

WIRELESS SET NO. 19

TECHNICAL HANDBOOK - FIELD AND BASE WORKSHOP REPAIRS

Note: This issue Pages 1 to 10, supersedes pages 1 to 4 of Issue 3, dated 30 Oct. 1944. It has been amended throughout.

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ADJUSTMENT OF B SET AERIAL FEEDERS

INTRODUCTION

1. The efficient operation of the B set of the Wireless set No. 19 is very largely dependent upon the accurate adjustment of the length of the resonant aerial feeders, which are either $1\frac{1}{2}$ or $2\frac{1}{2}$ wavelengths long. These feeders are identified as Connectors, coaxial, No. 11 or 11A respectively.
2. An improved method of cutting and testing these feeders has been devised which renders obsolete the need for stocks of Connectors, coaxial, sub-standard, Nos. 11, 11A, 12A, 12B, 13A and 13B - Cat. Nos. WY 2358 to WY 2363 (inclusive). Instructions for the disposal of these connectors are given in para. 10.

FIELD REPAIRS

Test equipment

3. The following test equipment is required:-

Voltmeter, valve, U.H.F., No. 1
Wavemeter No. 4.

Adjustment of B set

4. (a) Examine aerial coil (L26A)
- (b) If it does not conform in appearance with Fig. 2, replace it with one constructed in accordance with the specification detailed in Fig. 1
- (c) Fit a standardized Connector, coaxial, No. 11 between the output terminal and the rod aerial. This connector must have been tested in accordance with the procedure detailed in paras. 23 to 27 and must bear a dated label inscribed 'TUNED LENGTH DO NOT CUT' (see paras. 7 to 8). Set the B set dial at 5
- (d) Switch the set to send and with the wavemeter check the frequency. Adjust the oscillator coil until a frequency of 235Mc/s is obtained. This coil adjustment must be made with GREAT CARE to avoid breaking the ceramic supports of the variable capacitor

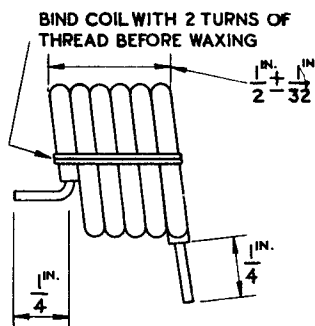
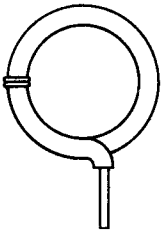
Testing of aerial feeders

5. (a) Adjust B set as detailed in para. 4
- (b) Connect the feeder under test, either No. 11 or 11A, between the output terminal and rod aerial. Switch to send and check the output frequency with the wavemeter. Adjust the B set dial until the wavemeter peaks at 235Mc/s. The dial reading must be within the limits 4.5 to 6.0
- (c) If the dial setting is outside these limits, action should be taken as detailed in Table 1
- (d) If the dial setting is within the limits, switch the B set to receive and check for blind spots. Should the oscillator stop completely at a dial setting near '0', the connector is probably too short and action as

detailed in column 4 of Table 1 should be taken. Should the oscillator stop completely at a dial setting near '10', the connector is probably too long and action as detailed in column 5 of Table 1 should be taken. If the blind spot is narrow (i.e. extending over only a $\frac{1}{4}$ division of dial scale) it is probably due to capacitor C46A being outside its tolerance limits. A narrow blind spot such as this is unlikely to interfere with communication and the replacement of C46A may be unnecessary.

- (e) Check that the B set sender output does not vary unduly with dial setting, using the U.H.F. valve voltmeter.
- (f) If the connector successfully conforms to the above tests, mark with two green bands at one end spaced 2 in. apart.

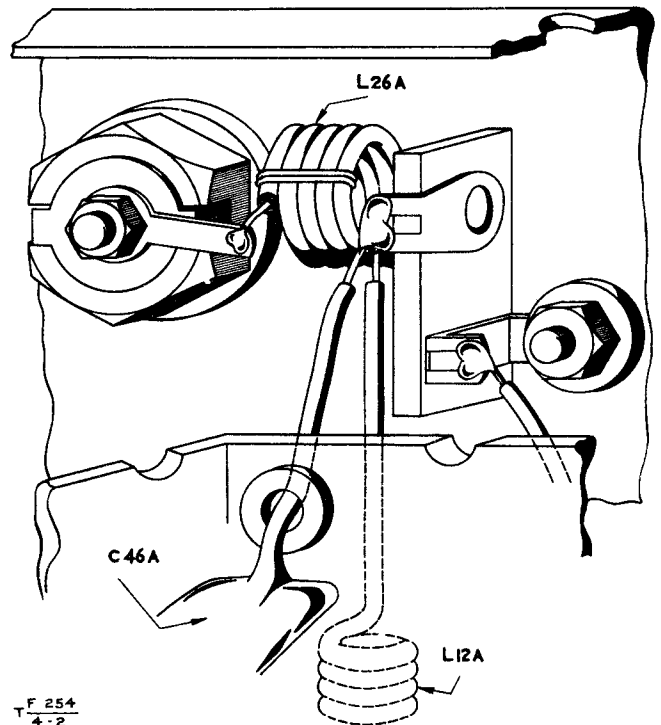
WIRE LEFT BARE FOR APPROX.
 $\frac{1}{4}$ IN. LENGTH AT EACH END



NOTE:- SPECIFICATION : FIVE TURNS OF 0.048 IN. DIA., 18 S.W.G., TINNED COPPER WIRE, COVERED WITH 1.5 MM. SLEEVING, CLOSE WOUND ON $\frac{3}{16}$ IN. DIA. MANDREL. AFTER WINDING, IMPREGNATE FOR 2 MIN. IN APPROVED WAX AT 100-110°C AND SHAKE OFF ALL SURPLUS WAX. ALTERNATIVELY, THE TURNS MAY BE FIXED IN POSITION BY VARNISH

T F 254
4-1

Fig. 1 - Specification of B set aerial coil L26A



T F 254
4-2

Fig. 2 - B set aerial coil L26A

6. All stocks of Connectors, coaxial, No. 11 or 11A, sub-standard, will be treated as normal aerial feeders and tested as in para. 5. Sub-standard connectors which conform to the tests will be marked with two green bands as specified. The old Cat. Nos. and old designations must be removed and the connectors relabelled: Z₁₁ 3142 - Connector, coaxial, No. 11 or Z₁₁ 3143 - Connector, coaxial, No. 11A, as the case may be.

7. The dated label, affixed to connectors that have been standardized by Base Workshops in accordance with this regulation, allows units to maintain a check on serviceability of connectors. It is anticipated that connectors so standardized will not require rechecking at intervals of less than two years.

Connector, coaxial, No.	Permissible dial setting		Disposal of faulty connectors	
	Min.	Max.	Dial setting below min.	Dial setting above max.
11	4.5	6.0	Connector too short. Action: cut down to form A set aerial feeder	Connector too long. Action: Label and return to base workshops for adjustment
11A	4.5	6.0	Connector too short. Action: Label and return to base work- shops for adjustment	Connector too long. Action: Label and return to base workshops for adjustment

Table 1 - Disposal of faulty connectors

8. Connectors bearing the dated label will not require marking with the two green bands.

BASE REPAIRS

CONNECTORS RETURNED FROM FIELD UNITS

9. Under the field testing procedure, see paras. 3 to 6, a number of connectors will be returned to Base Workshops for adjustment. These connectors should be tested to check the result of the field test and action taken as detailed in this regulation.

DISPOSAL OF SUB-STANDARD CONNECTORS

10. Table 2 gives disposal instructions for stocks of sub-standard, short-limit and long-limit connectors.

Sub-standard Connector No.	Action to be taken
11	Test as Connector, coaxial, No. 11, see paras. 23 to 27
11A	Test as Connector, coaxial, No. 11A, see paras. 30 to 33
12A	Cut to form Connector, coaxial, No. 11, see paras. 15 to 22
12B	Cut to form A set feeder see para. 26
13A	Cut to form Connector, coaxial, No. 11A, see paras. 28 to 29
13B	Cut to form Connector, coaxial, No. 11, see paras. 15 to 22

Table 2 - Disposal of sub-standard connectors

PREPARATION OF STANDARDIZED CONNECTORS

Test equipment

11. The following test equipment is required:-

- Meter, circuit magnification, No. 1 (any Mk.)
- Signal generator No. 2 (any Mk.)
- Frequency meter SCR 211
- Test inductor (see Fig. 5).

Ageing of new feeders

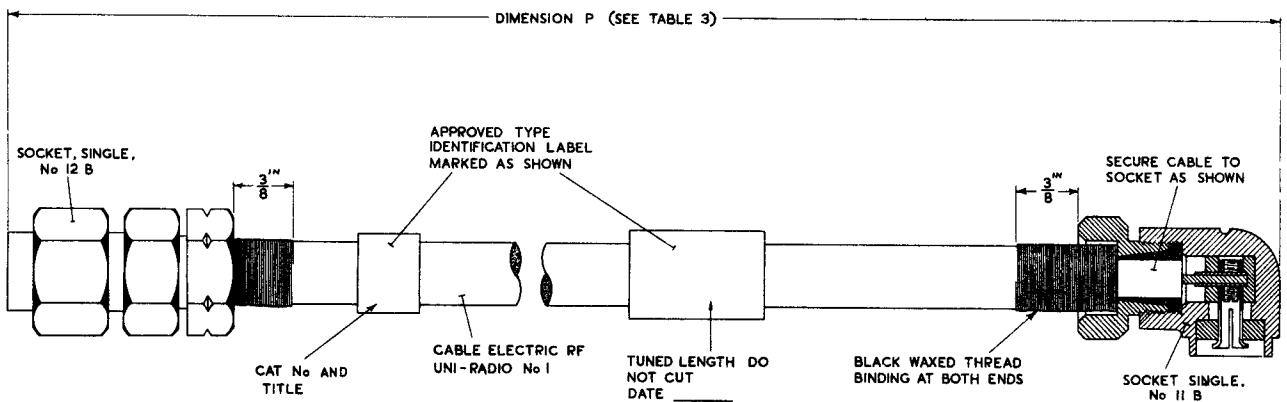
12. Each feeder consists of a length of Cable, electric, R.F., Uni-radio, No. 1 terminated by a Socket, single, No. 11B at one end and a Socket, single, No. 12B at the other. The methods of assembling the cable and sockets are illustrated in Fig. 3.

13. Cut the cable to the length shown in column 7 of Table 3 and fit a Socket, single, No. 11B to one end. Mate the socket to a Plug, single, No. 26A carried on a suitable mounting plate. The mounting plate, which may carry several plugs and their associated cable and socket assemblies, must be stored in a cool dry place with the cable lengths hanging vertically for a period of not less than seven days.

14. This procedure allows the cables to age, i.e. shrink etc. and assume effectively stable dimensions.

Cat. No.	Description	Half-wave resonant freq.	Tolerance		Min. length (dimension P)	Cutting length (new feeders)
			Freq.	pF		
Z _{11A} 3142	Connector, coaxial, No. 11	78.5Mc/s	0.9Mc/s	0.7	46 in.	53 in.
Z _{11A} 3143	Connector, coaxial, No. 11A	47.8Mc/s	0.3Mc/s	0.7	78 in.	87 in.

Table 3 - Connector dimensions and tolerances



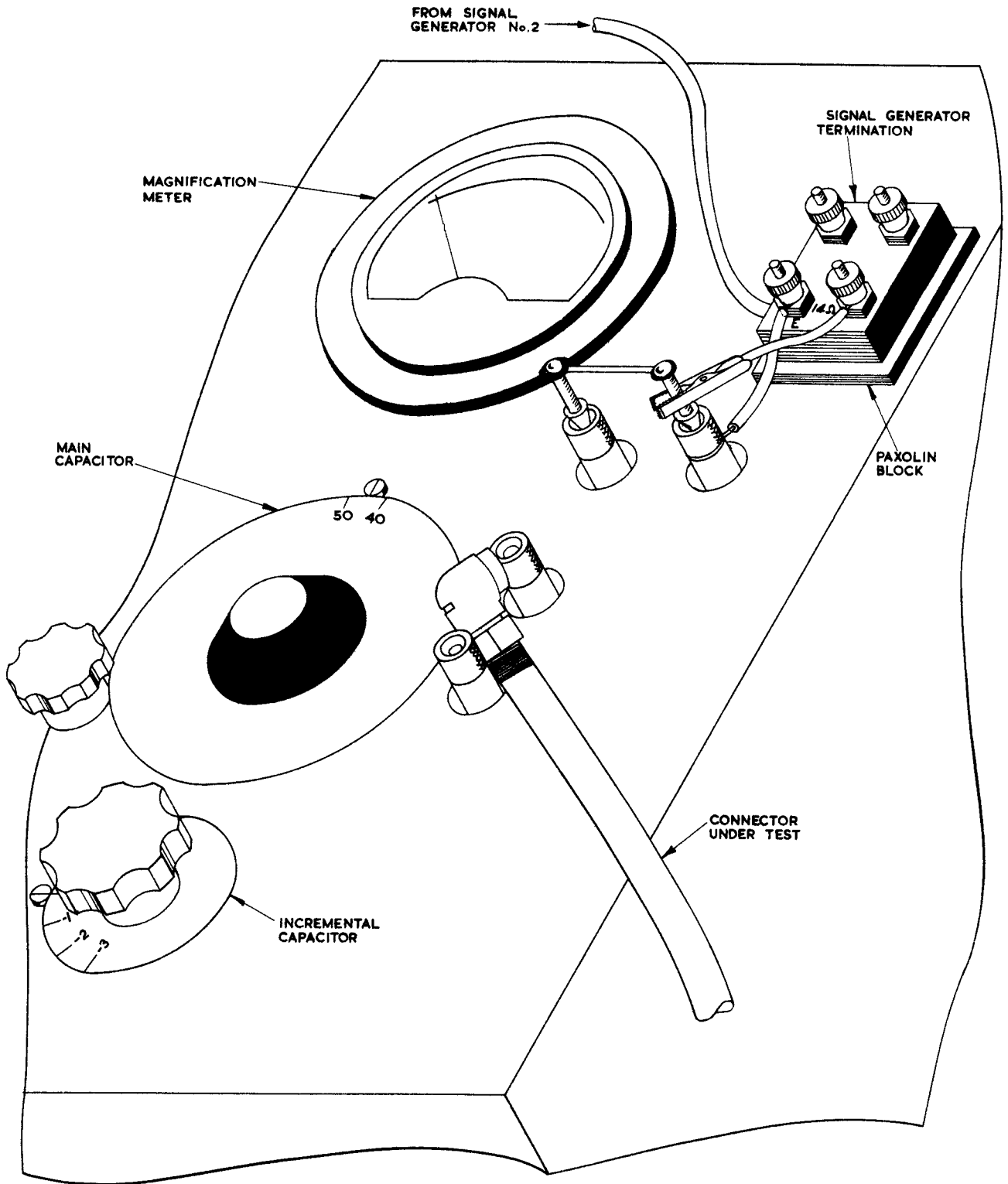
ASSEMBLY OF SOCKETS

THE SOCKET MUST BE ASSEMBLED AS FOLLOWS -

- 1 CUT BACK OUTER SHEATH BY $\frac{7}{8}$ "
- 2 BIND OUTER SHEATH WITH WAXED THREAD AS SHOWN
- 3 PUSH CLAMPING SCREW OVER SHEATH SO THAT SHOULDER IS $\frac{3}{4}$ " FROM END OF CABLE
- 4 FORCE SLEEVE UNDER BRAID MAINTAINING SAME POSITION FOR CLAMPING SCREW
- 5 CUT BACK POLYTHENE INSULATION FLUSH WITH END OF SLEEVE
- 6 PLACE SOLDER OVER INNER CONDUCTOR SO THAT THE ENDS ARE FLUSH AND SOLDER
- 7 COMPLETE ASSEMBLY OF PLUG AND ENSURE SET SCREW IS TIGHTENED

F 254
4-3

Fig. 3 - Assembly of Sockets, single, Nos. 11B and 12B



F-254
T 4-4

Fig. 4 - Equipment set up for checking Connectors, coaxial, No. 11

Cutting of Connectors, coaxial, No. 11

15. This connector is designed to be $1\frac{1}{2}$ wavelengths long at the B set frequency of 235Mc/s. Its half-wave resonant frequency is approximately 78.5Mc/s. As this frequency is outside the range of the internal oscillator of the circuit magnification meter, an external source, the Signal generator No. 2, must be used. Switch off the internal oscillator by setting the circuit magnification meter range switch to the blank position where provided, or to an intermediate range position. Plug in the test inductor.

16. Set the signal generator to give maximum output and adjust its frequency to 78.5Mc/s using the frequency meter on an appropriate harmonic. Tap the $1\mu\Omega$ termination of the signal generator on to the low potential end of the test inductor (see Fig. 4). The position of the tap should be adjusted to give the maximum 'Q' reading (approximately 40) when the circuit is tuned to resonance.

17. The inductor design (see Fig. 5) is not critical and is chosen so that the tuning point is within the range of the main tuning capacitor. With the test inductor shown, resonance is obtained at a capacitance reading on the main dial of about 40pF.

18. Set the incremental capacitance dial to '0' and using the main tuning dial, tune to the exact peak of the resonance curve as indicated on the magnification meter. Note the precise reading of the tuning dial. Apply the Socket, single, No. 11B of the cable to the capacitor terminals with the inner conductor contacting the live terminal and the socket casing in good contact with the earth terminal.

19. Carefully retune the magnification meter circuit to resonance using the main tuning dial and note the new dial reading. Check that the cable is too long by noting that a decrease in capacity is necessary to restore resonance. Cut off the excess cable using the figure of 2pF per inch length of cable. This figure of 2pF per inch allows a small margin for the more accurate final adjustments to be made as detailed in para. 20. Extreme care must be exercised in cutting off lengths of cable and a sharp knife should be used to avoid bruising the cable end. Remove the Socket, single, No. 11B from the capacitor terminals and retune to resonance as detailed in para. 18.

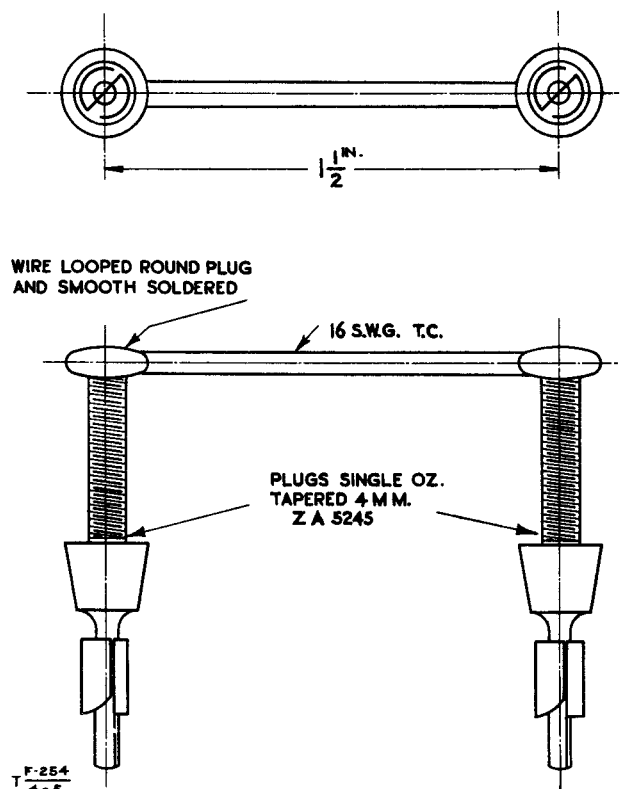


Fig. 5 - Test inductor for Meter, circuit magnification

20. Re-apply the Socket, single, No. 11B to the capacitor terminals and retune the circuit to resonance using the incremental capacitance dial only. Note the reading of the incremental and its polarity i.e., positive or negative. The correct cable length is that which permits resonance to be achieved with the incremental dial set at a reading of + 1.5pF. This 1.5pF compensates for the nett increase in the capacity of the cable which will occur when the Socket, single, No. 12B is fitted. Cut down the cable a little at a time, retuning to resonance using the incremental dial only, until resonance is obtained at an incremental dial reading of + 1.5pF \pm 0.2pF. It is essential that during the whole of these final adjustments the setting of the main tuning dial remains unaltered.

21. When the cable has been cut to the correct length, fit the Socket, single, No. 12B (see Fig. 3) and test the complete connector.

22. The frequency of the source must be checked and the circuit retuned before each new feeder is cut.

Testing of Connectors, coaxial, No. 11

23. Set up the equipment as detailed in paras. 15 to 17.

24. Set the incremental dial to '0' and tune the circuit to resonance using the main tuning dial. Apply the Socket, single, No. 11B of the cable to the capacitor terminals and retune the circuit to resonance using the incremental dial only. The change in capacity necessary to restore resonance must not be greater than \pm 0.7pF.

25. If the change is outside these limits and negative, the connector is too long. Remove the Socket, single, No. 12B and cut the connector to the correct length as detailed in paras. 18 to 22.

26. If the change is outside the limits and positive, the connector is too short and may be cut down to form one of the following A set feeders:-

Connectors, coaxial, Nos. 10A, 10E or 10K - their lengths being 24 in., 18 in. and 30 in. respectively.

27. A connector which conforms to the above test and whose physical length (dimension P in Fig. 3) is not less than 46 in. is satisfactory. Fit an approved identification sleeve over the connector and indelibly mark it 'TUNED LENGTH DO NOT CUT' and add the date (month and year). On a further sleeve state the Cat. No. and the full designation of the connector, i.e., Z₁ 3142 - Connector, coaxial, No. 11. Remove all other identification markings. A connector whose length is less than 46 in. should be dealt with as detailed in para. 26.

Cutting of Connectors, coaxial, No. 11A

28. This connector is designed to be $2\frac{1}{2}$ wavelengths long at the B set frequency of 235Mc/s. Its half-wave resonant frequency is approximately 47.8Mc/s. The Signal generator No. 2 is thus not required.

29. Plug the test inductor (see Fig. 5) into the inductor terminals of the circuit magnification meter and set the range switch to 25 - 50Mc/s. With the aid of the frequency meter adjust the frequency to 47.8Mc/s. Resonance will be obtained at a capacitance reading on the main dial of about 100pF. Cut the cable in accordance with the procedure detailed in paras. 18 to 22.

Testing of Connectors, coaxial, No. 11A

30. The method of testing $2\frac{1}{2}$ wavelength feeders is similar to that for testing $1\frac{1}{2}$ wavelength feeders (see para. 24). This test is however carried out at the feeder cutting frequency of 47.8Mc/s.

31. If the change is outside the limits and negative, the connector is too long. Remove the Socket, single, No. 12B and cut the cable to the correct length as detailed in paras. 18 to 22.

32. If the change is outside the limits and positive, the connector is too short. Remove the Socket, single, No. 12B and cut the cable to form a Connector, coaxial, No. 11 (see para. 15).

33. A connector which conforms to the test and whose physical length (dimension P in Fig. 3) is not less than 78 in. is satisfactory. Fit an approved identification sleeve over the connector and indelibly mark it 'TUNED LENGTH DO NOT CUT' and add the date (month and year). On a further sleeve state the Cat. No. and the full designation of the connector, i.e., ZA 3143 - Connector, coaxial, No. 11A. Remove all other identification markings. A connector whose length is less than 78 in. should be dealt with as detailed in para. 32.

STORAGE OF CONNECTORS

34. All Connectors, coaxial, Nos. 11 and 11A may be coiled for packing, storing or transit purposes. To ensure electrical stability the minimum diameter of a coiled feeder must not be less than 10 in.

Encl. No. 16 to 57/Maint/3964

END