Issue 1
23.3.73

DESIGNS DEPARTMENT

MANUFACTURING INFORMATION NO. 5.239(73)

Tunable UHF Bandpass Filters FL2/548A-D

(Band IV) and FL2/549A-D (Band V)

.....
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BBC

DS/SPA4

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D.D.M.I. No. 5.239(73)
Title Sheet

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C O N T E N T S

D R A W I N G S

FL2/548A-D

Parts List	D 32615 A4
Assembly	D 32616 A2
Details 1-5	D 32617 A1
Details 6-10	D 32618 A2

FL2/549A-D

Parts List	D 32637 A4
Assembly	D 32638 A2
Details 1-5	D 32639 A1
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General

These two element comb line filters were designed for use in the EP7/513A and B translator. They are similar to the four element filters type FL2/546 and 7, but they have a wider bandwidth and smaller group delay distortion.

Mechanical

Each filter consists of a flat fabricated box with two cylindrical resonators tuned by threaded cups or slugs. Various connectors are fitted to the end plates and couple capacitively to the filter via adjustable plungers.

Connectors:	FL2/546A,	FL2/547A	TNC both ends
	" B,	" B	BNC both ends
	" C,	" C	Type 'N' both ends
	" D,	" D	TNC one end, N other end.

Electrical

Band Centre Frequency range	FL2/548 434 to 579MHz FL2/549 618 to 835MHz
Pass band impedance (terminated in 50 ohms)	50 ohms
Return loss:	> 22dB
Recommended load:	50 ohms, 20dB return loss
Transmission loss:	< 1dB over 8MHz
Frequency response:	± .1dB over 8MHz
Typical out-of-band-loss:	14dB ~~20dB~~ @ ± 50MHz from Band Centre 35dB ~~40dB~~ @ ± 150MHz from Band Centre

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PRODUCTION TEST SCHEDULE

1. Equipment Required

Polyskop II
20dB coupler - Narda Microline 3020A
Selektomat
Desifix to type N adaptor
Type N to TNC or BNC to suit filter
6dB or 10dB coaxial attenuator
A number of 50 ohms leads, adaptors, attenuators and terminations.

2 off Male N type to female BNC for coupler ports

2. Mechanical inspection

2.1 Remove one side plate. Adjust the coupling plunger with a screwdriver over the total range of travel, ensuring that the faces do not rotate, and that the spring is able to return the plunger to its fully retracted position.

2.2 Free off the two nylon locking screws and see that both slugs adjust smoothly over their range of travel. Replace sideplate.

3. Procedure

3.1 In the block diagram below, it will sometimes be found easier to disconnect the output of the filter and terminate it directly without adaptors. It is perfectly in order to use a male N-type termination in a female BNC or TNC socket, but the mating connector is preferred, since it will not fall off.

The 20dB coupler should be screwed directly onto the filter using a maximum of one adaptor.

Set the Polyskop output attenuator to 10dB and the centre frequency to the centre frequency of the channel required, with a sweep of about 40MHz.

Connect the Selektomat to the forward-wave port of the coupler and tune it to track the polyskop, either on its second harmonic or third harmonic.

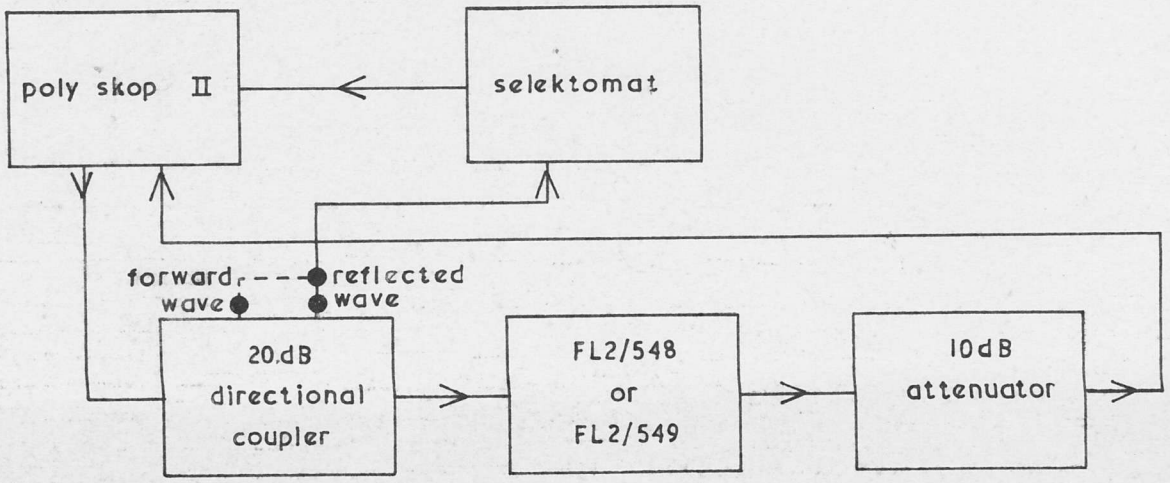

FIG. 1 BLOCK SCHEMATIC FOR ALIGNMENT

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3.2 Now transfer the Selektomat to the reflected wave port of the coupler and adjust the gains of the Selektomat and/or Y2 amplifier to give a trace on the screen.

3.3 Tune the resonator nearest the input for a resonance at the centre frequency. This is indicated by a disturbance to the trace which moves along the trace as the resonator is tuned.
(Note: The centre frequency of a television channel is 2.75MHz above the relevant vision carrier frequency).

3.4 Reverse the filter and repeat section 3.3. A trace similar to A, B, or C in fig. 2 should now be displayed.

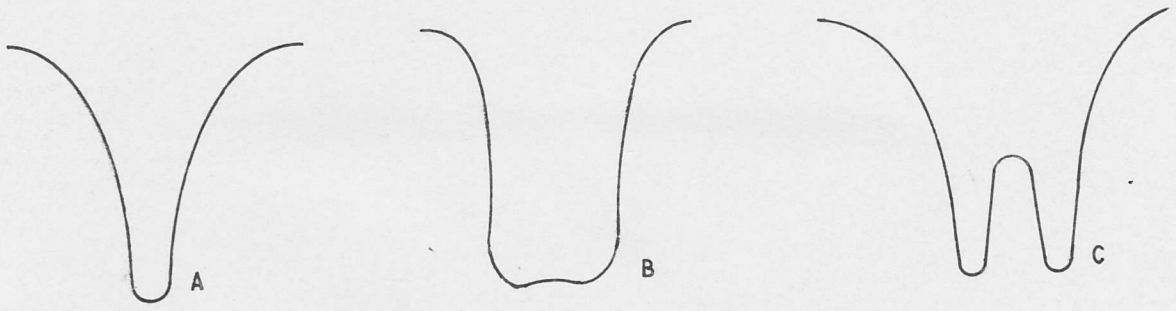

FIG. 2

3.5 The required trace is shown in B above. If the trace is similar to A the filter is undercoupled, so the coupling should be increased by turning the end coupling controls clockwise. Conversely if the trace is similar to C the filter is overcoupled, so the coupling should be reduced by turning the end coupling controls anticlockwise. Trim all four controls to obtain a trace similar to B above, the return loss should be greater than 22dB over a bandwidth of at least 10MHz.

3.6 Check that the filter through response and reflected wave response remain much the same, if the filter is reversed. If there is a significant change then the input and output resonance will have to be rematched as in 3.3 and 3.4.

3.7 Check that the through response is centred on the mid-channel frequency. It it is not then the resonances obtained in 3.3 and 3.4 should be altered in frequency to correct this. Sections 3.3 to 3.7 must be repeated if these adjustments are necessary.

3.8 Measure the return loss in the wanted channel by setting the reflected wave display to a convenient position on the screen and drawing a horizontal line corresponding to the maximum reflected signal in the channel. Then connect the Selektomat to the forward wave port of the coupler and use the Polyskop output attenuator to bring the incident wave display to the horizontal mark. The extra attenuation which is necessary is the return loss and this should be $>$ 22dB. Care must be taken to avoid overloading the Polyskop (indicated by a sudden depression of the response below the zero line).

3.9 Switch the Y1 amplifier to HF and the Y2 amplifier to EMF. Replace the filter with a through connection and adjust the Y1 and Y2 gains so that the two traces coincide. Now reconnect the filter and reduce the Polyskop attenuator setting by 1dB. Check that the filter through response is above the reference line over at least 8MHz.

3.10 The nylon screws fixing the resonator capacitors should be tightened.

3.11 The measuring capacity of the set-up may be checked by substituting the termination for the filter. This typically gives a return loss of between 26 and 36dB.

3.12 Fix a label to the top of the filter showing the channel to which it has been tuned.

D32615AA4 SHT 1 OF 2.

ISS.	CHANGE	
1	31/1/72	EMB. LOAN * SPEC. & ITEM 18 ADDED. W.H.W. CF. 11123(1) JCR. 21.11.72
2		ITEM 18: QTY. Was 1 ITEM 21 Was RG174 P.H 19.7.73
3		

FL2/548A-D FILTER, BAND PASS U.H.F. BAND IV

ITEM No.	No. OFF FL2/548/A	No. OFF FL2/548/B	No. OFF FL2/548/C	No. OFF FL2/548/D	SEE NOTE	DESCRIPTION	CCT. REF.	BBC REF. OR DRG. No.
						DRAWING NUMBERS		
						PARTS LIST D32615AA		
						ASSEMBLY D32616A2		
						DETAILS 1-5. D32617A1		
						DETAILS 6-11 D32618A2		
						FURTHER INFORMATION REQUIRED FOR MANUFACTURE		
						UNIT ASSY INFORMATION EA10484		
						SPEC: ED/FL2/548.		
1	1	1	1	1		FILTER BODY		D32617A1. DET 1
2	2	2	2	2		TUNING PLUG		D32617A1. DET 2
3	1	1	1	1		COVER PLATE		D32617A1. DET 3
4	2	2	2	2		RESONATOR		D32617A1. DET 4
5	2	2	2	2		SLEEVE		D32617A1. DET 5
6	2	2	2	2		TUNING PROBE		D32618A2. DET 6
7	2	2	2	2		BLOCK		D32618A2. DET 7
8	2	2	2	2		STUD		D32618A2. DET 8
9	2	2	2	2		CLIP		D32618A2. DET 9
10	2	2	2	2		SPRING		D32618A2. DET 10
11								
12								
13	2	2	2	2	*	NYLOC DOUBLE ANCHOR NUT 4 B.A. FIRTH CLEVELAND FASTENERS TYPE AGS2007/B1/NYLOC.		
14	2	—	—	1	*	SOCKET, INC 50Ω GREENPAR TYPE No GE 35807H		
15	—	2	—	—	*	SOCKET, BNC 50Ω GREENPAR TYPE No GE 35007H		
16	—	—	2	1	*	SOCKET TYPE 'N' GREENPAR No GE 15011H		
17								
18	2	2	2	2		PIN. SILVER STEEL.		D32618A2. DET. 11.
19								
20								
21	2	2	2	2		COPPER BRAID 15"/16 MADE BY CONTRACTOR FROM:-		
	2"	2"	2"	2'	*	MINIATURE COAXIAL CABLE RG174U "SEALECTRO LTD"		
22								
23								
24								

BBC VM275 A4

FL2/548A-D FILTER, BAND PASS U.H.F BAND IV. PARTS LIST.

DRN. G.W.W DESIGNS DEPARTMENT
TPD.
CKD.
APPD

D32615AA4 SHT 1 OF 2.

D3261SA4
SHT 2 OF 2.

CHANGE	ISS.
31/7/72 EMB. LOAN NOTE & ITEM 40 ADDED. W.H.W. ALSO ITEM 38 J.C.R. 21.11.72	2

FL2/548A-D
PARTS LIST.

ITEM No.	No. OFF FL2/548 A	No. OFF FL2/548 B	No. OFF FL2/548 C	No. OFF FL2/548 D	SEE NOTE	DESCRIPTION	CCT. REF.	BBC REF. OR DRG. No.
						SCREWS FOR FIXING ITEMS:-		
25	4	4	4	4		8B.A. X 3/16 CH. HD. ST. ZN. P. 13		
26	4	4	4	4		8B.A. X 5/16 CH. HD. ST. ZN. P. 7		
27	4	4	4	4		6B.A. X 3/16 CH. HD. ST. ZN. P. 14, 15, 16		
28	6	6	6	6		6B.A. X 1/4 C.S.K. HD. ST. ZN. P 3		
29	2	2	2	2		4B.A. X 7/8 CH. HD. ST. ZN. P. —		
30	2	2	2	2		4B.A. X 3/16 NYLON CH. HD —		
31	2	2	2	2		M6 X 20 C.S.K. HD. ST. ZN. P. —		
32								
33								
34								
						WASHERS		
35	8	8	8	8		8B.A. SHAKERPROOF ST. ZN. P. 7, 13		
36								
37								
38	1	1	1	1	*	LABEL SELF-ADHESIVE, BLICK. No 8 GREEN		
39								
40	1	1	1	1		CARTON, CARDBOARD.		SPEC: ED/FL2/548

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

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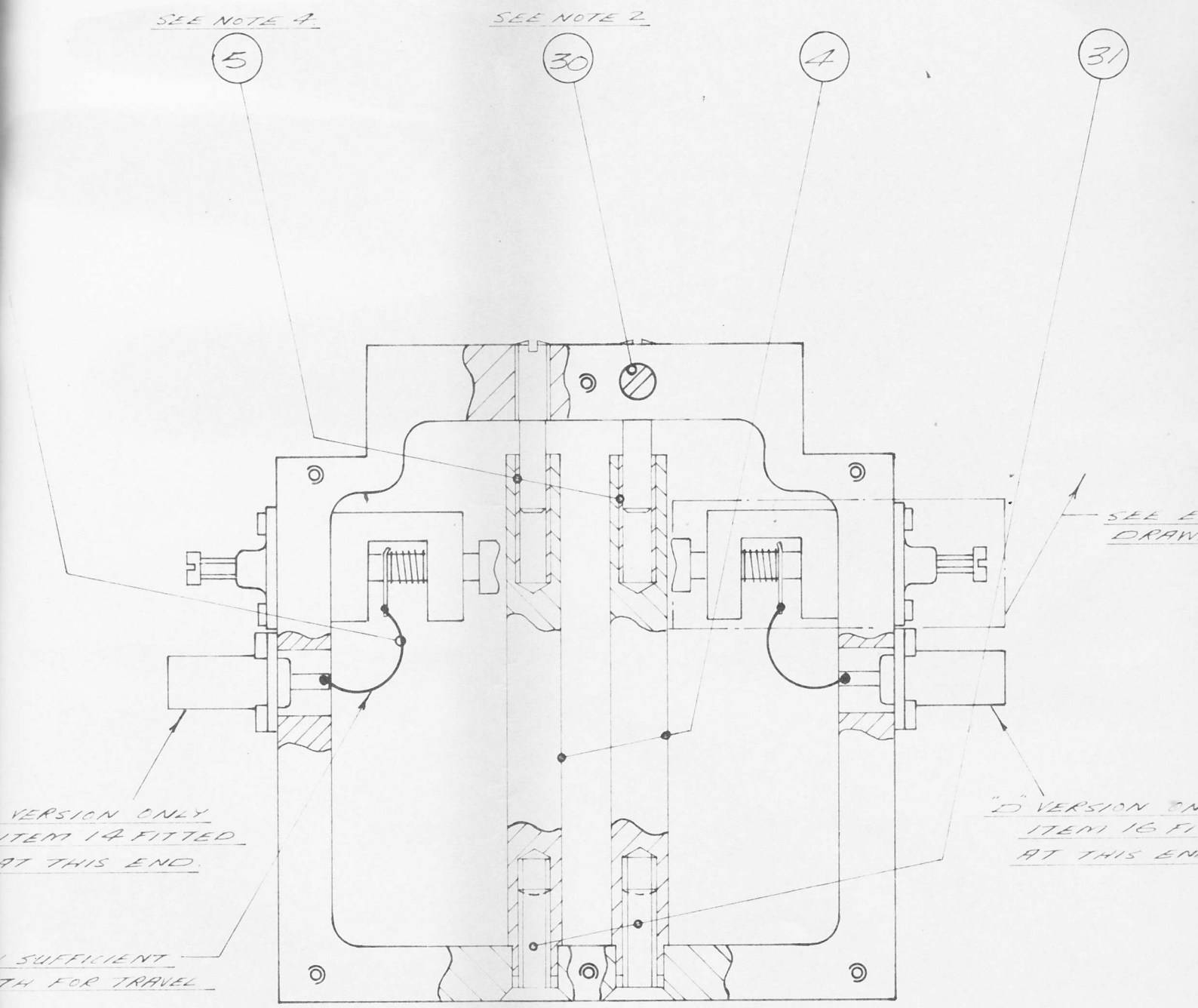
VM275 A4

FL2/548A-D.
PARTS LIST.

DRN.	G.W.W.	DESIGNS DEPARTMENT
TPD.		
CKD.		D3261SA4 SHT 2 OF 2
APPD		



COVER (ITEM 3) SHOWN REMOVED.