



# LUKE ROBERTS

SMART LIGHTING

## Lamp Control API

Version 1.3 (2019-07-09)

### 1. Introduction

This document describes the stable control API for Luke Roberts smart lamps. Hex notation is used for numbers in monospace. Multi-byte numbers are transmitted in network byte order (Big Endian).

#### Light Scenes

Light scenes are the primary way of interacting with the smart lamp. Users create scenes in the Luke Roberts app.

A light scene defines the configuration of each LED in the lamp. Indirect light is grouped into 16 segments, which can emit millions of colours and high-quality white light.

Direct light is grouped into 84 spots which can emit high-quality white light.

Scenes have a unique numeric identifier (Id). Id 0 is the Off scene and cannot be modified. Ids may be reused when a user deletes scenes and creates new ones.

### 2. Device connection

The smart lamp uses Bluetooth LE version 4.0 or later. However, to take advantage of some of the features described in this document, a version 4.2 central with Data Length Extension (DLE) should be used.

The Luke Roberts mobile app maintains connections to all lamps in range while it is running in the foreground. When a connection cannot be established because another central is connected, the app shows “In Use” (iOS) or “Waiting” (Android). Care should be taken not to keep connections from third-party Bluetooth LE centrals for too long to avoid impairing the user experience.

## Automatic Disconnect

Lamps running firmware 1.1.1 or later automatically terminate bluetooth connections after 8 seconds of inactivity. Please contact us if your use case requires a persistent connection.

## Security Code

Starting with firmware 1.1.0, lamps can have a security code set up by the Luke Roberts mobile apps. Devices with a security code accept Bluetooth connections as usual, but reject API commands with return code FC.

# 3. Service and Characteristics

The lamp exposes three services: Device Information, a custom control service and a firmware update service.

Use the custom control service 44092840-0567-11E6-B862-0002A5D5C51B to access the API.

## Selecting a user scene (deprecated)

Write one byte to characteristic 44092844-0567-11E6-B862-0002A5D5C51B to change the currently selected scene. Invalid scene ids are ignored.

Supported in firmware 1.0 or later

Deprecated in firmware version 1.0.7. Replaced by [05 Select Scene](#).

## External API endpoint

Use characteristic 44092842-0567-11E6-B862-0002A5D5C51B to write commands and receive indications with their response.

	<i>Prefix</i>	<i>V</i>	<i>Opcode</i>	<i>Parameters</i>		
Ping	A0	01	00	(none)		
Query Scene			01	II id		
Immediate Light			02	XX flags	DD DD duration	(variable length content)
Brightness			03	PP percent		
Color Temperature			04	KK KK Kelvin		
Select Scene		02	05	II id		
Next Scene by Brightness			06	DD direction		
Adjust Color Temperature			07	KK KK Kelvin increment		
Relative Brightness			08	PP percent		

Responses deliver a status code in byte 0.

00	Success
81	Invalid Parameters
84	Invalid Id
87	Invalid Version
BC	Bad Command
FC	Forbidden

## 00 Ping@V=01

Test your connection. This command has no parameters.

### Structure

A0	01	00
----	----	----

### Response

00
----

Supported in firmware 1.0.6 or later

## 00 Ping@V=02

Test your connection. This command has no parameters.

### Structure

A0	02	00
----	----	----

### Response

00	VV
----	----

VV     Highest supported API version supported by this lamp.

Supported in firmware 1.0.7 or later

## 01 Query Scene

Return a scene name.

Can be used to retrieve the list of scenes in the order of their appearance in the Luke Roberts app.

### Structure

A0	01	01	II
----	----	----	----

II     Scene Id to query

## Response

00	01	NN	XX	XX	XX	XX	XX	XX	...	00
----	----	----	----	----	----	----	----	----	-----	----

00     Status OK

01     Response Version 01

NN     Next scene id

XX...   null-terminated UTF-8 string, up to 20 bytes

If II is an invalid id, the status code is 84 (Invalid Id) and no payload data is returned.

To retrieve the whole list of scenes

- Use 00 for II
- query scene
- repeat with NN for II until it is FF

Note that extended MTU may be required depending on the scene name.

Supported in firmware 1.0.6 or later

## 02 Immediate Light

Modify the current light scene. Modifications are lost on power-down. The Luke Roberts app is currently unable to render previews for transient scenes.

### Structure

A0	01	02	XX	DD	DD				
			01			SS	HH	HH	BB
			02			KK	KK	BB	

XX     Flags that specify what content is present

DDDD   Duration in ms, 0 for infinite

SS     Saturation 0 .. 255

HHHH   Hue 0 .. 65535

HHHH   Kelvin 2700 .. 4000 for white light when SS = 0

KKKK   Kelvin 2700 .. 4000

BB     Brightness 0 .. 255

This command can contain one or two sub-packets, depending on which bits are set in XX.

If XX[0] is set, append the {SS HH HH BB} packet to modify the color in the Uplight.

If XX[1] is set, append the {KK KK BB} packet to change the brightness and color temperature in the Downlight.

Both packets (and bits) can be included in one command.

When a duration DDDD > 0 is specified, the light scene will revert to its original state after the duration elapses.

Response

00
----

00      Status OK

Supported in firmware 1.0.6 or later

### 03 Modify Brightness

Lowers the brightness of the currently selected light scene.

This modification is reverted when the user selects a different scene via app or Click Detection.

Structure

A0	01	03	PP
----	----	----	----

PP      Brightness in Percent, 0 ... 100

Response

00
----

00      Status OK

Supported in firmware 1.0.7 or later.

### 04 Modify Color Temperature

Selects a different color temperature for the Downlight part of the selected light scene.

This modification is reverted when the user selects a different scene via app or Click Detection.

Structure

A0	01	04	KK	KK
----	----	----	----	----

KKKK      Kelvin 2700 .. 4000  
Input value is clamped at 2700K and 4000K respectively.

Response

00
----

00      Status OK

Supported in firmware 1.0.7 or later.

## 05 Select Scene

This characteristic incorporates the functionality of the Selected Scene characteristic as an external API command.

Structure

A0	02	05	II
----	----	----	----

II          Scene id to select

Send 0xFF as II to select the default scene, e.g. the one that would also appear when powering up the lamp.

Response

00
----

00          Status OK

Supported in firmware 1.0.7 or later.

## 06 Next Scene by Brightness

Selects the next brighter or less bright scene from the list of scenes.

Structure

A0	02	06	DD
----	----	----	----

DD          direction, signed integer

DD can take the values -1 and 1, where 1 selects the next brighter scene and -1 selects the next less bright scene.

Response

00
----

00          Status OK

Supported in firmware 1.0.7 or later.



## 07 Adjust Color Temperature

Increments or decrements the currently visible color temperature in the Downlight part of the selected scene.

Structure

A0	02	07	KK	KK
----	----	----	----	----

KKKK Kelvin Increment

The resulting color temperature is clamped at 2700K and 4000K respectively.

Resulting values that are out of range are not indicated as an error but rather clamped into the valid range.

Response

00
----

00 Status OK

Supported in firmware 1.0.7 or later.

## 08 Relative Brightness

Scales the brightness of the current scene by multiplication. As opposed to [03 Modify Brightness](#), this command respects the brightness set by previous 03 and 08 commands.

Structure

A0	02	08	PP
----	----	----	----

PP percentage

The current brightness is multiplied by  $(PP / 100)$  and the result is clamped into the range (0 ... 1)

Response

00
----

00 Status OK

Supported in firmware 1.0.7 or later.

## 4. Revision History

1.3	2019-07-09	Added details for automatic disconnect and security code
1.2	2018-10-09	Added Select Scene, Next Scene by Brightness, Adjust Color Temperature, Relative Brightness, Ping@V=02. Deprecated <a href="#">writing the selected scene characteristic</a> .
1.1	2018-07-31	Added “Modify Brightness” and “Modify Color Temperature” commands
1.0	2018-06-28	Initial Release & RFC