RF-10

Country of origin: Czechoslovakia

DATA SUMMARY

Organisation: Czechoslovak defence force.

Design/Manufacturer: Tesla Pardubice.

Year of Introduction: 1973.

Purpose: General purpose, special forces.

Transmitter/receiver:

Frequency coverage: 44 to 53.975 MHz. FM. 400 channels with 25kHz spacing.

Receiver: Dual conversion superhet. 1st IF 6MHz; 2nd IF 100kHz; AFC; FM: Sensitivity: better than 0.5µV; AF output: 0.1-30mW.

Transmitter: RF output: 1W; Phase modulation (F3). Nominal deviation ± 5kHz. Tone transmission 1kHz.

Aerial and range:

- Rod aerial 0.5m long: 0.5-1km.
- Rod aerial 1.5m long: 5km.
- Vertical wire aerial 3.34m long: 10km.
- Directional semi-rhombic aerial 30m long: 20km.

Power Supply: 6V DC nominally derived from a 4000 mAh NiCad battery pack.

Operating time: 10 hours at a send/receive ratio of 1:5. The 5-7.8V DC input of the radio was stabilised; by means of an inverter it was brought up to 12V for the RF power amplifier and 22.5V for the tuning diodes. Batteries were normally charged by a standard charger for 6 batteries. Quick chargers N1 and N2, suitable to charge a battery in an hour, were only allowed to be used under combat conditions

Dimensions (cm) and weight:

- RF-10, set only: 29.5x4.7x19.1
- Weight of a complete operational station (comprising RF-10, battery, aerial, handset and strap) about 3.1kg.
- Weight of complete kit in transit case about 8.1kg.

REMARKS

The RF-10, code name Takt-1, was a portable VHF FM transmitter-receiver primary intended as tactical man pack at company and platoon level for the Czechoslovak Army.

Developed and produced by the Czech Tesla company (which eventually delivered 30.000 units), it replaced the large, heavy and obsolescent R-105/8/9 series of VHF man pack radios. The station was introduced in 1973 and used until the early 1990s when it was superseded by the RF-13.

Due to its adaptability the RF-10 was also installed in vehicles and used for other purposes such as civil defence, telephone relays and special purposes (See Chapter 272). A fully operational station comprised a RF-10, 6V rechargeable battery, handset, aerial and one of the various carrying straps or harness.

During normal operation, the RF-10 automatically operated in the so-called economical (intermittent) mode where the receiver power consumption was minimal when no signal was received. This feature, including disabling of the squelch, was disabled in modes ■ and ⊗.

The RF-10 transmitter was equipped with a dynamic limiter which provided full modulation during a silent call in the 'whisper' mode (position Δ). The test mode was activated at the 6th position of the function switch ⊗; the set was fully functional when a green light glowed on the front panel and noise was heard in the handset.

Condensed operating instructions were printed on the side of the set.

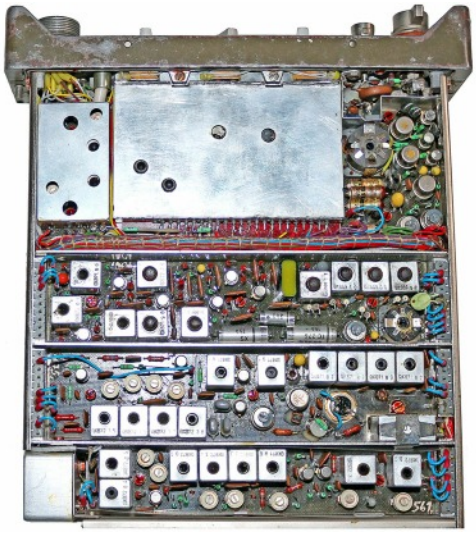
At the bottom of the radio and on top of the battery was a ceramic vent, used to equalise the internal air pressure with the changing atmosphere whilst maintaining a water-proof seal. The RF-10 was compatible for operation to existing contemporary radio stations such as R-105, R-107, R-111 and R-123.

Data transmission with speeds up to 600 Bd was possible with supplementary equipment.

A 40W RF amplifier was developed for the RF-10 but never came into production for reasons of degrading the reception of nearby stations, and causing interference in civilian TV reception.

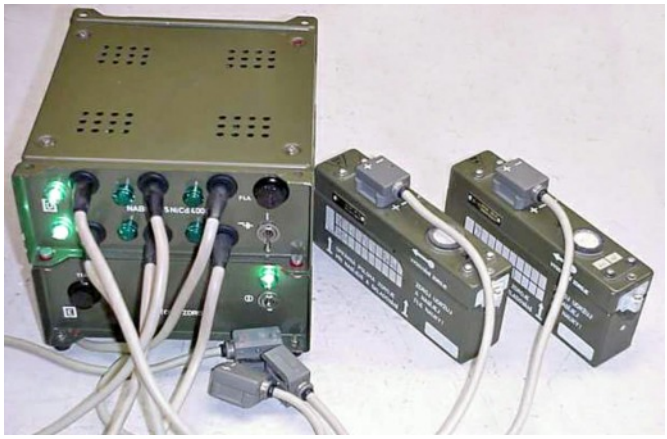
RF-10 front panel layout.

RF-10 development prototype.



Internal view of RF-10. The cast aluminium alloy front panel had a frame to protect the controls from damage. The set had 11 different boards, interconnected by thin wires with Teflon insulation.

RF-10 battery charging



The standard desktop charger for 6 batteries was composed of the E +D box. This combination was AC mains powered. In emergency a battery could also be charged via the vehicle A box.

Conservation unit K-30 was used for long-time storage of up to 30 batteries.

A RF-10 battery was comprised of five 1.2V 4Ah NiCad cells.

Quick charger N2 could charge 2 RF-10 batteries simultaneously in 1 hour. Both N1 and N2 chargers were not allowed to be used for normal operation, as it does not monitor the battery status but only the charging current for 1 hour. Imperfectly discharged batteries would overcharge and destroy their life span. It was developed for combat deployment only.

Vehicle charger kit N1 was designed for quick charge of RF-10 batteries in the field under combat conditions.

RF-10 field and workshop test equipment.

The KZ-10 was a portable test set for functional check of a RF-10 in the field. During the test the KZ-10 was connected between the set, handset and battery. It included a crystal controlled signal generator to check the receiver sensitivity, transmitter RF output power meter and a DC voltmeter to check a battery. The signal generator frequency, indicated on the housing, was normally 45.1 MHz.

The DC voltmeter, with ranges of 10V and 30V, brought out to two external test sockets, could also be used for general purpose measurements.
The battery condition could be checked independently, as the test set contained an artificial load bulb when the corresponding button (Zatez) was pressed.

Two simple condition testers were issued for a quick battery check (left).

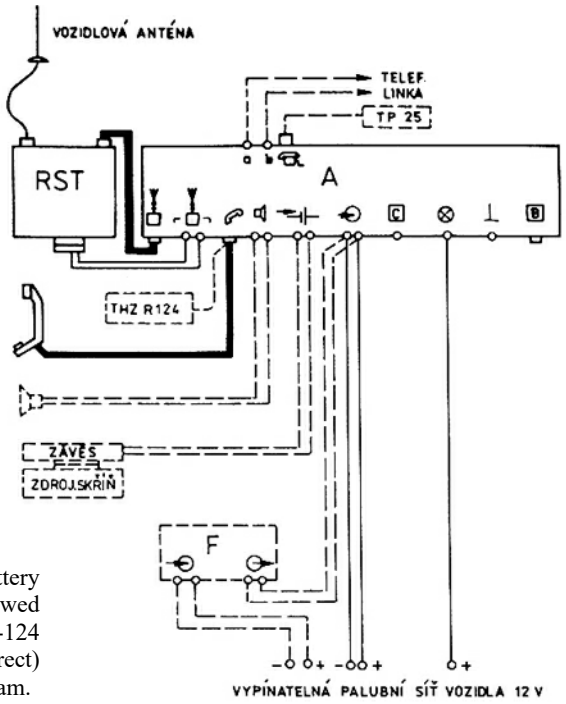
The ZZ-10 test set was designed to check the performance of a RF-10, and the A and B box for regular maintenance and repairs. Primarily intended for use in base- and mobile workshops, it found also use as portable set in the field. It was normally operated by 1 man and carried by 2 men.
Power for the ZZ-10 was derived from AC mains, 12/24V DC or a 6V standard RF-10 battery. The set came with cables for connection to power sources, cables connecting the radio and A/B boxes, quick start guide for measurement and operating/maintenance instructions. The ZZ-10 allowed measurements for RF-10 of the following parameters: transmitter frequency and RF power when the supply voltage drops, RF power at rated voltage, frequency accuracy of the transmitter, frequency of tone signalling, frequency characteristics of the transmitter, modulation sensitivity including the dynamic limiter, modulation sensitivity to data transmission input, frequency characteristics of the receiver, receiver sensitivity, receiver sensitivity when switching from power saving mode to normal, power supply current on reception, AF receiver power, handset tests (buttons, microphone, handset).
A number of functional tests and measurements could be performed on the A box: AF amplifier power, microphone amplifier, headphone amplifier, output for telephone line, data output for radio station. On the B box the microphone amplifier and headphone amplifier could be tested.

References:

- Information and most of the photographs for this chapter courtesy Jozef Burda, OM0ASB, Slovakia. See his website: www.sptech.sk
- The best and most comprehensive website on the RF-10 is: http://www.rf-10.nazory.cz/
- More on the RF-10 and other Tesla radios: https://www.facebook.com/Radiostanice-Tesla-722009397946545/
- Radiova Stance RF-10, Navod K Obsluze, Radio Station RF-10, User manual, 1989.
- Radio Set RF-10, Technical Description Part 1, April 1977. This technical manual in English can be downloaded at http://www.wftw.nl/downloads.html with thanks to Honza B.

Other Internet sources:
- http://volny.cz (OK1TO)
- http://www.csla.cz
- http://www.zelenavlna.com

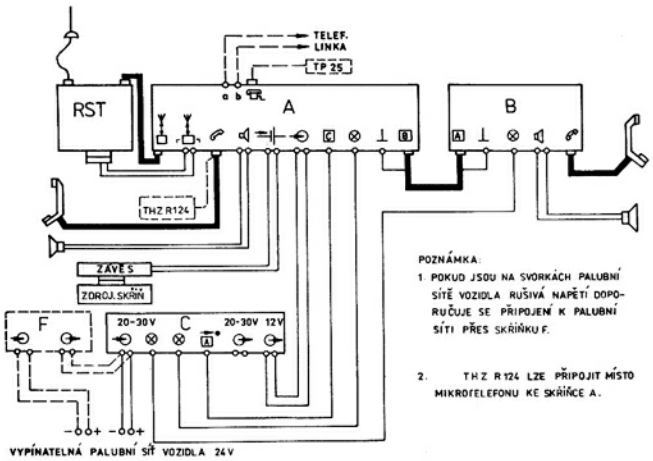
Fitting the RF-10 in vehicles



A basic RF-10 vehicle installation was powered from the 12V vehicle battery (usually via filter box F). With the RF-10 mounted on top of the A box it allowed normal operation via the handset, connection of an external loudspeaker, R-124 intercom call device, emergency charging a RF-10 battery, and remote (or direct) control using a TP 25 field telephone. See right hand functional block diagram.

(Right) Control box B allowed operation of the RF-10 from a different position in a vehicle. It was connected via a multi core cable to the A box. Intercom facility was provided between both A and B boxes.

Remote control box B.



(Left) Functional block diagram for 24V vehicles when the C box was used to power the A and B box, (usually via filter box F) from the on-board network. The C box could be switched on and off remotely from the A or B box.

24V power unit box C.

Filter box F.