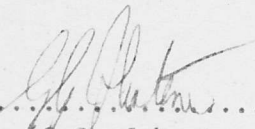


Issue 1
24.6.82

Designs Department Manufacturing Information

No. 5.405(81)

Tunable UHF Bandpass Filter FL2/565


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

Written by: M.T. Ellen

DDMI No. 5.405(81)
Title Sheet

VS

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BBC

DS/SPA4

Designs Department Manufacturing Information

No.5.405(81)

Tunable UHF Bandpass Filter FL2/565

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Designs Department Manufacturing Information

No. 5.405.(81)

Tunable UHF Bandpass Filter FL2/565

1. DESCRIPTION

The FL2/565 is a tunable four element UHF bandpass filter designed to select any 8MHz television channel within Bands IV and V. It was originally designed as a channel selection filter for use with the UHF transposer type TM4M/503. The input and output connectors are type BNC fixed sockets.

2. INFORMATION

- (a) Designed in Radio Frequency Section (5), Design Department
- (b) Designer: R.J. Hart
- (c) Engineer responsible: M.T. Ellen
- (d) Handbook: part of DD Handbook No. 5.156(81)
- (e) No Technical Instruction available 1.6.81
- (f) Preproduction batch of 10 tested in Designs Department

3. MANUFACTURING PERFORMANCE SPECIFICATION

- (a) Input/Output return loss at either port >18dB over 8MHz channel width
- (b) Insertion loss <1.5dB
- (c) Tunable range of centre frequency 470MHz to 860MHz
- (d) Typical bandpass bandwidth (0.5dB points) 9MHz at channel 21
12MHz at channel 40
12MHz at channel 69

4. WARNING

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

5. TEST APPARATUS REQUIRED

RF Analyser e.g. Wiltron Model 640 with two 640E and a 640G plug-in

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Sheet 1 of 4 sheets

SWR bridge e.g. Wiltron Model 6NF50

RF detector e.g. Wiltron Model 7N50

N male to BNC male adaptor

N female to BNC male adaptor

UR67 coaxial lead about 500mm long fitted with male N connectors.

6. INSPECTION CHECKS

Remove the fibreglass board on one side of the filter and check that it has been manufactured satisfactorily. In particular check the following:-

1. That the nuts holding the capacitors and connectors are tight.
2. That the capacitors have been soldered securely and are not mechanically strained.
3. That the coupling capacitors C1 and C6 are aligned with the holes through which they are adjusted.

Refit the fibreglass board and check that all the screws are tight.

7. TEST PROCEDURE

7.1 To Calibrate the Test Equipment

Only follow the instructions in this section at the start of each testing session, or if the controls have been disturbed since the previous calibration. The instructions refer to a Wiltron 640 but other equipment with a similar specification may be used.

Connect the detectors to the RF analyser and set the controls as follows:-

640G sweep width	100MHz/div.
markers	100MHz.
centre frequency	600MHz
output level	0dBm.
sweep trigger	auto.
sweep rate	fast.
right-hand 640E (connected to the SWR detector)	
Calibration	dBm
Sensitivity	10dB/div.

Trace position	Retrace line one large division below the top of the screen.
Offset polarity	negative.
Offset	Adjust to obtain a line that is superimposed on the retrace line (11.5dB is typical).

Connect the RF detector to the SWR detector via N-BNC, BNC-BNC and BNC-N adaptors and check that the return loss is better than 27dB from 400 to 900MHz. Switch off the amplifier.

Now set the controls on the left-hand 640E as follows:-

Amplifier	on
Calibration	dBm
Sensitivity	0.5dBm/div.
Trace position	Retrace line in centre of screen
Offset polarity	negative
Offset	Adjust to obtain a line that crosses the centre of the screen.

Switch the left-hand (through loss) amplifier off and the right-hand (return loss) amplifier on.

7.2 To Tune the Filter to Approximately the Correct Frequency

Connect SKA to the test port of the SWR detector using an N to BNC adaptor and leave SKB unterminated. Adjust the centre frequency on the display to 2MHz above the required vision carrier frequency- with a sweep width of 25MHz/div. Set the vertical sensitivity of the display to 1dB/div. and adjust the trace to one large division below the top of the screen.

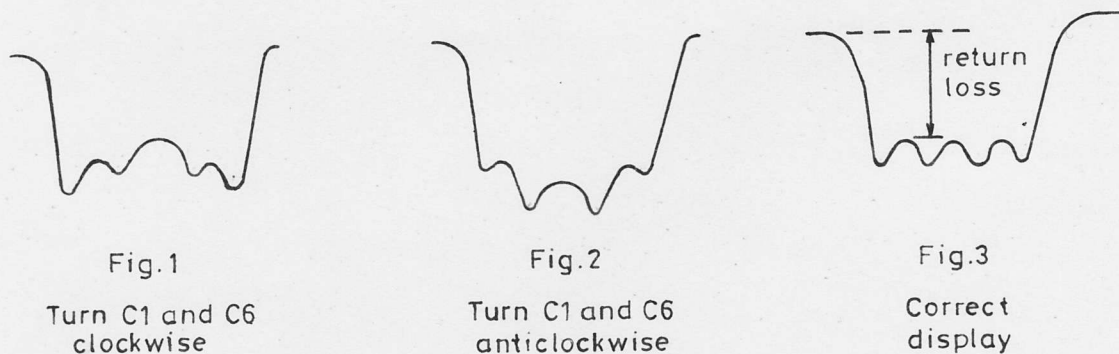
Adjust the end coupling capacitors (C1 and C6) to minimum, i.e. anti-clockwise, until the resistance to turning suddenly disappears, then screw back clockwise one turn. If the capacitors are turned anticlockwise beyond the slack point there is a danger of the tuning slugs falling out inside the filter.

Tune C2 to obtain a dip in the centre of the screen. The two centre capacitors (C3 and C4) should be set off-tune so that they do not affect the response observed. Adjust C1 clockwise until the notch depth is 1 ± 0.2 dB. Retune C2 if necessary, then reverse the filter and repeat the above procedure on the new input port (for C1 read C6 and for C2 read C5). Reconnect SKA to the SWR detector and connect

SKB to the RF detector using an N to BNC adaptor. Tune C3 to obtain a symmetrical double notch, then change the scale to 5dB/div and tune C4 for maximum return loss.

7.3 To Optimise the Return loss at SKA

Set the sweep width to 5MHz/div and check the centre frequency adjustment. Readjust C3 and C4 for a symmetrical display. If the return loss is better than 18dB and four dips are on the display then go straight to section 7.4. Otherwise adjust C1 and C6 (the coupling capacitors) by approximately equal amounts to obtain the return loss response shown in fig. 3. Figs 1 and 2 indicate the direction that the capacitors should be adjusted.



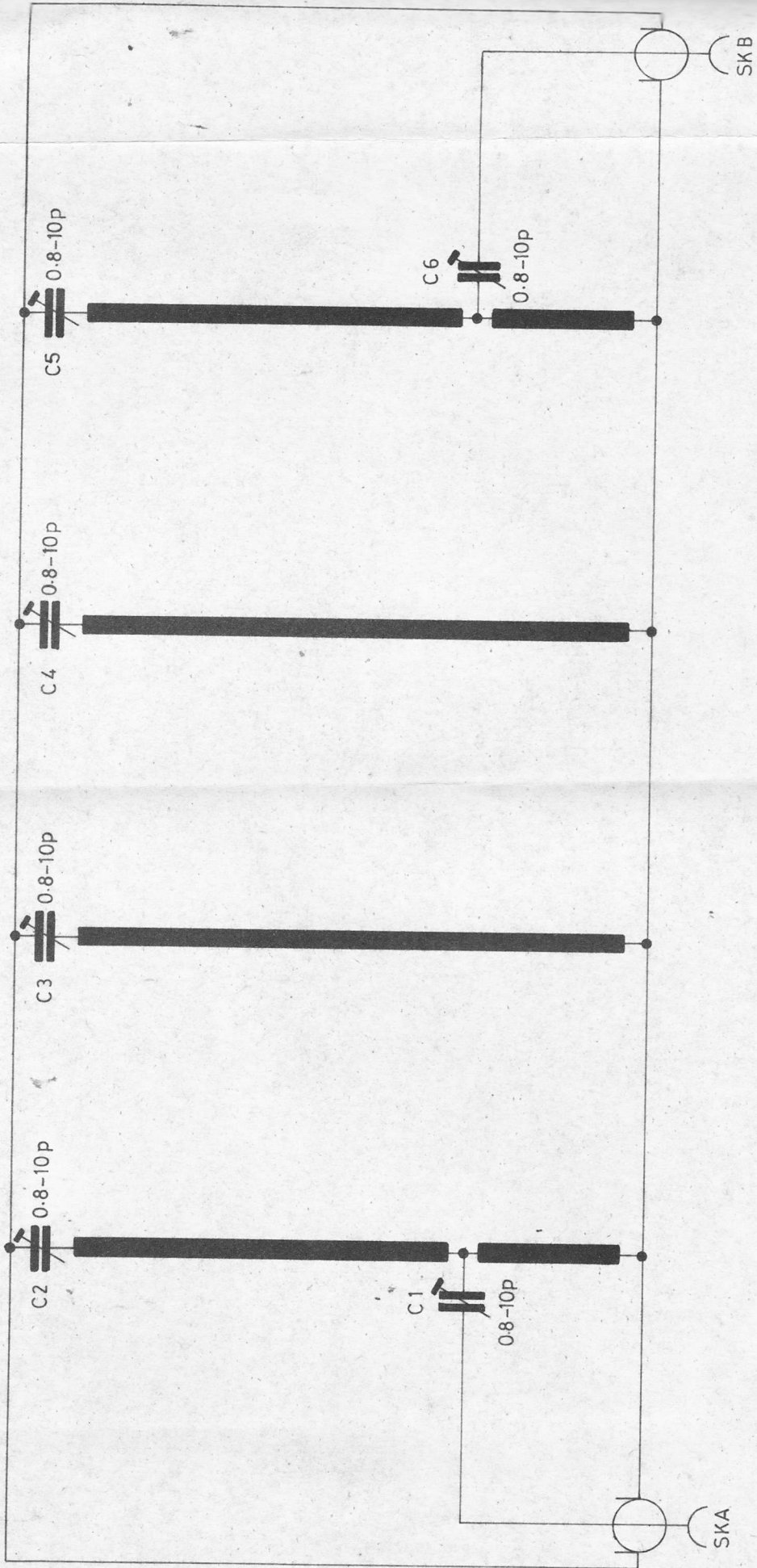
If necessary re-adjust C2, C3, C4 and C5 slightly to obtain a symmetrical return loss display, with a return loss better than 18dB.

7.4 To Check Return Loss at SKB

Interchange the connections to SKA and SKB and check that the return loss is better than 18dB with four dips, approximately as shown in fig 3. If this test is not passed repeat section 7.3.

7.5 To Check Through Response

Switch on the amplifier connected to the RF detector and check that the centre frequency loss is less than 1.5dB (refer to section 7.1 for calibration). Also check that the bandwidth (to -0.5dB relative to the centre frequency) is more than 9MHz.



D51250A4

SHEET 1 OF 2 SHEETS

ISS	2
CHANGE	26-6-1981
	14.10/9/81
JAB	26.10.81

ITEM No.	No. OFF	DESCRIPTION	CCT REF.	BBC REF. OR DRG. No.
DRAWING NUMBERS				
		CIRCUIT	D51249A3	
		PARTS LIST	D51250A4	
		ASSEMBLY	D51251A2	
		DETAILS 1-3	D51252A3	
		ETCHING MASTER	D51253A1	
		PRINTED BOARD MASTER	D51254A1	
		DRILLING DETAILS 4-6	D51255A2	
		LABEL MASTER	D51256A4	
FURTHER INFORMATION REQUIRED FOR MANUFACTURE				
UNIT ASSEMBLY INFORMATION: EA10484				
SPEC ED/FL2/565				
1	1	* SET OF DETAILS COMPRISING OF :-		(SEE ORDER)
	2	COVER (TOP & BOTTOM) SEE NOTE		D51255A2 DET.4
	1	COVER (FRONT)		" " .5
	1	COVER (BACK) SEE NOTE		" " .6
3	1	* SET ETCHED COMPONENTS MANUFACTURED TO:-		D51253A1 - 0440118
5	4	FIXING BAR, MANUFACTURED TO :-		D51252A3 DET 1
6				
7	2	FIXING BAR, MANUFACTURED TO :-		---"--- DET 2
8				
9	3	FIXING BAR, MANUFACTURED TO :-		---"--- DET 3
10				
11	2	* SOCKETS, FIXED, BNC, 50 Ω	SKA-B	S27500 --- 002186X
12				
13	6	* CAPACITOR, 0.8p-10p, VARIABLE, TUBULAR. (DISCARD COVERS AS NOT REQUIRED)	C1-6	S21214 --- 0205716
14				
15	4	* M3, ANCHOR BUSH RIVET, BRASS.		S31503 --- 0355581
16	1	CARDBOARD CARTON		TO SPEC ED/FL2/565
17	2	* M5, ANCHOR BUSH RIVET		S31505 --- 0355660
18				
19	1	* LABEL (SEE ORDER FOR SERIAL No., CENTRE FREQUENCY & CHANNEL No)		D51256A4 0440126
		SCREWS, METRIC, M.S, Zn P, PAN HD	FOR FIXING ITEMS	
20	40	M2.5 x 6mm LONG.	1, 3, 5, 7 & 9, 11	
21	4	M2.5 x 8mm LONG	1, 3	
22				
		NOTS, METRIC, FULL HEX, M.S, Zn P		
23	12	M2.5	1, 3 & 11	
24				
		WASHERS		
25	36	M2.5 PLAIN, M.S, Zn P	1 & 3	
26				
27				
28	8	M2.5 SHAKEPROOF STL.	11	
29				

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BBC
DS/PLA4

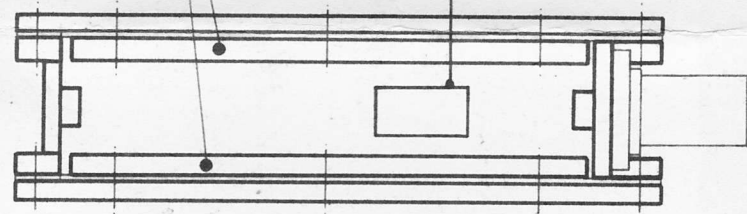
FL2/565
UHF BAND PASS FILTER
PARTS LIST.

DRN.	M.K	DESIGNS DEPARTMENT.
TPD.		
CKD.		
APPD.	A.T.F	

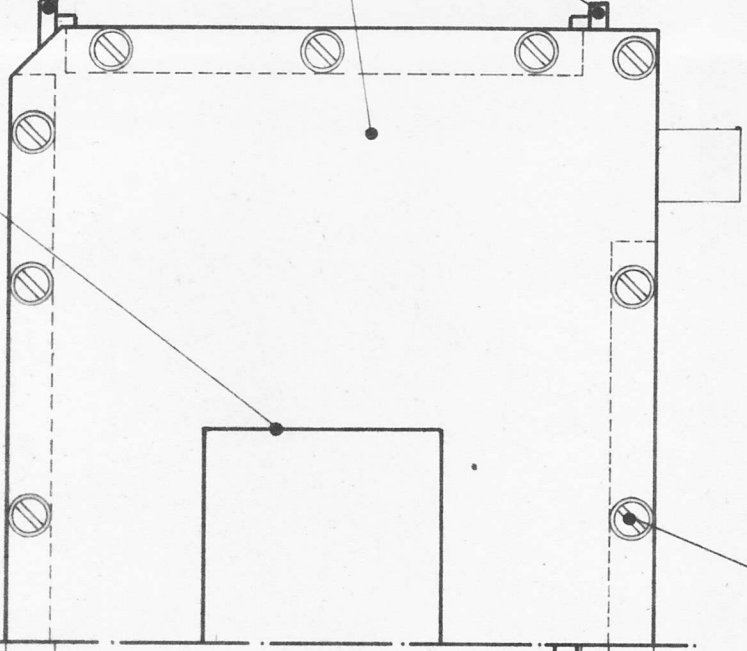
D51250A4
SHEET 1 OF 2 SHEETS

NO (SEE ORDER)

SOLDER, IN 6 POS?



1 ((SEE NOTE 4))



3

TERMINAL SLOT
(SEE NOTE 3)

9 3 20 25

21 23 25

