

BFi53ER0

Battery-Free Bluetooth Gateway

Quick Start v1.8

What the gateway does, a first installation, the status light, the live view, integration at a glance and where to find more.

For firmware 0.57.82 and later.

A BANFi Semiconductor Co., Ltd. product · protocol stack and firmware by FLSEMI

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What the gateway does

The BFi53ER0 receives telegrams from battery-free, self-powered Bluetooth switches and sensors and delivers them onto an Ethernet network. It is also a Modbus device with its own field terminals, so one DIN-rail unit can stand in for several.

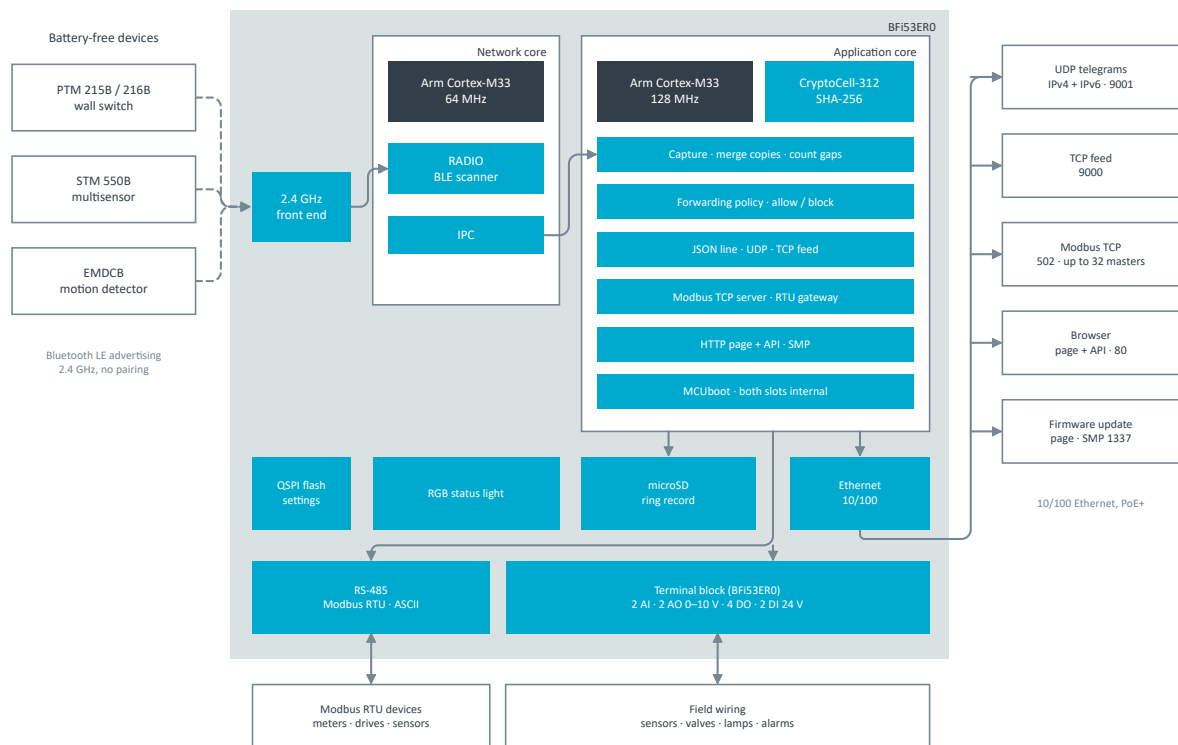


Figure 1: What the gateway connects

	What you get
Battery-free devices	switches and sensors that take their energy from a press, from light or from motion, compatible with EnOcean's Bluetooth LE models
JSON over UDP and TCP	one JSON object per telegram, on IPv4 and IPv6; a TCP feed that catches up from the microSD card after a disconnection
Modbus TCP	every switch and sensor as decoded registers, beside the gateway's own state; up to 32 masters at once; Modbus UDP and Modbus RTU over TCP as well
RS-485 Modbus RTU	on the BFi53ER0: a gateway from Modbus TCP to the devices on the bus, or a device on the bus itself; 1200 to 921600 bit/s
Field terminals	on the BFi53ER0: two analog inputs and two analog outputs, four digital outputs and two digital inputs; a switch can work an output directly, with no PLC and no network in the path. BFi53ER0S: terminal assignment to be announced
microSD card	a recording of every telegram, and a history of the bus and the terminals
Updates	signed firmware over the network, from the settings page, from a phone over Bluetooth, or from the card
Power	PoE+ (IEEE 802.3at) or 14–32 V DC

Table 1: At a glance

First installation

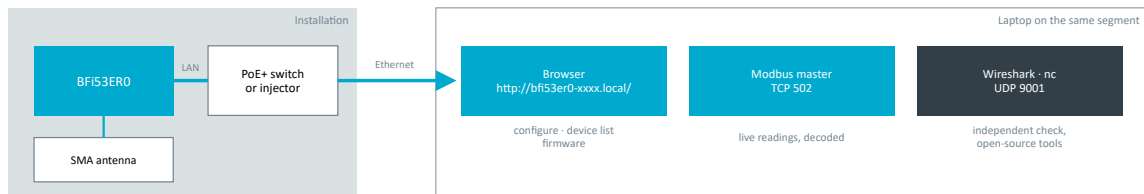


Figure 2: A first installation: gateway, PoE+ switch and a laptop on the same segment

Item	Notes
The gateway and its antenna	screw the antenna onto the SMA connector before powering the gateway
A PoE+ switch port or injector	IEEE 802.3at; or a 14–32 V DC supply and any Ethernet switch
A laptop on the same Ethernet segment	no DHCP server, router or internet is needed: both ends give themselves addresses
A microSD card (optional)	FAT or exFAT; enables recording, history and card updates

Table 2: What you need

Step	Do	You should see
1	Screw on the antenna, then connect Ethernet from the PoE+ port	the status light shows red, green, blue and white in turn, then breathes blue (with a card) or amber (without)
2	On the laptop, open <code>http://bfi53er0-xxxx.local/</code> with the name on the label	the live view; a card appears for each device as it reports
3	Press a battery-free switch near the gateway	the status light flashes green; the switch appears, with the contact pressed lit
4	Press <i>Settings</i> and sign in with <code>admin</code>	you are asked for a new password first, then the settings
5	Optional: capture UDP port 9001 in Wireshark	one JSON datagram per telegram, on IPv4 and on IPv6

Table 3: First start

- **Mount** it on a DIN rail or a wall, the antenna upright and clear of metal, where the switches and sensors are. Each telegram reports its signal strength, so a walk round with a switch in hand shows quickly whether a position works.
- **Indoors.** The enclosure has no ingress-protection rating; outdoors, use a sealed cabinet.
- **Field wiring** to the terminals with the power off; ratings are in the Hardware Specification.

Status light

The light breathes one colour for the state of the gateway, the most urgent first, and flashes green on every telegram heard.

Colour	Meaning
white	starting
magenta, alone or with white	firmware being written — do not remove power
magenta / white, slow	a new image from the microSD card on trial; it keeps itself after 2 minutes — do not remove power
green, fast	password or all settings reset with the reset button
red	no network address
blue, fast	Bluetooth open for a firmware update
amber	capturing; no microSD card, so nothing is recorded
cyan	capturing and recording, and a TCP feed client is connected
blue	capturing and recording
green flash	a telegram was heard

Table 4: Status light

The live view

Open <http://bfi53er0-xxxx.local/>; no password is needed. There is one card per device: a switch lights the contact pressed, a sensor shows its readings, and every card shows the signal strength and any telegrams missed. The page follows each telegram the moment it is heard, and fits a phone.

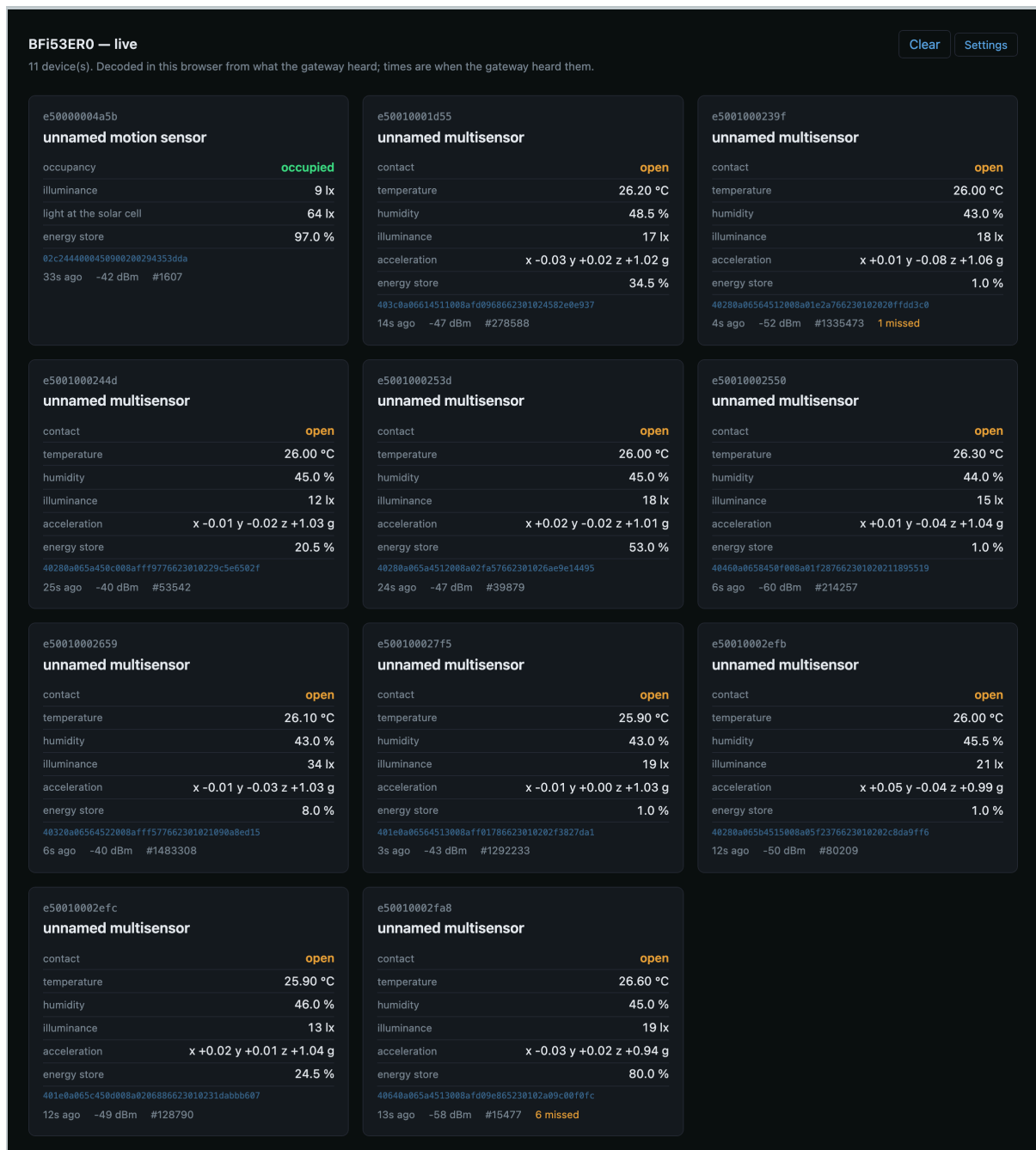


Figure 3: The live view

The settings are at `/admin`, behind a password, on the local network only: forwarding, devices and their names and places, Modbus, RS-485, the terminals, time and history, firmware and backup.

Integration at a glance

Port	Direction	For
UDP 9001	out	JSON telegrams, to the local segment by default or to a unicast address
TCP 9000	in	the JSON feed, with catch-up from the card
TCP 502	in	Modbus TCP, off until turned on
UDP 502, TCP 4001	in	Modbus UDP and Modbus RTU over TCP, when turned on
TCP 80	in	the live view and the settings pages

Table 5: Ports. Everything but the live view answers the local network only

Modbus registers	What they hold
input 0–29	the gateway: firmware, time running, telegrams, devices, masters, the time
input 100–163	the terminals: inputs, outputs, counters, analog values and alarms
input 200–379	the RS-485 port and its polling
input 1000 + 100 × <i>n</i>	each device: address, signal, telegrams missed; switch contacts and presses; sensor values
holding, coils	the outputs, and settings when a master is allowed to change them

Table 6: The Modbus register map in outline

Function codes 01–06, 15, 16 and 43/14. The gateway answers at unit ID 255; with the RS-485 port a gateway, other unit IDs reach the devices on the bus. Writes stay off until they are allowed on the settings page.

The example code on the website receives the telegrams over UDP and TCP and makes a first Modbus TCP read, with nothing but Python 3:

```
python3 udp_receive.py
python3 tcp_feed.py bfi53er0-xxxx.local
python3 modbus_identify.py bfi53er0-xxxx.local
```

Documents and support

Document	Contents	How to get it
Quick Start	this document	download from the website
Hardware Specification	terminals, electrical ratings, mechanics, certification, ordering	download from the website
Example code	receiving telegrams over UDP and TCP, and a first Modbus TCP read; Python 3, standard library only	download from the website
User Manual	installation, every settings page, receiving telegrams, Modbus TCP, RS-485, the terminals, time and history, backup, firmware updates and troubleshooting	download from the website
System Integration Guide	the JSON payload decoding, the complete Modbus register map and command reference, worked examples	leave your company details at flsemi.us/downloads#guide

Table 7: Documents

Ask for the System Integration Guide or an evaluation unit through the website's contact form. Firmware updates are sent on request.

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