DESIGNS DEPARTMENT

MANUFACTURING INFORMATION

NO.5.232(72)

Unit, Directional Coupler 20dB UN24/501

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(G.G. JOHNSTONE)
for Head of Designs Department

Written by:- M.T. Ellen

Issue 1
19.1.72

Unit, Directional Coupler 20dB UN24/501

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2. Mechanical Construction

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UN24/501

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BBC

DS/SPA4

Issue 1
19.1.73

DESIGNS DEPARTMENT MANUFACTURING INFORMATION NO.5.232(72)

Unit, Directional Coupler 20dB UN24/501

1. Introduction

The UN24/501 was designed to monitor the output of the EF7/513 A and B and the EF7/514 A and B translators and active deflectors. It consists of a through transmission line from PLF (input) to SKG (output), and two transmission lines with a coupling factor of 20dB with the through transmission line.

The output from one of the couplers is connected to a detector circuit which is normally used to drive an automatic gain control unit (UN3/541) and an automatic intercarrier monitor (MN2/522) via. PLD and PLE respectively. A bias current is supplied from the UN3/541 to the detecting diodes via. PLD in order to increase the sensitivity of the detector.

2. Mechanical Construction

All the transmission lines are striplines etched on Rexolite which is clamped between two aluminium plates together with another sheet of plain rexolite, to form a triplate coupler.

3. General Specification

Frequency range	470 MHz to 860 MHz
Characteristic impedance	50Ω
Input return loss	≥20dB
Coupling from PLF to PLA	20dB - 25dB
Output at PLD when 100mW is dissipated in a 50 load connected to SKC.	
With DC bias of 0.4mA (without an RF I/P) fed via PLD.	-375mV + 40mV
Without DC bias.	+75 ± 10mV

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Unit, Directional Coupler 20dB UN24/501

PRODUCTION TEST SCHEDULE

Equipment Required

UHF oscillator 470MHz to 860MHz (e.g. General Radio type 1209-C)
UHF power meter (e.g. Hewlett Packard type 432A)
UHF reflectometer of directional coupler
UHF logarithmic detector and display unit (e.g. Polyskop)
50 ohms termination (return loss better than -30dB) .
AVO 8
Power supply and 15K resistor
20dB pad for use with the power meter.

Test Procedure

Connect a UHF oscillator to PLF via a reflectometer and connect a 50 termination to SKG. Measure the input return loss and check that it is better than 25dB from 470MHz to 860MHz (a Polyskop could be used for this measurement).

Connect a UHF detector to PLA and check that the level is 20 to 25dB below the incident signal at PLF from 470MHz to 860MHz (a Polyskop could be used for this measurement). Set the output level of the UHF oscillator to 100mW and measure the voltage at PLD with an AVO 8 and check that it is within the specification. Connect PLE to a 6V power supply in series with a 15K resistor and measure the voltage at PLD with an AVO 8 and check that it is within the specification.

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DS/SPA4

D30258 A4.

sheet 1 of 2 sheets.

ISS.	CHANGE
1	24 - 11 - 71
2	SPEC ADDED. JRS R.B.A. 3—5—72
3	INDUCTOR & JIG ADDED TO FUR INF. No OFF ADDED TO ITEMS 5,13. ITEM 12 GREENPAR GE35870C10 DELETED. ITEM 16 SEALECTRO 51-045-0000 DELETED. ITEM 18 SEALEC. 61-001-0501 DELETED. ITEMS 20-21 ERIE LD25-30 N150 DELETED GNG 30-10-72 ITEMS 3,4,6 & 15 ADDED. GNG 16-11-72 cf 11186 (1) cf 7826(2)
3A	ITEM 16 WAS 'BULKHEAD RECEPTACLE' ITEM 18 WAS 'RESISTIVE TERMINATION' SJG 13-3-73 CF 7835(3)

UN24/501 UNIT DIRECTIONAL COUPLER 20dB PARTS LIST.

ITEM No.	No. OFF	SEE NOTE	DESCRIPTION		C'C'T REF.	BBC REF. OR DRG. No.
			DRAWING NUMBERS.			
			Parts List	D30258 A4		
			Assembly	D30259 A2		
			Order of Assembly	D30260 A4		
			Details 1-3	D30261 A2		
			P.B. No.1 Wiring	D30262 A2		
			P.B. No.1 Drilling	D30263 A4		
			P.B. No.2 Wiring	D 30264 A2		
			P.B. No.2 Drilling	D30265 A4		
			Circuit	D30279 A 3		
			DETAILS 4 & 5	ESK 2678 A3		FOR BBC REF ONLY.
			DETAIL 6	E14543 A4		
			FURTHER INFORMATION REQUIRED FOR MANUFACTURE.			
			Unit Assembly Information	EA10484		
			Connector Wiring	D26951A4		
			INDUCTOR	L2059		FOR B.B.C. REF ONLY
			ASSEMBLY JIG	ESK 2666 A4		
1	1	*	Printed Board No.1			D30262 A2, D30263 A4
2	1	*	Printed Board 2.			D30264 A2, D30265 A4
3	1	*	LABEL (2¼" x ⅞")			ESK 2678A3 Det 5
4	1	*	LABEL (1¾" x 1¼")			" " Det 4
5	1		Front Plate			D30261A2, Det.1
6	1		COVER PLATE			E14543 A4
7	1		Rear Plate			" Det.2
8						
9	1		Bracket			" Det.3
10						
11	1	*	Cable Termination 'Greenpar' GE30015. C10H			
12	1	*	Plug, Straight		PLF	1-24697-501
13	1	*	Panel Socket, Series N 'Greenpar' GE15042H		SKG	
14	A/R		Copper Foil .001" Thick x 3/8" Wide			
15	1	*	LABEL, SELF ADHESIVE, BLICK REF 8 GREEN.			
16	5	*	PLUG, TYPE SMB. SEALECTRO 51-045-9009		PLA-E	1-24682-503
			~~COMPLETE WITH G'PROOF & PLAIN WASHERS (ISSUED TOGETHER BY BBC CENTRAL STORES)~~			
18	3	*	SOCKET, TYPE SMB, RESISTIVE TERMINATION, 51Ω ± 5%		SKA-C	1-27422-515
19						
20	1	*	22pF Capacitor ± 20% LEADLESS DISC		C1	1-20612-058
21	1	*	22pF Capacktor ± 20% " " "		C2	" "
22						
23	1	*	Diode Hewlett-Packard HP5082-2800		D1	
24	1	*	Diode " " HP5082-2800		D2	
25						

BBC

DS/PLA4

UN24/501 - UNIT DIRECTIONAL COUPLER 20dB PARTS LIST.

DRN.	T. C. H.	DESIGNS DEPARTMENT
TPD.		
CKD.		D30258 A4
APPD.		sheet 1 of 2 sheets.

ISS.	CHANGE	
1	24 - 11 - 71	
2	ITEM 46 & NOTE ADDED. JRS R.B.A. 3—5—72	
3	ITEM 41 WAS 6OFF. ITEM 42,43 ADDED. ITEM 36,38,40 ADDED. GNG 30-10-72	

ITEM No.	No. OFF	SEE NOTES	DESCRIPTION	C'C'T REF.	BBC REF. OR DRG. No.
26	1	*	Inductor, Air Core		L/2059
27					
28	1	*	1kΩ Resistor 0.4W		1-26877-398
29					
30					
31					
32					
			SCREWS — For Fixing Items		
33	4		6B.A. x 5/16" LG. CH. HD. M.S. Zn.P — 9		
34					
35	2		6B.A. x 1/2" " " " " " " — 1, 2, 5, 7.		
36	4		6B.A. x 3/4" " " " " " " — 11, 6,		
37	2		6B.A. x 9/16" " " " " " " — 13.		
38	3		6B.A. x 1/4" " " " " " " — 11, 13, 1		
39					
40	4		NUT, 6BA, HEX. ORD. M.S. Zn.Pl. — 6,		
			WASHERS.		
41	14		6B.A. SHAKEPROOF STEEL Zn.P — 1, 2, 5, 7, 9, 13, 6,		
42	4		6B.A. GROVER STEEL Zn.P. — 11.		
43	1	*	6B.A. INSULATING — 1, 5		1 - 38151-561
44	10"	*	Cable R.F. Coaxial 50Ω General Radio 874-A3		
45					
46	1		CARTON, CARBOARD.		SPEC ED/UN24/501
47					
48	A/R		ARALDITE (OR SUITABLE EQUIVALENT)		
49					
50	1		WASHER, 6B.A., SMALL, PLAIN, M.S. Zn.Pl.		

NOTE
* DENOTES ITEMS SUPPLIED ON EMBODIMENT LOAN TO THE CONTRACTOR BY THE BBC FREE OF CHARGE.

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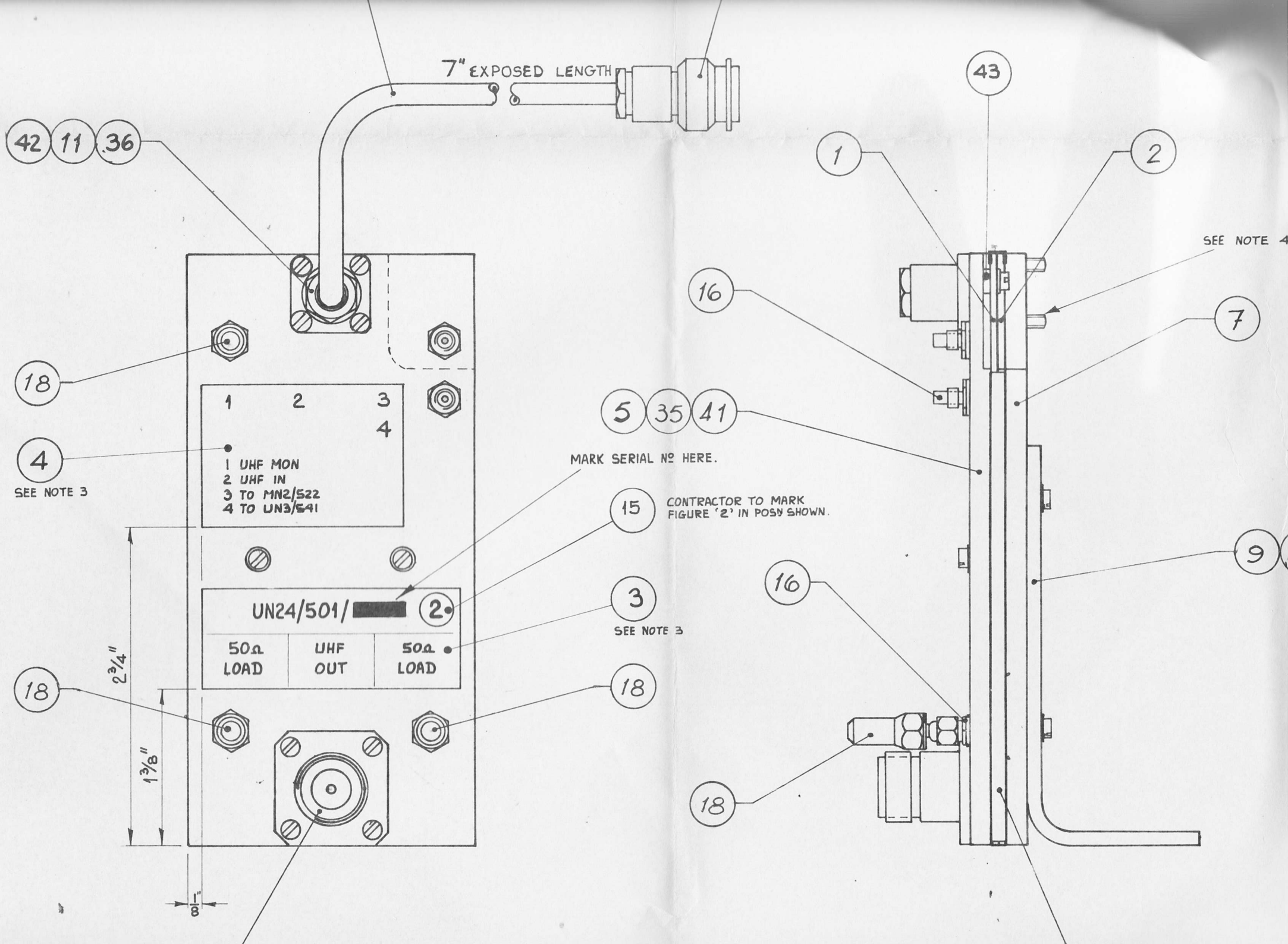
DS/PLA4

UN24/501 PARTS LIST

DRN. T.C.H. DESIGNS DEPARTMENT
TPD.
CKD.
APPD.

D30258A4
sheet 2 of 2 sheets.


7" EXPOSED LENGTH
42
11
36
18
1
2
3
4
1 UHF MON
2 UHF IN
3 TO MN2/522
4 TO UN3/541
SEE NOTE 3
UN24/501/
50Ω LOAD
UHF OUT
50Ω LOAD
2¾"
1⅜"
1/8"
MARK SERIAL Nº HERE.
15
CONTRACTOR TO MARK FIGURE '2' IN POSN SHOWN.
5
35
41
SEE NOTE 3
43
1
2
SEE NOTE 4
16
7
9
16
18
18

ISS	CHANGE
2	NOTES 2,5,6 & 8 REVISED. GNG 6-11-72

To be used in conjunction with D30259 A2.

ORDER OF ASSEMBLY.

1) Take printed boards, ready drilled and soft solder a square of copper foil to P.B.1 in position shown on D 30259A2.

2) Fit C1 to printed board by tinning one side of the capacitor and dropping it into the hole in the board, on top of the foil. Applying the soldering iron to the pad on the bottom side of the board is easier and less likely to crack the capacitor. The soldering iron must be applied to these ceramic capacitors for the absolute minimum time possible, and in any case, less than five seconds.

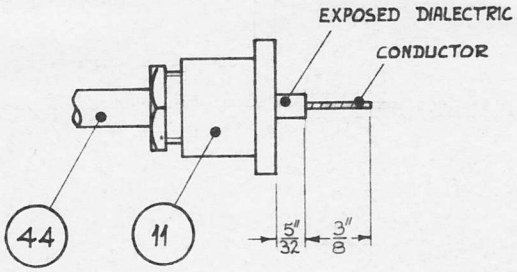
Note: Solder to be type "Multicore L.M.P" colour code red/blue (2% silver) or equivalent. Recommended iron temperature is 500° F.

3) Solder C2 on top of the board, in position shown, taking equal care.

4) Tin upper surfaces of C1 and C2.

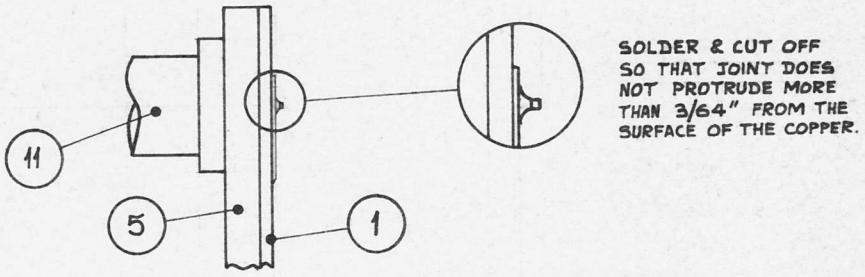
5) Solder D1, D2, L1 and R1 to P.B. 1 in positions indicated. Components must be mounted touching the board and wires must be as short as possible.

6) Fit item 12 to cable (item 44) as per instructions on D26951A4 and terminate the other end at item 11, as per sketch.



7) Fit 5 off item 16, complete with BOTH their washers (nuts not required) and items 11 and 13 to the front plate, item 5.

8 PLACE THE WASHER (ITEM 43) IN POSITION OVER TAPPED HOLE. LOCATE P.B. Nº1, WITH COPPER CHANNELS (ITEM 14) IN POSITION AGAINST THE FRONT PLATE. FIT THE SCREW & WASHER (ITEMS 38 & 50). CAREFULLY FIT THE ASSEMBLY JIG TO FLATTEN THE PRINTED BOARD. SOLDER THE TERMINATIONS OF ITEMS 13 & 16 AND THE CABLE CONDUCTOR TO P.B. Nº1. THE CABLE CONDUCTOR IS TO BE CUT OFF AS SHOWN.



Spec. ED/UN24/501

UN24/501 - Order of Assembly

BBC	UN24/501 Order of Assembly	DRN. GNG/DD	Designs Department
DS/A4		TCD.	D30260 A4
		CKD.	Sheet 1 of 2 Sheets.
		APPD	

S\H LTD 2389

D30260 A4

SHT. 2 OF 2 SHTS.

UN24/501 ORDER OF ASSEMBLY

ISS	CHANGE
2	REVISED. GNG 6-11-72

9) Remove jig and fit P.B. No. 2 and rear plate taking care that copper channels are clamped in position.

10) Fit 3 resistive terminations (item 18) to plugs (item 16) as shown.

SPEC. ED/UN24/501

BBC

DS/A4

UN24/501 Order of Assembly

DRN.	GNG / DD	Designs Department
TCD.		D30260 A4
CKD.		Sheet 2 of 2 Sheets.
APPD		

VM246 A4

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UN24/501 P.B.1. PRINTED BOARD DRILLING

D 30263 A4

CHANGE	ISS
24-11-71	1
'B' HOLES WERE 1/8" DIA. 'C' HOLES WERE 1·7mm. 'E' HOLES WERE ·260" DIA. MAT'L. WAS TYPE III. FINISH WAS ROLLER TINNED. CF7105 RBA 10-1-72.	2
SIZE OF BOARD SHOWN REVISED. JOS RBA. 3-5-72	3
NOTE ADDED. Cu. REVISED. 'A' HOLES WERE ·250" DIA. 'F' HOLE WAS 'D' GNG 22-10-72 'B' HOLE ADDED. cf11186(1) GNG 20-11-72	4

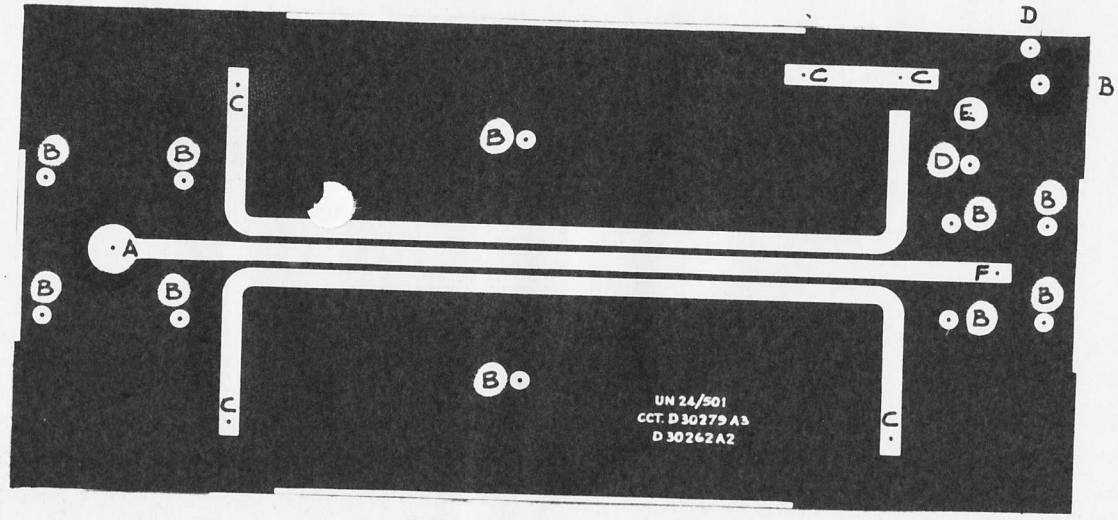
PRINTED BOARD DRILLING

UN24/501 P.B.1.

D30263A4

DESIGNS DEPARTMENT

	DRN	CKD	APPD
	T.C.H.		



NOTE THE FOLLOWING HOLES TO BE C'BORED ON REVERSE SIDE TO REMOVE COPPER SCREEN. DIAMETER AS INDICATED.

A & C HOLES $\frac{7}{32}$" DIA.

F HOLE $\frac{1}{8}$" DIA.

HOLE REF.	DRILL NO. OR SIZE	DIAMETER DEC.	DIAMETER MM
A	1/8"	·125"	3·0
B	27	·144"	3·7
C	52	·063"	1·6
D	56	·046"	1·2
E	G	·261"	6·6
F	55	·052"	1·3

CUT BOARD TO OUTER EDGE OF COPPER

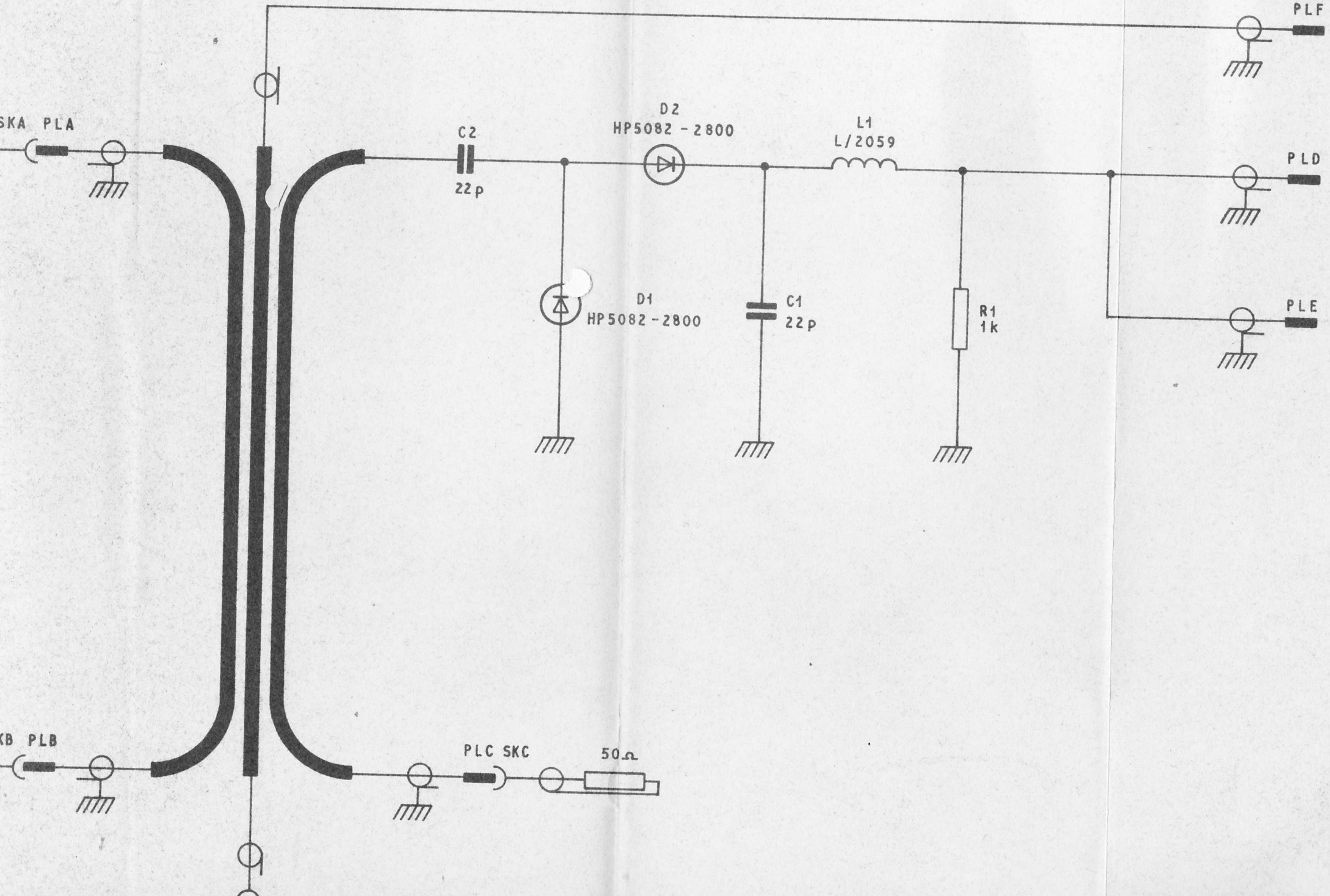
MATERIAL:
1·5 THICK REXOLITE TYPE 1422 CLAD ON BOTH SIDES WITH COPPER 35 MICRONS THICK.

MANUFACTURED TO:
D 30262 A2

FINISH:
CLEAN

APPROX. Nº OF HOLES 20.

SCALE 1:1


PLF
SKA PLA
C2
22p
D2
HP5082 - 2800
L1
L/2059
PLD
D1
HP5082 - 2800
C1
22p
R1
1k
PLE
KB PLB
PLC SKC
50Ω