



*RFT-868-USB  
User Manual v1.0*

*AUREL WIRELESS NETWORK  
USER MANUAL  
USB RFTide Network Interface  
868.3 MHz TRX*

Technical reference may be subject to variation during evaluation tests. AUREL S.p.A has no responsibility about any irregular uses of the devices.

## Device Specifications

- Power Supply: 5V (with USB 2.0 connection)
- Dimensions ( L x W x H ): 72 x 10 x 24 mm

## Radio Module TRX Features<sup>1</sup>

- Operating Frequency: 868.3 MHz
- Low Rx power consumption: 10mA.
- Low Tx power consumption: 33mA @+10dBm.
- Low Standby consumption: 4  $\mu$ A.
- FSK Modulation.
- Good reception sensitivity: down to -100 dBm at 25 kb/s in FSK.
- Packet handling feature with data whitening and automatic CRC generation.
- Incoming sync word recognition.
- Distance coverage: up to 20 m indoors (depending on building materials).
- Effective Radiated Power (ERP): 5mW.

## RFTide Network Features

- Wireless mesh network topology.
- Proprietary routing protocol and software application.
- Centrally managed network via UART communication.
- Advanced Encryption Standard (AES) of the data.
- Packet collision avoidance with Listen Before Talk techniques.
- Adjustable duty cycle, the application must be in accordance to the CEPT 70-03 Recommendation (September 2015).

## Typical Applications

- Wireless alarm and security systems.
- Wireless sensor networks.
- Automated Meter reading.
- Home and building automation.
- Industrial monitoring and control.
- Remote wireless control.

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<sup>1</sup> Refer to SEMTECH SX1211 Transceiver datasheet  
<http://www.semtech.com/images/datasheet/sx1211.pdf>

**Revision History**

<i>Date</i>	<i>Version</i>	<i>Revision</i>
15/09/2015	1.0	Initial Release

# CAUTION

➤ **Read this manual before attempting to install the device!**

- Failure to observe recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer Aurel s.p.a. will not be held responsible for any loss or damage resulting from not following the instruction of operating manual.
- When handled carelessly or used in non-specified environment conditions, the device may not function properly. It's highly recommended to ensure safety and property protection.
- The RFT-868-USB is a usb-powered device. Using connections other than specified may result in explosion. Dispose of properly, observing environmental protection rules.



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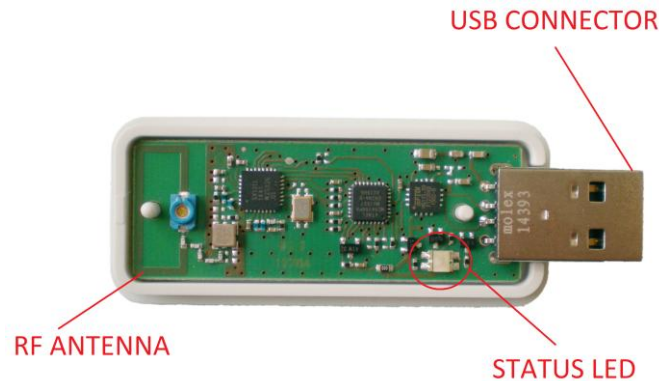
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## DESCRIPTION

The RFT-868-USB is the RFTide interface which permit to setup and manage the RFTide network. It is used as Network ID authorizer: it comes out from the factory with a unique serialized Network ID (as per the RFT-868-3V/V.2 serialized module), which it will be added to all the other devices in order to grant the access. This device has the characteristic to have an USB connection with power supply which means it could work only if connected to another device, with the proper serial COM connection it's possible to manage it and actively sending commands. The learning procedure is always the same for all the devices and the RFT-868-USB defines the Node ID for each component. After every learning procedure the new nodes will keep in memory the ID of the usb and depending on the device will use it for alarms, button pressed and status messages (see RFT-868-MAG, RFT-868-PIR, RFT-868-4CH and RFT-868-RELAY-S manuals) .



**Figure 1 - External view of the RFT-868-USB device**



**Figure 2 - Internal view of the RFT-868-USB device**

## *FIRST CONFIGURATION*

In order to operate in the network it is possible to send commands through a serial port using an external microcontroller or a PC. Referring to Figure 2, follow these configuration steps:

1. Connect the RFT-868-USB device to a usb 2.0 port (e.g. Personal Computer, Raspberry Pi...).

The parameter necessary in order to establish a serial communication through a Virtual Com Port VCP<sup>2</sup> are:

Baud Rate	<i>19200</i>
Data Bits	<i>8 bit</i>
Stop Bits	<i>1 bit</i>
Parity	<i>None</i>

2. To verify the usb device a RFTide Software v1.0 for PC can be downloaded from the following link:

<http://www.rftide.com/download-area/>

Whit this application it is possible to handle all the RFTide nodes.

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<sup>2</sup> VCP drivers can be found here: <http://www.ftdichip.com/Drivers/VCP.htm>

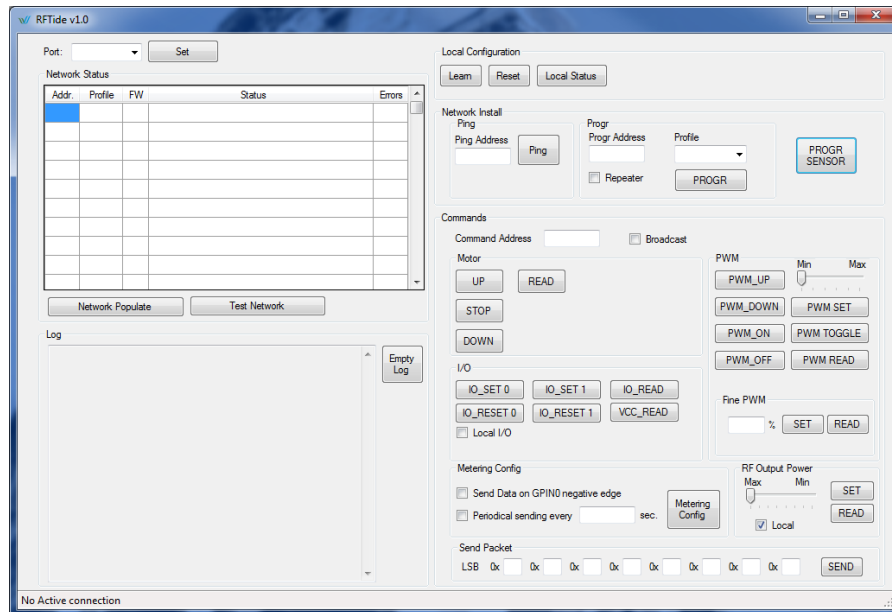
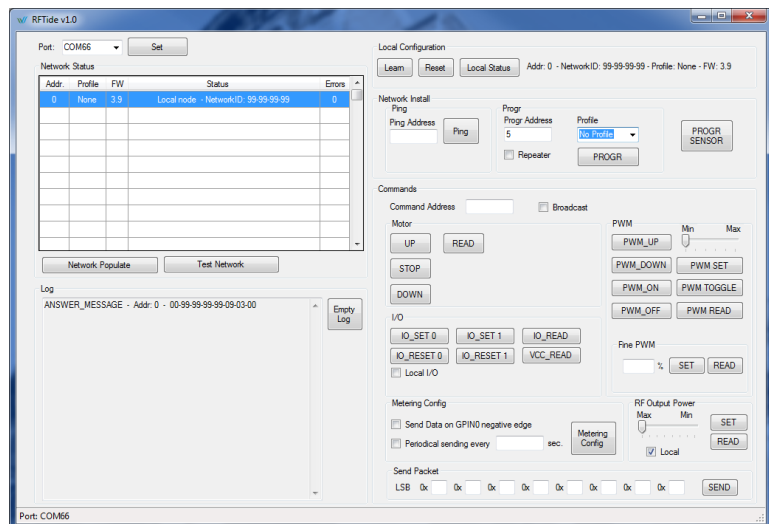


Figure 3 Software application for the RFT-868-USB

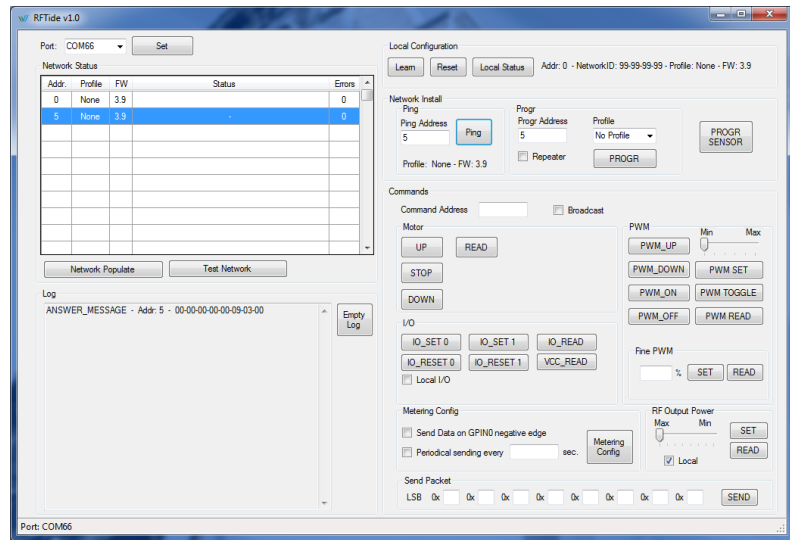
After connecting the RFT-868-USB select the proper serial Port and push “Set”(see Figure 3). Pressing “Local Status” will show the address number, the Network ID, the Profile (None) and the firmware version.

3. Configurations or particular activities may be different for every device which will be associated, except the learning procedure which will be always the same:
  - Once the “Learning Status”<sup>3</sup> of the RFTide device is active, it can be programmed by defining a *progr address* number (0 ÷ 253), setting “No Profile” and pushing the PROGR button.



<sup>3</sup> Refer to the proper device manual “Learning procedure” section.

- The led on the device must blink for 2 seconds, after that it will be ready and set for the communication (see *PING Message* section on RFTIDE COMMUNICATION PROTOCOL chapter). Doing the same activity for all the RFTide devices permit to establish the desired RFTide network.



## RFTIDE COMMUNICATION PROTOCOL

Each message sent through serial port is composed by 11 bytes sorted as follow:

Cmd LSB	Cmd MSB	Address	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7
Command to be executed or action performed		Recipient of the message	Payload: it depends on the type of message sent							

Table 1 – Serial Packet Structure

### I. PING Message

Referring to Figure 3, on the “Ping” section of the “Network Install” part, it can be tested the radio communication between the RFT-868-USB device and the other node by sending a “ping” packet. Just filling the “Ping Address” field and click the “Ping” button, if everything goes well, an answer message will be received. In the payload part of the answer message it’s possible to verify the firmware version and the profile set on the node.



### Ping Sequence

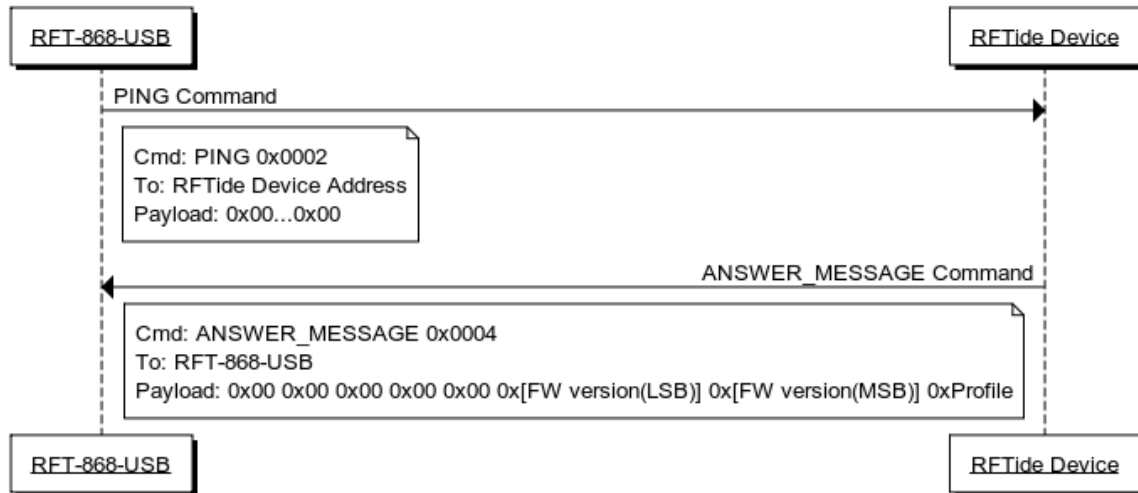


Figure 4 Ping Sequence

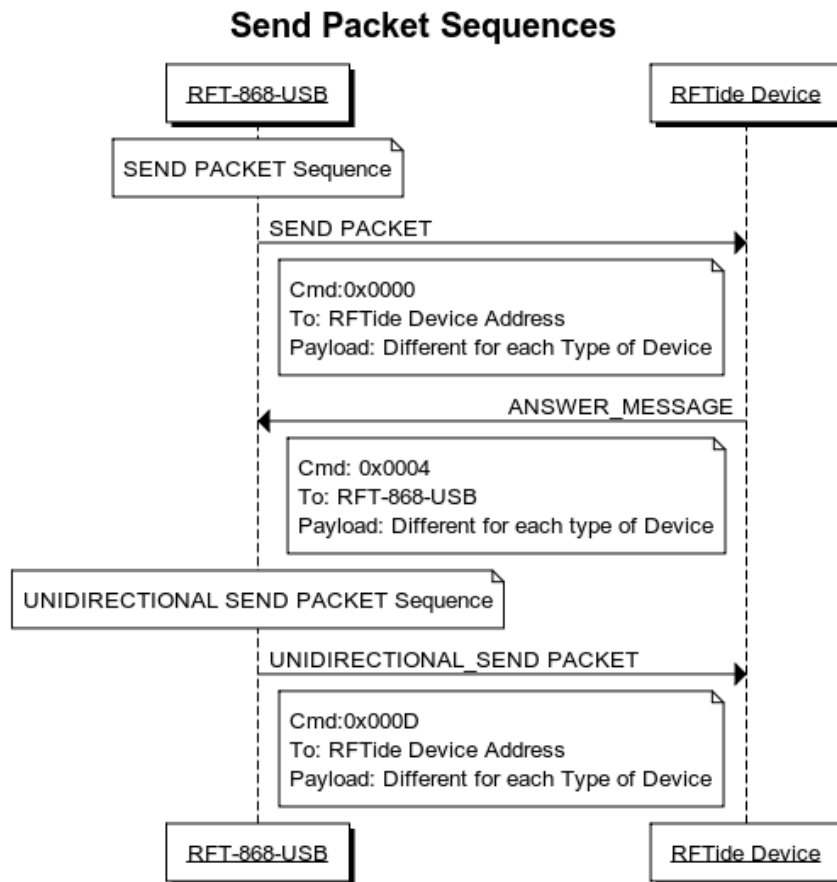
Before sending a ping message it's necessary that the recipient is included in the RFTide network by the learning procedure and that the radio module is on (RFT-868-PIR and RFT-868-MAG activate the radio communication only for a brief period in order to save the batteries).

## II. SEND PACKET Message

Referring to Figure 3, on the "Commands" section with the "Send Packet" field it's possible to:

- Send a message with the RFTide command "SEND\_PACKET" in case the acknowledge from the recipient is required. Retries will be done till an ANSWER\_MESSAGE won't arrive or even the second attempt results failure.
- Send a message with the RFTide command "UNIDIRECTIONAL\_SEND\_PACKET" in case the acknowledge from the recipient is not required.

The payload of the message is fully editable by filling the fields.



**Figure 5 Send Packet Sequences**

Depending on the payload, actions may change. This kind of message is multi-purpose:

- STATUS\_REQUEST (for RFT-868-PIR, RFT-868-MAG, RFT-868-RELAY-S).
- ON-OFF Command (for RFT-868-RELAY-S).