

**L11-L13: 2.2 mH FOR 160-40 METERS  
L11-L13: 10 uH FOR 20-10 METERS  
TO AVOID RESONANCE IN BANDS  
AND HAVE ENOUGH CHOKE INDUCTANCE**

**1200 W @ 50 OHMS = ~350 V & ~7 A PEAK**

**TOROIDS: T130-0 , T130-6, T130-17, T157-2  
WIRES: 15/10 mm ENAMELED (1.75 SQ.mm)  
RF CAPACITORS: ATC 100-B EXTENDED VOLTAGE  
(1000 VOLTS MINIMUM)**

**NOTA: FOR EACH POLE, UP-TO 6 CAPACITORS  
CAN BE PLACED IN PARALLEL, IF NECESSARY  
TO OBTAIN THE RIGHT VALUE.  
( ONLY 2 FOR C101 )**

**RELAYS: SPDT MADE FOR 16 AMPS AC  
OMRON G2RL-1-E, G2R-1-E, FINDER 40-61, OR  
EQUIVALENT. USE PREFERABLY LOW PROFILE RELAYS  
TO MINIMIZE INDUCTANCES (BETTER SWR).**

**COILS 24 V DC (SAME AS OTHER SSPA BOARDS &  
ANTENNA RELAYS). OR FOR 24 V SUPPLY & 12 V RELAYS,  
USE A SERIAL RESISTOR (OHM's LAW, IF YOU HEARD ABOUT IT)**

**USE 2 CIRCUITS FOR 6 BANDS  
160 m, 80 m, 40 m, and 20 m, 15 m, 10 m**

**FILTERS FOR 1.2 KW HF SSPA  
7+ POLES LOW PASS FOR 3 BANDS**

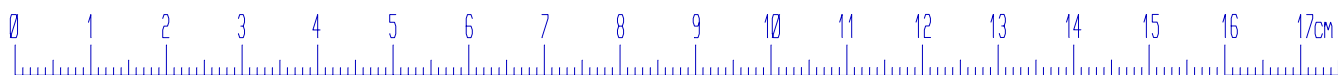
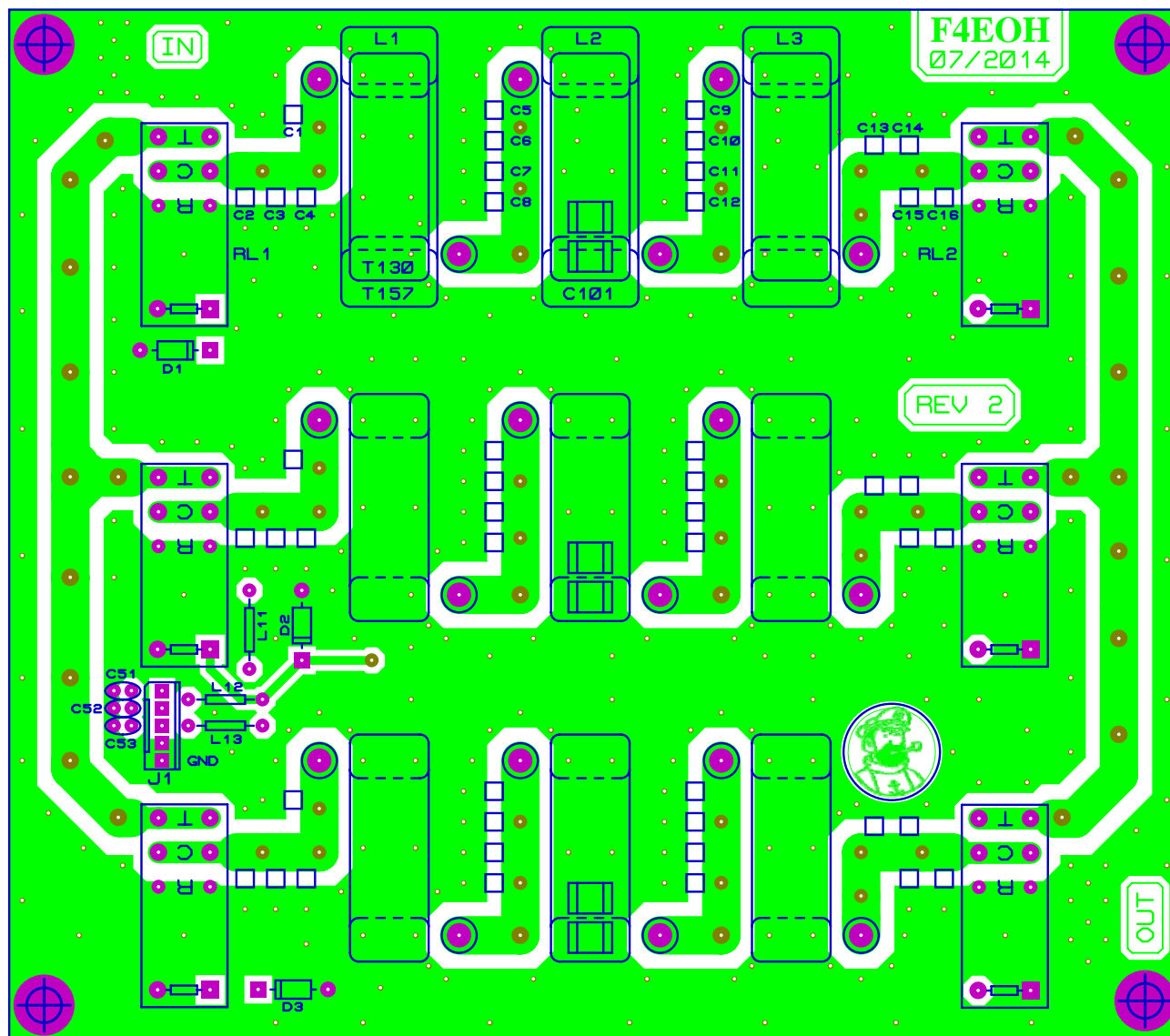
DOC N°: AMATEUR RADIO  
BY: F1FRV@SFR.FR  
DATE: 04/10/14 REV: 2 PAGE: 1/1

# FILTERS FOR 1.2 KW HF SSPA 7+ POLES LOW PASS FOR 3 BANDS

DATE: 07/2014 REV:2  
BY: F1FRV@SFR.FR  
DOC Nr: AMATEUR RADIO

DUAL SIDE 70 MICRONS PCB. DIMENSIONS: 5.9" x 6.7" (149.9 x 170.2 mm)  
455 HOLES FIXATION: 4 x M4 SCREWS, AXYS 140 x 160 mm

TOP SIDE



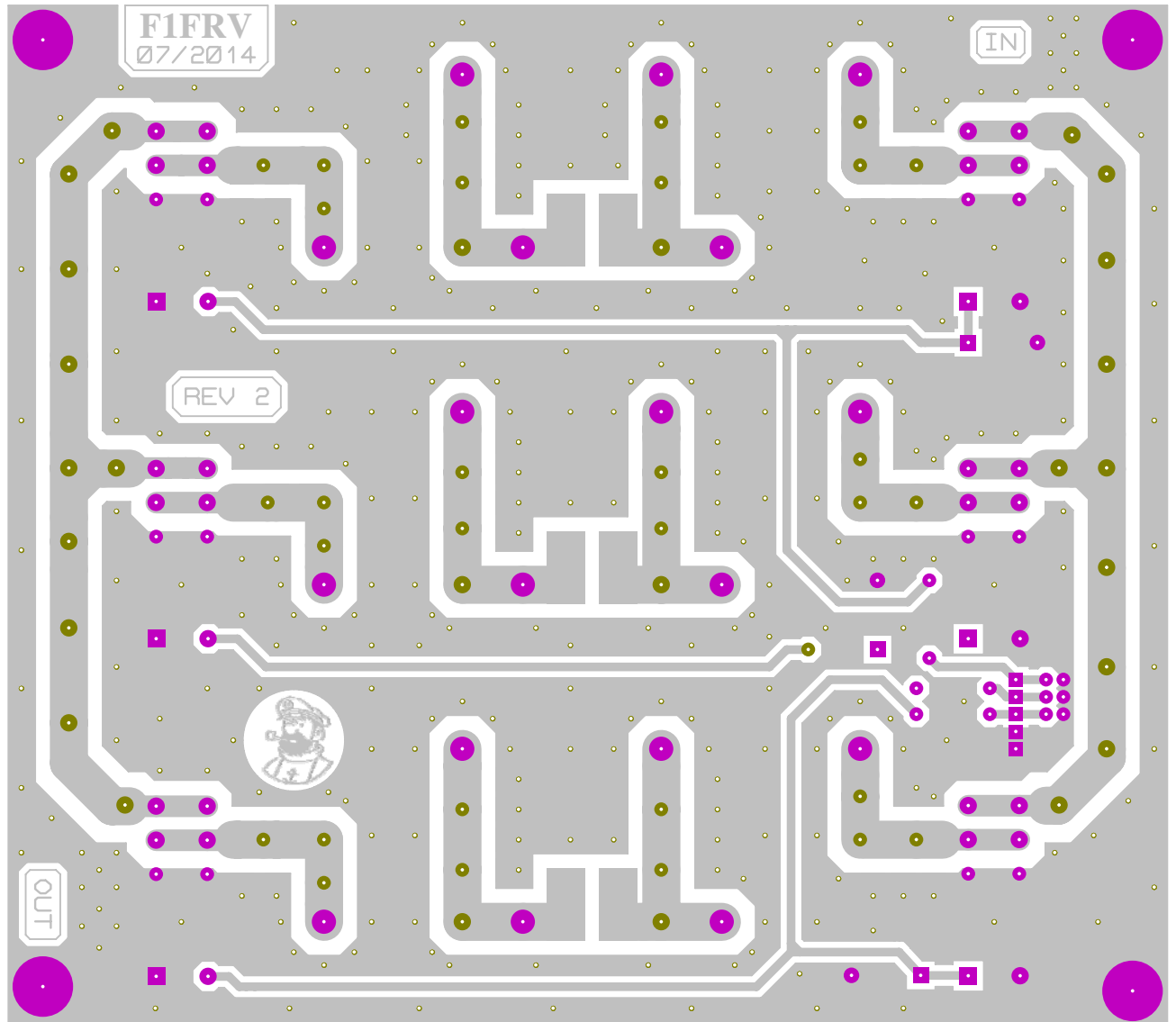
NOTA: NO SOLDER MASK BOTTOM SIDE (ALLOWS FOR VARIOUS SMD CAPACITORS)

DISTANCE FOR STACKING 2 BOARDS ~50 MM

F4EOH



**BOTTOM SIDE**



# BILL OF MATERIALS

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Design: 3 FILTERS FOR 1.2 KW HF SSPA

NOTA: FOR 6 BANDS, DOUBLE THE NUMBER OF COMPONENTS

Doc. no.: AMATEUR RADIO

Revision: 2

Author: [F1FRV@SFR.FR](mailto:F1FRV@SFR.FR)

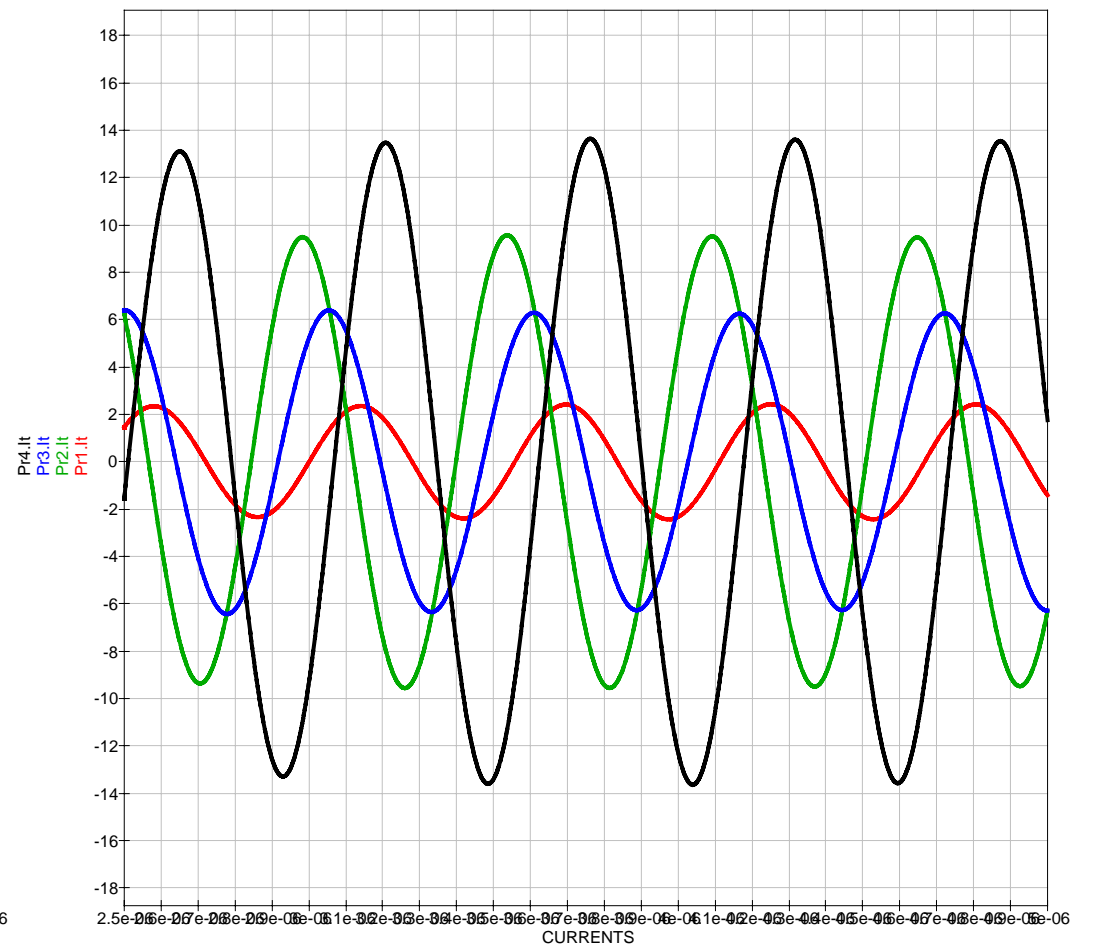
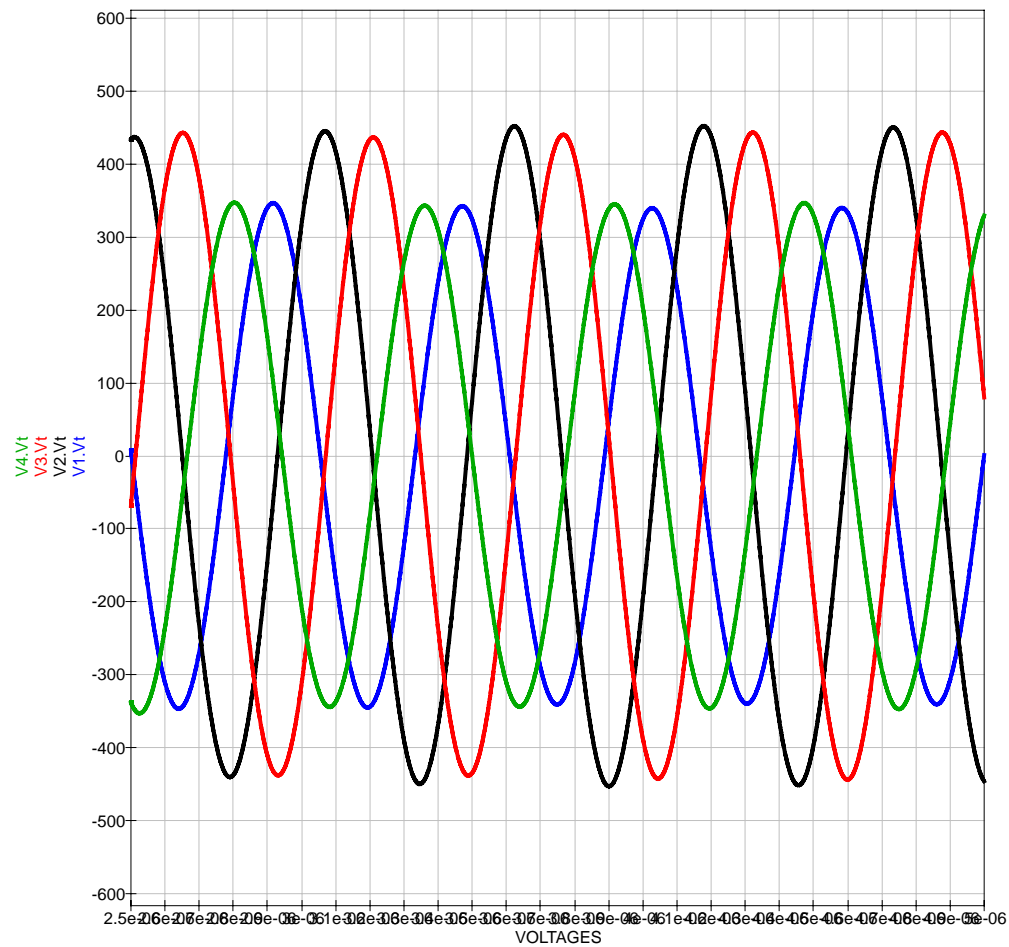
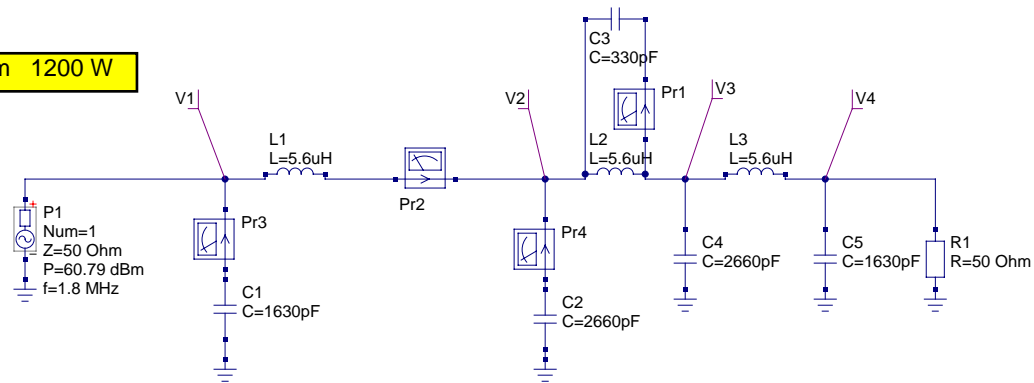
Created: 16/07/14

QTY	PART-REFS	VALUE	PACKAGE
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Capacitors			
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~29	C1-C??	???	ATC100-B extended voltage 1000 V MINI
3	C51,C52,C53	100nF	CERAMIC 50 V Pitch 2.54 or SMD
Diodes			
-----			
3	D1,D2,D3	1N4007	DO41
Miscellaneous			
-----			
9	L1,L2,L3,L4,L5,L6,L7,L8,L9	TOROID	T130-0, or -2, or -6, or -17, or T157-2
3	L11,L12,L13	2.2mH	CHOKE INDUCTOR FOR 160, 80, 40 M
OR			
3	L11,L12,L13	10uH	CHOKE INDUCTOR FOR 20, 15, 10 M
6	RL1,RL2,RL3,RL4,RL5,RL6	RELAY SPDT	REF: OMRON G2R(L)-1-E or EQUIVALENT
1	J1	IDC 1x5 PTS	"AUTOCOM" HE13/14 MALE + FEM

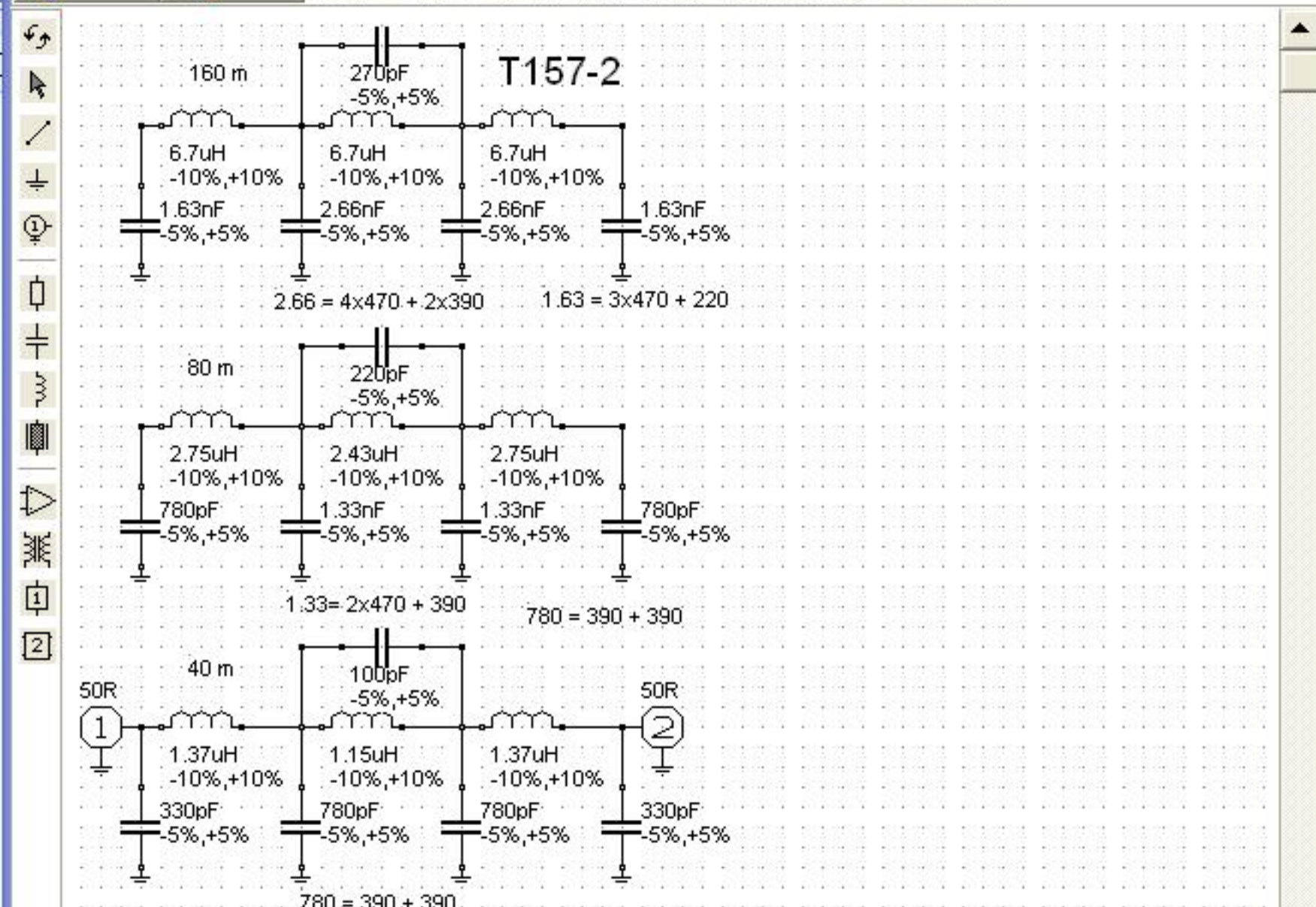
simulation  
en régime transitoire

160 m 1200 W

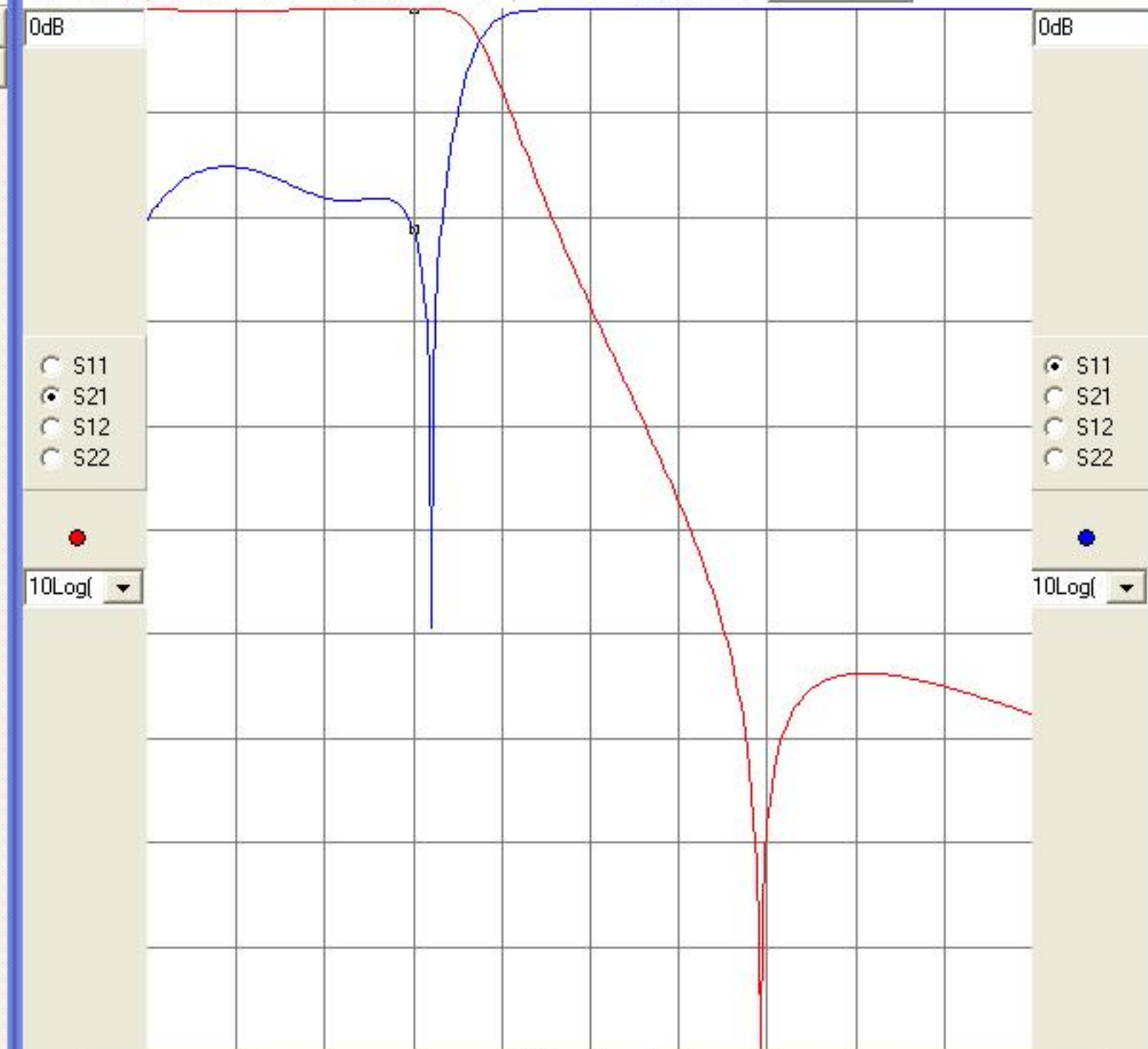
TR1  
Type=lin  
Start=0  
Stop=5 us



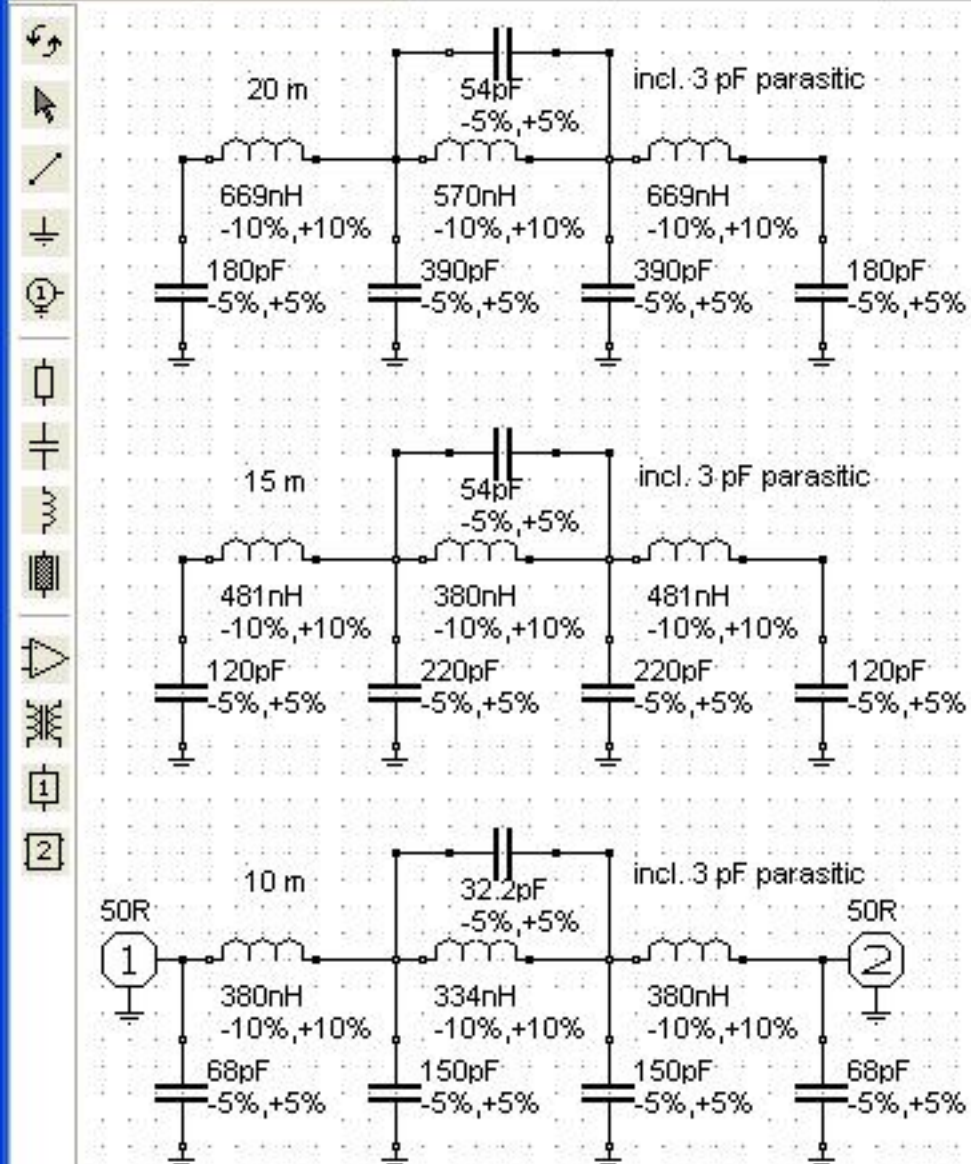




Capas ATC: 100, 200, 330, 390, 470 pF  
 DE PETITES VALEURS SONT NECESSAIRES POUR AJUSTEMENT  
 A CAUSE DES CAPAS PARASITES !! (10, 12, 15, 20, 22, 33, 47. etc)



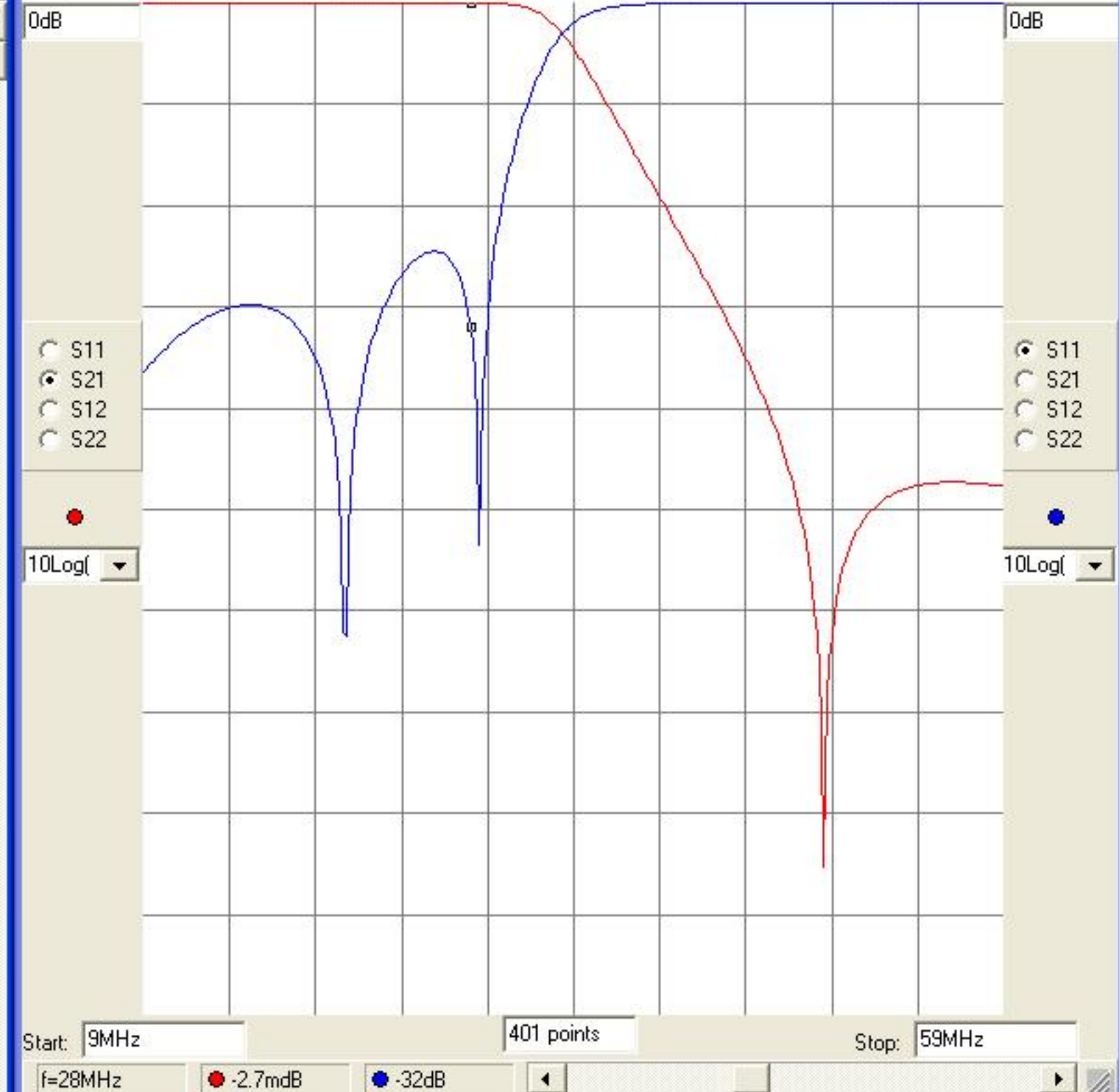




Capas ATC: 2.2, 24, 47, 51, 68, 120, 150, 180, 220, 330 pF

DE PETITES VALEURS SONT NECESSAIRES POUR AJUSTEMENT

A CAUSE DES CAPAS PARASITES !!





# 6 BANDS 7+ POLES LOW PASS FILTERS FOR 1.2 KW HF SSPA Rev2a F1FRV 10/2014

BAND	C1	C2	C3	C4	C5	C6	C7	C8	C8a	C8b	C101	C101a	C9	C10	C11	C12	C12a	C12b	C13	C14	C15	C16
	pF	pF	pF	pF	pF	pF	pF	pF	pF	pF	pF		pF	pF	pF	pF	pF	pF	pF	pF	pF	pF
160 m	470	470	470	220	470	470	470	470	390	390	270		470	470	470	470	390	390	470	470	470	220
80 m	390	390			470	470	390				220		470	470	390	0	0	0	390	390	0	0
40 m	330				390	390					100		390	390	0	0	0	0	330	0	0	0
20 m	180				390						51		390	0	0	0	0	0	180	0	0	0
15 m	120				220						51		220	0	0	0	0	0	120	0	0	0
10 m	68				150						27	2.2	150	0	0	0	0	0	68	0	0	0

**Nota: For C101, Values takes into account the additional PCB pads capacitance ~3 pF**

Capas ATC	Nb	Boitier 1111	Reference F. Rotta	Nb	QSJ	QSJ
pF				Cde	Unit	Total
1	2	ATC-B Extended voltage	100B-1P-J1500	2	1.36	2.72
2.2	2	ATC-B Extended voltage	100B-2P2-J1500	2	1.36	2.72
4.7	2	ATC-B Extended voltage	100B-4P7-J1500	2	1.36	2.72
10	2	ATC-B Extended voltage	100B-10P-J1500	2	1.36	2.72
15	2	ATC-B Extended voltage	100B-15P-J1500	2	1.36	2.72
22	2	ATC-B Extended voltage	100B-22P-J1500	2	1.36	2.72
2.2	1	ATC-B Extended voltage	100B-2P2-J1500	1	1.36	1.36
24	1	ATC-B Extended voltage	100B-24P-J1500	1	1.36	1.36
27	2	ATC-B Extended voltage	100B-27P-J1500	2	1.36	2.72
47	0	ATC-B Extended voltage	100B-47P-J1500	0	1.36	0
51	2	ATC-B Extended voltage	100B-51P-J1500	2	1.36	2.72
68	2	ATC-B Extended voltage	100B-68P-J1500	2	1.36	2.72
100	1	ATC-B Extended voltage	100B-100P-J1500	1	1.36	1.36
120	2	ATC-B Extended voltage	100B-120P-J1000	2	1.36	2.72
150	2	ATC-B Extended voltage	100B-150P-J1000	2	1.36	2.72
180	2	ATC-B Extended voltage	100B-180P-J1000	2	1.36	2.72
220	5	ATC-B Extended voltage	100B-220P-J1000	5	1.36	6.8
270	1	ATC-B Extended voltage	100B-270P-J1000	1	1.36	1.36
330	2	ATC-B Extended voltage	100B-330P-J1000	2	1.36	2.72
390	14	ATC-B Extended voltage	100B-390P-J1000	14	1.24	17.36
470	18	ATC-B Extended voltage	100B-470P-J1000	18	1.24	22.32
Total	67	For proto.	After, only 55 are needed		Euros	87.28

**SMALL VALUES FOR PROTO ADJUSTMENTS**

**ATC-B Extended voltage  
1500 V up-to 100 pF**

**ATC-B Extended voltage  
1000 V up-to 470 pF**

**As ATC-C are over priced, values > 470  
are made in paralleling lower values**

**70.96 Euros after prototype**

# 6 BANDS 7+ POLES LOW PASS FILTERS FOR 1.2 KW HF SSPA Rev2a F1FRV 10/2014

15/10 mm Lr: ~13 m	L1 Toroid	L1 sp Nb	TRUE Value	L2 Toroid	L2 sp Nb	TRUE Value	L3 Toroid	L3 sp Nb	TRUE Value
160 m	140-61	7	6.791	114-61	7	6.791	114-61	7	6.791
160 m	157-2	22	6.708	157-2	22	6.708	157-2	22	6.708
80 m	130-6	17	2.747	130-6	16	2.433	130-6	17	2.747
40 m	130-6	12	1.369	130-6	11	1.15	130-6	12	1.369
20 m	130-17	13	0.669	130-17	12	0.57	130-17	13	0.669
15 m	130-0	18	0.481	130-0	16	0.38	130-0	18	0.481
10 m	130-0	16	0.38	130-0	15	0.334	130-0	16	0.38

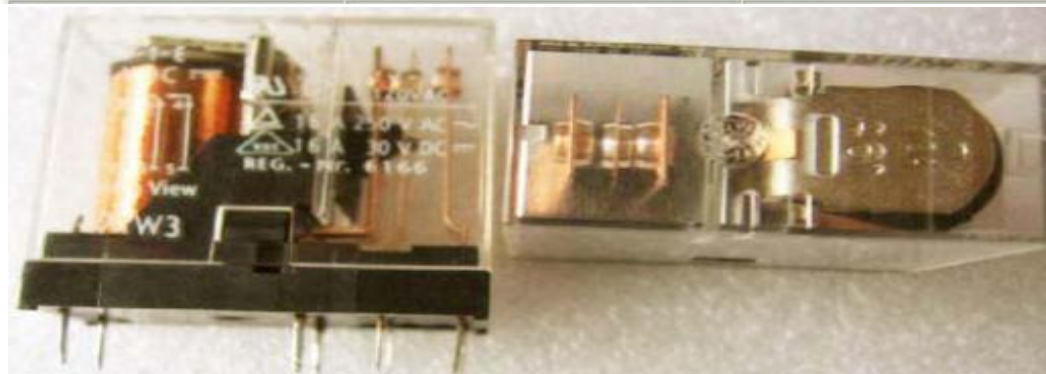
Alternative

COILS VALUES TO BE ADJUSTED TO NEAREST VALUES BY SPREADING OR SHRINKING COILS

NOTA: Flux in 160 m is too high with T130-2 > IMPORTANT HEAT !. A T157-2 or FT 140-61 are better.  
AFTER WINDING, inductances measured values tolerances must be less than 10 %

Toroids supplier: kitsandparts

T130-0	\$5 for 4 Pieces	\$50 for 50 Pieces
T130-2	\$5 for 3 Pieces	\$65 for 50 Pieces
T130-6	\$8 for 3 Pieces	\$100 for 50 pieces
T130-17	\$6 for 3 Pieces	\$90 for 50 pieces
T157-2	\$6 for 2 Pieces	\$80 for 30 Pieces



PREFER 24 V RELAYS  
AS OTHER SSPA BOARDS USE 24 V SUPPLY

- 12 Relays SPDT 16 Amps Coil 24 V DC
- 0 Relays SPDT 16 Amps Coil 12 V DC
- 6 Diode 1N4007 DO41
- 6 Capacitor 100 nF ceramic 50V Pitch 2.54
- 3 10 uH Choke inductor
- 3 2.2 mH Choke inductor
- 2 Connecteur IDC 5 Male
- 2 Connecteur IDC 5 Femelle

- Farnell reference 9480099 or equivalent TCHONG
- Farnell reference 9480080 or equivalent TCHONG
- Farnell reference 2395843
- Farnell reference 2112751
- RS Particuliers référence 1910481 or equivalent
- RS Particuliers référence 1910740 or equivalent
- RS Particuliers référence 2305082 or equivalent
- RS Particuliers référence 5067036 or equivalent

- Unit price ~1.65 Euros HT
- Unit price ~1.66 Euros HT
- Unit price ~0.0476 Euros HT
- Unit price ~0.044 Euros HT
- Unit price 0.41 Euros TTC
- Unit price 0.43 Euros TTC
- Unit price 0.42 Euros TTC
- Unit price 0.91 Euros TTC