

## Appendix 1

## CONTROL, RADIO SET, TYPE C1607/4

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**Introduction**

1. The tuning system employed in PTR175 equipments is identical with that used in the ARC52, being based on the tuning unit (mechanical), 5821-99-942-8549, and is described in Chap. 2 of this Part which should be read in conjunction with this appendix. The Type C1607/4 control unit only is used with PTR175 type equipments, however, and this description covers the differences between the Type C1607/4 and the earlier editions, these latter being described in detail in the main part of this Chapter.

2. The sub-units of the PTR175 equipments which are tunable are as follows:—

- (1) Spectrum generator
- (2) Oscillator unit
- (3) R.F. power amplifier
- (4) 1st i.f. unit (20-30 Mc/s)
- (5) V.H.F./u.h.f. r.f. amplifier

3. Of the above sub-units, only the last mentioned is tuned differently from its corresponding sub-unit in the ARC52.

4. The u.h.f. section of the v.h.f./u.h.f. r.f. amplifier has both variable capacitors and inductors in its tuned circuits, whereas variable capacitors only are tuned in the v.h.f. section. The mechanical drive for both sections is obtained from the 10 Mc/s and 1.0 Mc/s differential shaft. The drive to the u.h.f. section is direct and the shaft rotates in 360 steps of  $\frac{1}{2}$  degree following a linear law of one degree per megacycle. The v.h.f. section, however, only requires tuning through 30 Mc/s so the drive is applied through gearing such that the tuning shaft rotates through 6 degrees per megacycle interval. The tuning arrangement is shown schematically in fig. 1.

Since the tuning system is uni-directional, the rotation has to be maintained beyond the tuning range of the components so as to carry them through the unused sector.

**Control, radio set, Type C1607/4: circuits**

5. The circuits of the Type C1607/4 are very similar to those of the earlier control units described in Chap. 2, para. 36 et seq, but additional switching is incorporated to accommodate the increased facilities provided by the Type C1607/4. The corresponding switches, as considered from a functional standpoint, are as follows (fig. 2 at the end of this Appendix and Chap. 2, fig. 5):—

<b>C1607/ARC52</b>	<b>C1607/4</b>
S1801	SB
S1802	SA6
S1803 and S1804	SD
S1805	SE
S1806	SF
S1807A	SA1
S1807B	SA2
S1807C	SA3
S1807D	SA4

6. SB is the function switch and since the additional positions that it carries are not used in PTR175 type installations, its operation is identical with S1801 in this application; wafers SB1B and SB1F corresponding to S1801B and S1801F respectively.

7. Switches SD, SE and SF are used for manual frequency selection. Whereas separate switches (S1803 and S1804) are used for hundreds and tens selection in earlier editions of the control unit, their function is combined in one switch, SD, in

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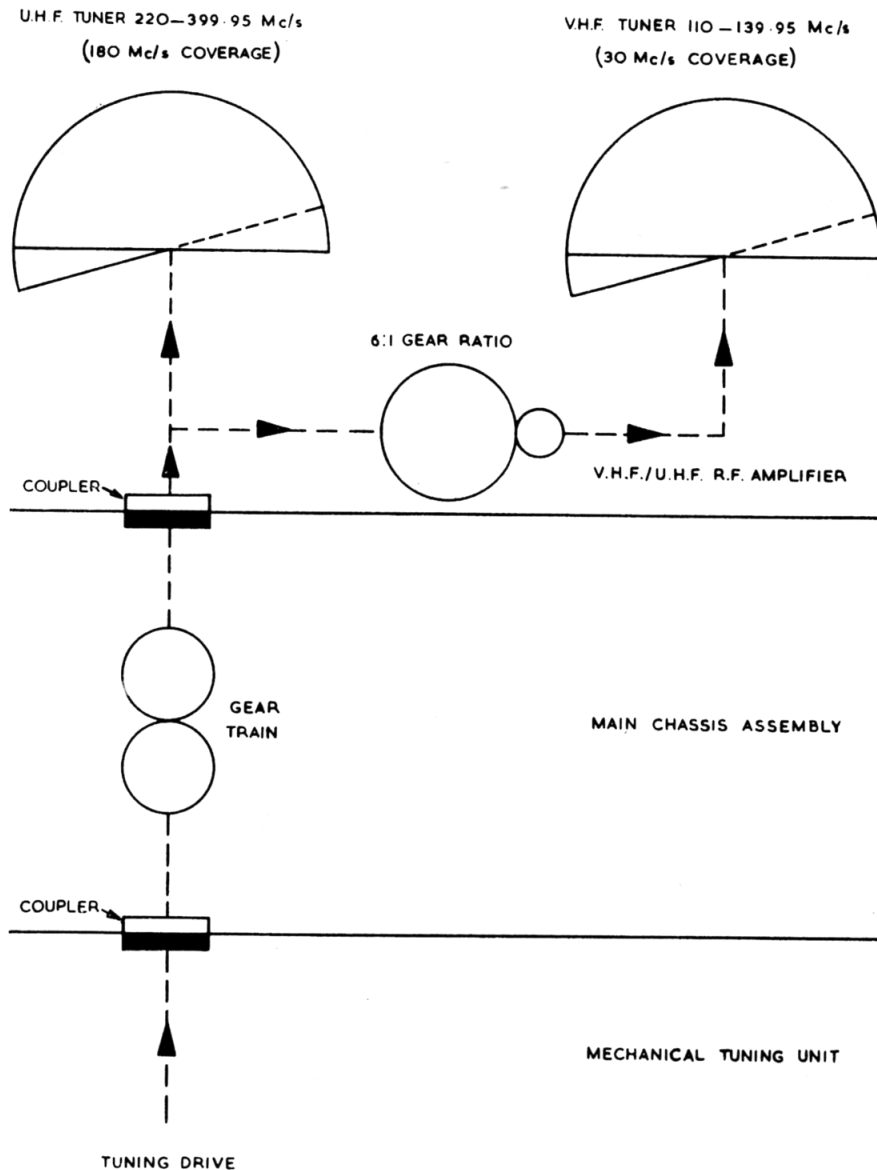


Fig. 1. V.H.F./u.h.f. r.f. amplifier: tuning arrangement

the C1607/4. Wafer SD3B is additional, and this controls the u.h.f./v.h.f. changeover relays. When a v.h.f. frequency is selected, the earth on SA4F is connected via contact 20 to SA4B contacts 23 and 25 and thence via SD3B to pole J of PLA. Connection from this pole is made to the relay unit and the v.h.f./u.h.f. r.f. amplifier, thereby completing the relay circuits which effect the changeover switching. Wafer SF1F is also additional and this is used for 50 kc/s channel selection. When a frequency at a 50 kc/s point is selected, the earth on SA4F is connected via contacts 34 and 20 of SF1F to pole B of PLA and thence to the diode switching circuits in the i.f. amplifier units.

8. For automatic frequency selection, switches SA1 to SA6 inclusive are operational. Again, these correspond closely to S1807 and S1802 in earlier versions of the control unit. When the CHAN. switch is rotated, SA1 to SA5 are directly driven and SA6 is ganged to the switch shaft via gearing. The tens, units and decimals circuits are

identical with those of earlier versions but the memory drum (SA6) has two additional micro-switches to accommodate the 50 kc/s and v.h.f. switching requirements. If a v.h.f. frequency is selected both SA6a1 and SA6a2 are operated, these being ganged together for v.h.f. selection only. SA6a2 completes the circuits to the mechanical tuning unit, the same tuning drive being required for frequencies of 100 Mc/s order as for those of 300 Mc/s order. When SA6a1 is made, an earth from SA1B is connected to pole J of PLA and thence to the u.h.f./v.h.f. changeover relays. When a 50 kc/s position is selected, SA6h1 is made and the earth from SA4F is connected to pole B of PLA and thence to the diode switching circuits in the i.f. amplifier units.

9. When a v.h.f. channel is selected, either manually or automatically, the appropriate oscillator stage in the v.h.f. spectrum generator is also brought into operation. This is achieved by earthing the cathode circuit of the stage required

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and by cutting off the two other stages, the method being as follows. The control wires from poles V (110 Mc/s selection), W (120 Mc/s selection) and X (130 Mc/s selection) of PLA are connected to the mechanical tuning unit at P1201 poles 4, 5 and 6 respectively and to the amplifier-oscillator relay assembly at P901 poles 31, 30 and 29 respectively. (See Chap. 2, fig. 4, also fig. 4 and 5 of Appendix 1 to Chap. 1). In the mechanical tuning unit a 27.5V d.c. supply is connected from the coil of relay K1201 to S1202F (via contact 3). From contacts 5, 6 and 7 of S1202F connection is made to P1201, poles 4, 5 and 6 respectively, and thence to the amplifier-oscillator relay assembly and the cathode circuits of the oscillator stages V902, V903 and V904 respectively. If a frequency of 120 Mc/s order is selected, S1202 is in the position shown in Chap. 2, fig. 4 with no connection between S1202F contact 6 and the 27.5V supply; no voltage is applied to the cathode of V903 therefore. At the control unit, however, the control wire to PLA pole W is earthed via SD1F and SA2F. Since the cathode of V903 is connected to this control wire, it is also at earth potential and the stage oscillates. In this condition the 27.5V supply is connected via S1202F contacts 5 and 7 to the 110 Mc/s and 130 Mc/s control wires, respectively, with the result that this potential is applied to the cathodes of V902 and V904 and these stages are cut off. Similarly V902 is operational and V903 and V904 are cut off when 110 Mc/s selection is made, and V904 is operational and V902 and V903 are cut off when 130 Mc/s selection is made.

**10.** The channel selector switch also carries wafer SA5 and this is to provide for remote, visual indication. The remote indicator which may be employed with PTR175 type equipments uses neon valves and the circuits to their cathodes are completed via SA5 and PLC as the channel selector switch is rotated.

**11.** Switch SC is incorporated in the C1607/4 to add to the versatility of the control unit, but in PTR175 type installations it should be kept in the position shown in fig. 2 where it makes the circuit to the guard receiver.

**12.** The C1607/4 control unit is also used in Type ARC52 installations. Those connections which are common to both ARC52 and PTR175 equipments are terminated on the 30-way connector PLA. There are certain additional connections made to PLA to accommodate the increased facilities provided in PTR175 type equipments, however, the poles concerned not being connected in Type ARC52 equipments. These are as follows:—

PLA Pole	Connection
B	Decimals 00 and 05 selection
H	225V in
J	u.h.f./v.h.f. control

When the Type C1607/4 control unit is used in ARC52 installations, no connection is made to PLC.

1-00200

FREQUENCY SELECTION 200 OR 300

PLA

DATA LINK DISPLAY EARTH

DATA TEST SIGNAL

H.S.R. DISABLE

DATA SIG. CONVERTER ON H.S.R. ON/OFF

COMMON GUARD OR DATA ON/OFF  
A.D.F. ON/OFF  
POWER ON/OFF

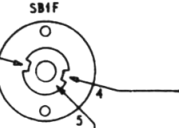
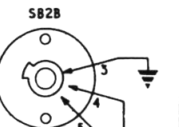
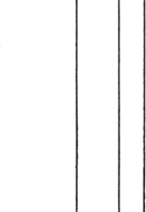
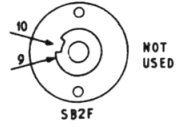
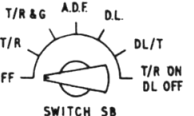
EARTH

AUDIO IN

PLA

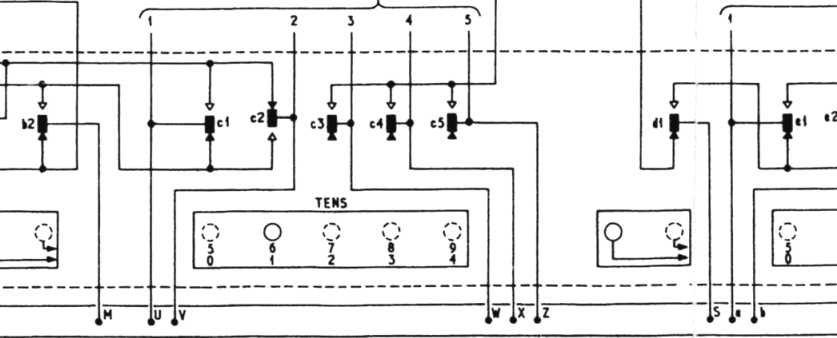
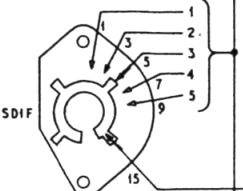
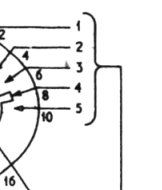
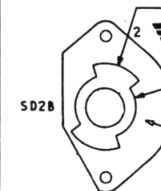
AUDIO OUT

LINE/VHF CONTROL



OPERATING PIP IN POS1 OPERATES CONTACTS #1 & #2 BUT IN POS 3 ONLY OPERATES #2

SD3B DRIVEN BY SELECTOR SWITCH 5D BUT IN OPPOSITE ROTATION THRO' 1:629 TO 1 GEARING

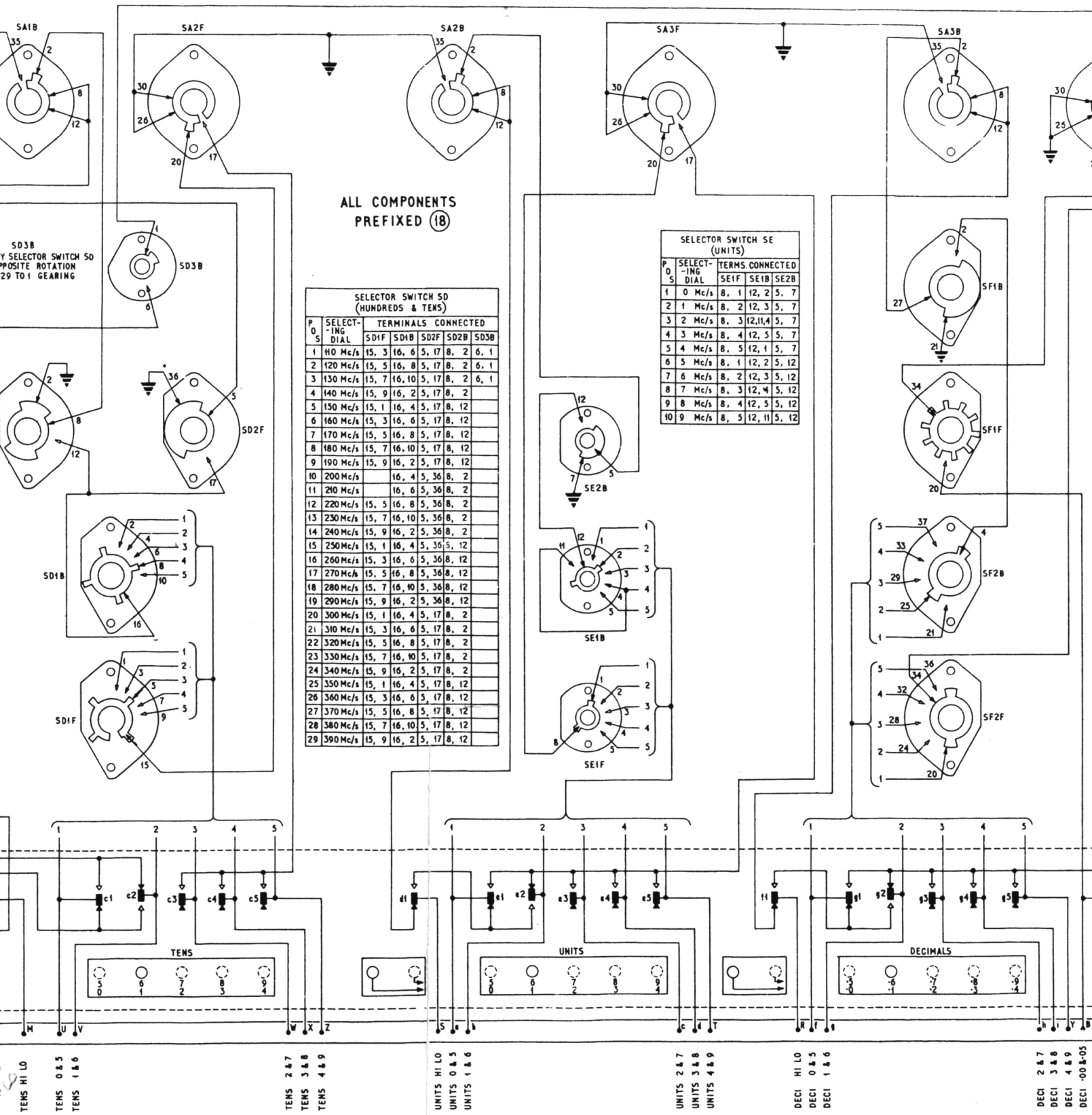


ALL COMPONENTS PREFIXED (18)

SELECTOR SWITCH 5D (HUNDREDS & TENS)

P DIAL	TERMINALS CONNECTED					
	SD1F	SD1B	SD2F	SD2B	SD3B	
1	HO Mc/s	15, 3	16, 6	5, 17	8, 2	6, 1
2	120 Mc/s	15, 5	16, 8	5, 17	8, 2	6, 1
3	130 Mc/s	15, 7	16, 10	5, 17	8, 2	6, 1
4	140 Mc/s	15, 9	16, 2	5, 17	8, 2	
5	150 Mc/s	15, 1	16, 4	5, 17	8, 12	
6	160 Mc/s	15, 3	16, 6	5, 17	8, 12	
7	170 Mc/s	15, 5	16, 8	5, 17	8, 12	
8	180 Mc/s	15, 7	16, 10	5, 17	8, 12	
9	190 Mc/s	15, 9	16, 2	5, 17	8, 12	
10	200 Mc/s		16, 4	5, 36	8, 2	
11	210 Mc/s		16, 6	5, 36	8, 2	
12	220 Mc/s	15, 5	16, 8	5, 36	8, 2	
13	230 Mc/s	15, 7	16, 10	5, 36	8, 2	
14	240 Mc/s	15, 9	16, 2	5, 36	8, 2	
15	250 Mc/s	15, 1	16, 4	5, 36	5, 12	
16	260 Mc/s	15, 3	16, 6	5, 36	8, 12	
17	270 Mc/s	15, 5	16, 8	5, 36	8, 12	
18	280 Mc/s	15, 7	16, 10	5, 36	8, 12	
19	290 Mc/s	15, 9	16, 2	5, 36	8, 12	
20	300 Mc/s	15, 1	16, 4	5, 17	8, 2	
21	310 Mc/s	15, 3	16, 6	5, 17	8, 2	
22	320 Mc/s	15, 5	16, 8	5, 17	8, 2	
23	330 Mc/s	15, 7	16, 10	5, 17	8, 2	
24	340 Mc/s	15, 9	16, 2	5, 17	8, 2	
25	350 Mc/s	15, 1	16, 4	5, 17	8, 12	
26	360 Mc/s	15, 3	16, 6	5, 17	8, 12	
27	370 Mc/s	15, 5	16, 8	5, 17	8, 12	
28	380 Mc/s	15, 7	16, 10	5, 17	8, 12	
29	390 Mc/s	15, 9	16, 2	5, 17	8, 12	

TENS R1 LO  
TENS 0 & 5  
TENS 1 & 6  
TENS 2 & 7  
TENS 3 & 8  
TENS 4 & 9  
UNITS HI LO  
UNITS 0 & 5  
UNITS 1 & 6



ALL COMPONENTS  
PREFIXED (18)

SELECTOR SWITCH SD  
(HUNDREDS & TENS)

P.O. S	SELECT- ING DIAL	TERMINALS CONNECTED				
		SD1F	SD1B	SD2F	SD2B	SD3B
1	10 Mc/s	15, 3	16, 6	5, 17	8, 2	6, 1
2	120 Mc/s	15, 5	16, 8	5, 17	8, 2	6, 1
3	130 Mc/s	15, 7	16, 10	5, 17	8, 2	6, 1
4	140 Mc/s	15, 9	16, 2	5, 17	8, 2	
5	150 Mc/s	15, 1	16, 4	5, 17	8, 2	
6	160 Mc/s	15, 3	16, 6	5, 17	8, 2	
7	170 Mc/s	15, 5	16, 8	5, 17	8, 2	
8	180 Mc/s	15, 7	16, 10	5, 17	8, 2	
9	190 Mc/s	15, 9	16, 2	5, 17	8, 2	
10	200 Mc/s		16, 4	5, 36	8, 2	
11	210 Mc/s		16, 6	5, 36	8, 2	
12	220 Mc/s	15, 5	16, 8	5, 36	8, 2	
13	230 Mc/s	15, 7	16, 10	5, 36	8, 2	
14	240 Mc/s	15, 9	16, 2	5, 36	8, 2	
15	250 Mc/s	15, 1	16, 4	5, 36	8, 2	
16	260 Mc/s	15, 3	16, 6	5, 36	8, 2	
17	270 Mc/s	15, 5	16, 8	5, 36	8, 2	
18	280 Mc/s	15, 7	16, 10	5, 36	8, 2	
19	290 Mc/s	15, 9	16, 2	5, 36	8, 2	
20	300 Mc/s	15, 1	16, 4	5, 17	8, 2	
21	310 Mc/s	15, 3	16, 6	5, 17	8, 2	
22	320 Mc/s	15, 5	16, 8	5, 17	8, 2	
23	330 Mc/s	15, 7	16, 10	5, 17	8, 2	
24	340 Mc/s	15, 9	16, 2	5, 17	8, 2	
25	350 Mc/s	15, 1	16, 4	5, 17	8, 2	
26	360 Mc/s	15, 3	16, 6	5, 17	8, 2	
27	370 Mc/s	15, 5	16, 8	5, 17	8, 2	
28	380 Mc/s	15, 7	16, 10	5, 17	8, 2	
29	390 Mc/s	15, 9	16, 2	5, 17	8, 2	

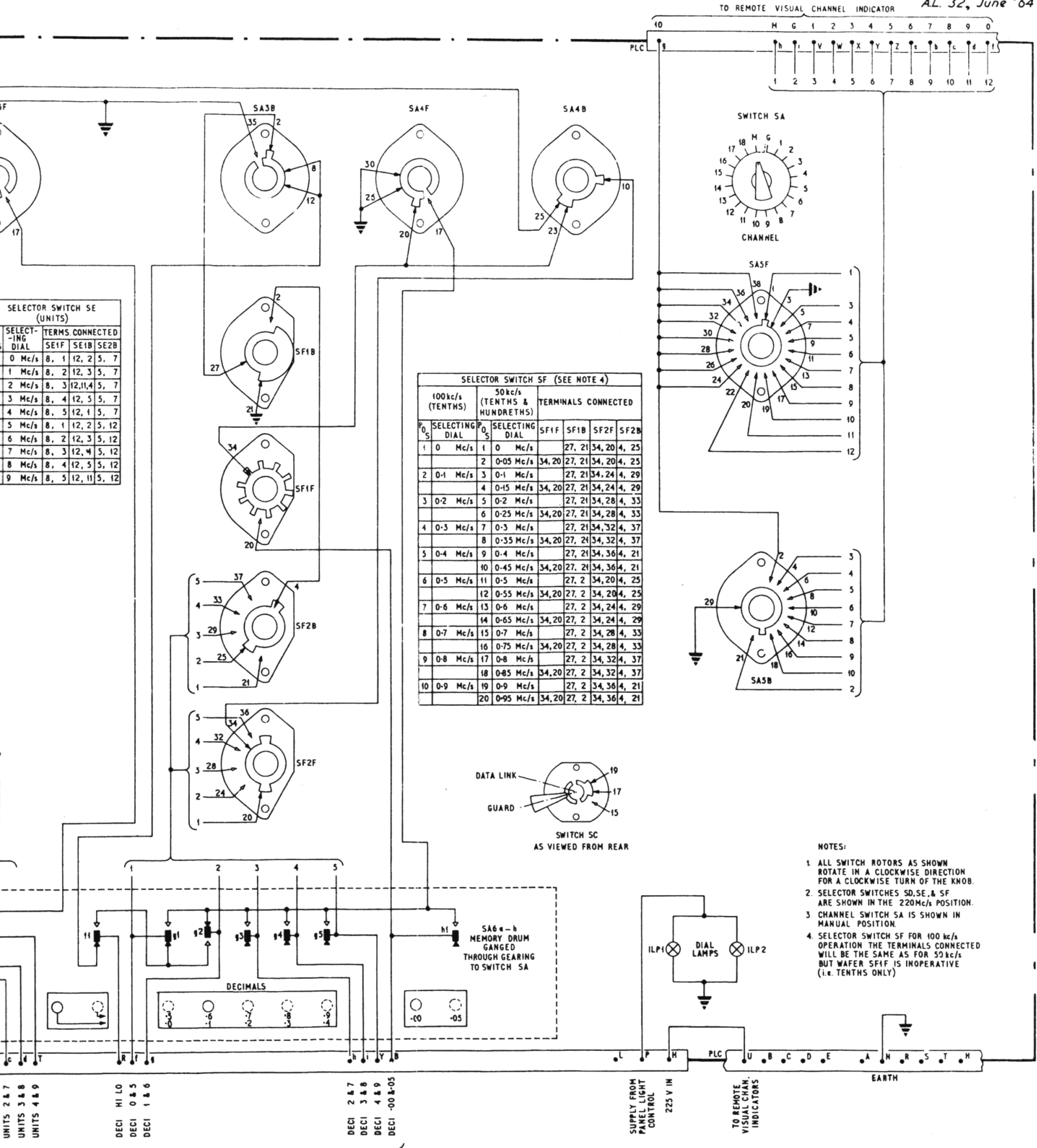
SELECTOR SWITCH SE  
(UNITS)

P.O. S	SELECT- ING DIAL	TERMS. CONNECTED		
		SE1F	SE1B	SE2B
1	0 Mc/s	8, 1	12, 2	5, 7
2	1 Mc/s	8, 2	12, 3	5, 7
3	2 Mc/s	8, 3	12, 11, 4	5, 7
4	3 Mc/s	8, 4	12, 5	7
5	4 Mc/s	8, 5	12, 1	5, 7
6	5 Mc/s	8, 1	12, 2	5, 12
7	6 Mc/s	8, 2	12, 3	5, 12
8	7 Mc/s	8, 3	12, 4	5, 12
9	8 Mc/s	8, 4	12, 5	5, 12
10	9 Mc/s	8, 5	12, 11	5, 12

TENS HI LO    TENS 0 & 5    TENS 1 & 6    TENS 2 & 7    TENS 3 & 8    TENS 4 & 9    UNITS HI LO    UNITS 0 & 5    UNITS 1 & 6    UNITS 2 & 7    UNITS 3 & 8    UNITS 4 & 9    DECI HI LO    DECI 0 & 5    DECI 1 & 6    DECI 2 & 7    DECI 3 & 8    DECI 4 & 9    DECI -00 & 05

FREQUENCY SELECTION

Control, radio set, Type C1607/4: circuit.  
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CI607/4: circuit.  
CTED

Fig 2