



OBLO
L I V I N G

BLE Smart Plug API Specification

Project: OBLO

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1 PREFACE

1.1 AUDIENCE

This document is intended for the people who are involved in the process of developing OBLO BLE Smart Plug device and other people involved in development of application used for Smart Plug device control.



2 INTRODUCTION

2.1 **PURPOSE**

We are pleased to provide API specification for BLE Smart Plug. This is initial version of API containing all relevant information about GATT profile services and attributes implemented by plug. This version should be used as a solid frame for further device API definition and not as a final API used for product mass production.

3 GENERAL PRODUCT INFORMATION

3.1 PLUG FUNCTIONALITIES

OBLO SPW35-B-00 is Bluetooth® low energy controlled electronic switch with overload protection and power measurement features. It can operate as a standalone unit or can be controlled by a suitable application on mobile device.

Relocate Smart Plug to another socket at home to control another device.

OBLO SPW35-B-00 communicates with other Bluetooth® low energy devices through 2.4GHz radio link supported by IEEE 802.15.1 standard protocol for Bluetooth communication.

Additional information about the plug can be found at <http://blueplug.oblo.rs/>



Figure 1 : Android control application

Functionalities

- Power state control (ON/OFF)
- Measurement monitoring
- Current measurement and history graph presentation
- Scheduled control (Timer)
- Power limit set/remove
- LED notification control
- Plug distance calculation
- Over the air firmware update

Power Limit

- Software power limit
- Works based on averaging power consumption measurements

Measurement Data

- Active power
- Reactive power
- Current
- Voltage
- Power factor
- Timer

Timer

- Allows setting relative timer to turn on or off power
- Timer can be disabled at any time
- Timer status can be monitored
- Second precision

4 BLE PROFILES AND SERVICES

4.1 GENERIC ACCESS (ASSIGNED NUMBER: 0x1800)

This service contains generic information about the device.

Characteristics description:

- Device Name – Symbolic name of the device as seen in scanning process.
- Appearance – The external appearance of the device. The value is predefined Bluetooth enumeration used to express type of the device (i.e. Watch, Keyboard, Barcode Scanner etc.).
- Peripheral Privacy Flag - This characteristic defines whether privacy is currently in use within this device.
- Peripheral Preferred Connection Parameters – Defines four parameters of connection: Minimum and Maximum connection interval, Latency and Timeout. Each parameter value is one unsigned 16 bit integer.

Uuid	Description	Data Type	Properties
0x2A00	Device Name	<i>UTF-8 string</i>	<i>Rd</i>
0x2A01	Appearance	<i>16 bit</i>	<i>Rd</i>
0x2A02	Peripheral Privacy Flag	<i>boolean</i>	<i>Rd Wr</i>
0x2A03	Reconnection Address	<i>uint48</i>	<i>Wr</i>
0x2A04	Peripheral Preferred Connection Parameters	<i>uint16s</i>	<i>Rd</i>

Table 1 : Generic access service

4.2 GENERIC ATTRIBUTE (ASSIGNED NUMBER: 0x1801)

Service Changed characteristic is used to connected devices that services have changed (i.e., added, removed or modified). *Value* is two 16-bit *Attribute Handles* concatenated together indicating the beginning and ending *Attribute Handles* affected by an addition, removal, or modification to a GATT-based service on the server.

Uuid	Description	Data Type	Properties
0x2A05	Service Changed	<i>uint16s</i>	<i>Ind</i>

Table 2 : Generic attribute service



4.3 DEVICE INFORMATION (ASSIGNED NUMBER: 0x180A)

This service does not contain valid information therefore is not used at the moment.

System ID – consists of a structure with two fields. The first field are the LSOs and the second field contains MSOs. This is a 64-bit structure which consists of a 40-bit manufacturer-defined identifier concatenated with a 24 bit unique Organizationally Unique Identifier (OUI). The OUI is issued by the IEEE Registration Authority and is required to be used in accordance with IEEE Standard 802-2000.6 while the least significant 40 bits are manufacturer defined.

PnP ID - The PnP ID characteristic is a set of values that used to create a device ID value that is unique for this device. Included in the characteristic is a Vendor ID Source field, a Vendor ID field, a Product ID field and a Product Version field. These values are used to identify all devices of a given type/model/version using numbers

Uuid	Description	Data Type	Properties
0x2A23	System ID	<i>uint64</i>	<i>Rd</i>
0x2A24	Model Number String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A25	Serial Number String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A26	Firmware Revision String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A27	Hardware Revision String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A28	Software Revision String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A29	Manufacturer Name String	<i>UTF-8 string</i>	<i>Rd</i>
0x2A2A	IEEE 11073-20601 Regulatory Certification Data List	<i>*reg-cert-data-list</i>	<i>Rd</i>
0x2A50	Pnp ID		<i>Rd</i>

Table 3 : Device information service

*reg-cert-data-list = Regulatory Certification Data List - Refer to IEEE 11073-20601 Regulatory Certification Data List characteristic

4.4 POWER MEASUREMENT (ASSIGNED NUMBER: 0xAA10)

Measurement Frequency Characteristic (0xAA17) contains Client Characteristic Configuration (0x2902) used to activate notification of all power parameters each N seconds defined within Measurement Frequency Characteristic Value.

Uuid	Description	Data Type	Properties
0xAA11	Active Power	<i>sint16</i>	<i>Rd Nfy</i>



0xAA12	Reactive Power	<i>sint16</i>	<i>Rd Nfy</i>
0xAA13	Current	<i>sint16</i>	<i>Rd Nfy</i>
0xAA14	Voltage	<i>sint16</i>	<i>Rd Nfy</i>
0xAA15	Power Factor	<i>sint16</i>	<i>Rd Nfy</i>
0xAA16	Power Limit	<i>uint16</i>	<i>Rd Wr</i>
0xAA17	Measurement Frequency(averaging interval of power parameters)	<i>uint32</i>	<i>Rd Wr Nfy</i>

Table 4 : Power measurement service

4.5 TIMER, RELAY AND RGB (ASSIGNED NUMBER: 0xAA20)

Uuid	Description	Data Type	Properties
0xAA21	Timer Value in milliseconds	<i>uint32</i>	<i>Rd Wr</i>
0xAA22	Timer Status (NO =0, ON=1, OFF=2)	<i>uint8</i>	<i>Rd Wr</i>
0xAA23	Relay Status(OFF=0, ON=1)	<i>uint8</i>	<i>Rd Wr Nfy</i>
0xAA24	RGB Led Indication(OFF=0, ON=1)	<i>uint8</i>	<i>Rd Wr</i>

Table 5 : Timer, Relay and RGB service

4.6 CUSTOM DEVICE INFORMATION (ASSIGNED NUMBER: 0xAA40)


Uuid	Description	Data Type	Properties
0xAA41	Firmware Version	<i>UTF-8 string</i>	<i>Rd</i>
0xAA42	Manufacturer Name	<i>UTF-8 string</i>	<i>Rd</i>
0xAA43	Device Name	<i>UTF-8 string</i>	<i>Rd Wr</i>
0xAA44	Init OAD (boots up the Plug for OAD process)	<i>uint8</i>	<i>Wr</i>

Table 6 : Custom device information service

4.7 ENERGY CONSUMPTION (ASSIGNED NUMBER: 0xAA80)

Uuid	Description	Data Type	Properties
0xAA81	Energy Consumption	<i>uint32</i>	<i>Rd</i>
0xAA82	Consumption Time (time expresses how long there was consumption)	<i>uint32</i>	<i>Rd</i>

Table 7 : Energy consumption service



4.8 OAD (ASSIGNED NUMBER: 0xF00FFC004514000B000000000000000)

Uuid	Description	Data Type	Properties
0x0xFFC1	Current Image Identification	<i>uint16</i>	<i>Wwr Wr Nfy</i>
0xFFC2	Image block (18bytes). Block no. (2 bytes), OAD image block (16 bytes)	<i>18 byte array</i>	<i>Wwr Wr Nfy</i>

Table 8 : Over the Air update service

* Properties abbreviations: Rd-Read, Wr-Write, Nfy-Notify, Ind - Indication, Wwr-Write without response.