

User Manual
Firmware version V3.2
19.8.2010

RTR970B FTR 970B

RADIO DATA RECEIVER



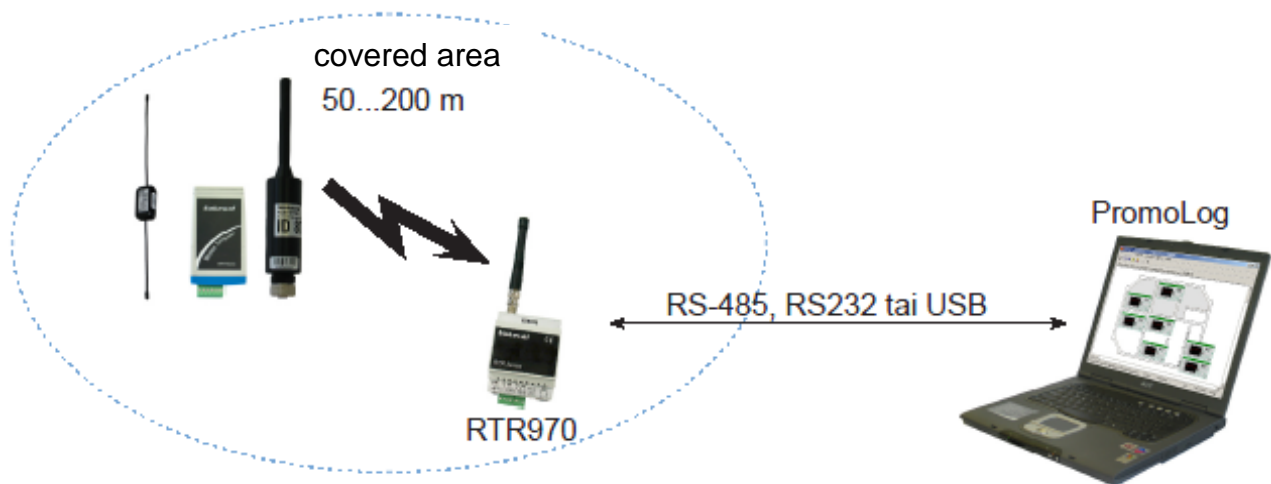
DESCRIPTION

RTR970B and FTR970B have only one difference, the case. The benefits in upgraded B version: Antenna is moved to the middle in both models and an USB- bus has been added to the FTR model. B version of FTR is also about half the size of the original.

The device is a radio data receiver for Nokeval MTR series wireless transmitters. It receives and buffers the data packets which have been sent by MTR transmitters. It automatically recognizes the types of the transmitters, so different kinds of transmitters can be used simultaneously. Transmitters can also have different transmission intervals. The device uses license free 433.92 MHz frequency band (ISM) so it can be freely used, for example, almost in whole Europe.

RTR970 is 35 mm DIN-rail mountable but desktop use is also possible. FTR970 is wall mountable. The receiver is connected to a computer using RS-485, USB or RS-232 bus and it requires PromoLog application that reads the information from the device.

Nokeval SCL protocol is used for data transmission between the receiver and the computer. Multiple receivers can be connected in parallel to an RS-485 bus to increase the covered area. The receiver has three indicator LEDs and it requires 8...30 VDC or USB.



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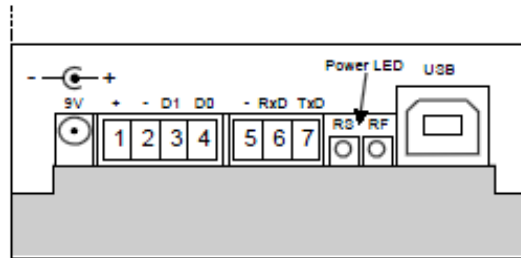
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INSTALLING

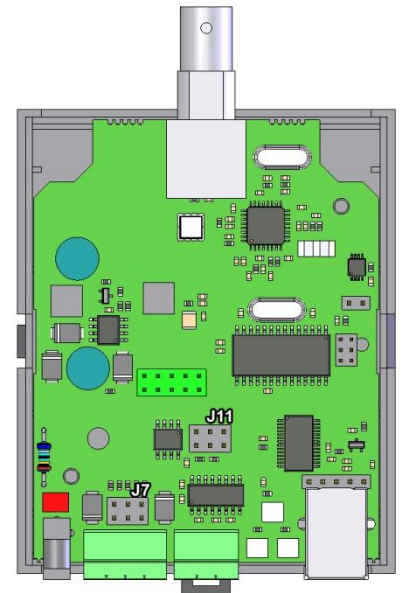
WHERE TO INSTALL

The RTR model is 35 mm DIN-rail mountable and FTR is wall mountable. Desktop use is also an option. The best place for a receiver is a big grounded horizontal metal level surrounded by as few as possible vertical metal surfaces. Antenna is to be installed perpendicular to the metal level with a corner piece or extension cord. The best range for the transmitter is achieved when there is a direct view from receiver to the transmitter. The walls and objects between the transmitters will dampen the signal and thereby shorten the range. On the other hand, metal surfaces cause reflections which might lengthen the range.

CONNECTIONS



USB-, RS-485-, or RS-232-bus can be used to connect the device via serial communications. Each of these connections will be covered in their own chapter below. By default, the device is jumpered to use the USB-bus. If RS-485 or RS-232 -bus is to be used, the serial bus needs to be jumpered differently. Open the case by pressing in the fasteners on both sides of the RTR970 case. The case of FTR970 is opened by removing the screws



ANTENNA CONNECTION

Antenna is attached to the BNC-connector by connecting the two locking pins, after which the ferrule at the foot of the antenna is to be turned 90 degrees clockwise. Antenna can be removed by turning the ferrule counterclockwise after which the antenna can be pulled off.

USB

To use USB-bus, jumper J11 has to be set as the picture below. Jumper J7 has nothing to do with using the USB -bus. The device is jumpered like this as default.



The device gains the supply voltage through the USB, but to ensure that the device will operate while the computer is turned off, connect the supply voltage 8...30 VDC either by 1.3 mm DC jack (center connector positive) or by detachable screw post connector terminals 1 (+) and 2 (-). Both supply voltage connectors are internally connected. The receiver is protected against wrong polarity of the supply voltage.

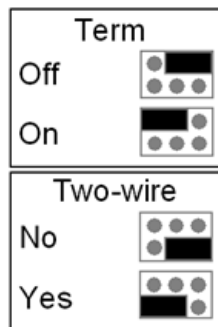
RS-485

To use RS-485-bus, jumper J11 has to be set as the picture below.



The supply voltage 8...30 VDC is connected using 1.3 mm DC jack (center connector positive) or by using detachable screw post connector terminals 1 (+) and 2 (-). Both supply voltage connectors are internally connected. The receiver is protected against wrong polarity of the supply voltage. The supply voltage's negative terminal is also used as ground for RS-485 and RS-232.

If necessary RS-485 interface can easily be added to a computer by using Nokeval DCS770 or DC771B USB - RS-485 converter or RCS770 USB/RS-232-RS-485 converter. RS-485 bus is connected to terminals 3 (D1) and 4 (D0).



If the master device in RS-485 bus has the common terminal, the "two-wire" jumper must be set to "no" position. If the master device doesn't have the common terminal, the jumper must be set to "yes" position.

If the device is the last device on the bus, it is recommended to set the "term" jumper to "on" position. When this jumper is set AC-termination is used which means that 1 nF capacitor and 110 ohm resistor are connected in series between the bus wires.

Length of RS-485 bus can be 1km and it can be connected to 32 devices, more can be connected via repeating transmitters.

RS-232

To use RS-485-bus, jumper J11 has to be set as the picture below. Jumper J7 has nothing to do with using the RS-232-bus.



The supply voltage 8...30 VDC is connected using 1.3 mm DC jack (center connector positive) or by using detachable screw post connector terminals 1 (+) and 2 (-). Both supply voltage connectors are internally connected. The receiver is protected against wrong polarity of the supply voltage. The supply voltage's negative terminal is also used as ground for RS-485 and RS-232.

RS-232-bus is not recommended since it is easily disturbed and the maximum length of the cord is only 15 meters in good circumstances. Long distances should be covered with RS-485-bus.

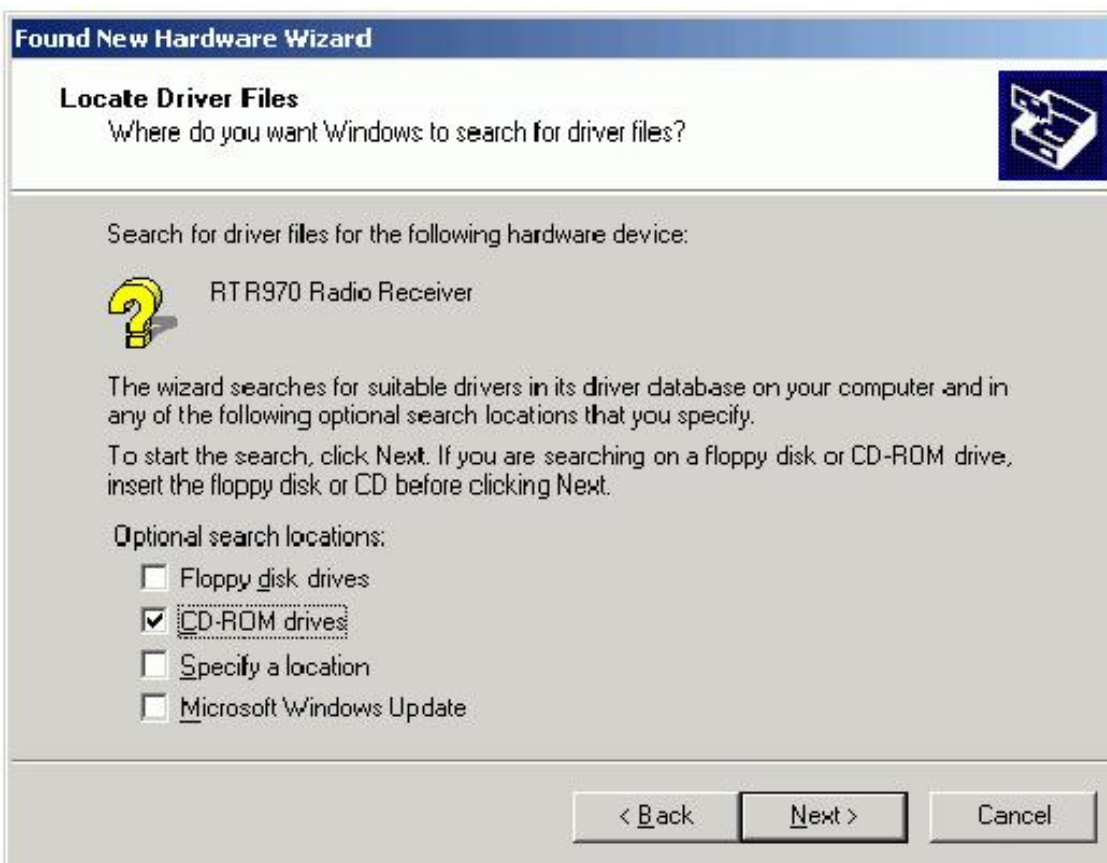
USB DRIVERS

The USB interface chip needs two drivers: one for USB bus and the other to create a virtual serial port.

The drivers can be obtained from a Nokeval Software CD or downloaded from the homepage of Nokeval at www.nokeval.com. The installation below assumes using CD, but using downloaded drivers is quite similar.

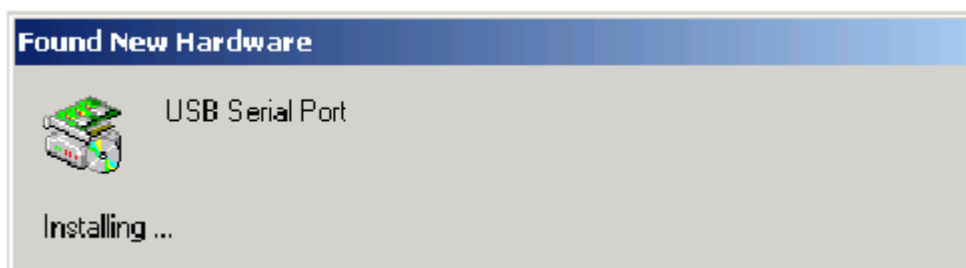
Insert the Nokeval Software CD and plug in the device. Windows should detect it and start installing automatically:





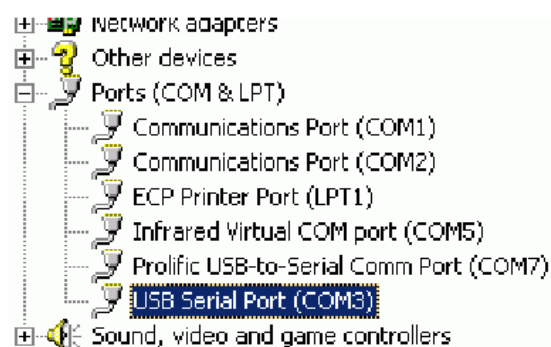


When USB bus driver ftdibus.inf is installed, Windows wants to install the virtual serial port driver, which makes the device look like an ordinary COM port.



Install in the same way as the bus driver.

Finally it is necessary to find out, which COM port represents the device. Open Control Panel, System, Hardware, Device Manager. In the device tree, expand Ports, and there should be USB Serial Port (COM3), for example.



SETTINGS

CONNECTION SETTINGS

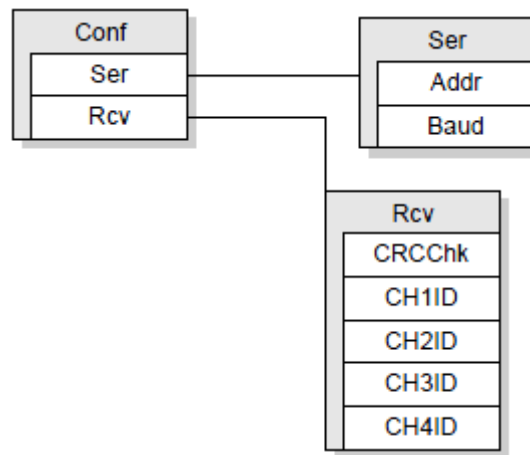
Use Mekuwin program to configure the device. You can download Mekuwin from Nokevals web site for free.

Default communication settings for configuration:

- speed 9600 baudia
- protocol SCL
- address 0

MENUTREE

Menu of the device:



SERIAL-SUBMENU (SER)

Serial communication settings. Note that the changes here do not affect until the device is rebooted.

Address:

SCL address selection. Allowed addresses are 0...123.

Baud:

Baud rate selection. Options are 300, 600, 1200, 2400, 4800, 9600 and 19200.

RECEIVE-SUBMENU (Rcv)

CRCChk

If selected, CRC checksum of received data packets is checked and corrupted packets are rejected. The setting is on by default and there is no reason to disable the setting.

CH1ID...CH4ID

Four MTR series transmitters (except MTR260 and FT10) can be defined to act as certain channel. For example, when the device receives "MEA CH 1?" command it sends latest received data from the transmitter that has been assigned to channel one. To assign a device to channel one, set the transmitter's ID to CH1ID value. Other channels can be assigned in the same way.

SCL-PROTOCOL

A more detailed description of the Nokeval SCL protocol can be downloaded from Nokeval [www-](#)pages. Some additional commands have been added to SCL protocol for MTR and RTR series devices that are not covered by the general SCL manual. These commands are explained in the list below.

Device supports the following SCL commands:

TYPE ?

Returns the model name and software version.

SN ?

Returns the device's serial number, for example "A123456"

MEA CH x ?

Returns the last received value from the device that is defined as "channel x".

DBG 1 ?

Returns the oldest unread data packet from the buffer.

DBR 1 xx ?

Returns a data packet from the ring buffer location xx.

DBX

Clears the ring buffer.

DBS 1 ?

Returns the size of the ring buffer.

SPECIFICATIONS

Radio receiver

Antenna

Connector: 50 Ω BNC female connector
Standard antenna: helical whip antenna (BNC connector)

Radio

Max input power: +10 dBm
Frequency band: license free 433.92MHz sub band e according to ERC/REC 70-03
Bandwidth: 180 kHz
Selective filter: Yes, SAW type
Sensitivity: -100 dBm (3·10⁻³ error ratio)

Decoder

Buffer memory: 96 latest transmissions

Serial connections

RS-485

Connector: Detachable screw post connector with 3.5 mm raster, combined with power supply, terminal 3 D1, terminal 4 D0.
Maximum cable length is 1000 m
Protocol: Nokeval SCL
Baud rates: 300/600/1200/2400/4800/9600/19200

RS-232

Connector: Detachable screw post connector with 3.5 mm raster, terminal 6 TxD, terminal 7 RxD.
Maximum cable length is 10 m
Protocol: Nokeval SCL
Baud rates: 300/600/1200/2400/4800/9600/19200

USB

Connector: USB type B, female
Protocol: Nokeval SCL
Baud rates: 300/600/1200/2400/4800/9600/19200

Supply voltage

Connector 1 1.3 mm DC-jack, center positive
Connector 2 detachable screw port connector with 3.5 mm raster, terminal 1+, terminal 2 --
Connector 4 USB type B, female
Voltage: 8...30 VDC

Environment

Operating temp.: -30...+60 °C
Protection class: RTR970B: IP20
FTR970B: IP65

LEDs

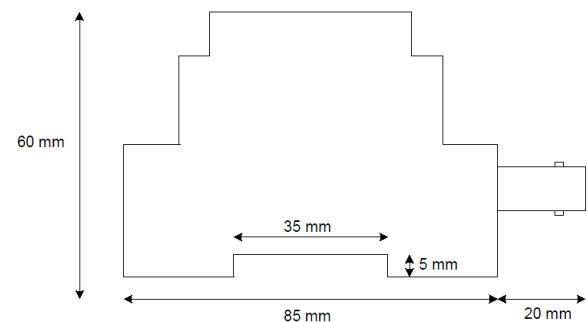
RS: Serial bus indicator
RF: Radio receiver indicator
Power: Power indicator (behind RS and RF LEDs)

Settings

Connection: RS-232/485 or USB
Protocol: Nokeval SCL-Meku 1
Software: Mekuwin for Windows 98...XP

Dimensions

RTR970B: 70 x 85 x 60 (WHD)



FTR970B: 80 x 130 x 60 (WHD)

Antenna: 100 mm, Ø 14 mm

Regulations

EMC directive
EMC immunity EN 61326
EMC emissions EN 61326, class B
R&TTE directive
EN 300 220 class 3
EN 300 489
EN 300 339



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