Valve & Vintage

By Ron Ham

In this month's column, Ron Ham takes a look at one of his favourite Second World War transceivers - the Canadian 58 set.

Welcome to the world of vintage wireless, hot valves and a warm workshop! I'm continuing my Second World theme by taking a look at a military transmitter-receiver which is rather special to me.

One of my favourites from the Second World War is the Canadian 58 set, which was made by Addison Industries in 1943 for infantry use, (right) **Fig. 1**. This set is a compact and well laid out transmitter and receiver.

The 58 set uses six miniature glass valves (1 x 1R5, 3 x 1S5 and 2 x 1T4) which I described in the April issue. It also uses two specials (1299A) with loctal bases. Unusually, permeability tuning is employed by the 58 set for the 6-9MHz range.

Briefly, permeability tuning dates back to the 1930s (I found a reference in *Wireless Terms Simply Explained*, by 'Decibel', published in 1937). The system was used in a variety of car radios for many years after the Second World War.

To remind you, there's no variable capacitor in the permeability type of tuning. Instead, the wanted frequency is selected by moving an iron dust cores in and out of tuning coils.

Focal Point

A three-range meter is the focal point of the front panel of the 58 set, with a six-way test switch on its right. This switch enables the operator to test the condition of the power supply and the general workings of the set.

Valve failure would show up among the readings on the test meter. And to allow further investigation, the chassis comes out of the cabinet by first unplugging the large connector on the right of the front panel and then undoing four (two each side) winged screws, shown in **Fig. 2**.

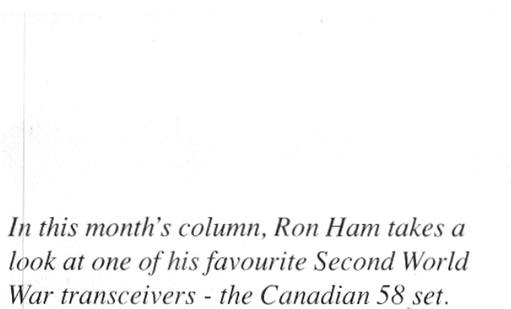


Fig. 1: A trio of Second World War military radio equipment. The 18 set (left), 38 set (centre) and the lesser known Canadian 58 set (see text).

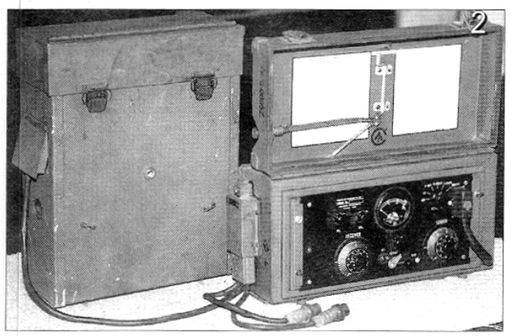


Fig. 2: The Canadian 58 set with its associated back-pack vibrator power supply unit (left).

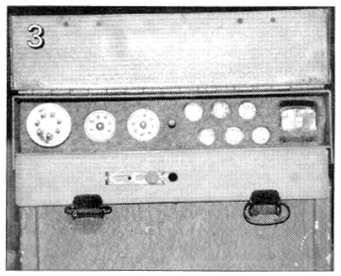
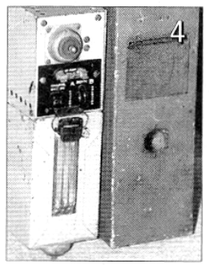
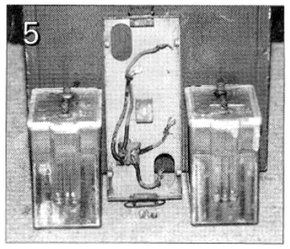


Fig. 3: The 58 set power supply unit (see text) also had room for various spares, including valves.

Fig. 4: The entire 58 set power supply assembly shown removed from the back-pack casing (see text).

Fig. 5: The 58 set used 2V accumulators for primary power. The built-in 'floating ball' hydrometers can be seen on each cell (see text).





The meter is calibrated 0-300V which covers the sender (180V) and receiver (90V) HT, 0-3V for the LT (1.5V) and 0-30mA which is adequate to measure the sender (23mA) and receiver (7mA) h.t. current.

The transmitter output is adjusted 'for maximum smoke'. This is achieved by adjusting the output trim knob immediately below the meter.

The receiver volume control and antenna trimmer are on the upper left respectively and the send/receive switch is at the bottom centre between the two main slow-motion tuning dials (RX left, TX right).

The main on/off switch is on the left of the case, **Fig. 2**, above the power input socket. Operating instructions and the expected meter readings are provided inside the lid.

While the set is stationary, as in **Fig. 2**, the send/receive switch was hand operated. When the lid was closed with the troops on the move, it was press-operated by the mechanical arrangement seen in the centre of the lid in both **Figs. 1** and **2**.

In my opinion, the 58 was another transceiver, just like the 19 and 38 sets, which was ahead of its time. The 58 in **Fig. 1** stands next to the 38 and 18 (left) sets, also designed for infantrymen to carry.

Power Supplies

The power demand by portable valved equipment is considerable. It has to come from a convenient source with a reasonable life.

The 18 set has a combined h.t./l.t. dry battery in the base of the framework under the transmitter. The 38 set has a similar battery kept in a signals-satchel (centre **Fig. 1**) with a lead between the set and the bag.

Together with the actual sets, were weighty replacement batteries, cases of spare valves and the headsets and microphones. These all had to be carried in additional satchels around someone's neck!

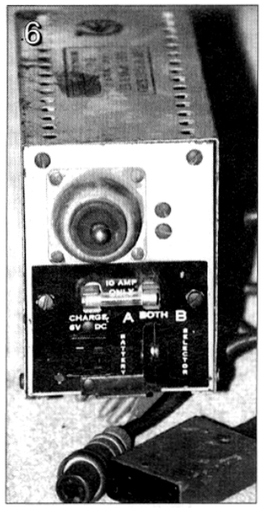


Fig. 6: The control panel on the 58 set enabled the operator to select either 'A' or 'B' or both accumulators by the central switch. They could be charged from a 6V d.c. source via the adjacent 4-pin socket.

Power for the 58 set is derived from a back-pack and/or self-standing vibrator unit, left in **Fig. 2**. This was driven by a pair of 2V wet accumulators.

Much thought was obviously given to 58's power-pack. For instance, although the lid must open to release the vibrator unit for repairs and the accumulators for replacement, it's also deep enough to carry the spare fuses, valves, and vibrator, **Fig. 3**.

Compare the area above the latches in **Fig. 2** with the same in **Fig. 3**. There are identical flaps and small inspection holes each side of the unit.

The latter, are marked A and B and are used to see the state of each accumulator, lower left **Fig. 2**. The power lead to the set comes out via the left-hand flap and the unit control panel is adjusted through the one on the right.

Pack Combined

The vibrator-pack is combined with the accumulator case, **Fig. 4**. The individual units are held together by a pair of latches and electrically joined by a 4-pin plug and socket.

Take a look a the base of the socket and the connecting wires which can be seen on the battery container lid in the centre of **Fig. 5**. The whole power assembly (left in **Fig. 4**) is slung inside the case on four rubber mounts (top and bottom **Fig. 4**).

The power assembly is removed from the case by releasing the clips that secure the lower mounts to the case. The upper mounts slide into rests, but its an awkward job to lift it out.

Be careful, because the case cannot stand up by itself. So, have some help nearby and be prepared to unclip the lower battery unit and separate the two immediately. If you're doing this job **take care and avoid contact with the accumulator acid**. Do **not** lay the battery box on its side.

Battery Box

The top of the battery box, centre of **Fig. 5**, is retained by four screws. The connecting spades must be removed from the accumulator terminals, two on each, **Fig. 5**, before they can be lifted out of the box.

The 58 set accumulators were specially constructed with an area designed to protrude through each side of the battery container, centre of box **Fig. 4**. These areas acted like a hydrometer with three floating coloured balls just visible at the bottom of the cells in **Figs. 4** and **5**.

Briefly, the hydrometer worked like this: when all three balls were up, the accumulator was fully charged. Two up indicated it was used and all down meant it was flat. The balls could be seen through the A and B windows on the main case.

The battery control panel, left in **Fig. 4** and centre **Fig. 6**, enables the operator to select the A or B or both accumulators by the switch on the vibrator unit and, charge them from a 6V source by inserting a lead in the adjacent 4-pin socket.

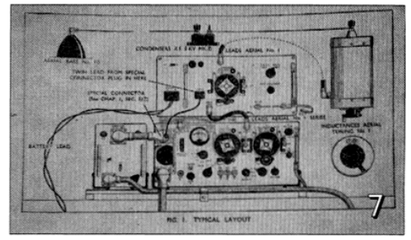


Fig. 7: The RF No. 2 radio frequency amplifier was developed for use with the 19 set. The unit had its own rotary transformer supply unit and employed four 807 valves under the military designation of ATS25 (see text).

Two Operators

Two operators were able to use the 58 set. The leads, with the robust 4-pin metal connectors, coming from the power-input plug, **Figs. 2** and **6**, are for their combined headsets and microphones.

The headphone-microphone sets fits comfortably in the palm of the hand. They include an upper lip spacer-bar to ensure the correct distance between the mouth and the microphone.

Finally, there was also a canvas pack of antenna rod sections. This was attached to the back of the lid and, when assembled, plugged into a large block on the rear of the set.

High Power

Even though they are well known, it's not generally known that a high-power r.f. amplifier was developed for the 19 set to increase the range of its transmitter. The unit, called RF No. 2, used four ATS 25 (807) valves.

The RF No. 2 amplifier had its own internal rotary transformer to produce the required 600V h.t. In use it was connected between a variometer and the antenna input to the main set.

The r.f. amplifier unit stood on top of the main casework, **Fig. 7**. It was placed in a convenient position for the operator to adjust the central tuning control and the wave change switch. Frequencies bands were selected either by the 2-4.5MHz or 4.5-7.6MHz ranges.

The rotary transformer inside the amplifier was fed from a separate battery. The tuning control matches those on the main set and, like them, can be tuned manually or flicked to a predetermined fixed frequency.

Selecting the fixed frequency was achieved by presetting four screws in the centre of each control. Then the operator moved a small lever on the right of each tuner between tune at the top and flick at the bottom.

The addition of the RF No. 2 unit meant changing the standard 19 set variometer for Inductance Aerial Tuning No. 1. This also required a special connector between the set and its own rotary-transformer power unit.

Valve Information

My thanks go to **Mr S. C. Tyler** for sending some sheets of valve information and one of Bernards circuit books from the 1940s. I could not thank you by post because there was no address on your letter. However, I have passed these goodies on to the Honourary Curator of the Vintage Wireless section at the Amberley Chalk Pits museum.

Vintage Gremlins

Finally, you may have heard former Second World War radio mechanics and elderly radio engineers (like myself!) refer to the 'gremlins'. Legend has it that these mythical ' bug like' creatures get into, and mess about with) wireless systems.

Gremlins cause great annoyance to the engineers. However, one must have followed me into retirement and taken a fancy to column two of the March 'Valve & Vintage'!

Although I stated (correctly) in the second paragraph that the valves in the 18, 38 and 46 sets have 2V filaments, the last line of the column suggests they have 2.5V filaments which is **Wrong**. Sorry about that mistake.

I've run out of space and it's time to 'shut the vintage wireless 'shop' once again. But don't forget you can write to me at any time at **'Faraday', Greyfriars, Storrington, West Sussex RH20 4HE**.