**USER GUIDE – BLE GATEWAY** 





# **USER GUIDE – BLE GATEWAY**



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## **USER GUIDE – BLE GATEWAY**



#### 1. GENERAL INFORMATION ABOUT BLUETOOTH LOW ENERGY

Bluetooth **Low Energy** technology is also called **LE** or **BLE Bluetooth**. This technology appeared in 2010 with the release of version 4.0 of the Bluetooth Core Specification.

Bluetooth Low Energy is an alternative to "classic Bluetooth". By "classic Bluetooth", we mean all versions of Bluetooth released before Core Specification 4.0.

Low Energy Bluetooth technology operates in the free band **ISM 2.4 GHz**. This technology relies on a **frequency hopping radio**. 40 physical channels are allocated and separated from each other by 2 MHz and used according to the FDMA. Three of them consist in **advertising channels** (they might be considered as signalization), and all the others are data channels. In contrast, conventional Bluetooth uses 80 channels separated from each other by 1 MHz



Figure 1: Evolution of Bluetooth Low Energy versions

**Bluetooth SIG** is the current standard in terms of information and specifications. The **Bluetooth Special Interest Group**, known as **SIG**, is the body that oversees the development of Bluetooth specifications, manages the various technology qualification processes and grants the needed licenses of the Bluetooth brand and technology to manufacturers.

Bluetooth SIG web site	https://www.bluetooth.com/bluetooth-technology
BLE Specification	https://www.bluetooth.com/specifications
BLE Services and features	https://www.bluetooth.com/specifications/gatt





## 2. INCLUDED IN PACKAGE

DESIGNATION	PRODUCT REFERENCE	DESCRIPTION
GTW	SCIBT107	Gateway Bluetooth Low Energy Raspberry PI4B. Industrial box compatible with DIN rail. Integrated antenna and external power supply included. Pre- installed single-user Gateway BLE software environment (Web App) with Scan BLE functions, Sensor graph, connected mode, transfer in MQTT, REST API or GRPC formats.







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## 3. MOUNTING AND INSTALLATION

3.1. TABLE TOP

#### Power



Carte SD





#### 3.2. RACK DIN MOUNT



#### 4. SETUP BLE GATEWAY

4.1. Setup with Wi-Fi hotspot

4.1.1. The Ela Gateway provides a WI-FI-Hotspot for initial setup, its SSID is **ElaGateway**. The default password of the WI-FI-Hotspot is **GatewayEla**.

4.1.2. Power on the Ela Gateway, search Wi-Fi hotspot SSID "**ElaGateway**" on your computer, then connect to the Wi-Fi hotspot.

4.1.3. Open an Internet browser on your computer, then enter the router's default IP address: **192.168.4.1** or the name of gateway provided on the product label ("nameofgateway/"), the default Username/Password is **admin/admin**.

- 4.2. Setup with ethernet Conexion an Internet
  - 4.2.1. Connect the Ela Gateway to a managed Ethernet.
  - 4.2.2. Power on the **Ela Gateway**, on your computer (that is connected to the same Network) use an IP address scanner to find the **Ela Gateway** on your local network.

4.2.3. Open an internet browser and enter the IP address discovered above or the name of gateway provided on the product label ("nameofgateway/"),. The default Username/Password is **admin/admin.** 



## 5. CONFIGURE GATEWAY

The user can configure the most common settings for the **Ela Gateway**, such user accounts, MQTT, GRPC, WI-FI-Hotspot

5.1. USERS ACCOUNT CONFIGURATION

On the web application you have the possibility to modify, add and delete an account, for this you just must follow this little tutorial.

To access the account page, you have an Account button on the header.

	=	RESET Restart MS Reboot 20 *
	Information systeme	<b>_</b>
The Home	Nome of Gateway :	
Configuration	ElaGateway	
* n	Adress MQTT :	
→ Biuetootri •	192/166.0.111	
DL visualization	Port MQTT (TLS) :	
🕰 MQTT Scan	1883	
	Adress GRPC :	
	192.168.0.III	
	Port GRPC :	
	50051	
	connection status :	
	Connected	
	Address IP :	
	192.168.0.111	
	Os:	
	Unix 630.17.7	
	version :	
	0.9	IS 2021 FLA INNOVATION
	- selv.	# 2021EDA INHOVATION





	=	RESET Restart MS Reboot 🛃 🛪
	Accounts	
🖀 Home	Username	+ Add User
🗱 Configuration	admin	
⊁ Bluetooth <del>-</del>		
DL visualization		

5.1.1. To add a new user, you have the button add user and enter the Username/password of the new account:

5.1.2. To update/delete an existing account, you have a button per account for this

Username	
admin	<mark>යි</mark> ඕ
ElaGateway	C C C C C C C C C C C C C C C C C C C

Once the form is submitted you will have a success/error message

5.2. CONFIGURE Wi-Fi

You have the possibility either to connect to the Wi-Fi or to share a hotspot for that it is enough to configure the ssid/password of the WIFI network or that of the Hotspot on the setup page .

WIFI Client	WIFI Hotspot
SSID :	
Password :	
	Submit

#### 5.3. CONFIGURE MQTT

The **Ela Gateway** allows to transmit Bluetooth data to an MQTT broker, you can configure it with an external or local broker.

5.3.1. Distant broker MQTT

To use a Distant broker MQTT, just put the configuration of your broker in the configuration form (if your broker is not secure, leave the Username & password MQTT fields empty)



0		
Gateway		
Name of Gateway :	EloGotewayMokhtar	]
MQTT:		
Adress MQTT :	1270.0.1	
Port MQTT (TLS):	1883	
		*
Bost MOTT(MS) .	109.4	1
Portmorr(wa).	1004	
Username MQTT :	admin	J
Password MQTT :	odmin	
Path ws MQTT :		
55L:		
Sart Scan MQTT auto :		

### 5.4. API RESTful

the gateway also has a RESTful API with documentation which is available directly on the web application by clicking on help

05.
Unix 5.10.17.7
Version :
0.9
Help



Swagger	Select a definition ELA GAteway V1 ~	Paste
		0
Ela Gateway Web service <sup>© 6359</sup>		Navi
/swagger/v1/swagger json		Search
		Headin
Config	×	1
POST /config Update config of gateway		4 3
GET /config Get the configuration of gateway		] * 4
GET /config/os getos		] 43
GET /config/reboot reboot the Gateway		)
GET /config/docker restart the Micro Service		)
GET /config/internet Statut ethemet		)
CET /config/ip Get address ip of ateway in the loccal network		)
POST /config/ssid Update config of hotspot		6
GET /config/reset Reset the config of gateway		)
POST /config/updatetoken Update token of gateway with the serial number		]
GET /config/geterror Get the serial number of gateway		)
Scan	~	
CET /scan Get the frames scanned and the data of all tag		→ Page 9 of

### 6. GATEWAY OPERATION

#### 6.1. WEB APP

#### 6.1.1. BLE-SCANNER

On the scanner page, you can visualize the frames scanned by the Ela Gateway microservice, with the time stamp, mac address, local name, RSSI, payload, type of sensor, and the data decrypt.

	=				RESET	Restart MS	Reboot	20 ·
	Scan							_
	Rechercher							
on					Start MQTT	C Refr	esh 🛛 🛓 Exp	ort
40.	Time Stamp	MAC_ADRESS	LocalName	Rssi	Payload T	ype	Data	
ıer	2021-11-05 13:37:08.891336	d1:67:21:b9:60:ef	ELA ID 6	-63	0201061aff4c0002150102030405060708090a 0b0c0d0e0f10020b010ab40909454c4120494 42036	unknown		
	2021-11-05 13:37:08.895011	fb:65:c5:49:37:14	BE_TEST_EL_MOK	-40	0201060f0942455f544553545f454c5f4d4f4b	unknown		
Command	2021-11-05 13:37:08.931086	d8:c4:9d:01:5a:74	FB CAP 47P2	-79	0201060c094642204341502034375032	unknown		
ition	2021-11-05 13:37:08.931965	ea:17:98:36:6b:16	B-TRH 00P2	-33	02010605166e2a00000b09422d5452482030	T	0 °C	☆
	2021-11-05 13:37:08.939822	f8:aa:9f:6c:6c:83	P T EN 800A6A	-71	02010605166e2a7f080e0950205420454e203	T	21.75 °C	☆
	2021-11-05 13:37:08.946312	d9:eb:10:31:a5:07	VFF44T_102	-71	02010605166e2ac3080b095646463434545f	T	22.43 °C	☆
	2021-11-05 13:37:08.950208	d4:77:51:dd:a2:ba	P T EN 800D71	-78	02010605166e2a78080e0950205420454e20	T	21.68 °C	
	2021-11-05 13:37:08.972712	d5:8a:b7:9d:80:19	P ID 001342	-73	0201060c095020494420303031333432	unknown		
	2021-11-05 13:37:09.004164	fa:36:c6:b6:18:71	BE_TEST_PII	-63	0201060c0942455f544553545f504949	unknown		
	2021-11-05 13:37:09.027889	c2:a2:ac:f8:72:e0	P T EN 800A88	-69	02010605166e2a7f080e0950205420454e203	т	21.75 °C	☆
	Help						© 202 <mark>1</mark> ELA INNO	VATION



You also have a smart search bar, it allows you to filter on all the data in the table, you just need to add spaces between the keywords, you can also add a tag to the favorites list (this will be seen in 6.1.2) by clicking on the star corresponding to your tag

Scan								
Rechercher	c9: <u>vh</u>			_				
Time Stamp		MAC_ADRESS	LocalName	Rssi	► Start Mo	Type	əfresh 🕹 Exp Data	port
27/10/2021 08:0	06:05.299	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
27/10/2021 08:	06:05.299	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	☆
27/10/2021 08:	06:04.251	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
27/10/2021 08:	06:04.251	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	☆
27/10/2021 08:	06:03.203	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	т	22.87 °C	
27/10/2021 08:	06:03.203	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	습
27/10/2021 08:0	06:02.123	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
27/10/2021 08:	06:02.123	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
27/10/2021 08:	06:01.044	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
27/10/2021 08:	06:01.044	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	☆
27/10/2021 08:	05:59.964	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	т	22.87 °C	
27/10/2021 08:	05:59.964	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	☆
27/10/2021 08:	05:58.914	C9:0A:5D:DC:12:D3	VHF57N_202	-62	02010605166e2aef080A0956484635374E5F324F32	Т	22.87 °C	
Help		000450000000	VUEE7N 000	60	00010605166602~6600040056404625274555294520	Т	© 2021 ELA INNO	NOTAVC



Start/stop MQTT	Start/stop the transmission of BLE data to MQTT (topic: Gateway/scan)
Refresh	Refresh the list of Frames scanned by the gateway microservice
Export	Export the list of Frames on csv file



#### 6.1.1.1. Info Tag

By clicking on the address of an ELA tag you access a personalized page, with a scanner, data tracking graph and tag information.

Advertising Top PV Info Venior: 300 Orm: HORE Time Stamp		Rssi Payload Gatew	▶ Start Scan for this	Tag <b>≜</b> Export Data	Command Batt Voltage QLed Off PLed On Data logger visualisation
Advertising Tog FW info: Version: 30.0 OPT: NONE					Command Batt Voltage QLed Off PLed On
Time Stamp	Rssi	Payload	Stop Scan for th	is Tag 🛃 Export	🛓 Data logger
2022-01-21 12:47:00.892975	-50	02010605166e2a370904166f2a230b09422d545248 2030305032	ElaGatewayMokhtar	23.59 °C 35 %	visualisation
2022-01-21 12:47:00.778681	-55	02010605166e2a350904166f2a230b09422d545248 2030305032	ElaGatewayMokhtar	23.57 °C 35 %	
2022-01-21 12:46:57.739026	-50	02010605166e2a350904166f2a240b09422d545248 2030305032	ElaGatewayMokhtar	23.57 °C 36 %	3
2022-01-21 12:46:54.694963	-61	02010605166e2a370904166f2a250b09422d545248 2030305032	ElaGatewayMokhtar	23.59 °C 37 %	PP 23.5
2022-01-21 12:46:51.566710	-50	02010605166e2a370904166f2a260b09422d545248 2030305032	ElaGatewayMokhtar	23.59 °C 38 %	23.4 
2022-01-21 12:46:48.606352	-57	02010605166e2a350904166f2a280b09422d545248 2030305032	ElaGatewayMokhtar	23.57 °C 40 %	
2022-01-21 12:46:45.360838	-50	02010605166e2a330904166f2a2a0b09422d545248 2030305032	ElaGatewayMokhtar	23.55 °C 42 %	
2022-01-21 12:46:36.200865	-52	02010605166e2a2e0904166f2a380b09422d545248 2030305032	ElaGatewayMokhtar	23.5 °C 56 %	🔶 ea:17:98:36:6b:16
2022-01-21 12:46:33.164852	-53	02010605166e2a2c0904166f2a3a0b09422d545248 2030305032	ElaGatewayMokhtar	23.48 °C 58 %	Humidity %
2022-01-21 12:46:33.056888	-63	02010605166e2a2a0904166f2a3a0b09422d54524 82030305032	ElaGatewayMokhtar	23.46 °C 58 %	60
2022-01-21 12:46:30.122238	-31	02010605166e2a2a0904166f2a350b09422d545248 2030305032	ElaGatewayMokhtar	23.46 °C 53 %	son
2022-01-21 12:46:26.852778	-44	02010605166e2a2a0904166f2a340b09422d545248 2030305032	ElaGatewayMokhtar	23.46 °C 52 %	40
2022-01-21 12:46:23 489194	-47	02010605166e2a2a0904166f2a2e0b09422d545248	ElaGatewayMokhtar	23.46 °C 46 %	SU S

You also have an order list that you can send directly to the selected tag.

Command		
Battery voltage (mV): 2974		
📼 Batt Voltage	♀Led Off	Led On
	<b>*</b>	oata logger



#### 6.1.1.2. Data Logger

for the data logger you have 2 types of command, if your tag does not have the ELA\_EN\_12830 option, you can also download the data logger in csv format by clicking directly on the data logger, otherwise you will have another display with the password to recover the data logger

Tog FW Info: Version: 3.0.0 OPT: ELA_EN12830			▶ Start 🛓 Export		Batt Voltage Led Off Led Off
Time Stamp	Rssi	Payload	Data	Data logger	
				Password	Password of Tag
				Argument	DD/MM/YYYY HH:MM:\$\$ +UU:UU
					🛓 Read Data logger 📄 Start Data logger
					Stop Data logger

#### 6.1.2. TAG

on this page you will find the list of favorite tags so that you can directly access the info tags page without going through the scanner, you can also **add** / **remove** tags.

Ξ		RESET	Restart MS	Reboot	20 ·
Tags					
				+ Add Te	ag
Loca	Name AdressMAc	Delete		_	
E8:C4	FB:23:51:C0 Elo_TAg				
					-



## 6.1.3. SEND COMMAND

To send an order, you must complete the form below.

Send Command	
Adress Mac:	
Command :	
Argument :	
Password	
	Submit

#### 6.1.3.1. Adress Mac

Once arrived on the page "send the order" an automatic scan will be carried out and you will have proposals of tags with the last tags of the scanner (in the form "mac address // local name").

Adress Mac:	8
	E7:CC:D2:0A:DD:3B // P T EN <b>8</b> 00A63
Command :	F1:9B:89:AD:FE:22 // C ID 002431
communu.	FC:B6:18:E6:79:11 // P T EN 800D6F
	F5:06:BD:07:04:62 // P T EN 800D8B
	D1:30:88:C0:C3:17 // P T EN 800FC4
Argument:	DA:65:23:77: <b>8</b> F:09 // P T EN <b>8</b> 00A75
	EB:A7:D5:AF:56:31 // P T EN 800C12
Password	C8:65:9A:A9:28:AB // P T EN 800FCD
	C4:E6:BE:95:9D:BB // P T EN 802F3B
	C0:B <b>8</b> :5E:F4:26:2B // FB T PUCK 5



COMMANDS	ACTIONS	MINIMUM FIRMWARE VERSION	
LED_ON XX	Turn ON the LED (for XX seconds)	≥2.0.0	
BUZZ_ON	Turn ON the buzzer (Repeated beep)	≥1.0.0	
BUZZ_OFF	Turn OFF the buzzer	≥1.0.0	
BUZZ_ON XX	Turn ON the buzzer (for XX seconds)	≥2.0.0	
DIGI_ON	Turn Digital Output to "ON" state	≥2.1.0	
DIGI_OFF	Turn Digital Output to "OFF" state	≥2.1.0	
DIGI_ON XX	Turn Digital Output to "ON" state for XX seconds ≥2.1.0		
RAZ_COUNT	Counter reset	≥2.0.0	
LOG_DL	Download datalogger values	≥2.0.0 (non-EN12830)	
LOG_RST	Erase datalogger values and timestamp	≥2.0.0 (non-EN12830)	
LOG_SP_DL XX YY	Y Download datalogger values from the index XX to index YY in chronological order (index 00 is the oldest value) ≥4.0.0 (non-EN12830)		
LOG_SP_INV_DL XX YY Download datalogger values from the index XX to index YY in reverse chronological order (index 00 is the newest value) ≥4		≥4.0.0 (non-EN12830)	
GET_BATT_VOLTAGE	DLTAGE  Return battery voltage in mV  ≥2.1.0		
GET_SENSOR_DATA	Return the last measured sensor value	≥2.2.0	

### 6.1.4. Data logger visualization

On this page you can visualize all your data loggers on a graph, just choose your csv file and click on "display".







Depending on your data logger you get a corresponding chart.

## **6.2.MQTT OPERATION**

#### 6.2.1. Routes

Торіс	Function
Gateway/"nameOfGateway"/Scan	on this topic you will receive all the frames of the
	scanner
Gateway/SendCommand/"NameOfGateway"/	On this topic you can send commands to tags respecting the format Json (6.2.2.)
Gateway/"nameofGateway"/Response	On this topic you will receive the response of the command sent



#### 6.2.2. JSON format

To send an order in mqtt it is imperative to respect the format below



Example:

For this example, we used the MQTT Explorer software



## User Guide - Bluetooth Gateway



### 7. NORMS & STANDARDS

#### **FCC Statement**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1. This device may not cause harmful interference; and
- 2. This device must accept any interference received, including interference that may cause undesired operation.

#### **Industry Canada Statement**

This device complies with ISED's license-exempt RSSs. Operation is subject to the following two conditions:

- 1. This device may not cause harmful interference, and
- 2. This device must accept any interference received, including interference that may cause undesired operation.

**CE Mark** 

CE

• FCC Mark



RoHS Certified



• Bluetooth 4.2

