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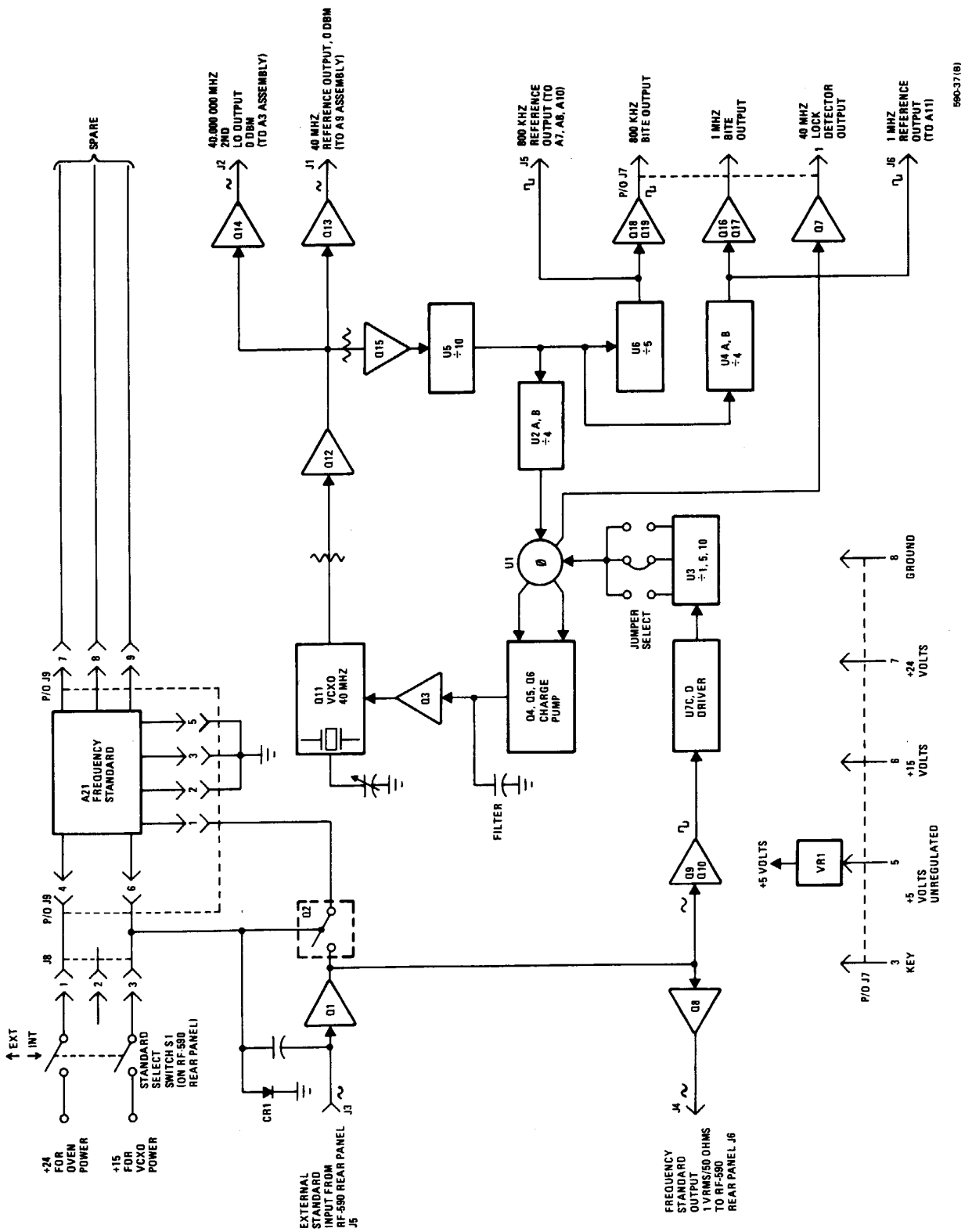

Reference Generator Assembly A12/Frequency Standard Assembly A21 Functional Block Diagram

1. GENERAL DESCRIPTION

Reference Generator Assembly A12 is a single phased locked loop synthesizer which locks to a highly stable frequency standard and derives the various reference frequencies required to accurately control the RF-590.

The frequency standard employed may be either an internal or external standard and may be a 1, 5, or 10 MHz source. (A jumper connection on the A12 assembly must be configured to allow for the frequency of the standard chosen.)

Frequency Standard Assembly A21 supplied with the radio is a self contained, sealed unit which plugs directly into the A12 assembly via a nine pin connector. The following stability options are available.

- ± 1 part in 10^6 per day, P/N 10073-6600, 5 MHz
- ± 1 part in 10^8 per day, P/N 0759-3906, 1 MHz

Since the reference frequencies supplied by the A12 assembly are derived from the frequency standard used, they will have the same accuracy and stability as the standard. The following reference outputs are provided by the A12 assembly for RF-590 operation.

- 40 MHz - to Second Converter Assembly A3, 0 dBm
- 40 MHz - to PLL IV Assembly A9, 0 dBm
- 1 MHz - to BFO Synthesizer Assembly A11, TTL
- 800 kHz - to PLL II Assembly A7, TTL
- 800 kHz - to PLL III Assembly A8, TTL
- 800 kHz - to PLL V Assembly A10, TTL

Additionally, the RF-590 rear panel contains BNC type connector J6 allowing access to the buffered frequency standard output of 1 Vrms/50 ohms. BNC connector J5 provides a 50 ohm input for an external 1 Vrms frequency standard. Rear panel switch S1 (INT/EXT standard select) chooses the standard to be used.

2. INTERFACE CONNECTIONS

Table 1 details the A12 input/output connections and other relevant data.

Table 1. Reference Generator A12 Interface Connection

Connector	Function	Characteristics
J1	Second LO Output	40 MHz, 0 dBm, 50 ohms
J2	40 MHz Reference	40 MHz, 0 dBm, 50 ohms
J3	External Standard Input	1 Vrms, 50 ohms
J4	Standard Output	1 Vrms, 50 ohms
J5	800 kHz Reference Output	TTL
J6	1 MHz Reference Output	TTL
J7-1	40 MHz Lock Detector Output	0 Vdc = PLL Locked
J7-2	1 MHz BITE Output	0 Vdc = 1 MHz ok
J7-3	Key	
J7-4	800 kHz BITE Output	0 Vdc = 800 kHz ok
J7-5	+5 Volts Unregulated	200 mA
J7-6	+15 Volts	30 mA
J7-7	+24 Volts	10 mA
J7-8	Ground	
J8-1	A21 XTAL Oven Power	+24 (draws 100 mA only when 1 x 10^{-8} ppm A21 option is chosen)
J8-2	Key	
J8-3	A21 TCXO Power	+15V, 100 mA
J9-1	Frequency Standard A21 Output	0.5 Vrms, 1, 5, or 10 MHz
J9-2	Gnd	
J9-3	Gnd	
J9-4	Same as J8-1	
J9-5	Gnd	

Table 1. Reference Generator A12 Interface Connection (Cont.)

Connector	Function	Characteristics
J9-6	Same as J8-3	
J9-7	Spare	
J9-8	Spare	
J9-9	Spare	

3. CIRCUIT DESCRIPTION

Voltage controlled crystal oscillator (VCXO) stage Q11 free runs at 40 MHz and provides all the outputs listed in section 1 after the required buffering and/or frequency division. The VCXO acquires its stability by providing a 1 MHz IF to one port of phase comparator U1 where phase comparison of the 1 MHz reference signal derived from the frequency standard occurs. Any difference in phase and/or frequency between these two signals produces an error signal by the phase comparator which causes the VCXO to tune in the direction which will reduce the error. In so doing, the VCXO frequency of 40 MHz acquires the stability and accuracy of the much lower frequency supplied by the frequency standard.

Note that many aspects of A12 operation are identical to the PLL description supplied in section 4 of this manual.

3.1 Frequency Standard Assembly A21

The frequency standard supplied with the RF-590 is a self contained, sealed unit and plugs directly into A12 connector J9. The following stability options are available.

- ± 1 part in 10^6 per day, P/N 10073-6600, 5 MHz
- ± 1 part in 10^8 per day, P/N 0759-3906, 1 MHz

The 1 x 10^{-8} ppm option is referred to as the high stability option, and it uses a crystal oven for greater temperature stability.

3.2 PLL Reference Generation

Phase comparator U1 obtains a 1.000000 MHz reference signal derived from either an internal or an external frequency standard whose frequency may be 1, 5, or 10 MHz. RF-590 rear panel INT/EXT standard select switch S1 chooses the desired source.

3.2.1 Internal Standard Select

When the standard select switch is in the INT position, +24 volts and +15 volts are applied via J8 and J9 to Frequency Standard Assembly A21. (The +24 volt line draws no current unless the 1 x 10^{-8} ppm A21 option is employed. It feeds a spare pin on the 1 x 10^{-6} ppm.)

The +15 volts power the A21 TCXO, and causes a 0.5 Vrms signal at the A21 frequency to appear at J9 (pin 1) RF output. This signal is applied to switch Q2, which is biased on by the +15 volts. This allows the internal standard signal to pass. Simultaneously, the +15 volts biases PIN diode CR1 on, which provides a low impedance path to ground for any signals that might be at the J3 external standard input. The signal present at the Q1-Q2 output is applied via buffer Q8 through J4 to the RF-590 rear panel at a 1 Vrms/50 ohm level. It is also applied to limiter stage Q9-Q10 where it is converted to a TTL level to driver U7. U7 in turn drives divide by 1, 5, or 10 counter U3 which produces a constant 1 MHz reference output to U1. The actual divisor ratio depends upon the choice of frequency standard chosen, and is determined by the locations of a jumper wire on the A12 assembly at the U3 output. This jumper is normally factory set.

3.2.2 External Standard Select

When the standard select is in the EXT position, the +24 and +15 volts are removed from the A21 assembly turning it off. Simultaneously, +15 volts is removed from Q2 and CR1 turning them both off. Since the low impedance path to ground caused by CR1 is now a high impedance, signals at J3 from an external standard may pass unattenuated through Q1.

3.3 Phase Comparison Circuits

Phase comparator U1 compares the frequency standard derived 1 MHz reference signal to a VCO derived 1 MHz IF signal. When these two signals are equal in frequency and phase, U1 outputs at TP1 and TP2 are essentially 5 Vdc. This holds all transistors in the carge pump circuit (Q4, Q5, Q6) off. The dc voltage across C16 is constant, Q3 is conducting, and the control voltage developed across R13 at TP1 is constant. This holds the VCO frequency constant and equal to a multiple of the frequency standard.

Assume that the VCO frequency decreases due to temperature variations. This causes the 1 MHz IF frequency to decrease. Comparison at U1, pins 1 and 3, cause TP2 to pulse low, and in so doing, turn on Q6 since the Q6 base-emitter circuit is now forward biased. (Q5 remains off.) Q6 collector voltage drops and forward biases the Q4 base-emitter junction turning Q4 on. Q4 now starts driving charge into C16 raising the C16 potential. This in turn causes Q3 to conduct harder, and the control voltage developed across R13 at TP1 increases. As the control voltage increases, the VCO frequency increases until the IF frequency is again equal to the reference frequency at the U1 inputs. At this point, TP2 switches to +5 Vdc and equilibrium is obtained. C16 holds this higher dc level to maintain the new higher VCO frequency.

Assume that the VCO frequency increases. This causes the 1 MHz IF frequency to decrease. Comparison at U1, pins 1 and 3, cause TP3 to pulse low, and in so doing, bias Q5 into conduction. (Q6 and Q4 remain off.) C16 now has a low impedance discharge path and charge is drawn out. This drops its voltage. This causes Q3 to conduct less and less control voltage is developed across R13. As this voltage decreases, the VCO frequency decreases until the inputs at U1 are again equal in frequency/phase. At this point, TP3 switches to +5 Vdc and equilibrium is obtained. C16 holds this lower dc level to maintain the new lower VCO frequency.

3.4 VCXO Operation and Control

A charge pump circuit consisting of Q4, Q5, and Q6 in conjunction with filter network C16, C17, and R14 converts the two phase comparator outputs into an analog dc control voltage. Buffer amplifier Q3 applies this control voltage to varactor diodes CR7 and CR8 in the VCXO. As the capacitance of these diodes

change due to control voltage fluctuations, JFET oscillator stage Q11 shifts in frequency. This stage is crystal controlled by Y1 and operates at a nominal frequency of 40.000000 MHz. VCXO output passes through amplifier stages Q12, Q15, and onto divide by 10 counter U5. The 4 MHz from U5 is applied to divide by 4 counter U2 which applies a 1 MHz signal to the second port of phase comparator U1 to complete the feedback loop.

3.5 A12 Reference Generator Outputs

The 40.000000 MHz from amplifier stage Q12 is amplified to 0 dBm by Q13 and applied through J1 to Second Converter Assembly A3 mixer U1 where it functions as a second local oscillator (LO) for the receiver.

Q12 also feeds amplifier stage Q14 which routes a 40.000000 MHz, 0 dBm signal to PLL IV Assembly A9 mixer U1 as an LO injection.

The 4 MHz from divider U5 is applied to divide by 5 counter U6. U6 TTL output at 800 kHz is fed through J5 to function as a reference signal for phase comparators on the A7, A8, and A10 assemblies. U5 also feeds 4 MHz to divide by 4 counter U4. U4 TTL output at 1 MHz is fed through U6 to function as a reference signal for beat frequency oscillator (BFO) Assembly A11.

3.6 BITE Circuits

Q7 monitors the phase comparator (U1) outputs. If either output goes low and remains low for a period of time exceeding the time constant of R19-C19, one of the two diodes (CR5 or CR6) will conduct. This turns Q7 on and develops a +5 Vdc level indicating on out of lock condition. This immediately flags the BITE monitoring circuits on Control Assembly A14 to display a front panel fault light indicator.

The 800 kHz TTL signals from U6 feed detector stage Q18/Q19 and 1 MHz TTL signals from U4B feed detector stage Q16/Q17. Both these detectors will provide a 0 Vdc level when the 800 kHz and 1 MHz reference signals are present and a +5 Vdc level when they are not. These two signals are checked only when the receiver BITE self-test is actuated.

4. MAINTENANCE

The following adjustments should not be performed as a routine maintenance procedure, but only when a failure indicates a definite need. All tests are performed with all connections in normal contact unless otherwise specified.

4.1 40 MHz Outputs Adjustment

Perform the following procedure to adjust the 40 MHz outputs.

a. Connect equipment as shown in figure 1.

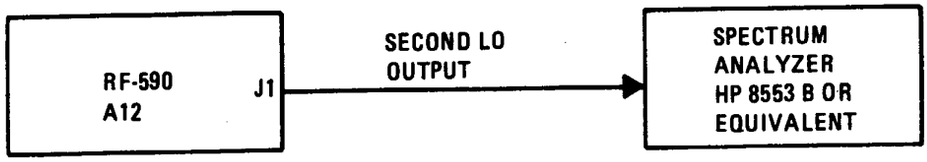

Figure 1. 40 MHz Outputs Adjustment

b. Set receiver controls to the following:

- Frequency to 10.000000 MHz
- Mode to USB
- INT/EXT Standard to INT

c. Monitoring J1, adjust T3 and then T4 for a peak indication at 40 MHz. (Approximately 0 dBm).

d. Monitor J2 and adjust T5 for a peak indication at 40 MHz. (Approximately 0 dBm). Test is complete. Reconnect J1 and J2.

4.2 A21 Frequency Standard Adjustment

Perform the following procedure to adjust the A21 frequency standard.

a. Connect equipment as shown in figure 2. Set receiver INT/EXT Standard switch to INT.

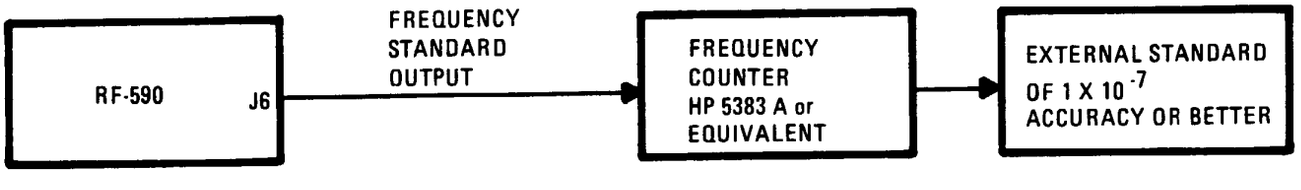

Figure 2. A21 Frequency Standard Adjustment

NOTE

The receiver should be on for at least 15 minutes prior to this alignment.

b. Remove the screw on top of the A21 assembly to gain access to the frequency adjustment. Adjust this control (using a JFD-type nonmetallic alignment tool) to the frequency stamped on top of the assembly. (The accuracy of this setting is crucial to the VCO adjustment so perform this test carefully.)

c. Test is complete. Replace screw in A21 assembly.

4.3 VCO Adjustment

Perform the following procedure to adjust the VCO.

a. Make sure that the INT/EXT Standard switch is in the INT position and that the A21 frequency standard is properly adjusted on frequency.

b. Monitor TP1 with a digital voltmeter. Adjust C36 for 7.4 Vdc. Test is complete.

5. PARTS LIST

Table 2 is a comprehensive parts list of all replaceable components in Reference Generator Assembly A12. When ordering parts from the factory, include a full description of the part. Use figure 3, Reference Generator Assembly A12 Component Location Diagram to identify parts.

6. SCHEMATIC DIAGRAM

Figure 4 is the Reference Generator Assembly A12 schematic diagram.

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700)

Ref. Desig.	Part Number	Description
	10073-4700	PWB
	E70-0001-002	INSL BEO TO-5 X.030 THK
C1	M39014/02-1320	CAP .47UF 10% 50V CER-R
C2	M39014/02-1320	CAP .47UF 10% 50V CER-R
C3	M39014/02-1310	CAP .1UF 10% 100V CER-R
C4	C26-0025-339	CAP 3.3UF 20% 25V TANT
C5	M39014/02-1310	CAP .1UF 10% 100V CER-R
C6	C26-0025-339	CAP 3.3UF 20% 25V TANT
C7	M39014/02-1310	CAP .1UF 10% 100V CER-R
C8	C26-0025-339	CAP 3.3UF 20% 25V TANT
C9	M39014/01-1535	CAP .01UF 20% 100V CER
C10	M39014/02-1310	CAP .1UF 10% 100V CER-R

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700) (Cont.)

Ref. Desig.	Part Number	Description
C11	M39014/02-1310	CAP .1UF 10% 100V CER-R
C12	M39014/02-1310	CAP .1UF 10% 100V CER-R
C13	C26-0035-100	CAP 10UF 20% 35V TANT
C14	M39014/02-1310	CAP .1UF 10% 100V CER-R
C15	C26-0025-470	CAP 47UF 20% 25V TANT
C16	C26-0025-339	CAP 3.3UF 20% 25V TANT
C17	M39014/02-1310	CAP .1UF 10% 100V CER-R
C18	M39014/02-1310	CAP .1UF 10% 100V CER-R
C19	C25-0001-301	CAP 1.0UF 20% 20V TANT
C20	C26-0025-339	CAP 3.3UF 20% 25V TANT
C21	M39014/02-1310	CAP .1UF 10% 100V CER-R
C22	M39014/02-1310	CAP .1UF 10% 100V CER-R
C23	M39014/02-1310	CAP .1UF 10% 100V CER-R
C24	M39014/02-1310	CAP .1UF 10% 100V CER-R
C25	M39014/02-1310	CAP .1UF 10% 100V CER-R
C26	M39014/02-1310	CAP .1UF 10% 100V CER-R
C27	M39014/02-1310	CAP .1UF 10% 100V CER-R
C28	M39014/02-1310	CAP .1UF 10% 100V CER-R
C29	M39014/02-1310	CAP .1UF 10% 100V CER-R
C30	CK05BX102M	CAP 1000PF 20% 200V CER
C31	CK05BX102M	CAP 1000PF 20% 200V CER
C32	M39014/02-1310	CAP .1UF 10% 100V CER-R
C33	C26-0025-680	CAP 68UF 20% 25V TANT
C34	M39014/01-1535	CAP .01UF 20% 100V CER
C35	CM04CD150J03	CAP 15PF 5% 500V MICA
C36	C85-0001-002	CAP 1.0-10PF 250V
C37	M39014/01-1535	CAP .01UF 20% 100V CER
C38	M39014/01-1535	CAP .01UF 20% 100V CER
C39	CM04ED470J03	CAP 47PF 5% 500V MICA
C40	M39014/01-1535	CAP .01UF 20% 100V CER
C41	M39014/02-1310	CAP .1UF 10% 100V CER-R
C42	M39014/01-1535	CAP .01UF 20% 100V CER
C43	M39014/02-1310	CAP .1UF 10% 100V CER-R
C44	M39014/01-1535	CAP .01UF 20% 100V CER
C45	CM04ED560J03	CAP 56PF 5% 500V MICA
C46	M39014/01-1535	CAP .01UF 20% 100V CER
C47	M39014/01-1535	CAP .01UF 20% 100V CER
C48	M39014/01-1535	CAP .01UF 20% 100V CER
C49	M39014/01-1535	CAP .01UF 20% 100V CER
C50	M39014/02-1310	CAP .1UF 10% 100V CER-R
C51	M39014/01-1535	CAP .01UF 20% 100V CER
C52	CM04ED560J03	CAP 56PF 5% 500V MICA
C53	M39014/01-1535	CAP .01UF 20% 100V CER
C54	M39014/01-1535	CAP .01UF 20% 100V CER
C55	M39014/02-1310	CAP .1UF 10% 100V CER-R

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700) (Cont.)

Ref. Desig.	Part Number	Description
C56	M39014/01-1535	CAP .01UF 20% 100V CER
C57	M39014/01-1535	CAP .01UF 20% 100V CER
C58	M39014/01-1535	CAP .01UF 20% 100V CER
C59	M39014/02-1310	CAP .1UF 10% 100V CER-R
C60	M39014/02-1310	CAP .1UF 10% 100V CER-R
C61	M39014/02-1310	CAP .1UF 10% 100V CER-R
C62	M39014/02-1310	CAP .1UF 10% 100V CER-R
C63	M39014/02-1310	CAP .1UF 10% 100V CER-R
C64	M39014/02-1310	CAP .1UF 10% 100V CER-R
C65	C26-0016-151	CAP 150UF 20% 16V TANT
C66	M39014/02-1310	CAP .1UF 10% 100V CER-R
C67	M39014/02-1310	CAP .1UF 10% 100V CER-R
C68	C26-0025-100	CAP 10UF 20% 25V TANT
C69	M39014/02-1310	CAP .1UF 10% 100V CER-R
C70	M39014/02-1310	CAP .1UF 10% 100V CER-R
C71	C26-0050-100	CAP 10UF 20% 50V TANT
C72	M39014/02-1310	CAP .1UF 10% 100V CER-R
C73	M39014/02-1310	CAP .1UF 10% 100V CER-R
C74	C26-0025-470	CAP 47UF 20% 25V TANT
C75	M39014/02-1310	CAP .1UF 10% 100V CER-R
C76	CK05BX102M	CAP 1000PF 20% 200V CER
C77	M39014/01-1535	CAP .01UF 20% 100V CER
C78	M39014/02-1310	CAP .1UF 10% 100V CER-R
C79	CK05BX102M	CAP 1000PF 20% 200V CER
C80	M39014/01-1535	CAP .01UF 20% 100V CER
C81	M39014/01-1535	CAP .01UF 20% 100V CER
C82	M39014/02-1310	CAP .1UF 10% 100V CER-R
C83	M39014/02-1310	CAP .1UF 10% 100V CER-R
C84	M39014/01-1535	CAP .01UF 20% 100V CER
C85	M39014/01-1535	CAP .01UF 20% 100V CER
C86	M39014/01-1535	CAP .01UF 20% 100V CER
C87	10121-4720	CAP, TEMP COMP, 10
CR1	D12-0007-001	DIODE 1W 75V PIN SW
CR2	1N3064	DIODE 75mA 75V SW
CR3	1N3064	DIODE 75mA 75V SW
CR4	1N3064	DIODE 75mA 75V SW
CR5	1N3064	DIODE 75mA 75V SW
CR6	1N3064	DIODE 75mA 75V SW
CR7	10073-7118	DIODE, SILICON, HYPERABRUPT
CR8	10073-7118	DIODE, SILICON, HYPERABRUPT
CR9	1N3064	DIODE 75mA 75V SW
CR10	1N3064	DIODE 75mA 75V SW
J1	J-0031	CONN SMB VERT PCB F
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700) (Cont.)

Ref. Desig.	Part Number	Description
J4	J-0031	CONN SMB VERT PCB F
J5	J-0031	CONN SMB VERT PCB F
J6	J-0031	CONN SMB VERT PCB F
J7	J46-0032-008	HDR 8 PIN 0.100" SR
J8	J46-0022-003	HDR 3 PIN, SINGLE
J9	10073-7045	CONNECTOR, 9 PIN
J10	J-0031	CONNECTOR SMB VERT PCB F
L1	MS75085-7	COIL 100UH 10% FXD RF
L2	MS75085-7	COIL 100UH 10% FXD RF
L3	MS75084-12	COIL 10UH 10% FXD RF
L4	MS75083-9	COIL .56UH 10% FXD RF
L5	MS75084-12	COIL 10UH 10% FXD RF
L6	MS75084-5	COIL 2.7UH 10% FXD RF
L7	MS75084-12	COIL 10UH 10% FXD RF
L8	MS75084-12	COIL 10UH 10% FXD RF
L9	MS75085-7	COIL 100UH 10% FXD RF
L10	MS75084-12	COIL 10UH 10% FXD RF
L11	L08-0001-001	CHOKE W B 50 MHZ
L12	L08-0001-001	CHOKE W B 50 MHZ
L13	L08-0001-001	CHOKE W B 50 MHZ
L14	MS75084-3	COIL 1.8UH 10% FXD RF
Q1	2N3227	XSTR SS/GP NPN TO-18
Q2	2N3227	XSTR SS/GP NPN TO-18
Q3	Q05-0001-000	XSTR JFET N-CH
Q4	2N2907	XSTR SS/GP PNP TO-18
Q5	2N2222	XSTR SS/GP NPN TO-18
Q6	2N2222	XSTR SS/GP NPN TO-18
Q7	2N2907	XSTR SS/GP PNP TO-18
Q8	2N3866	XSTR SS/RF NPN TO-39
Q9	Q-0153	XSTR SS/RF PN4258
Q10	2N2369	XSTR SS/RF NPN
Q11	Q35-0003-000	XSTR U310 JFET HIGH GM
Q12	Q35-0003-000	XSTR U310 JFET HIGH GM
Q13	Q35-0003-000	XSTR U310 JFET HIGH GM
Q14	Q35-0003-000	XSTR U310 JFET HIGH GM
Q15	Q35-0003-000	XSTR U310 JFET HIGH GM
Q16	2N2907	XSTR SS/GP PNP TO-18
Q17	2N2222	XSTR SS/GP NPN TO-18
Q18	2N2907	XSTR SS/GP PNP TO-18
Q19	2N2222	XSTR SS/GP NPN TO-18
R1	R65-0003-471	RES 470 5% 1/4W CAR FILM
R2	R65-0003-471	RES 470 5% 1/4W CAR FILM
R3	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R4	R65-0003-101	RES 100 5% 1/4W CAR FILM
R5	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R6	R65-0003-620	RES 62 5% 1/4W CAR FILM

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700) (Cont.)

Ref. Desig.	Part Number	Description
R7	R65-0003-561	RES 560 5% 1/4W CAR FILM
R8	R65-0003-152	RES 1.5K 5% 1/4W CAR FILM
R9	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R10	RN55D6810F	RES,681.0 1% 1/8W MET FLM
R11	R65-0003-101	RES 100 5% 1/4W CAR FILM
R12	RN55D6810F	RES,681.0 1% 1/8W MET FLM
R13	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R14	RN55D2211F	RES,2210 1% 1/8W MET FLM
R15	RN55D6810F	RES,681.0 1% 1/8W MET FLM
R16	RN55D2002F	RES,20.0K 1% 1/8W MET FLM
R17	RN55D3321F	RES,3320 1% 1/8W MET FLM
R18	RN55D6810F	RES,681.0 1% 1/8W MET FLM
R19	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R20	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R21	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R22	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R23	R65-0003-100	RES 10 5% 1/4W CAR FILM
R24	R65-0003-201	RES 200 5% 1/4W CAR FILM
R25	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R26	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R27	R65-0003-180	RES 18 5% 1/4W CAR FILM
R28	R65-0003-470	RES 47 5% 1/4W CAR FILM
R29	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R30	R65-0003-562	RES 5.6K 5% 1/4W CAR FILM
R31	R65-0003-241	RES 240 5% 1/4W CAR FILM
R32	R65-0003-270	RES 27 5% 1/4W CAR FILM
R33	R65-0003-331	RES 330 5% 1/4W CAR FILM
R34	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R35	R65-0003-391	RES 390 5% 1/4W CAR FILM
R36	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R37	R65-0003-201	RES 200 5% 1/4W CAR FILM
R38	R65-0003-201	RES 200 5% 1/4W CAR FILM
R39	R65-0003-101	RES 100 5% 1/4W CAR FILM
R40	R65-0003-201	RES 200 5% 1/4W CAR FILM
R42	R65-0003-101	RES 100 5% 1/4W CAR FILM
R44	R65-0003-201	RES 200 5% 1/4W CAR FILM
R45	R65-0003-751	RES 750 5% 1/4W CAR FILM
R46	R65-0003-751	RES 750 5% 1/4W CAR FILM
R47	R65-0003-201	RES 200 5% 1/4W CAR FILM
R49	R65-0003-101	RES 100 5% 1/4W CAR FILM
R50	R65-0003-201	RES 200 5% 1/4W CAR FILM
R51	R65-0003-101	RES 100 5% 1/4W CAR FILM
R52	R65-0003-101	RES 100 5% 1/4W CAR FILM
R53	R65-0003-201	RES 200 5% 1/4W CAR FILM
R54	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM

Table 2. Reference Generator Assembly A12 Parts List (PL 10073-4700) (Cont.)

Ref. Desig.	Part Number	Description
R55	R65-0003-510	RES 51 5% 1/4W CAR FILM
R56	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R57	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R58	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R59	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R60	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R61	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R62	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R63	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R64	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R65	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R66	R65-0003-224	RES 220K 5% 1/4W CAR FILM
T1	10073-7006	TRANSFORMER, RF, FIXED
T2	10073-7007	TRANSFORMER, RF, FIXED
T3	10073-7009	TRANSFORMER, RF, VARIABLE
T4	10073-7009	TRANSFORMER, RF, VARIABLE
T5	10073-7009	TRANSFORMER, RF, VARIABLE
TP1	J-0071	TP PWB BRN TOP ACCS .080"
TP2	J-0066	TP PWB RED TOP ACCS .080"
TP3	J-0069	TP PWB ORN TOP ACCS .080"
TP4	J-0070	TP PWB YEL TOP ACCS .080"
TP5	J-0068	TP PWB GRN TOP ACCS .080"
U1	IC-0430	IC MC4044 CERAMIC CMOS
U2	I05-0000-074	IC 74LS74 PLASTIC TTL
U3	I05-0000-090	IC 74LS90 PLASTIC TTL
U4	I05-0000-074	IC 74LS74 PLASTIC TTL
U5	I65-0004-001	IC 12013 PLASTIC ECL
U6	I05-0000-090	IC 74LS90 PLASTIC TTL
U7	I05-0000-000	IC 74LS00 PLASTIC TTL
VR1	I11-0001-001	IC VR 7805 + 5V 1.5A 4%
Y1	10073-4720	CRYSTAL, 40 MHZ

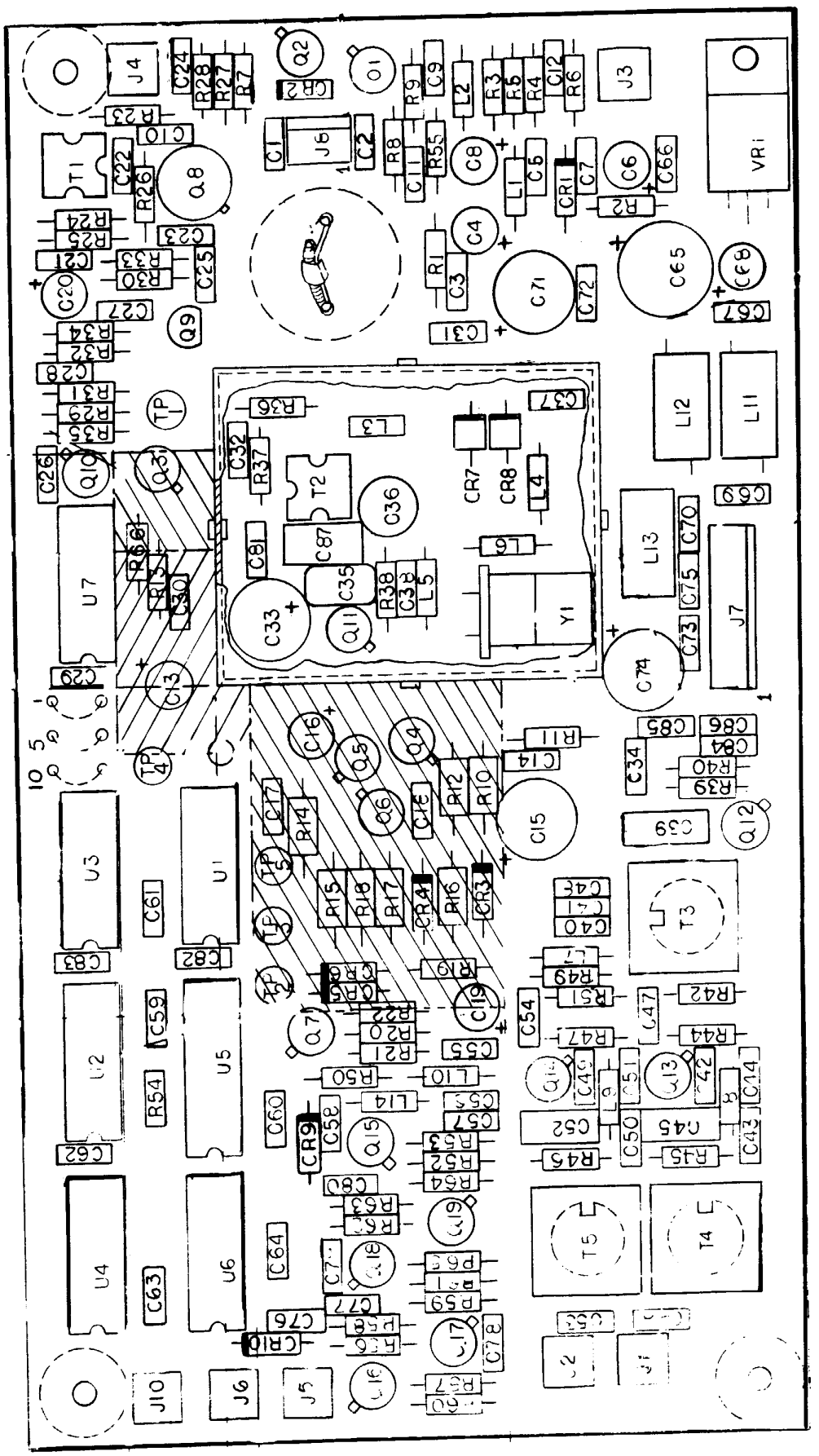

Figure 3. Reference Generator Assembly A12 Component Location Diagram (10073-4700, Rev. E)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
5. OPTIONAL JUMPERING REQUIRED:
   CONNECT 1 TO 2 WHEN USING 1MHZ STANDARD.
   CONNECT 3 TO 4 WHEN USING 5MHZ STANDARD.
   CONNECT 5 TO 6 WHEN USING 10MHZ STANDARD.
6. ALL INDUCTOR VALUES ARE IN MICROHENRIES.

UNUSED GATES	PT. NO.
U7A, U7B	74LS00

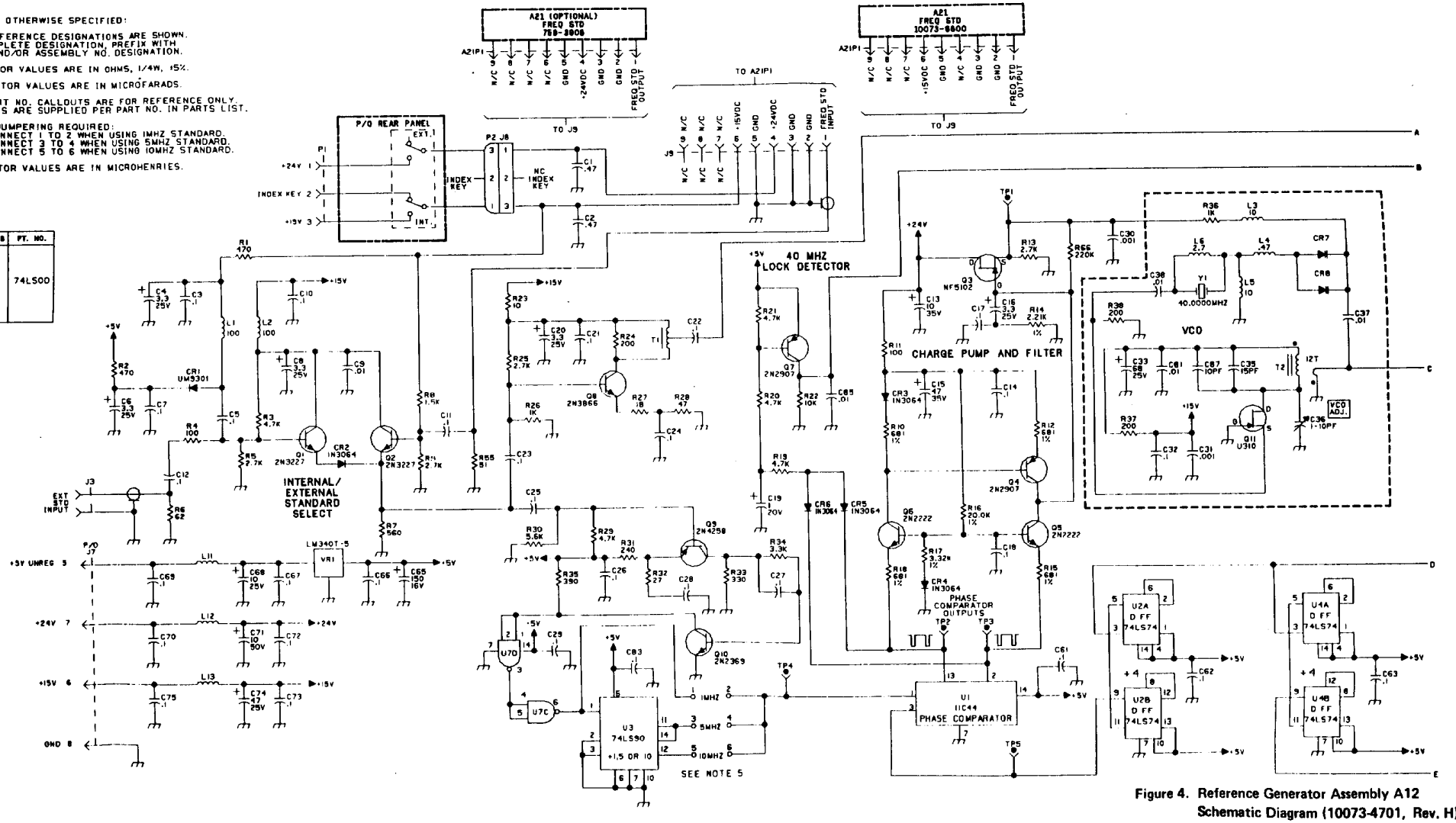

Figure 4. Reference Generator Assembly A12 Schematic Diagram (10073-4701, Rev. H) (Sheet 1 of 2)

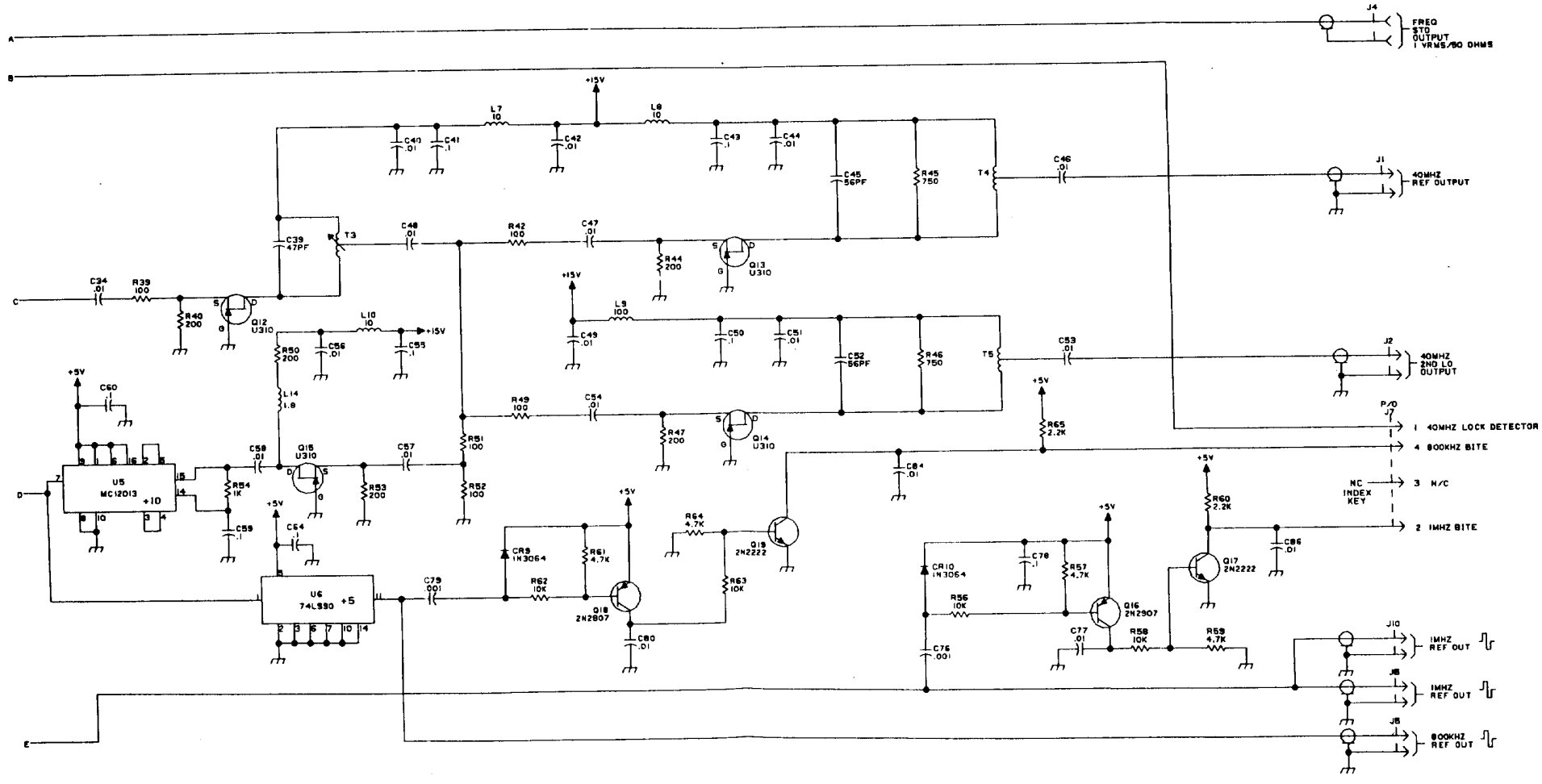

Figure 4. Reference Generator Assembly A12 Schematic Diagram (10073-4701, Rev. H) (Sheet 2 of 2)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, ±5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
5. OPTIONAL JUMPERING REQUIRED:
   CONNECT 1 TO 2 WHEN USING 1MHZ STANDARD.
   CONNECT 3 TO 4 WHEN USING 5MHZ STANDARD.
   CONNECT 5 TO 6 WHEN USING 10MHZ STANDARD.
6. ALL INDUCTOR VALUES ARE IN MICROHENRIES.

UNUSED GATES	PT. NO.
U7A, U7B	74LS00