



*RFT-868-4CH
User Manual v1.0*

*AUREL WIRELESS NETWORK
USER MANUAL
4 Channels Remote Controller
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: 3V (1xCR2032 battery)
- Current Draw in standby mode: 2µA
- Temperature Working Range: -10 ÷ +55°C
- Dimensions (L x W x H): 37 x 12 x 72 mm

Radio Module TRX Features

- Operating Frequency: 868.3 MHz
- 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>	<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-868-4CH is a battery-powered device. Using batteries other than specified may result in explosion. Dispose of properly, observing environmental protection rules.





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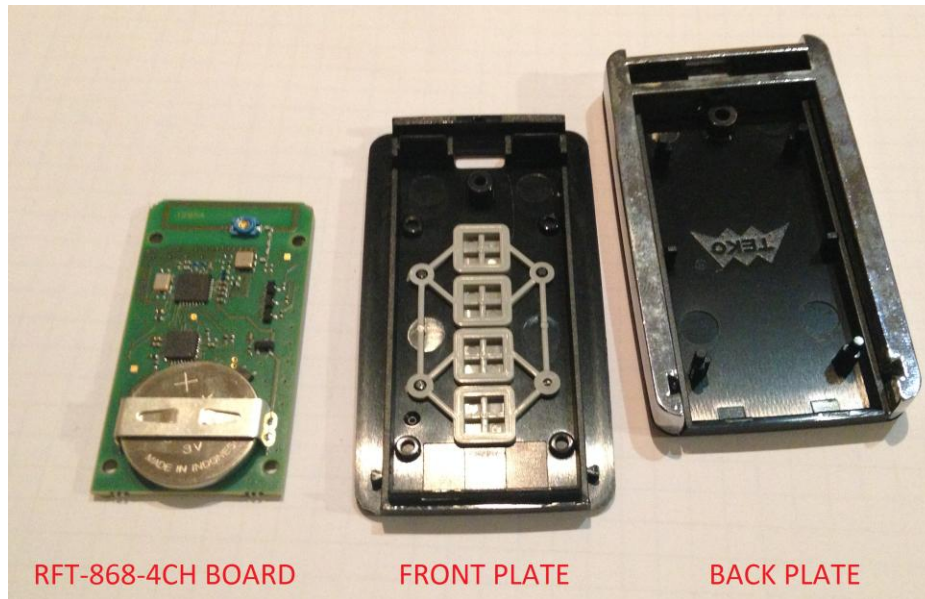
DESCRIPTION

The RFT-868-4CH is the RFTide device used for remote controlling the system in order to accomplish some assigned tasks. It is composed by 4 buttons which allow as much functions. All of the buttons must be managed from a “Control Unit”¹ that should assign every RFTide message to a particular action.



Figure 1 - RFT-868-4CH device

¹ A generic Control Unit device is intended a logic unit which directs operations and performs assigned task, cooperating with the RFTide network.

FIRST CONFIGURATION**Figure 2 - Part description of the RFT-868-4CH**

Referring to Figure 2, these first steps must be followed:

- a. Open the handheld removing the screw on the back of the device.
- b. Check the CR2032 battery status before placing on the holder, place it referring to the picture.
- c. Follow the “Learning Procedure” part explained in the chapter DEVICE SETTINGS at page 7.
- d. For advanced setup and configuration see the Command Messages section at page 8.

DEVICE SETTINGS

I. Learning Procedure

In order to let the device communicate with the existing RFTide network the following steps must be done:

1. Keep pushing the first and the third button of the RFT-868-4CH in order to set the device in learning mode (see Figure 3).
2. The RGB led will turn white for a while confirming the “Learning Status” (see Figure 3); till this time the RFTide Device which defines the network ID must send a `PROGR_MESSAGE` signal to the device. The message must contain the node address which will be assigned to the RFT-868-4CH (every number between 1 and 253 is valid).
3. If the message is received correctly, the RGB led must be blinking and then turns off.

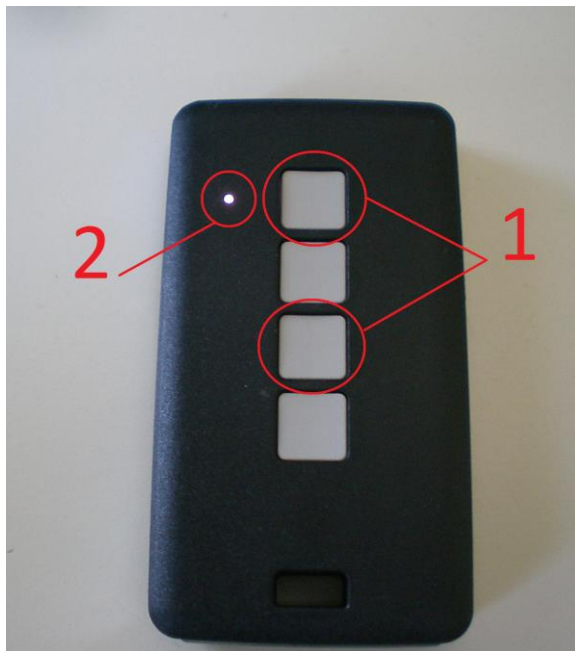


Figure 3 - Learning Procedure

II. Command Messages

Once the device has been learned into the RFTide network, it is possible to establish a communication. Here following the standard message which will be sent:

▪ Command:	SEND_PACKET	0x00 0x00	
▪ Destination:	RFTide Device	0x[Node ID]	
▪ Payload Byte 0:	0x10 (=handheld device)	0x10	
▪ Payload Byte 1:	Pressed button	[0x00 ÷ 0x04]	(see Figure 4)
▪ Payload Byte 2:	Battery level	0x[see Table 1]	
▪ Payload Byte 3:	Battery level	0x[see Table 1]	
▪ Payload Byte 4:	Serial ID	0x[Serial ID]	
▪ Payload Byte 5:	Serial ID	0x[Serial ID]	
▪ Payload Byte 6:	Firmware version	0x[FW version]	
▪ Payload Byte 7:	not used	0x00	

Serial ID is a unique 16 bits identifier serial number that is used from the Control Unit to recognize handhelds even if they have the same address. It can be useful in order to locate which device gave the message in case of multiple handheld in the same network or to eliminate it from the RFTide network.

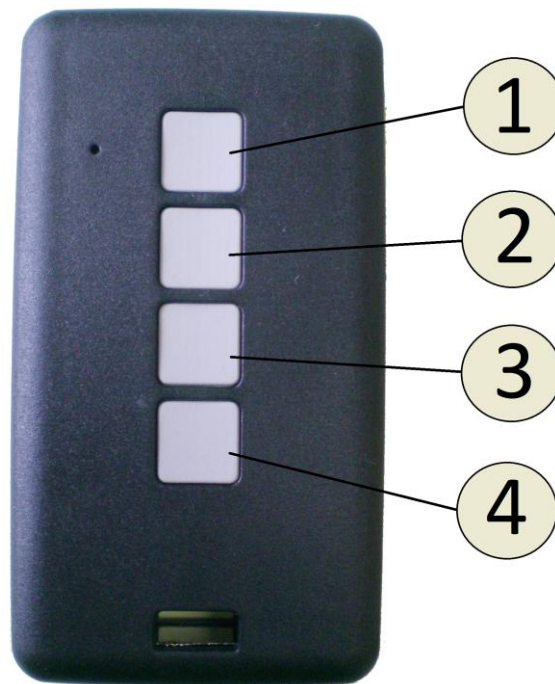


Figure 4 - Byte 1 equivalent Integer values for each button

Each pressure of the button corresponds to a different RFTide message, it sets a different value on the byte 1 of the payload. In Figure 4 the correspondent values. The 0x00 is used only in response of a learning message.

Battery Level [Byte 2, Byte 3](10 bits)		
MAX VALUE	1023	[0xFF, 0x03]
MIN VALUE	0	[0x00, 0x00]

Table 1 Battery Level

Note that the battery level value is applied on a resistance which is on 0÷1.1V range, therefore the A/D conversion has a resolution of $1.1V/2^{10} \approx 1.07mV$.

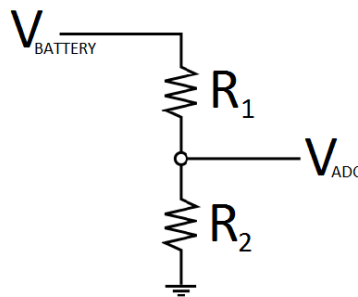


Figure 5 - Voltage divider for battery level reader

In order to measure the battery voltage consider the voltage divider in Figure 5 where $R_1 = 18K\Omega$ and $R_2 = 6.8K\Omega$ which result that $V_{ADC} \approx 0.2742 V_{BATTERY}$.

MAINTENANCE

In order to replace the battery, open the handheld and place the CR2032 battery as per Figure 2. A typical case of maintenance is when the RFT-868-4CH doesn't send any message: there could be a power supply issue, check the battery voltage and if it's low replace it. In case there's a communication issue just follow the learning procedure at page 7.