Helena

User Manual Appendix

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Appendix A   Configuration with nrf Connect

This section is only valid for Firmware revisions ≥ 1.0.0

The Configuration of states and group can be done with the App "nrf Connect" from Nordic Semiconductors.

Step 1. Plug in battery to Helena and open the App. Select SCANNER and then start scanning. Helena will then appear in the device list and you can press the CONNECT button.
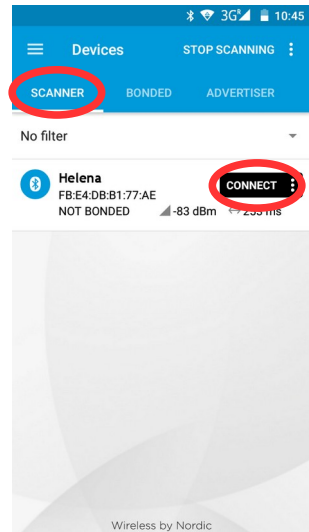

Image 1: Scanning

Step 2. After you connected to Helena, you will see a list of available services. Select the `Light Control Service`. Compare the UUIDs if the service is named `Unknown Service`.
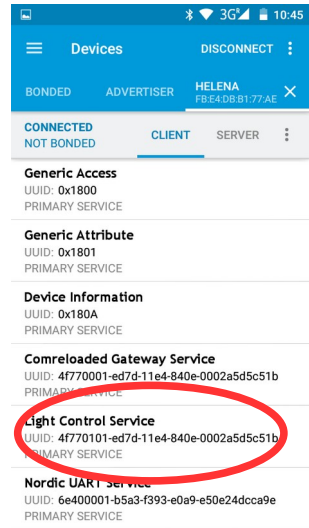

Image 2: Services list

Step 3. Go to the `Light Control Point Characteristic` (it may be named `Unknown Characteristic`, in this case compare the UUIDs again) and enable the indications by touching the arrow-up and arrow-down symbol.
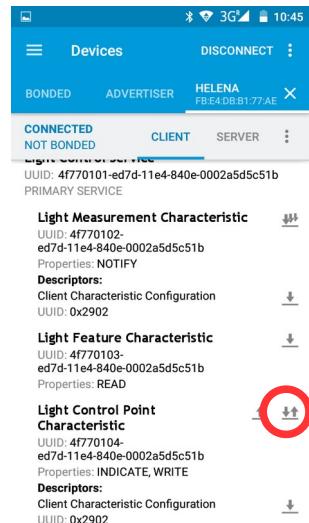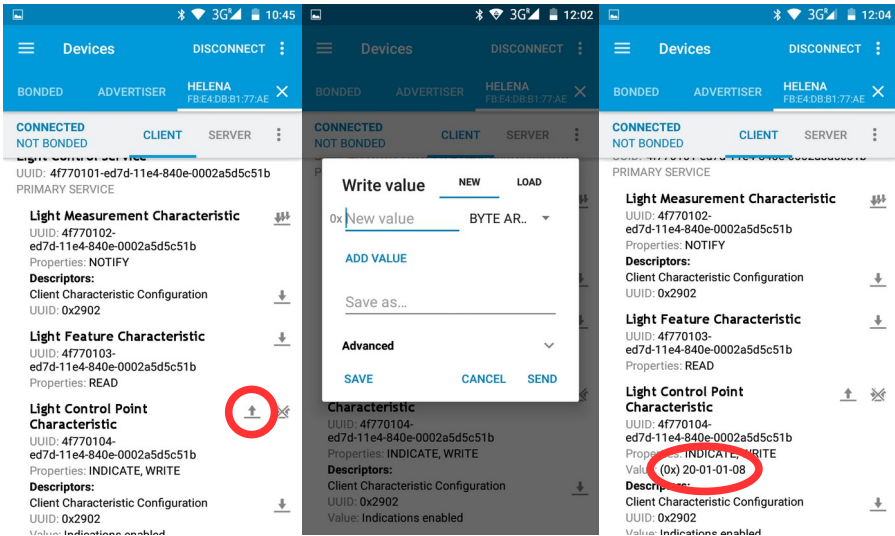

Image 3: Light Control Service

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Image 4: Send commands   Image 5: Send commands   Image 6: Command reply

Step 4. After you have enabled the indications for the Light Control
Point you are ready to send commands to read out the actual
configuration and to change it, too. To send a command you
have to click the arrow-up symbol, then you can enter the
desired command. The Control will reply with at least 3 bytes:
The first byte is always $0x20$.
The second byte is the command this reply belongs to.
The third byte is a status byte.

Status Byte Value	Description
$0x01$	Success
$0x02$	Not supported
$0x03$	Invalid parameter
$0x04$	Operation failed

Depending on the command there my be additional data bytes.

A.1.   En-/Decoding modes

With the Helena firmware each mode consists of one setup byte and one intensity byte:

setup flags						intensity	
reserved	reserved	reserved	reserved	output cloned	pitch comp.	spot enabled	flood enabled

setup value	active drivers	meaning of intensity byte
0x00	off	
0x01	flood	output current in %
0x02	spot	output current in %
0x03	flood & spot	output current in %
0x05	flood pitch compensated	target illumination in lux
0x06	sport pitch compensated	target illumination in lux
0x07	flood & spot pitch compensated	target illumination in lux
0x09	both drivers	output current in %
0x0A	both drivers	output current in %
0x0D	flood pitch compensated on both drivers	target illumination in lux
0x0E	spot pitch compensated on both drivers	target illumination in lux

With the Billina firmware each mode consists of one setup byte and two intensity bytes.

setup flags	main beam intensity in %	high beam intensity in %

reserved	reserved	reserved	reserved	reserved	high beam enabled	reserved	main beam enabled

setup value	active drivers
0x00	off
0x01	main beam
0x04	high beam
0x05	main & high beam

A.2.   Read Group Configuration

The command for reading the current group configuration is `0x03`.

The Control Point will reply with the actual number of groups in the fourth byte.

Image 7: Read group configuration command

Image 8: Group configuration reply
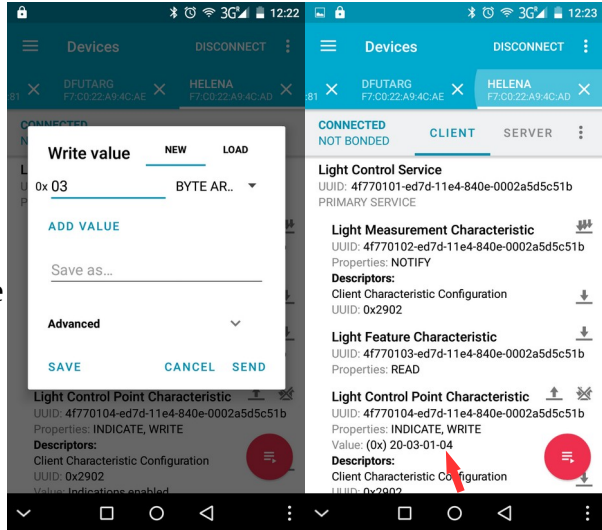
A.3.   Change Group Configuration

The command for changing the number of groups is $0x04$. The new number of groups is followed as second byte (the complete command in Image 9 changes the configuration to two groups).
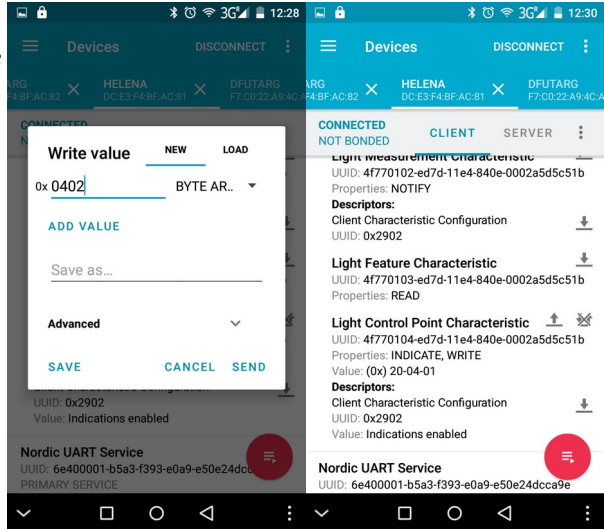

Image 9: Group change command

Image 10: Group change reply

A.4.   Read Mode Configuration

The command for reading the current mode configuration is `0x05`. Followed by the mode number to start reading[1].

The reply is a list of all modes, where the first byte of each state represent the setup and the second the intensity[2].
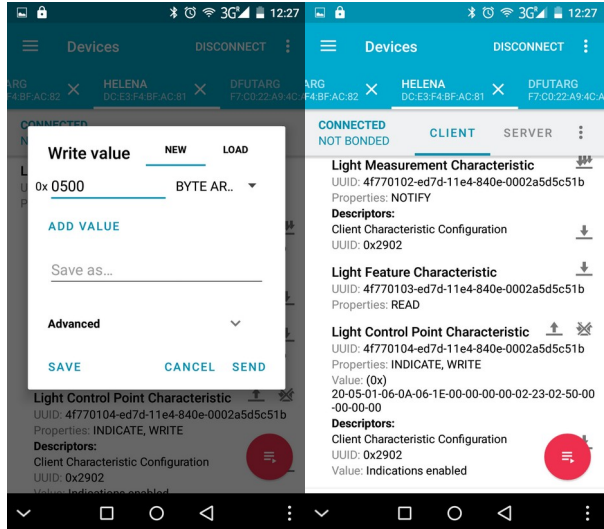

Image 11: Read state configuration command

Image 12: State configuration reply

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1   Internally the mode counter begins with 0, so to change mode 1 you have to select 0x00, for Mode 2 0x01, for Mode 3 0x02, ...

2   These are hexadecimal numbers, please use one of the plenty available online HEX to DEC converters.

The reply in Image 12 represents the following setting:

Mode 1	Spot Pitch compensated with 10lux
Mode 2	Spot Pitch compensated with 35lux
Mode 3	Not used
Mode 4	Not used
Mode 5	Spot constant with 35%
Mode 6	Spot constant with 80%
Mode 7	Not used
Mode 8	Not used

A.5. Change Mode Configuration

The command for changing the mode configuration is 0x06. Followed by the mode number to start[3] and a list of new mode. It is not necessary to change all modes, it is possible to change only a few, too. The command in Image 13 will start with Mode 3 and has only a list of two modes. So this command will
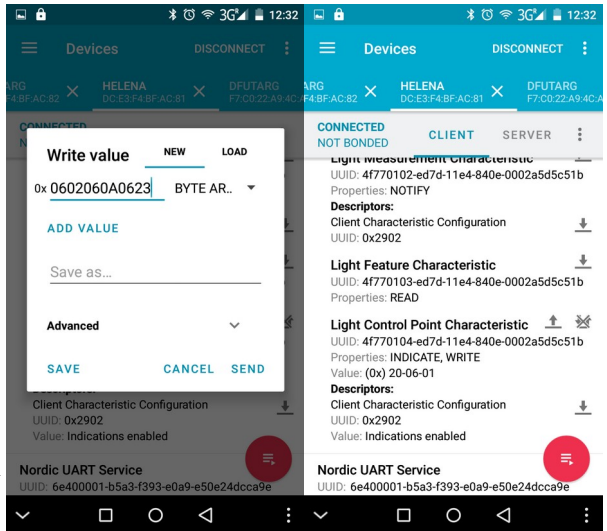

Image 13: State change command

Image 14: State change reply

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3   Internally the mode counter begins with 0, so to change Mode 1 you have to select 0x00, for Mode 2 0x01, for Mode 3 0x02, ...

result in changing mode 3 to Spot pitch compensated with 10lux and Mode 4 to Spot pitch compensated with 35lux. The other states will keep their prior setting.

A.6. Read Preferred Mode

The command for reading the preferred mode is `0x0D`.
The Control Point will reply with the current mode number used as preferred mode.

A.7. Set Preferred Mode

The command for setting the preferred mode is `0x0E`, followed by the mode number to be used as preferred mode. Use an invalid mode number (>= 8) to deactivate the preferred mode.

A.8. Read Temporary Mode

The command for reading the temporary mode is `0x0F`.
The Control Point will reply with the current mode number used as temporary mode.

A.9. Set Temporary Mode

The command for setting the temporary mode is `0x10`, followed by the mode number to be used as temporary mode. Use an invalid mode number (>= 8) to deactivate the temporary mode.

A.10. Firmware Update

First download the new firmware archive (normally named
`Helena_app.zip`) from the Github repository in the folder
`Firmware/Helena_NRF_SDK10/bin/debug`. To initiate the
Firmware Update Process you have to plug in the lamp while keeping
the button pressed. The Helena will activate the bootloader (indicated
with the red LED).

Now open the App and start scanning. Connect to the "DfuTarg" and
start the update by tapping on the small DFU icon in the top. Then
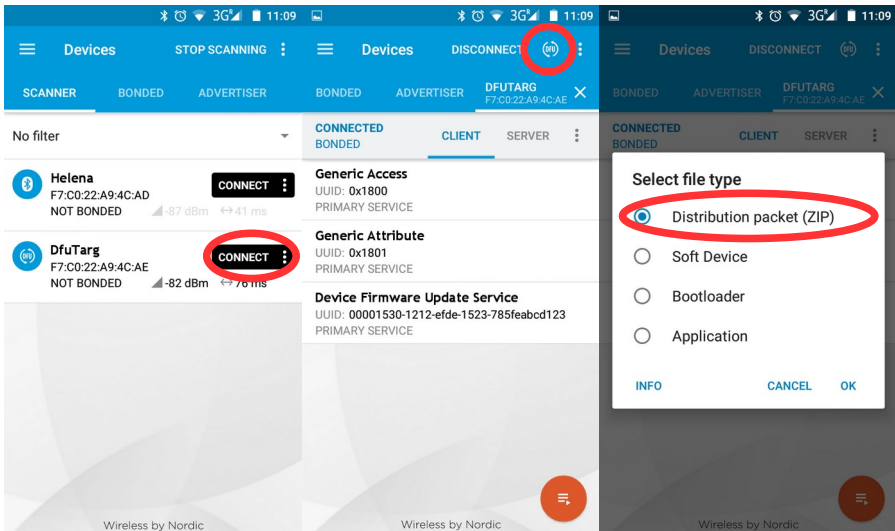select the previously downloaded firmware archive.

Image 15: scan and connect to DfuTarg

Image 16: start update

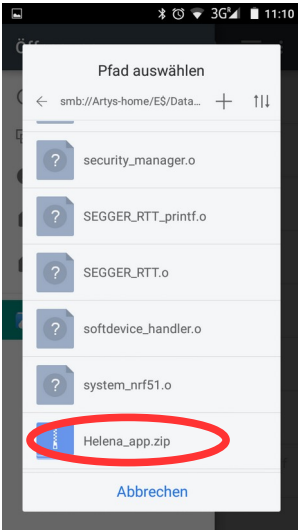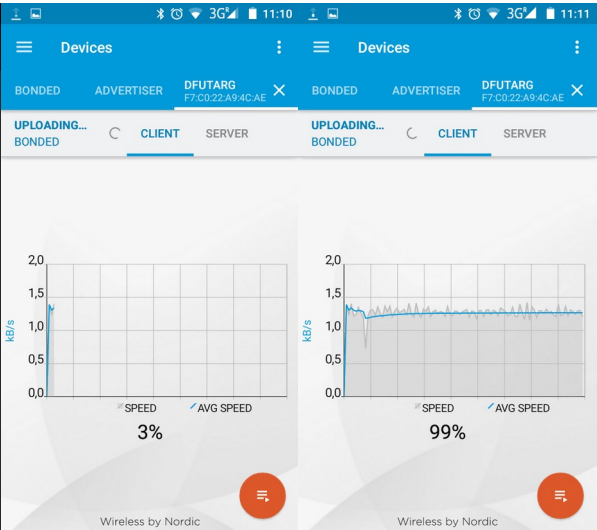Image 17: select Distribution packet (ZIP)

Image 18: select firmware archive   Image 19: update starting   Image 20: update finished