

TELECOMMUNICATIONS WING.

WIRELESS SECTION.

LECTURE PRECIS: W/3.

SUBJECT: Wireless Set No. 46 (Eng.)

ASSOCIATED DIAGRAMS: W/3A; W/3B; W/3C; W/3D.

APPLICATION.

The set is a pack set sender-receiver for transmission and reception of Speech and M.C.W.

GENERAL.

W/Set No. 46 English is used for transmission and reception over three preset frequencies, which are crystal-controlled. The complete station consists of the sender-receiver, which is water-proofed, in its carrying case, with batteries carried in a separate haversack. The battery is a 162/3 volt block.

The set is operated normally with a rod type aerial, which can be 2' to 16' in length.

Connection is made to the headphones double, L.R.2 and the throat microphone via a snatch plug, and between the set and battery via a 6 core screened cable with screw plug.

FREQUENCY COVERAGE.

The set is designed to cover the following bands by means of plug-in coils:-

- | | |
|-------------------|-------------------|
| (1) 3.6 - 4.3 M/C | (3) 6.4 - 7.6 M/C |
| (2) 5.0 - 6.0 M/C | (4) 7.9 - 9.1 M/C |

Any three frequencies in the band may be chosen by plug-in crystals (one each for transmitter and receiver) with adjustments made to the three pre-set trimmers. The transmitter frequencies are stable and accurate to .01%; the receiver to approximately ± 3 KC.

The operator may switch to any one of the three frequencies by switching. No re-adjustment of the aerial trimmer is normally required. Intermediate Frequency 1,550KC.

WEIGHTS AND DIMENSIONS.

	Weight	Width	Height	Depth.
No. 46 Set	9 lbs.	6 $\frac{1}{2}$ "	12"	4"
Set Carrier with Aerial "B"	2 "	7 $\frac{1}{2}$ "	12 $\frac{1}{2}$ "	4 $\frac{1}{2}$ "
Battery, 162/3 Volt in Bag	7 $\frac{1}{2}$ "	9"	5"	5"
Phones, Assembly No. 5	1 $\frac{1}{2}$ "	Leads 4'6"		
Complete Station as carried - 24 or 33 lbs with two batteries and two phones.				
Ant. Rods F 16' (fixed station).	- 6 $\frac{1}{2}$ lbs.			

VALVES, TYPES AND FUNCTIONS.

Circuit Ref.	Type	Function.
V1	ARTP2 Triode Pentode	Frequency Changer.
V2	ARP12 RF Pentode	1st IF Amp.
V3	ARP12 " "	2nd " " and Reflexed HF Amp.
V4	AR8 Duo-diode Triode	Diodes only used on receive as detector and AVC generators. Triode used as sender modulation amp.

<u>Circuit Ref.</u>	<u>Type</u>	<u>Function.</u>
V6	ATP4	RF Pentode
V5	ARP37	Double Pentode
		Sender Oscillator.
		Modulator - push-pull.

The valves are all two volt types with resistances to operate off 3 volts.

CONTROLS.

All the controls are situated on the top panel of the set. The are as follows:-

- (1) On-Off Switch with indicator to show at a distance.
- (2) Press to Send - Release to Receive. Arranged so this control can be used to send morse up to 12 W.P.M.
- (3) Channel switch. To select the desired channel of the three provided.
- (4) R.T. - M.C.W. Switch.
- (5) Trim Aerial Control. To adjust for different length aerals. Other items on the panel are:-
- (6) Aerial socket into which aerial rods "B" are plugged. When an "F" aerial or other larger aerial is used, the aerial adaptor is plugged into the socket and the aerial connected to a terminal on the adaptor.
- (7) 6. Way plug to mic., phones, and battery.
- (8) Dummy aerial. Bulb glow indicates sender output when lead is plugged into the socket in place of the aerial.

Four screws hold the panel in place, with a waterproof gasket of rubber.

RECEIVER.

The aerial circuit is tuned by C35; the aerial trim control. The circuit is common to both the sender and receiver.

In order to avoid having to reset this trimmer when the channel is switched additional trimmers are provided; C39, C37, C38, which are selected with the channel in use. These are preset to give correct aerial tuning.

A series resonant circuit tuned by C3 is included to provide a filter at IF - 1,550KC.

The first valve is the converter. The local oscillator section is crystal-controlled, and arranged so that any crystal in the band chosen will oscillate when plugged in, with no retuning of the oscillator plate circuit. The local oscillator works on

$$\begin{array}{lcl}
 \text{SF} + 1,550\text{KC} & - & \text{Band 1 (3.6 - 4.3 M/C)} \\
 \text{SF} - 1,550\text{KC} & - & \text{Bands 2, 3, 4 } \left. \begin{array}{l} (5.0-6.0 \text{ M/C}) \\ (6.4-7.6 \text{ "}) \\ (7.9-9.1 \text{ "}) \end{array} \right\}
 \end{array}$$

The I.F. Transformers L3L4, L5L6 and L7L8 are tuned by iron dust cores. The third IF transformer case also houses other components working at IF, the transformer secondary only being tuned. It is necessary to tune the transformers exactly.

The third I.F.T. feeds the diodes of V4; A.V.C. is applied to the converter and 1st IF Amplifier, with part AVC to the second reflexed IF Amp. The audio signal from the detector diode is fed to V3, which has an audio coupling transformer coupled to the phones in its plate circuit as well as the 3rd I.F.T. as this valve is replaced.

SENDER.

The sender consists of a plate modulated crystal controlled oscillator V6. V5 is the push-pull modulator, which is driven by the triode section of V4, the diodes only of which are used on receive. Sidetone is provided by connecting the phone transformer in series with the grid return of the oscillator.

For MCW operation the sub-modulator plate transformer primary is connected back to the mic. transformer primary to form an audio oscillator operating at about 1,000 - 1,5000 c/sec. On MCW operation, the sender filaments are on all the time, and H.T. is switched.

BATTERY CONSUMPTION.

	<u>L.T.</u>	<u>H.T.</u>
Receive R.T.	350 mA	10 mA
" MCW	900 "	10 "
Send R.T.	550 "	28 "
" MCW	550 "	37 "

The circuit is arranged so that the bias section of the battery will be run down at the same rate as the H.T. and L.T. sections, by means of R22, R23 and R24. It is important that the bias voltage is correct.

The point marked +12V on the battery is connected to chassis and to L.T. -, while the point marked 0V is used to supply the 12V neg. bias.

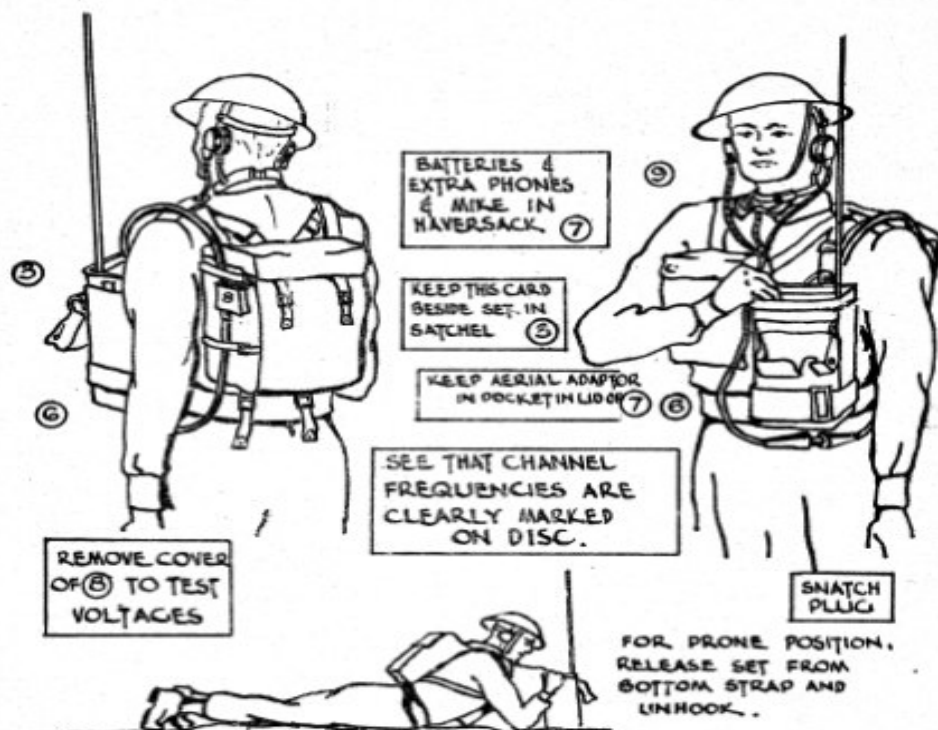
TELEPHONES AND MICROPHONES.

The phones used (D.L.R.2) are more sensitive than the normal type. They have an impedance of 500 - 1,000 ohms at middle audio frequencies. The throat microphone is 30 - 100 ohm impedance, and gives an output of 1 - 5 mV on speech.

AERIAL COUPLING.

The aerial circuit is primarily designed for matching to an 8' rod aerial, having a resistance of 20 - 60 ohms and a capacity of about 20 micro-microfarads. Larger aerials are accommodated by a series condenser in the aerial adaptor, which maintains the capacity at about 20 micro-microfarads with correct resistive loading.

31 Mar 44.



CHECK YOUR EQUIPMENT FROM THIS LIST.

1. NORMAL INFANTRY BELT & BRACES	1
2. NO. 46 SET	1
3. SET CARRIER (SATCHEL)	1
4. AERIALS "B" CARRIER NO. 1, IN POCKET OF (3)	1
5. AERIAL RODS "3"	9
6. SET CARRYING STRAPS	1 PAIR
7. BATTERY CARRIER (HAVERSACK) & BRACES	1
8. JUNCTION BOX & 3 LEADS, FIXED TO (7)	1
9. SET SUPPORTING HOOK, FIXED TO BRACES OF (7)	1
10. PHONES & MICROPHONE ASSEMBLY NO. 9	2
11. BATTERIES 162 2/3 VOLTS	2
12. WATERPROOF BAGS FOR BATTERIES 162 2/3 VOLTS	2
13. AERIAL ADAPTOR (FOR "F" OR LONG AERIALS)	1
14. 1/6" OF FLEX (FOR "F" AERIAL)	1
15. THIS WORKING INSTRUCTIONS CARD	1
N.B. SECOND BATTERY & PHONES MAY SOMETIMES BE OMITTED.	

STATIC WORKING (FIXED STATION)

SET & WORKING INSTRUCTIONS ARE SAME AS FOR NORMAL MOBILE WORKING, EXCEPT THAT A LARGER AERIAL SHOULD BE USED IF POSSIBLE.

AERIAL RODS "F", 16 FT. IN CASE WITH BASE & SPIKE, IS NORMAL FIELD AERIAL. CONNECT WITH SHORT WIRE (1/6" SUPPLIED) TO TERMINAL MARKED "F" ON ADAPTOR, WHICH IS PLUGGED INTO AERIAL SOCKET. A GOOD EARTH GIVES SOME ADVANTAGE BUT IS NOT ESSENTIAL IF SET IS STOOD ON GROUND.

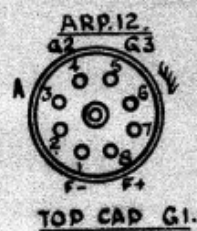
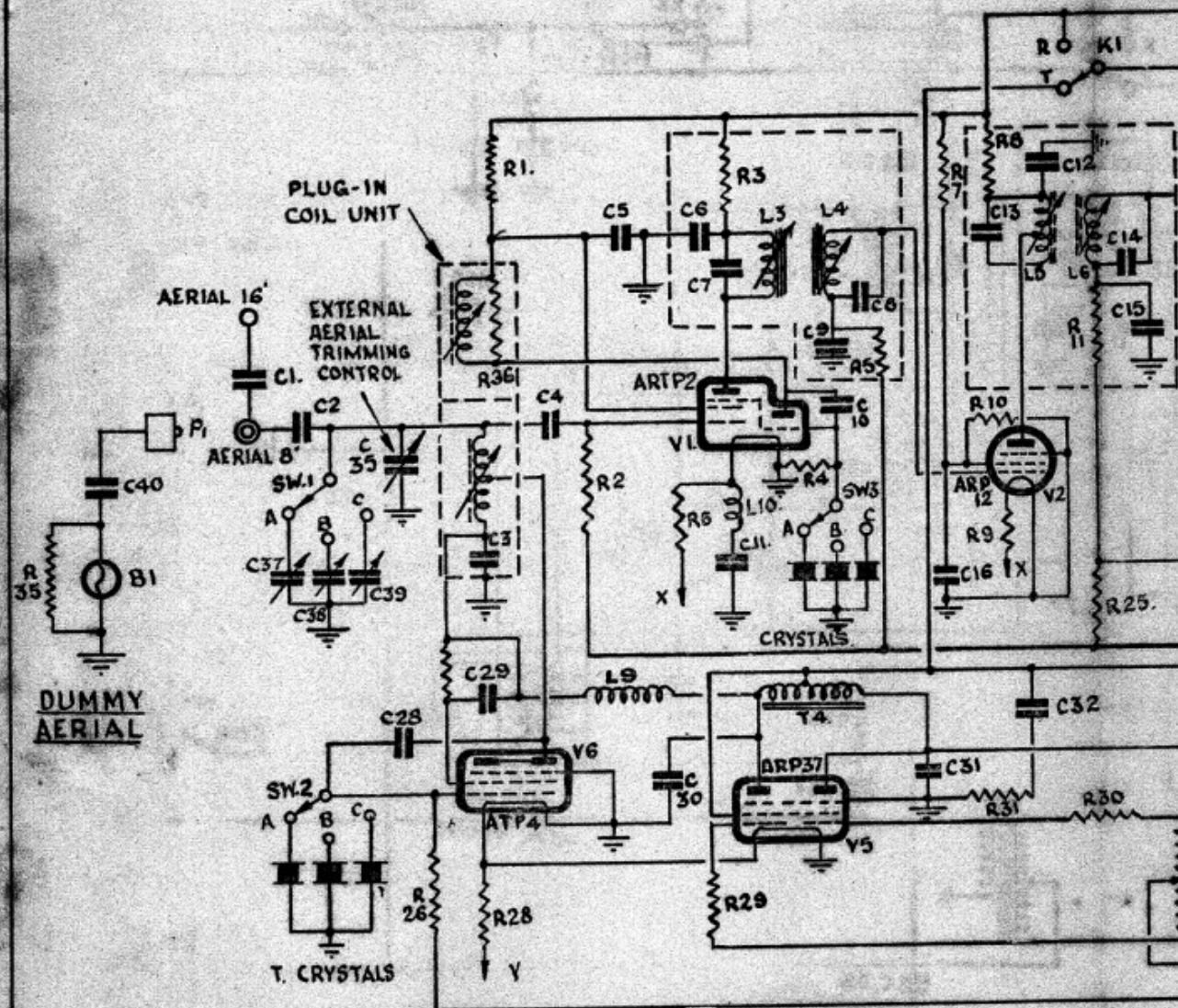
LARGE AERIALS, PREFERABLY VERTICAL AND NOT EXCEEDING A QUARTER WAVE, ARE CONNECTED TO TERMINAL MARKED "L" ON ADAPTOR.

(NOTE THAT AERIAL TUNING SETTING MAY NOT BE THE SAME FOR ALL CHANNELS IN THIS CASE)

LHQ. E&ME. SCHOOL.
WIRELESS SECTION, TELECOM WING.

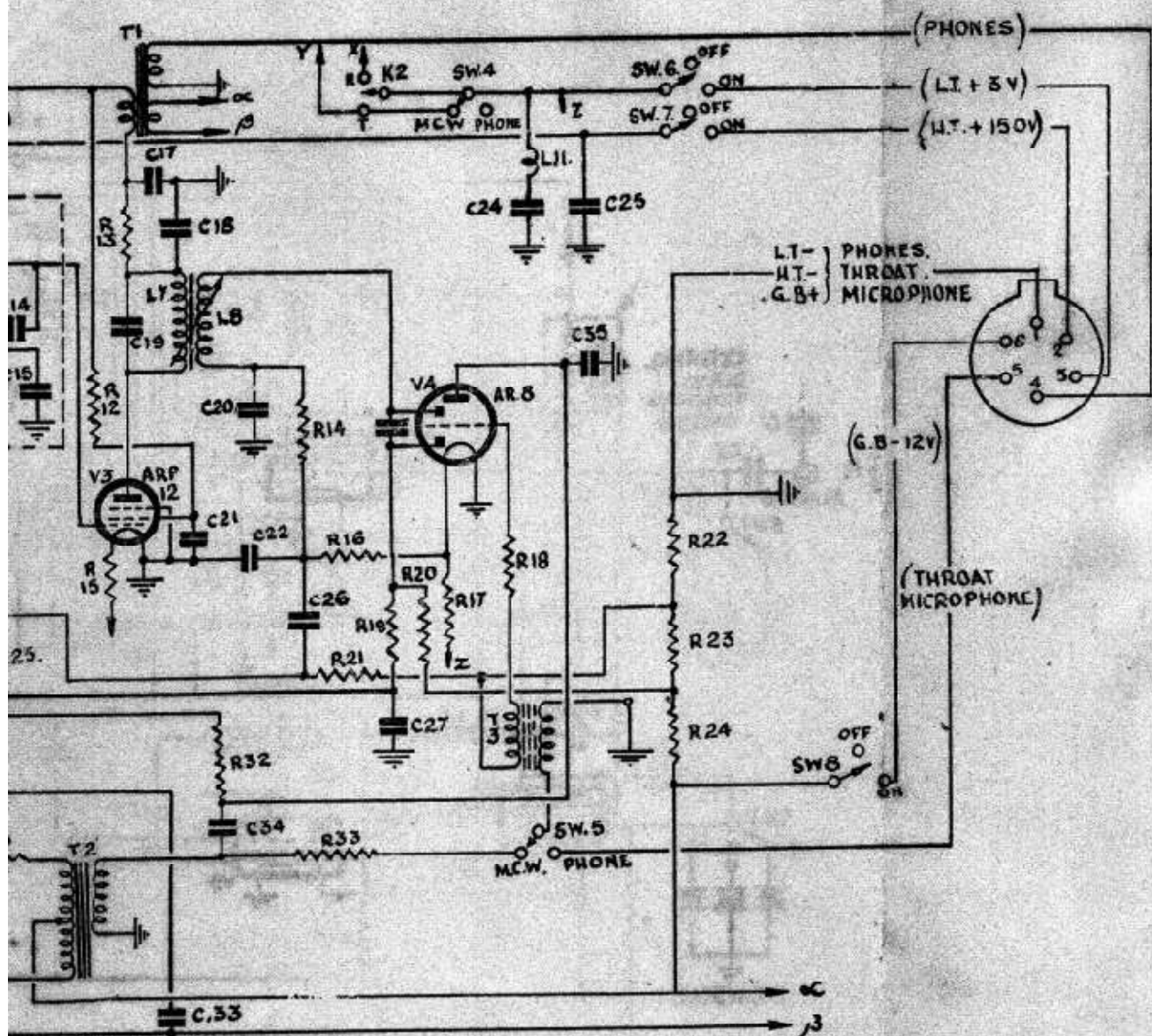
SERIES W3/C DRC NOT/587

WIRELESS SET NO. 46.
INSTRUCTION CARD.



VALVE BASES

LOOKING AT BASE

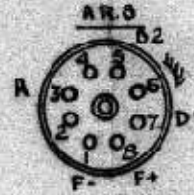
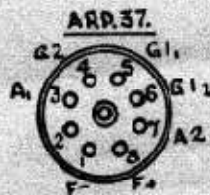


ES AND CONNECTIONS.



TOP CAP A

BASE OF VALVE.



TOP CAP G.

L.H.Q. E&M.E. SCHOOL.
WIRELESS SECT. TELECOM WING.
SERIES. W/3 B DRG. No T/575

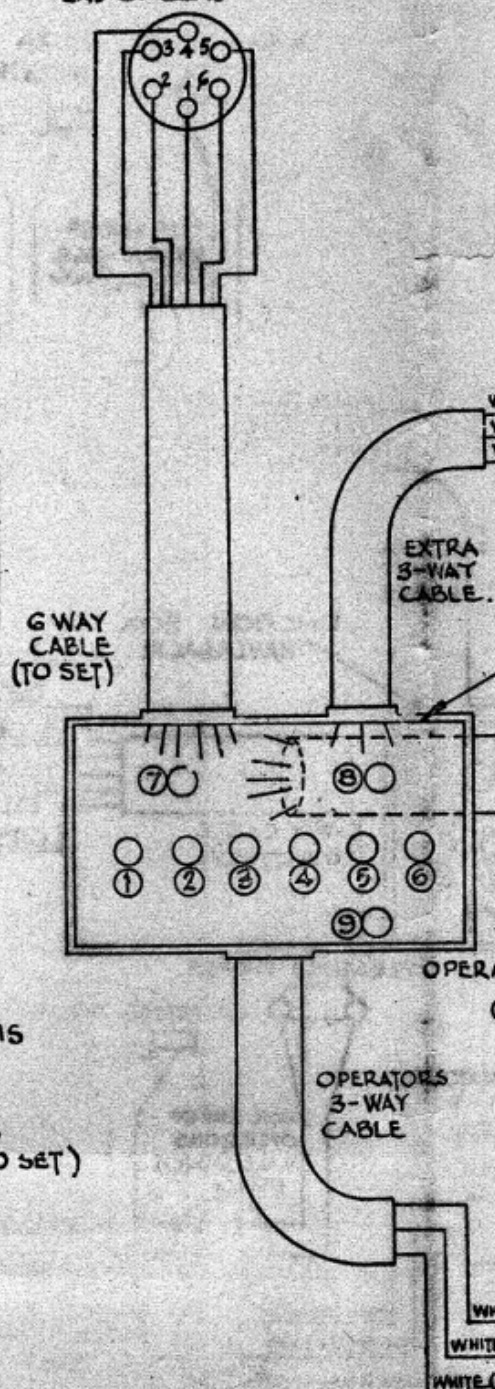
WIRELESS SET N°46

JUNCTION BOX INTERNAL CONNECTIONS

MARKING ON TOP-PLATE		6 WAY CABLE	5 WAY CABLE	OPERATOR 3-WAY CABLE	EXTRA 3WAY CABLE
+3V	① L.T. +	BLUE	GREEN		
	② MIKE	GREEN		WHITE (GREEN END)	WHITE (GREEN END)
	③ H.T.+SET	RED			
+150V	④ H.T.+BATT.		RED		
	⑤ PHONES	YELLOW		WHITE (RED END)	WHITE (RED END)
+12V	⑥ G.B.-	WHITE	YELLOW		
	⑦ CASE	BLACK	STRAW		
	⑧ CASE		BLUE		WHITE (BLUE END)
	⑨ CASE			WHITE (BLUE END)	

N.B. SOCKET MARKED +12V. ON BATTERY IS CONNECTED THROUGH TO CASE OF SET AND JUNCTION BOX AND TO L.T. - . SOCKET MARKED H.T. - ON BATTERY IS USED TO SUPPLY GRID BIAS (-12V. TO SET)

FREE END OF SOCKET ON SET
END OF LEAD



LHQ. E&ME. SCHOOL
WIRELESS SECTION, TELECOM WING
SERIES W 3/A. DRC. NO T/574

WIRING DIAGRAM OF LEADS
(WIRELESS SET NO. 46)
TRACED FROM B.W. 845

