BATCOMMS

A hard-to-detect and jamming-resistant digital data communication solution developed in Estonia for drone control and sensors.

FPV prototype with BC's comms module

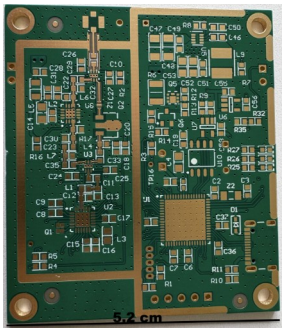
Features:

- ✗ Smart repeater
  - ✗ Communication range approx 40 km (operator $\leftrightarrow^{(\sim 20km)}$ repeater $\leftrightarrow^{(\sim 20km)}$ client)
  - ✗ Simultaneous digital links via repeater for up to 10 devices (up to 250 devices can be queued/standby)
  - ✗ Low power consumption. A 110 g unit with built-in battery can remain in standby for over 2 years.
  - ✗ Repeater can be installed statically (mast, high-rise roof, etc.) or mobile (e.g., mounted on a drone or balloon)
- ✗ Custom hardware and software
  - ✗ Low RF footprint on the airwaves, making detection difficult
  - ✗ True frequency hopping — hard to jam
  - ✗ Easy integration and customization
- ✗ Security
  - ✗ Optional encryption
  - ✗ >100 m distance between controller and transmitter using CAT (Ethernet) cableil
  - ✗ No Chinese components used
- ✗ Tested with UGV and FPV-type drones. Integrated with ASAX Innovation OÜ UGVs. Joint demo video https://www.youtube.com/watch?v=LIDBR7x84Bg

BC repeater mounted on Autel drone

Development roadmap:

- ✗ Distribute developer test kits to Estonian manufacturers — Sept–Oct
- ✗ Software improvements — reduce delay and improve RSSI feedback — Oct
- ✗ Extend communication range to approx. 60 km (30 + 30 km) — Nov
- ✗ Detect and operate on best (available) frequencies — Dec
- ✗ Testing under Ukrainian conditions — end of 2025
- ✗ Repeater handover: transfer active sessions between repeaters — Q1 2026
- ✗ RF bands: 100–1,600 MHz and 2.3–2.7 GHz — 2026
- ✗ Spectrum monitoring and jamming across the whole band (approx. 90% of CPU time available) — 2026
- ✗ Daisy-chaining of repeaters to extend the overall link reach — 2026



BC comms module

Request a developer test kit!

www.batcomms.ee

BATCOMMS

GENERAL	**rev.3 SPECIFICATION 09.2025**
Type	PCB module
Usage	Control/command communication and sensor data exchange
Data link type	Digital half-duplex
MECHANICAL & ENVIRONMENTAL	
PCB dimensions & weight	W: 59 mm L: 52 mm H: 8 mm ; 14 g
IP rating	IP65 with custom enclosure
Operating temp. range	-40...+85 C
Enclosure	Custom enclosure possible
TECHNICAL DATA	
Raw data speed	250 kbps
Delay	< 65 ms
Output power	> +29.5 dBm
Tested link range	LoS ~10 km per link; up to 20 km with repeater
Frequency range	2400-2500 MHz ISM band, 1 MHz channel step
Power input	+6...24 V, average 1 mA, max 550 mA
Modulation type	GFSK
Sensitivity	< -106 dBm typical
Total link budget	136 dB
Channel spacing	< 1 MHz
Frequency hopping	2.4 GHz ISM band, 16 random channels
Power consumption (TX/RX/Standby/Sleep)	TX 550 mA, RX 100 mA, average 1 mA @7,4V (client sleep mode < 50 uA, network active, connected, energy saving mode ON) . On sleep < 5 uA
Supplied battery	1000 mAh; In standby mode ~2 years. In working mode ~ 2-4 weeks
Encryption	AES128
Remote ↔ TX range	100+ meters with CAT cable
REPEATER	
Number of active devices	5 pairs (remote controller + receiver module)
Devices in queue	250
SOFTWARE	
Protocol	Proprietary
INTERFACES	
Serial port & speed	TTL 3.3V Full Duplex UART; async 9600 - 1 Mbaud
Serial port protocol	Serial passthrough, CRSF, Propiertary
USB	USB-C for charging, software updating and configuring
Antenna Connector	U.FL