

TECHNICAL DESCRIPTION

PCB 612/613/614 MASTER OSCILLATOR

The three Master Oscillators all consist of the same circuits but have different frequency stabilities determined by the 10.24 MHz Temperature Compensated Crystal Oscillator (TCXO) used. The output signal of the TCXO is split between two reference dividers. One for the 45-75 MHz Synthesizer and one for the 43.6 and 1.4 MHz Synthesizers. The Reference Divider, 45-75 MHz Synthesizer, divides the 10.24 MHz TCXO signal by 250 having a 40.96 kHz reference frequency at two outputs.

The Reference Divider, 43.6 and 1.4 MHz Synthesizer, divides the 10.24 MHz TCXO signal by 8, obtaining a 1.28 MHz signal fed to two outputs. The output signals of the divider are fed to the Check Detector to detect the presence of both. The resulting check signal MO-Check is via the Synthesizer Board 611 fed to the Transceiver Control Board 624.

For Master Oscillator 613 a heater (TCXO Heater 699) is incorporated in order to keep the TCXO ambient temperature above 0 deg. Celcius.

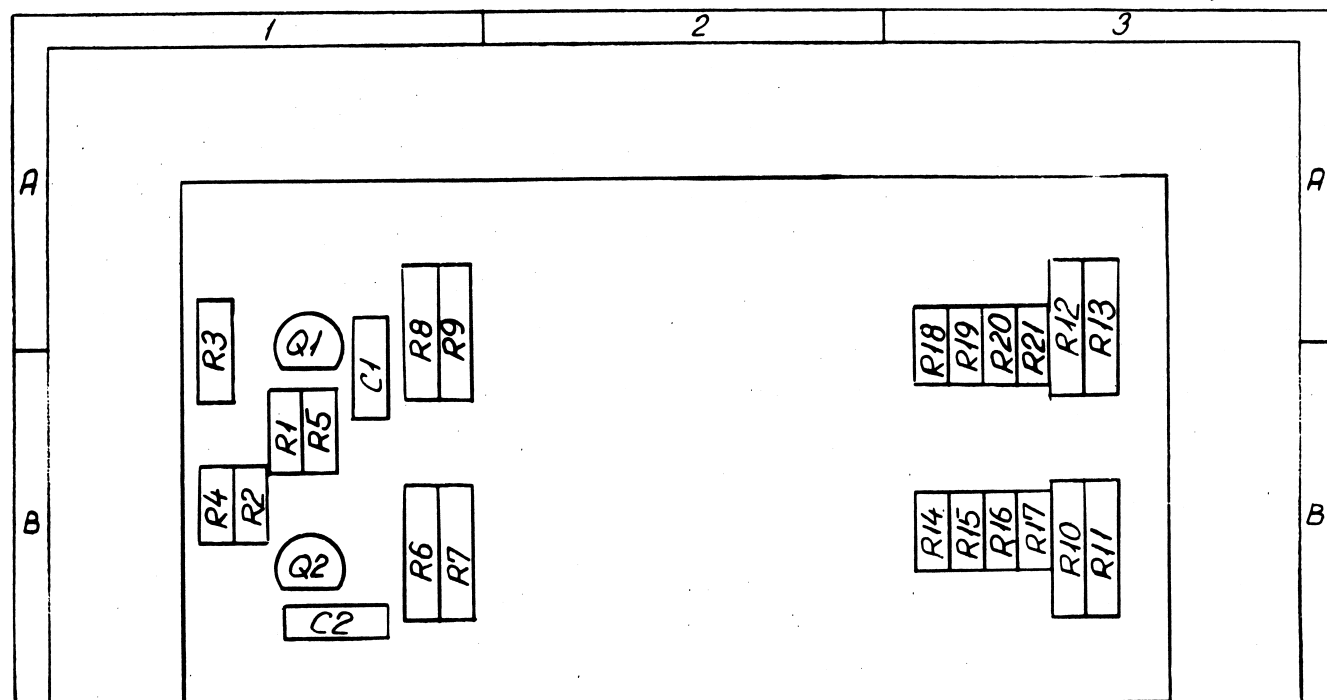
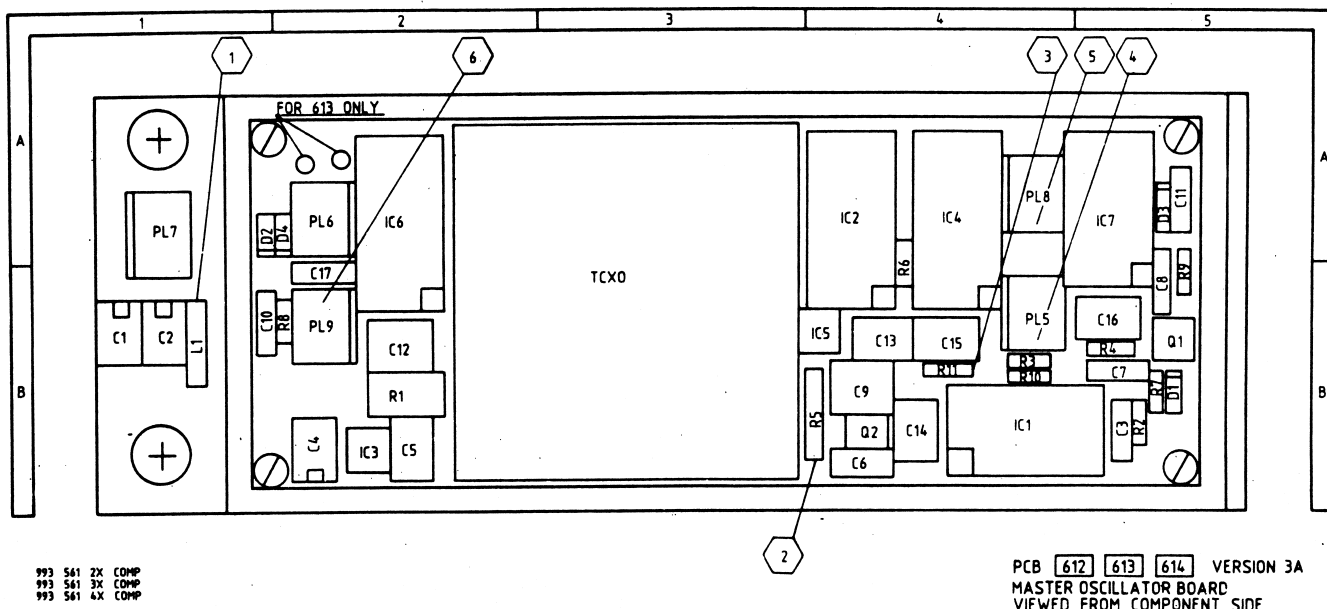
PCB 615/616 MASTER OSCILLATOR

Master Oscillator 615 and 616 produces enhanced frequency stabilities of $\pm 0.35\text{ppm}$ and $\pm 0.1\text{ppm}$ respectively. A highly stable oven controlled crystal oscillator (PCB 608 or PCB 609) is mounted in a shielding box on top of the Master Oscillator board. On Master Oscillator 615, PCB 608 is mounted and on 616, PCB 609 is mounted, giving the higher stability. The crystal oscillators produces a temperature stable 20.480000MHz signal giving a total frequency stability of less than either 10Hz or 3Hz for the Transceiver.

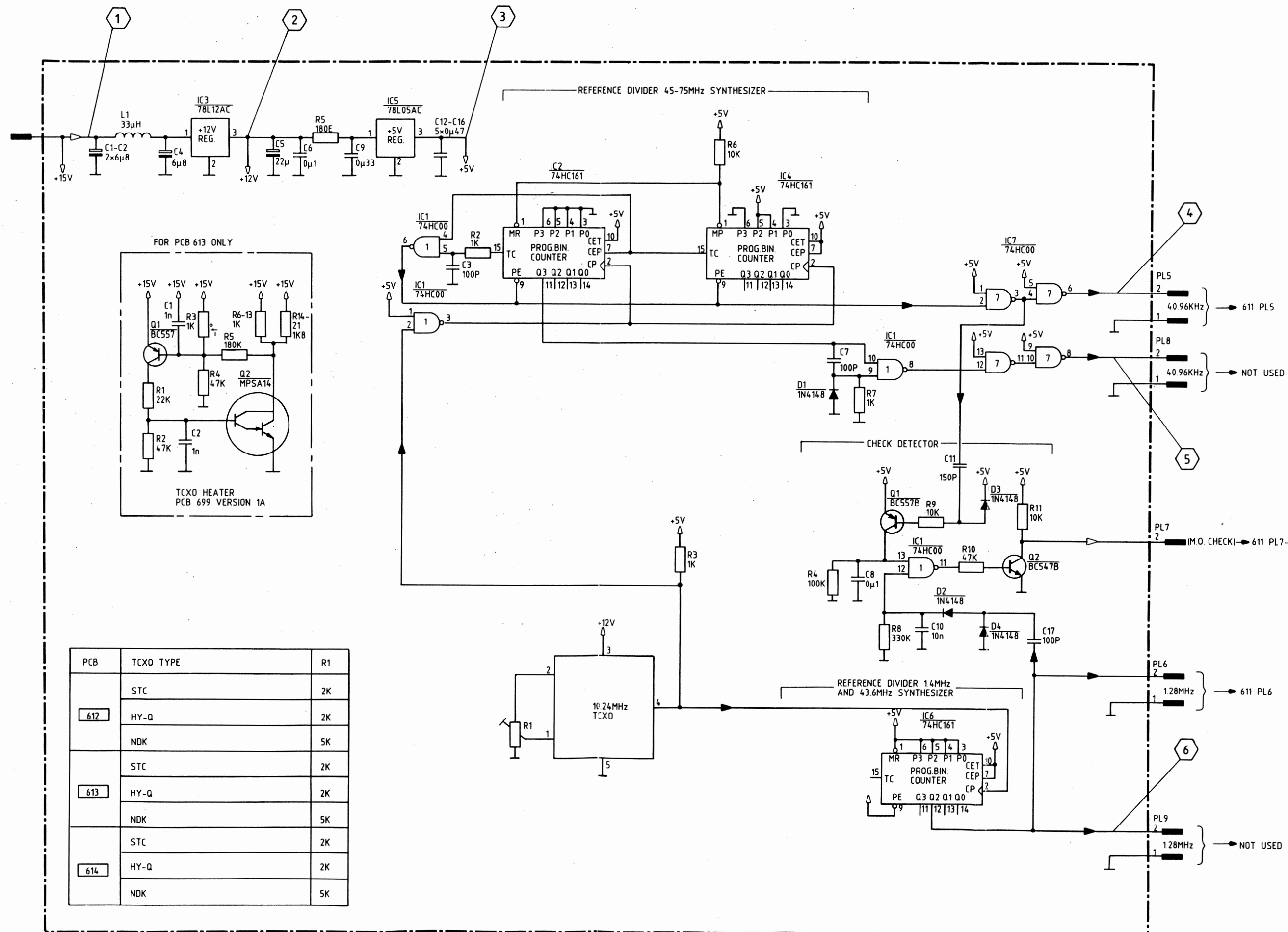
The oscillator signal is led to PCB 615/616 where it is divided by 2. This 10.24MHz signal is split between to divider chains dividing with 250 and 8 resulting in two reference frequencies of 40.96kHz and 1.28MHz respectively.

The 40.96kHz signal is led to PL5 and PL8 and is used as a reference frequency for the 45 to 75MHz synthesizer. Likewise the 1.28MHz signal is led to PL6 and PL9 and is used as reference frequencies for the 43.6MHz and the 1.4MHz synthesizer.

The output signals of the two divider chains are monitored and combined in a check detector, producing a check signal (MO-Check) which via Synthesizer Board 611 is led to the Transceiver Control Board 624. The check signal is used during self-test.



611 PL7 - 1



PCB	TCXO TYPE	R1
	STC	2K
612	HY-Q	2K
	NDK	5K
613	STC	2K
	HY-Q	2K
	NDK	5K
614	STC	2K
	HY-Q	2K
	NDK	5K

PARTS LIST FOR MASTER OSCILLATOR BOARD 612 VERSION 3A

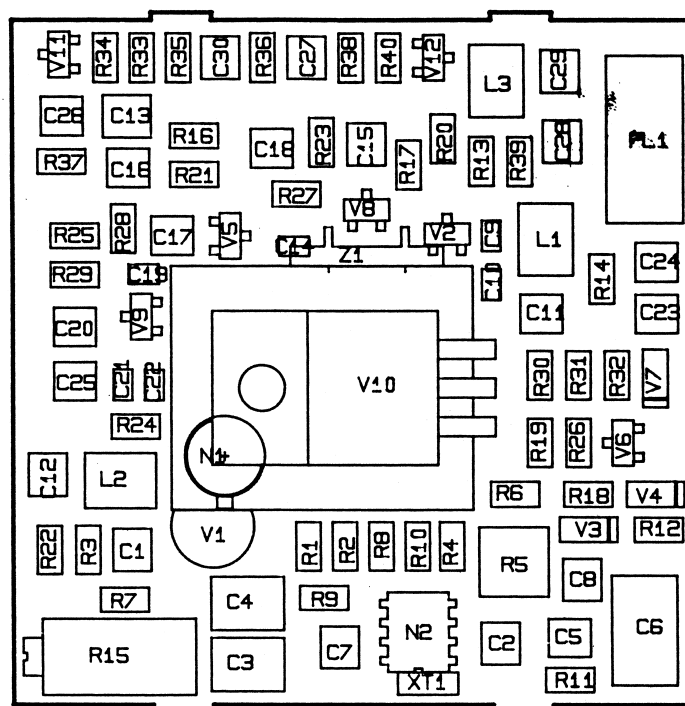
PARTS LIST FOR MASTER OSCILLATOR BOARD 613 VERSION 3A

nted Circuit Board Complete 612		107 561 21	Printed Circuit Board Complete 613		107 561 31
IC1,7	MC74HC00N	850 740 04	IC1,7	MC74HC00N	850 740 04
IC2,4,6	MC74HC161N	857 416 10	IC2,4,6	MC74HC161N	857 416 10
IC3	LM78L12ACP	850 741 20	IC3	LM78L12ACP	850 741 20
IC5	LM78L05ACP	850 780 52	IC5	LM78L05ACP	850 780 52
Q1	BC557B	840 055 70	Q1	BC557B	840 055 70
Q2	BC547B	840 054 70	Q2	BC547B	840 054 70
D1-4	1N4148	830 414 80	D1-4	1N4148	830 414 80
R2-3,7	1 kohm	500 310 00	R2-3,7	1 kohm	500 310 00
R4	100 kohm	500 510 00	R4	100 kohm	500 510 00
R5	180 ohm	501 218 00	R5	180 ohm	501 218 00
R6,9,11	10 kohm	500 410 00	R6,9,11	10 kohm	500 410 00
R8	330 kohm	500 533 00	R8	330 kohm	500 533 00
R10	47 kohm	500 447 00	R10	47 kohm	500 447 00
C1,2,4	6.8 uF	652 668 01	C1,2,4	6.8 uF	652 668 01
C3,7,17	100 pF	602 210 00	C3,7,17	100 pF	602 210 00
C5	22 uF	652 722 00	C5	22 uF	652 722 00
C6,8	0.1 uF	622 510 00	C6,8	0.1 uF	622 510 00
C9	0.33 uF	622 533 01	C9	0.33 uF	622 533 01
C10	10 nF	602 410 01	C10	10 nF	602 410 01
C11	150 pF	602 215 00	C11	150 pF	602 215 00
C12-16	0.47 uF	622 457 01	C12-16	0.47 uF	622 457 01
L1	33 uH	740 133 01	L1	33 uH	740 133 01
TCXO	10.24 MHz	383 570 11	TCXO	10.24 MHz	383 570 21
PL5,6,8,9	2 POL	750 001 45	TCXO HEATER PCB 699		107 569 91
PL7	2 POL	750 001 46	PL5,6,8,9	2 POL	750 001 45
			PL7	2 POL	750 001 46

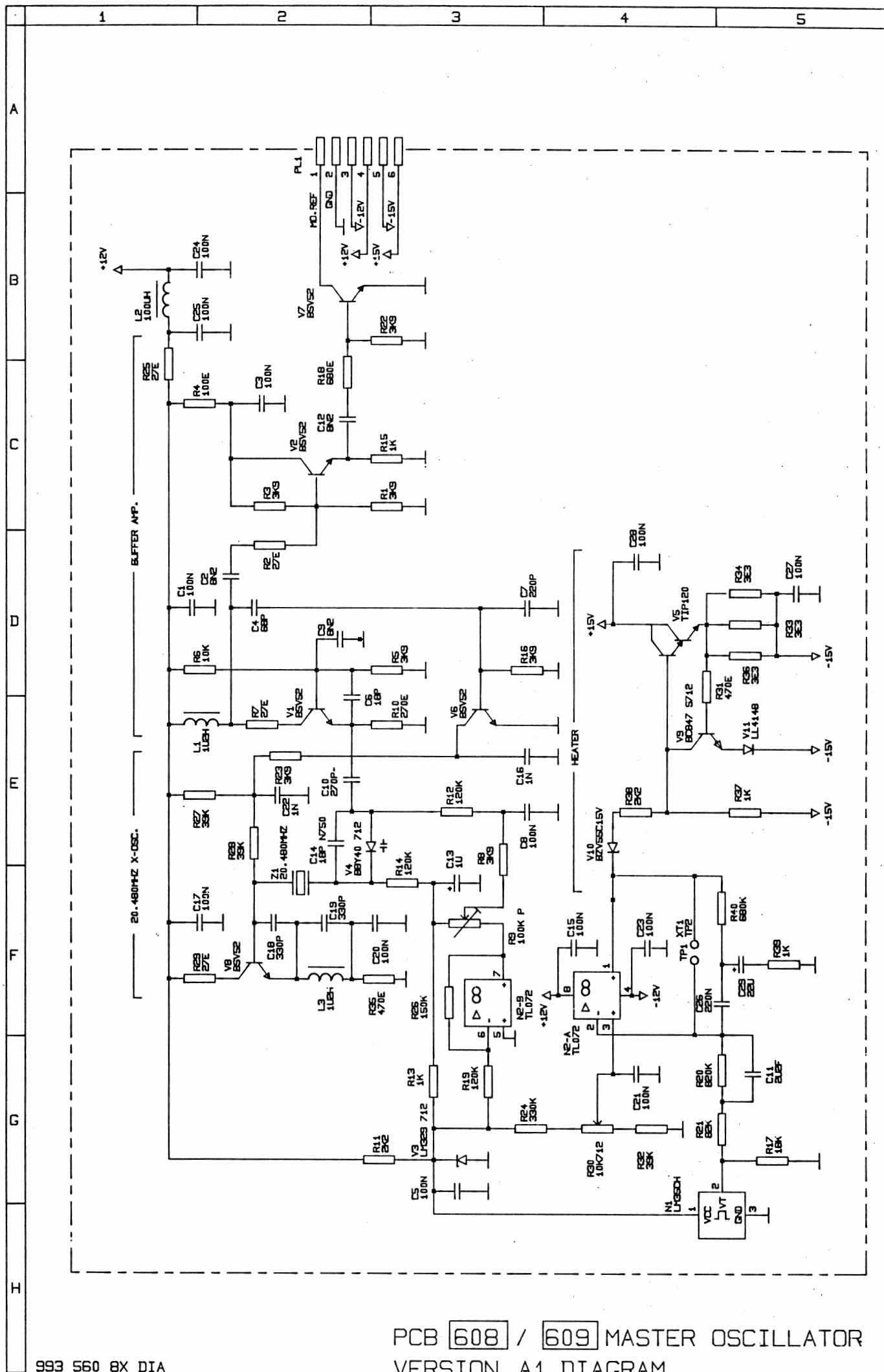
PARTS LIST FOR MASTER OSCILLATOR BOARD 614 VERSION 3A

PARTS LIST FOR TCXO HEATER PCB 699 VERSION 1A

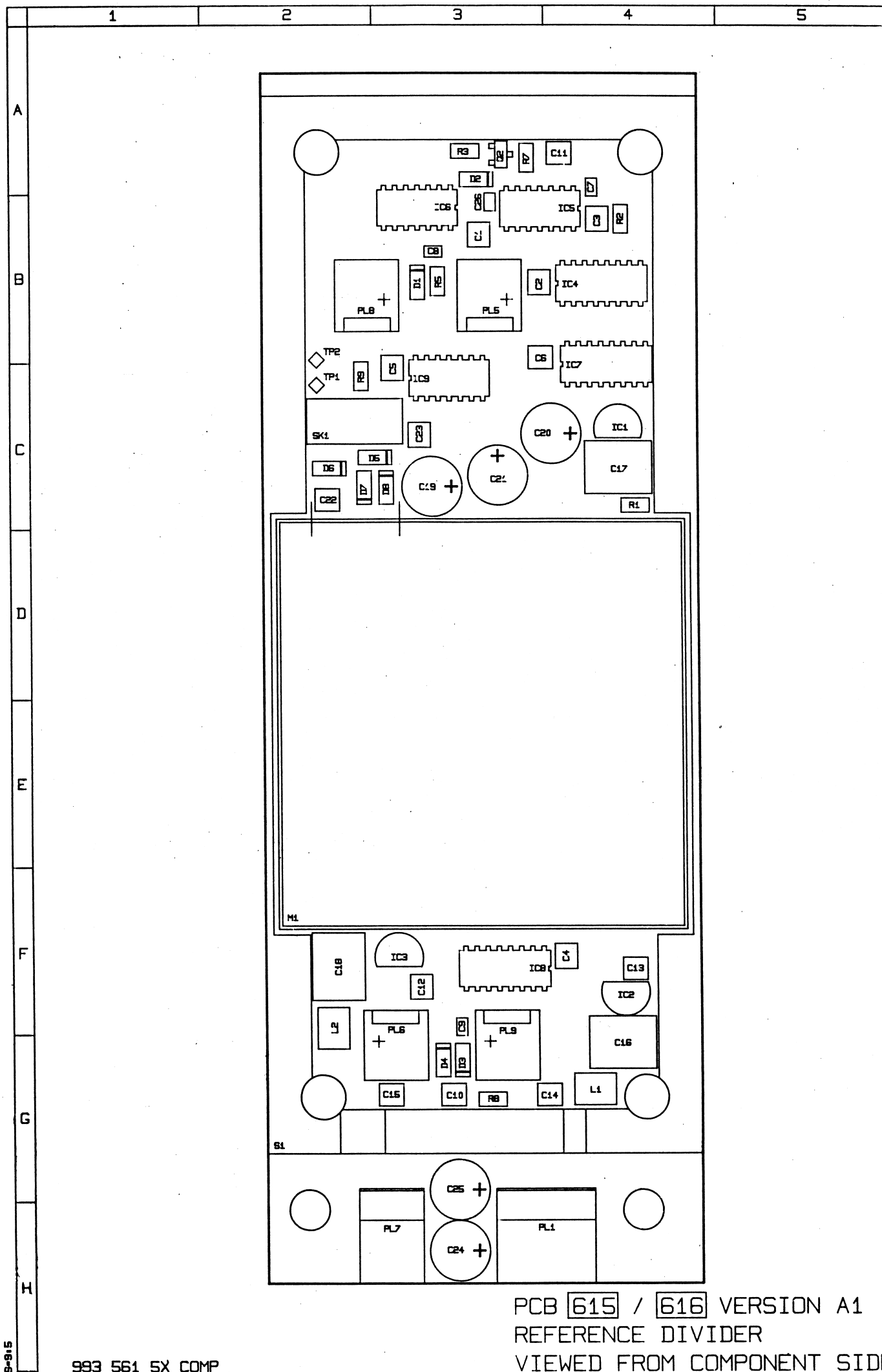
nted Circuit Board Complete 614				Printed Circuit Board Complete 699			
				Q1	BC557B		107 569 91
IC1,7	MC74HC00N		850 740 04	Q2	MPSA14		840 055 70
IC2,4,6	MC74HC161N		857 416 10				840 001 40
IC3	LM78L12ACP		850 741 20	R1	22 kohm	5% MF	500 422 00
IC5	LM78L05ACP		850 780 52	R2,4	47 kohm	5% MF	500 447 00
				R3	1 kohm	+10% NTC	591 310 00
Q1	BC557B		840 055 70	R5	180 kohm	5% MF	500 518 00
Q2	BC547B		840 054 70	R6-13	1 kohm	5% MF	501 310 00
D1-4	1N4148		830 414 80	R14-21	1.8 kohm	5% MF	500 318 00
				C1-2	1 nF	10% Cer.	602 310 02
R2-3,7	1 kohm	5% MF	500 310 00				
R4	100 kohm	5% MF	500 510 00				
R5	180 ohm	5% Car.	501 218 00				
R6,9,11	10 kohm	5% MF	500 410 00				
R8	330 kohm	5% MF	500 533 00				
R10	47 kohm	5% MF	500 447 00				
C1,2,4	6.8 uF	+50-20%	652 668 01				
C3,7,17	100 pF	2%	602 210 00				
C5	22 uF	20%	652 722 00				
C6,8	0.1 uF	10%	622 510 00				
C9	0.33 uF	20%	622 533 01				
C10	10 nF	-20+50%	602 410 01				
C11	150 pF	2%	602 215 00				
C12-16	0.47 uF	10%	622 457 01				
L1	33 uH		740 133 01				
TCXO (0.4 ppm)	10.24 MHz		383 570 31				
PL5,6,8,9	2 POL		750 001 45				
PL7	2 POL		750 001 46				



PCB [608] / [609] VERSION A1
MASTER OSCILLATOR
VIEWED FROM COMPONENT SIDE

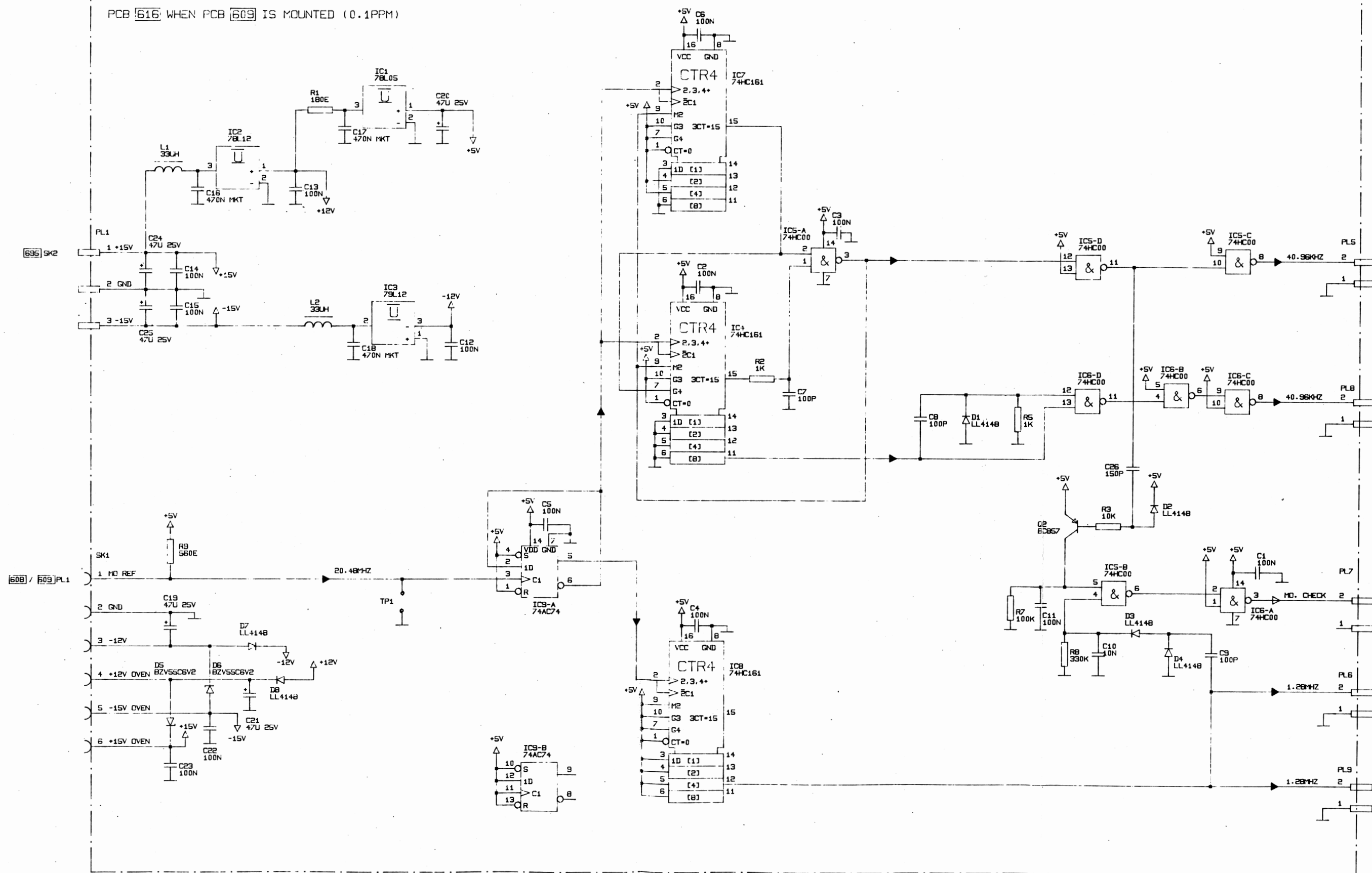


PCB 608 / 609 MASTER OSCILLATOR
VERSION A1 DIAGRAM



PCB [615] WHEN PCB [608] IS MOUNTED (0.35PPM)

PCB [616] WHEN PCB [609] IS MOUNTED (0.1PPM)



PCB [615] / [616] REFERENCE DIVIDER
VERSION A1 DIAGRAM

PARTS LIST FOR PCB 608 / 609 MASTER OSCILLATOR

PCB 608	10761300	PRINTED CIRCUIT BOARD COMPLETE		R11	57002000	SMD RESISTOR 2K2 5%	2
C1	67101100	CAP SMD 1210 100NF 10% X7R	13	R38	57004200	SMD RESISTOR 120K 5%	3
C3				R14			
C5				R19			
C8				R13	57001800	SMD RESISTOR 1K0 5%	4
C15				R15			
C17				R37			
C20				R39			
C21				R17	57003000	SMD RESISTOR 18K 5%	1
C23				R18	57007300	SMD RESISTOR 680E 5%	1
C24				R2	57000400	SMD RESISTOR 27E 5%	4
C25				R7			
C27				R25			
C28				R29			
C10	67008200	CAP SMD 1210 270P 2% NP0	1	R20	57005900	SMD RESISTOR 820K 5%	1
C11	62262201	WIMA 2.2UF	1	R21	57003800	SMD RESISTOR 82K 5%	1
C13	67700100	TANTAL B 1.0UF	1	R24	57004400	SMD RESISTOR 330K 5%	1
C14	602xxxxx	CERAMIC CAPACITOR 18PF CL1	1	R26	57003900	SMD RESISTOR 150K 5%	1
C16	67003200	CAP SMD 1210 1.0NF 2%	2	R27	57003400	SMD RESISTOR 39K 5%	3
C22				R28			
C18	67006800	CAP SMD 0805 330P NP0	2	R32			
C19				R30	57300100	POTENTIOMETER SMD 10K	1
C2	67007100	CAP SMD 1210 8.2NF 2%	3	R31	57001500	SMD RESISTOR 470E 5%	2
C9				R35			
C12				R33	57006700	SMD RESISTOR 3E3 5%	3
C26	67102000	CAP SMD 7.3X6 220NF	1	R34			
C29	67700800	TANTAL D 22UF 16V SMD	1	R36			
C4	67006600	CAP SMD 0805 68PF	1	R4	57001000	SMD RESISTOR 100E 5%	1
C6	67004000	CAP SMD 0805 18PF	1	R40	57007600	SMD RESISTOR 680K 5%	1
C7	67006400	CAP SMD 0805 220P NP0	1	R6	57002800	SMD RESISTOR 10K 5%	1
L1	74100200	SMD CHOKE-B 1.2UH 10%	2	R9	58251000	MULTITURN 100K	1
L3				V1	84720600	TRANS BSV52 NPN 20V SOT23	3
L2	74101600	SMD CHOKE-B 100UH 10%	1	V6			
N1	85000350	SENSOR LM35CH	1	V8			
N2	85810400	IC LF353 2XOPAM/JFET SO8	1	V10	83730500	DIODE SOD80 BVZV55C15V ZENER	1
PL1	37378501	RIBBON CABLE PCB712/PCB713	1	V11	83710000	DIODE LL4148 GEN-PUR SOD80	1
R1				V2	84720600	TRANS BSV52 NPN 20V SOT23	2
R3	57002300	SMD RESISTOR 3K9 5%	7	V7			
R5				V3	83003290	ZENERDIODE LM329	1
R8				V4	83750100	CAP. DIODE BBY40	1
R16				V5	84201200	DARLINGTON TRANSISTOR TIP120	1
R22				V9	84720000	TRANSISTOR BC847	1
R10	57001400	SMD RESISTOR 270E 5%	1	Z1	38373551	CRYSTAL SPEC.20.48000MHZ	1

