

This microprocessor controlled wireless repeater is designed for extending communication range of low power radio devices and features integrated transceiver allowing reliable receiving and retransmitting of selected radio signals in compliance with relevant R&TTE standards. Elmes TRX repeater identifies, stores and retransmits signals received exclusively from Elmes Electronic made transmitters. With long or large communication distance to cover many repeaters can be used in a chain or configured for simultaneous field operation. The repeater may be user set to retransmit data messages from all or selected Elmes devices offering multiple configurations and solving communication gap problems in wireless security and remote control applications.

Application examples

- Harsh radio propagation conditions or installation in basements, steel and concrete constructions, metal garages limiting practical operation range;
- Required distance between transmitter and receiver being greater than useful operating range of radio equipment thus requiring retransmitting of signals, as on fig. 1;
- Existing local object (wall, building, etc.) attenuating or reflecting wireless signals requiring repeater use to extend wireless range, as shown on fig. 2.
- Weak radio signals may not be reliably detected at large monitored area by a receiver thus requiring one or more repeaters to secure wide area coverage. Fig. 3 shows sample application of repeaters allowing key-fob UMB100H hand transmitters to be used in large area field.

Hint! The use of many repeaters in an installation increases the danger of radio interference and rejecting of transmitted alarm signals.

Operation

Depending on type of the received data signals the repeater operates as follows:

1. If data signal is received from Elmes dynamic hopping-code transmitter then user programmable **retransmission delay time** T_O (0 to 8 sec.) counting is triggered after which stored data is retransmitted within 0,8 sec. The repeater then is immediately ready to receive any next but different signal excluding possible retransmission of already transmitted code.
2. If data signal is received from Elmes fixed code transmitter RP501 then after delay time interval and data retransmission, user programmable **inactivity time** T_N (0 to 8 sec.) counting is triggered. During inactivity time interval the repeater does not receive, store nor transmit any data. Proper programming of inactivity interval eliminates repeaters' communication fault (B) described below.

Important! If **two or more** repeaters are used in a system, time intervals T_O and T_N need to be carefully programmed to avoid serious unwanted communication problems described below:

(A) Data signal from Elmes transmitter is simultaneously received by two TRX repeaters. To avoid interference at retransmission **delay time** T_O of the repeaters should be programmed to different values e.g. 0,8s and 1,6s.

(B) With two repeaters (A, B) operating in a system **with Elmes fixed code RP501 transmitters**, data retransmission from one may be detected by other. To exclude possible continuous backwards & forwards retransmitting of data between repeater B and repeater A the **inactivity time** T_N in both repeaters must be specifically programmed according to the following formula:

$$T_{N_A} > T_{O_B} + 0,8s \quad \text{and} \quad T_{N_B} > T_{O_A} + 0,8s$$

where:

T_{O_A} , T_{O_B} - retransmission delay time of repeaters A and B,
 T_{N_A} , T_{N_B} - inactivity time of repeaters A and B.

The T_O and T_N time intervals are as standard factory programmed to 1s and 0s respectively and **do not require re-programming if only one repeater is used in a system.**

The repeater is supplied with **ani-sabotage tamper switch** that may activate tamper alarm channel in any Elmes 433,92MHz band receiver provided the switch is used to activate transmissions while learning the TRX to the receiver.

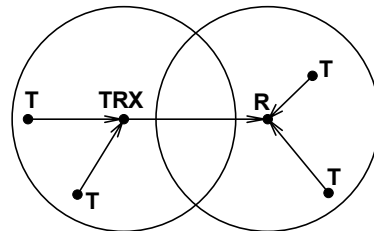


Fig.1

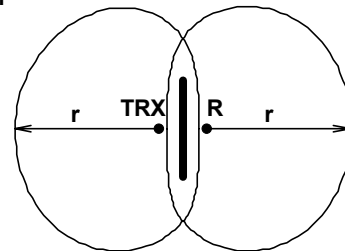


Fig.2

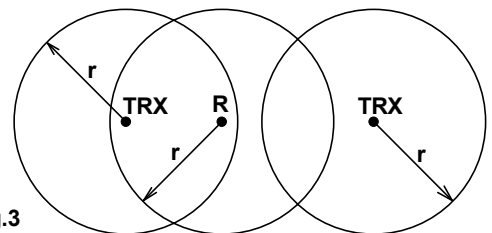


Fig.3

TRX – wireless repeater, R – receiver, T - transmitter
 r – nominal operating range of wireless device (e.g. UMB100H)

Interfacing with Elmes wireless devices

Elmes TRX repeater recognizes all digital radio data messages received from Elmes made devices (wireless detectors and transmitters) operating in 433,92MHz band. Described below, there are two operating modes of the repeater depending on the selection made by jumper JP1 placed on board of the repeater:

J1 shorted – repeater retransmits wireless data messages received from any Elmes made transmitter – there is no need to learn transmitters to the repeater memory prior to operation;

J1 opened – repeater exclusively retransmits wireless data messages received from transmitters learned to the repeater's memory prior to operation – this mode excludes retransmission of digital messages sent by Elmes made transmitters that for reason of selectivity or short distance operation from receiver do not require operation range extension.

Installation

Elmes TRX wireless repeater operates indoor only and should be installed at maximum height from floor level, far from any metal screening, mains wiring, steel reinforced concrete walls and other radio interfering devices. Standard wire transceiver antenna should not be glued to wall or any housing. External antenna may be connected to the repeater by the use of 50 ohm coaxial cable soldered in place of the standard wire antenna with screening of the coaxial cable soldered to pc board ground close to antenna output. The repeater is powered by 8...15VDC voltage connected to „+” and „-” terminals. Terminals marked „IN” and „OUT” should be left not connected.

Repeater's low pulsing LED indicates connected power supply while fast pulsing of the LED indicates repeater's transmission. The fast pulsing of the LED may be user set to off by disconnecting jumper **J2**.

The installer and user of wireless products are advised to find best operating place for the transmitting and receiving devices at installation and to regularly check operation of all wireless systems regardless of no failure indication.

PROGRAMMING PROCEDURES

1. Learning transmitter(s) to TRX memory - maximum 112:

- a) Press TRX board **PRG** switch for less than 2 seconds – LED switches off.
- b) Trigger first transmission in the transmitter to be learned – LED switches on.
- c) Trigger second transmission in the transmitter to be learned – pulsing LED will confirm end of the procedure and the transmitter is learned to the repeater memory.

2. Programming retransmission delay time T_O and inactivity time T_N :

(**Important!** For reason of precision of programmed timing T_O and T_N the required true values must be 8x multiplied at programming, e.g. to program 1 second delay/inactivity interval, 8 seconds programming time must be applied)

- a) Press and hold **PRG** switch (LED switches off) for more than 2 and less than 8 seconds. Releasing the switch LED switches on indicating entering this programming mode,
- b) Press **PRG** switch again – LED switches off. The delay time counting is started now.
- c) After desired delay time T_O has lapsed (max. 64s) press again **PRG** switch - LED switches on. The inactivity time interval counting is started now.
- d) After desired inactivity time T_N has lapsed (max. 64s) press again **PRG** switch – slow pulsing LED confirms end of procedure.

3. Deleting all transmitters from TRX memory:

Press **PRG** switch for more than 8 seconds, until the LED starts flashing then release the switch.

Slow flashing LED confirms correct programming end of the procedure. The repeater memory is erased now. Errors or programming time out failure are indicated by fast flashing LED and TRX self setting off programming mode.

Specifications

- Superheterodyne receiver and 433,92MHz transmitter requiring 8..15VDC, 20mA power supply.
- Radio transmission (433.92 MHz, <10mW) with 200m maximal operating range in open field.
- Programmable retransmission delay time range: 0 ÷ 8 seconds.
- Programmable inactivity time range: 0 ÷ 8 seconds.
- Ambient operating temperature range: -20°C to +40°C.
- External dimensions (l/w/h) 58/32/19mm.



Elmes Electronic declares that the product has been manufactured and tested to comply to the following standards: EN 60950-1 :2001 electric safety, EN 301 489-1 V1.4.1 (2002-08) EMC for radio equipment, EN 301 489-3 V1.2.1 (2002-08) EMC for Short Range Devices, EN 300 220-3 V1.1.1 (2000-09) EMC and Radio Spectrum Matters.

Manufacturer's Limited Warranty. This product carries one year warranty as from the date of purchase. The warranty is limited to the replacement of faulty original parts or repair defects of improper manufacture. Damage, misuse or improper handling by the user or installer as well as any alterations in product's hardware or software caused by unauthorized person void warranty obligations and all due repair costs will be charged. Elmes Electronic shall not be liable for any personal or material damage or loss resulting from any of its products direct, indirect or partial use or failure to operate properly.

For reason of continuous product update Elmes Electronic reserves the right to change product specification without prior notice.