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.

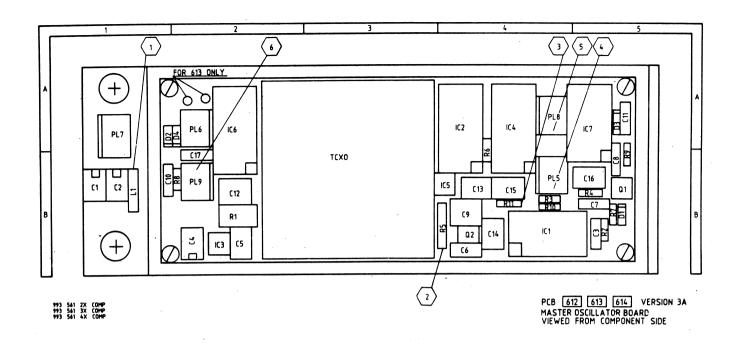
PCB 615/616 MASTER OSCILLATOR

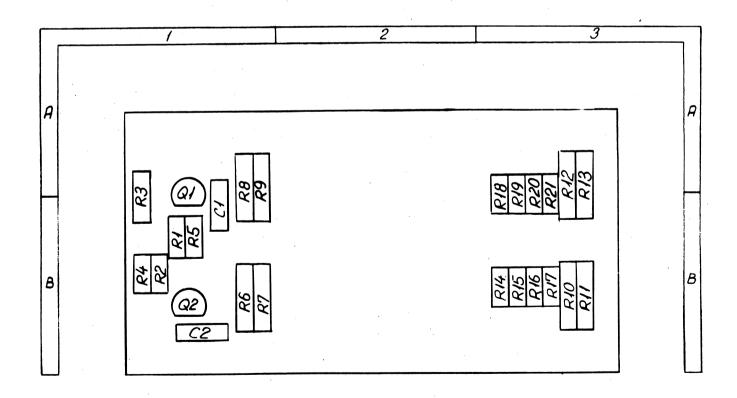
Master Oscillator 615 and 616 produces enhanced frequency stabilities of $+/-0.35 \mathrm{ppm}$ and $+/-0.1 \mathrm{ppm}$ respectively. A highly stable oven controlled crystal oscillator (PCB 608 or PCB 609) is mounted in a shielding box on top of the Master Oscillator board. On Master Oscillator 615, 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 $10 \mathrm{Hz}$ or $3 \mathrm{Hz}$ for the Transceiver.

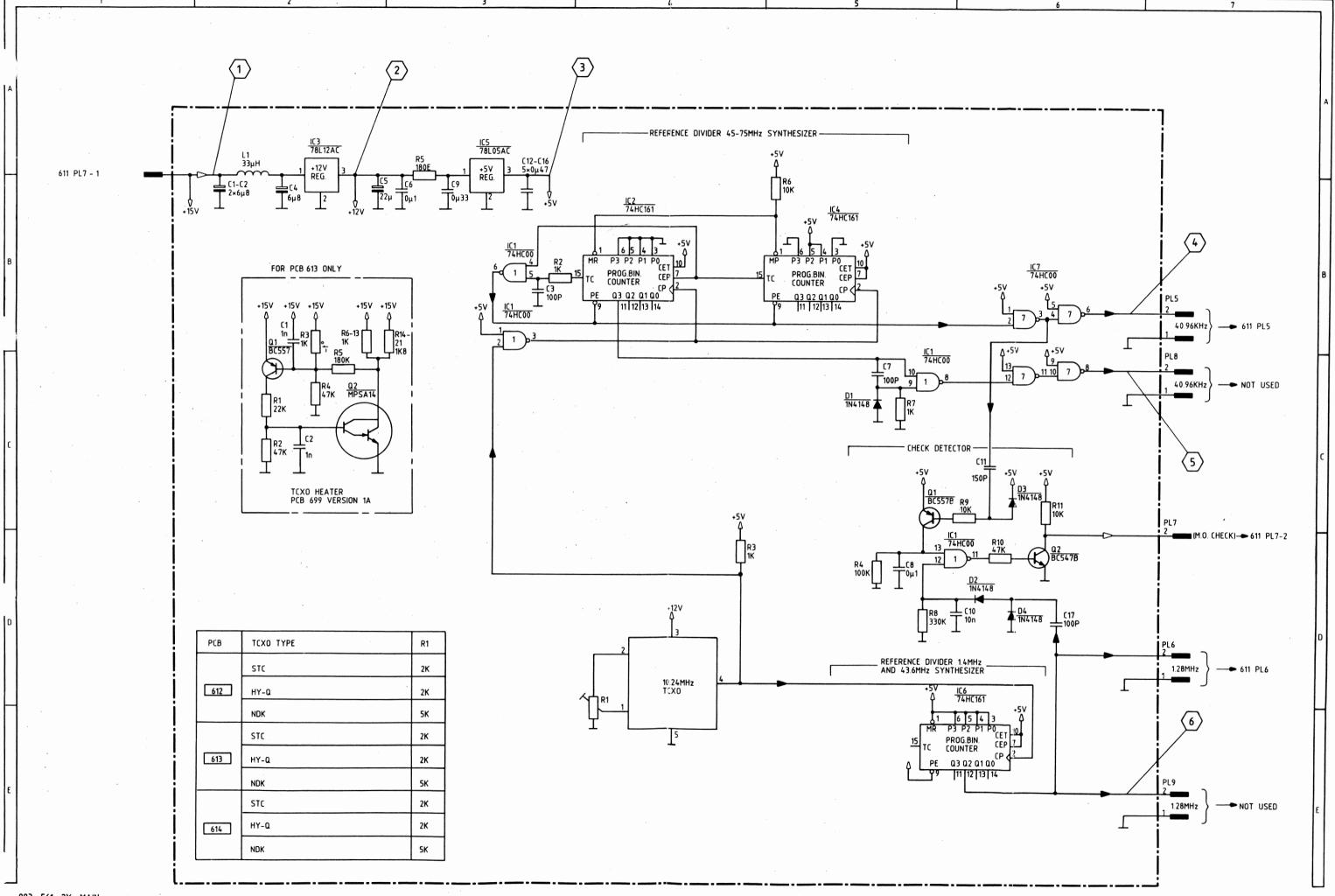
The oscillator signal is led to PCB 615/616 where it is divided by 2. This 10.24 MHz signal is split between to divider chains dividing with 250 and 8 resulting in two reference frequencies of 40.96 kHz and 1.28 MHz respectively.

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







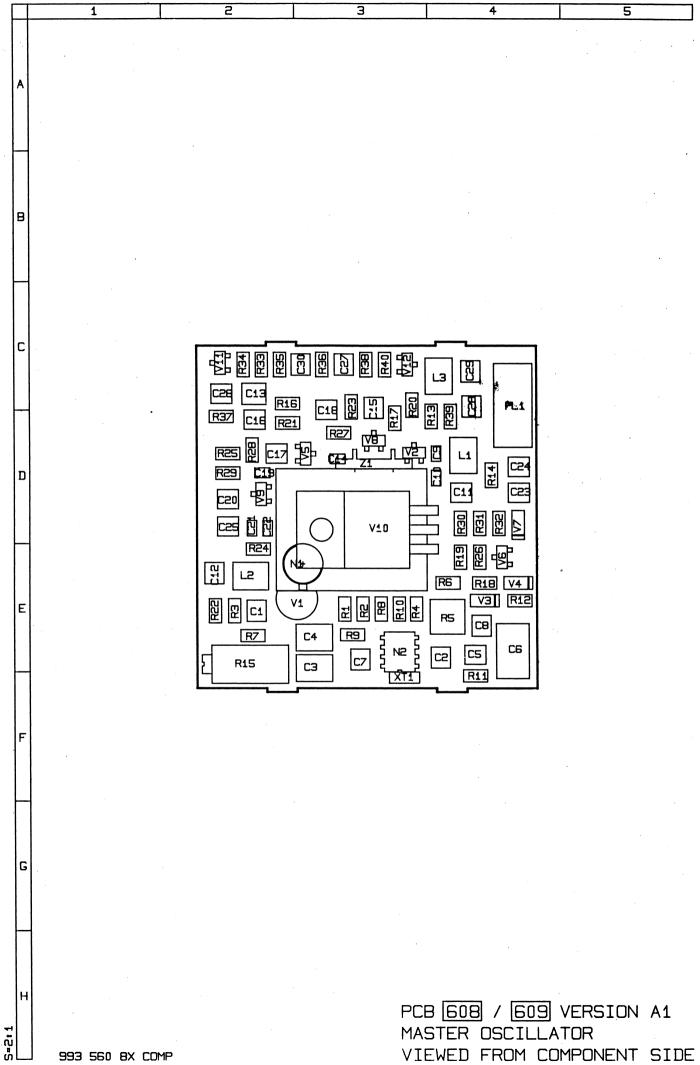
107 561 31	850 740 04 857 416 10 850 741 20 850 780 52	840 055 70 840 054 70	830 414 80	500 310 00 500 510 00 501 218 00 500 410 00 500 533 00	1. 652 668 01 602 210 00 652 722 00 8. 622 510 00 8. 622 533 01 602 410 01 602 457 01	740 133 01	383 570 21	569	750 001 45 750 001 46
				MF MF Car. MF MF	Sol.al. N150 Tan. Polyes. Polyes. Cer. N150				
		٠		1/8W 1/8W 1/4W 1/8W 1/8W 1/8W	25V 63V 25V 63V 63V 63V 63V 63V				
613			•	01 01 01 01 01 01 01 01 01 01 01 01 01 0	-20+50% 2% 20% 10% -20+50% 10%				
ard Complete (MC74HC00N MC74HC161N LM78L12ACP LM78L05ACP	BC557B BC547B	1N4148	1 kohm 100 kohm 180 ohm 10 kohm 330 kohm 47 kohm	6.8 uF 100 pF 22 uF 0.1 uF 10 nF 150 pF 0.47 uF	33 nH	10.24 MHz	669	2 POL 2 POL
Printed Circuit Board Complete	IC1,7 IC2,4,6 IC3 IC5	Q1 Q2	D1-4	R2-3,7 R4 R5 R6,9,11 R8 R10	C1,2,4 C3,7,17 C5 C6,8 C9 C10 C11 C12-16	L1	TCXO	TCXO HEATER PCB	PL5,6,8,9 PL7
107 561 21	850 740 04 857 416 10 850 741 20 850 780 52	840 055 70 840 054 70	830 414 80	500 310 00 500 510 00 501 218 00 500 410 00 500 533 00	652 668 01 602 210 00 652 722 00 622 510 00 622 533 01 602 410 01 602 215 00 622 457 01	740 133 01	383 570 11	750 001 45 750 001 46	
				MF MF MF MF	Sol.al. N150 Tan. Polyes. Polyes. Cer. N150				
				1/8W 1/8W 1/4W 1/8W 1/8W 1/8W	25V 63V 63V 63V 63V 63V 63V				
12				******	-20+50% 2% 20% 10% -20% -20+50% 10%				
nted Circuit Board Complete 612	MC74HC00N MC74HC161N IM78L12ACP IM78L05ACP	BC557B BC547B	1N4148	1 Kohm 100 Kohm 180 ohm 10 Kohm 330 Kohm 47 Kohm	6.8 uF 100 pF 22 uF 0.1 uF 10 nF 150 pF 0.47 uF	33 uH	10.24 MHz	2 POL 2 POL	
nted Circuit B	IC1,7 IC2,4,6 IC3 IC5	21 22	D1-4	R2-3,7 R4 R5 R6,9,11 R10	C1,2,4 C3,7,17 C5 C6,8 C9 C10 C11	L1	гсхо	PL5,6,8,9 PL7	

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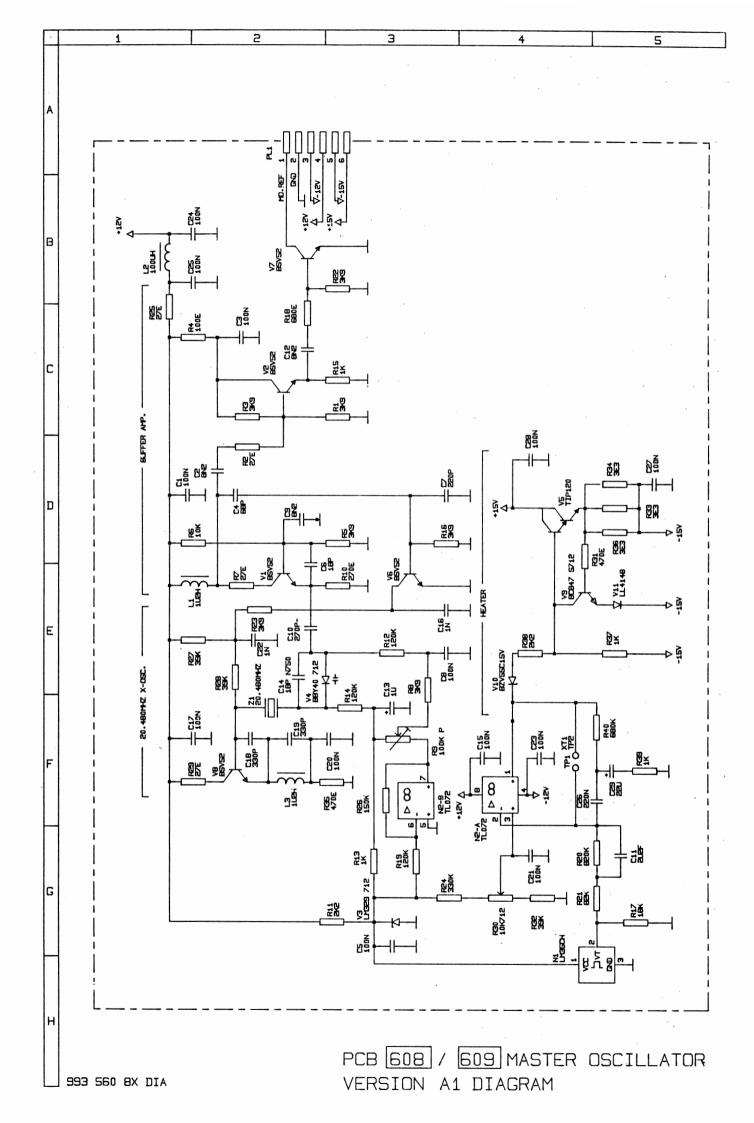
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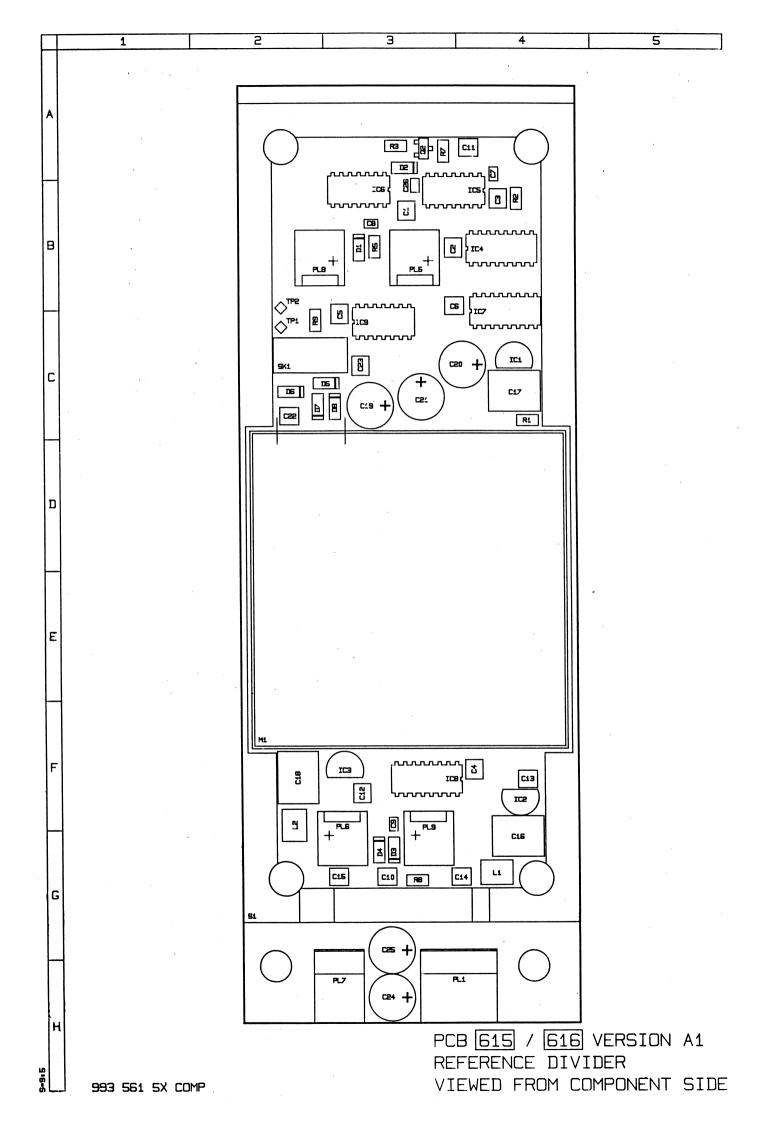
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6		- - 0.0 - 0.	+ 1 \(\(\(\) \(\) 5 \(\) \(\) \(\)	10\$								•						
Printed Circuit Board Complete 699	BC557B MPSA14		180 kohm 1 kohm	1.8 KOIIIII 1 nF														
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printed circ	Q1 Q2	R1 R2,4	R3 R5 R6-13	R14-21 C1-2					,									
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107 561 41	850 740 04 857 416 10		840 055 70 840 054 70	830 414 80	310	218 410	500 533 00 500 447 00	099		722	510	622 533 01 602 410 01	215	622 457 01	740 133 01	383 570 31	750 001 45 750 001 46	
			-		MF	car. MF	MF	נים	N150	Tan.	Polyes.	Polyes.	N150	Polyes.				
					1/8W 1/8W	1/4W 1/8W	1/8W 1/8W	2 547	νς 2	25V	637	63V 63V	63V	63V				
614				•	. y y	U U	ស្ន	6 C	+20-1-00+ 2%-00-1-00-1-00-1-00-1-00-1-00-1-00-1-00	20%	108	20%	, , , ,	10%				
nted Circuit Board Complete 614	MC74HC00N MC74HC161N	LM78L12ACP LM78L05ACP	BC557B BC547B	1N4148	~ ~	180 ohm 10 kohm			100 nF	22 uF		0.33 uF		0.47 uF	33 nH	10.24 MHz	2 POL 2 POL	
	IC1,7 IC2,4.6	•	Q1 Q2	D1-4	R2-3,7 R4	R5 R6.9.11	R8 R10		C1, 2, 4	CS	C6,8	65	C11	C12-16	1.1	TCXO (0.4 ppm)	PL5,6,8,9 PL7	

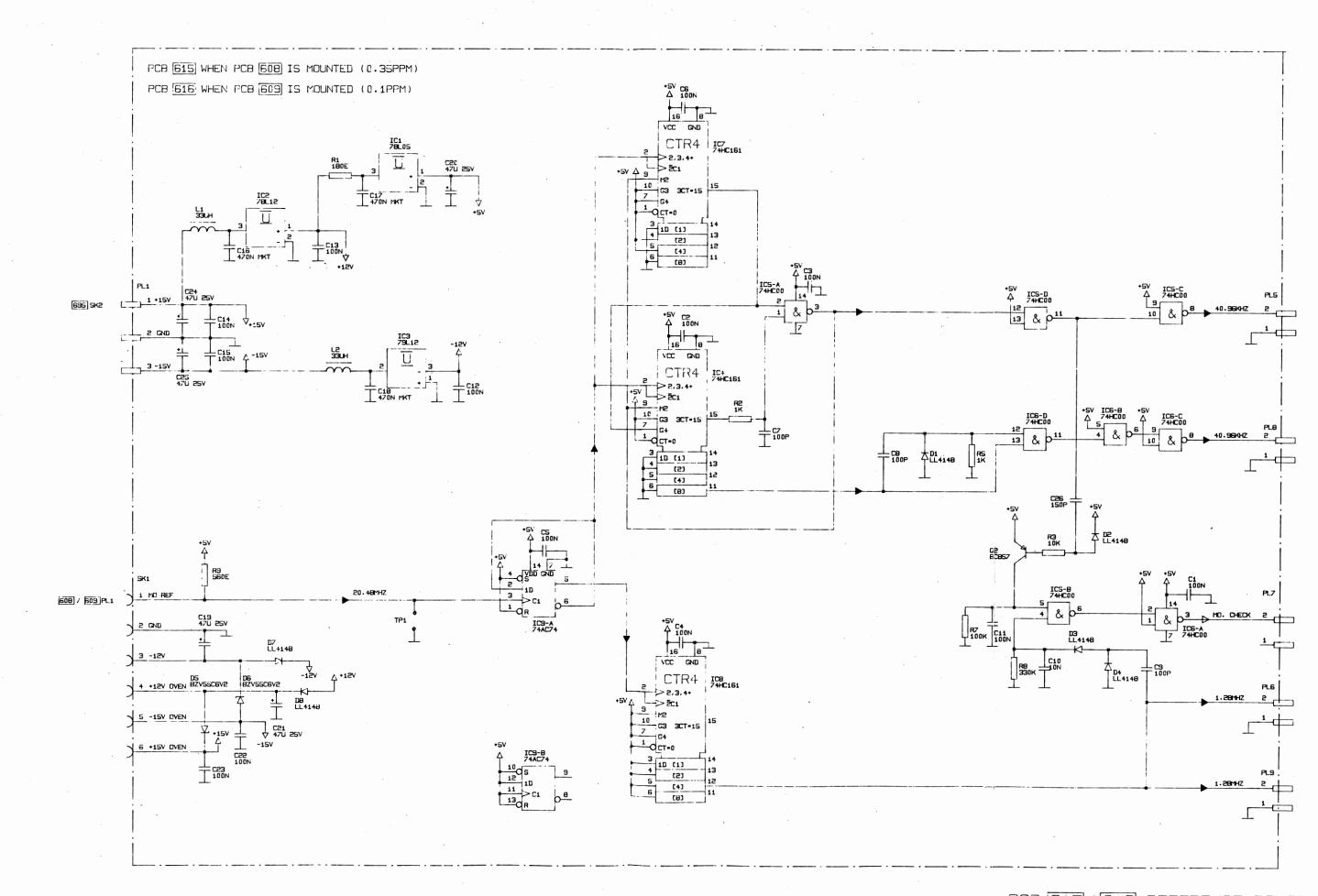


993 560 8X COMP

MASTER OSCILLATOR VIEWED FROM COMPONENT SIDE







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PARTS LIST FOR PCB 608 / 609 MASTER OSCILLATOR

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SMD RESISTOR 2K2 5%	SMD RESISTOR 120K 5%	SMD RESISTOR 1K0 5%	SMD RESISTOR 18K 5% SMD RESISTOR 680E 5%	SMD RESISTOR 27E 5%			SMD RESISTOR 150K 5% SMD RESISTOR 39K 5%		SMD RESISTOR 470E 5%	SMD RESISTOR 3E3 5%		SMD RESISTOR 100E 5% SMD RESISTOR 680K 5%	SMD RESISTOR 10K 5%	MOCHING COOK	I HANS BSV52 NPN 20V SO 123	DIODE SOD80 BZV55C15V ZENER	TRANS BSV52 NPN 20V SOT23	ZENEBDIODE I M329	CAP, DIODE BBY40	DARLINGTON TRANSISTOR TIP120 TRANSISTOR BC847	CRYSTAL SPEC.20.48000MHZ	
57002000	57004200	57001800	57003000 57007300	57000400	57005900	57004400	57003900 57003400	00000	57001500	57006700		57001000 57007600	57002800 58051000	00010200	84720600	83730500	84720600	83003290	83750100	84201200 84720000	38373551	
R11 B38	R12 814	R 113 R 15 R 37	R39 R17 R18	R2 R7 R25	R29	R24	R26 R27	R28	H31	H33	H34 H36	R4 R40	9 8 8	2 3	- 9 s	V10	75	\ \ \ \ \	5 > ;	c 6 ^ ^	Z1	
'n	13				-		- 2	8	က	•	-		· 	2	-	₩,	-	-	7			· -
PRINTED CIRCUIT BOARD COMPLETE	CAP SMD 1210 100NF 10% X7R				CAP SMD 1210 270P 2% NP0	TANTAL B 1.0UF	CERAMIC CAPACITOR 18PF CL1 CAP SMD 1210 1.0NF 2%	CAP SMD 0805 330P NP0	CAP SMD 1210 8.2NF 2%		CAP SMD 7.3X6 220NF TANTAL D 22UF 16V SMD	CAP SMD 0805 68PF CAP SMD 0805 18PF	CAP SMD 0805 220P NP0	SMD CHOKE-B 1.2UH 10%	SMD CHOKE-B 100UH 10%	SENSOR LM35CH		RIBBON CABLE PCB712/PCB713	SMD RESISTOR 3K9 5%			SMD RESISTOR 270E 5%
10761300	67101100				67008200	67700100	602xxxx 67003200	67006800	67007100		67102000 67700800	67006600 67004000	67006400	74100200	74101600	85000350	0000	37378501	57002300			57001400
PCB 608	ខន	05 08 015	C20 C21 C23	C24 C25 C27	SC C28	C13	C16	C18 C18 S	300	C12 C12	6,50 0,50 0,50 0,50 0,50 0,50 0,50 0,50	2 8	C2	55	3 9	Z Z	2 . 2 .	<u> </u>	æ 8	3	87. R16	R23

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PARTS LIST FOR PCB 615 / 616 REFERENCE DIVIDER

3POL PLUG W.FRICT LOCK		ZPOL MOLEX W.FRICTION LOCK TRANS SOT23 BC857B 45V	SMD RESISTOR 180E 5% SMD RESISTOR 1K0 5%	SMD RESISTOR 10K 5% SMD RESISTOR 100K 5% SMD RESISTOR 330K 5% SMD RESISTOR 560E 5%	6 POL MICRO MATCH								
75100177		75000146	. 57005400 57001800	57002800 57004100 57004400 57001600	75100162								
PL1	2 2 8 5 E	PL/ 02	£ 22 5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	SK1								
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PRINTED CIRCUIT BOARD COMPLETE	CAP SMD 1210 100NF 10% X7R			CAP SMD 1210 10NF 10%	MKT FILM CAPACITOR 470NF	CAPACITOR 47U 25V	CAP SMD 0805 150PF CAP SMD 0805 100PF	DIODE LL4148 GEN-PUR SOD80	DIODE SOD80 BZV55C6V2 ZENER	IC LM78L05 VOLTREG IC LM78L12 VOLTREG IC LM79L12 VOLTREG COUNTER, 4-BIT 74HC161T	QUAD 2-INPUT NAND 74HC00T	DUAL D-TYPE FLIP-FLOP 74AC74	SMD CHOKE-B 33UH 10%
10756151	67101100			67102200	62254701	65274702	67004900 67005500	83710000	83730800	85078052 85078121 85079121 85980700	85980000	85984200	74103400
PCB 615	2883	2	C12 C13 C13	C C C C C C C C C C C C C C C C C C C	C16 C17 C18	C C C C C C C C C C C C C C C C C C C	38 C 8 8	128468	000	5 <u>5555</u> 5	<u> </u>	<u> </u>	52