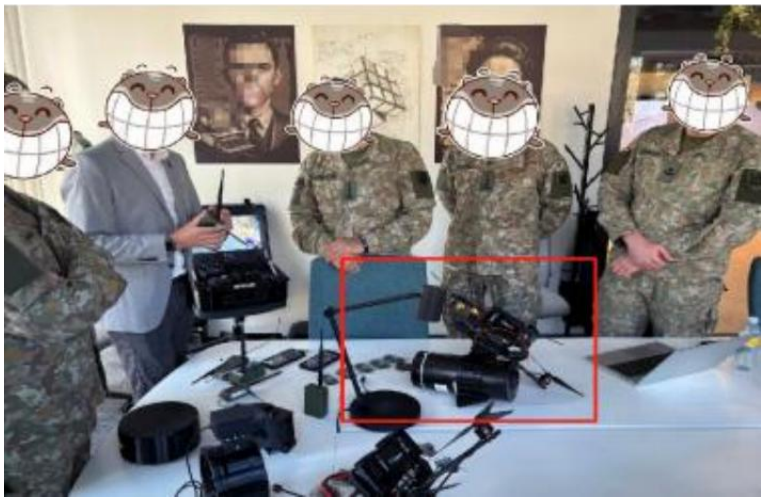
Novalynx V7 System Integration&Operation Manual

Description (Enhanced—Novalynx Tech,FieId-Proven,Interference-Free)

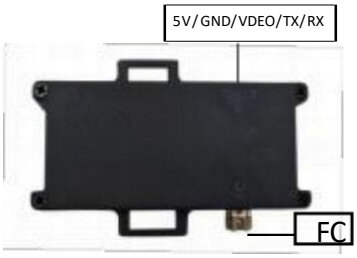
Developed by Novalynx Technology, the Fiber Optic reel kit is a field-proven solution engineered for secure, long-range UAV communication in electronic warfare and high-EMI environments. It converts analog video and control signals into optical signals, enabling 100% interference immunity and making the system undetectable by RF scanning or jamming equipment.

Through continuous upgrades, the system has been modularized and interface-optimized, allowing end users to deploy it with 90% less factory-level integration work. In most cases, no soldering is required — making setup faster, easier, and more reliable even in field conditions.

Paired with a precision-engineered optical fiber reel, the system enables interference-free drone operations over distances up to 25 km, delivering unmatched performance in defense, ISR, and critical mission applications.

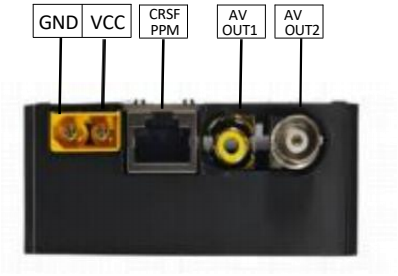


Airborne Optical Transmitter Module(Sky Terminal)



Parameter	Specification
Processor	MCU + FPGA
Power Input	9–18V
Interfaces	UART / Video
Video Protocols	PAL/ NTSC
Control Protocols	CRSF / ELRS
Max Transmission	>25 km
Optical Wavelength	1310 nm / 1550 nm
Dimensions (mm)	74 × 45 × 20
Weight	34g

Ground-Based Optical Receiver Module(Ground Terminal)



Parameter	Specification
Processor	MCU + FPGA
Power Input	4S–6S LiPo (via XT60)
Interfaces	UART / RCA Video / VTX
Video Protocols	PAL/ NTSC
Control Protocols	TTL / ELRS / TBS / PPM
Max Transmission	>25 km
Optical Wavelength	1310 nm / 1550 nm
Dimensions (mm)	72 × 32 × 30
Weight	87g

Optical Fiber Reel Specifications

Parameter	25km Version(2km, 3km, 5km, 10km 15km, 20km available)
Fiber Type	Single-mode G657A2
Fiber Diameter	0.25 mm / 0.29 mm
Fiber Interface	FC
Shell Material	ABS
Optical Wavelength	1310/ 1550 nm
Dimensions (mm)	130 ×350 (with outlet)
Weight	0.65kg for 5km

Fiber Cable Technical Specs (G657A2)

Property	Value
Mode Field Diameter (1310)	8.6 ± 0.4 μm
Cladding Diameter	125 ± 0.7 μm
Coating Diameter	242 ± 7 μm
Attenuation @1310 nm	≤ 0.35 dB/km
Attenuation @1550 nm	≤ 0.21 dB/km
Max Pull Strength	50N(150N option available)
Macro-bend Loss (15mm/10x)	≤ 0.03 dB

Model Variants & Mechanical Specifications

Model	Cable Length	Reel Weight (kg)	Dimensions (Ø x H)	Fiber Type
UFX-K3	3km	0.53	94x430mm	Tight-buffered Ø0.25 mm
UFX-K5	5km	0.65	94x430mm	Tight-buffered Ø0.25 mm
UFX-K10	10km	1	105x450mm	Tight-buffered Ø0.25 mm
UFX-K15	15km	1.3	105x450mm	Tight-buffered Ø0.25 mm
UFX-K20	20km	1.75	133x495mm	Tight-buffered Ø0.25 mm
UFX-K25	25km	2.05	133x495mm	Tight-buffered Ø0.25 mm
UFX-K30	30km	2.35	133x495mm	Tight-buffered Ø0.25 mm

Estimated Drone Payload

Model	Cable Length	Reel Weight (kg)	Payload on 7-inch (kg)	Payload on 10-inch (kg)	Payload on 13-inch (kg)	Payload on 15-inch (kg)
UFX-K3	3km	0.53	1.47	2.47	4.47	7.47
UFX-K5	5km	0.65	1.35	2.35	4.35	7.35
UFX-K10	10km	1	1	2	4	7
UFX-K15	15km	1.3	0.7	1.7	3.7	6.7
UFX-K20	20km	1.75	0.25	1.25	3.25	6.25
UFX-K25	25km	2.05	N/A	0.95	2.95	5.95
UFX-K30	30km	2.35	N/A	0.65	2.65	5.65

System IntegrationGuide:
ConnectingSky&GroundTerminalstoUAVPlatforms

1.Connecting theTXModule (SkyTerminal)tothe FlightController

VCC – Connect to the 9–18V power supply output from the flight controller.

GND – Connect to the ground (GND) pin on the flight controller.

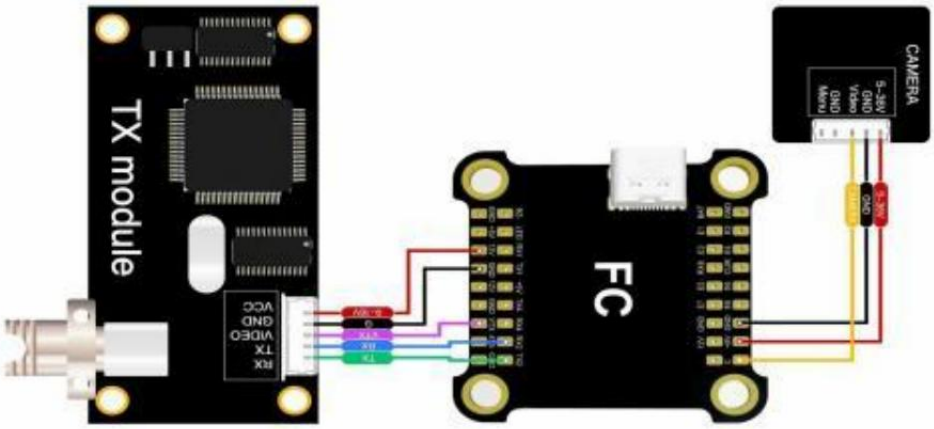
VIDEO – Connect to the VTX (video transmission) output of the flight controller.

RX – Connect to the TX (transmit) pin on the flight controller.

TX – Connect to the RX (receive) pin on the flight controller.

FC (Optical Interface) – Connect the optical fiber from the rear of the fiber optic storage reel to the FC port on the TX module.

Note: Ensureallconnectionsare secureandpolarity iscorrectbeforepoweringthesystem.



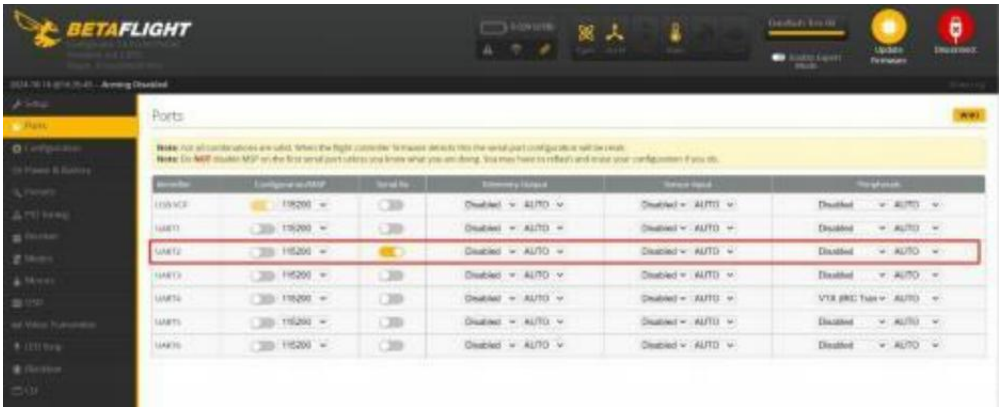
2.Betaflight Serial Receiver Port Configuration

After connecting the fiber optic TX module (Sky Terminal) to a UART port on the flight controller, identify the specific UART number (e.g., UART2).

In Betaflight Configurator, navigate to the Ports tab and enable the Serial RX function for the corresponding UART port.

Set the receiver protocol to CRSF under the Configuration tab to ensure compatibility with ExpressLRS or TBS systems.

✅Example: If the TX module is connected to UART2, enable Serial RX on UART2 and set Receiver Protocol = CRSF. Ensure all changes are saved and the flight controller is rebooted after applying the configuration.



3.Pairing the Receiver on the RX Module (Ground Terminal)

ExpressLRS (ELRS) Binding Procedure:

If using an ELRS receiver on the RX module, follow the steps below to enter binding mode:

Power cycle the RX module three times in quick succession (power ON → OFF → ON → OFF → ON). The receiver will enter bind mode, indicated by:

Flashing green LED three

times LED turns off briefly

Then flashes green three more times

On your radio controller, navigate to the SYS menu, then select: ExpressLRS → Bind and Pair.

After a few seconds, the connection will be established:

A pairing confirmation will appear on the controller screen

The receiver' s LED will stay solid green, indicating a successful bind

✅Note: Ensure the radio firmware version is compatible with the receiver module during binding.

4.Pairing the Receiver on the RX Module (Ground Terminal)

TBS Crossfire Binding Procedure:

To bind a TBS Crossfire receiver, follow the steps below:

Power on the RX module (ground terminal).

Press the bind button on the TBS receiver.

The receiver' s LED will begin flashing green, indicating it is in bind mode.

On your radio controller, navigate to the SYS menu, then open: TBS Agent Lite → Bind.

After a few seconds, the connection will be established:

A pairing confirmation will appear on the controller screen

The receiver' s LED will turn solid green, indicating successful pairing

Note: If you encounter issues with pairing, refer to the specifications and user guide for your specific receiver or radio module.

5. Connecting the Video Output

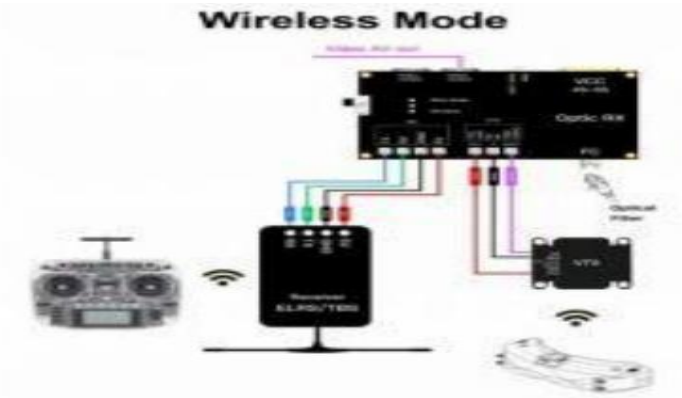
Wireless Video Output Mode:

To enable wireless video transmission, connect a compatible wireless video transmitter (VTX) to the designated video output port on the RX module.

The system supports VTX modules across all frequency bands

Ensure the VTX is securely connected and configured according to your UAV's video transmission requirements

✅Tip: Use a frequency that complies with local regulations and is interference-free for optimal performance.



6. Connecting the Optical Fiber

Important Safety Reminder:

Before initiating flight, remove the securing tie on the fiber optic storage reel.

Failure to do so may result in fiber breakage or damage to the cable during deployment.

Ensure the optical fiber is correctly aligned and connected to the appropriate FC interface before powering on the system.

7. Operational Recommendations for Safe Deployment

Fiber Optic Cable Outlet Positioning

Ensure the fiber optic cable outlet is positioned away from the drone' s propellers to avoid entanglement during flight.

Avoid Abrupt Movements

Do not perform rapid deceleration, sudden descent, or sharp turns while descending, as such maneuvers may cause the fiber to contact or be damaged by the propellers.

Minimum Bending Radius

Avoid excessive bending of the fiber optic cable. The minimum safe bending radius is 0.5cm.

Flight Speed Limit

Maintain a maximum flight speed of 120 km/h to prevent strain or unintentional tension on the cable.

Fiber Storage Box Locking Mechanism

Before flight, ensure that the locking buckle on the fiber optic reel is properly released to allow smooth unwinding of the cable.

Controlled Takeoff and Acceleration

Perform a gradual takeoff. Avoid sudden acceleration, especially during ascent, to reduce the mechanical load on the fiber optic cable.

Initial Fiber Fixation

After all connections are completed and the drone is ready for takeoff, temporarily secure the fiber optic cable with transparent tape to the airframe or ground anchor point. This helps prevent the cable from unintentionally unspooling and tangling at the start of deployment.

Tip:Ask our team for a demonstration video of this procedure to ensure correct handling during field use.

7. Operational Recommendations for Safe Deployment

Fiber Optic Cable Outlet Positioning

Ensure the fiber optic cable outlet is positioned away from the drone's propellers to avoid entanglement during flight.

Avoid Abrupt Movements

Do not perform rapid deceleration, sudden descent, or sharp turns while descending, as such maneuvers may cause the fiber to contact or be damaged by the propellers.

Minimum Bending Radius

Avoid excessive bending of the fiber optic cable. The minimum safe bending radius is 0.5cm.

Flight Speed Limit

Maintain a maximum flight speed of 120 km/h to prevent strain or unintentional tension on the cable.

Fiber Storage Box Locking Mechanism

Before flight, ensure that the locking buckle on the fiber optic reel is properly released to allow smooth unwinding of the cable.

Controlled Takeoff and Acceleration

Perform a gradual takeoff. Avoid sudden acceleration, especially during ascent, to reduce the mechanical load on the fiber optic cable.

Initial Fiber Fixation

After all connections are completed and the drone is ready for takeoff, temporarily secure the fiber optic cable with transparent tape to the airframe or ground anchor point. This helps prevent the cable from unintentionally unspooling and tangling at the start of deployment.

Tip: Ask our team for a demonstration video of this procedure to ensure correct handling during field use.