

**CECOM DMWR 11-5820-1102**

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**DEPOT MAINTENANCE WORK REQUIREMENT  
INCLUDING REPAIR PARTS AND  
SPECIAL TOOLS LIST**

**FOR  
RADIO SET, AN/PRC-132  
(NSN 5820-01-320-8831) (EIC:N/A)**

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**US ARMY COMMUNICATIONS-ELECTRONICS COMMAND  
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FORT MONMOUTH, NEW JERSEY 07703-5007  
DATE 1 Sep 93**



**5**

**SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK**

**1**

**DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL**

**2**

**IF POSSIBLE, TURN OFF THE ELECTRICAL POWER**

**3**

**IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL**

**4**

**SEND FOR HELP AS SOON AS POSSIBLE**

**5**

**AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION**

**WARNINGS AND CAUTIONS**

**WARNING  
RADIOFREQUENCY RADIATION HAZARD**



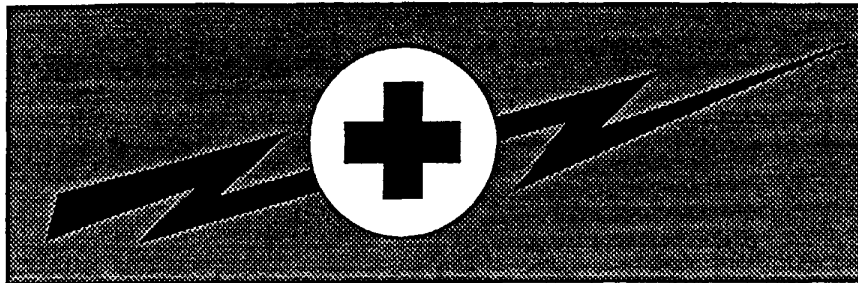
**DO NOT STAND IN THE DIRECT PATH OF THE ANTENNA WHEN THE POWER IS ON!! DO NOT WORK ON THE WAVEGUIDES WHILE THE POWER IS ON!!**

Radiofrequency electromagnetic radiation can cause fatal internal burns. It can literally "cook" internal organs and flesh. If you feel the slightest warming effect while near this equipment,

**MOVE AWAY QUICKLY!!**

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**WARNING**



**HIGH VOLTAGE**  
is used in the operation of this equipment.

**DEATH ON CONTACT**  
may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technicians are aided by operators, they must be warned about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections or 115 volt ac input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

**Warning: Do not be misled by the term "low voltage." Potentials as low as 50 volts may cause death under adverse conditions.**

For Artificial Respiration, refer to FM 21-11.

**WARNING**

**RF VOLTAGE WARNING**

Exposed metal transceiver parts can assume an RF potential to ground when antenna is tuned without grounding transceiver. To avoid RF burns, tie transceiver GND stud to ground.

**WARNING**

**DO NOT SERVICE OR ADJUST ALONE**

Do not attempt initial service or adjustment unless another person capable of rendering first aid and resuscitation is present.

**WARNING**

**REMOVE ALL WATCHES, RINGS, NECKLACES, OR OTHER METAL ADORNMENTS FROM BODY**

Dangerous voltages are present in the equipment and CAN RESULT IN SEVERE BURNS, INJURY, or EVEN DEATH if they come in contact with jewelry.

**WARNING**

**GROUND THE SYSTEM**

To minimize shock hazard, the equipment chassis must be connected to an electrical ground.

**WARNING**

**KEEP AWAY FROM LIVE CIRCUITS**

The antenna is a source of electrical and radio frequency energy. NEVER TOUCH THE ANTENNA WHEN RADIO IS IN USE. An RF burn may occur as a result of contact with an active antenna system.

**WARNING**

**ACCIDENTAL CONTACT WITH DC LINE VOLTAGE**

Use caution when performing equipment maintenance. Accidental contact with dc line voltage can cause injury.

**WARNING**

**DO NOT REMOVE OR REINSERT MODULES OR PCBs WITHOUT REMOVING PRIMARY POWER FROM EQUIPMENT**  
To prevent the possibility of damaging the equipment during maintenance, always remove primary power from the transceiver when removing or reinserting modules, PCBs, or other plug in assemblies.

**CAUTION**

The ANPRC-132 contains parts and assemblies susceptible to damage by electrostatic discharge (ESD). Use good shop practice to prevent such damage in accordance with DOD STD-1686 and MIL-HDBK-263.

**WARNING**

**DO NOT SUBSTITUTE PARTS OR MODIFY SYSTEM**  
Do not substitute parts or modify system in any manor.

**WARNING**

**BERYLLIUM OXIDE WARNING**

Beryllium oxide is used as an electrical insulator/thermal conductor in some electronic components contained within the equipment. Beryllium oxide easily goes to powder when crushed, and in this form is a toxic health hazard. Avoid crushing components which may contain beryllium oxide. In the event that suspected beryllium oxide powder is inhaled or swallowed, obtain medical assistance immediately.

Dispose of items containing beryllium oxide materials in accordance with standard Army procedures.

**WARNING**

**A13 POWER AMPLIFIER WARNING**

Circuit card A13 contains BERYLLIUM OXIDE (BeO) CERAMICS. The dust or fumes from BERYLLIUM OXIDE CERAMICS are HIGHLY TOXIC and breathing them can result in serious personal injury or DEATH. For logical guidance/assistance on disposal of unserviceable A13 circuit card, contact your servicing Defense Reutilization and Marketing Office (DRMO).

**WARNING****A1 PROCESSOR BOARD WARNING**

Processor board A1 contains a lithium battery. The lithium battery contains flammable organic materials. Incorrect handling may cause an explosion. Do not short battery leads together in any fashion. Do not expose battery to extreme heat for more than five seconds. Do not immerse battery in water or cleaning solution. Ensure battery polarity is correct. Do not strike or drop battery.

A lithium-sulfur dioxide (LiSO<sub>2</sub>) battery used with the AN/PRC-132 contains pressurized sulphur dioxide (SO<sub>2</sub>) gas. The gas is toxic, and the battery MUST NOT be handled in any way that may cause it to rupture.

DO NOT heat, short circuit, crush, puncture or disassemble batteries.

DO NOT use any battery which shows sign of damage, bulging or leaking.

DO NOT test BA-5590/U battery for capacity.

DO NOT recharge BA-5590/U batteries.

DO NOT dispose of BA-5590/U batteries with ordinary trash. Turn them over to Defense Reutilization and Marketing Office or dispose in accordance with standard Army procedures.

DO NOT attempt to transmit while charging the BB-590 battery.

DO NOT store batteries in unused equipment for more than 30 days.

**WARNING****BATTERY HEAT WARNING**

If battery compartment becomes hot to the touch, if a hissing sound is heard (i.e., battery venting), or smell irritating sulfur dioxide gas, IMMEDIATELY turn equipment off and leave the area.

1. Allow equipment to cool at least one hour.
2. Remove and replace battery only after the equipment has cooled to the touch.
3. If there is a safety incident, or if a hazard exists, notify Safety Officer and file a Quality Deficiency Report, SF 368, and notify the CECOM Safety Office, Ft. Monmouth, NJ at DSN 995-3112.

**WARNING**

**HALON FIRE EXTINGUISHER WARNING**

**DO NOT use a halon type fire extinguisher on a BA-5590/U battery.**

In the event of a fire involving lithium batteries, rapid cooling of the batteries is important. Flood equipment with water or use a carbon dioxide (CO<sub>2</sub>) extinguisher. Control of equipment fire, and cooling, may prevent the exposure of lithium metal. In the event that the lithium metal becomes involved in the fire, use a graphite based Class D fire extinguisher such as Lith-X or Met-L-X, as the unit contains lithium, which is not extinguishable by CO<sub>2</sub>.

**WARNING**

Use approved personal protective equipment (goggles/faceshield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream toward self or other personnel.



Depot Maintenance  
Work Requirement  
No. 11-5820-1102

US ARMY  
COMMUNICATIONS-ELECTRONICS COMMAND  
Fort Monmouth, NJ, 1 Sep 93

**DEPOT MAINTENANCE WORK REQUIREMENT  
INCLUDING  
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FOR  
RADIO SET, AN/PRC-132  
(NSN 5820-01-320-8831) (EIC: N/A)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms) or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007.

In either case a reply will be furnished direct to you.

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## CHAPTER 1

### INTRODUCTION

#### Section I. GENERAL

##### 1-1 SCOPE.

These instructions are for use by depot/contractor personnel. They apply to the Special Operations High Frequency Radio (SOHFRAD) and in case of conflict, take precedence over all other documents pertinent to depot maintenance of the item. Condition of the overhauled AN/PRC-132 shall be such that utility and performance is equal to that of condition code A as defined in AR 725-50.

##### 1-2 CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS.

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

##### 1-3 FORMS, RECORDS AND REPORTS.

a. *Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750, as contained in Maintenance Management Update. Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2, Vol 3 and unsatisfactory material/conditions (UR) IAW OPNAVINST 4790.2, Vol 2, chapter 17. Marine Corps maintains forms and procedures as prescribed by TM 4700-15/1.

b. *Reporting of Item and Packaging Discrepancies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. *Transportation Discrepancy Report (TDR) (SF 361).* Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

##### 1-4 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATION (EIRs).

If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ED-PH, Fort Monmouth, New Jersey 07703-5007. We'll send you a reply.

##### 1-5 ENGINEERING CHANGE PROPOSALS (ECPs).

ECPs will be prepared using DD Form 1693, Engineering Change Proposal. Instructions for preparing ECPs are provided in MIL-STD-481, Configuration Control Engineering Changes, Deviations and Waivers (Short Form). ECPs should be mailed direct to Commander, US Army Communications-Electronics Command, ATTN: AMSEL-ED-PH, Fort Monmouth, New Jersey 07705-5007. A reply will be furnished directly to you.

## 1-6 DEVIATIONS AND EXCEPTIONS.

1-6.1 Contractor. When any work segment, as set forth in this depot maintenance work requirement, cannot be accomplished, or can only be accomplished in a manner other than specified, prior approval of the work segment by the procuring activity shall be obtained by immediately submitting a request for Deviation/Waiver (RFD/W) in accordance with DoD-STD-480. Contractors shall submit a RFD/W to the Contracting Officer.

1-6.2 Depots. Defects shall be processed in accordance with DESCOM-R 702-1.

## Section II. DESCRIPTION DATA PLATES AND DATA

### 1-7 DESCRIPTION.

The AN/PRC-132 Radio Set consists of the RT-1648/PRC-132 Radio Receiver-Transmitter and the CY-8629/PRC-132 Battery Box. The battery box contains either one BB-590 or two BA-5590 12 Vdc batteries. The radio receiver-transmitter is protected by the control panel and rear panel cover assemblies when not in use. When in use the rear panel cover assembly is removed and the battery box is attached to the rear panel to provide power to the radio receiver-transmitter.

The radio set has an Amplitude Modulation (AM) frequency range of 1.6 to 49.9999 MHz. It provides half-duplex operation in Upper Sideband (USB), Lower Sideband (LSB), and Amplitude Modulation Equivalent (AME) modes. Voice, data, and CW operations are available in all modes. 100 receive and 100 transmit frequencies can be preprogrammed as channels 0 - 99. Channels are field programmable, with battery backup to prevent loss of memory. Up to 11 channels can be scanned, and receive frequencies can be scanned in 100 Hz increments. A receive only mode of operation can be selected. Four levels of transmit power are available: 5, 10, 20, and 50 watts. All transceiver memory can be cleared by the operator.

Secure lighting allows the illumination of display LCD for night operations.

The radio set will work with dipole or tuned antennas capable of handling 50 watts of Radio Frequency (RF) power. An unbalanced 50-ohm BNC-type antenna connector is provided on the front panel. A BNC-to-binding post adapter is also provided for connection to wire antennas. The radio set can be used with an untuned longwire antenna, although performance will be degraded.

The radio set can interface with a variety of auxiliary equipment necessary for mission performance.

### 1-8 DATA PLATES.

Data plates are composed of a .024 thick photo sensitized aluminum alloy. Data plate information is applied in black epoxy ink. When sufficient space is not available on the existing data plate to add information, the data plate shall be replaced and all pertinent data transferred to a new data plate. Data plate information shall not be stamped directly on any part, assembly, or item of equipment, except when approved by the government.



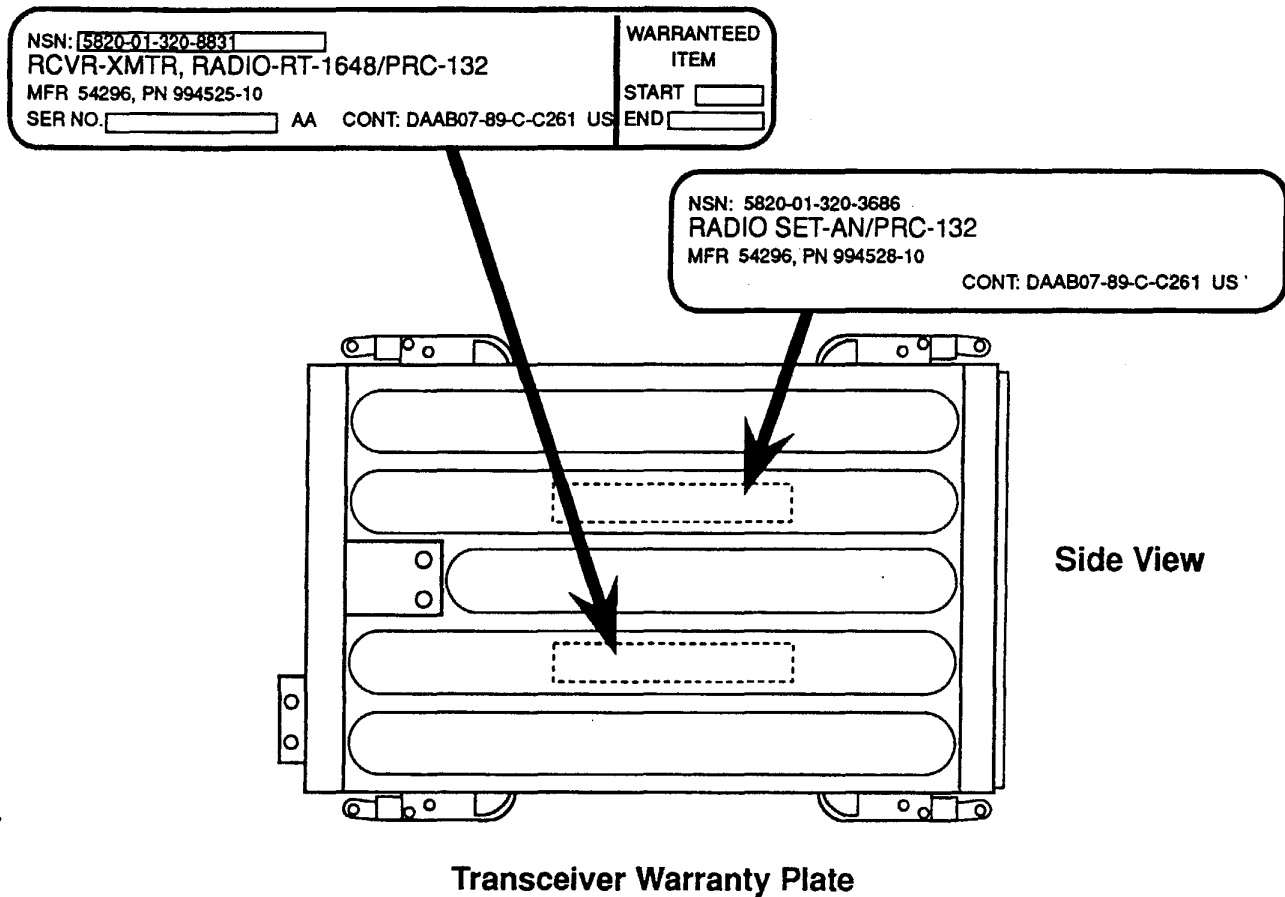
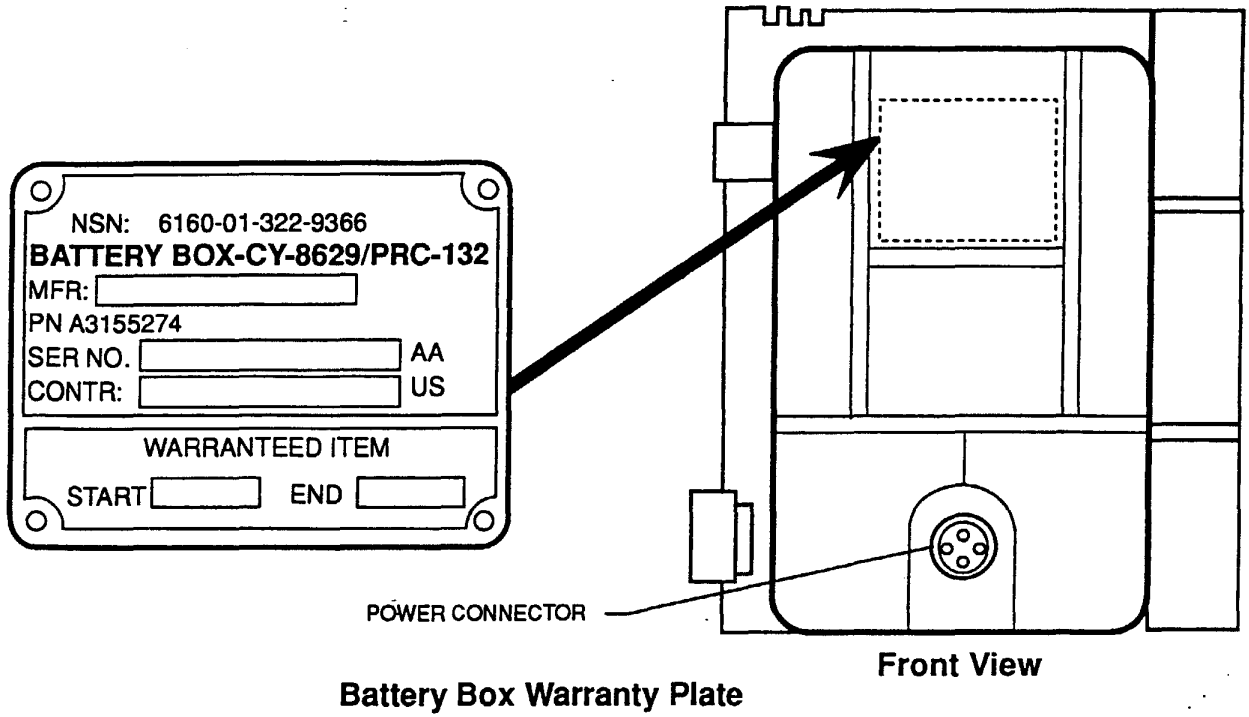


FIGURE 1-1. Radio Set - AN/PRC-132 Warranty Plate Locations

1-9 DATA.

1-9.1 Tabulated Data.

Table 1-1 contains tabulated data for the AN/PRC-132 Radio Set.

Table 1-1. Tabulated Data

|  |  |
|--|--|
| <u>Performance Specifications</u>            |  |
| Frequency range:                             | 1.6 to 49.9999 MHz.  |
| Frequency steps:                             | 100 Hz increments.   |
| Channels:                                    | 484,000, synthesized.  |
| Operating modes:                             | LSB, USB, AME (CW and voice in all modes).   |
| Audio input:                                 | 150 ohm impedance with Voice Operated Gain Adjustable Device (VOGAD) for constant audio level.   |
| Duty Cycle:                                  | 1:20 transmit to receive. 1 minute maximum continuous transmit time.   |
| Input voltage:                               | 12 Vdc nominal.  |
| Battery Life (BB-590):                       | 2 hours receive, 6 one-minute transmissions minimum between recharge; (1 each) at 50 watts.  |
| Battery Life (BA-5590):                      | 8 hours receive, 24 one-minute transmissions minimum before battery (2 each) replacement; at 20 watts.                                 |
| <u>Microprocessor Capability</u>             |  |
| Operation:                                   | Simplex, half-duplex.  |
| Number of channels (preprogrammable) stored: | 100 transmit, 100 receive.   |
| Scanning:                                    | Up to 11 channels may be scanned manually.   |
| Up-down tuning:                              | Continuous synthesized tuning in increments of 100 Hz, receive only.   |
| <u>Transmitter</u>                           |  |
| Power output:                                | Selectable 5, 10, 20, or 50 watts. NOTE: Transmit power is limited to a maximum of 20 watts when operating with two BA-5590 batteries. |
| Impedance:                                   | 50 ohms.   |
| Audio bandwidth:                             | 2.4 kHz, -6 dB bandwidth.  |
| Antenna mismatch:                            | Protected against mismatch, including open and short circuits.   |

Table 1-1. Tabulated Data

|   |   |
|---|---|
| <b>Receiver</b>   |   |
| Sensitivity:  | 117 dBm maximum for 10 dB SINAD.                        |
| Selectivity:  | 6 dB bandwidth, 2400 Hz; 50 dB bandwidth, 5 kHz.        |
| Audio output power:   | 10 mW minimum into 500 ohms at less than 5% distortion. |
| <b>Mechanical</b>   |   |
| Weight with battery box and cover (with one BB-590 or two BA-5590 batteries): | 16 pounds max (7.264 kg).                               |
| Displacement volume (with battery box):                                       | 350 cubic inches, maximum.                              |

1-9.2 Configuration Data. The only configuration addressed in this depot level manual is the transceiver receiver-transmitter radio and battery box listed above.

### Section III. MOBILIZATION REQUIREMENTS

#### 1-10 GENERAL.

In the event of mobilization, all depot maintenance overhaul/repair procedure requirements, except those necessary to return the end item, assembly, subassembly or component to a serviceable condition, are to be exempt or revised. The exemptions/revisions are identified in Appendix D.

## CHAPTER 2

### TECHNICAL SUPPORT REQUIREMENTS

#### Section I. SUPPORT ITEMS

##### 2-1 FACILITIES.

No special facilities are required.

##### 2-2 TOOLS AND EQUIPMENT.

Table 2-2 provides a complete listing of all the tools, test and inspection equipment used by the procedures in this manual. Specific equipment requirements are contained in the sections of Chapter 4 where they are used.

**2-2.1 Special Tools and Equipment.** Special tools and equipment are contained in Table 2-1. Each section of Chapter 4 lists diagnostic inspection and test equipment required for each item, assembly subassembly and/or component. General information regarding the special test fixtures is contained in the following paragraphs.

All of the test fixtures described below consist of a single, small aluminum chassis which contains connectors, switches, indicators and associated wiring. The A13 power amplifier test fixture contains an additional aluminum block that is used as a heat sink.

Table 2-1. Special Tools and Equipment

| Test Fixture                            | Part Number  | Reference Paragraph of Use |
|---|--------------|----------------------------|
| A1, A2, A3 Boards Test Fixture Assembly | 144-0011-001 | 4-110, 4-119, 4-128        |
| A7 Board Test Fixture Assembly          | 144-0012-001 | 4-137                      |
| A8 Board Test Fixture Assembly          | 144-0013-001 | 4-146                      |
| A9 Board Test Fixture Assembly          | 144-0014-001 | 4-155                      |
| A10 Board Test Fixture Assembly         | 144-0015-001 | 4-164                      |
| A11, A12 Boards Test Fixture Assembly   | 144-0016-001 | 4-173, 4-182               |
| A13 Board Test Fixture Assembly         | 144-0017-001 | 4-88                       |
| A22 Control Panel Test Fixture Assembly | 144-0010-001 | 4-215                      |

2-2.2 Inspection and Test Equipment. Table 2-2 lists all of the required inspection and test equipment.

Table 2-2. Inspection and Test Equipment

| Description   | NSN/Part No.       | Reference Paragraph of Use  |
|---|--------------------|---|
| ac Voltmeter  |                    | 4-88, 4-101, 4-173, 4-182, 4-263, 4-273   |
| Amplifier, ENI 325 LA (RF Power Amplifier)                  | 6625-01-264-5552   | 4-173, 4-182  |
| Assorted Jumpers (10)                                       | 204-12W-S          | 4-263, 4-273  |
| Attenuator, JFW 50H-30-100 or Equivalent                    | 6625-01-136-3170   | 4-88, 4-101, 4-173, 4-182, 4-263, 4-273   |
| Battery   | BB590/U1           | 4-263, 4-273  |
| Card Cage Extender Cable                                    | 437-0033-001       | 4-101   |
| Combiner, ANZAC HH108                                       | HH108              | 4-88  |
| DC Dummy Load, CAEN 102010 (Dummy Load)                     | 102010             | 4-101, 4-263, 4-273   |
| Distortion Analyzer, TS-4084/G (Distortion Measurement Set) | 6625-01-217-0054   | 4-101, 4-137  |
| AN/USM-486 (Digital Multimeter (DMM))                       | 6625-01-145-2430   | 4-88, 4-101, 4-110, 4-119, 4-128, 4-137, 4-146, 4-155, 4-164, 4-173, 4-182, 4-215, 4-273, 4-273 |
| Frequency Counter, AN/USM-459A                              | 6625-01-271-3012   | 4-110, 4-119, 4-215, 4-128  |
| Network Analyzer, HP 3577A                                  | 6625-01-238-9547   | 4-146, 4-155, 4-164, 4-173, 4-182, 4-215  |
| Network Analyzer/Spectrum Analyzer (Spectrum Analyzer)      | 4195A              | 4-88, 4-101, 4-119, 4-137, 4-155, 4-164, 4-128  |
| Oscilloscope, AN/USM-488                                    | 6625-01-187-7847   | 4-119, 4-137, 4-263, 4-273  |
| Power Meter, AN/USM-491                                     | 6625-01-191-7679   | 4-119, 4-164, 4-128   |
| Power Supply, PP 7545 B/U                                   | (1)130-01-238-8240 | 4-101, 4-110, 4-119, 4-128, 4-137, 4-146, 4-155, 4-164, 4-173, 4-182, 4-215, 4-263, 4-273       |
| Power Supply, PP 7548/U (Power Supply, High Current)        | 6625-00-437-4861   | 4-88, 4-101   |
| Radio DC Power Cable  | 437-0008-001       | 4-101   |
| Resistor, RE75G15R0, 50 Watts, 15 Ohms (Resistor, 15 Ohm)   | MIL-STD-RE75G15R0  | 4-263, 4-273  |
| S Parameter Test Set, HP 35677A                             | 6625-01-238-9547   | 4-155, 4-164, 4-215   |
| Signal Generator, SG-1170/U                                 | 6625-01-120-3501   | 4-88, 4-101, 4-137, 4-155, 4-164, 4-173, 4-182  |
| Simpson 375 (Current Meter)                                 | 6625-01-021-0236   | 4-88, 4-101, 4-137, 4-155, 4-164, 4-215, 4-273  |
| T Probe Connector, HP 11042A                                | 11042A             | 4-88, 4-101, 4-173, 4-182, 4-263, 4-273   |
| Temperature Probe   | 80T-150            | 4-263, 4-273  |
| Tool Kit, TK-101/G  | 5180-00-064-5178   | 4-88, 4-101, 4-110, 4-119, 4-128, 4-137, 4-146, 4-155, 4-164, 4-173, 4-182, 4-215, 4-263, 4-273 |
| Voltage Ohm Meter (VOM)                                     | PSM-4              | 4-263   |

2-2.2.1 A1, A2, A3 Boards Test Fixture (Figure 2-1). This test fixture is used to test the A1 processor board, the A2 1st Local Oscillator (LO) board, and the A3 2nd Local Oscillator (LO) board. The test fixture contains an A1 processor board, A2, 1st LO board, A3 2nd LO board and a front panel assembly built into it. When the test fixture is used, the board being tested is installed vertically into the A1, A2, or A3 slot in place of the board that is part of the test fixture. The A1, A2, or A3 board, and the front panel assembly provide required interface signals for the board being tested. When the A2 1st LO board is being tested, the A3 board need not be installed in the test fixture.

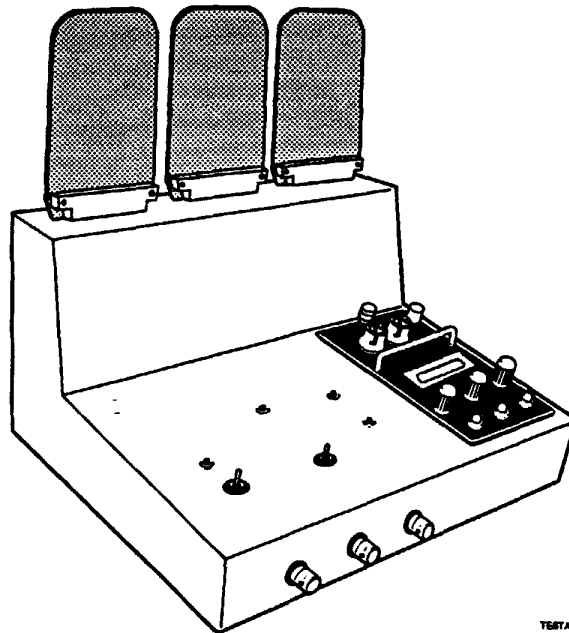


FIGURE 2-1. A1, A2, A3 Boards Test Fixture

2-2.2.2 A7 Board Test Fixture (Figure 2-2). This test fixture, in conjunction with standard test equipment, is used to align and test the A7 product detector board.

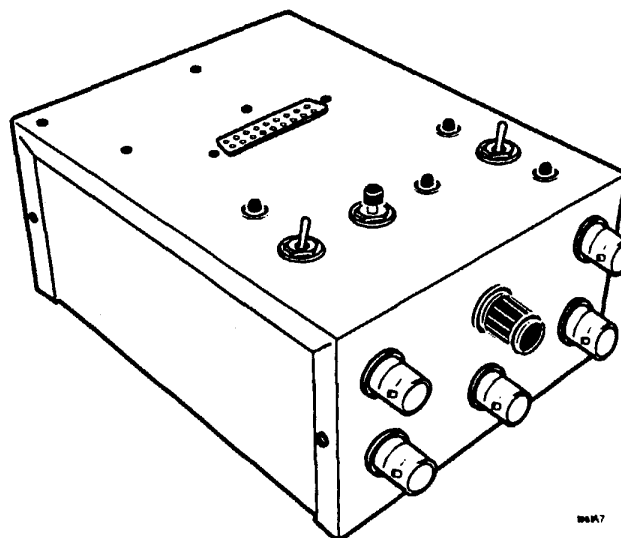


FIGURE 2-2. A7 Board Test Fixture

The test fixture contains a 5.12 MHz oscillator which provides a time base for the board under test. This time base oscillator is a Temperature Compensated Crystal Oscillator (TCXO) that is mounted on a small

PC board and is installed inside the test fixture. The time base oscillator in the test fixture uses the same 5.12 MHz TCXO used in the transceiver.

**2-2.2.3 A8 Board Test Fixture (Figure 2-3).** This test fixture is required to control operation of the A8 2nd IF board and interface it with standard external test equipment. The test fixture contains no active circuitry.

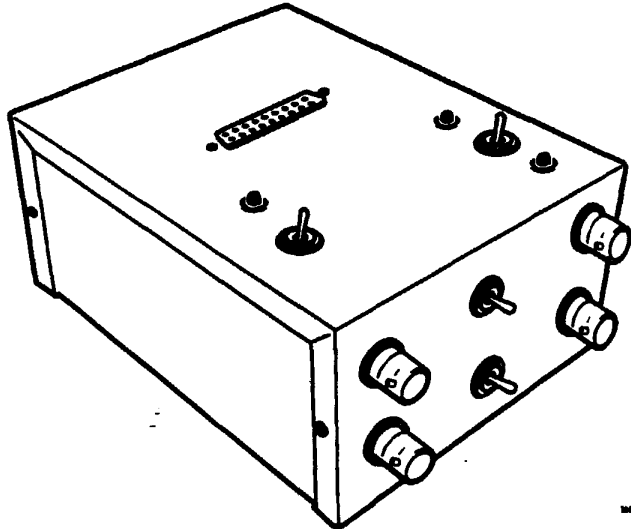


FIGURE 2-3. A8 Board Test Fixture

**2-2.2.4 A9 Board Test Fixture (Figure 2-4).** This test fixture is required to control operation of the A9 1st IF board and interface it with standard external test equipment. The test fixture contains mixer circuitry provided by a partially assembled A9 board which is installed inside the test fixture. An RF power splitter is also included inside the test fixture.

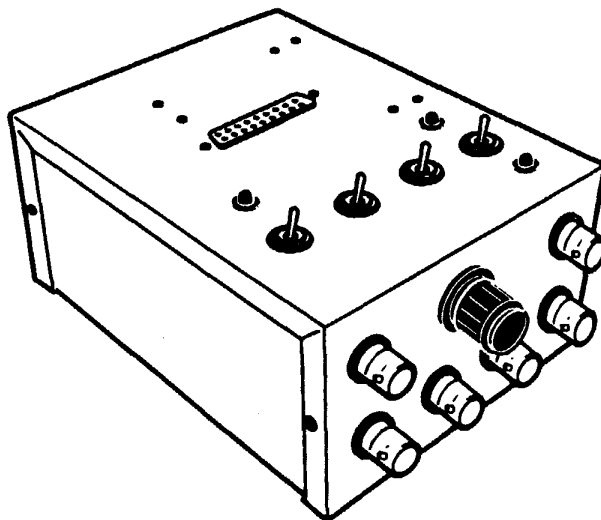


FIGURE 2-4. A9 Board Test Fixture

2-2.2.5 A10 Board Test Fixture (Figure 2-5). The A10 1st mixer board test fixture is required to control operation of the A10 1st mixer board and interface it with the test fixture and standard external test equipment. The A10 test fixture contains an RF power splitter. The test fixture provides dc power and control signal switching and contains no active circuitry. The input/output test connectors for the test fixture are located on front surface of test fixture.

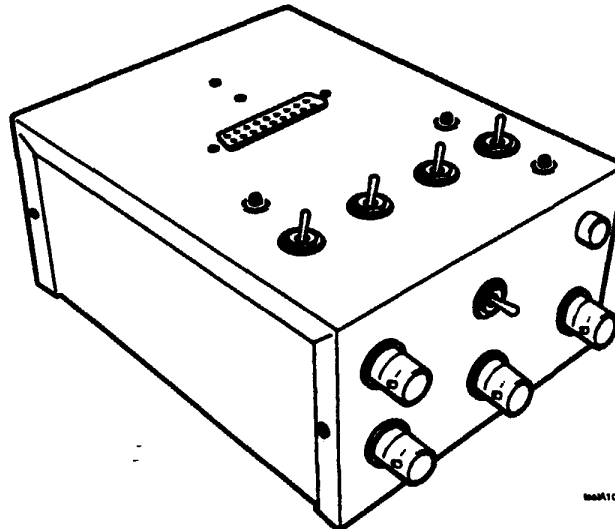


FIGURE 2-5. A10 Board Test Fixture

2-2.2.6 A11, A12 Boards Test Fixture (Figure 2-6). The A11, A12 boards test fixture is required to control operation of A11 or A12 board under test and interface it with standard external test equipment. The test fixture contains operational A11 and A12 filter boards. The A11 or A12 filter board under test is installed in place of one of the test fixture boards during testing. The test fixture contains active circuitry required to control filter selection relays on the A11 and A12 boards.

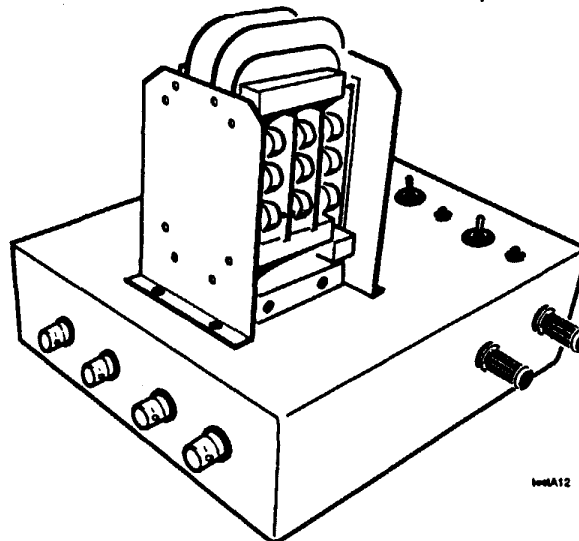
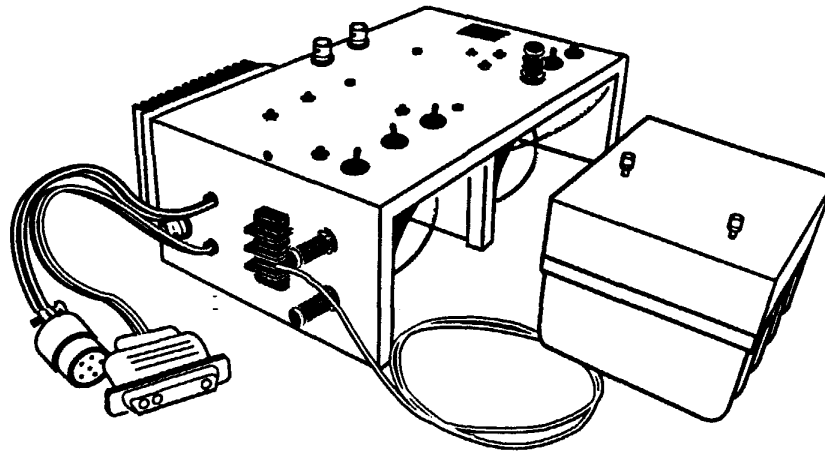


FIGURE 2-6. A11, A12 Boards Test Fixture



**2-2.2.7 A13 Board Test Fixture (Figure 2-7).** The A13 board test fixture consists of two separate pieces; the main test fixture and an aluminum block that it used as a heat sink. These two unique test fixture pieces are used in conjunction with standard test equipment to align and test the A13 power amplifier board.

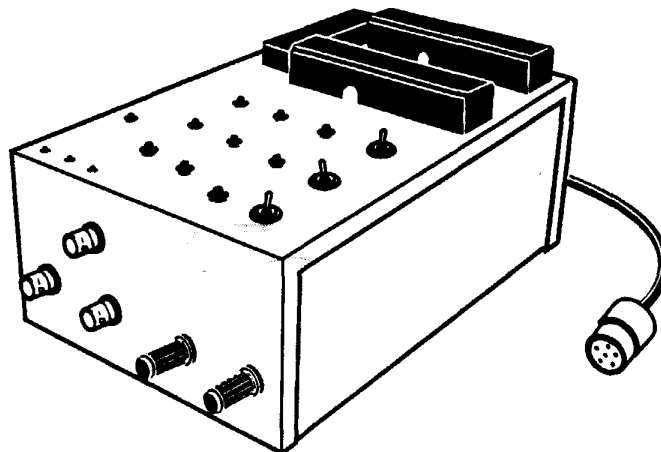
The A13 board test fixture consists of logic control circuitry, harmonic filters, and the preamplifier driver. The logic control circuitry is controlled by an electronically programmable logic device that converts the Binary Coded Decimal (BCD) thumbwheel switch input data into a series of usable addresses to control the harmonic filter. The preamplifier driver consists of an amplifier mounted on a printed circuit card and metal base. It provides a 30 dB gain to drive A13 power amplifier board.



100A13

FIGURE 2-7. A13 Board Test Fixture

**2-2.2.8 A22 Control Panel Test Fixture (Figure 2-8).** The control panel test fixture is required to control operation of the control panel assembly and interface it with A1, A2 and A3 boards, which are contained in the test fixture, and with standard external test equipment. The test fixture contains no active circuitry. The mating test connector for control panel assembly is located on the right side of the test fixture. Mating connectors for the A1, A2 and A3 boards are located inside the test fixture. An interconnect cable, with P1, is located on the right hand side of the test fixture.



100A22

FIGURE 2-8. A22 Control Panel Test Fixture

2-2.3 Special Inspection Equipment (SIE). There is no special inspection equipment designed for the Depot Maintenance Work Requirements (DMWR) of the radio set.

2-2.4 Fabricated Tools and Equipment. Table 2-3 lists the tools and/or equipment that are fabricated for maintenance of the radio set.

Table 2-3. Fabricated Tools and Equipment

| Fabricated Item                    | Part Number  |
|------------------------------------|--------------|
| Audio/Key Test Cable               | 991736-00    |
| Battery Box Charge Cable           | 137-1209-001 |
| Battery Box Load Cable             | 137-1208-001 |
| Exciter Power Cable                | 437-0050-001 |
| Lithium Battery Substitution Cable | 137-1210-001 |
| Ni-Cad Battery Extender Cable      | 137-1211-001 |

## Section II. FINITE LIFE ITEMS, TIME BETWEEN OVERHAUL (TBO) ITEMS, PARTS AND MODIFICATIONS

2-3 FINITE LIFE ITEMS AND TIME BETWEEN OVERHAUL (TBO) ITEMS. There are no finite life items or TBO items.

2-4 MANDATORY REPLACEMENT PARTS.

Chapter 4, Overhaul Operations, lists all mandatory replacement parts.

2-5 REPAIR PARTS.

Appendix B contains the Repair and Special Tools List (RPSTL).

2-6 MODIFICATIONS.

There are no modifications currently listed for the AN/PRC-132 Radio Set. In the event that this end item does change, modifications are identified in DA PAM 25-30.

## Section III. STANDARDS

2-7 QUALITY OF MATERIAL.

Parts and material used for replacement, repair, or modifications must meet requirements of the equipment drawings and specifications if standards are not provided in the DMWR.

2-8 ELECTROMAGNETIC COMPATIBILITY STANDARDS.

The Electromagnetic Compatibility Standard for this end item is MIL-STD-461; MIL-STD-462.

2-9 ELECTROSTATIC DISCHARGE (ESD).

Electrostatic discharge shall be controlled in accordance with standard shop practices and in accordance with DoD STD-1686 and MIL HDBK-263.

**DMWR 11-5820-1102**

**2-10 NUCLEAR HARDNESS.**

**There are no nuclear hardness survivability requirements.**

## CHAPTER 3

### PRESHOP ANALYSIS OPERATIONS

#### Section I. TEST AND ANALYSIS STANDARDS

##### 3-1 PURPOSE.

The purpose of preshop analysis operations is to determine, at the highest assembly level possible, the work required to return the AN/PRC-132 Radio Set to a serviceable condition as specified in the Depot Maintenance Work Requirements (DMWR). If inspection at the highest level of assembly is precluded by missing, damaged or diagnosed defective assemblies, consider techniques that allow continued inspection at the highest assembly level. If this is not possible, proceed with inspection at the next lower assembly level. The Preshop Analysis Checklist will be used to record the results of the analysis and any required maintenance. When performing a 100 percent teardown overhaul, a preshop analysis is not mandatory.

##### 3-2 GENERAL.

**3-2.1 Inspection of Forms.** Check all tags and forms attached to the radio set, assembly, subassembly or components to determine the reason for removal from service. Do not remove tags or forms.

**3-2.2 Removal of End Item, Assembly, Subassembly or Component From Shipping Container, Package or Storage.** Carefully remove any item, assembly, subassembly or component from its container, being careful not to misplace or destroy any tags or forms and not to damage equipment. Maintain good shop practices regarding Electrostatic Discharge (ESD).

#### **CAUTION**

Be careful not to misplace or destroy any tags or forms and not to damage equipment.

**3-2.3 External Inspection.** Inspect item, assembly, subassembly or component for evidence of damage and discrepancies in permanent marking.

**3-2.4 Cleaning.** Prior to disassembly, wipe down the transceiver housing, battery box, external connectors, front and rear covers and operating control panel and indicators with a cloth or soft bristle brush. Isopropyl alcohol or mild soap water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

**3-2.5 Test.** Test the end item in accordance with the procedure in Chapter 3 of TM 11-5820-1102-30. Verify the reported damage/malfunction report or historical record first (unless damage is obvious).

**3-2.6 Temporary Preservation/Protection.** Protect the item, assembly, subassembly or component being inspected, tested or repaired from further damage by using good shop practice and by placing item in temporary preservation/protection. Place component parts in electrostatic bags when not being tested or repaired. Cover major subassemblies, assemblies and items when not being tested and/or repaired to prevent further loss in serviceability.

3-2.7 Special Handling or Condemnation Procedures.

**WARNING**

**BERYLLIUM OXIDE WARNING**

Beryllium oxide may be used as an electrical insulator/thermal conductor in some electronic components contained within the equipment. Beryllium oxide easily goes to powder when crushed, and in this form is a toxic health hazard. Avoid crushing components which may contain beryllium oxide. In the event that suspected beryllium oxide powder is inhaled or swallowed, obtain medical assistance immediately.

Dispose of items containing beryllium oxide materials in accordance with standard Army procedures.

**WARNING**

**A13 POWER AMPLIFIER WARNING**

The A13 circuit card contains beryllium oxide (BeO) ceramics. Dust and fumes from beryllium oxide ceramics are highly toxic and breathing them can result in serious personal injury or death. For guidance or assistance on disposal of an unserviceable A13 circuit card, contact the Defense Reutilization and Marketing Office (DRMO).

**WARNING**

**A1 PROCESSOR BOARD WARNING**

The A1 processor board contains a lithium battery. The lithium battery contains flammable organic materials. Incorrect handling may cause an explosion. Do not short battery leads together in any fashion. Do not expose battery to extreme heat for more than five seconds. Do not immerse battery in any water or cleaning solution. Ensure that battery polarity is correct. Do not strike or drop battery.

A lithium-sulfur dioxide (LiSO<sub>2</sub>) battery used with the A1 board contains pressurized sulphur dioxide (SO<sub>2</sub>) gas. The gas is toxic, and the battery **MUST NOT** be handled in any way that may cause it to rupture.

DO NOT heat, short circuit, crush, puncture or disassemble batteries.

DO NOT use any battery which shows sign of damage, bulging or leaking.

DO NOT test BA-5590/U battery for capacity.

DO NOT recharge BA-5590/U batteries.

DO NOT dispose of the BA-5590/U batteries with ordinary trash. Turn them in to the DRMO or dispose in accordance with good shop practice.

DO NOT attempt to transmit while charging the BB-590 battery.

DO NOT store batteries in unused equipment for more than 30 days.

**WARNING****BATTERY HEAT WARNING**

If the battery compartment becomes hot to the touch, if you hear a hissing sound (i.e., battery venting), or smell irritating sulfur dioxide gas, immediately turn the equipment off and leave the area.

1. Allow equipment to cool at least one hour.
2. Remove and replace battery only after equipment has cooled to the touch.
3. If there is a safety incident, or if you believe a hazard exists, file a Quality Deficiency Report, SF 368, and notify the CECOM Safety Officer, Ft. Monmouth, NJ at DSN 995-3112.

**WARNING****HALON FIRE EXTINGUISHER WARNING**

DO NOT use a halon type fire extinguisher on a BA-5590/U battery.

In the event of a fire involving lithium batteries, rapid cooling of the batteries is important. Flood the equipment with water or use a carbon dioxide (CO<sub>2</sub>) extinguisher. Control of the equipment fire and cooling may prevent exposure of lithium metal. In the event that lithium metal becomes involved in a fire, use a graphite based Class D fire extinguisher such as Lith-X or Met-L-X.

**Section II. PRESHOP ANALYSIS CHECKLIST****3-3 GENERAL.**

**3-3.1 Preshop Analysis (PSA) Checklist.** Use the following table to record the finding of the end item test in para. 3-2.5. The Data Sheets in Chapter 4 will be used to record the results of tests for the end item assemblies.

| <b>Inspection/Test</b> | <b>Para.<br/>Ref</b> | <b>Conditions<br/>Found</b> | <b>Recommended<br/>Maintenance<br/>Action</b> | <b>Signature and Date of<br/>Person Performing<br/>Analysis</b> |
|------------------------|----------------------|-----------------------------|---|---|
|                        |                      |                             |   |   |

## CHAPTER 4

### OVERHAUL OPERATIONS

#### Section I. GENERAL REQUIREMENTS

##### 4-1 GENERAL ARRANGEMENT.

Overhaul operations in this chapter are arranged in sections that reflect the top down breakdown order of the end item. Table 4-1 contains the order of the sections within this chapter.

Table 4-1. Chapter Sections

| Section | Title                                       |
|---------|---|
| I       | GENERAL REQUIREMENTS                        |
| II      | AN/PRC-132 RADIO SET                        |
| III     | RT-1648/132 RADIO RECEIVER-TRANSMITTER      |
| IV      | SOHFRAD RADIO TRANSCEIVER                   |
| V       | CONTROL PANEL COVER ASSEMBLY                |
| VI      | REAR PANEL COVER ASSEMBLY                   |
| VII     | HOUSING ASSEMBLY                            |
| VIII    | A13 POWER AMPLIFIER ASSEMBLY                |
| IX      | RADIO CHASSIS ASSEMBLY                      |
| X       | A1 PROCESSOR                                |
| XI      | A2 1ST LOCAL OSCILLATOR BOARD               |
| XII     | A3 2ND LOCAL OSCILLATOR BOARD               |
| XIII    | A7 PRODUCT DETECTOR BOARD                   |
| XIV     | A8 2ND INTERMEDIATE FREQUENCY (IF) ASSEMBLY |
| XV      | A9 1ST INTERMEDIATE FREQUENCY (IF) ASSEMBLY |
| XVI     | A10 1ST MIXER ASSEMBLY                      |
| XVII    | A11 1ST FILTER ASSEMBLY                     |
| XVIII   | A12 2ND FILTER ASSEMBLY                     |
| XIX     | A14 INTERCONNECT BOARD                      |
| XX      | CARD CAGE ASSEMBLY                          |
| XXI     | CONTROL PANEL ASSEMBLY                      |
| XXII    | A16 FRONT PANEL                             |
| XXIII   | BATTERY BOX, CY-8629/PRC-132                |
| XXIV    | BATTERY BOX COVER ASSEMBLY                  |
| XXV     | BATTERY BOX HOUSING ASSEMBLY                |
| XXVI    | A1 CHARGE CONTROL CCA, CY-8629/PRC-132      |

##### 4-2 REFERENCES.

For a list of technical publications used as reference materials for this manual, see Appendix A. Quality assurance procedures and detailed inspection procedures are addressed, as appropriate, in each section of this chapter.

##### 4-3 SAFETY.

The Warnings and Cautions page at the front of this manual and individual Warnings and Cautions within each chapter section contains all relevant safety information.



#### 4-4 IN-PROCESS INSPECTIONS.

Each section provides in-process inspection procedures where they apply. These include applicable inspection procedures and specific accept/reject criteria for each assembly, sub-assembly or component.

4-4.1 Tolerances and Adjustments. Each section contains applicable tolerances and adjustments for the assembly being maintained.

4-4.2 Diagnostic and Test Equipment. Each section lists the diagnostic and test equipment used, if any. Chapter 2 provides a complete listing of tools and test equipment used to maintain the end item and its subassemblies.

#### 4-5 PROCESSES.

There are no processes required.

### Section II. AN/PRC-132 RADIO SET

#### 4-6 GENERAL.

The AN/PRC-132 Radio Set (Figure 4-1) consists of the RT-1648/132 Radio Receiver-Transmitter (1) and the CY-8629/PRC-132 Battery Box (2). The battery box (2) provides power to the receiver-transmitter (1), through connector J2 that mates with an connector A13J1 located on the power amplifier A13 in the back of the transceiver housing. The rear cover assembly protects the rear of the transceiver when the battery box is not installed.

#### 4-7 REMOVAL.

No removal from another assembly is required.

#### 4-8 DISASSEMBLY (Figure 4-1).

Radio set disassembly consists of separating the battery box from the transceiver. When the battery box is removed from the transceiver, the rear cover assembly shall be installed to protect exposed components, unless further disassembly of the transceiver is required. Disassemble the radio set as follows:

- a. Remove the battery box from the radio transceiver as follows:
  - (1) Lift up free end of two latches on the transceiver (1) and disengage latches from strikes on battery box (2).

#### NOTE

Battery box connector J2 is engaged with transceiver connector A13J1.

- (2) Separate transceiver from battery box by moving battery box (2) straight back and away from the transceiver (1).
- b. Remove o-ring from seat in transceiver or battery box.

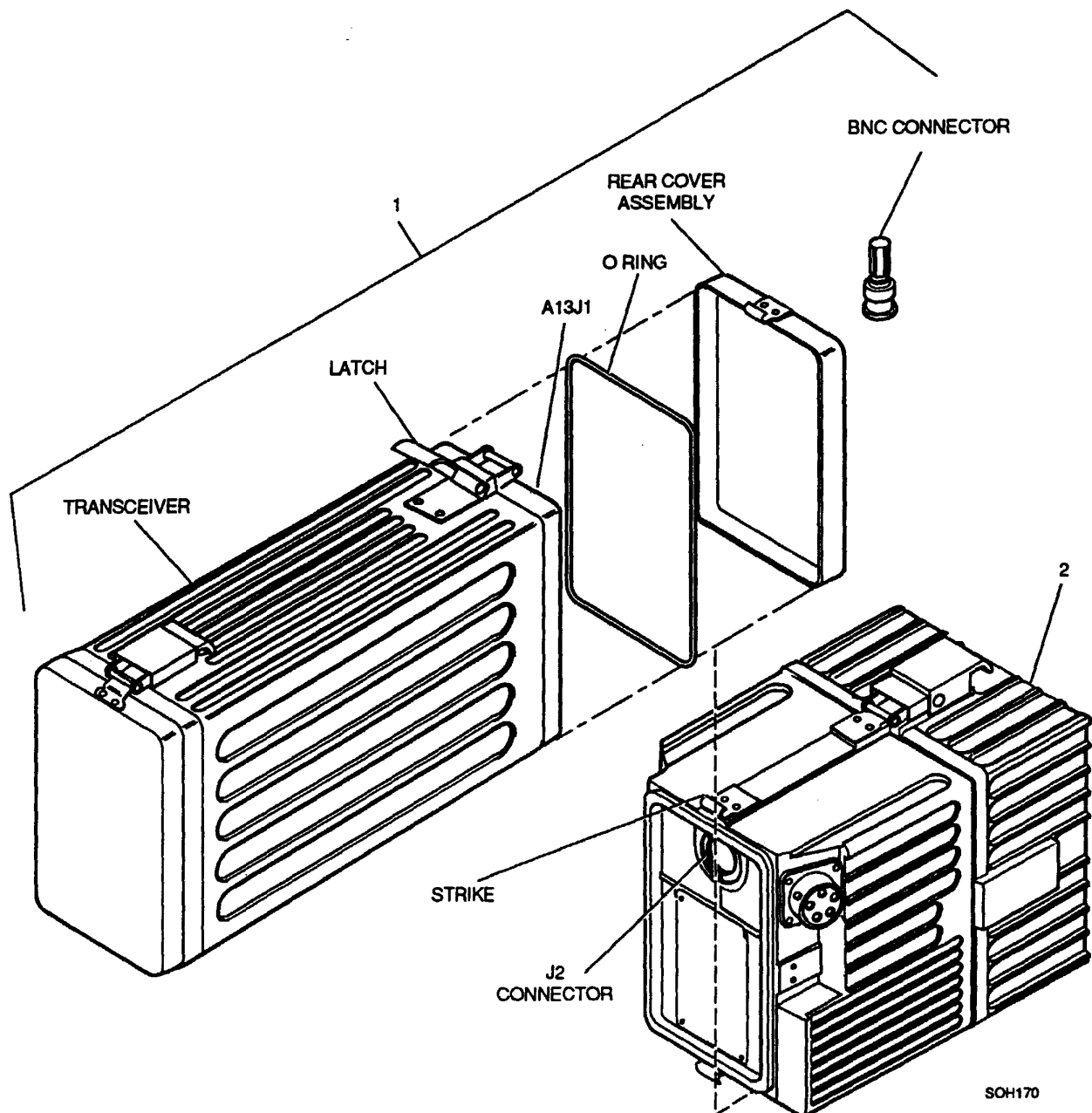


FIGURE 4-1. AN/PRC-132 Radio Set

**CAUTION**

Rear cover assembly shall be installed to transceiver during periods when battery box is not in use and transceiver is not being worked on. Failure to do so may result in damage to exposed transceiver components.

**NOTE**

Top and bottom of rear cover assembly are reversible.

- c. If required, install rear cover assembly to transceiver as follows:

- (1) Install o-ring into recessed seat in rear cover assembly.
- (2) Position rear cover assembly over rear end of transceiver and fit ends of both transceiver latches over rear cover assembly strikes.
- (3) Push both latches down flush with transceiver housing to secure rear cover assembly.

**WARNING**

If battery box is hot to touch, allow the equipment to cool for at least one hour before attempting further disassembly. If battery box emits a hissing sound (i.e., battery venting), or sulfur dioxide gas, IMMEDIATELY turn off equipment, leave the area, and notify the Safety Officer.

**CAUTION**

Battery box shall remain disconnected when transceiver is not in use. Failure to do so will lesson battery life.

#### 4-9 CLEANING.

Keep the radio set as clean as possible at all times. Prior to disassembly, wipe down the transceiver housing, battery box, external connectors, front and rear covers, and operating control panel and indicators with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

#### 4-10 INSPECTION.

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to the transceiver housing, front and rear covers, battery box, connectors, and housings.

#### 4-11 MANDATORY REPLACEMENT PARTS.

There are no mandatory replacement parts.

#### 4-12 REPAIR/REPLACE.

Repair of the radio set is accomplished by replacing the receiver-transmitter or the battery box in accordance with the disassembly and assembly instructions contained in this section. Additional repair procedures for the receiver-transmitter are contained in Section III. Additional repair procedures for the battery box are contained in Section XXIII.

#### 4-13 RECLAMATIONS.

There are no candidates for reclamation.

#### 4-14 ASSEMBLY (Figure 4-1).

Assembly of the radio set consists of removal of the rear cover assembly from the rear of the radio transceiver and installation of the battery box. Assemble the radio set as follows:

- a. If required, remove rear cover assembly from transceiver as follows:

- (1) Lift up on free end of both transceiver latches.
  - (2) Remove latches from strikes on rear cover assembly and remove rear cover assembly from transceiver.
  - (3) If required, remove o-ring from seat in rear cover assembly.
- b. Install battery box (2) to transceiver as follows:
- (1) Position battery box on rear end of transceiver housing so that battery box connector J2 interfaces with transceiver power amplifier connector A13J1. Fit ends of transceiver latches over battery box strikes.
  - (2) Push both transceiver latches down flush with transceiver housing to secure battery box.

#### 4-15 LUBRICATION.

Lubricate transceiver rear cover o-ring per lubrication instructions in Section IV.

#### 4-16 TESTING.

The radio set is tested as a complete assembly in TM 11-5820-1102-30.

#### 4-17 PAINTING AND MARKING.

Paint only exterior surfaces with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

#### 4-18 FINAL ASSEMBLY/INSTALLATION.

Prior to use, the rear and front cover assemblies should be removed and the battery box should be connected the transceiver.

#### NOTE

To preserve battery life, the battery box should remain disconnected while the transceiver is not in use.

### Section III. RT-1648/PRC-132 RADIO RECEIVER-TRANSMITTER

#### 4-19 GENERAL.

The RT-1648/PRC-132 Radio Receiver-Transmitter (Figure 4-2) consists of the radio transceiver (1) and accessory kit (2). The accessory kit consists of one BNC connector (2). The BNC connector attaches a bare wire, when required, to the built in radio connectors described in the Section XVI of this chapter.

#### 4-20 REMOVAL.

Remove the receiver-transmitter from the battery box in accordance with the disassembly instructions in Section II.

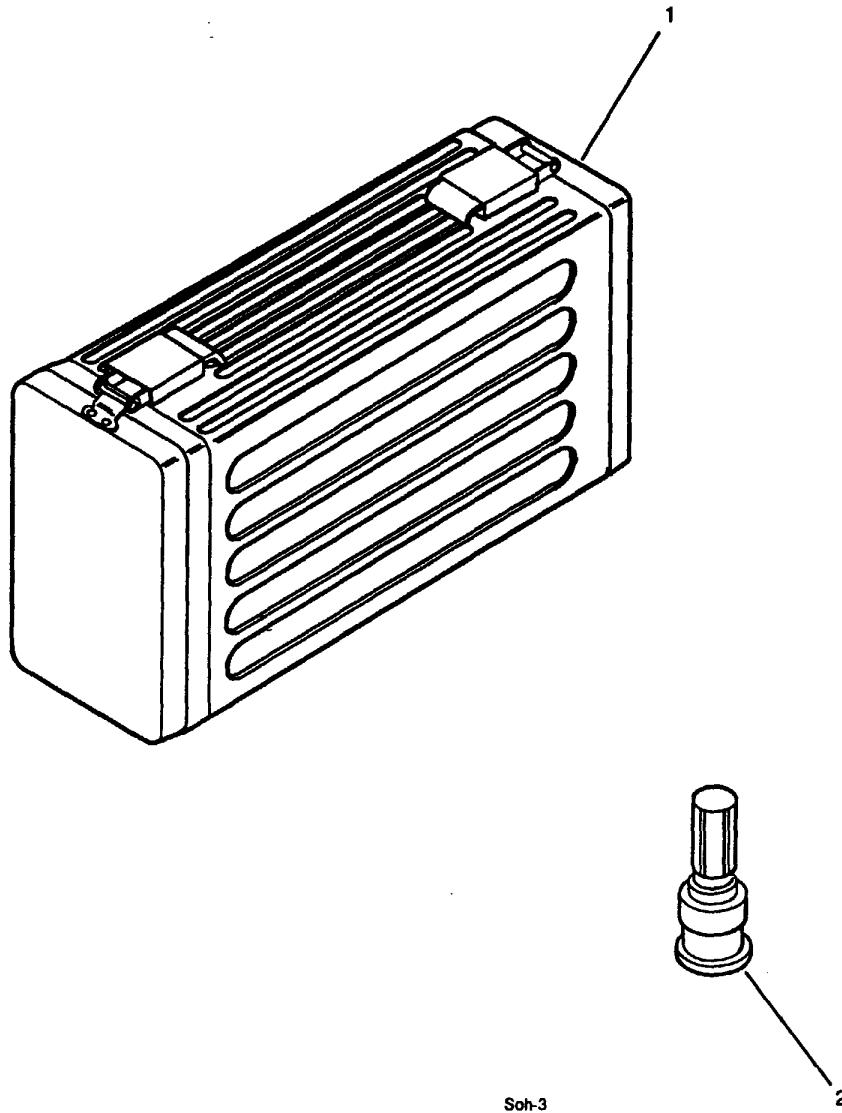


FIGURE 4-2. RT-1648/PRC-132 Radio

**4-21 DISASSEMBLY.**

Disassembly of the receiver-transmitter is limited to removal of the BNC connector. Disassembly of the radio set is covered in Section II. Disassembly of the transceiver is covered in Section IV. If required, remove the BNC connector (2) from the transceiver (1) as follows:

- a. Remove BNC connector from control panel connector.
- b. Install control panel cover on transceiver and fit ends of transceiver latches over control panel cover strikes.
- c. Push both latches down flush with transceiver housing to secure control panel cover.

**4-22 CLEANING.**

Keep the receiver-transmitter as clean as possible at all times. Prior to disassembly, wipe down housing, external connectors, front and rear covers and operating control panel and indicators with a cloth or soft

bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

**4-23 INSPECTION.**

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly.

**4-24 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-25 REPAIR/REPLACE.**

Repair of the receiver-transmitter is accomplished by replacing the transceiver or BNC connector. Additional repair procedures for the transceiver are contained in Section IV. No additional repair procedures for the BNC connector are authorized.

**4-26 RECLAMATION.**

There are no candidates for reclamation.

**4-27 ASSEMBLY.**

No assembly is required at this level.

**4-28 LUBRICATION.**

No lubrication is required at this level.

**4-29 TESTING.**

Testing of the transceiver is covered in TM 11-5820-1102-30.

**4-30 EQUIPMENT.**

There are no specific equipment requirements for testing the receiver-transmitter.

**4-31 PAINTING AND MARKING.**

Paint only exterior surfaces with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

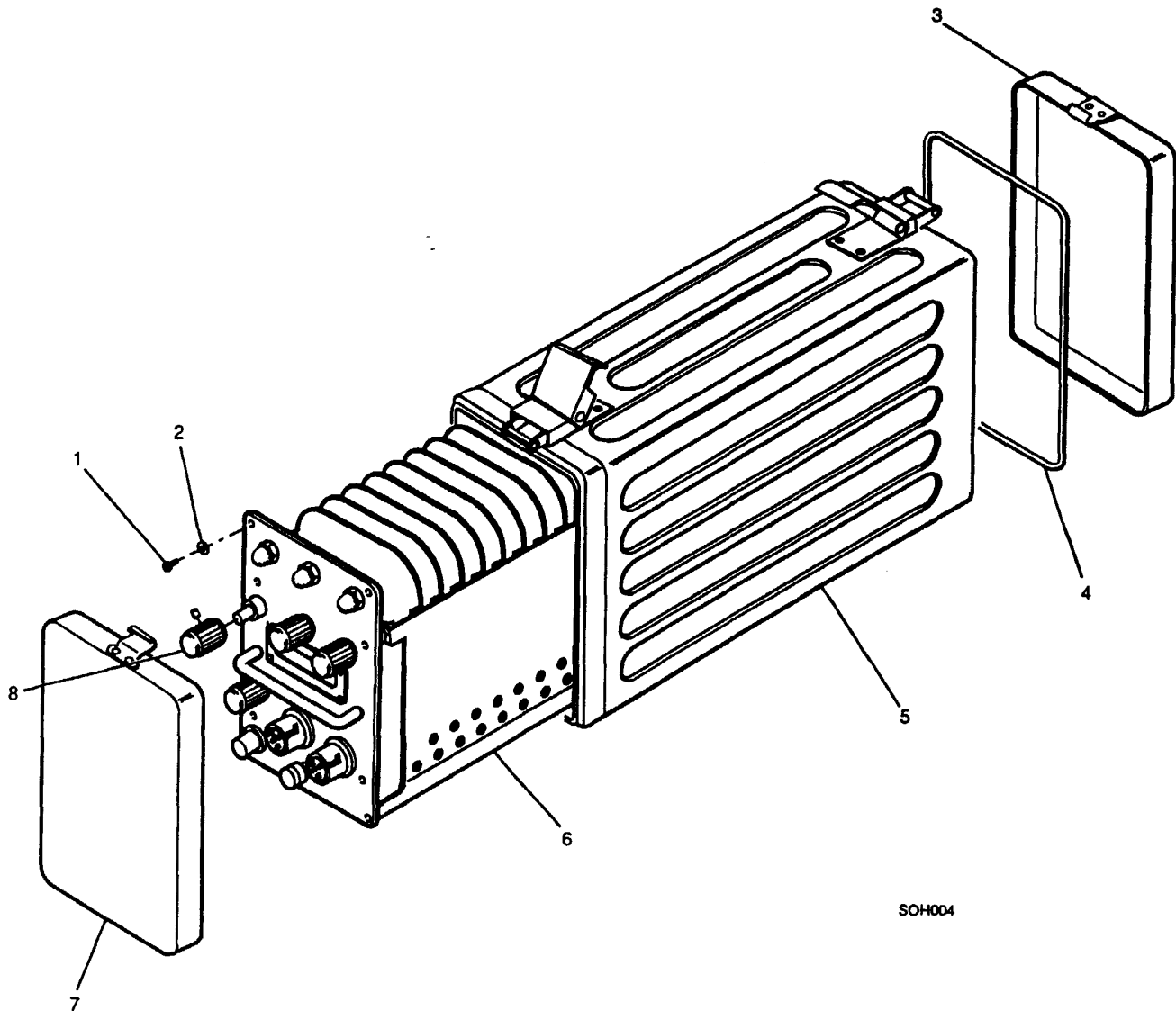
**4-32 FINAL ASSEMBLY/INSTALLATION.**

For installation to the battery box, see Section II of this chapter.

### Section IV. SOHFRAD RADIO TRANSCEIVER

#### 4-33 GENERAL.

The SOHFRAD radio transceiver (Figure 4-3) consists of the chassis assembly (6), housing assembly (5), control panel cover assembly (7), o-ring (4), and rear panel cover assembly (3). The chassis assembly is slide mounted inside the housing assembly and contains all of the transceiver electronics, except for the power amplifier. The housing assembly contains the power amplifier. The control panel cover assembly covers the control panel assembly when the radio is not in use. The rear panel cover assembly covers the rear of the radio when the battery box is not installed. The o-ring is used for either the battery box or the rear panel cover assembly, depending upon which one is installed.



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FIGURE 4-3. Disassembly of Transceiver

#### 4-34 REMOVAL.

Separate the transceiver from the BNC connector, as required, in accordance with the disassembly instructions in Section III.

**4-35 DISASSEMBLY.**

Disassembly of the transceiver consists of removing the front and rear cover assemblies, the chassis assembly, and the housing assembly. Disassemble the transceiver (Figure 4-3) as follows:

- a. Remove front cover assembly (7) from housing assembly (5) as follows:
  - (1) Lift up free end of both latches securing front cover assembly (7) to housing assembly (5).
  - (2) Lift ends of latches off of front cover assembly strikes and remove front cover assembly (7) from housing (5).
- b. Remove chassis assembly (6) from housing assembly (5) as follows:
  - (1) Remove front cover assembly (7) from housing assembly (5) (step a.).
  - (2) Remove four allen screws (1) and washers (2) securing chassis assembly (6) to housing assembly (5).

**NOTE**

Removal of chassis assembly will disconnect interconnect board connector A14J15 from power amplifier connector A13P1.

- (3) Slide chassis assembly (6) out of housing assembly (5).
- c. Remove rear cover assembly (3) and o-ring (4) from housing assembly (5) as follows:
  - (1) Lift up free end of both latches securing rear cover assembly (3) to housing assembly (5).
  - (2) Lift ends of latches off of rear cover assembly strikes and remove rear cover assembly (7) from housing (5).

**NOTE**

O-ring at rear of transceiver is used for either the rear cover assembly or battery box, depending upon which item is installed to transceiver.

- (3) Remove o-ring (4) from seat in housing assembly (5) or rear cover assembly (3).

**4-36 CLEANING.**

Keep transceiver as clean as possible at all times. Prior to disassembly, wipe down the transceiver housing, external connectors, front and rear covers and operating control panel and indicators with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth. Check rear o-ring (4) for damage or dirt and clean or replace as required.

**4-37 INSPECTION.**

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to chassis assembly components, housing assembly, control panel, and rear end o-ring.



**4-38 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-39 REPAIR/REPLACE.**

The transceiver (Figure 4-3) is repaired by replacing the chassis assembly (6), housing assembly (5), front cover assembly (7), rear cover assembly (3), or rear o-ring (4).

**4-40 RECLAMATION.**

There are no candidates for reclamation.

**4-41 ASSEMBLY.**

Assembly of the transceiver consists of installing the control panel and rear cover assemblies, the chassis assembly, and the housing assembly. Assemble the transceiver (Figure 4-3) as follows:

- a. Install rear cover assembly (3) and o-ring (4) to housing assembly (5) as follows:

**NOTE**

O-ring at rear of housing assembly is used when installing transceiver to either the rear cover assembly or battery box.

- (1) If required, lubricate rear o-ring (4) (See Lubrication, this Section).
- (2) Install o-ring (4) to seat in rear cover assembly (3).
- (3) Position rear cover assembly (3) on housing assembly and place ends of latches over rear cover assembly strikes.
- (4) Push ends of latches down flush with housing assembly (5) to secure rear cover assembly (3).

- b. Install chassis assembly (6) to housing (5) as follows:

**NOTE**

Chassis assembly interconnect board connector A14J15 will engage with housing assembly power amplifier connector A13P1 when chassis assembly is properly situated inside housing assembly.

- (1) Slide chassis assembly (6) inside housing assembly (5).
- (2) Install four screws (1) and washers (2) to secure chassis assembly (6) inside housing (5).

- c. Install control panel cover assembly (7) to housing assembly (5) as follows:

- (1) If required, lubricate front cover o-ring (See Lubrication, this Section).
- (2) Lift up front cover end of both latches.
- (3) Position control panel cover assembly (7) over front end of housing assembly (5) and place ends of both latches over control panel cover strikes.

- (4) Push down on both latches so that ends of latches are flush with housing assembly (5) and control panel cover assembly (7) is secured.

#### 4-42 LUBRICATION.

The rear o-ring (4) and control panel cover o-ring (part of 7) must be lubricated to maintain watertight integrity. Coat the o-rings with silicon (item 13, App. C) or an equivalent lubricant.

#### 4-43 TESTING.

Testing of the transceiver assembly is performed in accordance with the instructions in TM 11-5820-1102-30.

#### 4-44 PAINTING, REFINISHING AND MARKING.

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

#### 4-45 FINAL ASSEMBLY/INSTALLATION.

The radio transceiver is tested as an assembled unit. No additional assembly or installation is required.

### Section V. CONTROL PANEL COVER ASSEMBLY

#### 4-46 GENERAL.

This section contains depot level maintenance instructions for the control panel cover assembly. Included in these instructions are directions for removal, cleaning, inspection, repair, refinishing/markings and final assembly/installation.

The control panel cover assembly (Figure 4-4) provides a watertight seal over the transceiver control panel for protection of the control panel controls and indicators when the radio is not in use.

#### 4-47 REMOVAL.

Remove the control panel cover assembly from the radio transceiver in accordance with the disassembly instructions in Section IV.

#### 4-48 DISASSEMBLY (Figure 4-4).

Disassembly of the control panel cover assembly consists of removal of two strikes and the o-ring. Disassemble as follows:

- a. Remove o-ring (1) from seat of cover (5).
- b. Remove two screws (4), washers (3), and strike (2) from each end of cover.

#### 4-49 CLEANING.

Prior to disassembly, wipe down the control panel cover assembly with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

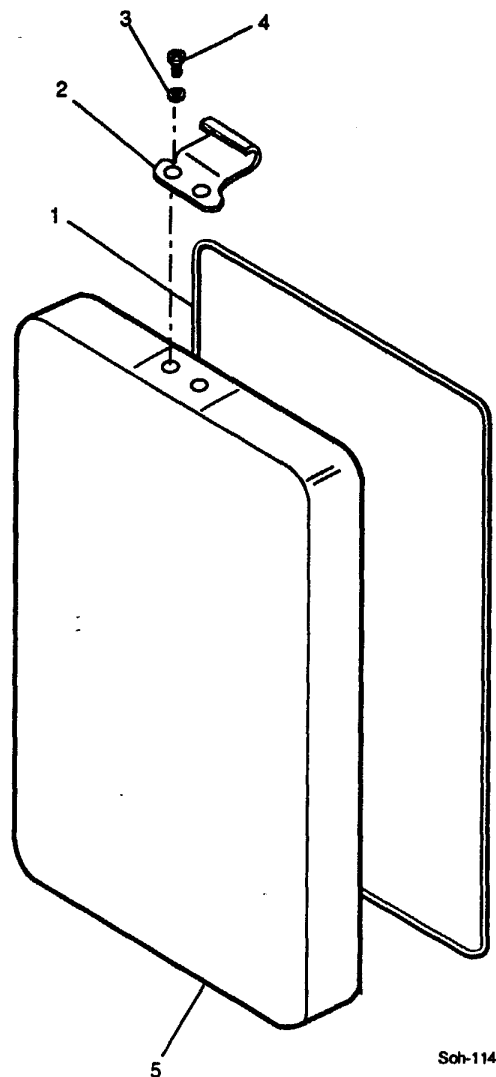


FIGURE 4-4. Disassembly of Control Panel Cover Assembly

**4-50 INSPECTION.**

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to the cover, o-ring, and strikes.

**4-51 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-52 REPAIR/REPLACE.**

The control panel cover assembly (Figure 4-4) is repaired by replacing either or both of the two strikes (2) or the o-ring (1). No additional repair of control panel components is authorized.

**4-53 RECLAMATION.**

There are no candidates for reclamation.

**4-54 ASSEMBLY (Figure 4-4).**

Assembly of the control panel cover assembly involves installing the o-ring and two strikes to the cover. Assemble as follows:

- a. Install two screws (4), washers (3), and strike (2) to each end of cover.
- b. Install o-ring (1) to seat in cover assembly (5).

**4-55 LUBRICATION.**

The front cover o-ring (1) must be lubricated as required to maintain watertight integrity. Coat the o-ring with silicon (item 13, App. C) or an equivalent lubricant.

**4-56 PAINTING AND MARKING.**

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

**4-57 FINAL ASSEMBLY/INSTALLATION.**

Install the assembled control panel cover assembly to the transceiver per instructions in Section IV.

**Section VI. REAR PANEL COVER ASSEMBLY****4-58 GENERAL.**

This section contains depot level maintenance instructions for the rear panel cover assembly. Included in these instructions are directions for removal, cleaning, inspection, repair, refinishing/markings and final assembly/installation.

The rear panel cover assembly fits over the transceiver when the battery box is not in use.

When installed with the interchangeable o-ring, the rear panel cover assembly (Figures 4-10) provides a watertight seal protecting the housing assembly and chassis assembly electronic components.

**4-59 REMOVAL.**

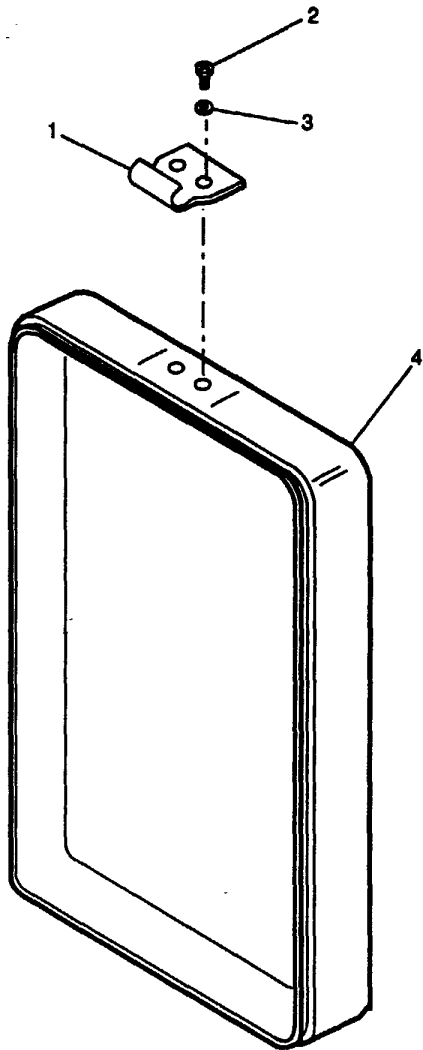
Remove the rear panel cover assembly from the transceiver in accordance with the disassembly instructions in Section IV.

**4-60 DISASSEMBLY (Figure 4-5).**

Disassembly of the rear panel cover assembly involves removal of two strikes. Disassemble by removing two screws (2), washers (3), and strike (1) from each end of rear cover.

**4-61 CLEANING.**

Prior to disassembly, wipe down the rear panel cover assembly with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.



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FIGURE 4-5. Disassembly of Rear Panel Cover Assembly

**4-62 INSPECTION.**

Check for damage to the cover and strikes.

**4-63 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-64 REPAIR/REPLACE.**

The rear panel cover assembly (Figure 4-5) is repaired by replacing either or both of the two strikes (1). No additional repair of the rear panel assembly is authorized.

**4-65 RECLAMATION.**

There are no candidates for reclamation.

**4-66 ASSEMBLY (Figure 4-5).**

Assembly of the rear panel cover assembly involves installing the two strikes to the cover. Assemble as follows:

- a. Install two screws (2), washers (3), and strike (1) to each end of rear cover.

**4-67 PAINTING AND MARKING.**

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

**4-68 FINAL ASSEMBLY/INSTALLATION.**

Install the assembled rear panel cover assembly to the transceiver per instructions in Section IV.

**Section VII. HOUSING ASSEMBLY****4-69 GENERAL.**

This section contains depot level maintenance instructions for the housing assembly. Included in these instructions are directions for removal, cleaning, inspection, repair, refinishing/marketing and final assembly/installation.

The housing assembly (Figure 4-6) contains the A13 power amplifier which converts power from the battery box to a usable form for the chassis assembly mounted circuit boards.

**4-70 REMOVAL.**

Remove the housing assembly from the transceiver in accordance with the disassembly instructions in Section IV.

**4-71 DISASSEMBLY (Figure 4-6).**

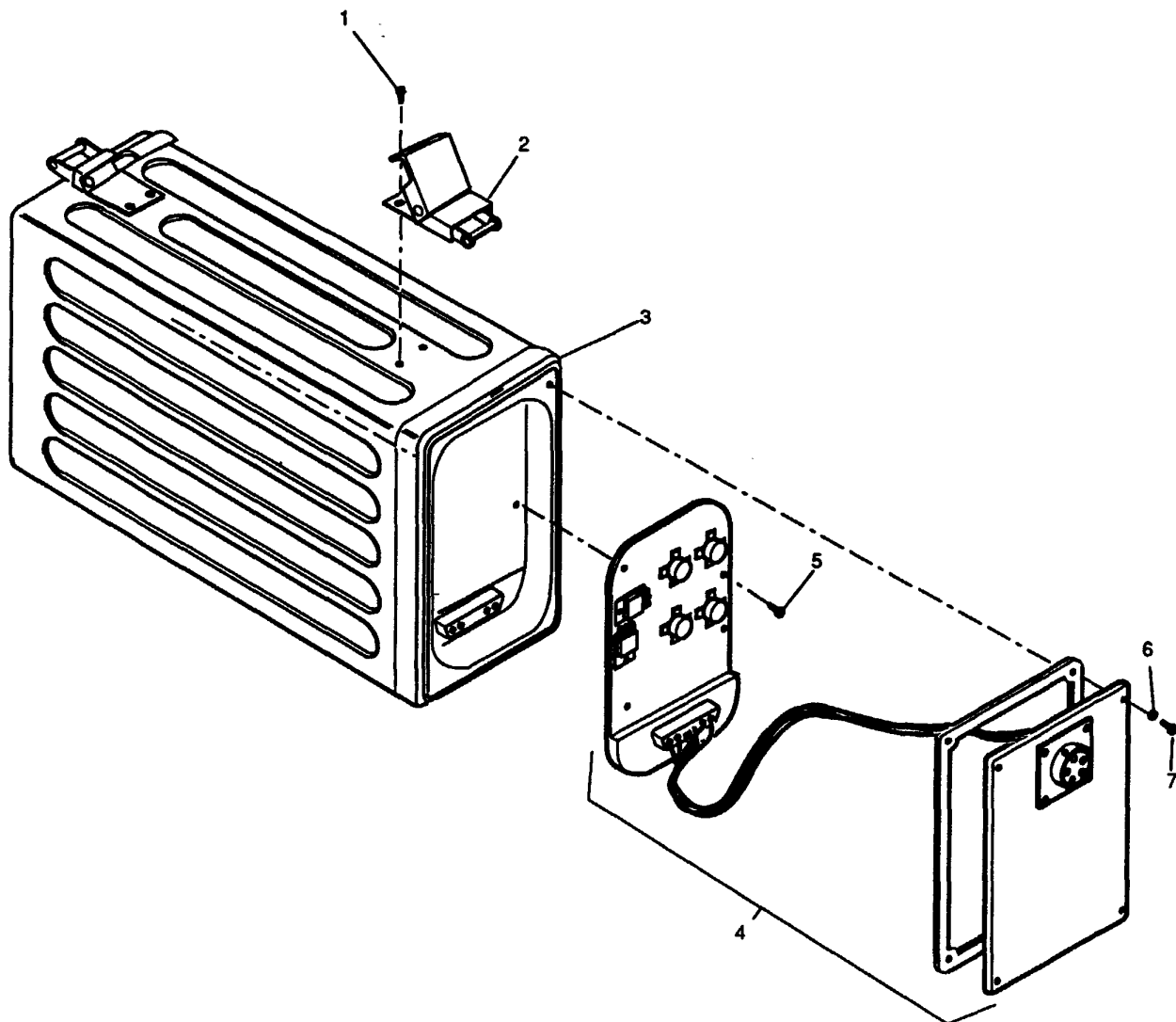
Disassembly of the housing assembly involves removal of the power amplifier and latches. Disassemble as follows:

- a. Remove power amplifier (4) from housing (3) as follows:

**WARNING****BERYLLIUM OXIDE WARNING**

Power amplifier transistors A13Q1-A13Q4 contain beryllium oxide. Beryllium oxide is toxic and can cause serious illness if inhaled or if it enters the body through cuts in the skin. Use care to ensure that transistors A13Q1-A13Q4 are not physically damaged while handling.

- (1) Remove four screws (7) and preformed packing (6) from cover backplate. Carefully lift up one side of cover backplate as if it were on a hinge. Rotate cover backplate to the left.
- (2) Remove three screws (5) from housing (3).



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FIGURE 4-6. Disassembly of Housing Assembly

**WARNING**

Do not drop power amplifier. Dropping power amplifier could damage assembly and release Beryllium Oxide.

- (3) Hold cover backplate against housing (3) and tilt housing downward. The A13 power amplifier should slide out into hands. If A13 power amplifier does not slide out, it may be gently lifted from the housing assembly.
- b. Remove latch (2) from housing (3) as follows:
  - (1) Lifting up on clamp down section of latch to expose screws.
  - (2) Remove two screws (1) and latch (2) from housing (3).

**4-72 CLEANING.**

Prior to disassembly, wipe down the housing assembly and external connectors with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

**4-73 INSPECTION.**

Check for damage to the housing, connectors, connector gaskets, and preformed packing around power amplifier installation screws.

**4-74 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-75 REPAIR/REPLACE.**

The housing assembly (Figure 4-6) is repaired by replacing either or both of the two latches (2) or the power amplifier assembly (4). Additional repair procedures for the power amplifier assembly are contained in Section VIII.

**4-76 RECLAMATION.**

There are no candidates for reclamation.

**4-77 ASSEMBLY (Figure 4-6).**

Assembly of the housing assembly involves installation of two latches and the A13 power amplifier. Assemble the housing assembly as follows:

- a. Install either of two latches (2) to housing (3) by using two screws (1).
- b. Install power amplifier to housing as follows:

**WARNING**

Do not drop power amplifier. Dropping power amplifier could damage assembly and release Beryllium Oxide.

- (1) Hold the housing (3) with rear end upright and A13 power amplifier cover backplate held against it. Gently place heatsink plate into recess in housing.
- (2) Install heatsink plate and three screws (5) to housing (3).
- (3) Hinge the power amplifier cover backplate clockwise into position.
- (4) Install four screws (7) preformed packing (6), and cover backplate to housing (3).

**4-78 TESTING.**

The housing assembly is tested as part of the transceiver in Section IV. The A13 power amplifier is tested in Section VIII.



**4-79 PAINTING AND MARKING.**

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

**4-80 FINAL ASSEMBLY/INSTALLATION**

The housing assembly is installed to the transceiver in Section IV.

**Section VIII. A13 POWER AMPLIFIER**

**4-81 GENERAL.**

This section contains depot level maintenance instructions for the A13 power amplifier. Included in these instructions, are directions for removal, cleaning, inspection, test procedures, repair, refinishing/markings and final assembly/installation.

The A13 power amplifier is mounted to the rear of the housing in two parts that are connected by a wiring harness.

The A13 power amplifier (Figure 4-7) provides the interface of the radio transceiver with the battery box. The A13 power amplifier provides power to all of the radio transceiver electronics and provides transmit power amplification up to 50 watts.

**WARNING**

**BERYLLIUM OXIDE WARNING**

Transistors A13Q1-A13Q4 contain beryllium oxide. Beryllium oxide is toxic and can cause serious illness if inhaled or if it enters the body through cuts in the skin. Use care to ensure that transistors A13Q1-A13Q4 are not physically damaged while handling.

DO NOT: Place these parts in uniform pockets.

DO NOT: Store these parts loosely.

DO NOT: Expose to heat; normal soldering and heatsink are safe.

DO NOT: Break parts open for inspection.

Normal first aid procedures should be followed for cuts and abrasions contaminated with beryllium oxide. Wash wounds thoroughly; then seek attention of a doctor or medic. If beryllium oxide is inhaled, seek immediate attention of a doctor.

All defective and broken parts must be individually wrapped, clearly identified as "DEFECTIVE BERYLLIUM COMPONENTS", and disposed of in accordance with instructions from the safety office.

**WARNING**

The A13 power amplifier draws high current from the battery box and generates high voltages. Be careful not to touch power amplifier components when power amplifier is on.

**4-82 REMOVAL.**

Remove the power amplifier from the housing assembly in accordance with the disassembly instructions in Section VII.

**4-83 DISASSEMBLY (Figure 4-7).**

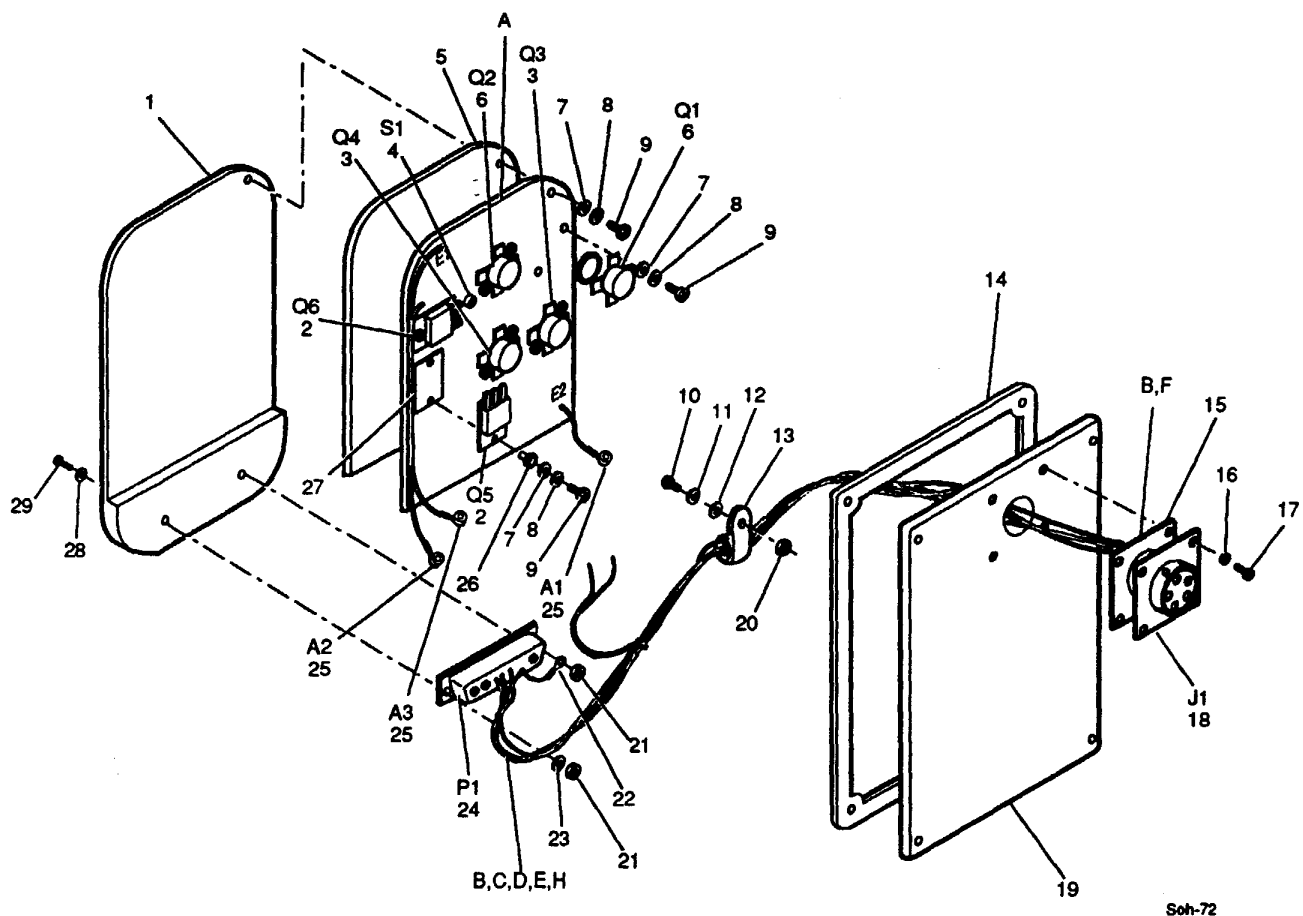
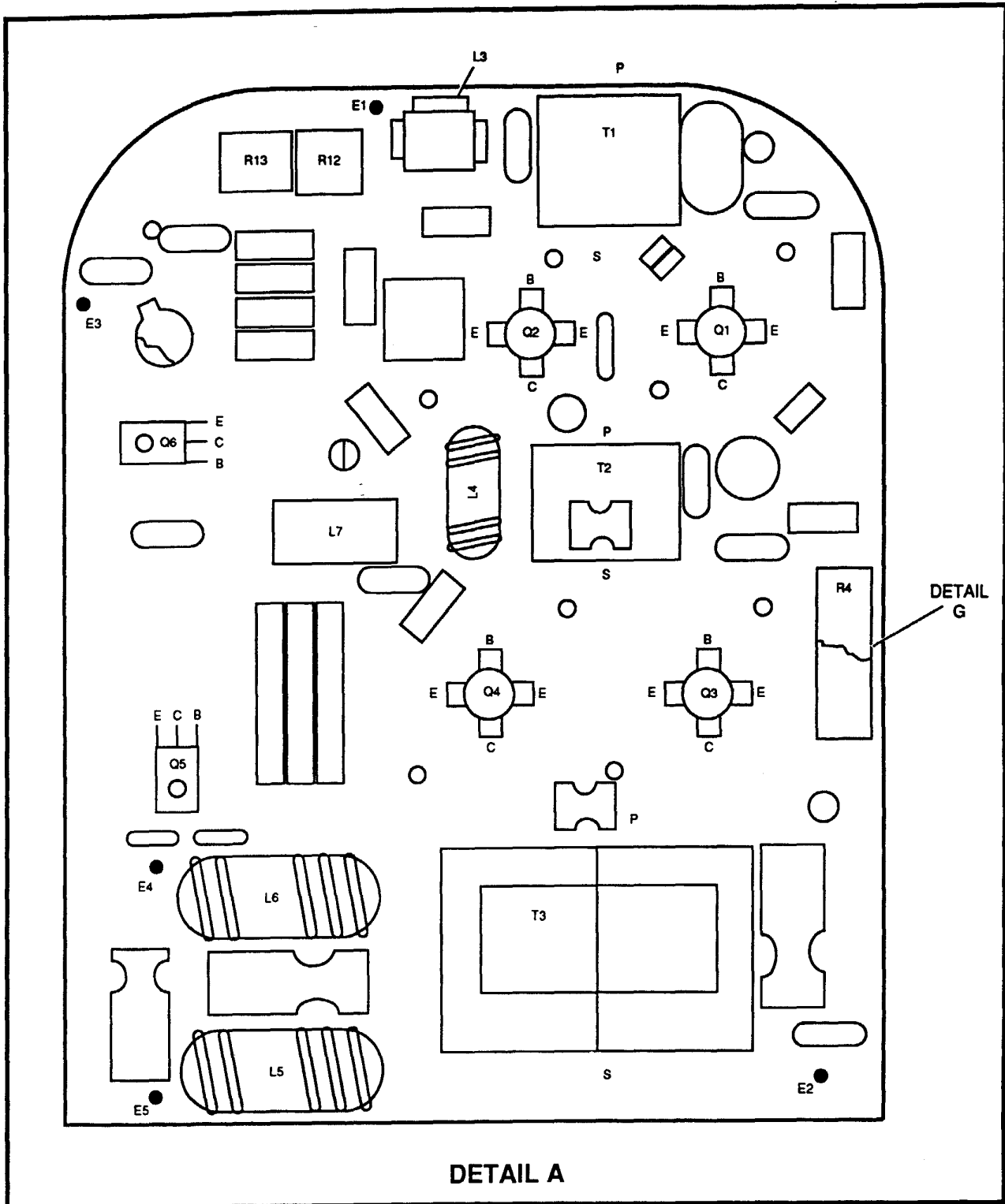


FIGURE 4-7. Disassembly of the A13 Power Amplifier Board (Sheet 1 of 3)

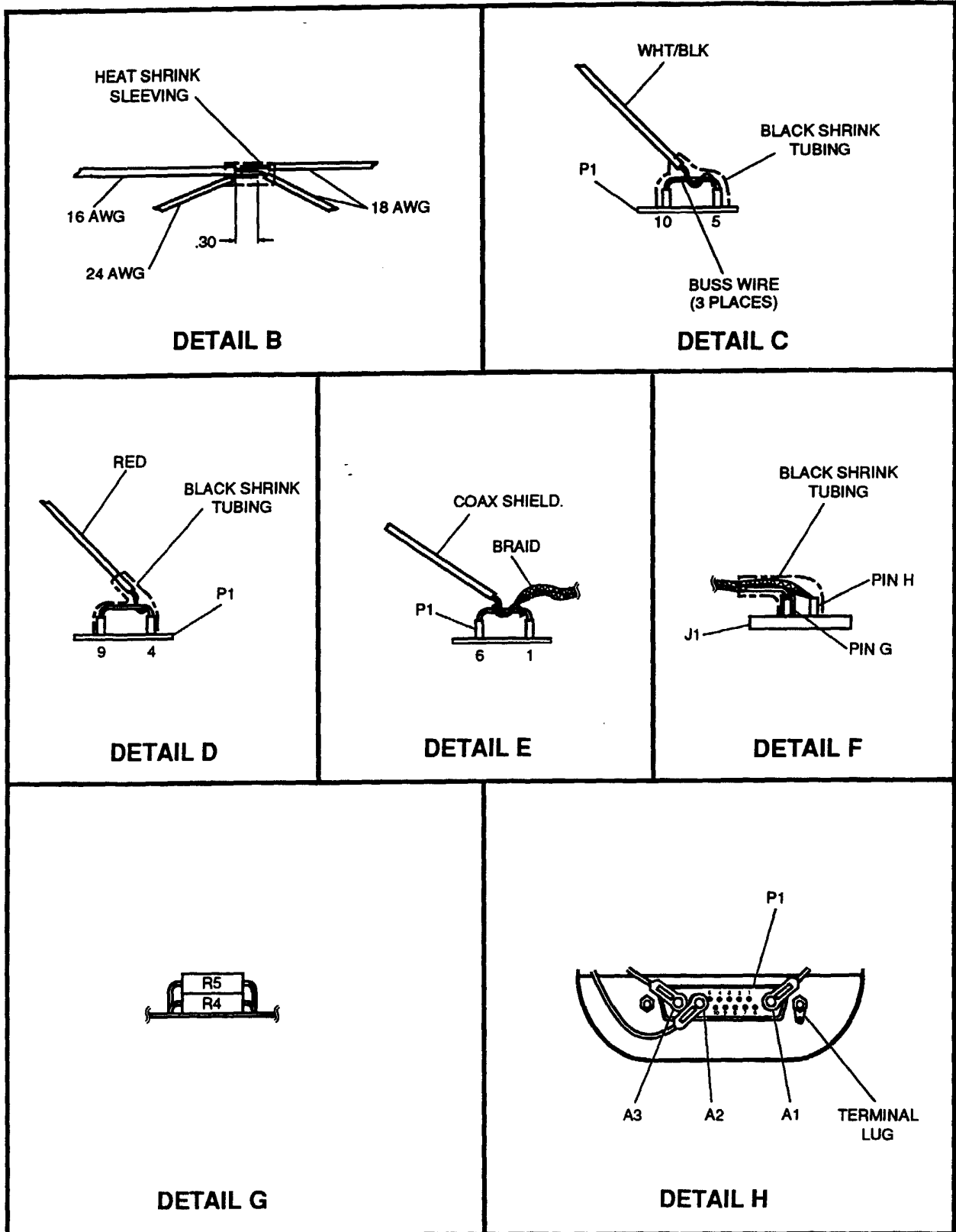
- a. Remove J1 connector (18) and gasket (15) from cover backplate (19) by removing four screws (17) and washers (16).
- b. Remove panel gasket (14) from panel backplate (19).
- c. Remove Q5 and Q6 transistors (2), and mounting pads (27) from Printed Circuit Board (PCB) by removing two screws (9), lock washers (8), flat washers (7) and shoulder washers (26).



DETAIL G

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FIGURE 4-7. Disassembly of the A13 Power Amplifier Board (Sheet 2 of 3)



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FIGURE 4-7. Disassembly of the A13 Power Amplifier Board (Sheet 3 of 3)

- d. Remove power amplifier PCB and spacer board (5) from heatsink plate (1) by removing four screws (9), lock washers (8) and flat washers (7).
- e. Remove cable clamp (13) from cover backplate (19) by removing nut (20), screw (10), flat washer (11) and lock washer (12).
- f. Remove connector P1 (24) from heatsink plate (1) by removing two screws (29), flat washers (28), nuts (21), lock washer (23), and terminal lug (22).
- g. Desolder wires from terminals E4 and E5 on power amplifier Printed Circuit Board (PCB) and separate power amplifier PCB from main wiring harness.

#### 4-84 CLEANING.

### **WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. If replacing gasket material, clean residue of old gasket using isopropyl alcohol.

#### 4-85 INSPECTION.

- a. Inspect board for missing, broken or damaged components and for any components that may not be improperly installed. Mark results on data sheet.
- b. Lead extensions on circuit side of power amplifier PCB shall not exceed 0.040 inches.
- c. Component height from circuit board shall not exceed that of T3 (Large Transformer). If required, spread wires on inductors L5 and L6 to achieve this requirement. (Figure 4-7, Sheet 2)
- d. Inspect board for solder bridges or other mechanical interference problems.
- e. Check electrical connections listed in Table 4-2. Connections must be visibly soldered on the component.

#### 4-86 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-89.
- b. Solder electronic components to circuit board using solder S/N 62 (item 20, App. C).
- c. Replace transistor Q1 or Q2 (6) as follows:
  - (1) Desolder leads of transistor from component side of power amplifier PCB.

Table 4-2. A13 Power Amplifier Wiring Chart

| From       | To  |
|------------|---|
| J1-A       | J1-B  |
| J1-D       | J1-C  |
| J1-F       | Splice (1)<br>— -J1-J<br>— -P1-4<br>— -P1-9<br>— -E4                            |
| J1-G, J1-H | P1-2<br>— -Item 102<br>— -P1-1<br>— -P1-6<br>— -P1-5<br>— -P1-10                |
| J1-K       | J1-M  |
| J1-4       | Splice (2)<br>— -E5<br>— -P1-10<br>— -P1-5<br>— -P1-6<br>— -P1-1<br>— -Item 102 |

- (2) Position new transistor on power amplifier such that chamfered tang of transistor points away from curved rounded edge of power amplifier PCB.
  - (3) Install transistor, two screws (9), lock washers (8) and flat washers (7) to power amplifier PCB.
  - (4) Solder transistor leads to power amplifier PCB using S/N 62 (item 20, App. C) solder.
- d. Replace transistor Q3 or Q4 (3) as follows:
- (1) Desolder leads of transistor from component side of power amplifier PCB.
  - (2) Position new transistor on power amplifier such that chamfered tang of transistor points away from curved rounded edge of power amplifier PCB.
  - (3) Install transistor, two screws (9), lock washers (8) and flat washers (7) to power amplifier PCB.
  - (4) Solder transistor leads to power amplifier PCB using S/N 62 (item 20, App. C) solder.
- e. Replace semi-rigid coax cables (item 2, App. C) on power amplifier PCB as follows:
- (1) Desolder semi-rigid coax cable from terminal E1, E2, or E3 (Figure 4-7, Sheet 2).
  - (2) Trim .050 inches of insulation off semi-rigid coax cable at each end.

- (3) Solder one end of coax cable to new D subminiature connector (Figure 4-7, Sheet 1, item 24). Apply heat shrink sleeving (item 15, App. C) to solder joint.
  - (4) Solder other end of coax cable to power amplifier PCB terminal E1, E2, or E3 as shown in Figure 4-7, Sheet 2. Ensure coax cable is a minimum of .125 inches from edge of PCB.
  - (5) Install right angle receptacle connectors A1, A2, or A3 (25) to connector P1 as shown in Figure 4-7, Detail H.
- f. Repair wiring at back side of J1 connector (18) as follows:
- (1) For wires terminating at J1-L and J1-J, strip 0.30 inches off end of wires and solder together as shown in Figure 4-7, Detail F. Cover stripped wire ends with heat shrink sleeving (item 15, App. C).
  - (2) Apply black shrink tubing (item 24, App. C) to coax cable terminating at J1-G and J1-H as shown in Figure 4-7, Detail F.
  - (3) Refer to Table 4-2 for J1 wiring.
- g. Repair wiring at connector P1 (24) as follows:
- (1) Solder shielded coax cable to braid (item 1, App. C) and P1-1 and P1-6 buss wire (item 27, App. C), with minimum strain on center conductor, as shown in Figure 4-7, Detail E. Do not allow solder to wick up coax or braid. Solder center conductor of coax cable to P1-2. Solder other end of braid to locking solder lug (Figure 4-7, Detail H).
  - (2) Solder wht/black 18 awg wire (item 46, App. C) to P1-10 and P1-5 buss wire (item 27, App. C), as shown in Figure 4-7, Detail C. Apply black shrink tubing (item 24, App. C) over wht/black wire and buss wire.
  - (3) Solder red 18 awg wire (item 45, App. C) to P1-9 and P1-4 buss wire (item 27, App. C), as shown in Figure 4-7, Detail D. Apply black shrink tubing (item 24, App. C) over wht/black wire and buss wire.
  - (4) Refer to Table 4-5 for P1 wiring.
- h. Secure inductors L4, L5, and L6 to PCB using silicon rubber compound (item 14, App. C) (Figure 4-7, Detail A).
- i. Install resistor R5 "Piggyback" onto resistor R4 as shown in Figure 4-7, Detail G.
- j. Install thermostat S1 to heatsink plate such that thermostat terminal is open to the side (Figure 4-7, Sheet 1).
- k. Humiseal (item 6, App. C) A13 power amplifier PCB after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable components.

#### 4-87 ASSEMBLY.

- a. Solder red wire to terminal E4 on power amplifier PCB (Figure 4-7, Sheet 2).
- b. Solder wht/blk wire to terminal E5 on power amplifier PCB.

- c. Install connector P1 (24) to heatsink plate (1) by installing two screws (29), flat washers (28), nuts (21), lock washer (23), and terminal lug (22).
- d. Install cable clamp (13) to cover backplate (19) by installing screw (10), flat washer (11), lock washer (12), and nut (20).
- e. Install power amplifier PCB and spacer board (5) to heatsink plate (1) by installing four screws (9), lock washers (8) and flat washers (7).
- f. Install Q5 and Q6 transistors (2), and mounting pads (27) to PCB by installing two screws (9), lock washers (8), flat washers (7) and shoulder washers (26).
- g. Install panel gasket (14) to panel backplate (19).
- h. Install J1 connector (18) and gasket (15) to cover backplate (19) by installing four screws (17) and washers (16).

#### 4-88 TESTING.

This test procedure covers alignment and electrical testing of A13 Power Amplifier (PA).

#### **WARNING**

The A13 PA draws high currents from the power supply, and generates high voltages during testing. Always be careful when the PA is on. Keep hands clear of PA PCB and test fixture to avoid severe shocks and burns.

As a general guideline for testing the PA, start with no RF input and slowly increase RF input level while simultaneously monitoring the following parameters:

- o RF input level
- o RF output level
- o DC input current
- o DC voltage at input to PA test fixture

By using this approach, a problem with the PA can be found before full power is applied, which will prevent serious damage to the PA and injury to test personnel.

4-88.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

4-88.2 Equipment. The following table lists unique and standard test equipment required for testing and alignment of A13 power amplifier. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to the start of testing.

| <u>DESCRIPTION</u>         | <u>QTY.</u> |
|----------------------------|-------------|
| 30 dB Attenuator           | 1           |
| A13 PA Test Fixture        | 1           |
| ac Voltmeter               | 1           |
| Combiner                   | 1           |
| Current Meter              | 1           |
| Digital Multimeter (DMM)   | 1           |
| Power Supply, High Current | 1           |
| Signal Generator           | 2           |



|                   |   |
|-------------------|---|
| Spectrum Analyzer | 1 |
| Tool Kit          | 1 |
| T-Probe Connector | 1 |

4-88.3 Initial Setup.

a. Using the DMM, verify the following measurements:

- (1) With the DMM on a high range, measure from collector to ground on Q1 through Q6 (Figure 4-7, Sheet 2). DMM should show high capacitive reactance of C18 and C20. Initial rating may be low and increase as capacitors charge.
- (2) Measure from base to ground on Q1 and Q2. Both should be  $34 \pm 2$  ohms.
- (3) Measure from base to ground on Q3 and Q4. Both should be  $5 \pm 1$  ohms.
- (4) Measure from collector to ground on Q5 and Q6. Both should be greater than 700 ohms.
- (5) Measure from L3 to base of Q1 and Q2. Both should be shorted.
- (6) Measure from L7 to base of Q3 and Q4. Both should be shorted.
- (7) Visually inspect T1, T2, and T3 to ensure both sides are soldered.
- (8) Measure from primary to secondary of T1, T2 and T3 to verify they are not shorted.
- (9) If all measurements are correct, mark X on data sheet.

b. Set test fixture switches to the following positions:

|                          |                   |
|--------------------------|-------------------|
| PWR:                     | Off               |
| Driver Power:            | Off               |
| Bias:                    | Off (down)        |
| Batt 1, Batt 2, Ext ALC: | EXT ALC (Full CW) |

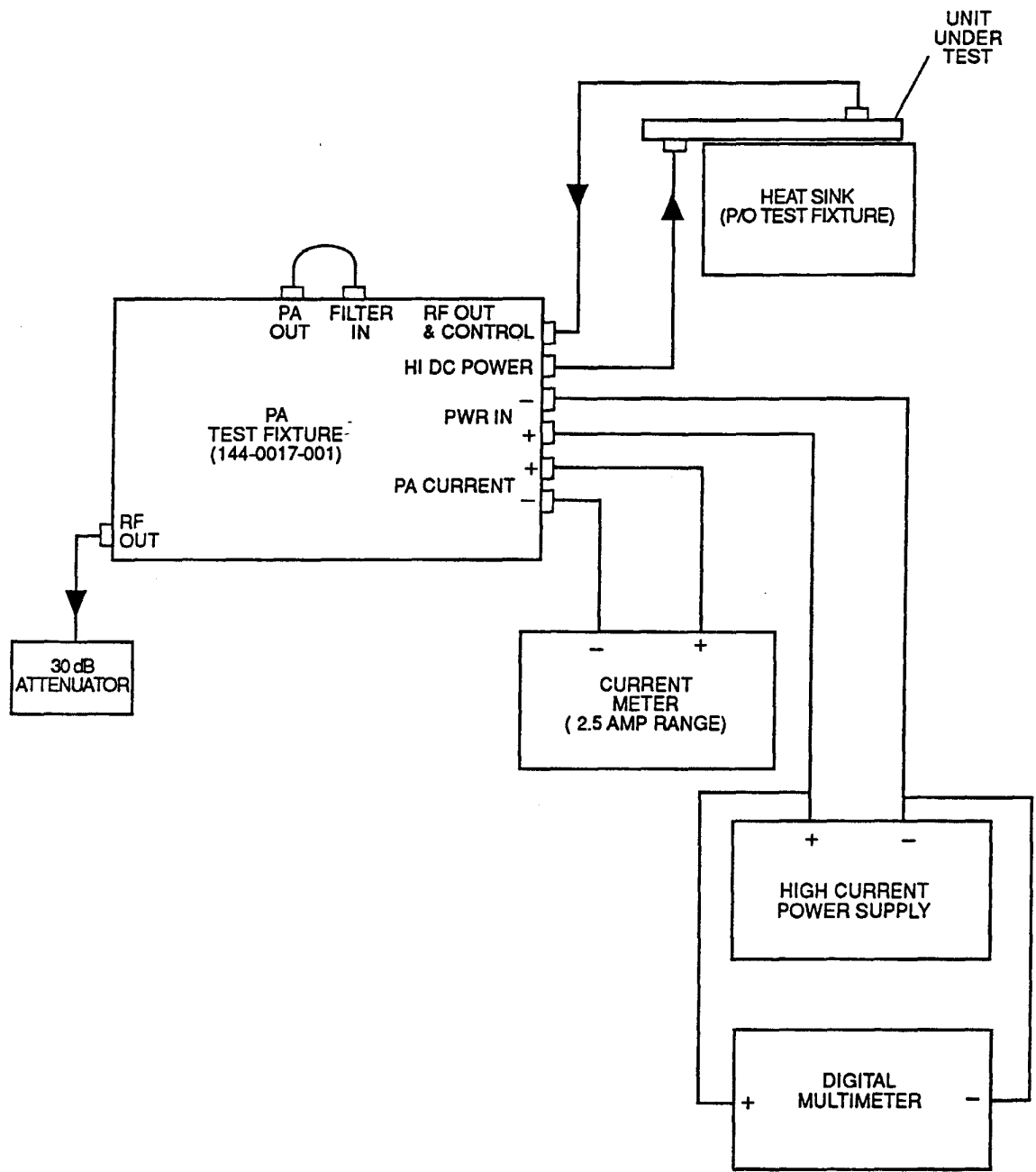
**CAUTION**

Do not force the PA into the mating connector in test fixture.

**NOTE**

The PA must be installed on the test fixture heatsink with the component side of the PA PCB board up.

- c. Carefully install A13 PA into test fixture and connect equipment as shown in Figure 4-8.
- d. Connect ammeter for the 2.5 A range.
- e. Turn ON test fixture power.
- f. Verify the EXT ALC, Batt 1 and Batt 2 LED light turns on one by one when selected.
- g. Turn test fixture OFF.



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FIGURE 4-8. Test Setup Block Diagram for Quiescent Current Adjustment

**NOTE**

Power supply voltages must be measured at input to PA test fixture, not at power supplies.

**4-88.4 Quiescent Current Adjustment.**

- a. Pre-set bias current potentiometers R12, R13 on PA to their maximum counterclockwise (CCW) position (Figure 4-7, Sheet 2).
- b. Turn external power supply on. Set to  $12.5 \pm 0.1$  Vdc.
- c. Set test fixture PWR switch on. PWR ON LED should light.
- d. Set test fixture DRIVER PWR switch to DRIVER ON.

**CAUTION**

Do not leave PA keyed for longer than 60 seconds or PA may overheat.

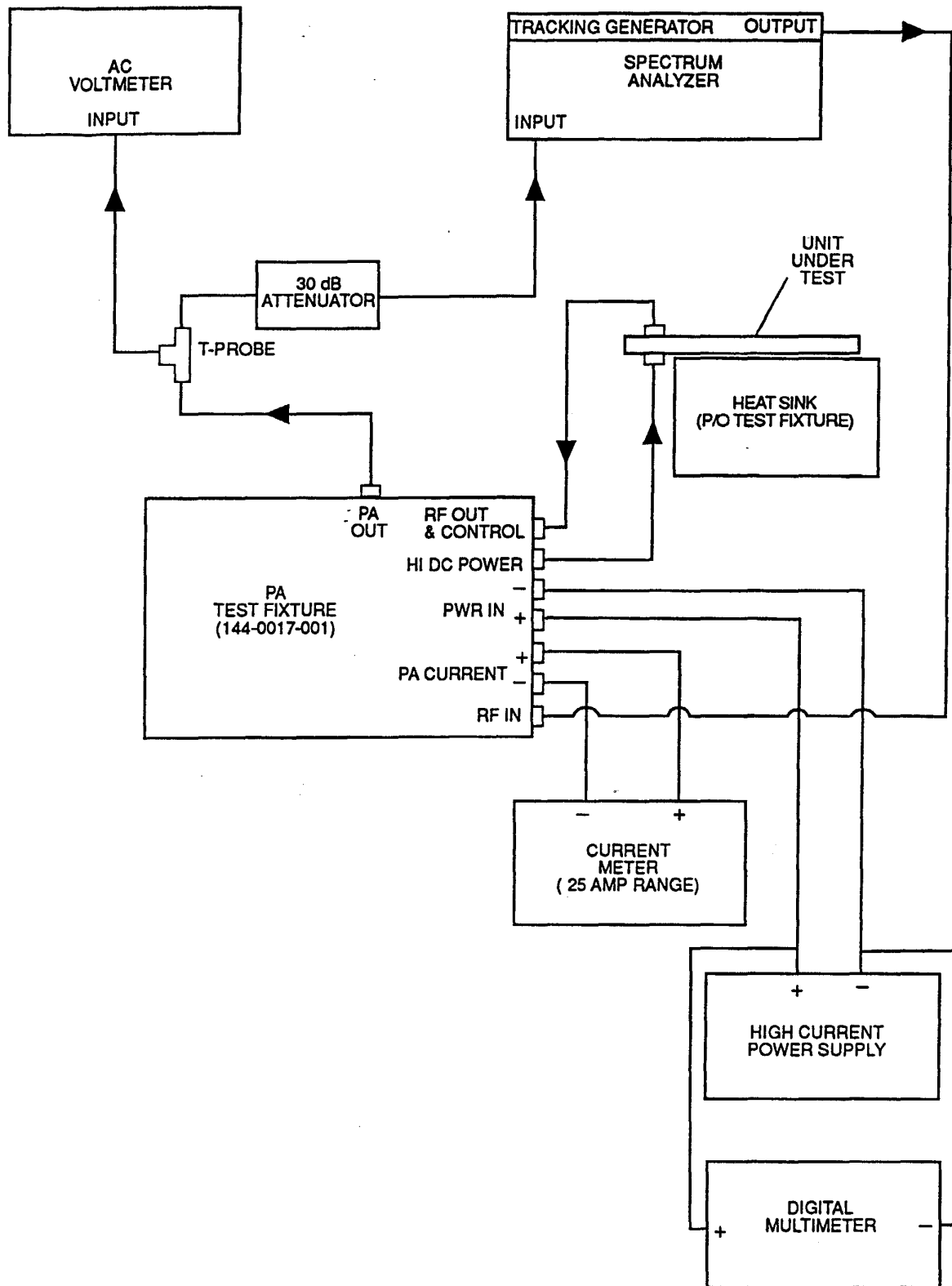
**CAUTION**

Be sure to set DRIVER PWR switch to DRIVER ON before turning on BIAS switch.

- e. Set test fixture BIAS switch to on. BIAS ON LED should light.
- f. Adjust R12 on PA for  $550 \text{ mA} \pm 10 \text{ mA}$ , as measured on the DC Current Meter. Record value on data sheet.
- g. Adjust R13 on PA for  $650 \text{ mA} \pm 10 \text{ mA}$ , as measured on the DC Current Meter. Record value on data sheet.
- h. Turn off BIAS switch, DRIVER PWR switch, and PWR switch, in that order.

**4-88.5 Forward Power.**

- a. Connect test equipment as shown in Figure 4-9. Be sure to connect the 30 dB attenuator between T-probe and spectrum analyzer.
- b. Set current meter for 25 A scale.
- c. Set spectrum analyzer tracking generator output to -25 dB.
- d. Set ac voltmeter to 50 V range.
- e. Set spectrum analyzer to the following settings:
  - Input Attenuation: 40 dB
  - Scan Width: 5 MHz/div.
  - Frequency: DC reference on left graticule
  - Bandwidth: 100 kHz
  - Time Scan: 2 mSecs/div.
  - Log Reference Level: 30 dBm (on HP-141T)
  - Level Vernier: 0
  - Video Filter: OFF



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FIGURE 4-9. Test Setup Block Diagram for Measuring Forward Power

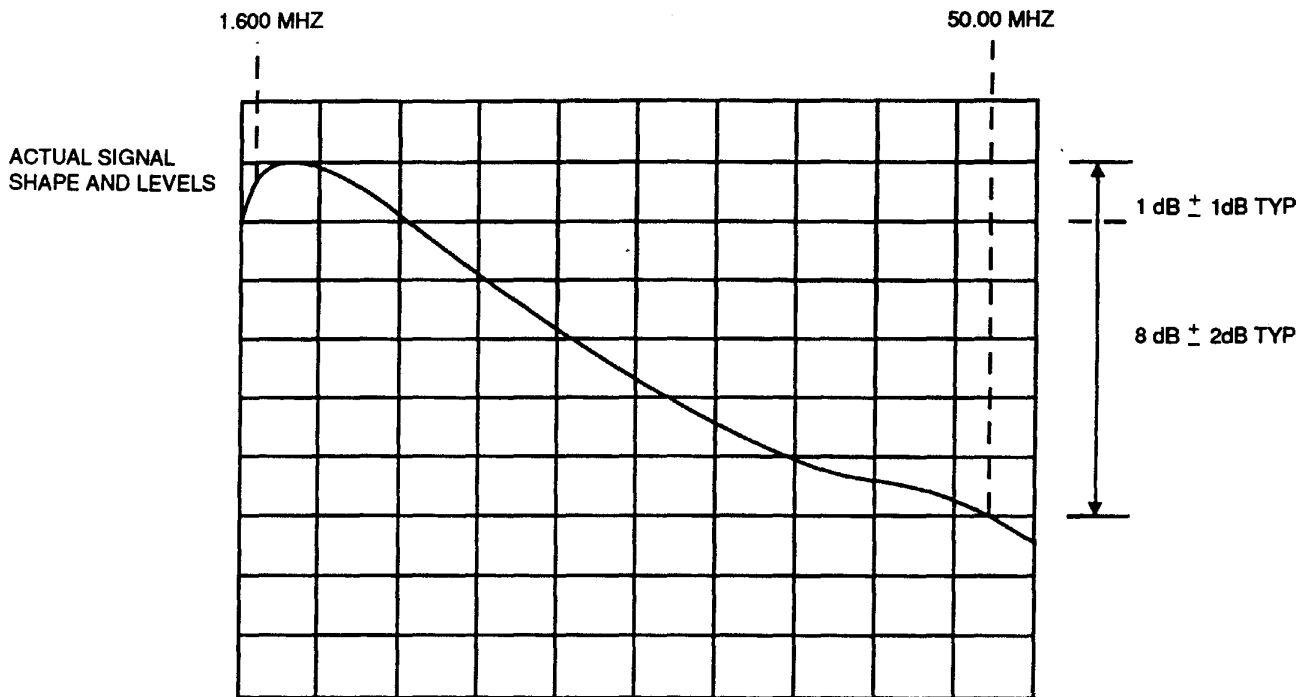
Scan Mode: INT  
 Scan Trigger: AUTO  
 Display Sensitivity: 2 dB Log

- f. Turn external power supply on.
- g. Set test fixture PWR switch on. PWR ON LED should light.
- h. Set test fixture DRIVER PWR switch to DRIVER ON.

**CAUTION**

Be sure to set DRIVER PWR switch to DRIVER ON before turning on BIAS switch.

- i. Set test fixture BIAS switch to on. BIAS ON LED should light.
- j. Spectrum analyzer display should be as shown in Figure 4-10. It may be necessary to remove some attenuation to get display on screen. Record amplitude change in dB from 1.6 to 50 MHz on data sheet if PA output spectrum is in accordance with display.



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FIGURE 4-10. Typical PA Spectrum Analyzer Display

- k. Turn off BIAS switch, DRIVER PWR switch, and PWR switch, in that order.
- l. Turn off external power supply.
- m. Connect test equipment as shown in Figure 4-11.
- n. Set signal generator frequency to 1.600 MHz and output level to -30 dBm.

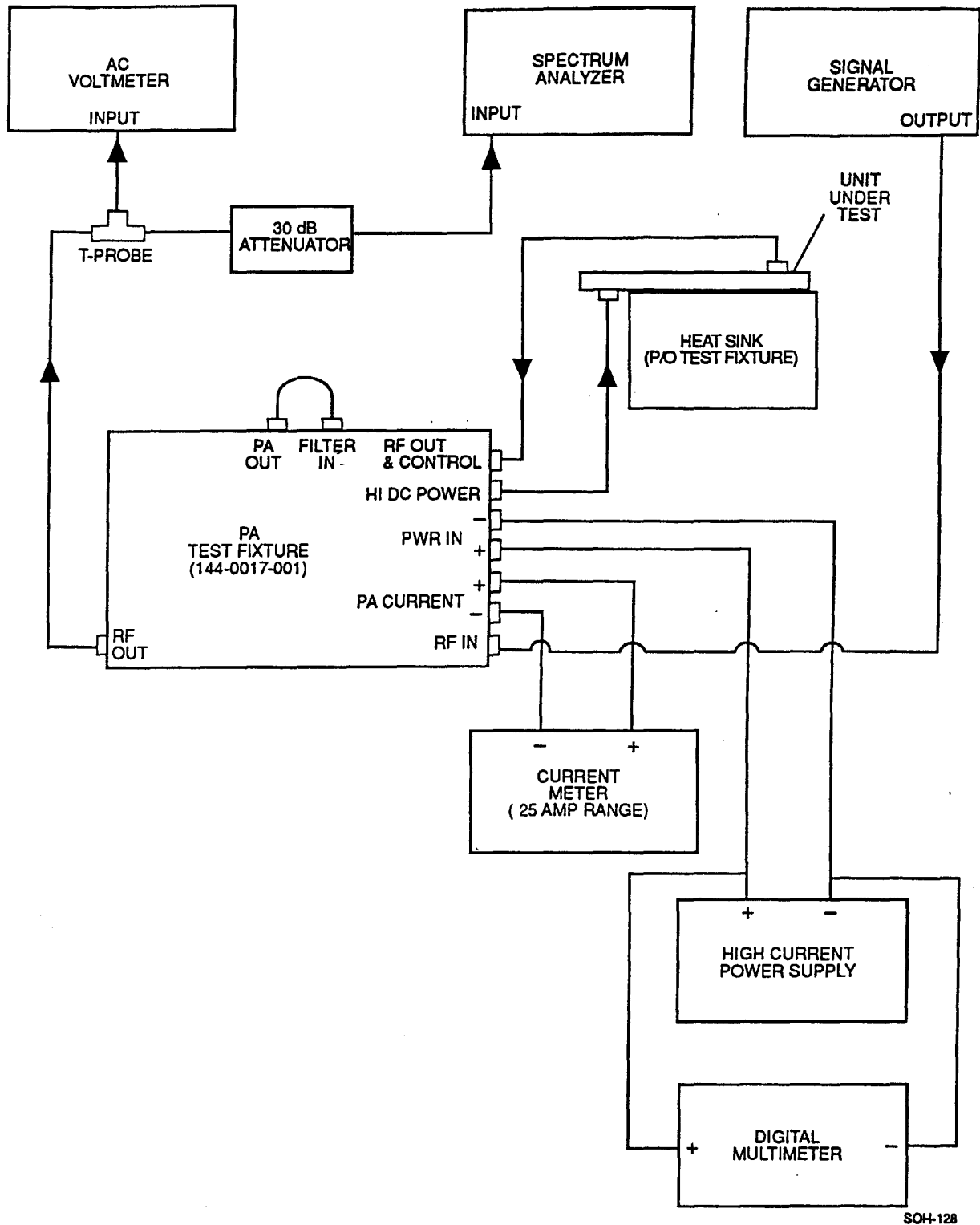


FIGURE 4-11. Test Setup Block Diagram for Measuring 50 Watt RF Output DC Current @ 1.6 MHz

- o. Turn on external power supply.
- p. Set test fixture PWR switch on. PWR ON LED should light.
- q. Reset all relays by depressing the ENTER push button switch and simultaneously moving the RESET switch up.
- r. Select 1 on the thumbwheel ADDRESS switch and momentarily depress the ENTER push button switch to select band 1.

**NOTE**

To reset all filters, hold RESET toggle switch up and then momentarily depress the ENTER push button switch. There will be a relay kicking noise every time setting or resetting the relays. Repeat the reset step if no kicking noise is heard.

- s. Set test fixture DRIVER PWR switch to DRIVER ON.

**CAUTION**

Be sure to set DRIVER PWR switch to DRIVER ON before turning on BIAS switch.

- t. Set test fixture BIAS switch to on. BIAS ON LED should light.
- u. Increase drive level from signal generator in .5 dB steps until RF output, as measured on ac voltmeter, reads 50 VRMS. Record the signal generator output level, the PA input current, and mark (X) for 50 Vrms RF output on data sheet.
- v. Turn off BIAS switch and DRIVER PWR switch, in that order.
- w. Connect test equipment as shown in Figure 4-12.
- x. Set test fixture DRIVER PWR switch to DRIVER ON.

**CAUTION**

Be sure to set DRIVER PWR switch to DRIVER ON before turning on BIAS switch.

- y. Set test fixture BIAS switch to on. BIAS ON LED should light.
- z. Adjust spectrum analyzer to read second and third harmonics. Record levels of second and third harmonics on data sheet.
- aa. Turn off BIAS switch and DRIVER PWR switch, in that order.
- ab. Repeat steps 4-88.5.m through 4-88.5.aa for RF input frequencies of 2.62 MHz (filter band 2), 4.28 MHz (filter band 3), 7.00 MHz (filter band 4), 11.44 MHz (filter band 5), 18.71 MHz (filter band 6), 30.58 MHz (filter band 7), and 50.00 MHz (filter band 7) using the appropriate harmonic filter. Use the appropriate filter band.

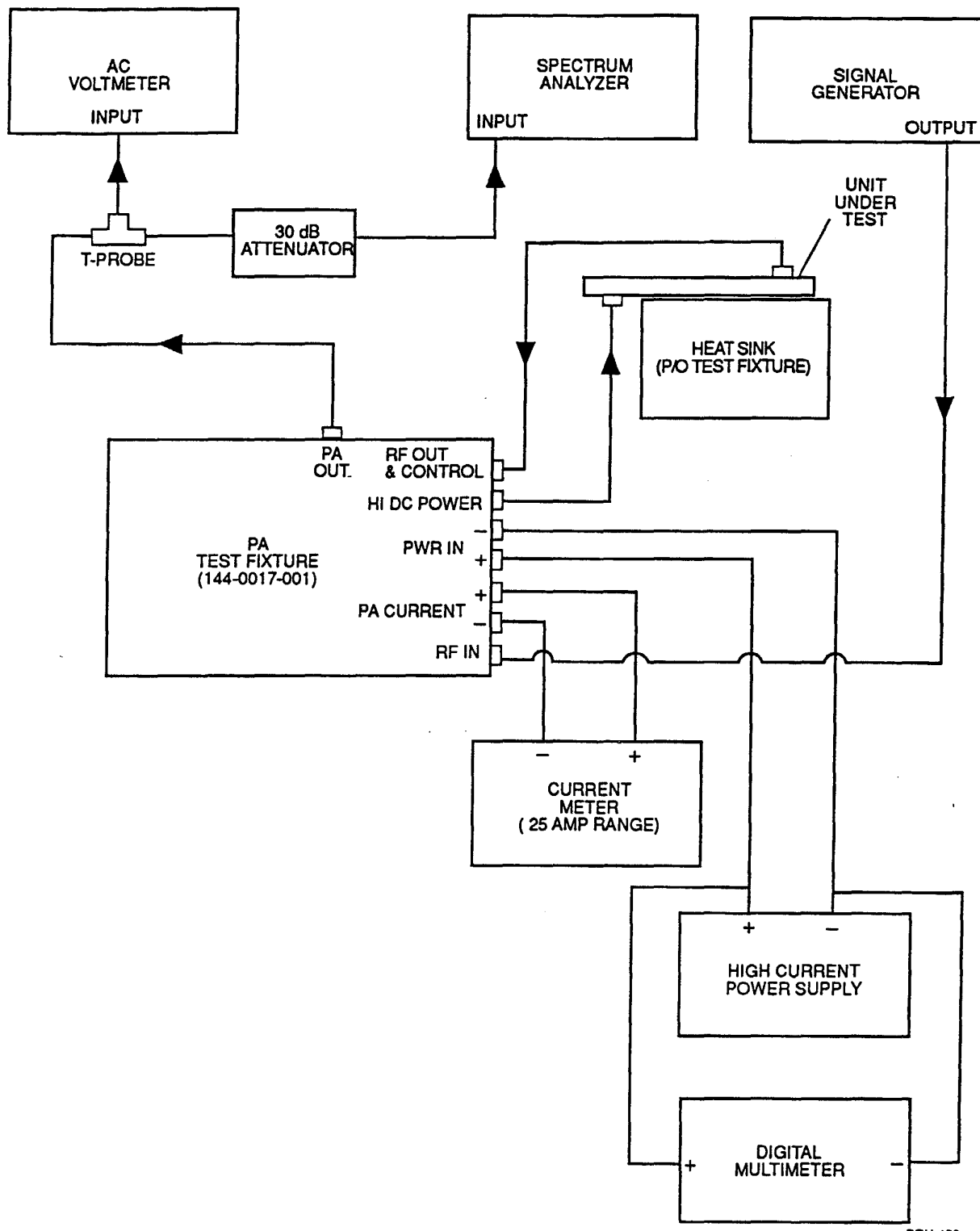


FIGURE 4-12. Test Setup Block Diagram for Measuring 2nd and 3rd Harmonics, RF Input Level and DC Current



4-88.6 Intermodulation Test.

- a. Connect test equipment as shown in Figure 4-13.
- b. Set spectrum analyzer to following settings:

|                      |              |
|----------------------|--------------|
| Input Attenuation:   | 40 dB        |
| Scan Width:          | 1 kHz/div.   |
| Frequency:           | as required  |
| Bandwidth:           | .1 kHz       |
| Time Scan:           | .5 Secs/div. |
| Log Reference Level: | +10 dBm      |
| Level Vernier:       | 0            |
| Video Filter:        | OFF          |
| Scan Mode:           | INT          |
| Scan Trigger:        | AUTO         |
| Display Sensitivity: | 10 dB Log    |
| Writing Speed:       | STD          |
- c. Connect output of signal generator #1 and #2 to combiner.
- d. Connect combiner output to RF IN of test fixture.
- e. Set frequency of signal generator #1 to 1.600 MHz (filter band 1) with output level to -30 dBm.
- f. Set frequency of signal generator #2 1 kHz higher than signal generator #1 with output level to -30 dBm.
- g. Reset all relays by depressing the ENTER push button switch and simultaneously moving the RESET switch up.
- h. Select 1 on the thumbwheel ADDRESS switch and momentarily depress the ENTER push button switch to select band 1.

**NOTE**

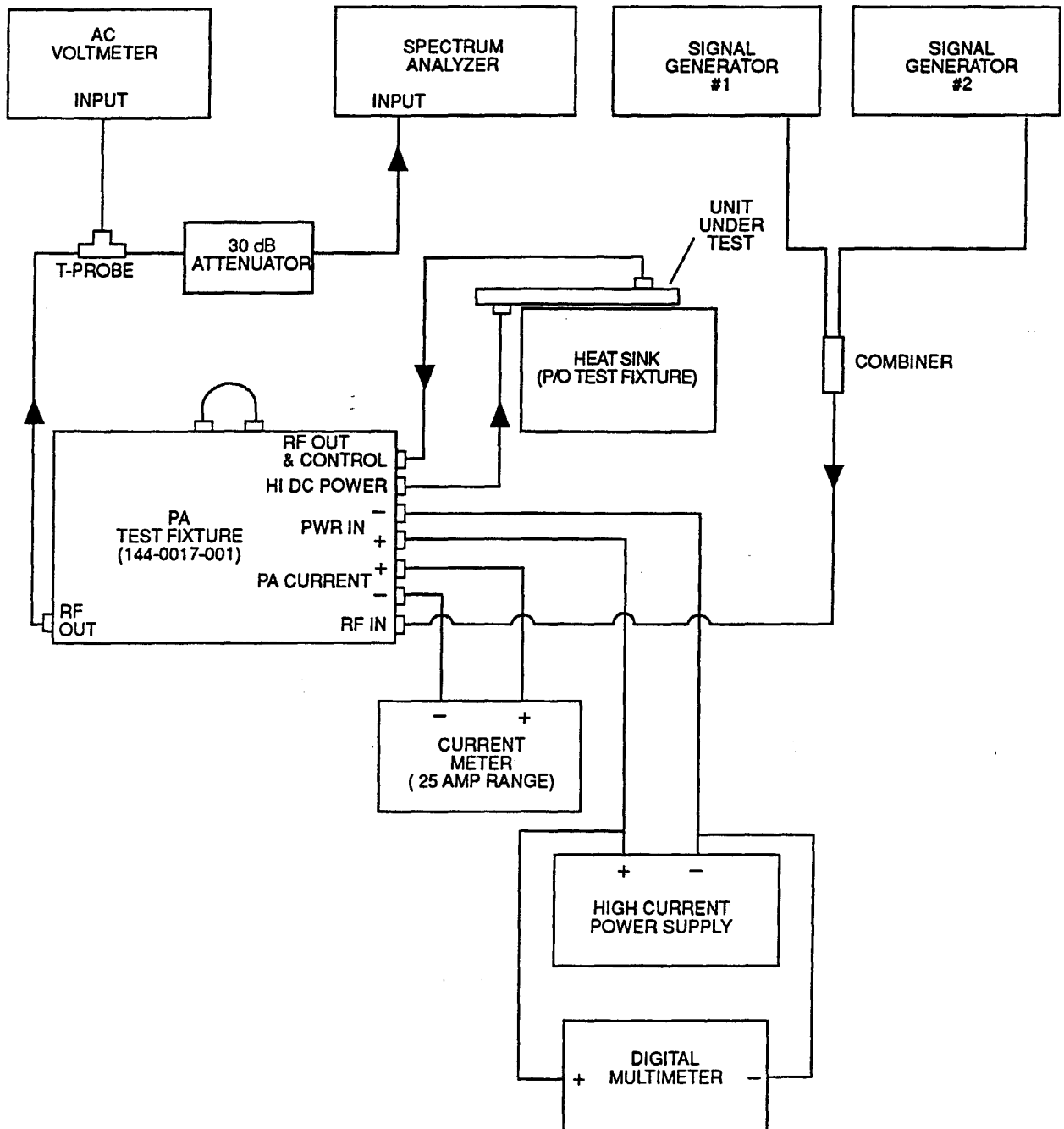
To reset all filters, hold RESET toggle switch up and then momentarily depress the ENTER push button switch. There will be a relay kicking noise every time setting or resetting the relays. Repeat the reset step if no kicking noise is heard.

- i. Set test fixture PWR switch on. PWR ON LED should light.
- j. Set test fixture DRIVER PWR switch to DRIVER ON.

**CAUTION**

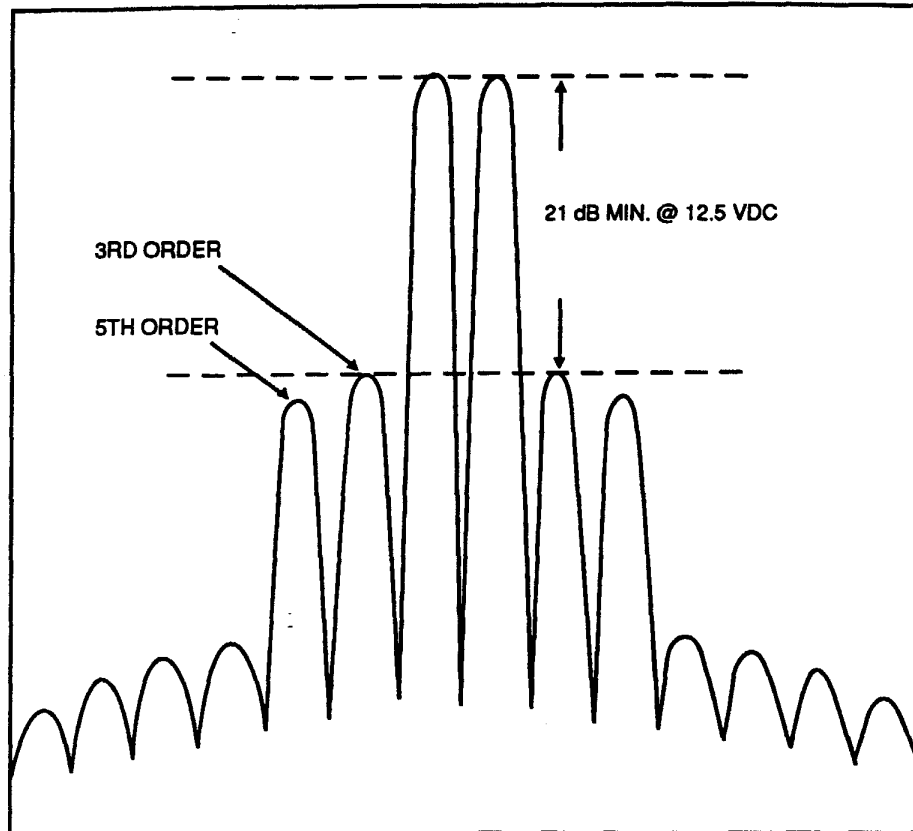
Be sure to set DRIVER PWR switch to DRIVER ON before turning on BIAS switch.

- k. Set test fixture BIAS switch to on. BIAS ON LED should light.
- l. Increase each signal generators' output level equally in .5 dB steps until RF output, as measured on ac voltmeter, reads 50 VRMS.
- m. Record RF input level and PA input current. Mark (X) for 50 Vrms RF output and record level of 3rd order intermodulation products as seen on spectrum analyzer (Figure 4-14).



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FIGURE 4-13. Test Setup Block Diagram for Measuring Intermod Products



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FIGURE 4-14. 3rd Order Intermodulation

- n. Turn off BIAS switch and DRIVER PWR switch, in that order.
- o. Repeat steps 4-88.6.e through 4-88.6.n for RF input frequencies of 2.62 MHz (filter band 2), 4.28 MHz (filter band 3), 7.00 MHz (filter band 4), 11.44 MHz (filter band 5), 18.71 MHz (filter band 6), 30.58 MHz (filter band 7), and 50.00 MHz (filter band 7) using appropriate harmonic filter.
- p. This completes alignment and electrical testing of the A13 Power Amplifier.
- q. Turn off external power supply.
- r. Remove A13 power amplifier from test fixture.
- s. Apply torque lacquer (item 23, App. C) to resistors R12 and R13 to hold adjustment of these components. Allow torque lacquer to set before proceeding.
- t. After torque lacquer has set, place tested A13 PA in protective bag and combine with completed test data sheet.

#### 4-89 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed. Indicated components are listed in the recommended order of replacement.

Table 4-3. A13 Power Amplifier Troubleshooting

| Symptom  | Paragraph Reference                                       | Suspect Component(s)   |
|--|---|--|
| Bad quiescent current measurement.                                       | 4-88.4.f<br>4-88.4.g                                      | Q1, Q2, Q6, R12, R13, R15, R16, R11, R2, R3, R14, or R20, U1 |
| Bad gain slope across the passband.                                      | 4-88.5.j  | Q1, Q2, Q3, or Q4  |
| Bad RF output, bad harmonics, bad 3rd order IMD or bad DC input current. | 4-88.5.u<br>4-88.5.z<br>4-88.5.ab<br>4-88.6.m<br>4-88.6.o | Q1, Q2, Q3, Q4, R12 and/or R13.                              |

## 4-90 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) assembly after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components. The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number. Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09-.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

## 4-91 FINAL ASSEMBLY/INSTALLATION.

No additional testing other than that called for in this section is required. The power amplifier is installed in the housing assembly in Section VII.

## A13 POWER AMPLIFIER DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>   | <u>Value</u>            | <u>Limits</u>                           |
|------------------|--|-------------------------|---|
| 4-85.a           | Mechanical Inspection                                      | _____                   | no damage                               |
| 4-88.3.a.(9)     | DMM Measurements   | _____                   | (X)                                     |
| 4-88.4.f         | R12 Quiescent Current                                      | _____                   | 550 mA $\pm$ 10 mA                      |
| 4-88.4.g         | Total Quiescent Current                                    | _____                   | 650 mA $\pm$ 10 mA                      |
| 4-88.5.j         | Forward Power per Figure 4-15                              | _____                   | _____ dB 1.6 to 50 MHz                  |
| 4-88.5.u         | RF Input Level @ 1.600 MHz<br>PA Input Current @ 1.600 MHz | _____<br>_____          | -22 dBm to -26 dBm<br>12A $\pm$ 2A      |
| 4-88.5.z         | RF Output<br>2nd Harmonic<br>3rd Harmonic                  | _____<br>_____<br>_____ | 50 VRMS (X)<br>$\geq$ -25 dBc min.<br>- |

## A13 POWER AMPLIFIER DATA SHEET

| <u>Para. No.</u>             | <u>Reading</u>               | <u>Value</u>       | <u>Limits</u>      |
|------------------------------|------------------------------|--------------------|--------------------|
| 4-88.5.ab                    | RF Input Level @ 2.620 MHz   | _____              | -24 dBm to -27 dBm |
|                              | PA Input Current @ 2.620 MHz | _____              | 11A ±2A            |
|                              | 2nd Harmonic                 | _____              | ≥-25 dBc min.      |
|                              | 3rd Harmonic                 | _____              | -                  |
|                              | RF Input Level @ 4.280 MHz   | _____              | -23 dBm to -26 dBm |
|                              | PA Input Current @ 4.280 MHz | _____              | 10A ±2A            |
|                              | 2nd Harmonic                 | _____              | ≥-25 dBc min.      |
|                              | 3rd Harmonic                 | _____              | -                  |
|                              | RF Input Level @ 7.000 MHz   | _____              | -23 dBm to -26 dBm |
|                              | PA Input Current @ 7.000 MHz | _____              | 9A ±2A             |
|                              | 2nd Harmonic                 | _____              | ≥-25 dBc min.      |
|                              | 3rd Harmonic                 | _____              | -                  |
|                              | RF Input Level @ 11.44 MHz   | _____              | -22 dBm to -25 dBm |
|                              | PA Input Current @ 11.44 MHz | _____              | 9A ±2A             |
|                              | RF Output                    | _____              | 50 VRMS (X)        |
|                              | 2nd Harmonic                 | _____              | ≥-25 dBc min.      |
|                              | 3rd Harmonic                 | _____              | -                  |
|                              | RF Input Level @ 18.71 MHz   | _____              | -20 dBm to -23 dBm |
|                              | PA Input Current @ 18.71 MHz | _____              | 9A ±2A             |
|                              | RF Output                    | _____              | 50 VRMS (X)        |
|                              | 2nd Harmonic                 | _____              | ≥-30 dBc min.      |
|                              | 3rd Harmonic                 | _____              | -                  |
|                              | RF Input Level @ 30.58 MHz   | _____              | -15 dBm to -19 dBm |
|                              | PA Input Current @ 30.58 MHz | _____              | 10A ±2A            |
| RF Output                    | _____                        | 50 VRMS (X)        |                    |
| 2nd Harmonic                 | _____                        | ≥-30 dBc min.      |                    |
| 3rd Harmonic                 | _____                        | -                  |                    |
| RF Input Level @ 50.00 MHz   | _____                        | -13 dBm to -16 dBm |                    |
| PA Input Current @ 50.00 MHz | _____                        | 10A ±2A            |                    |
| RF Output                    | _____                        | 50 VRMS (X)        |                    |
| 2nd Harmonic                 | _____                        | ≥-35 dBc min.      |                    |
| 3rd Harmonic                 | _____                        | -                  |                    |
| 4-88.6.m                     | RF Input Level @ 1.600 MHz   | _____              | -26 dBm to -29 dBm |
|                              | PA Input Current @ 1.600 MHz | _____              | 8A ±2A             |
|                              | RF Output                    | _____              | 50 VRMS (X)        |
|                              | 3rd Order IMD @ 1.600 MHz    | _____              | ≥-21 dBc min.      |

## A13 POWER AMPLIFIER DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>               | <u>Value</u> | <u>Limits</u>      |
|------------------|------------------------------|--------------|--------------------|
| 4-88.6.o         | RF Input Level @ 2.620 MHz   | _____        | -27 dBm to -30 dBm |
|                  | PA Input Current @ 2.620 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 2.620 MHz    | _____        | ≥-25 dBc min.      |
|                  | RF Input Level @ 4.280 MHz   | _____        | -27 dBm to -30 dBm |
|                  | PA Input Current @ 4.280 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 4.280 MHz    | _____        | ≥-25 dBc min.      |
|                  | RF Input Level @ 7.000 MHz   | _____        | -27 dBm to -30 dBm |
|                  | PA Input Current @ 7.000 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 7.000 MHz    | _____        | ≥-25 dBc min.      |
|                  | RF Input Level @ 11.44 MHz   | _____        | -26 dBm to -29 dBm |
|                  | PA Input Current @ 11.44 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 11.44 MHz    | _____        | ≥-25 dBc min.      |
|                  | RF Input Level @ 18.71 MHz   | _____        | -24 dBm to -27 dBm |
|                  | PA Input Current @ 18.71 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 18.71 MHz    | _____        | ≥-25 dBc min.      |
|                  | RF Input Level @ 30.58 MHz   | _____        | -20 dBm to -23 dBm |
|                  | PA Input Current @ 30.58 MHz | _____        | 7A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 30.58 MHz    | _____        | ≥-23 dBc min.      |
|                  | RF Input Level @ 50.00 MHz   | _____        | -16 dBm to -19 dBm |
|                  | PA Input Current @ 50.00 MHz | _____        | 9A ±2A             |
|                  | RF Output                    | _____        | 50 VRMS (X)        |
|                  | 3rd Order IMD @ 50.00 MHz    | _____        | ≥-25 dBc min.      |

## Section IX. RADIO CHASSIS ASSEMBLY

## 4-92 GENERAL

This section contains depot level maintenance instructions for the radio chassis assembly. Included in these instructions are directions for removal, cleaning, inspection, repair, testing, refinishing/markings and final assembly/installation.

The radio chassis assembly slides into the radio housing assembly and interfaces with the A13 power amplifier. The radio chassis (Figure 4-15) consists of the card cage (10), nine vertically mounted circuit card assemblies (1-9), the control panel assembly (18) and the A14 interconnect board assembly (13).

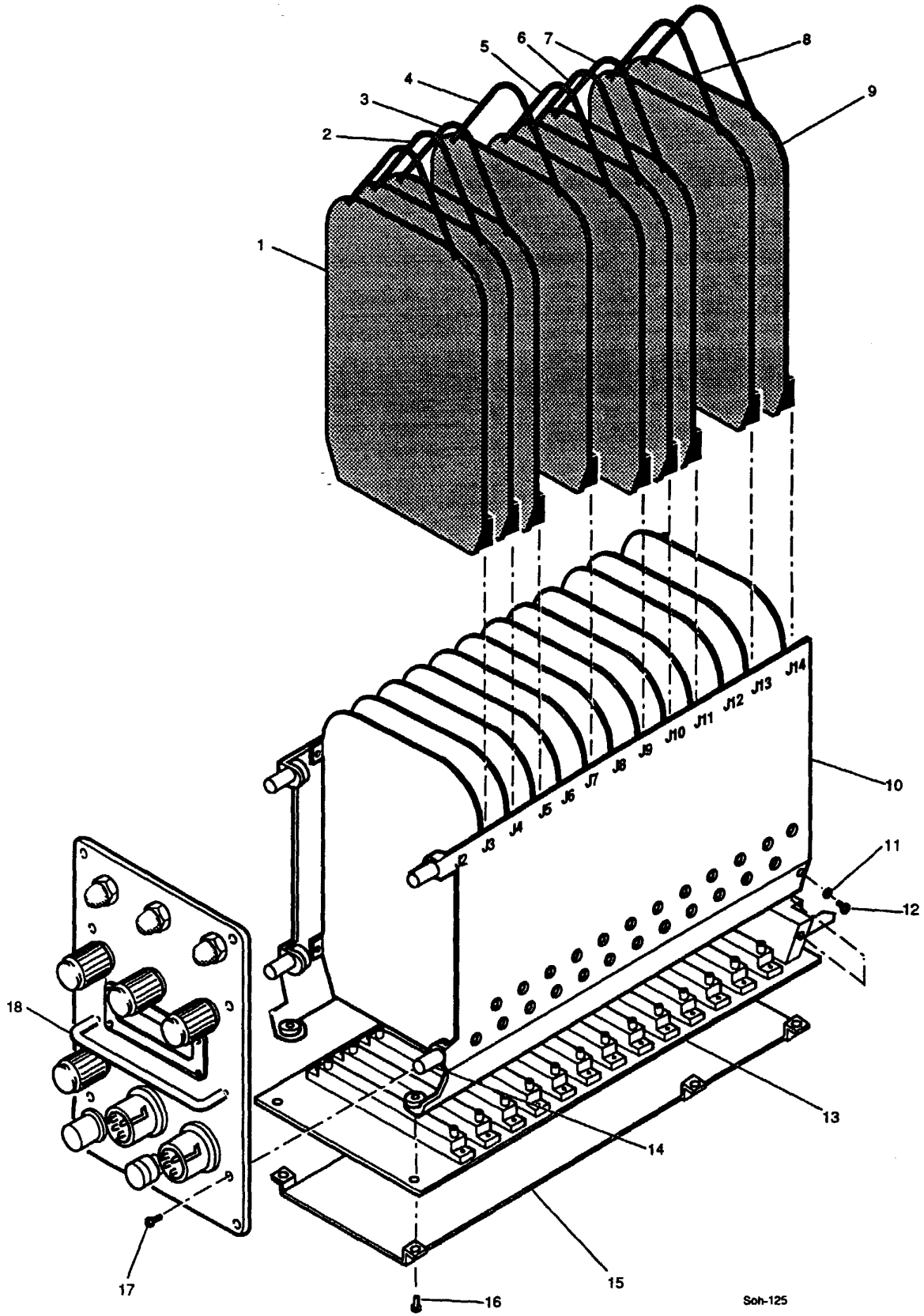


FIGURE 4-15. Disassembly of Radio Chassis Assembly

The card cage provides the structure for mounting of the control panel assembly, A14 interconnect board assembly and nine circuit card assemblies. The card cage assembly provides partitioned slots for isolation of electromagnetic interference for the nine vertically mounted circuit card assemblies and control panel assembly. The nine circuit card assemblies and control panel assembly plug into the A14 interconnect board.

#### 4-93 REMOVAL

Remove the chassis assembly from the housing assembly in accordance with the instructions contained in Section IV.

#### **CAUTION**

The radio chassis assembly contains Electrostatic Sensitive Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

#### 4-94 DISASSEMBLY (Figure 4-15).

Disassembly of the radio chassis assembly involves removal of nine circuit card assemblies from partitioned slots of the chassis assembly card cage, and removal of the A14 interconnect board assembly, control panel assembly, and card cage assembly. Disassemble the radio chassis assembly as follows:

#### **CAUTION**

Circuit card assemblies contains Electrostatic Sensitive Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

#### **NOTE**

The removal procedure for board assemblies A1 through A12 is identical, only the slot from which the board is removed is different.

Not all slots in the chassis assembly are occupied by a circuit card assembly. The circuit card assemblies and the slots they occupy are as follows:

|                                    |     |
|------------------------------------|-----|
| A1 processor board assembly        | J3  |
| A2 first LO board assembly         | J4  |
| A3 second LO board assembly        | J5  |
| A7 product detector board assembly | J7  |
| A8 second IF board assembly        | J9  |
| A9 first IF board assembly         | J10 |
| A10 mixer board assembly           | J11 |
| A11 filter 1-4 board assembly      | J13 |
| A12 filter 5-7 board assembly      | J14 |

The edges of circuit card assemblies slide into circuit retainers on each side of the chassis assembly. The edge connector of each board assembly engages with an interfacing connector located on the A14 interconnect board.

- a. Remove circuit card assembly (items 1 through 9) by grasping the braided nylon handle and firmly pulling card out of A14 interconnect board and chassis assembly. Place circuit card assembly in appropriate ESD protective bag.



- b. Remove four screws (17), standoffs (14) and control panel assembly (18) from card cage assembly (10). Place circuit card assembly in appropriate ESD protective bag.
- c. Remove A14 interconnect board assembly (13) as follows:
  - (1) Remove six screws (16) and cover (15) from interconnect board (13) and card cage (10).
  - (2) Remove two screws (12), lock washers (11), and A14 interconnect board assembly (13) from card cage assembly (10).

#### 4-95 CLEANING

Prior to disassembly, wipe down the radio chassis assembly and external connectors with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

#### 4-96 INSPECTION

Check for damage to the chassis assembly connectors and control panel assembly controls and connections.

#### 4-97 MANDATORY REPLACEMENT PARTS

There are no mandatory replacement parts.

#### 4-98 REPAIR/REPLACE

The radio chassis assembly (Figure 4-15) is repaired by replacing or repairing circuit card assemblies A1 through A12, A14, the control panel assembly, and the card cage assembly. Additional repair procedures for these assemblies are contained in Section X through Section XX. Troubleshoot assembly using procedure in paragraph 4-103.

#### 4-99 RECLAMATION

There are no candidates for reclamation.

#### 4-100 ASSEMBLY

Assembly of the radio chassis assembly involves installation of nine circuit card assemblies into partitioned slots of the card cage assembly, and installation of the A14 interconnect board assembly, control panel assembly, and card cage assembly. Assemble the radio chassis assembly as follows:

#### **CAUTION**

Circuit card assemblies contains Electrostatic Sensitive Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

#### **CAUTION**

Do not force A1-A12 boards into A14 interconnect board.

**NOTE**

The installation procedure for circuit card assemblies A1 through A12 is identical, only the slot in which the board is installed is different.

Not all slots in the chassis assembly are occupied by a circuit card assembly. The circuit card assemblies and slots they occupy are as follows:

|                                    |     |
|------------------------------------|-----|
| A1 processor board assembly        | J3  |
| A2 first LO board assembly         | J4  |
| A3 second LO board assembly        | J5  |
| A7 product detector board assembly | J7  |
| A8 second IF board assembly        | J9  |
| A9 first IF board assembly         | J10 |
| A10 mixer board assembly           | J11 |
| A11 filter 1-4 board assembly      | J13 |
| A12 filter 5-7 board assembly      | J14 |

**NOTE**

The edges of circuit card assemblies slide into circuit retainers on each side of the chassis assembly. The edge connector of each circuit card assembly engages with an interfacing connector located on the A14 interconnect board.

**NOTE**

Circuit card assemblies A1 through A12 are keyed to prevent incorrect installation.

- a. Hold braided nylon handle and edges of the board, and slide board, component side towards the control panel, into board retainer slots until edge connector seats fully into interfacing A14 interconnect board connector (Figure 4-15).
- b. Install control panel assembly (18), four standoffs (14), and screws (17) to card cage assembly (10).
- c. Install A14 interconnect board assembly (13) as follows:
  - (1) Install interconnect board (13) and two lock washers (11), and screws (12) to card cage assembly (10).
  - (2) Install cover (15) and six screws (16) to interconnect board (13) and card cage (10).

**4-101 TESTING.**

This test procedure covers alignment and functional testing of the receiver exciter and the Automatic Level Control (ALC) circuits of the transceiver.

**4-101.1 Equipment.** The following test equipment, or equivalent, is required for testing and alignment of the receiver exciter and ALC circuits. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>       | <u>QTY</u> |
|--------------------------|------------|
| 30 dB Attenuator         | 1          |
| ac Voltmeter             | 1          |
| Audio/Key Test Cable     | 1          |
| Card Cage Extender Cable | 1          |
| Current Meter            | 1          |

DMWR 11-5820-1102

|                            |   |
|----------------------------|---|
| Distortion Measurement Set | 1 |
| DMM                        | 1 |
| Dummy Load                 | 1 |
| Exciter Power Cable        | 1 |
| Power Supply, High Current | 1 |
| Power Supply               | 1 |
| Radio dc Power Cable       | 1 |
| Signal Generator           | 1 |
| Spectrum Analyzer          | 1 |
| Tool Kit                   | 1 |
| T-Probe Connector          | 1 |

4-101.2 Inspections.

- a. Inspect card cage to ensure all plug in boards are installed in their appropriate locations and are fully inserted.
- b. Inspect hardware in both card cage sides for tightness.
- c. Inspect hardware holding control panel assembly to card cage for tightness.
- d. Inspect guide pins that mate with the PA for tightness.
- e. Inspect hardware securing interconnect board for tightness.
- f. If all of above visual inspections are satisfactory, mark (X) on data sheet.

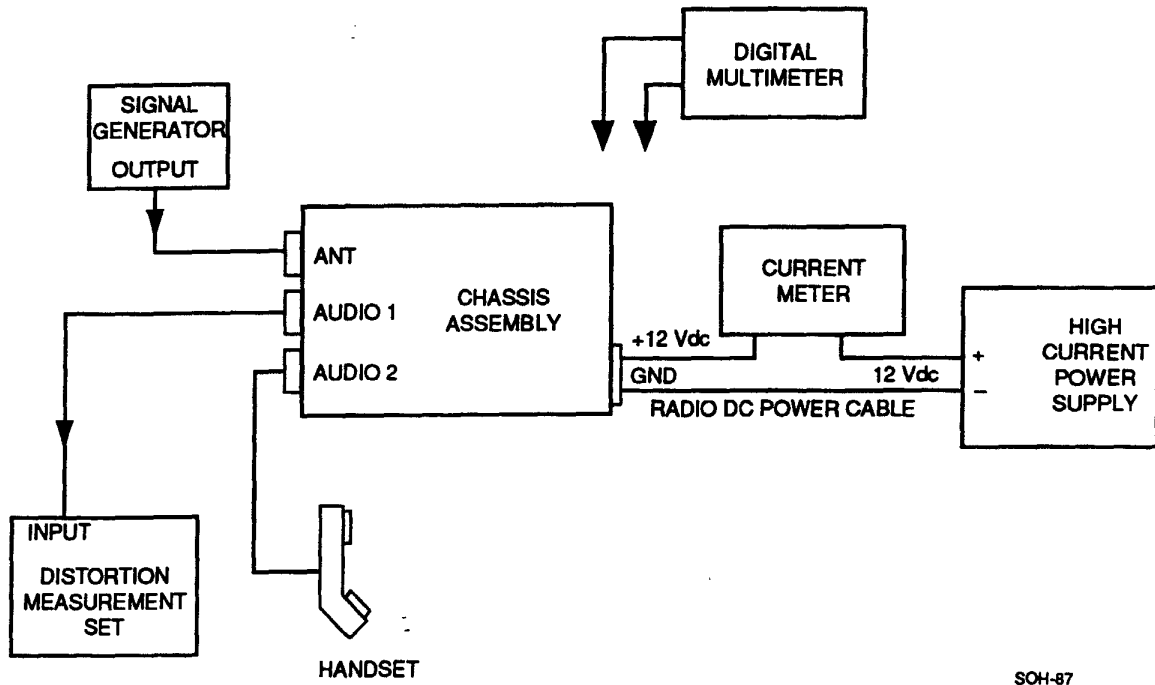
4-101.3 Channel Programming.

- a. Setup equipment as shown in Figure 4-16 with exciter power cable connected between chassis assembly and external power supply.
- b. Turn on power supply and adjust it for 12.0 Vdc  $\pm$ 0.1 Vdc as read on DVM.
- c. Set radio power switch to RX ONLY position.

**CAUTION**

The radio power switch should be kept in RX ONLY position to avoid accidental keying of radio. Accidental keying of radio may result in damage to test equipment connected to the antenna connector.

- d. Clear all radio channels by momentarily depressing FREQ SEL pushbutton six times in succession. Verify H's appear at all positions on display and that the display shows a receive frequency of 10.0000 MHz. Mark (X) on data sheet.
- e. Program radio channels as shown in Table 4-4.
- f. Step through channels and verify that they are programmed to the correct frequencies. Mark (X) on data sheet.



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FIGURE 4-16. Test Setup Block Diagram for Channel Programming

Table 4-4. Radio Channel RX/TX Frequencies

| Channel | Receive Frequency (MHz) | Transmit Frequency (MHz) |
|---------|-------------------------|--------------------------|
| 3       | 49.9999                 | 49.9999                  |
| 4       | 1.6000                  | 1.6000                   |
| 5       | 2.0100                  | 2.0100                   |
| 10      | 24.6500                 | 24.6500                  |
| 11      | 40.2900                 | 40.2900                  |

4-101.4 Sensitivity.

**CAUTION**

The radio power switch should be kept in RX ONLY position to avoid accidental keying of radio. Accidental keying of radio may result in damage to test equipment connected to the antenna connector.

- a. Set radio to channel 4 and USB mode.
- b. Set signal generator frequency to 1.601 MHz and output level to -117 dBm.
- c. Adjust volume control to a convenient listening level. A 1 kHz tone should be heard in handset. Mark (X) on data sheet.

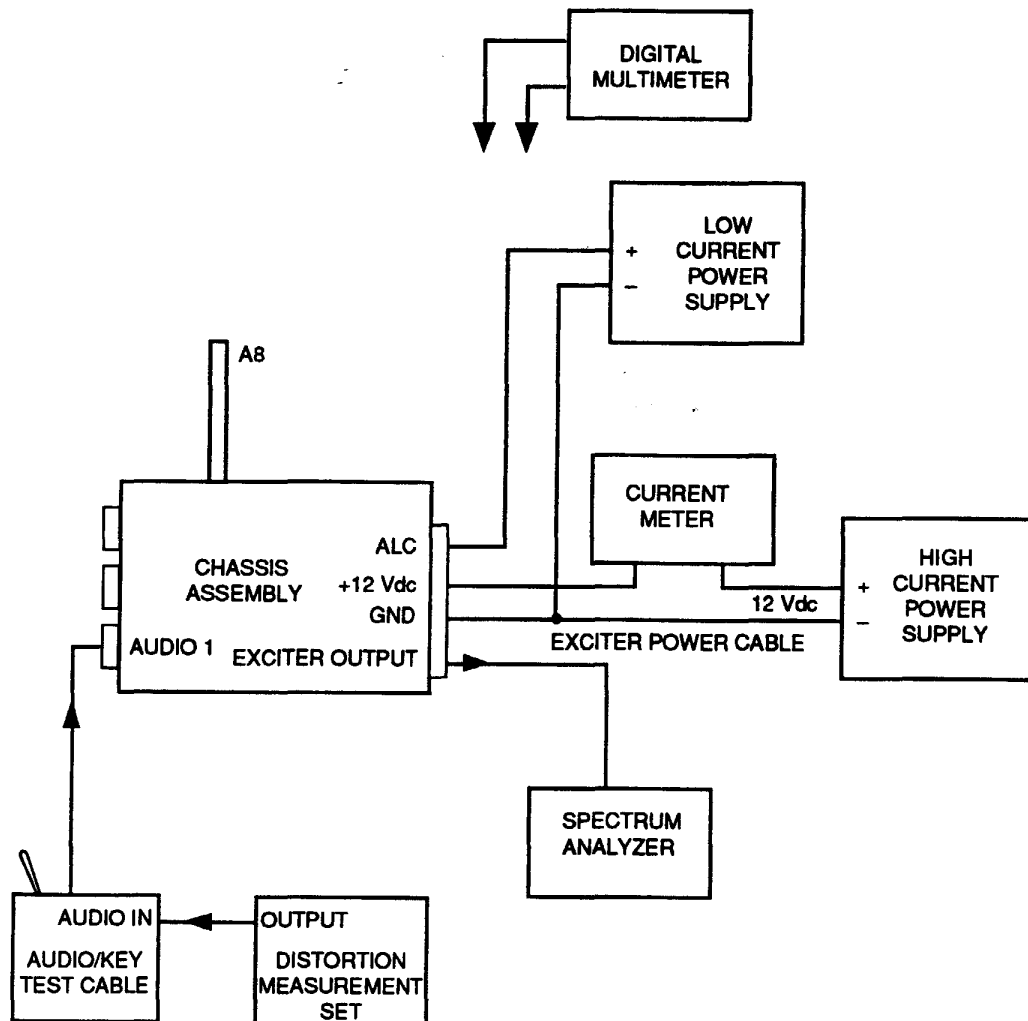
- d. Set distortion measurement set to read SINAD. Measure and record SINAD as read on distortion measurement set.
- e. Repeat steps 4-101.4.a through 4-101.4.d for each radio channel and signal generator frequency on data sheet.
- f. Turn off radio and power supply.

4-101.5 Exciter Output Level.

**CAUTION**

Extender card has no key pins. Ensure A8 card is installed into extender card correctly.

- a. Setup equipment as shown in Figure 4-17 with exciter power cable used to connect chassis assembly to both power supplies and spectrum analyzer.



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FIGURE 4-17. Test Setup Block Diagram for Exciter Output Level

- b. Turn on both power supplies.

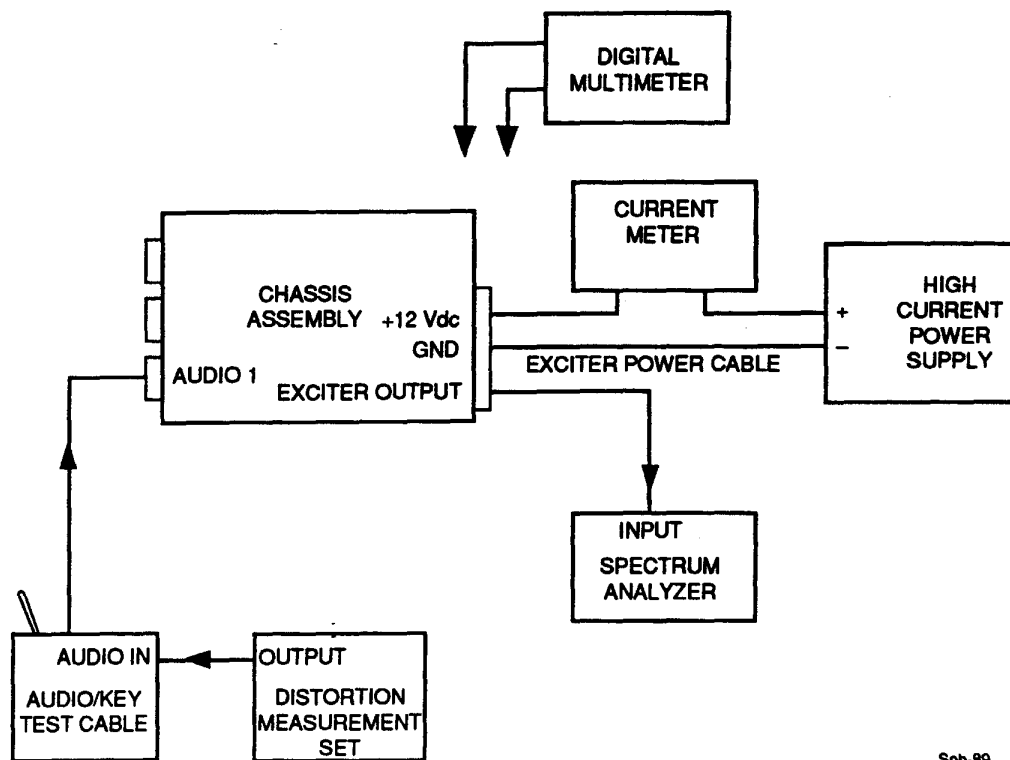
- c. Set radio power switch to 5 W position.
- d. Adjust high current power supply to  $12.0 \pm 0.1$  Vdc and low current power supply to 0 Vdc as read on DMM.
- e. Adjust audio output frequency of distortion measurement set to 1 kHz and audio output level to 1 mVrms.
- f. Set controls on the spectrum analyzer as follows:
 

|                       |              |
|-----------------------|--------------|
| Center Frequency:     | 40.29 MHz    |
| Frequency Span:       | 10 kHz       |
| Reference Level:      | +20 dBm      |
| Resolution Bandwidth: | 100 Hz       |
| Video Bandwidth:      | 300 Hz       |
| Sweep Time:           | 3.00 seconds |
| Vertical Scale:       | 10 dB/Div    |
- g. Set radio to channel 11 and LSB mode.
- h. Key radio and adjust A8R17 (Figure 4-46) for an exciter output level of between +20 and + 23 dBm, as read on spectrum analyzer.
- i. Unkey radio.
- j. Set radio mode to USB.
- k. Key radio and measure exciter output level. If it is less than +20 dBm, adjust A8R17 for +20 dBm.
- l. Measure and record on data sheet, exciter output level in both USB and LSB. Both should be between +20 and +23 dBm.
- m. Key radio and slowly adjust output voltage of low current power supply upward toward 12 Vdc. The exciter output level on spectrum analyzer should drop as output voltage increases. Record exciter output level with low current power supply set to 12 Vdc.
- n. Unkey radio and turn off radio and both power supplies.
- o. Remove A8 from extender card, remove extender card from chassis assembly, and install A8 into chassis assembly.

#### 4-101.6 AM Carrier Reinsertion and Side Band Carrier Suppression.

- a. Setup equipment as shown in Figure 4-18 with exciter power cable used to connect chassis assembly to power supply and spectrum analyzer.
- b. Turn on power supply and adjust it to  $12.0 \pm 0.1$  Vdc as read on DMM.
- c. Set radio power switch to 5 W position.
- d. Adjust the controls on spectrum analyzer as follows:
 

|                   |           |
|-------------------|-----------|
| Center Frequency: | 40.29 MHz |
| Frequency Span:   | 10 kHz    |



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FIGURE 4-18. Test Setup Block Diagram for AM Carrier Reinsertion and Sideband Carrier Suppression

|                       |              |
|-----------------------|--------------|
| Reference Level:      | +20 dBm      |
| Resolution Bandwidth: | 100 Hz       |
| Video Bandwidth:      | 300 Hz       |
| Sweep Time:           | 3.00 seconds |
| Vertical Scale:       | 10 dB/Div    |

- e. Set radio to channel 11 and AME mode.
- f. Key radio and adjust spectrum analyzer to view carrier and USB signal.
- g. Unkey radio. If carrier and USB signal are within  $\pm 0.5$  dB of each other, mark (X) on data sheet and go to step 4-101.6.k. If the carrier and USB signal are not within  $\pm 0.5$  dB of each other, go to step 4-101.6.h.
- h. Turn off radio and power supply and remove A9 from card cage assembly. If carrier in step 4-101.6.g. was higher than the USB signal, adjust A9R30 (Figure 4-56) clockwise a small amount. If the carrier in step 4-101.6.g. was lower than the USB signal, adjust A9R30 counterclockwise a small amount.
- i. Reinsert A9 fully into chassis assembly.
- j. Turn on power supply and radio and set radio power switch to 5W position. Repeat step g.
- k. Change audio output frequency of distortion measurement set to 1.5 kHz.
- l. Adjust controls on spectrum analyzer as follows:

Center Frequency: 2.010 MHz

|                       |              |
|-----------------------|--------------|
| Frequency Span:       | 10 kHz       |
| Reference Level:      | +20 dBm      |
| Resolution Bandwidth: | 100 Hz       |
| Video Bandwidth:      | 300 Hz       |
| Sweep Time:           | 3.00 seconds |
| Vertical Scale:       | 10 dB/Div    |

- m. Set radio to channel 5 and USB mode.
- n. Key radio and adjust spectrum analyzer to view the carrier and USB signal. Unkey radio.

**NOTE**

Video average 8 times to make the accurate measurement. If the carrier is 50 dB or more below the USB signal, unkey the radio and change mode to LSB.

- o. Key radio and adjust spectrum analyzer to view the carrier and LSB signal.

**NOTE**

Video average 8 times to make the accurate measurement.

- p. Unkey radio. If the carrier is 50 dB or more below the LSB signal, record the level differences between the carrier and USB signal and the carrier and LSB signal on data sheet. Turn off radio and power supply. Perform the Power Output Adjustment in paragraph 4-101.7. If, in either case, the carrier is not at least 50 dB below the desired USB and LSB signals, go to step 4-101.6.q.
- q. Turn off radio and power supply and remove A7 from card cage assembly. Adjust A7R55 (Figure 4-40) slightly clockwise or counterclockwise.

**NOTE**

This step may have to be repeated to obtain the desired results. A7R55 may require adjustment in the clockwise or counterclockwise direction. If adjustment in one direction does not reduce the carrier level, adjust A7R55 in the opposite direction.

- r. Reinsert A7 fully into card cage assembly. Turn on the power supply and radio and set radio power switch to 5W position and mode to USB. Repeat steps 4-101.6.m through 4-101.6.p.

**4-101.7 Power Output Adjust.**

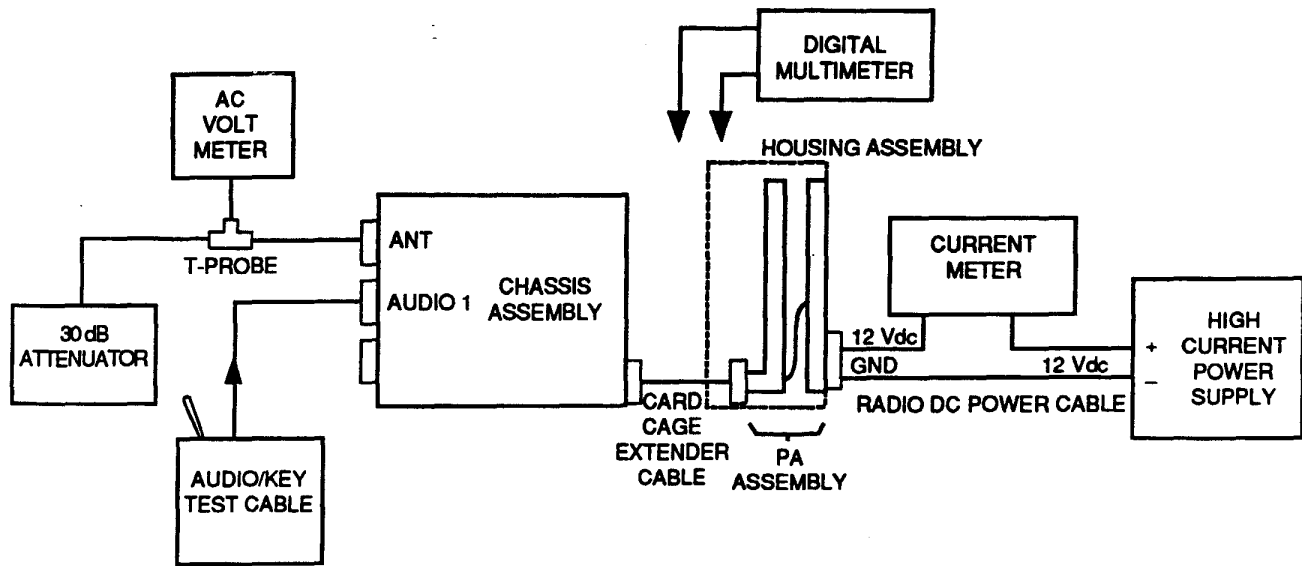
- a. Setup equipment as shown in Figure 4-19 with chassis assembly removed from radio housing.

**NOTE**

Power amplifier must be good in order to properly perform this procedure.

- b. Connect power supply through radio dc power cable to connector on rear plate attached to power amplifier assembly.
- c. Install exciter extender power cable to inside connection of power amplifier.
- d. Route card cage extender cable through housing and attach to chassis assembly.
- e. Turn on Power Supply and adjust it to 12.0 Vdc as read on DMM.





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FIGURE 4-19. Test Setup Block Diagram for Power Output Adjuster

- f. Set radio power switch to 5 W position.
- g. Set radio to channel 5 and USB mode.
- h. Adjust the distortion measurement set for 1 kHz audio output frequency and 1 mVrms audio output level.
- i. Key radio and adjust A16R19 (Figure 4-94) for 15.8 Vrms as read on ac Voltmeter.
- j. Unkey radio. Record voltage on data sheet.
- k. Set radio power switch to 10 W position.
- l. Key radio and adjust A16R18 for 22.4 Vrms as read on ac Voltmeter.
- m. Unkey radio. Record voltage on data sheet.
- n. Set radio power switch to 20 W position.
- o. Key radio and adjust A16R17 for 31.6 Vrms as read on ac Voltmeter.
- p. Unkey radio. Record voltage on data sheet.
- q. Set radio power switch to 50 W position.
- r. Key radio and adjust A16R16 for 50 Vrms as read on ac Voltmeter.
- s. Unkey radio. Record voltage on data sheet.

- t. With radio still set in 50W position, check power output on channels 10 and 3 and record levels on data sheet.
- u. This completes this test procedure.
- v. Turn off chassis power and power supply.
- w. Disconnect chassis assembly from test setup.

#### 4-102 PAINTING AND MARKING

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

#### 4-103 TROUBLESHOOTING

In most cases the easiest way to isolate a problem at the chassis level is to substitute known working PCBs in conjunction with Table 4-5.

Table 4-5. Chassis Assembly Troubleshooting

| Symptom   | Paragraph | Suspect Component(s)                               |
|---|-----------|--|
| Chassis will not enter RX ONLY mode.  | 4-101.3.c | A1, A2, A3, A7, A8, A9, A10, A11, A12, and/or A22. |
| Cannot clear all radio channels. H's do not appear at all positions on display. | 4-101.3.d | A2, A1, A22, and/or A14.                           |
| No 1 kHz tone in headset  | 4-101.4.c | A11, A12, A2, A3, A9, A8, A7, A22, and/or A14.     |
| SINAD out of acceptable range   | 4-101.4.d | A9, A7, A8, A22, and/or A14.                       |
| Problem with exciter output level   | 4-101.5   | A13, A10, A22, and/or A14                          |
| No AM signal  | 4-101.6.g | C22, A9, A14                                       |
| Unbalanced signal cannot be adjusted  | 4-101.6.g | A9   |
| Carrier suppression too high  | 4-101.6.p | A7, A9, A14  |
| Failure of low power output on all frequencies                                  | 4-101.7.r | A13, A10, A12, A8, A9 and/or A11                   |
| No transmit power out at frequencies between 1.6 - 11.4399 MHz                  | 4-101.7.t | A11, A2, A9, and/or A8                             |
| No transmit power out at frequencies between 11.44 - 49.999 MHz                 | 4-101.7.t | A12, A2, A9, and/or A8                             |

#### 4-104 FINAL ASSEMBLY/INSTALLATION

The radio chassis assembly is installed in the radio final assembly in Section IV.

## CHASSIS ASSEMBLY DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>                                 | <u>Data</u>    | <u>Limits</u>     |
|------------------|--|----------------|-------------------|
| 4-101.2.f        | <u>MECHANICAL INSPECTION</u>                   | _____          | (X)               |
| 4-101.3          | <u>CHANNEL PROGRAMMING</u>                     |                |                   |
| 4-101.3.d        | Clear channels                                 | _____          | (X)               |
| 4-101.3.f        | Channels programmed properly                   | _____          | (X)               |
| 4-101.4          | <u>SENSITIVITY</u>                             |                |                   |
| 4-101.4.c        | 1 kHz tone in handset                          | _____          | (X)               |
| 4-101.4.d        | Channel 4 SINAD                                | _____          | 10 dB min.        |
| 4-101.4.e        | Channel <u>Sig. Gen. Frequency</u>             |                |                   |
|                  | 10            24.651 MHz                       | SINAD _____ dB | 10 dB min.        |
|                  | 3            50.0009 MHz                       | SINAD _____ dB | 10 dB min.        |
| 4-101.5          | <u>EXCITER OUTPUT LEVEL</u>                    |                |                   |
| 4-101.5.l        | Channel 11, LSB, Exciter output level +20 dBm  | _____ dBm      | 20 to 23 dBm      |
| 4-101.5.i        | Channel 11, USB, Exciter output level +20 dBm  | _____ dBm      | 20 to 23 dBm      |
| 4-101.5.m        | Exciter output level with 12 ±0.1 Vdc ext. ALC | _____ dBm      | < -30 dBm         |
| 4-101.6          | <u>AM CARRIER REINSERTION</u>                  |                |                   |
| 4-101.6.g        | AM carrier and USB signal within ±0.5 dB       | _____          | (X)               |
| 4-101.6.p        | USB carrier suppression                        | _____ dB       | ≥50 dB            |
|                  | LSB carrier suppression                        | _____ dB       | ≥50 dB            |
| 4-101.7          | <u>POWER OUTPUT ADJUST</u>                     |                |                   |
| 4-101.7.j        | A16 R19 adjusted for 15.8 Vrms                 | _____          | (X)               |
| 4-101.7.m        | A16 R18 adjusted for 22.4 Vrms                 | _____          | (X)               |
| 4-101.7.p        | A16 R17 adjusted for 31.6 Vrms                 | _____          | (X)               |
| 4-101.7.s        | A16 R16 adjusted for 50 Vrms                   | _____          | (X)               |
| 4-101.7.t        | CH 10 power out                                | _____ Vrms     | 44.6 to 56.1 Vrms |
|                  | CH 3 power out                                 | _____ Vrms     | 44.6 to 56.1 Vrms |

**Section X. A1 PROCESSOR BOARD****4-105 GENERAL.**

This section contains depot level maintenance instructions for the A1 processor board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A1 processor board is mounted in the first slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A1 processor board from other boards mounted in the chassis assembly.

The A1 processor board controls most transceiver functions. It accepts operator input through front panel controls and stores channel and frequency data in memory. It controls synthesizers, LCD and filter relays, and communicates with other units through a data bus.

**4-106 REMOVAL OF A1 PROCESSOR.**

Refer to Section IX for removal of the A1 processor board.

**CAUTION**

The processor board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

**4-107 CLEANING.****WARNING**

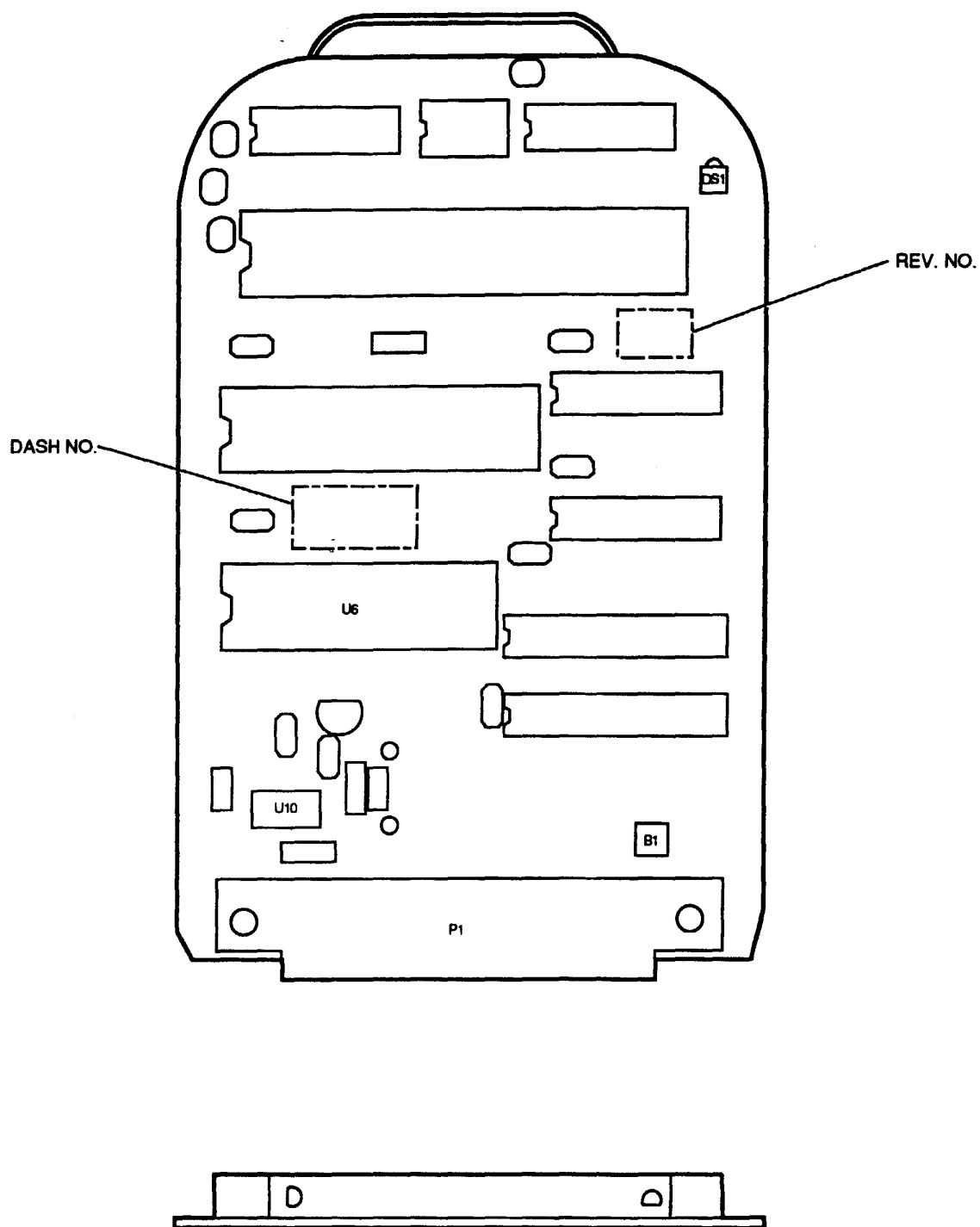
Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

**4-108 INSPECTION.**

- a. Inspect the A1 processor board for broken or damaged components.
- b. Inspect board for solder bridges or other mechanical problems.
- c. Inspect processor board to ensure keying pins are oriented as indicated and that silicon rubber compound has been applied properly to following areas (Figure 4-20):

- (1) Battery B1 leads (component and circuit side)
- (2) U6 pin 24 (circuit side)



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FIGURE 4-20. RTV Application and Connector Keying

- (3) U10 pin 1 (circuit side)
- (4) U10 pin 2 (circuit side)
- (5) Feed through hole above U10 pin 2 on circuit side of PCB.

d. Inspect lead extensions on circuit side. They must not be greater than 0.03 inches (Figure 4-21).

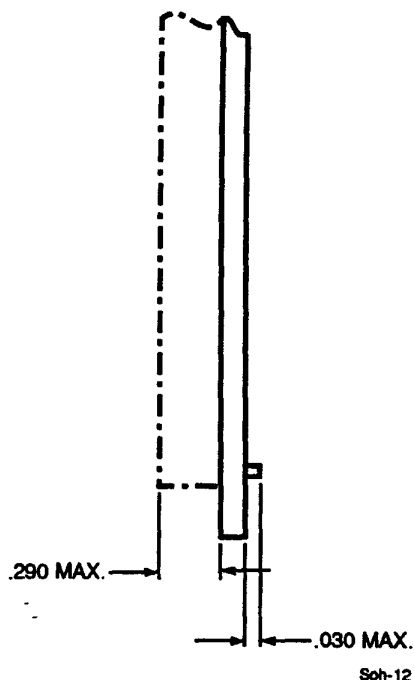


FIGURE 4-21. Component and Lead Extension Off PWB

- e. Inspect component height on component side. It must be no greater than 0.29 inches (Figure 4-21).
- f. Inspect processor board for any exposed surfaces through humiseal coating. If all visual inspections are satisfactory, mark (X) on data sheet.
- g. Repair board as necessary (paragraph 4-109).

#### 4-109 REPAIR/REPLACE.

The processor board is repaired by replacing its component parts and/or repairing the humiseal coating (item 6, App. C).

#### **WARNING**

The processor board contains a lithium battery which contains flammable organic materials. Incorrect handling may cause an explosion. Do not short battery leads together. Do not expose battery to extreme heat for more than five seconds. Do not immerse battery in water or cleaning solution. Ensure that battery polarity is correct. Do not strike or drop battery.

#### **CAUTION**

The processor board contains Electrostatic Sensitive Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

- a. Troubleshoot assembly using procedure in paragraph 4-111.

- b. When replacing battery B1, use silicon rubber compound (item 14, App. C) on battery leads at U6 pin 24, U10, pin 1, U10, pin 2, and feed through hole above U10, pin 2 on circuit side of PCB (Figure 4-20).
- c. When replacing IC U6, use silicon rubber compound (item 14, App. C) on battery lead at pin 24 (Figure 4-20).
- d. When replacing IC U10, use silicon rubber compound (item 14, App. C) on battery lead at pin 1 and pin 2 (Figure 4-20).
- e. When replacing connector, ensure that keying pins on connector are oriented as shown in Figure 4-20.
- f. Ensure that no leads extend more that 0.03 inches above circuit side of processor board (Figure 4-21).
- g. Ensure that no components extend more that .29 inches above component side of processor board.

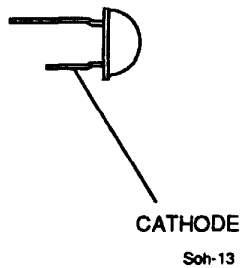


FIGURE 4-22. Diode DS1 Installation

- h. When replacing LED DS1, note that the cathode of LED DS1 is the shorter of the two leads (Figure 4-22).
- i. Solder electronic components using solder S/N 62 (item 20, App. C).
- j. Humiseal (item 6, App. C) processor board after replacing components or to repair damaged humiseal that may occur during test probing. Do not humiseal connector P1, adjustable components or voltage regulator (VR1).

4-110 TESTING.

This test procedure covers electrical testing of A1 processor board. The front panel assembly is part of the test fixture used to test A1 processor board. Be familiar with operation of the front panel controls and corresponding readouts on front panel display (See TM 11-5820-1102-12).

4-110.1 Conditions. This test procedure should be conducted in an ambient temperature environment of 25°C ±10°C.

4-110.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of the A1 processor board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify that test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>             | <u>QTY.</u> |
|--------------------------------|-------------|
| A1, A2, A3 Boards Test Fixture | 1           |

|                    |   |
|--------------------|---|
| Digital Multimeter | 1 |
| Frequency Counter  | 1 |
| Power Supply       | 1 |
| Tool Kit           | 1 |

#### 4-110.3 Set Up (Figure 4-23).

#### **CAUTION**

Do not force A1 processor board into test fixture mating connectors.

#### **NOTE**

The A1 processor board is index keyed with test fixture mating connector. Some test fixture connectors may not be keyed, so use care to ensure that each board is properly installed in appropriate connector.

- a. Setup in accordance with Figure 4-23. Ensure A2 board is installed in test fixture.
- b. Remove test fixture A1 processor board from A1 position on test fixture.
- c. Install A1 processor board to be tested, in A1 position on test fixture.
- d. Ensure test fixture PWR switch is set to OFF.
- e. Turn on power supply to test fixture and adjust power supply to +12 Vdc at test fixture voltage terminals. Use DMM.

#### 4-110.4 Testing and Alignment.

- a. Set test fixture switches and front panel assembly switches, in order shown, as follows:

|                                    |            |
|------------------------------------|------------|
| Test Fixture PTT Switch:           | OFF (Down) |
| Front Panel Assembly POWER Switch: | RX         |
| Front Panel Assembly MODE Switch:  | LSB        |
| Front Panel FREQ SEL Switch:       | 1          |

#### **NOTE**

Refer to Operator's and Unit Maintenance Manual, TM 11-5820-1102-12 for operation of front panel assembly.

- b. Set test fixture PWR switch to ON, then turn it OFF, then ON again. Verify front panel assembly display goes through an initialization sequence, then changes to read 10.0000, or the last entered receive frequency if A1 board was previously tested and programmed. Mark (X) on data sheet.
- c. Push channel button (CHAN) to see what channel the front panel assembly is set to. The display should read HL XX, where XX is any channel, number 00 through 99. Mark (X) on data sheet.
- d. Push ENTER button. The display should read current receive frequency. Mark (X) on data sheet.
- e. Turn test fixture off then on.



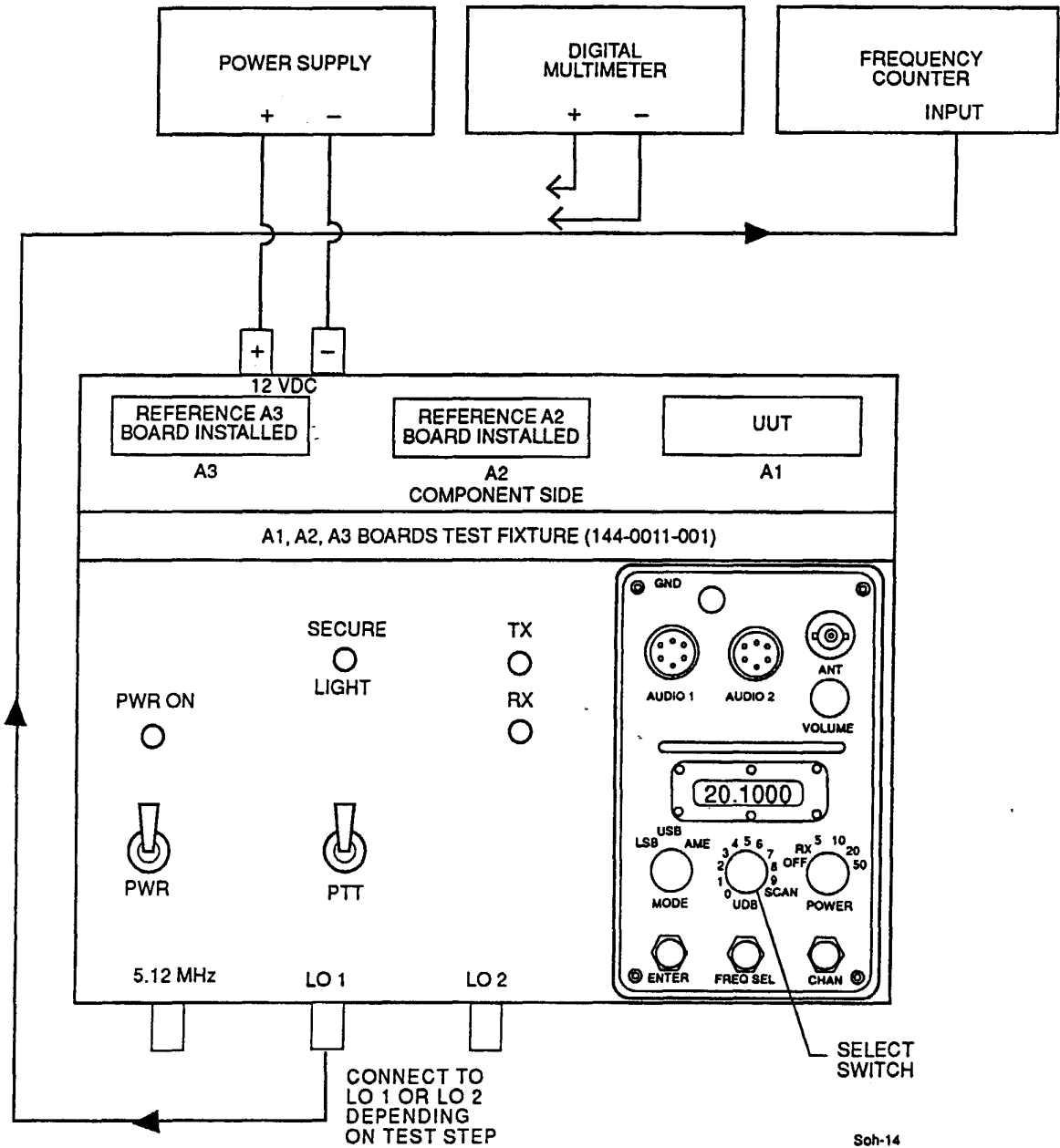


FIGURE 4-23. A1 Processor Board Test Fixture

- f. Clear all frequencies by depressing and releasing **FREQ SEL** button six times to clear all previous frequencies. Verify H's appear at all positions on front panel display and display shows a receive frequency of 10.0000. Mark (X) on data sheet.

**CAUTION**

Care must be taken in the following steps to avoid shorting U10 pins with DMM probe when making a measurement.

- g. Measure voltage at U10, pin 8 (Figure 4-20). Use DMM. Record voltage on data sheet.
- h. Measure voltage at U10, pin 1. Record voltage on data sheet.
- i. Enter a receive frequency of 12.4890 MHz on channel 01.
- j. Enter a transmit frequency of 44.4444 MHz on channel 01.
- k. Set front panel **POWER** switch to 5.
- l. Set test fixture **PTT** switch to **ON** and verify front panel display reads 44.4444 and **TX** indicator on test fixture illuminates. Mark (X) on data sheet.
- m. Connect frequency counter to LO1 BNC connector on test fixture. Verify an output frequency of 116.64 MHz. Mark (X) on data sheet.
- n. Set **PTT** switch on test fixture to **OFF** (down) position.
- o. Connect frequency counter to LO2 BNC connector on test fixture. Verify an output frequency of 82.431 MHz. Mark (X) on data sheet.
- p. Verify front panel display reads 12.4890, **TX** indicator on test fixture is off, and **RX** indicator is **ON**. Mark (X) on data sheet.
- q. Set test fixture **PWR** switch to **OFF**, then **ON**.
- r. Press channel button twice. Verify test fixture **SECURE LIGHT LED** is on. Mark (X) on data sheet.
- s. Press channel button twice again. Verify test fixture **SECURE LIGHT LED** is **OFF**. Mark (X) on data sheet.
- t. This completes testing of the A1 processor board.
- u. Set test fixture **PWR** switch to **OFF**, turn off external power supply, and set test fixture front panel assembly **POWER** switch to **OFF**.
- v. Carefully remove A1 processor board from test fixture.
- w. Place board in an ESD protective bag with data sheet and tag accordingly.

#### 4-111 A1 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-6. Indicated

components are listed in the recommended order of replacement. See fold-out FO-1 for a schematic of the A1 processor board as an aid to troubleshooting.

Table 4-6. A1 Troubleshooting

| Symptom                                   | Paragraph Reference                              | Suspect Component(s)  |
|---|--|---|
| Board does not initialize                 |  | F1, VR1   |
| No display or missing segment on display. | 4-110.4.b<br>4-110.4.c<br>4-110.4.d<br>4-110.4.f | Fuse F1, battery B1, VR1, U1, U4, U7, U11, U9, U16, U2, U5, U3, U6. |
| Bad voltage measurement at U10.           | 4-110.4.g<br>4-110.4.h                           | Battery B1, U10.  |
| Bad frequency measurement.                | 4-110.4.m<br>4-110.4.o                           | U1, U5, U3.   |
| Unable to operate secure light.           | 4-110.4.r<br>4-110.4.s                           | U4, U11, U7, U9, U16, U2, U5, U3, U6.                               |
| Will not program                          | 4-110.4.i  | B1, U10, U6.  |
| Will not go into transmit                 | 4-110.4.l  | U4, U5, U6, U11.  |
| PROM loses stored data                    | 4-110.4.p  | U6.   |

#### 4-112 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A1 processor board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. When any change is made to the program stored in EPROM U5, indicate software change by identification with dash number (See Figure 4-20). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09-.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

#### 4-113 FINAL ASSEMBLY/INSTALLATION.

Install the A1 processor board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

#### A1 PROCESSOR BOARD DATA SHEET

| <u>Para. Number</u> | <u>Test</u>  | <u>Measurement</u> | <u>Limits</u>                                   |
|---------------------|--|--------------------|---|
| 4-108.f             | Visual Mechanical Inspection   | _____              | (X)   |
| 4-110.4.b           | Display indicates 88 <sup>T</sup> 8888 then 10.0000 last entered receive frequency | _____              | (X) 88 <sup>T</sup> 8888 and 10.0000 or XX.XXXX |
| 4-110.4.c           | Channel number displayed   | _____              | (X) HL XX                                       |

## A1 PROCESSOR BOARD DATA SHEET

| <u>Para. Number</u> | <u>Test</u>                           | <u>Measurement</u> | <u>Limits</u>                                |
|---------------------|---------------------------------------|--------------------|--|
| 4-110.4.d           | Receive frequency displayed again     | _____              | (X) 10.0000 or XX.XXXX                       |
| 4-110.4.f           | Clear previous frequencies            | _____<br>_____     | (X) H's on display<br>(X) 10.0000 on display |
| 4-110.4.g           | Voltage at U10, pin 8                 | _____              | (X) 5.0 Vdc $\pm$ 0.1 Vdc                    |
| 4-110.4.h           | Voltage at U10, pin 1                 | _____              | (X) 5.0 Vdc $\pm$ 0.2 Vdc                    |
| 4-110.4.i           | Display reads 44.4444                 | _____              | (X)  |
| 4-110.4.l           | TX indicator illuminated              | _____              | (X)  |
| 4-110.4.m           | 1 <sup>st</sup> L.O. output frequency | _____              | (X) 116.64 MHz $\pm$ 1 ppm                   |
| 4-110.4.o           | 2 <sup>nd</sup> L.O. output frequency | _____              | (X) 82.431 MHz $\pm$ 1 ppm                   |
| 4-110.4.p           | Display reads 12.4890                 | _____              | (X)  |
|                     | TX indicator extinguished             | _____              | (X)  |
| 4-110.4.r           | Secure Light LED ON                   | _____              | (X)  |
| 4-110.4.s           | Secure Light LED OFF                  | _____              | (X)  |

## Section XI. A2 1ST LOCAL OSCILLATOR

## 4-114 GENERAL.

This section contains depot level maintenance instructions for the A2 1st local oscillator (LO) board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A2 1st LO is mounted in the second slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the 1st LO from other boards mounted in the chassis assembly.

The 1st LO provides a 73.80 - 122.19 MHz signal used in frequency conversion. It also provides a 5.12 MHz time base to the A7 product detector, to the A3 2nd LO, and to the A1 processor board. Output is +7 dBm, minimum.

## 4-115 REMOVAL OF A2 1ST LO.

Refer to Section IX for removal of the A2 1st LO.

**CAUTION**

The A2 1st LO contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

4-116 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures are to determine performance and suitability for use.

4-117 INSPECTION.

- a. Inspect A2 1st LO for broken or damaged components.
- b. Inspect 1st LO to ensure keying pins are oriented as indicated and coax cable is installed as show in Figure 4-24.
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.03 inches (Figure 4-25).

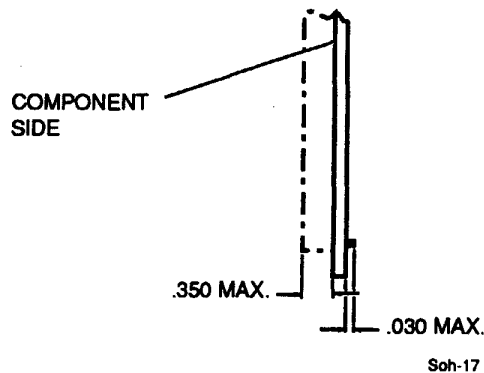


FIGURE 4-25. Component and Lead Extension Off PWB

- d. Inspect component height on component side. Height must be no greater than 0.35 inches (Figure 4-26).
- e. Inspect 1st LO for solder bridges or other mechanical problems.
- f. Inspect 1st LO to verify transformers and coils have been secured with silicon rubber compound.

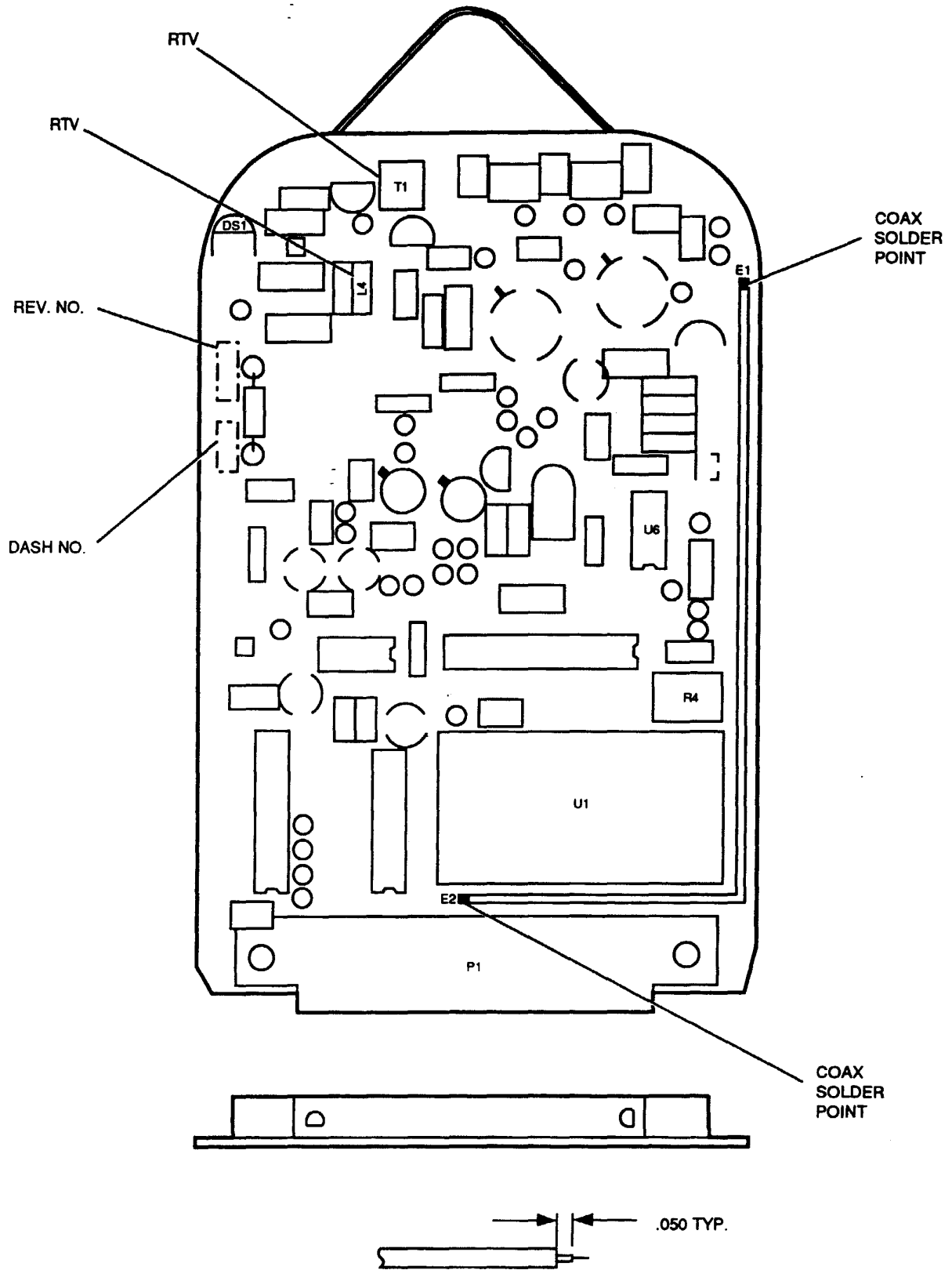


FIGURE 4-24. Installation of Coax Cables and Connector Keying

Sch-16

- g. Inspect 1st LO for any exposed surfaces through humiseal coating. If the visual inspection is in compliance, mark (X) on data sheet.
- h. Repair 1st LO as necessary (paragraph 4-118).

4-118 REPAIR/REPLACE.

**CAUTION**

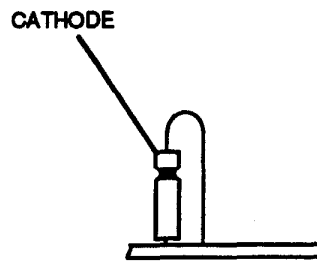
The 1st LO contains Electrostatic Sensitive Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its components.

- a. Troubleshoot assembly using procedure in paragraph 4-111, 4-120.
- b. Ensure no components extend more that .35 inches above component side of 1st LO (Figure 4-25).
- c. Ensure no leads extend more that 0.03 inches above circuit side of 1st LO (Figure 4-25).
- d. Secure transformers and coils T1 and L4, in place with silicon rubber compound (item 15, App. C) (Figure 4-24).
- e. Solder coax cable to terminals ground plane as shown in Figure 4-24. Provide .1 inch minimum clearance between cable and edge of PCB.
- f. When replacing LED DS1, note that cathode side of LED DS1 contains a beveled edge. (Figure 4-26).



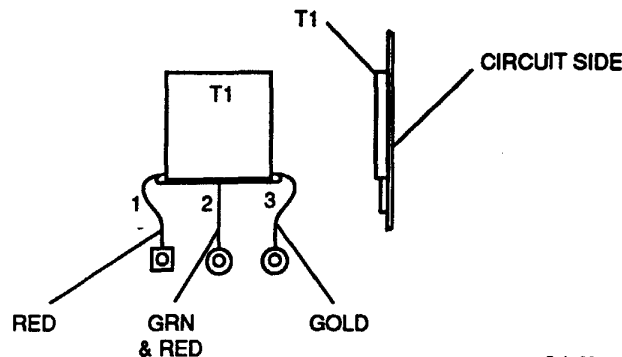
FIGURE 4-26. Diode DS1 Installation

- g. See Figure 4-27 for typical diode installation.
- h. See Figure 4-28 for wiring connections for transformer T1.
- i. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-24.
- j. Solder electronic components using solder S/N 62 (item 20, App. C).



Soh-19

FIGURE 4-27. Typical Diode Installation



Soh-20

FIGURE 4-28. Transformer T1 Installation

- k. Humiseal (item 6, App. C) 1st LO after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable component R4.

#### 4-119 TESTING.

This test procedure covers electrical testing of the A2 1st LO. The front panel assembly is part of the test fixture used to test A2 1st LO. Be familiar with operation of front panel controls and corresponding readouts on front panel display (See TM 11-5820-1102-12). An illustration of front panel assembly, showing controls, connectors and display is provided in Figure 4-29.

4-119.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

4-119.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of the A2 1st LO. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>             | <u>QTY.</u> |
|--------------------------------|-------------|
| A1, A2, A2 Boards Test Fixture | 1           |
| Digital Multimeter             | 1           |
| Frequency Counter              | 1           |
| Oscilloscope                   | 1           |
| Power Supply                   | 1           |
| Power Meter                    | 1           |
| Spectrum Analyzer              | 1           |
| Tool Kit                       | 1           |



4-119.3 Set Up (Figure 4-29).

**CAUTION**

Do not force A2 1st LO into test fixture mating connectors.

**NOTE**

The A2 board is index keyed with test fixture mating connectors. Some test fixture connectors may not be keyed, so use care to ensure that each board is properly installed in appropriate connector.

- a. Setup in accordance with Figure 4-29.
- b. Remove test fixture A2 1st LO from test fixture slot.

**NOTE**

The A3 board need not be installed in the test fixture when testing the A2 First Oscillator board.

- c. Install A2 1st LO in test fixture mating connector and connect external test equipment, as shown in Figure 4-29.
- d. Ensure test fixture PWR switch is set to OFF.
- e. Turn on power supply to test fixture and adjust power supply to  $+12 \pm 0.1$  Vdc. Use DMM.

4-119.4 Testing and Alignment.

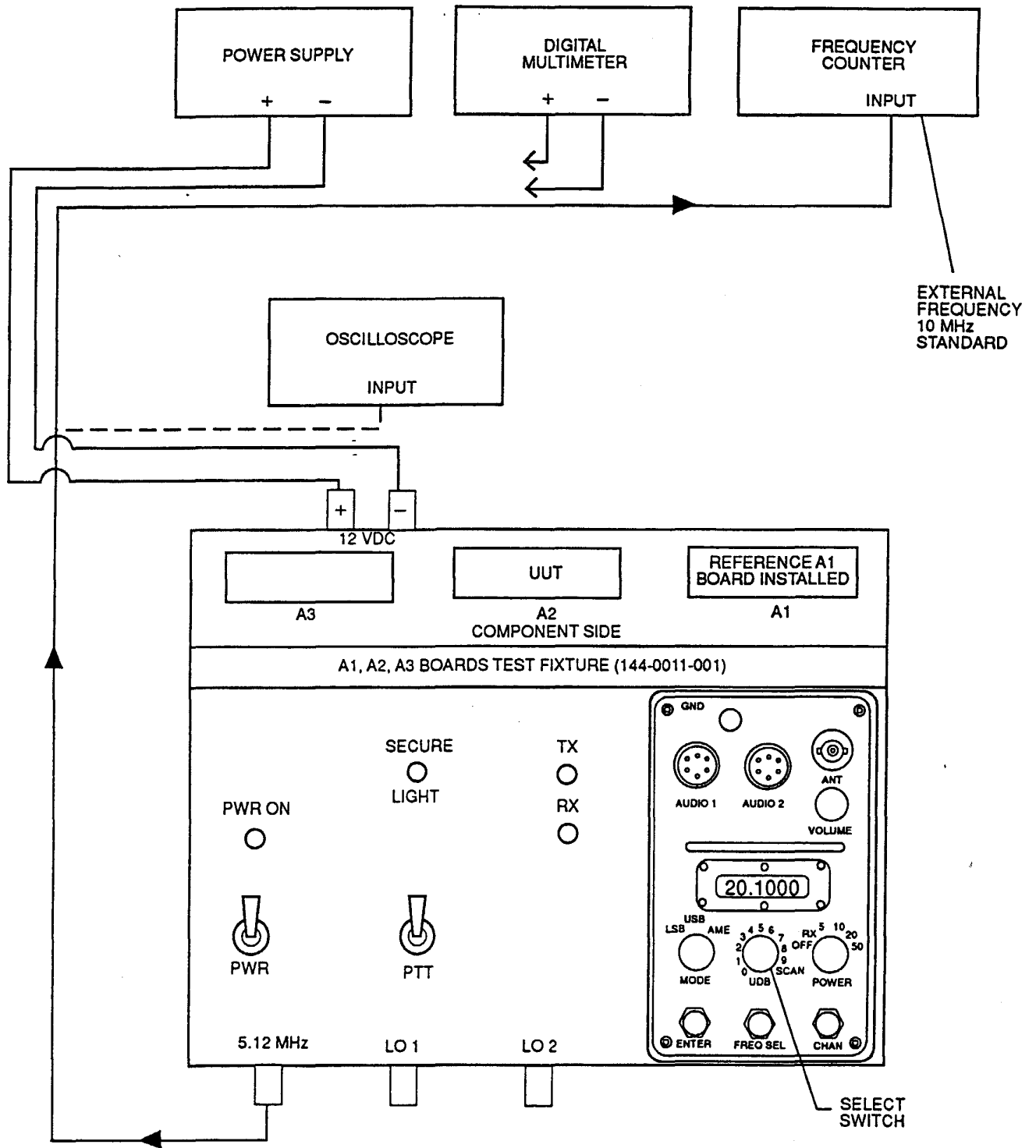
- a. Set test fixture switches and front panel assembly switches in order shown, as follows:

|                                    |            |
|------------------------------------|------------|
| Test Fixture PTT Switch:           | OFF (Down) |
| Front Panel Assembly POWER Switch: | RX         |
| Front Panel Assembly MODE Switch:  | LSB        |
| Front Panel SELECT Switch:         | 1          |

**NOTE**

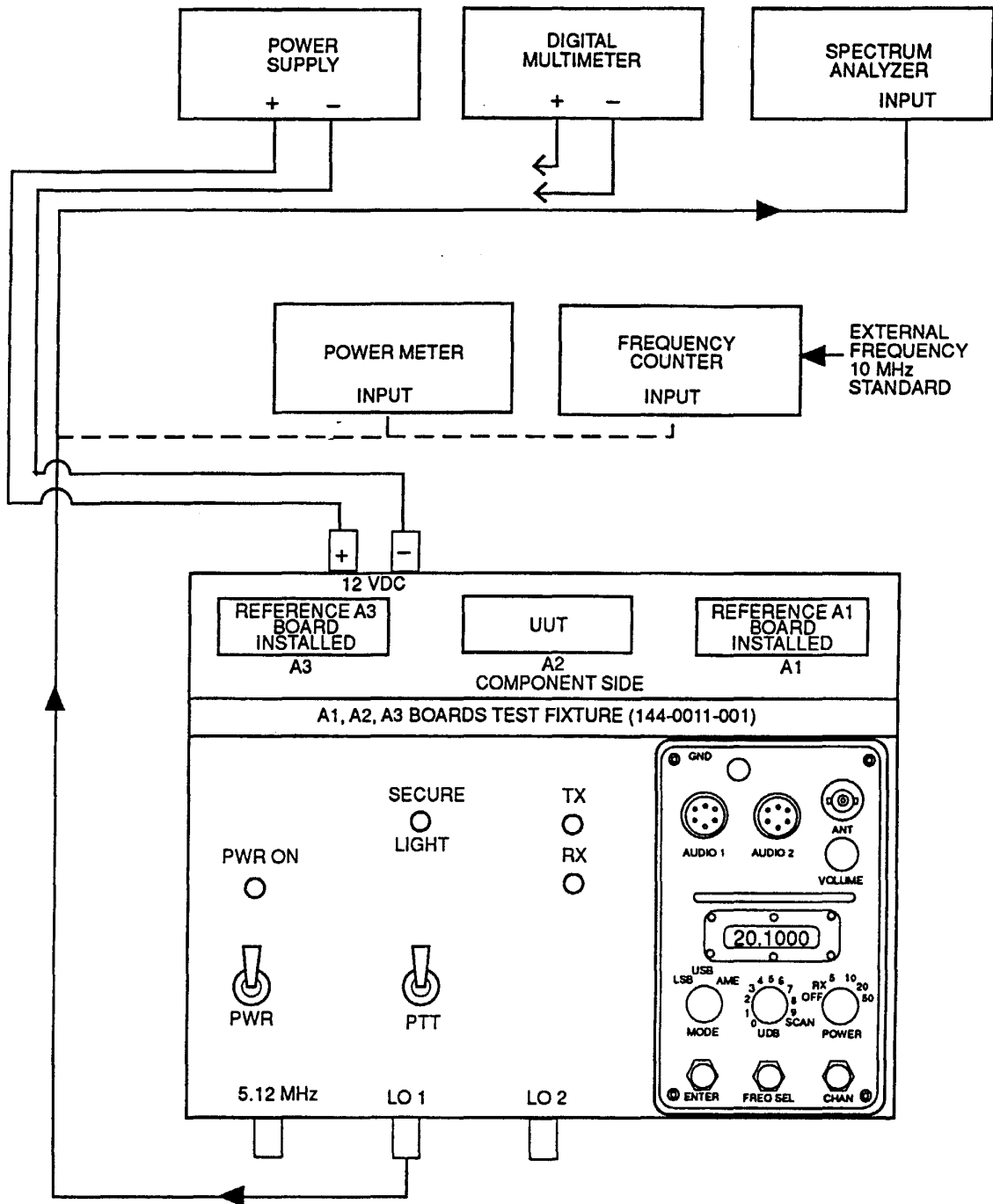
Refer to Operator's and Unit Maintenance Manual, TM 11-5820-1102-12 for control panel assembly operating information needed to complete remaining steps in this test procedure.

- b. Connect frequency counter to 5.120 MHz output connector on front of test fixture, as shown in Figure 4-29.
- c. Set PWR switch on test fixture to ON. Allow A2 1st LO to warm-up for at least 5 minutes before proceeding to next step.
- d. Adjust R4 (Figure 4-24) on A2 1st LO so frequency counter reads the frequency marked on TCXO (U1) on the A2 1st LO,  $\pm 1$  Hz. Record frequency on data sheet.
- e. Disconnect frequency counter from 5.120 MHz output connector on test fixture and connect oscilloscope to 5.120 MHz output connector. Measure and record TCXO output level.
- f. Disconnect oscilloscope from the 5.120 MHz connector and connect frequency counter to 1st LO output connector, LO1, on the front of test fixture, as shown in Figure 4-30.



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FIGURE 4-29. A2 First Local Oscillator Test Fixture, First Connection



Soh-23

FIGURE 4-30. A2 First Local Oscillator Test Fixture, Second Connection

- g. Program channel number 01 for a receive frequency of 1.6000 MHz.
- h. Program channel number 02 for a receive frequency of 24.9000 MHz.
- i. Program channel number 03 for a receive frequency of 25.0000 MHz.
- j. Program channel number 04 for a receive frequency of 49.9000 MHz.
- k. Select channel number 01 (1.6000 MHz).
- l. Measure output frequency of 1st LO (LO1). Record frequency on data sheet.
- m. Measure voltage on U6, pin 7. Connect the negative lead of DMM to a ground point near U6 on the A2 board. Record voltage on data sheet.
- n. Repeat steps 4-119.4.k, 4-119.4.l, and 4-119.4.m for channel numbers 02 (24.9000 MHz), 03 (25.0000 MHz), and 04 (49.9000 MHz) and record on data sheet.
- o. Disconnect frequency counter from LO1 output connector on test fixture.
- p. Connect spectrum analyzer to LO1 output connector on test fixture.

**NOTE**

In the following steps, measurements are made to determine noise level 1 kHz from the carrier. The level of the 10 kHz reference frequency side bands will also be measured.

- q. For 1 kHz offset noise level measurements, set controls of the spectrum analyzer as follows:

|                       |  |
|-----------------------|--|
| Resolution Bandwidth: | 100 Hz                                 |
| Video Bandwidth:      | 100 Hz                                 |
| Sweep Time:           | 3 Seconds                              |
| Input Attenuation:    | 20 dB                                  |
| Center Frequency:     | Determined by Channel                  |
| Frequency Span:       | 5 kHz Full Span or 500 Hz per division |
| Reference Level:      | +10 dBm                                |

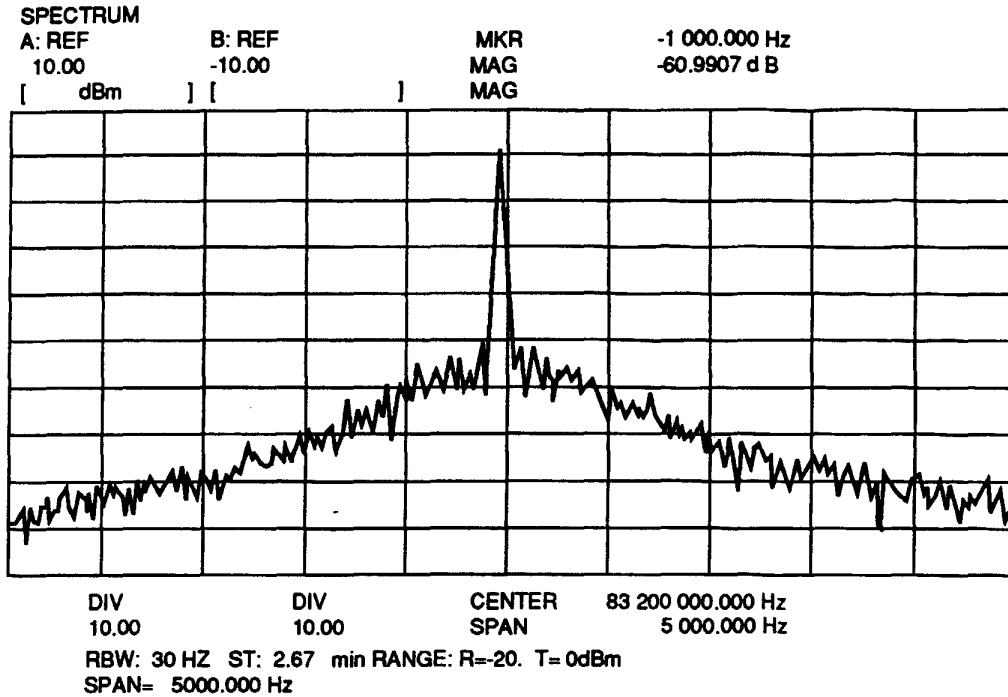
- r. For 10 kHz reference frequency side band measurements, set controls of spectrum analyzer as follows:

|                       |  |
|-----------------------|--|
| Resolution Bandwidth: | 1 kHz                                  |
| Video Bandwidth:      | 1 kHz                                  |
| Sweep Time:           | 300 mS                                 |
| Input Attenuation:    | 20 dB                                  |
| Center Frequency:     | Determined by Channel                  |
| Frequency Span:       | 50 kHz Full Span or 5 kHz per Division |
| Reference Level:      | +10 dBm                                |

**NOTE**

Note this measurement must be made using video averaging on the spectrum analyzer. Average 8 sweeps and then make the measurement.

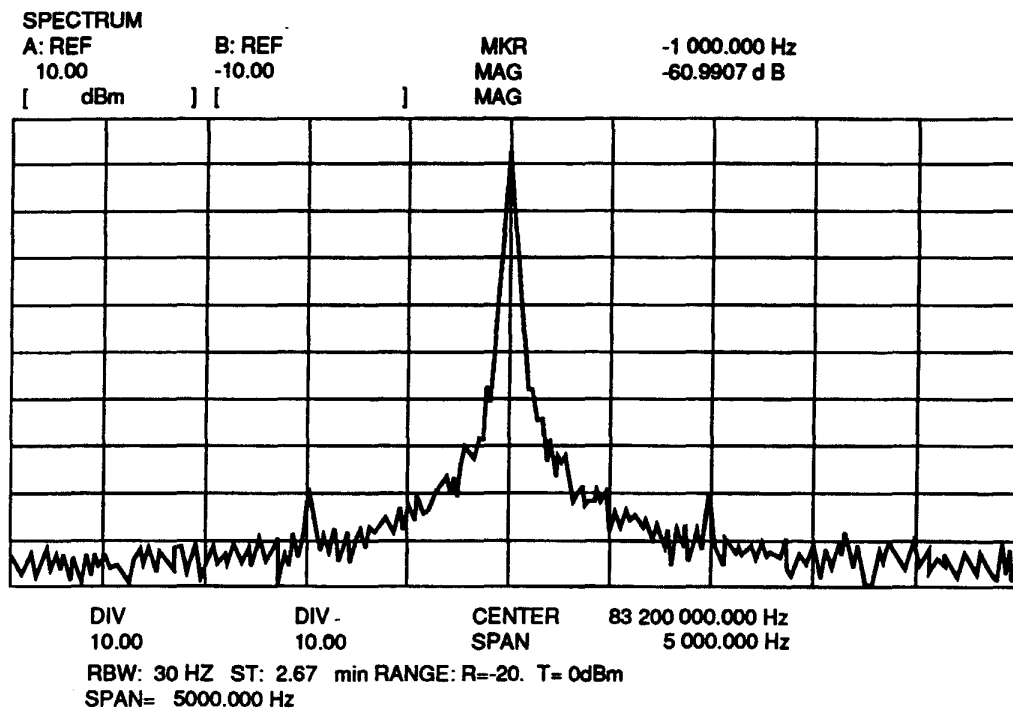
- s. On spectrum analyzer, note output frequency, noise pedestal 1 kHz from carrier, and level of 10 kHz reference side bands. Record levels on data sheet. See Figures 4-31 and 4-32 for a typical 1st LO spectrum.



Soh-24

FIGURE 4-31. Typical 1st LO Spectrum Plot

- t. Repeat steps 4-119.4.q, 4-119.4.r, and 4-119.4.s for channel numbers 03 (25.0000 MHz), 02 (24.9000 MHz), 01 (1.6000 MHz).
- u. Disconnect spectrum analyzer and connect RF millivolt meter to LO1 output connector on test fixture (Figure 4-30).
- v. Select channel number 01 (1.6000 MHz).
- w. Measure RF power. Record level on data sheet.
- x. Repeat steps 4-119.4.v and 4-119.4.w for channel numbers 02 (24.9000 MHz), 03 (25.0000 MHz), and 04 (49.9000 MHz).
- y. Recheck TCXO output frequency. Ensure it is still set to printed frequency upon the TCXO  $\pm$ .1 Hz.
- z. This completes alignment and electrical testing of the A2 1st LO.
- aa. Set test fixture PWR switch to OFF, turn off external power supply, and set test fixture front panel assembly POWER switch to OFF.
- ab. Carefully remove A2 1st LO from test fixture.
- ac. Apply torque lacquer (item 23, App. C) to variable resistor R4 that was adjusted during the test procedure (Figure 4-24). Allow torque lacquer to set before proceeding.



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FIGURE 4-32. Typical 1st LO Spectrum Plot

- ad. After torque lacquer has set, place A2 1st LO in an ESD protective bag with data sheet and tag accordingly.

#### 4-120 A2 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-7. Indicated components are listed in the recommended order of replacement. See fold-out FO-2 for a schematic of the A2 1st LO board as an aid to troubleshooting.

#### 4-121 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A2 1st LO after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silk screened/etched in each board at manufacturer level. Identify with dash number (Figure 4-24). Also identify with latest revision number. Identify dash and Revision numbers in areas shown per Mil-Std-130 using .09 - .12 high characters and using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

#### 4-122 FINAL ASSEMBLY/INSTALLATION.

Install A2 1st LO in accordance with procedures in Section IX and perform the procedures in Section XXVII.

Table 4-7. A2 Troubleshooting

| Symptom   | Paragraph                           | Suspect Component(s)  |
|---|-------------------------------------|---|
| Board does not initialize   |                                     | F1, U12, U13  |
| Low or No Current   |                                     | F1, T1, U12, U13  |
| Bad TCXO frequency measurement  | 4-119.4.d                           | U1, U2, R4  |
| Bad TCXO output level   | 4-119.4.e                           | U1, U2  |
| Garbage on display  |                                     | R5, U5  |
| Bad 1st LO frequency or bad control voltage 1.6 and 24.9.<br>Bad 1st LO frequency or bad control voltage 25-49.99 | 4-119.4.l<br>4-119.4.m<br>4-119.4.n | U11 (1.6-24.9), U10 (25-49.99)                                      |
| High noise pedestal at 1 KHz and 10 KHz from the carrier  | 4-119.4.s<br>4-119.4.t              | U6 (if both high and low bands),<br>U10 (25-49), U11 (1.6-24.9), Q6 |
| Low output power  | 4-119.4.w<br>4-119.4.x              | T1, Q6, U10 (UPPER only),<br>U11 (LOWER only), U6                   |

## A2 1ST LO DATA SHEET

| Para. No. | READING                            | VALUE                   | LIMITS   |
|-----------|------------------------------------|-------------------------|--|
| 4-117.g   | Mechanical Inspection              | _____                   | (X)  |
| 4-119.4.d | TCXO Frequency Adjust              | _____                   | TCXO frequency $\pm$ .1 Hz   |
| 4-119.4.e | TCXO Output Level                  | _____                   | 4.5 To 5.0 Vpp   |
| 4-119.4.l | LO Output Frequency at 1.60000 MHz | _____                   | 73.8 MHz $\pm$ 73 Hz   |
| 4-119.4.m | Voltage U6, Pin 7                  | _____                   | > 2 Vdc  |
| 4-119.4.n | LO Output Frequency at 24.9000 MHz | _____                   | 97.1000 MHz $\pm$ 97 Hz  |
|           | Voltage U6, Pin 7                  | _____                   | < 8 Vdc  |
|           | LO Output Frequency at 25.0000 MHz | _____                   | 97.2000 MHz $\pm$ 97 Hz  |
|           | Voltage U6, Pin 7                  | _____                   | > 2 Vdc  |
|           | LO Output Frequency at 49.9000 MHz | _____                   | 122.1000 MHz $\pm$ 122 Hz  |
|           | Voltage U6, Pin 7                  | _____                   | < 8 Vdc  |
| 4-119.4.s | Spectrum at 49.9000 MHz            | _____<br>_____<br>_____ | (X) 122.1 MHz $\pm$ 122 Hz<br>Pedestal $\leq$ -50 dBc @ 1 kHz<br>Reference Frequency Side<br>Bands $\leq$ -55 dBc @ 10 kHz |

## A2 1ST LO DATA SHEET

| <u>Para. No.</u> | <u>READING</u>          | <u>VALUE</u> | <u>LIMITS</u>   |
|------------------|-------------------------|--------------|---|
| 4-119.4.t        | Spectrum at 25.0000 MHz | _____        | (X) 97.2 MHz $\pm$ 97 Hz<br>Pedestal $\leq$ -50 dBc @ 1 kHz<br>Reference Frequency Side Bands $\leq$ -55 dBc @ 10 kHz |
|                  | Spectrum at 24.9000 MHz | _____        | (X) 97.1 MHz $\pm$ 97 Hz<br>Pedestal $\leq$ -50 dBc @ 1kHz<br>Reference Frequency Side Bands $\leq$ -55 dBc @ 10 kHz  |
|                  | Spectrum at 1.60000 MHz | _____        | (X) 73.8 MHz $\pm$ 97 Hz<br>Pedestal $\leq$ -50 dBc @ 1 kHz<br>Reference Frequency Side Bands $\leq$ -55 dBc @ 10 kHz |
| 4-119.4.w        | RF Level at 1.60000 MHz | _____        | +7 dBm, +4 dB -2 dB   |
| 4-119.4.x        | RF Level at 24.9000 MHz | _____        | +7 dBm, +4 dB -2 dB   |
|                  | RF Level at 25.0000 MHz | _____        | +7 dBm, +4 dB -2 dB   |
|                  | RF Level at 49.9000 MHz | _____        | +7 dBm, +4 dB -2 dB   |

## Section XII. A3 2ND LOCAL OSCILLATOR

## 4-123 GENERAL.

This section contains depot level maintenance instructions for the A3, 2nd local oscillator (2nd LO) board. Included in these instructions, are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A3 2nd LO board is mounted in the third slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A3 2nd LO board from other boards mounted in the chassis assembly.

The A3 2nd LO board provides a 82.4301 MHz signal used in frequency conversion. Output is +7dBm, minimum.

## 4-124 REMOVAL OF A3 2ND LO.

Refer to Section IX for removal of the A3 2nd LO Board.

**CAUTION**

The A3 2nd LO board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.



4-125 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-126 INSPECTION.

- a. Inspect 2nd LO board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-33.
- b. Inspect 2nd LO board for broken or damaged components.
- c. Inspect 2nd LO board to verify coil L7 is secured with silicon rubber compound (Figure 4-33).
- d. Inspect lead extensions on circuit side of 2nd LO board. They must not be greater than 0.03 inches (Figure 4-34).

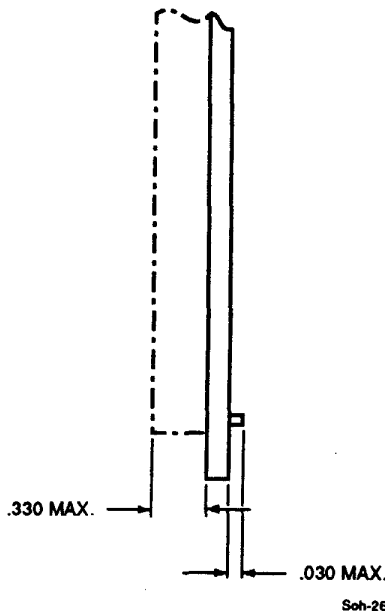
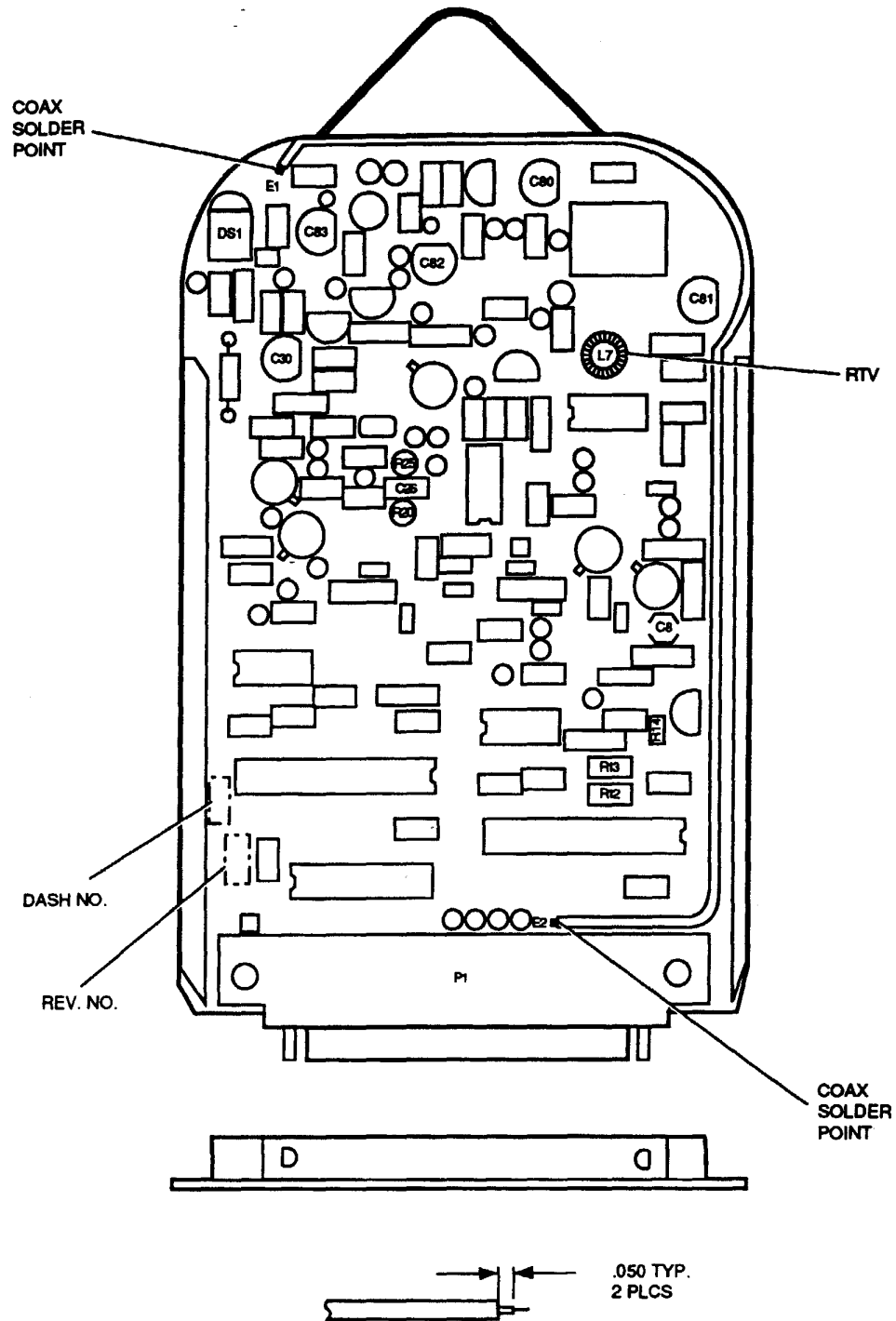


FIGURE 4-34. Component and Lead Extension Off PWB

- e. Inspect component height on component side of 2nd LO board. Height must be no greater than 0.33 inches (Figure 4-34).



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FIGURE 4-33. Installation of Coax Cables and Connector Keying

- f. Inspect 2nd LO board for solder bridges or other mechanical problems.
- g. Inspect 2nd LO board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- h. Repair 2nd LO board as necessary. (Paragraph 4-127)

4-127 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-129.
- b. Solder semi-rigid coax cable to terminals E1 and E2, and ground plane as shown in Figure 4-33. Provide .125 inch minimum clearance between cable and edge of board.
- c. When replacing connector P1, ensure key pins on connector are oriented as shown in Figure 4-33.
- d. Secure coil L7 in place with silicon rubber compound (item 15, App. C) (Figure 4-33).
- e. Ensure no components extend more than .33 inches above component side of 2nd LO board. (Figure 4-34)
- f. Ensure no leads extend more than 0.03 inches above circuit side of 2nd LO board. (Figure 4-34).
- g. When replacing LED DS1, note that cathode side of LED DS1 contains a beveled edge (Figure 4-35).



FIGURE 4-35. Diode DS1 Installation

- h. See Figure 4-36 for typical diode installation.

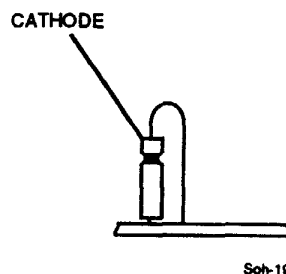


FIGURE 4-36. Typical Diode Installation

- i. Solder electronic components using solder S/N 62 (item 20, App. C).
- j. Humiseal (item 6, App. C) 2nd LO board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable component(s).

**4-128 TESTING.**

This test procedure covers alignment and electrical testing of A3 2nd LO board. The front panel assembly is part of the test fixture used to test A3 2nd LO board. Be familiar with operation of the front panel controls and corresponding readouts on the display (See TM 11-5820-1102-12). An illustration of front panel assembly, showing controls, connectors and display is provided in Figure 4-37.

4-128.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

4-128.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of front panel assembly. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>             | <u>QTY.</u> |
|--------------------------------|-------------|
| A1, A2, A3 Boards Test Fixture | 1           |
| Digital Multimeter             | 1           |
| Frequency Counter              | 1           |
| Power Supply                   | 1           |
| Spectrum Analyzer              | 1           |
| Power Meter                    | 1           |
| Tool Kit                       | 1           |

4-128.3 Set Up.**CAUTION**

Do not force A3 2nd LO board into mating connectors.

**NOTE**

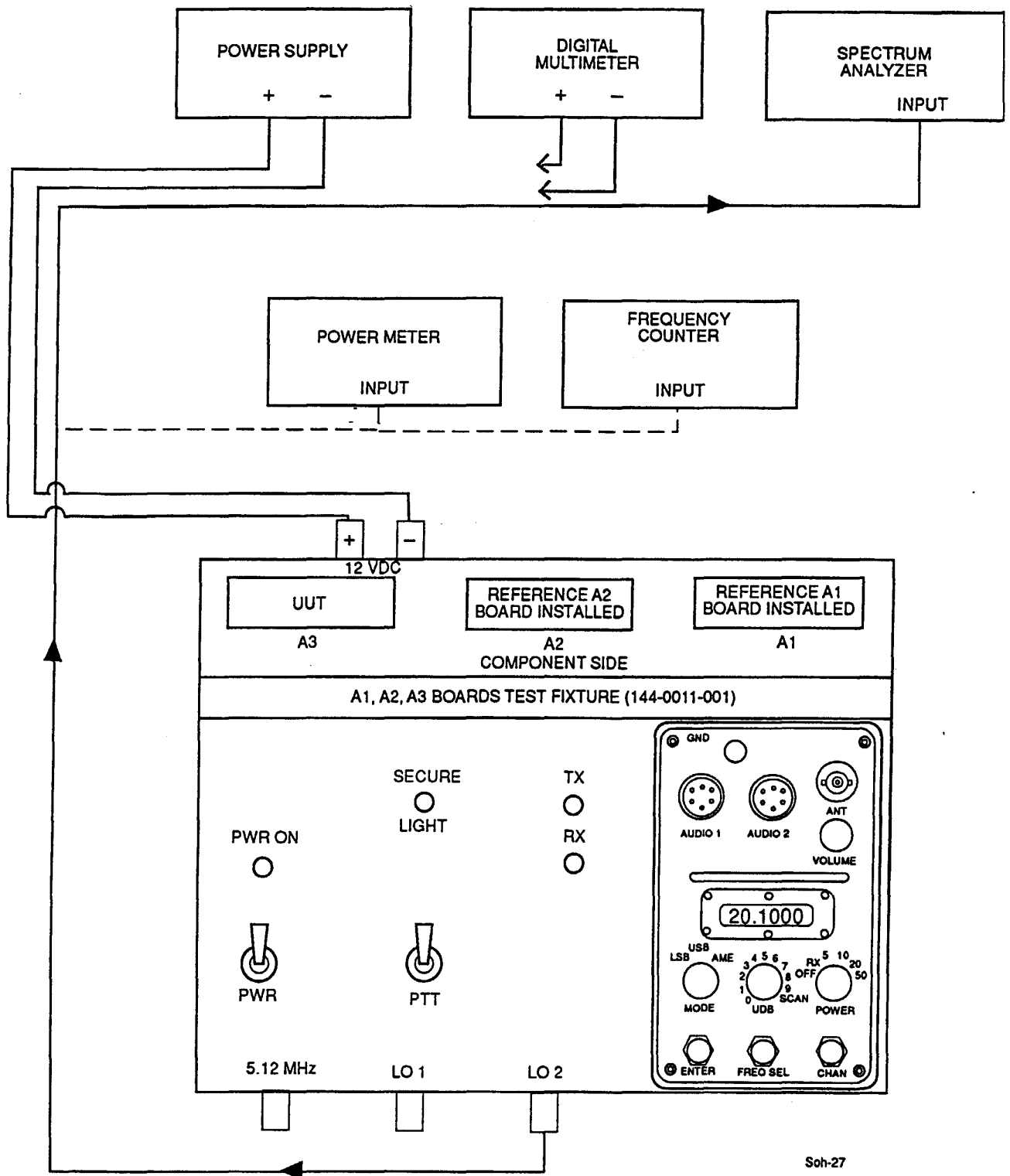
The A3 board is index keyed with test fixture mating connectors. Some test fixture connectors may not be keyed so use care to insure that each board is properly installed in the appropriate connector.

- a. Remove test fixture A3 board from test fixture.
- b. Install A3 2nd LO board to be tested to the mating connector on top surface of test fixture.
- c. Connect external test equipment as shown in Figure 4-37.
- d. Ensure test fixture PWR switch is set to OFF.
- e. Turn on power supply to test fixture and adjust power supply to  $+12 \pm 0.1$  Vdc. Use DMM.

4-128.4 Testing and Alignment.

- a. Set test fixture switches and front panel assembly switches in order shown, as follows:

|                                   |            |
|-----------------------------------|------------|
| Front Panel Power Switch:         | RX         |
| Test Fixture PTT Switch:          | OFF (Down) |
| Front Panel Assembly MODE Switch: | LSB        |
| Front Panel SELECT Switch:        | 1          |
| Test Fixture PWR Switch:          | ON         |



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FIGURE 4-37. A3 Second Local Oscillator Test Setup Diagram

**NOTE**

Refer to Operator's and Unit Maintenance Manual, TM 11-5820-1102-12 for front panel assembly operating information needed to complete remaining steps in this test procedure.

- b. Program channel number 1 for a receive frequency of 10.0000 MHz.
- c. Program channel number 2 for a receive frequency of 10.0050 MHz.
- d. Program channel number 3 for a receive frequency of 10.0099 MHz.
- e. Select channel 2 (10.0050 MHz).
- f. Connect DMM to the junction of R20, R25, and C26 (Figure 4-33). Set DMM to 20 Vdc range.
- g. Adjust capacitor C30 (Figure 4-33) for a reading of  $+2.5 \text{ Vdc} \pm 0.1 \text{ Vdc}$  at the junction of R20, R25, and C26. Record the voltage reading on the test data sheet.
- h. Connect DMM to junction of R12, R13, and R14 (Figure 4-33). Set the DMM to 20 Vdc range.
- i. Adjust capacitor C8 (Figure 4-33) for  $2.5 \pm 0.1 \text{ Vdc}$  at junction of R12, R13, and R14. Record voltage reading on data sheet.
- j. Select channel 3 (10.0099 MHz).
- k. Measure voltage at junction of R12, R13, and R14. Record voltage on the data sheet.
- l. Select channel 1 (10.0000 MHz).
- m. Measure voltage at junction of R12, R13, and R14. Record voltage on data sheet.
- n. Select channel 2 (10.0050 MHz).
- o. Set controls on spectrum analyzer as follows:
 

|                       |                               |
|-----------------------|-------------------------------|
| Center Frequency:     | 82.4350 MHz                   |
| Resolution Bandwidth: | 1 kHz (or automatic mode)     |
| Sweep Rate:           | 3 seconds (or automatic mode) |
| RF Input Level:       | +10 dBm                       |
| Amplitude Scale:      | 10 dB/Div.                    |
| Span:                 | 12 kHz                        |
- p. While monitoring spectrum analyzer, adjust capacitor C81 (Figure 4-33) for maximum output level.
- q. While monitoring spectrum analyzer, adjust capacitor C80 (Figure 4-33) for maximum output level.
- r. While monitoring spectrum analyzer, adjust capacitor C82 (Figure 4-33) for maximum output level.

- s. While monitoring spectrum analyzer, adjust capacitor C83 (Figure 4-33) for maximum output level.

**NOTE**

The next portion of the test procedure involves trimmer capacitors C81 and C80. These trimmer capacitors are adjusted for best flatness of crystal filter FL1 at 10.0000 MHz, 10.0050 MHz and 10.0099 MHz (channels 1, 2 and 3 respectively) as well as minimum spurious output(s).

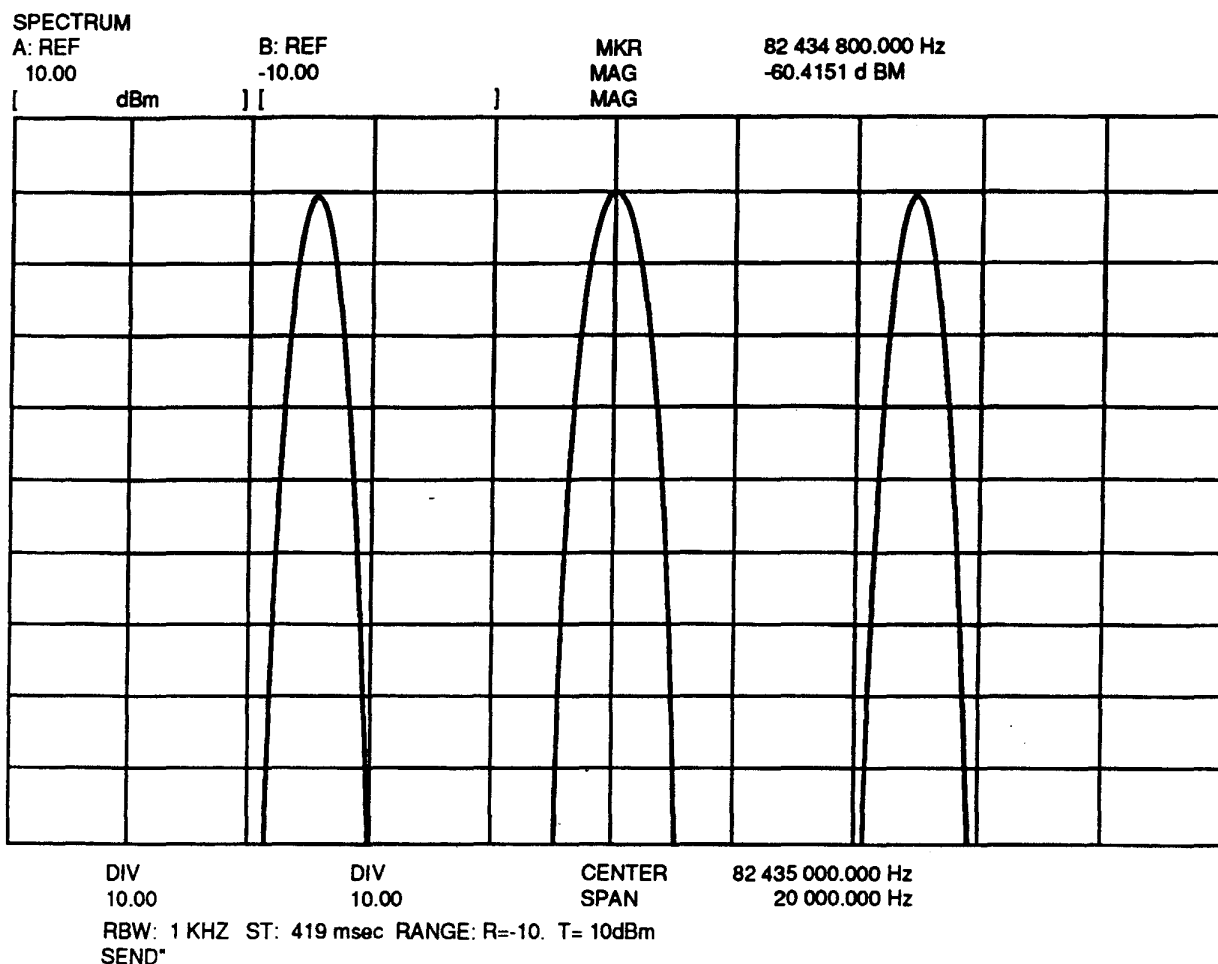
**NOTE**

This is an interactive process and will require repeated minor adjustments to obtain best overall flatness of filter as a function of the three frequencies. This final result will be a flatness of  $\pm 1$  dB maximum.

Refer to Figure 4-38 for a typical spectrum analyzer display for filter flatness adjustment. Note that only one signal is viewed at a time on spectrum analyzer display. The best flatness is for all three signals to be equal amplitude.

- t. Set spectrum analyzer amplitude scale for 1 dB/Div. to provide the required measurement resolution for this test.
- u. Select channel 1 (10.0000 MHz). Note amplitude of the signal.
- v. Select channel 2 (10.0050 MHz). Note amplitude of the signal.
- w. Select channel 3 (10.0099 MHz). Note amplitude of the signal.
- x. Adjust capacitors C81 and C80 as required, for best flatness.
- y. Repeat steps p through s as required, to obtain the best filter flatness. A typical spectrum analyzer display for filter flatness adjustment is shown in Figure 4-38. Mark (X) on data sheet.
- z. Select channel 2 (10.0050 MHz).
- aa. Adjust capacitor C82 for maximum output level.
- ab. Adjust capacitor C83 for maximum output level.
- ac. Set spectrum analyzer to the following:

|                       |                               |
|-----------------------|-------------------------------|
| Center Frequency:     | 82.4350 MHz                   |
| Frequency Span:       | 5 kHz                         |
| Sweep Rate:           | 3 seconds (or automatic mode) |
| RF Input Level:       | +10 dBm                       |
| Amplitude Scale:      | 10 dB/Div.                    |
| Bandwidth Resolution: | 100 Hz                        |
- ad. Set spectrum analyzer for averaging 8 times.
- ae. Measure noise 1 kHz away from carrier at 82.4350 MHz. The noise level must be at least 65 dB below the level of carrier at 82.4350 MHz. Record level of noise on data sheet. A typical spectrum analyzer display for this test is shown in Figure 4-39.

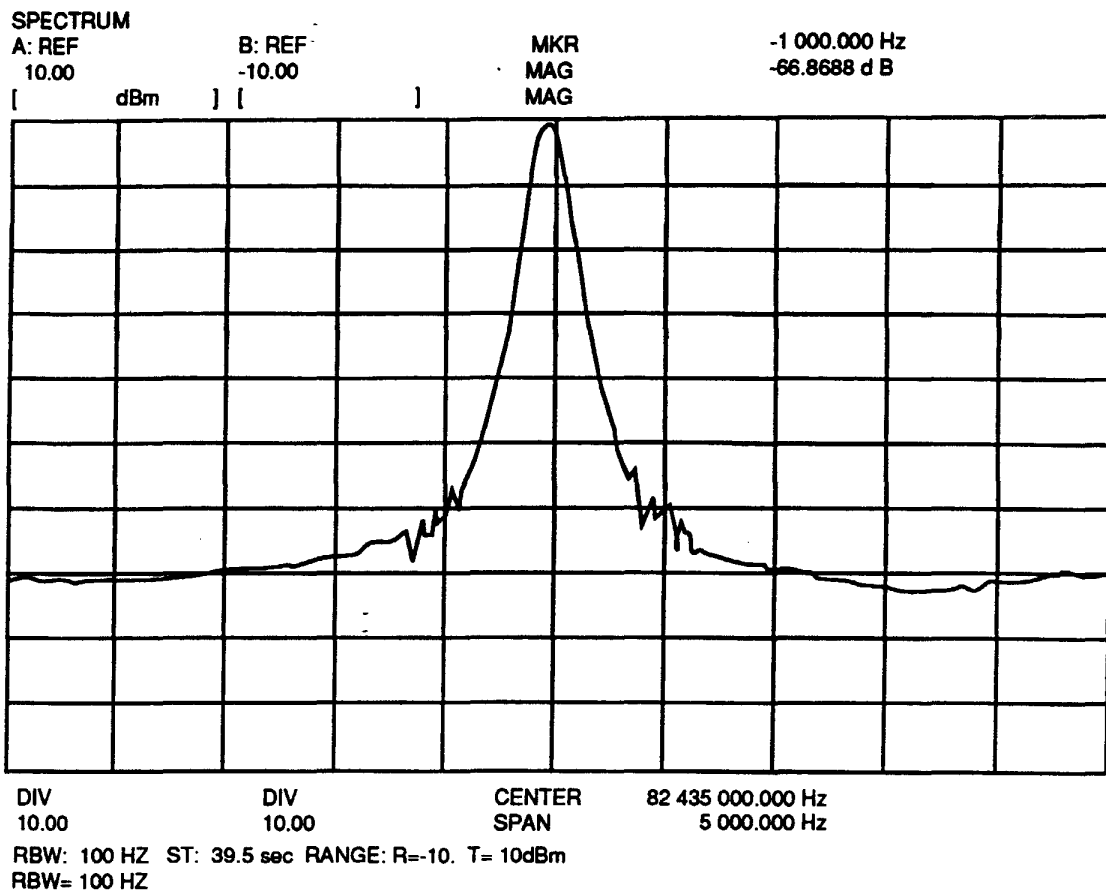


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FIGURE 4-38. Typical Spectrum Analyzer Readout for Filter Adjustment

- af. Set PWR switch on test fixture to OFF.
- ag. Disconnect spectrum analyzer from test fixture and connect RF power meter to A3 2nd LO board, LO2 connector on test fixture, as shown in Figure 4-37.
- ah. Set PWR switch on test fixture to ON.
- ai. Select channel 1 (10.0000 MHz). Record output power level on test data sheet.
- aj. Select channel 2 (10.0050 MHz). Record output power level on test data sheet.
- ak. Select channel 3 (10.0099 MHz). Record output power level on test data sheet.
- al. Set PWR switch on test fixture to OFF position.
- am. Disconnect RF power meter from the test fixture and connect frequency counter to LO2 connector on the test fixture, as shown in Figure 4-37.





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FIGURE 4-39. Typical Spectrum Analyzer Readout for Noise Measurement

- an. Set PWR switch on test fixture to ON.
- ao. Select channel 1 (10.0000 MHz). Record output frequency on test data sheet.
- ap. Select channel 2 (10.0050 MHz). Record output frequency on test data sheet.
- aq. Select channel 3 (10.0099 MHz). Record output frequency on test data sheet.
- ar. This completes alignment and electrical testing of the A3 2nd LO board.
- as. Set test fixture PWR switch to OFF and turn off external power supply. Set test fixture front panel POWER switch to OFF.
- at. Carefully remove the A3 2nd LO board from test fixture.
- au. Apply torque lacquer (item 23, App. C) to variable capacitors C8, C30, C80, C81, C82 and C83 (Figure 4-33) which were adjusted during test procedure. Allow torque lacquer to set before proceeding.
- av. After torque lacquer has set, place A3 2nd LO board in an ESD protective bag with completed data sheet and tag accordingly.

## 4-129 A3 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-8. Indicated components are listed in the recommended order of replacement. See fold-out FO-3 for a schematic of the A3 2nd LO board as an aid to troubleshooting. See Appendix B for location of suspected faulty components.

Table 4-8. A3 Troubleshooting

| Symptom  | Paragraph   | Suspect Component(s)           |
|--|---|--------------------------------|
| Board does not initialize  |   | F1, U6, U7                     |
| Bad D.C voltage measurements at the junction of R20, R25, C26 or R12, R13, R14 | 4-128.4.g<br>4-128.4.i<br>4-128.4.k<br>4-128.4.m    | FL1, Adjustment of C30, C8     |
| Bad filter flatness or low power output  | 4-128.4.y<br>4-128.4.ai<br>4-128.4.aj<br>4-128.4.ak | FL1, Q6, Q7                    |
| High noise level   | 4-128.4.ae  | Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8 |
| Bad frequency accuracy   | 4-128.4.ao<br>4-128.4.ap<br>4-128.4.aq              | FL1, C81, C80                  |

All the components following U8 and U14 are suspect in the case of noise problems. Phase loops are to eliminate noise close in. Most noise is at 1 kHz away from the carrier. Tolerance combinations of inductors and capacitor components can cause phase problems. Replacement of components is critical.

## 4-130 PAINTING AND MARKING.

Humiseal (item 6, App. C) A3 2nd LO board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (See Figure 4-33). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09-.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

## 4-131 FINAL ASSEMBLY/INSTALLATION.

Install A3 2nd LO board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

## A3 2ND LO BOARD DATA SHEET

| Para. No. | READING                    | VALUE     | LIMITS        |
|-----------|----------------------------|-----------|---------------|
| 4-126.g   | Mechanical Inspection      | _____     | (X)           |
| 4-128.4.g | Junction R20, R25, and C26 | _____ Vdc | 2.5 ± 0.1 Vdc |

## A3 2ND LO BOARD DATA SHEET

| <u>Para. No.</u> | <u>READING</u>             | <u>VALUE</u> | <u>LIMITS</u>                  |
|------------------|----------------------------|--------------|--------------------------------|
| 4-128.4.i        | Junction R12, R13, and R14 | _____ Vdc    | $2.5 \pm 0.1$ Vdc              |
| 4-128.4.k        | Junction R12, R13, and R14 | _____ Vdc    | 2.2 to 2.4 Vdc                 |
| 4-128.4.m        | Junction R12, R13, and R14 | _____ Vdc    | 2.6 to 2.8 Vdc                 |
| 4-128.4.y        | Best Filter Flatness       | _____        | (X) See curve in Figure 4-38   |
| 4-128.4.ae       | Noise at 1 kHz offset      | _____ dB     | $\geq 65$ dB below 82.4350 MHz |
| 4-128.4.ai       | 10.0000 MHz power          | _____ dBm    | $+9$ dBm $\pm 2$ dB            |
| 4-128.4.aj       | 10.0050 MHz power          | _____ dBm    | $+9$ dBm $\pm 2$ dB            |
| 4-128.4.ak       | 10.0099 MHz power          | _____ dBm    | $+9$ dBm $\pm 2$ dB            |
| 4-128.4.ao       | 82.4400 MHz                | _____ MHz    | $82.4400 \pm 1$ ppm            |
| 4-128.4.ap       | 82.4350 MHz                | _____ MHz    | $82.4350 \pm 1$ ppm            |
| 4-128.4.aq       | 82.4301 MHz                | _____ MHz    | $82.4301 \pm 1$ ppm            |

## Section XIII. A7 PRODUCT DETECTOR

## 4-132 GENERAL.

This section contains depot level maintenance instructions for the A7 product detector board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A7 product detector board is mounted in the seventh slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A7 from other boards mounted in the chassis assembly.

A7 product detector board, in receive mode, demodulates a filtered 10.24 MHz input and provides audio output to the front panel AUDIO connectors. In transmit mode, the A7 product detector board accepts audio input from the AUDiO connectors and generates a suppressed carrier double sideband signal at 10.24 MHz.

## 4-133 REMOVAL OF A7 PRODUCT DETECTOR.

Refer to Section IX for removal of the A7 product detector board.

**CAUTION**

The A7 product detector board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

## 4-134 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

## 4-135 INSPECTION.

- a. Inspect product detector board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-40.
- b. Inspect board for missing, broken or damaged components and for any components that may be improperly installed.
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.030 inches (Figure 4-41).

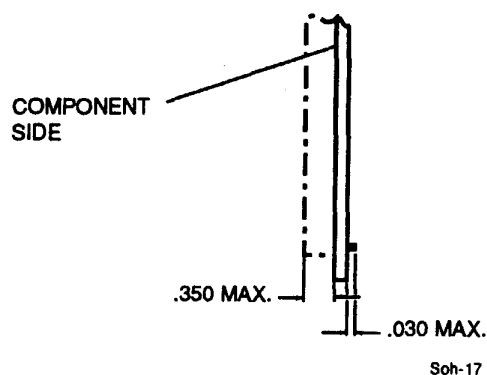
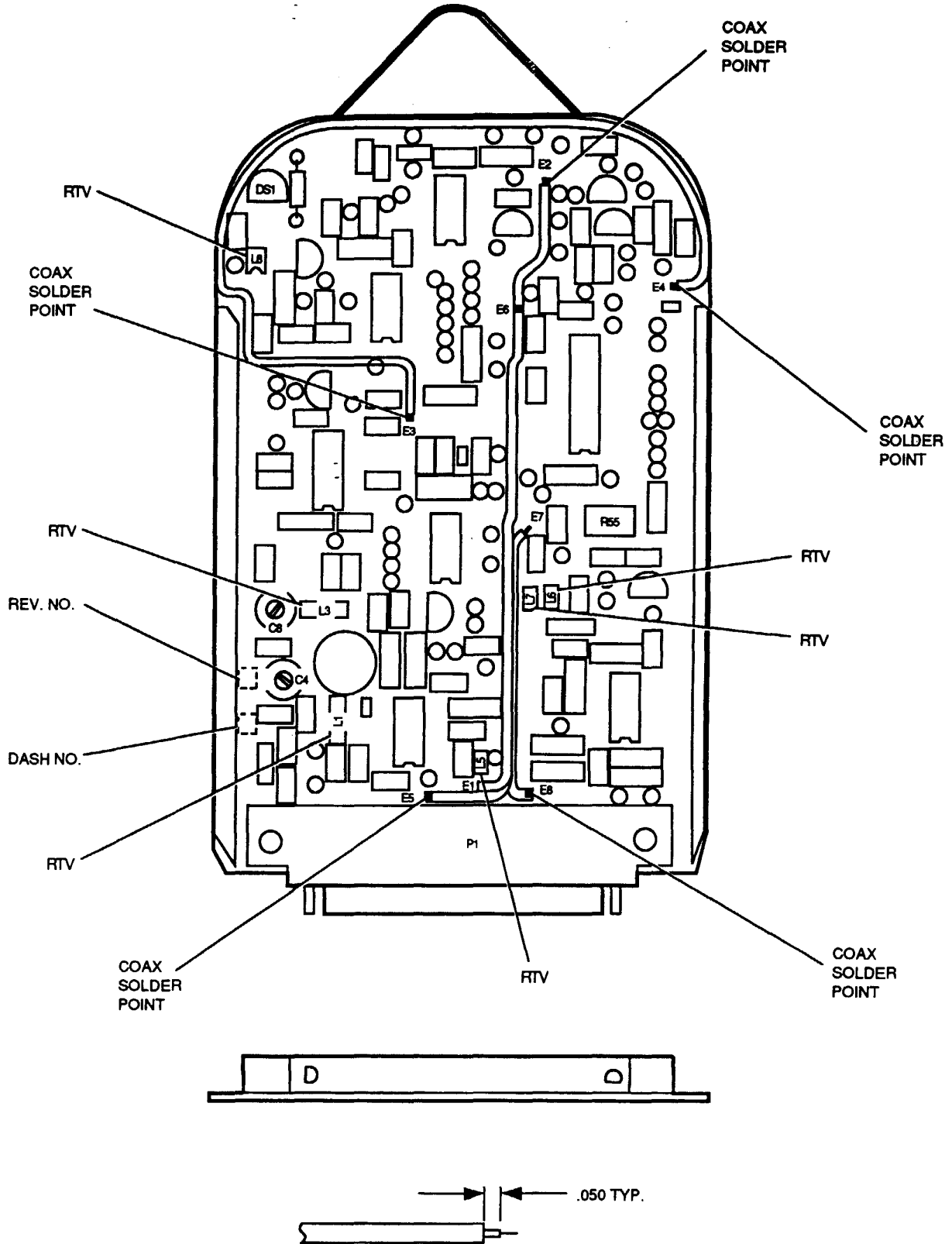


FIGURE 4-41. Components and Lead Extension Off PWB

- d. Inspect component height on component side. Height shall be no greater than 0.350 inches (Figure 4-41).
- e. Verify semi-rigid coax on board is properly installed and is not shorting to component leads.
- f. Inspect product detector board for solder bridges or other mechanical problems.
- g. Inspect product detector board to verify coils L1, L3, L5-L8 have been secured with silicon rubber compound.
- h. Inspect product detector board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.



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FIGURE 4-40. Installation of Coax Cables and Connector Keying

- i. Repair product detector board as necessary (Paragraph 4-136).

#### 4-136 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-138.
- b. When installing components, ensure no components extend more than .350 inches above component side of product detector board (Figure 4-41).
- c. When installing components, ensure no leads extend more than 0.030 inches above circuit side of product detector board (Figure 4-41).
- d. Secure coils, L1, L3, L5-L8 in place with silicon rubber compound (item 15, App. C).
- e. Install three stacked 50 Ohm semi-rigid coax cables to PCB as follows:
  - (1) Trim .050 inches of insulation off coax cables at each end (Figure 4-40).
  - (2) Install three coax cables by stacking in following order:
    - (a) Cable from E7 to E8.
    - (b) Cable from E5 to E6.
    - (c) Cable from E1 to E2.
  - (3) Solder stacked coax cables at points shown in Figure 4-40.
- f. Install coax cable around perimeter of PCB on opposite side of connector P1 as follows:
  - (1) Trim .050 inches of insulation off coax cable at each end (Figure 4-40).
  - (2) Install cable to terminals E3 and E4. Cable should conform to edge of PCB as shown in the Figure 4-40.
  - (3) Solder cable at points shown in Figure 4-40.
- g. When replacing LED DS1, note cathode side of LED DS1 is a shorter lead (Figure 4-42).

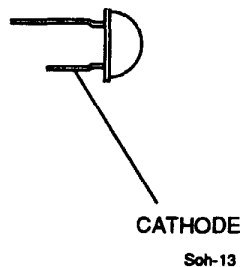


FIGURE 4-42. Diode DS1 Installation

- h. See Figure 4-43 for typical diode installation.
- i. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-40.
- j. Solder electronic components using solder S/N 62 (item 20, App. C).

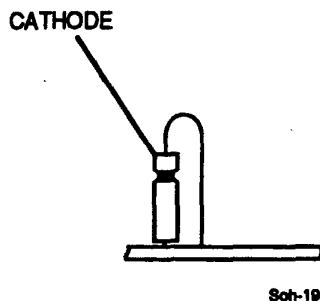


FIGURE 4-43. Typical Diode Installation

- k. Humiseal (item 6, App. C) product detector board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable components C4, C8, and R55.

4-137 TESTING.

This test procedure covers adjustment and electrical test for the A7 product detector board which is used in the RT-1648 HF/VHF radio.

4-137.1 Conditions. This test procedure should be conducted in an ambient temperature environment of 25°C ±10°C.

4-137.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of A7 product detector board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify that all test equipment is calibrated and operates properly prior to testing.

| <u>DESCRIPTION</u>         | <u>QTY.</u> |
|----------------------------|-------------|
| A7 Test Fixture            | 1           |
| Current Meter              | 1           |
| Digital Multimeter         | 1           |
| Distortion Measurement Set | 1           |
| Oscilloscope               | 1           |
| Power Supply               | 1           |
| Signal Generator           | 1           |
| Spectrum Analyzer          | 1           |
| Tool Kit                   | 1           |

4-137.3 Set up.

**CAUTION**

Do not force A7 product detector board into mating connector in the fixture.

**NOTE**

Be sure A7 product detector board is properly oriented with the test fixture connector before inserting. The A7 product detector board is index keyed with test fixture mating connector. The A7 board must be installed in the test fixture with the component side of the board toward the front of the test fixture. The proper orientation of the A7 board in the test fixture is shown in

the test set-up block diagrams of Figure 4-48 and 4-49 and by the words "COMPONENT SIDE".

- a. Install A7 product detector board in test fixture and connect test fixture and external test equipment as shown in Figure 4-44.
- b. Turn on A7 test fixture power supply and adjust for  $12 \pm 0.1$  Vdc. Use DMM.

#### 4-137.4 Testing and Alignment.

- a. Set short circuit current limit on power supply to .5A.
- b. Set A7 test fixture switches as follows:
 

|          |          |
|----------|----------|
| PWR:     | OFF      |
| RX/TX:   | TX       |
| VOL Pot: | Full CCW |
- c. While monitoring current meter, set ON/OFF switch on test fixture to ON position. Record current reading on data sheet.
- d. While monitoring current meter, set RX/TX switch to RX position. Record current reading on data sheet.
- e. Set test equipment as follows for receive path alignment.

|                      |                     |
|----------------------|---------------------|
| Signal Generator:    | 10.241 MHz, -70 dBm |
| Oscilloscope:        | 1 v/div, .5 mS/div  |
| Distortion Analyzer: |                     |
| Function:            | Distortion          |
| Input Range:         | .3 v                |
| Distortion Range:    | 0 dB                |
| Frequency:           | 1 kHz               |

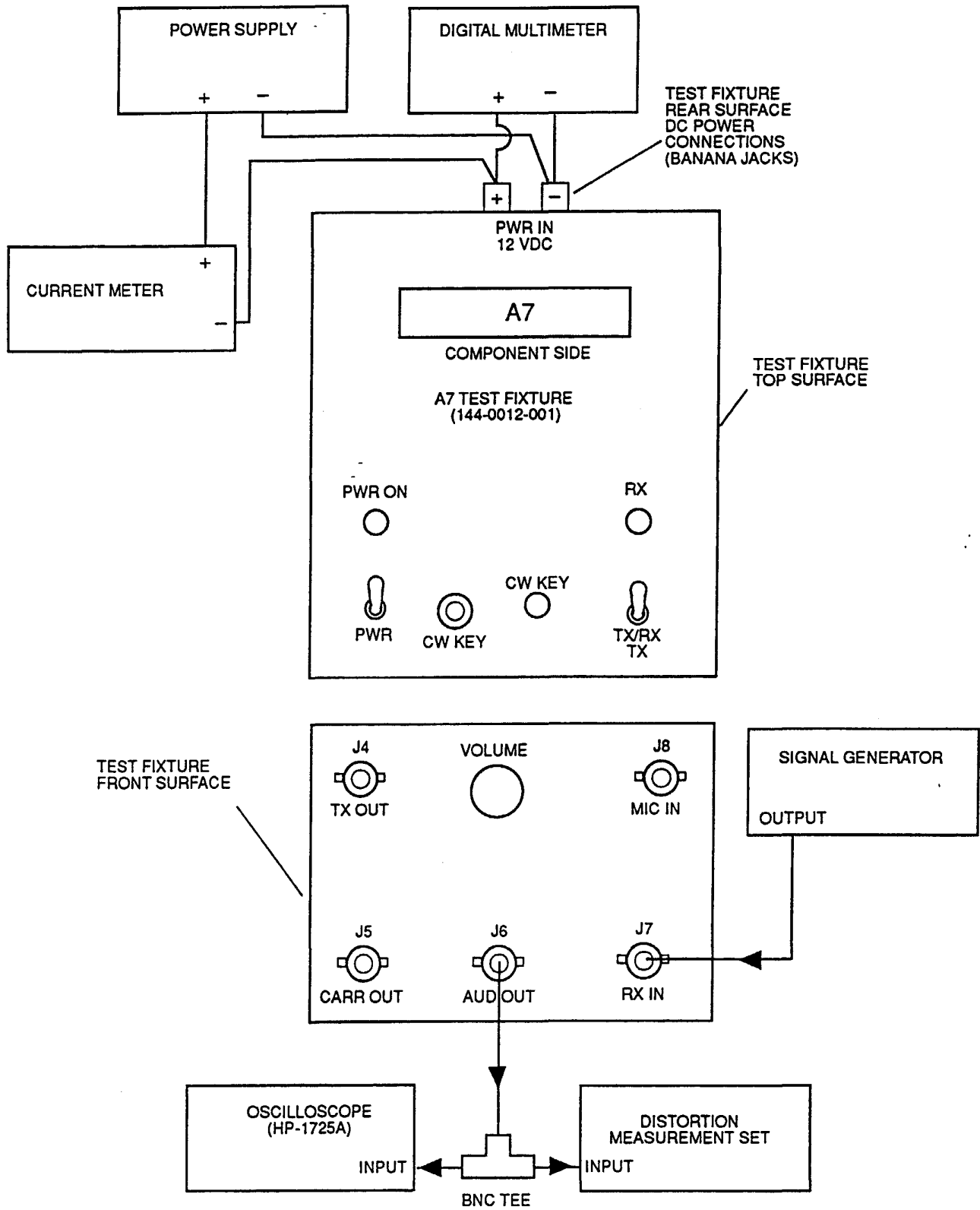
|               |  |
|---------------|--|
| Test Fixture: | Adjust VOLUME for a signal level of 3 Vpp on Oscilloscope. |
|---------------|--|

- f. While monitoring audio output with oscilloscope, adjust capacitors C4 and C8 (Figure 4-40) for peak audio output. It may be necessary to lower signal generator output level and increase audio output of test fixture using volume control pot on front of test fixture.
- g. Raise signal generator output level to -30 dBm and set a 0 dB reference using the Relative Level Function of Distortion Measurement Set. Reduce test fixture VOLUME control as required to keep audio output signal on the screen.
- h. Measure AGC leveling as follows: Lower signal generator output level to -70 dBm and verify a loss of  $\leq 2$  dB. Record loss reading on data sheet.
- i. At distortion measurement set, note SINAD at an input signal level out of signal generator of -115 dBm. Record SINAD reading on data sheet.

#### NOTE

Auto Set Level: No set level adjustment required. Distortion measurements are made directly over 10 dB range selected by input range switch. Two





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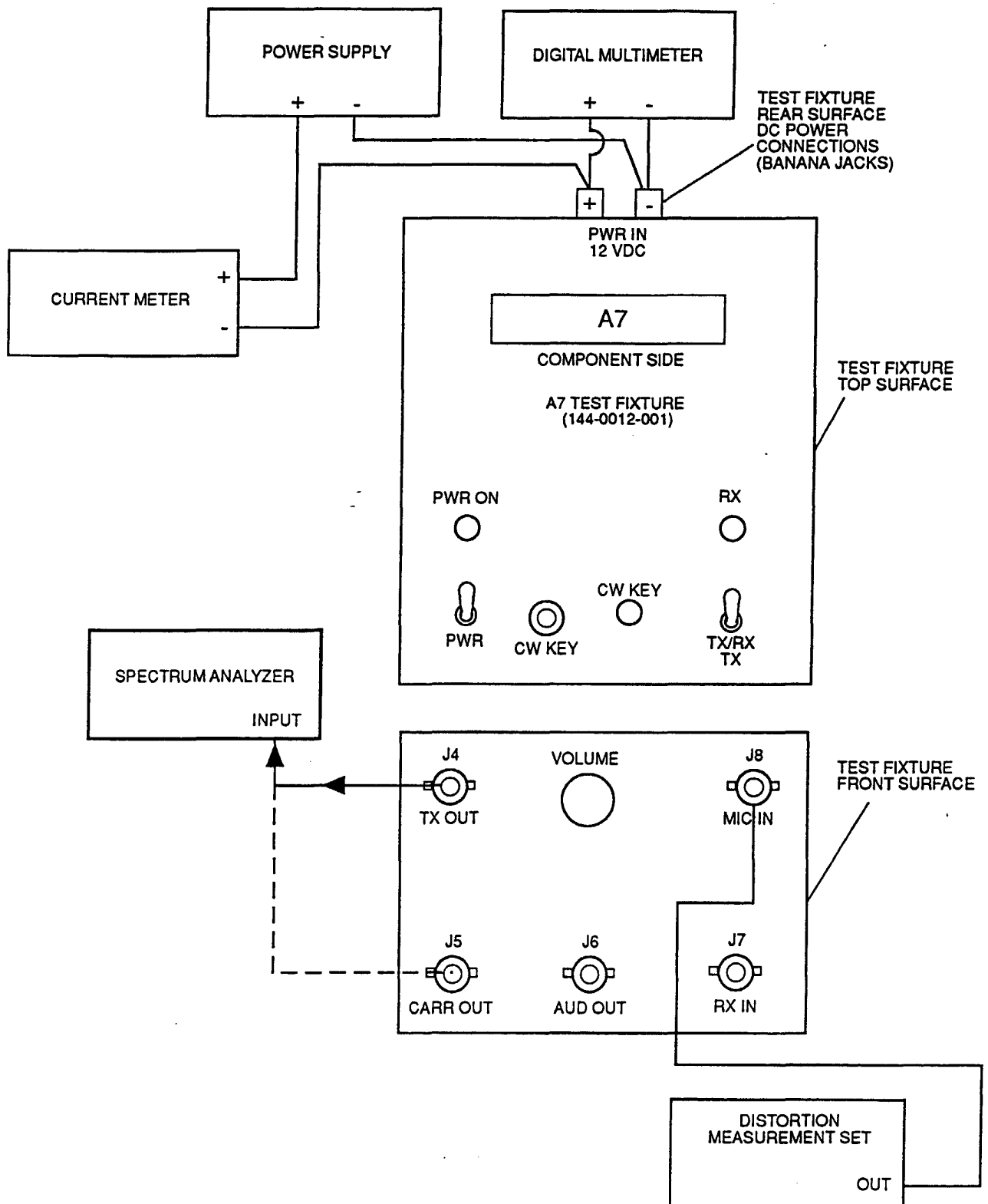
FIGURE 4-44. Test Set-up for Audio Level and Distortion

LED annunciators provide a fast visual indication to change input range for valid distortion measurement. Correct range is indicated when both annunciators are extinguished. It is recommended to increase volume midway to increase signal strength.

- j. Set test fixture PWR switch to OFF.
- k. Connect test equipment to test fixture as shown in Figure 4-45 to begin transmit path alignment.
- l. Set test fixture PWR switch to ON.
- m. Setup distortion measurement set as an audio oscillator set to 1 kHz. Set for a 1 mV output.
- n. Set test fixture RX/TX switch to TX.
- o. Connect spectrum analyzer to TX OUT connector J4.
- p. Set controls on spectrum analyzer as follows:
 

|                       |                  |
|-----------------------|------------------|
| Center Frequency:     | 10.24 MHz        |
| Frequency Span:       | .5 kHz full span |
| Reference Level:      | 0 dBm            |
| Resolution Bandwidth: | 100 Hz           |
| Video Bandwidth:      | 10 kHz           |
| Sweep Time:           | 5 Second         |
| Vertical Scale:       | 10 dB/div (log)  |
- q. While monitoring TX output with spectrum analyzer, adjust R55 (Figure 4-40) for minimum carrier amplitude.
- r. Set controls of spectrum analyzer as follows:
 

|                       |                                |
|-----------------------|--------------------------------|
| Center Frequency:     | 10.24 MHz                      |
| Frequency Span:       | 10 kHz                         |
| Reference Level:      | 0 dBm                          |
| Resolution Bandwidth: | 100 Hz (for final measurement) |
| Video Bandwidth:      | 300 Hz                         |
| Sweep Time:           | 3 Seconds                      |
- s. Note carrier suppression level, at 10.24 MHz, for each of two tones. Record carrier suppression level on data sheet.
- t. Note both output level for both TX output tones on spectrum analyzer. Record tone levels on data sheet.
- u. Turn off distortion measurement set.
- v. While monitoring spectrum analyzer, press CW key button on top surface of test fixture. Note similarity of two tones of equal amplitude to those observed in step s (-10 dBm,  $\pm 2$  dB). Record tone levels on data sheet.
- w. Move connector cable from J4 to J5 of test fixture.
- x. Note carrier output level. Record level on data sheet.



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FIGURE 4-45. Test Set-Up for Transmit Path Alignment

- y. This completes alignment and electrical testing of the A7 product detector board.
- z. Set test fixture PWR switch to OFF and turn off external power supply.
- aa. Carefully remove A7 board from test fixture.
- ab. Apply torque lacquer (item 23, App. C) to hold the position of variable capacitors C4 and C8. Allow torque lacquer to set before proceeding.
- ac. After torque lacquer is set, place A7 board in a protective ESD bag with data sheet and tag appropriately.

#### 4-138 A7 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-9. Indicated components are listed in the recommended order of replacement. See fold-out FO-4 for a schematic of A7 product detector board as an aid to troubleshooting.

Table 4-9. A7 Troubleshooting

| Symptom                   | Paragraph | Suspect Component(s) |
|---------------------------|-----------|----------------------|
| Board does not initialize |           | F1, U8               |
| Low TX current            | 4-137.4.c | F1, L8, L6           |
| Low RX current            | 4-137.4.d | F1, L7               |
| Bad AGC leveling          | 4-137.4.h | U1, U2, U3, U4       |
| Bad SINAD measurement     | 4-137.4.i | U1                   |
| Bad carrier null          | 4-137.4.s | Q1, Q2, U6           |
| Low output tone power     | 4-137.4.t | Q3, U5, U7, U6       |
| Bad CW signal             | 4-137.4.v | U7, Q4               |
| Low carrier output level  | 4-137.4.x | Q1, Q2, CR2, CR3     |

#### 4-139 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A7 product detector board assembly after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-40). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 -.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

#### 4-140 FINAL ASSEMBLY/INSTALLATION.

Install the A7 product detector board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

## A7 PRODUCT DETECTOR BOARD DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>                  | <u>Value</u> | <u>Limits</u>            |
|------------------|---------------------------------|--------------|--------------------------|
| 4-135.h          | Mechanical Inspection           | _____        | (X)                      |
| 4-137.4.c        | TX Current                      | _____ mA     | 55 ±5 mA                 |
| 4-137.4.d        | RX Current                      | _____ mA     | 75 ±5 mA                 |
| 4-137.4.h        | AGC Leveling                    | _____        | ≤2 dB                    |
| 4-137.4.i        | Receive SINAD                   | _____        | ≥11 dB                   |
| 4-137.4.s        | Carrier Suppression @ 10.24 MHz | _____        | ≥-50 dB either two tones |
| 4-137.4.t        | TX Output Tones                 | _____ _____  | -10 dBm ±2 dB            |
| 4-137.4.v        | CW Output Tones                 | _____ _____  | -10 dBm ±2 dB            |
| 4-137.4.x        | Carrier Output                  | _____        | -3 dBm ±2 dB             |

**Section XIV. A8 2ND IF****4-141 GENERAL.**

This section contains depot level maintenance instructions for the A8 2nd IF board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A8 2nd IF board is mounted in the eighth slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A8 from other boards mounted in the chassis assembly.

A8 2nd IF board provides sideband filtering at 10.24 MHz and transmit amplification.

**4-142 REMOVAL OF A8 2ND IF.**

Refer to Section IX for removal of the A8 2nd IF board.

**CAUTION**

The A8 2nd IF board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

**4-143 CLEANING.****WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-144 INSPECTION.

- a. Inspect A8 2nd IF board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-46.
- b. Inspect A8 2nd IF board for missing, broken or damaged components and any components that may be improperly installed.
- c. Inspect lead extensions on circuit side of 2nd IF board. They shall not be greater than 0.030 inches. (Figure 4-47)
- d. Inspect component height on component side of 2nd IF board. It shall be no greater than 0.500 inches. (Figure 4-47)
- e. Verify semi-rigid coax on the 2nd IF board is properly installed and is not shorting to component leads.
- f. Inspect 2nd IF board for solder bridges or other mechanical problems.
- g. Inspect 2nd IF board to verify Kapton Tape overlaps filter FL1 properly.
- h. Inspect 2nd IF board for any exposed surfaces through humiseal coating.
- i. Inspect board for solder bridges or other mechanical interference problems. If visual inspection is in compliance, mark (X) on data sheet.
- j. Repair 2nd IF board as necessary (Paragraph 4-145).

4-145 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-147.
- b. After replacing filter FL1, add Kapton Tape (item 22, App. C) over edge of filter as shown in Figure 4-46.
- c. Ensure no components extend more than .500 inches above component side of 2nd IF board. (Figure 4-47)
- d. Ensure no leads extend more than 0.030 inches above circuit side of 2nd IF board. (Figure 4-47)
- e. Secure transformer T1 in place with silicon rubber compound (item 15, App. C). (Figure 4-46)
- f. Install two stacked 50 Ohm semi-rigid coax cables (item 5, App. C) to PCB as follows:
  - (1) Trim .050 inches of insulation off semi-rigid coax cables at each end (Figure 4-46).
  - (2) Install two coax cables by stacking in following order:
    - (a) Cable from terminal E3 to E4.
    - (b) Cable from terminal E1 to E2.
    - (c) Solder stacked coax cables at points shown in Figure 4-46.
- g. When replacing LED DS1, note cathode side of LED DS1 is a shorter lead (Figure 4-48).

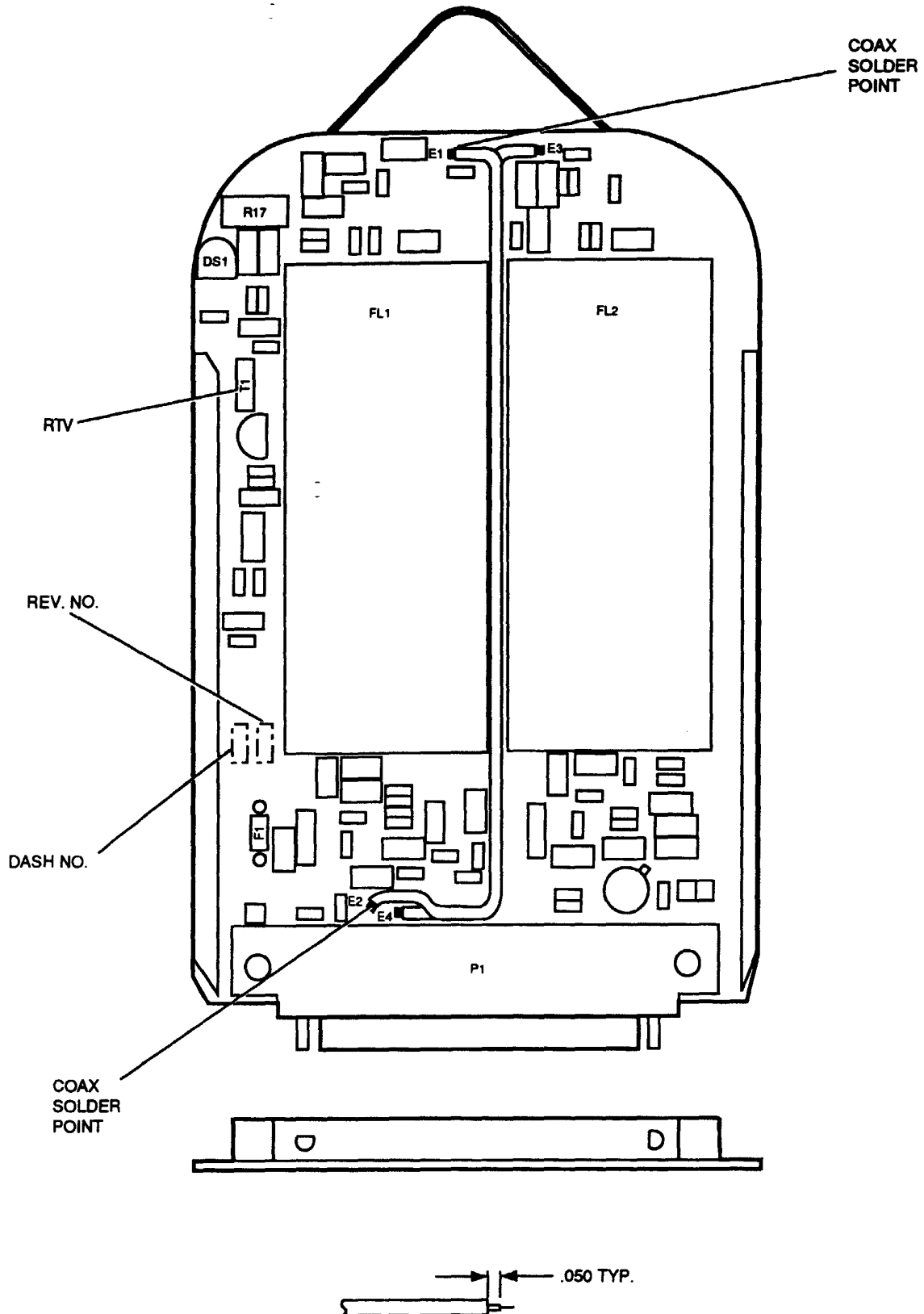
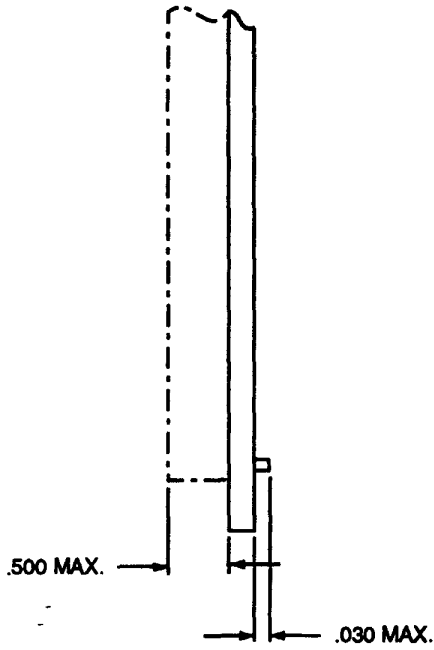


FIGURE 4-46. Installation of Coax Cables and Connector Keying

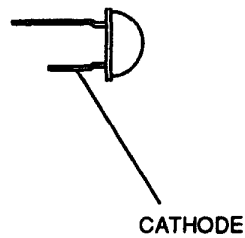
Soh-37





Soh-38

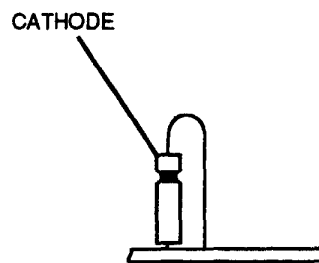
FIGURE 4-47. Component and Lead Extension Off PWB



Soh-13

FIGURE 4-48. Diode DS1 Installation

- h. See Figure 4-49 for typical diode installation.



Soh-19

FIGURE 4-49. Typical Diode Installation

- i. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-46.

- j. Solder electronic components using solder S/N 62 (item 20, App. C).
- k. Humiseal (item 6, App. C) A8 2nd IF board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable component R17.

#### 4-146 TESTING.

This test procedure covers alignment and electrical testing of the A8 2nd IF board.

4-146.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

4-146.2 Equipment. The following table lists unique and standard test equipment for test and alignment of the A8 2nd IF board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify all test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u> | <u>QTY.</u> |
|--------------------|-------------|
| A8 Test Fixture    | 1           |
| Digital Multimeter | 2           |
| Network Analyzer   | 1           |
| Power Supply       | 1           |
| Tool Kit           | 1           |

4-146.3 Set Up.

#### **CAUTION**

Do not force the 2nd IF board into the mating connector in the fixture.

#### **NOTE**

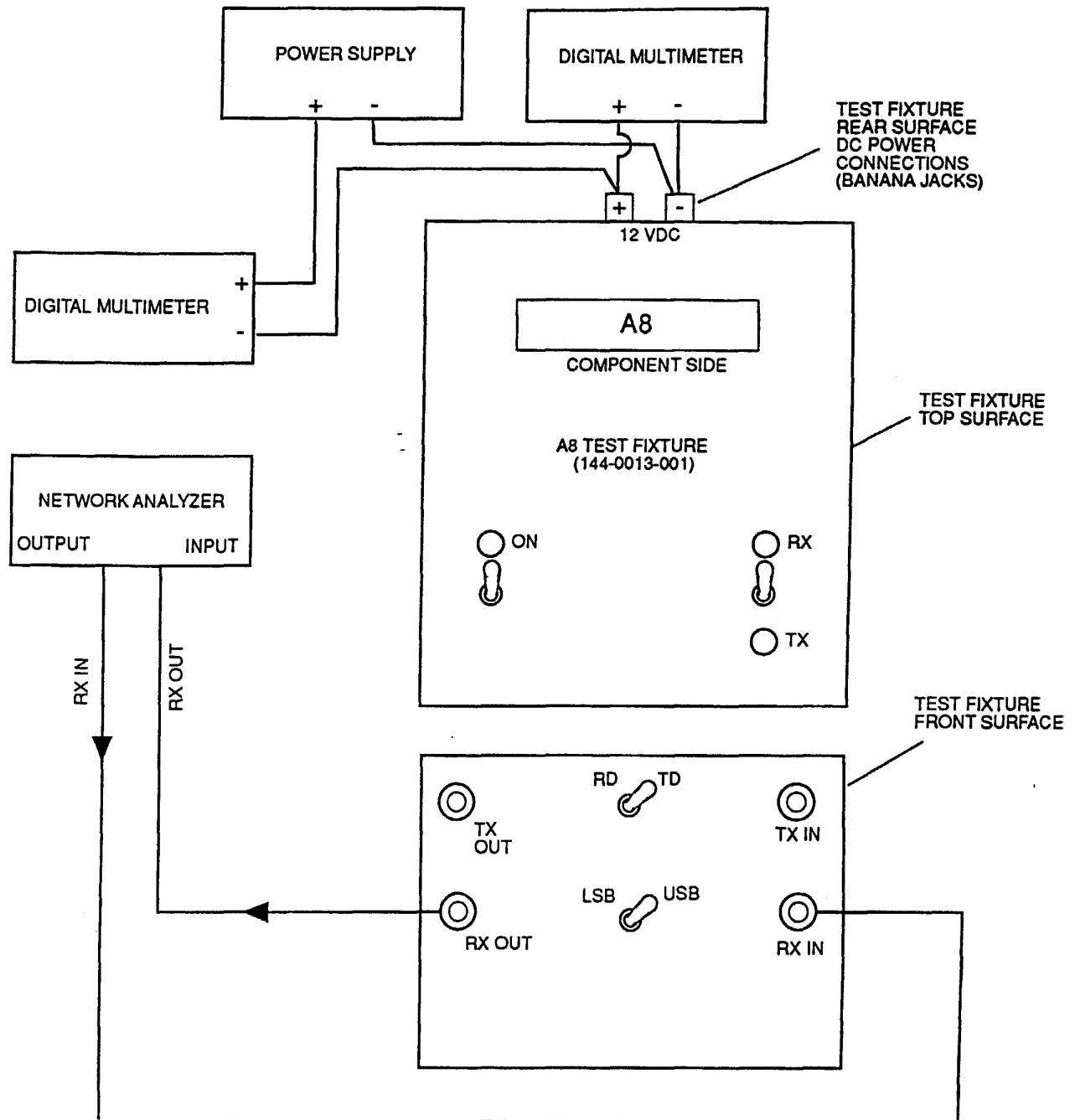
Be sure the 2nd IF board is properly oriented with the test fixture connector before inserting. The 2nd IF board is index keyed with test fixture mating connector. The 2nd IF board must be installed in the test fixture with the component side of the board toward the front of the test fixture. The proper orientation of the 2nd IF board in the test fixture is illustrated by the words "COMPONENT SIDE" on the test fixture, as shown in the test set up block diagrams, Figures 4-50 and 4-51.

- a. Install 2nd IF board into test fixture and connect test fixture and external test equipment, except for network analyzer, as shown in Figure 4-54.
- b. Turn on A8 test fixture power supply and adjust voltage for  $12\text{ Vdc} \pm 0.1\text{ Vdc}$ . Use DMM.

4-146.4 Testing and Alignment.

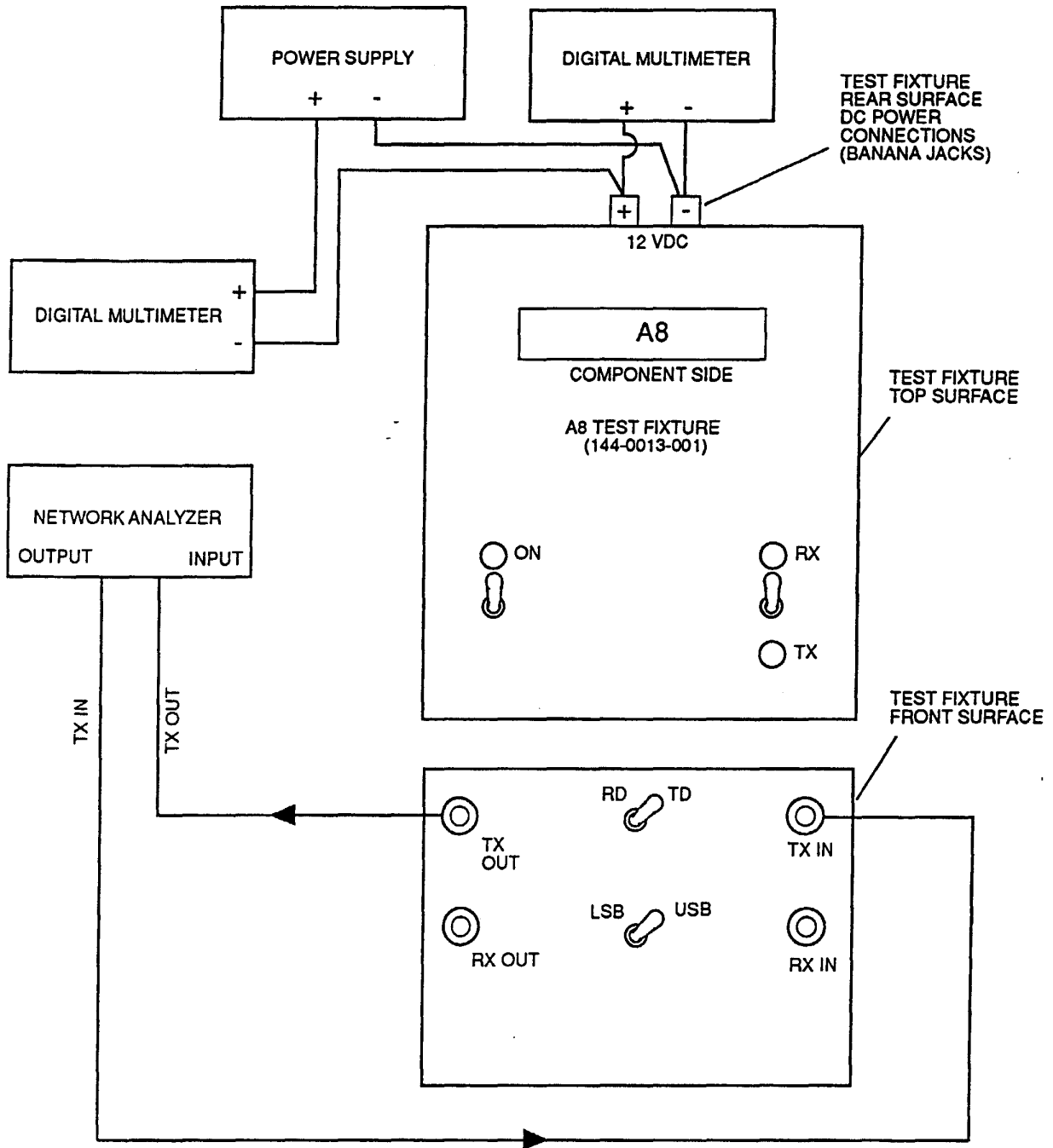
- a. Set current limit on power supply to .5A.
- b. Set A8 test fixture switches as follows:

|          |     |
|----------|-----|
| PWR:     | OFF |
| USB/LSB: | USB |
| RD/TD:   | RD  |
| RX/TX:   | RX  |



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FIGURE 4-50. Test Set-Up Block Diagram (RX)



SOH-40

FIGURE 4-51. Test Set-Up Block Diagram (TX)

- c. While monitoring current meter, set test fixture PWR switch to ON. Record current reading on data sheet.
- d. While monitoring current meter, set RX/TX switch on test fixture to TX position and RD/TD switch to TD position. Record current reading on data sheet.
- e. Connect test coaxial cables from network analyzer to RX IN and RX OUT connectors on test fixture. Refer to Figure 4-50.
- f. Set RX/TX switch back to RX position and RD/TD switch back to RD position.
- g. Set controls on network analyzer as follows:

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2415 MHz |
| Frequency Span:   | 3 kHz       |
| Amplitude:        | -10 dBm     |
| dB/Div.:          | 1 dB        |
| Ref Level:        | As Required |

- h. Calibrate network analyzer for a 0 dB reference. Refer to Instrument Operating Manual for instructions.

**NOTE**

The display may require adjustment to view the -6 dB points in this step.

- i. While monitoring network analyzer, note the -6 dB point, at the low side of the filter, and the -6 dB point, at the high side of the filter. Record upper and lower -6 dB points on data sheet.

**NOTE**

The -6 dB points are measured from maximum amplitude of the response which is not necessarily the amplitude at the center frequency.

- j. Note total insertion loss, relative to the 0 dB reference, and the ripple. Record insertion loss and ripple on data sheet. See Figures 4-52 and 4-53 for typical bandpass characteristics curve for USB.
- k. Set LSB/USB switch on test fixture to LSB.
- l. Set controls on network analyzer as follows:

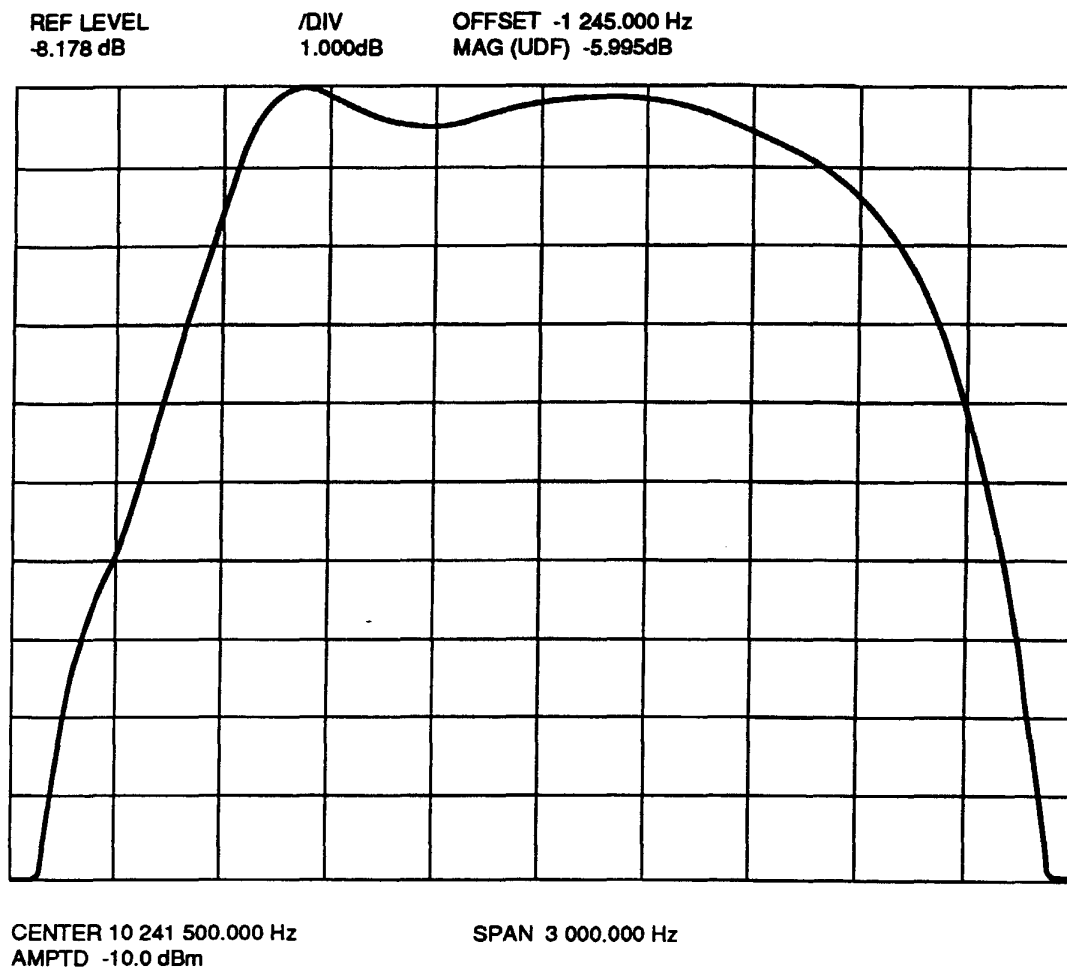
|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2385 MHz |
| Frequency Span:   | 3 kHz       |
| Amplitude:        | -10 dBm     |
| dB/Div.:          | 1 dB        |

- m. Calibrate network analyzer for a 0 dB reference. Refer to Instrument Operating Manual for instructions.

**NOTE**

The display may require adjustment to view the -6 dB points in this step.

- n. While monitoring network analyzer, note the -6 dB point, at the low side of the filter, and the -6 dB point, at the high side of the filter. Record upper and lower -6 dB points on data sheet.



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FIGURE 4-52. Typical Bandpass Characteristics Curve for USB

**NOTE**

The -6 dB points are measured from maximum amplitude of the response which is not necessarily the amplitude at the center frequency.

- o. Note total insertion loss, relative to the 0 dB reference, and the ripple. Record insertion loss and ripple on data sheet. See Figures 4-54 and 4-55 for typical bandpass characteristics curve for LSB.
- p. Connect test coaxial cables from network analyzer to TX in and TX out connectors on test fixture. Refer to Figure 4-51.
- q. Set controls on network analyzer as follows:

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2415 MHz |
| Frequency Span:   | 10 kHz      |
| Amplitude:        | -10 dBm     |
| dB/Div:           | 10 dB       |
| Ref Level:        | As Required |

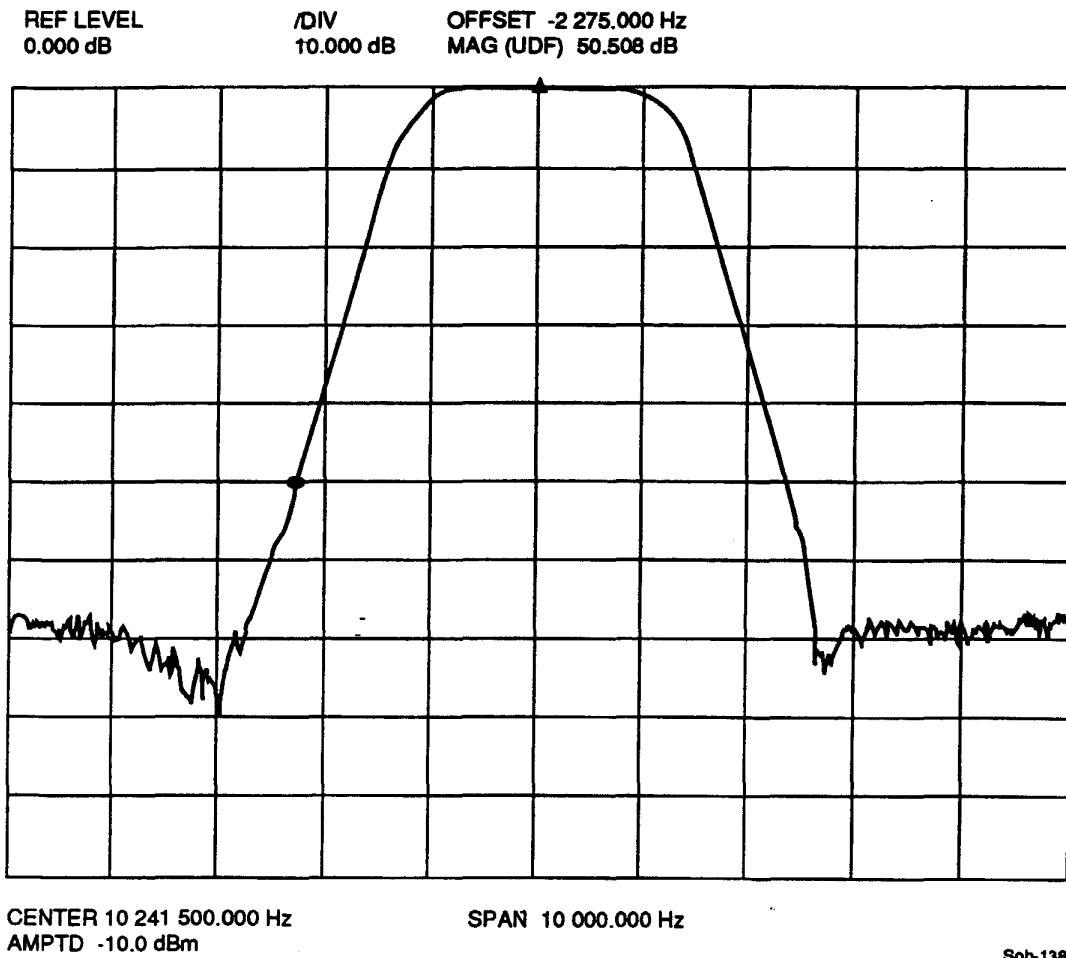


Figure 4-53. Typical Bandpass Curve Showing -50 dB Points for USB

- r. Calibrate network analyzer for 0 dB reference.
- s. Set switches on test fixture as follows:
 

|          |     |
|----------|-----|
| RX/TX:   | TX  |
| RD/TD:   | TD  |
| LSB/USB: | USB |
- t. Monitor network analyzer and note peak TX output level in USB.
- u. Set USB/LSB switch to LSB.
- v. Monitor network analyzer and note peak output level in USB.
- w. Select sideband has the lowest output level. Mark LSB or USB on data sheet.
- x. Leave USB/LSB switch in lowest TX output level sideband and adjust R17 (Figure 4-46) for an output level of 0 dB. Mark (X) on data sheet.
- y. Change USB/LSB switch to sideband with higher TX output level and note peak output level. Indicate difference in amplitude between highest and lowest sideband TX output level on data sheet.

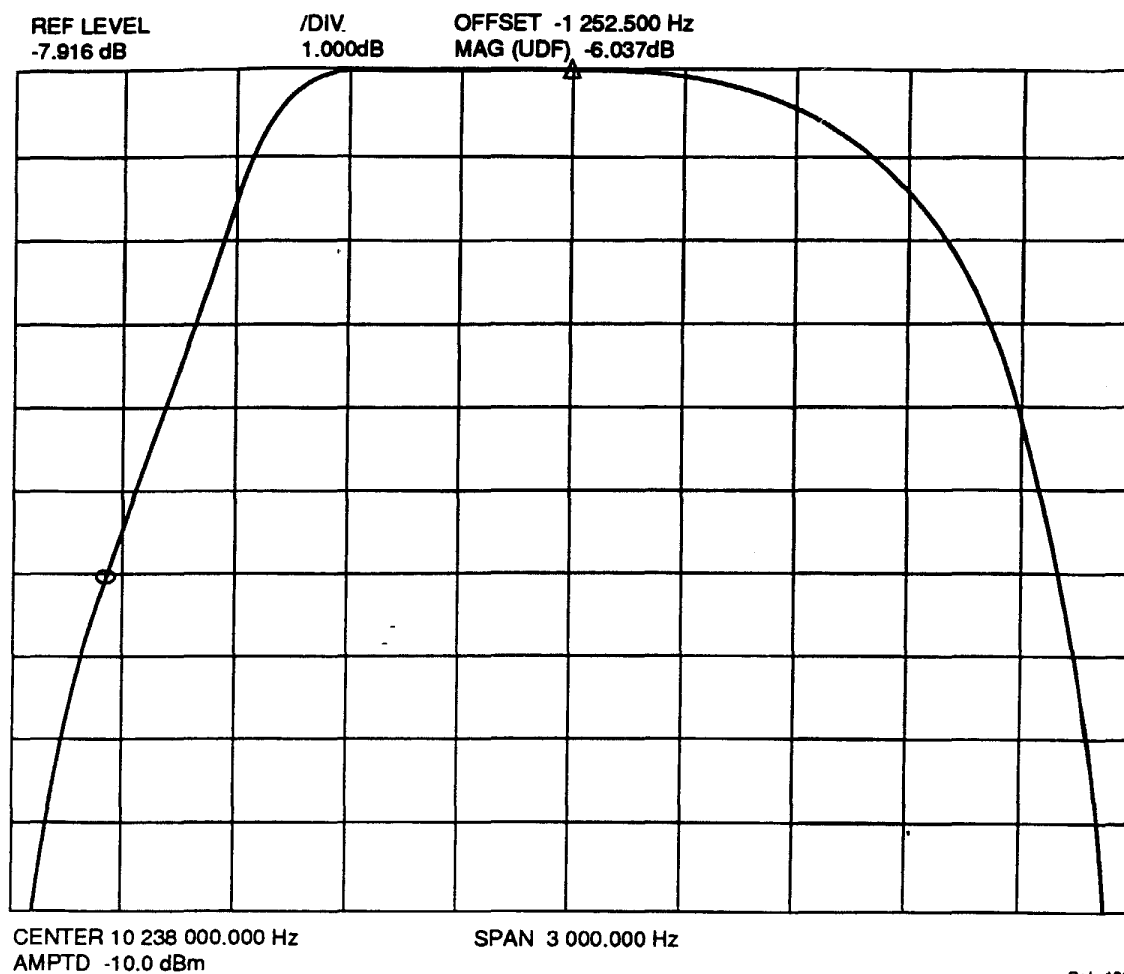


FIGURE 4-54. Typical Bandpass Characteristics Curve for LSB

- z. Set LSB/USB switch on A8 test fixture to LSB position.
- aa. Set controls on network analyzer as follows:
- |                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2385 MHz |
| Frequency Span:   | 3 kHz       |
| Amplitude:        | -10 dBm     |
| dB/Div:           | 1 dB        |
| Ref Level:        | As Required |
- ab. Calibrate network analyzer for a 0 dB reference. Refer to Instrument Operating Manual for instructions.

**NOTE**

The -6 dB points are measured from maximum amplitude of the response which is not necessarily the amplitude at the center frequency.

- ac. While monitoring network analyzer, note the -6 dB point at low and high side of filter, and the ripple. Record upper and lower -6 dB points and ripple on data sheet. See Figure 4-54 for a typical bandpass characteristics curve for LSB.



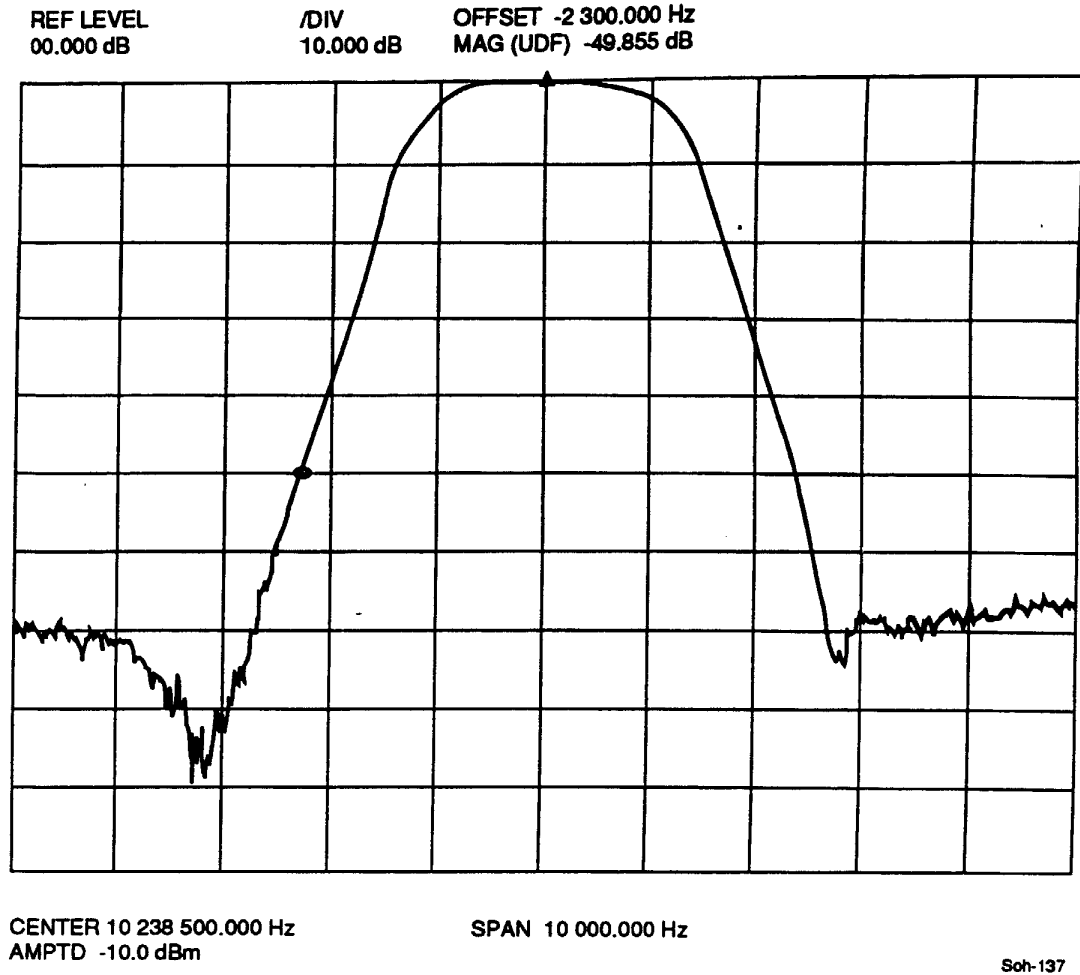


Figure 4-55. Typical Bandpass Curve Showing -50 dB Points for LSB

- ad. Set USB/LSB switch on test fixture to USB position.
- ae. Set controls of network analyzer as follows:
 

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2415 MHz |
| Frequency Span:   | 3 kHz       |
| Amplitude:        | -10 dBm     |
| dB/Div.:          | 1 dB        |
- af. Repeat steps 4-146.4.ab and 4-146.4.ac for USB. See Figures 4-52 and 4-53 for typical bandpass characteristics curve. Record on data sheet.
- ag. Set controls of network analyzer as follows:
 

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2415 MHz |
| Frequency Span:   | 10 kHz      |
| Amplitude:        | -10 dBm     |
| dB/Div.:          | 10 dB       |
- ah. Calibrate network analyzer for a 0 dB reference. Refer to Instrument Operating Manual for instructions.

- ai. While monitoring network analyzer, note the -50 dB point on the high and low side of the filter. Record the -50 dB points on data sheet. See Figures 4-52 and 4-53 for typical bandpass characteristics curve for USB.
- aj. Set LSB/USB switch on test fixture to LSB position.
- ak. Set controls of network analyzer as follows:
 

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.2385 MHz |
| Frequency Span:   | 10 kHz      |
| Amplitude:        | -10 dBm     |
| dB/Div.:          | 10 dB       |
- al. Repeat steps 4-146.4.ah and 4-146.4.ai for LSB. See Figures 4-54 and 4-55 for typical bandpass characteristics curve for LSB. Record on data sheet.
- am. This completes alignment and electrical testing of the A8 2nd IF board.
- an. Set test fixture PWR switch to OFF and turn off external power supply.
- ao. Carefully remove A8 2nd IF board from test fixture.
- ap. Place A8 board in an ESD protective bag with data sheet and tag appropriately.

#### 4-147 A8 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-10. Indicated components are listed in the recommended order of replacement. See fold-out FO-5 for a schematic of the A8 2nd IF board as an aid to troubleshooting.

#### 4-148 PAINTING AND MARKING.

Humiseal (item 6, App. C) A8 2nd IF board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-46). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 - .12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

#### 4-149 FINAL ASSEMBLY/INSTALLATION.

Install the A8 2nd IF board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

Table 4-10. A8 Troubleshooting

| Symptom                                    | Paragraph                             | Suspect Component(s)             |
|--|---------------------------------------|----------------------------------|
| Board does not initialize                  |                                       | F1                               |
| Bad Rx current measurement                 | 4-146.4.c                             | F1, CR6, CR11                    |
| Bad Tx current measurement                 | 4-146.4.d                             | CR1, CR5, CR10, T1               |
| Bad USB/LSB switching                      | 4-146.4.w                             | CR2, CR7, CR3, CR8, CR4, CR9     |
| Bad Rx or/and Tx frequency response in USB | 4-146.4.i<br>4-146.4.af<br>4-146.4.ai | FL1                              |
| Bad Rx or/and Tx frequency response in LSB | 4-146.4.n<br>4-146.4.ac<br>4-146.4.al | FL2                              |
| Bad Rx insertion loss in USB               | 4-146.4.i                             | CR6, CR2, CR4, CR11, FL1         |
| Bad Rx insertion loss in LSB               | 4-146.4.n                             | CR6, CR7, CR9, CR9, FL2          |
| Bad Tx gain in USB/LSB                     | 4-146.4.y                             | Q2, T1, CR6, CR2, CR4, CR11, FL1 |

## A8 2ND IF BOARD DATA SHEET

| Para. No. | Reading               | Value    | Limits  |
|-----------|-----------------------|----------|---|
| 4-144.i   | Mechanical Inspection | _____    | (X)   |
| 4-146.4.c | RX Current            | _____ mA | 40 ±4 mA  |
| 4-146.4.d | TX Current            | _____ mA | 40 ±4 mA  |
| 4-146.4.i | RX USB 6 dB Bandwidth |          |   |
|           | Low Side              | _____    | 1200 Hz <u>Minimum</u> below the 10.2415 MHz center frequency |
|           | High Side             | _____    | 1200 Hz <u>Minimum</u> above the 10.2415 MHz center frequency |
|           | USB Insertion Loss    | _____    | ≤ 9 dB  |
|           | USB Ripple            | _____    | ≤ 2 dB  |
| 4-146.4.n | RX LSB 6 dB Bandwidth |          |   |
|           | Low Side              | _____    | 1200 Hz <u>Minimum</u> below the 10.2385 MHz center frequency |
|           | High Side             | _____    | 1200 Hz <u>Minimum</u> above the 10.2385 MHz center frequency |
|           | LSB Insertion Loss    | _____    | ≤ 9 dB  |
|           | LSB Ripple            | _____    | ≤ 2 dB  |

## A8 2ND IF BOARD DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>   | <u>Value</u> | <u>Limits</u>   |
|------------------|--|--------------|---|
| 4-146.4.w        | LSB or USB Selected  | _____        | LSB or USB  |
| 4-146.4.x        | Set Tx Output to 0 dB  |              |   |
|                  | Reference Level  | _____        | (X)   |
| 4-146.4.y        | Tx Output Not More Than 3 dB Greater Than in step 4-141.3.x. | _____        | ≤3 dB   |
| 4-146.4.ac       | Tx LSB 6 dB Bandwidth  |              |   |
|                  | Low Side   | _____        | 1200 Hz <u>Minimum</u> below the 10.2385 MHz center frequency |
|                  | High Side  | _____        | 1200 Hz <u>Minimum</u> above the 10.2385 MHz center frequency |
|                  | LSB Ripple   | _____        | ≤ 2 dB  |
| 4-146.4.af       | Tx USB 6 dB Bandwidth  |              |   |
|                  | Low Side   | _____        | 1200 Hz <u>Minimum</u> below the 10.2415 MHz center frequency |
|                  | High Side  | _____        | 1200 Hz <u>Minimum</u> above the 10.2415 MHz center frequency |
|                  | USB Ripple   | _____        | ≤ 2 dB  |
| 4-146.4.ai       | USB 50 dB Bandwidth  |              |   |
|                  | Low Side   | _____        | 2500 Hz <u>Maximum</u> below the 10.2415 MHz center frequency |
|                  | High Side  | _____        | 2500 Hz <u>Maximum</u> above the 10.2415 MHz center frequency |
| 4-146.4.al       | LSB 50 dB Bandwidth  |              |   |
|                  | Low Side   | _____        | 2500 Hz <u>Maximum</u> below the 10.2385 MHz center frequency |
|                  | High Side  | _____        | 2500 Hz <u>Maximum</u> above the 10.2385 MHz center frequency |

## Section XV. A9 1st IF board

## 4-150 GENERAL.

This section contains depot level maintenance instructions for the A9 1st IF. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A9 1st IF board is mounted in the ninth slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A9 from other boards mounted in the chassis assembly.

The A9 1st IF board, in receive mode, provides first and second frequency conversion of the input RF signal. Its output is 10.24 MHz. In transmit mode, the 1st IF board A9 provides frequency conversion of a 10.24 MHz input to 72.1901 - 72.2000 MHz output.

#### 4-151 REMOVAL OF A9 1ST IF.

Refer to Section IX for removal of A9 1st IF board.

#### **CAUTION**

The A9 1st IF board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

#### 4-152 CLEANING.

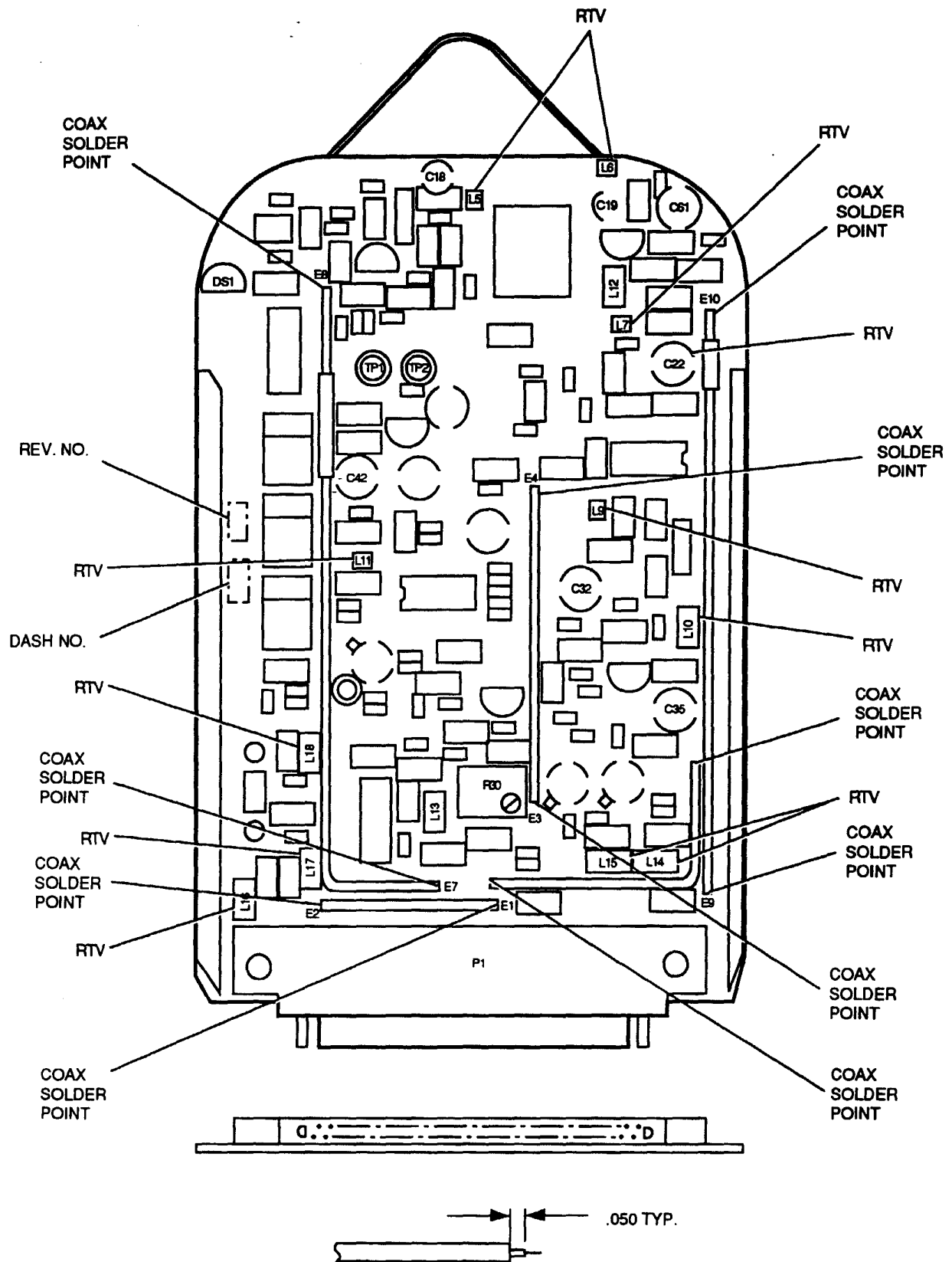
#### **WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

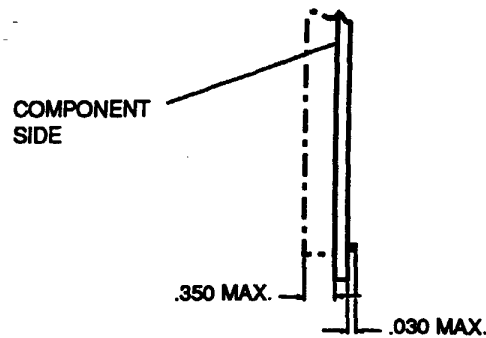
#### 4-153 INSPECTION.

- a. Inspect 1st IF board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-56.
- b. Inspect 1st IF board for missing, broken or damaged components and for any components that may be improperly installed (Figure 4-56).
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.030 inches (Figure 4-57).
- d. Inspect component height on component side. Height shall be not greater than 0.350 inches (Figure 4-57).
- e. Verify semi-rigid coax on board is properly installed and is not shorting to component leads.
- f. Inspect 1st IF board for solder bridges or other mechanical problems.
- g. Inspect 1st IF board to verify coils have been secured with RTV (Figure 4-56).



Sch-44

FIGURE 4-56. Installation of Coax Cables and Connector Keying



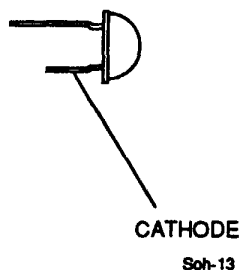
SoH-17

FIGURE 4-57. Component and Lead Extension Off PWB

- h. Inspect 1st IF board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- i. Repair 1st IF board as necessary (Paragraph 4-154).

4-154 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-156.
- b. Ensure no components extend more than .350 inches above component side of 1st IF board (Figure 4-57).
- c. Ensure no leads extend more than 0.030 inches above circuit side of 1st IF board (Figure 4-57).
- d. Secure inductors, L5-L7 and L9-L18, in place with silicon rubber compound (item 15, App. C) (Figure 4-56).
- e. Install 50 Ohm semi-rigid coax cables to 1st IF board as follows:
  - (1) Trim .050 inches of insulation off coax cables at each end (Figure 4-56).
  - (2) Solder coax cables to ground plane at points shown in Figure 4-56.
  - (3) When installing coax cable to terminals E9 and E10, ensure cable is a minimum of .125 inches from edge of PCB (Figure 4-56).
- f. When replacing LED DS1, note that cathode side of LED DS1 is a shorter lead (Figure 4-58).



SoH-13

FIGURE 4-58. Diode DS1 Installation

- g. See Figure 4-59 for typical diode installation.

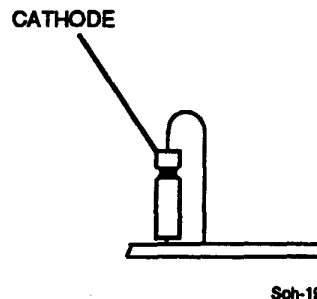


FIGURE 4-59. Typical Diode Installation

- h. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-56.
- i. Solder electronic components using solder S/N 62 (item 20, App. C).
- j. Humiseal (item 6, App. C) A9 1st IF board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal adjustable components.

#### 4-155 TESTING.

This test procedure covers alignment and electrical testing of A9 1st IF board.

4-155.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

4-155.2 Equipment. The following table lists unique and standard test equipment required for testing and alignment of the A9 1st IF board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>   | <u>QTY.</u> |
|----------------------|-------------|
| A9 Test Fixture      | 1           |
| Current Meter        | 1           |
| Digital Multimeter   | 1           |
| Network Analyzer     | 1           |
| Power Supply         | 1           |
| S Parameter Test Set | 1           |
| Signal Generator     | 3           |
| Spectrum Analyzer    | 1           |
| Tool Kit             | 1           |

4-155.3 Set Up.

#### CAUTION

Do not force the A9 1st IF board into the mating connector in the fixture.

#### NOTE

Be sure the 1st IF board is properly oriented with the test fixture connector before inserting. The 1st IF board is index keyed with test fixture mating connector. The 1st IF board must be installed in the test fixture with the component side toward the front



of the test fixture. The proper orientation of the 1st IF board in the test fixture is shown by the words "Component Side" in Figures 4-60, 4-61, 4-63, 4-64 and 4-66, the test set up block diagrams and on the test fixture.

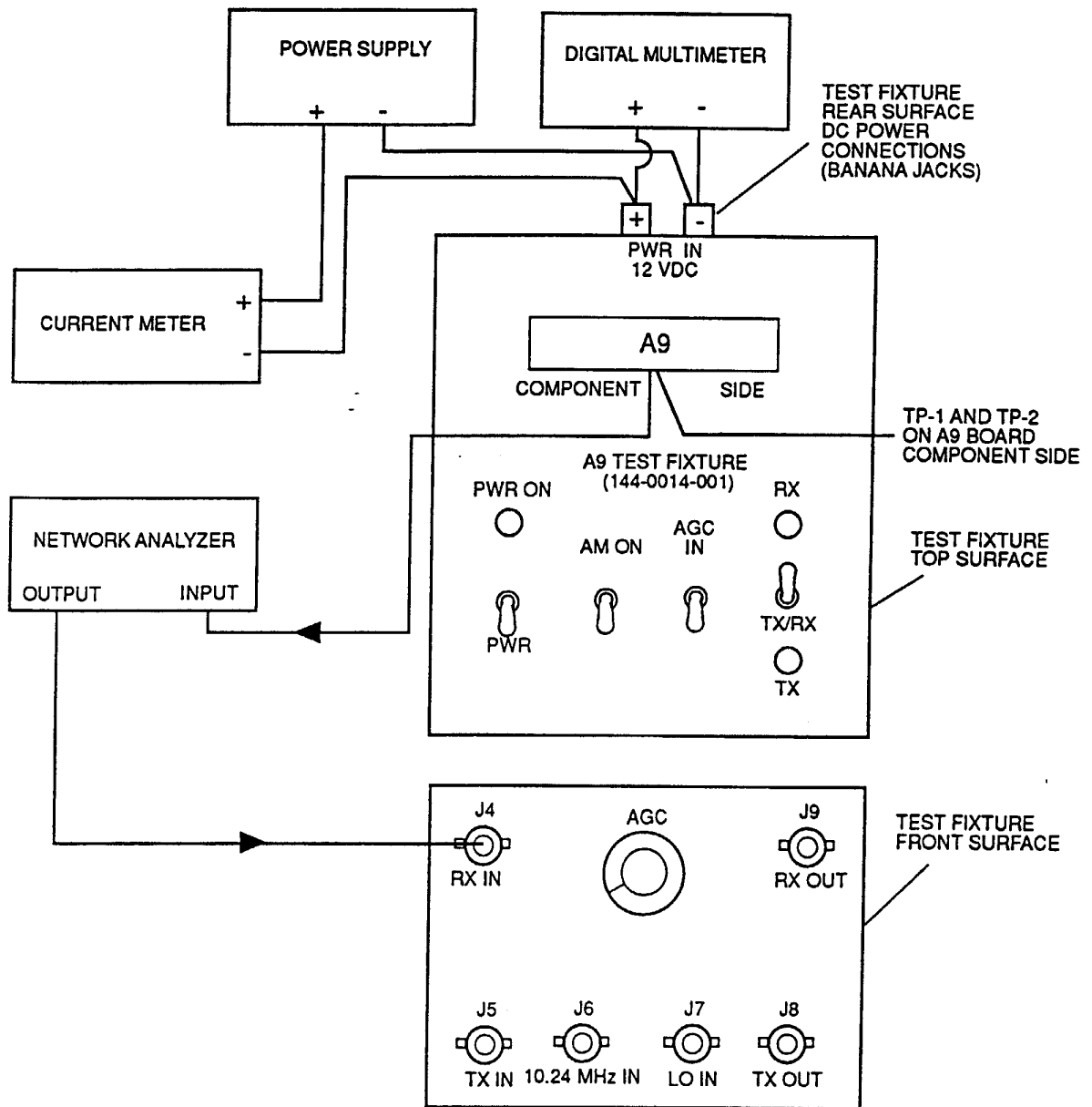
- a. Install 1st IF board in test fixture.
- b. Connect test fixture and external test equipment as shown in Figure 4-60.
- c. Turn on A9 test fixture power supply and adjust for 12 Vdc  $\pm$ 0.1 Vdc. Use DMM.

4-155.4 Testing and Alignment.

- a. Set power supply current limit to .5A.
- b. Set test fixture controls as follows:

|          |            |
|----------|------------|
| PWR:     | Off (DOWN) |
| TX/RX:   | RX (UP)    |
| AGC Pot: | Full CCW   |
| AM ON:   | Off (DOWN) |
| AGC IN:  | Off (DOWN) |
- c. While monitoring current meter, set test fixture PWR switch ON. Record current reading on data sheet.
- d. While monitoring current meter, set test fixture TX/RX switch to TX position. Record current reading on data sheet.
- e. Set test fixture TX/RX switch back to RX position.
- f. Set controls on network analyzer to measure receive circuitry insertion loss as follows:

|                  |             |
|------------------|-------------|
| Start Frequency: | .1 MHz      |
| Stop Frequency:  | 100 MHz     |
| Amplitude:       | 0 dBm       |
| dB/Div.:         | 1 dB        |
| Ref Level:       | As Required |
- g. Calibrate network analyzer for a 0 dB reference.
- h. Reconnect a test coax cable from network analyzer input to 1st IF board test point TP1 and ground to TP2 (Figure 4-56).
- i. While monitoring network analyzer, note insertion loss from 1.6 MHz to 50 MHz. Record maximum insertion loss on data sheet.
- j. Turn test fixture PWR switch to off.
- k. Remove test coax cable from TP1 and TP2.
- l. Connect test fixture and test equipment as shown in Figure 4-61 for receive path alignment.
- m. Turn test fixture PWR switch to PWR ON.
- n. Set controls of network analyzer for receive path alignment as follows:



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FIGURE 4-60. A9 Test Set-Up for Receive Circuitry Insertion Loss

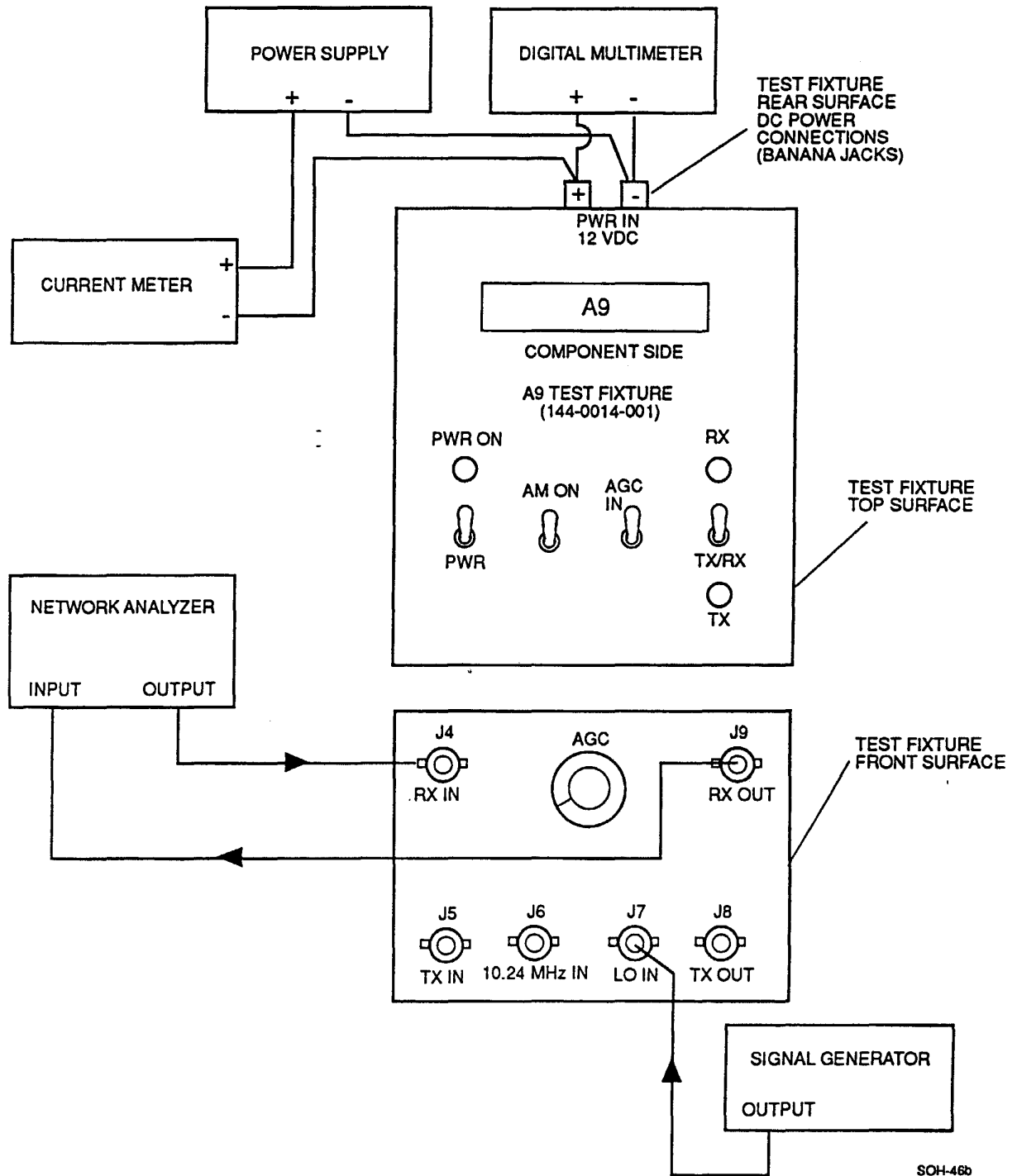


FIGURE 4-61. A9 Test Set-Up for Receive Path Alignment

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.24 MHz   |
| Frequency Span:   | 50 kHz      |
| Amplitude:        | -40 dBm     |
| dB/Div.:          | 1 dB        |
| Ref Level:        | As Required |

o. Normalize network analyzer 0 dB reference level.

p. Set controls on A9 test fixture as follows:

|              |            |
|--------------|------------|
| PWR:         | On (UP)    |
| TX/RX:       | RX (UP)    |
| AM On:       | Off (DOWN) |
| AGC In:      | On (UP)    |
| AGC Control: | Fully CCW  |

q. Set signal generator to 82.435 MHz @+10 dBm.

r. While monitoring network analyzer, adjust C18, C19, C22, C32, C35 and C61 (Figure 4-56), in that order, until a trace is visible.

#### NOTE

It may be necessary to change the scale to keep trace displayed on screen. If so, then C22 should be readjusted for peak gain.

#### NOTE

It may be necessary to readjust C18 and C19 for best filter flatness. When this is done, C61 must be adjusted again for peak gain to ensure transmit output gain is within specifications.

s. While monitoring network analyzer, note 3 dB bandwidth and maximum ripple with respect to the 10.24 kHz center frequency ( $\pm 12$  kHz to  $\pm 20$  kHz). Record the 3 dB bandwidth and maximum ripple on test data sheet. Refer to Figure 4-62 for a typical receive bandpass characteristic curve.

t. Note  $\geq 35$  dB gain. Record gain value on data sheet.

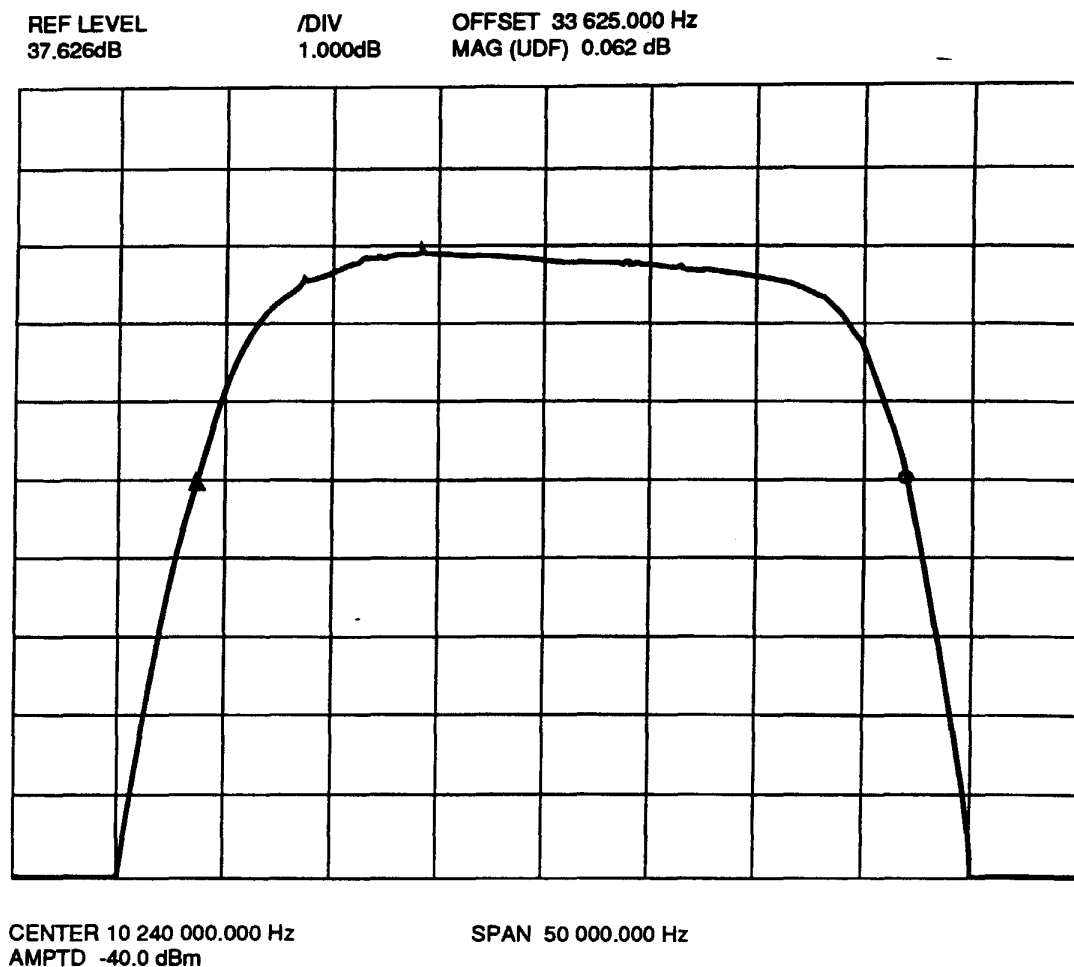
u. Apply a small amount of torque lacquer (item 23, App. C) to C18, C19, C22, C32, C35 and C61 (Figure 4-56). Allow to dry and repeat steps 4-155.4.s and 4-155.4.t to ensure response has not changed.

v. Connect test fixture and test equipment as shown in Figure 4-63 for return loss alignment.

w. Set controls on network analyzer for return loss alignment as follows:

|                   |           |
|-------------------|-----------|
| Center Frequency: | 10.24 MHz |
| Frequency Span:   | 10 kHz    |
| Amplitude:        | 15 dBm    |
| DB/Div:           | 5 dB      |
| Input:            | S11       |

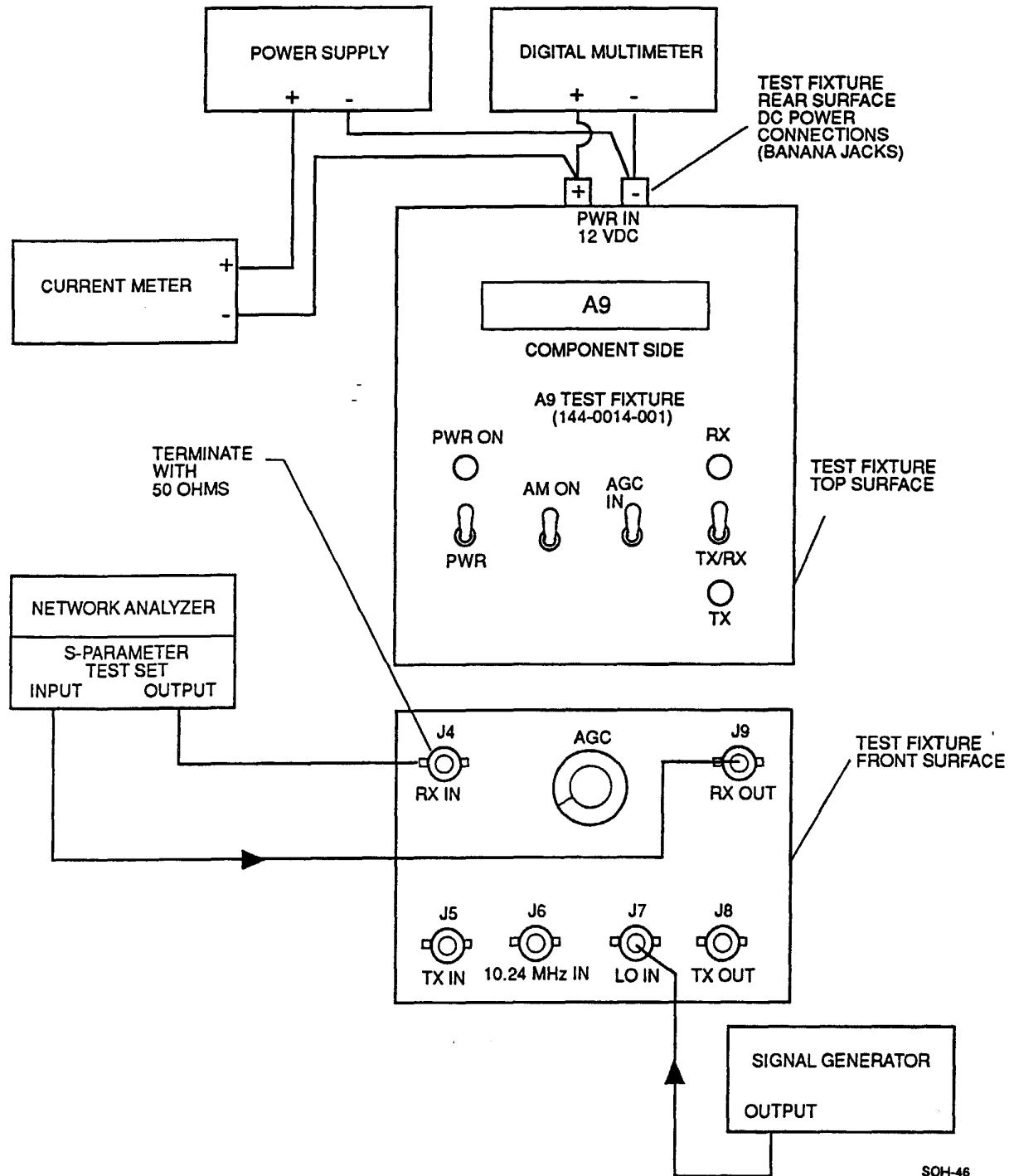
x. Calibrate network analyzer with same coaxial cable that will be used to connect S-Parameter test set to A9 test fixture.



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FIGURE 4-62. Receive Bandpass Characteristics

- y. Terminate test fixture RX input with 50 Ohm and connect network analyzer to output of test fixture. Record highest return loss on data sheet. C32 and C35 (Figure 4-56) may require some adjustment to meet the 15 dB return loss requirement. If adjusted, steps 4-155.4.r and 4-155.4.t must be repeated.
- z. Connect test fixture and test equipment as shown in Figure 4-61.
- aa. Set controls on network analyzer for receive path alignment as follows:
  - Center Frequency: 10.24 MHz
  - Frequency Span: 100 kHz
  - Amplitude: -40 dBm
  - dB/Div.: 10 dB
- ab. Normalize network analyzer.
- ac. Note gain from RX out as read on network analyzer.
- ad. Adjust test fixture AGC control fully CW. Note gain reduction. From the reading in step 4-155.4.ac, record gain reduction value on data sheet.



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FIGURE 4-63. Test Setup For Return Loss Alignment

- ae. This completes alignment and testing of the receive section of A9 board. The transmit section of the A9 board will now be tested and aligned.
- af. Connect test fixture and test equipment as shown in Figure 4-64 for AM transmit circuitry alignment.
- ag. Set controls on A9 test fixture as follows:

|              |            |
|--------------|------------|
| PWR:         | On (UP)    |
| TX/RX:       | TX (DOWN)  |
| AM On:       | Off (DOWN) |
| AGC In:      | Off (DOWN) |
| AGC Control: | Fully CCW  |

- ah. Set controls on network analyzer for transmit circuitry alignment as follows:

|                   |             |
|-------------------|-------------|
| Center Frequency: | 10.24 MHz   |
| Frequency Span:   | 50 kHz      |
| Amplitude:        | -20 dBm     |
| dB/Div.:          | 1 dB        |
| Ref Level:        | As Required |

- ai. Calibrate network analyzer for a -20 dBm amplitude reference at the 0 dB reference level and a 10.24 MHz frequency reference.
- aj. Set signal generator to 82.435 MHz at +10 dBm.
- ak. While monitoring network analyzer, adjust C-42 (Figure 4-56) for peak gain. The shape of the response should be similar to Figure 4-65. Note TX gain and record gain value on data sheet.

**NOTE**

If TX gain cannot be obtained by adjusting C42, it may be necessary to readjust C61. If this is done, it will be necessary to repeat step 4-155.4.r and verify RX gain.

- al. Note 3 dB bandwidth and ripple with respect to 10.24 MHz center frequency ( $\pm 12$  kHz to  $\pm 20$  kHz). Record the 3 dB bandwidth and maximum ripple on data sheet. Refer to Figure 4-65 for a typical transmit bandpass characteristic curve.
- am. Apply torque lacquer (item 23, App. C) to fix the position of C42 (Figure 4-56). Some readjustment of C42 may be necessary to maintain correct response as torque lacquer dries.
- an. Connect test equipment as shown in Figure 4-66 for AM carrier re-insertion test.
- ao. Set signal generator #1 for 10.241 MHz at -17 dBm.
- ap. Set signal generator #2 for 10.240 MHz at -10 dBm.
- aq. Set signal generator #3 for 82.440 MHz at +10 dBm.
- ar. Set controls of spectrum analyzer as follows:

|                   |            |
|-------------------|------------|
| Center Frequency: | 10.240 MHz |
|-------------------|------------|

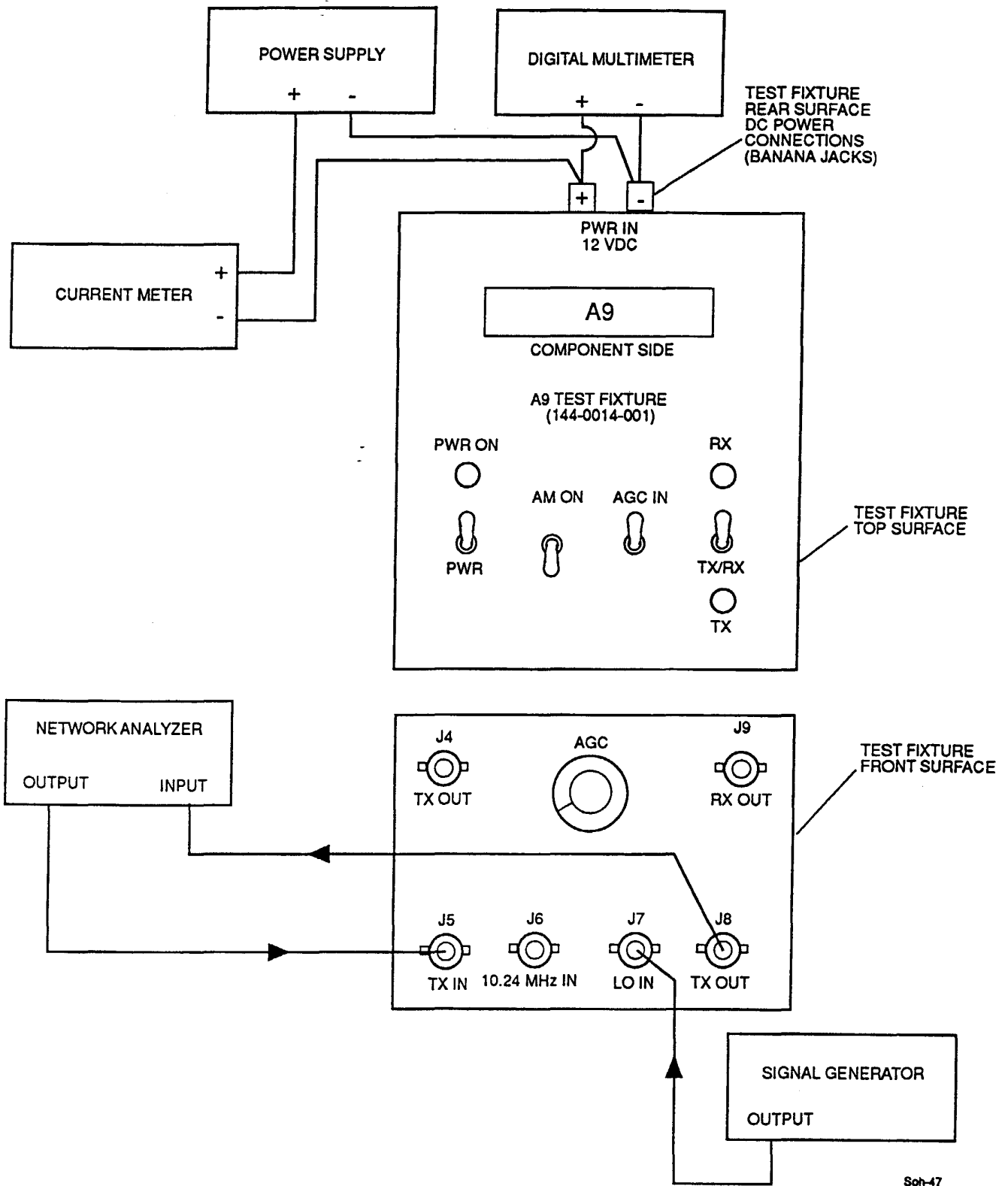


FIGURE 4-64. A9 Test Set-Up for AM Transmit Circuitry Test

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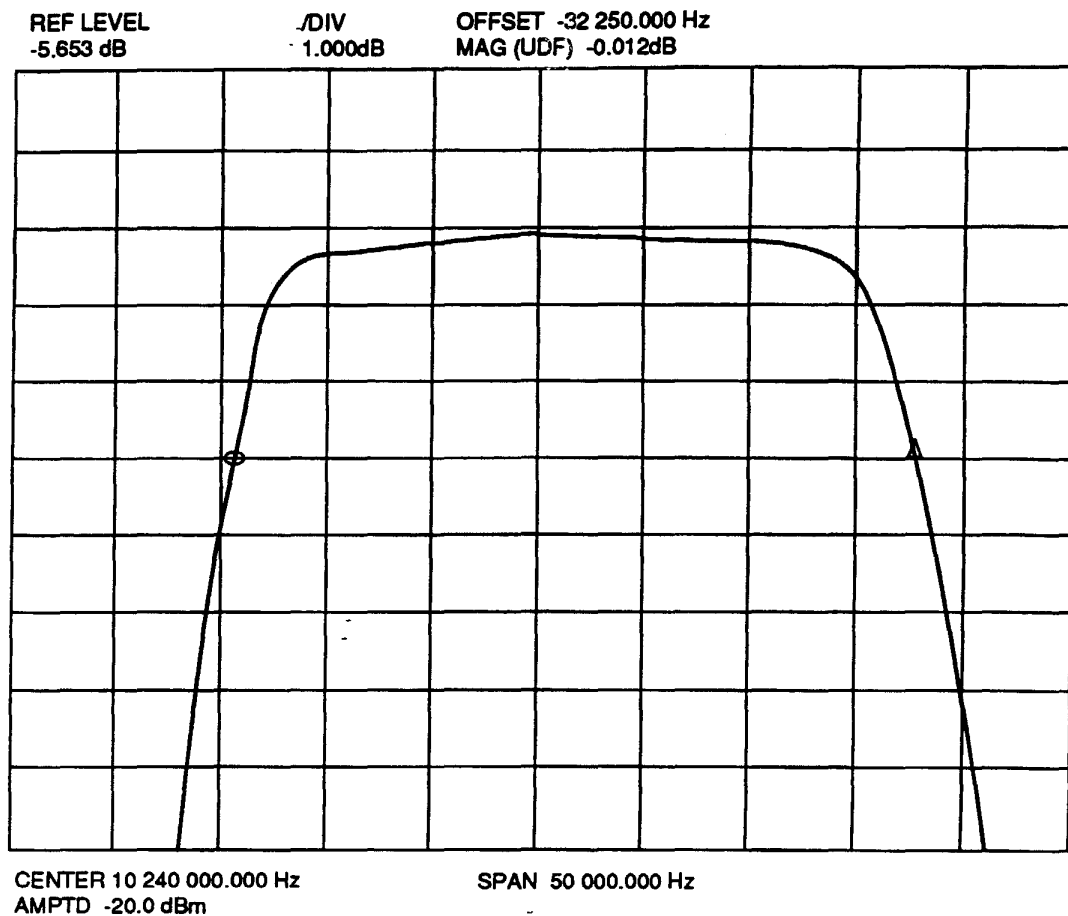


FIGURE 4-65. Transmit Bandpass Characteristics

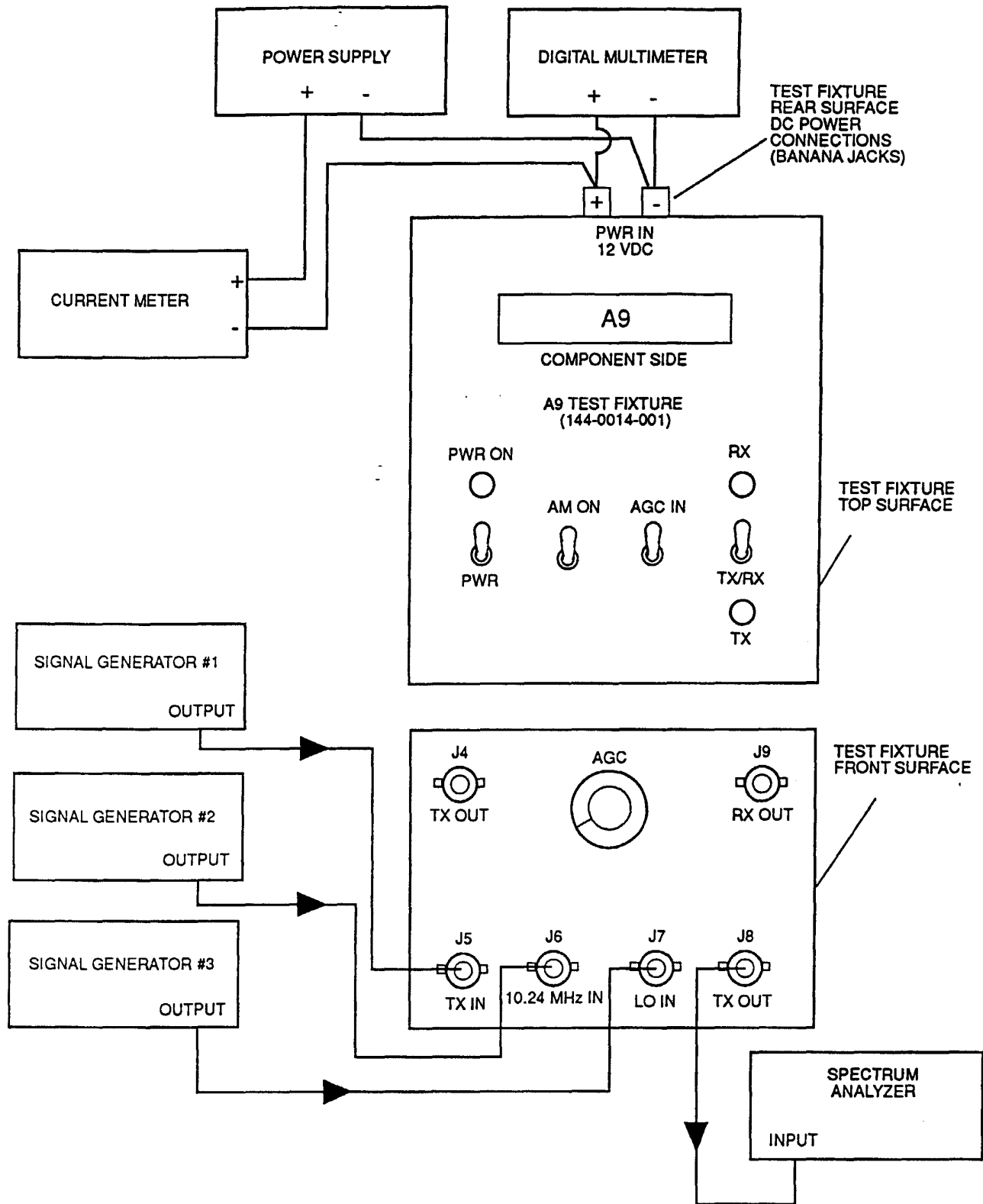
Frequency Span: 10.0 kHz  
Reference Level: 0 dBm

- as. Set test fixture AM switch to ON (up) position.
- at. While monitoring spectrum analyzer, adjust R30 (Figure 4-56) such that the signal at 10.24 MHz is +0/-1 dB relative to the signal at 10.241 MHz. Record relative signal strength on data sheet.
- au. This completes transmit path alignment.

**NOTE**

Torque lacquer is applied to R30 after the chassis alignment.

- av. This completes alignment and testing of the A9 1st IF board.
- aw. Set test fixture PWR switch to OFF and turn off external power supply.
- ax. Remove A9 1st IF board from test fixture.
- ay. Apply torque lacquer (item 23, App. C) to adjusted components before proceeding.



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FIGURE 4-66. A9 Test Set-Up for AM Carrier Re-Insertion Test

- az. After torque lacquer has set, place A9 1st IF board in an ESD protective bag with data sheet and tag accordingly.

#### 4-156 A9 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-11. Indicated components are listed in the recommended order of replacement. See fold-out FO-6 for a schematic of the A9 1st IF board as an aid to troubleshooting.

Table 4-11. A9 Troubleshooting

| Symptom  | Paragraph                           | Suspect Component(s)   |
|--|-------------------------------------|--|
| Board does not initialize                          |                                     | F1, U5   |
| Bad RX current measurement                         | 4-155.4.c                           | F1, L15-17, L5-6, CR2, CR4, CR8, U5, Q5  |
| Bad TX current measurement                         | 4-155.4.d                           | F1, L14, L16, L18, L5-6, CR6, CR7, CR10, CR12, Q6  |
| Bad TX/RX switching                                |                                     | Q5, Q6, L14-15, CR1, CR4, CR7, CR8, CR10, CR12   |
| Bad RX frequency response                          | 4-155.4.r<br>4-155.4.t<br>4-155.4.y | The response of the Receiver should always be determined prior to troubleshooting. The filter, Y1 and it's alignment components are interactive and are used by the TX path during that function. Y1, Z1, Z2, Z3, ALIGNMENT OF C18, C19, C61, C22, C32, C35. |
| Bad TX frequency response with Rx response correct | 4-155.4.al                          | Check RX response first. U3, Q3, CR6, CR10, CR14.  |
| Bad RX insertion loss                              | 4-155.4.i                           | Y1, U2, Q2, C32, C35, C18, C19, C61, U4  |
| Bad TX insertion loss                              | 4-155.4.i                           | Y1, U3, Q3, CR6, CR10, CR14, CR7, C21  |
| Bad TX gain in Sideband/AM Carrier Balance         | 4-155.4.ak<br>4-155.4.at            | Q4, R30, CR11, L13, C42, Q3  |
| AGC <30 dB range                                   | 4-155.4.ad                          | U4   |

#### 4-157 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A9 1st IF board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-56). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 - .12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

#### 4-158 FINAL ASSEMBLY/INSTALLATION.

Install the A9 1st IF board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

## A9 1ST IF BOARD DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>                         | <u>Value</u>   | <u>Limits</u>                                 |
|------------------|--|----------------|---|
| 4-153.h          | Mechanical Inspection                  | _____          | ( X )   |
| 4-155.4.c        | RX Current                             | _____          | 95 $\pm$ 5 mA                                 |
| 4-155.4.d        | TX Current                             | _____          | 90 $\pm$ 5 mA                                 |
| 4-155.4.i        | Insertion Loss, from 1.6 MHz to 50 MHz | _____          | $\leq$ 3.5 dB                                 |
| 4-155.4.r        | RX 3 dB Bandwidth<br>Ripple            | _____<br>_____ | $\pm$ 12.5 kHz to $\pm$ 20 kHz<br>$\leq$ 1 dB |
| 4-155.4.t        | RX Gain                                | _____          | $\geq$ 35 dB                                  |
| 4-155.4.y        | Highest Return Loss                    | _____          | $\geq$ 15 dB                                  |
| 4-155.4.ad       | AGC Range                              | _____          | $\geq$ 30 dB                                  |
| 4-155.4.ak       | TX Gain                                | _____          | -6 dB $\pm$ 1 dB                              |
| 4-155.4.al       | TX 3 dB Bandwidth<br>Ripple            | _____<br>_____ | $\pm$ 12.5 kHz to $\pm$ 20 kHz<br>$\leq$ 1 dB |
| 4-155.4.at       | Carrier Reinsertion                    | _____          | +0/-1 dB                                      |

## Section XVI. A10 1ST MIXER

## 4-159 GENERAL.

This section contains depot level maintenance instructions for the A10 1st mixer board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A10 1st mixer board is mounted in the fifth slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A10 from other boards mounted in the chassis assembly.

A10 1st mixer board is used in transmit mode only. It provides frequency conversion, wideband amplification and filtering. It also provides Automatic Level Control (ALC) gain control circuitry.

## 4-160 REMOVAL OF A10 1ST MIXER.

Refer to Section IX for removal of A10 1st mixer board.

**CAUTION**

The A10 1st mixer board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

4-161 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

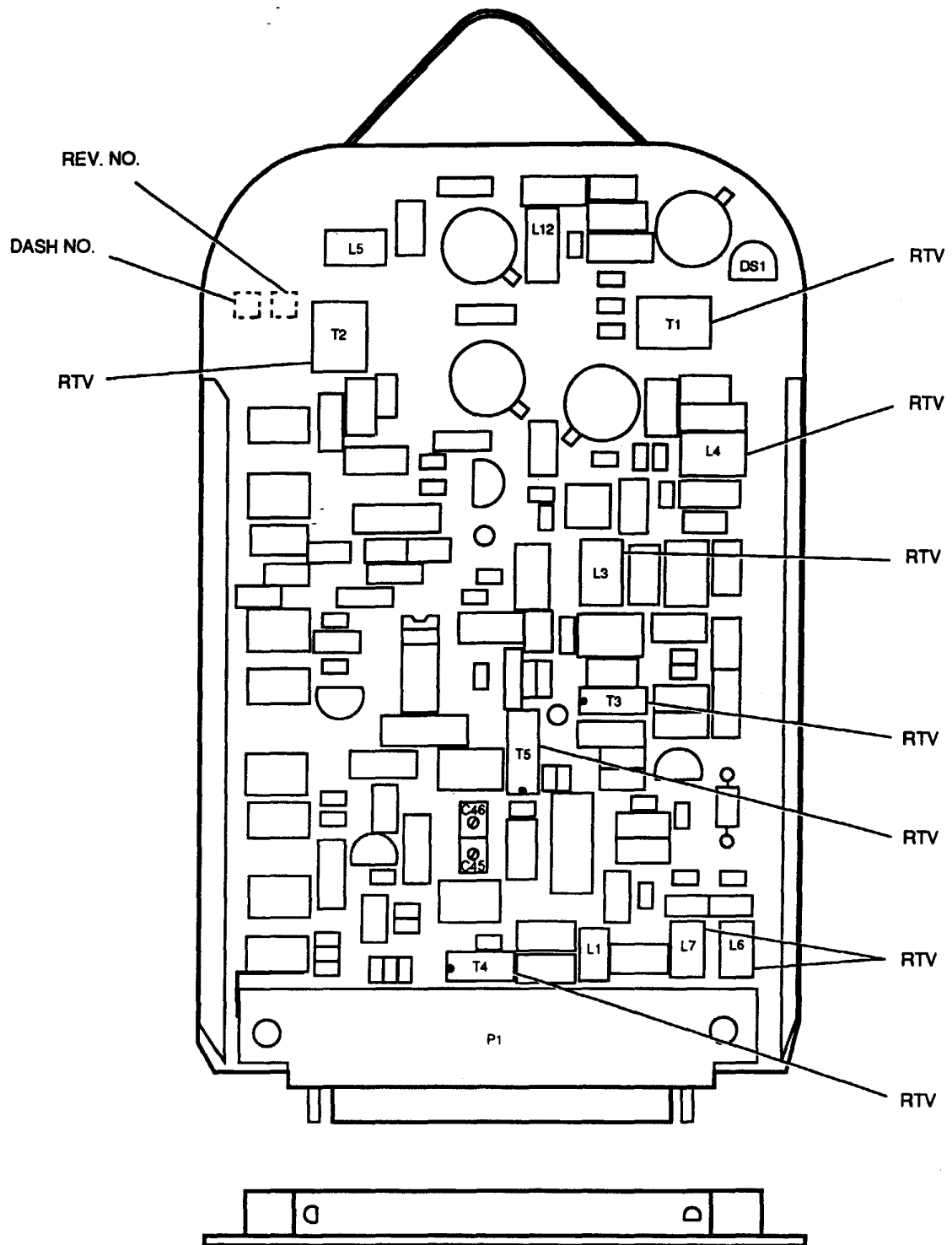
- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-162 INSPECTION.

- a. Inspect 1st mixer board to ensure keying pins are oriented as indicated in Figure 4-67.
- b. Inspect A10 1st mixer board for broken or damaged components and for any components that may be improperly installed.
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.030 inches (Figure 4-68).
- d. Inspect component height on component side. Height shall be no greater than 0.300 inches (Figure 4-68).
- e. Inspect 1st mixer board for solder bridges or other mechanical problems.
- f. Inspect 1st mixer board to verify transformers and coils have been secured with silicon rubber compound (Figure 4-67).
- g. Inspect 1st mixer board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- h. Repair 1st mixer board as necessary (Paragraph 4-163).

4-163 REPAIR/REPLACE.

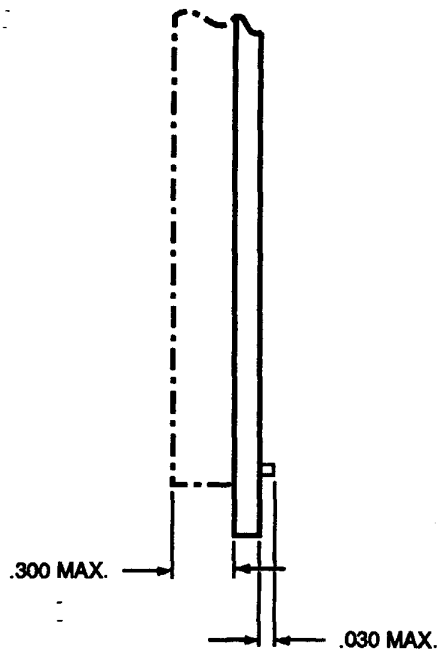
- a. Troubleshoot assembly using procedure in paragraph 4-165.
- b. Ensure no components extend more than 0.300 inches above component side of 1st mixer board (Figure 4-68).



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FIGURE 4-67. Installation of Transformers and Connector Keying

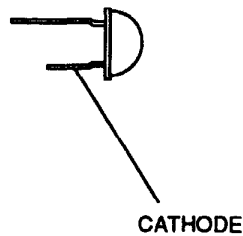
- c. Ensure no leads extend more that 0.030 inches above circuit side of 1st mixer board (Figure 4-68).
- d. Orient transformers T3-T5 with dot as shown in Figure 4-67.



Soh-53

FIGURE 4-68. Component and Lead Extension Off PWB

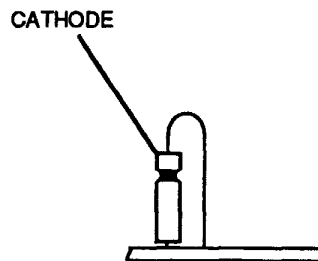
- e. Secure transformers and inductors, T1-T5, L1, L3-L7, L12, in place with silicon rubber compound (item 15, App. C) (Figure 4-67).
- f. When replacing LED DS1, note cathode side of LED DS1 is a shorter lead (Figure 4-69).



Soh-13

FIGURE 4-69. Diode DS1 Installation

- g. See Figure 4-70 for typical diode installation.



Soh-19

FIGURE 4-70. Typical Diode Installation

- h. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-67.
- i. Solder electronic components using solder S/N 62 (item 20, App. C).
- j. Humiseal (item 6, App. C) A10 1st mixer board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal adjustable components.

#### 4-164 TESTING.

This test procedure covers the alignment and electrical testing of A10 1st mixer board.

4-164.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

4-164.2 Equipment. The following table lists unique and standard test equipment required for testing and alignment of A10 1st mixer board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify that test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>   | <u>QTY.</u> |
|----------------------|-------------|
| A10 Test Fixture     | 1           |
| Current Meter        | 1           |
| Digital Multimeter   | 1           |
| Network Analyzer     | 1           |
| Power Supply         | 1           |
| Power Meter          | 1           |
| S Parameter Test Set | 1           |
| Signal Generator     | 3           |
| Spectrum Analyzer    | 1           |
| Tool Kit             | 1           |

#### 4-164.3 Set Up.

#### CAUTION

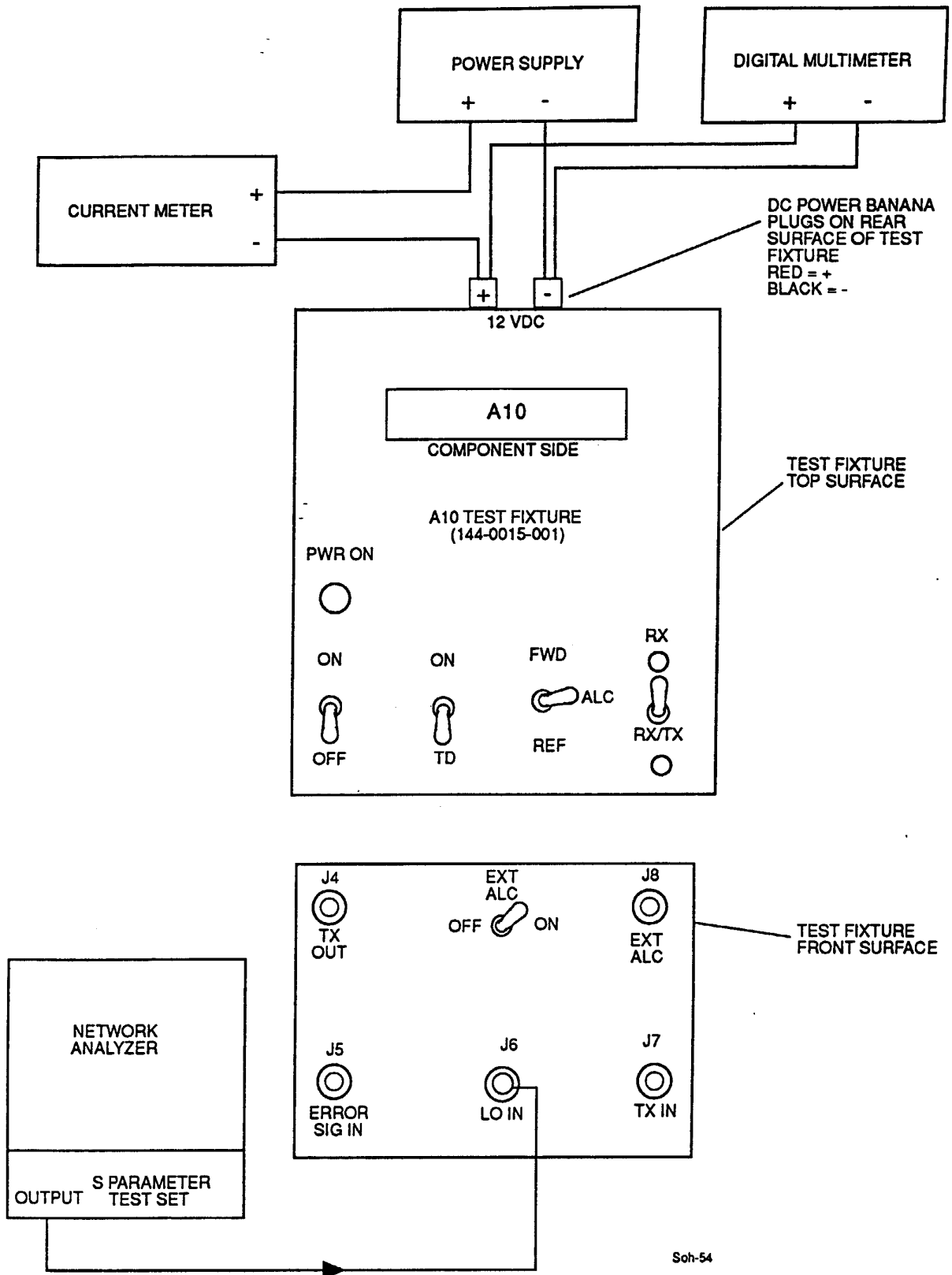
Do not force 1st mixer board into the mating connector on the fixture.

#### NOTE

Be sure the A10 1st mixer board is properly oriented with the corresponding test fixture connector before inserting. The 1st mixer board is index keyed with test fixture connector. Some test fixture connectors may not be keyed so use care to insure that the board is properly installed in the mating connector. Proper orientation of the 1st mixer board in the test fixture is indicated by the words "COMPONENT SIDE" on the test fixture, as shown in Figures 4-71, 4-72 and 4-73.

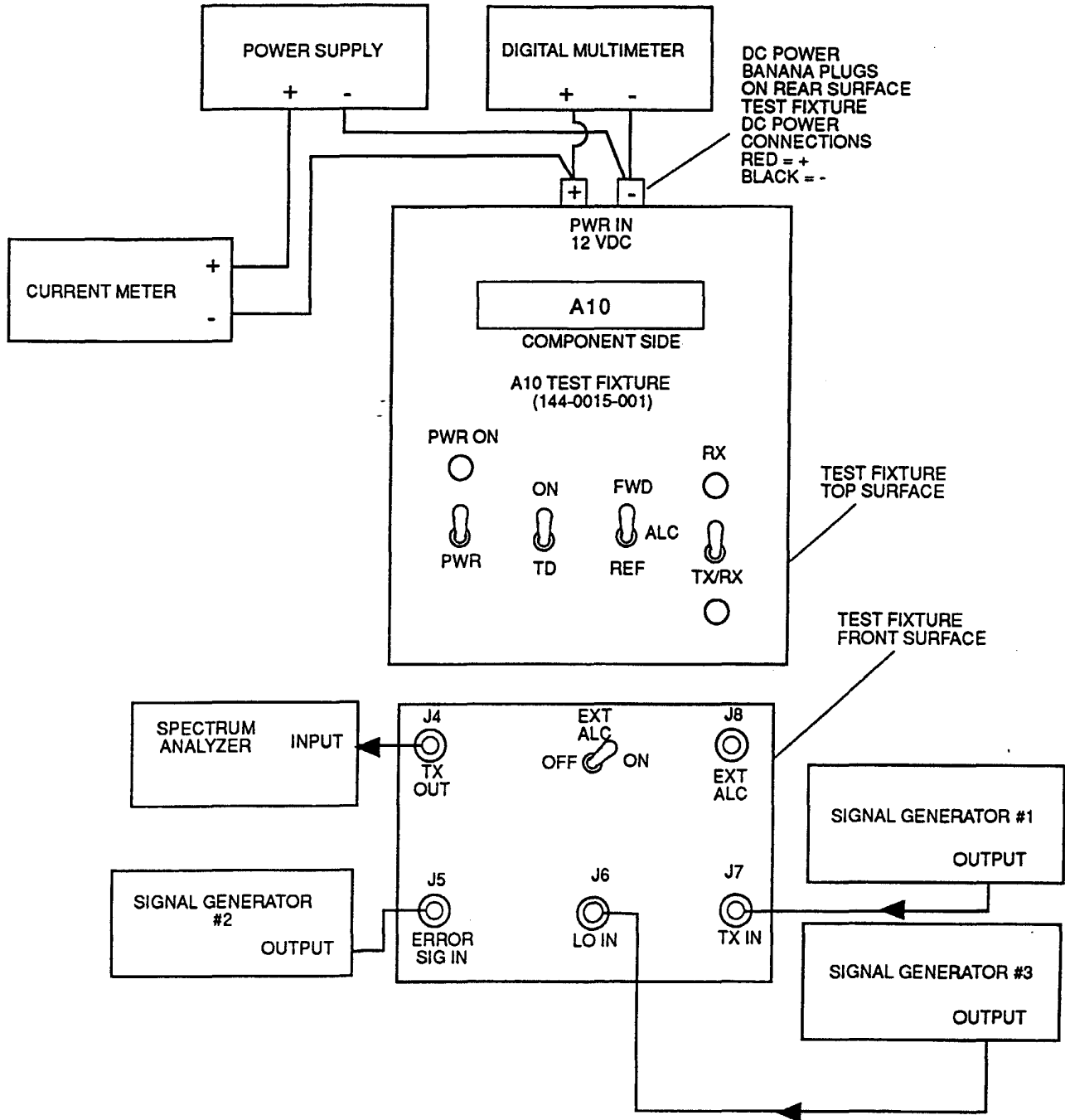
- a. Install A10 1st mixer board in test fixture.
- b. Connect test fixture and external test equipment as shown in Figure 4-71.
- c. Turn on dc power supply to test fixture and adjust voltage for  $12\text{ Vdc} \pm 0.1\text{ Vdc}$ . Use DMM.





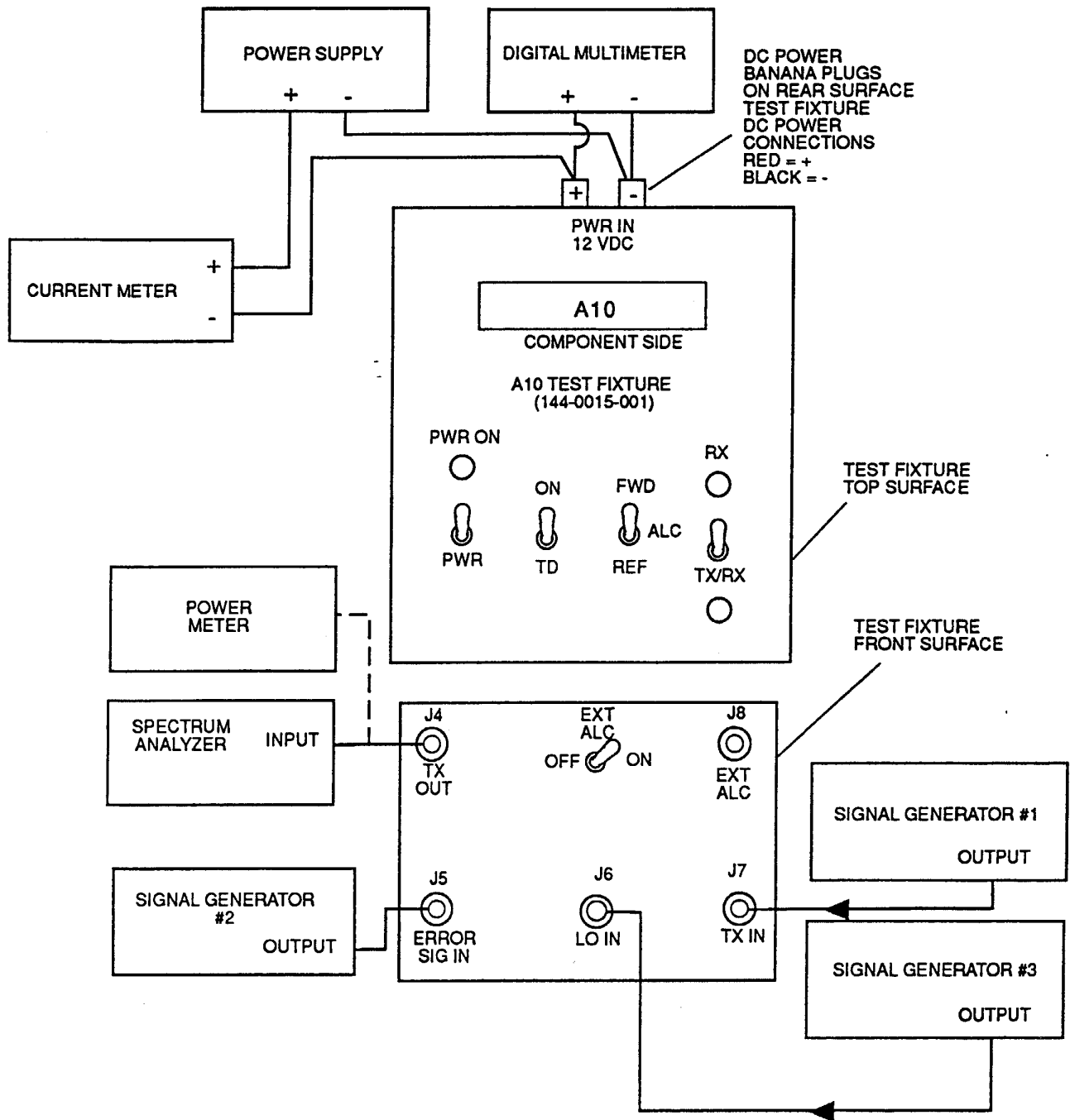
Soh-54

FIGURE 4-71. Test Fixture Set-Up with S-Parameter Test



Soh-55

Figure 4-72. Test Fixture Set-Up for TX Gain and Spurious Output



SoH-56

FIGURE 4-73. Test Fixture Set-Up for Output Power Measurement

4-164.4 Testing and Alignment.

- a. Set current limit on power supply for 0.5 A.
- b. Set switches on test fixture as follows:
 

|         |  |
|---------|--|
| PWR:    | OFF  |
| TX/RX:  | RX   |
| TD:     | OFF  |
| ALC:    | Center Position (NOTE: This is a two position momentary toggle switch) |
| EXT ALC | OFF  |
- c. While monitoring current meter, set PWR switch on test fixture to ON position. Record current reading on data sheet.

**CAUTION**

Due to power dissipation considerations on A10 1st mixer board, **DO NOT** leave test fixture TX switch in TX position for more than 60 seconds.

- d. While monitoring current meter, set test fixture TX/RX switch to TX position and TD switch to ON, just long enough to take a current reading. Record current reading on data sheet.
- e. Simultaneously set test fixture RX/TX switch to RX position and TD switch to OFF.
- f. Set network analyzer and S-parameter test set as follows.
 

|                   |               |
|-------------------|---------------|
| Amplitude:        | +15 dBm       |
| Display Function: | Log Magnitude |
| Input:            | S11           |
| Start Frequency:  | 100 kHz       |
| Stop Frequency:   | 200 MHz       |
| Reference Level:  | 0 dB          |
| Scale:            | 10 dB/Div.    |
- g. Disconnect Port 1 of S-parameter test set.
- h. Set the 0 dB reference level on network analyzer to top line on the display.
- i. Calibrate network analyzer for return loss with same coaxial cable that will be used to connect the S-parameter test set to test fixture. For information on performing calibration procedure, refer to instrument manual.
- j. Using same coaxial cable that was used in above step, connect S-parameter test set Port 1 to test fixture LO IN connector.

**CAUTION**

Do not leave test fixture TX/RX switch in TX position for more than 60 seconds.

- k. Set test fixture TX/RX switch to TX position and TD switch to ON. Note magnitude of the return loss at frequencies of 73.8 MHz and greater. See Figure 4-74 for a typical network analyzer display plot. Record magnitude of the return loss on data sheet.

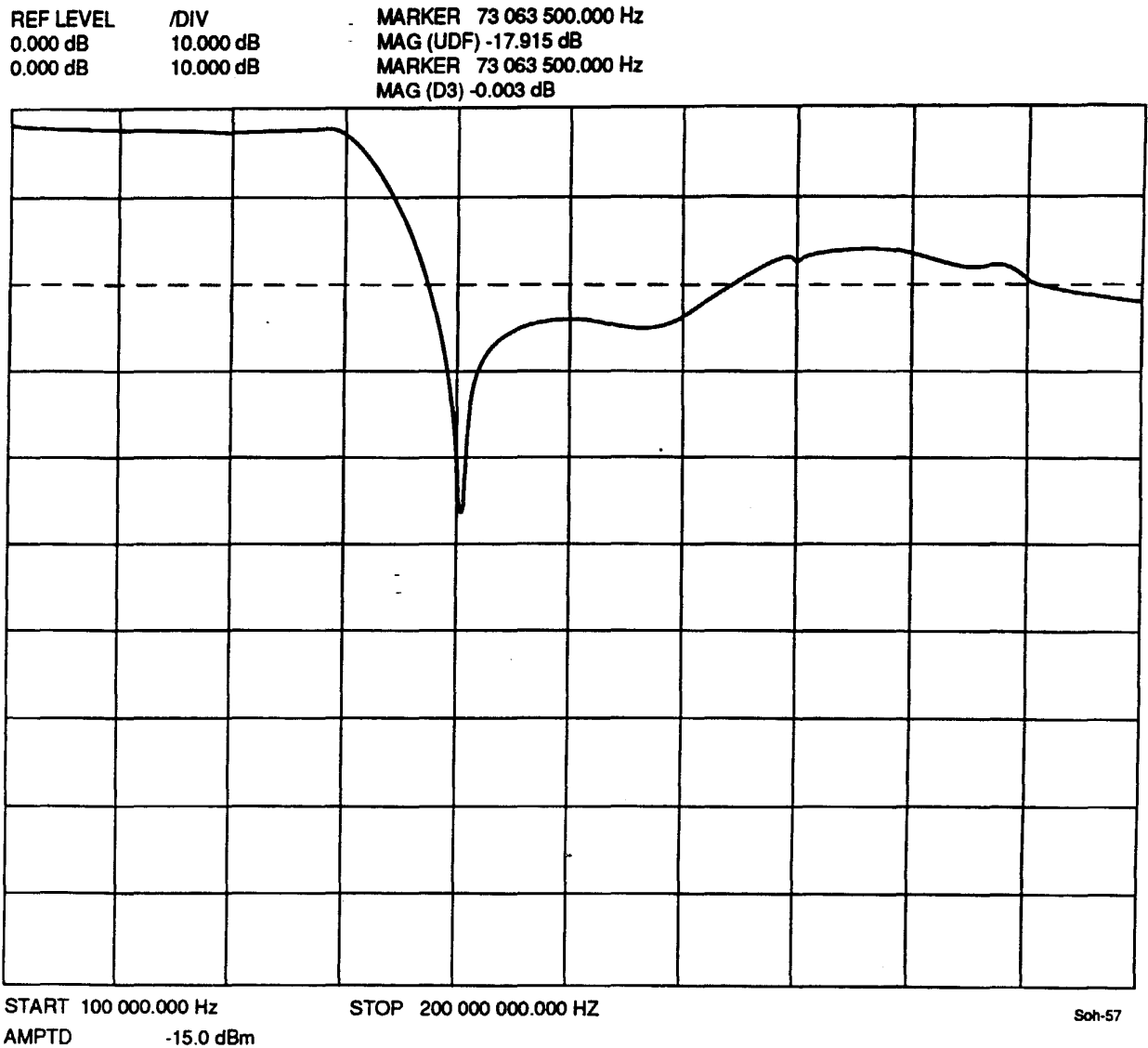


FIGURE 4-74. Network Analyzer Display Plot

- I. Set TX/RX switch to RX and TD switch to OFF after reading magnitude of S11.
- m. Turn test fixture PWR switch OFF.
- n. Connect test fixture and external test equipment as shown in Figure 4-72.
- o. Turn test fixture PWR switch to ON.
- p. Set controls on spectrum analyzer as follows:
 

|                    |            |
|--------------------|------------|
| Center Frequency:  | 40 MHz     |
| Bandwidth:         | 300 kHz    |
| Scan Width:        | 5 MHz/Div. |
| Input Attenuation: | 30 dB      |
| Scan Time:         | 5 ms/Div.  |
| Reference Level:   | 30 dBm     |
| Scale:             | 10 dB/Div. |

- q. Set signal generator #1 for a frequency of 72.2 MHz and an output level of -7 dBm.
- r. Using coaxial cable, connect output of signal generator #1 to test fixture TX IN connector J7.
- s. Set signal generator #2 for a frequency of 82.44 MHz and an output level of -17 dBm.
- t. Using coaxial cable, connect output of signal generator #2 to test fixture ERROR SIG IN connector J5.
- u. Set signal generator #3 for a frequency of 112.2 MHz and an output level of +7 dBm.
- v. Using coaxial cable, connect output of signal generator #3 to test fixture LO IN connector J6.

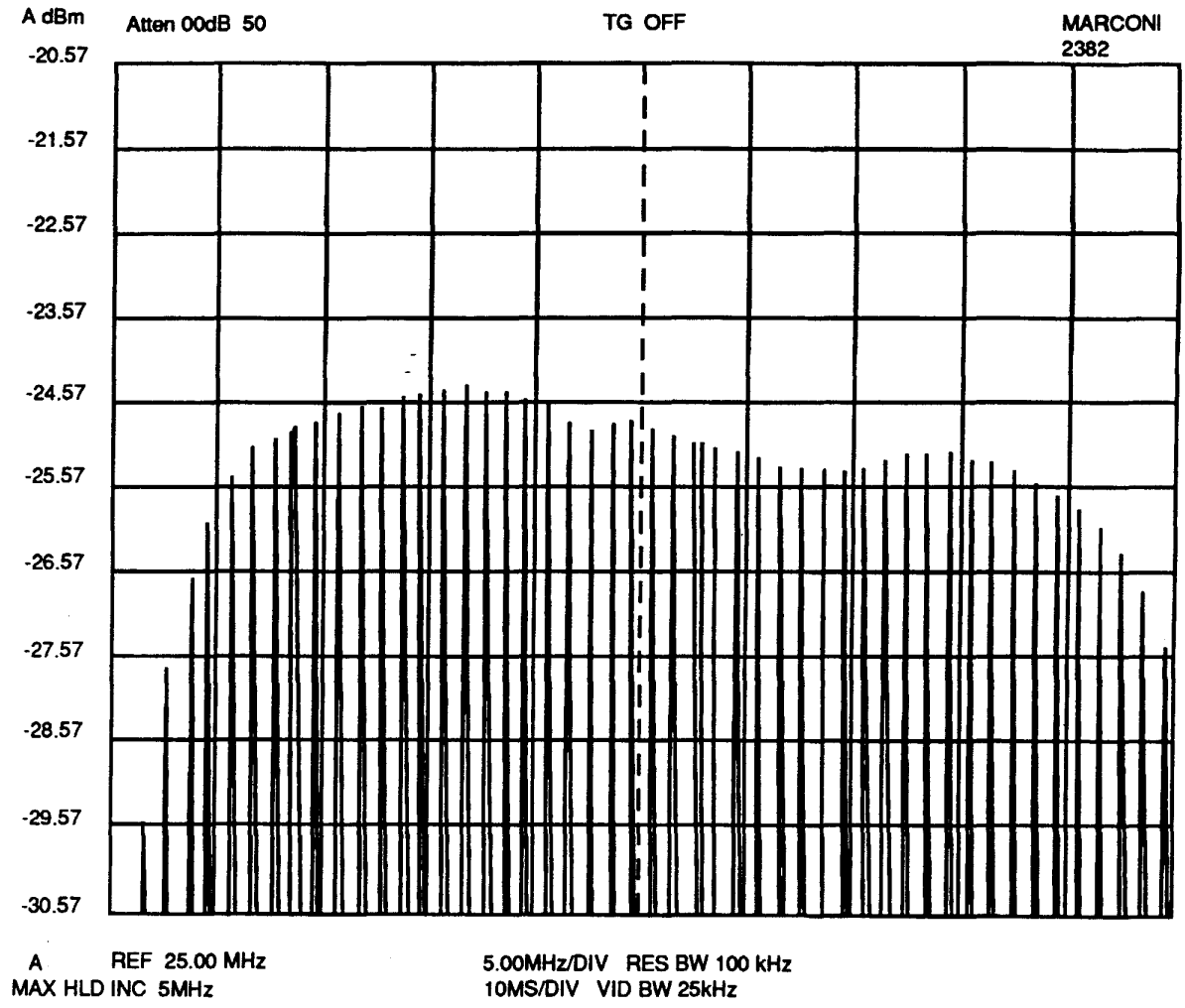
**CAUTION**

Do not leave TX/RX switch on test fixture in TX position for more than 60 seconds.

- w. While monitoring spectrum analyzer, set test fixture TX/RX switch to TX position and TD switch to ON.
- x. Adjust capacitors C45 and C46 (Figure 4-67) for a maximum gain at 40 MHz and maximum attenuation at 29.76 MHz. Note output level at 40 MHz. Record level on data sheet.
- y. Set TX/RX switch and TD switch to OFF.
- z. Set TX/RX switch to TX position and TD switch to ON.
- aa. Note spurious output at 29.76 MHz. Record level on data sheet.
- ab. Set TX/RX switch and TD switch to OFF position.
- ac. Connect test fixture and external test equipment as shown in Figure 4-73.
- ad. Adjust controls on spectrum analyzer as follows:
 

|                    |            |
|--------------------|------------|
| Center Frequency:  | 25 MHz     |
| Bandwidth:         | 300 kHz    |
| Scan Width:        | 5 MHz/Div. |
| Input Attenuation: | 30 dB      |
| Scan Time:         | 5 ms/Div.  |
| Reference Level:   | 30 dBm     |
| Scale:             | 10 dB/Div. |
- ae. Set signal generator #1 for a frequency of 72.2 MHz and an output level of -7 dBm.
- af. Using coaxial cable, connect output of signal generator #1 to TX IN connector J7. Do not change signal generator #2 from previous test setup.
- ag. Set signal generator #3 for a frequency of 73.8 MHz and an output level of +7 dBm.
- ah. Using coaxial cable, connect output of signal generator #3 to LO IN connector J6.

- ai. Adjust spectrum analyzer persistence so that TX OUT signal from test fixture connector J4 is retained on spectrum analyzer display as frequency of signal generator #3 is slowly increased from 73.8 MHz to 122.2 MHz, in 1 MHz steps.
- aj. While monitoring spectrum analyzer, note output power variation from 1.6 MHz to 50 MHz as frequency of signal generator #3 is increased from 73.8 MHz to 122.2 MHz, in 1 MHz steps. Record output power variation, in dB, on data sheet. See Figure 4-75 for a typical spectrum analyzer display plot.



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FIGURE 4-75. Spectrum Analyzer Display Plot

**NOTE**

Lowest TX OUT power is typically at the band edge (i.e., 1.6 MHz and 50 MHz) which corresponds to 73.8 and 122.2 MHz out of signal generator #3.

- ak. Disconnect spectrum analyzer and connect RF voltmeter to TX OUT connector J4 on A10 test fixture. Note RF output power as signal generator #3 is increased from 73.8 MHz to 122.2 MHz, in 1 MHz steps. Record lowest RF level, in dBm, on data sheet.

- al. Disconnect RF voltmeter and reconnect spectrum analyzer to TX OUT connector J4 on test fixture.
- am. Set signal generator #3 for a frequency of 97.2 MHz and an output level of +7 dBm. Observe TX OUT signal level at 25 MHz on spectrum. Record on data sheet.

**NOTE**

The TX OUT signal level observed in this step will be used as a reference level in steps 4-164.4.ao, 4-164.4.ap and 4-164.4.av.

- an. Hold ALC momentary switch in the FWD position.
- ao. While holding ALC switch in the FWD position, monitor spectrum analyzer and note attenuation of RF OUT signal level at 25 MHz from the level in step 4-164.4.am above. Record the attenuation on data sheet.
- ap. Release ALC switch and wait until RF OUT signal returns to original position.
- aq. Hold ALC momentary switch in REF position.
- ar. While holding ALC switch in REF position, monitor spectrum analyzer and note attenuation of RF OUT signal level at 25 MHz from level in step 4-164.4.am above. Record attenuation on data sheet.
- as. Release ALC switch and wait until RF OUT signal returns to original position.
- at. With EXT ALC switch in the OFF position, connect  $+12 \pm 0.1$  Vdc to test fixture EXTERNAL ALC connector J8.
- au. Switch EXT ALC switch to ON.
- av. While monitoring spectrum analyzer, note attenuation of the RF output signal level at 25 MHz from the level in step 4-164.4.am above. Record attenuation on test data sheet.
- aw. Turn off TD ON switch and move TX/RX switch to RX.
- ax. This completes alignment and electrical testing of 1st mixer board.
- ay. Set test fixture PWR switch to OFF and turn off external power supply.
- az. Carefully remove 1st mixer board from test fixture.
- ba. Apply torque lacquer (item 23, App. C) to variable capacitors C45 and C46 (Figure 4-67) that were adjusted during the test procedure. Allow torque lacquer to set before proceeding.
- bb. After torque lacquer has set, place 1st mixer board in an ESD protective bag with data sheet and tag appropriately.

#### 4-165 A10 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-12. Indicated components are listed in the recommended order of replacement. See fold-out FO-7 for a schematic or the A10 1st mixer board as an aid to troubleshooting.



Table 4-12. A10 Troubleshooting

| Symptom                      | Paragraph                              | Suspect Component(s)  |
|------------------------------|--|---|
| Board does not initialize    |  | F1  |
| Bad TX current measurement   | 4-164.4.d                              | F1, Q3-6, U2, L6, U3  |
| Low Output Power             | 4-164.4.x<br>4-164.4.aa                | The A10 has a 1 to 9 Duty Cycle and long term transmit condition is not recommended. This condition usually only happens during troubleshooting. The transistors Q3-Q6 should be monitored during the Transmit condition. T1, T2, Q5, Q6, Q4, Q3, Q2, U3, L1, T4, T5, T21-23, U1. |
| Bad TX/RX switching          |  | CR2, Q7   |
| Bad TX frequency response    | 4-164.4.aj<br>4-164.4.ak               | T1, T3, Q6, Q5, Z6-Z9, Q2   |
| ALC not functioning properly | 4-164.4.ao<br>4-164.4.ar<br>4-164.4.av | U2, Q1, Q8, CR2, CR3, CR6   |
| Bad RX current               | 4-164.4.c                              | F1, CR1, L1, L7   |
| Bad TX insertion loss        | 4-164.4.k                              | U1, CR1   |

4-166 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A10 1st mixer board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-67). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 -.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

4-167 FINAL ASSEMBLY/INSTALLATION.

Install A10 1st mixer board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

A10 1ST MIXER BOARD DATA SHEET

| Para. No. | READING               | VALUE    | LIMITS        |
|-----------|-----------------------|----------|---------------|
| 4-162.g   | Mechanical Inspection | _____    | (X)           |
| 4-164.4.c | RX Current            | _____ mA | 20 mA ±5 mA   |
| 4-164.4.d | TX Current            | _____ mA | 300 mA ±20 mA |

## A10 1ST MIXER BOARD DATA SHEET

| <u>Para. No.</u> | <u>READING</u>                           | <u>VALUE</u> | <u>LIMITS</u>   |
|------------------|--|--------------|---|
| 4-164.4.k        | Return Loss                              | _____ dB     | >10 dB down from reference                                |
| 4-164.4.x        | Maximum Gain at 40 MHz<br>Output Level   | _____ dBm    | >+20 dBm  |
| 4-164.4.aa       | Spurious Outputs at 29.76 MHz            | _____ dB     | ≥40 dB below the desired output level at 40 MHz           |
| 4-164.4.aj       | Output Power Variation 1.6 MHz to 50 MHz | _____ dB     | <6 dB   |
| 4-164.4.ak       | RF Output Power 1.6 MHz to 50 MHz        | _____ dBm    | ≥+20 dBm  |
| 4-164.4.ao       | RF Output at 25 MHz                      | _____ dB     | attenuated by at least 50 dB (FWD position of ALC switch) |
| 4-164.4.ar       | RF Output at 25 MHz                      | _____ dB     | attenuated by at least 50 dB (REF position of ALC switch) |
| 4-164.4.av       | RF Output at 25 MHz (EXT. ALC)           | _____ dB     | attenuated by at least 50 dB                              |

## Section XVII. A11 1ST FILTER

## 4-168 GENERAL.

This section contains depot level maintenance instructions for the A11 1st filter board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A11 1st filter board is mounted in the eleventh slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A11 1st filter board from other boards mounted in the chassis assembly.

A11 1st filter board, along with the A12 2nd filter, provides the transmit harmonic suppression for the radio set. Together they provide the transmit harmonic suppression/rejection for the end item filtering from 11.4400 - 49.9999 MHz. The A12 2nd filter also contains the Automatic Leveling Control (ALC) detector circuitry.

## 4-169 REMOVAL OF A11 1ST FILTER ASSEMBLY.

Refer to Section IX for removal of the A11 1st filter board.

**CAUTION**

The A11 1st filter board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

4-170 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-171 INSPECTION.

- a. Inspect 1st filter board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-76.
- b. Inspect 1st filter board for broken, missing or damaged components and for any components that may be improperly installed.
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.030 inches (Figure 4-77).
- d. Inspect component height on component side. They shall be no greater than 0.550 inches, (.570 inches for shields) (Figure 4-77).
- e. Verify semi-rigid coax on the board is properly installed and is not shorting to component leads.
- f. Inspect 1st filter board for solder bridges or other mechanical problems.
- g. Inspect 1st filter board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- h. Repair 1st filter board as necessary (Paragraph 4-172).

4-172 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-174.
- b. Ensure no components extend more than .550 inches (.570 inches for shields) above component side of 1st filter board (Figure 4-77).
- c. Ensure no leads extend more than 0.030 inches above circuit side of 1st filter board (Figure 4-77).
- d. Secure transformers Z1-Z12 to 1st filter board with small amount of silicon rubber compound (item 15, App. C) under the coils (Figure 4-76).

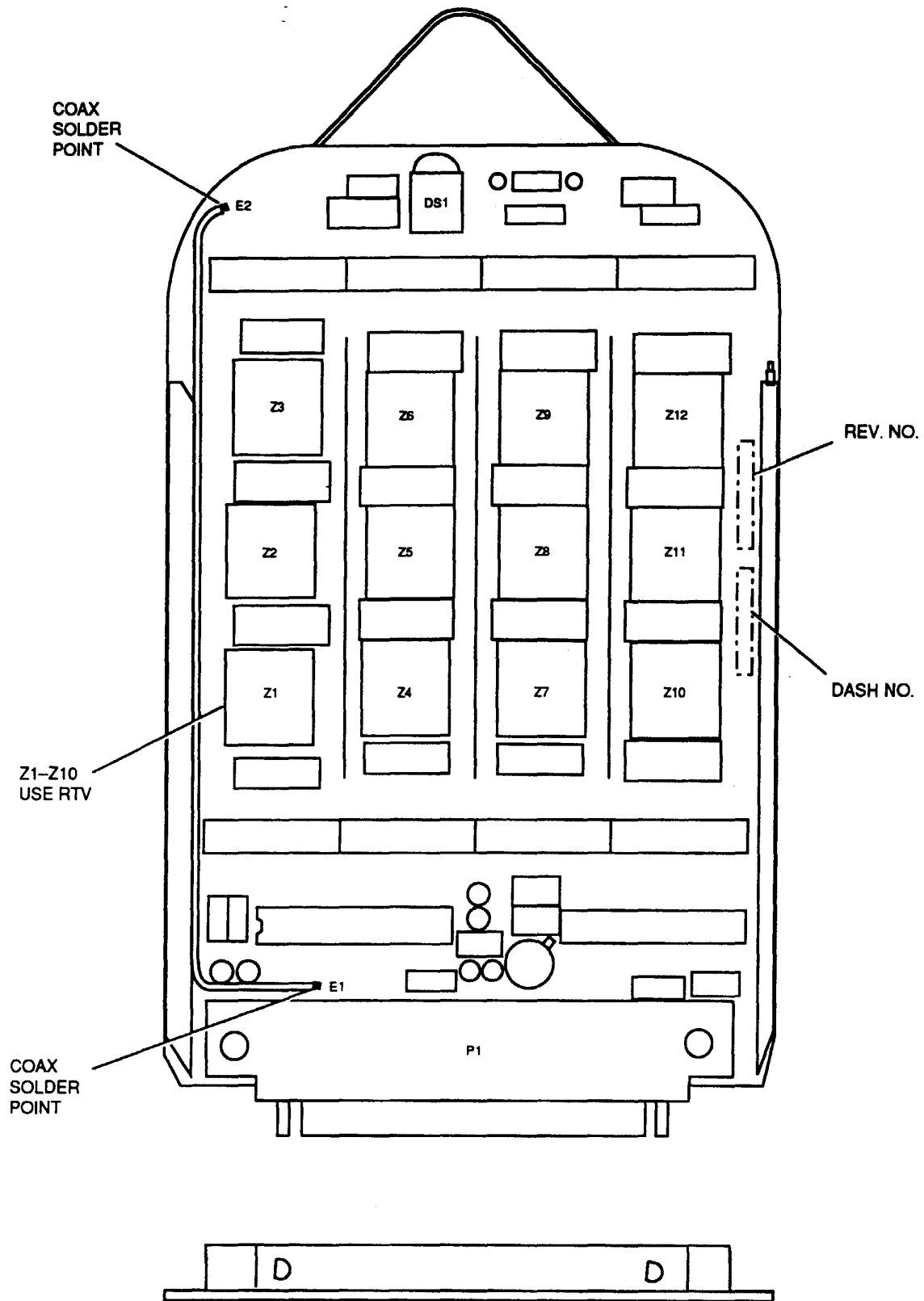


FIGURE 4-76. Installation of Coax Cables and Connector Keying

Sch-60

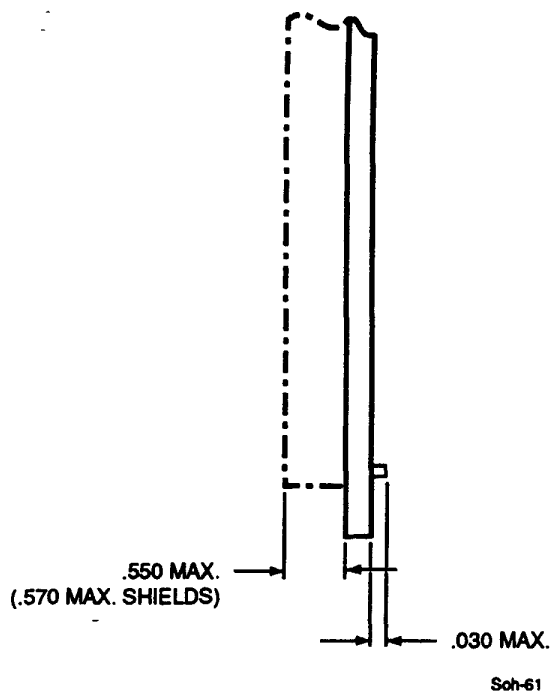


FIGURE 4-77. Component and Lead Extension Off PWB

- e. Install 50 Ohm semi-rigid coax cables (item 5, App. C) to 1st filter board as follows:
  - (1) Trim .050 inches of insulation off semi-rigid coax cable at each end (Figure 4-76).
  - (2) Install coax cable to terminals E1 and E2.
  - (3) Solder coax cable to ground plane at points shown in Figure 4-76.
  - (4) Ensure coax cable is a minimum of .125 inches from edge of PCB.
- f. When replacing LED DS1, note that beveled edge of LED DS1 is the cathode (Figure 4-78).

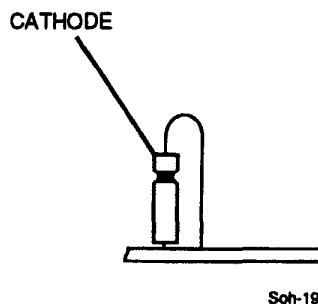


FIGURE 4-78. Diode DS1 Installation

- g. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-76.
- h. Solder electronic components using solder S/N 62 (item 20, App. C).

- i. Humiseal (item 6, App. C) A11 1st filter board assembly after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable components.

#### 4-173 TESTING.

This test procedure covers alignment and electrical testing of the A11 1st filter board. The A11 1st filter board is tested in the A11, A12 test fixture which is used to test both the A11 1st filter board and the A12 second filter.

The thumbwheel address switch on the test fixture, numbered 0 through 9, allows selection of a band which is applied to the A12 2nd filter for decoding the frequency range into a decimal format. The filter bands do not conform directly to the number on thumbwheel switch (Table 4-13). Table 4-13 relates thumbwheel address switch settings to a filter band being selected along with an appropriate frequency range. The decimal information is used to control filter selection relays on the A11 1st filter board.

The ADDRESS override momentary toggle switch, on test fixture, electrically accomplishes the same relay reset function as setting the thumbwheel address switch to a 0 or an 8. Reset is accomplished by depressing ENTER switch when the momentary ADDRESS override switch is held on or when thumbwheel switch is set to a 0 or an 8.

Table 4-13. Address Switch Settings

| Switch Address | Band  | Filter Assembly (Board) | Frequency Range (MHz)    |
|----------------|-------|-------------------------|--------------------------|
| 0              | RESET | A11 & A12               | N/A                      |
| 1 or 9         | 5     | A12                     | 11.44 MHz to 18.7099 MHz |
| 2              | 6     | A12                     | 18.71 MHz to 30.5799 MHz |
| 3              | 7     | A12                     | 30.58 MHz to 49.9999 MHz |
| 4              | 1     | A11                     | 1.60 MHz to 2.6199 MHz   |
| 5              | 2     | A11                     | 2.62 MHz to 4.2799 MHz   |
| 6              | 3     | A11                     | 4.28 MHz to 6.9999 MHz   |
| 7              | 4     | A11                     | 7.00 MHz to 11.4399 MHz  |
| 8              | RESET | A11 & A12               | N/A                      |

4-173.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

4-173.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of A11 1st filter board. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>           | <u>QTY.</u> |
|------------------------------|-------------|
| A11, A12 Boards Test Fixture | 1           |
| ac Voltmeter                 | 1           |
| Digital Multimeter           | 2           |
| Network Analyzer             | 1           |
| Power Supply                 | 1           |
| RF Power Amplifier           | 1           |
| Signal Generator             | 1           |
| T-Probe Connector            | 1           |
| 30 dB Attenuator             | 1           |
| Tool Kit                     | 1           |

4-173.3 Set Up.

**CAUTION**

Do not force the A11 1st filter board into the mating connector.

**NOTE**

The 1st filter board is index keyed with the mating connector. Some test fixture connectors, however, are not index keyed and caution is required when installing the A11 board in the test fixture to ensure proper insertion. The A11 board must be installed in test fixture with the component side toward rear of test fixture. The proper orientation of the board in test fixture is illustrated in test set-up block diagrams shown in Figure 4-79. The test fixture requires both the A11 and A12 boards be installed in the test fixture during testing of either board. One assembly must be known to function properly before testing of the other assembly can proceed. Known good A11 and A12 filters are provided as part of the test fixture to support testing.

- a. Connect test fixture and external test equipment as shown in Figure 4-79.
- b. Set test fixture PWR switch to OFF.
- c. Install A11 1st filter board in test fixture as shown in Figure 4-79.
- d. Turn on test fixture power supply and adjust for  $12 \pm 0.1$  Vdc. Use DMM.

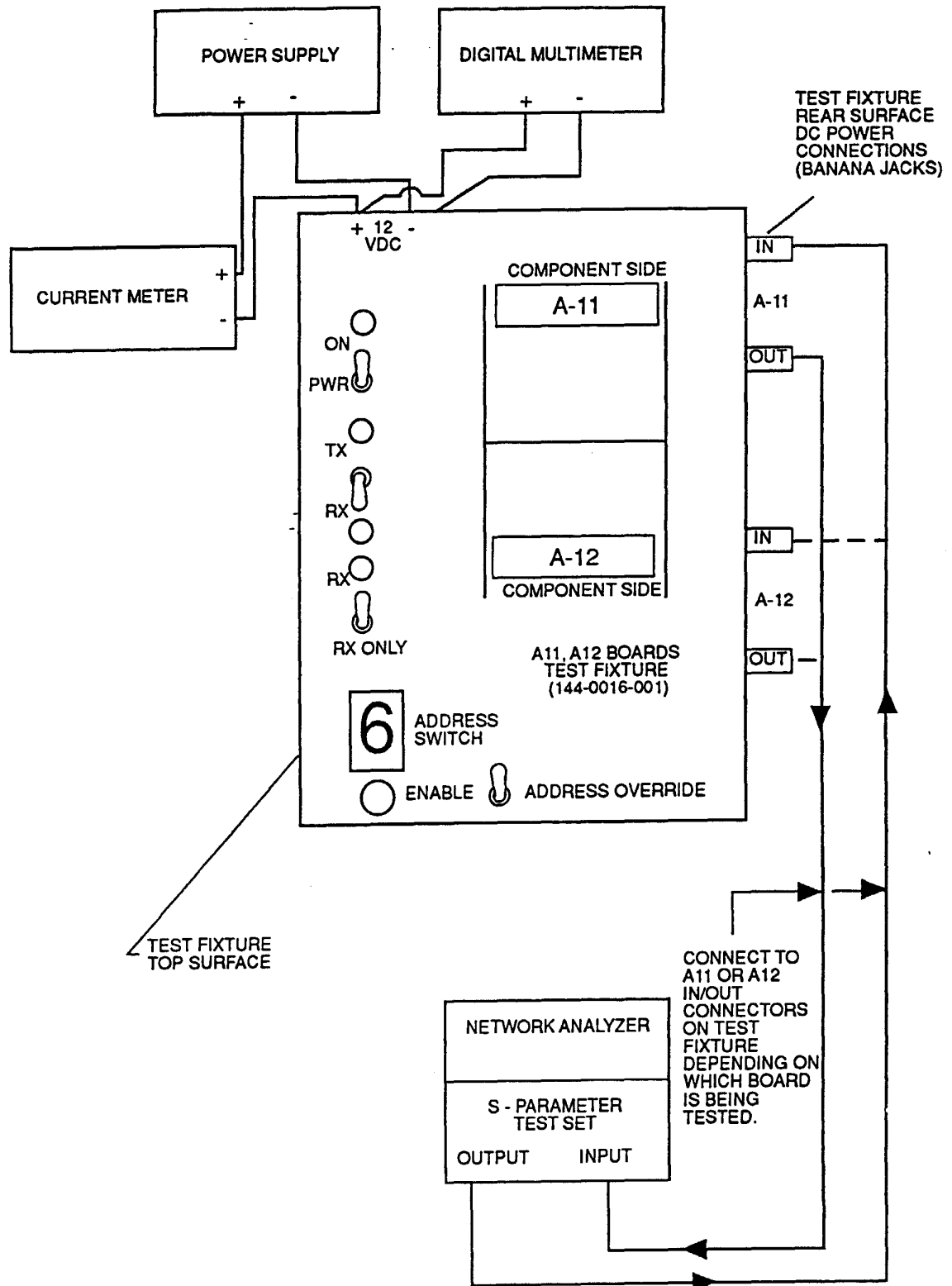
4-173.4 Testing and Alignment.

- a. Connect network analyzer connected to A11 IN and OUT connectors on side of test fixture.
- b. Set test fixture switches as follows:

|               |    |
|---------------|----|
| PWR Switch:   | ON |
| TX/RX Switch: | RX |

**NOTE**

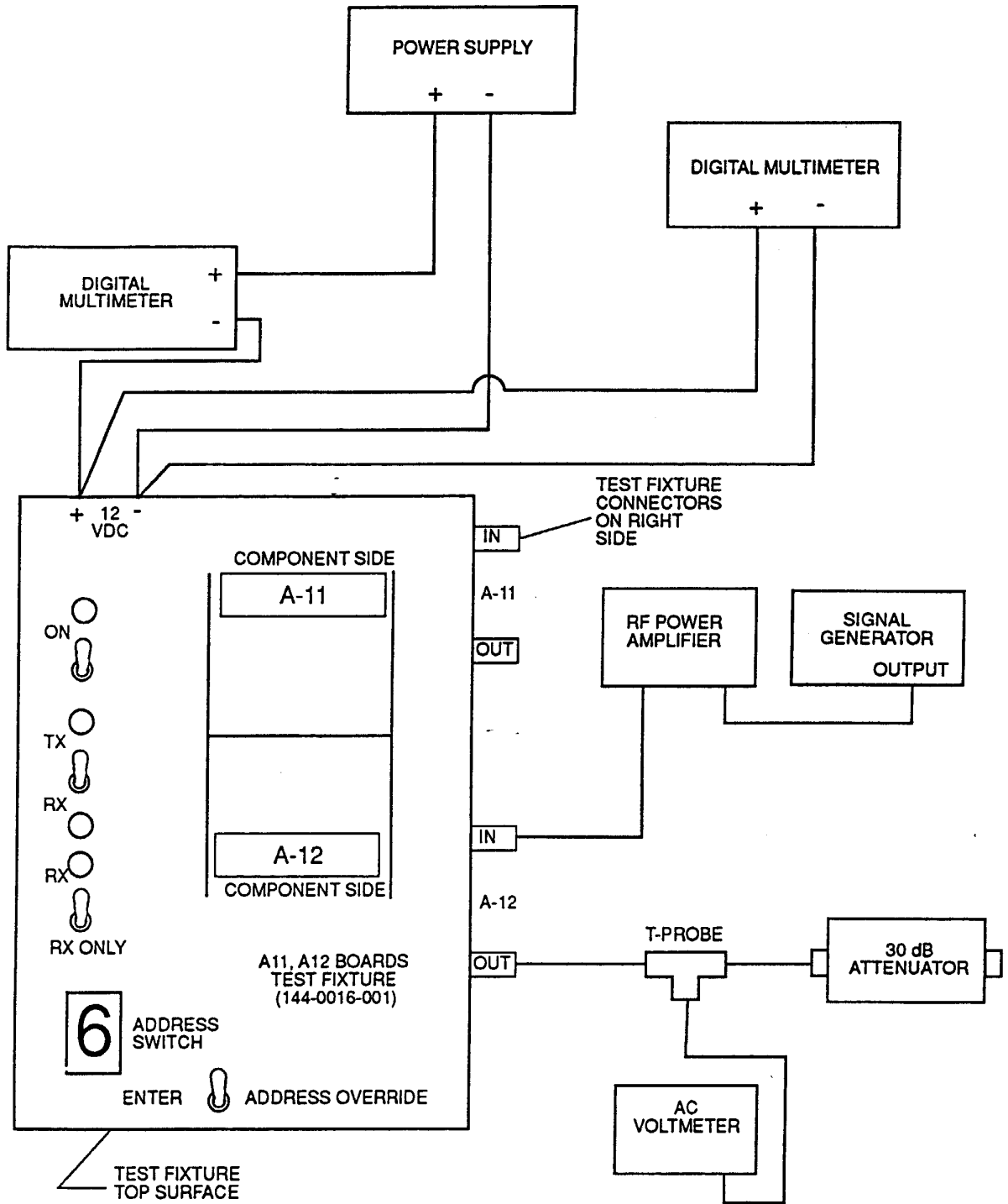
The filter selection relays on the A11 and A12 boards are magnetic latching. Therefore, the state of the relays (open or closed) cannot be predicted unless relays have all been initially reset to an open condition. The following step resets the relays on A11 and A12 boards to an open condition.



Soh-62

FIGURE 4-79. Filter Assembly Test Set-Up





Soh-63

Figure 4-80. A11 Filter Assembly Test Set-Up for Alignment of Power Detector

- c. Reset filter selection relays on the A11 and A12 boards by selecting 0 or 8 on test fixture thumbwheel address switch and momentarily depressing ENTER button, or by depressing and holding RESET toggle switch and then momentarily depressing ENTER button switch.
- d. Measure dc current on current meter. It should be approximately 55 mA. This is a typical number for total current required by fixture and A11 and A12 boards. Of this current, approximately 5 mA is used by the A11 board.
- e. Remove A11 board and note current drop into test fixture. Record current drop on data sheet.
- f. Reinstall A11 board in test fixture.
- g. Verify that RX indicator is lit. Mark (X) on data sheet.
- h. Set TX/RX switch to TX position.
- i. Monitor dc current on current meter. TX current should be 117 mA  $\pm$ 10 mA. Mark (X) on data sheet. This is the total current required for test fixture and A11 and A12 boards.
- j. Verify that green RX indicator is out and red TX indicator is lit. Mark (X) on data sheet.
- k. Hold the RX ONLY switch up and verify that red TX indicator is out. Mark (X) on data sheet. Release switch.
- l. Set ADDRESS switch to 4 and press ENTER switch to select filter band 1.

**NOTE**

Connect the two network analyzer test cables together and normalize network analyzer to a 0 dB reference level with test cables whenever a frequency or amplitude setting changes during this test procedure. Use BNC-to-BNC barrel adapter to connect the two test cables together.

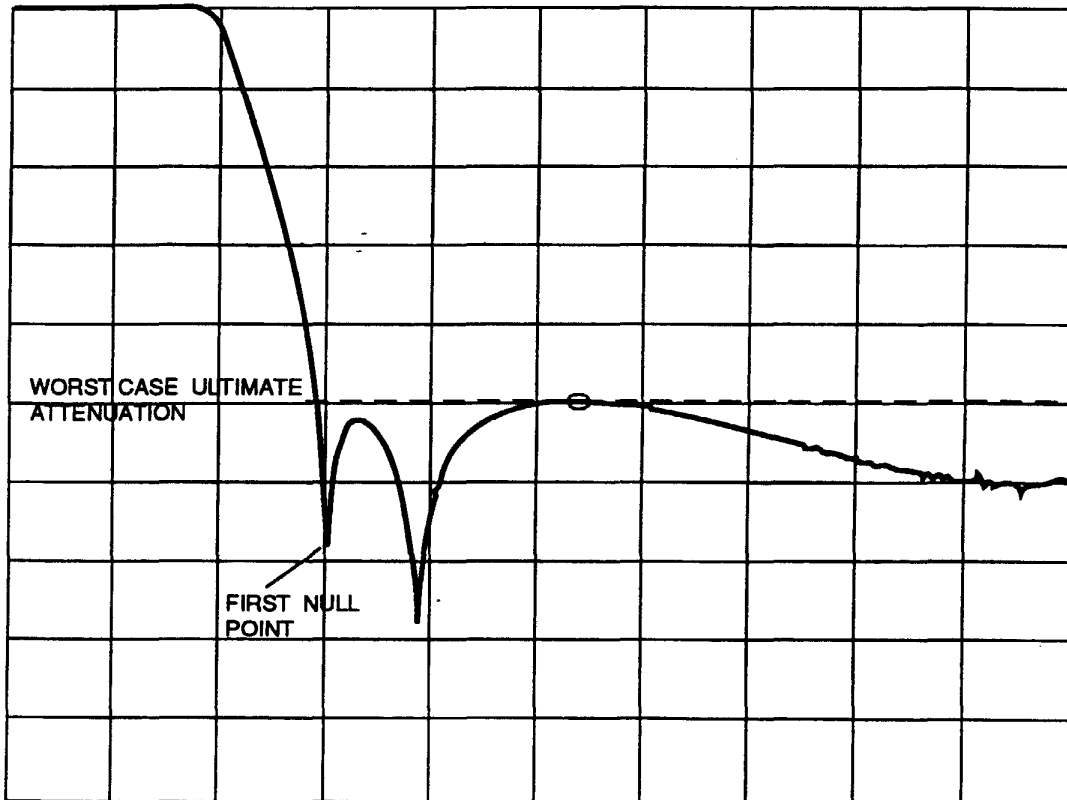
- m. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- n. Set network analyzer controls as follows:
 

|                  |            |
|------------------|------------|
| Start Frequency: | 1.6 MHz    |
| Stop Frequency:  | 2.6199 MHz |
| Amplitude:       | -5 dBm     |
| Scale:           | 1 dB/Div.  |
| Reference:       | 0 dB       |
- o. Reconnect the two network analyzer test cables to test fixture.
- p. Note difference in level, from 1.6 MHz to 2.6199 MHz, relative to normalized 0 dBm reference. Record loss on data sheet.
- q. Set network analyzer controls as follows:
 

|                 |            |
|-----------------|------------|
| Stop Frequency: | 7.86 MHz.  |
| Scale:          | 10 dB/Div. |

- r. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- s. Reconnect the two test cables to test fixture.
- t. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from the first null point to stop frequency of 7.86 MHz. See Figure 4-81 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.

REF LEVEL                      /DIV  
0.000 dB                      10.000 dB



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FIGURE 4-81. Typical Ultimate Rejection Curve

- u. Reset filter selection relays on A11 and A12 boards by holding address RESET switch down and pressing the ENTER button.
- v. Set ADDRESS switch to 5 and press ENTER switch to select filter band 2.
- w. Set network analyzer controls as follows:

Start Frequency:                      2.62 MHz.  
Stop Frequency:                      4.2799 MHz.  
Scale:                                      1 dB/Div.

- x. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- y. Reconnect test cables from network analyzer to test fixture.
- z. Note difference of level, from 2.62 MHz to 4.2799 MHz, to normalized 0 dBm reference. Record loss on data sheet.
- aa. Set network analyzer controls as follows:
  - Stop Frequency: 12.84 MHz.
  - Scale: 10 dB/Div.
- ab. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- ac. Reconnect test cables from network analyzer to test fixture.
- ad. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from the first null point to stop frequency of 12.84 MHz. Record ultimate rejection on data sheet. See Figure 4-81 for a typical ultimate rejection curve.
- ae. Reset filter selection relays on A11 and A12 boards by holding address RESET switch down and pressing the enable switch.
- af. Set ADDRESS switch to 6 and press ENTER switch to select filter band 3.
- ag. Set network analyzer controls as follows:
  - Start Frequency: 4.28 MHz.
  - Stop Frequency: 6.999 MHz.
  - Scale: 1 dB/Div.
- ah. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- ai. Reconnect test cables between network analyzer and test fixture.
- aj. Note difference in level, from 4.28 MHz to 6.9999 MHz, with normalized 0 dBm reference. Record loss on data sheet.
- ak. Set network analyzer controls as follows:
  - Stop Frequency: 21 MHz.
  - Scale: 10 dB/Div.
- al. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- am. Reconnect test cables between network analyzer and test fixture.

- an. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from the first null point to the stop frequency of 21 MHz. See Figure 4-81 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.
- ao. Reset filter selection relays on A11 and A12 boards by holding address RESET switch down and pressing ENTER button.
- ap. Set ADDRESS switch to 7 and press ENTER switch to select filter band 4.
- aq. Set network analyzer as follows:

|                  |             |
|------------------|-------------|
| Start Frequency: | 7.0 MHz     |
| Stop Frequency:  | 11.4399 MHz |
| Scale:           | 1 dB/Div.   |
- ar. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- as. Reconnect test cables between network analyzer and test fixture.
- at. Note difference in level, from 7.00 kHz to 11.4399 MHz, with normalized 0 dBm reference. Record loss on data sheet.
- au. Set network analyzer controls as follows:

|                 |            |
|-----------------|------------|
| Stop Frequency: | 34.32 MHz. |
| Scale:          | 10 dB/Div. |
- av. Disconnect two network analyzer test cables from test fixture and short two test cables together using a BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- aw. Reconnect test cables from network analyzer to test fixture.
- ax. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from the first null point to stop frequency of 34.32 MHz. See Figure 4-81 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.
- ay. This completes electrical testing of the A11 1st filter board.
- az. Set test fixture PWR switch to OFF and turn off external power supply.
- ba. Carefully remove A11 1st filter board from test fixture, place board in an ESD protective bag with data sheet, and tag appropriately.

4-174 A11 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-14. Indicated components are listed in the recommended order of replacement. See fold-out FO-8 for a schematic of the A11 1st filter board as an aid to troubleshooting.

This board is important in the operation of the Transmitter. Should any capacitor be replaced, ensure a working voltage of no less than 500 WV and keep all lead lengths as short as possible.

Table 4-14. A11 Troubleshooting

| Symptom                   | Paragraph  | Suspect Component(s) |
|---------------------------|--|----------------------|
| Board does not initialize |  | F1                   |
| No current                | 4-173.4.e  | F1                   |
| No band selection         | 4-173.4.p<br>4-173.4.t<br>4-173.4.aj<br>4-173.4.an<br>4-173.4.at<br>4-173.4.ax | K2-K9, U1            |
| No transmit               | 4-173.4.i  | K1, Q1, CR2, CR1     |

## 4-175 PAINTING, REFINISHING AND MARKING.

Humiseal (item 6, App. C) A11 1st filter board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-76). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 -.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

## 4-176 FINAL ASSEMBLY/INSTALLATION.

Install A11 1st filter board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

## A11 1ST FILTER BOARD DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>   | <u>Value</u> | <u>Limits</u>               |
|------------------|--|--------------|-----------------------------|
| 4-171.g          | Mechanical Inspection                                  | _____        | (X)                         |
| 4-173.4.e        | RX Current   | _____        | (X) drops by $5 \pm 2$ mA   |
| 4-173.4.g        | RX Indicator Illuminated                               | _____        | (X)                         |
| 4-173.4.i        | TX Current   | _____        | (X) $117 \pm 10$ mA         |
| 4-173.4.j        | TX Indicator Illuminated/<br>RX Indicator Extinguished | _____        | (X)                         |
| 4-173.4.k        | TX Indicator Extinguished                              | _____        | (X)                         |
| 4-173.4.p        | 1.6 MHz to 2.6199 MHz                                  | _____        | $\leq .4$ dB from reference |
| 4-173.4.t        | Ultimate Rejection (7.86 MHz)                          | _____        | $\geq 45$ dB from reference |
| 4-173.4.z        | 2.62 MHz to 4.2799 MHz                                 | _____        | $\leq .4$ dB from reference |

## A11 1ST FILTER BOARD DATA SHEET

| <u>Para. No.</u> | <u>Reading</u>                 | <u>Value</u> | <u>Limits</u>          |
|------------------|--------------------------------|--------------|------------------------|
| 4-173.4.ad       | Ultimate Rejection (12.84 MHz) | _____        | ≥ 40 dB from reference |
| 4-173.4.aj       | 4.28 MHz to 6.9999 MHz         | _____        | ≤ .7 dB from reference |
| 4-173.4.an       | Ultimate Rejection (21 MHz)    | _____        | ≥ 40 dB from reference |
| 4-173.4.at       | 7 MHz to 11.4399 MHz           | _____        | ≤ .5 dB from reference |
| 4-173.4.ax       | Ultimate Rejection (34.32 MHz) | _____        | ≥ 40 dB from reference |

## Section XVIII. A12 2ND FILTER

## 4-177 GENERAL.

This section contains depot level maintenance instructions for the A12 2nd filter board. Included in these instructions are directions for removal, cleaning, inspection, required test equipment/fixtures and test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The A12 2nd filter board is mounted in the twelfth slot of the radio chassis assembly which is inside the radio housing. Chassis assembly partitions isolate the A12 from other boards mounted in the chassis assembly.

A12 2nd filter board assembly, along with the A11 provides the transmit harmonic suppression/rejection for the radio set filtering from 11.4400 - 49.9999 MHz. It also contains the ALC detector circuitry.

## 4-178 REMOVAL OF A12 2ND FILTER.

Refer to Section IX for removal of the A12 2nd filter board.

**CAUTION**

The A12 2nd filter board contains Electrostatic Devices that are sensitive to damage by Electrostatic Discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

## 4-179 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.

- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

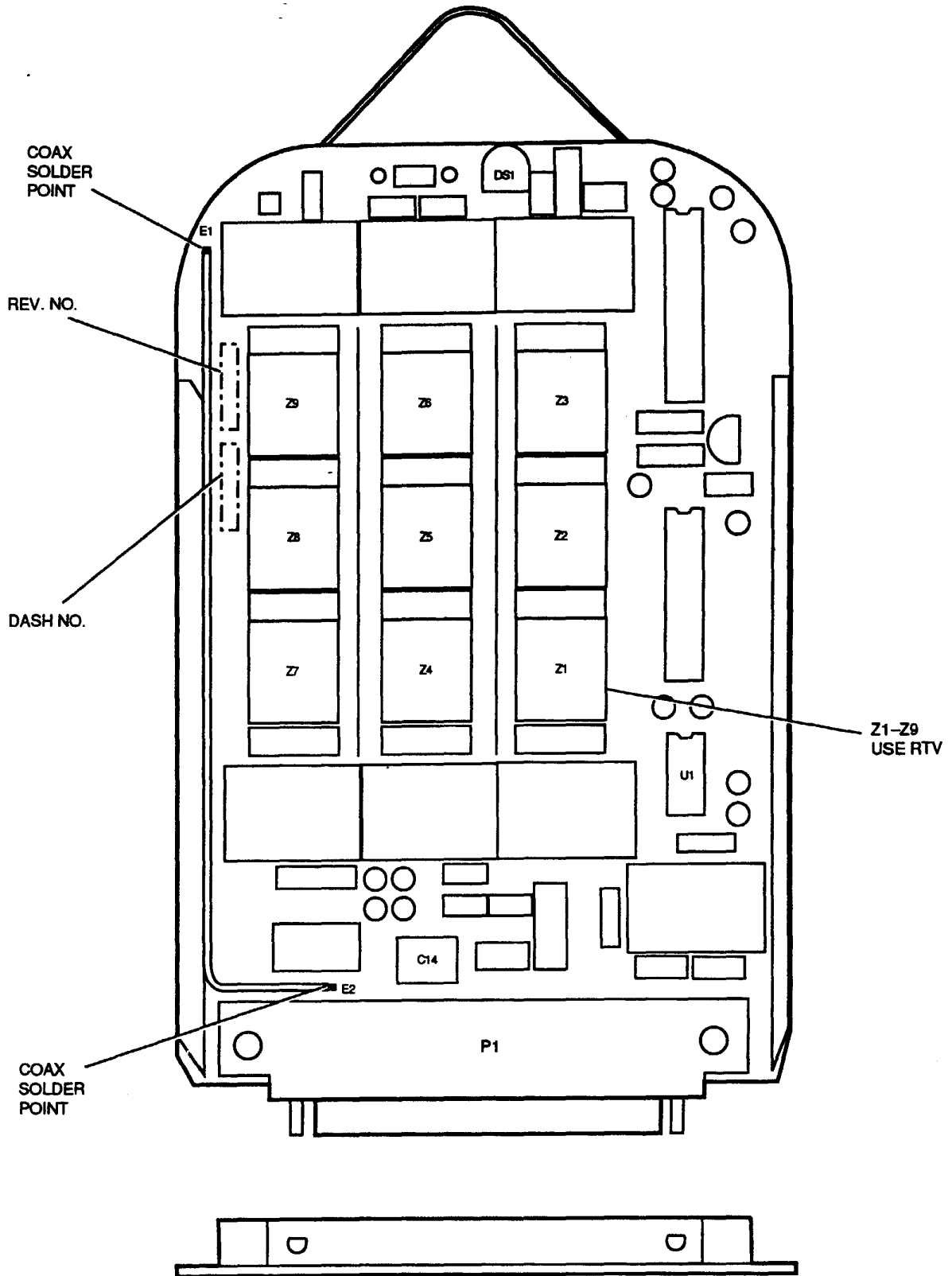
#### 4-180 INSPECTION.

- a. Inspect the A12 2nd filter board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-82.
- b. Inspect 2nd filter board for broken, missing or damaged components and for any components that may be improperly installed.
- c. Inspect lead extensions on circuit side. They shall not be greater than 0.030 inches (Figure 4-83).
- d. Inspect component height on component side. Height shall be no greater than 0.550 inches (.570 inches for shields) (Figure 4-83).
- e. Verify semi-rigid coax cable is properly installed and is not shorting to component leads.
- f. Inspect 2nd filter board for solder bridges or other mechanical problems.
- g. Inspect 2nd filter board for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- h. Repair 2nd filter board assembly as necessary (Paragraph 4-181).

#### 4-181 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-183.
- b. Ensure no components extend more than .550 inches (.570 inches for shields) above component side of 2nd filter board assembly (Figure 4-83).
- c. Ensure no leads extend more than 0.030 inches above circuit side of 2nd filter board assembly (Figure 4-83).
- d. Secure transformers Z1-Z9 to PCB with small amount of silicon rubber compound (item 15, App. C) under the coils.
- e. Install 50 Ohm semi-rigid coax cables (item 5, App. C) to PCB as follows:
  - (1) Trim .050 inches of insulation off semi-rigid coax cable at each end (Figure 4-84).
  - (2) Install coax cable to terminals E1 and E2.
  - (3) Solder coax cable to ground plane at points shown in Figure 4-82.
  - (4) Ensure coax cable is a minimum of .125 inches from edge of PCB.
- f. When replacing LED DS1, note that cathode end of LED DS1 is the shortest lead (Figure 4-84).
- g. When replacing connector P1, ensure keying pins on connector are oriented as shown in Figure 4-82.





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FIGURE 4-82. Installation of Coax Cables and Connector Keying

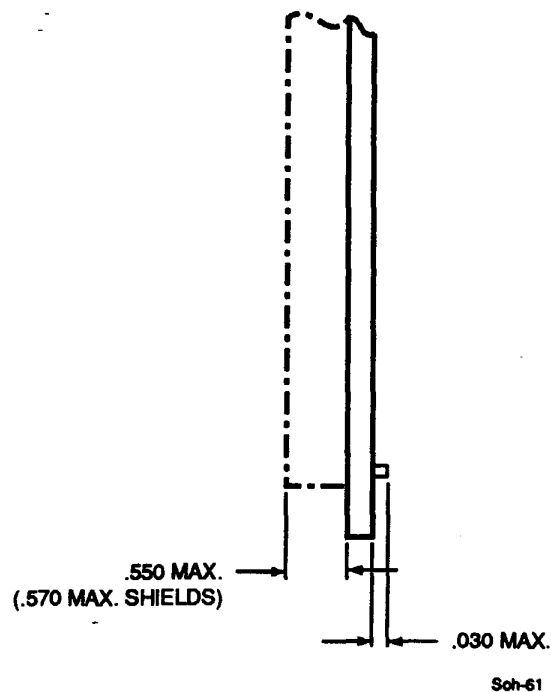


FIGURE 4-83. Component and Lead Extension Off PWB

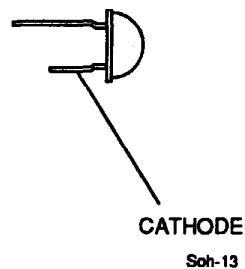


FIGURE 4-84. Diode DS1 Installation

- h. Solder electronic components using solder S/N 62 (item 20, App. C).
- i. Humiseal (item 6, App. C) A12 2nd filter board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector P1 or adjustable component C14.

#### 4-182 TESTING.

This test procedure covers alignment and electrical testing of A12 2nd filter board. The A12 2nd filter board is tested in the A11, A12 test fixture which is used to test both the A11 1st filter and the A12 second filter.

The thumbwheel ADDRESS switch on the test fixture (Numbered 0 through 9), allows selection of a band which is then applied to A12 board for decoding frequency range into a decimal format. Filter bands do not conform directly to the number on the thumbwheel switch (See Table 4-15). Table 4-15 relates

thumbwheel address switch setting to filter band being selected along with the appropriate frequency range. The decimal information is used to control filter selection relays on A11 1st filter. The ADDRESS override momentary toggle switch, on test fixture, electrically accomplishes the same relay reset function as setting the thumbwheel address switch to a 0 or an 8. Reset is accomplished by depressing ENTER switch when the momentary ADDRESS override switch is held on or when thumbwheel switch is set to a 0 or an 8.

Table 4-15. Address Switch Settings

| Switch Address | Band  | Filter Assembly (Board) | Frequency Range (MHz)    |
|----------------|-------|-------------------------|--------------------------|
| 0              | RESET | A11 & A12               | N/A                      |
| 1 or 9         | 5     | A12                     | 11.44 MHz to 18.7099 MHz |
| 2              | 6     | A12                     | 18.71 MHz to 30.5799 MHz |
| 3              | 7     | A12                     | 30.58 MHz to 49.9999 MHz |
| 4              | 1     | A11                     | 1.60 MHz to 2.6199 MHz   |
| 5              | 2     | A11                     | 2.62 MHz to 4.2799 MHz   |
| 6              | 3     | A11                     | 4.28 MHz to 6.9999 MHz   |
| 7              | 4     | A11                     | 7.00 MHz to 11.4399 MHz  |
| 8              | RESET | A11 & A12               | N/A                      |

4-182.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

4-182.2 Equipment. The following table lists unique and standard test equipment required for test and alignment of A12 Filter Assembly. Equivalent alternate test equipment may be substituted for any of items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>           | <u>QTY.</u> |
|------------------------------|-------------|
| A11, A12 Boards Test Fixture | 1           |
| ac Voltmeter                 | 1           |
| Digital Multimeter           | 2           |
| Network Analyzer             | 1           |
| Power Supply                 | 1           |
| RF Power Amplifier           | 1           |
| Signal Generator             | 1           |
| T-Probe Connector            | 1           |
| 30 dB Attenuator             | 1           |
| Tool Kit                     | 1           |

4-182.3 Set Up.**CAUTION**

Do not force the 2nd filter board into mating connector. The 2nd filter board is index keyed with mating connectors. Some test fixture connectors, however, are not index keyed and caution is required when installing the 2nd filter board in the test fixture to ensure proper insertion.

**NOTE**

The 2nd filter board must both be installed in test fixture with the component side of 2nd filter board toward front of test fixture and the component side of A11 1st filter toward rear of test fixture. Proper orientation of A11 and A12 boards in test fixture is illustrated in the test set up block diagrams shown in Figures 4-85 and 4-87. The test fixture requires that both A11 and A12 boards be installed in test fixture during the test of either board. One of the assemblies must be known to function properly before testing of other assembly can proceed. Known good A11 and A12 filters are provided with test fixture to support testing.

- a. Connect test fixture and external test equipment as shown in Figure 4-85.
- b. Set test fixture PWR switch to OFF.
- c. Install A12 filter into the test fixture along with a working A11 board.
- d. Turn on test fixture power supply and adjust for 12 Vdc. Use DMM.

4-182.4 Testing and Alignment.

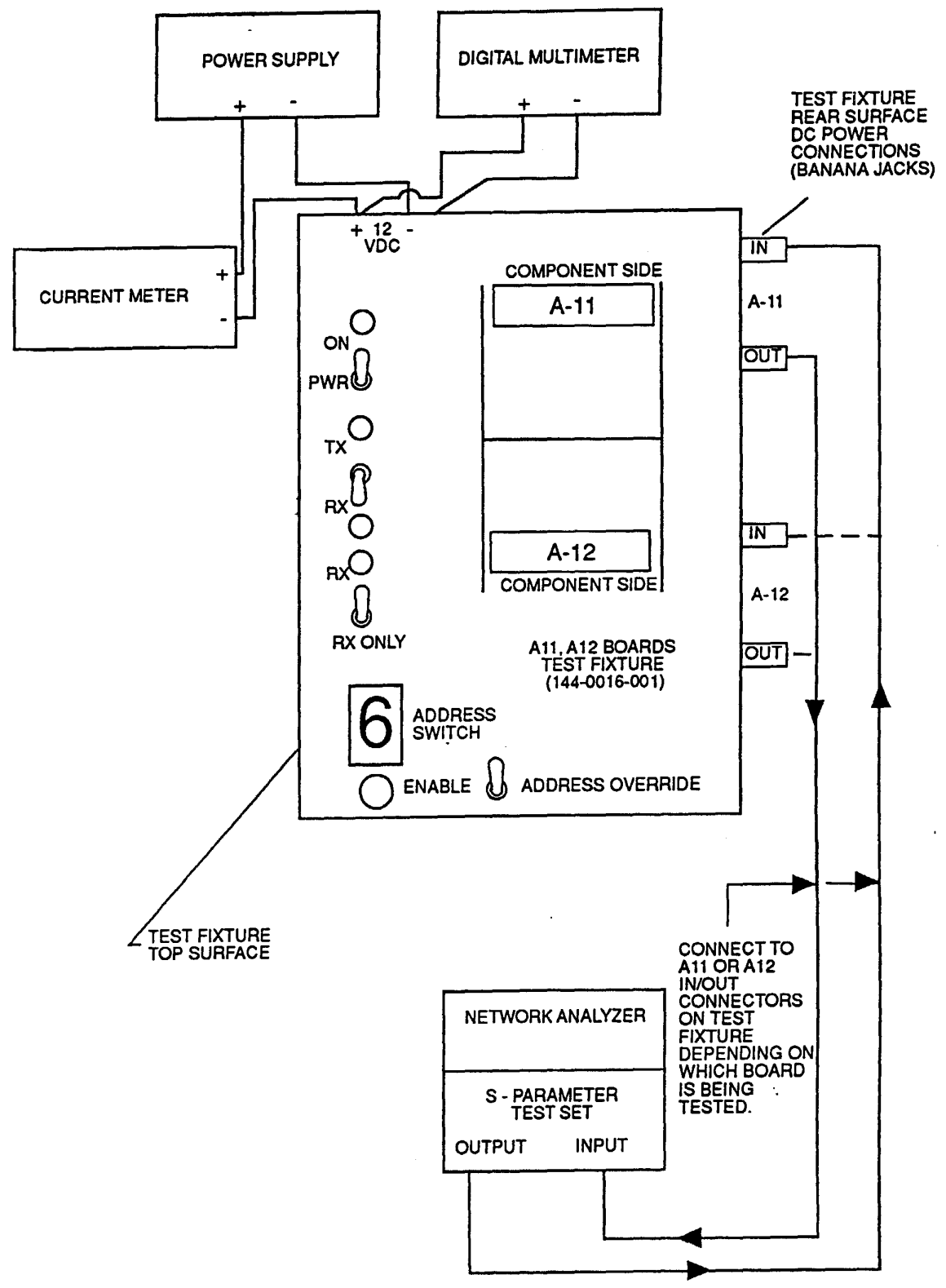
- a. Connect network analyzer to test fixture A12 IN and OUT connectors.
- b. Set test fixture switches as follows:

|               |    |
|---------------|----|
| PWR Switch:   | ON |
| RX/TX Switch: | RX |

**NOTE**

The filter selection relays on A11 and A12 boards are the magnetic latching. Therefore, the state of the relays (open or closed) cannot be predicted unless relays have been initially reset to an open condition. The following step resets relays on A11 and A12 boards to an open condition.

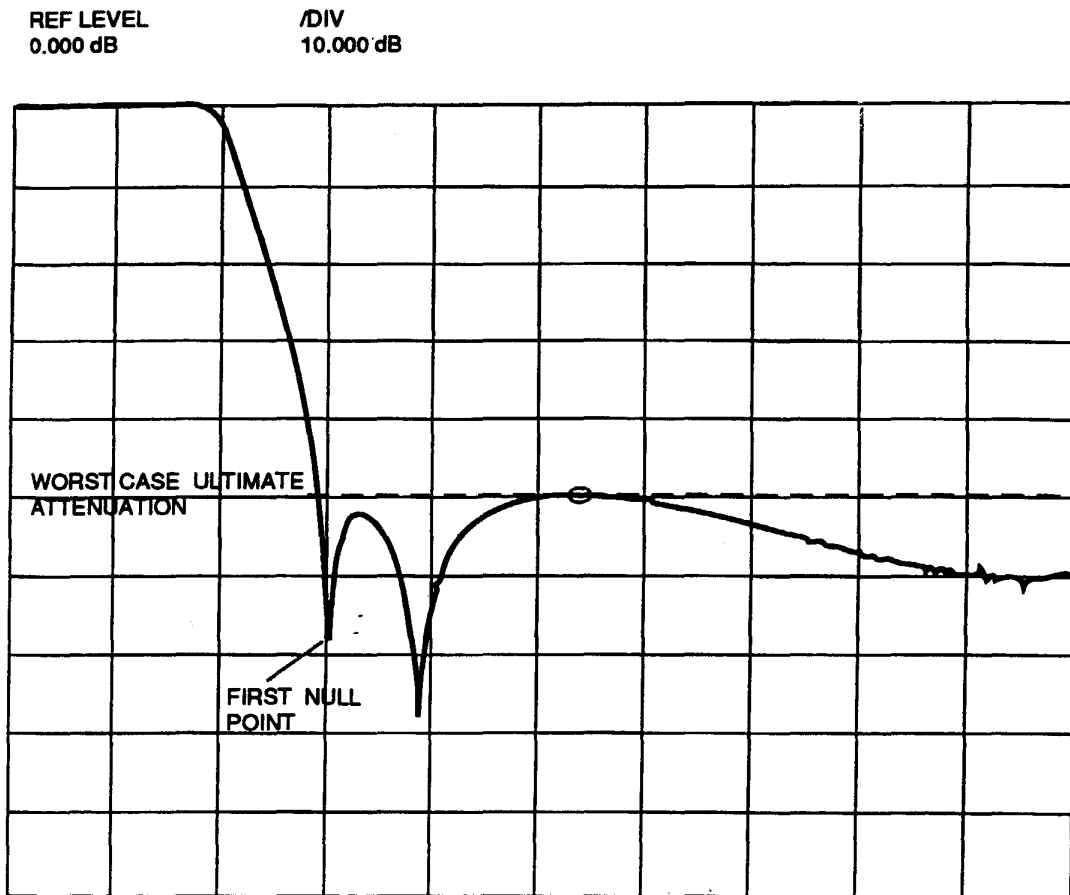
- c. Reset filter selection relays on A11 and A12 boards by selecting 0 or 8 on test fixture thumbwheel address switch and momentarily depressing the ENTER push button; or holding the RESET toggle switch and then momentarily depressing the ENTER push button switch.
- d. Measure dc current on current meter. It should be approximately 55 mA. This is typical for the total current required by the fixture and the A11 and A12 boards. Of this current, approximately 24 mA is used by 2nd filter board.
- e. Remove 2nd filter board and note current drop into the test fixture. Record current drop on data sheet.
- f. Install 2nd filter board back in test fixture.



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FIGURE 4-85. Filter Assembly Test Set-Up

- g. Note whether test fixture RX indicator is lit. Record status on data sheet.
- h. Set TX/RX switch to TX position.
- i. Monitor dc current on current meter. Record current on data sheet. This current is the total current required for the fixture and the A11 and A12 boards.
- j. Note whether green RX indicator out and red TX indicator is lit. Record status on data sheet.
- k. Hold the RX ONLY switch up and note whether red TX indicator is out. Record status on data sheet. Release switch.
- l. Set address switch to 1 or 9 and press ENTER switch to select filter band 5.
- m. Disconnect two network analyzer test cables from test fixture.
- n. Set controls on network analyzer as follows:
- |                  |             |
|------------------|-------------|
| Start Frequency: | 11.44 MHz   |
| Stop Frequency:  | 18.7099 MHz |
| Amplitude:       | -5 dBm      |
| Scale:           | 1 dB/Div.   |
| Reference:       | 0 dB        |
- o. Connect two network analyzer test cables together and normalize network analyzer to a 0 dB reference level. Use BNC-to-BNC barrel adapter to connect the two test cables together.
- p. Reconnect the two test cables from the network analyzer to test fixture.
- q. Note difference in level, from 11.44 MHz to 18.7099 MHz, with normalized 0 dBm reference. Record loss on data sheet.
- r. Set controls on network analyzer as follows:
- |                 |            |
|-----------------|------------|
| Stop Frequency: | 56.13 MHz. |
| Scale:          | 10 dB/Div. |
- s. Disconnect the two test cables from the test set and re-normalize network analyzer for a 0 dB reference level, with the two test cables connected together using BNC-to-BNC barrel adapter.
- t. Reconnect the two test cables from network analyzer to the test fixture.
- u. Note the difference in ultimate rejection of filter, with normalized 0 dBm reference, from first null point to the stop frequency of 56.13 MHz. See Figure 4-86 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.
- v. Reset filter selection relays on A11 and A12 by holding address RESET switch down and pressing the ENTER button.
- w. Set address switch to 2 and press the ENTER switch to select filter band 6.



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FIGURE 4-86. Typical Ultimate Rejection Curve

- x. Set controls on network analyzer as follows:
  - Start Frequency: 18.71 MHz.
  - Stop Frequency: 30.5799 MHz.
  - Scale: 1 dB/Div.
- y. Disconnect the two test cables from test fixture and re-normalize the analyzer for a 0 dB reference level, with the two test cables connected together using BNC-to-BNC barrel adapter.
- z. Reconnect the two test cables to test fixture.
- aa. Note the difference in level, from 18.71 MHz to 30.5799 MHz, with normalized 0 dBm reference. Record loss on data sheet.
- ab. Set controls on network analyzer as follows:
  - Stop Frequency: 90 MHz.
  - Scale: 10 dB/Div.
- ac. Disconnect test cables from test fixture and re-normalize network analyzer for a 0 dB reference level, with test cables connected together using BNC-to-BNC barrel adapter.

- ad. Reconnect test cables to test fixture.
- ae. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from first null point to the stop frequency of 90 MHz. See Figure 4-86 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.
- af. Reset filter selection relays on A11 and 2nd filter boards by holding address RESET switch down and pressing the ENTER button.
- ag. Set address switch to 3 and press the ENTER switch to select filter band 7.
- ah. Set controls on network analyzer as follows:
 

|                  |            |
|------------------|------------|
| Start Frequency: | 30.58 MHz. |
| Stop Frequency:  | 50.0 MHz.  |
| Scale:           | 1 dB/Div.  |
- ai. Disconnect test cables from test fixture and re-normalize analyzer for a 0 dB reference level, with the two test cables connected together using BNC-to-BNC barrel adapter.
- aj. Reconnect test cables to test fixture.
- ak. Note difference in level, from 30.58 MHz to 49.9999 MHz, with normalized 0 dBm reference. Record loss on data sheet.
- al. Set controls on network analyzer as follows:
 

|                 |            |
|-----------------|------------|
| Stop Frequency: | 150 MHz.   |
| Scale:          | 10 dB/Div. |
- am. Disconnect test cables from test fixture and re-normalize analyzer for a 0 dB reference level, with the two test cables connected together using BNC-to-BNC barrel adapter.
- an. Reconnect test cables to test fixture.
- ao. Note difference in ultimate rejection of filter, with normalized 0 dBm reference, from first null point to stop frequency of 150 MHz. See Figure 4-86 for a typical ultimate rejection curve. Record ultimate rejection on data sheet.

#### **CAUTION**

Do not turn on RF power amplifier until called for.

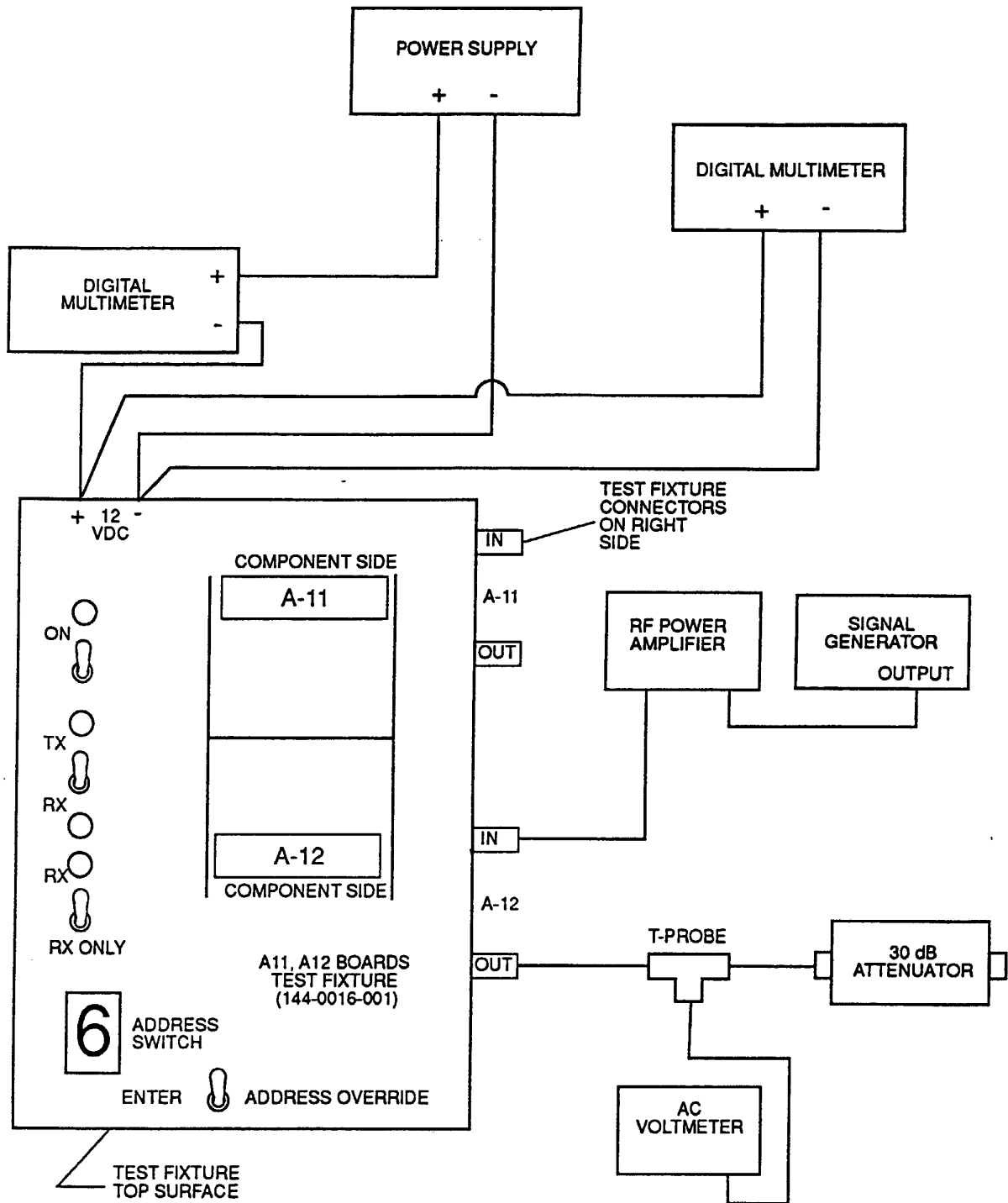
- ap. Configure the indicated test equipment as shown in Figure 4-87, for alignment of 2nd filter board power detector. Ensure thumbwheel switch is set to switch 3 (band 7).
- aq. Set signal generator to 30 MHz at -7 dBm.

#### **NOTE**

The ground lead for multimeter should be kept as close as possible to U1 for a valid measurement.

- ar. Monitor voltage on U1 pin 1 (Figure 4-82). Use DMM.





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FIGURE 4-87. A12 Filter Assembly Test Set-Up for Alignment of Power Detector

**NOTE**

**C14 must be adjustable to a null point.**

- as. Turn on power amplifier and adjust capacitor C14 for minimum dc output voltage. Record dc output voltage on data sheet.
- at. Turn off power amplifier.
- au. This completes electrical testing and alignment of A12 2nd filter board.
- av. Set test fixture PWR switch to OFF and turn off external power supply.
- aw. Carefully remove A12 2nd filter board from test fixture.
- ax. Apply torque lacquer (item 23, App. C) to capacitor C14 (Figure 4-82). Allow torque lacquer to set before proceeding.
- ay. After torque lacquer has set, place A12 2nd filter board in and ESD protective bag with data sheet, and tag appropriately.

**4-183 A12 TROUBLESHOOTING.**

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-16, Table 4-16. Indicated components are listed in the recommended order of replacement. See fold-out FO-9 for a schematic of the A11 1st filter board as an aid to troubleshooting.

This board is important in the operation of the transmitter. Should any capacitor be replaced, ensure a working voltage of no less than 500 WV and keep all lead lengths as short as possible.

Table 4-16. A12 Troubleshooting

| Symptom                     | Paragraph  | Suspect Component(s)            |
|-----------------------------|--|---------------------------------|
| Board does not initialize   |  | F1, U2                          |
| No current                  | 4-182.4.e  | F1, U2                          |
| No band selection           | 4-182.4.q<br>4-182.4.u<br>4-182.4.aa<br>4-182.4.ae<br>4-182.4.ak<br>4-182.4.ao | K2-K7, U3, U4                   |
| No Transmit                 | 4-182.4.i  | K1, CR2, CR1, U2                |
| Low or erratic output power | 4-182.4.as   | T1, CR7, CR8, L1, C15, C16, C14 |

**4-184 PAINTING AND MARKING.**

Humiseal (item 6, App. C) 2nd filter board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components.

The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-82). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 - .12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

## 4-185 FINAL ASSEMBLY/INSTALLATION.

Install A12 2nd filter board in accordance with procedures in Section IX and perform the procedures in Section XXVII.

## A12 2ND FILTER BOARD DATA SHEET

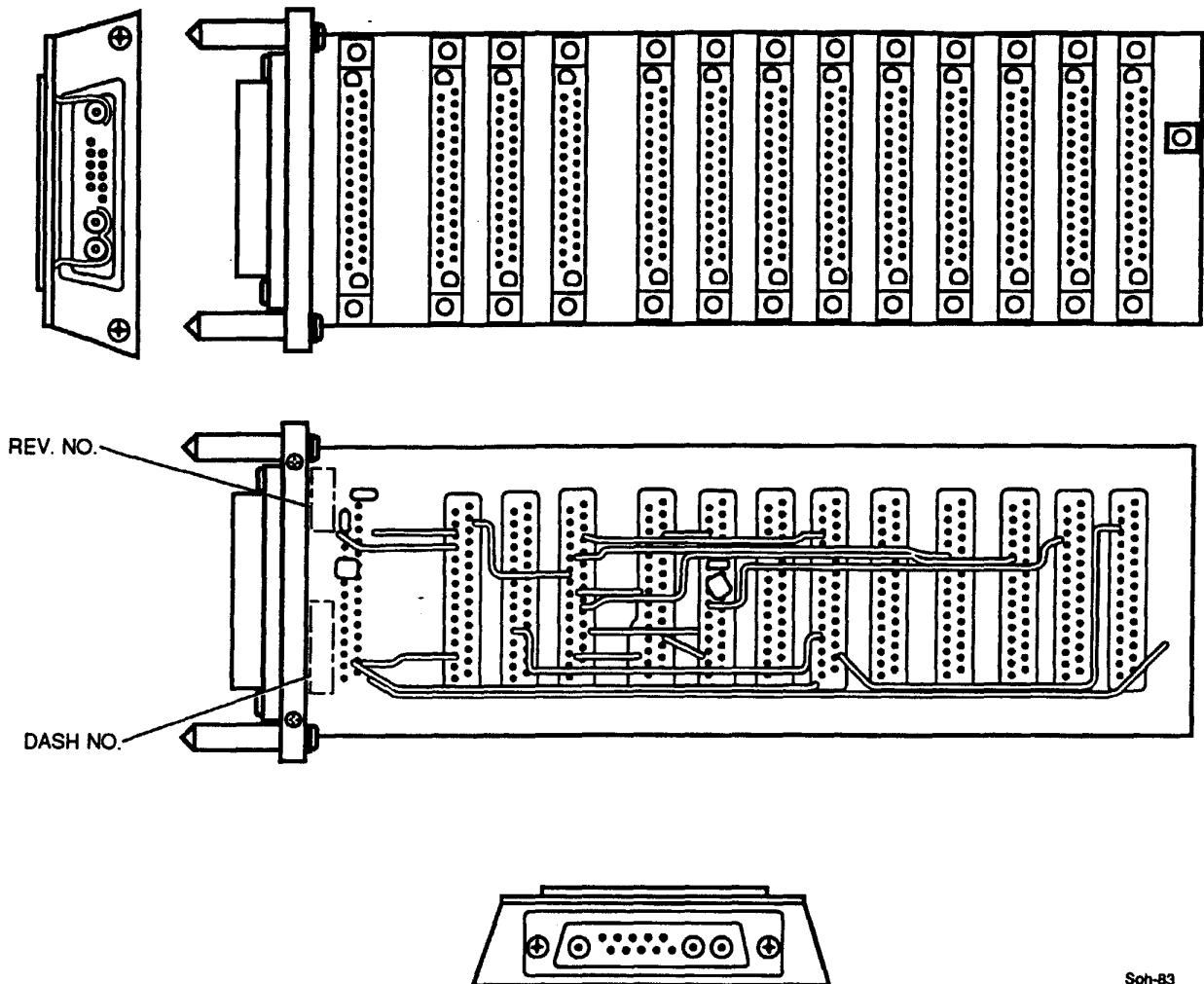
| <u>Para. No.</u> | <u>Reading</u>   | <u>Value</u>   | <u>Limits</u>                                 |
|------------------|--|----------------|---|
| 4-180.g          | Mechanical Inspection                                  | _____          | (X)   |
| 4-182.4.e        | RX Current   | _____          | (X) 24 ± 2 mA                                 |
| 4-182.4.g        | RX Indicator Illuminated                               | _____          | (X)   |
| 4-182.4.i        | TX Current   | _____          | (X) 117 ± 10 mA                               |
| 4-182.4.j        | TX Indicator Illuminated/<br>RX Indicator Extinguished | _____          | (X)   |
| 4-182.4.k        | TX Indicator Extinguished                              | _____          | (X)   |
| 4-182.4.q        | 11.44 MHz to 18.7099 MHz                               | _____          | ≤ .7 dB from reference                        |
| 4-182.4.u        | Ultimate Rejection (56.13 MHz)                         | _____          | ≥ 40 dB from reference                        |
| 4-182.4.aa       | 18.71 MHz to 30.5799 MHz                               | _____          | ≤ .7 dB from reference                        |
| 4-182.4.ae       | Ultimate Rejection (90 MHz)                            | _____          | ≥ 40 dB from reference                        |
| 4-182.4.ak       | 30.58 MHz to 49.9999 MHz                               | _____          | ≤ 1.1 dB from reference                       |
| 4-182.4.ao       | Ultimate Rejection (150 MHz)                           | _____          | ≥ 40 dB from reference                        |
| 4-182.4.as       | Minimum DC Output<br>C14 Adjustable to a Null Point    | _____<br>_____ | C14 set for minimum (.050 Vdc nominal)<br>(X) |

## Section XIX. INTERCONNECT BOARD A14

## 4-186 GENERAL.

This section contains depot level maintenance instructions for the A14 interconnect board. Included in these instructions are directions for removal, cleaning, inspection, test procedures, repair, refinishing/markings and final assembly/installation.

The A14 interconnect board (Figure 4-88) attaches to the bottom of the card cage assembly and provides connections to the control panel assembly, circuit card assemblies A1 through A12 and the A13 power amplifier. The A14 interconnect board provides interconnecting circuitry between all of the electrical subassemblies that attach to it.



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FIGURE 4-88. Installation of Coax Cables and Connector Repair

## 4-187 REMOVAL.

The A14 interconnect board is removed per the disassembly instructions in Section IX.

## 4-188 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.

**DMWR 11-5820-1102**

- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.**
- c. After cleaning, perform test procedures to determine performance and suitability for use.**

**4-189 INSPECTION.**

- a. Inspect interconnect board for missing or damaged components and for any components that may be improperly installed.**
- b. Verify semi-rigid coax on interconnect board is properly installed and is not shorting to component leads.**
- c. Inspect interconnect board for solder bridges or other mechanical problems.**
- d. Inspect soldered side of interconnect board for any exposed surfaces through humiseal coating.**
- e. Ensure bow and twist of interconnect board is within .015 inch.**
- f. Repair interconnect board as necessary. (Paragraph 4-190)**

**4-190 REPAIR/REPLACE.**

- a. Troubleshoot assembly using procedure in paragraph 4-192.**
- b. Install 50 Ohm semi-rigid coax cables (item 5, App. C) to Piggyback Interconnect PCB as follows:
  - (1) Trim .050 inches of insulation off semi-rigid coax cable at each end (Figure 4-88).**
  - (2) If required, trim connector pins, laying underneath coax cable, to board level. Do not trim connector pins used as coax cable terminating points.**
  - (3) Solder coax cable to connector pin terminating point (Figure 4-88).****
- c. Solder piggyback PCB to main board at eleven slotted places (Figure 4-88).**
- d. Prior to soldering connector J15 to interconnect board, install a mating connector to check proper alignment.**
- e. Solder 26 awg bus wire (item 29, App. C) to connector J15 as shown in Figure 4-88. Shrink sleeve wire.**
- f. Humiseal (item 6, App. C) solder side of interconnect board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connectors.**

**4-191 TESTING.**

The A14 interconnect board is tested as part of the radio chassis assembly, found in Section IX.

**4-192 TROUBLESHOOTING.**

Determination of a faulty A14 interconnect board is accomplished by installation of known good PCBs into the chassis assembly and performing the chassis assembly test in Section IX. Troubleshooting of a

known bad A14 interconnect board is accomplished by performing pin to pin continuity checks for A14 interconnect board circuitry. Table 4-17 and FO-11 contains information for performing the pin to pin continuity checks.

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal           | To  |
|-------|------------------|---|
| J2-1  | GND              |   |
| J2-2  | R+               | J6-2<br>J8-2<br>J12-1<br>J9-17<br>J7-2<br>J11-1<br>J10-2<br>J14-2, C1 |
| J2-3  | ALC-REF          | J7-27   |
| J2-4  | AUDIO OUT        | J9-20   |
| J2-5  | VOL CONTROL IN   | J9-19   |
| J2-6  | PS               | J3-6  |
| J2-7  | CW KEY           | J9-6  |
| J2-8  | NC               |   |
| J2-9  | I/O 89-9F, 80-9F | J3-9  |
| J2-10 | D0               | J3-10<br>J14-20<br>J5-10<br>J4-10                                     |
| J2-11 | D2               | J14-22<br>J3-11<br>J5-11<br>J4-11                                     |
| J2-12 | D4               | J3-12   |
| J2-13 | AM               | J11-12  |
| J2-14 | USB              | J10-14  |
| J2-15 | GND              |   |
| J2-16 | PTT              | J9-5<br>J13-5<br>J14-5  |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal         | To  |
|-------|----------------|---|
| J2-17 | T+             | J6-17<br>J8-17<br>J12-16<br>J9-17<br>J11-16<br>J7-16<br>J7-17<br>J10-17<br>J14-17<br>J15-A2, C2 |
| J2-18 | RX ONLY        | J13-21  |
| J2-19 | LIGHT          | J3-4  |
| J2-20 | MIC IN         | J9-7, C4,C5   |
| J2-21 | LSB            | J10-21  |
| J2-22 | VOL CMTL WIPER | J9-16   |
| J2-23 | I/O 60-7F      | J3-9  |
| J2-24 | I/O A0-BF      | J3-24   |
| J2-25 | D1             | J3-25   |
|       |                | J4-25<br>J5-25<br>J14-21  |
| J2-26 | D3             | J3-26<br>J14-23   |
| J2-27 | D5             | J3-27   |
| J2-28 | +12 BATT       | J15-9<br>J15-4  |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal           | To  |
|-------|------------------|---|
| J2-29 | +12V             | J3-29<br>J3-15<br>J4-29<br>J4-14<br>J6-29<br>J5-29<br>J5-14<br>J8-29<br>J12-29<br>J9-29<br>J11-29<br>J10-29<br>J15-3<br>J13-12<br>J13-27<br>J7-29<br>J14-27<br>J14-12 |
| J2-30 | GND              |   |
| J3-1  | GND              |   |
| J3-2  | NC               |   |
| J3-3  | 5.12 MHz         | J5-3<br>J4-3<br>J9-9  |
| J3-4  | LIGHT            | J2-19   |
| J3-5  | NC               |   |
| J3-6  | PS               | J2-6  |
| J3-7  | NC               |   |
| J3-8  | I/O 20-3F        | J4-8  |
| J3-9  | I/O 80-9F, 89-9F | J2-9  |
| J3-10 | D0               | J4-10<br>J5-10<br>J14-20<br>J2-10   |
| J3-11 | D2               | J2-11<br>J14-22<br>J4-11<br>J5-11   |
| J3-12 | D4               | J2-12   |
| J3-13 | A0               | J4-27   |



Table 4-17. A14 Interconnect Board Continuity

| From  | Signal    | To  |
|-------|-----------|---|
| J3-14 | A2        | J4-28   |
| J3-15 | +12V      | J3-29<br>J2-29<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J9-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J3-16 | NC        |   |
| J3-17 | NC        |   |
| J3-18 | NC        |   |
| J3-19 | TD        | J7-10<br>J10-5  |
| J3-20 | NC        |   |
| J3-21 | I/O 20-3F | J4-21   |
| J3-22 | NC        |   |
| J3-23 | I/O 60-7F | J2-23   |
| J3-24 | I/O A0-BF | J2-25   |
| J3-25 | D1        | J2-25<br>J4-25<br>J5-25<br>J14-21   |
| J3-26 | D3        | J14-23<br>J2-26   |
| J3-27 | D5        | J2-27   |
| J3-28 | A1        | J4-13   |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal    | To  |
|-------|-----------|---|
| J3-29 | +12V      | J2-29<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J9-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12<br>J3-15 |
| J3-30 |           |   |
| J4-1  | NC        |   |
| J4-2  | GND       |   |
| J4-3  | 5.12 MHz  | J5-3<br>J3-3<br>J9-9  |
| J4-4  | GND       |   |
| J4-5  | LO1       | J7-5<br>J11-24  |
| J4-6  | GND       |   |
| J4-7  | NC        |   |
| J4-8  | I/O 20-3F | J3-8  |
| J4-9  | NC        |   |
| J4-10 | D0        | J3-10<br>J2-10<br>J5-10<br>J14-20   |
| J4-11 | D2        | J5-11<br>J3-11<br>J2-11<br>J14-22   |
| J4-12 | NC        |   |
| J4-13 | A1        | J2-28   |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal | To  |
|-------|--------|---|
| J4-14 | +12V   | J4-29<br>J3-29<br>J3-15<br>J2-29<br>J5-29<br>J5-14<br>J6-29<br>J9-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J4-15 | GND    |   |
| J4-16 | NC     |   |
| J4-17 | GND    |   |
| J4-18 | GND    |   |
| J4-19 | GND    |   |
| J4-20 | GND    |   |
| J4-21 | I/O 21 | J3-21   |
| J4-22 | I/O 22 | J5-22   |
| J4-23 | I/O 23 | J5-23   |
| J4-24 | I/O 24 | J14-24  |
| J4-25 | D1     | J3-25<br>J2-25<br>J14-21<br>J5-25   |
| J4-26 |        | J5-26   |
| J4-27 | A0     | J3-13   |
| J4-28 | A2     | J3-14   |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal   | To   |
|-------|----------|--|
| J4-29 | +12V     | J4-14<br>J3-29<br>J3-15<br>J2-29<br>J5-29<br>J5-14<br>J6-29<br>J9-29<br>J8-29<br>J5-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-12<br>J14-12 |
| J4-30 | GND      |  |
| J5-1  | NC       |  |
| J5-2  | GND      |  |
| J5-3  | 5.12 MHz | J5-3<br>J3-3<br>J9-9   |
| J5-4  | GND      |  |
| J5-5  | LO1      | J11-24   |
| J5-6  | GND      |  |
| J5-7  | NC       |  |
| J5-8  | NC       |  |
| J5-9  | NC       |  |
| J5-10 | D0       | J4-10<br>J14-20<br>J3-10<br>J2-10  |
| J5-11 | D2       | J4-11<br>J3-11<br>J2-11<br>J14-22  |
| J5-12 | NC       |  |
| J5-13 | NC       |  |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal | To  |
|-------|--------|---|
| J5-14 | +12V   | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J6-29<br>J9-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12<br>J8-29<br>J12-29 |
| J5-15 | GND    |   |
| J5-16 | NC     |   |
| J5-17 | GND    |   |
| J5-18 | GND    |   |
| J5-19 | GND    |   |
| J5-20 | GND    |   |
| J5-21 | NC     |   |
| J5-22 | I/O 22 | J4-22   |
| J5-23 | I/O 23 | J4-23   |
| J5-24 | NC     |   |
| J5-25 | D1     | J4-25<br>J3-25<br>J2-25   |
| J5-26 | I/O 25 | J4-26   |
| J5-27 | NC     |   |
| J5-28 | NC     |   |

Table 4-17. A14 Interconnect Board Continuity

| From                    | Signal | To  |
|-------------------------|--------|---|
| J5-29                   | +12V   | J4-29<br>J4-14<br>J2-29<br>J3-29<br>J3-15<br>J6-29<br>J9-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12<br>J5-14 |
| J5-30                   | GND    |   |
| J6-1                    | GND    |   |
| J6-2                    | R+     | J2-2<br>J8-2<br>J12-1<br>J9-2<br>J11-1<br>J7-2<br>J14-2<br>J10-2, C1  |
| J6-3 THRU<br>J6-16      | NC     |   |
| J6-17                   | T+     | J2-17<br>J8-17<br>J9-17<br>J12-16<br>J11-16<br>J7-16<br>J7-17<br>J10-17<br>J14-17<br>J15-A2, C2   |
| J6-18<br>THRU J6-<br>28 | NC     |   |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal  | To  |
|-------|---------|---|
| J6-29 | +12V    | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J9-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J6-30 | GND     |   |
| J7-1  | EXT ALC | J15-2   |
| J7-2  | R+      | J2-2<br>J6-2<br>J8-2<br>J12-1<br>J9-2<br>J11-1<br>J14-2<br>J10-2, C1  |
| J7-3  | GND     |   |
| J7-4  | GND     |   |
| J7-5  | LO1     | J11-24<br>J4-5  |
| J7-6  | GND     |   |
| J7-7  | GND     |   |
| J7-8  | NC      |   |
| J7-9  | NC      |   |
| J7-10 | TD      | J10-5<br>J3-19  |
| J7-11 | REF L   | J12-11<br>J14-11  |
| J7-12 | GND     |   |

Table 4-17. A14 Interconnect Board Continuity

| From      | Signal      | To  |
|-----------|-------------|---|
| J7-13     | GND         |   |
| J7-14     | GND         |   |
| J7-15     | EXCITER OUT | J15-A3  |
| J7-16, 17 | T+          | J15-A2<br>J2-17<br>J8-17<br>J9-17<br>J12-16<br>J11-16<br>J10-17<br>J14-17<br>C2 |
| J7-18     | 2ND IF TX   | J11-18  |
| J7-19     | GND         |   |
| J7-20     | GND         |   |
| J7-21     | NC          |   |
| J7-22     | NC          |   |
| J7-23     | NC          |   |
| J7-24     | NC          |   |
| J7-25     | NC          |   |
| J7-26     | FWD         | J14-26  |
| J7-27     | ALC REF     | J2-3  |
| J7-28     | NC          |   |



Table 4-17. A14 Interconnect Board Continuity

| From                    | Signal | To  |
|-------------------------|--------|---|
| J7-29                   | +12V   | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J8-29<br>J9-29<br>J12-29<br>J10-29<br>J11-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J7-30                   | GND    |   |
| J8-1                    | GND    |   |
| J8-2                    | R+     | J2-2<br>J6-2<br>J12-1<br>J9-2<br>J11-1<br>J7-2<br>J14-2<br>J10-2<br>C2  |
| J8-3 THRU<br>J8-16      | NC     |   |
| J8-17                   | T+     | J2-17<br>J6-17<br>J9-17<br>J12-16<br>J11-16<br>J7-16<br>J7-17<br>J10-17<br>J14-17<br>J15-A2, C2   |
| J8-18<br>THRU J8-<br>28 | NC     |   |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal   | To   |
|-------|----------|--|
| J8-29 | +12V     | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J9-29<br>J6-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J8-30 | GND      |  |
| J9-1  | GND      |  |
| J9-2  | R+       | J6-2<br>J8-2<br>J12-1<br>J11-1<br>J7-2<br>J14-2<br>J10-2<br>J2-2, C1   |
| J9-3  | GND      |  |
| J9-4  | GND      |  |
| J9-5  | PTT      | J2-16<br>J13-5<br>J14-5  |
| J9-6  | CW KEY   | J2-7   |
| J9-7  | MIC IN   | J2-20, C4,<br>C5   |
| J9-8  | GND      |  |
| J9-9  | 5.12 MHz | J3-3<br>J4-3<br>J5-3   |
| J9-10 | GND      |  |
| J9-11 | CARRIER  | J11-26   |
| J9-12 | GND      |  |

Table 4-17. A14 Interconnect Board Continuity

| From  | Signal         | To   |
|-------|----------------|--|
| J9-13 | RX IN          | J10-26   |
| J9-14 | GND            |  |
| J9-15 | NC             |  |
| J9-16 | VOL CNTL WIPER | J2-22  |
| J9-17 | T+             | J6-17<br>J2-17<br>J8-17<br>J12-16<br>J11-16<br>J7-16, 17<br>J10-17<br>J14-17<br>J15-A2, C2 |
| J9-18 | MOD OUT        | J10-18   |
| J9-19 | VOL CNTL IN    | J2-5   |
| J9-20 | AUD OUT        | J2-4   |
| J9-21 | GND            |  |
| J9-22 | AGC            | J10-15   |
| J9-23 | GND            | J11-15   |
| J9-24 | GND            |  |
| J9-25 | GND            |  |
| J9-26 | GND            |  |
| J9-27 | GND            |  |
| J9-28 | GND            |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal    | To  |
|--------|-----------|---|
| J9-29  | +12V      | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J8-29<br>J12-29<br>J10-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J9-30  | GND       |   |
| J10-1  | GND       |   |
| J10-2  | R+        | J6-2<br>J2-2<br>J8-2<br>J12-1<br>J9-2<br>J11-1<br>J7-2<br>J14-2, C1   |
| J10-3  | GND       |   |
| J10-4  | GND       |   |
| J10-5  | TD        | J7-10<br>J3-19  |
| J10-6  | NC        |   |
| J10-7  | GND       |   |
| J10-8  | 2ND IF RX | J11-8   |
| J10-9  | GND       |   |
| J10-10 | NC        |   |
| J10-11 | GND       |   |
| J10-12 | GND       |   |
| J10-13 | 1ST IF TX | J11-13  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal  | To   |
|--------|---------|--|
| J10-14 | VSB     | J2-14  |
| J10-15 | AGC     | J9-22  |
| J10-16 | GND     | J11-15   |
| J10-17 | T+      | J6-17<br>J2-17<br>J7-16<br>J8-17<br>J9-17<br>J12-16<br>J11-7<br>J14-17<br>J15-A2, C2 |
| J10-18 | MOD OUT | J9-18  |
| J10-19 | NC      |  |
| J10-20 | NC      |  |
| J10-21 | LSB     | J2-21  |
| J10-22 | GND     |  |
| J10-23 | GND     |  |
| J10-24 | GND     |  |
| J10-25 | GND     |  |
| J10-26 | RX OUT  | J9-13  |
| J10-27 | GND     |  |
| J10-28 | GND     |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal    | To  |
|--------|-----------|---|
| J10-29 | +12V      | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J4-29<br>J5-29<br>J5-14<br>J6-29<br>J9-29<br>J8-29<br>J12-29<br>J11-29<br>J7-29<br>J15-3<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J10-30 | GND       |   |
| J11-1  | R+        | J2-2<br>J6-2<br>J8-2<br>J12-16<br>J7-16<br>J10-17<br>J14-17<br>J15-A2<br>J9-17, C1  |
| J11-2  | GND       |   |
| J11-3  | GND       |   |
| J11-4  | GND       |   |
| J11-5  | LO2       | J4-5  |
| J11-6  | GND       |   |
| J11-7  | GND       |   |
| J11-8  | 2ND IF RX | J10-8   |
| J11-9  | GND       |   |
| J11-10 | GND       |   |
| J11-11 | GND       |   |
| J11-12 | AM        | J2-13   |
| J11-13 | 1ST IF TX | J10-13  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal    | To   |
|--------|-----------|--|
| J11-14 | GND       |  |
| J11-15 | AGC       | J10-15   |
|        |           | J9-22  |
| J11-16 | T+        | J2-17<br>J8-17<br>J6-17<br>J9-17<br>J12-16<br>J7-16<br>J7-17<br>J10-17<br>J14-17<br>J15-A2, C2 |
| J11-17 | GND       |  |
| J11-18 | 2ND IF TX | J7-18  |
| J11-19 | GND       |  |
| J11-20 | GND       |  |
| J11-21 | RX IN     | J13-17<br>J13-2  |
| J11-22 | GND       |  |
| J11-23 | GND       |  |
| J11-24 | LO1       | J4-5   |
| J11-25 | GND       |  |
| J11-26 | CARRIER   | J9-11  |
| J11-27 | GND       |  |
| J11-28 | GND       |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal | To   |
|--------|--------|--|
| J11-29 | +12V   | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J12-29<br>J13-12<br>J13-27<br>J14-27<br>J14-12<br>J15-3 |
| J11-30 | GND    |  |
| J12-1  | R+     | J6-2<br>J2-2<br>J8-2<br>J9-2<br>J11-1<br>J7-2<br>J14-2<br>J10-2, C1  |
| J12-2  | GND    |  |
| J12-3  | GND    |  |
| J12-4  | GND    |  |
| J12-5  | NC     |  |
| J12-6  | GND    |  |
| J12-7  | GND    |  |
| J12-8  | NC     |  |
| J12-9  | NC     |  |
| J12-10 | NC     |  |
| J12-11 | REFL   | J7-11<br>J14-11  |
| J12-12 | GND    |  |
| J12-13 | GND    |  |



Table 4-17. A14 Interconnect Board Continuity

| From   | Signal | To   |
|--------|--------|--|
| J12-14 | GND    |  |
| J12-15 | NC     |  |
| J12-16 | T+     | J2-17<br>J8-17<br>J9-17<br>J6-17<br>J11-16<br>J7-16<br>J7-17<br>J10-17<br>J14-17<br>J15-A2, C2 |
| J12-17 | GND    |  |
| J12-18 | NC     |  |
| J12-19 | GND    |  |
| J12-20 | GND    |  |
| J12-21 | NC     |  |
| J12-22 | NC     |  |
| J12-23 | NC     |  |
| J12-24 | NC     |  |
| J12-25 | NC     |  |
| J12-26 | FWD    | J7-26<br>J14-26  |
| J12-27 | NC     |  |
| J12-28 | NC     |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal | To   |
|--------|--------|--|
| J12-29 | +12V   | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J13-12<br>J13-27<br>J14-27<br>J14-12<br>J15-3 |
| J12-30 | GND    |  |
| J13-1  | GND    |  |
| J13-2  | RX IN  | J13-17   |
| J13-3  | FC     | J14-3<br>J14-18  |
| J13-4  | PA     | J13-19<br>J15-A1   |
| J13-5  | PTT    | J14-5<br>J9-5<br>J2-16   |
| J13-6  | BND1   | J14-6, C3  |
| J13-7  | BND2   | J14-6  |
| J13-8  | BND3   | J14-8  |
| J13-9  | BND4   | J14-9  |
| J13-10 | CO     | J14-10   |
| J13-11 | NC     |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal  | To   |
|--------|---------|--|
| J13-12 | +12V    | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J12-29<br>J13-27<br>J14-27<br>J14-12<br>J15-3 |
| J13-13 | FO      | J13-28   |
| J13-14 | GND     | J14-13<br>J14-28   |
| J13-15 | GND     | J14-13<br>J14-28   |
| J13-16 | GND     | J14-13<br>J14-28   |
| J13-17 | RX IN   | J13-2<br>J11-21  |
| J13-18 |         | J13-3<br>J14-18<br>J14-3   |
| J13-19 | PA      | J13-4<br>J15-A1  |
| J13-20 | T+ ENB  | J14-25   |
| J13-21 | RX ONLY | J2-18  |
| J13-22 | NC      |  |
| J13-23 | NC      |  |
| J13-24 | NC      |  |
| J13-25 | NC      |  |
| J13-26 | NC      |  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal | To   |
|--------|--------|--|
| J13-27 | +12V   | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J12-29<br>J13-12<br>J14-27<br>J14-12<br>J15-3 |
| J13-28 | FO     | J13-13<br>J14-13<br>J14-28   |
| J13-29 | GND    |  |
| J13-30 | GND    |  |
| J14-1  | GND    |  |
| J14-2  | R+     | J2-2<br>J8-2<br>J12-1<br>J9-2<br>J11-1<br>J7-2<br>J10-2<br>J6-2, C1  |
| J14-3  | FC     | J14-18<br>J13-3<br>J13-18  |
| J14-4  | PA     | J13-19<br>J15-A1   |
| J14-5  | PTT    | J14-5  |
| J14-6  | BND 1  | J14-6, C3  |
| J14-7  | BND 2  | J14-7  |
| J14-8  | BND 3  | J14-8  |
| J14-9  | BND 4  | J14-9  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal | To   |
|--------|--------|--|
| J14-10 | CO     | J14-10   |
| J14-11 | REFL   | J7-11<br>J12-11  |
| J14-12 | +12V   | J14-27<br>J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J12-29<br>J13-12<br>J13-27<br>J15-3 |
| J14-13 | FO     | J14-28<br>J13-3<br>J13-28<br>J14-25  |
| J14-14 | ANT    | P4 (TO A15<br>DISPLAY<br>BD.)<br>J14-29  |
| J14-15 | GND    |  |
| J14-16 | GND    |  |
| J14-17 | T+     | J2-17<br>J8-17<br>J9-17<br>J12-16<br>J11-16<br>J7-16<br>J7-17<br>J10-17<br>J15-A2<br>J6-17<br>C2   |
| J14-18 | FC     | J13-3<br>J13-18<br>J14-3   |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal    | To   |
|--------|-----------|--|
| J14-19 | GND       |  |
| J14-20 | D0        | J3-10<br>J4-10<br>J5-10<br>J2-10   |
| J14-21 | D1        | J2-25<br>J3-25<br>J4-25<br>J5-25   |
| J14-22 | D2        | J3-11<br>J5-11<br>J4-11<br>J2-11   |
| J14-23 | D3        | J3-26<br>J2-26   |
| J14-24 | I/O 24    | J4-24  |
| J14-25 | T+ ENABLE | J13-20   |
| J14-26 | FWD       | J7-26<br>J12-26  |
| J14-27 | +12V      | J14-12<br>J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J12-29<br>J13-12<br>J13-27<br>J15-3 |
| J14-28 | FO        | J14-13<br>J13-28<br>J13-13   |
| J14-29 | ANT       | J14-14<br>P4 (TO A15<br>DISPLAY<br>BD.)  |

Table 4-17. A14 Interconnect Board Continuity

| From   | Signal    | To  |
|--------|-----------|---|
| J14-30 | GND       |   |
| J15-1  | GND       |   |
| J15-2  | EXT ALC   | J7-1  |
| J15-3  | +12V      | J2-29<br>J3-29<br>J3-15<br>J4-29<br>J4-14<br>J5-29<br>J5-14<br>J6-29<br>J7-29<br>J8-29<br>J9-29<br>J10-29<br>J11-29<br>J12-29<br>J13-12<br>J13-27<br>J14-27<br>J14-12 |
| J15-4  | +12V BATT | J2-28<br>J15-9  |
| J15-5  | GND       |   |
| J15-6  | GND       |   |
| J15-7  | NC        |   |
| J15-8  | NC        |   |
| J15-9  | +12V BATT | J2-28<br>J15-4  |
| J15-10 | GND       |   |

**4-193 PAINTING, REFINISHING AND MARKING.**

Humiseal (item 6, App. C) A14 interconnect board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components. The part number is silkscreened/etched in each board at manufacturer level. Identify with dash Number (Figure 4-88). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09-.12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

**4-194 FINAL ASSEMBLY/INSTALLATION.**

No other assembly other than that defined in this section is required. Install the A14 interconnect board into the radio chassis assembly per the instructions in Section IX and perform the procedures in Section XXVII.

**Section XX. CARD CAGE ASSEMBLY****4-195 GENERAL.**

This section contains depot level maintenance instructions for the card cage assembly. Included in these instructions are directions for removal, cleaning, inspection, repair, refinishing/markings and final assembly/installation.

The card cage assembly (Figure 4-89) provides the mechanical structure for the radio chassis assembly. The A14 interconnect board attaches to the bottom of the card cage and the control panel assembly attaches to the front of it. The vertically mounted circuit card assemblies A1 through A12 slide into board retainers mounted on the sides of the card cage walls. Partitions with isolators between each of the vertically mounted circuit card assemblies and the control panel assembly provide Electromagnetic Interference protection between the circuit card assemblies.

**4-196 REMOVAL.**

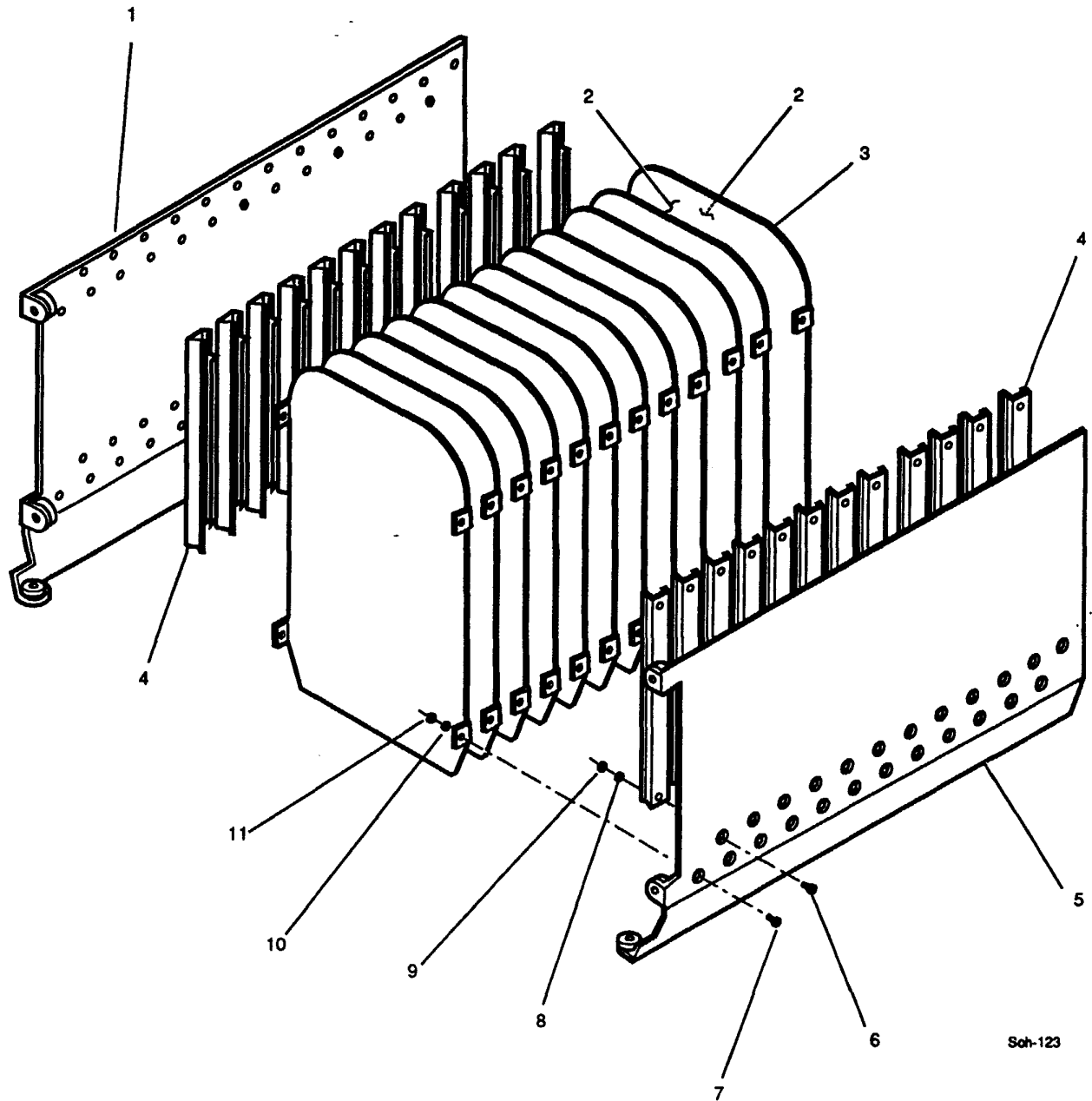
The card cage assembly is removed as part of the disassembly of the radio chassis assembly (Section IX). No other special precautions are required.

**4-197 DISASSEMBLY (Figure 4-89).**

The card cage assembly is comprised of two side walls with circuit card retainers and partitions with isolators in between. Each partition is sandwiched between two isolators. The circuit card retainers fasten to the sides of the card cage walls and the card cage walls fasten to the isolated partitions. Disassemble the card cage assembly as follows:

- a. Remove 48 screws (6), nuts (11), split washers (10), and left and right cages (5,1) from partitions (3).
- b. Remove 48 screws (7) nuts (9), lock washers (8), and circuit retainers (4) from left and right cages (5,1).
- c. If required, remove two isolators (2), one from each side, from each of 12 partitions (3).





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FIGURE 4-89. Disassembly of Card Cage Assembly

4-198 CLEANING.

Prior to disassembly, wipe down the card cage assembly with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

4-199 INSPECTION.

Check for damage to the partitions and isolators.

**4-200 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-201 REPAIR/REPLACE.**

The card cage assembly is repaired by replacing either of the card cage walls, board retainers, partitions, or isolators.

**4-202 RECLAMATION.**

There are no candidates for reclamation.

**4-203 ASSEMBLY (Figure 4-89).**

The card cage assembly is comprised of two side walls with circuit card retainers and partitions with isolators in between. Each partition is sandwiched between two isolators. The circuit card retainers fasten to the sides of the card cage walls and the card cage walls fasten to the isolated partitions. Assemble the card cage assembly as follows:

- a. If required, install two isolators (2), one to each side, to each of 12 partitions (3).
- b. Install 48 screws (7) nuts (9), lock washers (8), and circuit retainers (4) to left and right cages (5,1). Torque screws to 2.5 inch-pounds.
- c. Install 48 screws (6), nuts (11), split washers (10), and left and right cages (5,1) to partitions (3). Torque screws to 2.25 inch-pounds.

**4-204 PAINTING AND MARKING.**

Rubber stamp left cage wall per 16000933 with part number and revision.

**4-205 FINAL ASSEMBLY/INSTALLATION.**

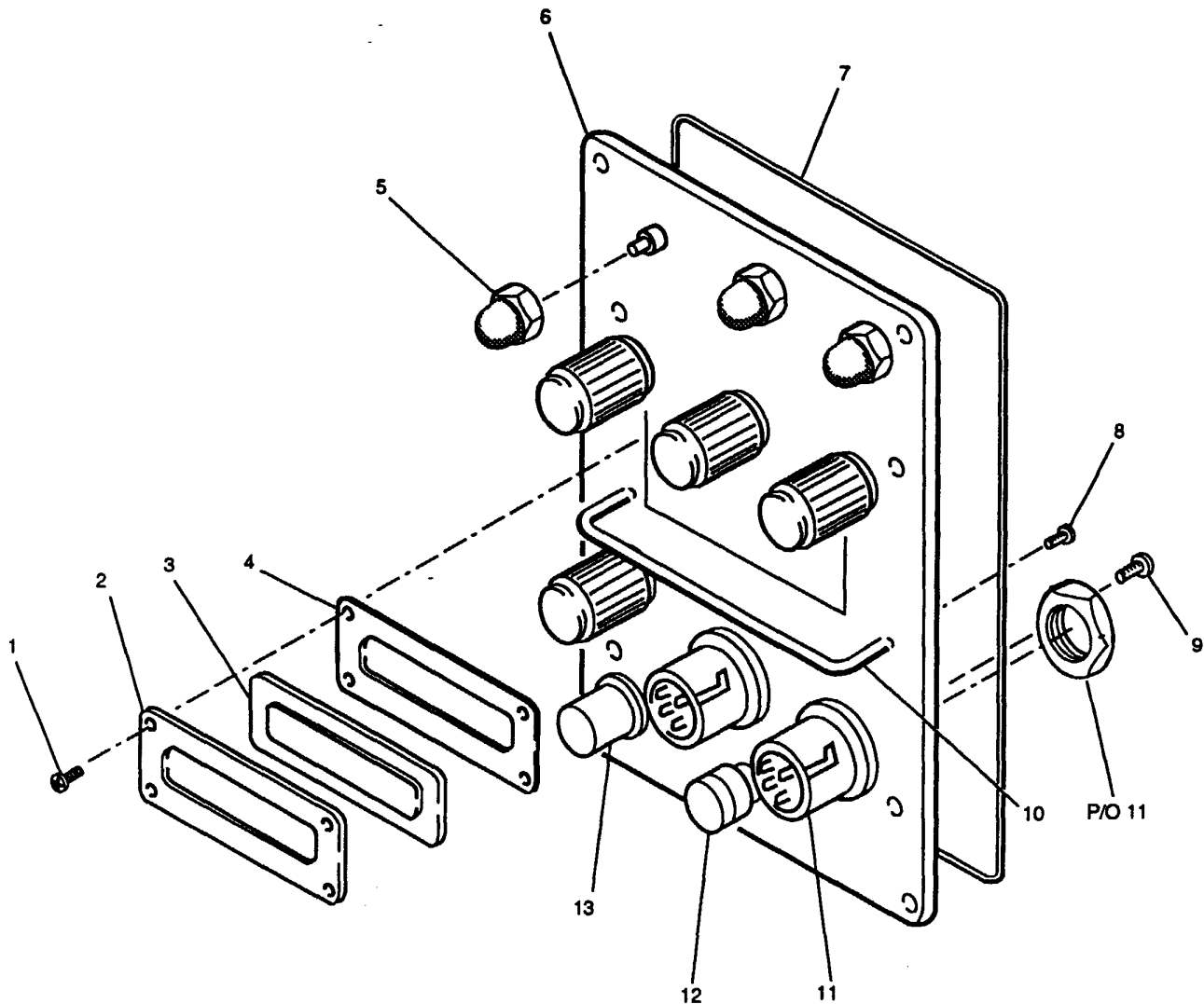
Install the assembled card cage to the radio chassis assembly per instructions in Section IX and perform the procedures in Section XXVII.

**Section XXI. CONTROL PANEL ASSEMBLY****4-206 GENERAL.**

This section contains depot level maintenance instructions for the A22 control panel assembly, which includes display board A15 and front panel board A16 as one unit. Included in these instructions are directions for removal, cleaning, inspection, test procedures, troubleshooting, repair, refinishing/markings and final assembly/installation.

The control panel assembly A22 (Figure 4-90) is mounted to the front of the radio chassis assembly and contains all of the controls and indicators necessary for operating the radio set.

The control panel assembly consists of various controls, switches, and a display that interfaces to the A15 display board. The A15 display board interfaces with the A16 front panel board which interfaces to the radio chassis assembly via its connection to the A14 interconnect board.



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FIGURE 4-90. Disassembly of Control Panel Assembly (Sheet 1 of 2)

4-207 REMOVAL.

**CAUTION**

The control panel assembly contains electrostatic devices that are sensitive to damage by electrostatic discharge (ESD). Use ESD precautionary procedures when handling this assembly and its component parts.

The control panel assembly is removed per the instructions contained in Section IX.

4-208 DISASSEMBLY (Figure 4-90).

Disassembly of the control panel assembly involves removal of certain control panel knobs, switches, and the A16 front panel board. The control panel assembly is not coded for complete disassembly. Only the items for which disassembly procedures exist below are approved for disassembly. The A15 display

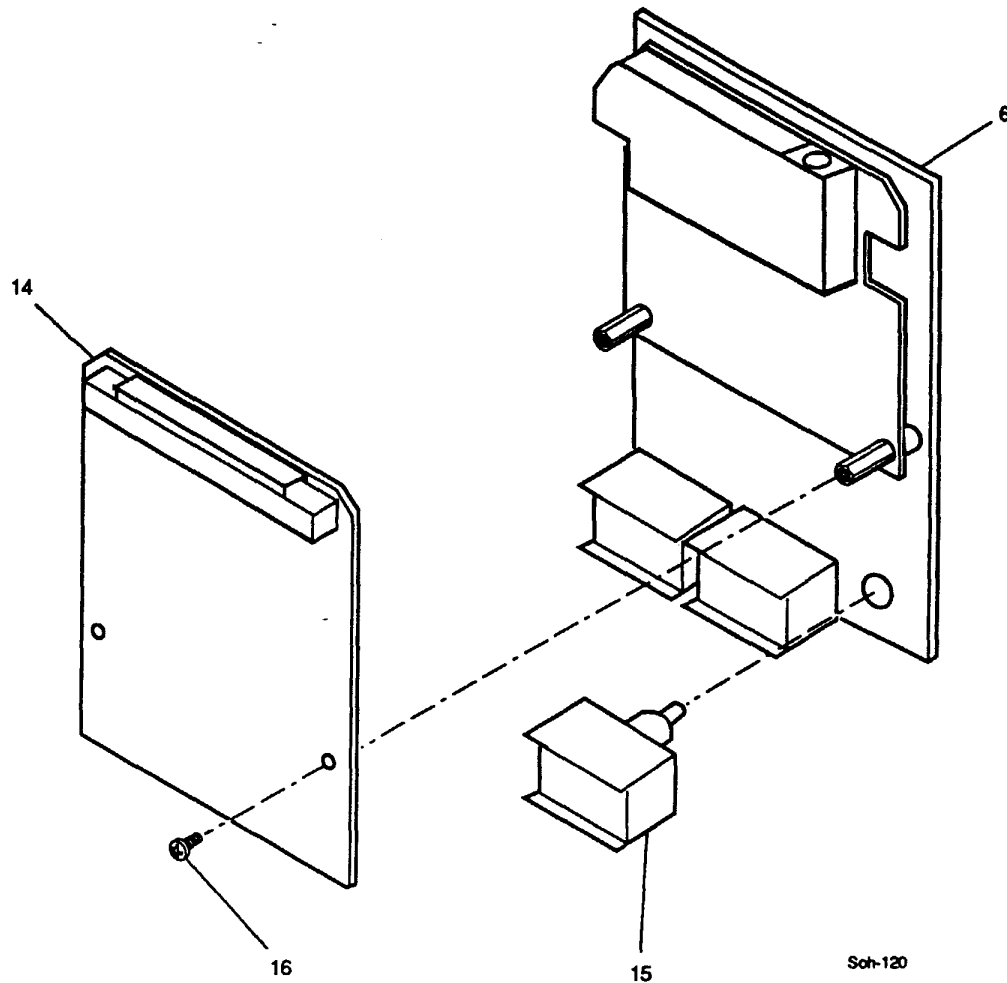


FIGURE 4-90. Disassembly of Control Panel Assembly (Sheet 2 of 2)

board is among the items that are not approved for disassembly. Disassemble the control panel assembly as follows:

a. Remove front panel controls as follows:

- (1) Remove four screws (1) from bezel (2), window display (3) and panel gasket (4).
- (2) Carefully pull panel gasket (7) away from front panel (6).

**CAUTION**

Take care not to scratch rear surface of panel.

- (3) Remove handle (10) by removing two screws (8) from rear of panel.
- (4) Remove binding post (12) by removing screw (9).
- (5) Remove 6 pin connectors (11) by removing large hex nut (P/O 11) from connector end at rear of panel.

**NOTE**

**Bulkhead connector (13) is threaded into assembly.**

- (6) Remove bulkhead connector (13) from front panel by turning counterclockwise.
- b. Remove switches S4 through S6 as follows:
  - (1) Remove dust boots (5) from switch shaft by turning hex base counterclockwise.
  - (2) Switches (15) are released when dust boots (5) are removed. Grasp them firmly and pull them straight back away from assembly.
  - (3) Remove wire leads from back of switch.
- c. Remove A16 front panel board assembly as follows:
  - (1) Remove six wire leads from terminals on A16 front panel board.
  - (2) Remove two screws (16) and A16 front panel board (14) from front panel (6).

**NOTE**

The A15 display board shall remain attached to the front panel and is not to be disassembled as a separate component.

4-209 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-210 INSPECTION.

- a. Inspect control panel assembly for missing or damaged components and for any components that may be improperly installed.
- b. Inspect control panel assembly for solder bridges or other mechanical problems.
- c. Inspect soldered side of the control panel assembly for any exposed surfaces through humiseal coating. If visual inspection is in compliance, mark (X) on data sheet.
- d. Repair control panel assembly as necessary (Paragraph 4-212).

**4-211 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-212 REPAIR/REPLACE.**

- a. Troubleshoot assembly using procedure in paragraph 4-216.
- b. Repair the control panel assembly by replacing the items assembled in paragraph 4-213.

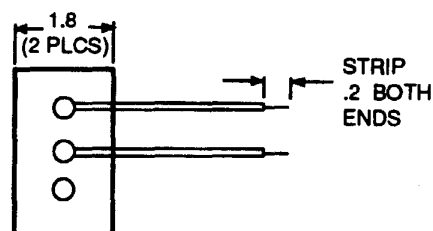
**4-213 ASSEMBLY.**

- a. Install A16 front panel board to control panel assembly as follows:
  - (1) Install two screws (16) and A16 front panel board (14) to standoffs on rear of front panel (6).
  - (2) If new wiring for switches S4 through S6 is required, strip .2 inches off both ends of two 1.8 inch wire segments (Figure 4-90, Sheet 2). Solder wire to terminals on front panel board.
- b. Install switches S4 through S6 as follows:
  - (1) Tighten nut on switches (15) before installing through panel.

**NOTE**

Switches (15) are attached to front panel (6) when dust boots (5) are installed.

- (2) Push switch shaft through hole in front panel (6).
  - (3) Install switch (15) and dust boot (5) to front panel (6).
- c. Install wire leads to switch S4-S6 Normally Open and Common terminals as follows (Figure 4-91):



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FIGURE 4-91. Switch S4-S6 Wiring

- (1) Prepare two 1.8 inch segments of wire.
- (2) Snip .2 inches from each end of both wire segments.

(3) Solder wires to C and NO terminals.

d. Install front cover assembly controls as follows:

**CAUTION**

Bulkhead connector (13) is screwed into threaded front panel. Be careful not to over-tighten and strip front panel threads.

- (1) Screw bulkhead connector (13) to front panel (6).
- (2) Install 6 pin connectors (11) by attaching large hex nut (P/O 11) to connector at rear of front panel.
- (3) Install binding post (12) to front panel (6) as follows:
  - (a) Position slot in binding post (12) parallel to top edge of panel.
  - (b) Install binding post (12) by attaching screw (9).
- (4) Install two screws (8) and handle (10) to front panel.
- (5) Carefully place panel gasket (7) behind front panel (6).
- (6) Install two screws (1), bezel (2), window display (3) and panel gasket (4) to front panel.

**4-214 LUBRICATION.**

None required.

**4-215 TESTING.**

This test procedure covers electrical testing of the control panel assembly. The control panel assembly consists of the control panel itself, which contains radio controls and connectors, the A15 display board and A16 front panel board, which are both attached to the rear of the control panel to form the complete control panel assembly.

The A16 front panel board accepts switch data from panel controls and interfaces them with control signals to A1 processor board data bus in radio. This is done with a programmable logic device (IC). Circuitry on the A16 board also generates ALC reference voltage that controls the transceiver RF output power level. The A15 display board contains the liquid crystal display (LCD), which is visible through the control panel window, secure lighting for illuminating LCD and logic circuitry required to interface with the LCD.

Be familiar with the operation of transceiver controls and corresponding readouts on display (TM 11-5802-1102-10).

**4-215.1 Conditions.** Test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ .

**4-215.2 Equipment.** The following table lists unique and standard test equipment required for testing and alignment of control panel assembly. Equivalent alternate test equipment may be substituted for any of the items listed below. Verify test equipment is calibrated and operating properly prior to testing.

| <u>DESCRIPTION</u>                  | <u>QTY.</u> |
|-------------------------------------|-------------|
| Control Panel Assembly Test Fixture | 1           |
| Current Meter                       | 1           |
| Digital Multimeter                  | 1           |
| Frequency Counter                   | 1           |
| Network Analyzer                    | 1           |
| Power Supply                        | 1           |
| S Parameter Test Set                | 1           |
| Tool Kit                            | 1           |

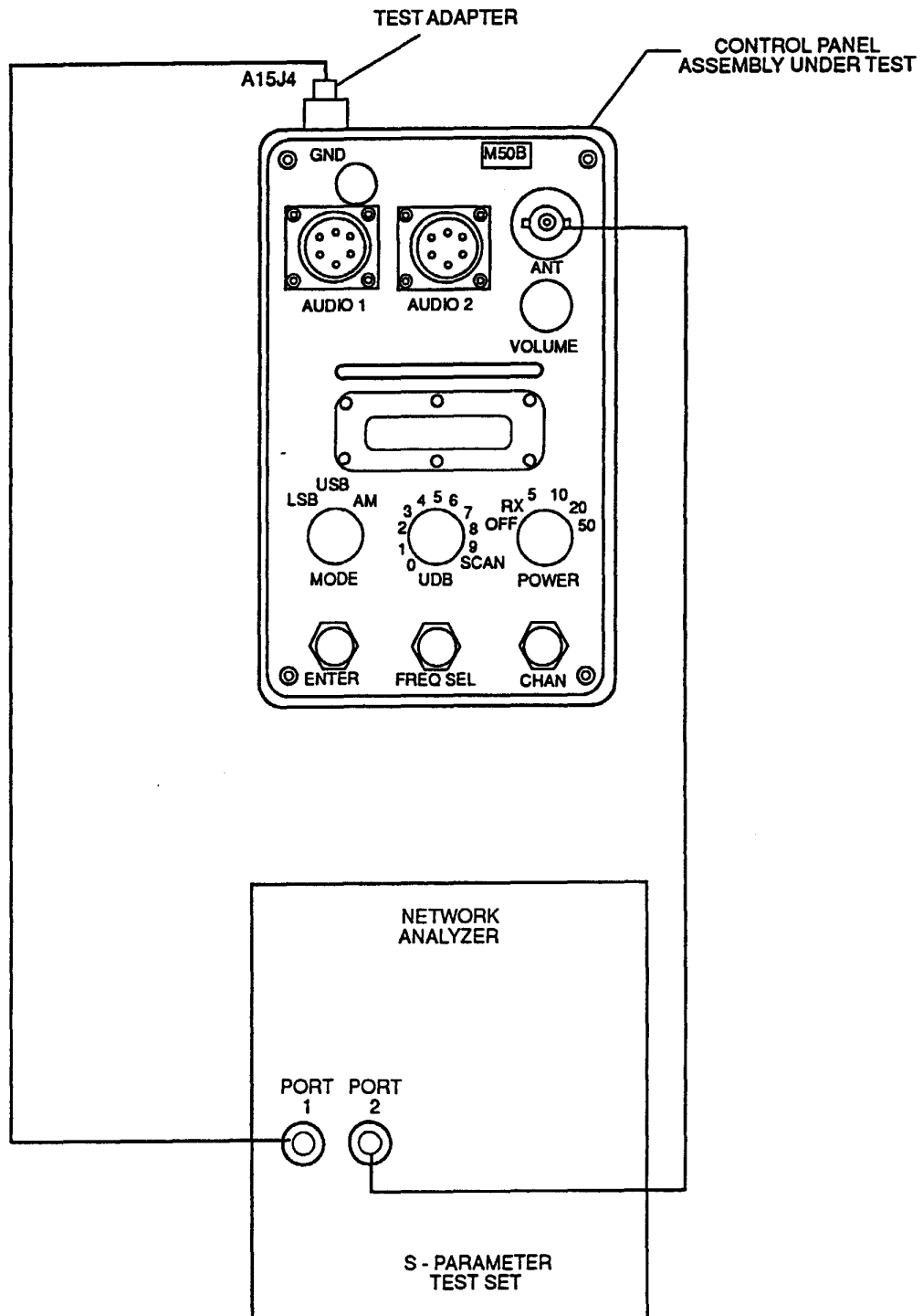
#### 4-215.3 EMI Filter Response.

- a. Before installing control panel assembly in test fixture, check EMI filter response.
- b. Set controls of network analyzer as follows:
 

|                  |            |
|------------------|------------|
| Start Frequency: | 1.6 MHz    |
| Stop Frequency:  | 50 MHz     |
| Amplitude:       | -5 dBm     |
| Scale:           | .1 dB/div. |
| Reference:       | 0 dB       |
- c. Connect two network analyzer test cables together using BNC-to-BNC barrel adapter to normalize network analyzer to a 0 dBm reference level.
- d. Connect test cables from S-parameter test set to EMI filter circuitry in control panel assembly under test as shown in Figure 4-92. Connect one coax test cable from Port 1 on S-parameter test set to EMI filter input connector (A15J4) on control panel assembly. Connector A15J4 is located on A15 board at top of control panel assembly. Connect second coax test cable from ANT connector on front of control panel assembly to Port 2 on S-parameter test set.
- e. Measure and record maximum loss with respect to reference established in step 4-215.3.b over frequency range from 1.6 MHz to 50 MHz.
- f. Set controls of network analyzer as follows:
 

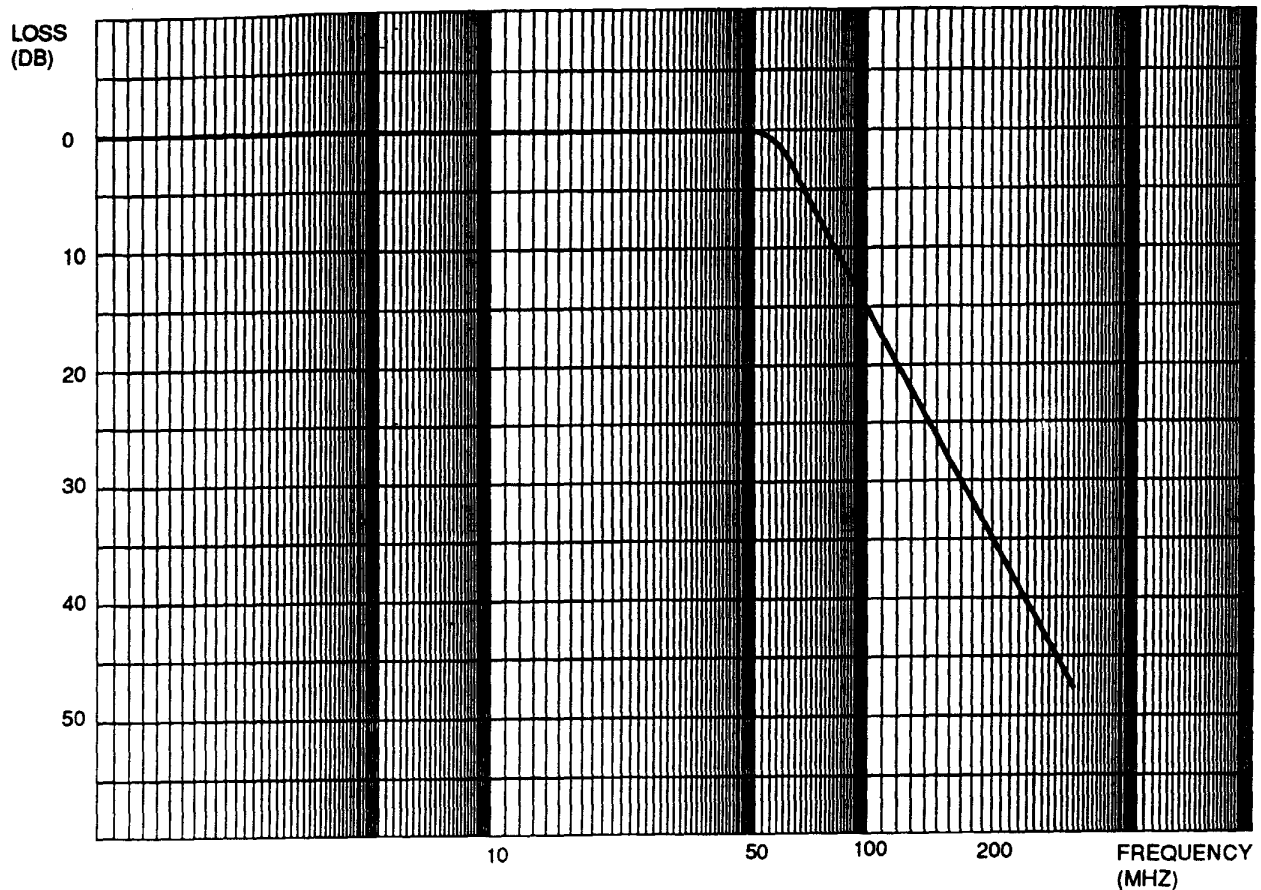
|        |           |
|--------|-----------|
| Start: | 1.6 MHz   |
| Stop:  | 150 MHz   |
| Amp:   | -5 dBm    |
| Scale: | 10 dB/DIV |
| Ref:   | 0 dB      |
- g. Connect two network analyzer test cables together to normalize network analyzer to a 0 dBm reference level.
- h. Repeat step 4-215.3.d and verify filter response is approximately as shown in Figure 4-93 with loss at 120 MHz greater than or equal to 20 dB. Record loss at 120 MHz on data sheet.
- i. This completes electrical testing of EMI Filter.
- j. Disconnect EMI filter test cables from control panel assembly.





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FIGURE 4-92. EMI Test Setup



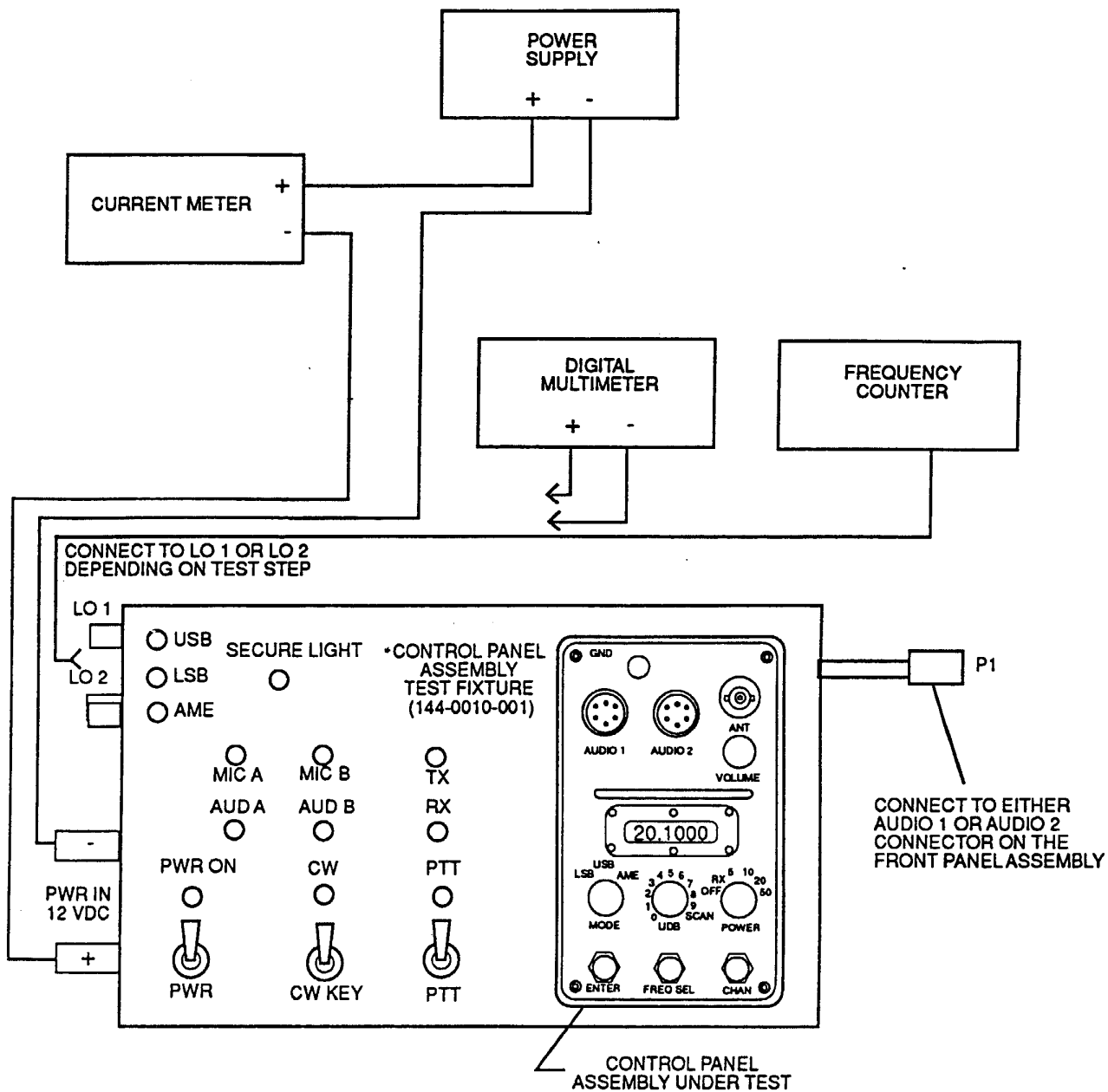
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FIGURE 4-93. EMI Filter Response Curve

4-215.4 Setup.**CAUTION**

When installing the control panel assembly in test fixture, do not force them into mating connectors in the fixture. Be sure control panel assembly is properly oriented with corresponding test fixture connectors before inserting.

- a. Install control panel assembly in test fixture and connect external test equipment as shown in Figure 4-94. Be sure to connect P1 from test fixture to either the AUDIO 1 or AUDIO 2 connector on the front of control panel assembly.
- b. Set test fixture PWR switch to OFF.
- c. Connect power supply to terminals on left side of the test fixture.
- d. Turn power supply ON and adjust it to  $+12 \pm 0.1$  Vdc. Use DMM to set voltage at test fixture voltage terminals.



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FIGURE 4-94. Control Panel Test Setup

**4-215.5 Power Up Sequence.**

- a. Set test fixture switches and control panel assembly switches as shown below.

|                               |            |
|-------------------------------|------------|
| Test Fixture Power Switch:    | OFF (Down) |
| Test Fixture CW Key Switch:   | OFF (Down) |
| Test Fixture PTT Switch:      | OFF (down) |
| Control Panel POWER Switch:   | OFF        |
| Control Panel MODE Switch:    | LSB        |
| Control Panel SELECT Switch:  | 1          |
| Control Panel VOLUME Control: | Full CW    |

- b. Verify all LED indicators on test fixture are off. Mark X on data sheet.
- c. Set test fixture PWR switch to ON. Verify PWR LED indication is ON. Mark an X on data sheet.
- d. Set control panel POWER Switch to RX position.
- e. Verify control panel display goes through an initialization state then changes to read 10.0000 or the last entered receive frequency, if control panel under test was previously tested and programmed. Mark X on data sheet.
- f. Verify LSB, RX, AUD A, AUD B, MIC A and MIC B are on. Mark X on data sheet.
- g. Observe reading on current meter. Record current reading on test data sheet.

**NOTE**

TP1 is on left side of control panel assembly. It is accessed through a hole in left side rail.

- h. Measure dc voltage at TP1 on A16 PCB (Figure 4-95). Use DMM with clip-on connector. Record dc voltage on data sheet.
- i. Slowly rotate control panel volume control counterclockwise and verify AUD A and AUD B LED indicators dim. Mark X on data sheet.

**4-215.6 Power Adjustment Test.****NOTE**

TP2 is on right side of control panel assembly and is accessed through a hole in the right side rail.

- a. Adjust R19 as follows:
- (1) Set RF power switch to 5.
  - (2) Rotate R19 fully CW.
  - (3) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (4) Rotate R19 fully CCW.
  - (5) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.

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- (6) Rotate R19 so that value measured at TP2 is 2.5 Vdc.
- b. Adjust R18 as follows:
- (1) Set RF power switch to 10.
  - (2) Rotate R18 fully CW.
  - (3) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (4) Rotate R18 fully CCW.
  - (5) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (6) Rotate R18 so that value measured at TP2 is 3.5 Vdc.
- c. Adjust R17 as follows:
- (1) Set RF power switch to 20.
  - (2) Rotate R17 fully CW.
  - (3) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (4) Rotate R17 fully CCW.
  - (5) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (6) Rotate R17 so that value measured at TP2 is 4.5 Vdc.
- d. Adjust R16 as follows:
- (1) Set RF power switch to 50.
  - (2) Rotate R16 fully CW.
  - (3) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (4) Rotate R16 fully CCW.
  - (5) Measure voltage at TP2. Use DMM. Enter measured voltage on data sheet.
  - (6) Rotate R16 so that value measured at TP2 is 6.5 Vdc.

**4-215.7 Channel Programming.**

- a. Clear all frequencies by momentarily depressing the control panel FREQ SEL button six times before proceeding. Verify H's appear at all positions on control panel display and display shows a receive frequency of 10.0000 MHz. Mark X on data sheet.
- b. Enter a receive frequency of 12.3456 on channel 01 and verify selected receiver frequency appears on display as it is entered. Verify "T" annunciator is visible on display above the decimal after receiver frequency is entered. Mark X's on data sheet.

- c. Enter a transmit frequency of 49.8770 MHz and verify selected transmit frequency appears on display as it is entered. Verify receiver frequency (12.3456 MHz) once again appears on display after complete transmit frequency is entered. Mark X's on data sheet.
- d. Set control panel SELECT (Middle) switch to UDB position and depress FREQ SEL button. Verify PL01 is displayed. Since channel 01 was programmed in step b, the display will read PL01. Mark X on data sheet.
- e. Depress control panel ENTER switch and verify receive frequency of 12.3456 appears on display. Mark (X) on data sheet.
- f. Depress FREQ SEL button five to ten times to increment receive frequency in .1 kHz steps. Mark (X) on data sheet.
- g. Depress ENTER button five to ten times to decrement receive frequency in .1 kHz steps. Mark (X) on data sheet.
- h. Increment or decrement receive frequency back to 12.3456 MHz. Verify displayed receive frequency does increment and decrement in .1 kHz steps. Mark X's on data sheet.
- i. Select SCAN on control panel SELECT (Middle) switch and depress CHAN button. Verify HL01 appears on display. Mark (X) on data sheet.
- j. Depress ENTER button and verify 12.3456 MHz receive frequency appears on display. Mark (X) on data sheet.
- k. Depress FREQ SEL button, then depress CHAN button and verify HL02 appears on display. Mark (X) on data sheet.
- l. Depress FREQ SEL button again, then CHAN button and verify HL03 appears on display. Mark (X) on data sheet.
- m. Repeat this procedure for all 11 channels (HL11), then return to HL01. Mark X's on data sheet as each step is successfully completed.
- n. Select LSB, USB and AME positions on control panel MODE switch, in that order, and verify that only corresponding indicator on test fixture lights, as shown in Table 4-18. Mark X on data sheet for each MODE switch setting.

Table 4-18. Test Fixture Indicators for Selected Mode Settings

| FRONT PANEL MODE SWITCH SETTING | TEST FIXTURE INDICATORS |     |     |
|---------------------------------|-------------------------|-----|-----|
|                                 | LSB                     | USB | AME |
| LSB                             | ON                      | OFF | OFF |
| USB                             | OFF                     | ON  | OFF |
| AME                             | OFF                     | ON  | ON  |

4-215.8 Secure Lite.

- a. Turn control panel POWER switch to OFF and then to RX.

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- b. Depress and release CHAN button twice. Verify test fixture SECURE LIGHT LED indicator is on and both green lights on control panel assembly LCD display are on. Mark X on data sheet.
- c. Observe current meter and record current on test data sheet. Record current on data sheet.
- d. Depress and release CHAN button twice again and verify test fixture SECURE LIGHT LED indicator is off and both green lights on control panel assembly LCD display are off. Mark X on data sheet.

4-215.9 TX Mode.

- a. Verify control panel POWER switch is in RX position. Verify RX LED indicator on test fixture is on and TX LED indicator is off. Mark X on data sheet.
- b. Set test fixture PTT switch to ON position and verify RX LED indicator stays on and TX LED indicator stays off. Mark X on data sheet.
- c. Set PTT switch to OFF.
- d. Set control panel POWER switch to the 5 position. Verify RX LED indicator is on and TX LED indicator is off.
- e. Set PTT switch to ON position and verify RX LED indicator is off, TX LED indicator is on and front panel display shows 49.8770.
- f. Set PTT switch to the OFF position. Mark X's on data sheet.
- g. Repeat steps 4-215.9.d through 4-215.9.f with control panel POWER switch set to 10, 20 and 50 positions.
- h. Turn PTT switch to OFF position at end of this test.
- i. Set test fixture CW switch to ON position. Verify CW LED indicator goes from OFF to ON. Mark X on data sheet. Return CW switch to OFF position.
- j. Connect frequency counter to LO1. Measure and record output frequency on data sheet.
- k. Set PTT switch on test fixture to ON position. Measure and record LO1 output frequency on data sheet.
- l. Connect frequency counter to LO2 output. Measure and record LO2 output frequency.
- m. Set PTT switch to OFF. Measure and record LO2 output frequency.
- n. Rotate control panel SELECT (Middle) switch to any digit, 0 through 9.
- o. Clear all frequencies by momentarily depressing control panel FREQ SEL button six times before proceeding. Verify H's appear at all positions on control panel display and display shows a receive frequency of 10.0000 MHz. Mark X on data sheet.
- p. Turn off test set and power supply.

**4-216 A22 TROUBLESHOOTING.**

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-19. Indicated components are listed in the recommended order of replacement.

**4-217 PAINTING, REFINISHING AND MARKING.**

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

**4-218 FINAL ASSEMBLY/INSTALLATION.**

No other assembly instructions other than those in this section are required. Install the control panel into the radio chassis assembly in Section IX and perform the procedures in Section XXVII.

**CONTROL PANEL ASSEMBLY DATA SHEET**

| <u>Para. No.</u> | <u>Test</u>  | <u>Measurement</u>    | <u>Limits</u>  |
|------------------|--|-----------------------|--|
| 4-210.c          | Visual Mechanical Inspection                                   | _____                 | (X)  |
| 4-215.3.e        | EMI filter in-band loss (maximum)<br>Frequency of maximum loss | _____ dB<br>_____ MHz | 0.3 dB maximum<br>Reference  |
| 4-215.3.h        | EMI filter out-of-band response<br>EMI filter loss at 120 MHz  | _____ dB              | Figure 4 response (X)<br>20 dB minimum   |
| 4-215.5.b        | Initial power up   | _____                 | All LEDs OFF (X)   |
| 4-215.5.c        | Test fixture power on  | _____                 | PWR ON LED ON (X)  |
| 4-215.5.e        | Control Panel power on to RX                                   | _____                 | Display indicates 88.8888<br>with "T" lit, then goes to<br>10.0000 or last entered<br>receiver frequency (X) |
| 4-215.5.f        | Control Panel power on to RX                                   | _____                 | AUD A, AUD B, MIC A, MIC<br>B, PWR ON, LSB, and RX<br>LEDs ON (X)  |
| 4-215.5.g        | Current Measurement  | _____                 | 185 mA $\pm$ 10 mA   |
| 4-215.5.h        | TP1 Voltage  | _____                 | +5 Vdc $\pm$ 0.1 Vdc   |
| 4-215.5.i        | Volume control   | _____                 | AUD A and AUD B LEDs<br>dim (X)  |



## CONTROL PANEL ASSEMBLY DATA SHEET

| <u>Para. No.</u> | <u>Test</u>                                      | <u>Measurement</u> | <u>Limits</u>   |
|------------------|--|--------------------|---|
| 4-215.6          | Power Adjustment Pots                            |                    |   |
|                  | -R19 (CW)  | _____              | 1.5V to 1.9V  |
|                  | -R19 (CCW)                                       | _____              | 3.5V to 3.9V  |
|                  | -R18 (CW)  | _____              | 2.0V to 2.4V  |
|                  | -R18 (CCW)                                       | _____              | 4.4V to 4.9V  |
|                  | -R17 (CW)  | _____              | 3.2V to 3.6V  |
|                  | -R17 (CCW)                                       | _____              | 7.0V to 7.8V  |
|                  | -R16 (CW)  | _____              | 4.0V to 4.6V  |
|                  | -R16 (CCW)                                       | _____              | 7.5V to 8.5V  |
| 4-215.7.a        | Clear previous frequencies                       | _____<br>_____     | H's on display<br>10.0000 on display (X)  |
| 4-215.7.b        | Enter receive frequency of 12.3456 MHz           | _____<br>_____     | Display reads 12.3456 (X)<br>"T" appears after receive frequency is entered (X)                           |
| 4-215.7.c        | Enter transmit frequency of 49.8770 MHz          | _____<br>_____     | Display reads 49.8770 (X)<br>Receive frequency of 12.3456 appears after transmit frequency is entered (X) |
| 4-215.7.d        | Channel Select                                   | _____              | PL01 displayed (X)  |
| 4-215.7.e        | Receive frequency increment/decrement            | _____              | Receive frequency of 12.3456 displayed (X)  |
| 4-215.7.f        | Increment in .1 kHz steps (X)                    |                    |   |
| 4-215.7.g        | Decrement in .1 kHz steps (X)                    |                    |   |
| 4-215.7.h        | Receive frequency 12.3456 (X)                    |                    |   |
| 4-215.7.i        | SCAN   | _____              | HL01 appears on display (X)   |
| 4-215.7.j        | Receive frequency 12.3456 appears on display (X) |                    |   |
| 4-215.7.k        | HL02 appears (X)                                 |                    |   |
| 4-215.7.l        | HL03 appears (X)                                 |                    |   |

## CONTROL PANEL ASSEMBLY DATA SHEET (CONT.)

| <u>Para. No.</u> | <u>Test</u>                                | <u>Measurement</u>                  | <u>Limits</u>  |
|------------------|--|-------------------------------------|--|
| 4-215.7.m        | HL04 appears (X)                           | _____                               | HL05 appears (X)<br>HL06 appears (X)<br>HL07 appears (X)<br>HL08 appears (X)<br>HL09 appears (X)<br>HL10 appears (X)<br>HL11 appears (X)<br>HL01 appears (X) |
| 4-215.7.n        | LSB, USB and AME position                  | _____ LSB<br>_____ USB<br>_____ AME | Appropriate Indicators Illuminated on Test Fixture (X)   |
| 4-215.8.b        | Secure light ON                            | _____                               | SECURE LIGHT LED ON and Control Panel Assy LCD display lights illuminated (X)  |
| 4-215.8.c        | DC Current measurement                     | _____ mA                            | No more than 120 mA greater than in paragraph 4-215.5.g  |
| 4-215.8.d        | Secure light OFF                           | _____                               | SECURE LIGHT LED OFF and control panel assembly LCD lights extinguished (X)  |
| 4-215.9          | TX Mode                                    |                                     |  |
| 4-215.9.a        | RX Mode, PTT OFF                           | _____                               | RX LED ON, TX LED OFF (X)  |
| 4-215.9.b        | Rx Mode, PTT ON                            | _____                               | RX LED ON, TX LED OFF (X)  |
| 4-215.9.c        | 5W Mode, PTT OFF                           | _____                               | RX LED ON, TX LED OFF (X)  |
| 4-215.9.d        | 5W Mode, PTT ON                            | _____                               | RX LED OFF, TX LED ON (X)  |
| 4-215.9.e        | Display is 49 <sup>T</sup> 8770 with T (X) |                                     |  |
| 4-215.9.f        | SW mode PTT OFF                            | _____                               | (X)  |

## CONTROL PANEL ASSEMBLY DATA SHEET (CONT.)

| <u>Para. No.</u> | <u>Test</u>                                | <u>Measurement</u> | <u>Limits</u>  |
|------------------|--|--------------------|--|
| 4-215.9.g        | 10W Mode, PTT OFF<br>10W Mode, PTT ON      | _____              | RX LED ON, TX LED OFF  |
|                  |  | _____              | RX LED OFF, TX LED ON  |
|                  | 20W Mode, PTT OFF<br>20W Mode, PTT ON      | _____              | Display is 49.8770 with T (X)  |
|                  |  | _____              | RX LED ON, TX LED OFF  |
|                  | 50W Mode, PTT OFF<br>50W Mode, PTT ON      | _____              | RX LED OFF, TX LED ON  |
|                  |  | _____              | Display is 49.8770 with T (X)  |
| 4-215.9.i        | CW Mode                                    | _____              | RX LED ON, TX LED OFF<br>RX LED OFF TX LED ON<br>Display is 49.8770 with T (X) |
| 4-215.9.j        | Receive mode 1 <sup>st</sup> LO frequency  | _____ MHz          | CW LED ON (X)  |
| 4-215.9.k        | Transmit mode 1 <sup>st</sup> LO frequency | _____ MHz          | 84.54 MHz ± 85 Hz  |
| 4-215.9.l        | Transmit mode 2 <sup>nd</sup> LO frequency | _____ MHz          | 122.07 MHz ± 122 Hz  |
| 4-215.9.m        | Receive mode 2 <sup>nd</sup> LO frequency  | _____ MHz          | 82.433 MHz ± 83 Hz   |
| 4-215.9.o        | Clear previous frequencies                 | _____              | 82.4344 MHz ± 83 Hz  |
|                  |  | _____              | H's on display (X)   |
|                  |  | _____              | 10.0000 on display (X)   |

## Section XXII. A16 FRONT PANEL

## 4-219 GENERAL.

This section contains depot level maintenance instructions for the A16 front panel board. Included in these instructions are directions for removal, cleaning, inspection, test procedures, repair, refinishing/markings and final assembly/installation.

The A16 front panel board is mounted to the rear of the control panel assembly and provides the interface between control panel controls and the A1 processor board.

## 4-220 REMOVAL.

**CAUTION**

The A16 front panel board and its component parts contain electrostatic devices that are sensitive to damage by electrostatic discharge (ESD). Use ESD procedures when handling this assembly and its component parts.

The front panel board is removed from the control panel assembly per the instructions Section XXI.

Table 4-19. A22 Troubleshooting

| Symptom  | Paragraph   | Suspect Component(s) (Precede reference designators with A16) |
|--|---|---|
| Assembly does not initialize                       | 4-215.5.b   | F1, F2, S3, VR1   |
| Problem with LEDs during initialization            | 4-215.5.c   | Bad LEDs, connectors (AUDIO 1, AUDIO 2), A15                  |
| Problem with control panel power to RX             | 4-215.5.f   | S2, S3  |
| Inaccurate TP1 voltage                             | 4-215.5.h   | VR1   |
| Audio level intermittent or not present            | 4-215.5.i   | U1  |
| Problem with power adjustment pots                 | 4-215.6   | R19 or power switch, S3                                       |
| Unable to clear previous frequencies               | 4-215.7.a   | S4, U1  |
| Problem entering RX/TX frequencies 12.3456-49.8770 | 4-215.7.b<br>4-215.7.c  | S1, S4-S6, U1   |
| Channel select problem                             | 4-215.7.d, 4-215.7.e<br>4-215.7.f, 4-215.7.g<br>4-215.7.h                         | U1  |
| Problem with SCAN                                  | 4-215.7.i, 4-215.7.j<br>4-215.7.k, 4-215.7.l<br>4-215.7.m                         | S1, U1, RN3 & RN4   |
| Unable to put in LSB, USB or AME position          | 4-215.7.n   | S2  |
| Problem with secure lighting                       | 4-215.8.b, 4-215.8.c<br>4-215.8.d   | Q2, CR6, A15  |
| Problem with PTT                                   | 4-215.9.a, 4-215.9.b<br>4-215.9.c, 4-215.9.d<br>4-215.9.e, 4-215.9.f<br>4-215.9.g | U1, U4, RN1   |
| Display missing segments or digits                 | 4-215.5.e   | Connection between A16 and A15.<br>Replace A15.               |
| Unable to turn on CW mode                          | 4-215.9.i   | A15, U1   |
| Problems with EMI filter                           | 4-215.3.e<br>4-215.3.h  | A15   |
| Inaccurate RX/TX LO frequencies                    | 4-215.9.j, 4-215.9.k<br>4-215.9.l, 4-215.9.m                                      | U1  |
| Current out of range                               | 4-215.5.g   | VR1, ensure secure lighting is OFF.                           |

4-221 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

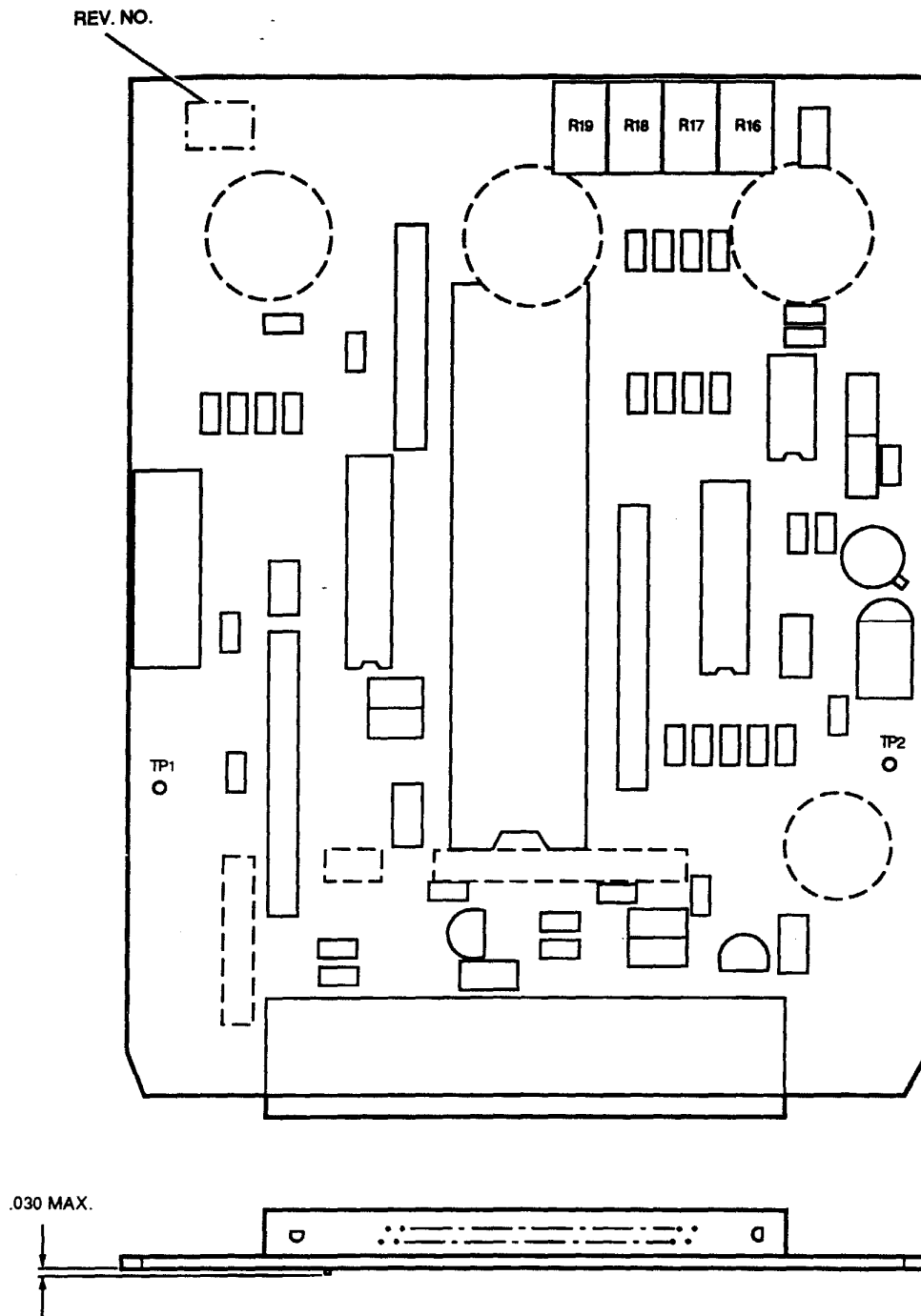
- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-222 INSPECTION.

- a. Inspect A16 front panel board to ensure keying pins are oriented as indicated and coax cable is soldered as shown in Figure 4-94.
- b. Inspect front panel board for broken, missing or damaged components and for any components that may be improperly installed.
- c. Inspect component height on component side. Height shall be no greater than 0.29 inches. (Figure 4-95).
- d. Inspect front panel board for solder bridges or other mechanical problems.
- e. Inspect front panel board for any exposed surfaces through humiseal coating.
- f. Repair front panel board as necessary (Paragraph 4-223).

4-223 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-225.
- b. Inspect front panel board to ensure keying pins are oriented as indicated in Figure 4-94.
- c. Ensure no leads extend more than 0.030 inches above circuit side of front panel board (Figure 4-95).
- d. Clip lead extensions in outlined area shown in Figure 4-95 flush to PCB before soldering.
- e. When replacing LED DS1, note that cathode side of LED DS1 contains a beveled edge (Figure 4-96).
- f. Remove bottom cross support after soldering U1.
- g. Replacing switches S1-S3 as follows (Figure 4-97):
  - (1) Remove stop pins under retainer nut from switch.



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FIGURE 4-95. Repair of PCB and Connector Keying

- (2) Install one pin between positions 1 and 2.
  - (3) Reinstall retainer nut and discard remaining pin.
- h. Solder electronic components using solder S/N 62 (item 20, App. C).

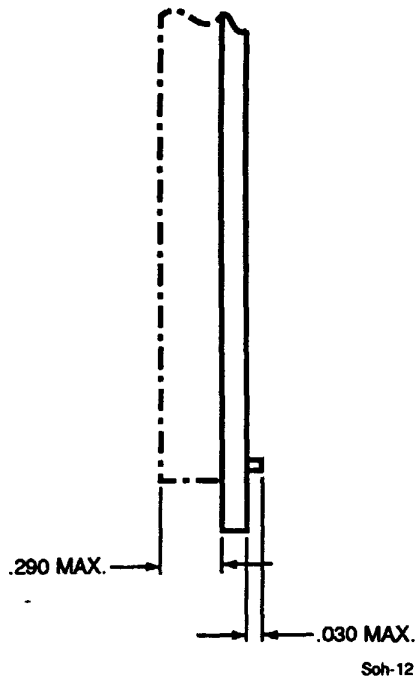


FIGURE 4-96. Component and Lead Extension Off PWB



FIGURE 4-97. Diode DS1 Installation

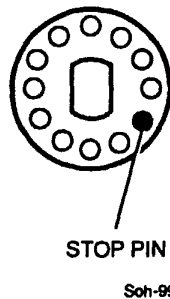


FIGURE 4-98. Switch S1-S3 Installation

- i. Humiseal (item 6, App. C) both sides of front panel board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connectors, test points, switches, pads, and adjustable components.

**4-224 TESTING.**

The A16 front panel board is tested as part of the control panel assembly (Section XIV).

**4-225 TROUBLESHOOTING.**

The A16 front panel board is troubleshot as part of the control panel assembly (Section XIV).

**4-226 PAINTING, REFINISHING AND MARKING.**

Humiseal (item 6, App. C) front panel board after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components. The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-94). Also identify with latest revision number. Identify dash and revision numbers in areas shown per Mil-Std-130 using .09 - .12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

**4-227 FINAL ASSEMBLY/INSTALLATION.**

Install the A16 front panel board into the control panel assembly in Section XXI and perform the procedures in Section XXVII.

### Section XXIII. BATTERY BOX, CY-8629/PRC-132

**4-228 GENERAL.**

This section contains depot level maintenance instructions for the CY-8629/PRC-132 Battery Box. Included in these instructions are directions for removal, disassembly, cleaning, inspection, mandatory replacement parts, repair/replace, reclamation, assembly, lubrication, testing, painting/refinishing/markings and final assembly/installation.

The battery box consists of the cover assembly and housing assembly.

The battery box is capable of accepting two BB-590 batteries, two BA-5590 batteries, or a combination of one BB-590 and one BA-5590 battery. The BB-590 contains two 12 volt batteries and the BA-5590 contains two 15 volt batteries. When operated with CY-8629/PRC-132, the batteries are operated in parallel to provide 12 to 15 Vdc in all cases of operation.

**4-229 REMOVAL.**

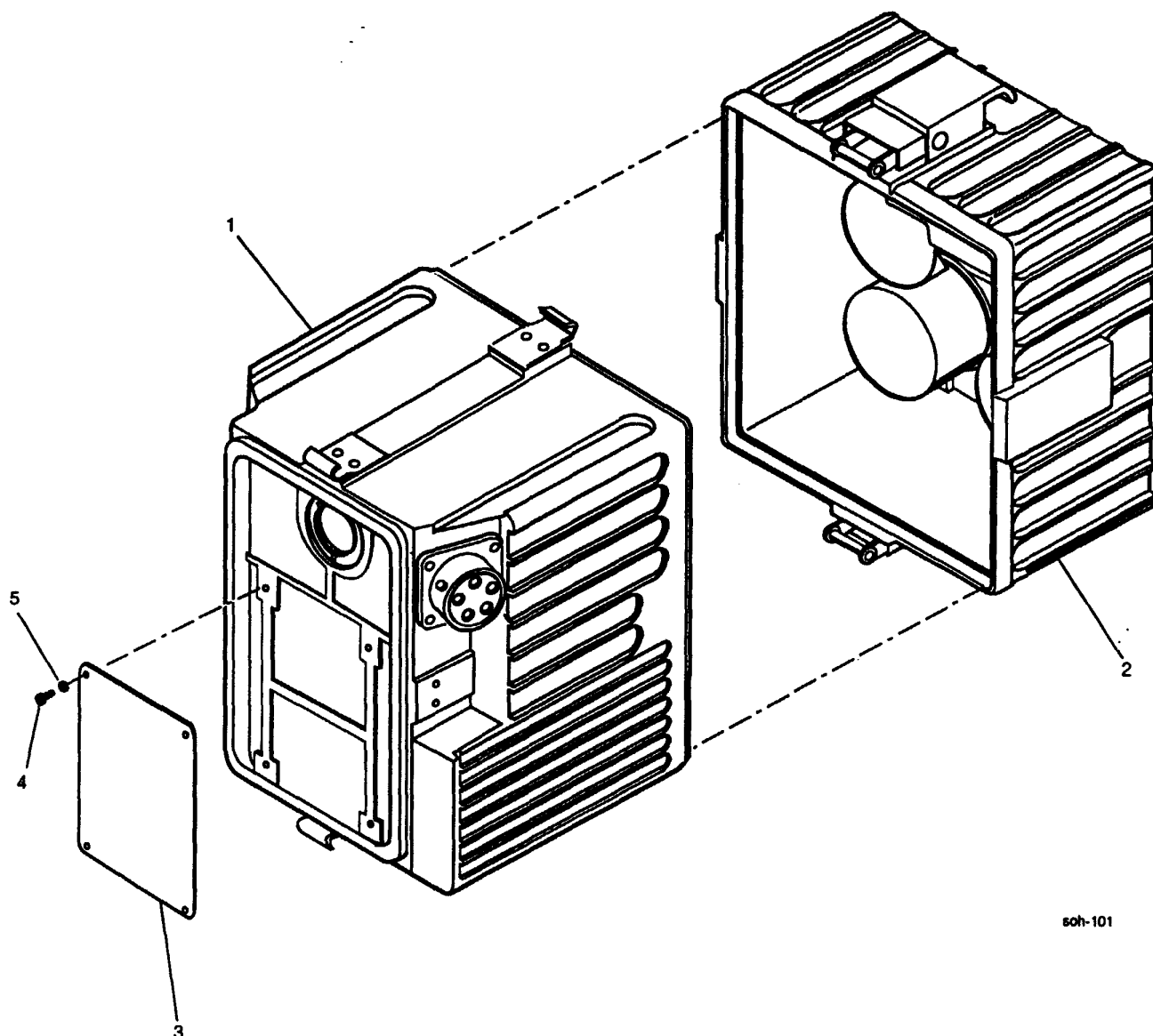
The battery box is separated from the radio set in Section II.

**4-230 DISASSEMBLY (Figure 4-99).**

Disassembly of the battery box involves separating the cover assembly from the housing assembly and removal of the nameplate. Disassemble as follows:

- a. Remove battery box cover assembly (2) from housing assembly (1) by releasing latches on cover from strikes on housing.
- b. Remove battery(ies), if installed.
- c. Remove name plate (3) from the housing (1) by removing screws (4) and flat washers (5).





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FIGURE 4-99. CY-8629/PRC-132 Battery Box

4-231 CLEANING.

**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.

- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. Prior to disassembly, wipe down the battery box and external connectors with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

#### 4-232 INSPECTION.

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to the radio housing, front and rear covers, battery box, connectors, and housings.

#### 4-233 MANDATORY REPLACEMENT PARTS.

There are no mandatory replacement parts.

#### 4-234 REPAIR/REPLACE.

The battery box is repaired by replacing the housing assembly, cover assembly or name plate. Additional repair procedures for the housing assembly are contained in Section XXV. Additional repair procedures for the cover assembly are contained in Section XXIV.

#### 4-235 RECLAMATION.

There are no candidates for reclamation.

#### 4-236 ASSEMBLY.

Assembly of the battery box involves attaching the name plate to the housing assembly and attaching the cover assembly to the housing assembly. Assemble battery box as follows:

- a. Install name plate (3) to housing (1) by installing four rivet screws (4) and washers (5).
- b. Install battery if radio is to be operated.
- c. Install battery box cover assembly (2) to housing assembly (1) by connecting the latches on cover to strikes on housing.

#### 4-237 LUBRICATION.

Lubrication instructions for the battery box are contained in the lubrication instructions for the cover assembly (Section XXIV) and the housing assembly (Section XXV).

#### 4-238 TESTING.

The battery box is not tested as an assembled unit. The battery box housing assembly contains all of the battery box testable electronic components. The battery box housing is tested in Section XXV.

#### 4-239 PAINTING AND MARKING.

Paint exterior surfaces only with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

#### 4-240 FINAL ASSEMBLY/INSTALLATION.

No other assembly instructions for the battery box other than those already indicated are required. Install the battery box to the radio set in Section II and perform the procedures in Section XXVII.

### Section XXIV. BATTERY BOX COVER ASSEMBLY

#### 4-241 GENERAL.

This section contains depot level maintenance instructions for the battery box cover assembly. Included in these instructions are directions for removal, disassembly, cleaning, inspection, mandatory replacement parts, repair/replace, reclamation, assembly, lubrication, painting/refinishing/markings and final assembly/installation.

The battery box cover along with the housing contain one of two batteries during operation of the radio set. No electronic components are contained within the cover assembly. Pads in the cover assembly press up against the installed battery. Cover assembly latches enable the cover assembly to attach to the battery box housing assembly. The cover assembly o-ring provides for a watertight seal around an installed battery.

#### 4-242 REMOVAL.

The battery box cover assembly is removed as part of the battery box (Section XXIII). No other special precautions are required.

#### 4-243 DISASSEMBLY (Figure 4-100).

Disassembly of the cover assembly involves removal of the latches (2), pads (5), gasket (6), or housing (1). Disassemble the cover assembly as follows:

- a. Remove latch (2) from cover (1) by removing screws (4) and washers (3).

#### NOTE

Battery pads are glued into cover housing with RTV.

- b. Remove battery pads (5) from cover with firm outward motion.
- c. Carefully remove o-ring (6) from cover.

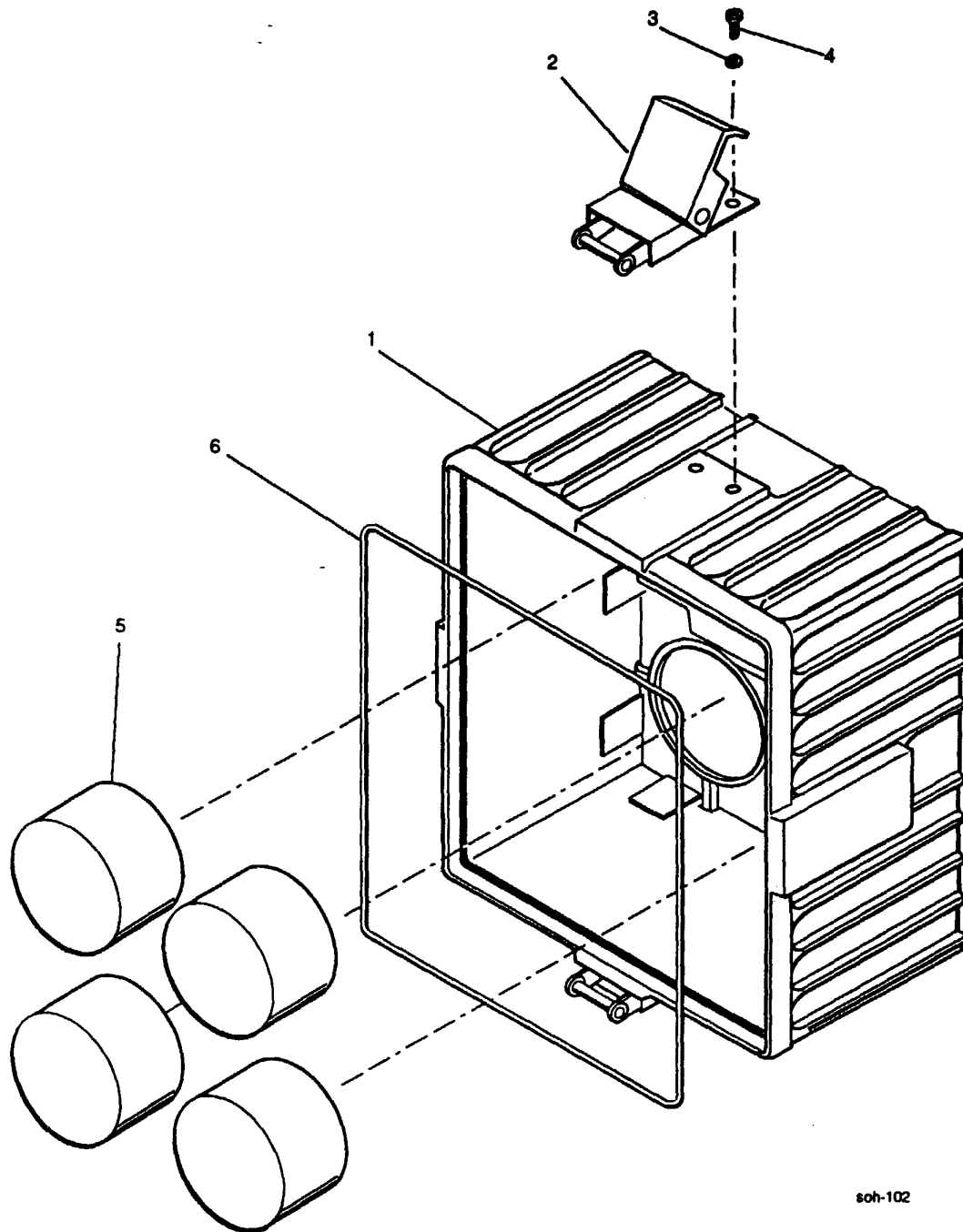
#### 4-244 CLEANING.

Prior to disassembly, wipe down the cover assembly with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth. If replacing battery pads, clean residue from old pads off of cover assembly using isopropyl alcohol or a suitable solvent.

#### 4-245 INSPECTION.

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to the housing and latches. Check for deterioration to battery pads and o-rings.

Check the cover assembly o-ring for damage or dirt and clean or replace as required.



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FIGURE 4-100. Disassembly of Battery Box Cover Assembly

4-246 MANDATORY REPLACEMENT PARTS.

There are no mandatory replacement parts.

4-247 REPAIR/REPLACE.

The cover is repaired by replacing either of the latches (2), pads (5), gasket (6), or housing (1).

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**4-248 RECLAMATION.**

There are no candidates for reclamation.

**4-249 ASSEMBLY (Figure 4-100).**

- a. Install o-ring (6) to cover housing as follows:
  - (1) Prior to replacing o-ring into lip of cover, apply light coating of silicon compound (item 13, App. C).
  - (2) Install o-ring (6) to cover.
- b. Install battery pads (5) into cover housing as follows:
  - (1) Apply light coating of adhesive to pad(s).
  - (2) Glue battery pads (5) into cover with firm inward motion.
- c. Install latch (2) to cover (1) by attaching two screws (4) and washers (3).

**4-250 LUBRICATION.**

Lubricate the cover assembly o-ring to maintain watertight integrity. Coat the o-ring with silicon (item 13, App. C) or an equivalent lubricant.

**4-251 PAINTING AND MARKING.**

Paint only exterior surfaces with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

**4-252 FINAL ASSEMBLY/INSTALLATION.**

Install the assembled cover assembly to the housing assembly per instructions in Section XXIII and perform the procedures in Section XXVII.

**Section XXV. BATTERY BOX HOUSING ASSEMBLY**

**4-253 GENERAL.**

This section contains depot level maintenance instructions for the battery box housing assembly. Included in these instructions are directions for removal, disassembly, cleaning, inspection, mandatory replacement parts, repair/replace, reclamation, assembly, lubrication, testing, painting/refinishing/markings and final assembly/installation.

The battery box housing attaches to the battery box cover assembly to house the battery. The battery box housing assembly contains the charge control CCA and all of the other battery box electronics that are used to transfer battery power to the radio final assembly.

**4-254 REMOVAL.**

The battery box housing is separated from the battery box cover in Section XXIII.

## 4-255 DISASSEMBLY (Figure 4-101).

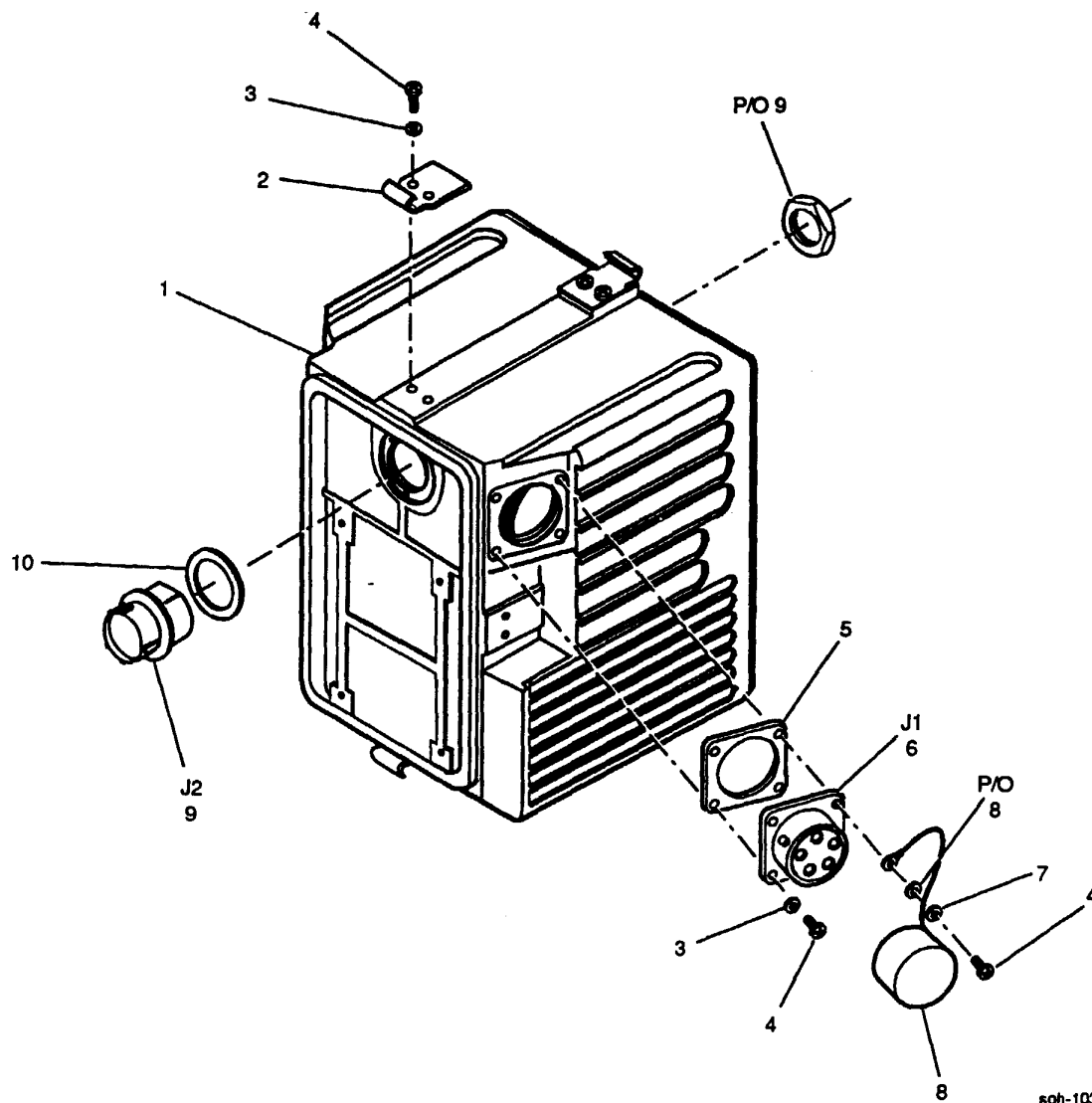
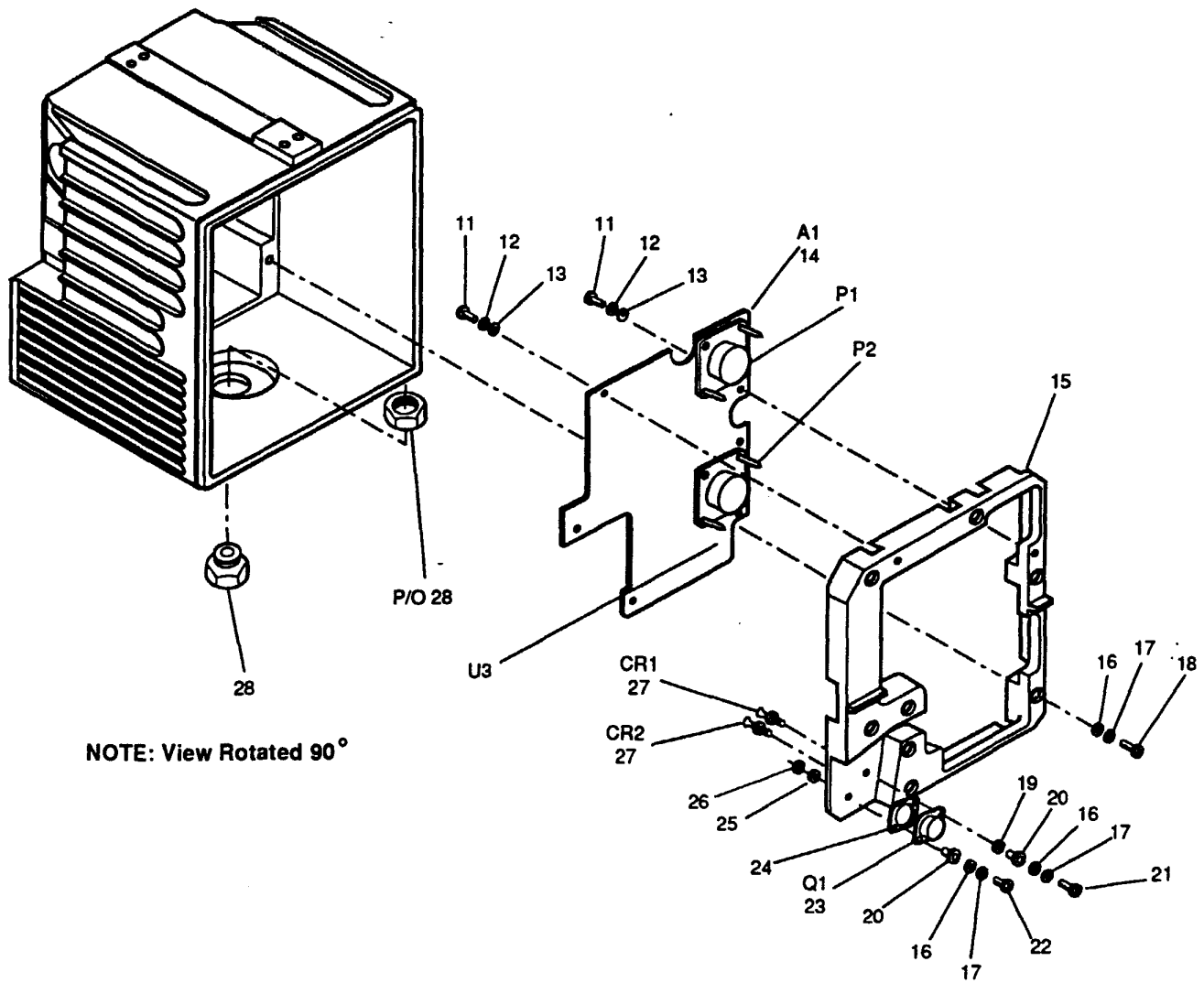


FIGURE 4-101. Housing Assembly (Sheet 1 of 2)

- a. Remove strikes (2) from housing (1) by removing screws (4) and washers (3).
- b. Remove J1 connector (6) and gasket (5) from housing (1) by removing screws (4), washers (3), washer (7) and electrical cover (8) with attached terminal lug.
- c. Remove J2 connector (9) and o-ring (10) from housing (1) by removing large hex nut (P/O 9) from inside housing.
- d. Remove circuit card assembly frame (15) from housing (1) by removing screws (18), lock washers (17) and flat washers (16).
- e. Remove circuit card assembly (14) from frame by extracting screws (11), lock washers (12) and flat washers (13). Disassembly of the charge control CCA is covered in Section XXVI.
- f. Remove the Q1 semiconductor (23) and mounting pad (24) from the frame (15) by removing screws (21) and (22), lock washers (17), flat washers (16), shoulder washers (20), terminal lugs

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NOTE: View Rotated 90°

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Figure 4-101. Housing Assembly (Sheet 2 of 2)

(19) and (25) and hex nut (26).

**NOTE**

Semiconductors CR1 and CR2 are threaded and equipped with a hex base.

- g. Remove semiconductors CR1 and CR2 by turning counterclockwise.
- h. Remove pressure relief valve (28) by removing the hex nut portion inside housing. The valve portion will fall out in hands.

**4-256 CLEANING.****WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. Prior to disassembly, wipe down the battery box and external connectors with a cloth or soft bristle brush. Isopropyl alcohol or mild soapy water may be used as needed. Rinse by wiping with a clean damp cloth. Dry using a fresh cloth.

**4-257 INSPECTION.**

Follow the PMCS chart found in TM 11-5820-1102-12 as a checklist for initial inspection of the assembly. Check for damage to charging connector cap gasket and electronic components.

- a. Inspect for solder bridges or other mechanical problems.
- b. Inspect for wiring correctness per Table 4-20.
- c. If assembly visual inspection shows none of the above conditions, mark X on data sheet. If there are problems with assembly, return it for rework.

**4-258 MANDATORY REPLACEMENT PARTS.**

There are no mandatory replacement parts.

**4-259 REPAIR/REPLACE.**

The battery box housing is repaired by replacing the components removed from the battery box housing in the disassembly paragraph above. Additional repair procedures for the charge control CCA are contained in Section XXVI. Troubleshoot assembly using procedure in paragraph 4-264.

**4-260 RECLAMATION.**

There are no candidates for reclamation.

**4-261 ASSEMBLY (Figure 4-101).**

- a. Install pressure relief valve (28) by holding the valve portion in place at bottom of housing while attaching the hex nut portion inside the housing.

**NOTE**

Semiconductors CR1 and CR2 are threaded and equipped with a hex base.

- b. Install semiconductors CR1 and CR2 by turning clockwise.



Table 4-20. Battery Box Housing Wire List

| From  | To     | Awg./Color    | Length (in) |
|-------|--------|---------------|-------------|
| J1-D  | A1E1   | 24/RED        | 8.30        |
| J1-B  | A1E2   | 24/BLACK      | 8.70        |
| J2-J  | A1E12  | 16/RED        | 9.25        |
| J2-F  | A1E13  | 24/RED        | 8.70        |
| J2-L  | E1     | 16/BLACK      | 10.25       |
| J2-E  | A1E15  | 24/BLUE       | 11.30       |
| J2-D  | A1E16  | 24/RED        | 11.40       |
| J2-A  | A1E18  | 24/WHT-RED    | 9.00        |
| J2-B  | A1E17  | 24/WHT-BLUE   | 10.50       |
| J2-G  | A1E19  | COAX CNTR     | 8.70        |
| J2-H  | A1E20  | COAX SHIELD   | ---         |
| Q1-E  | A1E3   | 24/YELLOW     | 3.20        |
| Q1-C  | A1E11  | 24/BLUE       | 2.50        |
| Q1-B  | A1E7   | 24/GREEN      | 2.90        |
| E1    | A1E14  | 24/BLACK      | 5.10        |
| CR1-C | A1P1-1 | 16/VIOLET     | 5.20        |
| CR1-C | A1P1-2 | 16/VIOLET     | 5.20        |
| CR1-C | A1E4   | 16/RED        | 3.80        |
| P1-4  | A1E6   | 16/RED        | 2.40        |
| P1-5  | A1E6   | 16/WHT-VIOLET | 2.40        |
| CR2-C | A1P2-1 | 16/WHT-VIOLET | 5.60        |
| CR2-C | A1P2-2 | 24/WHT-VIOLET | 5.70        |
| CR2-C | A1E10  | 16/WHT-RED    | 3.70        |
| P2-4  | A1E9   | 24/WHT-VIOLET | 3.10        |
| P2-5  | A1E9   | 16/WHT-RED    | 3.10        |
| E5    | A1P1-3 | 24/BLUE       | 4.30        |
| E8    | A1P2-3 | 24/WHT-BLUE   | 5.60        |

- c. Install Q1 semiconductor (23) and mounting pad (24) to the frame (15) by attaching screws (21) and (22), lock washers (17), flat washers (16), shoulder washers (20), terminal lugs (19) and (25) and hex nut (26).

- d. Install charge control CCA (14) to frame by attaching screws (11), lock washers (12) and flat washers (13).
- e. Install frame (15) to housing by attaching screws (18), lock washers (17) and flat washers (16).
- f. Install J2 connector (9) and o-ring (10) to housing (1) by attaching it with large hex nut (P/O 9), inside housing.
- g. Install J1 connector (6) and gasket (5) to housing (1) by attaching screws (4), washers (3), washer (7) and electrical cover (8) with attached terminal lug.
- h. Install strikes (2) to housing (1) by attaching screws (4) and washers (3).

#### 4-262 LUBRICATION

The battery box charging connector cap gasket must be properly lubricated. Coat the gasket with silicon (item 13, App. C) or an equivalent lubricant.

#### 4-263 TESTING.

This test procedure covers electrical testing of the battery box housing. The testing is at the housing assembly where all wiring and electrical assembly have been completed.

The battery box housing contains charging control circuitry which includes a voltage regulator to convert voltage from G-76/G direct current generator to a voltage useable for charging batteries.

The charging control circuitry uses voltage tapering to prevent battery overcharge and temperature-current shaping to compensate for the change required in charging current versus temperature.

Individual sections of each battery are charged in parallel. Charging control circuitry is duplicated for each battery to prevent undercharging or overcharging of any battery.

Charging circuitry is automatically disabled if a lithium battery is installed to prevent potential damage to the lithium battery or nearby personnel. The circuitry uses the difference in battery connections to distinguish between lithium and nickel cadmium batteries. Reverse polarity protection on the charging input connector is provided and an internal voltage regulator also protects the radio (RT-1648) from overvoltage.

The current limiting circuitry limits current drawn from the lithium batteries to prevent blowing the internal fuse. Each 15 volt section of the BA-5590 is internally fused with a non-replaceable 2.25 A slow-blow fuse. The total current from BA-5590, with the two 15 volt sections in parallel, is limited to 4.5 A, 2.25 A from each section. The internal limiting circuitry however, restricts this to 4.11 A to allow margin for ambient temperature rise of the fuse.

The characteristics of the lithium batteries enhance their current sharing capabilities when they are tied in parallel. The internal series resistance of the batteries acts as a ballast so that at high current, drain currents from each paralleled section are nearly equal.

To limit current drain of the two 15 volt sections to 4.11 A, a small current sense resistor is used in series with the paralleled 15 volt outputs of the lithium battery. The voltage across this resistor is used to generate a signal (external ALC) which is connected to internal circuitry of the RT-1648 and controls RF power output.

Whenever the current approaches 4.11 A, the RF output power of the radio is reduced so that the maximum current from the lithium battery does not exceed 4.11 A. This circuitry is duplicated for both

BA-5590 batteries in the battery box so that the power will be reduced when the current from either battery approaches 4.11 A.

This circuitry allows the AN/PRC-132 to operate over its full frequency range with up to 20 Watts of transmitter output power without performance degradation while protecting the batteries from blowing an internal fuse under abnormal conditions or under conditions when the operator may have transmit power output switch in 50 Watt position while operating with the lithium batteries.

4-263.1 Conditions. This test procedure should be conducted in an ambient temperature environment of 25°C ±5°C.

4-263.2 Equipment. The following table lists unique and standard test equipment required for test and adjustment of the battery box housing and its associated PCB assembly. Equivalent alternate test equipment may be substituted for items listed below. All test equipment shall be maintained in accordance with MIL-STD-45662. Verify proper operation and calibration prior to testing.

| <u>DESCRIPTION</u>                 | <u>QTY</u> |
|------------------------------------|------------|
| 30 dB Attenuator                   | 1          |
| ac Voltmeter                       | 1          |
| Battery                            | 1          |
| Battery Box Charge Cable           | 1          |
| Battery Box Load Cable             | 1          |
| CW Keyer                           | 1          |
| Digital Multimeter                 | 2          |
| Dummy Load                         | 1          |
| Jumpers, assorted (10)             | 1          |
| Lithium Battery Substitution Cable | 1          |
| Ni-Cad Battery Extender Cable      | 1          |
| Oscilloscope                       | 1          |
| Power Supply                       | 2          |
| Resistor, 15 Ohm                   | 1          |
| T-Probe Connector                  | 1          |
| Temperature Probe                  | 1          |
| Tool Kit                           | 1          |
| Transceiver                        | 1          |
| Voltage Ohm Meter                  | 1          |

4-263.3 Test of the Battery Box Housing Assembly.

- a. Connect a Lithium battery substitution cable to A1A2A1A1P1 (Figure 4-102).
- b. Connect second Lithium battery substitution cable to A1A2A1A1P2 (Figure 4-103).
- c. Measure resistance between positive and negative leads on both cables. Ensure cables are not shorted together.
- d. With negative side of DMM to ground (PCB frame), measure resistance to all four test cable leads. All resistances should be greater than 200 ohms. Mark (X) on data sheet.
- e. Disconnect battery substitution cable at A1A2A1A1P2.
- f. Connect variable load to battery box load cable (Figure 4-104). Set load for minimum current drain.
- g. Connect other end of charging cable to A1A2J2 (Figure 4-101, Sheet 1).

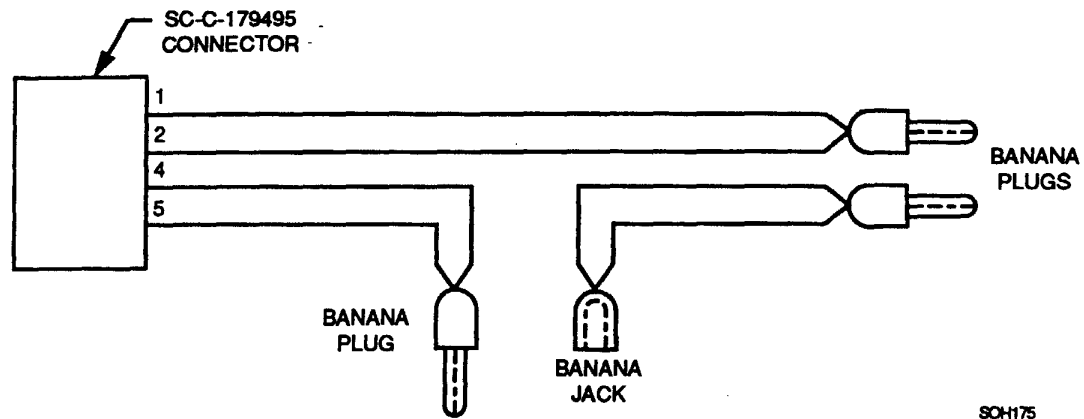


FIGURE 4-102. Lithium Battery Substitution Cable

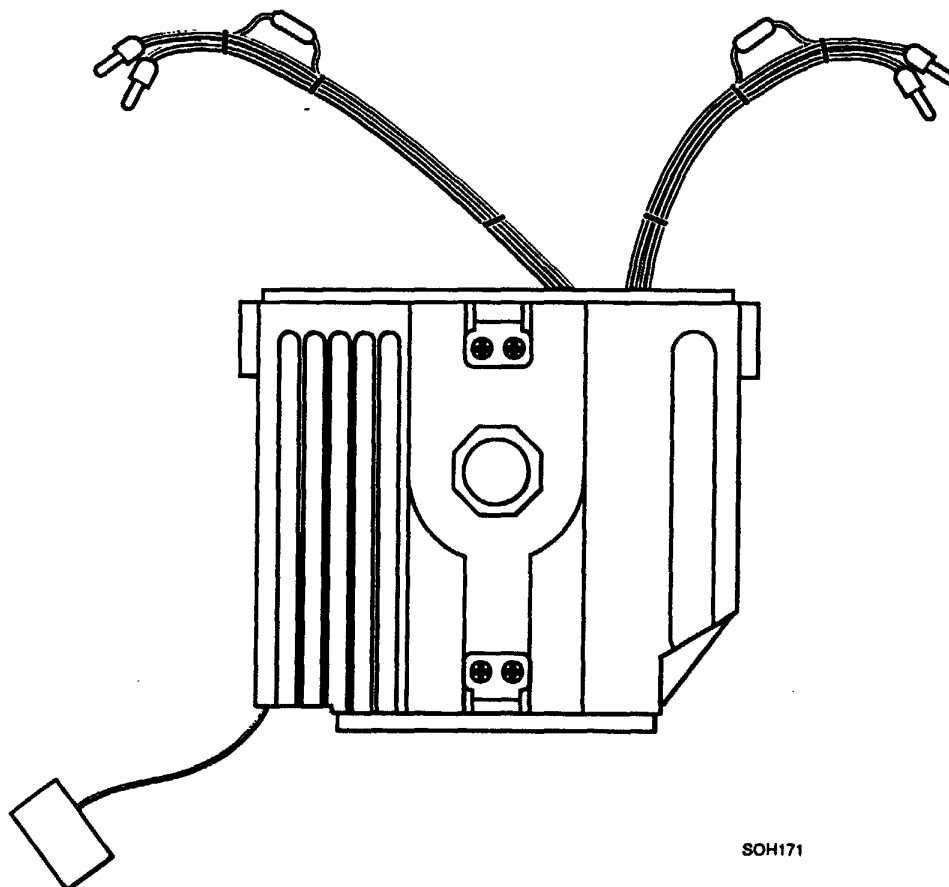


FIGURE 4-103. Connection of Lithium Battery Substitution Cables to Battery Box Housing

- h. Set power supply for  $14.9 \pm 0.1$  Vdc and current limit to 5 A.
- i. Noting polarity and ensuring that neither side of power supply is grounded, connect unterminated leads of Lithium battery substitution cable through a DMM on 10 A range to power supply.
- j. Connect VOM (10 Volt scale) from A1A2J2-G(+) to A1A2J2-H(-).

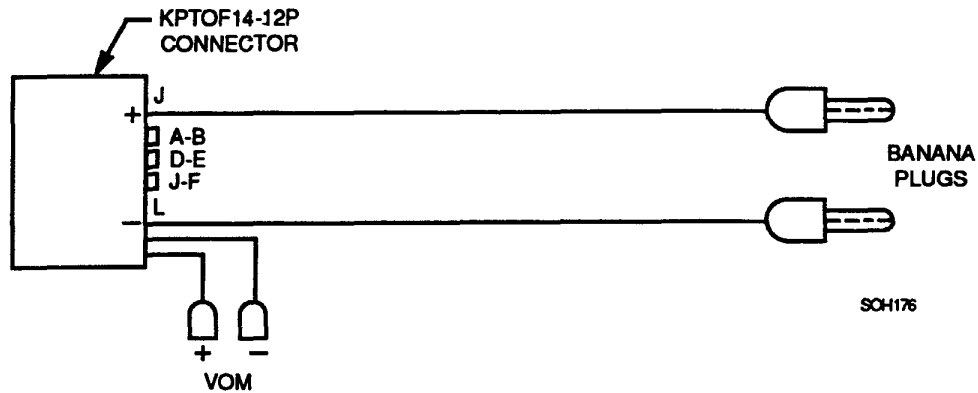


FIGURE 4-104. SOHFRAD Battery Box Load Cable

- k. Increase load current until voltage read on VOM is 5.0 Vdc. Record current on data sheet.
- l. This is a simulation of a Lithium battery charging a Ni-Cad battery. Connect Lithium battery substitution cable to A1A2A1A1P2. Repeat step 4-263.3.k for B2 (P2) side of circuitry. Record current on data sheet. Set load for minimum current. Turn off power supply.
- m. Connect Ni-Cad battery extender cable to A1A2A1A1P1 (Figure 4-105).

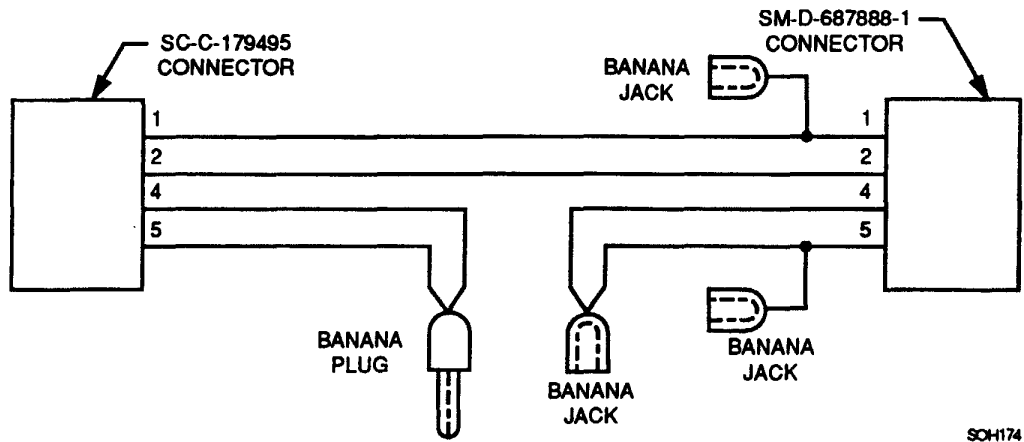


FIGURE 4-105. Ni-Cad Battery Extender Cable

- n. Install DMM (2 A scale) to positive lead of extender cable.
- o. Connect unterminated end of extender cable to the BB590/U and measure input (charge) current to battery. Note that polarity of current is into the BB590/U.

**NOTE**

If battery voltage during this test exceeds 13 Vdc, voltage tapering may come into effect, causing current reading to be too low. Charging currents must be measured with a discharged or partially discharged battery.

- p. Turn on power supply. Measure charging voltage at BB590/U. The magnitude of the current is based upon voltage at battery per Table 4-21. Record battery charging voltage and charging current on data sheet. In Limits section, record currents from table for charging voltage above and below that which was measured.

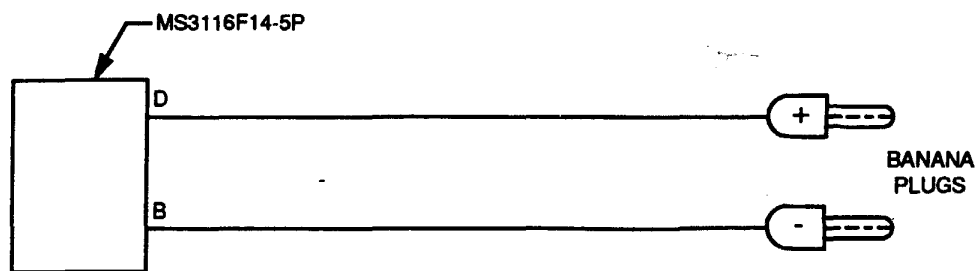
Table 4-21. Battery Charging Voltage versus Current

| BB590/U Charging Voltage | Charge Current (mA $\pm$ 20 mA) |
|--------------------------|---------------------------------|
| 2.0                      | 246                             |
| 3.0                      | 226                             |
| 4.0                      | 206                             |
| 5.0                      | 186                             |
| 6.0                      | 166                             |
| 7.0                      | 146                             |
| 8.0                      | 126                             |
| 9.0                      | 106                             |
| 10.0                     | 86                              |
| 11.0                     | 66                              |
| 12.0                     | 46                              |
| 13.0                     | 26                              |
| 14.0                     | 6                               |
| 14.3 and above           | 0                               |

- q. Reverse the two battery extender cables at A1A2A1A1P1 and P2.
- r. Repeat steps 4-263.3.m through 4-263.3.p to prove that Ni-Cad battery B2 can be charged from a simulated Lithium battery B1. Turn off power supply.
- s. Disconnect Lithium battery extender cable.
- t. Set power supply for 31 Vdc and current limit it to 3 A.
- u. Connect battery box charge cable (Figure 4-106) to A1A2J1 (Figure 4-101, Sheet 1) and power supply.
- v. Monitor temperature of U3 by holding temperature probe against A1 PCB in close proximity to U3 (Figure 4-101, Sheet 2). Refer to Table 4-22 for correct temperature readings.
- w. Turn on power supply. Measure charge current into Ni-Cad battery B2. Use DMM. Refer to Table 4-20 for correct charge current. Record charging current and temperature of U3 (if not 25 degrees C) on data sheet. The charging current must be within nominal value per Table 4-20.
- x. Turn off external power supply. Record nominal value of charge current on data sheet.
- y. Move the Ni-Cad battery and the extender cable from A1A2A1A1P2 to A1A2A1A1P1.
- z. Turn on power supply and repeat charge current measurement for B1. Record charging current and temperature of U3 (if not 25 degrees C) on data sheet.

Table 4-22. Charge Current for Effects of Temperature

| Temperature °C | Charge Current Range (mA) |
|----------------|---------------------------|
| 45             | 653 - 435                 |
| 35             | 557 - 340                 |
| 25             | 464 - 247                 |
| 15             | 373 - 186                 |
| 5              | 285 - 180                 |



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FIGURE 4-106. Battery Box Charge Cable

- aa. Disconnect all cables batteries and power supplies.
- ab. Connect battery box to standard SOHFRAD transceiver.
- ac. Connect RF output of transceiver through T-probe connector and ac voltmeter to 30 dB attenuator.
- ad. Connect CW keyer to one of the audio input jacks on the transceiver front panel.
- ae. Install a charged BB590/U battery into battery box position B1.
- af. Set transceiver to 1.6000 MHz and USB mode and 50 Watts output selected.
- ag. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ah. Set transceiver to 49.9999 MHz. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ai. Turn off transceiver.
- aj. Move BB590 battery from B1 position (A1A2A1A1P1) to B2 position (A1A2A1A1P2).
- ak. Repeat steps 4-263.3.ab through 4-263.3.ai for the case of the BB590 installed in B2 position.
- al. Remove battery from battery box.

Table 4-21. Battery Charging Voltage versus Current

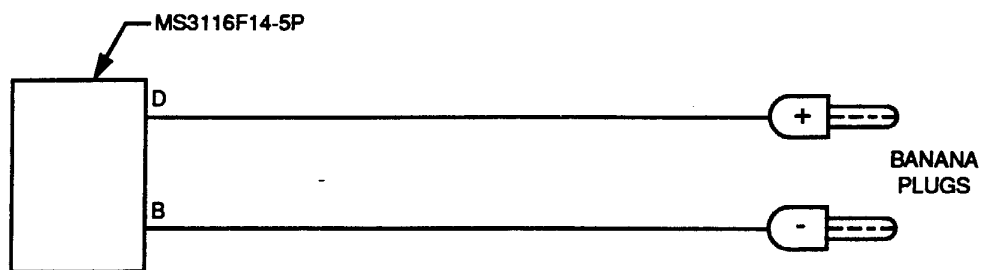
| BB590/U Charging Voltage | Charge Current (mA $\pm$ 20 mA) |
|--------------------------|---------------------------------|
| 2.0                      | 246                             |
| 3.0                      | 226                             |
| 4.0                      | 206                             |
| 5.0                      | 186                             |
| 6.0                      | 166                             |
| 7.0                      | 146                             |
| 8.0                      | 126                             |
| 9.0                      | 106                             |
| 10.0                     | 86                              |
| 11.0                     | 66                              |
| 12.0                     | 46                              |
| 13.0                     | 26                              |
| 14.0                     | 6                               |
| 14.3 and above           | 0                               |

- q. Reverse the two battery extender cables at A1A2A1A1P1 and P2.
- r. Repeat steps 4-43.m through 4-263.3.p to prove that Ni-Cad battery B2 can be charged by a simulated Lithibattery B1. Turn off power supply.
- s. Disconnect Lithibattery extender cable.
- t. Set power supply 31 Vdc and current limit it to 3 A.
- u. Connect battery charge cable (Figure 4-106) to A1A2J1 (Figure 4-101, Sheet 4-101).
- v. Monitor temperature U3 by holding temperature probe against A1 PCB in close proximity to U3 (Figure 4-101: 2). Refer to Table 4-22 for correct temperature reading (degrees C) on  $\phi$ .
- w. Turn on power supply. Measure charge current into Ni-Cad battery B2. Use Figure 4-20 for charge current. Record charging current and temperature (degrees C) on  $\phi$ . The charging current must be within nominal value  $\pm$  20%.
- x. Turn off power supply. Record nominal value of charge current on data sheet.
- y. Move Ni-Cad battery B2 from A1A2A1A1P2 to A1A2A1A1P1.
- z. Turn power supply on and repeat charge current measurement for B1. Record charging current and temperature (degrees C) on data sheet.



Table 4-22. Charge Current for Effects of Temperature

| Temperature °C | Charge Current Range (mA) |
|----------------|---------------------------|
| 45             | 653 - 435                 |
| 35             | 557 - 340                 |
| 25             | 464 - 247                 |
| 15             | 373 - 186                 |
| 5              | 285 - 180                 |



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FIGURE 4-106. Battery Box Charge Cable

- aa. Disconnect all cables batteries and power supplies.
- ab. Connect battery box to standard SOHFRAD transceiver.
- ac. Connect RF output of transceiver through T-probe connector and ac voltmeter to 30 dB attenuator.
- ad. Connect CW keyer to one of the audio input jacks on the transceiver front panel.
- ae. Install a charged BB590/U battery into battery box position B1.
- af. Set transceiver to 1.6000 MHz and USB mode and 50 Watts output selected.
- ag. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ah. Set transceiver to 49.9999 MHz. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ai. Turn off transceiver.
- aj. Move BB590 battery from B1 position (A1A2A1A1P1) to B2 position (A1A2A1A1P2).
- ak. Repeat steps 4-263.3.ab through 4-263.3.ai for the case of the BB590 installed in B2 position.
- al. Remove battery from battery box.

- am. Set two power supplies for equal voltages at approximately 14.9 Vdc, and set current limit on supplies for 5 A.
- an. Using Lithium battery substitution cables, connect power supplies through DMM, on 10 amp scale, to battery box B1 and B2 connectors.
- ao. Turn on transceiver. It should be at 1.6000 MHz and USB mode.
- ap. Set control panel power select switch for 50 Watt position and key transmitter.
- aq. Carefully adjust the voltage of the power supply drawing the highest current down for equal input currents on the DMM's. Measure input current on both of the DMMs and voltage on the ac voltmeter. Record input currents for B1 and B2 on data sheet. RF output voltage should be greater than 28.1 (20 Watts minus 1 dB) and less than 56.1 Vrms (50 Watts plus 1 dB). Record RF output voltage on data sheet.
- ar. Unkey transmitter.
- as. Set POWER select switch for 20 Watt position.
- at. Repeat step 4-263.3.aq. Record currents for B1 and B2 on data sheet. Record RF output voltage on data sheet.
- au. Repeat steps 4-263.3.am through 4-263.3.at for a frequency of 49.9999 MHz. Record input currents and RF output voltage on data sheet.
- av. This concludes testing of SOHFRAD battery box.
- aw. Disconnect all cables, meters and power supplies.

#### 4-264 TROUBLESHOOTING.

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-23. Indicated components are listed in the recommended order of replacement.

#### 4-265 PAINTING AND MARKING.

Paint only exterior surfaces with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

#### 4-266 FINAL ASSEMBLY/INSTALLATION.

Install the battery box to the battery box cover per instructions in Section XXIII and perform the procedures in Section XXVII.

Table 4-23. Battery Box Housing Troubleshooting

| Symptom                                      | Paragraph                    | Suspect Component(s)                            |
|--|------------------------------|---|
| Low resistance at A1A2A1A1P1/P2              | 4-263.3.c                    | A1CR1/CR2, A1A1 PCB                             |
| No or incorrect voltage or current at A1A2J2 | 4-263.3.k                    | J2 and associated wiring, A1CR1, A1A1 PCB       |
| No or incorrect voltage or current at A1A2J2 | 4-263.3.l                    | J2 and associated wiring, A1CR1, A1A1 PCB       |
| Incorrect charging rate                      | 4-263.3.p<br>or<br>4-263.3.r | A1Q1, A1A1 PCB                                  |
| Incorrect external charging rate             | 4-263.3.w<br>or<br>4-263.3.z | J1 and associated wiring, A1Q1, A1A1 PCB        |
| Output at J1 with battery in B1 position     | 4-263.3.ag                   | Bad or uncharged battery, A1Q1, A1CR1, A1A1 PCB |
| Output at J1 with battery in B2 position     | 4-263.3.aj                   | Bad or uncharged battery, A1Q1, A1CR2, A1A1 PCB |

## BATTERY BOX HOUSING DATA SHEET

| Para. No.  | Test  | Data            | Limits                               |
|------------|---|-----------------|--------------------------------------|
| 4-257.c    | Mechanical inspection   | _____ ( ) _____ | (X)                                  |
| 4-263.3.d  | All resistance measurements   | _____ ( ) _____ | (X) > 200 ohms                       |
| 4-263.3.k  | Load current (B1)   | _____           | 4.0 - 4.11 A                         |
| 4-263.3.l  | Load current (B2)   | _____           | 4.0 - 4.11 A                         |
| 4-263.3.p  | Lithium charges Ni-Cad B1 (battery voltage)<br>(charge current)             | _____<br>_____  | _____                                |
| 4-263.3.r  | Lithium charges Ni-Cad B2 (battery voltage)<br>(charge current)             | _____<br>_____  | _____                                |
| 4-263.3.w  | External charging current for B2 Temperature                                | _____           | See Table 4-20                       |
| 4-263.3.z  | External charging current for B1 Temperature                                | _____           | See Table 4-20                       |
| 4-263.3.ag | Transmit power B1 Ni-Cad 1.6000 MHz   | _____           | 44.5 - 56.1 Vrms                     |
| 4-263.3.ah | Transmit power B1 Ni-Cad 49.9999 MHz  | _____           | 44.5 - 56.1 Vrms                     |
| 4-263.3.ak | Transmit power B2 Ni-Cad 49.9999 MHz<br>Transmit Power B2 Ni-Cad 1.6000 MHz | _____<br>_____  | 44.5 - 56.1 Vrms<br>44.5 - 56.1 Vrms |

## BATTERY BOX HOUSING DATA SHEET

| <u>Para. No.</u> | <u>Test</u>                                     | <u>Data</u> | <u>Limits</u>    |
|------------------|---|-------------|------------------|
| 4-263.3.aq       | Input current B1, 50 Watt selected, 1.6000 MHz  | _____       | 3.85 - 4.2 A     |
|                  | Input current B2, 50 Watt selected, 1.6000 MHz  | _____       | 3.85 - 4.2 A     |
|                  | RF output Voltage 1.6000 MHz                    | _____       | 28.1 - 56.1 Vrms |
| 4-263.3.at       | Input current B1, 20 Watt selected, 1.6000 MHz  | _____       | ≤ 4.2 A          |
|                  | Input current B2, 20 Watt selected, 1.6000 MHz  | _____       | ≤ 4.2 A          |
|                  | RF output Voltage 1.6000 MHz                    | _____       | 28.1 - 35.5 Vrms |
| 4-263.3.au       | Input current B1, 50 Watt selected, 49.9999 MHz | _____       | 3.85 - 4.2 A     |
|                  | Input current B2, 50 Watt selected, 49.9999 MHz | _____       | 3.85 - 4.2 A     |
|                  | RF output Voltage 49.9999 MHz                   | _____       | 28.1 - 56.1 Vrms |
|                  | Input current B1, 20 Watt selected, 49.9999 MHz | _____       | ≤ 4.2 A          |
|                  | Input current B2, 20 Watt selected, 49.9999 MHz | _____       | ≤ 4.2 A          |
|                  | RF output Voltage 49.9999 MHz                   | _____       | 28.1 - 35.5 Vrms |

## Section XXVI. CHARGE CONTROL CCA, CY-8629/PRC-132

## 4-267 GENERAL.

This section contains depot level maintenance instructions for the charge control CCA. Included in these instructions are directions for removal, disassembly, cleaning, inspection, mandatory replacement parts, repair/replace, reclamation, assembly, lubrication, testing, painting/refinishing/markings and final assembly/installation.

The charge control CCA contains circuitry necessary to regulate voltage and convert it from the dc generator to voltage usable for battery charging. It also contains current limiting circuitry that serves as an equipment protecting limiting mechanism preventing inappropriate power demands and/or incorrect battery hook-up.

Charging control circuitry includes a voltage regulator to convert the voltage from the G-76/G direct current generator to a voltage useable for charging the batteries. Charging control circuitry uses voltage tapering to prevent battery overcharge and temperature-current shaping to compensate for the change required in charging current versus temperature.

The individual sections of each battery are charged in parallel. Charging control circuitry is duplicated for each battery to prevent undercharging or overcharging of any battery. If a lithium battery is installed, charging circuitry is automatically disabled to prevent potential damage to the lithium battery or nearby personnel. The circuitry uses the difference in the battery connections to distinguish between the lithium and the nickel cadmium batteries.

Reverse polarity protection on the charging input connector is provided and the internal voltage regulator also protects the transceiver from overvoltage.

## 4-268 REMOVAL.

Remove charge control CCA from housing as described in Section XXV.

4-269 CLEANING.

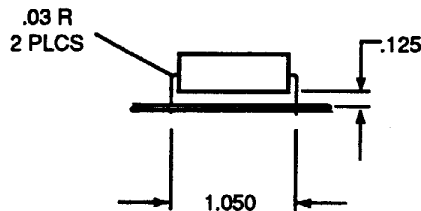
**WARNING**

Use approved personal protective equipment (goggles/face shield) when using canned/compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 30 PSI. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

- a. Remove dust and dirt from electrical parts with canned/compressed air. A vacuum source may be used when compressed air is not available.
- b. In less accessible areas, loosen dust and dirt with a soft bristle brush before applying compressed air.
- c. After cleaning, perform test procedures to determine performance and suitability for use.

4-270 INSPECTION.

- a. Inspect CCA for missing, broken or damaged components and for any components that may be improperly installed.
- b. Inspect CCA for solder bridges or any mechanical problems.
- c. Height and spacing for R4, R7, R12, and R32 must be no greater than .125 (Figure 4-107).



soh-105

FIGURE 4-107. Component Heights and Spacing

- d. Component height of L1 Inductor and P1 and P2 connectors must not be greater than .825 (Figure 4-108).
- e. Mounting hole spacing for CR1 and CR6 through CR10 must be no greater than .300 (Figure 4-109).

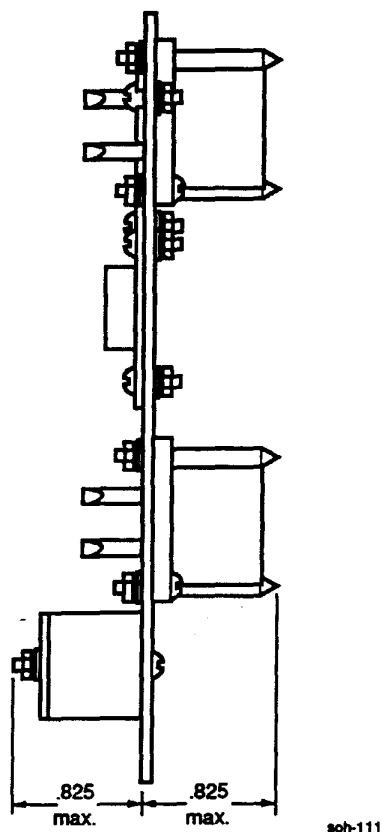
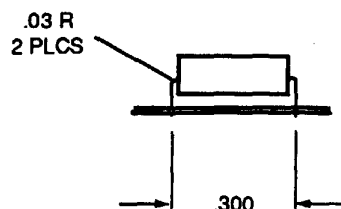


FIGURE 4-108. Component Height of Inductors and Connectors



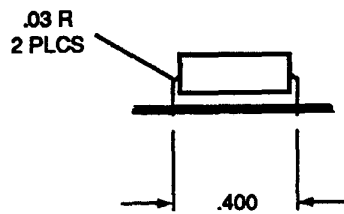
soh-106

FIGURE 4-109. Mounting Hole Spacing for CR1 and CR6 through CR10

- f. Mounting hole spacing for CR2, CR5, R1 and R5 must be no greater than .400 (Figure 4-110).
- g. If the CCA visual inspection shows none of the above conditions, check off on data sheet.

#### 4-271 DISASSEMBLY (Figure 4-111).

- a. Remove P1 and P2 pin connectors (4) from CCA (6) by removing hex nuts (1), lock washers (2) flat washers (3), and screws (5).
- b. Remove semiconductors (11) from CCA (1) by removing screws (5), flat washers (3), lock washers (2), and hex nuts (1) (Figure 4-111, Sheet 2).
- c. Remove L1 connector (9), mounting pads (8) and large flat washer (10) by removing screw (1), flat washer (3), lock washer (2) and hex nut (1).



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FIGURE 4-110. Mounting Hole Spacing for CR2, CR5, R1 and R5

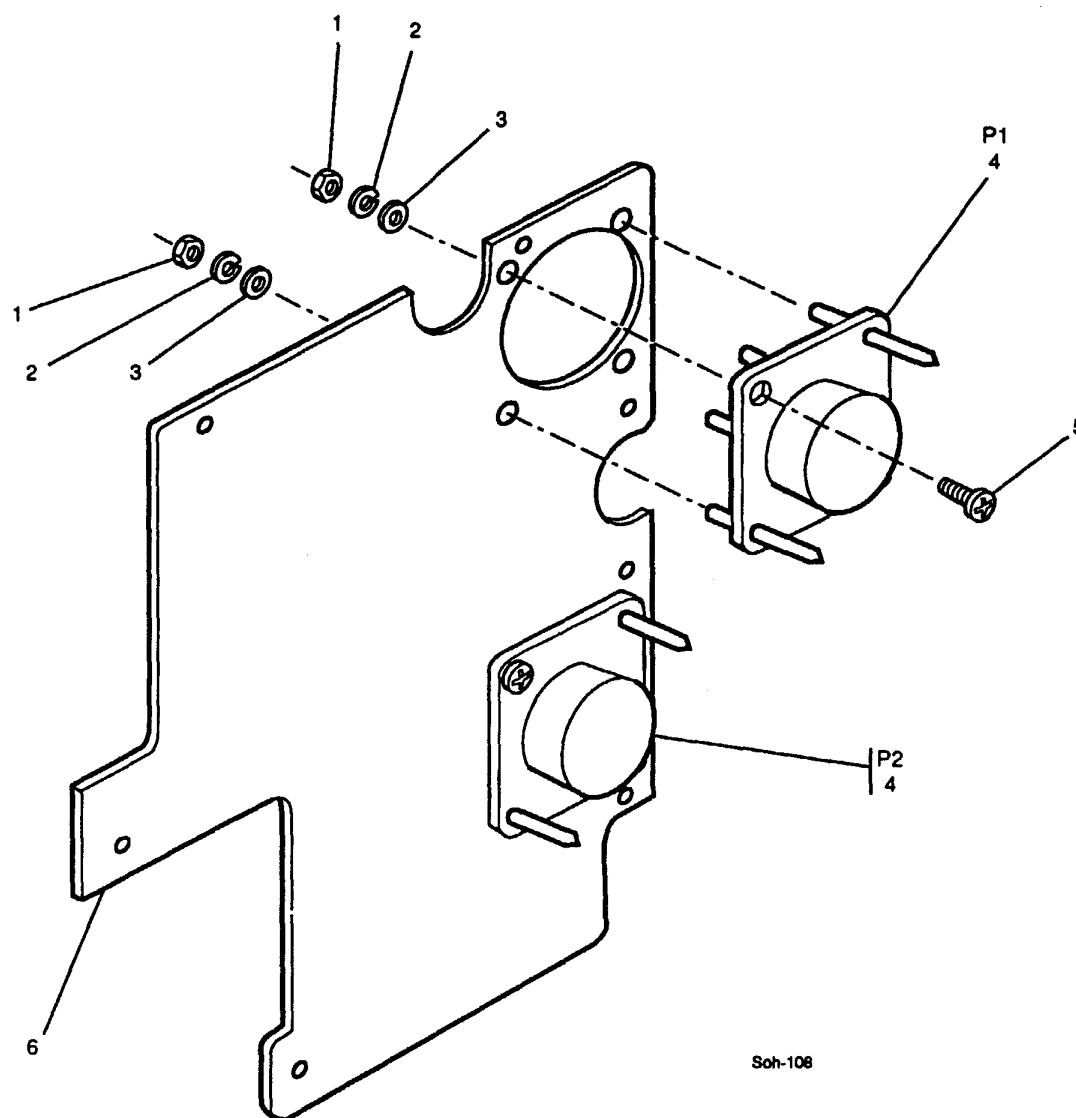
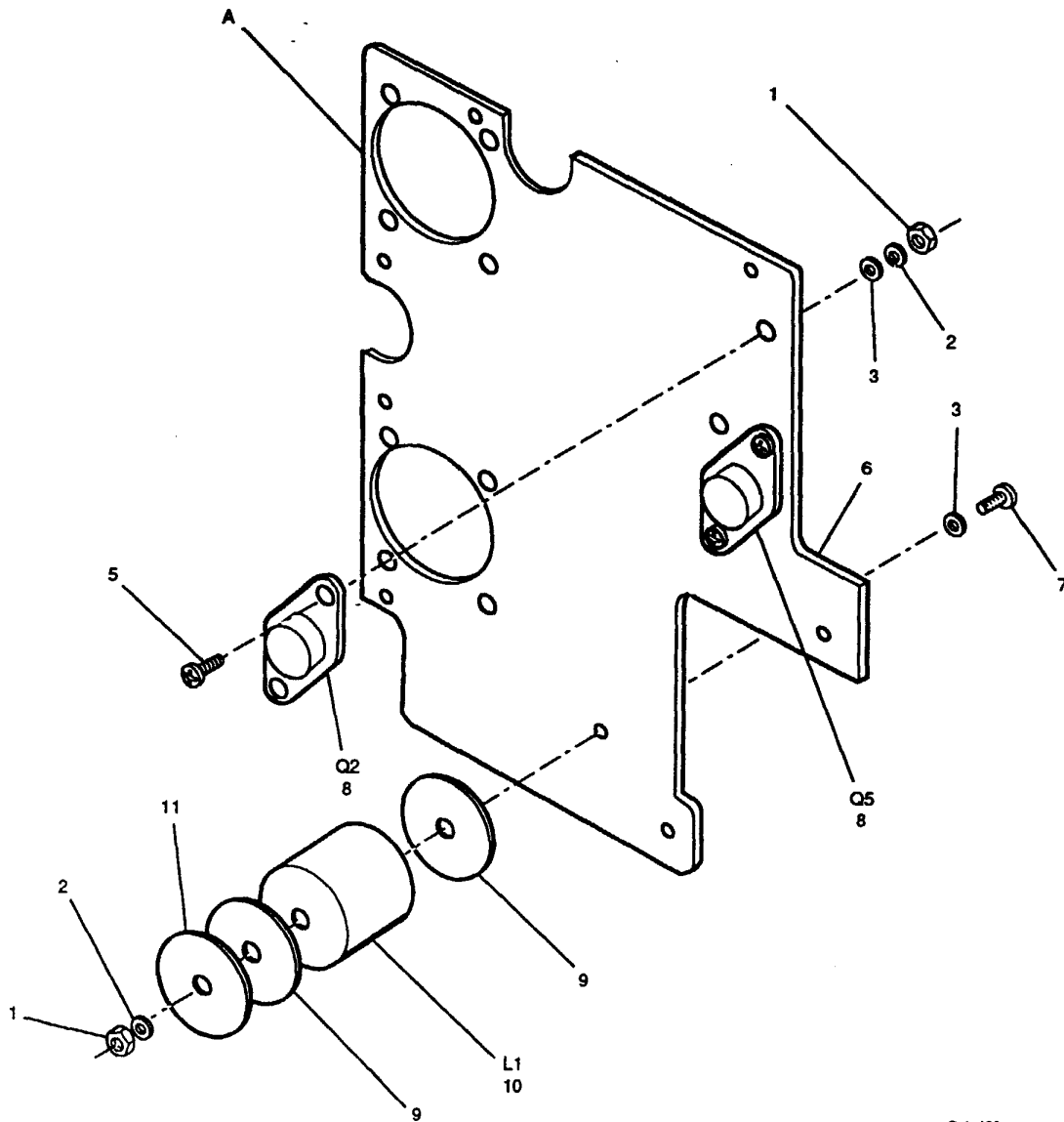


FIGURE 4-111. Charge Control CCA, CY-8629/PRC-132 (Sheet 1 of 3)

4-272 REPAIR/REPLACE.

- a. Troubleshoot assembly using procedure in paragraph 4-274.



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FIGURE 4-111. Charge Control CCA, CY-8629/PRC-132 (Sheet 2 of 3)

- b. Utilize alignment pin provided for P1 and P2 connectors (Figure 4-111, Sheet 1).
- c. Solder using S/N 62 (item 20, App. C).
- d. Square pads indicate IC-PIN 1, Diode-cathode and capacitor-positive.

#### 4-273 TESTING.

This test procedure covers the electrical testing of circuitry that controls the discharge rate of a lithium battery. Other circuits are tested during battery box housing assembly testing in Section XXV.

4-273.1 Conditions. This test procedure should be conducted in an ambient temperature environment of  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ .



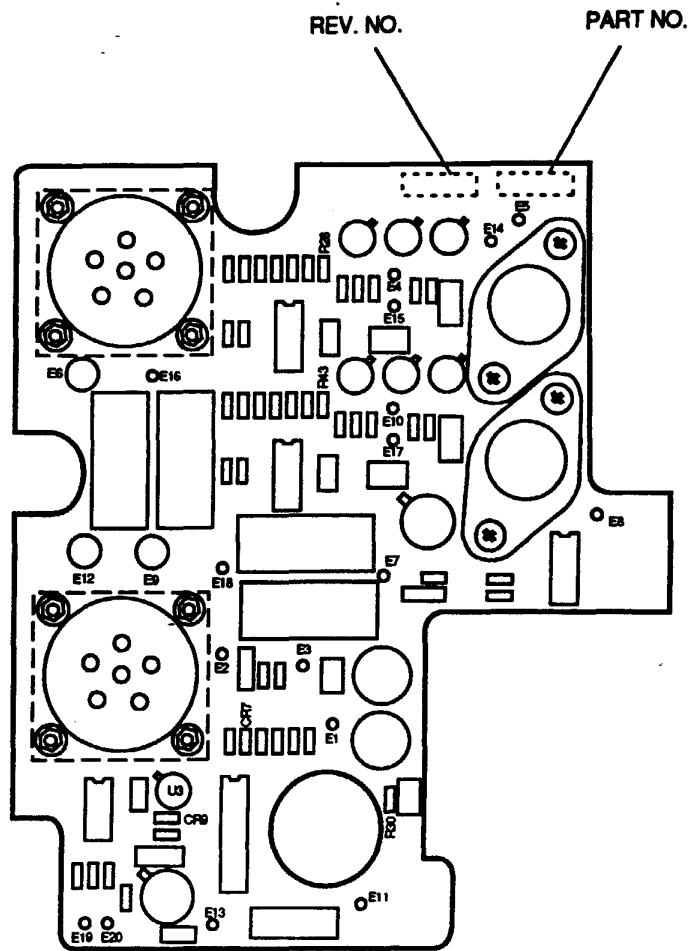


FIGURE 4-111. Charge Control CCA, CY-8629/PRC-132 (Sheet 3 of 3)

4-273.2 Equipment. The following table lists unique and standard test equipment required for test and adjustment of the charge control CCA. Equivalent alternate test equipment may be substituted for any of the items listed below. All test equipment shall be maintained in accordance with MIL-STD-45662. Verify proper operation and calibration prior to testing.

| <u>DESCRIPTION</u>     | <u>QTY</u> |
|------------------------|------------|
| 30 dB Attenuator       | 1          |
| ac Voltmeter           | 1          |
| Battery                | 1          |
| Current Meter          | 1          |
| Digital Multimeter     | 2          |
| Dummy Load             | 1          |
| Jumpers, assorted (10) | 1          |
| Oscilloscope           | 1          |
| Power Supply           | 2          |
| Resistor, 15 Ohm       | 1          |
| Tool Kit               | 1          |
| T-Probe Connector      | 1          |
| Temperature Probe      | 1          |
| Transceiver            | 1          |

**4-273.3 Test of the Charge Control CCA.****NOTE**

It is not necessary to fully remove the charge control CCA from the battery box housing assembly in order to perform the following test.

- a. Disconnect charge control CCA (Figure 4-101, Sheet 2, item 14) from frame (15) by removing six screws (18), lock washers (17) and flat washers (16).

**CAUTION**

Ensure that case of A1A2A1Q1 does not short to battery box housing or damage to component may result.

- b. Ground negative side of DMM to terminal E14 and check that the following terminals measure greater than 200 Ohms to ground: E1, E4, E6, E9 and E10. Mark X on data sheet.
- c. Set external power supply for  $30 \pm 0.1$  Vdc and limit its maximum current to 2 A. Turn off power supply.
- d. Connect 15 Ohm, 50 Watt resistor, with jumper wires, between terminals E12 and E14.
- e. Connect power supply positive lead to terminal E1 and negative lead to terminal E2.

**NOTE**

Do not ground either side of power supply to chassis ground, it must be left in the floating mode as if it were a battery.

- f. Turn power supply on. Measure voltage at terminal E12. Use DMM. Record measured voltage on data sheet.
- g. Measure voltage at cathode of CR9 to ground. Use DMM. Record measured voltage on data sheet.
- h. Measure forward voltage drop across CR7. Use DMM. Record voltage on data sheet.
- i. Measure voltage across R30. Use DMM. Record voltage on data sheet.
- j. Find vertical column in Table 4-24 that corresponds to forward voltage drop across CR7 and horizontal row that corresponds to temperature (found by measuring the temperature at the case of U3); if voltage at the intersection is within 16% of that measured, the circuit is considered operational. Some interpolation may be necessary. Mark X on data sheet.
- k. Measure voltage at E19 to ground. It must be less than 2 Vdc.
- l. Record E19 voltage to ground on data sheet.
- m. Disconnect all jumpers, cables and test equipment.
- n. Determine if R28 and R43 are of correct value as follows.
  - (1) Jumper E12 to E13. Jumper E15 to E16. Jumper E17 to E18.
  - (2) Connect DMM (10 volt scale) from E19 to E14 (ground) (Figure 4-112).

Table 4-24. Voltage Drop Across CR7 in Vdc

| Temperature<br>°C | .35  | .45  | .55  | .65  |
|-------------------|------|------|------|------|
| 45                | .326 | .289 | .253 | .217 |
| 35                | .278 | .242 | .206 | .170 |
| 25                | .232 | .195 | .159 | .123 |
| 15                | .186 | .150 | .114 | .093 |
| 5                 | .142 | .106 | .090 | .090 |

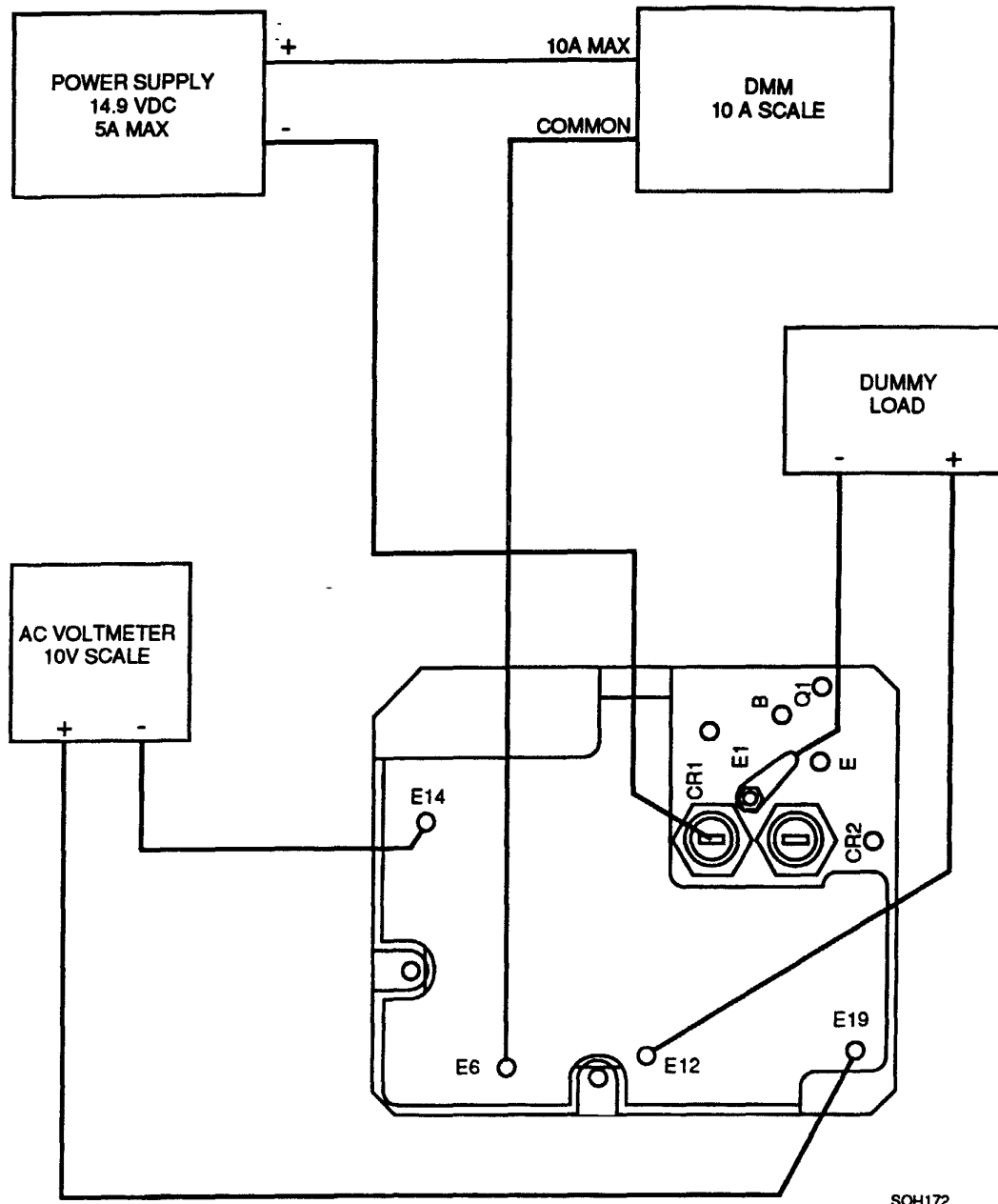
- (3) Connect external power supply and set for 14.9 Vdc. Limit current to 5 A through DMM on the 10 A scale with positive lead to E6 and negative lead to cathode of A1A2A1CR1.
- (4) Connect electronic load from E12 to A1A2A1E1.
- (5) Increase load current until DMM at E19 reads 5.0 Vdc. Record current reading on data sheet.
- (6) If load current was greater than 4.11 A or less than 4.00 A, compute the new value of R28 as follows:

$$\{1/(\text{measured current}/4.055) \times [1/(1/R28_{\text{ACTUAL}})+(1/10,000,000)]\}-.0000001 = 1/R28_{\text{NEW}} \text{ value}$$

**NOTE**

If charge control CCA has 223K ohm resistors in R28 or R43, use the following equation:  $[1/(\text{measured current}/4.055) \times 218136] - .0000001 = 1/R28_{\text{NEW}} \text{ value}$ .

- (7) Temporarily jumper E5 to E4; note that DMM reading at E19 drops to  $\leq 0.2$  Vdc. Remove this jumper. Mark value on data sheet.
  - (8) Choose the nearest value to that computed from find numbers 51 through 90 (See Appendix B). Record this value on data sheet.
  - (9) Increase load current until DMM at E19 reads 5.0 Vdc. Record current on data sheet.
  - (10) Connect power supply/ammeter to: positive E9 (Figure 4-113), negative to the cathode of A1A2A1CR2. Repeat steps 5 and 6 for R43. Record current reading on data sheet.
  - (11) Temporarily jumper E8 to E10. Note that DMM reading at E19 drops to  $\leq 0.2$  Vdc. Record the new value for R43 on data sheet. This concludes testing of charge control CCA.
- o. Remove all jumpers, cables and test equipment. Enter serial number of circuit assembly and name or identification stamp on data sheet. Note that the following circuits have not been tested at this time: U4B, U4C, Q2, Q5, CR3, CR4, R4, R7.



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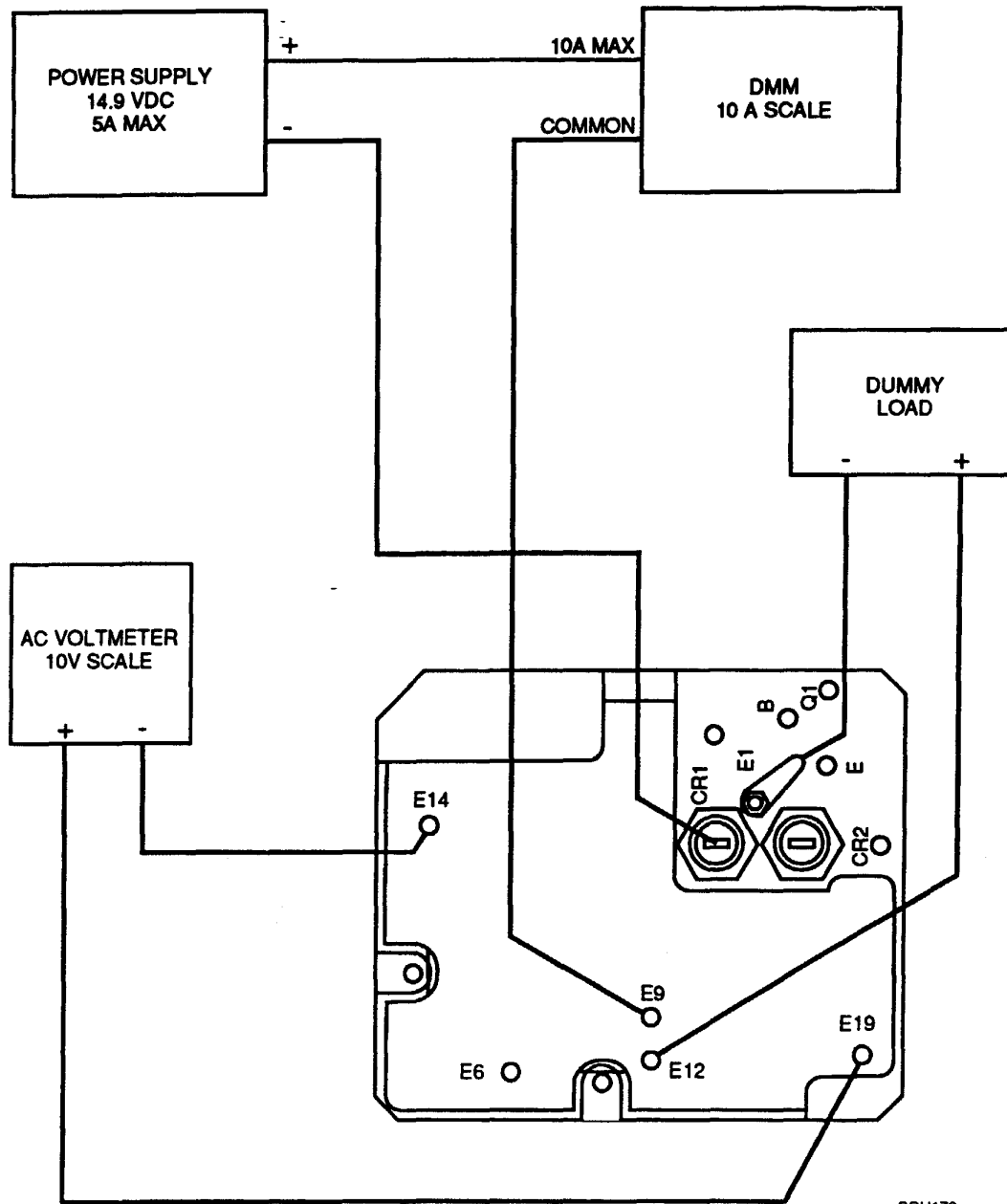
FIGURE 4-112. Charge Control Setup for R28

**4-274 TROUBLESHOOTING.**

The procedures and guidelines in this section consist of a list of typical problems and the circuit or components that are most likely to cause the problem listed in Table 4-25. Indicated components are listed in the recommended order of replacement.

**4-275 PAINTING, REFINISHING AND MARKING.**

Humiseal (item 6, App. C) charge control CCA after replacing components or to repair damaged humiseal that can occur during test probing. Do not humiseal connector or adjustable components. The part number is silkscreened/etched in each board at manufacturer level. Identify with dash number (Figure 4-111, Sheet 3). Also identify with latest Revision number. Identify dash and revision numbers



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FIGURE 4-113. Charge Control Test Setup for R43

in areas shown per Mil-Std-130 using .09 - .12 high characters using white epoxy ink per Mil-I-43553, Type II. Insert manufacture cage code number and serial number in areas shown.

4-276 FINAL ASSEMBLY/INSTALLATION.

Install the charge control CCA into the battery box housing per the instructions in Section XXV and perform the procedures in Section XXVII.

Table 4-25. Charge Control CCA Troubleshooting

| Symptom                  | Paragraph     | Suspect Component(s)  |
|--------------------------|---------------|---|
| Indirect Voltage at E12  | 4-273.3.g     | Q1, A1, U1, U2 or associated circuitry  |
| Incorrect Current at R30 | 4-273.3.j     | Temperature compensation circuit consisting of U3, U4, and associated circuitry |
| Incorrect Load Current   | 4-273.3.n.(8) | R28 wrong value; U5, Q1, Q4, and associated circuitry                           |
| Incorrect Load Current   | 4-273.3.n.(9) | R43 wrong value; U6, Q7, Q8, and associated circuitry                           |

## CHARGE CONTROL CCA DATA SHEET

| <u>Para. No.</u> | <u>Test</u>   | <u>Data</u>     | <u>Limits</u>    |
|------------------|---|-----------------|------------------|
| 4-270.g          | Mechanical inspection.  | _____ ( ) _____ | (X)              |
| 4-273.3.b        | E1, E4, E6, E9 and E10 > 200 ohms to ground.                                | _____ ( ) _____ | (X)              |
| 4-273.3.f        | Charging voltage at E12.  | _____           | 14.67 - 16.87    |
| 4-273.3.g        | Voltage at CR9 cathode.   | _____           | 5.000 ± .006     |
| 4-273.3.h        | Voltage drop across CR7.  | _____           | Reference        |
| 4-273.3.i        | Voltage across R30.   | _____           | Reference        |
| 4-273.3.j        | Voltage within ±16% in Table 4-23.  | _____ ( ) _____ | (X)              |
| 4-273.3.l        | Voltage at E19 to ground.   | _____           | ≤ 2.00           |
| 4-273.3.n.(5)    | Current for 5.0 Vdc at E19.   | _____           | Reference        |
| 4-273.3.n.(7)    | Voltage at E19 ≤ 0.1 Vdc  | _____           | (X)              |
| 4-273.3.n.(8)    | Part number for new value of R28.   | _____           | Reference        |
| 4-273.3.n.(9)    | Current for 5.0 Vdc at E19.   | _____           | Reference        |
| 4-273.3.n.(11)   | Part number for new value of R43.<br>Voltage at E19 drops to ≤ 0.1 Vdc. (X) | _____ ( ) _____ | Reference<br>(X) |

## Section XXVII. FINAL ASSEMBLY TESTING

### 4-277 GENERAL.

This section contains final assembly testing instructions for the AN/PRC-132 Radio Set. Section II contains specific testing and maintenance instructions for the radio set. Sections III through XXI contain testing and maintenance instructions for the radio set assemblies, subassemblies, and components. The requirements in this section must be met before work on the end item can be considered complete.

### 4-278 INSPECTION.

Follow the PMCS chart in TM 11-5820-1102-12 to as a checklist for final inspection of the assembly.

### 4-279 LUBRICATION.

No lubrication is required at final assembly.

### 4-280 TESTING/PERFORMANCE CHECK.

Testing and performance checks for the radio set end item, assemblies, subassemblies, and components are contained in Section II through Section XXI of this DMWR. Once an assembly/subassembly has been successfully tested, the assembly/subassembly shall be installed into the next higher assembly per the instructions contained in the section referenced by the FINAL/ASSEMBLY/INSTALLATION paragraph for the assembly/subassembly that was successfully tested. Testing instructions contained in the referenced section for the next higher assembly shall be followed to test the next higher assembly. This process of testing each level of the end item shall be maintained until successful assembly and testing of the radio set end item is achieved.

Testing of the overall AN/PRC-132 Radio Set (Section II), RT-1648/PRC-132 Radio Receiver-Transmitter (Section III), and SOHFRAD Radio Transceiver (Section IV) is covered in TM 11-5820-1102-30.

### 4-281 OIL ANALYSIS.

There are no oil analysis requirements for the end item.

### 4-282 PAINTING AND MARKING.

Paint only exterior surfaces with a light textured finish (overspray not permitted) per MIL-C-83286B, Type 1, color: 24084 per FED STD 595.

## **CHAPTER 5**

### **QUALITY ASSURANCE REQUIREMENTS**

#### **Section I. GENERAL**

##### **5-1 RESPONSIBILITY.**

The contractor/depot is responsible for the accomplishment of the requirements described herein. The contractor/depot may utilize its own facilities or any other commercial laboratory acceptable to the procuring activity/commodity manager (PA/CM) for the performance of inspections and calibrations. The PA/CM reserves the right to perform the inspections to ensure that supplies or services conform to the prescribed requirements.

##### **5-2 DEFINITIONS.**

The quality assurance terms used shall be those defined in MIL-STD-109, AR 702-10 and MIL-W-63150.

##### **5-3 INSPECTION EQUIPMENT.**

There are no special requirements for the design, acquisition, maintenance, calibration and disposition of inspection equipment beyond the equipment described in each section of Chapter 4. Further, inspection requirements are outlined in each section of Chapter 4 as it relates to the item, assembly, subassembly or component addressed.

##### **5-4 CERTIFICATION REQUIREMENTS.**

The contractor/depot shall be responsible for ascertaining and certifying that personnel skills, procedures, processes, materials, and equipment identified below are used where required in the work process of this DMWR. Certification or like evidence will be maintained throughout the life of the contract.

##### **5-5 QUALITY ASSURANCE PLAN.**

The contractor/depot QA activity is responsible for preparing the QA/QC plan covering the work required by the DMWR and contract/work directive. Depots shall prepare the plan in accordance with DARCOM-R 702-1. Contractors shall conform to either MIL-Q-9858 or MIL-I-45208 as specified by the PA/CM. In addition to meeting the requirements of the foregoing references, the plan will provide that:

- a. The QA/QC plan shall be made available to the PA/CM for review prior to the start of work and through the life of the program. The contractor shall notify the PA/CM in writing of any change. The basic plan and changes thereto are subject to disapproval by the PA/CM.
- b. Comparison inspection standards are coordinated with the PA/CM Quality Assurance element.
- c. Material or procedural departure from the DMWR or supporting specifications will not be accepted without prior approval of the PA/CM in accordance with MIL-STD-481.
- d. Rejected material is randomly inspected to verify classification prior to reclamation or disposal.
- e. Maintenance and reclamation procedures are verified before and periodically during operations.
- f. Inspection requirements in Section II below are accomplished.



**Section II. INSPECTION REQUIREMENTS**

**5-6 INITIAL RECONDITIONING INSPECTION (FIRST ARTICLE, AR 702-10).**

**5-7 IN-PROCESS INSPECTION.**

Minimum required in-process inspections are identified throughout this DMWR. Additional inspections may be established by the contractor/depot as necessary.

**5-8 ACCEPTANCE INSPECTIONS.**

Acceptance of all items processed in accordance with this DMWR will be based on the following:

- a. Compliance with quality of material requirements.
- b. Compliance with in-process inspections.
- c. Compliance with the requirements of the final acceptance inspection and for the final assembly inspections.
- d. Proper preparation for shipment/storage, if appropriate.

**CHAPTER 6**  
**PRESERVATION, PACKING AND MARKING**  
**PREPARATION FOR DELIVERY**

**6-1 PREPARATION FOR DELIVERY**

Verify that end item is complete as required by purchase order and includes all relevant components, assemblies and accessories. Inspect end item for cleanliness and clean as required (Chapter 4). Inspect end item for damage and correct or note damage as required.

6-1.1 Preservation and packaging. Preservation and packaging shall conform to MIL-STD-2073. The level of protection shall be B.

6-1.2 Preservation method. The preservation method shall be 2M which is cushioned and enclosed in a snug fitting carton or box and enclosed in a sealed bag.

6-1.3 Unit container. The unit shall be type CF, weather resistant.

6-1.4 Packing. Packing shall conform to MIL-E-55585. The level of packing shall be C.

6-1.5 Marking. Marking shall be bar codes in accordance with MIL-STD-129 and MIL-STD-1189.

**APPENDIX A****REFERENCES****AN/PRC-132 Radio Set****A-1 SCOPE.**

A-1.1 This specification establishes the performance, design, test, manufacture, and acceptance requirements for the AN/PRC-132 prime item.

**A-2 APPLICABLE DOCUMENTS.****A-2.1 Government Documents.**

A-2.2 Specifications and Standards. The following specifications, standards and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the Department of Defense Index of Specifications and Standards (DODISS) and supplement hereto.

**SPECIFICATIONS**

MIL-C-83286B

MIL-E-55585            Electronics Equipment and Parts

MIL-Q-9858            Quality Program Requirements

MIL-I-45208           Inspection System Requirements

MIL-W-63150           Weapons and Support Material Standard Quality Assurance Provisions for

**STANDARDS**

FED STD 595

MIL-STD-129           Marking for Shipment and Storage

MIL-STD-461           Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

MIL-STD-462           Electromagnetic Interference Characteristics, Measurement of

MIL-STD-481

MIL-STD-1189           Bar Code Symbology, Standard Department of Defense

MIL-STD-2073           Packaging Requirement Codes

MIL-STD-109           Quality Assurance Terms and Definitions

MIL-STD-481           Configuration Control - Engineering Changes, Deviation and Waivers (Short Form)

Table 4-22. Charge Current for Effects of Temperature

| Temperature °C | Charge Current Range (mA) |
|----------------|---------------------------|
| 45             | 653 - 435                 |
| 35             | 557 - 340                 |
| 25             | 464 - 247                 |
| 15             | 373 - 186                 |
| 5              | 285 - 180                 |

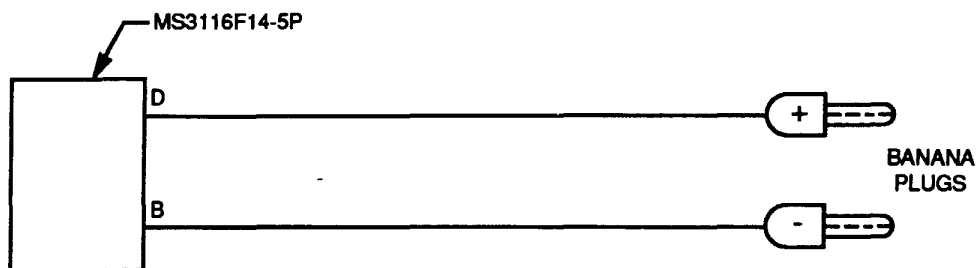


FIGURE 4-106. Battery Box Charge Cable

- aa. Disconnect all cables batteries and power supplies.
- ab. Connect battery box to standard SOHFRAD transceiver.
- ac. Connect RF output of transceiver through T-probe connector and ac voltmeter to 30 dB attenuator.
- ad. Connect CW keyer to one of the audio input jacks on the transceiver front panel.
- ae. Install a charged BB590/U battery into battery box position B1.
- af. Set transceiver to 1.6000 MHz and USB mode and 50 Watts output selected.
- ag. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ah. Set transceiver to 49.9999 MHz. Key transmitter and verify 50 Watts  $\pm$  1 dB (44.5 to 56.1 Vrms). Record transmit voltage on data sheet.
- ai. Turn off transceiver.
- aj. Move BB590 battery from B1 position (A1A2A1A1P1) to B2 position (A1A2A1A1P2).
- ak. Repeat steps 4-263.3.ab through 4-263.3.ai for the case of the BB590 installed in B2 position.
- al. Remove battery from battery box.

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## GLOSSARY

| <u>Abbreviation</u> | <u>Meaning</u>  |
|---------------------|---|
| AGC                 | Automatic Gain Control                                      |
| ALC                 | Automatic Level Control                                     |
| AM                  | Amplitude Modulation  |
| AME                 | Amplitude Modulation Equivalent                             |
| BCD                 | Binary Coded Digit  |
| CCA                 | Circuit Card Assembly                                       |
| CCW                 | Counterclockwise  |
| CW                  | Continuous Wave or Clockwise                                |
| DMM                 | Digital Multimeter  |
| DMWR                | Depot Maintenance Work Requirement                          |
| DODISS              | Department of Defense Index of Specifications and Standards |
| DRMO                | Defense Reutilization & Marketing Office                    |
| ECP                 | Engineering Change Proposal                                 |
| EIR                 | Equipment Improvement Recommendations                       |
| ESD                 | Electrostatic Discharge                                     |
| HF                  | High Frequency  |
| IAW                 | In Accordance With  |
| IF                  | Intermediate Frequency                                      |
| LCD                 | Liquid Crystal Display                                      |
| LED                 | Light Emitting Diode  |
| LO                  | Local Oscillator  |
| LSB                 | Lower Side Band   |
| PA/CM               | Procuring Activity/Commodity Manager                        |
| PA                  | Power Amplifier or Product Assurance                        |
| PCB                 | Printed Circuit Board                                       |
| PEP                 | Peak Envelope Power   |
| PQDR                | Product Quality Deficiency Report                           |
| PSA                 | Preshop Analysis  |
| PSI                 | Pounds Per Square Inch                                      |
| PTT                 | Push-To-Talk  |
| QA                  | Quality Assurance   |
| QC                  | Quality Control   |
| QDR                 | Quality Deficiency Report                                   |
| RED/W               | Request for Deviation/Waiver                                |
| RF                  | Radio Frequency   |
| ROD                 | Report of Discrepancy                                       |
| RPSTL               | Repair Parts and Special Tools List                         |
| RX                  | Receive   |
| SIE                 | Special Inspection Equipment                                |
| SINAD               | Signal Plus Noise and Distortion                            |
| SOHFRAD             | Special Operations High Frequency Radio                     |
| SSB                 | Single Side Band  |
| TAMMS               | The Army Maintenance Management Systems                     |
| TBO                 | Time Between Overhaul                                       |
| TCXO                | Temperature Compensated Crystal Oscillator                  |
| TX                  | Transmit  |
| U/M                 | Unit of Measure   |
| USB                 | Upper Side Band   |
| VHF                 | Very High Frequency   |
| VOM                 | Voltage-Ohm-Milliammeter                                    |
| VR                  | Voltage Regulator   |

**A-2.4 Other Publications.**

**HANDBOOKS**

**MIL-HDBK-263      Electrostatic Discharge Control Handbook**

**TECHNICAL MANUALS (End Item Specific)**

**TM 11-5820-1102-12    Operators and Unit Maintenance Manual**

**TM 11-5820-1102-30    Maintenance Instructions Direct Support**



**APPENDIX B**  
**DEPOT MAINTENANCE**  
**REPAIR PARTS AND SPECIAL TOOLS LIST**

**SECTION I. INTRODUCTION**

**1. SCOPE**

This manual lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for the performance of depot level maintenance of Radio Set, AN/PRC-132. It authorizes the requisitions, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

**2. GENERAL**

This Repair Parts and Special Tools List is divided into the following sections:

*a. Section II. Repair Parts List.* A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. This list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending item number sequence, with the parts in each group listed in ascending item number sequence. Figure numbers are listed directly beneath the group header. Bulk materials are listed in item name sequence. Repair part kits are listed separately in their own functional group within Section II. Repair parts for reparable special tools are also listed in this section. Items listed are shown on the associated illustration.

*b. Section III. Special Tools List.* Not applicable.

*c. Section IV. Cross-Reference Indexes.* A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphameric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance. The figure number and item number index lists figure and item numbers in numeric sequence and cross-references National stock number, Commercial and Government Entity Code, and part numbers.

**3. EXPLANATION OF COLUMNS (Section II and III)**

*a. Item No. (Column (1)).* Indicates the number used to identify items called out in the illustrations.

*b. SMR Code (Column (2)).* The source, maintenance, and recoverability (SMR) code is a five-position code containing supply/requisitioning information, maintenance category authorization criteria and disposition instruction, as shown in the following breakout:

| Source Code          | Maintenance Code                          | Maintenance Code                                   | Recoverability Code   |
|----------------------|---|--|---|
| XX                   | X   | X  | X   |
| 1st two positions    | 3d position                               | 4th position                                       | Who determines disposition action on an unserviceable item. |
| How you get an item. | Who can install, replace or use the item. | Who can do complete repair (see note) on the item. |   |

**NOTE**

Complete repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "repair" function in a use/user environment in order to restore serviceability to a failed item.

(1) *Source code.* The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follows:

| Code | Explanation  |
|------|--|
| PA   | Stocked items: use the applicable NSN to request/requisition items with these source codes. They are authorized to the category indicated by the code entered in the third position of the SMR code. |
| PB   |  |
| PC   |  |
| PD   |  |
| PE   |  |
| PF   |  |
| PG   |  |

**NOTE**

Items coded PC are subject to deterioration.

|    |  |
|----|--|
| KD | Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the third position of the SMR code. The complete kit must be requisitioned and applied. |
| KF |  |
| KB |  |

MO - Made at org/AVUM category  
 MF - Made at DS/AVIM category  
 MH - Made at GS category  
 ML - Made at Specialized Repair  
       Activity (SRA)  
 MD - Made at Depot

Items with these codes are not to be requested/requisitioned individually. They must be made from bulk material which is identified by the part number in the description and useable on code (UOC) column and listed in the Bulk Material group of the repair parts list. If the item is authorized to you by the third position code of the SMR code, but the source code indicates it is made at a higher category, order the item from the higher category of maintenance.

AO - Assembled by org/AVUM category  
 AF - Assembled by DS/AVIM category  
 AH - Assembled by GS category  
 AL - Assembled by SRA  
 AD - Assembled by Depot

Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the category of maintenance indicated by the source code. If the third position code of the SMR code authorized you to replace the item, but the source code indicates the item is assembled at a higher category, order the item from the higher category of maintenance.

**Code**                      **Explanation**

XA - Do not requisition an "XA" coded item. Order its next higher assembly.  
 XB - If an "XB" item is not available from salvage, order it using the CAGEC and part number given.  
 XC - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number  
 XD - Item is not stocked. Order an "XD" coded item through normal supply channels using the CAGEC and part number given, if no NSN is available.

**NOTE**

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

(2) *Maintenance Code.* Maintenance codes tell you the category of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance category authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following categories of maintenance.

**Code**                      **Application/Explanation**

C - Crew or operator maintenance done within organizational or aviation maintenance.  
 O - Organizational or aviation unit category can remove, replace, and use the item.  
 F - Direct support or aviation intermediate category can remove, replace, and use the item.  
 H - General support category can remove, replace, and use the item.  
 L - Specialized repair activity can remove, replace, and use the item.

D - Depot category can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance category with the capability to do complete repair (i.e., perform all authorized repair functions). This position will contain one of the following maintenance codes.

#### NOTE

Some limited repair may be done on the item at a lower category of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

| <b>Code</b> | <b>Explanation</b>   |
|-------------|--|
| O -         | Organizational or aviation unit is the lowest category that can do complete repair of the item.  |
| F -         | Direct support or aviation intermediate is the lowest category that can do complete repair of the item.  |
| H -         | General support is the lowest category that can do complete repair of the item.  |
| L -         | Specialized repair activity (designate the specialized repair activity) is the lowest category that can do complete repair of the item.  |
| D -         | Depot is the lowest category that can do complete repair of the item.  |
| Z -         | Nonreparable. No repair is authorized.   |
| B -         | No repair is authorized. (No parts or special tools are assigned for the maintenance of a "B" coded item.) However, the item may be reconditioned by adjusting, lubricating, etc., at the user category. |

(3) *Recoverability code.* Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR code as follows:

| <b>Recoverability Code</b> | <b>Application/Explanation</b>   |
|----------------------------|--|
| Z -                        | Nonreparable item. When unserviceable, condemn and dispose of the item at the category of maintenance shown in the third position of SMR code.   |
| O -                        | Reparable item. When uneconomically repairable, condemn and dispose of the item at organizational or aviation unit category.   |
| F -                        | Reparable item. When uneconomically repairable, condemn and dispose of the item at direct support or aviation intermediate category.   |
| H -                        | Reparable item. When uneconomically repairable, condemn and dispose of the item at general support category.   |
| D -                        | Reparable item. When beyond lower category repair capability, return to depot. Condemnation and disposal of item not authorized below depot category.  |
| L -                        | Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).  |
| A -                        | Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material. Refer to appropriate manuals/directives for specific instructions. |

c. *CAGEC (Column (3)).* The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. *Part Number (Column (4)).* Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

**NOTE**

When you use an NSN to requisition an item, the item you receive may have a different part number from the part ordered.

e. *Description and Useable on Code (UOC) (Column (5)).* This column includes the following information.

- (1) The Federal item name and, when required, a minimum description to identify the item.
- (2) The physical security classification of the item is indicated by the parenthetical entry (N/A) - Not Applicable.
- (3) Items that are included in kits and sets are listed below the name of the kit or set.
- (4) Spare/repair parts that make up an assembled item are listed immediately following the assembled item line entry.
- (5) Part numbers for bulk materials are referenced in this column in the line entry for the item to be manufactured/fabricated.
- (6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line of the description (before UOC).
- (7) Usable on code, when applicable (para 5).

f. *Qty (Column (6)).* Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

#### 4. EXPLANATION OF COLUMNS (Section IV)

##### a. *National Stock Number (NSN) Index.*

(1) *Stock number column.* This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN. When using this column to locate an item, ignore the first four digits of the NSN. When requisitioning items use the complete NSN (13 digits) sequence.

(2) *Fig. column.* This column lists the number of the figure where the item is identified/located. The illustrations are in numerical sequence in sections II and III.

(3) *Item column.* The item number identifies the item associated with the figure listed in the adjacent Fig. column. This item is also identified by the NSN listed on the same line.

b. *Part Number Index.* Part numbers in this index are listed by part number in ascending alphameric sequence.

- (1) *CAGEC column.* This column lists the Commercial and Government Entity Code (CAGEC).
- (2) *Part number column.* This column indicates the part number assigned to the item.
- (3) *Stock number column.* This column lists the National stock number for the associated part number and manufacturer identified in the part number and CAGEC columns to the left.

(4) *Fig. column.* This column lists the number of the figure where the item is identified/located in sections II and III.

(5) *Item column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

c. *Figure and Item Number Index.*

(1) *Fig. column.* This column lists the number of the figure where the item is identified/located in sections II and III.

(2) *Item column.* The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

(3) *Stock number column.* This column lists the National stock number for the item.

(4) *CAGEC column.* The Commercial and Government Entity Code (CAGEC) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(5) *Part number column.* Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls and the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

## 5. SPECIAL INFORMATION

a. *Fabrication Instructions.* Not applicable.

b. *Associated Publications.* Not applicable.

c. *National Stock Numbers.* National stock numbers (NSN's) that are missing from P source coded items have been applied for and will be added to this TM by future change/revision when they are entered in the Army Master Data File (AMDF). Until the NSN's are established and published, submit exception requisitions to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-MM, Fort Monmouth, NJ 07703-5007 for the part required to support your equipment.

## 6. HOW TO LOCATE REPAIR PARTS

a. *When National stock number or part number is not known.*

(1) *First.* Using the table of contents, determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) *Second.* Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) *Third.* Identify the item on the figure and note the item number.

(4) *Fourth.* Refer to the Repair Parts Lists for the figure to find the part number for the item number noted on the figure.

(5) *Fifth.* Refer to the Part Number Index to find the NSN, if assigned.

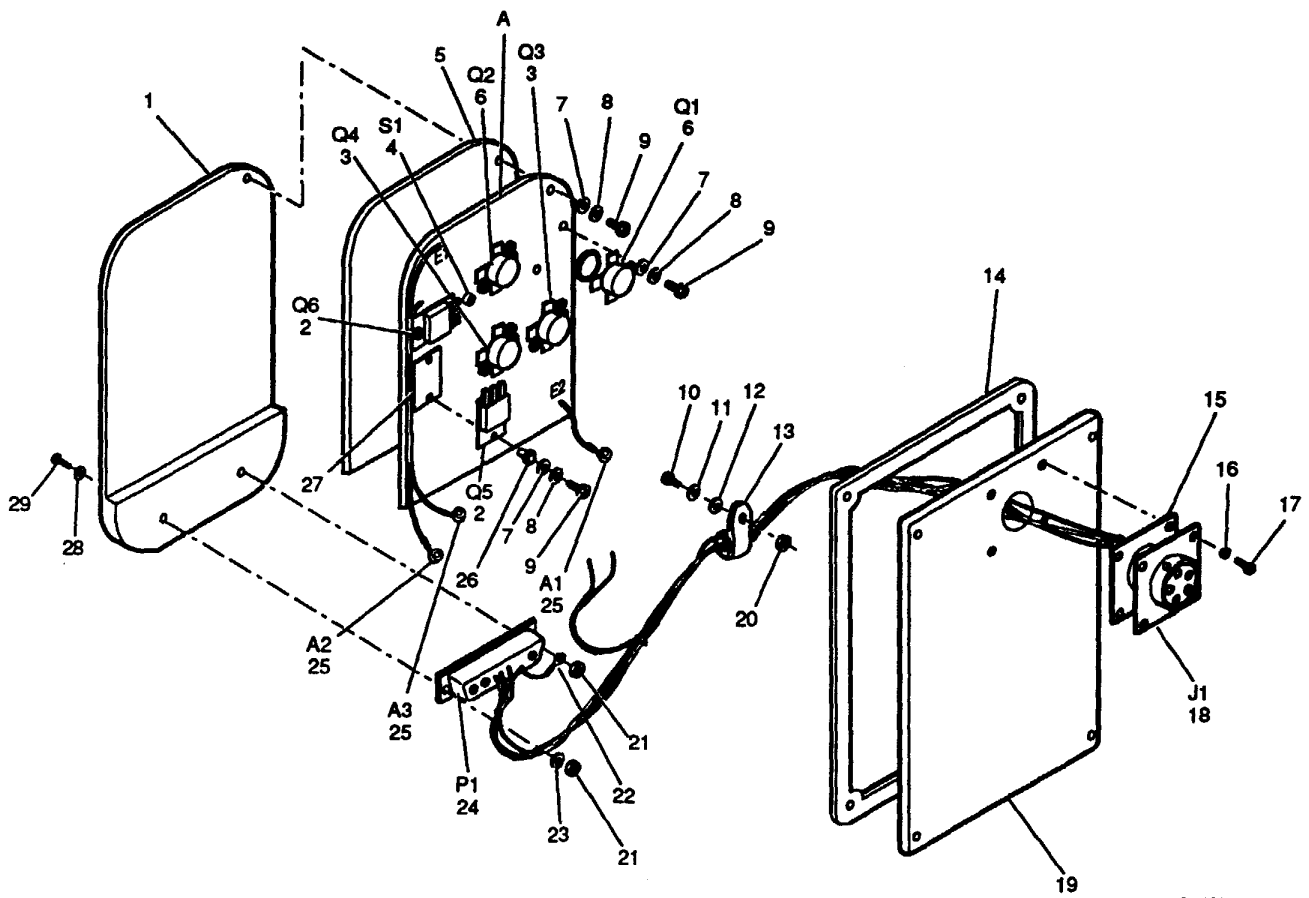
b. *When National stock number or part number is known.*

(1) *First.* Using the index of National stock numbers and part numbers, find the pertinent National stock number or part number. The NSN index is in National item identification number (NIIN) sequence (para 4a(1)). The part numbers in the part number index are listed in ascending alphameric sequence (para 4b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) *Second.* After finding the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

## **7. ABBREVIATIONS**

Not applicable.

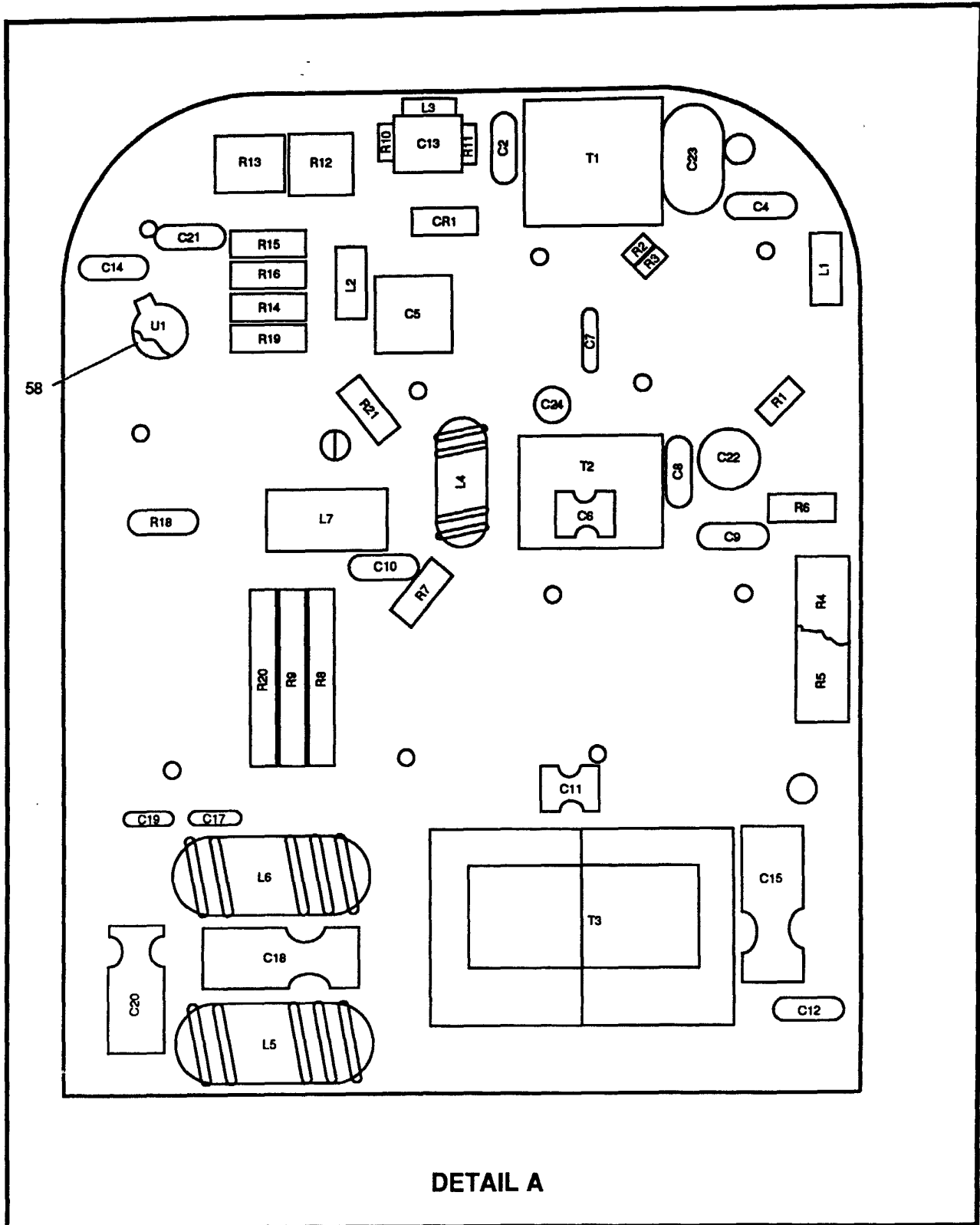


SCH180

Precede all reference designators with A1A13

Figure B-1. A13 Power Amplifier Assembly (Sheet 1 of 3)





SOH182

Precede all reference designators with A1A13

Figure B-1. A13 Power Amplifier Assembly (Sheet 2 of 3)

## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C2         | 30         | C12        | 30         | C22        | 34         | L6         | 40         | R8         | 43         | R18        | 51         |
| C4         | 30         | C13        | 30         | C23        | 35         | L7         | 41         | R9         | 43         | R19        | 52         |
| C5         | 30         | C14        | 30         | C24        | 34         | R1         | 42         | R10        | 45         | R20        | 53         |
| C6         | 31         | C15        | 33         | CR1        | 36         | R2         | 42         | R11        | 46         | R21        | 42         |
| C7         | 30         | C17        | 30         | L1         | 37         | R3         | 42         | R12        | 47         | T1         | 54         |
| C8         | 30         | C18        | 33         | L2         | 37         | R4         | 43         | R13        | 47         | T2         | 55         |
| C9         | 30         | C19        | 30         | L3         | 38         | R5         | 43         | R14        | 48         | T3         | 56         |
| C10        | 30         | C20        | 33         | L4         | 39         | R6         | 44         | R15        | 49         | U1         | 57         |
| C11        | 32         | C21        | 30         | L5         | 40         | R7         | 44         | R16        | 50         |            |            |

Precede all reference designators with A1A13

SECTION II DR11-5820-1102 (5) (6)

| (1)<br>ITEM<br>NO | (2)<br>SMR<br>CODE | (3)<br>CAGEC | (4)<br>PART<br>NUMBER | DESCRIPTION AND USABLE ON CODES(UOC)         | QTY |
|-------------------|--------------------|--------------|-----------------------|--|-----|
|                   |                    |              |                       | GROUP 01010301 POWER AMPLIFIER ASSEMBLY, A13 |     |

FIGURE B-1

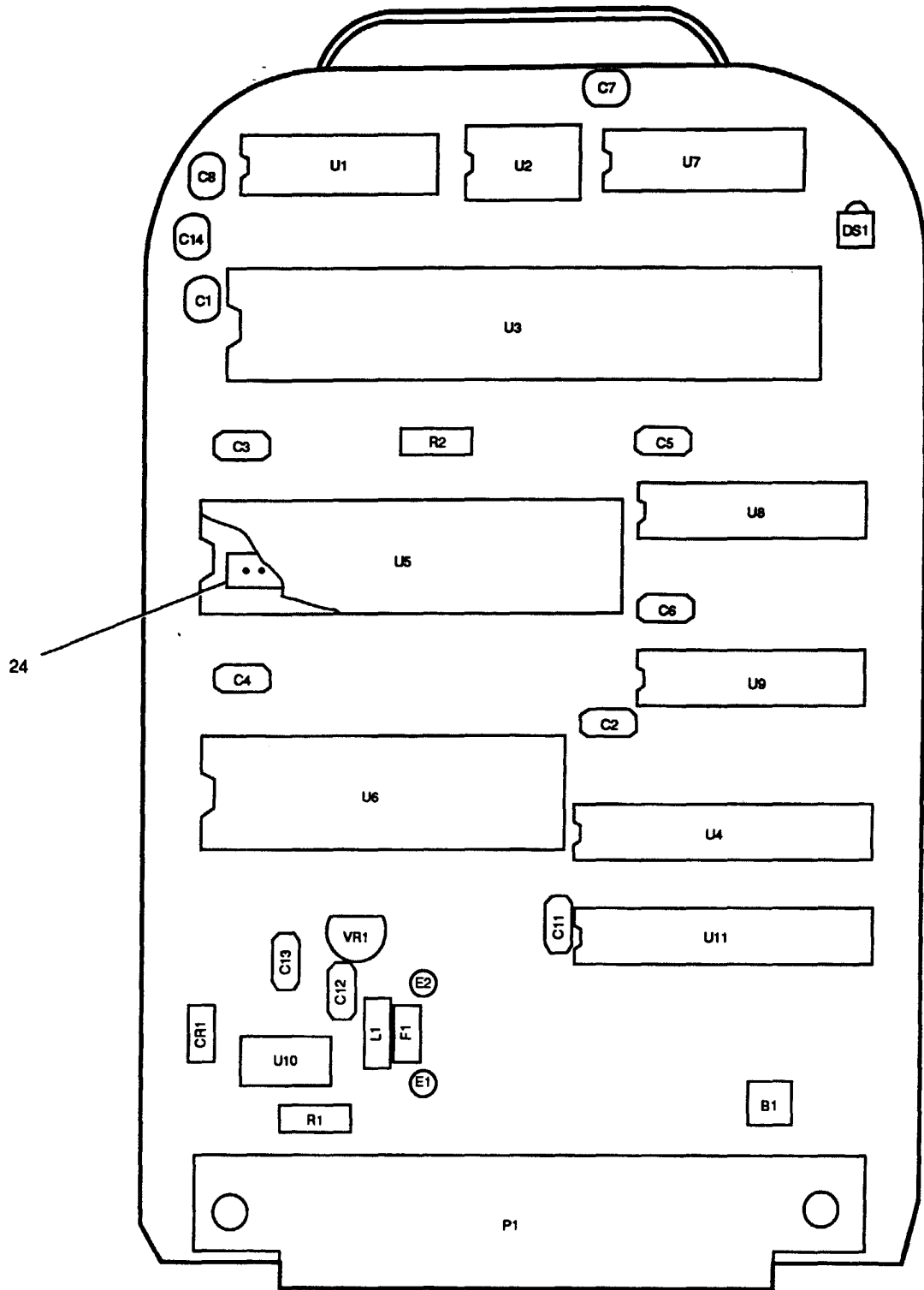
|    |       |       |                |                       |    |
|----|-------|-------|----------------|-----------------------|----|
| 1  | PADZZ | 54296 | 823973-00      | HEAT SINK, ELECTRICAL | 1  |
| 2  | PADZZ | 01295 | TIP41C         | TRANSISTOR            | 2  |
| 3  | PADZZ | 54296 | 440106-00      | TRANSISTOR            | 2  |
| 4  | PADZZ | 01295 | KLIXOM3BTD3-45 | SWITCH, THERMOSTATIC  | 1  |
| 5  | PADZZ | 54296 | 831883-01      | INSULATOR, PLATE      | 1  |
| 6  | PADZZ | 54296 | 101-0167-001   | SEMICONDUCTOR DEVIC   | 1  |
| 7  | PADZZ | 96906 | MS15795-803    | WASHER, FLAT          | 14 |
| 8  | PADZZ | 54296 | 812038-00      | WASHER, LOCK          | 14 |
| 9  | PADZZ | 96906 | MS51957-14     | SCREW, MACHINE        | 2  |
| 10 | PADZZ | 26136 | HC440-8-SS-B   | SCREW, CAP, SOCKET HE | 1  |
| 11 | PADZZ | 2A392 | AN-960-42      | WASHER, FLAT          | 1  |
| 12 | PADZZ | 54296 | 116-0001       | WASHER, SPLIT         | 1  |
| 13 | PADZZ | 15786 | 81487-4        | CLAMP, LOOP           | 1  |
| 14 | PADZZ | 54296 | 158-0099-001   | GASKET                | 1  |
| 15 | PADZZ | 18876 | 9166235        | GASKET                | 1  |
| 16 | PADZZ | 96906 | MS15795-803    | WASHER, FLAT          | 4  |
| 17 | PADZZ | 54296 | 810551-01      | SCREW, CAP, SOCKET HE | 3  |
| 18 | PADZZ | 96906 | MS3470W14-12P  | CONNECTOR, RECEPTAC   | 1  |
| 19 | XBDZZ | 54296 | 823974-10      | COVER, ACCESS         | 1  |
| 20 | PADZZ | 78189 | NAS671C4       | NUT, PLAIN, HEXAGON   | 1  |
| 21 | PADZZ | 96906 | MS35649-224    | NUT, PLAIN, HEXAGON   | 2  |
| 22 | PADZZ | 79963 | 922-092        | TERMINAL, LUG         | 1  |
| 23 | PADZZ | 96906 | MS51848-43     | WASHER, LOCK          | 1  |
| 24 | PADZA | 13499 | 371-1285-320   | CONNECTOR, RECEPTAC   | 1  |
| 25 | PADZA | 71468 | DM53743-5000   | CONTACT, ELECTRICAL   | 3  |
| 26 | PADZZ | 13764 | 12SWS0200      | INSULATOR, BUSHING    | 2  |
| 27 | PADZZ | 08289 | SM-73-48-13    | INSULATOR, PLATE      | 2  |
| 28 | PADZZ | 96906 | MS15795-802    | WASHER, FLAT          | 1  |
| 29 | PADZZ | 96906 | MS51957-13     | SCREW, MACHINE        | 2  |
| 30 | PADZZ | 81349 | M39014/01-1593 | CAPACITOR, FIXED, CER | 13 |
| 31 | PADZZ | 14655 | CD15FD471J03   | CAPACITOR, FIXED, MIC | 1  |
| 32 | PADZZ | 81349 | CMR05F361F0DR  | CAPACITOR, FIXED, MIC | 1  |
| 33 | PADZZ | 54296 | 142210-00      | CAPACITOR, FIXED, ELE | 3  |
| 34 | PADZZ | 62462 | CLEE10M25V     | CAPACITOR, FIXED, ELE | 2  |
| 35 | PADZZ | 05397 | T368D227M010AS | CAPACITOR, FIXED, ELE | 1  |
| 36 | PADZZ | 81349 | JANTX1N4245    | SEMICONDUCTOR DEVIC   | 1  |
| 37 | PADZZ | 28480 | 9100-2251      | COIL, RADIO FREQUENC  | 2  |
| 38 | PADZZ | 09969 | IM-2 10.0UH    | COIL, RADIO FREQUENC  | 1  |
| 39 | PADZZ | 54296 | 312326-00      | COIL, RADIO FREQUENC  | 1  |
| 40 | PADZZ | 54296 | 312327-00      | COIL, RADIO FREQUENC  | 2  |
| 41 | PADZZ | 14933 | 82027-03       | COIL, RADIO FREQUENC  | 1  |
| 42 | PADZZ | 81349 | RLR07C68R0GS   | RESISTOR, FIXED, FILM | 4  |
| 43 | PADZZ | 81349 | RL42S561JTX    | RESISTOR, FIXED, FILM | 4  |
| 44 | PADZZ | 81349 | RCR20G100JS    | RESISTOR, FIXED, COMP | 2  |
| 45 | PADZZ | 81349 | RLR07C39R0GS   | RESISTOR, FIXED, FILM | 1  |
| 46 | PADZZ | 81349 | RLR07C1000GS   | RESISTOR, FIXED, FILM | 1  |

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| SECTION II |       |       | DR11-5820-1102  |                                      |     |  |
|------------|-------|-------|-----------------|--------------------------------------|-----|--|
| (1)        | (2)   | (3)   | (4)             | (5)                                  | (6) |  |
| ITEM       | SMR   |       | PART            |                                      |     |  |
| NO         | CODE  | CAGEC | NUMBER          | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 47         | PADZZ | 81349 | RJ26FW501R      | RESISTOR,VARIABLE.....               | 2   |  |
| 48         | PADZZ | 81349 | RLR07C2200GS    | RESISTOR, FIXED, FILM.....           | 1   |  |
| 49         | PADZZ | 81349 | RNR55C2490FS    | RESISROR, FIXED.....                 | 1   |  |
| 50         | PADZZ | 81349 | RNR55C1301FS    | RESISTOR, FIXED, FILM.....           | 1   |  |
| 51         | PADZZ | 81349 | RCR20G330JS     | RESISTOR, FIXED, COMP.....           | 1   |  |
| 52         | PADZZ | 29604 | CF-07-6.80HM-5% | RESISTOR, FIXED, FILM.....           | 1   |  |
| 53         | PADZZ | 81349 | RCR42G100JS     | RESISTOR, FIXED, COMP.....           | 1   |  |
| 54         | PADZZ | 54296 | 361469-00       | REACTOR.....                         | 1   |  |
| 55         | PADZZ | 54296 | 361470-00       | TRANSFORMER, POWER A.....            | 1   |  |
| 56         | PADZZ | 54296 | 361471-00       | TRANSFORMER, CURRENT.....            | 1   |  |
| 57         | PADZA | 81349 | M38510/11703BXC | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 58         | PADZZ | 81349 | M38527/02-020D  | MOUNTING PAD, ELECTR.....            | 1   |  |

END OF FIGURE

11



SOH142

Precede all reference designators with A1A1

Figure B-2. A1 Processor Board Assembly (Sheet 1 of 2)

DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| B1         | 1          | C6         | 3          | C14        | 2          | L1         | 10         | U3         | 16         | U9         | 21         |
| C1         | 2          | C7         | 2          | CR1        | 6          | P1         | 11         | U4         | 17         | U10        | 22         |
| C2         | 3          | C8         | 2          | DS1        | 7          | R1         | 12         | U5         | 18         | U11        | 17         |
| C3         | 3          | C11        | 3          | E1         | 8          | R2         | 13         | U6         | 19         | VR1        | 23         |
| C4         | 3          | C12        | 4          | E2         | 8          | U1         | 14         | U7         | 20         |            |            |
| C5         | 3          | C13        | 5          | F1         | 9          | U2         | 15         | U8         | 21         |            |            |

Precede all reference designators with A1A1

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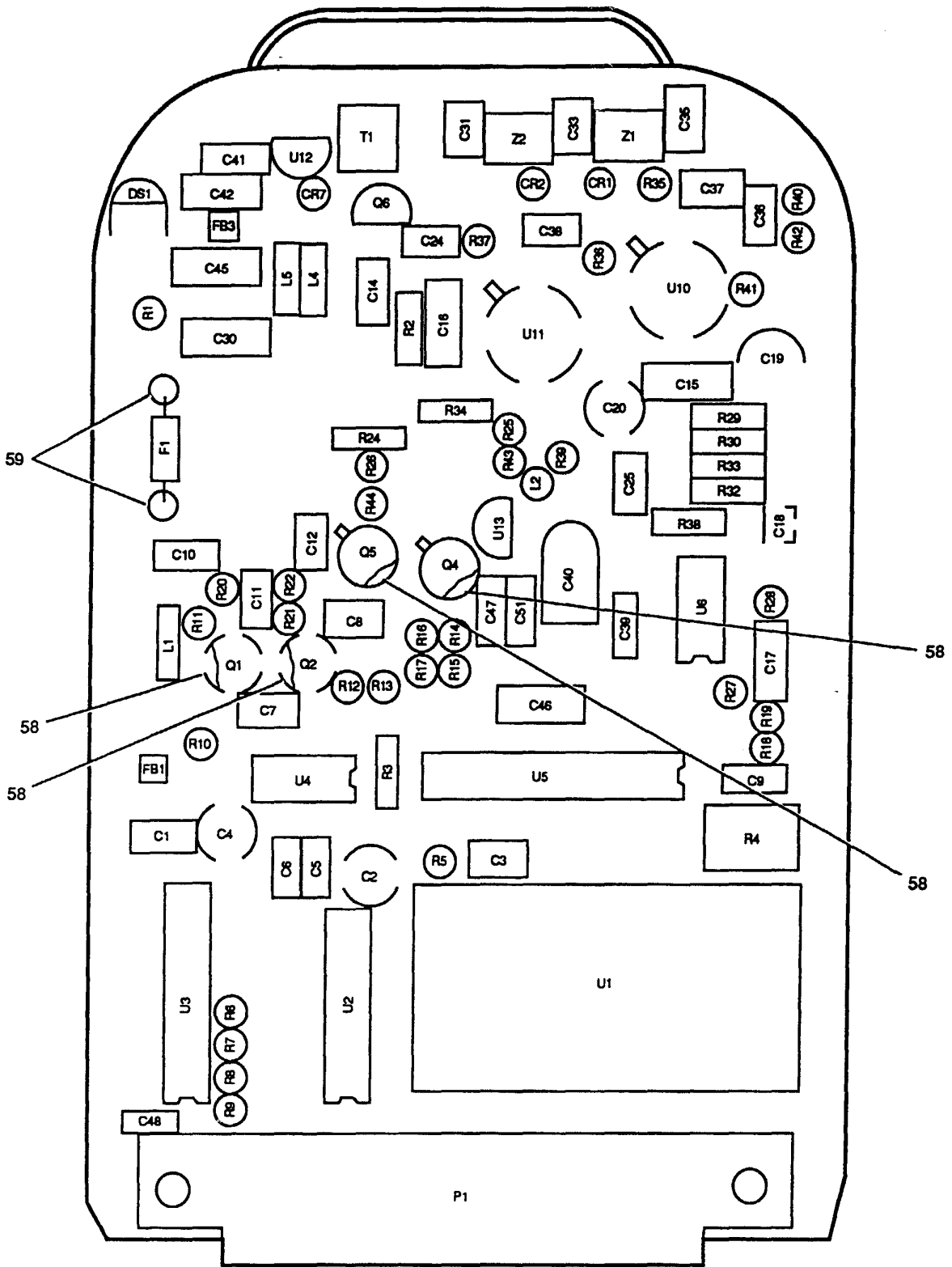
|            |      |       |                |                                      |     |
|------------|------|-------|----------------|--------------------------------------|-----|
| SECTION II |      |       | DR11-5820-1102 | (5)                                  | (6) |
| (1)        | (2)  | (3)   | (4)            |                                      |     |
| ITEM       | SMR  |       | PART           |                                      |     |
| NO         | CODE | CAGEC | NUMBER         | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |

GROUP 01010401 PROCESSOR BOARD ASSEMBLY, A1

FIGURE B-2

|    |       |       |                  |                            |   |
|----|-------|-------|------------------|----------------------------|---|
| 1  | PCDZZ | 5P319 | BR1225-1HD       | BATTERY, LITHIUM.....      | 1 |
| 2  | PADZZ | 81349 | M39014/23-0355   | CAPACITOR, FIXED, CER..... | 4 |
| 3  | PADZZ | 81349 | M39014/23-0356   | CAPACITOR, FIXED, CER..... | 6 |
| 4  | PADZZ | 31433 | T390A105M025AS   | CAPACITOR, FIXED.....      | 1 |
| 5  | PADZZ | 54296 | 151529-00        | CAPACITOR, FIXED, ELE..... | 1 |
| 6  | PADZZ | 81349 | JANTX1N4148-1    | SEMICONDUCTOR DEVIC.....   | 1 |
| 7  | PADZZ | 96214 | 803415-3         | LIGHT EMITTING DIOD.....   | 1 |
| 8  | PADZZ | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....        | 2 |
|    |       |       | 0                |                            |   |
| 9  | PADZZ | 81349 | FM04A125V1/4A    | FUSE, CARTRIDGE.....       | 1 |
| 10 | PADZZ | 91637 | IM2-100UH 10%    | COIL, RADIO FREQUENC.....  | 1 |
| 11 | PADZZ | 97913 | HGM030MEA2Y00A   | CONNECTOR, RECEPTACL.....  | 1 |
| 12 | PADZZ | 81349 | RLR07C1001GS     | RESISTOR, FIXED, FILM..... | 1 |
| 13 | PADZZ | 81349 | RLR05C1002GS     | RESISTOR, FIXED, FILM..... | 1 |
| 14 | PADZZ | 67268 | 8405601CB        | MICROCIRCUIT, DIGITA.....  | 1 |
| 15 | PADZZ | 0B0A9 | DS1231-35        | MICROCIRCUIT, DIGITA.....  | 1 |
| 16 | PADZZ | 27014 | NSC800N-31/A+    | MICROCIRCUIT, DIGITA.....  | 1 |
| 17 | PADZZ | 81349 | M38510/6502BRA   | MICROCIRCUIT, DIGITA.....  | 2 |
| 18 | PADZZ | 54296 | 102-0689-002     | MICROCIRCUIT, MEMORY.....  | 1 |
| 19 | PADZZ | 61892 | UPD446C-2        | MICROCIRCUIT, MEMORY.....  | 1 |
| 20 | PADZZ | 81349 | M38510/65001BCA  | MICROCIRCUIT, DIGITA.....  | 1 |
| 21 | PADZZ | 81349 | M38510/65802BEA  | MICROCIRCUIT, DIGITA.....  | 2 |
| 22 | PADZZ | 0B0A9 | DS1210           | MICROCIRCUIT, DIGITA.....  | 1 |
| 23 | PADZZ | 27014 | LM340LAZ-5.0     | MICROCIRCUIT, LINEAR.....  | 1 |
| 24 | PADZZ | 55322 | IC0-628-NGT      | SOCKET, PLUG-IN, ELEC..... | 1 |

END OF FIGURE



SOH153

Precede all reference designators with A1A2

Figure B-3. A2 1ST LO Board Assembly (Sheet 1 of 2)



DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C24        | 1          | CR2        | 14         | R4         | 28         | R24        | 30         | R44        | 44         |
| C2         | 2          | C25        | 7          | CR7        | 15         | R5         | 29         | R25        | 36         | T1         | 45         |
| C3         | 1          | C30        | 8          | DS1        | 16         | R6         | 29         | R26        | 36         | U1         | 46         |
| C4         | 2          | C31        | 9          | F1         | 17         | R7         | 29         | R27        | 37         | U2         | 47         |
| C5         | 1          | C33        | 10         | FB1        | 18         | R8         | 29         | R28        | 34         | U3         | 48         |
| C6         | 3          | C35        | 11         | FB3        | 18         | R9         | 29         | R29        | 38         | U4         | 49         |
| C7         | 1          | C36        | 1          | L1         | 19         | R10        | 27         | R30        | 39         | U5         | 50         |
| C8         | 1          | C37        | 3          | L2         | 20         | R11        | 30         | R32        | 40         | U6         | 51         |
| C9         | 4          | C38        | 3          | L4         | 21         | R12        | 27         | R33        | 41         | U10        | 52         |
| C10        | 1          | C39        | 1          | L5         | 19         | R13        | 31         | R34        | 37         | U11        | 53         |
| C11        | 1          | C40        | 12         | P1         | 22         | R14        | 32         | R35        | 35         | U12        | 54         |
| C12        | 1          | C41        | 1          | Q1         | 23         | R15        | 32         | R36        | 26         | U13        | 55         |
| C14        | 3          | C42        | 8          | Q2         | 23         | R16        | 32         | R37        | 35         | Z1         | 56         |
| C15        | 5          | C45        | 8          | Q4         | 24         | R17        | 32         | R38        | 42         | Z2         | 57         |
| C16        | 5          | C46        | 8          | Q5         | 24         | R18        | 33         | R39        | 27         |            |            |
| C17        | 6          | C47        | 1          | Q6         | 25         | R19        | 33         | R40        | 27         |            |            |
| C18        | 7          | C48        | 1          | R1         | 26         | R20        | 34         | R41        | 43         |            |            |
| C19        | 2          | C51        | 13         | R2         | 27         | R21        | 35         | R42        | 27         |            |            |
| C20        | 2          | CR1        | 14         | R3         | 27         | R22        | 35         | R43        | 44         |            |            |

Precede all reference designators with A1A2

Figure B-3. A2 1ST LO Board Assembly (Sheet 2 of 2)

11

SECTION II DR11-5820-1102 (5) (6)

(1) (2) (3) (4)

ITEM SMR CAGEC PART

NO CODE CAGEC NUMBER DESCRIPTION AND USABLE ON CODES(UOC) QTY

GROUP 01010402 1ST LO BOARD ASSEMBLY, A2

FIGURE B-3

|    |       |       |                 |                            |    |
|----|-------|-------|-----------------|----------------------------|----|
| 1  | PADZZ | 81349 | M39014/23-0356  | CAPACITOR, FIXED, CER..... | 14 |
| 2  | PADZZ | 31433 | T370C225K025AS  | CAPACITOR, FIXED, ELE..... | 4  |
| 3  | PADZZ | 81349 | M39014/23-0338  | CAPACITOR, FIXED.....      | 4  |
| 4  | PADZZ | 81349 | M39014/23-0349  | CAPACITOR, FIXED, CER..... | 1  |
| 5  | PADZZ | 31433 | T370E226M015AS  | CAPACITOR, FIXED, ELE..... | 2  |
| 6  | PADZZ | 81349 | M39014/01-1587  | CAPACITOR, FIXED, CER..... | 1  |
| 7  | PADZZ | 54296 | 11112000        | CAPACITOR, FIXED, CER..... | 2  |
| 8  | PADZZ | 31433 | T370D106M020AS  | CAPACITOR, FIXED, ELE..... | 4  |
| 9  | PADZZ | 81349 | CMR03E200DOCR   | CAPACITOR, FIXED, MIC..... | 1  |
| 10 | PADZZ | 93790 | CD5EC330J03     | CAPACITOR, FIXED, MIC..... | 1  |
| 11 | PADZZ | 81349 | CMR03C100DOCR   | CAPACITOR, FIXED, MIC..... | 1  |
| 12 | PADZZ | 56289 | 199D476X9025EE2 | CAPACITOR, FIXED, ELE..... | 1  |
| 13 | PADZZ | 81349 | M39014/23-0374  | CAPACITOR, FIXED, CER..... | 1  |
| 14 | PADZZ | 52673 | S12-3542        | SEMICONDUCTOR DEVIC.....   | 2  |
| 15 | PADZZ | 81349 | JANTX1N4148-1   | SEMICONDUCTOR DEVIC.....   | 1  |
| 16 | PADZZ | 96214 | 803415-3        | LIGHT EMITTING DIOD.....   | 1  |
| 17 | PADZZ | 81349 | FM04A125V1/4A   | FUSE, CARTRIDGE.....       | 1  |
| 18 | PADZZ | 34899 | 2673000201      | SHIELDING BEAD, ELEC.....  | 2  |
| 19 | PADZZ | 96906 | MS75083-13      | COIL, RADIO FREQUENC.....  | 2  |
| 20 | PADZZ | 96906 | MS75085-11      | COIL, RADIO FREQUENC.....  | 1  |
| 21 | PADZZ | 99800 | 1025-68         | COIL, RADIO FREQUENC.....  | 1  |
| 22 | PADZZ | 97913 | HGM030MEA2Y00A  | CONNECTOR, RECEPTACL.....  | 1  |
| 23 | PADZZ | 81349 | JANTX2N918      | TRANSISTOR.....            | 2  |
| 24 | PADZZ | 81349 | JAN2N2907A      | TRANSISTOR.....            | 2  |
| 25 | PADZZ | 57304 | 45002600        | TRANSISTOR.....            | 1  |
| 26 | PADZZ | 81349 | RLR05C1001GS    | RESISTOR, FIXED, FILM..... | 2  |
| 27 | PADZZ | 81349 | RLR05C10R0GS    | RESISTOR, FIXED, FILM..... | 7  |
| 28 | PADZZ | 81349 | R426FW503R      | RESISTOR, VARIABLE.....    | 1  |
| 29 | PADZZ | 81349 | RLR05C1004GS    | RESISTOR, FIXED, FILM..... | 5  |
| 30 | PADZZ | 81349 | RLR05C4700GS    | RESISTOR, FIXED, FILM..... | 2  |
| 31 | PADZZ | 81349 | RLR05C2700GS    | RESISTOR, FIXED, FILM..... | 1  |
| 32 | PADZZ | 81349 | RLR05C2702GS    | RESISTOR, FIXED, FILM..... | 4  |
| 33 | PADZZ | 81349 | RLR05C4702GS    | RESISTOR, FIXED, FILM..... | 2  |
| 34 | PADZZ | 81349 | RLR05C3301GS    | RESISTOR, FIXED, FILM..... | 2  |
| 35 | PADZZ | 81349 | RLR05C2201GS    | RESISTOR, FIXED, FILM..... | 4  |
| 36 | PADZZ | 81349 | RLR05C1002GS    | RESISTOR, FIXED, FILM..... | 2  |
| 37 | PADZZ | 81349 | RLR05C3602GS    | RESISTOR, FIXED, FILM..... | 2  |
| 38 | PADZZ | 81349 | RLR05C2202GS    | RESISTOR, FIXED, FILM..... | 1  |
| 39 | PADZZ | 81349 | RLR05C1202GS    | RESISTOR, FIXED, FILM..... | 1  |
| 40 | PADZZ | 81349 | RLR05C3901GS    | RESISTOR, FIXED, FILM..... | 1  |
| 41 | PADZZ | 81349 | RLR05C1000GS    | RESISTOR, FIXED, FILM..... | 1  |
| 42 | PADZZ | 81349 | RLR05C1501GS    | RESISTOR, FIXED, FILM..... | 1  |
| 43 | PADZZ | 81349 | RLR05C1500GS    | RESISTOR, FIXED, FILM..... | 1  |
| 44 | PADZZ | 81349 | RCR05G120JS     | RESISTOR, FIXED, COMP..... | 2  |
| 45 | PADZZ | 29971 | TR50-200AB-5    | TRANSFORMER, RADIO F.....  | 1  |
| 46 | PADZZ | 54296 | 951943-00       | OSCILLATOR, CRYSTAL.....   | 1  |

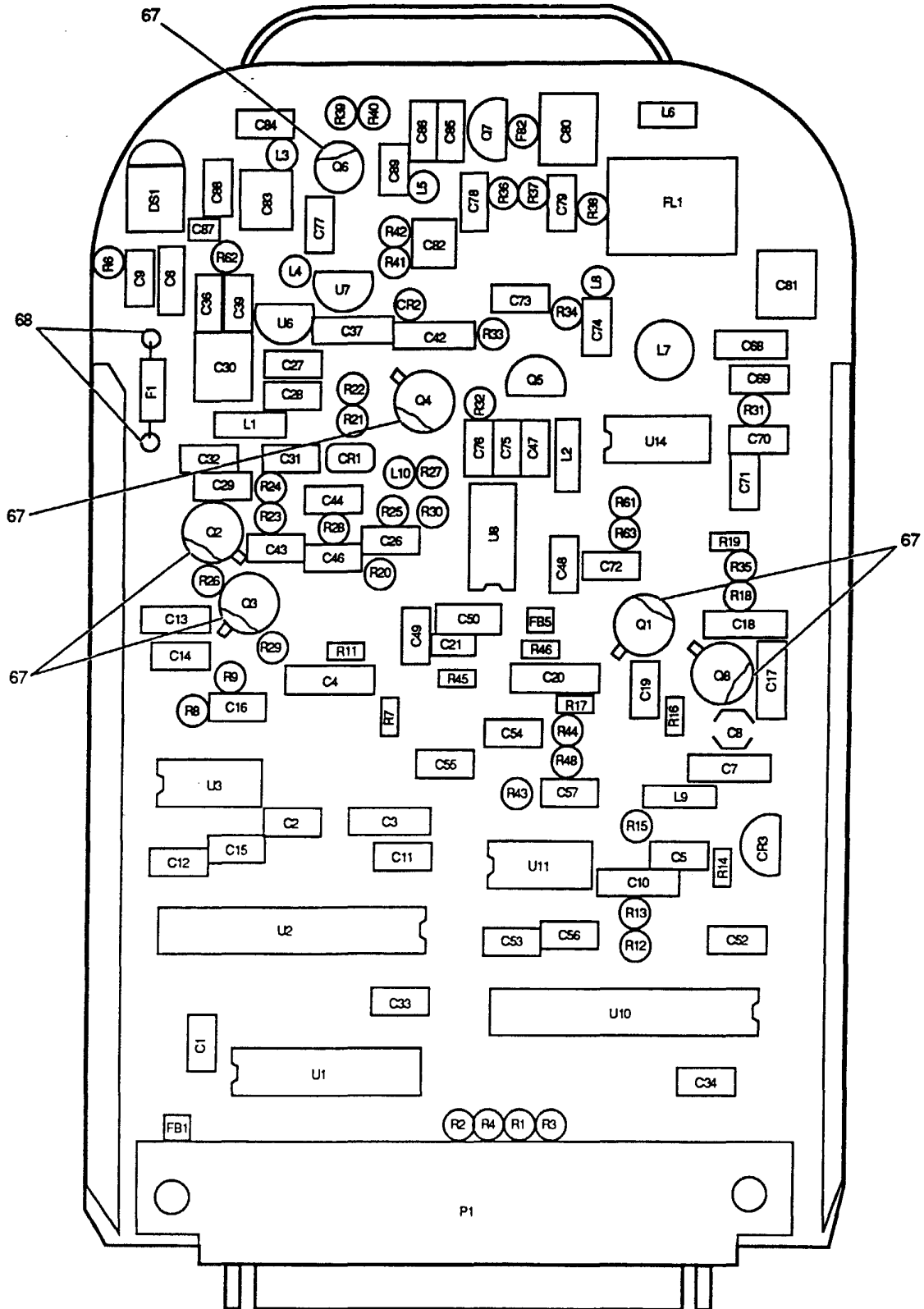
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| SECTION II |          |       | DR11-5820-1102   |                                      |     |  |
|------------|----------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)      | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER      | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 47         | PADZZ    | 67268 | 8405601CB        | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 48         | PADZZ    | 81349 | M38510/65802BEA  | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 49         | PADZZ    | 53469 | SP8793DP         | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 50         | PADZZ    | 04713 | MC145156P        | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 51         | PADZZ    | 89536 | 855130           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 52         | PADZZ    | 54296 | 460259-00        | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 53         | PADZZ    | 54296 | 460260-00        | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 54         | PADZZ    | 01295 | TL750L08CLP      | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 55         | PADZZ    | 05157 | 3610195-005      | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 56         | PADZZ    | 54296 | 440-0001-001     | COIL, RADIO FREQUENC.....            | 1   |  |
| 57         | PADZZ    | 54296 | 440-0002-001     | COIL, RADIO FREQUENC.....            | 1   |  |
| 58         | PADZZ    | 81349 | M38527/01-040D   | MOUNTING PAD, ELECTR.....            | 4   |  |
| 59         | PADZZ    | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 2   |  |
|            |          |       | 0                |                                      |     |  |

END OF FIGURE

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SOH154

Precede all reference designators with A1A3

Figure B-4. A3 2ND LO Board Assembly (Sheet 1 of 2)

## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C31        | 14         | C73        | 1          | L1         | 26         | R9         | 43         | R36        | 53         |
| C2         | 2          | C32        | 11         | C74        | 1          | L2         | 27         | R11        | 44         | R37        | 53         |
| C3         | 3          | C33        | 1          | C75        | 1          | L3         | 28         | R12        | 45         | R38        | 54         |
| C4         | 4          | C34        | 1          | C76        | 2          | L4         | 29         | R13        | 45         | R39        | 55         |
| C5         | 4          | C36        | 1          | C77        | 1          | L5         | 28         | R14        | 46         | R40        | 56         |
| C6         | 5          | C37        | 3          | C78        | 1          | L6         | 30         | R15        | 47         | R41        | 57         |
| C7         | 6          | C39        | 1          | C79        | 1          | L7         | 31         | R16        | 48         | R42        | 58         |
| C8         | 7          | C42        | 3          | C80        | 13         | L8         | 32         | R17        | 45         | R43        | 42         |
| C9         | 1          | C43        | 12         | C81        | 13         | L9         | 28         | R18        | 47         | R44        | 51         |
| C10        | 1          | C44        | 1          | C82        | 13         | L10        | 33         | R19        | 40         | R45        | 47         |
| C11        | 1          | C46        | 1          | C83        | 13         | P1         | 34         | R20        | 49         | R46        | 50         |
| C12        | 1          | C47        | 15         | C84        | 6          | Q1         | 35         | R21        | 48         | R48        | 40         |
| C13        | 8          | C48        | 16         | C85        | 6          | Q2         | 36         | R22        | 45         | R61        | 59         |
| C14        | 1          | C49        | 1          | C86        | 18         | Q3         | 36         | R23        | 47         | R62        | 42         |
| C15        | 9          | C50        | 17         | C87        | 1          | Q4         | 35         | R24        | 40         | R63        | 51         |
| C16        | 10         | C52        | 1          | C88        | 18         | Q5         | 37         | R25        | 46         | U1         | 60         |
| C17        | 11         | C53        | 1          | C89        | 1          | Q6         | 35         | R26        | 40         | U2         | 61         |
| C18        | 12         | C54        | 8          | CR1        | 19         | Q7         | 38         | R27        | 47         | U3         | 62         |
| C19        | 9          | C55        | 1          | CR2        | 20         | Q8         | 35         | R28        | 50         | U6         | 63         |
| C20        | 3          | C56        | 9          | CR3        | 19         | R1         | 39         | R29        | 51         | U7         | 64         |
| C21        | 1          | C57        | 10         | DS1        | 21         | R2         | 39         | R30        | 43         | U8         | 65         |
| C26        | 9          | C68        | 8          | F1         | 22         | R3         | 39         | R31        | 42         | U10        | 61         |
| C27        | 3          | C69        | 1          | FB1        | 23         | R4         | 39         | R32        | 45         | U11        | 62         |
| C28        | 1          | C70        | 9          | FB2        | 24         | R6         | 40         | R33        | 52         | U14        | 66         |
| C29        | 1          | C71        | 9          | FB5        | 23         | R7         | 41         | R34        | 47         |            |            |
| C30        | 13         | C72        | 2          | FL1        | 25         | R8         | 42         | R35        | 40         |            |            |

Precede all reference designators with A1A3

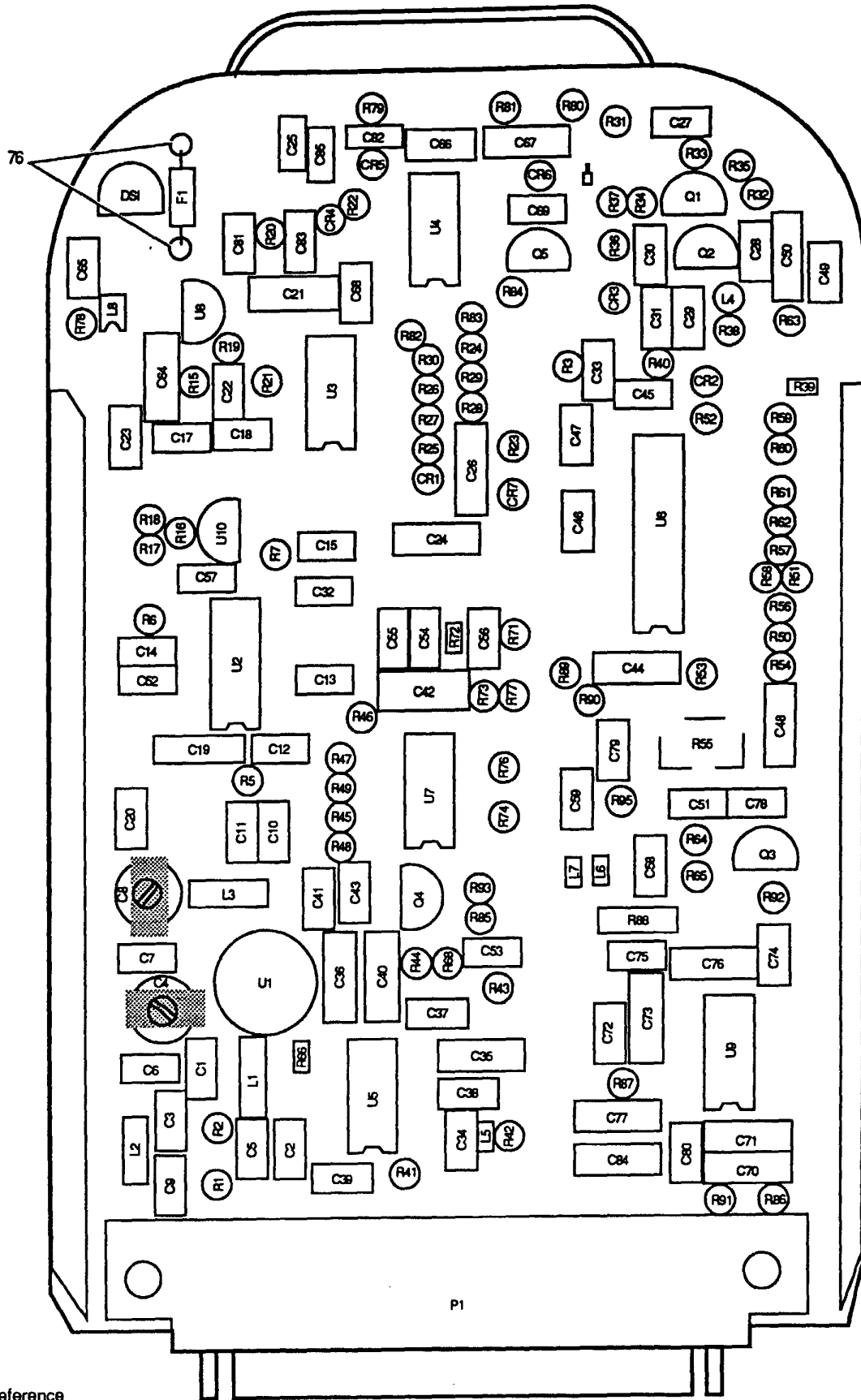
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| SECTION II |       |       | DR11-5820-1102 |  | (5) | (6) |
|------------|-------|-------|----------------|--|-----|-----|
| (1)        | (2)   | (3)   | (4)            |  |     |     |
| ITEM       | SMR   |       | PART           |  |     |     |
| NO         | CODE  | CAGEC | NUMBER         | DESCRIPTION AND USABLE ON CODES(UOC) QTY |     |     |
|            |       |       |                | GROUP 01010403 2ND LO BOARD ASSEMBLY, A3 |     |     |
|            |       |       |                | FIGURE B-4                               |     |     |
| 1          | PADZZ | 81349 | M39014/23-0356 | CAPACITOR, FIXED, CER.....               |     | 28  |
| 2          | PADZZ | 81349 | CMR03F391GOYR  | CAPACITOR, FIXED, MIC.....               |     | 3   |
| 3          | PADZZ | 31433 | T370E226M015AS | CAPACITOR, FIXED, ELE.....               |     | 5   |
| 4          | PADZZ | 81349 | M39014/02-1419 | CAPACITOR, FIXED, CER.....               |     | 2   |
| 5          | PADZZ | 88818 | C605006182     | CAPACITOR, FIXED, ELE.....               |     | 1   |
| 6          | PADZZ | 81349 | CMR03E300GOCR  | CAPACITOR, FIXED, MIC.....               |     | 3   |
| 7          | PADZZ | 37695 | 265011-39      | CAPACITOR, VARIABLE,.....                |     | 1   |
| 8          | PADZZ | 31433 | T370C225K025AS | CAPACITOR, FIXED, ELE.....               |     | 3   |
| 9          | PADZZ | 81349 | M39014/23-0338 | CAPACITOR, FIXED.....                    |     | 6   |
| 10         | PADZZ | 81349 | CMR03F101GOCR  | CAPACITOR, FIXED, MIC.....               |     | 2   |
| 11         | PADZZ | 81349 | CMR03C7R0DOCR  | CAPACITOR, FIXED, MIC.....               |     | 2   |
| 12         | PADZZ | 81349 | CMR03C180DOCR  | CAPACITOR, FIXED, MIC.....               |     | 2   |
| 13         | PADZZ | 51406 | TZ03Z070E      | CAPACITOR, VARIABLE,.....                |     | 5   |
| 14         | PADZZ | 81349 | CMR03C100DOCR  | CAPACITOR, FIXED, MIC.....               |     | 1   |
| 15         | PADZZ | 81349 | CMR03F910GOCR  | CAPACITOR, FIXED, MIC.....               |     | 1   |
| 16         | PADZZ | 81349 | M39014/23-0373 | CAPACITOR, FIXED, CER.....               |     | 1   |
| 17         | PADZZ | 31433 | T370C105M025AS | CAPACITOR, FIXED.....                    |     | 1   |
| 18         | PADZZ | 81349 | CMR03F121GOCR  | CAPACITOR, FIXED, MIC.....               |     | 2   |
| 19         | PADZZ | 04713 | MV209          | SEMICONDUCTOR DEVIC.....                 |     | 2   |
| 20         | PADZZ | 81349 | JANTX1N4148-1  | SEMICONDUCTOR DEVIC.....                 |     | 1   |
| 21         | PADZZ | 96214 | 803415-3       | LIGHT EMITTING DIOD.....                 |     | 1   |
| 22         | PADZZ | 81349 | FM04A125V1/4A  | FUSE, CARTRIDGE.....                     |     | 1   |
| 23         | PADZZ | 34899 | 2673000201     | SHIELDING BEAD, ELEC.....                |     | 2   |
| 24         | PADZZ | 34899 | 2673004701     | SHIELDING BEAD, ELEC.....                |     | 1   |
| 25         | PADZZ | 54296 | 952354-10      | FILTER, BAND PASS.....                   |     | 1   |
| 26         | PADZZ | 96906 | MS75083-3      | COIL, RADIO FREQUENC.....                |     | 1   |
| 27         | PADZZ | 28480 | 9100-2272      | COIL, RADIO FREQUENC.....                |     | 1   |
| 28         | PADZA | 59474 | 4416-1J        | COIL, RADIO FREQUENC.....                |     | 3   |
| 29         | PADZZ | 96906 | MS75083-13     | COIL, RADIO FREQUENC.....                |     | 1   |
| 30         | PADZZ | 96906 | MS75083-11     | COIL, RADIO FREQUENC.....                |     | 1   |
| 31         | PADZZ | 54296 | 312316-00      | TRANSFORMER, RADIO F.....                |     | 1   |
| 32         | PADZZ | 99800 | 1025-68        | COIL, RADIO FREQUENC.....                |     | 1   |
| 33         | PADZZ | 96906 | MS75085-11     | COIL, RADIO FREQUENC.....                |     | 1   |
| 34         | PADZZ | 97913 | HGM030MEA2Y00A | CONNECTOR, RECEPTAC.....                 |     | 1   |
| 35         | PADZZ | 81349 | JANTX2N918     | TRANSISTOR.....                          |     | 4   |
| 36         | PADZZ | 04713 | MRF914         | TRANSISTOR.....                          |     | 2   |
| 37         | PADZZ | 04713 | MPSH81         | TRANSISTOR.....                          |     | 1   |
| 38         | PADZZ | 57304 | 45002600       | TRANSISTOR.....                          |     | 1   |
| 39         | PADZZ | 81349 | RLR05C1004GS   | RESISTOR, FIXED, FILM.....               |     | 4   |
| 40         | PADZZ | 81349 | RLR05C1001GS   | RESISTOR, FIXED, FILM.....               |     | 6   |
| 41         | PADZZ | 81349 | RLR05C2203GS   | RESISTOR, FIXED, FILM.....               |     | 1   |
| 42         | PADZZ | 81349 | RLR05C10R0GS   | RESISTOR, FIXED, FILM.....               |     | 4   |
| 43         | PADZZ | 81349 | RLR05C1000GS   | RESISTOR, FIXED, FILM.....               |     | 2   |
| 44         | PADZZ | 81349 | RLR05C2702GS   | RESISTOR, FIXED, FILM.....               |     | 1   |
| 45         | PADZZ | 81349 | RLR05C3901GS   | RESISTOR, FIXED, FILM.....               |     | 5   |
| 46         | PADZZ | 81349 | RLR05C1002GS   | RESISTOR, FIXED, FILM.....               |     | 2   |

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| SECTION II |       |       | DR11-5820-1102   |                                      |     |  |
|------------|-------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)   | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM       | SMR   |       | PART             |                                      |     |  |
| NO         | CODE  | CAGEC | NUMBER           | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 47         | PADZZ | 81349 | RLR05C22R0GS     | RESISTOR, FIXED, FILM.....           | 6   |  |
| 48         | PADZZ | 81349 | RLR05C6201GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 49         | PADZZ | 81349 | RLR05C2200GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 50         | PADZZ | 81349 | RLR05C1501GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 51         | PADZZ | 81349 | RLR05C6800GS     | RESISTOR, FIXED, FILM.....           | 3   |  |
| 52         | PADZZ | 81349 | RLR05C2701GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 53         | PADZZ | 81349 | RLR05C51R0GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 54         | PADZZ | 81349 | RLR05C91R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 55         | PADZZ | 81349 | RLR05C4701GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 56         | PADZZ | 81349 | RLR05C1801GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 57         | PADZZ | 81349 | RLR05C1500GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 58         | PADZZ | 81349 | RLR05C15R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 59         | PADZZ | 81349 | RLR05C7501GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 60         | PADZZ | 67268 | 8409801CA        | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 61         | PADZZ | 04713 | MC145156P        | MICROCIRCUIT, DIGITA.....            | 2   |  |
| 62         | PADZZ | 53469 | SP8793DP         | MICROCIRCUIT, DIGITA.....            | 2   |  |
| 63         | PADZZ | 05157 | 3610195-005      | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 64         | PADZZ | 01295 | TL750L08CLP      | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 65         | PADZZ | 18324 | SA602N           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 66         | PADZZ | 94580 | 10115418-101     | MICROCIRCUIT, DIGITA.....            | 1   |  |
| 67         | PADZZ | 13103 | 7717-16DAP       | MOUNTING PAD, ELECTR.....            | 6   |  |
| 68         | PADZZ | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 2   |  |
|            |       |       | 0                |                                      |     |  |

END OF FIGURE



Precede all reference designators with A1A7

Figure B-5. A7 RE Product Detector Board Assembly (Sheet 1 of 2)



## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C35        | 9          | C72        | 2          | Q2         | 28         | R38        | 49         | R74        | 58         |
| C2         | 2          | C36        | 9          | C73        | 8          | Q3         | 28         | R39        | 49         | R76        | 36         |
| C3         | 3          | C37        | 14         | C74        | 12         | Q4         | 29         | R40        | 49         | R77        | 61         |
| C4         | 4          | C38        | 15         | C75        | 2          | Q5         | 28         | R41        | 50         | R78        | 49         |
| C5         | 2          | C39        | 16         | C76        | 9          | R1         | 30         | R42        | 51         | R79        | 62         |
| C6         | 5          | C40        | 9          | C77        | 9          | R2         | 31         | R43        | 30         | R80        | 63         |
| C7         | 2          | C41        | 2          | C78        | 2          | R3         | 32         | R44        | 52         | R81        | 63         |
| C8         | 4          | C42        | 9          | C79        | 2          | R5         | 33         | R45        | 53         | R82        | 30         |
| C9         | 5          | C43        | 17         | C80        | 2          | R6         | 33         | R46        | 36         | R83        | 45         |
| C10        | 6          | C44        | 9          | C81        | 14         | R7         | 34         | R47        | 36         | R84        | 64         |
| C11        | 3          | C45        | 2          | C82        | 5          | R15        | 35         | R48        | 37         | R85        | 46         |
| C12        | 5          | C46        | 2          | C83        | 5          | R16        | 30         | R49        | 36         | R86        | 30         |
| C13        | 5          | C47        | 9          | C84        | 9          | R17        | 30         | R50        | 49         | R87        | 65         |
| C14        | 5          | C48        | 9          | C85        | 17         | R18        | 36         | R51        | 54         | R88        | 66         |
| C15        | 5          | C49        | 2          | CR1        | 19         | R19        | 36         | R52        | 33         | R89        | 39         |
| C17        | 7          | C50        | 8          | CR2        | 20         | R20        | 36         | R53        | 45         | R90        | 30         |
| C18        | 2          | C51        | 2          | CR3        | 20         | R21        | 36         | R54        | 45         | R91        | 36         |
| C19        | 8          | C52        | 5          | CR4        | 19         | R22        | 37         | R55        | 55         | R92        | 36         |
| C20        | 5          | C53        | 2          | CR5        | 19         | R23        | 38         | R56        | 56         | R93        | 30         |
| C21        | 9          | C54        | 2          | CR6        | 19         | R24        | 39         | R57        | 56         | R95        | 46         |
| C22        | 10         | C55        | 5          | CR7        | 19         | R25        | 40         | R58        | 51         | U1         | 67         |
| C23        | 2          | C56        | 18         | DS1        | 21         | R26        | 41         | R59        | 57         | U2         | 68         |
| C24        | 9          | C57        | 14         | F1         | 22         | R27        | 42         | R60        | 58         | U3         | 69         |
| C25        | 11         | C58        | 5          | L1         | 23         | R28        | 31         | R61        | 58         | U4         | 69         |
| C26        | 9          | C59        | 5          | L2         | 24         | R29        | 43         | R62        | 59         | U5         | 70         |
| C27        | 2          | C64        | 8          | L3         | 23         | R30        | 44         | R63        | 30         | U6         | 71         |
| C28        | 2          | C65        | 2          | L4         | 25         | R31        | 45         | R64        | 30         | U7         | 72         |
| C29        | 12         | C66        | 15         | L5         | 26         | R32        | 46         | R65        | 49         | U8         | 73         |
| C30        | 2          | C67        | 11         | L6         | 26         | R33        | 47         | R66        | 37         | U9         | 74         |
| C31        | 13         | C68        | 2          | L7         | 26         | R34        | 48         | R68        | 46         | U10        | 75         |
| C32        | 2          | C69        | 2          | L8         | 26         | R35        | 30         | R71        | 46         |            |            |
| C33        | 2          | C70        | 9          | P1         | 27         | R36        | 34         | R72        | 60         |            |            |
| C34        | 5          | C71        | 9          | Q1         | 28         | R37        | 33         | R73        | 61         |            |            |

Precede all reference designators with A1A7

SECTION II DR11-5820-1102 (5) (6)  
 (1) (2) (3) (4)  
 ITEM SMR CAGEC PART  
 NO CODE CAGEC NUMBER

DESCRIPTION AND USABLE ON CODES(UOC) QTY  
 GROUP 01010404 RE PRODUCT DETECTOR  
 BOARD ASSEMBLY, A7

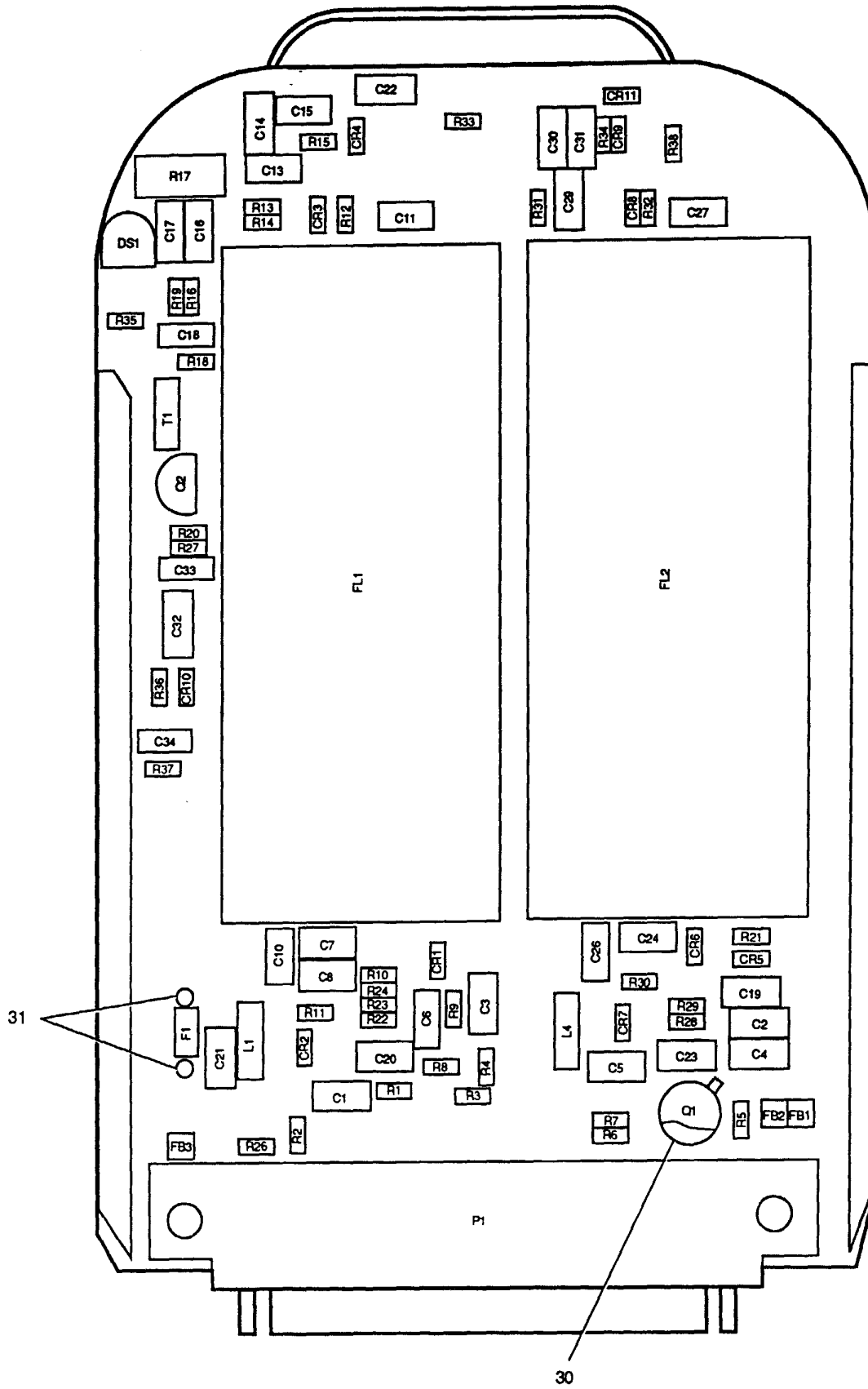
FIGURE B-5

|    |       |       |                 |                       |    |
|----|-------|-------|-----------------|-----------------------|----|
| 1  | PADZZ | 93790 | CD5EC510J03     | CAPACITOR, FIXED, MIC | 1  |
| 2  | PADZZ | 81349 | M39014/23-0373  | CAPACITOR, FIXED, CER | 25 |
| 3  | PADZZ | 81349 | M39014/23-0310  | CAPACITOR, FIXED, CER | 2  |
| 4  | PADZZ | 51406 | TZ03Z500F       | CAPACITOR, VARIABLE   | 2  |
| 5  | PADZZ | 81349 | M39014/23-0356  | CAPACITOR, FIXED, CER | 14 |
| 6  | PADZZ | 04222 | SR202A360JAA    | CAPACITOR, FIXED, CER | 1  |
| 7  | PADZZ | 56289 | 199D225X0025BA1 | CAPACITOR, FIXED, ELE | 1  |
| 8  | PADZZ | 88818 | C605006182      | CAPACITOR, FIXED, ELE | 4  |
| 9  | PADZZ | 31433 | T370E226M015AS  | CAPACITOR, FIXED, ELE | 15 |
| 10 | PADZZ | 81349 | M39014/23-0328  | CAPACITOR, FIXED, CER | 1  |
| 11 | PADZZ | 31433 | T370D106M020AS  | CAPACITOR, FIXED, ELE | 2  |
| 12 | PADZZ | 81349 | M39014/23-0315  | CAPACITOR, FIXED, CER | 2  |
| 13 | PADZZ | 81349 | M39014/23-0331  | CAPACITOR, FIXED, CER | 1  |
| 14 | PADZZ | 03640 | 6116730-1       | CAPACITOR, FIXED, ELE | 3  |
| 15 | PADZZ | 31433 | T370C225K025AS  | CAPACITOR, FIXED, ELE | 2  |
| 16 | PADZZ | 81349 | M39014/23-0325  | CAPACITOR, FIXED, CER | 1  |
| 17 | PADZZ | 81349 | M39014/23-0338  | CAPACITOR, FIXED      | 2  |
| 18 | PADZZ | 18796 | 8131-050X7R224M | CAPACITOR, FIXED, CER | 1  |
| 19 | PADZZ | 81349 | JANTX1N4148-1   | SEMICONDUCTOR DEVIC   | 5  |
| 20 | PADZZ | 52673 | S12-3542        | SEMICONDUCTOR DEVIC   | 2  |
| 21 | PADZZ | 28480 | 1990-1169       | LIGHT EMITTING DIOD   | 1  |
| 22 | PADZZ | 06994 | 4301001-2R000   | FUSE, SPECIAL         | 1  |
| 23 | PADZZ | 54296 | 312317-00       | COIL, RADIO FREQUENC  | 2  |
| 24 | PADZZ | 09969 | IM-2 10.0UH     | COIL, RADIO FREQUENC  | 1  |
| 25 | PADZZ | 96906 | MS75084-8       | COIL, RADIO FREQUENC  | 1  |
| 26 | PADZZ | 54296 | 129-0105-001    | COIL, RADIO FREQUENC  | 4  |
| 27 | PADZZ | 97913 | HGM030MEA2Y00A  | CONNECTOR, RECEPTAC   | 1  |
| 28 | PADZA | 14304 | Q25-0005-000    | TRANSISTOR            | 4  |
| 29 | PADZZ | 17856 | J176            | TRANSISTOR            | 1  |
| 30 | PADZZ | 81349 | RLR05C1000GS    | RESISTOR, FIXED, FILM | 11 |
| 31 | PADZZ | 81349 | RLR05C5601GS    | RESISTOR, FIXED, FILM | 2  |
| 32 | PADZZ | 81349 | RLR05C27R0GS    | RESISTOR, FIXED, FILM | 1  |
| 33 | PADZZ | 81349 | RLR05C51R0GS    | RESISTOR, FIXED, FILM | 4  |
| 34 | PADZZ | 81349 | RLR05C4700GS    | RESISTOR, FIXED, FILM | 2  |
| 35 | PADZZ | 81349 | RLR05C6201GS    | RESISTOR, FIXED, FILM | 1  |
| 36 | PADZZ | 81349 | RLR05C4702GS    | RESISTOR, FIXED, FILM | 10 |
| 37 | PADZZ | 81349 | RLR05C2202GS    | RESISTOR, FIXED, FILM | 3  |
| 38 | PADZZ | 81349 | RLR05C1802GS    | RESISTOR, FIXED, FILM | 1  |
| 39 | PADZZ | 81349 | RLR05C8201GS    | RESISTOR, FIXED, FILM | 2  |
| 40 | PADZZ | 81349 | RLR05C8203GS    | RESISTOR, FIXED, FILM | 1  |
| 41 | PADZZ | 81349 | RLR05C1103GS    | RESISTOR, FIXED, FILM | 1  |
| 42 | PADZZ | 81349 | RLR05C1303GS    | RESISTOR, FIXED, FILM | 1  |
| 43 | PADZZ | 81349 | RCR05G162JS     | RESISTOR, FIXED, COMP | 1  |
| 44 | PADZZ | 81349 | RLR05C1801GS    | RESISTOR, FIXED, FILM | 1  |
| 45 | PADZZ | 81349 | RLR05C1002GS    | RESISTOR, FIXED, FILM | 4  |
| 46 | PADZZ | 81349 | RLR05C1003GS    | RESISTOR, FIXED, FILM | 5  |

11

| SECTION II |          |       | DR11-5820-1102   |                                      |     |  |
|------------|----------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)      | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER      | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 47         | PADZZ    | 81349 | RLR05C9101GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 48         | PADZZ    | 81349 | RLR05C2701GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 49         | PADZZ    | 81349 | RLR05C1001GS     | RESISTOR, FIXED, FILM.....           | 6   |  |
| 50         | PADZZ    | 81349 | RLR05C1800GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 51         | PADZZ    | 81349 | RLR05C6800GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 52         | PADZZ    | 81349 | RLR05C1004GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 53         | PADZZ    | 81349 | RLR05C5101GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 54         | PADZZ    | 81349 | RLR05C8200GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 55         | PADZZ    | 81349 | RJR26FX503R      | RESISTOR, VARIABLE, N.....           | 1   |  |
| 56         | PADZZ    | 81349 | RLR05C2200GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 57         | PADZZ    | 81349 | RLR05C1301GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 58         | PADZZ    | 81349 | RLR05C2401GS     | RESISTOR, FIXED, FILM.....           | 3   |  |
| 59         | PADZZ    | 81349 | RLR05C1102GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 60         | PADZZ    | 81349 | RLR05C2702GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 61         | PADZZ    | 81349 | RLR05C4302GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 62         | PADZZ    | 81349 | RLR05C4703GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 63         | PADZZ    | 81349 | RLR05C5103GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 64         | PADZZ    | 81349 | RLR05C6802GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 65         | PADZZ    | 81349 | RLR05C56R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 66         | PADZZ    | 14304 | R65-0004-109     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 67         | PADZZ    | 67268 | 5962-8765701GA   | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 68         | PADZZ    | 18324 | SA602N           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 69         | PADZZ    | 27014 | LM258J           | MICROCIRCUIT, LINEAR.....            | 2   |  |
| 70         | PADZZ    | 52648 | SL6270C-DP       | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 71         | PADZZ    | 67268 | 5962-8857101CA   | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 72         | PADZZ    | 01295 | TL062IP          | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 73         | PADZZ    | 01295 | TL750L08CLP      | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 74         | PADZZ    | 54296 | 460251-00        | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 75         | PADZZ    | 27014 | LM340LAZ-5.0     | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 76         | PADZZ    | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 2   |  |
|            |          |       | 0                |                                      |     |  |

END OF FIGURE



Precede all reference designators with A1A8

Figure B-6. A8 2ND IF Board Assembly (Sheet 1 of 2)

## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C19        | 2          | CR3        | 5          | L1         | 12         | R12        | 22         | R29        | 22         |
| C2         | 2          | C20        | 2          | CR4        | 5          | L4         | 12         | R13        | 22         | R30        | 22         |
| C3         | 1          | C21        | 2          | CR5        | 6          | P1         | 13         | R14        | 23         | R31        | 22         |
| C4         | 2          | C22        | 2          | CR6        | 5          | Q1         | 14         | R15        | 24         | R32        | 22         |
| C5         | 3          | C23        | 2          | CR7        | 5          | Q2         | 15         | R16        | 17         | R33        | 23         |
| C6         | 2          | C24        | 2          | CR8        | 5          | R1         | 16         | R17        | 25         | R34        | 24         |
| C7         | 2          | C26        | 2          | CR9        | 5          | R2         | 17         | R18        | 26         | R35        | 22         |
| C8         | 2          | C27        | 2          | CR10       | 5          | R3         | 16         | R19        | 26         | R36        | 22         |
| C10        | 2          | C29        | 2          | CR11       | 5          | R4         | 17         | R20        | 27         | R37        | 28         |
| C11        | 2          | C30        | 2          | DS1        | 7          | R5         | 17         | R21        | 17         | R38        | 21         |
| C13        | 2          | C31        | 2          | F1         | 8          | R6         | 18         | R22        | 17         | T1         | 29         |
| C14        | 2          | C32        | 4          | FB1        | 9          | R7         | 19         | R23        | 22         |            |            |
| C15        | 2          | C33        | 2          | FB2        | 9          | R8         | 20         | R24        | 26         |            |            |
| C16        | 1          | C34        | 2          | FB3        | 9          | R9         | 21         | R26        | 22         |            |            |
| C17        | 2          | CR1        | 5          | FL1        | 10         | R10        | 21         | R27        | 22         |            |            |
| C18        | 2          | CR2        | 5          | FL2        | 11         | R11        | 22         | R28        | 26         |            |            |

Precede all reference designators with A1A8

SECTION II DR11-5820-1102

| (1)<br>ITEM<br>NO | (2)<br>SMR<br>CODE | (3)<br>CAGEC | (4)<br>PART<br>NUMBER | (5)<br>DESCRIPTION AND USABLE ON CODES(UOC) | (6)<br>QTY |
|-------------------|--------------------|--------------|-----------------------|---|------------|
|-------------------|--------------------|--------------|-----------------------|---|------------|

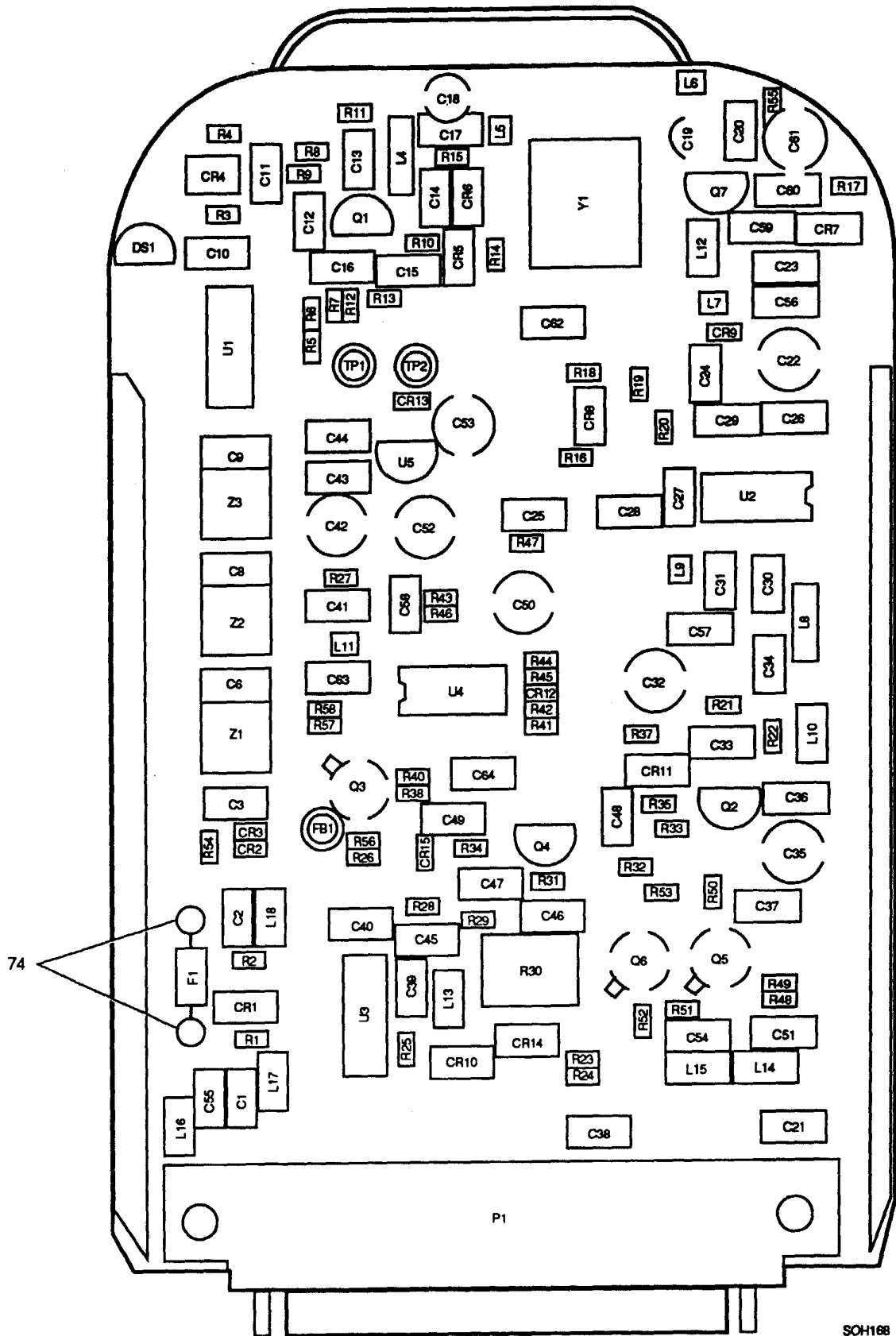
GROUP 01010405 2ND IF BOARD  
ASSEMBLY, A8

FIGURE B-6

|    |       |       |                  |                            |    |
|----|-------|-------|------------------|----------------------------|----|
| 1  | PADZZ | 81349 | M39014/23-0356   | CAPACITOR, FIXED, CER..... | 3  |
| 2  | PADZZ | 81349 | M39014/23-0374   | CAPACITOR, FIXED, CER..... | 25 |
| 3  | PADZZ | 31433 | T390A105M025AS   | CAPACITOR, FIXED.....      | 1  |
| 4  | PADZZ | 31433 | T370C225K025AS   | CAPACITOR, FIXED, ELE..... | 1  |
| 5  | PADZZ | 52673 | S12-3542         | SEMICONDUCTOR DEVIC.....   | 10 |
| 6  | PADZZ | 81349 | JANTX1N4148-1    | SEMICONDUCTOR DEVIC.....   | 1  |
| 7  | PADZZ | 28480 | 1990-1169        | LIGHT EMITTING DIOD.....   | 1  |
| 8  | PADZZ | 81349 | FM04A125V1/4A    | FUSE, CARTRIDGE.....       | 1  |
| 9  | PADZZ | 34899 | 2673000201       | SHIELDING BEAD, ELEC.....  | 3  |
| 10 | PADZZ | 54296 | 952352-10        | FILTER, BAND PASS.....     | 1  |
| 11 | PADZZ | 54296 | 952353-10        | FILTER, BAND PASS.....     | 1  |
| 12 | PADZZ | 28480 | 9100-2272        | COIL, RADIO FREQUENC.....  | 2  |
| 13 | PADZZ | 97913 | HGM030MEA2Y00A   | CONNECTOR, RECEPTACL.....  | 1  |
| 14 | PADZA | 81349 | JANTX2N2222A     | TRANSISTOR.....            | 1  |
| 15 | PADZA | 14304 | Q25-0005-000     | TRANSISTOR.....            | 1  |
| 16 | PADZZ | 81349 | RLR05C3302GS     | RESISTOR, FIXED, FILM..... | 2  |
| 17 | PADZZ | 81349 | RLR05C1000GS     | RESISTOR, FIXED, FILM..... | 6  |
| 18 | PADZZ | 81349 | RLR05C1002GS     | RESISTOR, FIXED, FILM..... | 1  |
| 19 | PADZZ | 81349 | RLR05C2203GS     | RESISTOR, FIXED, FILM..... | 1  |
| 20 | PADZZ | 81349 | RLR05C2202GS     | RESISTOR, FIXED, FILM..... | 1  |
| 21 | PADZZ | 81349 | RLR05C4700GS     | RESISTOR, FIXED, FILM..... | 3  |
| 22 | PADZZ | 81349 | RLR05C1001GS     | RESISTOR, FIXED, FILM..... | 12 |
| 23 | PADZZ | 81349 | RLR05C2200GS     | RESISTOR, FIXED, FILM..... | 2  |
| 24 | PADZZ | 81349 | RLR05C8200GS     | RESISTOR, FIXED, FILM..... | 2  |
| 25 | PADZZ | 81349 | RJR26FW501R      | RESISTOR, VARIABLE, N..... | 1  |
| 26 | PADZZ | 81349 | RLR05C4701GS     | RESISTOR, FIXED, FILM..... | 4  |
| 27 | PADZZ | 81349 | RLR05C10R0GS     | RESISTOR, FIXED, FILM..... | 1  |
| 28 | PADZZ | 81349 | RLR05C51R0GS     | RESISTOR, FIXED, FILM..... | 1  |
| 29 | ADDZZ | 54296 | 123-0042-001     | TRANSFORMER ASSEMBL.....   | 1  |
| 30 | PADZZ | 13103 | 7717-16DAP       | MOUNTING PAD, ELECTR.....  | 1  |
| 31 | PADZZ | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....        | 2  |

END OF FIGURE

B-6-1/(B-6-2 blank)



SOH168

Precede all reference designators with A1A9

Figure B-7. A9 1ST IF Board Assembly (Sheet 1 of 2)

## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C33        | 12         | C62        | 1          | L12        | 30         | R15        | 42         | R46        | 54         |
| C2         | 1          | C34        | 1          | C63        | 6          | L13        | 34         | R16        | 42         | R47        | 46         |
| C3         | 2          | C35        | 10         | C64        | 6          | L14        | 34         | R17        | 42         | R48        | 60         |
| C6         | 3          | C36        | 13         | CR1        | 22         | L15        | 34         | R18        | 42         | R49        | 57         |
| C8         | 4          | C37        | 14         | CR2        | 23         | L16        | 34         | R19        | 50         | R50        | 64         |
| C9         | 5          | C38        | 6          | CR3        | 23         | L17        | 34         | R20        | 51         | R51        | 60         |
| C10        | 6          | C39        | 6          | CR4        | 22         | L18        | 34         | R21        | 52         | R52        | 57         |
| C11        | 6          | C40        | 6          | CR5        | 22         | P1         | 35         | R22        | 53         | R53        | 64         |
| C12        | 6          | C41        | 7          | CR6        | 22         | Q1         | 36         | R23        | 42         | R54        | 42         |
| C13        | 7          | C42        | 15         | CR7        | 22         | Q2         | 37         | R24        | 42         | R55        | 52         |
| C14        | 7          | C43        | 16         | CR8        | 22         | Q3         | 38         | R25        | 42         | R56        | 54         |
| C15        | 6          | C44        | 17         | CR9        | 24         | Q4         | 39         | R26        | 54         | R57        | 41         |
| C16        | 6          | C45        | 1          | CR10       | 22         | Q5         | 40         | R27        | 55         | R58        | 50         |
| C17        | 8          | C46        | 1          | CR11       | 22         | Q6         | 40         | R28        | 56         | TP1        | 65         |
| C18        | 9          | C47        | 1          | CR12       | 23         | Q7         | 37         | R29        | 57         | TP2        | 65         |
| C19        | 9          | C48        | 1          | CR13       | 23         | R1         | 41         | R30        | 58         | U1         | 66         |
| C20        | 8          | C49        | 1          | CR14       | 22         | R2         | 41         | R31        | 57         | U2         | 67         |
| C21        | 6          | C50        | 18         | CR15       | 23         | R3         | 42         | R32        | 56         | U3         | 66         |
| C22        | 10         | C51        | 1          | DS1        | 25         | R4         | 42         | R33        | 42         | U4         | 68         |
| C23        | 11         | C52        | 18         | F1         | 26         | R5         | 43         | R34        | 42         | U5         | 69         |
| C24        | 6          | C53        | 19         | FB1        | 27         | R6         | 44         | R35        | 57         | Y1         | 70         |
| C25        | 7          | C54        | 1          | L4         | 28         | R7         | 43         | R37        | 42         | Z1         | 71         |
| C26        | 6          | C55        | 1          | L5         | 29         | R8         | 45         | R38        | 57         | Z2         | 72         |
| C27        | 6          | C56        | 20         | L6         | 29         | R9         | 46         | R40        | 59         | Z3         | 73         |
| C28        | 6          | C57        | 21         | L7         | 30         | R10        | 47         | R41        | 60         |            |            |
| C29        | 6          | C58        | 1          | L8         | 31         | R11        | 48         | R42        | 61         |            |            |
| C30        | 7          | C59        | 11         | L9         | 32         | R12        | 49         | R43        | 62         |            |            |
| C31        | 1          | C60        | 20         | L10        | 32         | R13        | 42         | R44        | 62         |            |            |
| C32        | 10         | C61        | 15         | L11        | 33         | R14        | 42         | R45        | 63         |            |            |

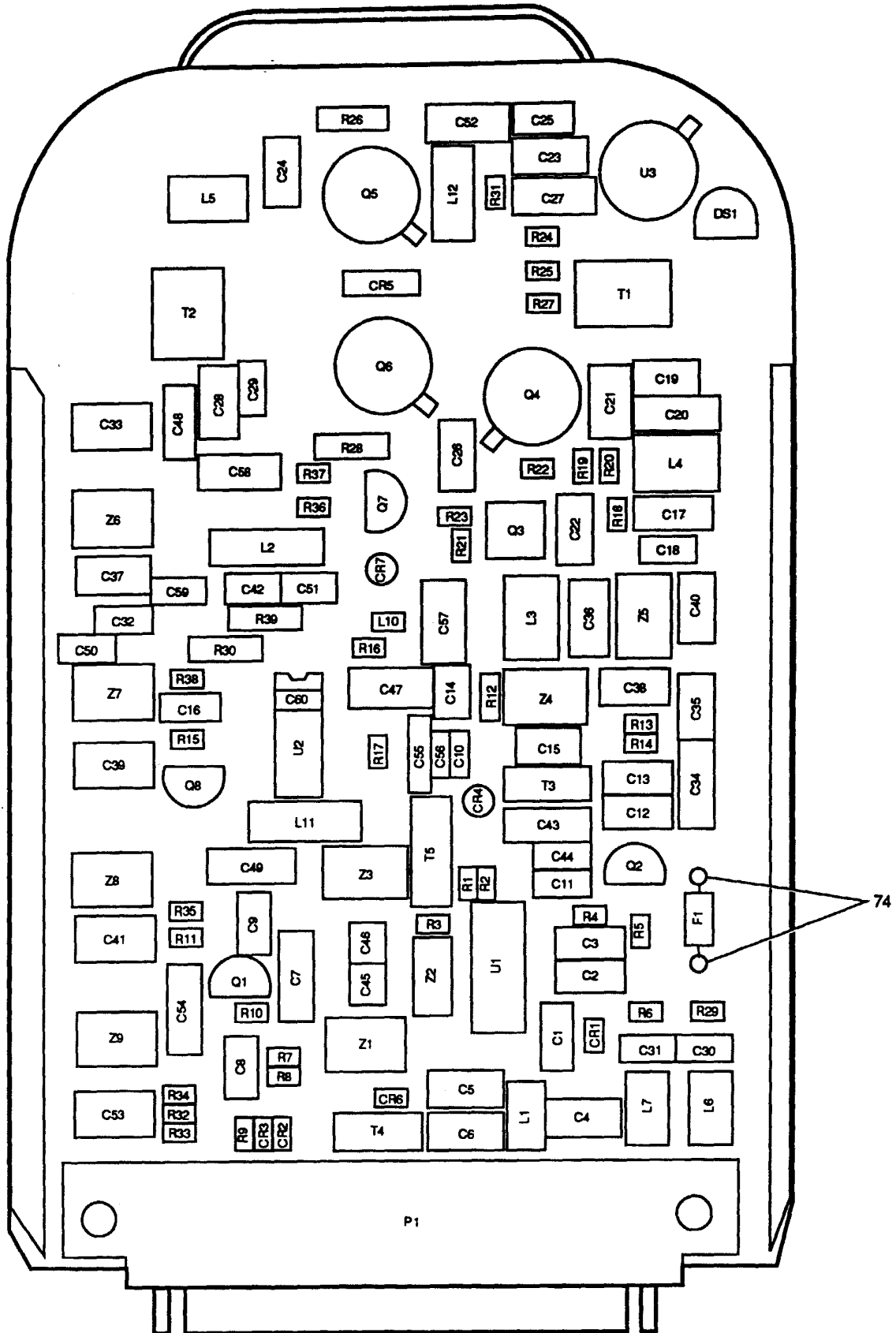
Precede all reference designators with A1A9



| SECTION II |          |       | DR11-5820-1102         |                                      | (5)                       | (6) |
|------------|----------|-------|------------------------|--------------------------------------|---------------------------|-----|
| (1)        | (2)      | (3)   | (4)                    |                                      |                           |     |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER            | DESCRIPTION AND USABLE ON CODES(UOC) | GROUP 01010406            | QTY |
|            |          |       |                        |                                      | 1ST IF BOARD ASSEMBLY, A9 |     |
| FIGURE B-7 |          |       |                        |                                      |                           |     |
| 1          | PADZZ    | 81349 | M39014/23-0373         | CAPACITOR, FIXED, CER.....           |                           | 14  |
| 2          | PADZZ    | 81349 | CMR03E620GOCR          | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 3          | PADZZ    | 81349 | CMR03F101GOCR          | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 4          | PADZZ    | 81349 | CMR03F910GOCR          | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 5          | PADZZ    | 93790 | CD5EC510J03            | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 6          | PADZZ    | 81349 | M39014/23-0338         | CAPACITOR, FIXED.....                |                           | 16  |
| 7          | PADZZ    | 81349 | M39014/23-0356         | CAPACITOR, FIXED, CER.....           |                           | 5   |
| 8          | PADZZ    | 04222 | SR152A750JAA           | CAPACITOR, FIXED, CER.....           |                           | 2   |
| 9          | PADZZ    | 54296 | 105-0033-001           | CAPACITOR, VARIABLE.....             |                           | 2   |
| 10         | PADZZ    | 51406 | TZ03Z500F              | CAPACITOR, VARIABLE.....             |                           | 3   |
| 11         | PADZZ    | 81349 | M39014/23-0316         | CAPACITOR, FIXED, CER.....           |                           | 2   |
| 12         | PADZZ    | 81349 | M39014/23-0331         | CAPACITOR, FIXED, CER.....           |                           | 1   |
| 13         | PADZZ    | 59660 | 8121-100-C0G0-10<br>1K | CAPACITOR, FIXED, CER.....           |                           | 1   |
| 14         | PADZZ    | 61637 | C320C152J1G5CA         | CAPACITOR, FIXED, CER.....           |                           | 1   |
| 15         | PADZZ    | 37695 | 265011-39              | CAPACITOR, VARIABLE.....             |                           | 2   |
| 16         | PADZZ    | 81349 | CMR03E300GOCR          | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 17         | PADZZ    | 81349 | CMR03F181GOAR          | CAPACITOR, FIXED, MIC.....           |                           | 1   |
| 18         | PADZZ    | 31433 | T370C225K025A5         | CAPACITOR, FIXED, ELE.....           |                           | 2   |
| 19         | PADZZ    | 31433 | T370D106M020A5         | CAPACITOR, FIXED, ELE.....           |                           | 1   |
| 20         | PADZZ    | 81349 | M39014/23-0306         | CAPACITOR, FIXED, CER.....           |                           | 2   |
| 21         | PADZZ    | 81349 | M39014/23-0321         | CAPACITOR, FIXED, CER.....           |                           | 1   |
| 22         | PADZZ    | 52673 | S12-3542               | SEMICONDUCTOR DEVIC.....             |                           | 9   |
| 23         | PADZZ    | 81349 | JANTX1N4148-1          | SEMICONDUCTOR DEVIC.....             |                           | 5   |
| 24         | PADZZ    | 28480 | 5082-3081              | SEMICONDUCTOR DEVIC.....             |                           | 1   |
| 25         | PADZZ    | 28480 | 1990-1169              | LIGHT EMITTING DIOD.....             |                           | 1   |
| 26         | PADZZ    | 81349 | FM04A125V1/4A          | FUSE, CARTRIDGE.....                 |                           | 1   |
| 27         | PADZZ    | 34899 | 2673004701             | SHIELDING BEAD, ELEC.....            |                           | 1   |
| 28         | PADZZ    | 71895 | 1325-333               | COIL, RADIO FREQUENC.....            |                           | 1   |
| 29         | PADZZ    | 54296 | 312320-00              | COIL, RADIO FREQUENC.....            |                           | 2   |
| 30         | PADZZ    | 54296 | 312328-00              | COIL, RADIO FREQUENC.....            |                           | 2   |
| 31         | PADZZ    | 71895 | 1325-272               | COIL, RADIO FREQUENC.....            |                           | 1   |
| 32         | PADZZ    | 54296 | 312317-00              | COIL, RADIO FREQUENC.....            |                           | 2   |
| 33         | PADZZ    | 54296 | 129-0110-001           | COIL, RADIO FREQUENC.....            |                           | 1   |
| 34         | PADZZ    | 54296 | 129-0105-001           | COIL, RADIO FREQUENC.....            |                           | 6   |
| 35         | PADZZ    | 97913 | HGM030MEA2Y00A         | CONNECTOR, RECEPTAC.....             |                           | 1   |
| 36         | PADZZ    | 4T165 | NE85632                | TRANSISTOR.....                      |                           | 1   |
| 37         | PADZZ    | 57304 | 45002600               | TRANSISTOR.....                      |                           | 2   |
| 38         | PADZZ    | 92702 | WS2107F-1110           | FAN, TUBEAXIAL.....                  |                           | 1   |
| 39         | PADZA    | 14304 | Q25-0005-000           | TRANSISTOR.....                      |                           | 1   |
| 40         | PADZA    | 81349 | JANTX2N2222A           | TRANSISTOR.....                      |                           | 2   |
| 41         | PADZZ    | 81349 | RLR05C4700GS           | RESISTOR, FIXED, FILM.....           |                           | 3   |
| 42         | PADZZ    | 81349 | RLR05C1001GS           | RESISTOR, FIXED, FILM.....           |                           | 15  |
| 43         | PADZZ    | 54296 | 214471-00              | RESISTOR, FIXED, FILM.....           |                           | 2   |
| 44         | PADZZ    | 81349 | RCR05G120JS            | RESISTOR, FIXED, COMP.....           |                           | 1   |
| 45         | PADZZ    | 81349 | RLR05C3301GS           | RESISTOR, FIXED, FILM.....           |                           | 1   |

| SECTION II |          |       | DR11-5820-1102   |                                      |     |  |
|------------|----------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)      | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER      | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 46         | PADZZ    | 81349 | RLR05C6800GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 47         | PADZZ    | 54296 | 214271-00        | RESISTOR, FIXED, FILM.....           | 1   |  |
| 48         | PADZZ    | 81349 | RLR05C3300GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 49         | PADZZ    | 81349 | RLR05C62R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 50         | PADZZ    | 81349 | RLR05C3600GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 51         | PADZZ    | 81349 | RLR05C51R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 52         | PADZZ    | 81349 | RLR05C1600GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 53         | PADZZ    | 81349 | RLR05C10R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 54         | PADZZ    | 81349 | RLR05C4702GS     | RESISTOR, FIXED, FILM.....           | 3   |  |
| 55         | PADZZ    | 81349 | RLR05C22R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 56         | PADZZ    | 81349 | RLR05C1000GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 57         | PADZZ    | 81349 | RLR05C1002GS     | RESISTOR, FIXED, FILM.....           | 6   |  |
| 58         | PADZZ    | 81349 | RJR26FX501R      | RESISTOR, VARIABLE, N.....           | 1   |  |
| 59         | PADZZ    | 54296 | 214393-00        | RESISTOR, FIXED, FILM.....           | 1   |  |
| 60         | PADZZ    | 81349 | RLR05C3901GS     | RESISTOR, FIXED, FILM.....           | 3   |  |
| 61         | PADZZ    | 81349 | RLR05C1502GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 62         | PADZZ    | 81349 | RLR05C3302GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 63         | PADZZ    | 81349 | RLR05C1802GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 64         | PADZZ    | 81349 | RLR05C15R0GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 65         | PADZZ    | 00779 | 60803-2          | CONTACT, ELECTRICAL.....             | 2   |  |
| 66         | PADZZ    | 15542 | TFM2             | MIXER STAGE, FREQUEN.....            | 2   |  |
| 67         | PADZZ    | 18324 | SA602N           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 68         | PADZZ    | 27014 | LM258J           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 69         | PADZZ    | 04713 | MC78L08ACP       | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 70         | PADZZ    | 54296 | 952351-10        | FILTER, BAND PASS.....               | 1   |  |
| 71         | PADZZ    | 54296 | 440-0003-001     | COIL, RADIO FREQUENC.....            | 1   |  |
| 72         | PADZZ    | 54296 | 440-0003-002     | COIL, RADIO FREQUENC.....            | 1   |  |
| 73         | PADZZ    | 54296 | 440-0003-003     | COIL, RADIO FREQUENC.....            | 1   |  |
| 74         | PADZZ    | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 2   |  |
|            |          |       | 0                |                                      |     |  |

END OF FIGURE



Precede all reference designators with A1A10

SOH143

Figure B-8. A10 Mixer Board Assembly (Sheet 1 of 2)

DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C25        | 2          | C49        | 6          | L4         | 27         | R9         | 39         | R33        | 55         |
| C2         | 2          | C26        | 8          | C50        | 2          | L5         | 27         | R10        | 40         | R34        | 56         |
| C3         | 3          | C27        | 9          | C51        | 2          | L6         | 27         | R11        | 37         | R35        | 40         |
| C4         | 4          | C28        | 6          | C52        | 6          | L7         | 27         | R12        | 41         | R36        | 42         |
| C5         | 4          | C29        | 2          | C53        | 18         | L10        | 28         | R13        | 42         | R37        | 57         |
| C6         | 5          | C30        | 2          | C54        | 6          | L11        | 26         | R14        | 43         | R38        | 39         |
| C7         | 6          | C31        | 2          | C55        | 16         | L12        | 27         | R15        | 44         | R39        | 58         |
| C8         | 2          | C32        | 2          | C56        | 3          | P1         | 29         | R16        | 45         | T1         | 59         |
| C9         | 2          | C33        | 10         | C57        | 11         | Q1         | 30         | R17        | 37         | T2         | 60         |
| C10        | 2          | C34        | 11         | C58        | 16         | Q2         | 31         | R18        | 46         | T3         | 61         |
| C11        | 2          | C35        | 3          | C59        | 3          | Q3         | 32         | R19        | 46         | T4         | 62         |
| C12        | 3          | C36        | 12         | C60        | 2          | Q4         | 33         | R20        | 47         | T5         | 62         |
| C13        | 2          | C37        | 13         | CR1        | 19         | Q5         | 33         | R21        | 48         | U1         | 63         |
| C14        | 2          | C38        | 14         | CR2        | 20         | Q6         | 33         | R22        | 49         | U2         | 64         |
| C15        | 2          | C39        | 13         | CR3        | 20         | Q7         | 30         | R23        | 50         | U3         | 65         |
| C16        | 2          | C40        | 15         | CR4        | 21         | Q8         | 30         | R24        | 51         | Z1         | 66         |
| C17        | 6          | C41        | 13         | CR5        | 22         | R1         | 34         | R25        | 40         | Z2         | 67         |
| C18        | 2          | C42        | 2          | CR6        | 20         | R2         | 35         | R26        | 52         | Z3         | 66         |
| C19        | 2          | C43        | 16         | CR7        | 21         | R3         | 34         | R27        | 51         | Z4         | 68         |
| C20        | 6          | C44        | 3          | DS1        | 23         | R4         | 36         | R28        | 52         | Z5         | 69         |
| C21        | 7          | C45        | 17         | F1         | 24         | R5         | 37         | R29        | 37         | Z6         | 70         |
| C22        | 7          | C46        | 17         | L1         | 25         | R6         | 37         | R30        | 53         | Z7         | 71         |
| C23        | 6          | C47        | 9          | L2         | 26         | R7         | 37         | R31        | 54         | Z8         | 72         |
| C24        | 6          | C48        | 9          | L3         | 27         | R8         | 38         | R32        | 55         | Z9         | 73         |

Precede all reference designators with A1A10

Figure B-8. A10 Mixer Board Assembly (Sheet 2 of 2)

SECTION II DR11-5820-1102 (5) (6)

| (1)<br>ITEM<br>NO                        | (2)<br>SMR<br>CODE | (3)<br>CAGEC | (4)<br>PART<br>NUMBER | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |
|--|--------------------|--------------|-----------------------|--------------------------------------|-----|
| GROUP 01010407 MIXER BOARD ASSEMBLY, A10 |                    |              |                       |                                      |     |

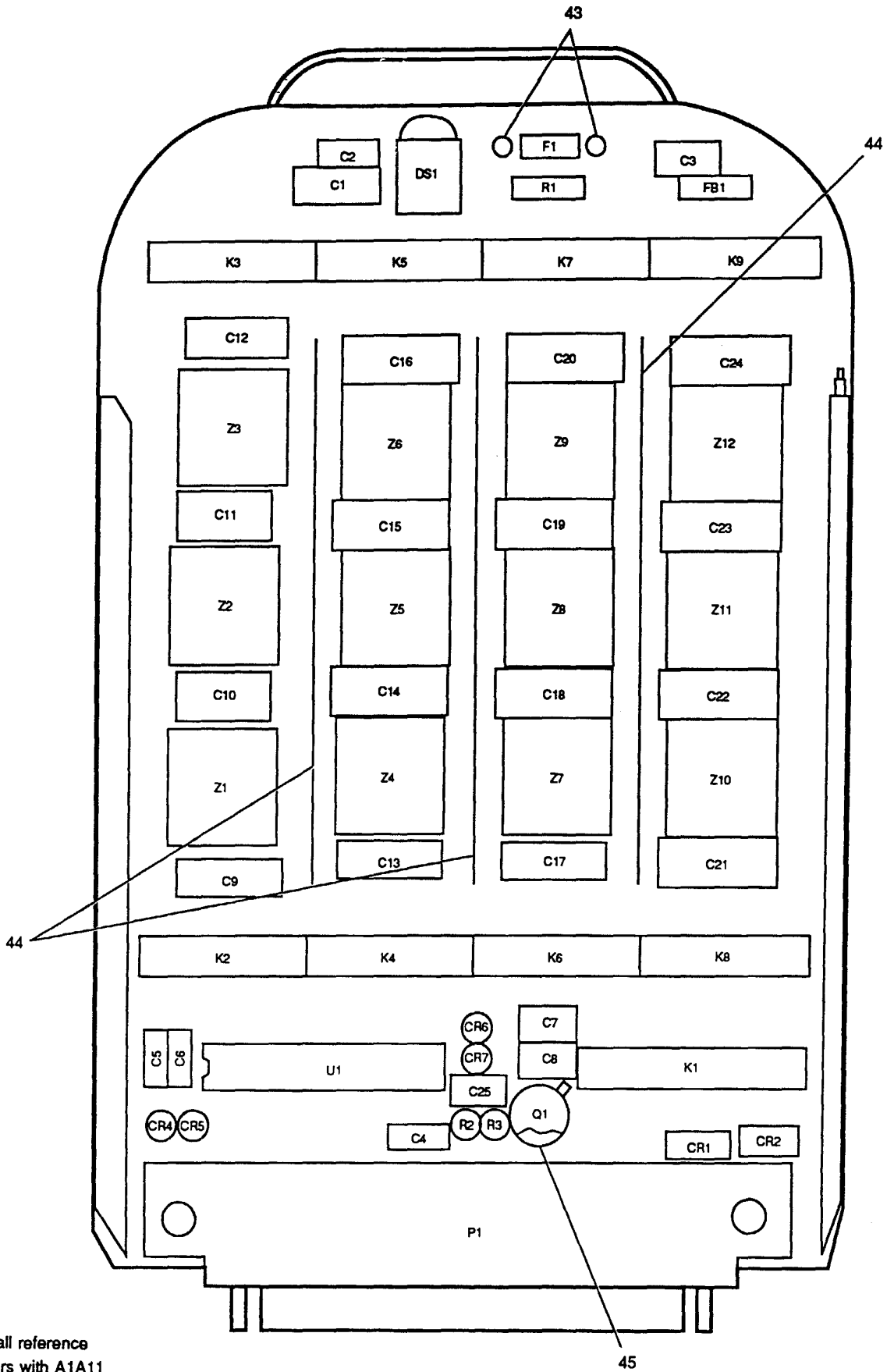
FIGURE B-8

|    |       |       |                |                       |    |
|----|-------|-------|----------------|-----------------------|----|
| 1  | PADZZ | 81349 | M39014/23-0338 | CAPACITOR, FIXED      | 1  |
| 2  | PADZZ | 81349 | M39014/23-0373 | CAPACITOR, FIXED, CER | 20 |
| 3  | PADZZ | 81349 | M39014/23-0356 | CAPACITOR, FIXED, CER | 6  |
| 4  | PADZZ | 81349 | CMR03E430GOCR  | CAPACITOR, FIXED, MIC | 2  |
| 5  | PADZZ | 81349 | CMR03E820GOCR  | CAPACITOR, FIXED, MIC | 1  |
| 6  | PADZZ | 31433 | T370D106M020AS | CAPACITOR, FIXED, ELE | 9  |
| 7  | PADZZ | 81349 | CMR03F201GOAR  | CAPACITOR, FIXED, MIC | 2  |
| 8  | PADZZ | 81349 | CMR03F301GOYR  | CAPACITOR, FIXED, MIC | 1  |
| 9  | PADZZ | 31433 | T370E226M015AS | CAPACITOR, FIXED, ELE | 3  |
| 10 | PADZZ | 81349 | CMR03C180DOCR  | CAPACITOR, FIXED, MIC | 1  |
| 11 | PADZZ | 88818 | C605006182     | CAPACITOR, FIXED, ELE | 2  |
| 12 | PADZZ | 81349 | CMR03C120DOCR  | CAPACITOR, FIXED, MIC | 1  |
| 13 | PADZZ | 81349 | CMR03E560GOCR  | CAPACITOR, FIXED, MIC | 3  |
| 14 | PADZZ | 81349 | CMR03E270GOCR  | CAPACITOR, FIXED, MIC | 1  |
| 15 | PADZZ | 81349 | CMR03C100DOCR  | CAPACITOR, FIXED, MIC | 1  |
| 16 | PADZZ | 81349 | M39014/02-1419 | CAPACITOR, FIXED, CER | 3  |
| 17 | PADZZ | 37695 | 265011-39      | CAPACITOR, VARIABLE   | 2  |
| 18 | PADZZ | 81349 | CMR03C5R0DOCR  | CAPACITOR, FIXED, MIC | 1  |
| 19 | PADZZ | 52673 | S12-3542       | SEMICONDUCTOR DEVIC   | 1  |
| 20 | PADZZ | 81349 | JANTX1N4148-1  | SEMICONDUCTOR DEVIC   | 3  |
| 21 | PADZZ | 28480 | 5082-3081      | SEMICONDUCTOR DEVIC   | 2  |
| 22 | PADZZ | 81349 | JANTX1N4245    | SEMICONDUCTOR DEVIC   | 1  |
| 23 | PADZZ | 28480 | 1990-1169      | LIGHT EMITTING DIOD   | 1  |
| 24 | PADZZ | 75915 | 251001         | FUSE, CARTRIDGE       | 1  |
| 25 | PADZZ | 54296 | 312324-00      | COIL, RADIO FREQUENC  | 1  |
| 26 | PADZZ | 96906 | MS90538-19     | COIL, RADIO FREQUENC  | 2  |
| 27 | PADZZ | 54296 | 129-0106-001   | COIL, RADIO FREQUENC  | 6  |
| 28 | PADZZ | 96906 | MS75085-11     | COIL, RADIO FREQUENC  | 1  |
| 29 | PADZZ | 97913 | HGM030MEA2Y00A | CONNECTOR, RECEPTA    | 1  |
| 30 | PADZA | 14304 | Q25-0005-000   | TRANSISTOR            | 3  |
| 31 | PADZZ | 57304 | 45002600       | TRANSISTOR            | 1  |
| 32 | PADZZ | 15818 | 2N5179         | TRANSISTOR            | 1  |
| 33 | PADZZ | 80131 | 2N4427         | TRANSISTOR            | 3  |
| 34 | PADZZ | 81349 | RLR05C3000GS   | RESISTOR, FIXED, FILM | 2  |
| 35 | PADZZ | 81349 | RLR05C18R0GS   | RESISTOR, FIXED, FILM | 1  |
| 36 | PADZZ | 81349 | RLR05C1600GS   | RESISTOR, FIXED, FILM | 1  |
| 37 | PADZZ | 81349 | RLR05C1001GS   | RESISTOR, FIXED, FILM | 6  |
| 38 | PADZZ | 81349 | RLR05C8203GS   | RESISTOR, FIXED, FILM | 1  |
| 39 | PADZZ | 81349 | RLR05C4702GS   | RESISTOR, FIXED, FILM | 2  |
| 40 | PADZZ | 81349 | RLR05C1000GS   | RESISTOR, FIXED, FILM | 3  |
| 41 | PADZZ | 81349 | RLR05C22R0GS   | RESISTOR, FIXED, FILM | 1  |
| 42 | PADZZ | 81349 | RLR05C1002GS   | RESISTOR, FIXED, FILM | 2  |
| 43 | PADZZ | 81349 | RLR05C4701GS   | RESISTOR, FIXED, FILM | 1  |
| 44 | PADZZ | 81349 | RLR05C1003GS   | RESISTOR, FIXED, FILM | 1  |
| 45 | PADZZ | 81349 | RLR05C2701GS   | RESISTOR, FIXED, FILM | 1  |
| 46 | PADZZ | 81349 | RLR05C9100GS   | RESISTOR, FIXED, FILM | 2  |

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| SECTION II |          |       | DR11-5820-1102   |                                      |     |  |
|------------|----------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)      | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER      | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 47         | PADZZ    | 81349 | RLR05C39R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 48         | PADZZ    | 81349 | RLR05C3300GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 49         | PADZZ    | 81349 | RLR05C68R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 50         | PADZZ    | 81349 | RLR05C33R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 51         | PADZZ    | 81349 | RLR05C10R0GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 52         | PADZZ    | 81349 | RLR07C10R0GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 53         | PADZZ    | 81349 | RLR07C22R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 54         | PADZZ    | 81349 | RLR05C2700GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 55         | PADZZ    | 81349 | RLR05C8R20GS     | RESISTOR, FIXED, FILM.....           | 2   |  |
| 56         | PADZZ    | 81349 | RLR05C1300GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 57         | PADZZ    | 81349 | RLR05C6802GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 58         | PADZZ    | 81349 | RLR07C68R0GS     | RESISTOR, FIXED, FILM.....           | 1   |  |
| 59         | PADZZ    | 54296 | 123-0040-001     | TRANSFORMER, RADIO F.....            | 1   |  |
| 60         | PADZZ    | 54296 | 123-0039-001     | TRANSFORMER, RADIO F.....            | 1   |  |
| 61         | PADZZ    | 54296 | 123-0041-001     | TRANSFORMER, POWER A.....            | 1   |  |
| 62         | PADZZ    | 54296 | 123-0043-001     | TRANSFORMER, RADIO F.....            | 2   |  |
| 63         | PADZZ    | 15542 | TFM2             | MIXER STAGE, FREQUEN.....            | 1   |  |
| 64         | PADZZ    | 66958 | L272M            | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 65         | PADZZ    | 12040 | LM109H           | MICROCIRCUIT, LINEAR.....            | 1   |  |
| 66         | PADZZ    | 54296 | 440-0003-013     | COIL, RADIO FREQUENC.....            | 2   |  |
| 67         | PADZZ    | 54296 | 440-0003-014     | COIL, RADIO FREQUENC.....            | 1   |  |
| 68         | PADZZ    | 54296 | 440-0003-007     | COIL, RADIO FREQUENC.....            | 1   |  |
| 69         | PADZZ    | 54296 | 440-0003-008     | COIL, RADIO FREQUENC.....            | 1   |  |
| 70         | PADZZ    | 54296 | 440-0003-009     | COIL, RADIO FREQUENC.....            | 1   |  |
| 71         | PADZZ    | 54296 | 440-0003-010     | COIL, RADIO FREQUENC.....            | 1   |  |
| 72         | PADZZ    | 54296 | 440-0003-011     | COIL, RADIO FREQUENC.....            | 1   |  |
| 73         | PADZZ    | 54296 | 440-0003-012     | COIL, RADIO FREQUENC.....            | 1   |  |
| 74         | PADZZ    | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 2   |  |
|            |          |       | 0                |                                      |     |  |

END OF FIGURE



Precede all reference designators with A1A11

Figure B-9. A11 Filter 1-4 Board Assembly (Sheet 1 of 2)

## LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C12        | 6          | C23        | 11         | FB1        | 22         | Q1         | 26         | Z7         | 37         |
| C2         | 2          | C13        | 7          | C24        | 17         | K1         | 23         | R1         | 27         | Z8         | 38         |
| C3         | 2          | C14        | 8          | C25        | 2          | K2         | 24         | R2         | 28         | Z9         | 39         |
| C4         | 2          | C15        | 9          | CR1        | 18         | K3         | 24         | R3         | 29         | Z10        | 40         |
| C5         | 2          | C16        | 10         | CR2        | 18         | K4         | 24         | U1         | 30         | Z11        | 41         |
| C6         | 2          | C17        | 11         | CR4        | 19         | K5         | 24         | Z1         | 31         | Z12        | 42         |
| C7         | 2          | C18        | 12         | CR5        | 19         | K6         | 24         | Z2         | 32         |            |            |
| C8         | 2          | C19        | 13         | CR6        | 19         | K7         | 24         | Z3         | 33         |            |            |
| C9         | 3          | C20        | 14         | CR7        | 19         | K8         | 24         | Z4         | 34         |            |            |
| C10        | 4          | C21        | 15         | DS1        | 20         | K9         | 24         | Z5         | 35         |            |            |
| C11        | 5          | C22        | 16         | F1         | 21         | P1         | 25         | Z6         | 36         |            |            |

Precede all reference designators with A1A11



SECTION II DR11-5820-1102 (5) (6)

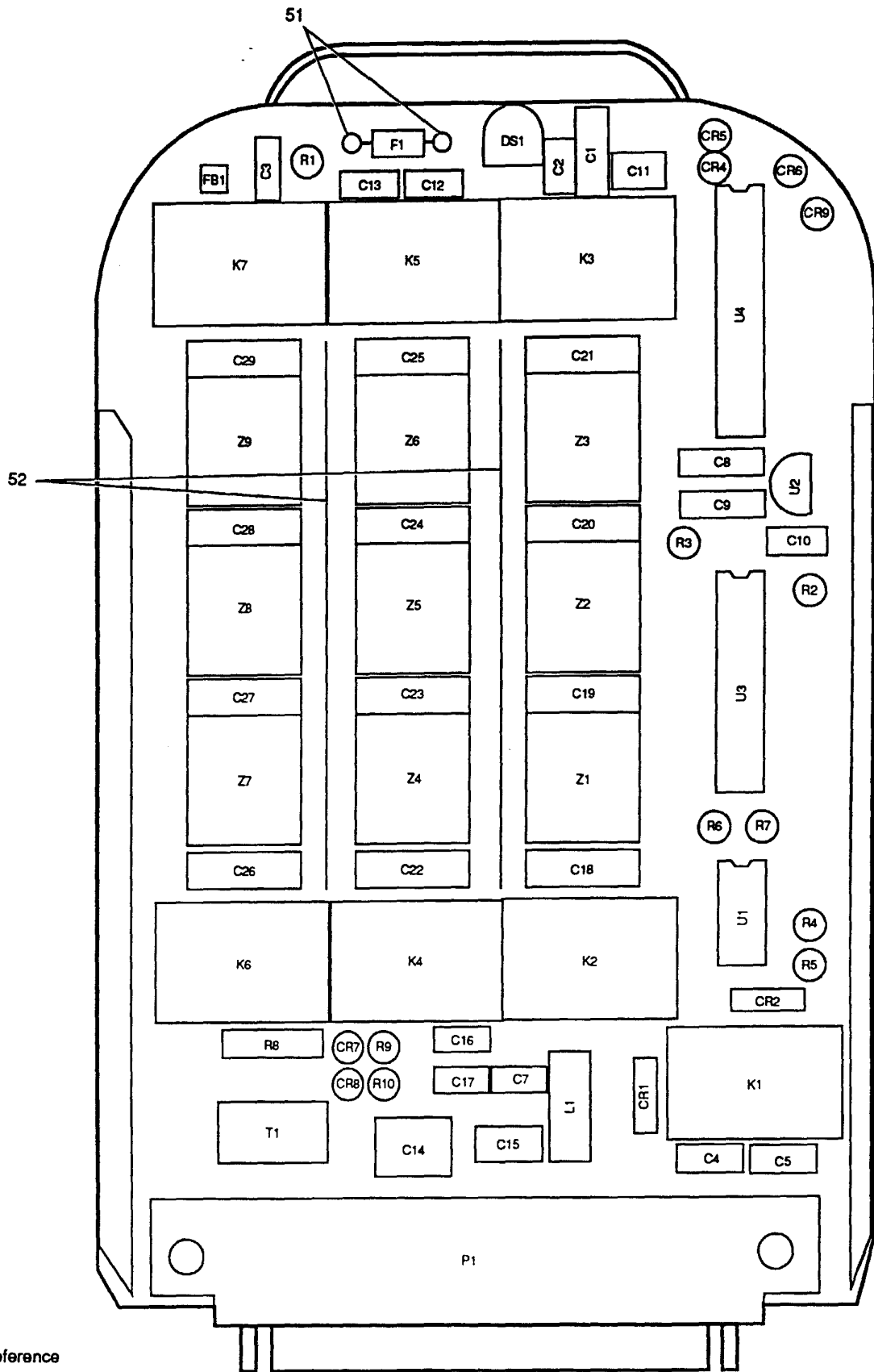
| (1)<br>ITEM<br>NO | (2)<br>SMR<br>CODE | (3)<br>CAGEC | (4)<br>PART<br>NUMBER | (5)<br>DESCRIPTION AND USABLE ON CODES(UOC)   | (6)<br>QTY |
|-------------------|--------------------|--------------|-----------------------|---|------------|
|                   |                    |              |                       | GROUP 01010408 FILTER 1-4 BOARD ASSEMBLY, All |            |

FIGURE B-9

|    |       |       |                       |                       |   |
|----|-------|-------|-----------------------|-----------------------|---|
| 1  | PADZZ | 03640 | 6116730-1             | CAPACITOR, FIXED, ELE | 1 |
| 2  | PADZZ | 81349 | M39014/23-0356        | CAPACITOR, FIXED, CER | 8 |
| 3  | PADZZ | 81349 | CCR06CG911FS          | CAPACITOR, FIXED, CER | 1 |
| 4  | PADZZ | 81349 | CCR06CG162FS          | CAPACITOR, FIXED, CER | 1 |
| 5  | PADZZ | 81349 | CCR06CG152FS          | CAPACITOR, FIXED, CER | 1 |
| 6  | PADZZ | 81349 | CCR06CG621FM          | CAPACITOR, FIXED, CER | 1 |
| 7  | PADZZ | 54296 | 108-1031-431          | CAPACITOR, FIXED, MIC | 1 |
| 8  | PADZZ | 54296 | 108-1031-821          | CAPACITOR, FIXED, MIC | 1 |
| 9  | PADZZ | 54296 | 108-1031-751          | CAPACITOR, FIXED, MIC | 1 |
| 10 | PADZZ | 54296 | 108-1031-151          | CAPACITOR, FIXED, MIC | 1 |
| 11 | PADZZ | 54296 | 108-1031-301          | CAPACITOR, FIXED, MIC | 2 |
| 12 | PADZZ | 54296 | 108-1031-561          | CAPACITOR, FIXED, MIC | 1 |
| 13 | PADZZ | 54296 | 108-1031-501          | CAPACITOR, FIXED, MIC | 1 |
| 14 | PADZZ | 54296 | 108-1031-201          | CAPACITOR, FIXED, MIC | 1 |
| 15 | PADZZ | 54296 | 108-1031-161          | CAPACITOR, FIXED, MIC | 1 |
| 16 | PADZZ | 54296 | 108-1031-331          | CAPACITOR, FIXED, MIC | 1 |
| 17 | PADZZ | 54296 | 108-1031-101          | CAPACITOR, FIXED, MIC | 1 |
| 18 | PADZZ | 81349 | JANTX1N4148-1         | SEMICONDUCTOR DEVIC   | 2 |
| 19 | PADZZ | 81349 | JANTX1N4245           | SEMICONDUCTOR DEVIC   | 4 |
| 20 | PADZZ | 96214 | 803415-3              | LIGHT EMITTING DIOD   | 1 |
| 21 | PADZZ | 50163 | 39030030-1002         | FUSE, CARTRIDGE       | 1 |
| 22 | PADZZ | 34899 | 2673000201            | SHIELDING BEAD, ELEC  | 1 |
| 23 | PADZA | 61529 | DS2E-M-DC12V          | RELAY, ELECTROMAGNET  | 1 |
| 24 | PADZA | 61529 | DS1EML2DC12V          | RELAY, ELECTROMAGNET  | 8 |
| 25 | PADZZ | 97913 | HGM030MEA2Y00A        | CONNECTOR, RECEPTACL  | 1 |
| 26 | PADZZ | 81349 | JAN2N2907A            | TRANSISTOR            | 1 |
| 27 | PADZZ | 81349 | RLR05C1201GS          | RESISTOR, FIXED, FILM | 1 |
| 28 | PADZZ | 81349 | RLR05C4702GS          | RESISTOR, FIXED, FILM | 1 |
| 29 | PADZZ | 81349 | RLR05C2201GS          | RESISTOR, FIXED, FILM | 1 |
| 30 | PADZA | 56289 | UDN-2981A             | MICROCIRCUIT, DIGITA  | 1 |
| 31 | PADZZ | 54296 | 440-0004-001          | COIL, RADIO FREQUENC  | 1 |
| 32 | PADZZ | 54296 | 440-0005-001          | COIL, RADIO FREQUENC  | 1 |
| 33 | PADZZ | 54296 | 440-0006-001          | COIL, RADIO FREQUENC  | 1 |
| 34 | PADZZ | 54296 | 440-0007-001          | COIL, RADIO FREQUENC  | 1 |
| 35 | PADZZ | 54296 | 440-0008-001          | COIL, RADIO FREQUENC  | 1 |
| 36 | PADZZ | 54296 | 440-0009-001          | COIL, RADIO FREQUENC  | 1 |
| 37 | PADZZ | 54296 | 440-0010-001          | COIL, RADIO FREQUENC  | 1 |
| 38 | PADZZ | 54296 | 440-0011-001          | COIL, RADIO FREQUENC  | 1 |
| 39 | PADZZ | 54296 | 440-0012-001          | COIL, RADIO FREQUENC  | 1 |
| 40 | PADZZ | 54296 | 440-0013-001          | COIL, RADIO FREQUENC  | 1 |
| 41 | PADZZ | 54296 | 440-0014-001          | COIL, RADIO FREQUENC  | 1 |
| 42 | PADZZ | 54296 | 440-0015-001          | COIL, RADIO FREQUENC  | 1 |
| 43 | PADZZ | 98291 | 229-3070-00-0-47<br>0 | TERMINAL, STUD        | 2 |
| 44 | PADZZ | 54296 | 426-0005-001          | SHIELD, ELECTRONIC C  | 3 |
| 45 | PADZZ | 13103 | 7717-16DAP            | MOUNTING PAD, ELECTR  | 1 |

END OF FIGURE

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Precede all reference designators with A1A12

Figure B-10. A12 Filter 5-7 Board Assembly (Sheet 1 of 2)

DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C14        | 3          | C26        | 14         | DS1        | 21         | R1         | 28         | U2         | 39         |
| C2         | 2          | C15        | 4          | C27        | 15         | F1         | 22         | R2         | 29         | U3         | 40         |
| C3         | 2          | C16        | 5          | C28        | 16         | FB1        | 23         | R3         | 30         | U4         | 41         |
| C4         | 2          | C17        | 5          | C29        | 17         | K1         | 24         | R4         | 31         | Z1         | 42         |
| C5         | 2          | C18        | 6          | CR1        | 18         | K2         | 25         | R5         | 32         | Z2         | 43         |
| C7         | 2          | C19        | 7          | CR2        | 18         | K3         | 25         | R6         | 33         | Z3         | 44         |
| C8         | 1          | C20        | 8          | CR4        | 19         | K4         | 25         | R7         | 34         | Z4         | 45         |
| C9         | 1          | C21        | 9          | CR5        | 19         | K5         | 25         | R8         | 35         | Z5         | 46         |
| C10        | 2          | C22        | 10         | CR6        | 19         | K6         | 25         | R9         | 36         | Z6         | 47         |
| C11        | 2          | C23        | 11         | CR7        | 20         | K7         | 25         | R10        | 36         | Z7         | 48         |
| C12        | 2          | C24        | 12         | CR8        | 20         | L1         | 26         | T1         | 37         | Z8         | 49         |
| C13        | 2          | C25        | 13         | CR9        | 19         | P1         | 27         | U1         | 38         | Z9         | 50         |

Precede all reference designators with A1A12

Figure B-10. A12 Filter 5-7 Board Assembly (Sheet 2 of 2)

| SECTION II |          |       | DR11-5820-1102 |                                      | (5)                            | (6) |
|------------|----------|-------|----------------|--------------------------------------|--------------------------------|-----|
| (1)        | (2)      | (3)   | (4)            |                                      |                                |     |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER    | DESCRIPTION AND USABLE ON CODES(UOC) |                                | QTY |
|            |          |       |                | GROUP 01010409                       | FILTER 5-7 BOARD ASSEMBLY, A12 |     |

FIGURE B-10

|    |       |       |                              |                            |   |
|----|-------|-------|------------------------------|----------------------------|---|
| 1  | PADZZ | 03640 | 6116730-1                    | CAPACITOR, FIXED, ELE..... | 3 |
| 2  | PADZZ | 81349 | M39014/23-0356               | CAPACITOR, FIXED, CER..... | 9 |
| 3  | PADZZ | 54296 | 108-1031-240                 | CAPACITOR, FIXED, MIC..... | 1 |
| 4  | PADZZ | 81349 | CMR03F101G0CR                | CAPACITOR, FIXED, MIC..... | 1 |
| 5  | PADZZ | 81349 | M39014/23-0338               | CAPACITOR, FIXED.....      | 2 |
| 6  | PADZZ | 54296 | 108-1031-121                 | CAPACITOR, FIXED, MIC..... | 1 |
| 7  | PADZZ | 54296 | 108-1031-201                 | CAPACITOR, FIXED, MIC..... | 1 |
| 8  | PADZZ | 54296 | 108-1031-181                 | CAPACITOR, FIXED, MIC..... | 1 |
| 9  | PADZZ | 54296 | 108-1031-560                 | CAPACITOR, FIXED, MIC..... | 1 |
| 10 | PADZZ | 54296 | 108-1031-680                 | CAPACITOR, FIXED, MIC..... | 1 |
| 11 | PADZZ | 54296 | 108-1031-131                 | CAPACITOR, FIXED, MIC..... | 1 |
| 12 | PADZZ | 54296 | 108-1031-111                 | CAPACITOR, FIXED, MIC..... | 1 |
| 13 | PADZZ | 54296 | 108-1031-390                 | CAPACITOR, FIXED, MIC..... | 1 |
| 14 | PADZZ | 54296 | 108-1031-360                 | CAPACITOR, FIXED, MIC..... | 1 |
| 15 | PADZZ | 54296 | 108-1031-820                 | CAPACITOR, FIXED, MIC..... | 1 |
| 16 | PADZZ | 54296 | 108-1031-750                 | CAPACITOR, FIXED, MIC..... | 1 |
| 17 | PADZZ | 54296 | 108-1031-240                 | CAPACITOR, FIXED, MIC..... | 1 |
| 18 | PADZZ | 81349 | JANTX1N4148-1                | SEMICONDUCTOR DEVIC.....   | 2 |
| 19 | PADZZ | 81349 | JANTX1N4245                  | SEMICONDUCTOR DEVIC.....   | 4 |
| 20 | PADZZ | 81349 | JANTX1N5711                  | SEMICONDUCTOR DEVIC.....   | 2 |
| 21 | PADZZ | 28480 | 1990-1169                    | LIGHT EMITTING DIOD.....   | 1 |
| 22 | PADZZ | 06994 | 4301001-2R000                | FUSE, SPECIAL.....         | 1 |
| 23 | PADZZ | 34899 | 2673000201                   | SHIELDING BEAD, ELEC.....  | 1 |
| 24 | PADZA | 61529 | DS1EMDC12V                   | RELAY, ELECTROMAGNET.....  | 1 |
| 25 | PADZA | 61529 | DS1EML2DC12V                 | RELAY, ELECTROMAGNET.....  | 6 |
| 26 | PADZZ | 99800 | 1641-225                     | COIL, RADIO FREQUENC.....  | 1 |
| 27 | PADZZ | 97913 | HGM030MEA2Y00A               | CONNECTOR, RECEPTAC.....   | 1 |
| 28 | PADZZ | 81349 | RLR05C1201GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 29 | PADZZ | 81349 | RLR05C1004GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 30 | PADZZ | 81349 | RLR05C1003GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 31 | PADZZ | 81349 | RLR05C1002GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 32 | PADZZ | 81349 | RLR05C6802GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 33 | PADZZ | 81349 | RLR05C4302GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 34 | PADZZ | 81349 | RLR05C3602GS                 | RESISTOR, FIXED, FILM..... | 1 |
| 35 | PADZZ | 19647 | MK132-5MEGOHMSPD<br>RMO.1PCT | RESISTOR, FIXED, FILM..... | 1 |
| 36 | PADZZ | 81349 | RLR05C4702GS                 | RESISTOR, FIXED, FILM..... | 2 |
| 37 | PADZZ | 54296 | 361465-00                    | TRANSFORMER, RADIO F.....  | 1 |
| 38 | PADZZ | 27014 | LM258J                       | MICROCIRCUIT, LINEAR.....  | 1 |
| 39 | PADZZ | 27014 | LM340LAZ-5.0                 | MICROCIRCUIT, LINEAR.....  | 1 |
| 40 | PADZZ | 04713 | 14099B/BEAJC                 | MICROCIRCUIT, DIGITA.....  | 1 |
| 41 | PADZA | 56289 | UDN-2981A                    | MICROCIRCUIT, DIGITA.....  | 1 |
| 42 | PADZZ | 54296 | 440-0016-001                 | COIL, RADIO FREQUENC.....  | 1 |
| 43 | PADZZ | 54296 | 440-0017-001                 | COIL, RADIO FREQUENC.....  | 1 |
| 44 | PADZZ | 54296 | 440-0018-001                 | COIL, RADIO FREQUENC.....  | 1 |
| 45 | PADZZ | 54296 | 440-0019-001                 | COIL, RADIO FREQUENC.....  | 1 |

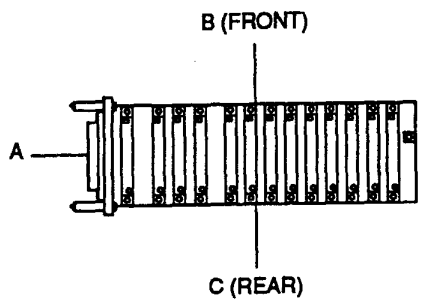
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| SECTION II |       |       | DR11-5820-1102   |                                      |     |  |
|------------|-------|-------|------------------|--------------------------------------|-----|--|
| (1)        | (2)   | (3)   | (4)              | (5)                                  | (6) |  |
| ITEM       | SMR   |       | PART             |                                      |     |  |
| NO         | CODE  | CAGEC | NUMBER           | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |  |
| 46         | PADZZ | 54296 | 440-0020-001     | COIL,RADIO FREQUENC.....             | 1   |  |
| 47         | PADZZ | 54296 | 440-0021-001     | COIL,RADIO FREQUENC.....             | 1   |  |
| 48         | PADZZ | 54296 | 440-0022-001     | COIL,RADIO FREQUENC.....             | 1   |  |
| 49         | PADZZ | 54296 | 440-0023-001     | COIL,RADIO FREQUENC.....             | 1   |  |
| 50         | PADZZ | 54296 | 440-0024-001     | COIL,RADIO FREQUENC.....             | 1   |  |
| 51         | PADZZ | 98291 | 229-3070-00-0-47 | TERMINAL,STUD.....                   | 2   |  |
|            |       |       | 0                |                                      |     |  |
| 52         | PADZZ | 54296 | 426-0005-001     | SHIELD,ELECTRONIC C.....             | 2   |  |

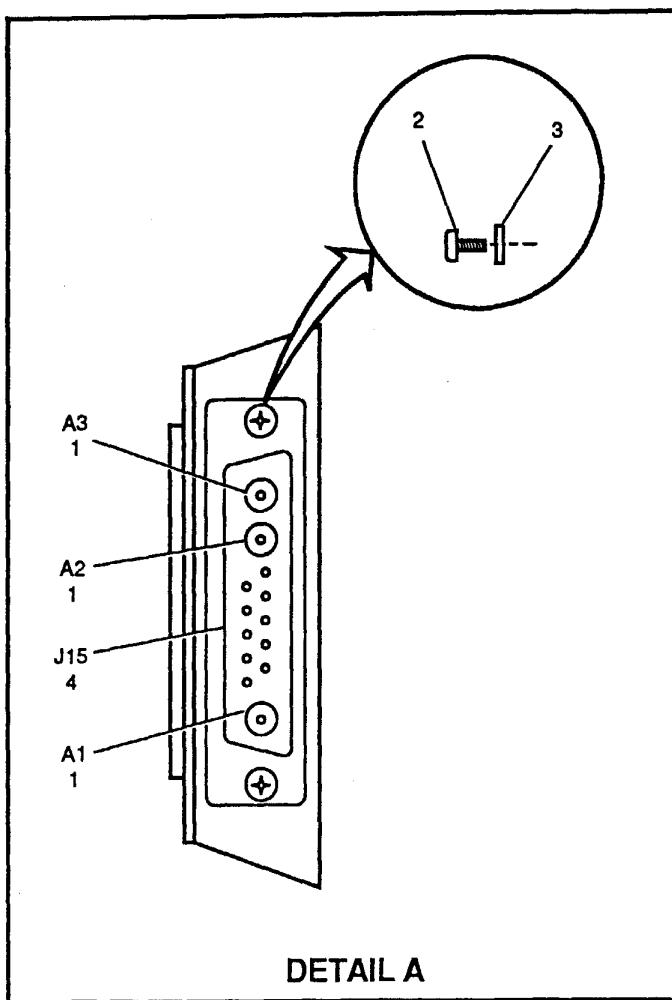
END OF FIGURE

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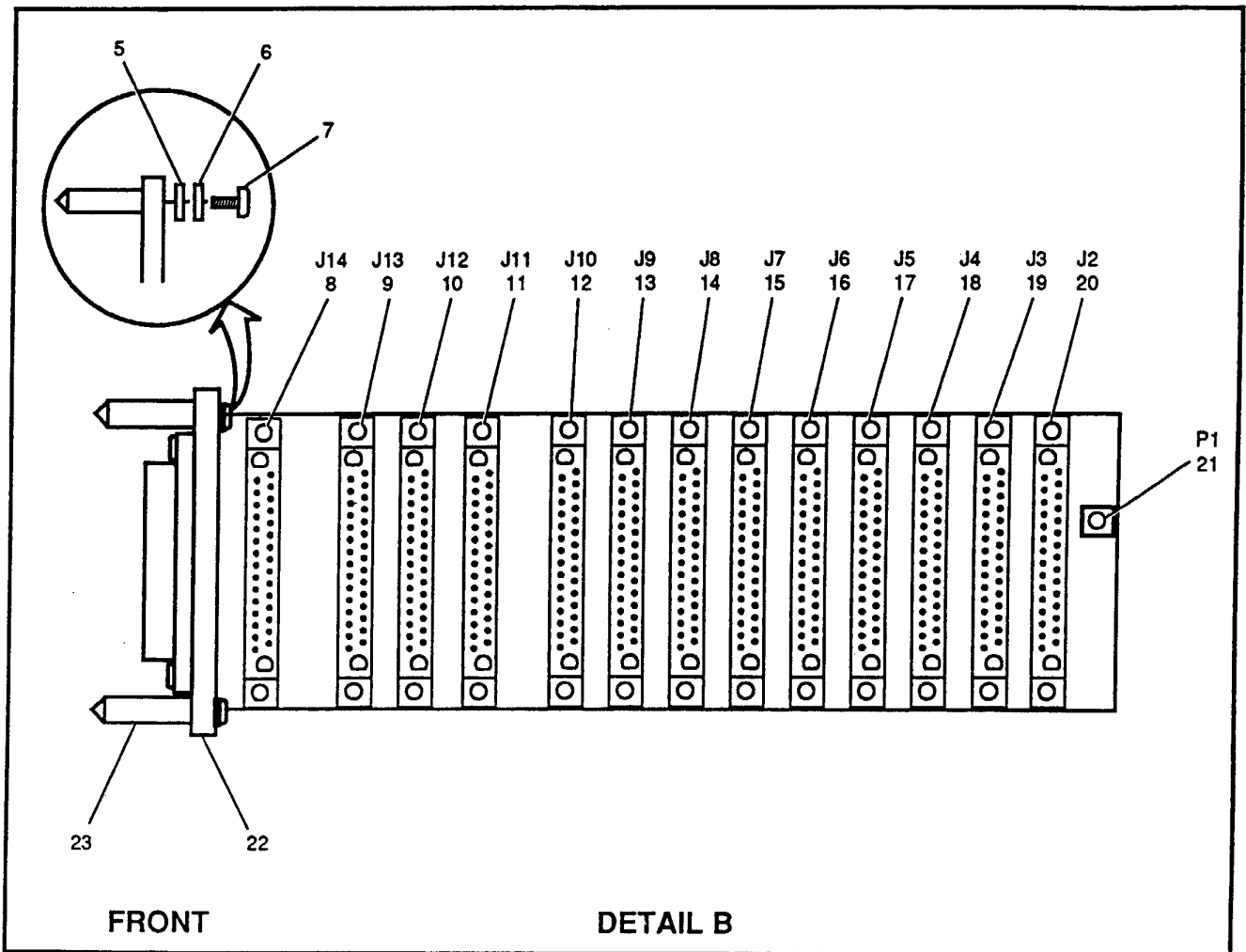


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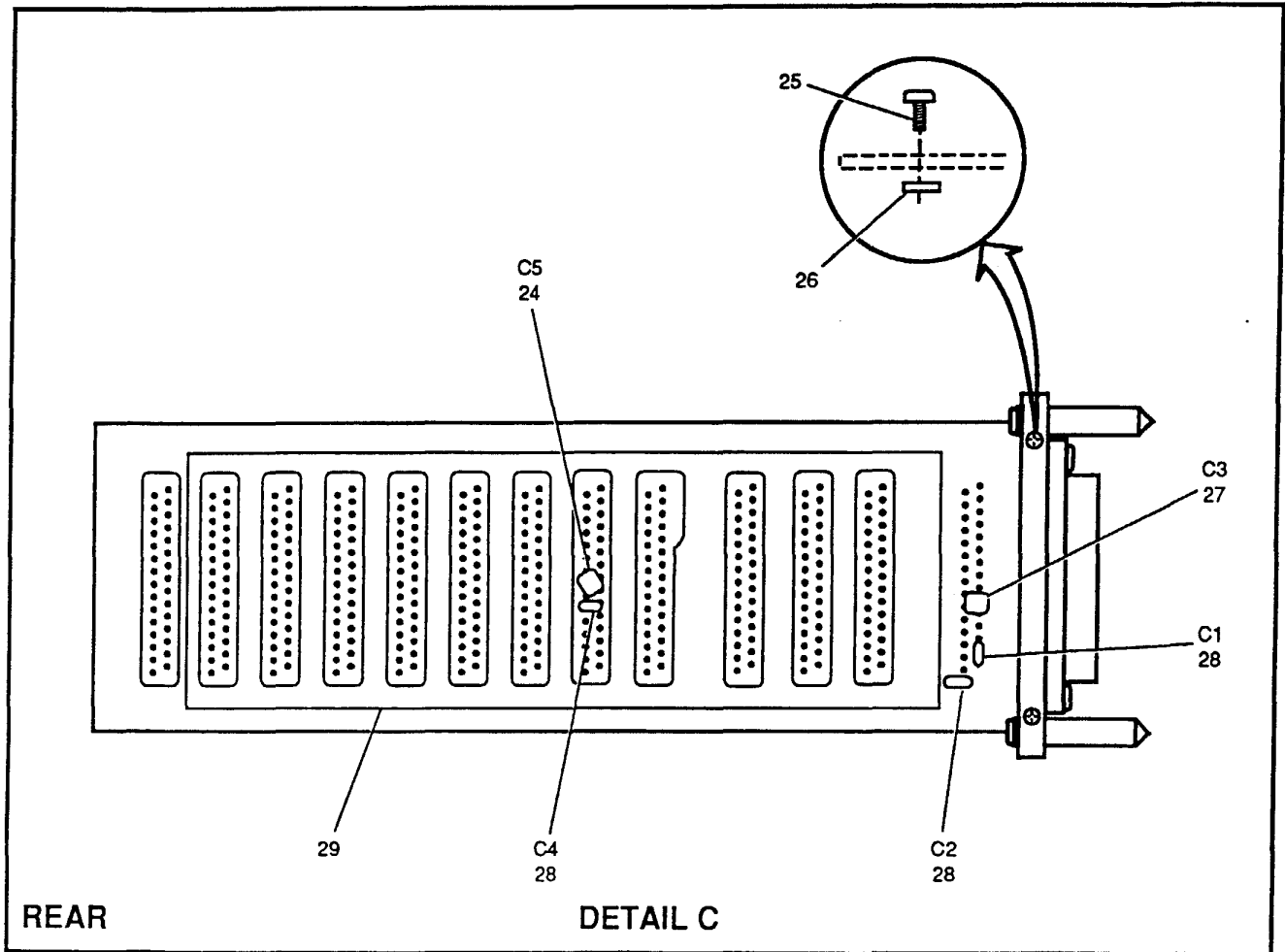
Precede all reference designators with A1A14

Figure B-11. A14 Interconnect Board Assembly (Sheet 1 of 3)



Precede all reference designators with A1A14

Figure B-11. A14 Interconnect Board Assembly (Sheet 2 of 3)



Precede all reference designators with A1A14

Figure B-11. A14 Interconnect Board Assembly (Sheet 3 of 3)

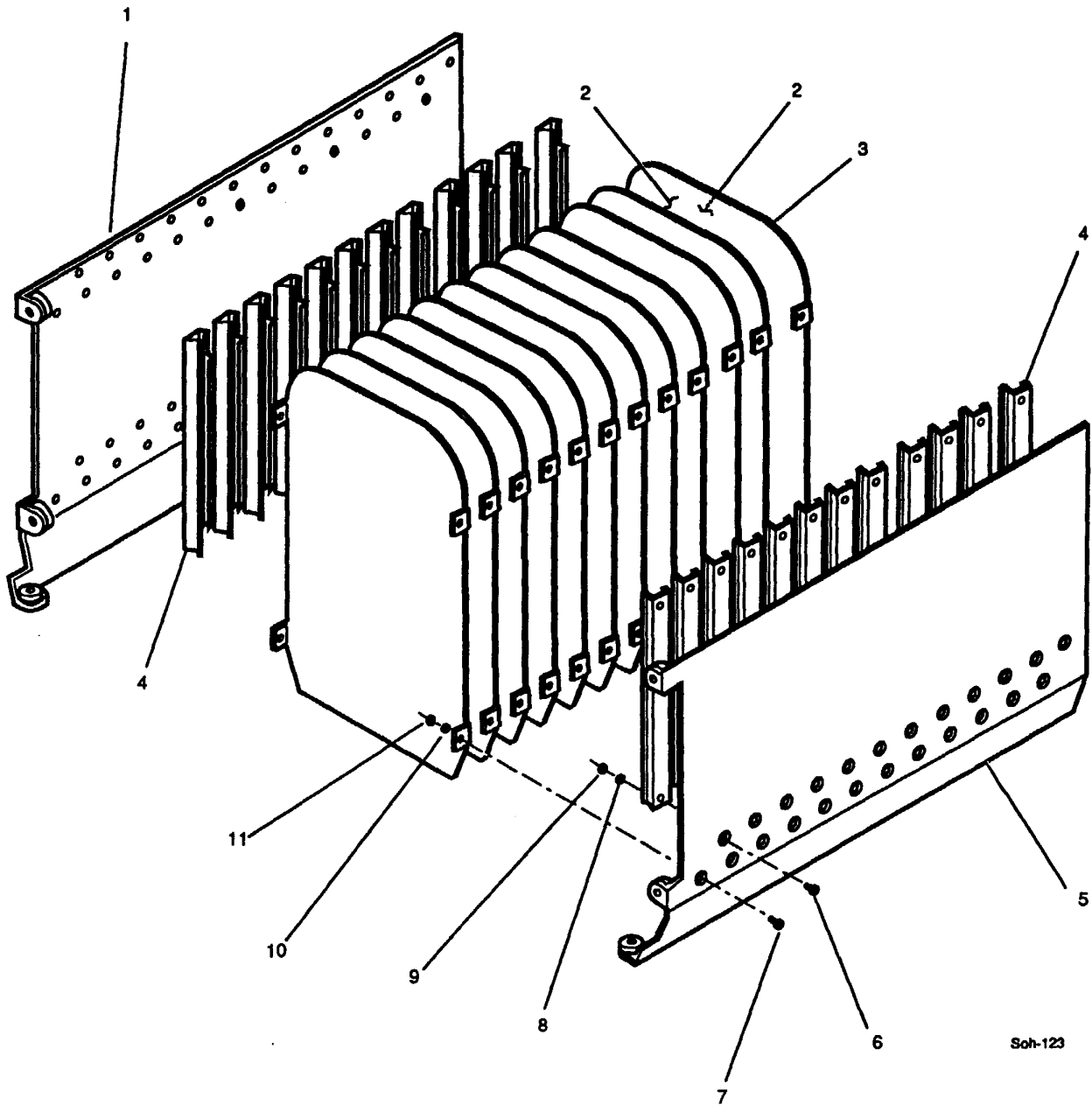


| SECTION II |          |       | DR11-5820-1102 |                                      |                                  |  |
|------------|----------|-------|----------------|--------------------------------------|----------------------------------|--|
| (1)        | (2)      | (3)   | (4)            | (5)                                  | (6)                              |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER    | DESCRIPTION AND USABLE ON CODES(UOC) | QTY                              |  |
|            |          |       |                | GROUP 01010410                       | INTERCONNECT BOARD ASSEMBLY, A14 |  |

FIGURE B-11

|    |       |       |                 |                            |   |
|----|-------|-------|-----------------|----------------------------|---|
| 1  | PADZA | 94375 | RF02040-919W    | CONTACT, ELECTRICAL.....   | 3 |
| 2  | PADZZ | 96906 | MS51957-13B     | SCREW, MACHINE.....        | 2 |
| 3  | PADZZ | 81891 | 1204-09-00-541B | WASHER, LOCK.....          | 2 |
| 4  | PADZA | 71468 | DBMM-13W3P      | CONNECTOR, RECEPTACL.....  | 1 |
| 5  | PADZZ | 96906 | MS15795-802     | WASHER, FLAT.....          | 2 |
| 6  | PADZZ | 96906 | MS51848-43      | WASHER, LOCK.....          | 2 |
| 7  | PADZZ | 80205 | NAS1635-02-6    | SCREW, MACHINE.....        | 2 |
| 8  | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 9  | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 10 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 11 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 12 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 13 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 14 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 15 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 16 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 17 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 18 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 19 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 20 | PADZZ | 97913 | HGM030FDA2Y00A  | CONNECTOR, RECEPTACL.....  | 1 |
| 21 | PADZZ | 16733 | 700532          | CONNECTOR, RECEPTACL.....  | 1 |
| 22 | PADZZ | 54296 | 823971-00       | BRACKET, ELECTRICAL.....   | 1 |
| 23 | PADZZ | 54296 | 445-0001-001    | JACKSCREW, ELECTRICAL..... | 2 |
| 24 | PADZZ | 81349 | M39014/01-1593  | CAPACITOR, FIXED, CER..... | 1 |
| 25 | PADZZ | 96906 | MS51957-2       | SCREW, MACHINE.....        | 2 |
| 26 | PADZZ | 96906 | MS35333-69      | WASHER, LOCK.....          | 2 |
| 27 | PADZZ | 81349 | CCR06CG152FS    | CAPACITOR, FIXED, CER..... | 1 |
| 28 | PADZZ | 81349 | M39014/23-0355  | CAPACITOR, FIXED, CER..... | 3 |
| 29 | PADZZ | 54296 | 831884-01       | PRINTED WIRING BOAR.....   | 1 |

END OF FIGURE



Soh-123

Figure B-12. Card Cage Assembly

| SECTION II |      |       | DR11-5820-1102 |  |                                      |     |
|------------|------|-------|----------------|--|--------------------------------------|-----|
| (1)        | (2)  | (3)   | (4)            |  | (5)                                  | (6) |
| ITEM       | SMR  |       | PART           |  |                                      |     |
| NO         | CODE | CAGEC | NUMBER         |  | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |

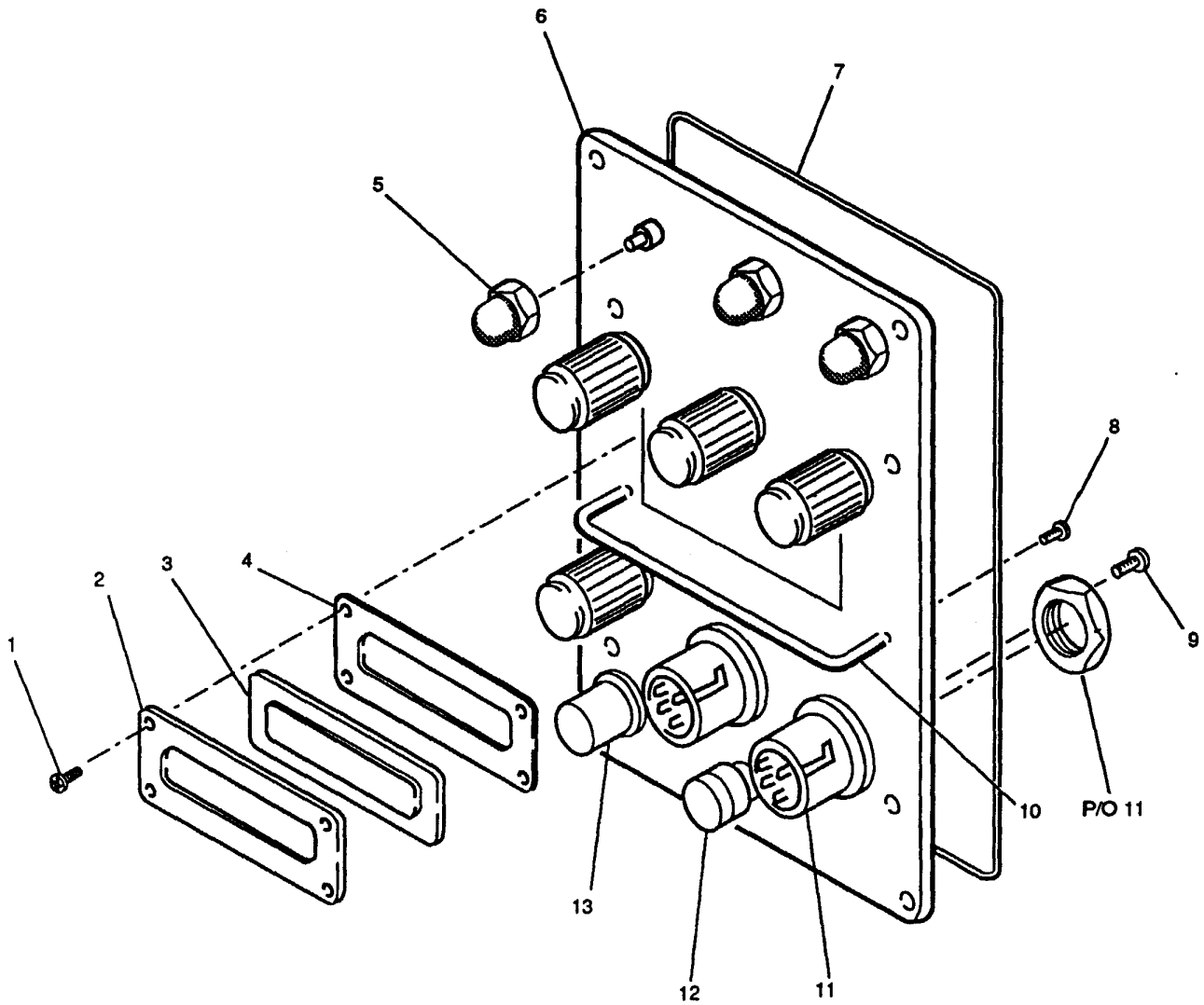
GROUP 01010411 CARD CAGE ASSEMBLY

FIGURE B-12

|    |       |       |              |     |                            |    |
|----|-------|-------|--------------|-----|----------------------------|----|
| 1  | PADZZ | 54296 | 823965-10    |     | HOLDER, ELECTRICAL C.....  | 1  |
| 2  | PADZZ | 54296 | 823968-00    |     | INSULATOR, PLATE.....      | 24 |
| 3  | PADZZ | 54296 | 823967-00    |     | SPACER, SLEEVE.....        | 12 |
| 4  | PADZZ | 18915 | 35-1B2-5-3   |     | RETAINER, CIRCUIT, CA..... | 24 |
| 5  | PADZZ | 54296 | 823966-10    |     | HOLDER, ELECTRICAL C.....  | 1  |
| 6  | PADZZ | 88044 | AN510C1-3    |     | SCREW, MACHINE.....        | 48 |
| 7  | PADZZ | 06540 | 2-56 X 3/16  |     | SCREW, MACHINE.....        | 48 |
| 8  | PADZZ | 96906 | MS35333-69   |     | WASHER, LOCK.....          | 48 |
| 9  | PADZZ | 98284 | 1-72 X 5/32, | SSL | NUT, PLAIN, HEXAGON.....   | 48 |
| 10 | PADZZ | 96906 | MS51848-43   |     | WASHER, LOCK.....          | 48 |
| 11 | PADZZ | 80205 | NAS671C2     |     | NUT, PLAIN, HEXAGON.....   | 48 |

END OF FIGURE

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Figure B-13. Control Panel Assembly (Sheet 1 of 2)

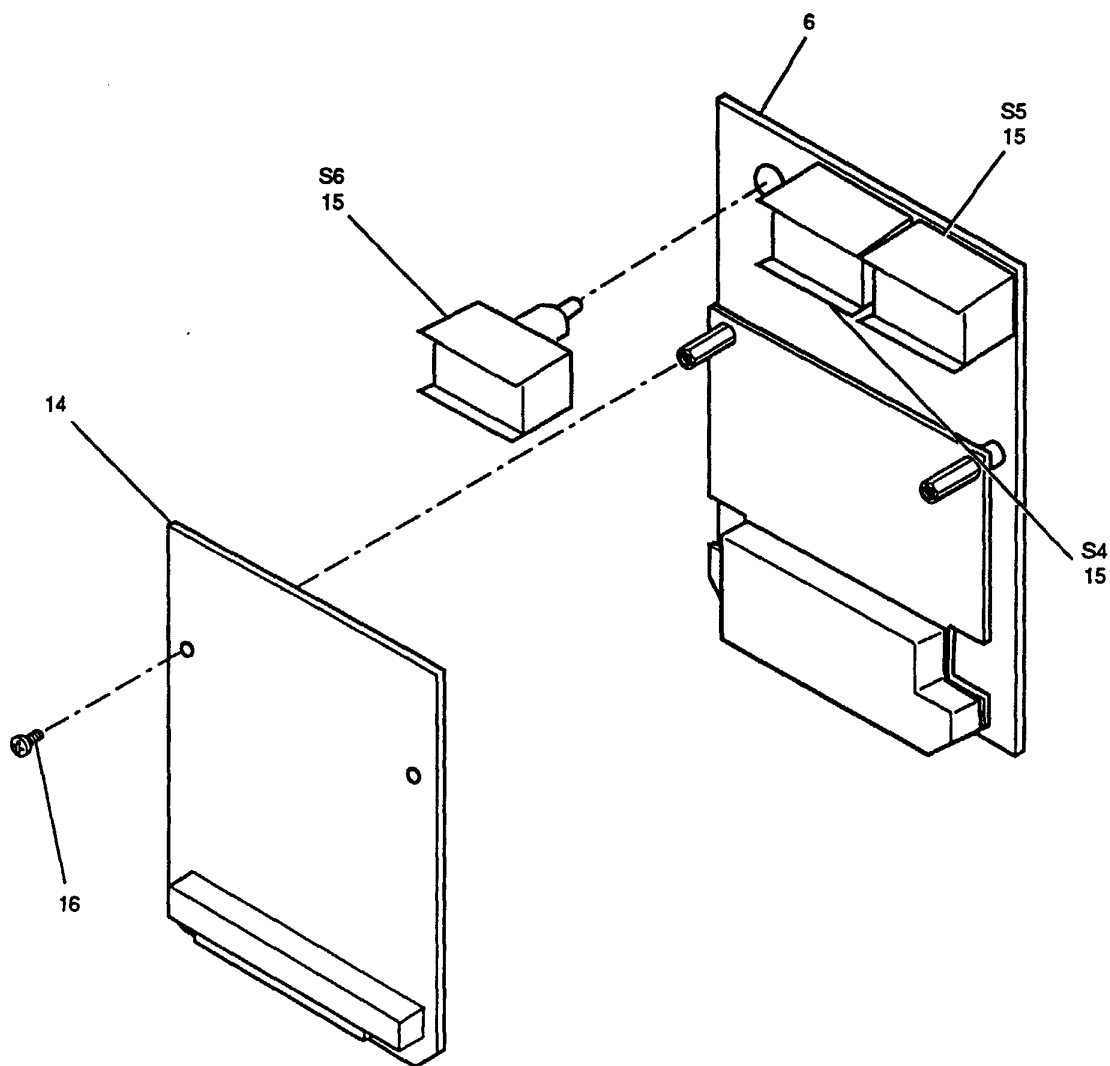
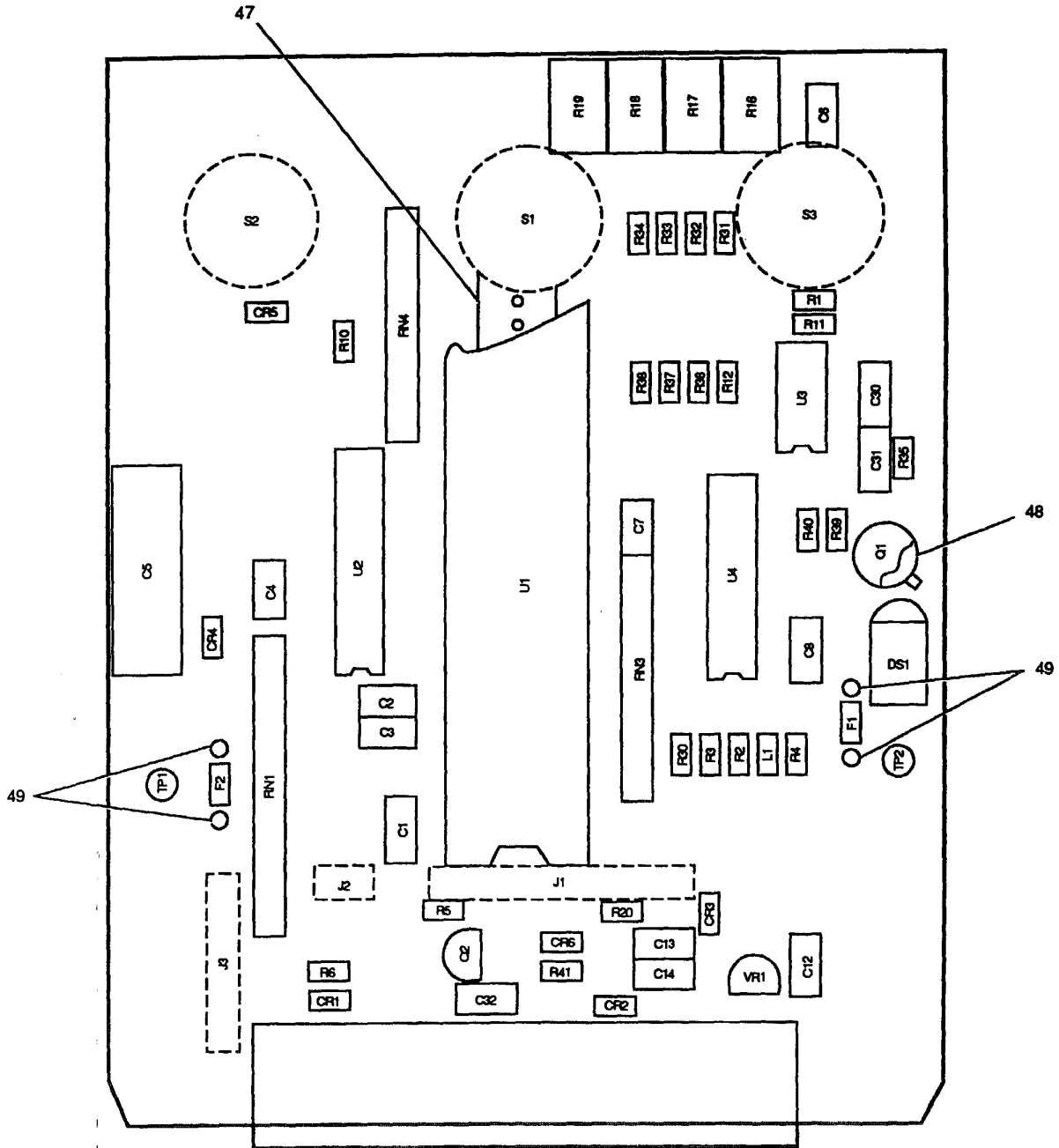


Figure B-13. Control Panel Assembly (Sheet 2 of 2)

| SECTION II  |          |       | DR11-5820-1102         |  |                        |     |
|-------------|----------|-------|------------------------|--|------------------------|-----|
| (1)         | (2)      | (3)   | (4)                    | (5)  | (6)                    |     |
| ITEM NO     | SMR CODE | CAGEC | PART NUMBER            | DESCRIPTION AND USABLE ON CODES(UOC)                     |                        | QTY |
|             |          |       |                        | GROUP 01010412   | CONTROL PANEL ASSEMBLY |     |
| FIGURE B-13 |          |       |                        |  |                        |     |
| 1           | PADZZ    | 58802 | SEELSKREW/5/2-56 X 1/4 | SCREW,MACHINE.....                                       |                        | 4   |
| 2           | PADZZ    | 54296 | 426-0001-010           | BEZEL,INSTRUMENT MO.....                                 |                        | 1   |
| 3           | PADZZ    | 54296 | 426-0002-001           | WINDOW,OBSERVATION.....                                  |                        | 1   |
| 4           | PADZZ    | 54296 | 812385-10              | GASKET.....  |                        | 1   |
| 5           | PADZZ    | 81349 | M5423-10-02            | BOOT,DUST AND MOIST.....                                 |                        | 3   |
| 6           | XBDZZ    | 54296 | 994515-10              | DISPLAY,OPTOELECTRI.....                                 |                        | 1   |
| 7           | PADZZ    | 54296 | 158-0099-001           | GASKET.....  |                        | 1   |
| 8           | PADZZ    | 97539 | R/4-40X.312#           | SCREW,MACHINE.....                                       |                        | 2   |
| 9           | PADZZ    | 96906 | MS3212-11              | SCREW,MACHINE.....                                       |                        | 1   |
| 10          | PADZZ    | 06540 | 10094-SS-0440-6B       | HANDLE,BOW.....  |                        | 1   |
| 11          | PADZA    | 25330 | GC683S                 | CONNECTOR,RECEPTACL.....                                 |                        | 2   |
| 12          | PADZZ    | 81348 | WF408                  | ADAPTER,ELECTRICAL.....                                  |                        | 1   |
| 13          | PADZZ    | 05276 | 4159                   | CONNECTOR,RECEPTACL.....                                 |                        | 1   |
| 14          | PADDD    | 54296 | 994516-10              | CIRCUIT CARD ASSEMB (SEE FIGURE B-14 FOR BREAKDOWN)..... |                        | 1   |
| 15          | PADZZ    | 54296 | 125-0237-001           | SWITCH,PUSH.....   |                        | 3   |
| 16          | PADZZ    | 54296 | 810228-00              | SCREW,ASSEMBLED WAS.....                                 |                        | 3   |

END OF FIGURE

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Precede all reference designators with A1A16

Figure B-14. A16 Front Panel Board Assembly (Sheet 1 of 2)

DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 1          | C31        | 4          | J2         | 13         | R10        | 24         | R34        | 32         | S2         | 39         |
| C2         | 2          | C32        | 4          | J3         | 14         | R11        | 25         | R35        | 22         | S3         | 40         |
| C3         | 1          | CR1        | 6          | L1         | 15         | R12        | 26         | R36        | 33         | TP1        | 41         |
| C4         | 2          | CR2        | 6          | P1         | 16         | R16        | 27         | R37        | 34         | TP2        | 41         |
| C5         | 3          | CR3        | 6          | Q1         | 17         | R17        | 27         | R38        | 20         | U1         | 42         |
| C6         | 4          | CR4        | 7          | Q2         | 18         | R18        | 27         | R39        | 20         | U2         | 43         |
| C7         | 1          | CR5        | 6          | R1         | 19         | R19        | 27         | R40        | 29         | U3         | 44         |
| C8         | 1          | CR6        | 8          | R2         | 20         | R20        | 28         | R41        | 35         | U4         | 45         |
| C12        | 5          | DS1        | 9          | R3         | 20         | R30        | 29         | RN1        | 36         | VR1        | 46         |
| C13        | 2          | F1         | 10         | R4         | 21         | R31        | 30         | RN3        | 37         |            |            |
| C14        | 4          | F2         | 11         | R5         | 22         | R32        | 31         | RN4        | 37         |            |            |
| C30        | 5          | J1         | 12         | R6         | 23         | R33        | 31         | S1         | 38         |            |            |

Precede all reference designators with A1A16

Figure B-14. A16 Front Panel Board Assembly (Sheet 2 of 2)



SECTION II DR11-5820-1102 (5) (6)  
 (1) (2) (3) (4)  
 ITEM SMR CAGEC PART  
 NO CODE CAGEC NUMBER DESCRIPTION AND USABLE ON CODES(UOC) QTY  
 GROUP 0101041201 FRONT PANEL BOARD  
 ASSEMBLY, A16

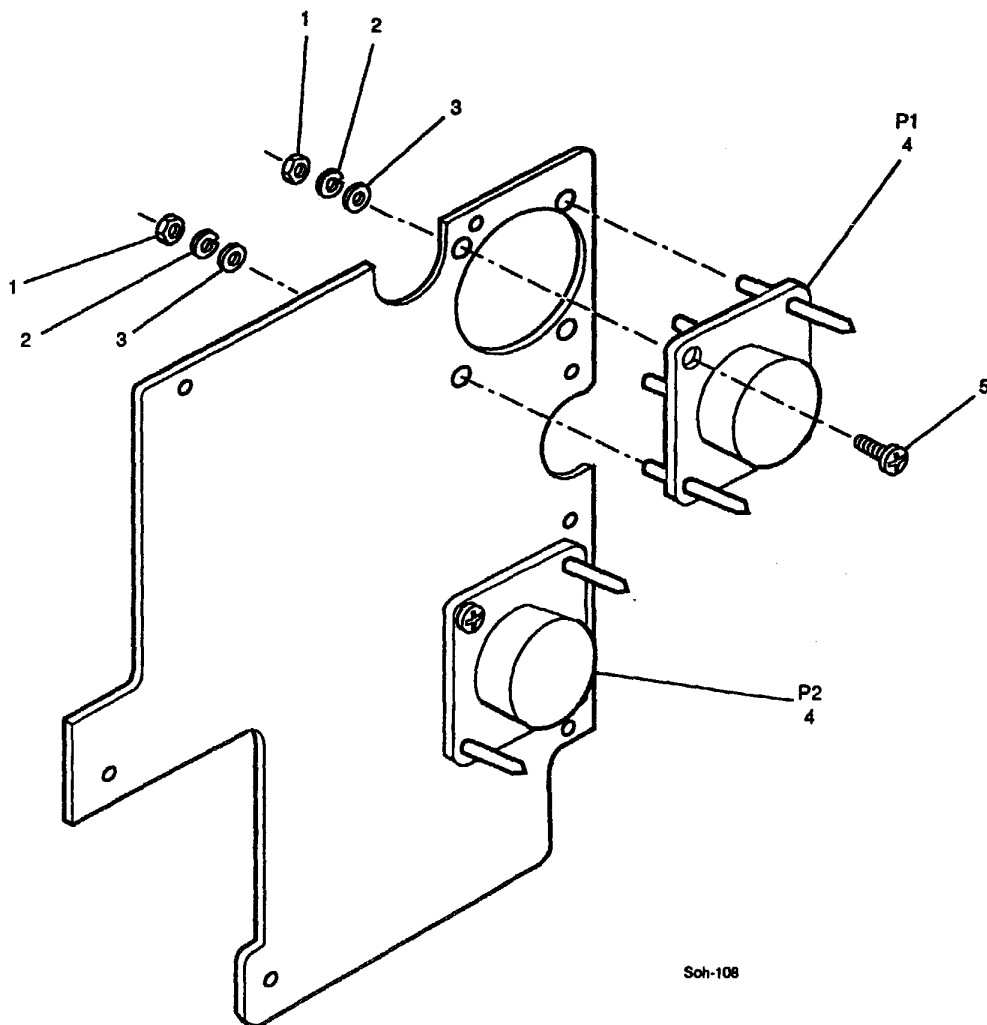
FIGURE B-14

|    |       |       |                 |                        |   |
|----|-------|-------|-----------------|------------------------|---|
| 1  | PADZZ | 81349 | M39014/23-0356  | CAPACITOR, FIXED, CER. | 4 |
| 2  | PADZZ | 54296 | 151529-00       | CAPACITOR, FIXED, ELE. | 3 |
| 3  | PADZZ | 31433 | T322F107K020AS  | CAPACITOR, FIXED, ELE. | 1 |
| 4  | PADZZ | 81349 | M39014/23-0373  | CAPACITOR, FIXED, CER. | 4 |
| 5  | PADZZ | 31433 | T390A105M025AS  | CAPACITOR, FIXED.      | 2 |
| 6  | PADZZ | 81349 | JANTX1N4148-1   | SEMICONDUCTOR DEVIC.   | 4 |
| 7  | PADZZ | 81349 | JANTX1N4245     | SEMICONDUCTOR DEVIC.   | 1 |
| 8  | PADZZ | 80131 | 1N4156          | SEMICONDUCTOR DEVIC.   | 1 |
| 9  | PADZZ | 96214 | 803415-3        | LIGHT EMITTING DIOD.   | 1 |
| 10 | PADZZ | 81349 | FM04A125V1/4A   | FUSE, CARTRIDGE.       | 1 |
| 11 | PADZZ | 06994 | 4301001-2R000   | FUSE, SPECIAL.         | 1 |
| 12 | PADZZ | 8J953 | SS009-04TG      | CONNECTOR, RECEPTACL.  | 1 |
| 13 | PADZZ | 8J953 | SS002-04TG      | CONNECTOR, RECEPTACL.  | 1 |
| 14 | PADZZ | 8J953 | SS006-04TG      | CONNECTOR, RECEPTACL.  | 1 |
| 15 | PADZZ | 91637 | IM2-100UH 10%   | COIL, RADIO FREQUENC.  | 1 |
| 16 | PADZZ | 97913 | HGM030MEA2Y00A  | CONNECTOR, RECEPTACL.  | 1 |
| 17 | PADZA | 81349 | JANTX2N2222A    | TRANSISTOR.            | 1 |
| 18 | PADZA | 80131 | 2N6426          | TRANSISTOR.            | 1 |
| 19 | PADZZ | 81349 | RLR05C1000GS    | RESISTOR, FIXED, FILM. | 1 |
| 20 | PADZZ | 81349 | RLR05C1002GS    | RESISTOR, FIXED, FILM. | 4 |
| 21 | PADZZ | 81349 | RLR05C2001GS    | RESISTOR, FIXED, FILM. | 1 |
| 22 | PADZZ | 81349 | RLR05C1001GS    | RESISTOR, FIXED, FILM. | 2 |
| 23 | PADZZ | 91637 | CMF55-4R300F-T0 | RESISTOR, FIXED, FILM. | 1 |
| 24 | PADZZ | 81349 | RLR05C4302GS    | RESISTOR, FIXED, FILM. | 1 |
| 25 | PADZA | 80031 | RN55C1003F      | RESISTOR, FIXED, FILM. | 1 |
| 26 | PADZZ | 81349 | RNC55H6192FS    | RESISTOR, FIXED, FILM. | 1 |
| 27 | PADZZ | 81349 | RJR26FX502R     | RESISTOR, VARIABLE.    | 4 |
| 28 | PADZZ | 81349 | RLR05C2701GS    | RESISTOR, FIXED, FILM. | 1 |
| 29 | PADZZ | 81349 | RLR05C2202GS    | RESISTOR, FIXED, FILM. | 2 |
| 30 | PADZZ | 81349 | RLR05C5601GS    | RESISTOR, FIXED, FILM. | 1 |
| 31 | PADZZ | 81349 | RLR05C3901GS    | RESISTOR, FIXED, FILM. | 2 |
| 32 | PADZZ | 81349 | RCR05G362JS     | RESISTOR, FIXED, COMP. | 1 |
| 33 | PADZZ | 81349 | RLR05C6800GS    | RESISTOR, FIXED, FILM. | 1 |
| 34 | PADZZ | 81349 | RLR05C6201GS    | RESISTOR, FIXED, FILM. | 1 |
| 35 | PADZZ | 81349 | RLR05C5101GS    | RESISTOR, FIXED, FILM. | 1 |
| 36 | PADZZ | 81349 | M8340109K1002FC | RESISTOR NETWORK, FI.  | 1 |
| 37 | PADZZ | 81349 | M8340105K1002GC | RESISTOR NETWORK, FI.  | 2 |
| 38 | PADZZ | 81073 | 51MY23766       | SWITCH, ROTARY.        | 1 |
| 39 | PADZZ | 81073 | 50MY24360       | SWITCH, ROTARY.        | 1 |
| 40 | PADZZ | 81073 | 51MY23767       | SWITCH, ROTARY.        | 1 |
| 41 | PADZA | 88245 | 10-861-2-03     | TERMINAL, STUD.        | 2 |
| 42 | PADZZ | 54296 | 102-0694-001    | MICROCIRCUIT, MEMORY.  | 1 |
| 43 | PADZZ | 04713 | MC74HC4538N     | MICROCIRCUIT, DIGITA.  | 1 |
| 44 | PADZZ | 27014 | LM258J          | MICROCIRCUIT, LINEAR.  | 1 |
| 45 | PADZZ | 14933 | 7705601CB       | MICROCIRCUIT, DIGITA.  | 1 |
| 46 | PADZZ | 27014 | LM340LAZ-5.0    | MICROCIRCUIT, LINEAR.  | 1 |

| SECTION II |          |       | DR11-5820-1102   |                                      |     |
|------------|----------|-------|------------------|--------------------------------------|-----|
| (1)        | (2)      | (3)   | (4)              | (5)                                  | (6) |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER      | DESCRIPTION AND USABLE ON CODES(UOC) | QTY |
| 47         | PADZA    | 55322 | ICO-640-NGT      | SOCKET, PLUG-IN ELEC.....            | 1   |
| 48         | PADZZ    | 13103 | 7717-16DAP       | MOUNTING PAD, ELECTR.....            | 1   |
| 49         | PADZZ    | 98291 | 229-3070-00-0-47 | TERMINAL, STUD.....                  | 4   |
|            |          |       | 0                |                                      |     |

END OF FIGURE

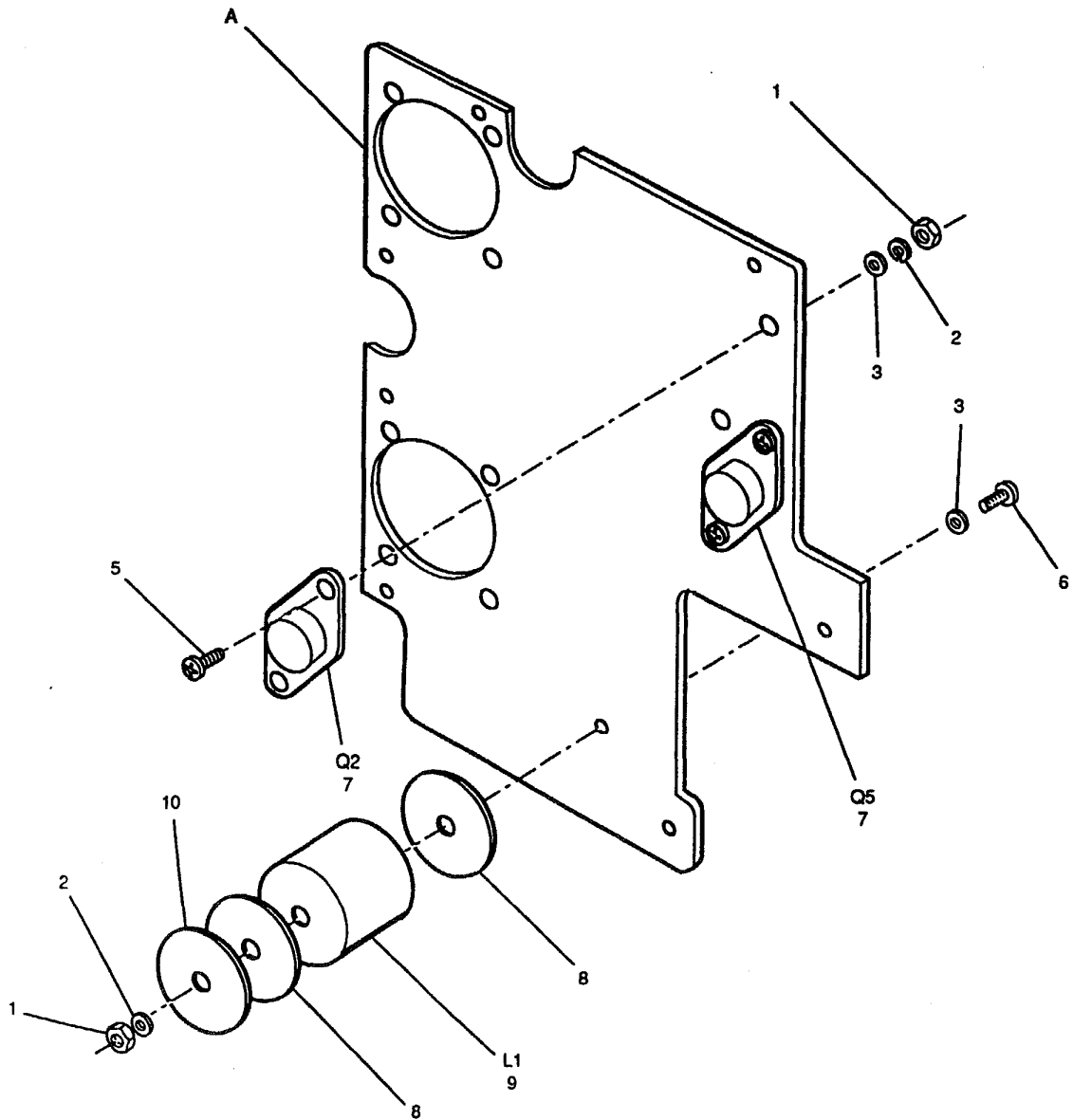
DMWR-11-5820-1102



Precede all reference designators with A2A1A1

Figure B-15. CY PC Subassembly (Sheet 1 of 4)

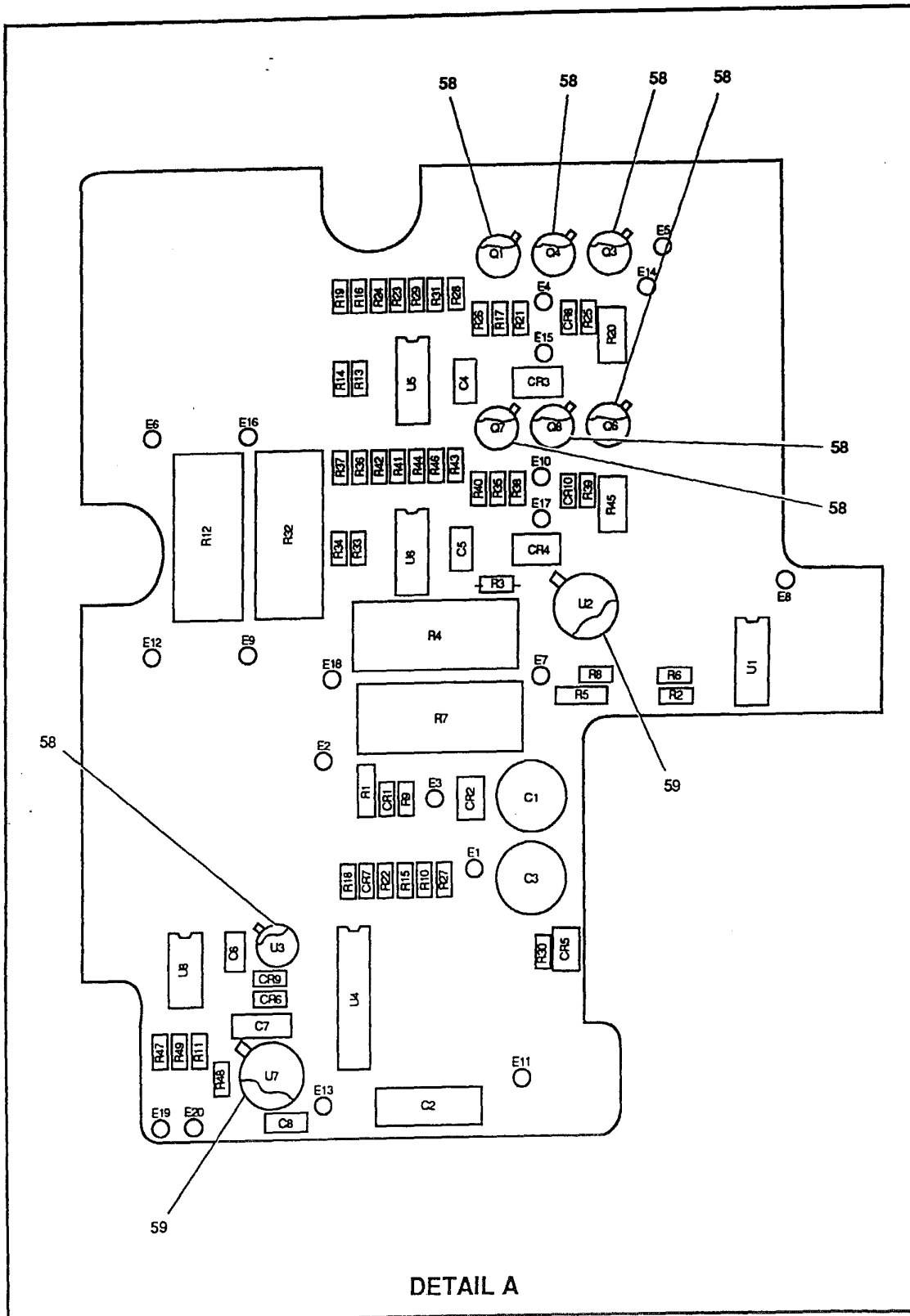
DMWR-11-5820-1102



Sch-109

Precede all reference designators with A2A1A1

Figure B-15. CY PC Subassembly (Sheet 2 of 4)



DETAIL A

Precede all reference designators with A2A1A1

Figure B-15. CY PC Subassembly (Sheet 3 of 4)

DMWR-11-5820-1102

LEGEND

| REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO | REF<br>DES | ITEM<br>NO |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| C1         | 11         | E1         | 21         | E19        | 21         | R6         | 30         | R24        | 45         | R42        | 45         |
| C2         | 12         | E2         | 21         | E20        | 21         | R7         | 28         | R25        | 34         | R43        | 48         |
| C3         | 13         | E3         | 21         | L1         | 9          | R8         | 31         | R26        | 46         | R44        | 41         |
| C4         | 14         | E4         | 21         | P1         | 4          | R9         | 32         | R27        | 47         | R45        | 42         |
| C5         | 14         | E5         | 21         | P2         | 4          | R10        | 33         | R28        | 48         | R46        | 50         |
| C6         | 14         | E6         | 22         | Q1         | 23         | R11        | 34         | R29        | 41         | R47        | 51         |
| C7         | 15         | E7         | 21         | Q2         | 7          | R12        | 35         | R30        | 49         | R48        | 26         |
| C8         | 16         | E8         | 21         | Q3         | 24         | R13        | 36         | R31        | 50         | R49        | 41         |
| CR1        | 17         | E9         | 22         | Q4         | 23         | R14        | 37         | R32        | 35         | U1         | 52         |
| CR2        | 18         | E10        | 21         | Q5         | 7          | R15        | 38         | R33        | 36         | U2         | 53         |
| CR3        | 19         | E11        | 21         | Q6         | 24         | R16        | 39         | R34        | 37         | U3         | 54         |
| CR4        | 19         | E12        | 22         | Q7         | 23         | R17        | 40         | R35        | 40         | U4         | 55         |
| CR5        | 20         | E13        | 21         | Q8         | 23         | R18        | 41         | R36        | 39         | U5         | 56         |
| CR6        | 17         | E14        | 21         | R1         | 25         | R19        | 39         | R37        | 39         | U6         | 56         |
| CR7        | 17         | E15        | 21         | R2         | 26         | R20        | 42         | R38        | 30         | U7         | 57         |
| CR8        | 17         | E16        | 21         | R3         | 27         | R21        | 30         | R39        | 34         | U8         | 56         |
| CR9        | 17         | E17        | 21         | R4         | 28         | R22        | 43         | R40        | 46         |            |            |
| CR10       | 17         | E18        | 21         | R5         | 29         | R23        | 44         | R41        | 44         |            |            |

Precede all reference designators with A2A1A1

SECTION II DR11-5820-1102 (5) (6)

(1) (2) (3) (4)

ITEM SMR CAGEC PART

NO CODE CAGEC NUMBER DESCRIPTION AND USABLE ON CODES(UOC) QTY

GROUP 020201 CY PC SUBASSEMBLY

FIGURE B-15

|    |       |       |                 |                            |    |
|----|-------|-------|-----------------|----------------------------|----|
| 1  | PADZZ | 78189 | NAS671C4        | NUT, PLAIN, HEXAGON.....   | 13 |
| 2  | PADZZ | 96906 | MS35338-135     | WASHER, LOCK.....          | 13 |
| 3  | PADZZ | 80205 | NAS620C4        | WASHER, FLAT.....          | 13 |
| 4  | PADZA | 20183 | 93534-1         | CONNECTOR, RECEPTACL.....  | 2  |
| 5  | PADZZ | 96906 | MS51957-14      | SCREW, MACHINE.....        | 8  |
| 6  | PADZZ | 96906 | MS51957-20      | SCREW, MACHINE.....        | 1  |
| 7  | PADZZ | 81349 | JAN2N6352       | TRANSISTOR.....            | 2  |
| 8  | PADZZ | 80063 | A3155290        | MOUNTING PAD, ELECTR.....  | 2  |
| 9  | PADZZ | 80063 | A3155289        | REACTOR.....               | 1  |
| 10 | PADZZ | 80063 | A3155291        | WASHER, FLAT.....          | 1  |
| 11 | PADZZ | 81349 | CX02N226K       | CAPACITOR, FIXED, ELE..... | 1  |
| 12 | PADZZ | 81349 | M39003/01-8108  | CAPACITOR, FIXED, ELE..... | 1  |
| 13 | PADZZ | 81349 | CX02M476K       | CAPACITOR, FIXED, ELE..... | 1  |
| 14 | PADZZ | 81349 | M39014/23-0056  | CAPACITOR, FIXED, CER..... | 3  |
| 15 | PADZZ | 81349 | M39014/02-1419  | CAPACITOR, FIXED, CER..... | 1  |
| 16 | PADZZ | 81349 | M39014/23-0338  | CAPACITOR, FIXED.....      | 1  |
| 17 | PADZZ | 81349 | JANTX1N4148-1   | SEMICONDUCTOR DEVIC.....   | 6  |
| 18 | PADZZ | 81349 | JAN1N6077       | SEMICONDUCTOR DEVIC.....   | 1  |
| 19 | PADZZ | 81349 | JAN1N5415       | SEMICONDUCTOR DEVIC.....   | 2  |
| 20 | PADZZ | 81349 | JAN1N5809       | SEMICONDUCTOR DEVIC.....   | 1  |
| 21 | PADZZ | 81349 | M55155/30-5     | TERMINAL, STUD.....        | 17 |
| 22 | PADZZ | 81349 | SE12XC07        | TERMINAL, STUD.....        | 3  |
| 23 | PADZZ | 81349 | JAN2N2605       | TRANSISTOR.....            | 4  |
| 24 | PADZA | 81349 | JANTX2N2222A    | TRANSISTOR.....            | 2  |
| 25 | PADZZ | 81349 | RLR07C56R2FS    | RESISTOR, FIXED, FILM..... | 1  |
| 26 | PADZZ | 81349 | RLR05C2001GS    | RESISTOR, FIXED, FILM..... | 2  |
| 27 | XBDZZ | 81349 | RLR05C8062FS    | RESISTOR, FIXED, FILM..... | 1  |
| 28 | PADZZ | 81349 | RWR74S49R9FS    | RESISTOR, FIXED, WIRE..... | 2  |
| 29 | PADZZ | 81349 | RLR07C4021FS    | RESISTOR, FIXED, FILM..... | 1  |
| 30 | PADZZ | 81349 | RLR05C1004GM    | RESISTOR, FIXED.....       | 3  |
| 31 | PADZZ | 81349 | RLR05C4021FS    | RESISTOR, FIXED, FILM..... | 1  |
| 32 | XBDZZ | 81349 | RLR05C5622FS    | RESISTOR, FIXED, FILM..... | 1  |
| 33 | PADZZ | 81349 | RLR05C9311FS    | RESISTOR, FIXED, FILM..... | 1  |
| 34 | PADZZ | 81349 | RLR05C1002GS    | RESISTOR, FIXED, FILM..... | 3  |
| 35 | PADZZ | 81349 | M4946507TR0100F | RESISTOR, FIXED, FILM..... | 2  |
| 36 | PADZZ | 81349 | RNC50J3402BS    | RESISTOR, FIXED, FILM..... | 2  |
| 37 | PADZZ | 81349 | RNC50J3922BS    | RESISTOR, FIXED, FILM..... | 2  |
| 38 | PADZZ | 81349 | RLR05C2370FS    | RESISTOR, FIXED, FILM..... | 1  |
| 39 | PADZZ | 81349 | RNC50J9762BS    | RESISTOR, FIXED, FILM..... | 4  |
| 40 | PADZZ | 81349 | RLR05C8203GS    | RESISTOR, FIXED, FILM..... | 2  |
| 41 | PADZZ | 81349 | RLR05C1003FS    | RESISTOR, FIXED, FILM..... | 4  |
| 42 | PADZZ | 81349 | RWR81SR499FS    | RESISTOR, FIXED, WIRE..... | 2  |
| 43 | PADZZ | 81349 | RLR05C2492FS    | RESISTOR, FIXED, FILM..... | 1  |
| 44 | PADZZ | 81349 | RLR05C1503GS    | RESISTOR, FIXED, FILM..... | 2  |
| 45 | PADZZ | 81349 | RNC50J2433BS    | RESISTOR, FIXED, FILM..... | 2  |
| 46 | PADZZ | 81349 | RLR05C7503GS    | RESISTOR, FIXED, FILM..... | 2  |
| 47 | PADZZ | 81349 | RLR05C7502FS    | RESISTOR, FIXED, FILM..... | 1  |

| SECTION II |          |       | DR11-5820-1102 |   |     |  |
|------------|----------|-------|----------------|---|-----|--|
| (1)        | (2)      | (3)   | (4)            | (5)   | (6) |  |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER    | DESCRIPTION AND USABLE ON CODES(UOC)        | QTY |  |
| 48         | PADZZ    | 81349 | RNC50J1723BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1743FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1763BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZA    | 81349 | RNC50J1783FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1803BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1823FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1843BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1873FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1893BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZA    | 81349 | RNC50J1913FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1933BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1963FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J1983DS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2033BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZA    | 81349 | RNC50J2053FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2083BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2103FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2133BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2153FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2183BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2213FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2233BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2263FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2293BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2323FS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |
| 48         | PADZZ    | 81349 | RNC50J2343BS   | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |  |



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| SECTION II |          |       |                 | DR11-5820-1102 |   |     |
|------------|----------|-------|-----------------|----------------|---|-----|
| (1)        | (2)      | (3)   | (4)             |                | (5)   | (6) |
| ITEM NO    | SMR CODE | CAGEC | PART NUMBER     |                | DESCRIPTION AND USABLE ON CODES(UOC)        | QTY |
| 48         | PADZZ    | 81349 | RNC50J2373BS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2403DS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2433FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2463BS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2493FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2523BS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2553FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2583DS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2613FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2643DS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2673FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2713DS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 48         | PADZZ    | 81349 | RNC50J2743FS    |                | RESISTOR, FIXED, FILM (SELECT AT TEST)..... | 2   |
| 49         | PADZZ    | 81349 | RLR05C3481FS    |                | RESISTOR, FIXED, FILM.....                  | 1   |
| 50         | PADZZ    | 81349 | RLR05C1332FS    |                | RESISTOR, FIXED, FILM.....                  | 2   |
| 51         | PADZZ    | 81349 | RLR05G106JP     |                | RESISTOR, FIXED.....                        | 1   |
| 52         | PADZZ    | 81349 | M38510/10304BPA |                | MICROCIRCUIT, LINEAR.....                   | 1   |
| 53         | PADZZ    | 81349 | M38510/10704BXA |                | MICROCIRCUIT, LINEAR.....                   | 1   |
| 54         | PADZA    | 64155 | LM134H/883      |                | MICROCIRCUIT, LINEAR.....                   | 1   |
| 55         | PADZZ    | 81349 | M38510/11005BCA |                | MICROCIRCUIT, LINEAR.....                   | 1   |
| 56         | PADZZ    | 67268 | 5962-8771002PA  |                | MICROCIRCUIT, LINEAR.....                   | 3   |
| 57         | PADZZ    | 67268 | 5962-8876202GA  |                | MICROCIRCUIT, LINEAR.....                   | 1   |
| 58         | PADZZ    | 81349 | M38527/01-035N  |                | MOUNTING PAD, ELECTR.....                   | 7   |
| 59         | PADZZ    | 81349 | M38527/07-001N  |                | MOUNTING PAD, ELECTR.....                   | 2   |

END OF FIGURE

## SECTION IV

DR11-5820-1102

## CROSS-REFERENCE INDEXES

| STOCK NUMBER     | NATIONAL STOCK NUMBER INDEX | STOCK NUMBER     | FIG. | ITEM |
|------------------|-----------------------------|------------------|------|------|
| 5910-00-010-8717 | B-1 30                      | 5961-00-434-3022 | B-6  | 15   |
|                  | B-11 24                     |                  | B-7  | 39   |
| 5910-00-010-8721 | B-4 4                       |                  | B-8  | 30   |
|                  | B-8 16                      | 4140-00-442-3490 | B-7  | 38   |
|                  | B-15 15                     | 5905-00-451-7410 | B-14 | 26   |
| 5999-00-021-2118 | B-1 25                      | 5961-00-458-5813 | B-1  | 36   |
| 5950-00-031-4571 | B-5 25                      |                  | B-8  | 22   |
| 5950-00-035-4416 | B-3 19                      |                  | B-9  | 19   |
|                  | B-4 29                      |                  | B-10 | 19   |
| 5305-00-054-5636 | B-11 25                     |                  | B-14 | 7    |
| 5305-00-054-5647 | B-1 29                      | 5961-00-460-5007 | B-8  | 33   |
| 5305-00-054-5648 | B-1 9                       | 5905-00-479-6658 | B-14 | 32   |
|                  | B-15 5                      | 5961-00-483-4190 | B-15 | 19   |
| 5305-00-054-5654 | B-15 6                      | 5905-00-491-6344 | B-3  | 44   |
| 5310-00-057-0573 | B-15 3                      |                  | B-7  | 44   |
| 5940-00-082-5094 | B-15 21                     | 5305-00-494-7333 | B-11 | 2    |
| 5950-00-097-7570 | B-8 26                      | 5310-00-543-4652 | B-11 | 26   |
| 5935-00-103-1657 | B-1 24                      |                  | B-12 | 8    |
| 5905-00-104-5755 | B-1 44                      | 5961-00-584-4527 | B-2  | 6    |
| 5910-00-113-5278 | B-3 6                       |                  | B-3  | 15   |
| 5905-00-153-4354 | B-1 53                      |                  | B-4  | 20   |
| 5961-00-163-7231 | B-10 20                     |                  | B-5  | 19   |
| 5305-00-206-5334 | B-12 6                      |                  | B-6  | 6    |
| 5310-00-208-3786 | B-1 20                      |                  | B-7  | 23   |
|                  | B-15 1                      |                  | B-8  | 20   |
| 5950-00-211-3995 | B-4 30                      |                  | B-9  | 18   |
| 5962-00-248-5241 | B-8 65                      |                  | B-10 | 18   |
| 5935-00-249-1469 | B-11 4                      |                  | B-14 | 6    |
| 5905-00-264-3870 | B-1 50                      |                  | B-15 | 17   |
| 5975-00-284-6655 | B-13 12                     | 5330-00-585-1591 | B-1  | 15   |
| 5950-00-325-6462 | B-3 20                      | 5310-00-595-6211 | B-1  | 7    |
|                  | B-4 33                      |                  | B-1  | 16   |
|                  | B-8 28                      | 5310-00-595-6761 | B-1  | 28   |
| 5961-00-401-0507 | B-8 32                      |                  | B-11 | 5    |
| 5920-00-402-1721 | B-2 9                       | 5940-00-725-9498 | B-15 | 22   |
|                  | B-3 17                      | 5950-00-779-3452 | B-4  | 26   |
|                  | B-4 22                      | 5340-00-782-8737 | B-1  | 13   |
|                  | B-6 8                       | 5310-00-812-4294 | B-12 | 11   |
|                  | B-7 26                      | 5961-00-836-6663 | B-3  | 23   |
|                  | B-14 10                     |                  | B-4  | 35   |
| 5305-00-403-3502 | B-11 7                      | 5961-00-858-3826 | B-6  | 14   |
| 5950-00-412-4341 | B-4 28                      |                  | B-7  | 40   |
| 5905-00-413-0632 | B-14 25                     |                  | B-14 | 17   |
| 5905-00-413-1199 | B-5 43                      |                  | B-15 | 24   |
| 5905-00-419-7413 | B-1 49                      | 5999-00-878-4714 | B-11 | 1    |
| 5910-00-426-0330 | B-4 5                       | 5975-00-893-1928 | B-13 | 5    |
|                  | B-5 8                       | 5961-00-911-6104 | B-14 | 8    |
|                  | B-8 11                      | 5961-00-925-3777 | B-3  | 24   |
| 5950-00-431-3211 | B-1 37                      |                  | B-9  | 26   |
| 5961-00-434-3022 | B-5 28                      | 5961-00-932-9318 | B-15 | 23   |

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|------------------|------|-------------------------------------|------------------|------|------|
| 5310-00-933-8118 | B-15 | 2                                   | 5910-01-087-6360 | B-4  | 10   |
| 5905-00-935-8543 | B-1  | 51                                  |                  | B-7  | 3    |
| 5310-00-938-2013 | B-1  | 21                                  |                  | B-10 | 4    |
| 5865-00-984-1976 | B-12 | 4                                   | 5910-01-089-8731 | B-4  | 15   |
| 5935-01-011-5499 | B-11 | 21                                  |                  | B-7  | 4    |
| 5961-01-023-5750 | B-7  | 24                                  | 5910-01-089-9766 | B-4  | 18   |
|                  | B-8  | 21                                  | 5910-01-090-1530 | B-8  | 5    |
| 5310-01-023-6132 | B-1  | 23                                  | 5910-01-093-6316 | B-7  | 17   |
|                  | B-11 | 6                                   | 5910-01-093-6317 | B-8  | 7    |
|                  | B-12 | 10                                  | 5910-01-093-6324 | B-4  | 2    |
| 5305-01-029-0713 | B-13 | 9                                   | 5910-01-093-9498 | B-7  | 2    |
| 5910-01-029-0728 | B-3  | 11                                  | 5910-01-094-1397 | B-8  | 8    |
|                  | B-4  | 14                                  | 5905-01-097-1613 | B-15 | 42   |
|                  | B-8  | 15                                  | 5962-01-098-0251 | B-9  | 30   |
| 5910-01-031-9849 | B-4  | 12                                  |                  | B-10 | 41   |
|                  | B-8  | 10                                  | 5962-01-098-8192 | B-15 | 54   |
| 5910-01-031-9855 | B-8  | 12                                  | 5910-01-100-8108 | B-3  | 8    |
| 5910-01-031-9856 | B-8  | 4                                   |                  | B-5  | 11   |
| 5961-01-033-9368 | B-1  | 2                                   |                  | B-7  | 19   |
| 5961-01-037-0108 | B-15 | 7                                   |                  | B-8  | 6    |
| 5910-01-038-7892 | B-8  | 14                                  | 5962-01-110-3480 | B-7  | 69   |
| 5910-01-038-7894 | B-3  | 9                                   | 5962-01-115-7575 | B-15 | 53   |
| 5910-01-038-7900 | B-4  | 11                                  | 5905-01-115-8584 | B-14 | 37   |
| 5910-01-038-7907 | B-8  | 18                                  | 5910-01-118-9101 | B-5  | 16   |
| 5910-01-043-8882 | B-4  | 6                                   | 5910-01-118-9102 | B-4  | 16   |
|                  | B-7  | 16                                  |                  | B-5  | 2    |
| 5961-01-045-9170 | B-4  | 37                                  |                  | B-7  | 1    |
| 5905-01-049-3123 | B-1  | 48                                  |                  | B-8  | 2    |
| 5961-01-053-2794 | B-15 | 20                                  |                  | B-14 | 4    |
| 5905-01-053-5784 | B-1  | 42                                  | 5962-01-120-6421 | B-2  | 23   |
|                  | B-8  | 58                                  |                  | B-5  | 75   |
| 5961-01-055-4352 | B-15 | 18                                  |                  | B-10 | 39   |
| 5910-01-058-9574 | B-1  | 32                                  |                  | B-14 | 46   |
| 5905-01-067-4887 | B-15 | 48                                  | 5935-01-121-9427 | B-15 | 4    |
| 5961-01-068-2717 | B-14 | 18                                  | 5961-01-125-3746 | B-4  | 19   |
| 5905-01-069-6025 | B-15 | 48                                  | 5905-01-126-7996 | B-15 | 48   |
| 5910-01-077-0186 | B-3  | 2                                   | 5905-01-128-3403 | B-15 | 48   |
|                  | B-4  | 8                                   | 5905-01-129-2386 | B-5  | 66   |
|                  | B-5  | 15                                  | 5961-01-135-1334 | B-3  | 14   |
|                  | B-6  | 4                                   |                  | B-5  | 20   |
|                  | B-7  | 18                                  |                  | B-6  | 5    |
| 5910-01-080-0700 | B-5  | 18                                  |                  | B-7  | 22   |
| 5905-01-080-6285 | B-15 | 48                                  |                  | B-8  | 19   |
| 5980-01-081-9113 | B-2  | 7                                   | 5895-01-135-1852 | B-7  | 66   |
|                  | B-3  | 16                                  |                  | B-8  | 63   |
|                  | B-4  | 21                                  | 5910-01-138-7861 | B-15 | 13   |
|                  | B-9  | 20                                  | 5962-01-139-4098 | B-14 | 45   |
|                  | B-14 | 9                                   | 5905-01-142-2888 | B-8  | 52   |
| 5905-01-085-1164 | B-2  | 12                                  | 5910-01-142-8675 | B-2  | 2    |
| 5910-01-086-6356 | B-8  | 13                                  |                  | B-11 | 28   |

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| 5905-01-147-2331 | B-1  | 46                                  | 5905-01-173-4326 | B-15 | 37   |
| 5905-01-152-8934 | B-5  | 65                                  | 5905-01-173-8099 | B-6  | 16   |
| 5905-01-153-7449 | B-5  | 53                                  |                  | B-7  | 62   |
|                  | B-14 | 35                                  | 5905-01-173-8931 | B-3  | 26   |
| 5910-01-154-0845 | B-1  | 31                                  |                  | B-4  | 40   |
| 5940-01-155-4016 | B-1  | 22                                  |                  | B-5  | 49   |
| 5905-01-155-8627 | B-5  | 31                                  |                  | B-6  | 22   |
|                  | B-14 | 30                                  |                  | B-7  | 42   |
| 5962-01-156-7241 | B-1  | 57                                  |                  | B-8  | 37   |
| 5905-01-157-7790 | B-15 | 29                                  |                  | B-14 | 22   |
| 5935-01-158-0374 | B-13 | 11                                  | 5905-01-173-8932 | B-4  | 55   |
| 5905-01-158-2316 | B-1  | 45                                  |                  | B-6  | 26   |
| 5905-01-158-4989 | B-8  | 56                                  |                  | B-8  | 43   |
| 5999-01-158-7233 | B-7  | 65                                  | 5905-01-173-8933 | B-3  | 40   |
| 5905-01-158-8981 | B-4  | 52                                  |                  | B-4  | 45   |
|                  | B-5  | 48                                  |                  | B-7  | 60   |
|                  | B-8  | 45                                  |                  | B-14 | 31   |
|                  | B-14 | 28                                  | 5905-01-175-0703 | B-14 | 21   |
| 5905-01-159-0772 | B-3  | 41                                  |                  | B-15 | 26   |
|                  | B-4  | 43                                  | 5905-01-175-0705 | B-5  | 61   |
|                  | B-5  | 30                                  |                  | B-10 | 33   |
|                  | B-6  | 17                                  |                  | B-14 | 24   |
|                  | B-7  | 56                                  | 5905-01-175-0706 | B-3  | 31   |
|                  | B-8  | 40                                  |                  | B-8  | 54   |
|                  | B-14 | 19                                  | 5905-01-175-0707 | B-3  | 30   |
| 5905-01-159-0773 | B-5  | 38                                  |                  | B-5  | 34   |
|                  | B-7  | 63                                  |                  | B-6  | 21   |
| 5950-01-159-5785 | B-1  | 41                                  |                  | B-7  | 41   |
| 5905-01-162-0721 | B-8  | 55                                  | 5305-01-175-6939 | B-1  | 10   |
| 5905-01-163-3118 | B-15 | 47                                  | 5905-01-175-7857 | B-3  | 35   |
| 5905-01-165-5208 | B-4  | 41                                  |                  | B-9  | 29   |
|                  | B-6  | 19                                  | 5905-01-176-3858 | B-7  | 50   |
| 5910-01-165-5249 | B-5  | 14                                  | 5905-01-176-3870 | B-3  | 33   |
|                  | B-9  | 1                                   |                  | B-5  | 36   |
|                  | B-10 | 1                                   |                  | B-7  | 54   |
| 5905-01-165-8590 | B-8  | 53                                  |                  | B-8  | 39   |
| 5905-01-167-0069 | B-15 | 50                                  |                  | B-9  | 28   |
| 5905-01-167-5098 | B-5  | 64                                  |                  | B-10 | 36   |
|                  | B-8  | 57                                  | 5905-01-176-3872 | B-5  | 46   |
|                  | B-10 | 32                                  |                  | B-8  | 44   |
| 5905-01-169-0047 | B-15 | 41                                  |                  | B-10 | 30   |
| 5905-01-169-9933 | B-14 | 27                                  | 5905-01-176-3873 | B-2  | 13   |
| 5905-01-170-0388 | B-15 | 43                                  |                  | B-3  | 36   |
| 5905-01-170-9063 | B-4  | 48                                  |                  | B-4  | 46   |
|                  | B-5  | 35                                  |                  | B-5  | 45   |
|                  | B-14 | 34                                  |                  | B-6  | 18   |
| 5905-01-170-9082 | B-4  | 47                                  |                  | B-7  | 57   |
|                  | B-7  | 55                                  |                  | B-8  | 42   |
|                  | B-8  | 41                                  |                  | B-10 | 31   |
| 5905-01-170-9084 | B-5  | 58                                  |                  | B-14 | 20   |

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|                  | FIG.                        | ITEM         |                  |      |    |
| 5905-01-176-3873 | B-15                        | 34           | 5905-01-185-4114 | B-6  | 24 |
| 5905-01-176-3875 | B-4                         | 49           | 5905-01-185-5597 | B-7  | 49 |
|                  | B-5                         | 56           | 5905-01-186-3798 | B-5  | 32 |
|                  | B-6                         | 23           | 5905-01-186-3807 | B-4  | 51 |
| 5905-01-176-7123 | B-15                        | 28           |                  | B-5  | 51 |
| 5905-01-176-7328 | B-8                         | 49           |                  | B-7  | 46 |
| 5905-01-176-7338 | B-5                         | 59           |                  | B-14 | 33 |
| 5905-01-176-7347 | B-7                         | 52           | 5905-01-186-4902 | B-8  | 46 |
|                  | B-8                         | 36           | 5905-01-186-4929 | B-3  | 43 |
| 5905-01-176-7348 | B-9                         | 27           |                  | B-4  | 57 |
|                  | B-10                        | 28           | 5905-01-186-6767 | B-7  | 48 |
| 5905-01-176-7352 | B-3                         | 32           |                  | B-8  | 48 |
|                  | B-4                         | 44           | 5905-01-186-8261 | B-5  | 62 |
|                  | B-5                         | 60           | 5905-01-186-8263 | B-15 | 48 |
| 5905-01-176-7353 | B-4                         | 53           | 5305-01-186-8927 | B-13 | 1  |
|                  | B-5                         | 33           | 5910-01-187-1708 | B-5  | 3  |
|                  | B-6                         | 28           | 5999-01-188-4374 | B-1  | 58 |
|                  | B-7                         | 51           | 5905-01-188-6252 | B-15 | 48 |
| 5905-01-176-7355 | B-4                         | 58           | 5905-01-188-8105 | B-5  | 47 |
|                  | B-7                         | 64           | 5905-01-189-9181 | B-15 | 39 |
| 5905-01-176-7356 | B-3                         | 42           | 5905-01-189-9670 | B-4  | 59 |
|                  | B-4                         | 50           | 5970-01-190-5255 | B-1  | 26 |
| 5905-01-176-7358 | B-8                         | 47           | 5910-01-190-6678 | B-7  | 14 |
| 5905-01-176-9305 | B-7                         | 61           | 5962-01-191-1026 | B-3  | 55 |
| 5905-01-176-9307 | B-5                         | 50           |                  | B-4  | 63 |
| 5905-01-177-1078 | B-5                         | 42           | 5905-01-191-9611 | B-3  | 38 |
| 5905-01-177-1911 | B-3                         | 39           |                  | B-5  | 37 |
| 5905-01-177-4403 | B-4                         | 56           |                  | B-6  | 20 |
|                  | B-5                         | 44           |                  | B-14 | 29 |
| 5905-01-177-4405 | B-3                         | 37           | 5905-01-193-2357 | B-10 | 35 |
|                  | B-10                        | 34           | 5905-01-194-7241 | B-5  | 41 |
| 5905-01-177-9467 | B-3                         | 34           | 5905-01-195-7189 | B-3  | 29 |
|                  | B-7                         | 45           |                  | B-4  | 39 |
| 5905-01-179-1885 | B-15                        | 44           |                  | B-5  | 52 |
| 5905-01-179-4747 | B-15                        | 48           |                  | B-10 | 29 |
| 5905-01-179-7506 | B-8                         | 35           | 5905-01-198-2492 | B-14 | 36 |
| 5905-01-179-8489 | B-5                         | 57           | 5999-01-199-7477 | B-3  | 58 |
| 5905-01-179-9749 | B-5                         | 39           |                  | B-4  | 67 |
| 5905-01-181-3201 | B-15                        | 38           |                  | B-6  | 30 |
| 5935-01-181-6612 | B-1                         | 18           |                  | B-9  | 45 |
| 5905-01-181-9605 | B-15                        | 49           |                  | B-14 | 48 |
| 5905-01-182-4648 | B-8                         | 34           | 5905-01-202-5861 | B-3  | 27 |
| 5905-01-183-9163 | B-15                        | 25           |                  | B-4  | 42 |
| 5905-01-184-5231 | B-8                         | 50           |                  | B-6  | 27 |
| 5910-01-184-5316 | B-3                         | 4            |                  | B-7  | 53 |
| 5910-01-184-7936 | B-5                         | 13           |                  | B-8  | 51 |
|                  | B-7                         | 12           | 5905-01-202-6112 | B-15 | 48 |
| 5905-01-184-7954 | B-15                        | 31           | 5905-01-206-1181 | B-6  | 25 |
| 5905-01-185-0555 | B-5                         | 55           | 5910-01-208-9091 | B-7  | 13 |
| 5905-01-185-4114 | B-5                         | 54           | 5905-01-210-6305 | B-15 | 33 |

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| 5910-01-213-0761 | B-4                         | 7            | 5905-01-274-9018 | B-5  | 63 |
|                  | B-7                         | 15           | 5950-01-277-6051 | B-1  | 38 |
|                  | B-8                         | 17           |                  | B-5  | 24 |
| 5910-01-214-0376 | B-5                         | 10           | 5962-01-280-2203 | B-5  | 67 |
| 5910-01-217-8279 | B-9                         | 3            | 5961-01-282-0064 | B-4  | 36 |
| 5910-01-218-7756 | B-9                         | 5            | 5905-01-286-1514 | B-15 | 48 |
|                  | B-11                        | 27           | 5905-01-286-1517 | B-15 | 48 |
| 5962-01-223-7499 | B-10                        | 40           | 5905-01-286-2129 | B-15 | 48 |
| 5962-01-228-8376 | B-2                         | 14           | 5962-01-286-2241 | B-15 | 56 |
|                  | B-3                         | 47           | 5905-01-293-3944 | B-15 | 48 |
| 5910-01-229-7137 | B-3                         | 5            | 5962-01-294-1305 | B-4  | 66 |
|                  | B-4                         | 3            | 5905-01-297-6762 | B-15 | 46 |
|                  | B-5                         | 9            | 5980-01-305-7666 | B-5  | 21 |
|                  | B-8                         | 9            |                  | B-6  | 7  |
| 5910-01-230-0394 | B-15                        | 12           |                  | B-7  | 25 |
| 5905-01-233-1870 | B-4                         | 54           |                  | B-8  | 23 |
| 5962-01-234-0865 | B-5                         | 70           |                  | B-10 | 21 |
| 5962-01-237-1546 | B-4                         | 60           | 5905-01-306-5236 | B-15 | 48 |
| 5910-01-238-1395 | B-9                         | 4            | 5962-01-306-8886 | B-5  | 71 |
| 5962-01-238-5501 | B-15                        | 55           | 5920-01-309-5480 | B-8  | 24 |
| 5910-01-238-7741 | B-1                         | 35           | 5910-01-316-6685 | B-2  | 3  |
| 5962-01-240-5625 | B-2                         | 20           |                  | B-3  | 1  |
| 5950-01-240-8137 | B-4                         | 27           |                  | B-4  | 1  |
|                  | B-6                         | 12           |                  | B-5  | 5  |
| 5905-01-240-9165 | B-5                         | 40           |                  | B-6  | 1  |
|                  | B-8                         | 38           |                  | B-7  | 7  |
|                  | B-15                        | 40           |                  | B-8  | 3  |
| 5920-01-244-4238 | B-9                         | 21           |                  | B-9  | 2  |
| 5950-01-252-0963 | B-3                         | 21           |                  | B-10 | 2  |
|                  | B-4                         | 32           |                  | B-14 | 1  |
| 5910-01-253-6210 | B-3                         | 12           | 5910-01-316-6686 | B-3  | 13 |
| 5905-01-256-1370 | B-15                        | 48           |                  | B-6  | 2  |
| 5905-01-256-1377 | B-15                        | 36           | 5920-01-318-9440 | B-5  | 22 |
| 5910-01-256-9638 | B-15                        | 11           |                  | B-10 | 22 |
| 5910-01-257-0422 | B-3                         | 10           |                  | B-14 | 11 |
| 5905-01-259-1926 | B-15                        | 48           | 5962-01-319-4588 | B-3  | 50 |
| 5905-01-259-1928 | B-15                        | 48           |                  | B-4  | 61 |
| 5905-01-259-3515 | B-7                         | 58           | 5962-01-321-0129 | B-15 | 52 |
| 5962-01-265-2532 | B-3                         | 49           | 5962-01-327-6566 | B-2  | 22 |
|                  | B-4                         | 62           | 5310-01-328-7732 | B-1  | 12 |
| 5962-01-267-7055 | B-5                         | 69           | 5905-01-329-9377 | B-15 | 45 |
|                  | B-7                         | 68           | 5905-01-330-3463 | B-15 | 48 |
|                  | B-10                        | 38           | 5905-01-334-4635 | B-15 | 48 |
|                  | B-14                        | 44           | 5962-01-334-8150 | B-15 | 57 |
| 5999-01-268-1412 | B-15                        | 59           | 5962-01-336-2496 | B-14 | 43 |
| 5905-01-271-8187 | B-15                        | 48           | 5905-01-336-5252 | B-15 | 48 |
| 5962-01-272-4446 | B-2                         | 21           | 5905-01-336-5254 | B-15 | 48 |
|                  | B-3                         | 48           | 5905-01-336-5255 | B-15 | 48 |
| 5945-01-273-2979 | B-9                         | 23           | 5905-01-336-5256 | B-15 | 48 |
| 5961-01-274-7544 | B-5                         | 29           | 5905-01-336-5257 | B-15 | 48 |

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| 5905-01-336-5260 | B-15                        | 48           | 5999-01-367-9306 | B-1  | 1  |
| 5905-01-336-5262 | B-15                        | 48           | 5930-01-367-9338 | B-14 | 39 |
| 5905-01-336-5267 | B-15                        | 48           | 5930-01-367-9340 | B-14 | 38 |
| 5905-01-336-6265 | B-15                        | 48           | 5930-01-367-9341 | B-14 | 40 |
| 5905-01-336-9448 | B-15                        | 48           | 5955-01-367-9432 | B-3  | 46 |
| 5905-01-336-9449 | B-15                        | 48           | 5998-01-367-9441 | B-11 | 29 |
| 5305-01-339-3298 | B-13                        | 8            | 5970-01-367-9577 | B-1  | 27 |
| 5998-01-356-7017 | B-13                        | 14           | 5970-01-367-9578 | B-1  | 5  |
| 5962-01-364-7953 | B-3                         | 51           | 5970-01-367-9579 | B-12 | 2  |
| 5905-01-366-0802 | B-15                        | 48           | 9330-01-368-1294 | B-13 | 3  |
| 5905-01-366-0803 | B-15                        | 48           | 5945-01-368-2572 | B-10 | 24 |
| 5905-01-366-1094 | B-15                        | 48           | 5930-01-368-2598 | B-1  | 4  |
| 5905-01-366-1095 | B-15                        | 48           | 5945-01-368-3073 | B-9  | 24 |
| 5905-01-366-1096 | B-15                        | 48           |                  | B-10 | 25 |
| 5905-01-366-1097 | B-15                        | 48           | 5962-01-368-3222 | B-2  | 15 |
| 5905-01-366-1098 | B-15                        | 48           | 5962-01-368-3224 | B-2  | 18 |
| 5905-01-366-1099 | B-15                        | 35           | 5962-01-368-3225 | B-2  | 19 |
| 5310-01-366-8142 | B-15                        | 10           | 5910-01-368-3713 | B-9  | 9  |
| 5310-01-366-8144 | B-1                         | 8            | 5910-01-368-3714 | B-9  | 10 |
| 5340-01-367-4951 | B-13                        | 10           | 5910-01-368-3715 | B-5  | 1  |
| 5310-01-367-6214 | B-12                        | 9            |                  | B-7  | 5  |
| 5330-01-367-6384 | B-1                         | 14           | 5999-01-368-3737 | B-15 | 8  |
|                  | B-13                        | 7            | 5915-01-368-5143 | B-4  | 25 |
| 5305-01-367-6748 | B-13                        | 16           | 5915-01-368-5144 | B-6  | 10 |
| 5910-01-367-7888 | B-5                         | 12           | 5915-01-368-5145 | B-6  | 11 |
| 5910-01-367-7889 | B-7                         | 11           | 5915-01-368-5146 | B-7  | 70 |
| 5910-01-367-7890 | B-7                         | 20           | 5961-01-368-5228 | B-1  | 3  |
| 5910-01-367-7891 | B-7                         | 21           | 5961-01-368-5229 | B-3  | 25 |
| 5930-01-367-8007 | B-13                        | 15           |                  | B-4  | 38 |
| 5962-01-367-8167 | B-3                         | 53           |                  | B-7  | 37 |
| 5962-01-367-8168 | B-4                         | 65           |                  | B-8  | 31 |
|                  | B-5                         | 68           | 5961-01-368-5230 | B-7  | 36 |
|                  | B-7                         | 67           | 5962-01-368-5344 | B-2  | 16 |
| 5962-01-367-8169 | B-5                         | 74           | 5961-01-368-5396 | B-1  | 6  |
| 5962-01-367-8186 | B-14                        | 42           | 5910-01-368-7322 | B-10 | 12 |
| 5905-01-367-8634 | B-15                        | 48           | 5910-01-368-7323 | B-10 | 3  |
| 5905-01-367-8636 | B-14                        | 23           |                  | B-10 | 17 |
| 5999-01-367-8709 | B-9                         | 44           | 5910-01-368-7324 | B-10 | 15 |
|                  | B-10                        | 52           | 5910-01-368-7327 | B-14 | 3  |
| 5962-01-367-8858 | B-3                         | 54           | 5935-01-368-7340 | B-13 | 13 |
|                  | B-4                         | 64           | 5950-01-368-7350 | B-9  | 32 |
|                  | B-5                         | 73           | 5950-01-368-7351 | B-10 | 43 |
| 5962-01-367-8859 | B-3                         | 52           | 5910-01-368-8059 | B-10 | 14 |
| 5962-01-367-8860 | B-5                         | 72           | 5910-01-368-8060 | B-10 | 13 |
| 5962-01-367-8861 | B-8                         | 64           | 5910-01-368-8061 | B-10 | 10 |
| 6695-01-367-8928 | B-13                        | 2            | 5910-01-368-8062 | B-10 | 16 |
| 5998-01-367-9190 | B-12                        | 1            | 5935-01-368-8072 | B-14 | 47 |
| 5305-01-367-9268 | B-1                         | 17           | 5935-01-368-8525 | B-11 | 22 |
| 5330-01-367-9298 | B-13                        | 4            | 5310-01-368-8669 | B-11 | 3  |
| 5998-01-367-9305 | B-12                        | 5            | 5910-01-368-8780 | B-10 | 6  |

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| 5910-01-368-8782 | B-10                        | 8    | 5950-01-368-8922 | B-10      | 49   |
| 5910-01-368-8783 | B-10                        | 9    | 5950-01-368-8923 | B-10      | 50   |
| 5910-01-368-8784 | B-9                         | 17   | 5950-01-368-8924 | B-10      | 48   |
| 5910-01-368-8785 | B-9                         | 14   | 5950-01-368-8925 | B-10      | 45   |
|                  | B-10                        | 7    | 5950-01-368-8927 | B-1       | 39   |
| 5910-01-368-8786 | B-9                         | 11   | 5950-01-368-8928 | B-1       | 40   |
| 5910-01-368-8787 | B-9                         | 13   | 5950-01-368-8929 | B-3       | 56   |
| 5910-01-368-8788 | B-9                         | 7    | 5950-01-368-8930 | B-3       | 57   |
| 5910-01-368-8789 | B-9                         | 8    | 5950-01-368-8931 | B-5       | 26   |
| 5910-01-368-8790 | B-9                         | 12   |                  | B-7       | 34   |
| 5910-01-368-8791 | B-9                         | 15   | 5950-01-368-8932 | B-5       | 23   |
| 5910-01-368-8792 | B-9                         | 16   |                  | B-7       | 32   |
| 5910-01-368-8795 | B-3                         | 7    | 5950-01-368-8933 | B-7       | 33   |
| 5910-01-368-8796 | B-5                         | 6    | 5950-01-368-8934 | B-7       | 29   |
| 5910-01-368-8803 | B-7                         | 8    | 5950-01-368-8935 | B-7       | 30   |
| 5910-01-368-8805 | B-1                         | 34   | 5950-01-368-8936 | B-8       | 27   |
| 5910-01-368-8806 | B-1                         | 33   | 5950-01-368-8937 | B-8       | 25   |
| 5910-01-368-8807 | B-2                         | 5    | 5950-01-368-8938 | B-1       | 55   |
|                  | B-14                        | 2    | 5950-01-368-8939 | B-8       | 61   |
| 5910-01-368-8808 | B-5                         | 7    | 5910-01-368-8993 | B-4       | 13   |
| 5935-01-368-8821 | B-2                         | 24   | 5910-01-368-8994 | B-7       | 9    |
| 5950-01-368-8890 | B-1                         | 54   | 5935-01-368-9006 | B-11      | 23   |
| 5950-01-368-8892 | B-1                         | 56   | 5950-01-368-9048 | B-4       | 24   |
| 5950-01-368-8894 | B-3                         | 45   |                  | B-7       | 27   |
| 5950-01-368-8895 | B-8                         | 60   | 5940-01-368-9583 | B-14      | 41   |
| 5950-01-368-8896 | B-8                         | 59   | 5950-01-368-9668 | B-8       | 73   |
| 5950-01-368-8897 | B-8                         | 62   | 5950-01-368-9669 | B-8       | 66   |
| 5950-01-368-8899 | B-7                         | 71   | 5950-01-368-9670 | B-8       | 67   |
| 5950-01-368-8900 | B-7                         | 72   | 5950-01-369-0815 | B-15      | 9    |
| 5950-01-368-8901 | B-7                         | 73   | 5950-01-369-0816 | B-4       | 31   |
| 5950-01-368-8902 | B-8                         | 68   | 5950-01-369-0817 | B-10      | 37   |
| 5950-01-368-8903 | B-8                         | 69   | 5950-01-369-0819 | B-7       | 28   |
| 5950-01-368-8904 | B-8                         | 70   | 5950-01-369-0820 | B-7       | 31   |
| 5950-01-368-8905 | B-8                         | 71   | 5950-01-369-0821 | B-10      | 26   |
| 5950-01-368-8906 | B-8                         | 72   | 5950-01-369-1509 | B-3       | 18   |
| 5950-01-368-8907 | B-9                         | 33   |                  | B-4       | 23   |
| 5950-01-368-8908 | B-9                         | 35   |                  | B-6       | 9    |
| 5950-01-368-8909 | B-9                         | 36   |                  | B-9       | 22   |
| 5950-01-368-8910 | B-9                         | 31   |                  | B-10      | 23   |
| 5950-01-368-8911 | B-9                         | 38   | 5365-01-369-2206 | B-12      | 3    |
| 5950-01-368-8912 | B-9                         | 34   | 5905-01-369-6323 | B-1       | 43   |
| 5950-01-368-8913 | B-9                         | 39   | 5910-01-369-7514 | B-9       | 6    |
| 5950-01-368-8914 | B-9                         | 41   | 5940-01-369-9838 | B-2       | 8    |
| 5950-01-368-8915 | B-9                         | 42   |                  | B-3       | 59   |
| 5950-01-368-8916 | B-9                         | 37   |                  | B-4       | 68   |
| 5950-01-368-8917 | B-9                         | 40   |                  | B-5       | 76   |
| 5950-01-368-8918 | B-10                        | 44   |                  | B-6       | 31   |
| 5950-01-368-8919 | B-10                        | 46   |                  | B-7       | 74   |
| 5950-01-368-8920 | B-10                        | 42   |                  | B-8       | 74   |



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|                  | B-10                        | 51   |      |
|                  | B-14                        | 49   |      |
| 5935-01-374-1835 | B-2                         | 11   |      |
|                  | B-3                         | 22   |      |
|                  | B-4                         | 34   |      |
|                  | B-5                         | 27   |      |
|                  | B-6                         | 13   |      |
|                  | B-7                         | 35   |      |
|                  | B-8                         | 29   |      |
|                  | B-9                         | 25   |      |
|                  | B-10                        | 27   |      |
|                  | B-14                        | 16   |      |
| 5935-01-374-8398 | B-11                        | 8    |      |
|                  | B-11                        | 9    |      |
|                  | B-11                        | 10   |      |
|                  | B-11                        | 11   |      |
|                  | B-11                        | 12   |      |
|                  | B-11                        | 13   |      |
|                  | B-11                        | 14   |      |
|                  | B-11                        | 15   |      |
|                  | B-11                        | 16   |      |
|                  | B-11                        | 17   |      |
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|                  | B-11                        | 20   |      |
| 6135-01-375-2021 | B-2                         | 1    |      |

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| 2A392 | AN-960-42       |                                   | B-1  | 11   |
| 88044 | AN510C1-3       | 5305-00-206-5334                  | B-12 | 6    |
| 80063 | A3155289        | 5950-01-369-0815                  | B-15 | 9    |
| 80063 | A3155290        | 5999-01-368-3737                  | B-15 | 8    |
| 80063 | A3155291        | 5310-01-366-8142                  | B-15 | 10   |
| 5P319 | BR1225-1HD      | 6135-01-375-2021                  | B-2  | 1    |
| 81349 | CCR06CG152FS    | 5910-01-218-7756                  | B-9  | 5    |
|       |                 |                                   | B-11 | 27   |
| 81349 | CCR06CG162FS    | 5910-01-238-1395                  | B-9  | 4    |
| 81349 | CCR06CG621FM    | 5910-01-369-7514                  | B-9  | 6    |
| 81349 | CCR06CG911FS    | 5910-01-217-8279                  | B-9  | 3    |
| 14655 | CD15FD471J03    | 5910-01-154-0845                  | B-1  | 31   |
| 93790 | CD5EC330J03     | 5910-01-257-0422                  | B-3  | 10   |
| 93790 | CD5EC510J03     | 5910-01-368-3715                  | B-5  | 1    |
|       |                 |                                   | B-7  | 5    |
| 29604 | CF-07-6.80HM-5% |                                   | B-1  | 52   |
| 62462 | CLEE10M25V      | 5910-01-368-8805                  | B-1  | 34   |
| 91637 | CMF55-4R300F-T0 | 5905-01-367-8636                  | B-14 | 23   |
| 81349 | CMR03C100DOCR   | 5910-01-029-0728                  | B-3  | 11   |
|       |                 |                                   | B-4  | 14   |
|       |                 |                                   | B-8  | 15   |
| 81349 | CMR03C120DOCR   | 5910-01-031-9855                  | B-8  | 12   |
| 81349 | CMR03C180DOCR   | 5910-01-031-9849                  | B-4  | 12   |
|       |                 |                                   | B-8  | 10   |
| 81349 | CMR03C5R0DOCR   | 5910-01-038-7907                  | B-8  | 18   |
| 81349 | CMR03C7R0DOCR   | 5910-01-038-7900                  | B-4  | 11   |
| 81349 | CMR03E200DOCR   | 5910-01-038-7894                  | B-3  | 9    |
| 81349 | CMR03E270GOCR   | 5910-01-038-7892                  | B-8  | 14   |
| 81349 | CMR03E300GOCR   | 5910-01-043-8882                  | B-4  | 6    |
|       |                 |                                   | B-7  | 16   |
| 81349 | CMR03E430GOCR   | 5910-01-031-9856                  | B-8  | 4    |
| 81349 | CMR03E560GOCR   | 5910-01-086-6356                  | B-8  | 13   |
| 81349 | CMR03E620GOCR   | 5910-01-093-9498                  | B-7  | 2    |
| 81349 | CMR03E820GOCR   | 5910-01-090-1530                  | B-8  | 5    |
| 81349 | CMR03F101GOCR   | 5910-01-087-6360                  | B-4  | 10   |
|       |                 |                                   | B-7  | 3    |
|       |                 |                                   | B-10 | 4    |
| 81349 | CMR03F121GOCR   | 5910-01-089-9766                  | B-4  | 18   |
| 81349 | CMR03F181GOAR   | 5910-01-093-6316                  | B-7  | 17   |
| 81349 | CMR03F201GOAR   | 5910-01-093-6317                  | B-8  | 7    |
| 81349 | CMR03F301GOYR   | 5910-01-094-1397                  | B-8  | 8    |
| 81349 | CMR03F391GOYR   | 5910-01-093-6324                  | B-4  | 2    |
| 81349 | CMR03F910GOCR   | 5910-01-089-8731                  | B-4  | 15   |
|       |                 |                                   | B-7  | 4    |
| 81349 | CMR05F361F0DR   | 5910-01-058-9574                  | B-1  | 32   |
| 81349 | CX02M476K       | 5910-01-138-7861                  | B-15 | 13   |
| 81349 | CX02N226K       | 5910-01-256-9638                  | B-15 | 11   |
| 61637 | C320C152J1G5CA  | 5910-01-190-6678                  | B-7  | 14   |
| 88818 | C605006182      | 5910-00-426-0330                  | B-4  | 5    |
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| 71468 | DBMM-13W3P     | 5935-00-249-1469                  | B-11 | 4    |
| 71468 | DM53743-5000   | 5999-00-021-2118                  | B-1  | 25   |
| 61529 | DS1EMDC12V     | 5945-01-368-2572                  | B-10 | 24   |
| 61529 | DS1EML2DC12V   | 5945-01-368-3073                  | B-9  | 24   |
|       |                |                                   | B-10 | 25   |
| 0B0A9 | DS1210         | 5962-01-327-6566                  | B-2  | 22   |
| 0B0A9 | DS1231-35      | 5962-01-368-3222                  | B-2  | 15   |
| 61529 | DS2E-M-DC12V   | 5945-01-273-2979                  | B-9  | 23   |
| 81349 | FM04A125V1/4A  | 5920-00-402-1721                  | B-2  | 9    |
|       |                |                                   | B-3  | 17   |
|       |                |                                   | B-4  | 22   |
|       |                |                                   | B-6  | 8    |
|       |                |                                   | B-7  | 26   |
|       |                |                                   | B-14 | 10   |
| 25330 | GC683S         | 5935-01-158-0374                  | B-13 | 11   |
| 26136 | HC440-8-SS-B   | 5305-01-175-6939                  | B-1  | 10   |
| 97913 | HGM030FDA2Y00A | 5935-01-374-8398                  | B-11 | 8    |
|       |                |                                   | B-11 | 9    |
|       |                |                                   | B-11 | 10   |
|       |                |                                   | B-11 | 11   |
|       |                |                                   | B-11 | 12   |
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|       |                |                                   | B-11 | 18   |
|       |                |                                   | B-11 | 19   |
|       |                |                                   | B-11 | 20   |
| 97913 | HGM030MEA2Y00A | 5935-01-374-1835                  | B-2  | 11   |
|       |                |                                   | B-3  | 22   |
|       |                |                                   | B-4  | 34   |
|       |                |                                   | B-5  | 27   |
|       |                |                                   | B-6  | 13   |
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|       |                |                                   | B-8  | 29   |
|       |                |                                   | B-9  | 25   |
|       |                |                                   | B-10 | 27   |
|       |                |                                   | B-14 | 16   |
| 55322 | IC0-640-NGT    | 5935-01-368-8072                  | B-14 | 47   |
| 55322 | IC0-628-NGT    | 5935-01-368-8821                  | B-2  | 24   |
| 09969 | IM-2 10.0UH    | 5950-01-277-6051                  | B-1  | 38   |
|       |                |                                   | B-5  | 24   |
| 91637 | IM2-100UH 10%  |                                   | B-2  | 10   |
|       |                |                                   | B-14 | 15   |
| 81349 | JANTX1N4148-1  | 5961-00-584-4527                  | B-2  | 6    |
|       |                |                                   | B-3  | 15   |
|       |                |                                   | B-4  | 20   |
|       |                |                                   | B-5  | 19   |
|       |                |                                   | B-6  | 6    |
|       |                |                                   | B-7  | 23   |

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|       |                              |                                   | B-9  | 18   |
|       |                              |                                   | B-10 | 18   |
|       |                              |                                   | B-14 | 6    |
|       |                              |                                   | B-15 | 17   |
| 81349 | JANTX1N4245                  | 5961-00-458-5813                  | B-1  | 36   |
|       |                              |                                   | B-8  | 22   |
|       |                              |                                   | B-9  | 19   |
|       |                              |                                   | B-10 | 19   |
|       |                              |                                   | B-14 | 7    |
| 81349 | JANTX1N5711                  | 5961-00-163-7231                  | B-10 | 20   |
| 81349 | JANTX2N2222A                 | 5961-00-858-3826                  | B-6  | 14   |
|       |                              |                                   | B-7  | 40   |
|       |                              |                                   | B-14 | 17   |
|       |                              |                                   | B-15 | 24   |
| 81349 | JANTX2N918                   | 5961-00-836-6663                  | B-3  | 23   |
|       |                              |                                   | B-4  | 35   |
| 81349 | JAN1N5415                    | 5961-00-483-4190                  | B-15 | 19   |
| 81349 | JAN1N5809                    | 5961-01-053-2794                  | B-15 | 20   |
| 81349 | JAN1N6077                    | 5961-01-055-4352                  | B-15 | 18   |
| 81349 | JAN2N2605                    | 5961-00-932-9318                  | B-15 | 23   |
| 81349 | JAN2N2907A                   | 5961-00-925-3777                  | B-3  | 24   |
|       |                              |                                   | B-9  | 26   |
| 81349 | JAN2N6352                    | 5961-01-037-0108                  | B-15 | 7    |
| 17856 | J176                         | 5961-01-274-7544                  | B-5  | 29   |
| 01295 | KLIX0N3BTD3-45               | 5930-01-368-2598                  | B-1  | 4    |
| 12040 | LM109H                       | 5962-00-248-5241                  | B-8  | 65   |
| 64155 | LM134H/883                   | 5962-01-098-8192                  | B-15 | 54   |
| 27014 | LM258J                       | 5962-01-267-7055                  | B-5  | 69   |
|       |                              |                                   | B-7  | 68   |
|       |                              |                                   | B-10 | 38   |
|       |                              |                                   | B-14 | 44   |
| 27014 | LM340LAZ-5.0                 | 5962-01-120-6421                  | B-2  | 23   |
|       |                              |                                   | B-5  | 75   |
|       |                              |                                   | B-10 | 39   |
|       |                              |                                   | B-14 | 46   |
| 66958 | L272M                        | 5962-01-367-8861                  | B-8  | 64   |
| 04713 | MC145156P                    | 5962-01-319-4588                  | B-3  | 50   |
|       |                              |                                   | B-4  | 61   |
| 04713 | MC74HC4538N                  | 5962-01-336-2496                  | B-14 | 43   |
| 04713 | MC78L08ACP                   | 5962-01-110-3480                  | B-7  | 69   |
| 19647 | MK132-5MEGOHMSPD<br>RMO.1PCT | 5905-01-193-2357                  | B-10 | 35   |
| 04713 | MPSH81                       | 5961-01-045-9170                  | B-4  | 37   |
| 04713 | MRF914                       | 5961-01-282-0064                  | B-4  | 36   |
| 96906 | MS15795-802                  | 5310-00-595-6761                  | B-1  | 28   |
|       |                              |                                   | B-11 | 5    |
| 96906 | MS15795-803                  | 5310-00-595-6211                  | B-1  | 7    |
|       |                              |                                   | B-1  | 16   |
| 96906 | MS3212-11                    | 5305-01-029-0713                  | B-13 | 9    |
| 96906 | MS3470W14-12P                | 5935-01-181-6612                  | B-1  | 18   |

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|       |                 |                                | B-12 | 8    |
| 96906 | MS35338-135     | 5310-00-933-8118               | B-15 | 2    |
| 96906 | MS35649-224     | 5310-00-938-2013               | B-1  | 21   |
| 96906 | MS51848-43      | 5310-01-023-6132               | B-1  | 23   |
|       |                 |                                | B-11 | 6    |
|       |                 |                                | B-12 | 10   |
| 96906 | MS51957-13      | 5305-00-054-5647               | B-1  | 29   |
| 96906 | MS51957-13B     | 5305-00-494-7333               | B-11 | 2    |
| 96906 | MS51957-14      | 5305-00-054-5648               | B-1  | 9    |
|       |                 |                                | B-15 | 5    |
| 96906 | MS51957-2       | 5305-00-054-5636               | B-11 | 25   |
| 96906 | MS51957-20      | 5305-00-054-5654               | B-15 | 6    |
| 96906 | MS75083-11      | 5950-00-211-3995               | B-4  | 30   |
| 96906 | MS75083-13      | 5950-00-035-4416               | B-3  | 19   |
|       |                 |                                | B-4  | 29   |
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| 96906 | MS75083-3       | 5950-00-779-3452               | B-5  | 25   |
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| 81349 | M39014/23-0325  | 5910-01-118-9101               | B-5  | 16   |
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| 81349 | M39014/23-0349  | 5910-01-184-5316                  | B-3  | 4    |
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|       |                 |                                   | B-9  | 2    |
|       |                 |                                   | B-10 | 2    |
|       |                 |                                   | B-14 | 1    |
| 81349 | M39014/23-0373  | 5910-01-118-9102                  | B-4  | 16   |
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|       |                 |                                   | B-7  | 1    |
|       |                 |                                   | B-8  | 2    |
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| 81349 | M39014/23-0374  | 5910-01-316-6686                  | B-3  | 13   |
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| 81349 | M4946507TR0100F | 5905-01-366-1099                  | B-15 | 35   |
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| 81349 | M55155/30-5     | 5940-00-082-5094                  | B-15 | 21   |
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| 80205 | NAS620C4        | 5310-00-057-0573                  | B-15 | 3    |
| 80205 | NAS671C2        | 5310-00-812-4294                  | B-12 | 11   |
| 78189 | NAS671C4        | 5310-00-208-3786                  | B-1  | 20   |
|       |                 |                                   | B-15 | 1    |
| 4T165 | NE85632         | 5961-01-368-5230                  | B-7  | 36   |
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| 81349 | RJR26FW501R  | 5905-01-206-1181                  | B-6  | 25   |
| 81349 | RJR26FX501R  | 5905-01-259-3515                  | B-7  | 58   |
| 81349 | RJR26FX502R  | 5905-01-169-9933                  | B-14 | 27   |
| 81349 | RJR26FX503R  | 5905-01-185-0555                  | B-5  | 55   |
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| 81349 | RLR05C1002GS | 5905-01-176-3873                  | B-2  | 13   |
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| 81349 | RLR05C1102GS | 5905-01-176-7338                  | B-5  | 59   |
| 81349 | RLR05C1103GS | 5905-01-194-7241                  | B-5  | 41   |
| 81349 | RLR05C1201GS | 5905-01-176-7348                  | B-9  | 27   |
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| 81349 | RLR05C1202GS | 5905-01-177-1911                  | B-3  | 39   |
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| 81349 | RLR05C1500GS | 5905-01-186-4929                  | B-3  | 43   |
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| 81349 | RLR05C1501GS | 5905-01-176-7356                  | B-3  | 42   |
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| 81349 | RLR05C18R0GS | 5905-01-179-7506                  | B-8  | 35   |
| 81349 | RLR05C1800GS | 5905-01-176-9307                  | B-5  | 50   |
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| 81349 | RLR05C1802GS | 5905-01-159-0773                  | B-5  | 38   |
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| 81349 | RLR05C2001GS | 5905-01-175-0703                  | B-14 | 21   |
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| 81349 | RLR05C2200GS | 5905-01-176-3875                  | B-4  | 49   |
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| 81349 | RLR05C2201GS | 5905-01-175-7857                  | B-3  | 35   |
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| 81349 | RLR05C2202GS | 5905-01-191-9611                  | B-3  | 38   |
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| 81349 | RLR05C2203GS | 5905-01-165-5208                  | B-4  | 41   |
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| 81349 | RLR05C2370FS | 5905-01-181-3201                  | B-15 | 38   |
| 81349 | RLR05C2401GS | 5905-01-170-9084                  | B-5  | 58   |
| 81349 | RLR05C2492FS | 5905-01-170-0388                  | B-15 | 43   |
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| 81349 | RLR05C2701GS | 5905-01-158-8981                  | B-4  | 52   |
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| 81349 | RLR05C3000GS | 5905-01-182-4648                  | B-8  | 34   |
| 81349 | RLR05C33R0GS | 5905-01-184-5231                  | B-8  | 50   |
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| 81349 | RLR05C3600GS | 5905-01-176-3858                  | B-7  | 50   |
| 81349 | RLR05C3602GS | 5905-01-177-4405                  | B-3  | 37   |
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| 81349 | RLR05C39R0GS | 5905-01-176-7358                  | B-8  | 47   |
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| 81349 | RLR05C4021FS | 5905-01-184-7954                  | B-15 | 31   |
| 81349 | RLR05C4302GS | 5905-01-175-0705                  | B-5  | 61   |
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| 81349 | RLR05C4703GS | 5905-01-186-8261                  | B-5  | 62   |
| 81349 | RLR05C51R0GS | 5905-01-176-7353                  | B-4  | 53   |
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| 81349 | RLR05C5101GS | 5905-01-153-7449                  | B-5  | 53   |
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| 81349 | RLR05C5103GS | 5905-01-274-9018                  | B-5  | 63   |
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| 81349 | RLR05C8062FS |                                | B-15 | 27   |
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| 81349 | RLR05C8201GS | 5905-01-179-9749               | B-5  | 39   |
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| 81349 | RLR05C91R0GS | 5905-01-233-1870               | B-4  | 54   |
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| 81349 | RLR07C22R0GS | 5905-01-165-8590               | B-8  | 53   |
| 81349 | RLR07C2200GS | 5905-01-049-3123               | B-1  | 48   |
| 81349 | RLR07C39R0GS | 5905-01-158-2316               | B-1  | 45   |
| 81349 | RLR07C4021FS | 5905-01-157-7790               | B-15 | 29   |
| 81349 | RLR07C56R2FS | 5905-01-183-9163               | B-15 | 25   |
| 81349 | RLR07C68R0GS | 5905-01-053-5784               | B-1  | 42   |
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| 81349 | RNC50J1743FS | 5905-01-336-9448               | B-15 | 48   |
| 81349 | RNC50J1763BS | 5905-01-271-8187               | B-15 | 48   |
| 81349 | RNC50J1783FS | 5905-01-069-6025               | B-15 | 48   |
| 81349 | RNC50J1803BS | 5905-01-336-5254               | B-15 | 48   |
| 81349 | RNC50J1823FS | 5905-01-336-9449               | B-15 | 48   |
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| 81349 | RNC50J2033BS | 5905-01-336-6265               | B-15 | 48   |
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| 81349 | RNC50J2103FS | 5905-01-202-6112               | B-15 | 48   |
| 81349 | RNC50J2133BS | 5905-01-336-5262               | B-15 | 48   |
| 81349 | RNC50J2153FS | 5905-01-286-1517               | B-15 | 48   |
| 81349 | RNC50J2183BS | 5905-01-366-1095               | B-15 | 48   |

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| 81349 | RNC50J2213FS               | 5905-01-128-3403                  | B-15 | 48   |
| 81349 | RNC50J2233BS               | 5905-01-366-1096                  | B-15 | 48   |
| 81349 | RNC50J2263FS               | 5905-01-259-1928                  | B-15 | 48   |
| 81349 | RNC50J2293BS               | 5905-01-366-1097                  | B-15 | 48   |
| 81349 | RNC50J2323FS               | 5905-01-286-2129                  | B-15 | 48   |
| 81349 | RNC50J2343BS               | 5905-01-188-6252                  | B-15 | 48   |
| 81349 | RNC50J2373BS               | 5905-01-186-8263                  | B-15 | 48   |
| 81349 | RNC50J2403DS               | 5905-01-367-8634                  | B-15 | 48   |
| 81349 | RNC50J2433BS               | 5905-01-329-9377                  | B-15 | 45   |
| 81349 | RNC50J2433FS               | 5905-01-256-1370                  | B-15 | 48   |
| 81349 | RNC50J2463BS               | 5905-01-306-5236                  | B-15 | 48   |
| 81349 | RNC50J2493FS               | 5905-01-126-7996                  | B-15 | 48   |
| 81349 | RNC50J2523BS               | 5905-01-330-3463                  | B-15 | 48   |
| 81349 | RNC50J2553FS               | 5905-01-334-4635                  | B-15 | 48   |
| 81349 | RNC50J2583DS               | 5905-01-366-1098                  | B-15 | 48   |
| 81349 | RNC50J2613FS               | 5905-01-293-3944                  | B-15 | 48   |
| 81349 | RNC50J2643DS               | 5905-01-366-0802                  | B-15 | 48   |
| 81349 | RNC50J2673FS               | 5905-01-336-5267                  | B-15 | 48   |
| 81349 | RNC50J2713DS               | 5905-01-366-0803                  | B-15 | 48   |
| 81349 | RNC50J2743FS               | 5905-01-179-4747                  | B-15 | 48   |
| 81349 | RNC50J3402BS               | 5905-01-256-1377                  | B-15 | 36   |
| 81349 | RNC50J3922BS               | 5905-01-173-4326                  | B-15 | 37   |
| 81349 | RNC50J9762BS               | 5905-01-189-9181                  | B-15 | 39   |
| 81349 | RNC55H6192FS               | 5905-00-451-7410                  | B-14 | 26   |
| 81349 | RNR55C1301FS               | 5905-00-264-3870                  | B-1  | 50   |
| 81349 | RNR55C2490FS               | 5905-00-419-7413                  | B-1  | 49   |
| 80031 | RN55C1003F                 | 5905-00-413-0632                  | B-14 | 25   |
| 81349 | RWR74S49R9FS               | 5905-01-176-7123                  | B-15 | 28   |
| 81349 | RWR81SR499FS               | 5905-01-097-1613                  | B-15 | 42   |
| 81349 | R426FW503R                 |                                   | B-3  | 28   |
| 14304 | R65-0004-109               | 5905-01-129-2386                  | B-5  | 66   |
| 18324 | SA602N                     | 5962-01-367-8168                  | B-4  | 65   |
|       |                            |                                   | B-5  | 68   |
|       |                            |                                   | B-7  | 67   |
| 58802 | SEELSKREW/\$/2-56<br>X 1/4 | 5305-01-186-8927                  | B-13 | 1    |
| 81349 | SE12XC07                   | 5940-00-725-9498                  | B-15 | 22   |
| 52648 | SL6270C-DP                 | 5962-01-234-0865                  | B-5  | 70   |
| 08289 | SM-73-48-13                | 5970-01-367-9577                  | B-1  | 27   |
| 53469 | SP8793DP                   | 5962-01-265-2532                  | B-3  | 49   |
|       |                            |                                   | B-4  | 62   |
| 04222 | SR152A750JAA               | 5910-01-368-8803                  | B-7  | 8    |
| 04222 | SR202A360JAA               | 5910-01-368-8796                  | B-5  | 6    |
| 8J953 | SS002-04TG                 |                                   | B-14 | 13   |
| 8J953 | SS006-04TG                 |                                   | B-14 | 14   |
| 8J953 | SS009-04TG                 |                                   | B-14 | 12   |
| 52673 | S12-3542                   | 5961-01-135-1334                  | B-3  | 14   |
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| 01295 | TIP41C           | 5961-01-033-9368                  | B-1  | 2    |
| 01295 | TL062IP          | 5962-01-367-8860                  | B-5  | 72   |
| 01295 | TL750L08CLP      | 5962-01-367-8858                  | B-3  | 54   |
|       |                  |                                   | B-4  | 64   |
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| 29971 | TR50-200AB-5     | 5950-01-368-8894                  | B-3  | 45   |
| 51406 | TZ03Z070E        | 5910-01-368-8993                  | B-4  | 13   |
| 51406 | TZ03Z500F        |                                   | B-5  | 4    |
|       |                  |                                   | B-7  | 10   |
| 31433 | T322F107K020AS   | 5910-01-368-7327                  | B-14 | 3    |
| 05397 | T368D227M010AS   | 5910-01-238-7741                  | B-1  | 35   |
| 31433 | T370C105M025AS   |                                   | B-4  | 17   |
| 31433 | T370C225K025AS   | 5910-01-077-0186                  | B-3  | 2    |
|       |                  |                                   | B-4  | 8    |
|       |                  |                                   | B-5  | 15   |
|       |                  |                                   | B-6  | 4    |
|       |                  |                                   | B-7  | 18   |
| 31433 | T370D106M020AS   | 5910-01-100-8108                  | B-3  | 8    |
|       |                  |                                   | B-5  | 11   |
|       |                  |                                   | B-7  | 19   |
|       |                  |                                   | B-8  | 6    |
| 31433 | T370E226M015AS   | 5910-01-229-7137                  | B-3  | 5    |
|       |                  |                                   | B-4  | 3    |
|       |                  |                                   | B-5  | 9    |
|       |                  |                                   | B-8  | 9    |
| 31433 | T390A105M025AS   |                                   | B-2  | 4    |
|       |                  |                                   | B-6  | 3    |
|       |                  |                                   | B-14 | 5    |
| 56289 | UDN-2981A        | 5962-01-098-0251                  | B-9  | 30   |
|       |                  |                                   | B-10 | 41   |
| 61892 | UPD446C-2        | 5962-01-368-3225                  | B-2  | 19   |
| 81348 | WF408            | 5975-00-284-6655                  | B-13 | 12   |
| 92702 | WS2107F-1110     | 4140-00-442-3490                  | B-7  | 38   |
| 98284 | 1-72 X 5/32, SSL | 5310-01-367-6214                  | B-12 | 9    |
| 80131 | 1N4156           | 5961-00-911-6104                  | B-14 | 8    |
| 88245 | 10-861-2-03      | 5940-01-368-9583                  | B-14 | 41   |
| 06540 | 10094-SS-0440-6B | 5340-01-367-4951                  | B-13 | 10   |
| 54296 | 101-0167-001     | 5961-01-368-5396                  | B-1  | 6    |
| 94580 | 10115418-101     | 5962-01-294-1305                  | B-4  | 66   |
| 54296 | 102-0689-002     | 5962-01-368-3224                  | B-2  | 18   |
| 54296 | 102-0694-001     | 5962-01-367-8186                  | B-14 | 42   |
| 99800 | 1025-68          | 5950-01-252-0963                  | B-3  | 21   |
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| 54296 | 105-0033-001     | 5910-01-368-8994                  | B-7  | 9    |
| 54296 | 108-1031-101     | 5910-01-368-8784                  | B-9  | 17   |
| 54296 | 108-1031-111     | 5910-01-368-7322                  | B-10 | 12   |
| 54296 | 108-1031-121     | 5910-01-368-8780                  | B-10 | 6    |
| 54296 | 108-1031-131     | 5910-01-368-8781                  | B-10 | 11   |
| 54296 | 108-1031-151     | 5910-01-368-3714                  | B-9  | 10   |

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| 54296 | 108-1031-181    | 5910-01-368-8782                  | B-10 | 8    |
| 54296 | 108-1031-201    | 5910-01-368-8785                  | B-9  | 14   |
|       |                 |                                   | B-10 | 7    |
| 54296 | 108-1031-240    | 5910-01-368-7323                  | B-10 | 3    |
|       |                 |                                   | B-10 | 17   |
| 54296 | 108-1031-301    | 5910-01-368-8786                  | B-9  | 11   |
| 54296 | 108-1031-331    | 5910-01-368-8792                  | B-9  | 16   |
| 54296 | 108-1031-360    | 5910-01-368-8059                  | B-10 | 14   |
| 54296 | 108-1031-390    | 5910-01-368-8060                  | B-10 | 13   |
| 54296 | 108-1031-431    | 5910-01-368-8788                  | B-9  | 7    |
| 54296 | 108-1031-501    | 5910-01-368-8787                  | B-9  | 13   |
| 54296 | 108-1031-560    | 5910-01-368-8783                  | B-10 | 9    |
| 54296 | 108-1031-561    | 5910-01-368-8790                  | B-9  | 12   |
| 54296 | 108-1031-680    | 5910-01-368-8061                  | B-10 | 10   |
| 54296 | 108-1031-750    | 5910-01-368-8062                  | B-10 | 16   |
| 54296 | 108-1031-751    | 5910-01-368-3713                  | B-9  | 9    |
| 54296 | 108-1031-820    | 5910-01-368-7324                  | B-10 | 15   |
| 54296 | 108-1031-821    | 5910-01-368-8789                  | B-9  | 8    |
| 54296 | 11112000        | 5910-01-368-8795                  | B-3  | 7    |
| 54296 | 116-0001        | 5310-01-328-7732                  | B-1  | 12   |
| 13764 | 125W50200       | 5970-01-190-5255                  | B-1  | 26   |
| 81891 | 1204-09-00-541B | 5310-01-368-8669                  | B-11 | 3    |
| 54296 | 123-0039-001    | 5950-01-368-8895                  | B-8  | 60   |
| 54296 | 123-0040-001    | 5950-01-368-8896                  | B-8  | 59   |
| 54296 | 123-0041-001    | 5950-01-368-8939                  | B-8  | 61   |
| 54296 | 123-0042-001    |                                   | B-6  | 29   |
| 54296 | 123-0043-001    | 5950-01-368-8897                  | B-8  | 62   |
| 54296 | 125-0237-001    | 5930-01-367-8007                  | B-13 | 15   |
| 54296 | 129-0105-001    | 5950-01-368-8931                  | B-5  | 26   |
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| 54296 | 129-0106-001    | 5950-01-368-8936                  | B-8  | 27   |
| 54296 | 129-0110-001    | 5950-01-368-8933                  | B-7  | 33   |
| 71895 | 1325-272        | 5950-01-369-0820                  | B-7  | 31   |
| 71895 | 1325-333        | 5950-01-369-0819                  | B-7  | 28   |
| 04713 | 14099B/BEAJC    | 5962-01-223-7499                  | B-10 | 40   |
| 54296 | 142210-00       | 5910-01-368-8806                  | B-1  | 33   |
| 54296 | 151529-00       | 5910-01-368-8807                  | B-2  | 5    |
|       |                 |                                   | B-14 | 2    |
| 54296 | 158-0099-001    | 5330-01-367-6384                  | B-1  | 14   |
|       |                 |                                   | B-13 | 7    |
| 99800 | 1641-225        | 5950-01-369-0821                  | B-10 | 26   |
| 56289 | 199D225X0025BA1 | 5910-01-368-8808                  | B-5  | 7    |
| 56289 | 199D476X9025EE2 | 5910-01-253-6210                  | B-3  | 12   |
| 28480 | 1990-1169       | 5980-01-305-7666                  | B-5  | 21   |
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| 06540 | 2-56 X 3/16     |                                   | B-12 | 7    |
| 80131 | 2N4427          | 5961-00-460-5007                  | B-8  | 33   |

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| 80131 | 2N6426           | 5961-01-068-2717                  | B-14 | 18   |
| 54296 | 214271-00        |                                   | B-7  | 47   |
| 54296 | 214393-00        |                                   | B-7  | 59   |
| 54296 | 214471-00        |                                   | B-7  | 43   |
| 98291 | 229-3070-00-0-47 | 5940-01-369-9838                  | B-2  | 8    |
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| 75915 | 251001           | 5920-01-309-5480                  | B-8  | 24   |
| 37695 | 265011-39        | 5910-01-213-0761                  | B-4  | 7    |
|       |                  |                                   | B-7  | 15   |
|       |                  |                                   | B-8  | 17   |
| 34899 | 2673000201       | 5950-01-369-1509                  | B-3  | 18   |
|       |                  |                                   | B-4  | 23   |
|       |                  |                                   | B-6  | 9    |
|       |                  |                                   | B-9  | 22   |
|       |                  |                                   | B-10 | 23   |
| 34899 | 2673004701       | 5950-01-368-9048                  | B-4  | 24   |
|       |                  |                                   | B-7  | 27   |
| 54296 | 312316-00        | 5950-01-369-0816                  | B-4  | 31   |
| 54296 | 312317-00        | 5950-01-368-8932                  | B-5  | 23   |
|       |                  |                                   | B-7  | 32   |
| 54296 | 312320-00        | 5950-01-368-8934                  | B-7  | 29   |
| 54296 | 312324-00        | 5950-01-368-8937                  | B-8  | 25   |
| 54296 | 312326-00        | 5950-01-368-8927                  | B-1  | 39   |
| 54296 | 312327-00        | 5950-01-368-8928                  | B-1  | 40   |
| 54296 | 312328-00        | 5950-01-368-8935                  | B-7  | 30   |
| 18915 | 35-182-5-3       | 5865-00-984-1976                  | B-12 | 4    |
| 05157 | 3610195-005      | 5962-01-191-1026                  | B-3  | 55   |
|       |                  |                                   | B-4  | 63   |
| 54296 | 361465-00        | 5950-01-369-0817                  | B-10 | 37   |
| 54296 | 361469-00        | 5950-01-368-8890                  | B-1  | 54   |
| 54296 | 361470-00        | 5950-01-368-8938                  | B-1  | 55   |
| 54296 | 361471-00        | 5950-01-368-8892                  | B-1  | 56   |
| 13499 | 371-1285-320     | 5935-00-103-1657                  | B-1  | 24   |
| 50163 | 39030030-1002    | 5920-01-244-4238                  | B-9  | 21   |
| 05276 | 4159             | 5935-01-368-7340                  | B-13 | 13   |
| 54296 | 426-0001-010     | 6695-01-367-8928                  | B-13 | 2    |
| 54296 | 426-0002-001     | 9330-01-368-1294                  | B-13 | 3    |
| 54296 | 426-0005-001     | 5999-01-367-8709                  | B-9  | 44   |
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| 06994 | 4301001-2R000    | 5920-01-318-9440                  | B-5  | 22   |
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| 54296 | 440-0001-001   | 5950-01-368-8929                  | B-3  | 56   |
| 54296 | 440-0002-001   | 5950-01-368-8930                  | B-3  | 57   |
| 54296 | 440-0003-001   | 5950-01-368-8899                  | B-7  | 71   |
| 54296 | 440-0003-002   | 5950-01-368-8900                  | B-7  | 72   |
| 54296 | 440-0003-003   | 5950-01-368-8901                  | B-7  | 73   |
| 54296 | 440-0003-007   | 5950-01-368-8902                  | B-8  | 68   |
| 54296 | 440-0003-008   | 5950-01-368-8903                  | B-8  | 69   |
| 54296 | 440-0003-009   | 5950-01-368-8904                  | B-8  | 70   |
| 54296 | 440-0003-010   | 5950-01-368-8905                  | B-8  | 71   |
| 54296 | 440-0003-011   | 5950-01-368-8906                  | B-8  | 72   |
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| 54296 | 440-0003-013   | 5950-01-368-9669                  | B-8  | 66   |
| 54296 | 440-0003-014   | 5950-01-368-9670                  | B-8  | 67   |
| 54296 | 440-0004-001   | 5950-01-368-8910                  | B-9  | 31   |
| 54296 | 440-0005-001   | 5950-01-368-7350                  | B-9  | 32   |
| 54296 | 440-0006-001   | 5950-01-368-8907                  | B-9  | 33   |
| 54296 | 440-0007-001   | 5950-01-368-8912                  | B-9  | 34   |
| 54296 | 440-0008-001   | 5950-01-368-8908                  | B-9  | 35   |
| 54296 | 440-0009-001   | 5950-01-368-8909                  | B-9  | 36   |
| 54296 | 440-0010-001   | 5950-01-368-8916                  | B-9  | 37   |
| 54296 | 440-0011-001   | 5950-01-368-8911                  | B-9  | 38   |
| 54296 | 440-0012-001   | 5950-01-368-8913                  | B-9  | 39   |
| 54296 | 440-0013-001   | 5950-01-368-8917                  | B-9  | 40   |
| 54296 | 440-0014-001   | 5950-01-368-8914                  | B-9  | 41   |
| 54296 | 440-0015-001   | 5950-01-368-8915                  | B-9  | 42   |
| 54296 | 440-0016-001   | 5950-01-368-8920                  | B-10 | 42   |
| 54296 | 440-0017-001   | 5950-01-368-7351                  | B-10 | 43   |
| 54296 | 440-0018-001   | 5950-01-368-8918                  | B-10 | 44   |
| 54296 | 440-0019-001   | 5950-01-368-8925                  | B-10 | 45   |
| 54296 | 440-0020-001   | 5950-01-368-8919                  | B-10 | 46   |
| 54296 | 440-0021-001   | 5950-01-368-8921                  | B-10 | 47   |
| 54296 | 440-0022-001   | 5950-01-368-8924                  | B-10 | 48   |
| 54296 | 440-0023-001   | 5950-01-368-8922                  | B-10 | 49   |
| 54296 | 440-0024-001   | 5950-01-368-8923                  | B-10 | 50   |
| 54296 | 440106-00      | 5961-01-368-5228                  | B-1  | 3    |
| 59474 | 4416-1J        | 5950-00-412-4341                  | B-4  | 28   |
| 54296 | 445-0001-001   | 5935-01-368-9006                  | B-11 | 23   |
| 57304 | 45002600       | 5961-01-368-5229                  | B-3  | 25   |
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| 54296 | 460251-00      | 5962-01-367-8169                  | B-5  | 74   |
| 54296 | 460259-00      | 5962-01-367-8859                  | B-3  | 52   |
| 54296 | 460260-00      | 5962-01-367-8167                  | B-3  | 53   |
| 81073 | 50MY24360      | 5930-01-367-9338                  | B-14 | 39   |
| 28480 | 5082-3081      | 5961-01-023-5750                  | B-7  | 24   |
|       |                |                                   | B-8  | 21   |
| 81073 | 51MY23766      | 5930-01-367-9340                  | B-14 | 38   |
| 81073 | 51MY23767      | 5930-01-367-9341                  | B-14 | 40   |
| 67268 | 5962-8765701GA | 5962-01-280-2203                  | B-5  | 67   |

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| 67268 | 5962-8857101CA   | 5962-01-306-8886                  | B-5  | 71   |
| 67268 | 5962-8876202GA   | 5962-01-334-8150                  | B-15 | 57   |
| 00779 | 60803-2          | 5999-01-158-7233                  | B-7  | 65   |
| 03640 | 6116730-1        | 5910-01-165-5249                  | B-5  | 14   |
|       |                  |                                   | B-9  | 1    |
|       |                  |                                   | B-10 | 1    |
| 16733 | 700532           | 5935-01-011-5499                  | B-11 | 21   |
| 14933 | 7705601CB        | 5962-01-139-4098                  | B-14 | 45   |
| 13103 | 7717-16DAP       | 5999-01-199-7477                  | B-4  | 67   |
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|       |                  |                                   | B-9  | 45   |
|       |                  |                                   | B-14 | 48   |
| 96214 | 803415-3         | 5980-01-081-9113                  | B-2  | 7    |
|       |                  |                                   | B-3  | 16   |
|       |                  |                                   | B-4  | 21   |
|       |                  |                                   | B-9  | 20   |
|       |                  |                                   | B-14 | 9    |
| 54296 | 810228-00        | 5305-01-367-6748                  | B-13 | 16   |
| 54296 | 810551-01        | 5305-01-367-9268                  | B-1  | 17   |
| 54296 | 812038-00        | 5310-01-366-8144                  | B-1  | 8    |
| 59660 | 8121-100-C0G0-10 | 5910-01-208-9091                  | B-7  | 13   |
|       | 1K               |                                   |      |      |
| 54296 | 812385-10        | 5330-01-367-9298                  | B-13 | 4    |
| 18796 | 8131-050X7R224M  | 5910-01-080-0700                  | B-5  | 18   |
| 15786 | 81487-4          | 5340-00-782-8737                  | B-1  | 13   |
| 14933 | 82027-03         | 5950-01-159-5785                  | B-1  | 41   |
| 54296 | 823965-10        | 5998-01-367-9190                  | B-12 | 1    |
| 54296 | 823966-10        | 5998-01-367-9305                  | B-12 | 5    |
| 54296 | 823967-00        | 5365-01-369-2206                  | B-12 | 3    |
| 54296 | 823968-00        | 5970-01-367-9579                  | B-12 | 2    |
| 54296 | 823971-00        | 5935-01-368-8525                  | B-11 | 22   |
| 54296 | 823973-00        | 5999-01-367-9306                  | B-1  | 1    |
| 54296 | 823974-10        |                                   | B-1  | 19   |
| 54296 | 831883-01        | 5970-01-367-9578                  | B-1  | 5    |
| 54296 | 831884-01        | 5998-01-367-9441                  | B-11 | 29   |
| 67268 | 8405601CB        | 5962-01-228-8376                  | B-2  | 14   |
|       |                  |                                   | B-3  | 47   |
| 67268 | 8409801CA        | 5962-01-237-1546                  | B-4  | 60   |
| 89536 | 855130           | 5962-01-364-7953                  | B-3  | 51   |
| 28480 | 9100-2251        | 5950-00-431-3211                  | B-1  | 37   |
| 28480 | 9100-2272        | 5950-01-240-8137                  | B-4  | 27   |
|       |                  |                                   | B-6  | 12   |
| 18876 | 9166235          | 5330-00-585-1591                  | B-1  | 15   |
| 79963 | 922-092          | 5940-01-155-4016                  | B-1  | 22   |
| 20183 | 93534-1          | 5935-01-121-9427                  | B-15 | 4    |
| 54296 | 951943-00        | 5955-01-367-9432                  | B-3  | 46   |
| 54296 | 952351-10        | 5915-01-368-5146                  | B-7  | 70   |
| 54296 | 952352-10        | 5915-01-368-5144                  | B-6  | 10   |
| 54296 | 952353-10        | 5915-01-368-5145                  | B-6  | 11   |
| 54296 | 952354-10        | 5915-01-368-5143                  | B-4  | 25   |



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| 54296 | 994515-10   |                                   | B-13 | 6    |
| 54296 | 994516-10   | 5998-01-356-7017                  | B-13 | 14   |

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| FIG. | ITEM | FIGURE AND ITEM NUMBER<br>STOCK NUMBER | INDEX<br>CAGEC | PART NUMBER    |
|------|------|--|----------------|----------------|
| B-1  | 1    | 5999-01-367-9306                       | 54296          | 823973-00      |
| B-1  | 2    | 5961-01-033-9368                       | 01295          | TIP41C         |
| B-1  | 3    | 5961-01-368-5228                       | 54296          | 440106-00      |
| B-1  | 4    | 5930-01-368-2598                       | 01295          | KLIXON3BTD3-45 |
| B-1  | 5    | 5970-01-367-9578                       | 54296          | 831883-01      |
| B-1  | 6    | 5961-01-368-5396                       | 54296          | 101-0167-001   |
| B-1  | 7    | 5310-00-595-6211                       | 96906          | MS15795-803    |
| B-1  | 8    | 5310-01-366-8144                       | 54296          | 812038-00      |
| B-1  | 9    | 5305-00-054-5648                       | 96906          | MS51957-14     |
| B-1  | 10   | 5305-01-175-6939                       | 26136          | HC440-8-SS-B   |
| B-1  | 11   |  | 2A392          | AN-960-42      |
| B-1  | 12   | 5310-01-328-7732                       | 54296          | 116-0001       |
| B-1  | 13   | 5340-00-782-8737                       | 15786          | 81487-4        |
| B-1  | 14   | 5330-01-367-6384                       | 54296          | 158-0099-001   |
| B-1  | 15   | 5330-00-585-1591                       | 18876          | 9166235        |
| B-1  | 16   | 5310-00-595-6211                       | 96906          | MS15795-803    |
| B-1  | 17   | 5305-01-367-9268                       | 54296          | 810551-01      |
| B-1  | 18   | 5935-01-181-6612                       | 96906          | MS3470W14-12P  |
| B-1  | 19   |  | 54296          | 823974-10      |
| B-1  | 20   | 5310-00-208-3786                       | 78189          | NAS671C4       |
| B-1  | 21   | 5310-00-938-2013                       | 96906          | MS35649-224    |
| B-1  | 22   | 5940-01-155-4016                       | 79963          | 922-092        |
| B-1  | 23   | 5310-01-023-6132                       | 96906          | MS51848-43     |
| B-1  | 24   | 5935-00-103-1657                       | 13499          | 371-1285-320   |
| B-1  | 25   | 5999-00-021-2118                       | 71468          | DM53743-5000   |
| B-1  | 26   | 5970-01-190-5255                       | 13764          | 12SWS0200      |
| B-1  | 27   | 5970-01-367-9577                       | 08289          | SM-73-48-13    |
| B-1  | 28   | 5310-00-595-6761                       | 96906          | MS15795-802    |
| B-1  | 29   | 5305-00-054-5647                       | 96906          | MS51957-13     |
| B-1  | 30   | 5910-00-010-8717                       | 81349          | M39014/01-1593 |
| B-1  | 31   | 5910-01-154-0845                       | 14655          | CD15FD471J03   |
| B-1  | 32   | 5910-01-058-9574                       | 81349          | CMR05F361F0DR  |
| B-1  | 33   | 5910-01-368-8806                       | 54296          | 142210-00      |
| B-1  | 34   | 5910-01-368-8805                       | 62462          | CLEE10M25V     |
| B-1  | 35   | 5910-01-238-7741                       | 05397          | T368D227M010AS |
| B-1  | 36   | 5961-00-458-5813                       | 81349          | JANTX1N4245    |
| B-1  | 37   | 5950-00-431-3211                       | 28480          | 9100-2251      |
| B-1  | 38   | 5950-01-277-6051                       | 09969          | IM-2 10.0UH    |
| B-1  | 39   | 5950-01-368-8927                       | 54296          | 312326-00      |
| B-1  | 40   | 5950-01-368-8928                       | 54296          | 312327-00      |
| B-1  | 41   | 5950-01-159-5785                       | 14933          | 82027-03       |
| B-1  | 42   | 5905-01-053-5784                       | 81349          | RLR07C68R0GS   |
| B-1  | 43   | 5905-01-369-6323                       | 81349          | RL42S561JTX    |
| B-1  | 44   | 5905-00-104-5755                       | 81349          | RCR20G100JS    |
| B-1  | 45   | 5905-01-158-2316                       | 81349          | RLR07C39R0GS   |
| B-1  | 46   | 5905-01-147-2331                       | 81349          | RLR07C1000GS   |
| B-1  | 47   |  | 81349          | RJ26FW501R     |
| B-1  | 48   | 5905-01-049-3123                       | 81349          | RLR07C2200GS   |
| B-1  | 49   | 5905-00-419-7413                       | 81349          | RNR55C2490FS   |
| B-1  | 50   | 5905-00-264-3870                       | 81349          | RNR55C1301FS   |
| B-1  | 51   | 5905-00-935-8543                       | 81349          | RCR20G330JS    |

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| B-1  | 52   |  | 29604          | CF-07-6.80HM-5%       |
| B-1  | 53   | 5905-00-153-4354                       | 81349          | RCR42G100JS           |
| B-1  | 54   | 5950-01-368-8890                       | 54296          | 361469-00             |
| B-1  | 55   | 5950-01-368-8938                       | 54296          | 361470-00             |
| B-1  | 56   | 5950-01-368-8892                       | 54296          | 361471-00             |
| B-1  | 57   | 5962-01-156-7241                       | 81349          | M38510/11703BXC       |
| B-1  | 58   | 5999-01-188-4374                       | 81349          | M38527/02-020D        |
| B-2  | 1    | 6135-01-375-2021                       | 5P319          | BR1225-1HD            |
| B-2  | 2    | 5910-01-142-8675                       | 81349          | M39014/23-0355        |
| B-2  | 3    | 5910-01-316-6685                       | 81349          | M39014/23-0356        |
| B-2  | 4    |  | 31433          | T390A105M025AS        |
| B-2  | 5    | 5910-01-368-8807                       | 54296          | 151529-00             |
| B-2  | 6    | 5961-00-584-4527                       | 81349          | JANTX1N4148-1         |
| B-2  | 7    | 5980-01-081-9113                       | 96214          | 803415-3              |
| B-2  | 8    | 5940-01-369-9838                       | 98291          | 229-3070-00-0-47<br>0 |
| B-2  | 9    | 5920-00-402-1721                       | 81349          | FM04A125V1/4A         |
| B-2  | 10   |  | 91637          | IM2-100UH 10%         |
| B-2  | 11   | 5935-01-374-1835                       | 97913          | HGM030MEA2Y00A        |
| B-2  | 12   | 5905-01-085-1164                       | 81349          | RLR07C1001GS          |
| B-2  | 13   | 5905-01-176-3873                       | 81349          | RLR05C1002GS          |
| B-2  | 14   | 5962-01-228-8376                       | 67268          | 8405601CB             |
| B-2  | 15   | 5962-01-368-3222                       | 0B0A9          | DS1231-35             |
| B-2  | 16   | 5962-01-368-5344                       | 27014          | NSC800N-31/A+         |
| B-2  | 17   |  | 81349          | M38510/6502BRA        |
| B-2  | 18   | 5962-01-368-3224                       | 54296          | 102-0689-002          |
| B-2  | 19   | 5962-01-368-3225                       | 61892          | UPD446C-2             |
| B-2  | 20   | 5962-01-240-5625                       | 81349          | M38510/65001BCA       |
| B-2  | 21   | 5962-01-272-4446                       | 81349          | M38510/65802BEA       |
| B-2  | 22   | 5962-01-327-6566                       | 0B0A9          | DS1210                |
| B-2  | 23   | 5962-01-120-6421                       | 27014          | LM340LAZ-5.0          |
| B-2  | 24   | 5935-01-368-8821                       | 55322          | IC0-628-NGT           |
| B-3  | 1    | 5910-01-316-6685                       | 81349          | M39014/23-0356        |
| B-3  | 2    | 5910-01-077-0186                       | 31433          | T370C225K025AS        |
| B-3  | 3    |  | 81349          | M39014/23-0338        |
| B-3  | 4    | 5910-01-184-5316                       | 81349          | M39014/23-0349        |
| B-3  | 5    | 5910-01-229-7137                       | 31433          | T370E226M015AS        |
| B-3  | 6    | 5910-00-113-5278                       | 81349          | M39014/01-1587        |
| B-3  | 7    | 5910-01-368-8795                       | 54296          | 11112000              |
| B-3  | 8    | 5910-01-100-8108                       | 31433          | T370D106M020AS        |
| B-3  | 9    | 5910-01-038-7894                       | 81349          | CMR03E200D0CR         |
| B-3  | 10   | 5910-01-257-0422                       | 93790          | CD5EC330J03           |
| B-3  | 11   | 5910-01-029-0728                       | 81349          | CMR03C100D0CR         |
| B-3  | 12   | 5910-01-253-6210                       | 56289          | 199D476X9025EE2       |
| B-3  | 13   | 5910-01-316-6686                       | 81349          | M39014/23-0374        |
| B-3  | 14   | 5961-01-135-1334                       | 52673          | S12-3542              |
| B-3  | 15   | 5961-00-584-4527                       | 81349          | JANTX1N4148-1         |
| B-3  | 16   | 5980-01-081-9113                       | 96214          | 803415-3              |
| B-3  | 17   | 5920-00-402-1721                       | 81349          | FM04A125V1/4A         |
| B-3  | 18   | 5950-01-369-1509                       | 34899          | 2673000201            |
| B-3  | 19   | 5950-00-035-4416                       | 96906          | MS75083-13            |

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| B-3  | 20   | 5950-00-325-6462                    | 96906       | MS75085-11            |
| B-3  | 21   | 5950-01-252-0963                    | 99800       | 1025-68               |
| B-3  | 22   | 5935-01-374-1835                    | 97913       | HGM030MEA2Y00A        |
| B-3  | 23   | 5961-00-836-6663                    | 81349       | JANTX2N918            |
| B-3  | 24   | 5961-00-925-3777                    | 81349       | JAN2N2907A            |
| B-3  | 25   | 5961-01-368-5229                    | 57304       | 45002600              |
| B-3  | 26   | 5905-01-173-8931                    | 81349       | RLR05C1001GS          |
| B-3  | 27   | 5905-01-202-5861                    | 81349       | RLR05C10R0GS          |
| B-3  | 28   |                                     | 81349       | R426FW503R            |
| B-3  | 29   | 5905-01-195-7189                    | 81349       | RLR05C1004GS          |
| B-3  | 30   | 5905-01-175-0707                    | 81349       | RLR05C4700GS          |
| B-3  | 31   | 5905-01-175-0706                    | 81349       | RLR05C2700GS          |
| B-3  | 32   | 5905-01-176-7352                    | 81349       | RLR05C2702GS          |
| B-3  | 33   | 5905-01-176-3870                    | 81349       | RLR05C4702GS          |
| B-3  | 34   | 5905-01-177-9467                    | 81349       | RLR05C3301GS          |
| B-3  | 35   | 5905-01-175-7857                    | 81349       | RLR05C2201GS          |
| B-3  | 36   | 5905-01-176-3873                    | 81349       | RLR05C1002GS          |
| B-3  | 37   | 5905-01-177-4405                    | 81349       | RLR05C3602GS          |
| B-3  | 38   | 5905-01-191-9611                    | 81349       | RLR05C2202GS          |
| B-3  | 39   | 5905-01-177-1911                    | 81349       | RLR05C1202GS          |
| B-3  | 40   | 5905-01-173-8933                    | 81349       | RLR05C3901GS          |
| B-3  | 41   | 5905-01-159-0772                    | 81349       | RLR05C1000GS          |
| B-3  | 42   | 5905-01-176-7356                    | 81349       | RLR05C1501GS          |
| B-3  | 43   | 5905-01-186-4929                    | 81349       | RLR05C1500GS          |
| B-3  | 44   | 5905-00-491-6344                    | 81349       | RCR05G120JS           |
| B-3  | 45   | 5950-01-368-8894                    | 29971       | TR50-200AB-5          |
| B-3  | 46   | 5955-01-367-9432                    | 54296       | 951943-00             |
| B-3  | 47   | 5962-01-228-8376                    | 67268       | 8405601CB             |
| B-3  | 48   | 5962-01-272-4446                    | 81349       | M38510/65802BEA       |
| B-3  | 49   | 5962-01-265-2532                    | 53469       | SP8793DP              |
| B-3  | 50   | 5962-01-319-4588                    | 04713       | MC145156P             |
| B-3  | 51   | 5962-01-364-7953                    | 89536       | 855130                |
| B-3  | 52   | 5962-01-367-8859                    | 54296       | 460259-00             |
| B-3  | 53   | 5962-01-367-8167                    | 54296       | 460260-00             |
| B-3  | 54   | 5962-01-367-8858                    | 01295       | TL750L08CLP           |
| B-3  | 55   | 5962-01-191-1026                    | 05157       | 3610195-005           |
| B-3  | 56   | 5950-01-368-8929                    | 54296       | 440-0001-001          |
| B-3  | 57   | 5950-01-368-8930                    | 54296       | 440-0002-001          |
| B-3  | 58   | 5999-01-199-7477                    | 81349       | M38527/01-040D        |
| B-3  | 59   | 5940-01-369-9838                    | 98291       | 229-3070-00-0-47<br>0 |
| B-4  | 1    | 5910-01-316-6685                    | 81349       | M39014/23-0356        |
| B-4  | 2    | 5910-01-093-6324                    | 81349       | CMR03F391GOYR         |
| B-4  | 3    | 5910-01-229-7137                    | 31433       | T370E226M015AS        |
| B-4  | 4    | 5910-00-010-8721                    | 81349       | M39014/02-1419        |
| B-4  | 5    | 5910-00-426-0330                    | 88818       | C605006182            |
| B-4  | 6    | 5910-01-043-8882                    | 81349       | CMR03E300GOCR         |
| B-4  | 7    | 5910-01-213-0761                    | 37695       | 265011-39             |
| B-4  | 8    | 5910-01-077-0186                    | 31433       | T370C225K025AS        |
| B-4  | 9    |                                     | 81349       | M39014/23-0338        |
| B-4  | 10   | 5910-01-087-6360                    | 81349       | CMR03F101GOCR         |

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| B-4  | 11   | 5910-01-038-7900                | 81349                 | CMR03C7R0DOCR  |
| B-4  | 12   | 5910-01-031-9849                | 81349                 | CMR03C180DOCR  |
| B-4  | 13   | 5910-01-368-8993                | 51406                 | TZ03Z070E      |
| B-4  | 14   | 5910-01-029-0728                | 81349                 | CMR03C100DOCR  |
| B-4  | 15   | 5910-01-089-8731                | 81349                 | CMR03F910GOCR  |
| B-4  | 16   | 5910-01-118-9102                | 81349                 | M39014/23-0373 |
| B-4  | 17   |                                 | 31433                 | T370C105M025AS |
| B-4  | 18   | 5910-01-089-9766                | 81349                 | CMR03F121GOCR  |
| B-4  | 19   | 5961-01-125-3746                | 04713                 | MV209          |
| B-4  | 20   | 5961-00-584-4527                | 81349                 | JANTX1N4148-1  |
| B-4  | 21   | 5980-01-081-9113                | 96214                 | 803415-3       |
| B-4  | 22   | 5920-00-402-1721                | 81349                 | FM04A125V1/4A  |
| B-4  | 23   | 5950-01-369-1509                | 34899                 | 2673000201     |
| B-4  | 24   | 5950-01-368-9048                | 34899                 | 2673004701     |
| B-4  | 25   | 5915-01-368-5143                | 54296                 | 952354-10      |
| B-4  | 26   | 5950-00-779-3452                | 96906                 | MS75083-3      |
| B-4  | 27   | 5950-01-240-8137                | 28480                 | 9100-2272      |
| B-4  | 28   | 5950-00-412-4341                | 59474                 | 4416-1J        |
| B-4  | 29   | 5950-00-035-4416                | 96906                 | MS75083-13     |
| B-4  | 30   | 5950-00-211-3995                | 96906                 | MS75083-11     |
| B-4  | 31   | 5950-01-369-0816                | 54296                 | 312316-00      |
| B-4  | 32   | 5950-01-252-0963                | 99800                 | 1025-68        |
| B-4  | 33   | 5950-00-325-6462                | 96906                 | MS75085-11     |
| B-4  | 34   | 5935-01-374-1835                | 97913                 | HGM030MEA2Y00A |
| B-4  | 35   | 5961-00-836-6663                | 81349                 | JANTX2N918     |
| B-4  | 36   | 5961-01-282-0064                | 04713                 | MPF914         |
| B-4  | 37   | 5961-01-045-9170                | 04713                 | MPSH81         |
| B-4  | 38   | 5961-01-368-5229                | 57304                 | 45002600       |
| B-4  | 39   | 5905-01-195-7189                | 81349                 | RLR05C1004GS   |
| B-4  | 40   | 5905-01-173-8931                | 81349                 | RLR05C1001GS   |
| B-4  | 41   | 5905-01-165-5208                | 81349                 | RLR05C2203GS   |
| B-4  | 42   | 5905-01-202-5861                | 81349                 | RLR05C10R0GS   |
| B-4  | 43   | 5905-01-159-0772                | 81349                 | RLR05C1000GS   |
| B-4  | 44   | 5905-01-176-7352                | 81349                 | RLR05C2702GS   |
| B-4  | 45   | 5905-01-173-8933                | 81349                 | RLR05C3901GS   |
| B-4  | 46   | 5905-01-176-3873                | 81349                 | RLR05C1002GS   |
| B-4  | 47   | 5905-01-170-9082                | 81349                 | RLR05C22R0GS   |
| B-4  | 48   | 5905-01-170-9063                | 81349                 | RLR05C6201GS   |
| B-4  | 49   | 5905-01-176-3875                | 81349                 | RLR05C2200GS   |
| B-4  | 50   | 5905-01-176-7356                | 81349                 | RLR05C1501GS   |
| B-4  | 51   | 5905-01-186-3807                | 81349                 | RLR05C6800GS   |
| B-4  | 52   | 5905-01-158-8981                | 81349                 | RLR05C2701GS   |
| B-4  | 53   | 5905-01-176-7353                | 81349                 | RLR05C51R0GS   |
| B-4  | 54   | 5905-01-233-1870                | 81349                 | RLR05C91R0GS   |
| B-4  | 55   | 5905-01-173-8932                | 81349                 | RLR05C4701GS   |
| B-4  | 56   | 5905-01-177-4403                | 81349                 | RLR05C1801GS   |
| B-4  | 57   | 5905-01-186-4929                | 81349                 | RLR05C1500GS   |
| B-4  | 58   | 5905-01-176-7355                | 81349                 | RLR05C15R0GS   |
| B-4  | 59   | 5905-01-189-9670                | 81349                 | RLR05C7501GS   |
| B-4  | 60   | 5962-01-237-1546                | 67268                 | 8409801CA      |
| B-4  | 61   | 5962-01-319-4588                | 04713                 | MC145156P      |

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| FIG. | ITEM | FIGURE AND ITEM NUMBER<br>STOCK NUMBER | INDEX<br>CAGEC | PART NUMBER           |
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| B-4  | 62   | 5962-01-265-2532                       | 53469          | SP8793DP              |
| B-4  | 63   | 5962-01-191-1026                       | 05157          | 3610195-005           |
| B-4  | 64   | 5962-01-367-8858                       | 01295          | TL750L08CLP           |
| B-4  | 65   | 5962-01-367-8168                       | 18324          | SA602N                |
| B-4  | 66   | 5962-01-294-1305                       | 94580          | 10115418-101          |
| B-4  | 67   | 5999-01-199-7477                       | 13103          | 7717-16DAP            |
| B-4  | 68   | 5940-01-369-9838                       | 98291          | 229-3070-00-0-47<br>0 |
| B-5  | 1    | 5910-01-368-3715                       | 93790          | CD5EC510J03           |
| B-5  | 2    | 5910-01-118-9102                       | 81349          | M39014/23-0373        |
| B-5  | 3    | 5910-01-187-1708                       | 81349          | M39014/23-0310        |
| B-5  | 4    |  | 51406          | TZ03Z500F             |
| B-5  | 5    | 5910-01-316-6685                       | 81349          | M39014/23-0356        |
| B-5  | 6    | 5910-01-368-8796                       | 04222          | SR202A360JAA          |
| B-5  | 7    | 5910-01-368-8808                       | 56289          | 199D225X0025BA1       |
| B-5  | 8    | 5910-00-426-0330                       | 88818          | C605006182            |
| B-5  | 9    | 5910-01-229-7137                       | 31433          | T370E226M015AS        |
| B-5  | 10   | 5910-01-214-0376                       | 81349          | M39014/23-0328        |
| B-5  | 11   | 5910-01-100-8108                       | 31433          | T370D106M020AS        |
| B-5  | 12   | 5910-01-367-7888                       | 81349          | M39014/23-0315        |
| B-5  | 13   | 5910-01-184-7936                       | 81349          | M39014/23-0331        |
| B-5  | 14   | 5910-01-165-5249                       | 03640          | 6116730-1             |
| B-5  | 15   | 5910-01-077-0186                       | 31433          | T370C225K025AS        |
| B-5  | 16   | 5910-01-118-9101                       | 81349          | M39014/23-0325        |
| B-5  | 17   |  | 81349          | M39014/23-0338        |
| B-5  | 18   | 5910-01-080-0700                       | 18796          | 8131-050XR224M        |
| B-5  | 19   | 5961-00-584-4527                       | 81349          | JANTX1N4148-1         |
| B-5  | 20   | 5961-01-135-1334                       | 52673          | S12-3542              |
| B-5  | 21   | 5980-01-305-7666                       | 28480          | 1990-1169             |
| B-5  | 22   | 5920-01-318-9440                       | 06994          | 4301001-2R000         |
| B-5  | 23   | 5950-01-368-8932                       | 54296          | 312317-00             |
| B-5  | 24   | 5950-01-277-6051                       | 09969          | IM-2 10.0UH           |
| B-5  | 25   | 5950-00-031-4571                       | 96906          | MS75084-8             |
| B-5  | 26   | 5950-01-368-8931                       | 54296          | 129-0105-001          |
| B-5  | 27   | 5935-01-374-1835                       | 97913          | HGM030MEA2Y00A        |
| B-5  | 28   | 5961-00-434-3022                       | 14304          | Q25-0005-000          |
| B-5  | 29   | 5961-01-274-7544                       | 17856          | J176                  |
| B-5  | 30   | 5905-01-159-0772                       | 81349          | RLR05C1000GS          |
| B-5  | 31   | 5905-01-155-8627                       | 81349          | RLR05C5601GS          |
| B-5  | 32   | 5905-01-186-3798                       | 81349          | RLR05C270GS           |
| B-5  | 33   | 5905-01-176-7353                       | 81349          | RLR05C510GS           |
| B-5  | 34   | 5905-01-175-0707                       | 81349          | RLR05C4700GS          |
| B-5  | 35   | 5905-01-170-9063                       | 81349          | RLR05C6201GS          |
| B-5  | 36   | 5905-01-176-3870                       | 81349          | RLR05C4702GS          |
| B-5  | 37   | 5905-01-191-9611                       | 81349          | RLR05C2202GS          |
| B-5  | 38   | 5905-01-159-0773                       | 81349          | RLR05C1802GS          |
| B-5  | 39   | 5905-01-179-9749                       | 81349          | RLR05C8201GS          |
| B-5  | 40   | 5905-01-240-9165                       | 81349          | RLR05C8203GS          |
| B-5  | 41   | 5905-01-194-7241                       | 81349          | RLR05C1103GS          |
| B-5  | 42   | 5905-01-177-1078                       | 81349          | RLR05C1303GS          |
| B-5  | 43   | 5905-00-413-1199                       | 81349          | RCR05G162JS           |

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| B-5  | 44   | 5905-01-177-4403             | 81349              | RLR05C1801GS          |
| B-5  | 45   | 5905-01-176-3873             | 81349              | RLR05C1002GS          |
| B-5  | 46   | 5905-01-176-3872             | 81349              | RLR05C1003GS          |
| B-5  | 47   | 5905-01-188-8105             | 81349              | RLR05C9101GS          |
| B-5  | 48   | 5905-01-158-8981             | 81349              | RLR05C2701GS          |
| B-5  | 49   | 5905-01-173-8931             | 81349              | RLR05C1001GS          |
| B-5  | 50   | 5905-01-176-9307             | 81349              | RLR05C1800GS          |
| B-5  | 51   | 5905-01-186-3807             | 81349              | RLR05C6800GS          |
| B-5  | 52   | 5905-01-195-7189             | 81349              | RLR05C1004GS          |
| B-5  | 53   | 5905-01-153-7449             | 81349              | RLR05C5101GS          |
| B-5  | 54   | 5905-01-185-4114             | 81349              | RLR05C8200GS          |
| B-5  | 55   | 5905-01-185-0555             | 81349              | RJR26FX503R           |
| B-5  | 56   | 5905-01-176-3875             | 81349              | RLR05C2200GS          |
| B-5  | 57   | 5905-01-179-8489             | 81349              | RLR05C1301GS          |
| B-5  | 58   | 5905-01-170-9084             | 81349              | RLR05C2401GS          |
| B-5  | 59   | 5905-01-176-7338             | 81349              | RLR05C1102GS          |
| B-5  | 60   | 5905-01-176-7352             | 81349              | RLR05C2702GS          |
| B-5  | 61   | 5905-01-175-0705             | 81349              | RLR05C4302GS          |
| B-5  | 62   | 5905-01-186-8261             | 81349              | RLR05C4703GS          |
| B-5  | 63   | 5905-01-274-9018             | 81349              | RLR05C5103GS          |
| B-5  | 64   | 5905-01-167-5098             | 81349              | RLR05C6802GS          |
| B-5  | 65   | 5905-01-152-8934             | 81349              | RLR05C56R0GS          |
| B-5  | 66   | 5905-01-129-2386             | 14304              | R65-0004-109          |
| B-5  | 67   | 5962-01-280-2203             | 67268              | 5962-8765701GA        |
| B-5  | 68   | 5962-01-367-8168             | 18324              | SA602N                |
| B-5  | 69   | 5962-01-267-7055             | 27014              | LM258J                |
| B-5  | 70   | 5962-01-234-0865             | 52648              | SL6270C-DP            |
| B-5  | 71   | 5962-01-306-8886             | 67268              | 5962-8857101CA        |
| B-5  | 72   | 5962-01-367-8860             | 01295              | TL062IP               |
| B-5  | 73   | 5962-01-367-8858             | 01295              | TL750L08CLP           |
| B-5  | 74   | 5962-01-367-8169             | 54296              | 460251-00             |
| B-5  | 75   | 5962-01-120-6421             | 27014              | LM340LAZ-5.0          |
| B-5  | 76   | 5940-01-369-9838             | 98291              | 229-3070-00-0-47<br>0 |
| B-6  | 1    | 5910-01-316-6685             | 81349              | M39014/23-0356        |
| B-6  | 2    | 5910-01-316-6686             | 81349              | M39014/23-0374        |
| B-6  | 3    |                              | 31433              | T390A105M025AS        |
| B-6  | 4    | 5910-01-077-0186             | 31433              | T370C225K025AS        |
| B-6  | 5    | 5961-01-135-1334             | 52673              | S12-3542              |
| B-6  | 6    | 5961-00-584-4527             | 81349              | JANTX1N4148-1         |
| B-6  | 7    | 5980-01-305-7666             | 28480              | 1990-1169             |
| B-6  | 8    | 5920-00-402-1721             | 81349              | FM04A125V1/4A         |
| B-6  | 9    | 5950-01-369-1509             | 34899              | 2673000201            |
| B-6  | 10   | 5915-01-368-5144             | 54296              | 952352-10             |
| B-6  | 11   | 5915-01-368-5145             | 54296              | 952353-10             |
| B-6  | 12   | 5950-01-240-8137             | 28480              | 9100-2272             |
| B-6  | 13   | 5935-01-374-1835             | 97913              | HGM030MEA2Y00A        |
| B-6  | 14   | 5961-00-858-3826             | 81349              | JANTX2N2222A          |
| B-6  | 15   | 5961-00-434-3022             | 14304              | Q25-0005-000          |
| B-6  | 16   | 5905-01-173-8099             | 81349              | RLR05C3302GS          |
| B-6  | 17   | 5905-01-159-0772             | 81349              | RLR05C1000GS          |

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| B-6  | 18   | 5905-01-176-3873                             | 81349          | RLR05C1002GS     |
| B-6  | 19   | 5905-01-165-5208                             | 81349          | RLR05C2203GS     |
| B-6  | 20   | 5905-01-191-9611                             | 81349          | RLR05C2202GS     |
| B-6  | 21   | 5905-01-175-0707                             | 81349          | RLR05C4700GS     |
| B-6  | 22   | 5905-01-173-8931                             | 81349          | RLR05C1001GS     |
| B-6  | 23   | 5905-01-176-3875                             | 81349          | RLR05C2200GS     |
| B-6  | 24   | 5905-01-185-4114                             | 81349          | RLR05C8200GS     |
| B-6  | 25   | 5905-01-206-1181                             | 81349          | RJR26FW501R      |
| B-6  | 26   | 5905-01-173-8932                             | 81349          | RLR05C4701GS     |
| B-6  | 27   | 5905-01-202-5861                             | 81349          | RLR05C10R0GS     |
| B-6  | 28   | 5905-01-176-7353                             | 81349          | RLR05C51R0GS     |
| B-6  | 29   |  | 54296          | 123-0042-001     |
| B-6  | 30   | 5999-01-199-7477                             | 13103          | 7717-16DAP       |
| B-6  | 31   | 5940-01-369-9838                             | 98291          | 229-3070-00-0-47 |
|      |      |  |                | 0                |
| B-7  | 1    | 5910-01-118-9102                             | 81349          | M39014/23-0373   |
| B-7  | 2    | 5910-01-093-9498                             | 81349          | CMR03E620GOCR    |
| B-7  | 3    | 5910-01-087-6360                             | 81349          | CMR03F101GOCR    |
| B-7  | 4    | 5910-01-089-8731                             | 81349          | CMR03F910GOCR    |
| B-7  | 5    | 5910-01-368-3715                             | 93790          | CD5EC510J03      |
| B-7  | 6    |  | 81349          | M39014/23-0338   |
| B-7  | 7    | 5910-01-316-6685                             | 81349          | M39014/23-0356   |
| B-7  | 8    | 5910-01-368-8803                             | 04222          | SR152A750JAA     |
| B-7  | 9    | 5910-01-368-8994                             | 54296          | 105-0033-001     |
| B-7  | 10   |  | 51406          | TZ03Z500F        |
| B-7  | 11   | 5910-01-367-7889                             | 81349          | M39014/23-0316   |
| B-7  | 12   | 5910-01-184-7936                             | 81349          | M39014/23-0331   |
| B-7  | 13   | 5910-01-208-9091                             | 59660          | 8121-100-C0G0-10 |
|      |      |  |                | 1K               |
| B-7  | 14   | 5910-01-190-6678                             | 61637          | C320C152J1G5CA   |
| B-7  | 15   | 5910-01-213-0761                             | 37695          | 265011-39        |
| B-7  | 16   | 5910-01-043-8882                             | 81349          | CMR03E300GOCR    |
| B-7  | 17   | 5910-01-093-6316                             | 81349          | CMR03F181GOAR    |
| B-7  | 18   | 5910-01-077-0186                             | 31433          | T370C225K025AS   |
| B-7  | 19   | 5910-01-100-8108                             | 31433          | T370D106M020AS   |
| B-7  | 20   | 5910-01-367-7890                             | 81349          | M39014/23-0306   |
| B-7  | 21   | 5910-01-367-7891                             | 81349          | M39014/23-0321   |
| B-7  | 22   | 5961-01-135-1334                             | 52673          | S12-3542         |
| B-7  | 23   | 5961-00-584-4527                             | 81349          | JANTX1N4148-1    |
| B-7  | 24   | 5961-01-023-5750                             | 28480          | 5082-3081        |
| B-7  | 25   | 5980-01-305-7666                             | 28480          | 1990-1169        |
| B-7  | 26   | 5920-00-402-1721                             | 81349          | FM04A125V1/4A    |
| B-7  | 27   | 5950-01-368-9048                             | 34899          | 2673004701       |
| B-7  | 28   | 5950-01-369-0819                             | 71895          | 1325-333         |
| B-7  | 29   | 5950-01-368-8934                             | 54296          | 312320-00        |
| B-7  | 30   | 5950-01-368-8935                             | 54296          | 312328-00        |
| B-7  | 31   | 5950-01-369-0820                             | 71895          | 1325-272         |
| B-7  | 32   | 5950-01-368-8932                             | 54296          | 312317-00        |
| B-7  | 33   | 5950-01-368-8933                             | 54296          | 129-0110-001     |
| B-7  | 34   | 5950-01-368-8931                             | 54296          | 129-0105-001     |
| B-7  | 35   | 5935-01-374-1835                             | 97913          | HGM030MEA2Y00A   |



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| FIG. | ITEM | FIGURE AND ITEM<br>STOCK NUMBER | NUMBER INDEX<br>CAGEC | PART NUMBER      |
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| B-7  | 36   | 5961-01-368-5230                | 4T165                 | NE85632          |
| B-7  | 37   | 5961-01-368-5229                | 57304                 | 45002600         |
| B-7  | 38   | 4140-00-442-3490                | 92702                 | WS2107F-1110     |
| B-7  | 39   | 5961-00-434-3022                | 14304                 | Q25-0005-000     |
| B-7  | 40   | 5961-00-858-3826                | 81349                 | JANTX2N2222A     |
| B-7  | 41   | 5905-01-175-0707                | 81349                 | RLR05C4700GS     |
| B-7  | 42   | 5905-01-173-8931                | 81349                 | RLR05C1001GS     |
| B-7  | 43   |                                 | 54296                 | 214471-00        |
| B-7  | 44   | 5905-00-491-6344                | 81349                 | RCR05G120JS      |
| B-7  | 45   | 5905-01-177-9467                | 81349                 | RLR05C3301GS     |
| B-7  | 46   | 5905-01-186-3807                | 81349                 | RLR05C6800GS     |
| B-7  | 47   |                                 | 54296                 | 214271-00        |
| B-7  | 48   | 5905-01-186-6767                | 81349                 | RLR05C3300GS     |
| B-7  | 49   | 5905-01-185-5597                | 81349                 | RLR05C62R0GS     |
| B-7  | 50   | 5905-01-176-3858                | 81349                 | RLR05C3600GS     |
| B-7  | 51   | 5905-01-176-7353                | 81349                 | RLR05C51R0GS     |
| B-7  | 52   | 5905-01-176-7347                | 81349                 | RLR05C1600GS     |
| B-7  | 53   | 5905-01-202-5861                | 81349                 | RLR05C10R0GS     |
| B-7  | 54   | 5905-01-176-3870                | 81349                 | RLR05C4702GS     |
| B-7  | 55   | 5905-01-170-9082                | 81349                 | RLR05C22R0GS     |
| B-7  | 56   | 5905-01-159-0772                | 81349                 | RLR05C1000GS     |
| B-7  | 57   | 5905-01-176-3873                | 81349                 | RLR05C1002GS     |
| B-7  | 58   | 5905-01-259-3515                | 81349                 | RJR26FX501R      |
| B-7  | 59   |                                 | 54296                 | 214393-00        |
| B-7  | 60   | 5905-01-173-8933                | 81349                 | RLR05C3901GS     |
| B-7  | 61   | 5905-01-176-9305                | 81349                 | RLR05C1502GS     |
| B-7  | 62   | 5905-01-173-8099                | 81349                 | RLR05C3302GS     |
| B-7  | 63   | 5905-01-159-0773                | 81349                 | RLR05C1802GS     |
| B-7  | 64   | 5905-01-176-7355                | 81349                 | RLR05C15R0GS     |
| B-7  | 65   | 5999-01-158-7233                | 00779                 | 60803-2          |
| B-7  | 66   | 5895-01-135-1852                | 15542                 | TFM2             |
| B-7  | 67   | 5962-01-367-8168                | 18324                 | SA602N           |
| B-7  | 68   | 5962-01-267-7055                | 27014                 | LM258J           |
| B-7  | 69   | 5962-01-110-3480                | 04713                 | MC78L08ACP       |
| B-7  | 70   | 5915-01-368-5146                | 54296                 | 952351-10        |
| B-7  | 71   | 5950-01-368-8899                | 54296                 | 440-0003-001     |
| B-7  | 72   | 5950-01-368-8900                | 54296                 | 440-0003-002     |
| B-7  | 73   | 5950-01-368-8901                | 54296                 | 440-0003-003     |
| B-7  | 74   | 5940-01-369-9838                | 98291                 | 229-3070-00-0-47 |
|      |      |                                 |                       | 0                |
| B-8  | 1    |                                 | 81349                 | M39014/23-0338   |
| B-8  | 2    | 5910-01-118-9102                | 81349                 | M39014/23-0373   |
| B-8  | 3    | 5910-01-316-6685                | 81349                 | M39014/23-0356   |
| B-8  | 4    | 5910-01-031-9856                | 81349                 | CMR03E430GOCR    |
| B-8  | 5    | 5910-01-090-1530                | 81349                 | CMR03E820GOCR    |
| B-8  | 6    | 5910-01-100-8108                | 31433                 | T370D106M020AS   |
| B-8  | 7    | 5910-01-093-6317                | 81349                 | CMR03F201GOAR    |
| B-8  | 8    | 5910-01-094-1397                | 81349                 | CMR03F301GOYR    |
| B-8  | 9    | 5910-01-229-7137                | 31433                 | T370E226M015AS   |
| B-8  | 10   | 5910-01-031-9849                | 81349                 | CMR03C180DOCR    |
| B-8  | 11   | 5910-00-426-0330                | 88818                 | C605006182       |

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| B-8  | 12   | 5910-01-031-9855                       | 81349          | CMR03C120DOCR  |
| B-8  | 13   | 5910-01-086-6356                       | 81349          | CMR03E560G0CR  |
| B-8  | 14   | 5910-01-038-7892                       | 81349          | CMR03E270G0CR  |
| B-8  | 15   | 5910-01-029-0728                       | 81349          | CMR03C100DOCR  |
| B-8  | 16   | 5910-00-010-8721                       | 81349          | M39014/02-1419 |
| B-8  | 17   | 5910-01-213-0761                       | 37695          | 265011-39      |
| B-8  | 18   | 5910-01-038-7907                       | 81349          | CMR03C5R0D0CR  |
| B-8  | 19   | 5961-01-135-1334                       | 52673          | S12-3542       |
| B-8  | 20   | 5961-00-584-4527                       | 81349          | JANTX1N4148-1  |
| B-8  | 21   | 5961-01-023-5750                       | 28480          | 5082-3081      |
| B-8  | 22   | 5961-00-458-5813                       | 81349          | JANTX1N4245    |
| B-8  | 23   | 5980-01-305-7666                       | 28480          | 1990-1169      |
| B-8  | 24   | 5920-01-309-5480                       | 75915          | 251001         |
| B-8  | 25   | 5950-01-368-8937                       | 54296          | 312324-00      |
| B-8  | 26   | 5950-00-097-7570                       | 96906          | MS90538-19     |
| B-8  | 27   | 5950-01-368-8936                       | 54296          | 129-0106-001   |
| B-8  | 28   | 5950-00-325-6462                       | 96906          | MS75085-11     |
| B-8  | 29   | 5935-01-374-1835                       | 97913          | HGM030MEA2Y00A |
| B-8  | 30   | 5961-00-434-3022                       | 14304          | Q25-0005-000   |
| B-8  | 31   | 5961-01-368-5229                       | 57304          | 45002600       |
| B-8  | 32   | 5961-00-401-0507                       | 15818          | 2N5179         |
| B-8  | 33   | 5961-00-460-5007                       | 80131          | 2N4427         |
| B-8  | 34   | 5905-01-182-4648                       | 81349          | RLR05C3000GS   |
| B-8  | 35   | 5905-01-179-7506                       | 81349          | RLR05C18R0GS   |
| B-8  | 36   | 5905-01-176-7347                       | 81349          | RLR05C1600GS   |
| B-8  | 37   | 5905-01-173-8931                       | 81349          | RLR05C1001GS   |
| B-8  | 38   | 5905-01-240-9165                       | 81349          | RLR05C8203GS   |
| B-8  | 39   | 5905-01-176-3870                       | 81349          | RLR05C4702GS   |
| B-8  | 40   | 5905-01-159-0772                       | 81349          | RLR05C1000GS   |
| B-8  | 41   | 5905-01-170-9082                       | 81349          | RLR05C22R0GS   |
| B-8  | 42   | 5905-01-176-3873                       | 81349          | RLR05C1002GS   |
| B-8  | 43   | 5905-01-173-8932                       | 81349          | RLR05C4701GS   |
| B-8  | 44   | 5905-01-176-3872                       | 81349          | RLR05C1003GS   |
| B-8  | 45   | 5905-01-158-8981                       | 81349          | RLR05C2701GS   |
| B-8  | 46   | 5905-01-186-4902                       | 81349          | RLR05C9100GS   |
| B-8  | 47   | 5905-01-176-7358                       | 81349          | RLR05C39R0GS   |
| B-8  | 48   | 5905-01-186-6767                       | 81349          | RLR05C3300GS   |
| B-8  | 49   | 5905-01-176-7328                       | 81349          | RLR05C68R0GS   |
| B-8  | 50   | 5905-01-184-5231                       | 81349          | RLR05C33R0GS   |
| B-8  | 51   | 5905-01-202-5861                       | 81349          | RLR05C10R0GS   |
| B-8  | 52   | 5905-01-142-2888                       | 81349          | RLR07C10R0GS   |
| B-8  | 53   | 5905-01-165-8590                       | 81349          | RLR07C22R0GS   |
| B-8  | 54   | 5905-01-175-0706                       | 81349          | RLR05C2700GS   |
| B-8  | 55   | 5905-01-162-0721                       | 81349          | RLR05C8R20GS   |
| B-8  | 56   | 5905-01-158-4989                       | 81349          | RLR05C1300GS   |
| B-8  | 57   | 5905-01-167-5098                       | 81349          | RLR05C6802GS   |
| B-8  | 58   | 5905-01-053-5784                       | 81349          | RLR07C68R0GS   |
| B-8  | 59   | 5950-01-368-8896                       | 54296          | 123-0040-001   |
| B-8  | 60   | 5950-01-368-8895                       | 54296          | 123-0039-001   |
| B-8  | 61   | 5950-01-368-8939                       | 54296          | 123-0041-001   |
| B-8  | 62   | 5950-01-368-8897                       | 54296          | 123-0043-001   |

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| B-8  | 63   | 5895-01-135-1852                       | 15542          | TFM2                  |
| B-8  | 64   | 5962-01-367-8861                       | 66958          | L272M                 |
| B-8  | 65   | 5962-00-248-5241                       | 12040          | LM109H                |
| B-8  | 66   | 5950-01-368-9669                       | 54296          | 440-0003-013          |
| B-8  | 67   | 5950-01-368-9670                       | 54296          | 440-0003-014          |
| B-8  | 68   | 5950-01-368-8902                       | 54296          | 440-0003-007          |
| B-8  | 69   | 5950-01-368-8903                       | 54296          | 440-0003-008          |
| B-8  | 70   | 5950-01-368-8904                       | 54296          | 440-0003-009          |
| B-8  | 71   | 5950-01-368-8905                       | 54296          | 440-0003-010          |
| B-8  | 72   | 5950-01-368-8906                       | 54296          | 440-0003-011          |
| B-8  | 73   | 5950-01-368-9668                       | 54296          | 440-0003-012          |
| B-8  | 74   | 5940-01-369-9838                       | 98291          | 229-3070-00-0-47<br>0 |
| B-9  | 1    | 5910-01-165-5249                       | 03640          | 6116730-1             |
| B-9  | 2    | 5910-01-316-6685                       | 81349          | M39014/23-0356        |
| B-9  | 3    | 5910-01-217-8279                       | 81349          | CCR06CG911FS          |
| B-9  | 4    | 5910-01-238-1395                       | 81349          | CCR06CG162FS          |
| B-9  | 5    | 5910-01-218-7756                       | 81349          | CCR06CG152FS          |
| B-9  | 6    | 5910-01-369-7514                       | 81349          | CCR06CG621FM          |
| B-9  | 7    | 5910-01-368-8788                       | 54296          | 108-1031-431          |
| B-9  | 8    | 5910-01-368-8789                       | 54296          | 108-1031-821          |
| B-9  | 9    | 5910-01-368-3713                       | 54296          | 108-1031-751          |
| B-9  | 10   | 5910-01-368-3714                       | 54296          | 108-1031-151          |
| B-9  | 11   | 5910-01-368-8786                       | 54296          | 108-1031-301          |
| B-9  | 12   | 5910-01-368-8790                       | 54296          | 108-1031-561          |
| B-9  | 13   | 5910-01-368-8787                       | 54296          | 108-1031-501          |
| B-9  | 14   | 5910-01-368-8785                       | 54296          | 108-1031-201          |
| B-9  | 15   | 5910-01-368-8791                       | 54296          | 108-1031-161          |
| B-9  | 16   | 5910-01-368-8792                       | 54296          | 108-1031-331          |
| B-9  | 17   | 5910-01-368-8784                       | 54296          | 108-1031-101          |
| B-9  | 18   | 5961-00-584-4527                       | 81349          | JANTX1N4148-1         |
| B-9  | 19   | 5961-00-458-5813                       | 81349          | JANTX1N4245           |
| B-9  | 20   | 5980-01-081-9113                       | 96214          | 803415-3              |
| B-9  | 21   | 5920-01-244-4238                       | 50163          | 39030030-1002         |
| B-9  | 22   | 5950-01-369-1509                       | 34899          | 2673000201            |
| B-9  | 23   | 5945-01-273-2979                       | 61529          | DS2E-M-DC12V          |
| B-9  | 24   | 5945-01-368-3073                       | 61529          | DS1EML2DC12V          |
| B-9  | 25   | 5935-01-374-1835                       | 97913          | HGM030MEA2Y00A        |
| B-9  | 26   | 5961-00-925-3777                       | 81349          | JAN2N2907A            |
| B-9  | 27   | 5905-01-176-7348                       | 81349          | RLR05C1201GS          |
| B-9  | 28   | 5905-01-176-3870                       | 81349          | RLR05C4702GS          |
| B-9  | 29   | 5905-01-175-7857                       | 81349          | RLR05C2201GS          |
| B-9  | 30   | 5962-01-098-0251                       | 56289          | UDN-2981A             |
| B-9  | 31   | 5950-01-368-8910                       | 54296          | 440-0004-001          |
| B-9  | 32   | 5950-01-368-7350                       | 54296          | 440-0005-001          |
| B-9  | 33   | 5950-01-368-8907                       | 54296          | 440-0006-001          |
| B-9  | 34   | 5950-01-368-8912                       | 54296          | 440-0007-001          |
| B-9  | 35   | 5950-01-368-8908                       | 54296          | 440-0008-001          |
| B-9  | 36   | 5950-01-368-8909                       | 54296          | 440-0009-001          |
| B-9  | 37   | 5950-01-368-8916                       | 54296          | 440-0010-001          |
| B-9  | 38   | 5950-01-368-8911                       | 54296          | 440-0011-001          |

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| B-9  | 39   | 5950-01-368-8913             | 54296              | 440-0012-001                 |
| B-9  | 40   | 5950-01-368-8917             | 54296              | 440-0013-001                 |
| B-9  | 41   | 5950-01-368-8914             | 54296              | 440-0014-001                 |
| B-9  | 42   | 5950-01-368-8915             | 54296              | 440-0015-001                 |
| B-9  | 43   | 5940-01-369-9838             | 98291              | 229-3070-00-0-47<br>0        |
| B-9  | 44   | 5999-01-367-8709             | 54296              | 426-0005-001                 |
| B-9  | 45   | 5999-01-199-7477             | 13103              | 7717-16DAP                   |
| B-10 | 1    | 5910-01-165-5249             | 03640              | 6116730-1                    |
| B-10 | 2    | 5910-01-316-6685             | 81349              | M39014/23-0356               |
| B-10 | 3    | 5910-01-368-7323             | 54296              | 108-1031-240                 |
| B-10 | 4    | 5910-01-087-6360             | 81349              | CMR03F101GOCR                |
| B-10 | 5    |                              | 81349              | M39014/23-0338               |
| B-10 | 6    | 5910-01-368-8780             | 54296              | 108-1031-121                 |
| B-10 | 7    | 5910-01-368-8785             | 54296              | 108-1031-201                 |
| B-10 | 8    | 5910-01-368-8782             | 54296              | 108-1031-181                 |
| B-10 | 9    | 5910-01-368-8783             | 54296              | 108-1031-560                 |
| B-10 | 10   | 5910-01-368-8061             | 54296              | 108-1031-680                 |
| B-10 | 11   | 5910-01-368-8781             | 54296              | 108-1031-131                 |
| B-10 | 12   | 5910-01-368-7322             | 54296              | 108-1031-111                 |
| B-10 | 13   | 5910-01-368-8060             | 54296              | 108-1031-390                 |
| B-10 | 14   | 5910-01-368-8059             | 54296              | 108-1031-360                 |
| B-10 | 15   | 5910-01-368-7324             | 54296              | 108-1031-820                 |
| B-10 | 16   | 5910-01-368-8062             | 54296              | 108-1031-750                 |
| B-10 | 17   | 5910-01-368-7323             | 54296              | 108-1031-240                 |
| B-10 | 18   | 5961-00-584-4527             | 81349              | JANTX1N4148-1                |
| B-10 | 19   | 5961-00-458-5813             | 81349              | JANTX1N4245                  |
| B-10 | 20   | 5961-00-163-7231             | 81349              | JANTX1N5711                  |
| B-10 | 21   | 5980-01-305-7666             | 28480              | 1990-1169                    |
| B-10 | 22   | 5920-01-318-9440             | 06994              | 4301001-2R000                |
| B-10 | 23   | 5950-01-369-1509             | 34899              | 2673000201                   |
| B-10 | 24   | 5945-01-368-2572             | 61529              | DS1EMDC12V                   |
| B-10 | 25   | 5945-01-368-3073             | 61529              | DS1EML2DC12V                 |
| B-10 | 26   | 5950-01-369-0821             | 99800              | 1641-225                     |
| B-10 | 27   | 5935-01-374-1835             | 97913              | HGM030MEA2Y00A               |
| B-10 | 28   | 5905-01-176-7348             | 81349              | RLR05C1201GS                 |
| B-10 | 29   | 5905-01-195-7189             | 81349              | RLR05C1004GS                 |
| B-10 | 30   | 5905-01-176-3872             | 81349              | RLR05C1003GS                 |
| B-10 | 31   | 5905-01-176-3873             | 81349              | RLR05C1002GS                 |
| B-10 | 32   | 5905-01-167-5098             | 81349              | RLR05C6802GS                 |
| B-10 | 33   | 5905-01-175-0705             | 81349              | RLR05C4302GS                 |
| B-10 | 34   | 5905-01-177-4405             | 81349              | RLR05C3602GS                 |
| B-10 | 35   | 5905-01-193-2357             | 19647              | MK132-5MEGOHMSPO<br>RMO.1PCT |
| B-10 | 36   | 5905-01-176-3870             | 81349              | RLR05C4702GS                 |
| B-10 | 37   | 5950-01-369-0817             | 54296              | 361465-00                    |
| B-10 | 38   | 5962-01-267-7055             | 27014              | LM258J                       |
| B-10 | 39   | 5962-01-120-6421             | 27014              | LM340LAZ-5.0                 |
| B-10 | 40   | 5962-01-223-7499             | 04713              | 14099B/BEAJC                 |
| B-10 | 41   | 5962-01-098-0251             | 56289              | UDN-2981A                    |
| B-10 | 42   | 5950-01-368-8920             | 54296              | 440-0016-001                 |

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| B-10 | 43   | 5950-01-368-7351             | 54296              | 440-0017-001          |
| B-10 | 44   | 5950-01-368-8918             | 54296              | 440-0018-001          |
| B-10 | 45   | 5950-01-368-8925             | 54296              | 440-0019-001          |
| B-10 | 46   | 5950-01-368-8919             | 54296              | 440-0020-001          |
| B-10 | 47   | 5950-01-368-8921             | 54296              | 440-0021-001          |
| B-10 | 48   | 5950-01-368-8924             | 54296              | 440-0022-001          |
| B-10 | 49   | 5950-01-368-8922             | 54296              | 440-0023-001          |
| B-10 | 50   | 5950-01-368-8923             | 54296              | 440-0024-001          |
| B-10 | 51   | 5940-01-369-9838             | 98291              | 229-3070-00-0-47<br>0 |
| B-10 | 52   | 5999-01-367-8709             | 54296              | 426-0005-001          |
| B-11 | 1    | 5999-00-878-4714             | 94375              | RF02040-919W          |
| B-11 | 2    | 5305-00-494-7333             | 96906              | MS51957-13B           |
| B-11 | 3    | 5310-01-368-8669             | 81891              | 1204-09-00-541B       |
| B-11 | 4    | 5935-00-249-1469             | 71468              | DBMM-13W3P            |
| B-11 | 5    | 5310-00-595-6761             | 96906              | MS15795-802           |
| B-11 | 6    | 5310-01-023-6132             | 96906              | MS51848-43            |
| B-11 | 7    | 5305-00-403-3502             | 80205              | NAS1635-02-6          |
| B-11 | 8    | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 9    | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 10   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 11   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 12   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 13   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 14   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 15   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 16   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 17   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 18   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 19   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 20   | 5935-01-374-8398             | 97913              | HGM030FDA2Y00A        |
| B-11 | 21   | 5935-01-011-5499             | 16733              | 700532                |
| B-11 | 22   | 5935-01-368-8525             | 54296              | 823971-00             |
| B-11 | 23   | 5935-01-368-9006             | 54296              | 445-0001-001          |
| B-11 | 24   | 5910-00-010-8717             | 81349              | M39014/01-1593        |
| B-11 | 25   | 5305-00-054-5636             | 96906              | MS51957-2             |
| B-11 | 26   | 5310-00-543-4652             | 96906              | MS35333-69            |
| B-11 | 27   | 5910-01-218-7756             | 81349              | CCR06CG152FS          |
| B-11 | 28   | 5910-01-142-8675             | 81349              | M39014/23-0355        |
| B-11 | 29   | 5998-01-367-9441             | 54296              | 831884-01             |
| B-12 | 1    | 5998-01-367-9190             | 54296              | 823965-10             |
| B-12 | 2    | 5970-01-367-9579             | 54296              | 823968-00             |
| B-12 | 3    | 5365-01-369-2206             | 54296              | 823967-00             |
| B-12 | 4    | 5865-00-984-1976             | 18915              | 35-1B2-5-3            |
| B-12 | 5    | 5998-01-367-9305             | 54296              | 823966-10             |
| B-12 | 6    | 5305-00-206-5334             | 88044              | AN510C1-3             |
| B-12 | 7    |                              | 06540              | 2-56 X 3/16           |
| B-12 | 8    | 5310-00-543-4652             | 96906              | MS35333-69            |
| B-12 | 9    | 5310-01-367-6214             | 98284              | 1-72 X 5/32, SSL      |
| B-12 | 10   | 5310-01-023-6132             | 96906              | MS51848-43            |
| B-12 | 11   | 5310-00-812-4294             | 80205              | NAS671C2              |

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| B-13 | 1    | 5305-01-186-8927                       | 58802          | SEELSKREW/\$/2-56<br>X 1/4 |
| B-13 | 2    | 6695-01-367-8928                       | 54296          | 426-0001-010               |
| B-13 | 3    | 9330-01-368-1294                       | 54296          | 426-0002-001               |
| B-13 | 4    | 5330-01-367-9298                       | 54296          | 812385-10                  |
| B-13 | 5    | 5975-00-893-1928                       | 81349          | M5423-10-02                |
| B-13 | 6    |  | 54296          | 994515-10                  |
| B-13 | 7    | 5330-01-367-6384                       | 54296          | 158-0099-001               |
| B-13 | 8    | 5305-01-339-3298                       | 97539          | R/4-40X.312#               |
| B-13 | 9    | 5305-01-029-0713                       | 96906          | MS3212-11                  |
| B-13 | 10   | 5340-01-367-4951                       | 06540          | 10094-SS-0440-6B           |
| B-13 | 11   | 5935-01-158-0374                       | 25330          | GC683S                     |
| B-13 | 12   | 5975-00-284-6655                       | 81348          | WF408                      |
| B-13 | 13   | 5935-01-368-7340                       | 05276          | 4159                       |
| B-13 | 14   | 5998-01-356-7017                       | 54296          | 994516-10                  |
| B-13 | 15   | 5930-01-367-8007                       | 54296          | 125-0237-001               |
| B-13 | 16   | 5305-01-367-6748                       | 54296          | 810228-00                  |
| B-14 | 1    | 5910-01-316-6685                       | 81349          | M39014/23-0356             |
| B-14 | 2    | 5910-01-368-8807                       | 54296          | 151529-00                  |
| B-14 | 3    | 5910-01-368-7327                       | 31433          | T322F107K020AS             |
| B-14 | 4    | 5910-01-118-9102                       | 81349          | M39014/23-0373             |
| B-14 | 5    |  | 31433          | T390A105M025AS             |
| B-14 | 6    | 5961-00-584-4527                       | 81349          | JANTX1N4148-1              |
| B-14 | 7    | 5961-00-458-5813                       | 81349          | JANTX1N4245                |
| B-14 | 8    | 5961-00-911-6104                       | 80131          | 1N4156                     |
| B-14 | 9    | 5980-01-081-9113                       | 96214          | 803415-3                   |
| B-14 | 10   | 5920-00-402-1721                       | 81349          | FM04A125V1/4A              |
| B-14 | 11   | 5920-01-318-9440                       | 06994          | 4301001-2R000              |
| B-14 | 12   |  | 8J953          | SS009-04TG                 |
| B-14 | 13   |  | 8J953          | SS002-04TG                 |
| B-14 | 14   |  | 8J953          | SS006-04TG                 |
| B-14 | 15   |  | 91637          | IM2-100UH 10%              |
| B-14 | 16   | 5935-01-374-1835                       | 97913          | HGM030MEA2Y00A             |
| B-14 | 17   | 5961-00-858-3826                       | 81349          | JANTX2N2222A               |
| B-14 | 18   | 5961-01-068-2717                       | 80131          | 2N6426                     |
| B-14 | 19   | 5905-01-159-0772                       | 81349          | RLR05C1000GS               |
| B-14 | 20   | 5905-01-176-3873                       | 81349          | RLR05C1002GS               |
| B-14 | 21   | 5905-01-175-0703                       | 81349          | RLR05C2001GS               |
| B-14 | 22   | 5905-01-173-8931                       | 81349          | RLR05C1001GS               |
| B-14 | 23   | 5905-01-367-8636                       | 91637          | CMF55-4R300F-T0            |
| B-14 | 24   | 5905-01-175-0705                       | 81349          | RLR05C4302GS               |
| B-14 | 25   | 5905-00-413-0632                       | 80031          | RN55C1003F                 |
| B-14 | 26   | 5905-00-451-7410                       | 81349          | RNC55H6192FS               |
| B-14 | 27   | 5905-01-169-9933                       | 81349          | RJR26FX502R                |
| B-14 | 28   | 5905-01-158-8981                       | 81349          | RLR05C2701GS               |
| B-14 | 29   | 5905-01-191-9611                       | 81349          | RLR05C2202GS               |
| B-14 | 30   | 5905-01-155-8627                       | 81349          | RLR05C5601GS               |
| B-14 | 31   | 5905-01-173-8933                       | 81349          | RLR05C3901GS               |
| B-14 | 32   | 5905-00-479-6658                       | 81349          | RCR05G362JS                |
| B-14 | 33   | 5905-01-186-3807                       | 81349          | RLR05C6800GS               |
| B-14 | 34   | 5905-01-170-9063                       | 81349          | RLR05C6201GS               |

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## CROSS-REFERENCE INDEXES

| FIG. | ITEM | FIGURE AND ITEM STOCK NUMBER | NUMBER INDEX CAGEC | PART NUMBER           |
|------|------|------------------------------|--------------------|-----------------------|
| B-14 | 35   | 5905-01-153-7449             | 81349              | RLR05C5101GS          |
| B-14 | 36   | 5905-01-198-2492             | 81349              | M8340109K1002FC       |
| B-14 | 37   | 5905-01-115-8584             | 81349              | M8340105K1002GC       |
| B-14 | 38   | 5930-01-367-9340             | 81073              | 51MY23766             |
| B-14 | 39   | 5930-01-367-9338             | 81073              | 50MY24360             |
| B-14 | 40   | 5930-01-367-9341             | 81073              | 51MY23767             |
| B-14 | 41   | 5940-01-368-9583             | 88245              | 10-861-2-03           |
| B-14 | 42   | 5962-01-367-8186             | 54296              | 102-0694-001          |
| B-14 | 43   | 5962-01-336-2496             | 04713              | MC74HC4538N           |
| B-14 | 44   | 5962-01-267-7055             | 27014              | LM258J                |
| B-14 | 45   | 5962-01-139-4098             | 14933              | 7705601CB             |
| B-14 | 46   | 5962-01-120-6421             | 27014              | LM340LAZ-5.0          |
| B-14 | 47   | 5935-01-368-8072             | 55322              | ICO-640-NGT           |
| B-14 | 48   | 5999-01-199-7477             | 13103              | 7717-16DAP            |
| B-14 | 49   | 5940-01-369-9838             | 98291              | 229-3070-00-0-47<br>0 |
| B-15 | 1    | 5310-00-208-3786             | 78189              | NAS671C4              |
| B-15 | 2    | 5310-00-933-8118             | 96906              | MS35338-135           |
| B-15 | 3    | 5310-00-057-0573             | 80205              | NAS620C4              |
| B-15 | 4    | 5935-01-121-9427             | 20183              | 93534-1               |
| B-15 | 5    | 5305-00-054-5648             | 96906              | MS51957-14            |
| B-15 | 6    | 5305-00-054-5654             | 96906              | MS51957-20            |
| B-15 | 7    | 5961-01-037-0108             | 81349              | JAN2N6352             |
| B-15 | 8    | 5999-01-368-3737             | 80063              | A3155290              |
| B-15 | 9    | 5950-01-369-0815             | 80063              | A3155289              |
| B-15 | 10   | 5310-01-366-8142             | 80063              | A3155291              |
| B-15 | 11   | 5910-01-256-9638             | 81349              | CX02N226K             |
| B-15 | 12   | 5910-01-230-0394             | 81349              | M39003/01-8108        |
| B-15 | 13   | 5910-01-138-7861             | 81349              | CX02M476K             |
| B-15 | 14   |                              | 81349              | M39014/23-0056        |
| B-15 | 15   | 5910-00-010-8721             | 81349              | M39014/02-1419        |
| B-15 | 16   |                              | 81349              | M39014/23-0338        |
| B-15 | 17   | 5961-00-584-4527             | 81349              | JANTX1N4148-1         |
| B-15 | 18   | 5961-01-055-4352             | 81349              | JAN1N6077             |
| B-15 | 19   | 5961-00-483-4190             | 81349              | JAN1N5415             |
| B-15 | 20   | 5961-01-053-2794             | 81349              | JAN1N5809             |
| B-15 | 21   | 5940-00-082-5094             | 81349              | M55155/30-5           |
| B-15 | 22   | 5940-00-725-9498             | 81349              | SE12XC07              |
| B-15 | 23   | 5961-00-932-9318             | 81349              | JAN2N2605             |
| B-15 | 24   | 5961-00-858-3826             | 81349              | JANTX2N2222A          |
| B-15 | 25   | 5905-01-183-9163             | 81349              | RLR07C56R2FS          |
| B-15 | 26   | 5905-01-175-0703             | 81349              | RLR05C2001GS          |
| B-15 | 27   |                              | 81349              | RLR05C8062FS          |
| B-15 | 28   | 5905-01-176-7123             | 81349              | RWR74549R9FS          |
| B-15 | 29   | 5905-01-157-7790             | 81349              | RLR07C4021FS          |
| B-15 | 30   |                              | 81349              | RLR05C1004GM          |
| B-15 | 31   | 5905-01-184-7954             | 81349              | RLR05C4021FS          |
| B-15 | 32   |                              | 81349              | RLR05C5622FS          |
| B-15 | 33   | 5905-01-210-6305             | 81349              | RLR05C9311FS          |
| B-15 | 34   | 5905-01-176-3873             | 81349              | RLR05C1002GS          |
| B-15 | 35   | 5905-01-366-1099             | 81349              | M4946507TR0100F       |

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## CROSS-REFERENCE INDEXES

| FIG. | ITEM | FIGURE AND ITEM STOCK NUMBER | NUMBER INDEX CAGEC | PART NUMBER  |
|------|------|------------------------------|--------------------|--------------|
| B-15 | 36   | 5905-01-256-1377             | 81349              | RNC50J3402BS |
| B-15 | 37   | 5905-01-173-4326             | 81349              | RNC50J3922BS |
| B-15 | 38   | 5905-01-181-3201             | 81349              | RLR05C2370FS |
| B-15 | 39   | 5905-01-189-9181             | 81349              | RNC50J9762BS |
| B-15 | 40   | 5905-01-240-9165             | 81349              | RLR05C8203GS |
| B-15 | 41   | 5905-01-169-0047             | 81349              | RLR05C1003FS |
| B-15 | 42   | 5905-01-097-1613             | 81349              | RWR81SR499FS |
| B-15 | 43   | 5905-01-170-0388             | 81349              | RLR05C2492FS |
| B-15 | 44   | 5905-01-179-1885             | 81349              | RLR05C1503GS |
| B-15 | 45   | 5905-01-329-9377             | 81349              | RNC50J2433BS |
| B-15 | 46   | 5905-01-297-6762             | 81349              | RLR05C7503GS |
| B-15 | 47   | 5905-01-163-3118             | 81349              | RLR05C7502FS |
| B-15 | 48   | 5905-01-067-4887             | 81349              | RNC50J1913FS |
| B-15 | 48   | 5905-01-069-6025             | 81349              | RNC50J1783FS |
| B-15 | 48   | 5905-01-080-6285             | 81349              | RNC50J2053FS |
| B-15 | 48   | 5905-01-126-7996             | 81349              | RNC50J2493FS |
| B-15 | 48   | 5905-01-128-3403             | 81349              | RNC50J2213FS |
| B-15 | 48   | 5905-01-179-4747             | 81349              | RNC50J2743FS |
| B-15 | 48   | 5905-01-186-8263             | 81349              | RNC50J2373BS |
| B-15 | 48   | 5905-01-188-6252             | 81349              | RNC50J2343BS |
| B-15 | 48   | 5905-01-202-6112             | 81349              | RNC50J2103FS |
| B-15 | 48   | 5905-01-256-1370             | 81349              | RNC50J2433FS |
| B-15 | 48   | 5905-01-259-1926             | 81349              | RNC50J1963FS |
| B-15 | 48   | 5905-01-259-1928             | 81349              | RNC50J2263FS |
| B-15 | 48   | 5905-01-271-8187             | 81349              | RNC50J1763BS |
| B-15 | 48   | 5905-01-286-1514             | 81349              | RNC50J1873FS |
| B-15 | 48   | 5905-01-286-1517             | 81349              | RNC50J2153FS |
| B-15 | 48   | 5905-01-286-2129             | 81349              | RNC50J2323FS |
| B-15 | 48   | 5905-01-293-3944             | 81349              | RNC50J2613FS |
| B-15 | 48   | 5905-01-306-5236             | 81349              | RNC50J2463BS |
| B-15 | 48   | 5905-01-330-3463             | 81349              | RNC50J2523BS |
| B-15 | 48   | 5905-01-334-4635             | 81349              | RNC50J2553FS |
| B-15 | 48   | 5905-01-336-5252             | 81349              | RNC50J1723BS |
| B-15 | 48   | 5905-01-336-5254             | 81349              | RNC50J1803BS |
| B-15 | 48   | 5905-01-336-5255             | 81349              | RNC50J1843BS |
| B-15 | 48   | 5905-01-336-5256             | 81349              | RNC50J1893BS |
| B-15 | 48   | 5905-01-336-5257             | 81349              | RNC50J1933BS |
| B-15 | 48   | 5905-01-336-5260             | 81349              | RNC50J2083BS |
| B-15 | 48   | 5905-01-336-5262             | 81349              | RNC50J2133BS |
| B-15 | 48   | 5905-01-336-5267             | 81349              | RNC50J2673FS |
| B-15 | 48   | 5905-01-336-6265             | 81349              | RNC50J2033BS |
| B-15 | 48   | 5905-01-336-9448             | 81349              | RNC50J1743FS |
| B-15 | 48   | 5905-01-336-9449             | 81349              | RNC50J1823FS |
| B-15 | 48   | 5905-01-366-0802             | 81349              | RNC50J2643DS |
| B-15 | 48   | 5905-01-366-0803             | 81349              | RNC50J2713DS |
| B-15 | 48   | 5905-01-366-1094             | 81349              | RNC50J1983DS |
| B-15 | 48   | 5905-01-366-1095             | 81349              | RNC50J2183BS |
| B-15 | 48   | 5905-01-366-1096             | 81349              | RNC50J2233BS |
| B-15 | 48   | 5905-01-366-1097             | 81349              | RNC50J2293BS |
| B-15 | 48   | 5905-01-366-1098             | 81349              | RNC50J2583DS |
| B-15 | 48   | 5905-01-367-8634             | 81349              | RNC50J2403DS |



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## CROSS-REFERENCE INDEXES

| FIG. | ITEM | FIGURE AND ITEM STOCK NUMBER | NUMBER INDEX CAGEC | PART NUMBER     |
|------|------|------------------------------|--------------------|-----------------|
| B-15 | 49   | 5905-01-181-9605             | 81349              | RLR05C3481FS    |
| B-15 | 50   | 5905-01-167-0069             | 81349              | RLR05C1332FS    |
| B-15 | 51   |                              | 81349              | RLR05G106JP     |
| B-15 | 52   | 5962-01-321-0129             | 81349              | M38510/10304BPA |
| B-15 | 53   | 5962-01-115-7575             | 81349              | M38510/10704BXA |
| B-15 | 54   | 5962-01-098-8192             | 64155              | LM134H/883      |
| B-15 | 55   | 5962-01-238-5501             | 81349              | M38510/11005BCA |
| B-15 | 56   | 5962-01-286-2241             | 67268              | 5962-8771002PA  |
| B-15 | 57   | 5962-01-334-8150             | 67268              | 5962-8876202GA  |
| B-15 | 58   |                              | 81349              | M38527/01-035N  |
| B-15 | 59   | 5999-01-268-1412             | 81349              | M38527/07-001N  |

**APPENDIX C**  
**EXPENDABLE SUPPLIES AND MATERIALS**

**Section I. INTRODUCTION**

**C-1 SCOPE.**

This appendix lists expendable supplies and materials needed to operate and maintain the AN/PRC-132 Radio Set. These items are authorized by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

**C-2 EXPLANATION OF COLUMNS.**

- a. Column (1)-Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g. "Use cleaning compound, item 5, App. C").
- b. Column (2)-National Stock Number. This is the National Stock Number assigned to the item; use it to request or requisition the item.
- c. Column (3)-Description. Indicates the Federal item name and, if required, a description to identify the items. The last line for each item indicates the Commercial And Government Entity (CAGE) code in parentheses followed by the part number.
- d. Column (4)-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

**Section II. Expendable Supplies and Materials List**

| (1)<br>Item<br>Number | (2)<br>National<br>Stock Number | (3)<br>Description  | (4)<br>Unit of<br>Measure<br>(U/M) |
|-----------------------|---------------------------------|---|------------------------------------|
| 1                     |                                 | BRAIDED GROUND STRAP WIRE, 24 x 2 x 36,<br>NE24236-T (04946)      | EA                                 |
| 2                     | 6145-00-812-5034                | CABLE, COAXIAL, RG178B/U (C7318)                                  | FT                                 |
| 3                     | 6145-01-351-8704                | CABLE, RADIO FREQUENCY, COAXIAL, 50 OHMS,<br>M17/93-00001 (81349) | FT                                 |
| 4                     |                                 | CABLE TIE, NATURAL NYLON, 4 IN LG, LOCK,<br>PTL-1M-MP (06383)     | EA                                 |

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| (1)<br>Item<br>Number | (2)<br>National<br>Stock Number | (3)<br>Description  | (4)<br>Unit of<br>Measure<br>(U/M) |
|-----------------------|---------------------------------|---|------------------------------------|
| 5                     |                                 | COAX, SEMIRIGID, 50 OHM, UT-47(TP) (93306)  | FT                                 |
| 6                     |                                 | HUMISEAL, TYPE 1815 (0SR97)   | LB                                 |
| 7                     |                                 | INSULATING COMPOUND, ELECTRICAL, TYPE AR (81349)  | LB                                 |
| 8                     | 5970-00-812-2968                | INSULATION SLEEVING, ELECTRICAL HEAT, SHRINKABLE FLEXIBLE, M23053/5-102-0 (81349)           | FT                                 |
| 9                     | 423053/5-103-0                  | INSULATION SLEEVING, ELECTRICAL HEAT, SHRINKABLE FLEXIBLE, M23053/5-103-0 (81349)           | FT                                 |
| 10                    | 5970-00-812-2969                | INSULATION SLEEVING, ELECTRICAL HEAT, SHRINKABLE FLEXIBLE, M23053/5-104-0 (81349)           | FT                                 |
| 11                    |                                 | INSULATION TUBING, ELECTRICAL POLYTETRAFLUOROETHYLENE RESIN, NON RIGID, M22129-18-0 (81349) | FT                                 |
| 12                    | 8040-00-843-3460                | LOCTITE, #271 (05972)   | LB                                 |
| 13                    |                                 | SILICON COMPOUND, S-736 (NATO), MIL-S-8660 (81349)  | LB                                 |
| 14                    | 8040-01-009-1562                | SILICON RUBBER COMPOUND, 3140 RTV (5D026)   | LB                                 |
| 15                    |                                 | SILICON RUBBER COMPOUND, 3145 RTV (5D026)   | LB                                 |
| 16                    |                                 | SLEEVING, HEAT SHRINK, MIL-I-23053 (81349)  | FT                                 |
| 17                    |                                 | SLEEVING, SHRINK, 1/16 IN BLACK, MIL-I-23053 (81349)  | FT                                 |
| 18                    |                                 | SLEEVING, TEFLON, #22 NATURAL (04946)   | FT                                 |
| 19                    |                                 | SLEEVING, TEFLON, #24 NATURAL, #5-96T (04946)   | FT                                 |
| 20                    |                                 | SOLDER, TIN ALLOY, SN62, QQ-S-571 (52292)   | LB                                 |
| 21                    |                                 | STRING, BRAIDED NYLON, 174M SIZE #18 (25770)  | FT                                 |
| 22                    | 7510-01-041-0275                | TAPE, KAPTON .375 x .003 THK, 5413 (0788X)  | FT                                 |
| 23                    |                                 | TORQUE LACQUEUR, F-900 (01195)  | LB                                 |
| 24                    |                                 | TUBING, INSULATION, 18 AWG (81349)  | FT                                 |
| 25                    |                                 | TUBING, SHRINK, 1/8 BLACK, CP-221-1/8 (8C945)   | FT                                 |
| 26                    |                                 | TUBING, TEFLON, CLEAR 17 GA (04946)   | FT                                 |
| 27                    |                                 | WIRE, BUSS, 18 AWG TINNED, QQ-W-343, TYPE S (81349)   | FT                                 |

| (1)<br>Item<br>Number | (2)<br>National<br>Stock Number | (3)<br>Description  | (4)<br>Unit of<br>Measure<br>(U/M) |
|-----------------------|---------------------------------|---|------------------------------------|
| 28                    |                                 | WIRE, BUSS, 22 AWG TINNED, QQ-W-343, TYPE S (81349)   | FT                                 |
| 29                    |                                 | WIRE, BUSS, 26 AWG QQ-W-343, TYPE S (81349)   | FT                                 |
| 30                    | 6145-01-057-9419                | WIRE, ELECTRIC, FLUOROPOLYMER-INSULATED, TIN-COATED COPPER CONDUCTOR 600 VOLT, 150 DEG. C, M22759/16-24-0 (81349) | FT                                 |
| 31                    | 6145-01-057-9420                | WIRE, ELECTRIC, FLUOROPOLYMER-INSULATED, TIN-COATED COPPER CONDUCTOR 600 VOLT, 150 DEG. C, M22759/16-24-2 (81349) | FT                                 |
| 32                    | 6145-01-044-8798                | WIRE, ELECTRIC, M22759/16-16-0 (81349)  | FT                                 |
| 33                    | 6145-01-250-5176                | WIRE, ELECTRIC, M22759/16-16-2 (81349)  | FT                                 |
| 34                    | 6145-01-PAD-2105                | WIRE, ELECTRIC, M22759/16-16-7 (81349)  | FT                                 |
| 35                    | 6145-01-PAD-2173                | WIRE, ELECTRIC, M22759/16-16-92 (81349)   | FT                                 |
| 36                    | 6145-01-PAD-1688                | WIRE, ELECTRIC, M22759/16-16-97 (81349)   | FT                                 |
| 37                    | 6145-01-057-9422                | WIRE, ELECTRIC, M22759/16-24-4 (81349)  | FT                                 |
| 38                    | 6145-01-057-9423                | WIRE, ELECTRIC, M22759/16-24-5 (81349)  | FT                                 |
| 39                    | 6145-01-057-9424                | WIRE, ELECTRIC, M22759/16-24-6 (81349)  | FT                                 |
| 40                    | 6145-01-057-9425                | WIRE, ELECTRIC, M22759/16-24-7 (81349)  | FT                                 |
| 41                    | 6145-01-057-8325                | WIRE, ELECTRIC, M22759/16-24-92 (81349)   | FT                                 |
| 42                    | 6145-01-057-4202                | WIRE, ELECTRIC, M22759/16-24-96 (81349)   | FT                                 |
| 43                    | 6145-01-058-8328                | WIRE, ELECTRIC, M22759/16-24-97 (81349)   | FT                                 |
| 44                    | 6145-01-360-2077                | WIRE, 16 GA, TEF-ZEL, BLACK, MIL-W-22759/34-16-0 (81349)  | FT                                 |
| 45                    | 6145-01-360-2076                | WIRE, 16 GA, TEF-ZEL, RED, MIL-W-22759/34-16-2 (81349)  | FT                                 |
| 46                    | 6145-01-344-7634                | WIRE, 18 GA, TEF-ZEL, RED, MIL-W22759/34-18-2 (81349)   | FT                                 |
| 47                    | 6145-01-284-1481                | WIRE, 18 GA, WHT WITH BLK STRIPE, MIL-W-22759/34-18-90 (81349)  | FT                                 |
| 48                    |                                 | WIRE, 24 GA, WHT WITH BRN STRIPE, M22759/34-24-91 (81349)   | FT                                 |
| 49                    |                                 | WIRE, 24 GA, WHT WITH ORN STRIPE, MIL-W-22759/34-24-93 (81349)  | FT                                 |

**APPENDIX D**

**DEPOT MOBILIZATION REQUIREMENTS**

In the event of mobilization, all depot maintenance overhaul/repair procedure requirements apply. There are no exemptions or revisions to these requirements.