PoolLAB 1.0®

PoolLab 1.0® Bluetooth® API

Interface Documentation

02/03/2022

Version 2

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Glossary

Acronym	Description
BLE	Bluetooth® Low Energy
BLE-Stack	Piece of software or code that handles BLE connections on a platform
Platform	Reference to a device's overlaying operating system (e.g. Android, iOS)
MOSI	Master Out Slave In – Data channel from the master to the slave device
MISO	Master In Slave Out – Data channel from the slave to the master device
M2M	Machine-to-Machine
GAP	Generic Access Profile
GATT	Generic Attribute Profile
L2CAP	Logical link control and adaption protocol
Central Device	The device which initiates the connection to the peripheral device (e.g. your smartphone). Sometimes referred to as the **master**.
Peripheral Device	The device receiving the connection from a central device (e.g. the PoolLab®). Sometimes also referred to as the **slave**.
CCCD	"Client Characteristic Configuration Descriptor", refer to Bluetooth® manual
CUDD	"Characteristic User Description Descriptor", refer to Bluetooth® manual
OEM	Original Equipment Manufacturer

Bluetooth® Core Profile

The PoolLab® is equipped with a Bluetooth® Low Energy radio. It does **not** support dual mode operation (Bluetooth® Classic). The PoolLab® implements a *GAP peripheral* device and uses *GATT* to exchange data with a central device.

The information in this chapter are typically not required to communicate with the PoolLab® using a consumer device. They are provided for developers who wish to connect their embedded devices with the PoolLab® (M2M Communication).

The Bluetooth® software stack on consumer devices (e.g. Smartphone, Laptop or PC) will automatically choose the correct connection parameters.

The PoolLab®'s **GAP settings** are listed below:

Device Name	PoolLab®
Device MAC address	60:44:7A:NN:NN:NN
Appearance	Unknown / Generic
Attribute MTU size (byte)	23
Link Layer max TX payload size (byte)	27
Link Layer max RX payload size (byte)	27
Link Layer Privacy	OFF
Discovery Mode	General
Advertising Type	Connectable undirected advertising
Filter Policy	Scan: Any – Connect: Any
Advertisement channel map	37 + 38 + 39
Advertisement config	Min/Max 20/50ms for 30sec, 1000/1500ms after
Connection interval min/max (ms)	10 / 500
Slave latency	0
Connection supervision timeout (ms)	5000

The PoolLab®'s **L2CAP** settings are shown below:

Num. of logical channels	1
Num. of PSMs	1
L2CAP MTU size (byte)	23
L2CAP MPS size (byte)	23

The PoolLab®'s **security configuration** is shown below:

Security Mode	Mode 1
Security Level	No authentication, no encryption
I/O Capabilities	No Input No Output
Strict Pairing	No
Bonding requirement	No Bonding
Encryption Key size (bytes)	16

Bluetooth® Custom Profile

To transfer data between your central device and the PoolLab® a custom Bluetooth® service (‘**PoolLabSvc**”) is implemented. This service consists of three characteristics and each characteristic contains a “Client Characteristic Configuration Descriptor” (**CCCD**) and a “Characteristic User Description Descriptor” (**CUDD**).

To understand the principles of BLE communication using GATT profiles/services, please refer to the official documentation. A good starting point for developers is
https://www.bluetooth.com/specifications/gatt/generic-attributes-overview

Custom service GATT-profile:

Service or Descriptor Name	**UUID size**	**UUID**
PoolLabSvc	128 bit	A7EE04A9-507B-4910-A528-B619D5501924
– CommandMISO	128 bit	2FF18B59-195D-4EE1-B78C-0CBDE3EFF9C2
–– CCCD	16 bit	2902
–– CUDD	16 bit	2901
– CommandMOSI	128 bit	91BFA536-3036-4901-8813-3635FCED7B90
–– CCCD	16 bit	2902
–– CUDD	16 bit	2901
– MISO_Signal	128 bit	C2296C06-C7E0-4657-B42E-C8330826454C
–– CCCD	16 bit	2902
–– CUDD	16 bit	2901

C-Style compiler definitions:

```
#define BLE_POOL_SERVICE_UUID           "A7EE04A9-507B-4910-A528-B619D5501924"
#define BLE_POOL_CHR_MOSICMD_UUID       "91BFA536-3036-4901-8813-3635FCED7B90"
#define BLE_POOL_CHR_MISOCMD_UUID       "2FF18B59-195D-4EE1-B78C-0CBDE3EFF9C2"
#define BLE_POOL_CHR_MISOSIGNAL_UUID    "C2296C06-C7E0-4657-B42E-C8330826454C"
```

Bluetooth® Connection Setup

1. Create a BLE-Connection

To create a connection between your central device and a PoolLab® a call to your platform's BLE-library connect-function should be sufficient. **Do not pair/bond with the PoolLab®!** It does not support pairing or bonding, however some platforms will report a bogus successful pairing result when pairing is requested.

2. Discover the GATT-services

Usually the connection handle created in (1) will offer a method to initiate service discovery. Wait until all services have been discovered and search the connection handle for the **PoolLabSvc**.

3. Discover the PoolLabSvc details

Create a handle/object for the **PoolLabSvc** found in (2) and initiate the service detail discovery process. Wait for the discovery process to finish.

4. Find the characteristics

Typically your service object created in (3) will offer a way to iterate through all of it's characteristics. Find the three characteristics of the service by comparing their UUIDs (see chapter *Bluetooth® Custom Profile*for the list of UUIDs). Typically you will create a handle or an object representing each of the characteristics.

5. Enable notifications of the MISO_Signal characteristic

Find the **CCCD** of the **MISO_Signal** characteristic and enable notifications either by using your platform's dedicated method or by writing the byte-sequence "**01 00**" to the **CCCD**. As the PoolLab® does not implement bonding this step needs to be repeated at every connection.

Bluetooth® Interface: Command flow

Interaction with the PoolLab® can begin once the connection is set up and all characteristics have been discovered and the **MISO_Signal** notifications are enabled.

In general the PoolLab® uses a Command-And-Response scheme, with the exception that some commands do not produce a response (e.g. device reset). These commands can be assumed to have executed successfully if a Bluetooth®-error is returned from your central device's BLE-stack (e.g. connection lost / timeout).

To send data to the PoolLab®, a write-request to the **CommandMOSI** characteristic must be executed. The maximum payload of the write-request is *128 byte*. The PoolLab® will ignore write-requests with oversized payloads. However, shorter payloads are okay and encouraged as they are processed faster. Minimum size is 1 byte. All bytes after the last used byte in a command must be zero.

Once a command was sent the central device should wait for the PoolLab®'s **MISO_Signal** notification. The data returned with the notification are **NOT** the result of the operation and can be discarded, the **MISO_Signal** is only a confirmation that your command has executed and response data are available to be read from the **CommandMISO** characteristic.

After receiving the notification from the **MISO_Signal** the central device should execute a *characteristic-read* operation on the **CommandMISO** characteristic. The read will return the response-data from your last request. The response will always contain 250 byte and must be read completely.

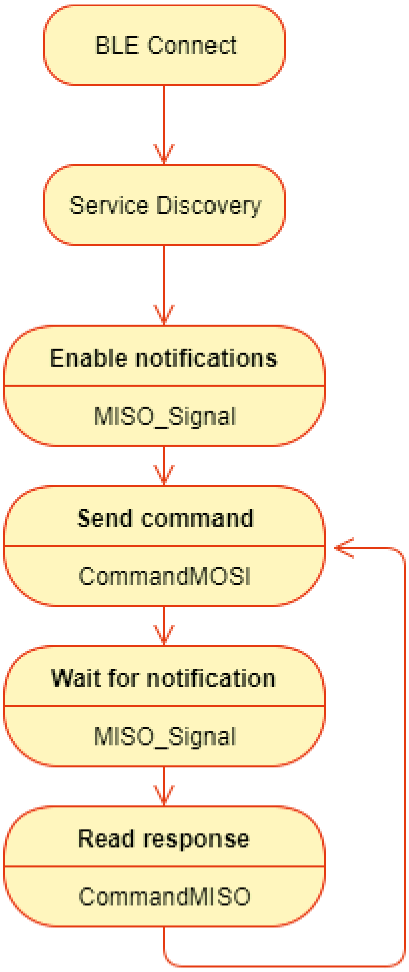

Illustration 1: Command Flow

Bluetooth® Interface: API

General Command Format

Commands sent to the PoolLab® must be in this format:

B0	B1	B2	B3	B4	B5	B6	Bn
Preamble (0xAB)	Command ID (low byte)	Command ID (high byte)	Parameter Byte 0	Parameter Byte 1	Parameter Byte 2	Parameter Byte 3	Parameter Byte (n-3)

The command ID is a two-byte (16bit) integer, the lower part occupies **B1**, the higher part **B2**. The endianness used throughout the protocol is **little-endian**.

Available commands and their IDs are listed below.

Command name	ID	Description
PCMD_API_GET_INFO	0x01	Returns information about the device
PCMD_API_SET_TIME	0x02	Set the PoolLab®'s date/time
PCMD_API_RESET_DEVICE	0x03	Immediately restarts the PoolLab® (BLE conn. will fail)
PCMD_API_SLEEP_DEVICE	0x04	Send the device into sleep-mode/standby
PCMD_API_GET_MEASURES	0x05	Read measurement results from flash
PCMD_API_RESET_MEASURES	0x06	Delete all saved measurement results from the PoolLab®

```
#define PCMD_API_GET_INFO                0x01
#define PCMD_API_SET_TIME                0x02
#define PCMD_API_RESET_DEVICE            0x03
#define PCMD_API_SLEEP_DEVICE            0x04
#define PCMD_API_GET_MEASURES            0x05
#define PCMD_API_RESET_MEASURES          0x06
```

PCMD_API_GET_INFO

Command ID: 0x0001h

Parameters: None

B0	B1	B2	B3	B4	B5	B6	Bn
0xAB	0x01	0x00	0x00	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7
0xAB	Active ID (low byte)	Active ID (high byte)	FW-Version (low byte)	FW-Version (high byte)	Resultcount (low byte)	Resultcount (high byte)	Device Time (1st byte)
B8	**B9**	**B10**	**B11**	**B12**	**B13**	**B14**	**B15**
Device Time (2nd byte)	Device Time (3rd byte)	Device Time (4th byte)	Device Time (5th byte)	Device Time (6th byte)	Device Time (7th byte)	Device Time (8th byte)	MAC Address (1st Byte)
B16	**B17**	**B18**	**B19**	**B20**	**B21**	**B22**	**B23**
MAC Address (2nd Byte)	MAC Address (3rd Byte)	MAC Address (4th Byte)	MAC Address (5th Byte)	MAC Address (6th Byte)	Battery Level (low byte)	Battery Level (high byte)	0x00
B24	**B25**	**B26**	**B27**	**B28**	**B29**	**B30**	**B31-127**
0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Response fields are:

Field name	Size	Description
Active ID	2 byte	OEM ID of the device. See “OEM variants” for details
FW-Version	2 byte	Firmware Version Code
Resultcount	2 byte	Num. of saved measurement results on the device
Device Time	8 byte	Current date/time (in seconds since 01/01/1970 (Unixtime))
MAC Address	6 byte	MAC-Address of the PoolLab®
Battery Level	2 byte	Battery charge level in percent (0..100)

```
struct dev_info_response {
        uint8_t         preamble;
        uint16_t        active_id;
        uint16_t        fw_version;
        uint16_t        result_count;
        uint64_t        unix_time;
        uint8_t         mac_address[6];
        uint16_t        battery_level;
};
```

PCMD_API_SET_TIME

Command ID: 0x0002h

Parameters: Unixtime (seconds) as 32bit-integer

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x02	0x00	Unixtime (1st byte)	Unixtime (2nd byte)	Unixtime (3rd byte)	Unixtime (4th byte)	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	Result Code	0x00	0x00	0x00	0x00	0x00	0x00

Result Code	**Value**
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

PCMD_API_RESET_DEVICE

Command ID: 0x0003h

Parameters: none

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x03	0x00	0x00	0x00	0x00	0x00	0x00

Response:

None, the BLE connection will fail due to the PoolLab immediately restarting. The error returned is platform dependant, some platforms will report a write-error when sending the command, some will only notice the PoolLab® being offline after the supervision timeout.

PCMD_API_SLEEP_DEVICE

Command ID: 0x0004h
Parameters: none

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x04	0x00	0x00	0x00	0x00	0x00	0x00

Response:
None, the BLE connection will fail due to the PoolLab® immediately disabling it’s radio and going into deep-sleep mode. The error returned is platform dependant, some platforms will report a write-error when sending the command, some will only notice the PoolLab® being offline after the supervision timeout.

The result of this command is the same as if the user would press and hold the power button on the PoolLab® until the display turns off. In this state the PoolLab® should use less than 20µA (typical 8.5µA) and only retains what is necessary to keep the internal real-time-clock running.

PCMD_API_GET_MEASURES

Command ID: 0x0005h
Parameters: flash cell ID, cell high/low indicator

The PoolLab®'s measurement result memory is organized into 16 flash cells, each containing up to 16 measurements. A flash cell is divided into a lower and an upper half, containing 8 results per half.

Every PCMD_API_GET_MEASURES command will read and return either the upper or lower half of a flash cell, so with every command 8 measurement results are returned. The lower half of the cell contains the first 8 results of this cell and the upper half contains the last 8 results, so the lower half should be read first.

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x05	0x00	Flash Cell ID (low byte)	Flash Cell ID (high byte)	Flash Cell half selector	0x00	0x00

Parameter Name	Size	Value Range	Description
Flash Cell ID	2 byte	0 – 15	The flash cell to read and return
Flash Cell half selector	1 byte	0x00 or 0x01	Select either upper or lower half the flash cell 0x00 for lower half, 0x01 for upper half

Response:

The first byte is always the preamble, followed by 16 bytes for the first measurement, repeated 8 times for 8 measurements (the preamble is not repeated). If more measurements are read than saved the remaining bytes are all zero. For example if only 5 measurement results are saved in the requested lower half of a cell, the first 81 bytes are used *((16*5) + Preamble = 81)* and the remaining bytes are zero, and the upper half will be all zero.

Continued on next page.

The best practice is to first use the GET_INFO command which will tell you how many measurement results are saved (field "Resultcount"). The amount of GET_MEASURES commands needed to retrieve all measurement results can be calculated like this:

Read-Commands-required = 1 + (Resultcount / 8)

When reading all measurement results from the PoolLab®, each cell (possibly except the last required) will be addressed twice, once for each half.

The response is formatted like this:

B0	B1	B2	B3	B4	B5	B6	B7
0xAB	FM_1[0]	FM_1[1]	FM_1[2]	FM_1[3]	FM_1[4]	FM_1[5]	FM_1[6]
B8	**B9**	**B10**	**B11**	**B12**	**B13**	**B14**	**B15**
FM_1[7]	FM_1[8]	FM_1[9]	FM_1[10]	FM_1[11]	FM_1[12]	FM_1[13]	FM_1[14]
B16	**B17**	**B18**	**B19**	**B20**	**B21**	**B22**	**B23**
FM_1[15]	FM_2[0]	FM_2[1]	FM_2[2]	FM_2[3]	FM_2[4]	FM_2[5]	FM_2[6]
B24	**B25**	**B26**	**B27**	**B28**	**B29**	**B30**	**B31**
FM_2[7]	FM_2[8]	FM_2[9]	FM_2[10]	FM_2[11]	FM_2[12]	FM_2[13]	FM_2[14]
B32	**B33**	**B34**	**B35**	**B36**	**B37**	**B38**	**B39**
FM_2[15]	FM_3[0]	FM_3[1]	FM_3[2]	FM_3[3]	FM_3[4]	FM_3[5]	FM_3[6]

....

B120	B121	B122	B123	B124	B125	B126	B127
FM_8[7]	FM_8[8]	FM_8[9]	FM_8[10]	FM_8[11]	FM_8[12]	FM_8[13]	FM_8[14]

B128
FM_8[15]

Continued on next page.

Each measurement result (FM_1..8) has a size of 16 bytes with the following fields:

Field name	Size	Description
Result ID	2 byte	ID of the result. The ID is incremented by 1 for each new saved result. The ID-counter is reset when the RESET_MEASURES command is executed.
Measure Type	1 byte	Measurement scenario ID, see chapter “Measurement Types” for a list of all scenario IDs
Measure Status	1 byte	0: Result is OK 1: Result is Underrange 2: Result is Overrange
Date/Time	4 byte	Date/time (in seconds since 01/01/1970 (Unixtime)) when this result was saved
Result Value	4 byte	Measurement result value, represented as single-precision floating point number (IEEE 754-2008)
Reserved	4 byte	Reserved for special use

In code, a flash measurement result data type might be defined like this:

```
struct flash_measurement_result {
        uint16_t        measure_id;
        uint8_t         measure_type;
        uint8_t         measure_status;
        uint32_t        measure_timestamp;
        float           measure_value;
        uint8_t         reserved[4];
};
```

PCMD_API_RESET_MEASURES

Command ID: 0x0006h
Parameters: none

The PoolLab®'s measurement result memory is reset, all flash cells are zeroed and the result counter is reset as well. This cannot be undone so make sure to have all data read from the PoolLab® (using the GET_MEASURES command).

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x06	0x00	0x00	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	Result Code	0x00	0x00	0x00	0x00	0x00	0x00

Result Code	Value
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

PCMD_API_SET_CONTRAST_PLUS

Command ID: 0x0008

Parameters: none

Increase PoolLab®'s LCD contrast by 1 level. If already at maximum level, an error is returned (result code 0x02), otherwise result code will be 0x01, and the next two bytes of the response will be a 16 bit integer (LSB first) that indicates the new LCD contrast level. Contrast level range is 18 to 38

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x08	0x00	0x00	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	Result Code	Contrast, lower byte	Contrast, upper byte	0x00	0x00	0x00	0x00

Result Code	Value
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

PCMD_API_SET_CONTRAST_MINUS

Command ID: 0x0009
Parameters: none

Decrease PoolLab®'s LCD contrast by 1 level. If already at minimum level, an error is returned (result code 0x02), otherwise result code will be 0x01, and the next two bytes of the response will be a 16 bit integer (LSB first) that indicates the new LCD contrast level. Contrast level range is 18 to 38

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x09	0x00	0x00	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	Result Code	Contrast, lower byte	Contrast, upper byte	0x00	0x00	0x00	0x00

Result Code	Value
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

PCMD_API_GET_PPM_MGL

Command ID: 0x000A

Parameters: none

Read device unit configuration. A value of 0 indicates the device is in 'ppm' mode, a value of 1 indicates the device is in 'mg/L' mode.

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x0A	0x00	0x00	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	Unitmode, 0 or 1	0x00	0x00	0x00	0x00	0x00	0x00

Result Code	Value
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

PCMD_API_GET_PPM_MGL

Command ID: 0x000B
Parameters: none

Set device unit configuration. A value of 0 sets the device into 'ppm' mode, a value of 1 sets the device into 'mg/L' mode.

B0	B1	B2	B3	B4	B5	B6	B7-127
0xAB	0x0B	0x00	Unitmode, 0 or 1	0x00	0x00	0x00	0x00

Response:

B0	B1	B2	B3	B4	B5	B6	B7-250
0xAB	0x00	0x00	0x00	0x00	0x00	0x00	0x00

Result Code	Value
PCMD_RESPONSE_OK	0x01
PCMD_RESPONSE_ERR	0x02

Measurement Result Types

Type ID	Scenario Name	Result Unit	Result Range	Result Decimals
1	Total Chlorine	Cl2 (ppm)	0.00 – 0.60	2
2	Ozone	O3 (ppm)	0.00 – 4.00	2
3	Chlorine Dioxide	ClO2 (ppm)	0.00 – 11.40	1
4	(removed)	–	–	–
5	Active Oxygen	O2 (ppm)	0.00 – 30.00	1
6	Bromine	Br (ppm)	0.00 – 13.50	1
7	Hydrogen Peroxide	H2O2 (ppm)	0.00 – 2.90	2
8	Free Chlorine	fCl (ppm)	0.00 – 6.00	2
9	pH	pH	6.50 – 8.40	2
10	Total Alkalinity	TA (ppm)	0.00 – 300.00	0
11	Cyanuric Acid	Cya (ppm)	0.00 – 160.00	0
12	Hydrogen Peroxide HR	H2O2 (ppm)	0.00 – 200.00	0
13	Total Hardness HR	CaCO3 (ppm)	0.00 – 500.00	1
14	Isothiazilinone	C3H3NOS (ppm)	0.00 – 200.00	1
15	Nitrite LR	NO2 (ppm)	0.00 – 1.65	2
16	Nitrate	NO3 (ppm)	0.00 – 50.00	1
17	Phosphate	PO4 (ppm)	0.00 – 1.50	2
18	Iron LR	Fe (ppm)	0.00 – 1.00	2
19	Dissolved Oxygen	DO2 (ppm)	0.00 – 10.00	2
20	Ammonia	NH4 (ppm)	0.00 – 1.30	2
21	Silica	SiO2 (ppm)	0.00 – 6.00	2
22	Copper	Cu (ppm)	0.00 – 5.00	2
23	Calcium	CaCO3 (ppm)	0.00 – 500.00	0
24	Ozone i.p.o. Chlorine	O3 (ppm)	0.00 – 4.00	2

Colored lines indicate availability of the test on different OEM versions:
- Green: available on standard PoolLab 1.0® OEM
- Yellow: only available on ISOLab 1.0 OEM
- Cyan: currently in development for FinWell Pro OEM

Measurement Result Types

Type ID	Scenario Name	Result Unit	Result Range	Result Decimals
25	Magnesium	Mg (ppm)	0.00 – 100.00	0
26	Potassium	K (ppm)	0.80 – 12.00	1
27	ph HR	pH	8.00 – 9.30	2
28	ph LR	pH	5.20 – 6.80	2
29	ph HR (Saltwater)	pH	8.00 – 9.30	2
30	ph HR (Seawater)	pH	8.00 – 9.30	2
31	ph LR (Saltwater)	pH	5.20 – 6.80	2
32	ph LR (Seawater)	pH	5.20 – 6.80	2
33	ph MR (Saltwater)	pH	6.50 – 8.40	2
34	ph MR (Seawater)	pH	6.50 – 8.40	2
35	Total Hardness	CaCO3 (ppm)	0.00 – 200.00	0
36	ph MR	pH	6.50 – 8.40	2
37	Iodine	I2 (ppm)	0.00 – 21.47	2
38	Urea	CH4N2O (ppm)	0.00 – 2.51	2
39	PHMB	PHMB (ppm)	5.00 – 60.00	0
40	Total Alkalinity (Seawater)	TA (ppm)	0.00 – 200.00	0
41	Total Chlorine (liquid)	tCl (ppm)	0.03 – 8.00	2
42	Ozone (liquid)	O3 (ppm)	0.00 – 4.07	2
43	Chlorine Dioxide (liquid)	ClO2 (ppm)	0.00 – 11.42	2
44	Active Oxygen (liquid)	O2 (ppm)	0.00 – 30.00	1
45	Bromine (liquid)	Br (ppm)	0.00 – 13.55	1
46	Hydrogen Peroxide (liquid)	H2O2 (ppm)	0.00 – 2.90	2
47	Free Chlorine (liquid)	fCl (ppm)	0.03 – 8.00	2
48	pH (liquid)	pH	6.5 – 8.4	2
49	Ozone i.p.o. Chlorine (liquid)	O3 (ppm)	0.00 – 4.07	2

Colored lines indicate availability of the test on different OEM versions:
- Green: available on standard PoolLab 1.0® OEM
- Yellow: only available on ISOLab 1.0 OEM
- Cyan: currently in development for FinWell Pro OEM

OEM Variants

The PoolLab is available under different brand names (e.g. “9-in-1 Multitest”, “ISOLab 1.0”, ...) but all use the same Bluetooth® LE API described in this paper.

The difference between these variants, excluding the design of the case/package, is that some measurements can only be done on some of the variants. For example the ISOLab OEM Variant is only capable of testing ID-14 (Isothiazilinone), and it’s also the only variant which includes this test.

Current OEM variants and their IDs are:

OEM ID	OEM Name	Remarks
0	INTERNAL	Internal Version. No LCD output, no measurement types
1	PoolLab 1.0	
2	9-in-1 Multitest	Like PoolLab
3	ISOLab 1.0	Can only do measurement type 14
4	Aquaviva	Like PoolLab
5	FinWell Pro	
6	INTERNAL	Internal Version
7	FOLKPOOL	Like PoolLab
8	INTERNAL	Internal Version
9	INTERNAL	Internal Version
10	INTERNAL	Internal Version
11	Poolsana	Like PoolLab
12	Dutrion	Like PoolLab
13	SPC	Like PoolLab
14	Steinbach	Like PoolLab
15	INTERNAL	Internal Version
16	Evolution	Like PoolLab

This document will be updated when new OEM variants become available. However, from a developers point of view, all OEM versions are identical in their BLE interface.

Errata and Document Revisions

Version	Date	Author	Changes
1	26.02.2018	MOP	Initial Release
2	02.03.2022	DWE	• Device MAC address changed to: 00:A0:50:NN:NN:NN • New command: PCMD_API_SET_CONTRAST_PLUS • New command: PCMD_API_SET_CONTRAST_MINUS • New command: PCMD_API_GET_PPM_MGL command id 0x000A • New command: PCMD_API_GET_PPM_MGL command id 0x000B • Added parameters: Magnesium 0.00 - 100.00; Potassium 0.80 - 12.00; ph HR 8.00 - 9.3; ph LR 5.20 - 6.80; ph HR (Saltwater) 8.00 - 9.30; ph HR (Seawater) 8.00 - 9.30; ph LR (Saltwater) 5.20 - 6.80; ph LR (Seawater) 5.20 - 6.80; ph MR (Saltwater) 6.50 - 8.40: ph MR (Seawater) 6.50 - 8.40; Total Hardness 0.00 - 200.00; ph MR 6.50 - 8.40; Iodine 0.00 - 21.47; Urea 0.00 - 2.51; PHMB 5.00 - 60.00; Total Alkalinity (Seawater) 0.00 - 200.00 Total Chlorine (liquid) 0.03 - 8.00; Ozone (liquid) 0.00 - 4.07 Chlorine Dioxide (liquid) 0.00 - 11.42; Active Oxygen (liquid) 0.00 - 30.00; Bromine (liquid) 0.00 - 13.55; Hydrogen Peroxide (liquid) 0.00 - 2.90; Free Chlorine (liquid) 0.03 - 8.00; pH (liquid) 6.5 - 8.4; Ozone i.p.o. Chlorine (liquid) 0.00 - 4.07 • OEM variant changes: 1 / PoolLab 1.0 / Remarks deleted 2 / 9-in-1 Multitest / Remark: "Like PoolLab" 4 / Aquaviva / Remark: "Like PoolLab" 5 / FinWell Pro / Remarks deleted 6 / INTERNAL / Internal Version 7 / FOLKPOOL / Remark: "Like PoolLab" 8 / INTERNAL / Internal Version 9 / INTERNAL / Internal Version 10 / INTERNAL / Internal Version 11 / Poolsana / "Like PoolLab" 12 / Dutrion / "Like PoolLab" 13 / SPC / "Like PoolLab" 14 / Steinbach / "Like PoolLab" 15 / INTERNAL / Internal Version 16 / Evolution / "Like PoolLab"

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