

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				
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Name: Light Control Point Requirement: Optional	Property	Requirement	None	Overview	Permissions	
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	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			
			Bit	Size	Name	Definition
						Key Value
			0	1	Intensity Field Present	0 True
						1 False
			1	1	Flood Status Field Present	0 True
						1 False
			2	1	Spot Status Field Present	0 True
						1 False
			3	1	Flood Output Power Field Present	0 True
						1 False
Mode	Mandatory	uint8	4	1	Spot Output Power Field Present	0 True
						1 False
			5	1	Temperature Field Present	0 True
						1 False
			6	1	Input Voltage Field Present	0 True
						1 False
			7	1	Pitch Field Present	0 True
						1 False
			8	8	Reserved fur future use	
			Enumerations:			
			Key		Value	
			0		Off	
			1		Flood	
			2		Spot	
			3		Flood & Spot	
			4		Flood Pitch Compensated	

			<table><tr><td>5</td><td>Spot & Pitch Compensated</td></tr><tr><td>6</td><td>Flood & Spot Pitch Compensated</td></tr><tr><td>7</td><td>Flood (both driver used)</td></tr><tr><td>8</td><td>Spot (both drivers used)</td></tr><tr><td>9</td><td>Flood Pitch Compensated (both drivers used)</td></tr><tr><td>10</td><td>Spot Pitch Compensated (both drivers used)</td></tr><tr><td>11-255</td><td>Reserved for future use</td></tr></table>	5	Spot & Pitch Compensated	6	Flood & Spot Pitch Compensated	7	Flood (both driver used)	8	Spot (both drivers used)	9	Flood Pitch Compensated (both drivers used)	10	Spot Pitch Compensated (both drivers used)	11-255	Reserved for future use																															
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Intensity Information: Unit is in percentage with a resolution of 1, in relation to maximum output power. In an adaptive mode 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	None																																													
Flood Status	Optional	8bit	<table><tr><td colspan="5">Bit Field</td></tr><tr><td rowspan="2">Bit</td><td rowspan="2">Size</td><td rowspan="2">Name</td><td colspan="2">Definition</td></tr><tr><td>Key</td><td>Value</td></tr><tr><td rowspan="2">0</td><td rowspan="2">1</td><td rowspan="2">Overcurrent Indicator</td><td>0</td><td>Not active</td></tr><tr><td>1</td><td>active</td></tr><tr><td rowspan="2">1</td><td rowspan="2">1</td><td rowspan="2">Voltage Limiting Indicator</td><td>0</td><td>Not active</td></tr><tr><td>1</td><td>active</td></tr><tr><td rowspan="2">2</td><td rowspan="2">1</td><td rowspan="2">Temperature Limiting Indicator</td><td>0</td><td>Not active</td></tr><tr><td>1</td><td>active</td></tr><tr><td rowspan="2">3</td><td rowspan="2">1</td><td rowspan="2">Duty Cycle Limit Indicator</td><td>0</td><td>Not active</td></tr><tr><td>1</td><td>active</td></tr><tr><td>4</td><td>4</td><td>Reserved fur future use</td><td colspan="2"></td></tr></table>	Bit Field					Bit	Size	Name	Definition		Key	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 Indicator	0	Not active	1	active	4	4	Reserved fur future use		
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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 Voltagege 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	8bit	Bit Field				
			Bit	Size	Name	Definition	
						Key	Value
			0	1	Flood Supported	0	True
						1	False
			1	1	Spot Supported	0	True
						1	False
			2	1	Pitch Compensation Supported	0	True
						1	False
			3	1	Mode Change Supported	0	True
						1	False
			4	1	Mode Configuration Supported	0	True
						1	False
			5	1	Mode Grouping Supported	0	True
						1	False
			6	1	LED configuration check supported	0	True
						1	False
			7	1	Reserved fur future use	1	

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	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.
			3	Request mode configuration	Request a list of mode configurations. The mode list start number is sent as uint8 with preceding Op Code 0x03 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.
			4	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 0x04 operand. The response to this control point is Op Code 0x20. To put the light in off mode send an invalid mode number.
			5	Configure	Initiate the procedure to change

				Mode	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 mode and an uint8 representing the intensity) with preceding Op Code 0x05 operand. The response to this control point is Op Code 0x20			
			6	Configure Group	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 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	Strat 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.			
			32	Response Code	The response code is followed by the requested Op Code, the response value and optionally 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	C1	uint8	Enumerations <table><tr><th>Key</th><th>Value</th><th>Description</th></tr></table>			Key	Value	Description
Key	Value	Description						

of the Parameter Value for "Response Code" Op Code. C1: This Field is Mandatory for "Response Code" Op Code, otherwise this field is Excluded.			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		