



LORA TX control link (915MHz)

A000059 – User Manual



AIOBOTICS

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Introduction

The AO00059 LoRa Remote control RF link is a UHF transmitter in the 902-928MHz ISM band. It used for manual control of Airobotics' Industrial drones during VLOS (Visual Line of Sight) operation.

The AO00059 connects to any off the shelf radio control transmitter (such as the Futaba T14SG) via the remote-control trainer port. Connection of the AO00059 to the trainer port overrides the remote control's internal RF transmitter circuitry and disables it.

The AO00059 receives a PPM serial data stream from the RC remote's trainer port. The onboard FPGA samples the analog PPM data stream and digitizes it to binary format.

The digitized data is sent over the air using Microchip's RN2903 LoRa Chirp Spread Spectrum Module. A CML Micro CMX901 RF Power amplifier is used to extend the reliability of the system.

The AO00059 is designed to be powered using an off the shelf external 3S LiPo battery with XT60 connector.

An external SMA connector is used to connect the antenna to the AO00059.

LoRa is a Chirp Spread Spectrum based modulation scheme developed by Semtech.

The USB port of the AO00059 is used for configuration and engineering purposes only, this shall be done only by Airobotics authorized personal. The USB port is used for both firmware flash, RF power amplifier calibration and ID configuration.

Specifications

Input Voltage	9 -12.6VDC
Input current	300mA (Max)
Internal RF Module	Microchip RN2903 + CML Micro CMX901
Tx Frequency	902-928MHz
OTA Bandwidth	500Khz
Tx Power	20dBm
Power Spectral Density	8dBm/3kHz (Max)
Modulation Type	Chirp Spread Spectrum
Encryption	AES256 (Optional)
Safety Features	RF Carrier Sense, Loss of Signal Alarm, Low Battery Alarm
Antenna Connector	SMA (50 Ohm)
Power Connector	XT60
Data Connector	Switchcraft: EN3L6FX
Antenna Types	Taoglas: FW.95.B.SMA.M, 2.7dBi, Omni Directional Nearson: S463AM-915, 2dBi, Omni Directional
Weight (w/o Antenna)	215 gr.
Dimensions (w/o Antenna)	130 x 55 x 35 mm

Installation Manual

Warning: This device must be professionally installed by Airobotics certified technician

Needed materials:

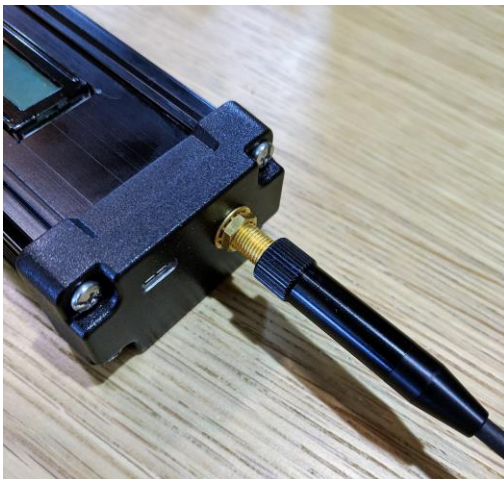
- AO00059 LoRa transmitter module
- Antenna (FW.95.B.SMA.M/ S463AM-915)
- Remote control – Futaba T14SG for example
- 3S LiPo battery with XT60 connector
- Trainer port to LoRa cable
- Thread-lock - Loctite 243(Airobotics P/N: 001339)

Connection instructions:

1. Connect the specified antenna to the AO00059 LoRa module

Antenna installation notes:

- Use thread-lock to permanent secure the SMA antenna connection.
- Take extra care when attaching the Antenna SMA connector, Finger tight with approximately torque of 0.6-0.8Nm is sufficient.



Warning: It is absolutely forbidden for any operator to modify or change the device antenna. In the event the need arises to replace the antenna, replacement of the antenna shall only be performed by a professional installer.

2. Connect the LoRa module and battery to the back of the remote control using dual-side adhesive tape.



3. Connect the Trainer cable to the Remote control



4. Connect the trainer cable to the LoRa module



5. Connect the battery to the LoRa module, this will power up the AO00059 and will start transmitting the remote-control trainer output.



Warning: It's forbidden to connect any device to the USB port while the AO00059 is transmitting.

FCC Compliance Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception.

However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

WARNING! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WARNING! A distance of at least 6cm should be maintained between the antenna and all persons during the operation of the of this device