CERTIFICATION

Hewlett-Packard Company (HP) certifies that this product met its published specifications at the time of shipment from the factory. HP further certifies that its calibration measurements are traceable to the United States National Bureau of Standards, to the extent allowed by the Bureau's calibration facility, and to the calibration facilities of other International Standards Organization members.

WARRANTY

This HP instrument product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, HP will, at its option, either repair or replace products which prove to be defective.

For warranty service or repair, this product must be returned to a service facility designated by HP. Buyer shall prepay shipping charges to HP and HP shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties, and taxes for products returned to HP from another country.

HP warrants that its software and firmware designated by HP for use with an instrument will execute its programming instructions when properly installed on that instrument. HP does not warrant that the operation of the instrument, or software, or firmware will be uninterrupted or error free.

LIMITATION OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HP SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCLUSIVE REMEDIES

THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES. HP SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

SECTION I. GENERAL INFORMATION

1-1. INTRODUCTION

This manual contains information required to install, operate, and service the Hewlett-Packard Model 3048A Option K22 Dual RF Amplifier, an optional accessory for the HP 3048A Phase Noise Measurement System.

The Dual RF Amplifier Operating and Service Manual has five sections. The subjects addressed are:

1-2. SPECIFICATIONS

Instrument specifications are listed in table 1-1. These specifications are the performance standards or limits against which the instrument may be tested.

Table 1-1. Specifications

Characteristics	Performance Limits	Conditions
MAXIMUM INPUT POWER	+10 dBm	5 MHz to 1500 MHz
GAIN	9 dB +/-1.5 dB	5 MHz to 1500 MHz
NOISE FIGURE	<7.5 dB Typ.	50 MHz to 1500 MHz
NOISE FLOOR *		Input Frequency
Offset from Carrier (Hz)	dBc/Hz	50 MHz to 1500 MHz
.01	-70	+5 to +10 dBm
1.0	-130	Input Level
10.0	-140	
100.0	-150	
1.0k	-160	
10.0k to 10M	-170	
10.0M to 40M	-165	

* Does not include phase noise and spurious signals from another source.

1-3. DESCRIPTION

The HP Model 3048A Option K22 Dual RF Amplifier is an optional accessory to the HP 3048A Phase Noise Measurement System. It contains two RF amplifiers and an on-board +15V regulator.

The RF amplifiers have a gain of 9 dB +/-1.5 dB with a maximum output power of +15 dBm typical. The inputs and outputs of the two amplifiers are accessed by four SMA connectors on the front cover.

A +19V to +25V DC power supply is needed at the POWER input. The +15V regulator regulates the DC supply down to +15V, which is used to power the two amplifiers.

1-4. INITIAL INSPECTION

Inspect the shipping container. If the container and/or packing material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is mechanical damage or if the instrument does not pass the performance tests, notify the nearest Hewlett-Packard office. Keep the damaged shipping materials (if any) for inspection by the carrier and a Hewlett-Packard representative.

1-5. ACCESSORIES

The accessories supplied with the HP 3048A Option K22 are listed below:

Delay Line.....03048-62018
Adapter-Coax Rgt-Ang SMAf-SMAm.....1250-1249
Adapter-Coax Rgt-Ang SMAm-SMAm.....1250-1397

SECTION II. OPERATION

2-1. CONNECTIONS

The HP 3048A Option K22 requires a +19V to +25V DC supply at the banana connectors on the front cover. The +15V regulator on the pc board provides excellent line rejection. Because of this the +19V to +25V DC supply does not need to be completely noise free. Any regulated DC supply within the required voltage range is sufficient. The DC POWER input is reverse voltage protected to 100V reverse voltage at the DC POWER input.

NOTE

Due to the filter in the +15V regulator, when power is first applied to the HP 3048A Option K22, it will draw approximately 90 mA and then drift up to 160 mA in 10 to 20 seconds.

The input signal to the amplifier can be in the frequency range of 5 MHz to 1500 MHz. The amplifier is specified in the frequency range of 50 MHz to 1500 MHz with an input level between +5 dBm and +10 dBm. The input level can have up to a +/-10V DC bias. The maximum output level is +15 dBm +/-1 dB.

2-2. APPLICATIONS

The HP 3048A Option K22 amplifier is recommended for applications requiring medium gain (8 dB to 16 dB) with high dynamic range. If a larger gain is needed, a HP 8447A or similar pre-amp with the necessary gain is recommended.

Several amplifiers can be cascaded together with attenuators between each amplifier. This will provide isolation between the input and output while maintaining the high dynamic range.

An application for cascading several of the HP 3048A Option K22 with 6 dB pads between each amplifier is to stop an oscillator from injection locking to another oscillator during a phase noise measurement. Figures 2-1, 2-2, and 2-3 show three ways to configure the HP 3048A Option K22 amplifiers with different input levels.

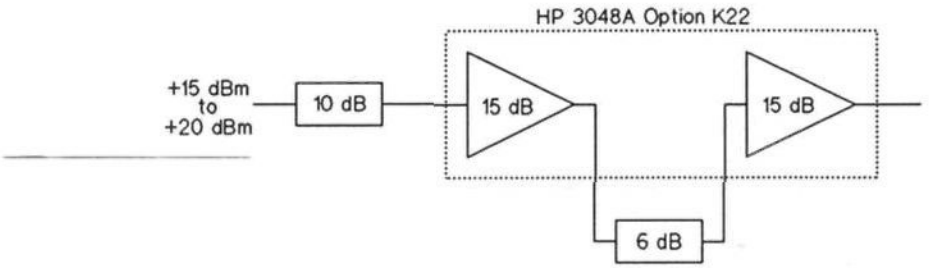


Figure 2-1.

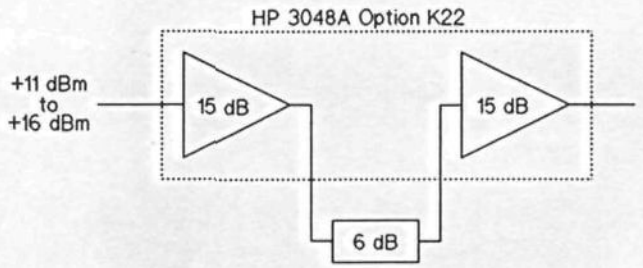


Figure 2-2.

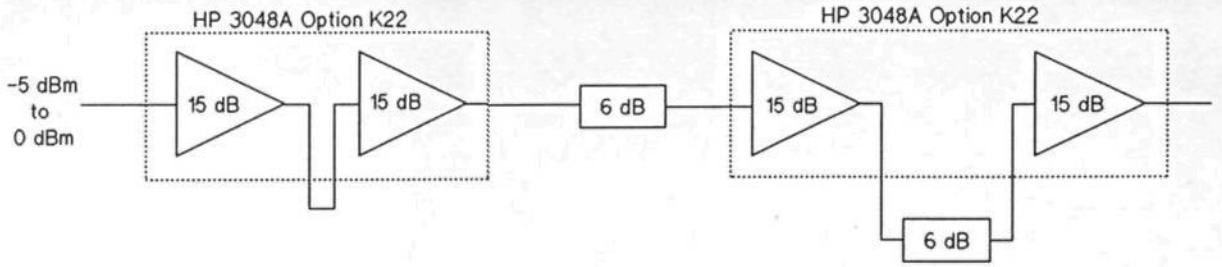


Figure 2-3.

SECTION III. PERFORMANCE TESTS

3-1. INTRODUCTION

The procedures in this section test the instrument's electrical performance using the specifications of table 1-1 as performance standards. All tests are performed without accessing the interior of the instrument.

NOTE

For greatest accuracy, allow the test equipment to warm up at least one-half hour.

3-2. PERFORMANCE TEST RESULTS

Results of the performance tests may be hard copied to a printer for future reference. The results, recorded at incoming inspection, can be used for comparison in periodic maintenance, troubleshooting, and after repairs.

3-3. CALIBRATION CYCLE

This instrument requires periodic verification of performance. Depending on the use and environmental conditions, the instrument should be checked using the following performance tests at least once every year.

3-4. PERFORMANCE TESTING

No abbreviation of the performance testing is recommended.

PERFORMANCE TEST 1

GAIN AND NOISE FIGURE TEST

DESCRIPTION

In this test, a HP 8970A/B is used to measure the gain and noise figure of the HP 3048A Option K22. The HP 8970A/B uses a HP 346B as a noise source. First, the HP 8970A/B must be calibrated by connecting the noise source directly to the input of the HP 8970A/B and calibrating the HP 8970A/B from 10 MHz to 1500 MHz.

One of the amplifiers is then inserted between the HP 346B and the input to the HP 8970A/B. The gain and noise figure for each frequency is then noted and compared to the specifications.

EQUIPMENT

NOISE FIGURE METER.....HP 8970A/B
NOISE SOURCE.....HP 346B
POWER SUPPLY.....HP 6205B

PROCEDURE

1. Connect the equipment up as shown in figure 3-1.

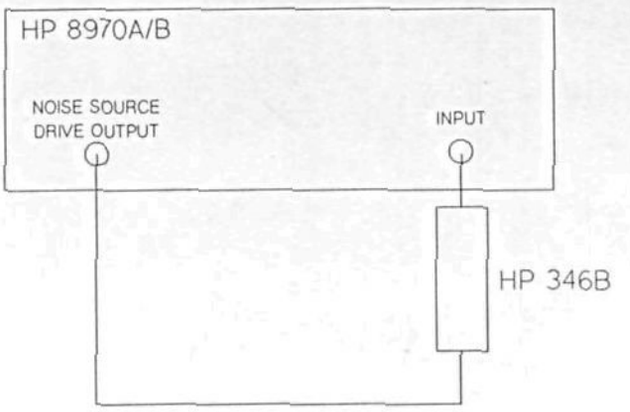


Figure 3-1. Gain/Noise Figure Cal

2. Press the [PRESET] key on the HP 8970A/B.

3. Set up the START and STOP frequencies on the HP 8970A/B by pressing the following keys:

   [START FREQ] 1 0 [ENTER]
   [STOP FREQ] 1 5 0 0 [ENTER]

4. Increase the smoothing to '16' by pressing the [INCREASE] key three times. A '16' should appear in the left display.

5. Press the [NOISE FIGURE AND GAIN] key.

6. Press the [CALIBRATE] key.

7. When the HP 8970A/B finishes its calibration routine connect the equipment up as shown in figure 3-2.

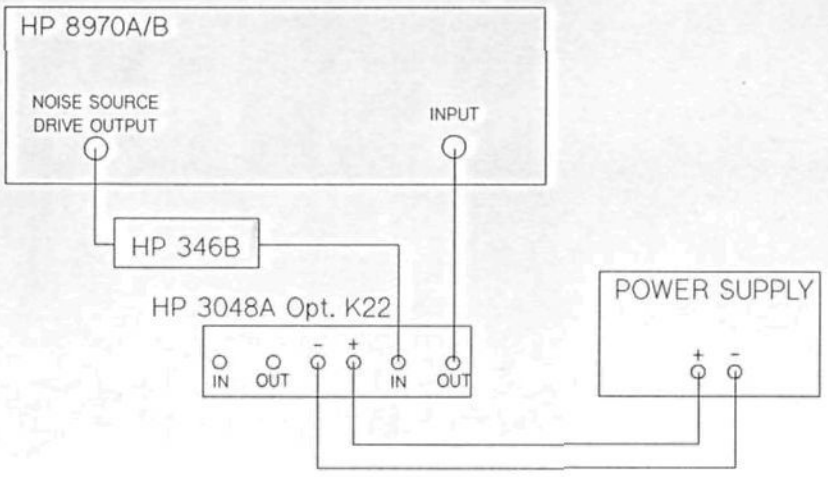


Figure 3-2. Gain/Noise Figure Measurement

8. Press the following keys on the HP 8970A/B:

   [FREQUENCY] 1 0 [ENTER]

9. Note the gain displayed on the HP 8970A/B (middle display) and record it in table 3-1.

10. For each frequency listed in table 3-1, enter the frequency (in MHz) and press [ENTER] on the HP 8970A/B. Note the gain (middle display) and noise figure (right display) of the HP 3048A Option K22 amplifier at that frequency. Record these results in table 3-1.

11. Connect the HP 8970A/B to the left amplifier of the HP 3048A Option K22 and repeat steps 8 thru 10.

Table 3-1. GAIN AND NOISE FIGURE RESULTS

Frequency (MHz)	Gain (dB)	Lower Limit (dB)	Upper Limit (dB)	Noise Figure (dB)	Upper Limit (dB) Typ.
Left Amp					
10	_____	7.5	10.5	*********	*********
50	_____	7.5	10.5	_____	<7.5
100	_____	7.5	10.5	_____	<7.5
250	_____	7.5	10.5	_____	<7.5
500	_____	7.5	10.5	_____	<7.5
750	_____	7.5	10.5	_____	<7.5
1000	_____	7.5	10.5	_____	<7.5
1250	_____	7.5	10.5	_____	<7.5
1500	_____	7.5	10.5	_____	<7.5
Right Amp					
10	_____	7.5	10.5	*********	*********
50	_____	7.5	10.5	_____	<7.5
100	_____	7.5	10.5	_____	<7.5
250	_____	7.5	10.5	_____	<7.5
500	_____	7.5	10.5	_____	<7.5
750	_____	7.5	10.5	_____	<7.5
1000	_____	7.5	10.5	_____	<7.5
1250	_____	7.5	10.5	_____	<7.5
1500	_____	7.5	10.5	_____	<7.5

PERFORMANCE TEST 2

NOISE FLOOR TEST

DESCRIPTION

This test measures the noise of the HP 3048A Option K22 amplifiers apar from the phase noise contribution of the external reference sources. Thus, this test measures the noise floor of the amplifiers.

The output of the HP 11848A internal 350-500 MHz oscillator is split. One path is attenuated 6 dB and applied to the HP 3048A Option K22 amplifier. The output of the amplifier is connected to one of the inputs of the HP 3048A 5 MHz to 1.6 GHz Phase Detector. The other path is delayed one-quarter wavelength to establish phase quadrature of the split signal at 400 MHz. Fine adjustment of quadrature is made by tuning the oscillator until the dc output of the detector is 0V. The phase noise of the oscillator cancels itself out because the phase fluctuations of the split signals are correlated.

EQUIPMENT

PHASE NOISE MEASUREMENT SYSTEM	HP 3048A
POWER SUPPLY	HP 6205B
6 dB PAD	HP 8493A OPT 006
DELAY LINE	03048-62018
ADAPTER-COAX RGT-ANG SMAf-SMAm	1250-1249
ADAPTER-COAX RGT-ANG SMAm-SMAm	1250-1397
NOISE FLOOR TEST FIXTURE	03048-61032

PROCEDURE

1. Connect the equipment as shown in figure 3-3.

NOTE

Remove the semi-rigid cable and the Type N(m) to SMA(m) adapter from the HP 11848 Noise Floor Test Fixture, HP part number 03048-61032. Assemble the HP 3048A Option K22 noise floor fixture as shown in figure 3-3 with the parts listed in the equipment list above and the Type N(m) to SMA(m) adapter removed from the Noise Floor Test Fixture.

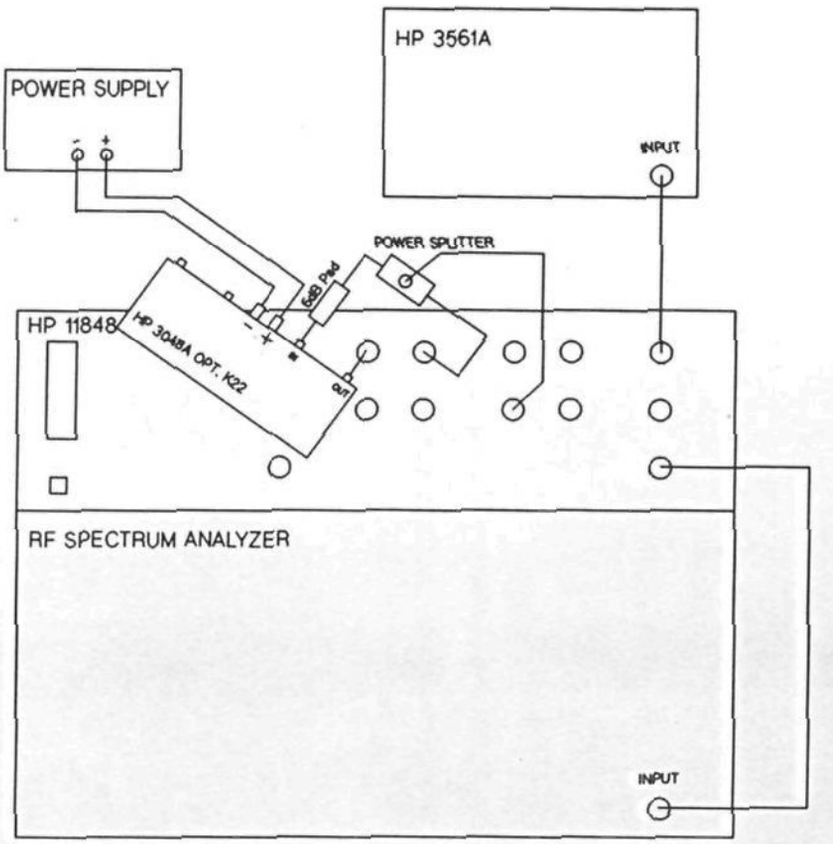


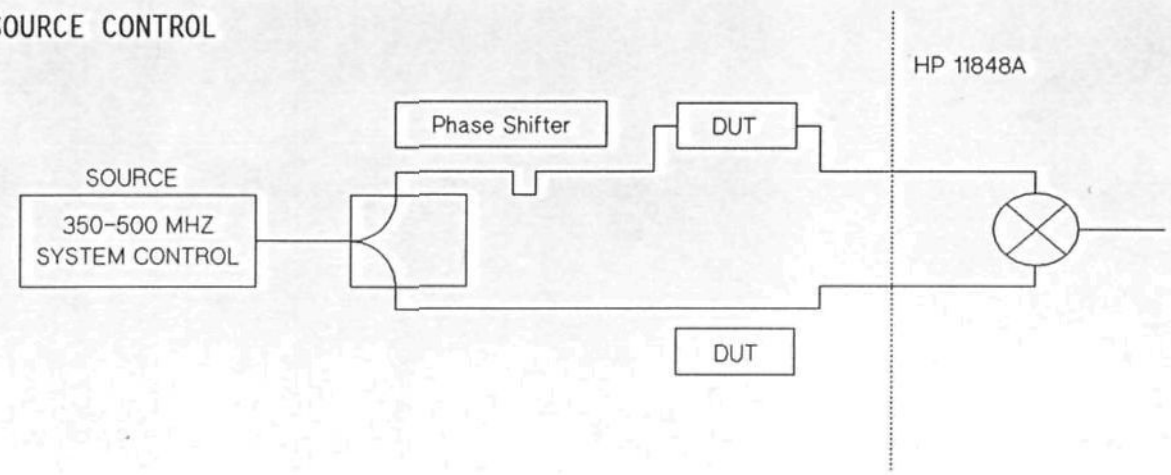
Figure 3-3. Noise Floor Measurement

2. From the Main Level menu of the HP 3048A software, select the [Define Msrmt] softkey and set up the measurement given in table 2-1.

NOTE

Refer to page 1-14 of the HP 3048A Operating Manual to guide the user in operation of this part of the software.

Table 3-2. Measurement Definition for HP 3048A Option K22 Noise Floor Test

Step	Parameters	Data
1	MEASUREMENT TYPE FREQUENCY RANGE Start Frequency Stop Frequency Averages	Phase Noise without Using a PPL .01 Hz 100.E+3 Hz (40.E+6)* 4
2	INSTRUMENT PARAMETERS Carrier Frequency Det./Discr. Input Freq. Internal Phase Detector	 385.E+6 Hz 400.E+6 Hz 5 MHz to 1600 MHz
3	CALIBRATION TECHNIQUE Phase Detector Constant	 Use the Current Detector Constant enter 600.E-6 V/rad
4	SOURCE CONTROL 	
5	DEFINE GRAPH Title Minimum X Maximum X Minimum Y Maximum Y Graph Type	 HP 3048A OPTION K22 NOISE FLOOR MEASUREMENT AT 400 MHz .01 Hz 100.E+3 Hz (40.E+6 Hz)* -200 -30 Single Sideband Phase Noise (dBc/Hz)

* 40.E+6 Hz should be entered if a RF spectrum analyzer is connected to the System.

3. After all the measurement definitions have been entered, return to the Main Level software menu and press the [New Msrmt] softkey.

4. When prompted by the controller, 'Are you sure want to proceed with the new measurement?', press the [Yes, Proceed] softkey.

5. After the controller has completed the initial setup for the measurement, a connect diagram will be displayed. Verify that the equipment is connected as shown in figure 3-3, then press the [Proceed] softkey.

6. The controller should be able to complete the measurement without any interruptions. Once the measurement is complete and shown on the screen, a hard copy can be obtained if a printer is connected to the system and is in the System Configuration Table, by pressing the [Hard Copy] softkey.

7. Connect the HP 3048A Option K22 noise floor fixture to the right RF amplifier and repeat steps 2 thru 6. Figure 3-4 shows a typical noise floor plot of the HP 3048A Option K22 amplifier.

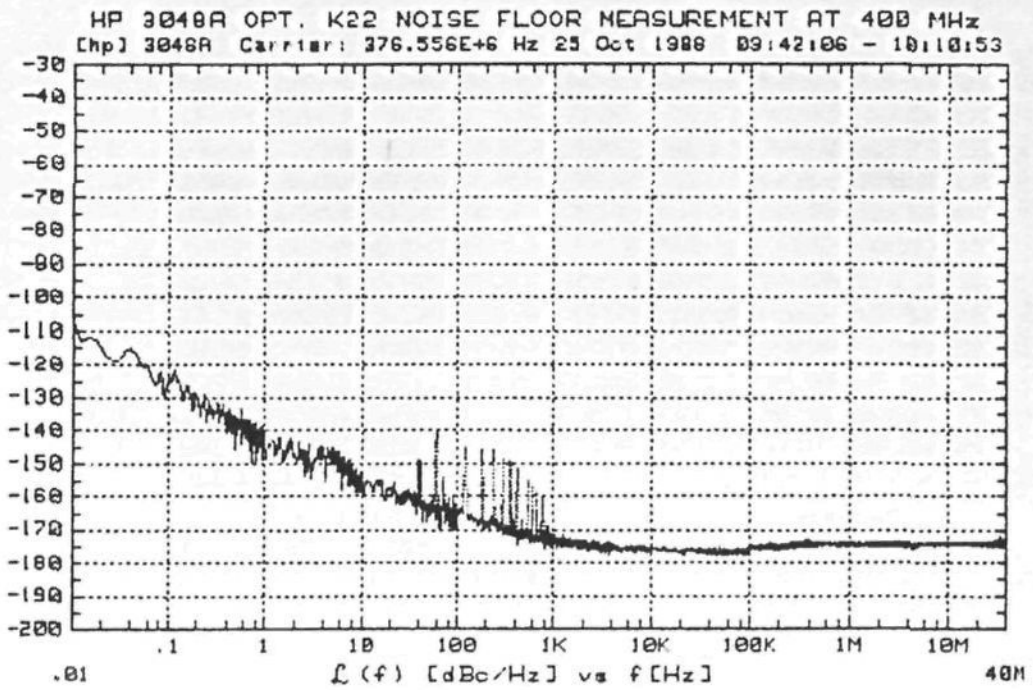


Figure 3-4.

SECTION IV. REPLACEABLE PARTS

Table 4-1 lists the replaceable parts. It is organized with the electrical components first, in alphabetical order by reference designator, followed by mechanical parts. The following information is given for each part:

a. the reference designator;
b. the HP Part Number;
c. the total quantity (Qty) used in the instrument;
d. the part number check digit (CD); and
e. the description of the part.

Table 4-1. Replaceable Parts

Refer. Desig.	HP Part Number	Qty	C D	Description
A1	03048-60102	1	0	Dual RF Amplifier Assembly
A1C1	0160-6222	20	0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C2	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C3	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C4	0160-5942	6	9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER
A1C5	0160-6216	2	2	CAPACITOR-FXD 1000PF +-5% 50VDC CER
A1C6	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C7	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C8	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C9	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C10	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C11	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C12	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C13	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C14	0160-5942		9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER
A1C15	0160-6216		2	CAPACITOR-FXD 1000PF +-5% 50VDC CER
A1C16	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C17	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C18	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C19	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C20	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C21	0180-3754	3	9	CAPACITOR-FXD 10UF +-20% 25VDC TA
A1C22	0180-3754		9	CAPACITOR-FXD 10UF +-20% 25VDC TA
A1C23	0180-3754		9	CAPACITOR-FXD 10UF +-20% 25VDC TA
A1C24	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C25	0180-1819	1	3	CAPACITOR-FXD 100UF -75+10% 50VDC TA
A1C26	0160-5942		9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER
A1C27	0160-5942		9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER
A1C28	0160-5942		9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER

Table 4-1. Replaceable Parts (Cont'd)

Refer. Desig.	HP Part Number	Qty	C D	Description
A1C29	0160-5942		9	CAPACITOR-FXD 1PF +-.25PF 50VDC CER
A1C30	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C31	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C32	0160-6222		0	CAPACITOR-FXD .1UF +-10% 50VDC CER
A1C33				NOT ASSIGNED
A1C34				NOT ASSIGNED
A1CR1	1901-0731	1	5	DIODE-PWR RECT 400V 1A
A1DS1	1990-0487	1	2	LED-LAMP LUM-INT=2MCD BVR=5V
A1J1	1250-2091	4	5	CONNECTOR-RF SMA FEM PC 50-OHM
A1J2	1250-2091		5	CONNECTOR-RF SMA FEM PC 50-OHM
A1J3	1250-2091		5	CONNECTOR-RF SMA FEM PC 50-OHM
A1J4	1250-2091		5	CONNECTOR-RF SMA FEM PC 50-OHM
A1L1	9100-3922	4	4	INDUCTOR-FXD 120-1300 HZ
A1L2	9100-3922		4	INDUCTOR-FXD 120-1300 HZ
A1L3	9100-3922		4	INDUCTOR-FXD 120-1300 HZ
A1L4	9100-3922		4	INDUCTOR-FXD 120-1300 HZ
A1MP1	2360-0197	2	2	SCREW-MACH 6-32 .5-IN-LG 82-DEG
A1MP2	2360-0197		2	SCREW-MACH 6-32 .5-IN-LG 82-DEG
A1MP3	2420-0003	2	7	NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK
A1MP4	2420-0003		7	NUT-HEX-DBL-CHAM 6-32-THD .094-IN-THK
A1MP5	2190-0918	2	3	WASHER-LK HLCL NO. 6 .141-IN-ID
A1MP6	2190-0918		3	WASHER-LK HLCL NO. 6 .141-IN-ID
A1MP7	1205-0697	1	8	HEAT SINK SGL TO-220-CS
A1Q1	1854-1009	2	3	TRANSISTOR NPN SI PD=580MW
A1Q2	1853-0568	2	5	TRANSISTOR PNP SI TO-236AA PD=350MW
A1Q3	1854-1009		3	TRANSISTOR NPN SI PD=580MW
A1Q4	1853-0568		5	TRANSISTOR PNP SI TO-236AA PD=350MW
A1Q5	1853-0542	1	5	TRANSISTOR PNP 2N6491 SI TO-220AB
A1R1	0699-1318	6	6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R2	0699-1419	4	8	RESISTOR 147 1% .125W TKF TC=0+-100
A1R3	0699-1361	2	9	RESISTOR 51.1 1% .125W TKF TC=0+-100
A1R4	0699-1359	12	5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R5	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R6	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R7	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R8	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R9	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R10	0699-1318		6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R11	0698-0084	2	9	RESISTOR 2.15K 1% .125W TF TC=0+-100
A1R12	0757-0278	2	9	RESISTOR 1.78K 1% .125W TF TC=0+-100
A1R13	0698-3401	4	0	RESISTOR 215 1% .5W TF TC=0+-100
A1R14	0698-3401		0	RESISTOR 215 1% .5W TF TC=0+-100

Table 4-1. Replaceable Parts (Cont'd)

Refer. Desig.	HP Part Number	Qty	C D	Description
A1R15	0699-1318		6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R16	0699-1419		8	RESISTOR 147 1% .125W TKF TC=0+-100
A1R17	0699-1361		9	RESISTOR 51.1 1% .125W TKF TC=0+-100
A1R18	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R19	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R20	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R21	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R22	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R23	0699-1359		5	RESISTOR 42.2 1% .125W TKF TC=0+-100
A1R24	0699-1318		6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R25	0698-0084		9	RESISTOR 2.15K 1% .125W TF TC=0+-100
A1R26	0757-0278		9	RESISTOR 1.78K 1% .125W TF TC=0+-100
A1R27	0698-3401		0	RESISTOR 215 1% .5W TF TC=0+-100
A1R28	0698-3401		0	RESISTOR 215 1% .5W TF TC=0+-100
A1R29	0699-1330	2	2	RESISTOR 100K 1% .125W TKF TC=0+-100
A1R30	0699-1330		2	RESISTOR 100K 1% .125W TKF TC=0+-100
A1R31	0699-1435	2	8	RESISTOR 110K 1% .125W TKF TC=0+-100
A1R32	0699-1345		8	RESISTOR 110K 1% .125W TKF TC=0+-100
A1R33	0698-3430	2	5	RESISTOR 21.5 1% .125W TF TC=0+-100
A1R34	0698-3430		5	RESISTOR 21.5 1% .125W TF TC=0+-100
A1R35	0699-1415	2	4	RESISTOR 100 1% .125W TKF TC=0+-100
A1R36	0699-1318		6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R37	0757-0280	1	3	RESISTOR 1K 1% .125W TF TC=0+-100
A1R38	0757-1094	1	9	RESISTOR 1.47K 1% .125W TF TC=0+-100
A1R39				*NOT ASSIGNED*
A1R40	0699-1318		6	RESISTOR 1K 1% .125W TKF TC=0+-100
A1R41	0699-1415		4	RESISTOR 100 1% .125W TKF TC=0+-100
A1R42	0757-1090	1	5	RESISTOR 261 1% .5W TF TC=0+-100
A1R43	0757-0274	1	5	RESISTOR 1.21K 1% .125W TF TC=0+-100
A1R44	0699-1419		8	RESISTOR 147 1% .125W TKF TC=0+-100
A1R45	0699-1419		8	RESISTOR 147 1% .125W TKF TC=0+-100
A1TP1	1251-0600	1	0	CONNECTOR-SGL CONT PIN 1.14-MM-BSC-SZ
A1U1	1826-1049	1	2	IC OP AMP PRCN 8-DIP-C PKG
A1VR1	1902-0961	1	7	DIODE-ZNR 13V 5% DO-35 PD=.4W TC=+.082%
A1VR2	1902-0680	1	7	DIODE-ZNR 1N827 6.2V 5% DO-7 PD=.4W
J1	1510-0091	1	3	BINDING POST SGL SGL-TUR JGK RED
J2	1510-0107	1	2	BINDING POST SGL SGL-TUR JGK BLK
MP1	08640-20230	1	6	AMPLIFIER HOUSING
MP2	2200-0139	6	6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI
MP3	2200-0139		6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI

Table 4-1. Replaceable Parts (Cont'd)

Refer. Desig.	HP Part Number	Qty	C D	Description
MP4	2200-0139		6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI
MP5	2200-0139		6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI
MP6	2200-0139		6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI
MP7	2200-0139		6	SCREW-MACH 4-40 .25-IN-LG PAN-HD-POZI
MP8	6960-0016	4	0	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL
MP9	6960-0016		0	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL
MP10	6960-0016		0	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL
MP11	6960-0016		0	PLUG-HOLE TR-HD FOR .125-D-HOLE NYL
MP12	03048-02012	1	6	AMPLIFIER HOUSING COVER
MP13	08665-21006	4	7	SPACER
MP14	08665-21006		7	SPACER
MP15	08665-21006		7	SPACER
MP16	08665-21006		7	SPACER
MP17	1250-0569	4	8	NUT-RF CONNECTOR 1/4-36UNS THD; 5/16-IN
MP18	1250-0569		8	NUT-RF CONNECTOR 1/4-36UNS THD; 5/16-IN
MP19	1250-0569		8	NUT-RF CONNECTOR 1/4-36UNS THD; 5/16-IN
MP20	1250-0569		8	NUT-RF CONNECTOR 1/4-36UNS THD; 5/16-IN
MP21	1250-2280	4	4	WASHER-RF CONNECTOR SMA
MP22	1250-2280		4	WASHER-RF CONNECTOR SMA
MP23	1250-2280		4	WASHER-RF CONNECTOR SMA
MP24	1250-2280		4	WASHER-RF CONNECTOR SMA
MP25	2950-0144	2	0	NUT-HEX-DBL-CHAM 3/8-32-THD .188-IN-THK
MP26	2950-0144		0	NUT-HEX-DBL-CHAM 3/8-32-THD .188-IN-THK
MP27	2190-0016	2	3	WASHER-LK INTL T 3/8-IN .377-IN-THK
MP28	2190-0016		3	WASHER-LK INTL T 3/8-IN .377-IN-THK

SECTION V. SERVICE

5-1. INTRODUCTION

This section contains information for troubleshooting and repairing the Dual RF Amplifier. Included is a component locator diagram and schematic diagrams.

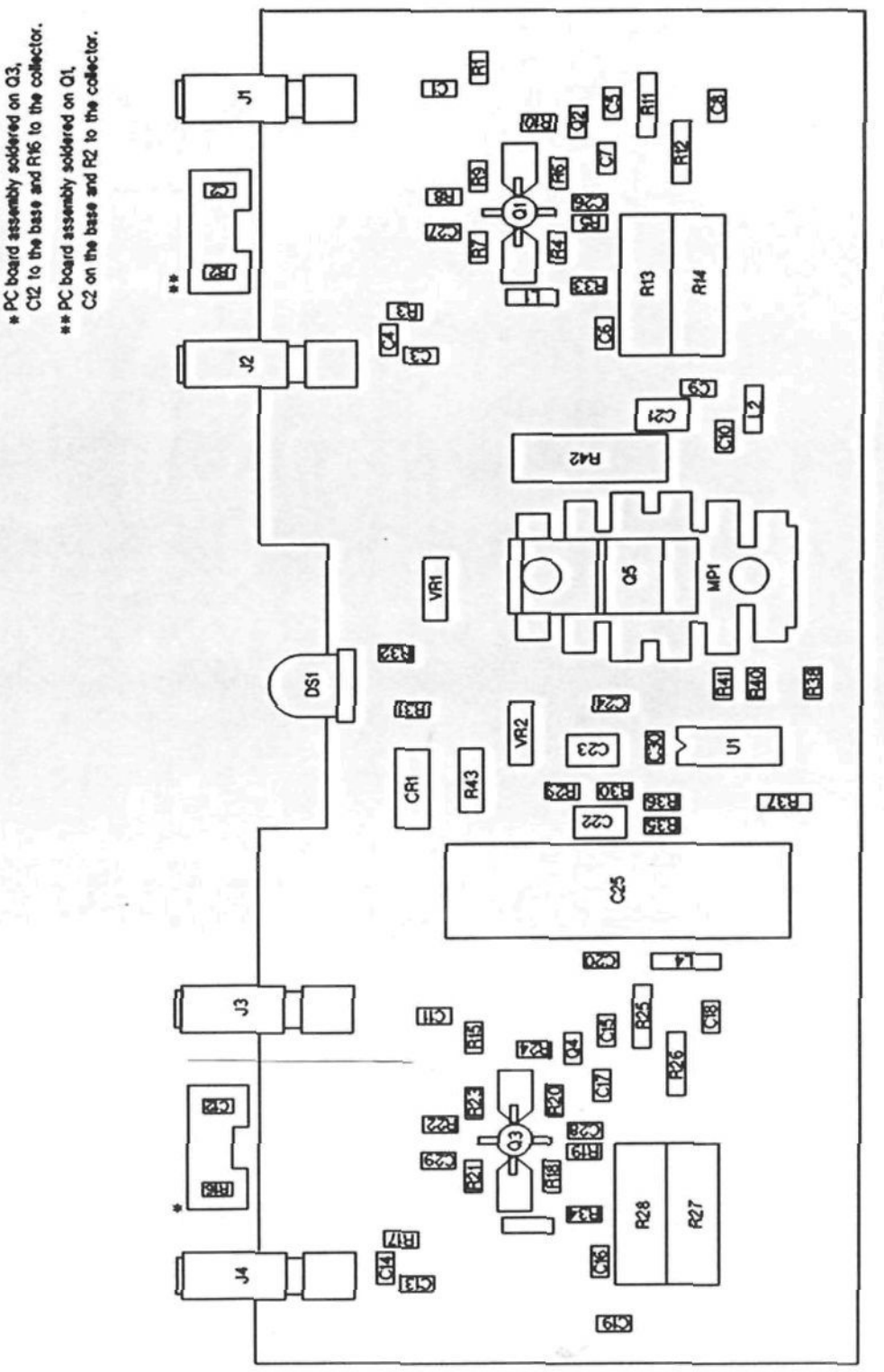


Figure 5-1. A1 Component Locator Diagram

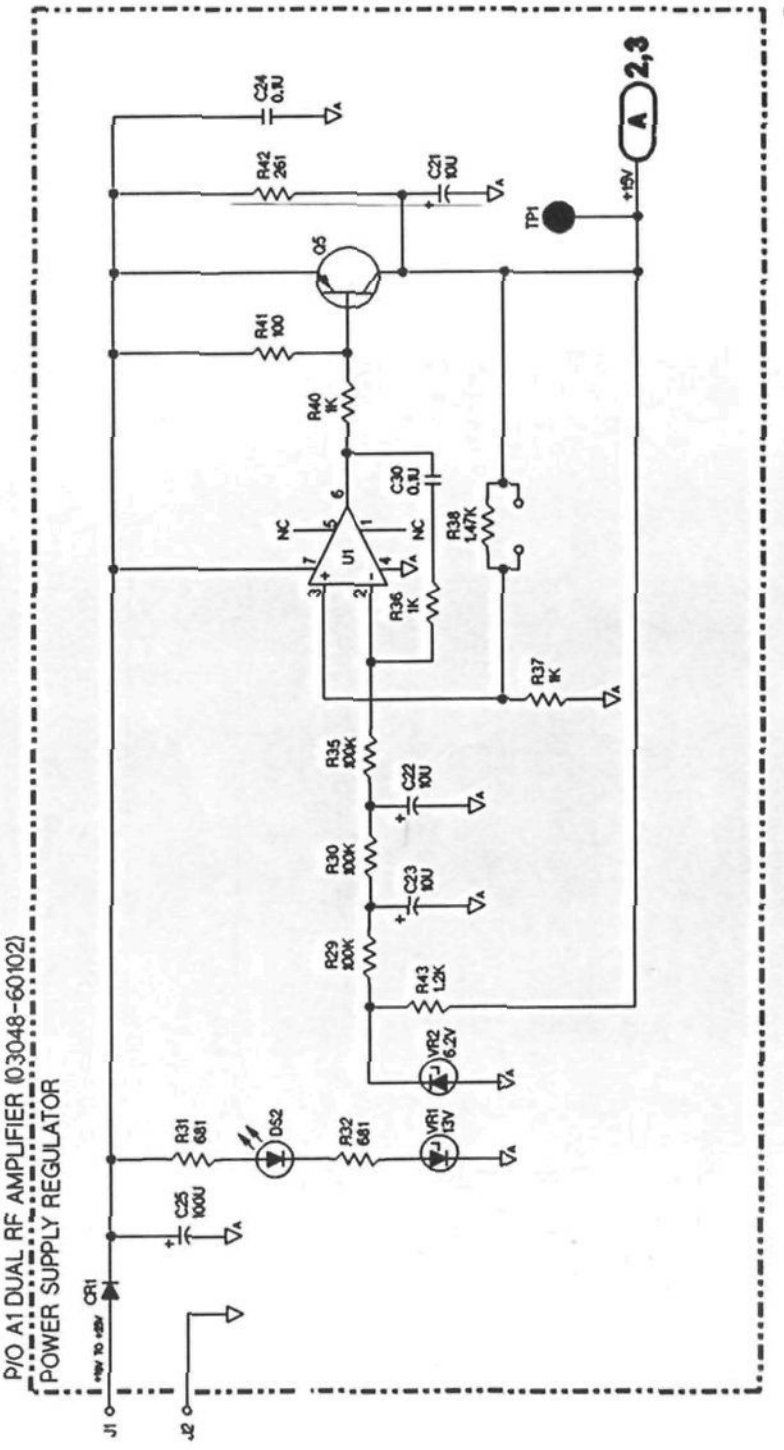


Figure 5-2. P/O A1, POWER SUPPLY REGULATOR

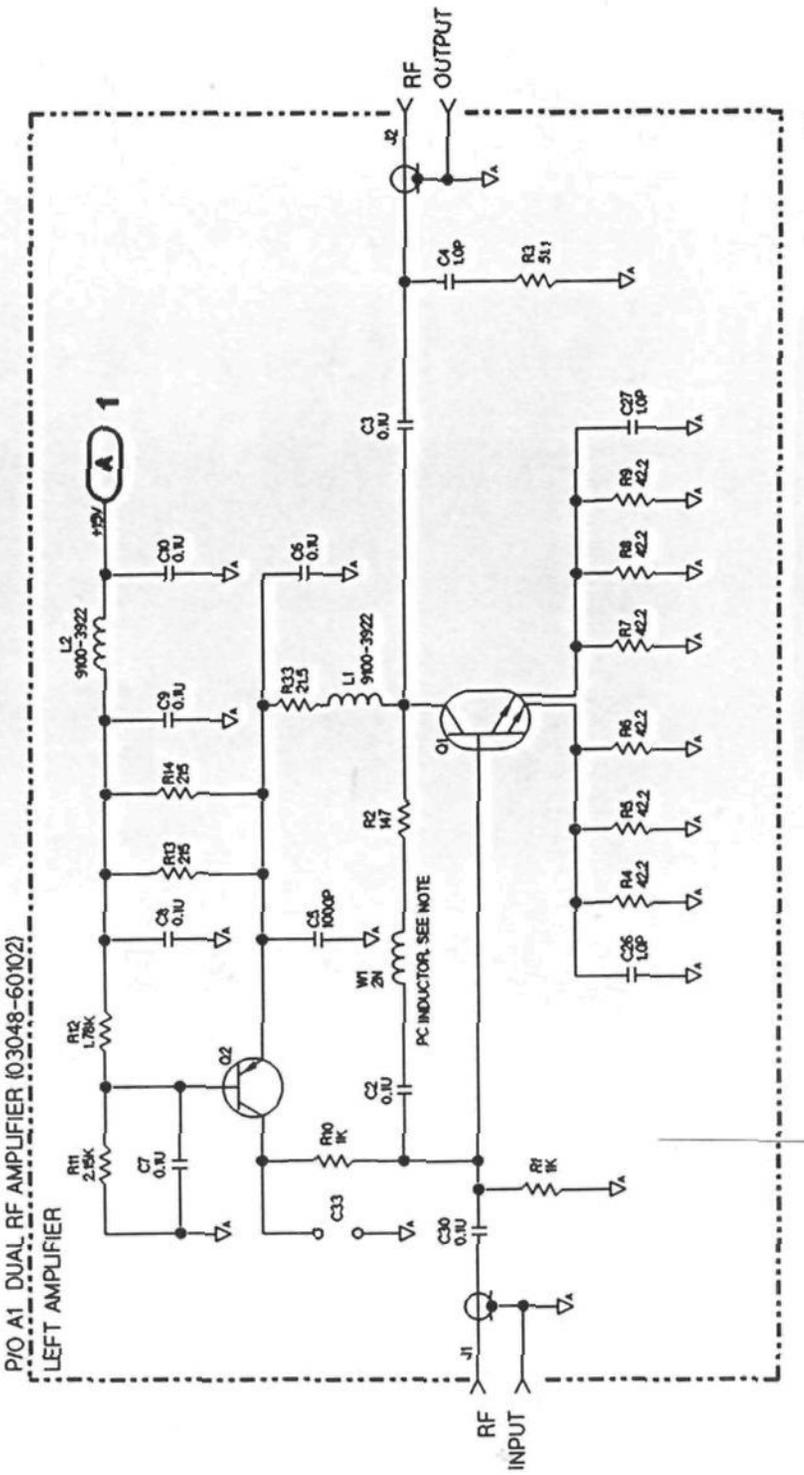


Figure 5-3. P/O A1, LEFT AMPLIFER

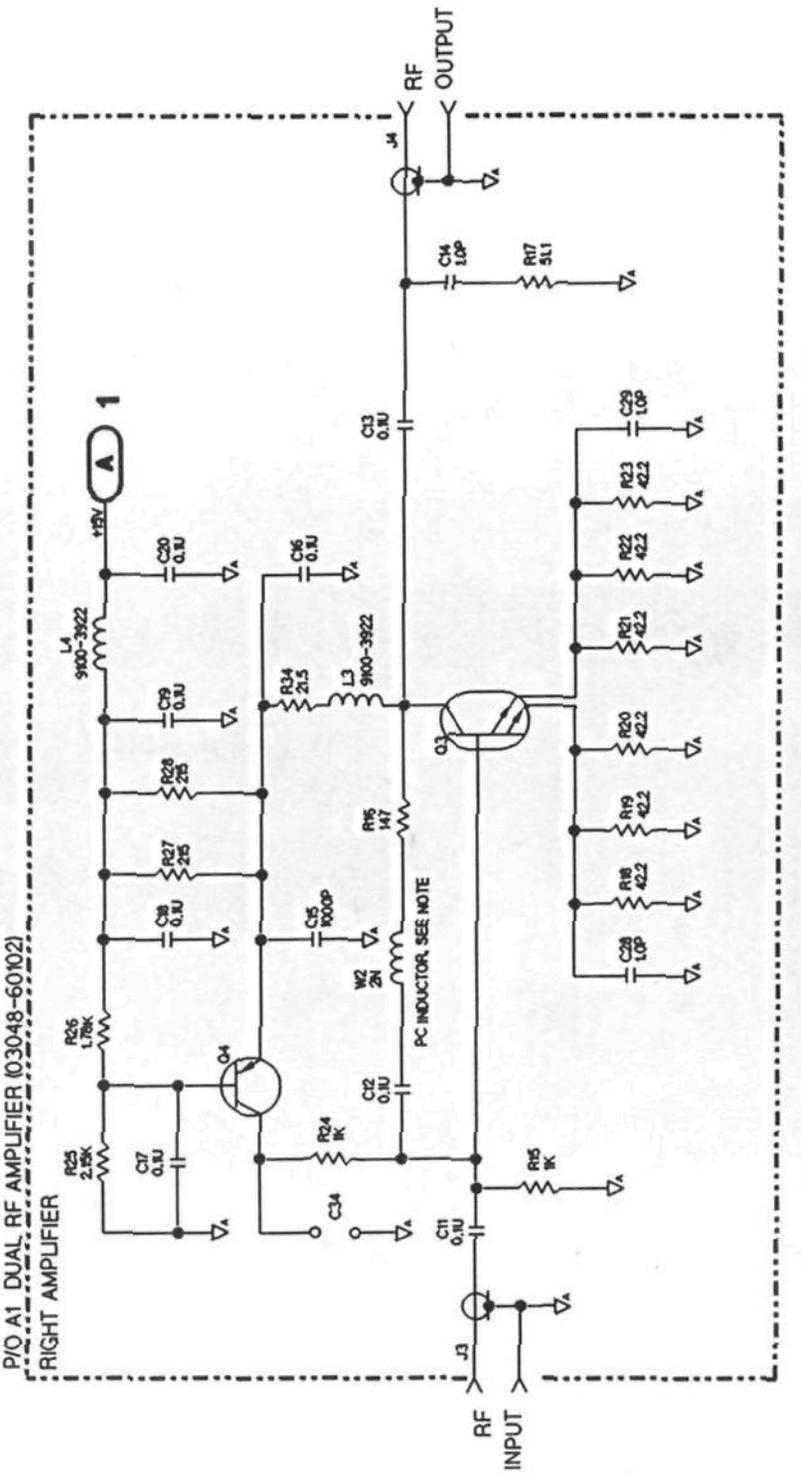


Figure 5-4. P/O A1, RIGHT AMPLIFIER 3

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