

Vol. 2 AMENDMENT No.1 Ver 2.0

Date of issue: November 2013

After the publication of *Wireless for the Warrior* Volume 2 a number of minor typing errors and incorrect data have been noted. Corrections and additional information are combined in this *Volume 2 Amendment No. 1*. If printed on A4 paper please cut away circa 6mm (¼ inch) from the bottom and the right hand side of the sheet. The prepared sheets will then fit snugly between the last page and cover of the book. **Printed in RED are later found additions notified in Ver. 2.0.**

WIRELESS SET No. 19

- Page W.S.19 - 3: Data Summary: *Size (Inches) and Weight*: Change width (2½) in Wireless Set No. 19 to **12½**.
- Page W.S.19 - 51: (Figure 19-73) Circuit and appearance of Rejector Unit No. 1: The top side of the variable capacitor in the circuit diagram should be connected to the centre contact of the switch and not to the coil as drawn.

WIRELESS SET No. 19 Control System

- Add new page W.S.19 Control - 27: Improvised remote control.
- Add new page W.S.19 Control - 28: External tank telephone.

WIRELESS SET No. 22

- Page W.S.22 - 3: Data Summary: *Size (Inches) and Weight*: Change width (3½) in Power Supply Unit to **12½**.
- Replace and add new page W.S.22 - 52: Operating on dry batteries and Aerial coupling methods.

WIRELESS SET No. 48

- Add new page W.S.48 - 13: Wireless Set No. 48 Morse key assembly.
- Add new page W.S.48 - 14: Wireless Set No. 48 Vibrator Power Unit (NZ).
- Add new page W.S.48 - 15: Hand generator for Wireless Set No. 48.

WIRELESS SET No. 62

- Replace and add new page W.S.62 - 38: Wireless Set No. 62 Power Supply Transistorised No. 36.

Appendix 3 'Accessories'

- Page Appendix 3 - 4: Aerial Bases, *Remarks*: Change ...For Aerial Dipole No. 6... to ...For Aerial Dipole No. **16**...
- Page Appendix 3 - 6: Aerial Coupling Equipment. Change the following items:
 - Aerial Coupling Equipment K ZA 23688 R106... to ...Aerial Coupling Equipment K **(Set Unit) ZA 23688 T1154/R106 in Truck.**
 - Aerial Coupling Equipment No. 1... to ...Aerial Coupling **Unit** No. 1.
 - Aerial Coupling Equipment No. 2a... to ...Aerial Coupling **Unit** No. 2a.
 - Aerial Coupling Equipment No. 2a Mk.1/1... to ...Aerial Coupling **Unit** No. 2a Mk.1/1.
 - Aerial Coupling Equipment No. 3... to ...Aerial Coupling **Unit** No. 3.
 - Aerial Coupling Equipment No. 6... to ...Aerial Coupling **Unit** No. 6.
 - Aerial Coupling Equipment No. 8... to ...Aerial Coupling **Unit** No. 8.
- Page Appendix 3 - 9: Cases Spare Valves/Parts. Add the following items:
 - Cases Spare Valve 10¼ x 6½ x 6¼ ZA 42362 Wireless Set C43.
 - **Cases Spare Valves No. 16 Mk.2 ZA 42589 (Believed Reception Set R209 Mk.2).**
 - Cases Spare Valves No. 18 ZA 37926 Reception Set R220/R220.
 - Cases Spare Valves No. 22A ZA 43457 Wireless Station C41/R222.
 - Cases Spare Parts No. 5E Wireless Station T1154/R106.
- Page Appendix 3 - 9: Cases Spare Valves/Parts. Change the following item:
 - Cases Spare Valves No. 40 ...to... Cases Spare Valves No. **4p Z2/ZB 14828 SR C12.**
- Page Appendix 3 - 10: Key and Plug Assemblies. Add:
 - Key and Plug assembly No. 18 (4-pt plug and toggle switch on top) **SPF Mk.2.**
- Page Appendix 3 - 10: Microphones Hand. Add:
 - **Microphones Hand No. 13A S.P.F. No. 2. (Has a Pye plug and 4-pt plug)**
- Page Appendix 3 - 10: Lamps Operator. Add the following items:
 - Lamps Operator No. 3 **...ZA 4600...**
 - Lamps Operator No. 4 **...ZA 1906...**
 - Lamps Operator No. 5 **...ZA 10741...**
 - **Lamps Operator No. 5 N.Z. GA 104.....New Zealand Wireless Set ZC1 Mk.I and Mk.II.**
 - **Lamps Operator No. 6A Mk.1/1.....ZA 29311.....Tropicalised version of Lamps Operator No. 6A.**
 - Lamps Operator No. 6 (Aust)Wireless Set No. 153 (Aust)
 - Lamps Operator No. 10 Mk.1/1..... Use unknown.
 - Lamps Operator No. 11 Mk.1/1..... Use unknown.
 - Lamps Operator No. C1.....ZA/C 4412.....Wireless Set No. 52.

Wireless Set No. 19 Improved Remote Control

Note: The below described No. 19 Set **improvised remote control** and **external tank telephone** were two completely different arrangements but had a similar (improvised) handset in common. The remote control was merely an extension of one of the crew Microphone and Receiver Headgear Assemblies allowing control of either A set, B set or intercom via a two wire line when the tank or other type of vehicle was at the halt. The external telephone, however, was fitted in a protective box at the rear of the tank and had intercom facility only. The physical shape of the handset of both systems was similar, though components and circuit of both systems differed.

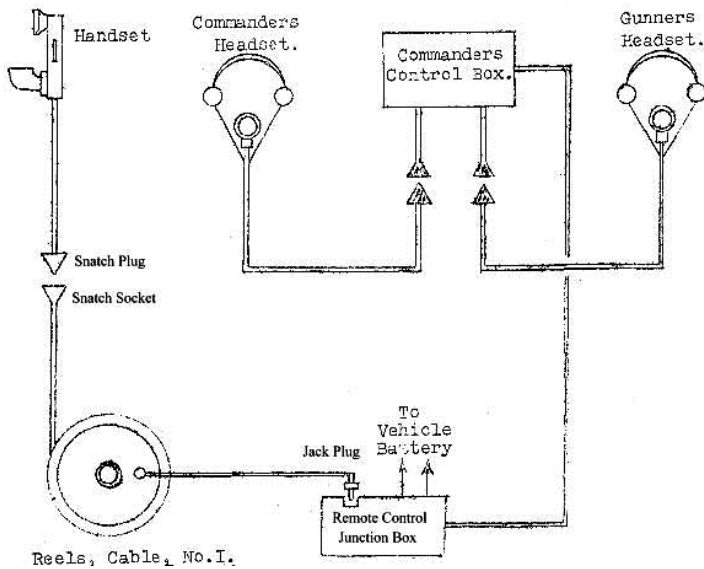
Improved remote control

In the early and mid World War 2 period considerable attention was paid in various theatres of war to the provision of a light and compact remote control system for the Wireless Set No. 19, particularly for AFV and Royal Artillery requirements. One local solution, for some time standard in the Middle East was the 'Bean' system. This improvised remote control was locally constructed and made up from standard War Department Ordnance spare parts. The 'local' unit housed in a small box, for example a spare Junction Distribution No. 1 or 2, was normally fitted in the tank turret near the Commander's control box.

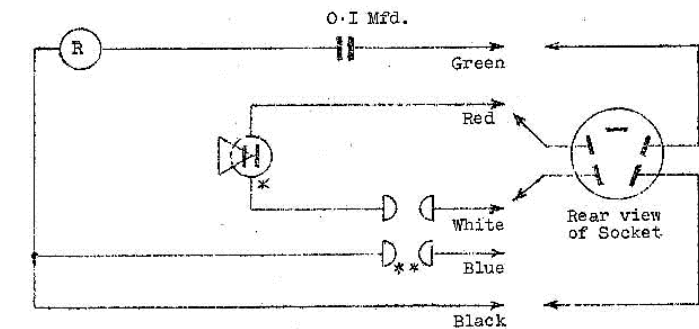
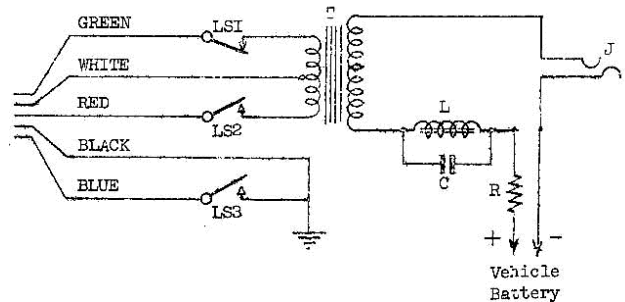
The absolute minimum of operation was required at the 'remote end', this consisted of a handset only, connected to the improvised remote control junction box via normally available two wire Q22 or field cable on Reel Cable No. 1 mounted at the rear of the tank turret.

The handset was made up from a standard Microphone and Headgear Assembly No. 1 with one earpiece mounted on the microphone. The original moving coil Microphone No. 7 was exchanged for a carbon type Microphone No. 3.

General layout of improvised remote control system (left). The handset is connected via a two wire line to the remote control junction box. This box is connected to the standard No. 19 Set Control Harness.



Circuit diagram of the locally constructed remote control junction box (right). The five wires on the left hand side of the circuit are connected to the terminal strip inside the Commander/Gunner control box in the tank. This allows switching to A set, B set or intercom. The transmit/receive relay L (activating contacts LS1 to LS3) is a spare No. 19 Set transmit relay. The transformer T is the microphone transformer T7A normally found in Junction Distribution No.1 or No.2 and is used as a set to line transformer. One half of the low impedance winding carried audio from the set, the other half carried microphone audio. The higher impedance winding of the transformer, which is connected to the two wire line, is used alternatively as audio secondary or microphone primary.



Circuit diagram of modified Microphone and Headgear Assembly No. 1 (left). Only one earpiece is used (with a condenser in series for blocking the DC) and the microphone is a carbon type. In the corresponding Snatch Socket the microphone is connected in parallel with the earpiece and the two wires terminated to the reel cable. The Blue wire marked ** is not used. This was previously the transmit/receive contact, but now the microphone current actuates the relay in the remote control junction box. Much later in the war Junction Remote Control No. 1 and No. 2 were issued for this purpose, partly based on

the 'Bean' system, but not so compact. See pages 22 and 23 of the 'WS 19 Control' paragraph in *Wireless for the Warrior* Volume 2.

External telephone on Sherman tank intercom system for Infantry use

To allow the Infantry to communicate in the No. 19 Set tank intercom system an external telephone handset was connected to an additional standard driver's type Junction Distribution No. 3. This assembly was mounted on the outside of the tank in a protective container bolted to the rear of the tank about midway between the exhaust stacks. It was wired into the No. 19 Set intercom system via a protective cable run through the tank hull to the terminal strip in the normal Junction Distribution No.3 (the driver's box). To allow the Infantry user of the external tank telephone some freedom of movement for observation, the drop lead on the external Junction Distribution No. 3 was 30 ft in length. The improvised telephone handset was ingeniously made up from a standard No. 19 or No. 22 Set type Microphone and Headgear Assembly No. 1 or driver's type No. 2. It is interesting to note that it is physically almost impossible to use the handset in the normal way and whilst speaking the earpiece cannot be used.



Mechanical arrangements of fitting a single earpiece to the dynamic type Microphone Hand No. 7, part of Microphone and Headgear Assembly No. 1.



Alternative arrangements of fitting a single earpiece to a carbon granule (Tannoy) type Microphone Hand Power No. 1A, part of Microphone and Headgear Assembly No. 2. The microphone is slightly modified, by two machined flat surfaces on the handle, to which is bolted the bracket for the microphone, part of the standard headset headband. The VAOS number YA 28968 is handwritten on the end of the microphone. Pictures courtesy Chris Clotworthy GI7TEU.

Wireless Set No. 22

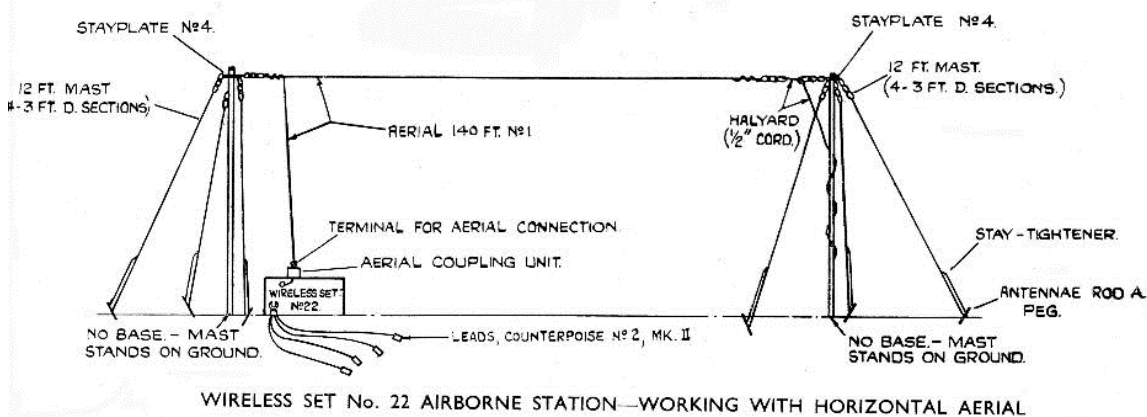
- Operating on dry batteries

Owing to the critical supply position of secondary batteries for Wireless Set No. 22, 'Batteries Dry HT/LT 160/7.5V (WB N(ot) I(n) V(ocabulary))' were introduced during a certain period in 1944 as an alternative. They were made up in four containers as follows:

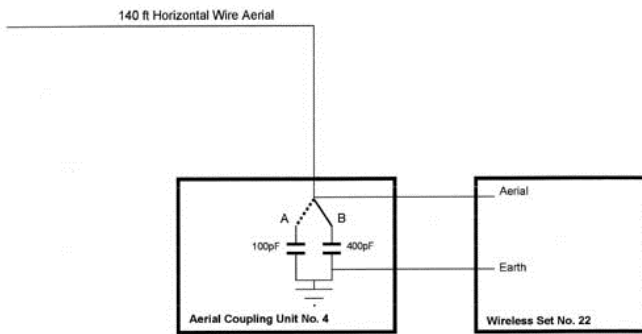
- One Container No. 1 (Battery dry HT 160 volts)
- One Container No. 2 (Battery dry HT 160 volts)
- One Container No. 3 (Battery dry LT 7.5 volts)
- One Container No. 4 (Battery dry LT 7.5 volts)

When operated from dry batteries the Power Supply Unit No. 4 as normally used with Wireless Set No. 22 when working from a secondary battery, was not used. It may be interesting to note that Wireless Set No. 62 (the replacement for the No. 22 Set) was similarly modified to operate from No. 31 Set dry batteries. See Page W.S.-34 in Volume 2 of "Wireless for the Warrior".

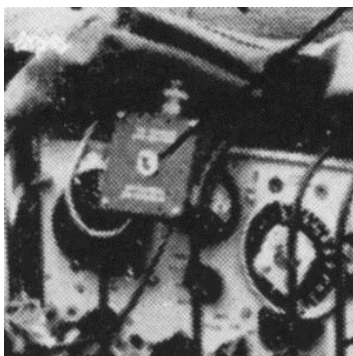
- All Wave Aerial for Wireless Set No. 22



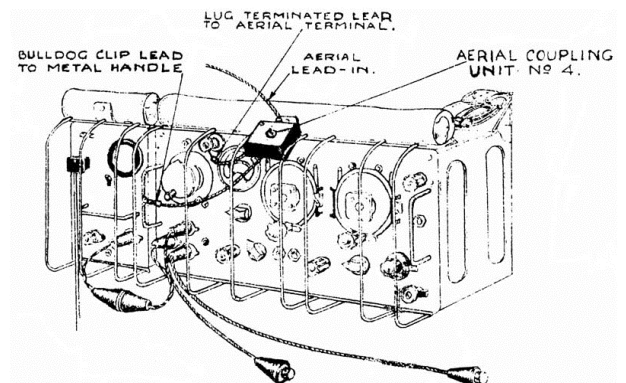
Aerial 140-ft No. 1 on 12-ft masts is an 'All Wave' inverted L type horizontal wire aerial for Wireless Set No. 22, suitable for medium range communication (over 50 miles). Its advantage is that it can be used on any frequency within the coverage of Wireless Set No. 22 without making adjustments to its length. It was standard issue for special forces stations such as used by Airborne Signals. More can be found in 'Wireless for the Warrior', Volume 2, Section WS 22-16. The 140-ft aerial should not be confused with the series of 3/4 wavelength wire aerials as these had each a limited frequency range. In order to match a 140-ft aerial to the Wireless Set No. 22, a special loading unit is required, 'Aerial Coupling Unit No. 4', a small box comprising two condensers and a switch. It is normally clipped on to the front grille of the set.



The aerial lead is connected to the top terminal of the Aerial Coupling Unit No. 4. A lug termination connects to the Wireless Set No. 22 aerial terminal and a 'bulldog' clip connects to a suitable earth point on the set, for example the metal handle. Depending on the frequency in use, condenser A (400pF) or condenser B (100pF) is switched in parallel to the set aerial and chassis. Note that Leads Counterpoise No.2 Mk.II must be used, normally arranged under the horizontal aerial.

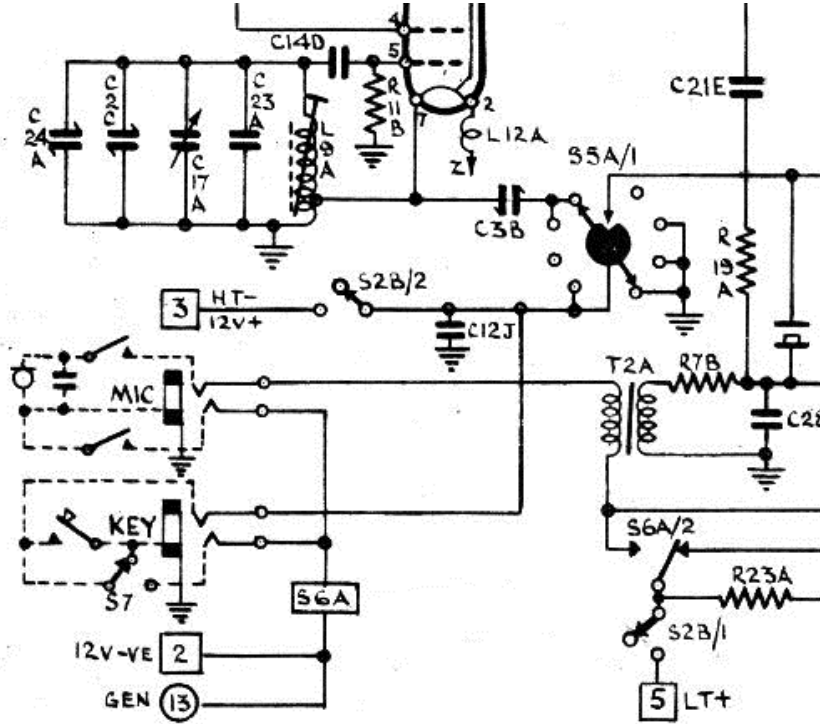


Photograph of Aerial Coupling Unit No. 4, clamped on the Wireless Set No. 22 grille. Three versions of this unit are noted: Mk.I (ZA 10560), Mk.II (ZA 22594) and Mk.III (ZA 27322), differing only in small detail.

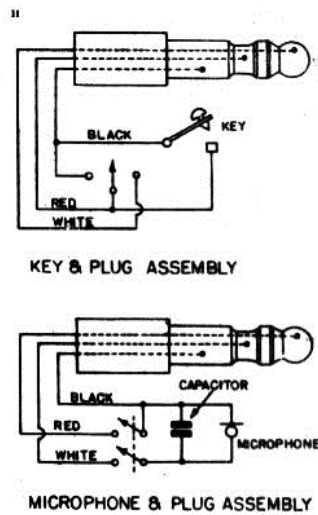


Wireless Set No. 48 Morse key assembly

Kelvin Barnsdale, ZL3KB, from New Zealand noted that there is a slight error in the circuit diagram drawing of Wireless Set No. 48 Mk. 1*(Figure 48-5 in Volume 2 of 'Wireless for the Warrior'). The arrow of the Send/Receive switch S7 is drawn wrong and must be reversed. The present position of S7 is 'Receive'. When the switch is thrown into 'Send', the top and mid tip of the jack are connected resulting in Send/Receive relay S6A to be active. The actual keying is done by the Morse key connecting the HT- and 12V+ to chassis.



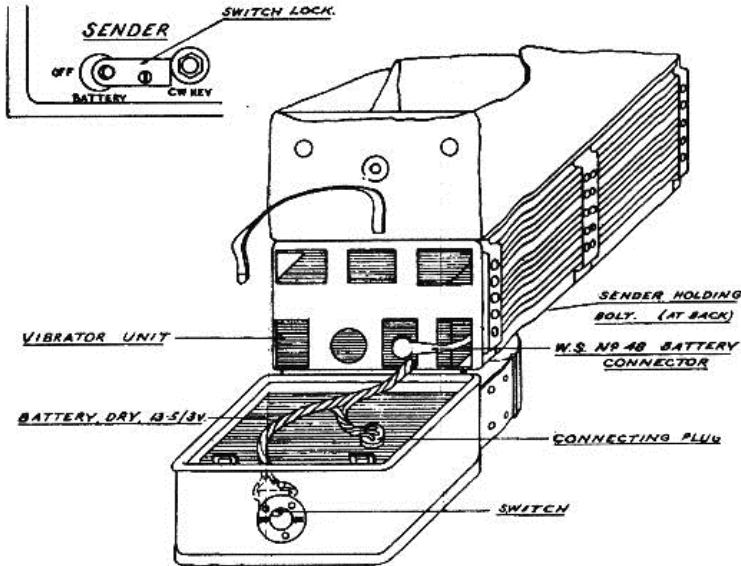
Revised (part) circuit diagram Wireless Set No. 48 Mk. 1* Sender. See Figure 48-5 in Volume 2 of 'Wireless for the Warrior'.



Circuit diagram of Key and Plug Assembly No. 8A (ZA/US/1104) and Microphone and Plug Assembly T17 (2B 1617).

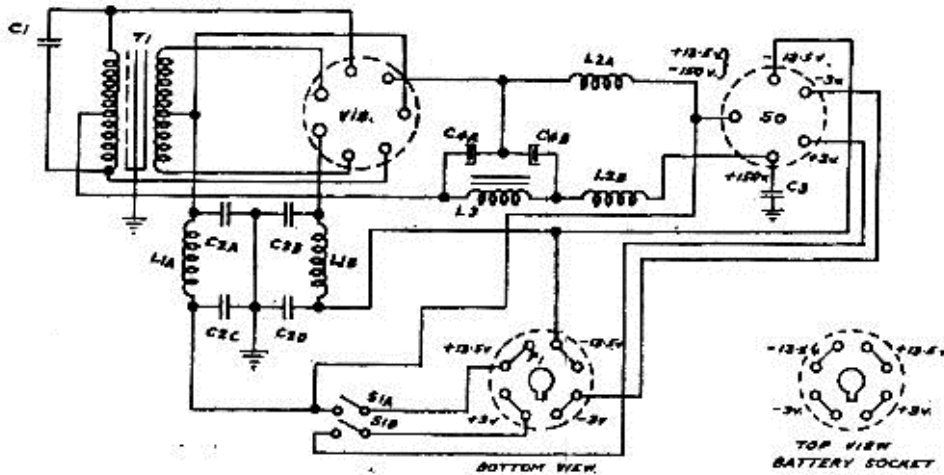
Wireless Set No. 48 Vibrator Power Unit (NZ)

From John McKim of Christchurch, New Zealand, I received more information on the Vibrator Power Unit (NZ) for Wireless Set No. 48. (See page 48-10 in Volume 2 of 'Wireless for the Warrior'). The Wireless Set No. 48 Vibrator Power Unit (NZ) permits the use of a 13.5/3 volt block instead of the battle battery when the set is used as a one man station. The 13.5/3 volt block is much simpler to manufacture and has much greater tropical life.



The Wireless Set No. 48 Vibrator Power Unit (NZ) is housed in a metal box which fits into the space beneath the sender section of the Wireless Set No. 48. It is fitted with a five-pin socket into which plugs the battery connection of the No. 48 Set. In addition it has a lead which bears an octal plug to connect with the 13.5/3 volt block and a second lead with a double-pole switch for controlling the filament supply and input to the vibrator section. The 3 volt section is used only to supply the No. 48 Set filaments. The 13.5 volt part of the battery block feeds the vibrator unit, producing about 150 volt HT; it is also used to energise the send/receive relay.

WIRELESS SET NO 48 VIBRATOR POWER UNIT (N.Z.) AND BATTERY, DRY, 13.5/3V. INSTALLATION.



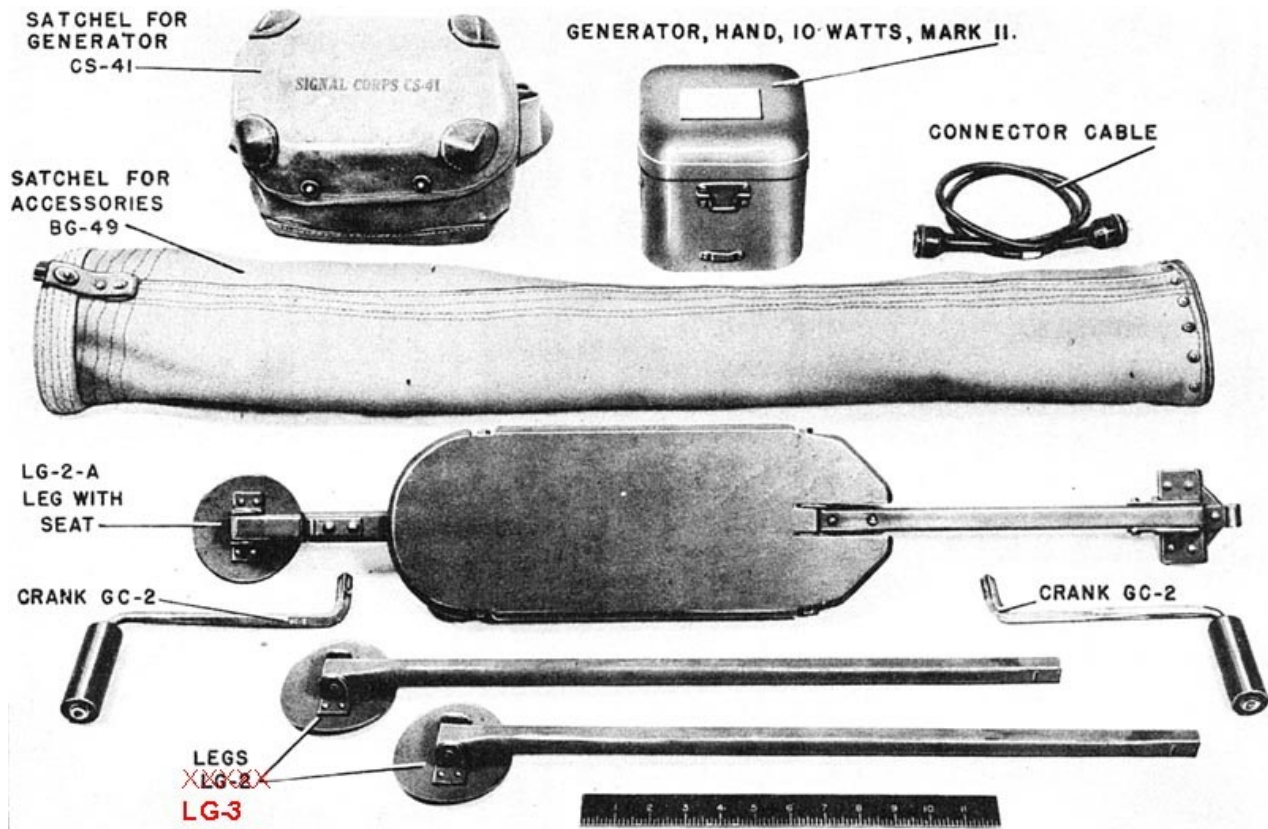
PART	DESCRIPTION	VALUE	PURPOSE
L1A, L1B	CHOKER, L.T.		HASH
L2A, L2B	" DOUBLE, H.T.		"
L3	" H.T.		SMOOTHING
C3	CONDENSER, PAPER	.005 MF, 1600V	BUFFER
C2A, B, C, D,	"	.25 " 600V	HASH
C3	"	.05 "	"
C4A, C4B	" ELECTRO.	8 " 250V	SMOOTHING
T1	TRANSFORMER	13.5 / 150V	
VIB.	VIBRATOR, V6273	12V, 7 PIN	
S1A, S1B	SWITCH, D.P.D.T.		ON/OFF
SO	SOCKET	5 PIN, MIN.	OUTPUT
PI	PLUG	5 PIN, OCTAL	INPUT

WIRELESS SET NO 48 VIBRATOR POWER UNIT (NZ)

Hand generator for Wireless Set No.48

Generator , hand, 10 watts, Mk.II was designed to supply LT, HT and GB for Wireless Sets No.48 and No.18. The generator set is principally comprised of the generator with two cranks, two straight front legs and a folding rear leg with seat. Figure 48-12 in Volume 2 of 'Wireless for the Warrior' shows all the component parts.

It must be noted that there is an error in the nomenclature of the straight legs. This error is not only in the component parts picture but also in the component parts list printed in the original No.48 Set manual.



Robert Downs WA5CAB who reported this error, wrote the following to clear the situation: ‘...on the Wireless Set No. 48 page the nomenclature of the straight legs is incorrect. The folding leg is LG-2 (steel), LG-2-A (aluminium in early '41 then back to steel in '42) and LG-2-B (aluminium) in late '43. The straight leg is LG-3 (steel) then LG-3-B (aluminium) in late '43 with the easing of the aluminium shortage in the US...’.

‘...the post-war legs, besides being made for the AN/GRC-9 (GN-58-A) were also used with the AN/TRC-7 (G-3B/TRC-7) and the MX-898/GR (G-8/GR for several sets that included RT-66, 67, 68 or 70). Cut off, they were used with the RS-6 and AN/GRC-109 (both with GN-58-A). In the late 50's, the G-43/G came along to replace the GN-58-A and for what ever reason, they built a tripod mount for it, which also fit the later G-77/G. So as far as I know, the last generator built that used LG-2-B and LG-3-B was the G-8A/GR. The GN-45-A or -B of SCR-284 used the same LG-2 and LG-3 as did all the other radio hand crank generators built before, during and immediately after the War (except for GN-54 which used three LG-3's and no LG-2)...’.

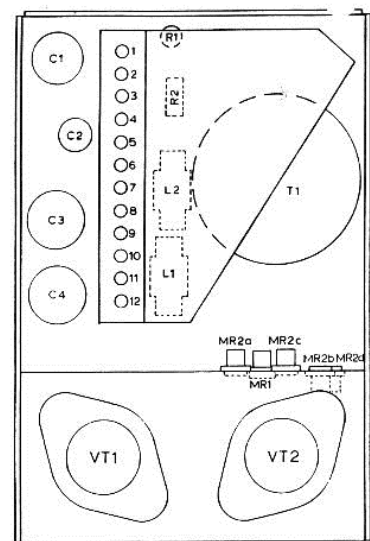
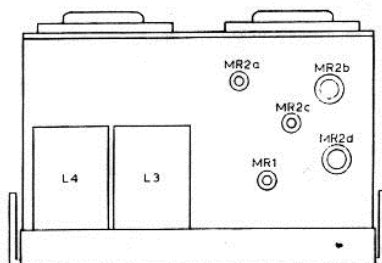
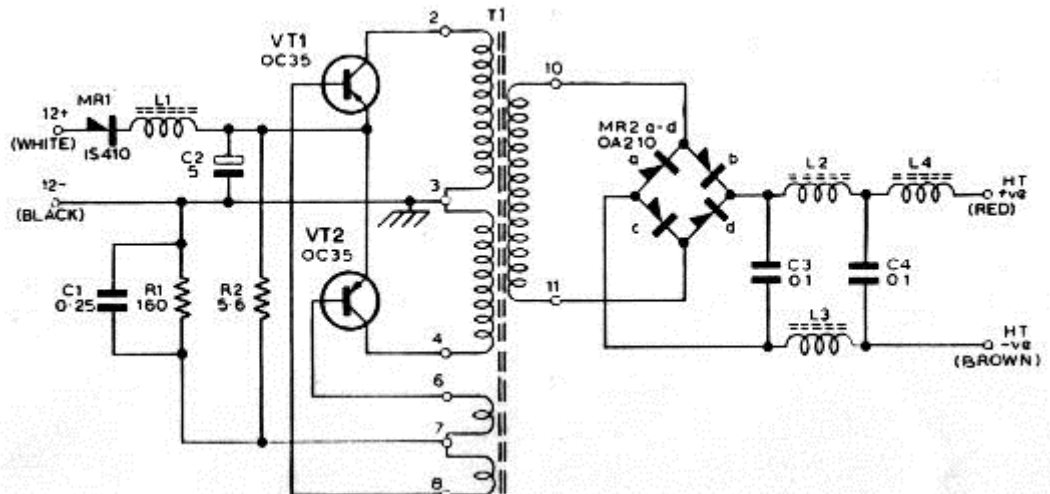
Wireless Set No. 62 Power Supply Transistorised No. 36

The transistorised power supply for Wireless Set No. 62 (Cat No. Z1/5820-99-102-2776) was a direct replacement of the rotary transformer power unit which was normally issued with the standard equipment. It operates on 12 V DC and results in a considerable reduction in battery consumption. Year of introduction was about 1963. Around 1965 the stocks of the rotary transformer unit were exhausted and Power Supply Transistorised No. 36 was issued in lieu. Sets fitted with the new transistor power supply unit were marked in red lettering "TRANSISTORISED P.S.U." in a space to the left and above the front panel meter. The complete unit is housed in a ventilated metal case with the same overall dimensions as those of the rotary transformer power unit. When installed it is bolted directly to the chassis of the No. 62 Set, the two securing screws being provided with adapter washers to replace the rubber grommets on which the rotary transformer power unit was mounted. The unit operates from 12V DC and uses two transistors type OC35 in a conventional push-pull DC converter circuit with saturable transformer coil switching. Diode MR1 provides protection for the transistors if the supply is connected in the wrong polarity. The working frequency of the converter is approximately 1.5kHz.

	Rotary transformer	Transistor power supply
	Average current	Average current
Listening watch	3A	0.9A
Receive (ALL ON)	3.7A	1.5A
1:5 transmit/Receive	4.2A	2.3A
Transmit CW	5A	2.7A
Transmit R/T	4.6A	2.5A

Table showing differences in current consumption, Wireless Set No. 62 rotary transformer vs transistor power supply.

- C1 0,25µF 150V
- C2 5µF 50V
- C3 0,1µF 600V
- C4 0,1µF 600V
- R1 160Ω 6W
- R2 5,6Ω 3W
- T1 AL21091
- VT1/2 OC35
- MR1 1S410
- MR2a-d OA210
- L1 1mH
- L2/3 500µH
- L4 155mH



Wireless Set No. 62 Power Supply Transistorised No. 36.