

Chapter 2

(Completely revised)

CONTROL, RADIO SET, TYPE C1607/4
5821-99-945-5739
AND
CONTROL, RADIO SET, TYPE C1607/9
5821-99-223-8189

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Introduction

1. The control, radio set, Type C1607/4, 5821-99-945-5739 (fig. 1) provides the necessary facilities for operating transmitter-receivers Type ARC-52, X11672, PTR175 and PTR177. Front panel controls provide both manual and preset frequency selection facilities together with service selection and volume control. The control, radio set, Type C1607/9, 5821-99-223-8189 is a variant of the

Type C1607/4 and has been introduced by Mod. No. 1763. Both control units are mechanically and electrically identical, the only difference being that the manual frequency read-out window on the Type C1607/9 has been enlarged to give improved visibility when the unit is fitted in certain types of aircraft; consequently the illustrations and servicing and testing instructions given in this chapter

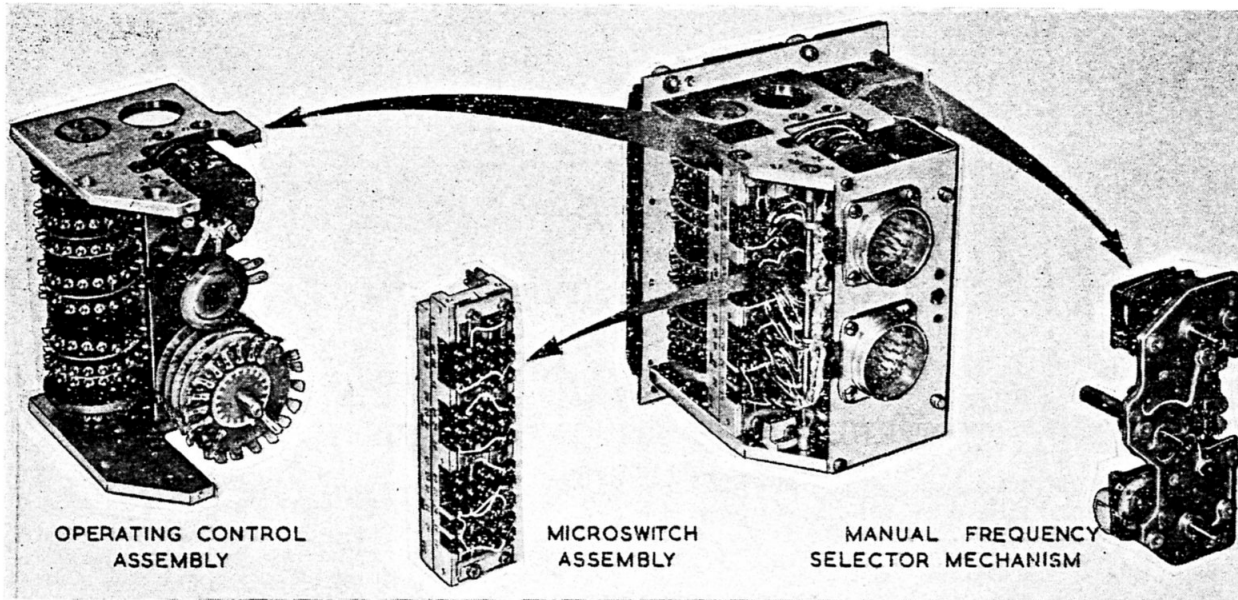


Fig. 1. Control unit, showing the three main parts

apply equally to both types. The control units are fully described in A.P.116D-0133-1A, Sect. 3, Chap. 1 and a circuit diagram appears in A.P. 116D-0133-10, fig. 32.

Preliminary examination

WARNING . . .

When using Trichloroethane/Inhibi-sol as a cleaning agent the following precautions must be taken:—

- (1) Ensure maximum ventilation
 - (2) Do not smoke
 - (3) Avoid contact with the skin
 - (4) Do not immerse any components for more than one minute
 - (5) Dry all components thoroughly before re-assembly.
2. Verify that the repair card details are up to date with the module serial number and modification state duly recorded.
 3. At the rear of the control unit release the single Dzus fastener and remove the cover; conduct the following examination:—
 - (1) Examine for evidence of dirt and moisture; where those are present investigate the cause and take remedial action. Thoroughly clean the unit using dry air and a soft squirrel-hair brush.
 - (2) Ensure that the unit is free from general damage and corrosion and that all components are securely retained in position; any loose components must be securely refitted.

(3) Verify that the switch contacts are not worn or burnt; any dirty contacts must be cleaned with Trichloroethane 6810-99-220-1949. If any contacts are unserviceable the appropriate switch wafers must be renewed (para. 11 and 12).

(4) Rotate each switch in turn and ensure that the action is positive, ascertaining that the detent mechanisms do not show signs of wear. Verify that all the dials indicate correctly.

(5) Ensure that the memory drum is in no way distorted or damaged, particularly the actuator studs and the section dividing rings.

Wiring

4. The main wiring is carried in a cableform which terminates at one end in the two 30-pole plugs PLA and PLC on the rear panel of the control unit; by removing four screws this plate may be released to provide access to the terminations. The wiring should be checked by means of a point-to-point test or such electrical test which will confirm the accuracy of the wiring. Examine for neatness of soldering, absence of dry joints and a generally satisfactory condition of the wiring and insulation, particularly the sleeving which covers the connections to the plugs PLA and PLC. No inadvertent interconnections or tracking paths should be permitted due to excess solder, wire slippings or dirty connections.

5. Where renewal of wiring is necessary, this must be done using the correct type of wire, with the gauge, lengths and routing exactly the same as the original wiring except where modifications have brought about changes. Details of the wires are given in the wiring key in Table 1 which should be used in conjunction with wiring diagram (fig. 9).

TABLE 1

Wiring key

From	Colour markers	Length (in.)	To
Wire, electrical equipment, 7/0-0048, pink, 6145-99-970-7917			
PLA/A	Brown/yellow	4 $\frac{1}{2}$	SB1F/4
PLA/B	Brown/green	7 $\frac{3}{4}$	SA6h1/c
PLA/C	Red/slate	6 $\frac{5}{8}$	SB1B/7
PLA/D	Red/blue	4 $\frac{3}{4}$	SCf/17
PLA/E	Red/yellow	5 $\frac{5}{8}$	RV1/1
PLA/F	Red/orange	5 $\frac{5}{8}$	RV1/2
PLA/H	Red/brown	6 $\frac{5}{8}$	PLC/U
PLA/J	Brown/white	8 $\frac{3}{8}$	SA6a1/c
PLA/K	Brown/violet	8 $\frac{7}{8}$	SA1F/26
PLA/M	Black/red	8	SA6b2/c
PLA/N	Black/yellow	4	ET2
PLA/P	Black/blue	8	SF1F/30
PLA/R	Black/slate	6 $\frac{7}{8}$	SA6f1/c
PLA/S	Brown/black	7	SA6d1/c
PLA/T	Brown/red	6 $\frac{3}{4}$	SA6e5/c
PLA/U	Brown/orange	7 $\frac{7}{8}$	SA6c1/c
PLA/V	Red/white	7 $\frac{1}{2}$	SA6c2/c
PLA/W	Red/green	7 $\frac{3}{4}$	SA6c3/c
PLA/X	Red/red	7 $\frac{1}{4}$	SA6c4/c
PLA/Y	Brown/slate	7 $\frac{1}{2}$	SA6g5/c
PLA/Z	Brown/blue	7 $\frac{1}{2}$	SA6c5/c
PLA/a	Black/brown	7	SA6e1/c
PLA/b	Black/green	6 $\frac{3}{4}$	SA6e2/c
PLA/c	Black/violet	6 $\frac{7}{8}$	SA6e3/c
PLA/d	Brown/brown	6 $\frac{1}{4}$	SA6e4/c
PLA/f	Black/white	6 $\frac{7}{8}$	SA6g1/c
PLA/g	Red/violet	7	SA6g2/c
PLA/h	Red/black	7 $\frac{1}{4}$	SA6g3/c
PLA/i	Black/orange	7 $\frac{1}{2}$	SA6g4/c
PLC/F	Orange/violet	8	SB2B/4
PLC/h	Yellow/white	4 $\frac{7}{8}$	SA5F/1
PLC/J	Yellow/violet	7 $\frac{3}{8}$	SB1F/10
PLC/K	Yellow/green	7 $\frac{1}{2}$	SB1B/9
PLC/L	Yellow/yellow	6 $\frac{5}{8}$	SB1B/11
PLC/M	Yellow/orange	6	SCF/15
PLC/N	Yellow/black	4	ET1
PLC/V	Orange/orange	4 $\frac{3}{8}$	SA5F/5
PLC/W	Orange/green	4 $\frac{3}{8}$	SA5F/7
PLC/X	Orange/blue	5	SA5F/9
PLC/Y	Yellow/slate	4 $\frac{7}{8}$	SA5F/11
PLC/Z	Yellow/blue	5 $\frac{1}{4}$	SA5F/13
PLC/a	Yellow/red	5 $\frac{3}{8}$	SA5F/15
PLC/b	Orange/white	5 $\frac{3}{4}$	SA5F/17
PLC/c	Orange/slate	5 $\frac{1}{2}$	SA5F/19
PLC/d	Orange/black	7 $\frac{1}{8}$	SA5F/20
PLC/f	Orange/red	7 $\frac{1}{4}$	SA5F/22
PLC/g	Orange/yellow	7 $\frac{1}{4}$	SA5F/24
PLC/i	Yellow/brown	7 $\frac{1}{4}$	SA5B/21
SA1F/17	Green/blue	11 $\frac{1}{8}$	SA6a2/c
SA1F/20	Green/violet	7 $\frac{3}{8}$	SD2F/5
SA1B/2	Green/slate	5 $\frac{1}{4}$	SD2B/8
SA1B/12	Green/white	9 $\frac{7}{8}$	SA6b2/NC
SA1B/35	Green/brown	7 $\frac{1}{2}$	RV2/1
SA2F/17	Slate/orange	10	SA6c4/NO
SA2F/20	Violet/violet	7	SD1F/15
SA2B/2	Slate/slate	7 $\frac{3}{4}$	SE2B/5
SA2B/12	Slate/green	9 $\frac{1}{8}$	SA6d1/NC
SA3F/17	Violet/brown	9 $\frac{1}{8}$	SA6e2/NO

TABLE 1 (cont.)

Wiring key

From	Colour markers	Length (in.)	To
SA3F/20	Slate/blue	11	SE1F/8
SA3B/2	Blue/white	8 $\frac{1}{2}$	SF1B/27
SA3B/12	Violet/black	8 $\frac{7}{8}$	SA6f1/NC
SA4F/17	Blue/brown	8 $\frac{1}{2}$	SA6g2/NO
SA4F/20	Blue/slate	11 $\frac{1}{2}$	SF1F/34
SA4B/10	Blue/violet	9 $\frac{5}{8}$	SF2F/34
SA4B/25	Slate/violet	7 $\frac{1}{2}$	SD2B/10
SA5B/29	Green/green	7 $\frac{1}{2}$	SD2B/2
SA6a1/c	Slate/yellow	11 $\frac{1}{2}$	SD2B/14
SA6c1/c	Violet/slate	11 $\frac{1}{4}$	SD1B/2
SA6c2/c	Violet/white	11 $\frac{1}{2}$	SD1B/4
SA6c3/c	Slate/black	10 $\frac{5}{8}$	SD1B/6
SA6c4/c	Slate/brown	10	SD1B/8
SA6c5/c	Slate/red	10 $\frac{1}{2}$	SD1B/10
SA6e1/c	Violet/red	10 $\frac{1}{4}$	SE1F/1
SA6e2/c	Violet/orange	9 $\frac{3}{4}$	SE1F/2
SA6e3/c	Violet/yellow	8 $\frac{3}{4}$	SE1F/3
SA6e4/c	Violet/green	7 $\frac{3}{4}$	SE1F/4
SA6e5/c	Violet/brown	7 $\frac{3}{4}$	SE1F/5
SA6g1/c	Blue/red	8 $\frac{1}{2}$	SF2B/21
SA6g2/c	Blue/orange	8 $\frac{3}{4}$	SF2B/25
SA6g3/c	Blue/yellow	9 $\frac{1}{4}$	SF2B/29
SA6g4/c	Blue/green	10 $\frac{1}{4}$	SF2B/33
SA6g5/c	Blue/blue	10 $\frac{1}{2}$	SF2B/37
SA6h1/c	Blue/black	8 $\frac{3}{4}$	SF1F/20
SB1B/5	Green/yellow	4 $\frac{1}{2}$	ET2
SB2B/3	Green/black	6 $\frac{3}{4}$	RV2/1
SD2F/36	Green/red	11 $\frac{1}{2}$	SE2B/7
SE2B/7	Green/orange	3	SF1B/21
SA4F/26	—	—	SA5F/3
SA5B/2	—	—	SA5F/38
SA5B/29	—	—	SA5F/3
SB1B/1	—	—	SB1B/6
SB1B/1	—	—	SB1B/11
SB1B/2	—	—	SCF/15
SB1B/12	—	—	SCF/19
SB2B/3	—	—	SB1F/5
SD2B/10	Slate/violet	—	SD3B/4
SD2B/14	Slate/yellow	—	SD3B/6
SE1B/4	Black/blue	—	SE1B/11
SF1F/30	—	—	ILP2/2
ILP/1	—	—	ILP2/2
Wire, electrical, 6145-99-999-3915			
SA1F/26	—	—	SA1F/30
SA1B/8	—	—	SA1B/12
SA2F/26	—	—	SA2F/30
SA2F/30	—	—	SA2B/35
SA2B/8	—	—	SA2B/12
SA3F/26	—	—	SA3F/30
SA3F/30	—	—	SA3B/35
SA3B/8	—	—	SA3B/12
SA3B/35	—	—	SA4F/30
SA4F/20	—	—	SA4B/23
SA4F/26	—	—	SA4F/30
SA5F/5	—	—	SA5B/4
SA5F/7	—	—	SA5B/6
SA5F/9	—	—	SA5B/8
SA5F/11	—	—	SA5B/10
SA5F/13	—	—	SA5B/12
SA5F/15	—	—	SA5B/14
SA5F/17	—	—	SA5B/16

TABLE 1 (cont.)**Wiring key**

From	Colour markers	Length (in.)	To
SA5F/19	—	—	SA5B/18
SA5F/24	—	—	SA5F/26
SA5F/26	—	—	SA5F/28
SA5F/28	—	—	SA5F/30
SA5F/30	—	—	SA5F/32
SA5F/32	—	—	SA5F/34
SA5F/34	—	—	SA5F/36
SA5F/36	—	—	SA5F/38
SB1B/2	—	—	SB1B/3
SB1B/6	—	—	SB2B/5
SB2B/4	—	—	SB1F/4
SD1F/1	—	—	SD1B/2
SD1F/3	—	—	SD1B/4
SD1F/5	—	—	SD1B/6
SD1F/7	—	—	SD1B/8
SD1F/9	—	—	SD1B/10
SD1B/16	—	—	SD2F/17
SD2F/17	—	—	SD2B/12
SD2F/36	—	—	SD2B/2
SE1F/1	—	—	SE1B/1
SE1F/2	—	—	SE1B/2
SE1F/3	—	—	SE1B/3
SE1F/4	—	—	SE1B/4
SE1F/5	—	—	SE1B/5
SE1B/12	—	—	SE2B/12
SF1B/2	—	—	SF2B/4
SF2F/20	—	—	SF2B/21
SF2F/24	—	—	SF2B/25
SF2F/28	—	—	SF2B/29
SF2F/32	—	—	SF2B/33
SF2F/36	—	—	SF2B/37

Test equipment

6. Items of equipment required for testing and servicing the control unit are listed in Table 2;

further details may be obtained by reference to the publications quoted.

TABLE 2
Test equipment

Item	Ref. No.	Nomenclature	Further details
1	6625-99-943-6905	Test set, control unit	A.P.116D-0133-6B, Chap. 16
2	5QP/17447	Multimeter CT498	A.P.120M-0106-1
3	5821-99-954-3091	Setting tool	
4	10AG/945	Roll pin applicator ($\frac{1}{16}$ in.)	
5	—	Drilling jig (Plessey T.407427)	
6	5120-99-943-7464	Adjuster, spring	
7	—	Microswitch checking gauge	Para. 7

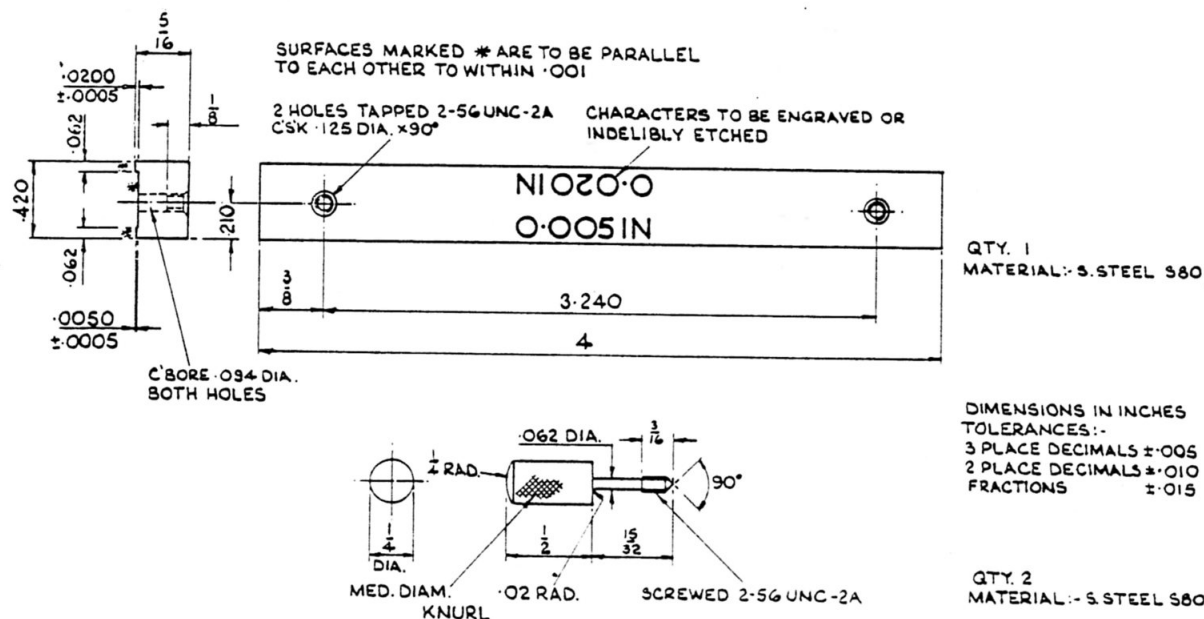


Fig. 2. Microswitch checking gauge: manufacturing details

7. A gauge is required to check the operation of the microswitch assembly in accordance with the instructions given in para. 23; details for manufacturing this gauge are given in fig. 2.

Servicing

General

8. The control unit contains three main assemblies (fig. 1); these are the manual frequency selector mechanism, the microswitch assembly and the operating control assembly. The servicing of each of these assemblies is dealt with separately in the subsequent instructions.

9. In order to perform any servicing which may be required, it will usually be necessary to dismantle the control unit; this must be done in clean, dust-free conditions. Do not dismantle the unit any further than is necessary to enable a particular repair to be carried out. When re-assembling the unit all tests specified in the re-assembly instructions must be performed. Before proceeding with servicing it is advisable to first read the instructions to ascertain which items of test equipment, tools, etc. will be required to be available at any particular stage.

10. When proceeding with servicing the following points should be observed.

- (1) All gears and detent wheels should be lubricated with a fine film of grease XG-287.
- (2) Screws and nuts, removed during servicing, which are not fitted with locknuts or lockwashers must be locked with an approved varnish on re-assembly unless otherwise stated; a small amount of varnish shall be applied under the head of a screw or at the thread junction with a nut as appropriate.

WARNING . . .

- (1) When applying locking varnish

care must be taken to ensure that varnish is not allowed to drip or run into any of the mechanisms, switches etc; this particularly applies to the microswitches which can be damaged by the ingress of varnish.

(2) Certain servicing procedures involve releasing components etc. without unsoldering the attached wiring; in such cases constant care must be taken to avoid imposing strain on the wiring and associated terminations.

Switches

11. Should it be necessary to renew switch wafers, attention should be given to the following points:

- (1) The orientation of each wafer and the position of its rotor blade should be noted in order that correct re-assembly is achieved.
- (2) Note the quantities and positioning of washers, spacers etc. associated with each securing screw to ensure that the switches are correctly re-built.
- (3) Where a wafer which does not require renewal is removed from its shaft, it will not be necessary to unsolder the wiring provided that removal can be effected without straining the wires or terminations.
- (4) If it is necessary to unsolder any wiring, each wire should be suitably identified to facilitate subsequent reconnection; reference should also be made to the wiring key in Table 1 and the wiring diagram (fig. 9).

12. To gain access to the wafers of switches SA and SB it will be necessary to remove the rear panel of the control unit (secured by four screws); the wafers may then be removed from their shafts after the retaining screws and associated washers,

spacers etc. have been removed and the wiring unsoldered as necessary (para. 11). When servicing switch SA care must be taken to ensure that the locating wire fitted to the shaft is correctly positioned before re-assembly. Access to the wafers of switches SD, SE and SF is afforded by releasing the front panel and the manual frequency selector mechanism (para. 14).

13. The microswitches are accessible from the underside of the control unit; the procedures for renewing individual microswitches are given in para. 20.

Manual frequency selector mechanism

14. The manual frequency selector mechanism is assembled on a main plate which is secured to pillars on the front panel by three screws. To remove this assembly proceed as follows:—

- (1) Set the front panel controls as follows:—
 - (a) MANUAL switches to 110.00.
 - (b) Function switch to OFF.
 - (c) VOL. control fully counter-clockwise.
 - (d) CHAN. switch to G (note that preset channel 11 is indicated).
- (2) Slacken the two grub screws of each of the six control knobs and remove the knobs. Unscrew the two front panel lamps.
- (3) Remove the indicator panel (secured by three screws and washers) and the preset channel indicator panel (secured by two screws); access to the latter is obtained by opening the small hinged cover on the front panel.

(4) Remove the six countersunk screws which secure the front panel to the main chassis of the control unit.

(5) Refer to the wiring diagram (fig. 9) and unsolder two wires coded slate/yellow and two wires coded slate/violet from tags 14 and 10 respectively of switch wafer SD2B, ensuring that the marker sleeves are retained on the wires.

(6) Gently ease the front panel away from the chassis until access to the securing screws of switches SD, SE and SF is obtained; remove these screws and carefully withdraw the switch wafers from their respective shafts (see also para. 11).

(7) Turn switch SF1 to expose its front section (normally nearer the front panel) and, referring to the wiring diagram (fig. 9), unsolder two wires coded black/blue from tag 30 of wafer SF1F, taking care that the marker sleeves are retained on these wires; note that the single wire coded blue/black, connected to tag 20 of this wafer, should not be unsoldered.

(8) Completely separate the front panel and manual frequency selector mechanism from the chassis.

(9) At the rear of the front panel, unsolder two wires from ILP2 lampholder and a single wire from ILP1 lampholder; these wires will be retained in holes in the main plate of the manual frequency selector mechanism.

(10) At the front of the front panel, remove three screws which secure the manual fre-

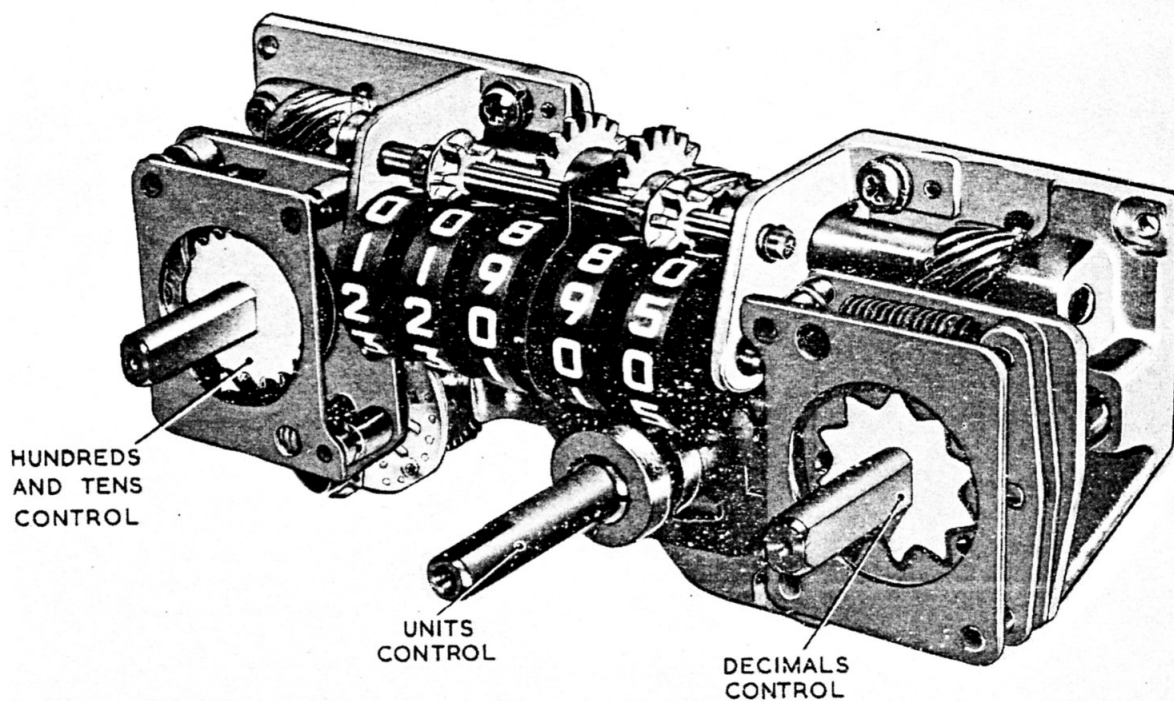


Fig. 3. Manual frequency selector mechanism: general view

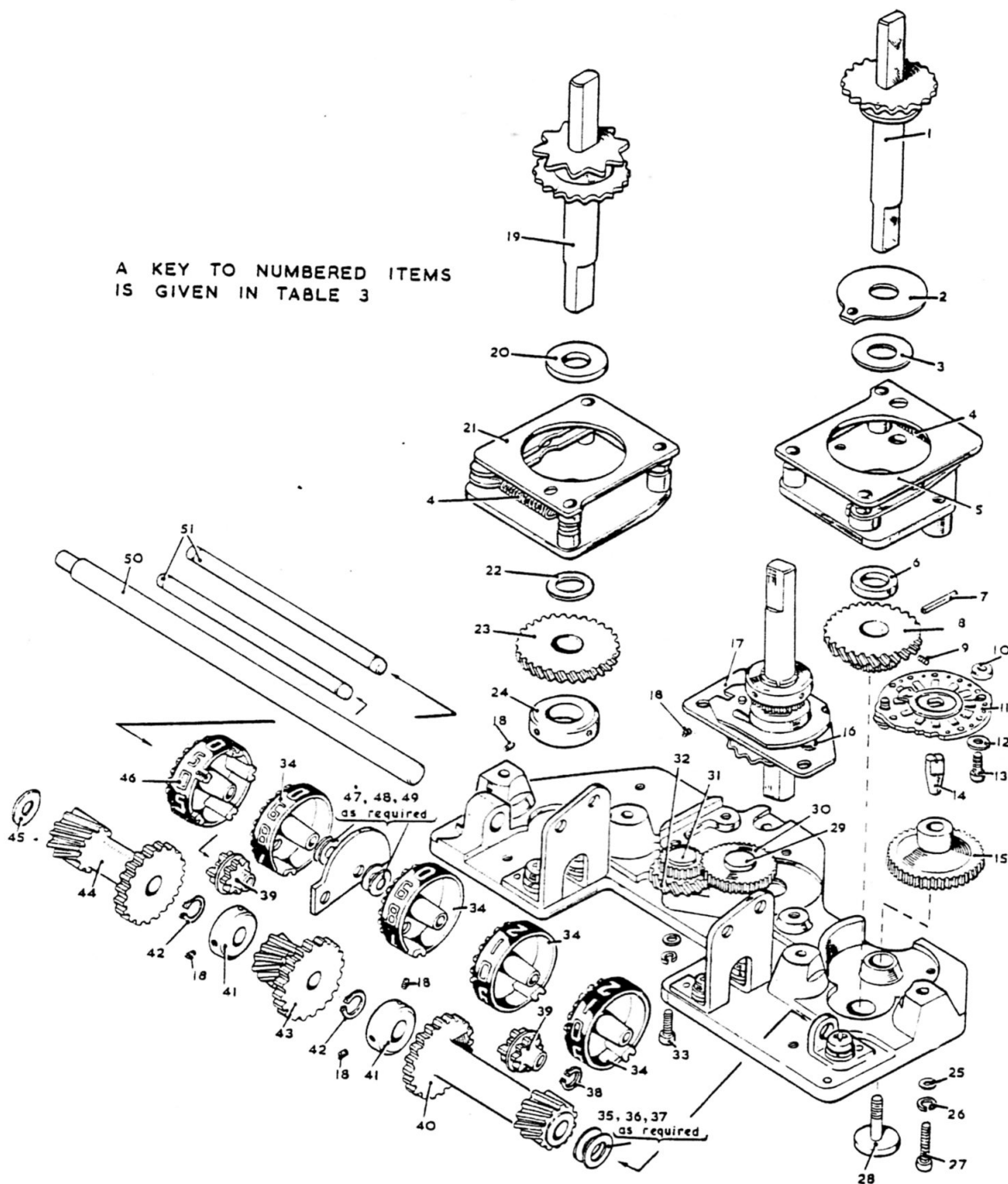


Fig. 4. Manual frequency selector mechanism: exploded view

quency selector mechanism to the panel; the mechanism may now be removed for servicing.

Caution . . .

If it is necessary to dismantle the manual frequency selector mechanism care must be taken to ensure that the correct relative positioning of the switch shafts and their associated dials is maintained on re-assembly. It is therefore advisable, before dismantling, to set the MANUAL controls to 110.00; this positions the hundreds/tens and units switches fully counter-clockwise against the stops and thus only the position of the decimals

switch shaft (which has no stop) must be carefully noted.

15. Manual frequency selection is by means of three detent switches; operating these results in the rotation of the frequency scale, the drive being transmitted through 90° by helical gears (fig. 3). Two short shafts are located in a bracket and retained in position by circlips at their ends; a long shaft rests in two end brackets and the gear clusters are held in position along this shaft by circlips (grip rings) and collars.

16. To facilitate servicing an exploded view of the mechanism is given in fig. 4 with numbers indicating the replaceable items; a key to fig. 4 is given in Table 3.

TABLE 3
Manual frequency selector mechanism-components
(key to fig. 4)

Item No. (fig. 4)	Nomenclature	N.A.T.O. Stock No.	Item No. (fig. 4)	Nomenclature	N.A.T.O. Stock No.
1	Switch Sub-assembly	5930-99-970-3321	27	Screw, machine	5305-99-948-0205
2	Plate, detent	5821-99-970-4812	28	Screw, machine	5305-99-970-3319
3	Washer, flat	5310-99-970-3565	29	Pin, shoulder, headed	5315-99-970-3713
4	Spring, helical, extension	5340-99-970-3318	30	Gear, spur	3020-99-970-5175
5	Switch sub-assembly	5930-99-970-3320	31	Pin, shoulder headed	5315-99-970-3714
6	Washer, flat	5310-99-970-3315	32	Gear cluster, helical-spur	3020-99-970-4807
7	Pin, spring	5315-99-106-2796	33	Screw, machine	5305-99-120-1120
8	Gear cluster, helical-spur	3020-99-970-4808	34	Dial, scale	5355-99-194-7144
9	Screw, grub	5305-99-970-3569	35	Washer, flat	5310-99-970-3566
10	Spacer, sleeve	5821-99-954-3322	36	Shim (.005 in.)	5340-99-970-3567
11	Switch section, rotary	5930-99-970-3322	37	Shim (0.1 in.)	5340-99-970-3568
12	Washer, non-metallic	5330-99-970-3715	38	Ring, retaining	5340-99-970-3562
13	Screw, machine	5305-99-948-0197	39	Gear, spur	5821-99-222-9308
14	Shaft, shouldered	3040-99-970-5179	40	Gear cluster, helical-spur	3020-99-970-5274
15	Gear, spur	3020-99-970-4806	41	Collar, shaft	3040-99-970-5267
16	Ball, bearing	3110-99-950-0566	42	Ring, retaining	5340-99-970-3561
17	Detent, switch	5930-99-970-3314	43	Gear cluster, helical-spur	3020-99-970-4809
18	Screw, grub	5305-99-948-0058	44	Gear, cluster, helical-spur	3020-99-970-5270
19	Switch sub-assembly	5930-99-970-3317	45	Shim (0.148 in.)	5340-99-970-3608
20	Washer, flat	5310-99-970-3323	46	Dial, scale	5355-99-194-7145
21	Switch sub-assembly	5930-99-970-3316	47	Shim (.01 in.)	5340-99-970-3563
22	Washer, flat	5310-99-970-3324	48	Shim (.005 in.)	5340-99-970-3564
23	Gear, helical	3020-99-970-4810	49	Washer, flat	5310-99-970-3589
24	Collar, shaft	5821-99-970-4811	50	Shaft, shouldered	3040-99-970-5177
25	Washer, flat	5310-99-941-8122	51	Shaft, straight	3040-99-970-5269
26	Washer, lock	5310-99-941-6641			

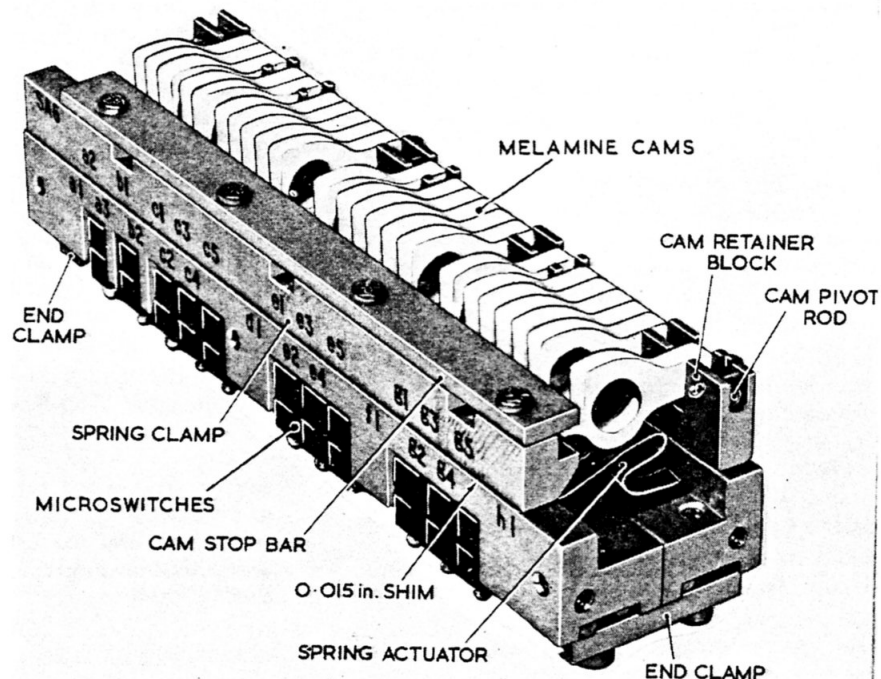


Fig 5. Microswitch assembly

17. Where the manual frequency selector mechanism has been dismantled for servicing, carefully re-assemble the mechanism ensuring that the relative positioning of the switch shafts is correct (para. 14 caution).

18. Refit the manual frequency selector mechanism and the front panel to the control unit chassis by reversing the order and sense of the removal instructions given in para. 14(2) to (10), carefully ensuring that: —

- (1) The switch wafers are correctly orientated on their respective shafts (para. 11(1)).
- (2) All wiring is correctly reconnected (refer to Table 1 and fig. 9).
- (3) The shafts of the function and CHAN switches and the VOL control are as set in para. 14(1) before refitting the knobs; when fitted the knobs must be correctly positioned before tightening the grub screws.

Microswitch assembly

19. The microswitch assembly (fig. 5) is secured between the side plates of the control unit by two screws at each side. After removing these screws the assembly may be gently eased from the chassis, care being taken to support the assembly and avoid strain on the wiring (see para. 10, warning (2)).

Caution . . .

It is inadvisable to unsolder any of the wiring connections at the microswitches except where a faulty microswitch is to be changed.

20. The microswitch assembly comprises two aluminium blocks into which are recessed two banks of microswitches, each bank being threaded on to two runners which are secured to the blocks by clamps at each end and two screws and washers situated along each bank. The procedure for renewing a faulty microswitch is as follows: —

- (1) Remove the two end clamps (each secured by two screws) which retain the switch banks.
- (2) Remove the two retaining screws and washers situated along the switch bank containing the faulty microswitch.
- (3) Unsolder the wiring connections at the faulty microswitch, suitably identifying the wires to ensure correct connection to the replacement item.
- (4) Slide out the runners from the switch bank, carefully noting the positioning of the spacer springs in the bank, and remove the faulty microswitch.
- (5) Insert a new microswitch (switch, sensitive 5930-99-947-2849) into the bank, ensuring that the switch is correctly positioned to accommodate the wiring connections.
- (6) Slide the runners into the bank, taking care that the spacer springs are correctly positioned between the switches as noted in sub-para. (4).
- (7) Re-assemble the switch bank to its associated block by reversing the order and sense

of the removal procedure in sub-para. (1) to (3).

21. The microswitches are operated by finger spring actuators which are in turn depressed by melamine cams. Individual cams and the spring actuators may be renewed in the following manner: —

- (1) Remove the four screws which secure the cam stop bar and the 0.015 in. shim to the spring clamp (fig. 5).
- (2) Extract the three split cotter pins which secure the cam pivot rod to the cam retainer block.
- (3) Take out the pivot rod complete with cams and any associated shims; if any cams require renewal proceed as follows: —
 - (a) Slide the cams and shims (if fitted) from the pivot rod, carefully noting the positions of the shims to facilitate correct re-assembly.
 - (b) Discard the faulty cams; replacement items are identified as cams, control 3040-99-970-5273 with the exception of the extreme left-hand cam (as viewed in fig. 5) which is a cam, control 3040-99-970-5272.
 - (c) Apply a fine film of oil OM-12 to the pivot rod and then assemble the cams on to the rod, ensuring that each cam rotates freely about the rod and that any shims are replaced in the positions noted in operation (a). Apply a fine film of grease XG-287 to those cam faces which contact the spring actuators.
- (4) If it is necessary to renew a spring actuator, this may be achieved by removing the three screws which secure the spring clamp or the cam retainer block as appropriate (fig. 5); the faulty spring may then be removed, a new spring substituted and the associated clamp refitted. The spring fitted under the spring clamp is identified as an adaptor, switch actuator 5930-99-970-3609 while that under the cam retainer block is an adaptor, switch actuator 5930-99-970-3670.
- (5) When the spring actuators have been fitted and their clamps secured, refit the cam pivot rod and cams into the cam retainer block and verify that the cams are centrally aligned over their respective spring fingers; any misalignment may be corrected by adding or removing shims between the cams.
- (6) Secure the cam pivot rod with three new pins, cotter, split 5315-99-120-2555.

Note . . .

Before proceeding further it is advisable to conduct an examination of the wiring to the microswitch assembly in order to verify that no damage has been sustained during servicing.

22. When servicing of the microswitch assembly has been completed, the tests described in para. 23 must be implemented to verify the following: —

- (1) With the cams depressed 0.005 in. below the top of the spring clamp, none of the

microswitches shall have operated.

(2) With the cams depressed 0.020 in. below the top of the spring clamp, all the microswitches shall have operated.

23. The test procedures for verifying the conditions of para. 22 are as follows: —

(1) Partially insert the microswitch assembly into the control unit so that the two upper securing holes of the assembly are aligned with the lower securing holes in the side plates; insert screws into these holes and, with the control unit inverted on the bench, position the microswitch assembly so that the cams are uppermost, then tighten the two screws.

(2) With the cam stop bar and 0.015 in. shim removed (para. 21 (1)), fit the microswitch

checking gauge (para. 7) so that its 0.005 in. step is towards the cams and tighten the two knurled screws.

(3) Interconnect the control unit and the test set, control unit (fig. 8) using the cable assemblies provided.

(4) Verify that the test set mains tapings are correctly adjusted to the local a.c. mains supply and then connect the test set to the mains. Operate the test set SUPPLY switch to ON and the CHANNEL switch to M.

(5) Rotate the test set DENARY switch to each of the positions indicated below and verify that only the lamps specified become illuminated; this indicates that no microswitches have been operated.

DENARY sw. posn.	Lamps								
	00/05	VHF	0/5	1/6	2/7	3/8	4/9	0/4 GP	200 GP
TENS								X	
UNITS								X	
DEC.								X	X

(6) Should any of the lamps specified in sub-para. (5) not be illuminated, the wiring may be faulty and should be investigated. The illumination of any other lamp indicates that a microswitch has operated due to an incorrectly adjusted spring actuator, in which case proceed as described in sub-para. (7) to (10).

(7) To locate an incorrectly operated microswitch, depress and release each cam in turn. A non-operated microswitch will be heard to operate by a distinct "click" as the cam is depressed, followed by a second "click" as the cam is released; these "clicks" will not be heard if the microswitch has been operated by the spring actuator. It may be found more convenient to operate the cams from right to left (viewed as in fig. 5); since the extreme left-hand cam is fitted with a pin which operates the adjacent cam, the latter must be held in the depressed position while the operation of the left-hand cam is checked.

(8) Where the check of sub para. (7) indicates that a microswitch has operated, carefully note the position of the associated cam, then remove the microswitch checking gauge and raise the cams to expose the spring actuators; carefully bend the appropriate spring finger in order to decrease the applied pressure.

(9) Return the cams to their former positions, refit the microswitch checking gauge

with its 0.005 in. step towards the cams and tighten the knurled screws. Repeat sub-para. (5).

(10) Where necessary repeat sub-para. (7) to (9) until the conditions of sub-para. (5) are satisfied.

(11) Remove the checking gauge, refit it with the 0.020 in. step towards the cams and tighten the knurled screws.

(12) Rotate the DENARY switch to each of the positions indicated below and verify that the lamps specified become illuminated; this indicates that all the microswitches have been operated.

(13) The non-illumination of any of the lamps specified in sub-para. (12) indicates that a microswitch has not operated due to an incorrectly adjusted spring actuator, in which case proceed as described in sub-para. (14) to (16).

(14) Locate the non-operated microswitch as described in sub-para. (7) and note the position of the associated cam, then remove the microswitch checking gauge and raise the cams to expose the spring actuators; carefully bend the appropriate spring finger in order to increase the applied pressure.

(15) Return the cams to their former positions, refit the microswitch checking gauge

DENARY	Lamps								
sw. posn.	·00/·05	VHF	0/5	1/6	2/7	3/8	4/9	0/4 GP	200 GP
TENS	X	X	X	X	X	X	X		
UNITS			X	X	X	X	X		
DEC.			X	X	X	X	X		

with its 0.020 in. step towards the cams and tighten the knurled screws. Repeat sub-para. (12).

(16) Repeat sub-para. (14) and (15), as necessary, until the conditions of sub-para. (12) are satisfied.

(17) The procedures of sub-para. (2), (5), (11) and (12) should now be repeated and, if necessary, re-adjustments made in accordance with sub-para. (7) to (10) and/or sub-para. (14) to (16) as appropriate until the requirements of para. 22 are satisfied.

(18) Operate the test set SUPPLY switch to OFF and uncouple the control unit.

(19) Refit the 0.015 in. shim and the cam stop bar to the spring clamp (fig. 5) and fit

the four retaining screws, applying locking varnish (para. 10 (2) and warning (1)).

(20) Apply a fine film of grease XG-287 to those cam faces which are contacted by the memory drum actuator studs.

(21) Remove the two screws securing the microswitch assembly (sub-para. (1)), gently ease the assembly into its correct position in the control unit and fit, but do not fully tighten, the four securing screws.

24. If further servicing is necessary which involves removing the memory drum assembly (para. 26 to 31), this must now be undertaken; otherwise proceed with positioning the micro-switch assembly (para. 32).

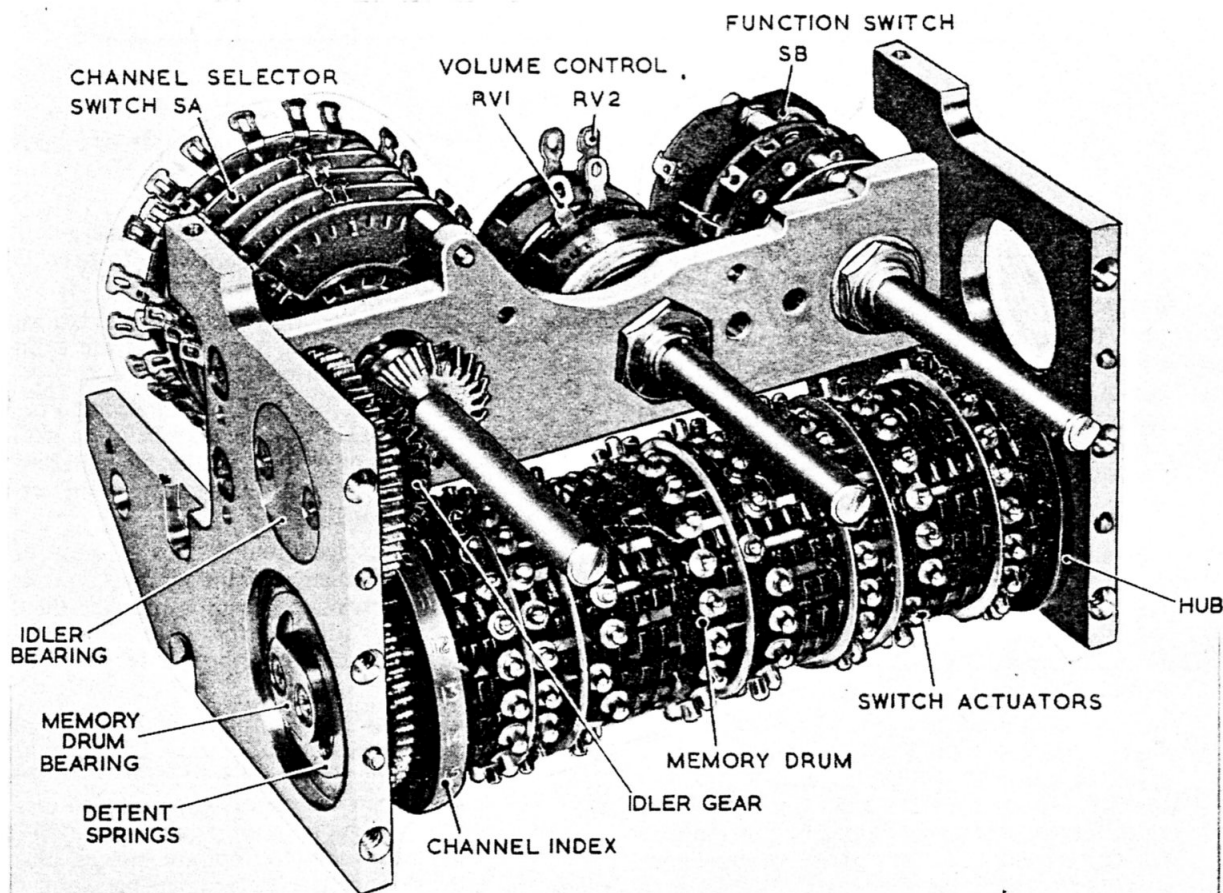


Fig. 6. Operating control assembly

Operating control assembly

25. The operating control assembly (fig. 6) comprises the channel selector switch and associated memory drum, the volume control and the function switch; this assembly is secured to the front panel by six screws.

26. Servicing of the memory drum assembly is usually confined to renewing switch actuator studs (para. 27). However, where necessary the assembly may be renewed as a complete item with the detent wheel and channel indicator pinned to the shaft. Removal of the memory drum assembly from the control unit is as follows: —

- (1) Remove the four screws which secure the microswitch assembly and gently ease this assembly clear of the memory drum studs.
- (2) Remove the bearing (secured by two screws) from the hub end of the memory drum assembly, taking care not to lose any associated shims.
- (3) Remove the bearing and two detent springs (secured by two screws) from the detent end of the memory drum assembly and remove the detent ball from its socket.
- (4) Withdraw the memory drum from the control unit.

Note . . .

It should be appreciated that the actuator studs, when fitted to the memory drum, must conform to the following requirements: —

- (1) In any circular row any variation in the height of the studs, relative to the axis of the drum, shall not exceed 0.009 in.
- (2) On the entire memory drum the variation in height between any two studs, relative to the axis of the drum, shall not exceed 0.020 in.

Failure to meet these requirements could give rise to difficulties in performing the adjustment of the microswitch assembly (para. 32) by causing the cams to bottom on the stop; this will necessitate renewal of the unsatisfactory studs.

27. The procedure for renewing worn, damaged or otherwise unsatisfactory switch actuator studs (see note) is as follows: —

- (1) Remove the nut from the hub end of the shaft and slide off the spring, hub and drum.
- (2) Unsolder the section dividing rings as necessary to enable the defective studs to be moved to the ends of the drum in order to facilitate removal.
- (3) Using an adjuster, spring 5120-99-943-7464 remove the circlip, washer, helical spring and second washer (in that order) from each defective stud and fit new studs in the reverse manner.
- (4) Ensure that all studs are moved to their

respective sections and then solder the dividing rings in position.

(5) Refit the drum on to the shaft so that the shorter axial slots are towards the detent wheel; align the row of fixed studs with the letter M on the channel indicator and engage the slots in the end of the drum with the locating dowels on the channel indicator.

(6) Fit the hub, engaging its locating dowels with the slots in the end of the drum, locate the spring in the slots in the hub face and secure the assembly with the end nut.

28. With the memory drum assembly removed access is gained to the retaining nuts of the function switch and the volume control; removing the control unit rear panel (secured by four screws) gives access to the wiring connections. Renewal is then effected by removing the control knobs (each secured by two grub screws), unsoldering the wiring, removing the retaining nuts and the components and then fitting new items in the reverse manner.

29. When fitting the memory drum into the control unit, it is important to ensure that the relative alignment of the drum with the channel selector switch is correct; to achieve this fit the memory drum as follows: —

- (1) Ensure that the CHAN switch is set to G, then locate the memory drum assembly in position so that channel 11 is centrally positioned in the PRESET CHAN aperture of the front panel.
- (2) Apply a fine film of grease XG-287 between the two detent springs and then place these springs on the detent end bearing; insert the detent ball into its socket in the side plate and secure the bearing and springs to the side plate with two screws.
- (3) At the hub end of the drum fit shims as necessary to give 0.005 in. clearance and secure the bearing in position with two screws.
- (4) Rotate the CHAN switch slowly through each of its positions, verifying at each position that the channel number on the knob is directly opposite the indicating pointer and that the rotor blades of the switch wafers are centrally positioned within their respective contacts (where applicable).
- (5) Any serious misalignment between the channel selector switch and the memory drum assembly will necessitate renewal of the channel selector switch shaft and bevel gear (para. 31).
- (6) Gently ease the microswitch assembly into the control unit until its fixing holes are aligned and then insert, but do not fully tighten, the four screws.

30. The idler gear comprises a bevel gear and a spur gear which engage with the channel selector switch shaft and the memory drum assembly

respectively. Since the two gears are cut independently, idler gears are not necessarily interchangeable and changing an idler gear could cause misalignment between the channel selector switch and the memory drum. Thus if the idler gear requires renewal this will necessitate fitting a new channel selector switch shaft and bevel gear because these must be pinned together. For this reason, the procedure for changing the idler gear is included with that for changing the channel selector switch shaft and bevel gear (para. 31).

31. If the channel selector switch shaft or the bevel gear become damaged, both the shaft and the gear must be changed since the gear is pinned to the shaft; this also applies if there is any misalignment of the mechanism (para. 29 (4) and (5)) or if it is necessary to change the idler gear (para. 30). The procedure is as follows: —

- (1) Slacken the two grub screws of the CHAN switch control knob and remove the knob.
- (2) Remove the memory drum assembly (para. 26).
- (3) Take out the four screws which secure the control unit rear panel and, taking care not to strain the cableform, move the panel to expose the rear of the channel selector switch.
- (4) Remove the two screws which secure the channel selector switch wafers SA1 to 5, taking care not to lose the locking washer and six spacers associated with each screw.
- (5) Remove the switch wafers from the channel selector switch shaft, unsoldering wires as required; it will not be necessary to unsolder wiring where it is possible to remove a wafer without straining the wires or terminations. Remove the locating wire from the shaft and retain this item for fitting to the new shaft.
- (6) Remove the two screws which secure the idler gear bearing shaft to the left-hand side plate and remove the shaft, idler gear and any associated shims; where the idler gear is to be renewed discard the faulty gear, otherwise it must be retained for subsequent refitting.
- (7) Carefully punch out the pin which secures the bevel gear to the selector switch shaft.
- (8) Remove the retaining circlip from the switch shaft and withdraw the shaft together with the stop plate and any associated shims from the rear of the control unit, at the same time removing the bevel gear.
- (9) Slide the stop plate from the shaft and fit it on to the new shaft, shouldered 3040-99-975-5624; insert this shaft into the control unit from the rear, ensuring that the smaller pin of the stop plate is located in the elongated hole in the mounting plate, and sliding the new gear, bevel 3020-99-970-5622 on to the front end of the shaft with its bush towards the rear.
- (10) Secure the shaft with the circlip; it may be necessary to fit shims 5305-99-948-7309 and/or 5305-99-948-7421 between the

stop plate and the mounting plate in order to minimize end play.

(11) Fit the idler gear and its bearing shaft, securing the shaft with two screws; where a new idler gear is to be fitted, this is identified as a gear, cluster 3020-99-970-5271.

(12) Fully mesh the bevel gear on the switch shaft with the idler gear, ensuring that backlash is minimal, and then tighten the grub screw to secure the bevel gear to the shaft; it may be necessary to fit shims 5340-99-8369 and/or 5340-99-970-8640 behind the idler gear in order to achieve correct alignment of the bevel gears.

(13) Fit the locating wire (retained from sub-para. (5)) to the switch shaft so that the rear end of the wire is inserted in the chamfered end of its retaining hole.

(14) Re-assemble the switch wafers SA1 to 5 on to the shaft; each wafer is marked with a cross (X) adjacent to one of the fixing holes and must be positioned so that this cross is towards the top and facing the front of the control unit. Secure the wafers using the two screws and locking washers and twelve spacers. Solder all wires disconnected during dismantling, referring to table 1 and fig. 9.

(15) Fit the control knob on the channel selector switch shaft and tighten the grub screws.

(16) Rotate the CHAN switch fully counter-clockwise against the stop to position G; verify that the rotor blade of the rear switch wafer is centrally positioned within the contact immediately to the right of the lower securing screw (as viewed from the rear).

(17) Fit the memory drum assembly in accordance with para. 29(1) to (3); if this causes any movement of the switch from the setting in sub-para. (16) above, slacken the grub screw of the switch shaft bevel gear, re-adjust the shaft to meet the requirements of sub-para. (16) and then, ensuring that backlash is minimal, tighten the grub screw.

(18) Remove the memory drum assembly (para. 26 (2) and (3)) and fit the drilling jig (Plessey T.407427) to the side plates of the control unit.

(19) Drill through the bevel gear and shaft, via the pilot hole in the gear, using a $\frac{1}{8}$ in. drill; fit a pin, spring 5315-99-107-5254 in the hole by means of the roll pin applicator Ref. No. 10AG/945. Take off the drilling jig and remove the grub screw from the bevel gear.

(20) Refit the memory drum in accordance with para. 29 (1) to (6) and then secure the control unit rear panel to the side plates using the four screws.

Positioning of microswitch assembly

32. If it has been necessary to remove the memory drum assembly and/or the microswitch assembly, the position of the microswitch assembly relative

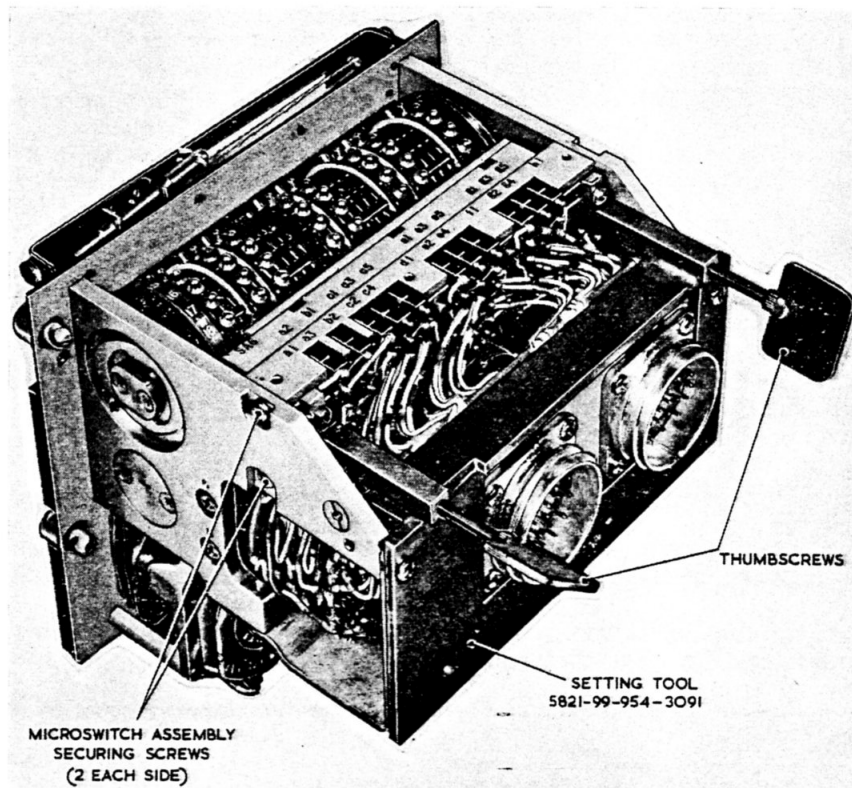


Fig. 7. Control unit with setting tool fitted

to the memory drum must be adjusted in the following manner: —

- (1) On the setting tool 5821-99-954-3091, turn the two thumbscrews counter-clockwise so that there is no protrusion of the screws from the ends of the pillars.
- (2) Remove the two screws which secure the control unit rear panel to the rear ends of the side plates and use these screws to secure the

setting tool to the rear of the control unit (fig. 7).

- (3) With its securing screws slackened, move the microswitch assembly away from the memory drum until the rear of the microswitch assembly is pressed against the ends of the pillars on the setting tool; verify that as the CHAN switch is rotated none of the cams

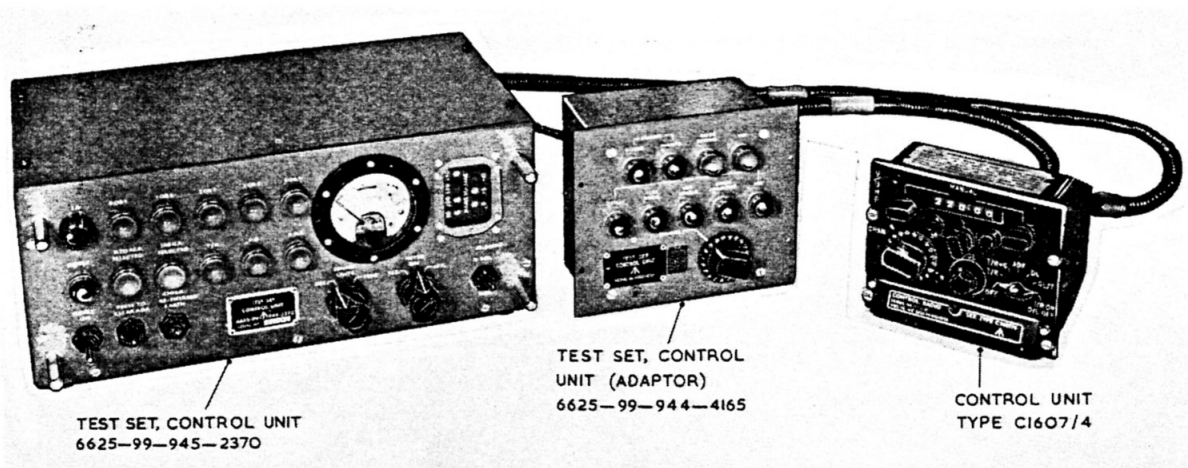


Fig. 8. Control unit arranged for testing

are depressed by the memory drum actuator studs.

(4) Move the microswitch assembly towards the memory drum, by slowly and uniformly rotating the setting tool thumbscrews clockwise, until all the microswitches are just operated when the memory drum actuator studs are set to the appropriate positions.

(5) Rotate both thumbscrews a further quarter-turn clockwise, thus moving the microswitch assembly forward by another 0.006 in. approximately.

(6) Rotate the CHAN switch to ensure that the cams do not bottom on the stop when operated by the actuating studs (see para. 26 note). Tighten the microswitch securing screws.

(7) Interconnect the control unit and the test set, control unit (fig. 8) using the cable assemblies provided. Verify that the test set mains tappings are correctly adjusted to the local a.c. mains supply and then connect the test set to the mains.

(8) Operate the test set SUPPLY switch to ON, the CHAN switch to M and the MANUAL controls to 220.00.

(9) On the test set turn the DENARY switch to TENS; the CHECK RE-ENTRANT EARTH switch

should be up and the METER switch OFF. Verify that the lamps designated 200 GP SELECTED, 0 TO 4 GP SELECTED and 2 OR 7 are illuminated.

(10) Operate the CHECK RE-ENTRANT EARTH switch; only the 2 OR 7 lamp should remain illuminated.

(11) Set all the adjustable preset channels to each of five frequencies in turn as detailed in Table 4; operate the test set in accordance with this table and verify that the lamp indications are as specified for all channels.

(12) If a fault is evident, loosen the microswitch assembly securing screws and repeat the procedures described in sub-para. (1), (3), (4), (5) and (6), then repeat the tests described in sub-para. (9) and (10).

(13) Remove the setting tool by reversing the procedure in sub-para. (2).

Functional tests

33. Arrange the control unit for testing in accordance with para. 32 (7).

34. Verify the operation of the function switch circuits, with the control unit G/DL switch set to G, by rotating the function switch and confirming the following test set lamp indications: —

Switch position	Lamps illuminated
OFF	Nil
T/R	SUPPLY, HSR DISABLE, SIGNAL CONVERTER, HSR
T/R + G	SUPPLY, GUARD, HSR DISABLE, SIGNAL CONVERTER, HSR
ADF	SUPPLY, ADF, HSR DISABLE, SIGNAL CONVERTER, HSR
DL	SUPPLY, DISPLAY, SIGNAL CONVERTER, HSR
DL/T	SUPPLY, DISPLAY, SIGNAL CONVERTER, TEST SIGNAL, HSR
T/R ON DL OFF	SUPPLY, HSR DISABLE, HSR

35. Set the control unit G/DL switch to DL and again rotate the function switch; the lamp indications should be as follows: —

Switch position	Lamps illuminated
OFF	NIL
T/R	SUPPLY, HSR DISABLE, SIGNAL CONVERTER, HSR
T/R + G	SUPPLY, HSR DISABLE, SIGNAL CONVERTER, HSR
ADF	SUPPLY, ADF, HSR DISABLE, SIGNAL CONVERTER, HSR
DL	SUPPLY, GUARD, DISPLAY, SIGNAL CONVERTER, HSR
DL/T	SUPPLY, GUARD, DISPLAY, TEST SIGNAL, SIGNAL CONVERTER, HSR
T/R ON DL OFF	SUPPLY, HSR DISABLE, HSR

WARNING . . .

When testing the control unit VOL control, resistor R1801 in the control unit becomes overheated if the test set METER switch is set to ATT and the VOL control is turned fully counter-clockwise for a period of time. Testing of the VOL control only takes a few seconds and, when the test is completed, the VOL control must be immediately turned fully clockwise and, as an additional safeguard, the METER switch turned away from the ATT position.

36. Test the operation of the VOL control in the following manner:—

- (1) Operate the test set METER switch to RES.
- (2) Rotate the VOL control through its full range and note the change in the test set meter reading; this should be between the two calibration marks on the dial.
- (3) Turn the METER switch to ATT and the DB RANGE switch to 0·5dB.
- (4) Rotate the VOL control fully clockwise; the reading should not exceed 0·4dB.

(5) Set the dB RANGE switch to 35dB, turn the VOL control fully counter-clockwise (see warning); the reading should be not less than 35dB.

37. Verify the functions of the MANUAL switches by setting the CHAN switch to M and selecting frequencies in accordance with Table 5; the test set controls should be as stated in the table and the lamps should be illuminated as specified.

38. Test the preset channel circuits by setting up the channels in accordance with Table 6 and rotating the control unit CHAN switch to the appropriate position for the particular test. As the CHAN switch is rotated, simultaneously set the test set switch to the same position and verify that the M-UNITS and G-TENS lamps light to indicate the channel number.

39. If the tests reveal faults in the control unit, the multimeter CT498 should be used to conduct a point-to-point continuity test, referring to Table 1 and fig. 9.

40. When testing has been completed satisfactorily, switch off the test set, uncouple the control unit and refit its cover.

TABLE 4
Microswitch test settings

Memory drum setting	Test set switches		Test set lamps										
	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	00/05	V.I.L.F.	G-TENS	M-UNITS
100-00	DEC	Up		X	X							X	
366-65	DEC	Up				X				X			
277-75	DEC	Up					X			X			
288-85	DEC	Up						X		X			
299-95	DEC	Up							X	X			
100-00	DEC	Down			X							X	
366-65	DEC	Down			X	X				X			
277-75	DEC	Down			X	X	X			X			
288-85	DEC	Down			X	X		X		X			
299-95	DEC	Down			X	X			X	X			
100-00	UNITS	Up		X	X							X	
366-65	UNITS	Up				X				X			
277-75	UNITS	Up					X			X			
288-85	UNITS	Up						X		X			
299-95	UNITS	Up							X	X			
100-00	UNITS	Down			X							X	
366-65	UNITS	Down			X	X				X			
277-75	UNITS	Down			X	X	X			X			
288-85	UNITS	Down			X	X		X		X			
299-95	UNITS	Down			X	X			X	X			
100-00	TENS	Up		X	X							X	
366-65	TENS	Up				X				X			
277-75	TENS	Up	X				X			X			
288-85	TENS	Up	X					X		X			
299-95	TENS	Up	X						X	X			
100-00	TENS	Down			X	X						X	
366-65	TENS	Down			X	X				X			
277-75	TENS	Down			X	X	X			X			
288-85	TENS	Down			X	X		X		X			
299-95	TENS	Down			X	X			X	X			

TABLE 5
Manual frequency selection tests

Control unit MANUAL switches			Test set switches		Test set lamps											
Hundreds and tens	Units	Deci- mals	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS	
11	0	00	TENS	Down				X	X				X		X	
12	0	00	TENS	Down					X	X			X		X	
13	0	00	TENS	Down						X	X		X		X	
14	0	00	TENS	Down			X				X				X	
15	0	00	TENS	Down			X	X							X	
16	0	00	TENS	Down				X	X						X	
17	0	00	TENS	Down					X	X					X	
18	0	00	TENS	Down						X	X				X	
19	0	00	TENS	Down			X				X				X	
20	0	00	TENS	Down											X	
21	0	00	TENS	Down											X	
22	0	00	TENS	Down					X						X	
23	0	00	TENS	Down						X					X	
24	0	00	TENS	Down							X				X	
25	0	00	TENS	Down			X	X							X	
26	0	00	TENS	Down				X	X						X	
27	0	00	TENS	Down					X	X					X	
28	0	00	TENS	Down						X	X				X	
29	0	00	TENS	Down			X				X				X	
30	0	00	TENS	Down			X	X							X	

Manual frequency selection tests

[illegible]

TABLE 5 (cont.)
Manual frequency selection tests

Control unit MANUAL switches			Test set switches		Test set lamps											
Hundreds and tens	Units	Deci- mals	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS	
22	0	00	TENS	Up	X	X			X						X	
23	0	00	TENS	Up	X	X				X					X	
24	0	00	TENS	Up	X	X					X				X	
25	0	00	TENS	Up	X		X								X	
26	0	00	TENS	Up	X			X							X	
27	0	00	TENS	Up	X				X						X	
28	0	00	TENS	Up	X					X					X	
29	0	00	TENS	Up	X						X				X	
30	0	00	TENS	Up		X	X								X	
31	0	00	TENS	Up		X		X							X	
32	0	00	TENS	Up		X			X						X	
33	0	00	TENS	Up		X				X					X	
34	0	00	TENS	Up		X					X				X	
35	0	00	TENS	Up			X								X	
36	0	00	TENS	Up				X							X	
37	0	00	TENS	Up					X						X	
38	0	00	TENS	Up						X					X	
39	0	00	TENS	Up							X				X	
20	0	00	UNITS	Up		X	X								X	
20	1	00	UNITS	Up		X		X							X	

TABLE 5 (cont.)
Manual frequency selection tests

Control unit MANUAL switches			Test set switches		Test set lamps											
Hundreds and tens	Units	Deci- mals	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS	
20	2	00	UNITS	Up		X			X						X	
20	3	00	UNITS	Up		X				X					X	
20	4	00	UNITS	Up		X					X				X	
20	5	00	UNITS	Up			X								X	
20	6	00	UNITS	Up				X							X	
20	7	00	UNITS	Up					X						X	
20	8	00	UNITS	Up						X					X	
20	9	00	UNITS	Up							X				X	
20	0	00	UNITS	Down			X								X	
20	1	00	UNITS	Down				X							X	
20	2	00	UNITS	Down					X						X	
20	3	00	UNITS	Down						X					X	
20	4	00	UNITS	Down							X				X	
20	5	00	UNITS	Down			X	X							X	
20	6	00	UNITS	Down				X	X						X	
20	7	00	UNITS	Down					X	X					X	
20	8	00	UNITS	Down						X	X				X	
20	9	00	UNITS	Down						X	X				X	
20	0	00	DEC	Down			X								X	
20	0	05	DEC	Down			X					X			X	

TABLE 5 (cont.)
Manual frequency selection tests

Control unit MANUAL switches			Test set switches		Test set lamps										
Hundreds and tens	Units	Deci- mals	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	00/05	V.H.F.	G-TENS	M-UNITS
20	0	10	DEC	Down				X							X
20	0	15	DEC	Down				X				X			X
20	0	20	DEC	Down					X						X
20	0	25	DEC	Down					X			X			X
20	0	30	DEC	Down						X					X
20	0	35	DEC	Down						X		X			X
20	0	40	DEC	Down							X				X
20	0	45	DEC	Down							X	X			X
20	0	50	DEC	Down			X	X							X
20	0	55	DEC	Down			X	X				X			X
20	0	60	DEC	Down				X	X						X
20	0	65	DEC	Down				X	X			X			X
20	0	70	DEC	Down					X	X					X
20	0	75	DEC	Down					X	X		X			X
20	0	80	DEC	Down						X	X				X
20	0	85	DEC	Down						X	X	X			X
20	0	90	DEC	Down			X				X				X
20	0	95	DEC	Down			X				X	X			X
20	0	00	DEC	Up		X	X								X
20	0	05	DEC	Up		X	X					X			X

TABLE 5 (cont.)
Manual frequency selection tests

Control unit MANUAL switches			Test set switches		Test set lamps										
Hundreds and tens	Units	Deci- mals	DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS
20	0	10	DEC	Up		X		X				X			X
20	0	15	DEC	Up		X		X				X			X
20	0	20	DEC	Up		X			X						X
20	0	25	DEC	Up		X			X			X			X
20	0	30	DEC	Up		X				X					X
20	0	35	DEC	Up		X				X		X			X
20	0	40	DEC	Up		X					X				X
20	0	45	DEC	Up		X					X	X			X
20	0	50	DEC	Up			X								X
20	0	55	DEC	Up			X					X			X
20	0	60	DEC	Up				X							X
20	0	65	DEC	Up				X				X			X
20	0	70	DEC	Up					X						X
20	0	75	DEC	Up					X			X			X
20	0	80	DEC	Up						X					X
20	0	85	DEC	Up						X		X			X
20	0	90	DEC	Up							X				X
20	0	95	DEC	Up							X	X			X

TABLE 6
Preset frequency selection tests

Control unit		Test set switches		Test set lamps										
CHAN	Frequency	DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP									
				SELECTED	SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS
G	243·00	TENS	Up	X	X					X			X	
		UNITS	Up		X				X				X	
		DEC	Up		X	X							X	
1	225·05	TENS	Up	X	X			X			X			X
		UNITS	Up			X					X			X
		DEC	Up		X	X					X			X
2	235·10	TENS	Up	X	X				X					X
		UNITS	Up			X								X
		DEC	Up		X		X							X
3	246·05	TENS	Up	X	X					X	X			X
		UNITS	Up				X				X			X
		DEC	Up		X	X					X			X
4	254·20	TENS	Up	X		X								X
		UNITS	Up		X					X				X
		DEC	Up		X			X						X
5	267·35	TENS	Up	X			X				X			X
		UNITS	Up					X			X			X
		DEC	Up		X				X		X			X

TABLE 6 (cont.)
Preset frequency selection tests

Control unit		Test set switches		Test set lamps													
CHAN	Frequency		DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP											
					SELECTED	SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	00/05	V.H.F.	G-TENS	M-UNITS		
6	275.00	{	TENS	Up	X					X					X		
			UNITS	Up							X			X			
			DEC	Up			X	X						X			
7	288.05	{	TENS	Up	X						X		X		X		
			UNITS	Up							X		X		X		
			DEC	Up			X	X					X		X		
8	295.40	{	TENS	Up	X							X			X		
			UNITS	Up					X						X		
			DEC	Up			X					X			X		
9	309.25	{	TENS	Up			X	X					X		X		
			UNITS	Up								X	X		X		
			DEC	Up			X			X			X		X		
10	119.30	{	TENS	Up			X		X					X	X	X	
			UNITS	Up								X		X	X	X	
			DEC	Up			X				X			X	X	X	
11	121.55	{	TENS	Up			X			X			X	X	X	X	
			UNITS	Up			X			X				X	X	X	X
			DEC	Up					X					X	X	X	X

TABLE 6 (cont.)

Preset frequency selection tests

Control unit		Test set switches		Test set lamps										
CHAN Frequency		DENARY	CHECK RE-ENTRANT EARTH	200 GP SELECTED	0 TO 4 GP SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	00/05	V.H.F.	G-TENS	M-UNITS
12	135-60	TENS	Up		X				X			X	X	X
		UNITS	Up			X						X	X	X
		DEC	Up				X					X	X	X
13	341-95	TENS	Up		X					X	X		X	X
		UNITS	Up		X		X				X		X	X
		DEC	Up							X	X		X	X
14	350-70	TENS	Up			X							X	X
		UNITS	Up		X	X							X	X
		DEC	Up					X					X	X
15	362-95	TENS	Up				X				X		X	X
		UNITS	Up		X			X			X		X	X
		DEC	Up							X	X		X	X
16	375-80	TENS	Up					X					X	X
		UNITS	Up				X						X	X
		DEC	Up						X				X	X
17	383-95	TENS	Up						X		X		X	X
		UNITS	Up		X				X		X		X	X
		DEC	Up							X	X		X	X

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TABLE 6 (cont.)
Preset frequency selection tests

Control unit		Test set switches		Test set lamps										
CHAN	Frequency	DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP									
				SELECTED	SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/-05	V.H.F.	G-TENS	M-UNITS
18	399·90	TENS	Up								X		X	X
		UNITS	Up								X		X	X
		DEC	Up								X		X	X
M	110·00	TENS	Up		X		X					X		X
		UNITS	Up		X	X						X		X
		DEC	Up		X	X						X		X
G	243·00	TENS	Down								X		X	
		UNITS	Down						X				X	
		DEC	Down			X							X	
1	225·05	TENS	Down					X				X		X
		UNITS	Down			X	X					X		X
		DEC	Down			X						X		X
2	235·10	TENS	Down						X					X
		UNITS	Down			X	X							X
		DEC	Down				X							X
3	246·05	TENS	Down							X	X			X
		UNITS	Down			X	X					X		X
		DEC	Down			X						X		X

TABLE 6 (cont.)
Preset frequency selection tests

Control unit		Test set switches		Test set lamps										
CHAN	Frequency	DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP									
				SELECTED	SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9	·00/·05	V.H.F.	G-TENS	M-UNITS
4	254·20	TENS	Down			X	X							X
		UNITS	Down							X				X
		DEC	Down					X						X
5	267·35	TENS	Down			X	X				X			X
		UNITS	Down			X	X	X			X			X
		DEC	Down						X		X			X
6	275·00	TENS	Down			X	X	X						X
		UNITS	Down			X	X							X
		DEC	Down			X								X
7	288·05	TENS	Down			X	X		X		X			X
		UNITS	Down			X	X		X		X			X
		DEC	Down			X					X			X
8	295·40	TENS	Down			X	X			X				X
		UNITS	Down			X	X							X
		DEC	Down							X				X
9	309·25	TENS	Down			X	X				X			X
		UNITS	Down			X	X			X	X			X
		DEC	Down					X			X			X

TABLE 6 (cont.)

Preset frequency selection tests

Control unit		Test set switches		Test set lamps															
CHAN	Frequency		DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP										·00/·05	V.H.F.	G-TENS	M-UNITS
					SELECTED	SELECTED	0 OR 5	1 OR 6	2 OR 7	3 OR 8	4 OR 9								
10	119·30	{	TENS	Down			X	X							X	X	X		
			UNITS	Down			X	X					X		X	X	X		
			DEC	Down							X				X	X	X		
11	121·55	{	TENS	Down			X	X	X					X	X	X	X		
			UNITS	Down					X						X	X	X	X	
			DEC	Down			X	X							X	X	X	X	
12	135·60	{	TENS	Down			X	X				X			X	X	X		
			UNITS	Down			X	X							X	X	X	X	
			DEC	Down			X	X							X	X	X	X	
13	341·95	{	TENS	Down			X	X					X	X		X	X		
			UNITS	Down					X						X		X	X	
			DEC	Down			X	X					X	X		X	X	X	
14	350·70	{	TENS	Down			X	X								X	X		
			UNITS	Down			X									X	X	X	
			DEC	Down			X	X	X							X	X	X	
15	362·95	{	TENS	Down			X	X						X		X	X		
			UNITS	Down						X					X		X	X	
			DEC	Down			X	X					X	X		X	X	X	

TABLE 6 (cont.)
Preset frequency selection tests

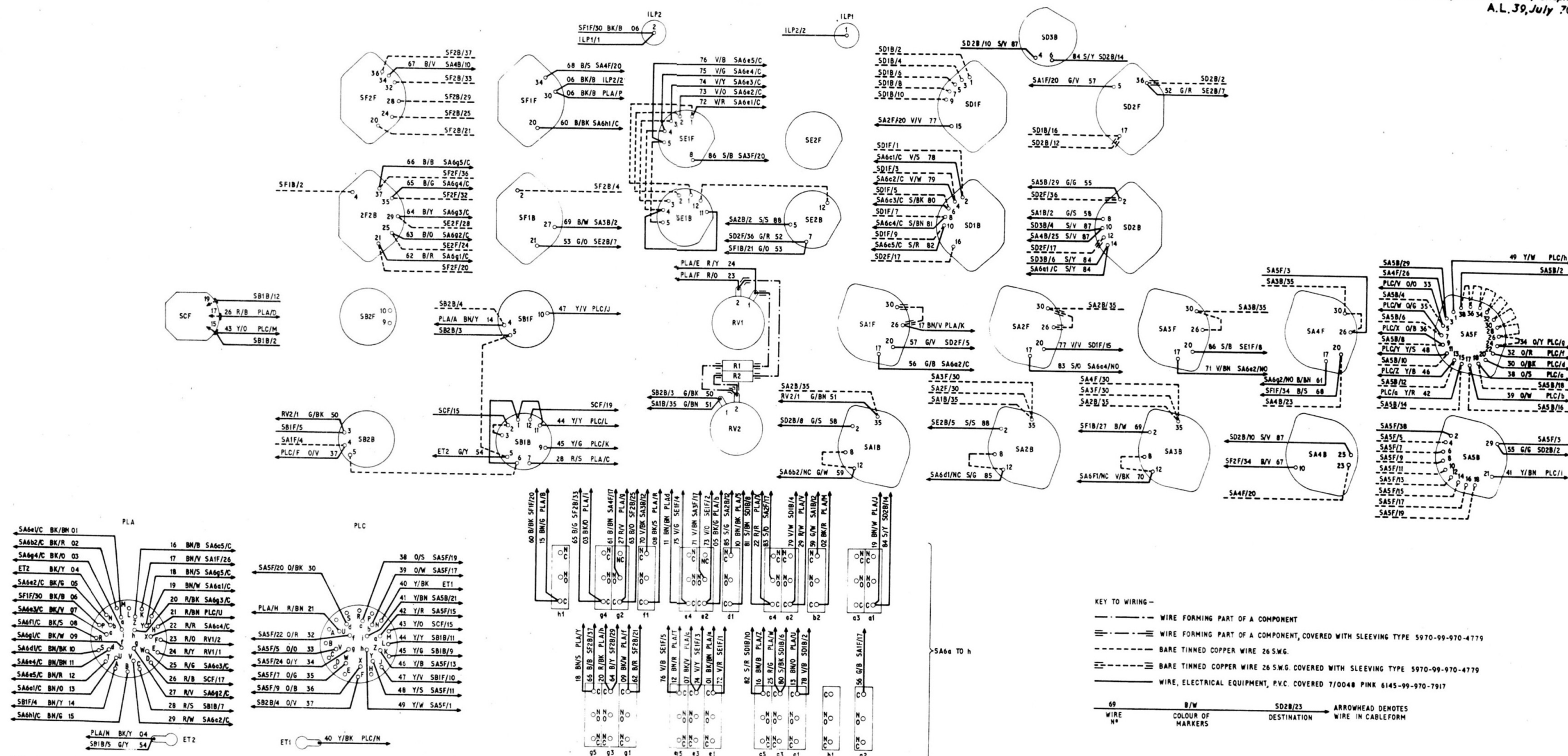
Control unit		Test set switches		Test set lamps															
CHAN	Frequency	DENARY	CHECK RE-ENTRANT EARTH	200 GP	0 TO 4 GP	0 OR 5		1 OR 6		2 OR 7		3 OR 8		4 OR 9		·00/·05	V.H.F.	G-TENS	M-UNITS
				SELECTED	SELECTED														
16	375·80	TENS	Down			X		X		X								X	X
		UNITS	Down			X		X										X	X
		DEC	Down			X		X				X						X	X
17	383·95	TENS	Down			X		X				X			X			X	X
		UNITS	Down									X			X			X	X
		DEC	Down			X		X					X		X			X	X
18	399·90	TENS	Down			X		X						X				X	X
		UNITS	Down			X		X						X				X	X
		DEC	Down			X		X						X				X	X
M	110·00	TENS	Down					X		X							X		X
		UNITS	Down			X											X		X
		DEC	Down			X											X		X

TABLE 7
Modifications

Mod. No.	Class	Leaflet	Topic-2 A.L.	Label No.	Brief details of change
8313	B/3 (R.A.F.) B/2 (R.N.)	B107	165 and 206	1	Change of melamine cams on early equipments.
8911	B/3 (R.A.F.) B/4 (R.N.)	B133	196	2	Replacement of one ball bearing in index mechanism by an additional spring.
9124	B/3 (R.A.F.) B/3 at 3rd line (R.N.)	B132	195	3	Dial hub on memory drum assembly modified to facilitate method of fixing on shaft.
9396	B/3 (W.O.T.S.A.C.)	B135	198 and 215	4	Substitution of variable attenuator 5905-99-954-3548, in place of variable attenuator 5905-99-970-8632.
9479	B/2	B138	203 and 207	5	Prevention of malfunction of the microswitches by adding a shim under the cam retaining bar of the channel change mechanism.
0764	C/3	B176	264, 280 and 289	6	Reduce length of boss of gear to prevent earthing on rotor of hundreds switch.
1763	S.O.O. (R.A.F. for Harrier A/C)			N/A	Replacement of the luminescent front panel. Unit re-identified as Control radio set Type C1607/9 (5821-99-223-8189).
1764	C/3			7	Elevation of channel selector pointer.

Note . . .

For details of these modifications and the method used to incorporate them reference should be made to the appropriate leaflets in A.P.116D-0133-2 (formerly A.P.2531J, Vol. 2).



AIR DIAGRAM-MIN
116D-0133-MD82
BY COMMAND OF THE DEFENCE COUNCIL FOR USE IN THE
NAVAL SERVICE/ROYAL AIR FORCE
ISSUE 1 Prepared by the Ministry of Technology

FORMERLY 6150P

Controls, radio set, 5821-99-945-5739 (Type C1607/4)
and 5821-99-223-8189 (Type C1607/9)-wiring diagram

Fig. 9