

RT695A - PRC-41
Manpack UHF transceiver
1963



Receiver-Transmitter
RT-695 / PRC-41
size 28 x 10.5 x 35 cm
weight 10,5 kg



Either the battery or the ac power supply can be attached to the RT695.
Both have the same size (28 x 10.5 x 19 cm) and weight (7.5 kg)
The battery must be charged with a special charger, not this PP-3700

PRC-41 REFERENCE DATA

a. POWER REQUIREMENTS. - 26.5 volts dc+10 percent (equipment will operate with an input voltage as low as 22 volts dc) or 115 or 230 volts ± 10 percent, 50-to-400-cps single phase.

Equipment is normally connected for 115 volts; cable re-fabrication is required for operation from a 230-volt source. Refer to section 2 of Installation and Operation Technical Manual for Radio Set AN/PRC-41.

Alternatively, battery BB-451/U is used for 10 hours with 1 minute transmit / 9 minutes receive cycle.

b. FREQUENCY DATA.

- (1) Range: 225.0 to 399.9 mc.
- (2) Channels: 1750 spaced at 100-kc intervals over the range.
- (3) Stability: ± 15 kc.
- (4) Type of frequency control: Crystal.
- (5) Number of crystals: 39 crystals.
- (6) Type of transmission and reception: A3.

c TRANSMITTER DATA.

- (1) Power output: 3 watts average unmodulated power into a 50-ohm load.
- (2) Modulation: AM.
- (3) Modulation sensitivity: Carbon microphone input of 1.0 volt.
- (4) Modulation capability: 80 percent minimum (adjusted to clip between 70 to 90 percent).
- (5) Transmitter fidelity: +1, -3 db, 300 to 3500 cps (from 1000-cps reference).
- (6) Transmitter distortion: Less than 10 percent with modulation 3 db below clipping level.
- (7) Duty cycle: 1-minute transmit, 9-minute receive.

d RECEIVER DATA.

- (1) Sensitivity: A signal having an average level of 3 uv modulated 30 percent at 1000 cps produces 7 mw at a signal plus-noise to noise ratio of 10 db or greater.
- (2) Selectivity: 6 db, 47 kc minimum; 60 db, 120 kc maximum.
- (3) Images and spurious responses: 70 db
- (4) I-f rejection: 80 db down.
- (5) Avc characteristics: Output within ± 3 db from 10 to 100,000 uv (from 1000-microvolt reference).
- (6) Blocking: No blocking for input signals up to, 0.5 volt.
- (7) Squelch operation: A change in audio output of at least 10 db is effected by a 1-db change in input signal.
- (8) Ultimate S+N/N ratio: At least 35 db (measured at 1000 uv).
- (9) Audio output: 50 mw into a 300-ohm load with 30- percent modulation, 1000 uv.
- (10) Audio fidelity: +1, -3 db from 300 to 3500 cps (from 1000-cps reference).
- (11) Audio distortion: Less than 10 percent at 50-mw output.

e. GUARD RECEIVER DATA.

- (1) Sensitivity: A signal having an average level of 5 uv into the guard receiver modulated 30 percent at 1000 cps produces 7 mw at a signal plus-noise to noise ratio of 10 db or greater.
- (2) Selectivity: 6 db, 50 kc minimum; 60 db, 200 kc maximum.
- (3) Images and spurious responses: 60 db down.
- (4) I-f rejection: 80 db down.
- (5) Avc characteristics: Output within ± 3 db from 10 to 100,000 uv (from 1000-microvolt reference).
- (6) Blocking: No blocking for input signals up to 0.5 volt.
- (7) Squelch operation: A change in audio output of at least 10 db is effected by a 1-db change in input signal.
- (8) Ultimate S+N/N ratio: At least 35 db (measured at 1000 uv).
- (9) Audio output: 50 mw into a 300-ohm load with 30-percent modulation, 1000 uv.
- (10) Audio fidelity: +1, -3 db from 300 to 3500 cps (from 1000-cps reference).
- (11) Audio distortion: Less than 10 percent at 50-mw output (1000-microvolt input, 1000 cps, 30-percent modulated).

Battery - BB-451/U 24V - 25Ah Nominal, rechargeable battery

The battery consists of 16 series-connected **silver-zinc cells** constructed in blocks of four cells each. Nominal open-circuit voltage of a fully charged cell is 1.86 volts per cell. The minimum voltage per cell under specified load is 1.375 volts at -11 °C (+12F) and above, and 1.250 volts from -10°C to -25°C (+14F to -13°F).

The battery cells will perform according to specifications after charging at a modified constant current of **2.5 amperes** average **with voltage cutoff at 2.03 volts**. Emergency charging of the cells is possible by charging at a constant potential of 2.03 volts per cell with charge acceptance as follows: a 0.5- charge period replaces 50 percent of the capacity removed on previous discharge; a 4-hour charge period replaces 60 percent of the capacity removed on the previous discharge. All recharging must be with Battery Charger **PP-3240/U** or its exact replacement.. A plastic sheet for recording charging history is bonded to the underside of the cover plate. To avoid a long formation and activation period. the BB-451/U is supplied in a dry charge condition.

The PRC-41 is a portable transceiver for ground-to-air service, built with modified modules from the [ARC-51](#). It is intended for forward air control.

The radio has 1750 channels in the military 225-400 MHz band, spaced 100kHz.

Output power is approx. 2W (3W max). The unit is supplied by 26Vdc, at 2A in receive, or 2.8A in transmit , plus a short (7ms/ 2A) pulse for the coax T/R switch when changing from Rx to Tx or back.

Components:

Transceiver	RT 695 / PRC-41	28 x 10.5 x 35 cm , 10.5 kg
Power Supply	PP-3700	28 x 10.5 x 19 cm , 7.5 kg
Battery	BB-451/U	28 x 10.5 x 19 cm , 7.5 kg

Transceiver Like the ARC51, The RT695 is a triple superhet with fully crystal controlled channels. Differences to the ARC51 are: Manual control, no crystal oven, simplified squelch circuits and only 2W RF output.

Versions: The RT695A has a slightly modified audio circuit to allow voice encryption using the external crypto unit [KY-38](#)

Battery The battery has 16 silver/ zinc oxide cells, filled with potassium hydroxide (KOH). The nominal voltage and capacity is 24V, 25Ah, although it was recommended not to discharge beyond 20Ah.

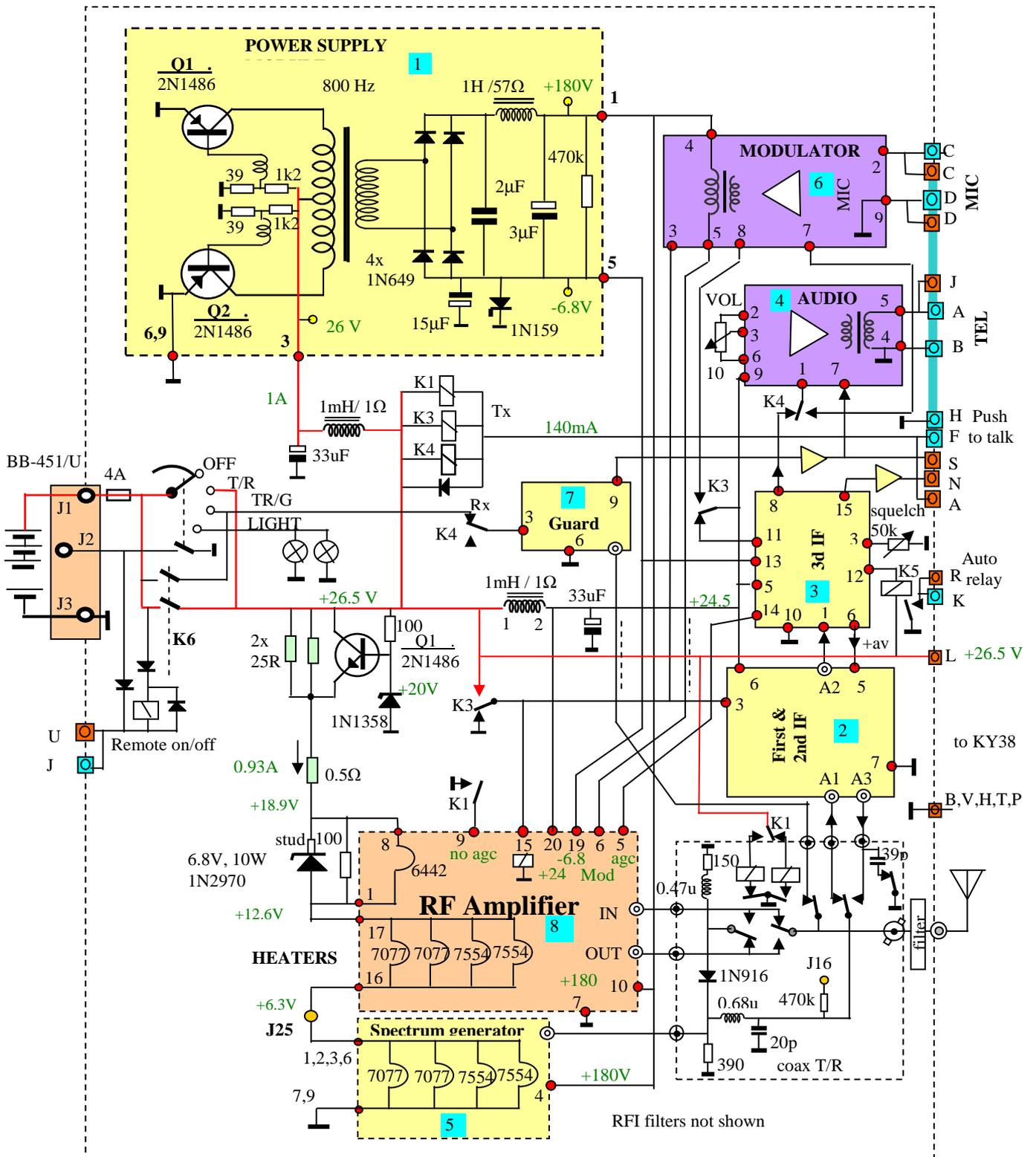
With a cycle of 1 minute transmit and 9 minutes receive, the battery will last 12 hours at an ambient temperature between -20 and +35 deg. C.

The battery can be recharged up to 20 times with $16 \times 2.03 = 32.5V$, initially current limited to 2.5A. After 20 recharge cycles, the battery is discarded, and the silver is recycled if possible.

AC Power Supply The PP-3700 is a transformer-ballast type power supply with 26.5V output at maximal 4.5A, in the same case as the battery.

The PP-3700 is not physical nor electrical suitable to recharge the battery.

Interconnections between modules and power supply

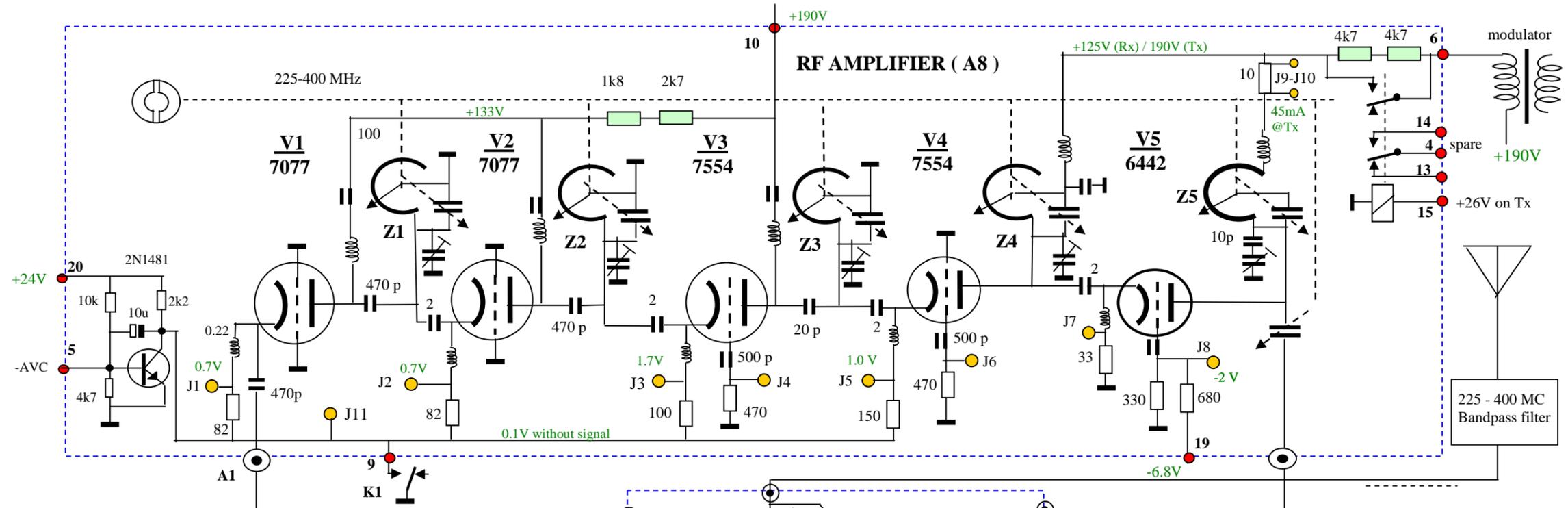


16 cells 25 Ah
Silver-zinc alkaline
1.86V fully charged
1.30V end of discharge

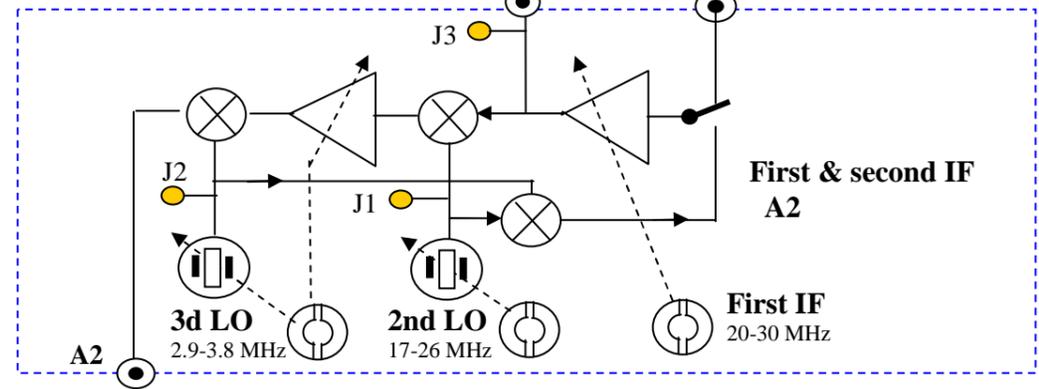
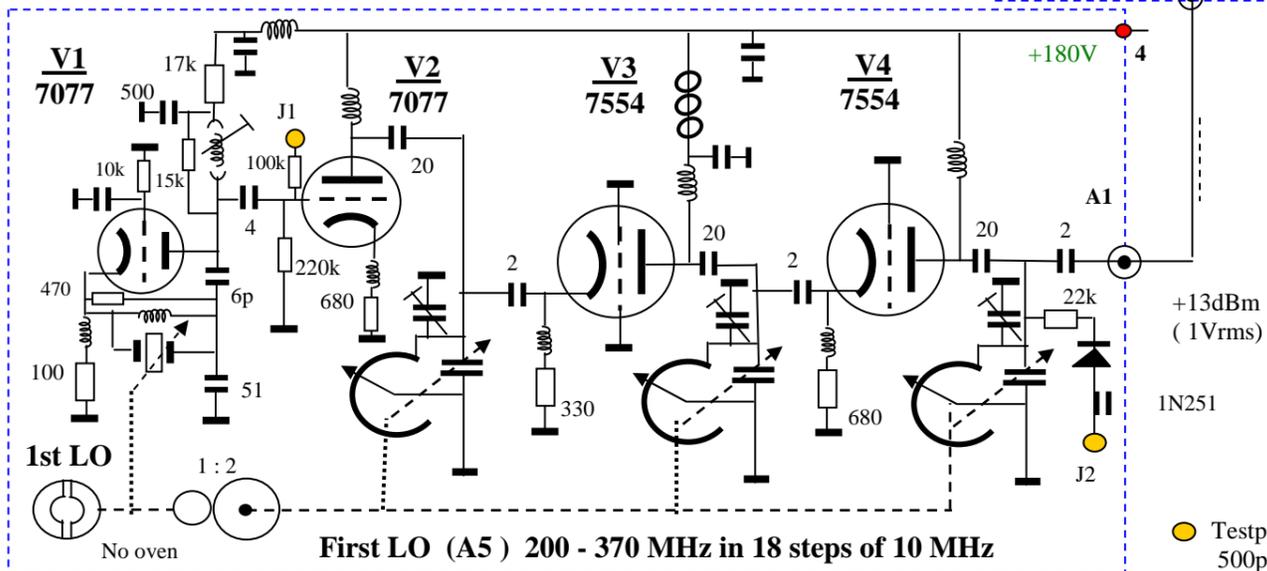
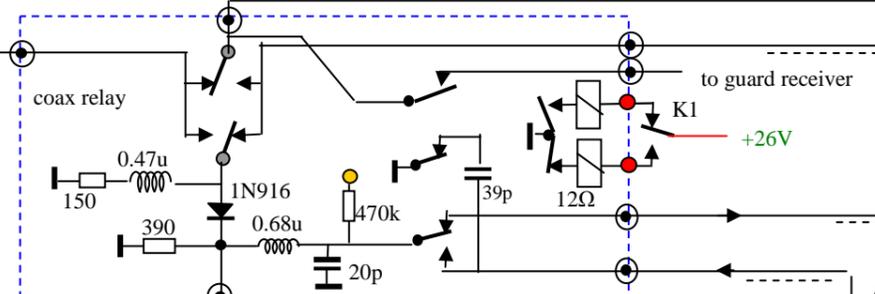
19 pole crypto plug
10 pole headset plug
both on front

PRC-41 INTERNAL WIRING

3 - 3 - 2018 / kb

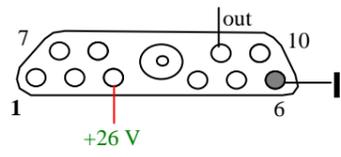
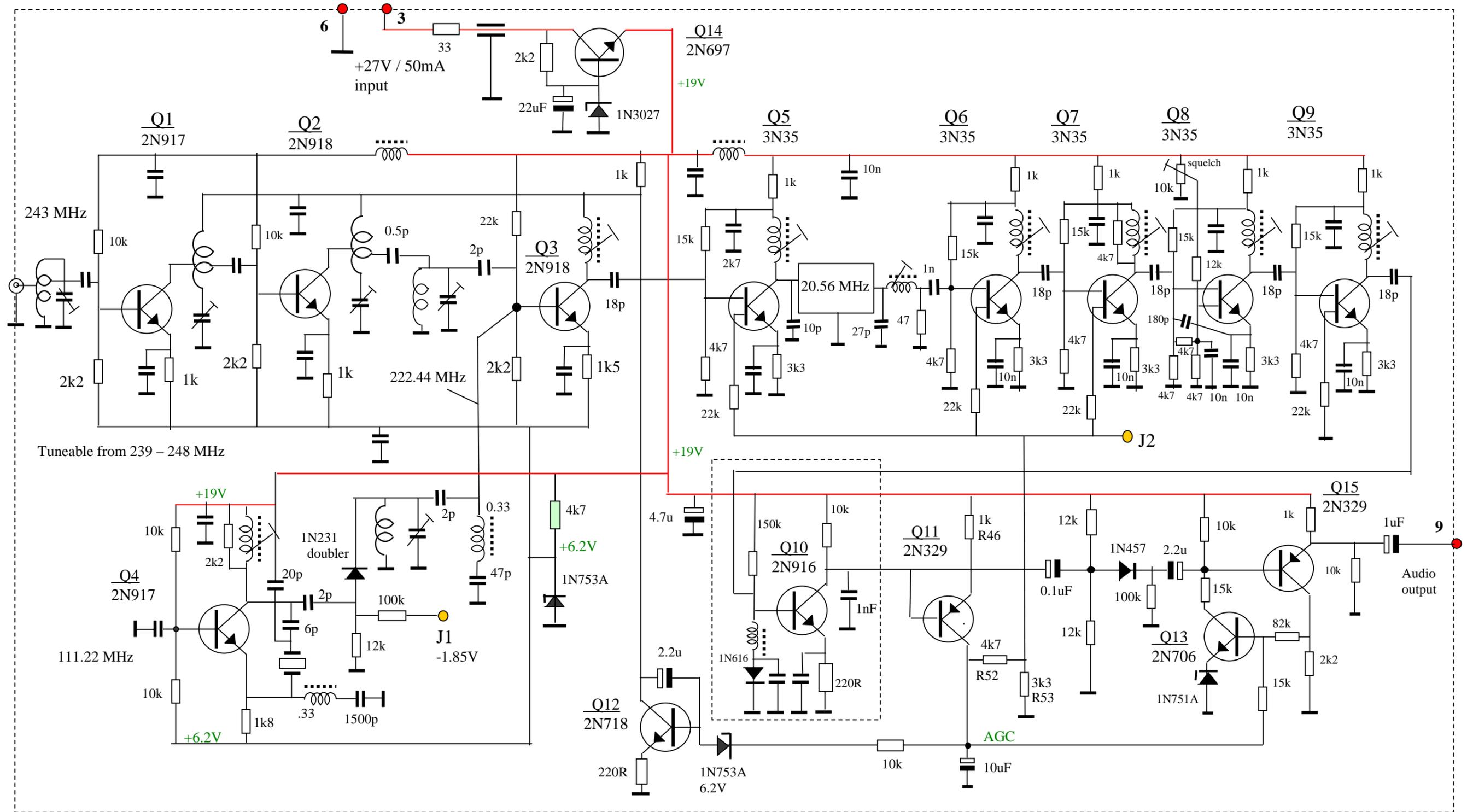


All relay contacts shown in receive position



● Testpoint, 1M series resistor and 500pF feedtru not shown

PRC-41 RF parts
 For heaters see power supplies sheet
 9 dec 2017 kb



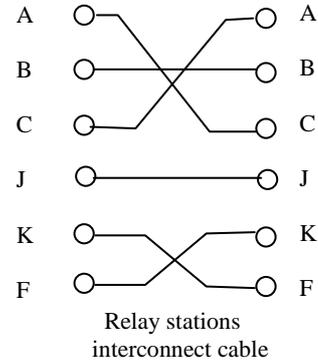
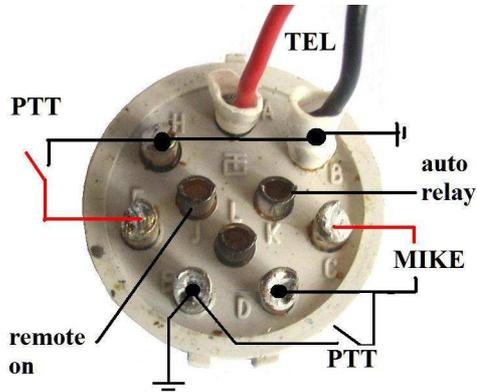
RT-695A / PRC-41 Guard Receiver (A7)
 28 feb 2018 kb

Front side connectors

The left connector is for the headset with a standard 10-way NATO plug.

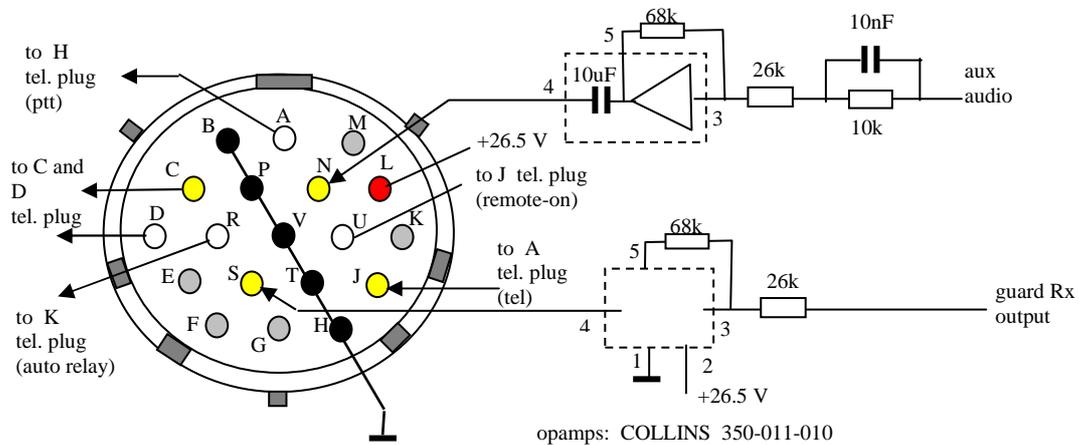
The microphone is normally floating. Pushing the push-to-talk switch grounds one side of the microphone.

The same connector can also be used for remote turn-on of the complete set, or a small cable can be connected to a second PRC41 to create a relay station in order to bridge a larger distance than possible with one set.



The basic PRC-41 has two of these 10-way connectors, all pins are connected in parallel.

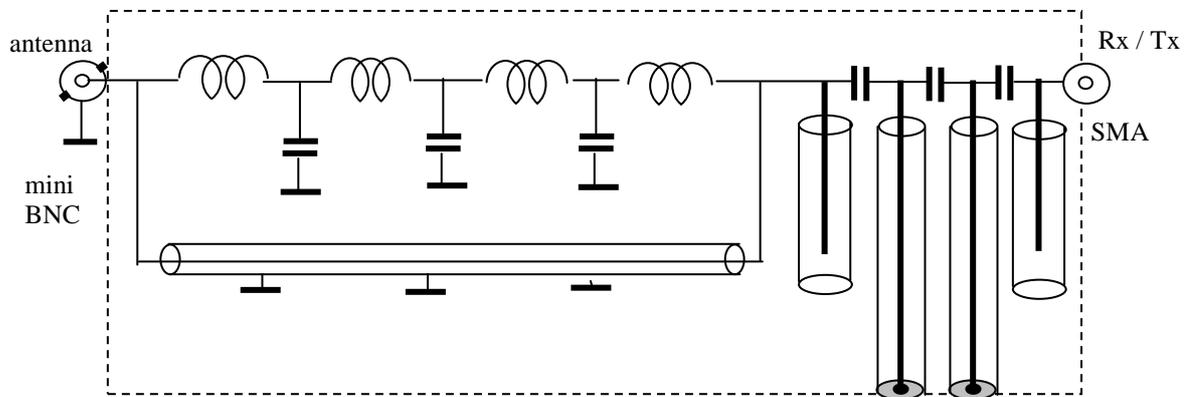
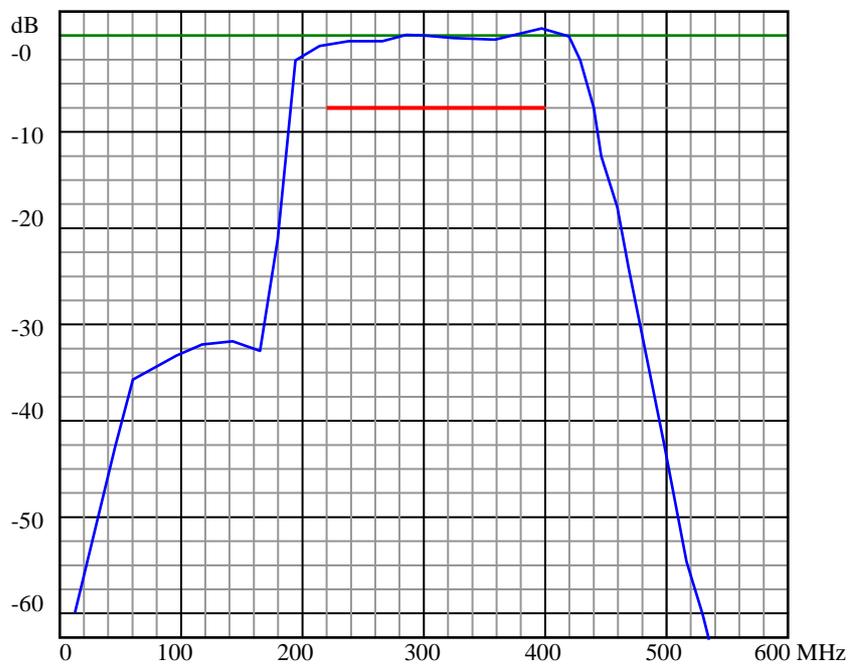
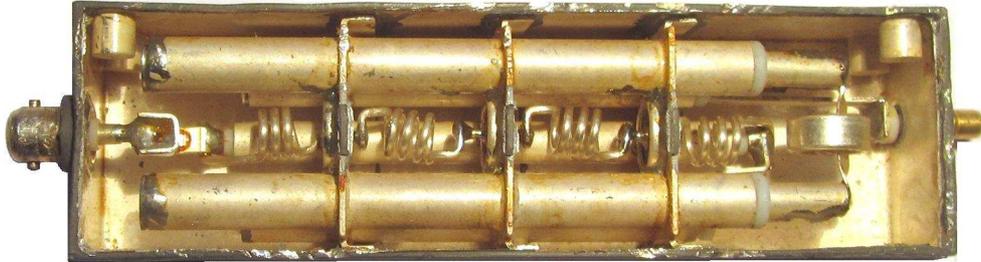
The PRC-41A only has one 10-way connector. The other one is a 19-way connector which connects to a Nestor KY38 speech scrambler. Added are two Collins "opamps" in the RT695A/PRC-41A



Antenna filter

in the PRC-41

BAND PASS FILTER 225 - 400 MC
PN 241 - 0467 - 00
model 5364
BIRD ELECTRONIC CORP.
CLEVELAND, OHIO



BB-451 /U
TM-11-6140-208-15

SECTION 1 GENERAL DESCRIPTION AND SPECIFICATION DATA

1-1 INTRODUCTION

- a. SCOPE. This manual covers the operation, maintenance and repair of the BB-451/U Silver-Zinc Storage Battery, F8N 6140-889-1027.
- b. PURPOSE. The purpose of the BB-451/U Silver-Zinc Storage Battery is to provide a light-weight power source for use with man-pack communications and electronic equipment. The silver-zinc battery is superior to the lead-acid, nickel cadmium, and silver-cadmium batteries in watt-hour capacity per-pound of battery weight. The silver-zinc battery is also superior to the lead-acid battery in voltage regulation during discharge. The construction, maintenance and personnel precautions pertaining to the silver-zinc battery vary greatly from the more familiar lead-acid battery. This manual provides adequate operational and maintenance data on the BB-451/U Silver-Zinc Storage Battery to ensure proper use, thus minimizing the probability of injury to the user or damage to the battery.

1-2 PHYSICAL AND FUNCTIONAL DESCRIPTION (see Figures 1-1 to 1-3 and Table 1-1)

- a. PHYSICAL DESCRIPTION. The BB-451/U Storage Battery Is a rechargeable, SILVER-ZINC, ALKALINE ELECTROLYTE battery, rated at 25 ampere-hours (AH). The battery contains 16 series-connected cells with a nominal cell voltage of 1.5 volts, producing a total nominal battery voltage of 24 volts. Each group of four cells is combined within separate plastic cases called mono-blocks. A battery, therefore, contains four monoblocks. Each cell within a monoblock case consists of eight silver (positive electrodes) and eight zinc (negative electrodes) plates. Each plate is enclosed within several layers of cellulose material. The monoblock casings are made of molded plastic, and the four cells within the monoblock are equipped with threaded-screw nylon vent caps. Each monoblock is replaceable as an assembly. All metal parts of the battery are passivated and nickel or silver plated to resist reaction with the electrolyte. The overall physical size of the BB-451/U is 7-11/16 inches_high, 11-9/16 Inches long and 4-9/64 Inches wide. The battery weighs 16 pounds when filled with electrolyte.

Overall Dimensions (Inches)	7- 11/16 H x 11- 9/16 L
.....	x 4- 9/64 W
Weight Filled (Pounds) .	16lbs (7.3 kg)
Cathode	Zinc
Anode	Silver Oxide
Electrolyte.....	40% Potassium Hydroxide- KOH
Nominal Cell Voltage.....	1,5 V
Nominal Battery Voltage .	24 V
Nominal Ampere-Hour Capacity	25 Ah
Open Circuit Voltage	29.76 V
Watt- Hour/Pound	59
Watt-Hour/Cubic Inches..	4.4
Voltage Regulation	Good
Discharge Rate (Maximum, Amperes)	25 A
Cycle Life (Cycles)	10-30

The input current of the RT695A / PRC41 is 1.9A in receive mode, or 3.1A in transmit mode.

b. FUNCTIONAL DESCRIPTION.

The battery when charged, has positive electrodes of silver oxide and negative electrodes of metallic zinc. During discharge the positive plates are reduced to silver while the negative plates are Oxidized to zinc-oxide. Charging the battery reverses this process (returns It to the charged state). The electrolyte acts as a medium for the exchange of Oxygen, and is also the current carrier within the cell. In an alkaline cell, unlike a lead-acid cell, the electrolyte does not take part in the chemical transformations. Therefore, its specific gravity does not change with state of charge of the cell. This then, makes a hydrometer useless with the BB-451/U Silver-Zinc Storage Battery.

(1) Intended Use. The BB-451/U is designed to provide a lightweight power source to meet the high-current demands for man-pack radios such as the AN/PRC-41 and the AN/ PRC-47.

(2) Limitations. The following limitations apply to this battery.

(a) Heavy Discharge Sensi tivity. Even though the BB-451/U is rated at 25 AH at 24 volts dc for radio receiving and transmitting applications, it is recommended that it not be discharged more than 20 AH per cycle, since a deeper discharge will materially shorten the battery life.

(b) Low Temperature Sensitivity. The performance of the battery is seriously affected by low temperatures. At temperatures below approximately -35°C (-31°F) the battery effectively ceases to operate

(c) High Temperature Sensltivlty. The performance of the battery la seriously affected by very high temperatures. At temperatures above 100°F (37.8°C). the cycle life and wet life are greatly reduced (see Table 1-2.).

(c) Sensitivity to OverFilling. Both the silver and zinc plates of the battery are soluble in the electrolyte, therefore, the instructions on filling should be carefully followed (see paragraph 1-4 "Servicing").

(d) Sensitivity to OverCharging. The battery will not accept excessive current during overcharge, but rather, this current will cause the generation of hydrogen and oxygen, and will be of no aid to charging the battery.

WARNING

THE BB-451/U IS A SILVER-ZINC BATTERY UTILIZING AN ALKALINE ELECTROLYTE OF 40% POTASSIUM HYDROXIDE (KOH). DO NOT INSERT SULFURIC ACID (H₂SO₄) USED IN LEAD-ACID BATTERIES, AS ACID WILL REACT **VIOLENTLY** WITH THE ALKALINE ELECTROLYTE CAUSING PERMANENT DAMAGE TO THE BATTERY AND POSSIBLE INJURY TO THE USER

TABLE 1-2. BATTERY PERFORMANCE AT VARIOUS TEMPERATURES

Temp (°F)>	Cycle Life*	Wet Life (Months)**
-13	20	12
0	20	12
32	25	12
40	30	16
75	30	18
90	25	18
100	20	12
120	10	2
140	10	1

* Cycle Life: The number of charge/discharge cycles the battery experiences.

* Wet Life: Useful life of activated battery.