Issue 1
15.9.77

DESIGNS DEPARTMENT MANUFACTURING INFORMATION

No. 6.309(77)

O.B. Line Equaliser EQ3/34

J. O'Clarey

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for Head of Designs Department

Written by: M.T. Ellen

BBC

DS/SPA4

HMC

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O.B. Line Equaliser EQ3/34

1. INTRODUCTION

This unit is the BMM equivalent of the EQ3/25A which was designed to meet the requirement for a cheap, quick and easily adjustable equaliser for use at Local Radio Stations. It will cope adequately with the average temporary O.B. music circuits used in Local Radio. These are nearly always less than ten miles in length, without intermediate amplification, so they can generally be corrected by a resonant type equaliser to within 2dB, the permitted tolerance.

The original equaliser in the series (EQ3/25) only had one resonant circuit but the EQ3/25A and the EQ3/34 each have two resonant circuits, one of which may be selected by a switch on the front panel. The two circuits have the same resonant frequency of 10kHz but different L/C ratios.

2. SPECIFICATION

Performance Data

Input:	Output from temporary O.B. music circuit.
Maximum input level:	+20dBm.
Source impedance:	75Ω.
Output:	Depends on equaliser settings.
Load impedance:	600Ω.

Mechanical Data

Chassis:	CH1/65A.
Weight:	0.4Kg.

Installation Data

Input pins:	PLA14 and PLA15.
Output pins:	PLA2 and PLA3.
Earth pin:	PLA1
Indexing positions:	1, 6 and 15.
Plug indexing positions:	A1.

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PRODUCTION TEST SCHEDULE

1. Description

This is an adjustable equaliser for correcting the frequency response of temporary O.B. music circuits used at Local Radio Stations. It consists of a tuned circuit with a resonant frequency of 10kHz in parallel with the signal path. The damping and basic loss of the circuit may be varied and there is a choice of two different L/C ratios. A 10dB attenuator may be switched into circuit, but as it is terminated by the tuned circuit in parallel with 600Ω its effective attenuation is only 10dB at 10kHz.

2. Information

a)	Design Section:	Transmission Section, D.D.
b)	Designer:	M.T. Ellen. (Circuit supplied by Communications Department).
c)	Engineer responsible:	M.T. Ellen.
d)	Handbook:	Not available 1/8/77.
e)	Technical Instruction:	Not available 1/8/77.
f)	Other information:	Based on EQ3/25 and EQ3/25A.
g)	Pre-production batch:	This Production Test Schedule has not been tested on a pre-production batch.

3. Manufacturing Performance Specification

a)	Input requirements:	Low distortion sine wave.
b)	Output:	Low distortion sine wave (for amplitude see section d)).
c)	Power supply:	None, passive circuit.

d) Performance:

The output levels in Table I should be obtained (±2dB) when the source, load and controls are as follows:

1) Source: TS10 oscillator with internal attenuator set to -20dB and its output level control set to +18dB. Its output must be shunted with 600Ω and 100Ω resistors in parallel to provide a source impedance of 75Ω.

2) Load: ATM/1 with 600Ω input impedance.

3) Controls: Basic loss and damping at minimum resistance.

TABLE I

Frequency Hz	Slope 1, att. 0dB	Slope 1, att. 10dB	Slope 2, att. 0dB	Slope 2, att. 10dB
250	-67.5dBm	-	-64	
1,000	-59	-	-53	-66.5
1,700	-54	-66.5	-48.5	-63.5
2,000	-52.5	-66	-47.5	-62
4,000	-46.5	-60.5	-42	-56
8,000	-39.5	-51	-38	-48.5
10,000	-37.5	-47.5	-37	-47.5
12,000	-36.5	-50	-37	-48.5
15,000	-38.5	-55	-37	-51

With the Damping control at minimum resistance and the attenuator set to 0dB the output levels given in Table II should be obtained ±2dB, with the same source and load conditions.

TABLE II

Basic loss setting	Slope 1		Slope 2	
	100Hz	8kHz	100Hz	8kHz
0		-39		-38
2	-46dBm	-40	-46	-38
4	-41.5	-40	-41.5	-38
6	-40	-39.5	-40	-38
8	-39	-39	-39	-38
10	-39	-39	-39	-38

With the Basic Loss control at minimum resistance and the attenuator set to 0dB the output levels given in Table III should be obtained ±2dB, with the same source and load conditions.

TABLE III

Damping setting	Slope 1		Slope 2	
	100Hz	8kHz	100Hz	8kHz
0		-39		-38
2	-55dBm	-40	-55	-38
4	-50	-41.5	-50	-38.5
6	-47	-42	-47	-39
8	-45.5	-42	-45.5	-39.5
10	-44.5	-42	-44.5	-39.5

4. Warning

No voltages above 50 volts d.c. or 30 volts a.c. are connected to this unit.

5. Test Apparatus Required

Variable audio frequency oscillator (e.g. TS/10).

Amplifier detector (e.g. ATM/1).

600Ω MR25 resistor.

100Ω MR25 resistor.

6. Inspection

a) Check that the unit has been satisfactorily manufactured in accordance with the drawings. Check that the slot positions of the coding comb are 1, 6 and 15.

b) No mains voltages are connected to this unit. Check the wiring to the input transformer T1 and the components on the front panel.

c) Check that the following components are correctly inserted:

Capacitors C1 to C4

Resistors R1 to R14

Inductor L1

Transformer T1

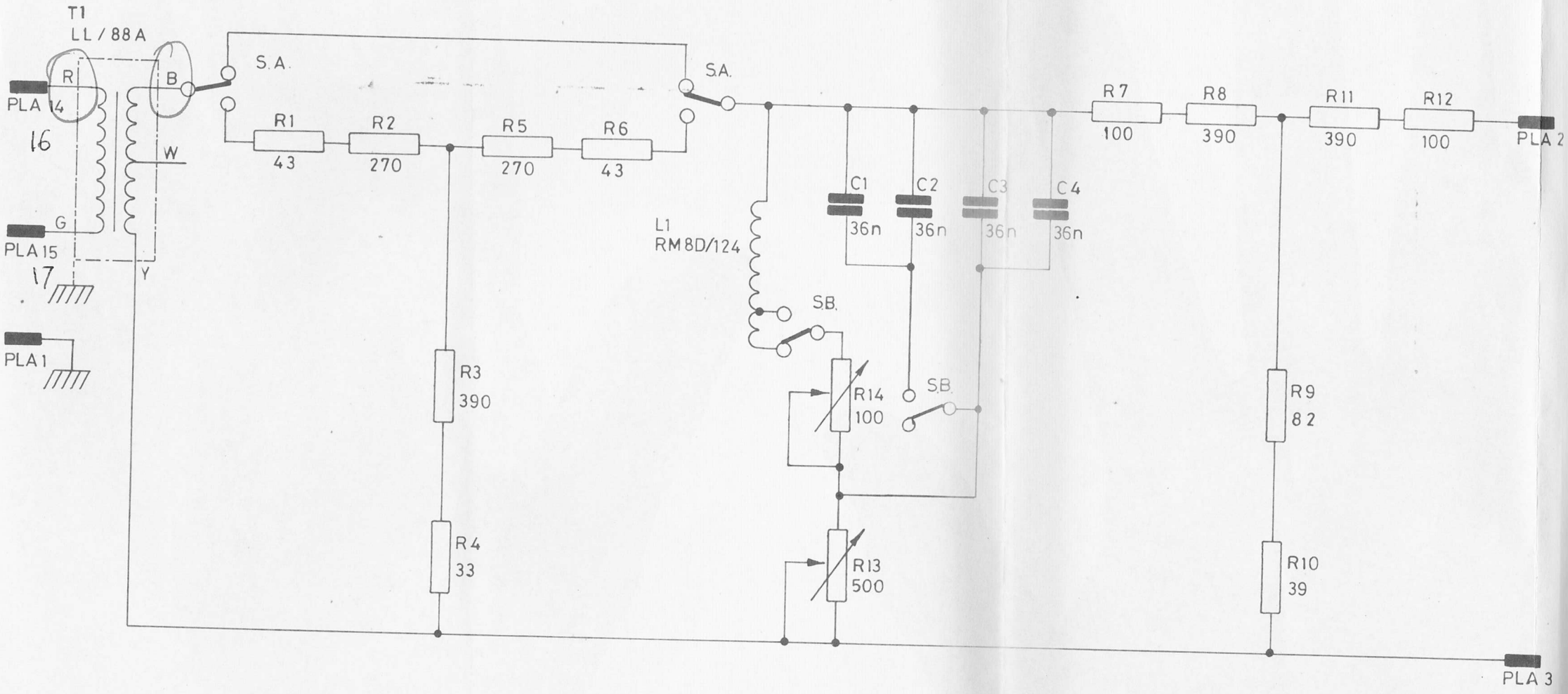
7. Test Procedure

7.1 To Check the Frequency Response

a) Connect a TS/10 in parallel with 600Ω and 100Ω resistors to PLA14 and PLA15. Set the output attenuator to -20dB and the output level control to +18dB. Connect an ATM/1 (600Ω input impedance) to PLA2 and PLA3 and adjust its attenuators as required to measure the output level. Set the frequency and adjust the controls as given in Tables 1, II and III and compare the readings obtained with those given in the Tables.

b) The readings should be within ±2dB of those given in the Tables.

c) If the frequency response is not within the specification check all the component values.


T1
LL / 88 A
R
B
W
G
Y
PLA 14
16
PLA 15
17
PLA 1
S.A.
S.A.
R1
43
R2
270
R5
270
R6
43
L1
RM 8D/124
C1
36n
C2
36n
C3
36n
C4
36n
S.B.
S.B.
R14
100
R3
390
R4
33
R13
500
R7
100
R8
390
R11
390
R12
100
R9
82
R10
39
PLA 2
PLA 3

D41584 A4

EQ3/34 PARTS LIST

ISS.	CHANGE	
1	11 : 1 : 77	
1a	*, NOTES, ITEMS 9 & 10 ADDED. SPEC ADDED TO ITEM 2. L.F.E. 18.8.77	
2	S/S LEGEND Nº E15302 ADDED. D.M.C. J.H. 26-10-77	

ITEM No.	No. OFF		DESCRIPTION	C'CT REF.	BBC REF. OR DRG. No.
			DRAWING NUMBERS		
			CIRCUIT D 41583 A3		
			PARTS LIST D 41584 A4		
			ASSEMBLY & WIRING D 41585 A2		
			DETAILS D 41586 A2		
			PB WIRING D 41587 A2		
			PB COMP LOC D 41588 A3		
			PB DRILLING D 41589 A3		
			RM INDUCTOR DATA SHEET RM8 RMBD / 124		
			SILK SCREEN LEGEND. E15302 A3		
			FURTHER INFORMATION REQUIRED FOR MANUFACTURE		
			UNIT ASSEMBLY INFORMATION EA 10484		
			UNIT WIRING INFORMATION EA 10137		
			COMP WIRING TO PCB INFORMATION EA 10140		
1	1	*	CHI / 65 A CHASSIS ASSEMBLED & MODIFIED BY		
			CONTRACTOR AS FOLLOWS :-		
			FRONT PANEL DRILLED & ENGRAVED OR PRINTED TO		D 41586 A2 DET. 1
			HANDLE, MARKING TO :-		" DET. 4
NOTE			CODING PLATE SLOT POSITIONS 1, 6 & 15 MODIFIED		" " 3
			BY B.B.C. WORKSHOPS BEFORE ISSUE TO CONTRACTOR :-		
2	1	*	PRINTED BOARD TO SPEC ED/PB/EQ3/34		D 41587 A2, D41588 A3 & D 41589 A3
3	1	*	PLUG FIXED 17 WAY SOURIAU LECTROPON		
			8611 - 17 - 32 - 13 - 201 A		
			SCREWS FOR FIXING ITEMS		
4	6		M 2·5 x 6 PAN MS Zn P 2		
5					
6					
7	6		WASHER M 2·5 PLAIN MS Zn P 2		
8					
9	1	*	LABEL, BLICK No. 8 GREEN.		
10	1	*	FOAM PACK (COMPLETE WITH CARTON).		51556 - 0342719

NOTES.

* DENOTES ITEMS SUPPLIED ON EMBODIMENT LOAN TO THE CONTRACTOR BY THE B.B.C. FREE OF CHARGE.

\+ DENOTES ITEMS NOT FITTED BY CONTRACTOR UNLESS ACCOMPANIED BY THE SYMBOL *. THESE ITEMS WILL NORMALLY BE SUPPLIED & FITTED BY THE B.B.C. ON TEST.

BBC

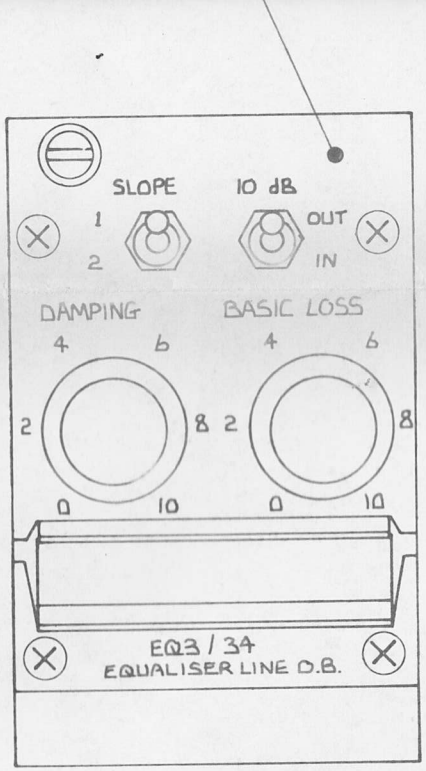
EQ3/34 PARTS LIST

EQUALISER LINE OR

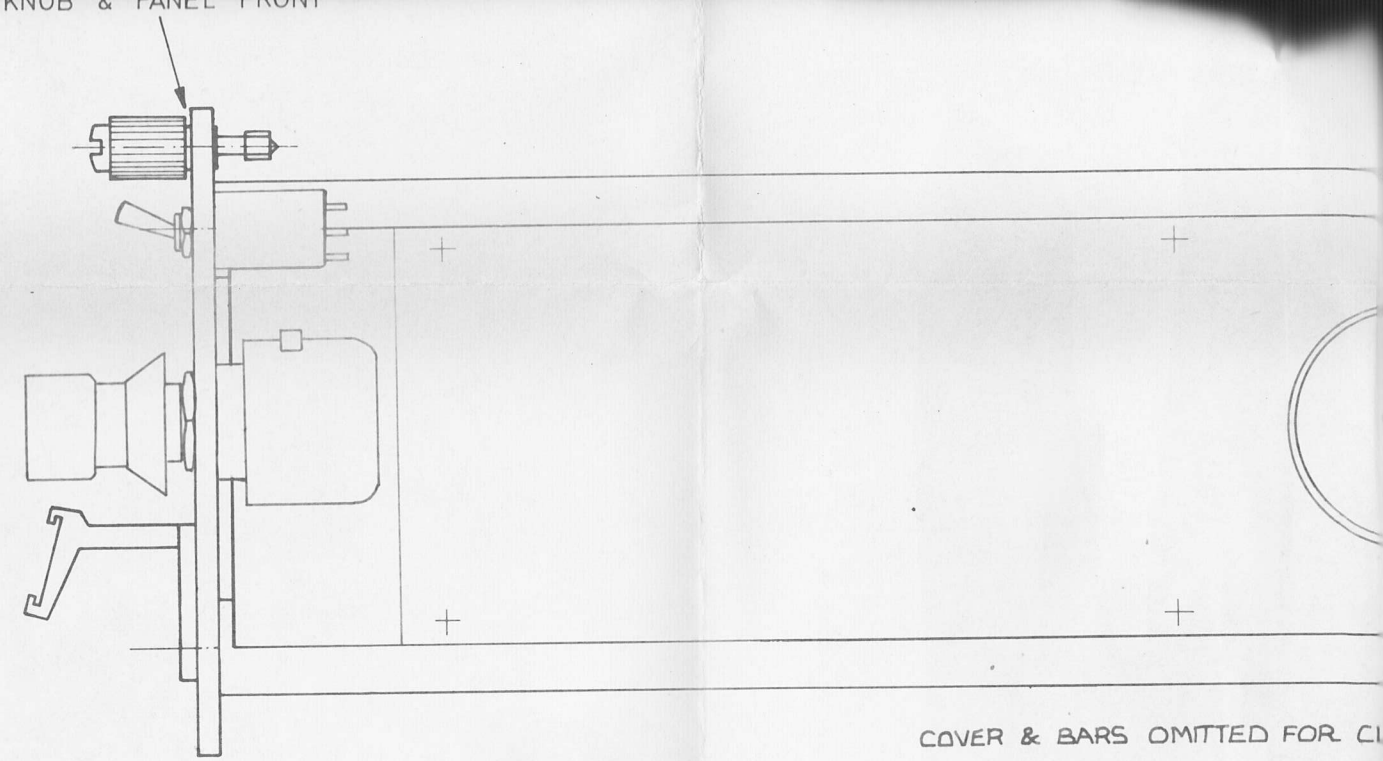
DRN.	GAS
TPD.	
CKD.	

DESIGNS DEPARTMENT

D 41584 A4

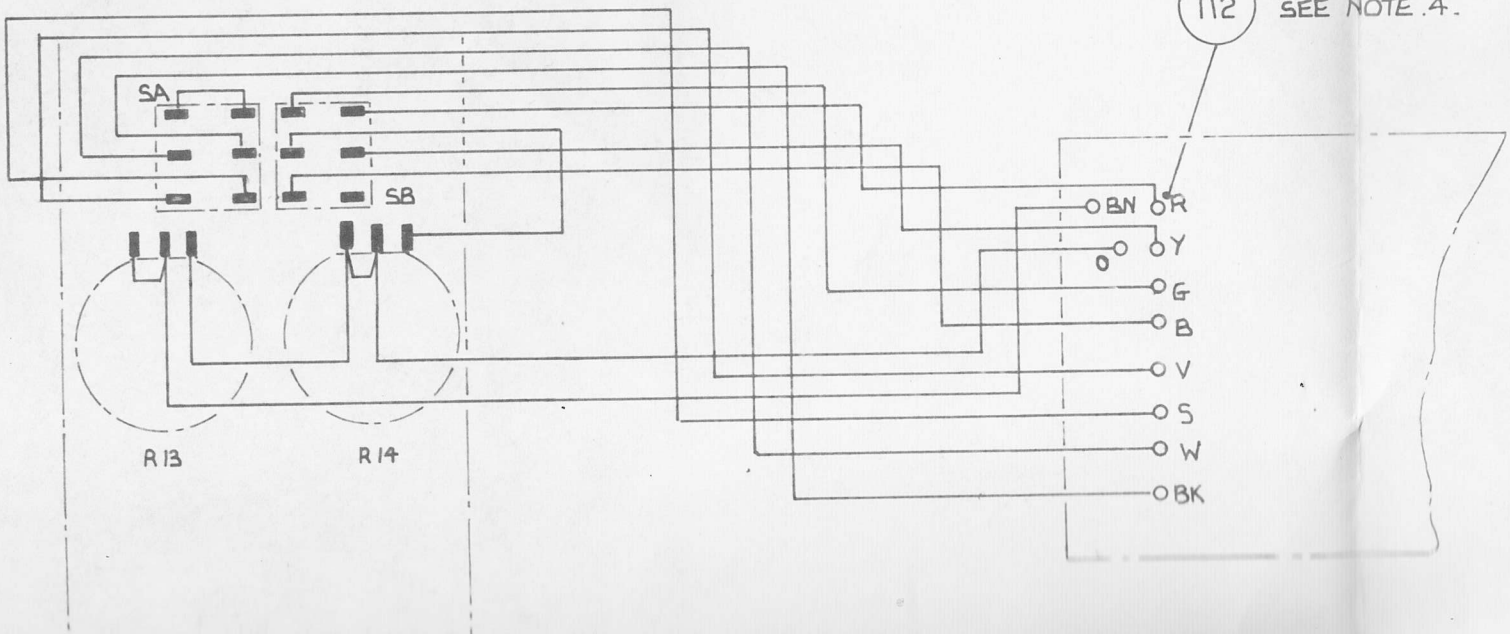


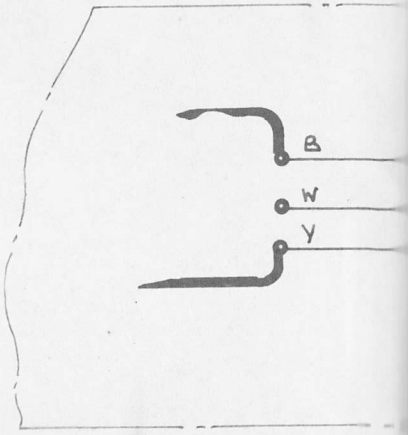
KNOB & PANEL FRONT



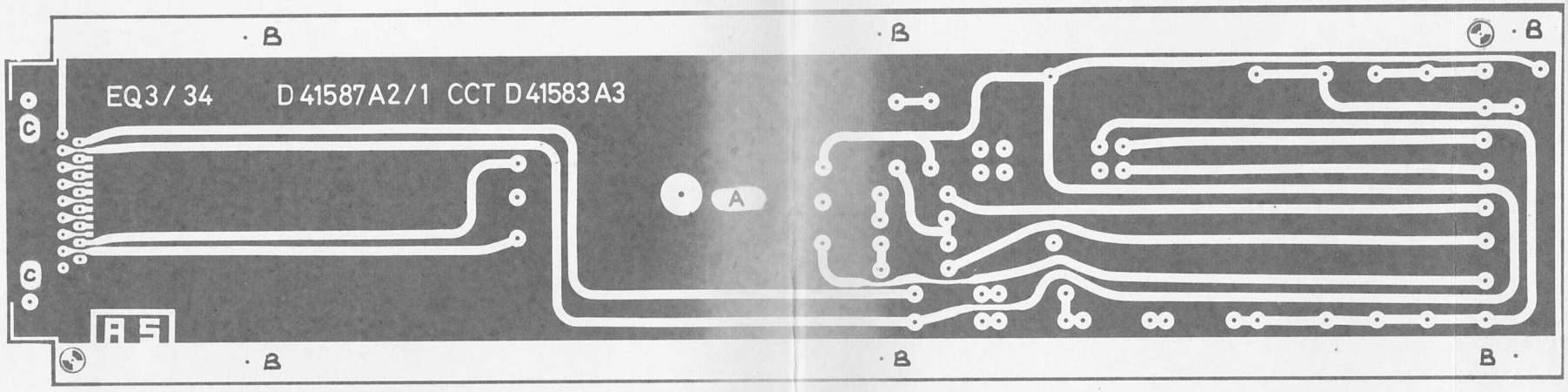
COVER & BARS OMITTED FOR CLARITY

112 SEE NOTE 4.





VIEW



6·35
2·9
2·7
0·85
3·0

MATERIAL 1·6 THK TO BS4584 +CL5·2, EP-GC-Cu-3,
35/0 1·6±0·2 (EPOXIDE WOVEN GLASS
FABRIC CLAD ON ONE/~~TWO~~ SIDES
WITH 35μm THK COPPER)

MANUFACTURED TO D 41587 A2 & D 41588 A3.

WAS — X

USED ON:-
EQ3/34

MANUFACTURERS MUST HAVE AVAILABLE, AND CONFORM TO, DESIGNS DEPARTMENT MANUFACTURING INFORMATION No 6.264(75)

CHANGE	SS
11 : 1 : 77	1
* ADDED. L.F.F. 11.10.77	2

ITEM	SEE NOTE	QTY	DESCRIPTION	BBC REF No
1	*	1	CORE MULLARD TYPE LA 4344	S22762-0348885
2	*	1	FORMER MULLARD TYPE DT2480	S22766-0349011
3	*	1	ADJUSTER MULLARD TYPE LA 1430	S22765-0348964
4	*	2	CLIP MULLARD TYPE DT2496	S22766-0349046
5				
6				
7				
8				

NOTE:-
ITEMS MARKED THUS * ARE EMBODIMENT LOAN TO MANUFACTURERS

WINDING INFORMATION

TERMINALS	1-2	2-3	1-3			
TURNS	52	21				
WIRE SIZE	·56	·56				
WIRE TYPE	SELF FLUXING TO BS 3188 INSULATION F					

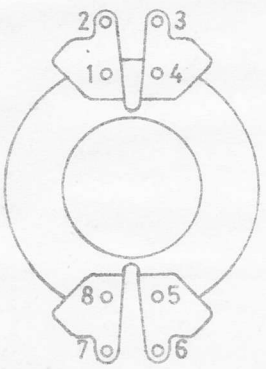
PARAMETERS

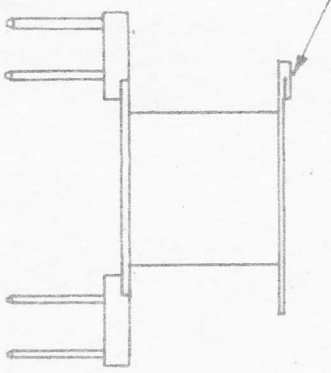
INDUCTANCE	1·78 mH		3·56 mH			
D.C. RESISTANCE	0·15 Ω		0·21 Ω			
Q FACTOR						

FREQUENCY

1. TO ADJUST INDUCTANCE ____ KHz WITH TEST CURRENT ≃ 0
2. TO DETERMINE Q ____ KHz. WITH TEST CURRENT ≃ 0

CONSTRUCTION





SCALE: 2/1

SPECIAL REQUIREMENTS

BBC

VM432A4

RM INDUCTOR DATA SHEET RM8

DRN	
TCD	
CKD	RTE
APPD	

DESIGNS DEPARTMENT

RM8D/124