Transceiver for Optic Fiber Module SE (40km)

User manual

PILOTIX™

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1. Product overview

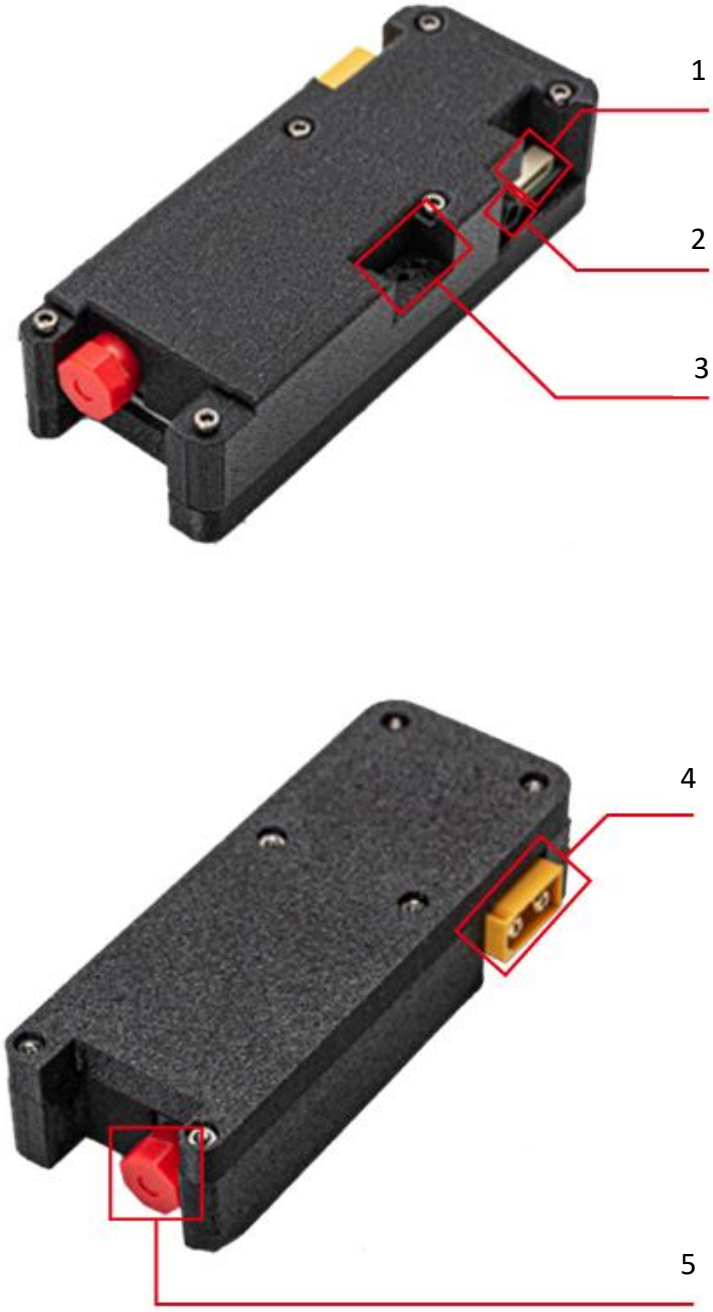


Fig.1. Ground unit

1. SH1.0 serial port
2. Video output port
3. LED Indicator
4. Power connector

5. Ground End fiber optic interface

1.1. LED indicator definition



Fig.2. LED indicators ground unit

- Power indicator
- Fiber Optic Mapping Indicator
- Image Signal Indicator
- Data Signal Indicator

LED status reference

Indicator	Status meaning
Power indicator	Lit — the module is powered on normally
Fiber Optic Mapping Indicator	Lit — fiber connection is active and the signal is locked to the sky unit
Image Signal Indicator	Active — the analog video stream is being decoded
Data Signal Indicator	Active — TTL/SBUS control data is passing through

1.2. Port description

Port (Fig.1)	Description
SH1.0 serial port	Bidirectional TTL/SBUS control data. Connect to an RC receiver (SBUS input) or to a map transmitter / ground control relay.
Video output port	Decoded analog video (NTSC/PAL/SECAM). Connect to an FPV monitor, an analog video receiver or analog FPV goggles. Digital HDMI output is not available.

Port (Fig.1)	Description
Power connector	DC 5.5–26 V. Connect a dedicated ground power supply (battery or adapter).
Ground End fiber optic interface	FC connector, single-mode fiber. Receives the optical signal from the sky unit through the fiber.
LED indicator	Four LEDs: Power, Fiber Optic Mapping, Image Signal, Data Signal (see 1.1).

1.3. Specifications

Item	Specification
Video format	NTSC / PAL / SECAM (analog)
Fiber connector	FC (single-mode, single fiber)
Data interface	SH1.0
Data format	TTL / SBUS (bidirectional)
Data speed	0 – 1 Mbps
Fiber type	Single-mode, single fiber
Wavelength	1310 nm (9/125 µm) + 1550 nm
Maximum transmission distance	Up to 40 km
Supply voltage	DC 5.5 – 26 V
Body size	96 × 37 × 23 mm
Body weight	54 ± 2 g
LED indicators	4 (Power, Fiber Optic Mapping, Image Signal, Data Signal)

2. Installation & Setup

2.1. Preparation before using the optical disk

The optical fiber disk outlet FC fiber optic port of the protective shell before use need to remove, draw out the optical fiber into the ground end of the module block FC interface.

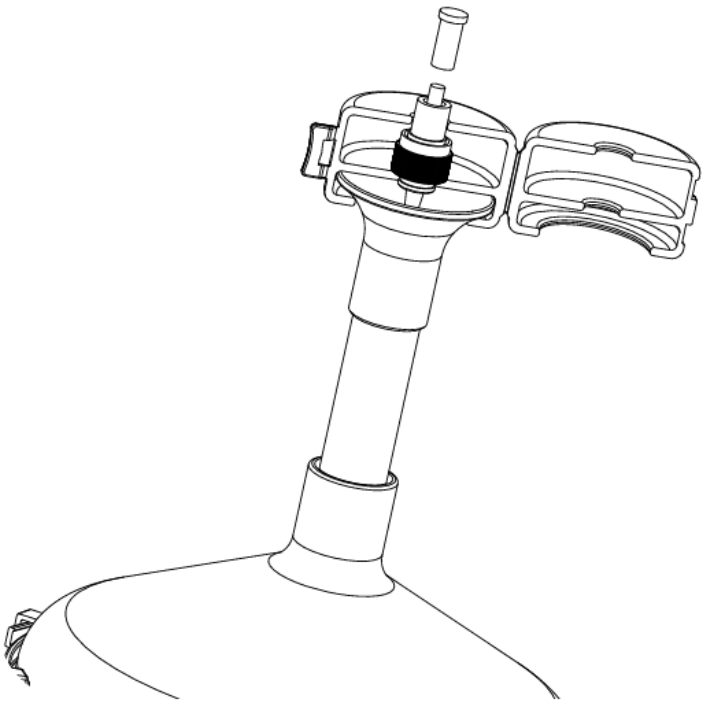


Fig.3. Preparation before using

2.2. Ground Side Wireless Connection

1. Connect the ground SH1.0 line to the receiver and the map transmitter.
2. Connect the fiber optic harness, connect the FC ports on both ends of the fiber optic disk to the FC port on the sky end and the FC port on the ground end, and note that the nozzle end is connected to the FC port on the ground end.
3. Insert the lithium battery of the ground end into the ground end connector after it is fully charged.

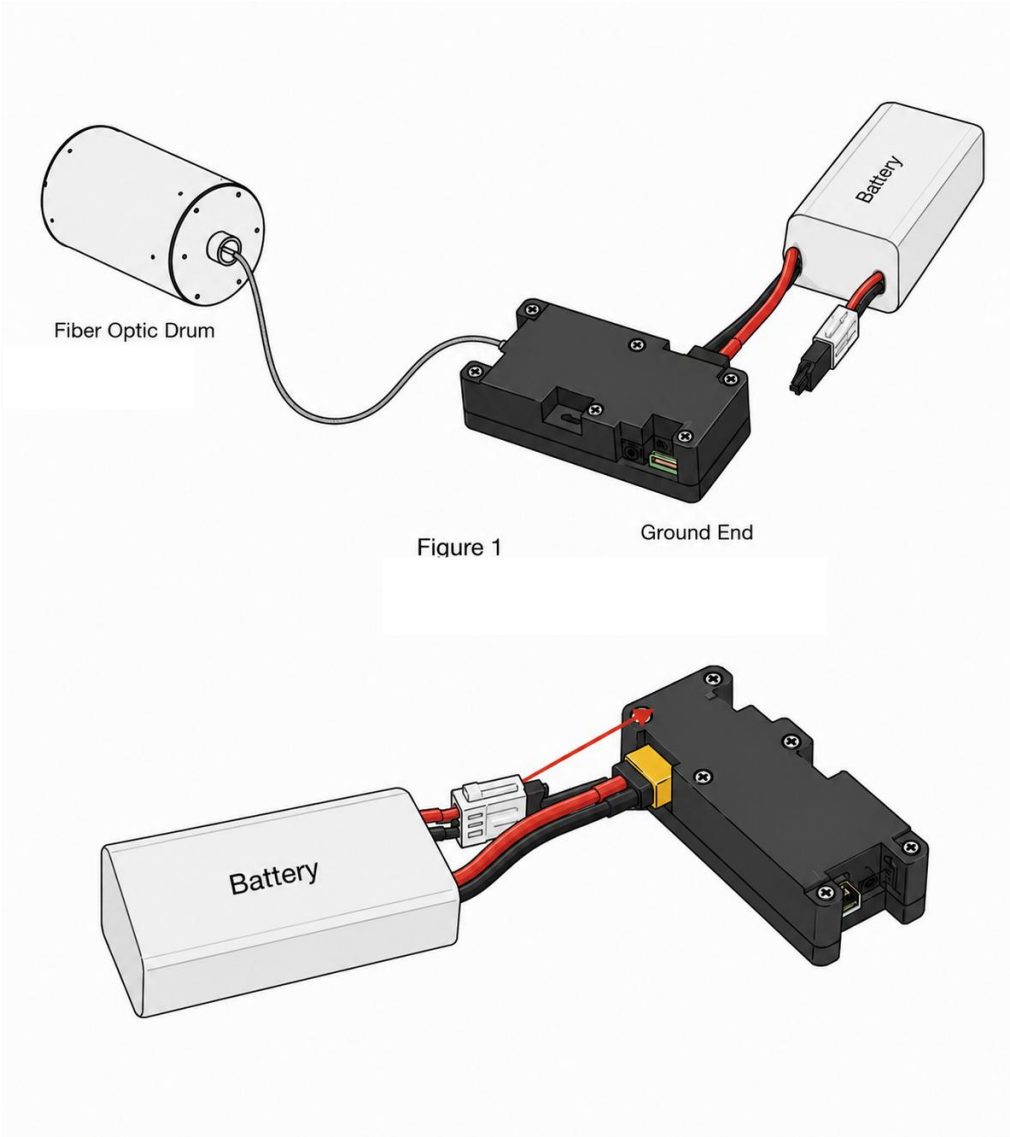


Fig.4. Connection diagram

2.3. Ground-side wiring reference

Connection	Description
Video	Analog video output → FPV monitor, analog video receiver or analog FPV goggles (NTSC/PAL input)
Control	SH1.0 data cable → RC receiver (SBUS input) or map transmitter / ground control relay
Power	Ground unit power connector ← DC 5.5–26 V supply (lithium battery pack or AC adapter)
Fiber	Free-end FC connector of the fiber roll → FC fiber port of the sky unit on the drone

2.4. Connection with a map transmitter / image relay

For longer-range ground control setups, the SH1.0 data output of the ground unit can be connected to a map transmitter or image relay unit, which distributes the video and SBUS signals wirelessly to a remote operator station. Connect the SH1.0 cable from the ground unit to the receiver and the map transmitter as shown in the connection diagram (Fig.4).

Note: when using a map transmitter relay, make sure the SBUS signal polarity matches the input requirements of the relay device. Some devices require inverted SBUS — check compatibility before flight.

2.5. Pre-flight checklist

- Verify the fiber type: single-mode (SMF), FC connector on both the sky unit and the roll end
- Inspect both FC ferrules for dust or contamination; clean them with optical-grade wipes
- Charge the power supply of the ground unit (lithium battery) or confirm the adapter output: DC 5.5–26 V
- Connect the analog FPV monitor or video receiver to the video output of the ground unit
- Connect the SH1.0 data cable from the ground unit to the RC receiver or relay device

2.6. Fiber connection, power-up and verification

- Take the free-end FC connector from the roll, route it to the drone and plug it into the FC fiber port of the sky unit
- Make sure the FC connector is fully seated and locked — a partial connection causes signal loss

WARNING: always connect and disconnect FC fiber connectors with BOTH the sky unit and the ground unit powered OFF.

- Power on the ground unit first (DC 5.5–26 V)
- Power on the drone — the sky unit initializes automatically
- The Fiber Optic Mapping Indicator on the ground unit should light up within a few seconds; if it does not, check that both FC connectors are fully seated
- Analog video should appear on the connected FPV monitor within seconds
- Check that the Data Signal Indicator is active, confirming that the SBUS/TTL control link is live
- Perform a brief ground test: arm and disarm via the RC controller to confirm command pass-through

2.7. After-mission procedure

- Land and disarm the drone; power off the sky unit (disconnect the battery) before reeling in the fiber
- Power off the ground unit and disconnect the monitor, the RC receiver and the power supply
- Reel the fiber back onto the roll at a steady pace, without kinks or tangles

- Cap both FC connectors with dust caps

2.8. Fiber roll handling

- Place the roll on a flat, stable surface at the launch point of the drone
- Orient the roll so that the fiber pays out toward the expected direction of flight to minimize lateral pull
- Minimum fiber bend radius is about 30 mm — do not kink or sharply bend the fiber
- When flying around or over structures, guide the fiber along smooth paths free of sharp edges
- Cap both FC connectors with dust caps for storage

WARNING: exceeding the minimum bend radius permanently damages the fiber. A kinked fiber causes partial or total signal loss.

3. Troubleshooting

If the system does not work as expected, check the following.

Symptom	Possible cause	Solution
No video on monitor	FC fiber not connected / not seated	Check the FC connectors at both the sky unit and the ground unit; make sure both are fully latched
No video on monitor	Sky unit not powered	Verify that the drone battery is connected and the Power LED of the sky unit is on
No video on monitor	Ground unit not powered	Check the DC 5.5–26 V supply; verify that the Power indicator of the ground unit is on
No video on monitor	Monitor input mismatch	Make sure the monitor accepts analog NTSC/PAL/SECAM input; check the cable connection
Fiber Optic Mapping Indicator off	FC fiber damaged or dirty	Inspect the FC ferrules for contamination; clean with an optical wipe
Fiber Optic Mapping Indicator off	Fiber kinked or bent too sharply	Straighten the fiber; the minimum bend radius is about 30 mm
Ground unit does not power on	Supply voltage out of range	Verify DC 5.5–26 V at the power connector
Signal lost mid-flight	Fiber fully paid out from the roll	The drone has exceeded the fiber length of the roll; return toward the launch point to restore slack
Signal lost mid-flight	Fiber snagged on an obstacle	Land immediately; inspect and straighten the fiber before resuming

4. Safety & Compliance

● The input voltage 11.1-26v is within the safe range, please do not exceed or fall below the limit voltage, do not reverse the positive and negative poles.

● Do not make the optical fiber folding circle, to avoid being cut by sharp objects and lead to fiber breakage.

● Pay attention to the protection of fiber optic connectors and FC interfaces, avoid dust and oil and water, save the interface protection cover well twisted.

● Store in a cool, dry and light-proof area.

● Fiber optic disk precision structure, gently take and put, vertical storage.

● This system creates a physical fiber tether between the drone and the ground. Brief all personnel in the operation area about the tether before every flight.

● Do not fly over people, roads, vehicles or obstacles where the fiber tether could cause entanglement, injury or property damage.

● Never look directly into any FC fiber connector end while the sky unit or the ground unit is powered. The laser emission is invisible and can cause permanent eye damage.

● Secure the fiber roll against tipping or being dragged by the tether tension during flight.

● Inspect the full fiber length before every mission — a compromised fiber that fails mid-flight causes total loss of video and control.

● Always comply with local aviation regulations for UAV operations, including specific rules for tethered UAV flights.

5. Technical notes

Video output — analog format

The ground unit outputs analog video in NTSC, PAL or SECAM format. Make sure the connected FPV monitor, analog video receiver or FPV goggles accept analog composite video input. Digital HDMI output is not available on the ground unit.

Control data — TTL/SBUS

The control link uses the TTL/SBUS protocol with a data rate of 0–1 Mbps. On the ground side, connect the SH1.0 data cable to the SBUS or TTL input of the RC receiver or the map transmitter relay.

Fiber connector — FC type

The ground unit uses an FC (Ferrule Connector) fiber connector. FC connectors use a threaded coupling that provides a secure, vibration-resistant connection. When cleaning FC connectors, use a reel-type optical fiber cleaner or lint-free optical wipes; never use standard cotton swabs.

Power compatibility

The ground unit input voltage is DC 5.5–26 V. The ground unit is an independent power domain and requires its own ground-side power source. Do not power the ground unit from the drone battery via the fiber link.

Fiber range

The transceiver supports a fiber length of up to 40 km. Use a roll with FC connectors and single-mode fiber (ITU-T G.652D or equivalent).

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