SPE/M

MAINTENANCE HANDBOOK

FOR

SP CONTROL DESKS

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A DIVISION OF RANK AUDIO VISUAL LIMITED

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1. Access to replaceable or checkable items and sub-units:

1.1. Two-Preset Systems:

1.1.1. Supply fuse: This is located on one side of the DBO keyswitch on the desk-top

1.1.2. Ref. 940 and 941 Cards & 'Control' Terminal Block: Remove the six screws securing the top panel on Desk and lift panel off sufficiently to gain access to the plug-in printed-circuit card units and the terminal block. Note that, on 40/2 systems, the two Ref. 941 Units are labelled 'I' and 'II' to indicate the Preset served by each Card.

1.2. Three-Preset Systems:

1.2.1. 'Control Active' indicators are located above and on either side of the DBO keyswitch on the Desk.

1.2.2. All other replaceable or checkable items are accessible by loosening the two screws at the lower edge of each Control-Panel, and hingeing all the panels (one at a time) up, till its movement is limited by the rope-tie provided.

Supply fuses are located under the left Control Panel on 40/3 and 60/3 systems, and under the second-from-left Panel on 80/3 systems.

Ref. 940 and 941 Plug-in Cards are located under the middle Control Panel on 40/3 and 60/3 systems and under the second-from-right panel on 80/3 systems. Note that the Ref. 940 Units are labelled (A or B) to indicate the associated Master-Faders, and the Ref. 941 units are labelled as indicated in Fig. 5.

'Control' terminal blocks are located under the middle panel on 40/3 and 60/3 systems, and under the two right-hand panels on 80/3 systems.

2. Fault Diagnosis

WARNING Before attempting any test or replacement of units in the equipment, always switch off the a-c supply to the associated Dimmer Rack if the desk supply is derived from the Rack, or the a-c supplies to the Desk and Rack if these are separately fed from the mains.

NOTE (1) See attached STM Maintenance Handbook for diagnosis of faults associated with STM Dimmer Racks. The information given below is mainly confined to trouble shooting on SP Desks although some information on associated troubleshooting on Dimmer Racks is included where necessary.

(2) The troubleshooting information given below covers fault-conditions correctable on site by simple checks and substitution of easily replaceable items or sub-assemblies, as well as fault-conditions which require detailed diagnosis by competent engineers with adequate test/service facilities. To distinguish the second category of fault-conditions from the first, diagnostic steps requiring detailed tests are inset from the left margin of the page, identified by a vertical line on the left of the paragraph.

(3) The extent and nature of the fault (e.g. the number of channels or of presets affected) will often provide a reliable clue to the faulty section of the equipment.

2.1. Two-Preset Systems (SP20/2, 30/2 and 40/2):

2.1.1. Total failure: Check if 'Supply On' neon is lit.

If neon is not lit, check a-c supply to desk and to associated Dimmer Rack if the Rack supplies a-c to the Desk; if a-c supply to Desk is correct, check supply fuse on Desk.

If neon is lit, proceed as in para 2.1.2.

2.1.2. Control failure on both masters and both presets, all channels:

Check that the DBO keyswitch is on. If so, check a-c supply to Dimmer Rack is on, especially if the desk supply is taken from a separate a-c mains; if this is correct, check that the common return ('C') interconnection between the 'Control' terminals on Rack and on Desk is not open-circuit. If this is correct, replace the Ref. 940 card in Desk.

On 20/2 Systems, if fault still persists:

- replace the Ref. 941 card- if this does not clear the fault, check the 24V a-c and rectifier circuits (in Desk) associated with diodes D2/D4 and capacitors C2/C4 for -32V d-c supplies to the Ref. 940 and 941 cards; check also the -18V d-c output from the Ref. 940 Unit to the Master Faders.

On 30/2 and 40/2 Systems, if replacing the Ref. 940 Unit does not cure the fault,

- check the rectifier circuits of D2/C2 in Desk for -32V d-c to the Ref. 940 Card and -18V d-c output from the Ref. 940 Card; if these are correct, check the Master Fader circuits.

2.1.2.1. ON 40/2 SYSTEMS ONLY: failure of all channels on one Preset only, for both Masters:

Replace the appropriate Ref. 941 Card in desk; if fault still persists,

- check the rectifier circuits of D3/C3 or D4/C4, as appropriate, for -32V d-c output to the Ref. 941 unit.

2.1.3. Control Failure on one Preset and one Master only, all channels:

Replace the Ref. 941 Card in Desk. If fault persists,

- check associated Master Fader circuit.

2.1.3.1. ON 30/2 AND 40/2 SYSTEMS ONLY: Failure of a set of 10 (No. 1-10, 11-20, etc.) or 20 (1-20, 21-40) channels on both Presets for both Masters:

Check a-c supply to the respective Dimmer Rack, especially if the Desk supply is not taken from that Dimmer Rack. If this is correct and switched on, check the common 'control' interconnection between

desk and Dimmer Rack.

2.1.3.2. ON 30/2 and 40/2 SYSTEMS ONLY: Failure of a set of 20 (1-20 or 21-40) channels on one Preset for one Master only:

This indicates section-fault in the appropriate Ref. 941 Card circuit. Replace the appropriate Ref. 941 Card.

2.1.4. Failure on two channels (one being an odd number channel and the other being the next higher number) on both Masters, any one Preset:

- check the common low-end connection to the two Channel Faders on the same Fader Control Unit.

2.1.5. Failure of one channel only, on both Masters and both Presets:

Check the Channel Fuse on the associated Dimmer Rack. If this is not faulty, check the channel load-lamp and load circuits. If these are also correct,

- check that the d-c voltage at the respective 'Control' terminals on Desk and on Dimmer Rack varies from OV to -15V with the settings of Master and Channel Fader combination. If there is no voltage, check the 10K resistor to the Desk 'Control' terminal. If the voltage check is correct, check the Dimmer module (see STM Handbook).

2.1.6. Failure of one channel, on one Preset only:

Check whether this occurs on one Master only or on both Masters. Recheck that the Group Selector switch is set correctly.

- If this fault occurs on 'A', 'B' and 'A + B' group selections, check the Channel Fader and its circuit. If the fault occurs on only one of the above three group selections, check the associated diode on the Ref. 938 printed-circuit card.

2.1.7. Cross-fade faults on one channel only:

Check that if the fault occurs on cross-fade between 'A' and 'B' Masters or between No. 1 and No. 2 Presets.

- If the former, check the respective diodes on the Ref. 938 Card. If the latter, check the diodes connected to the Fader sliders for that channel on the two presets.

2.2. Three-Preset Systems (SP 40/3, 60/3 and 80/3):

2.2.1. Total failure: Check if the 'Control' indicators are lit.

2.2.1.1. If both indicators are lit, check that a-c supply is switched on to the Dimmer Racks, especially if the desk supply is not derived from the Dimmer Racks.

2.2.1.2. If both indicators are not lit, check that the DBO keyswitch is on; if so, check the a-c supplies to desk and the supply fuses in in the desk.

2.2.1.3. If only one indicator is lit, this condition will normally be associated with the fault described in para. 2.2.2; see below.

2.2.2. Failure of all channels on all Presets, for one Master only:

Check that the associated 'Control' indicator (left of DBO switch for 'A' Group and right for 'B' Group) is lit.

2.2.2.1. If the indicator is off, check a-c supply from Rack 1 or 2 to the appropriate A/B/E terminals on Desk; if this is correct, check the respective supply fuse in the Desk; if the fuse in intact,

- Check the 24V a-c from the respective mains-transformer in desk, as well as the -32V d-c outputs from rectifiers D2 or D4 as appropriate.

(Note that a-c supply or mains-transformer failure resulting in failure of 'B' group will result also in failure of FOH inhibition on 'A' group.)

2.2.2.2. If the indicator is lit, replace the appropriate Ref. 940 Card in Desk. ON 40/3 SYSTEMS, if fault persists, replace the appropriate ('A' or 'B') Ref. 941 Card; if fault is not cleared, check

- the common d-c supply circuits of the Master Faders for that group.

ON 60/3 and 80/3 SYSTEMS, if replacing the Ref. 940 Card does not clear fault,

- check the common d-c supply circuits of the Master Faders for that group.

2.2.3. ON 60/3 SYSTEMS ONLY

2.2.3.1. Failure of Presets 1 and 2 on 'A' Group or Presets 2 & 3 on 'B' Group only:

Replace the Ref. 941 'A' or 'B' card respectively. If fault persists,

- Check the respective circuits of D4/C4 (for 'A') or D2/C2 (for 'B') in desk, for -32V d-c supply to the respective Ref. 941 Card: if correct, check plug-in connections to the Ref. 941 Card.

2.2.3.2. Failure of Preset 3 on 'A' master AND Preset 1 on 'B' master:

Proceed as in para 2.2.3.1 but replace the Ref. 941 - 'A/B' Card Card in desk, and

- check D5/C5 circuits in desk.

2.2.4. ON 80/3 SYSTEMS ONLY:

One-Group faults associated with the Ref. 941 Cards are listed below. Check by following the procedure of para 2.2.3.1. but checking the Ref. 941 card and rectifier-circuits as tabulated below:

Fault	Ref. 941 Card	Rectifier circuits
'A' Group, all channels on Preset 1, and 1-40 channels on Preset 2	'A1'	D4/C4
'A' Group, 41-80 channels on Preset 2, all channels on Preset 3	'A2'	D5/C5
'B' Group, all channels on Preset 1, 1-40 channels on Preset 2	'B1'	D2/C2
'B' Group, 41-80 channels on Preset 2, all channels on Preset 3	'B2'	D3/C3

2.2.5. Failure of all channels on one Preset, on one Master only:

- check the associated Master Fader circuits for -18V supply to Master Faders, and 0 to -15V output from the Master Faders.

2.2.6. Two-Channel Failure as in para 2.1.4:

- check as in para 2.1.4

2.2.7. Failure of a set of 10(1-10, 11-20, etc.) or 20 (1-20, 21-40, etc) channels on both Masters and all Presets:

Check if these channels are subject to FOH inhibition. If not, proceed as in para 2.1.3.1. If yes, check that the FOH fader is up; if fault persists with FOH fader at maximum setting, proceed as in para 2.2.12. below.

2.2.8. Failure of a set of 20 (1-20, 21-40, etc.) channels on one Preset for one Master only:

See para 2.1.3.2.

2.2.9. Failure of one channel only, on all Presets and both Masters:

See para 2.1.5.

2.2.10. Failure of one channel, on one Preset only:

See para 2.1.6, but note that diode printed-circuit card is Ref. 937 on 3-Preset systems.

2.2.11. Cross-fade faults on one channel only:

See para 2.1.7. but note that diode card is Ref. 937 on 3-Preset systems.

2.2.12. FOH faults:

2.2.12.1. On one channel only:

Check the connection from the Ref. 939 (FOH) Card to the

respective 'Control' terminal on the desk. If this is correct,

- check the respective diode on the Ref. 939 output circuit.

2.2.12.2. Set of 10 adjacent channels:

This indicates a fault in one of the four circuit sections on the Ref. 939 Card.

- check the appropriate section of the Ref. 939 Card.

2.2.12.3. All FOH channels:

- check that +8 to +16V supply to FOH fader is available at the junction of the two 330Ω resistors in desk; if not, check the rectifier circuits of D1 and C1 and the two resistors; if yes, check that -25V is supplied from pin 1 of Ref. 940 'B' card to pin 5 of the Ref. 939 Card; if correct, check FOH fader and its connections.

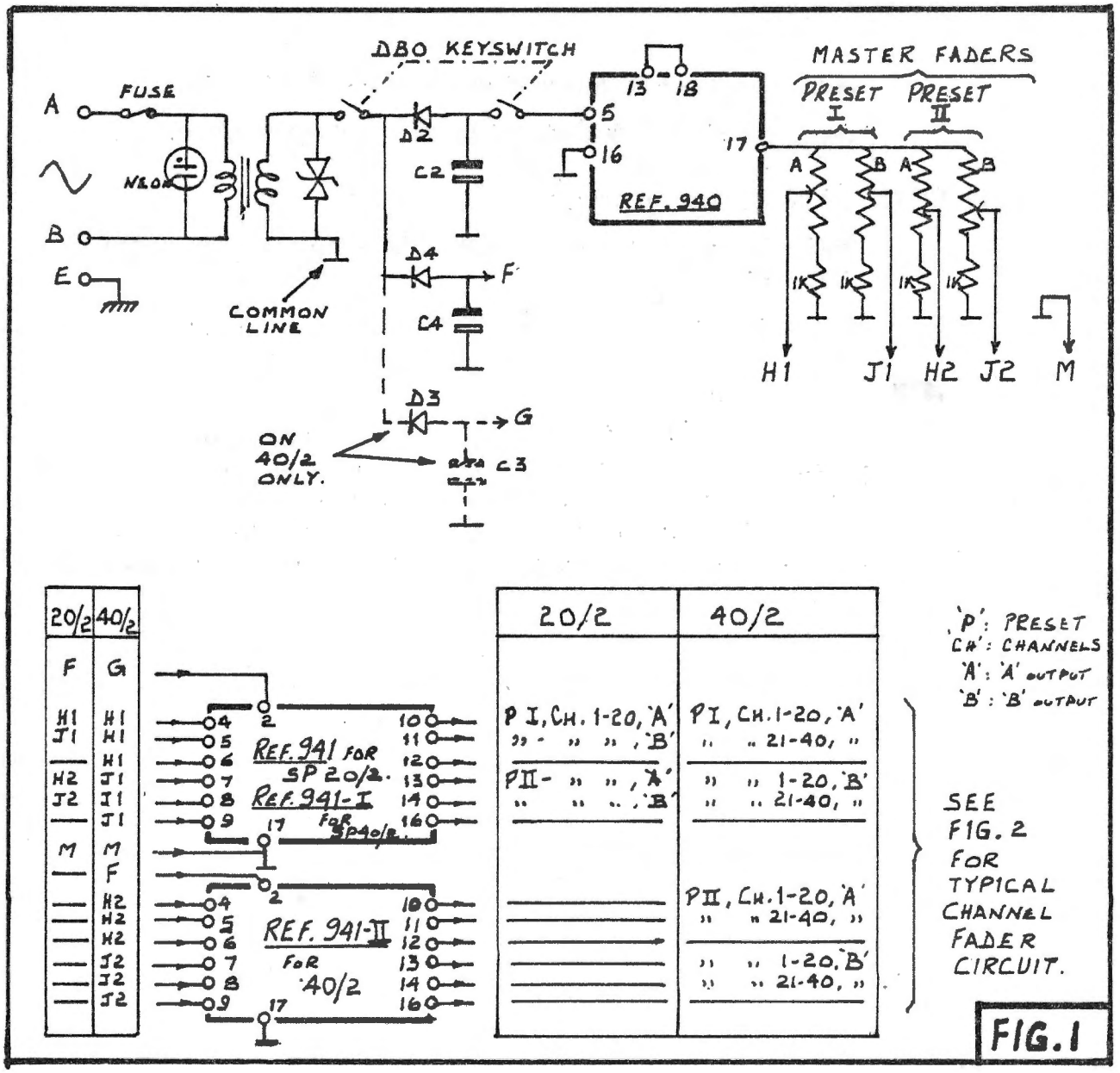
DBO KEYSWITCH
MASTER FADERS
PRESET I
PRESET II
FUSE
A
B
E
NEON
COMMON LINE
D2
C2
D4
C4
D3
C3
F
G
ON 40/2 ONLY.
13
18
5
16
17
REF. 940
1K
H1
J1
H2
J2
M
20/2
40/2
F
G
H1
J1
H2
J2
M
REF. 941 FOR SP 20/2.
REF. 941-I FOR SP 40/2.
REF. 941-II FOR 40/2
P I, CH. 1-20, 'A'
" " " " 21-40, "
PII- " " " 'A'
" " " 'B'
PII, CH. 1-20, 'A'
" " 21-40, "
" " 1-20, 'B'
" " 21-40, "
'P': PRESET
'CH': CHANNELS
'A': 'A' OUTPUT
'B': 'B' OUTPUT
SEE FIG. 2 FOR TYPICAL CHANNEL FADER CIRCUIT.

FIG.1

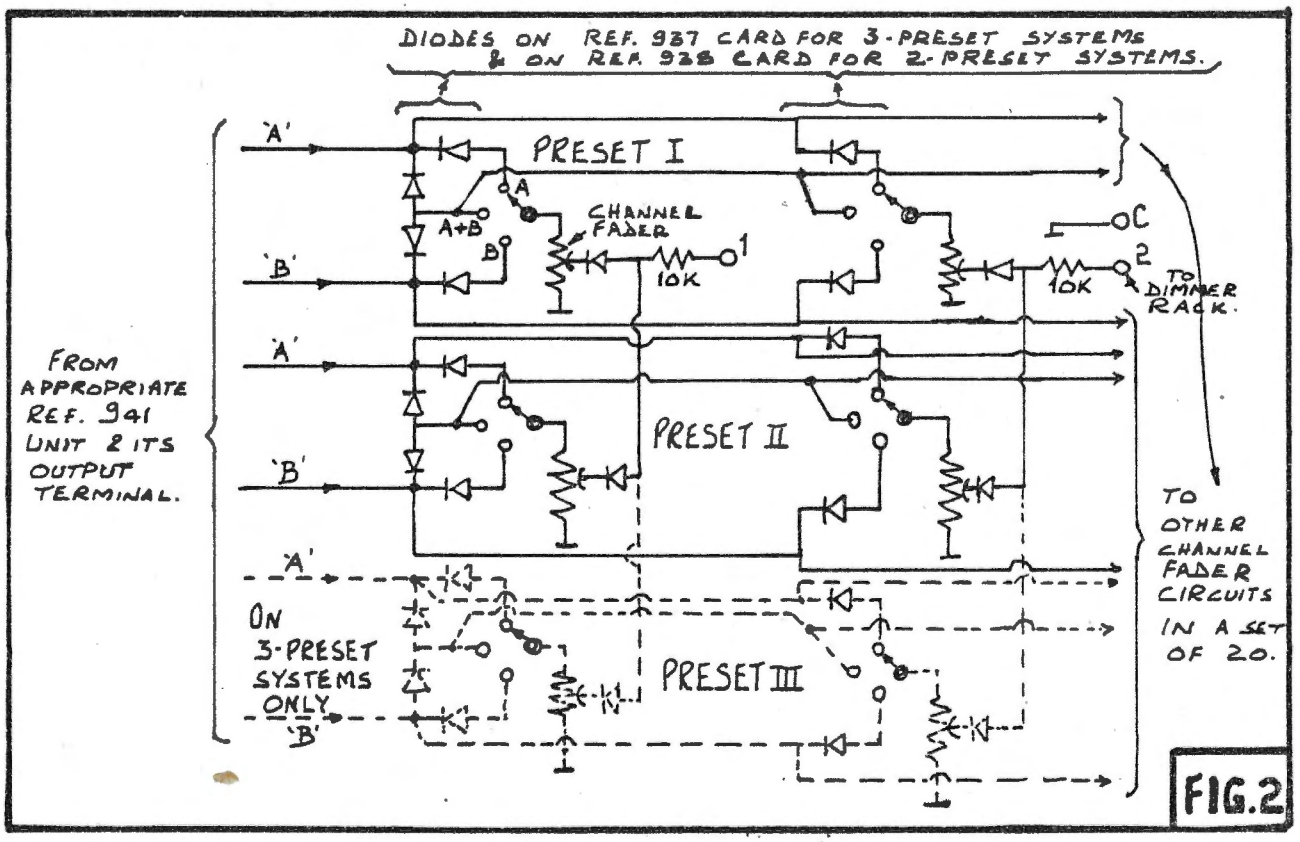
DIODES ON REF. 937 CARD FOR 3-PRESET SYSTEMS & ON REF. 938 CARD FOR 2-PRESET SYSTEMS.
FROM APPROPRIATE REF. 941 UNIT & ITS OUTPUT TERMINAL.
'A'
'B'
PRESET I
PRESET II
PRESET III
A
A+B
B
CHANNEL FADER
10K
C
TO DIMMER RACK.
ON 3-PRESET SYSTEMS ONLY
TO OTHER CHANNEL FADER CIRCUITS IN A SET OF 20.

FIG.2

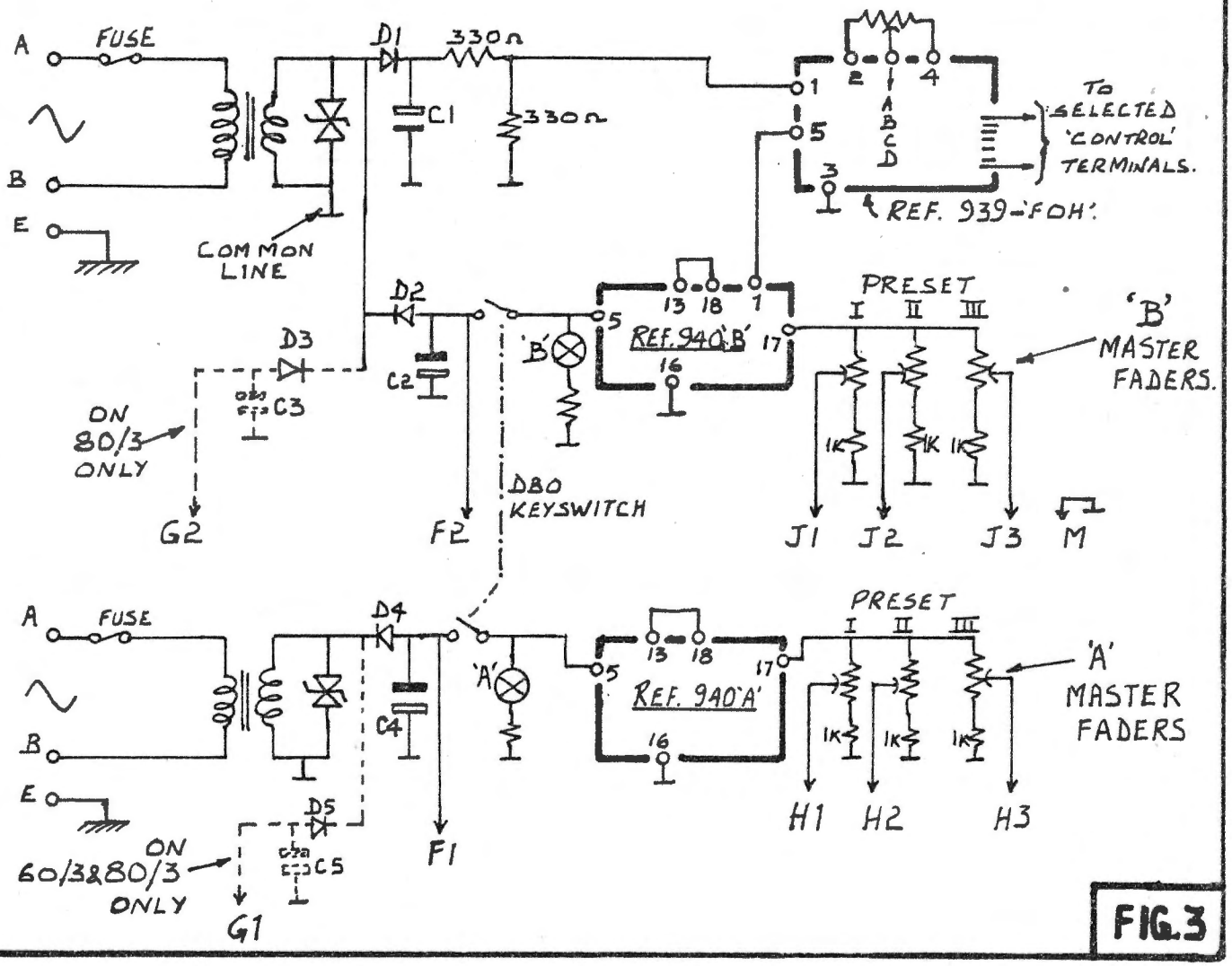

FIG.3

40/3	60/3	80/3		40/3	60/3	80/3
F1	F1	F1				
H1	H1	H1	CARD '1'	P I, CH. 1-20, 'A'	P I, CH. 1-20, 'A'	P I, CH. 1-20, 'A'
"	"	"		" 21-40. "	" 21-40. "	" 21-40, "
H2	"	"		P II CH. 1-20. "	" 41-60. "	" 41-60, "
"	H2	"		" 21-40. "	P II 1-20. "	" 61-80. "
H3	"	H2		P III 1-20. "	" 21-40. "	P II 1-20 "
"	"	"		" 21-40. "	" 41-60 "	" 21-40 "
M	M	M				
F2	G1	G1				
J1	H3	H2	CARD '2'	P I, CH. 1-20, 'B'	P III 1-20 "	" 41-60 "
"	"	"		" 21-40. "	" 21-40 "	" 61-80 "
J2	"	H3		P II 1-20 "	" 41-60 "	P III 1-20 "
"	J1	"		" 21-40 "	P I 1-20 'B'	" 21-40 "
J3	"	"		P III 1-20 "	" 21-40 "	" 41-60 "
"	"	"		" 21-40 "	" 41-60 "	" 61-80 "
—	F2	F2				
—	J2	J1	CARD '3'		P II 1-20 "	P I 1-20, 'B'
—	"	"			" 21-40 "	" 21-40 "
—	"	"			" 41-60 "	" 41-60 "
—	J3	"			P III 1-20 "	" 61-80 "
—	"	J2			" 21-40 "	P II 1-20 "
—	"	"			" 41-60 "	" 21-40 "
—	—	G2				
—	—	J2	CARD '4'			" 41-60 "
—	—	"				" 61-80 "
—	—	J3				P III 1-20 "
—	—	"				" 21-40 "
—	—	"				" 41-60 "
—	—	"				" 61-80 "

P = PRESET.
CH: CHANNELS
'A': 'A' OUTPUT
'B': 'B' OUTPUT

SEE FIG.2 FOR TYPICAL CHANNEL FADER CIRCUIT.

FIG.4

Ref. 941 Cards - Labelling in 3-Preset equipments				
System	Card 1	Card 2	Card 3	Card 4
40/3	A	B	-	-
60/3	A	A/B	B	-
80/3	A1	A2	B1	B2

FIGURE 5