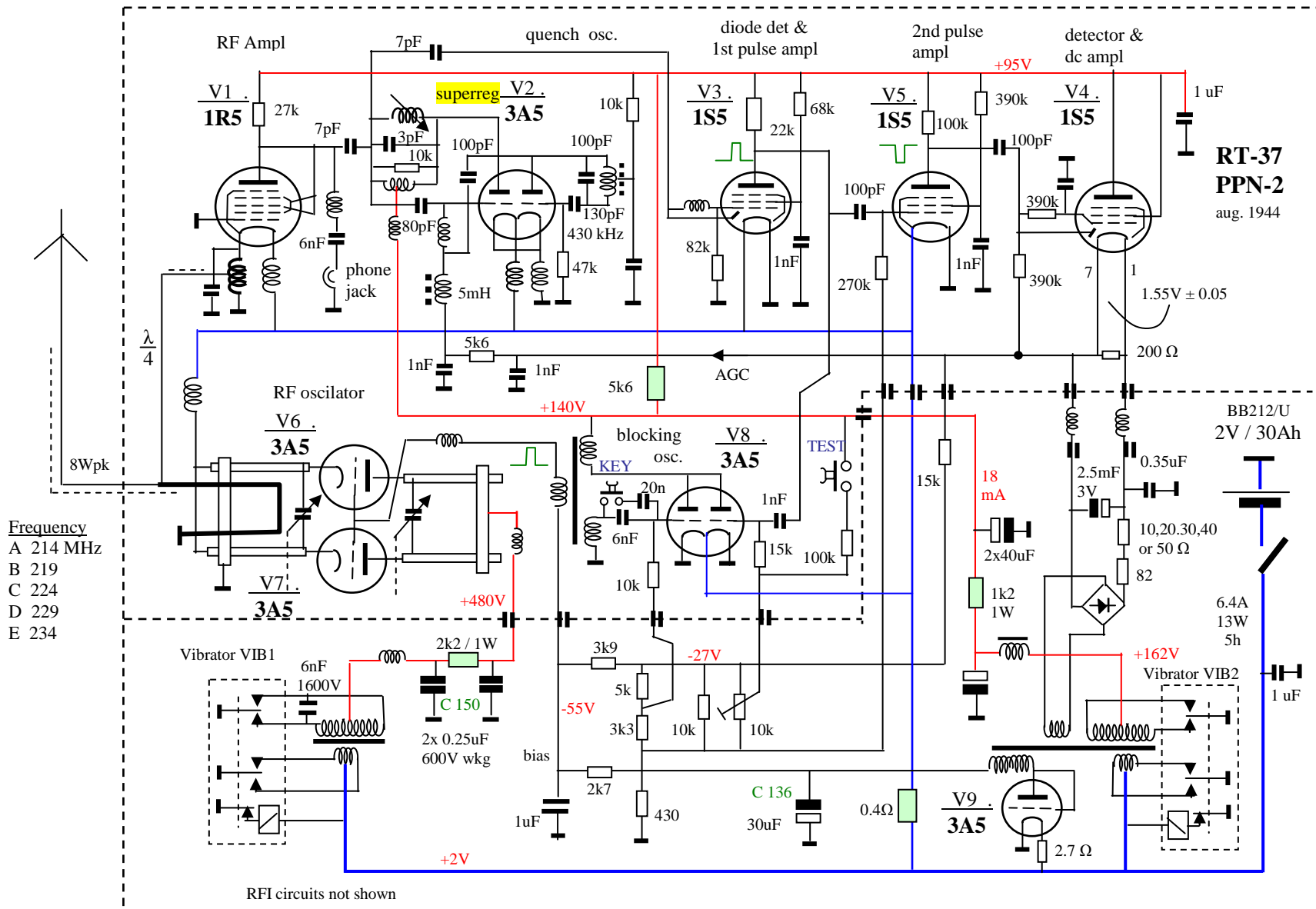


EUREKA beacon RT-37/ PPN-2



# EUREKA BEACON

## RT-37 / PPN-2

Released August 1944

The beacon is used in conjunction with aircraft carrying the associated airborne interrogation equipment. Briefly its operation is as follows: The airborne equipment radiates pulses of radio-frequency energy called interrogating pulses, which, when received by the beacon, automatically trigger it into operation. The beacon then radiates answering pulses of radio-frequency energy called reply pulses. These reply pulses, when received by the airborne equipment, enable the aircraft personnel to determine the position of the beacon with respect to the plane, and at the same time provide a means of communication between the aircraft personnel and the man on the ground who is operating the beacon. The beacon ordinarily transmits only when receiving interrogating pulses.

### Receiver

The Rx sensitivity is 300uV or better for safe triggering of the transmitter.

After a RF amplifier, the received RF signals enter the superregenerator around the double triode V2. The left section is the RF superreg oscillator that is started every microsecond by the hartley oscillator around the right section of V2. The quench frequency is 430 kHz. With RF signal from the antenna, oscillation starts earlier, and lasts longer. The DC bias from the RF oscillator is critical, and maintained by the AGC.

### Automatic gain control

The RF from the superreg is detected in V3, amplified in V5 and detected and amplified in V4, resulting in a dc level proportional with the noise from the superreg oscillator. The DC level is fed-back to maintain a constant noise floor.

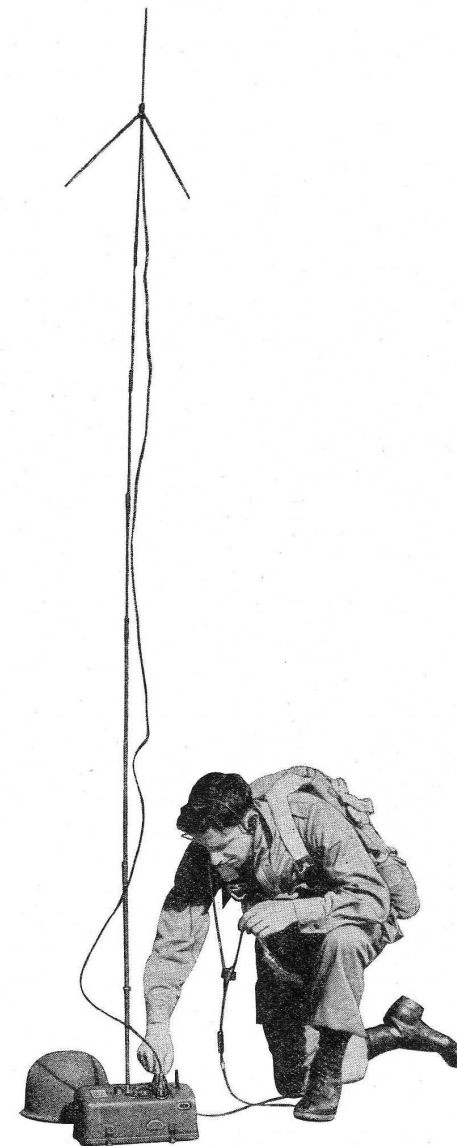
### Transmitter

The transmitter has two triodes, only a half-3A5 is used in each position. The hidden feature is that the valves can be swapped should one fail. This was a high risk, the valves are pulsed far above spec. Pulsing is by a blocking oscillator 3A5 with a trigger level that is far above the noise floor of the AGC circuit. Interference from the vibrators is possible however.

The KEY button doubles the pulse width from 8 to 20 us, used by the ground operator to signal that the aircraft was visible. The TEST button reduces the trigger threshold so pulses are transmitted, as can be checked with the earphone.

### Power supply

Is a 2V/30Ah lead-acid battery, and two vibrators /transformers for the high voltage. One provides 450V for the transmitter, the other +140V and -55V for all other valves, as well as 1.55V for the floating filament of V4. This filament should get  $1.55 \pm 0.05V$ , adjustable by choosing one of 5 series resistors.



TL-38551

Figure 1. Beacon in operation.