor moves for a given period of time but did not block.
0x45	K_ERROR_BUSY	Returned on any lock action via bluetooth if there is already a lock action processing.
0x46	K_ERROR_CANCELED	Returned on any lock action or during calibration if the user canceled the motor movement by pressing the button
0x47	K_ERROR_NOT_CALIBRATED	Returned on any lock action if the Smart Lock has not yet been calibrated
0x48	K_ERROR_MOTOR_POSITION_LIMIT	Returned during calibration if the internal position database is not able to store any more values
0x49	K_ERROR_MOTOR_LOW_VOLTAGE	Returned if the motor blocks because of low voltage.
0x4A	K_ERROR_MOTOR_POWER_FAILURE	Returned if the power drain during motor movement is zero
0x4B	K_ERROR_CLUTCH_POWER_FAILURE	Returned if the power drain during clutch movement is

		zero
0x4C	K_ERROR_VOLTAGE_TOO_LOW	Returned on a calibration request if the battery voltage is too low and a calibration will therefore not be started
0x4D	K_ERROR_FIRMWARE_UPDATE_NEEDED	Returned during any motor action if a firmware update is mandatory

## 7. Status codes

Code	Name	Usage
0x00	COMPLETE	Returned to signal the successful completion of a command
0x01	ACCEPTED	Returned to signal that a command has been accepted but the completion status will be signaled later.

## 8. List of timezone IDs

ID	Name	Offset	Timezone	DST
0	Africa/Cairo	UTC+2	EET	no
1	Africa/Lagos	UTC+1	WAT	no

2	Africa/Maputo	UTC+2	CAT, SAST	no
3	Africa/Nairobi	UTC+3	EAT	no
4	America/Anchorage	UTC-9/-8	AKDT	yes
5	America/Argentina/Buenos_Aires	UTC-3	ART, UYT	no
6	America/Chicago	UTC-6/-5	CDT	yes
7	America/Denver	UTC-7/-6	MDT	yes
8	America/Halifax	UTC-4/-3	ADT	yes
9	America/Los_Angeles	UTC-8/-7	PDT	yes
10	America/Manaus	UTC-4	AMT, BOT, VET, AST, GYT	no
11	America/Mexico_City	UTC-6/-5	CDT	yes
12	America/New_York	UTC-5/-4	EDT	yes
13	America/Phoenix	UTC-7	MST	no
14	America/Regina	UTC-6	CST	no

15	America/Santiago	UTC-4/-3	CLST, AMST, WARST, PYST	yes
16	America/Sao_Paulo	UTC-3	BRT	no
17	America/St_Johns	UTC-3½/ -2½	NDT	yes
18	Asia/Bangkok	UTC+7	ICT, WIB	no
19	Asia/Dubai	UTC+4	SAMT, GET, AZT, GST, MUT, RET, SCT, AMT-Arm	no
20	Asia/Hong_Kong	UTC+8	HKT	no
21	Asia/Jerusalem	UTC+2/+3	IDT	yes
22	Asia/Karachi	UTC+5	PKT, YEKT, TMT, UZT, TJT, ORAT	no
23	Asia/Kathmandu	UTC+5¾	NPT	no
24	Asia/Kolkata	UTC+5½	IST	no
25	Asia/Riyadh	UTC+3	AST-Arabia	no
26	Asia/Seoul	UTC+9	KST	no



27	Asia/Shanghai	UTC+8	CST, ULAT, IRKT, PHT, BND, WITA	no
28	Asia/Tehran	UTC+3½	ARST	no
29	Asia/Tokyo	UTC+9	JST, WIT, PWT, YAKT	no
30	Asia/Yangon	UTC+6½	MMT	no
31	Australia/Adelaide	UTC+9½/10½	ACDT	yes
32	Australia/Brisbane	UTC+10	AEST, PGT, VLAT	no
33	Australia/Darwin	UTC+9½	ACST	no
34	Australia/Hobart	UTC+10/+11	AEDT	yes
35	Australia/Perth	UTC+8	AWST	no
36	Australia/Sydney	UTC+10/+11	AEDT	yes
37	Europe/Berlin	UTC+1/+2	CEST	yes
38	Europe/Helsinki	UTC+2/+3	EEST	yes
39	Europe/Istanbul	UTC+3	TRT	no

40	Europe/London	UTC+0/+1	BST, IST	yes
41	Europe/Moscow	UTC+3	MSK	no
42	Pacific/Auckland	UTC+12/+13	NZDT	yes
43	Pacific/Guam	UTC+10	ChST	no
44	Pacific/Honolulu	UTC-10	H(A)ST	no
45	Pacific/Pago_Pago	UTC-11	SST	no
65535 (0xFFFF )	None			

## 9. Command usage examples

This section describes the usage of some basic commands to show the communication between the client (CL) and the Nuki Smartlock (SL).

### Authorize App

1. User enables pairing mode on SL by pressing the button for 5 seconds
2. CL registers itself for indications on GDIO
3. CL writes **Request Data** command with **Public Key** command identifier to GDIO
  - a. CL sends **0100030027A7**
4. SL sends its **public key** via multiple indications on GDIO
  - a. CL receives **03002FE57DA347CD62431528DAAC5FBB290730FF**
  - b. CL receives **F684AFC4CFC2ED90995F58CB3B749DB9**
5. CL generates own keypair
  - a. Private key  
**8CAA54672307BFFDF5EA183FC607158D2011D008ECA6A1088614FF0853A5AA07**
  - b. Public key  
**F88127CCF48023B5CBE9101D24BAA8A368DA94E8C2E3CDE2DED29CE96AB50C15**



## Read lock state

Shared key:

217FCB0F18CAF284E9BDEA0B94B83B8D10867ED706BFDEDBD2381F4CB3B8F730

Authorization-ID: 2

1. CL writes **Request Data** command with **Keyturner States** command identifier to USDIO
  - a. Unencrypted: 0200000001000C00418D
  - b. Encrypted:  
37917F1AF31EC5940705F34D1E5550607D5B2F9FE7D496B6020000001A00670D124926004366532E8D927A33FE84E782A9594D39157D065E
  - c. CL sends encrypted message
2. SL sends **Keyturner States** command via multiple indications on USDIO
  - a. CL receives 90B0757CFED0243017EAF5E089F8583B9839D61B
  - b. CL receives 050924D2020000002700B13938B67121B6D528E7
  - c. CL receives DE206B0D7C5A94587A471B33EBFB012CED8F1261
  - d. CL receives 135566ED756E3910B5
  - e. Decrypted: 020100E0070307080F1E3C0000200A
  - i. Nuki state: 02
  - ii. Lock state: 01
  - iii. Lock trigger: 00
  - iv. Time: 2016-03-07 08:15:30
  - v. Offset: 60
  - vi. Battery critical: false

## Perform unlock

Shared key:

217FCB0F18CAF284E9BDEA0B94B83B8D10867ED706BFDEDBD2381F4CB3B8F730

Authorization-ID: 2

1. CL writes **Request Data** command with **Challenge** command identifier to USDIO
  - a. Unencrypted: 0200000001000400E804
  - b. Encrypted:  
88FDEFD7F941B63C242B7F84B3D786886340A4A8B1C1EAA0020000001A00066819A2956E6A79AF6ED66D257B276715F51F63A8BEB9ED0D47
  - c. CL sends encrypted message
2. SL sends **Challenge** command via multiple indications on USDIO
  - a. CL receives 99C8613A9F6AB6D3FB0399D37AD38C5C003AC139
  - b. CL receives B1567BC102000000380028CDCbackground-lightgreen8C08DA47BF32
  - c. CL receives 3BF9371EBF068F6D480438563660780A4234D9A2

- d. CL receives 3794E305EE37878874EDE106A0BBFCF5B60E0C2E
- e. CL receives 2BA17248A02B
- f. Decrypted:  
57D95521BEA186B5A9244F025737924C5B7E33592D0614D5F6EF2E2F142C6D4B
- 3. CL writes **Lock Action** command with action 0x01 to USDIO
  - a. Unencrypted:  
020000000D0001000000000057D95521BEA186B5A9244F025737924C5B7E33592D0614D5F6EF2E2F142C6D4BCACF
  - b. Encrypted:  
19467990B69FFBE3D484A5882C995449E3EBC878712152E7020000003E00B30D19E0C0A12F4D8C887864877B8853437825D587F85BB6C21BF674E204A685AC5E40E8A5FDB85349F520069496F092FAB63736928C0933DB34CFA21809
  - c. CL sends encrypted message
  - 4. SL send **Status ACCEPTED** via multiple indications on USDIO
    - a. CL receives 020000000E00010D9A
    - 5. SL sends **Keyturner States** command with status unlocking on USDIO
      - a. CL receives decrypted: 020200E00703070818203C00000007
      - 6. SL sends **Keyturner States** command with status unlocked on USDIO
        - a. CL receives decrypted: 020300E007030708182C3C00000007
        - 7. SL sends **Status COMPLETE** via multiple indications on USDIO
          - a. CL receives 020000000E00002C8A

## 10. Changelog

### Changelog v.2.1.0

16.03.2020

New:

- 0x0100: [Simple Lock Action](#)

Updated:

- Added the new nightmode settings to 0x0035: [Set Advanced Config](#) and 0x0037: [Advanced Config](#)
- Fixed several formatting issues

### Changelog v.2.0.0

12.11.2018

New:

- 0x0041 - 0x0048: Keypad commands
- 0x003A - 0x003F: Time control commands
- 0x0031 - 0x0034: Reworked log commands

Updated:

- 0x000C: Updated Smart Lock states for scheduled events, auto-lock and the door sensor
- 0x0011: Added more details to the battery report command
- 0x0015: Added Homekit status
- 0x000C, 0x0013, 0x0015: Added Timezone support
- Error codes: More detailed error codes available

Removed:

- 0x0022 - 0x0026: Replaced log commands