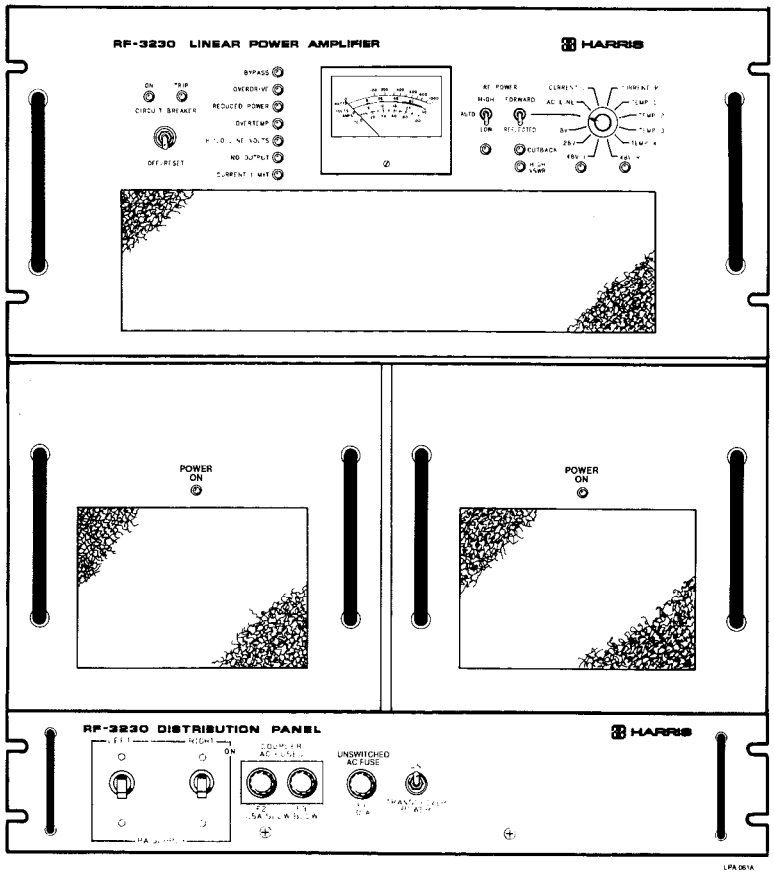
PUBLICATION NUMBER: 10221-0030C
FEBRUARY 1995

RF-3230

LINEAR POWER AMPLIFIER



LPA 051A

SERVICE MANUAL

HARRIS

HARRIS

LIMITED ONE YEAR WARRANTY
HARRIS CORPORATION (RF COMMUNICATIONS DIVISION)

FROM HARRIS TO YOU – This warranty is extended to the original buyer and applies to all Harris Corporation, RF Communications Division equipment purchased and employed for the service normally intended, except those products specifically excluded.

WHAT WE WILL DO – If your Harris Corporation, RF Communications Division equipment purchased from us for use outside the United States fails in normal use because of a defect in workmanship or materials within one year from the date of shipment, we will repair or replace (at our option) the equipment or part without charge to you, at our factory. If the product was purchased for use in the United States, we will repair or replace (at our option) the equipment or part without charge to you at our Authorized Repair Center or factory.

WHAT YOU MUST DO – You must notify us promptly of a defect within one year from date of shipment. Assuming that Harris concurs that the complaint is valid, and is unable to correct the problem without having the equipment shipped to Harris:

- Customers with equipment purchased for use outside the United States will be supplied with information for the return of the defective equipment or part to our factory in Rochester, NY, U.S.A., for repair or replacement. You must prepay all transportation, insurance, duty and customs charges. We will pay for return to you of the repaired/replaced equipment or part, C.I.F. destination; you must pay any duty, taxes or customs charges.
- Customers with equipment purchased for use in the United States must obtain a Return Authorization Number, properly pack, insure, prepay the shipping charges and ship the defective equipment or part to our factory or to the Authorized Warranty Repair Center indicated by us.

Harris Corporation
RF Communications Division
Customer Service
1680 University Avenue
Rochester, NY 14610, U.S.A.

Telephone: (716) 244-5830
Telex: 240313
Cable: RFCOM

Harris will repair or replace the defective equipment or part and pay for its return to you, provided the repair or replacement is due to a cause covered by this warranty.

WHAT IS NOT COVERED – We regret that we cannot be responsible for:

- Defects or failures caused by buyer or user abuse or misuse.
- Defects or failures caused by unauthorized attempts to repair or alter the equipment in any way.
- Consequential damages incurred by a buyer or user from any cause whatsoever, including, but not limited to transportation, non-Harris repair or service costs, downtime costs, costs for substituting equipment or loss of anticipated profits or revenue.
- The performance of the equipment when used in combination with equipment not purchased from Harris.
- HARRIS MAKES NO OTHER WARRANTIES BEYOND THE EXPRESS WARRANTY AS CONTAINED HEREIN. ALL EXPRESS OR IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY ARE EXCLUDED.

SERVICE WARRANTY – Any repair service performed by Harris under this limited warranty is warranted to be free from defects in material or workmanship for sixty days from date of repair. All terms and exclusions of this limited warranty apply to the service warranty.

IMPORTANT – Customers who purchased equipment for use in the United States must obtain a Return Authorization Number before shipping the defective equipment to us. Failure to obtain a Return Authorization Number before shipment may result in a delay in the repair/replacement and return of your equipment.

IF YOU HAVE ANY QUESTIONS – Concerning this warranty or equipment sales or services, please contact our Customer Service Department.

PUBLICATION NUMBER: 10221-0030C
FEBRUARY 1995

RF-3230

LINEAR POWER AMPLIFIER

SERVICE MANUAL

HARRIS

HARRIS CORPORATION RF COMMUNICATIONS DIVISION
1680 University Avenue Rochester, New York 14610-1887 USA
Tel: 716-244-5830. Fax: 716-244-2917, 716-325-1572. TELEX: 240313 RFCOM UR

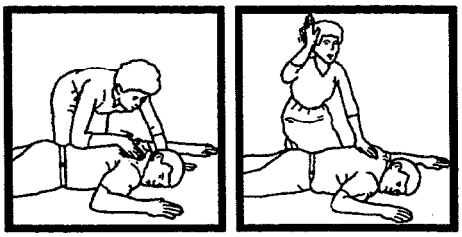
When an Adult Stops Breathing

WARNING

DO NOT attempt to perform the rescue breathing techniques provided on this page, unless certified. Performance of these techniques by uncertified personnel could result in further injury or death to the victim.

1 Does the Person Respond?

- Tap or gently shake victim.
- Shout, "Are you OK?"

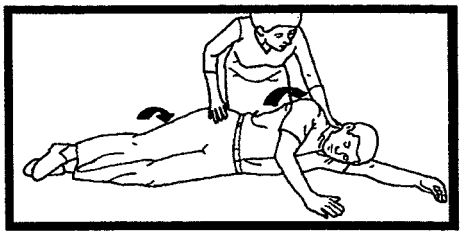


2 Shout, "Help!"

- Call people who can phone for help.

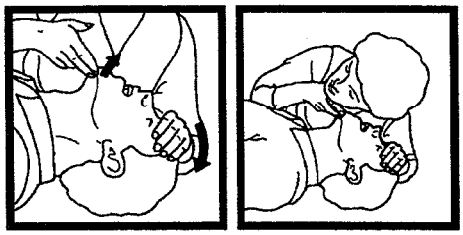
3 Roll Person Onto Back

- Roll victim toward you by pulling slowly.



4 Open Airway

- Tilt head back and lift chin.



5 Check for Breathing

- Look, listen, and feel for breathing for 3 to 5 seconds.

6 Give 2 Full Breaths

- Keep head tilted back.
- Pinch nose shut.
- Seal your lips tight around victim's mouth.
- Give 2 full breaths for 1 to 1-1/2 seconds each.

7 Check for Pulse at Side of Neck

- Feel for pulse for 5 to 10 seconds.

8 Phone for Help

- Send someone to call an ambulance.

9 Begin Rescue Breathing

- Keep head tilted back.
- Lift chin.
- Pinch nose shut.
- Give 1 full breath every 5 seconds.
- Look, listen, and feel for breathing between breaths.

10 Recheck Pulse Every Minute

- Keep head tilted back.
- Feel for pulse for 5 to 10 seconds.
- If victim has pulse but is not breathing, continue rescue breathing. If no pulse, begin CPR.

For more information about these and other life–saving techniques, contact your Red Cross chapter for training.
"When Breathing Stops" reproduced with permission from an American Red Cross Poster.

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SPECIFICATIONS

Frequency Range:	1.6 to 30 MHz
Power Output:	1 kW PEP and Average
Gain Flatness:	1 dB
Modes:	Hi/Low power, automatic bypass
Load VSWR:	Rated power at 1.5:1; stable and fully protected for all VSWR conditions
Intermodulation Distortion:	36 dB below PEP
Harmonic Suppression:	73 dB below PEP
Hum and Noise:	50 dB below PEP
RF Drive Power:	60 watts for 1 kW output with overdrive protection
Tuning Time:	50 msec
Built-In-Test:	**Metering:** Forward/Reflected Power; AC Line Voltage; DC Voltages (48, 24, 8 Vdc); Operating Currents; PA Device Temperatures
	Indicators: Power On; Breaker Trip; Mode-Hi/Low Power; Overtemp; Hi/Lo Line; Filter Fault; Current Limit; Reflected Power Cutback; Reflected Power Fault
Fault Protection:	Fully protected for input drive, thermal overload, VSWR mismatch
Built-In Redundancy:	Continuous operation at reduced power with redundant 500 watt power amplifier modules, ac/dc power supplies, cooling fans
Cooling:	Heavy-duty, forced air Washable air filter replaces easily from front, without opening unit.
Power Requirements:	115/230 Vac (230 Vac standard), ±15%, 47 to 63 Hz, 4500 VA maximum
Environmental:	-30 to +50 degrees C
	0 to 95% humidity, non-condensing
Shock/Vibration:	MIL-STD-810D (optional isolators available)
Size:	21H x 19W x 24D inches (53H x 48W x 61D cm)
Weight:	177 lbs. (80 kg)

ABOUT THIS MANUAL

The tab sections in this manual are outlined as follows:

- Section 1 – General Information: Provides a general description of the RF-3230/RF-3230B.
- Section 2 – Troubleshooting: Provides a troubleshooting flowchart including an assembly replacement sequence.
- Section 3 – Maintenance: Provides preventive maintenance requirements, repair and replacement procedures, and alignment procedures.
- Section 4 – Major Assembly Location and Interconnection: Provides a listing and locations of assemblies and subassemblies.
- Section 5 – System Interconnection: Provides interconnection information between the system transceiver, its associated power supply and (optional) antenna coupler, and the RF-3230/RF-3230B.

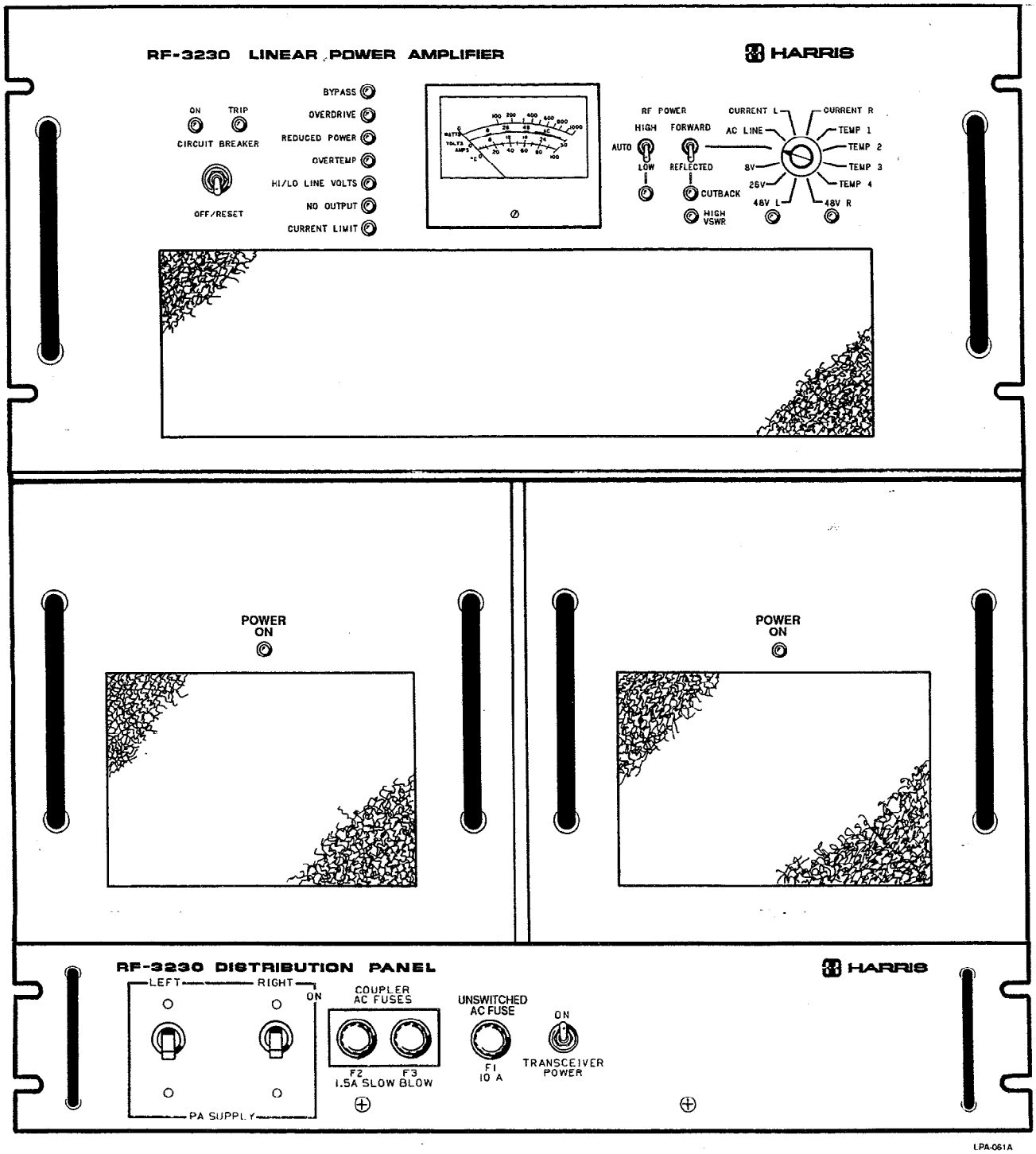
The following tab sections provide general descriptions, interface connections, parts lists, component location diagrams, and schematic diagrams for each assembly and subassembly:

- A2 1 kW Power Amplifier
- A2A1 Interconnect PWB
- A2A2 Filter Control PWB
- A2A3 Front Panel PWB
- A2A4 Input Splitter PWB
- A2A5 VSWR PWB
- A2A6/A2A7 500 Watt Amplifier Assemblies
- A2A8 Combiner Assembly
- A2A9 Low Pass Filter PWB
- A3/A4 Power Supplies
- A3A1/A4A1 Triac Driver PWB
- A3A2/A4A2 Control PWB
- A3A3/A4A3 Line Filter PWB
- A3A4/A4A4 Capacitor PWB
- A5 Power Distribution Panel Assembly
- A5A1 Power Distribution Panel PWB
- A5A2 Fan Regulator PWB

RF-3230

LINEAR POWER AMPLIFIER

SERVICE MANUAL



RF-3230 Solid State Linear Power Amplifier

SECTION 1

GENERAL INFORMATION

1.1 INTRODUCTION

The RF-3230 Solid State Linear Power Amplifier (LPA) uses new broadband techniques to provide 1 kW PEP and Average Power over the 1.6 to 30 MHz range, without vacuum tubes or motor-driven bandswitching. This amplifier features superior intermodulation and harmonic output, rapid frequency switching, built-in redundancy, and built-in-test (BIT).

Operational reliability is provided by the redundant, modular design of the RF-3230. The unit continues to function at reduced power if a failure occurs in one of the two identical final power amplifiers, or one of the two identical power supplies. Built-in-test, including front panel meter indications and status monitor indications of all critical functions, provides fast and easy fault isolation and maintenance.

The RF-3230 is integrated with various transceivers, their associated power supplies, and (optional) antenna couplers to form complete 1 kW systems. This manual also describes the RF-3230B, a modified version of the basic LPA, which differs slightly from the RF-3230 as described in subsection 1.1.2.

1.1.1 Organization of Assemblies

The components comprising the RF-3230 Linear Power Amplifier are designated in this manual as follows:

- A1 is the system transceiver with associated power supplies and antenna couplers.
- A2 is the 1 kW Power Amplifier Drawer (10221-3000) which contains the following subassemblies:
  - A2A1 Interconnect PWB Assembly (10221-3160)
  - A2A2 Filter Control PWB Assembly (10221-3360)
  - A2A3 Front Panel Assembly (10221-3350)
  - A2A4 Input Splitter PWB Assembly (10221-3400)
  - A2A5 VSWR PWB Assembly (10221-3250)
  - A2A6/A2A7 500 Watt Amplifier Assemblies (10221-3100)
  - A2A8 Combiner Assembly (10221-3500)
  - A2A9 Low Pass Filter PWB Assembly (10221-3200)
- A3/A4 are the two redundant Power Supplies (10221-4500) of the Power Supply Assembly (10221-4000). Power Supplies A3/A4 each contain the following subassemblies:
  - A3A1/A4A1 Triac Driver PWB Assemblies (10221-4110)
  - A3A2/A4A2 Control PWB Assemblies (10221-4120)
  - A3A3/A4A3 Line Filter PWB Assemblies (10221-4130)
  - A3A4/A4A4 Capacitor PWB Assemblies (10221-4200)

- A5 is the Power Distribution Panel Assembly (10221-3800 for the RF-3200E or 10221-3900 for the RF-3200B) which contains the following subassemblies:
  - A5A1 Power Distribution Panel PWB Assembly (10221-3820)
  - A5A2 Fan Regulator PWB Assembly (10221-3840)

1.1.2 RF-3230B Linear Power Amplifier

The RF-3230B Linear Power Amplifier (10221-3010) is essentially identical to the RF-3230, except that it provides for operation of an external blower for additional cooling. In addition, the color of its panels are light gray rather than black. This manual provides parts lists and schematic drawings unique to the RF-3230B.

1.2 SCOPE OF THIS MANUAL

This manual provides a general description of the RF-3230 Linear Power Amplifier assemblies and subassemblies, a general description of system operation, troubleshooting information, maintenance procedures, top level parts lists and an interconnection diagram for the assemblies and subassemblies, and separate tab sections for the assemblies and subassemblies. An additional supplement, found in section 5 (System Interconnection) of this manual, provides installation and interconnection information about the specific system in which the RF-3230 is installed.

This section provides a general description of the RF-3230 Linear Power Amplifier, a general description of system operation, and options and accessories for the RF-3230.

1.3 GENERAL DESCRIPTION

The following information includes a list of major assemblies and drawings, a simplified block diagram showing the functional relationships of the RF-3230 assemblies, and a description of the power amplifier assembly and subassembly tab sections.

1.3.1 RF-3230 Major Assembly Parts Lists and Drawings

Refer to section 4, Major Assembly Location and Interconnection, for the following parts lists, major assembly location diagram, and interconnection diagram:

- RF-3230 Linear Power Amplifier Top Level Assembly Parts List (10221-1000)
- A2 1 kW Power Amplifier Major Subassemblies Parts List (10221-3000)
- Front Panel Assembly Parts List (10221-3300)
- Power Supply Assembly Parts List (10221-4000)
- A5 Power Distribution Panel Assembly Parts List (10221-3800)
- RF-3230 Major Assembly Locations
- RF-3230 Interconnect Schematic (10221-1001)

Refer to the frontispiece for a front view of the RF-3230 Linear Power Amplifier showing the major assemblies: the LPA Drawer, the two Power Supplies, and the Power Distribution Panel. Figure 1-1 is a rear view of the RF-3230 major assemblies. Refer to section 4 for detailed major assembly locations.

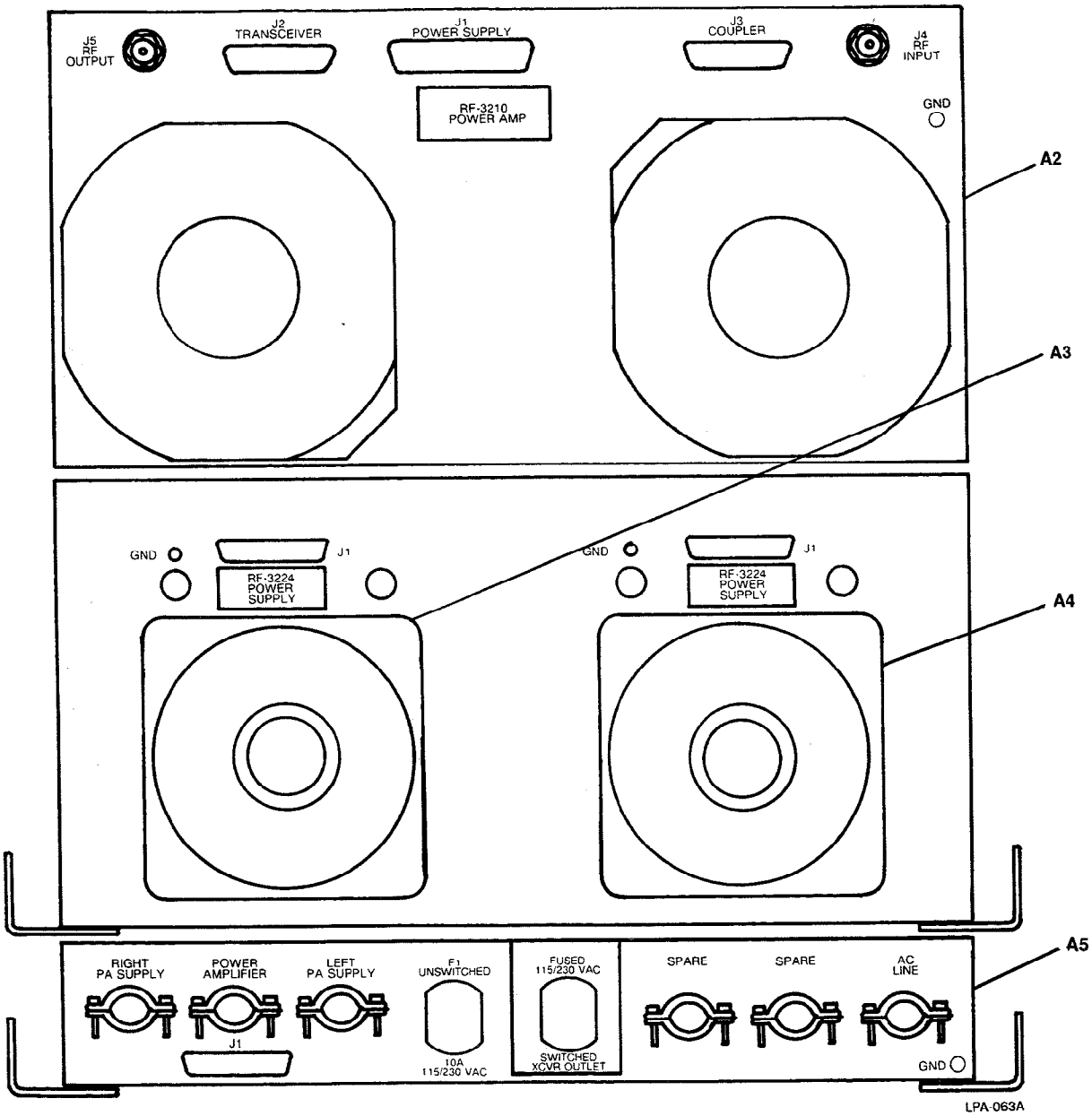


Figure 1-1. Rear View of the RF-3230 A2 Linear Power Amplifier

1.3.2 RF-3230 Simplified Block Diagram

Figure 1-2 is a simplified block diagram which shows the functional relationships among the RF-3230 assemblies. Note that the diagram applies also to the RF-3230B with the Power Distribution Assembly replaced by part number 10221-3900.

1.3.3 RF-3230 Assembly and Subassembly Tab Section Descriptions

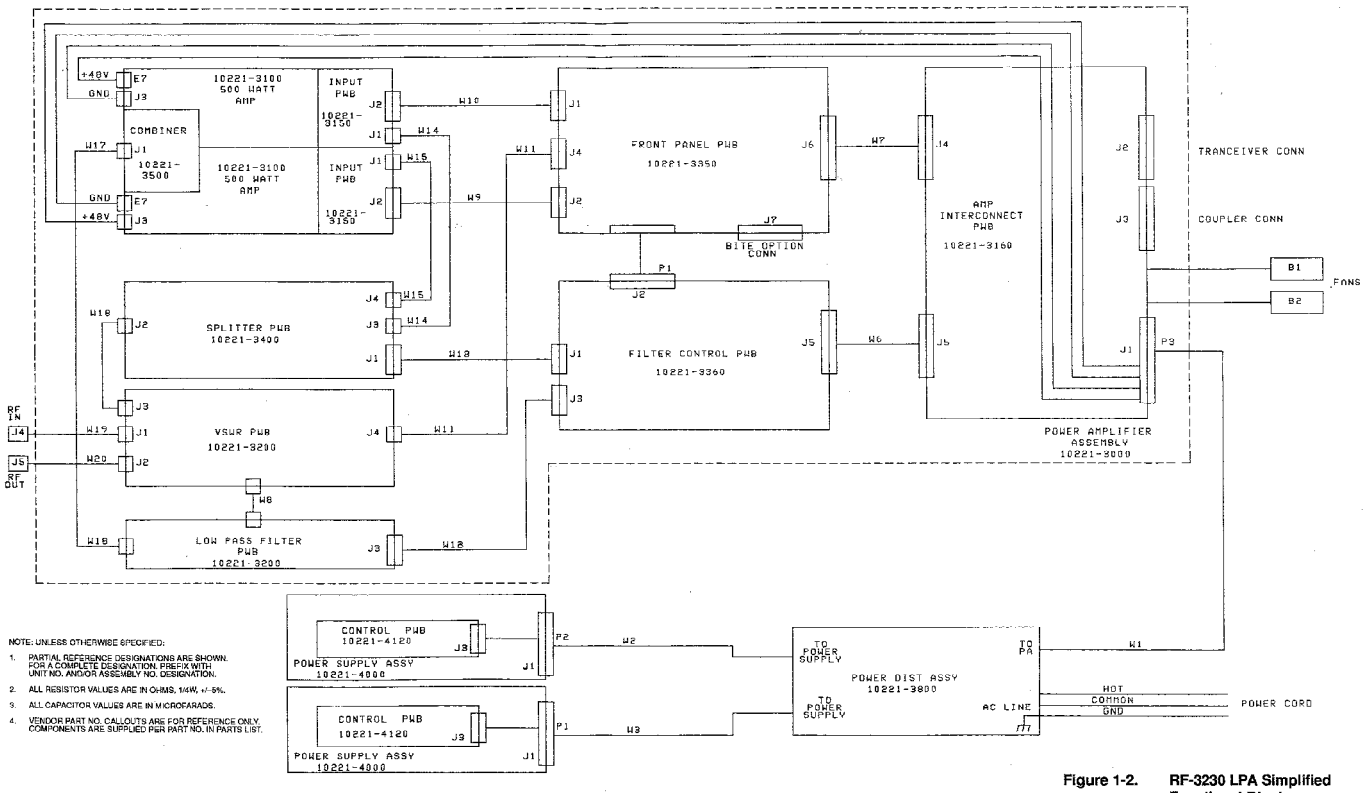
The RF-3230 consists of the A1 Transceiver, the A2 Power Amplifier Drawer, the A3/A4 Power Supplies, and the A5 Power Distribution Panel Assembly. These assemblies (except for the A1 Transceiver) and their subassemblies are documented in tab sections of this manual and described as follows:

- The A2 (RF-3230) 1 kW Linear Power Amplifier Drawer contains nine major subassemblies which provide the following functions:
  - The A2A1 Interconnect PWB Assembly routes all control signals between the power amplifier, transceiver, and antenna coupler (optional), and also provides an interface between the A5 Power Distribution Panel Assembly and the A2A3 Front Panel PWB Assembly.
  - The A2A2 Filter Control PWB Assembly selects the relays on the A2A9 Low Pass Filter PWB Assembly in response to the frequency of the RF input sample. The Filter Control PWB also contains tuning control and keyline logic.
  - The A2A3 Front Panel PWB Assembly contains the power control, amplifier bias control, fault protection, and metering circuits. Refer to the operator card in this section and to section 2, Troubleshooting, for a description of the front panel controls and indicators.
  - The A2A4 Input Splitter PWB Assembly splits the RF signal to produce inputs for the 500 Watt Amplifier Assemblies, detects the RF input for the Front Panel PWB Assembly, and provides an RF sample for the Filter Control PWB Assembly.
  - The A2A5 VSWR PWB Assembly detects the forward and reflected RF power output levels for the Front Panel PWB Assembly, and switches the transmit and receive signal paths.
  - Each of the A2A6/A2A7 500 Watt Amplifier Assemblies contains a dual MOSFET push-pull amplifier, temperature sensors, and input and output matching networks. The amplifier bias is controlled by the Front Panel PWB Assembly in response to temperature variations.
  - The A2A8 Combiner Assembly combines the output of the two power amplifiers to produce 1 kW of RF power.
  - The A2A9 Low Pass Filter (LPF) PWB Assembly filters out harmonics from the RF output signal. The reactive elements are selected by relays in response to the control lines from the Filter Control PWB Assembly.

- The A3/A4 Power Supplies provide +48 Vdc (regulated and unregulated), +26 Vdc, +8 Vdc, and -12 Vdc for the RF-3230 LPA. Each power supply contains four subassemblies as follows:
  - The A3A1/A4A1 Triac Driver PWB Assembly contains six optoisolator circuits that bias and switch the triacs in response to the tap select lines from the Control PWB Assembly.
  - The A3A2/A4A2 Control PWB Assembly contains tap change logic which directs how the six optoisolator circuits on the Triac Driver PWB Assembly will bias and switch the triacs. The Control PWB also produces +8 Vdc and -12 Vdc supplies from a 24 Vac input. BIT logic provides an indication that the Power Supply is functioning properly.
  - The A3A3/A4A3 Line Filter PWB Assembly filters the AC input before it is applied to the power transformer. The Line Filter PWB also generates a 50 - 60 Hz clock output from the AC line frequency, providing the timing for the tap change logic on the Control PWB.
  - The A4A3/A4A4 Capacitor PWB Assembly filters the rectified AC from the bridge rectifiers. The Capacitor PWB contains the filter capacitors for the +48 Vdc supply, and the bleeder resistors that shunt the +48 Vdc to ground when the crowbar is activated.
- The A5 Power Distribution Panel Assembly is the interface between the A3/A4 Power Supplies, the A2A1 Interconnect PWB Assembly, and the primary power source. The Power Distribution Panel Assembly contains circuit breakers for each Power Supply, two convenience outlets, and two PWBs:
  - The A5A1 Power Distribution Panel PWB Assembly provides a safety interlock circuit breaker trip.
  - The A5A2 Fan Regulator PWB Assembly regulates power to the fans on the RF-3230 LPA.

1.4 INSTALLATION

System installation is described in System Interconnection, section 5 of this manual.



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.

Figure 1-2. RF-3230 LPA Simplified Functional Block Diagram (10221-0011 Rev. B)

1.5 OPERATION

1.5.1 Normal Operation

Under normal operation, the RF-3230 is automatically controlled by the transceiver. To operate the system, proceed as follows:

a. Verify that J5 (RF OUTPUT) on the rear of the A2 RF-3230 Power Amplifier Assembly chassis is connected to an antenna or a load.

b. Turn the system transceiver and its associated power supply on.

c. Set the TRANSCEIVER POWER switch on the front panel of the RF-3230 A5 Power Distribution Panel Assembly to the up (ON) position.

d. Set the PA SUPPLY LEFT and the PA SUPPLY RIGHT switches on the front panel of the RF-3230 A5 Power Distribution Panel Assembly to the up (ON) position.

e. Set the CIRCUIT BREAKER OFF/RESET switch on the A2 Power Amplifier Assembly to the up (ON) position.

    1. The following indicators should light:

        (a.) On the front panel of the A2 Power Amplifier Assembly, the circuit breaker ON indicator and the 48V L and 48V R indicators

        (b.) On the front of the A3 and A4 Power Supplies, the POWER ON indicators

f. Set the RF POWER HIGH/AUTO/LOW switch on the A2 assembly to the center (AUTO) position.

g. Rotate the Meter Selector dial on the front panel of the A2 assembly to verify that the AC LINE, 8 V, 26 V, 48 V L, and 48 V R supplies are normal. Verify that both 48 V indicators (green LEDs) are on.

h. Verify that all red and yellow LEDs on the RF-3230 front panel are extinguished.

i. Set the Meter Selector dial on the front panel of the A2 assembly to FORWARD/REFLECTED power. Set the FORWARD/REFLECTED switch to the up (FORWARD) position.

j. Select a frequency and mode on the system transceiver.

k. Key the system using the microphone or CW key.

l. The amplifier and coupler, if used, will tune. Verify that there are no faults. Unkey the transceiver.

m. Key the system again and verify 1000 watts peak or average forward power, then check that the reflected power is less than 4% of the forward reading.

n. Make the appropriate response to the following conditions:

    1. If the transceiver indicates a fault, refer to the RF-3200E Series Product Line Service Manual, Publication No. 10212-0300B.

    2. If the word "TUNING" flashes repeatedly on the transceiver display, refer to section 2.4 of this manual.

    3. If any red fault indicators are illuminated on the RF-3230, refer to section 2 of this manual.

1.5.2 Bypass Operation

To operate the transceiver independently of the power amplifier, set the CIRCUIT BREAKER OFF/RESET switch on the front panel of the A2 Power Amplifier Assembly to the down (OFF) position. In this mode, the transceiver output is sent directly to the antenna.

If the system includes the RF-3200E-11 A/C Antenna Coupler Option, the following procedures are applicable:

- To operate the unit in the emergency reduced power mode due to a left power supply or right power amplifier failure, set the left circuit breaker to the OFF position.
- To operate the unit when a right power supply failure has occurred, exchange the left and the right power supplies, and set the left circuit breaker to the OFF position.
- To operate the unit when either a right power amplifier failure has occurred or when using only the transceiver power, set both the right and the left circuit breakers to the OFF position.

1.5.3 Controls and Indicators

Section 2 contains a detailed description of the RF-3230 controls and indicators. Also refer to the operator card at the end of this section.

1.5.4 Operator Card

Included at the end of this section is an operator card for the RF-3230 for quick reference when operating the 1 kW system.

1.6 OPTIONS AND ACCESSORIES

Options and accessories for the RF-3230 are described in the following subsections.

1.6.1 RF-3230 Linear Power Amplifier Systems

The RF-3230 Linear Power Amplifier is integrated with various transceivers, their associated power supplies, and (optional) antenna couplers to form the 1-kW systems listed in table 1-1.

Table 1-1. RF-3230 Systems

System Consists Of	Description	System Service Manual Part No.	System
RF-3200E-10M FCC Type Accepted 1 kW System	Provides long-range communications over HF radio with 1000 watt PEP/Average.	10221-5332–20	RF-3200EM Transceiver RF-3236M Power Supply RF-3230 1 kW Amplifier
Fixed Station RF-3200E-10 1 kW System	Provides long-range voice communications over HF radio with 1000 watt PEP/Average.	10221-5333-20	RF-3200E Transceiver RF-3236 Power supply RF-3230 1 kW Amplifier

Table 1-1. RF-3230 Systems (Cont.)

System Consists Of	Description	System Service Manual Part No.	System
RF-3266EA-10 1 kW High-Speed Data System	Provides long-range voice and high-speed data transmission over HF radio with 1000 watt PEP/Average.	10221-5338-20	RF-3200E Transceiver RF-3236 Power Supply RF-3466A High-Speed Data Modem RF-3230 1 kW Amplifier
RF-5000B-1000E 1000-Watt HF-SSB Base Station Transceiver	RF-5000 based 1000-watt PEP/Average output base station transceiver covers the frequency range from 1.6 to 30 MHz in USB, LSB, CW, and AME modes.	10221-5340	RF-5022R/T(E) – Receiver-Transmitter RF-5031PA-125E – Power Amplifier – 125 Watt RF-5051PS-125 – AC Power Supply – 125 Watt Base Station 10221-6000 – Interface Kit – 1 kW RF-3230 – 1 kW Power Amplifier and AC Power Supply
RF-350-20	RF-350 based 1kW long range HF communication system		RF-350K Transceiver RF-3230 1kW Linear Power Amplifier

1.6.2 Associated Transceiver and Power Supplies

Section 5 of this manual covers the system installation and interconnection of the transceiver, and power supplies associated with your system.

1.6.3 Optional 1 kW Antenna Couplers

Optional 1 kW antenna couplers are available as follows:

- The RF-2601 1 kW Fast-Tune Antenna Coupler includes the RF-2602 Status Monitor and requires the RF-2601 Antenna Coupler Installation Kit (10221-0603). The system requires lengths of 10257-0015-03 coupler control cable and 10213-1821 coupler coaxial cable to connect the Rf-2601 to the Rf-2602 and the RF-3230 (specify length).

- The RF-2601/AC 1 kW Fast-Tune Antenna Coupler does not include the RF-2602 Status Monitor. The RF-2601/AC requires lengths of 10257-0017 coupler control cable and 10213-1821 coupler coaxial cable to connect the RF-2601/AC to the RF-3230 (specify length).

1.6.4 Optional Spare Parts Kits

Optional Spare Parts Kits are available as follows:

- RF-3230/SSK Site Spares Kit

- RF-3230/RSK Running Spares Kit

- RF-3230/RF-2301/ARK Assembly Repair Kit

- RF-3200E-10/RSK Running Spares Kit
- RF-3200E-10/SSK Site Spares Kit
- RF-3200E-10/ARK Assembly Repair Kit
- RF-3200E-10EM/RSK Running Spares Kit
- RF-3200E-10EM/SSK Site Spares Kit
- RF-3200E-10EM/ARK Assembly Repair Kit

1.6.5 Other Options and Accessories

Other options and accessories are listed in table 1-2.

Table 1-2. RF-3230 Options and Accessories

Part Number	Description
10213-1821	Pre-assembled N to N RF-213/U coaxial cable with connectors installed. Specify length required.
RF-322	15-conductor cable (W50-0001-001)
RF-3230-02	Power supply cable extender kit (10221-0167) which provides plug-ended cables to extend the RF-3230 power supply for servicing.
RF-3230-04	Shock mount kit. Recommended for use in mounting a RF-3200E-10, RF-3200E-10M, or RF-2301-10 solid-state 1 kW system into a high shock or high vibration environment, such as on a shipboard or oil rig. It consists of a bottom shock platform for rack mounting, and an anti-sway brace which mounts between the rear top of the cabinet and a rear wall.
RF-1132	Power postselector
1 kW Antennas	See product catalog for details.
10257-0015-03	RF-2601 Control Cable
RF-3230-05	Rack Mount Kit
10257-0017	Preassembled RF-2601/AC Control Cable
10221-0603	RF-2601 Antenna Coupler Installation Kit

SECTION 2

TROUBLESHOOTING

2.1 INTRODUCTION

This section includes descriptions of the various controls and indicators used to isolate fault conditions. It also provides a troubleshooting flowchart which includes an assembly replacement sequence.

2.2 CONTROLS AND INDICATORS

The status controls, indicators, and meter on the front panel of the RF-3230, shown in figure 2-1, are valuable tools for both the operator and technician. Status and meter indications alert the operator of abnormal operation, and assist the technician in isolating fault conditions.

Transceiver controls and indicators are described in the associated user guide or instruction manual.

2.2.1 A2 Power Amplifier Chassis External Controls and Indicators

The following paragraphs describe the controls and indicators located on the front panel of the A2 Power Amplifier (PA). See figure 2-1.

2.2.1.1 CIRCUIT BREAKER ON Indicator

The green CIRCUIT BREAKER ON indicator is on if either power supply is operational. This LED also indicates the presence of +26 Vdc and +8 Vdc. Both power supplies must be shut down to extinguish this LED.

2.2.1.2 CIRCUIT BREAKER TRIP Indicator

The red CIRCUIT BREAKER TRIP indicator is on if either power supply has tripped its internal circuit breaker due to excessive input or output current. When a trip occurs, the PA must be manually turned off using the CIRCUIT BREAKER OFF/RESET switch, or remotely turned off from the transceiver and then reset.

2.2.1.3 CIRCUIT BREAKER OFF/RESET Switch

The CIRCUIT BREAKER OFF/RESET switch is a single-throw switch on the A2 assembly which is used to apply power to the PA, and to reset the circuit breaker when tripped. If connected to a transceiver, the transceiver must also be on in order to turn the PA on.

2.2.1.4 BYPASS Indicator

The yellow BYPASS indicator turns on if the transceiver initiates the bypass mode. In this mode, transceiver output is sent directly to the antenna, and the PA does not transmit or tune. When returning to normal operation, if the transmit frequency was changed during bypass, the transceiver must initiate a retune sequence before the PA can be keyed.

2.2.1.5 OVERDRIVE Indicator

The yellow OVERDRIVE indicator turns on whenever the PA internal ALC loop is activated. This condition occurs when the transceiver is not limiting its output properly in response to the TGC voltage. Although not a normal condition, operating while the OVERDRIVE indicator is on does not damage the PA.

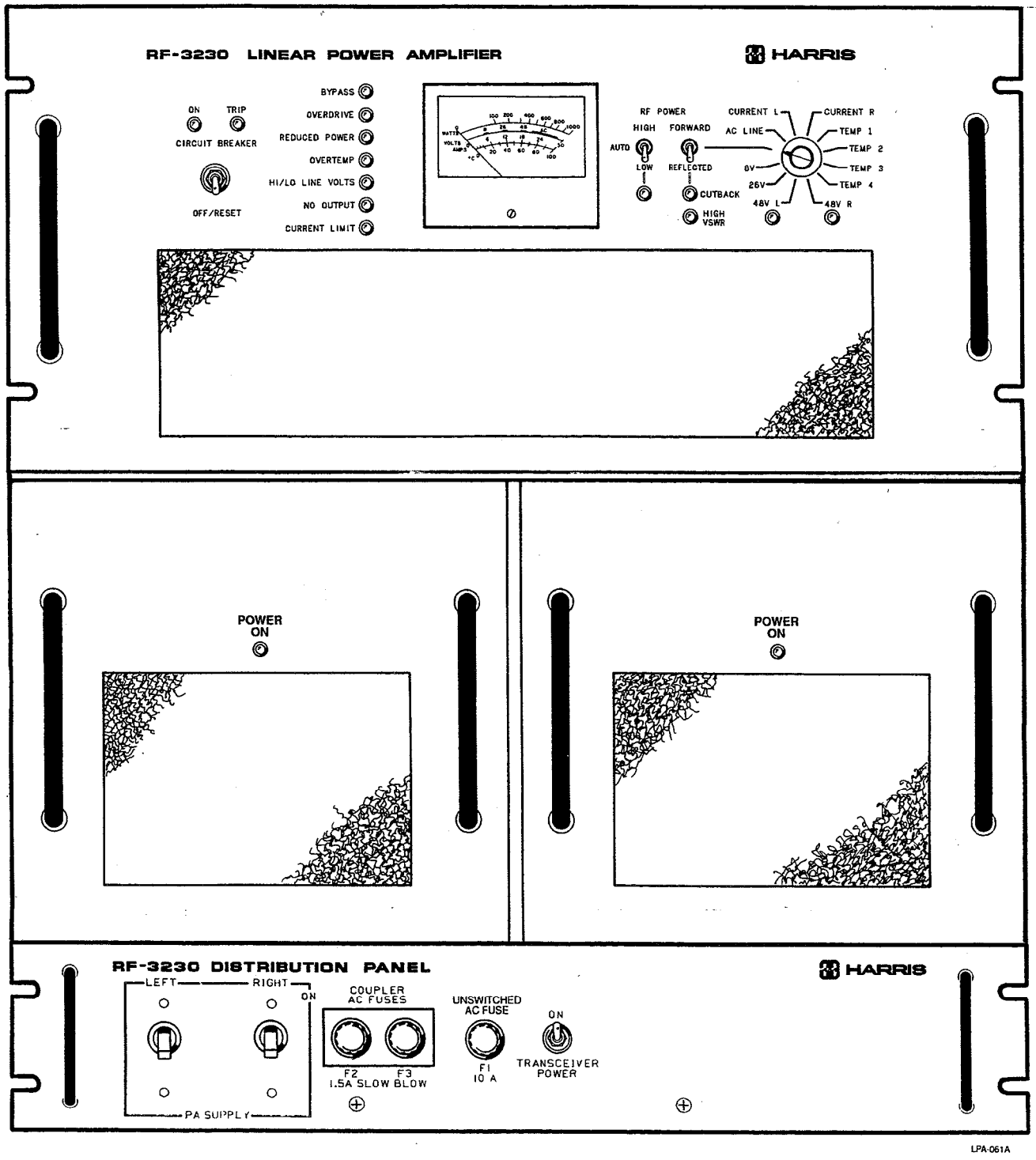


Figure 2-1. RF-3230 Controls and Indicators

2.2.1.6 REDUCED POWER Indicator

The red REDUCED POWER indicator turns on whenever the PA is operating at a reduced power level. The reduced power level is always 250 watts or less. The PA switches to reduced power mode when:

- A power supply fails
- A power supply is in an overtemperature condition
- An FET case temperature is over 90 degrees C
- There is a 10 degree C difference between any two FET case temperatures

2.2.1.7 OVERTEMP Indicator

The red OVERTEMP indicator turns on when either power supply or any of the power FETs are in an overtemperature condition. This indicator is also on if there is more than a 10 degree C difference between any two FET case temperatures.

NOTE

An overtemperature indication is normal when operating with one power supply switched off or tripped.

2.2.1.8 HI/LO LINE VOLTS Indicator

The red HI/LO LINE VOLTS indicator turns on if the line voltage is out of tolerance (96 - 132 Vac or 196 - 260 Vac, depending on the input power strapping). Both supplies are disabled if the line voltage is out of tolerance.

2.2.1.9 NO OUTPUT Indicator

The red NO OUTPUT indicator turns on whenever the PA is not putting out power (due to a fault condition) while the PA is keyed. This indicator is on when any of the following conditions occur:

- A frequency counter fault
- A gain fault is detected (little or no transmit power from the PA when input power is received from the transceiver)
- A maximum overtemperature (any of the FETs are over 100 degrees C)

2.2.1.10 CURRENT LIMIT Indicator

The red CURRENT LIMIT indicator is on whenever either power supply is on and supplying more than 30 amperes. Under some modulation conditions, it is normal for the CURRENT LIMIT indicator to flash during transmission.

Excessive current draw on the +48 Vdc output causes the internal circuit breaker to trip. During other conditions, the power supply limits current and automatically recovers when the condition is corrected.

2.2.1.11 RF POWER HIGH/AUTO/LOW Switch

The RF POWER HIGH/AUTO/LOW switch is a three-position switch used to force the PA to remain in HIGH power mode or LOW power mode, or to allow the transceiver to select the PA mode (AUTO). HIGH power mode is adjustable from 400 to 1000 watts by setting R188; LOW power mode is adjustable from 100 to 800 watts by setting R189.

2.2.1.12 RF POWER FORWARD/REFLECTED Switch

The RF POWER FORWARD/REFLECTED switch, used in conjunction with the front panel meter, enables the meter to indicate the forward or reflected power.

2.2.1.13 LOW Indicator

The yellow LOW indicator turns on whenever low power mode is selected, either by setting the RF POWER HIGH/AUTO/LOW switch to LOW or to AUTO, or by selecting low power at the transceiver.

2.2.1.14 CUTBACK Indicator

The yellow CUTBACK indicator turns on if the PA is operating into a VSWR of 1.5:1 or greater. This corresponds to 40 watts reflected power. At this point, the TGC voltage is being controlled by the reflected power sample, in order to reduce the PA output to a safe operating level. Although not a normal condition, operating while the CUTBACK indicator is on does not damage the PA.

2.2.1.15 HIGH VSWR Indicator

The red HIGH VSWR indicator turns on if the VSWR is 3:1 or greater. This LED provides only an indication of excessive VSWR, and does not directly affect the operation of the PA. As long as the TGC is in effect (the CUTBACK indicator is on), the power is limited to a safe level.

2.2.1.16 Meter Selector Dial

The meter selector dial enables any of the following operating parameters to be displayed on the front panel meter:

- CURRENT L – current drawn from the left power supply
- CURRENT R – current drawn from the right power supply
- TEMP 1 – temperature (degrees C) of power FET 1 (amplifier 1)
- TEMP 2 – temperature (degrees C) of power FET 2 (amplifier 1)
- TEMP 3 – temperature (degrees C) of power FET 1 (amplifier 2)
- TEMP 4 – temperature (degrees C) of power FET 2 (amplifier 2)
- 48V R – voltage output of right +48 Vdc supply
- 48V L – voltage output of left +48 Vdc supply
- 26V – voltage output of +26 Vdc supply
- 8V – voltage output of +8 Vdc supply
- RF POWER – relative forward or reflected power (used in conjunction with RF POWER FORWARD/REFLECTED switch)
- AC LINE – nominal AC input (115 Vac or 230 Vac)

2.2.1.17 Front Panel Meter

The front panel meter (M1) has four scales: WATTS, VOLTS, AMPS, and degrees C.

- The WATTS scale, in conjunction with the RF POWER FORWARD/REFLECTED switch, is used to indicate relative forward and reflected power as seen at the antenna connector. The WATTS scale has a range from 0 to 1200 watts.
- The VOLTS scale is used to indicate whether the +48 Vdc (left), +48 Vdc (right), +26 Vdc, +8 Vdc, and AC line voltages are in their normal ranges.
- The AMPS scale is used to indicate the current being drawn from either the left or right power supply. The AMPS scale is linear with a range from 0 to 33 amperes.
- The degrees C scale is used to indicate the relative temperature of the four power FETs in the 500 watt amplifiers. The degrees C scale is linear with a range from 0 to 100 degrees C.

The meter is intended to give only an indication of normal or abnormal operation, and is not a precise measurement of operating parameters.

2.2.1.18 48V L Indicator

The green 48V L indicator is on whenever the + 48 Vdc power supply for the left power amplifier is on. This indicator is off if the left power amplifier + 48 Vdc supply has failed, or is in an overcurrent condition. Since each power amplifier has its own + 48 Vdc supply, the failure of one supply does not shut down the PA, but does cause the PA to operate in reduced power mode.

2.2.1.19 48V R Indicator

The green 48V R indicator is on whenever the + 48 Vdc power supply for the right power amplifier is on. This indicator is off if the right power amplifier + 48 Vdc supply has failed or is in an overcurrent condition.

2.2.2 A2 Power Amplifier Chassis Internal Controls and Indicators

The following paragraphs describe the controls and indicators that are hidden behind the PA air filter media. Refer to figure 3-2.

2.2.2.1 TUNE Indicator

The red TUNE indicator (figure 3-2) is on whenever the A8 Low Pass Filter is not tuned. The low-pass filter retunes:

- On power-up
- When the MANUAL TUNE button on the A7A3 PWB is pressed
- In response to a RETUNE signal from the transceiver when the frequency is changed and RF input is present

2.2.2.2 MANUAL TUNE Switch

The MANUAL TUNE switch (figure 3-2) is used to initiate a retune sequence. When a manual tune is requested, the PA sends a TUNE POWER REQUEST to the transceiver and waits for RF power to tune the low-pass filter. When the retune sequence is complete, the TUNE indicator turns off.

2.2.2.3 FORWARD TGC Indicator

The green FORWARD TGC indicator (figure 3-2) is on whenever the TGC voltage is derived from the forward power sample. This indicator is normally on when the PA is transmitting. If the reflected power circuit is controlling the TGC level, the CUTBACK indicator is on.

2.2.3 A3/A4 Power Supply Assemblies Indicators

Refer to figure 2-1 for the following indicator.

2.2.3.1 POWER ON Indicator

The green POWER ON indicator, located on the front panel of each power supply, is on when all power supply voltages are present (+48 Vdc, +26 Vdc, +8 Vdc, and -12 Vdc).

2.2.4 A5 Power Distribution Assembly Controls and Indicators

Refer to figure 2-1 for the following controls and indicators.

2.2.4.1 LEFT PA SUPPLY ON/Off Circuit Breaker Switch

The LEFT PA SUPPLY ON circuit breaker switch is used to apply power to the left power supply, and to reset the circuit breaker when tripped.

2.2.4.2 RIGHT PA SUPPLY ON/Off Circuit Breaker Switch

The RIGHT PA SUPPLY ON circuit breaker switch is used to apply power to the right power supply, and to reset the circuit breaker when tripped.

2.2.4.3 TRANSCEIVER POWER ON/Off Switch

The TRANSCEIVER POWER ON/Off switch is used to apply power to the system transceiver.

2.2.4.4 F1 10 A UNSWITCHED AC FUSE

The F1 fuse is the fuse for the system transceiver.

2.2.4.5 F2/F3 1.5A SLOW BLOW COUPLER AC FUSES

The F2 and F3 fuses are the fuses for the system antenna coupler (optional).

2.3 TROUBLESHOOTING FLOWCHART

A logical troubleshooting flowchart including an assembly replacement sequence is shown in figure 2-2.

2.4 RF-2601 FAULT INDICATIONS

If "TUNING" repeatedly flashes on the RF-3200E, this indicates a RF-2601 coupler fault. The specific fault can be determined by counting the number of flashes between pauses and referring to the following chart in the RF-2601 Service Manual, designated here as table 2-1.

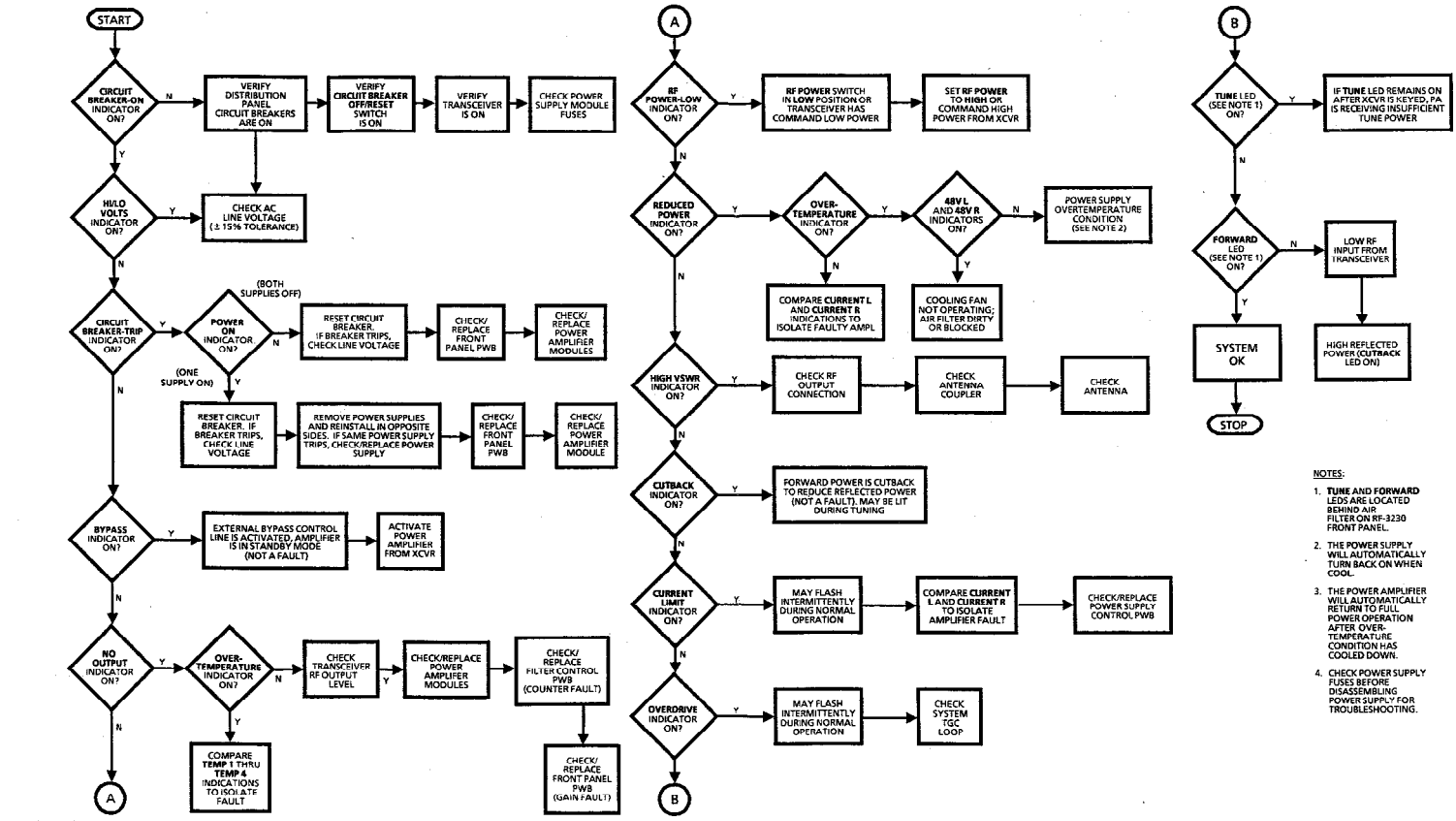


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Figure 2-2. RF-3230 Troubleshooting Flowchart

Table 2-1. RF-2601 Coupler Fault Indications

Flash "TUNING" Sequence	Condition	Likely Defective Unit of Coupler Assy, in Order
ON	TUNE IN PROGRESS	
NONE	NO FAULT DETECTED	
1	TUNE TIME OUT FAULT	CHECK ANT, IF OK, GO TO STEP 3 (STATIC TEST)
2	HIGH TUNE PWR FAULT	XMTR, PWR DOWN/UP RF-350, RT-1446, A7, A5, A3
3	LOW/NO TUNE PWR FAULT	RF INPUT PATH, XMTR, A1, A5, A3
1-2	FREQ COUNT FAULT	A5, A3
1-3	OVER-VOLTAGE FAULT	ANT LENGTH TOO SHORT, HIGH XMTR PWR, A5, A3
2-3	OVER TEMP FAULT	COUPLER TEMP > 100 DEGREES C (WAIT, THEN REDUCE RF INPUT PWR.)
4	VSWR FAULT	DEFECTIVE OR VARYING ANTENNA, ARCING
1-4	TUNE SOLUTION FAULT	CHECK ANT, IF OK, GO TO STEP 3 (STATIC TEST)
2-4	DISCONNECTED PWB FAULT	CHECK A4, A5, AND A8 PLUGS (4 TOTAL)
3-4	PRESSURE FAULT	CHECK COUPLER PRESSURE
5	NEAR FIELD INTERFERENCE	NEARBY TRANSMITTING ANTENNA
1-5	COOLING AIR FAULT	A8B1, A8B1 LINE CORD, A3, A6

SECTION 3

MAINTENANCE

3.1 INTRODUCTION

This section provides preventive maintenance requirements, special repair and replacement procedures, and power amplifier and power supply alignment procedures.

3.2 PREVENTIVE MAINTENANCE

The RF-3230 is designed for long-term maintenance-free operation. The only routine maintenance requirement is to clean the air filter media.

The operator can assist with preventive maintenance as follows:

a. Check meter voltages, currents, and temperatures on a daily basis.

b. Report any changes in operating parameters.

These procedures help reduce equipment failure by early detection of potential problems.

3.2.1 Air Filter Cleaning

No tools are required to remove the air filters.

WARNING

If the system is connected to an AC source, use caution when removing or installing air filter media.

Remove and clean the air filter media as follows:

a. Gently grasp the filter, and pull it out from the frame.

b. Wash the filter in warm, soapy water, and rinse it several times in running tap water.

c. Squeeze the filter by hand, and lay it on a flat surface to dry.

d. When dry, reinstall the filter by pushing it back into place in the frame.

3.3 REPAIR AND REPLACEMENT PROCEDURES

WARNING

Lethal voltages are present in the power amplifiers and power supplies. Verify that the power is removed and all high-voltage components (including the 48V FET supplies) are discharged before removing assemblies.

3.3.1 Common Test Equipment Required

The following common test equipment is required for the RF-3230 maintenance procedures. Required special test equipment is described at the beginning of each procedure.

- Dc current meter
- Watt meter (1000 watts)
- Digital voltmeter

3.3.2 Common Tools Required

The circuit board assemblies are easily removed and replaced using the following common tools. Required special tools are described at the beginning of each procedure.

- Medium flat-blade screwdriver
- Medium Phillips screwdriver

3.3.3 MOSFET Troubleshooting and Replacement

Be cautious when repairing and replacing power FETs and CMOS integrated circuits. The following subsections describe handling, troubleshooting, and replacement of transistors A2Q1 through A2Q4 (P/N 10221-3105). This matched set of four transistors are listed under item 45 in table 2, the A2 1 kW Power Amplifier Drawer Parts List in tab section A2, 1 kW Power Amplifier.

3.3.3.1 Handling Precautions

The RF power transistors are MOSFET devices and can be damaged by electrostatic discharge if not handled properly. Observe the following precautions:

CAUTION

Never use a soldering gun on MOSFET or CMOS components.

a. Store devices in their antistatic package until ready to install.

b. Wear a grounded wrist cuff, and place a conductive work surface such as a metal plate or antistatic rubber mat under the amplifier chassis. The chassis, plate or mat, and wrist cuff must be connected to the same ground point.

c. The MOSFET metal case is connected to the source. Avoid situations that could place the MOSFET junctions in a discharge path by touching leads to ungrounded objects.

d. When handling the MOSFET, avoid touching the tab leads. Be careful not to drop the device onto a hard surface.

e. Connect the soldering iron tip to the same ground as the chassis, plate or mat, and wrist cuff. Use a soldering iron with a grounded tip and a three-blade AC connector. Connect the ground system described in step b to the AC ground of the power outlet.

3.3.3.2 Diagnosing Component Failure

Special equipment is required as follows:

- Grounded wrist cuff and conductive work surface such as a metal plate or antistatic rubber mat, both connected to the same ground point
- Soldering iron with grounded tip and three-blade AC connection

Before replacing the RF power transistors, verify that the transistor is damaged. Common problems are shorts between the drain and source, or between the gate and source which may upset bias circuits. Troubleshoot a short condition as follows:

a. If one or both of the +48 Vdc supplies is not present as indicated by the 48 V indicator or front panel meter, turn off the power supply.

b. Disconnect the +48 Vdc input lead from the suspected amplifier module (see figure 4-1). The left supply powers the left PA module, and the right supply powers the right PA module.

c. Turn the power supply on. If there is a short in the amplifier module, the indicator and meter will now indicate the presence of the +48 Vdc supply.

d. Turn off the power supply and reconnect the +48 Vdc input lead.

e. If a short caused the power supply failure, examine the A2A6A2/A2A7A2 Output Transformer PWB. Locate the three series-connected Tranzorbs (transient suppressor) in each drain circuit ground path.

f. Unsolder the Tranzorb leads from the MOSFET drain tabs.

NOTE

The Tranzorbs are designed to protect the MOSFET drain-to-source junction from excess voltage. A short may indicate a problem in the RF signal path between the amplifier and the A2A5 VSWR PWB, the VSWR protection circuit, or the TGC loop.

g. Turn on the power supply. If the +48 Vdc supply is present, one or both strings of Tranzorbs are shorted.

CAUTION

Do not key the system with the Tranzorbs disconnected.

h. Turn off the power supply, and replace the Tranzorbs as necessary.

CAUTION

Observe all MOSFET handling precautions.

i. If the Tranzorbs were not shorted, unsolder one MOSFET drain tab from the Output Transformer PWB, and repeat the +48 Vdc test. Repeat for the other MOSFET. Replace the MOSFETs as necessary following the procedure in subsection 3.3.3.3.

Bias irregularities may accompany RF performance problems, and may be associated with degraded MOSFET characteristics. Troubleshoot the bias circuit as follows:

a. Turn on the PA and momentarily key the transmitter on any frequency.

b. Disconnect the cable from RF INPUT connector J4.

c. Key the PA. There should be no RF output.

NOTE

The gate-to-source and gate-to-drain junctions are very high impedances relative to the bias circuit impedances. The gate-to-source bias voltage should be determined solely by the bias circuit.

d. Measure the bias voltage at J2-4 or J2-10 on the input PWB, then measure the MOSFET gate voltage. The gate voltage should be within 1 percent of exactly half the undivided bias. A lower gate voltage may indicate gate-to-source leakage, gate-to-source Tranzorb leakage, or voltage divider error.

e. Disconnect the +48 Vdc supply lead, the gate Tranzorb lead, and the gate lead in sequence from the input PWB to diagnose the source of the bias error.

f. Replace the MOSFET, the Tranzorbs, or the voltage divider resistors as required.

3.3.3.3 MOSFET Replacement Procedure

Special equipment is required as follows:

- Grounded wrist cuff and conductive work surface such as a metal plate or antistatic rubber mat, both connected to the same ground point
- Soldering iron with grounded chisel tip, approximately 1/4 to 3/8 inch wide (Weller temperature control tip #8 or equivalent), and three-blade AC connection
- Torque wrench that can be set up to at least 3 inch-pounds, adjustable in 1 inch-pound increments, with proper length and correct Phillips tip A screwdriver type is preferred, but a beam type can be used.
- 4-40 bottom tap
- Small, stiff brush and solvent (Freon-TMC or trichloroethylene), if desired
- Pair of pliers
- Dow Corning 340 thermal compound (grease)
- Cotton swab
- Loctite Grade C (non-permanent)

CAUTION

Follow all antistatic precautions when handling the MOSFET. Use a chisel-tip iron, approximately 1/4 to 3/8 inch wide (Weller temperature control tip #8 or equivalent) to solder the device.

NOTE

The MOSFETs must be carefully matched for optimum performance. Matched pairs are indicated by a color dot or letter system. When replacing a single FET, verify the color dot or letter matches the other FET. (When replacing pairs of FETs, the color dots or letters must be the same on each MOSFET, and should be no more than one group removed from those in the companion module, see table 3-1.)

a. Unsolder the Tranzorbs from the MOSFET drain and gate.

b. Unsolder the drain lead from the output transformer PWB and the gate lead from the input PWB.

c. Unsolder the ground end of the drain Tranzorb from the output transformer PWB. (The other end may be left on the ground lug.)

NOTE

If it becomes necessary to replace ground lugs for any reason, be sure to use a flat rather than toothed variety.

d. Remove the four mounting screws. Retain the screws, mounting blocks, flat washers, Tranzorbs, and associated ground lugs.

e. Discard the cup-shaped Bellville washers used under each screw. New ones are used for reassembly.

f. Use a 4-40 bottom tap to chase out excess Loctite in the four mounting holes. Proceed slowly to guard against snapping the tap or dislodging the threaded insert.

1. Alternative method: Use a small, stiff brush and solvent (Freon-TMC or trichloroethylene). Clean the mounting screw threads and remove Loctite and thermal grease residue, or use new screws of the same length.

NOTE

Careful cleaning will ensure the mounting hardware is free-running in the threaded mounting holes. This is essential to allow correct mounting of the MOSFET. The free-running thread engagement is a minimum of 4 to about 11 turns. When checking, do not run beyond the free turning point.

g. Remove any thermal grease and Loctite from the mounting surface. Clean the underside of the mounting block. The heatsink surface must be clean when the new MOSFET is mounted.

h. Ensure that the MOSFET copper bottom heatsink surface is free of any debris. Using the removed part as a model, bend the end of the drain lead 90 degrees.

CAUTION

Use a pair of pliers (placed on the lead next to the ceramic cap) to support the drain lead while bending. This will avoid stressing the ceramic copper interface. Never pull up on the ribbon leads with the device attached, or damage may result.

i. Place a light, uniform coating of grease on the copper bottom of the MOSFET, and on the gold top surface adjacent to the ceramic cap (see detail A of figure 3-1).

NOTE

Use only Dow Corning 340 thermal compound.

j. Place the replacement part in the correct position on the heatsink, with the gate leads towards the front panel.

k. Using only hand pressure, press down on the ceramic cap while moving the MOSFET parallel to the heatsink in small circular motions (approximately 0.1 inch diameter for 1 minute). This action allows the heatsink and MOSFET high points to contact each other and force out excess grease. Use a cotton swab to remove excess grease.

l. Prepare the mounting hardware as shown in detail B of figure 3-1. Be sure to use new Bellville washers and follow the sequence exactly. Verify that drain (P6KE39A) and gate (P6KE18CA) Tranzorbs are not interchanged.

m. Apply a small quantity of Loctite (Grade C) to the bottom 1/4 inch of the two screws in the block. Lower the screws into the mounting holes, and tighten to just short of the point of contact.

n. Repeat for the second mounting block.

o. Position the Tranzorb lugs.

NOTE

Use a torque wrench that can be set up to at least 3 inch-pounds, adjustable in 1 inch-pound increments. A screwdriver type is preferred, but a beam type could be used. Be sure to have the appropriate length and correct Phillips tip to allow proper seating and coaxial engagement in the screw head.

p. Using a diagonal pattern, tighten all four screws to 1 inch-pound. Repeat at 3 inch-pounds. It may be necessary to hold the Tranzorb lug in position.

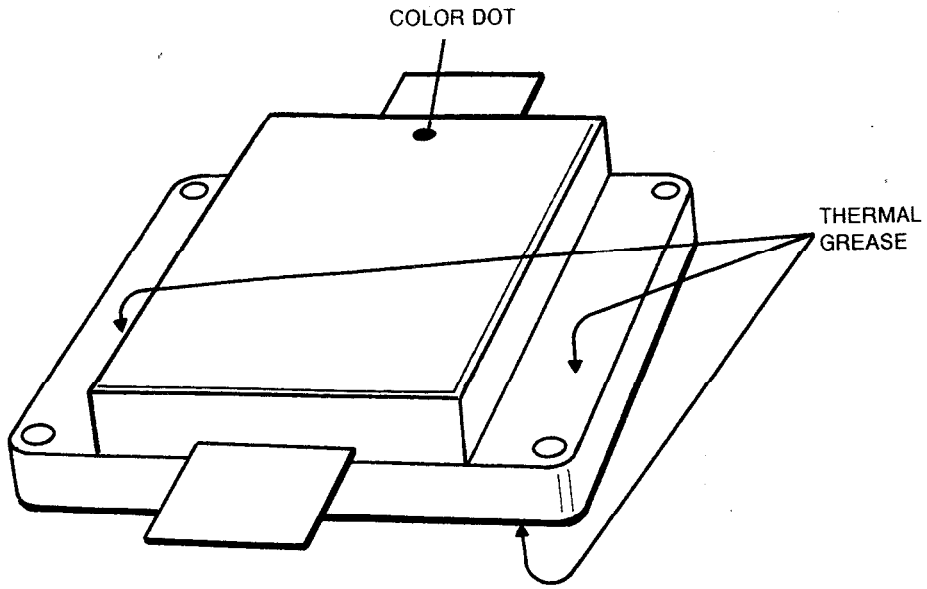
1. Alternative method (if a torque wrench is not available): Gently seat all four screws. Using a diagonal pattern, tighten all four screws 1/8 turn (45 degrees). Repeat the pattern, tightening all screws an additional 1/8 turn (45 degrees). Ensure that the Tranzorb ground lugs remain positioned.

q. Solder the drain terminal to the output transformer PWB, and the gate terminal to the input PWB. Solder the drain Tranzorbs to the drain leads, and the gate Tranzorbs to the gate leads.

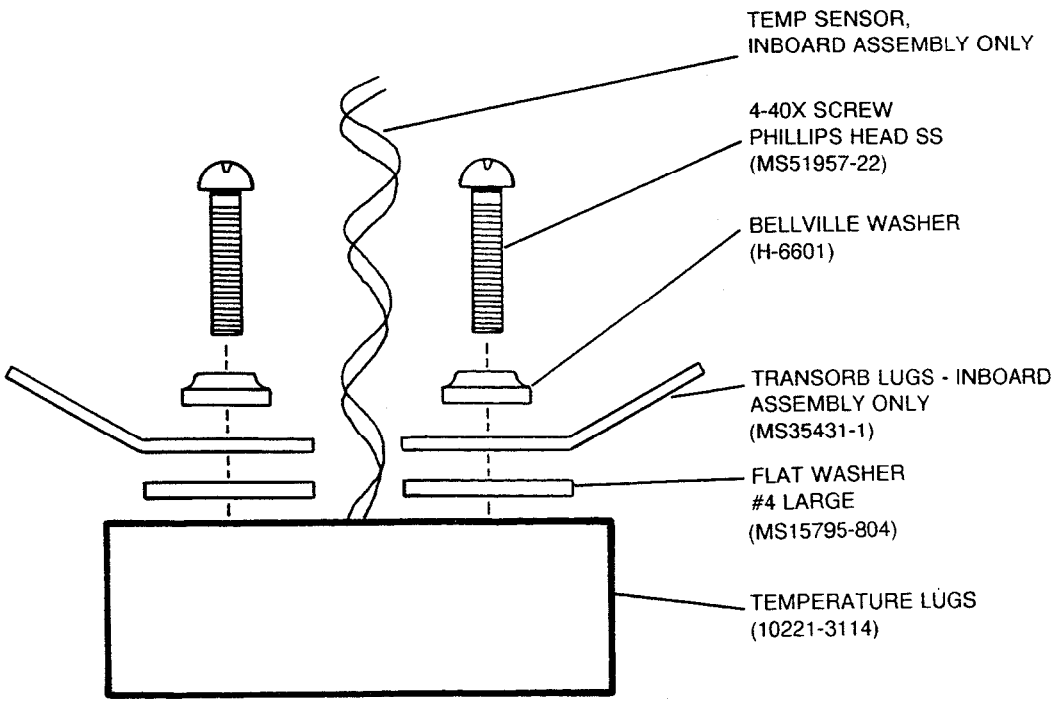
r. Reconnect the thermal sensor to the input PWB, observing the correct polarity.

Table 3-1. MOSFET (MRF-154) Matching Code Sequence

Color Dot	Letter Equivalent
Black	A
Brown	B
Red	C
Orange	D
Yellow	E
Green	F
Blue	G
Violet	H
Gray	I



DETAIL A



DETAIL B

LPA-200

Figure 3-1. RF Power Transistor Mounting Procedure

3.3.3.4 Bias Adjustment

Special equipment is required as follows:

- Grounded wrist cuff and conductive work surface such as a metal plate or antistatic rubber mat, both connected to the same ground point
- Soldering iron with grounded tip and three-blade AC connection

Adjust the MOSFET gate bias as described in subsections 3.4.2.1 and 3.4.3.1. Because each MOSFET has a separate bias adjustment, only the bias circuit for the replacement part will need adjustment.

3.3.4 Handling of Static-Sensitive (CMOS) Devices

To protect static-sensitive devices from damage, follow these suggested precautions:

a. Keep all static-sensitive devices in their protective packages until needed. This packaging is conductive, and provides adequate protection for the device. Storing or transporting static-sensitive devices in conventional plastic containers could be destructive to the device.

b. Disengage power prior to insertion or extraction of sensitive devices. This also applies to printed wiring boards containing sensitive devices.

c. Double check test equipment voltages and polarities prior to conducting any tests. Verify that no transients exist.

d. Use only soldering irons and tools that are properly grounded. Ungrounded soldering tips will destroy these devices. NEVER USE SOLDERING GUNS.

e. Avoid contact with the leads of the device. The component should always be handled very carefully by the ends or the side opposite the leads.

f. Avoid contact between printed wiring board circuits or component leads and synthetic clothing while handling static-sensitive devices or assemblies containing them.

3.4 POWER AMPLIFIER AND POWER SUPPLY ALIGNMENT PROCEDURES

NOTE

The power amplifier and power supply should be aligned in the following sequence.

Most of the power amplifier adjustments are on the A2A3 Front Panel PWB, which is located behind the air filter media as shown in figure 3-2.

3.4.1 Power Supply Adjustments

The A3/A4 Power Supplies should be aligned after replacing components, or if module performance is degraded. Proceed as follows:

a. Disconnect connector J1, and remove the A3 or A4 Power Supply from the chassis.

b. Place the module on a bench, and reconnect the cable to J1. Use the optional extender cable if a longer length is needed.

c. Remove the top cover from the module. Verify that terminal block TB1 is strapped for correct line voltage (115 Vac or 230 Vac), as shown on the A3/A4 Power Supply schematic and on the terminal block cover label.

d. Locate the A3A3/A4A3 Control PWB, and disconnect the cable from J7.

e. Verify that the transceiver is not keyed, and turn on the circuit breaker.

f. Monitor TP1 with the digital voltmeter. Verify that the voltage at TP1 is +8 +/- 0.4 Vdc.

g. Monitor TP5, and verify that the voltage is -12 +/- 0.6 Vdc.

h. Monitor TP12, and adjust R90 for +4.0 Vdc.

i. Monitor TP11, and adjust R8 for +6.85 Vdc.

j. Monitor TP6, and adjust R74 for +3.67 Vdc.

k. Turn off the circuit breaker. Reconnect the cable to J7.

l. Set the circuit breaker to ON. Measure the voltage at J4-19 and at J4-20 of the Control PWB. Verify that this voltage is +22 +/- 2.0 Vdc.

m. If the AC line frequency is 60 Hz, adjust R97 fully counterclockwise. If the AC line frequency is 50 Hz, adjust R97 fully clockwise. (This adjusts the power transformer magnetization currents for minimum effect.)

n. Measure the unregulated 48V supply at TP4. With no load, this voltage should be +55 +/- 3.0 Vdc.

o. Monitor TP3, and adjust R44 for +48 Vdc output.

p. Measure the voltage at J5-1 and at J6-1. This voltage is between +2.5 and +3.5 Vdc if the temperature sensors are working properly. The sensor voltage is calculated as follows:

$$V = +2.73 \text{ Vdc} + \frac{\text{Temp degrees C}}{100} \quad +/- 2 \text{ percent}$$

For example, the sensor voltage would be +2.98 Vdc at 25 degrees C.

q. Disconnect the cable from J5 on the Control PWB. Verify that the corresponding 48V indicator is off, the OVERTEMP indicator is on, and there is no voltage at TP3.

r. Reconnect the cable to J5. Verify that the corresponding 48V indicator is on, the OVERTEMP indicator is off, and +48 Vdc is present at TP3.

s. Disconnect the cable from J6 on the Control PWB. Verify that the corresponding 48V indicator is off, the OVERTEMP indicator is on, and there is no voltage at TP3.

t. Reconnect the cable to J6. Verify that the corresponding 48V indicator is on, the OVERTEMP indicator is off, and +48 Vdc is present at TP3.

u. This completes the power supply alignment. Repeat this procedure for the other power supply module; disconnect the test setup, and reinstall the A3/A4 Power Supply modules.

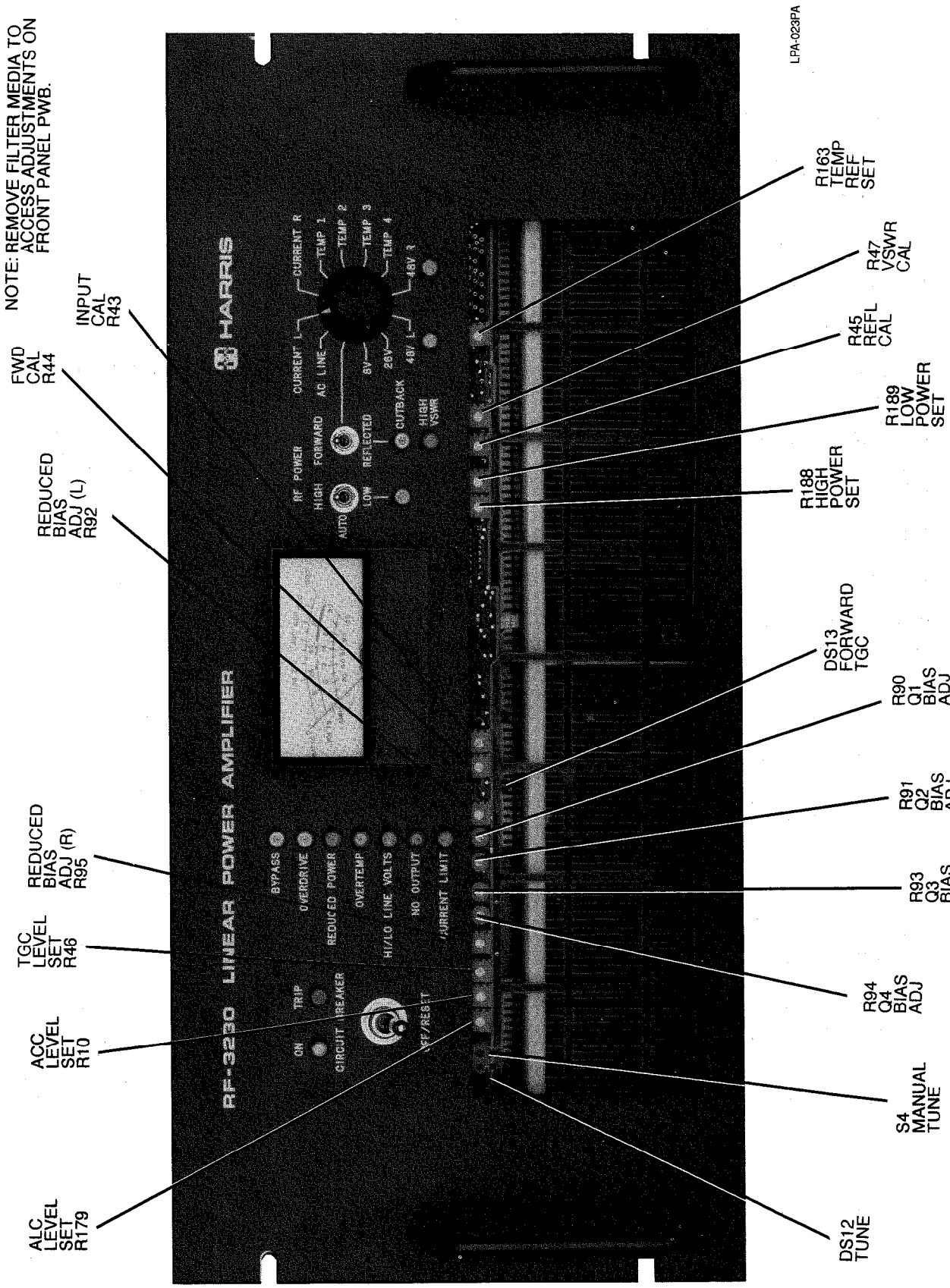


Figure 3-2. Locations of Front Panel PWB Adjustments

3.4.1.1 Current Limit Adjustment (R29)

Special equipment is required as follows:

- Active load, Transistor Devices model DLP 50-150-3000, or equivalent.

Whenever a power supply module is repaired, the current limit adjustment (R29) should be adjusted to go into current limiting if the load exceeds 32 amperes.

NOTE

If the entire power supply module is replaced, this procedure does not have to be performed.

Proceed as follows:

a. See figure 4-1 and to the component location and schematic diagrams in the A3/A4 Power Supplies tab section. Remove the +48V-L or the +48V-R lead corresponding to the power supply that was repaired or replaced.

b. Perform the following procedure on the active load:

1. Connect a ground from the E- terminal on the rear of the unit to the power supply module chassis.
2. Connect the +48V-L or +48V-R lead to the E+ terminal on the rear of the unit.
3. Adjust the DC load knob on the front panel to minimum.
4. Turn the AC power switch to the ON position.
5. Set the DC circuit breaker switch to the ON position.
6. Adjust the DC load to 35 amps.
7. Adjust resistor R29 on the A3A3/A4A3 Control PWB until it just trips.
8. The adjustment is complete. Turn off the active load, disconnect the +48V-L or +48V-R lead, and reconnect it into the RF-3230 PA. (See figure 4-1 for correct connection location.)

3.4.2 Power Amplifier Alignment

NOTE

This procedure should only be used with power amplifiers having an A2A3 Front Panel PWB Assembly before revision E. For revision E or later, use the alignment procedures given in subsection 3.4.3 below.

3.4.2.1 Bias Adjustment

The power amplifier bias must be adjusted whenever a power transistor is replaced. See figure 3-2 in the instruction manual, and proceed as follows:

WARNING

Steps in the following procedures require the operator to reach into the PA compartment with +48V power applied. Although this voltage is unlikely to be lethal by itself, operators should remove all metal objects (watches, rings, etc.) from their hands.

CAUTION

The procedure below must be followed thoroughly to avoid damaging the Field Effect Transistors (FETs) Q1 – Q4.

a. Set the CIRCUIT BREAKER OFF/RESET switch to OFF.

b. Remove the top cover of the PA assembly, and set it aside.

c. Adjust R90 (Q1), R91 (Q2), R93 (Q3), and R94 (Q4) on the A2A3 Front Panel PWB counterclockwise several turns.

d. Adjust A2A3R43 (INPUT) **fully counterclockwise**. (This prevents erroneous gain fault during tune.)

e. Ensure that the transmitter is unkeyed. Disconnect the coaxial cables W14 and W15 attached to J3 and J4 of the A2A4 Input Splitter PWB.

f. Set the CIRCUIT BREAKER OFF/RESET switch to ON.

g. Set the transmitter frequency to 15.0500 MHz.

h. Momentarily key the transmitter in CW mode.

i. Verify that the TUNE indicator (DS12) is off, indicating a successful tuning cycle.

j. Unkey the transmitter.

k. Connect a DC ammeter to the +48V-L line (red wire) of the left power amplifier module.

l. Carefully short the gate of Q2 to ground. The gate lead is the one closest to the front panel.

m. Key the transmitter.

n. ***Slowly*** adjust R90 on the Front Panel PWB for +3.5 +/- 0.1 amperes (DC). This adjustment sets the bias for Q1.

o. Unkey the transmitter, and remove the short from the gate of Q2.

p. Carefully short the gate of Q1 to ground.

q. Key the transmitter, and *Slowly* adjust R91 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q2.

r. Unkey the transmitter, and remove the short from Q1.

s. Verify that the 48V L indicator is ON. Verify that the 8V and 26V supplies are in the normal range.

t. Verify that CURRENT L indicates approximately 7 amperes (DC) greater keyed than when unkeyed.

u. Ensure that the transmitter is unkeyed.

v. Connect a DC ammeter to the +48V-R line (red wire) of the left power amplifier module.

w. Carefully short the gate of Q4 to ground. The gate lead is the one closest to the front panel.

x. Key the transmitter.

y. ***Slowly*** adjust R93 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q3.

z. Unkey the transmitter, and remove the short from the gate of Q4.

aa. Carefully short the gate of Q3 to ground.

ab. Key the transmitter, and ***slowly*** adjust R94 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q4.

ac. Unkey the transmitter, and remove the short from Q3.

ad. Verify that the 48V-R indicator is ON. Verify that the 8V and 26V supplies are in the normal range.

ae. Verify that CURRENT R indicates approximately 7 amperes (DC) greater keyed than when unkeyed.

af. This completes the bias adjustment procedure. Ensure that the transmitter is unkeyed, remove the DC ammeter, and reconnect the coaxial cables W14 to J3 and W15 to J4 of the A2A4 assembly.

3.4.2.2 Power Amplifier Adjustments

Perform the power amplifier adjustments in the following sequence to ensure optimum performance. Set up the transmitter and test equipment as follows:

a. Set the adjustments on the A2A3 Front Panel PWB as listed in table 3-2.

b. Connect the test equipment as shown in figure 3-3.

c. Turn on the transmitter, and set the frequency to 15.0500 MHz, CW mode.

d. Turn on the CIRCUIT BREAKER OFF/RESET switch.

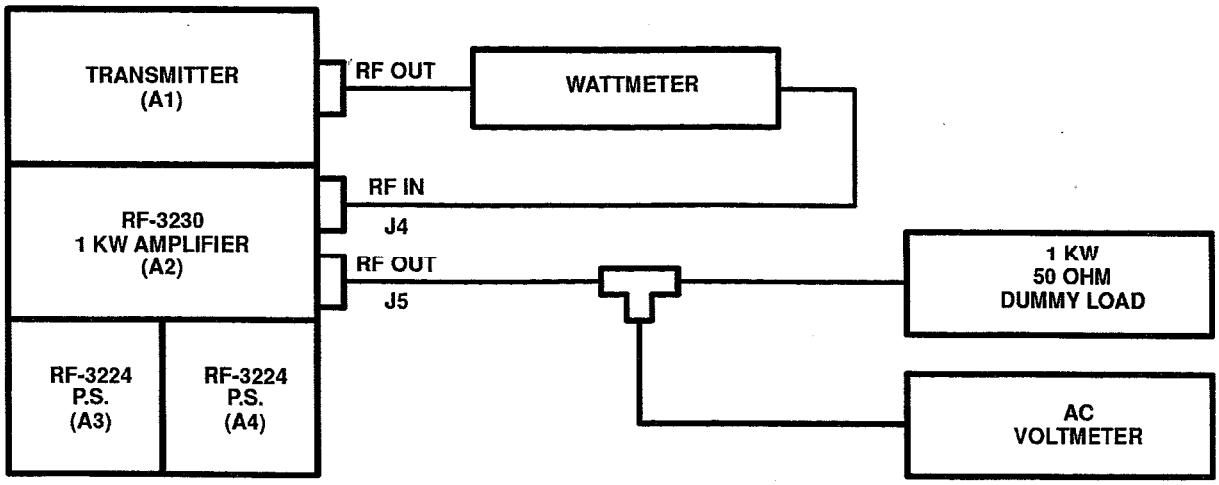
e. Verify that no fault conditions are indicated.

f. Using the front panel meter, verify that all operating DC voltages are in the normal range.

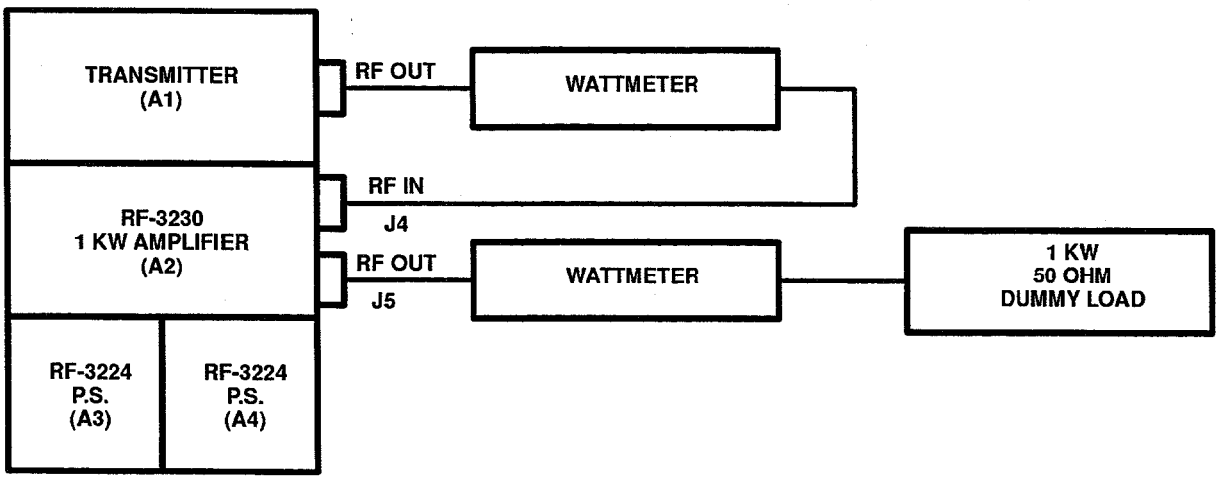
g. Proceed with the forward power and TGC adjustment (Refer to subsection 3.4.2.2.1).

Table 3-2. Power Amplifier Front Panel PWB Initial Adjustments

Adjustment	Function	Setting
R179	ALC Level	Fully clockwise
R10	ACC Level	Fully counterclockwise
R46	TGC Level	Fully clockwise
R95	Reduced Bias (R)	Fully counterclockwise
R92	Reduced Bias (L)	Fully counterclockwise
R44	Forward Power	Fully clockwise
R43	Input Power	Fully counterclockwise
R188	High Power	Fully counterclockwise
R189	Low Power	Fully counterclockwise
R45	Reflected Power	Fully counterclockwise
R47	VSWR	Fully counterclockwise
R163	TEMP	Do not adjust at this time



NORMAL TEST SETUP
(PA POWER MEASURED IN AC VOLTS)



ALTERNATE TEST SETUP
(PA POWER MEASURED IN WATTS)

LPA-201

Figure 3-3. Power Amplifier Alignment Test Setup and Alternate Test Setup

3.4.2.2.1 Forward Power and TGC Adjustment

Adjust the forward power (R44) and TGC (R46) potentiometers as follows:

a. Switch off the CIRCUIT BREAKER OFF/RESET switch.

b. Switch off the transmitter.

c. Switch off the RIGHT PA SUPPLY circuit breaker on the A5 Power Distribution Panel Assembly. Switch on the LEFT PA SUPPLY breaker.

d. Switch on the transmitter.

e. Switch on the CIRCUIT BREAKER OFF/RESET switch.

f. Verify the status of the following indicators:

1. POWER ON (on the power supply) - ON
2. 48V L - ON
3. REDUCED POWER - ON
4. 48V R - OFF
5. TUNE (behind the PA air filter media) - ON

g. Verify the following front panel meter indications:

1. 8V - normal range
2. 26V - normal range
3. 48V L - normal range
4. 48V R - no indication

h. Set the meter selector dial to RF POWER, the RF POWER FORWARD/REFLECTED switch to FORWARD, and the RF POWER HIGH/AUTO/LOW switch to HIGH.

NOTE

If you have a REV H A2A5 VSWR Assembly (10221-3250), do not perform steps i. through k. Go directly to step l. Do not perform this alignment without a separate power supply.

i. Connect a power supply adjusted to the voltage shown in the following chart between A2A5 TP2 (+) and ground.

PWB Revision Level	Power Supply Voltage
Rev F (unmodified) and below	11.3 Vdc
Rev F (modified) (See note below.)	9.8 Vdc
Rev H (Rev G non-existent)	Factory Set to 10.4 V – Do Not Readjust

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

j. Adjust A2A3R44 (FORWARD) to indicate 1000 watts on the Front Panel Meter. **Do not readjust this pot.**

k. Disconnect the power supply.

l. Connect a DVM to A2A5 TP2 using a 10K ohm resistor in series with the (+) lead.

m. Key the transmitter in CW mode at 15.0500 MHz.

n. Adjust A2A3R46 (TGC) for a voltage reading according to the following chart. This will correspond to 250 watts on the front panel meter. **Do not readjust this pot.**

PWB Revision Level	TP2 Reading
Rev F (unmodified) and below	5.5 Vdc
Rev F (modified) (See note below.)	4.9 Vdc
Rev H (Rev G non-existent)	5.2 Vdc

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

NOTE

Test point A2A5TP2 gives a very accurate indication of the amplifier's power output. Unless the external voltmeter or wattmeter is both inherently highly accurate and recently calibrated, TP2 is likely to be more accurate.

o. Verify that the front panel meter agrees within 5% of the external power meter indication.

p. Unkey the transmitter.

q. On the A5 Power Distribution Panel Assembly, switch on the RIGHT PA SUPPLY circuit breaker, and switch off the LEFT PA SUPPLY circuit breaker.

r. Reset the OFF/RESET switch on the amplifier.

s. Key the transmitter and verify that both the front panel meter and the external power meter indicate 250 watts.

t. Unkey the transmitter.

u. Turn on the LEFT PA SUPPLY circuit breaker on the Power Distribution Panel Assembly.

v. Reset the OFF/RESET switch on the amplifier.

w. Proceed with the High Power Adjustment (refer to subsection 3.4.2.2.2).

3.4.2.2.2 High Power Adjustment

Adjust the high power level potentiometer (R188) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

b. Connect a DVM to A2A5 TP2 using a 10K ohm resistor in series with the (+) lead.

c. Key the transmitter in CW mode at 15.0500 MHz.

NOTE

Test point A2A5TP2 gives a very accurate indication of the amplifier's power output. Unless the external voltmeter or wattmeter is both inherently highly accurate and recently calibrated, TP2 is likely to be more accurate.

d. Adjust R188 according to the following chart.

VSWR PWB Revision Level	TP2 Reading
Ref. F (unmodified) and below	11.3 Vdc
Rev. F (modified)	9.8 Vdc
Rev. H (Rev. G non-existent)	10.4 Vdc

The external power meter should indicate 1000 watts (224 volts).

e. Verify that the front panel meter agrees with the external power meter (or voltmeter) indication (within 5 percent).

f. Unkey the transmitter.

g. Proceed with the input drive power adjustment (refer to subsection 3.4.2.2.3).

3.4.2.2.3 Input Drive Power Adjustment

Adjust the input power level potentiometer (R43) as follows:

a. Turn off the CIRCUIT BREAKER OFF/RESET switch.

b. Disconnect both the +48 Vdc left and right connections (red wires) to the A2A6/A2A7 500-watt Power Amplifier Assemblies.

c. Short TP5 (Green) on the A2A3 Front Panel PWB to ground. (This disables the PA Fault line.)

d. Turn on the CIRCUIT BREAKER OFF/RESET switch.

e. Key the transmitter in CW mode at 15.0500 MHz.

f. Adjust R43 until the NO OUTPUT indicator just flashes and the transmitter driver is unkeyed.

g. Unkey the transmitter.

h. Turn off the CIRCUIT BREAKER OFF/RESET switch.

i. Reconnect the +48 Vdc power supplies (red wires).

j. Remove the short at TP5.

k. Proceed with the reflected power adjustment (refer to subsection 3.4.2.2.4).

3.4.2.2.4 Reflected Power Adjustment

Adjust the reflected power level potentiometer (R45) as follows:

a. Turn on the CIRCUIT BREAKER OFF/RESET switch.

b. Set the RF POWER HIGH/AUTO/LOW switch to LOW.

c. Key the transmitter in CW mode at 15.0500 MHz.

d. Monitor the forward power on the front panel meter. Adjust R189 for 100 watts.

e. Unkey the transmitter.

WARNING

Verify that the transmitter is not keyed when disconnecting the cable in the following step.

f. Disconnect coaxial cable W20 from connector J2 on the A2A5 VSWR PWB.

g. Locate CR16 on the A2A2 Filter Control PWB. Short the anode of CR16 to ground.

h. Key the transmitter.

i. Set the RF POWER FORWARD/REFLECTED switch to REFLECTED.

j. Verify that the CUTBACK and HIGH VSWR indicators are on.

k. Adjust R45 for an indication of 100 watts on the front panel meter.

l. Set the RF POWER FORWARD/REFLECTED switch to FORWARD.

m. Verify a 100-watt indication on the front panel meter.

n. Unkey the transmitter.

o. Adjust R189 fully counterclockwise.

p. Key the transmitter.

q. Adjust R189 for a reading of 250 watts on the front panel meter. Verify that the HIGH VSWR lamp is on and that the CUTBACK lamp begins to come on.

r. Unkey the transmitter.

WARNING

Verify that the transmitter is not keyed when reconnecting the following cable.

s. Reconnect coaxial cable W20 to A2A5J2.

t. Disconnect the ground shorting jumper from the anode of CR16.

u. Proceed with the ALC adjustment (refer to subsection 3.4.2.2.5).

3.4.2.2.5 ALC Adjustment

Adjust the ALC level potentiometer (R179) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

b. Key the transmitter in CW mode.

c. Use a DVM with a 10K ohm resistor in series with the (+) lead to measure the voltage at TP4 (Yellow) on the A2A3 Front Panel PWB. It should be approximately 8 Vdc. Multiply this voltage by 1.1, and note the result.

d. Measure the voltage at TP6 (Blue) on the Front Panel PWB.

e. Adjust R179 (ALC) for the voltage calculated in step c.

f. Unkey the transmitter.

g. Proceed with the low power adjustment (refer to subsection 3.4.2.2.6).

3.4.2.2.6 Low Power Adjustment

Adjust the low power level potentiometer (R189) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to LOW.

b. Verify that the LOW indicator is on.

c. Key the transmitter in CW mode.

d. Adjust R189 for 400 watts (141 Vac, or the level specified for your system), as indicated on the external power meter.

e. Verify that the front panel meter indicates 400 watts and agrees with the power meter indication (within 5 percent).

f. Unkey the transmitter.

g. Proceed with the ACC adjustment (refer to subsection 3.4.2.2.7).

3.4.2.2.7 ACC Adjustment

NOTE

This adjustment is used only with the RF-2301-10 system. For amplifiers used with other systems, skip to the VSWR calibration.

Adjust the ACC level potentiometer (R10) as follows:

a. Set the transmitter to AM mode, with no audio input.

b. Key the transmitter.

c. Adjust R10 for an output level of 250 watts.

d. Unkey the transmitter.

e. Proceed with the VSWR calibration (refer to subsection 3.4.2.2.8).

3.4.2.2.8 VSWR Calibration

Normally, VSWR adjustment resistor A2A3R47 is shorted out by jumpers JMP1 and JMP2. (In fact, R47 might not be installed on all front panel PWBs.) In this case, R47 has no effect on the operation of the VSWR circuit, and the high VSWR threshold (the level at which the HIGH VSWR indicator turns ON) is set by the ratio of fixed resistors R60 and R61. For special requirements, JMP1 and JMP2 may be removed and the VSWR threshold set to another level using R47. Refer to the manuals or addendums supplied with your system for the appropriate setting.

3.4.2.2.9 Overtemperature Calibration

With the amplifier power on, but the transmitter and amplifier unkeyed, adjust R163 (TEMP) for a reading of +2.73 Vdc on A2A3TP2 (Red).

3.4.2.2.10 2:1 VSWR Test

Perform the 2:1 VSWR test as follows:

a. Connect a 25-ohm load to the output of the transmitter.

b. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

c. Set the FORWARD/REFLECTED switch to FORWARD.

d. CW key the transmitter.

e. The forward power indicated on the front panel meter should be approximately 650 watts, and the reading at A2A5 TP2 should correspond to those in the following chart.

PWB Revision Level	TP2 Reading	TP1 Reading
Rev F (unmodified) and below	8.97 Vdc	2.91 Vdc
Rev F (modified) (See note below.)	8.10 Vdc	2.43 Vdc
Rev H (Rev G non-existent)	8.53 Vdc	2.58 Vdc

NOTE

Modified Rev F PWB will have two, 200-ohm 1/4-watt resistors soldered to the underside of the PWB assembly.

f. Set the FORWARD/REFLECTED switch to REFLECTED.

g. The front panel meter should indicate about 50 watts, and the reading at A2A5 TP1 should correspond to those in the chart found in step e.

h. Unkey the transmitter.

i. Disconnect the output of the transmitter from the loads.

j. Set the RF POWER HIGH/LOW switch to LOW.

k. Set the FORWARD/REFLECTED switch to FORWARD.

l. CW key the transmitter.

m. The forward power indicated on the front panel meter should be approximately 100 watts, and the reading at A2A5 TP2 should correspond to those in the following chart.

PWB Revision Level	TP2 Reading	TP1 Reading
Rev F (unmodified) and below	3.76 Vdc	3.75 Vdc
Rev F (modified) (See note below.)	3.45 Vdc	3.43 Vdc
Rev H (Rev G non-existent)	3.57 Vdc	3.58 Vdc

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

n. Set the FORWARD/REFLECTED switch to REFLECTED.

o. The front panel meter should indicate 100 watts, and the reading at A2A5 TP2 should correspond to those in the chart shown in step m.

p. Unkey the transmitter.

3.4.3 Power Amplifier Alignment (Rev. E Front Panel or Later)

NOTE

This procedure should only be used with power amplifiers having an A2A3 Front Panel PWB Assembly of revision E or later. For boards with revision levels **before E**, use the alignment procedures given in subsection 3.4.2 above.

3.4.3.1 Bias Adjustment

The power amplifier bias must be adjusted whenever a power transistor is replaced. See figure 3-2, and perform the following steps:

WARNING

Several steps in the following procedures require the operator to reach into the PA compartment with +48V power applied. Although this voltage is unlikely to be lethal by itself, operators should remove all metal objects (watches, rings, etc.) from their hands.

CAUTION

The procedure below must be followed thoroughly to avoid damaging the Field Effect Transistors (FETs) Q1 – Q4.

a. Set the CIRCUIT BREAKER OFF/RESET switch to OFF.

b. Remove the top cover to the power amplifier assembly, and set it aside.

c. Adjust R90 (Q1), R91 (Q2), R93 (Q3), and R94 (Q4) on the A2A3 Front Panel PWB several turns counterclockwise.

d. Adjust A2A3R43 (INPUT) **fully counterclockwise**. (This prevents an erroneous gain fault during alignment.)

e. Adjust A2A3R219 (CURRENT) fully clockwise.

f. Disconnect the coaxial cables W14 and W15 attached at J3 and J4 of the A2A4 Input Splitter PWB.

g. Set the CIRCUIT BREAKER OFF/RESET switch to ON.

h. Set the transmitter frequency to 15.0500 MHz, USB mode.

i. Momentarily key the transmitter.

j. Verify that the TUNE indicator (DS12) is off, indicating a successful tuning cycle.

k. Unkey the transmitter.

l. Connect a DC ammeter to the +48V-L line (red wire) of the left power amplifier module.

m. Carefully connect the gate of Q2 to ground through a 470-ohm resistor. The gate lead is the one closest to the front panel.

n. Key the transmitter.

o. ***Slowly*** adjust R90 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q1.

p. Unkey the transmitter and remove the short from the gate of Q2. Carefully short the gate of Q1 to ground through a 470-ohm resistor.

q. Key the transmitter.

CAUTION

If R90 is rotated too fast, the bias might increase too quickly damaging the FET Q1.

r. ***Slowly*** adjust R91 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q2.

s. Unkey the transmitter, and remove the short from Q1.

t. Verify that the 48V L indicator is ON. Verify that the 8V and 26V supplies are in the normal range.

u. Verify that CURRENT L indicates approximately 7 amperes (DC) greater when keyed than when unkeyed.

v. Ensure that the transmitter is unkeyed, and move the DC ammeter to the +48V-R line (red wire) of the right power amplifier module.

w. Carefully short the gate of Q4 to ground through a 470-ohm resistor.

x. Key the transmitter.

y. ***Slowly*** adjust R93 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q3.

z. Unkey the transmitter and remove the short from the gate of Q4. Carefully short the gate of Q3 to ground through a 470-ohm resistor.

aa. Key the transmitter.

ab. ***Slowly*** adjust R94 on the Front Panel PWB for +3.5 ±0.1 amperes (DC). This adjustment sets the bias for Q4.

ac. Unkey the transmitter, and remove the short from Q3.

ad. Verify that the 48V R indicator is ON. Verify that the 8V and 26V supplies are in the normal range.

ae. Verify that CURRENT R indicates approximately 7 amperes (DC) greater when keyed than when unkeyed.

af. This completes the bias adjustment procedure. Ensure the transmitter is unkeyed, remove the DC ammeter, and reconnect coaxial cable W14 to J3 and W15 to J4 of the A2A4 assembly.

3.4.3.2 Power Amplifier Adjustments

Perform the power amplifier adjustments in the following sequence to ensure optimum performance. Set up the transmitter and test equipment as follows:

a. Set the adjustments on the A2A3 Front Panel PWB as listed in table 3-3.

b. Connect the test equipment as shown in figure 3-2.

c. Turn on the transmitter, and set the frequency to 15.0500 MHz, CW mode.

d. Turn on the CIRCUIT BREAKER OFF/RESET switch.

e. Verify that no fault conditions are indicated.

f. Using the front panel meter, verify that all operating voltages are in the normal range.

g. Proceed with the forward power and TGC adjustment (refer to subsection 3.4.3.2.1).

Table 3-3. Power Amplifier Front Panel PWB Initial Adjustments

Adjustment	Function	Setting
R179	ALC Level	Fully clockwise
R10	ACC Level	Fully counterclockwise
R46	TGC Level	Fully clockwise
R219	Current Cutback	Fully clockwise
R44	FORWARD Power	Fully clockwise
R43	INPUT Power	Fully counterclockwise
R188	High Power (HI)	Fully counterclockwise
R189	Low Power (LO)	Fully counterclockwise
R45	Reflected Power (REFL)	Fully counterclockwise
R47	VSWR	Fully counterclockwise
R218	TUNE Power	Fully counterclockwise
R163	TEMP	Do not adjust at this time

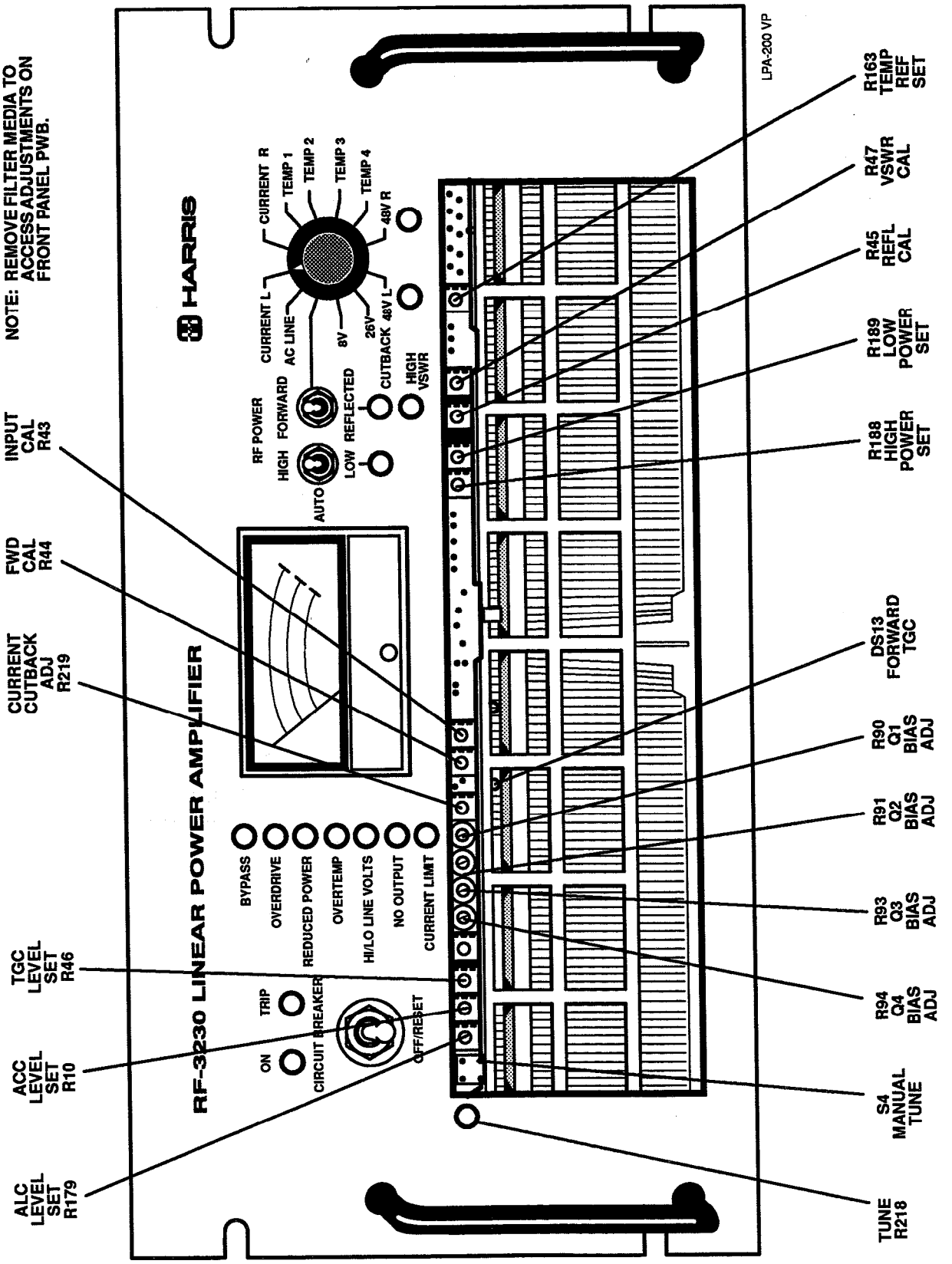


Figure 3-4. Locations of Rev. E Front Panel PWB Adjustments

3.4.3.2.1 Forward Power and TGC Adjustment

Adjust the forward power (R44) and TGC (R46) potentiometers as follows:

a. Switch off the CIRCUIT BREAKER OFF/RESET switch.

b. Switch off the transmitter.

c. Switch off the RIGHT PA SUPPLY circuit breaker on the A5 Power Distribution Panel Assembly. Turn on the left circuit breaker.

d. Switch on the transmitter.

e. Switch on the CIRCUIT BREAKER OFF/RESET switch located on the PA.

f. Verify the status of the following indicators:

1. POWER ON (on the power supply) - ON
2. 48V L - ON
3. REDUCED POWER - ON
4. 48V R - OFF
5. TUNE (behind the PA air filter media) - ON

g. Verify the following front panel meter indications:

1. 8V - normal range
2. 26V - normal range
3. 48V L - normal range
4. 48V R - no indication

h. Set the meter selector dial to RF POWER, the RF POWER FORWARD/REFLECTED switch to FORWARD, and the RF POWER HIGH/AUTO/LOW switch to HIGH.

NOTE

If you have a REV H A2A5 VSWR Assembly, do not perform steps i. through k. Go directly to step l. Do not perform this alignment without a separate power supply.

i. Connect a power supply adjusted to the voltage shown in the following chart between A2A5 TP2 (+) and ground.

PWB Revision Level	Power Supply Voltage
Rev F (unmodified) and below	11.3 Vdc
Rev F (modified) (See note below.)	9.8 Vdc
Rev H (Rev G non-existent)	Factory Set to 10.4 V – Do Not Readjust

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

j. Adjust A2A3R44 (FORWARD) to indicate 1000 watts on the Front Panel Meter. **Do not readjust this pot.**

k. Disconnect the power supply.

l. Connect a DVM to A2A5 TP2 using a 10K ohm resistor in series with the (+) lead.

m. Key the transmitter in CW mode at 15.0500 MHz.

n. Adjust A2A3R46 (TGC) for a voltage reading according to the following chart. This will correspond to 250 watts on the front panel meter. **Do not readjust this pot.**

PWB Revision Level	TP2 Reading
Rev F (unmodified) and below	5.5 Vdc
Rev F (modified) (See note below.)	4.9 Vdc
Rev H (Rev G non-existent)	5.2 Vdc

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

NOTE

Test point A2A5TP2 gives a very accurate indication of the amplifier's power output. Unless the external voltmeter or wattmeter is both inherently highly accurate and recently calibrated, TP2 is likely to be more accurate.

o. Verify that the front panel meter agrees within 5% of the external power meter indication.

p. Unkey the transmitter.

q. On the A5 Power Distribution Panel Assembly, switch on the RIGHT PA SUPPLY circuit breaker, and switch off the LEFT PA SUPPLY circuit breaker.

r. Reset the OFF/RESET switch on the amplifier.

s. Key the transmitter and verify that both the front panel meter and the external power meter indicate 250 watts.

t. Unkey the transmitter.

u. Turn on the LEFT PA SUPPLY circuit breaker on the Power Distribution Panel Assembly.

v. Reset the OFF/RESET switch on the amplifier.

w. Proceed with the High Power Adjustment (refer to subsection 3.4.3.2.2).

3.4.3.2.2 High Power Adjustment

Adjust the high power level potentiometer (R188) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

b. Connect a DVM to A2A5 TP2 using a 10K ohm resistor in series with the (+) lead.

c. Key the transmitter in CW mode at 15.0500 MHz.

NOTE

Test point A2A5TP2 gives a very accurate indication of the amplifier's power output. Unless the external voltmeter or wattmeter is both inherently highly accurate and recently calibrated, TP2 is likely to be more accurate.

d. Adjust R188 according to the following chart.

VSWR PWB Revision Level	TP2 Reading
Ref. F (unmodified) and below	11.3 Vdc
Rev. F (modified)	9.8 Vdc
Rev. H (Rev. G non-existent)	10.4 Vdc

The external power meter should indicate 1000 watts (224 volts).

e. Verify that the front panel meter agrees with the external power meter (or voltmeter) indication (within 5 percent).

f. Unkey the transmitter.

g. Proceed with the input drive power adjustment (refer to subsection 3.4.3.2.3).

3.4.3.2.3 Input Drive Power Adjustment

Adjust R43 (INPUT) fully clockwise.

3.4.3.2.4 Reflected Power Adjustment

Adjust the reflected power level potentiometer (R45) as follows:

a. Turn on the CIRCUIT BREAKER OFF/RESET switch.

b. Set the RF POWER HIGH/AUTO/LOW switch to LOW.

c. Key the transmitter in CW mode.

d. Monitor the forward power on the front panel meter. Adjust R189 for 100 watts.

e. Unkey the transmitter.

WARNING

Verify that the transmitter is not keyed when disconnecting the following cable.

f. Disconnect coaxial cable A2W20 from J2 on the A2A5 VSWR PWB.

g. Locate CR16 on the A2A2 Filter Control PWB, and short its anode to ground.

h. Key the transmitter in CW mode.

i. Set the RF POWER FORWARD/REFLECTED switch to REFLECTED.

j. Verify that the HIGH VSWR indicator is on.

k. Adjust R45 for an indication of 100 watts on the front panel meter.

l. Set the RF POWER FORWARD/REFLECTED switch to FORWARD.

m. Verify a 100-watt indication on the front panel meter.

n. Unkey the transmitter.

o. Adjust the R189 fully counter clockwise.

p. Key the transmitter.

CAUTION

Be extremely careful when making the following adjustment. If the amplifier meter reading rises appreciably above 250 watts, unkey the transmitter IMMEDIATELY. Failure to do this may result in the destruction of the amplifier output FETs.

q. Adjust R189 for a reading of 250 watts on the front panel meter. Verify that the HIGH VSWR lamp is on and that the CUTBACK lamp begins to illuminate.

r. Unkey the transmitter.

WARNING

Verify that the transmitter is not keyed when reconnecting the RF output cable.

s. Reconnect A2W20 to A2A5J2.

t. Key the transmitter.

u. Adjust R189 for 400 watts amplifier output.

v. Unkey the transmitter, and remove the short from the anode of CR16.

w. Proceed with the ALC adjustment (refer to subsection 3.4.3.2.5).

3.4.3.2.5 ALC Adjustment

Adjust the ALC level potentiometer (R179) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

b. Key the transmitter in CW mode.

c. Use a DVM with a 10K ohm resistor in series with the (+) lead to measure the voltage at TP4 (Yellow) on the A2A3 Front Panel PWB. (It should be approximately 8 Vdc.) Multiply this voltage by 1.1 and note the result.

d. Measure the voltage at TP6 (Blue) on the Front Panel PWB.

e. Adjust R179 (ALC) so that the voltage at TP6 is equal to the voltage calculated in step c.

f. Unkey the transmitter.

g. Proceed with the current cutback adjustment (refer to subsection 3.4.3.2.6).

3.4.3.2.6 Current Cutback Adjustment

Adjust the current cutback (R219) as follows:

a. Set R219 fully clockwise.

b. Set the RF POWER HIGH/AUTO/LOW switch to LOW.

c. Set the transmitter to 29.9 MHz in CW mode.

d. Key the transmitter.

e. Determine whether the CURRENT L or CURRENT R position gives a higher reading on the front panel meter, and place the meter switch in that position.

f. Set the low power level potentiometer (R189) until the meter indicates 30 amperes.

NOTE

The CURRENT LIMIT lamp may flicker. This does not indicate a problem and may be ignored.

g. Adjust R219 until the current decreases to 29 amperes.

h. Unkey the transmitter.

i. Proceed with the low power adjustment (refer to subsection 3.4.3.2.7).

3.4.3.2.7 Low Power Adjustment

Adjust the low power level potentiometer (R189) as follows:

a. Set the RF POWER HIGH/AUTO/LOW switch to LOW.

b. Verify that the LOW indicator is on.

c. Key the transmitter in CW mode.

d. Adjust R189 for 400 watts (141 volts), or the level specified for your system, as indicated on the external power meter.

e. Verify that the front panel meter indicates 400 watts and agrees with the power meter indication (within 5 percent).

f. Unkey the transmitter.

g. Proceed with the ACC adjustment (refer to subsection 3.4.3.2.8).

3.4.3.2.8 ACC Adjustment

NOTE

The ACC and Tune Power adjustments are used only with the RF-2301-10 system. For amplifiers used with other systems, skip to the VSWR calibration procedure.

Adjust the ACC level potentiometer (R10) as follows:

a. Set the transmitter to AM mode, with no audio input.

b. Key the transmitter.

c. Adjust R10 for an output level of 250 watts.

d. Unkey the transmitter.

e. Proceed with the tune power adjustment (refer to subsection 3.4.3.2.9).

3.4.3.2.9 Tune Power Adjustment

This adjustment is used to set the tune power level when an antenna coupler is included in the system. Adjust tune power as follows:

NOTE

Do not perform this procedure in systems with RF-350 Transceivers.

a. Adjust R218 (TUNE - located behind the left side of the front panel) for the desired tune power level at the RF output of the RF-3230 while the antenna coupler is tuning.

b. Depending on the antenna coupler used, adjust the tune power level with R218 as follows:

1. If the antenna coupler is the RF-2601, set tune power to 200 watts.

2. If the antenna coupler is the RF-2601A, set tune power to 250 watts.

3. If no antenna coupler is used with the system, set R218 fully counterclockwise.

c. Proceed with the VSWR calibration (refer to subsection 3.4.3.2.10).

3.4.3.2.10 VSWR Calibration

Normally, VSWR indicator adjustment resistor A2A3R47 is shorted out by jumpers JMP1 and JMP2. (In fact, R47 might not be installed on some front panel PWBs.) In this case, R47 has no effect on the operation of the VSWR circuit, and the high VSWR threshold (that is, the level at which the HIGH VSWR indicator turns ON) is set by the ratio of fixed resistors R60 and R61. For special requirements, JMP1 and JMP2 may be removed and the VSWR threshold set to another level using R47. Refer to the manuals or addendums supplied with your system for the appropriate setting.

3.4.3.2.11 Overtemperature Calibration

With the amplifier power on but the transmitter and amplifier unkeyed, adjust R163 (TEMP) for a reading of +2.73 Vdc on A2A3TP2 (Red).

3.4.3.2.12 2:1 VSWR Test

Perform the 2:1 VSWR test as follows:

a. Connect a 25-ohm load to the output of the transmitter.

b. Set the RF POWER HIGH/AUTO/LOW switch to HIGH.

c. Set the FORWARD/REFLECTED switch to FORWARD.

d. CW key the transmitter.

e. The forward power indicated on the front panel meter should be approximately 650 watts, and the reading at A2A5 TP2 should correspond to those in the following chart.

PWB Revision Level	TP2 Reading	TP1 Reading
Rev F (unmodified) and below	8.97 Vdc	2.91 Vdc
Rev F (modified) (See note below.)	8.10 Vdc	2.43 Vdc
Rev H (Rev G non-existent)	8.53 Vdc	2.58 Vdc

NOTE

Modified Rev F PWB will have two 200-ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

f. Set the FORWARD/REFLECTED switch to REFLECTED.

g. The front panel meter should indicate about 50 watts, and the reading at A2A5 TP1 should correspond to those in the chart found in step e.

h. Unkey the transmitter.

i. Disconnect the output of the transmitter from the loads.

j. Set the RF POWER HIGH/LOW switch to LOW.

k. Set the FORWARD/REFLECTED switch to FORWARD.

l. CW key the transmitter.

m. The forward power indicated on the front panel meter should be approximately 100 watts, and the reading at A2A5 TP2 should correspond to those in the following chart.

PWB Revision Level	TP2 Reading	TP1 Reading
Rev F (unmodified) and below	3.76 Vdc	3.75 Vdc
Rev F (modified) (See note below.)	3.45 Vdc	3.43 Vdc
Rev H (Rev G non-existent)	3.57 Vdc	3.58 Vdc

NOTE

Modified Rev F PWB will have two 200 ohm, 1/4-watt resistors soldered to the underside of the PWB assembly.

n. Set the FORWARD/REFLECTED switch to REFLECTED.

o. The front panel meter should indicate 100 watts, and the reading at A2A5 TP2 should correspond to those in the chart shown in step m.

p. Unkey the transmitter.

SECTION 4

MAJOR ASSEMBLY LOCATION AND INTERCONNECTION

4.1 INTRODUCTION

This tab section contains top assembly, power supply assembly, and ancillary kit parts lists, an assembly locations drawing, and an interconnect schematic diagram for the RF-3230 1 kW Linear Power Amplifier (10221-1000).

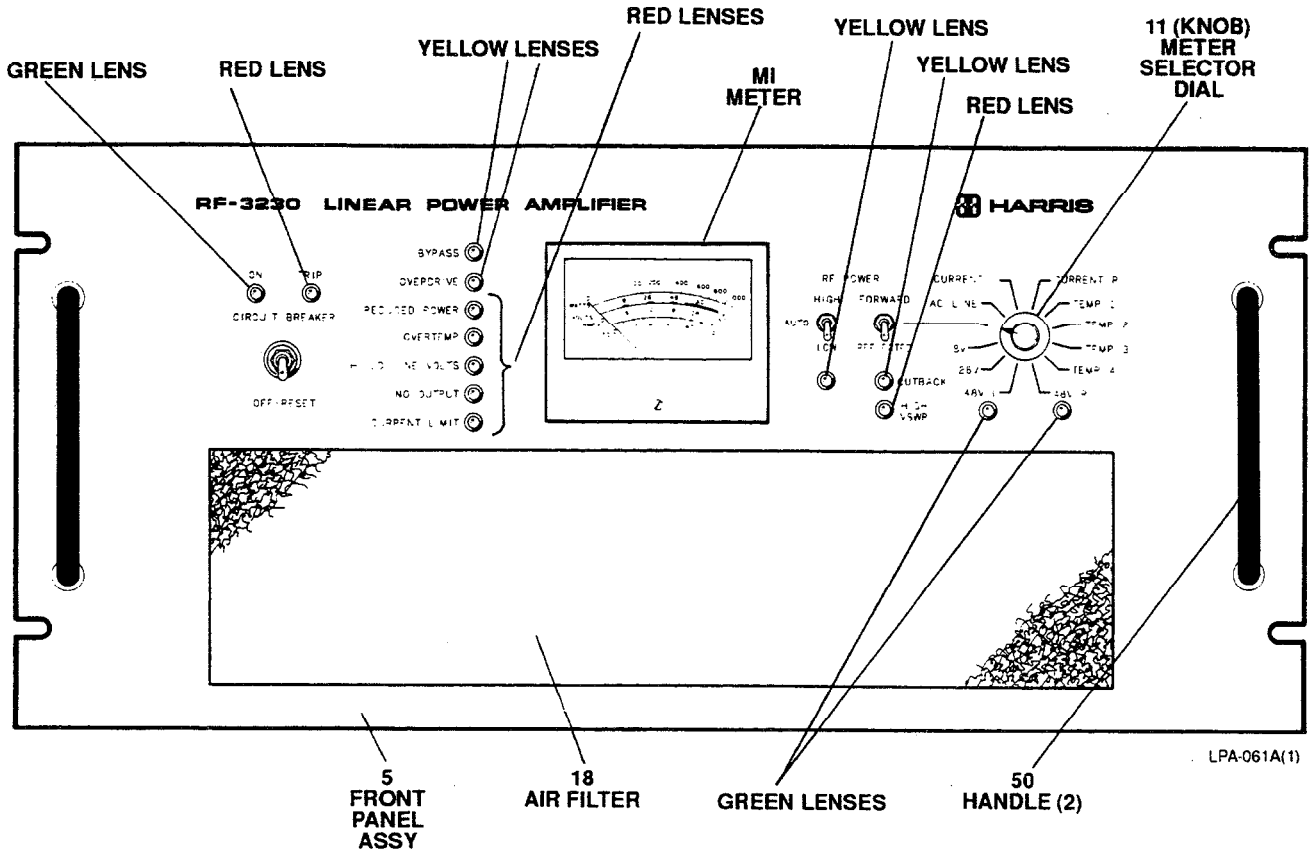
The parts lists and diagrams for the RF-3230 major assemblies and subassemblies are contained in the following tab sections:

- A2 1 kW Power Amplifier (10221-1000 for the RF-3230 and 10221-0350 for the RF-3230B)
  - A2A1 Interconnect PWB (10221-3160)
  - A2A2 Filter Control PWB (10221-3360) (Part of Front Panel Assembly 10221-3300)
  - A2A3 Front Panel PWB (10221-3350) (Part of Front Panel Assembly 10221-3300)
  - A2A4 Input Splitter PWB (10221-3400)
  - A2A5 VSWR PWB (10221-3250)
  - A2A6/A2A7 500 Watt Amplifier Assemblies (10221-3100)
  - A2A8 Combiner Assembly (10221-3500)
  - A2A9 Low Pass Filter PWB (10221-3200)
- A3/A4 Power Supplies
  - A3A1/A4A1 Triac Driver PWB (10221-4110)
  - A3A2/A4A2 Control PWB (10221-4120)
  - A3A3/A4A3 Line Filter PWB (10221-4130)
  - A3A4/A4A4 Capacitor PWB (10221-4200)
- A5 Power Distribution Panel Assembly
  - A5A1 Power Distribution Panel PWB (10221-3820)
  - A5A2 Fan Regulator PWB (10221-3840)

The RF-3230 contains two identical A2A6/A2A7 500 Watt Amplifiers, and two identical A3/A4 Power Supplies.

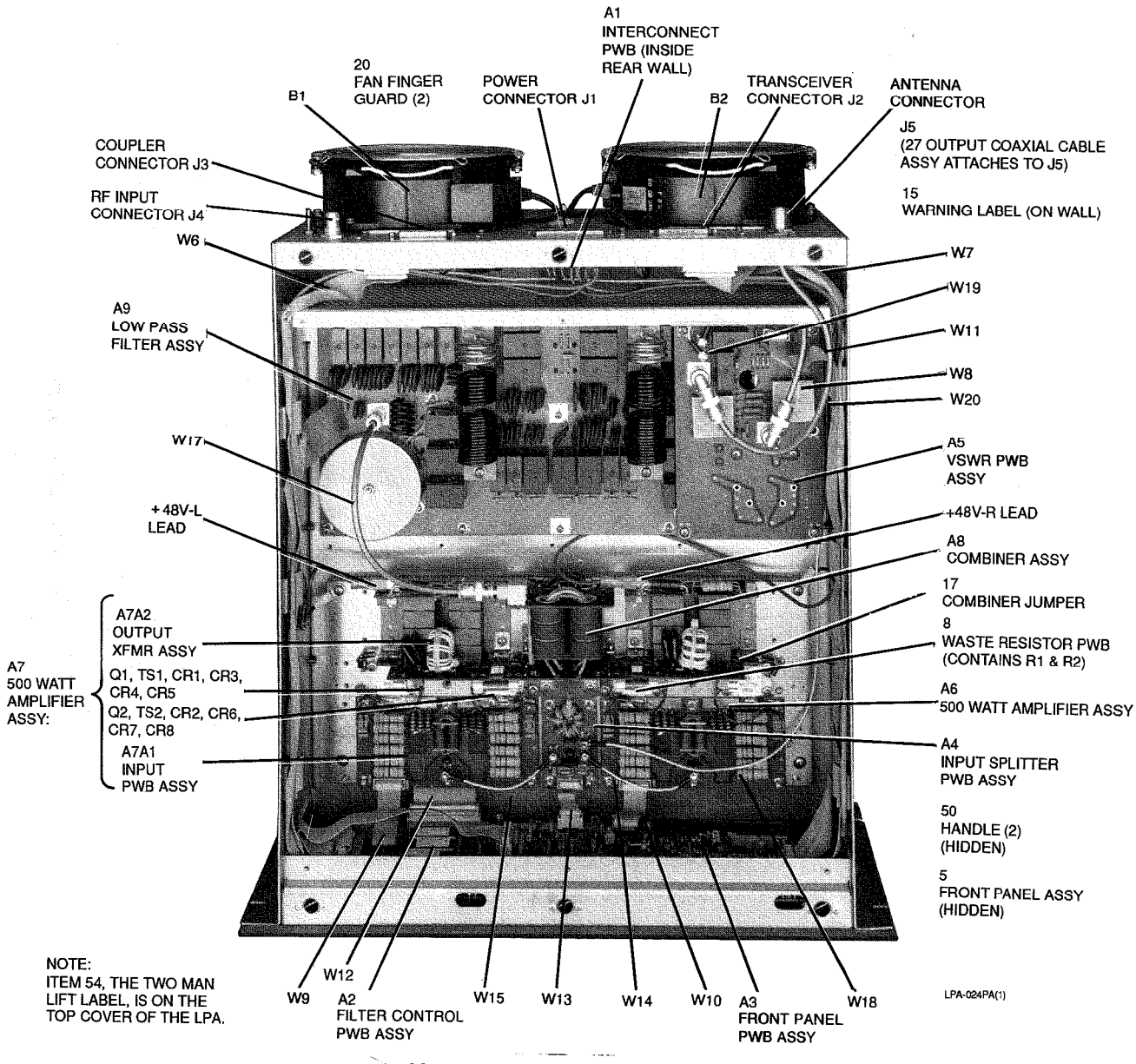
4.2 LOCATIONS OF MAJOR ASSEMBLIES

The major assemblies of the RF-3230 are identified in figure 4-1.



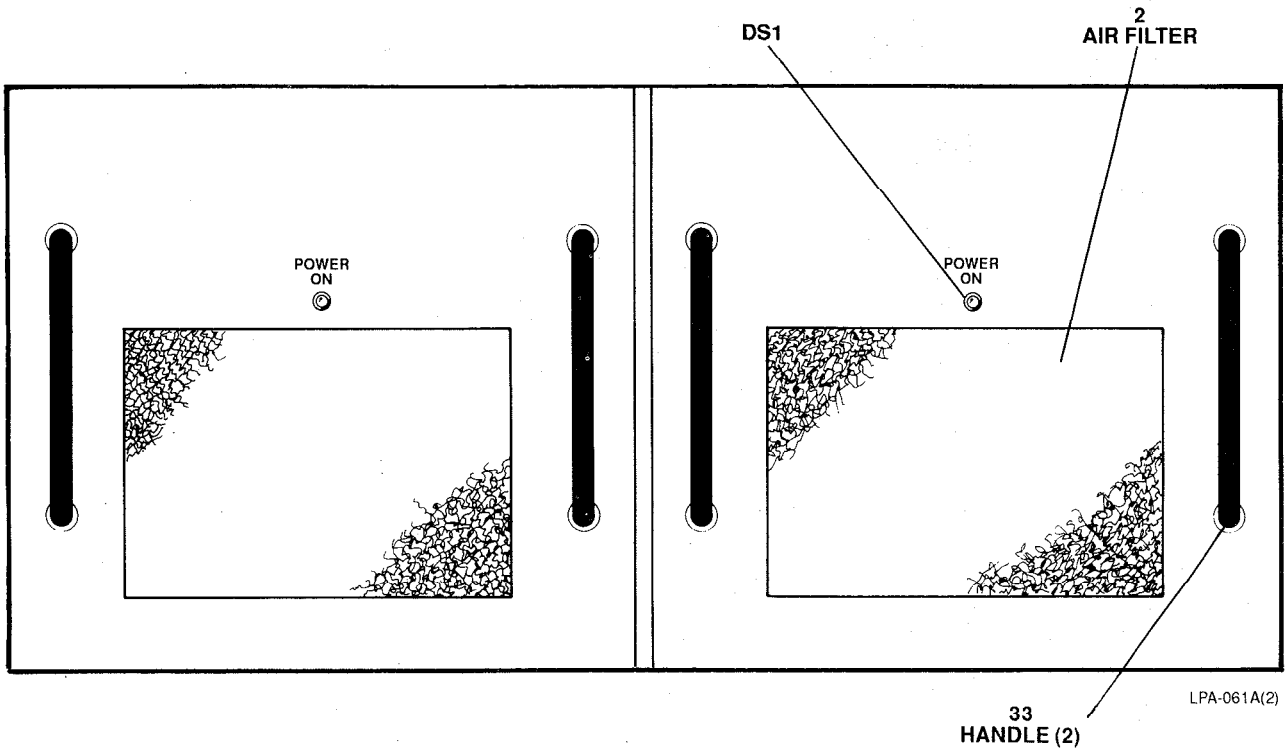
A2 (RF-3230) 1 KW AMPLIFIER DRAWER (FRONT VIEW)

Figure 4-1. RF-3230 Major Assembly Locations (Sheet 1 of 4)



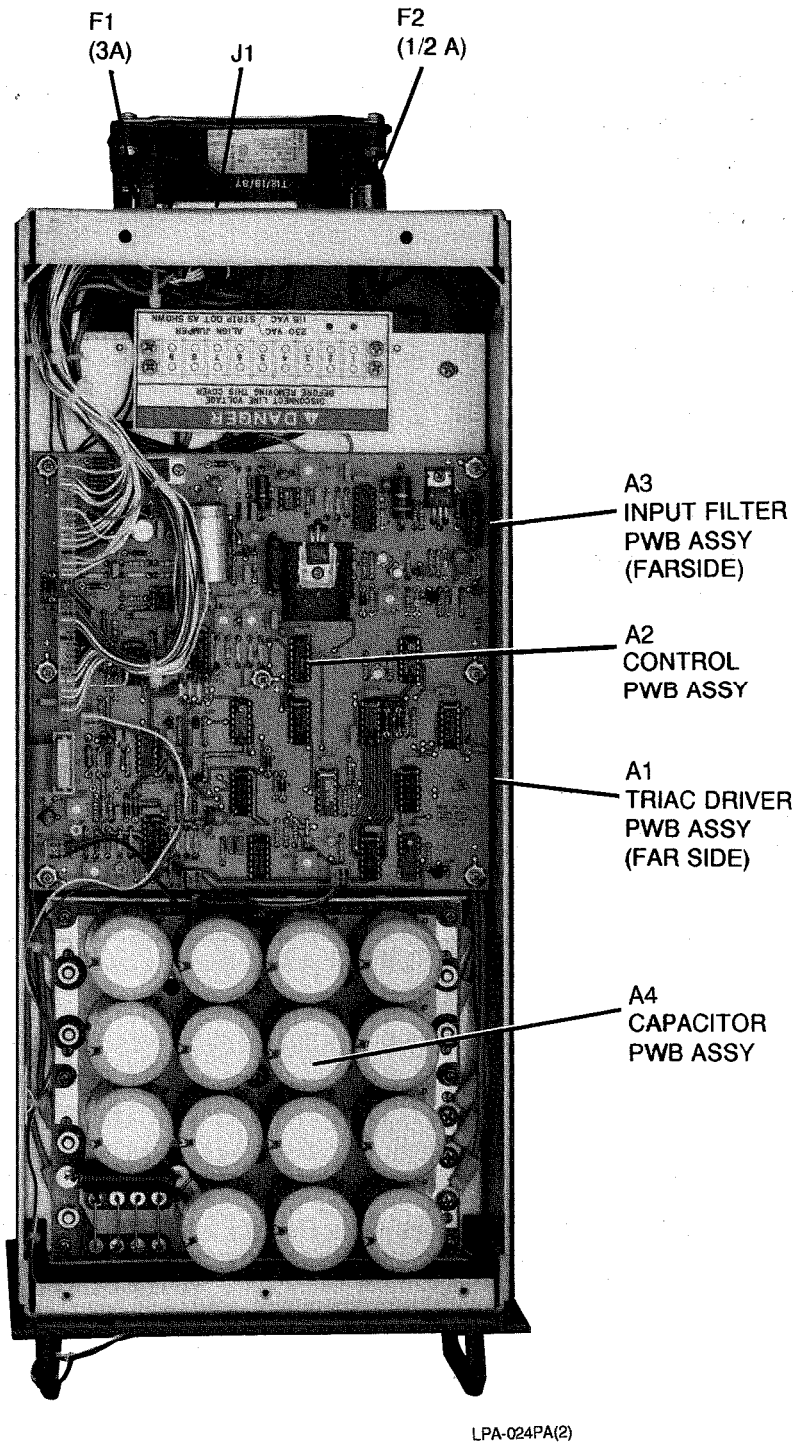
A2 (RF-3210) 1 KW AMPLIFIER DRAWER (TOP VIEW)

Figure 4-1. RF-3230 Major Assembly Locations (Sheet 2 of 4)



A3/A4 (RF-3224) POWER SUPPLIES
(FRONT VIEW)

Figure 4-1. RF-3230 Major Assembly Locations (Sheet 3 of 4)



A3/A4
(RF-3224) POWER SUPPLY
(ONE OF TWO IDENTICAL POWER SUPPLIES)
(TOP VIEW)

Figure 4-1. RF-3230 Major Assembly Locations (Sheet 4 of 4)

4.3 PARTS LISTS

Tables 4-1 and 4-2 are the top assembly parts lists and tables 4-3 and 4-4 the Power Supply Assembly parts lists for the RF-3230 and RF-3230B, respectively. Table 4-5 is the ancillary kit parts list for the RF-3230. RF-3230 major assembly and subassembly level parts lists are in the individual tab sections of this manual.

Tables 4-3 and 4-4 are the parts list for the Power Supply assemblies used in the RF-3200E and RF-3200B, respectively.

4.4 INTERCONNECT DIAGRAM

Figure 4-2 is an interconnect schematic for the RF-3230 Linear Power Amplifier. Note that this diagram applies to the RF-3230B as well with the exception that on sheet 3 the A5 Power Distribution Assembly is part number 10221-3900 rather than 10221-3800.

Table 4-1. RF-3230 Linear Power Amplifier Top Assembly Parts List (10221-1000 Rev. C)

Ref. Desig.	Part Number	Description
A2	10221-3000	AMPLIFIER ASSY (Refer to section A2)
3	10221-4000	POWER SUPPLY ASSY
A5	10221-3800	POWER DISTRIBUTION PANEL ASSY (Refer to section A5)
5	10221-0210	ANCILLARY KIT, RF-3230 (Refer to table 4-5.)

Table 4-2. RF-3230B Linear Power Amplifier Top Assembly Parts List (10221-0350 Rev. –)

Ref. Desig.	Part Number	Description
A2	10221-3010	AMPLIFIER ASSY (Refer to section A2)
3	10221-4100	POWER SUPPLY ASSY
A5	10221-3900	POWER DISTRIBUTION PANEL ASSY (Refer to section A5)
5	10221-0210	ANCILLARY KIT, RF-3230 (Refer to table 4-5.)
6	10221-0030	RF-3230 SERVICE MANUAL

Table 4-3. Power Supply Assembly Parts List (10221-4000 Rev. G)

Ref. Desig.	Part Number	Description
2	10221-4500	1500W POWER SUPPLY MODULE
3	10221-4505	CHASSIS,POWER SUPPLY ASSY
5	10221-4506-01	FRONT PANEL,BLACK
6	10221-4527	LABEL,WARNING
18	10221-0127	LABEL,TWO MAN LIFT
20	Z22-0007-501	BASE CLAMP LESS GLUE

Table 4-4. Power Supply Assembly Parts List (10221-4100 Rev. A)

Ref. Desig.	Part Number	Description
2	10221-4600	1500W POWER SUPPLY MODULE
3	10221-4505	CHASSIS,POWER SUPPLY ASSY
5	10221-4506-03	FRONT PANEL, LIGHT GRAY
6	10221-4527	LABEL,WARNING
18	10221-0127	LABEL,TWO MAN LIFT
20	Z22-0007-501	BASE CLAMP LESS GLUE

Table 4-5. RF-3230 Ancillary Kit Parts List (10221-0210 Rev. F)

Ref. Desig.	Part Number	Description
2	F-0008	FUSE 1/2A QA 250V 3AG
3	F-0013	FUSE 3.0A QA 250V 3AG
4	F-0072	FUSE 10A CER QA 250V 3AG
6	F03-0002-022	FUSE 1-1/2A SB 250V 3AG
7	J22-0058-113	D CONN 17W2P SLDR CUP
8	J22-0100-026	PLUG, #12
9	J55-0015-025	HOOD D-CONN 25 POS
10	J85-0010-001	PLUG, 230VAC

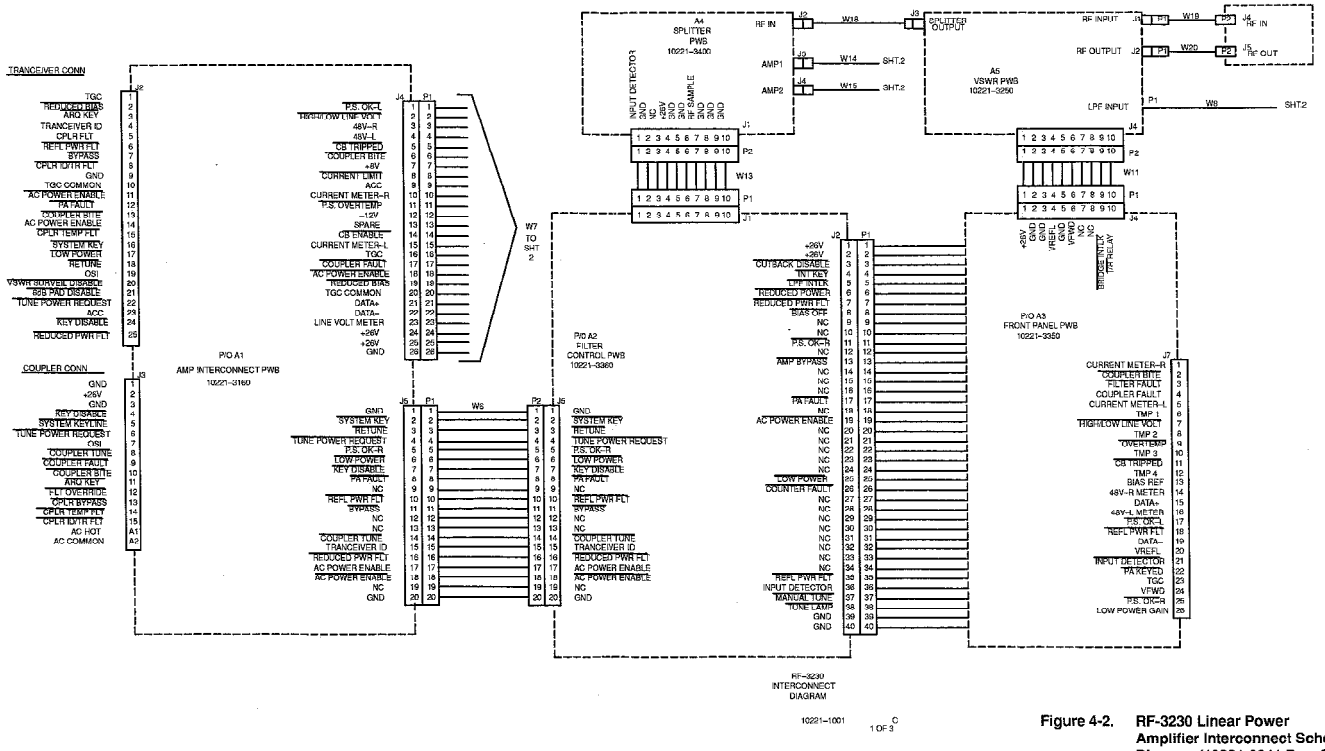


Figure 4-2. RF-3230 Linear Power Amplifier Interconnect Schematic Diagram (10221-0011 Rev. C) (Sheet 1 of 3)

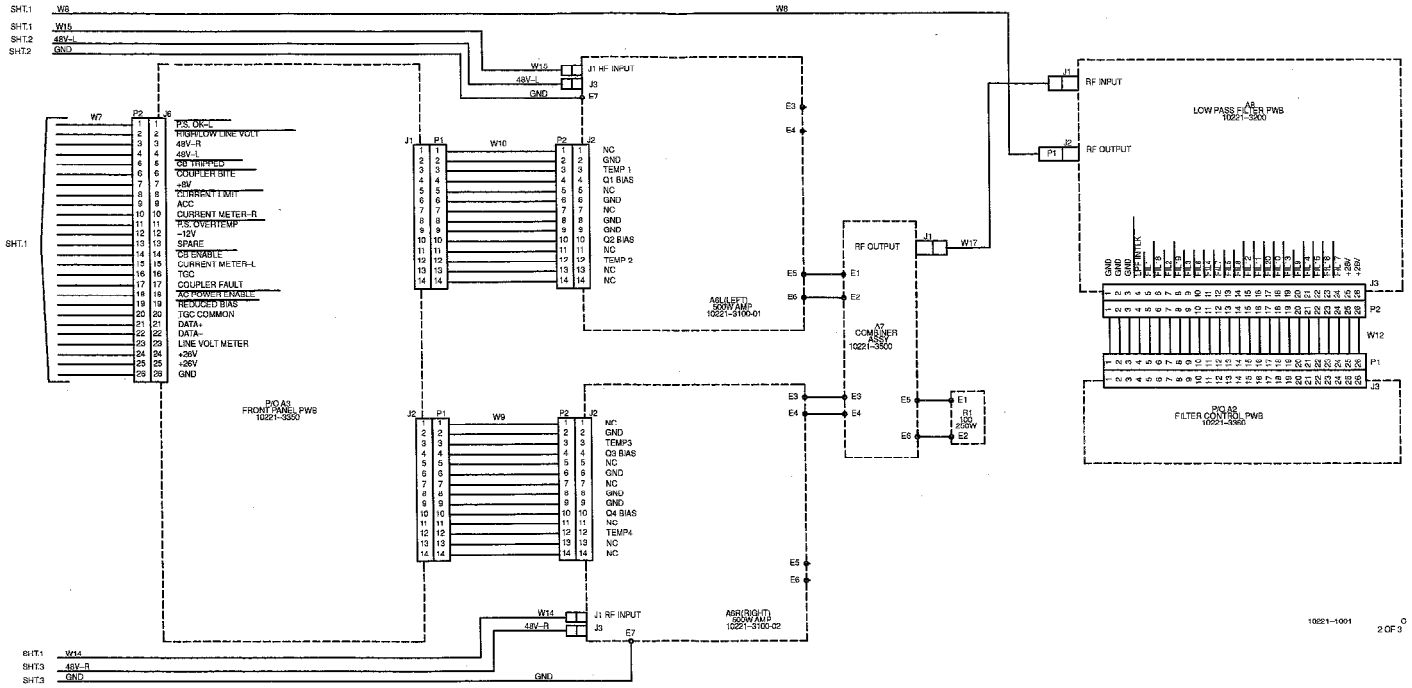


Figure 4-2. RF-3230 Linear Power Amplifier Interconnect Schematic Diagram (10221-0011 Rev. C) (Sheet 2 of 3)

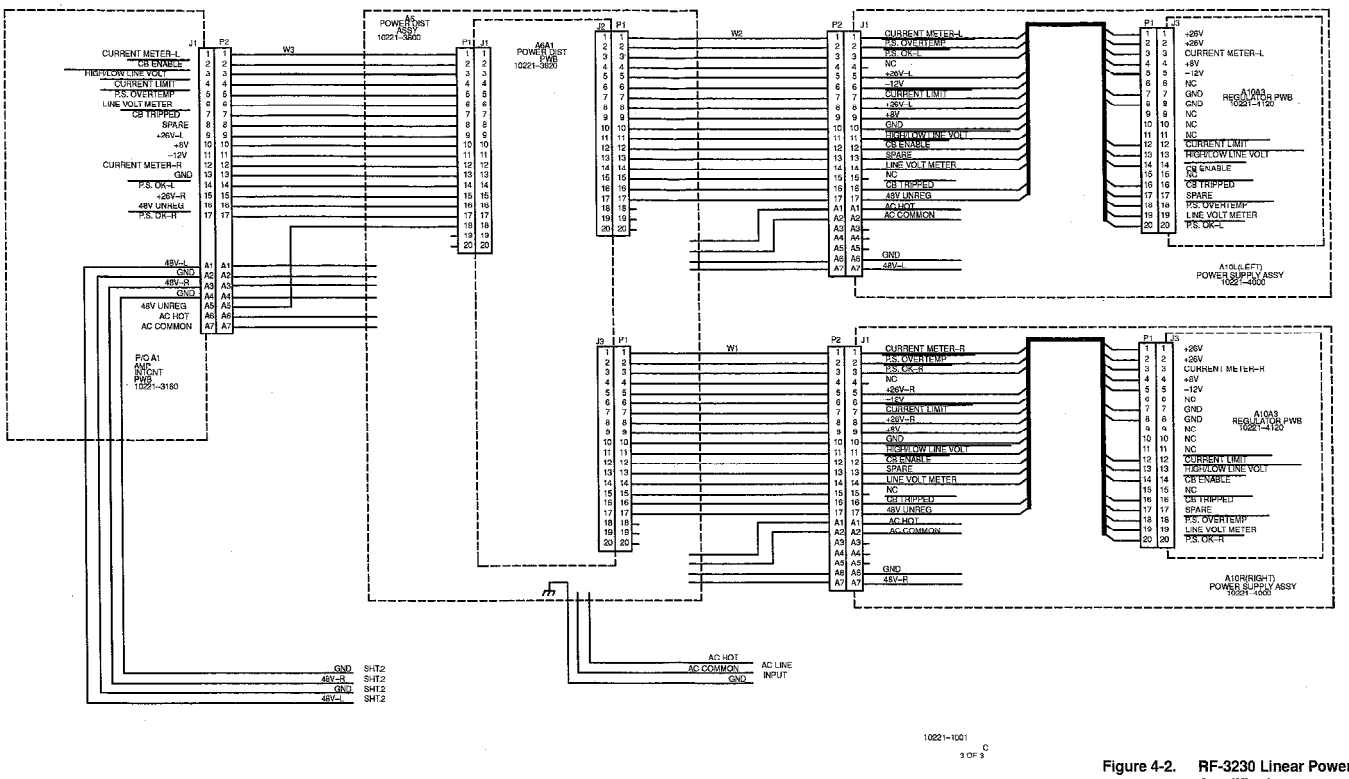


Figure 4-2. RF-3230 Linear Power Amplifier Interconnect Schematic Diagram (10221-0011 Rev. C) (Sheet 3 of 3)

SECTION 5

RF-3200E-10 SYSTEM INTERCONNECTION

5.1 SYSTEM DESCRIPTION

The RF-3200E-10 combines the RF-3200E Transceiver and the RF-3230 Linear Power Amplifier to form an integral 1 kW HF fixed-station system. A standard rack-mounted RF-3200E, with an RF-3236 Power Supply, provides reliable voice and data communications with complete coverage of the 1.6 to 30 MHz range in 100 Hz synthesized steps. The fully solid-state design, rugged construction, and field-proven electrical components make this 125 watt transceiver an excellent choice in both mobile and fixed stations.

The RF-3200E-10 can be operated with broadband HF antennas such as the RF-1933 series, or with an automatic 1 kW antenna coupler such as the RF-601A or the RF-2601.

A complete line of accessories provide the flexibility necessary to meet a wide variety of communications requirements. In addition to the antennas and antenna couplers, Harris manufactures a full complement of audio accessories, remote controls, and spares kits.

Figures 5-1 and 5-2 show the front and rear views of a rack mounted RF-3200E-10 1 kW system. Figure 5-3 is a block diagram of the RF-3200E-10 1 kW system.

Tables 5-1, 5-2, and 5-3 are the parts lists for the RF-3200E-10, RF-3200E-10 A/C, and RF-3200E-11 A/C (with antenna coupler) systems.

5.2 SYSTEM INSTALLATION

The RF-3200E-10 system is set up at the factory for intended service. Mechanical installation of the system consists of securing the rack in place. Electrical installation involves making primary power, remote audio, and antenna connections.

5.2.1 Unpacking and Inspection

Always save all packing material until the equipment has been inspected and verified for completeness. Report any shipping damage immediately. Store the original packing material for possible reshipment. Items in the ancillary kit are listed in table 5-4.

5.2.2 Mechanical Installation

Rack mounting dimensions are shown in figure 5-4. Consider all power entry, signal entry, and antenna output connections when selecting a location for the rack. Bolt the rack to the mounting platform or floor, using 5/16" hardware, according to the site plans.

5.2.2.1 Shock Mount Installation

A typical shock-mounted installation is shown in figure 5-5. Four sets of 1/2-13 UNC hardware (not supplied) are required to secure the shock mount base to the deck. Six sets of 3/8-16 UNC hardware (not supplied) are required to secure the stabilizer assembly to the bulkhead.

When installing the rack, allow a 2.0 inch vertical sway clearance above the rack, and a 2.0 inch lateral sway clearance per side. If the stabilizer is not installed, allow a 4.1 inch lateral sway clearance per side.

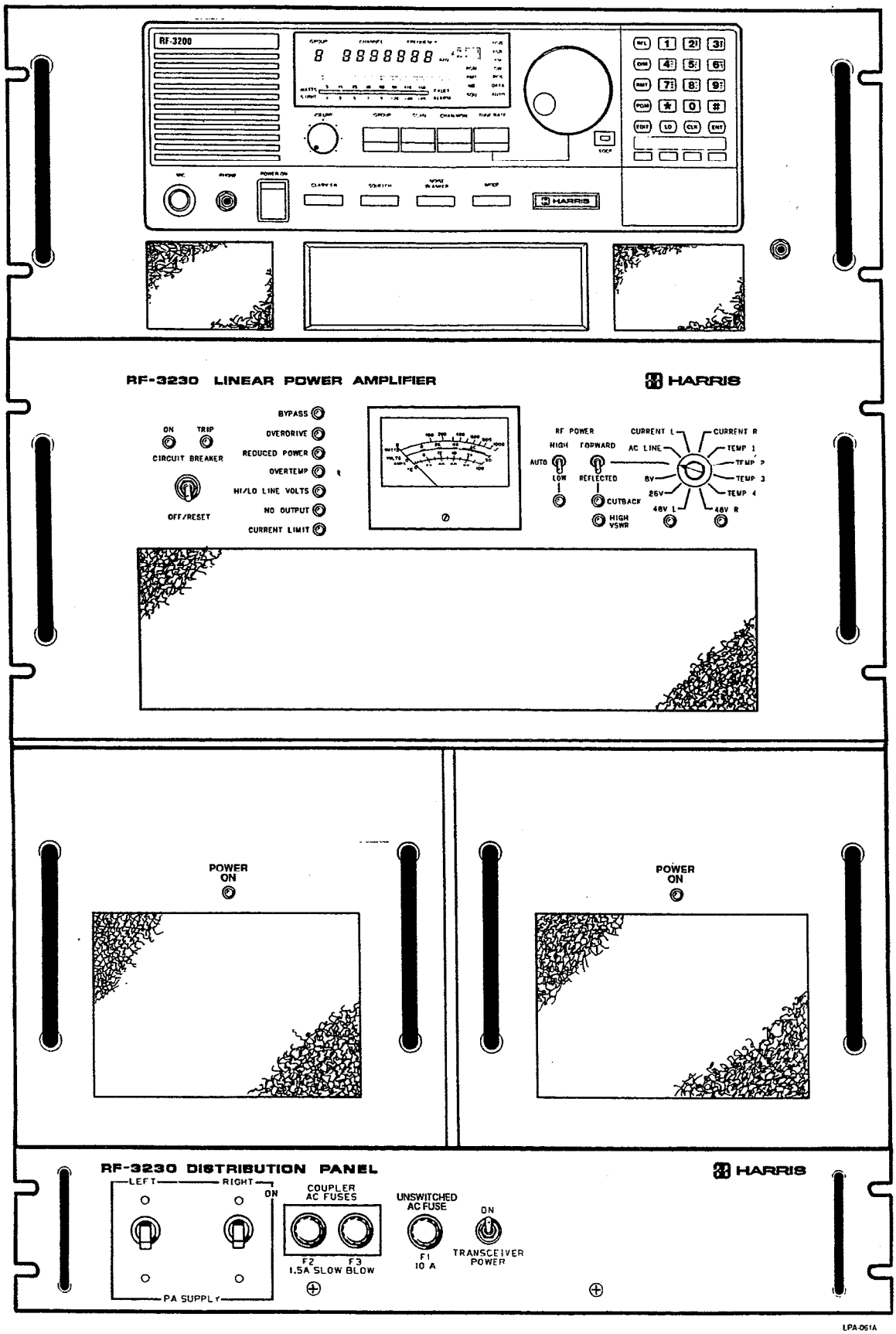


Figure 5-1. RF-3200-10 1 kW System Front View

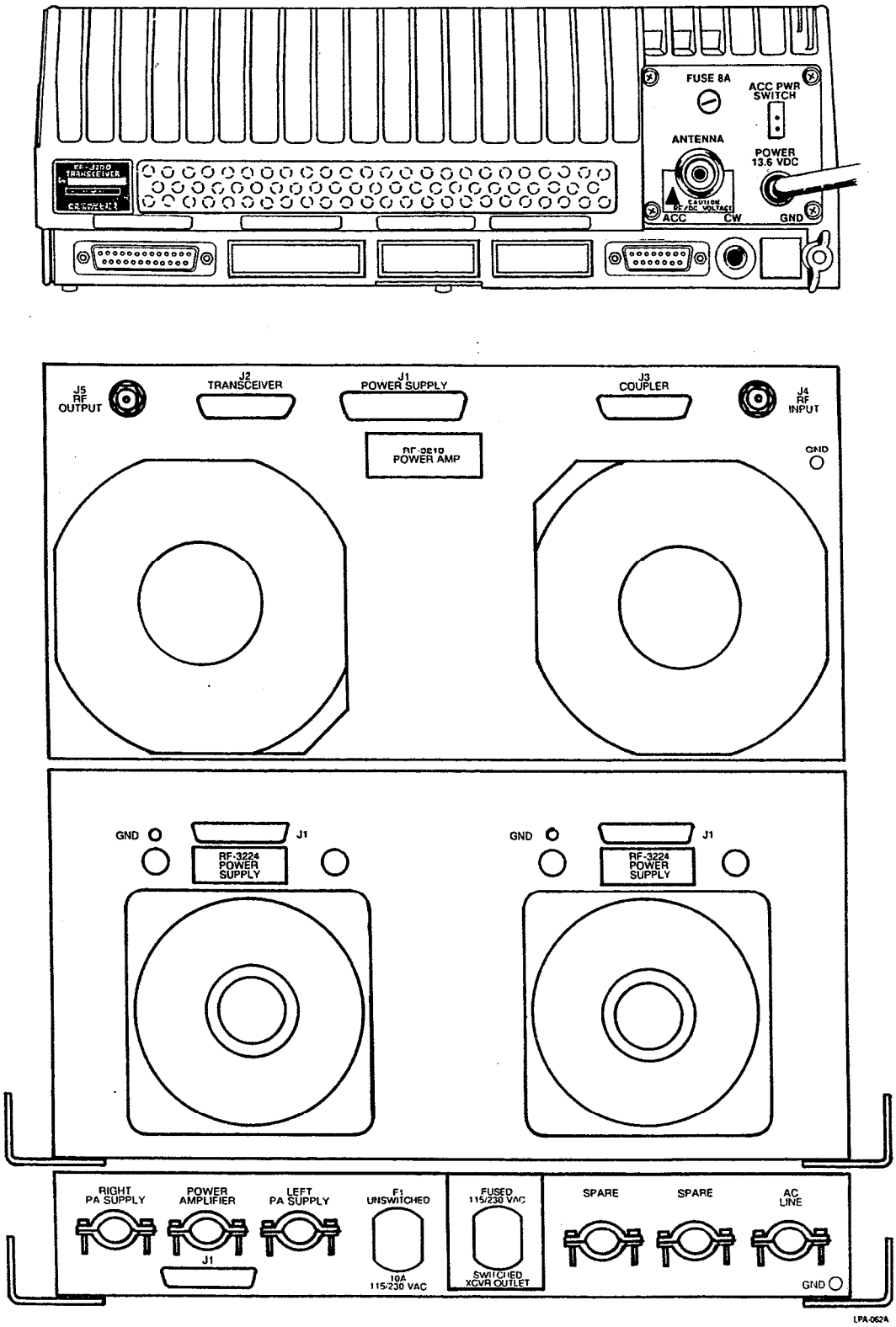


Figure 5-2. RF-3200-10 1 kW System Rear View

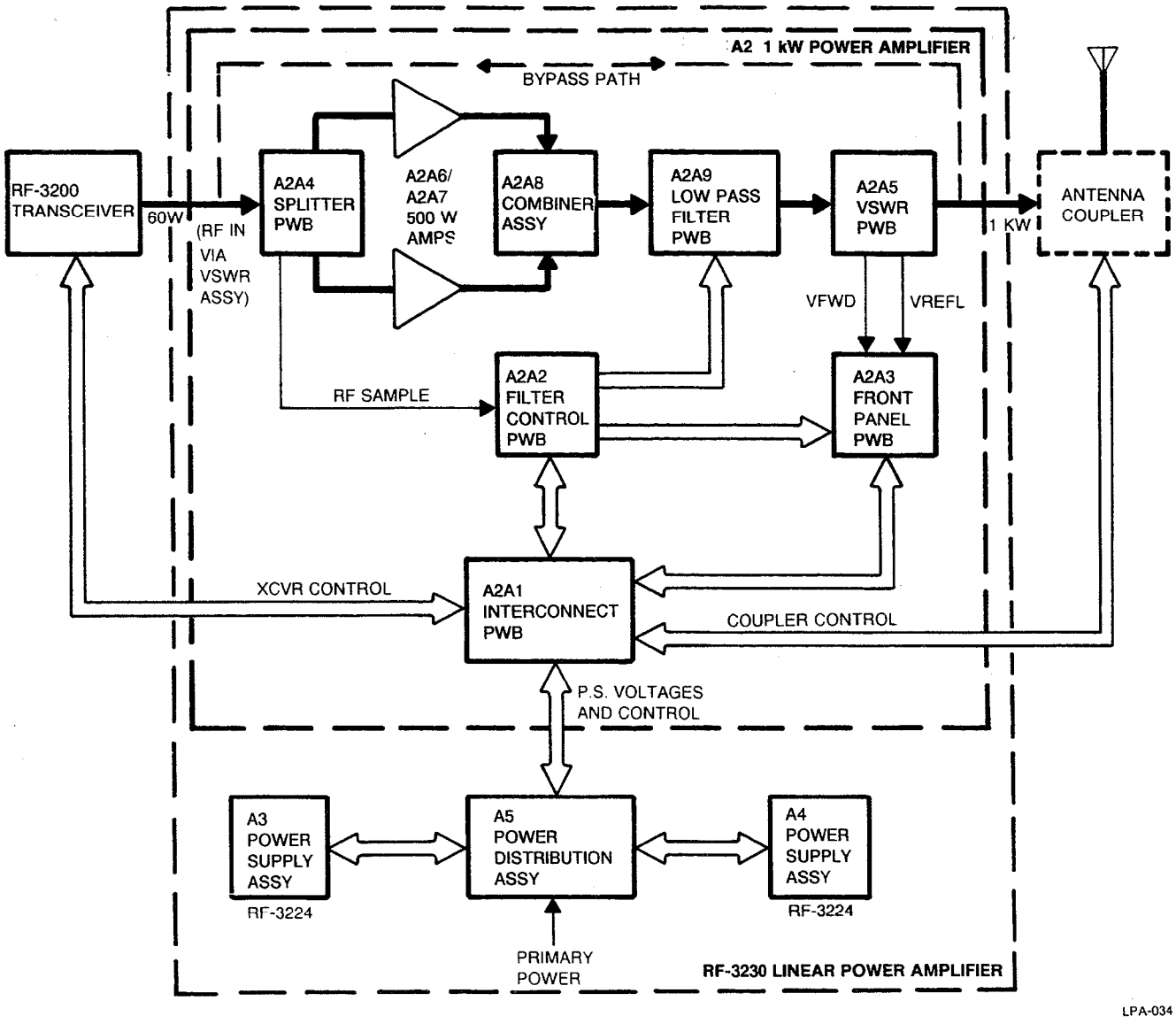


Figure 5-3. RF-3200-10 1 kW System Block Diagram

Table 5-1. RF-3200E-10 System Top Assembly Parts List (10221-0200 Rev. F)

Ref. Desig.	Part Number	Description
–	10212-0010	RF-3200E RADIO KIT
–	10221-1000	TOP ASSEMBLY, RF-3230
–	10221-1020	RF-3200E SERIES RACK
–	10221-5333	RF-3200E-10 SERVICE MANUAL
–	10221-0123	NAMEPLATE, RF-3200E-10

Table 5-2. RF-3200E-10 A/C Top Level Parts List (10221-0602 Rev. A)

Ref. Desig.	Part Number	Description
–	10221-0353	CABLE, PA/COUPLER CONTROL
–	6902-4006	RACK MT PACKAGE
–	10177-1165-5	GROUND STRAP

Table 5-3. RF-3200E-11 A/C Top Level Parts List (10221-0603 Rev. B)

Ref. Desig.	Part Number	Description
–	10257-0018	CABLE ASSY, RF-2602/3230
–	Z46-0019-102	BLANK PANEL, 1 3/4
–	10221-0004	INSTRUCTION SHEET
–	10177-1165-5	GROUND STRAP

Table 5-4. RF-3200E-10 Ancillary Kit (10221-0210 Rev. F)

Qty	Part Number	Description	Function
–	F-0008	FUSE, 1/2 A	REPLACEMENT FOR A3/A4 F2
–	F-0013	FUSE, 3.0 A	REPLACEMENT FOR A3/A4 F1
–	F-0072	FUSE, 10 A	REPLACEMENT FOR A5F1
–	F03-0002-022	FUSE, 1/2 A SLOW BLOW	REPLACEMENT FOR A5F2, A5F3
–	J22-0058-113	D CONNECTOR 17W2P	COUPLER CONNECTOR
–	J22-0100-026	PLUG #12	COUPLER CONNECTOR
–	J55-0015-025	HOOD D CONNECTOR 25 POS	COUPLER CONNECTOR
–	J85-0010-001	PLUG, 230 VAC	SPARE AC PLUG

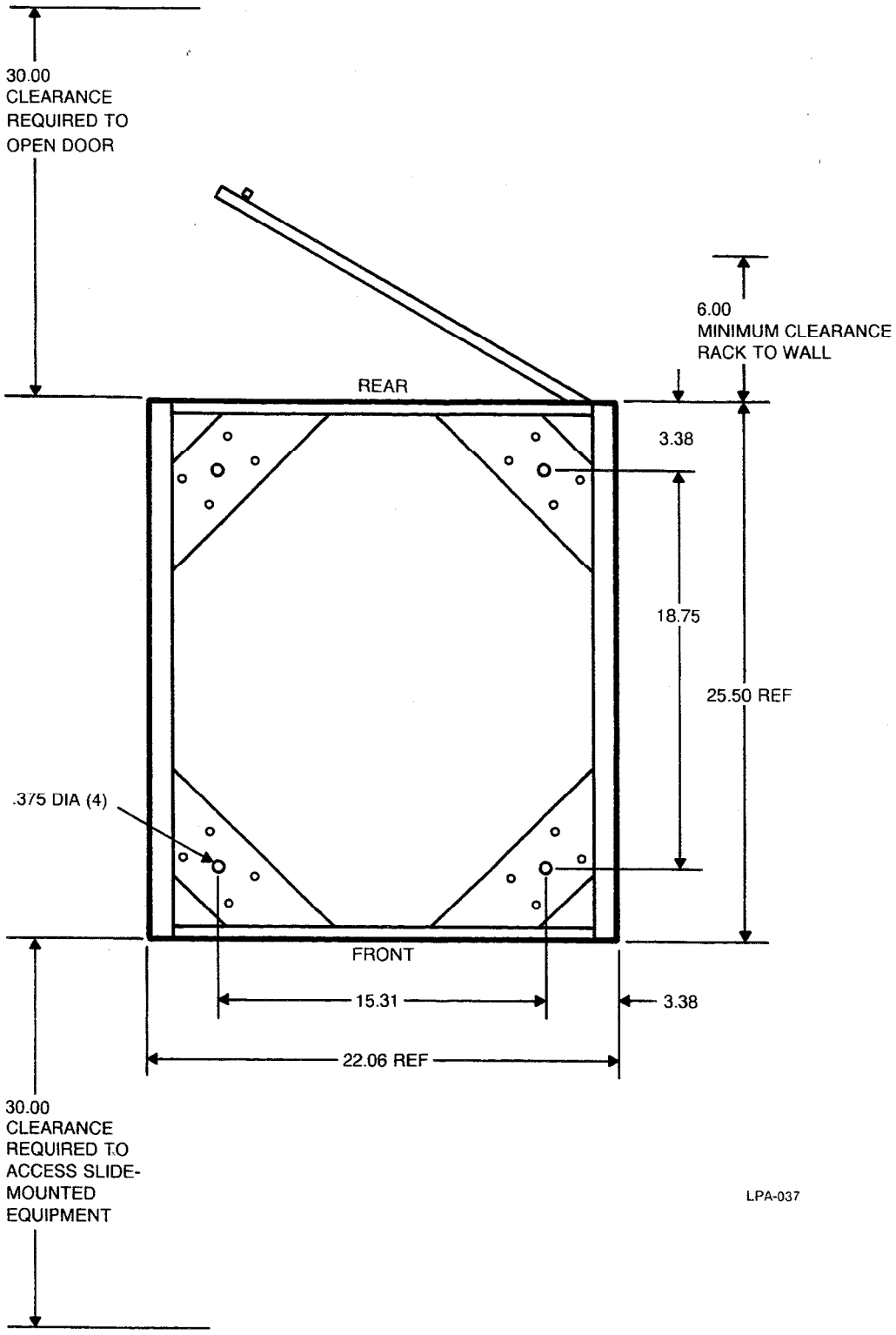


Figure 5-4. RF-3200-10 Rack Mounting Dimensions

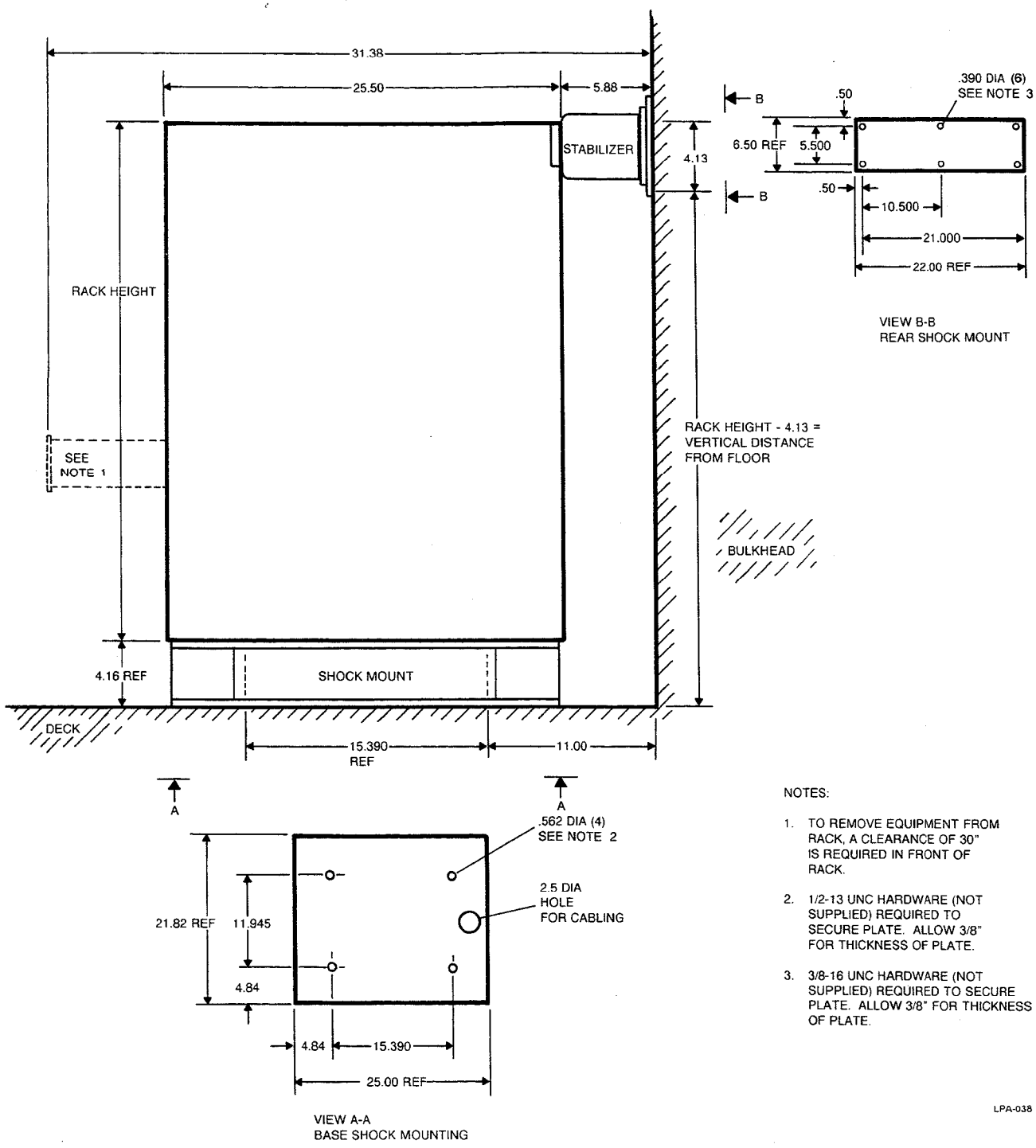


Figure 5-5. Shock Mount Installation Detail

5.2.3 Electrical Installation

WARNING

Verify the system is set up for the correct line voltage, and that the system is properly grounded, before applying primary power.

CAUTION

The system is supplied setup for either 115 Vac or 230 Vac, as required by the customer. The line voltage used determines the circuit breakers required, as well as connections made in the power distribution and power supply assemblies. The two AC outlets at the rear of the Power Distribution Assembly have the same voltage as the primary power to the system. The Power Supply and Power Distribution Assemblies are labeled for the line voltage required.

5.2.3.1 Primary Power Connection

Input power requirements are 115 Vac or 230 Vac + 15%, 47-63 Hz, 4500 VA maximum. Connect the AC input as follows:

a. Remove the hardware that secures the A5 Power Distribution Assembly to the rack.

b. Slide the chassis out far enough to reach the restraining clamp on the rear of the assembly.

c. Remove the top cover from the power distribution chassis.

d. Route the power cable through one of the holes in the bottom rail of the rack, as shown in detail A of figure 5-6.

e. Route the cable through the restraining clamp on the rear of the power distribution chassis.

f. Connect the green wire (GROUND) to ground lug E1, as shown in detail B of figure 5-6.

g. Connect the white wire (AC RETURN) to TB1-4.

h. Connect the black wire (AC HOT) to TB1-2.

i. Tighten the restraining clamp around the power cable, and reinstall the cover on the chassis.

j. Reinstall the power distribution assembly in the rack, and secure it with the hardware removed in step a.

5.2.3.2 RF Output Connection

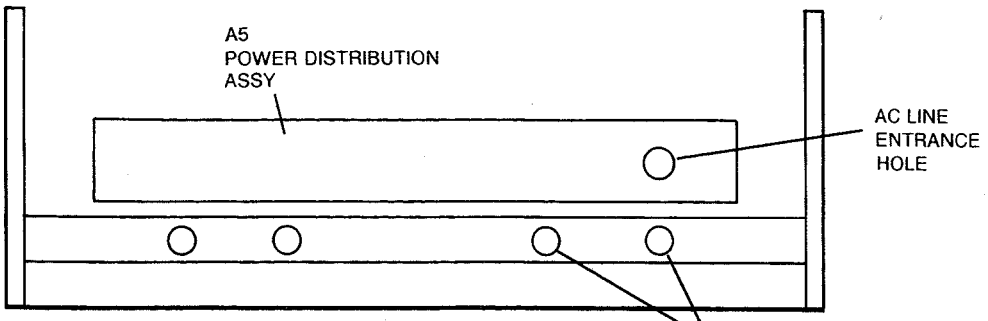
The system RF output connector is located at the left rear of the power amplifier. The characteristic impedance of the output is 50 ohms. Although the output is protected for operation into less than optimum loads, performance is always best when an optimum match is achieved. Use either a broadband antenna system for full-frequency operation, or a fixed resonant antenna for single-frequency operation. Harris manufactures a complete line of antenna couplers that permit operation of this equipment with a variety of antenna systems.

5.2.3.3 Remote Audio Input Connection

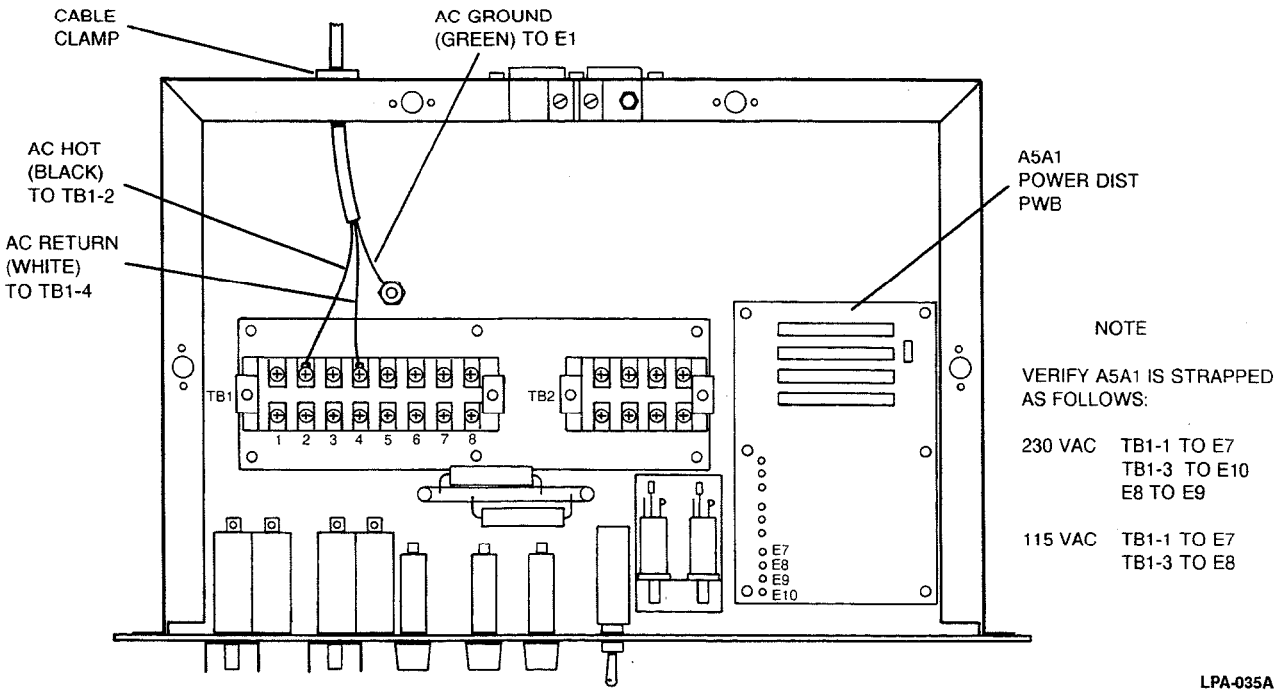
Make any necessary remote audio connections at connector J2 of the transceiver. An appropriate connector is provided in the ancillary kit. Refer to the RF-3200E instruction manual for interface information.

5.3 SYSTEM CONFIGURATION

The following paragraphs describe modifications to the transceiver and system interface connections. System operation with an antenna coupler is also described.



DETAIL A.



TOP VIEW OF A5 POWER DIST. ASSY

DETAIL B.

Figure 5-6. Primary Power Connection

5.3.1 Interface PWB

The interface PWB processes input and output signals between the RF-3200E Transceiver and the RF-3230 Linear Power Amplifier. The interface PWB is factory-installed when the RF-3200E-10 1 kW system is ordered. Figure 5-7 is a block diagram of the interface PWB.

Tables 5-5 through 5-10 provide parts information for the interface PWB. Component locations are shown in figure 5-8. Figure 5-9 is the schematic diagram.

5.3.1.1 Interface PWB Location

NOTE

The interface PWB is factory-installed when the RF-3200E is ordered as part of a 1 kW system.

The interface PWB is mounted on the pivot tray inside the RF-3200E, as shown in figure 5-10. The installation of the RF-3205 Option Starter Kit is described in publication 10212-3063. The installation of the interface PWB is described in publication 10212-3153.

To remove the interface PWB, proceed as follows:

a. Remove the bottom cover of the transceiver.

b. Loosen the three mounting nuts on the rear card guide, as shown in figure 5-10.

c. Disconnect the interface cables from J1, J3, J4, J5, and J6.

d. Remove the three mounting screws on the PWB, and slide the card guide back to remove the PWB.

5.3.2 RF-3200E-10 System Interconnection

Figure 5-11 is a schematic diagram of the RF-3200E/RF-3230 interface cable (10221-0152). Figure 5-12 is a block diagram of the RF-3200E-10 system.

5.3.3 RF-3200E-10 A/C Upgrade Operation

NOTE

Refer to the RF-2601A manual for cable fabrication procedure.

The interface signals between the RF-3200E, RF-3230, and RF-601A are shown in figure 5-13. The tuning sequence for the RF-3200E-10 and RF-601A is shown in figure 5-14. Timing signals are shown in figure 5-15.

5.3.4 RF-2601 Antenna Coupler Connection

NOTE

Refer to RF-601A manual for cable fabrication procedure.

Figure 5-16 shows the interconnection of the RF-3200E, RF-3230, and RF-2601. Antenna coupler operation (from the RF-3200E) is described in the RF-2601 Instruction Manual.

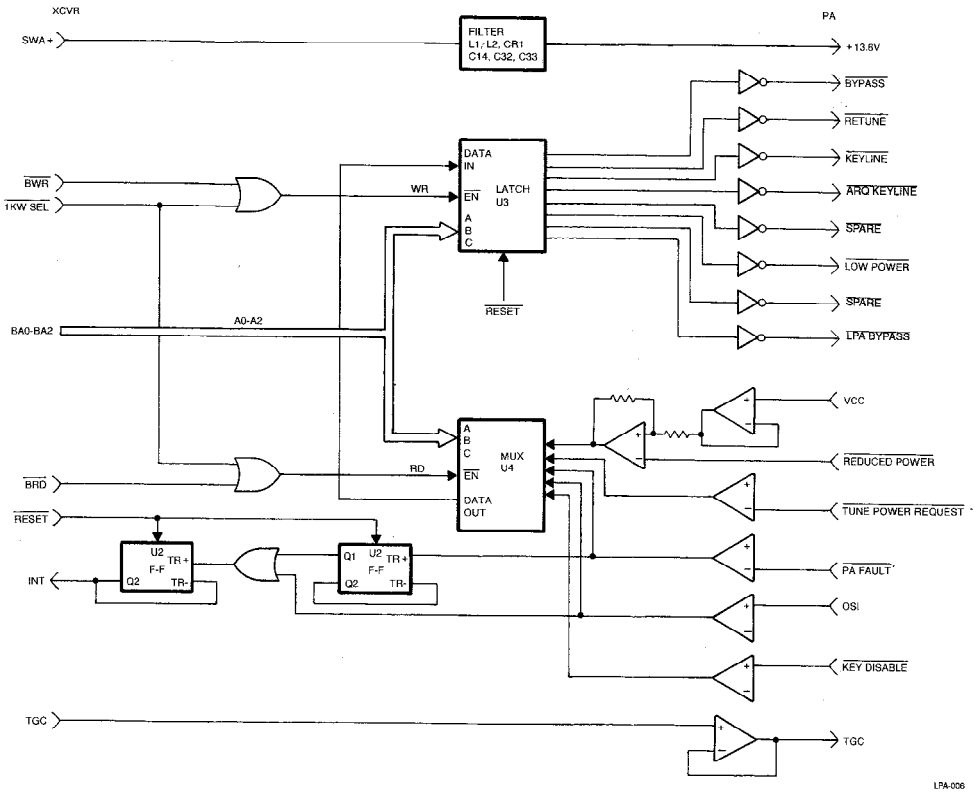


Figure 5-7. Interface PWB Block Diagram

Table 5-5. 1 kW/Coupler Interface Assembly Top Level Parts List (10212-3140 Rev. C)

Ref. Desig.	Part Number	Description
–	10212-3150	KIT, INTERFACE, RF-3230
–	10212-3155	ANCILLARY KIT
–	10212-3185-18	CABLE, 5 CONDUCTOR
–	10212-3190-16	CABLE, 10 CONDUCTOR
–	10212-3040	CABLE ASSY, 25 POS, OPTION BAY
–	M24308/26-1	SCREWLOCK, FEMALE
–	10212-3046	CABLE, POWER DIST/OPT
–	10212-3005-03	LABEL
–	10212-0301	RF-3200E CONFIGURATION INSTRUCTIONS

Table 5-6. RF-3230 Interface Kits Parts List (10212-3150 Rev. D)

Ref. Desig.	Part Number	Description
C1	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C2	C11-0009-103	CAP .01UF 20% 50V CER
C3	C11-0009-103	CAP .01UF 20% 50V CER
C4	C11-0009-103	CAP .01UF 20% 50V CER
C5	C11-0009-103	CAP .01UF 20% 50V CER
C6	C11-0009-103	CAP .01UF 20% 50V CER
C7	C11-0009-103	CAP .01UF 20% 50V CER
C8	C11-0009-103	CAP .01UF 20% 50V CER
C9	C11-0009-103	CAP .01UF 20% 50V CER
C10	C11-0009-103	CAP .01UF 20% 50V CER
C11	C11-0009-103	CAP .01UF 20% 50V CER
C12	C11-0009-103	CAP .01UF 20% 50V CER
C13	C11-0009-103	CAP .01UF 20% 50V CER
C14	C26-0025-680	CAP 68UF 20% 25V TANT
C15	C11-0009-103	CAP .01UF 20% 50V CER
C16	C11-0009-103	CAP .01UF 20% 50V CER
C17	C11-0009-103	CAP .01UF 20% 50V CER
C18	C11-0009-103	CAP .01UF 20% 50V CER
C19	C11-0009-103	CAP .01UF 20% 50V CER
C20	C11-0009-103	CAP .01UF 20% 50V CER
C21	C11-0009-103	CAP .01UF 20% 50V CER
C22	C11-0009-103	CAP .01UF 20% 50V CER
C23	C11-0009-103	CAP .01UF 20% 50V CER
C24	C11-0009-103	CAP .01UF 20% 50V CER
C25	C11-0009-103	CAP .01UF 20% 50V CER
C26	C11-0009-103	CAP .01UF 20% 50V CER
C27	C11-0009-104	CAP .1UF 20% 50V CER

Table 5-6. RF-3230 Interface Kits Parts List (10212-3150 Rev. D) (Cont.)

Ref. Desig.	Part Number	Description
C28	C26-0006-330	CAP 33UF 20% 6V TANT
C29	C11-0009-103	CAP .01UF 20% 50V CER
C30	C11-0009-103	CAP .01UF 20% 50V CER
C31	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C32	C11-0009-104	CAP .1UF 20% 50V CER
C33	C11-0009-104	CAP .1UF 20% 50V CER
C34	C11-0009-104	CAP .1UF 20% 50V CER
C35	C11-0009-103	CAP .01UF 20% 50V CER
C36	C11-0009-103	CAP .01UF 20% 50V CER
C37	C11-0009-103	CAP .01UF 20% 50V CER
C38	C11-0009-103	CAP .01UF 20% 50V CER
C39	C11-0009-103	CAP .01UF 20% 50V CER
C40	C11-0009-103	CAP .01UF 20% 50V CER
C41	C11-0009-103	CAP .01UF 20% 50V CER
C42	C11-0009-103	CAP .01UF 20% 50V CER
C43	C11-0009-103	CAP .01UF 20% 50V CER
CR1	D50-0007-001	TRANSORB 43.0V 600W UN
CR2	D50-0007-001	TRANSORB 43.0V 600W UN
CR3	D50-0007-001	TRANSORB 43.0V 600W UN
CR4	D50-0007-001	TRANSORB 43.0V 600W UN
CR5	D50-0007-001	TRANSORB 43.0V 600W UN
CR6	D50-0007-001	TRANSORB 43.0V 600W UN
CR7	D50-0007-001	TRANSORB 43.0V 600W UN
CR8	D50-0007-001	TRANSORB 43.0V 600W UN
CR9	D50-0007-001	TRANSORB 43.0V 600W UN
CR10	D50-0007-001	TRANSORB 43.0V 600W UN
CR11	1N4004	DIODE 1A 400V RECT GP
CR11	1N4004	DIODE 1A 400V RECT GP
CR12	1N4004	DIODE 1A 400V RECT GP
CR12	1N4004	DIODE 1A 400V RECT GP
CR13	1N4004	DIODE 1A 400V RECT GP
CR13	1N4004	DIODE 1A 400V RECT GP
CR14	1N4004	DIODE 1A 400V RECT GP
CR14	1N4004	DIODE 1A 400V RECT GP
CR15	1N5230B	DIODE 4.7V 5% .5W ZENER
CR17	1N4004	DIODE 1A 400V RECT GP
CR17	1N4004	DIODE 1A 400V RECT GP
CR18	1N5230B	DIODE 4.7V 5% .5W ZENER
J1	J46-0085-004	HDR STRAIGHT 4 POS

Table 5-6. RF-3230 Interface Kits Parts List (10212-3150 Rev. D) (Cont.)

Ref. Desig.	Part Number	Description
J2	J46-0085-004	HDR STRAIGHT 4 POS
J3	J46-0086-005	HDR 5 PIN 2MM SR SHRD
J4	J46-0086-010	HDR 10 PIN 2MM SR SHRD
J5	J46-0086-015	HDR 15 PIN 2MM SR SHRD
J6	J46-0086-010	HDR 10 PIN 2MM SR SHRD
L1	10228-1121-02	INDUCTOR 40UH
L2	MS75083-7	COIL .33UH 10% FXD RF
L3	MS75083-7	COIL .33UH 10% FXD RF
Q1	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q2	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q3	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q4	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q5	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q6	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q7	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q8	Q25-0007-000	XSTR SS/GP NPN MPSA06
R1	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R2	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R3	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R4	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R5	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R6	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R7	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R8	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R9	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R10	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R11	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R12	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R13	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R14	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R15	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R16	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R17	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R18	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R19	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R20	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R21	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R22	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R23	R65-0003-103	RES 10K 5% 1/4W CAR FILM

Table 5-6. RF-3230 Interface Kits Parts List (10212-3150 Rev. D) (Cont.)

Ref. Desig.	Part Number	Description
R24	RN55D1211F	RES 1210 1% 1/8W MET FLM
R25	RN55D6810F	RES 681 1% 1/8W MET FLM
R26	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R27	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R28	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R29	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R32	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R33	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R34	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R35	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
U1	I15-0000-032	IC 74HC32 PLASTIC CMOS
U2	I01-0000-353	IC 4538B PLASTIC CMOS
U3	I15-0000-259	IC 74HC259 PLASTIC CMOS
U4	I15-0000-251	IC 74HC251 PLASTIC CMOS
U5	I20-0008-000	IC LM239 COMPARATOR P/C
U6	I30-0003-000	IC OP AMP QUAD 324
U7	I11-0001-001	IC VR 7805 +5V 1.5A 4%

Table 5-7. Ancillary Kit (10212-3155 Rev. A)

Ref. Desig.	Part Number	Description
–	J22-0001-001	CONN-D M 25 FXD
–	J55-0015-825	HOOD D-CONN 25 POS
–	E50-0002-003	SLVG SHR 3/32" BLK
–	10212-3153	INSTRUCTIONS, 3150 INTERFACE

Table 5-8. Five-Conductor Cable Part List (10212-3185-18 Rev. A)

Ref. Desig.	Part Number	Description
P1	J46-0086-405	HSG 5 POS 2MM SR
P2	J46-0086-405	HSG 5 POS 2MM SR

Table 5-9. Ten-Conductor Cable Part List (10212-3190-16 Rev. B)

Ref. Desig.	Part Number	Description
P1	J46-0086-410	HSG 10 POS 2MM SR
P2	J46-0086-410	HSG 10 POS 2MM SR

Table 5-10. Option Bay 25-Position Cable Assembly Parts List (10212-3040 Rev. F)

Ref. Desig.	Part Number	Description
P1	J20-0004-103	CONN-D F 25 INS
P2	J46-0086-410	HSG 10 POS 2MM SR
P3	J46-0086-415	HSG 15 POS 2MM SR

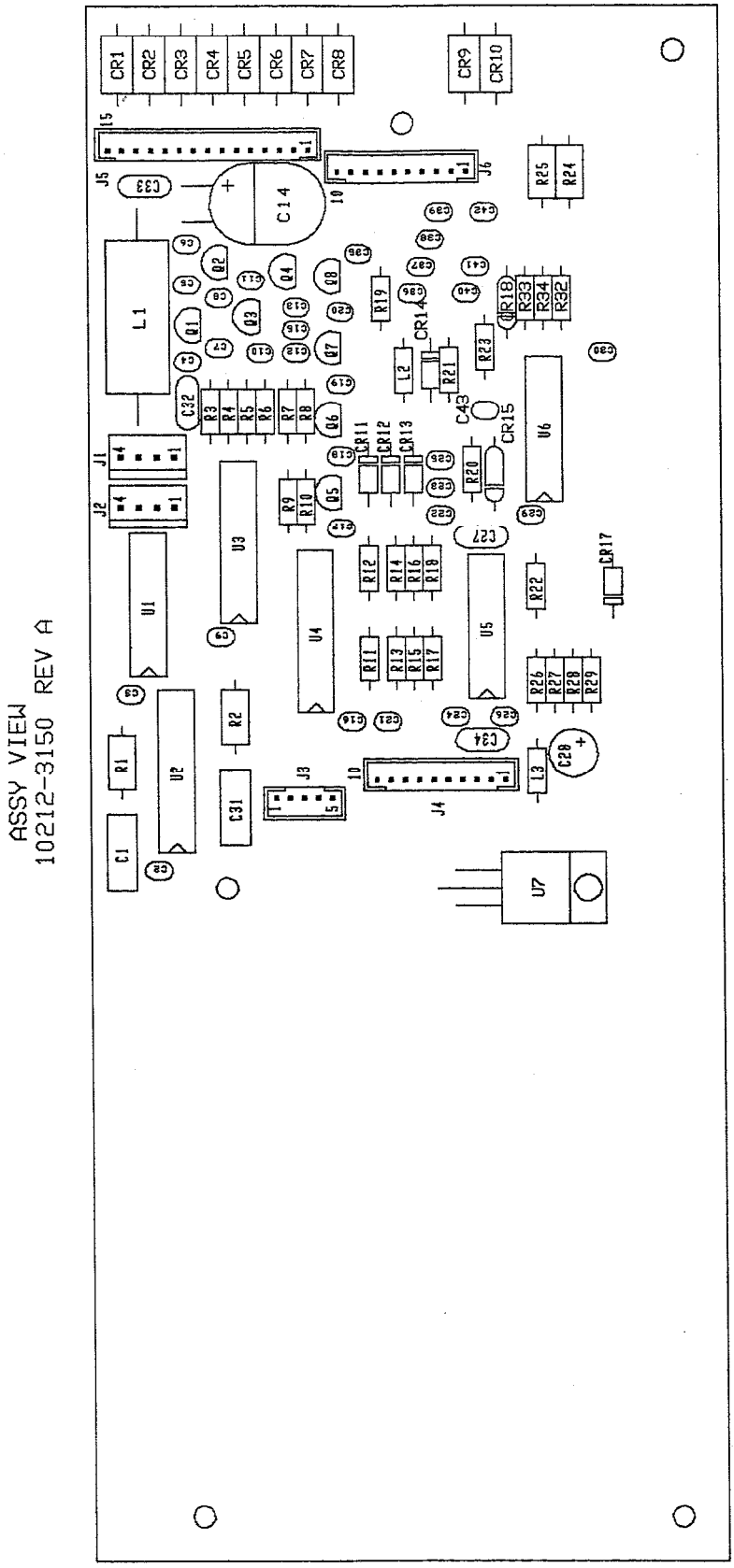
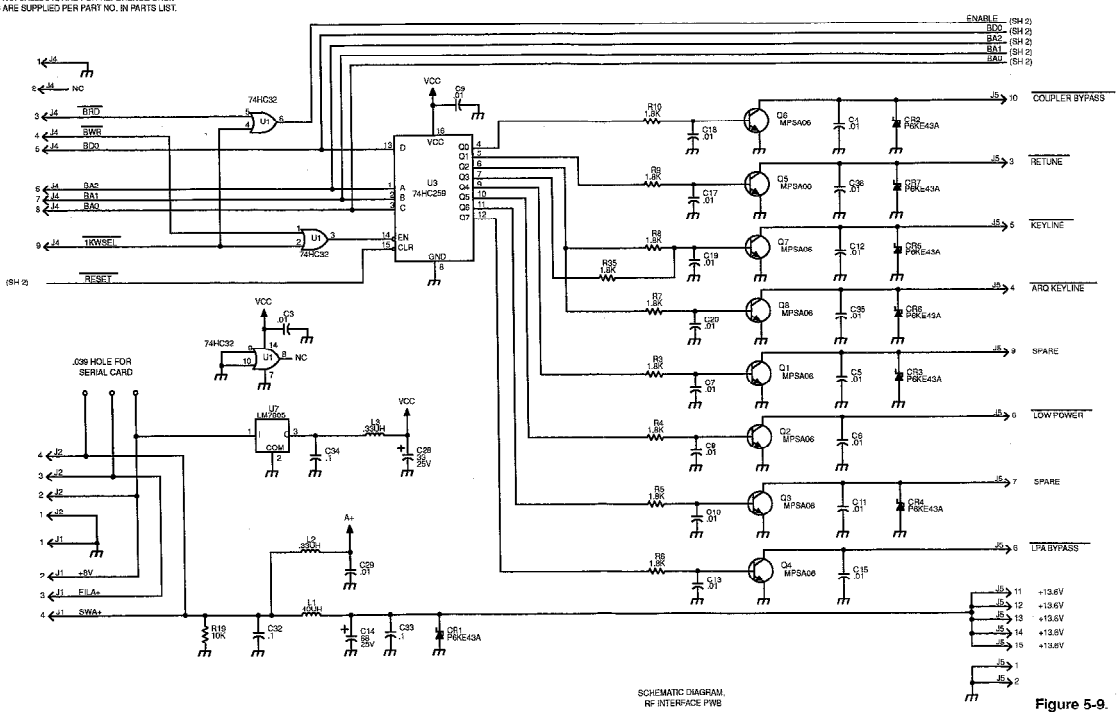


Figure 5-8. Interface PWB Component Location Diagram (10212-3150 Rev. A)

NOTE: UNLESS OTHERWISE SPECIFIED:

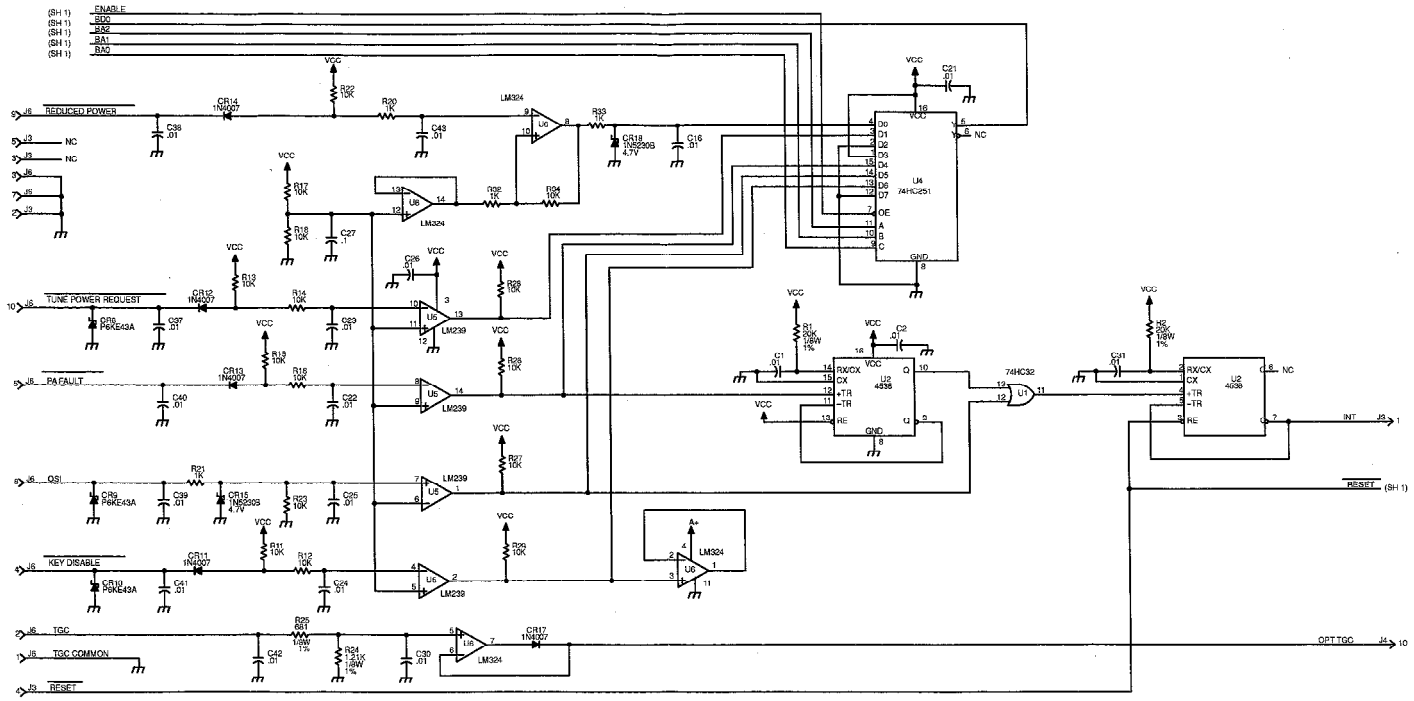
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR A COMPLETE DESIGNATION, PREFIX WITH UNIT NO. AND/OR ASSEMBLY NO. DESIGNATION.
2. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, +/-5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
4. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.



SCHEMATIC DIAGRAM,
RF INTERFACE PWB

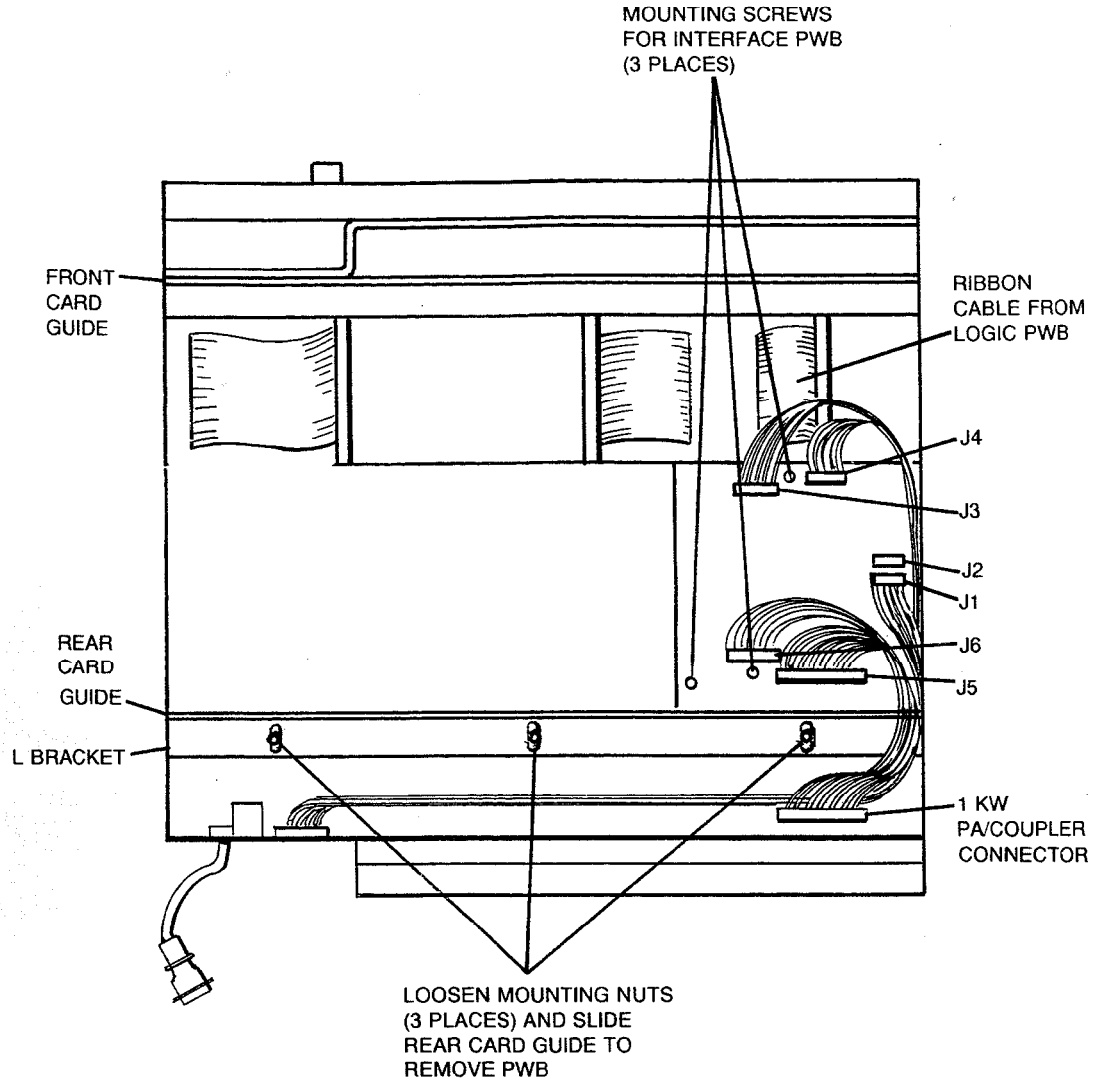
10212-3151 E
1 OF 2

Figure 5-9. Interface PWB Schematic Diagram (10212-3151 Rev. E) (Sheet 1 of 2)



10212-3151 E
2 OF 2

Figure 5-9. Interface PWB Schematic Diagram (10212-3151 Rev. E) (Sheet 2 of 2)



BOTTOM VIEW OF RF-3200E TRANSCEIVER

LPA-030

CONNECTOR	NO. OF PINS	FUNCTION	CONNECTS TO
J1	4	POWER DISTRIBUTION	POWER DISTRIBUTION PWB A5A2-J3
J2	4	POWER DISTRIBUTION TO OPTION PWB	POWER CONNECTOR ON OPTION PWB
J3	5	INTERFACE CONTROL	LOGIC PWB A7-J13
J4	10	INTERFACE CONTROL	LOGIC PWB A7-J10
J5	15	XCVR OUTPUT	1 KW PA/COUPLER CONNECTOR
J6	10	XCVR INPUT	1 KW PA/COUPLER CONNECTOR

Figure 5-10. Location of Interface PWB

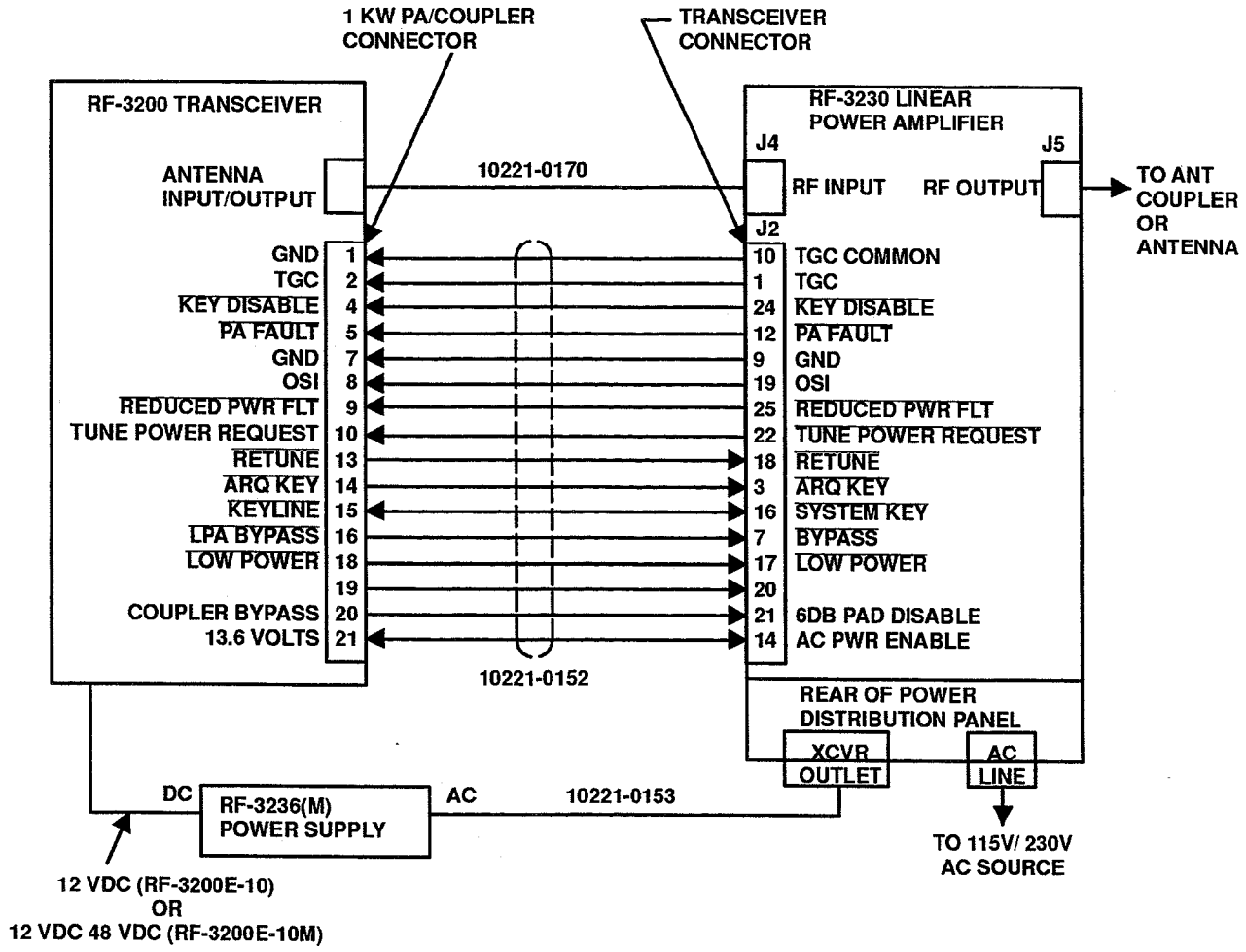


Figure 5-11. RF-3200E/RF-3230 Interface Cable

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.

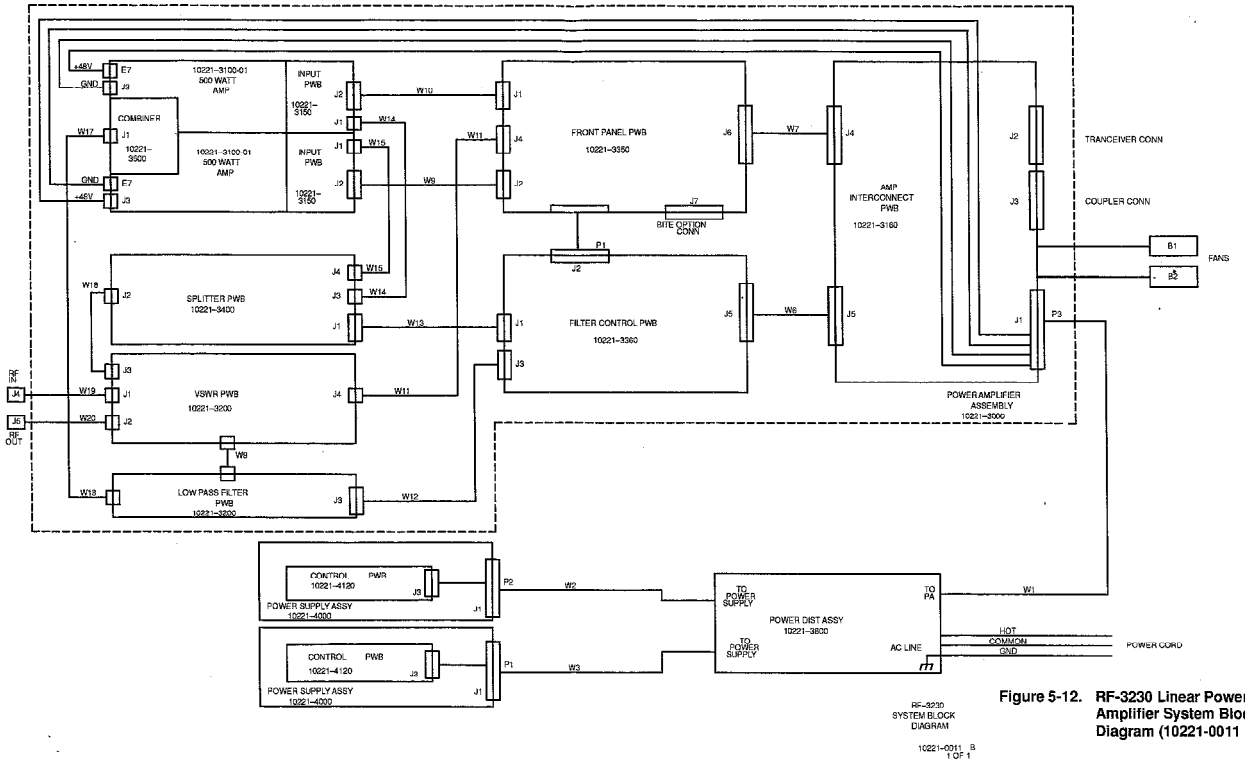
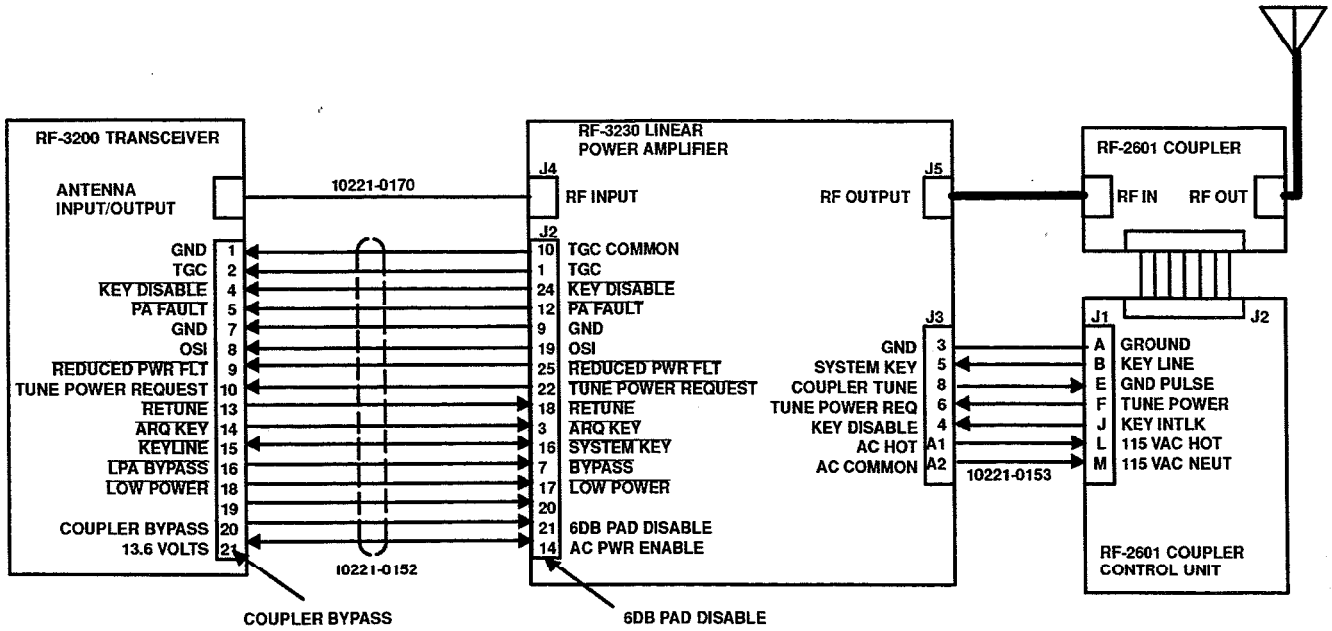


Figure 5-12. RF-3230 Linear Power Amplifier System Block Diagram (10221-0011 Rev. B)



LPA-032(B)

SIGNAL NAME	DESCRIPTION
GROUND	GROUND REFERENCE FOR SYSTEM KEYLINE, RETUNE, KEY DISABLE, TUNE POWER REQUEST, AND TGC.
SYSTEM KEYLINE	BIDIRECTIONAL KWYLINE SIGNAL. RF-3200E USES KEYLINE TO REQUEST THE RF-3230 TO KEY. RF-3230 HOLDS KEYLINE LOW WHILE IT TUNES. RF-2601 ALSO HOLDS KEYLINE LOW SHILE IT TUNES.
RETUNE	RF-3200E SENDS RETUNE TO REQUEST A TUNE CYCLE. RF-3230 TUNES AND PASSES THE SIGNAL TO RF-2601 AS COUPLER TUNE. RETUNE PULSE IS ACTIVATED ON POWER-UP AND WHEN FREQUENCY IS CHANGED.
TUNE POWER REQUEST	RF-3230 AND RF-2601 USE THIS SIGNAL TO REQUEST TUNE POWER FROM RF-3200E.
KEY DISABLE	RF-2601 USES THIS SIGNAL TO PREVENT RF-3230 FROM KEYING WHILE THE SOUPLER IS GOING TO HOME POSITION.
AC POWER ENABLE	+13.2 VDC FROM RF-3200E TURNS ON AC POWER AT RF-3230
TGC	TRANSMITTER CAIN CONTROL (TGC)/AUTOMATIC LEVEL CONTROL (ALC) VOLTAGE. THIS FEEDBACK SIGNAL MAINTAINS THE DESIRED RF OUTPUT POWER BY CONTROLLING THE TRANSMITTER RF OUTPUT. THE RF-3200E MONITORS THIS VOLTAGE AND ADJUSTS ITS OUTPUT SO THAT THE TGC VOLTAGE REMAINS STEADY AT +8 VDC.
AC	THE RF-3230 PROVIDES AC POWER FOR THE RF-2601.

NOTE: SEE RF-2601 MANUAL FOR COUPLER CONTROL/COUPLER INTERFACE DTA AND CABLE FABRICATION PROCEDURE

Figure 5-13. RF-3200E-10 with RF-3200E-10 A/C Upgrade System Interface Signals

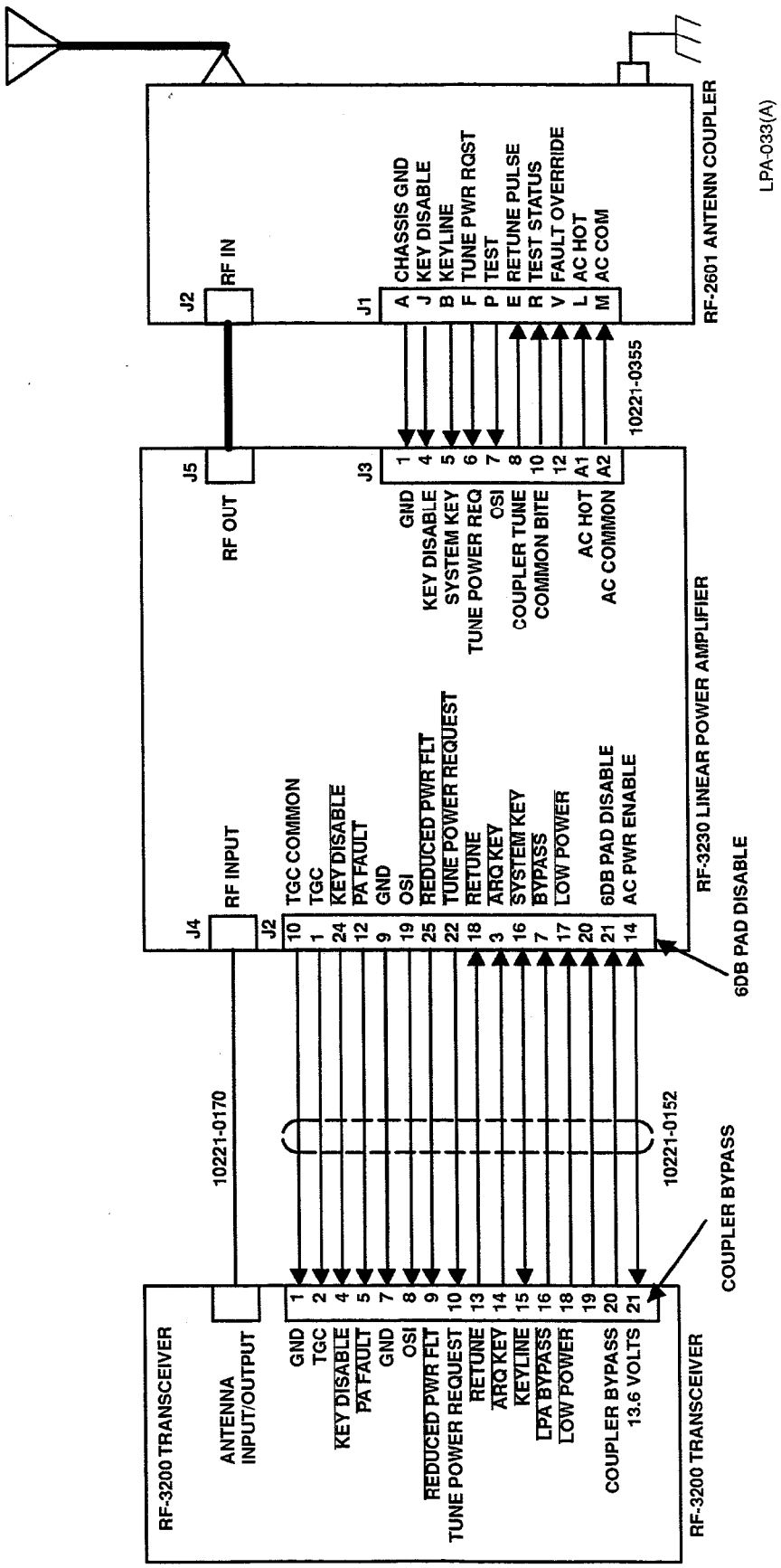


Figure 5-16. RF-2601 Antenna Coupler Interconnection

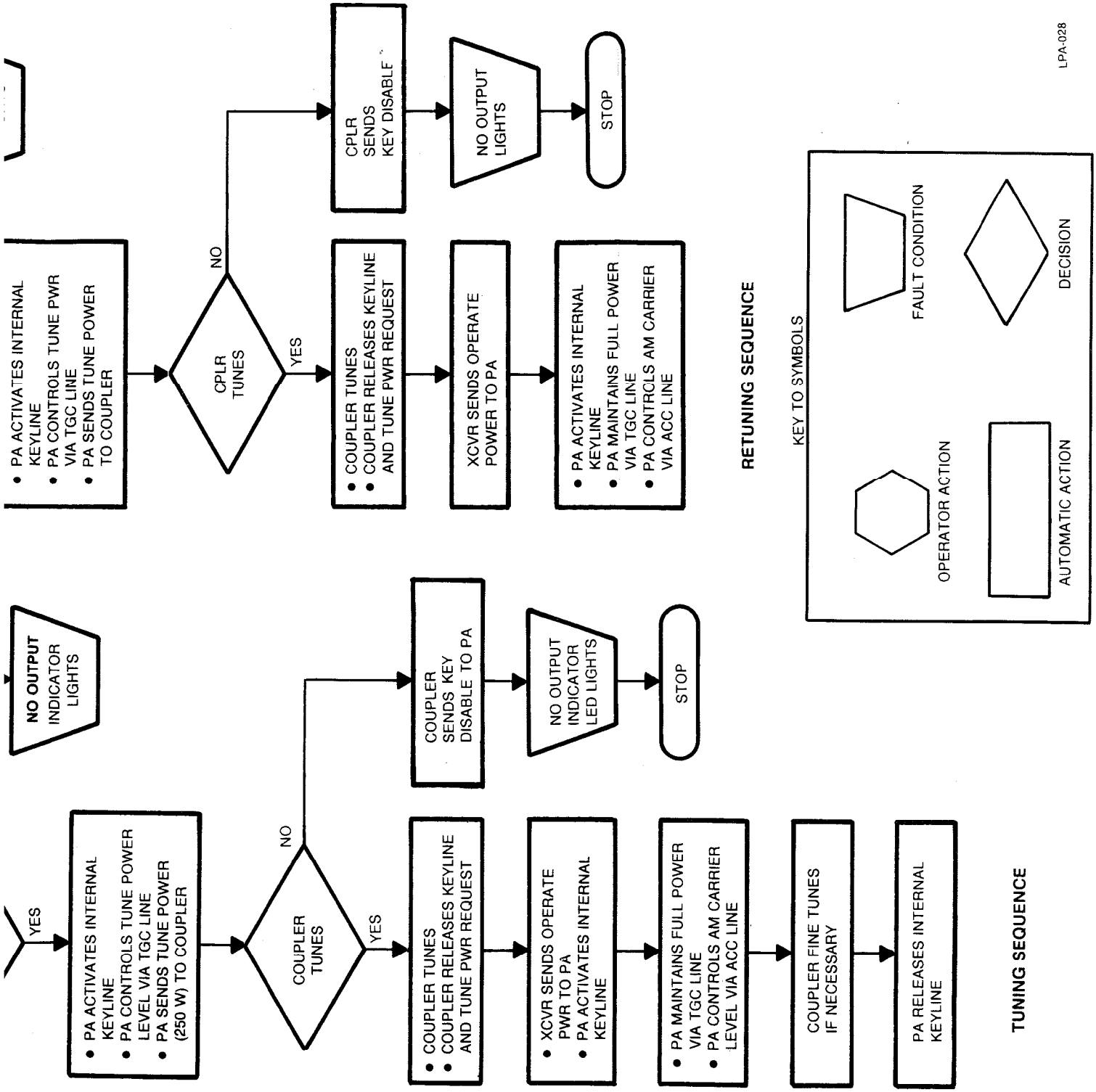
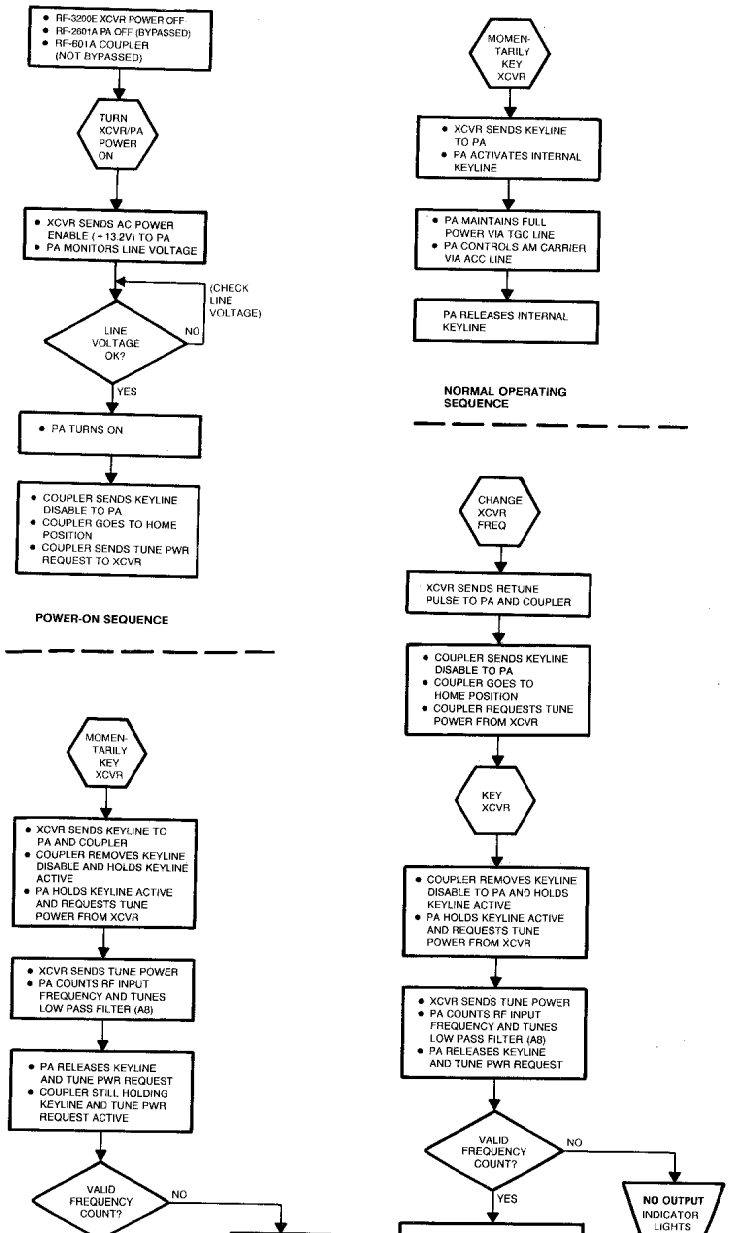


Figure 5-14. RF-3200E-10/RF-2601A Tuning Sequence


• RF-3200E XCVR POWER OFF
• RF-2601A PA OFF (BYPASSED)
• RF-601A COUPLER (NOT BYPASSED)
TURN XCVR/PA POWER ON
• XCVR SENDS AC POWER ENABLE (+13.2V) TO PA
• PA MONITORS LINE VOLTAGE
LINE VOLTAGE OK?
NO
(CHECK LINE VOLTAGE)
YES
• PA TURNS ON
• COUPLER SENDS KEYLINE DISABLE TO PA
• COUPLER GOES TO HOME POSITION
• COUPLER SENDS TUNE PWR REQUEST TO XCVR
POWER-ON SEQUENCE
MOMEN-TARILY KEY XCVR
• XCVR SENDS KEYLINE TO PA AND COUPLER
• COUPLER REMOVES KEYLINE DISABLE AND HOLDS KEYLINE ACTIVE
• PA HOLDS KEYLINE ACTIVE AND REQUESTS TUNE POWER FROM XCVR
• XCVR SENDS TUNE POWER
• PA COUNTS RF INPUT FREQUENCY AND TUNES LOW PASS FILTER (A8)
• PA RELEASES KEYLINE AND TUNE PWR REQUEST
• COUPLER STILL HOLDING KEYLINE AND TUNE PWR REQUEST ACTIVE
VALID FREQUENCY COUNT?
NO
MOMEN-TARILY KEY XCVR
• XCVR SENDS KEYLINE TO PA
• PA ACTIVATES INTERNAL KEYLINE
• PA MAINTAINS FULL POWER VIA TGC LINE
• PA CONTROLS AM CARRIER VIA ACC LINE
PA RELEASES INTERNAL KEYLINE
NORMAL OPERATING SEQUENCE
CHANGE XCVR FREQ
XCVR SENDS RETUNE PULSE TO PA AND COUPLER
• COUPLER SENDS KEYLINE DISABLE TO PA
• COUPLER GOES TO HOME POSITION
• COUPLER REQUESTS TUNE POWER FROM XCVR
KEY XCVR
• COUPLER REMOVES KEYLINE DISABLE TO PA AND HOLDS KEYLINE ACTIVE
• PA HOLDS KEYLINE ACTIVE AND REQUESTS TUNE POWER FROM XCVR
• XCVR SENDS TUNE POWER
• PA COUNTS RF INPUT FREQUENCY AND TUNES LOW PASS FILTER (A8)
• PA RELEASES KEYLINE AND TUNE PWR REQUEST
VALID FREQUENCY COUNT?
NO
YES
NO OUTPUT INDICATOR LIGHTS

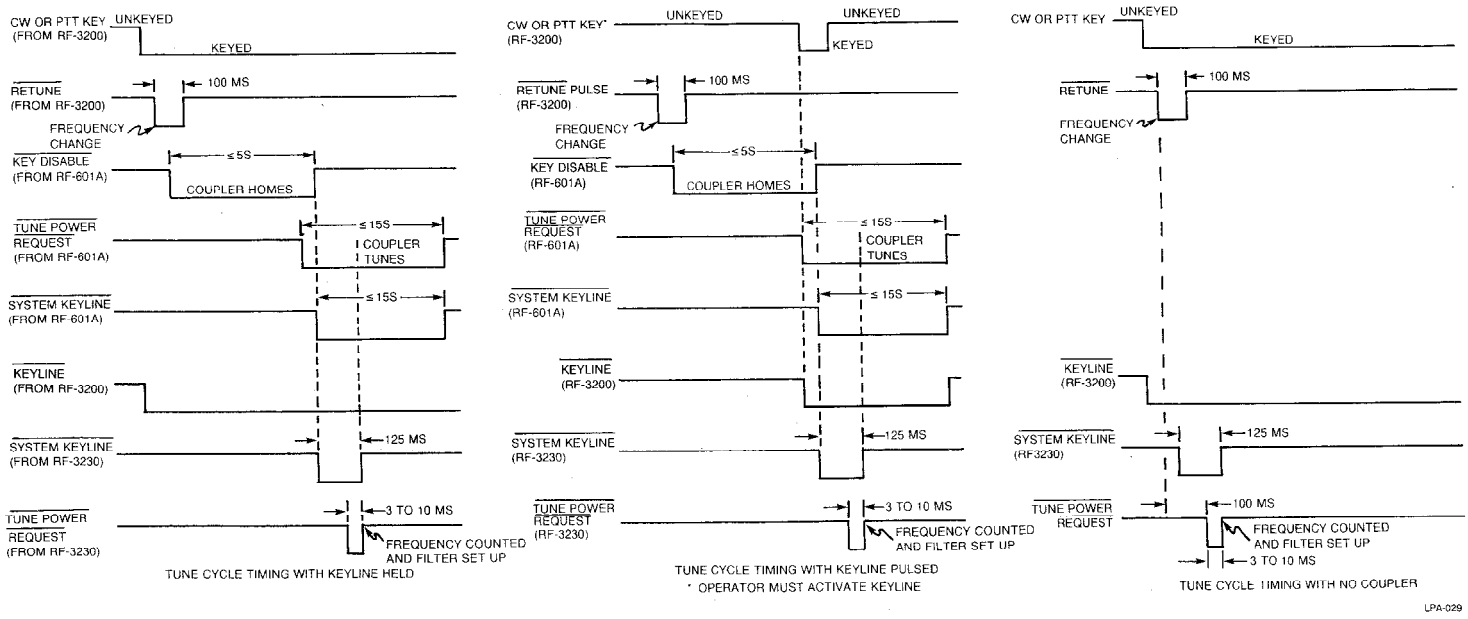
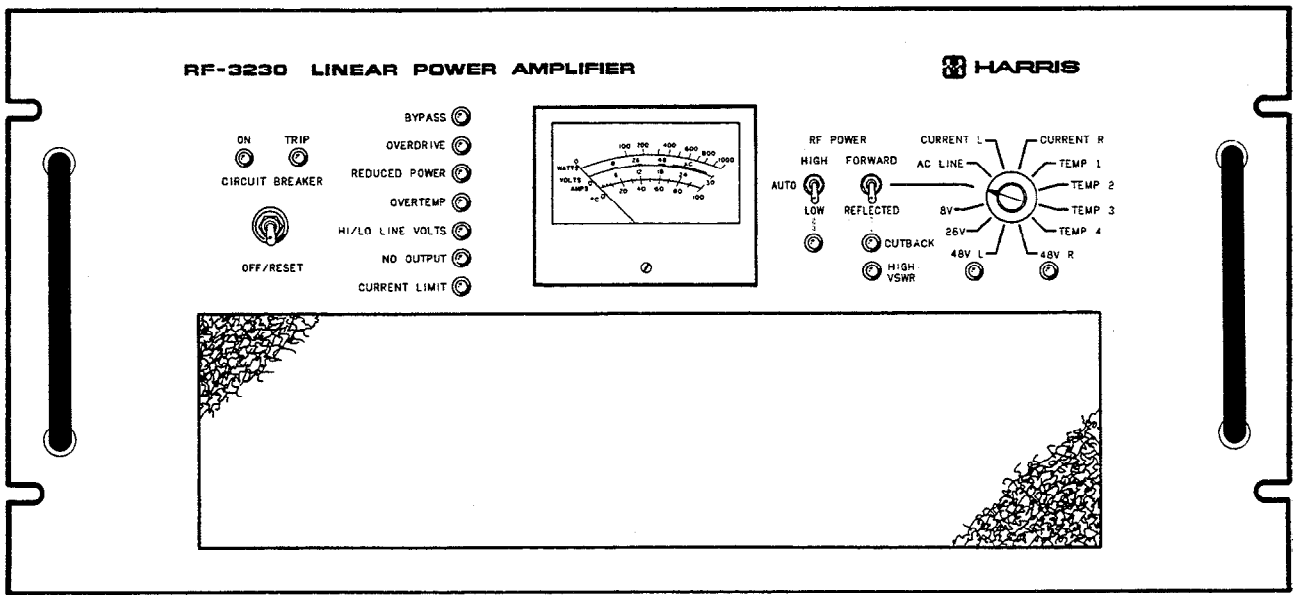


Figure 5-15. Tune Cycle Timing Diagram

A2

(RF-3210) 1 KW LINEAR POWER AMPLIFIER DRAWER



LPA-061A(1)

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LIST OF TABLES

A2 1 KW LINEAR POWER AMPLIFIER DRAWER

1. GENERAL DESCRIPTION

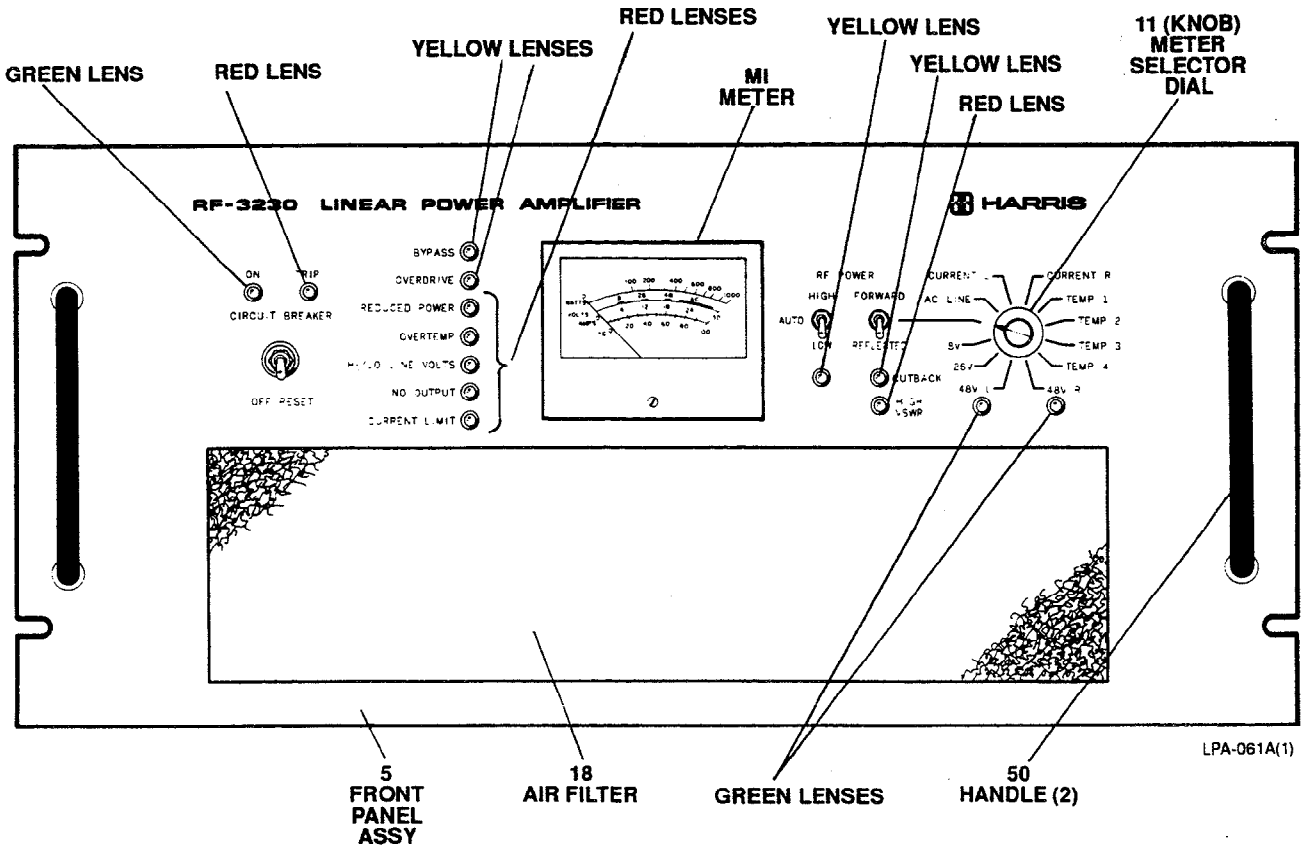
The A2 (RF-3230) 1 kW Linear Power Amplifier (LPA) (Drawer) Assembly (10221-3000), shown in figure 1, contains nine subassemblies as follows:

- A2A1 Interconnect PWB Assembly (10221-3160)
- A2A2 Filter Control PWB Assembly (10221-3360) (Part of Front Panel Assembly 10221-3300)
- A2A3 Front Panel PWB Assembly (10221-3350) (Part of Front Panel Assembly 10221-3300)
- A2A4 Input Splitter PWB Assembly (10221-3400)
- A2A5 VSWR PWB Assembly (10221-32501
- A2A6 500 Watt Amplifier Assembly (10221-3100-02)
- A2A7 500 Watt Amplifier Assembly (10221-3100-02)
- A2A8 Combiner Assembly (10221-3500)
- A2A9 Low-Pass Filter PWB Assembly (10221-3200)

Each one of these subassemblies has its own tab section with a parts list, component location diagram, and schematic diagram.

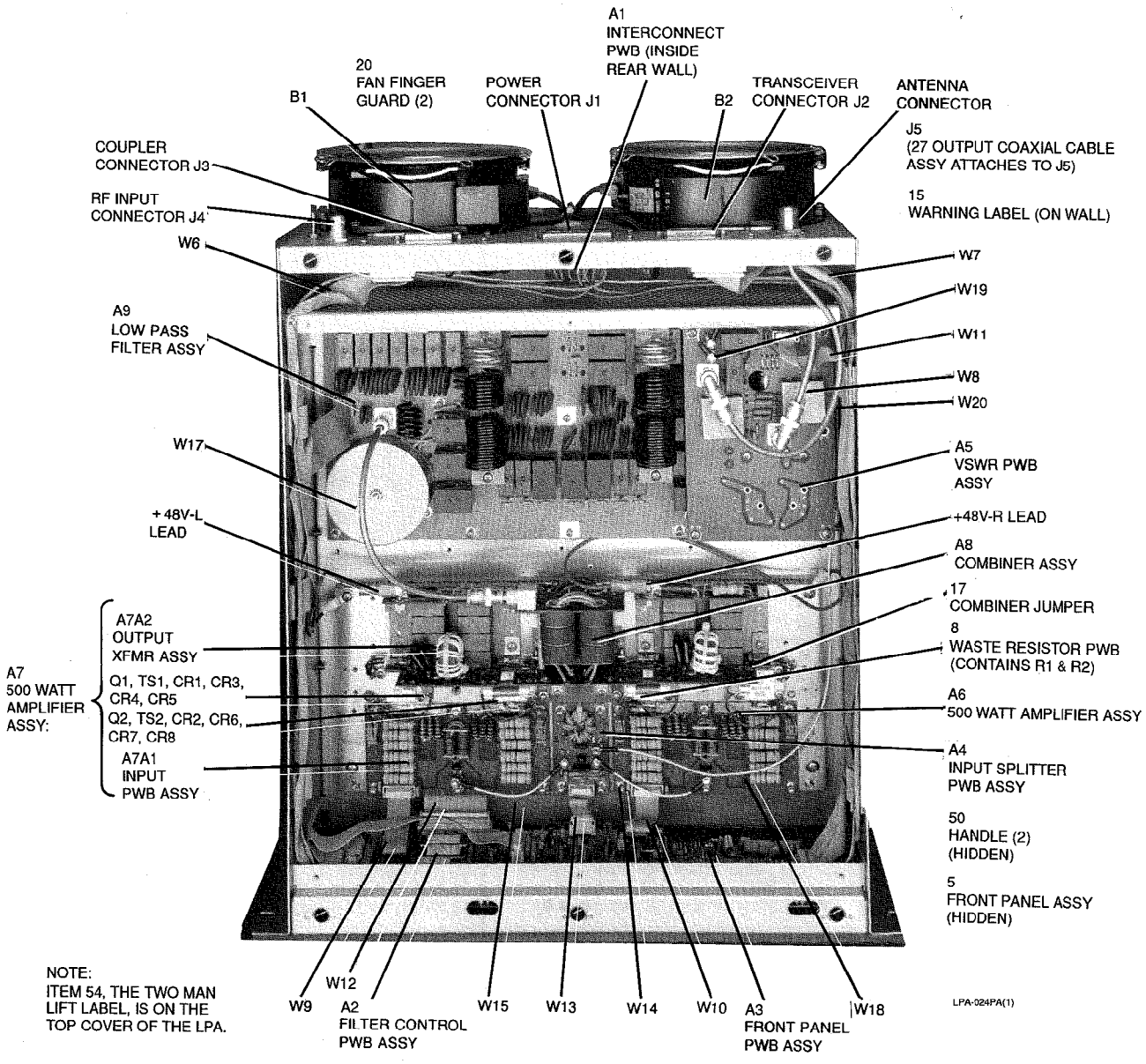
The A2 (RF-3230B) 1 kW Linear Power Amplifier (LPA) (Drawer) Assembly (10221-3010) contains the following subassemblies:

- A2A1 Interconnect PWB Assembly (10221-3160)
- Front Panel Assembly (10221-3320)
- A2A4 Splitter PWB Assembly (10221-3400)
- A2A5 VSWR PWB Assembly (10221-3250-02)
- Waster Resistor PWB (10221-3700)
- A2A6/A2A7 500 W Amplifier Assembly (10221-3100-01, -02)
- A2A8 Combiner Assembly (10221-3500)
- A2A9 Low Pass Filter PWB Assembly (10221-3200)



A2 (RF-3230) 1 KW AMPLIFIER DRAWER
(FRONT VIEW)

Figure 1. A2 (RF-3230) 1 kW Power Amplifier Drawer (Sheet 1 of 2)



A2 (RF-3230) 1 KW AMPLIFIER DRAWER
(TOP VIEW)

Figure 1. A2 (RF-3230) 1 kW Power Amplifier Drawer (Sheet 2 of 2)

2. INTERFACE CONNECTIONS

Table 1 lists the input/output cables and connectors on the 1 kW LPA Drawer and their destinations. The table can be used when tracing cables to and from the LPA Drawer subassemblies. The LPA interconnect diagram in section 4 can also be used when tracing cables.

Table 1. A2 1 kW Linear Power Amplifier Drawer Interface Connections

Cable/Connector	Cable Name(s)	Connects To
A2W6P1 from Interconnect PWB A2A1-J4	Front Panel - Interconnect	Front Panel PWB A2A3-J6 via cable A2W6P2
A2W7P1 from Interconnect PWB A2A1-J5	Filter Control - Interconnect	Filter Control PWB A2A2-J5 via A2W7P2
A2W8P2 from VSWR PWB A2A5-J6	Low Pass Filter (LPF) - VSWR	Low Pass Filter PWB A2A8-J2 via A2W8P1
A2W9P1 from Front Panel PWB A2A3-J1	Input PWB - 500W Amplifier	(Left) 500W Amplifier Assy A2A7-J2 via A2W9P2
A2W10P1 from Front Panel PWB A2A3-J2	Input PWB - 500W Amplifier	(Right) 500W Amplifier Assy A2A6-J2 via A2W10P2
A2W11P1 from Front Panel PWB A2A3-J4	VSWR - Front Panel	VSWR PWB A2A5-J4 via A2W11P2
A2W12P2 from Low Pass Filter PWB A2A9-J3	Filter Control - LPF	Filter Control PWB A2A2-J3 via A2W12P1
A2W13P1 from Filter Control PWB A2A2-J1	Splitter - Filter Control	Input Splitter PWB A2A4-J1 via A2W13P2
A2W14 from Input Splitter PWB A2A4-J3	Splitter - Amplifier Coax	(Right) 500W Amplifier Assy A2A6-J1 via A2W14
A2W15 from Input Splitter PWB A2A4-J4	Splitter - Amplifier Coax	(Left) 500W Amplifier Assy A2A7-J1 via A2W15
A2W17 from LPF PWB A2A9-J1	Low Pass Filter - Combiner Coax	Combiner Assy A2A8-J1 via A2W17
A2W18 from Input Splitter PWB A2A4-J2	Splitter - VSWR Coaxial	VSWR PWB A2A5-J3 via A2W18
A2W19P1 from VSWR PWB A2A5-J1	RF Input Coaxial	LPA Rear Panel J4 via A2W19P2
A2W20P1 from VSWR PWB A2A5-J2	RF Output Coaxial	LPA Rear Panel J5 via A2W20P2

3. PARTS LIST

Tables 2 and 3 are the parts list for the 1 kW LPA drawer in the RF-3230 and RF-3230B, respectively. Tables 4 and 5 are the parts list for the Front Panel Assembly for these drawers.

Table 2. A2 1 kW Power Amplifier Drawer Parts List (10221-3000 Rev. U)

Ref. Desig.	Part Number	Description
–	10221-3100-01	500 W AMPLIFIER ASSY, LEFT,A2A6/A2A7
–	10221-3200	LOW PASS FILTER PWB ASSY, A2A9
–	10221-3250-02	VSWR PWB ASSY, A2A5
–	10221-3300	FRONT PANEL ASSY
–	10221-3400	SPLITTER PWB ASSY, A2A4
–	10221-3709	PWB, WASTER RESISTOR
–	10221-3160	INTERCONNECT PWB ASSY, A2A1
–	10221-3500	COMBINER ASSY, A2A8
–	10221-0157	CABLE ASSY, OUTPUT COAX
–	10221-3008	AIR FILTER
–	10221-3100-02	500W AMP ASSY, RIGHT, A2A6/A2A7
R1	R70-0004-050	RES F/F 50 5% 250W FLPAK
R2	R70-0004-050	RES F/F 50 5% 250W FLPAK
W6	10221-1113	CABLE,FRT. PANEL-INTC
W7	10221-1112	CABLE,FIL CONTROL-INTC
W8	10221-1109	CABLE COAX,LPF-VSWR
W9	10221-1114	CABLE INPUT PWB
W10	10221-1114	CABLE INPUT PWB
W11	10221-1116	CABLE VSWR PWB
W12	10221-1115	CABLE,FILTER,CONTROL
W13	10221-1117	CABLE SPLITTER PWB
W14	10221-1107-01	CABLE COAX SPLIT-AMP W14
W15	10221-1107-02	CABLE COAX SPLIT-AMP W15
W17	10221-1108	CABLE COAX,LPF-COMBINER
W18	10221-1104	CABLE COAX,SPLIT-VSWR
W19	10221-1105	CABLE COAX,RF INPUT
W20	10221-1106	CABLE COAX,RF OUTPUT

Table 3. A2 1 kW Power Amplifier Drawer Parts List (10221-3010 Rev. C)

Ref. Desig.	Part Number	Description
–	10221-3100-01, -02	500 W AMPLIFIER ASSY, A2A6/A2A7
–	10221-3200	LOW PASS FILTER PWB ASSY, A2A9
–	10221-3250-02	VSWR PWB ASSY A2A5
–	10221-3320	FRONT PANEL ASSY
–	10221-3400	SPLITTER PWB ASSY, A2A4
–	10221-3700	PWB, WASTER RESISTOR
–	10221-3160	INTERCONNECT PWB ASSY, A2A1
–	10221-3500	COMBINER ASSY, A2A8
–	10221-0157	CABLE ASSY, OUTPUT COAX
R1	R70-0004-050	RES F/F 50 5% 250W FLPAK
R2	R70-0004-050	RES F/F 50 5% 250W FLPAK
W6	10221-1113	CABLE,FRT. PANEL-INTC
W7	10221-1112	CABLE,FIL CONTROL-INTC
W8	10221-1109	CABLE COAX,LPF-VSWR
W9	10221-1114	CABLE INPUT PWB
W10	10221-1114	CABLE INPUT PWB
W11	10221-1116	CABLE VSWR PWB
W12	10221-1115	CABLE,FILTER,CONTROL
W13	10221-1117	CABLE SPLITTER PWB
W14	10221-1107	CABLE COAX, SPLITTER
W15	10221-1107	CABLE COAX, SPLITTER
W17	10221-1108	CABLE COAX,LPF-COMBINER
W18	10221-1104	CABLE COAX,SPLIT-VSWR
W19	10221-1105	CABLE COAX,RF INPUT
W20	10221-1106	CABLE COAX,RF OUTPUT

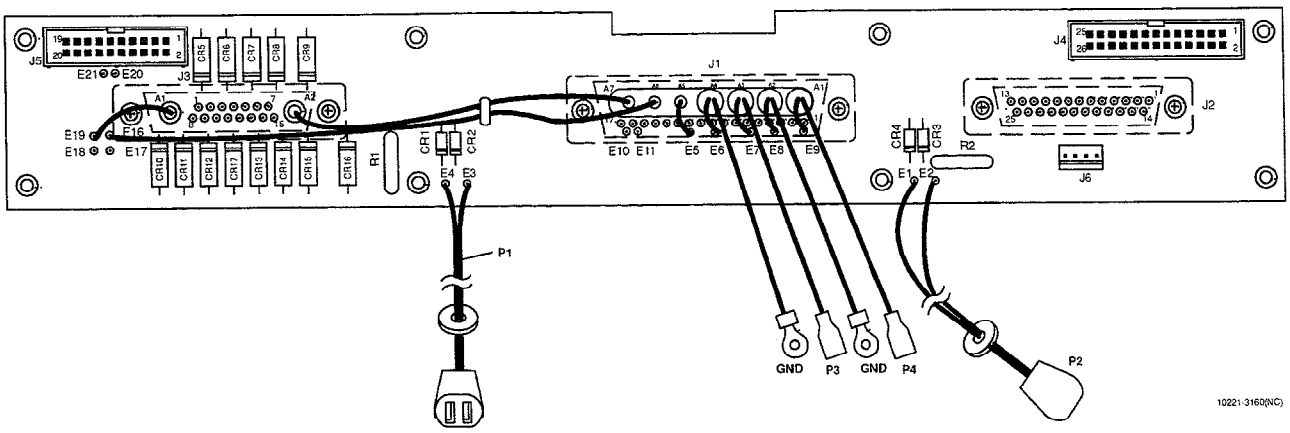
Table 4. Front Panel Assembly Parts List (10221-3300 Rev. L)

Ref. Desig.	Part Number	Description
–	10221-3021-01	FRONT PANEL, BLACK
–	10221-3350	PWB ASSY,FRONT PANEL, A2A3
–	10221-3360	PWB ASSY,FILTER CONTROL, A2A2
–	N15-0006-001	LENS,RED
–	N15-0006-003	LENS,GREEN
–	N15-0006-004	LENS,YELLOW
–	10221-3318	PANEL METER, 1MA
–	MS91528-1F1B	KNOB SKRT RD 1/4 DIA
–	10221-3310	FILTER HOLDER

Table 5. Front Panel Assembly Parts List (10221-3320 Rev. –)

Ref. Desig.	Part Number	Description
–	10221-3021-03	FRONT PANEL, LT GRAY
–	10221-3350	PWB ASSY,FRONT PANEL, A2A3
–	10221-3360	PWB ASSY,FILTER CONTROL, A2A2
–	N15-0006-001	LENS,RED
–	N15-0006-003	LENS,GREEN
–	N15-0006-004	LENS,YELLOW
–	10221-3318	PANEL METER,1MA
–	MS91528-1F1B	KNOB SKRT RD 1/4 DIA
–	10221-3310	FILTER HOLDER

A2A1
INTERCONNECT PWB ASSEMBLY



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A2A1 INTERCONNECT PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A1 Interconnect PWB Assembly (10221-3160) routes all control signals between the power amplifier, transceiver, and antenna coupler (optional). The Interconnect PWB also provides an interface between the A5 Power Distribution Panel Assembly and the A2A3 Front Panel PWB Assembly.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Interconnect PWB and their destinations. The table can be used when tracing signals to and from the Interconnect PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A1 Interconnect PWB Assembly Interface Connections

Connector	Signal Name(s)	Connects To
J1	Power Signals	Power Supply Power Distribution PWB A5A1-J1 via cable A5A1W3
J2	Control Signals	Transceiver
J3	Power and Control Signals	Antenna Coupler
J4	Power and Control Signals	Front Panel PWB A2A3-J6 via A2W6
J5	Power and Control Signals	Filter Control PWB A2A2-J5 via A2W7
J6	ARQ Key, PA Fault, +26V, CPLR ID/TR FLT	VSWR PWB A2A5 (ARQ only)
P1	48V Unreg	Left Fan B1 cord via A2A1-J1
P2	48V Unreg	Left Fan B2 cord via A2A1-J1
P3	48V-R, GND	(Right) 500W Amplifier Assy A2A6
P4	48V-L, GND	(Left) 500W Amplifier Assy A2A7

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the Interconnect PWB. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Interconnect PWB.

Table 2. A2A1 Interconnect PWB Parts List (10221-3160 Rev. P)

Ref. Desig.	Part Number	Description
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N4004	DIODE 1A 400V RECT GP
CR3	1N4004	DIODE 1A 400V RECT GP
CR4	1N4004	DIODE 1A 400V RECT GP
CR5	1N6282A	ZENER,TRANSIENT PR
CR6	1N6282A	ZENER,TRANSIENT PR
CR7	1N6282A	ZENER,TRANSIENT PR
CR8	1N6282A	ZENER,TRANSIENT PR
CR9	1N6282A	ZENER,TRANSIENT PR
CR10	1N6282A	ZENER,TRANSIENT PR
CR11	1N6282A	ZENER,TRANSIENT PR
CR12	1N6282A	ZENER,TRANSIENT PR
CR13	1N6282A	ZENER,TRANSIENT PR
CR14	1N6282A	ZENER,TRANSIENT PR
CR15	1N6282A	ZENER,TRANSIENT PR
CR16	1N6282A	ZENER,TRANSIENT PR
CR17	1N6282A	ZENER,TRANSIENT PR
J1	J22-0076-001	D CONN,17 SIG
J2	M24308/4-3	CONN-D MIL PC (DBMAM25P)
J3	J22-0076-002	D CONN,FEMALE,15 SIG
J4	J46-0054-026	HEADER 26 PIN
J5	J46-0054-020	HEADER 20 PIN
J6	J46-0022-004	HDR 4 PIN 0.100" SR LKG
P1	W80-0010-103	FAN CORD
P2	W80-0010-103	FAN CORD
R1	D41-0002-212	PTC,2.1 AMP
R2	D41-0002-212	PTC,2.1 AMP

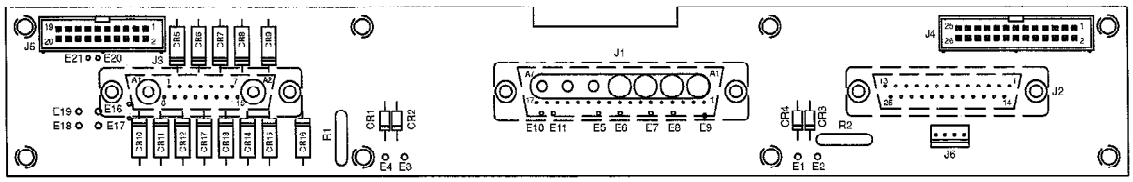


Figure 1. A2A1 Interconnect PWB Component Location Diagram (10221-3160 Rev. D)

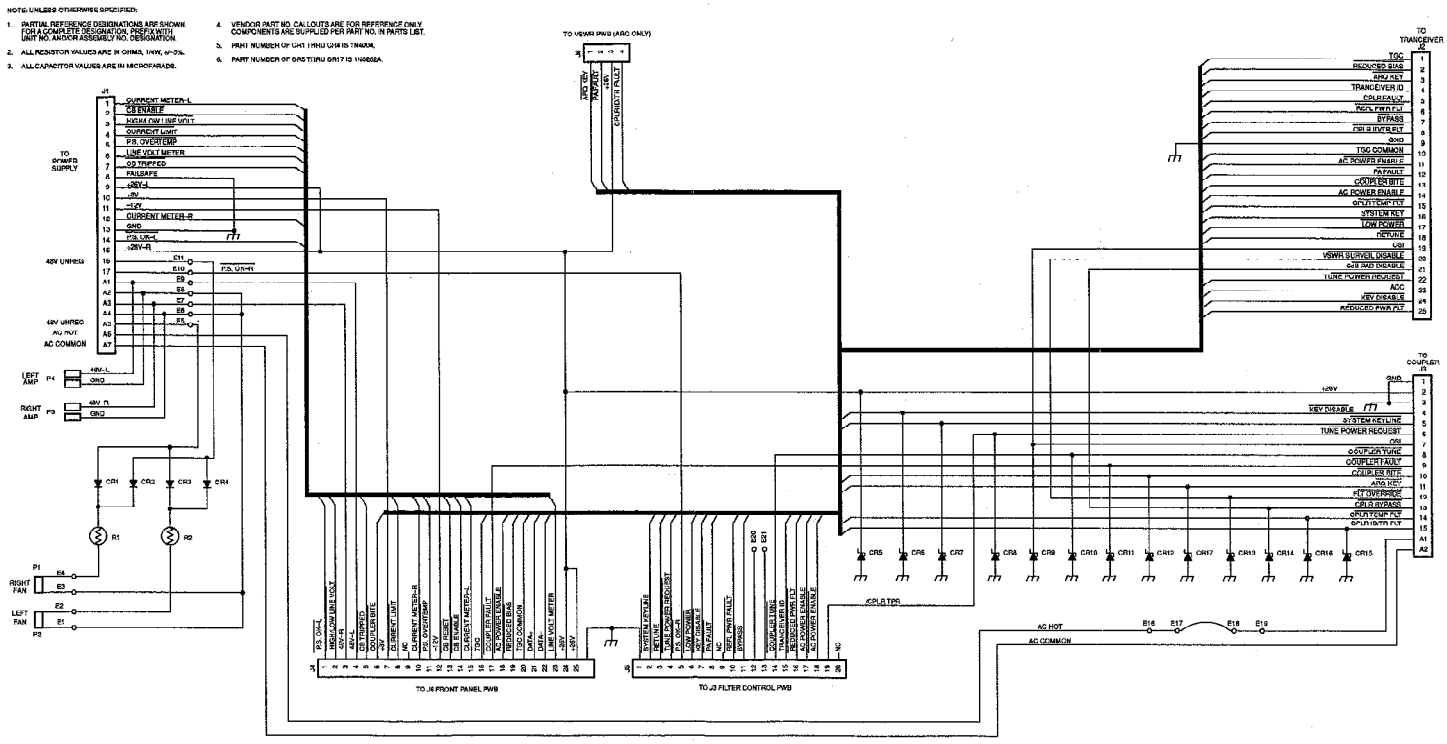
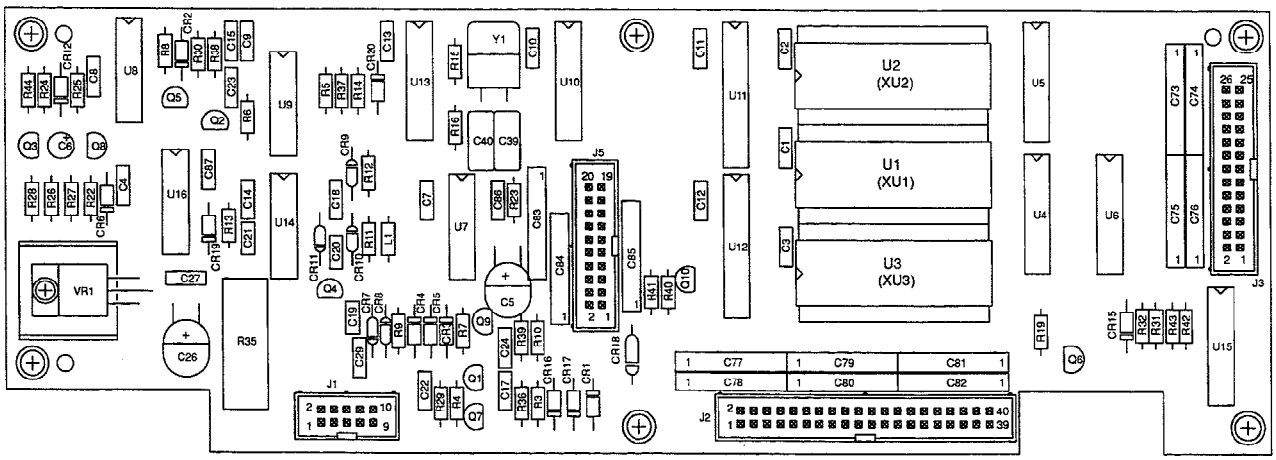


Figure 2. A2A1 Interconnect PWB Schematic Diagram (10221-3161 Rev. E)

A2A2
FILTER CONTROL PWB ASSEMBLY



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A2A2 FILTER CONTROL PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A2 Filter Control PWB Assembly (10221-3360) of the Front Panel Assembly (10221-3300) selects the relays on the A2A9 Low Pass Filter PWB in response to the frequency of the RF input sample. The filter control PWB also contains tuning control and keyline logic.

2. FUNCTIONAL DESCRIPTION

See figure 1, a block diagram of the PWB. When the frequency is changed, the transceiver sends a retune signal to the PA, which sends a coupler tune signal to the antenna coupler. The tune sequence can also be initiated by pressing the MANUAL TUNE switch on the A2A3 Front Panel PWB. The retune signal clocks tune flip-flop U7, which lights the TUNE indicator and sends a bias off signal to the front panel PWB.

When the transceiver is keyed, the internal keyline of the PA is activated, provided that the key disable and bypass lines are not low. The PA then produces a tune power request signal in response to the keyline and retune (or manual tune) signals. In response to the tune power request, the transceiver sends tune power. The tune power request signal also pulls the cutback disable and tune power lines to the front panel PWB, and activates counter U13.

During normal operation (i.e., the PA is tuned), counter U13 is held at reset. When a tune power request and RF drive power are present, the reset line of U13 is held low, and U13 divides down to produce a 208-microsecond count period. During the count period, the RF signal clocks flip-flop U7, which in turn clocks counter U10. Since the number of clock pulses during a count cycle is proportional to the frequency, the output of U10 is a binary representation of the frequency. A count of 1 is equal to 4.8 kHz.

U11 and U12 latch the output of U10 to produce an address for U1 through U3. EPROMs U1 through U3 contain a look-up table that outputs the control signals for the relays on the A2A9 Low Pass Filter PWB.

3. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Filter Control PWB and their destinations. The table can be used when tracing signals to and from the Filter Control PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A2 Filter Control PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	RF Sample	Input Splitter PWB A2A4-J1 via cable A2W13
J2	Power and Control Signals	Front Panel PWB A2A3
J3	LPF Interlock, Relay Control Signals	Low Pass Filter PWB A2A9-J3 via A2W12
J5	Power and Control Signals	Interconnect PWB A2A1-J5 via A2W7

A2A2 FILTER CONTROL PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A2 Filter Control PWB Assembly (10221-3360) of the Front Panel Assembly (10221-3300) selects the relays on the A2A9 Low Pass Filter PWB in response to the frequency of the RF input sample. The filter control PWB also contains tuning control and keyline logic.

2. FUNCTIONAL DESCRIPTION

See figure 1, a block diagram of the PWB. When the frequency is changed, the transceiver sends a retune signal to the PA, which sends a coupler tune signal to the antenna coupler. The tune sequence can also be initiated by pressing the MANUAL TUNE switch on the A2A3 Front Panel PWB. The retune signal clocks tune flip-flop U7, which lights the TUNE indicator and sends a bias off signal to the front panel PWB.

When the transceiver is keyed, the internal keyline of the PA is activated, provided that the key disable and bypass lines are not low. The PA then produces a tune power request signal in response to the keyline and retune (or manual tune) signals. In response to the tune power request, the transceiver sends tune power. The tune power request signal also pulls the cutback disable and tune power lines to the front panel PWB, and activates counter U13.

During normal operation (i.e., the PA is tuned), counter U13 is held at reset. When a tune power request and RF drive power are present, the reset line of U13 is held low, and U13 divides down to produce a 208-microsecond count period. During the count period, the RF signal clocks flip-flop U7, which in turn clocks counter U10. Since the number of clock pulses during a count cycle is proportional to the frequency, the output of U10 is a binary representation of the frequency. A count of 1 is equal to 4.8 kHz.

U11 and U12 latch the output of U10 to produce an address for U1 through U3. EPROMs U1 through U3 contain a look-up table that outputs the control signals for the relays on the A2A9 Low Pass Filter PWB.

3. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Filter Control PWB and their destinations. The table can be used when tracing signals to and from the Filter Control PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A2 Filter Control PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	RF Sample	Input Splitter PWB A2A4-J1 via cable A2W13
J2	Power and Control Signals	Front Panel PWB A2A3
J3	LPF Interlock, Relay Control Signals	Low Pass Filter PWB A2A9-J3 via A2W12
J5	Power and Control Signals	Interconnect PWB A2A1-J5 via A2W7

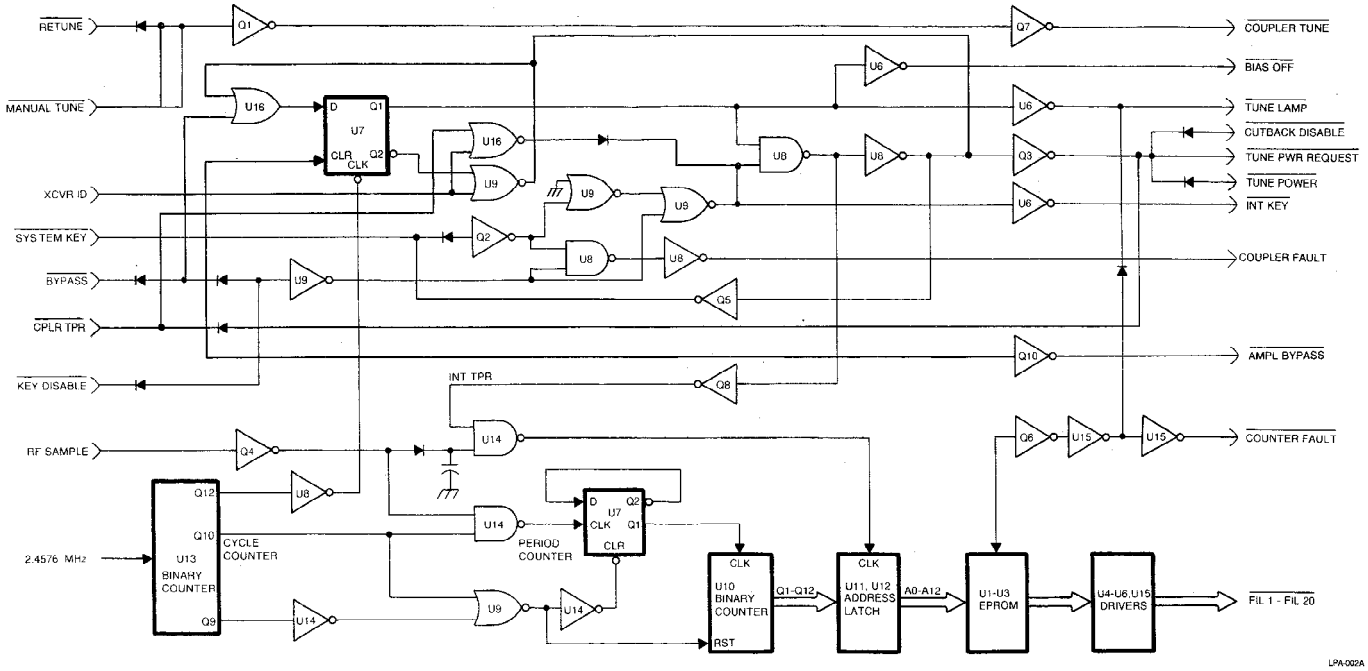


Figure 1. A2A2 Filter Control PWB Block Diagram

4. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the Filter Control PWB. Component locations are shown in figure 2. Figure 3 is the schematic diagram for the Filter Control PWB.

Table 2. A2A2 Filter Control PWB Parts List (10221-3360 Rev. R)

Ref. Desig.	Part Number	Description
–	10221-3369	PWB, FILTER CONTROL
–	10221-8101	FIRMWARE KIT
C1	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C5	C26-0016-330	CAP 33UF 20% 16V TANT
C6	C26-0010-479	CAP, FXD, TANT, 4.7UF, 10V
C7	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C8	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C9	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C10	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C11	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C12	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C13	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C14	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C15	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C17	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/01-1317V	CAP, 1000PF, 10% 200VC
C20	M39014/01-1317V	CAP, 1000PF, 10% 200VC
C21	M39014/01-1293V	CAP 47PF 10% 200V CER-R
C22	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C23	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C24	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C26	C26-0035-100	CAP 10UF 20% 35V TANT
C27	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C29	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C39	CM05ED220J03	CAP 22PF 5% 500V MICA
C40	CM05ED220J03	CAP 22PF 5% 500V MICA
C73	C07-0008-103	CAP, .01 UF NETWORK
C74	C07-0008-103	CAP, .01 UF NETWORK

Table 2. A2A2 Filter Control PWB Parts List (10221-3360 Rev. R) (Cont.)

Ref. Desig.	Part Number	Description
C75	C07-0008-103	CAP, .01 UF NETWORK
C76	C07-0008-103	CAP, .01 UF NETWORK
C77	C07-0008-103	CAP, .01 UF NETWORK
C78	C07-0008-103	CAP, .01 UF NETWORK
C79	C07-0008-103	CAP, .01 UF NETWORK
C80	C07-0008-103	CAP, .01 UF NETWORK
C81	C07-0008-103	CAP, .01 UF NETWORK
C82	C07-0008-103	CAP, .01 UF NETWORK
C83	C07-0008-103	CAP, .01 UF NETWORK
C84	C07-0008-103	CAP, .01 UF NETWORK
C85	C07-0008-103	CAP, .01 UF NETWORK
C86	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C87	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N4004	DIODE 1A 400V RECT GP
CR3	1N4004	DIODE 1A 400V RECT GP
CR4	1N4004	DIODE 1A 400V RECT GP
CR5	1N4004	DIODE 1A 400V RECT GP
CR6	1N4004	DIODE 1A 400V RECT GP
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	1N4004	DIODE 1A 400V RECT GP
CR15	1N4004	DIODE 1A 400V RECT GP
CR16	1N4004	DIODE 1A 400V RECT GP
CR17	1N4004	DIODE 1A 400V RECT GP
CR18	1N277	DIODE 80MW 125V GER
CR19	1N4004	DIODE 1A 400V RECT GP
CR20	1N4004	DIODE 1A 400V RECT GP
CR21	1N4004	DIODE 1A 400V RECT GP
J1	J46-0054-010	HEADER 10 PIN
J2	J46-0054-040	HEADER 40 PIN
J3	J46-0054-026	HEADER 26 PIN
J5	J46-0054-020	HEADER 20 PIN
L1	MS75084-6	COIL 3.3UH 10% FXD RF

Table 2. A2A2 Filter Control PWB Parts List (10221-3360 Rev. R) (Cont.)

Ref. Desig.	Part Number	Description
Q1	2N4126	XSTR SS/GP PNP TO-92
Q2	2N4126	XSTR SS/GP PNP TO-92
Q3	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q4	Q-0019	XSTR SS/GP MPS-6507
Q5	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q6	2N4124	XSTR SS/GP NPN TO-92
Q7	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q8	2N4124	XSTR SS/GP NPN TO-92
Q9	2N4126	XSTR SS/GP PNP TO-92
Q10	2N4126	XSTR SS/GP PNP TO-92
R3	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R4	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R5	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R6	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R7	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R8	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R9	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R10	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R11	R65-0003-333	RES 33K 5% 1/4W CAR FILM
R12	R65-0003-471	RES 470 5% 1/4W CAR FILM
R13	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R14	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R15	R65-0003-105	RES 1.0M 5% 1/4W CAR FILM
R16	R65-0003-152	RES 1.5K 5% 1/4W CAR FILM
R19	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R22	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R23	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R24	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R25	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R26	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R27	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R28	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R29	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R30	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R31	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R32	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R35	R80-0001-620	RES 62 5% 5W MET FILM

Table 2. A2A2 Filter Control PWB Parts List (10221-3360 Rev. R) (Cont.)

Ref. Desig.	Part Number	Description
R36	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R37	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R38	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R39	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R40	R65-0003-181	RES 180 5% 1/4W CAR FILM
R41	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R42	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R43	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R44	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R45	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
U4	I90-0006-003	IC XSTR ARRAY DARL 2003
U5	I90-0006-003	IC XSTR ARRAY DARL 2003
U6	I90-0006-003	IC XSTR ARRAY DARL 2003
U7	I15-0000-074	IC 74HC74 PLASTIC CMOS
U8	I15-0000-000	IC 74HC00 PLASTIC CMOS
U9	I15-0000-002	IC 74HC02 PLASTIC CMOS
U10	I15-0000-404	IC 74HC4040 PLASTIC CMOS
U11	I15-0000-574	IC 74HC574 PLASTIC CMOS
U12	I15-0000-574	IC 74HC574 PLASTIC CMOS
U13	I15-0000-998	IC 74HC4060 PLASTIC CMOS
U14	I15-0000-132	IC 74HC132 PLASTIC CMOS
U15	I90-0006-003	IC XSTR ARRAY DARL 2003
U16	I15-0000-002	IC 74HC02 PLASTIC CMOS
VR1	I11-0001-001	IC VR 7805 +5V 1.5A 4%
XU1	J77-0008-006	SKT IC MACH 28 PIN
XU2	J77-0008-006	SKT IC MACH 28 PIN
XU3	J77-0008-006	SKT IC MACH 28 PIN
Y1	Y15-0004-924	CRYSTAL,HC-18, 2.4576MHZ

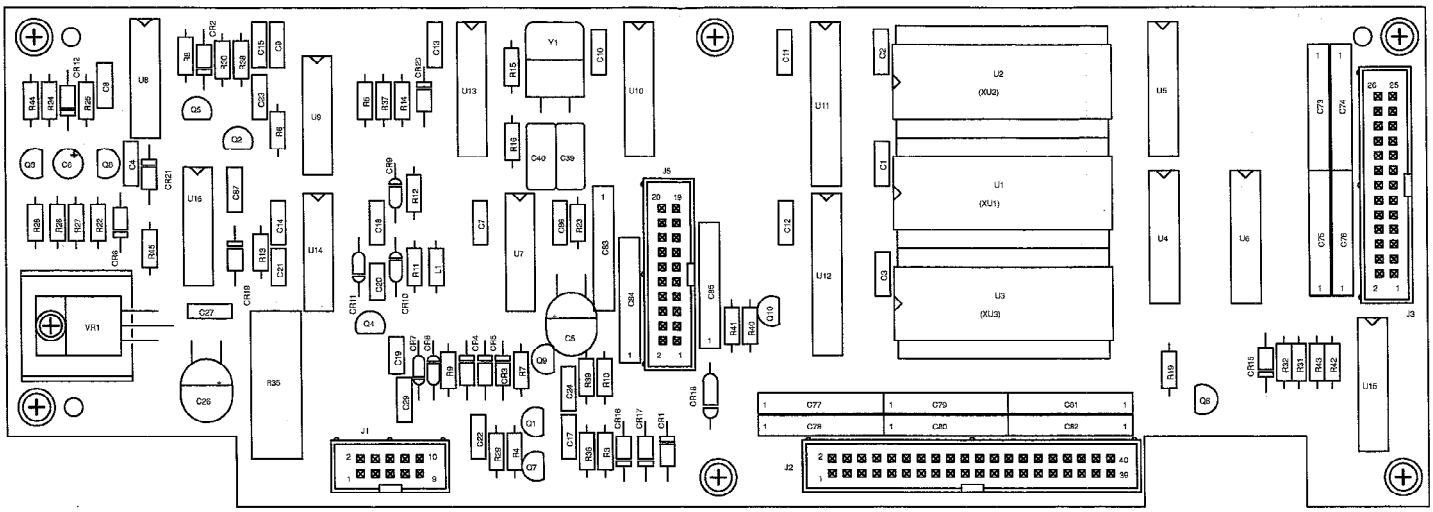


Figure 2. A2A2 Filter Control PWB Component Location Diagram (10221-3360 Rev. F)

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. ONLY INSTALLED FOR RF-350 TRANCEIVER CAN BE REMOVED FOR OTHER TRANCEIVERS TO DECREASE TUNE TIME.
6. ALL DIODES ARE 1N4004S
7. ALL INDUCTOR VALUES ARE IN MICROHENRYS
8. ALL UNUSED CONNECTOR PINS ARE CONNECTED TO A .01UF CAP TO GROUND, EXCEPT FOR J1.

UNUSED GATES

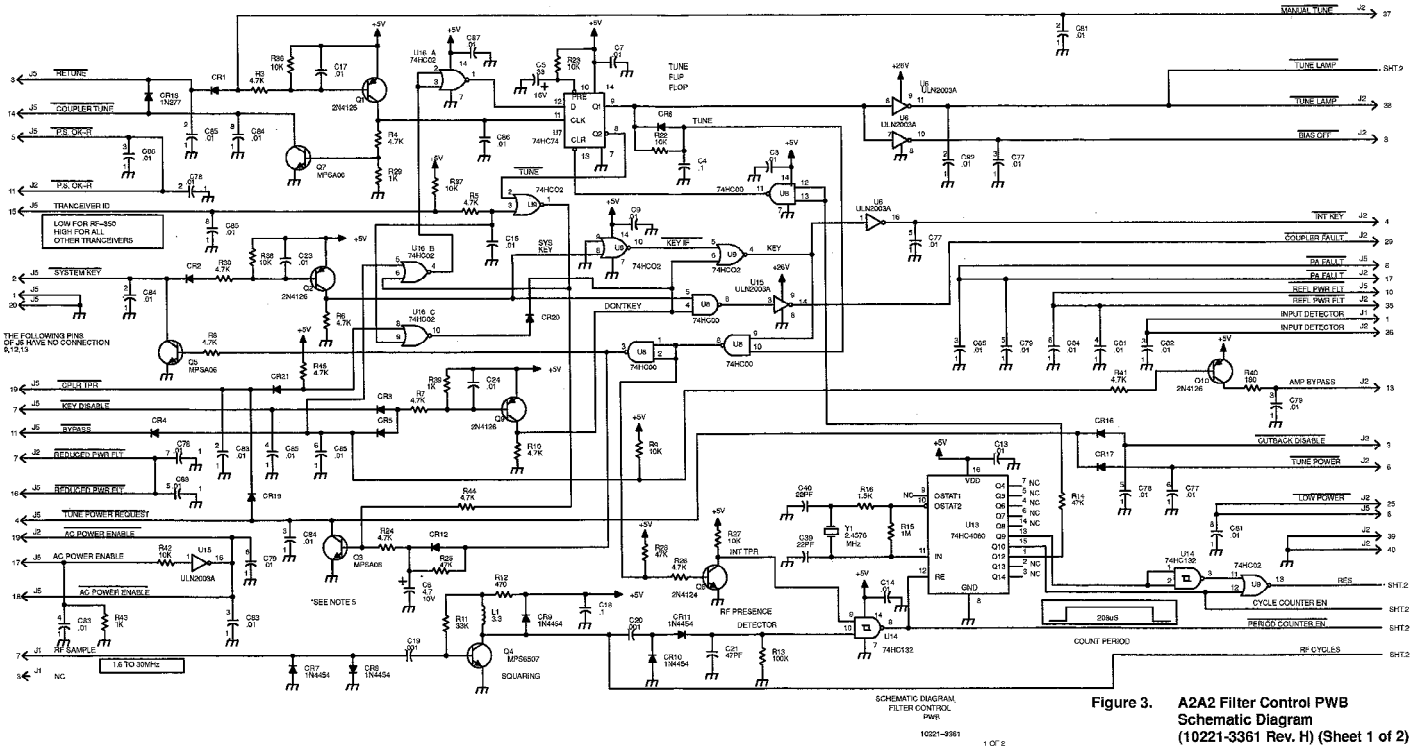


Figure 3. A2A2 Filter Control PWB Schematic Diagram (10221-3361 Rev. H) (Sheet 1 of 2)

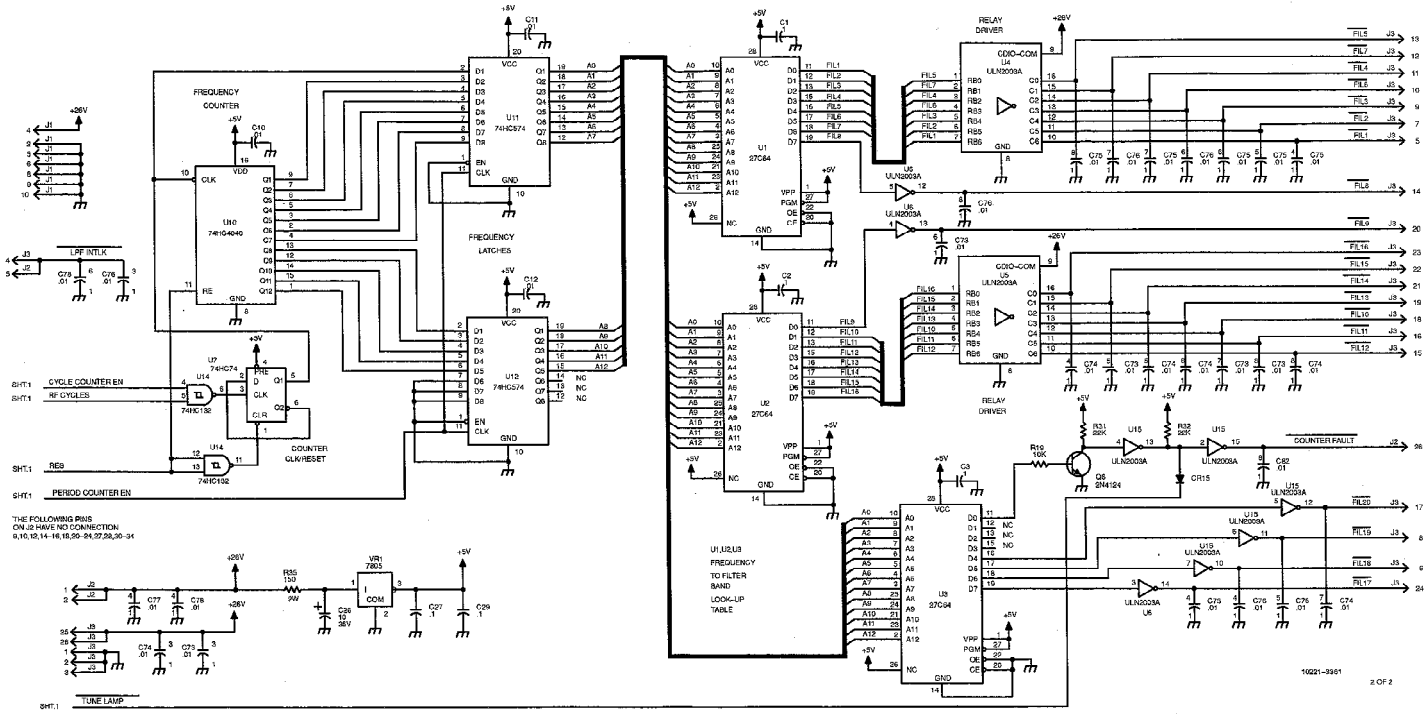
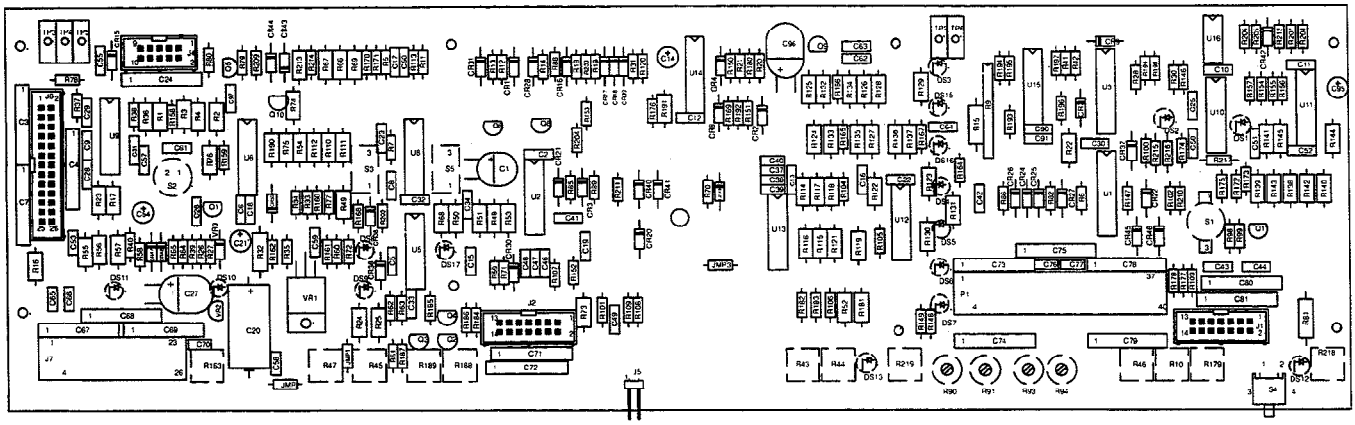


Figure 3. A2A2 Filter Control PWB Schematic Diagram (10221-3361 Rev. H) (Sheet 2 of 2)

A2A3
FRONT PANEL PWB ASSEMBLY



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A2A3 FRONT PANEL PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A3 Front Panel PWB Assembly (10221-3350) of the Front Panel Assembly (10221-3300) contains the power control, amplifier bias control, fault protection, and metering circuits. The front panel controls and indicators are described on the operator card in section 1, and in the troubleshooting section of this manual.

2. FUNCTIONAL DESCRIPTION

Refer to figure 1, a block diagram of the Front Panel PWB, and to the schematic diagram at the end of this tab section. The transmitter gain control (TGC) voltage is developed from the forward power and reflected power monitor voltages. During normal operation, the forward power sample controls the TGC voltage. The reflected power sample takes control of the TGC loop when the reflected power exceeds 40 watts (1.5:1 VSWR). The reflected power sample (U6-14) is pulled low during tuning by the cutback disable signal from the filter control PWB.

The TGC input voltage is applied to a switchable-gain amplifier. The TGC amplifier scales the transceiver TGC voltage for one of three output levels: high power (1000 watts), low power (adjustable from 100 to 800 watts), and reduced power (250 watts). The high power and low power levels are selected by HIGH/AUTO/LOW switch, and can be adjusted to meet user requirements. The reduced power mode is activated by the fault protection circuit when one of the power supplies or power amplifiers fails, and overtemperature fault occurs, or the PA is tuning.

The TGC amplifier output is also used to produce an automatic carrier control (ACC) voltage. (This voltage is used to control the AM carrier level of the RF-2301 Transceiver.) The TGC output is also applied to an internal automatic level control (ALC) circuit. The ALC circuit controls the reference voltage level for the bias amplifiers. ALC acts to limit the power output to approximately 1200 watts, and provides backup power control if the TGC loop fails.

The bias voltages for the MOSFET amplifiers are individually controlled. The temperature sensor voltage is applied to the inverting input of the bias amplifier (for temperature compensation), and the reference voltage developed by the ALC circuit is applied to the non-inverting input via the bias adjustment.

If a gain fault, low pass filter counter fault, or maximum overtemperature fault occurs, the bias reference voltage is pulled low (negative) by the bias enable comparator (U16-7). When the system is not keyed, the bias reference voltage is pulled low by the bias off comparator (U16-1). The output of the bias off comparator is also low when an interlock is open, a maximum overtemperature fault occurs, or the Filter Control PWB pulls the bias off line low.

The Front Panel PWB continuously monitors the +48 Vdc supplies, and switches the PA to reduced power mode if either supply voltage is not present. The PA is also switched to reduced power mode when an overtemperature condition occurs in one of the power amplifiers or power supplies.

Three types of overtemperature conditions are monitored: maximum overtemperature, PA overtemperature, and differential overtemperature. The maximum overtemperature comparators (U15) produce a maximum overtemperature fault when the operating temperature of any MOSFET exceeds 100 C. The PA overtemperature comparators (U11) produce a PA overtemperature fault when the operating temperature of any MOSFET exceeds 90 C. The differential overtemperature comparators (U10) produce a PA overtemperature fault when there is more than a 10 C difference between MOSFET pairs (i.e. Q1 and Q2, Q2 and Q3, Q3 and Q4, Q4 and Q1). If a maximum overtemperature occurs, the system will unkey, and may not be keyed until the MOSFET temperature falls below 100 C.

The Front Panel PWB includes meter amplifiers for each temperature sample, the forward and reflected power samples, and the front panel multimeter.

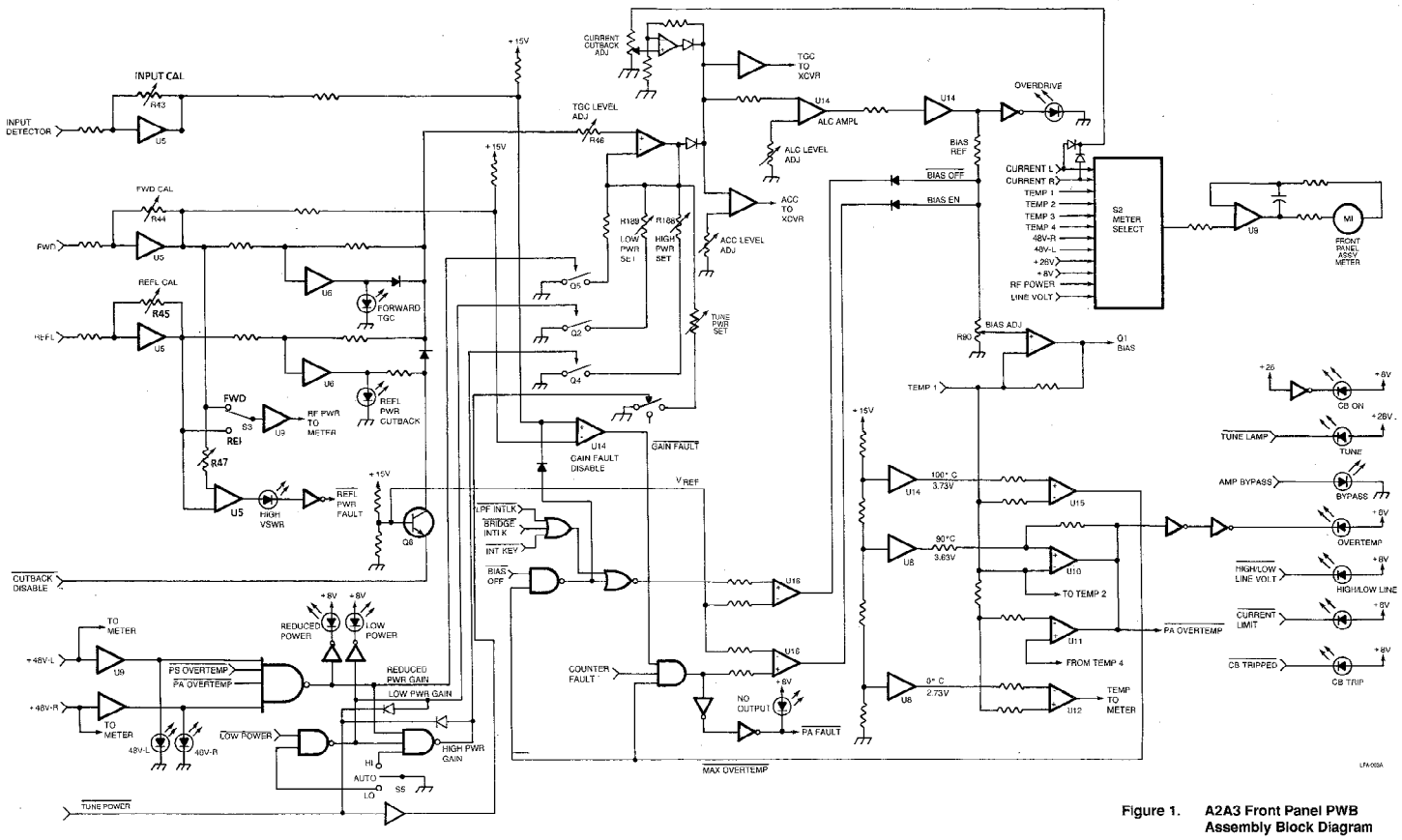


Figure 1. A2A3 Front Panel PWB Assembly Block Diagram

3. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Front Panel PWB and their destinations. The table can be used when tracing signals to and from the Front Panel PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A3 Front Panel PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	Temp 1, Q1 Bias, Q2 Bias, Temp 2	(Left) 500 Watt Amplifier A2A7-J2 via cable A2W9
J2	Temp 3, Q3 Bias, Q4 Bias, Temp 4	(Right) 500 Watt Amplifier A2A6-J2 via A2W10
J4	Power and Control Signals	VSWR PWB A2A5-J4 via A2W11
J5	Power Signals	Front Panel Assembly Meter via A2W6
J6	Power and Control Signals	Interconnect PWB A2A1-J4
P1	Control Signals	Filter Control PWB A2A2-J2

4. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the Front Panel PWB Assembly. Component locations are shown in figure 2. Figure 3 is the schematic diagram for the Front Panel PWB.

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD)

Ref. Desig.	Part Number	Description
C1	C26-0025-150	CAP 15UF 20% 25V TANT
C2	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C3	C07-0008-103	CAP, .01 UF NETWORK
C4	C07-0008-103	CAP, .01 UF NETWORK
C5	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C6	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C7	C07-0008-103	CAP, .01 UF NETWORK
C8	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C9	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C10	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C11	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C12	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C13	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C14	C26-0025-159	CAP,FXD,ELCTLT, 1.5UF
C15	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C16	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C17	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
C20	C18-0050-470	CAP 47UF AXL 50V ELEC
C21	C26-0025-100	CAP 10UF 20% 25V TANT
C22	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C23	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C24	C07-0008-103	CAP, .01 UF NETWORK
C25	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C26	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C27	C26-0025-470	CAP 47UF 20% 25V TANT
C28	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C29	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C30	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C31	M39014/02-1320V	CAP .47UF 10% 50V CER-R
C32	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C33	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C34	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C37	M39014/01-1317V	CAP,1000PF,10% 200VC
C38	M39014/01-1317V	CAP,1000PF,10% 200VC
C39	M39014/01-1317V	CAP,1000PF,10% 200VC
C40	M39014/01-1317V	CAP,1000PF,10% 200VC
C41	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C42	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C43	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C44	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C46	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C47	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C48	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C49	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C50	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C51	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C52	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C53	M39014/01-1317V	CAP,1000PF,10% 200VC
C54	C26-0025-339	CAP 3.3UF 20% 25V TANT
C55	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C57	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C58	M39014/01-1317V	CAP,1000PF,10% 200VC
C59	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C60	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C61	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C62	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
C63	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C64	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C65	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C66	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C67	C07-0008-103	CAP, .01 UF NETWORK
C68	C07-0008-103	CAP, .01 UF NETWORK
C69	C07-0008-103	CAP, .01 UF NETWORK
C70	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C71	C07-0008-103	CAP, .01 UF NETWORK
C72	C07-0008-103	CAP, .01 UF NETWORK
C73	C07-0008-103	CAP, .01 UF NETWORK
C74	C07-0008-103	CAP, .01 UF NETWORK
C75	C07-0008-103	CAP, .01 UF NETWORK
C76	M39014/01-1535V	CAP .01UF 10% 100V CER-R
C77	M39014/01-1535V	CAP .01UF 10% 100V CER-R
C78	C07-0008-103	CAP, .01 UF NETWORK
C79	C07-0008-103	CAP, .01 UF NETWORK
C80	C07-0008-103	CAP, .01 UF NETWORK
C81	C07-0008-103	CAP, .01 UF NETWORK
C82	M39014/02-1320V	CAP .47UF 10% 50V CER-R
C90	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C91	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C95	C26-0035-109	CAP 1.0UF 20% 35V TANT
C96	C26-0016-680	CAP 68UF 20% 16V TANT
C97	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C98	M39014/02-1320V	CAP .47UF 10% 50V CER-R
C99	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N4004	DIODE 1A 400V RECT GP
CR3	1N4004	DIODE 1A 400V RECT GP
CR4	1N4004	DIODE 1A 400V RECT GP
CR7	1N4004	DIODE 1A 400V RECT GP
CR8	1N4004	DIODE 1A 400V RECT GP
CR9	1N4004	DIODE 1A 400V RECT GP
CR15	1N4004	DIODE 1A 400V RECT GP
CR16	1N4004	DIODE 1A 400V RECT GP
CR17	1N4004	DIODE 1A 400V RECT GP
CR18	1N4004	DIODE 1A 400V RECT GP
CR20	1N4004	DIODE 1A 400V RECT GP

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
CR21	1N4004	DIODE 1A 400V RECT GP
CR22	1N4004	DIODE 1A 400V RECT GP
CR24	1N4004	DIODE 1A 400V RECT GP
CR25	1N4004	DIODE 1A 400V RECT GP
CR26	1N4004	DIODE 1A 400V RECT GP
CR27	1N4004	DIODE 1A 400V RECT GP
CR28	1N4004	DIODE 1A 400V RECT GP
CR30	1N4004	DIODE 1A 400V RECT GP
CR31	1N4004	DIODE 1A 400V RECT GP
CR36	1N4004	DIODE 1A 400V RECT GP
CR37	1N4004	DIODE 1A 400V RECT GP
CR38	1N4004	DIODE 1A 400V RECT GP
CR39	1N4004	DIODE 1A 400V RECT GP
CR40	1N4004	DIODE 1A 400V RECT GP
CR41	1N4004	DIODE 1A 400V RECT GP
CR42	1N4740A	DIODE 10V 5% 1W ZENER
CR43	1N4004	DIODE 1A 400V RECT GP
CR44	1N4004	DIODE 1A 400V RECT GP
CR45	1N4004	DIODE 1A 400V RECT GP
CR46	1N4004	DIODE 1A 400V RECT GP
CR47	1N4004	DIODE 1A 400V RECT GP
CR48	1N4004	DIODE 1A 400V RECT GP
CR49	1N4004	DIODE 1A 400V RECT GP
CR50	1N4004	DIODE 1A 400V RECT GP
DS1	N21-0013-003	LED GRN T-1 3/4
DS2	N21-0013-001	LED RED T-1 3/4
DS3	N21-0013-002	LED YEL T-1 3/4
DS4	N21-0013-001	LED RED T-1 3/4
DS5	N21-0013-001	LED RED T-1 3/4
DS6	N21-0013-001	LED RED T-1 3/4
DS7	N21-0013-001	LED RED T-1 3/4
DS8	N21-0013-002	LED YEL T-1 3/4
DS9	N21-0013-001	LED RED T-1 3/4
DS10	N21-0013-003	LED GRN T-1 3/4
DS11	N21-0013-003	LED GRN T-1 3/4
DS12	N21-0013-001	LED RED T-1 3/4
DS13	N21-0013-003	LED GRN T-1 3/4
DS15	N21-0013-002	LED YEL T-1 3/4
DS16	N21-0013-001	LED RED T-1 3/4

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
DS17	N21-0013-002	LED YEL T-1 3/4
J1	J46-0054-014	HEADER 14 PIN
J2	J46-0054-014	HEADER 14 PIN
J4	J46-0054-010	HEADER 10 PIN
J5	J46-0033-002	HEADER,2-POS
J6	J46-0054-026	HEADER 26 PIN
JMP1	MP-1142	RES ZERO OHM (CKT JMPR)
JMP2	MP-1142	RES ZERO OHM (CKT JMPR)
P1	10221-1119	RIB CABLE FRT PNL-FIL CON
Q1	2N4124	XSTR SS/GP NPN TO-92
Q2	2N4124	XSTR SS/GP NPN TO-92
Q3	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q4	2N4124	XSTR SS/GP NPN TO-92
Q5	2N4124	XSTR SS/GP NPN TO-92
Q6	2N4124	XSTR SS/GP NPN TO-92
Q8	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q9	2N4126	XSTR SS/GP PNP TO-92
Q10	2N4126	XSTR SS/GP PNP TO-92
Q11	2N4124	XSTR SS/GP NPN TO-92
R1	RN55D2001F	RES 2000 1% 1/8W MET FLM
R2	RN55D4022F	RES 40.2K 1% 1/8W MET FLM
R3	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R4	RN55D5621F	RES 5620 1% 1/8W MET FLM
R5	R65-0003-101	RES 100 5% 1/4W CAR FILM
R6	R65-0003-273	RES 27K 5% 1/4W CAR FILM
R7	R65-0003-203	RES 20K 5% 1/4W CAR FILM
R9	R50-0010-271	RES 270 2% 10SIP 9RES
R10	R-2213	RES VAR 100K 10% .5W HOR.
R11	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R12	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R13	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R14	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R15	R65-0004-681	RES 680 5% 1/2W CAR FILM
R16	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R17	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R18	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R19	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R20	R65-0003-152	RES 1.5K 5% 1/4W CAR FILM
R21	R65-0003-101	RES 100 5% 1/4W CAR FILM

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
R22	RN55D3651F	RES 3650 1% 1/8W MET FLM
R23	RN55D3651F	RES 3650 1% 1/8W MET FLM
R24	RN55D3922F	RES 39.2K 1% 1/8W MET FLM
R25	RN55D3481F	RES 3480 1% 1/8W MET FLM
R26	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R27	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R28	R65-0003-152	RES 1.5K 5% 1/4W CAR FILM
R30	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R31	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R32	R65-0004-220	RES 22 5% 1/2W CAR FILM
R33	R65-0003-474	RES 470K 5% 1/4W CAR FILM
R34	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R35	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R36	RN55D4021F	RES 4020 1% 1/8W MET FLM
R37	RN55D4992F	RES 49.9K 1% 1/8W MET FLM
R38	RN55D5621F	RES 5620 1% 1/8W MET FLM
R39	R65-0003-681	RES 680 5% 1/4W CAR FILM
R40	R65-0003-681	RES 680 5% 1/4W CAR FILM
R41	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R42	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R43	R-2209	RES VAR 10K 10% .5W HOR.
R44	R-2209	RES VAR 10K 10% .5W HOR.
R45	R-2209	RES VAR 10K 10% .5W HOR.
R46	R-2209	RES VAR 10K 10% .5W HOR.
R47	R-2209	RES VAR 10K 10% .5W HOR.
R48	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R49	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R50	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R51	RN55D4751F	RES 4750 1% 1/8W MET FLM
R52	RN55D4751F	RES 4750 1% 1/8W MET FLM
R53	RN55D4751F	RES 4750 1% 1/8W MET FLM
R54	RN55D1003F	RES 100K 1% 1/8W MET FLM
R55	RN55D1003F	RES 100K 1% 1/8W MET FLM
R56	RN55D9312F	RES 93.1K 1% 1/8W MET FLM
R57	RN55D1003F	RES 100K 1% 1/8W MET FLM
R58	R65-0003-101	RES 100 5% 1/4W CAR FILM
R59	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R60	RN55D1213F	RES 121K 1% 1/8W MET FLM
R61	RN55D2742F	RES 27.4K 1% 1/8W MET FLM

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
R62	R65-0003-681	RES 680 5% 1/4W CAR FILM
R63	R65-0003-470	RES 47 5% 1/4W CAR FILM
R64	R65-0003-333	RES 33K 5% 1/4W CAR FILM
R65	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R66	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R67	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R68	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R69	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R70	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R71	R65-0003-391	RES 390 5% 1/4W CAR FILM
R72	R65-0003-101	RES 100 5% 1/4W CAR FILM
R73	RN55D1502F	RES 15.0K 1% 1/8W MET FLM
R74	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R75	RN55D2001F	RES 2000 1% 1/8W MET FLM
R76	RN55D5111F	RES 5110 1% 1/8W MET FLM
R77	R65-0003-101	RES 100 5% 1/4W CAR FILM
R78	R65-0003-101	RES 100 5% 1/4W CAR FILM
R79	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R80	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R81	R65-0004-152	RES 1.5K 5% 1/2W CAR FILM
R82	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R85	R65-0003-274	RES 270K 5% 1/4W CAR FILM
R86	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R88	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R89	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R90	R40-0017-503	RES,VAR,50K,10%
R91	R40-0017-503	RES,VAR,50K,10%
R93	R40-0017-503	RES,VAR,50K,10%
R94	R40-0017-503	RES,VAR,50K,10%
R98	R65-0003-123	RES 12K 5% 1/4W CAR FILM
R99	R65-0003-123	RES 12K 5% 1/4W CAR FILM
R100	R65-0003-123	RES 12K 5% 1/4W CAR FILM
R101	R65-0003-123	RES 12K 5% 1/4W CAR FILM
R102	R65-0003-101	RES 100 5% 1/4W CAR FILM
R103	R65-0003-101	RES 100 5% 1/4W CAR FILM
R104	R65-0003-101	RES 100 5% 1/4W CAR FILM
R105	R65-0003-101	RES 100 5% 1/4W CAR FILM
R106	R65-0003-101	RES 100 5% 1/4W CAR FILM
R107	R65-0003-101	RES 100 5% 1/4W CAR FILM

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
R108	R65-0003-101	RES 100 5% 1/4W CAR FILM
R109	R65-0003-101	RES 100 5% 1/4W CAR FILM
R110	RN55D1331F	RES 1330 1% 1/8W MET FLM
R111	RN55D1470F	RES 147 1% 1/8W MET FLM
R112	RN55D4021F	RES 4020 1% 1/8W MET FLM
R113	R65-0003-101	RES 100 5% 1/4W CAR FILM
R114	RN55D5112F	RES 51.1K 1% 1/8W MET FLM
R115	RN55D5112F	RES 51.1K 1% 1/8W MET FLM
R116	RN55D5112F	RES 51.1K 1% 1/8W MET FLM
R117	RN55D5112F	RES 51.1K 1% 1/8W MET FLM
R118	RN55D4322F	RES 43.2K 1% 1/8W MET FLM
R119	RN55D4322F	RES 43.2K 1% 1/8W MET FLM
R120	R65-0003-274	RES 270K 5% 1/4W CAR FILM
R121	RN55D4322F	RES 43.2K 1% 1/8W MET FLM
R122	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R123	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R124	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R125	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R126	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R127	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R128	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R129	RN55D1622F	RES 16.2K 1% 1/8W MET FLM
R130	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R131	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R132	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R133	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R134	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R135	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R136	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R137	RN55D6492F	RES 64.9K 1% 1/8W MET FLM
R138	RN55D3481F	RES 3480 1% 1/8W MET FLM
R139	RN55D3481F	RES 3480 1% 1/8W MET FLM
R140	RN55D3481F	RES 3480 1% 1/8W MET FLM
R141	RN55D3481F	RES 3480 1% 1/8W MET FLM
R142	RN55D1053F	RES 105K 1% 1/8W MET FLM
R143	RN55D1053F	RES 105K 1% 1/8W MET FLM
R144	RN55D1053F	RES 105K 1% 1/8W MET FLM
R145	RN55D1053F	RES 105K 1% 1/8W MET FLM
R146	R65-0003-103	RES 10K 5% 1/4W CAR FILM

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
R147	R65-0003-273	RES 27K 5% 1/4W CAR FILM
R148	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R149	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R150	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R151	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R152	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R153	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R154	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R155	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R156	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R157	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R158	R65-0003-101	RES 100 5% 1/4W CAR FILM
R159	R65-0003-101	RES 100 5% 1/4W CAR FILM
R160	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R161	R65-0003-271	RES 270 5% 1/4W CAR FILM
R162	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R163	R-2205	RES VAR 500 10% .5W HOR.
R164	R65-0003-101	RES 100 5% 1/4W CAR FILM
R165	R65-0003-101	RES 100 5% 1/4W CAR FILM
R166	R65-0003-101	RES 100 5% 1/4W CAR FILM
R167	R65-0003-101	RES 100 5% 1/4W CAR FILM
R168	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R169	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R170	R65-0003-154	RES 150K 5% 1/4W CAR FILM
R171	R65-0003-392	RES 3.9K 5% 1/4W CAR FILM
R172	R65-0003-154	RES 150K 5% 1/4W CAR FILM
R173	R65-0003-154	RES 150K 5% 1/4W CAR FILM
R174	R65-0003-154	RES 150K 5% 1/4W CAR FILM
R175	R65-0003-154	RES 150K 5% 1/4W CAR FILM
R176	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R177	R65-0003-433	RES 43K 5% 1/4W CAR FILM
R178	R65-0003-683	RES 68K 5% 1/4W CAR FILM
R179	R-2211	RES VAR 25K 10% .5W HOR.
R180	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R181	RN55D4322F	RES 43.2K 1% 1/8W MET FLM
R182	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R183	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R184	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R185	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
R186	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R187	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R188	R-2212	RES VAR 50K 10% .5W HOR.
R189	R-2212	RES VAR 50K 10% .5W HOR.
R190	RN55D2001F	RES 2000 1% 1/8W MET FLM
R191	RN55D1652F	RES 16.5K 1% 1/8W MET FLM
R192	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R193	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R194	R65-0003-105	RES 1.0M 5% 1/4W CAR FILM
R195	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R196	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R197	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R198	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R199	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R200	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R203	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R204	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R205	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R206	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R207	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R208	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R209	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R210	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R211	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R212	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R213	RN55D5112F	RES 51.1K 1% 1/8W MET FLM
R214	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R215	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R216	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R217	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R218	R-2212	RES VAR 50K 10% .5W HOR.
R219	R-2211	RES VAR 25K 10% .5W HOR.
S1	S10-0006-001	SW TOG SPDT ON-NONE-ON PC
S2	S25-0002-001	SW 30DEG 1P ROT ENC PCTRM
S3	S10-0028-001	SWITCH, SPST
S4	S06-0002-116	SW PB SPST NO MOM RA PCMT
S5	S10-0028-002	SWITCH, SPDT
TP2	J60-0001-002	TP PWB RED RA S&T ACCESS
TP3	J60-0001-006	TP PWB ORN RA S&T ACCESS

Table 2. A2A3 Front Panel PWB Parts List (10221-3350 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
TP4	J60-0001-007	TP PWB YEL RA S&T ACCESS
TP5	J60-0001-004	TP PWB GRN RA S&T ACCESS
TP6	J60-0001-010	TP PWB BLU RA S&T ACCESS
U1	I90-0006-003	IC XSTR ARRAY DARL 2003
U2	I01-0000-008	IC 4011B PLASTIC CMOS
U3	I90-0006-003	IC XSTR ARRAY DARL 2003
U5	I30-0003-000	IC OP AMP QUAD 324
U6	I30-0003-000	IC OP AMP QUAD 324
U8	I30-0003-000	IC OP AMP QUAD 324
U9	I30-0003-000	IC OP AMP QUAD 324
U10	I20-0008-000	IC LM239 COMPARATOR P/C
U11	I20-0008-000	IC LM239 COMPARATOR P/C
U12	I30-0003-000	IC OP AMP QUAD 324
U13	I30-0003-000	IC OP AMP QUAD 324
U14	I30-0003-000	IC OP AMP QUAD 324
U15	I20-0008-000	IC LM239 COMPARATOR P/C
U16	I30-0020-004	IC OP AMP DUAL 2904
VR1	IC-0358	IC VR 317 ADJ V 1.5A
VR2	I12-0006-015	IC VR 78L15A +15V .10A 4%
VR3	1N4747A	DIODE 20V 5% 1W ZENER

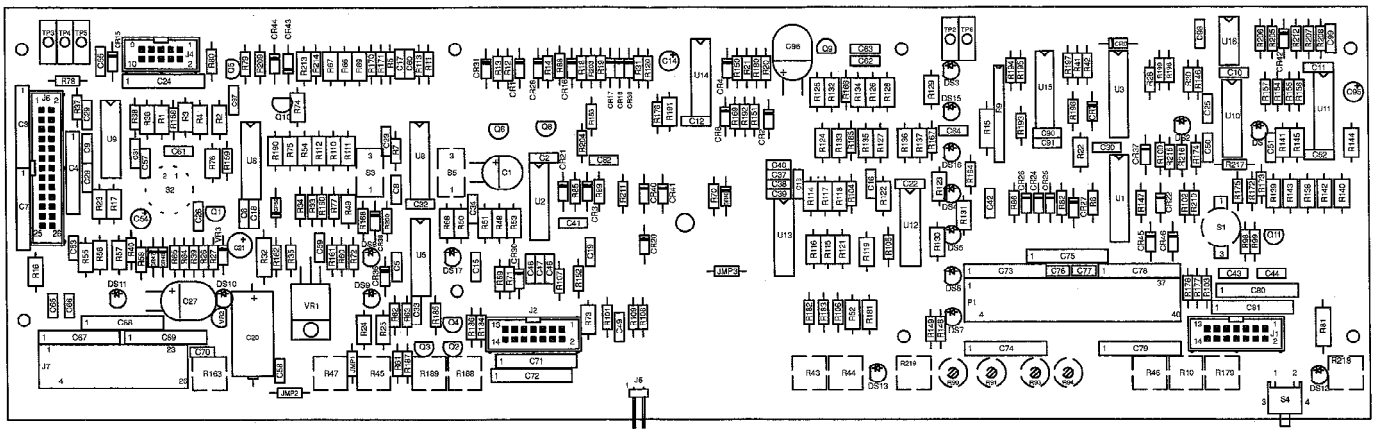


Figure 2. A2A3 Front Panel PWB Component Location Diagram (10221-3350 Rev. H)

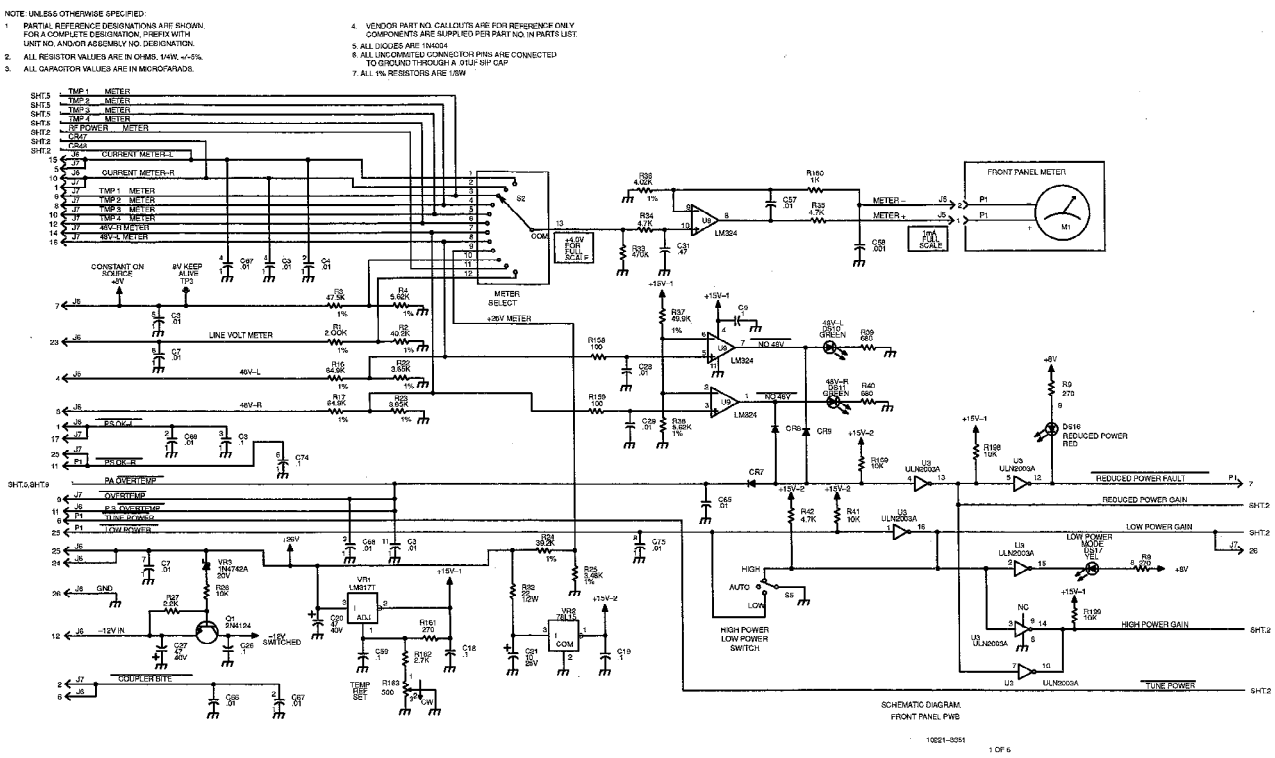


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 1 of 6)

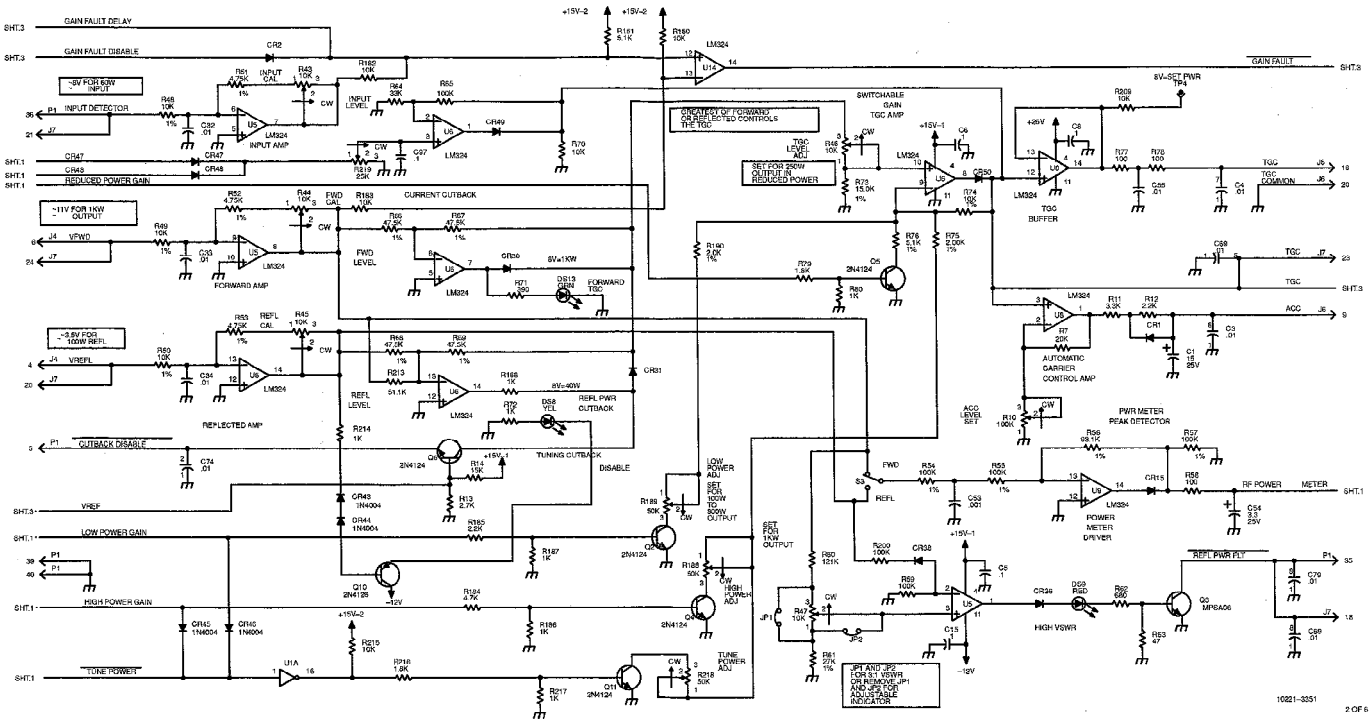


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 2 of 6)

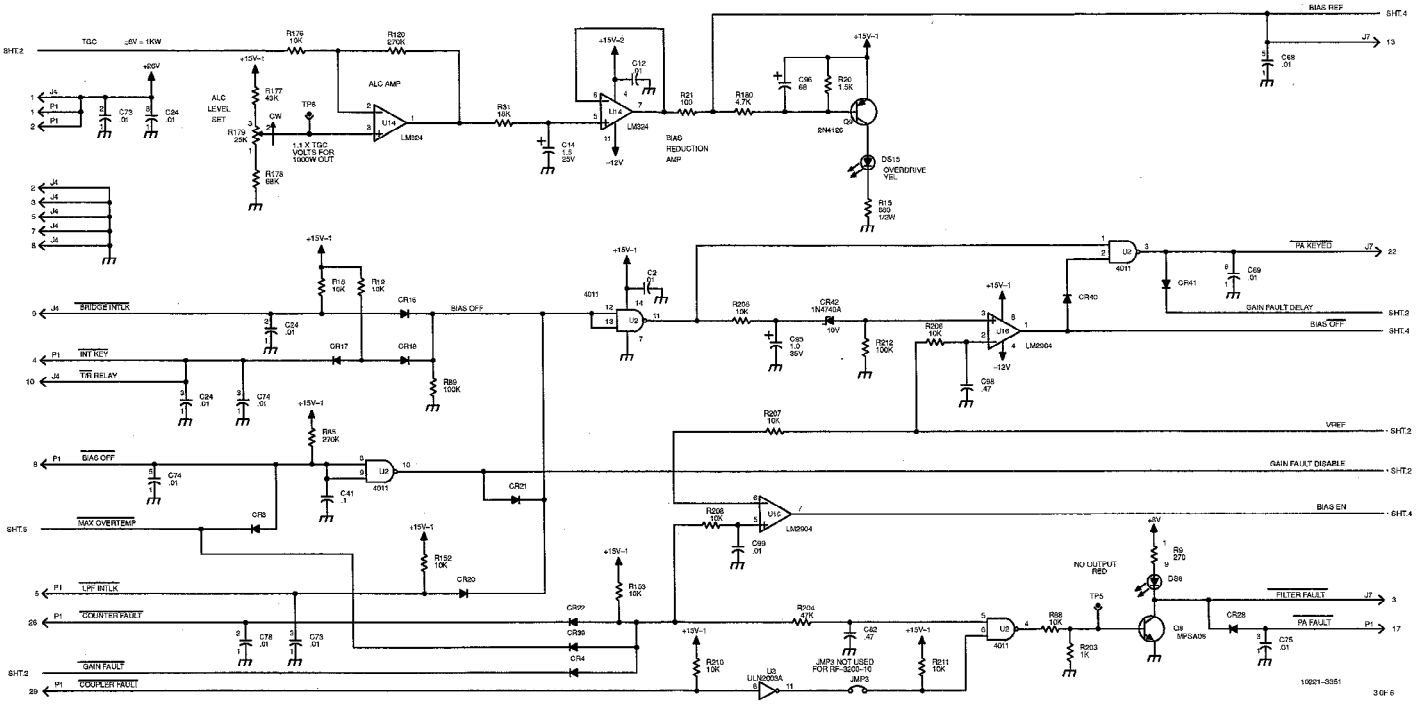


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 3 of 6)

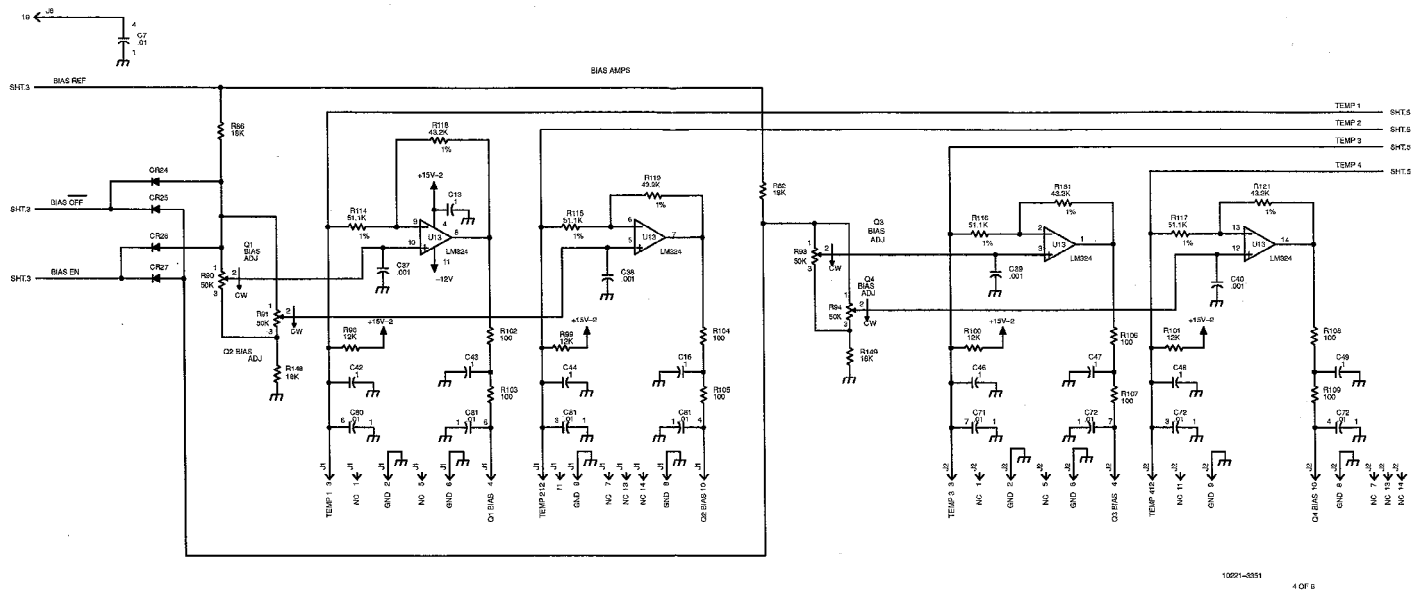


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 4 of 6)

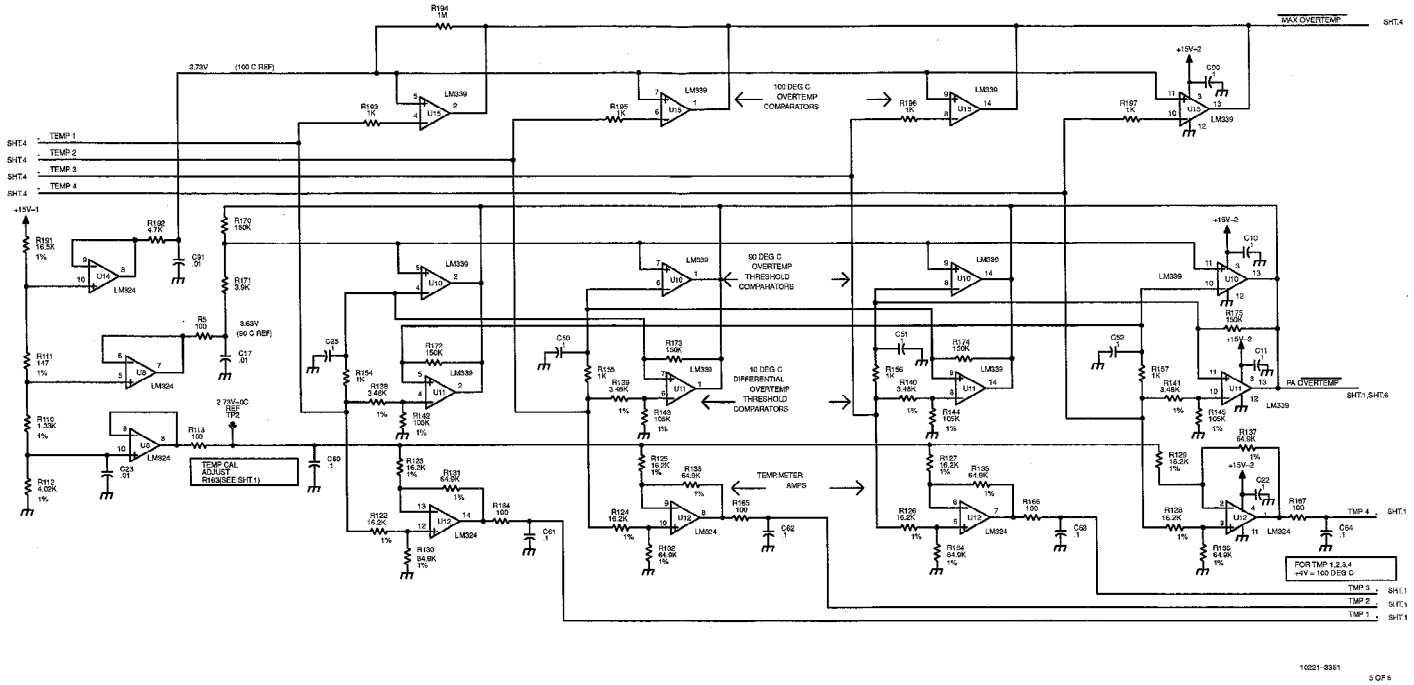


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 5 of 6)

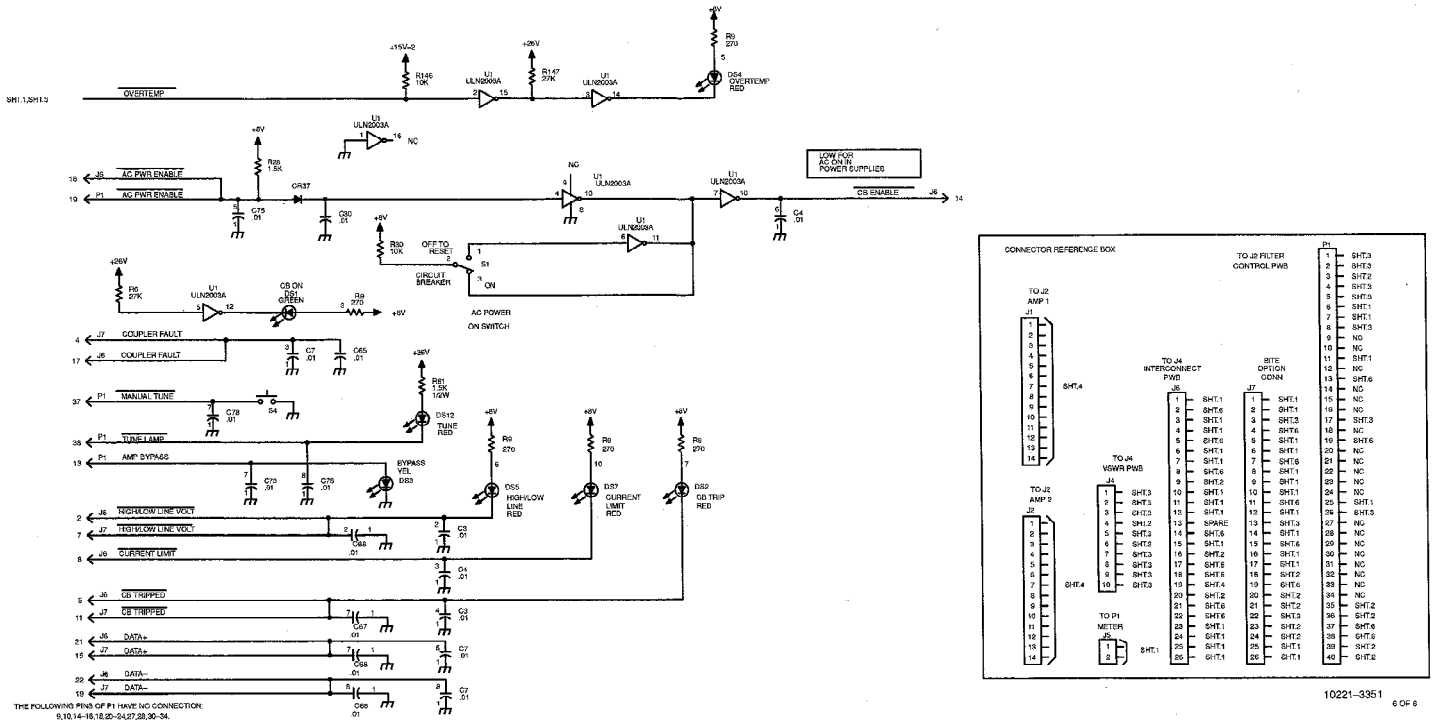
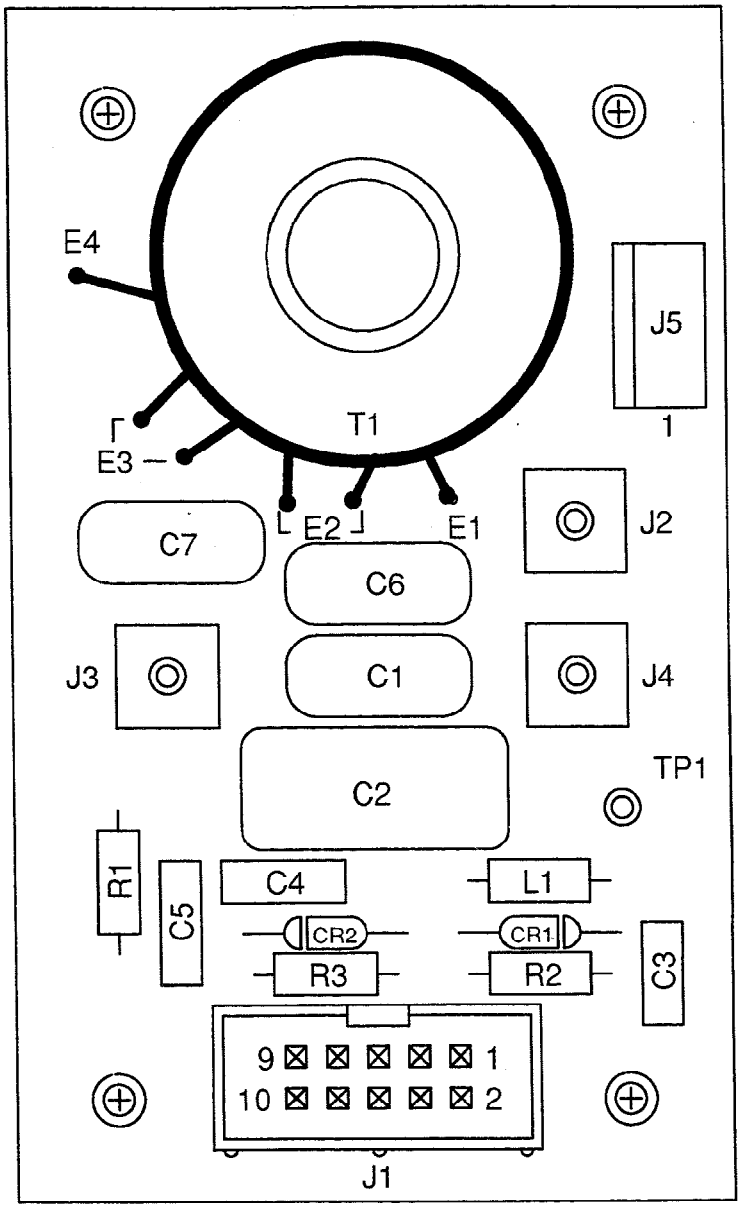


Figure 3. A2A3 Front Panel PWB Schematic Diagram (10221-3351 Rev. L) (Sheet 6 of 6)

A2A4
INPUT SPLITTER PWB ASSEMBLY



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A2A4 INPUT SPLITTER PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A4 Input Splitter PWB Assembly (10221-3400) splits the RF signal to produce inputs for the 500 Watt Amplifier Assemblies, detects the RF input for the Front Panel PWB, and provides an RF sample for the Filter Control PWB.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Input Splitter PWB and their destinations. The table can be used when tracing signals to and from the Filter Control PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A4 Input Splitter PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	Control Signals	Filter Control PWB A2A2-J1 via cable A2W13
J2	RF In	VSWR PWB A2A5-J3 via A2W18
J3	AMP 1	(Right) 500W Amplifier Assy A2A6-J1 via A2W14
J4	AMP 2	(Left) 500W Amplifier Assy A2A7-J1 via A2W15

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the Input Splitter PWB. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Input Splitter PWB.

Table 2. A2A4 Input Splitter PWB Parts List (10221-3400 Rev. D)

Ref. Desig.	Part Number	Description
C1	CM05ED820J03	CAP 82PF 5% 500V MICA
C2	CM06FD471J03	CAP 470PF 5% 500V MICA
C3	M39014/01-1317V	CAP 1000PF 10% 200V
C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C6	CM05ED470J03	CAP 47PF 5% 500V MICA
CR1	1N6263	DIODE .40W 60V HOT CARRIER
CR2	1N6263	DIODE .40W 60V HOT CARRIER
J1	J46-0054-010	HEADER 10 PIN
J2	J-0031	CONN SMB VERT PCB
J3	J-0031	CONN SMB VERT PCB
J4	J-0031	CONN SMB VERT PCB
L1	MS75085-17	COIL 680UH 10% FXD RF
R1	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R2	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R3	R65-0003-223	RES 22K 5% 1/4W CAR FILM
T1	10221-3408	SPLITTER TRANSFORMER
TP1	J-0071	TP PWB BRN TOP ACCS .080"

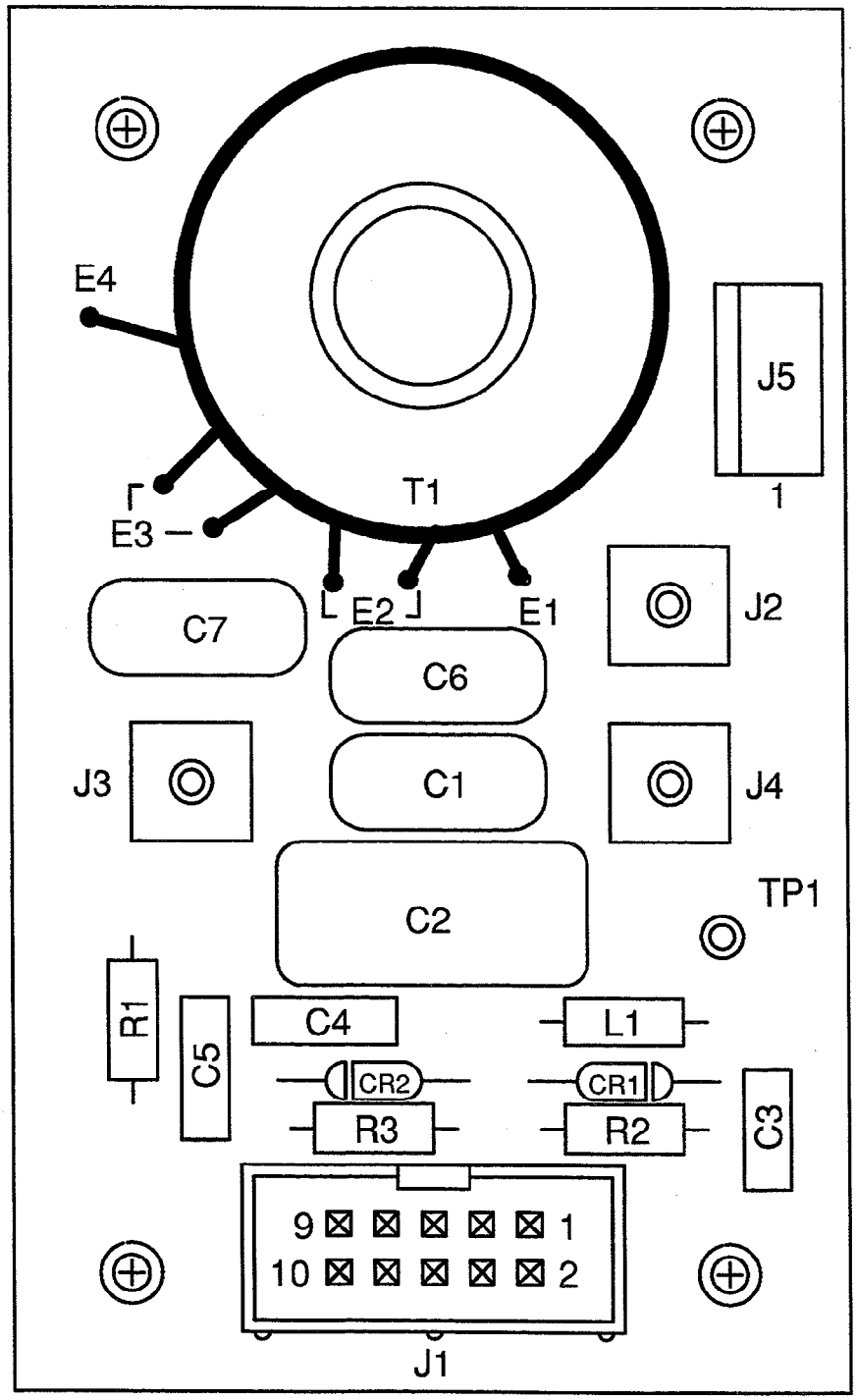
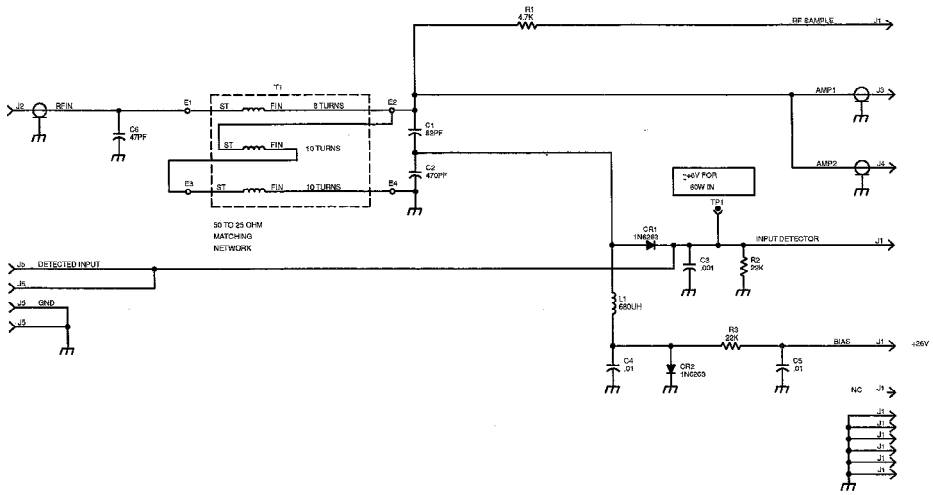


Figure 1. A2A4 Input Splitter PWB Component Location Diagram (10221-3400 Rev. A)

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.



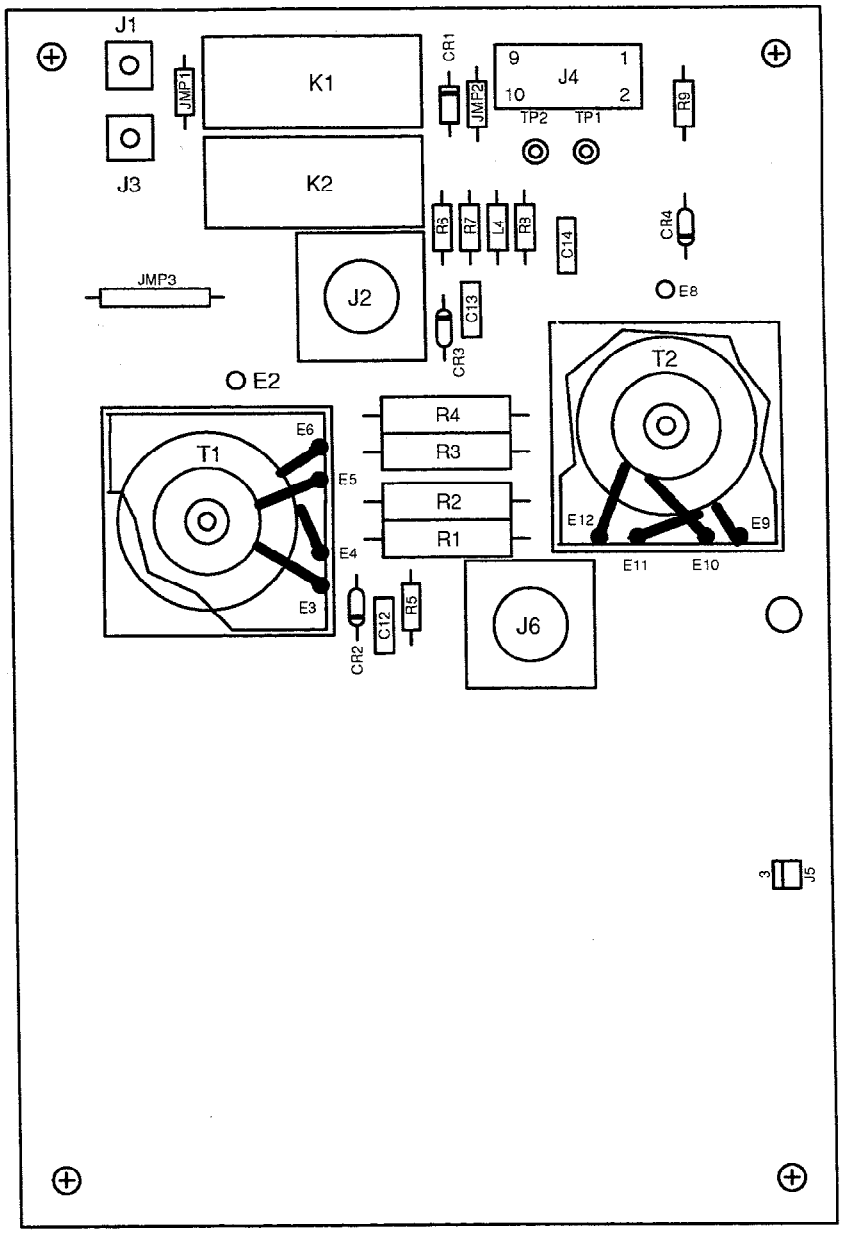
SCHEMATIC DIAGRAM,
INPUT SPLITTER
PWB

10221-3401 B

1 OF 1

Figure 2. A2A4 Input Splitter PWB Schematic Diagram (10221-3401 Rev. B)

A2A5
VSWR PWB ASSEMBLY



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A2A5 VSWR PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A5 VSWR PWB Assembly (10221-3250) detects the forward and reflected RF power output levels for the front panel PWB, and switches the transmit and receive signal paths.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Filter Control PWB and their destinations. The table can be used when tracing signals to and from the VSWR PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A5 VSWR PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	RF Input	LPA Rear Panel via cable A2W19P2
J2	RF Output	LPA Rear Panel via A2W20P2
J3	Splitter Output	Input Splitter PWB A2A4-J2 via A2W18
J4	Control Signals	Front Panel PWB A2A3-J4 via A2W11P1
J6	LPF Input	Low Pass Filter PWB A2A9-J2 via A2W8P1

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the VSWR PWB. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the VSWR PWB.

Table 2. A2A5 VSWR PWB Parts List (10221-3250-02 Rev. C)

Ref. Desig.	Part Number	Description
C12	M39014/01-1317V	CAP,1000PF,10% 200VC
C13	M39014/01-1317V	CAP,1000PF,10% 200VC
C14	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C28	C11-0015-082	CAP 8.2PF 5% 63V CER
C29	C11-0015-082	CAP 8.2PF 5% 63V CER
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N5711	DIODE SCHOTTKY 70V .25W
CR3	1N5711	DIODE SCHOTTKY 70V .25W
CR4	1N5711	DIODE SCHOTTKY 70V .25W
J1	J-0031	CONN SMB VERT PCB F
J2	J90-0019-000	CONN BNC VERT PCB MT F
J3	J-0031	CONN SMB VERT PCB F
J4	J46-0054-010	HEADER 10 PIN
J6	J90-0019-000	CONN BNC VERT PCB MT F
JMP2	MP-1142	RES ZERO OHM (CKT JMPR)
K1	10208-1412	RELAY SPDT 12VDC PC MOUNT
K2	10208-1412	RELAY SPDT 12VDC PC MOUNT
L4	MS75084-16	COIL 22.0UH 10% FXD RF

Table 2. A2A5 VSWR PWB Parts List (10221-3250-02 Rev. C) (Cont.)

Ref. Desig.	Part Number	Description
R1	R15-1214-101	RES 100 1% 1W NON-INDU
R2	R15-1214-101	RES 100 1% 1W NON-INDU
R3	R15-1214-101	RES 100 1% 1W NON-INDU
R4	R15-1214-101	RES 100 1% 1W NON-INDU
R5	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R6	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R7	R65-0003-101	RES 100 5% 1/4W CAR FILM
R8	R65-0003-101	RES 100 5% 1/4W CAR FILM
R9	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R31	R65-0004-151	RES 150 5% 1/2W CAR FILM
R32	R65-0004-151	RES 150 5% 1/2W CAR FILM
R33	R65-0003-101	RES 100 5% 1/4W CAR FILM
R34	R65-0003-101	RES 100 5% 1/4W CAR FILM
R35	R65-0004-101	RES 100 5% 1/2W CAR FILM
R36	R65-0004-101	RES 100 5% 1/2W CAR FILM
T1	10221-3255	XFMR,DIRECTIONAL COUPLER
T2	10221-3255	XFMR,DIRECTIONAL COUPLER
TP1	J-0071	TP PWB BRN TOP ACCS .080"
TP2	J-0066	TP PWB RED TOP ACCS .080"

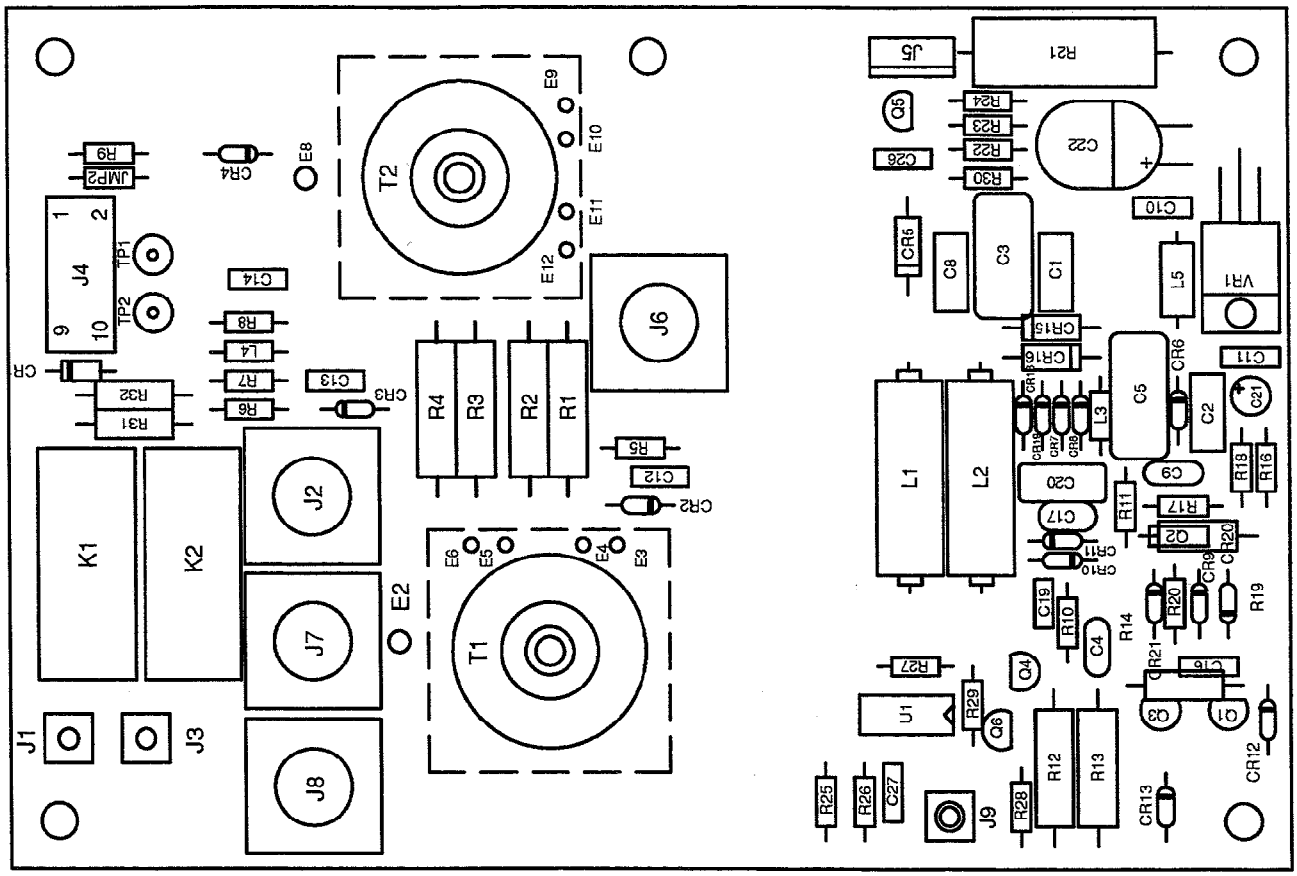


Figure 1. A2A5 VSWR PWB Component Location Diagram (10221-3250 Rev. E)

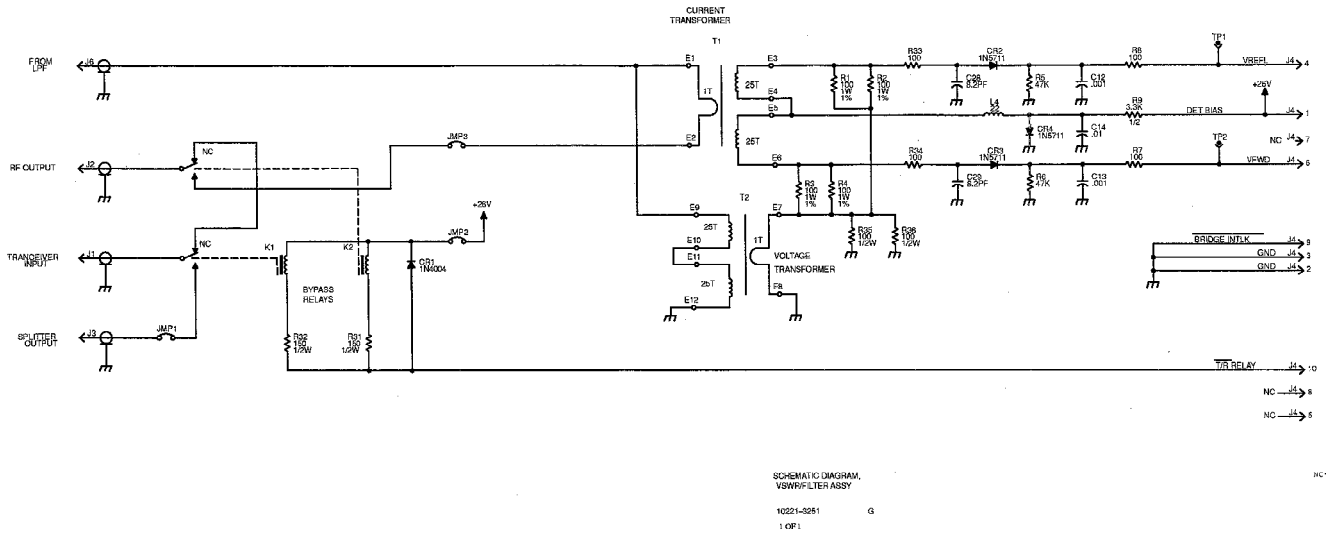
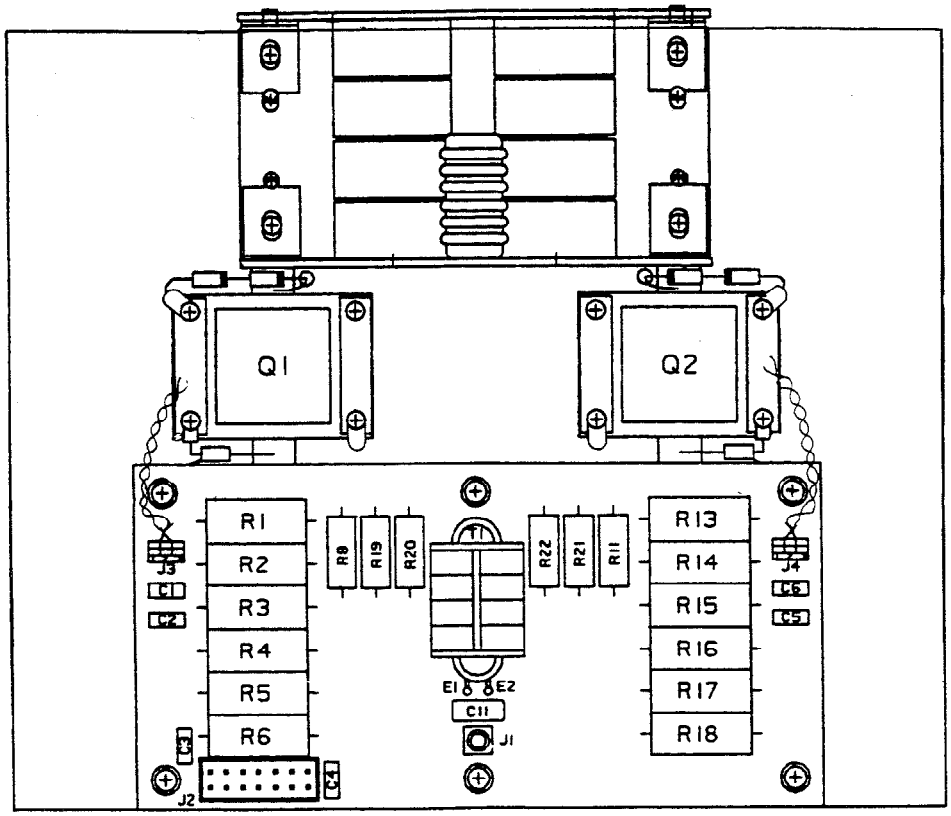


Figure 2. A2A5 VSWR PWB Schematic Diagram (10221-3251 Rev. G)

A2A6/A2A7
500 WATT AMPLIFIER ASSEMBLIES



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A2A6/A2A7 500 WATT AMPLIFIER ASSEMBLIES

1. GENERAL DESCRIPTION

There are two 500 Watt Amplifier Assemblies (10221-3100) contained in the A2 1 kW Amplifier Drawer.

Each 500 Watt Amplifier Assembly contains a dual MOSFET push-pull amplifier, temperature sensors, and input and output matching networks. The amplifier bias is controlled by the front panel PWB in response to temperature variations.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the 500 Watt Amplifier Assemblies and their destinations. The table can be used when tracing signals to and from the 500 Watt Amplifier Assemblies. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A6/A2A7 500 Watt Amplifier Assemblies Interface Connections

Connector	Signal Names	Connects To
A2A6A1-J1	RF Input	Splitter PWB A2A4-J3 via cable A2W14
A2A6A1-J2	Temp & Bias Signals	Front Panel PWB A2A3-J2 via A2W9
A2A6A1-J3	Temp Signals	Temperature Sensor 1
A2A6A1-J4	Temp Signals	Temperature Sensor 2
A2A7A1-J1	RF Input	Splitter PWB A2A4-J4 via A2W15
A2A7A1-J2	Temp & Bias Signals	Front Panel PWB A2A3-J1 via A2W10
A2A7A1-J3	Temp Signals	Temperature Sensor 1
A2A7A1-J4	Temp Signals	Temperature Sensor 2
A2A6A2-E3	RF Output	Combiner Assy A2A8-E3
A2A7A2-E4	GND	Combiner Assy A2A8-E4
A2A6A2-E5	GND	Combiner Assy A2A8-E1
A2A7A2-E6	RF Output	Combiner Assy A2A8-E2
A2A6A2-J1	+48V	Input PWB Assy A2A6A1-J3
A2A7A2-J1	+48V	Input PWB Assy A2A7A1-J3

3. PARTS LISTS, COMPONENT LOCATION DIAGRAMS, AND SCHEMATIC DIAGRAM

Tables 1 through 4 are the parts lists for the 500 Watt Amplifier Assemblies. Component locations are shown in figures 1 through 3. Figure 4 is the schematic diagram for the 500 Watt Amplifier Assemblies.

Table 2. A2A6/A2A7 500 Watt Amplifier Parts List (10221-3100-01 Rev. C)

Ref. Desig.	Part Number	Description
2	10221-3150	INPUT PWB ASSY
3	10221-3170-01	OUTPUT TRANSFORMER, LEFT
4	10221-3110	COPPER HEATSINK, AMP
CR1	10221-9062-01	TRANSORB 18.0V 600W
CR2	10221-9062-01	TRANSORB 18.0V 600W
CR3	10221-9061	TRANSORB, 39V, MOTOROLA
CR4	10221-9061	TRANSORB, 39V, MOTOROLA
CR5	10221-9061	TRANSORB, 39V, MOTOROLA
CR6	10221-9061	TRANSORB, 39V, MOTOROLA
CR7	10221-9061	TRANSORB, 39V, MOTOROLA
CR8	10221-9061	TRANSORB, 39V, MOTOROLA
TS1	10221-3115-02	TEMP. SENSOR ASSY
TS2	10221-3115-02	TEMP. SENSOR ASSY

Table 3. A2A6/A2A7 500 Watt Amplifier Parts List (10221-3100-02 Rev. C)

Ref. Desig.	Part Number	Description
2	10221-3150	INPUT PWB ASSY
3	10221-3170-02	OUTPUT TRANSFORMER, RIGHT
4	10221-3110	COPPER HEATSINK, AMP
CR1	10221-9062-01	TRANSORB 18.0V 600W
CR2	10221-9062-01	TRANSORB 18.0V 600W
CR3	10221-9061	TRANSORB, 39V, MOTOROLA
CR4	10221-9061	TRANSORB, 39V, MOTOROLA
CR5	10221-9061	TRANSORB, 39V, MOTOROLA
CR6	10221-9061	TRANSORB, 39V, MOTOROLA
CR7	10221-9061	TRANSORB, 39V, MOTOROLA
CR8	10221-9061	TRANSORB, 39V, MOTOROLA
TS1	10221-3115-02	TEMP. SENSOR ASSY
TS2	10221-3115-02	TEMP. SENSOR ASSY

Table 4. A2A6A1/A2A7A1 Input PWB Parts List (10221-3150 Rev. G)

Ref. Desig.	Part Number	Description
2	10221-3101	SCHEMATIC,600W AMPL ASSY
3	10221-3159	PWB,AMPL INPUT
7	P05-0002-006	TAPE, KAPTON .001 X 0.75"
C1	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C5	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C6	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C7	C11-0004-222	CAP, 2200 PF
C8	C11-0004-045	CAP 820PF 2% 1KV PORC
C9	C11-0004-222	CAP, 2200 PF
C10	C11-0004-045	CAP 820PF 2% 1KV PORC
C11	CM05ED820J03	CAP 82PF 5% 500V MICA
J1	J-0031	CONN SMB VERT PCB F
J2	J46-0054-014	HEADER 14 PIN
J3	J46-0022-003	HDR 3 PIN 0.100" SR LKG
J4	J46-0022-003	HDR 3 PIN 0.100" SR LKG
R1	R15-0007-015	RES,15,5W,2%
R2	R15-0007-015	RES,15,5W,2%
R3	R15-0007-015	RES,15,5W,2%
R4	R15-0007-015	RES,15,5W,2%
R5	R15-0007-015	RES,15,5W,2%
R6	R15-0007-015	RES,15,5W,2%
R7	RN55D4990F	RES 499 1% 1/8W MET FLM
R8	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP
R9	RN55D4990F	RES 499 1% 1/8W MET FLM
R10	RN55D4990F	RES 499 1% 1/8W MET FLM
R11	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP
R12	RN55D4990F	RES 499 1% 1/8W MET FLM
R13	R15-0007-015	RES,15,5W,2%
R14	R15-0007-015	RES,15,5W,2%
R15	R15-0007-015	RES,15,5W,2%
R16	R15-0007-015	RES,15,5W,2%
R17	R15-0007-015	RES,15,5W,2%
R18	R15-0007-015	RES,15,5W,2%
R19	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP

Table 4. A2A6A1/A2A7A1 Input PWB Parts List (10221-3150 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
R20	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP
R21	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP
R22	RCR32G2R7JM	RES 2.7 5% 1W CAR COMP
T1	10221-3155	INPUT TRANSFORMER

Table 5. A2A6A2/A2A7A2 Output Transformer Parts List (10221-3170-01 Rev. C)

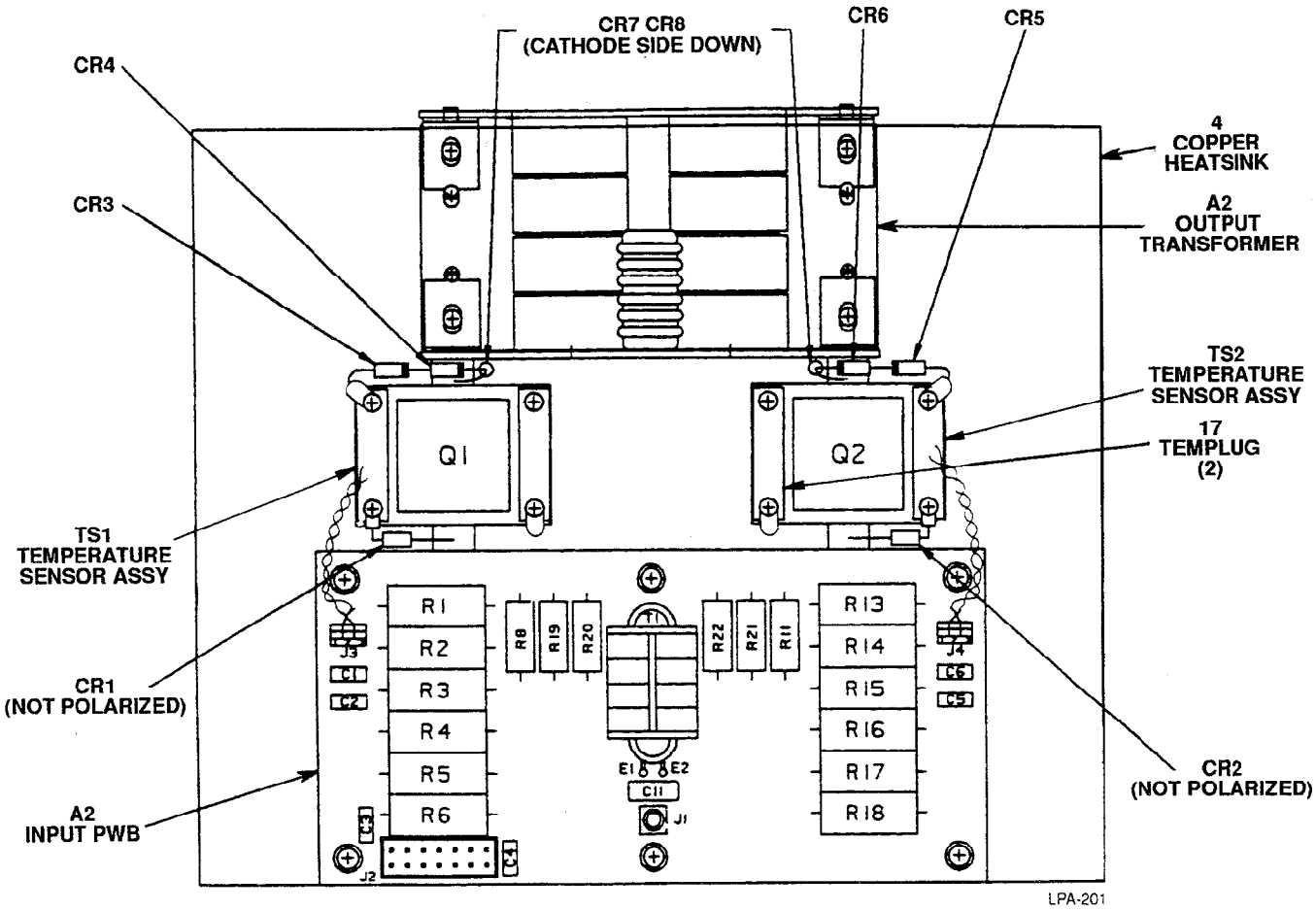
Ref. Desig.	Part Number	Description
C1	C11-0004-048	CAP 560PF 2% 2.5KV PORC
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	CM07FD822J03	CAP 8200PF 5% 500V MICA
C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C6	C11-0040-250	CAP 25PF 2% 5KV CER
C7	C11-0040-250	CAP 25PF 2% 5KV CER
E3	F01-0004-002	FUSE CLIP
E4	F01-0004-002	FUSE CLIP
E5	F01-0004-002	FUSE CLIP
E6	F01-0004-002	FUSE CLIP
J1	E10-0017-002	FASTON,RT ANGLE,MALE
L1	10221-3190	SUPPLY CHOKE
R1	R15-1223-058	RES 3.9 1% 3W NON-INDU
R2	R15-1223-058	RES 3.9 1% 3W NON-INDU
T1	10221-3180	TRANSFORMER,REVERSING

Table 6. A2A6A2/A2A7A2 Output Transformer Parts List (10221-3170-02 Rev. C)

Ref. Desig.	Part Number	Description
C1	C11-0004-048	CAP 560PF 2% 2.5KV PORC
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	CM07FD822J03	CAP 8200PF 5% 500V MICA
C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C6	C11-0040-250	CAP 25PF 2% 5KV CER
C7	C11-0040-250	CAP 25PF 2% 5KV CER
E3	F01-0004-002	FUSE CLIP
E4	F01-0004-002	FUSE CLIP
E5	F01-0004-002	FUSE CLIP
E6	F01-0004-002	FUSE CLIP

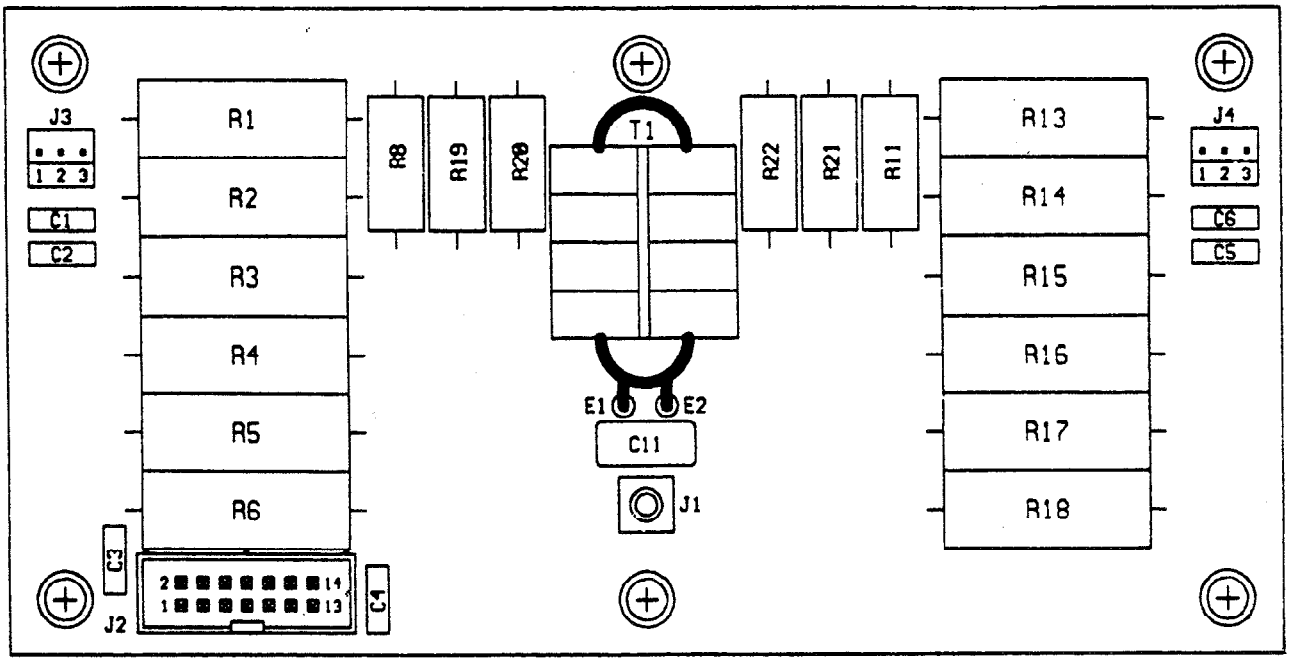
Table 6. A2A6A2/A2A7A2 Output Transformer Parts List (10221-3170-02 Rev. C) (Cont.)

Ref. Desig.	Part Number	Description
J1	E10-0017-002	FASTON,RT ANGLE,MALE
L1	10221-3190	SUPPLY CHOKE
R1	R15-1223-058	RES 3.9 1% 3W NON-INDU
R2	R15-1223-058	RES 3.9 1% 3W NON-INDU
T1	10221-3180	TRANSFORMER,REVERSING

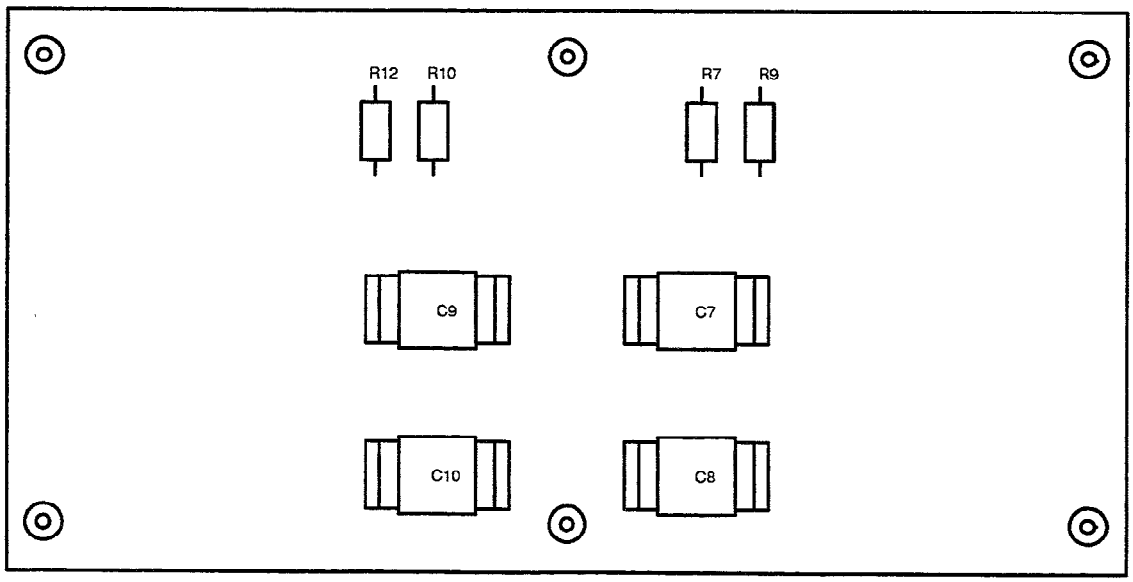


TOP VIEW

Figure 1. A2A6/A2A7 500 Watt Amplifier Component Locations (10221-3100)

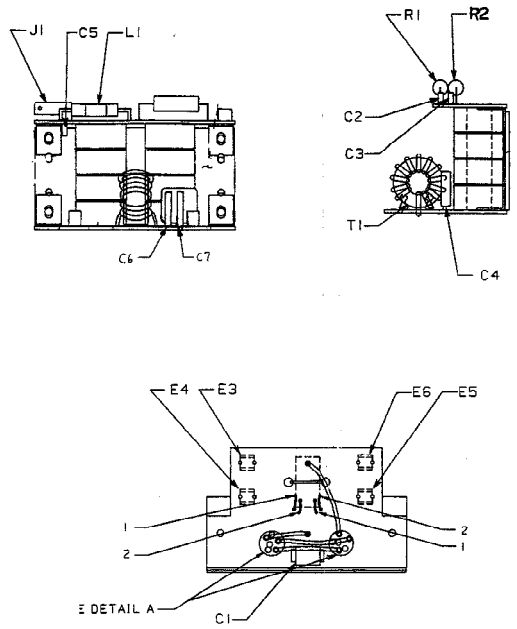


COMPONENT SIDE



WIRE SIDE

Figure 2. A2A6A1/A2A7A1 Input PWB Component Location Diagram (10221-3150 Rev. A)



DETAIL A
SCALE: 2/1

Figure 3. **A2A6A2/A2A7A2 Output Transformer Component Locations (10221-3170 Rev. C)**

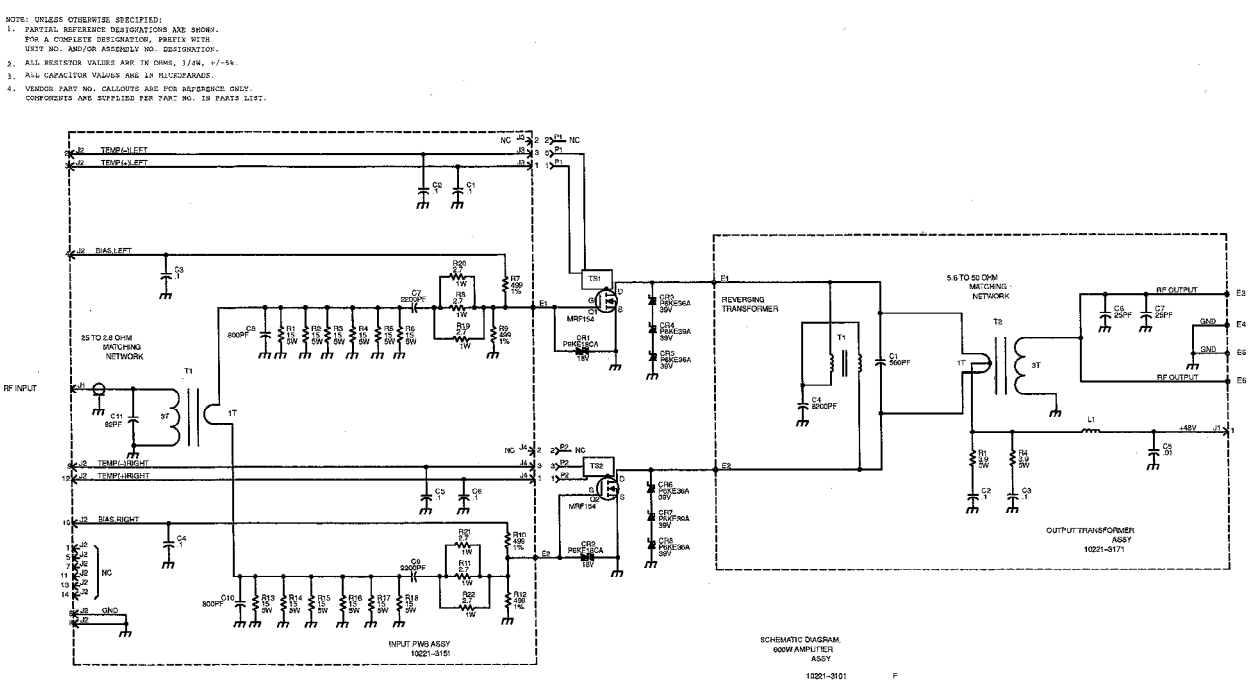
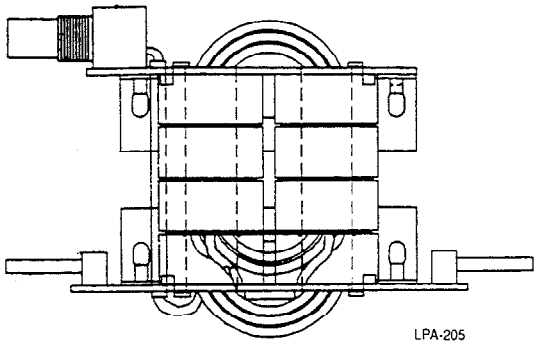


Figure 4. A2A6/A2A7 500 Watt Amplifier Schematic Diagram (10221-3101 Rev. F)

A2A8
COMBINER ASSEMBLY



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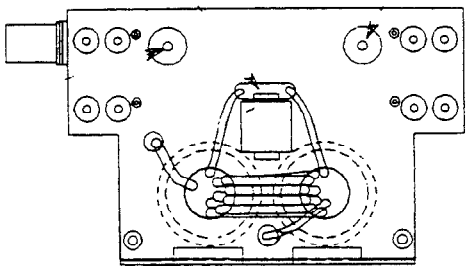
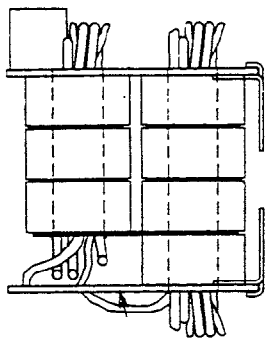
TOP VIEW



LPA-206

FRONT VIEW



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RIGHT SIDE VIEW

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A2A8 COMBINER ASSEMBLY

1. GENERAL DESCRIPTION

The A2A8 Combiner Assembly (10221-3500) combines the output of the two power amplifiers to produce 1 kW of RF power.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Combiner Assembly and their destinations. The table can be used when tracing signals to and from the Combiner Assembly. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A8 Combiner Assembly Interface Connections

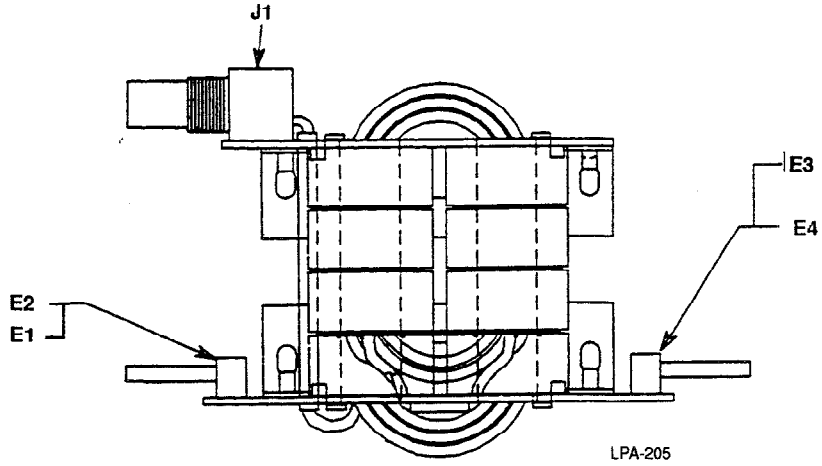
Connector	Signal Names	Connects To
E1	GND	(Left) 500W Amplifier Assy A2A7A2-E5
E2	RF Input (50 ohm)	(Left) 500W Amplifier Assy A2A7A2-E6
E3	RF Input (50 ohm)	(Right) 500W Amplifier Assy A2A6A2-E3
E4	GND	(Right) 500W Amplifier Assy A2A6A2-E4
E5	Waster Signal	A2R1
E6	Waster Signal	A2R2
J1	RF Output	Low Pass Filter PWB A2A9-J1 via cable A2W17

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

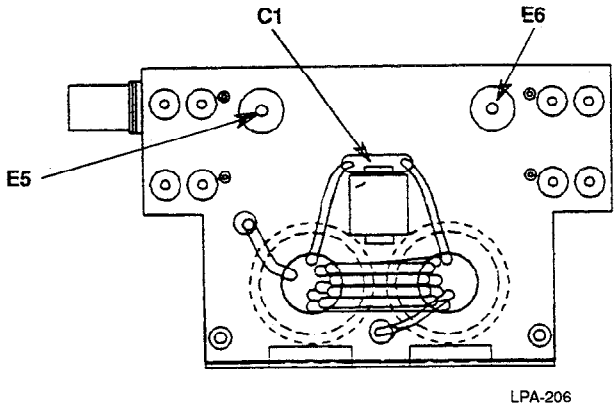
Table 2 is the parts list for the A2A8 Combiner Assembly. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Combiner assembly.

Table 2. A2A8 Combiner Assembly Parts List (10221-3500 Rev. G)

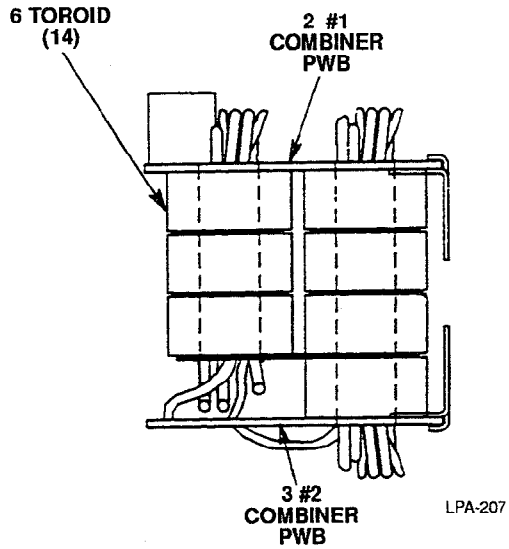
Ref. Desig.	Part Number	Description
C1	C11-0004-014	CAP 100PF 5% 3.6KV
E1	F01-0004-002	FUSE CLIP
E2	F01-0004-002	FUSE CLIP
E3	F01-0004-002	FUSE CLIP
E4	F01-0004-002	FUSE CLIP
J1	J90-0019 -012	CONN BNC PANEL MT
2	10221-3506	PWB, #1 COMBINER
3	10221-3507	PWB, #2 COMBINER
6	10087-4614	TOROID (14)



TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW

Figure 1. A2A8 Combiner Assembly Component Locations (10221-3500 Rev. A)

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.

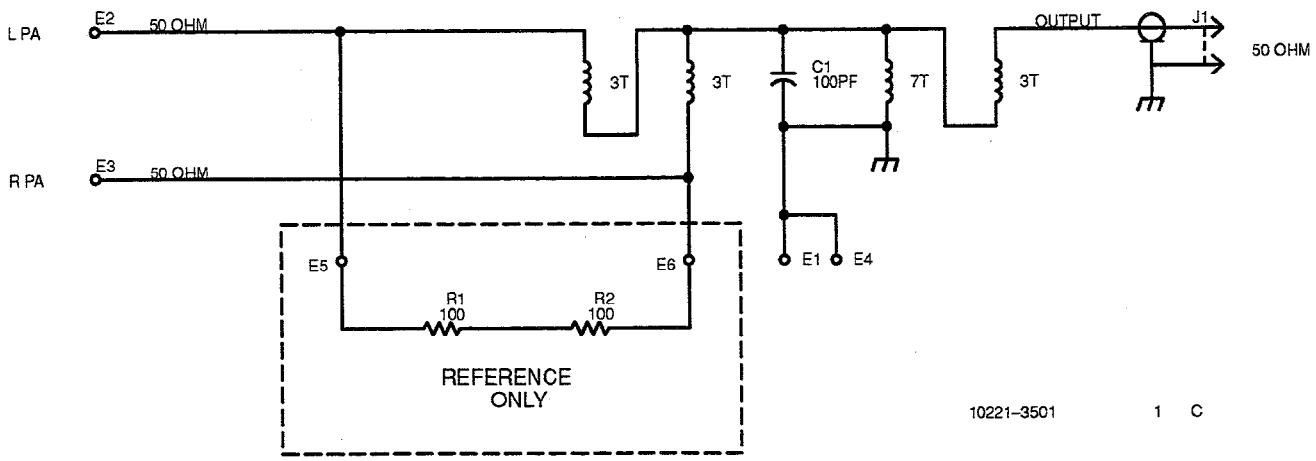
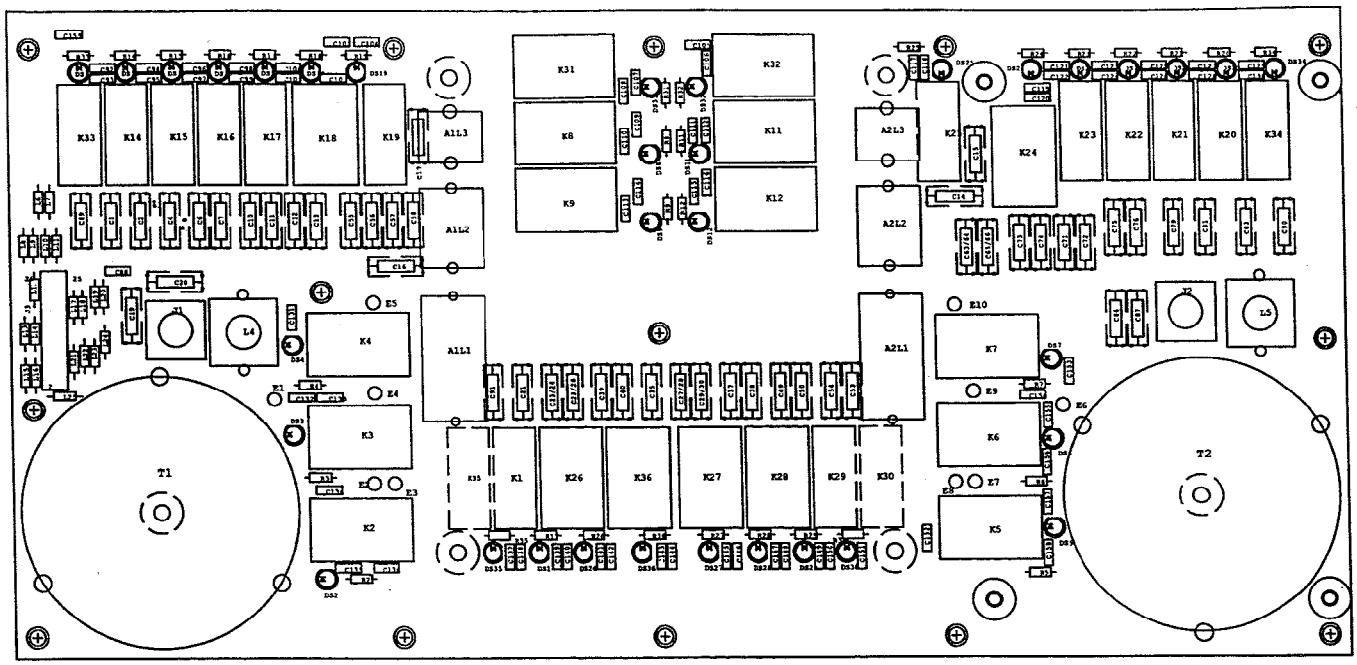


Figure 2. A2A8 Combiner Assembly Schematic Diagram (10221-3501 Rev. C)

A2A9
LOW PASS FILTER PWB ASSEMBLY



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A2A9 LOW PASS FILTER PWB ASSEMBLY

1. GENERAL DESCRIPTION

The A2A9 Low Pass Filter (LPF) PWB Assembly (10221-3200) filters out harmonics from the RF output signal. The reactive elements are selected by relays in response to the control lines from the Filter Control PWB. Figure 1 is a block diagram of the Low Pass Filter PWB.

2. INTERFACE CONNECTIONS

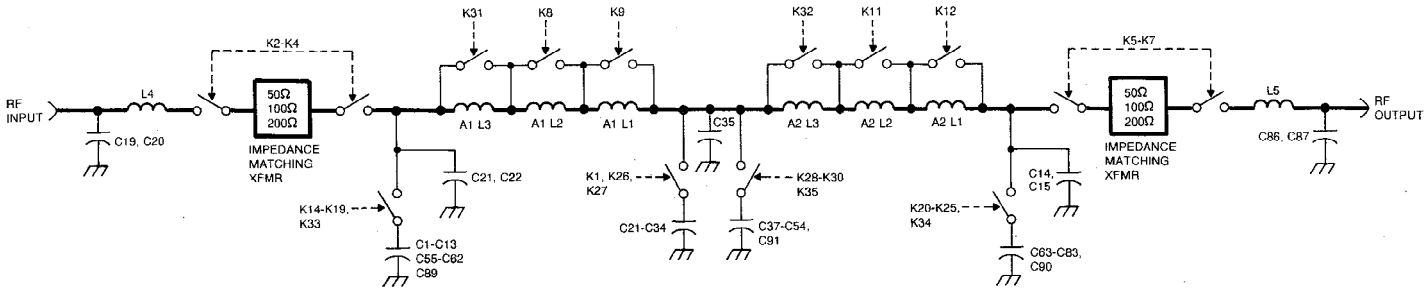
Table 1 lists the input/output connectors on the Low Pass Filter PWB and their destinations. The table can be used when tracing signals to and from the Low Pass Filter PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A2A9 Low Pass Filter PWB Assembly Interface Connections

Connector	Signal Names	Connects To
J1	RF Input	Combiner Assy A2A8-J1 via cable A2W17
J2	RF Output	VSWR PWB A2A5-J6 via A2W8
J3	LPF Interlock, Relay Control Signals	Filter Control PWB A2A2-J3 via A2W12

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the parts list for the Low Pass Filter PWB. Component locations are shown in figure 2. Figure 3 is the schematic diagram for the Low Pass Filter PWB.



INPUT	RELAY	SELECTED VALUE
$\overline{\text{FIL 1}}$	K30	200 pF
$\overline{\text{FIL 2}}$	K29	400 pF
$\overline{\text{FIL 3}}$	K28	3200 pF
$\overline{\text{FIL 4}}$	K27	1600 pF
$\overline{\text{FIL 5}}$	K26	800 pF
$\overline{\text{FIL 6}}$	K19, K25	1600 pF
$\overline{\text{FIL 7}}$	K18, K24	800 pF
$\overline{\text{FIL 8}}$	K17, K23	400 pF
$\overline{\text{FIL 9}}$	K16, K22	200 pF
$\overline{\text{FIL 10}}$	K15, K21	100 pF

INPUT	RELAY	SELECTED VALUE
$\overline{\text{FIL 11}}$	K14, K20	50 pF
$\overline{\text{FIL 12}}$	K1	100 pF
$\overline{\text{FIL 13}}$	K2, K5	50Ω
$\overline{\text{FIL 14}}$	K3, K6	100Ω
$\overline{\text{FIL 15}}$	K9, K11	L1 BYPASS
$\overline{\text{FIL 16}}$	K4, K7	200Ω
$\overline{\text{FIL 17}}$	K8, K12	L2 BYPASS
$\overline{\text{FIL 18}}$	K35	50 pF
$\overline{\text{FIL 19}}$	K33, K34	25 pF
$\overline{\text{FIL 20}}$	K31, K32	L3 BYPASS

LPA-004

Figure 1. A2A9 Low Pass Filter PWB Block Diagram

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P)

Ref. Desig.	Part Number	Description
19	10221-9094-01	HEATSINK, CAP
20	10221-9094-02	HEATSINK, CAP
A1	10221-3220	COIL ASSY (L1-L3)
A2	10221-3220	COIL ASSY (L1-L3)
C1	C11-0004-064	CAP 51PF 5% 3600V SMD
C2	C11-0004-058	CAP 100PF 2% 3.6KV PORC
C4	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C6	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C7	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C10	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C11	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C12	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C13	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C14	C11-0004-620	CAP 62 PF 2%
C15	C11-0004-620	CAP 62 PF 2%
C16	C11-0004-620	CAP 62 PF 2%
C17	C11-0004-620	CAP 62 PF 2%
C19	C11-0004-620	CAP 62 PF 2%
C20	C11-0004-620	CAP 62 PF 2%
C21	C11-0004-058	CAP 100PF 2% 3.6KV PORC
C23	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C24	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C25	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C26	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C27	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C28	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C29	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C30	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C35	C11-0004-430	CAP 43 PF 2%
C37	C11-0004-045	CAP 820PF 2% 1KV PORC
C38	C11-0004-045	CAP 820PF 2% 1KV PORC
C39	C11-0004-045	CAP 820PF 2% 1KV PORC
C40	C11-0004-045	CAP 820PF 2% 1KV PORC
C49	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C50	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C53	C11-0004-058	CAP 100PF 2% 3.6KV PORC
C54	C11-0004-058	CAP 100PF 2% 3.6KV PORC
C55	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C56	C11-0004-050	CAP 390PF 2% 3.6KV PORC

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
C57	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C58	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C63	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C64	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C65	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C66	C11-0004-050	CAP 390PF 2% 3.6KV PORC
C71	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C72	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C73	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C74	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C75	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C76	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C79	C11-0004-054	CAP 200PF 2% 3.6KV PORC
C81	C11-0004-058	CAP 100PF 2% 3.6KV PORC
C83	C11-0004-064	CAP 51PF 5% 3600V SMD
C86	C11-0004-620	CAP 62 PF 2%
C87	C11-0004-620	CAP 62 PF 2%
C88	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C89	C11-0004-240	CAP 24 PF 2%
C90	C11-0004-240	CAP 24 PF 2%
C91	C11-0004-064	CAP 51PF 5% 3600V SMD
C92	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C93	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C94	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C95	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C96	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C97	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C98	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C99	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C100	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C101	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C102	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C103	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C104	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C105	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C106	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C107	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C108	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C109	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
C110	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C111	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C112	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C113	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C114	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C115	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C116	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C117	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C118	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C119	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C120	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C121	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C122	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C123	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C124	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C125	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C126	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C127	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C128	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C129	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C130	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C131	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C132	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C133	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C134	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C135	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C136	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C137	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C138	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C139	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C140	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C141	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C142	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C143	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C144	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C145	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C146	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C147	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C148	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
C149	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C150	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C151	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C152	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C153	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C154	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C155	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C156	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C157	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C158	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C159	M39014/02-1310V	CAP .1UF 10% 100V CER-R
DS1	N21-0001-000	LED RED T-1 2.5MCD
DS2	N21-0001-000	LED RED T-1 2.5MCD
DS3	N21-0001-000	LED RED T-1 2.5MCD
DS4	N21-0001-000	LED RED T-1 2.5MCD
DS5	N21-0001-000	LED RED T-1 2.5MCD
DS6	N21-0001-000	LED RED T-1 2.5MCD
DS7	N21-0001-000	LED RED T-1 2.5MCD
DS8	N21-0001-000	LED RED T-1 2.5MCD
DS9	N21-0001-000	LED RED T-1 2.5MCD
DS11	N21-0001-000	LED RED T-1 2.5MCD
DS12	N21-0001-000	LED RED T-1 2.5MCD
DS14	N21-0001-000	LED RED T-1 2.5MCD
DS15	N21-0001-000	LED RED T-1 2.5MCD
DS16	N21-0001-000	LED RED T-1 2.5MCD
DS17	N21-0001-000	LED RED T-1 2.5MCD
DS18	N21-0001-000	LED RED T-1 2.5MCD
DS19	N21-0001-000	LED RED T-1 2.5MCD
DS20	N21-0001-000	LED RED T-1 2.5MCD
DS21	N21-0001-000	LED RED T-1 2.5MCD
DS22	N21-0001-000	LED RED T-1 2.5MCD
DS23	N21-0001-000	LED RED T-1 2.5MCD
DS24	N21-0001-000	LED RED T-1 2.5MCD
DS25	N21-0001-000	LED RED T-1 2.5MCD
DS26	N21-0001-000	LED RED T-1 2.5MCD
DS27	N21-0001-000	LED RED T-1 2.5MCD
DS28	N21-0001-000	LED RED T-1 2.5MCD
DS29	N21-0001-000	LED RED T-1 2.5MCD
DS30	N21-0001-000	LED RED T-1 2.5MCD

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
DS31	N21-0001-000	LED RED T-1 2.5MCD
DS32	N21-0001-000	LED RED T-1 2.5MCD
DS33	N21-0001-000	LED RED T-1 2.5MCD
DS34	N21-0001-000	LED RED T-1 2.5MCD
DS35	N21-0001-000	LED RED T-1 2.5MCD
DS36	N21-0001-000	LED RED T-1 2.5MCD
J1	J90-0019-000	CONN BNC VERT PCB MT F
J2	J90-0019-000	CONN BNC VERT PCB MT F
J3	J46-0054-126	CONNECTOR,26-PIN
K1	K28-0003-002	RELAY
K2	10221-9017	ALTERED ITEM,RELAY DPST
K3	10221-9017	ALTERED ITEM,RELAY DPST
K4	10221-9017	ALTERED ITEM,RELAY DPST
K5	10221-9017	ALTERED ITEM,RELAY DPST
K6	10221-9017	ALTERED ITEM,RELAY DPST
K7	10221-9017	ALTERED ITEM,RELAY DPST
K8	10221-9017	ALTERED ITEM,RELAY DPST
K9	10221-9017	ALTERED ITEM,RELAY DPST
K11	10221-9017	ALTERED ITEM,RELAY DPST
K12	10221-9017	ALTERED ITEM,RELAY DPST
K14	K28-0003-002	RELAY
K15	K28-0003-002	RELAY
K16	K28-0003-002	RELAY
K17	K28-0003-002	RELAY
K18	10221-9017	ALTERED ITEM,RELAY DPST
K19	K28-0003-002	RELAY
K20	K28-0003-002	RELAY
K21	K28-0003-002	RELAY
K22	K28-0003-002	RELAY
K23	K28-0003-002	RELAY
K24	10221-9017	ALTERED ITEM,RELAY DPST
K25	K28-0003-002	RELAY
K26	10221-9017	ALTERED ITEM,RELAY DPST
K27	10221-9017	ALTERED ITEM,RELAY DPST
K28	10221-9017	ALTERED ITEM,RELAY DPST
K29	K28-0003-002	RELAY
K30	K28-0003-002	RELAY
K31	10221-9017	ALTERED ITEM,RELAY DPST
K32	10221-9017	ALTERED ITEM,RELAY DPST

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
K33	K28-0003-002	RELAY
K34	K28-0003-002	RELAY
K35	K28-0003-002	RELAY
K36	10221-9017	ALTERED ITEM,RELAY DPST
L4	10221-3215	INDCT,.23UH
L5	10221-3215	INDCT,.23UH
L6	MS75085-7	COIL 100UH 10% FXD RF
L7	MS75085-7	COIL 100UH 10% FXD RF
L8	MS75085-7	COIL 100UH 10% FXD RF
L9	MS75085-7	COIL 100UH 10% FXD RF
L10	MS75085-7	COIL 100UH 10% FXD RF
L11	MS75085-7	COIL 100UH 10% FXD RF
L12	MS75085-7	COIL 100UH 10% FXD RF
L13	MS75085-7	COIL 100UH 10% FXD RF
L14	MS75085-7	COIL 100UH 10% FXD RF
L15	MS75085-7	COIL 100UH 10% FXD RF
L16	MS75085-7	COIL 100UH 10% FXD RF
L17	MS75085-7	COIL 100UH 10% FXD RF
L18	MS75085-7	COIL 100UH 10% FXD RF
L19	MS75085-7	COIL 100UH 10% FXD RF
L20	MS75085-7	COIL 100UH 10% FXD RF
L21	MS75085-7	COIL 100UH 10% FXD RF
L22	MS75085-7	COIL 100UH 10% FXD RF
L23	MS75085-7	COIL 100UH 10% FXD RF
L24	MS75085-7	COIL 100UH 10% FXD RF
L25	MS75085-7	COIL 100UH 10% FXD RF
R1	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R2	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R3	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R4	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R5	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R6	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R7	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R8	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R9	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R11	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R12	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R14	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R15	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM

Table 2. A2A9 Low Pass Filter PWB Parts List (10221-3200 Rev. P) (Cont.)

Ref. Desig.	Part Number	Description
R16	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R17	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R18	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
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	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R23	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R24	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R25	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R26	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R27	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R28	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R29	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R30	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R31	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R32	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R33	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R34	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R35	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R36	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
T1	10221-3235	TORROID ASSY
T2	10221-3235	TORROID ASSY

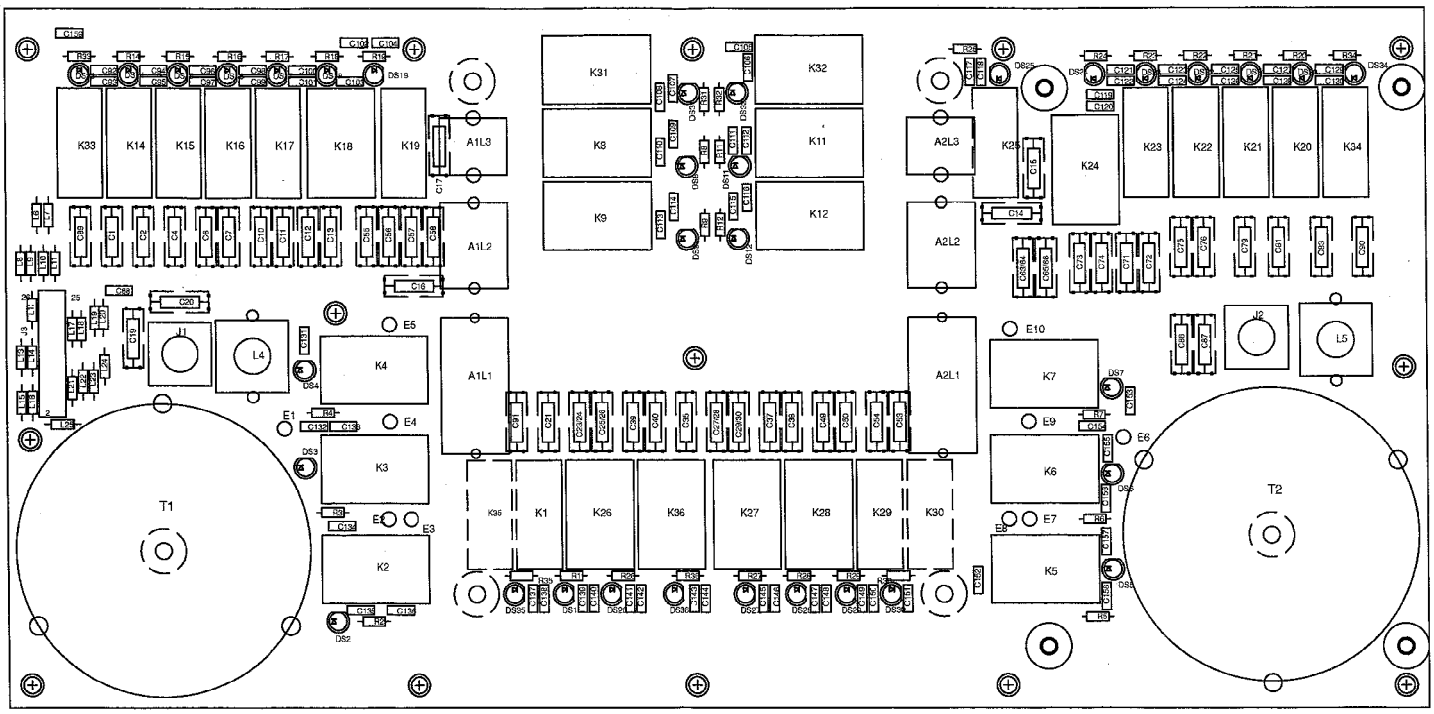


Figure 2. **A2A9 Low Pass Filter PWB Component Location Diagram (10221-3200 Rev. B)**

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. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

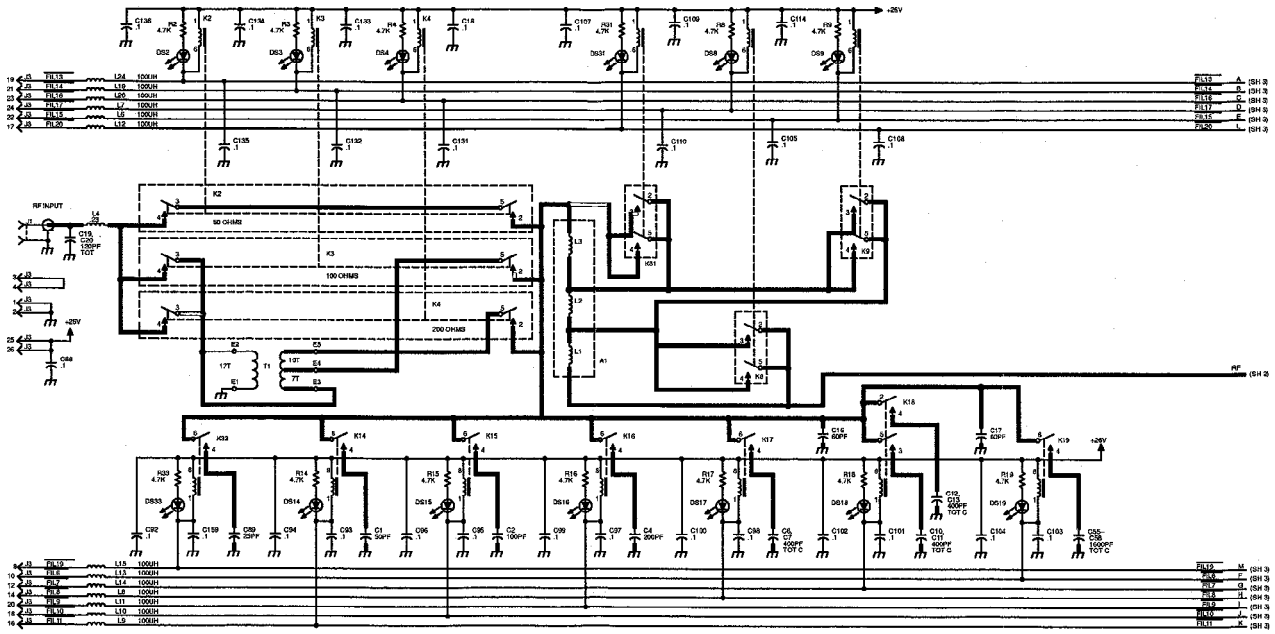


Figure 3. A2A9 Low Pass Filter PWB Schematic Diagram (10221-3201 Rev. F) (Sheet 1 of 3)

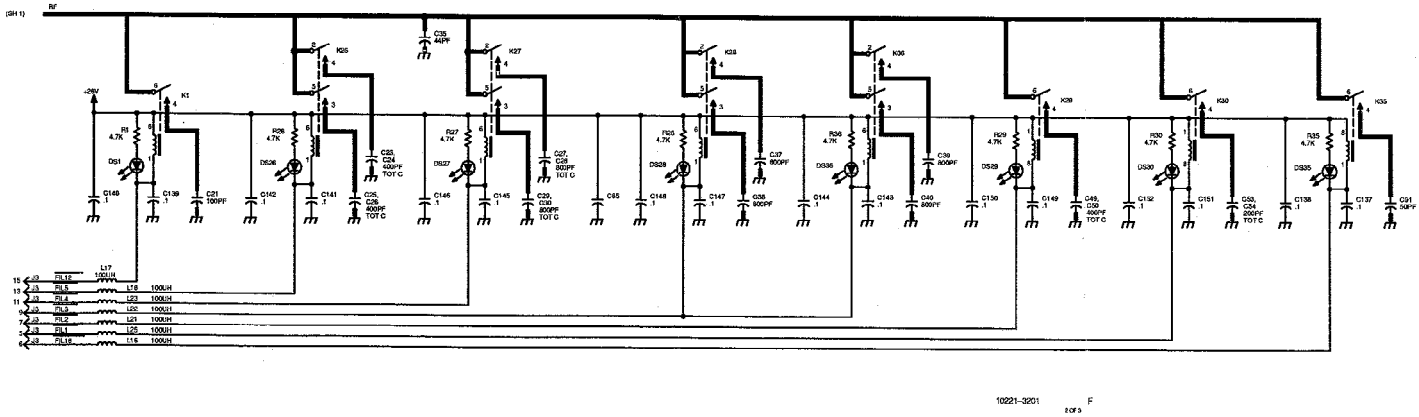


Figure 3. **A2A9 Low Pass Filter PWB Schematic Diagram (10221-3201 Rev. F) (Sheet 2 of 3)**

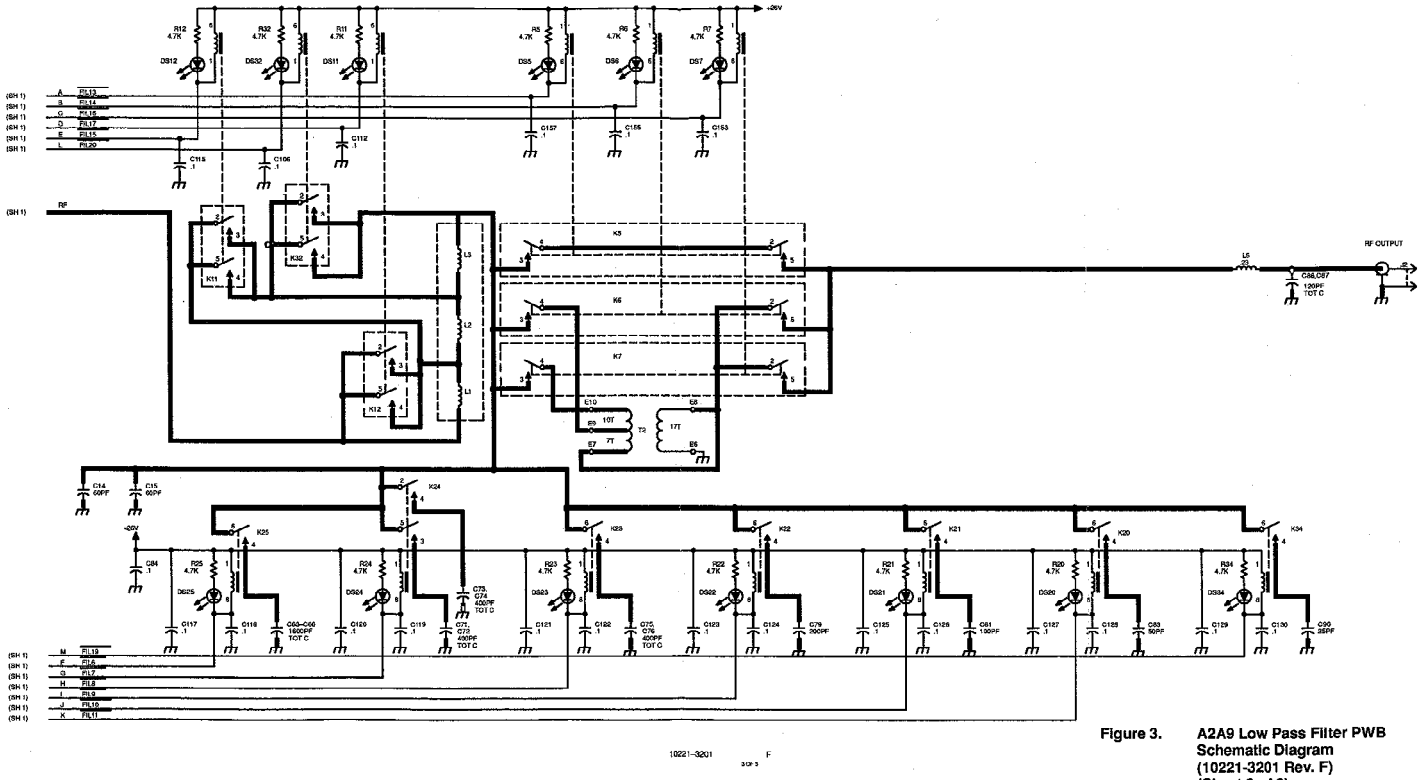
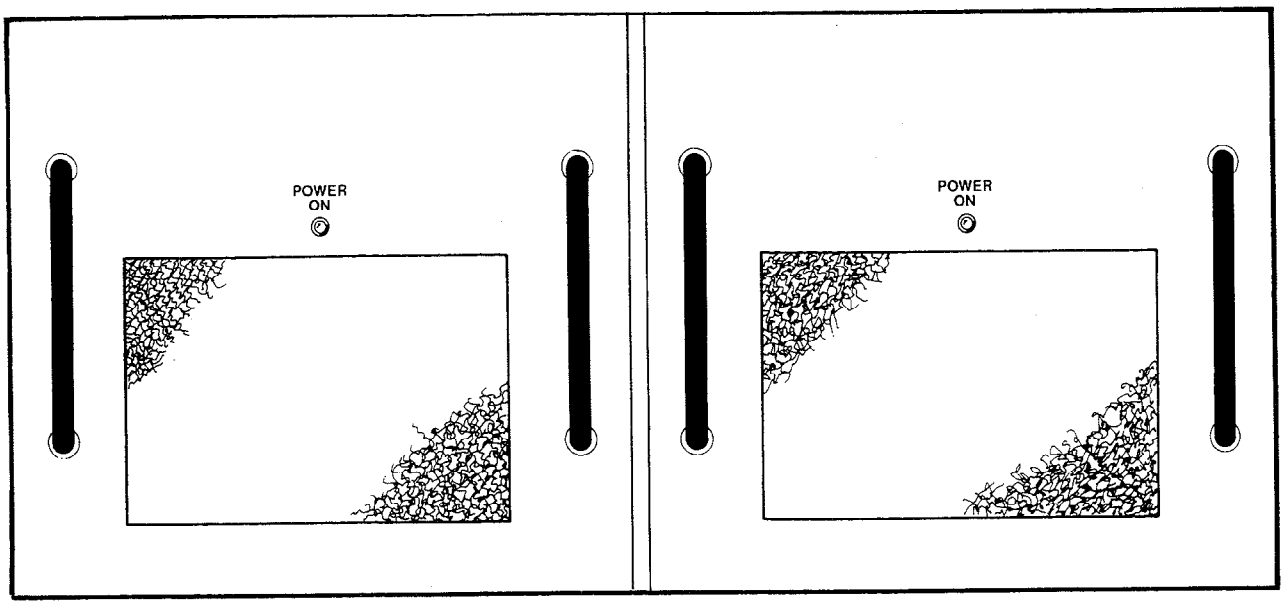


Figure 3. **A2A9 Low Pass Filter PWB Schematic Diagram (10221-3201 Rev. F) (Sheet 3 of 3)**

A3/A4
POWER SUPPLIES



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A3/A4 POWER SUPPLIES

1. GENERAL DESCRIPTION

The Power Supply Assembly (10221-4000 for the RF-3230 and 10221-4100 for the RF-3230B) comprises two power supplies (10221-4500 and 10221-4600, respectively). Each of them provides +48 Vdc (regulated and unregulated), +26 Vdc, +8 Vdc, and –12 Vdc for the linear power amplifier. Each Power Supply consists of four subassemblies: A3A1/A4A1 Triac Driver PWB Assembly, A3A2/A4A2 Control PWB Assembly, A3A3/A4A3 Line Filter PWB Assembly, and A3A4/A4A4 Capacitor PWB Assembly.

2. FUNCTIONAL DESCRIPTION

See figure 1. The Power Supply uses a series-pass regulator controlled by U11 on the Control PWB. The input to the regulator is controlled by switching taps on the primary side of the power transformer.

The Line Filter PWB filters the AC input before it is applied to the power transformer. The AC path through the filter is divided into three pairs of branches that are connected to the high, normal, and low taps of the transformer. The AC path through each branch is switched by a triac pair so that only one tap is selected at a time. (There is also a no-tap condition during which all three AC paths are open.) The Line Filter PWB also generates a 50 - 60 Hz clock output from the AC line frequency. This clock signal provides the timing for the tap change logic on the Control PWB.

The Triac Driver PWB contains six optoisolator circuits that bias and switch the triacs in response to the tap select lines from the Control PWB. The triac drivers are connected in series so that the triacs are switches in high-tap, normal-tap, and low-tap pairs. The tap change logic is controlled by an up/down counter. Voltage sensing comparator circuits monitor the unregulated +48 Vdc and +26 Vdc supplies. If the unregulated +48 Vdc supply exceeds +54 Vdc, the counter will count up. As the counter counts up, the tap select lines change from high-tap to normal-tap to low-tap, with a no-tap condition between tap changes. If the unregulated +48 Vdc supply falls below +53 Vdc, or the +26 V supply is low, the counter will count down, changing the tap lines in the opposite direction.

The counter output is applied to a decoder, which enables the triac drivers. The decoder also provides logic outputs that enable the clock during the no-tap condition, and disable the clock when an end-stop is reached. The clock signal for the counter is developed from the 50 – 60 Hz line voltage frequency. The tap change timing logic changes the clock phase when switching from a no-tap to a tap condition.

The +48 Vdc regulator (U11) output is applied to a current limiting circuit that removes the base drive from the external series-pass transistors when an overcurrent condition occurs. The collector voltage from the series-pass transistors is monitored by a power dissipation sensing circuit. The current through the series-pass transistors is also sensed and applied to a meter amplifier.

The line voltage is continuously monitored by a comparator circuit that produces a high/low line voltage fault when the voltage is out of tolerance. The line current is sensed by a comparator that produces a fault when the current exceeds 32 amperes. A line current, high/low line voltage, or over-dissipation fault will set the circuit breaker trip latch.

The power supply temperature is continuously monitored by two comparators. The temperature comparators and the circuit breaker latch disable the triac drivers during a fault condition. An overvoltage protection activates a crowbar, which shunts the series-pass regulator output to ground when the regulated +48 Vdc supply exceeds +50 Vdc.

The Control PWB also produces +8 Vdc and -12 Vdc supplies from a 24 Vac input. Built-in-test (BIT) logic provides an indication that the Power Supply is functioning properly.

The Capacitor PWB contains 84,000 uF of capacitance (C1 through C15) to filter the rectified AC from the bridge rectifiers. Peak current limiting components (L1 and R3-R6) protect the crowbar SCR. The Capacitor PWB contains the filter capacitors for the +48 Vdc supply, and the bleeder resistors that shunt the +48 Vdc to ground when the crowbar is activated.

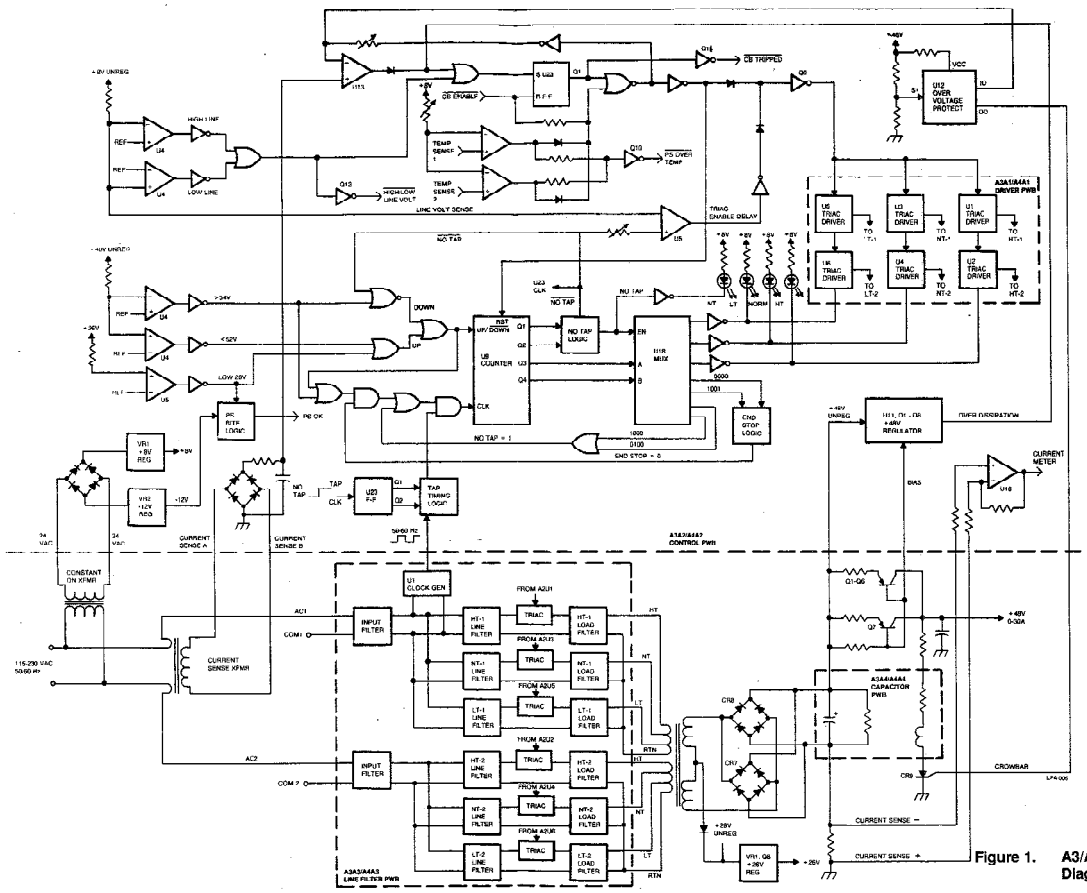


Figure 1. A3/A4 Power Supply Block Diagram

3. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Power Supplies and their destinations. The table can be used when tracing signals to and from the Power Supplies. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A3/A4 Power Supplies Interface Connections

Connector	Signal Names	Connects To
A3J1	Power and Control Signals	Power Distribution Panel PWB A5A1-J2 via cable A5A1W2
A4J1	Power and Control Signals	Power Distribution Panel PWB A5A1-J3 via cable A5A1W1
P3 P1	Power Signals	Power Distribution Panel Fan Regulator PWB A5A2-J3
P4	J46-0016-020	Conn Housing 20 Pos 24 AWG

4. PARTS LISTS, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Tables 2 and 3 are the parts lists for the A3/A4 Power Supplies used in the RF-3230 and RF-3230B, respectively. (Electrically, the two power supply versions are identical. They differ only in the color of their front panels.) Component locations are shown in figure 2. Figure 3 is the schematic diagram for the A3/A4 Power Supplies.

Table 2. A3/A4 Power Supply Parts List (10221-4500 Rev. AD)

Ref. Desig.	Part Number	Description
–	10221-4011	AIR FILTER
–	10221-3115-01	TEMP. SENSOR ASSY
–	B22-0007-201	FAN, 48V DC MUFFIN XL
–	W80-0010-103	FAN CORD
–	B22-9005-001	GUARD FAN FINGER
145	10221-3115-03	TEST CABLE ASSY
A1	10221-4110	TRIAC DRIVER PWB ASSY
A2	10221-4120	P.S. CONTROL PWB ASSY
A3	10221-4130	LINE FILTER PWB ASSY
A4	10221-4200	CAPACITOR PWB ASSY
A2P1	J46-0016-103	CONN HOUSING 3 POS 22AWG
A2P2	J46-0016-103	CONN HOUSING 3 POS 22AWG
A3P1	J46-0016-103	CONN HOUSING 3 POS 22AWG
C1	C21-0250-251	CAP,FXD,ELECTL,250 UF
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	C28-0050-682	CAP 6800UF 50V ELEC
CR1	D28-0001-001	THYR TRIAC 40A
CR2	D28-0001-001	THYR TRIAC 40A
CR3	D28-0001-001	THYR TRIAC 40A
CR4	D28-0001-001	THYR TRIAC 40A
CR5	D28-0001-001	THYR TRIAC 40A
CR6	D28-0001-001	THYR TRIAC 40A

Table 2. A3/A4 Power Supply Parts List (10221-4500 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
CR7	D23-0003-148	DIODE BRIDE
CR8	D23-0003-148	DIODE BRIDE
CR9	D29-0005-003	THYR SCR 100V 55A
CR10	CR-0407	DIODE 6A 100V RECT GP
DS1	6902-2209	LED GRN ASSY W/LEADS
F1	F-0013	FUSE 3.0A QA 250V 3AG
F2	F-0008	FUSE 1/2A QA 250V 3AG
J1	J22-0006-124	D-CONN 24W7P SLDR CP MIL
JMP1	10221-4106	115/230 VOLT JUMPER ASSY
P3	J46-0016-120	CONN HOUSING 20 POS 22AWG
P4	J46-0016-120	CONN HOUSING 20 POS 22AWG
Q1	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q2	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q3	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q4	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q5	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q6	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q7	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q8	2N6383	XSTR
R1	R12-0006-010	RES, .10 OHM 3% 5W
R2	R12-0006-010	RES, .10 OHM 3% 5W
R3	R12-0006-010	RES, .10 OHM 3% 5W
R4	R12-0006-010	RES, .10 OHM 3% 5W
R5	R12-0006-010	RES, .10 OHM 3% 5W
R6	R12-0006-010	RES, .10 OHM 3% 5W
R7	R12-0006-010	RES, .10 OHM 3% 5W
R9	R-2199	RES,W/W .005 10W 3%
R10	R65-0003-471	RES 470 5% 1/4W CAR FILM
R11	R65-0004-330	RES 33 5% 1/2W CAR FILM
R12	R15-1223-150	RES 15 1% 3W NON-INDU
R13	R15-1223-150	RES 15 1% 3W NON-INDU
R14	R15-1223-150	RES 15 1% 3W NON-INDU
R15	RCR32G102JM	RES 1.0K 5% 1W CAR COMP
T1	10221-4050	PWR TRANSFORMER
T2	10221-4107	ALTERED CURRENT TRANSFORM
T3	T40-0002-025	TRANSFORMER,POWER
TB1	37TB-9	TERM. STRIP, 9 POS
VR1	1N4750A	DIODE 27V 5% 1W ZENER
XF1	F01-0001-002	FUHLR PNL MT SOL .750H

Table 2. A3/A4 Power Supply Parts List (10221-4500 Rev. AD) (Cont.)

Ref. Desig.	Part Number	Description
XF2	F01-0001-002	FUHLR PNL MT SOL .750H
XQ1	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ2	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ3	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ4	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ5	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ6	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ7	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ8	J30-0006-000	SKT XSTR TO-3 .040 PIN

Table 3. A3/A4 Power Supply Parts List (10221-4600 Rev. H)

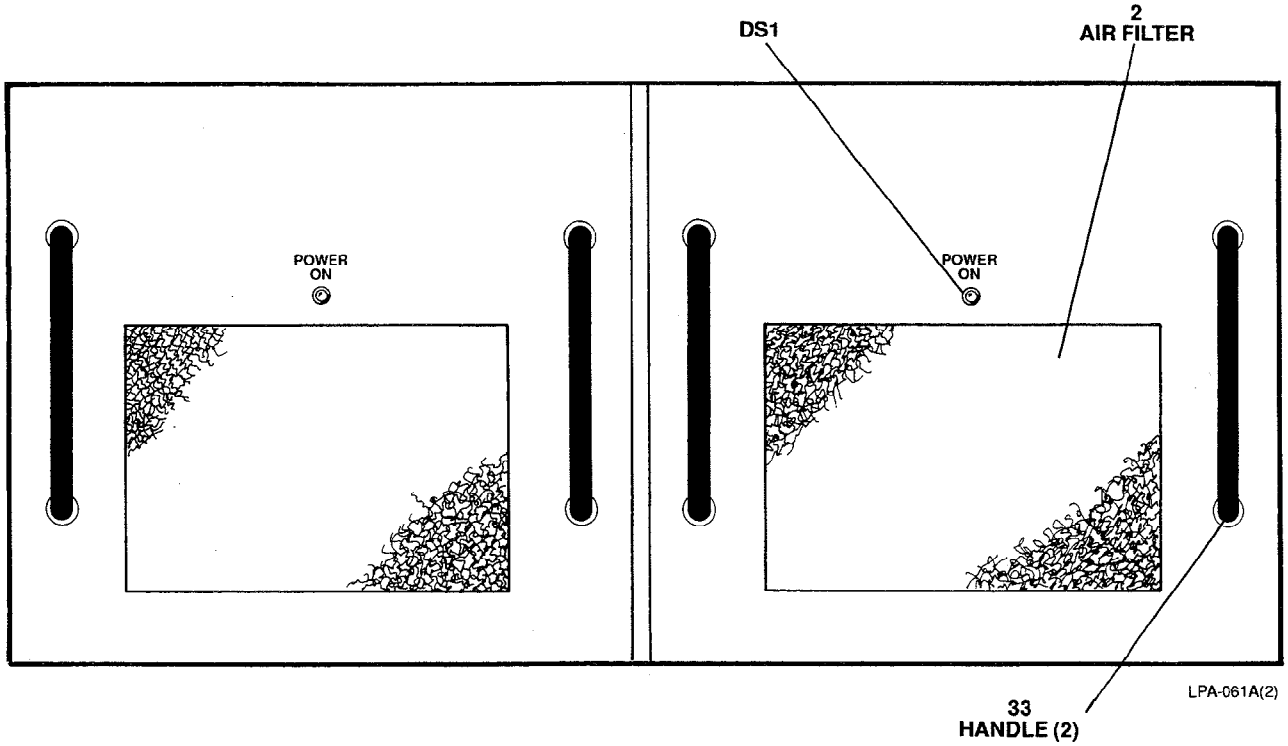
Ref. Desig.	Part Number	Description
2	10221-4011	AIR FILTER
7	10221-3115-01	TEMP. SENSOR ASSY
39	B22-0007-201	FAN, 48V DC MUFFIN XL
40	W80-0010-103	FAN CORD
41	B22-9005-001	GUARD FAN FINGER
145	10221-3115-03	TEST CABLE ASSY
A1	10221-4110	TRIAC DRIVER PWB ASSY
A2	10221-4120	P.S. CONTROL PWB ASSY
A3	10221-4130	LINE FILTER PWB ASSY
A4	10221-4200	CAPACITOR PWB ASSY
A2P1	J46-0016-103	CONN HOUSING 3 POS 22AWG
A2P2	J46-0016-103	CONN HOUSING 3 POS 22AWG
A3P1	J46-0016-103	CONN HOUSING 3 POS 22AWG
C1	C21-0250-251	CAP,FXD,ELECTL,250 UF
C2	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C3	C28-0050-682	CAP 6800UF 50V ELEC
CR1	D28-0001-001	THYR TRIAC 40A
CR2	D28-0001-001	THYR TRIAC 40A
CR3	D28-0001-001	THYR TRIAC 40A
CR4	D28-0001-001	THYR TRIAC 40A
CR5	D28-0001-001	THYR TRIAC 40A
CR6	D28-0001-001	THYR TRIAC 40A
CR7	D23-0003-148	DIODE BRIDE
CR8	D23-0003-148	DIODE BRIDE
CR9	D29-0005-003	THYR SCR 100V 55A
CR10	CR-0407	DIODE 6A 100V RECT GP
DS1	6902-2209	LED GRN ASSY W/LEADS

Table 3. A3/A4 Power Supply Parts List (10221-4600 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
F1	F-0013	FUSE 3.0A QA 250V 3AG
F2	F-0008	FUSE 1/2A QA 250V 3AG
J1	J22-0006-124	D-CONN 24W7P SLDR CP MIL
JMP1	10221-4106	115/230 VOLT JUMPER ASSY
P3	J46-0016-120	CONN HOUSING 20 POS 22AWG
P4	J46-0016-120	CONN HOUSING 20 POS 22AWG
Q1	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q2	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q3	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q4	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q5	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q6	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q7	Q50-0012-001	XSTR PNP 20 AMP TO-3
Q8	2N6383	XSTR
R1	R12-0006-010	RES, .10 OHM 3% 5W
R2	R12-0006-010	RES, .10 OHM 3% 5W
R3	R12-0006-010	RES, .10 OHM 3% 5W
R4	R12-0006-010	RES, .10 OHM 3% 5W
R5	R12-0006-010	RES, .10 OHM 3% 5W
R6	R12-0006-010	RES, .10 OHM 3% 5W
R7	R12-0006-010	RES, .10 OHM 3% 5W
R9	R-2199	RES,W/W .005 10W 3%
R10	R65-0003-471	RES 470 5% 1/4W CAR FILM
R11	R65-0004-330	RES 33 5% 1/2W CAR FILM
R12	R15-1223-150	RES 15 1% 3W NON-INDU
R13	R15-1223-150	RES 15 1% 3W NON-INDU
R14	R15-1223-150	RES 15 1% 3W NON-INDU
R15	RCR32G102JM	RES 1.0K 5% 1W CAR COMP
T1	10221-4050	PWR TRANSFORMER
T2	10221-4107	ALTERED CURRENT TRANSFORM
T3	T40-0002-025	TRANSFORMER,POWER
TB1	37TB-9	TERM. STRIP, 9 POS
VR1	1N4750A	DIODE 27V 5% 1W ZENER
XF1	F01-0001-002	FUHLR PNL MT SOL .750H
XF2	F01-0001-002	FUHLR PNL MT SOL .750H
XQ1	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ2	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ3	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ4	J30-0006-000	SKT XSTR TO-3 .040 PIN

Table 3. A3/A4 Power Supply Parts List (10221-4600 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
XQ5	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ6	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ7	J30-0006-000	SKT XSTR TO-3 .040 PIN
XQ8	J30-0006-000	SKT XSTR TO-3 .040 PIN



A3/A4 (RF-3224) POWER SUPPLIES
(FRONT VIEW)

Figure 2. A3/A4 Power Supply Component Locations (Sheet 1 of 4)

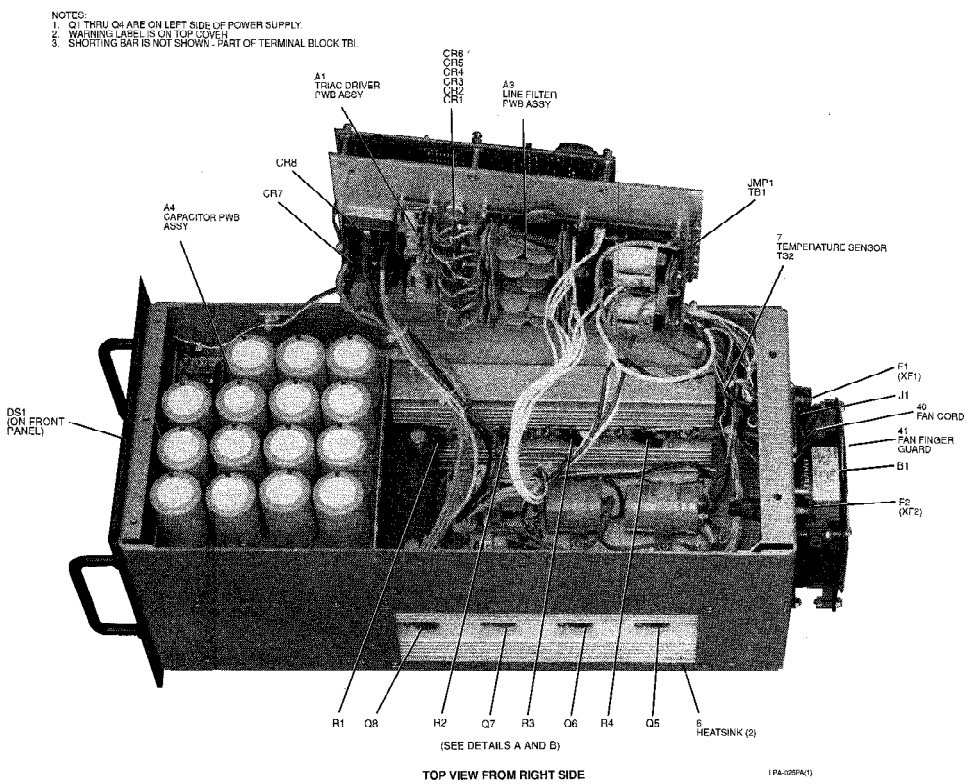
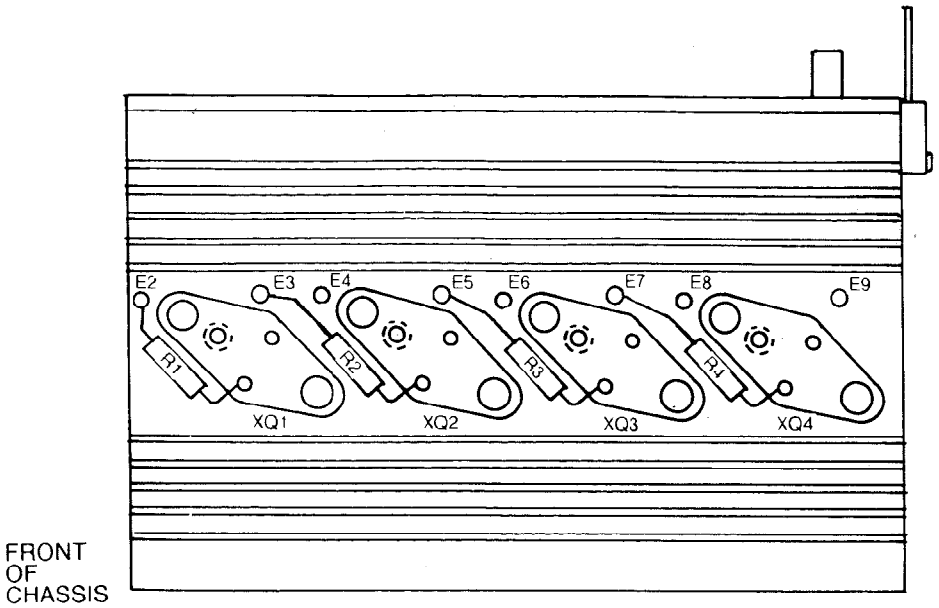
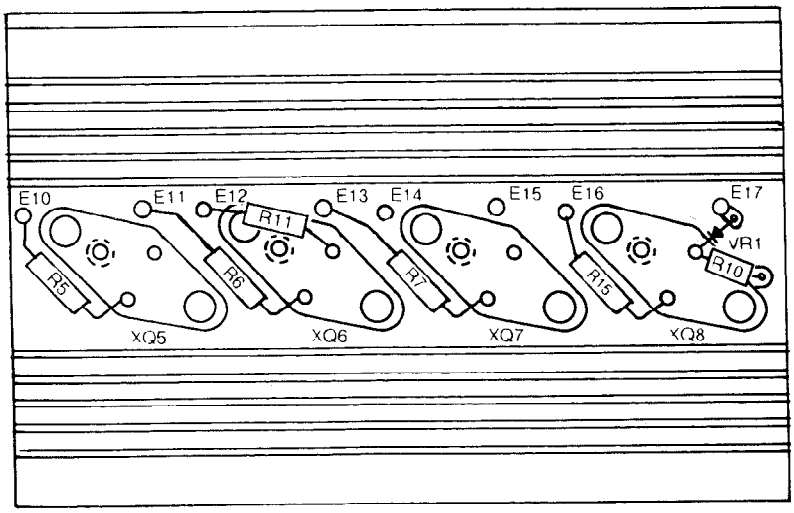


Figure 2. A3/A4 Power Supply Component Locations (Sheet 2 of 4)



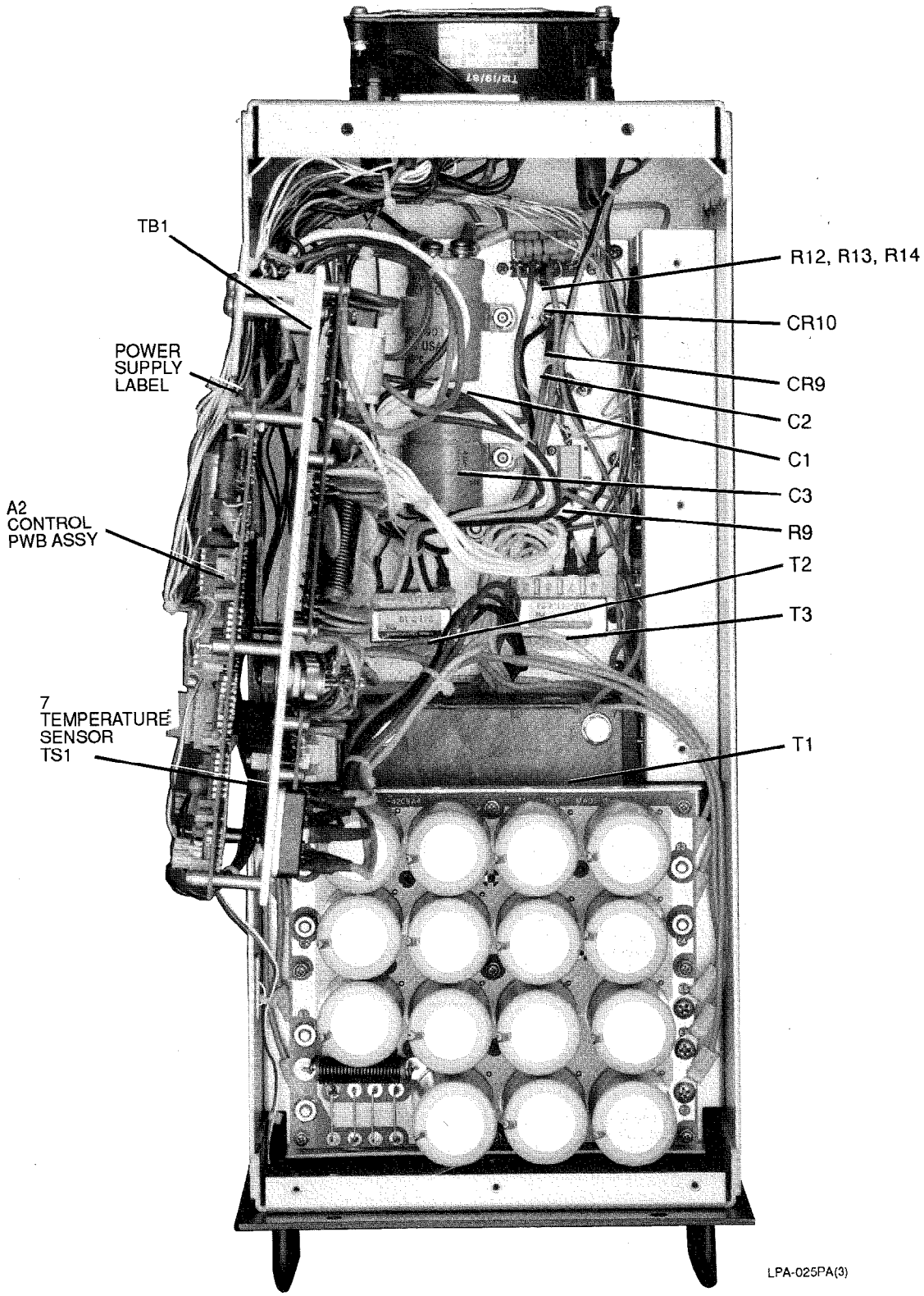
DETAIL A HEATSINK - LEFT SIDE FROM INSIDE OF POWER SUPPLY



DETAIL B HEATSINK - RIGHT SIDE FROM INSIDE OF POWER SUPPLY

LPA-025PA(2)

Figure 2. A3/A4 Power Supply Component Locations (Sheet 3 of 4)



TOP VIEW FROM FRONT

Figure 2. A3/A4 Power Supply Component Locations (Sheet 4 of 4)

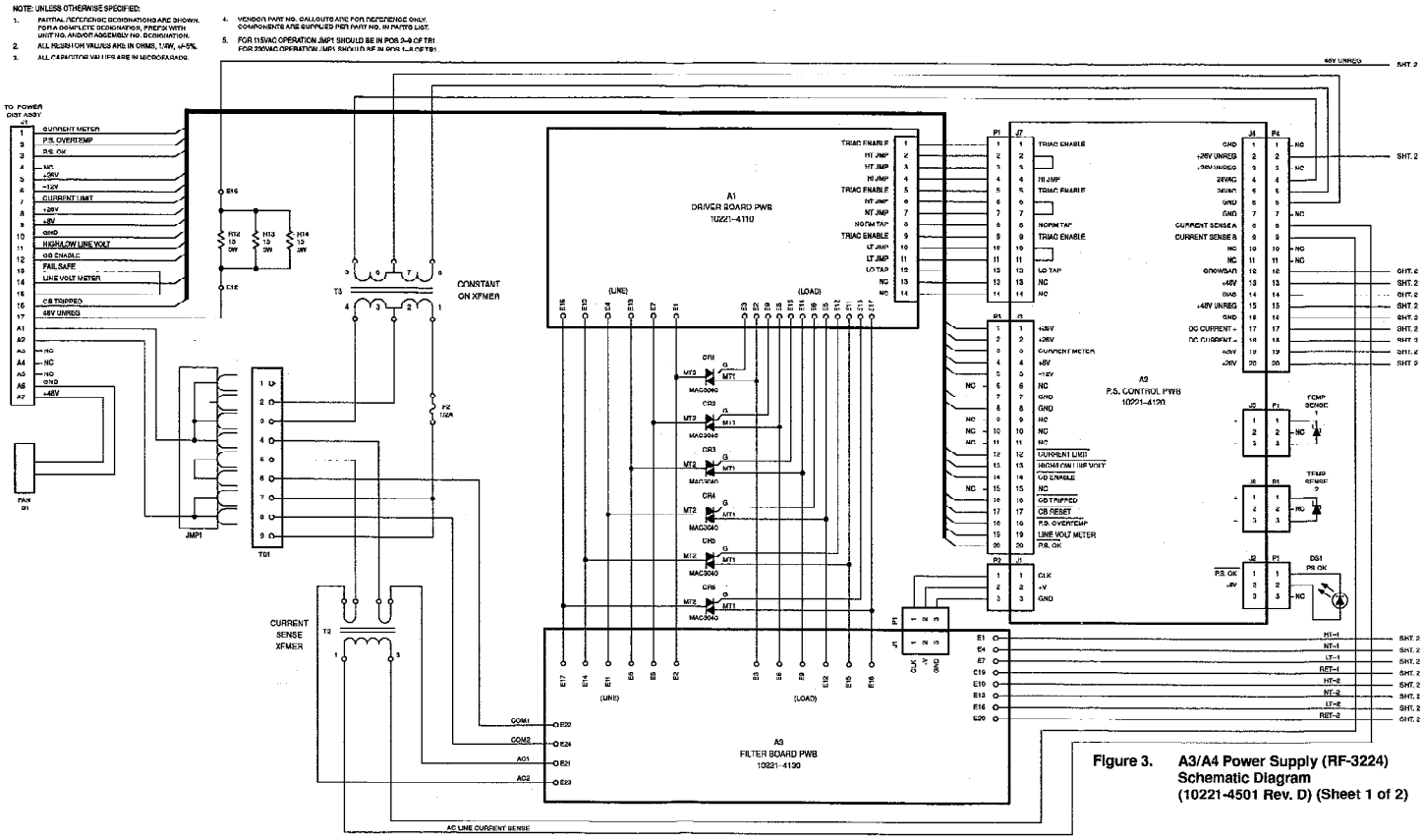


Figure 3. A3/A4 Power Supply (RF-3224) Schematic Diagram (10221-4501 Rev. D) (Sheet 1 of 2)

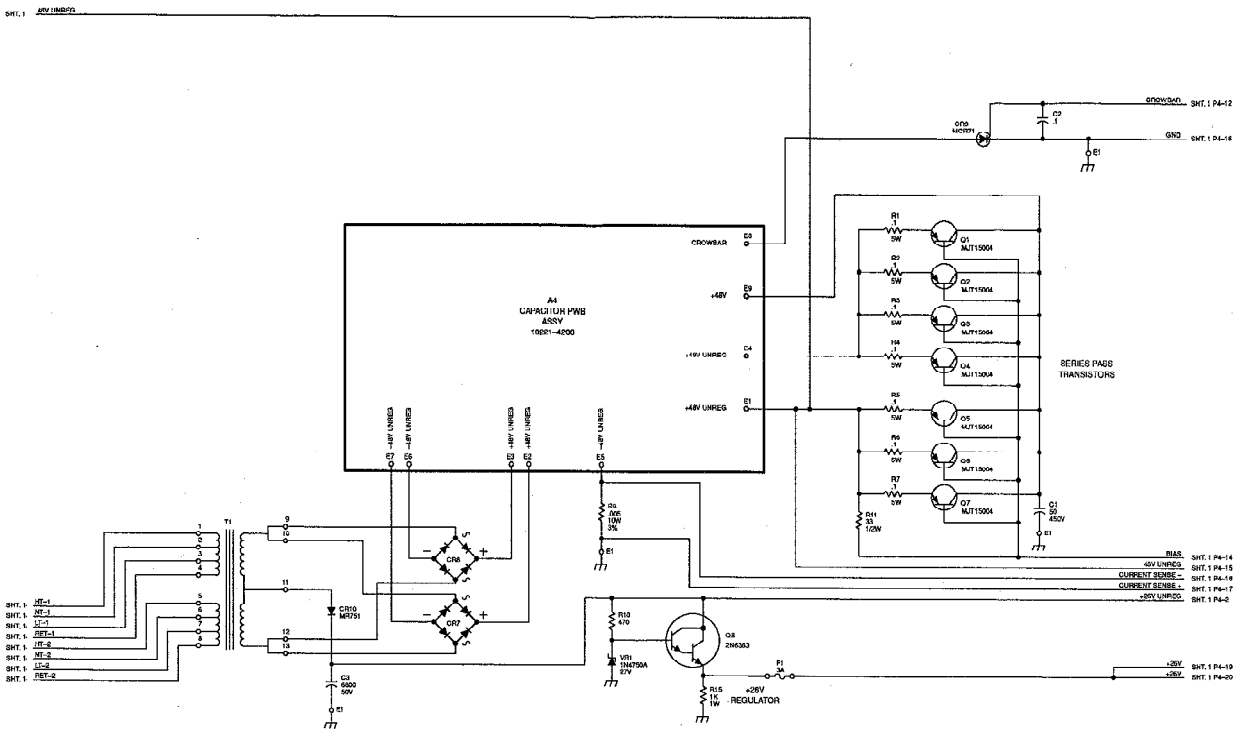
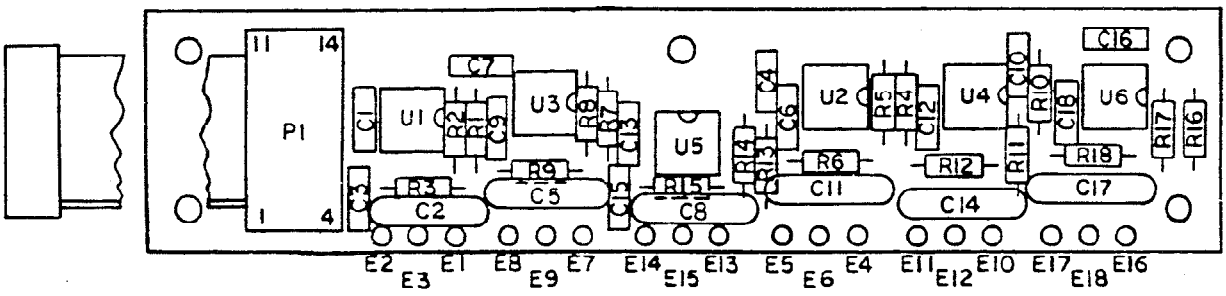


Figure 3. **A3/A4 Power Supply (RF-3224) Schematic Diagram (10221-4501 Rev. D) (Sheet 2 of 2)**

A3A1/A4A1
TRIAC DRIVER PWB ASSEMBLIES



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A3A1/A4A1 TRIAC DRIVER PWB ASSEMBLIES

1. GENERAL INFORMATION

The A3A1 and A4A1 Triac Driver PWB Assemblies (10221-4110) are located in the A3 and A4 Power Supplies, respectively. A functional description of these Power Supplies is provided in the A3/A4 tab section.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Triac Driver PWB and their destinations. The table can be used when tracing signals to and from the PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. Triac Driver PWB Assembly A3A1/A4A1 Interface Connections

Connector	Signal Name(s)	Connects To
E1	Line Signal	Line Filter PWB A3A3-E2/A4A3-E2
E2	Load Signal	Line Filter PWB A3A3-E3/A4A3-E3
E3	Load Signal	Line Filter PWB A3A3-CR1/A4A3-CR1
E4	Line Signal	Line Filter PWB A3A3-E11/A4A3-E11
E5	Load Signal	Line Filter PWB A3A3-E12/A4A3-E12
E6	Load Signal	Line Filter PWB A3A3-CR4/A4A3-CR4
E7	Line Signal	Line Filter PWB A3A3-E5/A4A3-E5
E8	Load Signal	Line Filter PWB A3A3-E6/A4A3-E6
E9	Load Signal	Line Filter PWB A3A3-CR2/A4A3-CR2
E10	Line Signal	Line Filter PWB A3A3-E14/A4A3-E14
E11	Load Signal	Line Filter PWB A3A3-E15/A4A3-E15
E12	Load Signal	Line Filter PWB A3A3-CR5/A4A3-CR5
E13	Line Signal	Line Filter PWB A3A3-E8/A4A3-E8
E14	Load Signal	Line Filter PWB A3A3-E9/A4A3-E9
E15	Load Signal	Line Filter PWB A3A3-CR3/A4A3-CR3
E16	Line Signal	Line Filter PWB A3A3-E17/A4A3-E17
E17	Load Signal	Line Filter PWB A3A3-E18/A4A3-E18
E18	Load Signal	Line Filter PWB A3A3-CR6/A4A3-CR6
P1	Triac Enable, HT JMP, HI Tap LT JMP, LO Tap	Control PWB A3A2-J7/A4A2-J7

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the Triac Driver PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Triac Driver PWB.

Table 2. A3A1/A4A1 Triac Driver PWB Parts List (10221-4110 Rev. D)

Ref. Desig.	Part Number	Description
C1	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C2	C11-0033-503	CAP .05UF 80% 500V CER
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C5	C11-0033-503	CAP .05UF 80% 500V CER
C6	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C7	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C8	C11-0033-503	CAP .05UF 80% 500V CER
C9	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C10	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C11	C11-0033-503	CAP .05UF 80% 500V CER
C12	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C13	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C14	C11-0033-503	CAP .05UF 80% 500V CER
C15	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C16	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C17	C11-0033-503	CAP .05UF 80% 500V CER
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
P1	10221-1118	RIBBON CABLE ASSY
R1	R65-0003-151	RES 150 5% 1/4W CAR FILM
R2	R65-0003-510	RES 51 5% 1/4W CAR FILM
R3	R65-0003-331	RES 330 5% 1/4W CAR FILM
R4	R65-0003-151	RES 150 5% 1/4W CAR FILM
R5	R65-0003-510	RES 51 5% 1/4W CAR FILM
R6	R65-0003-331	RES 330 5% 1/4W CAR FILM
R7	R65-0003-151	RES 150 5% 1/4W CAR FILM
R8	R65-0003-510	RES 51 5% 1/4W CAR FILM
R9	R65-0003-331	RES 330 5% 1/4W CAR FILM
R10	R65-0003-151	RES 150 5% 1/4W CAR FILM
R11	R65-0003-510	RES 51 5% 1/4W CAR FILM
R12	R65-0003-331	RES 330 5% 1/4W CAR FILM
R13	R65-0003-151	RES 150 5% 1/4W CAR FILM
R14	R65-0003-510	RES 51 5% 1/4W CAR FILM
R15	R65-0003-331	RES 330 5% 1/4W CAR FILM
R16	R65-0003-151	RES 150 5% 1/4W CAR FILM
R17	R65-0003-510	RES 51 5% 1/4W CAR FILM
R18	R65-0003-331	RES 330 5% 1/4W CAR FILM

Table 2. A3A1/A4A1 Triac Driver PWB Parts List (10221-4110 Rev. D) (Cont.)

Ref. Desig.	Part Number	Description
U1	I75-0015-001	OPTOISOLATOR MOC3020
U2	I75-0015-001	OPTOISOLATOR MOC3020
U3	I75-0015-001	OPTOISOLATOR MOC3020
U4	I75-0015-001	OPTOISOLATOR MOC3020
U5	I75-0015-001	OPTOISOLATOR MOC3020
U6	I75-0015-001	OPTOISOLATOR MOC3020

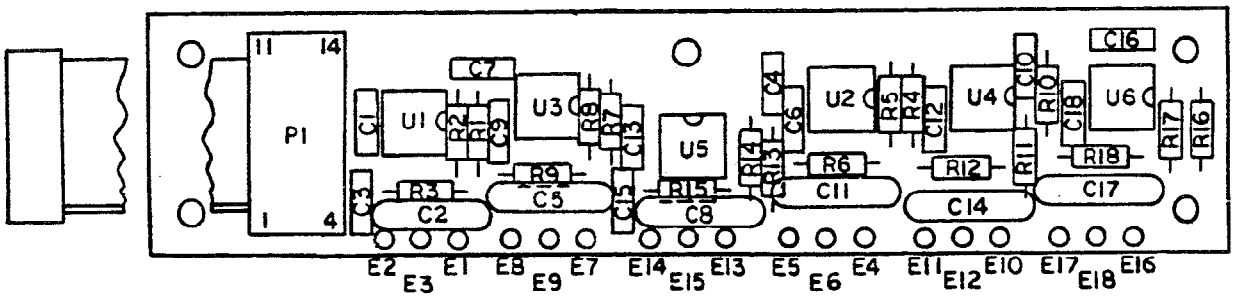


Figure 1. A3A1/A4A1 Triac Driver PWB Component Location Diagram (10221-4110 Rev. A)

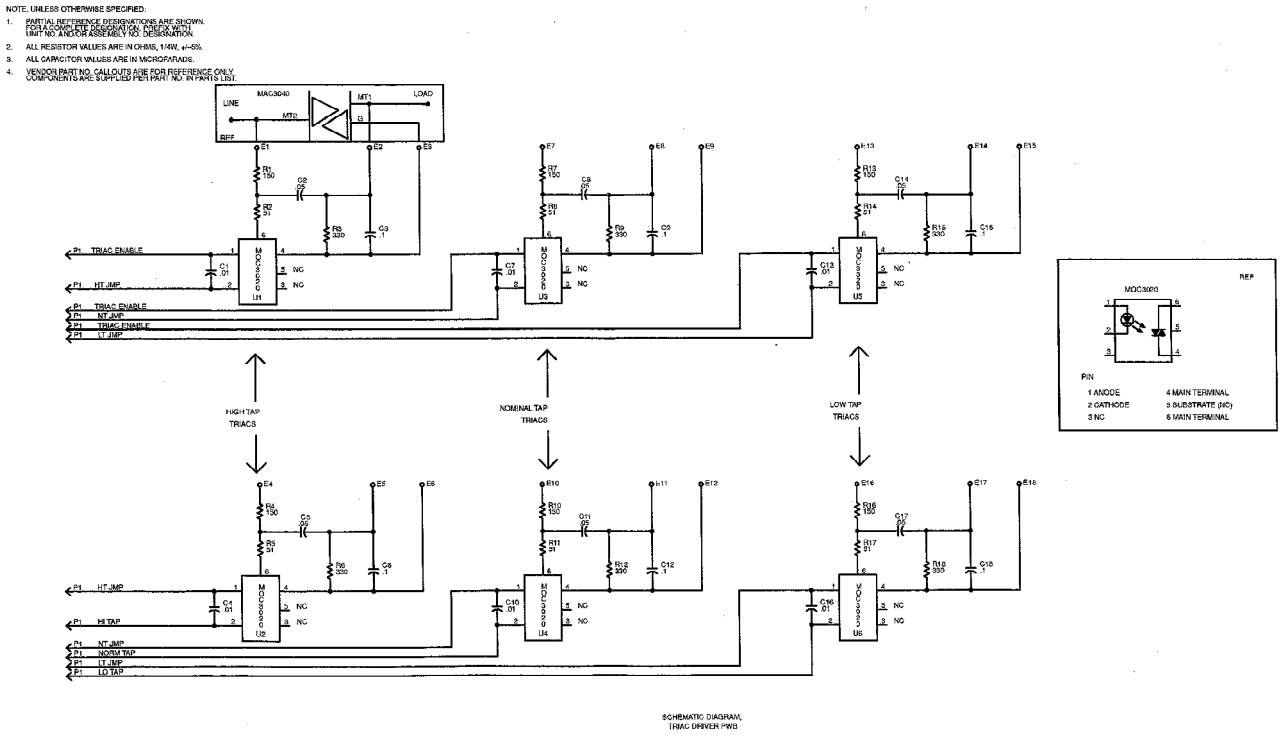
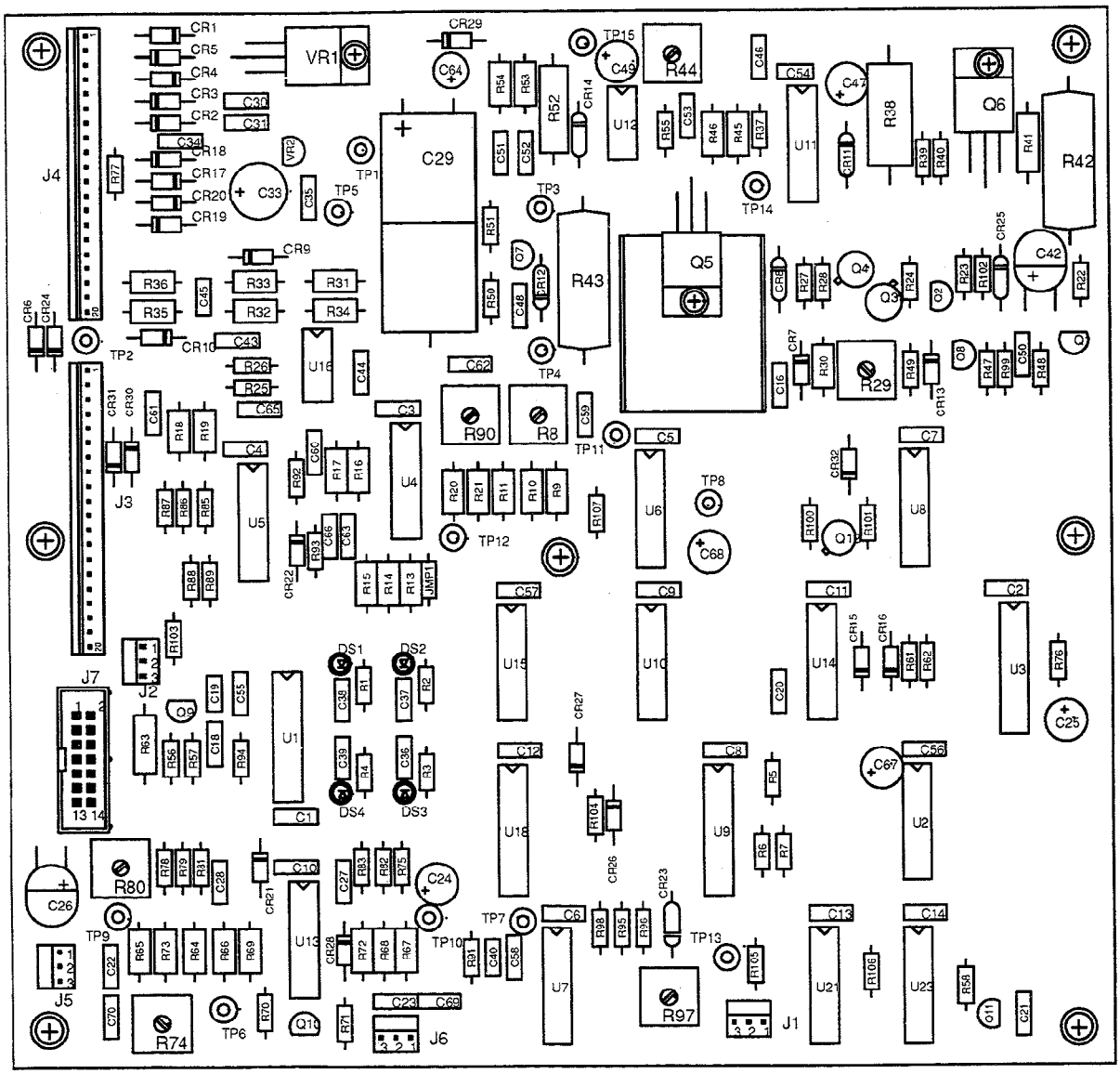


Figure 2. A3A1/A4A1 Triac Driver PWB Schematic Diagram (10221-4111 Rev. B)

A3A2/A4A2
CONTROL PWB ASSEMBLIES



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A3A2/A4A2 CONTROL PWB ASSEMBLIES

1. GENERAL INFORMATION

The A3A2 and A4A2 Control PWB Assemblies (10221-4120) are located in the A3 and A4 Power Supplies, respectively. A functional description of the Control PWB Assemblies is provided in the A3/A4 tab section.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Control PWB and their destinations. The table can be used when tracing signals to and from the Control PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A3A2/A4A2 Control PWB Assemblies Interface Connections

Connector	Signal Name(s)	Connects To
J1	CLK, +V, GND	Line Filter PWB A3A3/A4A3-J1 via cable
J2	P.S. OK, +8V	Control PWB A3A2/A4A2-DS1 (Red) Indicator
J3	Power Signals	Power Distribution Assy A5-J1 via cable
J4	+26V Unreg, +26V	A3/A4 Power Supply T1
	24 Vac, GND	A3/A4 Power Supply Constant On Transformer T3
	Current Sense A, B	A3/A4 Power Supply Current Sense Transformer T2
	Crowbar	Capacitor PWB A3A4/A4A4-E8
	48V Unreg	Capacitor PWB A3A4/A4A4-E1
	Dc Current +, Dc Current -	Capacitor PWB A3A4/A4A4-E5
J5	+, - Signals	Control PWB A3A2/A4A2 Temp Sense 1
J6	+, - Signals	Control PWB A3A2/A4A2 Temp Sense 2
J7	Power Signals	Triac Driver PWB A3A1/A4A1 Terminals

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the Control PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Control PWB.

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U)

Ref. Desig.	Part Number	Description
C1	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C2	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C3	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C6	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C7	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C8	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C9	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C10	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C11	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C12	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C13	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C14	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C16	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/01-1317V	CAP,1000PF,10% 200VC
C20	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C21	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C22	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C23	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C24	C26-0025-470	CAP 47UF 20% 25V TANT
C25	C26-0025-339	CAP 3.3UF 20% 25V TANT
C26	C26-0025-220	CAP 22UF 20% 25V TANT
C27	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C28	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C29	C20-0018-477	CAP 470UF 25V ELEC
C30	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C31	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C33	C78-0050-680	CAP 68UF 50V ELEC
C34	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C35	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C36	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C37	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C38	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C39	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C40	M39014/01-1311V	CAP 470PF 10% 200V CER-R
C42	C26-0025-470	CAP 47UF 20% 25V TANT
C43	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
C44	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C45	M39014/01-1317V	CAP,1000PF,10% 200VC
C46	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C47	C26-0025-100	CAP 10UF 20% 25V TANT
C48	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C49	C26-0025-100	CAP 10UF 20% 25V TANT
C50	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C51	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C52	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C53	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C54	M39014/01-1317V	CAP,1000PF,10% 200VC
C55	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C56	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C57	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C58	M39014/01-1541V	CAP .022UF 10% 50V CER-R
C59	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C60	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C61	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C62	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C63	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C64	C26-0050-339	CAP 3.3UF 20% 50V TANT
C65	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C66	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C67	C26-0025-220	CAP 22UF 20% 25V TANT
C68	C26-0025-339	CAP 3.3UF 20% 25V TANT
C69	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C70	M39014/02-1310V	CAP .1UF 10% 100V CER-R
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N4004	DIODE 1A 400V RECT GP
CR3	1N4004	DIODE 1A 400V RECT GP
CR4	1N4004	DIODE 1A 400V RECT GP
CR5	1N4004	DIODE 1A 400V RECT GP
CR6	1N4004	DIODE 1A 400V RECT GP
CR7	1N4004	DIODE 1A 400V RECT GP
CR8	1N5235B	DIODE 6.8V 5% .5W ZENER
CR9	1N4004	DIODE 1A 400V RECT GP
CR10	1N4004	DIODE 1A 400V RECT GP
CR11	1N5245B	DIODE 15V 5% .5W ZENER
CR12	1N5240B	DIODE 10V 5% .5W ZENER

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
CR13	1N4738A	DIODE 8.2V 5% 1W ZENER
CR14	1N5245B	DIODE 15V 5% .5W ZENER
CR15	1N4004	DIODE 1A 400V RECT GP
CR16	1N4004	DIODE 1A 400V RECT GP
CR17	1N4004	DIODE 1A 400V RECT GP
CR18	1N4004	DIODE 1A 400V RECT GP
CR19	1N4004	DIODE 1A 400V RECT GP
CR20	1N4004	DIODE 1A 400V RECT GP
CR21	1N4004	DIODE 1A 400V RECT GP
CR22	1N4736A	DIODE 6.8V 5% 1W ZENER
CR23	1N4733A	DIODE 5.1V 5% 1W ZENER
CR24	1N4004	DIODE 1A 400V RECT GP
CR25	1N5232B	DIODE 5.6V 5% .5W ZENER
CR26	1N4004	DIODE 1A 400V RECT GP
CR27	1N4004	DIODE 1A 400V RECT GP
CR28	1N4004	DIODE 1A 400V RECT GP
CR29	1N4004	DIODE 1A 400V RECT GP
CR30	1N4004	DIODE 1A 400V RECT GP
CR31	1N4004	DIODE 1A 400V RECT GP
CR32	1N4004	DIODE 1A 400V RECT GP
DS1	N21-0001-000	LED RED T-1 2.5MCD
DS2	N21-0001-000	LED RED T-1 2.5MCD
DS3	N21-0001-000	LED RED T-1 2.5MCD
DS4	N21-0001-000	LED RED T-1 2.5MCD
J1	J46-0022-003	HDR 3 PIN 0.100" SR LKG
J2	J46-0022-003	HDR 3 PIN 0.100" SR LKG
J3	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J4	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J5	J46-0022-003	HDR 3 PIN 0.100" SR LKG
J6	J46-0022-003	HDR 3 PIN 0.100" SR LKG
J7	J46-0054-014	HEADER 14 PIN
JMP1	MP-1142	RES ZERO OHM (CKT JMPR)
Q1	2N4124	XSTR SS/GP NPN TO-92
Q2	Q25-0009-000	XSTR SS/GP PNP MPSA56
Q3	2N2222A	XSTR SS/GP NPN TO-18
Q4	2N2222A	XSTR SS/GP NPN TO-18
Q5	Q-0047	XSTR PNP TIP-42C PWR
Q6	Q-0055	XSTR SS/GP NPN
Q7	Q25-0009-000	XSTR SS/GP PNP MPSA56

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
Q8	2N4126	XSTR SS/GP PNP TO-92
Q9	2N4126	XSTR SS/GP PNP TO-92
Q10	2N4124	XSTR SS/GP NPN TO-92
Q11	2N4124	XSTR SS/GP NPN TO-92
Q12	2N2222A	XSTR SS/GP NPN TO-18
R1	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R2	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R3	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R4	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R5	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R6	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R7	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R8	R-2208	RES VAR 5K 10% .5W HOR.
R9	RN55D3320F	RES 332 1% 1/8W MET FLM
R10	RN55D1211F	RES 1210 1% 1/8W MET FLM
R11	RN55D2150F	RES 215 1% 1/8W MET FLM
R13	RN55D1211F	RES 1210 1% 1/8W MET FLM
R14	RN55D1211F	RES 1210 1% 1/8W MET FLM
R15	RN55D2741F	RES 2740 1% 1/8W MET FLM
R16	RN55D4752F	RES 47.5K 1% 1/8W MET FLM
R17	RN55D5111F	RES 5110 1% 1/8W MET FLM
R18	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R19	RN55D4021F	RES 4020 1% 1/8W MET FLM
R20	RN55D4021F	RES 4020 1% 1/8W MET FLM
R21	RN55D4021F	RES 4020 1% 1/8W MET FLM
R22	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R23	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R24	R65-0003-220	RES 22 5% 1/4W CAR FILM
R25	R65-0003-100	RES 10 5% 1/4W CAR FILM
R26	R65-0003-100	RES 10 5% 1/4W CAR FILM
R27	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R28	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R29	R-2208	RES VAR 5K 10% .5W HOR.
R30	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R31	RN55D1183F	RES. 118K 1% 1/8W MET FLM
R32	RN55D2431F	RES 2430 1% 1/8W MET FLM
R33	RN55D2431F	RES 2430 1% 1/8W MET FLM
R34	RN55D1183F	RES. 118K 1% 1/8W MET FLM
R35	RN55D2431F	RES 2430 1% 1/8W MET FLM

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
R36	RN55D2431F	RES 2430 1% 1/8W MET FLM
R37	R65-0003-682	RES 6.8K 5% 1/4W CAR FILM
R38	RCR42G272JM	RES 2.7K 5% 2W CAR COMP
R39	R65-0003-471	RES 470 5% 1/4W CAR FILM
R40	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R41	R65-0004-101	RES 100 5% 1/2W CAR FILM
R42	RW74U1001F	RES,FXD,WW,1000,5W
R43	RW74U1001F	RES,FXD,WW,1000,5W
R44	R-2208	RES VAR 5K 10% .5W HOR.
R45	RN55D4022F	RES 40.2K 1% 1/8W MET FLM
R46	RN55D7151F	RES 7150 1% 1/8W MET FLM
R47	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R48	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R49	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R50	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R51	R65-0003-333	RES 33K 5% 1/4W CAR FILM
R52	RCR32G222JM	RES 2.2K 5% 1W CAR COMP
R53	RN55D7152F	RES 71.5K 1% 1/8W MET FLM
R54	RN55D3321F	RES 3320 1% 1/8W MET FLM
R55	R65-0003-470	RES 47 5% 1/4W CAR FILM
R56	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R57	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R58	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R61	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R62	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R63	R65-0004-181	RES 180 5% 1/2W CAR FILM
R64	RN55D4751F	RES 4750 1% 1/8W MET FLM
R65	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R66	RN55D1001F	RES 1000 1% 1/8W MET FLM
R67	RN55D4751F	RES 4750 1% 1/8W MET FLM
R68	RN55D1001F	RES 1000 1% 1/8W MET FLM
R69	RN55D3482F	RES 34.8K 1% 1/8W MET FLM
R70	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R71	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R72	RN55D3482F	RES 34.8K 1% 1/8W MET FLM
R73	RN55D1212F	RES 12.1K 1% 1/8W MET FLM
R74	R-2209	RES VAR 10K 10% .5W HOR.
R75	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R76	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
R77	R65-0003-101	RES 100 5% 1/4W CAR FILM
R78	R65-0003-512	RES 5.1K 5% 1/4W CAR FILM
R79	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R80	R-2207	RES VAR 2K 10% .5W HOR.
R81	R65-0003-272	RES 2.7K 5% 1/4W CAR FILM
R82	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R83	R65-0003-101	RES 100 5% 1/4W CAR FILM
R85	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R86	R65-0003-183	RES 18K 5% 1/4W CAR FILM
R87	R65-0003-242	RES 2.4K 5% 1/4W CAR FILM
R88	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R89	R65-0003-682	RES 6.8K 5% 1/4W CAR FILM
R90	R-2209	RES VAR 10K 10% .5W HOR.
R91	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R92	R65-0003-273	RES 27K 5% 1/4W CAR FILM
R93	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R94	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R95	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R96	R65-0003-751	RES 750 5% 1/4W CAR FILM
R97	R-2209	RES VAR 10K 10% .5W HOR.
R98	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R99	R65-0003-473	RES 47K 5% 1/4W CAR FILM
R100	R65-0003-470	RES 47 5% 1/4W CAR FILM
R101	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R102	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R103	R65-0003-751	RES 750 5% 1/4W CAR FILM
R104	R65-0003-822	RES 8.2K 5% 1/4W CAR FILM
R105	R65-0003-153	RES 15K 5% 1/4W CAR FILM
R106	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R107	R65-0003-103	RES 10K 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"
TP9	J-0065	TP PWB WHT TOP ACCS .080"

Table 2. A3A2/A4A2 Control PWB Parts List (10221-4120 Rev. U) (Cont.)

Ref. Desig.	Part Number	Description
TP10	J-0071	TP PWB BRN TOP ACCS .080"
TP11	J-0071	TP PWB BRN TOP ACCS .080"
TP12	J-0066	TP PWB RED TOP ACCS .080"
TP13	J-0069	TP PWB ORN TOP ACCS .080"
TP14	J-0070	TP PWB YEL TOP ACCS .080"
TP15	J-0068	TP PWB GRN TOP ACCS .080"
U1	I90-0006-003	IC XSTR ARRAY DARL 2003
U2	I01-0000-029	IC 4081B PLASTIC CMOS
U3	I01-0000-018	IC 4049UB PLASTIC CMOS
U4	I30-0025-001	IC OP AMP QUAD 2902
U5	I30-0025-001	IC OP AMP QUAD 2902
U6	I01-0000-355	IC 4584B PLASTIC CMOS
U7	I01-0000-355	IC 4584B PLASTIC CMOS
U8	I01-0000-023	IC 4071B PLASTIC CMOS
U9	I01-0000-108	IC 4516B PLASTIC CMOS
U10	I01-0000-029	IC 4081B PLASTIC CMOS
U11	I12-0004-000	IC VR 1723 ADJ V .15A
U12	I14-0004-001	IC CROWBAR 3423
U13	I30-0025-001	IC OP AMP QUAD 2902
U14	I01-0000-003	IC 4001B PLASTIC CMOS
U15	I01-0000-023	IC 4071B PLASTIC CMOS
U16	I30-0010-001	IC OP AMP SINGLE 356
U18	I01-0000-206	IC 4555B PLASTIC CMOS
U21	I01-0000-029	IC 4081B PLASTIC CMOS
U23	I01-0000-050	IC 4013B PLASTIC CMOS
VR1	I11-0001-003	IC VR 7808 +8V 1.5A 4%
VR2	I12-0010-012	IC VR 79L12A -12V .10A 4%

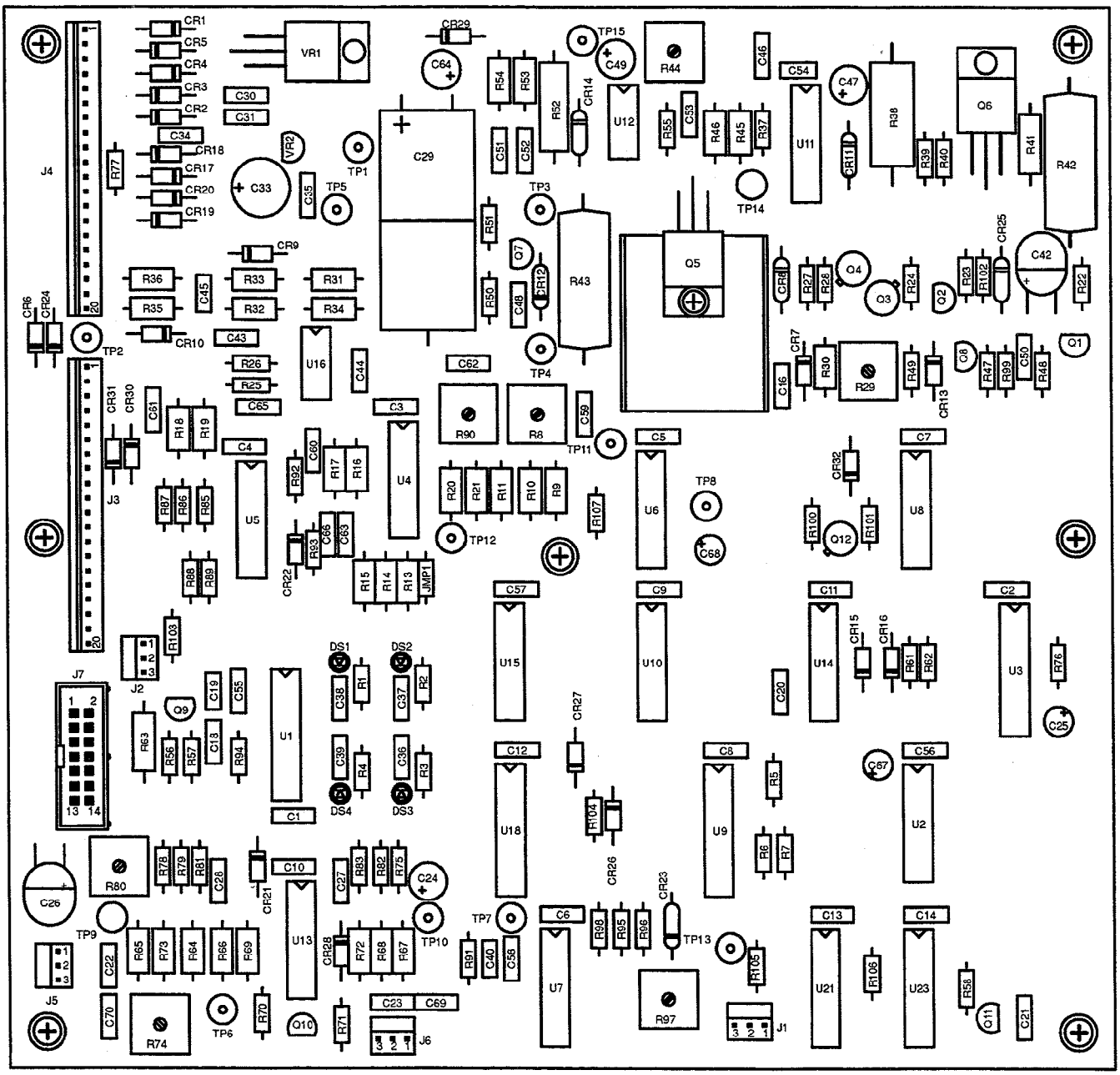


Figure 1. A3A2/A4A2 Control PWB Component Location Diagram (10221-4120 Rev. E)

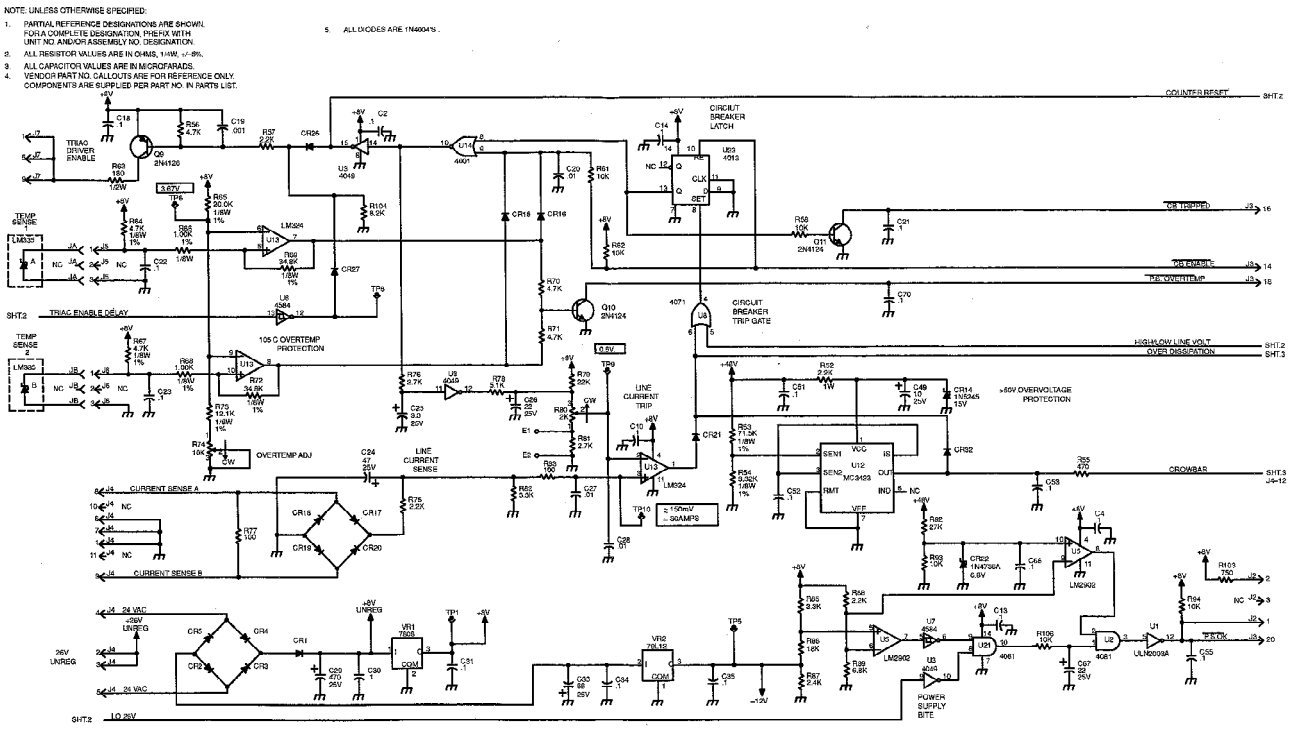
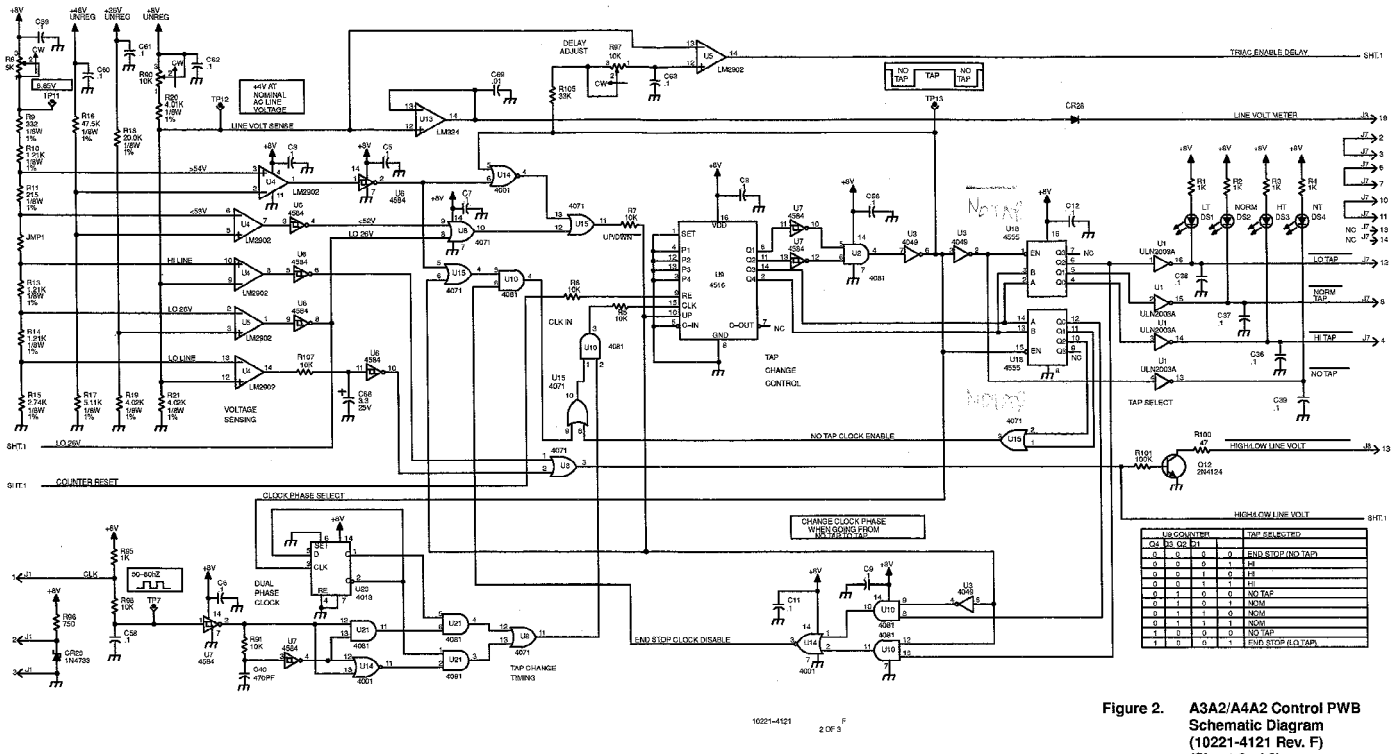


Figure 2. A3A2/A4A2 Control PWB Schematic Diagram (10221-4121 Rev. F) (Sheet 1 of 3)



U9 COUNTER				TAP SELECTED
Q4	Q3	Q2	Q1	
0	0	0	0	END STOP (NO TAP)
0	0	0	1	HI
0	0	1	0	HI
0	0	1	1	HI
0	1	0	0	NO TAP
0	1	0	1	NORM
0	1	1	0	NORM
0	1	1	1	NORM
1	0	0	0	NO TAP
1	0	0	1	END STOP (LO TAP)

Figure 2. A3A2/A4A2 Control PWB Schematic Diagram (10221-4121 Rev. F) (Sheet 2 of 3)

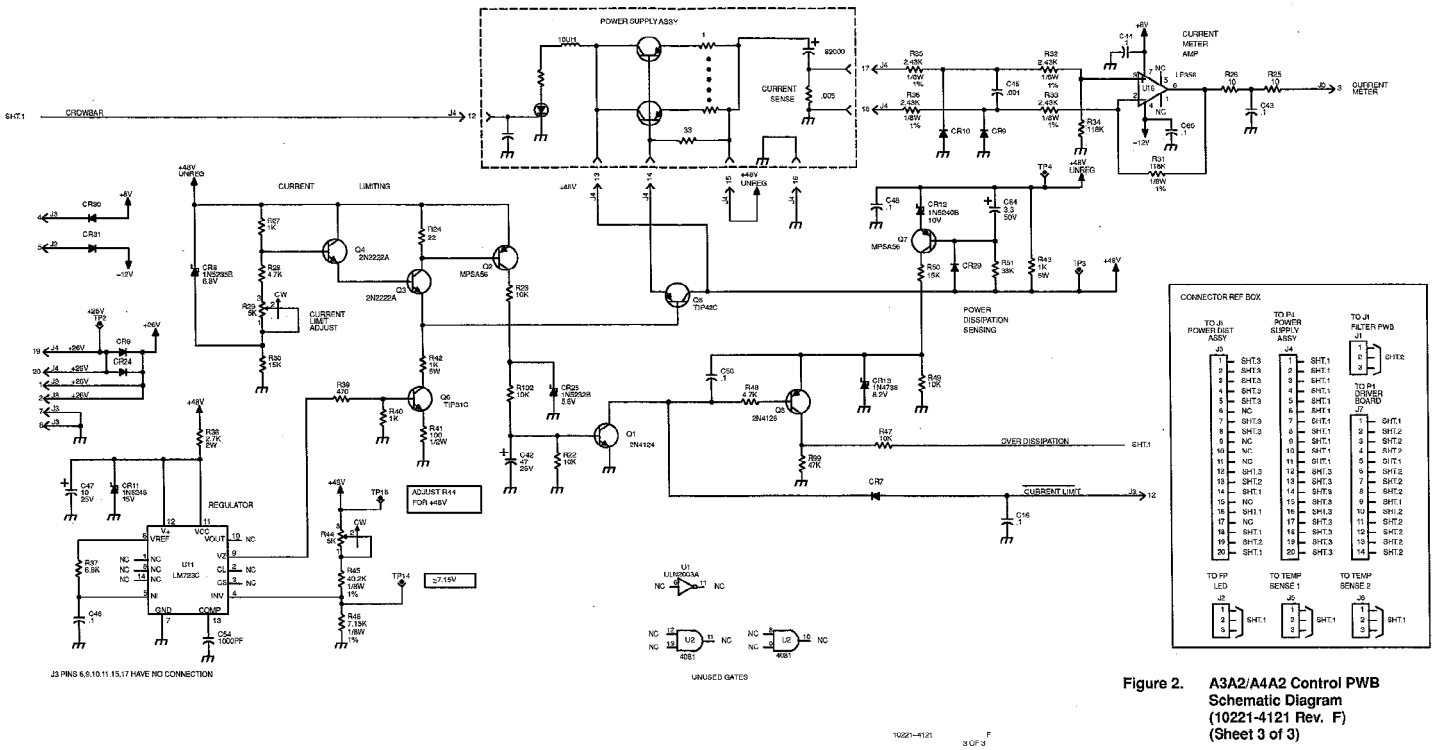
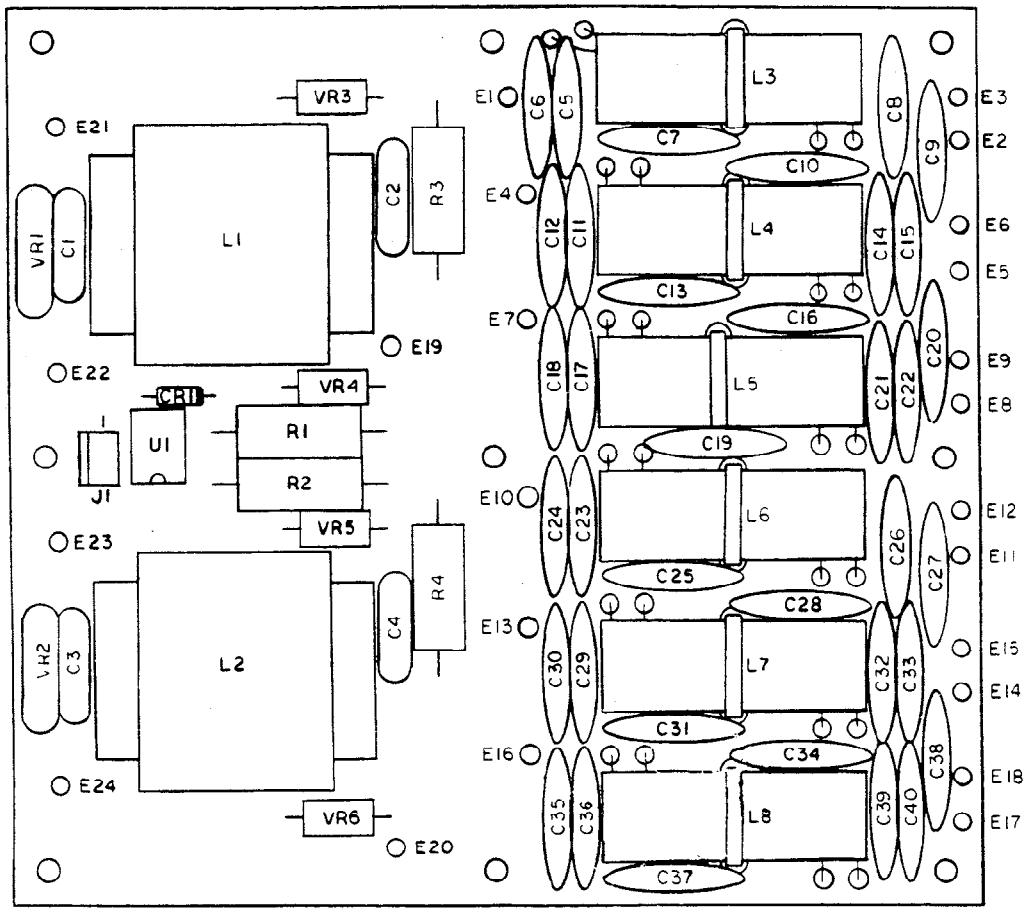


Figure 2. A3A2/A4A2 Control PWB Schematic Diagram (10221-4121 Rev. F) (Sheet 3 of 3)

A3A3/A4A3
LINE FILTER PWB ASSEMBLIES



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A3A3/A4A3 LINE FILTER PWB ASSEMBLIES

1. GENERAL INFORMATION

The A3A3 and A4A3 Line Filter PWB Assemblies (10221-4130) are located in the A3 and A4 Power Supplies, respectively. A functional description of these assemblies is found in the A3/A4 tab section.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Line Filter PWB and their destinations. The table can be used when tracing signals to and from the Line Filter PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A3A3/A4A3 Filter Control PWB Assemblies Interface Connections

Connector	Signal Name(s)	Connects To
E1	HT-1	A3/A4 Power Supply Transformer T1-1
E2	Line Signal	Triac Driver PWB A3A1/A4A1-E1
E3	Load Signal	Triac Driver PWB A3A1/A4A1-E3
E4	NT-1	A3/A4 Power Supply Transformer T1-2
E5	Line Signal	Triac Driver PWB A3A1/A4A1-E7
E6	Load Signal	Triac Driver PWB A3A1/A4A1-E8
E7	LT-1	A3/A4 Power Supply Transformer T1-3
E8	Line Signal	Triac Driver PWB A3A1/A4A1-E13
E9	Load Signal	Triac Driver PWB A3A1/A4A1-E14
E10	HT-2	A3/A4 Power Supply Transformer T1-5
E11	Line Signal	Triac Driver PWB A3A1/A4A1-E4
E12	Load Signal	Triac Driver PWB A3A1/A4A1-E5
E13	NT-2	A3/A4 Power Supply Transformer T1-6
E14	Line Signal	Triac Driver PWB A3A1/A4A1-E10
E15	Load Signal	Triac Driver PWB A3A1/A4A1-E11
E16	LT-2	A3/A4 Power Supply Transformer T1-7
E17	Line Signal	Triac Driver PWB A3A1/A4A1-E16
E18	Load Signal	Triac Driver PWB A3A1/A4A1-E17
E19	RET-1	A3/A4 Power Supply Transformer T1-4
E20	RET-1	A3/A4 Power Supply Transformer T1-8
E21	AC 1	A3/A4-TB1-4 via Current Sense Transformer T2
E22	COM 1	A3/A4-TB1-6
E23	AC 2	A3/A4-TB1-4 via Current Sense Transformer T2
E24	COM 2	A3/A4-TB1-5
J1	CLK, +V, GND	Power Supply Control PWB A3A2/A4A2-J1

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

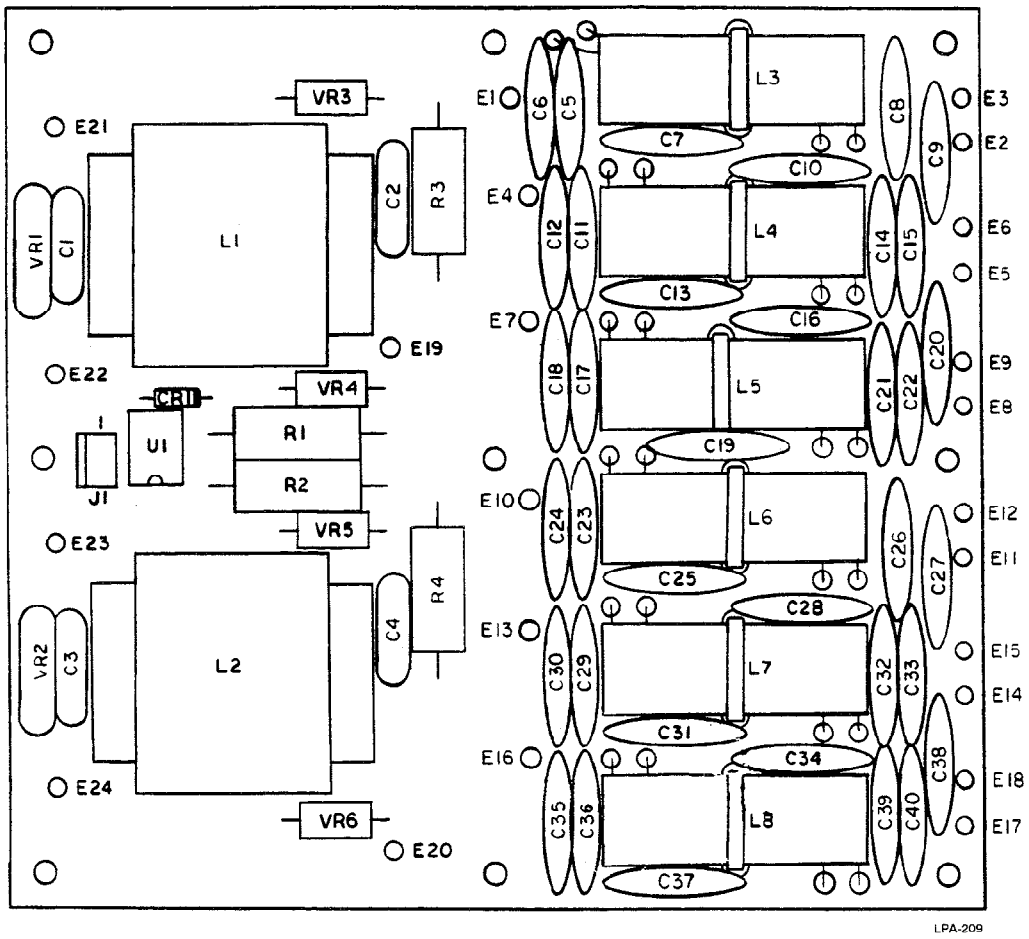
Table 2 is the Line Filter PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Line Filter PWB.

Table 2. A3A3/A4A3 Line Filter PWB Parts List (10221-4130 Rev. E)

Ref. Desig.	Part Number	Description
C1	C11-0033-503	CAP .05UF 80% 500V CER
C2	C11-0033-503	CAP .05UF 80% 500V CER
C3	C11-0033-503	CAP .05UF 80% 500V CER
C4	C11-0033-503	CAP .05UF 80% 500V CER
C5	C-0010	CAP .01UF 20% 1.6KV CER
C6	C-0010	CAP .01UF 20% 1.6KV CER
C7	C-0010	CAP .01UF 20% 1.6KV CER
C8	C-0010	CAP .01UF 20% 1.6KV CER
C9	C-0010	CAP .01UF 20% 1.6KV CER
C10	C-0010	CAP .01UF 20% 1.6KV CER
C11	C-0010	CAP .01UF 20% 1.6KV CER
C12	C-0010	CAP .01UF 20% 1.6KV CER
C13	C-0010	CAP .01UF 20% 1.6KV CER
C14	C-0010	CAP .01UF 20% 1.6KV CER
C15	C-0010	CAP .01UF 20% 1.6KV CER
C16	C-0010	CAP .01UF 20% 1.6KV CER
C17	C-0010	CAP .01UF 20% 1.6KV CER
C18	C-0010	CAP .01UF 20% 1.6KV CER
C19	C-0010	CAP .01UF 20% 1.6KV CER
C20	C-0010	CAP .01UF 20% 1.6KV CER
C21	C-0010	CAP .01UF 20% 1.6KV CER
C22	C-0010	CAP .01UF 20% 1.6KV CER
C23	C-0010	CAP .01UF 20% 1.6KV CER
C24	C-0010	CAP .01UF 20% 1.6KV CER
C25	C-0010	CAP .01UF 20% 1.6KV CER
C26	C-0010	CAP .01UF 20% 1.6KV CER
C27	C-0010	CAP .01UF 20% 1.6KV CER
C28	C-0010	CAP .01UF 20% 1.6KV CER
C29	C-0010	CAP .01UF 20% 1.6KV CER
C30	C-0010	CAP .01UF 20% 1.6KV CER
C31	C-0010	CAP .01UF 20% 1.6KV CER
C32	C-0010	CAP .01UF 20% 1.6KV CER

Table 2. A3A3/A4A3 Line Filter PWB Parts List (10221-4130 Rev. E) (Cont.)

Ref. Desig.	Part Number	Description
C33	C-0010	CAP .01UF 20% 1.6KV CER
C34	C-0010	CAP .01UF 20% 1.6KV CER
C35	C-0010	CAP .01UF 20% 1.6KV CER
C36	C-0010	CAP .01UF 20% 1.6KV CER
C37	C-0010	CAP .01UF 20% 1.6KV CER
C38	C-0010	CAP .01UF 20% 1.6KV CER
C39	C-0010	CAP .01UF 20% 1.6KV CER
C40	C-0010	CAP .01UF 20% 1.6KV CER
CR1	1N4004	DIODE 1A 400V RECT GP
J1	J46-0022-003	HDR 3 PIN 0.100" SR LKG
L1	L01-0001-681	COIL 680UH 25% FXD RF
L2	L01-0001-681	COIL 680UH 25% FXD RF
L3	10221-4133	FILTER CHOKE
L4	10221-4133	FILTER CHOKE
L5	10221-4133	FILTER CHOKE
L6	10221-4133	FILTER CHOKE
L7	10221-4133	FILTER CHOKE
L8	10221-4133	FILTER CHOKE
R1	RCR42G103JM	RES 10K 5% 2W CAR COMP
R2	RCR42G103JM	RES 10K 5% 2W CAR COMP
R3	RCR42G103JM	RES 10K 5% 2W CAR COMP
R4	RCR42G103JM	RES 10K 5% 2W CAR COMP
U1	6N138	OPTOISOLATOR 6N138
VR1	D60-0004-002	MOV 150VDC 2000A
VR2	D60-0004-002	MOV 150VDC 2000A
VR3	D50-0005-007	TRANSORB 1.5KE150CA
VR4	D50-0005-007	TRANSORB 1.5KE150CA
VR5	D50-0005-007	TRANSORB 1.5KE150CA
VR6	D50-0005-007	TRANSORB 1.5KE150CA

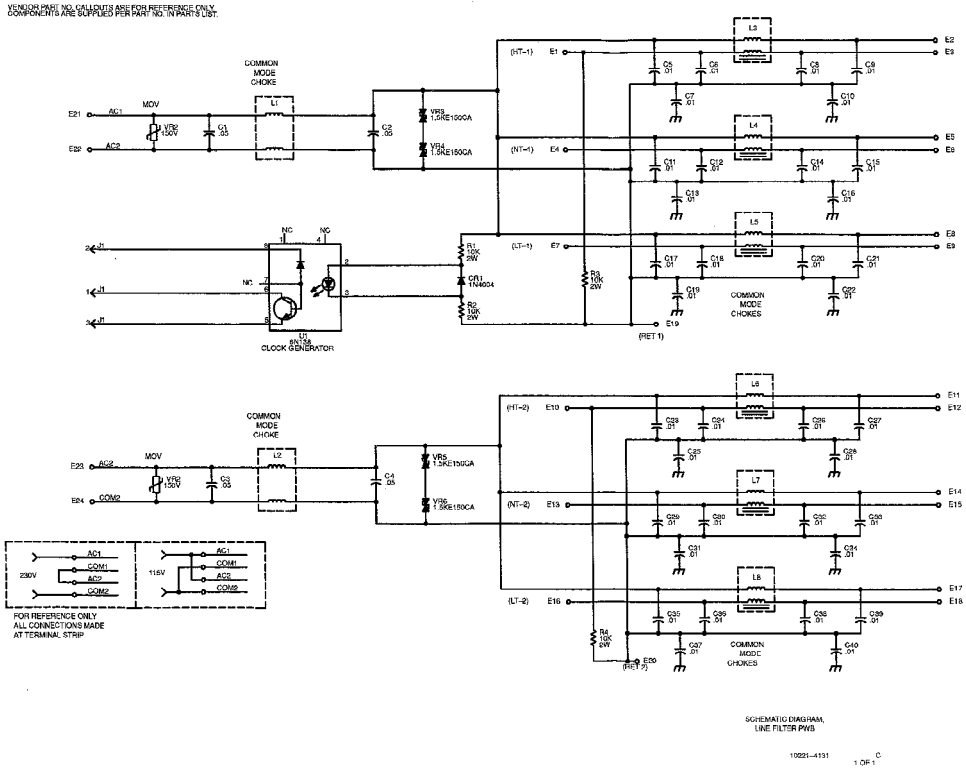


NOTE: E DESIGNATORS SHOWN FOR REFERENCE ONLY.

Figure 1. A3A3/A4A3 Line Filter PWB Component Location Diagram (10221-4130 Rev. B)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. ADD 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.



SCHEMATIC DIAGRAM,
LINE FILTER PWB

10221-4131 C
1 OF 1

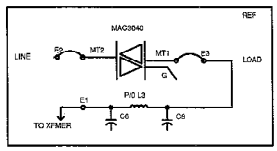
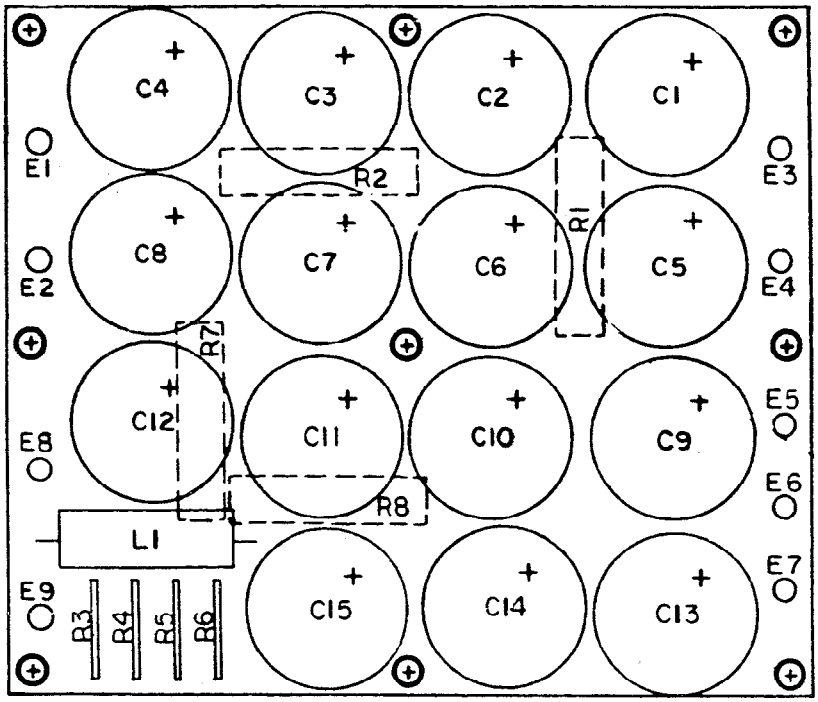


Figure 2. A3A3/A4A3 Line Filter PWB Schematic Diagram (10221-4131 Rev. C)

A3A4/A4A4
CAPACITOR PWB ASSEMBLIES



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A3A4/A4A4 CAPACITOR PWB ASSEMBLIES

1. GENERAL INFORMATION

The A3A4 and A4A4 Capacitor PWB Assemblies (10221-4200) are located in the A3 and A4 Power Supplies, respectively. A functional description of these assemblies is found in tab section A3/A4.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Capacitor PWB and their destinations. The table can be used when tracing signals to and from the Capacitor PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A3A4/A4A4 Capacitor PWB Assemblies Interface Connections

Connector	Signal Name(s)	Connects To
E1	+48V Unreg	A3/A4 Power Supply Series Pass Transistor Q5
E2	+48V Unreg	A3/A4 Power Supply Transformer T1 via A3/A4-CR7
E3	+48V Unreg	A3/A4 Power Supply Transformer T1 via A3/A4-CR8
E4	+48V Unreg	A3/A4 Power Supply Series Pass Transistor Q4
E5	-48V Unreg	Power Supply Control PWB A3A2/A4A2-J4
E6	-48V Unreg	A3/A4 Power Supply Transformer T1 via A3/A4-CR8
E7	-48V Unreg	A3/A4 Power Supply Transformer T1 via A3/A4-CR7
E8	Crowbar	Power Supply Control PWB A3A2/A4A2-J4
E9	+48V	A3/A4 Power Supply Series Pass Transistor Q1

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the Capacitor PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Capacitor PWB.

Table 2. A3A4/A4A4 Capacitor PWB Parts List (10221-4200 Rev. D)

Ref. Desig.	Part Number	Description
C1	C28-0080-562	CAP 5600UF 80V ELEC
C2	C28-0080-562	CAP 5600UF 80V ELEC
C3	C28-0080-562	CAP 5600UF 80V ELEC
C4	C28-0080-562	CAP 5600UF 80V ELEC
C5	C28-0080-562	CAP 5600UF 80V ELEC
C6	C28-0080-562	CAP 5600UF 80V ELEC
C7	C28-0080-562	CAP 5600UF 80V ELEC
C8	C28-0080-562	CAP 5600UF 80V ELEC
C9	C28-0080-562	CAP 5600UF 80V ELEC
C10	C28-0080-562	CAP 5600UF 80V ELEC
C11	C28-0080-562	CAP 5600UF 80V ELEC
C12	C28-0080-562	CAP 5600UF 80V ELEC
C13	C28-0080-562	CAP 5600UF 80V ELEC
C14	C28-0080-562	CAP 5600UF 80V ELEC
C15	C28-0080-562	CAP 5600UF 80V ELEC
L1	10221-4206	CHOKE, CROWBAR ASSY
R1	R15-0001-501	RES, WW, 500, 3%, 10W
R2	R15-0001-501	RES, WW, 500, 3%, 10W
R3	10029-0211	MANGANIN WIRE, FORMED
R4	10029-0211	MANGANIN WIRE, FORMED
R5	10029-0211	MANGANIN WIRE, FORMED
R6	10029-0211	MANGANIN WIRE, FORMED
R7	R15-0001-501	RES, WW, 500, 3%, 10W
R8	R15-0001-501	RES, WW, 500, 3%, 10W

NOTES:

1. E DESIGNATORS SHOWN FOR REF ONLY
2. R1, R2, R7, R8 ASSEMBLED FAR SIDE.

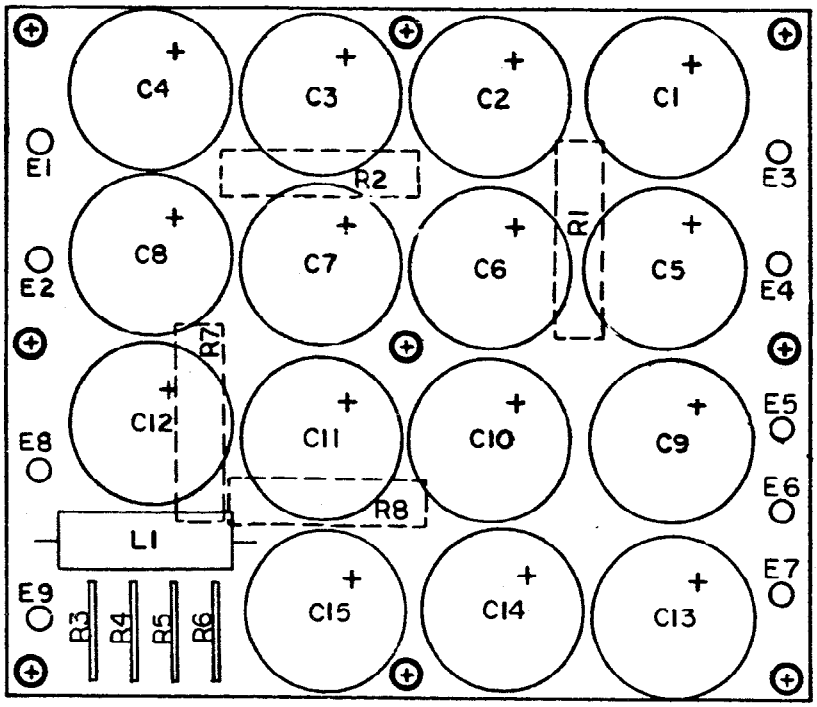


Figure 1. A3A4/A4A4 Capacitor PWB Component Location Diagram (10221-4200 Rev. A)

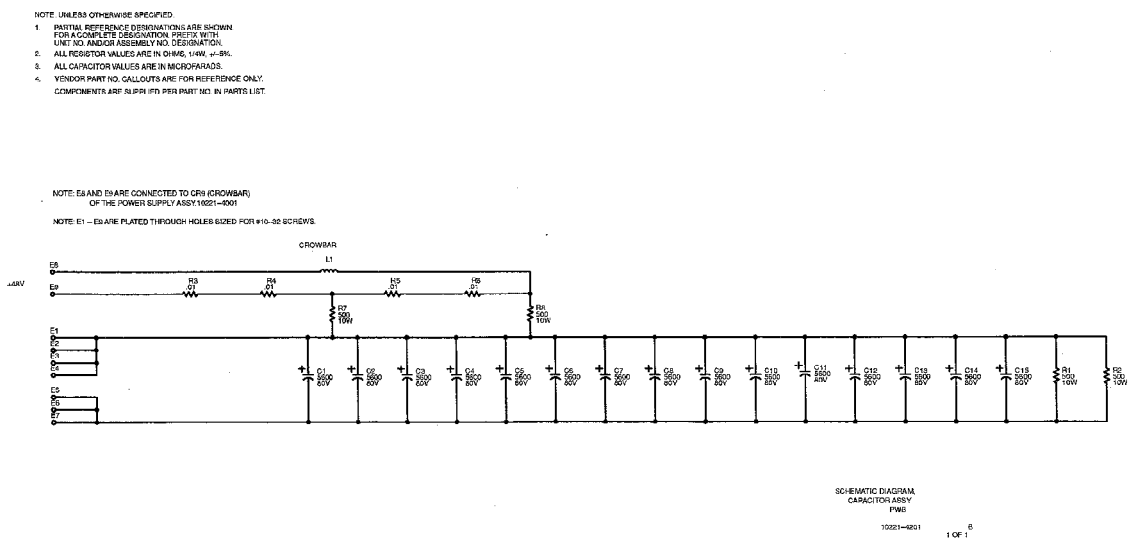
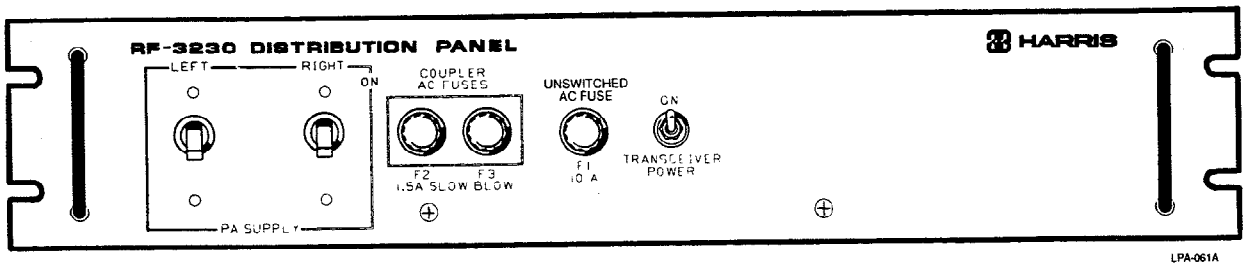


Figure 2. A3A4/A4A4 Capacitor PWB Schematic Diagram (10221-4201 Rev. B)

A5
POWER DISTRIBUTION PANEL ASSEMBLY



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A5 POWER DISTRIBUTION PANEL ASSEMBLY

1. GENERAL DESCRIPTION

The A5 Power Distribution Panel Assembly (10221-3800 in the RF-3230 and 10221-3900 in the RF-3230B) is the interface between the A3/A4 Power Supplies, the A2A1 Interconnect PWB, and the primary power source. The Power Distribution Panel Assembly also contains circuit breakers for each Power Supply, and two convenience outlets.

The only difference between these two assemblies is the wiring of the 10 A 115/230 Vac outlet. In the 10221-3800 assembly, this outlet is wired directly to the AC line and has power applied to it all the time. In the 10221–3900 assembly, this outlet is controlled by the left circuit breaker, CB1. If the circuit breaker is tripped due to a malfunction, the outlet no longer has power applied to it.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Power Distribution Panel Assembly and their destinations. The table can be used when tracing signals to and from the Power Distribution Panel Assembly. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A5 Power Distribution Panel Assembly Interface Connections

Connector	Signal Name(s)	Connects To
J1	230 Vac	Power Distribution PWB A5A1-J4 via A5W4P1
TB1-1	AC Hot	Power Distribution PWB A5A1-E1, Left Circuit Breaker CB1, Right CB2
TB1-2	AC Hot	10A 115/230 Vac Outlet or Switched XCVR Outlet via S1
TB1-3	AC Common	Power Distribution PWB A5A1-E1, Left CB1, Right CB2
TB1-4	AC Common	10A 115/230 Vac Outlet, Switched XCVR Outlet
TB1-5	AC Hot	Right Power Supply via W1P2, Right CB2
TB1-6	AC Common	Power Distribution PWB A5A1, Right CB2, Right Power Supply W1P2
TB1-7	AC Hot	Left CB1, Left Power Supply via W2P2
TB1-8	AC Common	Power Distribution PWB A5A1, Left CB1, Left Power Supply W2P2
TB2-1	48V-L	Power Amplifier Chassis via W3P2, Left Power Supply via W2P2
TB2-2	GND	Power Amplifier Chassis via W3P2, Left Power Supply via W2P2
TB2-3	48V-R	Power Amplifier Chassis via W3P2, Left Power Supply via W2P2
TB2-4	GND	Power Amplifier Chassis via W3P2, Left Power Supply via W2P2

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

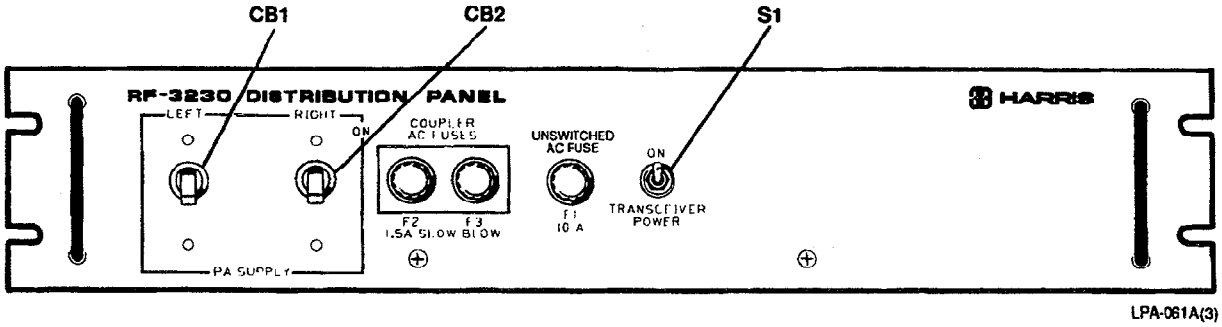
Tables 2 and 3 are the Power Distribution Panel Assembly parts lists. Component locations showing the front, rear, and top views of the Power Distribution Panel Assembly are located in figure 1. Figures 2 and 3 are the schematic diagrams for Power Distribution Panel Assembly 10221-3800 and 10228-3900, respectively.

Table 2. A5 Power Distribution Panel Assembly Parts List (10221-3800 Rev. Y)

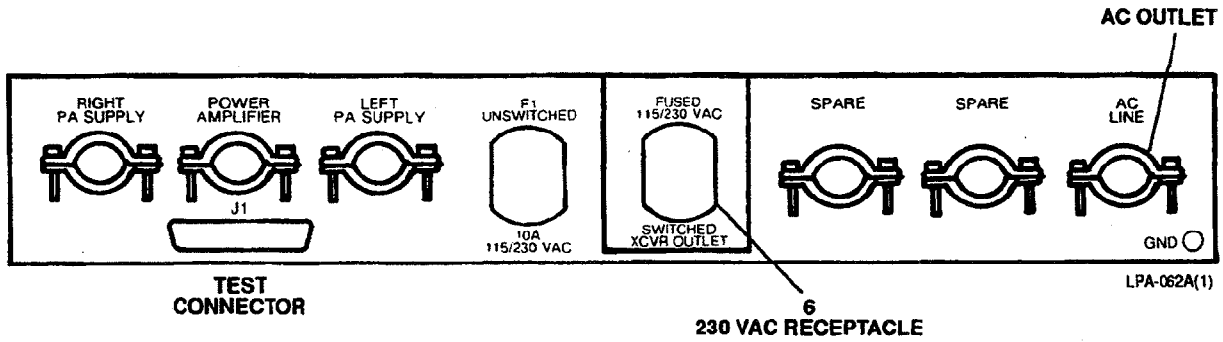
Ref. Desig.	Part Number	Description
6	J85-0009-001	RECEPTACLE, 230VAC
32	H34-0034-005	NUT HEX SPIRALOCK
41	10221-3840	PWB ASSY,FAN REGULATOR
A1	10221-3820	PWB ASSY,DIST PNL
CB1	10221-9050-02	CIRCUIT BREAKER, 230 VAC
CB2	10221-9050-02	CIRCUIT BREAKER, 230 VAC
CR1	D28-0001-001	THYR TRIAC 40A
CR2	D28-0001-001	THYR TRIAC 40A
CR3	D50-0005-011	DIODE,TRANSIENT SUPPRESS
CR4	D50-0005-011	DIODE,TRANSIENT SUPPRESS
CR5	D50-0005-011	DIODE,TRANSIENT SUPPRESS
CR6	D50-0005-011	DIODE,TRANSIENT SUPPRESS
CR7	D50-0005-011	DIODE,TRANSIENT SUPPRESS
CR8	D50-0005-011	DIODE,TRANSIENT SUPPRESS
F1	F-0072	FUSE 10A CER QA 250V 3AG
F2	F03-0002-022	FUSE 1-1/2A SB 250V 3AG
F3	F03-0002-022	FUSE 1-1/2A SB 250V 3AG
L1	10221-4206	CHOKE,CROWBAR ASSY
L2	10221-4206	CHOKE,CROWBAR ASSY
S1	MS35058-23	SW SP ON-NONE-ON SEALED
TB3	E31-0014-009	TERMINAL STRIP
W1	10221-3830	CABLE, INTFC,RIGHT PS
W2	10221-3831	CABLE,INTFC LEFT PS
W3	10221-3832	CABLE, INTFC PA
W4	10221-3833	CABLE, TEST POINT
XF1	F01-0001-002	FUHLR PNL MT SOL .750H
XF2	F01-0001-002	FUHLR PNL MT SOL .750H
XF3	F01-0001-002	FUHLR PNL MT SOL .750H

Table 3. A5 Power Distribution Panel Assembly Parts List (10221-3900 Rev. I)

Ref. Desig.	Part Number	Description
6	J85-0009-001	RECEPTACLE, 230VAC
32	H34-0034-005	TOP ASSY, 125W PA (HF)
41	10221-3840	PWB ASSY, FAN REGULATOR
A1	10221-3820	PWB ASSY, DIST PNL
CB1	10221-9050-02	CIRCUIT BREAKER, 230 VAC
CB2	10221-9050-02	CIRCUIT BREAKER, 230 VAC
CR1	D28-0001-001	THYR TRIAC 40A
CR2	D28-0001-001	THYR TRIAC 40A
CR3	D50-0005-011	DIODE, TRANSIENT SUPPRESS
CR4	D50-0005-011	DIODE, TRANSIENT SUPPRESS
CR5	D50-0005-011	DIODE, TRANSIENT SUPPRESS
CR6	D50-0005-011	DIODE, TRANSIENT SUPPRESS
CR7	D50-0005-011	DIODE, TRANSIENT SUPPRESS
CR8	D50-0005-011	DIODE, TRANSIENT SUPPRESS
F1	F-0072	FUSE 10A CER QA 250V 3AG
F2	F03-0002-022	FUSE 1-1/2A SB 250V 3AG
F3	F03-0002-022	FUSE 1-1/2A SB 250V 3AG
L1	10221-4206	CHOKE,CROWBAR ASSY
L2	10221-4206	CHOKE,CROWBAR ASSY
S1	MS35058-23	SW SP ON-NONE-ON SEALED
W1	10221-3830	CABLE, INTFC, RIGHT PS
W2	10221-3831	CABLE, INTFC LEFT PS
W3	10221-3832	CABLE, INTFC PA
W4	10221-3833	CABLE, TEST POINT
W5	10221-3930	LINE CORD
XF1	F01-0001-002	FUHLR PNL MT SOL .750H
XF2	F01-0001-002	FUHLR PNL MT SOL .750H
XF3	F01-0001-002	FUHLR PNL MT SOL .750H



FRONT VIEW



REAR VIEW

Figure 1. A5 Power Distribution Panel Assembly Component Locations (Sheet 1 of 2)

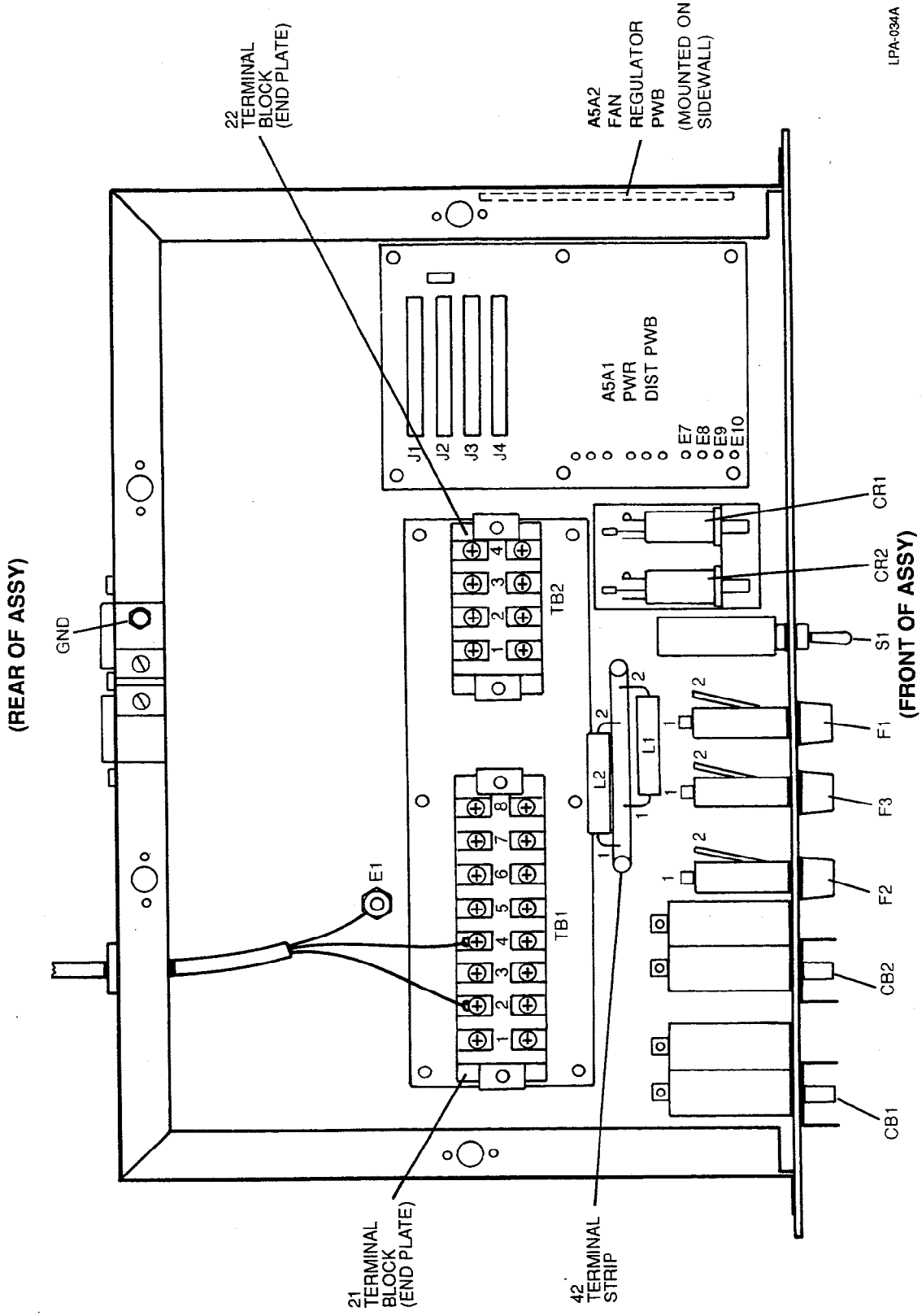


Figure 1. A5 Power Distribution Panel Assembly Component Locations (Sheet 2 of 2)

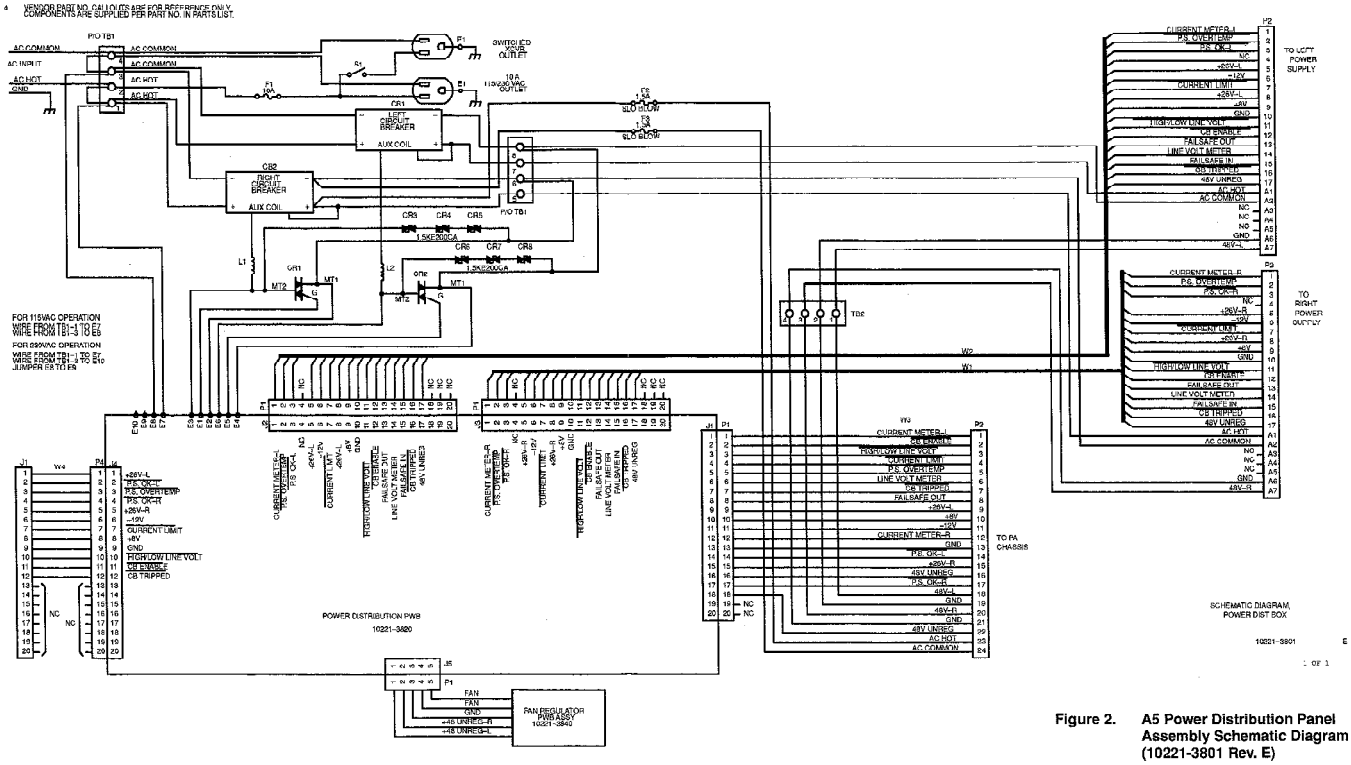


Figure 2. A5 Power Distribution Panel Assembly Schematic Diagram (10221-3801 Rev. E)

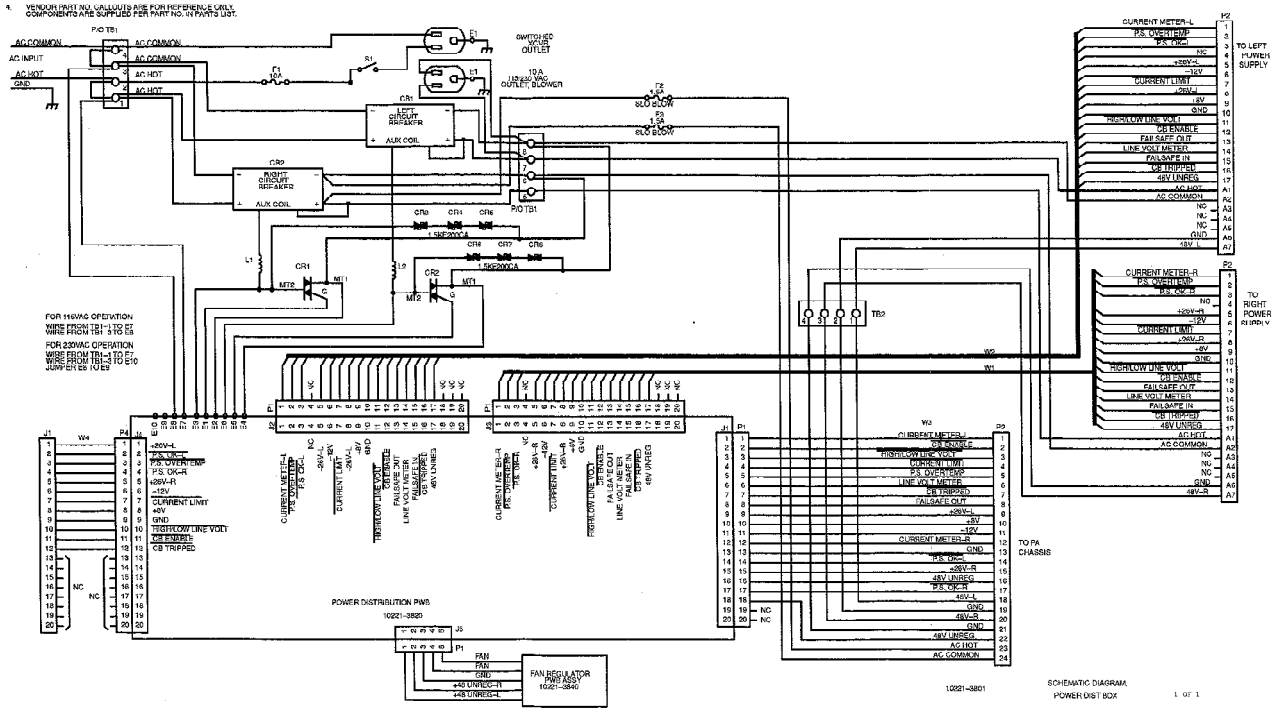
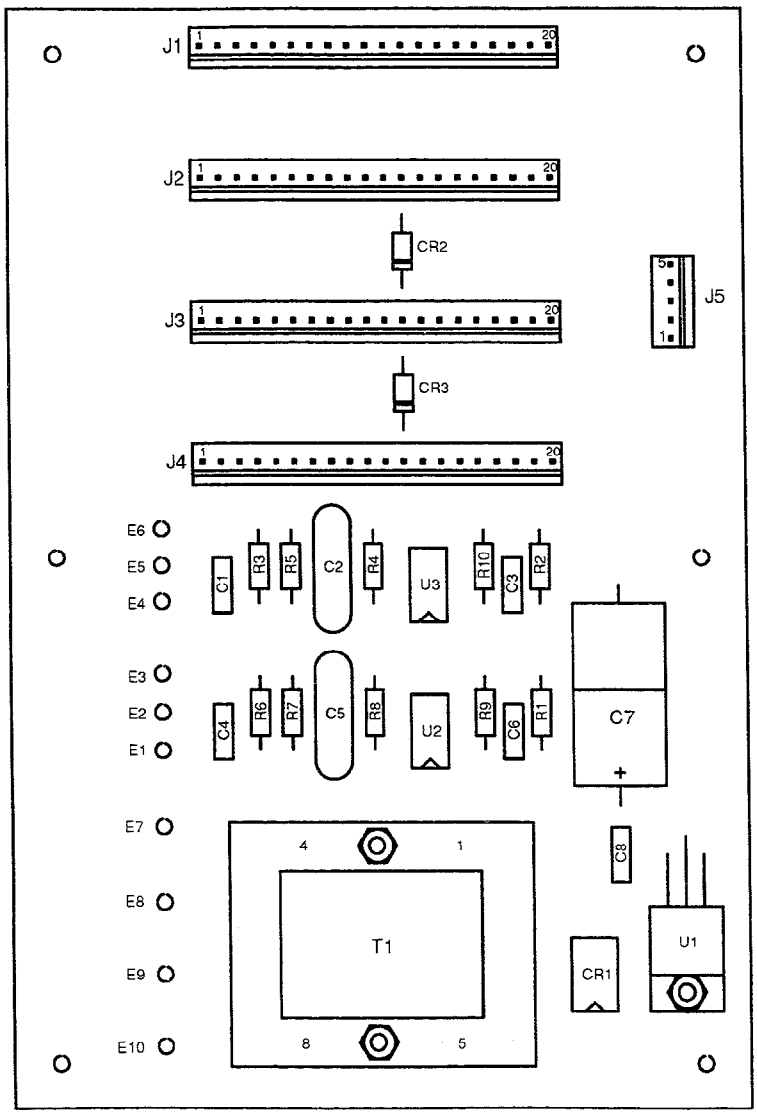


Figure 3. A5 Power Distribution Panel Assembly Schematic Diagram (10221-3901 Rev. –)

A5A1
POWER DISTRIBUTION PANEL PWB ASSEMBLY



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A5A1 POWER DISTRIBUTION PANEL PWB

1. GENERAL INFORMATION

The A5A1 Power Distribution Panel PWB Assembly (10221-3820) is located inside the A5 Power Distribution Panel Assembly. Refer to figure 1 in the A5 tab section for the location of this assembly. The A5A1 PWB has a safety interlock circuit breaker trip.

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Power Distribution Panel PWB and their destinations. The table can be used when tracing signals to and from the Power Distribution Panel PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. A5A1 Power Distribution Panel PWB Assembly Interface Connections

Connector	Signal Name(s)	Connects To
J1	Power Signals	Interconnect PWB A2A1-J1 via W3P2
J2	Power Signals	Left Power Supply A3 via A5W2P2
J3	Power Signals	Right Power Supply A4 via A5W1P2
J4	Power Signals	Test Equipment via A5W4P4
J5	Power Signals	Fan Regulator PWB A5A2P1

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the Power Distribution PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Power Distribution Panel PWB.

Table 2. A5A1 Power Distribution Panel PWB Parts List (10221-3820 Rev. G)

Ref. Desig.	Part Number	Description
C1	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C2	C11-0033-503	CAP .05UF 80% 500V CER
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C5	C11-0033-503	CAP .05UF 80% 500V CER
C6	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C7	C24-2025-108	CAP 1000UF AXL 25V ELEC
C8	M39014/02-1310V	CAP .1UF 10% 100V CER-R
CR1	D22-5005-000	DIODE 1A 200V RECT BR
CR2	1N4004	DIODE 1A 400V RECT GP
CR3	1N4004	DIODE 1A 400V RECT GP
J1	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J2	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J3	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J4	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J5	J46-0022-005	HDR 5 PIN 0.100" SR LKG
R1	R65-0003-680	RES 68 5% 1/4W CAR FILM
R2	R65-0003-680	RES 68 5% 1/4W CAR FILM
R3	R65-0003-331	RES 330 5% 1/4W CAR FILM
R4	R65-0003-510	RES 51 5% 1/4W CAR FILM
R5	R65-0003-151	RES 150 5% 1/4W CAR FILM
R6	R65-0003-331	RES 330 5% 1/4W CAR FILM
R7	R65-0003-151	RES 150 5% 1/4W CAR FILM
R8	R65-0003-510	RES 51 5% 1/4W CAR FILM
R9	R65-0003-680	RES 68 5% 1/4W CAR FILM
R10	R65-0003-680	RES 68 5% 1/4W CAR FILM
T1	T40-0012-124	TRANSFORMER, PWR
U1	I11-0001-001	IC VR 7805 +5V 1.5A 4%
U2	I75-0017-003	OPTOISOLATOR
U3	I75-0017-003	OPTOISOLATOR

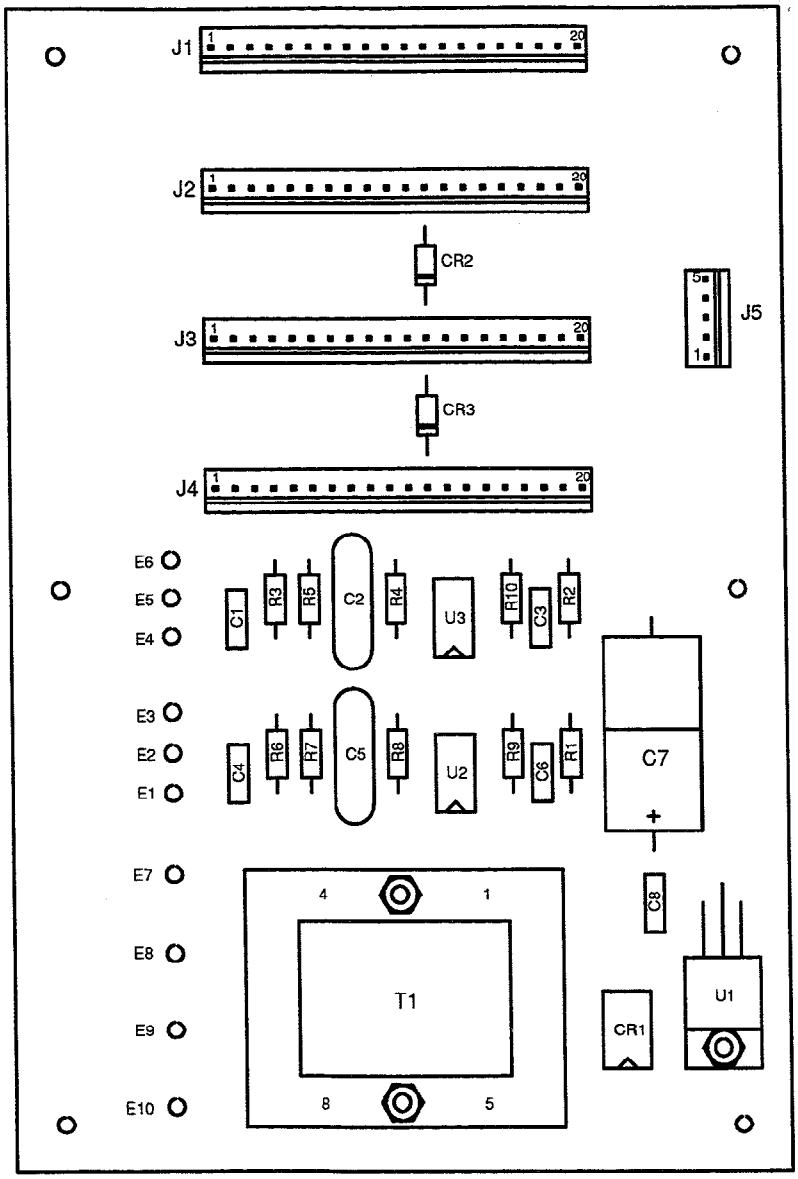


Figure 1. A5A1 Power Distribution Panel PWB Component Location Diagram (10221-3820 Rev. A)

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.

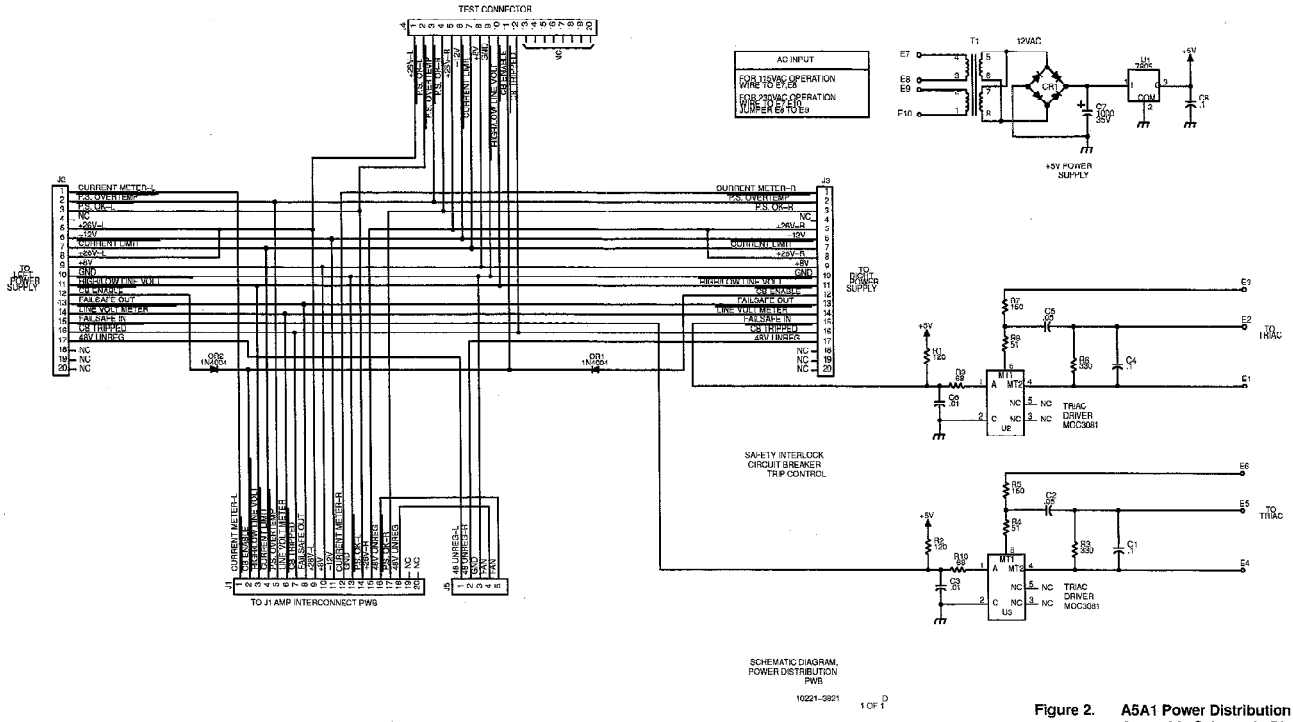
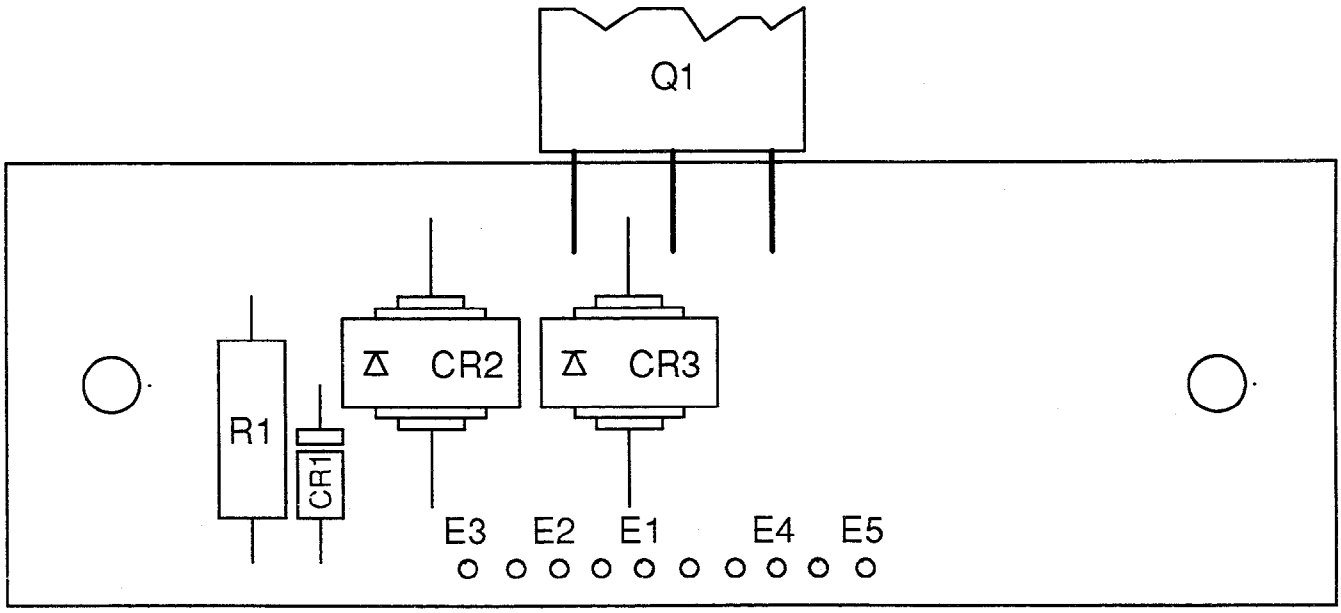


Figure 2. A5A1 Power Distribution Panel Assembly Schematic Diagram (10221-3821 Rev. D)

A5A2
FAN REGULATOR PWB ASSEMBLY



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A5A2 FAN REGULATOR PWB ASSEMBLY

1. GENERAL INFORMATION

The A5A2 Fan Regulator PWB Assembly (10221-3840) is located inside the A5 Power Distribution Panel Assembly on the side wall. (See figure 1 in the A5 tab section for the location of this PWB.)

2. INTERFACE CONNECTIONS

Table 1 lists the input/output connectors on the Fan Regulator PWB and their destinations. The table can be used when tracing signals to and from the Fan Regulator PWB. (Note: The interconnect diagram in section 4 can also be used when tracing signals.)

Table 1. Fan Regulator PWB Assembly Interface Connections

Connector	Signal Name(s)	Connects To
P1	Fan Supply-L	E4 via fan cord to fans
P1	Fan Supply-R	E5 via fan cord to fans
P1	+48V Unreg-L	E1 via fan cord from A2A1 Interconnect PWB Assy
P1	+48V Unreg-R	E2 via fan cord from A2A1 Interconnect PWB Assy
P1	GND	E3

3. PARTS LIST, COMPONENT LOCATION DIAGRAM, AND SCHEMATIC DIAGRAM

Table 2 is the Fan Regulator PWB parts list. Component locations are shown in figure 1. Figure 2 is the schematic diagram for the Fan Regulator PWB.

Table 2. A5A2 Fan Regulator PWB Parts List (10221-3840 Rev. G)

Ref. Desig.	Part Number	Description
CR1	1N4757A	DIODE,ZENER,51V
CR2	CR-0407	DIODE 6A 100V RECT GP
CR3	CR-0407	DIODE 6A 100V RECT GP
P1	J46-0016-005	CONN HOUSING 5 POS 24AWG
Q1	Q-0388	XSTR NPN DARL TIP-140
R1	R65-0004-821	RES 820 5% 1/2W CAR FILM

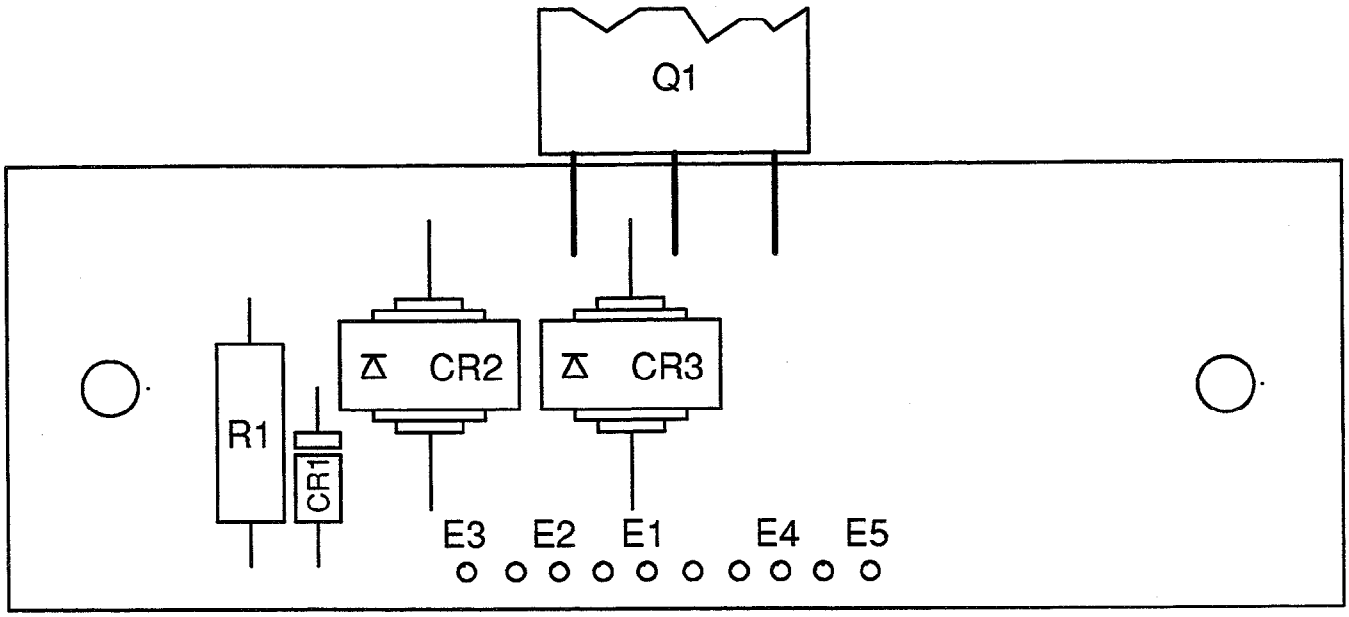
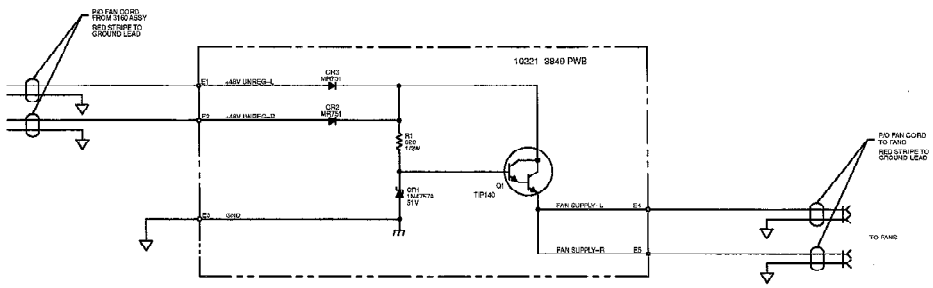


Figure 1. A5A2 Fan Regulator PWB Component Location Diagram (10221-3840 Rev. –)

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, 1/0W.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
4. SLASH (/) DENOTES ACTIVE LOW. DASH (-) INDICATES MULTI-FUNCTION SIGNAL.



10221-3841 REV-
SHEET 1 OF 1

Figure 2. A5A2 Fan Regulator PWB Schematic Diagram (10221-3841 Rev. –)

APPENDIX A

GLOSSARY

AFSK	Audio frequency shift keying
AGC	Automatic gain control
ALC	Automatic level control
ALE	Automatic link establishment
AM	Amplitude modulation
AME	Amplitude modulation equivalent (only one sideband sent)
ARQ	Automatic repeat on request
BAUD	Data bits per second
BPF	Band pass filter
CLK	Clock
CPU	Central processing unit
CW	Continuous wave or carrier wave
DSB	Double sideband
FCC	Federal Communications Commission
FM	Frequency modulation
FSK	Frequency shift keying
Half-Duplex	Receiver and transmitter operate on separate frequencies using one antenna, and simultaneous receive and transmit operation is not possible.
HPF	High pass filter
IC	Integrated circuit
I/O	Input/output
LED	Light emitting diode
LPA	Linear power amplifier or log periodic antenna
LPF	Low pass filter
LSB	Lower sideband
Mic	Microphone
PA	Power amplifier
PCS	Partial carrier suppression
PEP	Peak envelope power

APPENDIX A (Cont.)

GLOSSARY

PLL	Phase locked loop
PTT	Push to talk
PWB	Printed wiring board
RX	Receive
Simplex	Receiver and transmitter operate on the same frequency
SINAD	Measurement of signal quality
S/N	Signal-to-noise ratio
SSB	Single sideband
S-UNITS	Received signal strength measurement units
SWR	Standing wave ratio
T/R	Transmit/Receive
TX	Transmit
USB	Upper sideband
VCO	Voltage-controlled oscillator
VFD	Vacuum fluorescent display
VSWR	Voltage standing wave ratio

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