

## TECHNICAL DESCRIPTION

### PCB 618 RECEIVER SIGNAL PATH

The antenna RF signal is led through coax connector SK1 to the protection circuit, which protects the receiver against excessive RF voltages and static electricity discharges, appearing on the antenna. Through the switchable attenuator the RF signal is led to the preselector consisting of eleven fixed-tuned bandpass filters. The bandpass filters covers the frequency bands 10-405 kHz, 405-527 kHz, 527-1600 kHz, 1.6-4 MHz, 4-5.246 MHz, 5.246-7.27 MHz, 7.27-10.383 MHz, 10.383-14.695 MHz, 14.695-19.571 MHz, 19.571-24.424 MHz, 24.424-30 MHz. A change in receiver frequency will be followed by automatic selection from among the bandpass filters. The automatic selection is controlled from the Transceiver Control Board 624 via the serial data bus. The RF signal goes via the switchable RF amplifier to the high level double balanced Schottky diodes mixer, where it is mixed with the 45-75 MHz synthesizer signal from the Synthesizer Board 611 to generate the first intermediate frequency signal of 45 MHz. Before the signal is applied to the first mixer, the signal level is detected by the broadband detector. The 45 MHz IF signal is amplified in the grounded gate JFET amplifier and then filtered in the 45 MHz double sideband crystal filter, determining the overall AM selectivity. Before being fed to the 2nd mixer, the IF signal is passing through the MOSFET amplifier which has a variable gain controlled by the delayed AGC voltage. The 2nd mixer converts the 45 MHz IF signal to the 1.4 MHz IF signal by mixing with a 43.6 MHz synthesizer signal from the Synthesizer Board 611. After amplification in the grounded gate JFET amplifier, the 1.4 MHz signal is fed to the Information filter bank. Depending on the version (i.e. crystal filter options) and the selected mode, the 1.4 MHz signal is routed through one of the filters X2, X3, X4, X5 or the wide filter, controlled by the Transceiver Control Board 624 via the serial data bus. The now filtered 1.4 MHz signal is amplified in the 1.4 MHz amplifier strip IC4, Q14 and Q15. The voltage gain of the amplifier strip is controlled partly by the AGC voltage applied to IC4 and partly by the control line "IF-GAIN", which, when in logical high condition, increases the gain of Q14 with approx. 8 dB. From the IF strip the signal is fed to the Signal Detector IC6. The integrated circuit of the Signal Detector contains a balanced mixer and a high gain limiting amplifier. The IF signal is applied to the one input port of the mixer. In the modes H3E and H2A, the IF signal is also fed to the amplified input. This signal is amplified and clipped to constant amplitude and internally connected to the other input port of the mixer where it is mixed with the modulated signal. The difference frequency contains the wanted AF signal. In other modes but H3E and H2A a 1.4 MHz signal, derived from the Synthesizer Board 611, is applied to the amplifier input. The unbalanced AF signal is filtered and converted to a balanced signal before it is fed to the flat cable connector PL1.

From the IF strip the signal is also fed to the AGC Detector consisting of two transistors in the integrated array IC23. The signal, which is now rectified to a DC voltage, is applied to the AGC Timing Circuit. The AGC voltage from the AGC Timing Circuit controls the overall gain of the receiver. The AGC voltage is also fed to the Transceiver Control Board 624, where it is used in

self test routines and, by means of a voltage to frequency converter, fed to the Control Unit controlling the signal strength meter on the front panel. When manual gain control (MGC) is selected the Transceiver Control Board 624 generates a DC voltage which is fed to the receiver signal path instead of the AGC voltage. Subdiagram 5 shows the control circuits for the board and Subdiagram 6 shows the interface circuits to the serial data busses.



SK1  
ANTENNA INPUT

PL1  
GND 40  
GND 39  
+15V 38  
+7V5 37  
-15V 36  
+15V 35

(SYNADR 2)  
(SYNADR 1)  
(SYNADR 0)  
(SYNDATA 3)  
(SYNDATA 2)  
(SYNDATA 1)  
(SYNDATA 0)  
(SYNSTR 4)  
(SYNSTR 3)  
(SYNSTR 2)  
(SYNSTR 1)  
(SYNSTR 0)  
(SYNCHECK 1)  
(SYNCHECK 0)  
(MOCHECK)  
(COMDATA)  
(COMLOAD RX/EX)  
(COMLOAD EX)  
(CLOCK)  
(STATLOAD)  
(STATDATA RX/EX)  
(STATDATA EX)  
ALC VOLTAGE  
(SHAPE KEY)  
(MUTING)  
(TX/RX)  
(SYNSTR 5)

MGC  
AFRX- 6  
AFRX+ 5  
AFTX- 4  
AFTX+ 3  
GND 2  
GND 1

SUBDIAGRAM 6

VOLTAGE  
REGULATORS

CONTROL LOGIC

ATTENUATOR CONTROL

SUBDIAGRAM 5

SUBDIAGRAM 1

11 BP  
FILTERS

SUBDIAGRAM 2

SUBDIAGRAM 4

AGC

AM/SSB  
DET.

SUBDIAGRAM 3

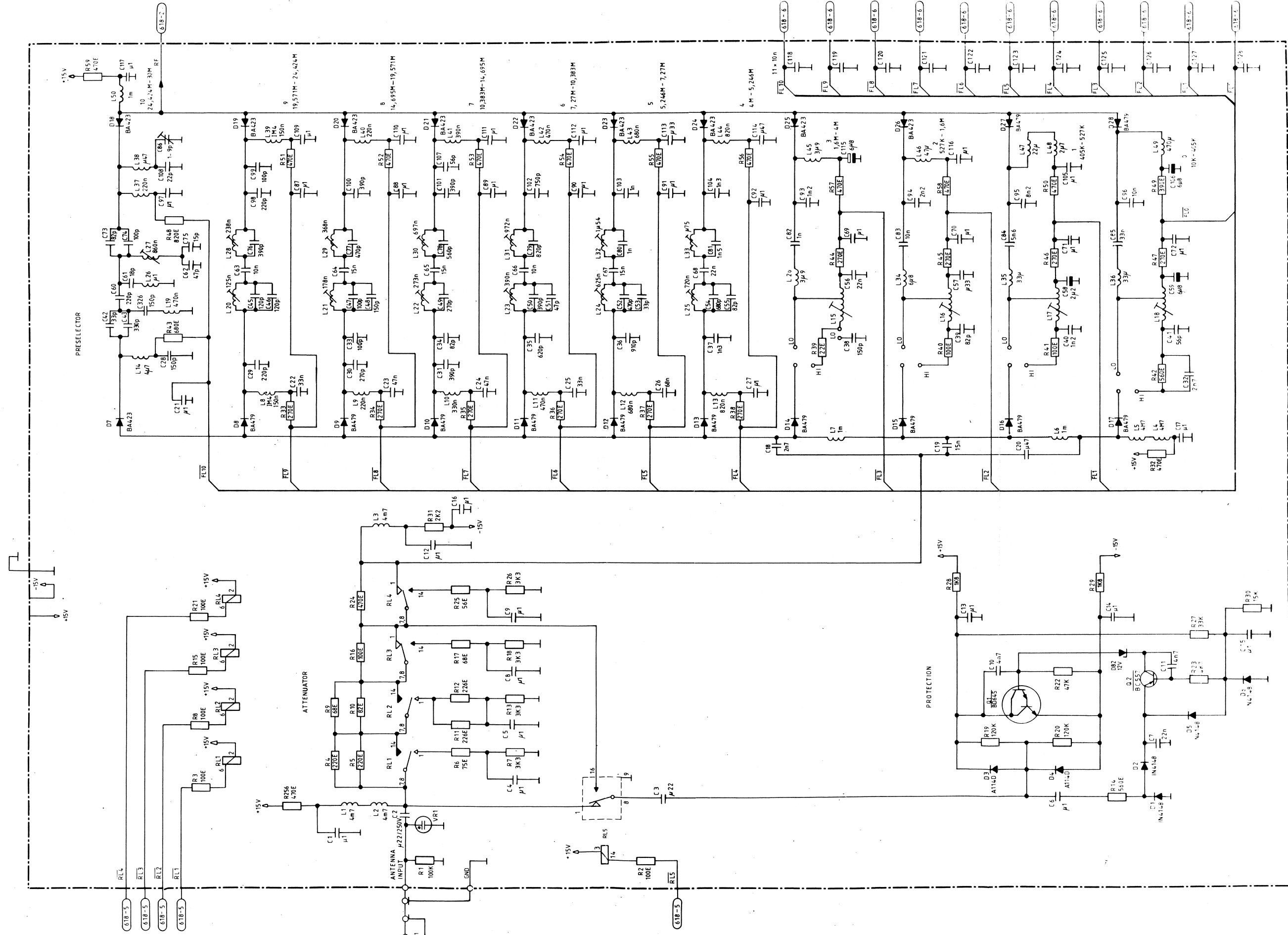
1.4 MHz  
X-TAL  
FILTER  
BANK

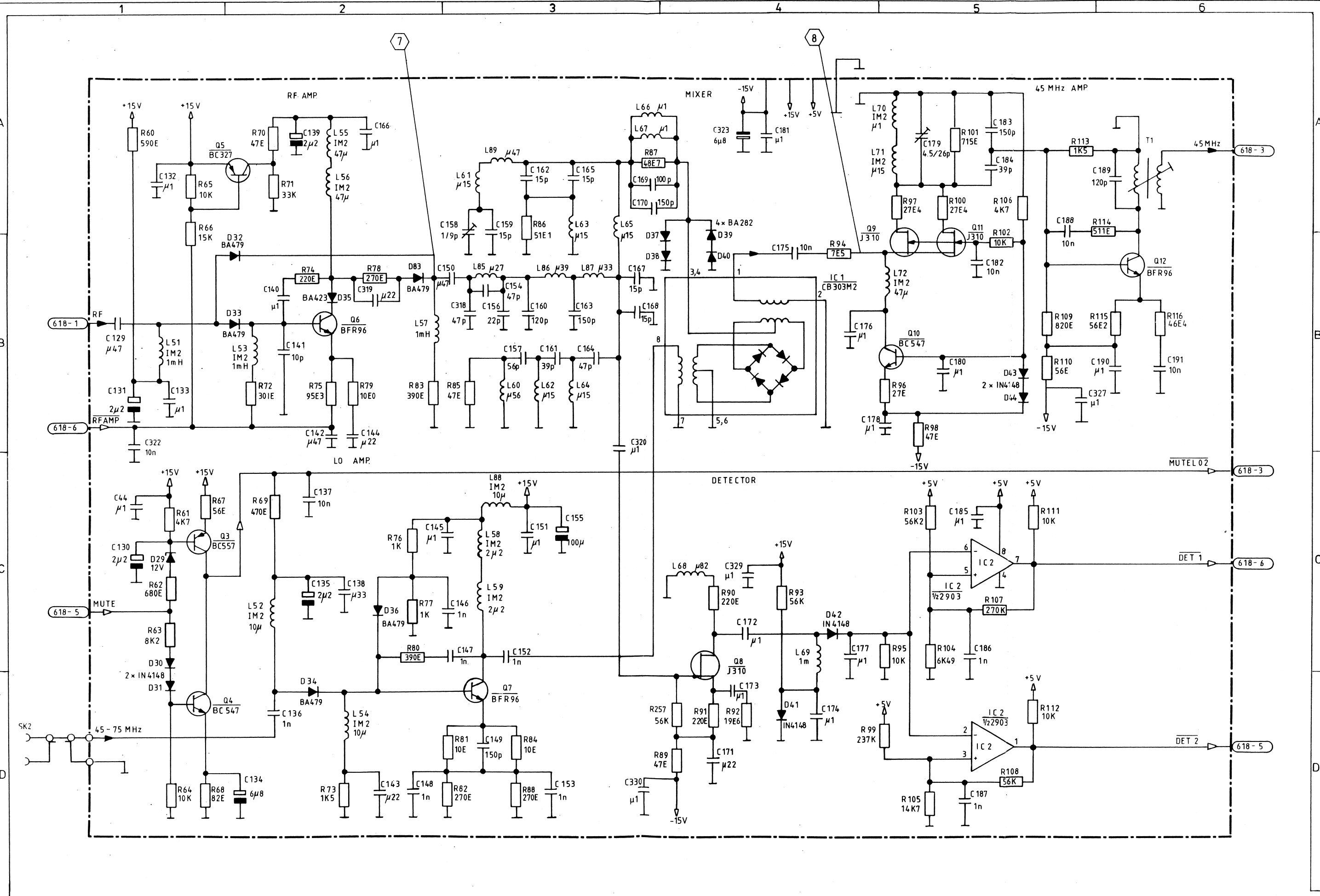
45MHz

PL 2  
45 - 75 MHz

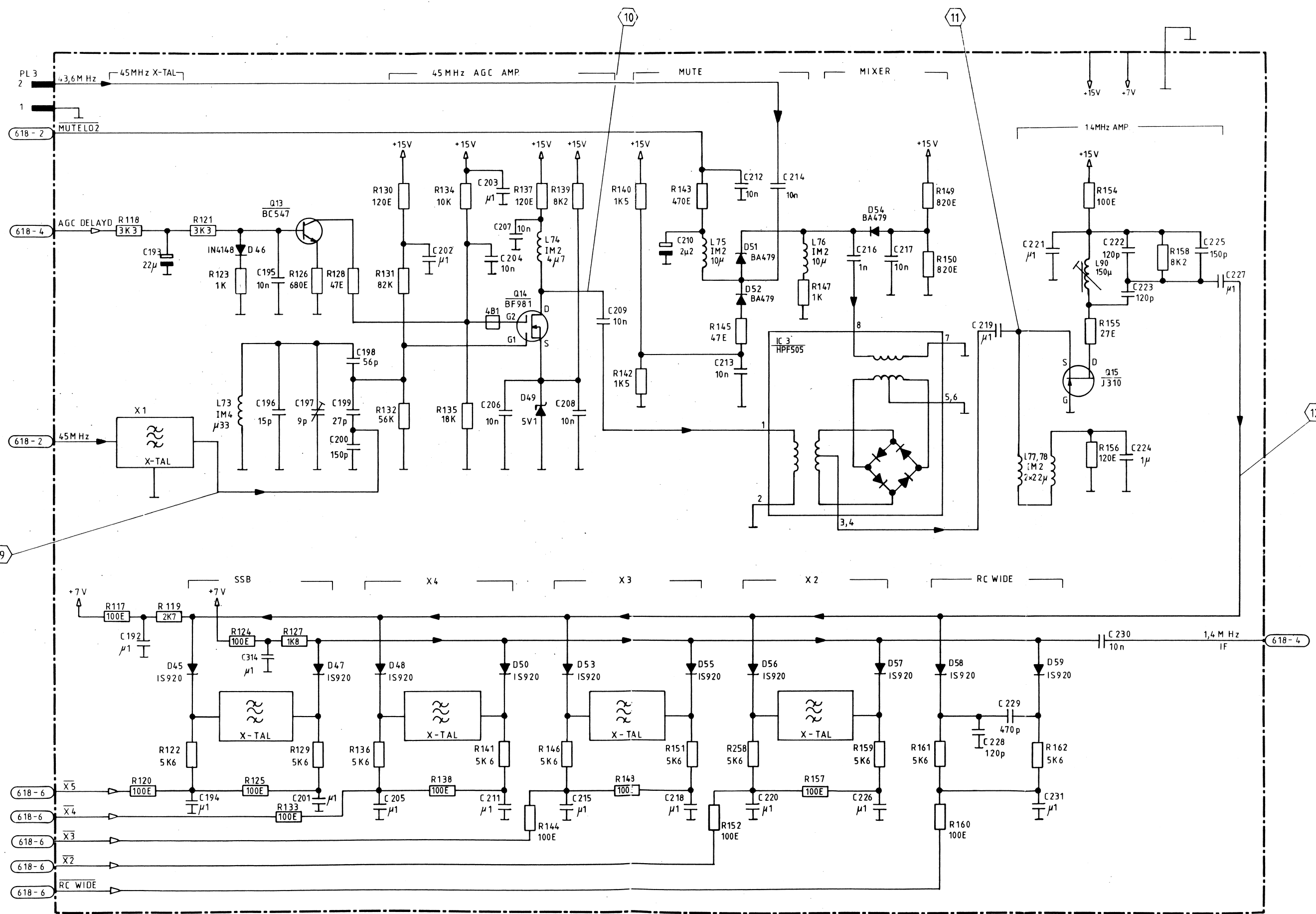
PL 3  
43.6 MHz

SK3  
1.4 MHz



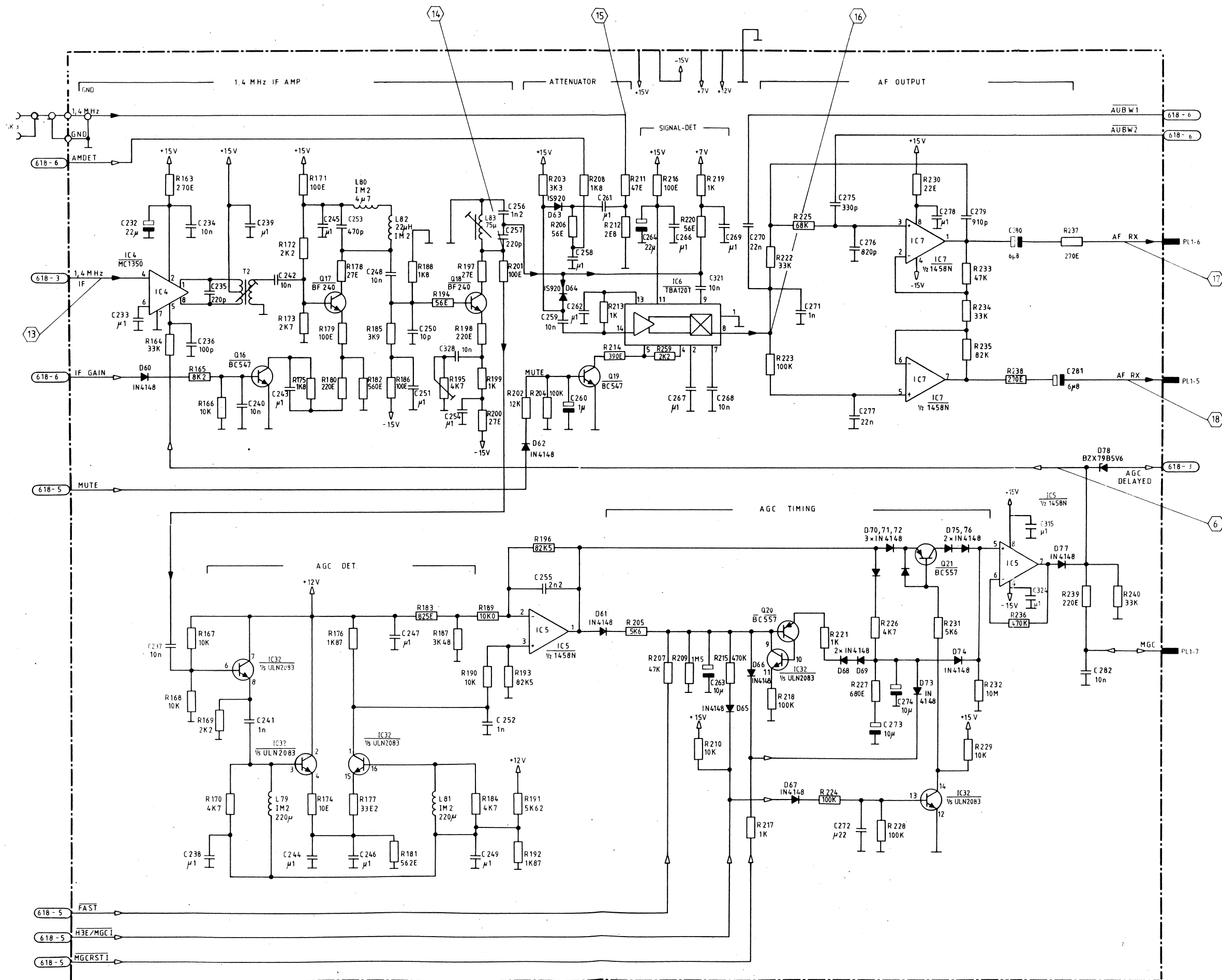


PCB 618 RECEIVER SIGNAL PATH  
VERSION A7 SUBDIAGRAM 2 OF 6



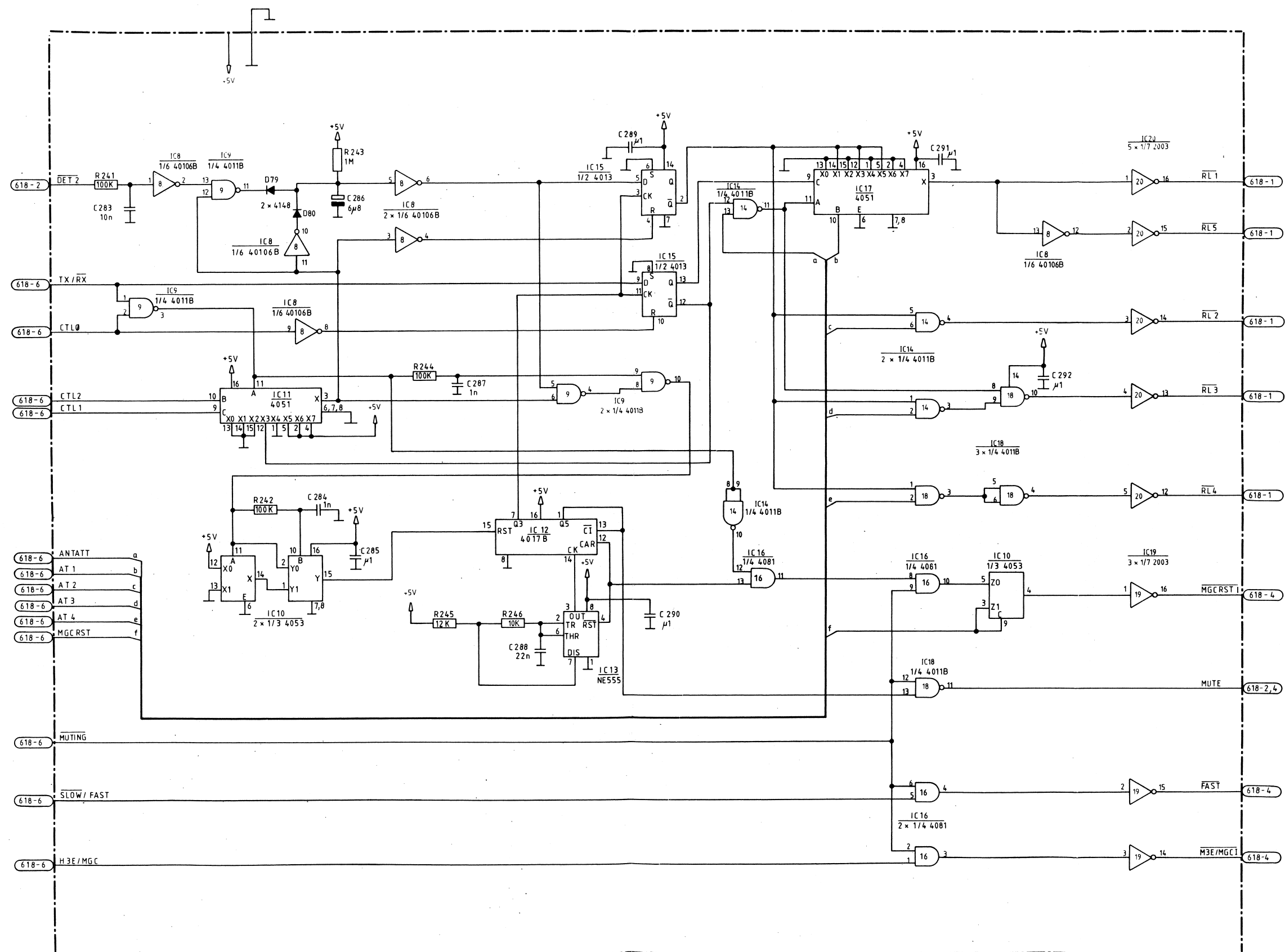
PCB 618 RECEIVER SIGNAL PATH  
VERSION A7 SUBDIAGRAM 3 OF 6

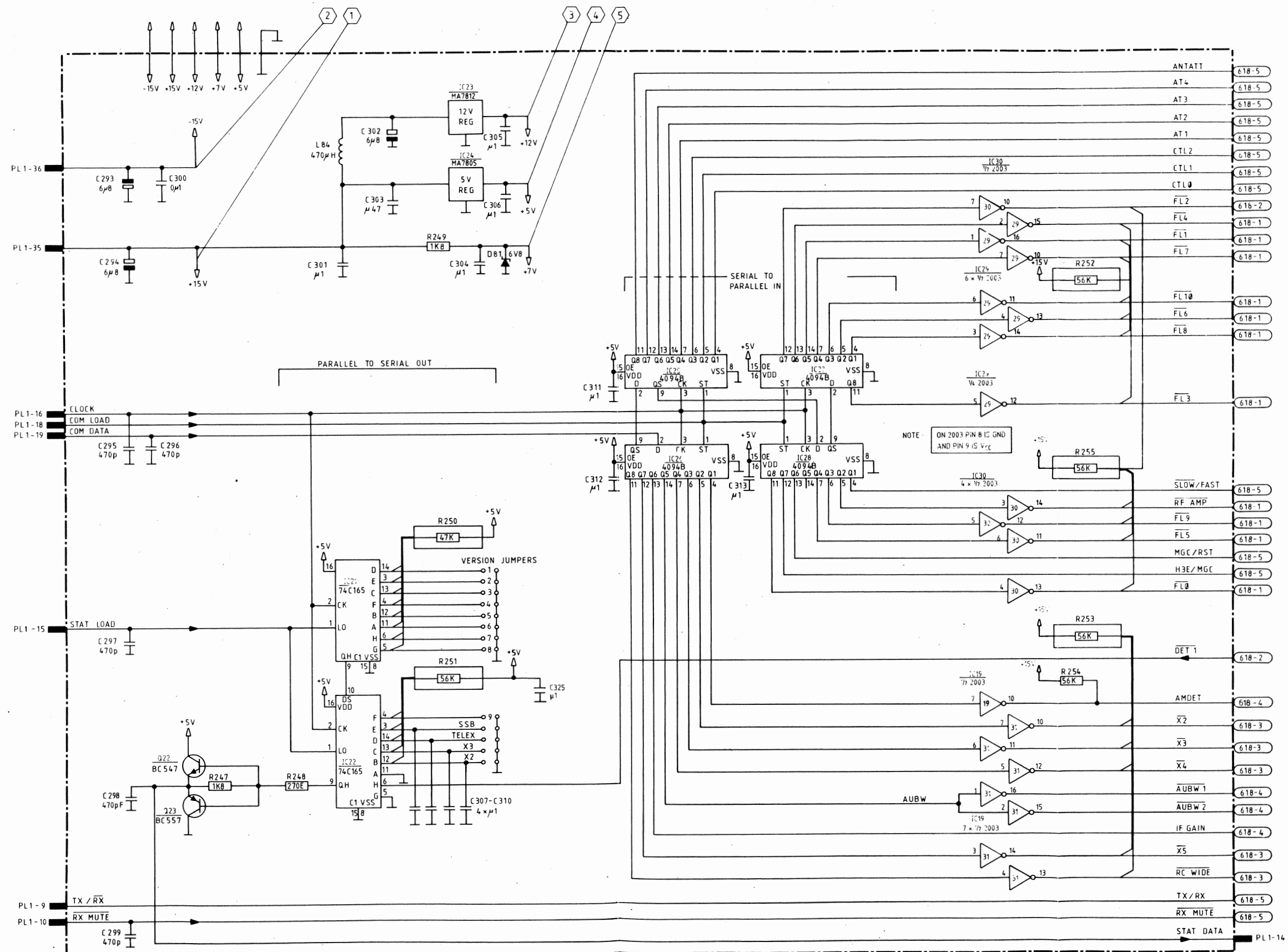




PCB 618 RECEIVER SIGNAL PATH  
VERSION A7 SUBDIAGRAM 4 OF 6







# TEST POINTS FOR PCB 618 RECEIVER SIGNAL PATH.

1 + 15V DC

2 - 15V DC

3 + 12V DC

4 + 5V DC

5 + 6.8V DC

<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">6</span>	SELF TEST #	22	7V
	—— " ——	23-24	2.9V
	—— " ——	25-30	9.8V

7 8 9 10 11 ONLY FOR USE WITH SIGNAL GENERATOR

<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">12</span>	SELF TEST #	25	50mV <sub>pp</sub>
	—— " ——	26-30	40mV <sub>pp</sub>

<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">13</span>	SELF TEST #	25-30	30mV <sub>pp</sub>
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<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">14</span>	SELF TEST #	25-30	450mV <sub>pp</sub> SINEWAVE 1.4 MHz
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<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">15</span>	SELF TEST #	22-30	650mV <sub>pp</sub> —— " —— 1.4 MHz
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<span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">16</span> <span style="border: 1px solid black; border-radius: 50%; padding: 2px 6px;">17</span>	SELF TEST #	25	1.7V <sub>pp</sub> - 1 kHz
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NOTE: KEEP GROUND CORD ON PROBE AS SHORT AS POSSIBLE..

PARTS LIST FOR RECEIVER SIGNAL PATH BOARD 618 VERSION A7

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Printed Circuit Board Complete 618					
IC1	CB303M2 Balanced mixer	107 561 81	D81	BZX79C6V8	832 796 80
IC2	LM2903	850 030 30	VR1	NEON LAMP	722 000 00
IC3	HPF505 Balanced mixer	850 290 30	X1	45 HHZ Filter 2.7 kHz	383 571 01
IC4	MC1350	850 000 11	X2	LSB Filter 1.4 MHz 1 kohm	385 112 03
IC5,7	MC1458N	850 135 00	RL1-4	Relay 12V DIL	780 000 25
IC6	TBA 120 T	850 145 80	RL5	Relay 12V DR-12V	780 000 38
IC8	CD40106B	850 010 60	R1,204,218,223,224,228,241,242,244	100 kohm 5%	500 510 00
IC9,14,18	4011B	850 401 10	R2,3,8,15,21,40,41,117,120,124-125,133,138,144,148,152,154,157,160,171,179,186,201,216	100 ohm 5%	500 210 00
IC10	CD4053B	850 405 30	R4,5	220 ohm 5%	544 222 00
IC11,17	CD4051B	850 405 10	R6	75 ohm 5%	547 175 00
IC12	4017B	850 401 70	R7,13,18,26,118,121,203	3.3 kohm 5%	500 333 00
IC13	NE555	850 055 50	R9	68 ohm 5%	501 168 00
IC15	4013B	850 401 30	R10	82 ohm 5%	501 182 00
IC16	4081B	850 408 10	R11,12	226 ohm 1%	511 222 60
IC19,20,29,30,31	2003A	850 200 30	R14,42,182	560 ohm 5%	500 256 00
IC21,22	74C165	850 416 50	R16	100 ohm 1%	511 210 00
IC23	MA7812	850 781 20	R17	68 ohm 5%	544 168 00
IC24	MA7805	850 780 50	R19,20	120 kohm 5%	500 512 00
IC25,26,27,28	4094B	850 409 40	R22,207,233	47 kohm 5%	500 447 00
IC32	ULN2083A	850 208 30	R23,61,106,170,184,226	4.7 kohm 5%	500 347 00
Q1	BC327	840 032 70	R24,32,50-59	470 ohm 5%	501 247 00
Q2,17,18,20,22	BC557B	840 055 70	R25	56 ohm 5%	544 156 00
Q3,9,11,16,18,19	BC547B	840 054 70	R27,71,164,222,234,240	33 kohm 5%	500 433 00
Q4,5,10	BFR96	840 009 60	R28,29,127,175,188,208,247,249	1.8 kohm 5%	500 318 00
Q6,13	J310	840 031 03	R30,66	15 kohm 5%	500 415 00
Q7	J310 2 pcs. matched	840 031 02	R31	2.2 kohm 5%	501 322 00
Q12	BF981	843 098 10			
Q14,15	BF240	840 024 00			
Q21	BD645	842 064 50			
D1,2,5,6,30,31,41-44,46,60-62,65-77,79,80	1N4148	830 414 80			
D3,4	388A 114A	830 011 40			
D7,18-26,35	BA423	830 042 30			
D8-17,27-28,32-34,36,51,52,54,83	BA479	833 047 90			
D29	BZX79C12	832 791 21			
D37-40	BA282	830 028 20			
D45,47,48,50,53,55-59,63,64	1S920	830 192 00			
D49	BZX79B5V1	832 795 11			
D78	BZX79B5V6	832 795 60			

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R33-38,44-47, 78	270 ohm	5%	1/4W	Car.	501 227 00	R96,155,178,197, 200	27 ohm	5%	1/8W	Car.	500 127 00
R39,230	22 ohm	5%	1/8W	Car.	500 122 00	R97,100	27.4 ohm	1%	1/4W	MF	511 127 40
R43,62	680 ohm	5%	1/4W	Car.	501 268 00	R99	237 kohm	1%	1/4W	MF	511 523 70
R48	820 ohm	5%	1/4W	Car.	501 282 00	R101	715 ohm	1%	1/4W	MF	511 271 50
R49,83	390 ohm	5%	1/4W	Car.	501 239 00	R103	56.2 kohm	1%	1/4W	MF	511 456 20
R60	590 ohm	1%	1/4W	MF	511 259 00	R104	6.49 kohm	1%	1/4W	MF	511 364 90
R64,65,95,102, 111,112,134, 166-168,210,229, 246	10 kohm	5%	1/8W	Car.	500 410 00	R105	14.7 kohm	1%	1/4W	MF	511 414 70
R119,173	2.7 kohm	5%	1/8W	Car.	500 327 00	R107	270 kohm	5%	1/8W	Car.	500 527 00
R63,139,158,165	8.2 kohm	5%	1/8W	Car.	500 382 00	R109,149,150	820 ohm	5%	1/8W	Car.	500 282 00
R67,194,206,220	56 ohm	5%	1/8W	Car.	500 156 00	R110	56 ohm	5%	1/4W	Car.	501 156 00
R68	82 ohm	5%	1/8W	Car.	500 182 00	R114	511 ohm	1%	1/4W	MF	511 251 10
R69,143,215,236	470 kohm	5%	1/8W	Car.	500 547 00	R115	56.2 ohm	1%	1/4W	MF	511 156 20
R70	47 ohm	5%	1/4W	Car.	501 147 00	R116	46.4 ohm	1%	1/4W	MF	511 146 40
R72	301 ohm	1%	1/4W	MF	511 230 10	R122,129,136,141, 146,151,159,161, 162,205,231,258	5.6 kohm	5%	1/8W	Car.	500 356 00
R73,113,140,142	1.5 kohm	5%	1/8W	Car.	500 315 00	R126,227	680 ohm	5%	1/8W	Car.	500 268 00
R74,90,91,180, 198,239	220 ohm	5%	1/8W	Car.	500 222 00	R130,137,156	120 ohm	5%	1/8W	Car.	500 212 00
R75	90.3 ohm	1%	1/8W	MF	511 195 30	R131,235	82 kohm	5%	1/8W	Car.	500 482 00
R76,77,123,147, 199,213,217,219, 221	1 kohm	5%	1/8W	Car.	500 310 00	R135	18 kohm	5%	1/8W	Car.	500 418 00
R79,174	10 ohm	1%	1/4W	MF	511 110 00	R163,237,238,248	270 ohm	5%	1/8W	Car.	500 227 00
R80,214	390 ohm	5%	1/8W	Car.	500 239 00	R169,172,259	2.2 kohm	5%	1/8W	Car.	500 322 00
R81,84	10 ohm	5%	1/8W	Car.	500 110 01	R176,192	1.87 kohm	1%	1/4W	MF	511 318 70
R82,88	270 ohm	5%	1/2W	Car.	502 227 00	R177	33.2 ohm	1%	1/4W	MF	511 133 20
R85,89,98, 128,145,211	47 ohm	5%	1/8W	Car.	500 147 00	R181	562 ohm	1%	1/4W	MF	511 256 20
R86	51.1 ohm	1%	1/4W	MF	511 151 10	R183	825 ohm	1%	1/4W	MF	511 282 50
R87	48.7 ohm	1%	1/4W	MF	511 148 70	R185	3.9 kohm	5%	1/8W	Car.	500 339 00
R92	19.6 ohm	1%	1/4W	MF	511 119 60	R187	3.48 kohm	1%	1/4W	MF	511 334 80
R93,108,132, 254,257	56 kohm	5%	1/8W	Car.	500 456 00	R191	5.62 kohm	1%	1/4W	MF	511 356 20
R94	7.5 ohm	1%	1/4W	MF	511 075 00	R193,196	82.5 kohm	1%	1/4W	MF	511 482 50
						R195	4.7 kohm	1%	1/4W	Pot.	582 347 00
						R202,245	12 kohm	5%	1/8W	Car.	500 412 00
						R209	1.5 Mohm	5%	1/4W	Car.	501 615 00
						R189,190	10 kohm	1%	1/4W	MF	511 410 00
						R225	68 kohm	5%	1/8W	Car.	500 468 00
						R232	10 Mohm	5%	1/4W	Car.	501 710 00
						R243	1 Mohm	5%	1/8W	Car.	500 610 00
						R250	9x47 kohm			Sil.	530 000 07
						R251-253,255	7x56 kohm			Sil.	530 000 13



PARTS LIST FOR RECEIVER SIGNAL PATH BOARD 618 VERSION A7

C136,146,147, 148,152,153,186, 187,216,241,252, 271,283,287	1 nF	10%	63V	Cer.	602 310 02
C141,250	10 pF	2%	63V	N150	602 110 00
C143,144,171, 272,319	0.22 uF	10%	63V	Polyes.	622 522 01
C155	100 uF		25V	Sol. al.	652 810 00
C158,314	2-9 pF		100V	Var.	683 009 00
C161,184	39 pF	2%	63V	N150	602 139 01
C179	4.5-26 pF			Var.	683 126 00
C193,232,264	22 uF		16V	Tan.	651 722 01
C199	27 pF	2%	63V	N150	602 127 00
C260	1 uF		35V	Tan.	652 610 01
C263,273,274	10 uF		63V	Sol. al.	652 710 02
C293,294,302,323	6.8 uF		25V	Sol. al.	652 668 01
C295-299	470 pF	10%	63V	Cer.	602 247 00
L1-5	4.7 mH	5%	RF Choke		740 347 00
L6,7,50,51,53, 57,69	1000 uH	10%	RF Choke	IM2	740 310 04
L8,39	0.15 uH	20%	RF Choke	IM4	740 001 51
L9,37,40	0.22 uH	10%	RF Choke	IM2	740 002 21
L10,87	0.33 uH	10%	RF Choke	IM2	740 003 30
L11,19,38	0.47 uH	10%	RF Choke	IM2	740 004 70
L12,43	0.68 uH	10%	RF Choke	IR2	740 006 81
L13,44,68	0.82 uH	10%	RF Choke	IM2	740 008 20
L14,74,80	4.7 uH	10%	RF Choke	IM2	740 047 02
L26,66,67,70	0.1 uH	10%	RF Choke	IM2	740 001 00
L34	6.8 uH	10%	RF Choke	IM2	740 068 01
L35,36	33 uH		RF Choke		740 133 01
L41,86	0.39 uH	10%	RF Choke	IM2	740 003 90
L45	3.9 uH	10%	RF Choke	IM2	740 039 00
L46,55,56,72	47 uH	10%	RF Choke	IM2	740 147 03
L47,77,78,82	22 uH	10%	RF Choke	IM2	740 122 02
L48	2.7 uH	10%	RF Choke	IM2	740 027 00
L49	470 uH	10%	RF Choke	IM2	740 247 02
L52,54,75,76,88	10 uH	10%	RF Choke	IM2	740 110 04
L58,59	2.2 uH	10%	RF Choke	IM2	740 022 02
L60	0.56 uH	10%	RF Choke	IM2	740 005 60
L61-65,71	0.15 uH	10%	RF Choke	IM2	740 001 50
L73	0.33 uH	10%	RF Choke	IM4	740 003 31
L79,81	220 uH	10%	RF Choke	IM2	740 222 02
L84	470 uH	5%	RF Choke		740 247 01
L85	0.27 uH	5%	RF Choke	IM2	740 002 71