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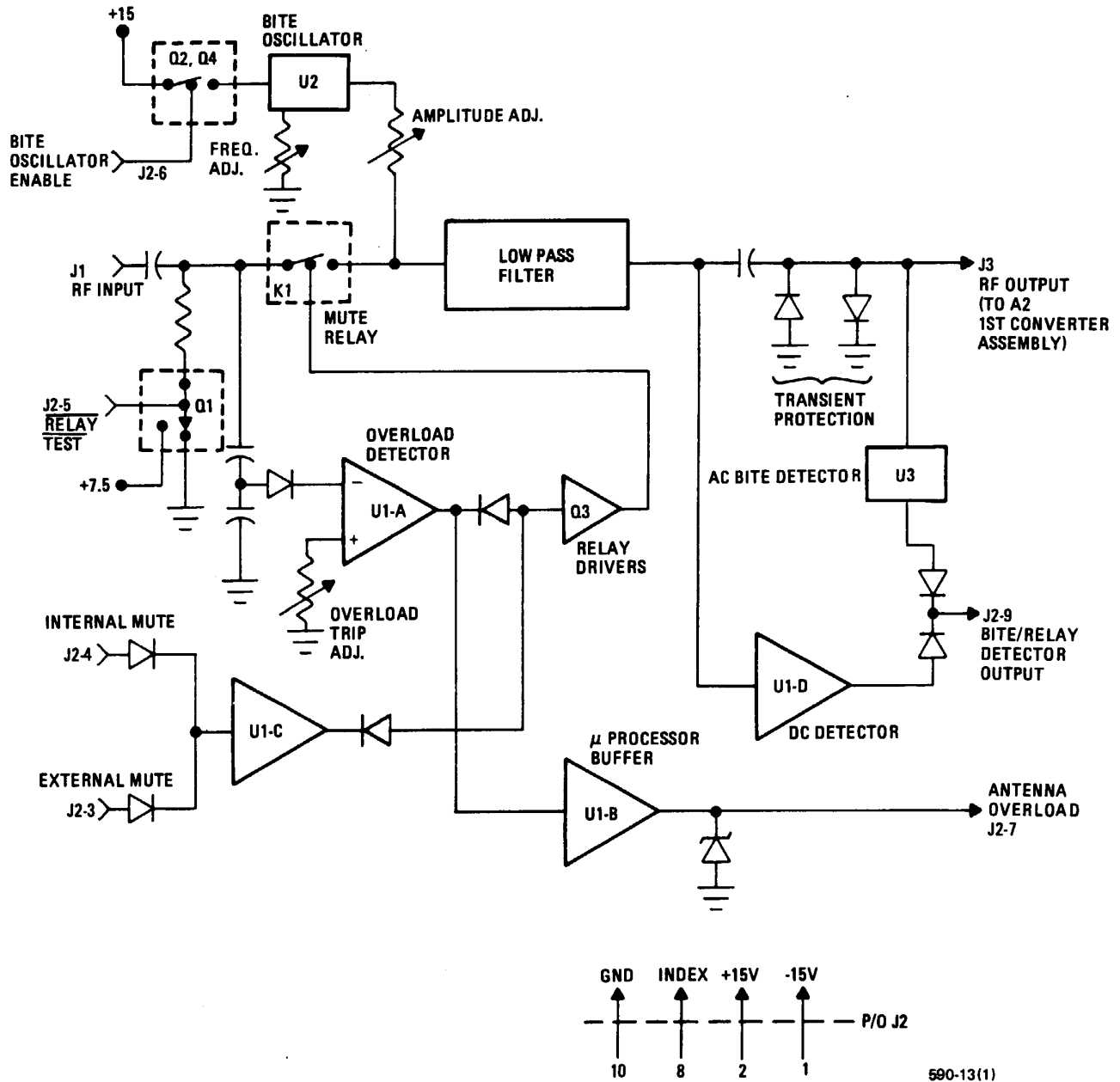
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Input Filter Assembly A1 Functional Block Diagram

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## 1. GENERAL DESCRIPTION

Input Filter Assembly A1 performs two primary functions:

- a. RF signal filtering above the desired receiver input range of 10 kHz to 30 MHz. Specifically, the first IF signal at 40.455 MHz, and the image band at 80.920 to 110.910 MHz.
- b. Protection from high level input signals (1.5 to 70 Vrms) which could damage receiver front end circuits.

Additionally, BITE signal generation, A1 BITE detection, and receiver muting also occur on the A1 Assembly.

RF input signals arrive at J1 from rear panel connector J1, Antenna Input. RF output signals feed from J3 to First Converter Assembly A2. Total module gain from input to output is nominally 0 dB.

## 2. INTERFACE CONNECTIONS

Table 1 details the various input/output connections and any relevant data.

**Table 1. A1 Input Filter Assembly Interface Connections**

Connector	Function	Characteristics
J1	RF INPUT	10 kHz - 30 MHz, $Z_o = 50$ ohms
J2-1	Power	-15 Vdc at 20 mA
J2-2	Power	+15 Vdc at 200 mA
J2-3	External Mute	Same as Internal Mute
J2-4	Internal Mute	+5 Vdc = relay contacts open, 0 Vdc = relay contacts closed
J2-5	Relay Test	Relay Test Line, 0 Vdc = +7.5 Vdc applied to K1 contacts +5 Vdc = 0 Vdc applied to K1 contacts
J2-6	Bite Oscillator Enable	Bite Oscillator Enable Line, +5 Vdc = oscillator on 0 Vdc = oscillator off
J2-7	Antenna Overload Output	3.5 Vdc output for 1.5 - 70 Vrms input
J2-8	Index	
J2-9	BITE Detector Output	BITE signal test: 2.5 Vdc nominally for ac or dc BITE tests
J2-10	GND	
J3	RF Output	10 kHz - 30 MHz, $Z_o = 50$ ohms

### 3. CIRCUIT DESCRIPTION

#### 3.1 Low Pass Filter (LPF) Circuit

The LPF was designed for a passband of 10 kHz to 30 MHz, a total insertion loss of less than 1/2 dB (nominally), and an SWR of 1.1:1.

The LPF image rejection desired of > 100 dB is required since the RF-590 image band of 80.920 MHz to 110.910 MHz encompasses U.S. TV channels 5, 6, and the FM band. To accomplish this, a ninth order Elliptic function filter is cascaded with a fifth order Chebishev function filter. The first null of the Elliptic filter was chosen at the first IF (40.455 MHz), and the Chebishev filter is used to flatten out the stop band characteristics of the Elliptic filter. See figure 1 for a typical A1 LPF characteristic. The -3 dB cutoff frequency is approximately 31.5 MHz.

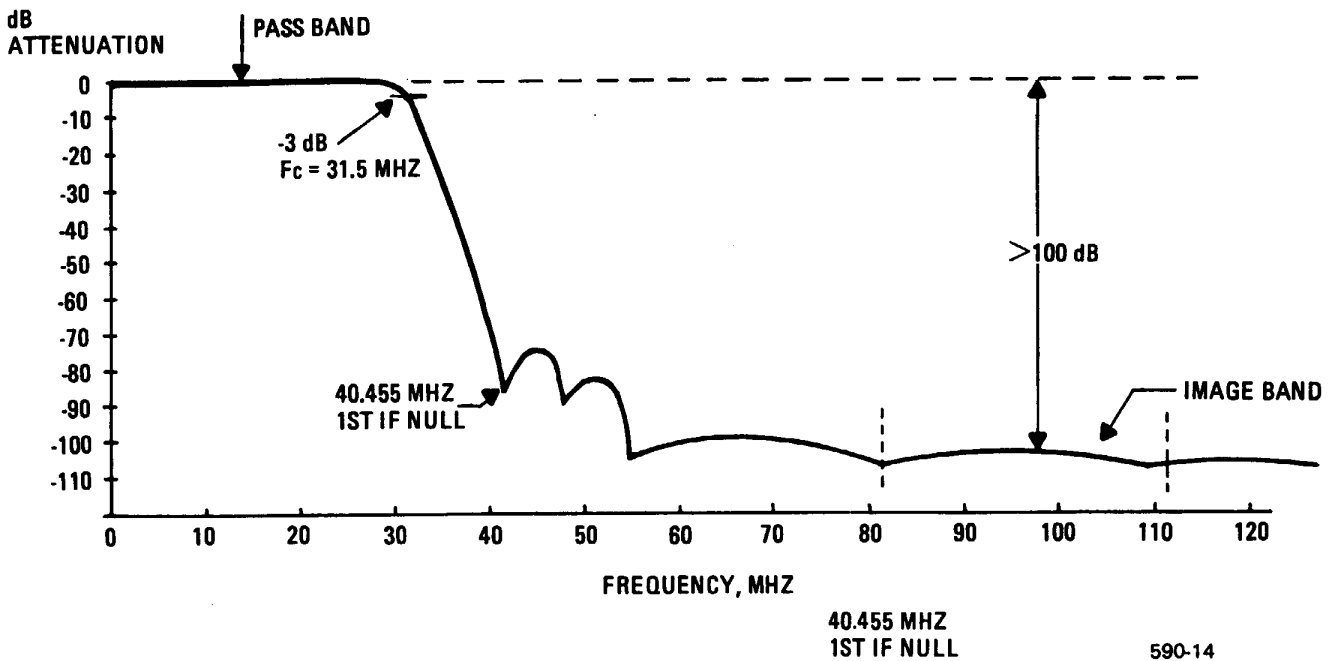


Figure 1. Typical A1 LPF Characteristic

#### 3.2 Protection Circuits

Two protection circuits are employed on the A1 assembly and respond to the two possible types of overload conditions: transient and steady state.

##### 3.2.1 Transient Protection

Upon initial application of an overload condition, a transient signal may pass through the LPF before relay K1 can deenergize. This transient is clamped at a maximum level of 8 Vpp by CR1-CR4 and CR24-CR27 before leaving the assembly. This allows temporary protection until the relay control circuits can activate

in the presence of a steady state signal. Also, certain types of overloads are basically transient in nature, and it may not be desirable to disturb the signal path by deenergizing K1.

### 3.2.2 Steady State Protection

Under no RF input conditions at J1, CR5-CR8, R40, and CR9-CR12, R5 bias U1A (-) input to nominally 0 Vdc. This value is less than the positive potential set by R7, Overload Adjust, at U1A (+), so U1A output at pin 8 will be high (+15 Vdc). Consequently, CR14 is reverse biased, and R10 supplies base current to Q3, turning Q3 and relay K1 on.

When an RF signal is received at J1, a portion is tapped off by voltage divider network C3-C9 and detected by the diode string CR5-CR12. This raises the potential at U1A (-). When this level exceeds the trip point set by R7 (corresponding to approximately 1.5 Vrms ac at J1), U1A output swings low (-15 Vdc) and forward biases CR14. This removes base drive to Q3. Q3 turns off and the relay deenergizes, breaking the RF signal path into the receiver. Hysteresis around U1A holds the relay deenergized until the RF input drops at least 10 dB.

Under overload conditions, the low output at U1A causes U1B output to swing high (+15 Vdc). This forward biases CR29. Voltage divider/clamp network R18, R21, R37, and CR22 provide a TTL logic high signal ( $\approx 4$  Vdc) to detection circuitry on Control Board A14. This in turn causes the RF-590 front panel display to read out the message ANTENNA OVERLOAD. This disables all front panel controls until the overload condition is removed, at which time the overload message is removed and normal operation is resumed.

### 3.3 Mute Circuitry

Two receiver mute inputs are provided on the A1 board; Internal Mute and External Mute. Both cause RF signal path muting when a high TTL level ( $\approx 5$  Vdc) signal is present at their inputs. This causes U1C output to swing low (-15 Vdc), which forward biases CR20 and removes base drive to Q3. Q3 turns off, deenergizing K1 and disrupting the RF signal path into the receiver. This +5 Vdc is generated on the control board (A14) whenever the external Mute line on J7-7 (rear panel) is grounded.

Internal Muting occurs as part of the receiver BITE routine. External Muting is accessed via the rear panel terminal strip TB1, pin 16, and/or connector J7, pin 7. External Muting is an option to be exercised by the operator, depending upon system requirements.

### 3.4 BITE Circuitry

Bite test signal generation occurs on the A1 assembly. This test signal is adjusted to -20 dBm, 100 kHz at J3. It is fed through the A1 assembly and on to assemblies A2-A5 for testing purposes. Various amplitude sample and detection circuits throughout the signal path monitor critical signal stages to check for proper operation. BITE testing is completely under software control and is initiated by pressing the RF-590 front panel TEST switch (see the Maintenance section of this manual).

### 3.4.1 BITE Signal Generation

The BITE test signal is generated by 100 kHz oscillator U2 and its associated components. U2 output is applied to the LPF side of relay K1 only when K1 is deenergized via software control. This prevents U2 output signals from reaching the antenna. The 100 kHz injection at U2, pin 3, is a 15 Vpp square wave. The BITE test signal is set while monitoring J3. R25 sets the operating frequency to 100 kHz and R28 sets the output amplitude to -18 dBm.

Oscillator U2 is enabled by Q2 and Q4, which in turn are controlled via system software. A +5 Vdc level at J2-6 enables U2.

### 3.4.2 BITE Detection

Two BITE tests are enacted on the A1 assembly.

- K1 relay check
- A1 signal path level check

Both tests are under BITE software control and commence upon initiating RF-590 front panel TEST control. The tests are done sequentially, and the resulting output signal at J2-9 is ultimately applied to Control Board Assembly A14. An error code will be displayed on the RF-590 front panel display if either test fails.

#### 3.4.2.1 Relay K1 Test Circuits

During normal operating conditions, K1 will be energized, Internal Mute line will be low, and Relay Test line will be high (consequently, holding Q1 on, and applying 0 Vdc to TP1 and relay K1). When the BITE routine begins, Relay Test goes low, turning off Q1 and applying  $\approx 7.5$  Vdc to TP1 and the relay contacts. This signal is passed through the relay and the low pass filter (LPF), and is detected by Dc BITE Detector U1D. U1D output, which had previously been low (-15 Vdc) will now swing high (+15 Vdc) and forward bias CR21. This provides a nominal 2.5 Vdc level at J2, pin 9, BITE/Relay Out. This signal is fed to an A/D converter on the A14 Control Board, which then feeds other A14 circuits that determine if this signal has sufficient amplitude to ensure that no dc losses are present in relay K1 or the LPF.

Next, Internal Mute goes high, which turns Q3 and K1 off. Since the 7.5 Vdc signal at TP1 can no longer pass through the relay, U1D output will swing low and present  $\approx 0$  Vdc at BITE/Relay Out. Control Board A14 circuitry will interpret this as an indication that the relay did deenergize, and will proceed to the next test, A1 Signal Path.

#### 3.4.2.2 A1 Signal Path Test Circuits

Upon successful completion of relay K1 testing, the A1 signal path is checked using a 100 kHz test signal generated by BITE Oscillator U2. The oscillator is enabled when the BITE Oscillator Enable line is pulled high (under software control) turning on Q4 and Q2. This applies +15 Vdc to oscillator U2. U2 output is

applied to the input of the LPF (relay K1 is deenergized during this test) and is detected by Ac BITE Detector U3. If no faults occur in the signal path, U3 will produce a nominal output voltage of 2.5 Vdc at J2, pin 9, BITE/RELAY OUT. This is sampled by the A/D Converter on Control Board A14, and if the level is sufficient (indicating no ac losses on the A1 assembly), BITE testing would continue throughout the RF chain of the receiver. (Note that it is this same 100 kHz signal which is used to test circuits on the A2-A5 assemblies.)

#### 4. MAINTENANCE

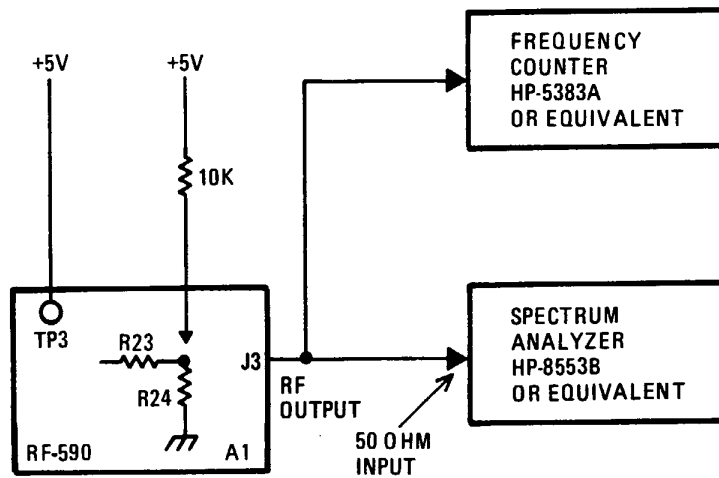
The following adjustments should not be performed as routine maintenance procedures, but should be used only when a failure indicates a definite requirement. All tests should be performed with all assembly connections in normal contact, unless otherwise specified.

#### NOTE

J3 plugs directly into the A2 assembly through the chassis. Therefore it will be necessary to remove the A1 assembly from the chassis to gain access to J3.

#### 4.1 BITE Oscillator Adjustments/Test

- a. Connect equipment as shown in figure 2.



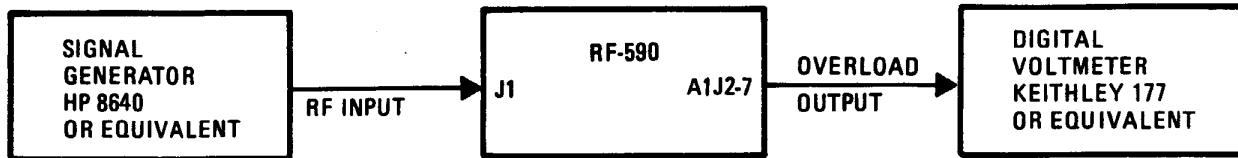
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**Figure 2. A1 BITE Oscillator Test Setup**

- b. Adjust R25 for 100.0 kHz and R28 for -18 dBm at J3 RF output.
- c. Disconnect all equipment and fully reconnect the A1 module to RF-590. Initiate RF-590 BITE Test. The receiver must pass O1 testing.

## 4.2 Overload Adjustments/Test

- a. Connect equipment as shown in figure 3.



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**Figure 3. A1 Overload Adjustment Test Setup**

- b. Set RF-590 controls as follows:

Frequency: 10.000000 MHz  
Mode: USB  
AGC: Medium  
RF Gain: Fully clockwise (cw)

- c. Set signal generator to 10.000 MHz, 1.5 Vrms.  
d. Adjust R7 until J2-7 Antenna Overload switches to approximately 5 Vdc.  
e. Disconnect all equipment.

## 5. PARTS LIST

Table 2 is a comprehensive parts list of all replaceable components in Input Filter Assembly A1. When ordering parts from the factory, include a full description of the part. Use figure 4, the Input Filter Assembly A1 Component location diagram to identify parts.

## 6. SCHEMATIC DIAGRAM

Figure 5 is the Input Filter Assembly A1 schematic diagram.



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Table 2. Input Filter Assembly A1 Parts List (PL 10073-5100)

Ref. Desig.	Part Number	Description
	10073-5100	PWB, INPUT FILTER
C1	M39014/02-1320	CAP .47UF 10% 50V CER-R
C2	M39014/02-1320	CAP .47UF 10% 50V CER-R
C3	CM04ED300J03	CAP 30PF 5% 500V MICA
C4	CM04ED300J03	CAP 30PF 5% 500V MICA
C5	CM04ED300J03	CAP 30PF 5% 500V MICA
C6	CM04ED300J03	CAP 30PF 5% 500V MICA
C7	CM04ED750J03	CAP 75PF 5% 500V MICA
C8	CM04ED750J03	CAP 75PF 5% 500V MICA
C9	CM04ED750J03	CAP 75PF 5% 500V MICA
C10	CM04CD120J03	CAP 12PF 5% 500V MICA
C11	CM04CD050D03	CAP 5PF + -.5PF 500V MICA
C12	CM04FD151J03	CAP 150PF 5% 500V MICA
C13	CM04ED430J03	CAP 43PF 5% 500V MICA
C14	CM04ED510J03	CAP 51PF 5% 500V MICA
C15	CM04ED750J03	CAP 75PF 5% 500V MICA
C16	CM04ED470J03	CAP 47PF 5% 500V MICA
C17	CM04FD131J03	CAP 130PF 5% 500V MICA
C18	CM04ED300J03	CAP 30PF 5% 500V MICA
C19	CM04ED620J03	CAP 62PF 5% 500V MICA
C20	CM04ED680J03	CAP 68PF 5% 500V MICA
C21	CM04FD151J03	CAP 150PF 5% 500V MICA
C22	CM04ED680J03	CAP 68PF 5% 500V MICA
C23	M39014/02-1310	CAP .1UF 10% 100V CER-R
C25	M39014/02-1320	CAP .47UF 10% 50V CER-R
C26	M39014/02-1320	CAP .47UF 10% 50V CER-R
C27	CK05BX472M	CAP 4700PF 20% 100V CER
C28	CM04FD151J03	CAP 150PF 5% 500V MICA
C29	M39014/02-1320	CAP .47UF 10% 50V CER-R
C30	M39014/02-1320	CAP .47UF 10% 50V CER-R
C31	M39014/02-1320	CAP .47UF 10% 50V CER-R
C32	M39014/02-1310	CAP .1UF 10% 100V CER-R
C33	CM06FD122J03	CAP 1200PF 5% 500V MICA
C35	M39014/02-1320	CAP .47UF 10% 50V CER-R
C36	M39014/01-1535	CAP .01UF 20% 100V CER
C37	M39014/02-1310	CAP .1UF 10% 100V CER-R
C38	M39014/02-1310	CAP .1UF 10% 100V CER-R
C39	M39014/02-1310	CAP .1UF 10% 100V CER-R
C40	M39014/02-1310	CAP .1UF 10% 100V CER-R
C41	M39014/02-1310	CAP .1UF 10% 100V CER-R
C43	M39014/02-1310	CAP .1UF 10% 100V CER-R
C44	C26-0025-339	CAP 3.3UF 20% 25V TANT
C45	C26-0025-339	CAP 3.3UF 20% 25V TANT
C46	M39014/01-1535	CAP .01UF 20% 100V CER
C47	M39014/01-1535	CAP .01UF 20% 100V CER

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Table 2. Input Filter Assembly A1 Parts List (PL 10073-5100) (Cont.)

Ref. Desig.	Part Number	Description
C48	M39014/02-1310	CAP .1UF 10% 100V CER-R
C50	CM04FD151J03	CAP 150PF 5% 500V MICA
CR1	D02-0003-001	DIODE 2.5A 50V RECT FR
CR2	D02-0003-001	DIODE 2.5A 50V RECT FR
CR3	D02-0003-001	DIODE 2.5A 50V RECT FR
CR4	D02-0003-001	DIODE 2.5A 50V RECT FR
CR5	1N4454	DIODE 200mA 75V SW
CR6	1N4454	DIODE 200mA 75V SW
CR7	1N4454	DIODE 200mA 75V SW
CR8	1N4454	DIODE 200mA 75V SW
CR9	1N4454	DIODE 200mA 75V SW
CR10	1N4454	DIODE 200mA 75V SW
CR11	1N4454	DIODE 200mA 75V SW
CR12	1N4454	DIODE 200mA 75V SW
CR13	1N5245B	DIODE 15V 5% .5W ZENER
CR14	1N4454	DIODE 200mA 75V SW
CR15	1N4007	DIODE 1A 1000V RECT GP
CR16	1N4454	DIODE 200mA 75V SW
CR17	1N4454	DIODE 200mA 75V SW
CR18	1N4454	DIODE 200mA 75V SW
CR19	1N4454	DIODE 200mA 75V SW
CR20	1N4454	DIODE 200mA 75V SW
CR21	1N4454	DIODE 200mA 75V SW
CR22	1N5230A	DIODE 4.7V 10% .5W ZENER
CR23	1N5230A	DIODE 4.7V 10% .5W ZENER
CR24	D02-0003-001	DIODE 2.5A 50V RECT FR
CR25	D02-0003-001	DIODE 2.5A 50V RECT FR
CR26	D02-0003-001	DIODE 2.5A 50V RECT FR
CR27	D02-0003-001	DIODE 2.5A 50V RECT FR
CR28	1N4454	DIODE 200mA 75V SW
CR29	1N4454	DIODE 200mA 75V SW
J1	J-0031	CONN SMB VERT PCB F
J2	J46-0032-010	HDR 10 PIN 0.100" SR
J3	J90-0014-001	CONN SMB VERT PCB MT M
K1	K-0118	RLY,12VDC,DPDT,ENC,PC MNT
L1	10073-5111	INDUCTOR
L2	10073-5112	INDUCTOR
L3	10073-5113	INDUCTOR
L4	10073-5114	INDUCTOR
L5	10073-5114	INDUCTOR
L6	10073-5114	INDUCTOR
L7	10073-7029	INDUCTOR, FILTER CHOKE
L9	MS75085-13	COIL 330UH 10% FXD RF
L10	MS75085-13	COIL 330UH 10% FXD RF
L11	MS75085-13	COIL 330UH 10% FXD RF

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Table 2. Input Filter Assembly A1 Parts List (PL 10073-5100) (Cont.)

Ref. Desig.	Part Number	Description
L12	MS75085-13	COIL 330UH 10% FXD RF
L13	MS75085-13	COIL 330UH 10% FXD RF
L14	MS75085-13	COIL 330UH 10% FXD RF
Q1	2N2222	XSTR SS/GP NPN TO-18
Q2	2N2907	XSTR SS/GP PNP TO-18
Q3	2N2222	XSTR SS/GP NPN TO-18
Q4	2N2222	XSTR SS/GP NPN TO-18
R1	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R2	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R3	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R4	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R5	RN55D1053F	RES,105K 1% 1/8W MET FLM
R6	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R7	R30-0008-501	RES,VAR,PCB 500 20%
R8	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R9	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R10	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R11	R65-0003-302	RES 3.0K 5% 1/4W CAR FILM
R12	R65-0003-330	RES 33 5% 1/4W CAR FILM
R13	RN55D1002F	RES,10.0K 1% 1/8W MET FLM
R14	RN55D1002F	RES,10.0K 1% 1/8W MET FLM
R15	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R16	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R17	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R18	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R19	R65-0003-133	RES 13K 5% 1/4W CAR FILM
R20	R65-0003-122	RES 1.2K 5% 1/4W CAR FILM
R21	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R22	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R23	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R24	R65-0003-513	RES 51K 5% 1/4W CAR FILM
R25	R-2228	RES,VAR,PCB 10K .5 20%
R26	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R27	R65-0003-203	RES 20K 5% 1/4W CAR FILM
R28	R-2229	RES,VAR,PCB 20K .5 20%
R29	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R30	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R31	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R32	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R33	RN55D1740F	RES,174.0 1% 1/8W MET FLM
R34	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R35	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R36	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R37	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R38	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM

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Table 2. Input Filter Assembly A1 Parts List (PL 10073-5100) (Cont.)

Ref. Desig.	Part Number	Description
R39	R65-0003-394	RES 390K 5% 1/4W CAR FILM
R40	RN55D8062F	RES,80.6K 1% 1/8W MET FLM
R41	R65-0004-472	RES 4.7K 5% 1/2W CAR FILM
R42	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R43	R65-0003-513	RES 51K 5% 1/4W CAR FILM
R44	R65-0003-302	RES 3.0K 5% 1/4W CAR FILM
R45	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R46	RN55D1003F	RES,100K 1% 1/8W MET FLM
R47	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R50	R65-0003-203	RES 20K 5% 1/4W CAR FILM
R51	R65-0003-203	RES 20K 5% 1/4W CAR FILM
R52	R65-0003-124	RES 120K 5% 1/4W CAR FILM
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	130-0003-000	IC 324 OP AMP PLASTIC
U2	120-0005-000	IC LM111H COMPARATOR
U3	120-0005-000	IC LM111H COMPARATOR

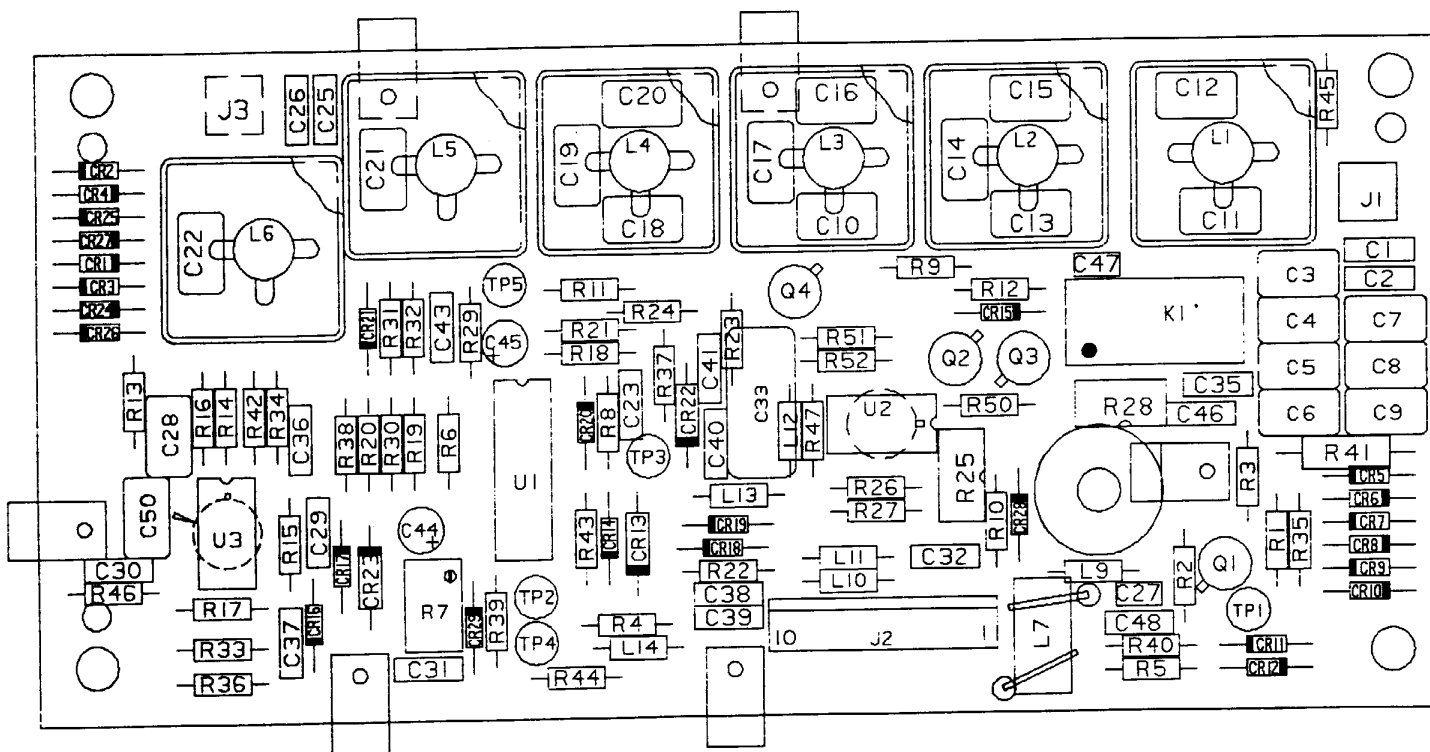
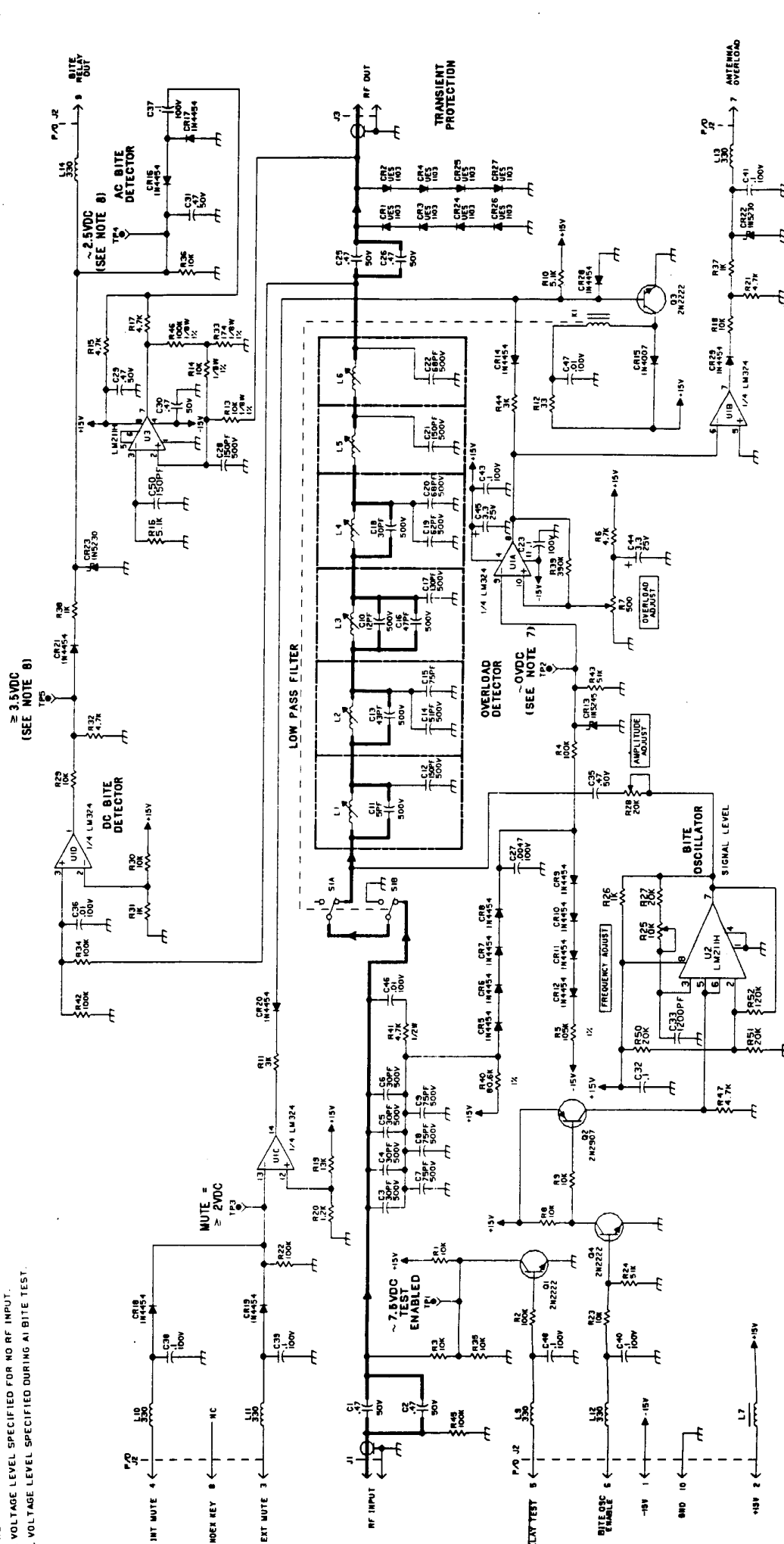


Figure 4. Input Filter Assembly A1 Component Location Diagram (10073-5100, Rev. J)

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- NOTE: UNLESS OTHERWISE SPECIFIED:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.
  2. COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO., DESIGNATION.
  3. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%. ALL CAPACITOR VALUES ARE IN MICROFARADS.
  4. ALL INDUCTOR VALUES ARE IN MICROHENRIES.
  5. VENDOR PART NO. CALCULATIONS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
  6. RELAY K1 IS SHOWN ENERGIZED.
  7. VOLTAGE LEVEL SPECIFIED FOR NO RF INPUT.
  8. VOLTAGE LEVEL SPECIFIED DURING A1 BITE TEST.

Figure 5. Input Filter Assembly A1 Schematic Diagram (10073-5101, Rev. F)

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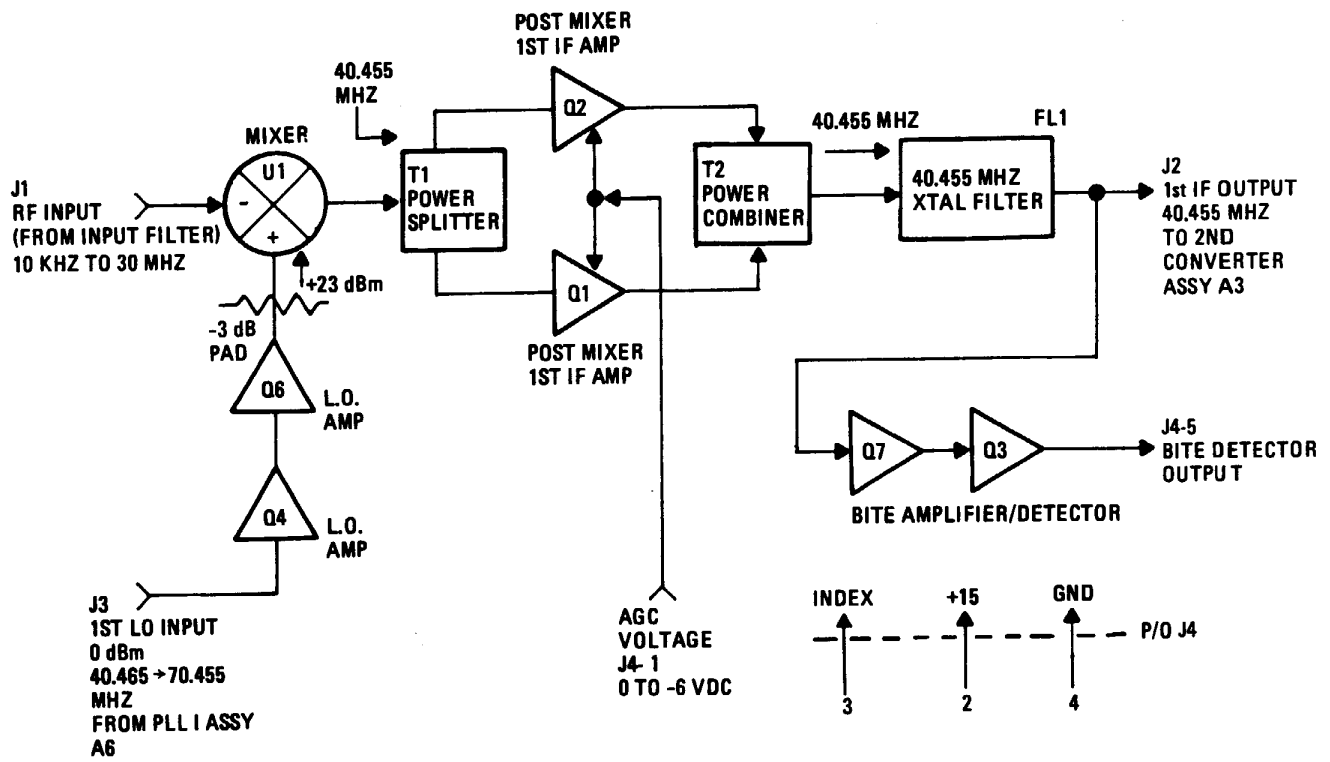
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**First Converter Assembly A2 Functional Block Diagram**

## 1. GENERAL DESCRIPTION

First Converter Assembly A2 converts the Input Radio Frequency (RF) range of 10 kHz to 30 MHz to an Intermediate Frequency (IF) of 40.455 MHz at mixer U1. (Sideband inversion occurs during the mixing process.) This IF signal is then split in power and fed to two identical automatic gain controlled (AGC) First IF Amplifier (postmixer) stages. After the amplified signals are recombined, they are filtered through a 16 kHz wide, 40.455 MHz crystal filter and directed to Second Converter Assembly A3. Typical RF input to IF output gain is 0 dB. The IF signal is also monitored by the Built In Test Equipment (BITE) detection circuit which monitors the operation of the First Converter Assembly.

## 2. INTERFACE CONNECTIONS

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

**Table 1. First Converter A2 Interface Connections**

Connector	Function	Characteristics
J1	RF INPUT	10 kHz - 30 MHz, -120/+10 dBm $Z_o = 50$ ohms
J2	IF Output	40.455 MHz $\pm 8$ kHz, -120/9 dBm (under AGC control), $Z_o = 50$ ohms
J3	LO No. 1 Injection	40.465 - 70.455 MHz, 0 dBm
J4-1	AGC Input	0 Vdc $\rightarrow$ -6 Vdc produces 0 $\rightarrow$ -20 dB gain reduction
J4-2	Power	+15 Vdc at 400 mA
J4-3	Index Pin	
J4-4	Ground	
J4-5	Bite Output	Approximately .75 Vdc for -20 dBm J1 input at 100 kHz

## 3. CIRCUIT DESCRIPTION

### 3.1 Mixer/Postmixer IF Amplifiers

RF input signals from 10 kHz to 30 MHz are applied to doubly balanced, diode - ring type mixer U2 at pin 1, through a 2 dB pad. U1 is a very high level mixer requiring +23 dBm at its LO port, pin 8, from the LO No. 1 Amplifier (paragraph 3.3). Conversion loss is typically 6 dB.

IF output from U1 (pins 3, 4) is applied to a broadband 50 ohm power splitter comprised of T1, C1, C2, C45, and R4.



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Q1 and Q2 are identically grounded gate FET amplifier stages, so only one stage (Q1) shall be discussed. Q1 is biased by R5 to typically 1-2 volts at its source. The drain load impedance is set at 1400 ohms by C46, C16, and L6 (L6 is adjusted for resonance at 40.455 MHz). Nominal stage power gain is +12 dB.

CR1 provides gain reduction by reducing the drain load on Q1 upon application of a negative AGC voltage at R7. Typically, -20 dB of gain reduction is possible.

Q1 and Q2 outputs are recombined in a broadband 50 ohm combiner consisting of T2, C19, C20, and R9. The 40.455 MHz IF output is then filtered in crystal filter FL-1, whose -3 dB bandwidth is  $\pm 8$  kHz and whose loss is approximately -5 dB.

The filtered IF output is directed to Second Converter Assembly A3 via J2, and to the BITE detection circuit (paragraph 3.2).

### 3.2 BITE Detection Circuit

The 40.455 MHz IF output is applied to buffer stage Q7, a source follower. Q7 output feeds tuned amplifier Q3, which amplifies the signal to the required detection level. This signal is then rectified and filtered by CR3, CR4, and C25. CR6 limits the detection voltage to approximately 5 Vdc to protect the following A/D converter inputs. An RF input level of -20 dBm at J1 results in approximately .5 Vdc at BITE Output, J4, pin 5.

### 3.3 LO No. 1 Amplifier

LO No. 1 injection of 0 dBm (nominally) is supplied by PLL1 Assembly A6 to LO No. 1 input, J3, and then to common base amplifier driver Q4. The LO frequency range is 40.465 - 70.455 MHz. Q4 is biased to approximately 50 mA of emitter current via R14 - R16, and provides approximately 10 dB of voltage gain from TP3 to TP4.

T3 and T4 provide an impedance stepdown to the base of power amplifier Q6. R29 - C40 - R26 stabilize Q6 and provide a flat output ( $\pm 1$  dB) from Q6 over the LO frequency range. T5 supplies nominally +26 dBm and impedance matching to a 50 ohm, -3 dB pad consisting of R1, R2, and R3. This pad then supplies a solid 50 ohm termination and +23 dBm level to the LO port of mixer U1.

Q5 and associated circuitry provides base current to Q6, resulting in a Q6 collector current of approximately 300 mA. Diode CR5 provides thermal stabilization to Q5 base current. Resistor pair R23 and R24 form a sense circuit for Q6 collector current. As Q6 collector current increases, the voltage at the emitter of Q5 decreases, thereby reducing the base-emitter voltage of Q5. This in turn reduces Q5 base and emitter current, and also Q6 base and collector current.

## 4. MAINTENANCE

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

**NOTE**

J1 plugs directly into the A1 assembly through the chassis.  
Therefore it will be necessary to remove the A1 assembly  
from the chassis to gain access to J1. Leave all other  
connections to A2 connected unless otherwise specified.

**4.1 LO No. 1 Amplifier Test**

- a. Set RF-590 controls as follows:

Frequency: 10.000000 MHz  
Mode: USB  
AGC: OFF  
RF Gain: Fully clockwise (cw)

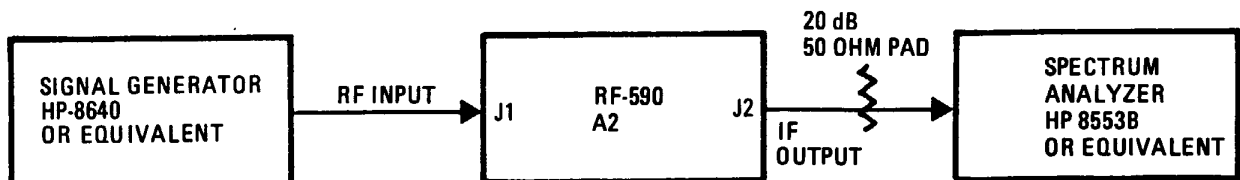
- b. Monitor A2 TP1 with an oscilloscope and frequency counter (each capable of measuring signals to 100 MHz). Signal at TP1 should be approximately 7.5 Vpp at 50.455000 MHz.

**4.2 Postmixer IF Amplifier Adjustments/Test**

- a. Set RF-590 controls as follows:

Frequency: 10.000000 MHz  
Mode: USB  
AGC: OFF  
RF Gain: Fully clockwise (cw)

- b. Connect equipment as shown in figure 1.



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**Figure 1. A2 Postmixer IF Amplifier Test Setup**

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- c. Apply a 0 dBm, 10.000000 MHz test signal to RF input J1. Monitoring IF output J2 with a spectrum analyzer at 40.455 MHz, adjust L6 and L7 for maximum output. Output must be 0 dBm  $\pm$  2 dB, indicating an overall module gain of 0 dB.

**4.3 AGC Test**

- a. Set RF-590 controls as follows:

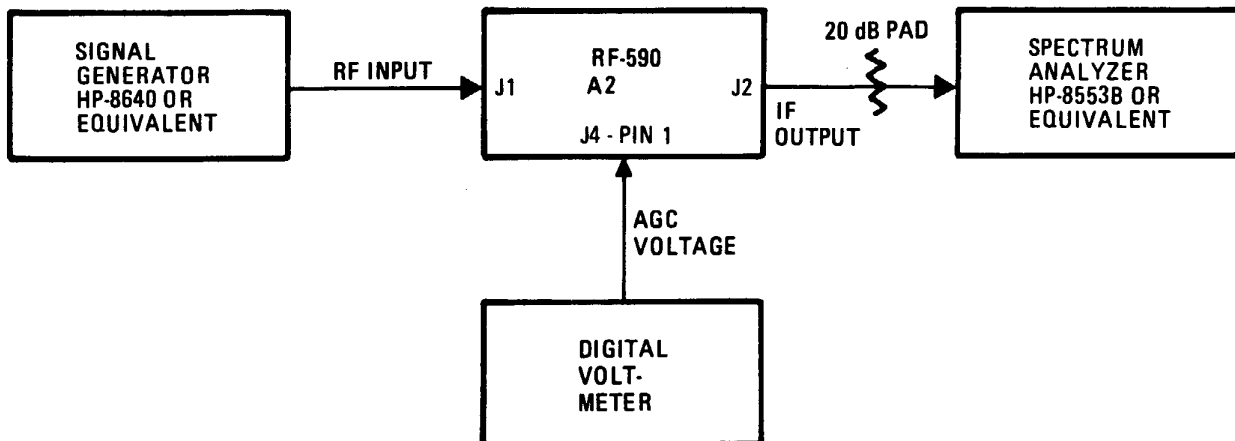
Frequency: 10.000000 MHz

Mode: USB

AGC: OFF

RF Gain: Fully clockwise (cw)

- b. Connect equipment as shown in figure 2.



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Figure 2. A2 AGC Test Setup

- c. Adjust signal generator to approximately 0 dBm at 10.000000 MHz. Monitor IF output J2 on spectrum analyzer. IF output must be 0 dBm  $\pm$  2 dB.
- d. Slowly turn RF-590 RF Gain Control counterclockwise (ccw). An AGC voltage range of 0 to -10 Vdc should result in an IF output gain reduction range of approximately 0 to -30 dB. Intermediate levels are given in table 2.

Table 2. A2 AGC - Gain Reduction Data

AGC Voltage, Volts	Gain Reduction, - dB
0	0
-1	9
-2	17
-3	21
-4	23
-5	25
-6	27
-7	28
-8	29
-9	30
-10	31

**4.4 BITE Test/Alignment**

- a. Set RF-590 controls as follows:

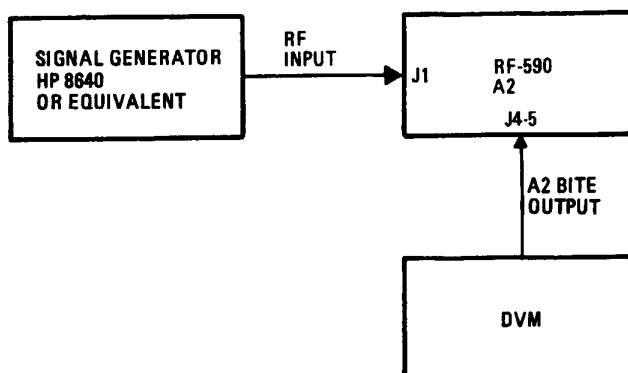
Frequency: 10.000000 MHz

Mode: USB

AGC: OFF

RF Gain: Fully clockwise (cw)

- b. Connect equipment as shown in figure 3.



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Figure 3. A2 BITE Test Setup

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- c. Set signal generator to 10.000000 MHz, -20 dBm. Adjust L8 for a peak indication on the DVM. DVM should indicate approximately .75 Vdc.
- d. Disconnect all equipment and reconnect A2 to RF-590. Initiate RF-590 BITE test. The receiver must pass 02 testing.

**5. PARTS LIST**

Table 3 is a comprehensive parts list of all replaceable components in First Converter Assembly A2. When ordering parts from the factory, include a full description of the part. Use figure 4, First Converter Assembly A2 Component Location diagram to identify parts.

**6. SCHEMATIC DIAGRAM**

Figure 5 is the First Converter Assembly A2 Schematic Diagram

**Table 3. First Converter Assembly A2 Parts List (PL 10073-5200)**

Ref. Desig.	Part Number	Description
	10073-5200	PWB, FIRST CONVERTER
	E70-0002-002	PAD MNT XSTR TO-5
	E70-0001-007	INSL BEO TO-5 X.015 THK
	E70-0011-001	INSL XSTR UNIVERSAL HOLE
C1	CM04ED330J03	CAP 33PF 5% 500V MICA
C2	CM04ED330J03	CAP 33PF 5% 500V MICA
C3	M39014/01-1535	CAP .01UF 20% 100V CER
C4	M39014/01-1535	CAP .01UF 20% 100V CER
C5	M39014/01-1535	CAP .01UF 20% 100V CER
C6	M39014/01-1535	CAP .01UF 20% 100V CER
C7	C26-0025-100	CAP 10UF 20% 25V TANT
C8	C26-0025-100	CAP 10UF 20% 25V TANT
C9	M39014/01-1535	CAP .01UF 20% 100V CER
C10	M39014/01-1535	CAP .01UF 20% 100V CER
C11	M39014/01-1535	CAP .01UF 20% 100V CER
C12	M39014/01-1535	CAP .01UF 20% 100V CER
C13	M39014/01-1535	CAP .01UF 20% 100V CER
C14	M39014/01-1535	CAP .01UF 20% 100V CER
C15	M39014/01-1535	CAP .01UF 20% 100V CER
C16	CM04CD150J03	CAP 15PF 5% 500V MICA
C17	CM04CD150J03	CAP 15PF 5% 500V MICA
C18	M39014/01-1535	CAP .01UF 20% 100V CER
C19	CM04ED330J03	CAP 33PF 5% 500V MICA
C20	CM04ED330J03	CAP 33PF 5% 500V MICA
C21	M39014/01-1535	CAP .01UF 20% 100V CER
C22	M39014/01-1535	CAP .01UF 20% 100V CER
C23	M39014/01-1535	CAP .01UF 20% 100V CER
C24	M39014/01-1535	CAP .01UF 20% 100V CER

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Table 3. First Converter Assembly A2 Parts List (PL 10073-5200) (Cont.)

Ref. Desig.	Part Number	Description
C25	M39014/01-1535	CAP .01UF 20% 100V CER
C26	CM04CD050D03	CAP 5PF +- .5PF 500V MICA
C27	M39014/02-1310	CAP .1UF 10% 100V CER-R
C28	C26-0025-339	CAP 3.3UF 20% 25V TANT
C29	M39014/01-1535	CAP .01UF 20% 100V CER
C30	M39014/01-1535	CAP .01UF 20% 100V CER
C31	M39014/02-1310	CAP .1UF 10% 100V CER-R
C32	M39014/01-1535	CAP .01UF 20% 100V CER
C33	CM04ED390J03	CAP 39PF 5% 500V MICA
C34	M39014/01-1535	CAP .01UF 20% 100V CER
C35	M39014/01-1535	CAP .01UF 20% 100V CER
C36	M39014/01-1535	CAP .01UF 20% 100V CER
C37	M39014/02-1310	CAP .1UF 10% 100V CER-R
C38	M39014/01-1535	CAP .01UF 20% 100V CER
C39	C26-0025-339	CAP 3.3UF 20% 25V TANT
C40	M39014/02-1310	CAP .1UF 10% 100V CER-R
C41	M39014/01-1535	CAP .01UF 20% 100V CER
C42	M39014/02-1310	CAP .1UF 10% 100V CER-R
C43	C26-0025-339	CAP 3.3UF 20% 25V TANT
C44	M39014/01-1535	CAP .01UF 20% 100V CER
C45	CM04CD050D03	CAP 5PF +- .5PF 500V MICA
C46	CM04ED510J03	CAP 51PF 5% 500V MICA
C47	CM04ED510J03	CAP 51PF 5% 500V MICA
C48	C26-0025-339	CAP 3.3UF 20% 25V TANT
C49	M39014/01-1535	CAP .01UF 20% 100V CER
C50	M39014/01-1535	CAP .01UF 20% 100V CER
C51	M39014/01-1535	CAP .01UF 20% 100V CER
C52	M39014/01-1535	CAP .01UF 20% 100V CER
CR1	D12-0007-001	DIODE 1W 75V PIN SW
CR2	D12-0007-001	DIODE 1W 75V PIN SW
CR3	1N4454	DIODE 200mA 75V SW
CR4	1N4454	DIODE 200mA 75V SW
CR5	1N3064	DIODE 75mA 75V SW
CR6	1N5231B	DIODE 5.1V 5% .5W ZENER
FL1	10073-7000	FILTER,40.455 MHZ
J1	J-0031	CONN SMB VERT PCB F
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F
J4	J46-0032-005	HDR 5 PIN 0.100" SR
L1	MS14046-4	COIL 10UH 10% FXD RF
L2	MS14046-4	COIL 10UH 10% FXD RF
L3	MS14046-4	COIL 10UH 10% FXD RF
L4	MS14046-4	COIL 10UH 10% FXD RF
L5	L08-0001-001	CHOKE W B 50 MHZ
L6	L11-0004-005	INDUCT SH VAR .198-.242UH

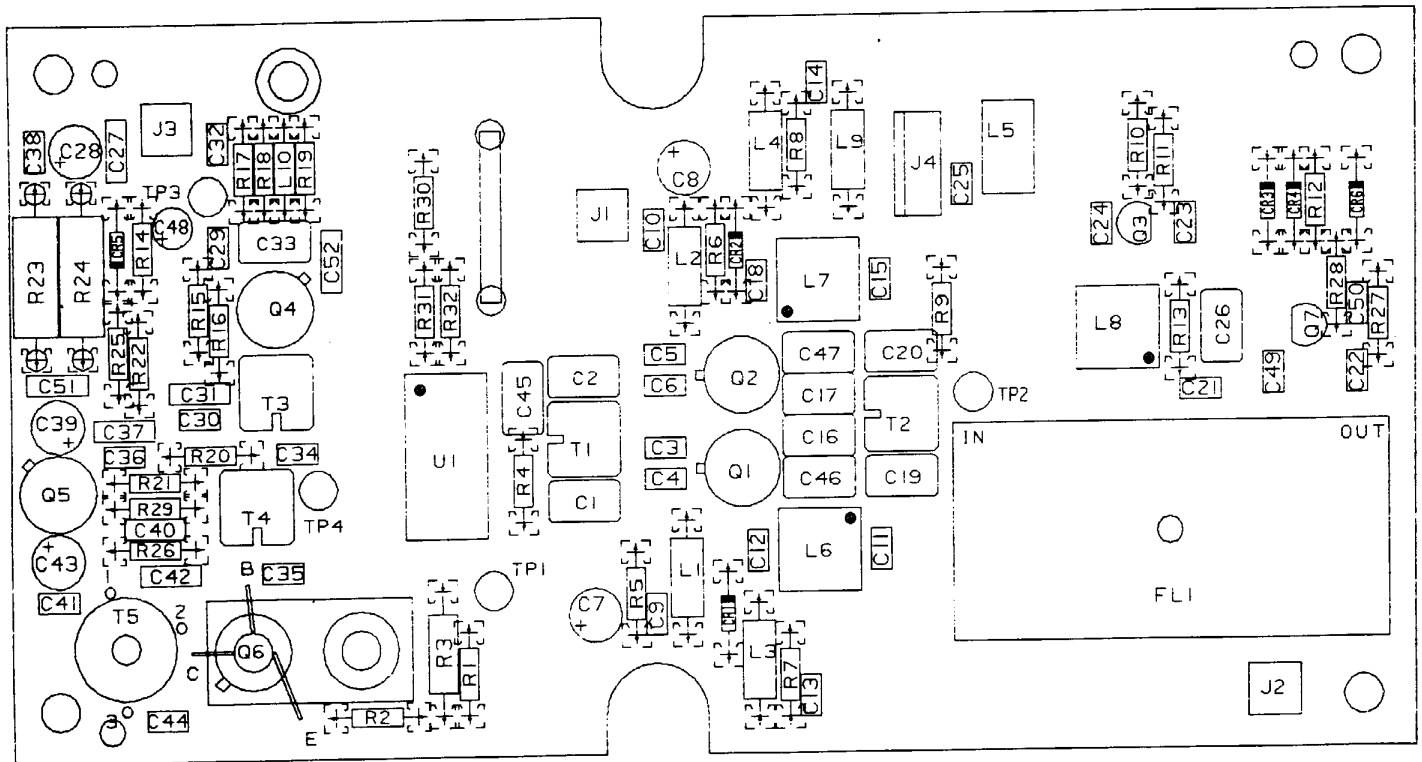
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**Table 3. First Converter Assembly A2 Parts List (PL 10073-5200) (Cont.)**

Ref. Desig.	Part Number	Description
L7	L11-0004-005	INDUCT SH VAR .198-.242UH
L8	L11-0004-013	INDUCT SH VAR .900-1.1 UH
L9	MS90538-12	COIL 100UH 5% FXD RF
L10	MS75084-12	COIL 10UH 10% FXD RF
Q1	Q35-0004-001	XSTR JFET U431
Q2	Q35-0004-001	XSTR JFET U431
Q3	Q35-0001-001	XSTR JFET J310
Q4	2N3866	XSTR SS/RF NPN TO-39
Q5	2N4037	XSTR SS/RF NPN TO-39
Q6	Q25-0014-000	XSTR RFPWR
Q7	Q35-0001-001	XSTR JFET J310
R1	R65-0003-301	RES 300 5% 1/4W CAR FILM
R2	R65-0003-301	RES 300 5% 1/4W CAR FILM
R3	RCR20G180JM	RES,18 5% 1/2W CAR COMP
R4	R65-0003-510	RES 51 5% 1/4W CAR FILM
R5	R65-0003-910	RES 91 5% 1/4W CAR FILM
R6	R65-0003-910	RES 91 5% 1/4W CAR FILM
R7	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R8	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R9	R65-0003-510	RES 51 5% 1/4W CAR FILM
R10	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R11	R65-0003-181	RES 180 5% 1/4W CAR FILM
R12	R65-0003-224	RES 220K 5% 1/4W CAR FILM
R13	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R14	R65-0003-100	RES 10 5% 1/4W CAR FILM
R15	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R16	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R17	R65-0003-270	RES 27 5% 1/4W CAR FILM
R18	R65-0003-221	RES 220 5% 1/4W CAR FILM
R19	R65-0003-680	RES 68 5% 1/4W CAR FILM
R20	R65-0003-101	RES 100 5% 1/4W CAR FILM
R21	R65-0003-681	RES 680 5% 1/4W CAR FILM
R22	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R23	RCR32G100JM	RES,10 5% 1W CAR COMP
R24	RCR32G100JM	RES,10 5% 1W CAR COMP
R25	R65-0003-301	RES 300 5% 1/4W CAR FILM
R26	R65-0003-101	RES 100 5% 1/4W CAR FILM
R27	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R28	R65-0003-181	RES 180 5% 1/4W CAR FILM
R29	R65-0003-101	RES 100 5% 1/4W CAR FILM
R30	R65-0003-431	RES 430 5% 1/4W CAR FILM
R31	R65-0003-120	RES 12 5% 1/4W CAR FILM
R32	R65-0003-431	RES 430 5% 1/4W CAR FILM
T1	10073-7013	TRANSFORMER ASSY
T2	10073-7013	TRANSFORMER ASSY

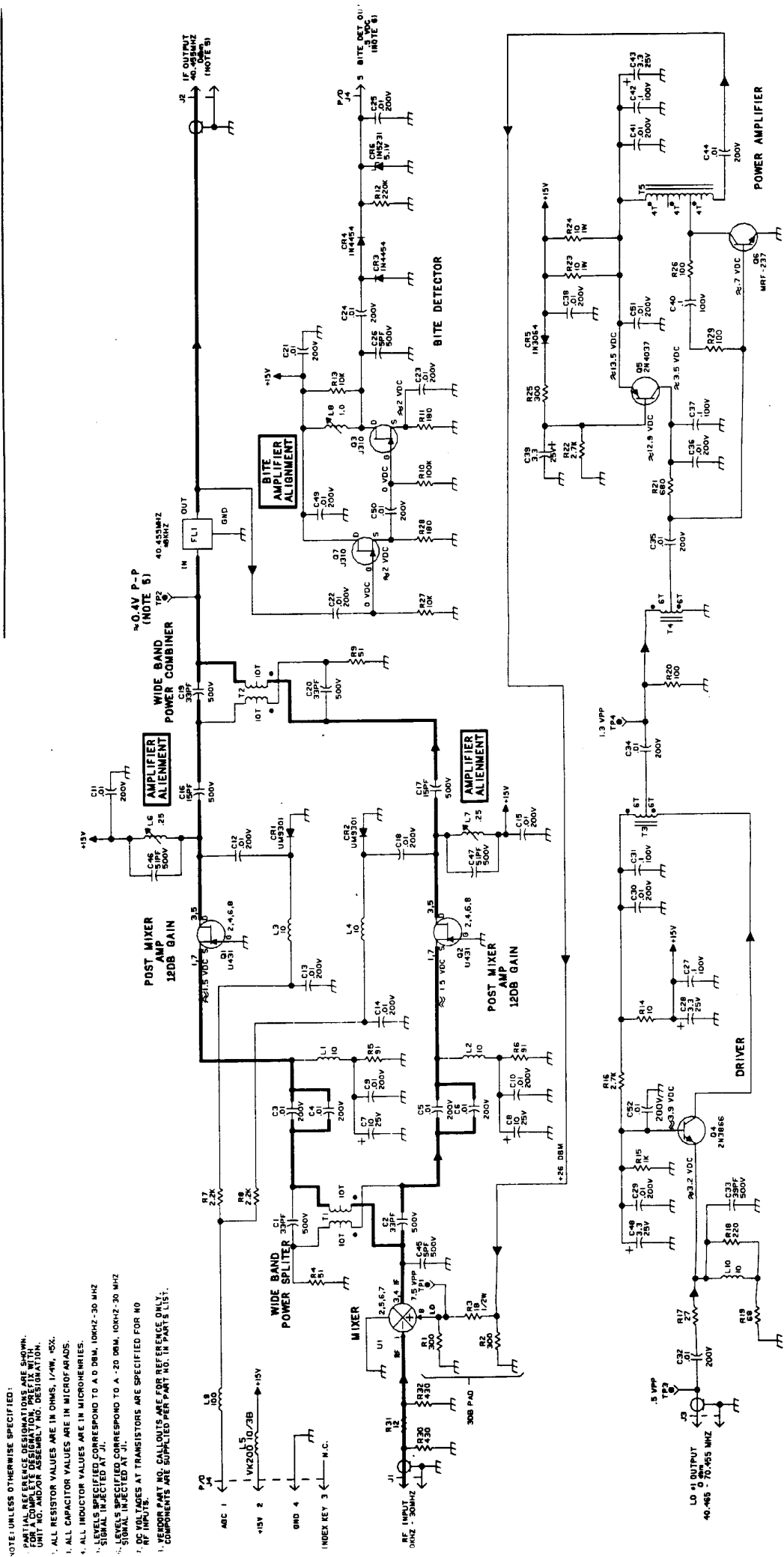
**Table 3. First Converter Assembly A2 Parts List (PL 10073-5200)**

Ref. Desig.	Part Number	Description
T3	10073-7005	TRANSFORMER, RF, FIXED
T4	10073-7005	TRANSFORMER, RF, FIXED
T5	10073-7010	TRANSFORMER, RF, FIXED
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"
U1	151-0003-002	MIXER DB 500MW 500MHZ



**Figure 4. First Converter Assembly A2 Component Location Diagram (10073-5200, Rev. F)**





NOTE: UNLESS OTHERWISE SPECIFIED:  
 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.  
 UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.  
 1. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, 5%.  
 2. ALL CAPACITOR VALUES ARE IN MICROFARADS.  
 3. ALL INDUCTOR VALUES ARE IN MICROHENRIES.  
 4. LEVELS SPECIFIED CORRESPOND TO A -20 DBM, 10KHZ-30 MHZ SIGNAL INJECTED AT J1.  
 5. LEVELS INJECTED AT J1 CORRESPOND TO A -20 DBM, 10KHZ-30 MHZ SIGNAL INJECTED AT J1.  
 6. DC VOLTAGES AT TRANSISTORS ARE SPECIFIED FOR NO RF INPUTS.  
 7. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

Figure 5. First Converter Assembly A2 Schematic Diagram (10073-5201, Rev. G)

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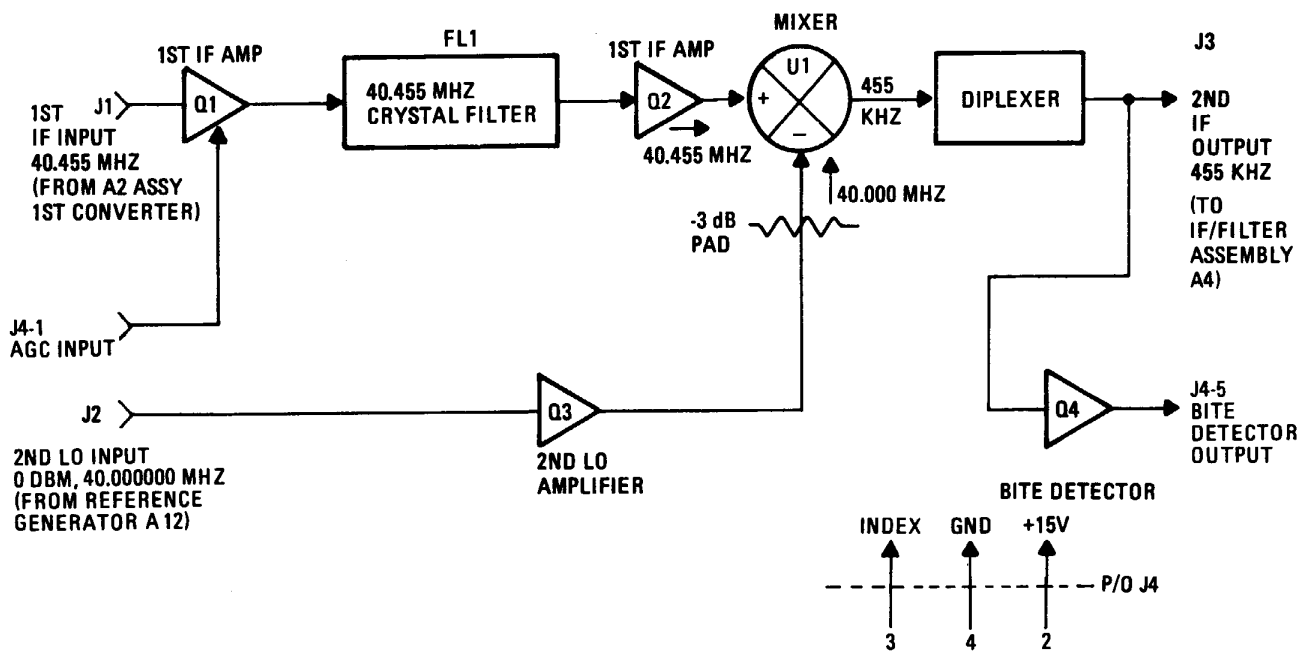
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Second Converter Assembly A3 Functional Block Diagram

## 1. GENERAL DESCRIPTION

Second Converter Assembly A3 converts the first IF of 40.455 (from First Converter Assembly A2) to a second IF of 455 kHz. Overall module gain from J1 to J3 is approximately  $14 \pm 2$  dB.

Input 40.455 MHz first IF signals are applied through an automatic gain controlled amplifier, a 40.455 MHz, 16 kHz wide crystal filter, and on to a fixed gain stage. At this point the signal is down converted to 455 kHz, filtered, and fed out to IF Filter Assembly A4. The second IF signal is also monitored by the BITE detection circuit which monitors the operation of the Second Converter Assembly.

## 2. INTERFACE CONNECTIONS

Table 1 details the various input/output connections and any relevant data.

**Table 1. Second Converter A3 Interface Connections**

Connector	Function	Characteristics
J1	First IF Input	40.455 MHz, -120/-9 dBm (under AGC control), $Z_o = 50$ ohms
J2	Second LO Input	40.000 MHz, 0 dBm, $Z_o = 50$ ohms
J3	Second IF Output	455 kHz, -107/-15 dBm (under AGC control), $Z_o = 50$ ohms
J4-1	AGC Input	0 to -6 Vdc produces a 0 to -20 dB gain reduction
J4-2	Power	+15 Vdc at 60 mA
J4-3	Index pin	
J4-4	Ground	
J4-5	BITE Output	2.25 - 3 Vdc for -20 dBm input at J1

## 3. CIRCUIT DESCRIPTION

### 3.1 IF Amplifiers and Mixer

First IF input signals from First Converter Assembly A2 are received at J1 and fed to grounded gate FET amplifier Q1. C1 and L4 perform an impedance transformation of 50 ohms to Q1's source impedance for optimum power gain. C2 and R1 form a bypassed bias resistor network. L1, C25, and C5 provide impedance transformation for Q1's drain load of 2200 ohms to FL-1's input impedance of 50 ohms. This yields an overall stage gain of 13 dB.

CR1 provides gain reduction by reducing Q1's drain load upon application of a negative AGC voltage at R2 (AGC input). Typically -20 dB of gain reduction is possible.

Filtering is applied at FL-1, a 40.455 MHz crystal filter whose -3 dB bandwidth is  $\pm 8$  kHz. Typical insertion loss is -3.5 dB. FL-1 output is applied to grounded gate FET amplifier Q2. Q2 and its associated components perform identically to amplifier Q1, except that no AGC is applied. This fixed gain stage also has an overall gain of 13 dB.

U1 is a low LO level diode ring mixer that converts the 40.455 MHz first IF to the 455 kHz second IF. A LO drive level of +7 dBm (50 ohm) at 40.000000 MHz is supplied by Q3 (paragraph 3.3). U1 typically has 6 dB of conversion loss.

Components C10 - C12, L6 - L8, and R5 form a diplexer with a cutoff frequency of 4 MHz to terminate all undesired mixer products (especially LO leakage) into 50 ohms. This allows only 455 kHz to pass out of J3 to IF Filter Assembly A4 and ultimately to the high gain second IF amplifiers on IF/Audio Assembly A5.

### 3.2 BITE Detection Circuit

The 455 kHz second IF signal is also applied to common emitter amplifier Q4. Bias circuitry R7, R8, and R11 bias Q4 to 10 mA of collector current. R9, R10, and C16 set the voltage gain to allow BITE to operate when the signal at J1 is at -20 dBm. The dc detection voltage produced by detector network CR2, CR4, and C17 under these conditions is approximately 2.25 to 3 Vdc at J4-5, BITE Detector output.

### 3.3 LO No. 1 Amplifier

Common emitter amplifier Q3 receives a 40.000000 MHz, 0 dBm drive signal from Reference Generator Assembly A12 at J2. R14, R15, CR3, and R17 bias Q3 to 23 mA of collector current. R16-C21 and R18 comprise emitter and collector to base feedback networks. These networks simultaneously set the stage gain to +10 dB and the input and output impedances to 50 ohms. A +10 dBm signal is fed to -3 dB, 50 ohm pad R19-R21. This applies a +7 dBm LO level to mixer U1.

## 4. MAINTENANCE

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

### 4.1 LO No. 1 Amplifier Test

- a. Set RF-590 controls as follows:

Frequency: 10.000000 MHz

Mode: USB

AGC: OFF

RF Gain: Fully clockwise (cw)

- b. Monitor TP4 with an oscilloscope and frequency counter. Signal at TP4 would be 40.000000 MHz at approximately 1.3 Vpp.

#### 4.2 IF Amplifiers and Mixer Adjustments/Test

- a. Remove the ribbon cable connecting the AGC assembly to the IF/Audio Amp Assembly A5A1.

- b. Set RF-590 controls as follows:

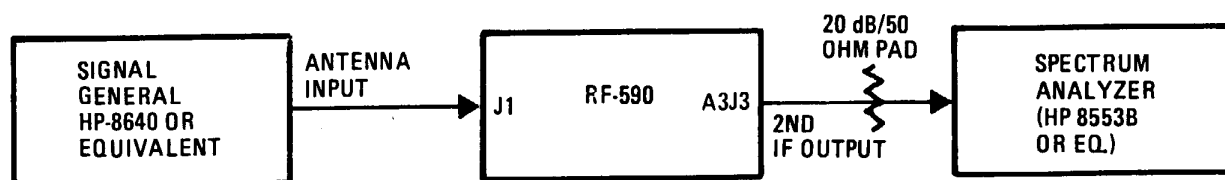
Frequency: 10.000000 MHz

Mode: USB

AGC: OFF

RF Gain: Fully clockwise (cw)

- c. Connect equipment as shown in figure 1.



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Figure 1. A3 IF Amplifier Test Setup

- d. Apply a -70 dBm, 10.0015 MHz signal at J1. Monitor second IF output J3 at 455 kHz on the spectrum analyzer. Adjust L1 and L2 for maximum output. Output must be -55 dBm  $\pm$  2 dB, indicating approximately 15 dB of module gain.

#### 4.3 AGC Test

- a. Set RF-590 controls as follows:

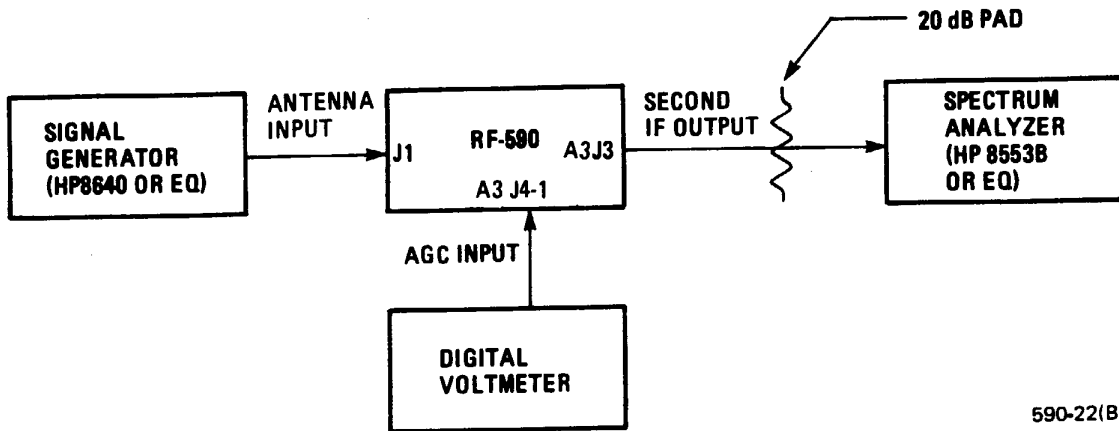
Frequency: 10.000000 MHz

Mode: USB

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AGC: OFF  
RF Gain: Fully clockwise (cw)

b. Connect equipment as shown in figure 2.



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Figure 2. A3 AGC Test Setup

- c. Adjust Signal Generator to -30 dBm, 10.0015 MHz. Monitor second IF output J3 on spectrum analyzer. IF output must be -15 dBm  $\pm$  3 dB.
- d. Slowly adjust RF-590 RF gain control counterclockwise (ccw). An AGC voltage range of 0 to -6 Vdc should result in an IF output gain reduction of approximately 0 to -20 dB. Intermediate levels are given in table 2. Reset RF gain control fully clockwise (cw).

Table 2. A3 AGC - Gain Reduction Data

AGC Voltage, Volts	Gain Reduction, - dB
0	0
-1	18
-2	32
-3	40
-4	45
-5	49
-6	52
-7	54
-8	56
-9	58

#### 4.4 BITE Test

- a. Set RF-590 controls as follows:

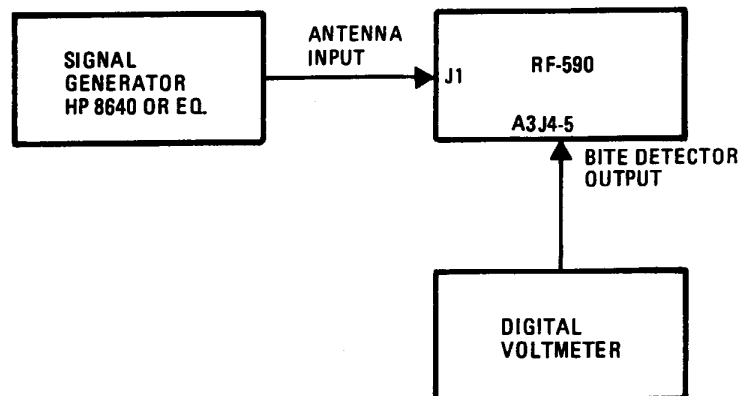
Frequency: 10.000000 MHz

Mode: USB

AGC: OFF

RF Gain: Fully clockwise (cw)

- b. Connect equipment as shown in figure 3.



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Figure 3. A3 BITE Test Setup

- c. Set signal generator to -20 dBm at 40.455 MHz. BITE output voltage must be approximately 2.25 -3 Vdc.
- d. Disconnect all equipment and reconnect A3 to RF-590. Initiate RF-590 BITE test. The receiver must pass 03 testing.

#### 5. PARTS LIST

Table 3 is a comprehensive parts list of all replaceable components in Second Converter Assembly A3. When ordering parts from the factory, include a full description of the part. Use figure 4, the Second Converter Assembly component location diagram to identify parts.

#### 6. SCHEMATIC DIAGRAM

Figure 5 is the Second Converter Assembly schematic diagram.



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**Table 3. Second Converter Assembly A3 Parts List (PL 10073-5300)**

Ref. Desig.	Part Number	Description
	10073-5300	PWB, 2ND CONVERTER
	E70-0002-002	PAD MNT XSTR TO-5
C1	CM04FD111J03	CAP 110PF 5% 500V MICA
C2	CK05BX103M	CAP .01UF 20% 100V CER
C3	CK05BX103M	CAP .01UF 20% 100V CER
C4	CK05BX103M	CAP .01UF 20% 100V CER
C5	CM04CD120J03	CAP 12PF 5% 500V MICA
C6	CM04FD111J03	CAP 110PF 5% 500V MICA
C7	CK05BX103M	CAP .01UF 20% 100V CER
C8	CK05BX103M	CAP .01UF 20% 100V CER
C9	CM04CD120J03	CAP 12PF 5% 500V MICA
C10	CM04FA391J03	CAP 390PF 5% 100V MICA
C11	CM04FA391J03	CAP 390PF 5% 100V MICA
C12	CM06FD182J03	CAP 1800PF 5% 500V MICA
C13	M39014/02-1320	CAP .47UF 10% 50V CER-R
C14	M39014/02-1310	CAP .1UF 10% 100V CER-R
C15	M39014/02-1320	CAP .47UF 10% 50V CER-R
C16	M39014/02-1320	CAP .47UF 10% 50V CER-R
C17	M39014/02-1310	CAP .1UF 10% 100V CER-R
C18	CK05BX103M	CAP .01UF 20% 100V CER
C19	CK05BX103M	CAP .01UF 20% 100V CER
C20	CK05BX103M	CAP .01UF 20% 100V CER
C21	CK05BX103M	CAP .01UF 20% 100V CER
C22	CK05BX103M	CAP .01UF 20% 100V CER
C23	M39014/02-1320	CAP .47UF 10% 50V CER-R
C24	CM04CD070D03	CAP 7PF +-.5PF 500V MICA
C25	CM04CD070D03	CAP 7PF +-.5PF 500V MICA
C26	CK05BX103M	CAP .01UF 20% 100V CER
CR1	D12-0007-001	DIODE 1W 75V PIN SW
CR2	1N4454	DIODE 200mA 75V SW
CR3	1N4454	DIODE 200mA 75V SW
CR4	1N4454	DIODE 200mA 75V SW
FL1	10073-7001	FILTER
J1	J-0031	CONN SMB VERT PCB F
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F
J4	J46-0032-005	HDR 5 PIN 0.100" SR
L1	L11-0004-011	INDUCT SH VAR .612-.748UH
L2	L11-0004-011	INDUCT SH VAR .612-.748UH
L3	MS14046-6	COIL 15UH 10% FXD RF
L4	MS18130-3	COIL .33UH 10% FXD RF
L5	MS18130-3	COIL .33UH 10% FXD RF
L6	MS18130-8	COIL 1.0UH 10% FXD RF
L7	MS18130-15	COIL 3.9UH 10% FXD RF
L8	MS18130-15	COIL 3.9UH 10% FXD RF

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**Table 3. Second Converter Assembly A3 Parts List (PL 10073-5300) (Cont.)**

Ref. Desig.	Part Number	Description
L9	MS14046-6	COIL 15UH 10% FXD RF
L10	MS90539-15	COIL 1000UH 5% FXD RF
Q1	Q35-0001-001	XSTR JFET J310
Q2	Q35-0001-001	XSTR JFET J310
Q3	2N5109	XSTR RFPWR NPN TO-39
Q4	2N2222	XSTR SS/GP NPN TO-18
R1	R65-0003-181	RES 180 5% 1/4W CAR FILM
R2	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R3	R65-0003-181	RES 180 5% 1/4W CAR FILM
R4	R65-0003-101	RES 100 5% 1/4W CAR FILM
R5	R65-0003-510	RES 51 5% 1/4W CAR FILM
R6	R65-0003-101	RES 100 5% 1/4W CAR FILM
R7	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R8	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R9	R65-0003-561	RES 560 5% 1/4W CAR FILM
R10	R65-0003-270	RES 27 5% 1/4W CAR FILM
R11	R65-0003-431	RES 430 5% 1/4W CAR FILM
R12	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R13	R65-0003-101	RES 100 5% 1/4W CAR FILM
R14	R65-0003-242	RES 2.4K 5% 1/4W CAR FILM
R15	R65-0003-471	RES 470 5% 1/4W CAR FILM
R16	R65-0003-399	RES 3.9 5% 1/4W CAR FILM
R17	R65-0003-101	RES 100 5% 1/4W CAR FILM
R18	R65-0003-681	RES 680 5% 1/4W CAR FILM
R19	R65-0003-301	RES 300 5% 1/4W CAR FILM
R20	R65-0003-180	RES 18 5% 1/4W CAR FILM
R21	R65-0003-301	RES 300 5% 1/4W CAR FILM
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	I51-0003-001	MIXER DB 50mW 500MHZ

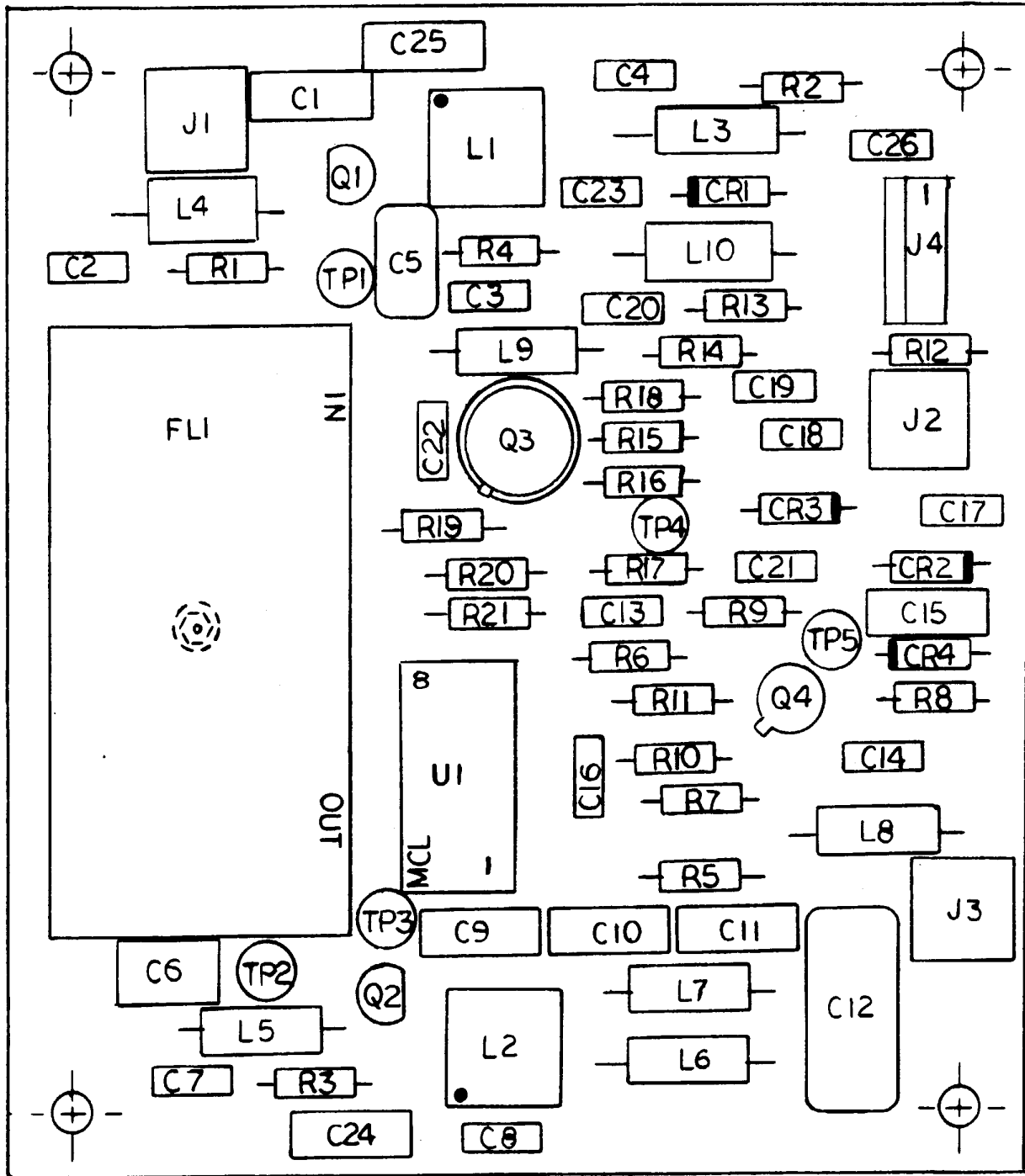


Figure 4. Second Converter Assembly A3 Component Location Diagram (10073-5300, Rev. F)



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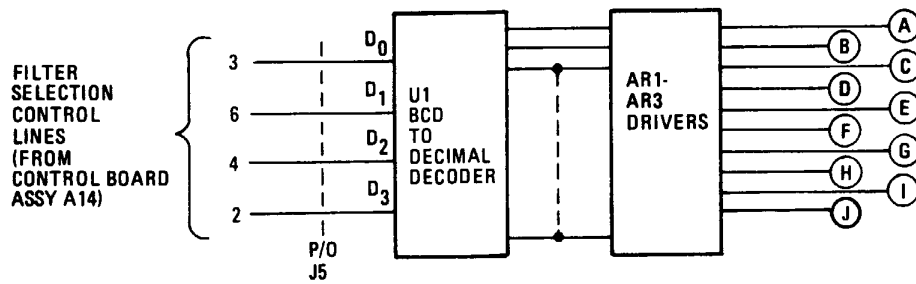
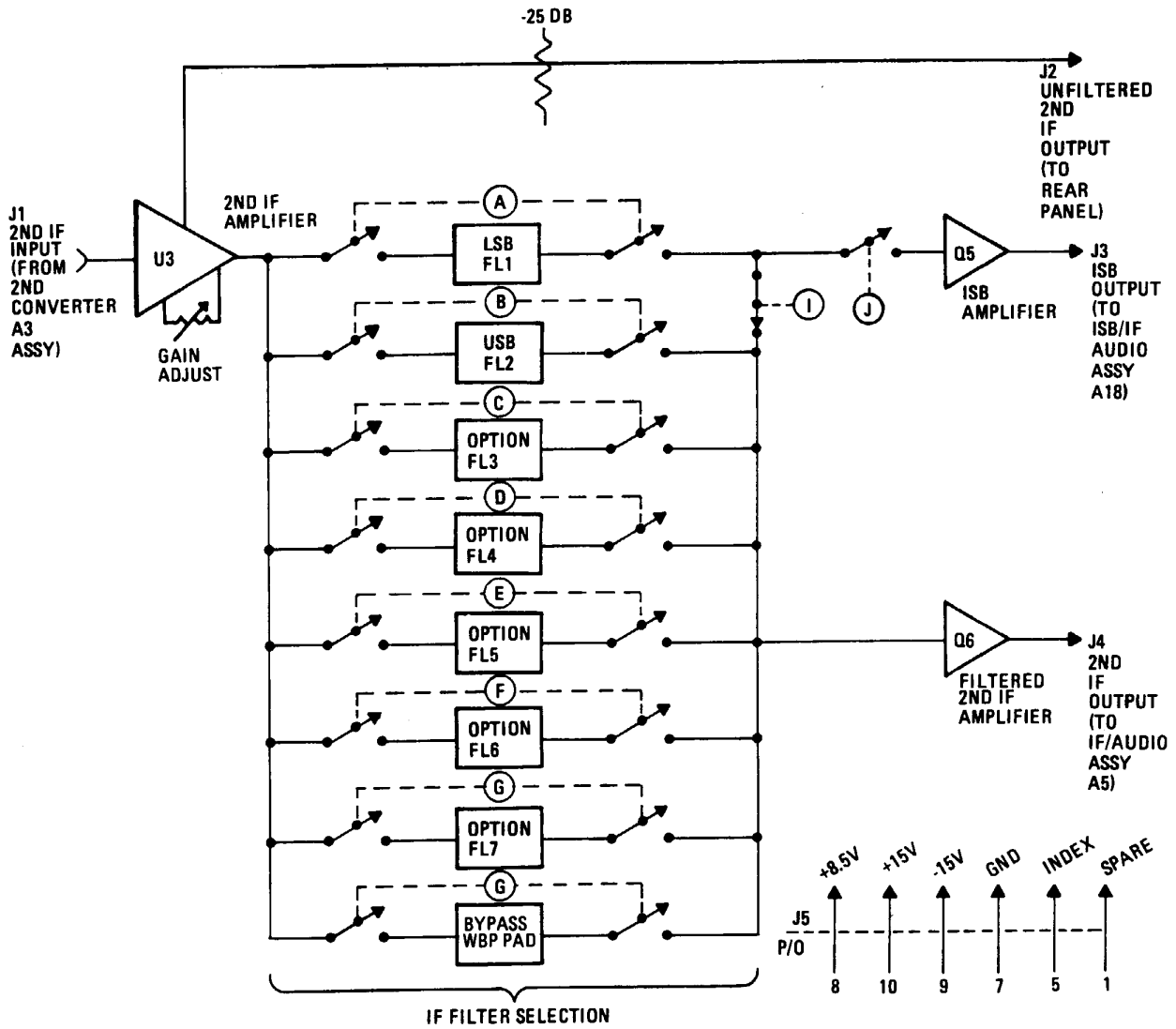
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**IF Filter Assembly A4 Functional Block Diagram**

**1. GENERAL DESCRIPTION**

IF Filter Assembly A4 contains provisions for automatically selecting one of seven bandpass filters or one filter bypass function, which is a resistive pad. The main signal frequency selectivity is determined by these filters. Actual filter bandwidths which may be employed are customer specified and depend upon operational modes desired (see note below). Table 1 shows a typical filter complement in the RF-590. Automatic filter selection is accomplished via flexible programmable logic circuitry on Control Board Assembly A14.

**NOTE**

Filter positions FL1 and FL2 must be reserved for LSB and USB (respectively) if ISB operation is desired. (ISB operation requires the simultaneous selection of two filters). WBP Pad is an R.C. filter pad network and is used for standard AM 16 kHz bandwidth and FM 16 kHz bandwidth operation.

**Table 1. Typical RF-590 Filter Complement**

Mode of Operation	Filter Selected	Specified Bandwidth
LSB	FL1	2.8 kHz
USB	FL2	2.8 kHz
CW	FL3	.3 kHz
CW	FL4	1.0 kHz
AM	FL5	3.2 kHz
AM	FL6	6.8 kHz
Optional	FL7	--
FM or AM	WBP Pad	16 kHz (Bypass)

Input signals at 455 kHz (nominally) arrive at J2 from Second Converter Assembly A3. Three A4 signal outputs are derived.

- Filtered Second IF output at J4. This output is fed to IF/Audio Assembly A5, and is chosen whenever SSB, AM, or FM detection is required.

- ISB output at J3. This output is fed to ISB IF/Audio Assembly A18 and is used whenever Independent Sideband (ISB) reception of LSB and USB signals is simultaneously required. Under these conditions, J3 carries the LSB signal to the A18 Assembly while J4 routes the USB signal to the A5 Assembly. Note that ISB IF/Audio Assembly A18 is an optional assembly, and ISB operation is not possible unless the RF-590 is equipped with it.
- Unfiltered second IF output at J2. This output is fed to RF-590 rear panel connector J3, and is provided as a convenience whenever external signal processing of the wideband signal (present at J1) is required.

Overall assembly gain is set by R10 to nominally be 10 dB at J4 in the USB mode of operation. This also sets the ISB output (when used) to 10 dB, and the unfiltered second IF output to approximately 4 dB.

## 2. INTERFACE CONNECTIONS

Table 2 details the various input/output connections and other relevant data.

**Table 2. IF Filter Assembly A4 Interface Connections**

Connector	Function	Characteristics
J1	Unfiltered second IF input	455 kHz, -107/-15 dBm, $Z_o = 50$ ohms
J2	Unfiltered second IF output	455 kHz, -103/-11 dBm, $Z_o = 50$ ohms
J3	ISB output	455 kHz, -97/-5 dBm, $Z_o = 50$ ohms
J4	Filtered second IF output	455 kHz, -97/-5 dBm, $Z_o = 50$ ohms
J5-1	Spare	
J5-2	D3	*
J5-3	D0	*
J5-4	D2	*
J5-5	Index pin	
J5-6	D1	*
J5-7	Ground	
J5-8	Power	+8.5 V at 8 mA
J5-9	Power	-15 V at 30 mA
J5-10	Power	+15 V at 100 mA

\* Filter select line: 0 = ground, 1 = +5 V



### 3. CIRCUIT DESCRIPTION

#### 3.1 Input/Output Amplifiers

Unfiltered second IF signals at J1 are applied to second IF amplifier U3. U3 provides +27 dB (nominal) of gain at each of two outputs, adjustable by R10. The output at pin 8 drives the selected filter input, and is adjusted by R10 for a nominal assembly gain of 10 dB with the USB filter selected.

The second U3 output at pin 7 is applied through 50 ohm matching network R75 and R77 to J2. This unfiltered 455 kHz IF output is then routed to RF-590 rear panel connector J2. Output level under AGC action at this port is typically -103/-11 dBm into 50 ohms.

Output source follower FET amplifier Q6 matches the high impedance filter outputs (5 K ohms) to the low impedance IF/Audio Assembly A5 input (50 ohms). Q6 may normally receive signals from any of the filters, depending upon the filter selected. However, when the ISB option is used, diode logic steers only USB information to Q6, while LSB information is steered to Q5 (see paragraph 3.2).

Output amplifier Q5 is essentially identical to Q6, except that it is used only when the ISB option is used, and then will only carry ISB (LSB) information. ISB signals would then pass through J3 ISB output to ISB IF/Audio Assembly A18. Q5 is turned off by Q4 when the radio is not in the ISB mode (see paragraph 3.2).

#### 3.2 Filter Selection

Automatic filter selection control originates on Control Assembly A14 in response to operator entries via the front panel controls. Control line inputs D0-D3 carry BCD control signals to BCD to decimal decoder U1. U1 outputs (as a function of control line inputs) are shown in table 3. U1 outputs are normally low (0 volts) until they are selected, and then switch high (5 volts).

U1 outputs, in turn, selectively drive switches AR1-AR3. These switches then select the appropriate filter by putting -15 Vdc on the associated filter control line, while holding all other lines at +15 Vdc.

As an example, consider the selection of FL3. U1 filter select control lines would be D0 = 1, D1 = 1, D2 = 0, and D3 = 0. This would cause only U1, pin 15, to switch high (+5 Vdc); all other outputs would remain low. This 5 volt level causes switch AR1-A, pin 13, (-) input to exceed the 2 volt level at AR1-A, pin 12 (+), which forces the output, pin 14, to swing to -15 Vdc. Note that at this time, all other switch outputs would be at +15 Vdc.

The -15 Vdc potential at AR1-A, pin 14, now forward biases CR12 and CR15, while reverse biasing CR13 and CR14. Any signal present at amplifier U3 output would now be allowed to only pass through FL3 to buffer amplifier Q6. Diodes associated with all other filters would prevent any signal from passing through these filters.

Table 3. A4 Filter Selection

Filter Position Chosen	Mode	Control Line Inputs				Selected Output Pin No.	Output Amplifier Used
		U1-10 D0	U1-13 D1	U1-12 D2	U1-11 D3		
FL1	LSB	0	1	0	0	2	Q6
FL2	USB	0	0	0	0	3	Q6
*FL1, FL2	ISB	1	0	0	0	14	Q5 and Q6
*FL1, FL2	ISB/LSB	1	0	0	1	5	Q5 and Q6
FL3	CW	1	1	0	0	15	Q6
FL4	CW	0	0	1	0	1	Q6
FL5	AM	1	0	1	0	6	Q6
FL6	AM	0	1	1	0	7	Q6
FL7	Optional	1	1	1	0	4	Q6
WBP Pad	Bypass	0	0	0	1	9	Q6

\*Software Dependent

If some other filter is selected, U1, pin 15, would now switch low (0 Vdc). This triggers AR1-A, pin 14, to swing to +15 Vdc. This level reverse biases CR12 and CR15 (preventing any signal from passing through FL3), while forward biasing CR13 and CR14 (which would short out any signal that did appear there).

### 3.2.1 ISB Operation

During ISB operation, U1, pin 14, is selected, allowing AR2-A and AR3-A to switch to -15 Vdc via OR Gates P/O U2. Control lines for FL1 and FL2 are then -15 Vdc, enabling FL1 and FL2. This places both USB and LSB filters in the circuit. The control line to R59 and R60 goes to +15 Vdc, which reverse biases CR5 and CR7, effectively steering FL1 (LSB) signals to Q5 (ISB output) and FL2 (USB) signals to Q6. Also, Q4 is selected via AR1-D which activates Q5 by applying +15 Vdc on Q5's drain.

Note that under normal LSB operation, the control line to R59 and R60 would be at -15 V. CR5 and CR7 would be forward biased and LSB signals would flow to Q6. All other operating modes except ISB would cause Q4 to turn Q5 off.

## 4. MAINTENANCE

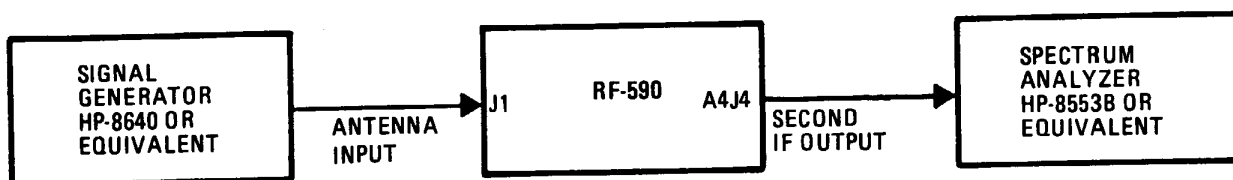
The following adjustment should not be performed as a routine maintenance procedure. It should be performed under the following two conditions:

- A failure indicating a definite problem
- Installation of new or different sideband filters. If the new filters have a loss which is different than the loss of the filters supplied with the RF-590, then R10 should be readjusted according to paragraph 4.1.

All tests are performed with all assembly connections in normal contact unless otherwise specified.

#### 4.1 Input/Output Amplifier Test/Adjustment

- a. Verify that the proper filters are installed in the A4 Assembly.
- b. Remove the ribbon cable connecting the AGC Assembly A5A2 to the IF/Audio Amp assembly A5A1.
- c. Set RF-590 controls as follows:
  - Frequency: 10.000000 MHz
  - Mode: USB
  - AGC: OFF
  - RF Gain: Fully clockwise (cw)
- d. Connect equipment as shown in figure 1.



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**Figure 1. A4 I/O Amplifiers Test Setup**

- e. Apply a -70 dBm, 10.0015 signal to J1, Antenna Input. Monitoring A4J4, adjust R10 for -44 dBm signal level.
- f. Monitor J2 (unfiltered IF output) with a spectrum analyzer. Signal level should be approximately -50 dBm.
- g. Place RF-590 to ISB mode of operation (if option is installed). Change signal generator frequency to 9.9985 MHz. Monitor A4J3 (ISB output) with spectrum analyzer. Signal level should be the same as step e.
- h. Disconnect test equipment and reconnect A4 to RF-590.

**4.2 Filter Selection Test**

- a. Selection of filters via the front panel consists of verifying that only the proper filter control line goes to -15 Vdc when the desired filter is selected. All other lines must stay at +15 Vdc (except in the case of ISB mode, where both control lines FL1 and FL2 go to -15 Vdc).
- b. Initiate RF-590 BITE test. The receiver must pass 04 testing.

**5. PARTS LIST**

Table 4 is a comprehensive parts list of all replaceable components in IF Filter Assembly A4. When ordering parts from the factory, include a full description of the part. Use figure 2, the IF Filter Assembly component location diagram to identify parts.

**6. SCHEMATIC DIAGRAMS**

Figure 3 is the IF Filter Assembly schematic diagram.

**Table 4. IF Filter Assembly A4 Parts List (PL 10073-5570)**

Ref. Desig.	Part Number	Description
	10073-5570	PWB, IF FILTER
AR1 - AR3	I30-0003-000	IC 324 OP AMP PLASTIC
C6	M39014/02-1320	CAP .47UF 10% 50V CER-R
C9	M39014/02-1320	CAP .47UF 10% 50V CER-R
C10	M39014/01-1535	CAP .01UF 20% 100V CER
C11	M39014/01-1535	CAP .01UF 20% 100V CER
C12	M39014/02-1320	CAP .47UF 10% 50V CER-R
C13	CM04FC271J03	CAP 270PF 5% 300V MICA
C14	CM04FC271J03	CAP 270PF 5% 300V MICA
C15	M39014/02-1320	CAP .47UF 10% 50V CER-R
C16	M39014/01-1535	CAP .01UF 20% 100V CER
C17	M39014/01-1535	CAP .01UF 20% 100V CER
C18	CM04FC271J03	CAP 270PF 5% 300V MICA
C19	CM04FC271J03	CAP 270PF 5% 300V MICA
C20	M39014/02-1320	CAP .47UF 10% 50V CER-R
C21	M39014/01-1535	CAP .01UF 20% 100V CER
C22	M39014/01-1535	CAP .01UF 20% 100V CER
C23	CM04FD181J03	CAP 180PF 5% 500V MICA
C24	CM04FD181J03	CAP 180PF 5% 500V MICA
C25	M39014/02-1320	CAP .47UF 10% 50V CER-R
C26	M39014/01-1535	CAP .01UF 20% 100V CER
C27	M39014/01-1535	CAP .01UF 20% 100V CER
C28	CM04FD111J03	CAP 110PF 5% 500V MICA
C29	CM04FD111J03	CAP 110PF 5% 500V MICA
C30	M39014/02-1320	CAP .47UF 10% 50V CER-R
C31, C32	M39014/01-1535	CAP .01UF 20% 100V CER
C33	CM04FA361J03	CAP 360PF 5% 100V MICA

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Table 4. IF Filter Assembly A4 Parts List (PL 10073-5570) (Cont.)

Ref. Desig.	Part Number	Description
C34	CM04FA361J03	CAP 360PF 5% 100V MICA
C35	M39014/02-1320	CAP .47UF 10% 50V CER-R
C36	M39014/01-1535	CAP .01UF 20% 100V CER
C37	M39014/01-1535	CAP .01UF 20% 100V CER
C38	CM06FD751J03	CAP 750PF 5% 500V MICA
C39	CM06FD751J03	CAP 750PF 5% 500V MICA
C40	M39014/02-1320	CAP .47UF 10% 50V CER-R
C41	M39014/01-1535	CAP .01UF 20% 100V CER
C42	M39014/01-1535	CAP .01UF 20% 100V CER
C43	CM06FD122J03	CAP 1200PF 5% 500V MICA
C44	CM06FD122J03	CAP 1200PF 5% 500V MICA
C45	M39014/02-1320	CAP .47UF 10% 50V CER-R
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	M39014/01-1535	CAP .01UF 20% 100V CER
C51	M39014/02-1310	CAP .1UF 10% 100V CER-R
C52	M39014/02-1310	CAP .1UF 10% 100V CER-R
C53	M39014/02-1310	CAP .1UF 10% 100V CER-R
C54	M39014/02-1310	CAP .1UF 10% 100V CER-R
C55	C26-0016-330	CAP 33UF 20% 16V TANT
C56	M39014/02-1320	CAP .47UF 10% 50V CER-R
C57	M39014/02-1320	CAP .47UF 10% 50V CER-R
C58	M39014/02-1320	CAP .47UF 10% 50V CER-R
C59	M39014/02-1320	CAP .47UF 10% 50V CER-R
C60	M39014/02-1320	CAP .47UF 10% 50V CER-R
C61	M39014/02-1320	CAP .47UF 10% 50V CER-R
C62	C26-0025-470	CAP 47UF 20% 25V TANT
C63	C26-0025-470	CAP 47UF 20% 25V TANT
CR1	1N4454	DIODE 200mA 75V SW
CR2	1N4454	DIODE 200mA 75V SW
CR3	1N4454	DIODE 200mA 75V SW
CR4	1N4454	DIODE 200mA 75V SW
CR5	1N4454	DIODE 200mA 75V SW
CR6	1N4454	DIODE 200mA 75V SW
CR7	1N4454	DIODE 200mA 75V SW
CR8	1N4454	DIODE 200mA 75V SW
CR9	1N4454	DIODE 200mA 75V SW
CR10	1N4454	DIODE 200mA 75V SW
CR11	1N4454	DIODE 200mA 75V SW
CR12	1N4454	DIODE 200mA 75V SW
CR13	1N4454	DIODE 200mA 75V SW
CR14	1N4454	DIODE 200mA 75V SW
CR15	1N4454	DIODE 200mA 75V SW

**HARRIS**  
**RF COMMUNICATIONS**

**Table 4. IF Filter Assembly A4 Parts List (PL 10073-5570) (Cont.)**

Ref. Desig.	Part Number	Description
CR16	1N4454	DIODE 200mA 75V SW
CR17	1N4454	DIODE 200mA 75V SW
CR18	1N4454	DIODE 200mA 75V SW
CR19	1N4454	DIODE 200mA 75V SW
CR20	1N4454	DIODE 200mA 75V SW
CR21	1N4454	DIODE 200mA 75V SW
CR22	1N4454	DIODE 200mA 75V SW
CR23	1N4454	DIODE 200mA 75V SW
CR24	1N4454	DIODE 200mA 75V SW
CR25	1N4454	DIODE 200mA 75V SW
CR26	1N4454	DIODE 200mA 75V SW
CR27	1N4454	DIODE 200mA 75V SW
CR28	1N4454	DIODE 200mA 75V SW
CR29	1N4454	DIODE 200mA 75V SW
CR30	1N4454	DIODE 200mA 75V SW
CR31	1N4454	DIODE 200mA 75V SW
CR32	1N4454	DIODE 200mA 75V SW
CR33	1N4454	DIODE 200mA 75V SW
CR34	1N4454	DIODE 200mA 75V SW
CR35	1N4454	DIODE 200mA 75V SW
CR39	1N4454	DIODE 200mA 75V SW
FL1	10073-7301	FILTER,MECH,455 KHZ USB
FL2	10073-7300	FILTER,MECH 455 KHZ LSB
FL3	10073-7302	FILTER
FL4	10073-7303	FILTER
FL5	10073-7304	FILTER
FL6	10073-7305	FILTER
J1	J-0031	CONN SMB VERT PCB F
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F
J4	J-0031	CONN SMB VERT PCB F
J5	J46-0032-010	HDR 10 PIN 0.100" SR
L4	MS75085-13	COIL 330UH 10% FXD RF
L5	MS75085-13	COIL 330UH 10% FXD RF
L6	10073-7033	INDUCTOR, 10MH
L7	10073-7033	INDUCTOR, 10MH
L8	MS75085-13	COIL 330UH 10% FXD RF
L9	MS75085-13	COIL 330UH 10% FXD RF
Q4	2N2222	XSTR 5S/GP NPN TO-18
Q5	Q35-0001-001	XSTR JFET J310
Q6	Q35-0001-001	XSTR JFET J310
R1	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R2	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R3	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R4	R65-0003-103	RES 10K 5% 1/4W CAR FILM

 **HARRIS**  
**RF COMMUNICATIONS**

**Table 4. IF Filter Assembly A4 Parts List (PL 10073-5570) (Cont.)**

Ref. Desig.	Part Number	Description
R5	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R6	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R7	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R8	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R10	R-2205	RES,VAR,PCB 500 .5 20%
R17	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R21	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R22	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R23	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R24	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R25	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R26	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R27	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R28	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R29	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R30	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R31	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R32	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R33	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R34	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R35	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R36	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R37	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R38	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R39	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R40	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R41	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R42	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R43	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R44	RNC55H5111FM	RES,5110 1% 0.1W MET FLM
R45	R65-0003-822	RES 8.2K 5% 1/4W CAR FILM
R46	R65-0003-822	RES 8.2K 5% 1/4W CAR FILM
R47	R65-0003-912	RES 9.1K 5% 1/4W CAR FILM
R48	R65-0003-101	RES 100 5% 1/4W CAR FILM
R49	R65-0003-101	RES 100 5% 1/4W CAR FILM
R50	R65-0003-101	RES 100 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	R65-0003-101	RES 100 5% 1/4W CAR FILM
R54	R65-0003-101	RES 100 5% 1/4W CAR FILM
R55	R65-0003-101	RES 100 5% 1/4W CAR FILM
R56	R65-0003-101	RES 100 5% 1/4W CAR FILM
R57	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R58	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R59	R65-0003-333	RES 33K 5% 1/4W CAR FILM

 **HARRIS**  
**RF COMMUNICATIONS**

**Table 4. IF Filter Assembly A4 Parts List (PL 10073-5570) (Cont.)**

Ref. Desig.	Part Number	Description
R60	R65-0003-333	RES 33K 5% 1/4W CAR FILM
R61	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R62	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R63	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R64	R65-0003-101	RES 100 5% 1/4W CAR FILM
R65	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R66	R65-0003-101	RES 100 5% 1/4W CAR FILM
R67	R65-0003-101	RES 100 5% 1/4W CAR FILM
R68	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R69	R65-0003-101	RES 100 5% 1/4W CAR FILM
R70	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R71	R65-0003-510	RES 51 5% 1/4W CAR FILM
R72	R65-0003-510	RES 51 5% 1/4W CAR FILM
R73	R65-0003-511	RES 510 5% 1/4W CAR FILM
R74	R65-0003-511	RES 510 5% 1/4W CAR FILM
R75	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R76	R65-0003-681	RES 680 5% 1/4W CAR FILM
R77	R65-0003-510	RES 51 5% 1/4W CAR FILM
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"
TP6	J-0072	TP PWB BLU TOP ACCS .080"
TP7	J-0073	TP PWB VIO TOP ACCS .080"
TP8	J-0074	TP PWB GRA TOP ACCS .080"
U1	I01-0000-200	IC 4028B PLASTIC CMOS
U2	I01-0000-023	IC 4071B PLASTIC CMOS
U3	I50-0002-000	IC 733 VIDEO AMP PLASTIC
VR1	1N5231B	DIODE 5.1V 5% .5W ZENER



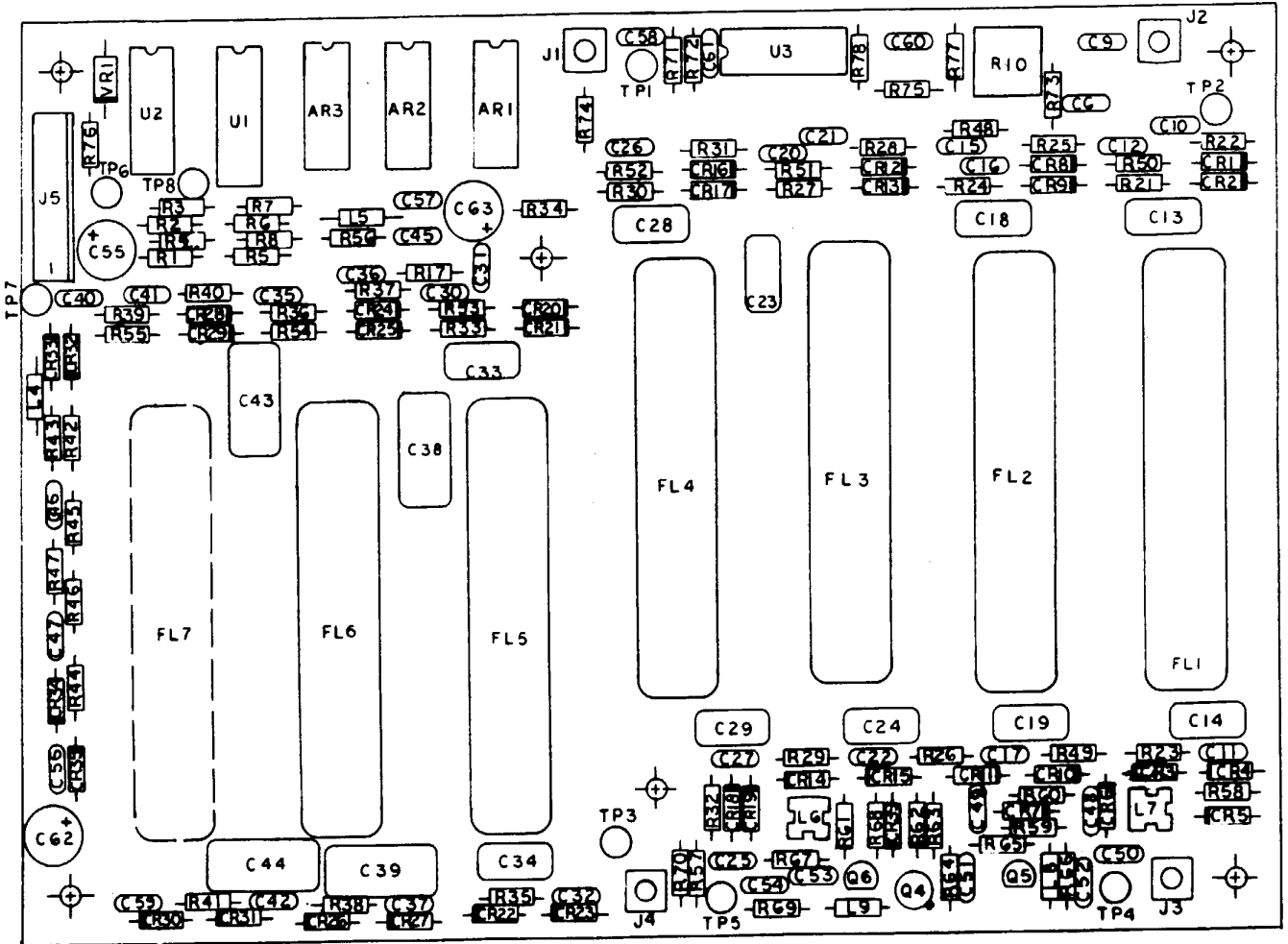


Figure 2. IF Filter Assembly A4 Component Location Diagram (10073-5570, Rev. D)

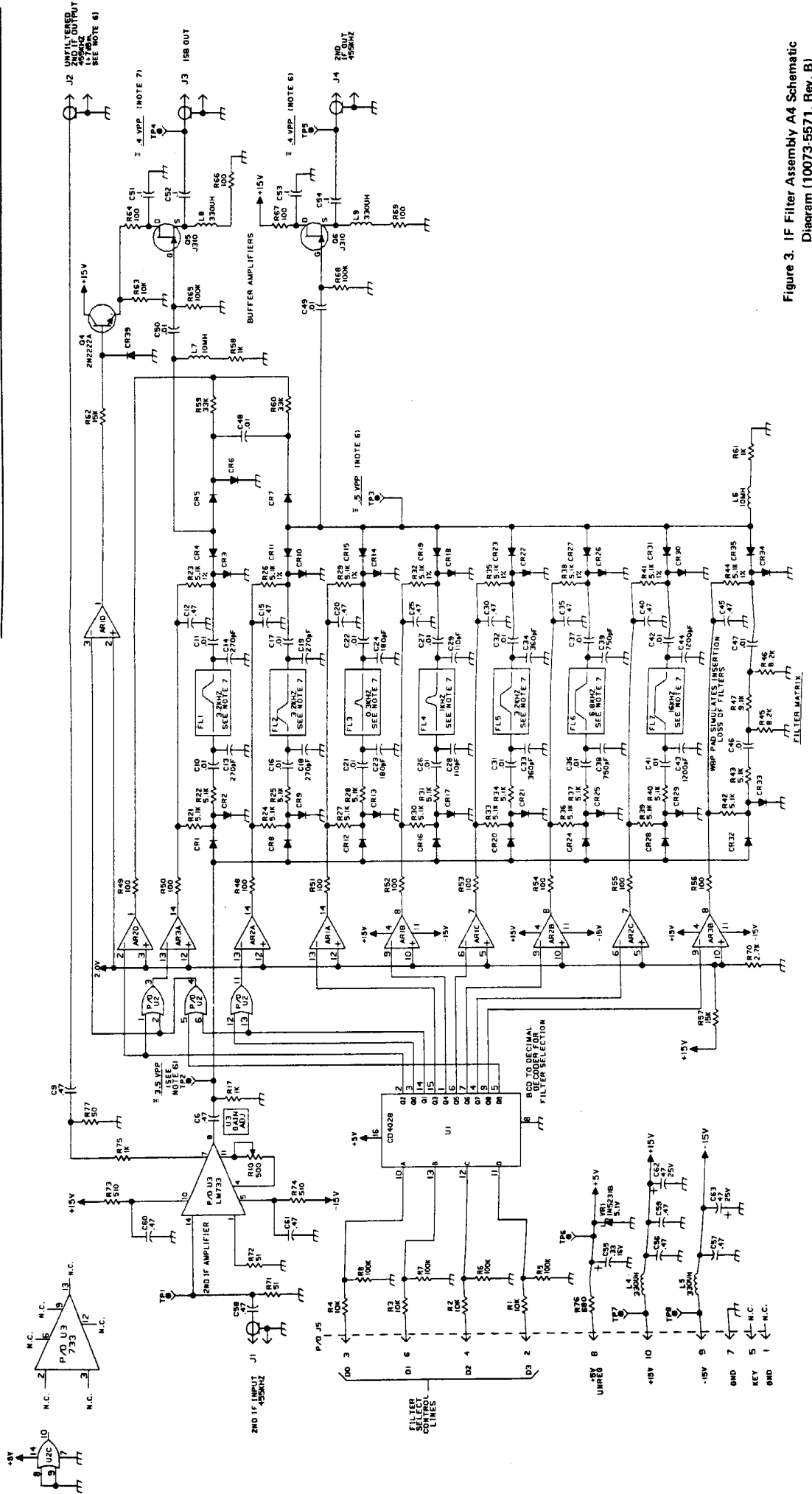
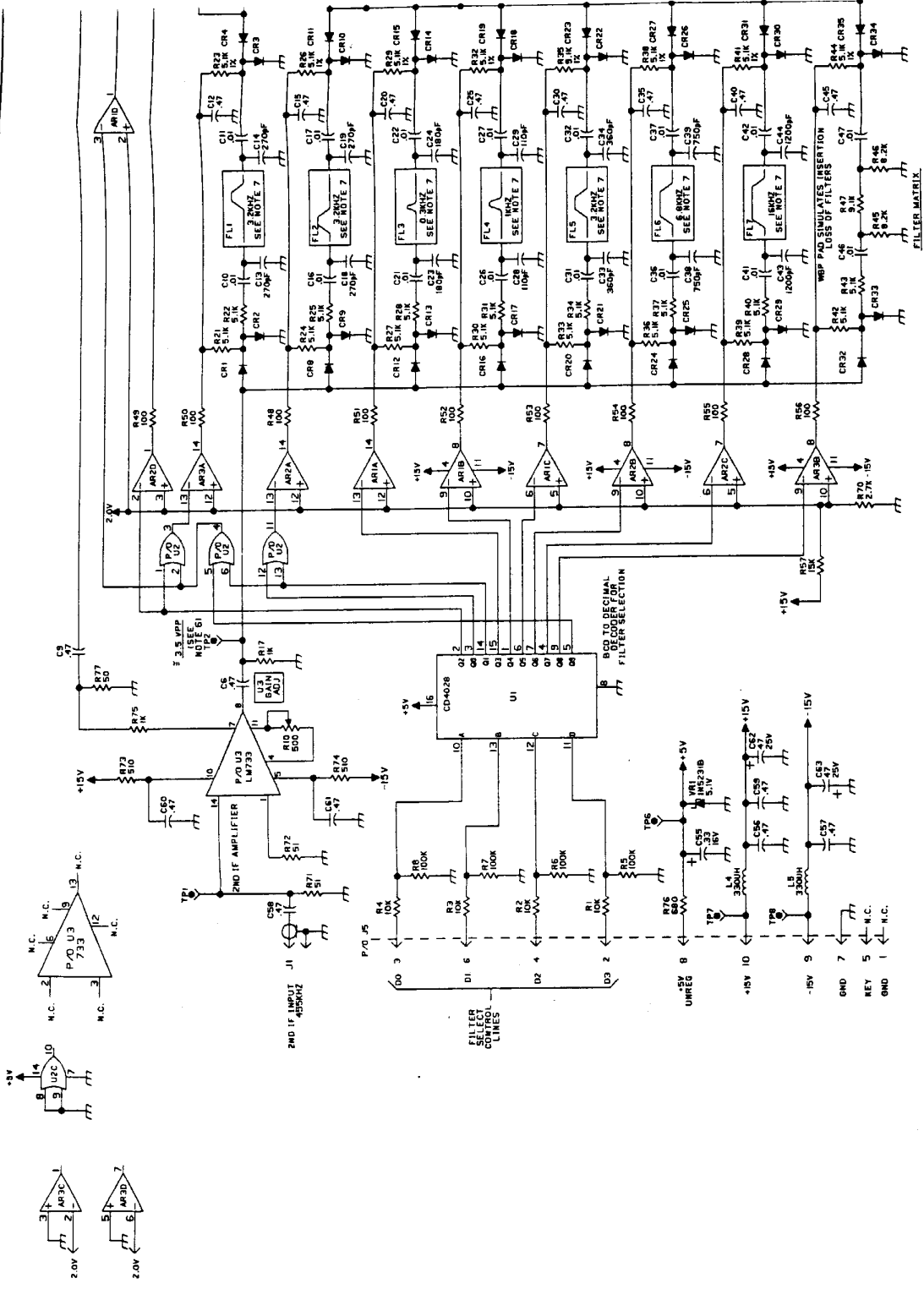


Figure 3. IF Filter Assembly A4 Schematic Diagram (10073-5571, Rev. B)



- 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. ALL UNLABELED DIODES ARE DID 4454-000.
  5. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED BY PART NO. IN PARTS LIST.
  6. COMPONENTS TO BE SPECIFIED CORRESPOND TO SKETCHED 485 KHZ INJECTION AT J1.
  7. FILTERS FL1 THROUGH FL7 ARE AND TYPE. OPTIONAL AND MAY VARY IN USE AND TYPE.

