

R-140 AMPLIFIER MODIFIED OUTPUT PI NETWORK

F1FRV Révision 2 du 16/10/2006

IT IS TO BE NOTED THAT L2 VALUES MUST BE ~1,5 TIME THE CALCULATED
VALUES IN BANDS 1 & 2, DUE TO THE TOO LOW VALUE OF C30 (2200 pF)
UNFORTUNATELY, NOT ENOUGH SPACE TO REPLACE BY HIGHER VALUE

Tube	GU-78b or 2 x GU-43b	
Voltage	3 000	Volts on tube under load
Current	2,000	Amps on tube under load
Efficiency	66,67	%
Minimum value of C1	0,0	pF
Cgp	59,0	pF Tube grid / plate cap + parasitics (~34 pF)
Z OUT	50	Ohms Output impedance to antenna
Class	AB	K 1,5
Output power ~	4000	Watts
Tube load resistance	1 000	Ohms
Tube dissipation ~	2 000	Watts

+ FIXED 25 pF 15 kV VACUUM CAPACITOR FOR GU-78b ONLY
NO CAPACITOR OR 12 pF FOR 2 x GU-43b

IN PRACTICE, FOR BANDS 1 AND 2, OUTPUT CAPACITORS NEED TO BE
~10% MORE THAN CALCULATED THEORICAL VALUES

Frequence MHz	Q	Input Cap pF	Inductor μH	Output Cap pF	AMPLIFIER INPUT pF	AMPLIFIER INDUCTOR μH	OLD 6LV OUTPUT pF	NEW 6M1 OUTPUT pF	NEW 6M1 OUTPUT pF
BAND 1 1.5 TO 3 MHz					1 RELAY FOR THE 470 pF				
1,8	11,04	917	9,58	4011	100+347+470	6 TO 36	1500+2200+(100-1200)	100+420+1500+2200+(0-367)	4220-4587
BAND 2 3 TO 5 MHz					6M1: 1 RELAY FOR THE 2200 pF				
3,5	9,47	372	5,69	1710	25 + 347	2 TO 12	1500+(100-1200)	100+1500+(0-367)	1600-1967
3,8	10,3	372	4,84	1748	25 + 347	2 TO 12	1500+(100-1200)	100+1500+(0-367)	1600-1967
4	10,83	372	4,39	1764	25 + 347	2 TO 12	1500+(100-1200)	100+1500+(0-367)	1600-1967
5	13,55	372	2,83	1826	25 + 347	2 TO 12	1500+(100-1200)	100+1500+(0-367)	1600-1967
BAND 3 5 TO 10 MHz					470 pF INSIDE BAND SW				
5	8,93	225	4,21	1109	25 + 200	2 TO 12	356 + (100-1200)	100+356+420 +(0-367)	876-1243
7	12,5	225	2,19	1191	25 + 200	2 TO 12	356 + (100-1200)	100+356+420 +(0-367)	876-1243
7,1	12,65	225	2,13	1190	25 + 200	2 TO 12	356 + (100-1200)	100+356+420 +(0-367)	876-1243
7,3	13,02	225	2,02	1196	25 + 200	2 TO 12	356 + (100-1200)	100+356+420 +(0-367)	876-1243
BAND 4 10 TO 16 MHz					6LV AND 6M1: 470 pF INSIDE BAND SW				
10	10	100	1,89	641	100	0.36 TO 2.3	(100-1200)	100+420+(0-367)	520-887
14	14	100	0,98	676	100	0.36 TO 2.3	(100-1200)	100+420+(0-367)	520-887
14,3	14,3	100	0,94	678	100	0.36 TO 2.3	(100-1200)	100+420+(0-367)	520-887
18	18	100	0,60	691	100	0.36 TO 2.3	(100-1200)	100+420+(0-367)	520-887
BAND 5 16 TO 30 MHz									
18	9,5	25	1,10	334	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
21	11,1	25	0,82	346	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
24	12,6	25	0,63	351	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
25	13,2	25	0,58	355	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
26	13,7	25	0,54	356	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
27	14,2	25	0,50	356	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
28	14,7	25	0,47	357	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
29	15,3	25	0,43	360	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467
30	15,8	25	0,41	360	25	0.36 TO 2.3	(100-1200)	100+(0-367)	100-467

NEW CAPACITORS <http://www.nd2x.net/Russ-caps/cap-en.htm>

470 pF 15 kV 40 kVAR K15U-1a N1500 DIA: 63 THK: 20 LENGTH: 24
 470 pF 10 kV 25 kVAR K15U-1a N1500 DIA: 52 THK: 18 LENGTH: 22
 470 pF 4 kV 20 kVAR K15U-1a N1500 DIA: 45 THK: 7.5 LENGTH: 14

1500 pF 6 kV 25 kVAR K15U-2 N1500 DIA: 42.5 THK: 63 LENGTH: 66

REPLACE C27 47pF 6 kV (ONLY !!!!) BY ANY 2 x 100 pF 6kV OR BY
 A 47 pF 10 kV 50 kVAR K15U-1a P100 DIA: 75 THK: 9.5 LENGTH: 15

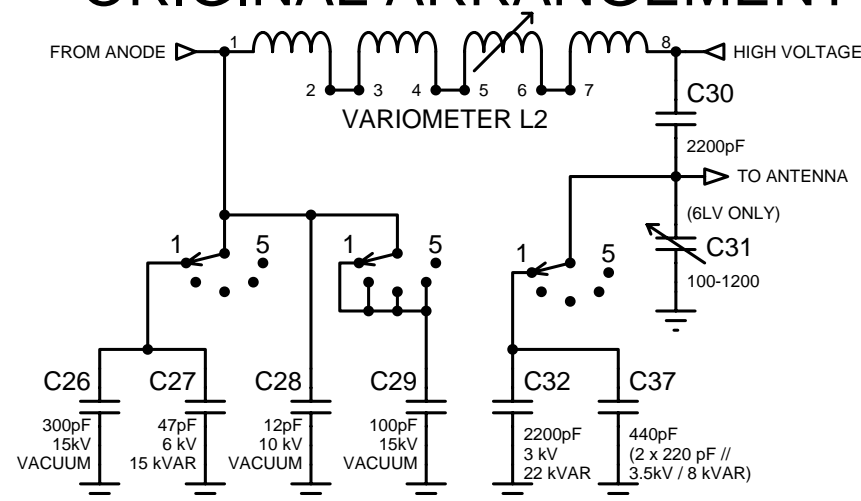
FOR MORE THAN 3000 WATTS OUTPUT
 ADD A FAN TO BLOW VARIOMETER
 AND BAND SWITCH CONTACTS

NEW ARRANGEMENT

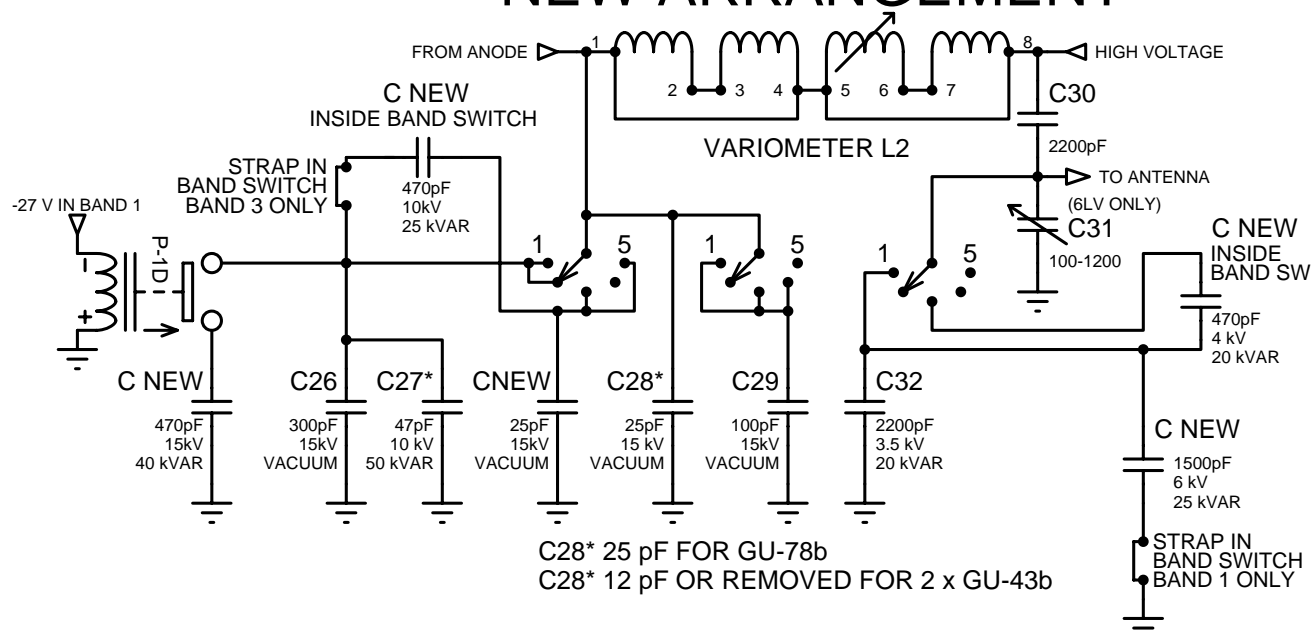
CALCULATIONS BASED ON
 3000 V @ 2 A (1000 OHMS)
 OUTPUT POWER ~4000 WATTS

	HARMONICS	
	2 (>dB)	3 (>dB)
BAND 1: 1.5 TO 3 MHz		
1.8 MHz Q = 11	-34.5	-46.5
BAND 2: 3 TO 5 MHz		
3.5 MHz Q = 9.5	-31.5	-43.5
3.8 MHz Q = 10.3		
4 MHz Q = 10.8		
5 MHz Q = 13.5	-34	-46
BAND 3: 5 TO 10 MHz		
5 MHz Q = 8.9	-30.5	-42.5
7 MHz Q = 12.5	-33.5	-45.5
7.1 MHz Q = 12.6		
7.3 MHz Q = 13	-34	-46
BAND 4: 10 TO 16 MHz		
10 MHz Q = 10	-31	-43
14 MHz Q = 14		
14.3 MHz Q = 14.3	-34.5	-47
18 MHz Q = 18	-37	-50
BAND 5: 16 TO 30 MHz		
18 MHz Q = 9.5	-30.5	-43.5
21 MHz Q = 11.1	-32.5	-45.5
24 MHz Q = 12.6	-34	-48
28 MHz Q = 14.7	-36	-50
30 MHz Q = 15.8	-36.5	-50.5

ORIGINAL ARRANGEMENT



NEW ARRANGEMENT

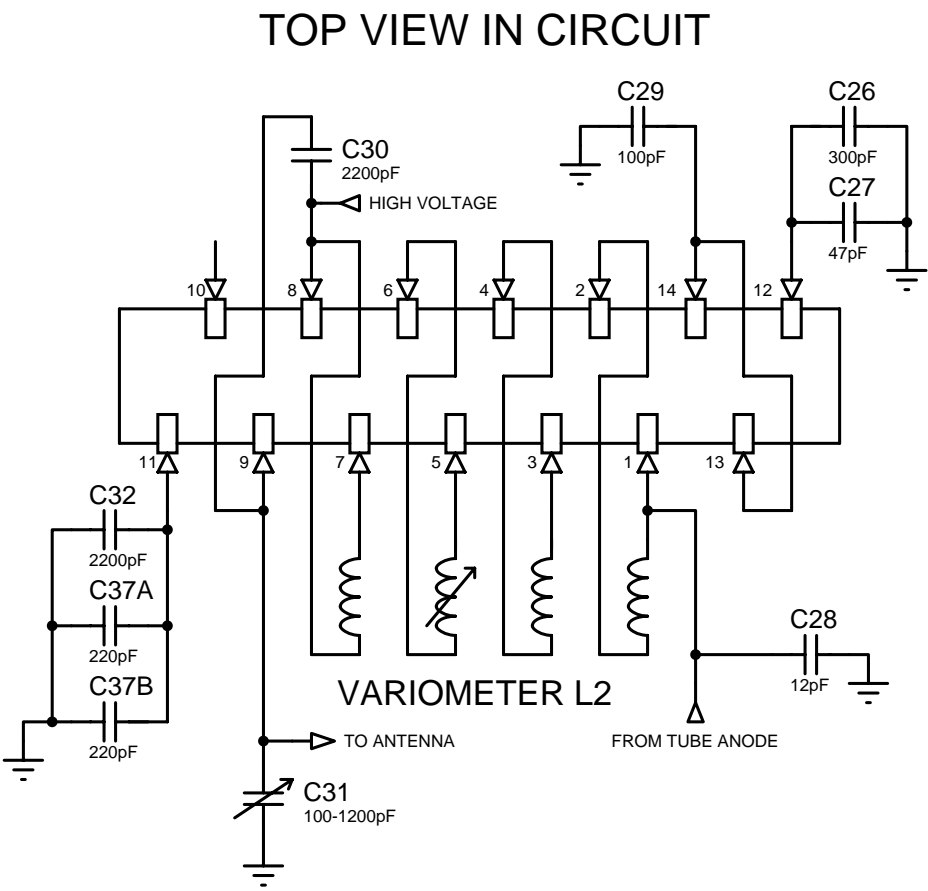


R-140 AMP GU-78b or 2 x GU-43b
 OUTPUT PI MODIFICATIONS

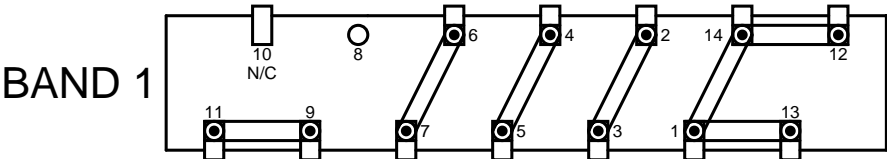
DATE: 16/10/06 REV: 2 PAGE: 1/5
 BY: f1frv@free.fr
 DOC N°: AMATEUR RADIO

NO HV ON TUBE WHEN ROTARY SWITCH IS MOVING BETWEEN 2 POSITIONS !!!!

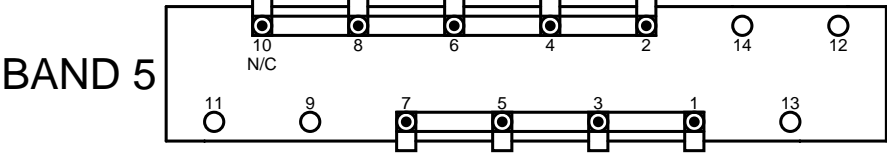
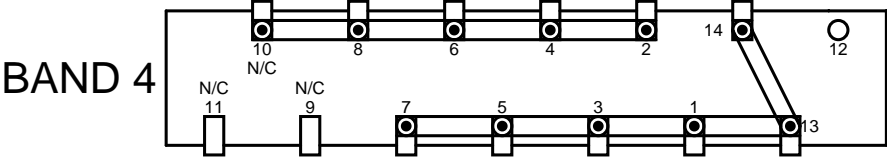
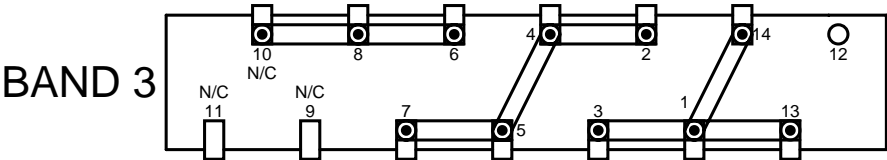
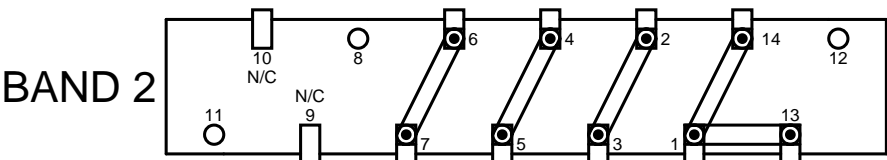
BE CAREFUL, TOP VIEW OF CONNETIONS OUT OF CIRCUIT, YOU CAN SEE FROM AMPLIFIER TOP, HAVE SYMETRICAL NUMBERING REGARDING THIS DRAWING. DO NOT CONFUSE !!!



TOP VIEW IN CIRCUIT



○ = CONTACT PAD MAY BE NOT PRESENT

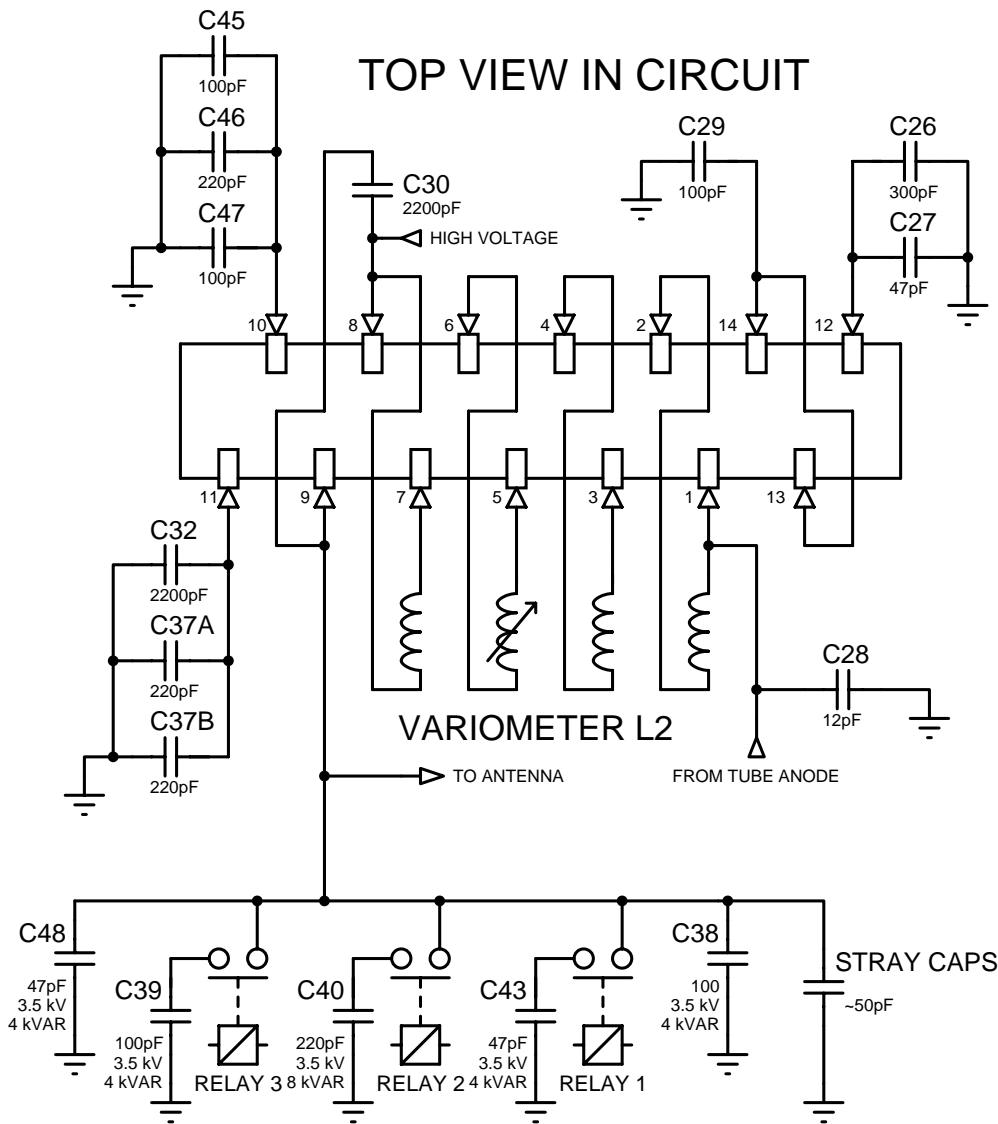


R-140 AMP GU-78b or 2 x GU-43b
ORIGINAL SWITCHING OLD "6LV"

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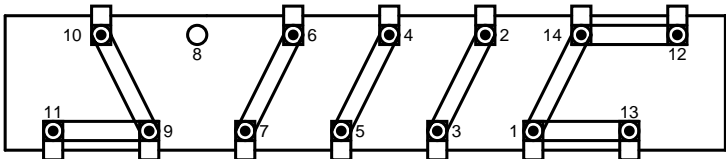
NO HV ON TUBE WHEN ROTARY SWITCH IS MOVING BETWEEN 2 POSITIONS !!!!

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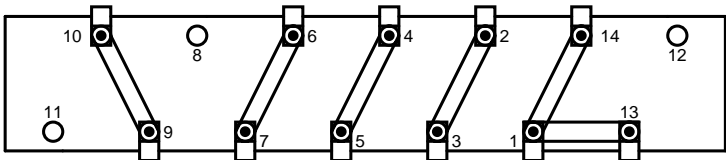
TOP VIEW IN CIRCUIT

BAND 1

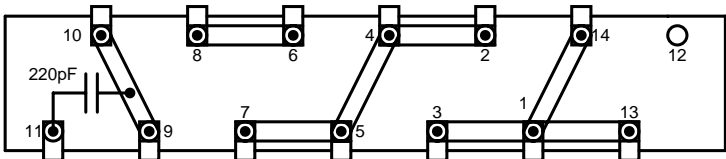


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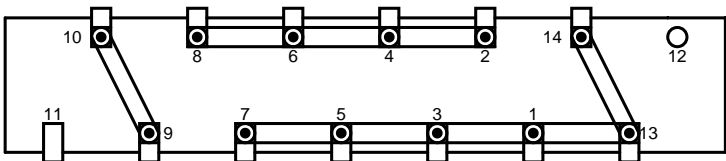
BAND 2



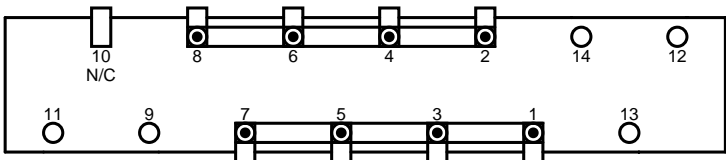
BAND 3



BAND 4



BAND 5

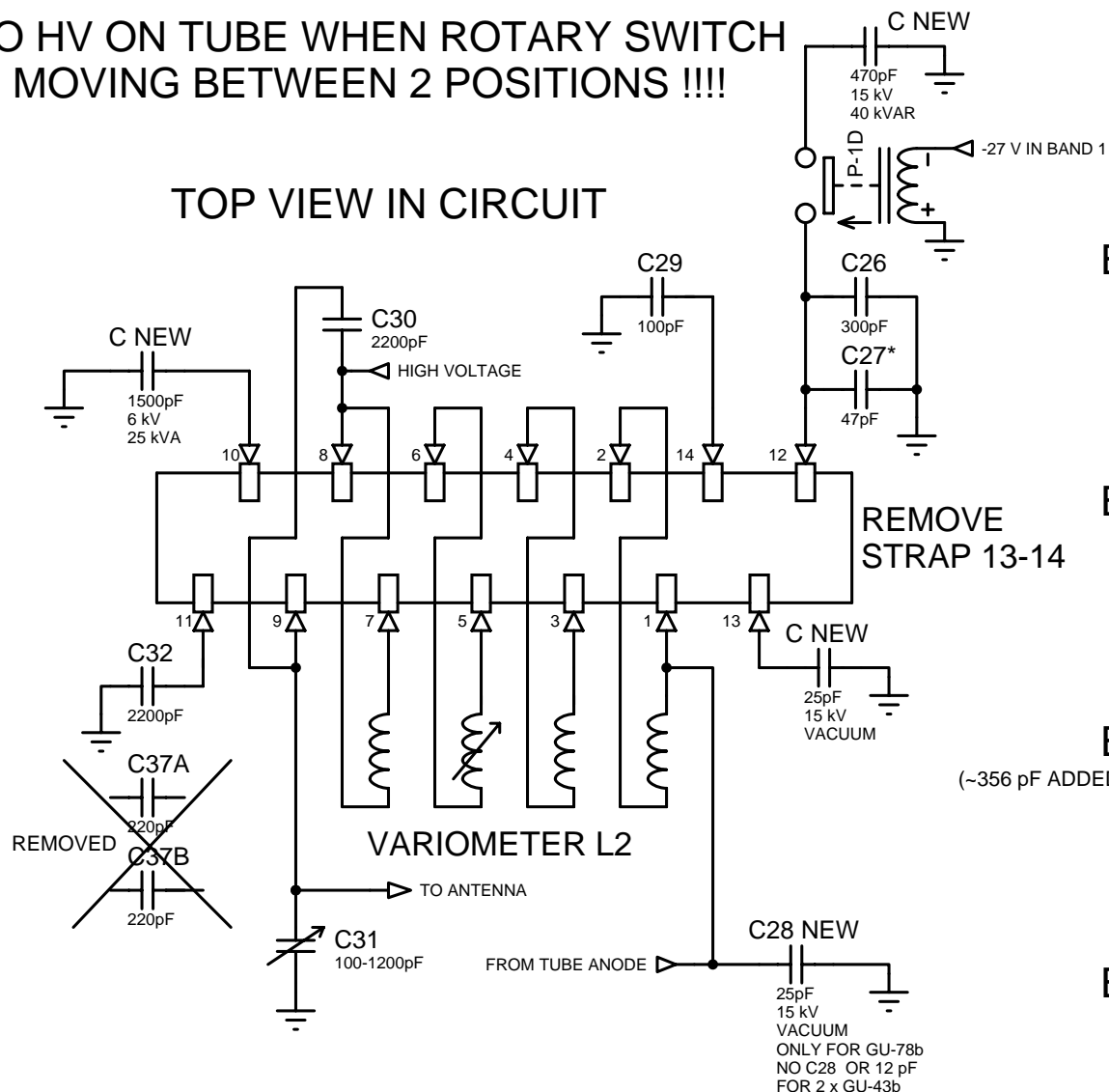


R-140 AMP GU-78b or 2 x GU-43b
ORIGINAL SWITCHING NEW "6M-1"

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NO HV ON TUBE WHEN ROTARY SWITCH IS MOVING BETWEEN 2 POSITIONS !!!!

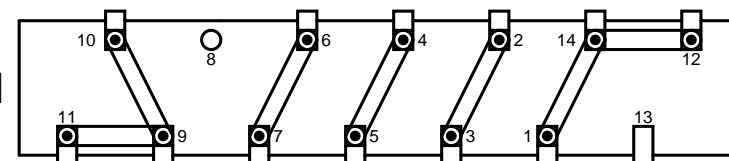
TOP VIEW IN CIRCUIT



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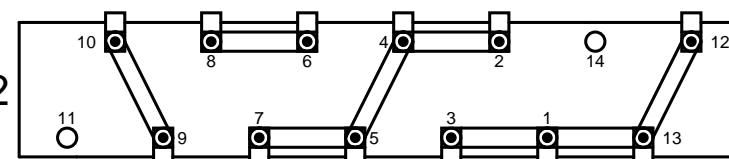
TOP VIEW IN CIRCUIT

BAND 1



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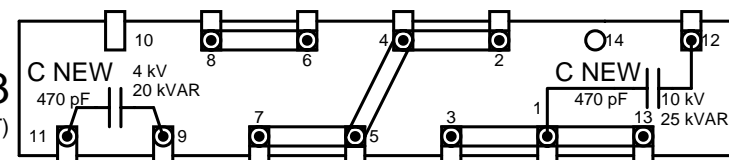
BAND 2



INSIDE DIAMETER OF BAND SWITCH: 53 MM

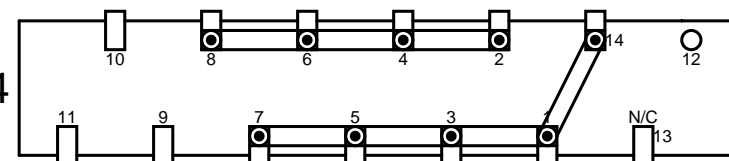
BAND 3

(~356 pF ADDED AT OUTPUT)

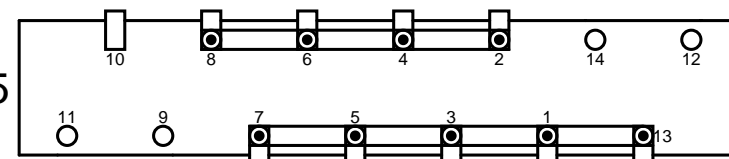


C EQUIVALENT TO 200 pF

BAND 4



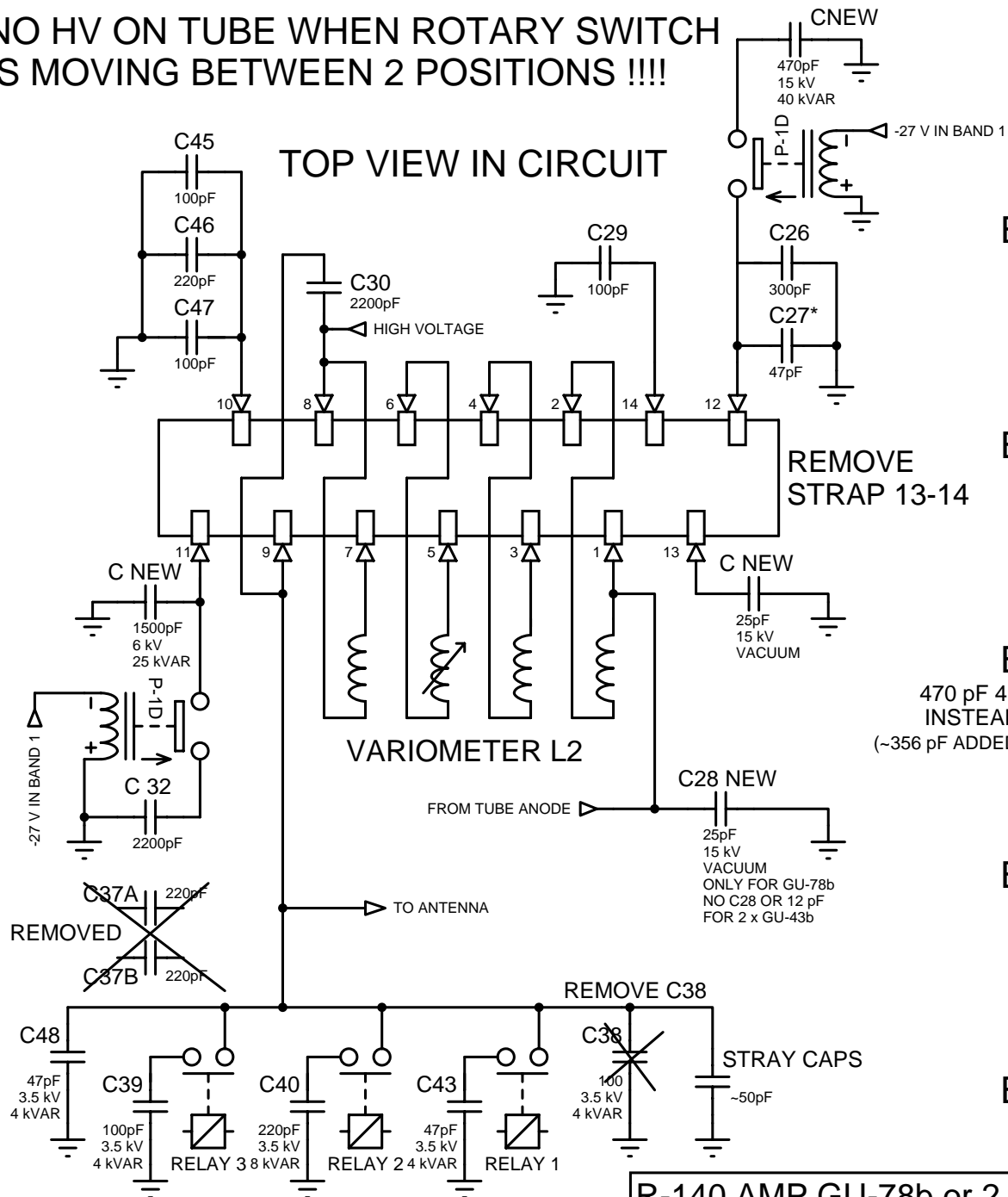
BAND 5



R-140 AMP GU-78b or 2 x GU-43b
MODIFICATIONS OF PI FOR "6LV"

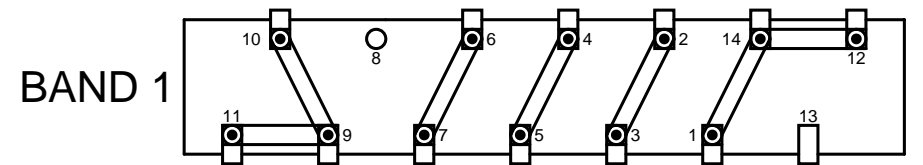
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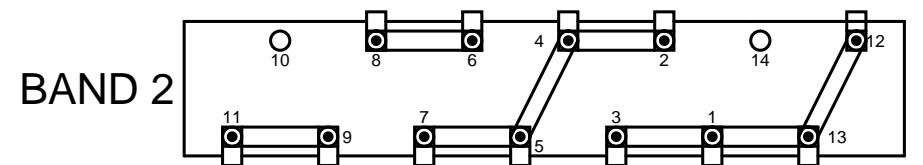


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YOU CAN SEE FROM AMPLIFIER TOP, HAVE SYMETRICAL
NUMBERING REGARDING THIS DRAWING. DO NOT CONFUSE !!!
57 CONTACT PADS NEEDED

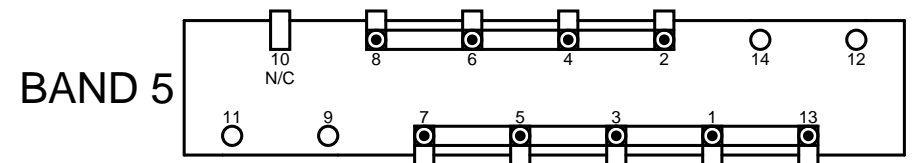
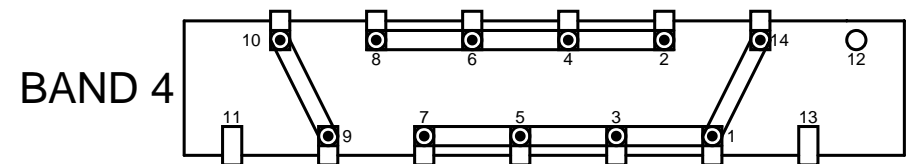
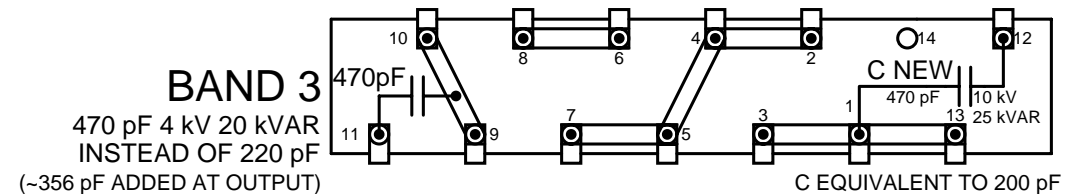
TOP VIEW IN CIRCUIT



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INSIDE DIAMETER OF BAND SWITCH: 53 MM



R-140 AMP GU-78b or 2 x GU-43b
MODIFICATIONS OF PI FOR "6M-1"

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