

RESTRICTED

ELECTRICAL AND MECHANICAL
ENGINEERING REGULATIONS

TELECOMMUNICATIONS F 252

WIRELESS SET NO. 19

GENERAL DESCRIPTION

DISTRIBUTION - CLASS 670 - CODE No.4

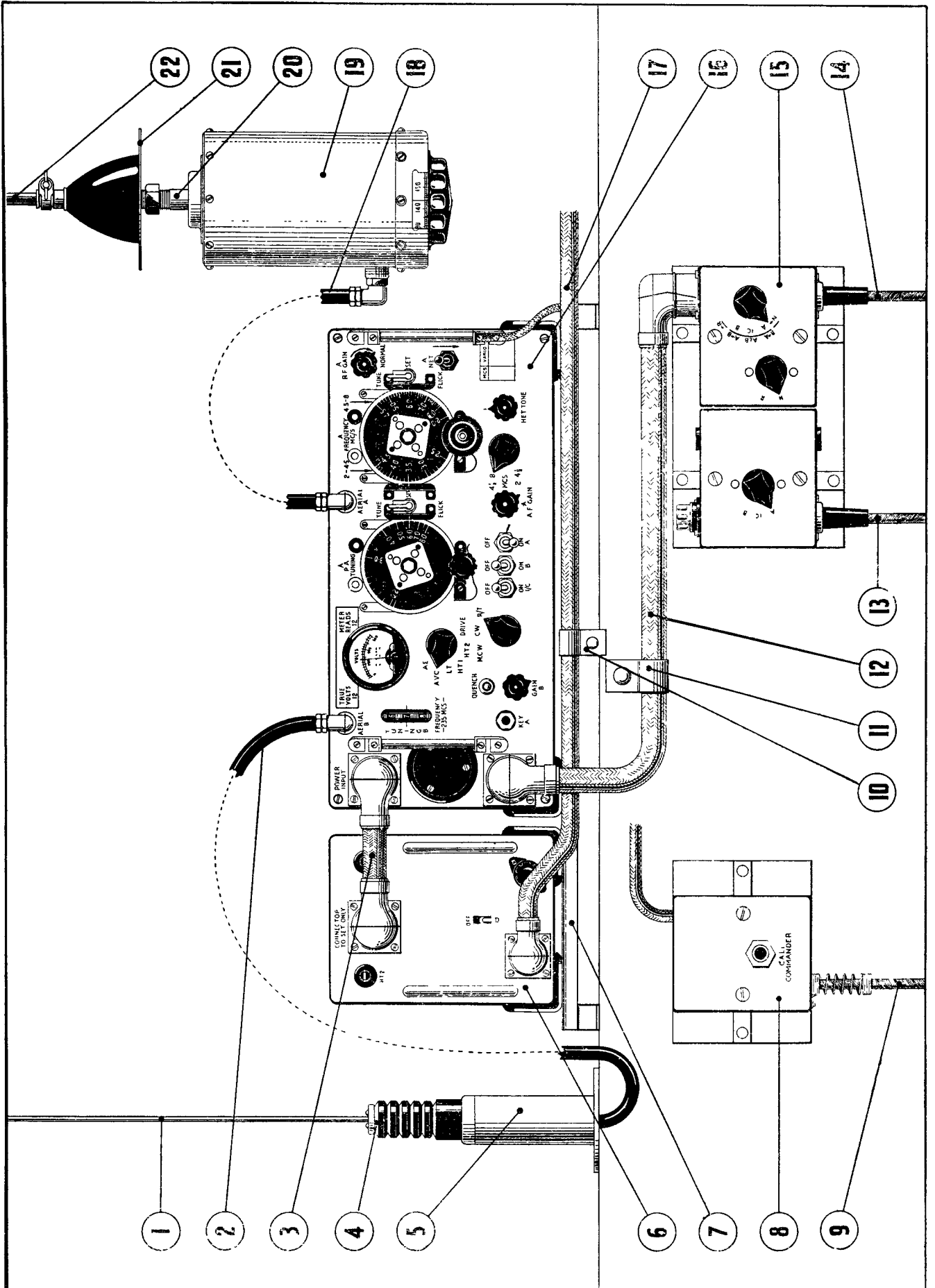


Fig. 1. Equipment for typical station

MAIN FEATURES

Equipment

1. The Wireless Set No. 19 was primarily designed for use in armoured fighting vehicles, but is now used in almost all kinds of vehicles throughout armoured formations. The equipment consists of:—

- (a) The sender-receiver unit, containing "A" set, "B" set, and intercommunication amplifier. This is mounted on a carrier together with (b) and sometimes (c).
- (b) The power supply unit.
- (c) Variometer, for tuning the "A" set aerial.
- (d) Aerials, aerial mountings and aerial feeders.
- (e) One or more control units and one or more junctions, distribution, with the necessary connectors.

Index to fig 1:—

1. Antennae rods G.
 2. Leads, aerial, no. 2 or 3.
 3. Connectors, 12-pt., no. 23A or 50.
 4. Aerial bases no. 9.
 5. Aerial bases no. 9, mountings no. 1 or 2.
 6. W.S. 19 power supply units no. 1 Mk. III.
 7. Carriers, sets, no. 21.
 8. Junctions, distribution, no. 1 or 3.
 9. Connectors, flexible, 5-pt. no. 2, to driver's headgear assembly no. 2 or 1.
 10. Cable clips no. 1.
 11. Cable clips no. 1.
 12. Connectors, 12-pt.
 13. Connectors, flexible, 5-pt. no. 2, to commander's headgear assembly no. 1.
 14. Connectors, flexible, 5-pt. no. 2, to operator's headgear assembly no. 1.
 15. Control units no. 3 Mk. II.
 16. Wireless sets no. 19 Mk. III.
 17. Connectors, 6-pt.
 18. Leads, aerial, no. 1.
 19. W.S. 19 aerial variometers Mk. III.
 20. W.S. 19 aerial feeder assembly no. 4 or 5.
 21. Aerial bases no. 10 Mk. II.
 22. Antennae rods F.
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- (f) Headphone and microphone sets, with pressel switch for send-receive switching.

These are illustrated in fig. 1.

Facilities

2. Three separate facilities are provided, which can be used simultaneously. They are:—

- (a) The "A" set sender-receiver (long range) for working between different headquarters and between individual vehicles.
- (b) The "B" set sender-receiver (short range) for working between individual vehicles in a troop or in a headquarters.
- (c) The "IC" amplifier for telephone intercommunication between all members of the crew of a vehicle.

Marks I, II and III

3. Owing to the differences between the three marks, it would lead to confusion if they were all covered in a single E.M.E.R.; therefore this E.M.E.R. deals only with items common to all three marks, and separate E.M.E.Rs. with the same number but suffixed /1, /2 and /3 are issued to cover those sections of the equipment peculiar to marks I, II and III, respectively. A summary of the differences between the three marks is given in paras. 5-11 of this E.M.E.R. It should be noted that the different marks of the control units are not related to the different marks of the wireless sets.

The control units

4. These enable certain members of the crew to switch their headsets to either "A" set, "B" set, or "IC." Certain types also provide rebroadcasting facilities. The driver's box (junction, distribution) has a push-button for operating a buzzer to call the commander's attention when the latter is working one of the wireless sets. The control units are arranged so that when either of the wireless sets is unattended, signals received on it are heard through the intercom. If both commander and operator are switched to "B," then a warning lamp ("A" unattended) lights on the operator's unit.

TECHNICAL DESCRIPTION

DIFFERENCES BETWEEN MARKS I, II & III

General

5. The general arrangement of all three marks is basically the same, but there are numerous differences in detail. It is not possible here to list all of them fully, and, for further details, reference should be made to the separate E.M.E.Rs. referred to in para. 3. The principal points in which Mk. III differs from Mk. II are given below. Mk. I is similar to Mk. II, but the "A" set has only a single frequency band, covering 2.5-6.25 Mc/s; it is now obsolete, and no further information about it need be given here.

"A" set receiver

6. (a) R.F. gain control fitted in Mk. III, not in Mk. II.
- (b) "A" on-off switch fitted in Mk. III in place of "A only-all" switch in Mk. II.
- (c) Toggle-switch for netting in Mk. III in place of push-button in Mk. II.
- (d) Two-speed slow-motion drive for frequency control in Mk. III; single-speed only in Mk. II.
- (e) Het. tone control range from 600 to 2000 c/s, single-sided, no zero, in Mk. II; range approx. 3000-0-3000 c/s, double-sided, centre zero, in Mk. III.

- (f) CW filter in A.T. amplifier in Mk. III, not in Mk. II.
- (g) On CW, beat oscillator injection via capacities of V2B and V2A in Mk. II; via direct coupling to I.F. amplifier in Mk. III.
- (h) Local oscillator circuit different. Frequency drift is less in Mk. III.
- (i) Different design of all R.F. coils.

“A” set sender

- 7. (a) Master oscillator circuit different. Frequency drift reduced in Mk. III.
- (b) Beat oscillator circuit and coil different. Spurious radiations from aerial less in Mk. III due to this.
- (c) Drive circuit coils of different design.
- (d) Drive A.G.C. circuit and P.A. bias circuit different.
- (e) P.A. coil of different design; frequency coverage slightly wider in Mk. III.
- (f) Aerial meter transformer different.

“B” set

8. No essential change, except “B” on-off switch controls H.T. only in Mk. II, and both H.T. and L.T. in Mk. III.

“IC” amplifier

9. No essential change, except “IC” on-off switch is fitted in Mk. III; “A only-all” switch used instead in Mk. II.

Power supply unit

10. Mks. I and I* are similar. They employ a single 3-commutator rotary transformer to supply both H.T. voltages simultaneously. Mk. III employs two separate small rotary transformers, H.T.2 being switched on by a relay only when the “A” set is switched to send. The filter circuits are different in the three types. Connection to the set is made with a 6-point connector on Mks. I and I* units, used with Mks. I and II sets, and with a 12-point connector on Mk. III unit, used with Mk. III set. The overall dimensions are the same for all types.

Variometer

- 11. This is the same in all marks, except that
 - (a) the meter transformer is similar in Mks. I and II, but different in Mk. III.
 - (b) R29A is contained in the set in Mk. I and in the variometer in Mks. II and III.

Interchangeability

- 12. (a) Power supply unit. Mks. I and I* are interchangeable and can be used with Mks. I and II sets, but not with Mk. III. Mk. III unit can be used only with Mk. III set.
- (b) Variometer. Mk. I can be used only with Mk. I sets. Mks. II and III can be used with Mk. I sets if R29A in the set is short-circuited. Mk. III can be used with Mk. II sets. Mk. II can be used with Mk. III sets in an emergency, but R29A may need readjustment to prevent meter going off scale when measuring aerial current.
- (c) Control units, harness, aerials, etc., are completely interchangeable with any mark of set.

AERIALS AND ASSOCIATED EQUIPMENT

“A” set rod aerials

13. The “A” set is designed primarily for use with 8-ft. or 12-ft. rod aerials of the type supplied with the equipment. When short range communication only is required, a single 4-ft. mast section may be used, if the 8-ft. rod aerial is regarded as too conspicuous.

“A” set horizontal aerials

14. It should first be understood that the aerial matching variometer on the no. 19 set loads the mast aerial to a quarter wavelength, and the impedance of the concentric line to the variometer is 40 ohms approximately. An aerial such as the Wyndom with its medium impedance feed is unsuitable, but a three-quarter wavelength aerial can be used. For example, at a frequency of 3 Mc/s, we should need 156 ft. of wire for a half wavelength, the practical length being 95 per cent. of the theoretical length. We know that the variometer will load a 12-ft. mast to one quarter wavelength at 3 Mc/s; if, therefore, a further 12 ft. are added to the half-wave aerial, and the complete aerial is attached to the variometer, it will be possible to load the aerial to three-quarter wave, for which the input impedance is approximately the same as for a quarter wave.

Lengths of horizontal aerials

15. In order to simplify the erection of aerials, the following lengths of wire have been calculated and checked by experiment as being suitable to cover the approximate frequency bands shown:—

Total length of wire	Frequency band covered
Feet	Mc/s.
250	2.0 - 2.65
185	2.6 - 3.5
150	3.45 - 4.5
110	4.45 - 5.6
90	5.55 - 6.65
70	6.6 - 8.0

Table I. Lengths of horizontal aerials

Erection of horizontal aerials

16. The wire should preferably be erected as high as possible, e.g. an inverted L with the horizontal portion 30 ft. from the ground, would be extremely good; good results, however, may be obtained with the horizontal portion of the aerial no more than 18 ft. from the ground. A quick and easy method of erecting an aerial, which will give results good enough for many purposes, is to attach one end of the wire to a tree, mast, or other support, and the other end to the vehicle in which the set is carried, the vehicle being so placed that the wire is stretched taut between them.

Aerial current indication

17. The aerial current indicated by the panel meter of the set, when used with a horizontal aerial, will be of the same order as the current indicated with the 12-ft. rod. In certain circumstances it may be less, but it should not be assumed that for this reason the radiation will be less.

Earths

18. The use of an elaborate earth, e.g. a radial earth with the spokes not less than half the wavelength in use, will improve radiation markedly. Even a simple earth pin near the vehicle will effect some improvement in radiation, and will avoid the noticeable drop in aerial current which would occur through people near a truck touching the parts of the chassis to which the set is earthed. An earth will also, in many cases, improve the signal/noise ratio on receive.

"B" set aerial

19. This is a half-wave rod aerial coupled to the set by a feeder which is a multiple of a half wavelength. Only two standard feeders are available. These are cut to correct lengths, and must therefore on no account be shortened. The approximate lengths are:—

Aerial feeder no. 2.	4 ft. 2 in.	1½ wavelengths.
" " no. 3.	7 ft.	2½ " "

Note.—These physical lengths are not equivalent to electrical lengths. They have been calculated by taking into account the characteristics of the feeder cable, etc.

HEADGEAR

Microphone and receiver headgear no. 1

20. This has a moving-coil microphone. To exclude noise, it is necessary to speak right into the mouthpiece of the microphone. The pressel switch contacts are used for switching from receive to send and for bringing the microphone into circuit. The headphones are also of the moving-coil type and are fitted with rubber caps to exclude external noise. Moving-coil units are used to give a good response over a wide frequency band, as this gives greatly increased intelligibility under noisy conditions.

Microphone and receiver headgear no. 2

21. In this case the microphone is of the carbon granule "power" type, so that it can be used without any amplification. The headphones are the same as those used for headgear no. 1. The connections for both types are shown in figs. 2 and 3.

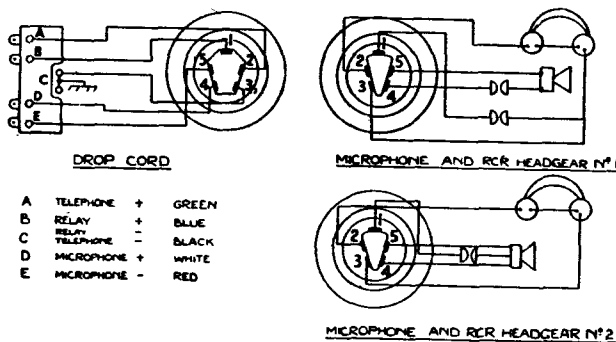
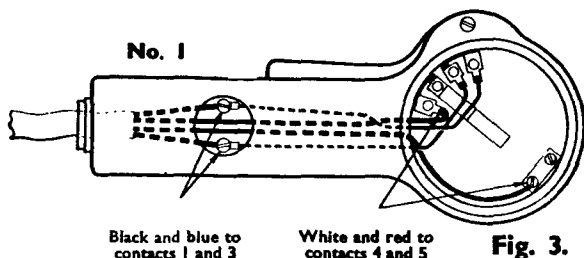


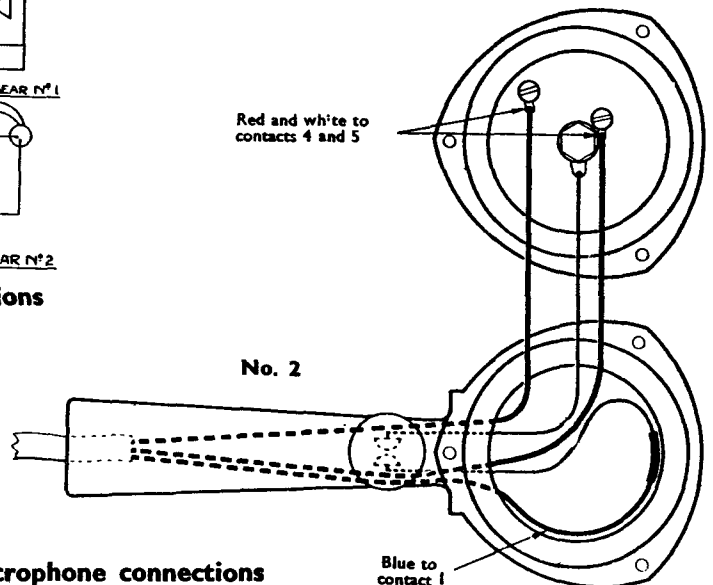
Fig. 2. Snatch plug and socket connections



Black and blue to contacts 1 and 3

White and red to contacts 4 and 5

Fig. 3. Microphone connections



Blue to contact 1

Red and white to contacts 4 and 5

CONTROL SYSTEM

Systems used

22. The no. 19 set may be used in many different types of vehicle and there are, in consequence, numerous variations in the control system. The following list of control units and junction, distribution, boxes, read in conjunction with the control switching charts (tables 2 and 3), explains the working of the various systems.

Control unit no. 1 Mk. II (fig. 4)

23. This is a single size unit, with a 12-pt. input plug and two drop leads. The left-hand bottom lead can be switched to "A," "IC" or "B," while the right-hand lead is permanently on "IC." A four-way terminal strip is provided to enable connections to be made to the "IC" amplifier circuits. The unit is normally connected by a 12-pt. connector to control unit no. 2, which in turn is connected by a 12-pt. connector to the set. Control units nos. 1 and 2 together give full switching facilities.

Control unit no. 1 Mk. I

24. This is the same as control unit no. 1 Mk. II, but without the terminal strip for connecting to the "IC" amplifier. It is now obsolescent.

Control units no. 1A Mk. I & II (fig. 5)

25. These are the same as control units no. 1 Mk. I and II, respectively, except that both drop leads are connected in parallel to the switch.

Note.—On some early two-man turret installations only the no. 1 or 1A was used, and in these cases the fuse in the control unit was removed. This, of course, did not provide full switching facilities, and has been superseded by control unit no. 3.

Control unit no. 2 Mk. II (fig. 6)

26. A single size unit with 12-pt. input and output plugs, one switched drop lead and an "A unattended" indicator lamp. It is normally used with a no. 1 or 1A unit, and provides switching facilities for rebroadcasting. The lamp lights when the controls on both boxes are switched to "B."

Control units { no. 1, Mk. I or II, or no. 1A, Mk. I or II, with control unit no. 2
no. 3, 3A or 3B.

Commander		Operator		"IC" and by-pass or watching circuits	General remarks
Switch		Switch			
"A"	Send or receive on "A."	"A"	Send or receive on "A." (Operator and commander should not converse on the side tone as their conversation would be broadcast.)	Tel. output from "B" fed into "IC" tel. circuit.	The crew can converse with each other on the 'IC' without interfering with the operation of the sets. The driver and/or co-driver are generally connected to the "IC" circuit, using junction, distribution, no. 1 or 2 and headgear no. 2.
		"IC" "B"	Can talk with crew on "IC." Send or receive on "B."		
"IC"	Can talk with crew on "IC."	"A"	Send or receive on "A."	Output from "B" fed into "IC." Output from "A" and "B" fed into "IC." Output from "A" fed into "IC."	junction, distribution, no 3 and headgear no. 1. The driver's buzzer signal is heard by the commander and also on any circuit to which the commander is switched
		"IC"	Can talk with crew on "IC."		
		"B"	Send or receive on "B."		
"B"	Send or receive on "B."	"A"	Send or receive on "A."	Output from "A" fed into "IC."	
		"IC"	Can talk with crew on "IC."		
		"B"	Send or receive on "B." (Operator and commander should not converse on the side tone as their conversation would be broadcast.) Warning lamp lights indicating that "A" set is unattended except on "IC."		

Table 2. Control switching chart A

Control unit no. 2 Mk. I

27. As no. 2 Mk. II, but without the rebroadcast facilities. It is now obsolescent.

Control unit no. 3 Mk. II (fig. 7)

28. This is a double unit with a 12-pt. input plug and two drop leads, switched independently, and an "A unattended" indicator lamp. This unit combines the circuits of nos. 1 and 2 without the "IC" drop lead, and was designed for use in a two-man turret. It also provides switching facilities for rebroadcasting.

Control unit no. 3 Mk. I

29. As no. 3 Mk. II, but without the rebroadcast facilities. It is now obsolescent.

Control units no. 3A Mks. I & II (fig. 8)

30. As no. 3 Mks. I and II, respectively, with the addition of an "IC" drop lead, designed for use in three-man turrets.

Control units no. 3B Mks. I & II

31. As no. 3 Mks. I and II, respectively, with the addition of an extra drop lead connected in parallel with one of the switched drop leads. It is primarily intended for use with ground stations and training sets.

Control unit no. 3C Mk. II (fig. 9)

32. This is a double size unit with a 12-pt. input plug, two drop leads, one switched and one "IC," and an "A unattended" indicator lamp. A four-way terminal strip, with switching, is provided for a commander's extended drop lead. In this unit the buzzer signal is applied to the

operator's phones, the operator controlling the commander's switch. It was developed for the M3 MED (American) turret, where the set and control units are in the hull and the commander's extended drop lead passes through the slip-rings into the turret and terminates at a junction, distribution, no. 3. The commander uses the buzzer to signal to the operator. A second four-way terminal strip is also provided to enable connections to be made to the "IC" circuits, and there are switching facilities for rebroadcasting.

Control unit no. 3C Mk. I

33. As no. 3C Mk. II, but without the rebroadcast facilities. It is now obsolescent.

Control units nos. 4, 5, 6 and 7

34. These were designed for use in ACVs. Only a small number were made, and they are now obsolete.

Control unit no. 8 Mk. I*

35. This is a single size unit with a 12-pt. input plug and two drop leads and a four-way terminal strip. The operator's drop lead may be switched to "A," "IC" or "B," the unattended set ("A" and/or "B") being automatically switched to "IC," providing a watching circuit. The second drop lead is connected to the "IC" microphone line, but the phones are connected in parallel with the operator's phones. The 4-way terminal strip enables connection to be made either to the "IC" circuit or alternatively in parallel with the second drop lead. Rebroadcast facilities are not provided. This supersedes no. 8 Mk. I, of which a limited number were made for a special installation.

Mk. II control units nos. 2, 3, 3A, 3B, 3C. (Rebroadcast control units.)

Operator		Commander*	
Switches		Switch	
"N"	"A" "IC" "B"	"A" "IC" "B"	Normal switching facilities as described in switching chart A.
"R"	"B→A"	"A" "IC" "B"	Hears "A" side tone (rebroadcast side tone) and can add his speech to the rebroadcast. Can converse with crew on "IC" (except operator). Hears "B" tel. (incoming signal) and can send on "B," his conversation being rebroadcast.
"R"	"A & B"	"A" "B" "IC"	Send or receive on "A" and "B" simultaneously. Can converse with crew on "IC" (except operator).
"R"	"A→B"	"B" "IC" "A"	Hears "B" side tone (rebroadcast side tone) and can add his speech to the rebroadcast. Can converse with the crew on "IC" (except operator). Hears "A" tel. (incoming signal) and can send on "A," his conversation being rebroadcast.

Note.—See switching chart A for other details. * In some units there are two drop leads switched in parallel.

Table 3. Control switching chart B

Control unit no. 10 (fig. 10)

36. This is intended for use where additional amplification is desirable for the "A" microphone circuit, in circumstances where the "IC" circuit can be dispensed with. To obtain this, the "A" microphone output is amplified by the "IC" amplifier before being fed into the "A" set.

37. No. 10 is a single size unit with 12-pt. input and output plugs, and is used in addition to the normal control units. It is connected to the set by a 12-pt. connector from the right-hand plug, and to the first normal control unit by a 12-pt. connector from the top plug. It is provided with a three-position switch; with this at normal, the other control units and all circuits function as usual; in the other two positions, two degrees of high level modulation are provided for the "A" set, the "IC" circuit being out of use.

38. Control unit no. 10 can be used on any existing installation provided that it is connected between the existing harness and the set. If junction, distribution, no. 1 or 2 is connected to the harness via the 6-pt. connector to the power supply unit, it will be possible for the man on this box to modulate the "A" sender when no. 10 unit is switched to high level modulation. To prevent this the speech lead to the 6-pt. connector should be transferred to the "IC" terminal strip in a control unit no. 1 or 1A Mk. II or 3C Mk. I or II.

Junction, distribution, no. 1 (fig. 11)

39. This is a single size box with a three-way terminal strip for output connections, one drop lead for microphone and receiver headgear no. 2, and a press-button and buzzer circuit. It is normally a driver's box, for "IC" only, and is connected to the set by two leads, speech and signal, via the slip-rings, and to the nearest 12-volt supply. The buzzer circuit is for calling the commander's attention when he is switched to one of the sets.

40. The output from the power microphone transformer is fed direct to the "IC" headphone circuit. Thus a two-way conversation can be carried on with the turret crew, using one wire through the slip-rings and an earth return. The driver will be heard by the turret crew, who can reply only if the "IC" amplifier is switched on. For this reason the "IC" headphone lead which passes through the power unit and 6-pt. connector is labelled "speech," since it serves both the microphone and the headphones.

Junction, distribution, no. 2

41. This is similar to junction, distribution, no. 1, but without the press-button buzzer circuit, and is intended for a co-driver. It is connected in parallel with junction, distribution no. 1. Like junction, distribution, no. 1, it is designed for microphone and receiver headgear no. 2.

Junction, distribution, no. 3 (fig. 12)

42. This is a single size box with two 3-way terminal strips for input connections. Two drop leads are provided for microphone and receiver headgear no. 1, and a press-button and buzzer circuit. It can be used for connecting extra crew to the "IC" circuit via a control unit no. 1 Mk. II or no. 1A Mk. II by a 3- or 4-way connector. It is also connected to the nearest 12-volt supply.

43. In some cases, where the number of available slip-rings permits, junction, distribution, no. 3 is used for the driver and/or co-driver. The moving-coil microphone in headgear no. 1 gives improved performance over the power microphone in headgear no. 2 used with junction, distribution, no. 1 or 2.

Junction, distribution, no. 4

44. As junction, distribution, no. 3, but without the press-button and buzzer circuit, and up to four drop leads may be accommodated. It is not in general use.

Junctions, remote control, nos. 1 and 2

45. This pair of units has been designed to enable a remote operator to send or receive on a W.S.19 installed in a vehicle from a distance of approximately 1 mile, using cable, D3, twisted.

Junction, remote control, no. 1 (Installation unit) (fig. 13)

46. A double size unit having one drop cord for connection to a drop cord on an existing control unit and one drop cord to be used in place of the drop cord on the existing unit. A lamp is fitted to indicate when the remote operator is on send or requires the set operator's attention. Two external terminals for the cable, D3, twisted and a terminal plate for 12V + input are provided. To switch from receive to send, the remote operator uses his pressel switch to work a relay contained in this unit. There are no external switches. The remote unit may be used on "A," "IC" or "B," the switching from set to set being done by the set operator on the existing control unit. Alternatively, it may be left switched to one set, thus avoiding the necessity for a set operator.

Junction, remote control, no. 2 (Remote unit) (fig. 14)

47. This is similar in size to a single unit, and is normally carried in a signals satchel, together with a headgear no. 1. It is fitted with two external terminals for the cable, D3, twisted and a drop cord for the headgear no. 1.

Wireless remote control unit "E" Mk. I & II (fig. 15)

48. This consists of a wireless remote control unit "B" with the addition of a conversion unit to enable the "B" unit to be connected to a W.S.19. The "E" unit enables the W.S.19 to be connected to a telephone system—

- (a) via a telephone exchange to another wireless remote control unit "E";
- (b) direct via a line to another wireless remote control unit "E."

An operator is required at the set to switch from receive to send. A high-low modulation switch is fitted on the conversion unit. The remote operator can use the key for sending CW. Detailed instructions for connection and operation are given on printed labels attached to the units.

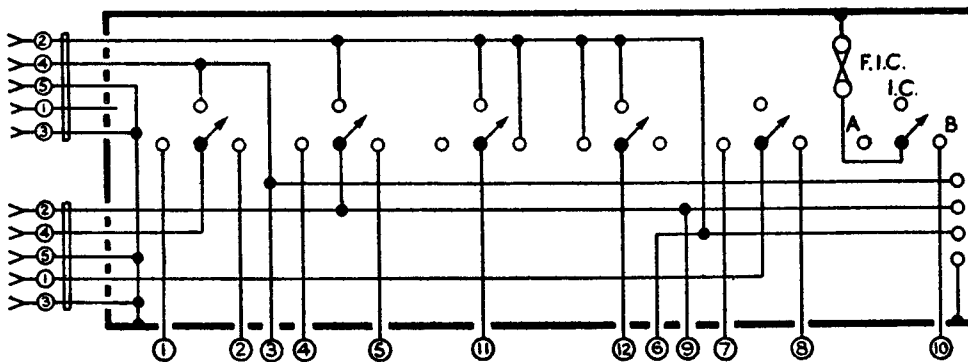


Fig. 4. Control unit no. 1 Mk. II

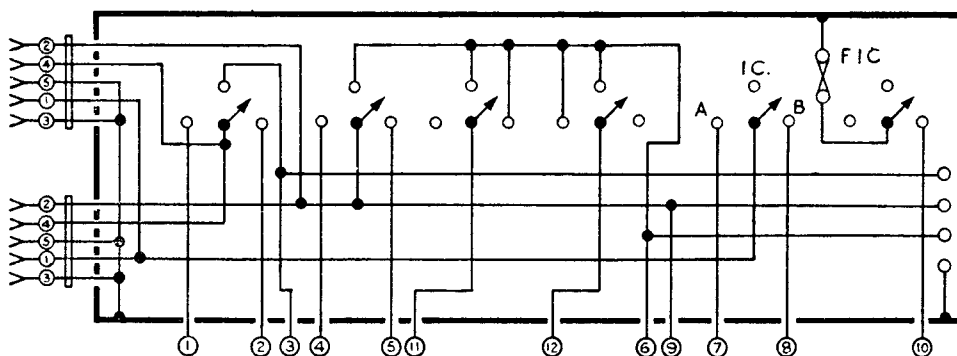
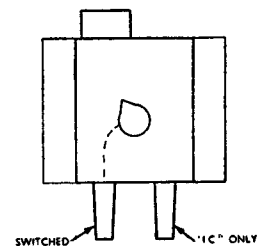
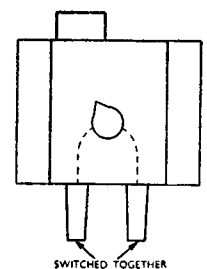


Fig. 5. Control unit no. 1A Mk. II



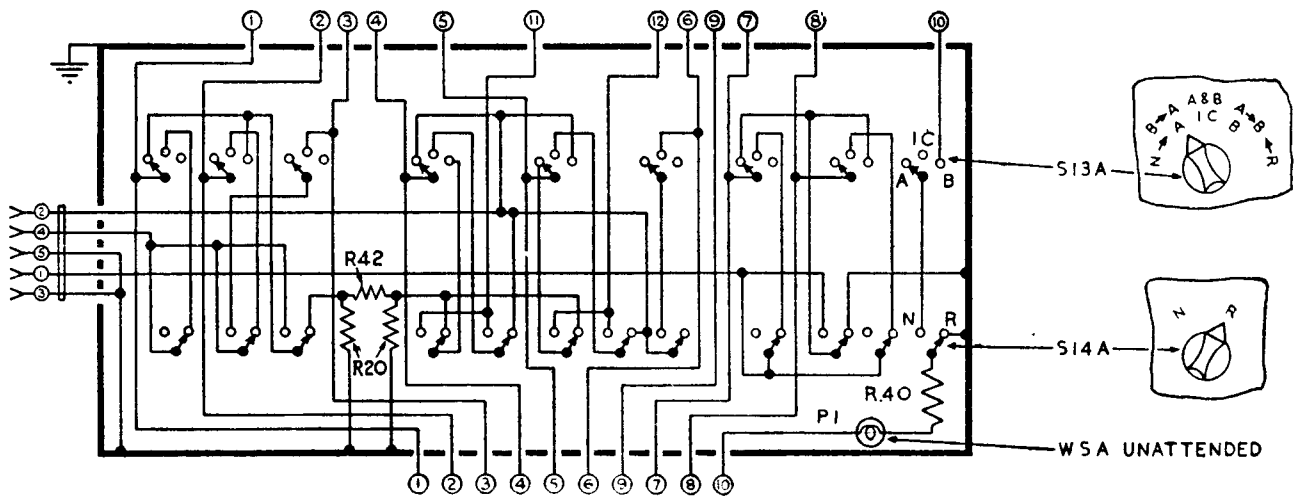


Fig. 6. Control unit no. 2 Mk. 2

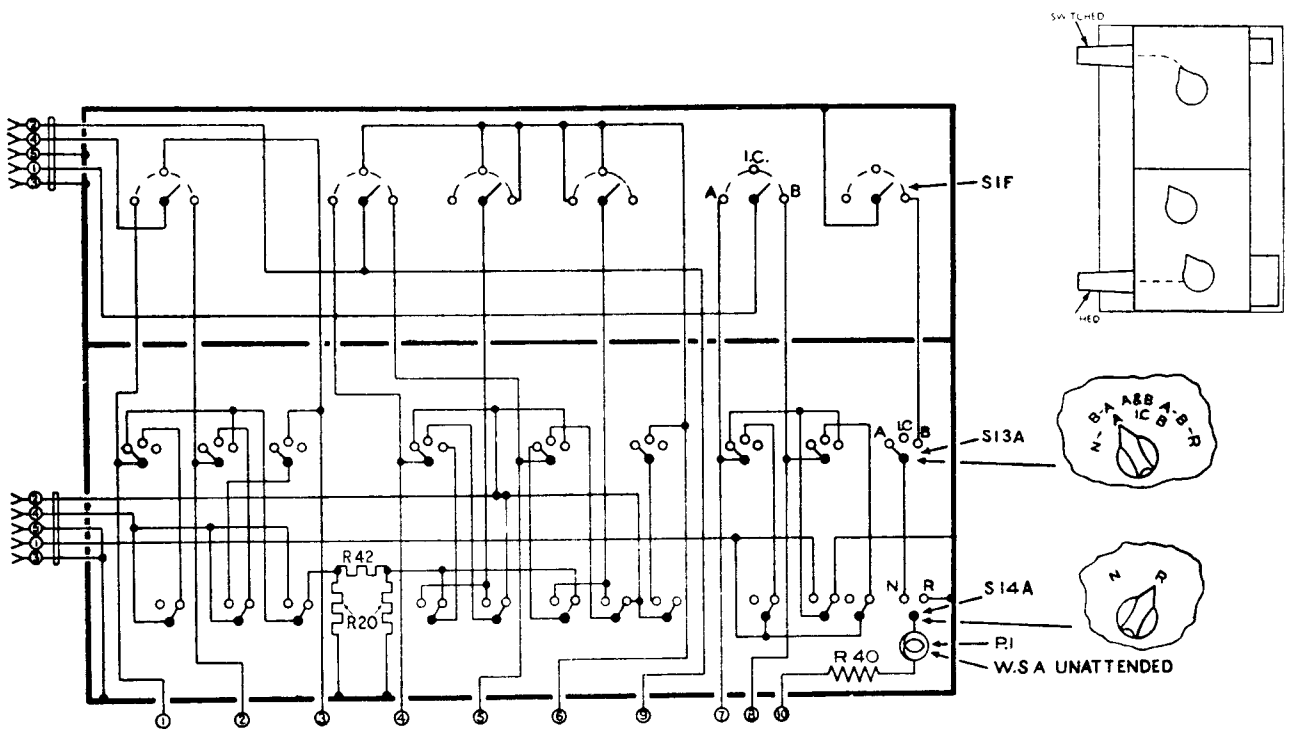
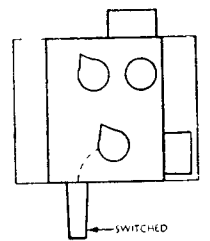
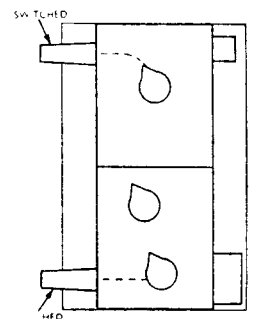


Fig. 7. Control unit no. 3 Mk. II



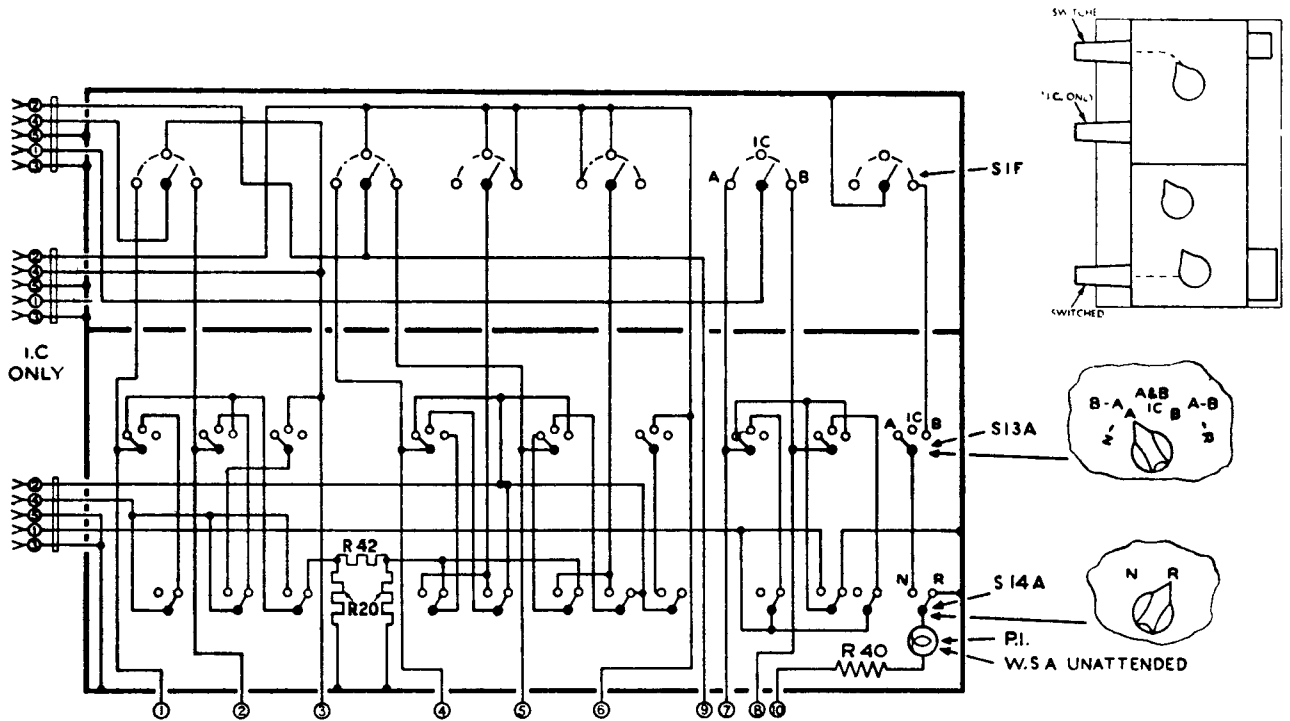


Fig. 8. Control unit no. 3A Mk. II

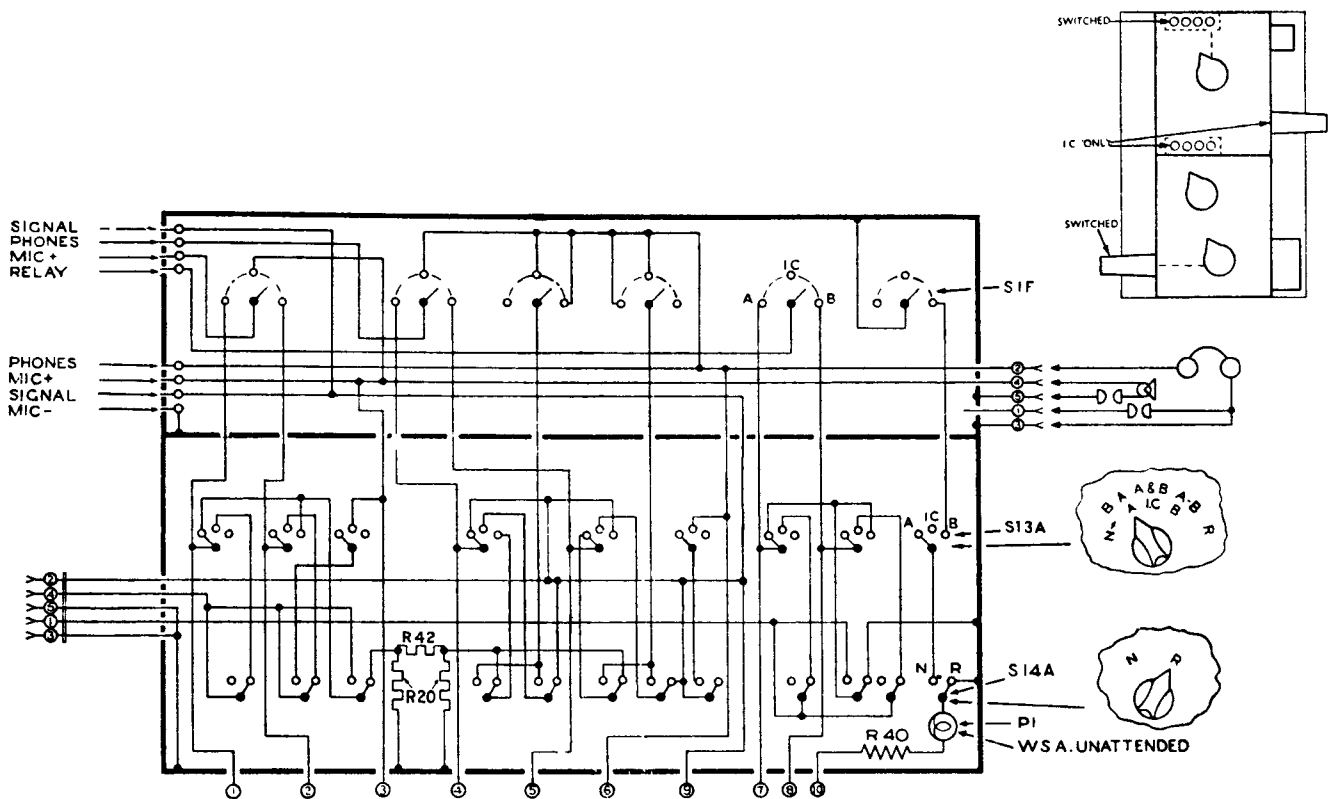


Fig. 9. Control unit no. 3C Mk. II

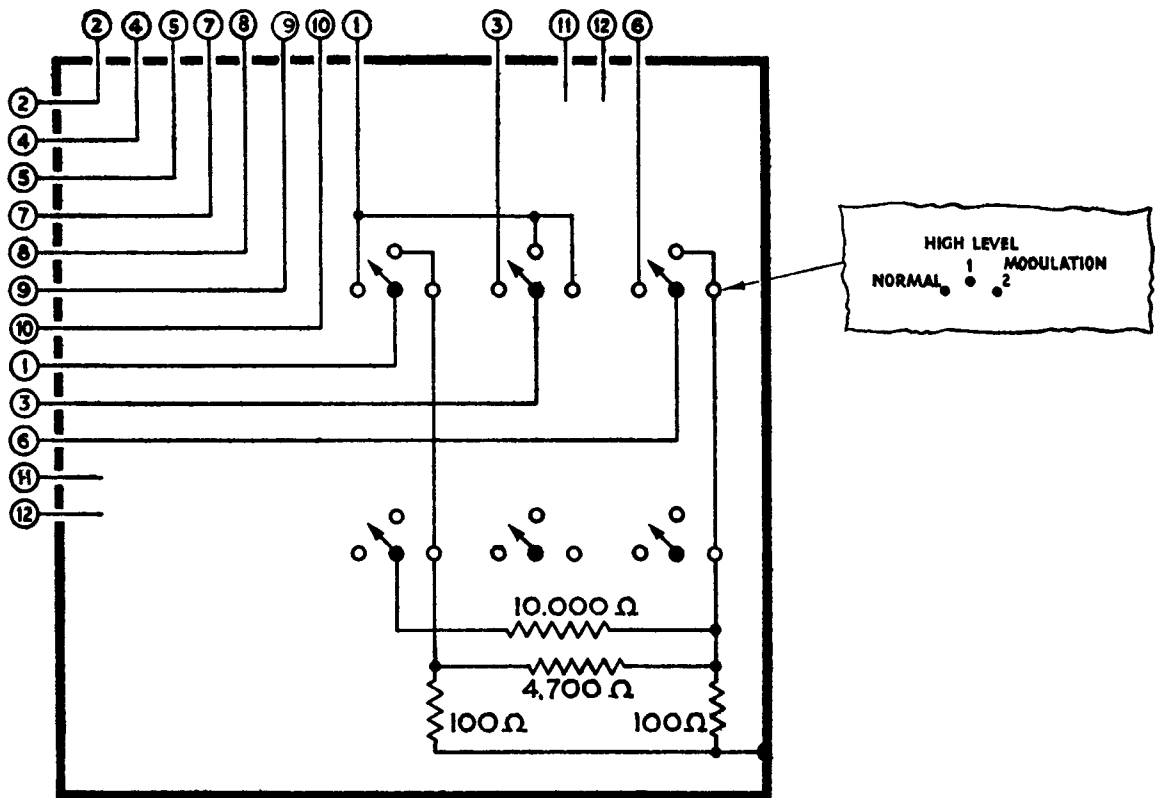


Fig. 10. Control unit no. 10

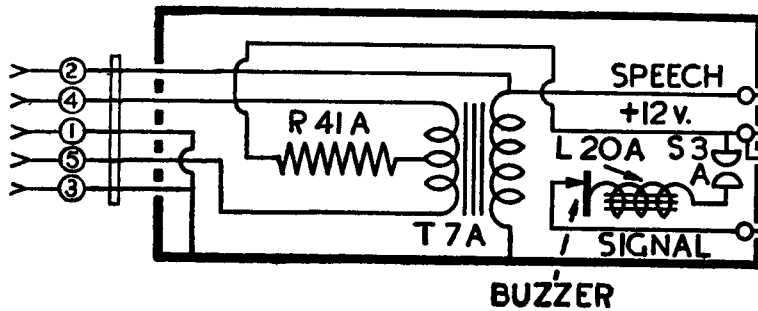


Fig. 11. Junction, distribution, no. 1

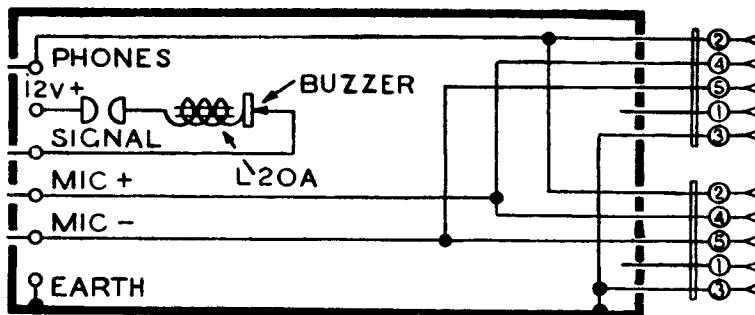


Fig. 12. Junction, distribution, no. 3

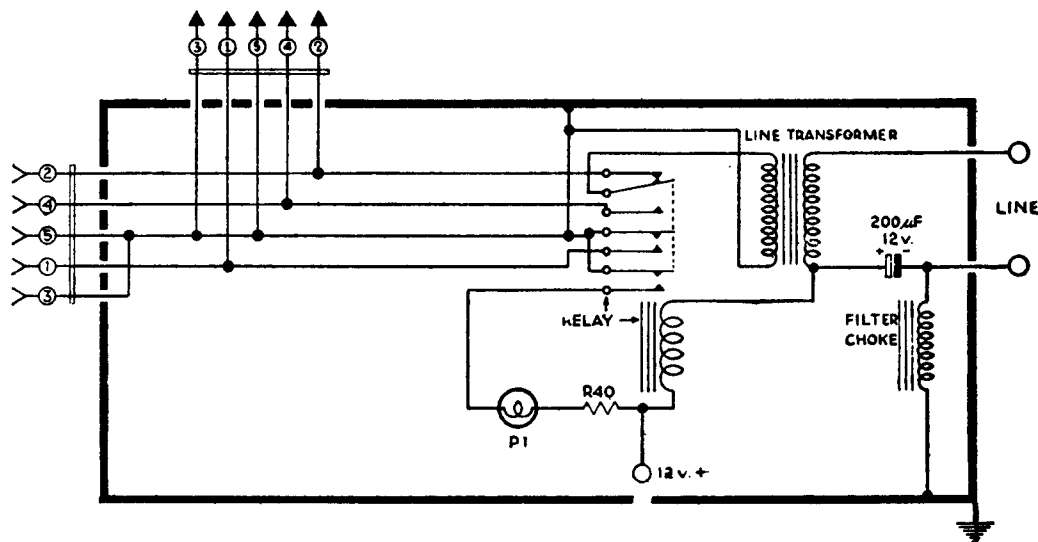


Fig. 13. Junction, remote control, no. 1

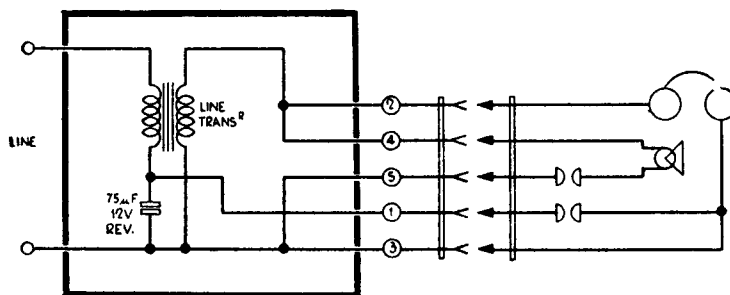


Fig. 14. Junction, remote control, no. 2

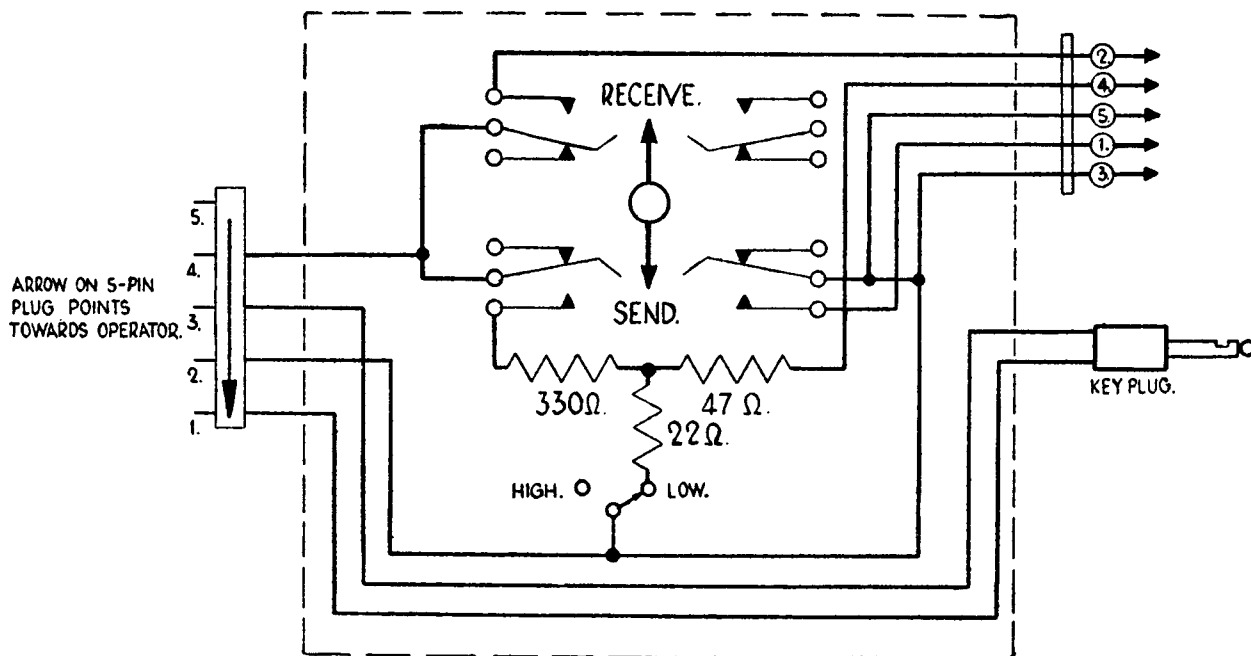


Fig. 15. Wireless remote control unit "E" conversion unit

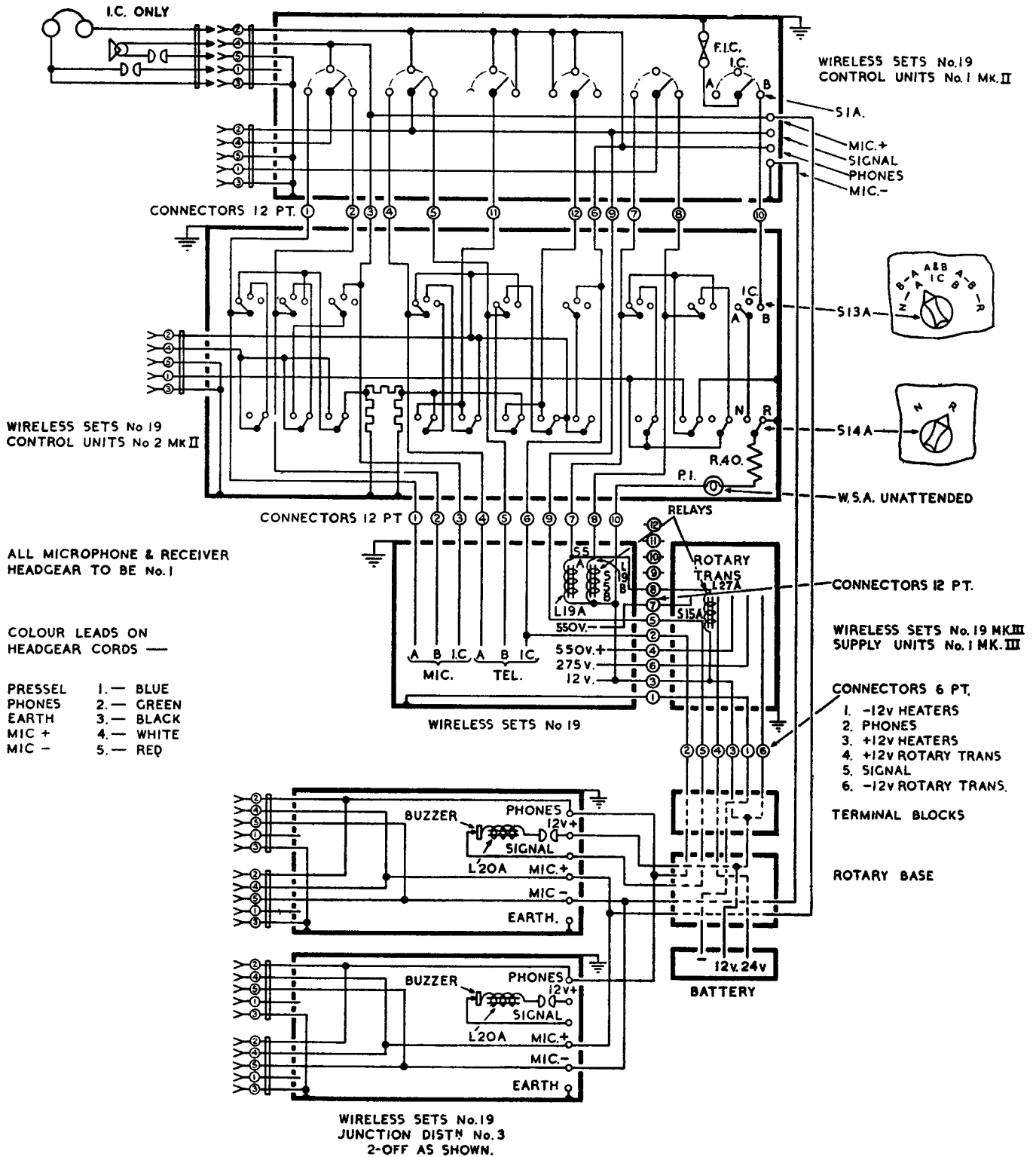


Fig. 16. Typical installation wiring diagram

Connectors using old type sockets (fixed)				
Designation	Length in inches	Position of locating groove		Relative position of sockets
		at no. 1 end	at no. 2 end	
6-pt. no. 4A	5	X	Y	1
" " 4B	5	Z	Z	1
" " 5A	37½	X	Z	3
" " 6A	13	W	2 B.A. terminals	
" " 6B	13	X	"	"
" " 7A	19	X	"	"
" " 7B	19	Y	"	"
" " 8A	37	X	"	"
" " 9A	49	Y	"	"
" " 12A	67	W	"	"
" " 12B	67	W	"	"
(a) " " 16A	5	X	Y	1
(b) " " 16B	5	X	Y	1
(c) " " 16C	5	X	Y	1
12-pt. no. 1A	14	X	Z	3
" " 1B	14	X	X	7
" " 1C	14	Z	X	5
" " 1D	14	Z	Z	3
" " 1E	14	W	Y	7
" " 1F	14	Z	X	1
" " 1G	14	Z	Y	5
" " 1H	14	W	X	1
" " 1J	14	Z	Z	5
" " 1K	14	X	X	5
" " 2A	26	Y	Z	3
" " 2B	26	Z	X	3
" " 2C	26	W	Y	5
" " 2D	26	X	Y	7
" " 2E	26	W	Y	7
" " 2F	26	Z	Z	7
" " 2G	26	Z	Y	7
" " 2J	26	Y	X	3
" " 2L	26	X	Z	5
" " 2N	26	Z	X	1
" " 3A	38	Z	Y	7
" " 3B	38	X	Z	5
" " 3C	38	Z	X	1
" " 3D	38	W	Z	1
" " 3E	38	W	X	7
" " 3F	38	Z	Y	3
" " 3G	38	Z	W	3
" " 4A	68	X	X	1
" " 4B	68	Z	Z	1
" " 4C	68	Z	X	1
" " 4D	68	X	Y	5
" " 4G	68	X	X	7
" " 4Z	68	X	X	3

Connectors using old type sockets (fixed)				
Designation	Length in inches	Position of locating groove		Relative position of sockets
		at no. 1 end	at no. 2 end	
12-pt. no. 5A	38 W.P.	Y	Z	7
" " 5B	38 W.P.	X	Z	1
" " 6A	80 W.P.	Z	X	1
" " 7A	146 W.P.	X	W	1
" " 8A	92 W.P.	X	X	5
" " 9A	80	Z	X	5
" " 9B	80	Z	X	7
" " 9C	80	X	Z	1
" " 9D	80	X	X	6
" " 10A	92	Z	X	1
" " 11A	146	X	Z	1
" " 11B	146	W	X	3
" " 11C	146	X	X	6
" " 11D	146	Z	Z	5
" " 12A	122	Z	Z	1
" " 12B	122	Z	Z	5
" " 12C	122	Z	X	1
" " 13A	104	Z	X	3
" " 13B	104	Z	X	1
" " 13C	104	Z	X	7
" " 15A	50	X	Y	5
" " 16A	98	Z	X	1
" " 19A	110	X	Z	1
" " 20A	182	W	X	1
" " 23A	5½	W	Y	1
" " 23B	5½	Y	W-Z	1
" " 24A	170	Z	X	1
" " 25A	236	Z	Z	5
" " 26A	266	X	Z	5
(a) " " 27A	5½	W	Y	1
(b) " " 27B	5½	W	Y	1

(W.P. indicates waterproof.)

- (a) Lead no. 4 broken and brought out to form twin connector 8 in. long for R.F. amplifier no. 2.
 (b) Ditto, 52 in. long.
 (c) Ditto, 14 in. long.

Table 4. 6- and 12-point connectors (old type)

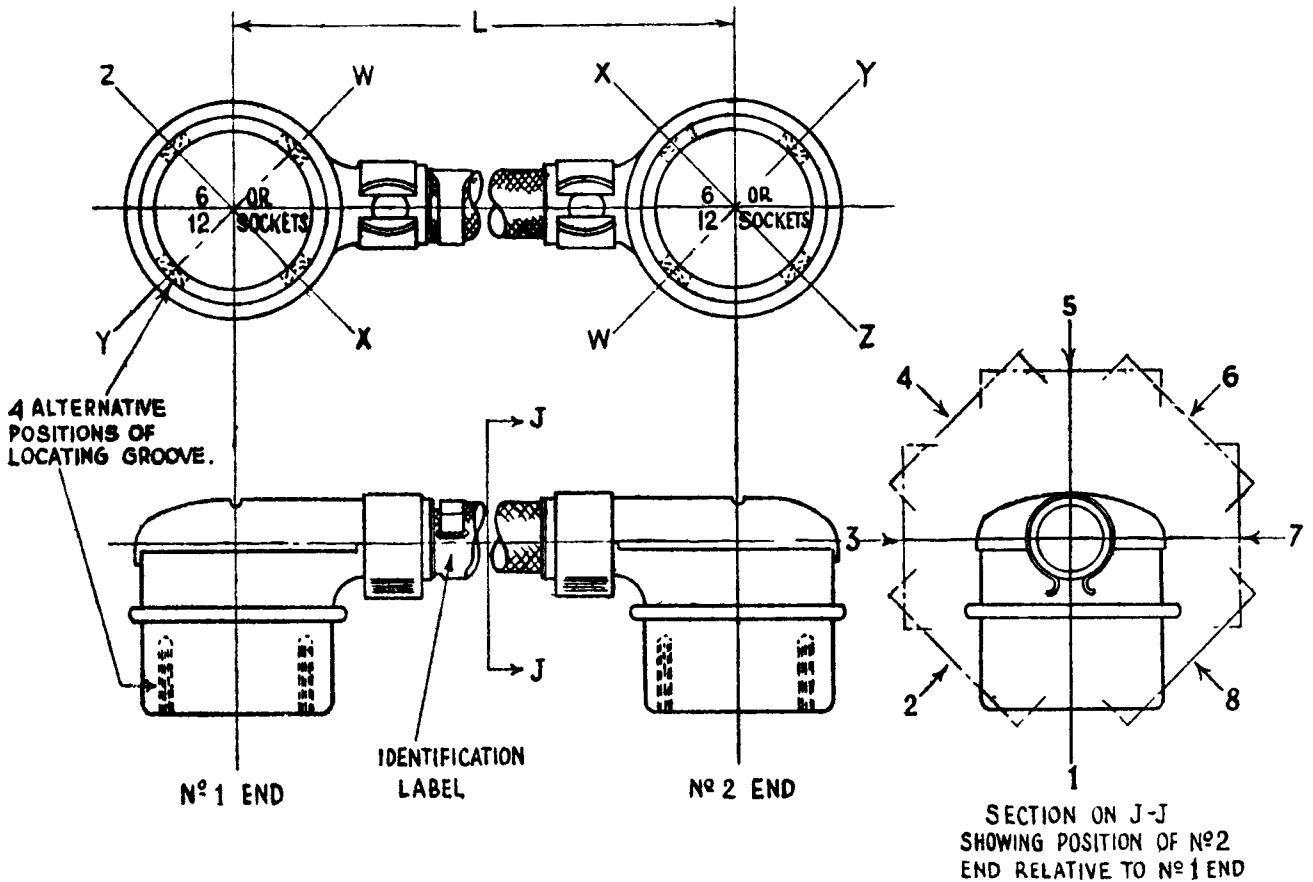


Fig. 17. Angular positions of sockets and ends of connectors

Connectors using new type sockets (adjustable).		
Designation	Length in inches	Replacement for
6-pt. no. 50	5	6-pt. nos. 4A onwards
" " 50A	37	" " 5A "
" " 51	19	" " 6A "
		& 7A "
" " 51A	37	" " 8A "
" " 51B	49	" " 9A "
" " 51C	67	" " 12A "
" " 52	67	" " 12B "
Drill for adjusting head position (sockets 6-pt. no. 11 and 12-pt. no. 3).		
1. Remove spring clip and cover.		
2. Free bush from socket housing and straighten leads.		
3. Rotate top part of socket housing to the desired position.		
4. Bend cable so that the bush is located in the socket housing without twisting the leads.		
5. Replace cover and spring clip.		

Designation	Length in inches	Replacement for
12-pt. no. 50	5½	12-pt. nos. 23A onwards
" " 50A	14	" " 1A "
" " 50B	26	" " 2A "
" " 50C	38	" " 3A "
		& 5A "
" " 50D	50	" " 15A "
" " 50E	68	" " 4A "
" " 50F	80	" " 6A "
		& 9A "
" " 50G	98	" " 8A "
		10A "
		& 16A "
" " 50H	110	" " 13A "
		& 19A "
" " 50J	122	" " 12A "
" " 50K	146	" " 7A "
		& 11A "
" " 50M	170	" " 20A "
		& 24A "
" " 50N	236	" " 25A "
" " 50P	266	" " 26A "

Table 5. 6- and 12-point connectors (new type), using adjustable sockets

Lead function	Lead colour	Sleeve colour	Wire number		
			12-pt. connector	Power input 6-pt. connector	Unit-set 6- or 12-pt. connector
Microphone "A"	White	Mauve	1	—	—
" " "B"	"	Grey	2	—	—
" " "IC"	"	Orange	3	—	—
Headphones "A"	Green	Mauve	4	—	—
" " "B"	"	Grey	5	—	—
" " "IC"	"	Orange	6	2	2
Relay "A"	Blue	Mauve	7	—	8
" " "B"	"	Grey	8	—	—
Driver's signal	Green	White	9	5	5
Lamp, "A" unattended	Brown	Brown	10	—	—
Headphone, stand by, "A"	Green	Red	11	—	—
Headphone, stand by, "B"	"	Brown	12	—	—
Heaters 12V—	Black	Black	—	1	1
" " 12V+	Red	Red	—	3	3
Rotary transformer 12V+	"	"	—	4	—
Rotary transformer 12V—	Black	Black	—	6	—
H.T.+1	Red	Yellow	—	—	6
H.T.+2	"	Green	—	—	4
H.T.—2	Blue	Green	—	—	7

Note.—See table 7 for colour code of new type connectors.

Table 6. Connections and colour-coding of control harness

Colour	Resistance		
	Body	Tip	Dot
Black	0	0	None
Brown	1	1	0
Red	2	2	00
Orange	3	3	000
Yellow	4	4	0,000
Green	5	5	00,000
Blue	6	6	000,000
Mauve	7	7	
Grey	8	8	
White	9	9	
Colour			% Tolerance
Gold			5
No extra colour (body colour)			10
Silver			20

Table 8. International resistance colour code

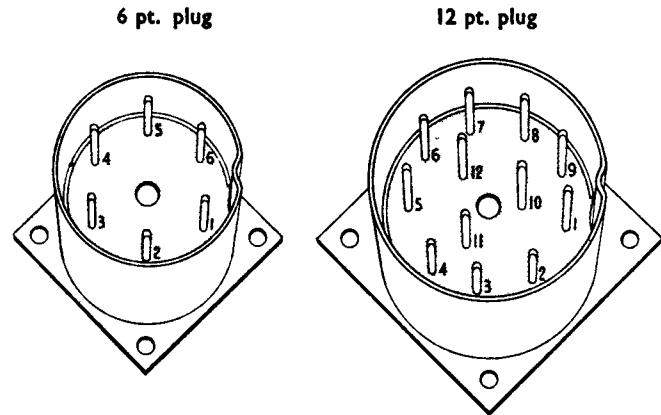


Fig. 18. 6- and 12-pt. plugs

Type	Contact no.	Lead colour	Tracer
6-point	1	Red	With tracer
	2	Black	With tracer
	3	Red	—
	4	White	With tracer
	5	Black	—
	6	White	—
12-point	1	Not coded	Blue/yellow
	2	" "	Blue/green
	3	" "	Red/black
	4	" "	Red/white
	5	" "	Red/yellow
	6	" "	Red/green
	7	" "	Red/blue
	8	" "	None
	9	" "	White
	10	" "	Yellow
	11	" "	Green
	12	" "	Red
	13*	" "	Blue

* Note.—No. 13 is earth lead soldered to socket body.

Table 7. Colour-coding of new type 6- and 12-point connectors

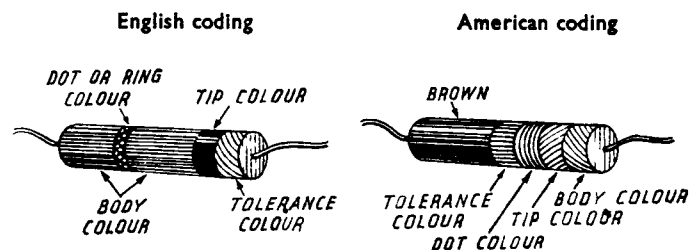


Fig. 19. International resistance colour code

WIRELESS SET NO. 19

JUNCTIONS, REMOTE CONTROL, A, Nos. 1 AND 2

49. These units have been developed to provide the facilities of the Junctions, remote control, Nos. 1 and 2, but with a smaller remote unit and using a telephone handset (Telephone, hand, No. 2).

50. The carbon microphone used has a greater output than the moving coil type of the Microphone and receiver, headgear, No. 1, and the normal microphone amplifiers are not used. The microphone input to the W.S. 19 is fed through the phone line to the output transformer T2A, and thence through C17B to modulate the PA in the A set, or to the modulating transformer T5A in the B set. For I.C. facilities, the microphone input is fed direct to the phones on those control units switched to I.C.

51. The receiver in the handset is fed from the phone line in the normal way.

52. No advantage is derived by the use of a Control unit No. 10.

Junction, remote control, A, No. 1 (installation unit) (Fig. 20A)

53. This is a single size unit having one drop cord for connection to a drop cord on an existing control unit, and one drop cord

to be used in place of the drop cord on the existing unit. A lead with a threaded lamp cap can be screwed into the pilot lamp socket on the power unit to supply power to the unit; the white lamp on the unit then acts as the pilot lamp. A red lamp is fitted to indicate when the remote operator is on send or requires the set operator's attention. Two external terminals are provided for the line.

54. To switch from receive to send, the remote operator uses his pressel switch to work a relay contained in this unit. There are no external switches. The remote unit may be used on A, I.C. or B, the switching from set to set being done by the set operator on the existing control unit. Alternatively, it may be left switched to one set, thus avoiding the necessity for a set operator.

Junction, remote control, A, No. 2 (remote unit) (Fig. 20(B))

55. This consists of a small metal box $3\frac{1}{4}$ in. \times $2\frac{3}{8}$ in. \times $1\frac{7}{8}$ in., fitted with two external terminals for the line and a four-pin socket for the handset.

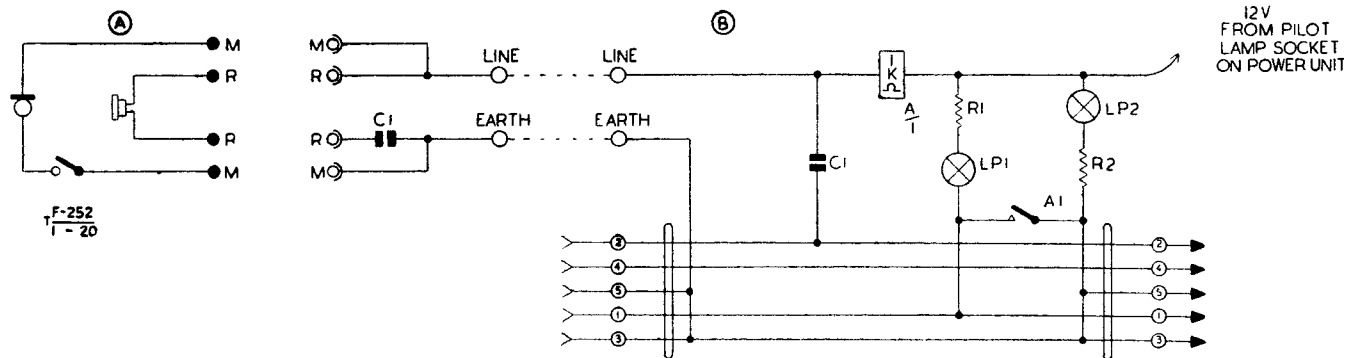


Fig 20—(A) Junction, remote control, A, No 1, (B) Junction remote control, A, No 2, circuit diagram, with handset

Circuit reference	Remarks
RESISTORS	
R1	20Ω, ± 10%, 1/2 W
R2	20Ω, ± 10%, 1/2 W
CONDENSERS	
C1	1μF, 400V, D.C. wkg
LAMPS	
LP1	12V, pilot lamp
LP2	12V, indicator lamp
RELAYS	
A	Relay, single-make, resistance 1kΩ

Table 9—Junction, remote control, A, No 1, details of components

Circuit reference	Remarks
CONDENSERS	
C1	1μF, 400V, D.C., wkg.

Table 10—Junction, remote control, A, No. 2, details of components

END

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