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	Bluetooth Profile Specifications	Par :	rop
		Version :	C
		Statut:	Valide

Intended use:

This document aims to describe how to communicate with Sylvac Bluetooth low energy technology¹ enabled products.

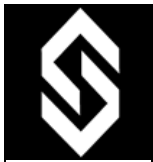
To the attention of:

Developers who want to integrate Sylvac Bluetooth® instruments to custom apps or software solution.

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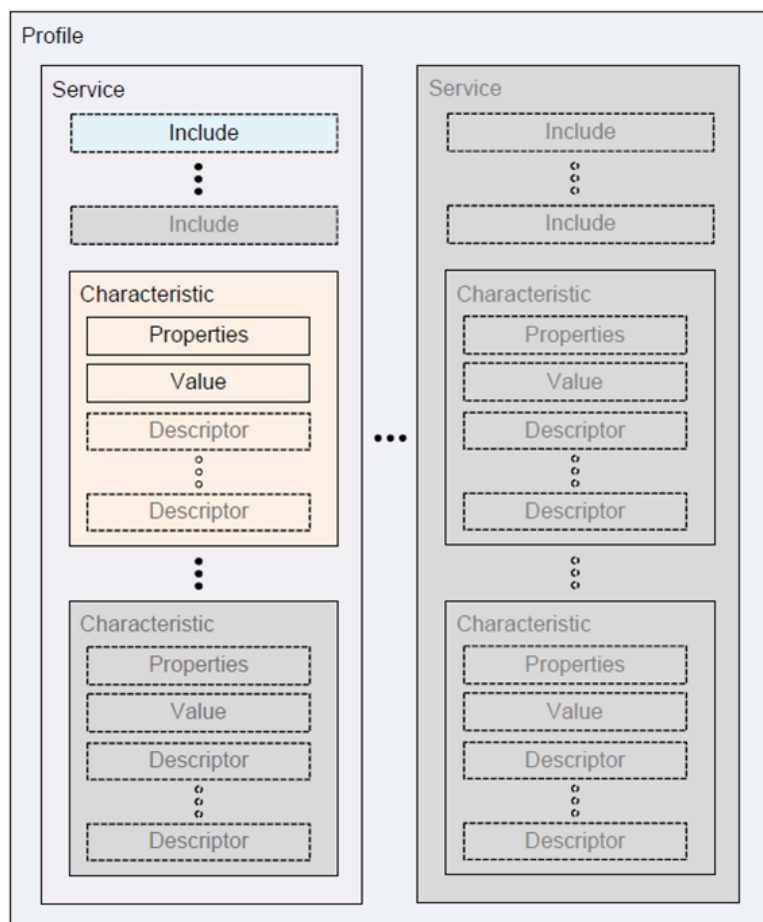


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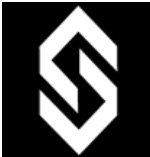
Introduction

The Generic Attributes (GATT) define a hierarchical data structure that is exposed to connected Bluetooth Low Energy (LE) devices.

The top level of the hierarchy is a profile, which is composed of one or more services necessary to fulfill a use case. A service is composed of characteristics or references to other services. A characteristic consists of a type (represented by a UUID), a value, a set of properties indicating the operations the characteristic supports and a set of permissions relating to security. It may also include one or more descriptors (metadata or configuration flags) relating to the owning characteristic.



Ref: <https://www.bluetooth.com/>

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GATT Services

Profile :

Base UUID	Service	Short UUID	Characteristics	UID	Example
0000xxxx-0000-1000-8000-00805F9B34FB	GAP	1800	Device Name	2A00	« SY295 »
			Appearance	2A01	0x0540
			PPCP	2A04	0xFFFF FFFF 0000 FFFF
	DIS	180A			
			Model Number String	2A24	« 805550110 »
			Serial Number String	2A25	« 17449001 »
			Firmware Revision String	2A26	« v1.24o 11.10.2017 »
			Hardware Revision String	2A27	« nRF8001D »
			Manufacturer Name String	2A29	« Sylvac SA »
	BAS	180F	Battery Level	2A19	0x32
	SDS	5000	Measurement	5020	2'147'483'647
			Parameters	5021	0x1200
C1B2xxx-CAAF-6D0E-4C33-7DAE30052840	SMS	5000	Data Send	5010	« +001.234\r »
			Remote Request	5012	« UNI?\r »
			Remote Response	5013	« MM\r »
			Free 1	5014	« 123ABCDEFGHJKLMNOPR »
			Free 2	5015	« 123ABCDEFGHJKLMNOPR »
			Free 3	5016	« 123ABCDEFGHJKLMNOPR »

Generic Access Profile Service (GAP)

See Bluetooth® SIG adopted specifications at [assigned-numbers](#)

Generic Attribute (GATT)

See Bluetooth® SIG adopted specifications at [gatt-specification-supplement-4](#)

Device information Service (DIS)

See Bluetooth® SIG adopted specifications at [device-information-service-1-1](#)

Battery Service (BAS)

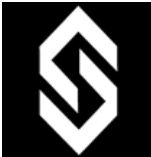
See Bluetooth® SIG adopted specifications at [battery-service-1-0](#)

Simple Data Service (SDS)

This service is used to transmit raw data and its corresponding parameters (unit, etc.).

This service is not a Bluetooth® SIG adopted one, it is a hybrid construction from Sylvac (custom service with Bluetooth® base UUID) to allow broadcasting on its characteristics.

➔ See Sylvac specifications file within Developer folder
 “SPE-PM 292-1744-01 – Simple Data Service Specification”

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Sylvac Metrology Service (SMS)

Some characteristics of this service have been made to replace Sylvac cable and thus to transfer plain ASCII text commands (see instrument specific command list within instrument specific manual).

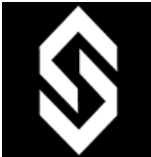
These three cases are identified and accessible through separated characteristics

- A data is sent by pressing the instrument's button (Data send)
- A command is sent to the instrument (Remote request)
- A response to a command is sent from the instrument (Remote response)

→ See Sylvac specifications file within Developer folder
 "SPE-PM 292-1746-01 – Sylvac Metrology Service Specification"

Remark

Enabling the whole set of characteristics may slightly increase current consumption (especially notify). End software should only enable the needed characteristics within used services.

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GAP Settings

Generic Access Profile defines the device

- Roles (Peripheral, Broadcaster, etc.)
- Mode and procedure (Discovery, Connection, Bonding)

Advertising data format


Sylvac devices expose the following Advertising Data (AD) elements

Length	AD type	Advertising data
2	Flags	Specified by Bluetooth SIG
6	Complete local name	With simple profile or when ready for bonding
3	Shortened local name	Only for reconnection after bonding
12	Service data	Model Number String (Device Information Service)
7	Service data	Measurement (signed int32) in display units $\times 10^4$

Service data is not available with HID over GATT profile.

Service data/Measurement is not intended to measure without connection but more to visualize the instrument to grab and connect among others.

➔ See advertising data format detail in annex.

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Security

Sylvac instruments have the ability to be switched between secured and non-secured Bluetooth profile according to the customers need.

The “secured” profile is provided to be used in configuration needing paired link but not to protect data from any form of spying².

Profile “SIMPLE”

Security Mode 1 / Level 1 (No Security - No authentication and no encryption)

Profile “PAIR”

Security Mode 1 / Level 2 (Unauthenticated pairing with encryption)


Device security is set to “Security required”, needs encrypted connection.

Required level of security is set to “Unauthenticated (Just Works)” and “no I/O capabilities”.

No bond timeout, device will wait forever to receive a pairing request.

Master device should send security request packet immediately after connecting to a bonded service.

² Security performance is relatively basic within *Bluetooth*® 4.0 technology (used by Sylvac). More features have been added since *Bluetooth*® 4.2 and 5.0

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Annex

Advertising data format detail

Byte	Profile "SIMPLE"	Profile "PAIR"	
	Adv packet for connection	Adv packet for bonding	Adv packet for reconnection
1	Length: 2	Length: 2	Length: 2
2	AD type = Flags	AD type = Flags	AD type = Flags
3	AD flag = General Disc. Mode 0x06	AD flag = Limited Disc. Mode 0x05	AD flag = Non-Disc. Mode 0x04
4	Length: 6	Length: 6	Length: 3
5	AD type = Complete local name	AD type = Complete local name	AD type = Shortened local name
6	53 (S)	53 (S)	53 (S)
7	59 (Y)	59 (Y)	59 (Y)
8	31 (1)	31 (1)	Length: 12
9	32 (2)	32 (2)	AD Type = Service data
10	33 (3)	33 (3)	Uuid lsb
11	Length: 12	Length: 12	Uuid msb
12	AD Type = Service data	AD Type = Service data	Application data (Model Number Str)
13	Uuid lsb	Uuid lsb	Application data (Model Number Str)
14	Uuid msb	Uuid msb	Application data (Model Number Str)
15	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
16	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
17	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
18	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
19	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
20	Application data (Model Number Str)	Application data (Model Number Str)	Application data (Model Number Str)
21	Application data (Model Number Str)	Application data (Model Number Str)	Length: 7
22	Application data (Model Number Str)	Application data (Model Number Str)	AD Type = Service data
23	Application data (Model Number Str)	Application data (Model Number Str)	Uuid lsb
24	Length: 7	Length: 7	Uuid msb
25	AD Type = Service data	AD Type = Service data	Application data (Measurement LSB)
26	Uuid lsb	Uuid lsb	Application data (Measurement)
27	Uuid msb	Uuid msb	Application data (Measurement)
28	Application data (Measurement LSB)	Application data (Measurement LSB)	Application data (Measurement)
29	Application data (Measurement)	Application data (Measurement)	Not used...
30	Application data (Measurement)	Application data (Measurement)	Not used...
31	Application data (Measurement)	Application data (Measurement)	Not used...

Table 1 - Sylvac advertising packets