



*RFT-868-SML
User Manual*

AUREL WIRELESS NETWORK

USER MANUAL

SMD RFTide Transceiver

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.

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Device Specifications

- Power Supply: 3V
- Current Draw in standby mode: 2 μ A
- Temperature Working Range: -10 ÷ +55°C
- Dimensions (L x W x H): 28 x 2 x 15 mm

Radio Module TRX Features

- Operating Frequency: 868.3MHz
- Low Tx power consumption: 33mA @+10dBm.
- 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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Revision History

<i>Date</i>	<i>Version</i>
15/09/2015	1.0
13/04/2016	1.1
08/09/2016	1.2

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.



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ELECTRICAL CHARACTERISTICS

Characteristic	Min	Typ	Max	Unit
Frequency		868.3		MHz
RF bandwidth		60		kHz
Supply Voltage (+3V version)	2.7	3.3	3.6	V
Supply current (TX mode)			33	mA
Supply current (RX mode)			10	mA
Supply current (Power down mode)	0.2		4	μA
Modulation		FSK		
Receiver sensitivity		-100		dBm
RF Power Out		7		dBm

Table 1 - Electrical Characteristics

Duty-cycle control is in charge of the user. Note that in optimal conditions the request and answer time is 250ms.

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In power down mode (ENABLE low) module is completely off and it can be switched on only raising ENABLE pin. When ENABLE pin is raised module requires about 50ms to come to full functionality.

MODULE PINOUT

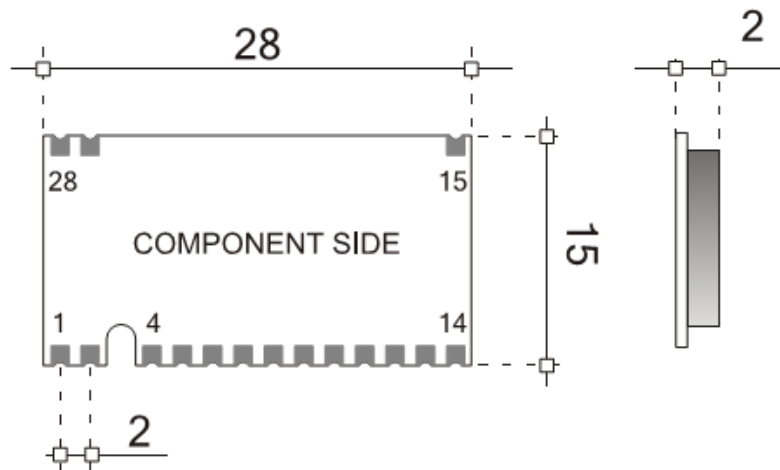


Figure 1

1. **ANTENNA**
2. **GND**
4. **GPOUT0** (0-3V Digital Output)
5. **GPIN0 / ADC0** (0-3V Analog Input)
6. **LEARN** (Input for learning procedure, pull-up is already provided. A button towards GND should be used).
7. **LED OUT** (Output for learning status. A led towards GND with resistance should be used).
8. **UART RX** (Input for module).
9. **UART TX** (Output for module).
10. **ENABLE (HI=ON, LO=OFF)** (High: ON – Low: OFF, with built-in pull-down resistor).
This pin can be driven by an external microcontroller, with no need for dedicated regulators or transistors to break module power-supply.
11. **VCC (+3V)**
12. **GPIN1/ ADC1** (0-3V Analog Input)
13. **GPOUT1** (0-3V Digital Output)
14. **GND**
15. **GND**
27. **GND**
28. **GND**

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I/O STAGES

I/O ports are connected to microcontroller pins through a 22R resistor. If a button has to be used, take care to add a pull-up (or pull-down) resistor properly. Note that for LEARN pin the pull-up is already built in the module because intended to be used with a button.

RF CONSIDERATION

50 Ohm line

It must be the shortest as possible.

1.8 mm wide for 1 mm thick FR4 printed circuits and 2.9 mm wide for 1.6 mm thick FR4 printed circuits. It must be kept 2 mm away from the ground circuit on the same side.

On the opposite side a ground circuit area must be present.

Antenna connection

It may be utilized as the direct connection point for the radiating whip antenna.

It can bear the connection of the central wire of a 50 Ω coaxial cable. Be sure that the braid is welded to the ground in a close point.

Antenna

A whip antenna, 8.5 cm long and approximately 1 mm diameter, brass or copper wire made, must be connected to the RF output of the transmitter.

The antenna body must be kept straight as much as possible and it must be free from other circuits or metal parts (5 cm minimum suggested distance).

It can be utilized either vertically or horizontally, provided that a good ground plane surrounds the connection point between antenna and transmitter output.

NOTE: as an alternative to the above described antenna it is possible to fit the whip model manufactured by AUREL (see related Data Sheet and Application Notes). By fitting whips too different from the described ones, the CE Certification is not assured.

UART PROTOCOL

All the RFTide modules use UART as a local interface (UART TX/RX pins). It is possible to connect to it via serial communication using the UART protocol with these settings:

Baud Rate	19200
Data bits	8
Parity	None
Stop bits	1

Each command sent through serial port is composed as follow:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9	Byte 10	Byte 11
<i>Cmd LSB</i>	<i>Cmd MSB</i>	<i>Address</i>	<i>Payload Byte 0</i>	<i>Payload Byte 1</i>	<i>Payload Byte 2</i>	<i>Payload Byte 3</i>	<i>Payload Byte 4</i>	<i>Payload Byte 5</i>	<i>Payload Byte 6</i>	<i>Payload Byte 7</i>
Command to be executed or action performed		Recipient of the message	Payload: it depends on the type of message sent							

Table 2 – Serial packet structure

- Byte 1 – Byte 2 : Command field
- Byte 3 : Destination Address (0 ÷ 255)
- Byte 4 ÷ Byte 11 : Payload of the message