Light Control Service

Base UUID: 4F770000ED7D-11E4-840E-0002A5D5C51B

Service UUID: 0x0101

Abstract:

This service exposes measurement data and control methods for lights intended to use with a bicycle.

Summary:

Service Dependencies:

This service is not dependent upon any other service.

GATT Requirements

Sub-Procedure	Server Requirement
Write Characteristic Value	C1
Notifications	Mandatory
Indications	C1
Read Characteristic Descriptors	Mandatory
Write Characteristic Descriptors	Mandatory

C1: Mandatory if the LC Control Point characteristic is supported, otherwise excluded for this service.

Transport Dependencies

Transport	Supported
Classic	false
Low Energy	true
High Speed	false

Error Codes

Name	Code	Description

Service Characteristics

Overview	Properties		Security	Descriptors			
Name: Light Measurement **Requirement:** Mandatory	**Property**	**Requirement**	None	**Overview**	**Permissions**		
	Read	Optional		**Name:** Client Characteristic Configuration **Requirement:** Mandatory	**Perm.**	**Req.**	
	Write	Excluded			Read	Mandatory	
	WriteWithoutResponse	Excluded			Write	Mandatory	
	SigneWrite	Excluded					
	Notify	Mandatory					
	Indicate	Excluded					
	WriteableAuxiliaries	Excluded					
	Broadcast	Excluded					
	ExtendedProperties						
Name: Light Feature **Requirement:** Mandatory	**Property**	**Requirement**	None	None			
	Read	Mandatory					
	Write	Excluded					
	WriteWithoutResponse	Excluded					
	SigneWrite	Excluded					
	Notify	Excluded					
	Indicate	Excluded					
	WriteableAuxiliaries	Excluded					
	Broadcast	Excluded					
	ExtendedProperties						
Name: Light Control Point **Requirement:** Optional	**Property**	**Requirement**	None	**Overview**	**Permissions**		
	Read	Excluded		**Name:** Client Characteristic Configuration **Requirement:** Mandatory	**Perm.**	**Req.**	
	Write	Mandatory			Read	Mandatory	
	WriteWithoutResponse	Excluded			Write	Mandatory	
	SigneWrite	Excluded					
	Notify	Excluded					
	Indicate	Mandatory					
	WriteableAuxiliaries	Excluded					
	Broadcast	Excluded					
	ExtendedProperties						

Light Measurement

Characteristic UUID: 0x0102

Summary:

The Light Measurement characteristic is a variable length structure containing a Flags field and, based on the contents of the Flags field, may contain one or more additional fields as shown in the table below.

Value Fields

Names	Field Req.	Format	Additional Information
Flags	Mandatory	16bit	Bit Field
Setup	Mandatory	8bit	Bit Field

Flags — Bit Field:

Bit	Size	Name	Definition Key	Definition Value
0	1	Intensity Field Present	0	False
			1	True
1	1	Flood Status Field Present	0	False
			1	True
2	1	Spot Status Field Present	0	False
			1	True
3	1	Flood Output Power Field Present	0	False
			1	True
4	1	Spot Output Power Field Present	0	False
			1	True
5	1	Temperature Field Present	0	False
			1	True
6	1	Input Voltage Field Present	0	False
			1	True
7	1	Pitch Field Present	0	False
			1	True
8	8	Reserved fur future use		

Setup — Bit Field:

Bit	Size	Name	Definition Key	Definition Value
0	1	Flood active	0	False
			1	True
1	1	Spot active	0	False

Name	Requirement	Type	Description

Top continuation bit field:

Bit	Size	Name	Definition Key	Definition Value
			1	True
2	1	Pitch compensation	0	Disabled
			1	Enabled
3	1	Output cloned	0	False
			1	True
4	1	External Taillight	0	Disabled
			1	Enabled
5	1	External Brakelight	0	Disabled
			1	Enabled
6	2	Reserved fur future use		

Name	Requirement	Type	Description
Intensity **Information:** Unit is is in percentage with a resolution of 1, in relation to maximum output power. In a setup with activated pitch compensation the unit is in lux with a resolution of 1, representing the illuminance under intended use **Unit:** org.bluetooth.unit.percentage org.bluetooth.unit.illuminance.lux **Exponent:** Decimal, 0	Optional	uint8	Only valid if flood and/or spot are enabled.
Flood Status	Optional	8bit	Bit Field (see below)

Flood Status Bit Field:

Bit	Size	Name	Definition Key	Definition Value
0	1	Overcurrent Indicator	0	Not active
			1	active
1	1	Voltage Limiting Indicator	0	Not active
			1	active
2	1	Temperature Limiting Indicator	0	Not active
			1	active
3	1	Duty Cycle Limit Indicatior	0	Not active
			1	active
4	4	Reserved fur future use		

Name	Requirement	Type	Description
Spot Status	Optional	8bit	Bit Field (see below)

Spot Status Bit Field:

Bit	Size	Name	Definition Key	Definition Value
0	1	Overcurrent Indicator	0	Not active
			1	active
1	1	Voltage Limiting	0	Not active

					Indicator	1	active
				2	1	Temperature Limiting Indicator	0	Not active
							1	active
				3	1	Duty Cycle Limit Indicatior	0	Not active
							1	active
				4	4	Reserved fur future use		

Field	Requirement	Type	
Flood Output Power **Information:** Unit is in watts with a resolution of 1/1000. **Unit:** org.bluetooth.unit.power.watt **Exponent:** Decimal, -3	Optional	uint16	
Spot Output Power **Information:** Unit is in watts with a resolution of 1/1000. **Unit:** org.bluetooth.unit.power.watt **Exponent:** Decimal, -3	Optional	uint16	
Temperature **Information:** Unit is in degree Celsius with a resolution of 1. **Unit:** org.bluetooth.unit.thermodynamic_temperature.degree_celsius **Exponent:** Decimal, 0	Optional	int8	
Input Voltagge **Information:** Unit is in volts with a resolution of 1/1000. **Unit:** org.bluetooth.unit.electric_potential_difference.volt **Exponent:** Decimal, -3	Optional	uint16	
Pitch **Information:** Unit is in degree with a resolution of 1. **Unit:** org.bluetooth.unit.plane_angle.degree **Exponent:** Decimal, 0	Optional	int8	

Light Feature

Characteristic UUID: 0x0103

Summary:

The Light Feature characteristic is used to report a list of features supported by the device.

Value Fields

Names	Field Req.	Format	Additional Information				
Light Feature	Mandatory	16bit	Bit Field				

Bit Field:

Bit	Size	Name	Definition	
			Key	Value
0	1	Flood Supported	0	False
			1	True
1	1	Spot Supported	0	False
			1	True
2	1	Pitch Compensation Supported	0	False
			1	True
3	1	Mode Change Supported	0	False
			1	True
4	1	Mode Configuration Supported	0	False
			1	True
5	1	Mode Grouping Supported	0	False
			1	True
6	1	LED configuration check supported	0	False
			1	True
7	1	Sensor offset calibration supported	0	False
			1	True
8	1	Current limitation supported	0	False
			1	True
9	1	External Taillight supported	0	False
			1	True
10	1	External Brake-light supported	0	False
			1	True
11	5	Reserved fur future use		

Light Control Point

Characteristic UUID: *0x0104*

Summary:

The Light Control Point characteristic is used to request a specific function to be executed on the receiving device.

Value Fields

Names	Field Req.	Format	Additional Information		
Op Codes	Mandatory	uint8	Enumerations		
			Key	**Value**	**Description**
			1	Request mode Count	Request the number of modes supported by the light. The response is Op Code 0x20 followed by the mode count (in uint8). The maximum number of supported modes is 16 and has always to be a power of 2.
			2	Set Mode	Initiate the procedure to put the light into a specific mode. The requested mode is sent as an uint8 with preceding Op Code 0x02 operand. The response to this control point is Op Code 0x20. To put the light in off mode send an invalid mode number.
			3	Request group configuration	Request current mode grouping configuration. The response is Op Code 0x20 followed by the current number of groups (in uint8). The number of modes available in each group is the quotient of mode count and group count.
			4	Set group configuration	Initiate the procedure to change the group configuration. The new number of groups (must be a power of two) is sent as an uint8 with preceding Op Code 0x04 operand. The response to this control point is Op Code 0x20.
			5	Request mode configuration	Request a list of mode configurations. The mode list start number is sent as uint8 with preceding Op Code 0x05 operand. The response to this control point is Op Code 0x20 followed by the list as response parameter. NOTE: If the list exceeds the

						maximum length of the indication packet it will be truncated. To receive the complete list of modes the host has to call this procedure multiple times with different start values.
					6	Set mode configuration	Initiate the procedure to change a set of mode configurations. The new configurations are sent as an uint8 (representing the first mode number to change) followed by a list of configurations (each containing an uint8 representing the setup and an uint8 representing the intensity) with preceding Op Code 0x06 operand. The response to this control point is Op Code 0x20
					7	Request LED configuration	Request the LED configuration setup. The response is Op Code 0x20 followed by the number of installed LEDs of the flood driver followed by the number if LEDS if the spot driver.
					8	Start LED configuration check	Initiate the procedure to start the detection of installed LED configuration. The response to this control point is Op Code 0x20 followed by the number of installed LEDs of the flood driver followed by the number if LEDS if the spot driver.
					9	Request Sensor Offset	Request the current Sensor Offset Values. The response is Op Code 0x20 followed by the offset values for x, y, z axis (in int16 each). If no offset values are available yet, the response value shall be set to 0x04.
					10	Start Sensor Offset Calibration	Initiate the procedure to start the sensor offset calibration. The response to this control point is 0x20 followed by the new offset values for x, y and z-axis (int16 each).
					11	Request Current Limit	Request the current current limits. The response is Op Code 0x20 followed by the current limits (in int8 representing %)
					12	Set Current Limit	Initiate the procedure to change the current limits. The new limits is sent as a pair of int8 (the first representing the limit for flood, the second for spot, both in %) with preceding Op Code 0x0C operand. The

					response to this control point is Op Code 0x20.
			32	Response Code	The response code is followed by the requested Op Code, the response value and optionaly the response parameter
			0-0	Reserved for future use	
			9-31	Reserved for future use	
			33-255	Reserved for future use	
Parameter Value	Optional	variable	Refer to the Op Code table above for additional information on the possible values for this filed		
Request Op Code **Information:** The Request Op Code is a sub field of the Parameter Value for "Response Code" Op Code. C1: This Field is Mandatory for "Response Code" Op Code, otherwise this field is Excluded.	C1	uint8	Refer to the Op Code table above for additional information on the possible values for this filed		
Response Value **Information:** The Request Op Code is a sub field of the Parameter Value for "Response Code" Op Code. C1: This Field is Mandatory for "Response Code" Op Code, otherwise this field is Excluded.	C1	uint8	Enumerations | Key	Value	Description
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1	Success	Response for successful operation.
2	Op Code not supported	Response if unsupported Op Code is received.
3	Invalid Parameter	Response if Parameter received does not meet the requirements of the service or is outside of the supported range of the Light.
4	Operation Failed	Response if the requested procedure failed
0-0	Reserved for future use	
5-255	Reserved for future use				
Response Parameter **Information:** The Response Parameter is a sub field of the Parameter Value for "Response Code" Op Code. C2:This Field is Optional for "Response Code" Op Code, otherwise this field is Excluded.	C2	variable	Note: The Response Parameter Value of the response to the Control Point is a variable length field to allow a list of different values defined by the Service Specification		