

Conservation of an amateur transmitter for 2 metres dated 1953

Andy Thomas G0SFJ

Recently I acquired two ex-air force VHF transmitters dating from the Second World War. They are both USAAF Type SCR-522 (also known by the British as BC-624) and used Amplitude Modulation (A3). One of them, Serial '21, was modd'ed to amateur use in October 1953 (see photo 1).

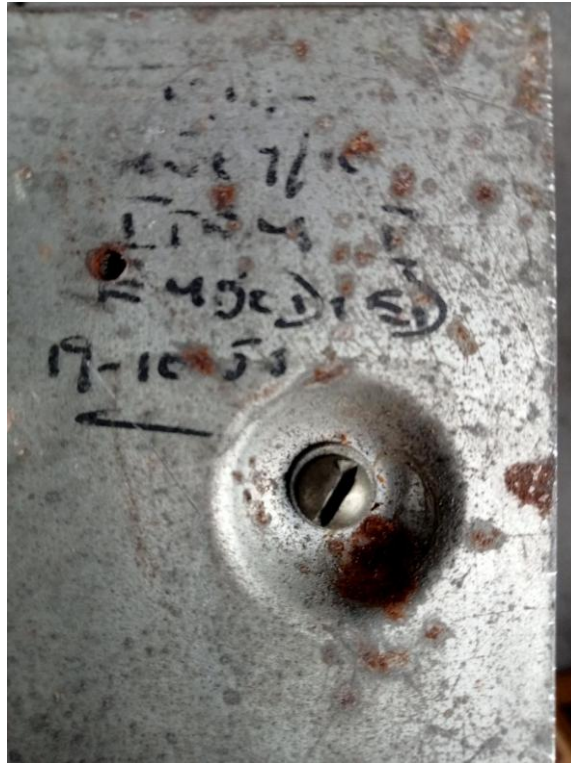


Photo 1: scribbled date, difficult to read now.

These years became known as the “Golden age” of amateur radio. Many amateurs had been trained and may have served as military radio operators, and the war machine had brought forth many surplus radio transmitters and receivers. The art was to convert them to peaceful use in the amateur service.

This article is about the conservation of these radio sets as they have been acquired, understanding and documenting their features, and extrapolating to their use in amateur radio. It isn't about “restoration” – in any case, what to? Amateur or aircraft use? – repair, or replica.

Amateur Modifications to this transmitter had been proposed in two publications from 1948 [1] and 195 [2] ; it is possible to use the set for AM Voice or modify it for MCW (Modulated CW, A2).

The two sets are shown in Photo 2 below.

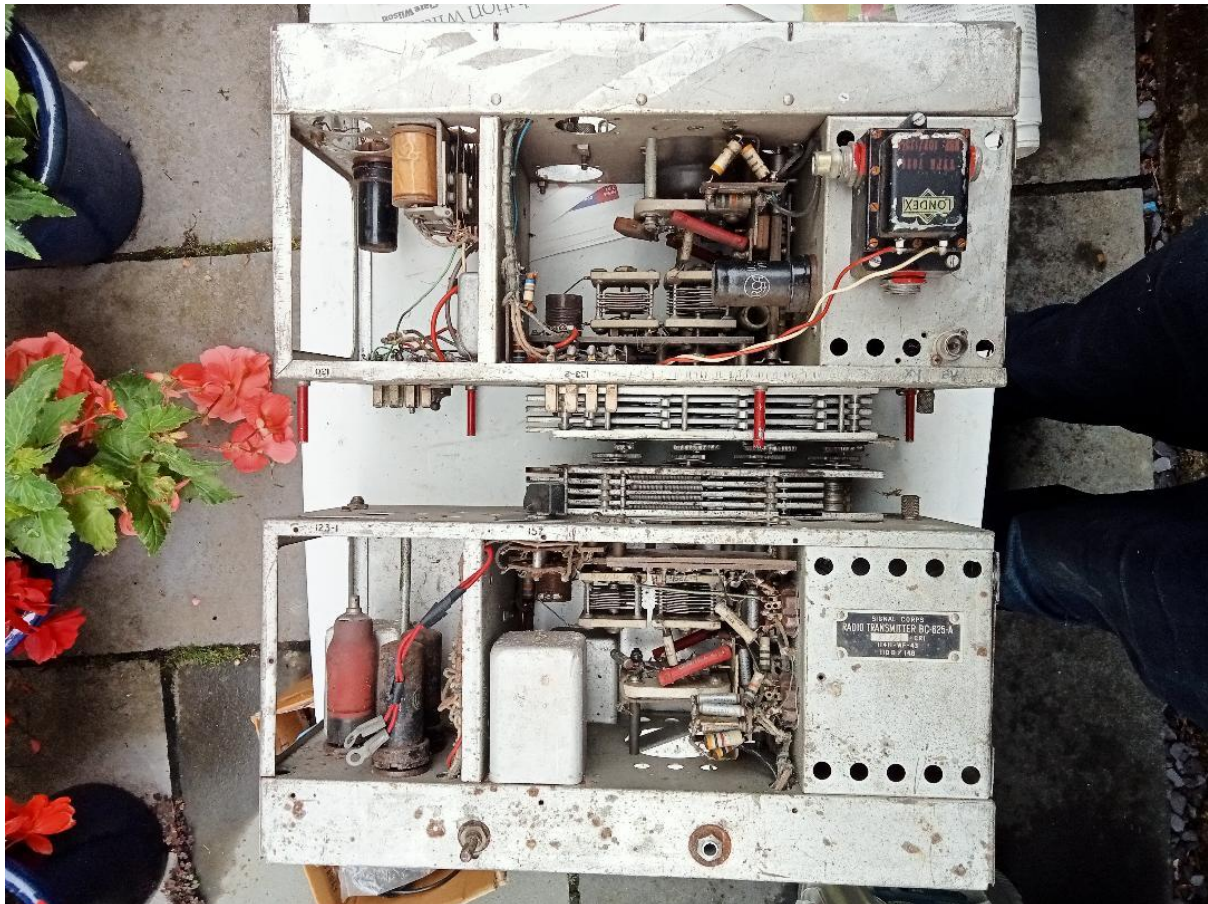


Photo 2: The two chassis

On the top is serial number '37 and serial number '21 is beneath. There are several features in common.

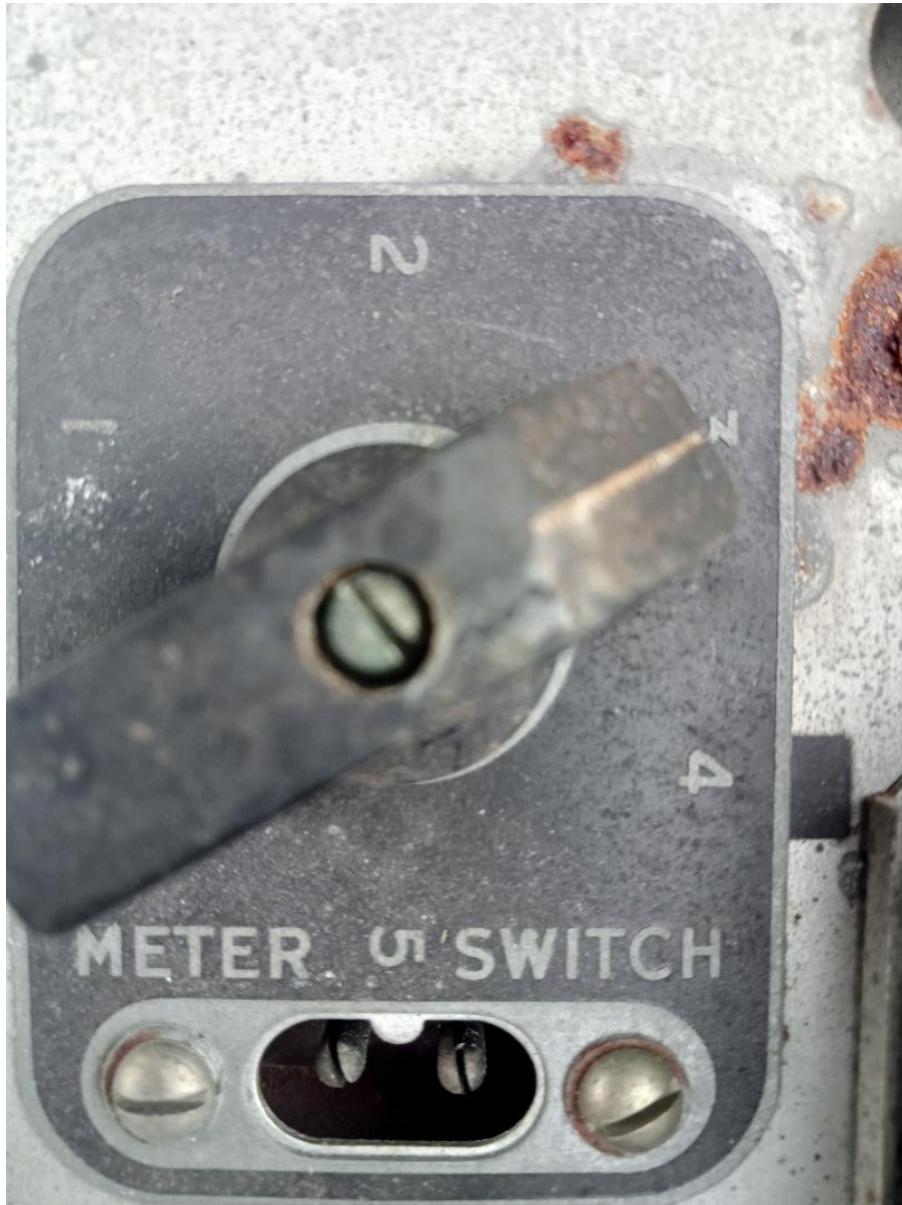


Photo 3: Meter switch

First of all, there is a 6 position meter switch. [1] gives anticipated currents at various positions of this switch, and the meter is detachable. [1] assumes a FSD of 50 mA

Both sets have an additional Belling-Lee coaxial socket, which connects two the original single-point jack sockets, for the antenna (aerial).

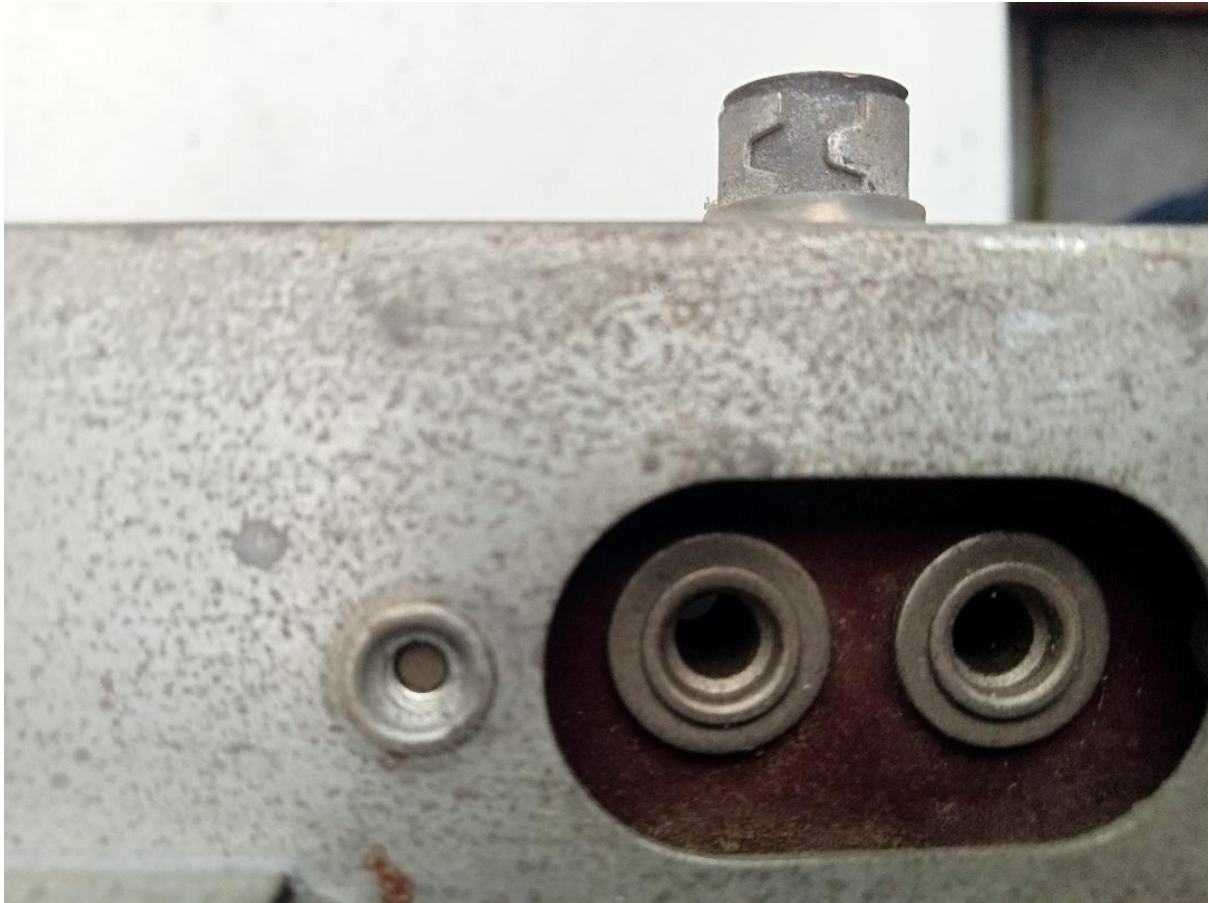


Photo 4: aerial connectors

While Serial '21 came with no crystals, Serial '37 has four fitted crystals. These are transmit crystals, type CR1-A, and according to both [1] and [2] the multiplier is 18. Photo 5 shows the crystals as fitted, Table 1 below show the frequencies expected in the 2-meter band, and Table 2 the crystals fitted..

Transmitter Crystal	2 metres frequency
8000.0	144.00
8010.0	144.180
8020.0	144.360
8030.0	144.540
8040.0	144.720
8050.0	144.900
8060.0	145.080
8070.0	145.260
8080.0	145.440
8090.0	145.620
8100.0	145.800
8110.0	145.980

Table 1 Crystal frequency chart (part) from the service manual [3]

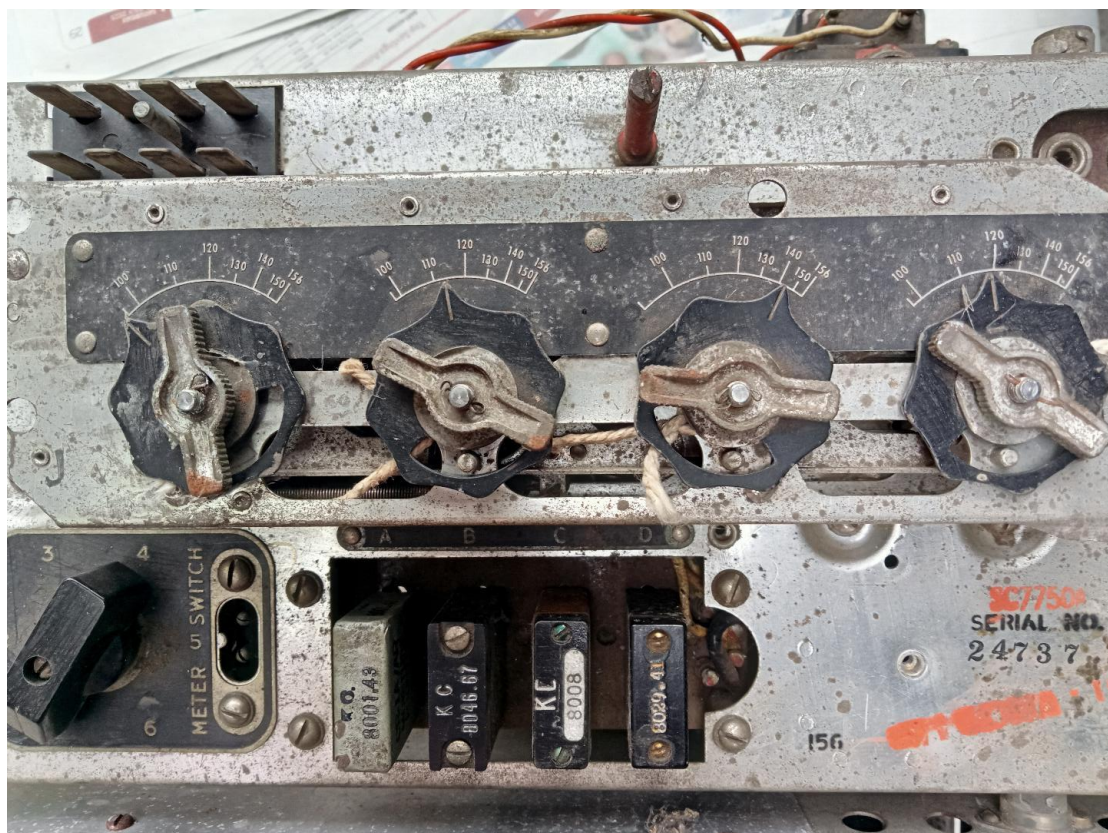


Photo 5: Crystals and fine-tune capacitors. The mechanical switch used to be at 156

The crystal holders will take CR-1A, 10X and FT-741 crystal holder sizes. In addition, set '37 has a FT-743 / FT-741 holder attached internally in parallel in position A – see Photo 6.

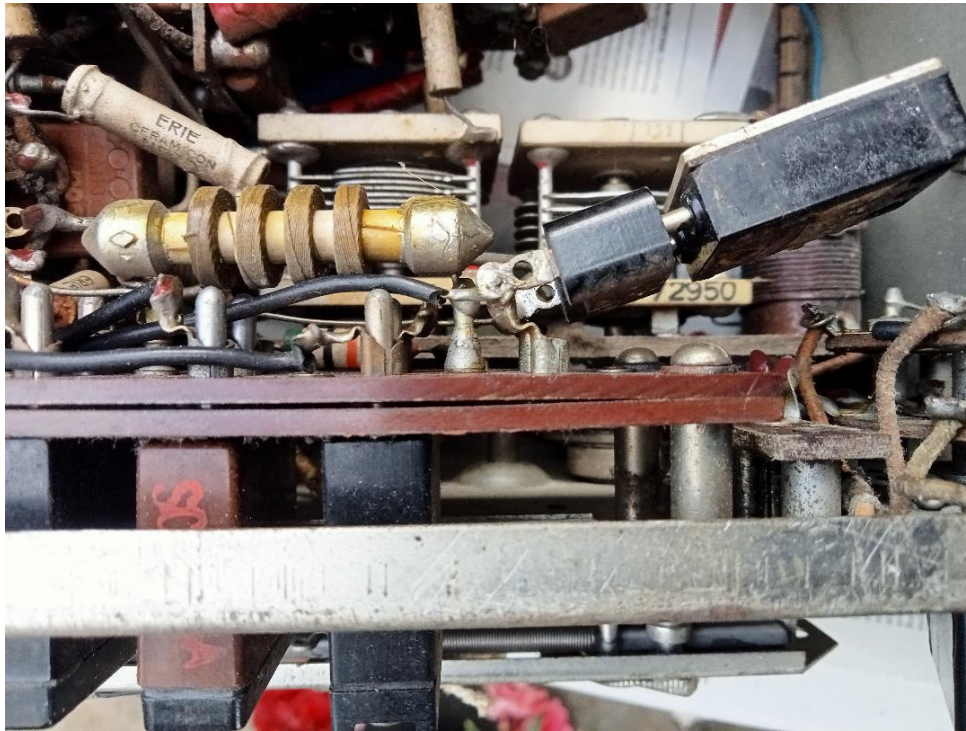


Photo 6: Extra crystal holder (different size).

Crystal	Frequency	Multiplied frequency	Zone
A	8001.43	144.025-74	A & B Scotland and “DX” (long distance) calls
B	8046.67	144.140-06	A & B Scotland
C	8008	144.144	A & B Scotland
D	8029.41	144.529-38	E Cheshire, Derby, Notts, Lines, Rutland, Leics, Warwick and Staffs

Table 2: Frequencies used on Serial '37.



This is the map to serve as a guide to the study of the Band Plan.

According to [4], there was an attempt in 1949 to “Zone” the frequencies used by amateurs – and indeed, “crystal swaps” were organised. Looking at Table 2, this combination suggests that Serial ‘37 came from or worked Scotland and the Midlands Zones.

Above each crystal you can see 4 tuning capacitors, covering the transmitter range of 100-156 MHz. But [2] warns that at the 2-metre end of the transmitter coverage there is very little play available in the variable capacitor, as can be seen in the scale (in MHz) below, Photo 7, which is compressed around 144 MHz..



Photo 7: Close-up of tuning scale

A Closer Look

There are differences between the two chassis as presented., as set out in Table 3 below. Comparing them elucidates the use of these transmitters.

	Serial '21	Serial '37
Front panel	4 position switch to PO socket 2 red wires to 0.76 ohm R –“Plate” (Anode) meter [3].	No switch, socket drilled, no extra meter wires.
	VR on top/rear panel. This is a “gain” control, present on some, absent on others [3].	No VR fitted
	Jones Plug 123-2 (Microphone input) REMOVED	Plug 123-2 present
XTAL switch 156	BASE ONLY and DISCONNECTED	BASE ONLY and connected
XTAL Holder	Only 1 xtal position “A” is wired in	All 4 xtal positions are wired in
Modulator section 2 @ VT 134	2 @ 12A6 √√	1 Missing 1 BASE REMOVED
Speech Amplifier VT199	EF37A √	6SS7 √
VT 198A (6G6-G)	Missing	√
VT134 (12A6)	√	√
VT118 (832)	1 present √, 1 Missing	√√

Table 3: Differences between the two sets as found

In summary, the main differences are that Serial '21 has the Speech Amplifier VT199 present as an EF37A, the microphone connector 123-2 removed, and PO jack plug inserted; whereas one base has been removed from the push-pull modulator in Serial '37. Both have suffered rewiring as a result.

Conclusion

This suggests that '21 is a MCW (Modulated CW) transmitter keying a tone/AM carrier on and off, whereas '37 is an AM voice transmitter, with less modulation than as in the original (perhaps a different microphone).

References

[1] Evenson, RC and Beach, OR (1948): Converting the SCR-522 (transmitter receiver). IN: *Surplus Radio Conversion Manual. Volume 1* pp 67-72

[2] Wingfield, FE G2AO (1951): Modifying the BC-625A for Two Metres. Short wave magazine July 1951 pp 268-273

[3] https://www.radiomanual.info/schemi/Surplus_NATO?SCR-522A_SCR_542A_serv_AN16-505CR522-3_1952.pdf

[4] Williams, EJ G2XC (1949): VHF Bands. *Short Wave Magazine*, August 1949 page 448

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