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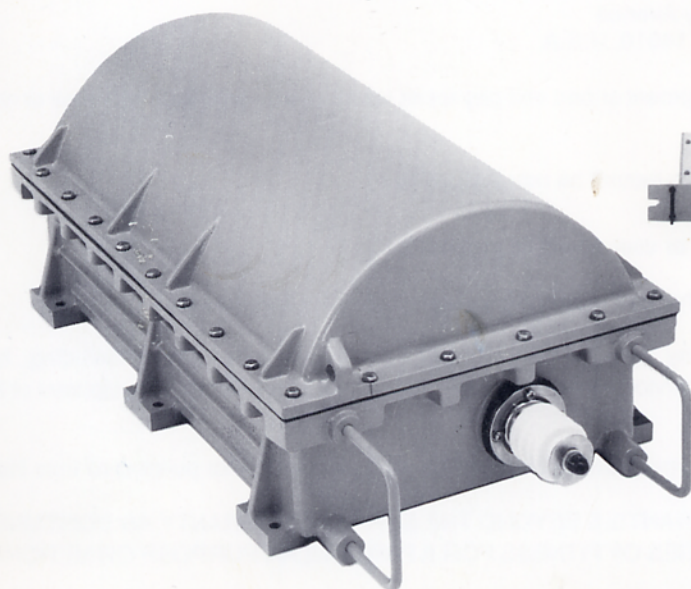
HARRIS

RF COMMUNICATIONS

RF-2601

FAST TUNE AUTOMATIC ANTENNA COUPLER

INSTRUCTION MANUAL





**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:

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- 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:

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- 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.
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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.

RF-2601**1KW FAST-TUNE****HF ANTENNA COUPLER**

*a rugged shipboard
qualified high power
antenna coupler*



The RF-2601 Antenna Coupler is designed specifically for applications where fast frequency change is necessary, such as those incorporating automatic link establishment. It will operate continuously under the most severe environmental conditions in vehicular, transportable, shipboard, and fixed-station applications.

The RF-2601 efficiently and rapidly matches the output of 1 kW transmitters and transceivers to a wide variety of whip, dipole, and long-wire antennas over the frequency range of 1.6 to 30 MHz. Upon keying the associated transmitter on a new frequency, tuning occurs typically in 75 ms using previously stored (memorized) tuning information. Emissions are minimized during memory tuning by limiting actual on-the-air time to less than 30 ms.

The coupler is designed for direct interface with the RF-1140 1kW HF-LSB Transmitter Series and RF-1145 1kW Transceiver System and can be remotored up to 500 feet from the transmitter or transceiver.

The RF-2601 provides extensive automatic monitoring of parameters during normal operation and also incorporates comprehensive operator-initiated static and transmit BIT. If a fault condition should arise, the processor-controlled BIT quickly identifies the source of the problem to the replaceable module level or lower, speeding mean time to repair.

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Specifications for the RF-2601

Electrical

Frequency Range	1.6 to 30 MHz
RF Power	2 to 30 MHz: 1 kW PEP/Average; 1.6 to 2 MHz: 1 kW PEP/500 watts Average
Tuning Capability	1.6 to 30 MHz: 35 foot whip, long wire, dipole, and broadband antennas; (The RF-625A Long-Wire Adapter is necessary for use with long-wires and dipoles.) 2.0 to 30 MHz: 16 to 24 foot mobile and shelter-mounted whips.
Tuning Accuracy	VSWR of 1.2:1 typical
Tuning Time	Memory: 75 milliseconds to 125 milliseconds; Learn: 2-3 seconds typical, 10 seconds maximum.
Tune Power Requirements	25 to 280 watts
Channel Memory	480 channels.
Circuit Protection	Protection from high VSWR, high temperature, low pressurization, RF over-voltage, control line lightning surges, RF path lightning surges.
Coupler Bypass	Automatically in fault mode; Manually, with RF-2602 Status Monitor.
Remote Capability	Up to 500 feet separation between transmitter and coupler with the use of 1/2 inch or 7/8 inch foam dielectric coaxial cable. Up to 250 feet with the use of RG-213/U Coaxial Cable.

Environmental

Temperature	MIL-STD-810D; Method 501.2 Proc I and II (storage at +71°C and operation at +65°C). Method 502.2, Proc. I and II (storage at -62°C and operation at -54°C).
Humidity	MIL-STD-810D; Method 507.2, Proc.II, (0 to 100% relative humidity).
Vibration	MIL-STD-810C; Method 514, Procedure VIII, curve Y except 5 to 55 Hz and 0.15 inches dbl. ampl. or 2.5G, whichever is less. MIL-STD-167-1; Type I for shipboard equipment.
Shock	MIL-S-901; Grade A, Class I (solid mount), Lightweight, type A
Altitude	MIL-STD-810D; Method 500.2, Proc.I and II, (storage and operation to 15,000 ft.).
Salt Fog	MIL-STD-810D; Method 509.2, Proc.I
Dust	MIL-STD-810D; Method 510.2, Proc.I and II (blowing dust and sand).
Rain	MIL-STD-810D; Method 506.2, Proc.I (blowing rain).
Installation	
Power Supply	115/230 VAC \pm 10%, 50/60 Hz single phase
Power Consumption	145 watts maximum. Primary power derived from transmitter/transceiver.
Size	Coupler Unit: 30L x 15W x 10.7H in (76.2L x 38.1W x 27.2H cm) Control Unit: 1.75H x 19W x 8.75D in (4.4H x 48.3W x 22.2D cm)
Weight	Coupler Unit: 86 lb maximum (39 kg) Control Unit: 10 lb (4.5 kg)

Optional Accessories for RF-2601 1 kW Fast-tune HF Antenna Coupler

RF-2601AC	Similar to RF-2601, except RF-2602 Status Monitor is deleted.	RF-636	Dry Air Pump. Hand pump recommended for pressurization of the RF-2601 when dry-nitrogen pressurization equipment is not available. Includes hose. Desiccant condition shown by color indicator on pump body.
RF-625A	Long-Wire Adapter. Permits RF-2601 to tune long-wire antennas.		
RF-628	Dry Nitrogen Kit. For inert gas pressurization of the RF-2601 Antenna Coupler. Includes 20 cubic feet dry-nitrogen-filled cylinder, regulator, and 10 foot hose sufficient to pressurize the RF-2601 up to 12 times.		

Specifications are subject to change without notice.



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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.

HIGHEST REFERENCE DESIGNATION				
C13	CR6	E8	J4	Q2
R14	U2	VR1		
REF. DESIGNATIONS NOT USED				

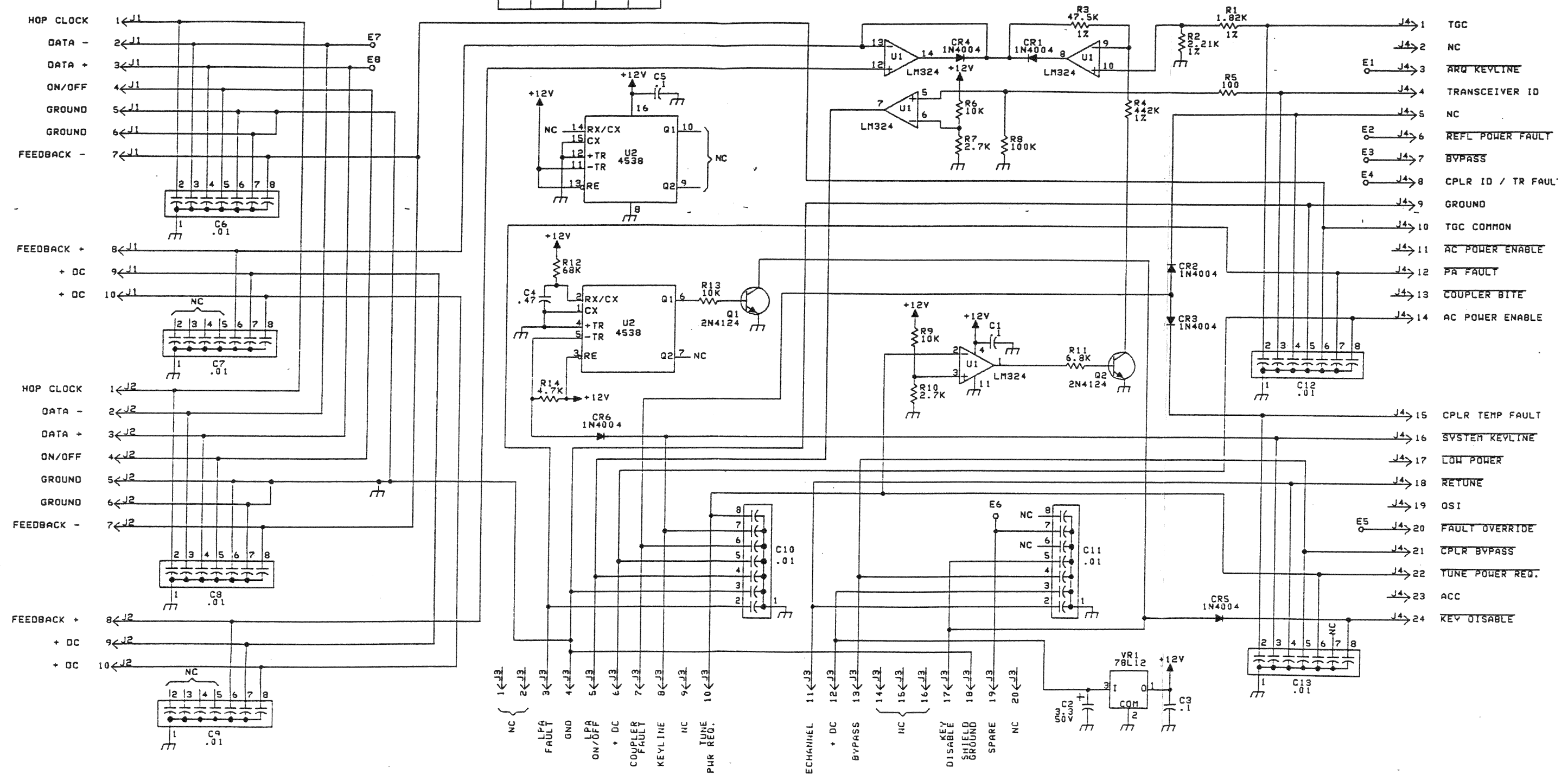


Figure 5-8. Interface PWB Assembly Schematic Diagram (10221-6201 Rev. -)

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. +/-5%.
3. ALL CAPACITOR VALUES ARE IN MICROFARADS.
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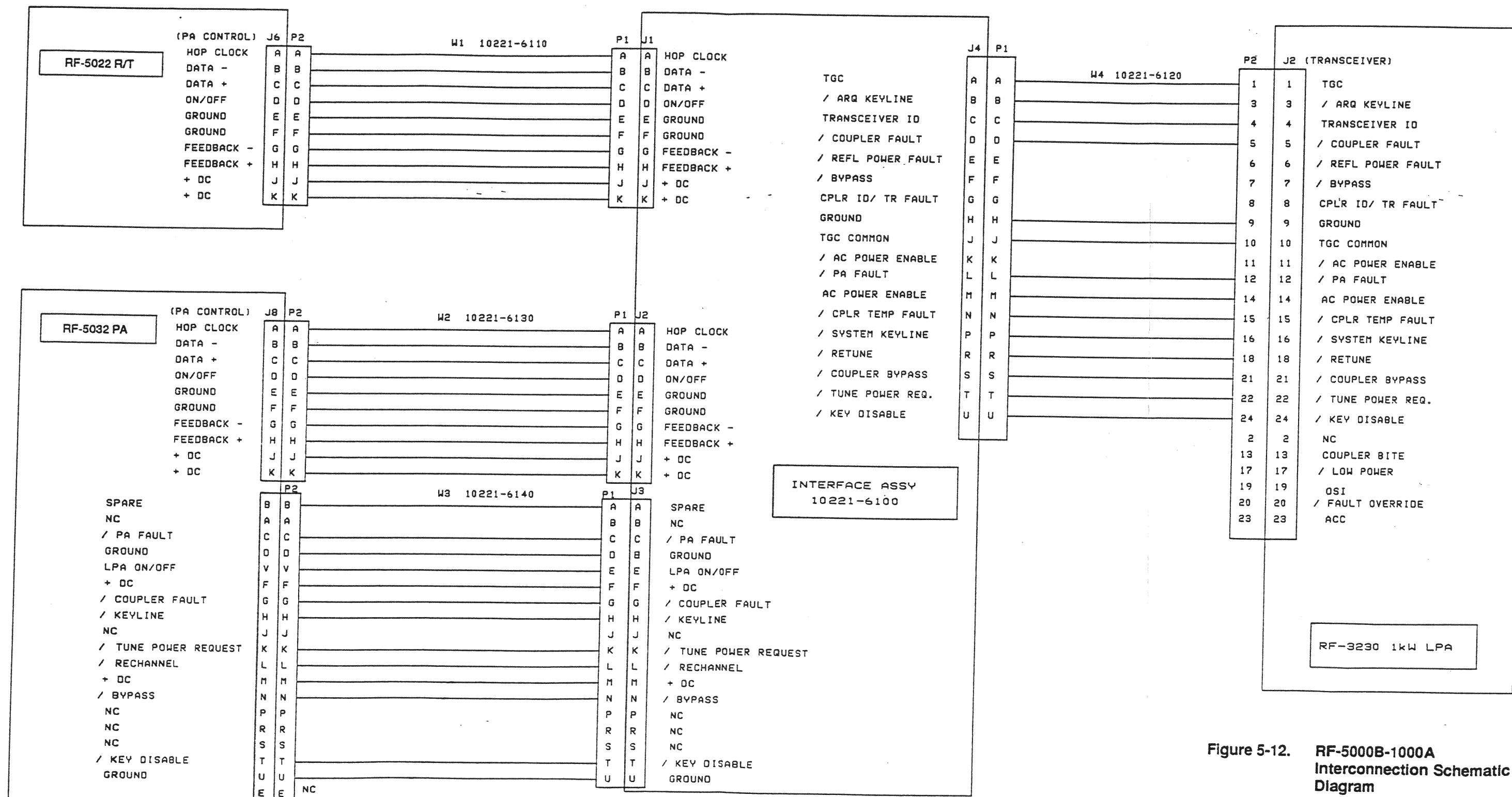


Figure 5-12. RF-5000B-1000A
Interconnection Schematic
Diagram
(10221-6001 Rev. -)

ADDENDUM

ADDENDUM NO: L921	APPLIES TO (RF Model or Product Name): RF-2601 Antenna Coupler	DATE: May 1995
ADDENDUM TO (Publication Number/Revision): 10257-0003C		FOR (Specific Application): ALL MANUALS

Remove the following pages from the RF-2601 Instruction Manual and replace them with the pages contained in this addendum.

- Pages iii through viii of the Table of Contents
- Section 2, Installation: Replace pages 2-13 through 2-25/2-26.

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- SEE SPECIFICATIONS PAGE FOR COMPATIBLE ANTENNA TYPES. FOR LONG-WIRE ANTENNAS GREATER THAN 75 FT., USE RF-625A LONG-WIRE ADAPTER.
- FOR DIPOLE OR LOG PERIODIC ANTENNAS, TERMINATE CENTER CONDUCTOR AT E1 AND SHIELD (OUTER CONDUCTOR) AT THREADED HOLE IN MOUNTING FOOT.
- CONNECT GROUND STRAP AT THREADED HOLE IN MOUNTING FOOT OF RF-2601 TO GOOD EARTH GROUND, SUITABLE COUNTERPOISE, OR SHIP'S GROUND PLATE AS APPROPRIATE.
- CONTACTS D, H, K, T, W, X, Y, Z, a THROUGH s HAVE NO CONNECTION AND ARE NOT SHOWN FOR CLARITY.
- GROUND CONSISTS OF SHIELD AND ONE WIRE CONNECTED AT BOTH ENDS OF CABLE.
- SPECIAL CONNECTOR IS SUPPLIED IN RF-2601 ANCILLARY KIT. IT IS SIMILAR TO AN MS3106F28-21S EXCEPT IT HAS AN EXTENDER SHELL AND CABLE SEAL GLAND.
- SEE SECTION 2, PARAGRAPH 2.8 FOR ENVIRONMENTAL PROTECTION OF CONNECTORS.
- USE RG-213/U COAXIAL CABLE, OR EQUIVALENT, UP TO 250 FEET (76M). USE 1/2 INCH OR 7/8 INCH (12.7 OR 19.1MM) FOAM DIELECTRIC COAXIAL CABLE UP TO 500 FEET (152M).
- IF THE RF-2601 IS REPLACING AN RF-601, RF-601A, AN/URA-38, AN/URA-38A, OR AN/URA-38C ANTENNA COUPLER, THE EXISTING MULTI-CONDUCTOR CABLE ASSEMBLY PREVIOUSLY USED BETWEEN THE ANTENNA COUPLER AND THE COUPLER CONTROL CAN BE USED (INSTEAD OF THE CONTROL CABLE INDICATED) IF A CONTROL CABLE ADAPTER IS USED. AS FOLLOWS: USE ADAPTER P/N 10257-0019-01 TO INTERCONNECT TO AN RF-130, RF-1130 OR AN/URT-23 SERIES TRANSMITTER. USE P/N 10257-0019-02 TO INTERCONNECT TO AN RF-350 OR RT-1446 URC TRANSCEIVER. USE P/N 10257-0019-03 TO INTERCONNECT TO AN RF-2602 STATUS MONITOR.
- SEE NOTE 9. IN ADDITION, THE CONTROL CABLE PREVIOUSLY USED BETWEEN THE TRANSMITTER AND COUPLER CONTROL MUST BE MODIFIED TO BE USED BETWEEN THE TRANSMITTER AND RF-2602, OR USE THE CABLE ASSEMBLY AS SHOWN. OBSERVE THE SETTINGS OF RF-2602 INTERNAL SWITCHES, S1 AND S3, PER THE INSTRUCTIONS LOCATED ON THE PULL-OUT CARD OF THE RF-2602.
- WIRES DENOTED BY DASHES EXIST IN PURCHASED CABLE ASSEMBLIES FOR MANUFACTURING CONVENIENCE. THEY ARE NOT REQUIRED, NOR DESIRED FOR OPERATION. THE WIRES NEED NOT BE CONNECTED IN CUSTOMER-MADE CABLES, IF SO DESIRED. SETTINGS OF RF-2602 INTERNAL SWITCHES, S1 AND S3, MUST BE OBSERVED PER THE INSTRUCTIONS LOCATED ON THE PULL-OUT CARD IN THE RF-2602.

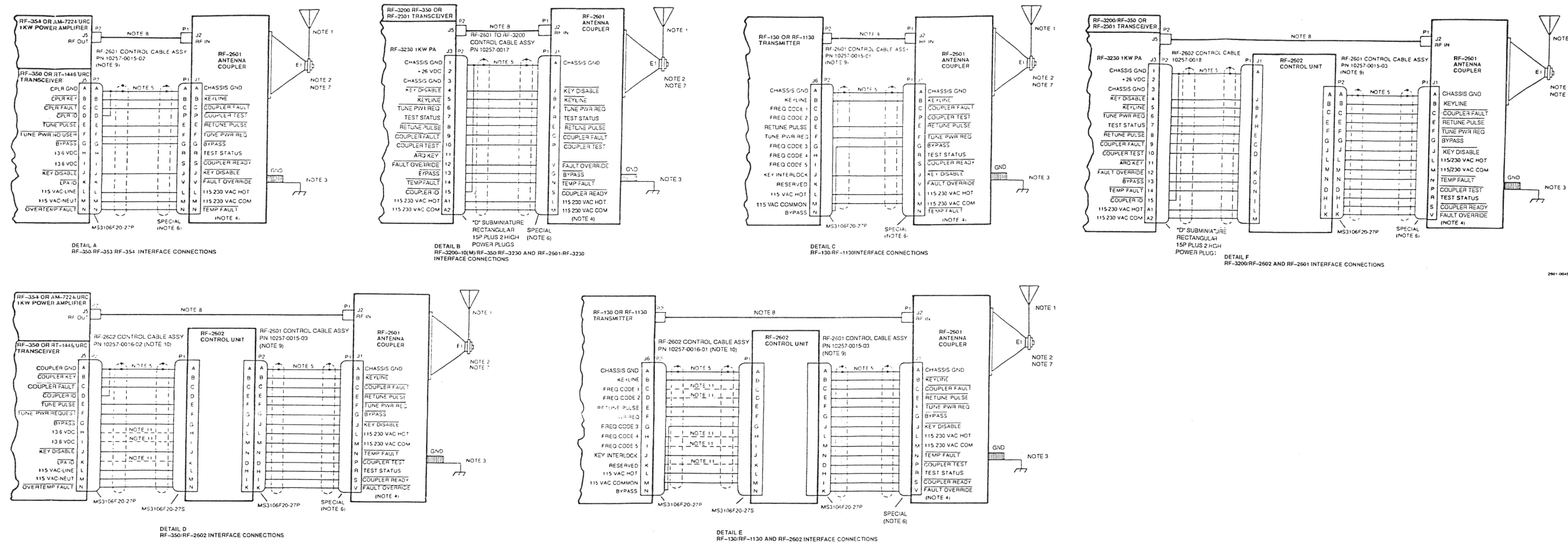


Figure 2-7. System Interconnect Data
(Sheet 1 of 2)

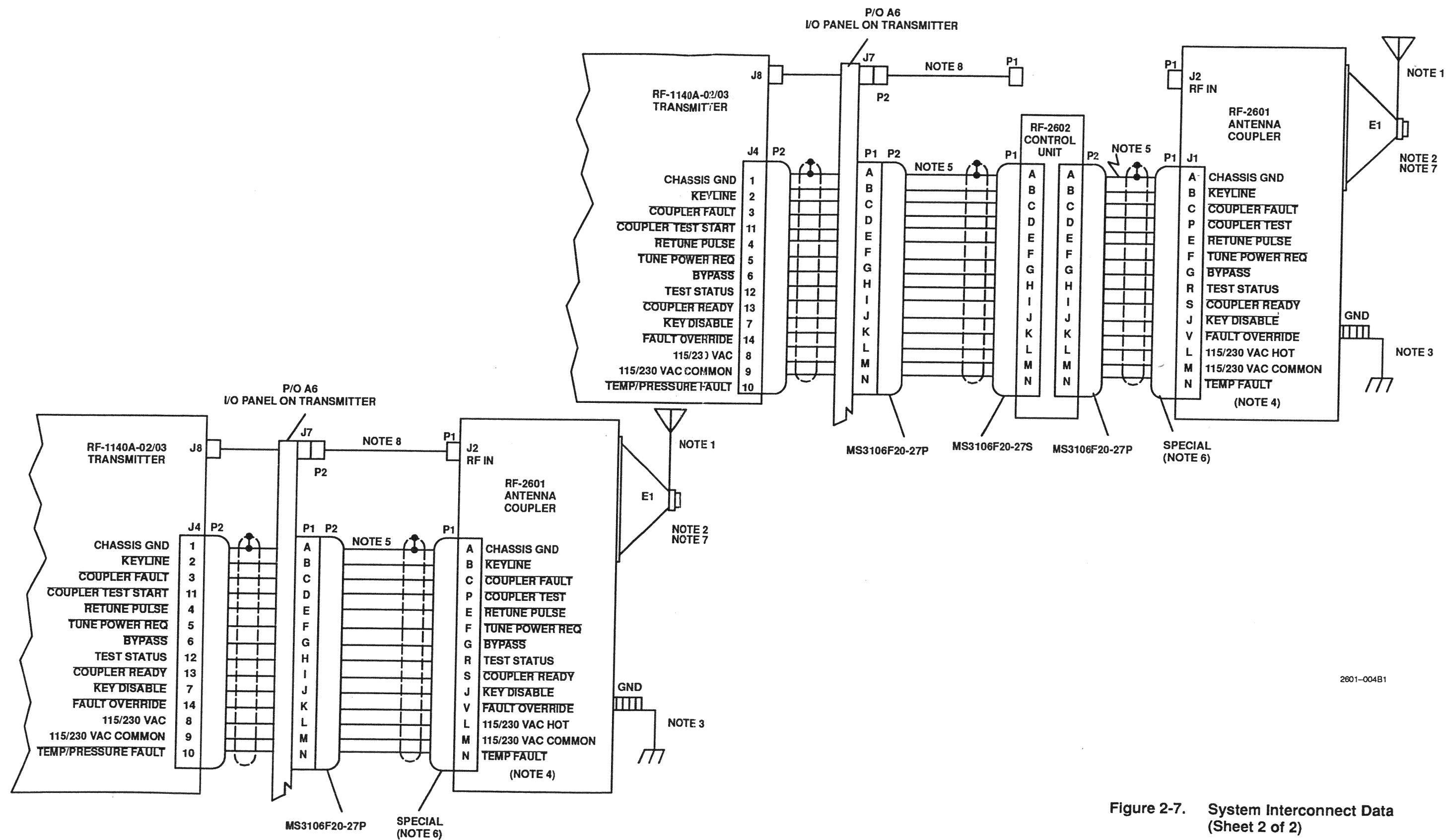
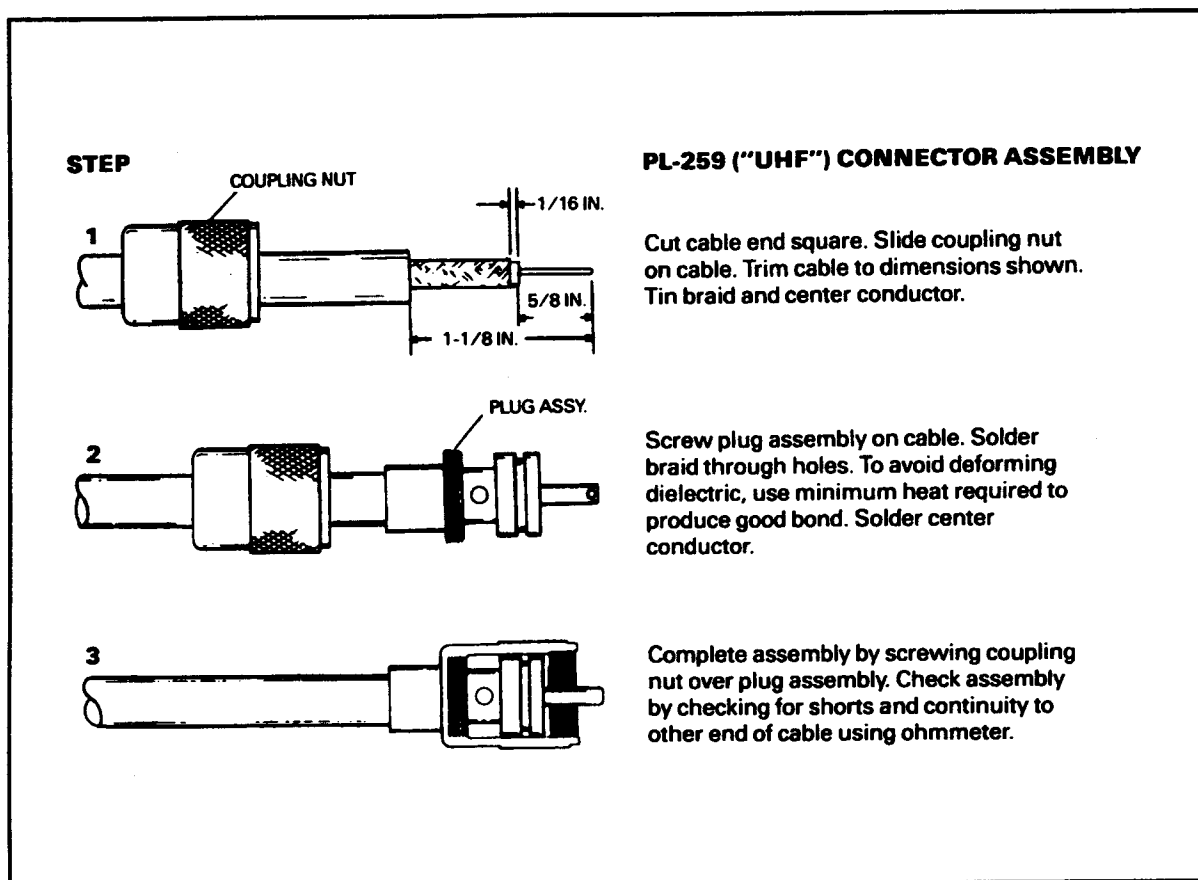
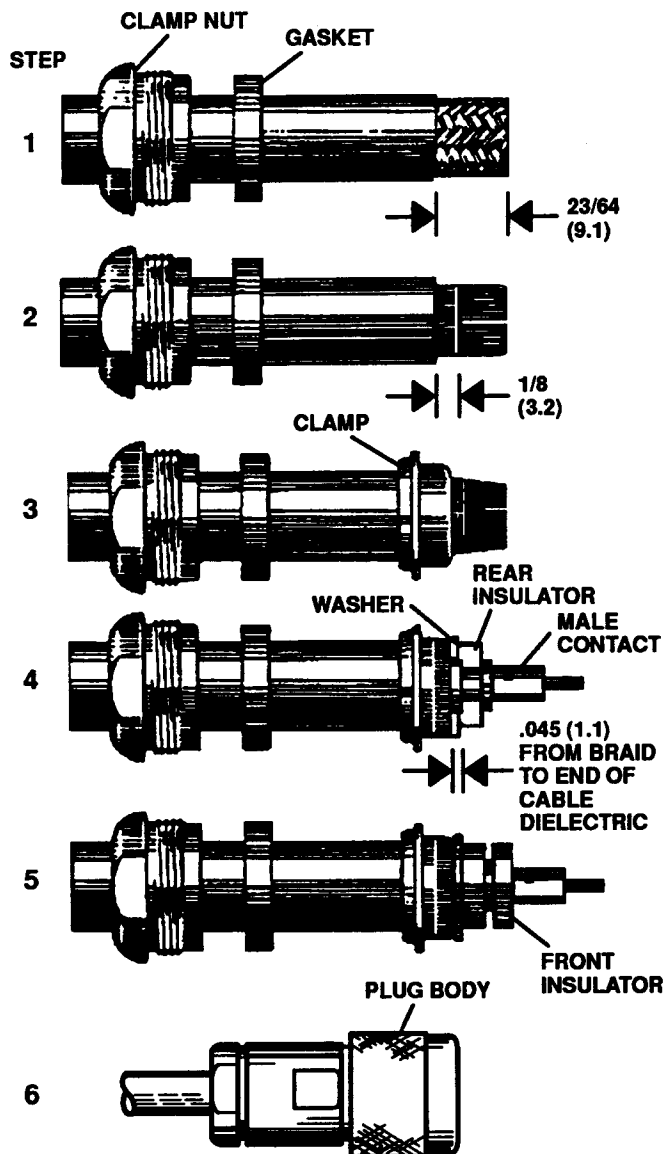


Figure 2-7. System Interconnect Data
(Sheet 2 of 2)



R32-018B

Figure 2-8. RF Cable Fabrication Procedure (Sheet 1 of 2)



M39012/01-0005 ("N") CONNECTOR ASSEMBLY

Cut cable end square, place clamp-nut and gasket, (with "V" groove toward clamp) over cable. Remove 23/64" (9.1mm) of vinyl jacket.

Comb out copper braid as shown. Cut off cable dielectric 1/8" (3.2mm) from end of jacket.

Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against cable jacket.

Fold back braid wires as shown, trim wires to proper length, and form wires over clamp as shown. Tin exposed center conductor, using minimum amount of heat.* Slide on washer, rear insulator, and contact. Contact shoulder, insulator, and cable core must butt as shown. Solder contact to center conductor.*

Slide front insulator over contact. Be sure to place counter bore end of insulator toward mating end of contact.

Insert prepared cable termination into connector body. Make sure sharp edge of clamp seats properly in gasket. Tighten nut, holding body stationary.

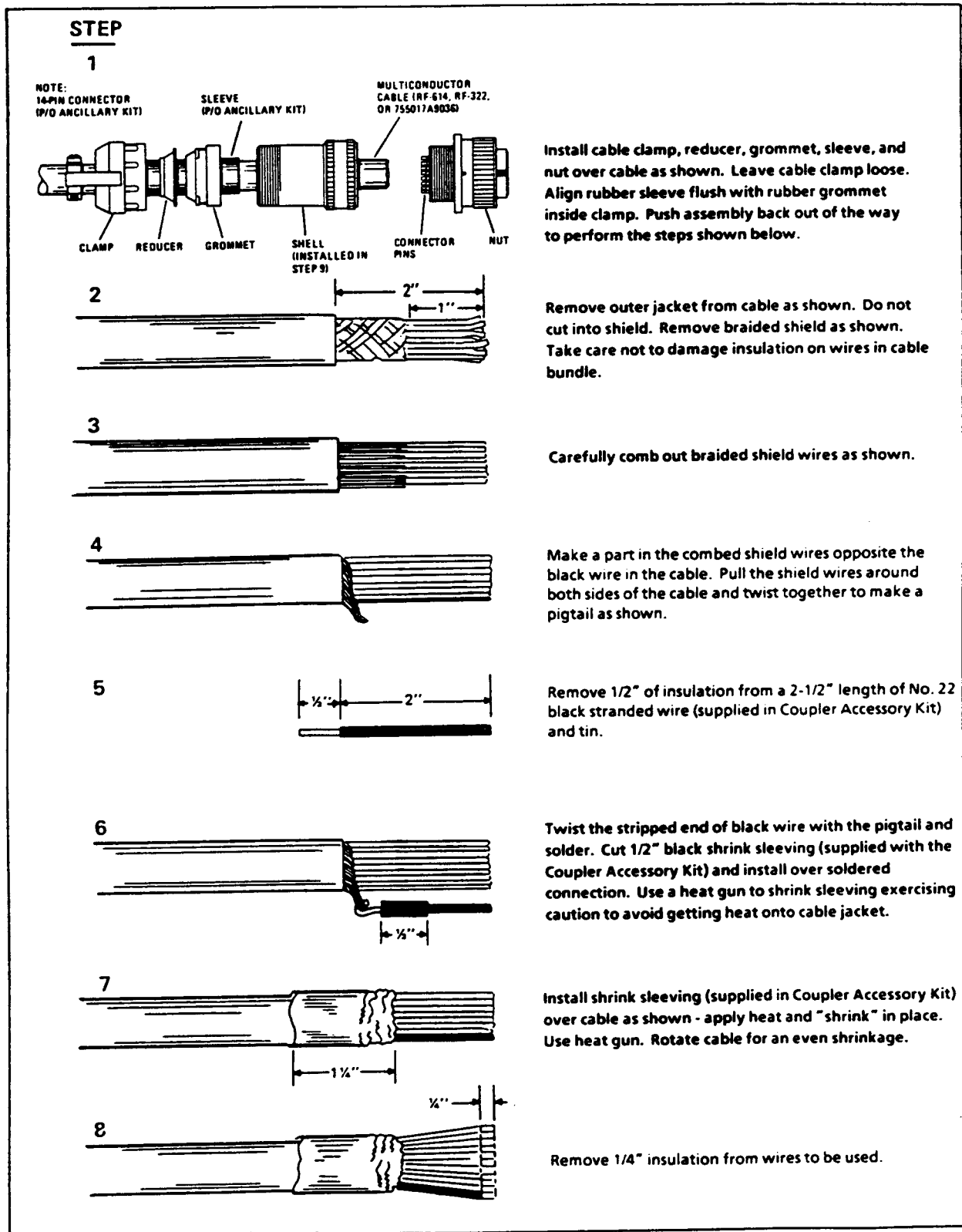
NOTE:

For armored cable, slide cap over armor first. Push armor and cap back out of way, and proceed with assembly as directed above using armor clamp in place of standard clamp nut. When assembly is complete, straighten bulge in armor and trim so it can be clamped between nut and cap.

*Use Divco #276 (or other high temperature alloy) solder for high temperature applications.

R32-019

Figure 2-8. RF Cable Fabrication Procedure (Sheet 2 of 2)



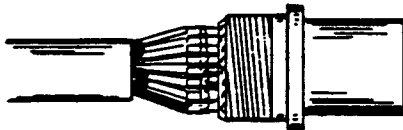
382-009 (1)

Figure 2-9. Control Cable Fabrication Procedure (Sheet 1 of 2)

STEP

9

10



Install Shell over cable.

Refer to figure 2-7 for proper interface connections. Twist and tin stripped wires together to form parallel connections as specified. Use shrink tubing to insulate soldered connections. Twist and tin remaining stripped wires. Cut sleeving supplied in ancillary kit into 1/2-inch (1-1/4 cm) lengths and slide over each wire. Keep wires parallel as they come out of the cable bundle to the connector pins. Ensure the black wire installed in step 6 and the ground wire in the cable are lined up with and soldered together in connector solder cup. Solder wires to the solder cups. Slide sleeving over solder cups. Write down wire colors assigned to each pin number for reference when assembling the connector on the other end of the cable.

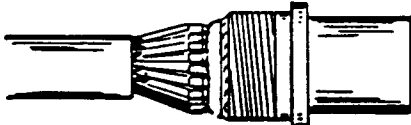
11

Repeat assembly and soldering procedures for the other end of the cable.

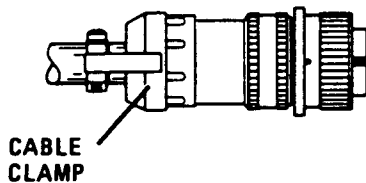
12

Check both ends of the cable for continuity, shorts between wires and shorts to the connector shell.

13



14



Assemble the plug as shown. Assemble clamp and shell as tightly as possible to assure a watertight connection around the cable. **DO NOT TWIST CABLE WHILE TIGHTENING.** After control and RF connectors have been threaded on Coupler case connectors J1 and J2, it may be desirable to wrap both connectors with several layers of plastic electrical tape as close to the Coupler case as possible. (For protection against corrosion of mating threads in wet or humid environments.)

NOTE: To convert inches to centimeters, multiply by 2.540.

382-009 (2)

Figure 2-9. Control Cable Fabrication Procedure (Sheet 2 of 2)

2.8 GROUNDING

The coupler ground configuration is an integral part of the antenna electrical system. The importance of this ground to effective system operation cannot be overemphasized. Inadequate grounding degrades system operation, and causes RF voltages to be present on the chassis. These voltages could cause equipment damage, and create a serious hazard to personnel.

WARNING

Inadequate or defective grounding creates a serious hazard to personnel that could result in serious injury or death.

CAUTION

Inadequate or defective grounding could damage the equipment.

Ground straps must be constructed of wide copper straps, and be as short as possible. Ground straps should be clamped and bonded to at least two ground rods. The rods must be at least 6 to 8 feet (1.83 to 2.44 m.) long, and must be spaced 4 to 5 feet (1.22 to 1.52 m.) apart around the coupler ground terminal. If ground rods cannot be used (for example, roof installation or insufficient soil conductivity), a ground counterpoise must be constructed using at least 16 insulated ground radials, longer than the antenna. The radials should be laid on the earth's surface, and must be well-bonded to the ground rods.

If the antenna coupler is mounted to a ship's bulkhead or deck, ensure a paint-free, rust-free mounting surface. (See paragraph 2.9 (c).)

2.9 ENVIRONMENTAL PROTECTION

If the coupler is exposed to a wet or humid environment, protect the exposed input connectors as follows:

- a. After connectors are installed, wrap both connectors with one layer on self-fusing silicone tape, P/N P50-0008-416, and two layers of vinyl electrical tape, P/N P05-0001-000. Wrap the connectors coming as close to the antenna coupler as possible. Extend the tape at least two inches down the cable.
- b. Coat the insulator at the antenna output connection and all ground connections with Dow Corning DC-5, General Electric G-635, or an equivalent dielectric compound (Harris Part No. P25-0002-000). Apply a coating approximately 1/8 inch (0.32 cm.) thick. This coating prevents deterioration of the antenna connection and its associated hardware. This coating also protects the insulator from conductive contaminants that could degrade the insulating properties of the output connector system, such as oil, dirt, dust, and corrosive material from the atmosphere. This is especially important in a salt-laden air environment.
- c. Coat all mounting surfaces and mounting hardware threads with anti-seize compound (Harris Part No. P40-0002-000) (included in ancillary kit). This compound retards corrosion, and prevents seizing of hardware threads.

2.10 INITIAL ADJUSTMENTS

The RF-2601 coupler requires no routine installation adjustments. Refer to the Operation section for specialized information on a particular system.

Before operation, verify the following:

1. Correct system voltage:

Without applying power to coupler or status monitor, verify 115 Vac 10% or 230 Vac 10% operating voltage (as appropriate) is present at the coupler input control connector J1 or RF-2602 Status Monitor control connector J1.

2. Coupler input voltage switch setting:

If the covers of the antenna coupler are in place so that the 115/230 Vac switches are inaccessible, measure the resistance between pins L and M on J1 of the antenna coupler, and pins L and M on J2 (with ac switch off) of the status monitor.

NOTE

The following resistance values do not account for control cable resistance. Add 2 ohms of resistance per 100 feet of 20 AWG control cable used.

If the resistance at the pins of the antenna coupler is about 3 ohms, the 115/230 Vac switch is set for 115 Vac. If the resistance is about 12 ohms, the 115/230 Vac switch is set for 230 Vac. If coupler input voltage switch setting is not correct, remove cover and set accordingly. Replace cover and pressurize per paragraph 5.7.2.2.

3. Status monitor input voltage switch setting:

If the resistance at the pins of the status monitor is about 55 ohms, the 115/230 Vac switch is set for 115 Vac. If the resistance is about 220 ohms, the 115-230 Vac switch is set for 230 Vac. Remove status monitor cover and set as required. See paragraph 5.6.

4. Status monitor system configuration settings:

Remove status monitor cover and check DIP switches S3 and S1 settings as per table 2-3. See also paragraph 5-6 and tab section RF-2602, figure 1.

5. All connections are in place and secure.

6. Antenna and antenna coupler grounds are in place and adequate.

7. Appropriate transceiver connections are made.

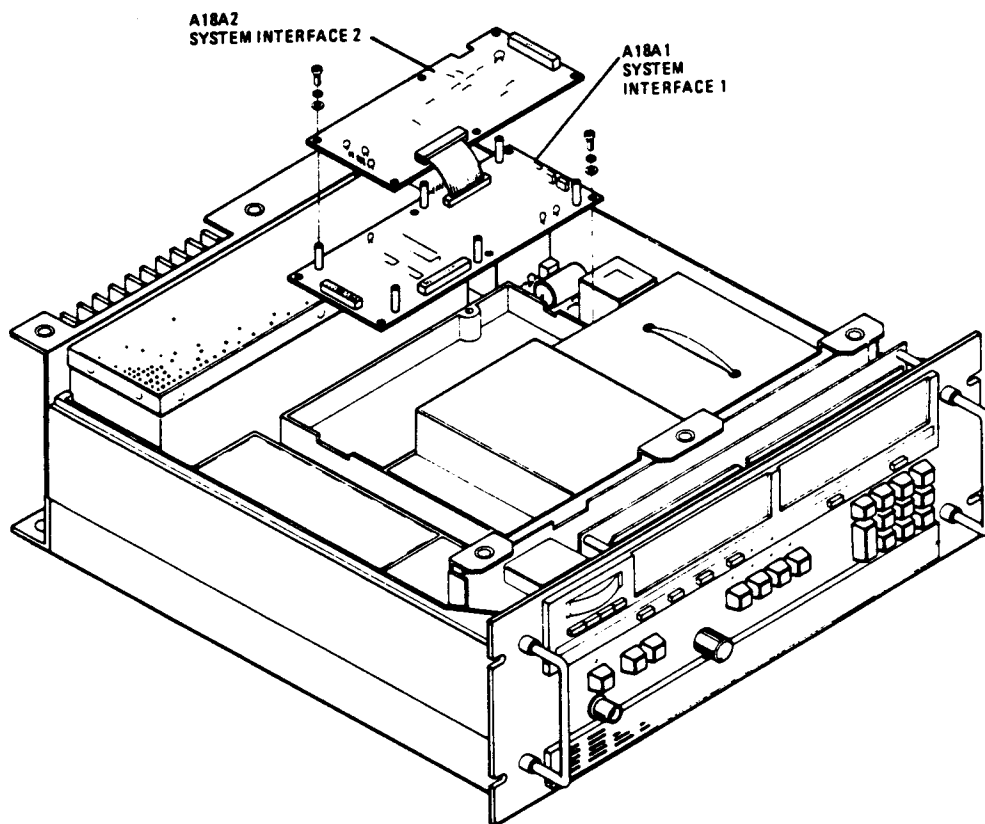
8. If the transmitter employs an RF-1310 Exciter, check its option switches per table 2-4, and figures 2-10 and 2-11.

Table 2-3. Status Monitor DIP Switch Settings

Transmitter/Transceiver Series	Switch Positions (C = Closed, O = Open)							
	S3-1	S3-2	S3-3	S3-4	S1-1	S1-2	S1-3	S1-4
RF-130, RF-1130, AN/URT-23	O	O	O	O	O	O	O	C
RF-350, RT-1446/URC	O	O	O	O	C	C	C	C
RF-3200-10(M)	C	C	C	C	C	C	C	C
RF-155DR	O	O	O	O	O	O	O	O

Table 2-4. RF-1310 Exciter Option Switches on A18A1 System Interface 1 Assembly

Switch Position	Description	
S1-1	Transmitter Gain Control Learn Enable	<p>Determines whether full power attenuation value used is the one stored in the battery-backed A14 RAM, or if a new one is learned and stored at the end of a PA tune cycle.</p> <p>Closed = Learn Disable - attenuation value is the one stored in A14 RAM. This value may cause the initial RF power output to the coupler to be very low or high the first time system is keyed after coupler is tuned. RF power then steps to 1000 watts. Subsequent keying results in quick risetime to 1000 watts.</p> <p>Open = Learn - a new value of attenuation needed for full power output will be learned and stored in A14 RAM. RF power will kick up at end of coupler tune cycle to learn where 1000 watts is the first time system is keyed. Subsequent keying results in quick risetime to 1000 watts.</p>
S1-2	Attenuation Control	<p>Determines whether attenuator control values are a function of what is read from potentiometer R15 or if normal TGC operation is in effect. (Used for test only. Leave switch in OPEN position.)</p> <p>Closed = Attenuation Manual - control value is read directly from R15 and TGC is disabled.</p> <p>This value may be stored in the A14 RAM as the learned value for a particular frequency by checking that S1-1 is closed and depressing S2.</p> <p>Open = Attenuation Auto - normal attenuation control under TGC.</p>
S1-3	Coupler Control	<p>Tells exciter to include RF-601A Antenna Coupler in tune cycle. Position switch closed for RF-2601 Antenna Coupler.</p> <p>Closed = All couplers but RF-601A.</p> <p>Open = RF-601A coupler only - enables a timer to declare homing or tuning time-out faults.</p>
S1-4	Signal Generator	<p>Allows exciter to be operated as a signal generator. In this mode, attenuation is set to front panel value. Exciter is ready when placed in operate and exciter must be keyed for output. PA is disabled from keying. Position switch closed for operation with RF-2601 Antenna Coupler.</p> <p>Closed = Exciter is in normal operating mode.</p> <p>Open = Exciter is in signal generator mode.</p>



1310-059

Figure 2-10. RF-1310 A18 Assembly Location

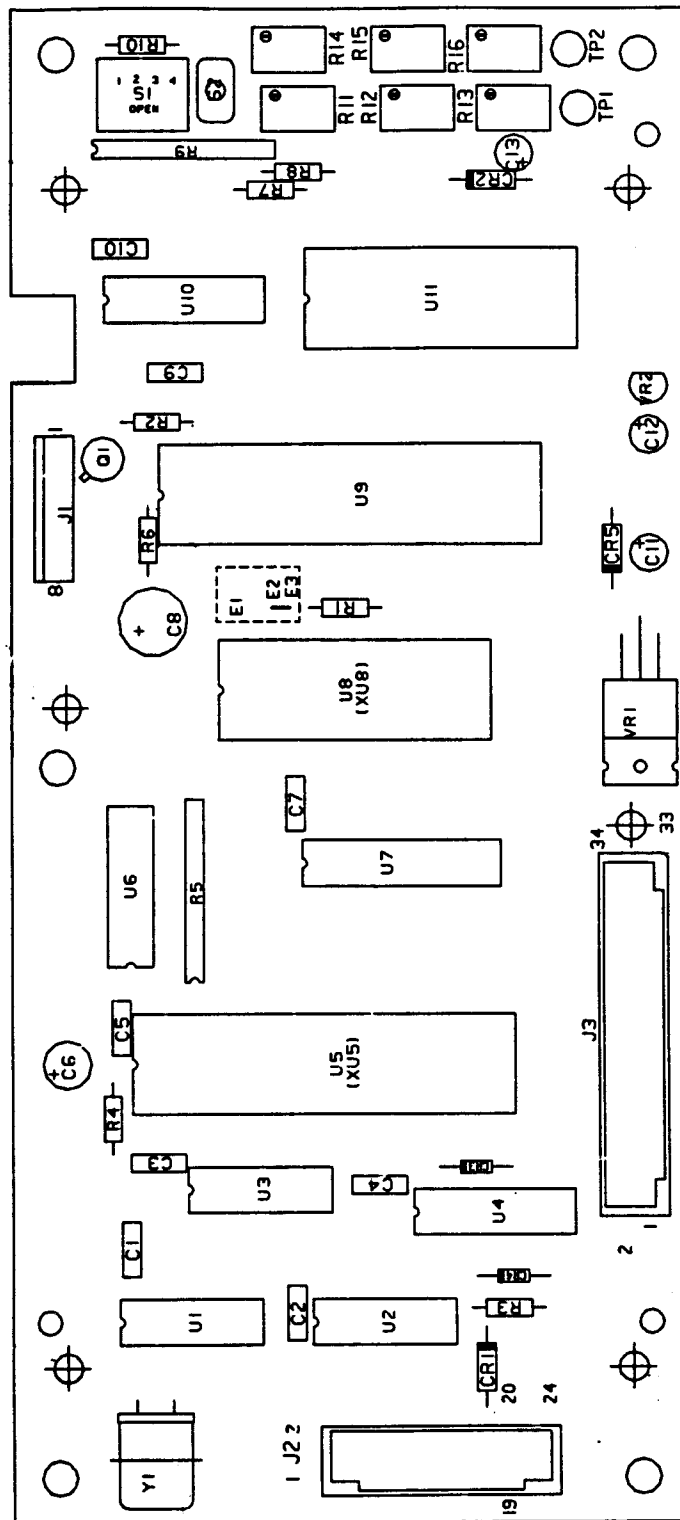


Figure 2-11. RF-1310 System Interface 1 Assembly A18A1 Component Location Diagram
(10121-6310 Rev. F)

RF-2601

FAST TUNE AUTOMATIC ANTENNA COUPLER

INSTRUCTION MANUAL

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Equipment manufactured by Harris Corporation, RF Communications Division meets stringent quality and safety standards. However, high voltages are present in many radio products, and only a skilled technician should attempt to remove outer covers and make adjustments or repairs. All personnel who operate and maintain the equipment should be familiar with this page as a safety preparedness measure. Although this procedure is reproduced as a service to the personnel involved with this equipment, Harris Corporation assumes no liability regarding any injuries incurred during the operation and repair of such equipment, or the administration of this suggested procedure.

ELECTRICAL SHOCK: EMERGENCY PROCEDURE

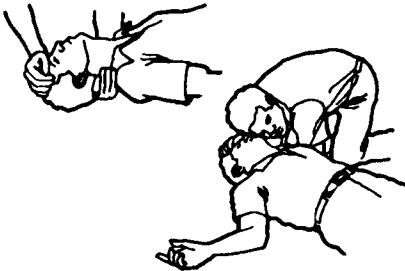
The victim will appear unconscious and may not be breathing. If the victim is still in contact with the voltage source, disconnect the power source in a manner safe to you, or remove the victim from the source with an insulated aid (wooden pole or rope). Next, determine if the victim is breathing and has a pulse. If there is a pulse but no breathing, administer artificial respiration. If there is no pulse and no breathing, perform CPR (if you have been trained to do so). If you have not been trained to perform CPR, administer artificial respiration anyway. Never give fluids to an unconscious person.

WHEN BREATHING STOPS



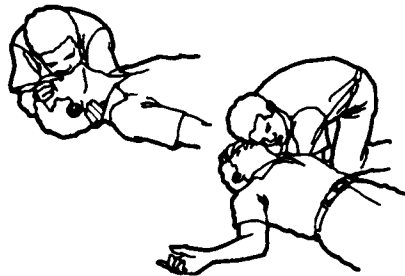
FIRST, send someone to get a **DOCTOR**.
THEN, administer first aid to restore breathing (artificial respiration):

1 IF A VICTIM APPEARS TO BE UNCONSCIOUS
TAP VICTIM ON THE SHOULDER AND SHOUT, "ARE YOU OKAY?"



2 IF THERE IS NO RESPONSE
TILT THE VICTIM'S HEAD, CHIN POINTING UP. Place one hand under the victim's neck and gently lift. At the same time, push with the other hand on the victim's forehead. This will move the tongue away from the back of the throat to open the airway.

IMMEDIATELY LOOK, LISTEN, AND FEEL FOR AIR.
While maintaining the backward head tilt position, place your cheek and ear close to the victim's mouth and nose. Look for the chest to rise and fall while you listen and feel for the return of air. Check for about five seconds.



3 IF THE VICTIM IS NOT BREATHING
GIVE FOUR QUICK BREATHS.
Maintain the backward head tilt, pinch the victim's nose with the hand that is on the victim's forehead to prevent leakage of air, open your mouth wide, take a deep breath, seal your mouth around the victim's mouth, and blow into the victim's mouth with four quick but full breaths just as fast as you can. When blowing, use only enough time between breaths to lift your head slightly for better inhalation.

If you do not get an air exchange when you blow, it may help to reposition the head and try again.

AGAIN, LOOK, LISTEN, AND FEEL FOR AIR EXCHANGE.



4 IF THERE IS STILL NO BREATHING
CHANGE RATE TO ONE BREATH EVERY FIVE SECONDS.

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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RF-2601AC SPECIFICATIONS

Frequency Range:	1.6 to 30 MHz
RF Power:	2 to 30 MHz: 1kW PEP/average 1.6 to 2 MHz: 1kW PEP/500 W average
Tuning Capability:	1.6 to 30 MHz: 35 foot whip, long wires, dipoles (such as RF-1912 and AS-2259 /GR), and broadband antennas. (The RF-625A long wire adapter is necessary for use with long wires.) 2 to 30 MHz: 16 to 24 foot mobile and shelter whips.
Tuning Accuracy:	Automatically tunes to 50 ohms within a VSWR of 1.5:1.
Tuning Time:	75 milliseconds tuning from memory (125 ms for RF-3200-10/10 m) based on prior tuneup of 2 to 3 seconds typical, 7 seconds maximum.
Tune Power Requirements:	25 to 200 watts
Channel Memory:	512 channels
Features:	Protection from high VSWR, high temperature, RF overvoltage, low pressurization, and control line lightning surges. Contains self-test.
Harmonic Rejection:	Provides additional 10 dB to 25 dB transmitter harmonic rejection depending on antenna.
Coupler Bypass:	Bypass mechanism engages automatically in fault mode, manually with RF-2602 Status Monitor. Can be used in transmit and receive modes.
Remote Capability:	Up to 500 ft. separation between transmitter and coupler with the use of 1/2 inch or 7/8 inch foam dielectric coaxial cable.
Primary Power Requirements:	115/230 Vac 10%, 47/63 Hz, single phase, 145 watts max, typically less than 100 watts. Primary power derived from transmitter/transceiver.
Weight:	86 lb. maximum (39.0 kg)
Size:	30.0 x 15.0 x 10.7 inches (76.2 x 38.1 x 27.0 cm)

RF-2601AC SPECIFICATIONS (Cont.)

ENVIRONMENTAL CONDITIONS

Vibration:	MIL-STD-810C: Method 514, procedure VIII, curve Y except 5 to 55 Hz and .15 inches D.A. or 2.5 G, whichever is less. MIL-STD-167-1: Type I for shipboard equipment.
Shock:	MIL-STD-901C: Grade A, Class 1 (solid mount), lightweight, Type A (high impact shock).
Temperature:	MIL-STD-810D: Method 501.2, procedures I and II (storage at 71C and operation at 65C); Method 502.2, procedures I and II (storage at -62C and operation at -54C).
Humidity:	MIL-STD-810D: Method 507.2, procedure II (0 to 100% relative humidity at 65C).
Altitude:	MIL-STD-810D: Method 500.2, procedures I and II (storage and operating to 15,000 ft.)
Salt Fog:	MIL-STD-810D: Method 509.2, procedure I (5% salt solution).
Dust:	MIL-STD-810D: Method 510.2, procedures I and II (blowing dust and sand).
Rain:	MIL-STD-810D: Method 506.2, procedure I (blowing rain).
Leakage:	MIL-STD-810D: Method 512.2, procedure I (basic leakage-immersion).

RF-2602 STATUS MONITOR SPECIFICATIONS

Description:	Permits remote operation and monitoring of self-test, operational status, and control of receive bypass, and fault override of RF-2601.
Primary Power Requirements:	115/230 Vac $\pm 10\%$, 47-63 Hz, single phase, 30 watts maximum. Primary power derived from transmitter/transceiver.
Weight:	10 lb. (4.5 kg)
Size:	1.75 x 19.0 x 8.75 inches (4.4 x 48.2 x 22.2 cm)

SPECIFICATIONS (Cont.)

OPTIONAL ACCESSORIES

RF-625A Long Wire Adapter:	Permits RF-2601 to tune into long wire antennas.
RF-322 Cable, 15 Conductor:	Bulk cable interconnects RF-2601 to transmitter/transceiver and RF-2602 status monitor.
RF-628 Dry Nitrogen Kit:	For inert gas pressurization of the RF-2601. Includes cylinder, regulator, and 10 foot hose.
Cylinder Capacity:	20 cubic feet – Sufficient to pressurize RF-2601 up to 12 times.
RF-636 Dry Air Pump:	Recommended for pressurization of the RF-2601 when dry nitrogen pressurization equipment is not available. Includes hose, hand pump. Desiccant condition is shown by color indicator on pump body.
RF-2066 Antenna Base Plate:	Provides a base for field mounting the coupler unit with certain whip antennas. Comes complete with ground rod, radials, mounting hardware, anchors, and guy assemblies.
RF-1912 Transmitting Dipole Antenna:	A dipole antenna for permanent installation on the ground (RF-1912) or rooftop (RF-1912A), for use with the RF-2601 to provide omnidirectional short-to-medium range communications from 2 to 30 MHz.
SB-V16 Series:	16 foot vertical fiberglass whips
SB-V35 Series:	35 foot vertical fiberglass whips
RF-1936 Series:	Deployable NVIS Antenna System
RF-2601/SSK/RSK/MRK:	Site Spares Kit (SSK), Running Spares Kit (RSK), and Maintenance Repair Kit (MRK)
10257-0015/0016/0017/0018 Preassembled Control Cables:	To interconnect RF-2601 to RF-2602 or transmitter/transceiver, and to interconnect RF-2602 to transmitter/transceiver.
10257-0019 Control Cable Adapter:	Connects existing 37 conductor control cable to transmitter or RF-2602.

ABOUT THIS MANUAL

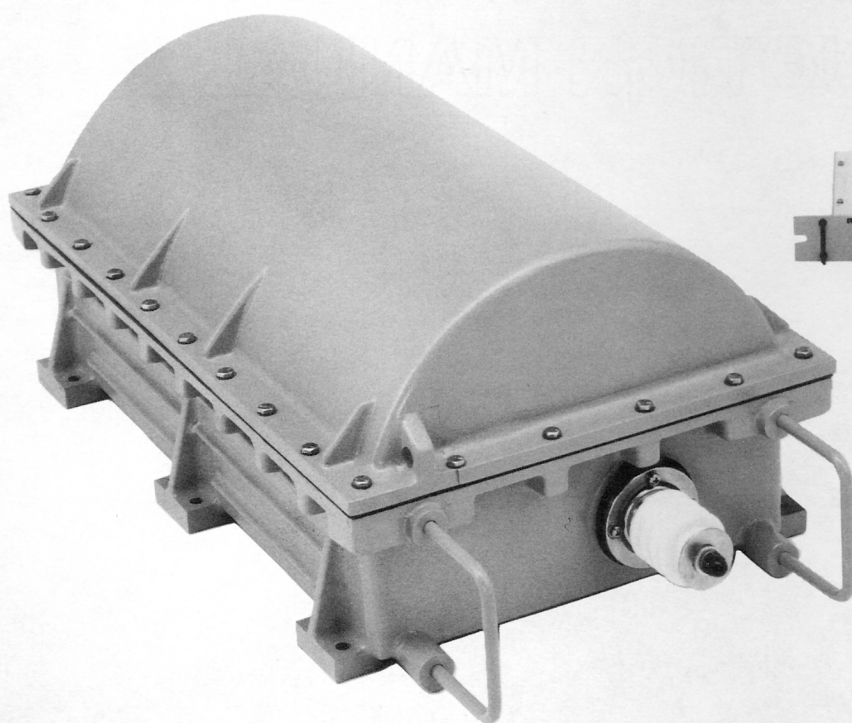
This manual provides complete user information for the RF-2601 Fast Tune Automatic Antenna Coupler and the RF-2602 Status Monitor. The blue tab sections provide instructions on how to install, operate, maintain, and troubleshoot the coupler. The white tab sections contain parts lists, component location drawings, and schematic diagrams for the individual antenna coupler assemblies.



RF-2601

FAST TUNE AUTOMATIC ANTENNA COUPLER

INSTRUCTION MANUAL



RF-2601 Systems Applications

SECTION 1

GENERAL INFORMATION

1.1 GENERAL DESCRIPTION

The RF-2601 Fast Tune Automatic Antenna Coupler matches the output of 1 kilowatt transmitters/transceivers from 1.6 to 30 MHz to a wide variety of whip, dipole, and long-wire antennas. Network tuning and monitoring are automatic, eliminating operator intervention. The RF-2601 is compatible with the RF-7100 and RF-7200 series AUTOLINK Adaptive Communications Systems.

A self-test feature uses more than 40 LED indicators to monitor self-test, and to provide operational status of major circuit functions. Four of these indicators illuminate in a binary-coded format to supply microprocessor-based failure analysis. Common tools are used to disassemble the unit. Access to component assemblies does not require the use of card extenders.

The RF-2601 normally is supplied with an RF-2602 Status Monitor. The rack-mountable RF-2602 provides antenna coupler operational information such as tuning, operational status, and self-test status. The RF-2601 can be remotely tested from the RF-2602 Status Monitor. In addition, the RF-2602 can switch the coupler into Receive Bypass and Fault Override modes. The RF-2602 contains a primary power switch and fuses for the RF-2601 Antenna Coupler, and a pull-out troubleshooting instructions card.

1.2 COUPLER CONFIGURATIONS

1.2.1 RF-2601 Antenna Coupler

The RF-2601 Antenna Coupler is navy gray, and designed to be mounted at the base of the antenna. It is designed to interface directly with RF-130, RF-1130, AN/URT-23 series 1 kW transmitters, the RF-350/353/354 series 1kW transceiver, and the RF-3200-10(M) series transceiver. The RF-2601 and RF-2602 (with adapter control cable) is a direct replacement for the RF-601A Antenna Coupler.

1.2.2 RF-2602 Status Monitor

The RF-2602 Status Monitor is navy gray, and designed to mount in a standard equipment rack. The RF-2602 is connected via control cables to the transceiver/transmitter and to the RF-2601 Antenna Coupler.

1.3 FEATURES

The RF-2601 incorporates many unique features, including:

- Fully automatic operation
- Fast tuning (75 msec) from memory
- Low probability of intercept (LPI) during tuning
- 1000 W peak envelope power (PEP) and average power
- Automatic protection to prevent unsafe operation
- Rugged construction that meets ground mobile, and ship and shore specifications
- Lightning surge protection
- Self-test routine that eliminates the need for test equipment down to module level
- 512-channel memory tune capability

Refer to the specifications page in the front of this manual for details.

1.4 PHYSICAL DATA

1.4.1 RF-2601 Antenna Coupler

The antenna coupler measures 29.5 x 15.0 x 10.5 inches (75.5 x 38.5 x 27.0 cm), and weighs approximately 86 pounds (39 kg). A rectangular box enclosing the coupler, including all of its projections, would have a volume of 4900 cubic inches (0.080 cubic meters).

1.4.2 RF-2602 Status Monitor

The rack-mounted status monitor measures 19.0 x 8.8 x 1.7 inches (48.3 x 22.2 x 4.3 cm), and weighs approximately 10 pounds (4.5 kg). The status monitor occupies 1-3/4 inches (4.5 cm) of rack space.

1.5 POWER REQUIREMENTS

The RF-2601 Antenna Coupler and RF-2602 Status Monitor operate from either 115 Vac or 230 Vac, 50/60 Hz, single-phase power at a maximum of 1.5 amps (115 Vac), .75 amps (230 Vac). Primary power for the antenna coupler and status monitor is provided by the transceiver via the control cable.

1.6 ENVIRONMENTAL REQUIREMENTS

The RF-2601 Antenna Coupler is designed for use in exposed installations. Refer to the specifications table for detailed environmental specifications.

The RF-2602 is designed for installations protected from weather.

1.7 ANCILLARY ITEMS AND OTHER ITEMS FURNISHED

The standard ancillary package includes an instruction manual and all necessary installation materials, including coupler mounting hardware. Because of the indeterminate cable lengths required for the control and RF cables, only mating connectors are furnished. The cables must be ordered separately (see table 1-1), or fabricated during installation. Refer to the Installation section for cable fabrication procedures.

1.8 ACCESSORIES AND OPTIONS

1.8.1 Interconnecting Cables

Interconnecting cables for the RF-2601 may be ordered from the factory or fabricated by the user. Refer to table 1-1 for part numbers of interconnecting cables.

Table 1-1. Interconnecting Cables for RF-2601 Antenna Coupler

Part Number	Description
10257-0015	RF-2601 Control Cable Assembly – Provides a preassembled control cable manufactured to a length up to 500 feet [150 m] as specified by the customer. It consists of RF-322 15-conductor cable with connectors attached to interconnect the RF-2601 coupler with the associated transmitter/transceiver or RF-2602 Status Monitor. Specify P/N 10257-0015-01 to interconnect to an RF-130 or RF-1130 series transmitter. Specify P/N 10257-0015-02 to interconnect to an RF-350/353/354 Transceiver. Specify P/N 10257-0015-03 to interconnect to an RF-2602 Status Monitor.
10257-0016	RF-2602 Control Cable Assembly – Provides a preassembled control cable manufactured to a length specified by the customer (usually 6 feet [1.8 m]). It consists of RF-322 15-conductor cable with connectors attached to interconnect the RF-2602 Status Monitor (if used with the RF-2601 Antenna Coupler) with the associated transmitter/transceiver. Specify P/N 10257-0016-01 to interconnect to an RF-130 or RF-1130 series transmitter. Specify P/N 10257-0016-02 to interconnect to an RF-350/353/354 Transceiver.

Table 1-1. Interconnecting Cables for RF-2601 Antenna Coupler (Cont.)

Part Number	Description
10257-0017	RF-2601 to RF-3230 Control Cable Assembly – Provides a preassembled control cable manufactured to a length up to 500 feet [150 m] as specified by the customer. It consists of RF-322 15-conductor cable with connectors attached to interconnect the RF-2601 coupler with the RF-3200/3230 Transceiver.
10257-0018	RF-2602 to RF-3230 Control Cable Assembly – Provides a preassembled control cable manufactured to length specified by the customer (usually 6 feet [1.8 m]). It consists of RF-322 15-conductor cable with connectors attached to interconnect the RF-2602 Status Monitor (if used with the RF-2601 Antenna Coupler) with the RF-3200/3230 Transceiver.
10257-0019	RF-601A/RF-2601 Cable Adapter – Provides a preassembled adapter control cable manufactured to a length of 1 foot (0.3 m). It consists of RF-322 15-conductor cable with connectors attached to interconnect the existing 37-conductor cable (used previously between the RF-601A Coupler and Control units) with the associated transmitter/transceiver or RF-2602 Status Monitor. Specify P/N 10257-0019-02 to interconnect to an RF-350/353/354 Transceiver. Specify P/N 10257-0019-03 to interconnect to an RF-2602 Status Monitor.
RF-322	15-Conductor Control Cable – Mates with connectors supplied in ancillary kit. PVC-jacketed cable has 15 #20 AWG copper conductors and an overall braided shield. Temperature rating is -20 to +60 °C (-4 to +140 °F). Cable size is 0.41 inches (1.09 cm) outside diameter.
RG-213/U	Cable-Coaxial – Type RF-213/U 50 ohm. Connectors not included. Not recommended for lengths greater than 250 feet (75 m), nor RF power greater than 1 kW. Use 1/2 inch or 7/8 inch (3.05 or 2.22 cm) foam dielectric coaxial cable for these applications.
W-0010K	Connector Installation Charge for RF-213/U – Provides installation of connectors on RG-213/U Coaxial Cable. Order connectors separately if not provided in equipment's ancillary kit.

1.8.2 Accessories

Accessories for the RF-2601 are listed in table 1-2.

Table 1-2. Accessories for RF-2601 Antenna Coupler

Model Number	Description
RF-2066	Antenna Base Plate Kit – Provides a base, ground stakes, guy ropes, and counterpoise wire for field-mounting of the coupler with any of the following antennas: SB-V16A, SB-V16C, SB-V35A, or SB-V35C.
RF-625A	Long-Wire Adapter – Used with long-wire antennas.
RF-636	Dry Air Pump – Hand pump recommended for pressurization of the coupler when dry nitrogen pressurization equipment is not available (see paragraph 5.7.2.2).
RF-628	Dry Nitrogen Kit – For inert gas pressurization of the coupler (see paragraph 5.7.1.2).

Table 1-2. Accessories for RF-2601 Antenna Coupler (Cont.)

Model Number	Description
RF-1912/RF-1912A	Transmitting Dipole Antenna – A dipole antenna for transportable use (RF-1912), or for permanent installation on the ground or rooftop (RF-1912A), for use with the RF-2601 to provide omnidirectional short-to-medium range communications from 2 to 30 MHz.
SB-V16C	Vertical 16 Foot (4.9 m) Fiberglass Whip Antenna
SB-V35C	Vertical 35 Foot (11 m) Fiberglass Whip Antenna
SB-V35S	Heavy-duty vertical antenna, 35' (11 m). Self-supporting, two section, w/flange base. Suitable for shipboard or mobile application.
SB-V35S/HD	Heavy-duty vertical antenna, 35' (11 m). Self-supporting, two section, w/flanged feed-thru base. Suitable for the most severe marine environment.

1.8.3 Spares Kits

The spares kits for the RF-2601 and RF-2602 are designated in table 1-3.

Table 1-3. Spares Kits for RF-2601 and RF-2602 Antenna Coupler

Model Number	Part Number	Description
RF-2601/SSK	1001-0687	RF-2601 Site Spares Kit – The RF-2601/SSK includes a complete set of PWB assemblies for the coupler. Each SSK will generally support up to five separate couplers for a period of two to four years.
RF-2601/RSK	1001-0686	RF-2601 Running Spares Kit – Contains items readily replaced in field operation by the operator, including those which may be consumed during equipment installation and set-up. The typical complement of parts includes fuses, lamps, etc. Each RSK will generally support a single equipment for two to four years.
RF-2601/MRK	1001-0688-21 RF-130/1130 1001-0688-22 RF-350 1001-0688-23 RF-3230	RF-2601 Maintenance Repair Kit – The RF-2601 MRK includes special items required for maintaining the coupler.
RF-2601/ARK	1001-0685	The RF-2601/ARK contains all parts required to repair defective assemblies or subassemblies.

Table 1-3. Spares Kits for RF-2601 and RF-2602 Antenna Coupler (Cont.)

Model Number	Part Number	Description
RF-2602/SSK	1001-0727	RF-2602 Site Spares Kit – The RF-2602/SSK includes a complete set of PWB assemblies for the status monitor. Each SSK will generally support up to five separate status monitors for a period of two to four years.
RF-2602/RSK	1001-0726	RF-2602 Running Spares Kit – Contains items readily replaced in field operation by the operator, including those which may be consumed during equipment installation and set-up. The typical complement of parts includes fuses, lamps, etc. Each RSK will generally support a single status monitor for two to four years.
RF-2602/MRK	Not Available	RF-2602 Maintenance Repair Kit – The RF-2602 MRK includes special items required for maintaining the status monitor.
RF-2602/ARK	1001-0729	The RF-2602/ARK contains all parts required to repair defective assemblies or subassemblies.

1.9 TACTICAL OPERATING CONSIDERATIONS

1.9.1 Tactical Security

An antenna is a potential target in many tactical operating situations. Vulnerability can be minimized by locating the radiating antenna away from the operating location. The coupler and antenna may be located up to 500 feet (152 m) from the transmitter/transceiver.

1.9.2 Low Probability of Intercept (LPI)

Low Probability of Intercept (LPI) during a tuning cycle is achieved by using previously stored tuning information to provide near-instantaneous configuration of the coupler tuning elements, and restricting on-the-air tuning to the last 25 ms of the 75 ms total tuning cycle.

1.10 REQUIRED TOOLS AND TEST EQUIPMENT

The coupler is designed for complete disassembly using only common tools. There are no moving parts that require routine maintenance. Self testing features eliminate the need for special test equipment. A high-impedance, digital voltmeter is the only test equipment requirement for coupler alignment.

1.11 PREPARATION FOR USE AND STORAGE

Unpacking, inspection, setup, and checkout instructions are given in the Installation section (section 2) of this manual.

1.12 WARRANTY INFORMATION

Unless otherwise specified, this product is covered by the standard Harris Corporation, RF Communications Group limited one-year warranty, as printed on the back of the front cover of this manual.





SECTION 2

INSTALLATION

2.1 GENERAL INFORMATION

This section contains the following information necessary to install and verify the operation of the RF-2601 Antenna Coupler and RF-2602 Status Monitor:

- Unpacking and Inspection
- Items Required for Installation
- Mounting the Antenna Coupler and Status Monitor
- Cable Fabrication and Installation
- Grounding
- Environmental Protection
- Initial Adjustments

2.2 SITE SURVEY

Site selection details vary depending on the configuration and usage of the equipment. Many factors must be considered from security to operational requirements. It is the responsibility of the user to determine which have precedence. This table is only a guide, however, because conditions vary for each installation.

- The RF-2602 control monitor should be installed with approximately 6 inches (15 cm) behind it for cable bends and cable removal at the rear of the unit.
- For shipboard systems, the antenna should be as high above the ship's superstructure as possible.
- Use a connection as short as possible between the ground connection on the RF-2601 antenna coupler and the ship's single point ground. (Ideally, the ship's single point ground is either its hull or a ground plate attached to the hull.)
- For shore installations, the antenna should be high enough to clear surrounding hills, woods and buildings. In addition, to avoid interference, locate the antenna as far as possible from power transmission lines.
- In shore installations, the antenna coupler should be connected to a 5/8-inch (1.59 cm) diameter rod pounded at least 6 to 8 feet (1.83 to 2.44 m) into the ground. The cable between the antenna coupler and the ground rod should be as short as possible. If the soil composition is sand, clay, or rock, a ground rod extending 80 to 100 feet (24 to 30 m) may be necessary. If only a short ground rod is possible, then the resistivity of the soil may be reduced by saturating the soil with a solution of Epsom salts (MgSO_4) in water.
- The RF-2601 Antenna Coupler should be installed as close to the antenna base as possible. Any cable connected between the RF-2601 and the antenna base is electrically part of the antenna. Keep such connecting cables as short as possible.
- The interconnecting cables between the RF-2601 and RF-2602 should not exceed 500 feet (152 m).

2.3 UNPACKING AND INSPECTION

WARNING

The antenna coupler assembly is fairly heavy and somewhat bulky. Do not attempt to move the unit without assistance.

The antenna coupler and status monitor are packed in corrugated cardboard boxes for shipment, as shown in figure 2-1. A two-piece foam enclosure protects the equipment from rough handling.

2.3.1 External Inspection

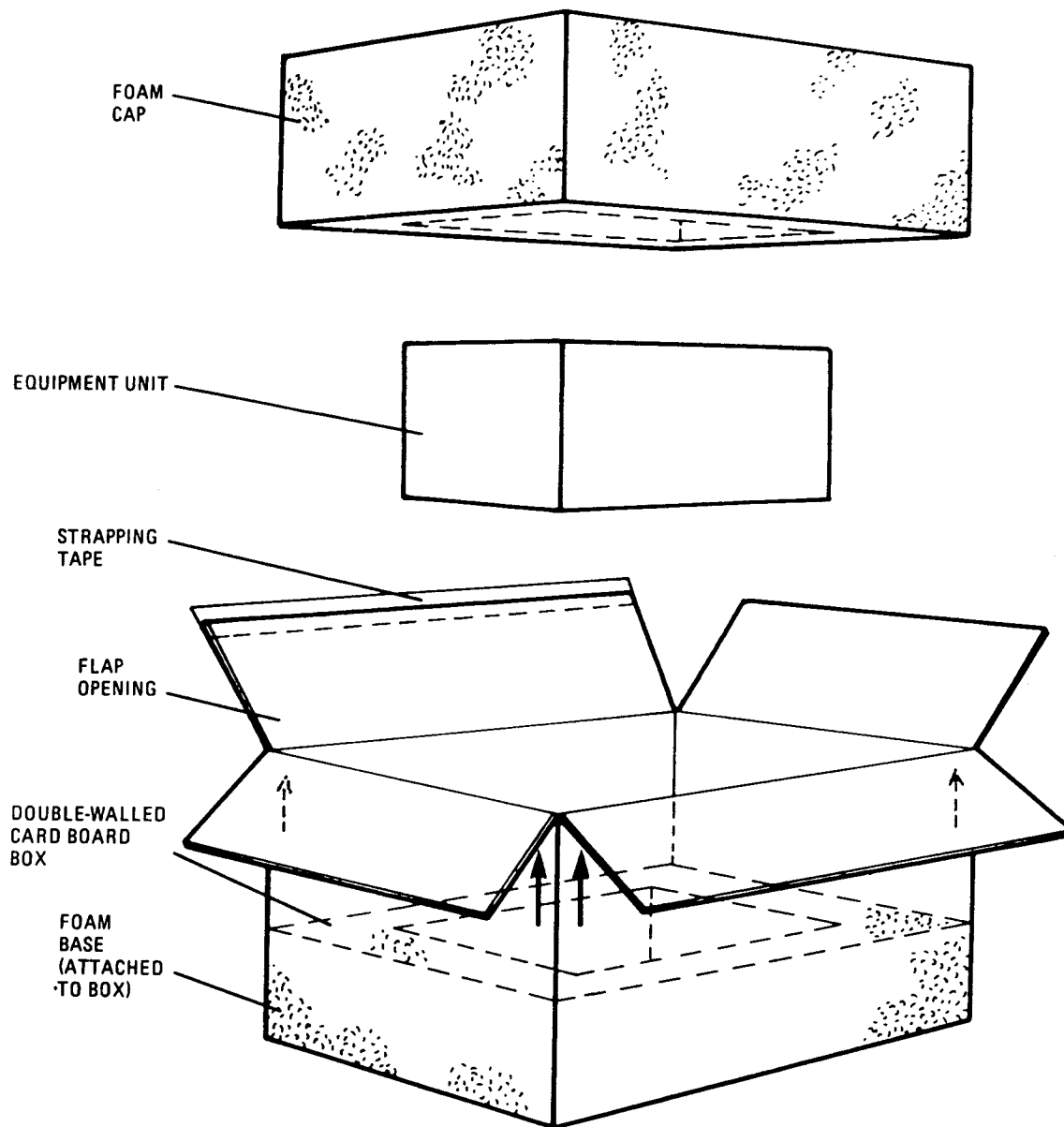
When the units are received, carefully inspect the exterior of the box for signs of rough handling, weather damage, or tampering. Note and report abnormalities. A sticker on the container provides additional instructions.

2.3.2 Inspecting for Completeness

A sharp knife is required to cut through the reinforced strapping tape. Keep the packing carton, together with the packing material, for possible future use. Remove the equipment from the box, and, using the packing list in the ancillary package, inspect for completeness.

2.3.3 Inspecting for Proper Setup

Couplers are tested and set up before shipment and do not require setup during installation.



UNPACKING PROCEDURE

1. PLACE BOX ON FLOOR WITH ARROWS MARKED ON EACH SIDE POINTING UP.
2. CUT TAPE ON TOP OF BOX AND REMOVE FOAM CAP FROM BOX.
3. LIFT EQUIPMENT UNIT OUT OF BOX.
4. SAVE BOX AND FOAM CAP FOR RESHIPMENT.

382-001

Figure 2-1. Unpacking the Equipment

2.4 ITEMS REQUIRED FOR INSTALLATION

2.4.1 Ancillary Kit

The items included in the ancillary kit are listed in table 2-1 and table 2-2.

Table 2-1. RF-2601 Ancillary Kit (10257-0002 Rev. D)

Qty	Part Number	Description	Purpose
1	10257-0003	Manual, RF-2601	Instruction Manual
1	J08-0002-243	Cable Clamp	Accessory to control cable mating connector
1	1002-0010	Instruction sheet	Shows installation of sleeving on soldered wires of mating connector.
1	10075-0447	Connector	Control cable mating connector to J2 of RF-2601.
2 inches	E50-0001-012	Sleeving, 11 AWG	Used to insulate mating connector solder cups after soldering in wires.
1 ft.	E50-0002-005	Sleeving, shrink .187 ID 6" L black	Used to insulate black wire/cable shield solder connection.
1	10075-0327	Sleeve	Accessory to control cable mating connector to seal cable at rubber grommet.
31	MS15795-814	Flat washer, 3/8	Fastens coupler to mounting surfaces and fastening ground straps.
1	MS35307-358	Bolt, 3/8-16 x 3/4	Fastens coupler to mounting surfaces and fastening ground straps.
4	MS35307-359	Bolt, 3/8-16 x 7/8	Fastens coupler to mounting surfaces and fastening ground straps.
11	MS35307-364	Bolt, 3/8-16 x 1-1/2	Fastens coupler to mounting surfaces and fastening ground straps.
16	MS35337-84	Lock washer, 3/8	Fastens coupler to mounting surfaces and fastening ground straps.
15	MS51971-3	Nut, 9/16 Hex, 3/8-16	Fastens coupler to mounting surfaces and fastening ground straps.
1	M39012/01-0005	Connector N cable plug sol	RG-213 RF coaxial cable mating connector to J1 of RF-2601.
1 tube	P40-0002-000	Anti-seize compound, 2.8 oz.	Applied to mounting surfaces and mounting hardware to prevent corrosion.

Table 2-1. RF-2601 Ancillary Kit (10257-0002 Rev. D) (Cont.)

Qty	Part Number	Description	Purpose
1	10257-1110	Label, warning	For warning personnel of high voltage. (Affix near antenna).
1 ft.	W10-0006-000	Wire black #22 AWG	Used to connect cable shield to mating connector contact.
1	10208-0009	Ground strap	For making ground connection.
5	F-0012	Fuse, 2 amp, 250 V	For A6 Power Supply Assembly.
1	10251-0042	High Voltage Wire Assy Kit	For making connection between the antenna insulator and antenna.
1	P05-0001-000	Tape, vinyl electrical	To weatherproof connectors
1	P05-0008-416	Tape, silicone	To weatherproof connectors

Table 2-2. RF-2602 Ancillary Kit (10257-6002 Rev. -)

Qty	Part Number	Description	Purpose
5	F-0011	Fuse, 1-1/2 amp, 230 Vac	Primary power fuse
2	MP-0060	Clamp	Accessory to control cable mating connector for strain relief.
1	MS3106A20-27P	Connector	Control cable mating connector
1	MS3106A20-27S	Connector	Control cable mating connector
2	MS3420-10A	Sleeve	Accessory to control cable mating connector to seal cable at rubber grommet.

2.4.2 Interconnecting Cables

The multi-conductor control and RF cables may be ordered from the factory or fabricated by the user during installation. Part numbers for preassembled cables are listed in table 1-1. Specify desired length when ordering.

Mating connectors are supplied in the transceiver, antenna coupler, and status monitor ancillary kits. Refer to paragraph 2.9a. for cable fabrication procedures and weatherproofing of connectors.

Since the RF-2601 is a replacement for the RF-601A Antenna Coupler, existing cables may be utilized by using an adapter control cable described in table 1-1.

CAUTION

To avoid damaging or kinking the cable when unwinding from cable reels or rolls of cables, unreel the cable as shown in figure 2-2, method A.

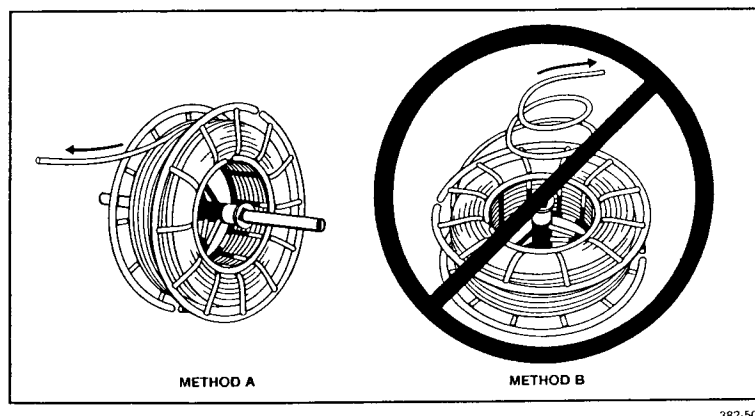


Figure 2-2. Cable Removal Method

2.5 MOUNTING THE ANTENNA COUPLER

The coupler can be mounted directly to a ship's bulkhead, an antenna mast, a vehicle frame, or to any other mechanically and electrically convenient surface. Mounting details are shown in figure 2-3.

NOTE

The RF-2601 is a direct replacement for the RF-601A. The mounting dimensions of the RF-2601 and RF-601A Antenna Couplers are identical.

If necessary, contact a Harris Field Service representative for more complete antenna siting and selection information.

WARNING

Under certain conditions, the voltages on the RF-2601 antenna terminal may be as high as 15 kV. Extreme caution must be taken to isolate this hot terminal at least six inches from any nearby objects such as cables, guy wires, brackets, or ground leads.

The exact method of mounting the coupler depends on the type of installation. If possible, the coupler should be mounted vertically (antenna insulator upward) to an aluminum base to provide maximum cooling efficiency. After determining the best location of the coupler, proceed as follows:

- a. Fabricate a mounting surface (aluminum alloy preferred) for the coupler. (The exact size and shape of the surface will depend on the structure on which the coupler is to be mounted.)
- b. Set the mounting surface on a bench.
- c. Place the coupler on the selected mounting surface and mark off the mounting holes (eleven required, two for each of the six mounting feet, except the tapped hole used to connect ground strap in right front foot, as viewed from antenna terminal).
- d. Drill the eleven 0.404 inch (1.03 cm) diameter holes in the mounting surface.
- e. Drill or prepare mounting surface as required, and attach to supporting structure.

WARNING

To avoid injury to personnel and equipment, do not over-stress mounting bolts since shock may cause them to shear. Tighten 3/8-16 bolts to 20 ft-lb (2.77 kg-m) maximum.

CAUTION

The coupler must be properly pressurized before operation. Failure to do so may limit coupler operation.

- f. Pressurize the coupler as described in paragraph 5.7.1.2 or 5.7.2.2.
- g. Attach the coupler to the mounting surface using eleven 3/8-16 bolts (furnished in the ancillary kit). The top cover includes a lifting ring (located on the insulator end of the unit), to which hoisting cables may be attached.
- h. Affix the high voltage label (from ancillary kit) near the antenna.
- i. Refer to paragraph 2.7 for interconnection information.

2.5.1 Fixed Station Installations

Fixed station installations allow a more versatile antenna selection over that of mobile installations; however, there are many factors that must be considered when making a selection. Select a whip antenna length of greater than one-tenth wavelength at the lowest operating frequency. Even though the RF-2601 operates with antennas as short as .014 wavelengths, antennas of less than .10 wavelength result in higher RF voltages and lower system RF efficiency.

Whip antenna lengths should not be much longer than five-eighths of a wavelength at the highest operating frequency. Even though the RF-2601 operates with antennas of much greater than five-eighths wave length, longer antennas exhibit many radiation pattern lobes that may result in a deep null in the direction in which communication is being attempted.

Longwire antenna lengths depend on the desired radiation pattern. Contact a Harris Field Service representative for longwire installation information. A good ground system is necessary for optimum performance (see paragraph 2.8).

2.5.1.1 Whip Antennas

Whip antennas are often used at fixed stations as backup antennas. Whip antennas often solve space problems and are also omnidirectional, and exhibit low radiation-angle characteristics. When operating frequencies are high enough for the radiating element to represent a reasonable fraction of a wavelength, these antennas can be a good choice. Whip antennas are available with part numbers of SB-V16 (B or C) through SB-V35 (B, C, S, or HD).

Figure 2-4 shows a typical whip antenna installation at a fixed site.

2.5.1.2 Long-Wire Antenna Installations

The coupler should be mounted as close as possible to the base of the antenna for long-wire antenna installations. Refer to figure 2-5 for details, and follow the same general instructions used for whip antenna installations.

2.5.2 Typical Vehicular Installation

This same procedure can be used for any vehicular installation by making adjustments to fit the particular vehicle.

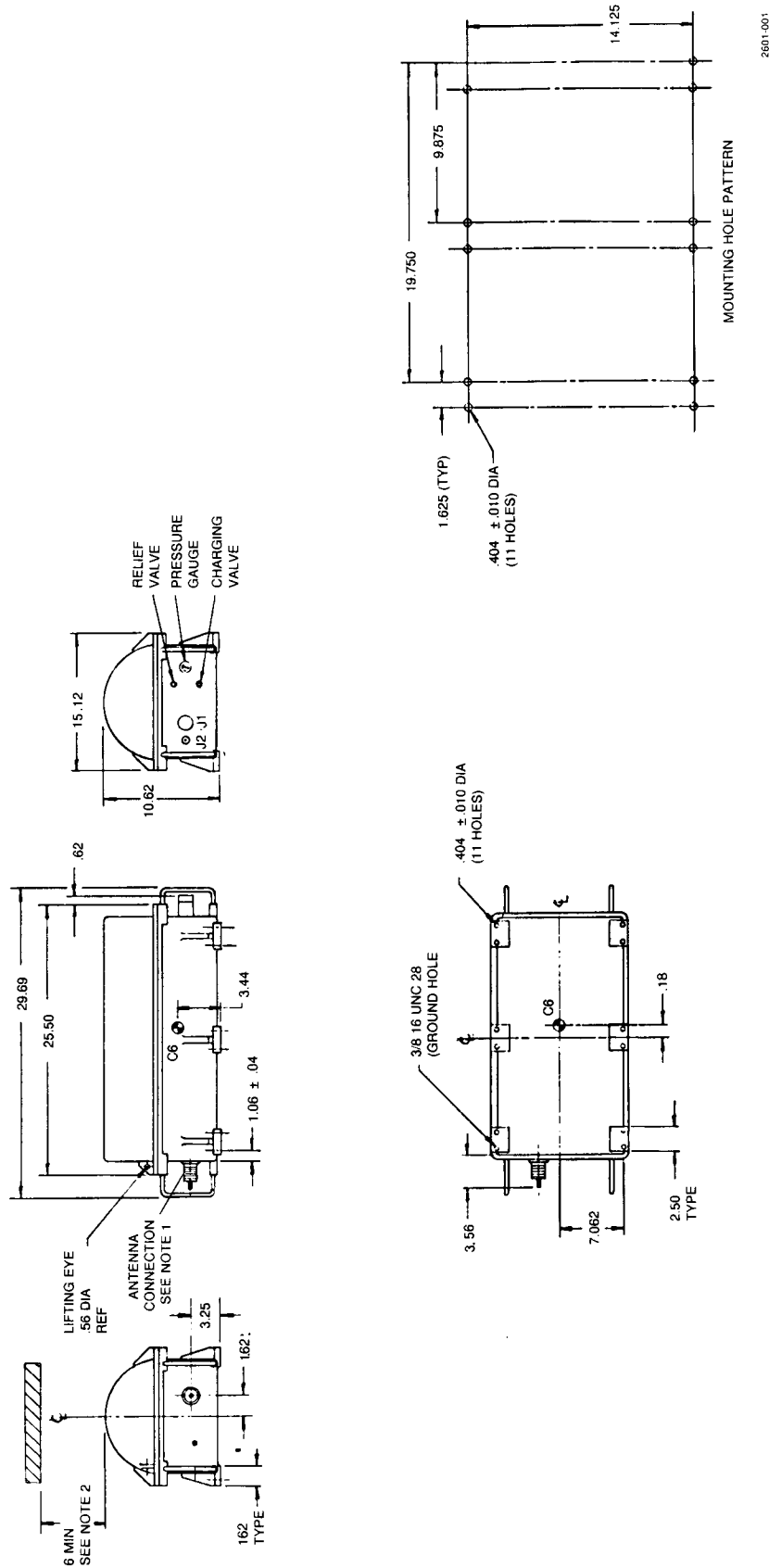
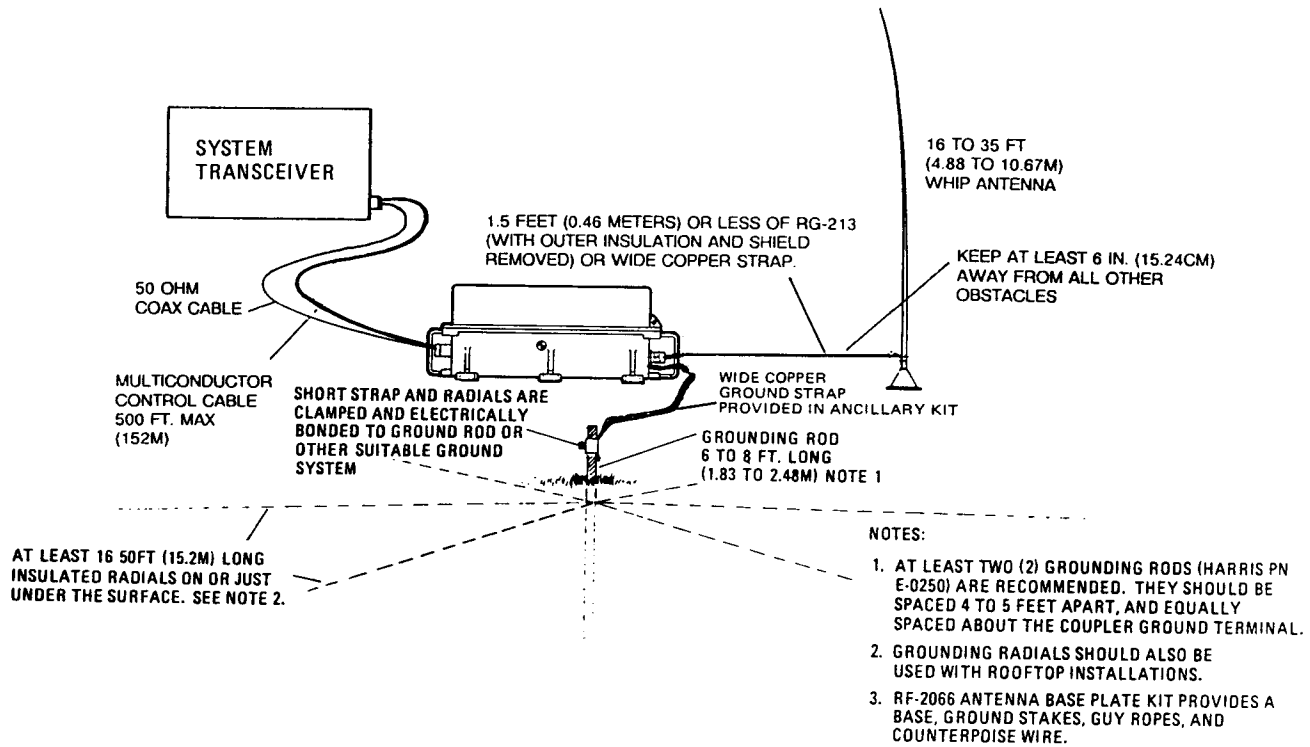


Figure 2-3. RF-2601 Mounting Dimensions



2601-002

Figure 2-4. Typical Whip Antenna Installation

2.6 MOUNTING THE RF-2602 STATUS MONITOR

The RF-2602 Status Monitor is rack-mounted, with the applicable transmitter/transceiver in a standard 19-inch electrical equipment cabinet. Refer to figure 2-6 for RF-2602 mounting dimensions.

2.7 CABLE FABRICATION AND INSTALLATION

Figure 2-7 gives control cable interconnect information for the various system configurations.

2.7.1 RF Cable Fabrication

Refer to figure 2-8 for RF cable fabrication instructions. RG-213/U coaxial cable is recommended. Install the PL-259, M39012/01-0005, or similar connector (provided in the transceiver ancillary kit) on the transceiver end of the RF cable. Install the UG-21D/U connector (provided in the coupler ancillary kit) on the coupler end of the cable.

NOTE

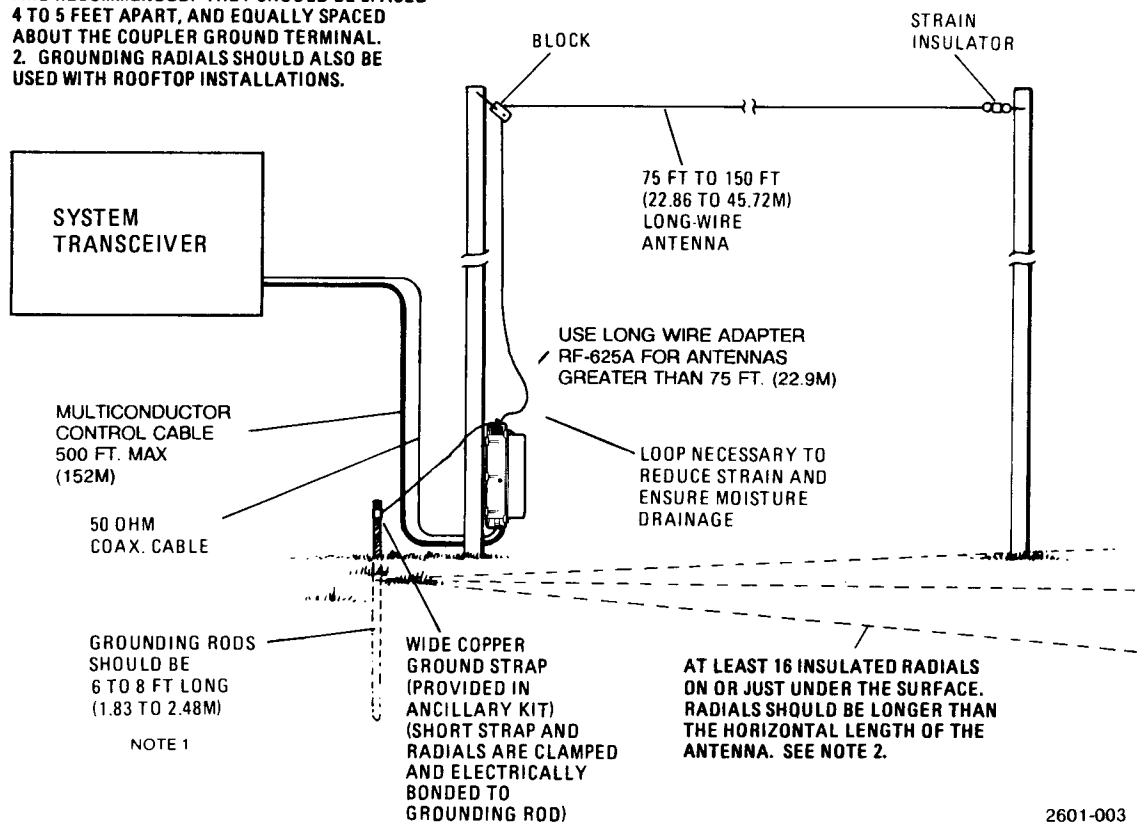
Observe limitations on RG-213/U applications, as listed in table 1-1.

2.7.2 Control Cable Fabrication

Refer to figure 2-9 for control cable fabrication instructions. Mating connectors are provided in the transceiver RF-2602 status monitor and RF-2601 antenna coupler ancillary kits. Preassembled control cable assemblies are available for purchase, and shown in table 1-1.

NOTES:

1. AT LEAST TWO (2) GROUNDING RODS (HARRIS PN E-0250) ARE RECOMMENDED. THEY SHOULD BE SPACED 4 TO 5 FEET APART, AND EQUALLY SPACED ABOUT THE COUPLER GROUND TERMINAL.
2. GROUNDING RADIALS SHOULD ALSO BE USED WITH ROOFTOP INSTALLATIONS.

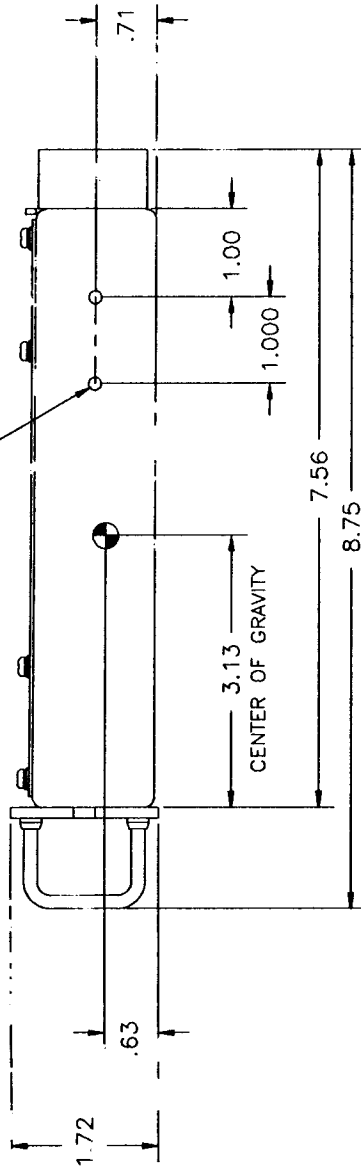


2601-003

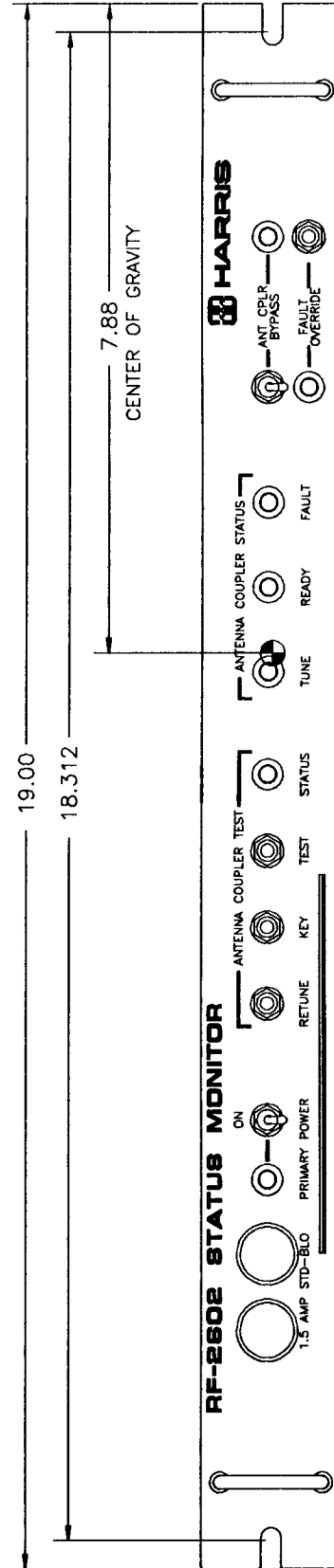
Figure 2-5. Typical Long-Wire Antenna Installation

RF-2602
STATUS MONITOR
WEIGHT: 10 lbs

#10-32 UNC 2B
ADDITIONAL MOUNTING
FOR TACTICAL APPLICATIONS



SIDE VIEW



FRONT VIEW

Figure 2-6. RF-2602 Mounting Dimensions



- SEE SPECIFICATIONS PAGE FOR COMPATIBLE ANTENNA TYPES. FOR LONG-WIRE ANTENNAS GREATER THAN 75 FT., USE RF-625A LONG-WIRE ADAPTER.
- FOR DIPOLE OR LOG PERIODIC ANTENNAS, TERMINATE CENTER CONDUCTOR AT E1 AND SHIELD (OUTER CONDUCTOR) AT THREADED HOLE IN MOUNTING FOOT.
- CONNECT GROUND STRAP AT THREADED HOLE IN MOUNTING FOOT OF RF-2601 TO GOOD EARTH GROUND. SUITABLE COUNTERPOISE, OR SHIP'S GROUND PLATE AS APPROPRIATE.
- CONTACTS D, H, K, T, W, X, Y, Z, a THROUGH s HAVE NO CONNECTION AND ARE NOT SHOWN FOR CLARITY.
- GROUND CONSISTS OF SHIELD AND ONE WIRE CONNECTED AT BOTH ENDS OF CABLE.
- SPECIAL CONNECTOR IS SUPPLIED IN RF-2601 ANCILLARY KIT. IT IS SIMILAR TO AN MS3106F28-21S EXCEPT IT HAS AN EXTENDER SHELL AND CABLE SEAL GLAND.
- SEE SECTION 2, PARAGRAPH 2.8 FOR ENVIRONMENTAL PROTECTION OF CONNECTORS.
- USE RG-213/U COAXIAL CABLE, OR EQUIVALENT, UP TO 250 FEET (76M). USE 1/2 INCH OR 7/8 INCH (12.7 OR 19.1MM) FOAM DIELECTRIC COAXIAL CABLE UP TO 500 FEET (152M).
- IF THE RF-2601 IS REPLACING AN RF-601, RF-601A, AN/URA-38, AN/URA-38A, OR AN/URA-38C ANTENNA COUPLER, THE EXISTING MULTI-CONDUCTOR CABLE ASSEMBLY PREVIOUSLY USED BETWEEN THE ANTENNA COUPLER AND THE COUPLER CONTROL CAN BE USED (INSTEAD OF THE CONTROL CABLE INDICATED) IF A CONTROL CABLE ADAPTER IS USED, AS FOLLOWS: USE ADAPTER P/N 10257-0019-01 TO INTERCONNECT TO AN RF-130., RF-1130 OR AN/URT-23 SERIES TRANSMITTER. USE P/N 10257-0019-02 TO INTERCONNECT TO AN RF-350 OR RT-1446/URC TRANSCEIVER. USE P/N 10257-0019-03 TO INTERCONNECT TO AN RF-2602 STATUS MONITOR.
- SEE NOTE 9. IN ADDITION, THE CONTROL CABLE PREVIOUSLY USED BETWEEN THE TRANSMITTER AND COUPLER CONTROL MUST BE MODIFIED TO BE USED BETWEEN THE TRANSMITTER AND RF-2602, OR USE THE CABLE ASSEMBLY AS SHOWN. OBSERVE THE SETTINGS OF RF-2602 INTERNAL SWITCHES, S1 AND S3, PER THE INSTRUCTIONS LOCATED ON THE PULL-OUT CARD OF THE RF-2602.
- WIRES DENOTED BY DASHES EXIST IN PURCHASED CABLE ASSEMBLIES FOR MANUFACTURING CONVENIENCE. THEY ARE NOT REQUIRED, NOR DESIRED FOR OPERATION. THE WIRES NEED NOT BE CONNECTED IN CUSTOMER-MADE CABLES, IF SO DESIRED. SETTINGS OF RF-2602 INTERNAL SWITCHES, S1 AND S3, MUST BE OBSERVED PER THE INSTRUCTIONS LOCATED ON THE PULL-OUT CARD IN THE RF-2602.

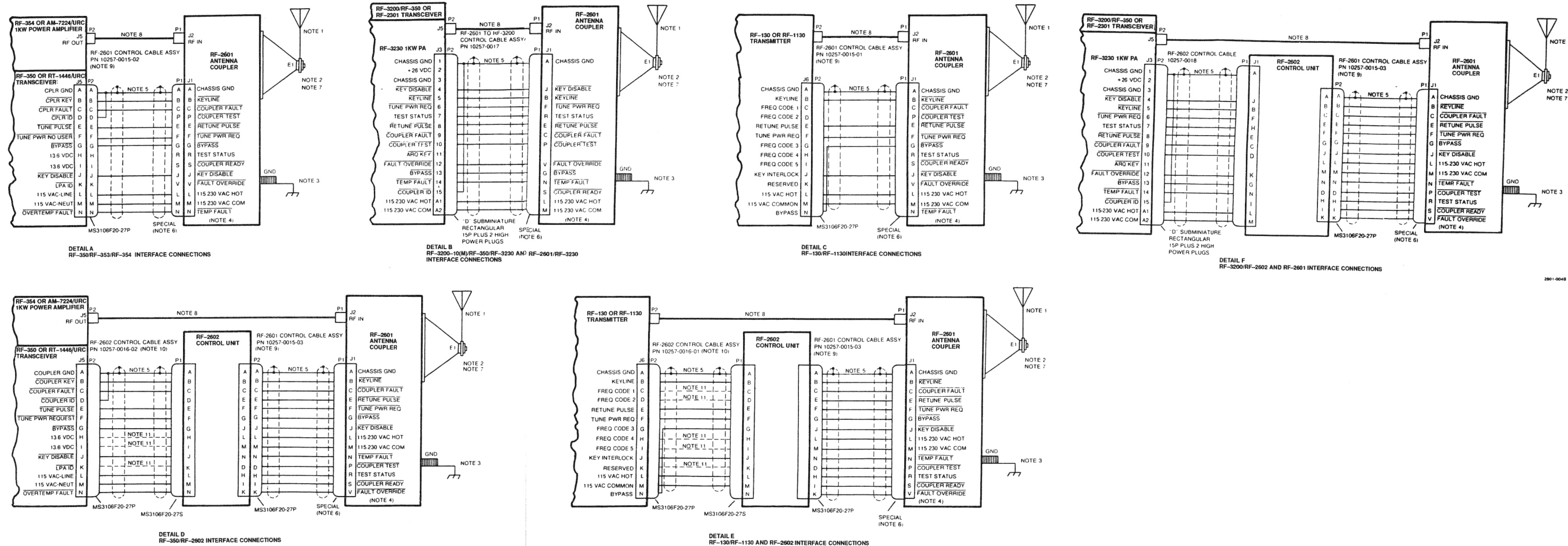
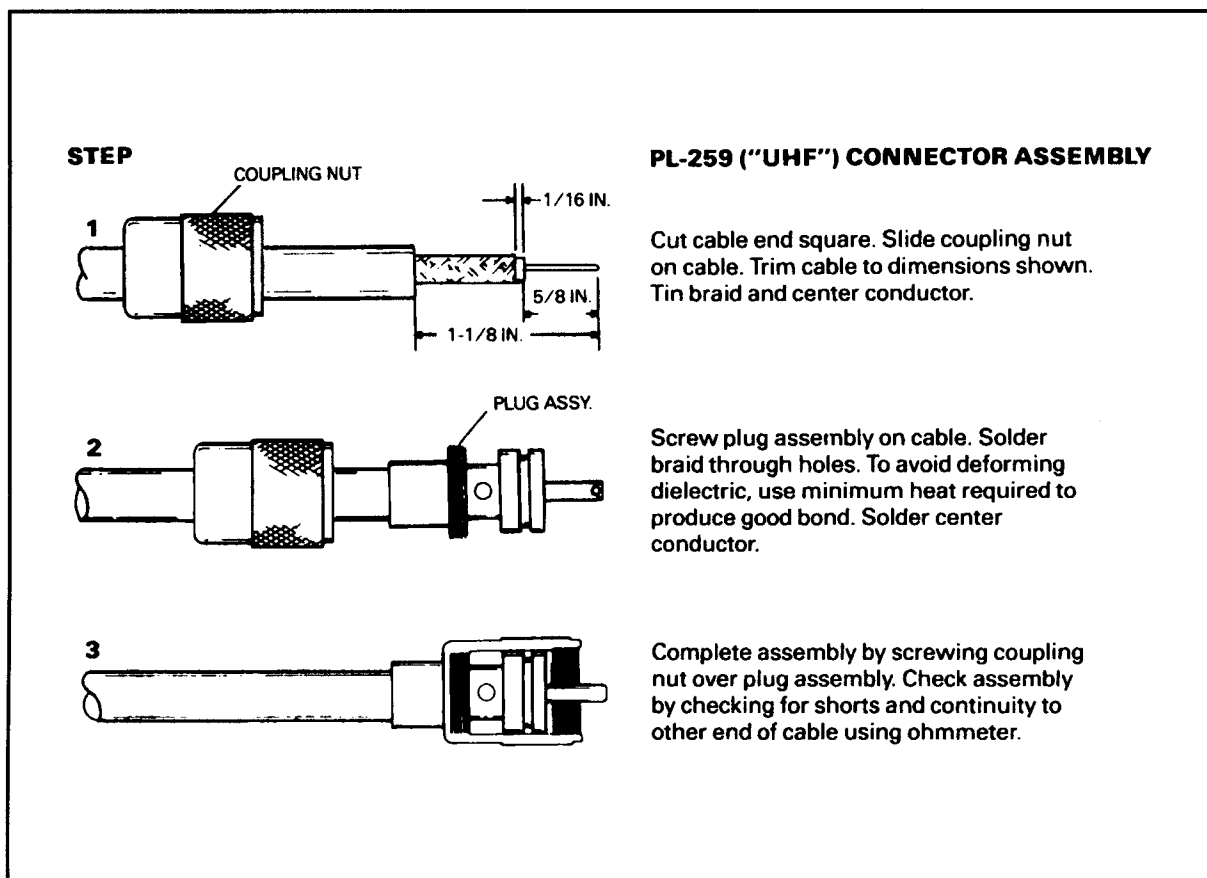
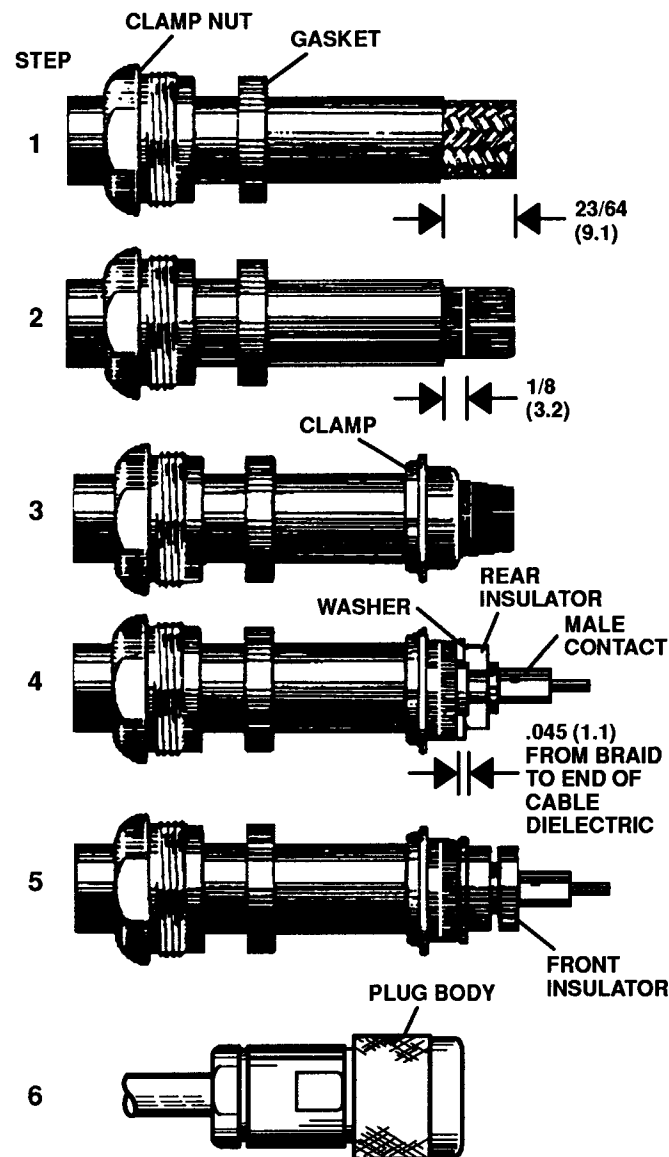


Figure 2-7. System Interconnect Data



R32-018B

Figure 2-8. RF Cable Fabrication Procedure (Sheet 1 of 2)



M39012/01-0005 ("N") CONNECTOR ASSEMBLY

Cut cable end square, place clamp-nut and gasket, (with "V" groove toward clamp) over cable. Remove 23/64" (9.1mm) of vinyl jacket.

Comb out copper braid as shown. Cut off cable dielectric 1/8" (3.2mm) from end of jacket.

Pull braid wires forward and taper toward center conductor. Place clamp over braid and push back against cable jacket.

Fold back braid wires as shown, trim wires to proper length, and form wires over clamp as shown. Tin exposed center conductor, using minimum amount of heat.* Slide on washer, rear insulator, and contact. Contact shoulder, insulator, and cable core must butt as shown. Solder contact to center conductor.*

Slide front insulator over contact. Be sure to place counter bore end of insulator toward mating end of contact.

Insert prepared cable termination into connector body. Make sure sharp edge of clamp seats properly in gasket. Tighten nut, holding body stationary.

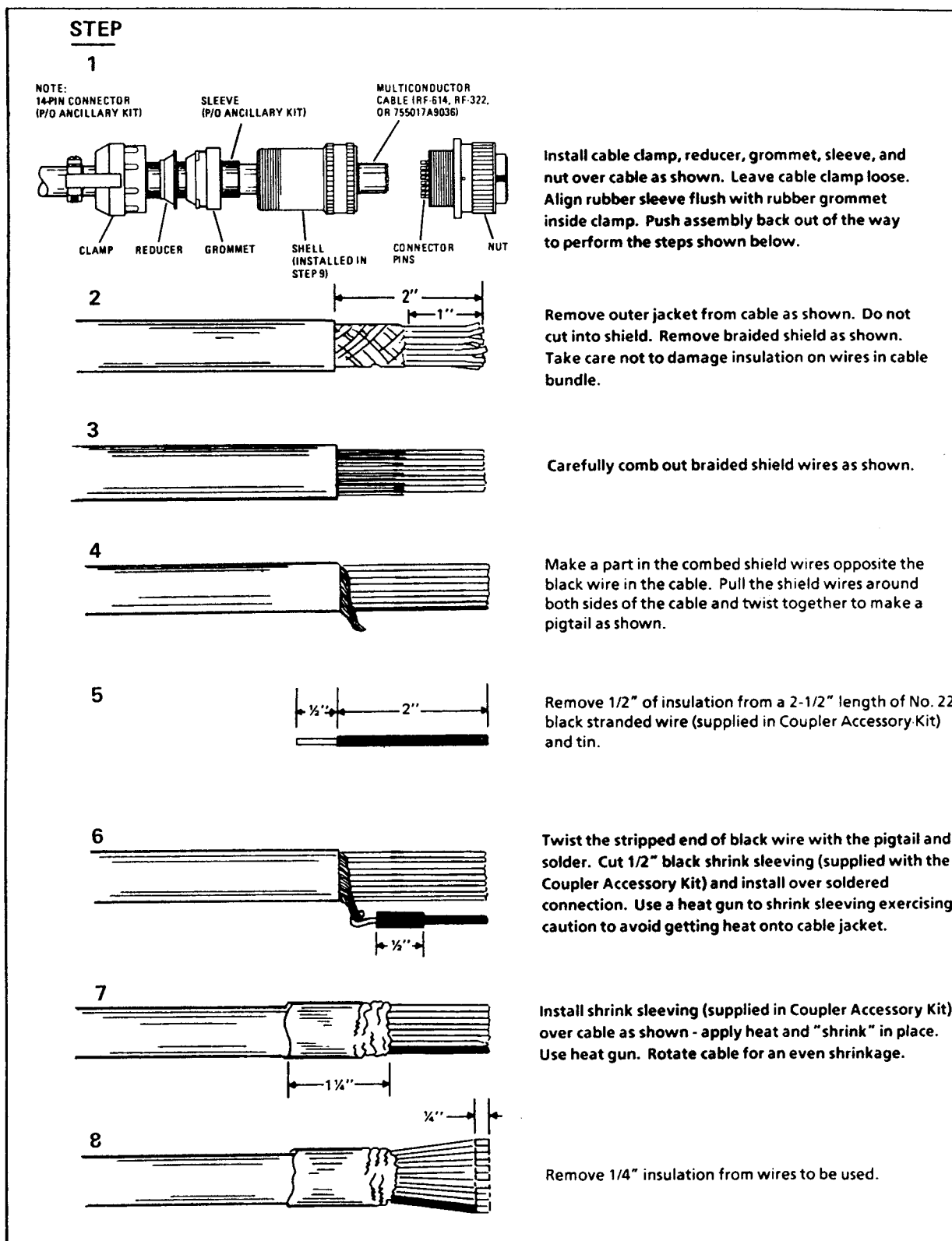
NOTE:

For armored cable, slide cap over armor first. Push armor and cap back out of way, and proceed with assembly as directed above using armor clamp in place of standard clamp nut. When assembly is complete, straighten bulge in armor and trim so it can be clamped between nut and cap.

*Use Divco #276 (or other high temperature alloy) solder for high temperature applications.

R32-019

Figure 2-8. RF Cable Fabrication Procedure (Sheet 2 of 2)



382-009 (1)

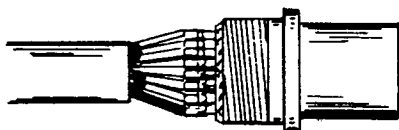
Figure 2-9. Control Cable Fabrication Procedure (Sheet 1 of 2)

STEP

9

Install Shell over cable.

10



Refer to figure 2-7 for proper interface connections. Twist and tin stripped wires together to form parallel connections as specified. Use shrink tubing to insulate soldered connections. Twist and tin remaining stripped wires. Cut sleeving supplied in ancillary kit into 1/2-inch (1-1/4 cm) lengths and slide over each wire. Keep wires parallel as they come out of the cable bundle to the connector pins. Ensure the black wire installed in step 6 and the ground wire in the cable are lined up with and soldered together in connector solder cup. Solder wires to the solder cups. Slide sleeving over solder cups. Write down wire colors assigned to each pin number for reference when assembling the connector on the other end of the cable.

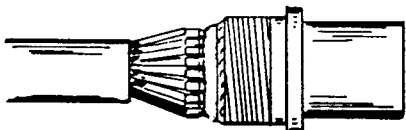
11

Repeat assembly and soldering procedures for the other end of the cable.

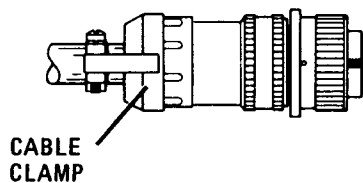
12

Check both ends of the cable for continuity, shorts between wires and shorts to the connector shell.

13



14



Assemble the plug as shown. Assemble clamp and shell as tightly as possible to assure a watertight connection around the cable. **DO NOT TWIST CABLE WHILE TIGHTENING.** After control and RF connectors have been threaded on Coupler case connectors J1 and J2, it may be desirable to wrap both connectors with several layers of plastic electrical tape as close to the Coupler case as possible. (For protection against corrosion of mating threads in wet or humid environments.)

NOTE: To convert inches to centimeters, multiply by 2.540.

382-009 (2)

Figure 2-9. Control Cable Fabrication Procedure (Sheet 2 of 2)

2.8 GROUNDING

The coupler ground configuration is an integral part of the antenna electrical system. The importance of this ground to effective system operation cannot be overemphasized. Inadequate grounding degrades system operation, and causes RF voltages to be present on the chassis. These voltages could cause equipment damage, and create a serious hazard to personnel.

WARNING

Inadequate or defective grounding creates a serious hazard to personnel that could result in serious injury or death.

CAUTION

Inadequate or defective grounding could damage the equipment.

Ground straps must be constructed of wide copper straps, and be as short as possible. Ground straps should be clamped and bonded to at least two ground rods. The rods must be at least 6 to 8 feet (1.83 to 2.44 m.) long, and must be spaced 4 to 5 feet (1.22 to 1.52 m.) apart around the coupler ground terminal. If ground rods cannot be used (for example, roof installation or insufficient soil conductivity), a ground counterpoise must be constructed using at least 16 insulated ground radials, longer than the antenna. The radials should be laid on the earth's surface, and must be well-bonded to the ground rods.

If the antenna coupler is mounted to a ship's bulkhead or deck, ensure a paint-free, rust-free mounting surface. (See paragraph 2.9 (c).)

2.9 ENVIRONMENTAL PROTECTION

If the coupler is exposed to a wet or humid environment, protect the exposed input connectors as follows:

- a. After connectors are installed, wrap both connectors with one layer on self-fusing silicone tape, P/N P50-0008-416, and two layers of vinyl electrical tape, P/N P05-0001-000. Wrap the connectors coming as close to the antenna coupler as possible. Extend the tape at least two inches down the cable.
- b. Coat the insulator at the antenna output connection and all ground connections with Dow Corning DC-5, General Electric G-635, or an equivalent dielectric compound (Harris Part No. P25-0002-000). Apply a coating approximately 1/8 inch (0.32 cm.) thick. This coating prevents deterioration of the antenna connection and its associated hardware. This coating also protects the insulator from conductive contaminants that could degrade the insulating properties of the output connector system, such as oil, dirt, dust, and corrosive material from the atmosphere. This is especially important in a salt-laden air environment.
- c. Coat all mounting surfaces and mounting hardware threads with anti-seize compound (Harris Part No. P40-0002-000) (included in ancillary kit). This compound retards corrosion, and prevents seizing of hardware threads.

2.10 INITIAL ADJUSTMENTS

The RF-2601 coupler requires no routine installation adjustments. Refer to the Operation section for specialized information on a particular system.

Before operation, verify the following:

1. Correct system voltage:

Without applying power to coupler or status monitor, verify 115 Vac 10% or 230 Vac 10% operating voltage (as appropriate) is present at the coupler input control connector J1 or RF-2602 Status Monitor control connector J1.

2. Coupler input voltage switch setting:

If the covers of the antenna coupler are in place so that the 115/230 Vac switches are inaccessible, measure the resistance between pins L and M on J1 of the antenna coupler, and pins L and M on J2 (with ac switch off) of the status monitor.

NOTE

The following resistance values do not account for control cable resistance. Add 2 ohms of resistance per 100 feet of 20 AWG control cable used.

If the resistance at the pins of the antenna coupler is about 3 ohms, the 115/230 Vac switch is set for 115 Vac. If the resistance is about 12 ohms, the 115/230 Vac switch is set for 230 Vac. If coupler input voltage switch setting is not correct, remove cover and set accordingly. Replace cover and pressurize per paragraph 5.7.2.2.

3. Status monitor input voltage switch setting:

If the resistance at the pins of the status monitor is about 55 ohms, the 115/230 Vac switch is set for 115 Vac. If the resistance is about 220 ohms, the 115-230 Vac switch is set for 230 Vac. Remove status monitor cover and set as required. See paragraph 5.6.

4. Status monitor system configuration settings:

Remove status monitor cover and check DIP switches S3 and S1 settings as per table 2-3. See also paragraph 5-6 and tab section RF-2602, figure 1.

5. All connections are in place and secure.

6. Antenna and antenna coupler grounds are in place and adequate.

7. Appropriate transceiver connections are made.

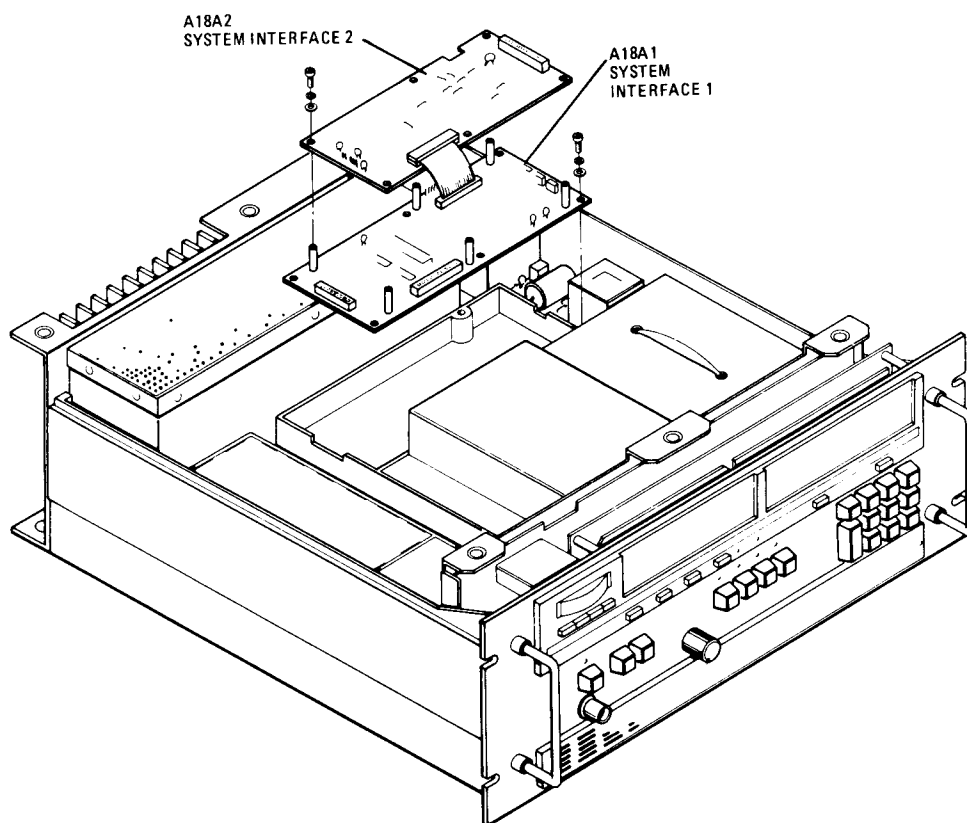
8. If the transmitter employs an RF-1310 Exciter, check its option switches per table 2-4, and figures 2-10 and 2-11.

Table 2-3. Status Monitor DIP Switch Settings

Transmitter/Transceiver Series	Switch Positions (C = Closed, O = Open)							
	S3-1	S3-2	S3-3	S3-4	S1-1	S1-2	S1-3	S1-4
RF-130, RF-1130, AN/URT-23	O	O	O	O	O	O	O	C
RF-350, RT-1446/URC	O	O	O	O	C	C	C	C
RF-3200-10(M)	C	C	C	C	C	C	C	C
RF-155DR	O	O	O	O	O	O	O	O

Table 2-4. RF-1310 Exciter Option Switches on A18A1 System Interface 1 Assembly

Switch Position	Description
S1-1	<p>Transmitter Gain Control Learn Enable</p> <p>Determines whether full power attenuation value used is the one stored in the battery-backed A14 RAM, or if a new one is learned and stored at the end of a PA tune cycle.</p> <p>Closed = Learn Disable - attenuation value is the one stored in A14 RAM. This value may cause the initial RF power output to the coupler to be very low or high the first time system is keyed after coupler is tuned. RF power then steps to 1000 watts. Subsequent keying results in quick risetime to 1000 watts.</p> <p>Open = Learn - a new value of attenuation needed for full power output will be learned and stored in A14 RAM. RF power will kick up at end of coupler tune cycle to learn where 1000 watts is the first time system is keyed. Subsequent keying results in quick risetime to 1000 watts.</p>
S1-2	<p>Attenuation Control</p> <p>Determines whether attenuator control values are a function of what is read from potentiometer R15 or if normal TGC operation is in effect. (Used for test only. Leave switch in OPEN position.)</p> <p>Closed = Attenuation Manual - control value is read directly from R15 and TGC is disabled.</p> <p>This value may be stored in the A14 RAM as the learned value for a particular frequency by checking that S1-1 is closed and depressing S2.</p> <p>Open = Attenuation Auto - normal attenuation control under TGC.</p>
S1-3	<p>Coupler Control</p> <p>Tells exciter to include RF-601A Antenna Coupler in tune cycle. Position switch closed for RF-2601 Antenna Coupler.</p> <p>Closed = All couplers but RF-601A.</p> <p>Open = RF-601A coupler only - enables a timer to declare homing or tuning time-out faults.</p>
S1-4	<p>Signal Generator</p> <p>Allows exciter to be operated as a signal generator. In this mode, attenuation is set to front panel value. Exciter is ready when placed in operate and exciter must be keyed for output. PA is disabled from keying. Position switch closed for operation with RF-2601 Antenna Coupler.</p> <p>Closed = Exciter is in normal operating mode.</p> <p>Open = Exciter is in signal generator mode.</p>



1310 059

Figure 2-10. RF-1310 A18 Assembly Location

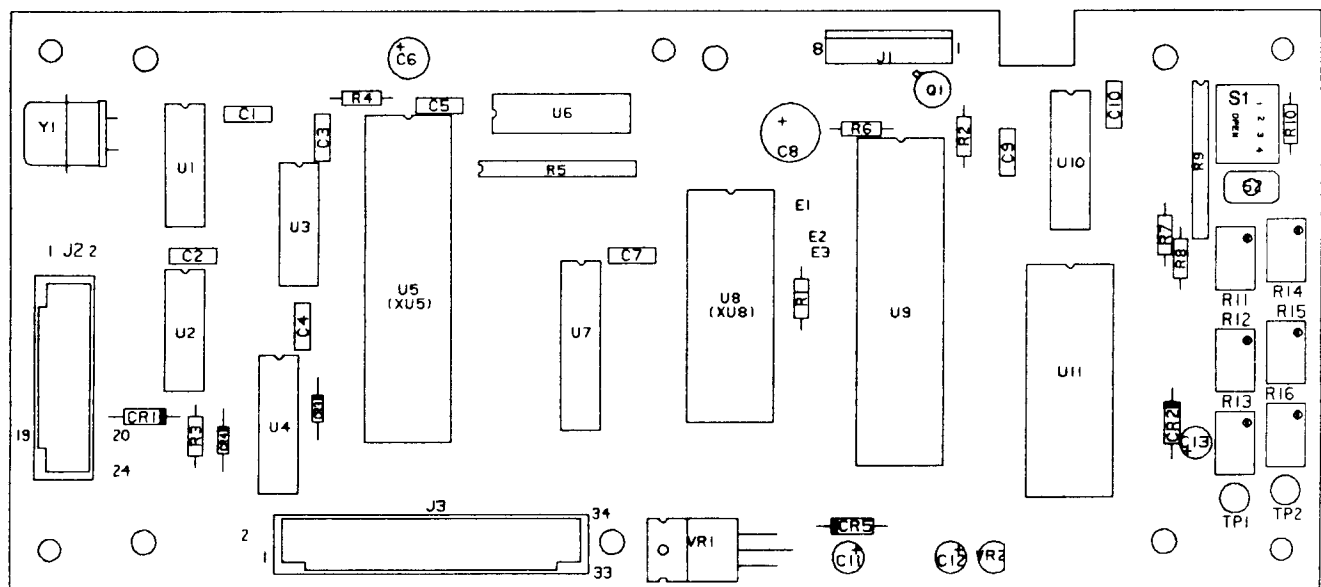


Figure 2-11. RF-1310 System Interface 1 Assembly A18A1 Component Location Diagram
(10121-6310 Rev F)





SECTION 3

OPERATION

3.1 GENERAL INFORMATION

There are no operator controls or externally-visible indicators on the RF-2601 Antenna Coupler. Tuning is automatic in response to commands from the transceiver and RF-2602 Status Monitor. The antenna coupler tunes in 75 milliseconds from memory based on prior tuneup, and typically in two to three seconds (seven seconds maximum) when a new tune sequence must be learned.

The RF-2602 Status Monitor permits remote operation and monitoring of self-test, operational status, and control of receive bypass and fault override of the RF-2601 Antenna Coupler.

The RF-2601 Antenna Coupler provides status information to the operator via indicators on the transmitter or transceiver. The RF-2602 Status Monitor provides additional status information and control.

NOTE

The RF-2602 is not necessary for antenna coupler operation. The additional information and control provided by the RF-2602 aids operation and troubleshooting, and provides control of Receive Bypass and Fault Override.

Paragraph 3.2 provides RF-2602 Status Monitor operation. Refer to the tables in this section for system specific antenna coupler operational information using the RF-130, RF-1130, and AN/URT-23 series transmitters, and the RF-350, RT-1446/URT, and RF-3200-10 series transceivers. Paragraph 3.4 provides antenna coupler operation with RF-7100 and RF-7200 Adaptive Systems.

3.2 RF-2602 STATUS MONITOR OPERATION

WARNING

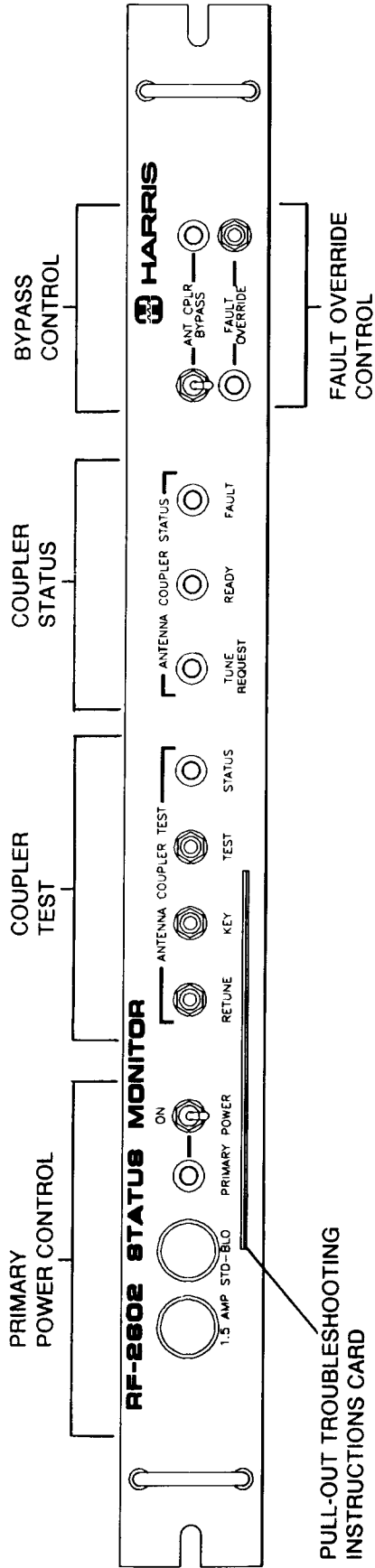
The RF-2602 PRIMARY POWER on/off switch cuts primary power to the RF-2601 and RF-2602 only. It DOES NOT remove RF power from the transmitter/transceiver.

The RF-2602 Status Monitor front panel, shown in figure 3-1, contains five separate control groups:

- Primary Power Control
- Coupler Test
- Coupler Status
- Bypass Control
- Fault Override Control

Table 3-1 provides a functional description of the RF-2602 front panel controls.

The front panel also provides a pull-out instruction card (shown in figure 3-2) covering operation, self-test, and troubleshooting of the coupler system.



2601-050

Figure 3-1. RF-2602 Status Monitor Front Panel Controls

Table 3-1. RF-2602 Front Panel Controls

Indicator/Control Group	Functional Description/Features
Fuses/Primary Power Group	<ul style="list-style-type: none"> • 1.5 Amp, Std-Blo fuses. • Power LED shows presence of 5 Vdc Supply. • Switch and fuses control power to RF-2601 Coupler and RF-2602 Status Monitor.
Test Switch Group	<ul style="list-style-type: none"> • RETUNE pushbutton initiates retune signal. (See note 1) • KEY pushbutton initiates keyline signal. (See note 2) • STATUS indicator shows test status state (Status flashes fault code, defined on troubleshooting card). (See note 3) • TEST pushbutton initiates static bit test. (See note 3)
Status Group	<ul style="list-style-type: none"> • TUNE REQUEST Indicator - indicates that tune cycle has been requested (TUNE POWER REQUEST sent from coupler). • READY Indicator - coupler is ready (tune cycle successful). • FAULT Indicator - Fault has been detected by coupler. (Status flashes fault code, defined on troubleshooting card).
Bypass Indicator/Switch Group	<ul style="list-style-type: none"> • BYPASS Indicator shows coupler bypass status. • BYPASS Switch grounds bypass line when closed, switches to RF bypass in Receive mode.
Override Indicator/Switch Group	<ul style="list-style-type: none"> • OVERRIDE Indicator shows condition of fault override line. • FAULT OVERRIDE pushbutton causes fault override line to go low. (See note 4)

NOTES:

1. RETUNE pushbutton not functional with systems using RF-350 and RT-1446 Transceivers.
2. KEY pushbutton not functional on RF-350, RT-1446, and RF-3200 Transceivers.
3. Status Group LEDs may go dark during static test.
4. FAULT OVERRIDE pushbutton not functional on RF-3200 and RF-3200-10M systems.

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- NOTES: A) FAULTS, SELF-TEST AND FAULT-OVERRIDE (AFTER TURNING OFF LED) ARE CLEARED BY CHANGING FREQUENCY, RETUNING COUPLER OR BY "RETUNE" SWITCH (SEE NOTE D).
B) "FAULT OVERRIDE" (NOT ACTIVE WITH RF-3200-10(M)) ALLOWS COUPLER TO OPERATE IN RF BYPASS MODE. SEE NOTE A.
C) FRONT PANEL FUSES ARE PROTECTION FOR BOTH ANTENNA COUPLER AND STATUS MONITOR.
D) ONLY RF-130, RF-1130, AND AN/URT-23 SERIES XMTRS ARE RESPONSIVE TO "RETUNE" AND "KEY" PUSHBUTTONS.

- 1) CHECK 115/230 VAC SWITCH, A152, INSIDE THIS UNIT FOR CORRECT VOLTAGE SETTING. ALSO, CHECK SETTINGS OF DIP SWITCHES, A151 AND A153, TO ASSURE CORRECT SETUP FOR TRANSMITTER/TRANSCIVER BEING USED.

SERIES OF XMTR/XCVR	S3-1	S3-2	S3-3	S3-4	S1-1	S1-2	S1-3	S1-4
RF-130, RF-1130, AN/URT-23	0	0	0	0	0	0	0	0
RF-350, RT-1446/URC	0	0	0	0	0	0	0	0
RF-3200-10(M)	C	C	C	C	C	C	C	C
RF-1550R	0	0	0	0	0	0	0	0

- 2) CONTINUOUS SURVEILLANCE TEST (SEE NOTES A AND B)

TEST STATUS LED FLASHING SEQUENCE	CONDITION	LIKELY DEFECTIVE UNIT OR CPLR 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
1-4	OVER TEMP FAULT	COUPLER TEMP/MC (WAIT-THEN REDUCE RF INPUT PWR)
4	VSWR FAULT	DEFECTIVE OR VARYING ANTENNA, ARCING
1-1	TUNE SOLUTION FAULT	CHECK ANT. IF OK, GO TO STEP 3 (STATIC TEST)
1-2	DISCONNECTED PWR FAULT	CHECK A4, A5, AND A6 PLUGS (4 TOTAL)
1-3	PRESSURE FAULT	CHECK COUPLER PRESSURE
1-4	NEAR FIELD INTERFERENCE	NEARBY TRANSMITTING ANTENNA
1-5	COOLING AIR FAULT	ASBL, ASBL LINE CORL, A3, A6

- 3) STATIC TEST: ENTER 7.7000 MHZ INTO XMTR. PUSH "TEST" PUSHBUTTON.

TEST STATUS LED FLASHING SEQUENCE	CONDITION	LIKELY DEFECTIVE CPLR ASSY. IN ORDER
ON	TEST IN PROGRESS (20-25 SECS)	SEE NOTE A
1	STATIC TEST PASSED	SEE NOTE A
1-2	RAM	A6, A4, A5, A1, A3
1-3	EEPROM	A3, A7
4	REAL TIME CLOCK	A3, A7
1-4	5 VDC REFERENCE	A3, A5
1-5	A/D CONVERTER	A3, A5
1-6	DETECTED FORWARD POWER	A5, A3, A2
1-7	DETECTED REFLECTED POWER	A5, A3, A2
1-8	RF READING	A5, A3, A5, A6
1-9	PHASE READING	A5, A3, A5, A6
1-10	OVER-VOLTAGE DETECTOR	A4, A3, A9
1-11	FREQUENCY COUNTER	A5, A3
1-12	TEMPERATURE DETECTOR	A3

- 4) TRANSMIT TEST: TRANSMIT TEST IS ONLY ACTIVE AFTER STATIC TEST HAS PASSED. MOMENTARILY DEPRESS TEST KEY PUSHBUTTON AFTER STATIC TEST. (EXCEPT RF-3500-10(M), RF-350 AND RT-1446/URC WHICH MUST BE MOMENTARILY KEYED AT TRANSCIVER.) SEE NOTES A AND B.

TEST STATUS LED FLASHING SEQUENCE	CONDITION	LIKELY DEFECTIVE CPLR ASSY. IN ORDER
ON	TEST IN PROGRESS (UP TO 45 SECS)	SEE NOTE A
1	TRANSMIT TEST PASSED	IGNORE EXCITER FAULT, IF ANY
1-2	TUNE FAULT	A6, A4, A5, A1, A3
3	HIGH TUNE POWER	A7, A5, A3, XMTR
4	LOW OR NO TUNE POWER	RF INPUT PATH, XMTR, A1, A5, A3
1-2	FREQUENCY COUNTER	XMTR FREQ, A5, A3
1-3	RF RELAY OR IT'S DRIVE CIRCUITRY	A6, A4, A5, A3
1-4	PHASE READING	A5, A3
1-5	RF READING	A5, A3
1-6	REFLECTED POWER	A5, A3

- 5) IF ABOVE TESTS DO NOT PROVIDE IDENTIFICATION OF LIKELY PROBLEM, PERFORM TROUBLESHOOTING INSTRUCTIONS GIVEN INSIDE ANTENNA COUPLER AND/OR CONSULT ANTENNA COUPLER TECHNICAL MANUAL, SECTION 5.

ANTENNA COUPLER TROUBLESHOOTING INSTRUCTIONS TO ASSEMBLY LEVEL
(PREFIX ALL ASSEMBLY REFERENCE DESIGNATIONS WITH 1A2)

↓ TROUBLESHOOTING INSTRUCTIONS **↓**

PULL

PULL

Figure 3-2. RF-2602 Troubleshooting Instructions Card (10257-6109 Rev. C)

3.3 TRANSMITTING SYSTEM OPERATION

3.3.1 Fault Handling General

A fault condition exists when the RF-2601 Antenna Coupler encounters any abnormal operating condition which would limit its operational capability. Fault conditions are detected by means of internal performance monitoring circuits, as well as external signal lines from the associated equipment. Important aspects of system faults are described below. Detail fault handling instructions are system specific, and are described in tables 3-2 through 3-5.

3.3.1.1 Fault Detection

The method by which faults are identified is a function of both the system with which the antenna coupler is used, and whether the RF-2602 Status Monitor is employed. See tables 3-2 through 3-5 for system-specific fault detection methods.

3.3.1.2 Fault Identification

Whenever the RF-2602 is installed in the system, faults can be identified by observing the STATUS LED on the RF-2602. Further identification can be obtained by performing static and transmit tests, as described on the RF-2602 Troubleshooting Instruction Card. The STATUS LED shows the nature and location of the fault with a coded sequence of flashes. See tables 3-2 through 3-5 for detailed fault discussions.

The location and nature of specific faults is also identified inside the RF-2601 case by means of LEDs and test points on individual PWB assemblies and a fault identifier table on the coupler shock cover. A duplicate status LED is also found inside the RF-2601 coupler, which has the same function as the RF-2602 front-panel LED.

3.3.1.3 Fault Recovery

Intervention by the operator is required to return the system to operating condition following a fault. Fault recovery can be as simple as pressing the appropriate front-panel control, or it may require hardware repair or replacement. See tables 3-2 through 3-5 for system-specific instructions to clear a fault.

3.3.1.4 Fault Override

In cases where the fault is not easily rectified, limited system operation may be restored by manually overriding the fault-detection circuits, or bypassing the RF networks of the coupler.

3.3.1.5 Bypass Operation

The RF-2601 Antenna Coupler cannot be manually switched to the bypass mode unless the RF-2602 Status Monitor is used. The ANTENNA COUPLER BYPASS switch on the RF-2602 can be used to switch the antenna coupler to RF-bypass during the receive mode for transceivers capable of half-duplex operation. Also, bypass is automatically controlled by some transceiver software to permit automatic receive scan operation, allowing compatibility with receive-channel monitoring and RF-7100 and RF-7200 Series adaptive equipment. See tables 3-2 through 3-5 for specific operation of RF-bypass.

3.3.1.6 Memory Tune Override

Under some circumstances, coupler tuning from stored configuration information may not be optimal, in which case the operator can initiate coupler retuning for better performance. Memory tune override procedures are system specific. See tables 3-2 through 3-5.

Table 3-2. Fault Handling of RF-130 (those not using RF-1310 Exciter) and AN/URT-23 Transmitters

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Detection	RF power level meter on transmitter shows no RF output power when system is keyed. RF-2602 FAULT indicator LED is on.	RF power level meter on transmitter shows no RF output power when system is keyed.
Fault Identification	Fault condition obtained by reading STATUS LED. Further information obtained by performing STATIC and TRANSMIT tests. Clear fault condition to determine if it will reappear (see Fault Recovery).	Fault is not identified as to the specific nature or location unless cover of RF-2601 Antenna Coupler is removed. See paragraph 3.3.1.2 for fault identification instructions with cover removed.
Fault Recovery	Clear antenna coupler fault by performing any one of the following: <ul style="list-style-type: none"> • push RF-2602 RETUNE pushbutton • cycle system power off/on 	Clear antenna coupler fault by performing any one of the following: <ul style="list-style-type: none"> • select a frequency at least 1 kHz away from the current frequency and then reselect the original frequency • cycle system power off/on
Fault Override	Used if desired to continue transmitting in RF-bypass mode. If fault is overridden and a fault reoccurs, the transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power. Push FAULT OVERRIDE pushbutton. FAULT OVERRIDE LED will come on. If a fault reoccurs, FAULT LED lamp will come on, STATUS LED will flash fault code. To clear the RF-2602 Fault Override mode, first push the FAULT OVERRIDE pushbutton, then see Fault Recovery.	Used if desired to continue transmitting in RF-bypass mode. If fault is overridden and a fault reoccurs, the transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power. Close DIP switch A3S4-1 inside antenna coupler as part of equipment set-up. A fault will be detectable when transceiver FAULT LED comes on. To clear the fault see Fault Recovery, above.

Table 3-2. Fault Handling of RF-130 (those not using RF-1310 Exciter) and AN/URT-23 Transmitters (Cont.)

Activity	Implementation	
	System with RF-2602	System without RF-2602
Bypass Operation	<p>Not manually controllable from the RF-130 or AN/URT-23 Transmitters.</p> <p>Manually controlled by RF-2602 COUPLER BYPASS switch.</p> <p>If COUPLER BYPASS switch is on, coupler is automatically switched to bypass during receive mode.</p> <p>Manual Bypass operation is primarily used for half-duplex operation when the split-frequencies are spaced too far apart for simplex operation. For these transmitters, split-frequencies are not possible.</p>	<p>Not manually controllable from the RF-130 or AN/URT-23 Transmitters.</p> <p>Manual Bypass operation is primarily used for half-duplex operation when the split-frequencies are spaced too far apart for simplex operation. For these transmitters, split-frequencies are not possible.</p>
Memory Tune Override	<p>Select a frequency at least 1 kHz away from the current frequency, and then reselect the original frequency (or press RF-2602 RETUNE, followed by KEY).</p>	<p>Select a frequency at least 1 kHz away from the current frequency, and then reselect the original frequency; then rekey system.</p>

Table 3-3. Fault Handling of RF-130-01 and RF-1130 Systems

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Detection	<p>Fault indicator on exciter front panel is on.</p> <p>RF power level meter on transmitter shows no RF output power when system is keyed.</p> <p>FAULT indicator LED on RF-2602 is on.</p>	<p>Fault indicator on exciter front panel is on.</p> <p>RF power level meter on transmitter shows no RF output power when system is keyed.</p>
Fault Identification	<p>Fault condition obtained by reading STATUS LED. Further information is obtained by performing STATIC and TRANSMIT tests. Clear fault condition to determine if it will reappear (see Fault Recovery).</p>	<p>Fault not identified as to the specific nature or location unless cover of RF-2601 Antenna Coupler is removed. See paragraph 3.3.1.2 for fault identification instructions with cover removed.</p>

Table 3-3. Fault Handling of RF-130-01 and RF-1130 Systems (Cont.)

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Recovery	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • push RF-1130 Exciter TUNE pushbutton • Select a frequency at least 20 kHz away from the current frequency, and then reselect the original frequency • push RF-2602 RETUNE pushbutton • cycle system power off/on 	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • push RF-1130 Exciter TUNE pushbutton • select a frequency at least 20 kHz away from the current frequency, and then reselect the original frequency • cycle system power off/on
Fault Override	<p>Used if desired to continue transmitting in RF bypass mode:</p> <p>If fault is overridden and another fault occurs, transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power.</p> <p>Push RF-2602 FAULT OVERRIDE pushbutton and its LED will come on. If a fault reoccurs, the RF-2602 FAULT LED lamps will come on, and the STATUS LED will flash fault code. On the RF-1310 Exciter, a fault will be detectable by noting the FAULT indicator exciter on the front panel and by noting high reflected power.</p> <p>To clear the RF-2602 Fault Override mode, push the Fault Override pushbutton. See Fault Recovery.</p>	<p>Used if desired to continue transmitting in RF bypass mode:</p> <p>If fault is overridden and another fault occurs, transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power.</p> <p>Close DIP switch A3S4-1 inside antenna coupler as part of equipment set-up. If a fault occurs, it will be detectable by noting the FAULT indicator on RF-1310 front panel, and by noting high reflected power on the P.A. power meter.</p> <p>To clear the fault, see Fault Recovery.</p>

Table 3-3. Fault Handling of RF-130-01 and RF-1130 Systems (Cont.)

Activity	Implementation	
	System with RF-2602	System without RF-2602
Bypass Operation	<p>Not manually controllable from the RF-1130 Transmitter.</p> <p>Manually controlled by the RF-2602 COUPLER BYPASS switch.</p> <p>If COUPLER BYPASS switch is on, coupler is automatically switched to bypass during receive mode.</p> <p>Manual Bypass operation is primarily used for half-duplex operation when the split frequencies are spaced too far apart for simplex operation. For these transmitters, split frequencies are not possible.</p> <p>Software-controlled by RF-1310 Exciter to permit automatic receive scan operation, and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p>	<p>Not manually controllable from the RF-1130 Transmitter.</p> <p>Manual bypass operation is primarily used for half-duplex operation when the split frequencies are spaced too far apart for simplex operation. For these transmitters, split frequencies are not possible.</p> <p>Software controlled by RF-1310 Exciter to permit automatic receive scan operation and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p>
Memory Tune Override	<p>Push RF-1310 TUNE pushbutton, or press RF-2602 RETUNE, followed by KEY.</p>	<p>Push RF-1310 TUNE pushbutton.</p>

Table 3-4. Fault Handling of RF-350 and RT-1446/URC Systems

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Detection	<p>FAULT indicator will come on, BYPASS indicator will illuminate (both on transceiver front panel).</p> <p>RF power level meter on transmitter will show no RF output power when system is keyed.</p> <p>RF-2602 FAULT indicator LED will come on.</p>	<p>FAULT indicator will come on, BYPASS indicator will illuminate (both on transceiver front panel).</p> <p>RF power level meter on transmitter will show no RF output power when system is keyed.</p>
Fault Identification	<p>Pressing 2nd and TEST buttons on transceiver will identify either a "3-1" fault (Coupler Fault, which is any fault except a Thermal Fault), or "3-2" fault (Thermal Fault).</p> <p>Fault condition obtained by reading RF-2602 STATUS LED. Further information is obtained by performing STATIC and TRANSMIT tests. Clear fault condition to determine if it will reappear. (See Fault Recovery).</p>	<p>Specific fault not identified as to the specific nature or location in the coupler unless cover of RF-2601 Antenna Coupler is removed. See paragraph 3.3.1.2 for fault identification instructions with cover removed.</p>
Fault Recovery	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • change transceiver channel and key • change frequency by at least 1% and key • push RF-2602 RETUNE pushbutton • cycle system power off/on <p>NOTE</p> <p>Operating RETUNE button on RF-2602 does not reset transceiver.</p>	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • change transceiver channel and key • change frequency by at least 1% and key • cycle system power off/on

Table 3-4. Fault Handling of RF-350 and RT-1446/URC Systems (Cont.)

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Override	If fault is overridden and a fault reoccurs, the transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power.	If fault is overridden and a fault reoccurs, the transmitter power will not be disabled. The power amplifier will protect itself by cutting back forward power as a function of reflected power.
Bypass Operation	<p>Not manually controllable from the transceiver.</p> <p>Manually controlled by the RF-2602 COUPLER BYPASS switch.</p> <p>If COUPLER BYPASS switch is on, coupler is automatically switched to bypass during receive mode.</p> <p>Manual bypass operation is primarily used for half-duplex operation when the split frequencies are spaced too far apart for simplex operation.</p> <p>Software-controlled by transceiver to permit automatic receive scan operation, and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p> <p>When the frequency is changed, but the transceiver is not keyed (to monitor other receive channels), the coupler may be RF-bypassed to prevent high insertion loss to the receiver. Depending on the transceiver and its version of software, the coupler may be bypassed if the frequency is changed by more than $\pm 1\%$, changed to below 4 MHz, or not bypassed at all.</p>	<p>Not manually controllable from the transceiver.</p> <p>Software-controlled by transceiver to permit automatic receive scan operation, and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p> <p>When the frequency is changed, but the transceiver is not keyed (to monitor other receive channels), the coupler may be RF-bypassed to prevent high insertion loss to the receiver. Depending on the transceiver and its version of software, the coupler may be bypassed if the frequency is changed by more than $\pm 1\%$, changed to below 4 MHz, or not bypassed at all.</p>
Memory Tune Override	<p>Press the RF-2602 RETUNE pushbutton, followed by transceiver key.</p> <p style="text-align: center;">NOTE</p> <p>Operating the KEY pushbutton on the RF-2602 Status Monitor does not key the transceiver.</p>	Memory Tune Override is not possible without the RF-2602.

Table 3-5. Fault Handling of RF-3200 Base Systems

Activity	Implementation	
	System with RF-2602	System without RF-2602
Fault Detection	<p>Front panel display flashes "tuning."</p> <p>RF power level meter on transmitter shows no RF output power when system is keyed.</p> <p>RF-2602 FAULT indicator LED is on.</p>	<p>Front panel display flashes "tuning."</p> <p>RF power level meter on transmitter shows no RF output power when system is keyed.</p>
Fault Identification	<p>Fault condition obtained by reading STATUS LED. Further information is obtained by performing STATIC and TRANSMIT tests. Clear fault condition to determine if it will reappear (see Fault Recovery).</p>	<p>Fault is identified at the RF-3200 by reading the RED Fault LED on RF-3200. Refer to troubleshooting card in the maintenance section of this manual for specific fault code displayed.</p>
Fault Recovery	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • select a different channel on the transceiver, and then return to the original channel • select a frequency at least 10 Hz away from the current frequency, and then reselect the original frequency • push RF-2602 RETUNE pushbutton • cycle system power off/on. 	<p>Clear antenna coupler fault by performing any one of the following:</p> <ul style="list-style-type: none"> • select a different channel on the transceiver, and then return to the original channel • select a frequency at least 10 Hz away from the current frequency, and then reselect the original frequency • cycle system power off/on.
Fault Override	<p>NOTE</p> <p>Fault Override cannot be accomplished either by the FAULT OVERRIDE switch on the RF-2602 Status Monitor, or by switch A3S4-1 on the RF-2601 Antenna Coupler Control Assembly.</p>	<p>NOTE</p> <p>Fault Override cannot be accomplished either by the FAULT OVERRIDE switch on the RF-2602 Status Monitor, or by switch A3S4-1 on the RF-2601 Antenna Coupler Control Assembly.</p>

Table 3-5. Fault Handling of RF-3200 Base Systems (Cont.)

Activity	Implementation	
	System with RF-2602	System without RF-2602
Bypass Operation	<p>Not manually controllable from the RF-3200 Transceiver.</p> <p>Manually controlled by the RF-2602 COUPLER BYPASS switch.</p> <p>If COUPLER BYPASS switch is on, coupler is automatically switched to bypass during receive mode.</p> <p>Manual Bypass operation is primarily used for half-duplex operation when split-frequencies are spaced too far apart for simplex operation.</p> <p>Software-controlled by RF-3200 Transceiver to permit automatic receive scan operation, and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p>	<p>Not manually controllable from the RF-3200 Transceiver.</p> <p>Software-controlled by RF-3200 Transceiver to permit automatic receive scan operation, and allow compatibility with RF-7100 and RF-7200 Series adaptive equipment.</p>
Memory Tune Override	Press RF-2602 RETUNE, followed by transceiver key.	Select a frequency at least 10 Hz away from the current frequency, and then reselect the original frequency, or select a different channel and return to the original channel; then key transceiver.

3.4 ANTENNA COUPLER OPERATION WITH ADAPTIVE SYSTEMS

When used with an RF-7100 or RF-7200 series Adaptive Communications System, the antenna coupler must first tune and store the network frequencies in memory in order for the system to properly perform Link Establishment and Link Quality Analysis. Perform the following procedure to store the frequencies in memory:

- If an RF-353 Power Amplifier is present in the RF-7100-04 system, verify that it is in the PA OFF or STANDBY mode during this procedure.
- Place the RF-7110 or RF-7210 Adaptive Controller into MANUAL mode by pushing the SCAN button until the indicator above it goes off.
- One-by-one, select each channel in the network, and tune the antenna coupler on that frequency.
- Return to the SCAN mode and continue normal operation.

For more information on adaptive system operation, refer to the system manual for the associated RF-7100 or RF-7200 Adaptive System.





SECTION 4

FUNCTIONAL DESCRIPTION

4.1 GENERAL INFORMATION

This section provides unit and assembly-level descriptions. The unit level information sections describe overall coupler operation, and should be studied before reading the assembly-level descriptions. The assembly level information sections provide component-level circuit descriptions to aid coupler troubleshooting at the assembly level.

4.2 UNIT-LEVEL FUNCTIONAL DESCRIPTION

Refer to figures 4-1, 4-2, and to figure 2 in the Main Chassis section, as necessary, during these discussions.

4.2.1 RF Signal Path

The RF signal from the transceiver is fed to the A5 Discriminator Assembly through coaxial cable 1A1W1 and 6 dB Pad Assembly A1. The Discriminator Assembly extracts the following information:

- Forward and reflected power
- Frequency
- Phase
- Parallel resistance (R_p)

The RF signal is then fed through the Discriminator PWB to the A4 Capacitor PWB Assembly and the A8 Coil Pack Assembly. These assemblies incorporate all of the reactive elements necessary to tune the coupler, together with their related switching elements. All tuning is accomplished by fast-acting relays that are controlled by a microprocessor, responding to data inputs and a preprogrammed algorithm. The RF output from the A8 assembly is fed directly to the antenna.

4.2.2 Control Signal and AC Power Path

Control signals from the transmitter/transceiver are routed to Transceiver Interface PWB Assembly A7 through connectors W2J1 and W2P1/J2, and cable 1A1W2. The 115/230 Vac input power lines are routed to Power Supply A6 through connectors W2J1 and 1A1W2P2/A2J3.

4.2.3 Module Interconnection

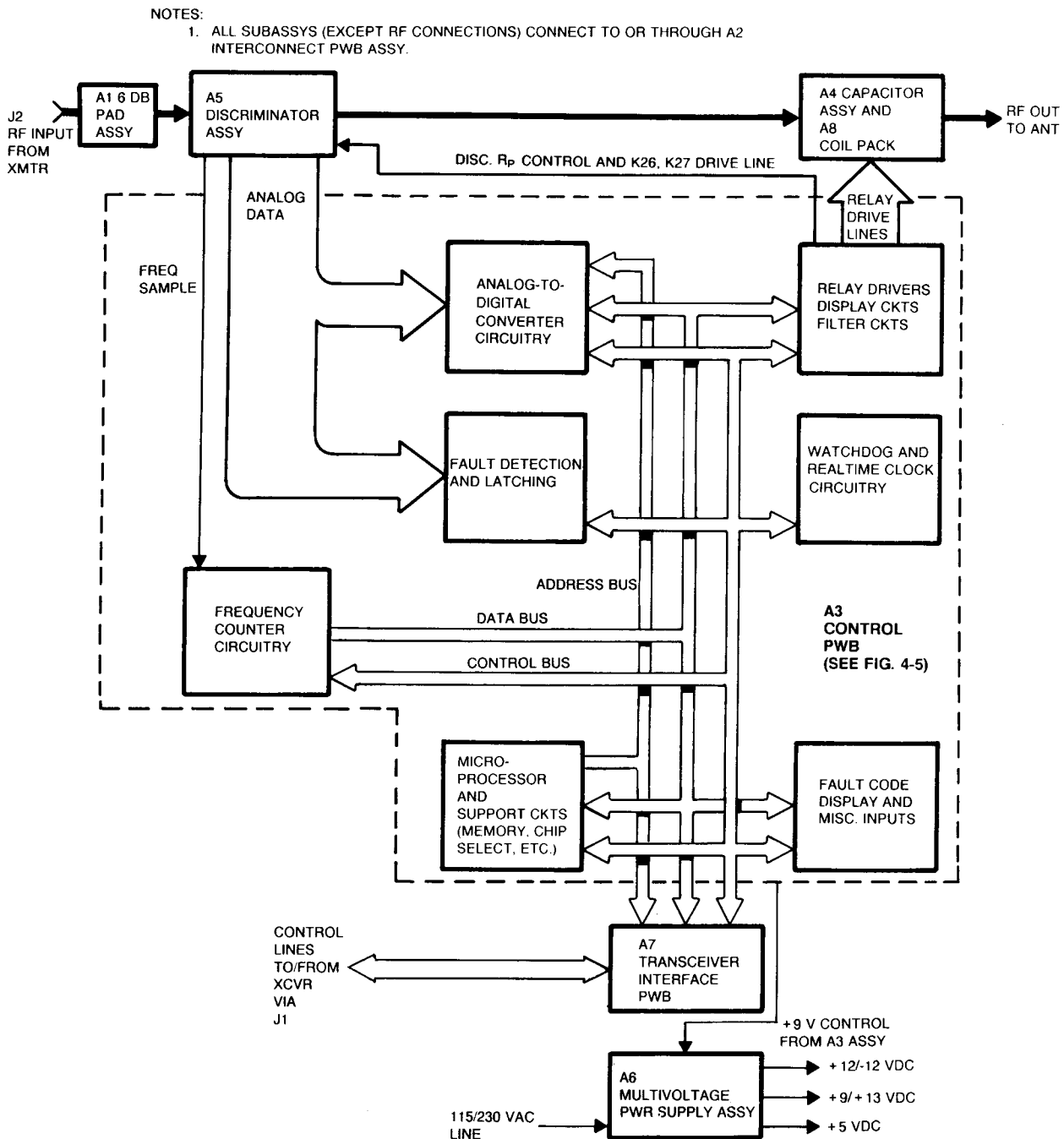
Interconnection of dc power and control signals among the coupler's modules is through Interconnect PWB Assembly A2. Interconnection of RF signals among the modules is through coaxial cables, not the Interconnect PWB Assembly.

4.2.4 Control Functions

The A3 Control PWB Assembly includes an 80C31 microprocessor and all support control functions. The microprocessor operates at a clock speed of approximately 5 MHz.

4.2.5 Transceiver Interface Functions

Transceiver Interface PWB Assembly A7 converts the control signals between the transmitter/transceiver and the coupler into TTL levels usable by the equipment's logic circuits. The assembly also detects changes in logic states to alert the microprocessor whenever control commands are received from the transmitter/transceiver.



2601-020

Figure 4-1. RF-2601 Functional Block Diagram

NOTES:

1. PREFIX ALL PARTIAL REFERENCE DESIGNATIONS WITH 1A2.
2. UNLESS OTHERWISE SPECIFIED:
A. ALL CAPACITOR VALUES ARE IN MICROFARADS.
B. ALL DIODES (CR DESIGNATORS) ARE 1N4004.
C. ALL ZENER DIODES (VR DESIGNATORS) ARE 1N4728A.
D. ALL COILS ARE IN MICROHENRIES.
3. ALL RELAYS SHOWN IN DE-ENERGIZED STATE.
4. EARLIER PRODUCTION RUNS DID NOT HAVE INCORPORATED:
L9, K31, CR18, VR8 AND C28 CIRCUITRY, AND COIL
PACK ID CIRCUITRY. IN ADDITION L6A, K16, CR9 AND
C9 CIRCUITRY WAS LOCATED BETWEEN L5B AND K22 AND
CAPACITOR A4C4 WAS 47PF AND CAPACITOR A4C5, A4C6
AND A4C7 WERE 82PF.

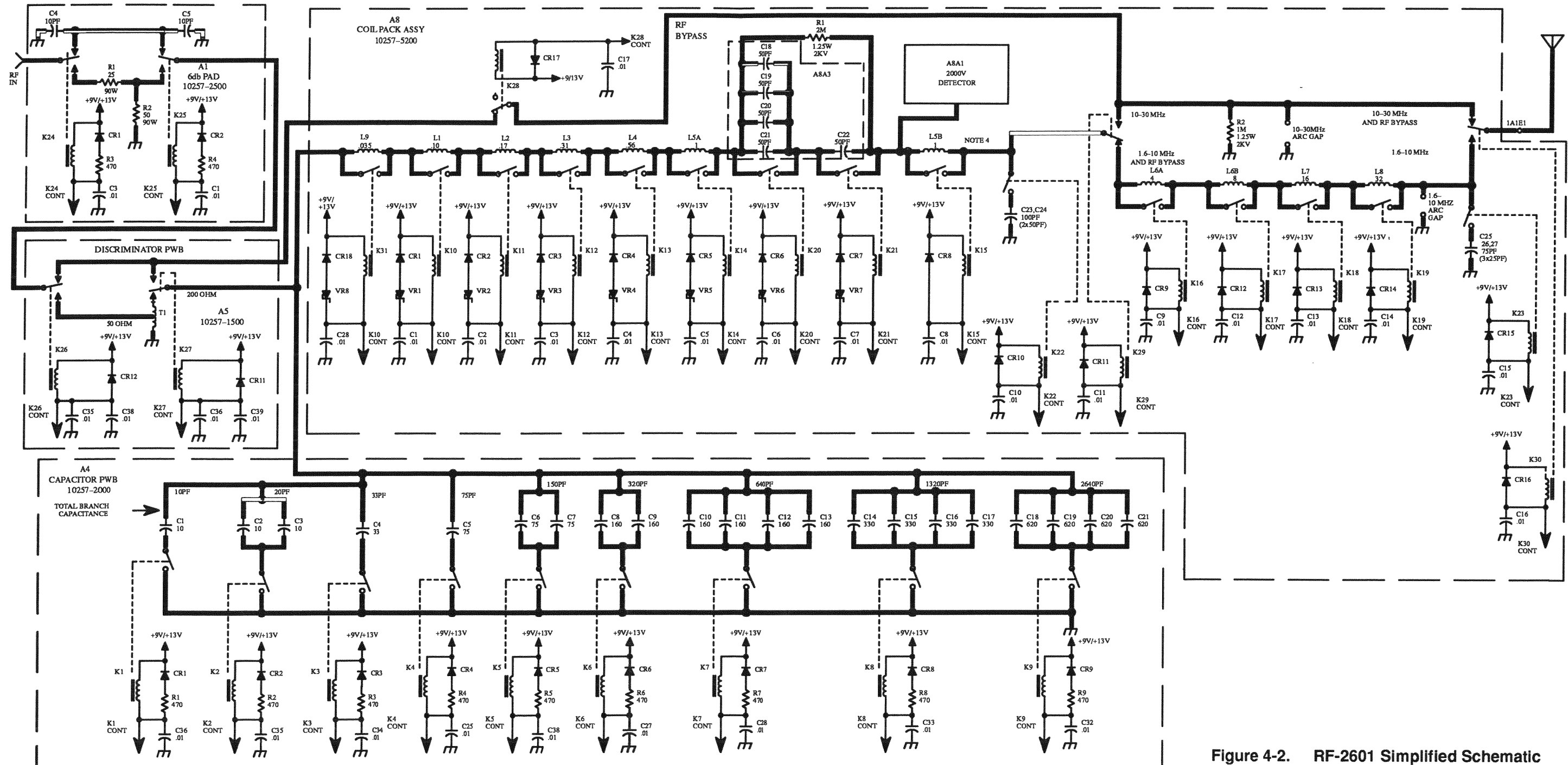


Figure 4-2. RF-2601 Simplified Schematic Diagram (10257-5301 Rev. B)

4.2.6 Power Inputs and Requirements

The coupler operates on 115/230 Vac 10%, 50/60 Hz; 145 W maximum, 100 W typical. Normally, primary power is derived from the transmitter/transceiver. The primary power input is routed to Power Supply A6; the power supply provides 12 V, +5 V, and +13 V/+9 V regulated dc supply voltages, and 115 Vac to Fan A8B1.

4.3 ASSEMBLY LEVEL CIRCUIT DESCRIPTIONS

All active components are on the A1, A3, A4, A5, A6, A7, and A8 assemblies. The following subparagraphs are circuit descriptions for each assembly. Refer to the white tab sections for parts lists, component location diagrams, and circuit schematics. Simplified schematic diagrams for the more complicated assemblies are contained in this section.

4.3.1 A6 Power Supply PWB Assembly

Power Supply Assembly A6 includes the following subassemblies:

- Power Supply PWB Assembly A6A1
- Ac Switch PWB Assembly A6A2

The power supply provides the following regulated dc voltages:

- +5 volts at 500 mA
- +12 volts at 200 mA
- -12 volts at 30 mA
- +9/+13 volts at 0.5 to 4 A

4.3.1.1 Dc Power Generation

Ac power is routed to power transformer T1 through Ac Switch PWB A2 and Input Connector A2J3. The transformer is connected for 115 or 230 volt operation by DPDT switch S1. The transformer secondaries connect to full-wave rectifiers CR1 and A1CR2/A1CR3. Rectified outputs are filtered by A1 capacitors C1, C2, C5, C10, and C11. The resultant dc voltages are applied to voltage regulation circuits to produce the power supply output voltages.

4.3.1.2 5 and 12 Volt Supply Regulation

The rectifier outputs are fed to three-pin regulators A1U1, A1U2, and U3 to produce regulated voltages of +12, -12, and +5 volts, respectively. These voltages are applied to antenna coupler circuits through A1J1.

4.3.1.3 +9/+13 Volt Supply Regulation

+9/+13 volt regulation is accomplished by A1U4 (a type 723 IC regulator) and its associated external circuitry. The regulator stabilizes output voltage by changing the conduction of series pass transistor Q2 in response to output voltage and current variations.

The filtered dc at the output of rectifier CR1 is applied to the regulator input at pin 11 (VIN), and to the series pass transistor through current-sensing resistors A1R6 and A1R7 (see paragraph 4.3.1.5). The regulator monitors output voltage (at the collector of the pass transistor) through a feedback network composed of resistors A1R19 through A1R22, and transistor A1Q6 (pin 4, IN-B). When a change in output voltage is detected, the regulator changes the amount of drive to the pass transistor (from VOUT pin 10 through driver Q1) to increase or decrease output as necessary. The output is routed to antenna coupler circuitry through A1J1, pins 3-8.

4.3.1.4 +9/+13 Volt Selection and Adjustment

Regulator output voltage level (+9 or +13 volts) is selected by the +9 V CONTROL line. The output remains at +9 volts except when the coupler is tuning, going into or out of the RF network bypass, or running a self test, at which time the output goes to +13 volts. The +9 V CONTROL line selects output voltage by changing the resistance (A1R19 through A1R22) in the voltage control feedback loop to pin 4 (IN-B) of the regulator. The resistance is reduced when the +9 V CONTROL line switches on transistors A1Q5 and A1Q6, effectively placing resistor A1R19 in parallel with A1R20 and potentiometer A1R22. The reduced loop resistance results in a +9 volt output. The 13 volt output level is adjusted by A1R22; there is little effect on the +9 volt output level.

4.3.1.5 +9/+13 Volt Supply Current Limiting

Current limiting is accomplished by reducing pass transistor output as necessary. A current limiting reference is set by Zener A1VR1 and resistors A1R1 through A1R3. A current mirror composed of transistors A1Q3 and A1Q4 compares the reference voltage to the voltage across resistors A1R6 and A1R7. When excess voltage is detected, the current mirror energizes the current limiting input (CURLIM, pin 2) to the regulator. The regulator reduces the drive to the pass transistor, folding back output voltage and current.

4.3.1.6 Power Supply Protection

The power supply is protected from potentially damaging input voltage spikes by metal oxide varistors A2Z1 and A2Z2. Fuse F1 provides over-current protection.

4.3.2 A1 6-dB Pad Assembly

The A1 6-dB Pad Assembly attenuates the RF signal applied to the tuning elements during a tune cycle. This prevents arcing or burning of the tuning element relay contacts caused by switching high-power RF energy, and extends relay life significantly. To prevent damage to the power resistors in the 6 dB pad, the coupler input power is limited to less than 200 watts.

4.3.3 A5 Discriminator PWB Assembly (see figure 4-3)

Discriminator PWB Assembly A5 includes Directional Coupler PWB Assembly A5A1, which is mounted directly to the A5 PWB.

The Discriminator Assembly produces the following control signal outputs:

- FWD PWR (forward power)
- REFL PWR (reflected power)
- Rp (parallel resistance)
- PHASE
- FREQ SAMPLE (frequency sample)

4.3.3.1 RF Sampling

The RF input to the Discriminator PWB is through the A5A1 Directional Coupler PWB Assembly. The RF flows through A5A1T1 and A5A1T2 on the Directional Coupler PWB before flowing through A5T2B, A5T2C, and A5T2D. A5A1T1, A5A1T2, A5T2B, A5T2C, and A5T2D provide current samples that produce the following indications: phase, parallel resistance (Rp), forward power, reflected power, and frequency sample. After flowing through T2D, the RF is routed to the A4 Capacitor Assembly/A8 Coil Pack Assembly by relays K26 and K27. Relay switching is controlled by the A3 Control PWB Assembly.

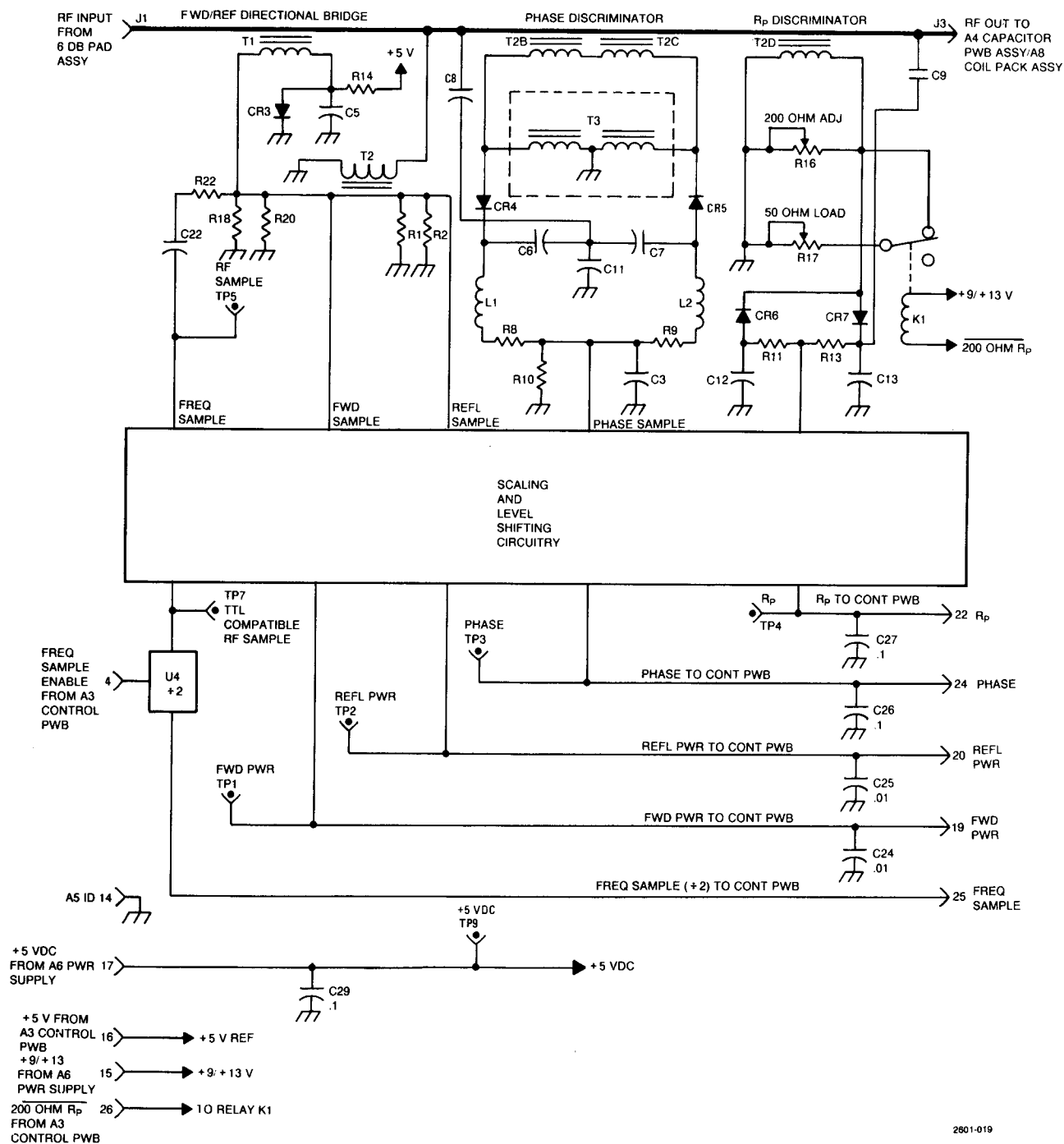


Figure 4-3. A5 Discriminator PWB Simplified Schematic Diagram

4.3.3.2 Frequency Sample

A5A1T1 and A5A1T2 provide an RF sample at A5TP5 that is proportional to the square root of forward power. The gain of A5Q1 and A5Q2 can be progressively observed at A5TP6 and A5TP7. The TTL-compatible RF sample voltage at A5TP7 is sufficient to drive flip-flop A5U4 when RF input power is between approximately 12 and 75 watts. When enabled by the frequency sample enable signal, A5U4 provides a divide-by-two output to the A3 Control PWB. This function is enabled only during tuning and self-test.

4.3.3.3 Forward and Reflected Power Sample

The forward power sample is sensed by A5A1T1 and A5A1T2, detected by A5CR1, and applied to operational amplifier A5U1A. A5U1A is set up for unity gain and produces approximately 4 Vdc at A5TP1, for 150 watts of forward power.

The reflected power sample is sensed by A5A1T1 and A5A1T2, detected by A5CR2, and applied to operational amplifier A5U1B. A5U1B is set up for a gain of 1.7, and produces approximately 5 Vdc at A5TP2 for a reflected power level of 90 watts. A5CR3 negates the diode drop across A5CR2, and to a lesser extent, A5CR1.

4.3.3.4 Phase Sample

A5T2B and A5T2C provide the RF current samples used in phase detection. A5C8 and A5C11 provide the RF voltage sample for phase detection. The output voltage of the phase detector is proportional to the phase of the RF signal.

A5U3A is set up as a unity gain amplifier to drive differential amplifier A5U2B. The (+) input to A5U2B is tied to a precision 1.66 Vdc reference voltage. The source voltage for this voltage reference is the +5 VREF supply on the A3 Control PWB. A5U2B is set up such that, with no phase shift, exactly +2.5 V will be present at A5TP3. Voltages in the 0 to +2.5 V range indicate an inductive phase relationship. Voltages in the +2.5 to +5.0 V range indicate a capacitive phase relationship.

4.3.3.5 Parallel Resistance Sample

NOTE

A5R16 and A5R17 are factory-adjusted, and should only be adjusted if A5R16, A5R17, or A5R5 are replaced. Improper adjustments can seriously degrade coupler performance. Refer to the Maintenance section for the adjustment procedure.

A5T2D is the parallel resistance (R_p) discriminator RF current sample element. A5C9 and A5C13 provide the voltage sample. A5R17 and A5R16 are adjusted to detect parallel resistances of 50 or 200 ohms, respectively, depending upon the position of relay A5K1. As the coupler tunes to these points, the associated circuit will produce a +2.5 V output. This voltage is applied to operational amplifier A5U3B. A5U3B is a non-inverting amplifier with a gain of 3. The output of A5U3B is applied to the inverting input of differential amplifier A5U2A. The (+) input is tied to a regulated +1.66 V reference to produce a 0 to +5 V output for the A3 Control PWB. A voltage at A5TP4 that is greater than +2.5 V indicates that the R_p (200 or 50 ohms) is less than desired; a voltage in the 0 to just less than +2.5 V range indicates a greater than desired R_p .

4.3.4 A4 Capacitor Assembly/A8 Coil Pack Assembly (see figure 4-4)

Coil Pack Assembly A8 includes the following subassemblies:

- 2-kV Detector PWB Assembly A8A1
- Series Capacitor Assembly A8A3

The Capacitor and Coil Pack Assemblies provide the reactive elements that form the coupler's LC tuning network. The assemblies connect to the output of Discriminator Assembly A5. The Capacitor Assembly is shunt-connected (grounded) across the Vf power input of the Coil Pack Assembly; the Coil Pack Assembly is series-connected with the output.

4.3.4.1 Tuning

The coupler tunes to the antenna by changing values of the tuning elements (L and C) in the tuning network. This occurs when relays (A4K1 through A4K9 in the Capacitor Assembly, and A5K10 through A5K23 in the Coil Pack Assembly) switch capacitors and inductors into and out of the network. Relay switching is controlled by the K CONTROL lines from Control Board A3.

4.3.4.2 Antenna Modifiers

Because the network's main tuning elements (A5L1 through A5L8, and A4C1 through A4C21) cannot tune all antenna impedance in the HF band, additional reactances (referred to as antenna modifiers) are used. The antenna modifiers (A8A3C18 through A8A3C22, A8C23 through A8C27) transform the antenna impedance to a value tunable by the main tuning elements. A8R1 provides a dc and static discharge path around C18 through C22.

4.3.4.3 Voltage Sampling

2-kV Detector PWB Assembly A8A1 samples the RF voltage at the output of capacitor A8A3C22. This voltage sample is attenuated by a capacitive voltage divider consisting of A8A1C2 through A8A1C4, detected by diodes A8A1CR1 and A8A1CR2, and filtered by capacitors A8A1C5 and A8A1C6. The level of the resultant dc signal is adjusted with potentiometer A8A1R3, and routed to Control Board A3 as the 2 kV SAMPLE signal.

4.3.4.4 Miscellaneous Functions

Bypass capacitors A4C25, A4C28, A4C32 through A4C38, A8C1 through A8C9, and A8C1 through A8C17 remove stray RF from the relay K CONTROL lines to prevent false relay switching. Diodes A4CR1 through A4CR9, and A8CR1 through A8CR17 short relay coil discharge energy, thereby protecting the relay drivers on the A3 Control PWB.

4.3.5 A7 Transceiver Interface PWB Assembly (see figure 4-5)

Transceiver Interface PWB Assembly A7 provides circuits that interconnect transmitter/transceiver control and Control PWB Assembly A3 signals. The A7 assembly also provides the wakeup pulse that activates the Control PWB Assembly microprocessor upon transmitter/transceiver activity. The A7 assembly contains the coupler's internal air pressure sensor and circuitry supporting self-testing functions.

4.3.5.1 Transmitter/Transceiver Control Lines

All transmitter/transceiver control lines are routed through connector J2 as follows:

- RETUNE PULSE, pin 9
- TUNE PWR REQUEST, pin 5
- BYPASS, pin 11
- KEYLINE, pin 2
- KEY DISABLE, pin 4
- COUPLER READY, pin 3
- TEST, pin 6
- TEST STATUS, pin 10
- COUPLER FAULT, pin 1
- TEMP/PRESR FAULT, pin 8
- FAULT OVERRIDE, pin 7

For additional information, refer to figure 2-7.

The control lines are protected from current surges and stray RF voltages by series-connected inductors (such as L6 on the FAULT OVERRIDE line), and metal-oxide varistors, and Zener diodes connected across the inputs (such as Z6, VR15, VR31, and VR32).

4.3.5.2 DATA BUS Interface

The control lines indirectly interface with the DATA BUS lines to Control PWB Assembly A3. The FAULT OVERRIDE, BYPASS, TEST, and RETUNE PULSE lines carry control line inputs. They interface with the DATA BUS lines through optocouplers and data latches. The TUNE PWR REQUEST, COUPLER READY, TEMP/PRESR FAULT, TEST STATUS, COUPLER FAULT, and KEY DISABLE lines are output lines. They interface with the DATA BUS lines through transistor switches, transistor drivers, and data latches. The KEYLINE line is an input and output line. It interfaces with the DATA BUS in both manners described above. The DATA BUS is routed to the Control PWB Assembly through connector J1.

The control line inputs activate optocouplers contained in U7, U6, and U11. When the input lines are low, the optocouplers ground DATA BUS lines through octal latch U2. DATA BUS lines ground the control line outputs (except the TEST STATUS line) by activating transistor switches Q1, Q3, Q4, and Q6 through Q8. The TEST STATUS line is energized with +12 volts through transistor Q2. The transistors are activated when they are biased on through octal latch U1 and transistor driver U10. When control lines are activated, associated LED indicators (DS1 through DS4) come on. The octal latches are enabled by the CS lines from Control PWB Assembly A3 (pins 8, 21, and 23 of connector J1). For test purposes, the RETUNE PULSE and KEYLINE control lines may be grounded manually with switches S1 and S2.

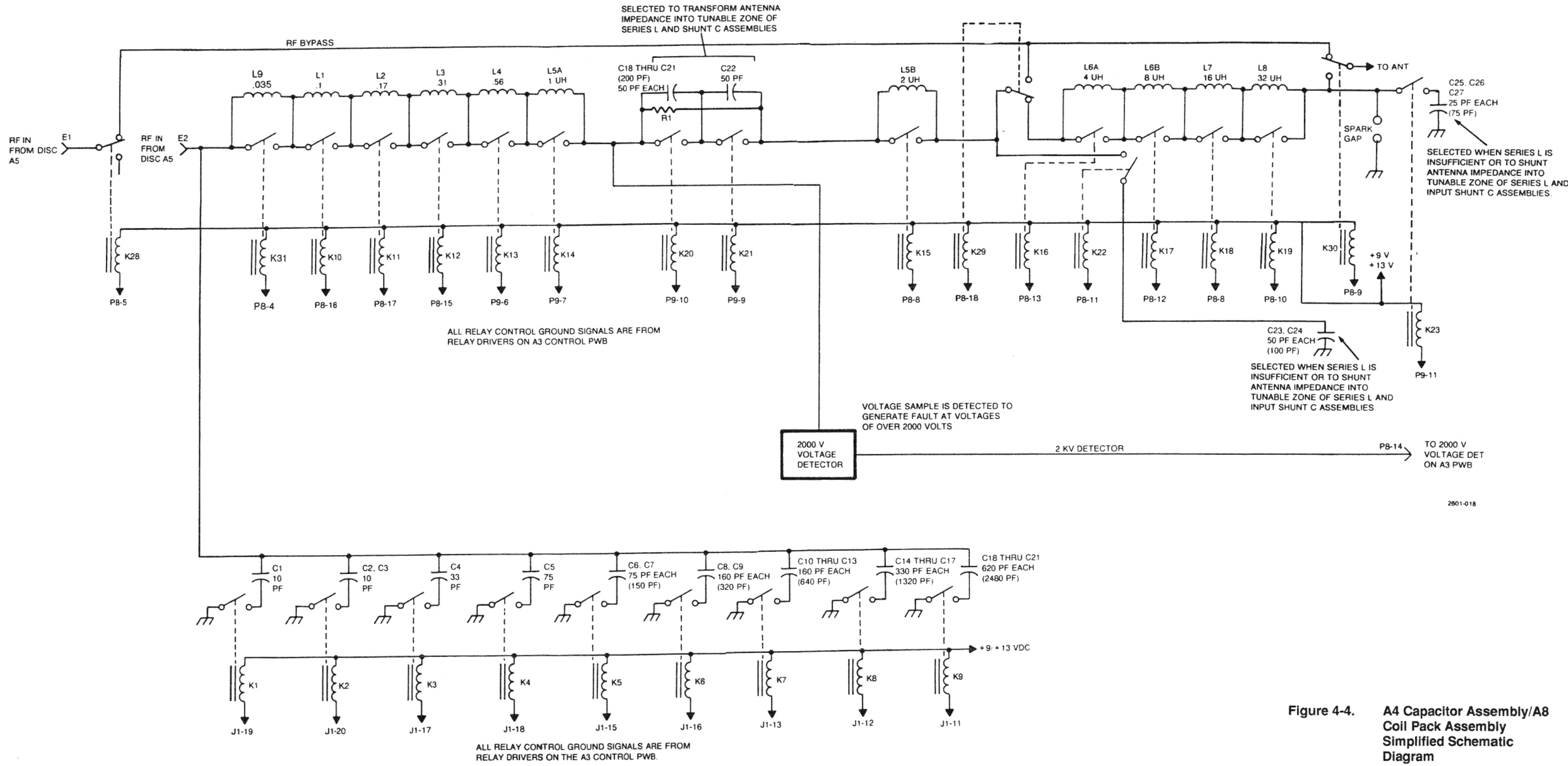


Figure 4-4. A4 Capacitor Assembly/A8 Coil Pack Assembly Simplified Schematic Diagram

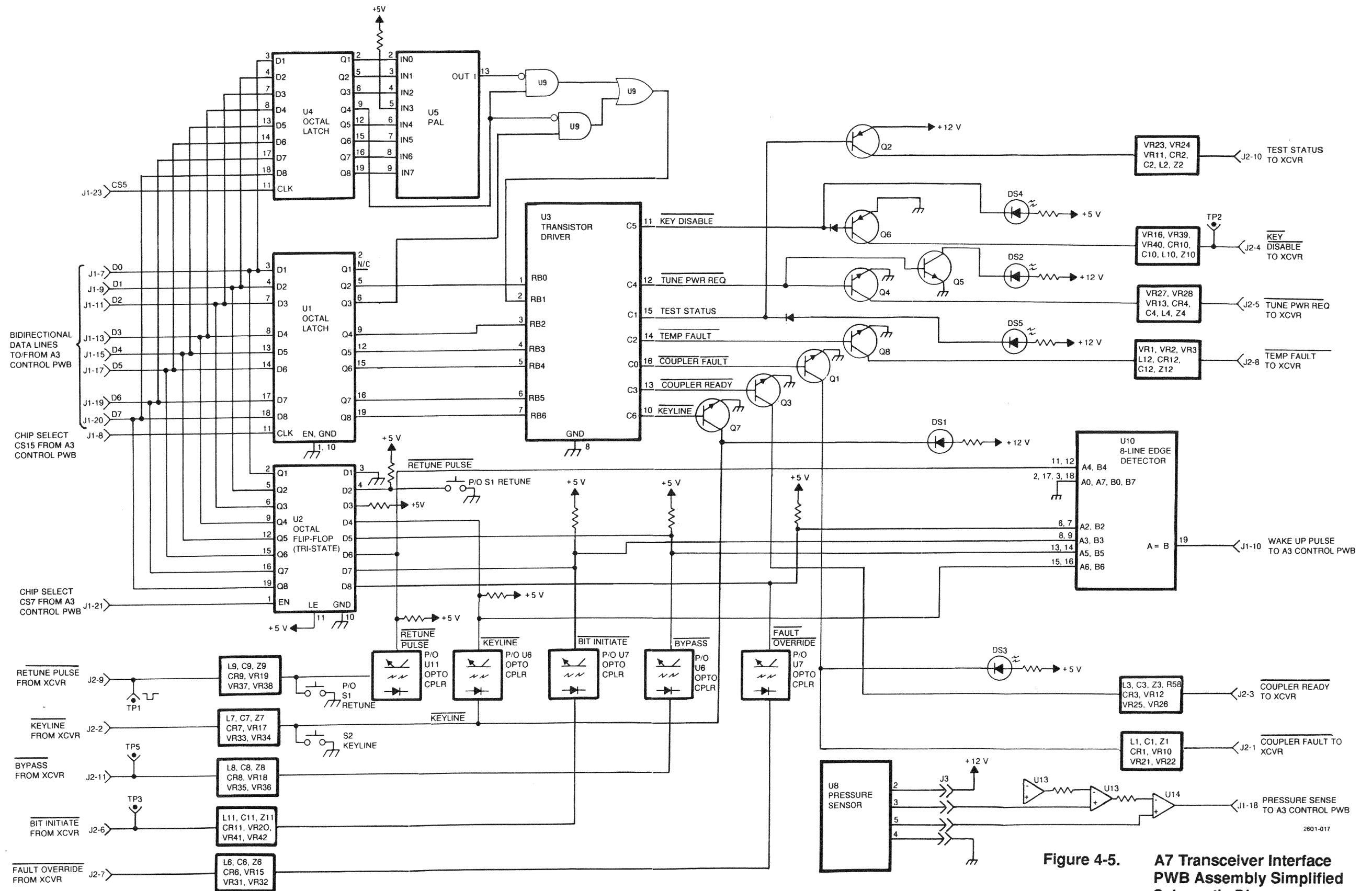


Figure 4-5. A7 Transceiver Interface PWB Assembly Simplified Schematic Diagram

4.3.5.3 Wakeup Pulse Generation

The WAKEUP PULSE line is routed to the Control PWB Assembly through pin 10 of connector J1. Because the outputs of optocouplers U7, U6, and U11 are tied to the inputs of AND gate array U10, a wakeup pulse is generated by U10 whenever any of the control line inputs are activated.

4.3.5.4 Pressure Sensor Output

The pressure sensing circuit consists of three op amps (in U13 and U14), and sensing unit U8. When air pressure in the coupler's internal cavity falls to unacceptably low levels, U8 activates the op amps and the PRESSURE SENSE line to the Control PWB Assembly (pin 18 of connector J1).

4.3.5.5 Self-Test Circuit

The self-test circuit consists of data latch U4, PAL U6, and trigger U12. Data latch U4 latches in data from the DATA BUS lines and routes it to PAL U6. The PAL is clocked by U12, resistor R39, and capacitor C28. The PAL output is routed through NAND gates (U9), the output of which is routed to transistor driver U3. When activated, the U3 output switches transistor Q2, energizing the TEST STATUS line (+12 volts) to the Control PWB Assembly.

4.3.6 A3 Control PWB Assembly (see figure 4-6)

Control PWB Assembly A3 performs the coupler's major control functions. It contains microprocessor U8, the main control component in the coupler. In general, the microprocessor and its associated Control PWB Assembly components control the coupler's tuning elements in response to control data supplied by the transmitter/transceiver and other coupler assemblies.

4.3.6.1 Interconnection

Since the Control PWB Assembly is the coupler's main control assembly, it interconnects with all coupler assemblies, as described in the following paragraphs.

4.3.6.1.1 Input Signals

The Control PWB Assembly receives inputs from the coupler's assemblies through connector P1.

- Inputs from Discriminator Assembly A5
 - REFL PWR, pin 61 (transmitter/transceiver reflected power)
 - FWD PWR, pin 62 (transmitter/transceiver forward power)
 - Rp, pin 63 (coupler parallel resistance)
 - PHASE, pin 65 (transmitter/transceiver RF phase)
 - FREQ SAMPLE, pin 68 (transmitter/transceiver frequency)
- Inputs from Power Supply Assembly A6
 - +9/+13 volts, pins 55 and 56 (supply voltages)
 - +5 volts, pins 59 and 60 (supply voltages)

- Inputs from Transceiver Interface Assembly A7
D0 through D7, pins 2, 4, 38, 37, 40, 39, 41, and 43, respectively (transmitter/transceiver data lines)
WAKEUP PULSE, pin 35 (activates microprocessor)
PRESSURE SENSE, pin 71 (coupler internal air pressure)
- Inputs from A8 Coil Pack Assembly
2-kV SAMPLE, pin 20 (coupler RF voltage)

4.3.6.1.2 Output Signals

The Control PWB Assembly sends outputs to the coupler's assemblies through connector P1.

- Outputs to 6-dB Pad Assembly A1
K25 and K24 CONT, pins 47 and 48, respectively (relay switching control)
- Outputs to Capacitor Assembly A4
K1 through K9 CONT, pins 33, 36, 31, 34, 29, 32, 27, 28, and 25, respectively (relay switching control)
- Outputs to Discriminator Assembly A5
K26 and K27 CONT, pins 10 and 12, respectively (relay switching control)
200 ohm Rp, pin 67 (parallel resistance)
FREQ SMPL ENBL, pin 66 (frequency sample enable)
+5 VDC REF, pin 70 (Dc reference voltage)
- Outputs to Transceiver Interface Assembly A7
D0 through D7, pins 2, 4, 38, 37, 40, 39, 41, and 43, respectively (transmitter/transceiver data lines)
CS15, CS7, and CS5, pins 1, 45, and 52, respectively (chip selection control)
+9 V CONTROL, pin 58 (supply voltage selection)
- Outputs to Coil Pack Assembly A8
K10 through K23, K29, and K30 CONT, pins 23, 24, 21, 22, 19, 18, 17, 15, 3, 6, 11, 14, 9, 8, 42, and 5, respectively (relay switching control)
- Assembly Connection Test Lines
P1 also connects lines used to test connections to the assemblies.
A4 ID, pin 30 (tests connection to A4 Capacitor Assembly)
A1P2 ID, pin 44 (tests connection to A8 Coil Pack Assembly)
A1P1 ID, pin 46 (tests connection to A8 Coil Pack Assembly)
A5 ID, pin 72 (tests connection to A5 Discriminator Assembly)

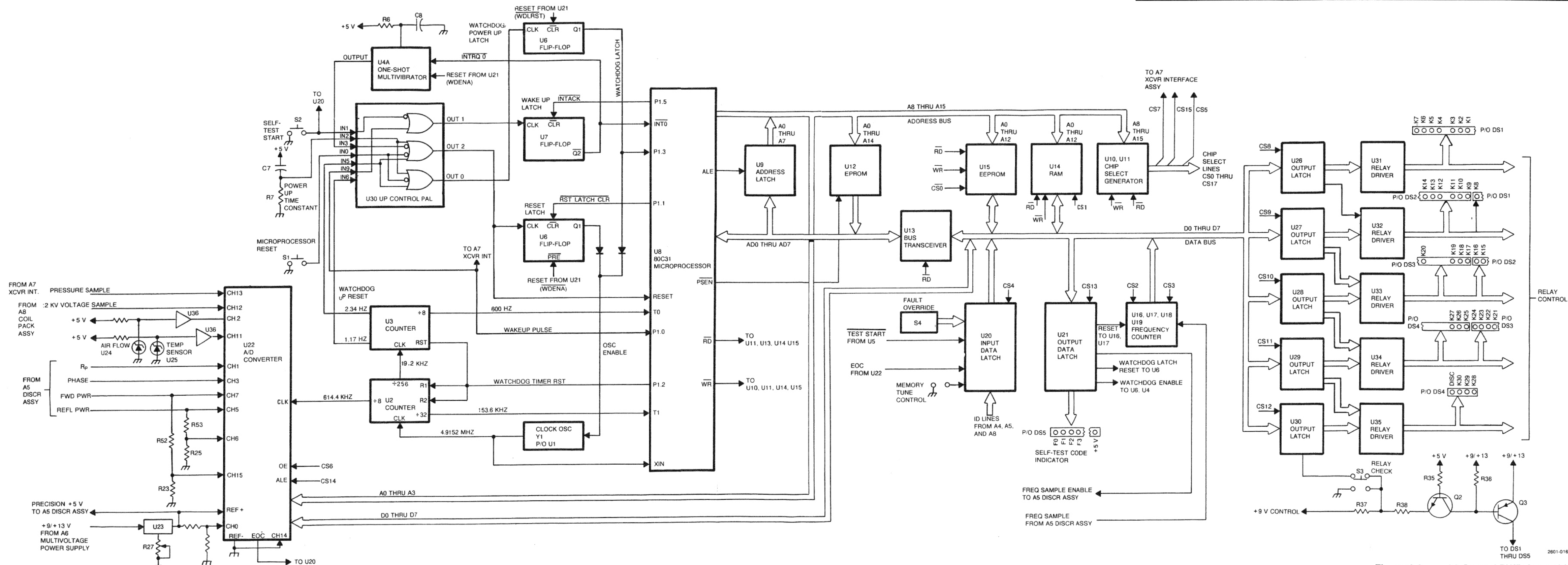


Figure 4-6. A3 Control PWB Assembly Simplified Schematic Diagram

4.3.6.2 Input/Output Functions

4.3.6.2.1 Analog-to-Digital Conversion

Input lines from Discriminator Assembly A5 (except the FREQUENCY SAMPLE line), the 2-kV SAMPLE line from A8, the PRESSURE SENSE line from A7, and the temperature from U36 are routed to analog-to-digital converter (ADC) U22, a 16-channel input, 8-bit output IC. The ADC converts the analog inputs (the CH inputs) into an 8-bit digital output (D0 through D7); this output is tied into the DATA BUS. The ADC is controlled by the microprocessor through the ADDRESS and CHIP SELECT BUSES. When the ADC completes a conversion, the microprocessor is notified through the EOC (end of conversion) line from pin 13. The ADC is controlled by the microprocessor and in real time by a 614-kHz clock signal (pin 22) from binary counter U2. The ADC is protected from excessive input levels by a protection circuit centered around a +5 volt precision reference (from regulator U23) and transistor Q1. All ADC conversion operations are based on this reference.

4.3.6.2.2 8-Bit Bidirectional Data

Microprocessor U8 sends and receives 8-bit parallel control data through the DATA bus. Program instructions and all other data ultimately converge at the ADDRESS/DATA BUS. The microprocessor uses this data to control the antenna coupler's functions.

- The DATA BUS ties into the following:
 - Analog-to-digital converter U22 (bidirectional)
 - Discriminator Assembly A5 (input)
 - Transceiver Interface Assembly A7 (bidirectional)
 - Assembly connection test (ID) lines (input)
 - RAM IC U14 (bidirectional)
 - EEPROM IC U15 (bidirectional)
 - Relay control latches U26 through U30 (output)
 - Data latch U21 (output)
 - Bus Transceiver U13 (bidirectional)

The FREQUENCY SAMPLE line from the A5 Discriminator Assembly is routed to a series of binary divide-by-16 counters (U16 and U17) that convert the FREQUENCY SAMPLE into frequency in kHz. The microprocessor latches this information into the DATA BUS through latches U18 and U19.

Inputs from the A7 Transceiver Interface Assembly (except the WAKEUP PULSE line) tie directly into the DATA BUS.

Assembly connection test (ID) lines enter the DATA BUS through latch U20 as directed by the microprocessor. The RAM, EEPROM, relay control latches, and output data latch U21 tie directly into the bus.

DATA BUS information flows into the ADDRESS/DATA BUS and to the microprocessor whenever the microprocessor sets bus transceiver U13 for a read. Conversely, ADDRESS/DATA BUS information flows into the DATA BUS when U13 is set to write (the buses are bidirectional).

The ADDRESS/DATA BUS ties directly to EPROM U12; information is read/written to and from the EPROM through the bus. The ADDRESS/DATA BUS also ties directly to octal latch U9. The latch transfers address information into the ADDRESS BUS.

4.3.6.2.3 Wakeup Pulse Input

During periods of system inactivity, the microprocessor does not run because the oscillator circuitry at U1 is shut down. The microprocessor is deactivated to prevent bus noise from degrading receiver noise floor. A pulse on the WAKEUP PULSE line from the Transceiver Interface Assembly activates the oscillator and resets the microprocessor. The line connects to the microprocessor at pin 1 and to PAL U5 at pin 11.

4.3.6.2.4 Relay Control Output Lines

The relay control output lines (RELAY CTL or K CONT lines) control antenna coupler relay switching in response to the microprocessor inputs. The relay control output lines tie into the microprocessor through the ADDRESS/DATA and DATA BUSES, latches U26 through U30, and driver transistor arrays U31 through U35. Relay switching information flows into the buses when the microprocessor sets bus transceiver U13 for a write. The information reaches the latch selected by the microprocessor through the CHIP SELECT BUS, and flows to the appropriate driver transistor array. The driver outputs switch the necessary relays.

4.3.6.2.5 Chip Select Output Lines

Chip select output lines (CS lines 5, 7, and 15) from the CHIP SELECT BUS are routed to the Transceiver Interface Assembly to enable ICs on the assembly.

4.3.6.3 Housekeeping Functions

4.3.6.3.1 IC Enable/Disable and Selection

IC chips and their functions are enabled, disabled, and selected with the high order 8 bits in the ADDRESS bus from the microprocessor (pins 21 through 28), the CLOCK/CONTROL bus, and the following lines from the microprocessor:

- WR (pin 16), microprocessor write
- RD (pin 17), microprocessor read
- PSEN (pin 29), program storage enable for EPROM
- ALE (pin 30), microprocessor address latch enable
- RST LATCH CLR (pin 2), microprocessor reset latch clear
- INTACK (pin 6)

The ADDRESS bus activates ICs with the outputs of chip select decoder ICs U10 and U11. For example, ROM chip U12 is activated by ADDRESS bus information in the range 0000 to 7FFF hex. The binary code also activates decoder U10 and PAL U11 to produce chip select (CS) outputs that activate other ICs. The remaining control lines activate ICs directly.

4.3.6.3.2 Clocks and Timing

Clock frequencies of 600 Hz and 153, and 614 kHz are generated by counters U2 and U3. The 4.9152-MHz oscillator formed by U1 provides the time base for the clock frequencies and the main clock input for the microprocessor. The oscillator is activated by the OSC ENA line from wakeup control. Clock and oscillator outputs are routed to ICs through the CLOCK/CONTROL bus. The 2.34 Hz pulse output is used for watchdog timer functions.

4.3.6.3.3 Watchdog Timer

The watchdog timer delete resets the microprocessor to its base state if it begins to run out of control. Microprocessor-generated data glitches could cause erratic coupler operation and result in damage to the coupler or transmitter/transceiver. Normal microprocessor data functions are not disturbed by the watchdog timer resets because they occur in the time intervals between resets.

The microprocessor sends watchdog counter reset signals to the watchdog timer (U2 and U3) over the WATCHDOG RST line. The watchdog timer produces a short pulse at U3 pin 2 approximately 210 ms after the watchdog timer was last reset. If watchdog timer resets occur within 210 ms, the pulse is not produced. Therefore, the short pulse is produced only when the microprocessor is not resetting the timer properly. When produced, the short pulse reaches PAL U5 at pin 6. The resultant O2 output (pin 17) then resets the microprocessor through the RESET line at pin 9 (RE).

4.3.6.3.4 Wakeup Pulse

The Transceiver Interface PWB Assembly activates the microprocessor through the WAKEUP PULSE line.

The line connects to input pin 11 (I9) of PAL U5 and to pin 1 of the microprocessor. PAL output 1 (pin 18) is high whenever the wakeup pulse line is high, or whenever test start switch S2 is closed. The pin 18 output activates wakeup latch U7, interrupting the microprocessor through the INT0 input (pin 12). PAL output 2 (pin 17) to the microprocessor reset (pin 9) and the reset latch (U6) clock input is not active when the following conditions exist simultaneously:

- a. The power up time constant circuit (PAL input I2) has timed out.
- b. One shot U4A triggers to PAL input I3.
- c. Microprocessor reset switch S1 is open (input I0).
- d. The 2.34 Hz watchdog reset line to PAL input I5 is low.

If any of the above conditions do not exist simultaneously, the microprocessor and reset latch U6 are activated for reset. The reset latch then activates the oscillator circuitry (U1) through the OSC ENA line. The oscillator circuitry is also activated through the OSC ENA line by watchdog/power-up latch U6. The watchdog/power-up latch is not activated whenever the following conditions exist simultaneously:

- a. The power up time constant circuit (PAL input I2) has timed out.
- b. Microprocessor reset switch S1 is open (input I0).
- c. The 2.34 Hz watchdog reset line to PAL input I5 is low.

4.3.6.4 Data Processing Functions

The microprocessor sends and receives control and operating data through the bidirectional ADDRESS/DATA bus. Bus direction for microprocessor read/write is controlled by bus transceiver U13. Microprocessor programming instructions are read from EPROM memory IC U12. Short-term Scratch Pad memory is provided by RAM IC U14. All coupler relay states resulting from successful learn tune sequences are stored in EEPROM IC U15. These relay states are recalled when tuning at a previously-used frequency band.

4.3.6.5 Fault Detection Functions

The microprocessor monitors coupler operation and detects any abnormalities. Detector signals from the coupler's modules and assemblies are converted into 8 bit data by ADC IC U22. Two of the detectors, temperature and air flow, are located on the A3 Control Board. The remainder are located on the A5 Discriminator PWB Assembly, A8 Coil Pack Assembly, and the A7 Transceiver Interface Assembly. The temperature and air flow detectors consist of the circuitry around U36. Diode U24 and resistor R32 make up the actual temperature detector. The resistor is not electrically connected, but is mechanically connected to the diode and provides a thermal mass similar to the one used in the air flow detector. The air flow detector consists of resistor R33 and diode U25. The air flow detector is located within the air flow path of cooling fan B1. When cooling air flow is cut off or reduced significantly, the power dissipated through R33 heats temperature sensor diode U25. The microprocessor receives the 8 bit data from U22 through the 8 bit DATA BUS. When abnormal conditions are detected, the microprocessor activates the fault indicators used in the self-test routine.

When testing and troubleshooting, fault conditions may be overridden with either the fault override on RF-2602, or dip switch A3S4 inside coupler fault override switch S4. When the coupler cover is removed, internal pressurization is lost, resulting in a pressure fault indication. When S4 is closed, the pressure fault is overridden, and the coupler operates normally. However, because the cover is removed, cooling air flow from the fan may be disturbed, resulting in an eventual air flow fault. Again, S4 must be closed to override this fault.

4.3.6.6 Self-Testing Functions

Instructions for the self-test routine are stored in PROM U12. The microprocessor runs the self-test routine whenever any of the following occur:

- a. The test start switch (S2) is closed.
- b. The TEST line on the A7 Transceiver Interface PWB is pulled low.
- c. The TEST pushbutton on the RF-2602 is pressed.

After the microprocessor determines that a self-test routine has been requested, it runs a static test. During static testing, the following operations are performed:

- a. U15 channel memory EEPROM and U14 scratchpad RAM are verified for bit errors during read and write operations.
- b. U3 600 Hz, output frequency is verified.
- c. All temperature sensors are checked.
- d. Each relay in the coupler is energized sequentially to verify operation.

If the Static Bit Test is successful, a transmit test is conducted as follows:

- a. Key transmitter to initiate a BIT tune cycle.
- b. Relay contacts are activated to ensure the following:
 - Antenna is disconnected.
 - Coupler tunes to an open CKT.
 - Relay states are memorized.
 - The state of each relay is changed, while resultant changes in VSWR are compared to VSWR information already stored in EPROM U12.
 - Each relay is returned to its original state, and VSWR is verified for agreement with stored VSWR information.
- c. The following are checked for dynamic performance:
 - Tune power
 - Phase and frequency
 - Reflected power
 - Parallel resistance

All test pass/fail criteria are stored in EPROM U12. When a failure is detected, the appropriate fault codes are displayed by the fault detection and fault code indicators. When a fault is detected, the self-test routine continues to run until completion; however, the fault indicators can show only one fault at a time.

4.3.7 RF-2602 Status Monitor

4.3.7.1 Interconnection and Signal Definitions

The Status Monitor is connected between the transmitter/transceiver and the Antenna Coupler. Signal lines from the transmitter/transceiver enter the Status Monitor through J1. Output lines to the Antenna Coupler leave through J2. Table 4-1 lists signal names and definitions. The functional descriptions show how the RF-2602 interconnects and operates with the rest of the system. Refer to figure 2-7 for additional detail.

Table 4-1. RF-2601 Control Signal Functions

Signal Names	Functional Descriptions
Retune Pulse	Control signal from RF source signaling coupler that frequency selection has changed, and that a retune cycle is now required.
Tune Power Request	Control signal from coupler to RF source indicating that restricted power level is required in order to perform tuning procedure.
Bypass	Control signal which commands the coupler to bypass all tuning elements, making a straight-through path for RF signals, and causing the signal source to operate into an untuned load.
Keyline	Control signal from RF source indicating that exciter/PA is in transmit mode and emitting RF power.
Key Interlock	Control signal from coupler to RF source indicating that coupler is not in operational condition, and RF power should be disabled.
Coupler Ready	Indicator signal showing that coupler tune cycle has been completed and coupler is in a tuned condition.
Test	Control signal to coupler which initiates internal maintenance test routines.
Test Status	Indicator signal showing results of test routine; can be on, off or flashing; fault codes are different for each type of test.
Coupler Fault	Indicator signal showing that a fault condition exists within the coupler.
Overtemp Fault	Indicator signal showing that fault is caused by overtemperature condition.
Fault Override	Control signal to coupler signaling that operations must be resumed in spite of fault.

4.3.7.2 RF-2602 Circuit Description

Refer to tab section RF-2602 for assembly drawings and schematic diagrams pertaining to circuits and controls discussed in the following paragraphs.

4.3.7.2.1 Power Supply Groups Control and Indicator Functions

The Status Monitor contains a built-in 5 volt regulated dc supply. Supply voltages at either 115 or 230 Vac (selectable with S2A and S2B) from the transmitter/transceiver feeds T1. T1 output is rectified by bridge CR1-CR4, filtered by C1, and regulated by U1.

4.3.7.2.2 TEST Group Control and Indicator Functions

When RETUNE pushbutton S3 is pressed, the RETUNE pulse line is grounded. When KEY pushbutton S2 is pressed, the KEYLINE line and base of Q2 are grounded. Q2 switches on, placing a high on U3 pins 12 and 13. When TEST pushbutton S1 is pressed, the TEST line is grounded. STATUS indicator DS5 lights up when the TEST STATUS line is high.

4.3.7.2.3 STATUS Group Indicator Functions

TUNE indicator DS6 lights up when the TUNE POWER REQUEST line is low. READY indicator DS3 lights up when the COUPLER READY line is low. FAULT indicator DS7 lights up when the COUPLER FAULT or OVERTEMP FAULT lines are low (because Q3 or Q4 switch on and activate U4 pin 3 output).

4.3.7.2.4 BYPASS Group Control and Indicator Functions

BYPASS indicator DS4 lights up when U4 pin 6 output is high. The output is high when the pin 3 output of U4 is high (as discussed in section 4.3.6.4), or when the U3 pin 6 output is high. U3 pin 6 is high whenever the BYPASS line is low (because Q1 switches on and places a high on U3 pin 10), and the KEYLINE line is high (as discussed in section 4.3.6.3). When BYPASS switch S4 is closed, the BYPASS line is grounded.

4.3.7.2.5 OVERRIDE Group Control and Indicator Functions

When FAULT OVERRIDE pushbutton S5 is pressed, the inputs to U3 are grounded, placing a high on the clock input of U2. The output of U2 goes high, which switches on transistor Q5, lighting up OVERRIDE indicator DS2 and placing a low on the FAULT OVERRIDE line.

4.3.8 Coupler Tuning Sequence

4.3.8.1 General Tune Sequence

Anytime the transmitter frequency is changed, a RETUNE pulse is generated and sent to the coupler. The coupler resets to the RF Bypass mode and prepares to perform a tune cycle. The tuning sequence may be one of two types: a Memory-tune or a Learn-Tune sequence.

When the transmitter is keyed and RF tune power is produced, the coupler will calculate the RF input VSWR of the RF network configured according to the stored tuning data for the frequency of the transmitter. If the VSWR is calculated to be below an acceptable threshold, a Memory-Tune sequence will occur. If the VSWR is at an acceptable threshold, a Learn-Tune sequence occurs.

The tuning sequence steps are as follows:

- a. After first detecting a RETUNE pulse from the transmitter and responding with a TUNE POWER REQUEST (TPR), the coupler switches to the RF Bypass mode and waits for an active KEYLINE signal.
- b. When the KEYLINE becomes active, the coupler switches the RF network to decouple itself from the antenna (by at least 40 dB).
- c. A count of the transmit frequency is made when an RF forward power is produced and exceeds a threshold of about 12 watts.
- d. The counted transmit frequency word is used to find one of 512 frequency channels in memory where the corresponding tune data is stored. (It may be current data or data from a preexisting antenna.)
- e. Tune data is decoded and applied to the relays connected to the binary-related RF tuning elements, thereby activating certain tuning elements.
- f. The RF input VSWR of the coupler is calculated. If the VSWR is 1.9:1 or less, TUNE POWER REQUEST is removed, and the Memory-Tune cycle is completed.
- g. If, however, the control circuits determine the input VSWR to be greater than 1.9:1, a Learn-Tune cycle is initiated.
- h. During a Learn-Tune cycle, different combinations of tuning elements are executed in logical sequences until the best possible VSWR level (below 1.5:1) is reached.
- i. After the optimum configuration has been determined, TUNE POWER REQUEST is removed, and the Learn-Tune cycle is complete.

- j. The RF relay data of the tuned configuration is stored in EEPROM, where it is available for quick retrieval when the channel containing the same frequency is used again.

NOTE

If the transmitter is retuned at the same frequency a subsequent time (as opposed to being retuned from a different frequency), the coupler will always disable the Memory-Tune and perform a new Learn-Tune. This feature is available for test and maintenance purposes.

- k. The COUPLER READY indicator on the control unit indicates a successful tune cycle.
- l. Whenever the transmitter is keyed, the coupler continuously monitors its RF input VSWR.
- m. If the VSWR should exceed 3:1, but be less than 3.4:1 (indicating a swaying whip antenna or some other momentary perturbation of the antenna impedance), the coupler will fault the system if the condition remains for over 400 milliseconds.
- n. If the VSWR exceeds 3.4:1 (indicating a broken, shorted, or arcing antenna or an internal coupler arc), the coupler will fault the system if the condition remains for over 40 milliseconds.
- o. A coupler fault will cause the coupler to switch to the Bypass mode. Some transmitters will continue to transmit through the bypassed coupler; others will shut down RF power by virtue of the activated KEY DISABLE line from the coupler.





SECTION 5

MAINTENANCE

5.1 SAFETY PRECAUTIONS

WARNING

Operating the RF-2601 is extremely hazardous with the cover or chassis removed from the case. The following precautions must always be taken.

- a. Never touch the unit with the transmitter keyed.
- b. Never let bystanders approach within arm's length of the unit while it is operating.
- c. Never leave the unit unattended while the transmitter is keyed.
- d. Always clear the area within arm's length of the unit before keying the transmitter.
- e. Before attempting to remove the unit from its mounting, disconnect the interconnecting cables. **ALWAYS REMOVE THE RF INPUT CABLE BEFORE DISCONNECTING THE ANTENNA CABLE.**
- f. If maintenance actions do not require RF power, disconnect the control and RF cables to the transmitter/transceiver.

5.2 TROUBLESHOOTING

Basic troubleshooting is performed using the following procedures:

- System testing using features built into the equipment (BITE)
- Specific testing of RF-2601 Coupler based on visual and auditory evaluation of BIT routines
- Basic voltage measurements, standard troubleshooting procedures, and normal repair by replacement of fault assemblies

5.2.1 System Troubleshooting

For initial system troubleshooting, it is necessary to isolate the major system components with the highest likelihood of problems, and eliminate, as much as possible, unnecessary maintenance activity. Built-in-test equipment (BITE) facilitates isolation of problem areas, and expedites prompt repair. If the RF-2602 Status Monitor is installed, fault identification can be made even more quickly.

If the system does not have the benefit of the RF-2602 Status Monitor, proceed to paragraph 5.2.3, System Troubleshooting without the RF-2602.

If the FAULT indicator DS3 on the RF-2602 front panel is on, or the coupler does not operate properly, module/assembly level troubleshooting must be performed as described in the following paragraphs.

NOTE

During the maintenance test routines, the RF-2602 TEST STATUS indicator displays a series of flashes that indicate which fault has occurred. There may be a single series of flashes, or two groups of flashes separated by about 400 milliseconds. By counting the flashes, (or groups of flashes), the flash sequence can be compared to the appropriate fault table.

Observe the RF-2602 Status Monitor TEST STATUS indicator, count the flash sequence, and record for future reference.

NOTE

There are three different maintenance test routines, each having a different fault code table:

- Normal Mode Continuous Fault Monitoring
- Static BIT Test
- Transmit BIT Test

Verify that the proper fault code table is used for the appropriate test.

5.2.2 System Troubleshooting with RF-2602 Status Monitor

NOTE

If initial fault condition results in flashing code on RF-2602 status monitor, verify that the flashing code is recorded for future reference before power is removed and troubleshooting begins.

Perform the troubleshooting instructions in the order given below. Refer to section 3 for operating instructions specific to the transmitter/transceiver being used.

- a. Turn system power off.
- b. Open the RF-2602 as detailed in paragraph 5.6.
- c. Verify that the ac line voltage switch inside the status monitor is set for the correct voltage value.
- d. Verify that DIP switches A1S1 and A1S3 inside the status monitor are set for the transmitter/transceiver system being used as per table 5-1.
- e. Turn system power on at RF-2602 front panel.

- f. Perform normal tune procedure, and key transmitter.
- g. Note FAULT and TEST STATUS LEDs on RF-2602 front panel. Record flash sequence for future reference, and refer to table 5-2 for suggestions on which condition or assembly to investigate further.
- h. Perform the following STATIC bit test:
 1. Enter 7.7000 MHz into the transmitter.
 2. Press the status monitor TEST pushbutton.
 3. Check the status monitor TEST STATUS indicator, comparing the flash sequence with table 5-3.
- i. If the static test has passed, perform the following TRANSMIT bit test. Press the status monitor TEST KEY pushbutton and note the TEST STATUS indicator flashing sequence as compared to table 5-4.

NOTE

Refer to chapter 3 for special keying instructions when using RF-3200-10(M), RF-350, or RT-1446/URC transmitters/transceivers.

Table 5-1. Status Monitor DIP Switch Settings

Transmitter/Transceiver Series	Switch Positions (C = Closed, O = Open)							
	S3-1	S3-2	S3-3	S3-4	S1-1	S1-2	S1-3	S1-4
RF-130, RF-1130, AN/URT-23	O	O	O	O	O	O	O	C
RF-350, RT-1446/URC	O	O	O	O	C	C	C	C
RF-3200-10(M)	C	C	C	C	C	C	C	C

Table 5-2. Normal Mode Continuous Fault Monitoring Indications

Test Status Indicator Flashing Sequence	Condition	Likely Problem, in Order
On	Tune in progress	None
None	No fault detected	None
1	Tune time-out fault	Check antenna; if ok, go to static bit test
2	High tune power fault	Transmitter (power down/up RF-350, RT-1446), A7, A5, A3
3	Low/no tune power fault	RF input path, transmitter, A1, A5, A3, A5, A3
1-2	Frequency counter fault	A5, A3
1-3	Overvoltage fault	Antenna too short, high transmitter power, A5, A3
2-3	Overtemperature fault	Coupler temp >100 °C, wait, then reduce RF input power
4	VSWR Fault	Arcing or bad antenna
1-4	Tune solution fault	Check antenna; if ok, go to static bit test
2-4	Disconnected PWB fault	A4, A5, and A8 plugs (all 4)
3-4	Pressure fault	Check coupler pressure
5	Near field interference	Nearby transmitting antenna
1-5	Cooling air fault	Fan, fan cable, A3, A6

NOTE

There are three different maintenance test routines, each having a different TEST STATUS LED fault code table:

- Normal Mode Continuous Fault Monitoring
- Static Bit Test
- Transmit BIT Test

Verify that the proper fault code table is used for the appropriate test.

Table 5-3. Static Bit Test Indications

Test Status Indicator Flashing Sequence	Condition	Assemblies to Replace, in Order
On	Test in progress (20-25 sec)	None
1	Static test passed	None
2	RAM	A3, A7
3	EEPROM	A3, A7
4	Real time clock	A3, A7
5	5 Vdc reference	A3, A5
1-2	A/D converter	A3, A5
1-3	Detected forward power	A5, A3, A2
1-4	Detected reflected power	A5, A3, A2
2-3	Rp reading	A5, A3, A2, A6
2-4	Phase reading	A5, A3, A2, A6
2-5	Overvoltage detector	A4, A3, A9
3-4	Frequency counter	A5, A3
3-5	Temperature detector	A3

Note: Record the coded flash sequence displayed by the RF-2602 test status LED for future reference.

NOTE

There are three different maintenance test routines, each having a different TEST STATUS LED fault code table:

- Normal Mode Continuous Fault Monitoring
- Static Bit Test
- Transmit BIT Test

Verify that the proper fault code table is used for the appropriate test.

Table 5-4. Transmit Bit Test Indications

Test Status Indicator Flashing Sequence	Condition	Assemblies to Replace, in Order
On	Test in progress (up to 45 sec)	None
1	Transmit test passed	None; ignore any exciter faults
2	Tune fault	A8, A4, A5, A1, A3
3	High tune power	A7, A5, A3, transmitter
4	Low/no tune power	RF input path, transmitter, A2, A5, A3
1-2	Frequency counter	Transmitter freq, A5, A3
1-3	RF relay or associated drive circuits	A8, A4, A5, A3
1-4	Phase reading	A5, A3
2-3	Rp Reading	A5, A3
2-4	Reflected power	A5, A3

Note: Record the coded flash sequence displayed by the RF-2602 test status LED for future reference.

Based on the results of troubleshooting with the RF-2602 Status Monitor, removal, repair, and replacement of the coupler, antenna, or cable assemblies may be required.

5.2.3 System Troubleshooting Without the RF-2602

If the system has no RF-2602, most fault indications will occur on the exciter front panel, and will not be identified as to the nature or location of the fault. See paragraph 3.3.1, and tables 3-2 through 3-5 for further detail on fault indications.

NOTE

RF-350 systems may include some description of failures on the front panel display. The RF-3200 systems will flash TUNING, and beep a code equivalent to the RF-2602 STATUS indicator. Refer to figure 3-2, and tables 5-2 through 5-4.

5.3 RF-2601 COUPLER TROUBLESHOOTING

When repair of the RF-2601 coupler is required, perform the coupler removal and disassembly procedure, as described in paragraphs 5.5 through 5.5.3. Perform the Basic Power Supply Checkout, as described in paragraph 5.3.1, and refer to tables 5-5 and 5-6 for initial diagnostic help. See figure 5-1 for the location of all LEDs, test points, and switches that apply to the troubleshooting procedures in this section.

NOTE

Refer to Normal Mode Continuous Fault Monitoring fault table 5-6 for specific assemblies to troubleshoot, and consult the appropriate maintenance manual tab section for specific coupler disassembly and repair instructions.

5.3.1 Basic Power Supply Checkout

Table 5-5 provides a guide to power supply checkout.

Table 5-5. Power Supply Test Points

Condition	Probable Cause
Fan not running	1. Primary Power 2. The power connector on fan
A3 5-volt indicator not on	1. A6F1 2. A6
Voltages on A6TP2 through TP6 do not measure as labeled	1. A6
Voltages on A7 TP6, TP7, and TP9 do not measure as labeled	1. A2P6 (14 pin plug to A6) 2. A7
Voltage on A3 TP2 does not measure as labeled	1. A3

NOTE

There are three different maintenance test routines, each having a different TEST STATUS LED fault code table:

- Normal Mode Continuous Fault Monitoring
- Static BIT Test
- Transmit BIT Test

Verify that the proper fault table is used for the appropriate test.

Table 5-6. Normal Mode Continuous Fault Monitoring (Non-BIT) Fault Codes and Indications

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Probable Cause
F3	F2	F1	F0			
0	0	0	0	On	Tuning in progress	None
0	0	0	0	None	No fault detected	None
0	0	0	1	1	Tuning time-out fault	Check antenna; if it is connected properly, perform the Static BIT Test.
0	0	1	0	2	High tune power fault	A1 6-dB Pad Assembly A5 Discriminator Assembly A3 Control Board Assembly
0	0	1	1	3	Low/no tune power fault	RF input path A1 6-dB Pad Assembly A5 Discriminator Assembly A3 Control Board Assembly
0	1	0	0	1-2	Frequency counter fault	A5 Discriminator Assembly A3 Control Board Assembly
0	1	0	1	1-3	Overvoltage fault	Antenna too short; high transmitter power; A3 Control Board Assembly A8 Coil Pack Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly A2 Interconnect Board Assembly
0	1	1	0	2-3	Overtemperature fault	Couple temp >100° C; wait, then reduce RF input power A3 Control Board Assembly A8 Coil Pack Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly
0	1	1	1	4	VSWR fault	Arcing or bad antenna A5 Discriminator Assembly A3 Control Board Assembly
1	0	0	0	1-4	Tune solution fault	Check antenna; if it is connected properly, perform the Static BIT Test.

Table 5-6. Normal Mode Continuous Fault Monitoring (Non-BIT) Fault Codes and Indications (Cont.)

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Probable Cause
F3	F2	F1	F0			
1	0	0	1	2-4	Disconnected PWB fault	A4 Capacitor Assembly A5 Discriminator Assembly, and A8 Coil Pack Assembly plugs (all 4)
1	0	1	1	3-4	Low pressure fault	Check case for pressure leaks.
1	1	0	0	5	Near-field interference	Nearby transmitting antenna
1	0	1	0	1-5	Cooling air fault	Fan, fan cable, A3 Control Board Assembly, A6 Power Supply

NOTES:

- See figure 5-3 for Fault Indicator (F0 through F3) locations. Indicator sequence (left to right) is in binary representation.
- See figure 5-3 for Test Status Indicator A7DS5 location.
- Typical flashing sequences are read and interpreted as follows:
 - Test Status Indicator A7DS5 flashing three times, pausing, then flashing three times again indicates a low or no power fault condition, as described.
 - Test Status Indicator A7DS5 flashing three times, pausing, then flashing four times indicates a low pressure fault, as described.



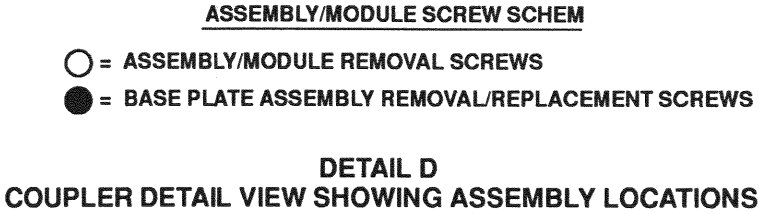
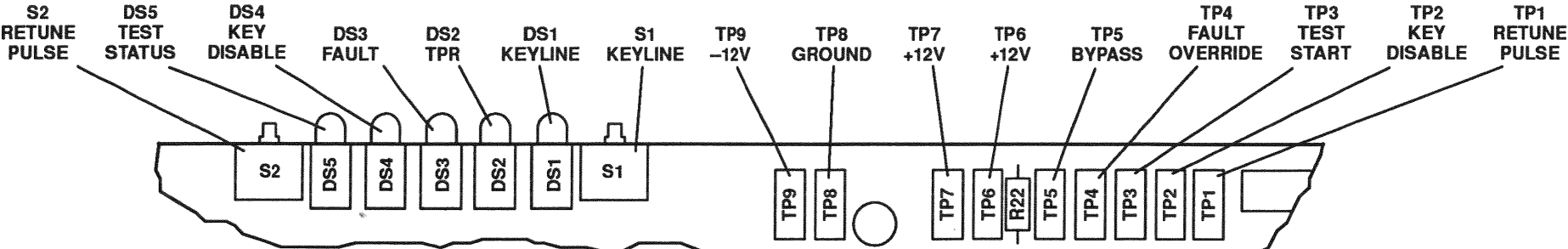
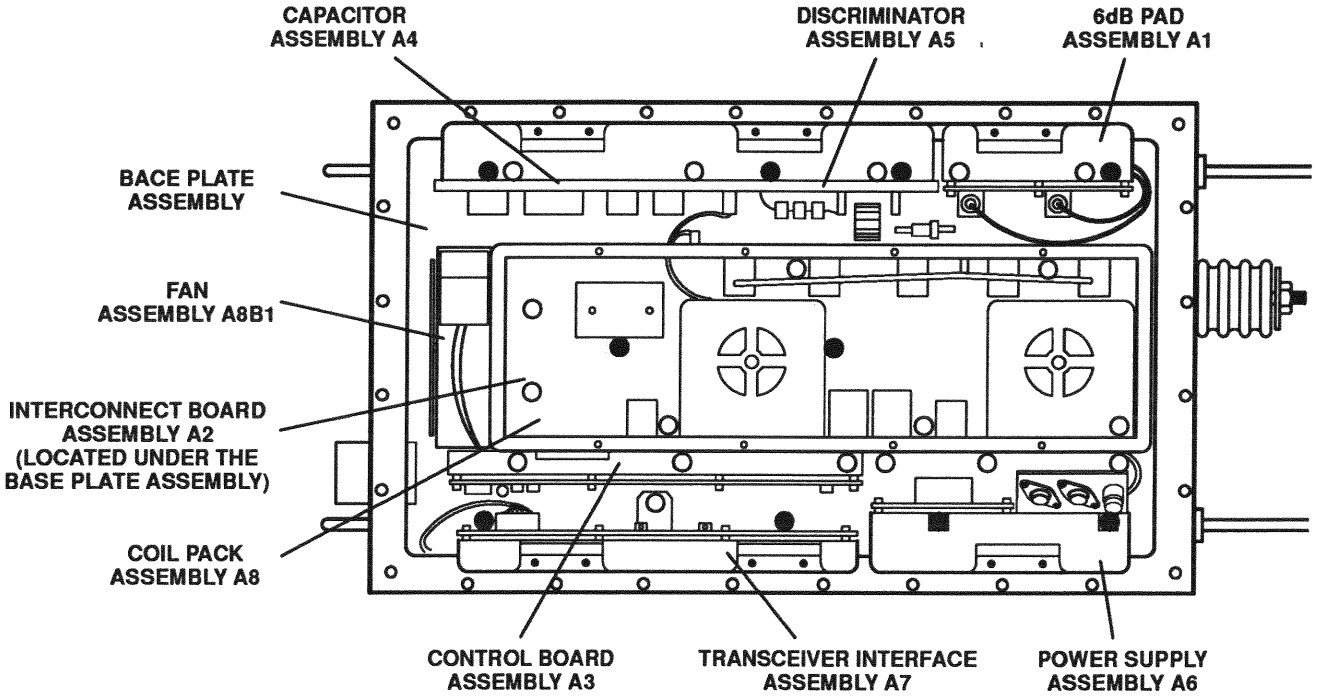
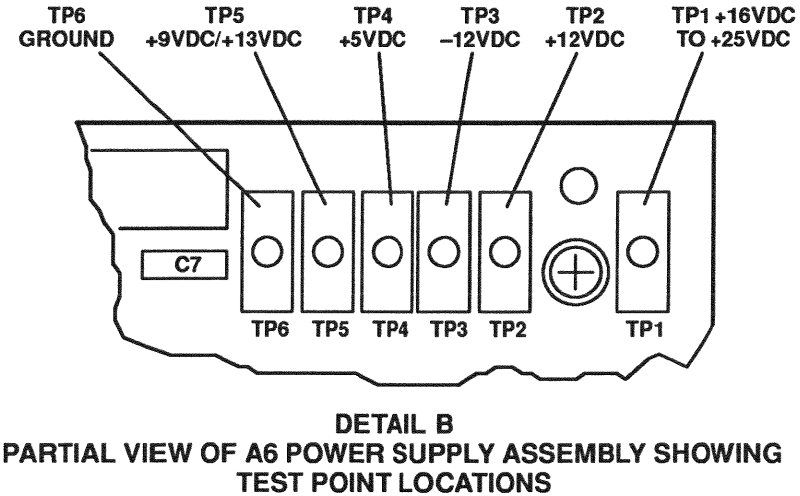
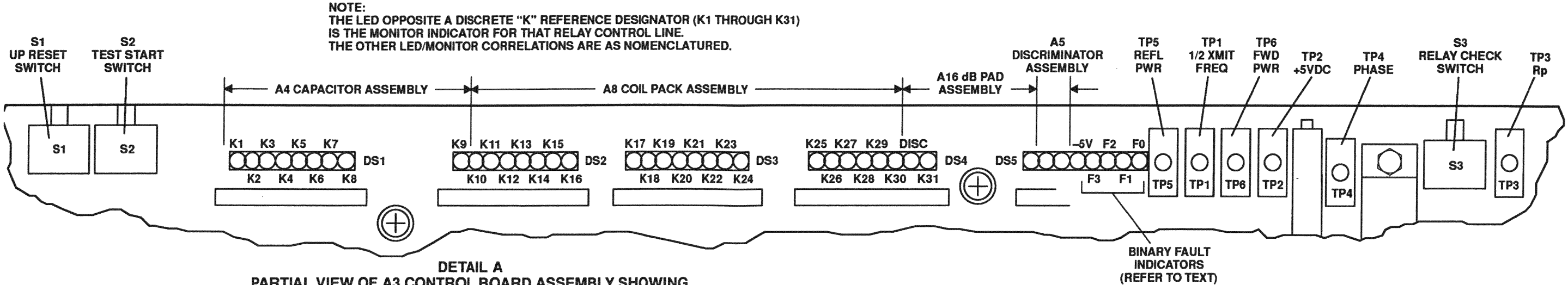


Figure 5-1. Coupler Assembly, Test Points, and Switch Locations

5.3.2 Troubleshooting with BIT Routines

With the coupler disassembled for repair, perform the BIT STATIC Test routine to further isolate faulty assemblies:

- Enter 7.7000 MHz into the transmitter.
- Press A3S2.
- Refer to table 5-7 for fault code information.
- Refer to table 5-8 for assembly replacement instructions.

NOTE

The STATIC BIT test portion of the maintenance self-test provides the service technician with a means of quickly verifying the condition of the relays and relay drivers. By using the audible "signature" of relays being actuated, the trained technician can tell if a relay is being activated properly, thereby confirming the relay driver circuits, as well as much about the relay itself.

The STATIC BIT test activates all relays in the coupler sequentially at an interval of approximately 700 ms. The A3 control board also displays the state of each relay by means of status LEDs on the top edge of the PCB. The exact identity of a missing audible signature click can be made from the A3 status LEDs, or by simply counting the sequence of clicks.

Table 5-7. Static BIT Test Fault Codes and Indications

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Assemblies to Replace (In Sequence)
F3	F2	F1	F0			
0	0	0	0	On	Test in progress	None
0	0	0	0	1	Static test passed	None
0	0	0	1	2	RAM	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly
0	0	1	0	3	EEPROM	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly
0	0	1	1	4	Real time clock	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly

Table 5-7. Static BIT Test Fault Codes and Indications (Cont.)

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Assemblies to Replace (In Sequence)
F3	F2	F1	F0			
0	1	0	0	5	5 Vdc reference	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly
0	1	0	1	1-2	A/D converter	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly
0	1	1	1	1-3	Detected forward power	A5 Discriminator Assembly A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly A2 Interconnect Board Assembly
1	0	0	0	1-4	Detected reflected power	A5 Discriminator Assembly, A3 Control Board Assembly, A6 Power Supply Assembly, A7 Transceiver Interface Assembly, A2 Interconnect Board Assembly
1	0	0	1	2-3	Rp (parallel resistance) reading	A5 Discriminator Assembly, A3 Control Board Assembly, A6 Power Supply Assembly, A7 Transceiver Interface Assembly, A2 Interconnect Board Assembly
1	0	1	0	2-4	Phase detector reading	A5 Discriminator Assembly A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly A2 Interconnect Board Assembly
1	0	1	1	2-5	Overvoltage detector	A5 Discriminator Assembly A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly A2 Interconnect Board Assembly

Table 5-7. Static BIT Test Fault Codes and Indications (Cont.)

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Assemblies to Replace (In Sequence)
F3	F2	F1	F0			
1	1	1	0	3-4	Frequency counter	A5 Discriminator Assembly A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly A2 Interconnect Board Assembly
1	1	1	1	3-5	Temperature detector	A3 Control Board Assembly A6 Power Supply Assembly A7 Transceiver Interface Assembly

NOTES:

- See figure 5-3 for Fault Indicator (F0 through F3) locations. Indicator sequence (left to right) is in binary representation.
- See figure 5-3 for Test Status Indicator A7DS5 location.
- Typical flashing sequences are read and interpreted as follows:
 - Test Status Indicator A7DS5 flashing three times, pausing, then flashing three times again indicates a EEPROM fault condition.
 - Test Status Indicator A7DS5 flashing three times, pausing, then flashing four times indicates a frequency counter fault.

Table 5-8. Faulty Relay-to-Assembly Correlation Data – Coupler Level

Condition During Static BIT Test	Assemblies to Replace (In Sequence)
Any relay LED fails to light	A3 Control Board Assembly
DISC relay or Relays K26, K27 fail to click	A5, Discriminator Assembly A3 Control Board Assembly A2 Interconnect Board Assembly
K1 through K9 relays fail to click	A4 Capacitor Assembly A3 Control Board Assembly A2 Interconnect Board Assembly
K10 through K23 or K28 through K30 relays fail to click	A8 Coil Pack Assembly A3 Control Board Assembly A2 Interconnect Board Assembly
K24 and K25 relays fail to click	A1 6-dB Pad Assembly A3 Control Board Assembly A2 Interconnect Board Assembly

NOTE

If the STATIC BIT test fails (CODE 1), the TRANSMIT BIT test will not operate.

Perform the TRANSMIT BIT Test Routine by keying the transmitter and noting the A3 FAULT indicator LEDs (or the RF-2602 TEST STATUS LED) for the fault code sequence. Consult table 5-9 for an explanation of fault codes.

Table 5-9. Transmit BIT Fault Codes and Indications

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Assemblies to Replace (In Sequence)
F3	F2	F1	F0			
0	0	0	0	On	Test in progress	None
0	0	0	0	1	Transmit test passed	None
0	0	0	1	2	Tune fault	A5 Discriminator Assembly A4 Capacitor Assembly A8 Coil Pack Assembly
0	0	1	0	3	High tune power	A1 6 dB Pad Assembly A5 Discriminator Assembly A3 Control Board Assembly
0	0	1	1	4	Low or no tune power	A1 6 dB Pad Assembly A5 Discriminator Assembly A3 Control Board Assembly

Table 5-9. Transmit BIT Fault Codes and Indications (Cont.)

Control Board Assembly A3 Fault Indicators (1 = Indicator On) (Refer to Note 1.)				Test Status Indicator A7DS5 Flashing Sequence (Refer to Notes 2 and 3.)	Condition or Fault	Assemblies to Replace (In Sequence)
F3	F2	F1	F0			
1	0	0	0	1-2	Frequency counter	A5 Discriminator Assembly A3 Control Board Assembly
1	0	0	1	1-3	RF Relay or associated drive circuits	A8 Coil Pack Assembly A4 Capacitor Assembly
1	0	1	0	1-4	Phase reading	A5 Discriminator Assembly A3 Control Board Assembly
1	0	1	1	2-3	Rp (parallel resis- tance) reading	A5 Discriminator Assembly A3 Control Board Assembly
1	1	0	0	2-4	Reflected power ex- cessive	A5 Discriminator Assembly A3 Control Board Assembly

NOTES:

1. See figure 5-3 for Fault Indicator (F0 through F3) locations. Indicator sequence (left to right) is in binary representation.
2. See figure 5-3 for Test Status Indicator A7DS5 location.
3. Typical flashing sequences are read and interpreted as follows:
 - Test Status Indicator A7DS5 flashing three times, pausing, then flashing three times again indicates a high tune power fault.
 - Test Status Indicator A7DS5 flashing two times, pausing, then flashing four times indicates that reflected power is excessive.

5.4 RF-2602 TROUBLESHOOTING

Refer to paragraph 5.6 for RF-2602 disassembly instructions.

The RF-2602 consists of only a few components, and is easily tested by standard electronic troubleshooting methods:

- a. Verify proper setting of S2 voltage select switch.
- b. Verify proper power supply voltage (5 volts DC).
- c. Activate front panel controls in turn, and use scope or logic probe to verify proper operation of discrete components and ICs.

Refer to paragraph 5.7 and tab section RF-2602 for schematic diagrams and component location drawings.

Repair or replace components or assemblies as required. See paragraph 5.9 for general repair guidelines.

5.5 COUPLER MODULE/ASSEMBLY REMOVAL AND REPLACEMENT

This section contains the information needed to access and remove/replace the coupler's modules and assemblies. If circuit card repairs are necessary, refer to paragraph 5.7 for important repair guidelines.

5.5.1 Tools and Test Equipment Required

The following tools and test equipment are required to remove/replace the coupler's modules and assemblies:

- Standard tool kit
- Silicone Sealant-Dow-Corning #5
- RF-628 coupler recharge kit
- RF-636 Dry Air Pump
- Torque Wrench

5.5.2 Initial Conditions

The following are initial conditions:

- Coupler removed from operating site
- Coupler depressurized
- Cover removed
- Power off

5.5.3 Accessing Modules and Assemblies

The enclosure cover and shock cover must be removed to access defective modules (see figure 5-2) and assemblies.

5.5.3.1 Cover Removal

To remove the cover, perform the following steps:

- a. Press the charging valve plunger to depressurize the coupler.
- b. Using the 7/16-inch wrench, remove the 28 bolts holding the cover to the case assembly.
- c. Lift the cover off the case assembly. Do not pry the cover off the case; mounting surfaces may be damaged resulting in defective case-to-cover sealing.

CAUTION

Avoid scratching, nicking, or marking case-to-cover mounting surfaces. Damage of this type may prevent the coupler from sealing properly. Protect mounting surfaces with cloth, tape, or other suitable materials when working on the coupler.

- d. Do not discard the sealing gasket (installed between the cover and case mounting surfaces); it may be reused during reassembly.

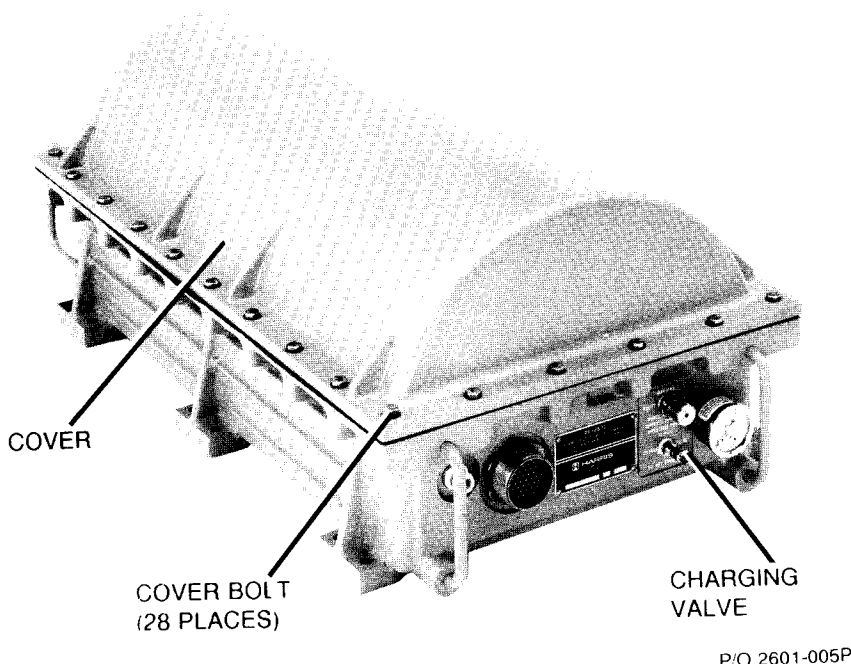


Figure 5-2. Accessing Modules and Assemblies

5.5.3.2 Cover Replacement Procedure

To replace the cover:

- a. Inspect the sealing gasket for signs of wear or damage; replace if necessary.
- b. Wipe the case-to-cover mounting surfaces and sealing gasket to remove all traces of sealing compound.
- c. Recoat the sealing gasket and mounting surfaces with silicone sealing compound.

- d. Reposition the sealing gasket and cover onto the case. Position the cover so that the lifting ring faces the insulator end of the case.
- e. Recoat the 28 cover bolts as necessary with anti-seize compound (contained in ancillary kit) to prevent corrosion.
- f. Tighten the cover bolts to 70 inch-pounds (0.81 kg-m) torque, in the sequence shown in figure 5-3.
- g. Repressurize the coupler, using the instructions given in paragraph 5.7.2.2.

5.5.4 Shock Cover Removal

To remove the shock cover:

- a. Following cover removal, remove the light shock cover mounting screws with a common screwdriver.
- b. Lift the shock cover away from the case.

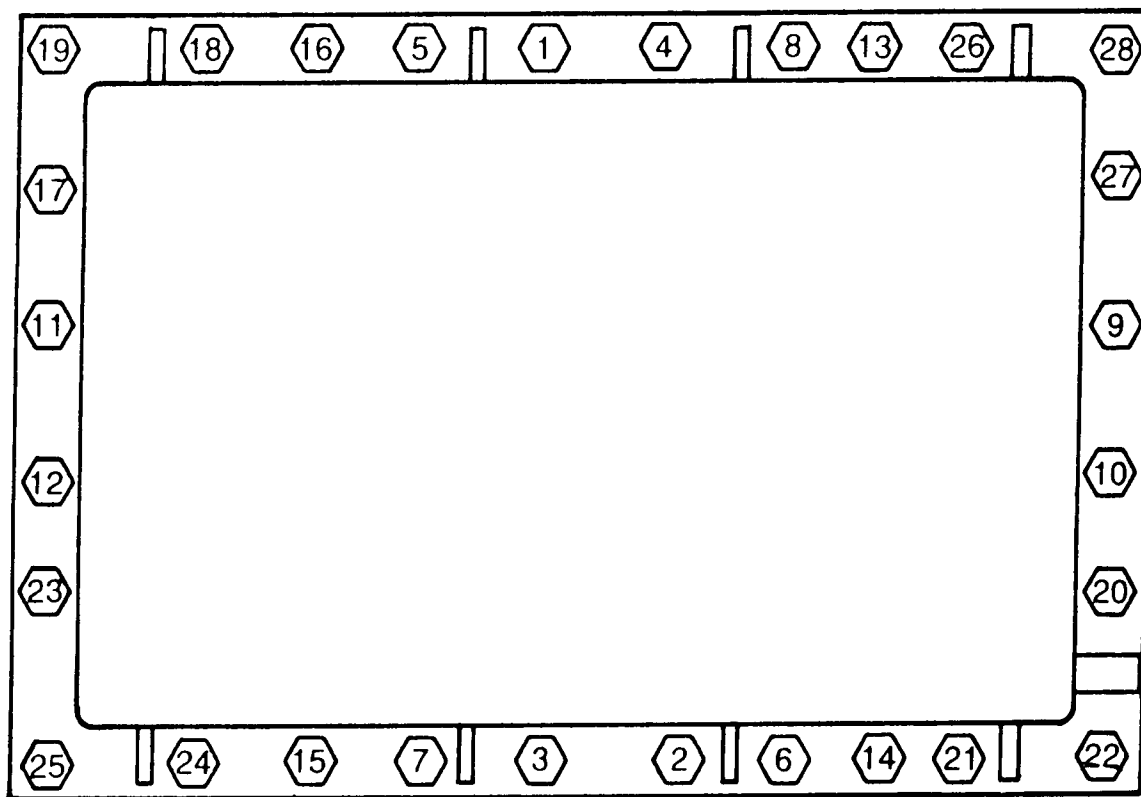


Figure 5-3. RF-2601 Cover Bolts Tightening Sequence

5.5.4.1 Shock Cover Replacement

To replace the shock cover:

- a. Align locating holes in center of shock cover over coil assembly L5 upper guide pins, and lower shock cover into position.
- b. Verify that guide pins of each "leg" of the shock cover are fully seated onto the coupler case flange.
- c. Install shock cover screws.

5.5.5 Six DB Pad A1 Removal (See figure 5-4)

To remove the 6-dB pad:

- Remove the coupler cover and shock cover as described in paragraphs 5.5.3.1 and 5.5.4.
- Disconnect the two coaxial cables attached to the module by unfastening the BNC connectors.
- Disconnect the dc power cable attached to the module by gently pulling the cable connector straight out.
- Loosen the two captive mounting screws using a Phillips screwdriver.
- Carefully lift the entire module assembly out of the case.

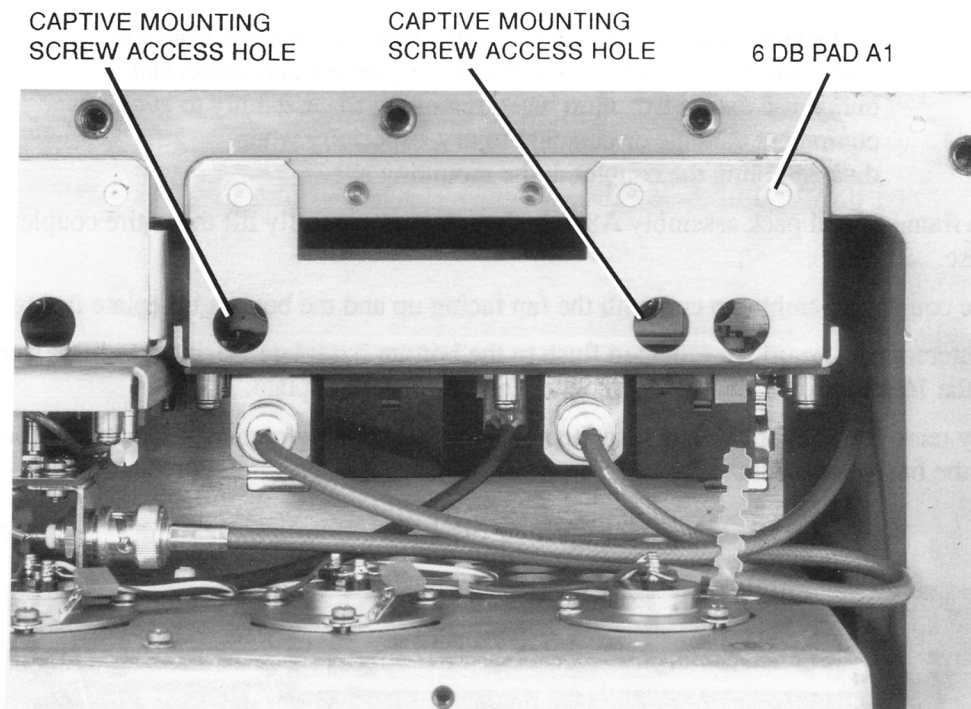


Figure 5-4. Six dB Pad A1 Removal

5.5.5.1 Six DB Pad A1 Replacement

To replace the 6-dB pad:

- Perform the disassembly steps given above in reverse order.
- Replace the shock cover and coupler cover as described in paragraphs 5.5.3.1.

5.5.6 Interconnect Board A2 Removal (See figure 5-5)

To remove the interconnect board:

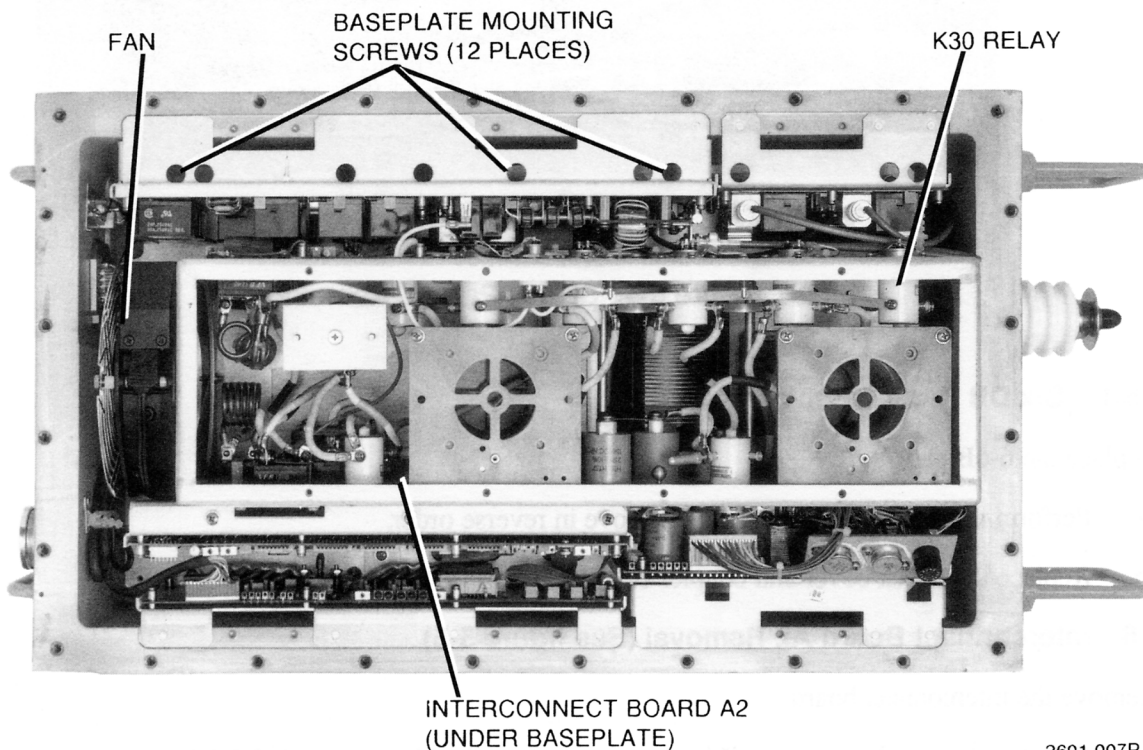
- Remove the coupler cover and shock cover as described in paragraph 5.5.3.1.
- Remove the screw holding the RF output line to relay K30 on coil pack assembly A8.

- c. Remove the following modules/assemblies:
 - 1. Six dB pad A1, see paragraph 5.5.5.
 - 2. Control assembly A3, see paragraph 5.5.7.
 - 3. Capacitor assembly A4/Discriminator assembly A5, see paragraph 5.5.8.
 - 4. Power supply A6, see paragraph 5.5.9.1.
 - 5. Transceiver interface A7, see paragraph 5.5.10.1.
- d. Disconnect the ac power cable attached to the fan by pulling cable connector P3 straight out.
- e. Remove the 12 captive baseplate mounting screws using a Phillips screwdriver.

WARNING

In the next step, the entire coupler assembly is removed from the case. Since the coupler assembly is fairly heavy and somewhat bulky, use extreme caution when removing the assembly to avoid equipment damage or personal injury, especially when disassembling the coupler at the mounting site.

- f. Hold the frame of coil pack assembly A8 at both ends, and carefully lift the entire coupler assembly out of the case.
- g. Stand the coupler assembly on end with the fan facing up and the bottom baseplate facing out.
- h. Locate interconnect board A2 mounted flush to the bottom baseplate. Using a Phillips screwdriver, remove the 16 screws holding the interconnect board to the baseplate.
- i. Carefully remove the board and its insulated backing strip, taking care to guide the attached ribbon cables through the baseplate clearance holes.



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Figure 5-5. Interconnect Board A2 Removal

5.5.6.1 Interconnect Board A2 Replacement

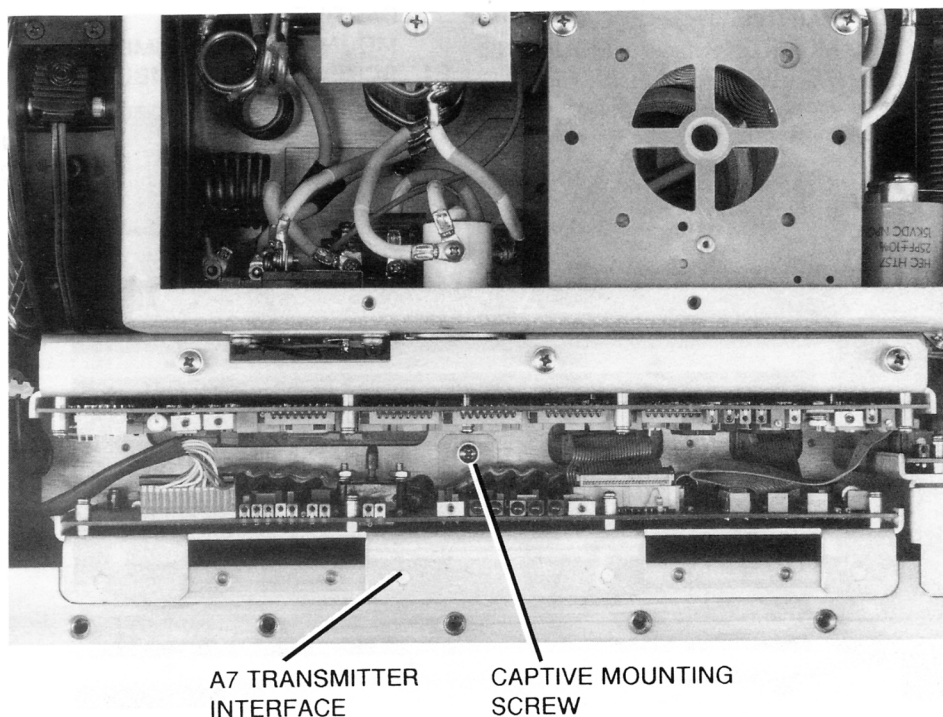
To replace the interconnect board:

- a. Perform the disassembly steps given above in reverse order, taking care not to stretch, pinch, or crush any connectors or cables.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2 .

5.5.7 Control Assembly A3 Removal (See figure 5-6)

To remove the control assembly:

- a. Remove the cover and shock cover as described in paragraphs 5.5.3.1 and 5.5.4.
- b. Remove the three captive mounting screws using a Phillips screwdriver.
- c. Pull the assembly straight up to disengage the connector at the bottom edge of the assembly.



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Figure 5-6. Control Assembly A3 Removal

5.5.7.1 Control Assembly A3 Replacement

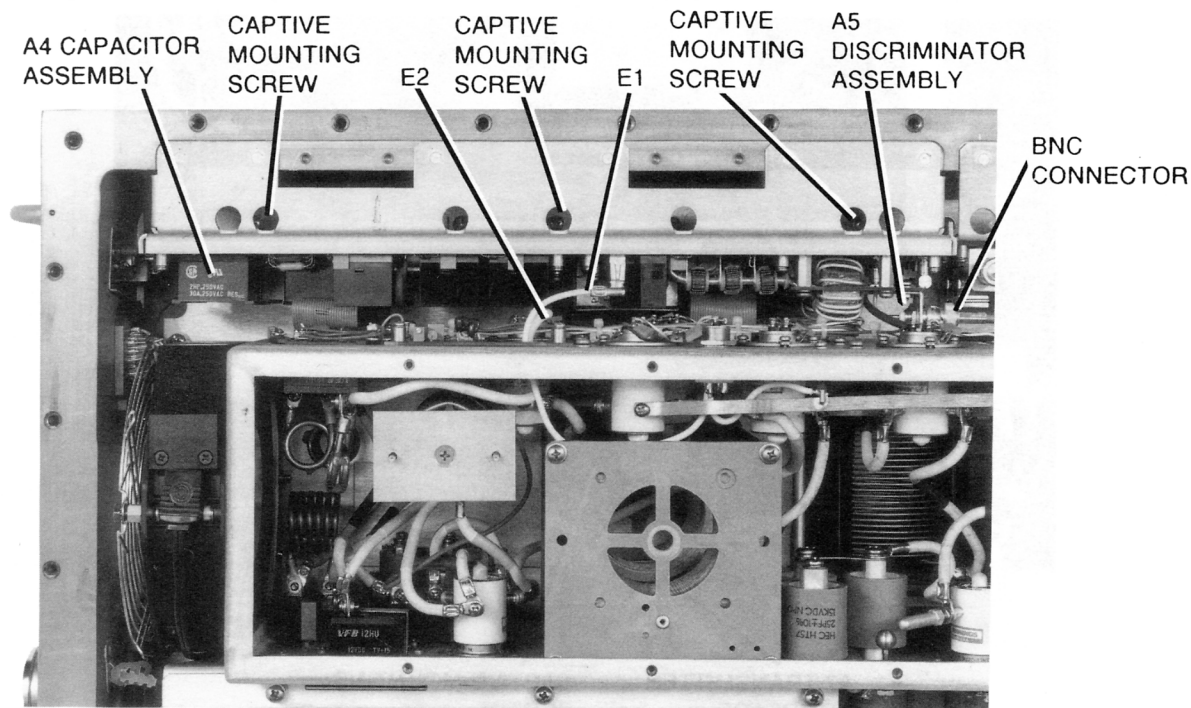
To replace the control assembly:

- a. Perform the disassembly steps given above in reverse order, taking care to properly engage the connector before pressing the assembly into place.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2.

5.5.8 Capacitor Assembly A4/Discriminator Assembly A5 Removal (See figure 5-7)

The capacitor and discriminator assemblies are mounted onto a common frame, and are removed and replaced as a whole. To remove the assemblies:

- a. Remove the coupler cover and shock cover as described in paragraph 5.5.3.1 and 5.5.4.
- b. Remove the three captive mounting screws using a Phillips screwdriver.
- c. Disconnect the cables attached at E1 on the discriminator assembly, and E2 on the capacitor assembly by gently pulling the connectors straight out.
- d. Disconnect the coaxial cable attached to the discriminator assembly by unfastening the BNC connector.
- e. Tilt the entire assembly back so the components face up. Disconnect the two ribbon cables attached to the assemblies by pressing down on the ejector handles (located at both ends of the ribbon connectors), just enough to release the connectors, and no more.



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Figure 5-7. Capacitor Assembly A4/Discriminator Assembly A5 Removal

5.5.8.1 Capacitor Assembly A4/Discriminator Assembly A5 Replacement

To replace the assemblies:

- a. Perform the disassembly steps given above in reverse order.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2.

5.5.9 Power Supply A6 Removal (See figure 5-8)

To remove the power supply:

- a. Remove the coupler cover and shock cover as described in paragraph 5.5.3.1 and 5.5.4.
- b. Remove the three captive mounting screws using a Phillips screwdriver.
- c. Lift the power supply assembly just enough to allow clear access to connector P2/J2. Unfasten the connection.
- d. Disconnect the ribbon cable attached to the power supply by pressing down on the ejector handles (located at both ends of the ribbon connector), just enough to release the connector, and no more.

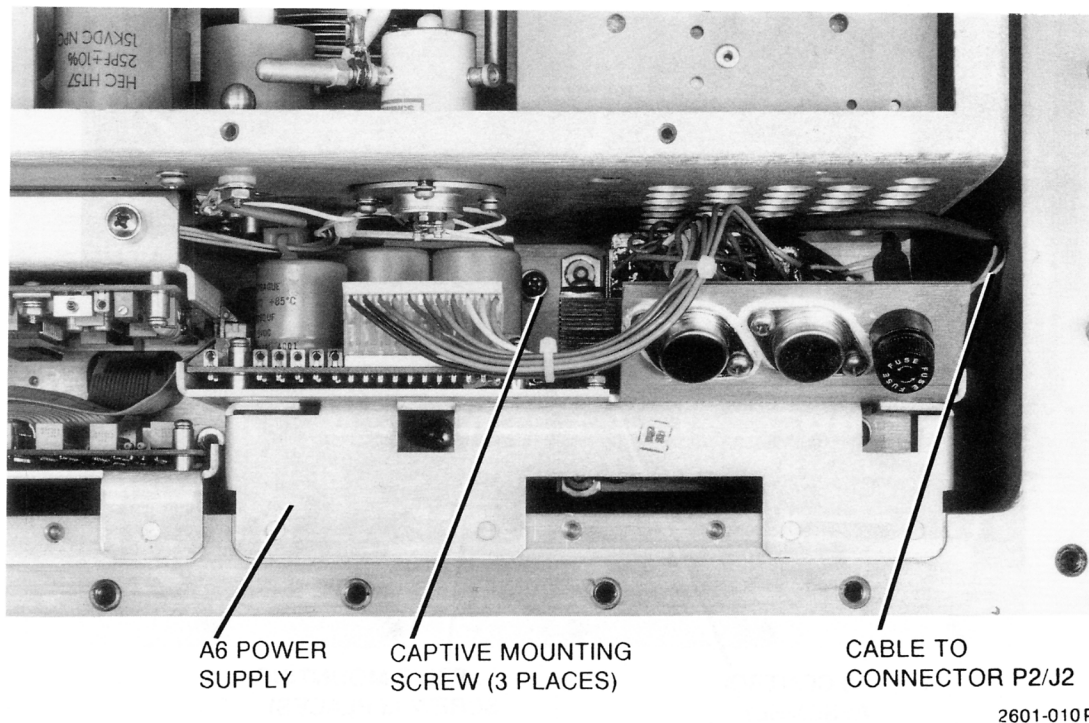


Figure 5-8. Power Supply A6 Removal

5.5.9.1 Power Supply A6 Replacement

To replace the power supply:

- a. Perform the disassembly steps given above in reverse order.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2.

5.5.10 Transceiver Interface A7 Removal (See figure 5-9)

To remove the transceiver interface:

- a. Remove the shock cover and coupler cover as described in paragraph 5.5.3.1 and 5.5.4.
- b. Remove the captive mounting screw using a Phillips screwdriver.
- c. Disconnect the ribbon cable attached to the transceiver interface by pressing down on the ejector handles (located at both ends of the ribbon connector), just enough to release the connector, and no more.
- d. Disconnect the remaining cable by gently pulling the connector straight out.
- e. Carefully lift entire module assembly out of case.

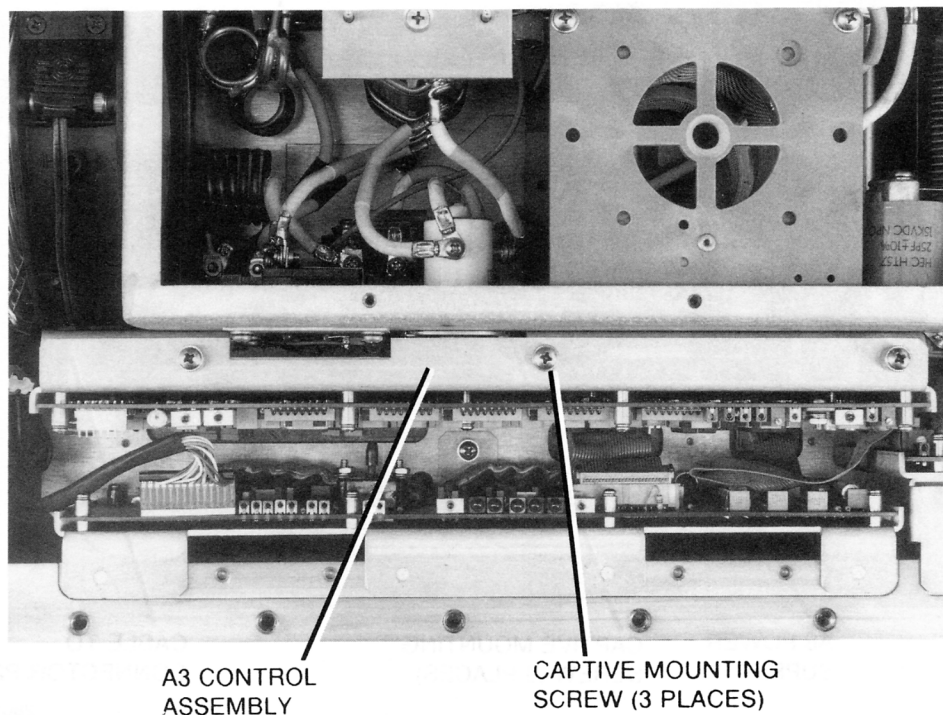


Figure 5-9. Transmitter Interface A7 Removal

5.5.10.1 Transceiver Interface A7 Replacement

To replace the transceiver interface:

- a. Perform the disassembly steps given above in reverse order.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2.

5.5.11 Coil Pack Assembly A8 Removal (See figure 5-10)

To remove the coil pack assembly:

- a. Remove the shock cover and coupler cover as described in paragraph 5.5.3.1 and 5.5.4.
- b. Disconnect the ac power cable attached to the fan by pulling cable connector P3 straight out.
- c. Remove capacitor assembly A4/discriminator assembly A5 as described in paragraph 5.5.8.1.
- d. Disconnect the dc cable attached at J8 of transceiver interface A7 by gently pulling the connector straight out.
- e. Remove control board A3 as described previously.
- f. Disconnect the dc cable attached at J9 (at the bottom of the case next to transceiver interface A7) by gently pulling the connector straight up. Transceiver interface A7 may be removed if necessary.
- g. Remove the seven captive mounting screws.

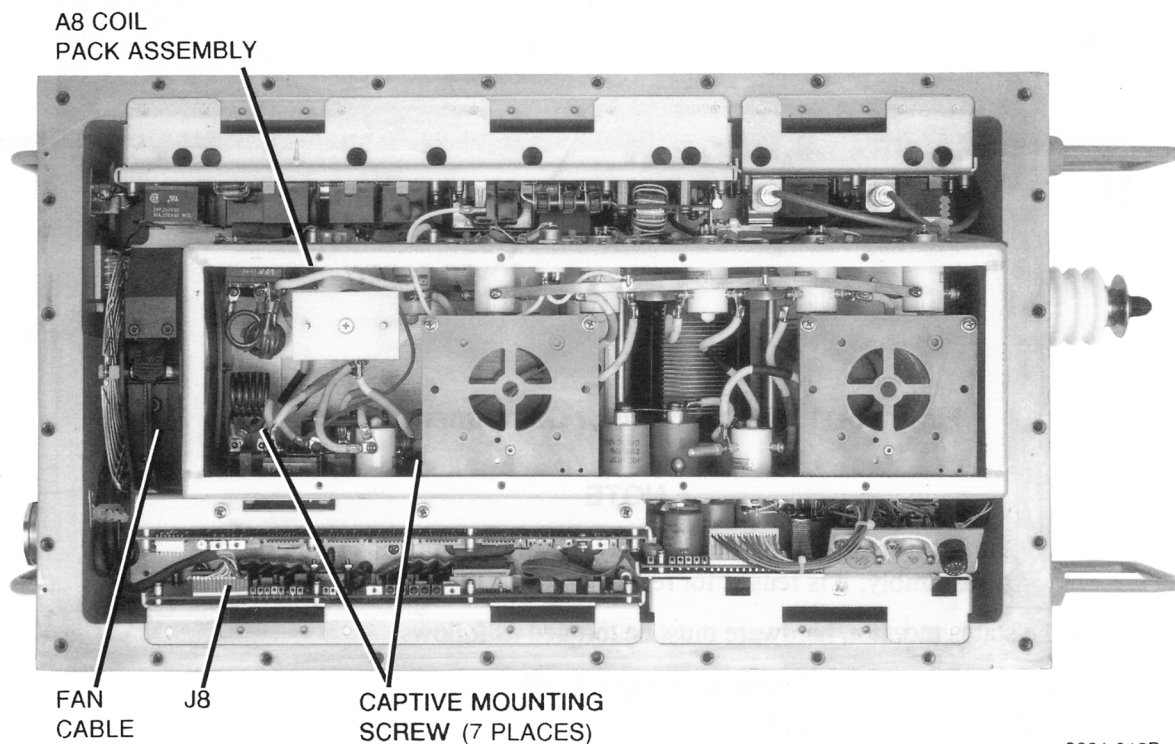


Figure 5-10. Coil Pack Assembly A8 Removal

5.5.11.1 Coil Pack Assembly A8 Replacement

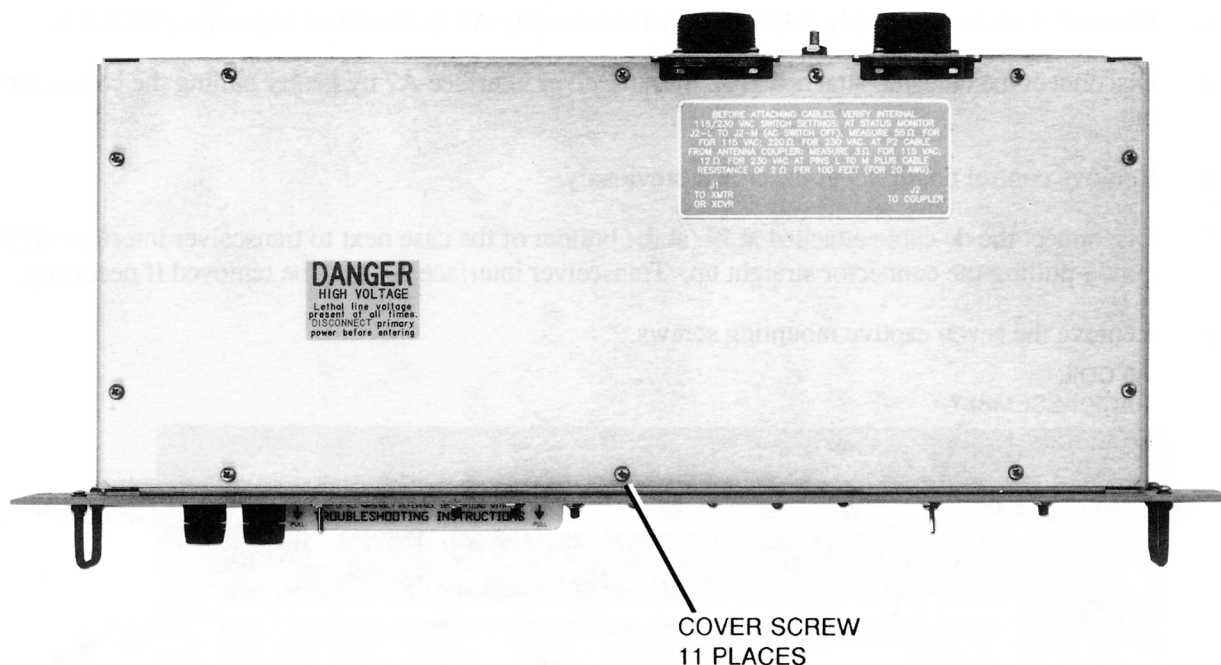
To replace the coil pack assembly:

- a. Perform the disassembly steps given above in reverse order, taking care not to stretch, pinch, or crush any connectors or cables.
- b. Replace the shock cover and coupler cover as described in paragraph 5.5.4.1 and 5.5.3.2.

5.6 RF-2602 STATUS MONITOR DISASSEMBLY

This section contains the information needed to access the status monitor's internal components (see figure 5-11). If circuit card repairs are necessary, refer to paragraph 5.4 for important repair guidelines.

To access internal components, remove the screws securing the RF-2602 to the panel rack, and slide out to expose top cover panel. Remove the top cover screws with a Phillips screwdriver. Reassemble in reverse order.



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Figure 5-11. Status Monitor Component Access

NOTE

Do not discard any of the assembly hardware removed during disassembly; it is reused for reassembly.

When reassembling the status monitor, hardware must be torqued as follows:

Size	Torque, in-lb (kg-m), 5%
4-40	6 (.07)
6-32	10 (.12)
8-32	21 (.24)
10-32	33 (.38)

5.7 COUPLER LEAK TESTING AND PRESSURIZATION

The coupler must be pressurized with dry nitrogen (best coupler internal atmosphere) at the time of installation and thereafter as required to maintain 4 to 6 pounds/in² (0.28 to 0.42 kg/cm²), as indicated on pressure gauge M1. An RF-628 Dry Nitrogen Pressurization Kit is available as an optional accessory. For cases where dry nitrogen cannot be located or obtained quickly, dry air may be used as a substitute (see paragraph 5.7.2). Paragraph 5.7.3 gives special emergency-type instructions for operating without any pressure in the coupler, or with pressure supplied directly from a manual (tire) pump.

5.7.1 Leak Testing and Pressurization Using the RF-628 Dry Nitrogen Kit

Once a coupler seal to the external environment has been disturbed, or the dry internal atmosphere of the coupler has been exposed to the external environment, the unit should be retested for leaks. Upon passing the leak test, the unit is then purged with a dry air or dry nitrogen atmosphere and pressurized to a specific pressure setting. The RF-628 Dry Nitrogen Kit provides this dry gas atmosphere. The following procedure gives instructions for leak testing and repressurizing the coupler with dry nitrogen.

WARNING

An instruction sheet is provided with the RF-628 Dry Nitrogen Kit. **DO NOT** attempt to use the kit until the instruction sheet has been completely reviewed and understood.

NOTE

The use of a manual air pump (tire pump) is recommended for the leak test to avoid wasting dry nitrogen. If an air pump is not available, the leak test can be performed using the dry nitrogen.

5.7.1.1 Leak Test

To leak test the coupler:

- a. Remove the charging valve cap and connect a hand air pump to the charging valve.
- b. The relief valve is adjustable and may be set for the desired relief pressure by rotating the adjusting cap clockwise to increase, or counterclockwise to decrease the relief pressure. To adjust the relief pressure, loosen the lock nut and turn the adjusting cap completely clockwise. Pressurize the coupler to 12 psig. Slowly turn the adjustment cap counterclockwise until the pressure reduces to 10 psig, and secure the locking nut.
- c. Depressurize the coupler to 5-6 psi, as indicated on the coupler pressure gauge.
- d. Apply a detergent solution to all points on the coupler where a leak may exist.
- e. Watch for the appearance of bubbles.
- f. If bubbles appear, check hardware for tightness. If a 1/8" diameter bubble forms in less than 40 seconds, or if a 1/4" diameter bubble forms in less than 5 minutes, replace or repair the applicable seal or gasket.
- g. If there is no apparent leakage, disconnect the pump and release the pressure.
- h. Remove all detergent solution from the coupler.
- i. Purge and pressurize the coupler as per paragraph 5.7.1.2.

5.7.1.2 Pressurization Procedure

To pressurize the coupler:

- a. Verify that the RF-628 regulator valve is turned off (regulator adjusting screw is turned completely counterclockwise).
- b. Partially open the cylinder shut-off valve on the dry nitrogen cylinder bottle. After the contents gauge stops moving, open the valve fully (counterclockwise).
- c. Turn the regulator adjusting screw clockwise until 10 psi pressure is indicated on the delivery gauge.

- d. Connect the air chuck to the charging valve, and pressurize the coupler to 5-6 psi as indicated on the coupler pressure gauge.
- e. Press the coupler relief valve to release the pressure, and purge the moist gas from the coupler. Repeat this process at least three times.

NOTE

For optimum dryness, purge and pressurize the coupler once a day for at least three days. This allows maximum absorption of moisture from internal surfaces, compounds, and trapped areas.

- f. Pressurize the coupler to 6 psig if the internal gas is at room temperature (approximately 25 degrees C). If the internal gas is not at room temperature, pressurize according to the formula: $P = 4.3 + .07T$, where P is in psig, and T is the gas temperature in Celsius degrees (refer to figure 5-12).
- g. Replace the valve cap on the charging valve.
- h. Dismantle and store the dry nitrogen kit per the RF-628 instruction sheet.

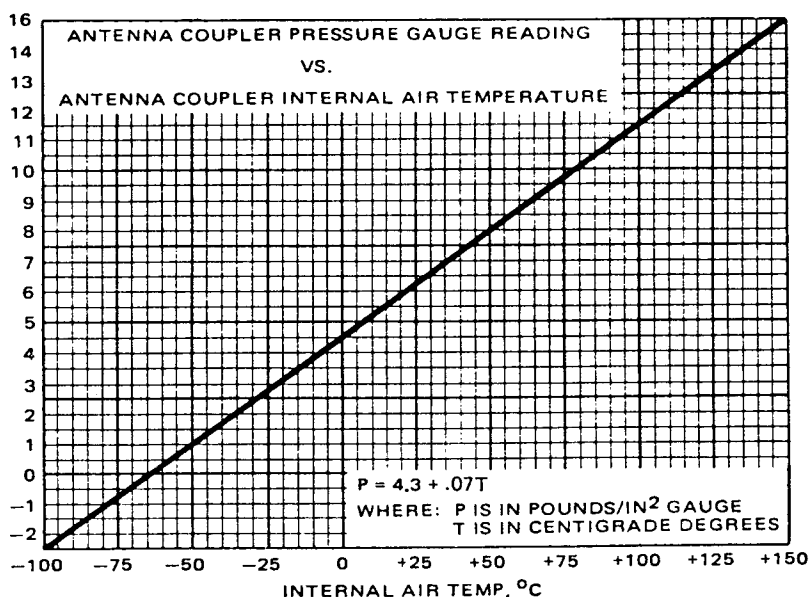


Figure 5-12. Coupler Charging Pressure vs. Temperature

5.7.2 Leak Testing and Pressurization Using Dry Air Pump RF-636

An RF-636 Dry Air pump is available as an optional accessory. The pressure vs. temperature chart (figure 5-12) applies to dry air, as well as dry nitrogen. The following procedures give instructions for leak testing, and pressurizing the coupler with dry air.

5.7.2.1 Leak Test

To leak test the coupler:

- a. Remove the valve charging cap and connect the RF-636 Dry Air Pump to the charging valve.
- b. The relief valve is adjustable, and may be set for the desired relief pressure by rotating the adjusting cap clockwise to increase, or counterclockwise to decrease the relief pressure. To adjust the relief pressure, loosen the lock nut and turn the adjusting cap completely clockwise. Pressurize the coupler to 12 psig. Slowly turn the adjustment cap counterclockwise until the pressure reduces to 10 psig, 1 psig, and secure the locking nut.
- c. Depressurize the coupler to 5-6 psi, as indicated on the coupler pressure gauge.
- d. Apply a detergent solution to all points on the coupler where a leak may exist.
- e. Watch for the appearance of bubbles.
- f. If bubbles appear, check hardware for tightness. If a 1/8" diameter bubble forms in less than 40 seconds, or if a 1/4" diameter bubble forms in less than 5 minutes, replace or repair the applicable seal or gasket.
- g. If there is no apparent leakage, disconnect the pump and release the pressure.
- h. Remove all detergent solution from the coupler.
- i. Pressurize the coupler as per paragraph 5.7.2.2.

5.7.2.2 Pressurization Procedure

To pressurize the coupler:

- a. Pressurize the coupler to 5-6 psi, as indicated on the coupler pressure gauge.
- b. Press the coupler relief valve to release the pressure, and purge the moist gas from the coupler. Repeat this process at least three times.

NOTE

For optimum dryness, purge and pressurize the coupler once a day for at least three days. This allows maximum absorption of moisture from internal surfaces, compounds, and trapped areas.

- c. Pressurize the coupler to 6 psig if the internal gas is at room temperature (approximately 25 degrees C). If the internal gas is not at room temperature, pressurize according to the formula: $P = 4.3 + .07T$, where P is in psig, and T is the gas temperature in Celsius degrees (refer to figure 5-11).
- d. Replace the valve cap on the charging valve.

5.7.3 Emergency Pressurization; Emergency Operation

CAUTION

Under emergency circumstances, the coupler may be operated without an internal dry gas atmosphere. Such operations cannot be continued over any extended period (days) without harm to the equipment.

For emergency use, pressurize the coupler to 6 psi with a manual air pump. (Do not pressurize over 6 pounds/in², and then exhaust the excess pressure, as is done with dry nitrogen.) Operate the coupler in a normal manner.

5.8 ADJUSTMENT PROCEDURES

All coupler adjustments are made at the factory and do not require routine adjustment. Make adjustments only when related components are changed, or when out-of-tolerance performance is indicated.

WARNING

Verify that the transmitter/transceiver is off and the coupler is deenergized before disassembling.

NOTE

Incorrect adjustments may seriously degrade coupler performance.

The coupler's cover and shock cover must be removed to make adjustments. See paragraph 5.5.3 for removal and replacement procedures. The coupler must be pressurized following reassembly. See paragraph 5.7.2.2 for instructions.

5.8.1 Arc Ball Gap Adjustment

The coupler includes two arc ball gaps which are set for different voltages. The arc ball gaps must be adjusted so that arc-over occurs only when RF output voltages exceed the ratings of the coupler's high voltage components.

The arc-over voltage is affected by the coupler's internal air pressure level and arc ball gap spacing. Arc-over voltage increases when internal air pressure increases and gap space increases, and conversely, decreases when internal air pressure decreases and gap space decreases.

The proper arc-over voltage for the 1.6-10 MHz arc ball gap is obtained by setting the arc ball gap to 0.149 to 0.151 inch (3.78 to 3.83 mm).

The proper arc-over voltage for the 10-20 MHz arc ball gap is obtained by setting the arc ball gap to 0.019 to 0.021 inch (0.48 to 0.53 mm).

5.8.1.1 Required Materials

The following tools and special equipment are recommended to adjust the arc ball gap:

- Open-end wrench, 5/16 inch
- Feeler gauge, 0.150 inch, ± 0.001 inch (3.78 to 3.83 mm)
- Feeler gauge, 0.020 inch, ± 0.001 inch (0.48 mm to 0.53 mm)

5.8.1.2 1.6-10 MHz Arc Ball Gap Adjustment Procedure

To adjust the 1.6-10 MHz arc ball gap, perform the following procedure:

- a. Refer to the A8 Assembly components locations diagrams, and locate the 1.6-10 MHz adjustable arc ball; loosen the locking nut with the wrench.
- b. Rotate the arc ball to obtain the 0.150 inch (3.81 mm) gap, as measured by the feeler gauge.
- c. Tighten the locking nut; do not allow the adjustable arc ball to move.
- d. Check the gap size; readjust if necessary.

5.8.1.3 10-30 MHz Arc Ball Adjustment Procedure

To adjust the 10-30 MHz arc ball, perform the following procedure:

- a. Refer to the A8 Assembly components locations diagrams, and locate the 10-30 MHz adjustable arc ball; loosen the locking nut with the wrench.
- b. Rotate the arc ball to obtain a 0.020 inch (0.050 mm) gap, as measured by the feeler gauge.
- c. Tighten the locking nut; do not allow the adjustable arc ball to move.
- d. Check the gap size; readjust if necessary.

5.8.2 2000-Volt Overvoltage Threshold Adjustment

The 2000-volt overvoltage threshold is adjusted with potentiometer R3, located on 2-kV Detector Assembly 1A2A8A1.

The following tools and special equipment are required to adjust the 2000-volt overvoltage threshold.

- Voltmeter (Simpson 260 or equivalent)
- Small screwdriver

5.8.2.1 Adjustment Procedure

To adjust the overvoltage threshold:

- a. Disconnect the antenna output lead from the common terminal of relay K3.
- b. Rotate R3 fully clockwise with the screwdriver.
- c. Key the coupler at 7.70 MHz.
- d. Adjust transmitter power to obtain a reading of +4.0 Vdc at Control Board A3 test point TP6. +4.0 volts represents about 200 watts of transmitter power.
- e. Rotate R3 counterclockwise to obtain a reading of +1.35 Vdc at test point E2 (the 2 kV Detector Assembly output).

5.8.3 Precision +5-Volt Supply Output Adjustment

The output of the precision +5-volt supply is adjusted with potentiometer R27 on Control Board Assembly A3.

5.8.3.1 Required Materials

The following tools are required to adjust the output of the precision +5-volt supply:

- Digital voltmeter (Fluke 73, HP-3435A, or equivalent)
- Small screwdriver

5.8.3.2 Adjustment Procedure

To adjust the +5-volt power supply:

- a. Energize the coupler and monitor the voltage at A3 Control Board test point TP2.
- b. Adjust R27 to obtain a voltmeter reading of +4.95 to +5.05 volts.
- c. Press A3 Control Board pushbutton switch S3; verify that the voltmeter reading remains constant.

5.8.4 Parallel Resistance Discriminator Adjustment

The parallel resistance discriminator is adjusted with potentiometers R16 and R17, located on Discriminator Assembly A5.

5.8.4.1 Required Materials

The following tools and special equipment are required to adjust the parallel resistance discriminator:

- Digital voltmeter (Fluke 73, HP-3435A, or equivalent)
- Coaxial cable (BNC-to-alligator clips), length 2-3 feet
- Shorting wire (with alligator clips), length 2 inches
- Grounding wire (with alligator clips), length 8 inches
- 50-ohm load, 100-watt rating
- Small screwdriver

5.8.4.2 Initial Setup

The following steps provide equipment setup instructions. To locate the components referenced in the procedures, refer to the component location diagrams contained in the white tab sections.

As described in step d., the coupler chassis supports the A4/A5 Assembly during the adjustment procedures described in 5.8.4.3.

- a. Remove the cover from the A8 Coil Pack Assembly.
- b. Perform steps a. through c. of the Capacitor Assembly A4/Discriminator Assembly A5 removal instructions (see paragraph 5.5.8).
- c. Remove the copper strap connecting A4E1 to A5E2.
- d. Set the A4/A5 Assembly on the chassis flange. Secure the assembly to the flange with the center captive screw.
- e. Connect the connector end of the coaxial cable to the 50-ohm load. Connect the cable's center conductor to the center conductor of transformer A5T2 (located to the left of T2D, at the point where the center conductor bends to enter the PWB). Connect the shield to the chassis lip at a point nearby the connection to the transformer.
- f. Adjust the voltmeter to accurately read levels around +2.5 volts. Connect the voltmeter positive lead to test point TP4 on discriminator assembly A5 (the parallel resistance test point). Ground the common lead to TP10.
- g. Connect the coupler to the transmitter/transceiver and apply power. The voltmeter must read +2.50 volts, 0.04 volts. If necessary, adjust the precision +5 volt supply output (as described in paragraph 5.8.3) to obtain the proper reading. If the voltage cannot be set, recheck the test setup and board interconnections.

5.8.4.3 Adjustment Procedures

To adjust the discriminator:

- a. Ground test point TP12 on discriminator assembly A5 with a grounding wire; short TP13 to TP14. Use as short a wire as possible to minimize lead inductance.
- b. Press pushbutton switch S1 on Transceiver Interface Assembly A7 to override the temperature and pressure fault functions.

- c. Momentarily key the transmitter/transceiver in AM mode at 2 MHz to cause the coupler to tune.
- d. While keying the transmitter/transceiver, set the transmitter/transceiver forward output power at 50 to 60 watts; adjust A5R16 to obtain a voltmeter reading of +2.50 volts.
- e. Unkey the transmitter/transceiver and remove the grounding wire. Relay K1 should click.
- f. While keying the transmitter/transceiver, verify that the voltmeter no longer reads +2.50 volts. If the reading is still +2.50 volts, relay K1 was not energized properly. Repeat the adjustment procedures.
- g. Unkey the transmitter/transceiver and remove the shorting wire.
- h. While keying the transmitter/transceiver, adjust A5R17 until the voltmeter reads +2.50 volts.
- i. Unkey and turn off the transmitter/transceiver. Disconnect the voltmeter and 50-ohm load. Remove the A4/A5 assembly from the chassis flange.
- j. Install the copper strap removed in step c. of the initial setup procedure (5.8.4.2).
- k. Install the A4/A5 assembly into the coupler (see paragraph 5.5.8.1), but do not replace the cover. Replace the A8 Coil Pack Assembly cover.
- l. Turn on the transmitter/transceiver, and press pushbutton switch S1 on Transceiver Interface Assembly A7 to override the temperature and pressure fault functions.
- m. Check the adjustments by tuning the coupler into an antenna, antenna simulator, or 50-ohm load before and after coupler reassembly.

5.9 REPAIRS

The following guidelines must be followed when replacing circuit card components.

5.9.1 General PCB Parts Replacement Techniques

When repairing printed circuit boards, carefully follow the procedures below to avoid damage.

- a. Use a pencil-type soldering iron with a 25 watt maximum capacity. Use an isolating transformer with an ac-operated iron. **Do not use a soldering gun**; damaging voltages can be induced into the components.
- b. When soldering transistors or diodes, solder quickly; where wiring permits, use a heatsink (such as long nose pliers) between the soldered joint and the part being replaced.
- c. Excessive heat can separate the copper strip from the board. Cement separated strips in place with a quick drying acetate base cement having good electrical insulating properties.
- d. Use high quality rosin core solder when repairing printed circuit boards. **NEVER USE PASTE FLUX**. After soldering, clean off any excess flux and coat the repair area with a high quality electrical varnish or lacquer.
- e. Repair a break in the copper of a printed circuit board by soldering a buss wire across the break.
- f. When removing parts from a printed circuit board, apply heat sparingly to the lead of the part to be replaced. Remove part from the printed circuit board as the iron heats the lead.
- g. When a part is replaced, tin the leads on the new part. Bend the clean tinned leads on the new part, and carefully insert them through the holes in the printed circuit board. Bend the leads close to the foil and cut so that approximately 1/16-inch of lead length is left. Hold part against the board and quickly solder the leads.

5.9.2 Handling Static-Sensitive Devices

The ISDU contains devices that may be damaged by electrostatic discharge (ESD). To prevent ESD-related failures, the following guidelines must be followed when disassembling or repairing the unit:

- a. All work must be performed at properly grounded workbenches.
- b. Use only properly grounded tools, especially soldering irons. Do not use soldering guns.
- c. Avoid wearing synthetic clothing, especially nylon.
- d. Use a properly grounded wrist strap.
- e. Store and transport static-sensitive devices only in anti-static containers and bags; avoid conventional trays, foams, and bags.
- f. When handling static-sensitive devices, do not touch the leads; handle by the case only.
- g. Avoid contact between PWB assemblies.
- h. Do not install or remove static-sensitive devices with circuit power applied.
- i. Check all power sources coming in contact with static-sensitive devices for proper voltages, polarities, and transient protection.



SECTION 6**PARTS LISTS, ASSEMBLY DRAWINGS AND SCHEMATICS****6.1 GENERAL INFORMATION**

This section contains illustrations showing the locations of major coupler assemblies. A cross-reference is provided for quick location of the tab section information. Table 6-1 is the parts list for the RF-2601 Antenna Coupler. Table 6-2 is the parts list for the RF-2601AC Antenna Coupler, and table 6-3 is the parts list for the RF-2602 Status Monitor.

6.2 COUPLER MAJOR ASSEMBLIES

Refer to the assembly level tab sections for parts lists, component locations drawings, and schematic diagrams for coupler assemblies.

Table 6-1. RF-2601 Fast Tune Automatic Antenna Coupler Parts List (10257-0010 Rev. A)

Ref. Desig.	Part Number	Description
—	10257-0030	RF-2601AC Antenna Coupler, Packed
—	10257-6010	RF-2602 Status Monitor, Packed

Table 6-2. RF-2601AC Antenna Coupler, Packed, Parts List (10257-0030 Rev. A)

Ref. Desig.	Part Number	Description
—	10257-0002	Ancillary Kit, RF-2601AC (See table 2-1)
—	10257-1000	RF-2601 Antenna Coupler (See table 1, Main Chassis tab section)

Table 6-3. RF-2602 Status Monitor, Packed, Parts List (10257-6010 Rev. —)

Ref. Desig.	Part Number	Description
—	10257-6002	Ancillary Kit, RF-2602 (See table 2-2)
—	10257-6100	Chassis Assy, RF-2602 (See table 1, RF-2602 tab section)





MAIN CHASSIS ASSEMBLY

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MAIN CHASSIS ASSEMBLY**1. GENERAL INFORMATION**

This section contains parts lists (tables 1, 2, and 3), an illustration of the coupler assemblies (figure 1), and a schematic diagram (figure 2) for the Main Chassis Assembly.

Table 1. RF-2601 Antenna Coupler Case Assembly Parts List (10257-1000 Rev. E)

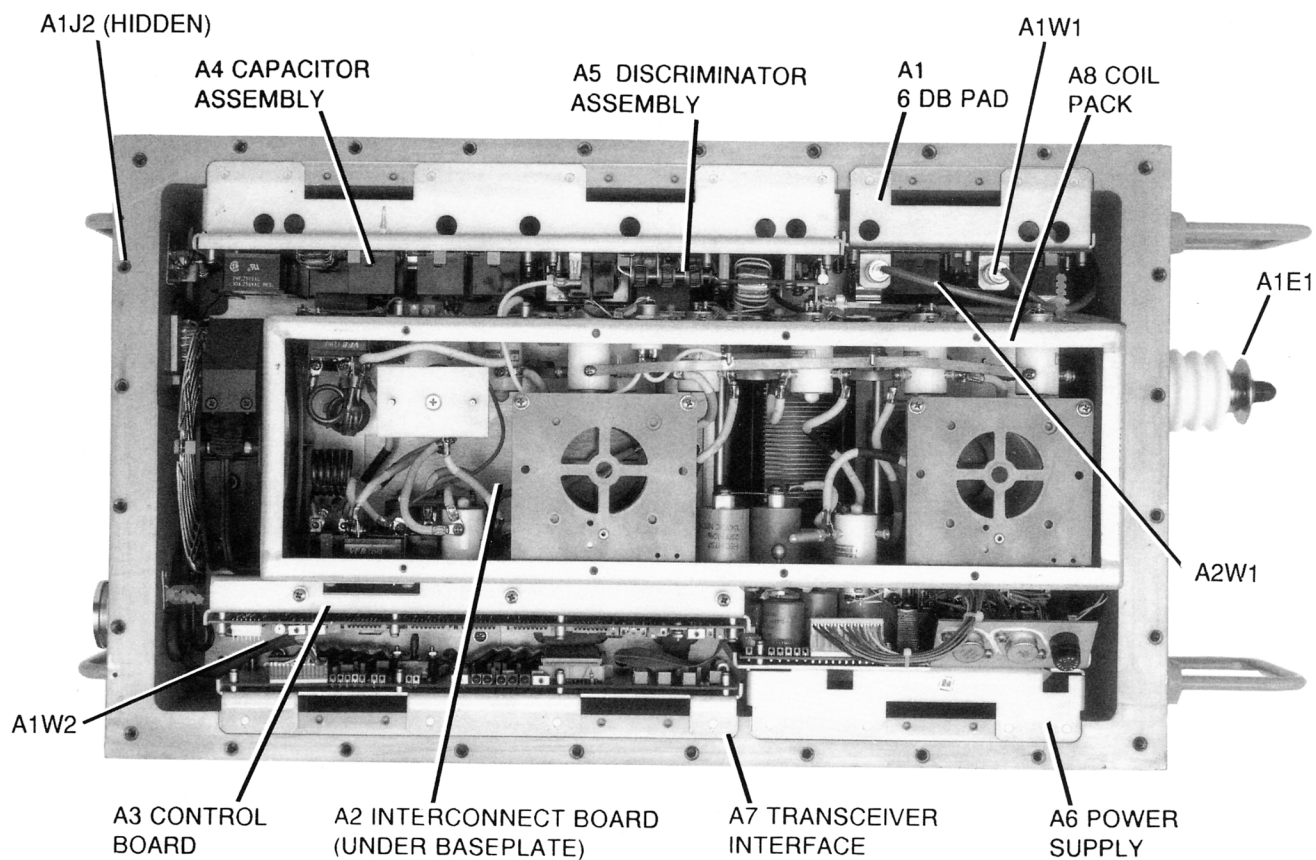
Ref. Desig.	Part Number	Description
—	10257-1116	COVER,SHOCK
—	10257-1117	GASKET,COVER
—	8949-1100	COVER
—	10257-1119	FASTENER STRIP, COVER
A1	10257-1100	CASE ASSEMBLY
A2	10257-1200	BASE PLATE ASSY

Table 2. Case Assembly A1 Parts List (10257-1100 Rev. C)

Ref. Desig.	Part Number	Description
—	10257-1115	CASE, COUPLER
—	902-1954	GAUGE, PRESSURE
E1	10257-1103	INSULATOR ASSY
J2	UG-680A/U	CONN N PANEL SEAL F
W1	10257-1107	CABLE ASSY,COAXIAL,INPUT
W2	10257-1108	CABLE ASSY,CONTROL,INPUT

Table 3. Base Plate A2 Parts List (10257-1200 Rev. C)

Ref. Desig.	Part Number	Description
A1	10257-2500	6 DB PAD ASSY
A2	10257-1700	INTERCONNECT PWBA
A2C1	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2C2	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2C3	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2C6	M39014/02-1298V	CAP .01UF 10% 200V CER-R
A2J3	J46-0058-080	CONN STR HEADER 80-POS
A2J8	J46-0022-020	HDR 20 PIN 0.100" SR LKG
A2J9	J46-0022-014	HDR 14 PIN 0.100" SR LKG
A2P3	10257-1730	CABLE ASSY, 6DB PAD
A2P4, A2P5	10257-1720	CABLE ASSY, INT/CAP/DISC
A2P6	10257-1725	CABLE ASSY, P.S.
A2P7	10257-1720	CABLE ASSY, INT/CAP/DISC
A3	10257-1300	CONTROL PWBA
A4	10257-2000	CAPACITOR ASSY
A5	10257-1500	DISCRIMINATOR PWBA
A6	10257-3000	POWER SUPPLY ASSY
A7	10257-3100	PA & XCVR INT PWBA
A8	10257-5200	COIL PACK
W1	10257-2520	W1 COAX CABLE, 6 DB/DIS



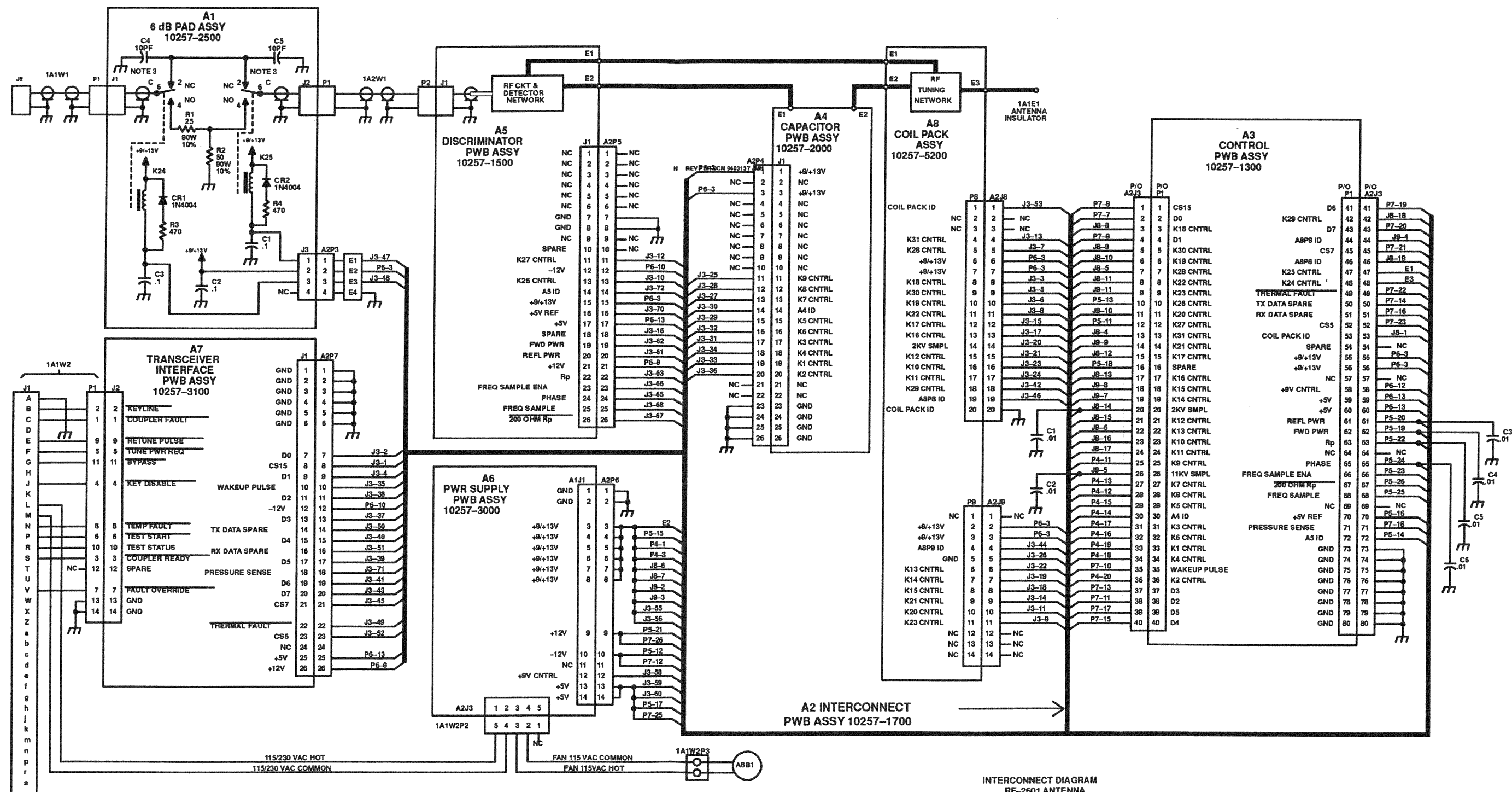
2601-013P

Figure 1. Antenna Coupler RF-2601 Module Locations

NOTES:

1. PRERX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
2. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, $\pm 5\%$.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.

3. EARLIER PRODUCTION RUNS DID NOT INCORPORATE A1C4 AND A1C5.
3. EARLIER PRODUCTION RUNS DID NOT INCORPORATE "COIL PACK ID" AND "K31 CNTRL" LINES.





A1 6dB PAD ASSY



A1

6-DB PAD ASSEMBLY

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A1 6-dB PAD ASSEMBLY**1. GENERAL INFORMATION**

This section contains parts list (table 1), component locations (figure 1), and schematic diagram (figure 2) for the A1 6-dB Pad Assembly.

Table 1. A1 6-dB Pad Parts List (10257-2500 Rev. G)

Ref. Desig.	Part Number	Description
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	C11-0035-100	CAP 10PF 5% 6KV CER
C5	C11-0035-100	CAP 10PF 5% 6KV CER
CR1	1N4004	DIODE 1A 400V RECT GP
CR2	1N4004	DIODE 1A 400V RECT GP
J1	M39012/21-0001	CONN BNC PANEL RECPT
J2	M39012/21-0001	CONN BNC PANEL RECPT
J3	J46-0022-004	HDR 4 PIN 0.100" SR LKG
K24	10208-1404	RELAY SPDT 12VDC MODIFIED
K25	10208-1404	RELAY SPDT 12VDC MODIFIED
R1	R90-0003-007	RES NON-IND 25 OHM 60 W
R2	R90-0003-008	RESISTOR, 50 OHM
R3	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R4	RCR07G471JM	RES 470 5% 1/4W CAR COMP



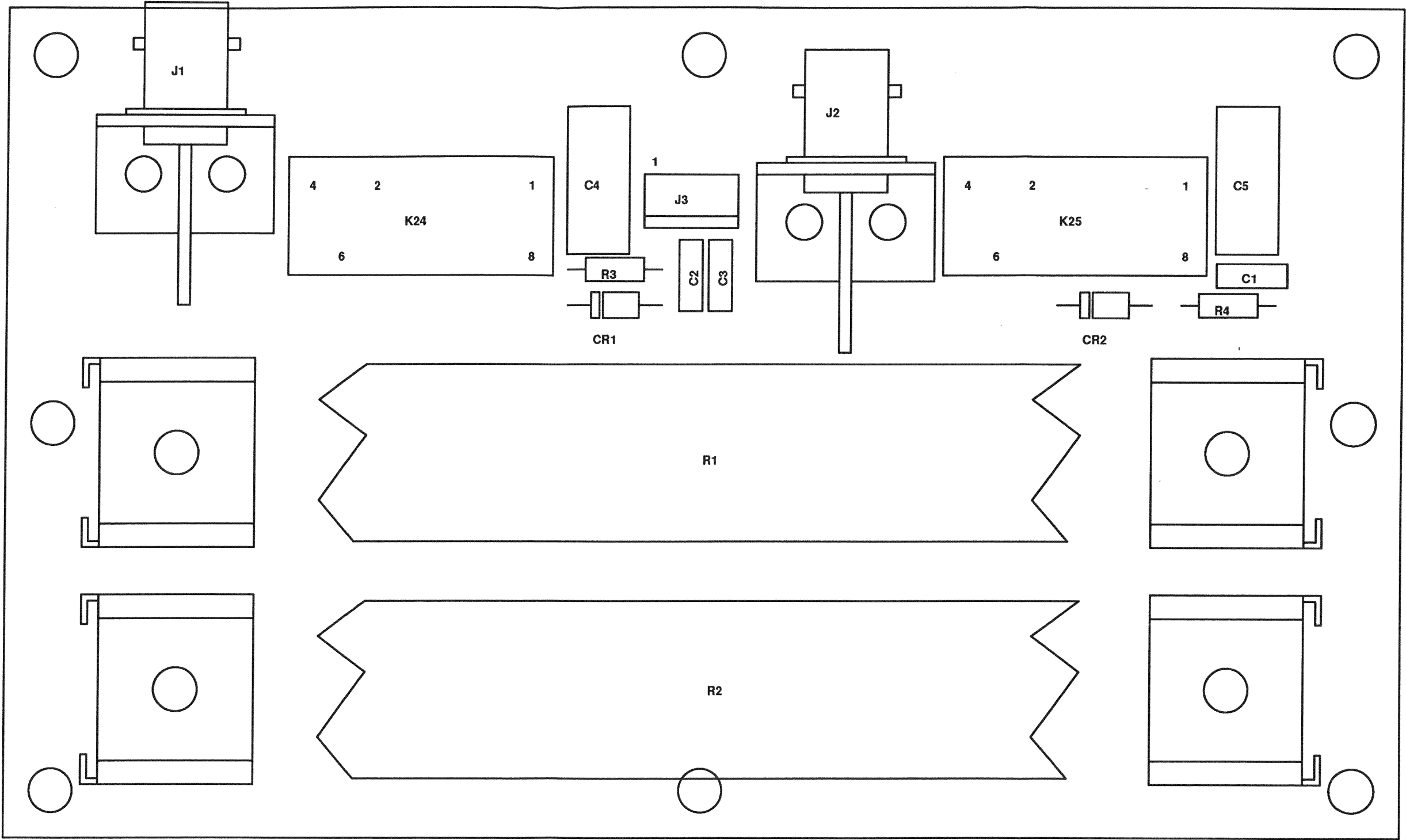


Figure 1. A1 6-dB Pad Component Locations (10257-2500 Rev. C)



5/6



A2 INTERCONNECT
BOARD ASSY



A2

INTERCONNECT BOARD ASSEMBLY

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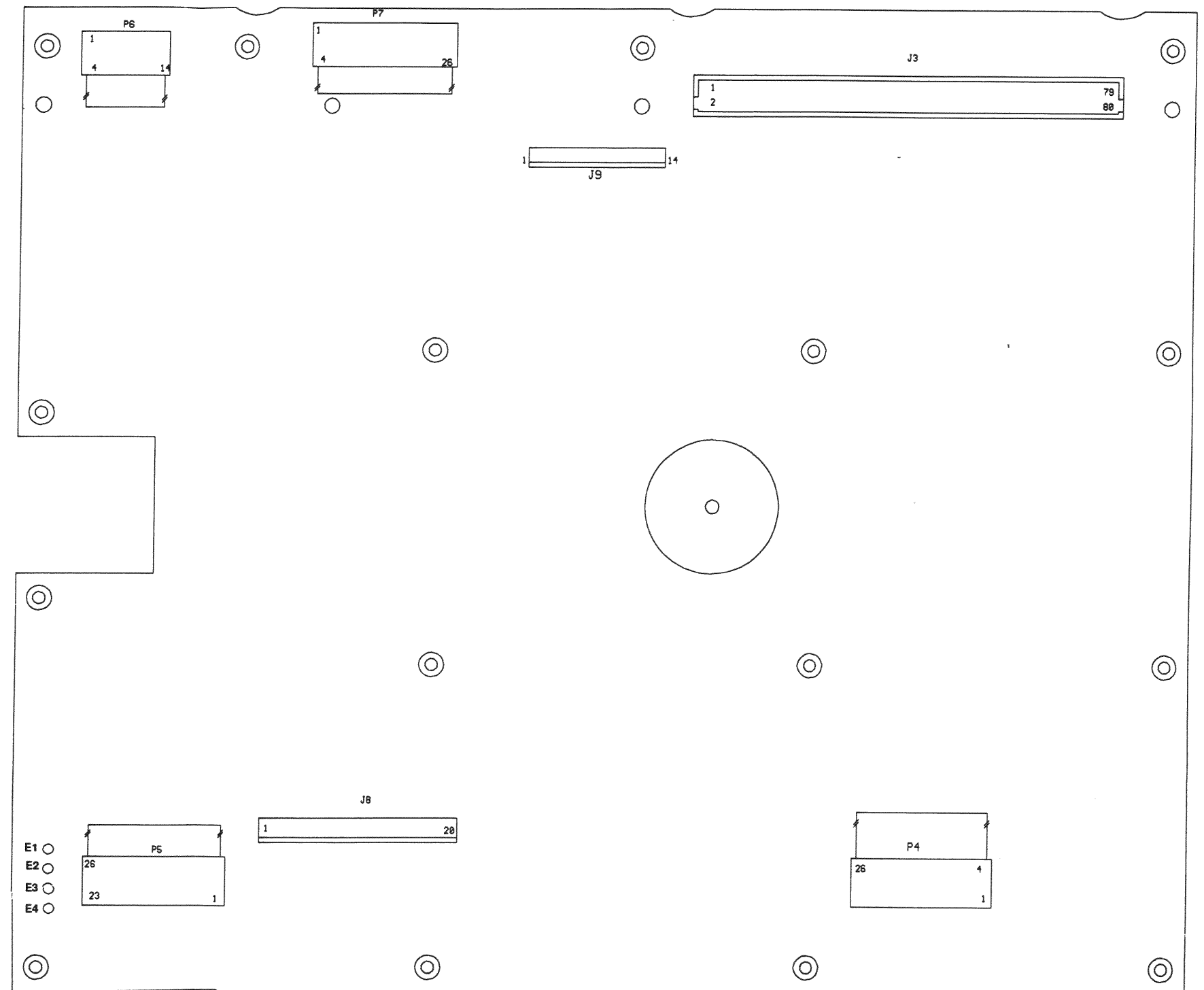
A2 INTERCONNECT BOARD ASSEMBLY**1. GENERAL INFORMATION**

This section contains a parts list (table 1) and component locations diagram (figure 1) for the A2 Interconnect Board Assembly.

Table 1. A2 Interconnect Board Assembly Parts List (10257-1700 Rev. A)

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
J3	J46-0058-080	CONN STR HEADER 80-POS
J8	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J9	J46-0022-014	HDR 14 PIN 0.100" SR LKG
P3	10257-1730	CABLE ASSY, 6DB PAD
P4	10257-1720	CABLE ASSY,INT/CAP/DISC
P5	10257-1720	CABLE ASSY,INT/CAP/DISC
P6	10257-1725	CABLE ASSY, P.S.
P7	10257-1720	CABLE ASSY,INT/CAP/DISC





**Figure 1. A2 Interconnect Board
Component Locations
(10257-1700 Rev. -)**

A3 CONTROL BOARD
ASSY



A3

CONTROL BOARD ASSEMBLY

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A3 CONTROL BOARD ASSEMBLY**1. GENERAL INFORMATION**

This section contains a parts list (table 1), component locations (figure 1), and schematic diagram (figure 2) for the A3 Control Board Assembly.

Table 1. A3 Control Board Parts List (10257-1300 Rev. K)

Ref. Desig.	Part Number	Description
C1	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C2	CM05ED390J03	CAP 39PF 5% 500V MICA
C3	CM05ED390J03	CAP 39PF 5% 500V MICA
C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C5	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C6	M39003/01-2268	CAP 3.3UF 10% 15V TANT-M
C7	M39003/01-2274	CAP 68UF 10% 15V TANT-M
C8	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C9	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C10	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C11	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C12	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C13	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C14	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C15	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C16	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C17	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C20	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C21	M39014/02-1310V	CAP .1UF 10% 100V 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
C25	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C26	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C27	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C28	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C29	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
C30	M39003/01-2356	CAP 1UF 10% 50V TANT-M
C31	M39014/02-1298V	CAP .01UF 10% 200V 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
C35	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C36	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C37	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C38	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C39	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C40	M39003/01-2268	CAP 3.3UF 10% 15V TANT-M
C41	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C42	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C43	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C44	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C45	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C46	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C47	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C48	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C49	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C50	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C51	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C52	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C53	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C54	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C55	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C56	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C57	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C58	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C59	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C60	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C61	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C62	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C63	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C64	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C65	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C66	M39014/02-1298V	CAP .01UF 10% 200V CER-R

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
C67	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C68	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C69	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C70	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C71	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C72	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C73	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C74	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C75	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C76	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C77	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C78	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C79	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C80	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C81	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C82	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C83	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C84	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C85	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C86	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C87	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C88	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C89	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C90	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C91	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C92	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C93	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C94	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C95	M39014/01-1317V	CAP,1000PF,10% 200VC
C96	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C97	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C98	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C99	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C100	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR1	1N4454	DIODE 200MA 75V SW
CR2	1N5711	DIODE SCHOTTKY 70V .25W
CR3	1N4454	DIODE 200MA 75V SW
CR4	1N5711	DIODE SCHOTTKY 70V .25W
CR5	1N5711	DIODE SCHOTTKY 70V .25W

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
CR6	1N4454	DIODE 200MA 75V SW
CR7	1N4454	DIODE 200MA 75V SW
CR8	1N4454	DIODE 200MA 75V SW
CR9	1N4454	DIODE 200MA 75V SW
CR10	1N4454	DIODE 200MA 75V SW
CR11	1N4454	DIODE 200MA 75V SW
CR12	1N4454	DIODE 200MA 75V SW
CR13	1N4454	DIODE 200MA 75V SW
CR14	1N4454	DIODE 200MA 75V SW
CR15	1N4454	DIODE 200MA 75V SW
CR17	1N5711	DIODE SCHOTTKY 70V .25W
CR18	1N5711	DIODE SCHOTTKY 70V .25W
CR20	1N4454	DIODE 200MA 75V SW
DS1	N25-0005-208	ARRAY LED RED 8 ELEMENTS
DS2	N25-0005-208	ARRAY LED RED 8 ELEMENTS
DS3	N25-0005-208	ARRAY LED RED 8 ELEMENTS
DS4	N25-0005-208	ARRAY LED RED 8 ELEMENTS
DS5	N25-0005-208	ARRAY LED RED 8 ELEMENTS
JMP1	MP-1142	RES ZERO OHM (CKT JMPR)
JMP2	MP-1142	RES ZERO OHM (CKT JMPR)
JMP3	MP-1142	RES ZERO OHM (CKT JMPR)
JMP4	MP-1142	RES ZERO OHM (CKT JMPR)
JMP5	MP-1142	RES ZERO OHM (CKT JMPR)
JMP6	MP-1142	RES ZERO OHM (CKT JMPR)
JMP7	MP-1142	RES ZERO OHM (CKT JMPR)
JMP8	MP-1142	RES ZERO OHM (CKT JMPR)
JMP9	J46-0047-002	HDR 2 POSITION
JMP10	MP-1142	RES ZERO OHM (CKT JMPR)
JMP11	MP-1142	RES ZERO OHM (CKT JMPR)
L1	MS75085-3	COIL 47UH 10% FXD RF
L2	MS75085-3	COIL 47UH 10% FXD RF
L3	MS75085-3	COIL 47UH 10% FXD RF
L4	MS75085-3	COIL 47UH 10% FXD RF
L5	MS75085-3	COIL 47UH 10% FXD RF
L6	MS75085-3	COIL 47UH 10% FXD RF
L7	MS75085-3	COIL 47UH 10% FXD RF
L8	MS75085-3	COIL 47UH 10% FXD RF
L9	MS75085-3	COIL 47UH 10% FXD RF
L10	MS75085-3	COIL 47UH 10% FXD RF

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
L11	MS75085-3	COIL 47UH 10% FXD RF
L12	MS75085-3	COIL 47UH 10% FXD RF
L13	MS75085-3	COIL 47UH 10% FXD RF
L14	MS75085-3	COIL 47UH 10% FXD RF
L15	MS75085-3	COIL 47UH 10% FXD RF
L16	MS75085-3	COIL 47UH 10% FXD RF
L17	MS75085-3	COIL 47UH 10% FXD RF
L18	MS75085-3	COIL 47UH 10% FXD RF
L19	MS75085-3	COIL 47UH 10% FXD RF
L20	MS75085-3	COIL 47UH 10% FXD RF
L21	MS75085-3	COIL 47UH 10% FXD RF
L22	MS75085-3	COIL 47UH 10% FXD RF
L23	MS75085-3	COIL 47UH 10% FXD RF
L24	MS75085-3	COIL 47UH 10% FXD RF
L25	MS75085-3	COIL 47UH 10% FXD RF
L26	MS75085-3	COIL 47UH 10% FXD RF
L27	MS75085-3	COIL 47UH 10% FXD RF
L28	MS75085-3	COIL 47UH 10% FXD RF
L29	MS75085-3	COIL 47UH 10% FXD RF
L30	MS75085-3	COIL 47UH 10% FXD RF
L31	MS75085-3	COIL 47UH 10% FXD RF
L32	MS75085-3	COIL 47UH 10% FXD RF
L33	MS75085-3	COIL 47UH 10% FXD RF
L34	MS75085-3	COIL 47UH 10% FXD RF
L35	MS75085-3	COIL 47UH 10% FXD RF
L36	MS75085-3	COIL 47UH 10% FXD RF
L37	MS75085-3	COIL 47UH 10% FXD RF
L38	MS75084-2	COIL 1.5UH 10% FXD RF
P1	10181-2511-80	CONN RECEPTACLE 80
Q1	JAN2N2907A	XSTR SS/GP PNP TO-18
Q2	JAN2N2222A	XSTR SS/GP NPN TO-18
Q3	JAN2N2907A	XSTR SS/GP PNP TO-18
R1	R65-0003-224	RES 220K 5% 1/4W CAR FILM
R2	R65-0003-105	RES 1.0M 5% 1/4W CAR FILM
R3	R65-0003-682	RES 6.8K 5% 1/4W CAR FILM
R4	R65-0003-224	RES 220K 5% 1/4W CAR FILM
R5	R65-0003-225	RES 2.2M 5% 1/4W CAR FILM
R6	R65-0003-563	RES 56K 5% 1/4W CAR FILM
R7	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
R8	R50-0010-103	RES 10K 2% 10SIP 9RES
R9	R50-0006-103	RES 10K 2% 6SIP 5RES
R10	R50-0010-103	RES 10K 2% 10SIP 9RES
R11	R50-0010-103	RES 10K 2% 10SIP 9RES
R12	R50-0010-103	RES 10K 2% 10SIP 9RES
R13	R50-0010-103	RES 10K 2% 10SIP 9RES
R14	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R15	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R16	R65-0003-393	RES 39K 5% 1/4W CAR FILM
R17	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R18	R65-0003-681	RES 680 5% 1/4W CAR FILM
R20	R65-0003-392	RES 3.9K 5% 1/4W CAR FILM
R21	R50-0006-122	RES 1.2K 2% 6SIP 5RES
R22	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R23	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R24	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R25	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R26	RN55D3010F	RES 301 1% 1/8W MET FLM
R27	R30-0001-101	REW VAR 10 3/4W 20%
R28	RN55D8450F	RES 845 1% 1/8W MET FLM
R29	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R30	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R31	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R32	R15-0006-101	RES 100 2% 3W FILM
R33	R15-0006-101	RES 100 2% 3W FILM
R34	R30-0001-103	RES VAR 10K 3/4W 20%
R35	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R36	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R37	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R38	R65-0003-681	RES 680 5% 1/4W CAR FILM
R39	R50-0010-122	RES 1.2K 2% 10SIP 9RES
R40	R50-0010-122	RES 1.2K 2% 10SIP 9RES
R41	R50-0010-122	RES 1.2K 2% 10SIP 9RES
R42	R50-0010-122	RES 1.2K 2% 10SIP 9RES
R43	R50-0006-122	RES 1.2K 2% 6SIP 5RES
R44	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R45	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R46	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R47	R65-0003-103	RES 10K 5% 1/4W CAR FILM

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
R48	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R49	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R50	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R51	R50-0006-331	RES 330 2% 6SIP 5RES
R52	R65-0003-331	RES 330 5% 1/4W CAR FILM
R53	R65-0003-331	RES 330 5% 1/4W CAR FILM
R54	R50-0006-103	RES 10K 2% 6SIP 5RES
R55	R50-0006-103	RES 10K 2% 6SIP 5RES
S1	S10-0010-911	SW PC MNT SPST N.O. PUSH
S2	S10-0010-911	SW PC MNT SPST N.O. PUSH
S3	S10-0010-912	SW PC MNT SPDT PUSH
S4	S50-0001-002	SW SPST 2SEC .1A SLD DIP
TP1	J60-0001-008	TP PWB BRN RA S&T ACCESS
TP2	J60-0001-002	TP PWB RED RA S&T ACCESS
TP3	J60-0001-006	TP PWB ORN RA S&T ACCESS
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	I15-0000-000	IC 74HC00 PLASTIC CMOS
U2	I15-0000-393	IC 74HC393 PLASTIC CMOS
U3	I15-0000-402	IC 74HC4020 PLASTIC CMOS
U4	I01-0000-353	IC 4538B PLASTIC CMOS
U5	10257-8300	FIRMWARE KIT, OSC/FLT
U6	I15-0000-074	IC 74HC74 PLASTIC CMOS
U7	I15-0000-074	IC 74HC74 PLASTIC CMOS
U8	I27-0017-311	IC MICMPTR 8-BIT 80C31
U9	I15-0000-373	IC 74HC373 PLASTIC CMOS
U10	I15-0000-138	IC 74HC138 PLASTIC CMOS
U11	10257-8200	FIRMWARE KIT, ADD. SEL
U12	10257-8100	FIRMWARE KIT, EPROM
U13	I15-0000-245	IC 74HC245 PLASTIC CMOS
U14	I26-0017-002	IC 8KX8 SRAM 6264
U15	I25-0003-001	IC 2KX8 EEPROM 2816
U16	I15-0000-393	IC 74HC393 PLASTIC CMOS
U17	I15-0000-393	IC 74HC393 PLASTIC CMOS
U18	I15-0000-373	IC 74HC373 PLASTIC CMOS
U19	I15-0000-373	IC 74HC373 PLASTIC CMOS
U20	I15-0000-373	IC 74HC373 PLASTIC CMOS
U21	I15-0000-374	IC 74HC374 PLASTIC CMOS

Table 1. A3 Control Board Parts List (10257-1300 Rev. K) (Cont.)

Ref. Desig.	Part Number	Description
U22	I40-0010-001	IC ADC0817 PLASTIC CMOS
U23	IC-0358	IC VR 317 ADJ V 1.5A
U24	I23-0001-001	IC LM135H TEMP SEN TO-46
U25	I23-0001-001	IC LM135H TEMP SEN TO-46
U26	I15-0000-374	IC 74HC374 PLASTIC CMOS
U27	I15-0000-374	IC 74HC374 PLASTIC CMOS
U28	I15-0000-374	IC 74HC374 PLASTIC CMOS
U29	I15-0000-374	IC 74HC374 PLASTIC CMOS
U30	I15-0000-374	IC 74HC374 PLASTIC CMOS
U31	I90-0006-004	IC XSTR ARRAY DARL 2003
U32	I90-0006-004	IC XSTR ARRAY DARL 2003
U33	I90-0006-004	IC XSTR ARRAY DARL 2003
U34	I90-0006-004	IC XSTR ARRAY DARL 2003
U35	I90-0006-004	IC XSTR ARRAY DARL 2003
U36	I30-0020-004	IC OP AMP DUAL 2904
VR1	1N5339A	DIODE,ZENER, 5.6V 5W
XU8	J77-0008-007	SKT IC MACH 40 PIN
XU12	J77-0008-006	SKT IC MACH 28 PIN
XU15	J77-0008-006	SKT IC MACH 28 PIN
Y1	Y15-0004-042	XTAL 4.9152 MHZ

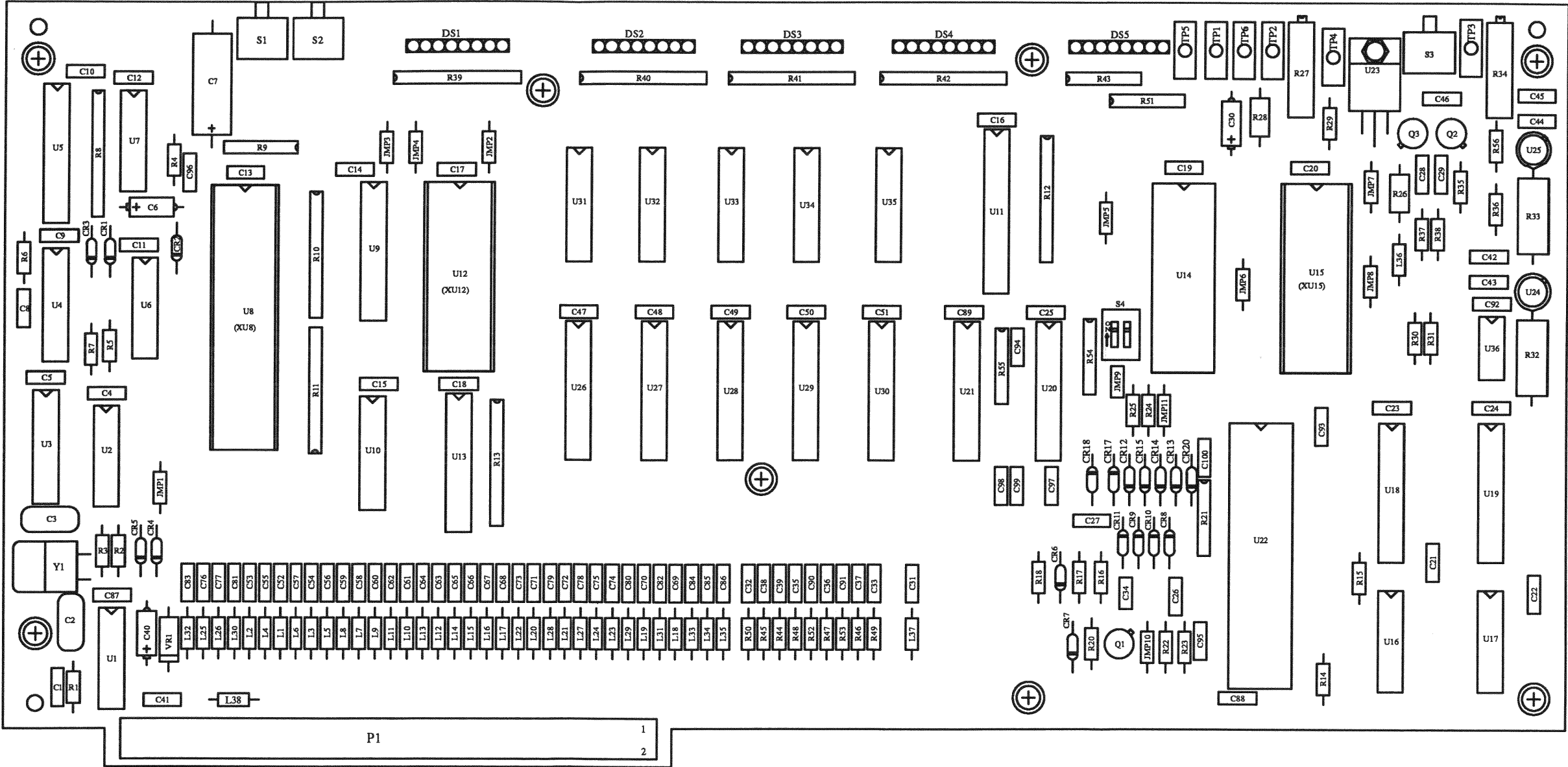
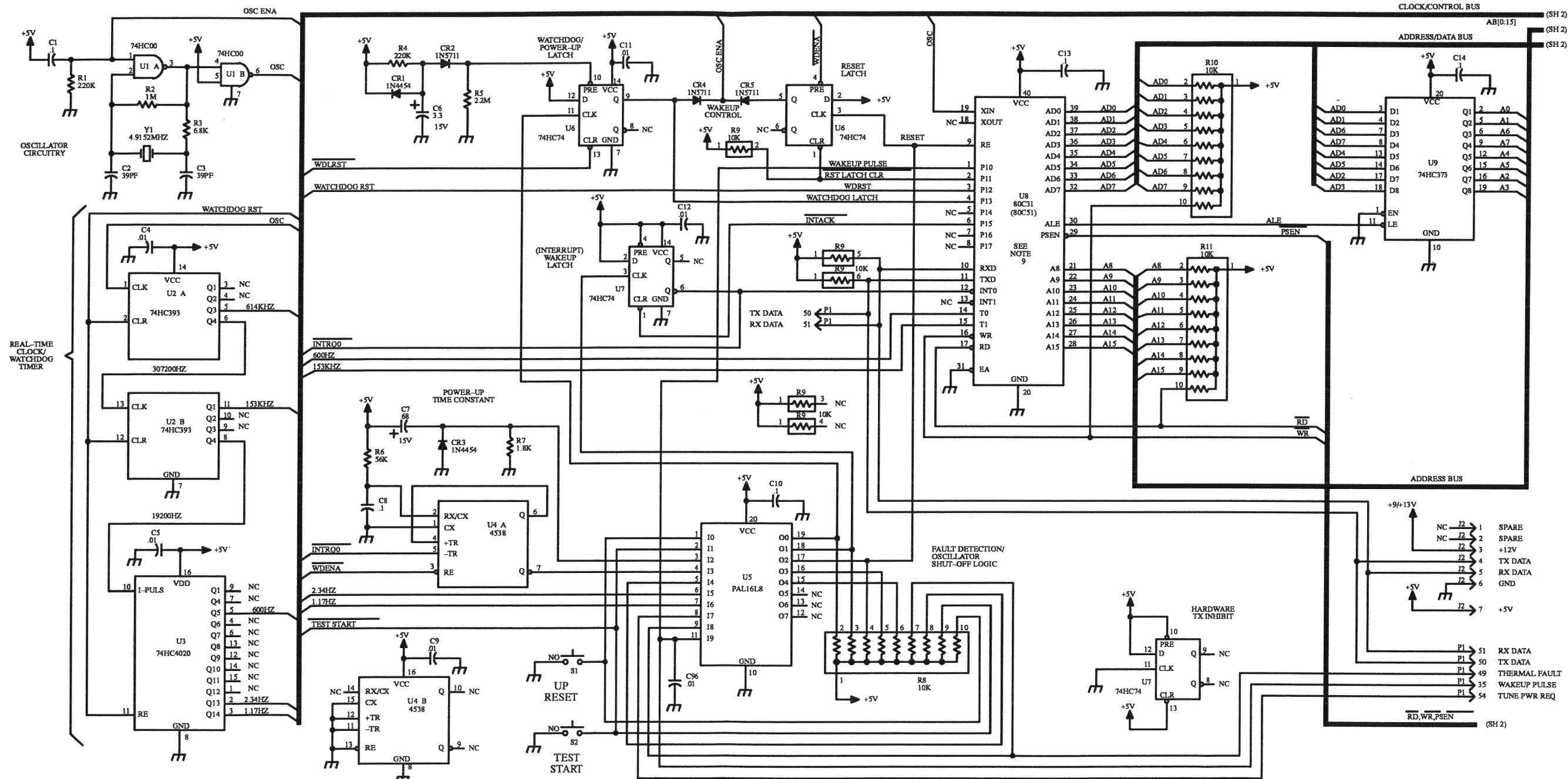


Figure 1. A3 Control Board
Component Locations
(10257-1300 Rev. D)

NOTES:

1. PREFIX INCOMPLETE REFERENCE DESIGNATORS WITH 1A2.
2. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, $\pm 5\%$.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
C. ALL COILS ARE IN MICROHENRIES.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY.
COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.
4. R56 CAN BE INSTALLED DURING COUPLER TEST TO KEEP RELAY CHECK LAMPS ON CONTINUOUSLY. IT IS NOT TO BE USED FOR NORMAL COUPLER OPERATION.
5. SEE PARAGRAPH ENTITLED "CIRCUIT DESCRIPTION" FOR PIN-OUT CONNECTIONS TO IC BEING USED.
6. THE VALUES FOR L1-L35 ARE 47 μ H (SHEETS 4 AND 5).
7. SEE NOTES ON SHEET 2.
8. EARLY PRODUCTION RUNS DID NOT INCORPORATE THIS CIRCUIT.
9. IC 80C51 TO BE USED ON 10257-1300-01 PARTS LIST.



HIGHEST REFERENCE DESIGNATION				
C96	CR20	DS5	J2	JMP9
L38	P1	O3	R56	S4
TP6	U36	VR1	Y1	
REF. DESIGNATIONS NOT USED				
J1	R19			

Figure 2. A3 Control Board Schematic Diagram (10257-1301 Rev. D) (Sheet 1 of 5)

-
- The schematic diagram illustrates the internal architecture of the 68000-based system. It features a central 68000 microprocessor (U1) connected to a 68000 cache (U10) and a 68000 cache controller (U11). The system includes several peripheral chips: 74HC245 (U12, U13, U14) for data bus buffering, 74HC393 (U16, U17, U18) for frequency counting, and 74HC373 (U19, U20) for data latching. The diagram shows the connection of address, data, and clock buses, as well as various control signals like RD, WR, PSEN, and CS. It also includes power supply connections and various test points and jumpers.

JUMPER POSITION: 1 = POSITION AS SHOWN ON SCHEMATIC
2 = OPPOSITE THAT SHOWN ON SCHEMATIC
BLANK = DON'T CARE

CHIP REFFS AND FUNCTION	MEMORY CONFIG	MEM SIZE	J M P 2	J M P 3	J M P 4	J M P 5	J M P 6	J M P 7	J M P 8	# OF CHIP PINS	NOTES:
											ALIGN CHIP SO THAT PINS MATCH:
U12 EPROM	STANDARD: OPTIONAL:	32K 64K	1 1	1 2	1 2					28	CHIP SIZE MATCHES SOCKET SIZE CHIP SIZE MATCHES SOCKET SIZE
U14 SCRATCH- PAD RAM	STANDARD: OPTIONAL: OPTIONAL:	8K 2K 32K				1 1 2	1 2 1			28	CHIP SIZE MATCHES SOCKET SIZE CHIP PINS #1,24 GO TO SOCKET PINS #1,26 RESP CHIP SIZE MATCHES SOCKET SIZE
U15 EPROM ORGANIZ. CONFIG MEM	STANDARD: OPTIONAL: OPTIONAL:	2K 4K 32K						1 1 2	2 1 2	28	CHIP PINS #1,24 GO TO SOCKET PINS #1,26 RESP CHIP SIZE MATCHES SOCKET SIZE CHIP SIZE MATCHES SOCKET SIZE

13/14

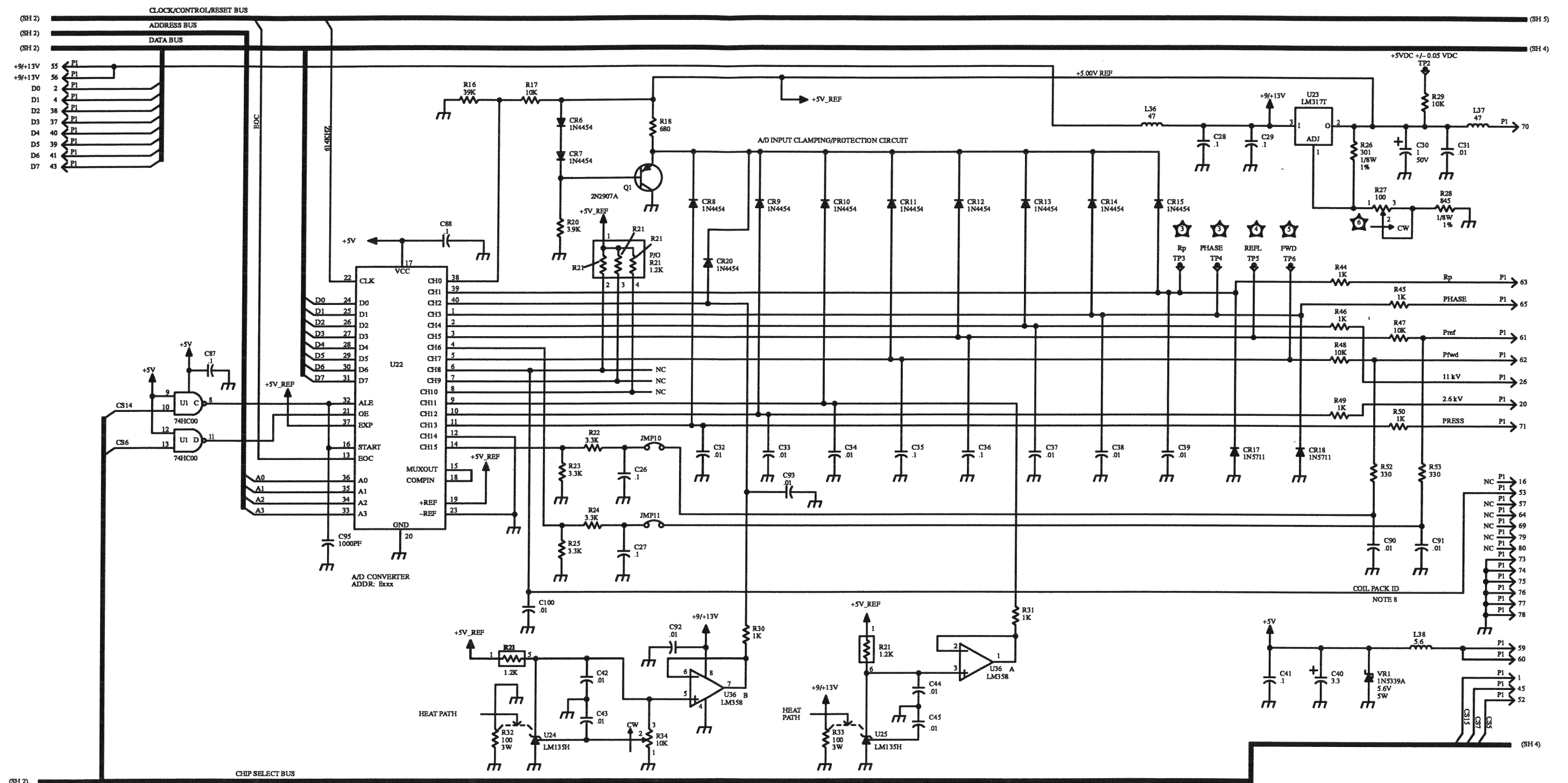


Figure 2. A3 Control Board Schematic Diagram (10257-1301 Rev. D) (Sheet 3 of 5)

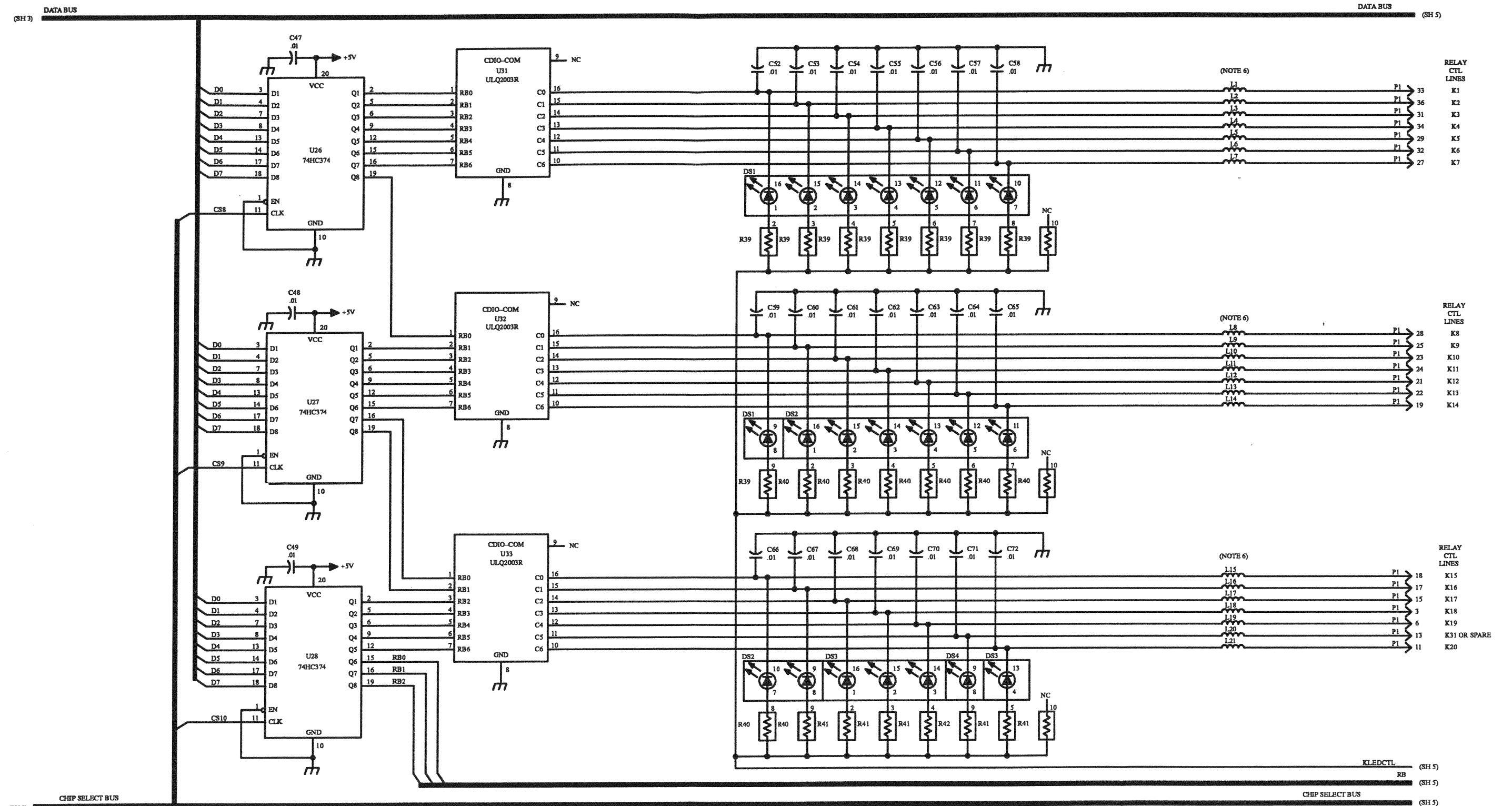
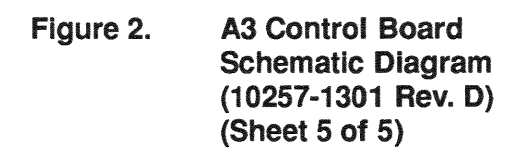


Figure 2. A3 Control Board Schematic Diagram (10257-1301 Rev. D) (Sheet 4 of 5)



A4

CAPACITOR ASSEMBLY

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A4 CAPACITOR ASSEMBLY

1. GENERAL INFORMATION

This section contains a parts list (table 1), component locations (figure 1), and schematic diagram (figure 2) for the A4 Capacitor Assembly.

Table 1. A4 Capacitor Assembly Parts List (10257-2000 Rev. D)

Ref. Desig.	Part Number	Description
C1	C11-0035-100	CAP 10PF 5% 6KV CER
C2	C11-0035-100	CAP 10PF 5% 6KV CER
C3	C11-0035-100	CAP 10PF 5% 6KV CER
C4	C11-0035-330	CAP 33PF 5% 1KV CER
C5	C11-0004-037	CAP 75PF 5% 3.6KV PORC
C6	C11-0004-037	CAP 75PF 5% 3.6KV PORC
C7	C11-0004-037	CAP 75PF 5% 3.6KV PORC
C8	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C9	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C10	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C11	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C12	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C13	C11-0004-032	CAP 160PF 5% 3.6KV PORC
C14	C11-0004-022	CAP 330PF 5% 3.6KV PORC
C15	C11-0004-022	CAP 330PF 5% 3.6KV PORC
C16	C11-0004-022	CAP 330PF 5% 3.6KV PORC
C17	C11-0004-022	CAP 330PF 5% 3.6KV PORC
C18	C11-0004-034	CAP 620PF 5% 2.5KV PORC
C19	C11-0004-034	CAP 620PF 5% 2.5KV PORC
C20	C11-0004-034	CAP 620PF 5% 2.5KV PORC
C21	C11-0004-034	CAP 620PF 5% 2.5KV PORC
C25	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C28	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C31	M39014/02-1298V	CAP .01UF 10% 200V 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
C35	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C36	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C37	M39014/02-1298V	CAP .01UF 10% 200V CER-R

Table 1. A4 Capacitor Assembly Parts List (10257-2000 Rev. D) (Cont.)

Ref. Desig.	Part Number	Description
C38	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	1N4004	DIODE 1A 400V RECT GP
CR8	1N4004	DIODE 1A 400V RECT GP
CR9	1N4004	DIODE 1A 400V RECT GP
E1	H32-0007-406	STANDOFF
E2	E10-0009-000	TAB PCBMNT FAST-ON 1/4
J1	J46-0052-026	HEADER,EJECTOR,26 PIN
K1	10208-1404	RELAY SPDT 12VDC MODIFIED
K2	10208-1404	RELAY SPDT 12VDC MODIFIED
K3	10208-1404	RELAY SPDT 12VDC MODIFIED
K4	10257-2020	RELAY,SPST,12VDC,MOD.
K5	10257-2020	RELAY,SPST,12VDC,MOD.
K6	10257-2020	RELAY,SPST,12VDC,MOD.
K7	10257-2020	RELAY,SPST,12VDC,MOD.
K8	10257-2020	RELAY,SPST,12VDC,MOD.
K9	10257-2020	RELAY,SPST,12VDC,MOD.
R1	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R2	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R3	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R4	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R5	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R6	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R7	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R8	RCR07G471JM	RES 470 5% 1/4W CAR COMP
R9	RCR07G471JM	RES 470 5% 1/4W CAR COMP

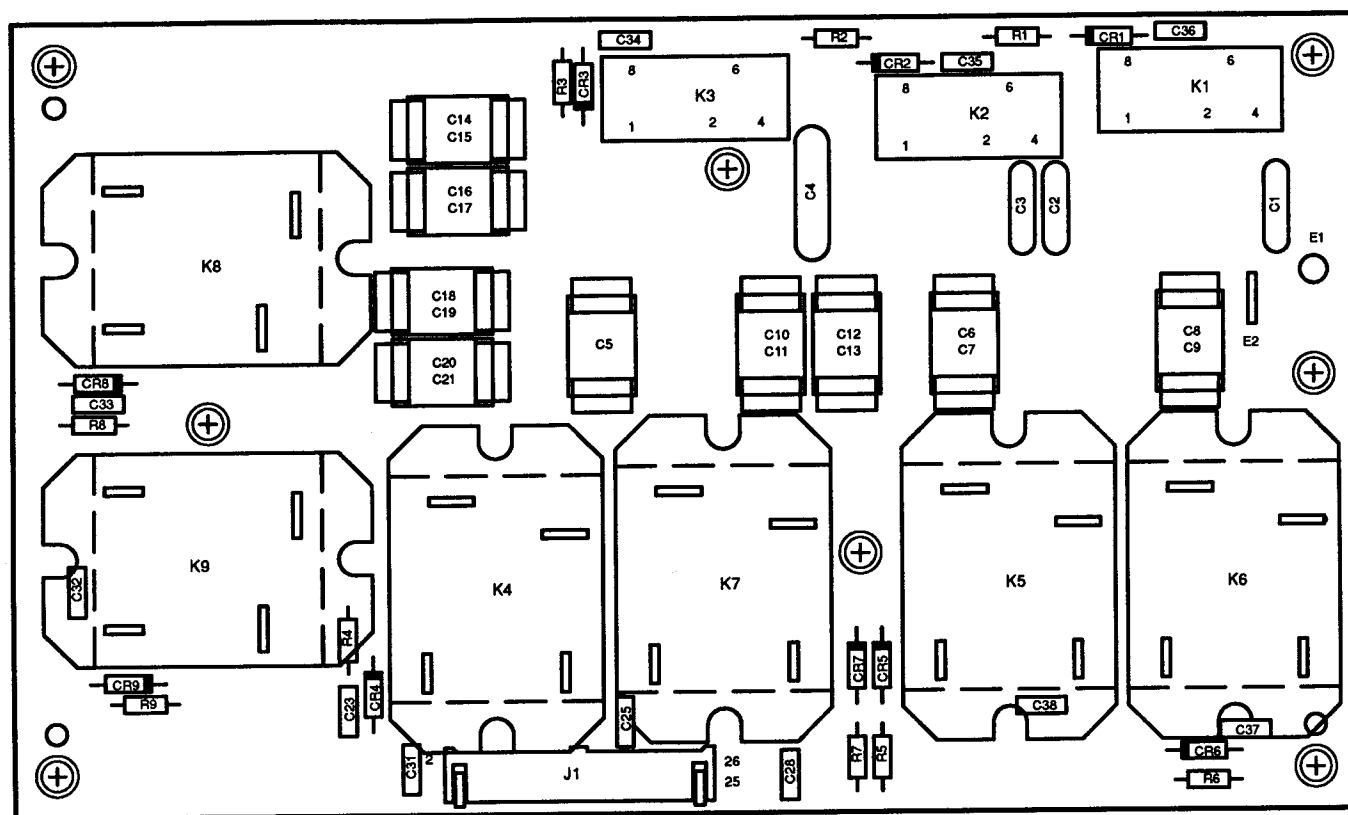


Figure 1. A4 Capacitor Assembly Component Locations Diagram (10257-2000 Rev. B)

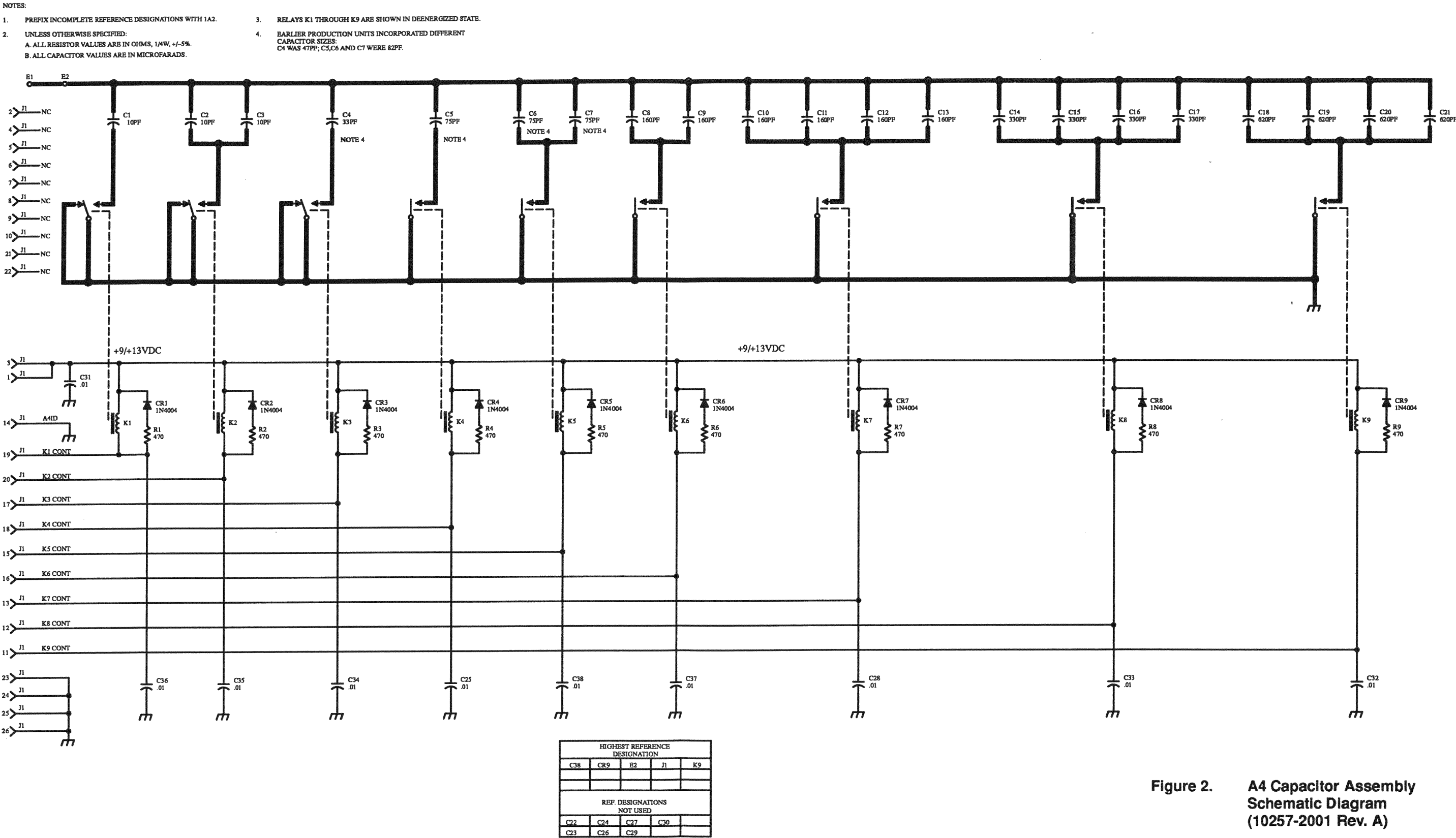


Figure 2. A4 Capacitor Assembly
Schematic Diagram
(10257-2001 Rev. A)



A5 DISCRIMINATOR
ASSY





A5

DISCRIMINATOR ASSEMBLY

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A5 DISCRIMINATOR ASSEMBLY

1. GENERAL INFORMATION

This section contains parts lists (tables 1 and 2), component locations (figures 1 and 2), and a schematic diagram (figure 3) for the A5 Discriminator Assembly.

Table 1. A5 Discriminator Assembly Parts List (10257-1500 Rev. H)

Ref. Desig.	Part Number	Description
A1	10257-1520	DIRECTIONAL COUPLER ASSY
C1	M39014/01-1317V	CAP,1000PF,10% 200VC
C2	M39014/01-1317V	CAP,1000PF,10% 200VC
C3	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C4	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C5	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C6	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C7	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C8	C-6614	CAP 5.1PF 5% 1KV CER
C9	C-6614	CAP 5.1PF 5% 1KV CER
C10	CM06FD681J03	CAP 680PF 5% 500V MICA
C11	CM05ED820G03	CAP 82PF 2% 500V MICA
C12	CM05FD121G03	CAP 120PF 2% 500V MICA
C13	CM05FD121G03	CAP 120PF 2% 500V MICA
C14	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C15	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C16	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
C20	M39014/01-1308V	CAP 330PF 10% 200V CER-R
C21	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C22	M39014/01-1317V	CAP,1000PF,10% 200VC
C23	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C24	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C25	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C26	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C27	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C28	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C29	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C31	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C32	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C33	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C34	M39014/01-1308V	CAP 330PF 10% 200V CER-R

Table 1. A5 Discriminator Assembly Parts List (10257-1500 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
C35	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C36	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C38	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C39	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR1	JANTX1N5711	DIODE
CR2	JANTX1N5711	DIODE
CR3	JANTX1N5711	DIODE
CR4	D02-0003-001	DIODE 2.5A 150V RECT GP
CR5	D02-0003-001	DIODE 2.5A 150V RECT GP
CR6	JANTX1N5711	DIODE
CR7	JANTX1N5711	DIODE
CR8	1N3064	DIODE 75MA 75V SW
CR9	JANTX1N5711	DIODE
CR10	1N4004	DIODE 1A 400V RECT GP
CR11	1N4004	DIODE 1A 400V RECT GP
CR12	1N4004	DIODE 1A 400V RECT GP
E1	E10-0009-000	TAB PCBMNT FAST-ON 1/4
E2	H32-0007-406	STANDOFF
E3	E35-0002-001	TERM STDF INSUL .62 L
J1	J46-0052-026	HEADER,EJECTOR,26 PIN
J2	J-0031	CONN SMB VERT PCB F
J3	J-0031	CONN SMB VERT PCB F
J4	J-0031	CONN SMB VERT PCB F
JMP1	MP-1142	RES ZERO OHM (CKT JMPR)
JMP2	MP-1142	RES ZERO OHM (CKT JMPR)
K1	K10-0004-001	RLY DPDT 12VDC SEALED DIP
K26	10208-1404	RELAY SPDT 12VDC MODIFIED
K27	10208-1404	RELAY SPDT 12VDC MODIFIED
L1	MS90539-11	COIL 680UH 5% FXD RF
L2	MS90539-11	COIL 680UH 5% FXD RF
L3	MS18130-7	COIL .82UH 10% FXD RF
L4	L-0630	COIL 15UH 10% FXD RF
L5	MS75085-2	COIL 39UH 10% FXD RF
Q1	Q35-0003-000	XSTR N-CH JFET U310
Q2	JAN2N2857	XSTR, SS/RF
R1	RN55D1000F	RES 100 1% 1/8W MET FLM
R2	RN55D1000F	RES 100 1% 1/8W MET FLM

Table 1. A5 Discriminator Assembly Parts List (10257-1500 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
R3	RN55D3321F	RES 3320 1% 1/8W MET FLM
R4	RN55D1621F	RES 1620 1% 1/8W MET FLM
R5	R65-0003-221	RES 220 5% 1/4W CAR FILM
R6	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R7	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R8	RN55D1003F	RES 100K 1% 1/8W MET FLM
R9	RN55D1003F	RES 100K 1% 1/8W MET FLM
R10	R65-0003-104	RES 100K 5% 1/4W CAR FILM
R11	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R12	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R13	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R14	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R15	R65-0003-511	RES 510 5% 1/4W CAR FILM
R16	R30-0008-201	RES VAR PCB 200 1/2W 10%
R17	R30-0008-201	RES VAR PCB 200 1/2W 10%
R18	RN65D1000F	RES 100 1% 1/2W MET FLM
R19	RN55D6811F	RES 6810 1% 1/8W MET FLM
R20	RN65D1000F	RES 100 1% 1/2W MET FLM
R21	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R22	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R23	RN55D2491F	RES 2490 1% 1/8W MET FLM
R24	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R25	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R26	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R27	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R28	RN55D1000F	RES 100 1% 1/8W MET FLM
R29	RN55D1000F	RES 100 1% 1/8W MET FLM
R30	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R31	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R32	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R33	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R34	R65-0003-273	RES 27K 5% 1/4W CAR FILM
R36	R65-0003-334	RES 330K 5% 1/4W CAR FILM
R38	R65-0003-101	RES 100 5% 1/4W CAR FILM
R40	R65-0003-561	RES 560 5% 1/4W CAR FILM
R42	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R43	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM

Table 1. A5 Discriminator Assembly Parts List (10257-1500 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
R44	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R45	RN55D3011F	RES 3010 1% 1/8W MET FLM
R46	RN55D5111F	RES 5110 1% 1/8W MET FLM
T1	10257-1525	XFORMER ASSY 50/200 OHM
T2	10257-1530	TRANS. ASSY,DISCR
T3	1960-4013	TRANSFORMER RF
TP1	J65-0009-001	TP PWB UNINS .10W X .20H
TP2	J65-0009-001	TP PWB UNINS .10W X .20H
TP3	J65-0009-001	TP PWB UNINS .10W X .20H
TP4	J65-0009-001	TP PWB UNINS .10W X .20H
TP5	J65-0009-001	TP PWB UNINS .10W X .20H
TP6	J65-0009-001	TP PWB UNINS .10W X .20H
TP7	J65-0009-001	TP PWB UNINS .10W X .20H
TP8	J65-0009-001	TP PWB UNINS .10W X .20H
TP9	J65-0009-001	TP PWB UNINS .10W X .20H
TP10	J65-0009-001	TP PWB UNINS .10W X .20H
TP11	J65-0009-001	TP PWB UNINS .10W X .20H
TP12	J65-0009-001	TP PWB UNINS .10W X .20H
TP13	J65-0009-001	TP PWB UNINS .10W X .20H
TP14	J65-0009-001	TP PWB UNINS .10W X .20H
U1	I30-0020-004	IC OP AMP DUAL 2904
U2	I30-0020-004	IC OP AMP DUAL 2904
U3	I30-0020-004	IC OP AMP DUAL 2904
U4	I85-0000-074	IC 54F74 FAST TTL
VR1	D16-0002-600	ARRESTOR SURGE 600V
W1	10257-1535	CABLE,COAXIAL
W2	10257-1535	CABLE,COAXIAL
W3	10257-1535	CABLE,COAXIAL

Table 2. A5A1 Directional Coupler Assembly Parts List (10257-1520 Rev. -)

Ref. Desig.	Part Number	Description
J1	M39012/21-0001	CONN BNC PANEL RECPT
J12	J-0031	CONN SMB VERT PCB F
J13	J-0031	CONN SMB VERT PCB F
J14	J-0031	CONN SMB VERT PCB F

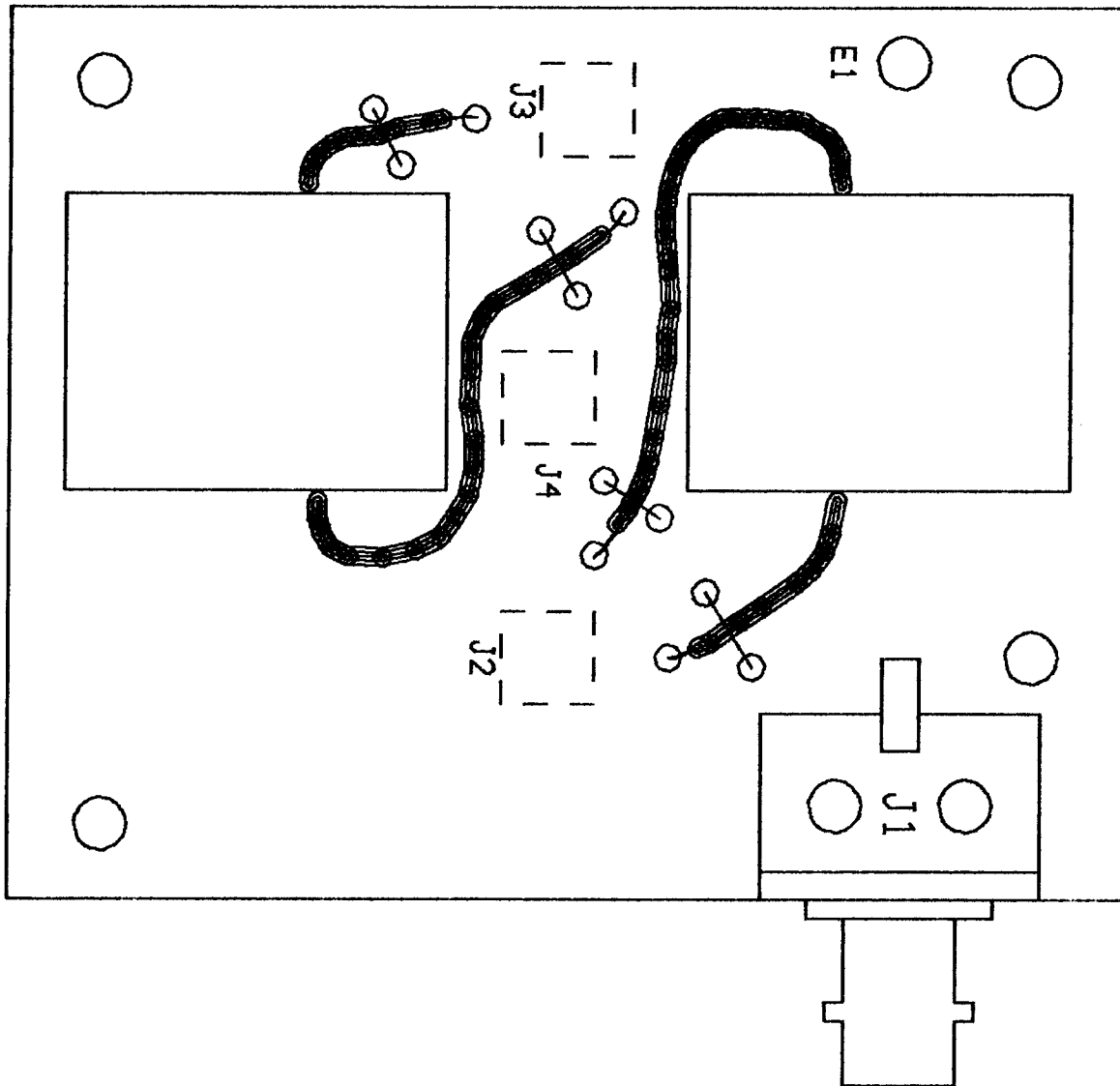


Figure 1. A5 Directional Coupler Component Locations (10257-1529 Rev. -)



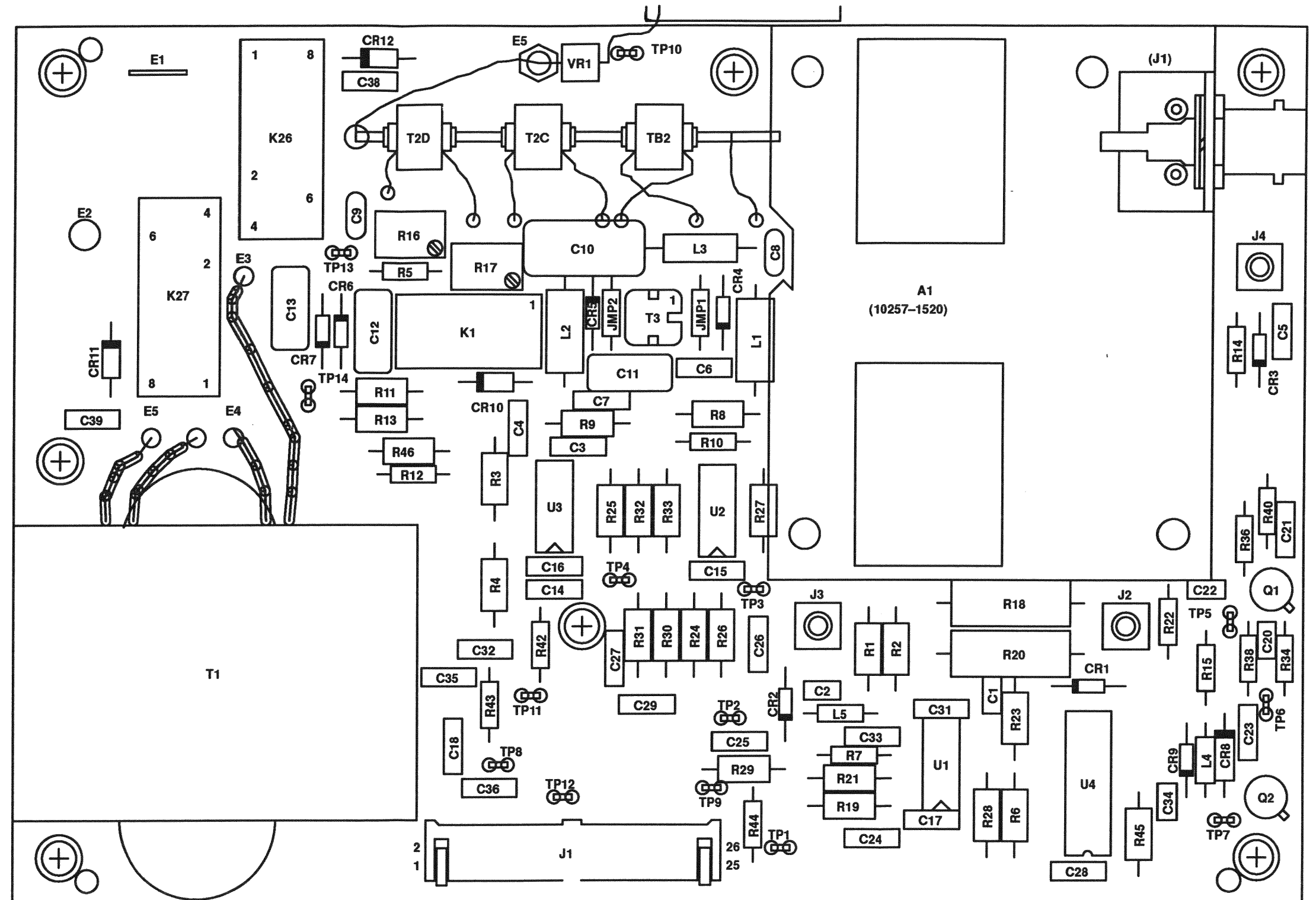
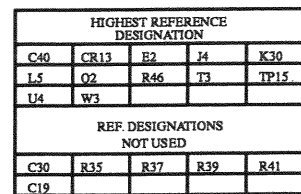


Figure 2. A5 Discriminator Assembly
Component Locations
(10257-1500 Rev. D)

RF-2601
A5 DISCRIMINATOR ASSEMBLY

1. PREFIX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
2. UNLESS OTHERWISE SPECIFIED:
 - A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, +/-5%.
 - B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

4. RELAYS K26 AND K27 ARE SHOWN IN DEENERGIZED STATE.



**Figure 3. A5 Discriminator Assembly
Schematic Diagram
(10257-1501 Rev. B)
(Sheet 1 of 2)**

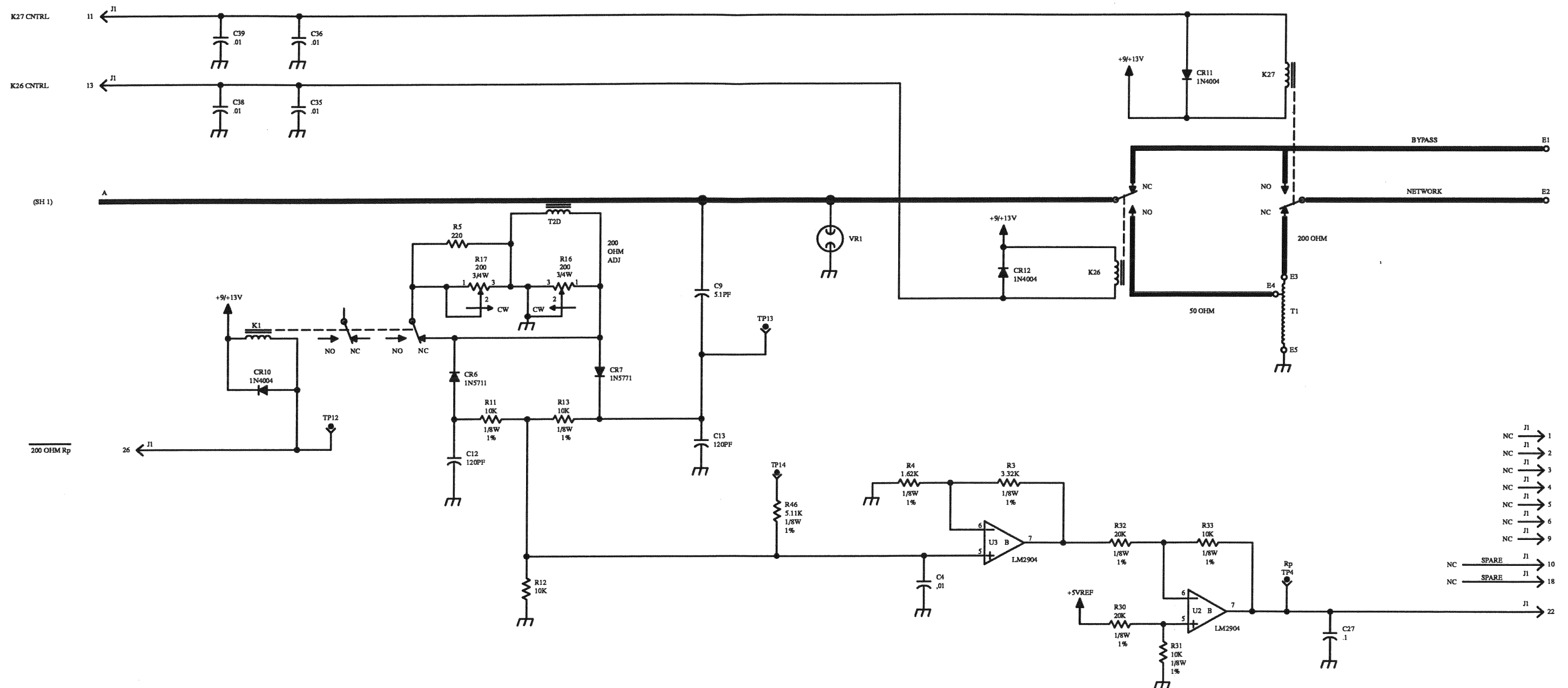


Figure 3. A5 Discriminator Assembly
Schematic Diagram
(10257-1501 Rev. B)
(Sheet 2 of 2)



A6

POWER SUPPLY ASSEMBLY

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A6 POWER SUPPLY ASSEMBLY
1. GENERAL INFORMATION

This section contains parts lists (tables 1, 2, and 3), component locations (figures 1 and 2), and a schematic diagram (figure 3) for the A6 Power Supply Assembly.

Table 1. A6 Power Supply Parts List (10257-3000 Rev. G)

Ref. Desig.	Part Number	Description
—	10257-3005	CHASSIS,POWER SUPPLY
—	M08-0001-056	INSL RUBBR/PLSTC FOR XSTR
—	E11-0012-005	INSL MICA PRECOATED TO-3
—	E11-0008-007	WSHR SHLDR INSL #4 .031LG
A1	10257-3010	PWBA,POWER SUPPLY
A2	10257-3050	PWBA AC SWITCH
CR1	D22-5011-200	DIODE 10A 200V RECT BR
E1	MS77068-1	LUG SOLDER #4
E2	MS77068-1	LUG SOLDER #4
F1	F-0012	FUSE 2.0A QA 250V 3AG
P2	J46-0017-211	CONNECTOR HOUSING
Q2	2N5884	XSTR POWER
T1	10257-3022	XFMR 115/230V, 17/32V
U3	I11-0006-005	+5VDC REGULATOR
XF1	F01-0001-002	FUHLR PNL MT SOL .750H
XQ2	J30-0006-000	SKT XSTR TO-3 .040 PIN
XU3	J30-0006-000	SKT XSTR TO-3 .040 PIN

Table 2. A6A1 PWBA, Power Supply Parts List (10257-3010 Rev. E)

Ref. Desig.	Part Number	Description
—	E-0218	PAD XSTR NYLN TO-5
C1	C28-0050-272	CAP 2700UF 50V ELEC
C2	C28-0050-272	CAP 2700UF 50V ELEC
C3	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C4	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C5	C28-0013-472	CAP 4700UF 25V ELEC
C7	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C8	C28-0050-272	CAP 2700UF 50V ELEC
C10	C28-0050-272	CAP 2700UF 50V ELEC
C11	C28-0050-272	CAP 2700UF 50V ELEC
C12	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C13	M39014/02-1310V	CAP .1UF 10% 100V CER-R

Table 2. A6A1 PWBA, Power Supply Parts List (10257-3010 Rev. E) (Cont.)

Ref. Desig.	Part Number	Description
C14	M39014/01-1317V	CAP,1000PF,10% 200VC
C15	C73-0040-470	CAP 47UF 40V ELEC
C16	C28-0050-272	CAP 2700UF 50V ELEC
C17	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C18	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR2	D22-0006-001	DIODE 3A 600V RECT GP
CR3	D22-0006-001	DIODE 3A 600V RECT GP
J1	J46-0052-014	HEADER,EJECTOR,14 PIN
J2	J46-0035-011	CONN 11 PIN SINGLE
Q1	Q-0059	XSTR TIP41C NPN POWER
Q3	JAN2N2907A	XSTR SS/GP PNP TO-18
Q4	JAN2N2907A	XSTR SS/GP PNP TO-18
Q5	JAN2N2222A	XSTR SS/GP NPN TO-18
Q6	JAN2N2907A	XSTR SS/GP PNP TO-18
R1	RN55D15R0F	RES 15.0 1% 1/8W MET FLM
R2	RN55D3320F	RES 332 1% 1/8W MET FLM
R3	RCR32G391JM	RES 390 5% 1W CAR COMP
R4	R65-0003-100	RES 10 5% 1/4W CAR FILM
R5	RN55D3571F	RES 3570 1% 1/8W MET FLM
R6	R13-0001-001	RES,0.1 2W 5%
R7	R13-0001-001	RES,0.1 2W 5%
R8	R65-0004-330	RES 33 5% 1/2W CAR FILM
R9	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R10	RCR32G220JM	RES 22 5% 1W CAR COMP
R11	R80-0001-330	RES 33 5% 5W MET FILM
R12	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R13	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R14	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R15	R65-0003-221	RES 220 5% 1/4W CAR FILM
R16	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R17	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R18	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R19	RN55D7501F	RES 7500 1% 1/8W MET FLM
R20	RN55D1102F	RES 11.0K 1% 1/8W MET FLM
R21	RN55D1822F	RES 18.2K 1% 1/8W MET FLM
R22	R-2227	RES VAR 5K 10% .5W VER.
R26	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R27	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM

Table 2. A6A1 PWBA, Power Supply Parts List (10257-3010 Rev. E) (Cont.)

Ref. Desig.	Part Number	Description
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
TP1	J60-0001-008	TP PWB BRN RA S&T ACCESS
TP2	J60-0001-002	TP PWB RED RA S&T ACCESS
TP3	J60-0001-006	TP PWB ORN RA S&T ACCESS
TP4	J60-0001-007	TP PWB YEL RA S&T ACCESS
TP5	J60-0001-004	TP PWB GRN RA S&T ACCESS
TP6	J60-0001-003	TP PWB BLK RA S&T ACCESS
U1	I10-0007-112	IC VR 7812BT +12V
U2	I10-0003-012	IC VR 79M12 -12V 0.5A 4%
U4	I12-0004-000	IC VR 1723 ADJ V .15A
VR1	1N5232A	DIODE 5.6V 10% .5W ZENER
VR2	1N4735A	DIODE 6.2V 5% 1W ZENER
VR3	1N6277A	TRANSORB 15.3V 1500W UNI

Table 3. A6A2 PWBA AC Switch Parts List (10257-3050 Rev. -)

Ref. Desig.	Part Number	Description
J3	J46-0035-005	CONN. .156 CTC 5 PIN
S1	S30-0014-202	SW DPDT PC 5A 115/230V
Z1	10043-0039	MOV,150V
Z2	10043-0039	MOV,150V

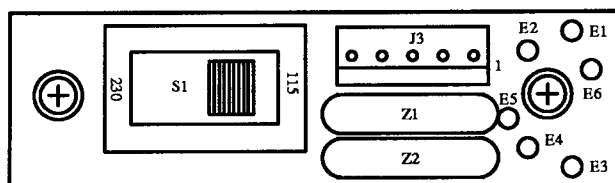


Figure 1. A6A2 PS Switch Board Component Locations (10257-3050 Rev. C)

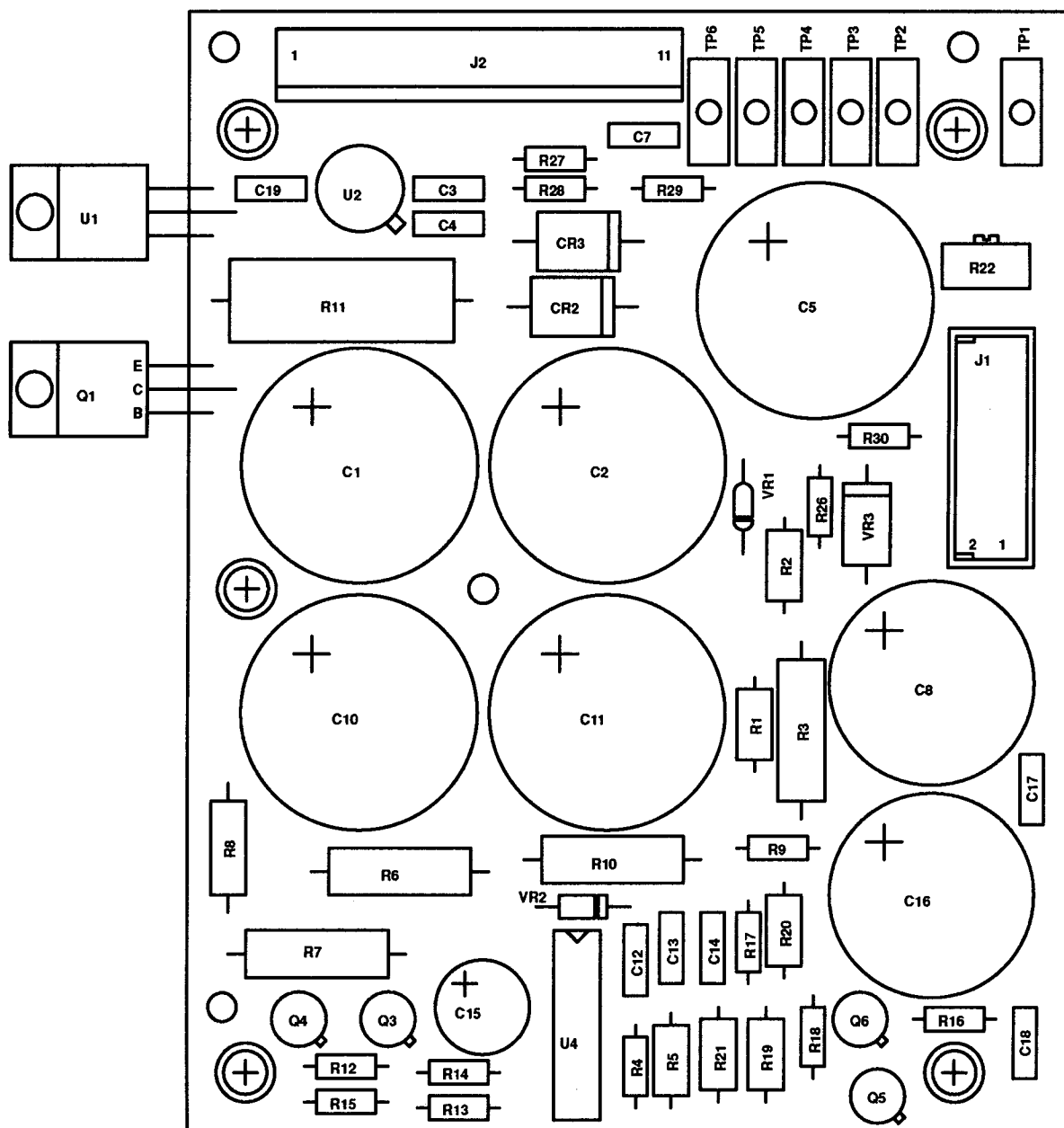
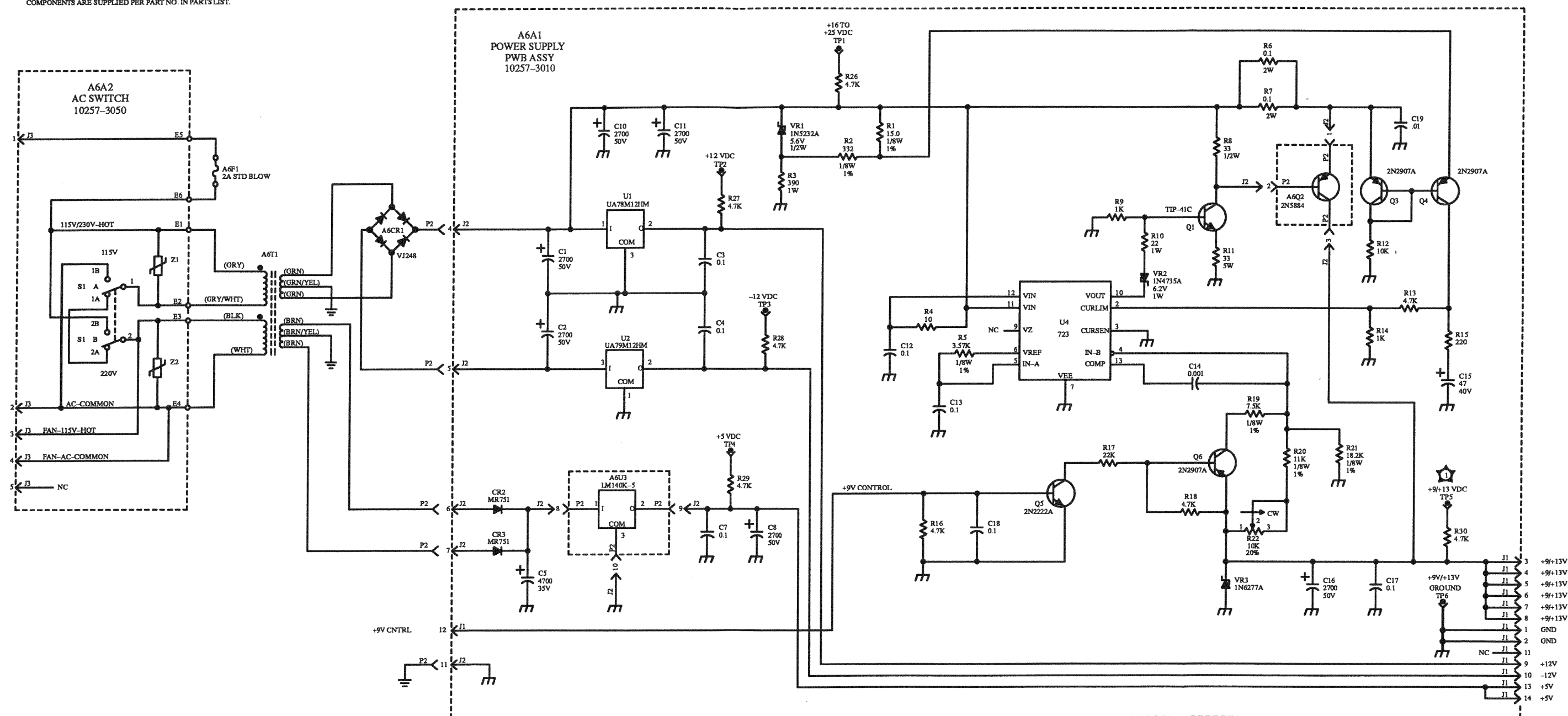


Figure 2. A6 Power Supply Component Locations (10257-3010/3019 Rev. A)

NOTES:

1. PREFIX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2, EXCEPT FOR P2, FOR WHICH THE COMPLETE PREFIX IS 1A2A6.
2. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, $\pm 5\%$.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

4. T1 CENTER TAP WIRES MAY BE: GRN/YEL, GRN/WHT, BRN/YEL, OR YEL.
 5. E1-E6 ON ASSEMBLY A6A2 ARE SOLDER PADS WHICH ARE USED AS TIE POINTS FOR WIRES (NOT DISCRETE PARTS).
- ⚠️ ADJUST R22 FOR +13VDC AT TP5 WHILE PUSHING A3S3, RELAY-CHECK PUSH-BUTTON ON CONTROL PWB ASSY, A3.



10257-3000 (A6)				
HIGHEST REFERENCE DESIGNATION				
A2	CR1	F1	P2	Q2
T1	U3			
REF. DESIGNATIONS NOT USED				
P1	Q1	U1	U2	

10257-3010 (A6A1)				
HIGHEST REFERENCE DESIGNATION				
C19	CR3	J2	Q6	R30
TP6	U4	VR3		
REF. DESIGNATIONS NOT USED				
C6	C9	CR1	Q2	R23
R24	R25	U3		

10257-3050 (A6A2)				
HIGHEST REFERENCE DESIGNATION				
J3	S1	Z2		
REF. DESIGNATIONS NOT USED				
J1	J2			

Figure 3. A3 Power Supply Schematic Diagram (10257-3001 Rev. B)

A7 TRANSCIEVER
INTERFACE ASSY





A7

TRANSCEIVER INTERFACE ASSEMBLY

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A7 TRANSCEIVER INTERFACE ASSEMBLY
1. GENERAL INFORMATION

This section contains a parts list (table 1), component locations (figure 1), and schematic diagram (figure 2) for the A7 Transceiver Interface Assembly.

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G)

Ref. Desig.	Part Number	Description
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	M39014/02-1310V	CAP .1UF 10% 100V CER-R
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	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C13	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C14	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C15	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C16	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C17	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C19	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C20	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C21	M39014/02-1298V	CAP .01UF 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
C25	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C26	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C27	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C28	M39003/01-2277	CAP 150UF 10% 15V TANT-M
C29	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C30	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C31	M39014/02-1298V	CAP .01UF 10% 200V 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
C35	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C36	M39014/01-1311V	CAP 470PF 10% 200V CER-R

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
C37	M39014/01-1308V	CAP 330PF 10% 200V CER-R
C38	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C39	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C40	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C41	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C42	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C43	M39014/02-1310V	CAP .1UF 10% 100V CER-R
C44	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	1N4004	DIODE 1A 400V RECT GP
CR8	1N4004	DIODE 1A 400V RECT GP
CR9	1N4004	DIODE 1A 400V RECT GP
CR10	1N4004	DIODE 1A 400V RECT GP
CR11	1N4004	DIODE 1A 400V RECT GP
CR12	1N4004	DIODE 1A 400V RECT GP
CR13	1N4454	DIODE 200MA 75V SW
CR14	1N4454	DIODE 200MA 75V SW
CR15	1N4454	DIODE 200MA 75V SW
CR16	1N4454	DIODE 200MA 75V SW
CR17	1N4454	DIODE 200MA 75V SW
CR18	1N4454	DIODE 200MA 75V SW
CR19	1N4004	DIODE 1A 400V RECT GP
CR20	1N4004	DIODE 1A 400V RECT GP
CR21	1N4454	DIODE 200MA 75V SW
DS1	N22-0006-002	LED RED T-1 3/4 RTANG
DS2	N22-0006-002	LED RED T-1 3/4 RTANG
DS3	N22-0006-002	LED RED T-1 3/4 RTANG
DS4	N22-0006-002	LED RED T-1 3/4 RTANG
DS5	N22-0006-002	LED RED T-1 3/4 RTANG
J1	J46-0052-026	HEADER,EJECTOR,26 PIN
J2	J46-0022-014	HDR 14 PIN 0.100" SR LKG
L1	MS18130-15	COIL 3.9UH 10% FXD RF
L2	MS18130-15	COIL 3.9UH 10% FXD RF
L3	MS18130-15	COIL 3.9UH 10% FXD RF

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
L4	MS18130-15	COIL 3.9UH 10% FXD RF
L5	MS18130-15	COIL 3.9UH 10% FXD RF
L6	MS18130-15	COIL 3.9UH 10% FXD RF
L7	MS18130-15	COIL 3.9UH 10% FXD RF
L8	MS18130-15	COIL 3.9UH 10% FXD RF
L9	MS18130-15	COIL 3.9UH 10% FXD RF
L10	MS18130-15	COIL 3.9UH 10% FXD RF
L11	MS18130-15	COIL 3.9UH 10% FXD RF
L12	MS18130-15	COIL 3.9UH 10% FXD RF
Q1	Q25-0007-000	XSTR SS/GP NPN MPSA06
Q2	Q25-0009-000	XSTR SS/GP PNP MPSA56
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	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R2	R65-0003-202	RES 2.0K 5% 1/4W CAR FILM
R3	R65-0003-122	RES 1.2K 5% 1/4W CAR FILM
R4	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R5	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R6	R65-0003-681	RES 680 5% 1/4W CAR FILM
R7	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R8	R65-0003-271	RES 270 5% 1/4W CAR FILM
R9	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R10	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R11	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R12	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R13	R65-0003-202	RES 2.0K 5% 1/4W CAR FILM
R14	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R15	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R16	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R17	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R18	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R19	R65-0003-271	RES 270 5% 1/4W CAR FILM
R20	R65-0003-271	RES 270 5% 1/4W CAR FILM
R21	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
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	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R27	R65-0003-103	RES 10K 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	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R31	R65-0003-122	RES 1.2K 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	R65-0003-225	RES 2.2M 5% 1/4W CAR FILM
R35	R65-0003-271	RES 270 5% 1/4W CAR FILM
R36	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R37	R65-0003-271	RES 270 5% 1/4W CAR FILM
R38	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R39	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R40	RN55D3922F	RES 39.2K 1% 1/8W MET FLM
R41	RN55D1002F	RES 10.0K 1% 1/8W MET FLM
R42	RN55D2002F	RES 20.0K 1% 1/8W MET FLM
R43	RN55D1003F	RES 100K 1% 1/8W MET FLM
R44	RN55D1003F	RES 100K 1% 1/8W MET FLM
R45	RN55D3921F	RES 3920 1% 1/8W MET FLM
R46	RN55D1003F	RES 100K 1% 1/8W MET FLM
R47	RN55D1003F	RES 100K 1% 1/8W MET FLM
R48	RN55D1502F	RES 15.0K 1% 1/8W MET FLM
R49	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R50	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R51	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R52	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R53	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R54	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R55	R65-0003-223	RES 22K 5% 1/4W CAR FILM
R56	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R57	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R58	RCR32G391JM	RES 390 5% 1W CAR COMP
S1	S10-0010-912	SW PC MNT SPDT PUSH
S2	S10-0010-911	SW PC MNT SPST N.O. PUSH

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
TP1	J60-0001-008	TP PWB BRN RA S&T ACCESS
TP2	J60-0001-002	TP PWB RED RA S&T ACCESS
TP3	J60-0001-006	TP PWB ORN RA S&T ACCESS
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
TP7	J60-0001-012	TP PWB VIO RA S&T ACCESS
TP8	J60-0001-013	TP PWB GRA RA S&T ACCESS
TP9	J60-0001-001	TP PWB WHT RA S&T ACCESS
U1	I15-0000-374	IC 74HC374 PLASTIC CMOS
U2	I15-0000-373	IC 74HC373 PLASTIC CMOS
U3	I90-0006-004	IC XSTR ARRAY DARL 2003
U4	I15-0000-374	IC 74HC374 PLASTIC CMOS
U5	10257-8400	FIRMWARE KIT, OSI
U6	I75-0007-000	OPTOISOLATOR DUAL MCT6
U7	I75-0007-000	OPTOISOLATOR DUAL MCT6
U8	S76-0001-030	PRESSURE SENSOR
U9	I15-0000-000	IC 74HC00 PLASTIC CMOS
U10	I15-0000-688	IC 74HC688 PLASTIC CMOS
U11	I75-0007-000	OPTOISOLATOR DUAL MCT6
U12	I15-0000-014	IC 74HC14 PLASTIC CMOS
U13	I30-0066-001	IC, DUAL OPAMP
U14	I30-0066-001	IC, DUAL OPAMP
VR1	1N4742A	DIODE 12V 5% 1W ZENER
VR2	1N4742A	DIODE 12V 5% 1W ZENER
VR3	1N4742A	DIODE 12V 5% 1W ZENER
VR4	1N5223B	DIODE 2.7V 5% .5W ZENER
VR5	1N5223B	DIODE 2.7V 5% .5W ZENER
VR6	1N5223B	DIODE 2.7V 5% .5W ZENER
VR7	1N5223B	DIODE 2.7V 5% .5W ZENER
VR8	1N5223B	DIODE 2.7V 5% .5W ZENER
VR9	1N5223B	DIODE 2.7V 5% .5W ZENER
VR10	1N4742A	DIODE 12V 5% 1W ZENER
VR11	1N4742A	DIODE 12V 5% 1W ZENER
VR12	1N4742A	DIODE 12V 5% 1W ZENER
VR13	1N4742A	DIODE 12V 5% 1W ZENER
VR14	1N4742A	DIODE 12V 5% 1W ZENER
VR15	1N4742A	DIODE 12V 5% 1W ZENER
VR16	1N4742A	DIODE 12V 5% 1W ZENER

Table 1. A7 Transceiver Interface Parts List (10257-3100 Rev. G) (Cont.)

Ref. Desig.	Part Number	Description
VR17	1N4742A	DIODE 12V 5% 1W ZENER
VR18	1N4742A	DIODE 12V 5% 1W ZENER
VR19	1N4742A	DIODE 12V 5% 1W ZENER
VR20	1N4742A	DIODE 12V 5% 1W ZENER
VR21	1N4742A	DIODE 12V 5% 1W ZENER
VR22	1N4742A	DIODE 12V 5% 1W ZENER
VR23	1N4742A	DIODE 12V 5% 1W ZENER
VR24	1N4742A	DIODE 12V 5% 1W ZENER
VR25	1N4742A	DIODE 12V 5% 1W ZENER
VR26	1N4742A	DIODE 12V 5% 1W ZENER
VR27	1N4742A	DIODE 12V 5% 1W ZENER
VR28	1N4742A	DIODE 12V 5% 1W ZENER
VR29	1N4742A	DIODE 12V 5% 1W ZENER
VR30	1N4742A	DIODE 12V 5% 1W ZENER
VR31	1N4742A	DIODE 12V 5% 1W ZENER
VR32	1N4742A	DIODE 12V 5% 1W ZENER
VR33	1N4742A	DIODE 12V 5% 1W ZENER
VR34	1N4742A	DIODE 12V 5% 1W ZENER
VR35	1N4742A	DIODE 12V 5% 1W ZENER
VR36	1N4742A	DIODE 12V 5% 1W ZENER
VR37	1N4742A	DIODE 12V 5% 1W ZENER
VR38	1N4742A	DIODE 12V 5% 1W ZENER
VR39	1N4742A	DIODE 12V 5% 1W ZENER
VR40	1N4742A	DIODE 12V 5% 1W ZENER
VR41	1N4742A	DIODE 12V 5% 1W ZENER
VR42	1N4742A	DIODE 12V 5% 1W ZENER
XU5	J77-0008-004	SKT IC MACH 20 PIN
Z1	D60-0003-000	MOV 36 VDC 2000A
Z2	D60-0003-000	MOV 36 VDC 2000A
Z3	D60-0003-000	MOV 36 VDC 2000A
Z4	D60-0003-000	MOV 36 VDC 2000A
Z5	D60-0003-000	MOV 36 VDC 2000A
Z6	D60-0003-000	MOV 36 VDC 2000A
Z7	D60-0003-000	MOV 36 VDC 2000A
Z8	D60-0003-000	MOV 36 VDC 2000A
Z9	D60-0003-000	MOV 36 VDC 2000A
Z10	D60-0003-000	MOV 36 VDC 2000A
Z11	D60-0003-000	MOV 36 VDC 2000A
Z12	D60-0003-000	MOV 36 VDC 2000A

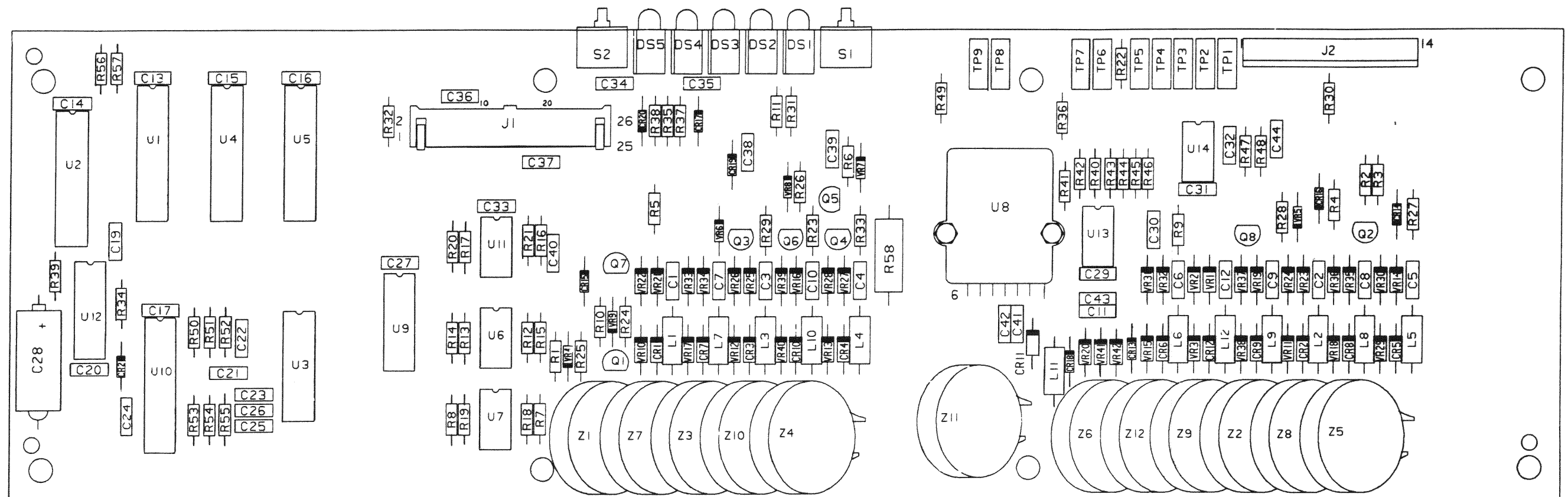


Figure 1. A7 Transceiver Interface
Component Locations
(10257-3100 Rev. B)

- NOTES:
1. PREFIX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
 2. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, +/-5%.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
 3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY.
COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

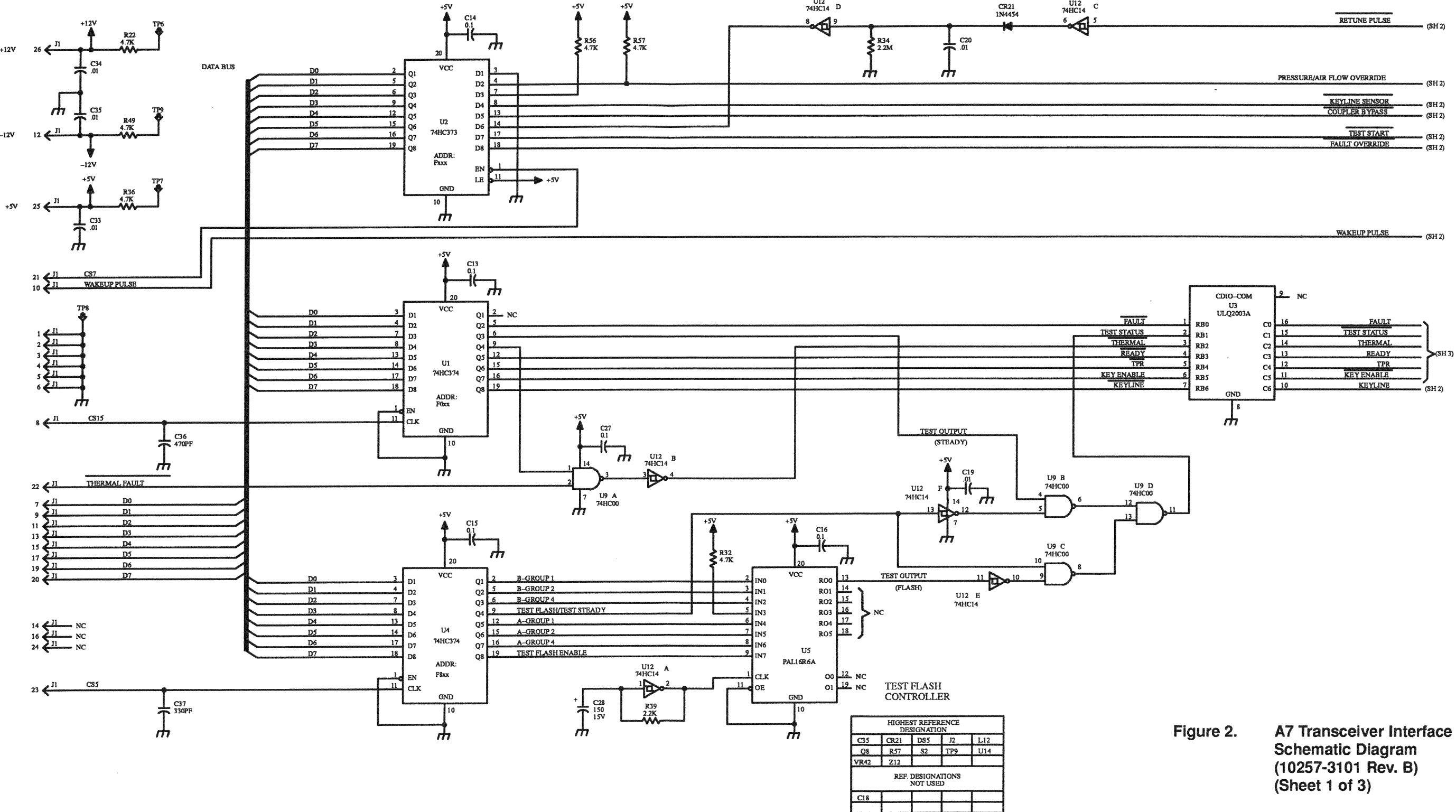


Figure 2. A7 Transceiver Interface Schematic Diagram (10257-3101 Rev. B) (Sheet 1 of 3)

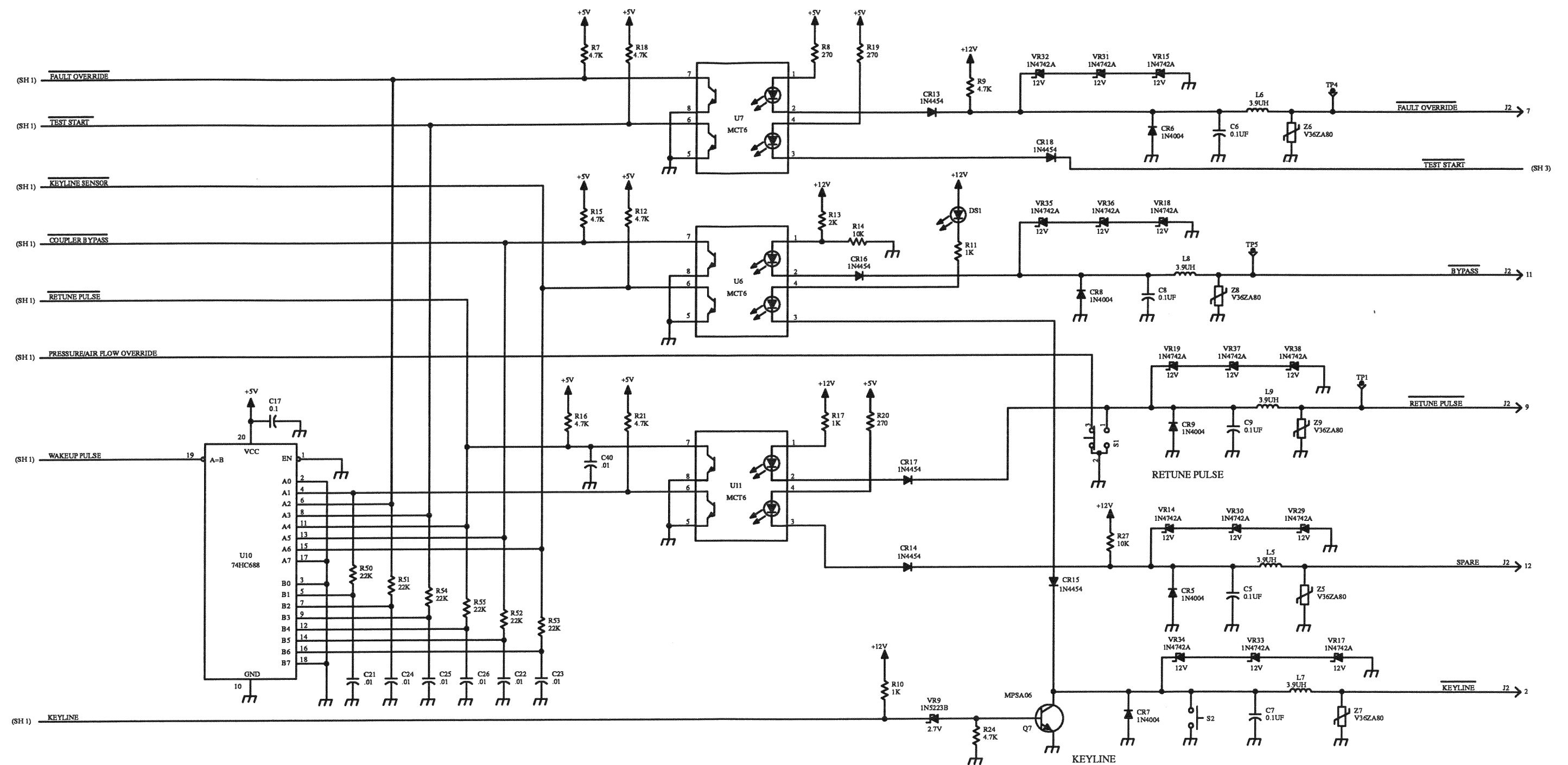


Figure 2. A7 Transceiver Interface Schematic Diagram (10257-3101 Rev. B) (Sheet 2 of 3)

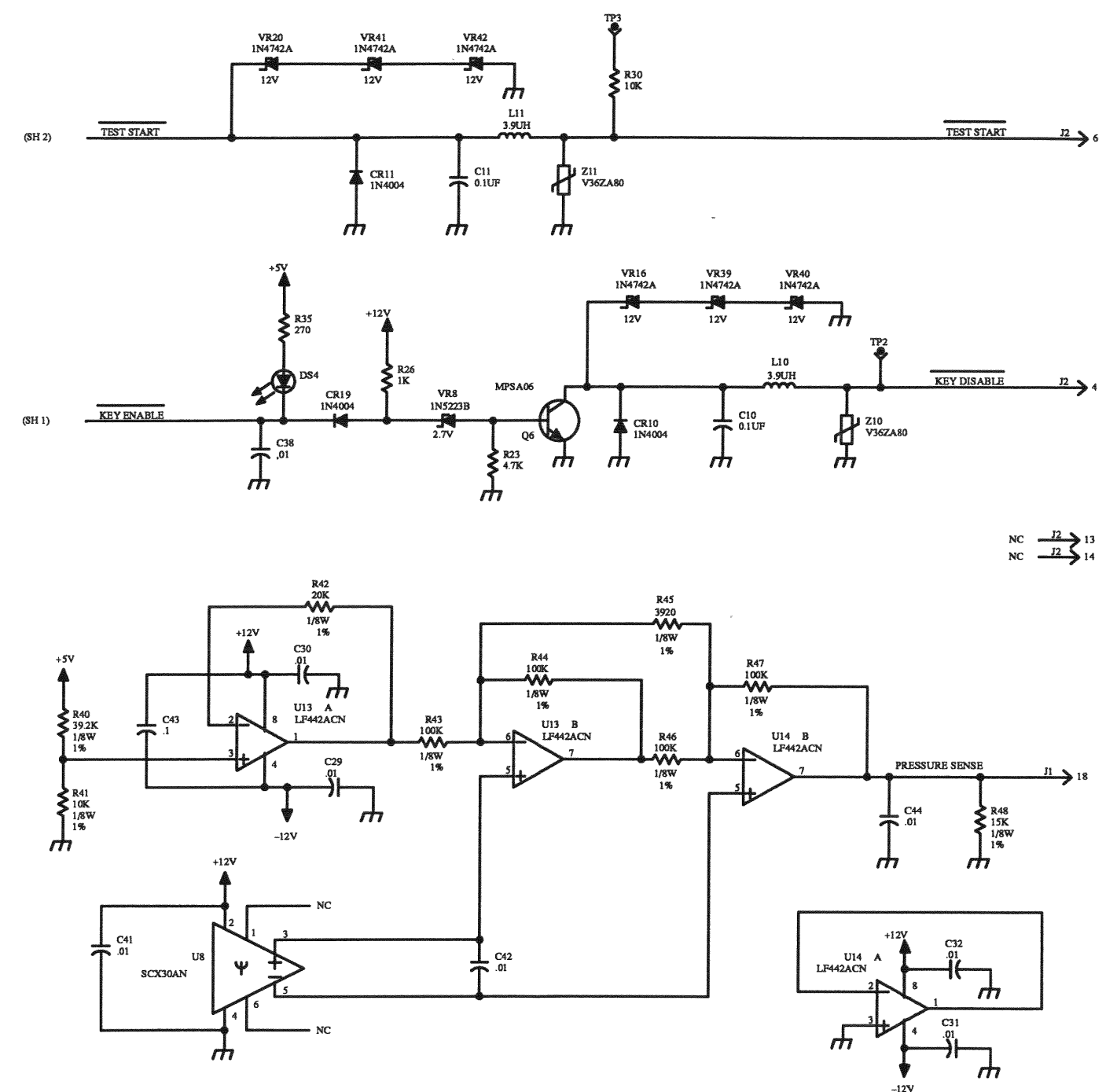
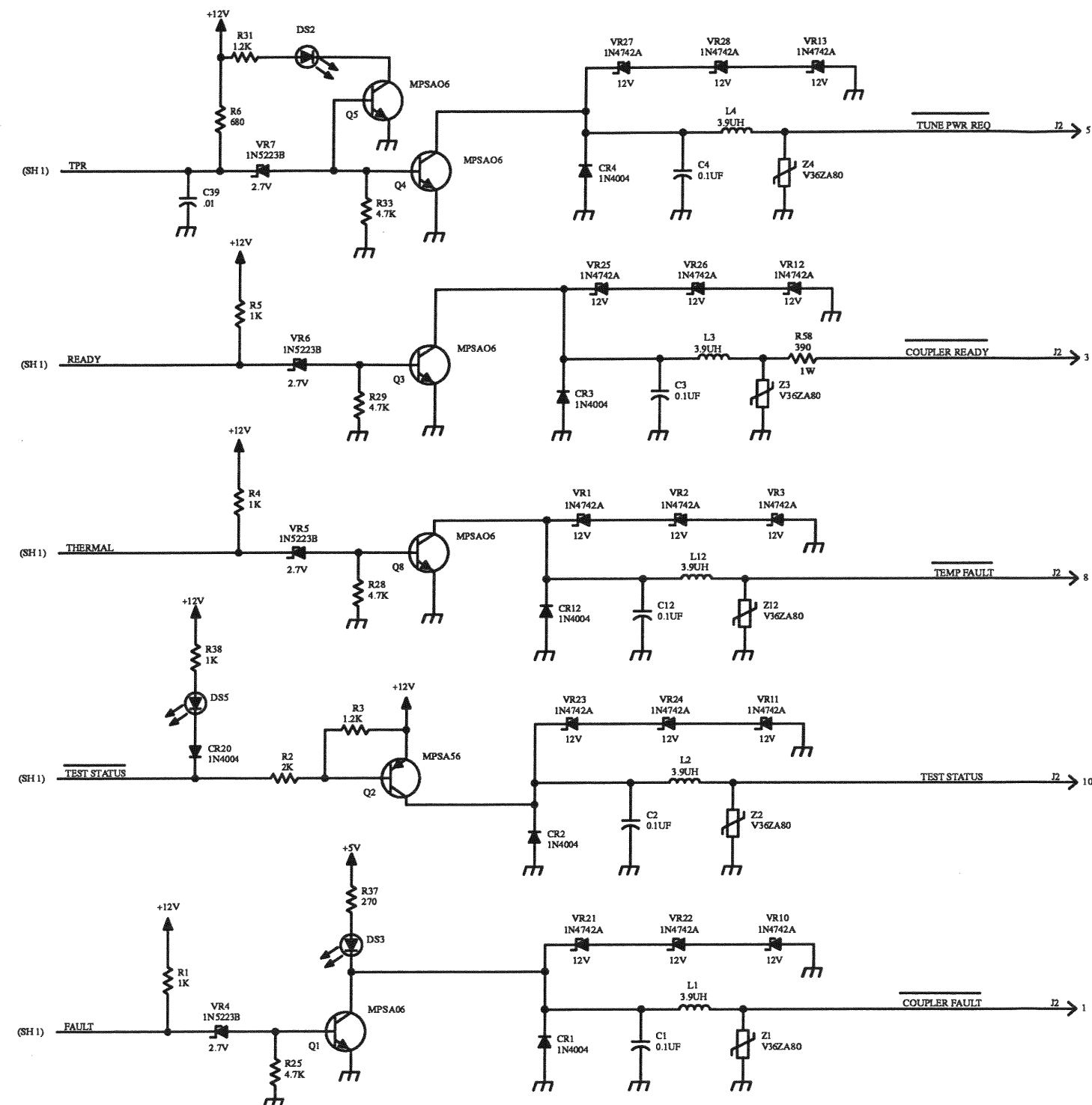


Figure 2. A7 Transceiver Interface Schematic Diagram (10257-3101 Rev. B) (Sheet 3 of 3)

A8 COIL PACK ASSY





A8

COIL PACK ASSEMBLY

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A8 COIL PACK ASSEMBLY

1. GENERAL INFORMATION

This section contains parts lists (tables 1, 2, and 3), component locations (figures 1 and 4), and schematic diagrams (figures 2 and 3) for the A8 Coil Pack Assembly.

Table 1. A8 Coil Pack Assembly Parts List (10257-5200 Rev. W)

Ref. Desig.	Part Number	Description
—	MP-0859	FINGER GUARD FAN
—	10257-5325-03	CABLE,JUMPER
—	10257-5325-05	CABLE,JUMPER
—	10257-5326	CABLE,JUMPER
—	10257-5325-04	CABLE,JUMPER
A1	10257-5230-01	DET, PWBA, 2K
A3	10257-5300	SERIES CAP ASSY
B1	B22-0023-115	FAN 115V 50/60HZ
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
C15	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C16	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C17	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C23	C15-0003-002	CAP 50PF 5% 7.5KV CER
C24	C15-0003-002	CAP 50PF 5% 7.5KV CER
C25	C-1176	CAP 25PF 10% 15KV CER
C26	C-1176	CAP 25PF 10% 15KV CER
C27	C-1176	CAP 25PF 10% 15KV CER
C28	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

Table 1. A8 Coil Pack Assembly Parts List (10257-5200 Rev. W) (Cont.)

Ref. Desig.	Part Number	Description
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	1N4004	DIODE 1A 400V RECT GP
CR9	1N4004	DIODE 1A 400V RECT GP
CR10	1N4004	DIODE 1A 400V RECT GP
CR11	1N4004	DIODE 1A 400V RECT GP
CR12	1N4004	DIODE 1A 400V RECT GP
CR13	1N4004	DIODE 1A 400V RECT GP
CR14	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
E17	E35-0002-002	TERM STDF INSUL .84 L
E18	E35-0002-002	TERM STDF INSUL .84 L
E19	1960-4001	BALL ASSY
E20	10208-1207	CONN PIN
E21	1960-4001	BALL ASSY
E22	10257-5204	PIN,SPARK GAP
E23	MS77068-1	LUG SOLDER #4
K10	10257-5320	RELAY SPST
K11	10257-5320	RELAY SPST
K12	10257-5320	RELAY SPST
K13	10257-5320	RELAY SPST
K14	10257-5320	RELAY SPST
K15	10257-5225	RELAY SPDT
K16	10257-5225	RELAY SPDT
K17	10257-5225	RELAY SPDT
K18	10257-5225	RELAY SPDT
K19	10257-5225	RELAY SPDT
K20	10257-5320	RELAY SPST
K21	10257-5320	RELAY SPST
K22	10257-5225	RELAY SPDT
K23	10257-5225	RELAY SPDT
K28	K70-0015-001	VACUUM RELAY
K29	10257-5225	RELAY SPDT
K30	10257-5225	RELAY SPDT

Table 1. A8 Coil Pack Assembly Parts List (10257-5200 Rev. W) (Cont.)

Ref. Desig.	Part Number	Description
K31	10257-5320	RELAY SPST
L1	10257-5210	RF COIL ASSY, .1UH
L2	10257-5220	RF COIL ASSY, .17UH
L3	10257-5250	COIL ASSY, .31UH
L4	10257-5260	COIL ASSY, .56UH
L5	10257-5270	COIL ASSY, 2/1UH
L6	10257-5280	COIL ASSY, 4/8UH
L7	10257-5290	COIL ASSY, 16UH
L8	10257-5310	COIL ASSY, 32UH
L9	10257-5340	COIL ASSY .035UH
P8	J46-0016-120	CONN HOUSING 20 POS 22AWG
P9	J46-0016-114	CONN HOUSING 14 POS 22AWG
R1	R15-0005-205	RES 2 MEG 1.25W 10% CF
R2	R15-0005-205	RES 2 MEG 1.25W 10% CF
VR1	1N4728A	DIODE 3.3V 5% 1W ZENER
VR2	1N4728A	DIODE 3.3V 5% 1W ZENER
VR3	1N4728A	DIODE 3.3V 5% 1W ZENER
VR4	1N4728A	DIODE 3.3V 5% 1W ZENER
VR5	1N4728A	DIODE 3.3V 5% 1W ZENER
VR6	1N4728A	DIODE 3.3V 5% 1W ZENER
VR7	1N4728A	DIODE 3.3V 5% 1W ZENER
VR8	1N4728A	DIODE 3.3V 5% 1W ZENER

Table 2. A8A1 DET, PWBA, 2K Parts List (10257-5230-01 Rev. E)

Ref. Desig.	Part Number	Description
C1	C15-0007-050	CAP 5PF +/- .25PF 5KV CER
C2	CM05FD101G03	CAP 100PF 2% 500V MICA
C3	CM05CD100D03	CAP 10PF +/- .5PF 500V MICA
C4	CM05FD201G03	CAP 200PF 2% 500V MICA
C5	C22-0002-106	CAP 10.0UF 10% 20V TANT
C6	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C7	M39014/02-1298V	CAP .01UF 10% 200V CER-R
CR1	1N5711	DIODE SCHOTTKY 70V .25W
CR2	1N5711	DIODE SCHOTTKY 70V .25W
L1	MS75084-16	COIL 22.0UH 10% FXD RF
R1	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R2	R65-0003-182	RES 1.8K 5% 1/4W CAR FILM
R3	R30-0001-501	RES VAR 500 3/4W 20%

Table 3. A8A3 Series Cap Assembly Parts List (10257-5300 Rev. B)

Ref. Desig.	Part Number	Description
C18	C15-0003-002	CAP 50PF 5% 7.5KV CER
C19	C15-0003-002	CAP 50PF 5% 7.5KV CER
C20	C15-0003-002	CAP 50PF 5% 7.5KV CER
C21	C15-0003-002	CAP 50PF 5% 7.5KV CER
C22	C15-0003-002	CAP 50PF 5% 7.5KV CER

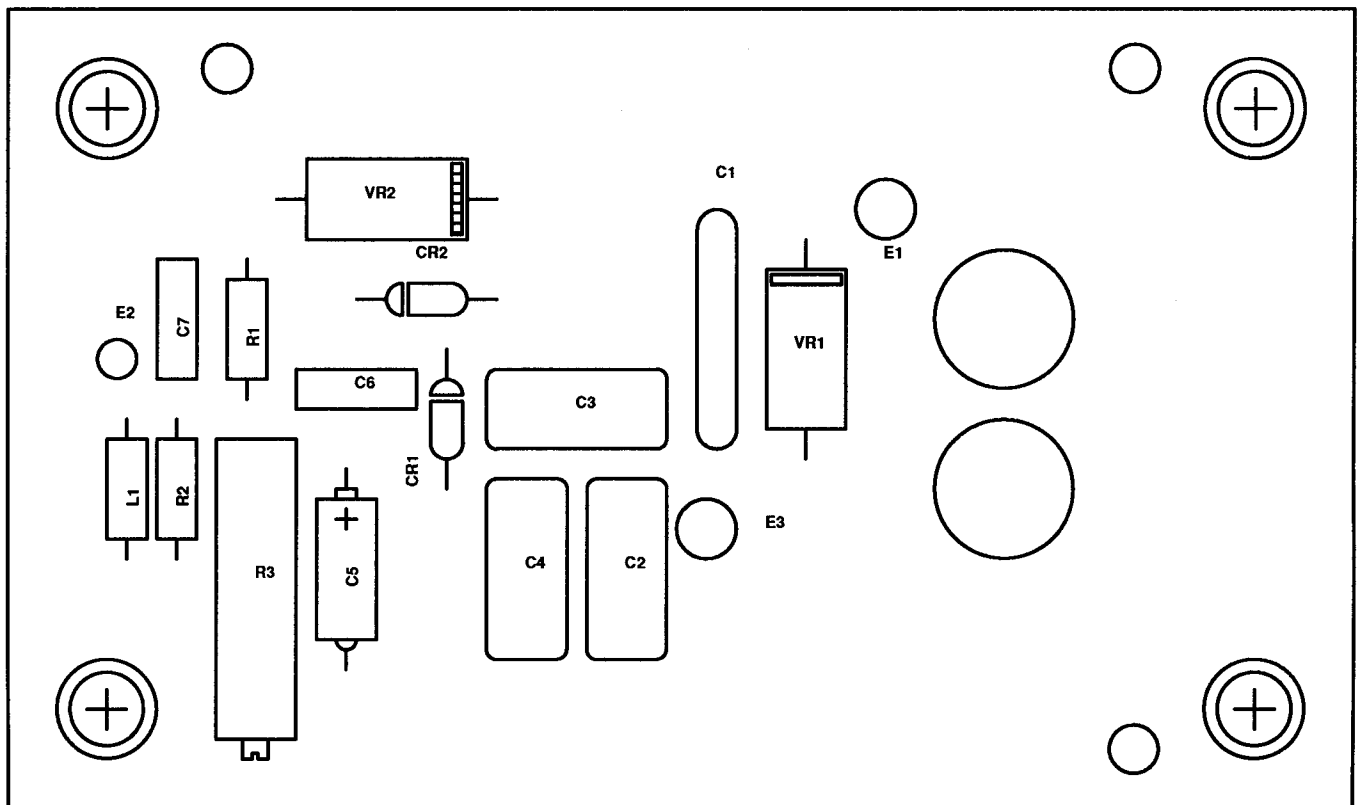


Figure 1. A8A1 2.0 kV Voltage Detector Component Locations (10257-5230 Rev. A)

- NOTES:
1. PREFIX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
 2. UNLESS OTHERWISE SPECIFIED:
 - A) ALL CAPACITOR VALUES ARE IN MICROFARADS.
 - B) ALL RESISTOR VALUES ARE IN OHMS, 1/4W, +/-5%.

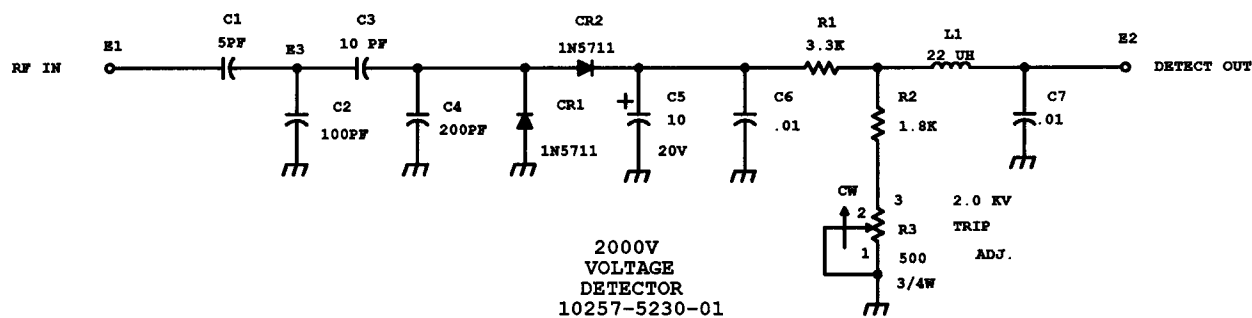
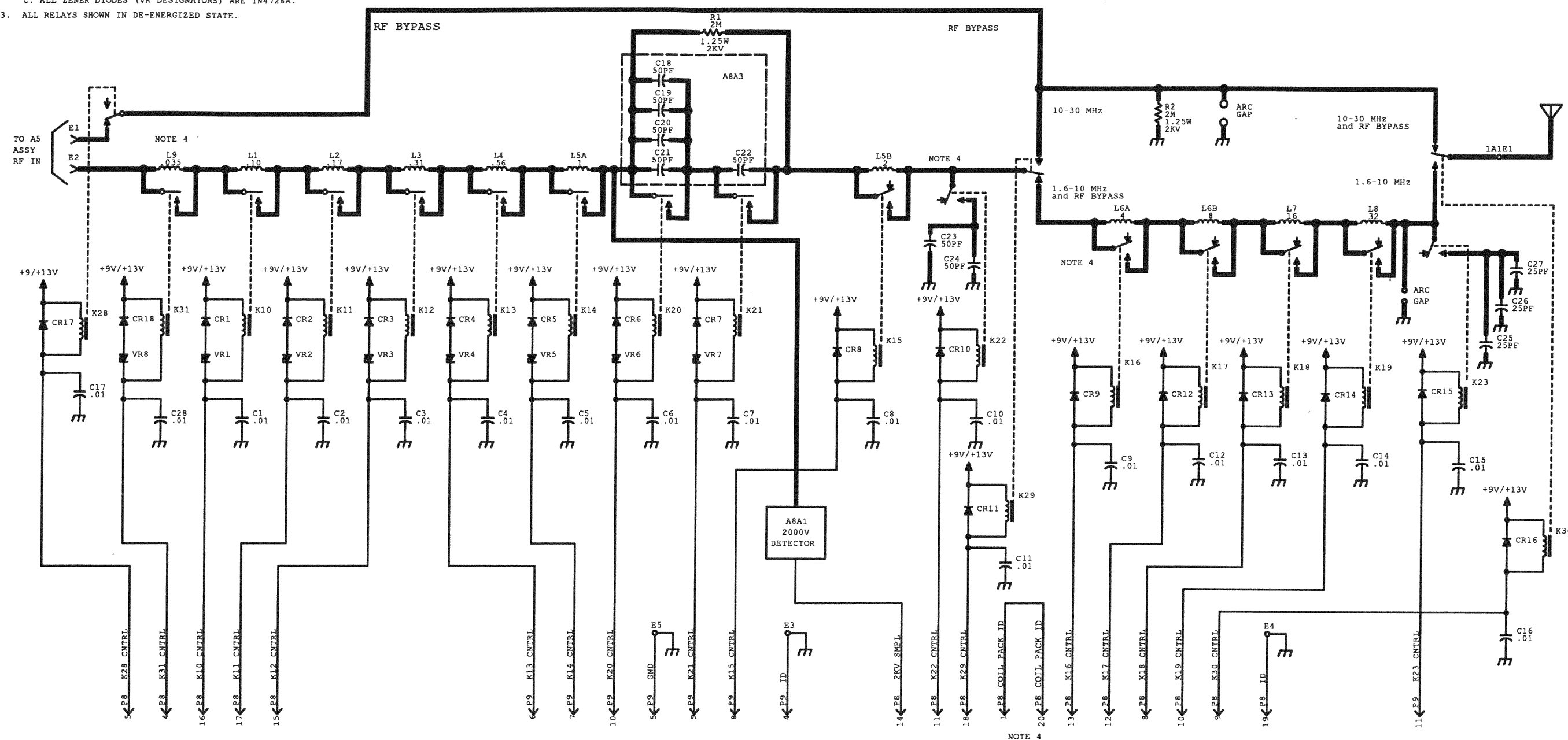


Figure 2. A8A1 2.0 kV Voltage Detector Schematic Diagram (10257-5241 Rev. A)

NOTE: UNLESS OTHERWISE SPECIFIED:

1. PREFIX ALL INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
2. A. ALL CAPACITOR VALUES ARE IN MICROFARADS.
B. ALL DIODES (CR DESIGNATORS) ARE 1N4004.
C. ALL ZENER DIODES (VR DESIGNATORS) ARE 1N4728A.
3. ALL RELAYS SHOWN IN DE-ENERGIZED STATE.

4. EARLIER PRODUCTION RUNS DID NOT HAVE INCORPORATED: L9, K31, CR18, VR8 AND C28 CIRCUITRY, AND P8-1 TO P8-20 CIRCUITRY. IN ADDITION, L6A, K16, CR9 AND C9 CIRCUITRY WAS LOCATED BETWEEN L5B AND K22.



HIGHEST REFERENCE DESIGNATION				
C28	CR18	K30	L8	R2
VR8				
REF. DESIGNATIONS NOT USED				
K1	K2	K3	K4	K5
K6	K7	K8	K9	K24
K25	K26	K27		

SCHEMATIC DIAGRAM,
COIL PACK, A8 ASSY
RF-2601 10257-5201 C
1 OF 1

Figure 3. A8 Coil Pack Assembly (10257-5201 Rev. C)

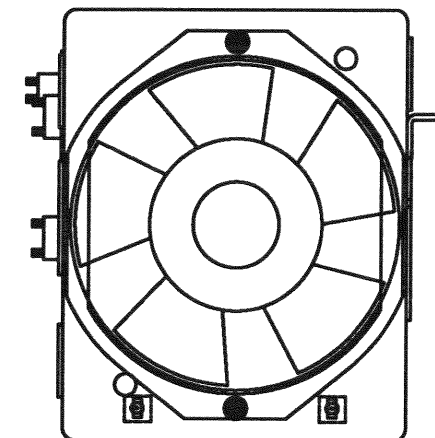
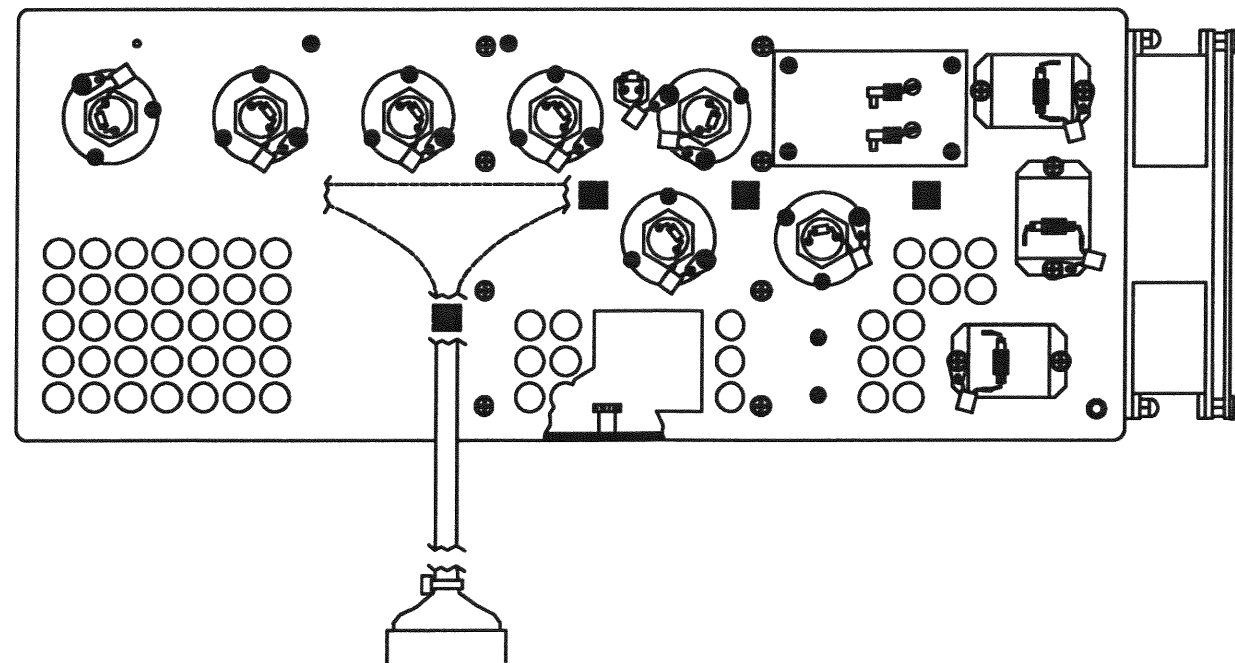
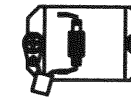
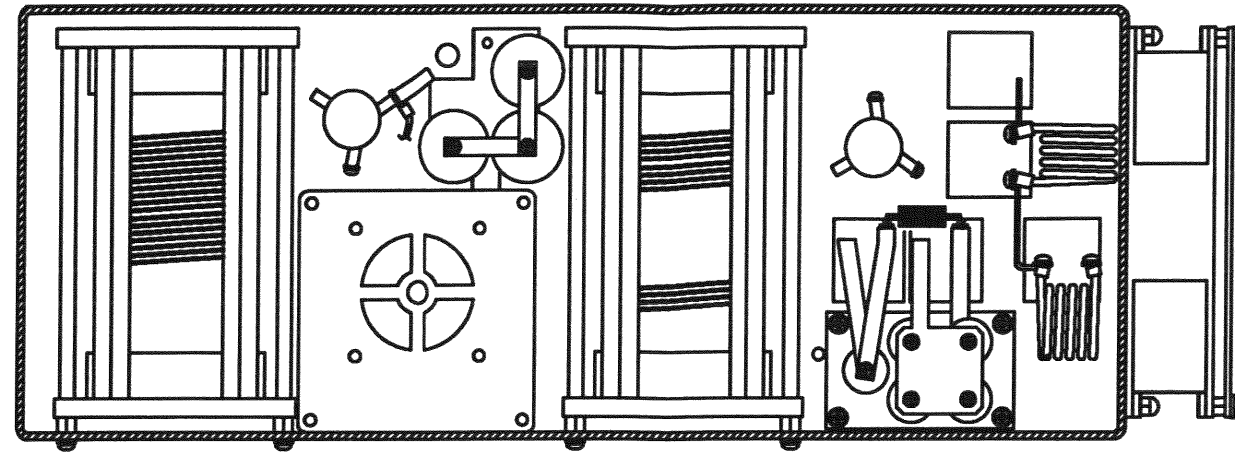


Figure 4. A8 Coil Pack Assembly
Component Locations
Diagram
(10257-5200 Rev. F)
(Sheet 1 of 2)

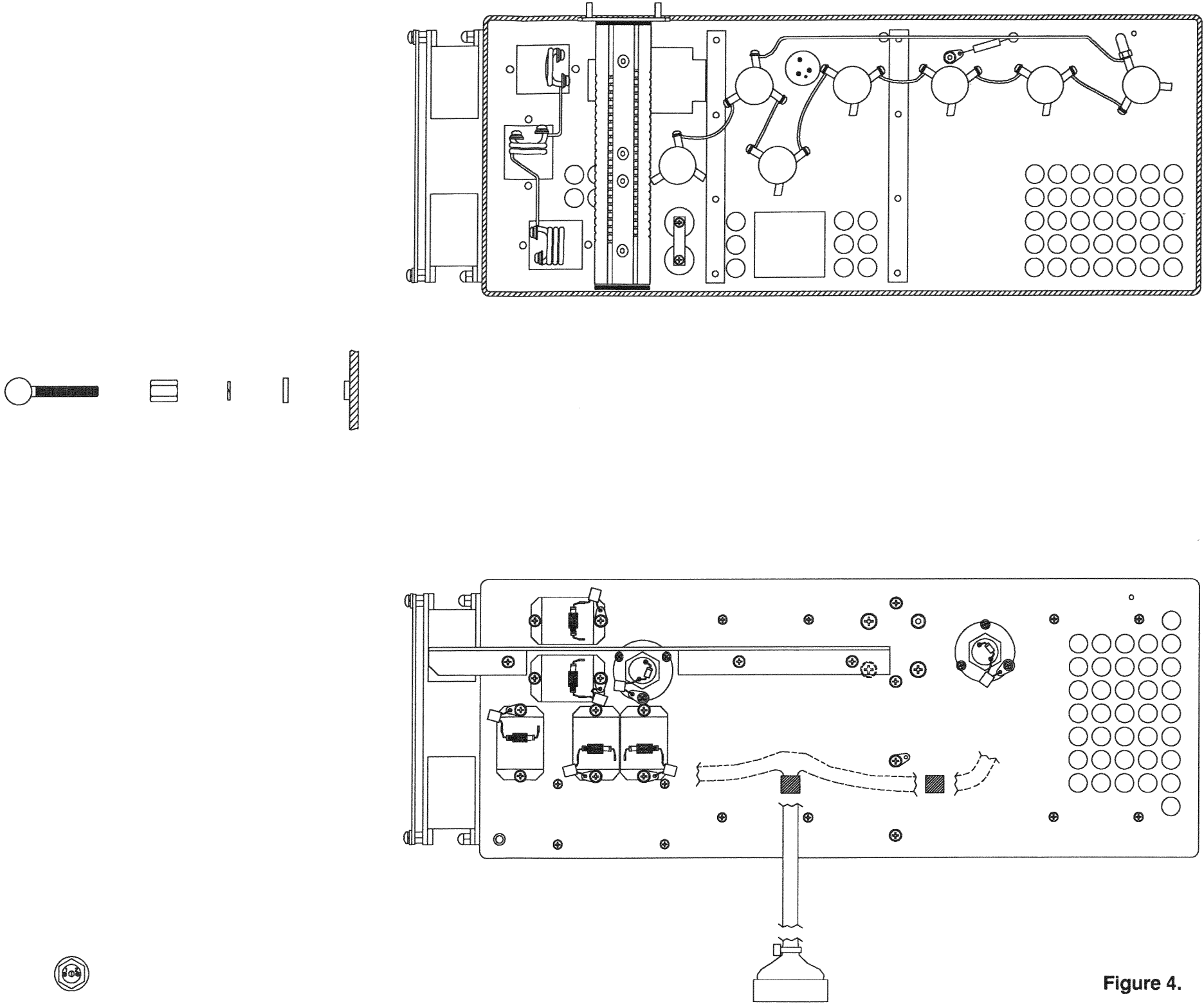


Figure 4. A8 Coil Pack Assembly
Component Locations
Diagram
(10257-5200 Rev. F)
(Sheet 2 of 2)

RF-2602 STATUS
MONITOR



RF-2602

STATUS MONITOR ASSEMBLY

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RF-2602 STATUS MONITOR ASSEMBLY

1. GENERAL INFORMATION

This section contains parts lists (tables 1, 2, and 3), component locations (figures 1, 2, and 3), and a schematic diagram (figure 4) for the RF-2602 Status Monitor.

Table 1. RF-2602 Status Monitor Parts List (10257-6100 Rev. D)

Ref. Desig.	Part Number	Description
—	10257-6105	CHASSIS,RF-2602
—	10257-6107	FRONT PANEL,RF-2602
—	10257-6106	COVER,RF-2602
—	10257-6005	ID PLATE, RF-2602
—	Z03-0011-001	FER ALUM BLK .200 I.D.
—	Z03-0012-001	HANDLE
A1	10257-6150	POWER SUPPLY/CONTROL PWBA
A2	10257-6120	FRONT PANEL PWBA
F1	F-0011	FUSE 1-1/2A QA 250V 3AG
F2	F-0011	FUSE 1-1/2A QA 250V 3AG
S1	S10-0002-111	SW TOG 2P ON-NONE-ON
W1	10257-6113	CABLE ASSY
XF1	F01-0001-002	FUHLR PNL MT SOL .750H
XF2	F01-0001-002	FUHLR PNL MT SOL .750H

Table 2. Power Supply/Control PWBA Parts List (10257-6150 Rev. H)

Ref. Desig.	Part Number	Description
C1	C28-0012-222	CAP ELCTLT 2200UF 50V
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	C26-0025-220	CAP 22UF 20% 25V TANT
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	C26-0025-479	CAP 4.7UF 20% 25V TANT
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
C16	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C17	M39014/02-1298V	CAP .01UF 10% 200V CER-R
C18	M39014/02-1298V	CAP .01UF 10% 200V CER-R

Table 2. Power Supply/Control PWBA Parts List (10257-6150 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
CR1	1N4007	DIODE 1A 1000V RECT GP
CR2	1N4007	DIODE 1A 1000V RECT GP
CR3	1N4007	DIODE 1A 1000V RECT GP
CR4	1N4007	DIODE 1A 1000V RECT GP
CR5	1N5711	DIODE SCHOTTKY 70V .25W
CR6	1N5711	DIODE SCHOTTKY 70V .25W
CR7	1N5711	DIODE SCHOTTKY 70V .25W
CR8	1N5711	DIODE SCHOTTKY 70V .25W
CR9	1N5711	DIODE SCHOTTKY 70V .25W
CR10	1N5711	DIODE SCHOTTKY 70V .25W
J1	J46-0022-020	HDR 20 PIN 0.100" SR LKG
J2	J46-0022-014	HDR 14 PIN 0.100" SR LKG
J3	J46-0035-005	CONN. .156 CTC 5 PIN
L1	MS14046-4	COIL 10UH 10% FXD RF
Q1	2N2907A	XSTR SS/GP PNP TO-18
Q2	2N2907A	XSTR SS/GP PNP TO-18
Q3	2N2907A	XSTR SS/GP PNP TO-18
Q4	2N2907A	XSTR SS/GP PNP TO-18
Q5	2N2222A	XSTR SS/GP NPN TO-18
R1	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R2	R65-0003-391	RES 390 5% 1/4W CAR FILM
R6	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R7	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R8	R65-0003-273	RES 27K 5% 1/4W CAR FILM
R9	R65-0003-332	RES 3.3K 5% 1/4W CAR FILM
R10	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R11	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
R12	R65-0003-103	RES 10K 5% 1/4W CAR FILM
R13	R65-0003-472	RES 4.7K 5% 1/4W CAR FILM
R14	R65-0003-222	RES 2.2K 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	R65-0003-222	RES 2.2K 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	R65-0003-102	RES 1.0K 5% 1/4W CAR FILM
R21	R65-0003-222	RES 2.2K 5% 1/4W CAR FILM
S1	S50-0001-004	SW SPST 4SEC .1A SLD DIP
S2	S30-0014-202	SW DPDT PC 5A 115/230V

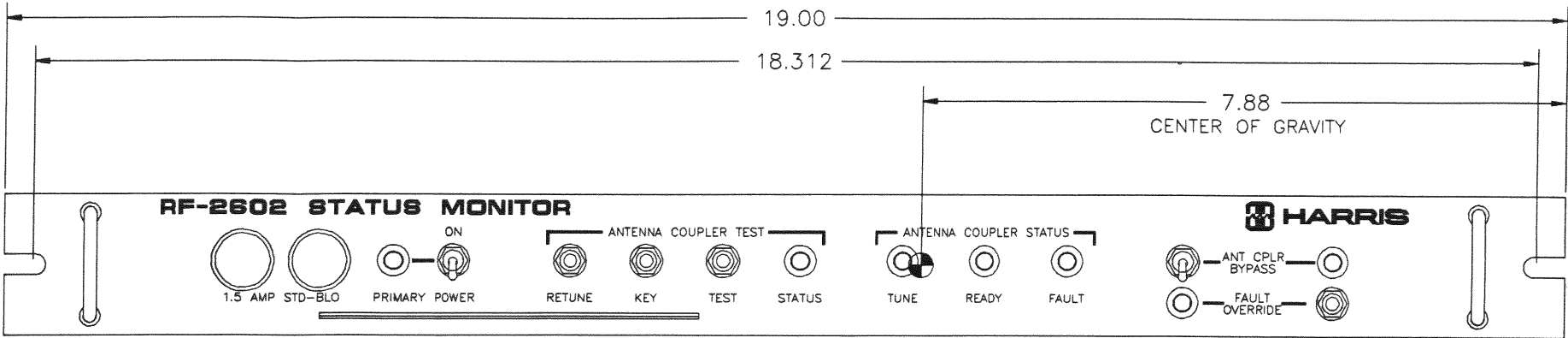
Table 2. Power Supply/Control PWBA Parts List (10257-6150 Rev. H) (Cont.)

Ref. Desig.	Part Number	Description
S3	S50-0001-004	SW SPST 4SEC .1A SLD DIP
T1	T40-0007-102	POWER TRANSFORMER
U1	I11-0001-001	IC VR 7805 +5V 1.5A 4%
U2	I05-0000-074	IC 74LS74A PLASTIC TTL
U3	I15-0000-132	IC 74HC132 PLASTIC CMOS
U4	I15-0000-032	IC 74HC32 PLASTIC CMOS
VR1	1N4734A	DIODE 5.6V 5% 1W ZENER
Z1	10043-0039	MOV,150V
Z2	10043-0039	MOV,150V

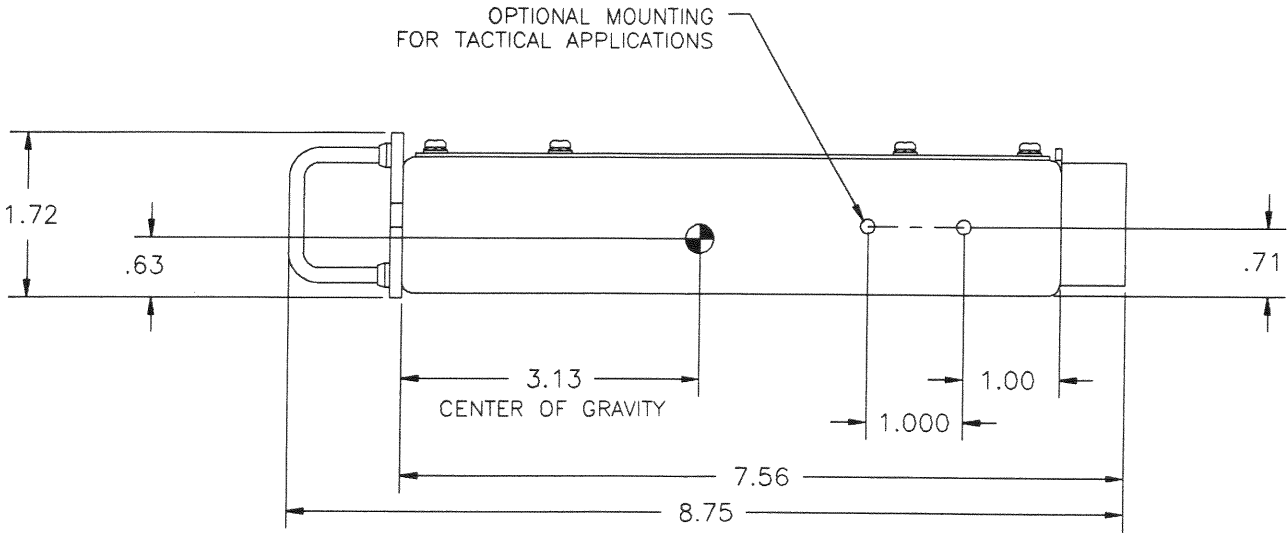
Table 3. Front Panel PWBA Parts List (10257-6120 Rev. A)

Ref. Desig.	Part Number	Description
A2	10257-6120	FRONT PANEL PWBA
CR1	1N5711	DIODE, SCHOTTKY 70V
CR2	1N5711	DIODE, SCHOTTKY 70V
DS1	N21-0013-003	LED GRN T-1 3/4
DS2	N21-0013-001	LED RED T-1 3/4
DS3	N21-0013-003	LED GRN T-1 3/4
DS4	N21-0013-002	LED YEL T-1 3/4
DS5	N21-0013-002	LED YEL T-1 3/4
DS6	N21-0013-002	LED YEL T-1 3/4
DS7	N21-0013-001	LED RED T-1 3/4
P4	J46-0016-114	CONN HOUSING 14PO
R1	R65-0003-391	RES 390 5% 1/4W C
R2	R65-0003-471	RES 470 5% 1/4W C
R3	R65-0003-471	RES 470 5% 1/4W C
R4	R65-0003-391	RES 390 5% 1/4W C
R5	R65-0003-471	RES 470 5% 1/4W C
S1	S-0245	SWITCH, PC, PB
S2	S-0245	SWITCH, PC, PB
S3	S-0245	SWITCH, PC, PB
S4	S10-0011-111	SW SP ON-NONE-ON T
S5	S-0245	SWITCH, PC, PB





FRONT VIEW



SIDE VIEW

Figure 1. RF-2602 Status Monitor Drawing

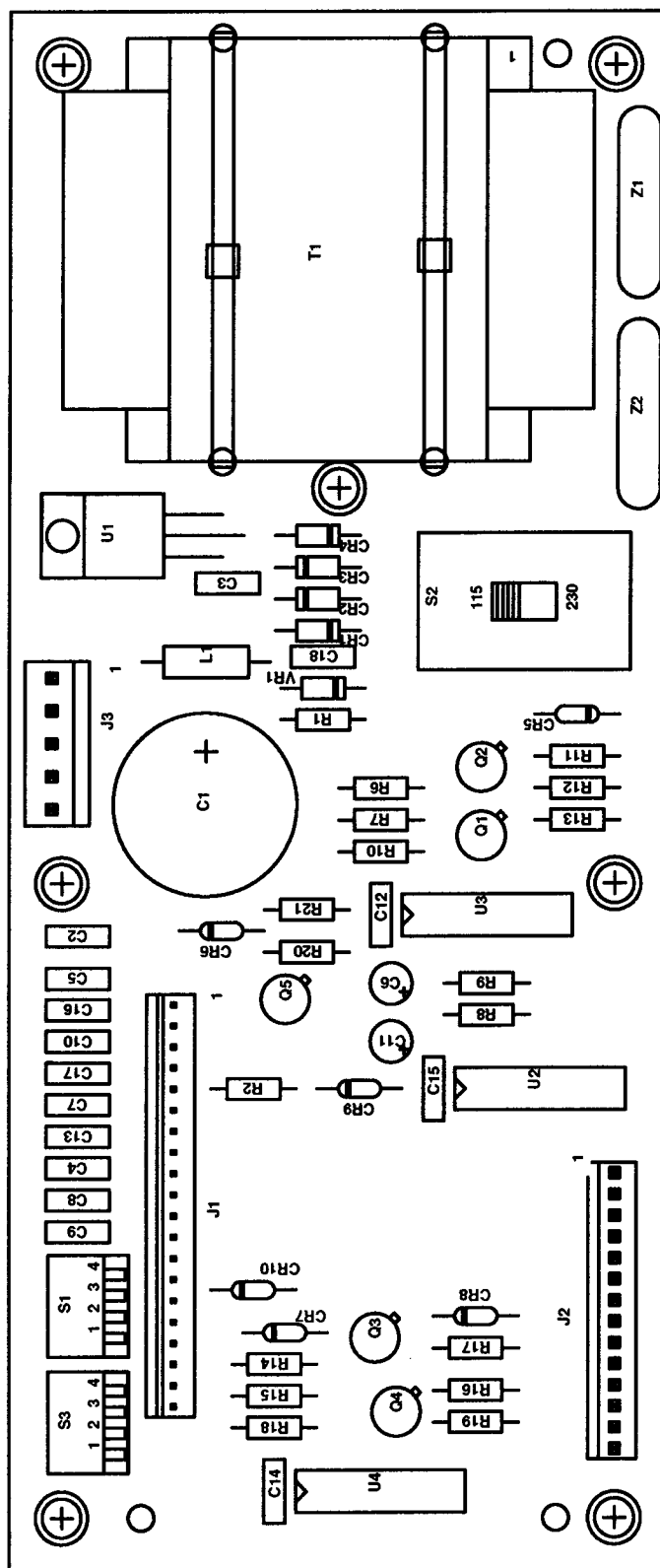
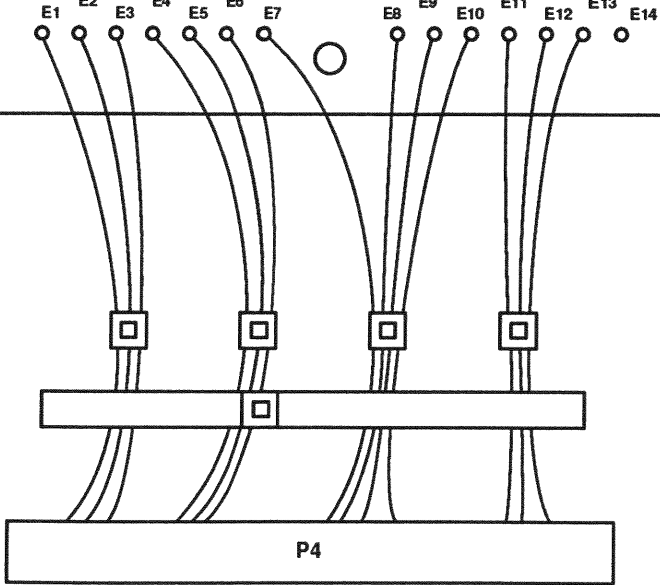


Figure 2. Power Supply/Control Assembly Component Location Drawing (10257-6150 Rev. B)





RF-2602 Status Monitor Front Panel Assembly Component Locations (10257-6120 Rev. A)

1. PREFIX INCOMPLETE REFERENCE DESIGNATIONS WITH 1A2.
2. UNLESS OTHERWISE SPECIFIED:
A. ALL RESISTOR VALUES ARE IN OHMS, 1/4W, $\pm 5\%$.
B. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. VENDOR PART NO. CALLOUTS ARE FOR REFERENCE ONLY. COMPONENTS ARE SUPPLIED PER PART NO. IN PARTS LIST.

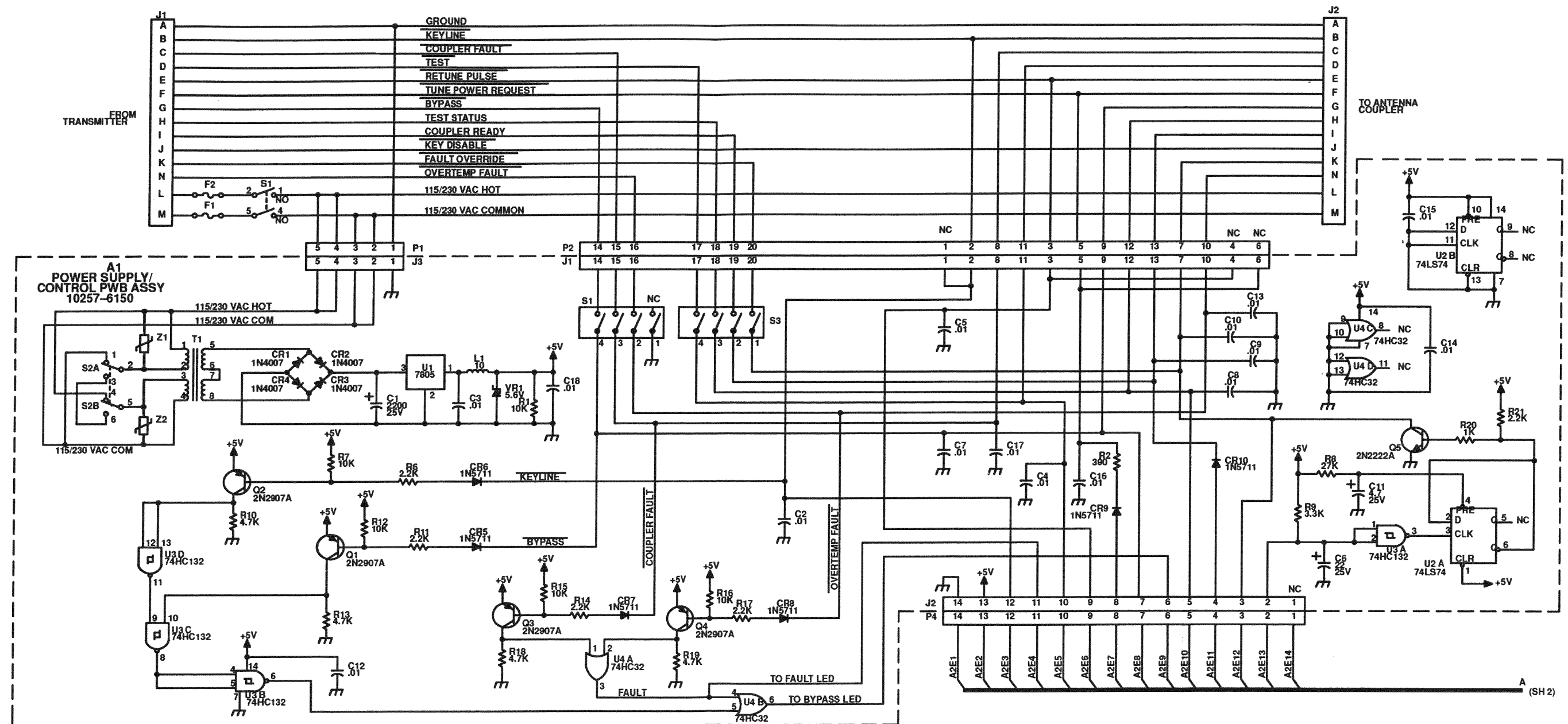


Figure 4. RF-2602 Status Monitor
Schematic Diagram
(10257-6101 Rev. A)
(Sheet 1 of 2)

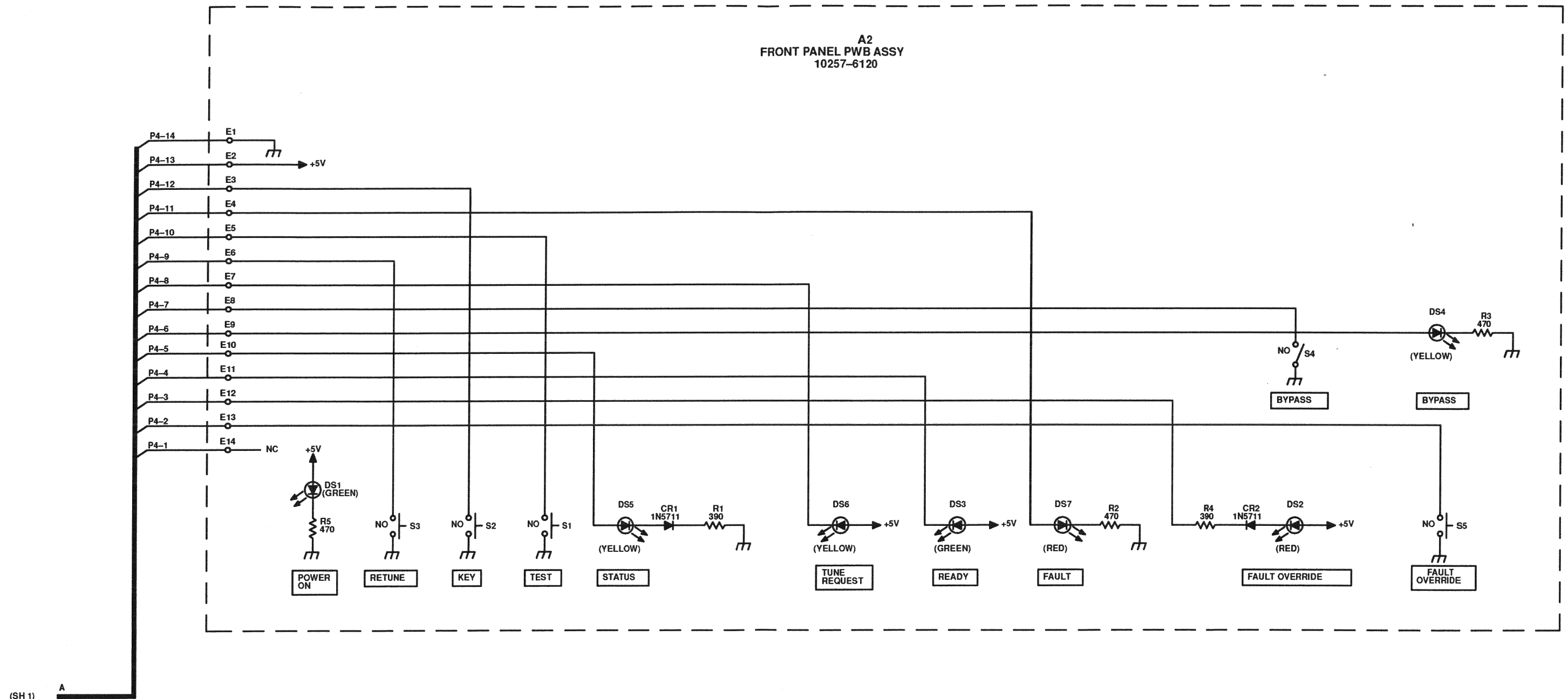


Figure 4. RF-2602 Status Monitor
Schematic Diagram
(10257-6101 Rev. A)
(Sheet 2 of 2)

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