

## Appendix 5

POWER SUPPLY UNIT, TYPE B, Ref. No. 6A/6822  
and TYPE C, Ref. No. 6A/8548

## SERVICING

## REMOVAL AND REPLACEMENT OF COMPONENTS

## LIST OF CONTENTS

	<i>Para.</i>		<i>Para.</i>
<i>Introduction</i> .. .. .	1	<i>Transformers</i> .. .. .	14
<i>Tools and materials</i> .. .. .	3	<i>Chokes L1 to L4</i> .. .. .	22
<i>Reassembly</i> .. .. .	4	<i>Preset potentiometers RV1, RV3 and RV4</i> ..	23
<i>Servicing precautions</i> .. .. .	6	<i>Power failure unit</i> .. .. .	24
<b>Removal and replacement of components</b>		<i>Torque switch S1</i> .. .. .	25
<i>Cover</i> .. .. .	9	<i>Power failure relay, S2</i> .. .. .	26
<i>Resistors R1 to R16</i> .. .. .	10	<i>Plessey-type connectors</i> .. .. .	27
<i>Capacitors C1 to C7</i> .. .. .	11	<i>Cable-form</i> .. .. .	29
<i>Silicon diodes MR1 to MR14</i> .. .. .	13	<i>Abbreviations</i> .. .. .	30

## LIST OF TABLES

	<i>Table</i>
<i>Cable interconnections – power supplies</i> ..	1
<i>Cable interconnections – transformer secondaries</i> .. .. .	2
<i>Earth and distribution board interconnections</i>	3
<i>List of components</i> .. .. .	4

## Introduction

1. This appendix covers the removal and replacement of electrical components of the power supply unit Type B, Ref. No. 6A/6822, or Type C, Ref. No. 6A/8548 to a level consistent with the second-line range of spares up to and including modification ADS/160.

2. The unit, which is illustrated in Chap. 9, consists of a cover, front panel, chassis, a distribution panel, a component panel, and a tie plate and bracket. The general location of components among the sub-assemblies is as follows:—

- |  |   |
|--|---|
| (1) Front panel<br>(Chap. 9, fig. 1)         | Plug PS3, sockets PS1 and PS2 and PS4 to PS8, transformer T3. |
| (2) Chassis<br>(Chap. 9, fig. 2 and 3)       | Transformers T1 and T3, Chokes L1, L2 and L3.                 |
| (3) Distribution panel<br>(Chap. 9, fig. 4a) | Interconnection between sub-assemblies.                       |

- |   |  |
|---|--|
| (4) Component panel<br>(Chap. 9, fig. 4b) | Resistors R1 to R16, capacitors C1 to C7, rectifiers MR1 to MR14.                                |
| (5) Bracket assembly<br>(Chap. 9, fig. 5) | Torque switch (S1), power failure relay (S2), preset potentiometers RV1, RV3, and RV4, choke L4. |

## Tools and materials

## 3. (1) Tools.

- (a) Plug/socket, Plessey Mk. 4, special tool.

## (2) Materials.

- (a) Cored solder, 18 SWG 60/40.  
(b) Terylene cord 0.5mm.  
(c) Helsyn sleeving H15.

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(d) Loctite sealant grade C, Ref. No. 33H/176, and grade E, Ref. No. 33H/225.

(e) Tape 0.5 in. Type 56.

(f) Wire, 26 SWG, tinned copper.

(g) Wire, 7/0076 PTFE covered (for colours see cable interconnections in Tables 1 to 3).

#### Reassembly

4. Unless otherwise detailed the replacement procedure for all components (a list of which is given at Table 4) is a reversal of removal.

5. All screws and threaded fixings 8 B.A. and smaller should be locked on assembly with sealant, Ref. No. 33H/225, all others with sealant, Ref. No. 33H/176.

#### Servicing precautions

6. Damage to miniaturized components can result from the incorrect use of a soldering iron, and excessive heat must be prevented from reaching these components during removal and replacement. The following precautions should be taken:—

(1) Soldering irons should not be applied until the required temperature for melting the solder (cored, 18 SWG 60/40) has been reached.

(2) Component connections should be hooked on to terminal lugs and not wrapped around them.

(3) A heat shield should be used whenever a soldering iron is applied to a component lead.

7. When the cover has been removed (para. 9), all components are fully accessible with the exception of capacitors C1 to C7. Access to the —ve terminal and securing nut of these capacitors is gained by removing the component panel from the assembly.

8. When soldering cable-form connections to plug PS3, sockets PS1, PS2, and PS4 to PS8, or the torque switch S1, the leads must first be sleeved with Helsyn H15  $\times$   $\frac{1}{2}$  in. long. The edges of the locating holes in the chassis for transformers T1 and T2 are covered with tape  $\frac{1}{2}$  in. Type 56, and if any wear is apparent in this tape it should be renewed before replacing T1 or T2. The securing nuts of capacitors C1 to C7 should be locked on assembly, using sealant, Ref. No. 33/176.

### REMOVAL AND REPLACEMENT OF COMPONENTS

#### Cover

9. Place the PSU on bench. Remove the two cover retaining nuts at the rear of the cover. Slide the cover clear of the assembly.

#### Resistors R1 to R16 (Chap. 9, fig. 4b)

10. Resistors R1 to R16 are removed by applying the soldering iron to the shank of the terminal lug and removing the lead with a pair of long snipe-nosed pliers. Heat transference to the associated diode will be reduced if the junction of the resistor and silicon diode is unsoldered first. On replacement, the leads of the resistors, shortened where necessary, should be hooked on to the shanks of the terminal lug before soldering. After soldering a resistor on to the terminal lugs, ensure that the cable-form connection and, where applicable, the inter-lug connection, are still efficiently soldered.

#### Capacitors C1 to C7 (Chap. 9, fig. 4b)

11. Remove the six 6 B.A. hex.hd. nuts and washers securing the component panel to the left-hand side frame and swing the panel clear of the assembly supported by the cable-form. Remove capacitors as necessary by unsoldering the leads to the positive and negative terminals and removing the 4 B.A. nut securing the capacitor to the rear of the component panel. If more than one capacitor is being removed the cable-form connections to each should be labelled and identified. Replacement capacitors should be secured to the component panel, using a 4 B.A. nut. PTFE wire is used for interconnection. Colours and routing are:—

From	To	Colour
C1 +ve	C2 —ve	B
C1 +ve	MR3 +ve	B
C4 +ve	MR6 +ve	Gn
C4 +ve	C3 +ve	Gn
C3 —ve	MR1 and MR2 —ve	R
C6 +ve	C5 +ve	R
C7 —ve	MR12 +ve	B

12. The foregoing and all other cable connections to the capacitors are given in Table 2 under the respective supply heading. If connections have been labelled on removing the capacitors, reference to the table will not be necessary.

#### Silicon diodes MR1 to MR14 (Chap. 9, fig. 4b)

13. Unsolder the relevant silicon diodes from the terminal lugs as necessary and lift clear. On replacement ensure that the diodes are replaced with the correct polarity connections. Shorten the leads, if necessary, to allow the diode to be hooked on to the shanks of the terminal lugs. Check that after replacement the cable-form connections and the inter-lug connections are still securely made.

**Transformers***Transformer T1* (Chap. 9, fig. 2)

14. Invert the PSU to gain access to the base pins and unsolder the cable-form from pin 1 to pin 19. Remove the four 4 B.A. ch.hd. screws, three of which are fitted with cable cleats and one with a soldering lug, securing T1 to the chassis. The cable cleats should remain fitted to the cable-form and the soldering lug to pin 7.

15. Turn the PSU upright and remove the five 6 B.A. ch.hd. screws securing the top tie-plate to the right-hand side frame and the rear tie-plate. Lift T1, complete with tie-plate, clear of the PSU and remove the three 4 B.A. ch.hd. screws securing the top tie-plate to T1.

16. On replacement, T1 must be positioned on the chassis with pin 1 and pin 2 towards the centre and pin 7 at the rear. It may be necessary, when tightening the four 4 B.A. ch.hd. screws securing T1 to the chassis, to slacken off the screws securing the top tie-plate to the right-hand side frame and rear tie-plate. These screws must subsequently be tightened.

17. Cable-form connections are given in Tables 1 and 2. Pins 4, 7 and 8 should be interconnected with 26 SWG tinned copper wire covered with PTFE sleeving, brown. Pin 7 should be connected to the soldering lug with wire 7/0076 covered with PTFE, thin wall, brown.

*Transformer T2* (Chap. 9, fig. 2)

18. Invert the PSU to gain access to the base pins and unsolder the cable-form from pin 1 to pin 13. Remove the four 4 B.A. ch.hd. screws (fitted with cable cleats). Turn the PSU upright and remove the five 6 B.A. ch.hd. screws securing the top tie-plate to the left-hand side frame and the rear tie-plate. Remove T2, complete with top tie-plate, from the PSU and remove the three 4 B.A. ch.hd. screws securing the top tie-plate to T2.

19. On replacement, T2 is positioned in the left-hand locating hole on the chassis with pin 1 to pin 4 adjacent to the outer edge, and pin 5 towards the rear of the chassis. It may be necessary, when tightening the four 4 B.A. ch.hd. screws securing T2 to the chassis, to slacken off the screws securing the top tie-plate to the left-hand side frame and rear tie-plate. These screws must subsequently be tightened.

20. Cable-form connections are given in Tables 1 and 2. Pins 4, 10 and 12 should be interconnected with 26 SWG tinned copper wire covered with PTFE, brown sleeving.

*Transformer T3* (Chap. 9, fig. 2)

21. Remove the component panel (para. 11). Remove the two 6 B.A. ch.hd. screws securing T3

to the front panel. Support T3 and push the transformer clear of the assembly with the cable-form attached. Unsolder the cable-form from T3.

**Chokes L1 to L4** (Chap. 9, fig. 3 and 5)

22. Each choke is secured in position (L1 to L3 on the underside of the chassis and L4 on the bracket) with two 6 B.A. ch.hd. screws. Unsolder the connections at A and H and remove the two 6 B.A. ch.hd. screws securing the choke to its mounting. Remove the choke, recovering the two thin washers between the choke and the mounting.

**Preset potentiometers RV1, RV3 and RV4** (Chap. 9, fig. 2)

23. Unsolder the connections to the terminals and, with the PSU inverted, remove the nut securing the relevant preset potentiometer to the bracket.

**Power failure unit** (Chap. 9, fig. 5)

24. The power failure unit consists of a torque switch, S1, and a power failure relay, S2, which are situated on the bracket. Each may be removed or replaced independently and in any order.

**Torque switch, S1** (Chap. 9, fig. 5)

25. Unsolder the cable-form connections to S1 terminals 1 to 6. Invert the PSU to gain access to the underside of the bracket and, supporting S1, remove the two 4 B.A. ch.hd. screws securing S1 to the bracket. On replacement the wires to the terminals should be sleeved with Helsyn H15  $\times$   $\frac{1}{2}$  in. long before soldering.

**Power failure relay, S2** (Chap. 9, fig. 5)

26. Unsolder the cable-form connection to the colour-coded terminals of S2. Invert the PSU and, supporting S2, remove the two 8 B.A. ch.hd. screws securing S2 to the bracket. On replacement the red and black terminals should be interconnected with wire 7/0076 PTFE, thin wall, black.

**Plessey-type connectors**

27. The removal procedure for each connector (sockets PS1, PS2, PS4 to PS8, and plug PS3) is identical. Fold back the Helsyn H15 sleeving on the cable-form connection to each pin in turn, and unsolder the connection. Remove the connector cover and cover retaining ring. Using the special tool, unscrew and remove the retaining clamp securing the connector to the front of the front panel. Withdraw the connector from the panel and replace the retaining clamp, the dust cover retaining ring and the dust cover.

28. On replacement, before soldering the cable-form connections to the pins, sleeve the ends of the wires with Helsyn H15  $\times$   $\frac{1}{2}$  in. long. Ensure that no solder is allowed to cause a short-circuit between pins.

### Cable-form

29. The cable-form is not a pre-assembled cable-form. Unserviceable leads may be replaced by unsoldering at each end, removing, as necessary, the ties and cleats and replacing the lead with a serviceable one having the same coloured PTFE sleeving. Ties should be made with Terylene cord 0.5 mm. at  $\frac{1}{4}$  in. intervals along the cable-form. A tie must be made where a part of the cable-form, or a single lead, branches off from the main cable-form. Colour code connections are given in the relevant table.

### Abbreviations

30. Throughout Tables 1 to 3 the following abbreviations and identifications apply:—

(1) "PS" identifications refer to distribution panel terminals (Chap. 9, fig. 4a).

(2) "SK" identifications refer to pins of Plessey sockets on front panel (Chap. 9, fig. 1).

(3) "PL" identifications refer to pins of Plessey plug on front panel (Chap. 9, fig. 1).

(4) "T" identifications refer to transformer pins, e.g. "T2-6" means pin 6 on transformer T2.

(5) Colours B = Blue  
 Bk = Black  
 Bn = Brown  
 Gn = Green  
 Gy = Grey  
 O = Orange  
 P = Pink  
 R = Red  
 V = Violet  
 W = White  
 Y = Yellow

TABLE 1  
 Cable connections – power supplies

115V supply (App. 3, fig. 1)								
Phase A			Phase B			Phase C		
From	To	Colour	From	To	Colour	From	To	Colour
PL1-A S1-1	S1-1 S2-B	R	PL1-B T2-1 S1-2	T2-1 S1-3 S2-Gn	Bk	PL1-C S1-4	S1-4 S2-R	W
S2-W S2-W T1-1 PS4-A	T1-1 T3-B PS6-N SK5-A		Bn/W	S2-Gn PS6-O PS4-B		PS6-O SK2-O SK5-B	Gn/W	
PS6-N	SK2-N	R						

Scott connections		
From	To	Colour
T2-2 T2-2	T1-2 T3-C	R/O

28V supply (for power failure relay)		
From	To	Colour
28V d.c. S1-6	S2-Y	Y
0V d.c. S1-5	S2-V	V

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**TABLE 2**  
Cable interconnections – transformer secondaries

T1					
Pins 4, 7 and 8 are linked, pin 7 being connected to earth tag (colour brown); pin 4 is connected to PS1-B and PS8-G (colour blue).					
25V a.c. supply			8V a.c. supply		
From	To	Colour	From	To	Colour
T1-6	PS1-A	} Bk	T1-9	PS5-L	} W
T1-6	SK7-A		T1-9	SK1-L	
PS5-A	SK1-A		PS6-K	SK2-K	
PS6-A	SK2-A		PS2-L	SK3-L	
PS2-A	SK3-A		PS7-L	SK4-L	
PS7-A	SK4-A		PS8-M	SK6-M	
PS8-J	SK6-J		PS1-L	SK7-L	
85V a.c. (AC1) supply			85V a.c. (AC2) supply		
From	To	Colour	From	To	Colour
T1-3	PS5-C	} R	T1-5	PS5-D	} O
T1-3	SK1-C		T1-5	SK1-D	
PS6-C	SK2-C		PS6-D	SK2-D	
PS2-C	SK3-C		PS2-D	SK3-D	
PS7-C	SK4-C		PS7-D	SK4-D	
PS8-D	SK6-D		PS8-E	SK6-E	
PS1-C	SK7-C		PS1-D	SK7-D	
6V a.c. supply 3V(X) and 3V(Y)			6V a.c. supply (Temperature probe)		
From	To	Colour	From	To	Colour
T1-13	PS8-A	B/O	T1-17	PS6-V	} R/Gn
PS8-A	SK6-A	P	T1-17	SK2-V	
T1-14	PS8-C	R/O	T1-15	PS6-U	} P
PS8-C	SK6-C	R/Gn	T1-15	SK2-U	
Pins 4, 10 and 12 are linked, pin 4 is connected to PS1-F (blue).					

## T2

50V a.c. supply		
From	To	Colour
T2-5	PS5-J	} R/W
T2-5	SK1-J	
PS6-M	SK2-M	
PS2-J	SK3-J	
PS7-J	SK4-J	
PS8-K	SK6-K	
PS1-J	SK7-J	

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TABLE 2—(continued)

T2 (continued)

-30V d.c. supply			+9V d.c. supply		
From	To	Colour	From	To	Colour
T2-9	R1/R2 to	Bn	T2-11	R14/R13 to	Bn/W
MR1-ve	MR1 & 2+ve		MR8-ve	MR8-ve	Gn
MR1-ve	C3-ve } L1-H }	R	L3-A	L3-H	
L1-A	PS5-E		C7+ve	SK1-G	
L1-A	SK1-E			PS5-G	
C4-ve	PS5-E		PS6-J	C2+ve	Gy
PS6-E	SK2-E	Y	PS2-G	SK2-J	
PS2-E	SK3-E		PS7-G	SK3-G	
PS7-E	SK4-E		PS1-G	SK4-G	
PS8-E	SK6-E			SK7-G	
PS1-E	SK7-E		T2-13	R12/R11 to	Bk
Earth run				MR7-ve	
C4 +ve	C3 +ve		MR7, MR8, MR13, MR14 positive terminals are joined		
C4 +ve	MR6 +ve }	Gn		Earth run	
			C2-ve	C1+ve	
			C7-ve	MR12 +ve }	B

-6V d.c. supplies

-6V(A)			-6V(B)		
From	To	Colour	From	To	Colour
T2-7	L2-H	Bk/W	T2-7	L4-H	
L2-A	PS5-H		L4-A	C5-ve	Bk/W
L2-A	SK1-H		L4-A	PS6-L	
C1-ve	C6-ve		PS6-L	SK2-L	
C6-ve	PS5-H	V		-6 volt Earth run	
PS6-H	SK2-H		T2-6	R9 (R5,	O
PS2-H	SK3-H			R6, R10)	
PS7-H	SK4-H		T2-8	R7, (R3,	W
PS1-H	SK7-H			R4, R8)	
			C6+ve(A)	C5+ve (B)	R
			C5+ve	MR9+ve	
			C1+ve	MR3+ve	B
			MR5+ve	PS5-F	
			MR3, MR4, MR5, MR6, MR9, MR10, MR11, and MR12 positives are linked		

T3

Pins G/F are connected to PS5-B (blue), RV1 wiper is connected to the earth tag (blue).

20V(X) supply			20V(Y) supply		
From	To	Colour	From	To	Colour
T3-N	R15	R/W	T3-R	R16	O/W
T3-N	PS5-K	B/W	T3-R	PS5-M	
PS5-K	SK1-K		PS5-M	SK1-M	
PS6-P	SK2-P		PS6-Q	SK2-Q	
PS8-L	SK6-L		PS8-H	SK6-H	

  

10V(X) supply			10V(Y) supply		
From	To	Colour	From	To	Colour
T3-H & O	RV4	Gn/Bk	T3-P & E	RV3	R/Bk
RV4	SK2-Y		SK2-Z		
	PS6-Y		PS6-Z		

Resistance network		
From	To	Colour
R15	RV1	B/W
R16	RV1	R/B

TABLE 3

Earth and distribution board interconnections

Earth connections							
From	To	Colour	Designation	From	To	Colour	Designation
SK2-G	PS6-F	B	Sig. E	SK6-G	PS8-G	Gn	Bias E
SK2-G	PS6-G			SK7-F	PS1-F		
SK2-R	PS6-R			MR5+ve	PS5-F	B	Bias E
SK2-S	PS6-S			T2-4	PS1-F		
SK2-T	PS6-T			T1-4	PS8-G	Bn	Ref. 2
SK2-X	PS6-X			SK2-B	PS6-B		
SK3-K	PS2-K			SK3-B	PS2-B		
SK4-K	PS7-K			SK4-B	PS7-B	B	Ref. 2
SK6-B	PS8-B			SK7-B	PS1-B		
SK7-K	PS1-K			T1-4	PS1-B	B	
T3-G/F	PS5-B			PS6-G	Earth tag		
SK1-F	PS5-F			PS6-F			
SK2-F	PS6-F			SK1-B	Earth tag		
		RV1-wiper					
		SK3-F	PS2-F	T1-7			
SK4-F	PS7-F						

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TABLE 3—(continued)

Distribution board interlinkages							Colour	Supply
PS6	PS2	PS7	PS8	PS5	PS1	PS4		
A	A	A	J	A	A		Bn	25V
B	B	B		B			R	Ref. 2
C	C	C	D	C	C		O	85V(AC1)
D	D	D	E	D	D		Y	85V(AC2)
E	E	E	F	E	E		Gn	—30V
F	F	F	G	F	F		B	Bias E
G	K	K	B	B	K		V	Sig. E
H	H	H		H	H		Gy	—6V(A)
J	G	G		G	G		W	+9V
K	L	L	M	L	L		Bk	8V
L								—6V(B)
M	J	J	K	J	J		Bn	50V
N						A	R	115V $\phi$ A
O						B	O	115V $\phi$ B
P			L	K			Y	20V (X)
Q			H	M			Gn	20V (Y)
R								
S								
T							B	Sig. E
U								
V								6V temp. probe
W						C	P	115V $\phi$ C
X							B	Sig. E
Y								10V (X)
Z								10V (Y)
								6V
								A } Transducer pick-offs
								C }

TABLE 4

List of components

Resistors	Value	Ref. No.
R1 to R14	4.7 ohm $\pm$ 10%, 1½W, W.W.	5905-99-011-3203
R15, R16	3.3 kilohm $\pm$ 10%, 1½W, W.W.	5905-99-011-3267
Resistors, variable	Value	
RV1	30 kilohm $\pm$ 10%, 1W, W.W.	
RV3, RV4	1 kilohm $\pm$ 10%, 1W, W.W.	
Capacitors	Value	Ref. No.
C1, C2, C5 } C6, C7	250µf, $\pm$ 20%, 15V, Tant. pellet	5910-99-012-0139
C3, C4	50µ, $\pm$ 20%, 70V, Tant. pellet	5910-99-012-0137

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**TABLE 4—(continued)**  
**List of components—(continued)**

Rectifiers	Type
MR1 to MR14	Ferranti ZS30A
Chokes	Type
L1	Elliott, Type 3C5896
L2, L3, L4	Elliott, Type 3C5897
Transformers	Type
T1	Elliott, Type 3C5903
T2	Elliott, Type 3C5904
T3	Elliott, Type 3C1379
Miscellaneous	Type
Torque switch (S1)	S.G. Brown, Type PF115
Power failure relay	Elliott, Type 3C6882
Plugs and sockets	Plessey, Mk. 4

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