# 3900 Series
# Digital Radio Test Set

## Maintenance Manual

Issue-7

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# 3900 Series

# Digital Radio Test Set

# Maintenance Manual

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# WARNING:

## HIGH VOLTAGE EQUIPMENT

**THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.**

**SAFETY FIRST: TO ALL SERVICE PERSONNEL**

**REFER ALL SERVICING OF UNIT TO QUALIFIED TECHNICAL PERSONNEL.**

### CASE, COVER OR PANEL REMOVAL

Removing protective covers, casings or panels from this unit exposes the technician to electrical hazards that can result in electrical shock or equipment damage.

### SAFETY IDENTIFICATION IN TECHNICAL MANUAL

This manual uses the following terms to draw attention to possible safety hazards that may exist when operating or servicing this equipment.

| | |
|---|---|
| CAUTION | IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN EQUIPMENT OR PROPERTY DAMAGE, E.G., FIRE. |
| WARNING | **IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN PERSONAL INJURY OR DEATH.** |

### SAFETY SYMBOLS IN MANUALS AND ON UNITS

| | |
|---|---|
| | **CAUTION**: Refer to accompanying documents. (This symbol refers to specific CAUTIONS represented on the unit and clarified in the text.) |
| | Indicates a Toxic hazard. |
| | Indicates item is static sensitive. |
| | **AC TERMINAL:** Terminal that may supply or be supplied with AC or alternating voltage. |
| | **DANGEROUS VOLTAGE:** Indicates electrical shock hazard due to high voltage levels. |

### EQUIPMENT GROUNDING PRECAUTION

| | |
|---|---|
| WARNING | **IMPROPER GROUNDING OF EQUIPMENT CAN RESULT IN ELECTRICAL SHOCK.** |

### USE OF PROBES

Refer to products specifications for the maximum voltage, current and power ratings of any connector on the unit before connecting it with a probe from a terminal device. Be sure the terminal device performs within these specifications before using it for measurement, to prevent electrical shock or damage to the equipment.

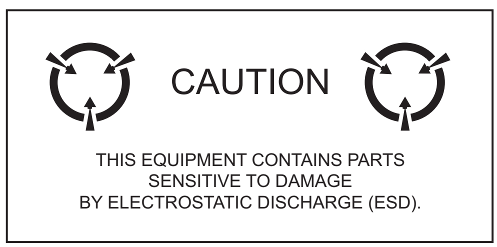
### POWER CORDS

Power cords must not be frayed or broken nor expose bare wiring when operating this equipment.

## USE RECOMMENDED FUSES ONLY

Use only fuses specifically recommended for the equipment at the specified current and voltage ratings. Refer to product specifications for fuse requirements and specifications..

| | |
|---|---|
| CAUTION | INTEGRATED CIRCUITS AND SOLID STATE DEVICES SUCH AS MOS FETS, ESPECIALLY CMOS TYPES, ARE SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGES RECEIVED FROM IMPROPER HANDLING, THE USE OF UNGROUNDED TOOLS AND IMPROPER STORAGE AND PACKAGING. ANY MAINTENANCE TO THIS UNIT MUST BE PERFORMED TAKING THE FOLLOWING PRECAUTIONS:<br><br>BEFORE USE IN A CIRCUIT, KEEP ALL LEADS SHORTED TOGETHER, EITHER BY THE USE OF VENDOR SUPPLIED SHORTING SPRINGS OR BY INSERTING LEADS INTO A CONDUCTIVE MATERIAL.<br><br>WHEN REMOVING DEVICES FROM THEIR CONTAINERS, GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.<br><br>TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.<br><br>DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.<br><br>PC BOARDS, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAD. REMOVE ANY BUILT-IN POWER SOURCE, SUCH AS A BATTERY, BEFORE LAYING PC BOARDS ON A CONDUCTIVE MAT OR STORING IN A CONDUCTIVE BAG.<br><br>PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGES IN A CONDUCTIVE BAG AND PLACED IN A WELL-CUSHIONED SHIPPING CONTAINER. |




| | |
|---|---|
| CAUTION | SIGNAL GENERATORS CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE (EMI) TO COMMUNICATION RECEIVERS. SOME TRANSMITTED SIGNALS CAN CAUSE DISRUPTION AND INTERFERENCE TO COMMUNICATION SERVICE OUT TO A DISTANCE OF SEVERAL MILES. USER OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION THAT RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND SHOULD TAKE NECESSARY PRECAUTIONS TO AVOID POTENTIAL COMMUNICATION INTERFERENCE PROBLEMS. |
| | KEEP ALL VENT OPENINGS CLEAR AND UNOBSTRUCTED FOR PROPER EQUIPMENT COOLING AND CONTINUED RELIABILITY. DO NOT OPERATE EQUIPMENT IN THE VERTICAL POSITION ON PLUSH CARPET OR UPHOLSTERY TO AVOID IMPAIRING THE AIR EXHAUST. WHEN OPERATING THE TEST SET IN THE NORMAL HORIZONTAL OR TILT BAIL POSITION, MAINTAIN AT LEAST 1.6 INCHES (4 CEMENTERS) OF CLEARANCE BETWEEN THE EQUIPMENT REAR EXHAUST FAN SCREEN AND OBJECTS OR WALLS. |

# Preface

## SCOPE

This manual contains instructions for the maintenance of the 3900 Series Digital Radio Test Set. Aeroflex recommends that the technician performing these procedures be familiar with this manual before attempting to perform any maintenance action on the Test Set. The information in this manual enables servicing technicians to:

- Service, test or replace any major assembly within the Test Set.
- Maintain operating conditions of the Test Set to the expected performance standards.
- Understand principles of operation, relating to the overall operation of the unit as well as functional operation within the major assemblies.

## NOMENCLATURE

The 3901, 3902, 3920 and 3920B Digital Radio Test Set is the official nomenclature for the test sets currently included in the 3900 Digital Radio Test Set Series. In this manual, 3900, unit or Test Set, refers to the 3901, 3902, 3920 and 3920B Digital Radio Test Sets unless otherwise indicated.

## ORGANIZATION

The 3900 Series Digital Radio Test Set Maintenance Manual is composed of the following sections:

### Chapter 1 - Introduction

Contains general Test Set information.

### Chapter 2 - Theory of Operation

Describes system level and module (assembly) level functionality of the 3900.

### Chapter 3 - Troubleshooting

Describes system level and assembly troubleshooting procedures.

### Chapter 4 - Verification/Calibration Procedures

Provides step by step procedures for verifying and calibrating the 3900.

### Chapter 5 - Replacement Procedures

Provides step by step instructions on removing and installing replaceable Test Set assemblies.

### Chapter 6 - Assemblies and Interconnect Diagrams

Provides interconnect and assembly diagrams for the 3901, 3902, 3920 and 3920B.

### Chapter 7 - Parts List

Provides parts lists for ordering accessories and replaceable parts for the 3900.

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## Remove/Install Procedures (cont)



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# 3900 Platform Specifications (cont)

# Controls and Connectors . . . . . . . . . . . . . . . . . . . . . . . .C - 1

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| FIGURE | PAGE |
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# List of Tables

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# Chapter 1 - General Information

## 1.1 GENERAL INFORMATION

The 3900 Digital Radio Test Set platform integrates several test instruments into a single user-friendly instrument that offers the interconnectivity normally expected from a personal computer.

The digital test platform, created with modular design, is simple to support and upgrade. The 3900 provides comprehensive transmitter and receiver testing, while the full-range spectrum analyzer and measurement Meters Tiles allow base site component testing to be performed. The dual channel oscilloscope and internal DEMOD scope provide comprehensive viewing of signals.

The 3920 has been designed to allow for an optional factory upgrade that extends the unit's frequency range value from 1.05 GHz to 2.71 GHz. The 3901 does not have this design capability.

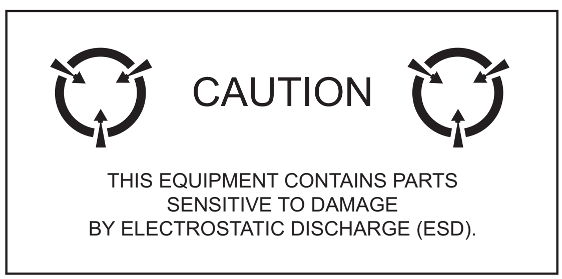
### 1.1.1 Scope

| | |
|---|---|
| **Type of Manual** | Maintenance Manual |
| **Equipment Name and Model Number** | 3901, 3902, 3920 or 3920B Digital Radio Test Set |
| **Equipment Use** | General purpose Communications Service Monitor for testing radios and related equipment. |

### 1.1.2 Nomenclature Cross Reference List

| | |
|---|---|
| **Common Name** | 3900, Test Set or Unit |
| **Official Nomenclature** | 3901, 3902, 3920 or 3920B Digital Radio Test Set |

## 1.2 EQUIPMENT DESCRIPTION AND DATA




### 1.2.1 Equipment Characteristics, Capabilities and Features

Refer to 3900 Series Operation Manual for this information.

### 1.2.2 Equipment Data

Refer to 3900 Series Operation Manual for this information.

### 1.2.3 Safety, Care and Handling

Observe all WARNINGS, CAUTIONS and NOTES in this manual. This equipment can be extremely dangerous if these instructions are not followed.

# 1.3 SERVICE UPON RECEIPT OF MATERIAL

## 1.3.1 Unpacking

Special design packing material inside this shipping container provides maximum protection for the 3900 Radio Test Set. Avoid damaging the shipping container and packaging material when unpacking equipment; if necessary the shipping container and packaging material can be reused to ship the Test Set.

**CAUTION**

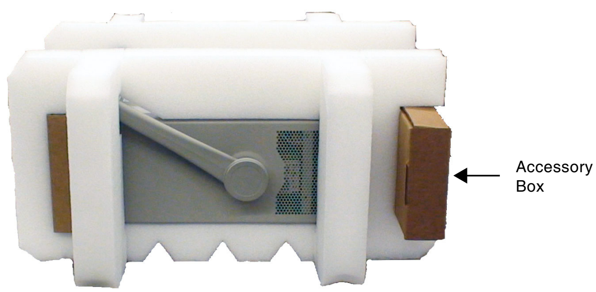
To prevent personal injury or damage to Test Set, Aeroflex recommends two people unpack the Test Set.

Use the following steps to unpack the 3900:

STEP PROCEDURESTEP PROCEDURE

1. Cut and remove sealing tape on top of the shipping container. Open shipping container.

2. Grasp the 3900 firmly while restraining the shipping container. Lift the equipment and packing material vertically out of the shipping container.
3. Place Test Set and packing material on a flat, clean and dry surface.
4. Remove Accessory Box from foam inserts.




5. Remove foam inserts from the Test Set.
6. Store packing materials (foam inserts and cardboard insert) inside shipping container. Store shipping container and materials for possible future use.

### 1.3.2 Checking Unpacked Equipment

Inspect equipment for possible damage incurred during shipment. If Test Set has been damaged, report the damage to Aeroflex Customer Service.

Review packing slip to verify shipment is complete. Packing slip identifies the standard items as well as purchased options. Report all discrepancies to Aeroflex.

**Contact:**

**Aeroflex**

Customer Service Dept.
10200 West York Street
Wichita, Kansas 67215

**Telephone:** 800-835-2350
**FAX:** 316-524-2623
**email:** americas.service@aeroflex.com

#### 1.3.2.A Standard Items

| Description | Part Number | QTY |
|---|---|---|
| Ship Unit | Refer to Packing List | 1 |
| 3900 Series Operation Manual (CD-ROM) | 6047 | 1 |
| 3900 Series Getting Started Manual | 6050 | 1 |
| Kit, STD Cords/Accessory | 63938 | 1 |

## 1.4 GENERAL CONDITIONS OF USE

This product is designed and tested to comply with the requirements of IEC/EN61010-1 'Safety requirements for electrical equipment for measurement, control and laboratory use' for Class I portable equipment and is for use in a pollution degree 2 environment. The equipment is designed to operate from installation supply Category II.

Equipment should be protected from liquids such as spills, leaks, etc. and precipitation such as rain, snow, etc. When moving the equipment from a cold to hot environment, allow the temperature of the equipment to stabilize before it is connected to the supply to avoid condensation forming. Only operate Test Set within specified environmental conditions (refer to Appendix B, Platform Specifications).

This product is not approved for use in hazardous atmospheres or medical applications. If the equipment is to be used in a safety-related application, such as avionics or military applications, the suitability of the product must be assessed and approved for use by a competent person.

Refer all servicing of unit to Qualified Technical Personnel. This unit contains no operator serviceable parts.

### 1.4.1 Case, Cover or Panel Removal

Opening the Case Assembly exposes the operator to electrical hazards that may result in electrical shock or equipment damage. Do not operate this Test Set with the Case Assembly open.

### 1.4.2 Precautions

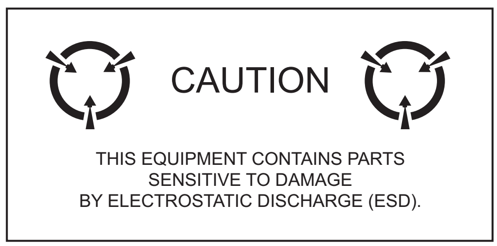
#### 1.4.2.A Safety

This manual uses the following terms to draw attention to possible safety hazards that may exist when operating or servicing this equipment.

| | |
|---|---|
| CAUTION | IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN EQUIPMENT OR PROPERTY DAMAGE, E.G., FIRE. |

| | |
|---|---|
| WARNING | **IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN PERSONAL INJURY OR DEATH.** |

Static Sensitive Components




| | |
|---|---|
| CAUTION | THIS EQUIPMENT CONTAINS COMPONENTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING MAINTENANCE OR CALIBRATION PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED. |

| | |
|---|---|
| NOTE | To comply with EMC requirements, double shielded cables should be used for making connections to all input and output connectors. |

# Chapter 2 - Theory of Operation

## 2.1 GENERAL INFORMATION

The 3900 Series Digital Radio Test platform integrates several radio-testing instruments into a single instrument that offers the inter connectivity normally expected from a personal computer. The 3900 test platform is a modular design that is simple to support and upgrade. The System Overview and Module Overview sections describe how the Test Set operates.

## 2.2 PRINCIPLES OF OPERATION

### 2.2.1 General Operational Description

Refer to the 3900 Series Operation Manual for general Test Set information.

### 2.2.2 General Functional Description

Refer to Test Set System Interconnect Diagrams (Fig. 2-1, Fig. 2-2 and Fig. 2-3) for the relationship of all 3900 assemblies. Table below lists assemblies alphabetically.

| Description | Reference Designator | Page |
|---|---|---|
| Attenuator Assembly | 44A1A3 | 2 - 34 |
| Backplane PCB Assembly | 44A1A1A1 | 2 - 29 |
| CAI PCB Assembly | 44A1A8 | 2 - 38 |
| CPU Adapter PCB Assembly | 44A1A1A5 | 2 - 30 |
| DAM Carrier PCB Assembly | 44A1A10 | 2 - 38 |
| Digital Multimeter (DMM) Assembly | -- | 2 - 32 |
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| Front Panel Analog PCB Assembly | 44A1A1A4A5 | 2 - 30 |
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| Generator Assembly | 44A1A4 | 2 - 34 |
| IF/Video PCB Assembly | 44A1A5 | 2 - 37 |
| Power Supply Assembly | 44A1A1A6 | 2 - 31 |
| Power Term(ination) Assembly | 44A1A1A7 | 2 - 31 |
| Rear Panel Audio I/O PCB Assembly | 44A1A1A10 | 2 - 30 |
| Rear Panel PCB Assembly | 44A1A1A3 | 2 - 30 |
| Receiver Assembly | 44A1A7 | 2 - 37 |

## 2.3 RECEIVE SYSTEM OVERVIEW

The Test Sets in the 3900 Series are capable of receiving modulated or un-modulated signals over a range of 1 MHz to 2.7 GHz depending on the model and options installed in the unit. Low power signals (<-10 dBm) are received through the Power Term Assembly at the ANT Connector. High power signals (>-10 to +50 dBm) are received through the Power Term Assembly at the T/R Connector. A diode detector serves to measure RF power applied to the T/R Connector. The ANT Connector and GEN Connector are protected from high power levels by a limiter circuit. Refer to section 2.4, Generate System Overview, for more details on the GEN Connector. The RF signal is routed to the Receiver Assembly.

The Receiver Assembly has selectable attenuators and provides the system with reference signals of 10, 40, 80 and 400 MHz. An External 10 MHz reference I/O is routed from the Receiver Assembly to the Rear Panel Assembly. The Receiver Assembly converts the incoming signal to a 210.7 MHz IF (intermediate frequency) and starts signal conditioning. The 210.7 MHz IF signal is then passed to the IF/Video PCB Assembly.

The IF/Video PCB Assembly has selectable 10.7 MHz IF filtering of 30 kHz, 300 kHz and 6 MHz. The CAI (Common Air Interface) PCB Assembly and IF/Video PCB Assembly work together to provide the AGC (Automatic Gain Control) for the Receiver Assembly. The CAI PCB Assembly sends data to the IF/Video PCB Assembly to increase or decrease the gain automatically, providing the correct level to the CAI PCB Assembly. The IF/Video PCB Assembly also selects and controls the Analyzer resolution bandwidth filters. When the Spectrum Analyzer is selected, all combinations of IF filtering are used to provide a fully functional Spectrum Analyzer. Other functions of the IF/Video PCB Assembly are to provide the following:

- 10.7 MHz IF output to the Rear Panel Assembly;
- Video output to the Rear Panel Assembly;
- IF Count to the DAM Carrier PCB Assembly.

The DAM Carrier PCB Assembly converts the 10.7 MHz IF signal to a digital signal, which is then sent to the CAI PCB Assembly.

The CAI PCB Assembly receives the 10.7 MHz digital signal and digitally performs the demodulation process. During the demodulation process, the signal is measured for correct power strength. If the incoming power is incorrect, data is provided back to the IF/Video PCB Assembly for AGC control as described in the section above regarding the IF/Video PCB Assembly. The CAI PCB Assembly provides digitally demodulated signals to the system for meter functions such as: Receiver Level Meter, Deviation Meter Demod Output, Internal Demod Scope, Speaker, etc. Other CAI PCB Assembly functions are discussed in the Generate System Overview.

## 2.4 GENERATE SYSTEM OVERVIEW

The Generate System path begins in the CAI PCB Assembly. The CAI PCB Assembly generates a digitally modulated 11.4 MHz IF signal and passes the modulated signal to the DAM Carrier PCB Assembly. The DAM Carrier PCB Assembly converts the 11.4 MHz IF Signal from a digital signal to an analog signal. The 11.4 MHz Analog signal is then routed to the Generator Assembly. The Modulation sources are the MIC and Audio connectors.

The Generator Assembly is designed to convert the 11.4 MHz IF analog signal to the desired output frequency between the 1 MHz to 2.7 GHz range, based on the unit's frequency range. The variable attenuator in the Generator Assembly provides 9.9 dB attenuation in 0.1 dB steps between the 10 dB steps of the Attenuator Assembly. The signal is amplified to a level high enough to overcome the losses of the Attenuator Assembly and Power Term Assembly and to meet the specified maximum output power level. The desired RF signal is then routed from the Generator Assembly to the Attenuator Assembly.

The Attenuator Assembly consists of six relay-attenuator sections and a driver board. The relay-attenuator section consists of one 10 dB relay-attenuator, one 5 dB relay-attenuator and four 20 dB relay-attenuators, for a total attenuation of 95 dB. From the Attenuator Assembly the RF signal is routed to the Power Term Assembly.

The Power Term Assembly routes the RF signal out the GEN Connector or the T/R Connector. The GEN Connector provides a maximum output signal of +10 dBm. The T/R Connector provides a maximum output signal of -30 dBm over the 1 MHz to 2.7 GHz range.

| NOTE | The 3901 and 3920 frequency range is 1 MHz to 1.05 GHz. The 3902 and 3920 with frequency extension option has a frequency range of 1 MHz to 2.7 GHz. Refer to Appendix B, Platform Specifications for complete product specifications. |
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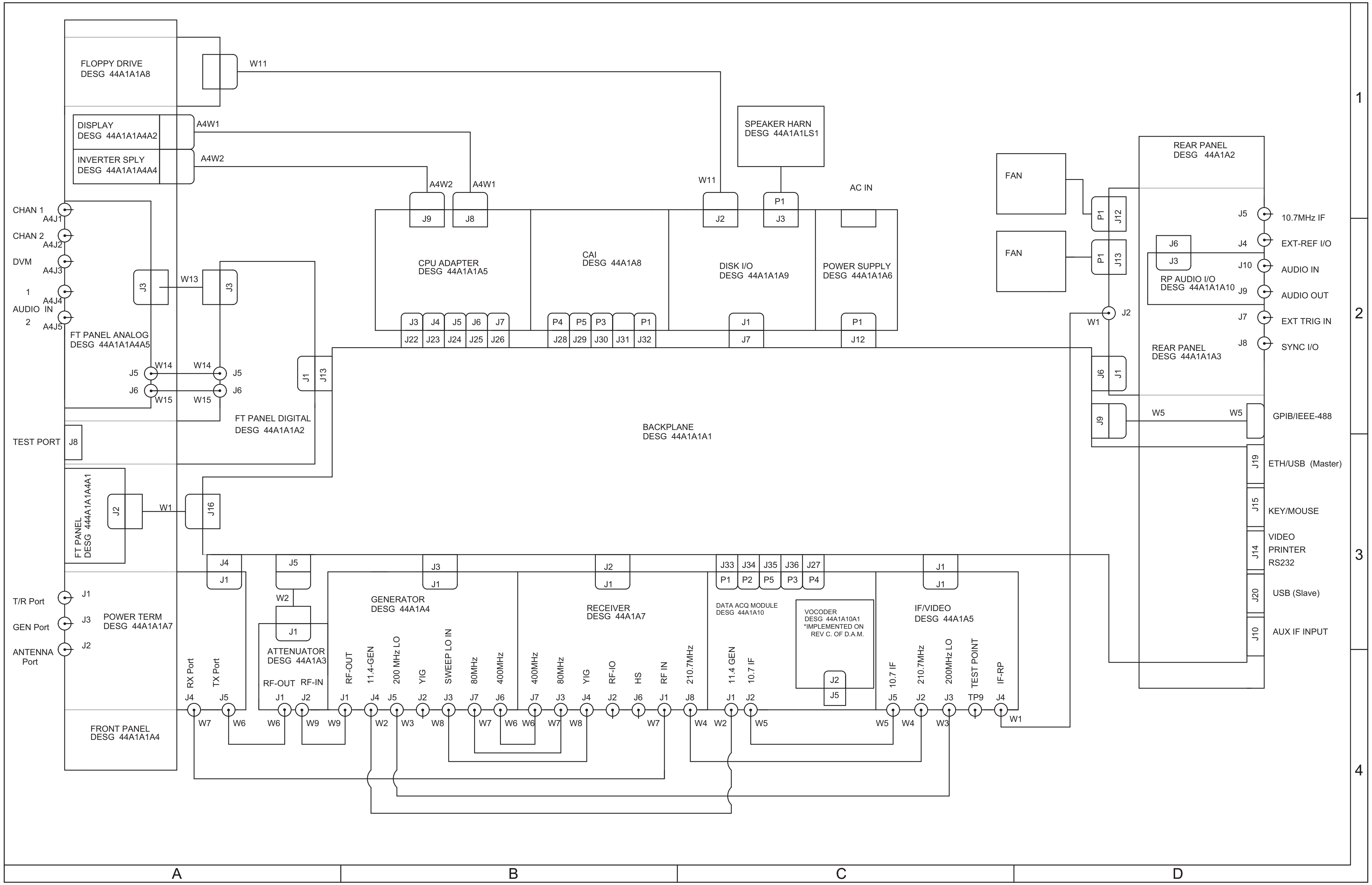


Fig. 2-1 3901/3902 System Interconnect Diagram

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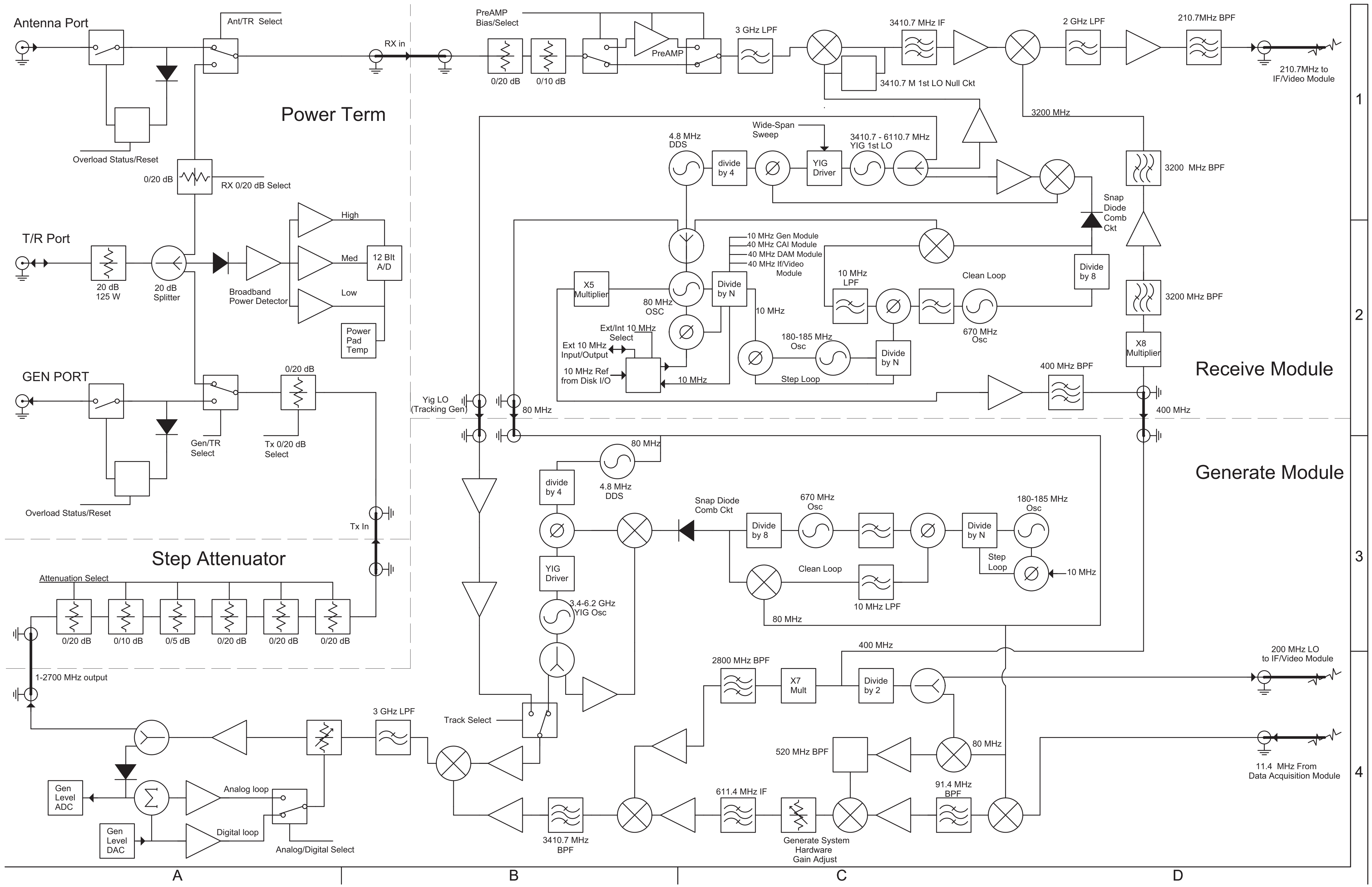


Fig. 2-1 3901/3902 System Interconnect Diagram

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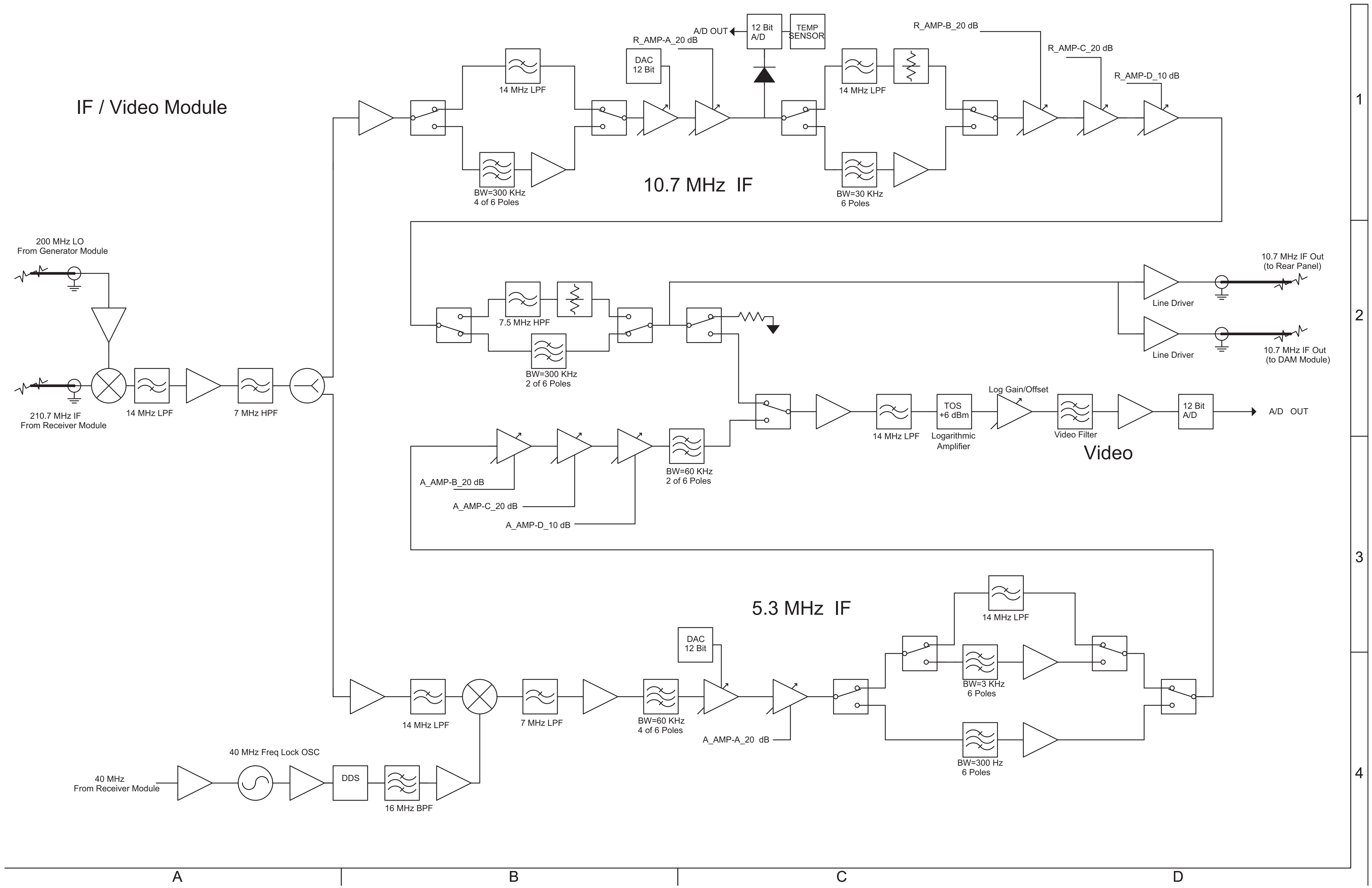


Fig. 2-1 3901/3902 System Interconnect Diagram
0000-4440-100-E (Sheet 3 of 7)

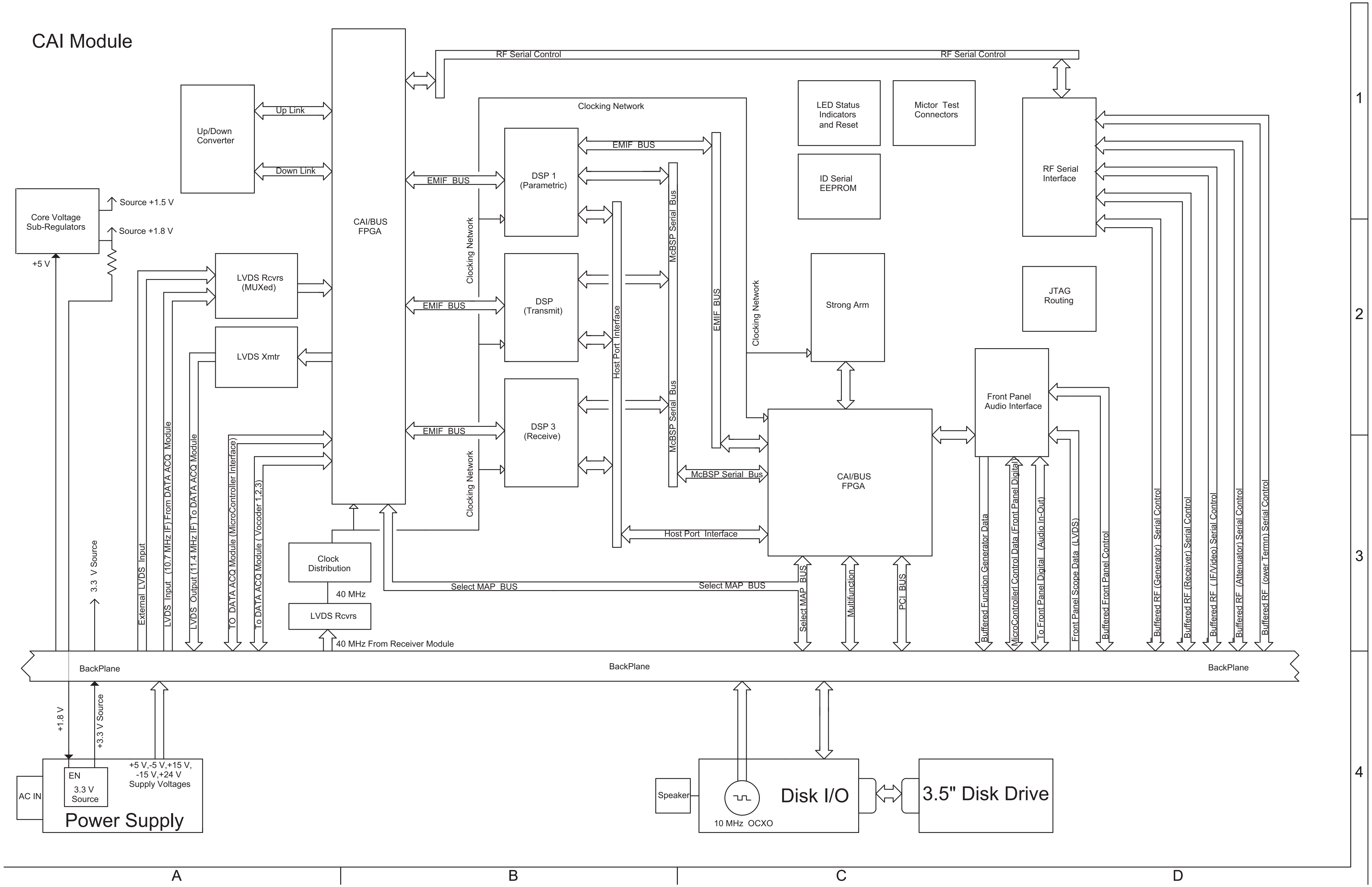


Fig. 2-1 3901/3902 System Interconnect Diagram

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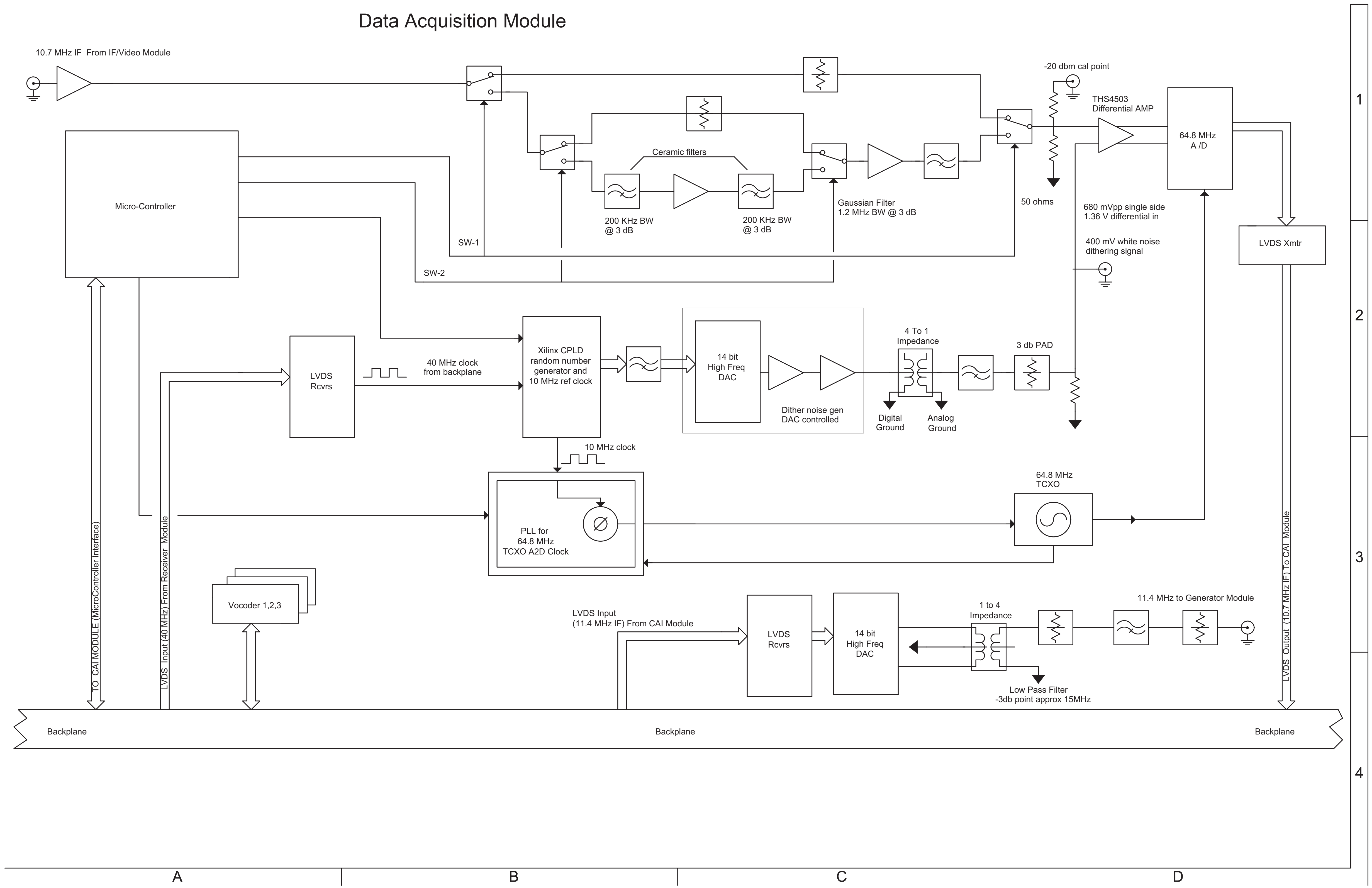


Fig. 2-1 3901/3902 System Interconnect Diagram
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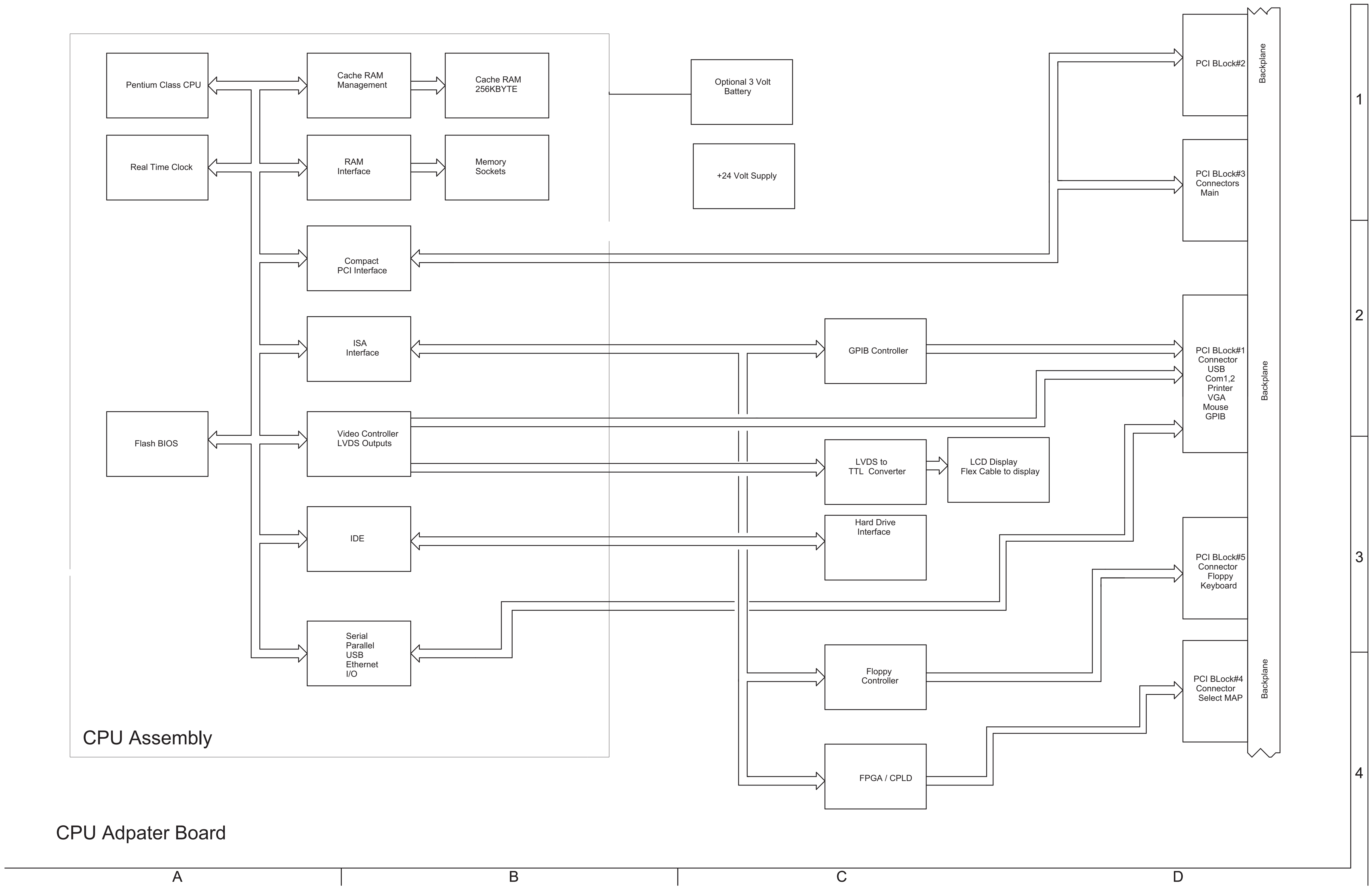


Fig. 2-1 3901/3902 System Interconnect Diagram

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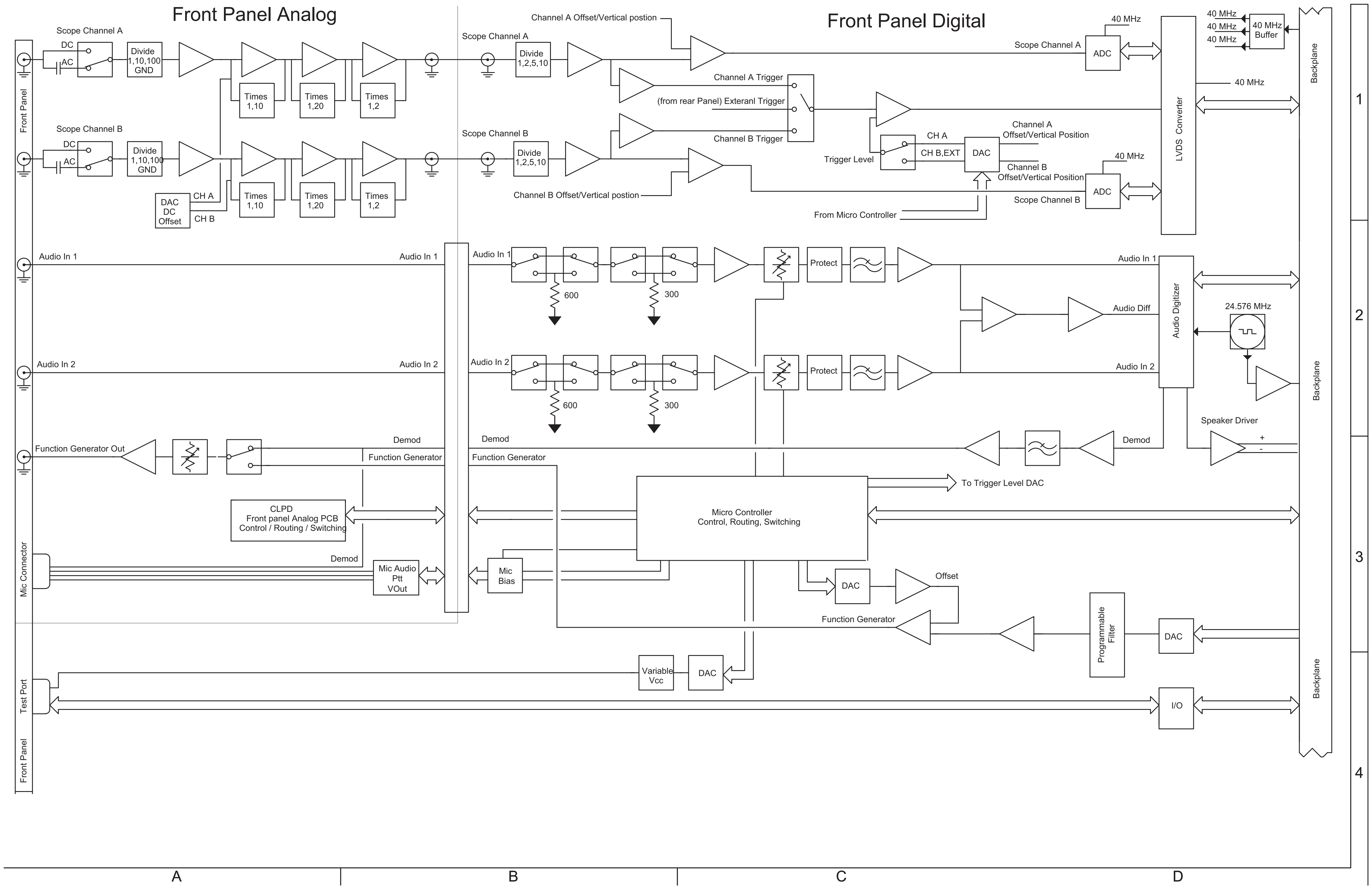


Fig. 2-1 3901/3902 System Interconnect Diagram

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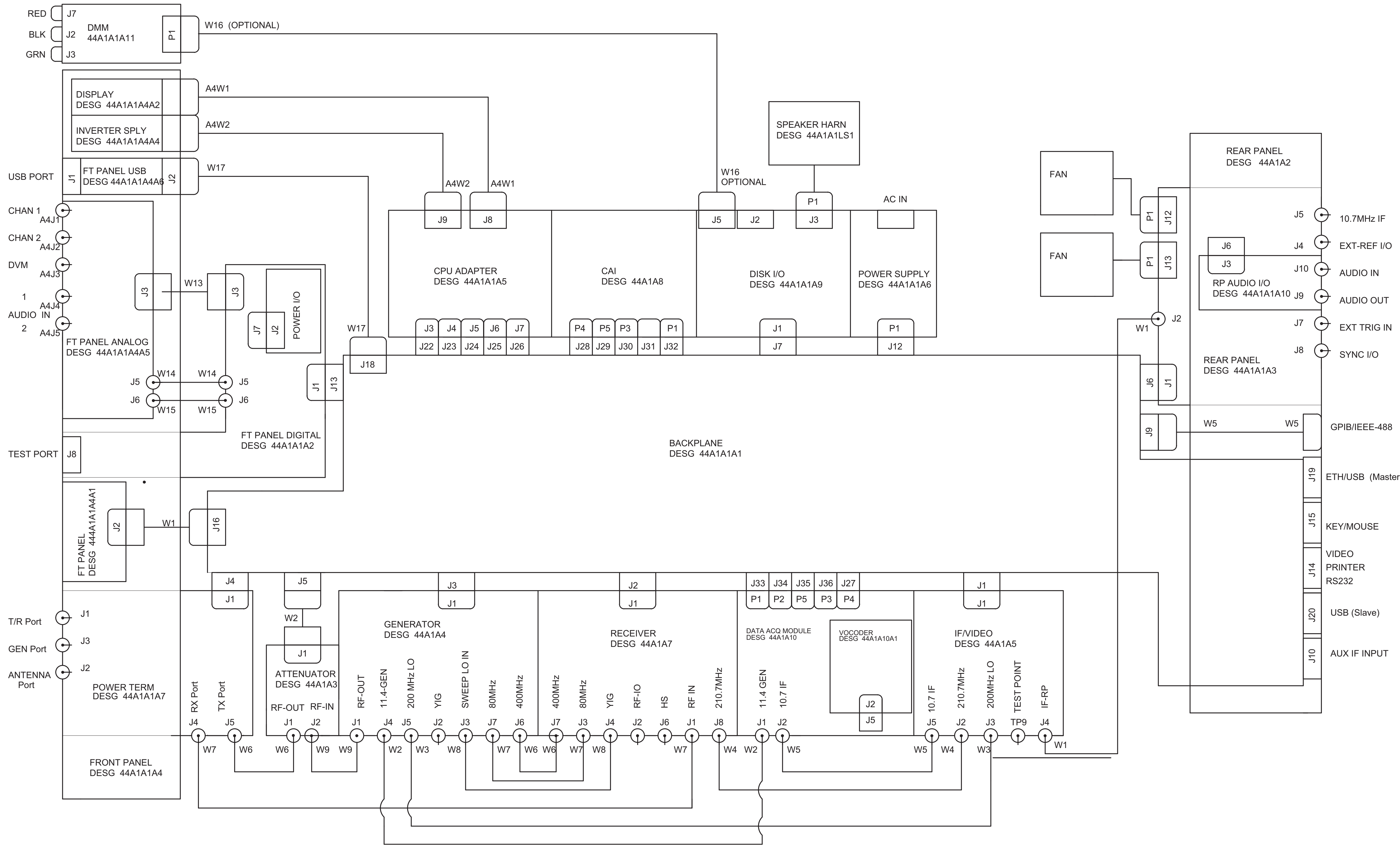


Fig. 2-2 3920 System Interconnect Diagram

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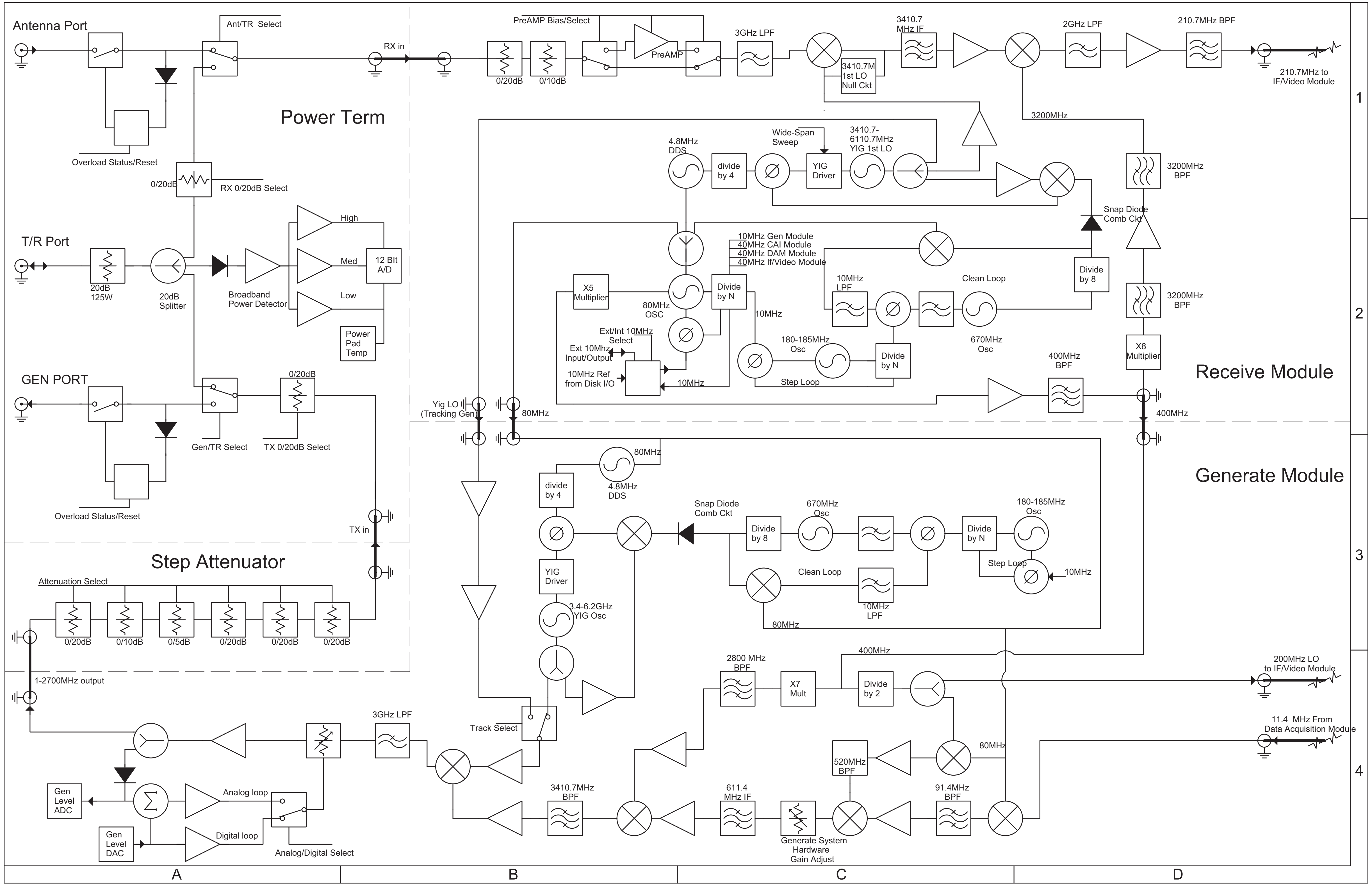


Fig. 2-2 3920 System Interconnect Diagram

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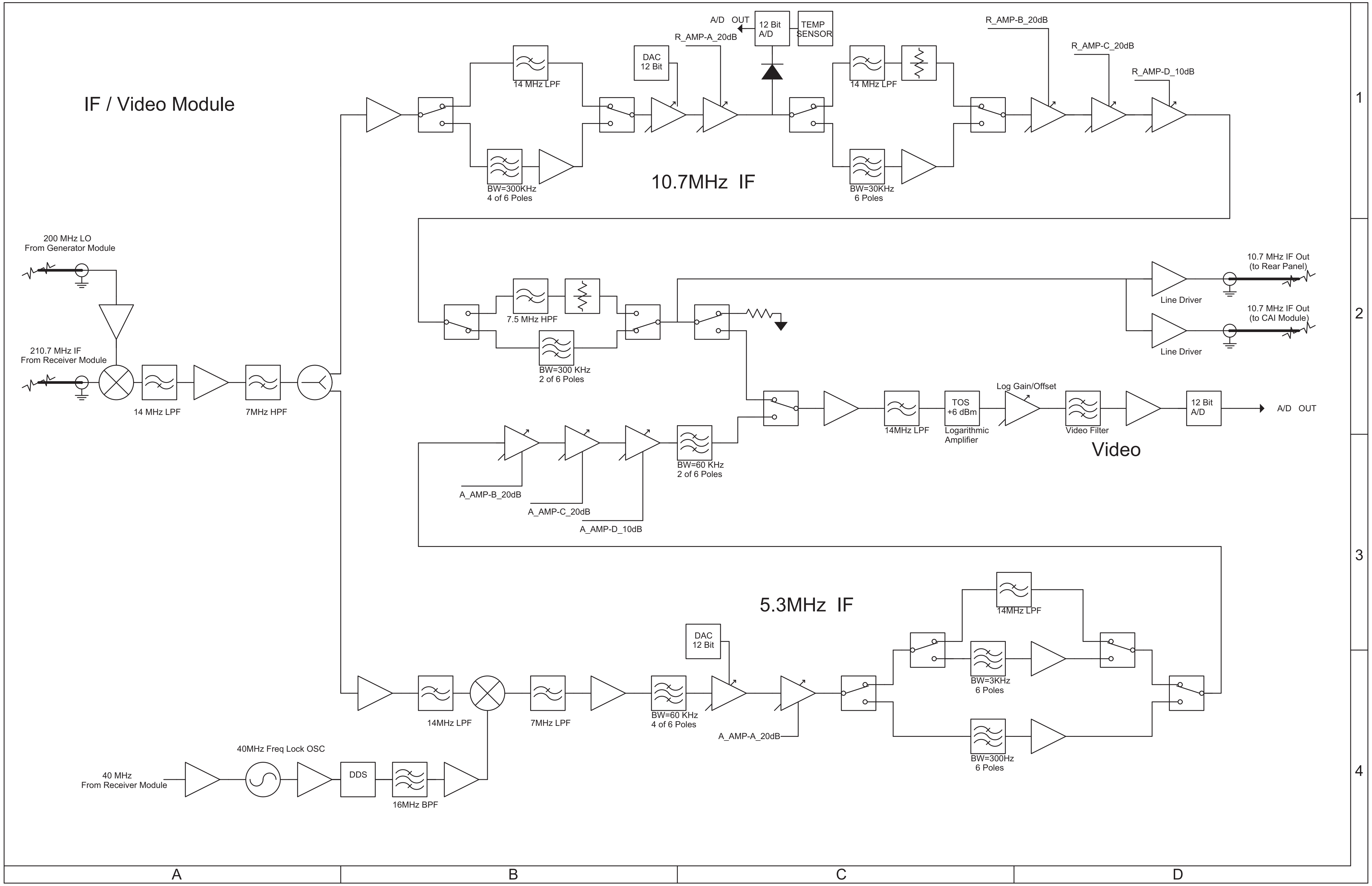


Fig. 2-2 3920 System Interconnect Diagram

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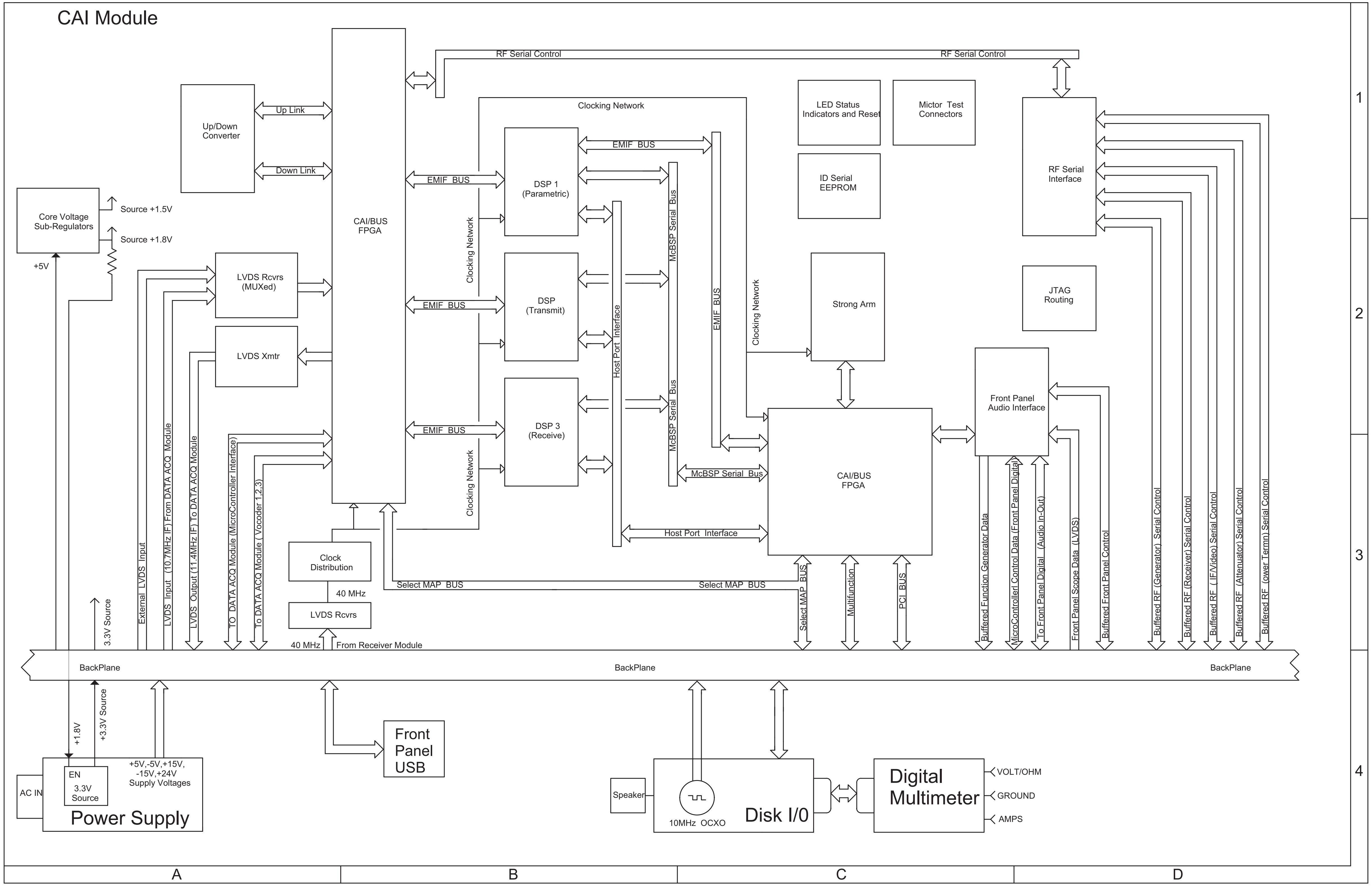


Fig. 2-2 3920 System Interconnect Diagram

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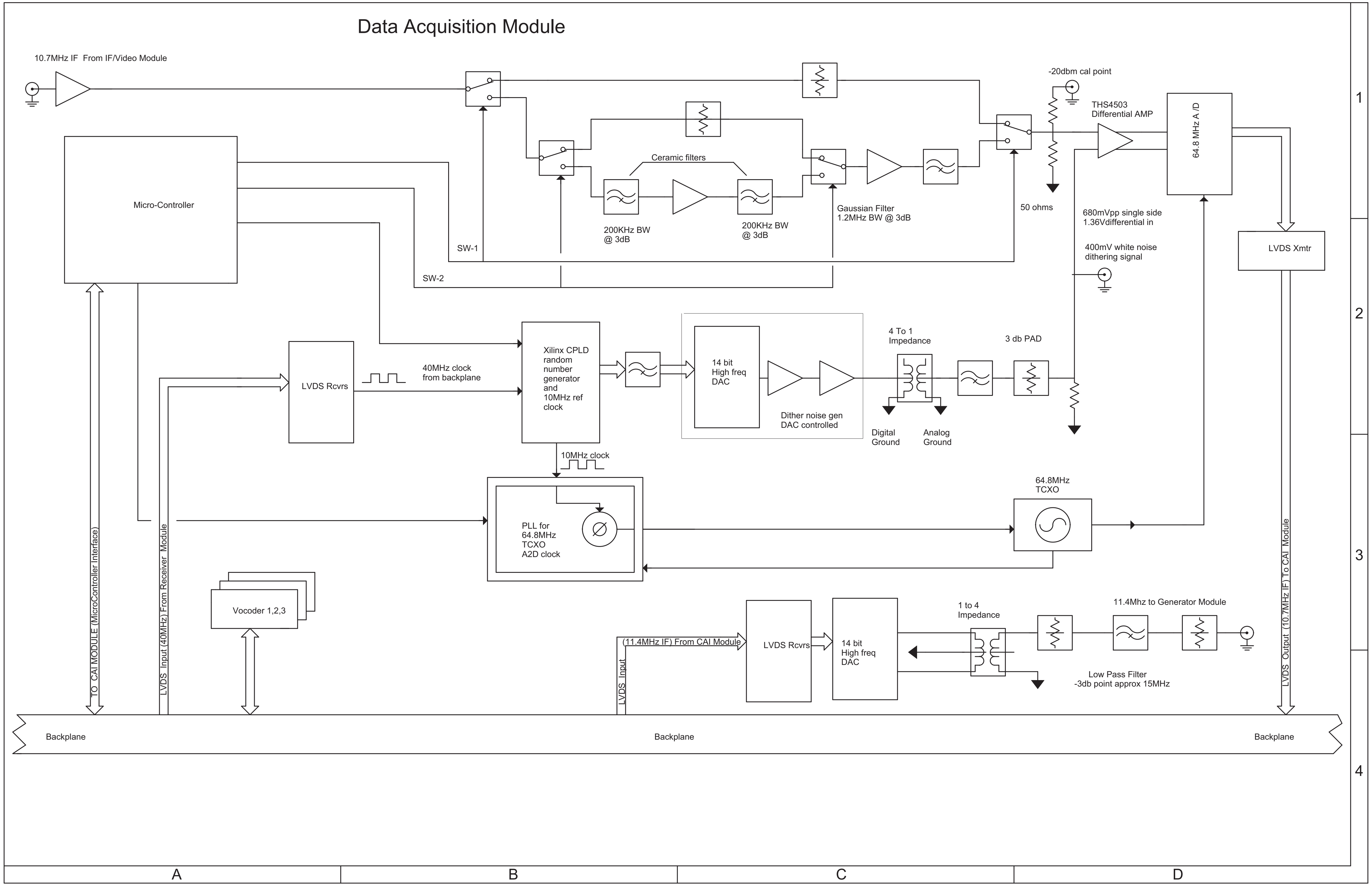


Fig. 2-2 3920 System Interconnect Diagram

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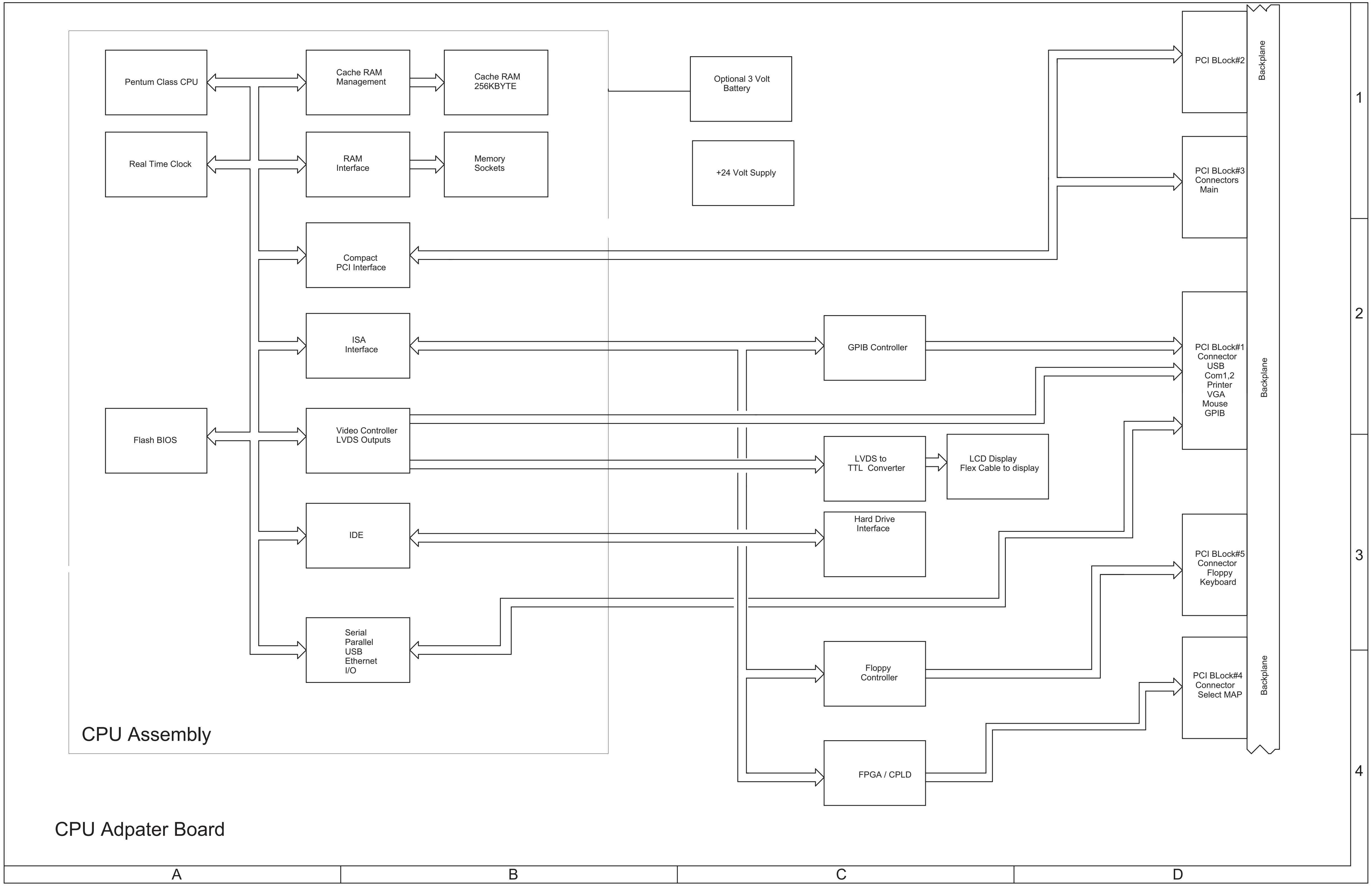


Fig. 2-2 3920 System Interconnect Diagram

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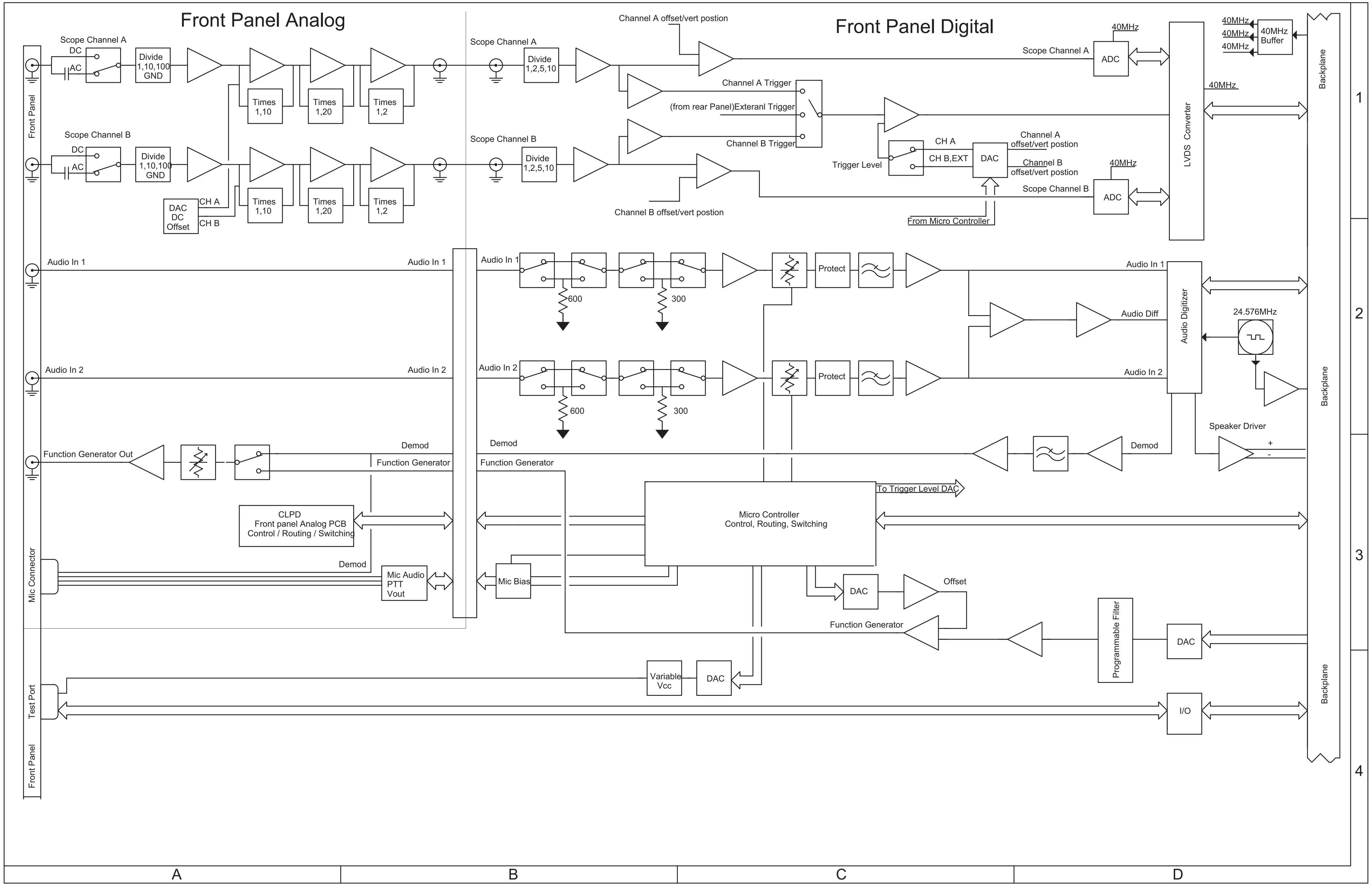


Fig. 2-2 3920 System Interconnect Diagram
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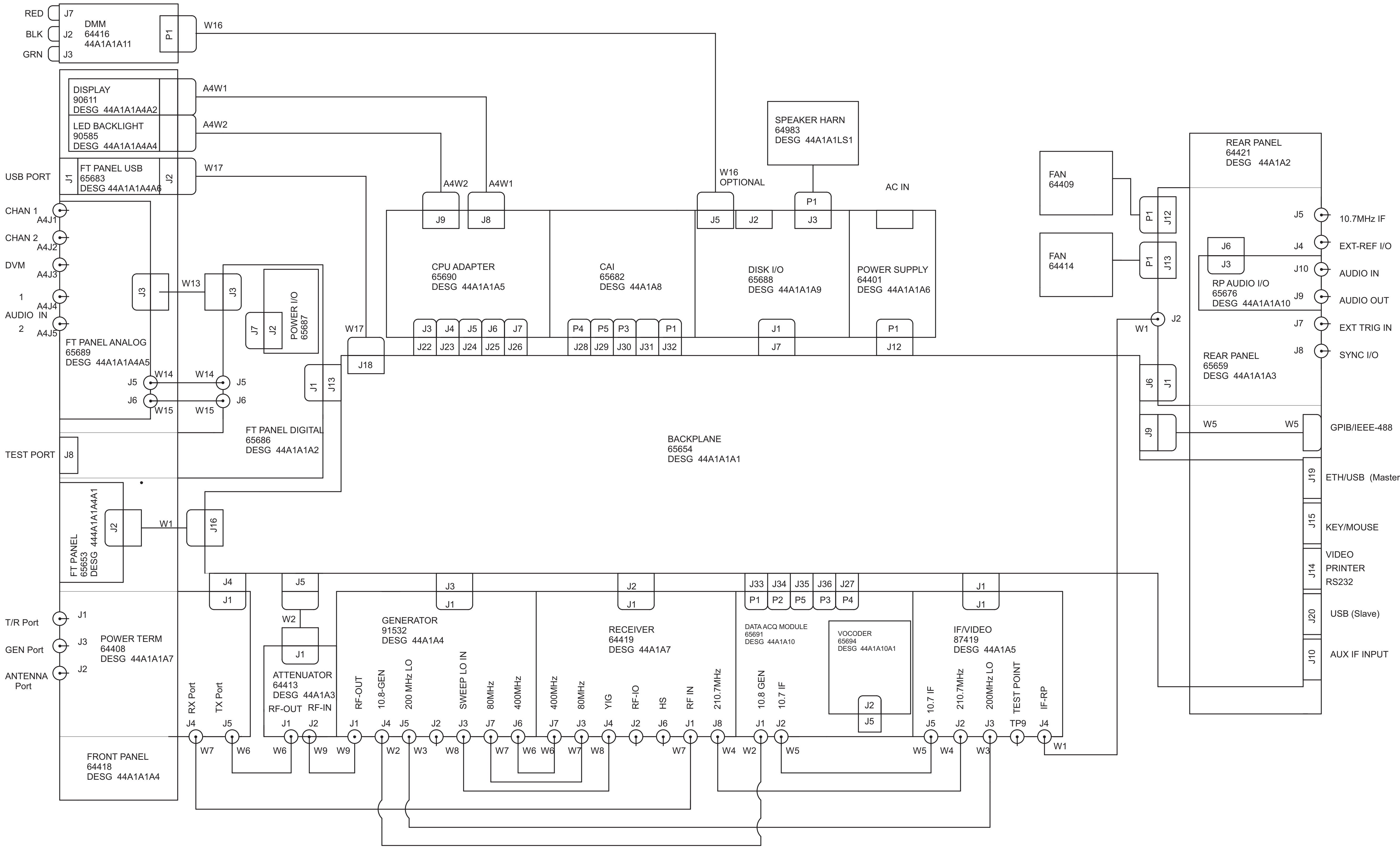


Fig. 2-3 3920B System Interconnect Diagram

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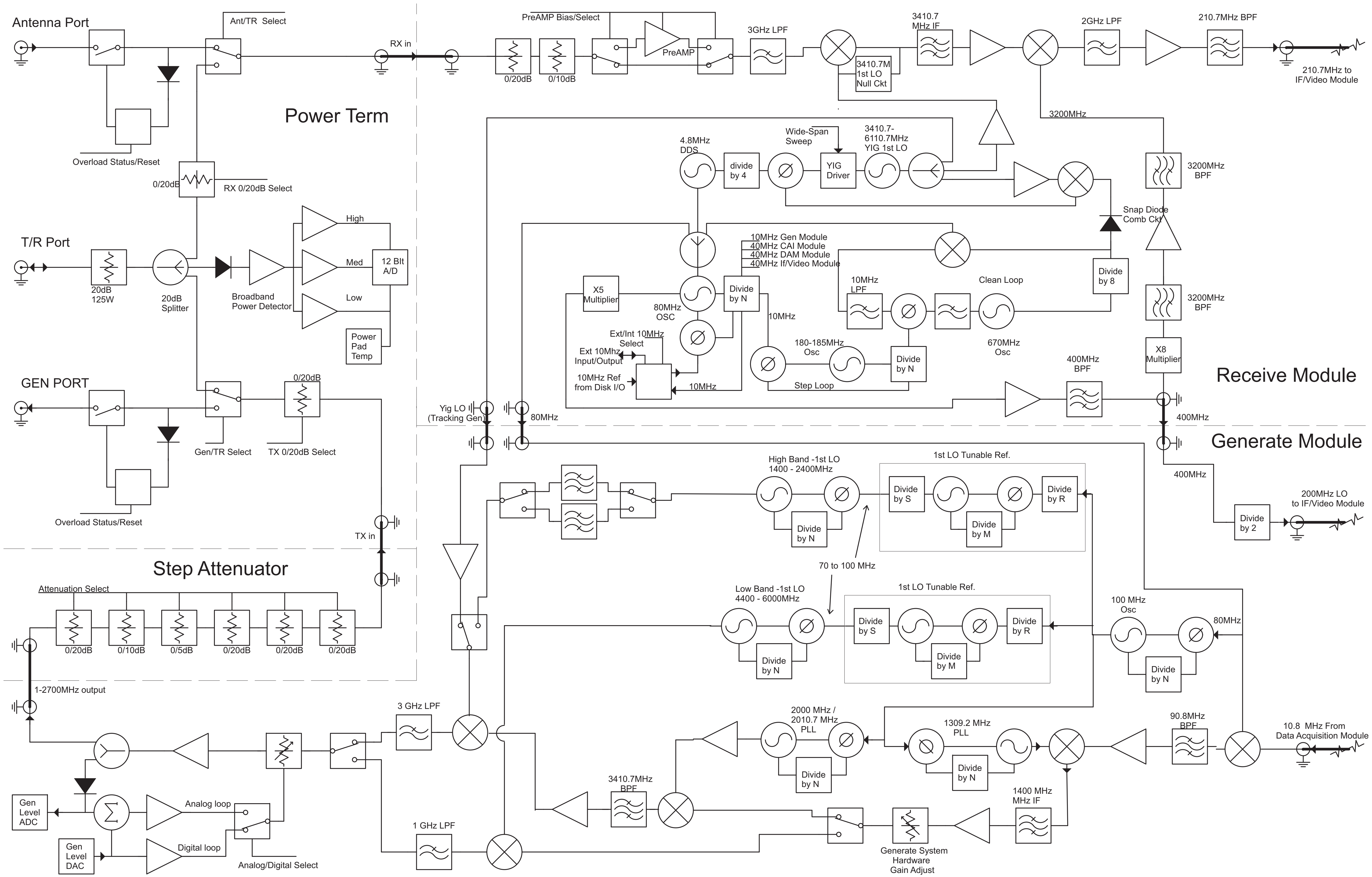


Fig. 2-3 3920B System Interconnect Diagram

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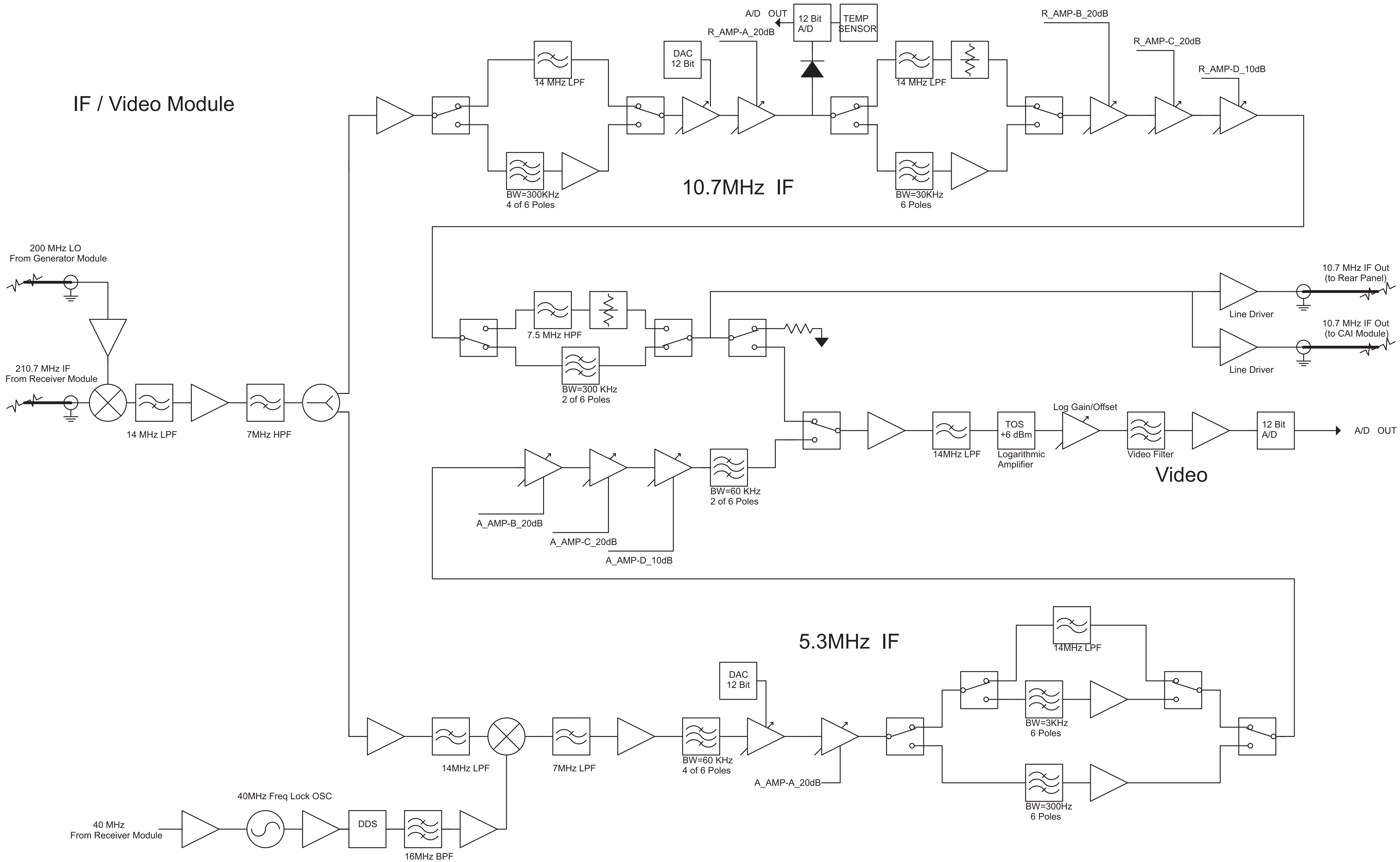



Fig. 2-3 3920B System Interconnect Diagram

10000026951 (Sheet 3 of 7)

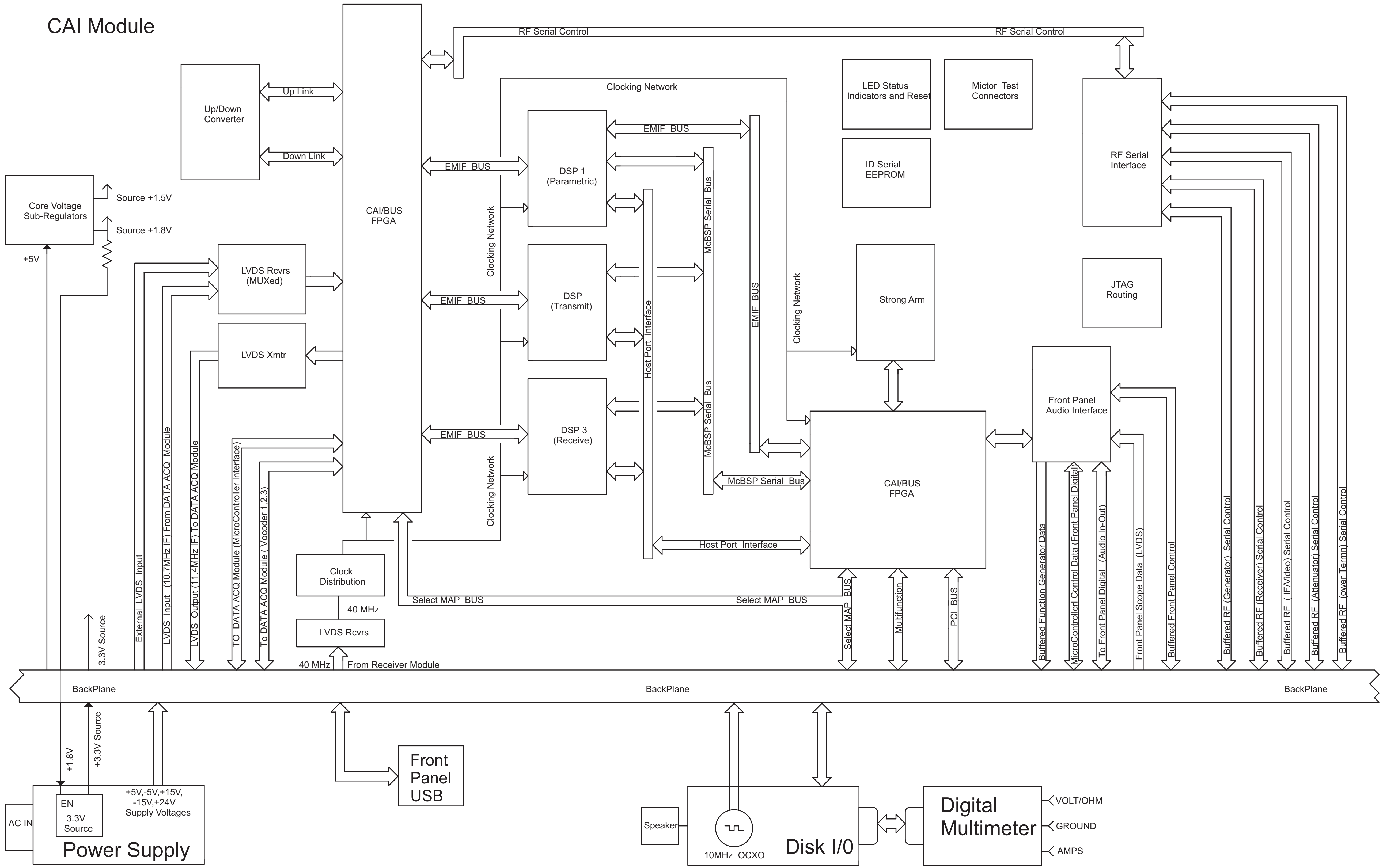



Fig. 2-3 3920B System Interconnect Diagram
10000026951 (Sheet 4 of 7)

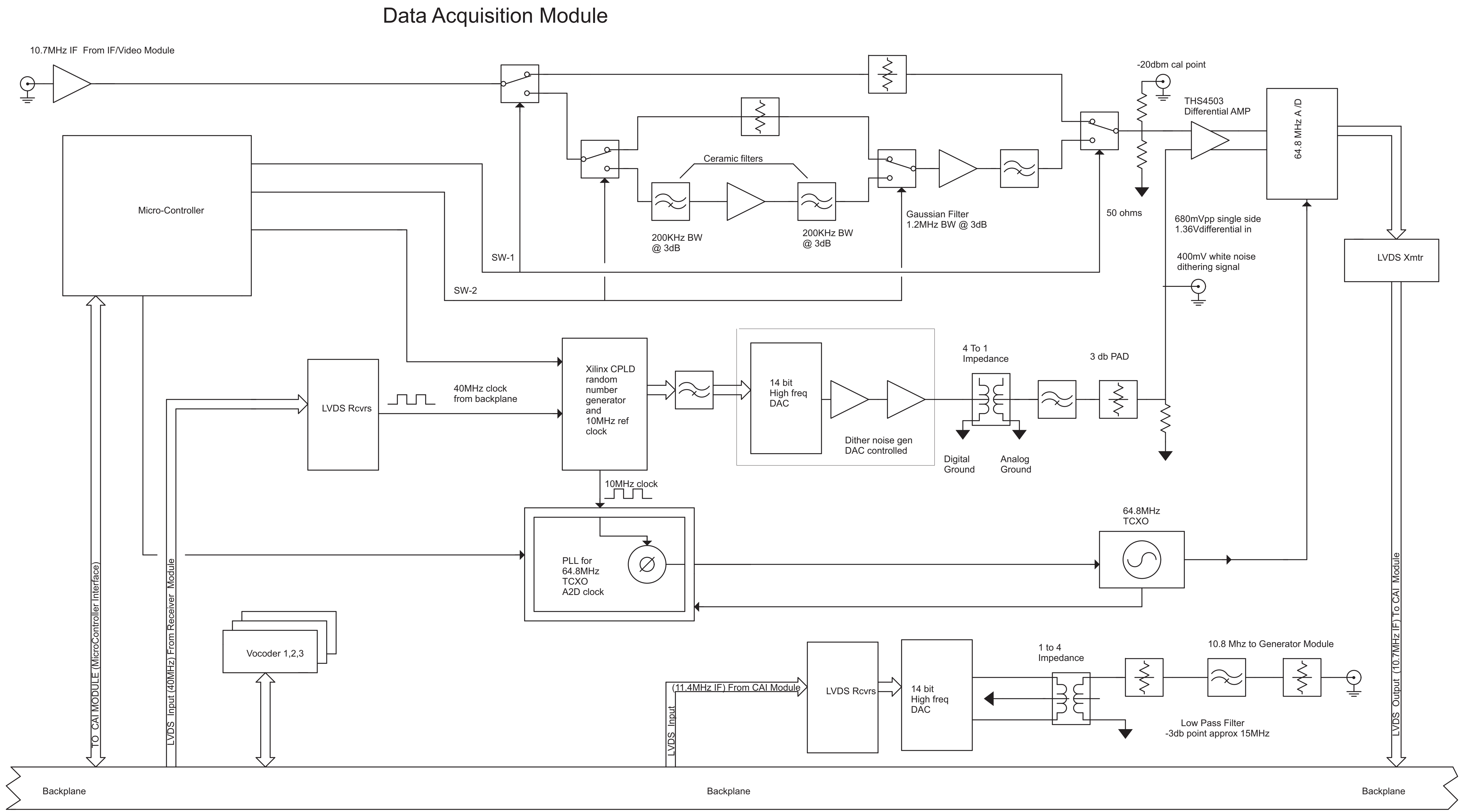
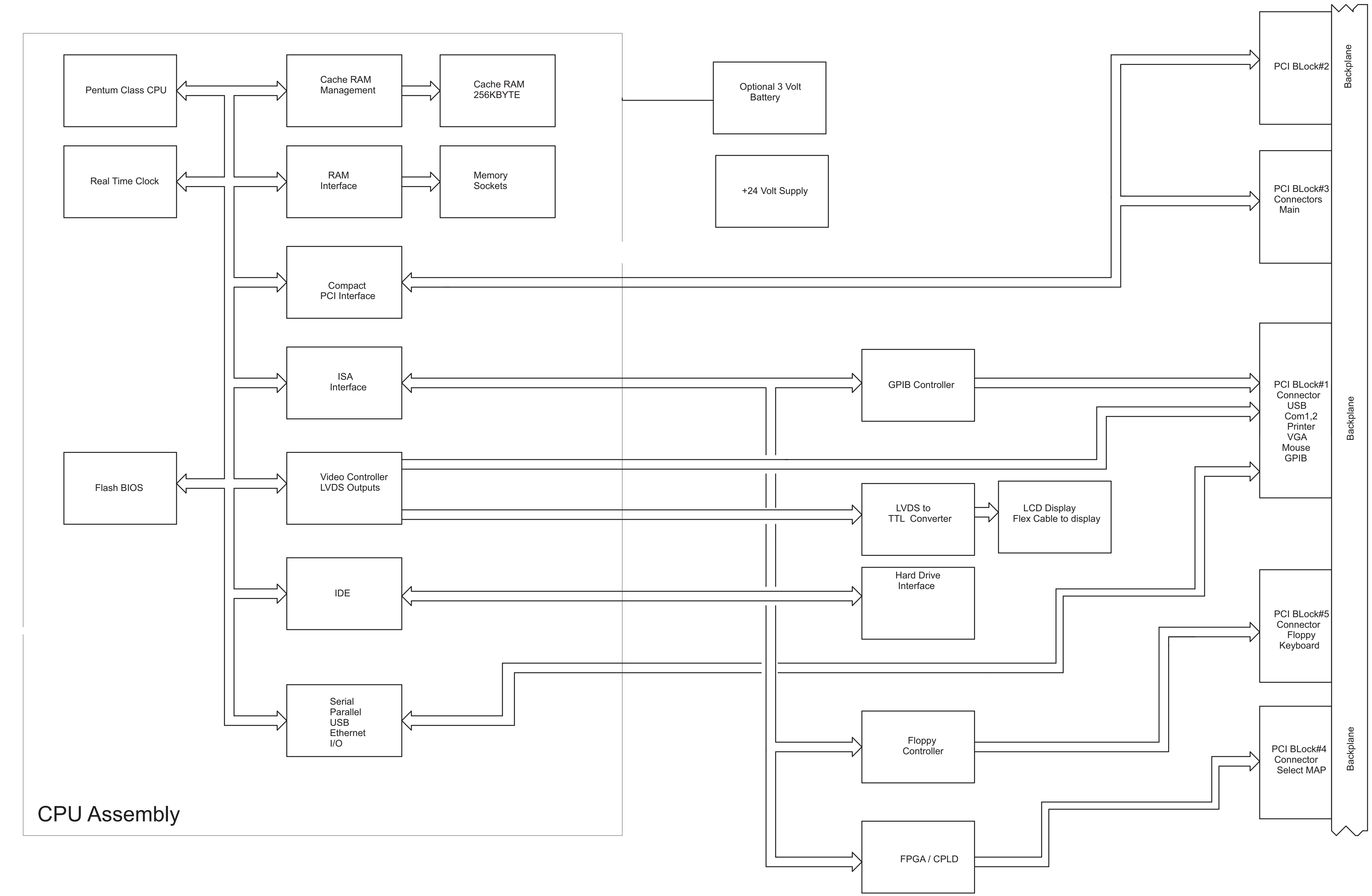



Fig. 2-3 3920B System Interconnect Diagram
10000026951 (Sheet 5 of 7)




CPU Adpater Board

Fig. 2-3 3920B System Interconnect Diagram
10000026951 (Sheet 6 of 7)

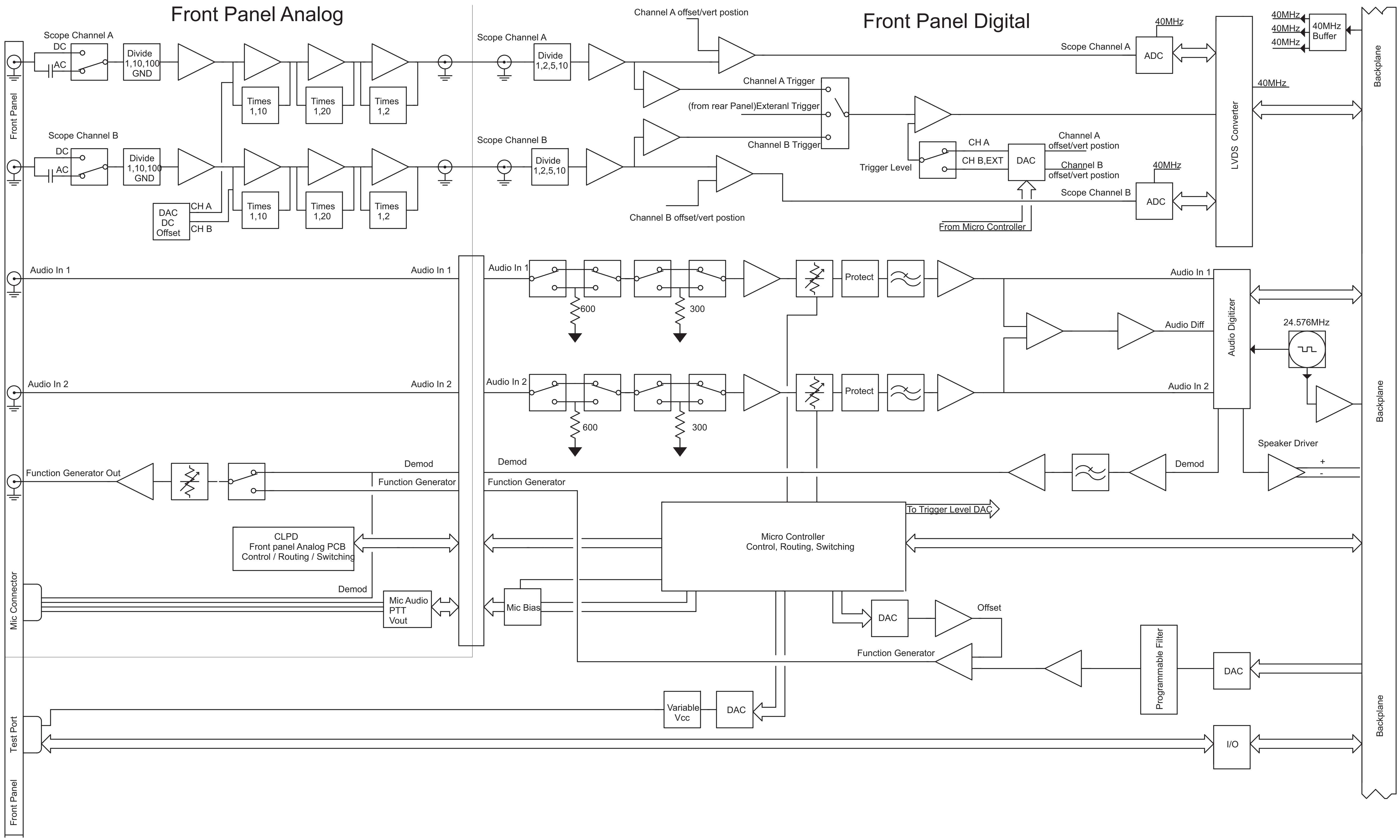



Fig. 2-3 3920B System Interconnect Diagram
10000026951 (Sheet 7 of 7)

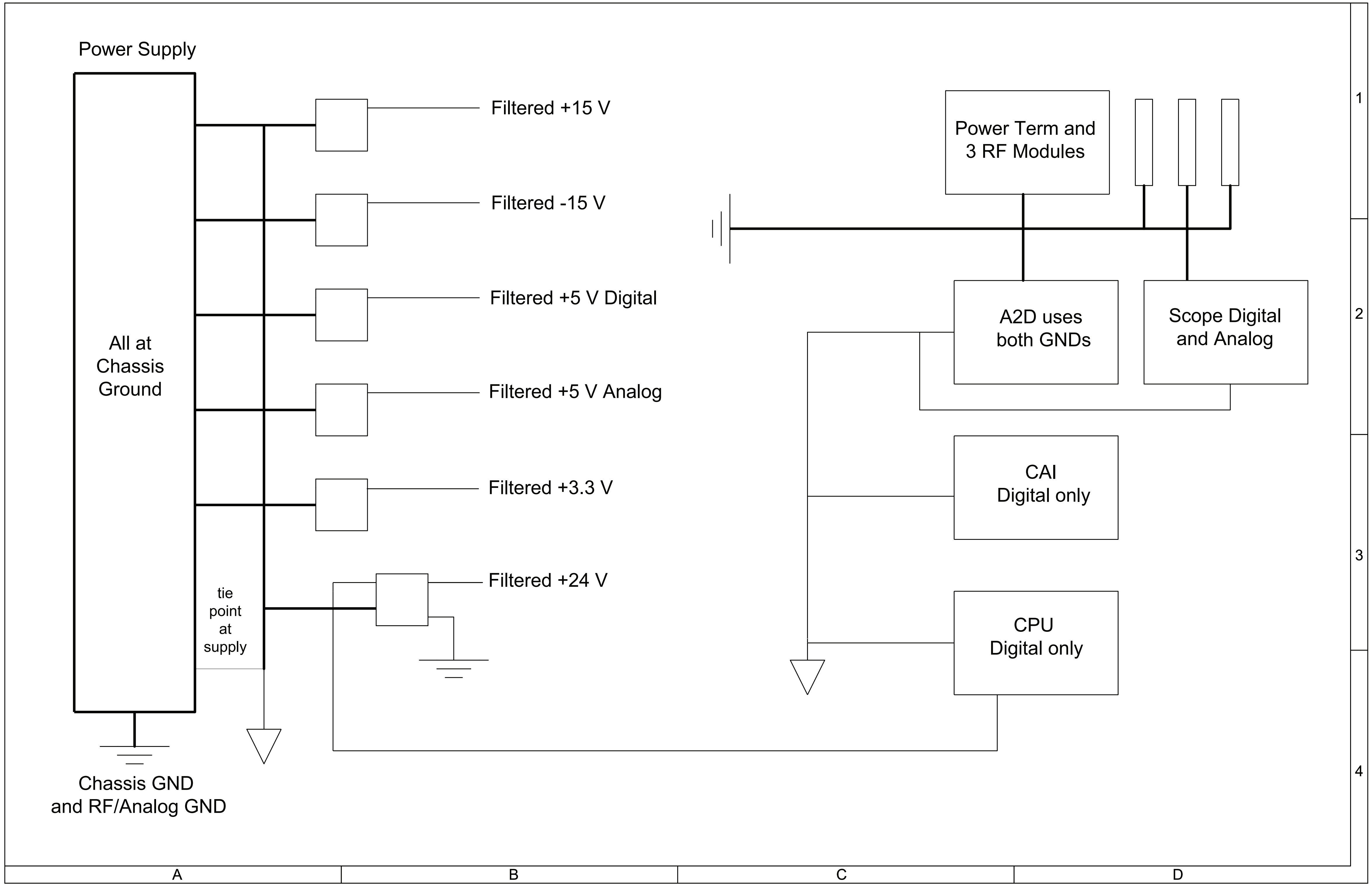



Fig. 2-4 Backplane PCB Assembly Interconnect Diagram

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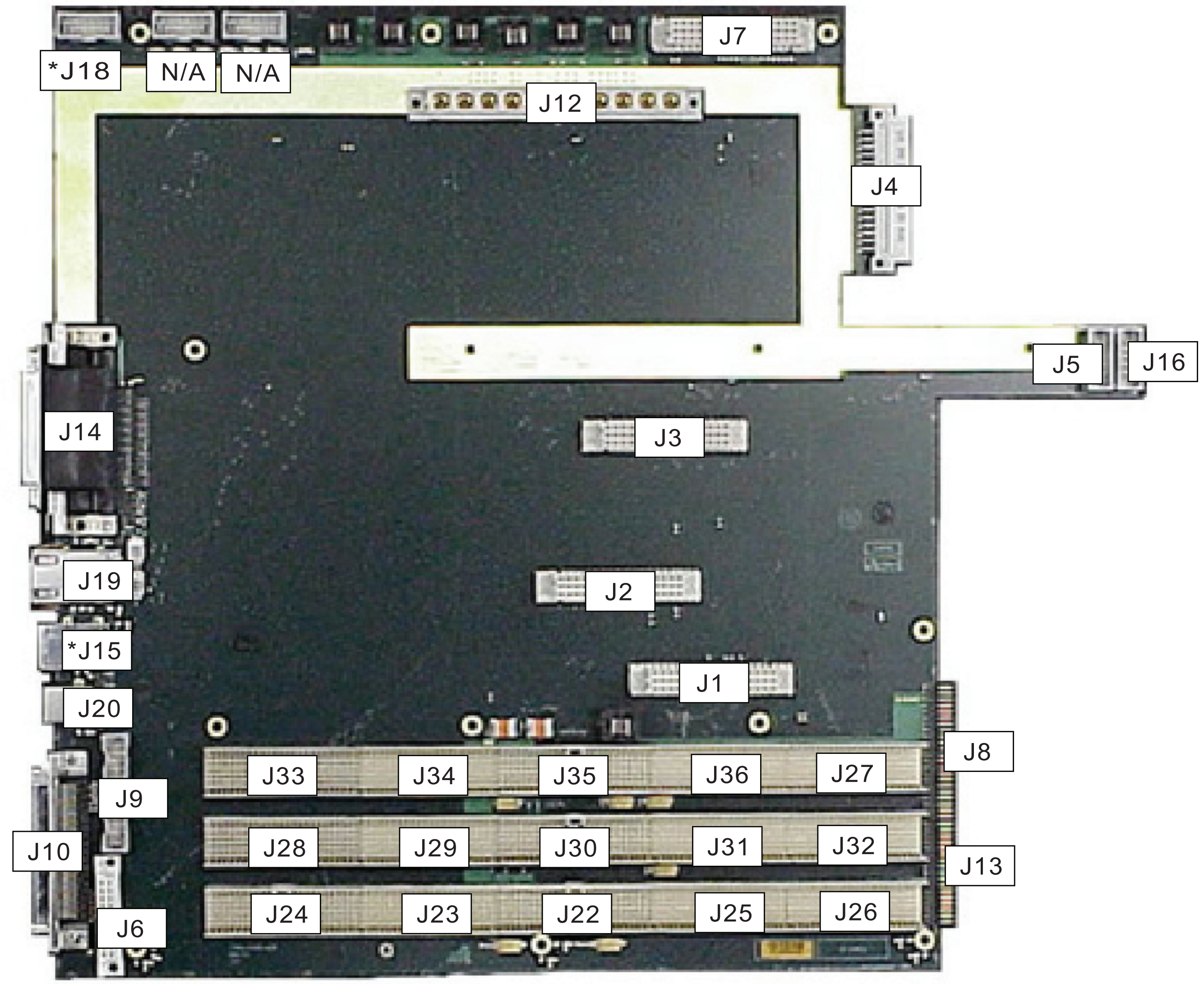


*J18 Applies to 3920 only and is a USB connection.
*J15 Applies to 3901/3902 only.

Fig. 2-5 Backplane PCB Assembly Connector Locations

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## 2.5 MODULE OVERVIEW

This section describes the various assemblies and connectors utilized in the 3900.

### 2.5.1 Backplane PCB Assembly (44A1A1A1)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-3.

The Backplane PCB Assembly routes electrical signals between the various system assemblies. The Backplane PCB Assembly utilizes the following connectors for routing signals:

- 32-Pin Connector provides connection to Power Term Assembly (J4).
- 10 Pin Header provides ribbon cable connection to Front Panel Keypad Assembly (J16).
- 10 Pin Header provides ribbon cable connection to Attenuator Assembly (J5).
- 24 Pin Header provides ribbon cable connection to GPIB Connector (J9).
- 44 Pin Header (J8) and 34 Pin Header (J13) provide connections to Front Panel Digital Interface PCB Assembly.
- 20 Pin DIN Connector for Rear Panel PCB Assembly (J6).
- 24 Pin DIN Connector for Power Supply Assembly (J12).
- 48 Pin DIN Connectors for:
- Disk I/O PCB Assembly (J7).
- IF/Video PCB Assembly (J1) (Slot 3).
- Generator Assembly (J3) (Slot 5).
- Receiver Assembly (J2) (Slot 4).
- Five 154 Pin DIN Connectors (J22, J23, J24, J25 and J26) for CPU Adapter Assembly (Slot 0).
- One 175 Pin PCI Connector (J28) and four 154 Pin Keyed Connectors (J29, J30, J31 and J32) for the CAI PCB Assembly (Slot 1).
- One 175 Pin PCI Connector (J33) and four 154 Pin Keyed Connectors (J27, J34, J35 and J36) for the Data Acquisition Module (DAM) (Slot 2).
- 68 PIN Auxiliary IF Input (J10).
- 25F/9M/15 HDF DSUB Connector for Video, Printer and RS-232 connections (J14).
- 6 PIN Dual PS/2 Connector for Keyboard (J15).
- 4 PIN USB Connector for USB connection (J20).
- 18 PIN 2XUSB Connector for Ethernet and USB device connections (J19).
- 4 PIN USB Connector for Front Panel USB connection (J18).

The Backplane PCB Assembly layout utilizes RF techniques on all signals >33 MHz and on all low level signals.

#### 2.5.1.A Front Panel Analog PCB Assembly (44A1A1A4A5)

#### 2.5.1.B Front Panel Digital Interface PCB Assembly (44A1A1A2)

Refer to Fig. 2-1 or Fig. 2-2.

The Front Panel Audio Assembly consists of the Front Panel Digital Interface PCB Assembly and the Front Panel Analog PCB Assembly. The Front Panel Audio Assembly includes standard audio Input/Output connectors and controls, as well as a 6-channel audio function generator and a dual-channel 40 msps digital Oscilloscope.

The Front Panel Analog PCB Assembly converts analog audio signals received from the Audio Input Connector to digital signals. The Front Panel Digital Interface PCB Assembly contains a Digital to Analog Converter (DAC) which converts the system's digital signals to analog audio signals which are then sent to the Front Panel Audio Output Connector.

Signal Tone filtering, in addition to the balanced or unbalanced switching, are also performed by the Front Panel Audio PCB Assembly. The Front Panel Audio PCB Assembly output signals are the audio function generator signals and the demodulated audio signal (Demod). Audio Input signals to the Front Panel Audio PCB Assembly are the Microphone, Channel 1 and 2 Scope inputs and Audio 1 and 2 connectors.

The Front Panel Audio PCB Assembly generates a digitally controlled output voltage for the Test Connector and routes input/output signals to/from the Test Connector.

### 2.5.2 Rear Panel Audio Assembly

#### 2.5.2.A Rear Panel PCB Assembly (44A1A1A3)

#### 2.5.2.B Rear Panel Audio I/O PCB Assembly (44A1A1A10)

Refer to Fig. 2-1 or Fig. 2-2.

The Rear Panel Audio Assembly consists of the Rear Panel PCB Assembly and the Rear Panel Audio I/O PCB Assembly. The Rear Panel PCB Assembly includes standard Input/Output connectors as well as Ethernet, Video, Printer, RS-232, keyboard, and USB Mouse connectors. The Rear Panel Audio I/O PCB Assembly includes standard audio Input/Output connectors.

### 2.5.3 CPU Adapter PCB Assembly (44A1A1A5)

Refer to Fig. 2-1 or Fig. 2-2.

The CPU Adapter Assembly provides a mechanism by which all CPU generated signals are distributed through the Backplane PCB Assembly to other system assemblies. The CPU Adapter Assembly is comprised of five Compact PCI connectors placed end-to-end along the CPU Adapter PCB Assembly. The CPU Adapter Assembly contains a 32 bit PCI bus which operates at 33 MHz, running a Pentium ETX form factor which offers internal RAM. The single board computer is mounted to the CPU Adapter PCB Assembly, which interfaces with other PCB Assemblies via the Backplane PCB Assembly.

| NOTE | 3901's with SN 298001115 and lower and 3902's with SN 297001117 and lower contain a CPU Adapter PCB Assembly that contains a 266 MHz processor.<br>Units containing a 266 MHz processor can be returned to the factory for an optional hardware upgrade to the 733 MHz processor. Check the UTILS, Operational Status Tile for unit processor speed. |
|---|---|

## 2.5.4 Power Supply Assembly (44A1A1A6)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-6.

AC power for the Power Supply Assembly is provided by an IEC universal 3-prong power entry module with an integrated power switch, fuses and EMI filter.

The Power Supply Assembly is responsible for generating all internal voltages required to operate the 3900. The voltages generated by the Power Supply Assembly and distributed through the Backplane PCB Assembly are:

- Filtered +5 V Digital and Analog
- Filtered +15 V
- Filtered -15 V
- +5.1 V Auxiliary
- +3.3 V Enable
- OS Active (Override from main CPU)

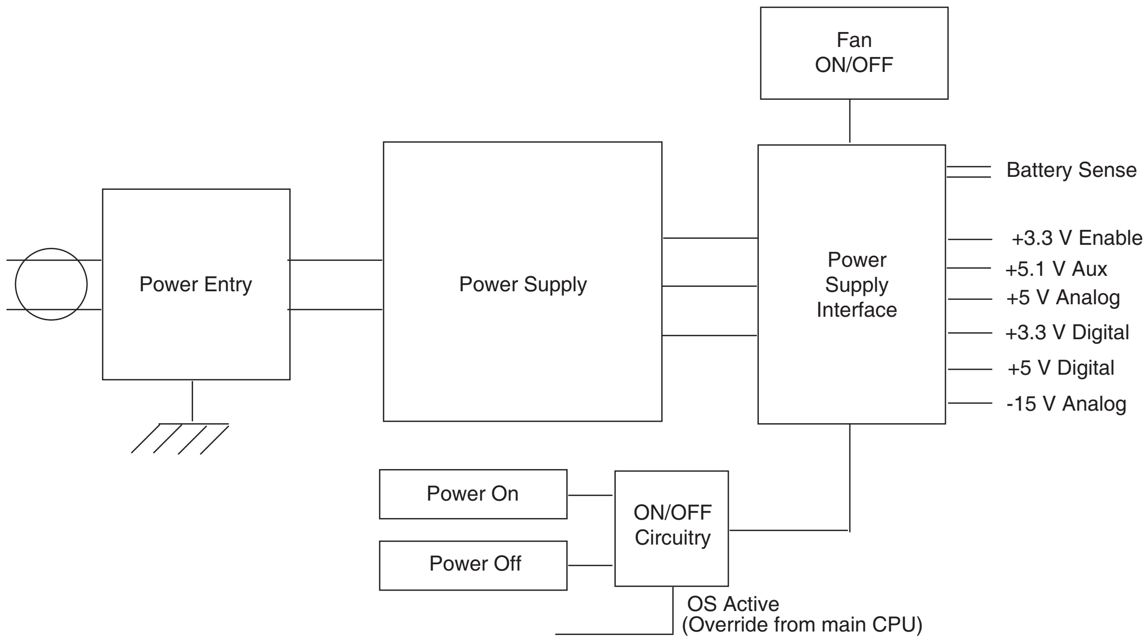


Fig. 2-6 Power Supply Assembly Interface Diagram

## 2.5.5 Power Term(ination) Assembly (44A1A1A7)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-14.

The Power Term Assembly provides the focal point through which RF signals pass between the UUT and the Test Set. There are three RF user interface connectors (on the front of the unit) (ANT IN, GEN OUT, T/R) and two internal coaxial cable connections (Receiver and Generator Assembly). The Power Term Assembly consists of the following PCB Assemblies: GEN and ANT Connector Power Buffers, RF Power and Controller and Tx/Rx Step Attenuators for input power and generator level control. The assembly housing provides circuit isolation, as well as heat sink cooling for the high power RF input. The cooling fan is turned on and off by the processor control based on the temperature of the Power Term Assembly.

## 2.5.6 Digital Multimeter (DMM) Assembly (44A1A1A9 3920 only)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-15.

The Digital Multimeter is hardware/software feature that is available on the 3920.

The Digital Multimeter is a self contained, electrically isolated, digital module capable of operating at temperatures of -20C to +70C. The Digital Multimeter measures AC and DC voltage, current and resistance within ±5% full scale of the selected range. The Digital Multimeter measures up to
400 Volts AC or DC, 3 Amps of current and 40 MΩ of resistance.

The Digital Multimeter is designed around a self contained, Integrated Circuit (IC) that is controlled by an on-board host microprocessor (uP). The Digital Multimeter's uP is responsible for transferring digitized measurement data from the Digital Multimeter IC to the 3900, for processing all commands sent to the Digital Multimeter module from the 3900 and for retaining calibration values for each function and range on the Digital Multimeter's flash memory.

All AC and DC voltage measurements must be adjusted to avoid damaging the input to the Digital Multimeter IC. The 3900's host processor performs the auto-ranging function using a resistive voltage divider network with various branches that are switched in or out by the Digital Multimeter IC according to the overflow data.

The Digital Multimeter also contains AC compensation capacitors that flatten out the AC voltage response of the meter over the range of 0 to ~ 20 KHz. The precision values of the AC compensation capacitors are critical to the proper operation of the AC voltage function over the entire frequency bandwidth.

The internal voltages for the Digital Multimeter module are received from a +5 V input from the Test Set via an isolated 5 Volt DC to DC converter whose output is also 5 volts DC and post regulated via a linear regulator IC. The output from the DC to DC Converter is split into separate +2.5 and
-2.5 Volt supplies for the associated analog circuitry.

The Digital Multimeter +5 V input supply and the 2-wire serial data port circuits that run between the Test Set and Digital Multimeter module are both electrically isolated within the Digital Multimeter module to prevent damage and personal injury which may occur when inappropriately high voltages are applied to the input terminals.

The AC Voltage function of the Digital Multimeter module is a true RMS reading achieved by using an RMS voltage converter IC. When AC Voltage measurements are being performed, the voltage is automatically routed through the RMS converter IC, then back into the Digital Multimeter IC for conversion. Streaming results and measurement data are then passed to the Test Set via the internal uP over a 2-wire serial link.

The AC and DC Current metering capability of the Digital Multimeter module is protected from overload by a fuse located on the front of the module. The fuse is rated at 3 amps maximum for a period of ten seconds. The voltage and resistance input terminals are internally protected from the application of excessive voltages by a gas discharge tube across the inputs.

## 2.5.7 DISK I/O PCB Assembly (44A1A1A9)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-7.

CPU Input/Output signals are routed to the Disk I/O PCB Assembly plug-in slot through the Backplane PCB Assembly. Signals for the floppy disk drive (3901/3902) are routed directly to a
26-pin flex cable header, providing a connection to a 3.5” half-height floppy disk drive. The 3920 has a serial port for DMM interconnect that is routed from the CPU to the Disk I/O PCB Assembly for DMM operation. The OCXO oscillator is located on the Disk I/O PCB Assembly, providing a stable and accurate 10 MHz reference frequency for the system. The Digital to Analog Converter (DAC) on the Disk I/O PCB Assembly provides voltage tuning for the OCXO. A serial EEPROM stores the factory calibrated tuning voltage for the oscillator. A dual Digital to Analog Converter (DAC) drives the speaker amplifier after it is filtered by a 4.6 kHz filter.

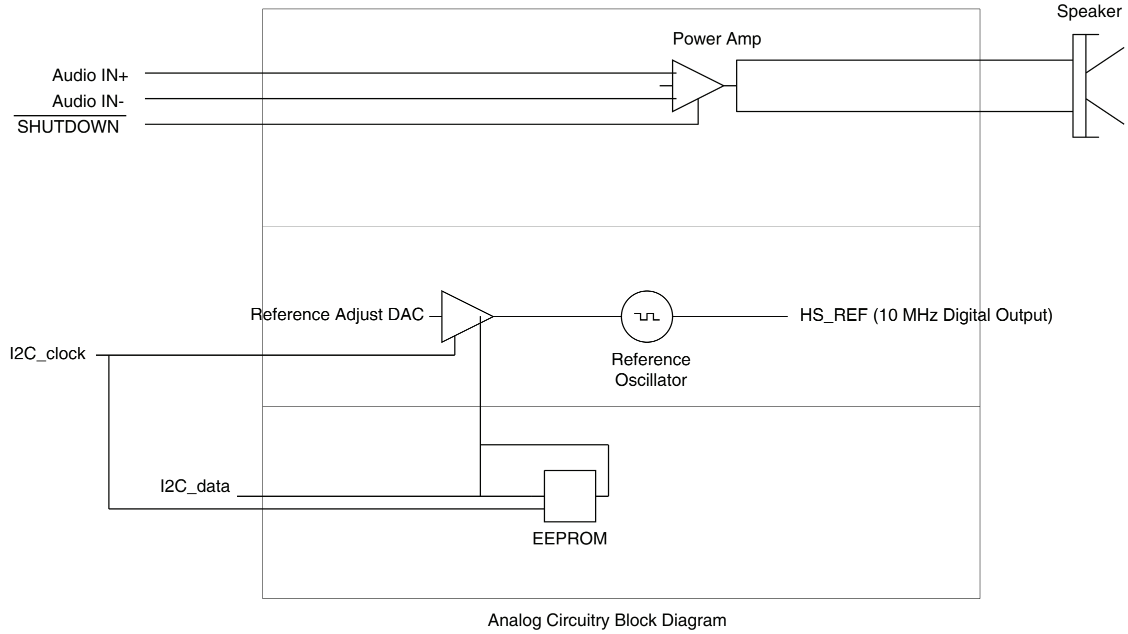


Fig. 2-7 Disk I/O PCB Assembly Interconnect Diagram

0000-4430-200-B1

## 2.5.8 Attenuator Assembly (44A1A3)

Refer to Fig. 2-1 or Fig. 2-2.

The attenuator consists of six relay-attenuator sections and a driver board. The relay-attenuator section consists of one 10 dB relay-attenuator, one 5 dB relay-attenuator and four 20 dB five relay-attenuators; for a total attenuation of 95 dB. The driver board contains a serial to parallel converter and six transistor driver stages which drive the attenuator relays with the required current. The module uses 5 V for the supply and relay drives.

Each stage is accurate (±0.5 dB) to its rated value. The attenuator has a frequency response flatness (slope) from 0 to 2.7 GHz of <3 dB. This slope remains constant (±0.5 dB) with different stages of attenuation on or off. This error is removed when the 3900 is calibrated.

## 2.5.9 Generator Assembly (44A1A4)

Section 2.5.9 applies to the 3901, 3902 and 3920 models. Refer to Fig. 2-1 or Fig. 2-2.

The CAI PCB Assembly provides 11.4 MHz IF to the Generator Assembly for frequency conversion to the desired output frequency. The Generator Assembly provides 0.1 dB increments between the 10 dB steps of the step attenuator attached to the top of the Generator Assembly. The Generator Assembly consists of the RF/Microwave PCB Assembly and Synthesizer/Control PCB Assembly. The lower frequency functions reside on the Synthesizer/Control PCB Assembly, while the higher frequency functions reside on the RF/Microwave PCB Assembly.

### 2.5.9.A RF/Microwave PCB Assembly

The RF/Microwave PCB Assembly is designed to convert an 11.4 MHz IF input to any frequency between 1 MHz to 2.7 GHz. The 11.4 MHz IF signal is converted to three increasingly higher IF frequencies: 91.4, 611.4 and 3411.4 MHz respectively. At each IF, a considerable amount of filtering is performed in order to remove the images resulting from the previous up-conversion. Finally, the 3411.4 MHz signal is down-converted to the desired frequency. The signal is then leveled and amplified up to a level high enough to overcome the losses of the step attenuator and Power Term and still meet the specified maximum output power level.

### 2.5.9.B Synthesizer/Control PCB Assembly\

The Synthesizer/Control PCB Assembly consists of three major loops: DDS, main and comb driver. This structure locks a YIG oscillator by mixing the output with that of the comb frequency coming from the clean loop. The comb moves in approximately 0.4 MHz steps providing a coarse tune. The DDS, which is tunable in extremely fine steps, drives the main loop, giving the Synthesizer/Control PCB Assembly sub-hertz resolution. The comb driver has two loops that generate an exceptionally clean signal that is multiplied up to the YIG frequency. The step loop provides all of the step size for the comb driver and is followed by the clean loop which tracks the step loop changes.The frequencies of 80 and 400 MHz that exist in the Receiver Assembly are reused to generate the LOs used for the up-converter block. This is what determines the choice of IF frequencies. In order to convert 11.4 to 91.4 MHz, 11.4 MHz is mixed with 80 MHz and the sum product taken. The 520 MHz LO needed for the 611.4 MHz IF is generated by dividing 400 MHz by two. This 200 MHz signal is mixed with the 80 MHz in a mixer that has poor third order LO performance. The 3rd LO minus the IF produces 600 MHz. Subtract 80 MHz for a sum of 520 MHz. Finally, the 2800 MHz LO needed to convert 611.4 to 3411.4 MHz is generated by multiplying 400 MHz by seven.

## 2.5.10 Generator Assembly (44A1A4)

Section 2.5.10 applies to the 3920B model. Refer to Fig. 2-1 or Fig. 2-3.

The CAI PCB Assembly provides 10.8 MHz IF to the Generator Assembly for frequency conversion to the desired output frequency. The Generator Assembly provides 0.1 dB increments between the 10 dB steps of the step attenuator attached to the top of the Generator Assembly. The Generator Assembly consists of the RF/Microwave PCB Assembly and Synthesizer/Control PCB Assembly. The lower frequency functions are performed by the Synthesizer/Control PCB Assembly, while the higher frequency functions are performed by the RF/Microwave PCB Assembly.

### 2.5.10.A RF/Microwave PCB Assembly

The RF/Microwave PCB Assembly is designed to convert a 10.8 MHz IF input to any frequency between 1 MHz to 2.7 GHz. The frequency conversion is handled in a banded approach. The Low Band range is 10 MHz to 1000 MHz; the High Band range is >1.0 GHz to 2.7 GHz. The 10.8 MHz IF signal is mixed with an 80 MHz LO signal from the Receiver Assembly to create a 90.8 MHz IF signal. This 90.8 MHz signal is then mixed with a 1309.2 MHz fixed LO which is received from the Synthesizer PCB to create a 1400 MHz IF signal. Low Band frequency conversion mixes the 1400 MHz IF signal with the Low Band 1$^{st}$ LO (1400 – 2400 MHz) to down convert the 1400 MHz IF signal to the desired output frequency. High Band frequency conversion mixes the 1400 MHz IF signal with a 2 GHz Fixed LO to create a 3400 MHz IF signal. The 3400 MHz IF signal is then down converted to the desired output frequency by mixing it with the High Band 1$^{st}$ LO (4400 – 6000 MHz).

When the system Tracking Generator is enabled the 2 GHz LO is adjusted to 2010.7 MHz and mixed with the 1400 MHz IF signal to form a 3410.7 IF signal. In order for the Receiver and Generator to track in frequency the 1$^{st}$ LO from the Receiver is used by the Generator to generate the output frequency.

Filtering is performed at each IF to remove the images resulting from the up-conversion process. In order to meet the specified maximum output power level the signal is leveled and amplified to a level high enough to overcome the losses of the step attenuator and Power Term.

## 2.5.10.B Synthesizer/Control PCB Assembly\

The Synthesizer/Control PCB Assembly consists of:

- A CPLD which interfaces with the system backplane to provide control functions for the module.
- Switching and linear voltage regulators to supply both the Synthesizer and Microwave PCB with the desired operating voltages.
- Automatic Level Control (ALC) circuitry used by the Microwave PCB to level the output signal.
- 7 Phase Locked Loops (PLL's) which generate the variable and fixed LO signals used on the Microwave PCB.

The 80 MHz LO signal from the Receiver module is amplified and filtered then sent to the Microwave PCB. This 80 MHz signal is also used as the reference to phase lock a 100 MHz OCXO with the system.

The 100 MHz OCXO provides an extremely low phase noise reference for the other PLL's. A fractional PLL referenced to the 100 MHz OCXO is used to generate the fixed 1309.2 MHz LO. An integer PLL uses the low phase noise OCXO as reference to generate a 2 GHz LO. When the system Tracking Generator is enabled the 2 GHz PLL is reconfigured to fractional mode to create a 2010.7 MHz LO signal.

Both the Low Band (1400 to 2400 MHz) and High Band (4400 to 6000 MHz) 1$^{st}$ LO signals are generated using fractional PLL circuits. In order to control the fractional spurs associated with fractional PLL's separate integer PLL's are used to generate the variable reference frequencies used by the Fractional PLL's to create the LO signal.

## 2.5.11 IF/Video PCB Assembly (44A1A5)

Refer to Fig. 2-1 or Fig. 2-2.

The IF/Video PCB Assembly conditions incoming signals from the Receive IF Assembly for the CAI PCB Assembly and provides a squared IF signal to the CAI PCB Assembly for frequency counter circuitry. The IF/Video PCB Assembly provides the analyzer gain adjustment when adjusting the Reference level dBm on the Spectrum Analyzer, and acts as the receiver Automatic Gain Control (AGC) when in the Receiver mode. As well as providing a digitized logarithmic representation of the incoming signal amplitude for both the “channel” and “widescan” analyzer modes, the IF/Video PCB Assembly also provides a buffered 10.7 MHz IF signal to the rear of the 3900 and a temperature sensor for sensing the internal ambient unit temperature.

### 2.5.11.A IF/Video - 10.7 MHz IF Filters

The 10.7 MHz IF path provides gain adjustment and hardware bandwidth restriction of the signal being received from the Receive IF Assembly. This signal is used by the CAI PCB Assembly to perform all signal processing, decoding and metering functions. The 10.7 MHz filter bandwidth selections include: 6 MHz, 300 kHz and 30 kHz.

### 2.5.11.B IF/Video - 5.3 MHz IF Filters “Channel” IF

The Spectrum Analyzer 5.3 MHz IF functions to provide a fixed frequency down-conversion of the CAI 10.7 MHz IF signal for the Channel Analyzer screens. The 5.3 MHz filter bandwidth selections include 60 kHz, 3 kHz and 300 Hz.

## 2.5.12 Receiver Assembly (44A1A7)

Refer to Fig. 2-1 or Fig. 2-2.

The Receiver Assembly is a self contained wideband triple conversion receiver designed to convert incoming frequencies (9 kHz to 2.7 GHz) to a 10.7 MHz IF Output frequency. The module consists of the Receiver PCB Assembly and Synthesizer PCB Assembly.

### 2.5.12.A Receiver PCB Assembly

The Receiver PCB Assembly converts incoming frequencies (9 kHz to 2.7 GHz) to a 10.7 MHz IF Output frequency. The Receiver PCB Assembly provides all the necessary LO’s for the conversion to 10.7 MHz IF. The 10.7 MHz IF is routed to the IF/Video PCB Assembly for additional filtering and signal conditioning.

### 2.5.12.B Synthesizer PCB Assembly

The Synthesizer PCB Assembly consists of three major loops: the DDS, main, and comb driver. This structure locks a YIG oscillator by mixing its output with that of the comb frequency coming from the clean loop. The comb itself moves in approximately 0.4 MHz steps providing a coarse tune. The DDS, which is tunable in extremely fine steps, drives the main loop giving the synthesizer its sub-hertz resolution. The comb driver has two loops that generate an exceptionally clean signal that is multiplied up to the YIG frequency. The step loop provides the step size for the comb driver and is followed by the clean loop which tracks the step loop changes. The synthesizer/control board provides an 80 and 400 MHz reference for the Generator Module.

## 2.5.13 CAI PCB Assembly (44A1A8)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-16.

The CAI (Common Air Interface) PCB Assembly contains three DSP's, a protocol processor and a digital up/down converter chipset. The main responsibility of the CAI PCB Assembly is to provide the interface between the IF and the host CPU.

- Digitally perform modulation and demodulation of IF signal using an up/down converter chipset and DSP.
- Perform parametric measurements from the digital data that is generated by the up/down converter chipset.
- Generate digital outputs.
- Controlled by the host CPU over the PCI bus in which part of the address decoding has been performed external to the CAI PCB Assembly.

## 2.5.14 DAM (Data Acquisition Module) Carrier PCB Assembly (44A1A10)

Refer to Fig. 2-1 or Fig. 2-2 and Fig. 2-17.

The DAM Carrier provides a digitizing sub system for the IF signal path. The output of the AD6644 64.8 MHz digitizer is converted to 16 pairs of LVDS (Low Voltage Differential) for transmission to the Backplane PCB Assembly. The data is reconstructed at the FPGA on the CAI module using a LVDS receiver IC.

The DAM Carrier contains three RF signal paths that are utilized by the analog to digital digitizer. One of the RF signal paths is the bypass mode, which does not contain bandwidth filtering. The total delay of this RF signal path is 12.5 ns. The second RF signal path is the 10.7 MHz Gaussian filter. This RF signal path contains a -3 dB bandwidth of 1.4 MHz, with a typical delay of 780 to 810 µs. The third RF signal path contains a 200 kHz ceramic filter in series with the Gaussian filter output. The two filters on this RF signal path create a combined delay of approximately 5 µs.

The AD6644`s 64.8 MHz Encode/Decode clock is phase locked to the 40 MHz reference routed from the Receiver module to the Backplane PCB Assembly, then to the Xilinx XC9572 CPLD. The CPLD uses the 40 MHz reference to derive the onboard 10 MHz PLL clock. The 64.8 MHz TCXO is a voltage controlled oscillator. The input control voltage for the TCXO is driven by the LMX2301TM Phase Lock Loop IC. Once the microcontroller has programmed the PLL registers, the LMX2301TM IC phase locks the TCXO to the 10 MHz reference. A red LED indicates whether or not phase lock has been established. When the red LED is OFF a phase locked condition has been achieved. If the LED is ON phase lock has not been achieved. Refer to Fig. 2-8 for red LED location.

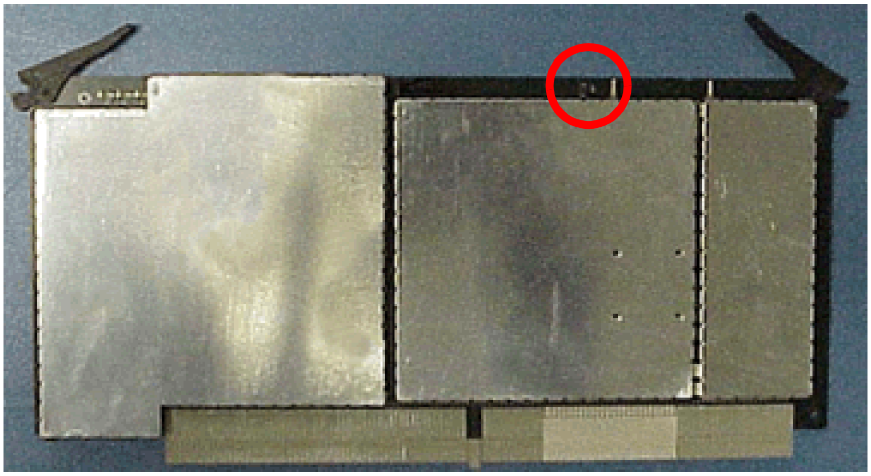

Fig. 2-8 DAM Carrier Red LED Status Indicator

An ATMEL microcontroller (ATMEGA8515) is used as the on board intelligent controller. The microcontroller uses a SPI (Serial Port Interface) to perform setups, filter selection, and dithering control. The microcontroller uses a 4 MHz clock, which is also derived from the 40 MHz reference.

The DAM Carrier contains a separate digital to analog converter that generates an RF Output signal in the range of 10 to 13 MHz, with a maximum output level of -6 dBm. The output signal is derived from another set of LVDS signals received from the FPGA on the CAI module. These LVDS signals drive a LVDS receiver, which converts the LVDS data into TTL compatible outputs that are used to drive the Digital to Analog Converter (DAC).

The DAM Carrier PCB Assembly has three slots available for vocoder functions. Each slot has ten bits of digital I/O connected to the CAI module. There are +5 V, +15 V, -15 V and +3.3 V power lines available for the satellite PCBs.

Vocoders are factory installed on all 3920's and have been installed on 3901 and 3902's with serial numbers ending in 1288 or higher. DAM Carrier PCB Assemblies containing Vocoders have visible white tabs on the back of the assembly (refer to Fig. 2-9). The Vocoder Option (390XOPT216) also appears in the option list on the Utility License Tile when the Vocoder hardware has been installed in a unit.

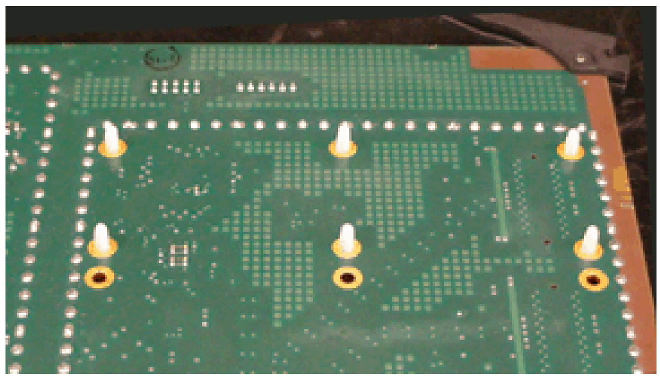

Fig. 2-9 Carrier - Vocoder Tabs

The DAM Carrier module has three green LEDs that indicate micro status (Fig. 2-10). The first two LEDs indicate filter status. When Wideband filtering is selected both of these LEDs are OFF. When Gaussian filtering is selected the first LED is ON and the second LED is OFF (Fig. 2-11). When the first and second LED are ON, GAUSSIAN plus 200 kHz Ceramic filters are selected (refer to Fig. 2-12). The third LED indicates a heartbeat and shows whether or not dithering is enabled (Fig. 2-13). A slow moderate blinking LED indicates NO DITHERING, while a fast blinking LED indicates dithering is enabled. LED blink speed indicates how much dithering is actually being applied.

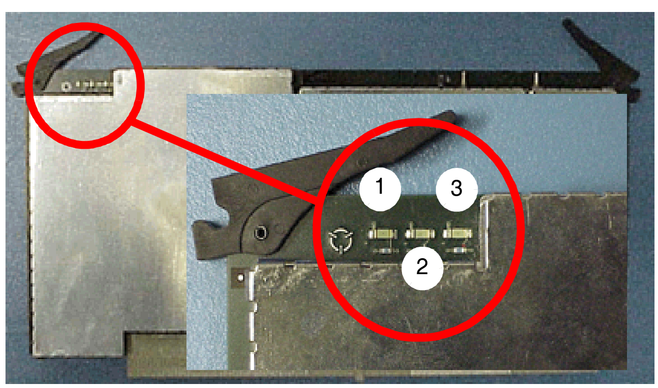


Fig. 2-10 Carrier Green LED Status Indicators

Fig. 2-11  Gaussian Filter Selected

Fig. 2-12  Gaussian plus 200 kHz Ceramic Filters Selected

Fig. 2-13  Dithering LED Status Indicator

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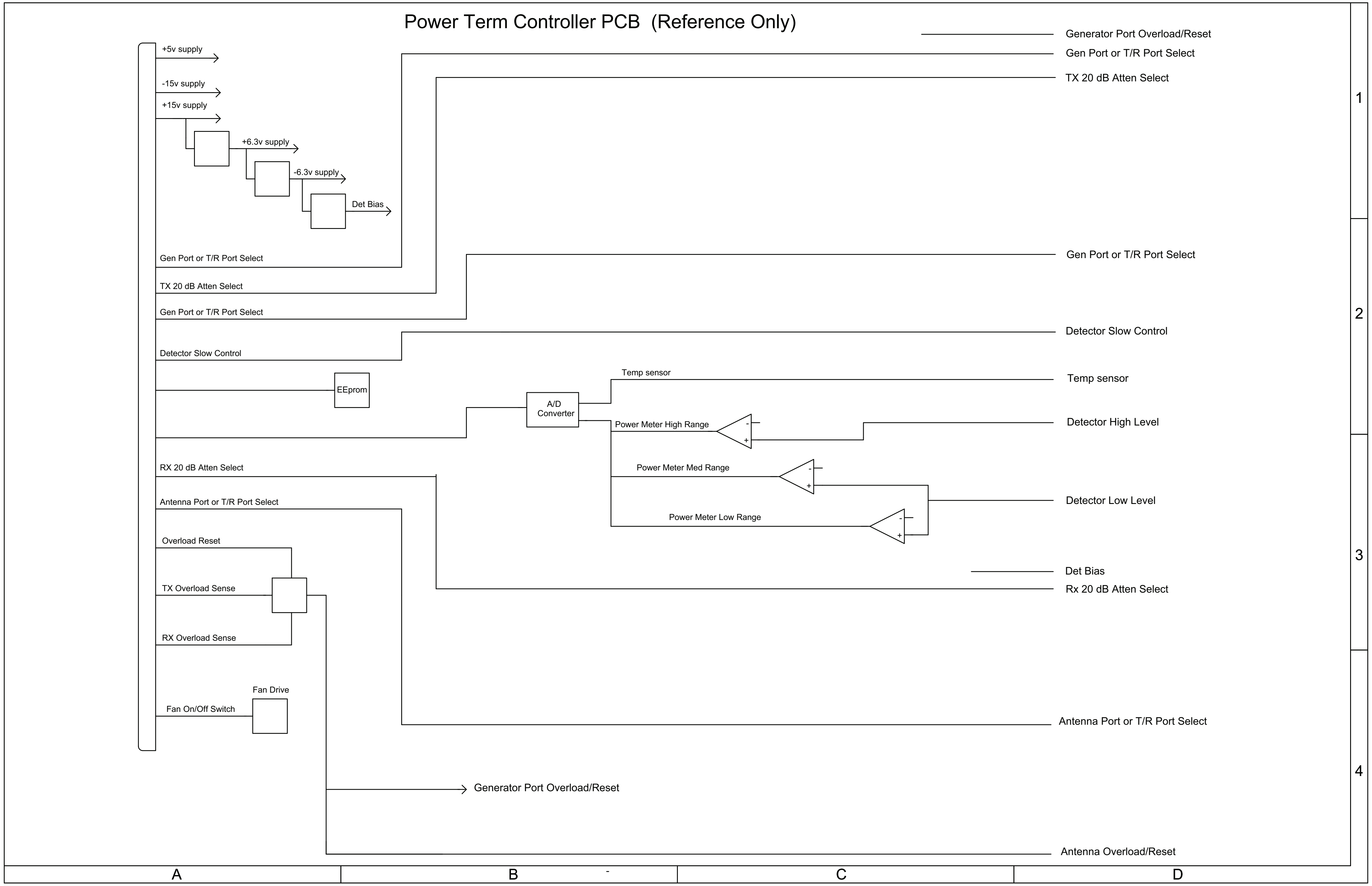



Fig. 2-14 Power Termination Assembly Interconnect Diagram

0000-4431-900-C (Sheet 1 of 2)

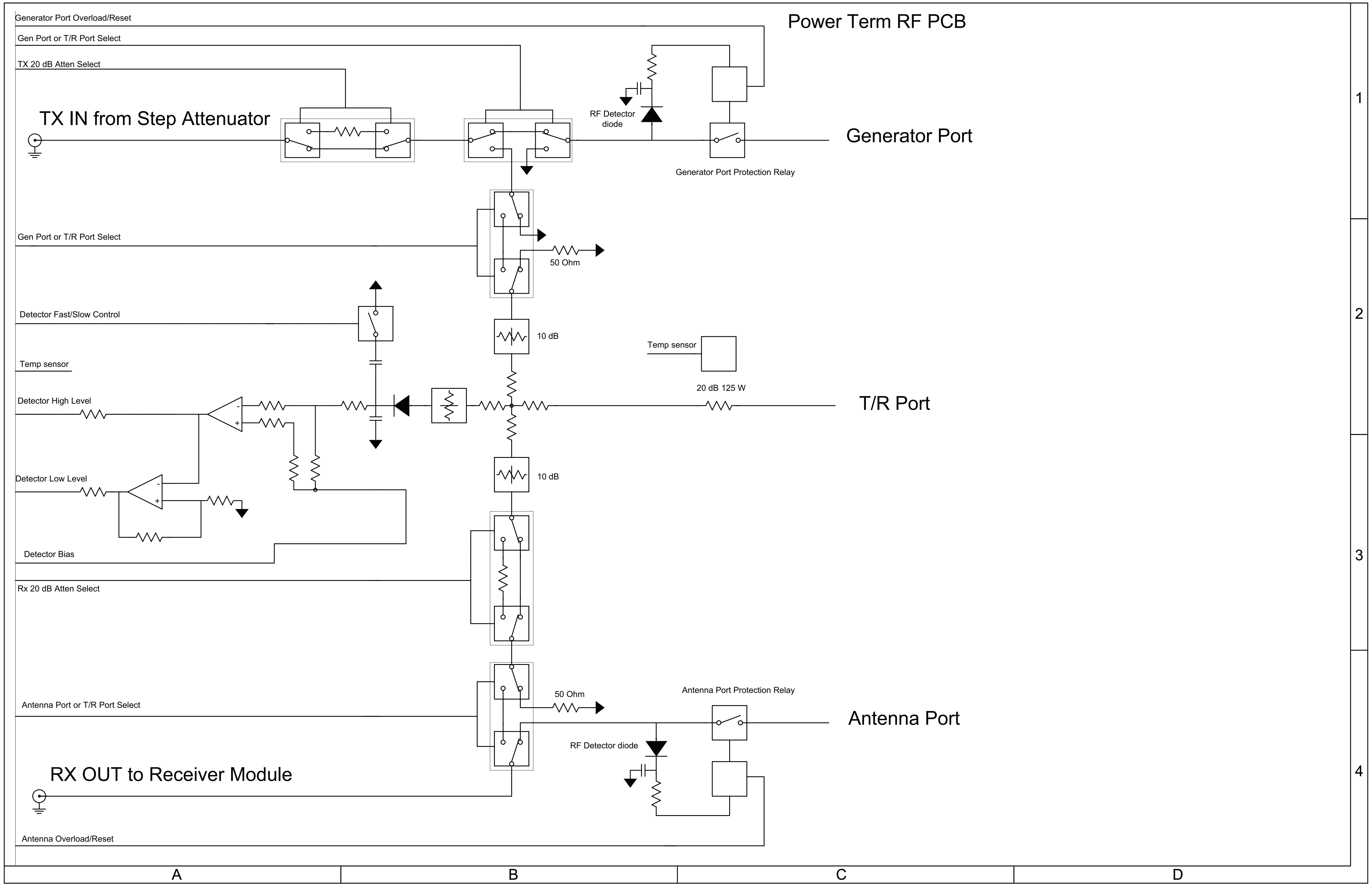
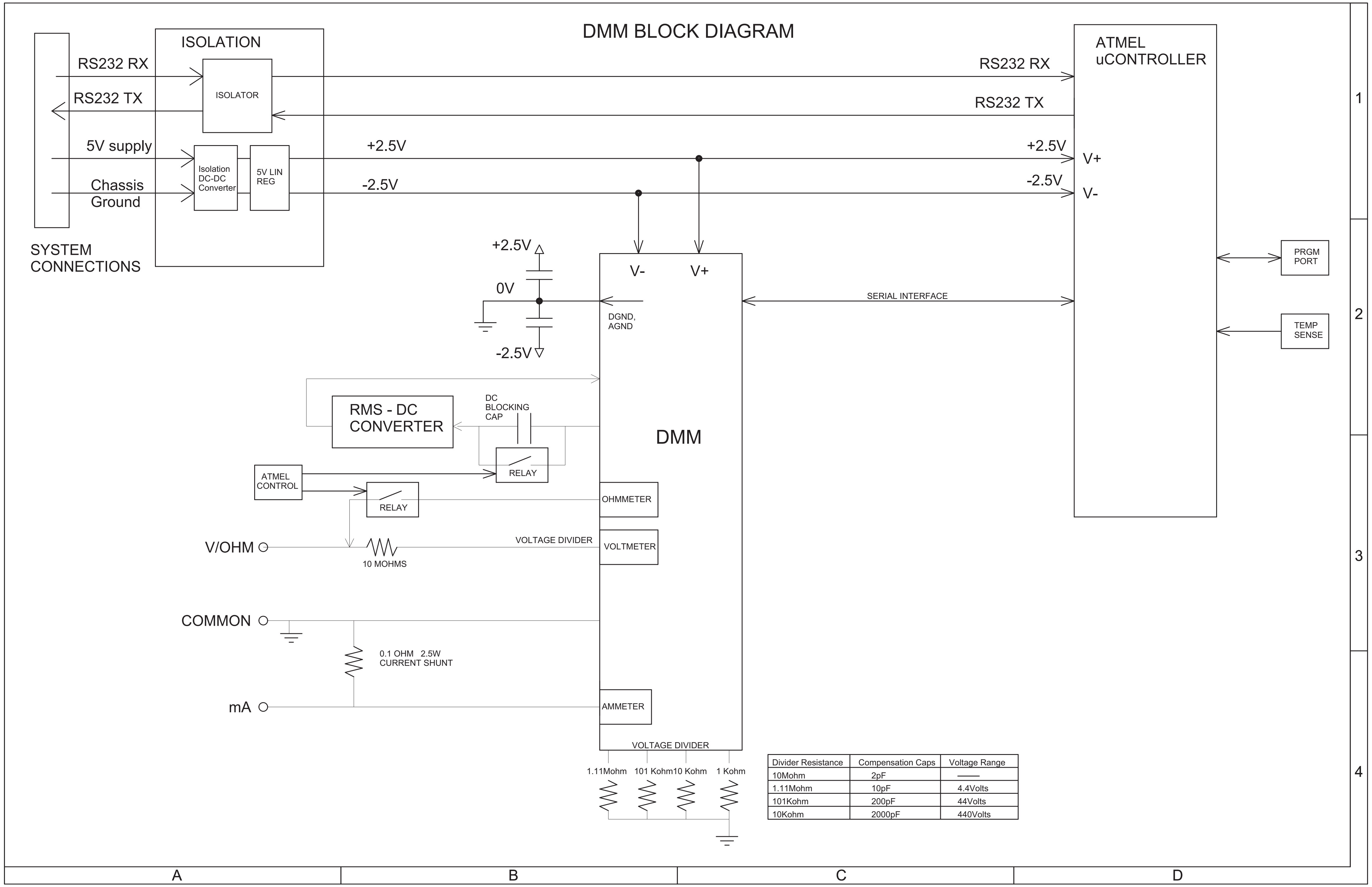



Fig. 2-14 Power Termination Assembly Interconnect Diagram
0000-4431-900-C (Sheet 2 of 2)




| Divider Resistance | Compensation Caps | Voltage Range |
|---|---|---|
| 10Mohm | 2pF | —— |
| 1.11Mohm | 10pF | 4.4Volts |
| 101Kohm | 200pF | 44Volts |
| 10Kohm | 2000pF | 440Volts |

Fig. 2-15 Digital Multimeter Block Diagram

0000-4435-100-C1

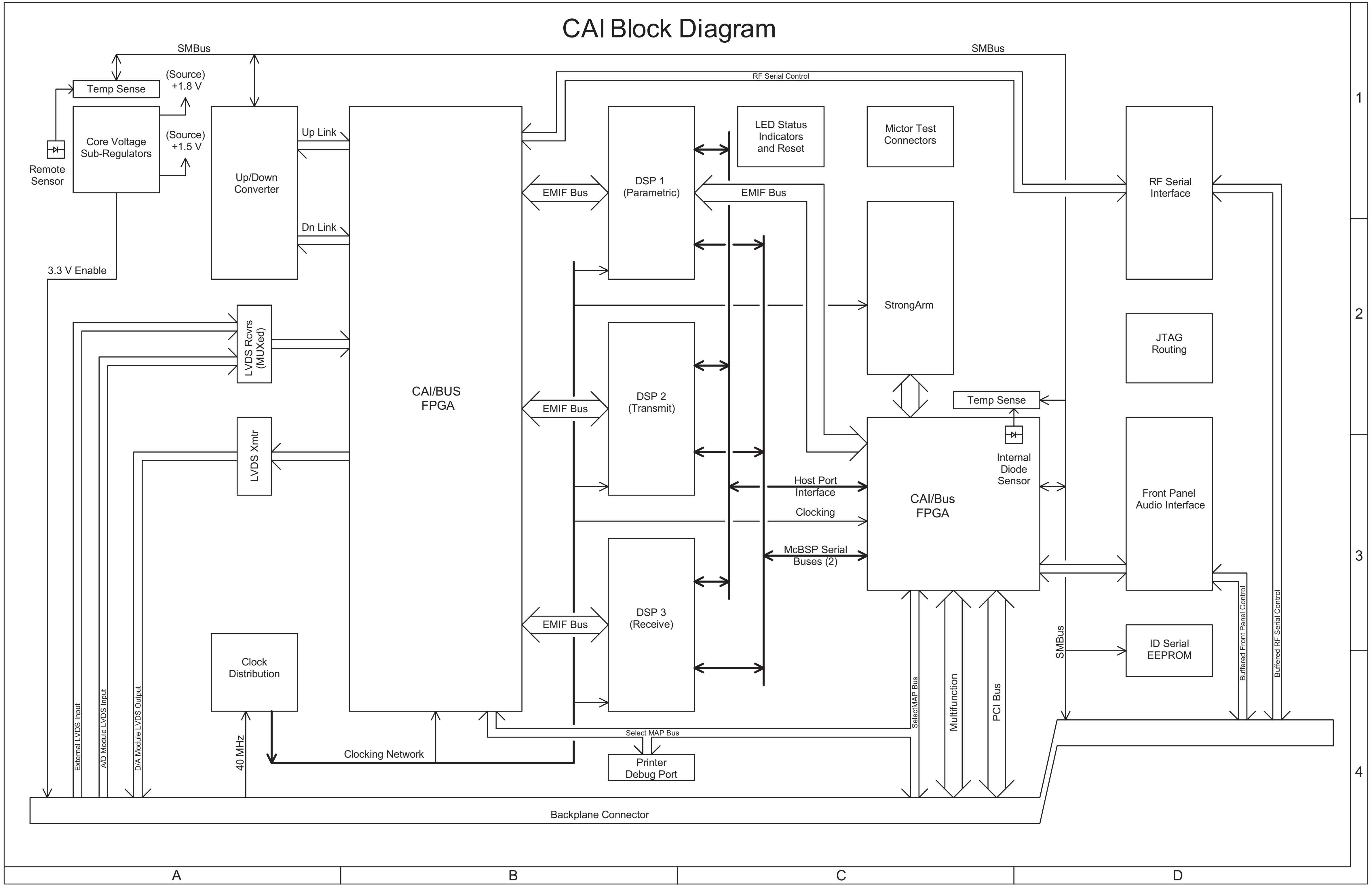



Fig. 2-16 CAI PCB Assembly Block Diagram

0000-4431-200-E (Sheet 1 of 5)

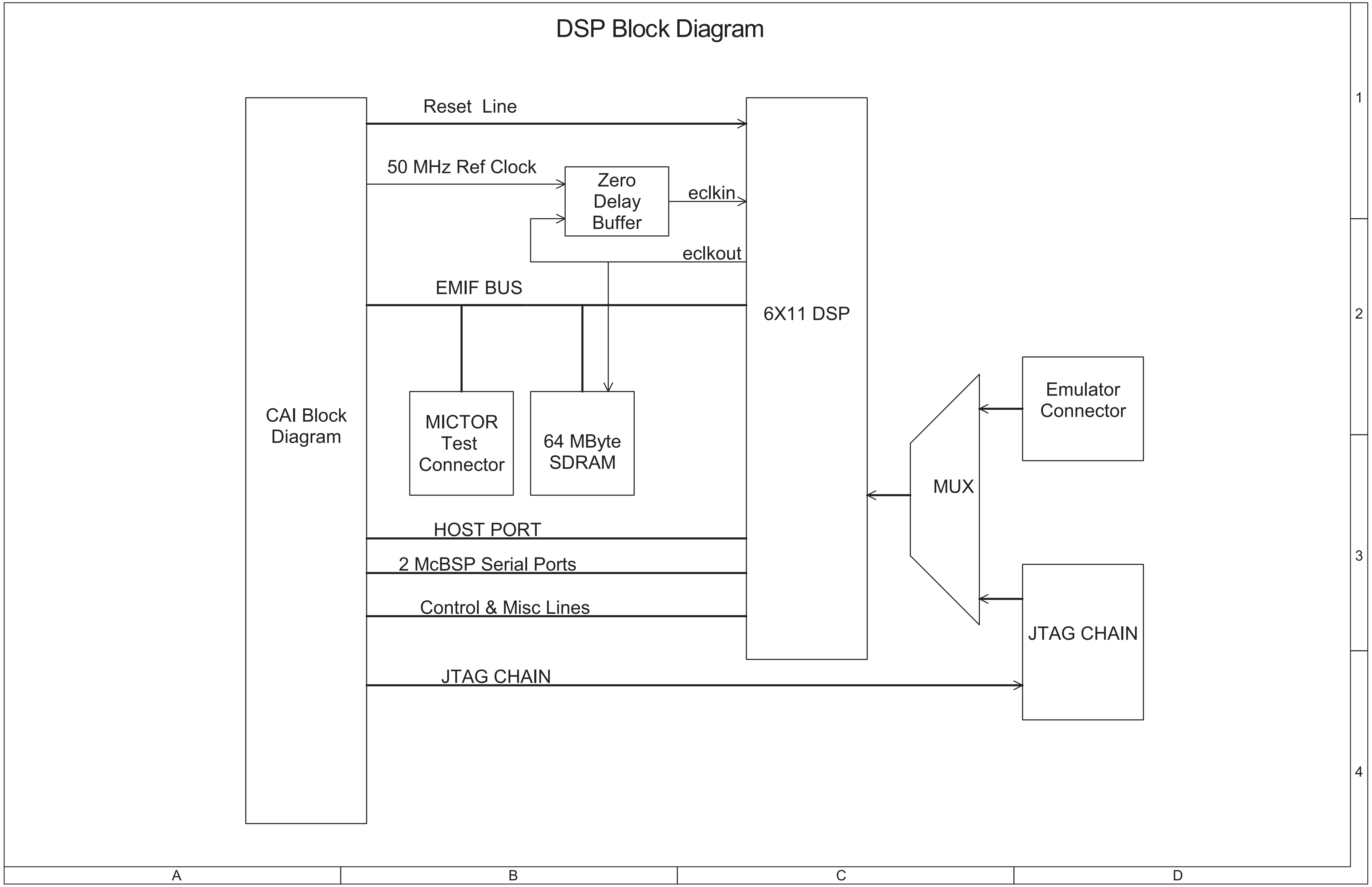



Fig. 2-16 CAI PCB Assembly Block Diagram

0000-4431-200-E (Sheet 2 of 5)

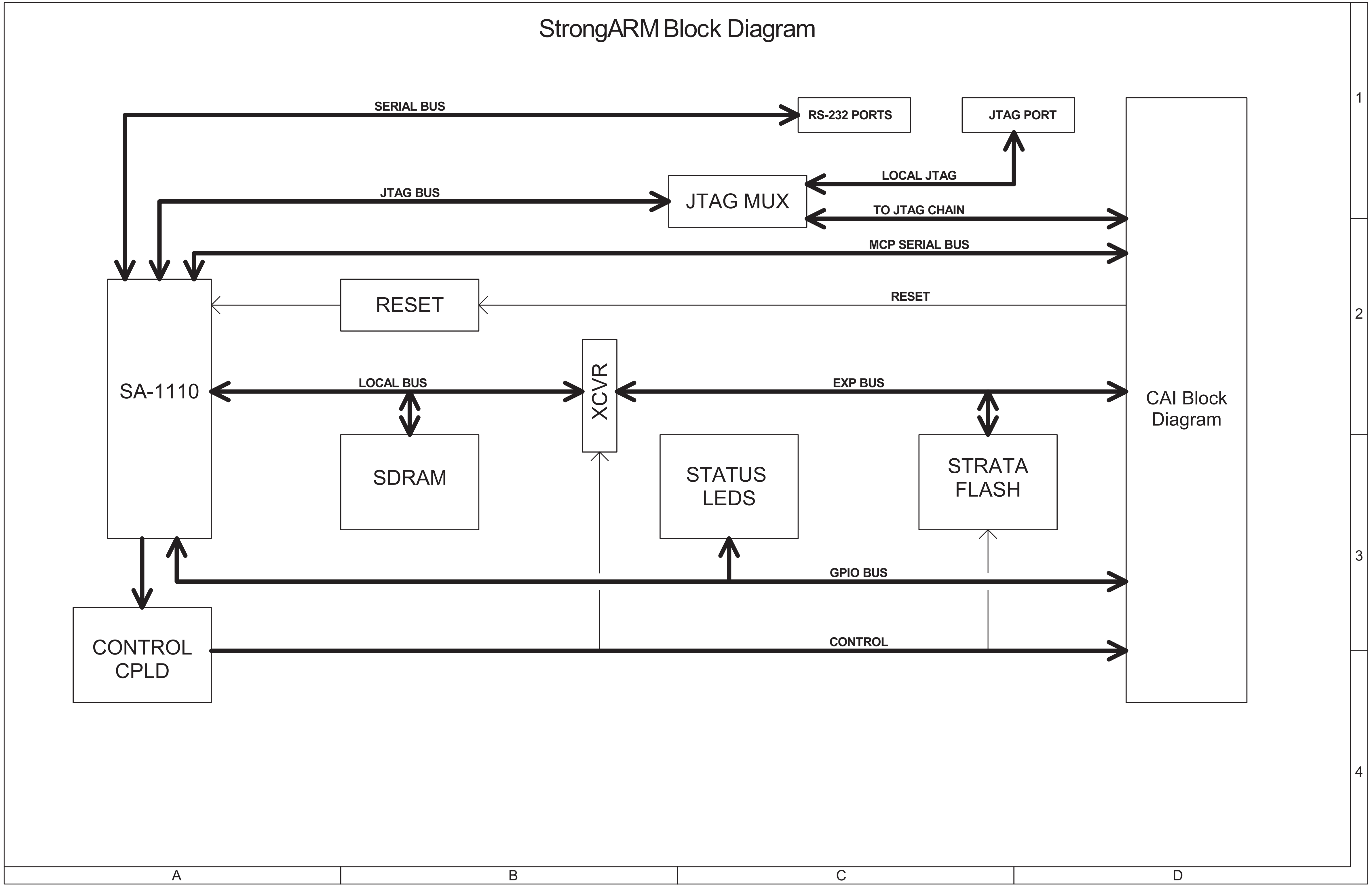



Fig. 2-16 CAI PCB Assembly Block Diagram
0000-4431-200-E (Sheet 3 of 5)

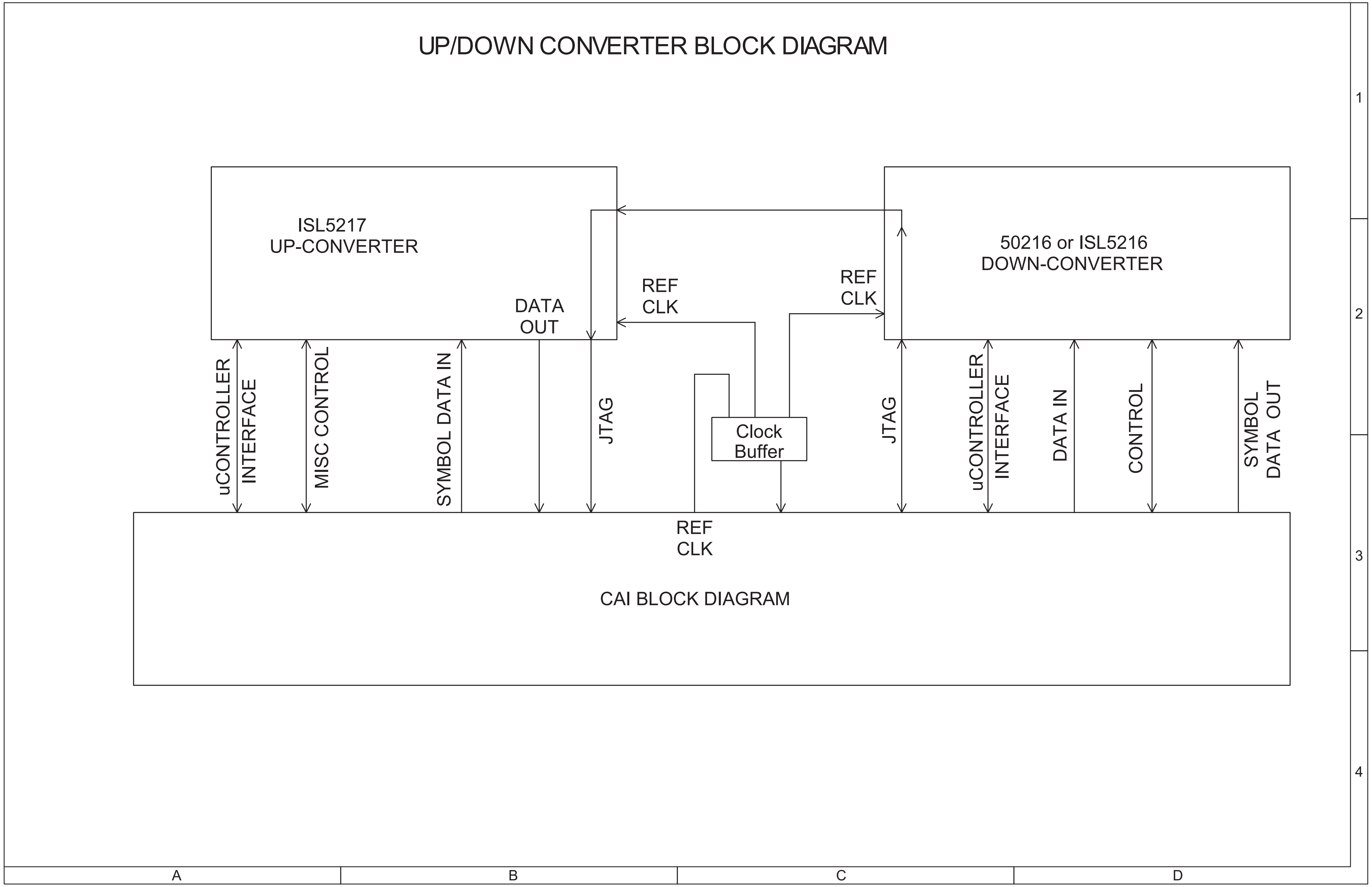



Fig. 2-16 CAI PCB Assembly Block Diagram

0000-4431-200-E (Sheet 4 of 5)

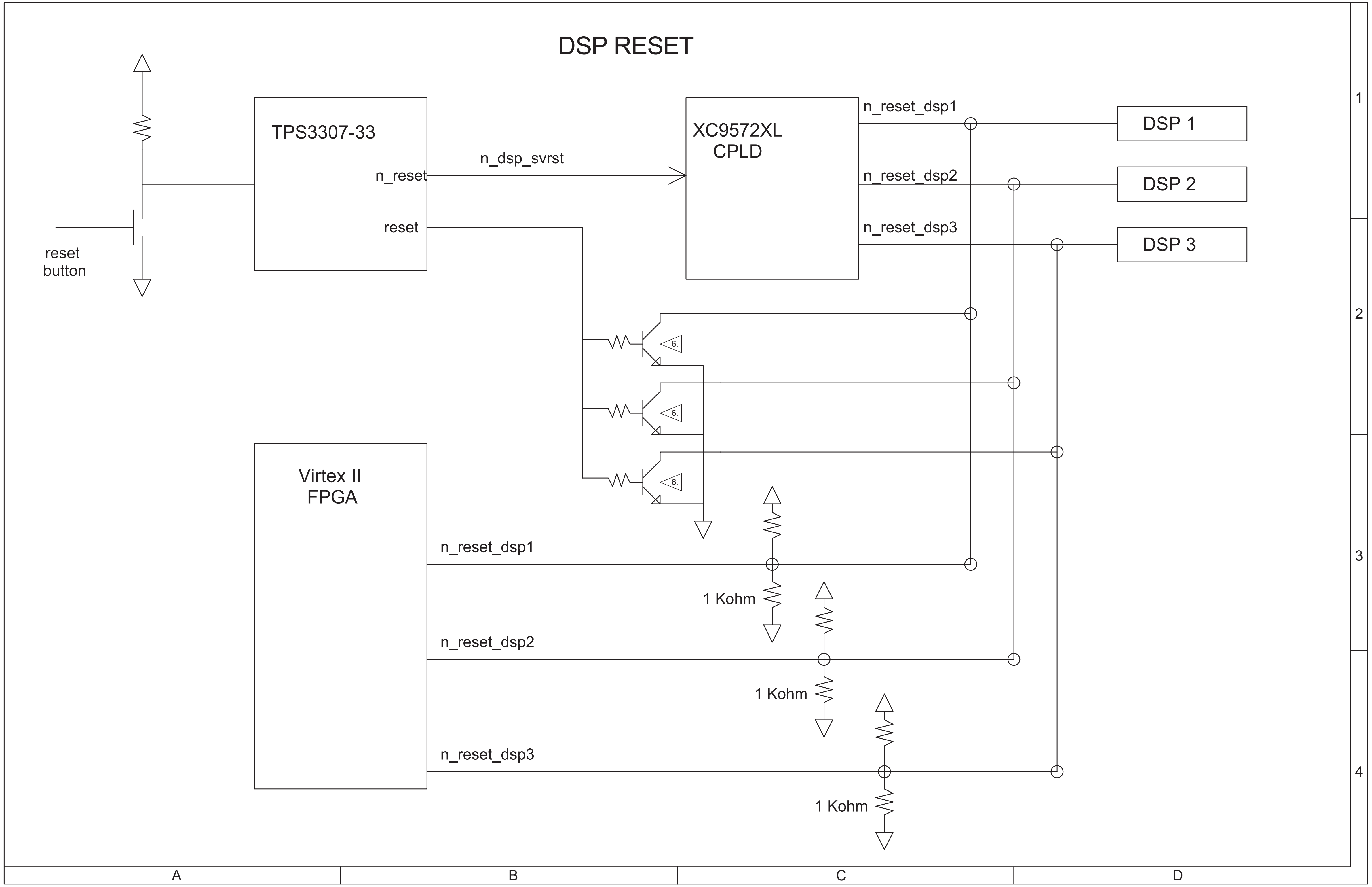



Fig. 2-16 CAI PCB Assembly Block Diagram

0000-4431-200-E (Sheet 5 of 5)

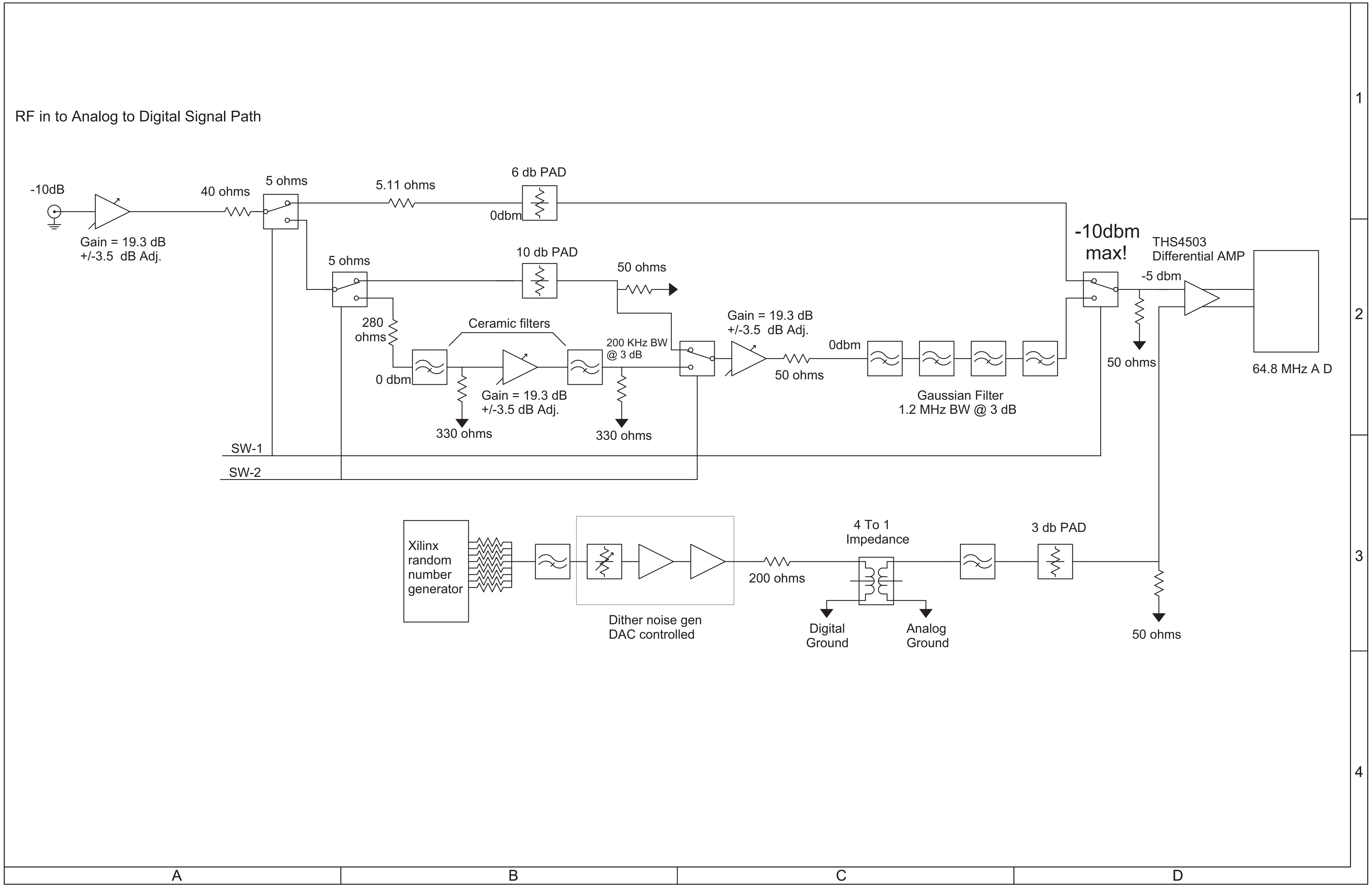



Fig. 2-17 DAM Carrier PCB Assembly Interconnect Diagram

0000-4433-200-E

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# Chapter 3 - Troubleshooting Procedures

## 3.1 GENERAL

Troubleshooting is divided into Symptom Troubleshooting Procedures and Assembly Troubleshooting Procedures.

### 3.1.1 Symptom Troubleshooting Procedures

The Symptom Troubleshooting Procedures identifies common malfunctions which may occur during Test Set operation. When numerous tests/inspections are indicated, perform tests/inspections and corrective actions in order listed.

| NOTE | |
|---|---|
| NOTE | Voltage readings reference analog ground unless otherwise specified. Refer to Chapter 6, Interconnect and Assembly Diagrams, for assembly drawings and interconnect diagrams.<br><br>This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, the troubleshooting technique (the formulation of a logical approach to locating the source of trouble) is left to the technician’s discretion. |

### 3.1.2 Assembly Troubleshooting Procedures

Assembly Troubleshooting Procedures are intended to determine whether or not an assembly is functioning properly; these procedures do not determine if an assembly is operating within specified parameters. Perform Test Set Verification Procedures (refer to Chapter 4, Verification and Calibration Procedures) to determine if an assembly is operating within specified parameters.

## 3.2 TROUBLESHOOTING GUIDELINES

The following is a list of guidelines to be used when troubleshooting the Test Set.

- Refer to Chapter 2, Theory of Operation for System Interconnect Diagram.
- Refer to the 3900 Series Operation Manual for proper use of the Test Set.
- Many Test Set problems are caused by cable corrosion. Sometimes removing and reseating an affected cable corrects the malfunction. Cleaning connectors and/or switch contacts with alcohol repairs many types of digital and analog circuit malfunctions.
- The following inspection procedures are used to locate obvious Test Set malfunctions :
- Inspect all external surfaces of Test Set for physical damage, breakage, loose or dirty contacts and missing components.

| NOTE | Do not disconnect or remove any board assemblies in the Test Set unless the unit is removed from AC Power source. Some assemblies contain devices that can be damaged if the assembly is removed when power is on. Several components can be damaged by Electrostatic Discharge. Use conductive foam and grounding straps when servicing is required around sensitive components. |
|---|---|

- Inspect assemblies for discoloration, cracks, breaks and warping.
- Inspect visible printed circuit boards for burnt or loose components, discoloration, cracks, breaks and warping.
- Inspect all chassis-mounted components for looseness, breakage, loose contacts or conductors.
- Inspect Test Set for disconnected, broken, cut, loose or frayed cables or wires.

### 3.2.1 Precautions

#### 3.2.1.A Safety

**WARNING**

**REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE PERFORMING ANY TROUBLESHOOTING PROCEDURES INVOLVING LIVE CIRCUITS.**

**WHEN WORKING WITH LIVE CIRCUITS OF HIGH POTENTIAL, KEEP ONE HAND IN POCKET OR BEHIND BACK TO AVOID SERIOUS SHOCK HAZARD.**

**USE ONLY INSULATED TOOLS WHEN WORKING WITH LIVE CIRCUITS.**

**FOR ADDED INSULATION, PLACE RUBBER BENCH MAT UNDERNEATH ALL POWERED BENCH EQUIPMENT, AS WELL AS A RUBBER MAT UNDERNEATH TECHNICIAN’S CHAIR.**

**HEED ALL WARNING AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.**

#### 3.2.1.B EMC and Safety Compliance

All assemblies, cables, connectors, plastic fasteners, gaskets, fingerstock and miscellaneous hardware within Test Set are configured to satisfy safety and EMC compliance standards.

| CAUTION | UPON COMPLETION OF ANY MAINTENANCE ACTION; ALL ASSEMBLIES, CABLE, CONNECTORS, PLASTIC FASTENERS, GASKETS, FINGERSTOCK AND MISCELLANEOUS HARDWARE MUST BE CONFIGURES AS INSTALLED AT THE FACTORY. |
|---|---|

### 3.2.1.C ESD

CAUTION

THIS EQUIPMENT CONTAINS PARTS
SENSITIVE TO DAMAGE
BY ELECTROSTATIC DISCHARGE (ESD).

**CAUTION** TEST SET COMPONENTS CONTAIN PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING TROUBLESHOOTING PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.

## 3.3 REQUIRED EQUIPMENT

The following equipment is required to perform 3900 Troubleshooting Procedures:

- Spectrum Analyzer
- SSMB to BNC Coaxial Cable
- SMA to BNC Coaxial Cable
- Male to Male SSMB Connector

## 3.4 PREVENTIVE MAINTENANCE PROCEDURES

Contains routine maintenance instructions for cleaning and inspecting the Test Set.

**CAUTION** DISCONNECT TEST SET FROM AC POWER SUPPLY TO AVOID POSSIBLE INJURY TO PERSONNEL AND DAMAGE TO ELECTRONIC CIRCUITS.

### 3.4.1 External Cleaning

| STEP | PROCEDURE |
|---|---|
| 1. | Clean front panel and display face with soft lint-free cloth. If dirt is difficult to remove, dampen cloth with water and mild liquid detergent. |
| 2. | Remove grease, fungus and ground-in dirt from surfaces with soft lint-free cloth dampened (not soaked) with isopropyl alcohol. |
| 3. | Remove dust and dirt from connectors with soft-bristled brush. |
| 4. | Cover connectors, not in use, with suitable dust cover to prevent tarnishing of connector contacts. |
| 5. | Clean cables with soft lint-free cloth. |
| 6. | Paint exposed metal surface to avoid corrosion. |

### 3.4.2 Internal Cleaning

Remove dust with hand-controlled dry air jet of 15 psi (1.054 kg/cm) and wipe internal chassis parts and frame with soft lint-free cloth moistened with isopropyl alcohol.

CAUTION

THIS EQUIPMENT CONTAINS PARTS
SENSITIVE TO DAMAGE
BY ELECTROSTATIC DISCHARGE (ESD).

| | |
|---|---|
| CAUTION | TO AVOID POSSIBLE DAMAGE, DO NOT NEEDLESSLY DISCONNECT CONNECTORS FROM ASSEMBLIES OR REMOVE ASSEMBLIES FROM TEST SET. |

Do not open assemblies for purpose of cleaning and inspection.

### 3.4.3 Visual Inspection

Inspect Chassis for:

- Tightness of sub-assemblies and chassis mounted connectors.
- Corrosion or damage to metal surfaces.

Inspect Connectors for:

- Loose or broken parts, cracked insulation and bad contacts.

Inspect Circuit Boards for:

- Corrosion or damage to connectors.
- Damage to visible mounted components including crystals and ICs.
- Freedom from foreign material.

Inspect Wiring for:

- Broken or loose ends and connections.
- Proper dress relative to other chassis parts.
- Verify wrapped wiring is tight.

# 3.5 ASSEMBLY CABLES AND CONNECTORS

## 3.5.1 390x and 3920 Cables and Connectors

Fig. 3-1 and Fig. 3-2 identify coaxial cables and connection points referenced in this section.

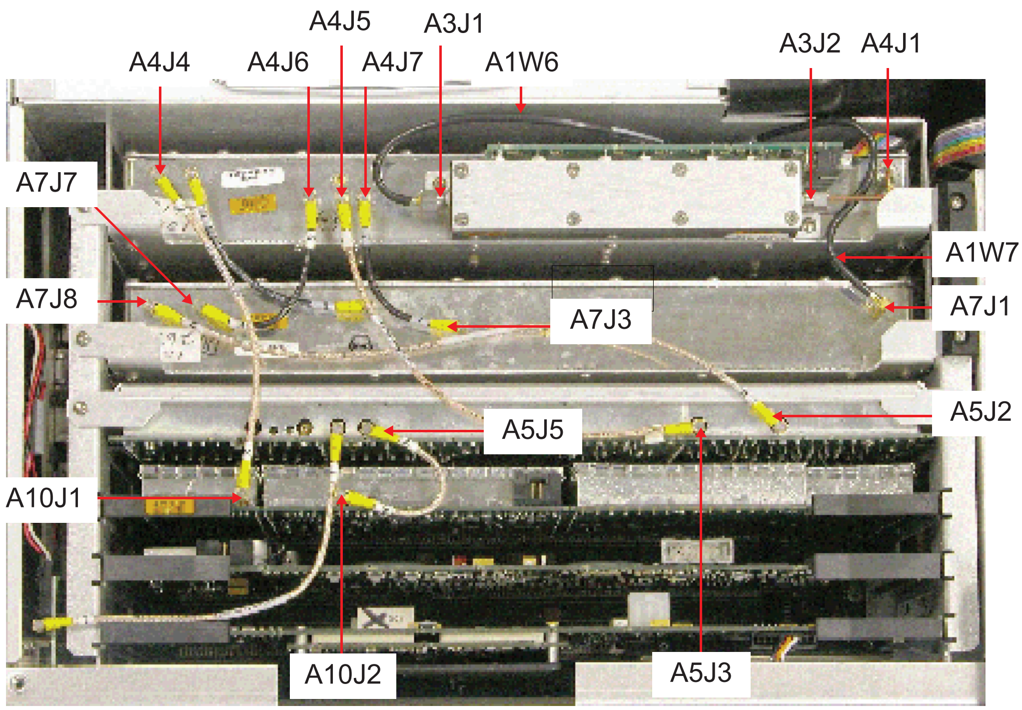



Fig. 3-1 3900 Assembly Connections

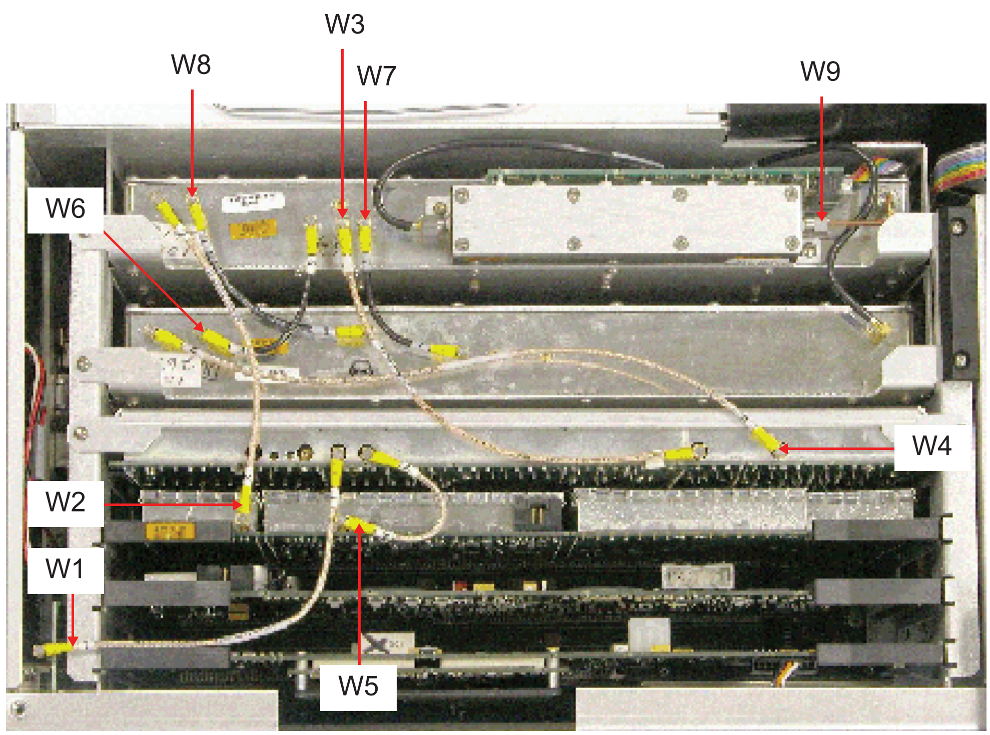



Fig. 3-2 3900 Assembly Cables

## 3.5.2 3920B Cables and Connectors

Fig. 3-3 and Fig. 3-4 identify coaxial cables and connection points referenced in this section.

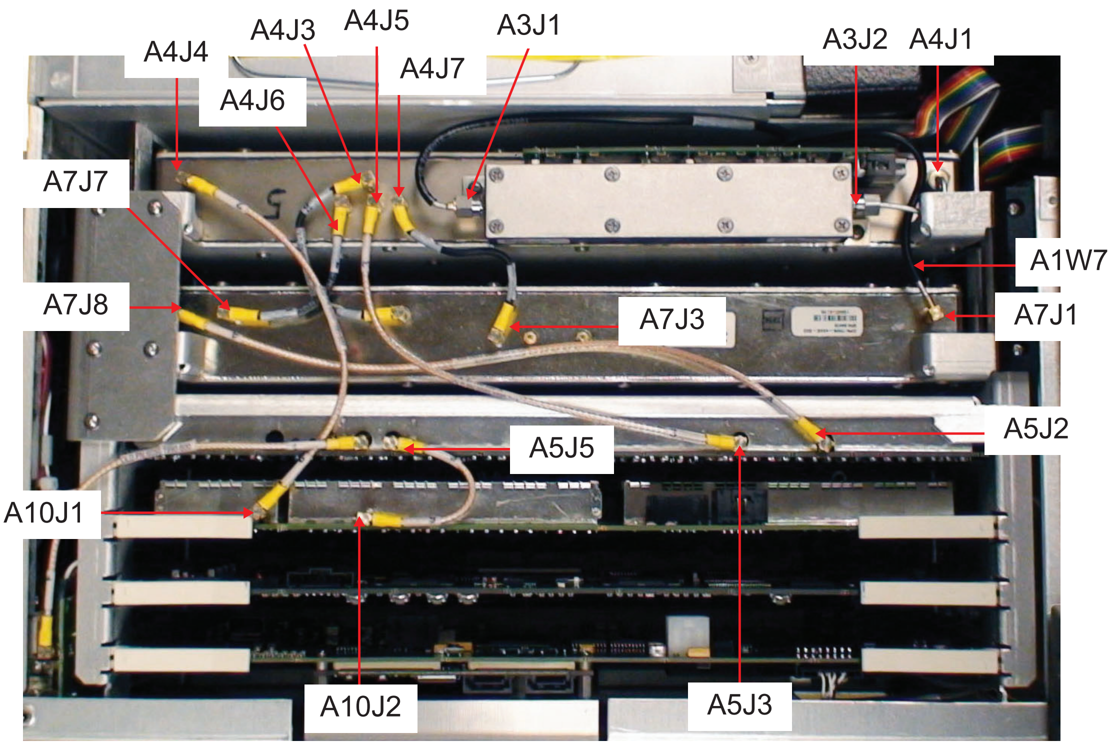



Fig. 3-3 3920B Assembly Connections

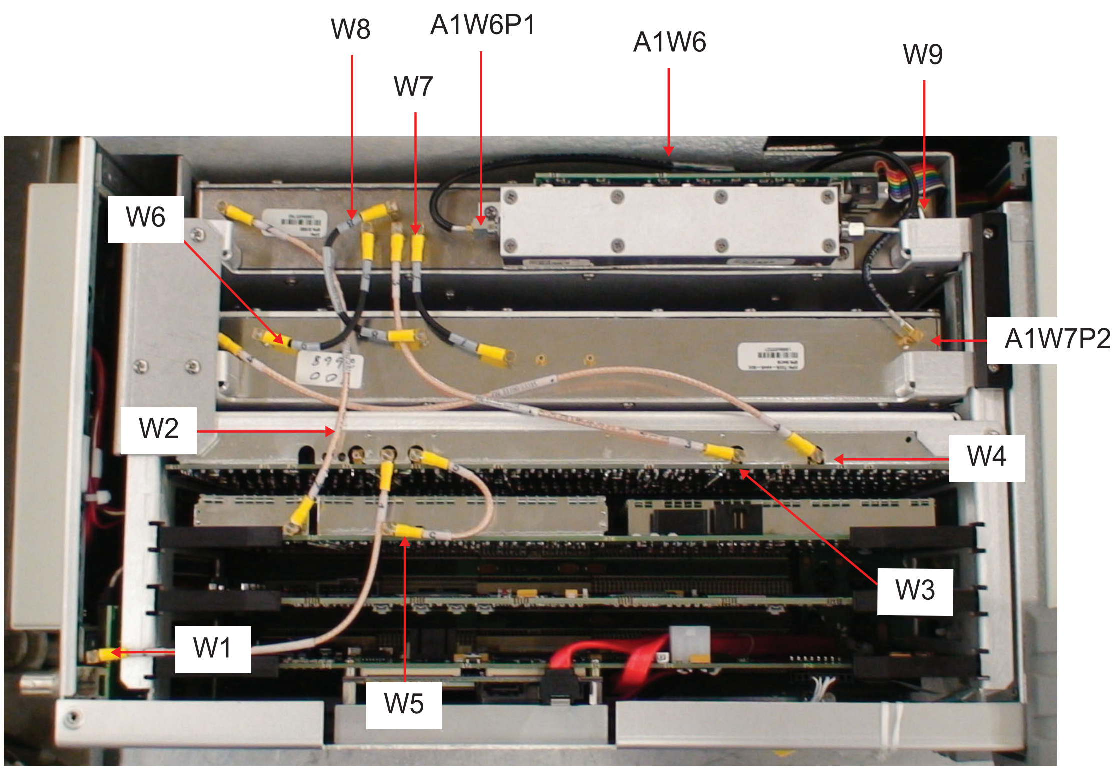



Fig. 3-4 3920B Assembly Cables

## 3.6 SYMPTOM TROUBLESHOOTING PROCEDURES

### 3.6.1 Preliminary Procedure

Reboot Test Set prior to performing any Troubleshooting Procedure. If the problem persists after rebooting Test Set, proceed to Troubleshooting Procedure.



| NOTE | The Symptom Index lists common malfunctions found during normal operation or maintenance of Test Set. The tests/inspections and corrective actions should be performed in the order listed. |
|---|---|

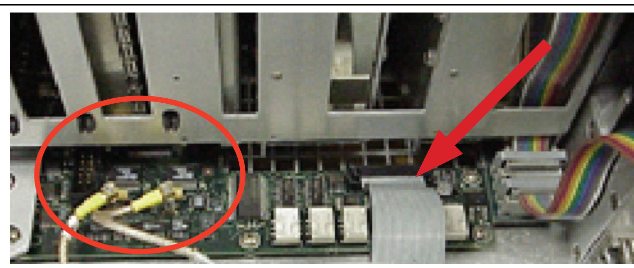
| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **1.** | **Front Panel ON/Standby LED does not illuminate.** | |
| | Step 1 | • Is Test Set connected to live AC Power Supply?<br>• If NO, connect Test Set to live AC Power Supply.<br>• If YES, proceed to next step. |
| | Step 2 | • Is Test Set AC Power Switch in ON position?<br>• If NO, turn AC Power Switch to ON.<br>• If YES, proceed to next step. |
| | Step 3 | • Is fuse at AC Power Switch functional? |
| | | • If NO, replace fuse. |
| | | • If YES, probable cause of error is Power Supply Assy. Refer to Chapter 5 for Power Supply Assy Remove/Install Procedures or contact Aeroflex Customer Service. |
| **2.** | **Test Set does not load system at power up.** | |
| | Step 1 | • Perform Reboot to Factory Defaults Procedure. If problem persists after corrective action is taken proceed to next step. |
| | Step 2 | • Is Test Set operating within specified temperature range (0° to 50° C)?<br>• If NO, move Test Set to suitable working environment and allow unit to reach proper operating temperature.<br>• If YES, proceed to next step. |
| | Step 3 | • Is Floppy Disk Drive empty?<br>• If NO, remove floppy disk from Floppy Disk Drive and restart Test Set.<br>• If YES, proceed to next step. |
| | Step 4 | • Have USB device(s) been removed from USB Connectors?<br>• If NO, remove USB device(s) and restart Test Set.<br>• If YES, proceed to next step. |
| | Step 5 | • Is License file valid (check status on UTILS, License Tile)?<br>• If NO, install valid License file.<br>• If YES, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 6 | • Does Start-up Screen list all licensed systems for Test Set?<br>• If YES, proceed to next step.<br>• If NO, does Operational Status Tile show valid Receive, Generator and IF temperatures?<br>• If NO, contact Aeroflex Customer Service for “One-Wire” debug.<br>• If YES, record Test Set Serial Number and UID from Utility License Tile and contact Aeroflex Customer Service to request a new License File. |
| | Step 7 | • If able to access files, save customer generated files and calibration files on a USB device or floppy disk. Refer to Chapter 4 for Save and Recall Calibration Files procedures. |
| | Step 8 | • Scrape and reload software and reinstall valid license file. If problem persists, contact Aeroflex Customer Service. |

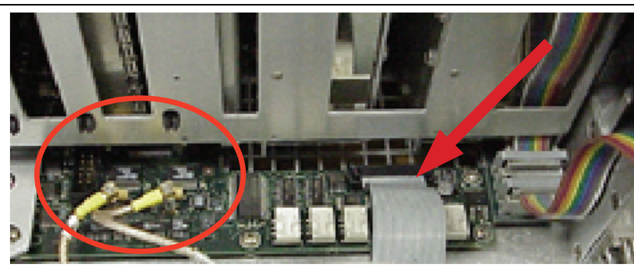
| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **3.** | **No GENERATE output at GEN or T/R connector.** | |
| | Step 1 | • Is correct Output connector selected (GEN or T/R).<br>• If NO, select correct Output connector.<br>• If YES, proceed to next step. |
| | Step 2 | • Is RF Gen Soft Key set to ON?<br>• If NO, turn RF Generator ON.<br>• If YES, proceed to next step. |
| | Step 3 | • Is RF Generator frequency set to desired frequency?<br>• If NO, set RF Generator frequency to desired frequency.<br>• If YES, proceed to next step. |
| | Step 4 | • Is RF Generator level set to desired setting?<br>• If NO, set RF Generator level to desired setting.<br>• If YES, proceed to next step. |
| | Step 5 | • The Port Overload Protection may have been triggered. Reset Port Overload Protection (UTILS, Hardware Settings, Operational Status Tile). If problem persists, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 6 | • Verify DAM Carrier Assy operation (3.7.2 Verify DAM Carrier PCB Assy Operation). |
| | Step 7 | • Verify Generator Assy operation (3.7.3 Verify Generator Assy Operation.). |
| | Step 8 | • Verify Attenuator/Power Term Assy operation (3.7.4 Verify Attenuator/Power Term Assy Operation.). |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **4.** | **No RECEIVE Signal at ANT or T/R connector.** | |
| | Step 1 | • Is cable properly connected to desired RF Receive Input connector (ANT or T/R)?<br>• If NO, connect cable to desired Input Connector.<br>• If YES, proceed to next step. |
| | Step 2 | • Is correct RF Receive Input Connector selected (ANT or T/R)?<br>• If NO, select correct Input Connector.<br>• If YES, proceed to next step. |
| | Step 3 | • Is IF Bandwidth set appropriately for input signal type?<br>• If NO, adjust IF Bandwidth to value appropriate for input signal.<br>• If YES, proceed to next step. |
| | Step 4 | • Is desired AGC mode of operation (Manual or Auto) selected?<br>• If NO, select desired AGC mode.<br>• If YES, proceed to next step. |
| NOTE | | AGC mode of operation is system dependent and not available with all Test Set systems. |
| | Step 5 | • Is desired Pre-AMP setting (ON or OFF) selected?<br>• If NO, select desired Pre-AMP setting.<br>• If YES, proceed to next step. |
| | Step 6 | • The Port Overload Protection may have been triggered. Reset Port Overload Protection (UTILS, Hardware Settings, Operational Status Tile). If problem persists, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 7 | • Verify Power Term Assy Receive operation (3.7.4 Verify Attenuator/Power Term Assy Operation.). |
| | Step 8 | • Verify Receiver Assy operation (3.7.6 Verify Receiver Assy Operation.). |
| | Step 9 | • Verify IF/Video PCB Assy operation (3.7.7 Verify IF/Video PCB Assy operation.). |
| **5.** | **Receive message "Receive Synthesizers are Unlocked" or "Reference is Unlocked."** | |
| NOTE | | When Test Set is configured to utilize an external reference signal, an external reference signal must be provided. |
| | Step 1 | • Is Test Set operating within specified temperature range (0° to 50° C)?<br>• If NO, move Test Set to suitable working environment and allow unit to reach proper operating temperature.<br>• If YES, proceed to next step. |
| | Step 2 | • Is INT/EXT frequency reference set EXT (External) (UTILS, Hardware Settings, Frequency Reference)?<br>• If NO, probable cause of error is Disk I/O PCB Assy. Refer to Chapter 5 for Disk I/O PCB Assy Remove/Install Procedures or contact Aeroflex Customer Service.<br>• If YES, proceed to next step. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| | Step 3 | • Is a valid reference frequency connected to the EXT I/O Connector?<br>• If NO, provide a valid reference frequency to EXT I/O Connector or switch to INT (Internal).<br>• If YES, probable cause of error is Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures or contact Aeroflex Customer Service. |
| **6.** | **No Audio measurements.** | |
| | Step 1 | • Is Source field on Analyzer Tile set to correct port?<br>• If NO, select correct port.<br>• If YES, proceed to next step. |
| | Step 2 | • Is Impedance field on Analyzer Tile set to expected received value?<br>• If NO, adjust Impedance setting.<br>• If YES, proceed to next step. |
| | Step 3 | • Is Filter field on Analyzer Tile set appropriately for frequency content of received signal?<br>• If NO, change filter selection to one appropriate for frequency content of received signal.<br>• If YES, proceed to next step. |
| | Step 4 | • Is provided signal level within Test Set specifications?<br>• If NO, adjust signal level.<br>• If YES, proceed to next step. |
| | Step 5 | • Is desired Noise Meter (SINAD or Distortion) selected?<br>• If NO, select desired Noise Meter.<br>• If YES, probable cause of error is FP Digital Interface PCB Assy, Front Panel Assy or coaxial cable(s). Refer to Chapter 5 for FP Digital Interface PCB Assy Remove/Install Procedures or contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | | |
|---|---|---|---|
| **7.** | **Apparent low sensitivity and/or degraded receive performance.** | | |
| | Step 1 | • | Is signal generator output routed to T/R port?<br>• If NO, proceed to next step.<br>• If YES, there may be an interfering signal. Perform one of the following:<br>• Turn off signal generator;<br>• Change generate frequency to a frequency outside of the receive bandwidth;<br>• Change selected port to GEN output port. |
| | Step 2 | • | Is IF Bandwidth set to an appropriate setting for current operating conditions?<br>• If NO, adjust IF Bandwidth to a setting appropriate for operating conditions.<br>• If YES, proceed to next step. |
| | Step 3 | • | Is Test Set operating with an antenna?<br>• If NO, proceed to next step.<br>• If YES, there may be an interfering signal causing interference. Remove interfering signal (Spectrum Analyzer can be used to locate unknown signals). |
| | Step 4 | • | Is a strong signal being received?<br>• If NO, proceed to next step.<br>• If YES, verify Pre-Amp is set to OFF (CONFIG, Ports, Pre-AMP)? |
| | Step 5 | • | The Port Overload Protection may have been triggered. Reset Port Overload Protection (UTILS, Hardware Settings, Operational Status Tile). If problem persists, proceed to next step |
| **The following steps are for Qualified Service Personnel Only!** | | | |
| | Step 6 | • | Verify Power Term Assy Receive operation (3.7.4 Verify Attenuator/Power Term Assy Operation.). |
| | Step 7 | • | Verify Receiver Assy operation (3.7.6 Verify Receiver Assy Operation.). |
| | Step 8 | • | Verify IF/Video PCB Assy operation (3.7.7 Verify IF/Video PCB Assy operation.). |

| | | |
|---|---|---|
| **MALFUNCTION**<br>**TEST OR INSPECTION**<br>**CORRECTIVE ACTION** | | |
| **8.** | **Scope trace is frozen and does not update.** | |
| | Step 1 | • Is cable properly connected to selected Scope input (CH1 or CH2)?<br>• If NO, properly connect cable to selected Scope input.<br>• If YES, proceed to next step. |
| | Step 2 | • Is desired trigger source selected (Trace A or B)?<br>• If NO, select desired trigger source.<br>• If YES, proceed to next step. |
| | Step 3 | • Is NORMAL Trigger mode selected?<br>• If NO, proceed to next step.<br>• If YES, verify Level setting is appropriate for signal type. |
| | Step 4 | • Is REPEAT trace selected?<br>• If NO, select REPEAT to enable continuous trace.<br>• If YES, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 5 | • Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/ Install Procedures. |
| | Step 6 | • Remove Front Panel Assy. Refer to Chapter 5 for Front Panel Assy Remove/Install Procedures. |
| | Step 7 | • Inspect cables that connect Front Panel Assy to Front Panel Audio PCB Assy. Are cables properly connected? |
| | |  |
| | | • If NO, properly connect cables that connect Front Panel Assy to Front Panel Audio PCB Assy.<br>• If cables are properly connected, probable cause of error is Front Panel Assy, Front Panel Digital PCB Assy, CAI PCB Assy or coaxial cable(s). Refer to Chapter 5 for Remove/ Install Procedures or contact Aeroflex Customer Service. |

| | | |
|---|---|---|
| **MALFUNCTION**<br>**TEST OR INSPECTION**<br>**CORRECTIVE ACTION** | | |
| **9.** | **Scope trace is not triggering properly.** | |
| | Step 1 | • Is desired trigger source selected (Trace A or B)?<br>• If NO, select desired trigger source.<br>• If YES, proceed to next step. |
| | Step 2 | • Is NORMAL Trigger mode selected?<br>• If NO, proceed to next step.<br>• If YES, verify Level setting is appropriate for signal type. |
| | Step 3 | • Is REPEAT trace selected?<br>• If NO, select REPEAT to enable continuous trace.<br>• If YES, proceed to next step. |
| | Step 4 | • Is Filter setting appropriate for signal type being measured?<br>• If NO, change filter type to one appropriate for signal type.<br>• If YES, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 5 | • Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/ Install Procedures. |
| | Step 6 | • Remove Front Panel Assy. Refer to Chapter 5 for Front Panel Assy Remove/Install Procedures. |
| | Step 7 | • Inspect cables that connect Front Panel Assy to Front Panel Audio PCB Assy. Are cables properly connected? |
| | |  |
| | | • If NO, properly connect cables that connect Front Panel Assy to Front Panel Audio PCB Assy.<br>• If YES, probable cause of error is Front Panel Assy, Front Panel Digital PCB Assy, CAI PCB Assy or coaxial cable(s). Refer to Chapter 5 for assembly Remove/Install Procedures or contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **10.** | **No modulation - CW Output only.** | |
| | Step 1 | • Is correct modulation type selected?<br>• If NO, select correct modulation type.<br>• If YES, proceed to next step. |
| | Step 2 | • Are modulators turned ON?<br>• If NO, turn modulators ON.<br>• If YES, proceed to next step. |
| | Step 3 | • Are modulator(s) set to desired settings?<br>• If NO, adjust modulator settings.<br>• If YES, proceed to next step. |
| | Step 4 | • Is External modulation set to Aud1, Aud2 or Balanced?<br>• If NO, proceed to next step.<br>• If YES, verify a modulation source is connected to selected source. |
| | Step 5 | • Is External modulation set to MIC?<br>• If NO, proceed to next step.<br>• If YES, verify MIC Phantom Power is set to desired setting. |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 6 | • Remove Case Assy. Refer to Chapter 5 for Remove/Install Procedures. |
| | Step 7 | • Are cables are properly connected to CAI PCB Assy?<br>• If NO, properly connect cables to CAI PCB Assy.<br>• If YES, probable cause of error is CAI PCB Assy or coaxial cable(s). Refer to Chapter 5 for CAI PCB Assy Remove/ Install Procedures or contact Aeroflex Customer Service. |
| **11.** | **Software Upgrade failed.** | |
| | Step 1 | • Verify Test Set recognizes USB device (Troubleshooting Procedure for Unresponsive USB Device). |
| | Step 2 | • Was Restore to Factory Defaults procedure completed before performing software upgrade?<br>• If NO, contact Aeroflex Customer Service.<br>• If YES, proceed to next step. |
| | Step 3 | • Does Test Set contains software version prior to V1.1?<br>• If NO, proceed to next step.<br>• If YES, contact Aeroflex Customer Service. |
| | Step 4 | • When performing Software Upgrade, was software upgrade file placed in correct folder hierarchy (\Aeroflex\3900)?<br>• If NO, place software upgrade file in correct folder hierarchy (\Aeroflex\3900) and repeat Software Upgrade procedure.<br>• If YES, proceed to next step. |
| | Step 5 | • Was license installed prior to software upgrade?<br>• If NO, install license and repeat Software Upgrade procedure.<br>• If YES, contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **12.** | **Option installation failed.** | |
| | Step 1 | • Is license valid?<br>• If NO, contact Aeroflex Customer Service.<br>• If YES, proceed to next step. |
| | Step 2 | • Was valid license installed in Test Set with serial number for which it was purchased?<br>• If NO, install license in Test Set with serial number for which it was purchased.<br>• If YES, contact Aeroflex Customer Service. |
| **13.** | **License installation failed.** | |
| | Step 1 | • Verify Test Set recognizes USB device (Troubleshooting Procedure for Unresponsive USB Device). |
| | Step 2 | • Was license installed in Test Set with same serial number for which it was purchased?<br>• If NO, install license in Test Set with serial number for which it was purchased.<br>• If YES, proceed to next step. |
| | Step 3 | • Has license expired?<br>• If NO, proceed to next step.<br>• If YES, contact Aeroflex Customer Service. |
| | Step 4 | • Does Test Set contains software prior to V1.1 release.<br>• If NO, proceed to next step.<br>• If YES, contact Aeroflex Customer Service. |
| | Step 5 | • When installing license, was license file in correct folder hierarchy (\Aeroflex\3900)?<br>• If NO, place license file in correct folder hierarchy (\Aeroflex\3900) and repeat License Installation procedure.<br>• If YES, contact Aeroflex Customer Service. |

**MALFUNCTION**
**TEST OR INSPECTION**
**CORRECTIVE ACTION**

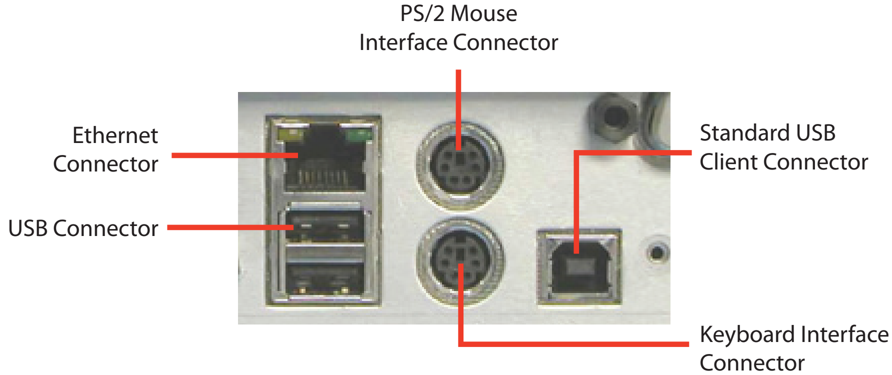
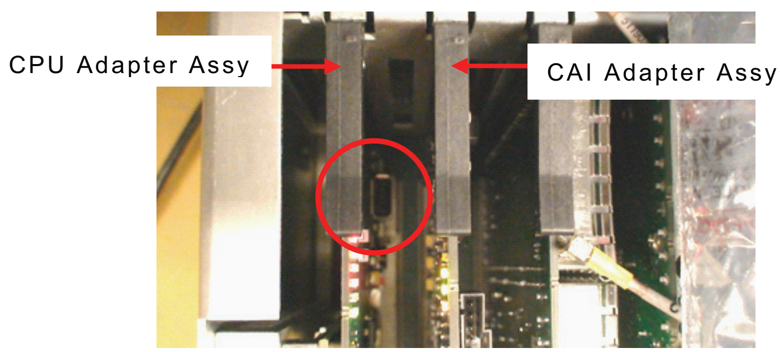



Fig. 3-5 3900 Mouse and Keyboard Connectors

Refer to Fig. 3-5 for connector identification for the following steps.

| | |
|---|---|
| **14.** | **Test Set does not recognize PS/2 mouse.** |
| | Test Set does not support PS/2 mouse. Use USB mouse with USB Connector. |
| **15.** | **USB Mouse unresponsive.** |
| | • Is USB mouse connected to USB Connector?<br>• If NO, connect USB mouse to USB Connector.<br>• If YES, disconnect, then reconnect, USB mouse from USB Connector. If problem persists after corrective action is performed, contact Aeroflex Customer Service. |
| **16.** | **USB Keyboard unresponsive.** |
| | • Is USB Keyboard connected to USB Connector?<br>• If NO, connect USB mouse to USB Connector.<br>• If YES, disconnect, then reconnect, USB Keyboard from USB Connector. If problem persists after corrective action is performed, contact Aeroflex Customer Service. |
| **17.** | **PS/2 Keyboard unresponsive.** |
| | • Is PS/2 Keyboard connected to Keyboard Interface Connector?<br>• If NO, connect PS/2 Keyboard to Keyboard Interface Connector.<br>• If YES, disconnect, then reconnect, PS/2 Keyboard from Keyboard Interface Connector. If problem persists after corrective action is performed, contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **18.** | **Front Panel USB Connector unresponsive.** | |
| | Step 1 | • Are you using recommended USB device, Aeroflex PN 67325?<br>• If NO, use recommended USB device, Aeroflex PN 67325.<br>• If YES, proceed to next step. |
| | Step 2 | • Does USB device (Aeroflex PN 67325) function when used with a device other than the Test Set?<br>• If NO, probable cause of error is USB device.<br>• If YES, proceed to next step. |
| | Step 3 | • Is USB device securely connected to Front Panel USB Connector?<br>• If NO, securely connect USB device to Front Panel USB Connector.<br>• If YES, disconnect, then reconnect, USB device Front Panel USB Connector. If problem persists after corrective action is performed, proceed to next step or contact Aeroflex Customer Service. |
| **The following steps are for Qualified Service Personnel Only!**<br>**These steps require use of recommended USB device, Aeroflex PN 67325.** | | |
| | Step 4 | • Remove Power Supply Assy. Refer to Chapter 5 for Remove/ Install Procedures. |
| | Step 5 | • Disconnect USB Cable from Backplane Assy USB Connector. |
| | Step 6 | • Connect USB device to Backplane Assy USB Connector. |
| | Step 7 | • Reinstall Power Supply with USB device still connected to Backplane PCB Assy. |
| | Step 8 | • Power on Test Set. Is USB device accessible/responsive using Store/Recall Utilities function?<br>• If NO, remove USB device from Backplane Assy USB Connector, reconnect USB Cable, reinstall Power Supply Assy and proceed to next step.<br>• If YES, probable cause of error is USB Cable. Refer to Chapter 5 for USB Cable Remove/Install Procedure or contact Aeroflex Customer Service. |
| | Step 9 | • Connect USB device to CPU Adapter Assy USB connector.<br><br> |
| | Step 10 | • Is USB device responsive?<br>• If NO, probable cause of error is CPU Adapter PCB Assy. Refer to Chapter 5 for CPU Adapter Assy Remove/Install Procedures or contact Aeroflex Customer Service.<br>• If YES, probable cause of error is Backplane Assy USB Connector. Refer to Chapter 5 for Backplane Assy Remove/ Install Procedures or contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **19.** | **Test Set does not maintain correct time or receive message “Check Date and Time settings”, “Press <F1> to resume. <F2> to Setup” when unit is powered on.** | |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 1 | • Replace CPU Adapter PCB Assy Battery. Refer to Chapter 5 for CPU Adapter PCB Assy Battery Remove/Install Procedures. |
| | Step 2 | • Program Test Set Date and Time on the Time Date Utility Tile. |
| | Step 3 | • If problem persists after corrective action is performed, contact Aeroflex Customer Service. |
| **20.** | **Test Set does not power down to Standby Mode when On/Standby Key is pressed.** | |
| | Step 1 | • Switch Rear Panel AC Power Supply Switch to OFF position. |
| | Step 2 | • After Test Set completely powers down, return AC Power Supply Switch to ON position. |
| | Step 3 | • Press On/Standby Key to power on Test Set. |
| | Step 4 | • Does Test Set reboot to operational state?<br>• If NO, contact Aeroflex Customer Service.<br>• If YES, proceed to next step. |
| | Step 5 | • Press On/Standby Key to initiate power down sequence. |
| | Step 6 | • At power down prompt, select YES. |
| | Step 7 | • Did Test Set initiate power down sequence?<br>• If NO, probable cause of error is Keypad Assy. Refer to Chapter 5 for Keypad Assy Remove/Install Procedure or contact Aeroflex Customer Service.<br>• If YES, proceed to next step. |
| | Step 8 | • Did Test Set initiate power down sequence, stopping with a black display containing a line of command code?<br>• If YES, probable cause of error is Power Supply Assy. Refer to Chapter 5 for Power Supply Assy Remove/Install Procedure or contact Aeroflex Customer Service. |
| **21.** | **Receive “Receiver YIG Calibration Failed” message during boot-up procedure.** | |
| **The following steps are for Qualified Service Personnel Only!** | | |
| | Step 1 | • Power down and reboot Test Set. Does error message re-occur during boot-up procedure?<br>• If YES, probable cause of failure is Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedure or contact Aeroflex Customer Service.<br>• If NO, verify all coaxial cables are securely attached to assemblies. Refer to Chapter 5, Remove/Install Procedures for connector locations. |
| | Step 2 | • Does problem persist after replacing Receiver Assy?<br>• If YES, probable cause of failure is DAM Carrier PCB Assy. Refer to Chapter 5 for DAM Carrier PCB Assy Remove/ Install Procedure or contact Aeroflex Customer Service. |
| | Step 3 | • Does problem persist after DAM Carrier PCB Assy is replaced?<br>• If YES, contact Aeroflex Customer Service. |

| MALFUNCTION<br>TEST OR INSPECTION<br>CORRECTIVE ACTION | | |
|---|---|---|
| **22.** | **Receive "Generator YIG Calibration Failed" message during boot-up procedure.** | |
| **The following steps are for Qualified Service Personnel Only!**<br>**The following steps apply to the 3901, 3902 and 3920.** | | |
| | Step 1 | • Power down and reboot Test Set. Does error message re-occur during boot-up procedure?<br>• If NO, verify all coaxial cables are securely attached to assemblies. Refer to Chapter 5, Remove/Install Procedures.<br>• If YES, probable cause of failure is Generator Assy. Refer to Chapter 5 for Generator Assy Remove/Install Procedure or contact Aeroflex Customer Service. |
| | Step 2 | • Does problem persist after replacing Generator Assy?<br>• If YES, probable cause of failure is Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedure or contact Aeroflex Customer Service. |
| | Step 3 | • Does problem persist after replacing Receiver Assy?<br>• If YES, probable cause of failure is DAM Carrier PCB Assy. Refer to Chapter 5 for DAM Carrier PCB Assy Remove/ Install Procedure or contact Aeroflex Customer Service. |
| | Step 4 | • Does problem persist after DAM Carrier PCB Assy is replaced?<br>• If YES, contact Aeroflex Customer Service. |
| **23.** | **Receive "Generator and Receiver YIG Calibration Failed" message during boot-up procedure.** | |
| **The following steps are for Qualified Service Personnel Only!**<br>**The following steps apply to the 3901, 3902 and 3920.** | | |
| | Step 1 | • Power down and reboot Test Set. Does error message re-occur during boot-up procedure?<br>• If NO, verify all coaxial cables are securely attached to assemblies. Refer to Chapter 5, Remove/Install Procedures.<br>• If YES, probable cause of failure is Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedure or contact Aeroflex Customer Service. |
| | Step 2 | • Does problem persist after replacing Receiver Assy?<br>• If YES, probable cause of failure is DAM Carrier PCB Assy. Refer to Chapter 5 for DAM Carrier PCB Assy Remove/ Install Procedure or contact Aeroflex Customer Service. |
| | Step 3 | • Does problem persist after DAM Carrier PCB Assy is replaced?<br>• If YES, probable cause of failure is Generator Assy. Refer to Chapter 5 for Generator Assy Remove/Install Procedure or contact Aeroflex Customer Service. |
| | Step 4 | • Does problem persist after Generator Assy is replaced?<br>• If YES, contact Aeroflex Customer Service. |

# 3.7 ASSEMBLY TROUBLESHOOTING PROCEDURES

Assembly Troubleshooting Procedures require Test Set disassembly and should only be performed by a qualified service technician. Refer to Fig. 3-1 and Fig. 3-2 for assembly connectors and coaxial cable locations.

| NOTE | Assembly Troubleshooting Procedures are intended to determine whether or not an assembly is functioning properly; these procedures do not determine if an assembly is operating within specified parameters. Perform Test Set Verification Procedures (refer to Chapter 4, Verification/Calibration Procedures) to determine if an assembly is operating within specified parameters. |
|---|---|

## 3.7.1 Preliminary Procedures

Complete section 3.6, Symptom Troubleshooting Procedures prior to performing Assembly Troubleshooting Procedures.

## 3.7.2 Verify DAM Carrier PCB Assy Operation

| TEST OR INSPECTION | CORRECTIVE ACTION |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect W2 from A10J1. |
| Step 4 | Use SSMB to BNC Coaxial Cable to connect Spectrum Analyzer to A10J1. |
| Step 5 | Use Spectrum Analyzer to search for a signal at 11.4 MHz (for 3920B search for signal at 10.8 MHz).<br>• NO SIGNAL on Spectrum Analyzer, probable cause of error is DAM Carrier PCB Assy or CAI PCB Assy. Refer to Chapter 5 for DAM Carrier PCB Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, proceed to 3.7.3 Verify Generator Assy Operation. |

### 3.7.3 Verify Generator Assy Operation.

| TEST OR INSPECTION<br>CORRECTIVE ACTION | |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect W7 from A7J3. |
| Step 4 | Use SSMB to BNC Coaxial Cable to connect Spectrum Analyzer to A7J3. |
| Step 5 | Use Spectrum Analyzer to search for a signal at 80 MHz.<br>• NO SIGNAL on Spectrum Analyzer, probable cause of error is the Receiver Assy, replace Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W7 to A7J3.<br>• 3901/3902/3920 proceed to next step.<br>• 3920B proceed to Step 12. |
| Step 6 | Disconnect W6 from A7J7. |
| Step 7 | Use SSMB to BNC Coaxial Cable to connect Spectrum Analyzer to A7J7. |
| Step 8 | Use Spectrum Analyzer to search for a signal at 400 MHz.<br>• NO SIGNAL on Spectrum Analyzer, probable cause of error is the Receiver Assy, replace Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W6 to A7J7. Proceed to next step. |
| Step 9 | Disconnect W3 from A4J5. |
| Step 10 | Use SSMB to BNC Coaxial Cable to connect Spectrum Analyzer to A4J5. |
| Step 11 | Use Spectrum Analyzer to search for a signal at 200 MHz.<br>• NO SIGNAL on Spectrum Analyzer, replace Generator Assy. Refer to Chapter 5 for Generator Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W3 to A4J5. Proceed to next step. |
| Step 12 | Disconnect W9 from A4J1 and A3J2. |
| Step 13 | Use SMA to BNC Coaxial Cable to connect Spectrum Analyzer to A4J1. |
| Step 14 | Use Spectrum Analyzer to search for a signal at set RF Generator frequency.<br>• NO SIGNAL on Spectrum Analyzer, probable cause of error is the Generator Assy. replace Generator Assy. Refer to Chapter 5 for Generator Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W9 to A4J1. Proceed to 3.7.4 Verify Attenuator/Power Term Assy Operation. |

### 3.7.4 Verify Attenuator/Power Term Assy Operation.

| TEST OR INSPECTION<br>CORRECTIVE ACTION | |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect A1W6 from connector A3J1. |
| Step 4 | Use SMA to BNC Coaxial Cable to connect Spectrum Analyzer to A3J1. |
| Step 5 | Use Spectrum Analyzer to search for a signal at the set RF Generator frequency.<br>• NO SIGNAL on Spectrum Analyzer, replace Attenuator Assy. Refer to Chapter 5 for Attenuator Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect A1W6 to A3J1 and replace Power Term Assy. Refer to Chapter 5 for Power Term Assy Remove/ Install Procedures. |

### 3.7.5 Verify Power Term Assy Receive operation.

| TEST OR INSPECTION<br>CORRECTIVE ACTION | |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect A1W7 from A7J1. |
| Step 4 | Use Male to Male SSMB Connector and SSMB to BNC coaxial cable to connect Spectrum Analyzer to end of A1W7. |
| Step 5 | Use Spectrum Analyzer to search for signal at expected frequency.<br>• NO SIGNAL on Spectrum Analyzer, replace Power Term Assy. Refer to Chapter 5 for Power Term Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect A1W7 to A7J1. Proceed to 3.7.6 Verify Receiver Assy Operation. |

## 3.7.6 Verify Receiver Assy Operation.

| TEST OR INSPECTION<br>CORRECTIVE ACTION | |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect W6 from A7J7. |
| Step 4 | Use SSMB to BNC coaxial cable to connect Spectrum Analyzer to A7J7. |
| Step 5 | Use Spectrum Analyzer to search for a signal at 400 MHz.<br>• NO SIGNAL on Spectrum Analyzer, replace Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W6 to A7J7 and proceed to next step. |
| Step 6 | Disconnect W7 from A7J3. |
| Step 7 | Use SSMB to BNC coaxial cable to connect Spectrum Analyzer to A7J3. |
| Step 8 | Use Spectrum Analyzer to search for a signal at 80 MHz.<br>• NO SIGNAL on Spectrum Analyzer, replace Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W7 to A7J3 and proceed to next step. |
| Step 9 | Disconnect W3 from A7J5. |
| Step 10 | Use SSMB to BNC coaxial cable to connect Spectrum Analyzer to A4J5. |
| Step 11 | Use Spectrum Analyzer to search for a signal at 200 MHz.<br>• NO SIGNAL on Spectrum Analyzer, replace Generator Assy. Refer to Chapter 5 for Generator Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W3 to A4J5 and proceed to next step. |
| Step 12 | Disconnect W4 from A7J8. |
| Step 13 | Use SSMB to BNC coaxial cable to connect Spectrum Analyzer to A7J8. |
| Step 14 | Use Spectrum Analyzer to search for a signal at 210.7 MHz.<br>• SIGNAL on Spectrum Analyzer, replace Receiver Assy. Refer to Chapter 5 for Receiver Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, reconnect W4 to A7J8. Proceed to 3.7.7 Verify IF/Video PCB Assy operation. |

### 3.7.7 Verify IF/Video PCB Assy operation.

| TEST OR INSPECTION<br>CORRECTIVE ACTION | |
|---|---|
| Step 1 | Remove Case Assy. Refer to Chapter 5 for Case Assy Remove/Install Procedures. |
| Step 2 | Inspect all coaxial cables to ensure they are properly connected to assemblies. If coaxial cables are properly connected to all assemblies, proceed to next step. |
| Step 3 | Disconnect W5 from A5J5. |
| Step 4 | Use SSMB to BNC coaxial cable to connect Spectrum Analyzer to A5J5. |
| Step 5 | Use Spectrum Analyzer to search for a signal at 10.7 MHz.<br>• NO SIGNAL on Spectrum Analyzer, replace IF/Video PCB Assy. Refer to Chapter 5 for IF/Video PCB Assy Remove/Install Procedures.<br>• SIGNAL on Spectrum Analyzer, probable cause of error is DAM Carrier PCB Assy, CAI PCB Assy or coaxial cable(s). Refer to Chapter 5 for Remove/Install Procedures or contact Aeroflex Customer Service. |

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# Chapter 4 - Verification/Calibration Procedures

## 4.1 GENERAL INFORMATION

This chapter provides step-by-step instructions for performing Test Set Verification and Calibration Procedures. Calibration files are included when the Calibration Software Option (390XOPT040) is installed in the Test Set. Software version 1.7.3 includes Verification Setup Files as a standard software item; units containing earlier software versions must download the Verification Setup Files from the 3900 Maintenance Manual CD.

Refer to the 3900 Series Operation CD for information on using the File Management Utility function to transfer Verification Setup Files to the Test Set.

## 4.2 VERIFICATION SCHEDULE

Verification Procedures should be performed following completion of any Remove/Install Procedure.

## 4.3 CALIBRATION SCHEDULE

The Calibration Procedure should be performed as a result of one or more of the following conditions:

- The Test Set fails to meet the performance specifications as determined by Verification Procedures.
- The recommended 12 month calibration interval is due.
- The CPU Adapter PCB Assy has been repaired or replaced.

## 4.4 FOLLOW-UP PROCEDURES

Aeroflex recommends that the Test Set's internal Calibration Files be saved to a USB device after Calibration is complete. Refer to section 4.11, Saving Calibration Files.

## 4.5 CONTROLS AND CONNECTORS

Refer to Appendix A for the location of controls and connectors specified in the Verification and Calibration Procedures.

## 4.6 TEST RECORDS

Make copies of the Verification and Calibration Data Sheets to record and verify results obtained while performing these Calibration Procedures.

Electronic Data Sheets are available by clicking the links below. Adobe Reader allows the user to complete the form electronically and print the results. Electronic copies of completed data sheets can only be saved when using Adobe Acrobat.

- Verification Data Sheet
- Calibration Data Sheet

## 4.7 DISASSEMBLY REQUIREMENTS

None.

## 4.8 PRECAUTIONS

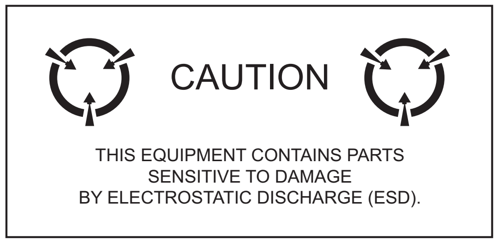
### 4.8.1 Safety

Use extreme caution when working with "live" circuits. Observe the following precautions when performing the Verification and Calibration Procedures:

**WARNING**

Heed all warnings and cautions concerning maximum voltages and power inputs.

### 4.8.2 ESD




**CAUTION**

Only perform Calibration Procedures in an ESD Environment. All personnel performing Calibration Procedures should have knowledge of accepted ESD practices and/or be ESD certified.

## 4.9 REQUIRED EQUIPMENT

Refer to Appendix E for list of equipment required to perform Verification and Calibration Procedures.

## 4.10 SPECIAL NOTES/INSTRUCTIONS

- Allow the Test Set to warm up for a minimum of 45 minutes prior to beginning Verification and Calibration Procedures.
- When 10 dB pads are included in the Calibration setup use one 10 dB pad only at Power Sensor head connections, and the other 10 dB pad only at ANT connections to obtain consistent readings.
- The Calibration System is designed to skip unnecessary steps when the Calibration Procedures are run consecutively. For example, the Zero and Calibrate Power Meter message is only displayed when this step needs to be performed.

## 4.11 SAVING CALIBRATION FILES

Aeroflex recommends that the Test Set's internal Calibration Files be saved to a USB device prior to servicing and/or after calibrating the unit. To Save Calibration Files to USB device:

| STEP | PROCEDURE |
|---|---|
| 1. | Power on Test Set. |
| 2. | Press UTILS Key to access Utilities floating menu. |
| 3. | Select Hardware Settings, Database Status from floating menu. |
| 4. | Connect USB device to Test Set USB Connector. |
| 5. | Press Backup to USB Soft Key. |
| 6. | When complete, remove USB device from Test Set. |

| NOTE | System Error message as shown in Fig. 4-1 is displayed when Backup to USB Soft Key is pressed before USB device is connected to Test Set. |
|---|---|

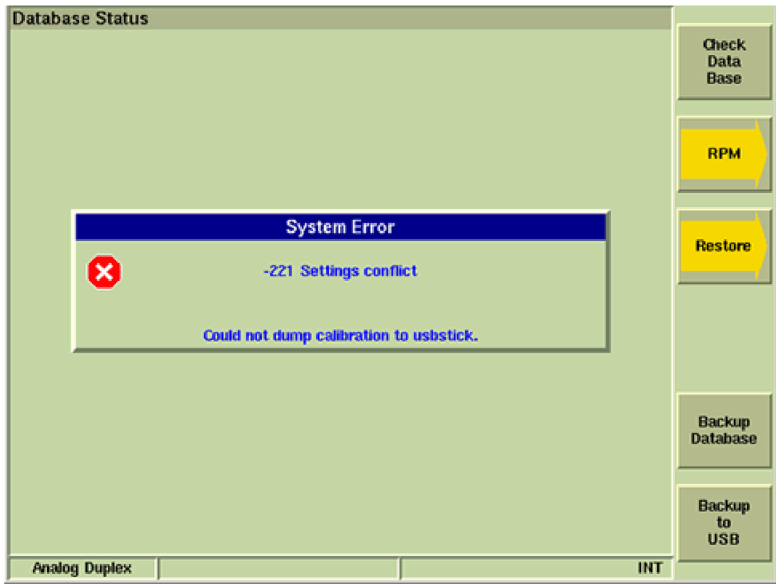



Fig. 4-1 System Error - No USB Device Connected

## 4.12 RESTORING CALIBRATION FILES

To restore Saved Calibration files:

| STEP | PROCEDURE |
|---|---|
| 1. | Power on Test Set. |
| 2. | Press UTILS Key to access Utilities floating menu. |
| 3. | Select Hardware Settings, Database Status from floating menu. |
| 4. | Connect USB device to Test Set USB Connector. |
| 5. | Press Restore Soft Key. Select Restore From USB Soft Key as source of saved Calibration Files. |
| 6. | When complete, remove USB device from Test Set. |

# 4.13 TEST SET VERIFICATION

## 4.13.1 Accessing Procedures

Verification Setup Files are found on the 3900 Series Maintenance CD. These files must be downloaded to the Test Set before they can be accessed from the Store/Recall Tile. Refer to the 3900 Series Operation CD for information on downloading files to the Test Set and using the Store/Recall function.

## 4.13.2 Verification Types

There are two types of Verification Procedures supported for the 3900.

### 4.13.2.A Calibration Verification

Calibration Verification should be performed following Test Set Calibration. To perform Calibration Verification, perform Verification Procedures 1 through 9.

### 4.13.2.B System Calibration

System Verification should be performed following completion of any Remove/Install Procedure or to determine if the Test Set is operating within product specifications. To perform System Verification, perform Verification Procedures 1 through 27 or 28 based on Test Set hardware configuration.

## 4.13.3 Verification Procedures

### 4.13.3.A Initial Setup

**Pre-requisites:** None
**Equipment:** 10 MHz Frequency Standard

STEP PROCEDURE

1. Connect the Test Set to an appropriate AC power source.
2. Set the AC Power Supply Switch to the ON position.
3. Connect the 10 MHz Frequency Standard to the Test Set External RF I/O Connector.

| NOTE | If procedure includes use of RF Generator, connect a 10 MHz frequency standard to RF Generator. |
|---|---|

4. Press UTILS Key to access the Utilities menu. Select Hardware Settings, Frequency Reference from floating menu.

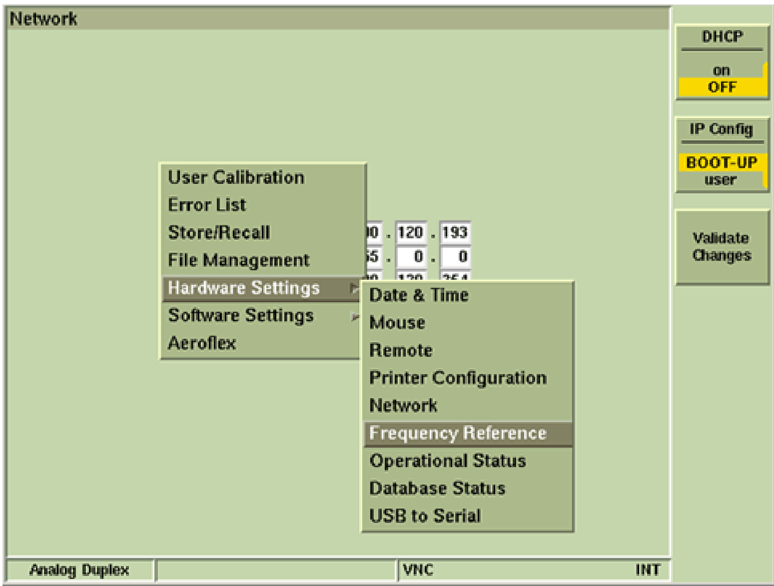



Fig. 4-2 Select Frequency Reference Tile

5. Select External from Reference (Internal/External) drop-down menu.

**Test Set system parameters are now ready to be verified.**

### 4.13.3.B Generator Output Frequency

**Pre-requisites:** None
**Equipment:** Frequency Counter

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 01. Wait for file to load. |
| 2. | After file loads press UTILS Key. Select Hardware Settings, Frequency Reference from floating menu. |
| 3. | After Tile opens, select Internal from Reference (Internal/External) drop down menu. |
| 4. | Disconnect 10 MHz Frequency Standard from Test Set External RF I/O Connector. |
| 5. | Connect Frequency Counter to Test Set GEN Connector. |
| 6. | Verify Frequency Counter reading is 1 GHz (±101 Hz). |
| • | If reading is correct, go to next step. |
| • | If reading is out of tolerance, perform the Test Set TCXO Calibration Procedure. |

#### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following key sequence to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |
| • | If this procedure is performed as part of System Verification, proceed to next Verification Procedure. |

### 4.13.3.C Generator Output Power

**Pre-requisites:** None
**Equipment:** Power Meter

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 02. Wait for file to load. |
| 2. | Connect Power Meter to Test Set GEN Connector. |
| 3. | Set Power Meter Frequency to 501.0 MHz. |
| 4. | Set Test Set RF Generator Level to each setting in Table 4-1. Verify Power Meter Level readings for each Test Set RF Generator Level setting in Table 4-1. |

| TEST SET RF GENERATOR LEVEL | POWER METER LEVEL |
|---|---|
| +10 dBm | +10 dBm (±1.0 dB) |
| 0 dBm | 0 dBm (±1.0 dB) |
| -10 dBm | -10 dBm (±1.0 dB) |
| -20 dBm | -20 dBm (±1.0 dB) |
| -30 dBm | -30 dBm (±1.0 dB) |
| -40 dBm | -40 dBm (±1.0 dB) |
| -50 dBm | -50 dBm (±1.0 dB) |
| -60 dBm | -60 dBm (±1.0 dB) |

Table 4-1 Power Meter Level Settings - Generator Output Power

- If all readings are correct, go to Follow-up Procedures.
- If any reading is out of tolerance, perform the Test Set RF Generator Calibration Procedures.

#### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.D Generator Level Flatness

**Pre-requisites:** Initial Setup
**Equipment:** Power Meter

STEP PROCEDURE

1. Recall Verification Setup File 03. Wait for file to load.
2. Connect Power Meter to Test Set GEN Connector.
3. Set Test Set RF Generator Frequency and Power Meter Frequency to each frequency in Table 4-2. Verify Power Meter reading is 0 dBm (±1.0 dB) for each frequency in Table 4-2.

All models start here

| | | | |
|---|---|---|---|
| 50 MHz | 350 MHz | 600 MHz | 900 MHz |
| 100 MHz | 400 MHz | 650 MHz | 950 MHz |
| 150 MHz | 450 MHz | 700 MHz | 1000 MHz |
| 200 MHz | 500 MHz | 750 MHz | 1050 MHz |
| 250 MHz | 550 MHz | 800 MHz | 3901/3920 Stop Here |
| 300 MHz | 350 MHz | 850 MHz | |

3902/3920/3920B with frequency extension option continue to next table

| | | | |
|---|---|---|---|
| 1100 MHz | 1550 MHz | 2000 MHz | 2400 MHz |
| 1150 MHz | 1600 MHz | 2050 MHz | 2450 MHz |
| 1200 MHz | 1650 MHz | 2100 MHz | 2500 MHz |
| 1250 MHz | 1700 MHz | 2150 MHz | 2550 MHz |
| 1300 MHz | 1750 MHz | 1900 MHz | 2600 MHz |
| 1350 MHz | 1800 MHz | 2200 MHz | 2650 MHz |
| 1400 MHz | 1850 MHz | 2250 MHz | 2700 MHz |
| 1450 MHz | 1900 MHz | 2300 MHz | |
| 1500 MHz | 1950 MHz | 2350 MHz | |

Table 4-2 Test Set Generator Frequencies - Generator Level Flatness

- If all readings are correct, go to Follow-up Procedures.
- If any reading is out of tolerance, perform the Test Set RF Generator Calibration Procedures.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.E Generator T/R Power Level Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Power Meter

STEP PROCEDURE

1. Recall Verification Setup File 04. Wait for file to load.
2. Connect Power Meter to Test Set T/R Connector.
3. Set Power Meter Frequency to 501.0 MHz.
4. Set Test Set Power Level to each setting in Table 4-3. Verify Power Meter Level reading is within tolerance indicated in Table 4-3 for each Test Set Power Level setting.

| TEST SET POWER LEVEL | POWER METER LEVEL |
|---|---|
| -30.0 dBm | -30 dBm (±1 dB) |
| -40.0 dBm | -40 dBm (±1 dB) |
| -50.0 dBm | -50 dBm (±1 dB) |
| -60.0 dBm | -60 dBm (±1 dB) |

Table 4-3 Power Meter Settings - Generator T/R Power Level Accuracy

- If all readings are correct, go to Follow-up Procedures.
- If any reading is out of tolerance, perform the Test Set RF Generator Calibration Procedures.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.F Generator T/R Power Level Flatness

**Pre-requisites:** Initial Setup
**Equipment:** Power Meter

STEP PROCEDURE

1. Recall Verification Setup File 05. Wait for file to load.
2. Connect Power Meter to Test Set T/R Connector.
3. Set Test Set RF Generator Frequency and Power Meter Frequency to each frequency in Table 4-4. Verify Power Meter reading is -30 dBm (±1 dB) for each frequency in Table 4-4.

All models start here

| | | | |
|---|---|---|---|
| 50 MHz | 350 MHz | 600 MHz | 900 MHz |
| 100 MHz | 400 MHz | 650 MHz | 950 MHz |
| 150 MHz | 450 MHz | 700 MHz | 1000 MHz |
| 200 MHz | 500 MHz | 750 MHz | 1050 MHz |
| 250 MHz | 550 MHz | 800 MHz | 3901/3920 Stop Here |
| 300 MHz | 350 MHz | 850 MHz | |

3902/3920/3920B with frequency extension option continue to next table

| | | | |
|---|---|---|---|
| 1100 MHz | 1550 MHz | 2000 MHz | 2400 MHz |
| 1150 MHz | 1600 MHz | 2050 MHz | 2450 MHz |
| 1200 MHz | 1650 MHz | 2100 MHz | 2500 MHz |
| 1250 MHz | 1700 MHz | 2150 MHz | 2550 MHz |
| 1300 MHz | 1750 MHz | 1900 MHz | 2600 MHz |
| 1350 MHz | 1800 MHz | 2200 MHz | 2650 MHz |
| 1400 MHz | 1850 MHz | 2250 MHz | 2700 MHz |
| 1450 MHz | 1900 MHz | 2300 MHz | |
| 1500 MHz | 1950 MHz | 2350 MHz | |

Table 4-4 Test Set Generator Frequencies - Generator T/R Power Level Flatness

- If all readings are correct, go to Follow-up Procedures.
- If any reading is out of tolerance, perform the Test Set RF Generator Calibration Procedures.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.G RF Power Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 06. Wait for file to load. |
| 2. | After file loads press ZERO on Test Set Meters Tile. |
| 3. | Connect RF Generator to Test Set T/R Connector. |
| 4. | Set RF Generator Frequency to 500 MHz. |
| 5. | Set RF Generator Power Level to 10.5 dBm. |
| 6. | Verify Test Set Power Meter reading is 10.5 dBm (±0.42 dBm).<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a Test Set hardware failure. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.H Inband Power Meter Accuracy

**Pre-requisites:** Initial Setup

**Equipment:** RF Generator
Power Splitter
Power Meter

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 07. Wait for file to load. |
| 2. | Press Calibrate on Meters Tile. |
| 3. | Verify No User Cal Errors is displayed on Test Set. |
| 4. | Connect common port of Power Splitter to RF Generator. |
| 5. | Connect one port of Power Splitter to Test Set ANT Connector. |
| 6. | Connect other port of Power Splitter to Power Meter. |
| 7. | Set RF Generator Level to settings in Table 4-5. Record Power Meter reading as Nominal Value for each setting in Table 4-5. |

| RF GENERATOR SETTINGS | Test Set RSSI METER |
|---|---|
| 500 MHz at -60 dBm | -60.0 dBm (±1.0 dB) |
| 500 MHz at -50 dBm | -50.0 dBm (±1.0 dB) |
| 500 MHz at -40 dBm | -40.0 dBm (±1.0 dB) |
| 500 MHz at -30 dBm | -30.0 dBm (±1.0 dB) |
| 500 MHz at -20 dBm | -20.0 dBm (±1.0 dB) |

Table 4-5 RF Generator Settings - Inband Power Meter Accuracy

8. Record Test Set Inband Power Meter reading for each RF Generator Level setting in Table 4-5.
9. Subtract Nominal value from Test Set Inband Power Meter reading. Verify difference is <1.0 dBm.
   - If all readings are correct, go to Follow-up Procedures.
   - If any reading is out of tolerance, perform the Test Set Receiver Calibration Procedure.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.I Analyzer Level Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator
Power Splitter
Power Meter

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 08. Wait for file to load. |
| 2. | After file loads press UTILS Key twice. Select User Calibration from floating menu. |
| 3. | Press Run User Calibration Soft Key to normalize Test Set. |
| 4. | When progress bar disappears press TEST Key to return to Spectrum Analyzer Tile. |
| 5. | Connect common port of Power Splitter to RF Generator. |
| 6. | Connect one port of Power Splitter to Test Set ANT Connector. |
| 7. | Connect other port of Power Splitter to Power Meter. |
| 8. | Set RF Generator Frequency and Power Meter Frequency to 10 MHz. |
| 9. | Set RF Generator Power Level to -30 dBm. |
| 10. | Record Power Meter reading as Nominal value. |
| 11. | Verify Spectrum Analyzer Center Frequency is set to 10 MHz. |
| 12. | Press Spectrum Analyzer Markers Soft Key. |
| 13. | Press Mkr 1 Soft Key, then the Mkr 1 to PK Soft Key. |
| 14. | Record Marker 1 Level reading from the Spectrum Analyzer. |
| 15. | Subtract Marker 1 Level reading from Power Meter reading. Verify difference between Power Meter reading and Marker 1 Level reading is <$\pm$1.0 dB. |
| 16. | Repeat Steps 8 through 15 for each frequency listed in Table 4-6: |

All models start here

| | | | |
|---|---|---|---|
| 50 MHz | 350 MHz | 600 MHz | 900 MHz |
| 100 MHz | 400 MHz | 650 MHz | 950 MHz |
| 150 MHz | 450 MHz | 700 MHz | 1000 MHz |
| 200 MHz | 500 MHz | 750 MHz | 1050 MHz |
| 250 MHz | 550 MHz | 800 MHz | 3901/3920 Stop Here |
| 300 MHz | 350 MHz | 850 MHz | |

3902/3920/3920B with frequency extension option continue to next table

| | | | |
|---|---|---|---|
| 1100 MHz | 1550 MHz | 2000 MHz | 2400 MHz |
| 1150 MHz | 1600 MHz | 2050 MHz | 2450 MHz |
| 1200 MHz | 1650 MHz | 2100 MHz | 2500 MHz |
| 1250 MHz | 1700 MHz | 2150 MHz | 2550 MHz |
| 1300 MHz | 1750 MHz | 1900 MHz | 2600 MHz |
| 1350 MHz | 1800 MHz | 2200 MHz | 2650 MHz |
| 1400 MHz | 1850 MHz | 2250 MHz | 2700 MHz |
| 1450 MHz | 1900 MHz | 2300 MHz | |
| 1500 MHz | 1950 MHz | 2350 MHz | |

Table 4-6 RF Generator Frequencies - Analyzer Level Accuracy

| STEP | PROCEDURE |
|---|---|
| | • If all readings are correct, go to Follow-up Procedures. |
| | • If any reading is out of tolerance, perform the Test Set Receiver Calibration Procedures. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.J Generator FM Residual

**Pre-requisites:** Initial Setup
**Equipment:** Modulation Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 09. Wait for file to load. |
| 2. | Connect Modulation Analyzer to Test Set GEN Connector. |
| 3. | Set Modulation Analyzer for 300 Hz to 3 kHz post-detection filtering. Verify Detector setting on Modulation Analyzer is RMS. |
| 4. | Record Residual FM Level reading. Verify Modulation Analyzer FM Level reading is <15 Hz.<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Generator Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.K Generator AM Residual

**Pre-requisites:** Initial Setup
**Equipment:** Modulation Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 10. Wait for file to load. |
| 2. | Connect Modulation Analyzer to Test Set GEN Connector. |
| 3. | Set Modulation Analyzer for 300 Hz to 3 kHz post-detection filtering. Verify Detector setting on Modulation Analyzer is Peak + (default setting). |
| 4. | Record Modulation Analyzer Residual AM Level reading. Verify Modulation Analyzer AM Level reading is <0.1%. |

- If reading is correct, go to Follow-up Procedures.
- If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Generator Assy, CAI Module Assy, DAM Carrier Assy. Contact Aeroflex Customer Service.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.L Generator FM Deviation Accuracy

**Pre-requisites:** Initial Setup
Generator FM Residual Verification Procedure

**Equipment:** Modulation Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 11. Wait for file to load. |
| 2. | Connect Modulation Analyzer to Test Set GEN Connector. |
| 3. | Set Modulation Analyzer to measure FM with the 15 kHz LP Filter selected. Verify Detector setting on Modulation Analyzer is Peak + (default setting). |
| 4. | Record Modulation Analyzer FM Deviation reading. |
| 5. | Subtract the Residual FM Level reading recorded in Step 4 of the Generator FM Residual Verification Procedure from the Modulation Analyzer FM Deviation reading recorded in Step 4 (above). Verify FM deviation is 10 kHz (±0.30 kHz).<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, DAM Carrier Assy or Generator Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

### 4.13.3.M Generator FM Modulation Rate

**Pre-requisites:** Initial Setup
Generator FM Residual Verification Procedure

**Equipment:** Modulation Analyzer

STEP PROCEDURE

1. Recall Verification Setup File 12. Wait for file to load.
2. Connect Modulation Analyzer to Test Set GEN Connector.
3. Set Modulation Analyzer to perform FM measurements with the 15 kHz LP Filter selected.
4. Set Test Set FM Modulation Rate to each setting in Table 4-7. Record Modulation Analyzer FM Deviation Level reading for each FM Modulation Rate in Table 4-7.

| TEST SET (M1) AF FIELD | FM DEVIATION |
|---|---|
| 50.0 Hz | 6 kHz (±0.18 kHz) |
| 300.0 Hz | 6 kHz (±0.18 kHz) |
| 10000.0 Hz | 6 kHz (±0.18 kHz) |

Table 4-7 FM Modulation Rates - Generator FM Modulation Rate

5. To calculate the FM Deviation Level, subtract the FM Residual reading recorded in Step 4 of Generator FM Residual Verification Procedure from the Modulation Analyzer FM reading.
   - If all readings are correct, go to Follow-up Procedures.
   - If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, DAM Carrier Assy or Generator Assy. Contact Aeroflex Customer Service.

#### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.N Generator FM Modulation Distortion

**Pre-requisites:** Initial Setup
**Equipment:** Modulation Analyzer
Audio Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 13. Wait for file to load. |
| 2. | Connect Modulation Analyzer to Test Set GEN Connector. |
| 3. | Set Modulation Analyzer to measure FM with the 3 kHz LP Filter selected. |
| 4. | Connect Audio Analyzer to Modulation Analyzer Modulation Output Connector. |
| 5. | Set Audio Analyzer LP Filter to 30 kHz. |
| 6. | Verify Audio Analyzer Modulation Distortion reading is <1%. |

- If reading is correct, go to Follow-up Procedures.
- If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, DAM Carrier Assy or Generator Assy. Contact Aeroflex Customer Service.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.O Generator AM Modulation Accuracy

**Pre-requisites:** Initial Setup
Generator AM Residual Verification Procedure
**Equipment:** Modulation Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 14. Wait for file to load. |
| 2. | Connect Modulation Analyzer to Test Set GEN Connector. |
| 3. | Set Modulation Analyzer to perform AM measurements. |
| 4. | Record Modulation Analyzer AM Modulation reading. |
| 5. | Subtract the Modulation Analyzer AM Level reading recorded in Step 4 of the Generator AM Residual Verification Procedure from the Modulation Analyzer AM Modulation reading recorded in Step 4 (above). Verify AM Modulation is 30% (±1%).<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, DAM Carrier Assy or Generator Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.P RF Offset Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 15. Wait for file to load. |
| 2. | Connect RF Generator to Test Set T/R Connector. |
| 3. | Set RF Generator Frequency to 1000.01 MHz. Set RF Generator Power Level to -20 dBm. Verify Test Set RF Offset Meter reading is +10000 Hz (±1 Hz). |
| 4. | Set RF Generator Frequency to 999.99 MHz. Set RF Generator Power Level to -20 dBm. Verify Test Set RF Offset Meter reading is -10000 Hz (±1 Hz). |
| | • If all readings are correct, go to Follow-up Procedures. |
| | • If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, IF/Video PCB Assy, DAM Carrier Assy or Receiver Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.Q Demod Frequency Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 16. Wait for file to load. |
| 2. | Connect RF Generator to Test Set ANT Connector. |
| 3. | Set RF Generator Frequency to 100 MHz. Set RF Generator Power Level to -10.0 dBm. |
| 4. | Set RF Generator to output a 6 kHz FM signal at a 1 kHz rate. |
| 5. | Verify Test Set Demod Frequency reading is 1000 Hz (±0.4 Hz).<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, IF/Video PCB Assy, DAM Carrier Assy or Receiver Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.R FM Deviation Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 17. Wait for file to load. |
| 2. | Connect RF Generator to Test Set ANT Connector. |
| 3. | Set RF Generator Frequency to 100 MHz at -10.0 dBm. Verify Modulation is OFF. |
| 4. | Record Modulation Analyzer reading as 8901 Residual. |
| 5. | Record Test Set FM reading as 3900 Residual. |
| 6. | Set RF Generator to output a 10 kHz FM signal with 1 kHz deviation rate. |
| 7. | Record Modulation Analyzer reading as 8901 FM. |
| 8. | Record Test Set FM reading as 3900 FM. |
| 9. | Subtract the 8901 Residual from the 8901 FM reading, and record as 8901 Nominal. |
| 10. | Subtract the 3900 Residual from the 3900 FM reading, and record as 3900 Measured. |
| 11. | Verify the value measured on the Test Set is within ±0.31 kHz of the 8901 Nominal value.<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, IF/Video PCB Assy, DAM Carrier Assy or Receiver Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.S AM Modulation Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 18. Wait for file to load. |
| 2. | Connect RF Generator to Test Set ANT Connector. |
| 3. | Set RF Generator Frequency to 100 MHz at -10.0 dBm. Verify Modulation is OFF. |
| 4. | Record Modulation Analyzer reading as 8901 Residual. |
| 5. | Record Test Set AM reading as 3900 Residual. |
| 6. | Set RF Generator to output a 50% AM depth at a 1 kHz rate. |
| 7. | Record Modulation Analyzer reading as 8901 AM. |
| 8. | Record Test Set AM reading as 3900 AM. |
| 9. | Subtract the 8901 Residual from the 8901 AM reading, and record as 8901 Nominal. |
| 10. | Subtract the 3900 Residual from the 3900 AM reading, and record as 3900 Measured. |
| 11. | Verify the 3900 Measured value is within ±1.6% of the 8901 Nominal value.<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy, IF/Video PCB Assy, DAM Carrier Assy or Receiver Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.T Analyzer Frequency and Span Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

STEP PROCEDURE

1. Recall Verification Setup File 19. Wait for file to load.
2. Connect RF Generator to Test Set ANT Connector.
3. Set RF Generator Frequency to 400 MHz. Set RF Generator Power Level to -20.0 dBm.
4. Verify Spectrum Analyzer Center Frequency is set to 400 MHz.
5. Press Spectrum Analyzer Markers Soft Key.
6. Press Mkr 1 Soft Key then the Mkr 1 to PK Soft Key.
7. Verify Marker 1 frequency reading is between 399.996500 MHz and 400.003500 MHz.

- If reading is correct go to next step.
- If reading is out of tolerance, this indicates a hardware failure in the 3900. Probable source of failure: IF/Video PCB Assy, Receiver Assy, or CAI PCB Assy. Return the 3900 to Aeroflex for repair.

8. Select 500 MHz span from Span drop-down menu.
9. Change RF Generator Frequency to 200 MHz.
10. Press Mkr 1 to PK Soft Key to move Marker 1 to signal peak.
11. Record Marker 1 frequency reading.
12. Change RF Generator Frequency to 600 MHz.
13. Press Mkr 1 to PK Soft Key to move Marker 1 to signal peak.
14. Record Marker 1 frequency reading.
15. Verify difference between the marker frequency recorded in Step 11 and the marker frequency recorded in Step 13 is between 395.000000 to 405.000000 MHz.
    - If reading is correct go to Follow-up Procedures.
    - If the reading is out of tolerance, perform the 3900 Analyzer Yig Sweep calibration procedure.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.U Analyzer Bandwidth Switching Error

**Pre-requisites:** Initial Setup
**Equipment:** RF Generator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 20. Wait for file to load. |
| 2. | After file loads press UTILS Key twice. Select User Calibration from floating menu. |
| 3. | Press Run User Calibration Soft Key to normalize Test Set. |
| 4. | When User Calibration is complete, press TEST Key to return to Spectrum Analyzer Tile. |
| 5. | Connect RF Generator to Test Set ANT Connector. |
| 6. | Set RF Generator frequency to 500 MHz. Set RF Generator Power Level to -30.0 dBm. |
| 7. | Verify RBW Filter is set to 300 Hz. Verify Span is set to 2.0 kHz. |
| 8. | Verify Marker 1 is ON. Verify Marker 1 position is set to 500 MHz. |
| 9. | Record 300 Hz RBW Filter Marker Level reading. |
| 10. | Select 50 kHz from Span drop-down menu. |
| 11. | Select 3 kHz from the RBW drop-down menu. |
| 12. | Record 3 kHz RBW Filter Marker Level reading. |
| 13. | Select 500 kHz from Span drop-down menu. |
| 14. | Select 30 kHz from RBW Filter drop-down menu. |
| 15. | Select 3 kHz VBW Filter drop-down menu. |
| 16. | Record 30 kHz RBW Filter Marker Level reading. |
| 17. | Select 1 MHz from Span drop-down menu. |
| 18. | Select 60 kHz RBW Filter drop-down menu. |
| 19. | Record 60 kHz RBW Filter Marker Level reading. |
| 20. | Select 5 MHz from Span drop-down menu. |
| 21. | Select 300 kHz from RBW Filter drop-down menu. |
| 22. | Record 300 kHz from RBW Filter Marker Level reading. |
| 23. | Select 20 MHz from Span drop-down menu. |
| 24. | Select 6 MHz from RBW Filter drop-down menu. |
| 25. | Record 6 MHz RBW Filter Marker Level reading. |
| 26. | Subtract lowest recorded Marker Level reading from highest recorded Marker Level reading. Verify difference in readings is <1 dB.<br>• If all readings are correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: IF/Video PCB Assy, CAI Module Assy or Receiver Assy. Contact Aeroflex Customer Service. |

STEP PROCEDURE

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.V Oscilloscope Amplitude Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Digital Multimeter
10 k Ω Load

STEP PROCEDURE

1. Recall Verification Setup File 21. Wait for file to load.
2. Connect a BNC-T Connector to Test Set FCTN GEN/Demod Out Connector.
3. Connect a coaxial cable from one end of BNC-T Connector to Digital Multimeter. Terminate connection with a 10 k Ω load.
4. Connect other end of BNC-T Connector to Test Set Scope Channel 1 Input Connector.
5. Maximize Scope Tile.
6. Verify Marker 1 and Marker 2 are ON.
7. Verify Marker 1 is set to 250 uS. Verify Marker 2 is set to 750 uS. Minimize Scope Tile.
8. Set Test Set Audio Function Generator Level to first value in Table 4-8. Record Digital Multimeter reading.

| 3900 Function Generator Level | 3900 V/Div | Error limit from Nominal Value |
|---|---|---|
| 42.4 mVrms (120.0 mVp-p) | 0.02 | ±8 mV |
| 106.1 mVrms (300.0 mVp-p) | 0.05 | ±20 mV |
| 212.1 mVrms (600 mVp-p) | 0.10 | ±40 mV |
| 424.2 mVrms (1200 mVp-p) | 0.20 | ±80 mV |
| 1.061 Vrms (3.000 Vp-p) | 0.50 | ±200 mV |
| 2.121 Vrms (6.000 Vp-p) | 1.00 | ±400 mV |
| 4.242 Vrms (12.000 Vp-p) | 2.00 | ±800 mV |

Table 4-8 Test Set Audio Function Generator Settings - Scope Amplitude Accuracy

9. Multiply Digital Multimeter reading recorded in Step 8 by 2.8289 and record results as Nominal Value.
10. Select Scope Tile. Press Toggle Marker Soft Key until Delta Level reading is displayed. Compare Marker Delta Level reading to nominal value recorded in Step 9. Verify Marker Delta reading is within the allowed limits specified in Table 4-8.
11. Repeat Steps 8 through 10 for all the levels in Table 4-8.
    - If all readings are correct, go to next step.
    - If reading is out of tolerance this indicates a Test Set hardware failure. Probable source of failure: Front Panel Analog PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service.
12. Remove BNC-T Connector from Test Set Channel 1 Input Connector and connect to Test Set Channel 2 Input Connector.
13. Maximize Scope Tile.
14. Select Channel 2 from Trace A Source drop-down menu. Minimize Scope Tile.
15. Set Test Set Audio Function Generator Level to values listed in Table 4-8.
16. Record the Digital Multimeter Level reading for each Audio Function Generator Level in Table 4-8.
17. Multiply each Digital Multimeter Level reading recorded in Step 16 by 2.8289 and record result as the Nominal Value.

| STEP | PROCEDURE |
|---|---|
| 18. | Select Scope Tile. Press Toggle Marker Soft Key until Delta Level reading is displayed. Compare Marker Delta Level reading to nominal value recorded in Step 17. Verify Marker Delta reading is within the allowed limits specified in Table 4-8. |
| 19. | Repeat Steps 15 through 18 for all the levels in Table 4-8.<br>• If all readings are correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Front Panel Analog PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.W Audio Level Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Digital Multimeter

STEP PROCEDURE

1. Recall Verification Setup File 22. Wait for file to load.
2. Connect a BNC-T Connector to Test Set FCTN GEN/Demod Out Connector.
3. Connect a coaxial cable from one end of the BNC-T Connector to Digital Multimeter.
4. Connect other end of the BNC-T Connector to Test Set Audio In 1 Connector.
5. Verify Test Set Audio Function Generator 1 Level is set to 200 mV and Audio Function Generator 1 (A1) is enabled.
6. Verify Test Set AF Level Meter reading is within ±10% of Digital Multimeter reading.
7. Set Test Set Audio Function Generator 1 (A1) Level to 1.000 V.
8. Verify Test Set AF Level Meter reading is within ±10% of Digital Multimeter reading.
   - If all readings are correct, go to next step.
   - If Reading is out of tolerance this indicates a Test Set hardware failure. Probable source of failure: Front Panel Analog PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service.
9. Maximize Analyzers Tile. Set Source field to Audio 2. Minimize Analyzers Tile.
10. Move coaxial cable from Audio In 1 Connector to Audio In 2 Connector.
11. Verify Test Set Audio Function Generator 1 (A1) Level is set to 1.000 V.
12. Verify Test Set AF Level Meter reading is within ±10% of Digital Multimeter reading.
13. Set Test Set Audio Function Generator 1 (A1) Level to 200 mV.
14. Verify Test Set AF Level Meter reading is within ±10% of Digital Multimeter reading.
    - If all readings are correct, go to Follow-up Procedures.
    - If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: CAI Module Assy. Contact Aeroflex Customer Service.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

STEP PROCEDURE

1. Press UTILS Key to access the Utilities Menu.
2. Select Store/Recall from menu.
3. When Store/Recall Tile opens, select Restore Factory Defaults Soft Key.

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.X Function Generator Level Accuracy

**Pre-requisites:** Initial Setup

**Equipment:** Digital Multimeter

10 k Ω Load

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 23. Wait for file to load. |
| 2. | Connect coaxial cable from FCTN GEN/Demod Out Connector to Digital Multimeter. Terminate connection with a 10 k Ω Load. |
| 3. | Set Digital Multimeter to perform AC Volt measurements. |
| 4. | Verify Digital Multimeter Level reading is 5.000 Vrms (±50 mVrms).<br>• If reading is correct, go to Follow-up Procedures<br>• If reading is out of tolerance, perform Function Generator Calibration Procedure. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.Y Function Generator Frequency Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Frequency Counter
10 k Ω Load

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 24. Wait for file to load. |
| 2. | Connect coaxial cable from FCTN GEN/Demod Out Connector to Frequency Counter. Terminate connection with a 10 k Ω Load. |
| 3. | Verify Frequency Counter Frequency reading is 5000 Hz (±0.25 Hz).<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Front Panel Audio PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.Z Function Generator Total Harmonic Distortion

**Pre-requisites:** Initial Setup
**Equipment:** Audio Analyzer
10 k Ω Load

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 25. Wait for file to load. |
| 2. | Connect coaxial cable from FCTN GEN/Demod Out Connector to Audio Analyzer. Terminate connection with a 10 k Ω Load. |
| 3. | Verify Audio Analyzer total harmonic output reading is <0.5%.<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Front Panel Audio PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.AA Audio Frequency Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Frequency Counter

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 26. Wait for file to load. |
| 2. | Connect a BNC-T Connector to Test Set FCTN GEN/Demod Out Connector. |
| 3. | Connect a coaxial cable from one end of BNC-T Connector to Frequency Counter. |
| 4. | Connect other end of BNC-T Connector to Test Set Audio In 1 Connector. |
| 5. | Verify Test Set Audio Frequency Meter reading is within $\pm$0.4 Hz of Frequency Counter reading. |

- If the reading is correct, go to Follow-up Procedures.
- If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Front Panel Audio PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service.

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure is performed as part of System Verification, proceed to next Verification Procedure.

## 4.13.3.AB Sinad/Distortion Meter Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Audio Analyzer

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 27. Wait for file to load. |
| 2. | Connect a BNC-T Connector to Test Set FCTN GEN/Demod Out Connector. |
| 3. | Connect a coaxial cable from one end of BNC-T Connector to Audio Analyzer. |
| 4. | Connect other end of BNC-T Connector to Test Set Audio In 1 Connector. |
| 5. | Record Test Set Sinad Meter reading on Analyzers Tile. |
| 6. | Record Audio Analyzer Sinad reading. |
| 7. | Verify Test Set Sinad Meter reading is within ±1.01 dB of Audio Analyzer Sinad reading.<br>• If the reading is correct, go to next step.<br>• If Reading is out of tolerance, this indicates a Test Set hardware failure. Probable source of failure: Front Panel Audio PCB Assy. Contact Aeroflex Customer Service. |
| 8. | Select Analyzers Tile. Press Noise Meters Soft Key. |
| 9. | Press AF Meter Soft Key until DISTN is selected. |
| 10. | Select Generator Tile. Set Fgen Source A2 Level to 200 mV. |
| 11. | Verify Test Set Distortion Meter reading is within ±0.5% of Audio Analyzer Distortion reading.<br>• If reading is correct, go to Follow-up Procedures.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: Front Panel Audio PCB Assy, Front Panel Digital PCB Assy or CAI Module Assy. Contact Aeroflex Customer Service. |

### Follow-up Procedures

Perform one of the following:

- If this procedure was performed as a stand-alone procedure, perform the following procedure to reset the Factory Default Settings, then remove power from the Test Set and disconnect the test equipment.

| STEP | PROCEDURE |
|---|---|
| 1. | Press UTILS Key to access the Utilities Menu. |
| 2. | Select Store/Recall from menu. |
| 3. | When Store/Recall Tile opens, select Restore Factory Defaults Soft Key. |

- If this procedure was performed as part of System Verification, and the Test Set does not have a DMM installed, System Verification is complete.
- If this procedure was performed as part of System Verification, and the Test Set has a DMM installed, proceed to next Verification Procedure.

### 4.13.3.AC DMM Functionality/Accuracy

**Pre-requisites:** Initial Setup
**Equipment:** Calibrator

| STEP | PROCEDURE |
|---|---|
| 1. | Recall Verification Setup File 28. Wait for file to load. |
| 2. | Verify DMM is set to read DC Volts. |
| 3. | Verify DMM Scale is set to AUTO SCALE. Verify Peak Hold is OFF. |
| 4. | Insert Banana Patch Cable from DMM Positive Input to DMM Negative Input shorting the inputs. |
| 5. | Record DMM reading. Verify DMM reads 0.0 DC Volts (±10 mV).<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 6. | Connect Calibrator to DMM Input. Observe correct polarity. |
| 7. | Set Calibrator to output 10 DC volts. |
| 8. | Record DMM reading. Verify DMM reads 10 DC Volts (±0.2 V).<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 9. | Set DMM to read AC Volts. |
| 10. | Set Calibrator to output 10 AC volts at 60 Hz. |
| 11. | Record DMM reading. Verify DMM reads 10 AC Volts (±1.0 V).<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 12. | Set Calibrator to supply 1,000 Ω resistance. |
| 13. | Set DMM to read Ω. Set DMM Scale to 2 k Ω. |
| 14. | Disconnect all connections from DMM. Record DMM reading. Verify DMM reads 2 k Ω +++ indicating an open.<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 15. | Connect Banana Patch Cable from DMM Positive Input to DMM Negative Input shorting the inputs. |
| 16. | Record DMM reading. Verify DMM reads 0 Ω (±1.0 Ω) indicating a short.<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 17. | Connect Calibrator the DMM inputs. Set Calibrator to 1 k Ω. |

| STEP | PROCEDURE |
|---|---|
| 18. | Record DMM reading. Verify DMM reads 1,000 Ω (±50 Ω).<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 19. | Set DMM to read DC Amps. Set DMM to AUTO SCALE. |
| 20. | Connect Calibrator to DMM current inputs using Banana Patch Cable. Observe correct polarity. |
| 21. | Set Calibrator to supply 1 DC Amp. |
| 22. | Record DMM reading. Verify DMM reads 1 Amp (±0.05 Amp).<br>• If reading is correct, go to next step.<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service. |
| 23. | Set DMM to read AC Amps. |
| 24. | Set Calibrator to supply 1 AC Amp at 60 Hz. |
| 25. | Record DMM reading. Verify DMM reads 1 Amp (±0.05 Amp).<br>• If reading is out of tolerance, this indicates a hardware failure in the Test Set. Probable source of failure: DMM module. Contact Aeroflex Customer Service.<br>• If this procedure was performed as part of System Verification, System Verification is complete. |

## 4.14 VERIFICATION DATA SHEET

Technician: ____________________ Date: __________

Test Set S/N: ____________________

| STEP | PROCEDURE | | |
|---|---|---|---|
| **4.13.3.B, Generator Output Frequency** | | | |
| **6.** | 1 GHz (±101 Hz) | | ______ |
| **4.13.3.C, Generator Output Power** | | | |
| **4.** | +10 dBm | +10 dBm (±1.0 dB) | ______ |
| | 0 dBm | 0 dBm (±1.0 dB) | ______ |
| | -10 dBm | -10 dBm (±1.0 dB) | ______ |
| | -20 dBm | -20 dBm (±1.0 dB) | ______ |
| | -30 dBm | -30 dBm (±1.0 dB) | ______ |
| | -40 dBm | -40 dBm (±1.0 dB) | ______ |
| | -50 dBm | -50 dBm (±1.0 dB) | ______ |
| | -60 dBm | -60 dBm (±1.0 dB) | ______ |
| **4.13.3.D, Generator Level Flatness** | | | |
| **3.** | 50 MHz | 0 dBm (±1 dB) | ______ |
| | 100 MHz | 0 dBm (±1 dB) | ______ |
| | 150 MHz | 0 dBm (±1 dB) | ______ |
| | 200 MHz | 0 dBm (±1 dB) | ______ |
| | 250 MHz | 0 dBm (±1 dB) | ______ |
| | 300 MHz | 0 dBm (±1 dB) | ______ |
| | 350 MHz | 0 dBm (±1 dB) | ______ |
| | 400 MHz | 0 dBm (±1 dB) | ______ |
| | 450 MHz | 0 dBm (±1 dB) | ______ |
| | 500 MHz | 0 dBm (±1 dB) | ______ |
| | 550 MHz | 0 dBm (±1 dB) | ______ |
| | 600 MHz | 0 dBm (±1 dB) | ______ |
| | 650 MHz | 0 dBm (±1 dB) | ______ |
| | 700 MHz | 0 dBm (±1 dB) | ______ |
| | 750 MHz | 0 dBm (±1 dB) | ______ |
| | 800 MHz | 0 dBm (±1 dB) | ______ |
| | 850 MHz | 0 dBm (±1 dB) | ______ |
| | 900 MHz | 0 dBm (±1 dB) | ______ |
| | 950 MHz | 0 dBm (±1 dB) | ______ |
| | 1000 MHz | 0 dBm (±1 dB) | ______ |
| | 1050 MHz | 0 dBm (±1 dB) | ______ |
| | 3901 / 3920 Stop Here | | |
| | 3902 / 3920 /3920B with frequency extension option continue | | |

| STEP | | PROCEDURE | |
|---|---|---|---|

4.13.3.D, Generator Level Flatness **(cont)**

| | | | |
|---|---|---|---|
| **3.** | 1100 MHz | 0 dBm (±1 dB) | ______ |
| | 1150 MHz | 0 dBm (±1 dB) | ______ |
| | 1200 MHz | 0 dBm (±1 dB) | ______ |
| | 1250 MHz | 0 dBm (±1 dB) | ______ |
| | 1300 MHz | 0 dBm (±1 dB) | ______ |
| | 1350 MHz | 0 dBm (±1 dB) | ______ |
| | 1400 MHz | 0 dBm (±1 dB) | ______ |
| | 1450 MHz | 0 dBm (±1 dB) | ______ |
| | 1500 MHz | 0 dBm (±1 dB) | ______ |
| | 1550 MHz | 0 dBm (±1 dB) | ______ |
| | 1600 MHz | 0 dBm (±1 dB) | ______ |
| | 1650 MHz | 0 dBm (±1 dB) | ______ |
| | 1700 MHz | 0 dBm (±1 dB) | ______ |
| | 1750 MHz | 0 dBm (±1 dB) | ______ |
| | 1800 MHz | 0 dBm (±1 dB) | ______ |
| | 1850 MHz | 0 dBm (±1 dB) | ______ |
| | 1900 MHz | 0 dBm (±1 dB) | ______ |
| | 1950 MHz | 0 dBm (±1 dB) | ______ |
| | 2000 MHz | 0 dBm (±1 dB) | ______ |
| | 2050 MHz | 0 dBm (±1 dB) | ______ |
| | 2100 MHz | 0 dBm (±1 dB) | ______ |
| | 2150 MHz | 0 dBm (±1 dB) | ______ |
| | 2200 MHz | 0 dBm (±1 dB) | ______ |
| | 2250 MHz | 0 dBm (±1 dB) | ______ |
| | 2300 MHz | 0 dBm (±1 dB) | ______ |
| | 2350 MHz | 0 dBm (±1 dB) | ______ |
| | 2400 MHz | 0 dBm (±1 dB) | ______ |
| | 2450 MHz | 0 dBm (±1 dB) | ______ |
| | 2500 MHz | 0 dBm (±1 dB) | ______ |
| | 2550 MHz | 0 dBm (±1 dB) | ______ |
| | 2600 MHz | 0 dBm (±1 dB) | ______ |
| | 2650 MHz | 0 dBm (±1 dB) | ______ |
| | 2700 MHz | 0 dBm (±1 dB) | ______ |

4.13.3.E, Generator T/R Power Level Accuracy

| | | | |
|---|---|---|---|
| **4.** | -30 dBm | -30 dBm (±1 dB) | ______ |
| | -40 dBm | -40 dBm (±1 dB) | ______ |
| | -50 dBm | -50 dBm (±1 dB) | ______ |
| | -60 dBm | -60 dBm (±1 dB) | ______ |

| STEP | PROCEDURE | | |
|---|---|---|---|

4.13.3.F, Generator T/R Power Level Flatness

| | | | |
|---|---|---|---|
| 3. | 50 MHz | -30 dBm (±1 dB) | ________ |
| | 100 MHz | -30 dBm (±1 dB) | ________ |
| | 150 MHz | -30 dBm (±1 dB) | ________ |
| | 200 MHz | -30 dBm (±1 dB) | ________ |
| | 250 MHz | -30 dBm (±1 dB) | ________ |
| | 300 MHz | -30 dBm (±1 dB) | ________ |
| | 350 MHz | -30 dBm (±1 dB) | ________ |
| | 400 MHz | -30 dBm (±1 dB) | ________ |
| | 450 MHz | -30 dBm (±1 dB) | ________ |
| | 500 MHz | -30 dBm (±1 dB) | ________ |
| | 550 MHz | -30 dBm (±1 dB) | ________ |
| | 600 MHz | -30 dBm (±1 dB) | ________ |
| | 650 MHz | -30 dBm (±1 dB) | ________ |
| | 700 MHz | -30 dBm (±1 dB) | ________ |
| | 750 MHz | -30 dBm (±1 dB) | ________ |
| | 800 MHz | -30 dBm (±1 dB) | ________ |
| | 850 MHz | -30 dBm (±1 dB) | ________ |
| | 900 MHz | -30 dBm (±1 dB) | ________ |
| | 950 MHz | -30 dBm (±1 dB) | ________ |
| | 1000 MHz | -30 dBm (±1 dB) | ________ |
| | 1050 MHz | -30 dBm (±1 dB) | ________ |

3901 / 3920 Stop Here

3902 / 3920 /3920B with frequency extension option continue

| STEP | PROCEDURE | | |
|---|---|---|---|

4.13.3.F, Generator T/R Power Level Flatness **(cont)**

| | | | |
|---|---|---|---|
| **3.** | 1100 MHz | -30 dBm (±1 dB) | ________ |
| | 1150 MHz | -30 dBm (±1 dB) | ________ |
| | 1200 MHz | -30 dBm (±1 dB) | ________ |
| | 1250 MHz | -30 dBm (±1 dB) | ________ |
| | 1300 MHz | -30 dBm (±1 dB) | ________ |
| | 1350 MHz | -30 dBm (±1 dB) | ________ |
| | 1400 MHz | -30 dBm (±1 dB) | ________ |
| | 1450 MHz | -30 dBm (±1 dB) | ________ |
| | 1500 MHz | -30 dBm (±1 dB) | ________ |
| | 1550 MHz | -30 dBm (±1 dB) | ________ |
| | 1600 MHz | -30 dBm (±1 dB) | ________ |
| | 1650 MHz | -30 dBm (±1 dB) | ________ |
| | 1700 MHz | -30 dBm (±1 dB) | ________ |
| | 1750 MHz | -30 dBm (±1 dB) | ________ |
| | 1800 MHz | -30 dBm (±1 dB) | ________ |
| | 1850 MHz | -30 dBm (±1 dB) | ________ |
| | 1900 MHz | -30 dBm (±1 dB) | ________ |
| | 1950 MHz | -30 dBm (±1 dB) | ________ |
| | 2000 MHz | -30 dBm (±1 dB) | ________ |
| | 2050 MHz | -30 dBm (±1 dB) | ________ |
| | 2100 MHz | -30 dBm (±1 dB) | ________ |
| | 2150 MHz | -30 dBm (±1 dB) | ________ |
| | 2200 MHz | -30 dBm (±1 dB) | ________ |
| | 2250 MHz | -30 dBm (±1 dB) | ________ |
| | 2300 MHz | -30 dBm (±1 dB) | ________ |
| | 2350 MHz | -30 dBm (±1 dB) | ________ |
| | 2400 MHz | -30 dBm (±1 dB) | ________ |
| | 2450 MHz | -30 dBm (±1 dB) | ________ |
| | 2500 MHz | -30 dBm (±1 dB) | ________ |
| | 2550 MHz | -30 dBm (±1 dB) | ________ |
| | 2600 MHz | -30 dBm (±1 dB) | ________ |
| | 2650 MHz | -30 dBm (±1 dB) | ________ |
| | 2700 MHz | -30 dBm (±1 dB) | ________ |

4.13.3.G, RF Power Meter Accuracy

| | | |
|---|---|---|
| **6.** | 10.5 dBm (±0.4 dB) | ________ |

STEP PROCEDURE

4.13.3.H, Inband Power Meter Accuracy

**3.** No User Cal Errors message

| RF Generator Level | 7. Nominal Value | 8. 3900 Inband Power Meter | 9. Difference is <±1 dB |
|---|---|---|---|
| -60 dBm | | | |
| -50 dBm | | | |
| -40 dBm | | | |
| -30 dBm | | | |
| -20 dBm | | | |

4.13.3.I, Analyzer Level Accuracy

| | 10. Nominal Value | 14. Marker 1 Level Reading | 15. Difference is <±1 dB |
|---|---|---|---|
| 10 MHz | | | |
| 50 MHz | | | |
| 100 MHz | | | |
| 150 MHz | | | |
| 200 MHz | | | |
| 250 MHz | | | |
| 300 MHz | | | |
| 350 MHz | | | |
| 400 MHz | | | |
| 450 MHz | | | |
| 500 MHz | | | |
| 550 MHz | | | |
| 600 MHz | | | |
| 650 MHz | | | |
| 700 MHz | | | |
| 750 MHz | | | |
| 800 MHz | | | |
| 850 MHz | | | |
| 900 MHz | | | |
| 950 MHz | | | |
| 1000 MHz | | | |
| 1050 MHz | | | |

3901 / 3920 Stop Here

3902 / 3920 /3920B with frequency extension option continue

STEP PROCEDURE

## 4.13.3.I, Analyzer Level Accuracy **(cont)**

| | 10. Nominal Value | 14. Marker 1 Level Reading | 15. Difference is <±1 dB |
|---|---|---|---|
| 1100 MHz | | | |
| 1150 MHz | | | |
| 1200 MHz | | | |
| 1250 MHz | | | |
| 1300 MHz | | | |
| 1350 MHz | | | |
| 1400 MHz | | | |
| 1450 MHz | | | |
| 1500 MHz | | | |
| 1550 MHz | | | |
| 1600 MHz | | | |
| 1650 MHz | | | |
| 1700 MHz | | | |
| 1750 MHz | | | |
| 1800 MHz | | | |
| 1850 MHz | | | |
| 1900 MHz | | | |
| 1950 MHz | | | |
| 2000 MHz | | | |
| 2050 MHz | | | |
| 2100 MHz | | | |
| 2150 MHz | | | |
| 2200 MHz | | | |
| 2250 MHz | | | |
| 2300 MHz | | | |
| 2350 MHz | | | |
| 2400 MHz | | | |
| 2450 MHz | | | |
| 2500 MHz | | | |
| 2550 MHz | | | |
| 2600 MHz | | | |
| 2650 MHz | | | |
| 2700 MHz | | | |

| STEP | PROCEDURE |
|---|---|

4.13.3.J, Generator FM Residual

**4.** Record Generator FM Level reading

Modulation Analyzer FM Level <15 Hz rms

4.13.3.K, Generator AM Residual

**4.** Record Residual AM Level reading

Modulation Analyzer AM Level <0.1%

4.13.3.L, Generator FM Deviation Accuracy

**4.** Record FM Deviation reading

FM Residual reading from Step 4 of the Generator FM Residual Verification Procedure

**5.** Subtract FM Residual reading from FM Deviation reading

FM deviation is 10 kHz (±0.30 kHz)

4.13.3.M, Generator FM Modulation Rate

**4.** Record FM Deviation readings

50.0 Hz

300.0 Hz

10000.0 Hz

FM Residual reading from Step 4 of the Generator FM Residual Verification Procedure

**5.** Subtract FM Residual reading from each Modulation Analyzer FM reading

50.0 Hz (6 kHz (±0.18 kHz) )

300.0 Hz (6 kHz (±0.18 kHz) )

10000.0 Hz (6 kHz (±0.18 kHz) )

4.13.3.N, Generator FM Modulation Distortion

**6.** Modulation Distortion is <1%

4.13.3.O, Generator AM Modulation Accuracy

**4.** Record AM Modulation reading

Residual AM Level reading Step 4 of the Generator AM Residual Verification Procedure

**5.** Subtract AM Level reading from AM Modulation reading

AM Modulation is 30% (±1%)

4.13.3.P, RF Offset Meter Accuracy

**3.** RF Offset Meter +10000 Hz (±1 Hz)

**5.** RF Offset Meter -10000 Hz (±1 Hz)

4.13.3.Q, Demod Frequency Meter Accuracy

**5.** Demod Frequency 1000 Hz (±0.4 Hz)

| STEP | PROCEDURE | | |
|---|---|---|---|

## 4.13.3.R, FM Deviation Meter Accuracy

| | | | |
|---|---|---|---|
| **4.** | 8901 Residual | ________ | kHz |
| **5.** | 3900 Residual | ________ | kHz |
| **7.** | 8901 FM | ________ | kHz |
| **8.** | 3900 FM | ________ | kHz |
| **9.** | 8901 Nominal | ________ | kHz |
| **10.** | 3900 Measured | ________ | kHz |

## 4.13.3.S, AM Modulation Meter Accuracy

| | | | |
|---|---|---|---|
| **4.** | 8901 Residual | ________ | % |
| **5.** | 3900 Residual | ________ | % |
| **7.** | 8901 FM | ________ | % |
| **8.** | 3900 FM | ________ | % |
| **9.** | 8901 Nominal | ________ | % |
| **10.** | 3900 Measured | ________ | % |

## 4.13.3.T, Analyzer Frequency and Span Accuracy

| | | |
|---|---|---|
| **6.** | Marker Frequency (400.000000 MHz ±0.003500 MHz) | ________ |
| **10.** | 200 MHz Marker Frequency | ________ |
| **13.** | 600 MHz Marker Frequency | ________ |
| **14.** | Difference (400.000000 MHz ±5.000000 MHz) | ________ |

## 4.13.3.U, Analyzer Bandwidth Switching Error

| | | |
|---|---|---|
| **9.** | 300 Hz RBW Filter Marker Level reading | ________ |
| **12.** | 3 kHz RBW Filter Marker Level reading | ________ |
| **16.** | 30 kHz RBW Filter Marker Level reading | ________ |
| **19.** | 60 kHz RBW Filter Marker Level reading | ________ |
| **22.** | 300 kHz RBW Filter Marker Level reading | ________ |
| **25.** | 6 MHz RBW Filter Marker Level reading | ________ |
| **26.** | Difference between highest and lowest Marker Level readings <1 dB | ________ |

STEP PROCEDURE

## 4.13.3.V, Oscilloscope Amplitude Accuracy

**8 - 10. Channel 1 Input Connector**

| 3900 AF Generator Level | 8. DMM Reading | 9. Nominal Value | 10. Marker Delta Level | Tolerance (Nominal ±) | Within Limits |
|---|---|---|---|---|---|
| 42.4 mVrms (120.0 mVp-p) | | | | (±8 mV) | |
| 106.1 mVrms (300.0 mVp-p) | | | | (±20 mV) | |
| 212.1 mVrms (600 mVp-p) | | | | (±40 mV) | |
| 424.2 mVrms (1200 mVp-p) | | | | (±80 mV) | |
| 1.061 Vrms (3.000 Vp-p) | | | | (±200 mV) | |
| 2.121 Vrms (6.000 Vp-p) | | | | (±400 mV) | |
| 4.242 Vrms (12.000 Vp-p) | | | | (±800 mV) | |

**16 - 18. Channel 2 Input Connector**

| 3900 AF Generator Level | 16. DMM Reading | 17. Nominal Value | 18. Marker Delta Level | Tolerance (Nominal ±) | Within Limits |
|---|---|---|---|---|---|
| 42.4 mVrms (120.0 mVp-p) | | | | (±8 mV) | |
| 106.1 mVrms (300.0 mVp-p) | | | | (±20 mV) | |
| 212.1 mVrms (600 mVp-p) | | | | (±40 mV) | |
| 424.2 mVrms (1200 mVp-p) | | | | (±80 mV) | |
| 1.061 Vrms (3.000 Vp-p) | | | | (±200 mV) | |
| 2.121 Vrms (6.000 Vp-p) | | | | (±400 mV) | |
| 4.242 Vrms (12.000 Vp-p) | | | | (±800 mV) | |

## 4.13.3.W, Audio Level Meter Accuracy

**6.** AF Level Meter ±10% of Digital Multimeter reading ______

**8.** AF Level Meter ±10% of Digital Multimeter reading ______

**12.** AF Level Meter ±10% of Digital Multimeter reading ______

**14.** AF Level Meter ±10% of Digital Multimeter reading ______

## 4.13.3.X, Function Generator Level Accuracy

**4.** 5.000 Vrms (±50 mVrms) ______

## 4.13.3.Y, Function Generator Frequency Accuracy

**3.** 5000 Hz (±0.25 Hz) ______

| STEP | PROCEDURE | |
|---|---|---|
| **4.13.3.Z, Function Generator Total Harmonic Distortion** | | |
| **3.** | Total harmonic output is <0.5% | ________ |
| **4.13.3.AA, Audio Frequency Meter Accuracy** | | |
| **5.** | Nominal ±0.4 Hz (5000.0 Hz) | ________ |
| **4.13.3.AB, Sinad/Distortion Meter Accuracy** | | |
| **5.** | Test Set Sinad Meter reading | ________ |
| **6.** | Audio Analyzer Sinad reading | ________ |
| **7.** | Sinad Meter Reading Nominal ±1.01 dB (20.0 dB) | ________ |
| **11.** | Distortion Meter Reading Nominal ±0.5% (20%) | ________ |
| **4.13.3.AC, DMM Functionality/Accuracy** | | |
| **5.** | Record DMM reading (Zero volts ± 10mV) | ________ |
| **8.** | Record DMM reading (10 DC volts ± .2V) | ________ |
| **11.** | Record DMM reading (10 AC volts ± 1V) | ________ |
| **14.** | Record DMM reading (2Kohms +++) | ________ |
| **16.** | Record DMM reading (Zero Ohms ± 1 ohms) | ________ |
| **18.** | Record DMM reading (1,000 Ohms ± 50 ohms) | ________ |
| **22.** | Record DMM reading (1 DC AMP ± .05 AMP) | ________ |
| **25.** | Record DMM reading (1 AC AMP ± .05 AMP) | ________ |

# 4.15 CALIBRATION PROCEDURES

This section provides instructions on accessing and using the 3900 Series Calibration System. The Calibration System is an optional feature that is only accessible when the option is installed on the Test Set. The Test Set Calibration Procedure is a user-friendly system that has been integrated into the Test Set. Step-by-step instructions and set-up diagrams are displayed on the Test Set's display.

The Test Set is the controller for all external test equipment used during the Calibration Procedure. Equipment connected to the Test Set via IEEE 488.2 cabling must be configured with the correct IEEE 488.2 address as specified in Table 4-9.

| Equipment | IEEE 488.2 Address |
|---|---|
| Agilent E4418B Power Meter | 4 |
| HP 34401A Digital Multimeter | 7 |

Table 4-9 IEEE 488.2 Addresses

The Calibration Procedure should only be performed by Technicians familiar with the setup and operation of the recommended test equipment.

## 4.15.1 Accessing Calibration System

The 3900 Series Calibration System is only available when the Calibration Option (390XOPT040) is installed in Test Set.

Refer to the 3900 Series Operation CD for information on accessing Test Set Systems.

## 4.15.2 Calibration Tile Layout

The Calibration Screen contains the following information fields and boxes:

- Calibration column lists available Calibration Procedures.
- Date/Time column indicates the Date and Time the Calibration Procedure was last performed.
- Blue tick boxes turn green to indicate when a Calibration Procedure has been selected.

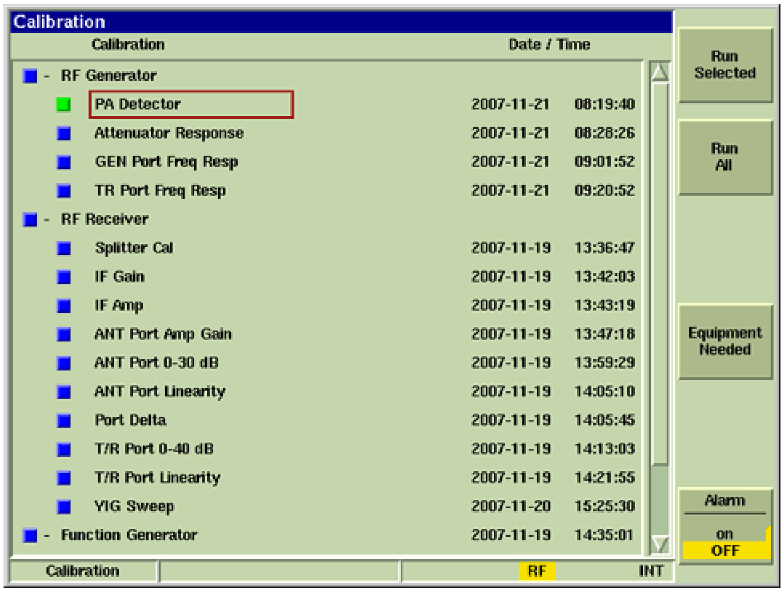



Fig. 4-3 Calibration Menu Layout

### 4.15.3 Selecting Calibration Procedure

Click on the name of the Calibration Procedure, **not** the blue indicator box to select a Calibration Procedure. After the procedure is selected, press **SELECT**. The tick box turns **GREEN** to indicate procedure has been selected.

Selecting a top level Calibration Procedure selects all lower level procedures listed under the top level heading. For example, selecting RF Generator enables all RF Generator sub-level Calibration Procedures (PA Detector, Attenuator Response and GEN T/R Port Freq Resp). When a top level Calibration Procedure is selected, the Test Set stops when user action is required (i.e., to change calibration setup).

### 4.15.4 Soft Keys

The calibration screens contain soft keys that are used in each Calibration Procedure. Soft Key functions are:

#### 4.15.4.A Run Selected Soft Key

Runs the selected Calibration Procedure.

#### 4.15.4.B Run All Soft Key

Runs all selected Calibration Procedures.

#### 4.15.4.C Equipment Needed Soft Key

Opens a list of equipment required for the selected Calibration Procedure. A Calibration Procedure must be selected before pressing this soft key.

#### 4.15.4.D Continue Soft Key

Advances to next calibration screen.

#### 4.15.4.E Alarm On/Off Soft Key

Turns audible notification ON or OFF. When ON, an alarm sounds when user action is required to continue Calibration Procedure (i.e., reconfigure equipment setup).

### 4.15.5 Zero/Calibrate Message

The Power Meter must be zeroed and calibrated every three hours during the Calibration Procedure. The Test Set monitors the three hour time span and displays the Zero and Calibrate Power Meter prompt when the procedure needs to be performed (refer to Fig. 4-4).

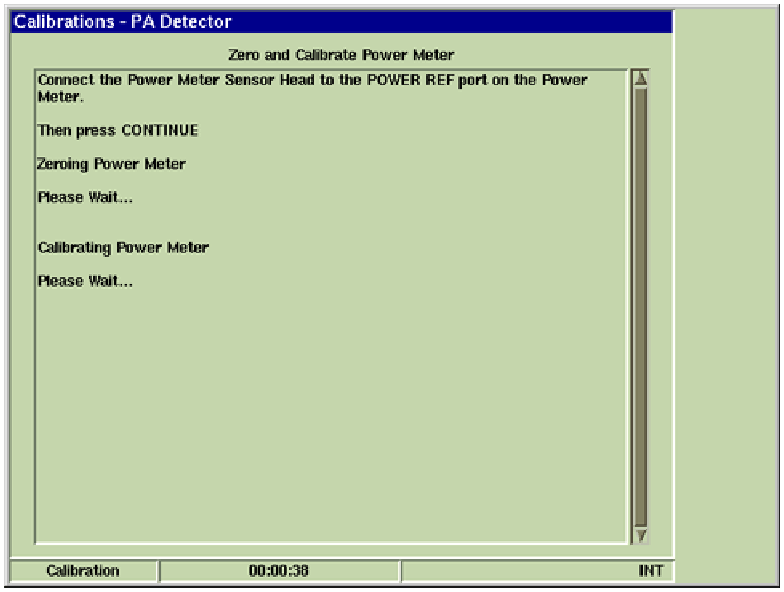



Fig. 4-4 Zero/Calibrate Status Message

## 4.15.6 Time to Complete

Time estimates are based on a Test Set with a 733 MHz processor. Refer to the UTILS, Operational Status Tile for Test Set processor speed. Procedures are listed in the order they appear on the Calibration menu screen.

| Calibration Procedure | Time to Complete | Page |
|---|---|---|
| **RF Generator Calibration** | | 4 - 52 |
| PA Detect.25or Calibration | 4 min | 4 - 52 |
| **Requires calibration setup change between procedures.** | | |
| Attenuator Response Calibration | 45 min | 4 - 53 |
| GEN Port Freq Response Calibration | 7 min | 4 - 54 |
| T/R Port Freq Response Calibration | 18 min | 4 - 55 |
| **Requires calibration setup change between procedures.** | | |
| **Receiver Calibration** | | 4 - 56 |
| Splitter Calibration<br>(Calibration setup change during procedure) | 5 min | 4 - 56 |
| **Requires calibration setup change between procedures.** | | |
| IF Gain Calibration | 5 min | 4 - 58 |
| IF AMP Calibration | 2 min | 4 - 60 |
| ANT Port AMP Gain Calibration | 9 min | 4 - 62 |
| ANT Port 0-30 dB Calibration | 12 min | 4 - 63 |
| ANT Port Linearity Calibration | 1 min | 4 - 64 |
| Port Delta Calibration | 1 min | 4 - 65 |
| **Requires calibration setup change between procedures.** | | |
| T/R Port 0-40 dB Calibration | 10 min | 4 - 66 |
| T/R Port Linearity Calibration | 1 min | 4 - 67 |
| **Requires calibration setup change between procedures.** | | |
| **YIG Sweep Calibration** | 5 min | 4 - 68 |
| **Requires calibration setup change between procedures.** | | |
| **Function Generator Calibration** | 4 min | 4 - 69 |
| **Requires calibration setup change between procedures.** | | |
| **Scope DC Calibration** | 2 min | 4 - 70 |
| **Requires calibration setup change between procedures.** | | |
| **Scope AC Calibration** | 3 min | 4 - 71 |
| **Requires calibration setup change between procedures.** | | |
| **TCXO Adjustment Calibration** | 4 min | 4 - 73 |
| Total | 2 hrs 18 min | |

Table 4-10 Calibration Time Chart

# 4.16 RF GENERATOR CALIBRATION

## 4.16.1 PA Detector Calibration

STEP PROCEDURE

1. Select PA Detector on Calibration Tile. Press Run Selected Soft Key.
2. Follow screen prompts. Press Continue Soft Key as needed to advance to next screen.
3. Configure equipment. Refer to Fig. 4-5 as needed.

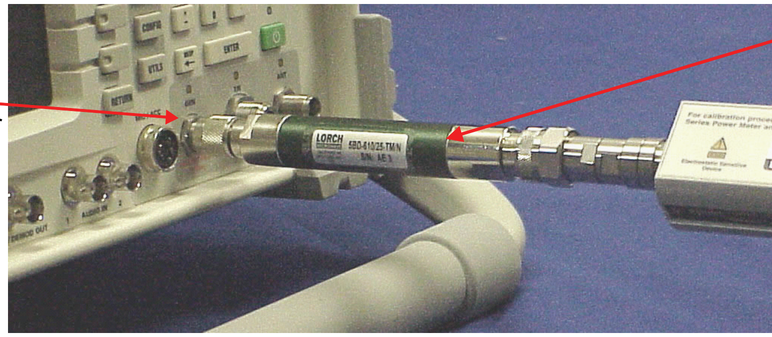



Fig. 4-5 PA Detector Calibration Setup

4. Press Continue Soft Key. Run is displayed in dialog box, followed by calibration data.
5. When the PA Detector Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-6.

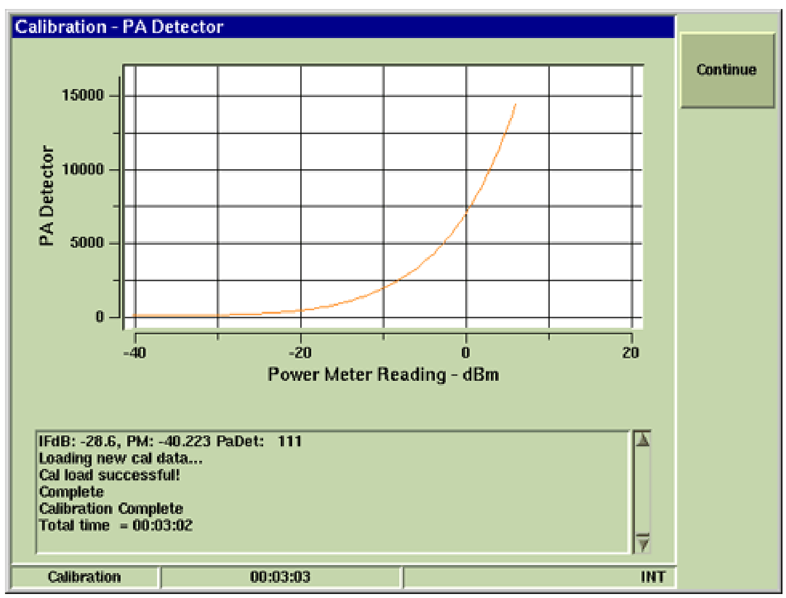



Fig. 4-6 PA Detector Signal Trace

6. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**PA Detector Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with the next Calibration Procedure.**

## 4.16.2 Attenuator Response Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select Attenuator Response on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure Equipment. Refer to Fig. 4-7 as needed. |

GEN Connector

M TNC/F N Adapter

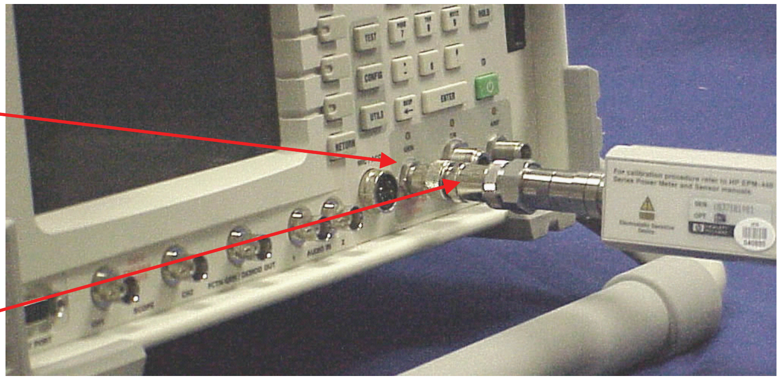


Fig. 4-7 Attenuator Response Calibration Setup

4. Press Continue Soft Key to run the Attenuator Response Calibration Procedure.

5. When the Attenuator Response Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal traces on Test Set resemble signal traces shown in Fig. 4-8.

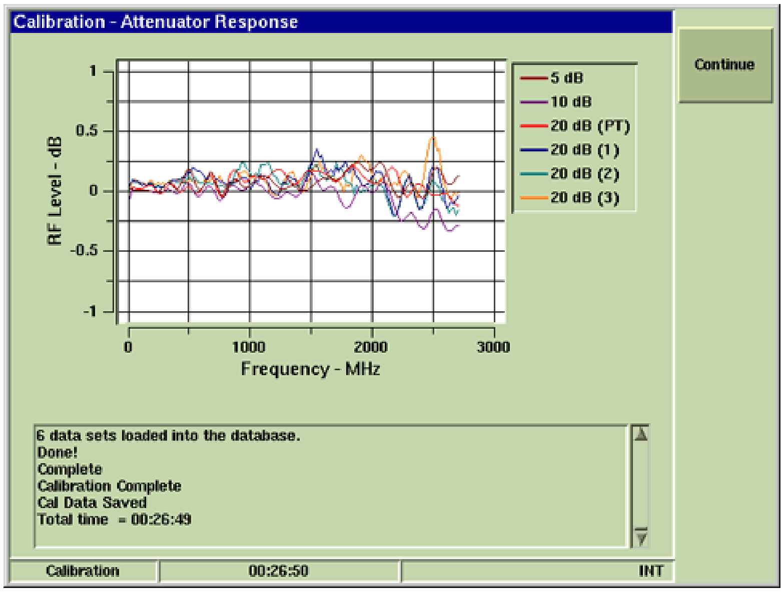



Fig. 4-8 Attenuator Response Signal Trace

6. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**ATTENUATOR RESPONSE CALIBRATION PROCEDURE IS COMPLETE.**

**IF THIS PROCEDURE WAS PERFORMED AS PART OF SYSTEM CALIBRATION, PROCEED WITH THE NEXT CALIBRATION PROCEDURE.**

## 4.16.3 GEN Port Freq Response Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select GEN Port Freq Resp on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-9 as needed. |

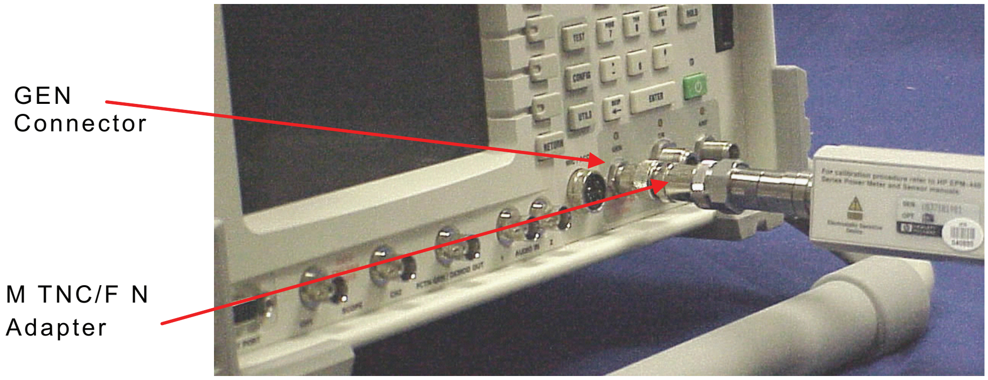



Fig. 4-9 GEN Port Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the GEN Port Freq Response Calibration Procedure. |
| 5. | When the GEN Port Freq Response Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify the signal traces on the Test Set resemble the signal traces as shown in Fig. 4-10. |

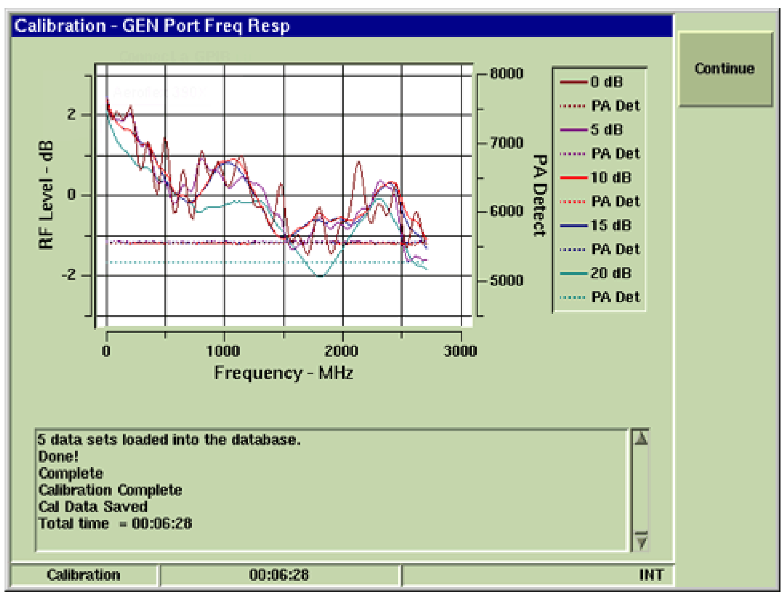



Fig. 4-10 GEN Port Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**GEN Port Freq Response Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.16.4 T/R Port Freq Response Calibration

| STEP | PROCEDURE |
|---|---|

1. Select T/R Port Freq Resp on Calibration Tile. Press Run Selected Soft Key.
2. Follow screen prompts. Press Continue Soft Key as needed to advance to next screen.
3. Configure equipment. Refer to Fig. 4-11 as needed.

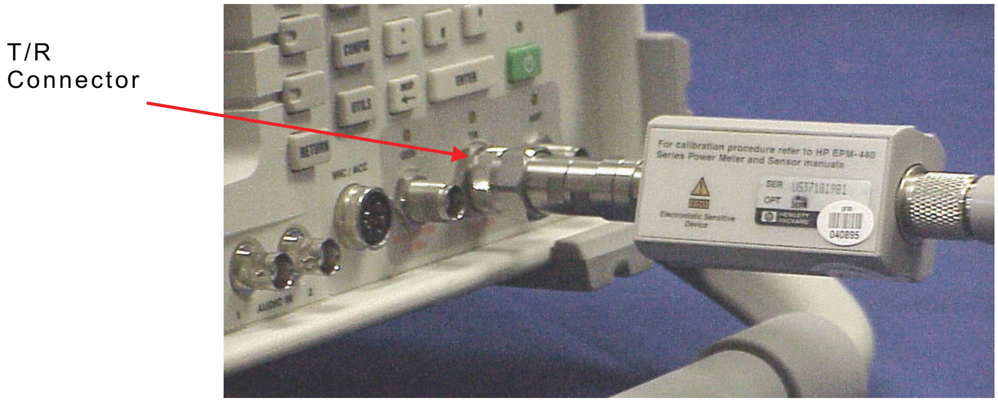



Fig. 4-11 T/R Port Calibration Setup

4. Press Continue Soft Key to run the T/R Port Freq Response Calibration.
5. When the T/R Port Freq Response Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal traces on Test Set resemble signal traces shown in Fig. 4-12.

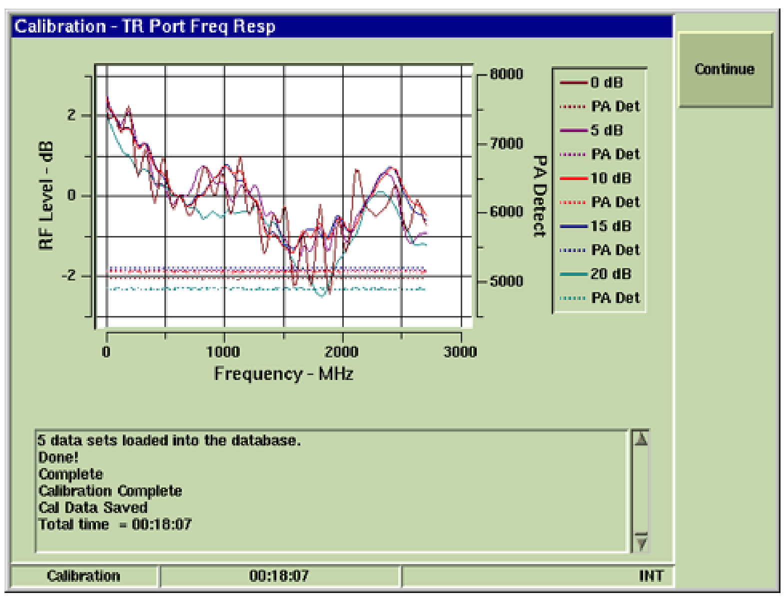



Fig. 4-12 T/R Port Signal Trace

6. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**T/R Port Freq Response Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure. Reboot Test Set before proceeding with Receiver Calibration Procedures.**

# 4.17 RECEIVER CALIBRATION

## 4.17.1 Splitter Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select Splitter Cal on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-13 as needed. |

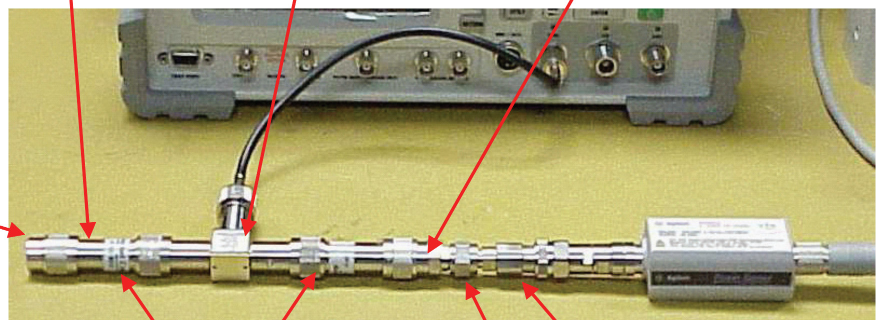



Fig. 4-13 Splitter Calibration Setup (ANT Port)

4. Press Continue Soft Key. Test Set runs ANT Side portion of the Splitter Calibration Procedure. Test Set advances to next calibration setup unless an error is received during the ANT Side portion of the Calibration Procedure.

5. At prompt, reconfigure equipment. Switch Power Meter Sensor head to 10 dB pad on REF Port Side; switch 50 Ω load to 10 dB pad on ANT Port Side. Refer to Fig. 4-14 as needed.

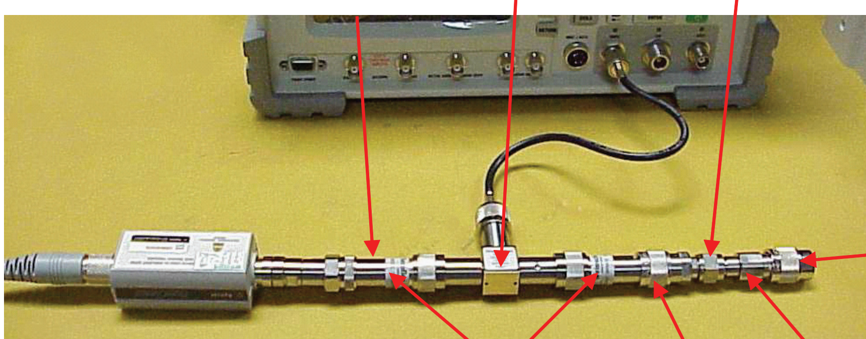



Fig. 4-14 Splitter Calibration Setup (REF Port)

| STEP | PROCEDURE |
|---|---|
| 6. | When the REF Side portion of Splitter Calibration Procedure is complete, verify Calibration Complete is displayed on screen. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-15. |

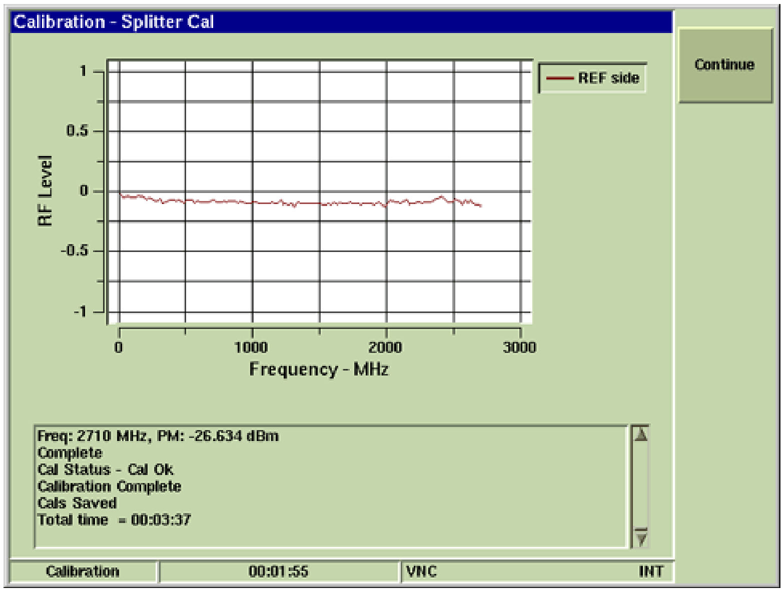



Fig. 4-15 Splitter Calibration Complete

| | |
|---|---|
| 7. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**Splitter Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.2 IF Gain Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select IF Gain on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-16 as needed. If continuing from Splitter Calibration Procedure, remove 50 Ω load and F N/F TNC Adapter from M TNC/M N Adapter on ANT Port Side and connect M TNC/F N Adapter to Test Set ANT Connector. |

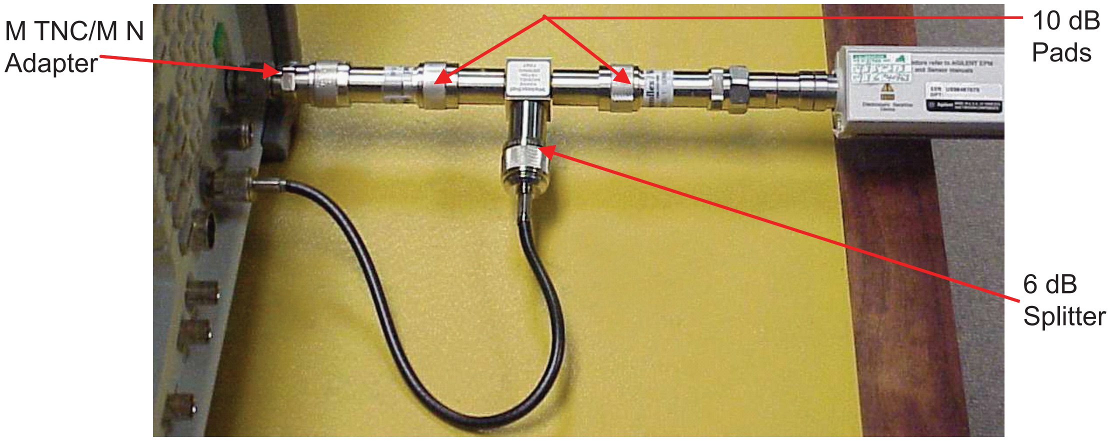



Fig. 4-16 IF Gain Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the Channel Cal portion of the IF Gain Calibration Procedure. |
| 5. | When the Channel Cal portion of the IF Gain Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify the signal trace on the Test Set resembles the signal trace as shown Fig. 4-17. |

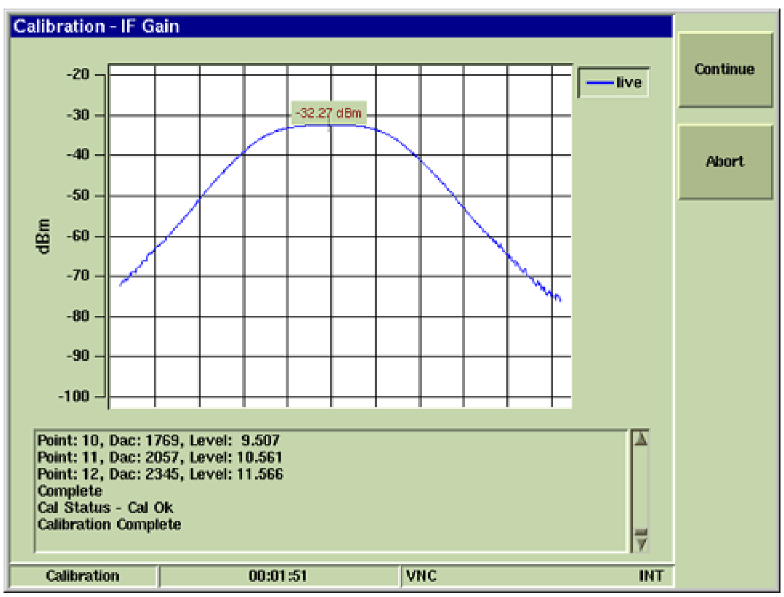



Fig. 4-17 IF Gain Channel Cal Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key to run the Main Cal portion of the IF Gain Calibration Procedure. |

| STEP | PROCEDURE |
|---|---|
| 7. | When the Main Cal portion is complete, verify Calibration Complete is displayed in dialog box. Verify the signal trace on the Test Set resembles the signal trace as shown in Fig. 4-18. |

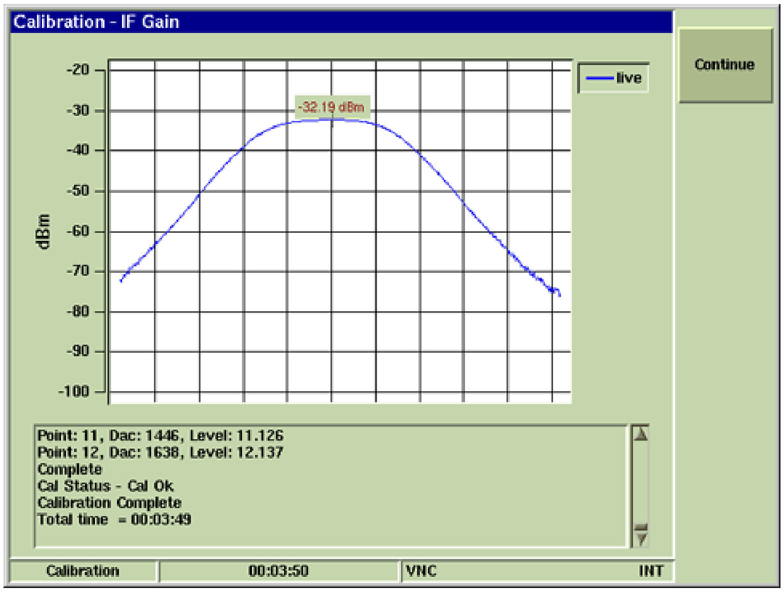



Fig. 4-18 IF Gain Main Cal Signal Trace

| | |
|---|---|
| 8. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**IF Gain Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.3 IF AMP Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select IF AMP on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-19 as needed. |

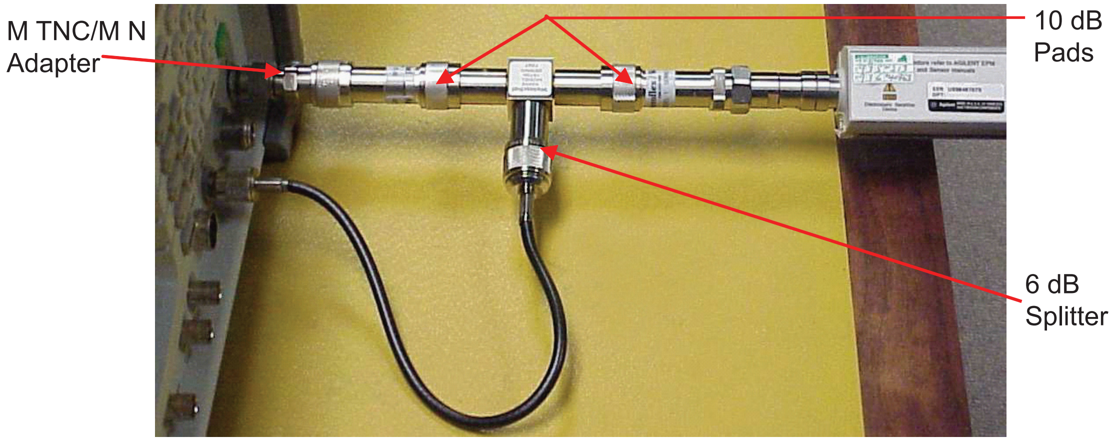



Fig. 4-19 IF AMP Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the Channel Cal portion of IF AMP Calibration Procedure. |
| 5. | When the Channel Cal portion is complete, verify Calibration Complete is displayed in dialog box. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-20. |

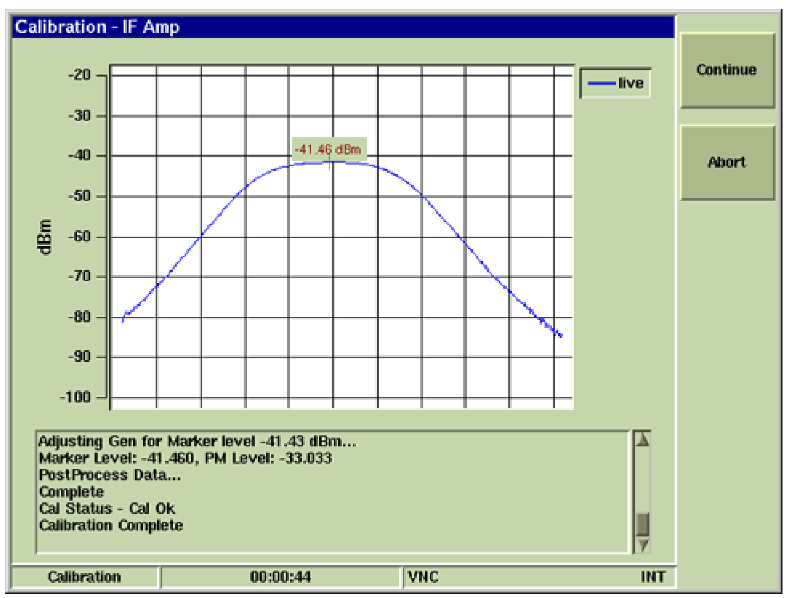



Fig. 4-20 IF AMP Channel Cal Signal Trace

| STEP | PROCEDURE |
|---|---|
| 6. | Press Continue Soft Key to run Main portion of the IF AMP Calibration Procedure. |

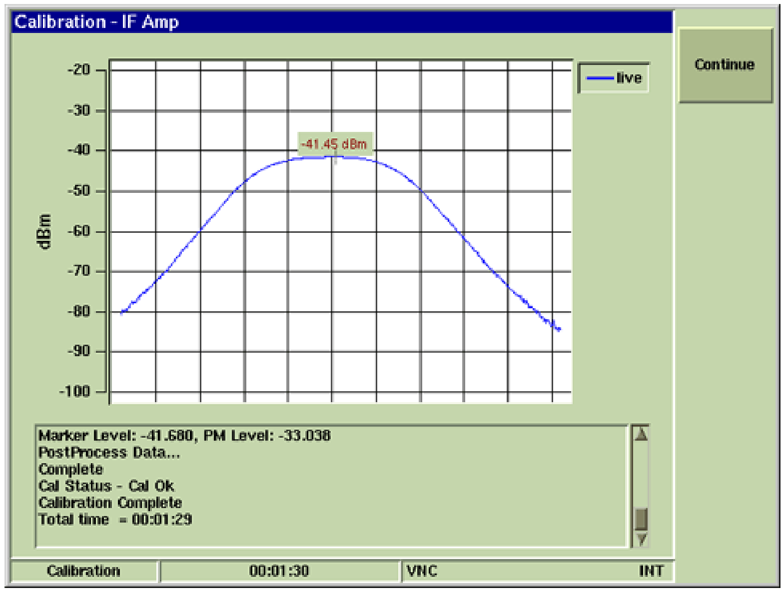



Fig. 4-21 IF AMP Main Cal Signal Trace

| STEP | PROCEDURE |
|---|---|
| 7. | When the Main Cal portion of IF AMP Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-21. |
| 8. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**IF AMP Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.4 ANT Port AMP Gain Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select ANT Port Amp Gain on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-22 as needed. |

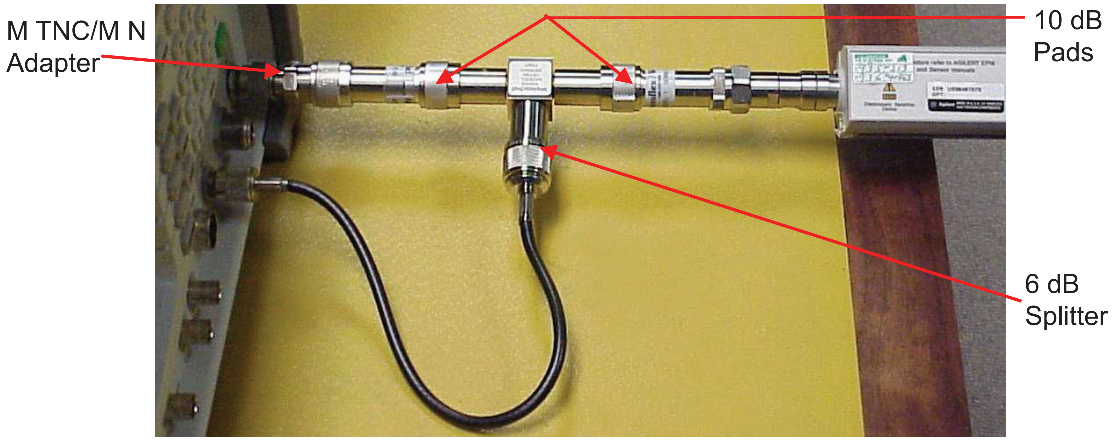



Fig. 4-22 ANT Port Amp Gain Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the ANT Port Amp Gain Calibration Procedure. |
| 5. | When the ANT Port Amp Gain Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal traces on Test Set resemble signal traces shown in Fig. 4-23. |

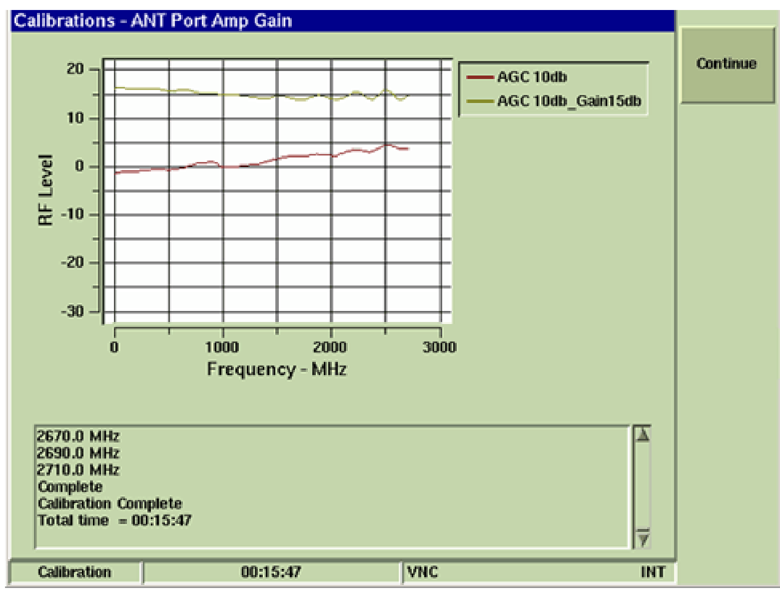



Fig. 4-23 ANT Port Amp Gain Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**ANT Port AMP Gain Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.5 ANT Port 0-30 dB Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select ANT Port 0-30 dB on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-24 as needed. |

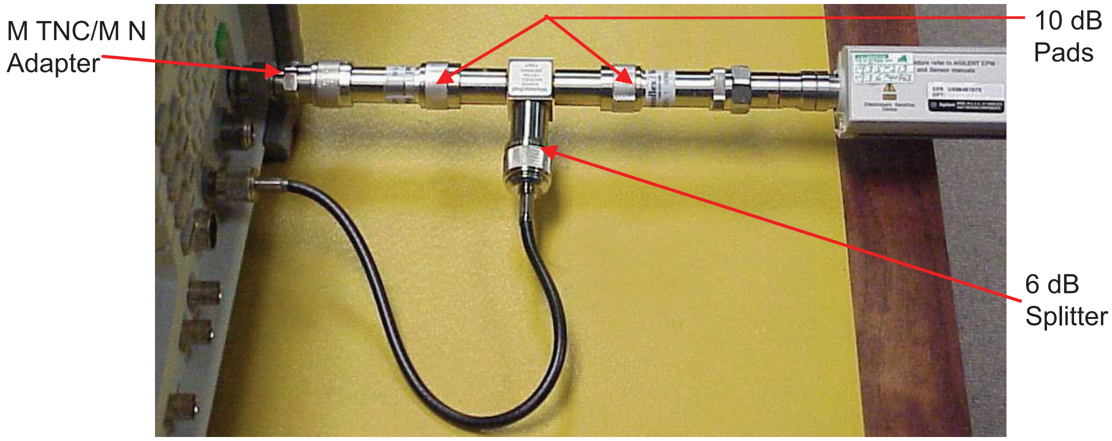



Fig. 4-24 ANT Port 0-30 dB Calibration Setup

4. Press Continue Soft Key to run the ANT Port 0-30 dB Calibration Procedure.
5. When the ANT Port 0-30 dB Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal traces on Test Set resemble the signal traces shown in Fig. 4-25.

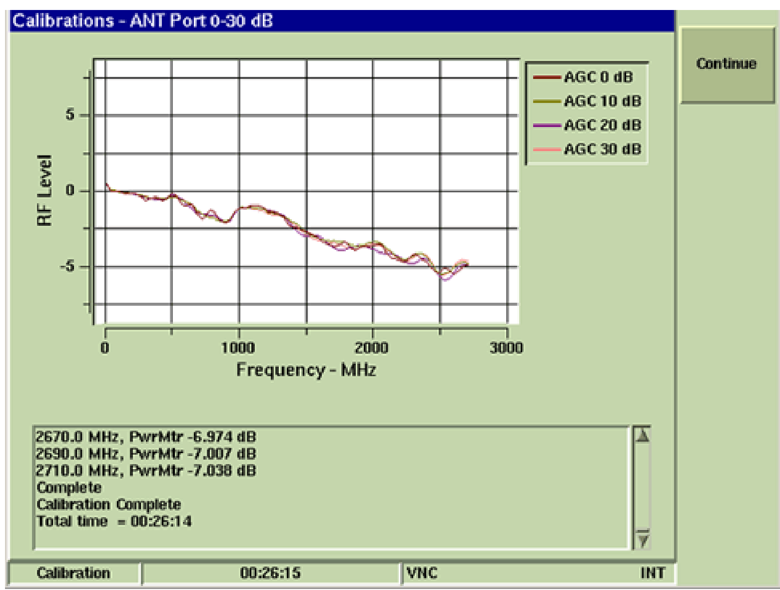



Fig. 4-25 ANT Port 0-30 dB Signal Traces

6. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**ANT Port 0-30 dB Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.6 ANT Port Linearity Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select ANT Port Linearity on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-26 as needed. |

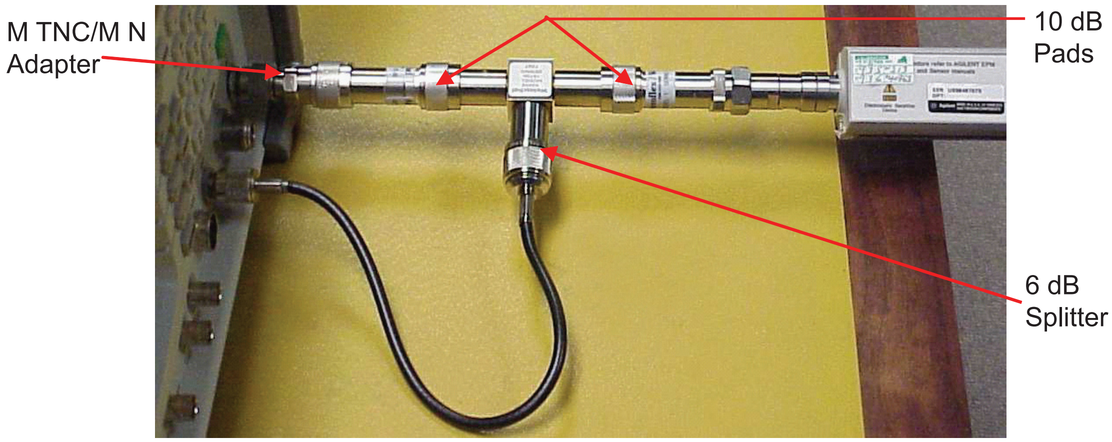



Fig. 4-26 ANT Port Linearity Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the ANT Port Linearity Calibration Procedure. |
| 5. | When the ANT Port Linearity Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-27. |

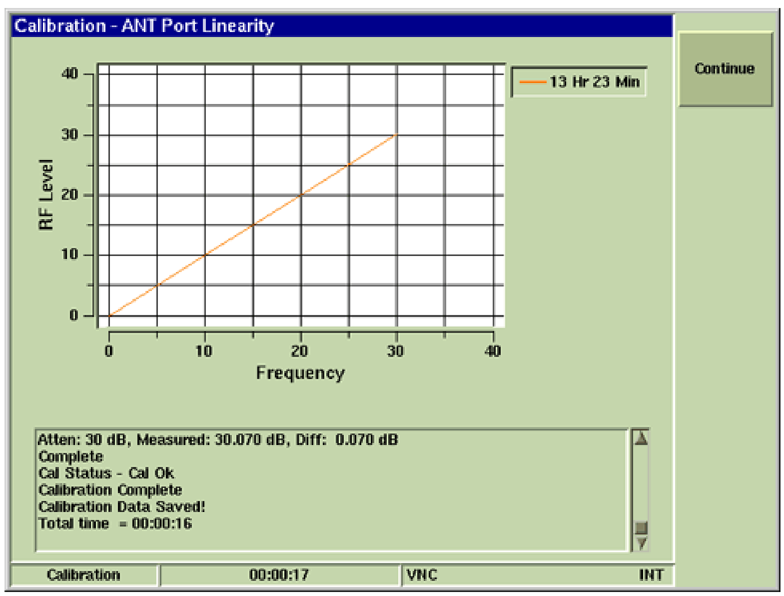



Fig. 4-27 ANT Port Linearity Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**ANT Port Linearity Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.7 Port Delta Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select Port Delta on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-28 as needed. |

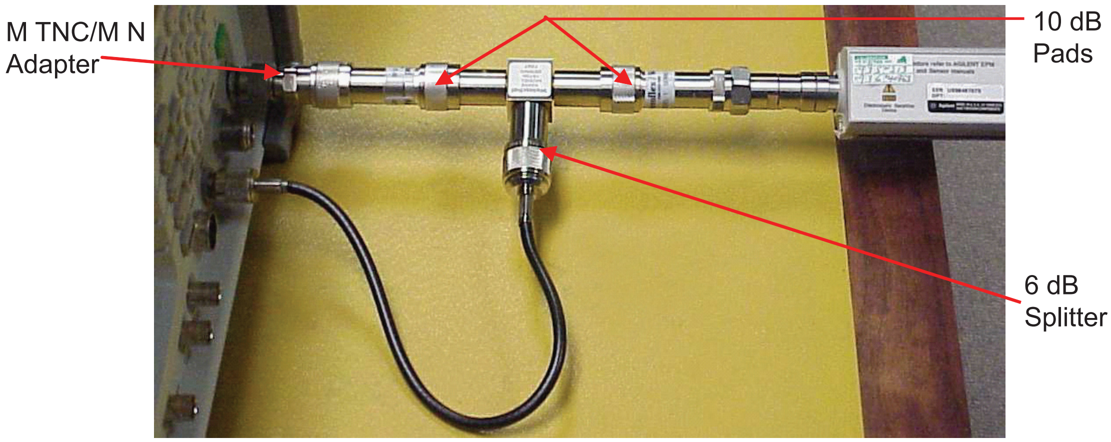



Fig. 4-28 Port Delta Calibration Setup

| STEP | PROCEDURE |
|---|---|
| 4. | Press Continue Soft Key to run the Port Delta Calibration Procedure. |
| 5. | When the Port Delta Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box as shown in Fig. 4-29. |

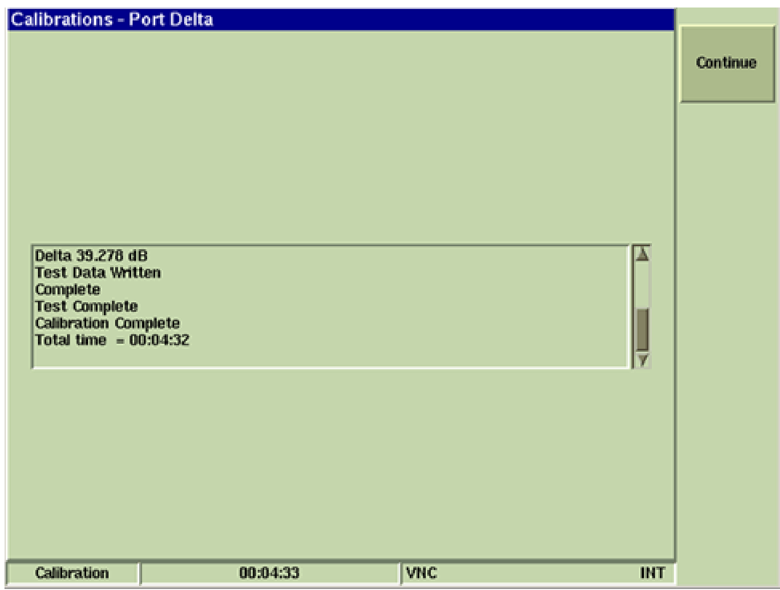



Fig. 4-29 Port Delta Calibration Complete

| STEP | PROCEDURE |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**Port Delta Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.8 T/R Port 0-40 dB Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select T/R Port 0-40 dB on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-30 as needed. |

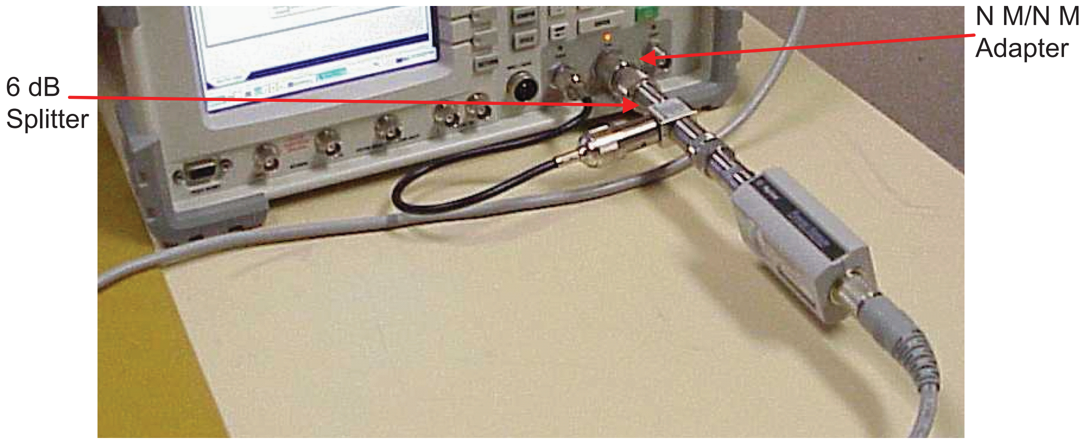



Fig. 4-30 T/R Port 0-40 dB Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the T/R Port 0-40 dB Calibration Procedure. |
| 5. | When the T/R Port 0-40 dB Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal traces on Test Set resemble signal traces shown in Fig. 4-31. |

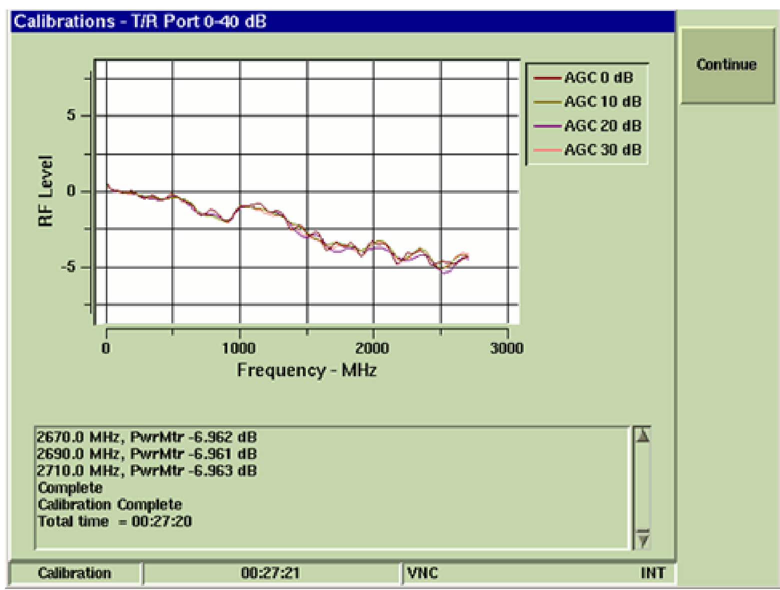



Fig. 4-31 T/R Port 0-40 dB Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

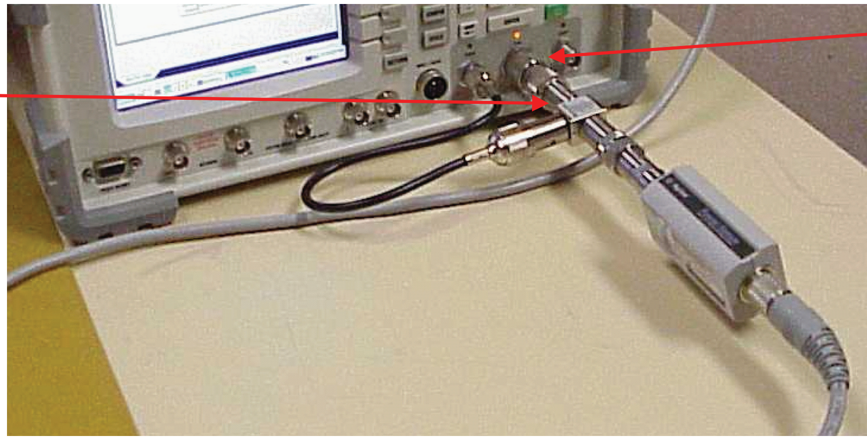
**T/R Port 0 - 40 dB Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.9 T/R Port Linearity Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select T/R Port Linearity on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure equipment. Refer to Fig. 4-32 as needed. |

6 dB Splitter



N M/N M Adapter

Fig. 4-32 T/R Port Linearity Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the T/R Port Linearity Calibration Procedure. |
| 5. | When the T/R Port Linearity Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box. Verify signal trace on Test Set resembles signal trace shown in Fig. 4-33. |

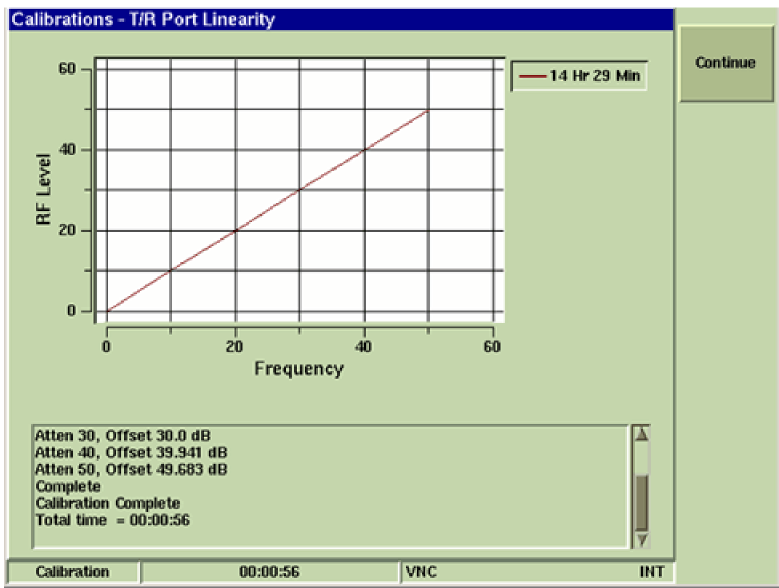



Fig. 4-33 T/R Port Linearity Signal Trace

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**T/R Port Linearity Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.10 YIG Sweep Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select YIG Sweep on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Disconnect all Test Set connections. Press Continue Soft Key to run the YIG Sweep Calibration Procedure. |
| 3. | When the YIG Sweep Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box as shown in Fig. 4-34. |
| 4. | Press Continue Soft Key. Wait while Test Set updates date and time information. |

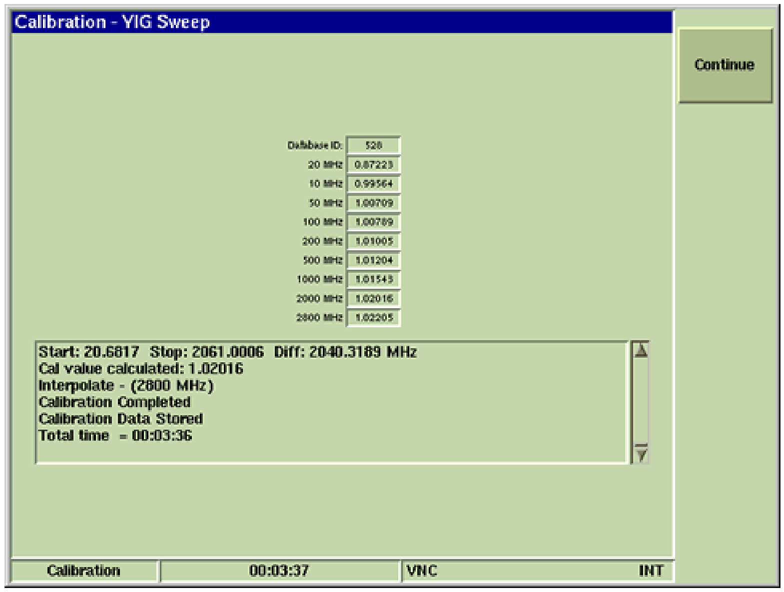



Fig. 4-34 YIG Sweep Calibration Complete

**YIG Sweep Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure. zero**

## 4.17.11 Function Generator Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select Function Generator on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key to run the Function Generator Calibration Procedure. |
| 3. | Configure Equipment. Refer to Fig. 4-35 as needed. |
| 4. | Press Continue Soft Key to run the Function Generator Calibration Procedure. |

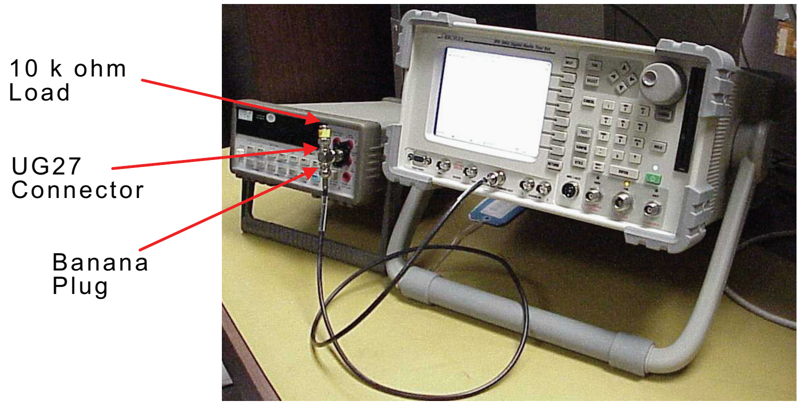



Fig. 4-35 Function Generator Calibration Setup

5. When the Function Generator Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box as shown in Fig. 4-36.

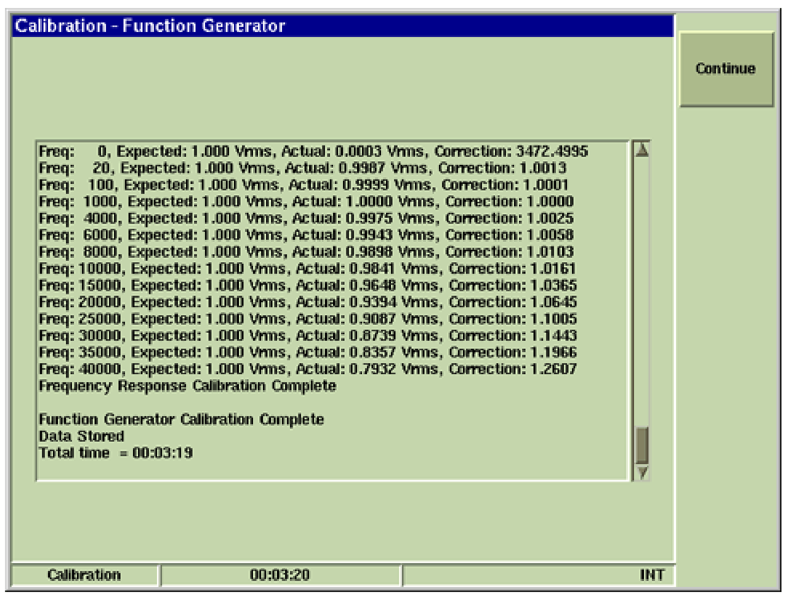



Fig. 4-36 Function Generator Calibration Complete

6. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**Function Generator Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.12 Scope DC Calibration

STEP PROCEDURE

1. Select Scope DC on Calibration Tile. Press Run Selected Soft Key.
2. Disconnect all equipment from Test Set Front Panel connectors. Press Continue Soft Key. Bar graphs will be displayed on the plot field during the Calibration Procedure.

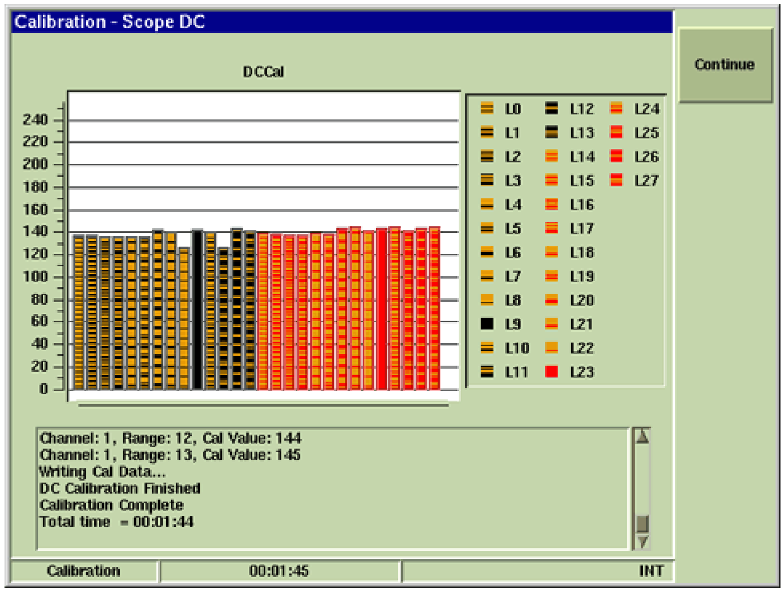



Fig. 4-37 Scope DC Calibration Complete

3. When the Scope DC Calibration Procedure is complete, verify Calibration Complete is displayed in dialog box as shown in Fig. 4-37.
4. Press Continue Soft Key. Wait while Test Set updates system date and time information.

**Scope DC Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.13 Scope AC Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select Scope AC on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Follow screen prompts. Press Continue Soft Key as needed to advance to next screen. |
| 3. | Configure Equipment. Refer to Fig. 4-38 as needed. |

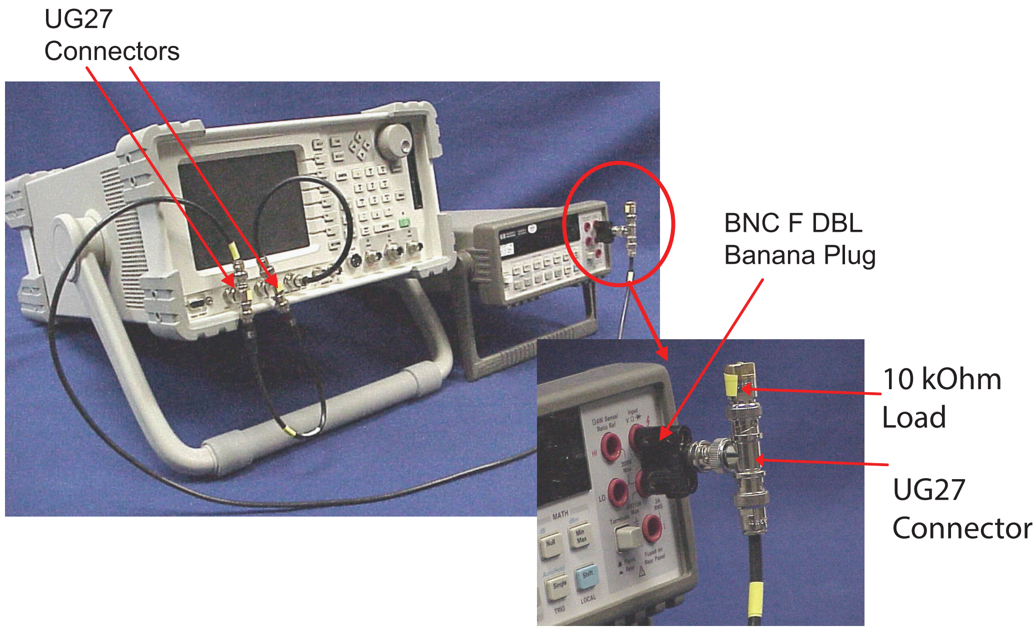



Fig. 4-38 Scope AC Calibration Setup

| | |
|---|---|
| 4. | Press Continue Soft Key to run the Scope AC Calibration Procedure. |

| STEP | PROCEDURE |
|---|---|
| 5. | When the Scope AC Calibration Procedure is complete, verify Calibration Complete is displayed on screen in dialog box as shown in Fig. 4-39. |

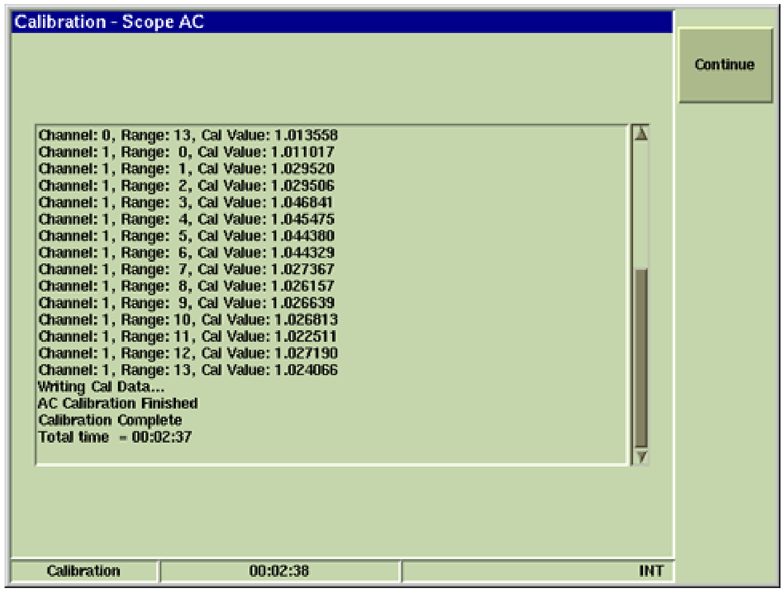



Fig. 4-39 Scope AC Calibration Complete

| | |
|---|---|
| 6. | Press Continue Soft Key. Wait while Test Set updates system date and time information. |

**Scope AC Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, proceed with next Calibration Procedure.**

## 4.17.14 TCXO Adjustment Calibration

| STEP | PROCEDURE |
|---|---|
| 1. | Select TCXO Adjustment on Calibration Tile. Press Run Selected Soft Key. |
| 2. | Configure equipment. Refer to Fig. 4-40 as needed. |


Fig. 4-40 TCXO Adjust Calibration Setup

| | |
|---|---|
| 3. | Connect 10 MHz External Reference to Frequency Counter Ext Ref port. |
| 4. | Configure Frequency Counter to display frequency resolution of 0.01 Hz. |
| 5. | Press Continue Soft Key. Press the Select Key to select the DAC Adjust Field. |
| 6. | Turn Test Set Rotary knob until Frequency Counter reads 1000.000000 MHz (±2.0 Hz). Press Done Soft Key to enter value. |
| 7. | Press Continue Soft Key to return to the main calibration menu. |

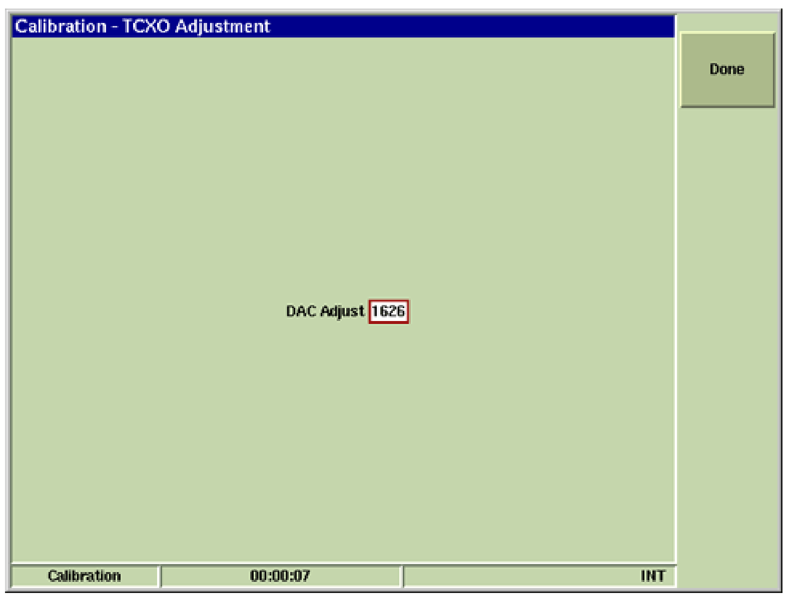



Fig. 4-41 TCXO Adjust Calibration Complete

| | |
|---|---|
| 8. | Wait while Test Set updates system date and time information. |

**TCXO Adjustment Calibration Procedure is complete.**

**If this procedure was performed as part of System Calibration, System Calibration is complete.**

# 4.18 CALIBRATION DATA SHEET

Technician: ____________________ Date: __________

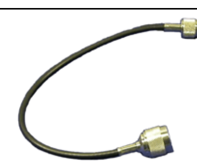
Test Set S/N: ____________________

| STEP | PROCEDURE | |
|---|---|---|
| **4.16, RF Generator Calibration** | | |
| **4.16.1, PA Detector Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.16.2, Attenuator Response Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.16.3, GEN Port Freq Response Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.16.4, T/R Port Freq Response Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.17, Receiver Calibration** | | |
| **4.17.1, Splitter Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.17.2, IF Gain Calibration** | | |
| | **Channel Portion** | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| | **Main Portion** | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.17.3, IF AMP Calibration** | | |
| | **Channel Portion** | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| | **Main Portion** | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |
| **4.17.4, ANT Port AMP Gain Calibration** | | |
| | Calibration Complete | ______ ✓ |
| | Verify signal trace | ______ ✓ |

| STEP | PROCEDURE | |
|---|---|---|
| **4.17, Receiver Calibration (cont)** | | |
| 4.17.5, ANT Port 0-30 dB Calibration | | |
| | Calibration Complete | ✓ |
| | Verify signal trace | ✓ |
| 4.17.6, ANT Port Linearity Calibration | | |
| | Calibration Complete | ✓ |
| | Verify signal trace | ✓ |
| 4.17.7, Port Delta Calibration | | |
| | Calibration Complete | ✓ |
| 4.17.8, T/R Port 0-40 dB Calibration | | |
| | Calibration Complete | ✓ |
| | Verify signal trace | ✓ |
| 4.17.9, T/R Port Linearity Calibration | | |
| | Calibration Complete | ✓ |
| | Verify signal trace | ✓ |
| 4.17.10, YIG Sweep Calibration | | |
| | Calibration Complete | ✓ |
| | **Miscellaneous Procedures** | |
| 4.17.11, Function Generator Calibration | | |
| | Calibration Complete | ✓ |
| 4.17.12, Scope DC Calibration | | |
| | Calibration Complete | ✓ |
| 4.17.13, Scope AC Calibration | | |
| | Calibration Complete | ✓ |
| 4.17.14, TCXO Adjustment Calibration | | |
| | 1000.000000 MHz (±2.0 Hz) | ✓ |

## 4.19 CALIBRATION KIT CONTENTS

The 3900 Series Calibration Kit (Aeroflex PN 63934) contains the following items:

| Part Number | Description | Qty | Item |
|---|---|---|---|
| 20339 | UG27A Connector | 3 |  |
| 23758 | F BNC/M TNC Connector Adapter | 1 |  |
| 23764 | BNC F/DBL Banana Plug Connector Adapter | 1 |  |
| 23765 | N M/N M Connector Adapter | 1 |  |
| 23766 | M TNC/M N Connector Adapter | 1 |  |
| 23766 | F N/F TNC Connector Adapter | 1 |  |
| 23768 | M TNC/F N Connector Adapter | 1 |  |
| 38209 | 10 dB, 5 W, N, 12.4 GHz Attenuator | 2 |  |
| 56427 | Power Splitter, Type N, Broadband | 1 |  |
| 58525 | Termination, 50 Ω, N M | 1 |  |
| 58526 | Termination, 10 k Ω, BNC M | 1 |  |
| 59762 | Filter, Tubular BP, 610 MHz, 3 dB | 1 |  |
| 62375 | 50 Ω, N M/TNC M Cable | 1 |  |

| Part Number | Description | Qty | Item |
|---|---|---|---|
| 63339 | 58S, S M BNC/S M BNC Cable | 2 |  |
| 63352 | 1601 Radio Cable | 1 |  |

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# Chapter 5 - Remove/Install Procedures

## 5.1 GENERAL

This chapter contains instructions for removing and installing Test Set assemblies. The instructions provided are for removal and replacement of each assembly. Prerequisite and follow-up instructions are identified as needed.

Remove/Install procedures are grouped as follows:

- Common Procedures apply to all 3900 models.
- 3901/3902 Procedures apply only to these models.
- 3920/3920B Procedures apply only to these models.

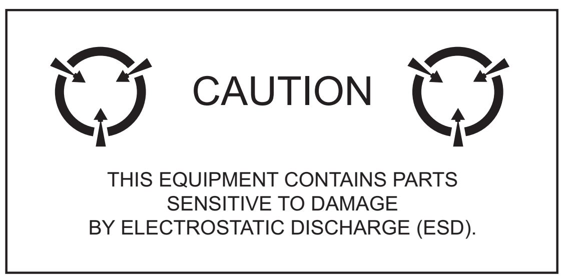
| | |
|---|---|
| NOTE | Due to variations in hardware configuration, actual cable color and assembly appearance may vary from the pictures provided in this chapter. |

## 5.2 SAFETY PRECAUTIONS

Disconnect Test Set from AC Power Source before initiating any procedure.

| | |
|---|---|
| WARNING | **DANGEROUS VOLTAGES ARE PRESENT WHEN CASE ASSEMBLY IS REMOVED WHEN POWER IS PRESENT.** |

## 5.3 ESD PRECAUTIONS




| | |
|---|---|
| CAUTION | THE TEST SET CONTAINS PARTS SENSITIVE TO DAMAGE BY ELECTROSTATIC DISCHARGE (ESD). ALL PERSONNEL PERFORMING DISASSEMBLY/REASSEMBLY PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED. |

## 5.4 TOOL REQUIREMENTS

The following tools are required to perform remove and install procedures:

| TOOL | SIZE |
|---|---|
| WRENCH, OPEN END | 5/16” |
| CHANNEL LOCK PLIERS | SMALL |
| RATCHET/SOCKET | 3/16” 1/4” |
| RATCHET/DEEP SOCKET | 9/16” 3/4” |
| 6” & 10” SCREWDRIVER | CROSS RECESSED |

## 5.5 PRELIMINARY PROCEDURES

Aeroflex recommends that the Test Set’s internal Calibration Files be saved to a USB device prior to servicing the unit. Calibration Files can then be restored after service is completed. Refer to section titled *Saving Calibration* Files in Chapter 4 for Save and Restore Calibration Files procedure.

# 5.6 REMOVE/INSTALL PROCEDURES

## 5.6.1 Common Procedures

| Assembly | Remove Procedure | Install Procedure |
|---|---|---|
| Attenuator Assembly | 5 - 10 | 5 - 11 |
| Backplane PCB Assembly | 5 - 59 | 5 - 61 |
| CAI PCB Assembly | 5 - 14 | 5 - 15 |
| Case Assembly | 5 - 4 | 5 - 6 |
| CPU Adapter PCB Assembly | 5 - 16 | 5 - 18 |
| CPU Adapter PCB Assembly Battery | 5 - 20 | 5 - 20 |
| DAM Carrier PCB Assembly | 5 - 12 | 5 - 13 |
| Fan Assembly | 5 - 31 | 5 - 32 |
| Handle Assembly | 5 - 8 | 5 - 9 |
| Inverter Supply PCB Assembly | 5 - 49 | 5 - 53 |
| LED Backlight Driver | 5 - 52 | 5 - 53 |
| Keypad Assembly | 5 - 48 | 5 - 48 |
| LCD Assembly | 5 - 38 | 5 - 39 |
| LCD Lens | 5 - 41 | 5 - 42 |
| Power Supply Assembly | 5 - 33 | 5 - 35 |
| Power Termination Assembly | 5 - 55 | 5 - 57 |
| Rear Panel Assembly | 5 - 21 | 5 - 24 |
| Rear Panel PCB Assembly | 5 - 28 | 5 - 28 |
| Rear Panel Audio I/O PCB Assembly | 5 - 29 | 5 - 30 |
| Speaker Wire Harness Assembly | 5 - 37 | 5 - 37 |

## 5.6.2 3901/3902 Procedures

| Assembly | Remove Procedure | Install Procedure |
|---|---|---|
| Disk I/O PCB Assembly | 5 - 74 | 5 - 75 |
| Floppy Drive Assembly | 5 - 84 | 5 - 85 |
| Front Panel Assembly | 5 - 76 | 5 - 78 |
| Front Panel Digital Interface PCB Assembly | 5 - 80 | 5 - 82 |
| Generator Assembly | 5 - 86 | 5 - 89 |
| IF/Video PCB Assembly | 5 - 95 | 5 - 97 |
| Receiver Assembly | 5 - 91 | 5 - 93 |

## 5.6.3 3920/3920B Procedures

| Assembly | Remove Procedure | Install Procedure |
|---|---|---|
| Disk I/O PCB Assembly | 5 - 98 | 5 - 99 |
| Digital Multimeter Assembly | 5 - 107 | 5 - 108 |
| Front Panel Assembly | 5 - 100 | 5 - 102 |
| Front Panel Digital Interface PCB Assembly | 5 - 104 | 5 - 106 |
| Generator Assembly | 5 - 86 | 5 - 89 |
| IF/Video PCB Assembly | 5 - 95 | 5 - 97 |
| Receiver Assembly | 5 - 91 | 5 - 93 |

| | | |
|---|---|---|
| USB Cable | 5 - 109 | 5 - 110 |

# 5.7 COMMON PROCEDURES

The following procedures apply to all 3900 models.

## 5.7.1 Case Assembly

### 5.7.1.A Remove Case Assembly

#### 5.7.1.A.1 Description

This procedure covers: Remove. Install.

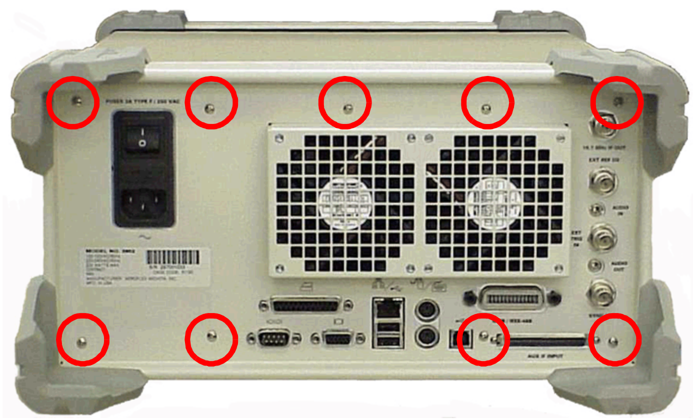
#### 5.7.1.A.2 Preliminary Procedures

None.

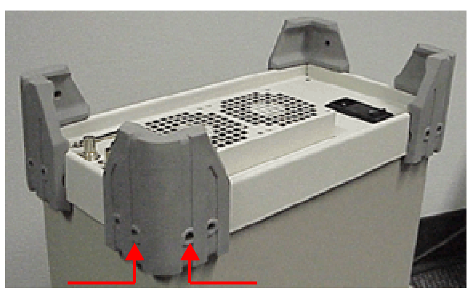
**WARNING** DANGEROUS VOLTAGES ARE PRESENT WHEN CASE ASSEMBLY IS REMOVED WHEN POWER IS PRESENT.

STEP PROCEDURE

1. Disconnect external power source and all external cables from Test Set.
2. Remove nine screws securing Chassis Rear Panel to Chassis Assembly.



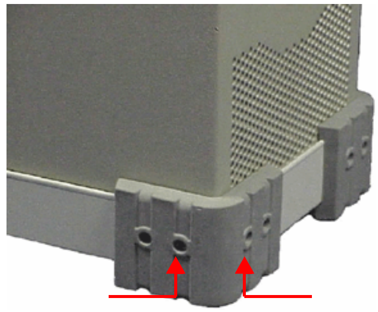
3. Stand Test Set on end with Front Panel side down.
4. Remove outside screws from each Rear Panel corner bumper (total of eight screws).



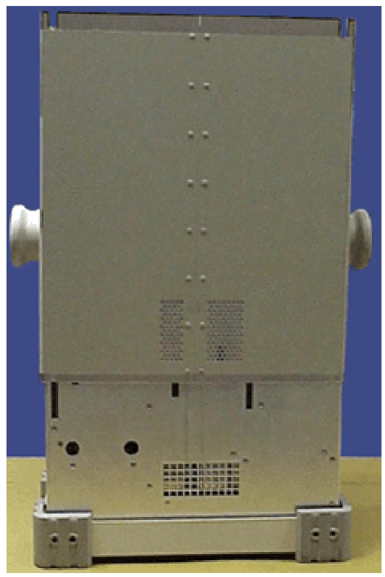
5. Remove Chassis Rear Panel from Chassis Assembly.

**NOTE** Use care when removing Chassis Rear Panel to avoid damaging internal fingerstock.

| STEP | PROCEDURE |
|---|---|
| 6. | Loosen outside screw at each corner of Front Panel corner bumper. |

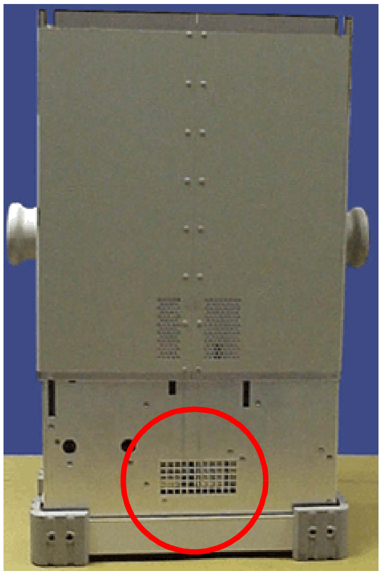


| | |
|---|---|
| 7. | Grasp both Handle Grips and pull up to slide Case Assembly from Chassis Assembly. |



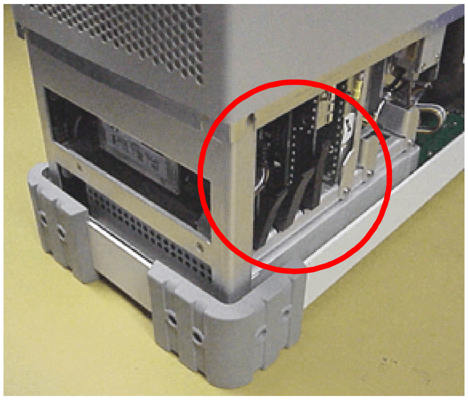
## 5.7.1.B Install Case Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Stand Chassis Assembly on end with display face down. |
| 2. | Hold Case Assembly so air vent on bottom of Case Assembly is aligned with the air vent on the bottom of the Chassis Assembly. Slide Case Assembly down over Chassis Assembly. |



Bottom Air Vents

| NOTE | Use care when sliding Case Assembly over Chassis Assembly to avoid pinching cables or catching the black PC Board retainers on internal assemblies. |
|---|---|

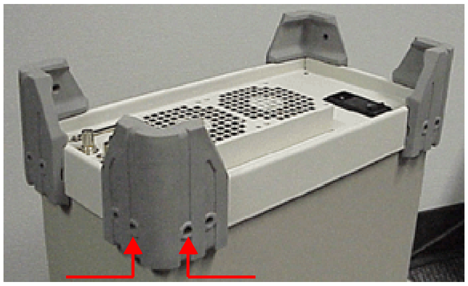


PC Board Retainer Clips

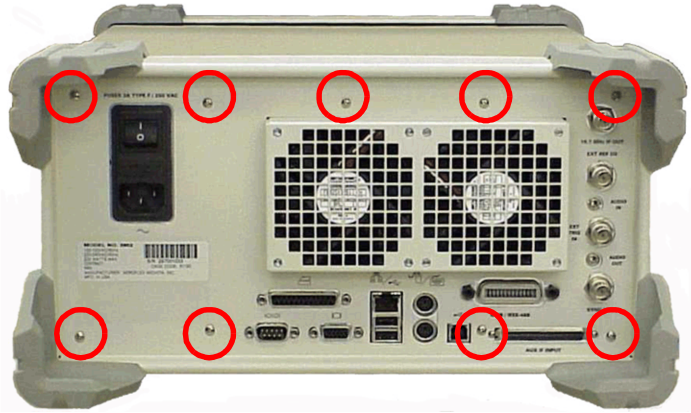
| STEP | PROCEDURE |
|---|---|
| 3. | Align edge of Case Assembly to obtain tight fit with Front Panel Assembly. |
| 4. | Install Chassis Rear Panel on Chassis Assembly. |

| NOTE | Use care when installing Chassis Rear Panel to avoid damaging internal fingerstock. |
|---|---|

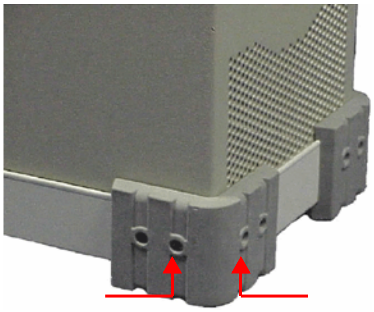
| STEP | PROCEDURE |
|---|---|
| 5. | Tighten outside screw of each Chassis Rear Panel corner bumper (total of eight screws). Torque screws to 8 in/lbs. |



| | |
|---|---|
| 6. | Install nine screws securing Chassis Rear Panel to Chassis Assembly. Torque screws to 8 in/lbs. |



| | |
|---|---|
| 7. | Tighten outside screw at each corner of Front Panel corner bumper. Torque screws to 8 in/lbs. |



## 5.7.1.B.1 Follow-up Procedures:

None.

## 5.7.2 Handle Assembly

### 5.7.2.A Remove Handle Assembly

#### 5.7.2.A.1 Description

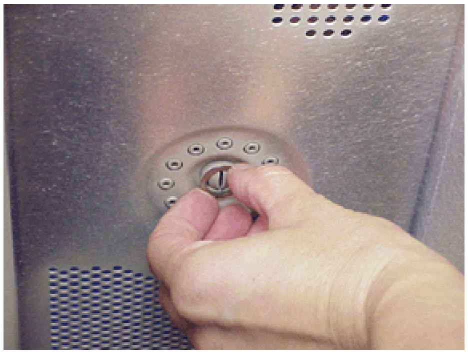
This procedure covers: Remove. Install.

#### 5.7.2.A.2 Preliminary Procedures

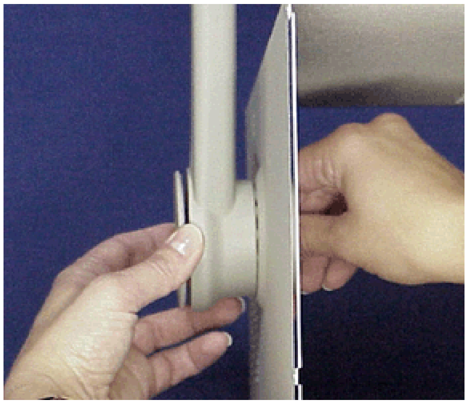
Remove Case Assembly (5 - 4).

STEP PROCEDURE

1. Reach inside Case Assembly and squeeze together ends of Securing Clip and remove Circular Spacer. Repeat procedure on other side.



2. Squeeze together ends of Securing Clip on inside of Case Assembly. Grasp and pull on outside of Securing Clip to remove Securing Clip from Handle Assembly. Repeat procedure on other side.

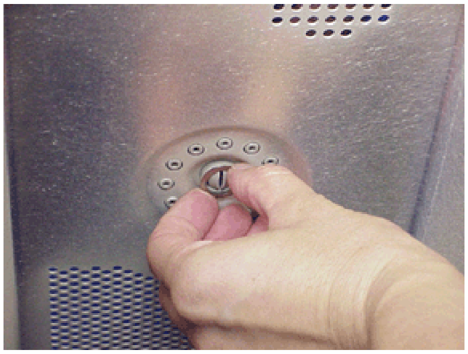


3. Grasp both Handle Grips and pull away from sides of Case Assembly to remove Handle Assembly from Case Assembly.

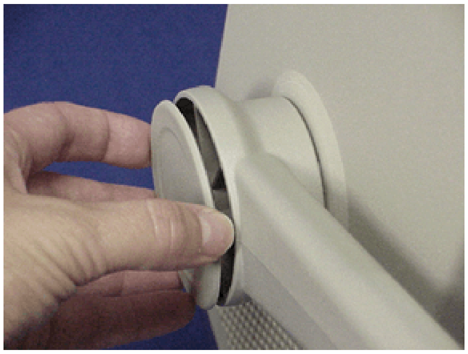
## 5.7.2.B Install Handle Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Stand Case Assembly on end with front edge facing down. |
| 2. | Grasp each side of Handle Assembly and position Handle Grips on each side of Case Assembly. |
| 3. | Pull out on Handle Grips to align notches on Handle Grips with holes in sides of Case Assembly. |

| STEP | PROCEDURE |
|---|---|
| 4. | Align notches on Handle Assembly with holes in each side of Case Assembly. Release Handle Grips to secure Handle Assembly to Case Assembly. |
| 5. | Insert Securing Clip into Handle Grip. Squeeze together ends of Securing Clip and place Circular Spacer around ends of Securing Clip. Repeat procedure on other Handle Grip. |
| | –OR- |
| 6. | Reach inside Case Assembly and align Circular Spacer with ends of Securing Clip before inserting Securing Clip into Handle Grip. Insert Securing Clip into Handle Grip, guiding ends of Securing Clip through Circular Spacer. |



Align Circular Spacer



Insert Securing Clip

### 5.7.2.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.3 Attenuator Assembly

### 5.7.3.A Remove Attenuator Assembly

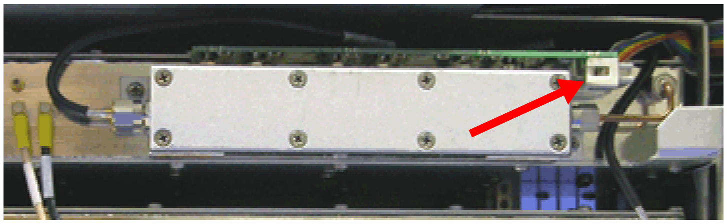
#### 5.7.3.A.1 Description

This procedure covers: Remove. Install.

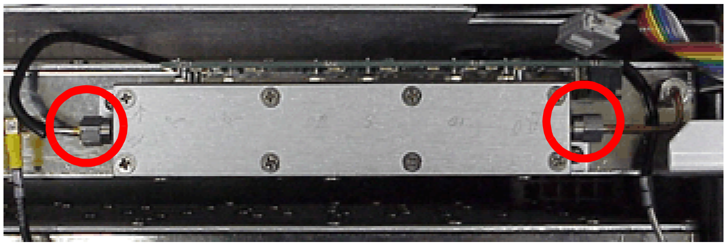
#### 5.7.3.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

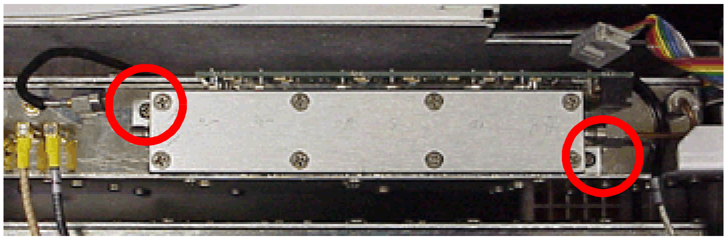
| STEP | PROCEDURE |
|---|---|
| 1. | Disconnect ribbon cable from Attenuator Assembly. |



2. Disconnect coaxial cable from each end of Attenuator Assembly.



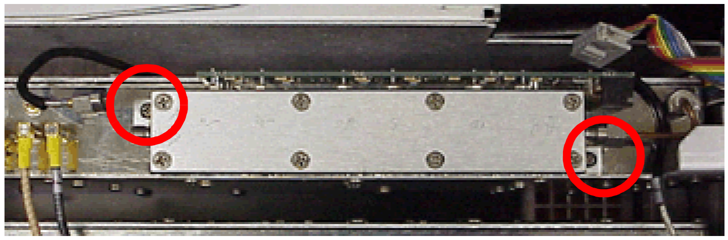
3. Remove two screws securing Attenuator Assembly to Generator Assembly.



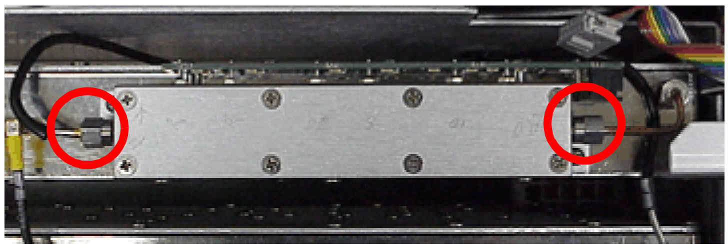
4. Remove Attenuator Assembly from Generator Assembly.

## 5.7.3.B Install Attenuator Assembly

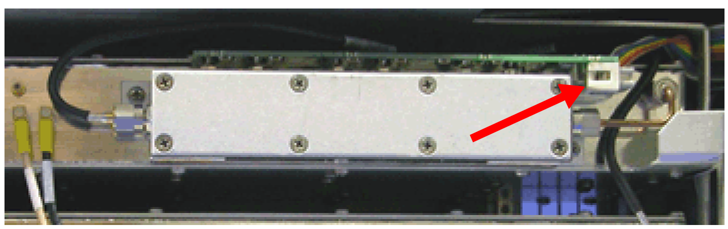
| STEP | PROCEDURE |
|---|---|
| 1. | Place Attenuator Assembly on Generator Assembly. |
| 2. | Install two screws to secure Attenuator Assembly to Generator Assembly. Torque screws to 8 in/lbs. |



| | |
|---|---|
| 3. | Attach coaxial cables to each end of Attenuator Assembly. Torque to 8 in/lbs. |



| | |
|---|---|
| 4. | Connect ribbon cable to Attenuator Assembly. |



### 5.7.3.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.4 DAM Carrier PCB Assembly

### 5.7.4.A Remove DAM Carrier PCB Assembly

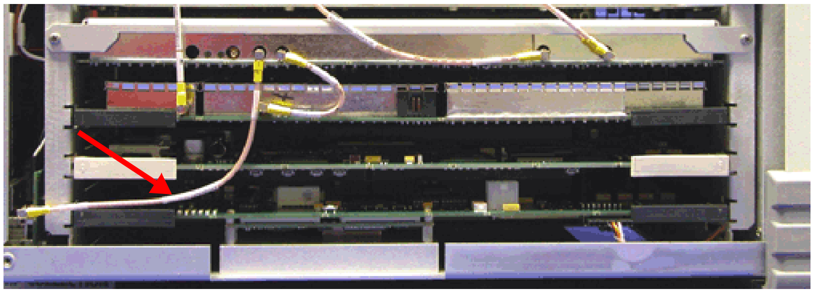
#### 5.7.4.A.1 Description

This procedure covers: Remove. Install.

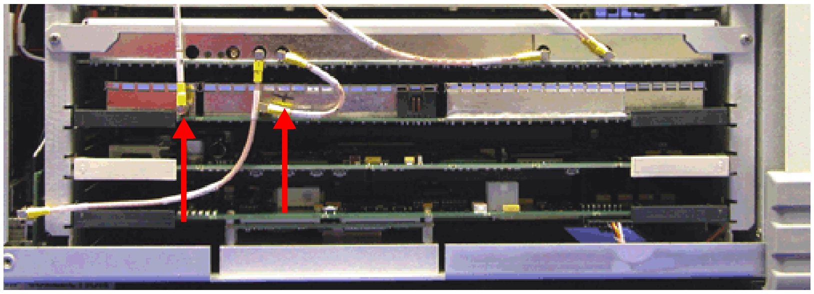
#### 5.7.4.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

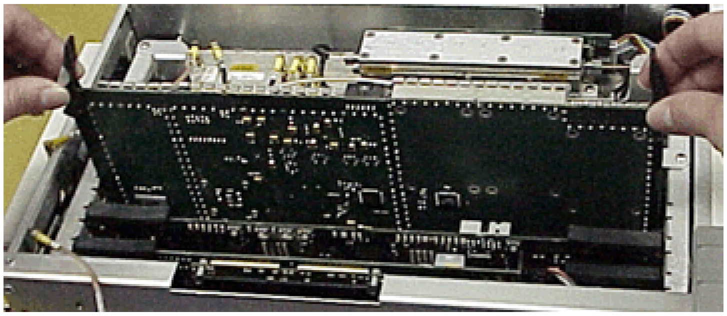
| STEP | PROCEDURE |
|---|---|
| 1. | Reposition cable connecting IF/Video PCB Assembly and Rear Panel PCB Assembly to remove DAM Carrier PCB Assembly. |



| STEP | PROCEDURE |
|---|---|
| 2. | Disconnect two coaxial cables from DAM Carrier PCB Assembly. |



| STEP | PROCEDURE |
|---|---|
| 3. | Lift up on card ejectors and remove DAM Carrier PCB Assembly from Card Cage Assembly. |

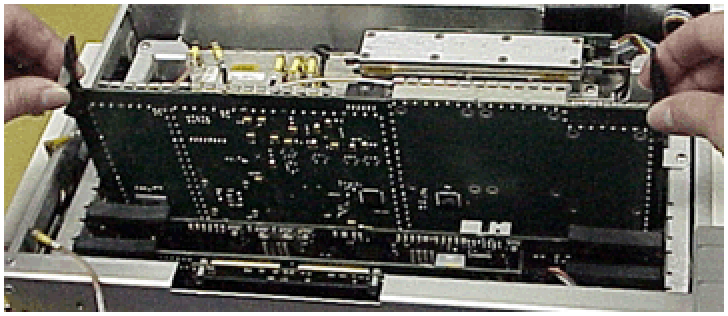


| | |
|---|---|
| NOTE | DAM Carrier PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing DAM Carrier PCB Assembly to avoid damaging connector pins. |

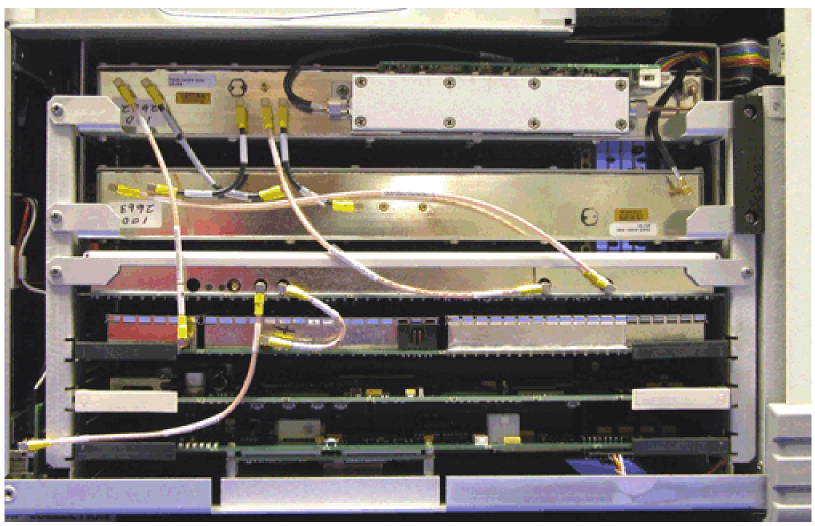
## 5.7.4.B Install DAM Carrier PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert DAM Carrier PCB Assembly securely into Card Cage Assembly. |

| | |
|---|---|
| NOTE | DAM Carrier PCB Assembly connects directly into Backplane PCB Assembly.  Use care when installing DAM Carrier PCB Assembly to avoid damaging connector pins. |



2. Press card ejectors down to secure DAM Carrier PCB Assembly in Card Cage Assembly.
3. Connect coaxial cables to DAM Carrier PCB Assembly as shown below.



### 5.7.4.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.5 CAI PCB Assembly

### 5.7.5.A Remove CAI PCB Assembly

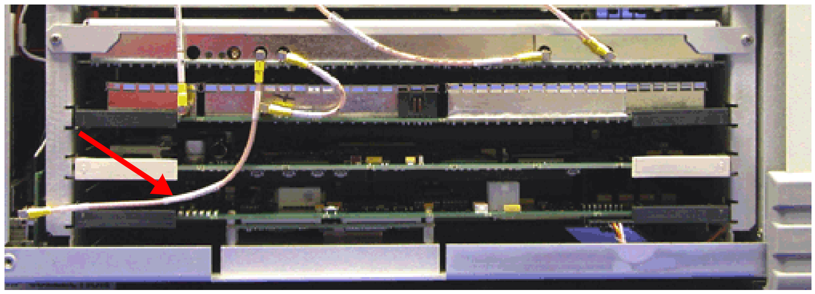
#### 5.7.5.A.1 Description

This procedure covers: Remove. Install.

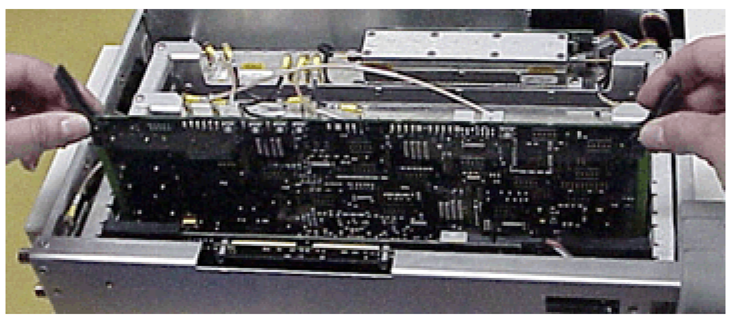
#### 5.7.5.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

| STEP | PROCEDURE |
|---|---|
| 1. | Reposition coaxial cable connecting IF Video PCB Assembly and Rear Panel PCB Assembly to remove CAI PCB Assembly. |



| STEP | PROCEDURE |
|---|---|
| 2. | Lift up on card ejectors and remove CAI PCB Assembly from Card Cage Assembly. |

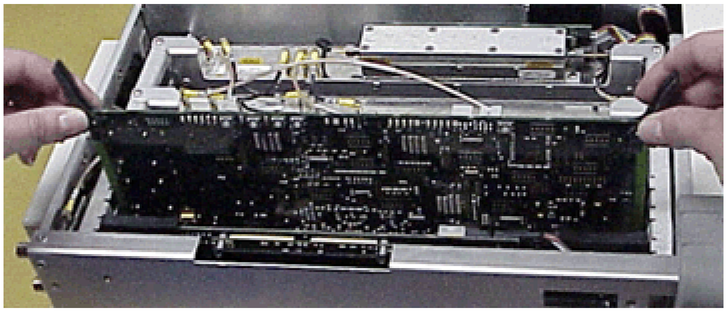


| NOTE | CAI PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing CAI PCB Assembly to avoid damaging connector pins. |
|---|---|

## 5.7.5.B Install CAI PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert CAI PCB Assembly securely into Card Cage Assembly. |

| NOTE | CAI PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing CAI PCB Assembly to avoid damaging connector pins. |
|---|---|



| | |
|---|---|
| 2. | Press card ejectors down to secure CAI PCB Assembly in Card Cage Assembly. |

### 5.7.5.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.6 CPU Adapter PCB Assembly

### 5.7.6.A Remove CPU Adapter PCB Assembly

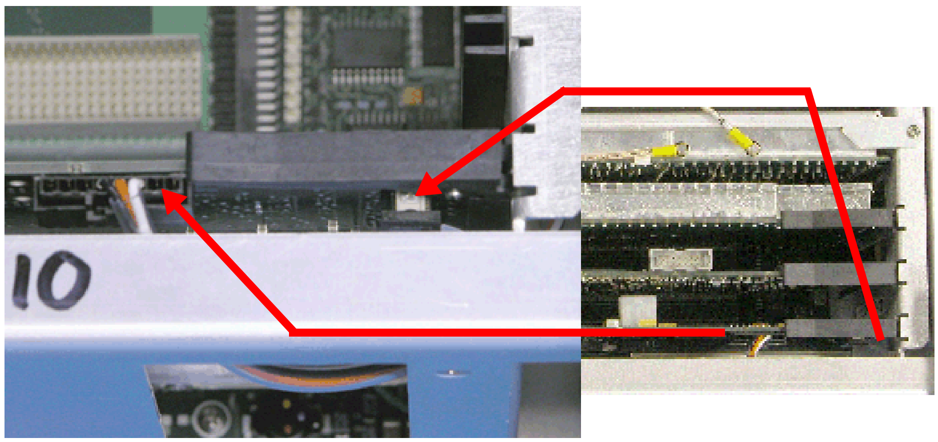
#### 5.7.6.A.1 Description

This procedure covers: Remove. Install.

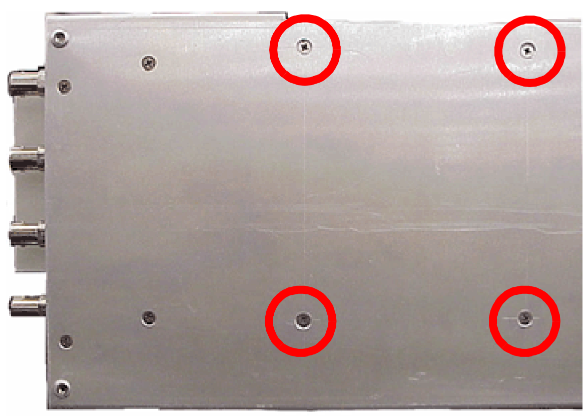
#### 5.7.6.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

| STEP | PROCEDURE |
|---|---|
| 1. | Disconnect ribbon cable and wire harness from CPU Adapter PCB Assembly. |



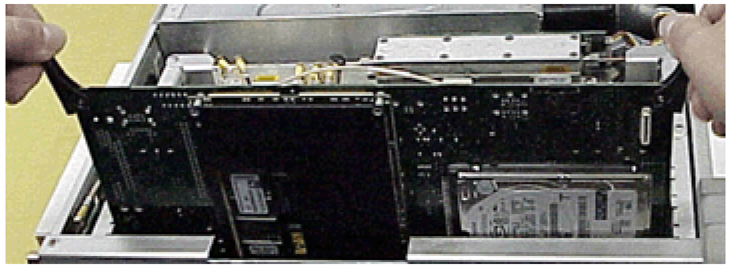

| | |
|---|---|
| 2. | Remove four screws securing CPU Adapter PCB Assembly to side of Chassis Assembly. |



**NOTE**

This step applies to the following: 3901 models with SN 298001115 and higher, 3902 models with SN 297001117 and higher, and all 3920 models.
Field serviced units with replaced CPU Adapter PCB Assemblies with PN 65681 or 65690.

| STEP | PROCEDURE |
| --- | --- |
| 3. | Lift up on card ejectors and remove CPU Adapter PCB Assembly from Card Cage Assembly. |



| | |
| --- | --- |
| NOTE | CPU Adapter PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing CPU Adapter PCB Assembly to avoid damaging connector pins. |

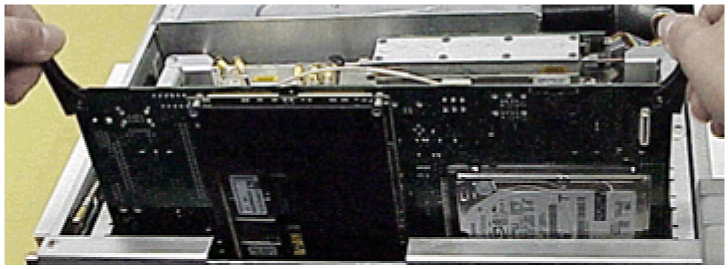
## 5.7.6.B Install CPU Adapter PCB Assembly

### 5.7.6.B.1 Preliminary Procedure

If replacing CPU Adapter PCB Assembly, remove protective film from Disk I/O PCB Assembly connector before installing assembly.

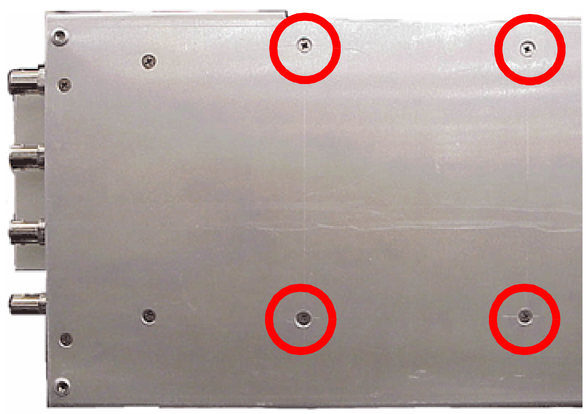
| STEP | PROCEDURE |
| --- | --- |
| 1. | Insert CPU Adapter PCB Assembly securely into Card Cage Assembly. |

| NOTE | CPU Adapter PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing CPU Adapter PCB Assembly to avoid damaging connector pins. |
| --- | --- |



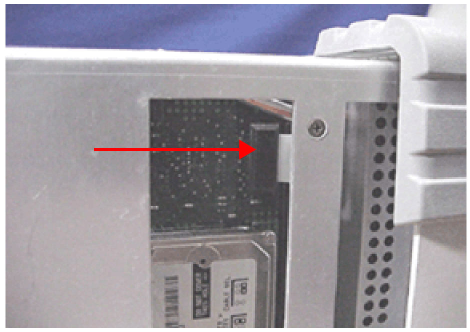
2. Press card ejectors down to secure CPU Adapter PCB Assembly in Card Cage Assembly.

3. Install four screws securing CPU Adapter PCB Assembly to side of Chassis Assembly. Torque screws to 6 in/lbs.

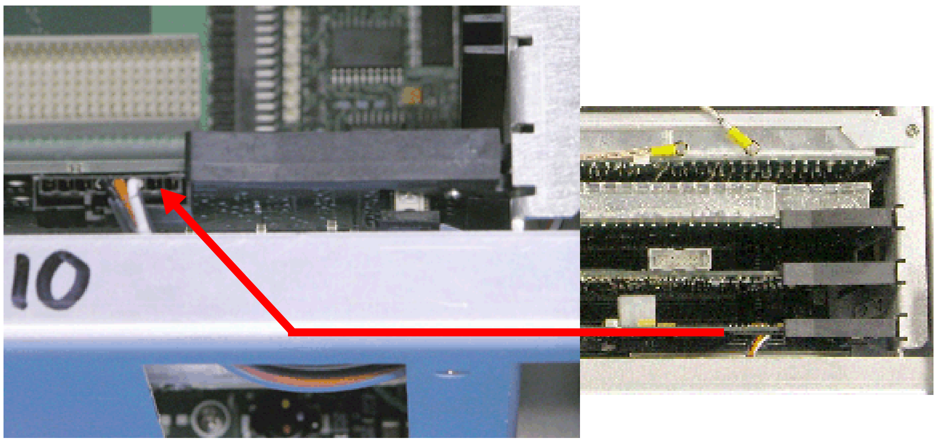


| NOTE | This step applies to the following: 3901 models with SN 298001115 and higher, 3902 models with SN 297001117 and higher, and all 3920 models.<br>Field serviced units with replaced CPU Adapter PCB Assemblies with PN 7010-4437-200. |
| --- | --- |

| STEP | PROCEDURE |
|---|---|
| 4. | Connect ribbon cable from Front Panel Assembly to CPU Adapter PCB Assembly. |



| | |
|---|---|
| 5. | Connect wire harness from Front Panel Assembly to CPU Adapter PCB Assembly. |



### 5.7.6.B.2 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.7 CPU Adapter PCB Assembly Battery

### 5.7.7.A Remove CPU Adapter PCB Assembly Battery

#### 5.7.7.A.1 Description

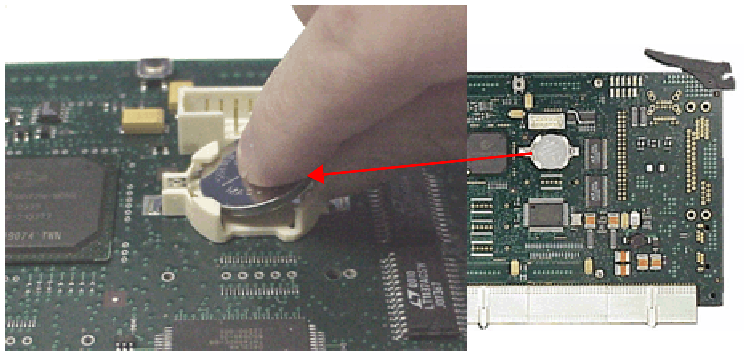
This procedure covers: Remove. Install.

#### 5.7.7.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

Remove CPU Adapter PCB Assembly (5 - 16).

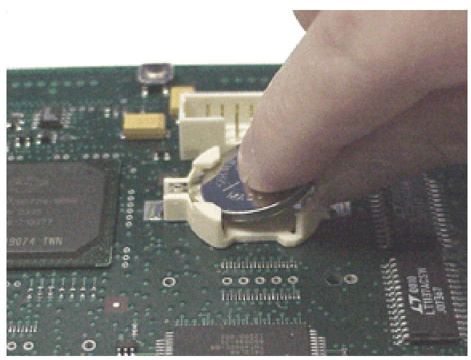
| STEP | PROCEDURE |
|---|---|
| 1. | Pull back on white clips and remove battery from housing bracket. |



**WARNING** DO NOT USE A METAL OBJECT TO REMOVE BATTERY FROM HOUSING BRACKET: THIS MAY CAUSE A SHORT BETWEEN THE POSITIVE AND NEGATIVE TERMINALS WHICH MAY CAUSE THE BATTERY TO EXPLODE.

### 5.7.7.B Install CPU Adapter PCB Assembly Battery

| STEP | PROCEDURE |
|---|---|
| 1. | Install battery into housing bracket. |



| | |
|---|---|
| 2. | Press down to secure battery in housing bracket. |

#### 5.7.7.B.1 Follow-up Procedures:

Install CPU Adapter PCB Assembly (5 - 18).

Install Case Assembly (5 - 6).

## 5.7.8 Rear Panel Assembly

### 5.7.8.A Remove Rear Panel Assembly

#### 5.7.8.A.1 Description

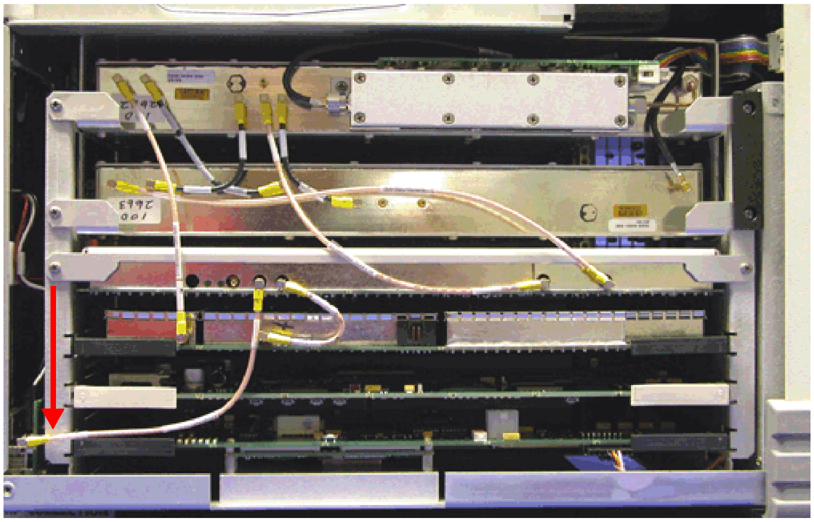
This procedure covers: Remove. Install.

#### 5.7.8.A.2 Preliminary Procedures

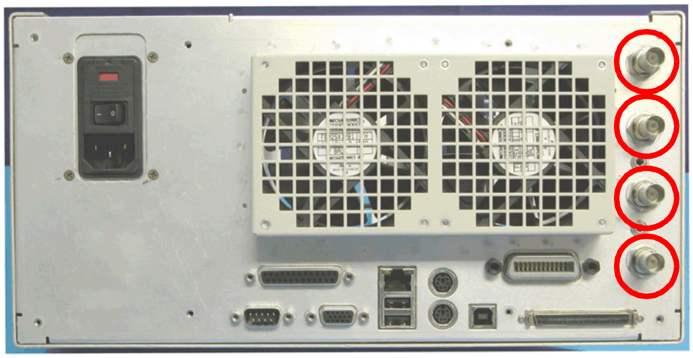
Remove Case Assembly (5 - 4).

STEP PROCEDURE

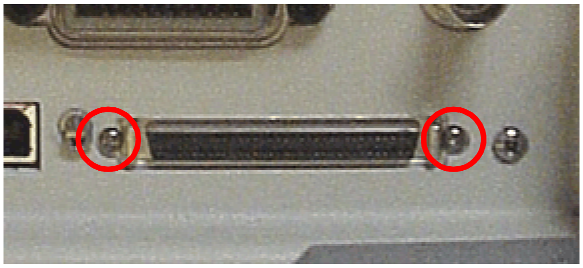
1. Disconnect coaxial cable from Rear Panel PCB Assembly.



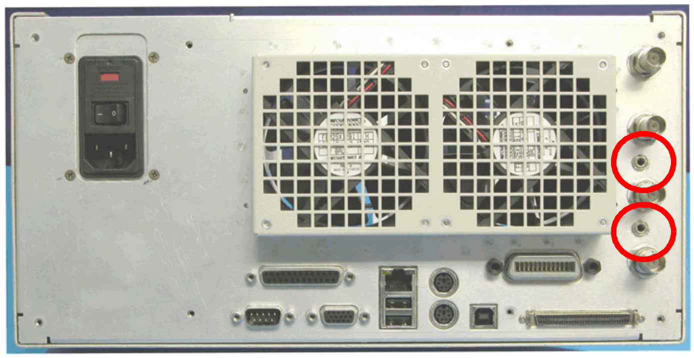
2. Remove nut and washer from four connectors on Rear Panel Assembly.



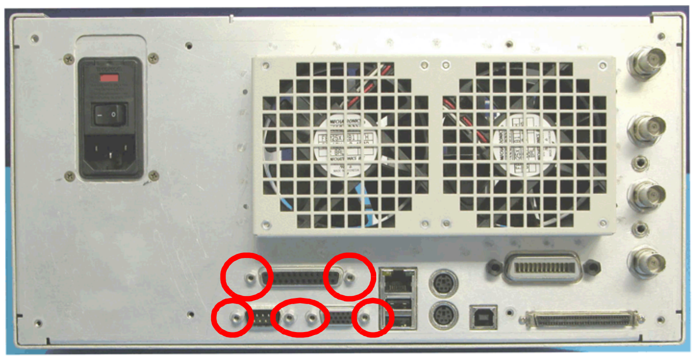
3. Remove two screws securing Aux IF Input Connector to Rear Panel Assembly.



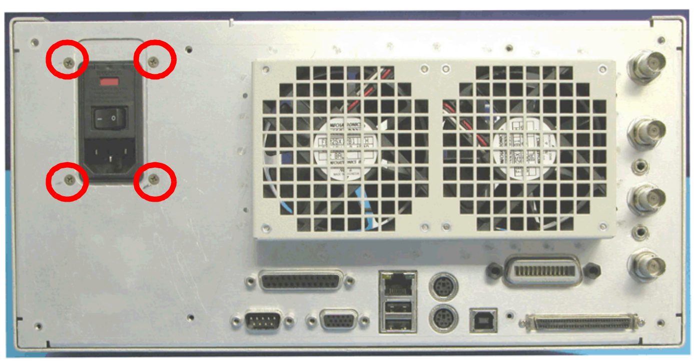
| STEP | PROCEDURE |
|---|---|
| 4. | Remove two nuts securing Rear Panel Assembly to Rear Panel Audio I/O PCB Assembly. Use care when removing nuts to avoid breakage. |



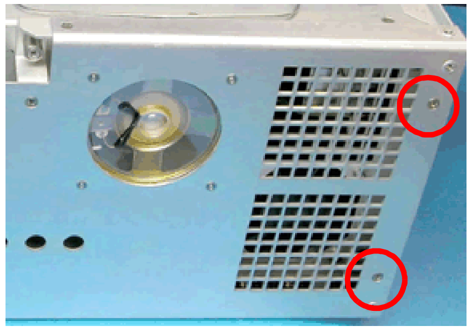
| STEP | PROCEDURE |
|---|---|
| 5. | Remove 6 shell nuts securing Rear Panel Assembly at three connectors. |



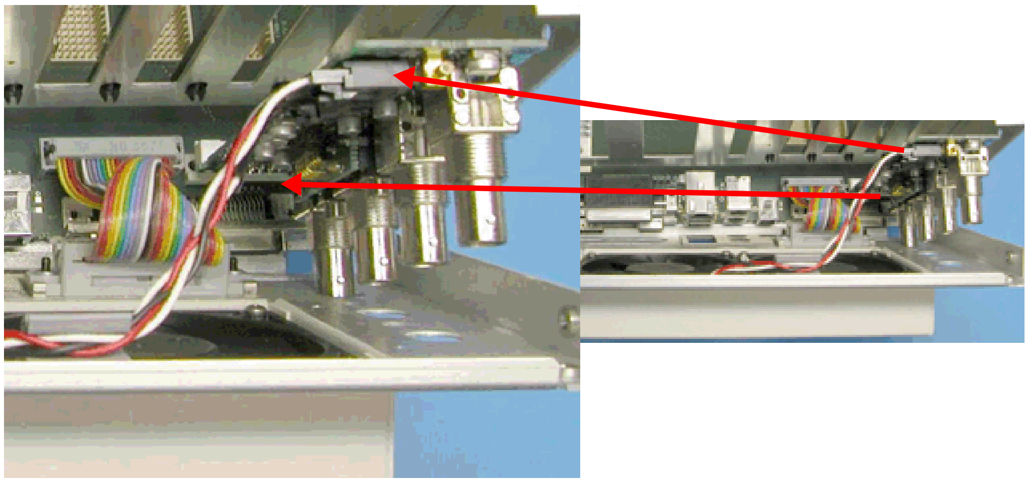
| STEP | PROCEDURE |
|---|---|
| 6. | Remove four screws at each corner of AC Power Switch. |



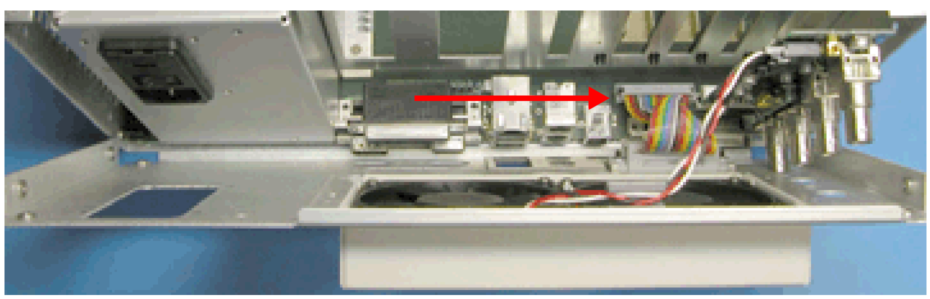
| STEP | PROCEDURE |
|---|---|
| 7. | Remove two screws from each side of Chassis Assembly. |



| | |
|---|---|
| 8. | Remove Rear Panel Assembly from Chassis Assembly. Disconnect two wire harnesses from Rear Panel PCB Assembly. |



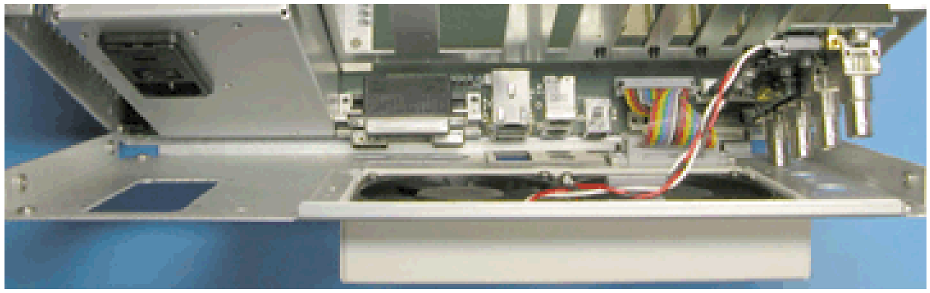
| | |
|---|---|
| 9. | Disconnect ribbon cable from Backplane PCB Assembly. |



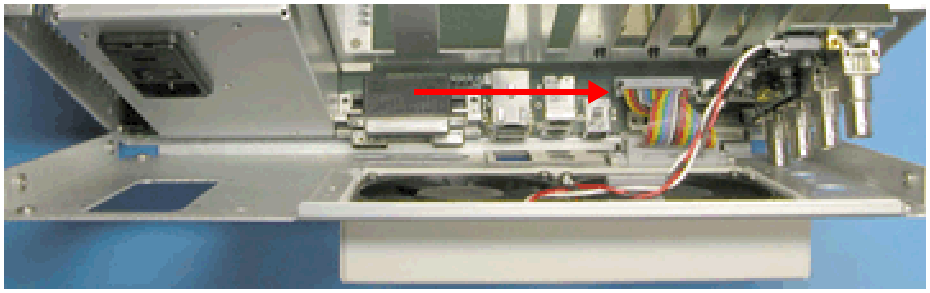
| | |
|---|---|
| 10. | Remove Rear Panel Assembly from Chassis Assembly. |

## 5.7.8.B Install Rear Panel Assembly

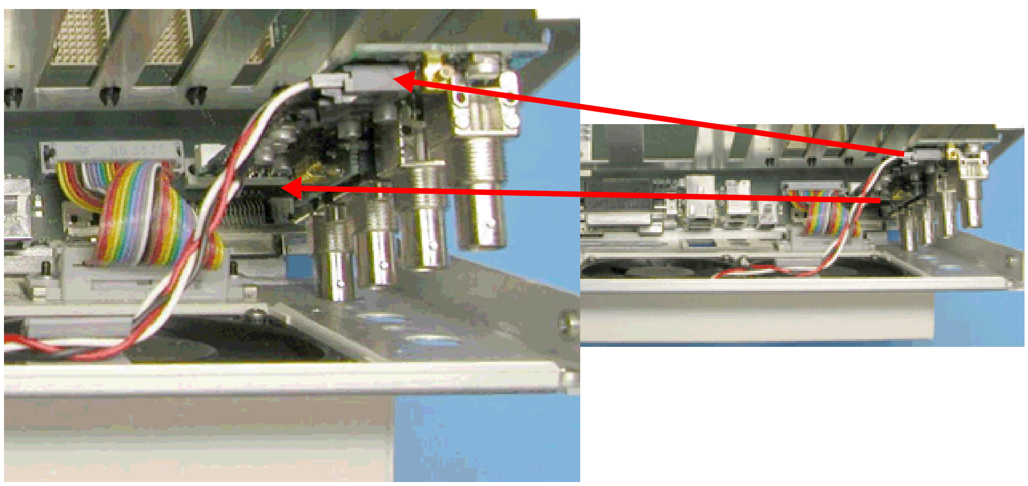
| STEP | PROCEDURE |
|---|---|
| 1. | Position Rear Panel Assembly to connect cables to Rear Panel PCB Assembly. |



| STEP | PROCEDURE |
|---|---|
| 2. | Connect ribbon cable from Rear Panel Assembly to Backplane PCB Assembly. |

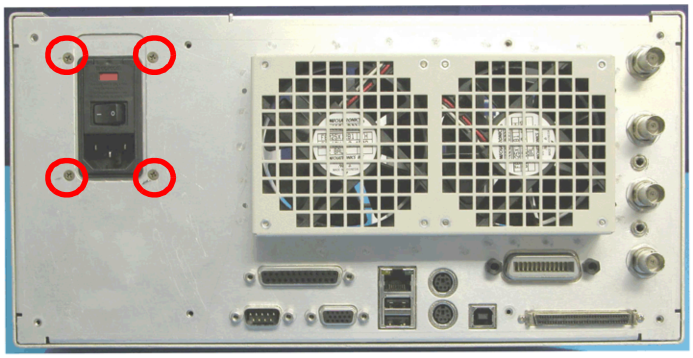


| STEP | PROCEDURE |
|---|---|
| 3. | Connect wire harnesses from fans on Rear Panel Assembly to Rear Panel PCB Assembly. |

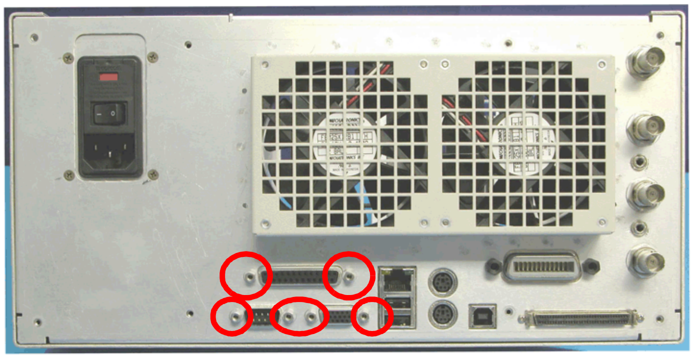


| STEP | PROCEDURE |
|---|---|
| 4. | Install Rear Panel Assembly in Chassis Assembly. |

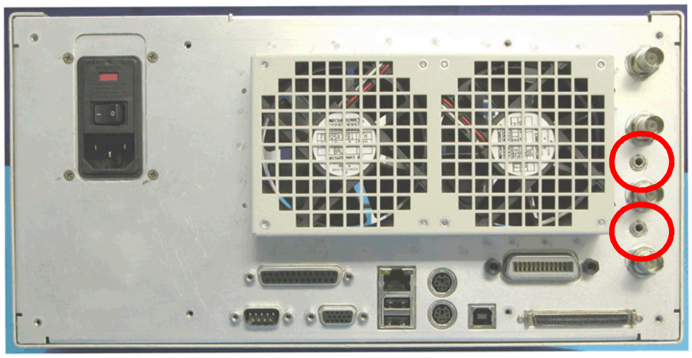
| STEP | PROCEDURE |
|---|---|
| 5. | Install four screws securing Rear Panel Assembly at AC Power Switch. Torque screws to 6 in/lbs. |



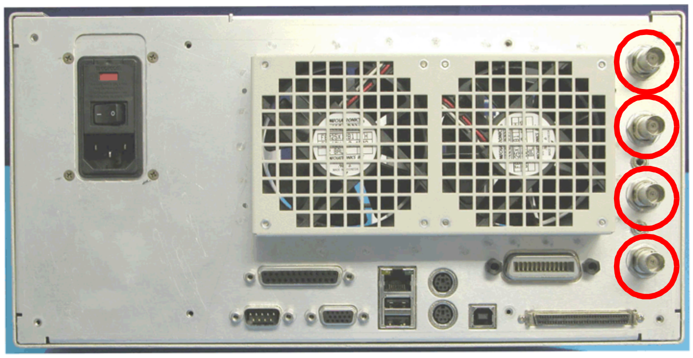
| | |
|---|---|
| 6. | Install six shell nuts securing Rear Panel Assembly at three connectors. Place Loctite on each screw before installing. Torque screws to 4 in/lbs. |



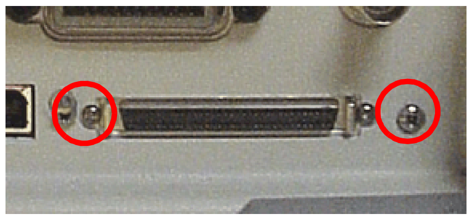
| | |
|---|---|
| 7. | Install two nuts securing Rear Panel Assembly to Rear Panel Audio I/O PCB Assembly. Torque nuts to 6 in/lbs. |



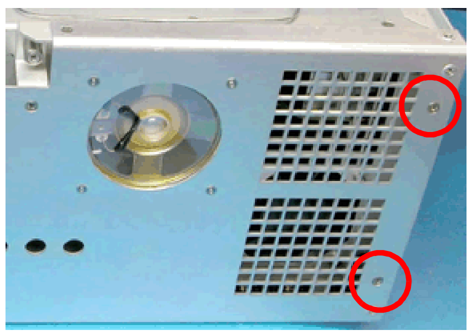
| STEP | PROCEDURE |
|---|---|
| 8. | Install nut and washer on four connectors on Rear Panel Assembly. Torque nut to 40 in/lbs. |



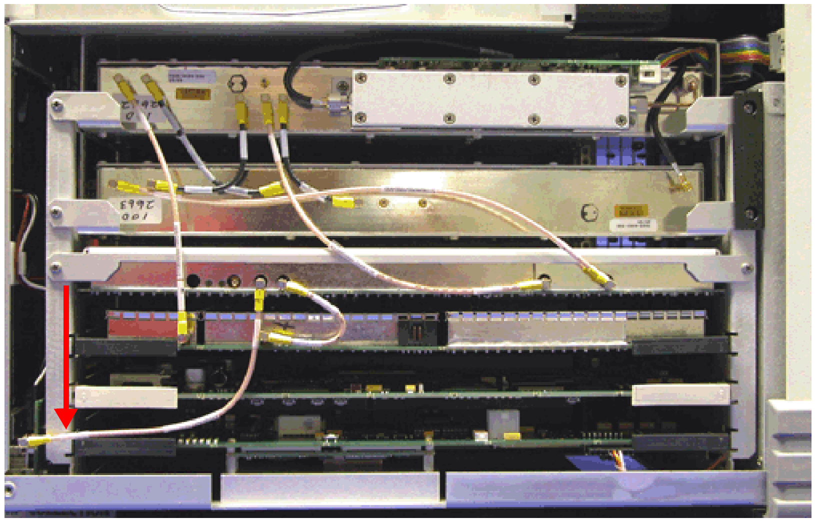
| | |
|---|---|
| 9. | Install two screws securing Chassis Rear Panel at Aux IF Input Connector. Torque screws to 4 in/lbs. |



| | |
|---|---|
| 10. | Install two screws on each side of Chassis Assembly. Torque screws to 6 in/lbs. |



| STEP | PROCEDURE |
|---|---|
| 11. | Attach coaxial cable connecting IF/Video PCB Assembly and Rear Panel PCB Assembly. |



## 5.7.8.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.7.9 Rear Panel PCB Assembly

### 5.7.9.A Remove Rear Panel PCB Assembly

#### 5.7.9.A.1 Description

This procedure covers: Remove. Install.

#### 5.7.9.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

Remove Rear Panel Assembly (5 - 21).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove Rear Panel PCB Assembly from Backplane PCB Assembly connector. |

| NOTE | Rear Panel PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing Rear Panel PCB Assembly to avoid damaging connector pins. |
|---|---|

### 5.7.9.B Install Rear Panel PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Connect Rear Panel PCB Assembly to Backplane PCB Assembly connector. |

#### 5.7.9.B.1 Follow-up Procedures:

Install Rear Panel Assembly (5 - 24).

Install Case Assembly (5 - 6).

## 5.7.10 Rear Panel Audio I/O PCB Assembly

### 5.7.10.A Remove Rear Panel Audio I/O PCB Assembly

#### 5.7.10.A.1 Description

This procedure covers: Remove. Install.

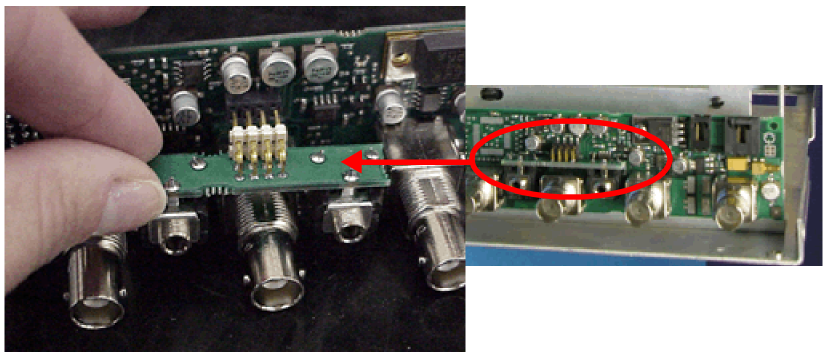
#### 5.7.10.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

Remove Rear Panel Assembly (5 - 21).

Remove Rear Panel PCB Assembly (5 - 28).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove Rear Panel Audio I/O PCB Assembly from Rear Panel PCB Assembly. |

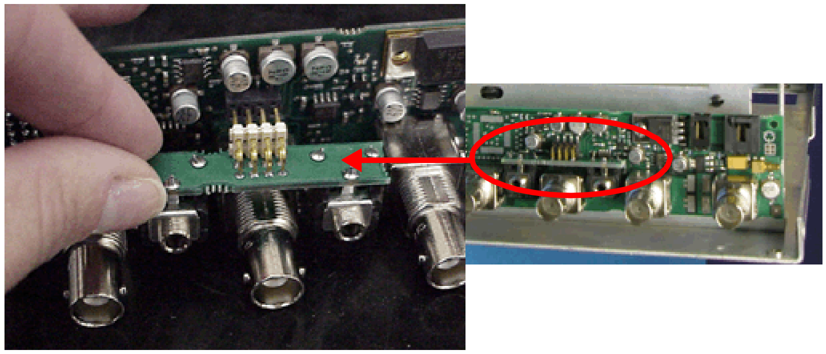


| NOTE | Rear Panel Audio I/O Assembly connects directly into Rear Panel PCB Assembly connector. Use care when removing Rear Panel Audio I/O PCB Assembly to avoid damaging connector pins. |
|---|---|

## 5.7.10.B Install Rear Panel Audio I/O PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Install Rear Panel Audio I/O PCB Assembly on Rear Panel PCB Assembly at connector interface. |

> **NOTE** Rear Panel Audio I/O Assembly connects directly into Rear Panel PCB Assembly connector. Use care when installing Rear Panel Audio I/O PCB Assembly to avoid damaging connector pins.



### 5.7.10.B.1 Follow-up Procedures:

Install Rear Panel PCB Assembly (5 - 28).

Install Rear Panel Assembly (5 - 24).

Install Case Assembly (5 - 6).

## 5.7.11 Fan Assembly

### 5.7.11.A Remove Fan Assembly

#### 5.7.11.A.1 Description

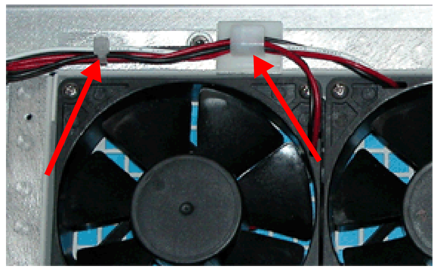
This procedure covers: Remove. Install. Procedure applies to both Fan Assemblies.

#### 5.7.11.A.2 Preliminary Procedures

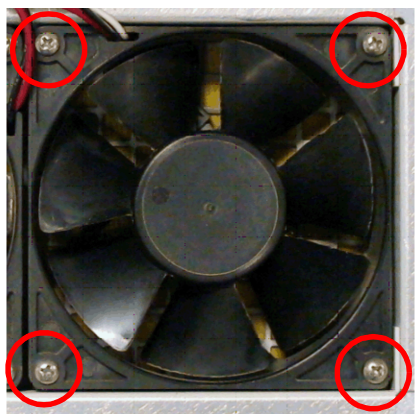
Remove Case Assembly (5 - 4).

Remove Rear Panel Assembly (5 - 21).

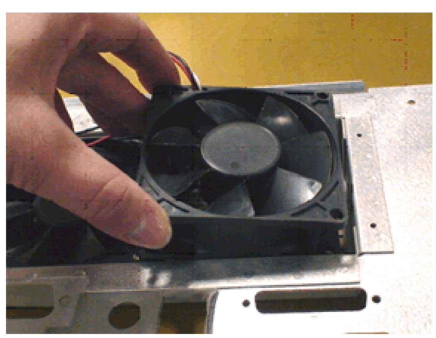
| STEP | PROCEDURE |
|---|---|
| 1. | Cut plastic fastener securing fan wire harness to Rear Panel Assembly and remove wires from securing clip. |



| | |
|---|---|
| 2. | Remove four screws securing Fan Assembly to Rear Panel Assembly |

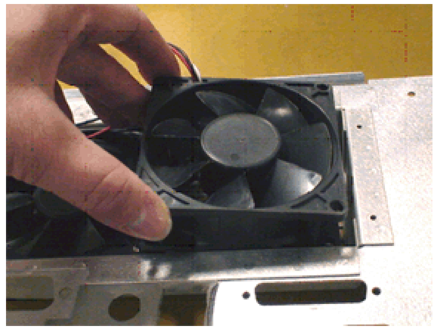


| | |
|---|---|
| 3. | Remove Fan Assembly from Rear Panel Assembly. |

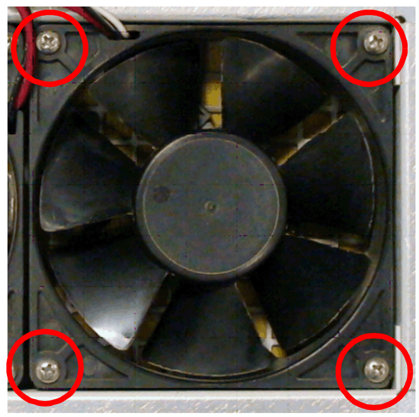


## 5.7.11.B Install Fan Assembly

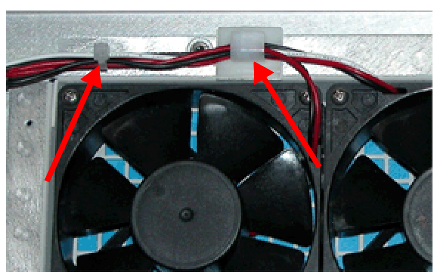
| STEP | PROCEDURE |
|---|---|
| 1. | Install Fan Assembly in Rear Panel Assembly. |



| | |
|---|---|
| 2. | Install four screws securing Fan Assembly to Rear Panel Assembly. Tighten until binding is felt. Over tightening may crack Fan Assembly. |



| | |
|---|---|
| 3. | Insert Fan Assembly wire harness in securing clip and replace plastic fastener. |



### 5.7.11.B.1 Follow-up Procedures:

Install Rear Panel Assembly (5 - 24).

Install Case Assembly (5 - 6).

## 5.7.12 Power Supply Assembly

### 5.7.12.A Remove Power Supply Assembly

#### 5.7.12.A.1 Description

This procedure covers: Remove.  Install.

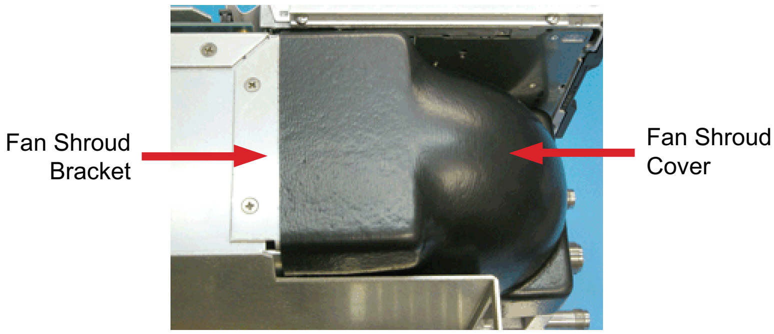
#### 5.7.12.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

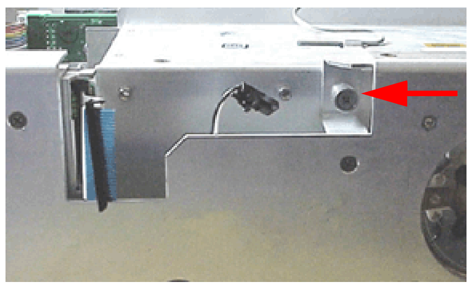
Remove Front Panel Assembly (5 - 76/5 - 100).

Remove Disk I/O Assembly (5 - 74/5 - 98).

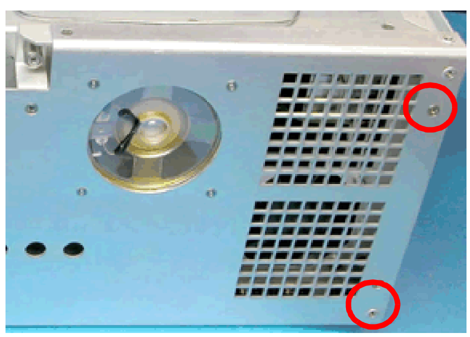
| STEP | PROCEDURE |
|---|---|
| 1. | Remove two screws securing Fan Shroud Bracket to Power Supply Assembly. Remove Fan Shroud Bracket and Fan Shroud Cover from Power Supply Assembly. |



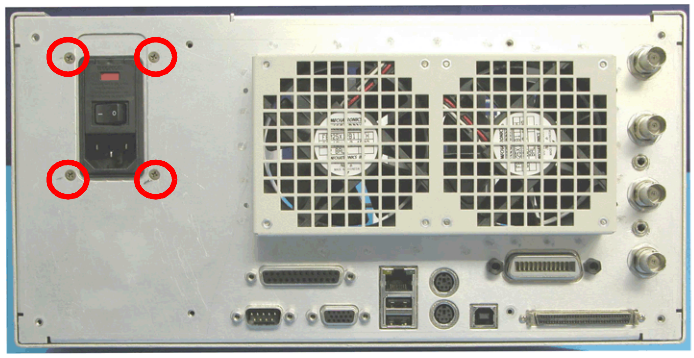

| STEP | PROCEDURE |
|---|---|
| 2. | Remove Fan Shroud Cover from Fan Shroud Bracket. |
| 3. | Fully loosen captive screw securing Power Supply Assembly to Chassis Assembly. |



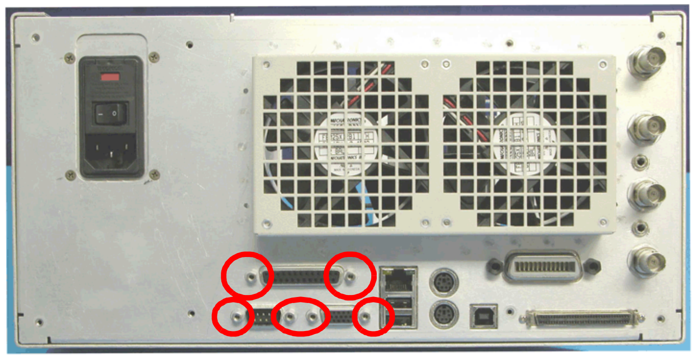
| STEP | PROCEDURE |
|---|---|
| 4. | Remove two screws securing Rear Panel Assembly to Chassis Assembly. |



| STEP | PROCEDURE |
|---|---|
| 5. | Remove four screws securing Power Supply Assembly to Rear Panel Assembly. |



| STEP | PROCEDURE |
|---|---|
| 6. | Remove six shell nuts securing Rear Panel Assembly to Chassis Assembly at three connectors. |



| STEP | PROCEDURE |
|---|---|
| 7. | Separate side of Chassis Assembly from Rear Panel Assembly to allow room to grasp Power Supply Assembly. Grasp Power Supply Assembly and pull to remove Power Supply from Chassis Assembly. |

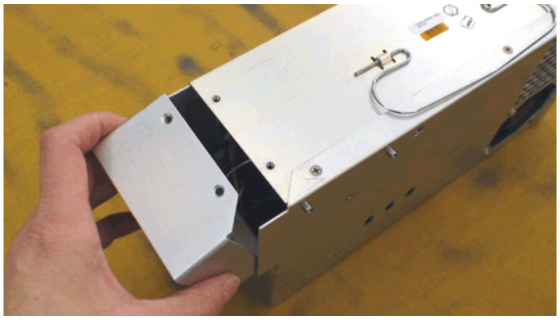
| NOTE | Do not pull on wire handle to remove Power Supply Assembly. Rock Power Supply Assembly back and forth in Card Cage Assembly to remove.<br>Power Supply Assembly connects directly into Backplane PCB Assembly. Use care when removing Power Supply Assembly to avoid damaging connector pins. |
|---|---|

## 5.7.12.B Install Power Supply Assembly

### 5.7.12.B.1 Preliminary Procedure

Replace 1/2 in. double-sided, VHB, adhesive tape on Fan Shroud Bracket.

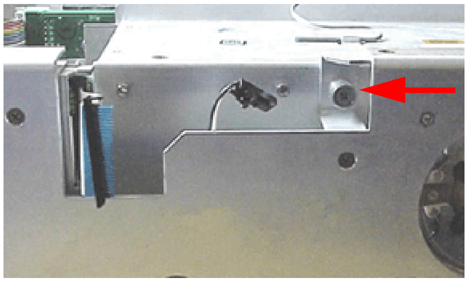
| STEP | PROCEDURE |
|---|---|
| 1. | Insert Fan Shroud Bracket on Power Supply Assembly. Install two screws securing Fan Shroud Bracket to Power Supply Assembly. Torque screws to 6 in/lbs. |



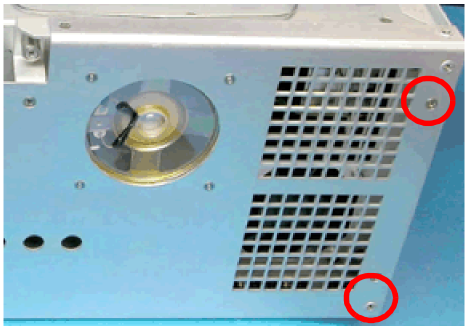
| | |
|---|---|
| 2. | Insert Power Supply Assembly in Chassis Assembly. Align Power Supply Assembly with Backplane PCB Assembly connector and press down firmly to ensure proper connection with Backplane PCB Assembly. |

| NOTE | Power Supply Assembly connects directly into Backplane PCB Assembly. Use care when installing Power Supply Assembly to avoid damaging connector pins. |
|---|---|

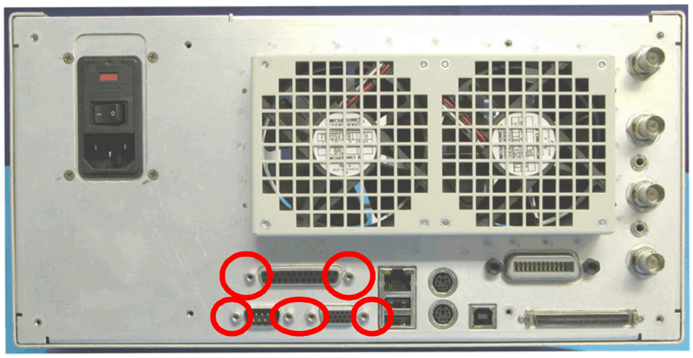
| | |
|---|---|
| 3. | Tighten captive screw securing Power Supply Assembly to Chassis Assembly. Torque screw to 6 in/lbs. |



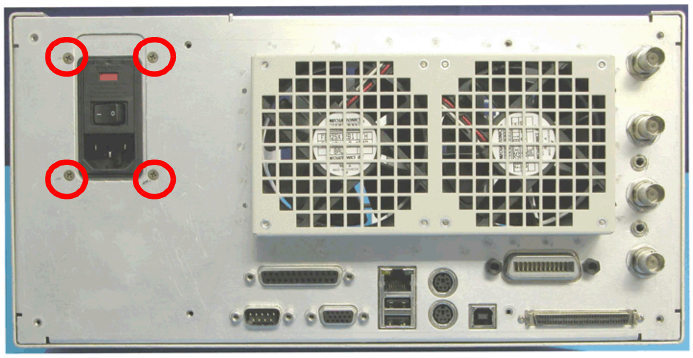
| | |
|---|---|
| 4. | Install two screws securing Rear Panel Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



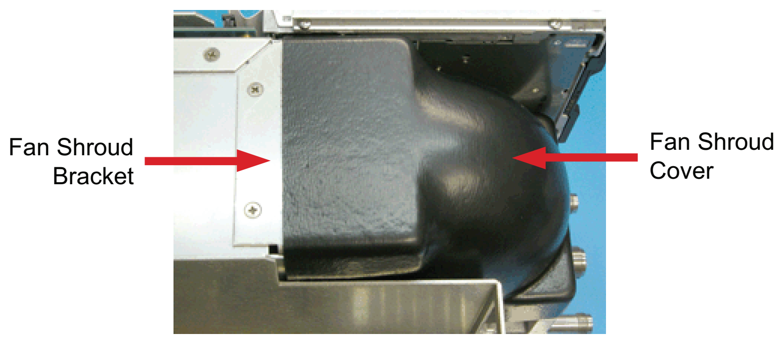
| STEP | PROCEDURE |
|---|---|
| 5. | Install six shell nuts securing Rear Panel Assembly to Chassis Assembly at three connectors. Place Lock Tight on screws before installing. Torque screws to 4 in/lbs. |



| | |
|---|---|
| 6. | Install four screws securing Power Supply Assembly to Rear Panel Assembly. Torque screws to 6 in/lbs. |



| | |
|---|---|
| 7. | Attach Fan Shroud Cover to Fan Shroud Bracket. |




## 5.7.12.B.2 Follow-up Procedures:

Install Disk I/O PCB Assembly (5 - 74/5 - 75).

Install Front Panel Assembly (5 - 78/5 - 102).

Install Case Assembly (5 - 6).

## 5.7.13 Speaker Wire Harness Assembly

### 5.7.13.A Remove Speaker Wire Harness Assembly

#### 5.7.13.A.1 Description

This procedure covers: Remove. Install.

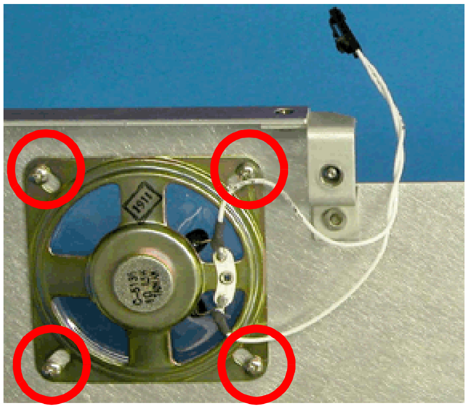
#### 5.7.13.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

Remove Disk I/O Assembly (5 - 74/5 - 98).

Remove Power Supply Assembly (5 - 33).

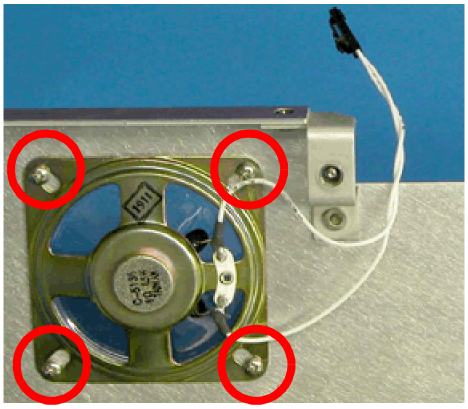
| STEP | PROCEDURE |
| --- | --- |
| 1. | Remove four screws securing Speaker Wire Harness Assembly to Chassis Assembly. |



| | |
| --- | --- |
| 2. | Remove Speaker Wire Harness Assembly from Chassis Assembly. |

### 5.7.13.B Install Speaker Wire Harness Assembly

| STEP | PROCEDURE |
| --- | --- |
| 1. | Install Speaker Wire Harness Assembly in Chassis Assembly. |
| 2. | Install four screws to secure Speaker Wire Harness Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



#### 5.7.13.B.1 Follow-up Procedures:

Install Power Supply Assembly (5 - 35).

Install Disk I/O PCB Assembly (5 - 74/5 - 75).

Install Case Assembly (5 - 6).

# 5.7.14 LCD Assembly

## 5.7.14.A Remove LCD Assembly

### 5.7.14.A.1 Description

This procedure covers: Remove. Install.

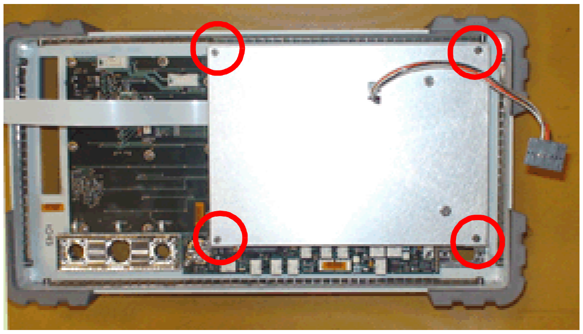
### 5.7.14.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

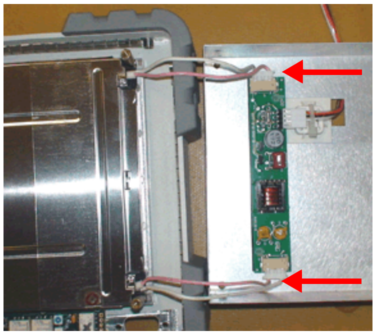
Remove Front Panel Assembly (5 - 76/5 - 100).

STEP PROCEDURE

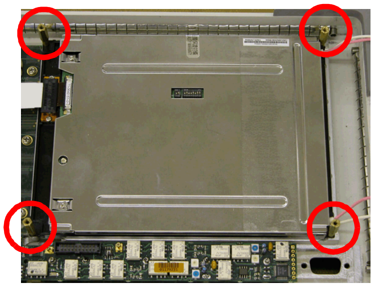
1. Remove four screws securing LCD Lens to Front Panel Assembly.



2. Remove LCD Lens from LCD Assembly. Avoid placing tension on connecting cables. Disconnect LCD Assembly cables from Inverter PCB Assembly.



3. Remove four standoff pins securing LCD Assembly to Front Panel Assembly. Remove LCD Assembly from Front Panel Assembly.



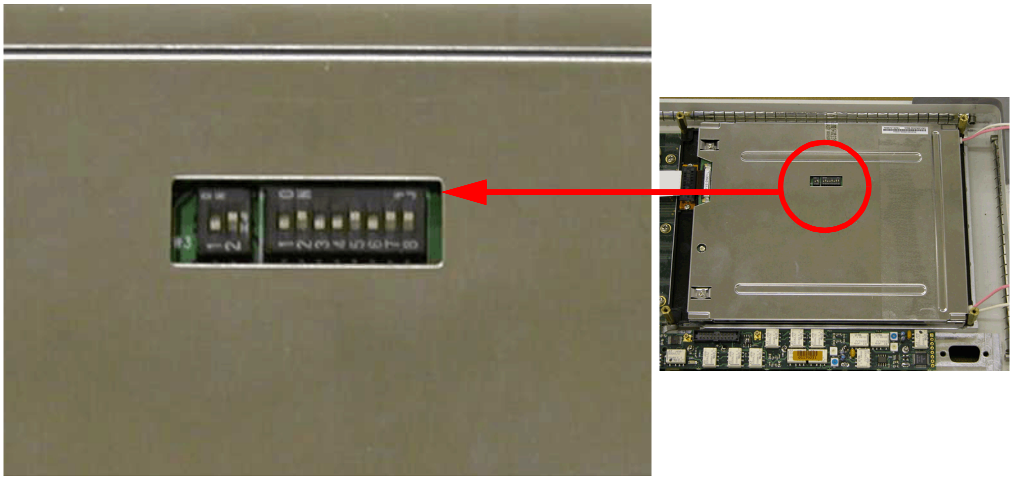
4. Remove ribbon cable from LCD Assembly if replacing LCD Assembly.

## 5.7.14.B Install LCD Assembly

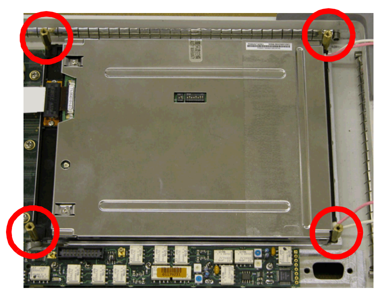
### 5.7.14.B.1 Preliminary Procedure (if replacing LCD Display):

Remove protective film from front of new LCD Display.

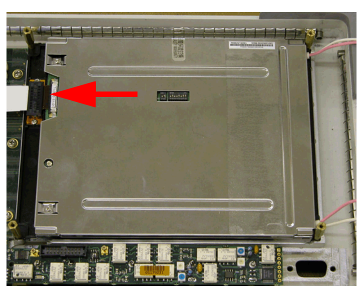
Set LCD Assembly screen adjustment switches to match the configuration of the switches on the LCD Assembly being replaced. If the old LCD Assembly is not available, contact Aeroflex Customer Service. Please have the CPU Adapter PCB Assembly removed from unit and available when contacting customer service.



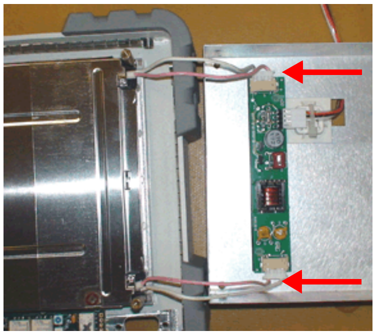
| STEP | PROCEDURE |
|---|---|
| 1. | Place LCD Assembly with display side down on Front Panel Assembly. Install four standoff pins securing LCD Assembly to Front Panel Assembly. Torque standoff pins to 2 in/lbs. |



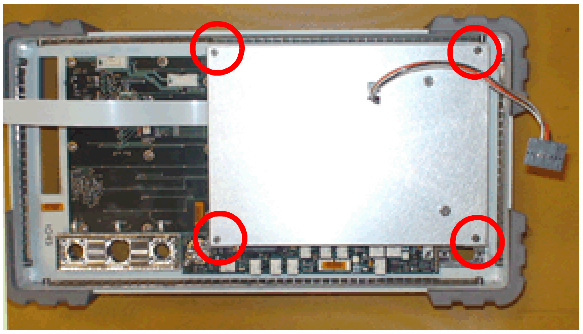
| | |
|---|---|
| 2. | Connect ribbon cable securely to LCD Assembly. |



| STEP | PROCEDURE |
|---|---|
| 3. | Connect cables from LCD Assembly securely to Inverter PCB Assembly. |



| STEP | PROCEDURE |
|---|---|
| 4. | Install LCD Lens on LCD Assembly. Install four screws securing LCD Lens to LCD Assembly. Torque screws to 2 in/lbs. |



## 5.7.14.B.2 Follow-up Procedures:

Install Case Assembly (5 - 6).

Install Front Panel Assembly (5 - 78/5 - 102).

# 5.7.15 LCD Lens

## 5.7.15.A Remove LCD Lens

### 5.7.15.A.1 Description

This procedure covers: Remove. Install.

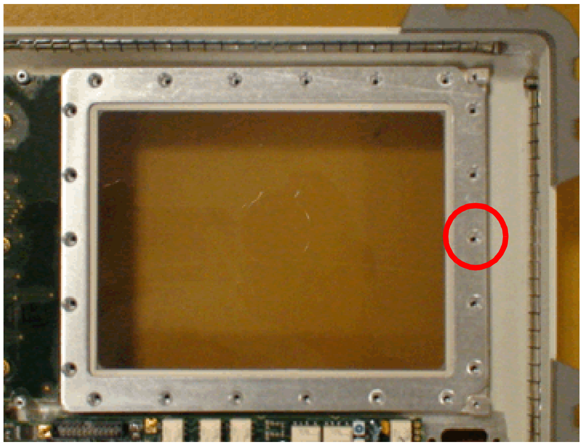
### 5.7.15.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

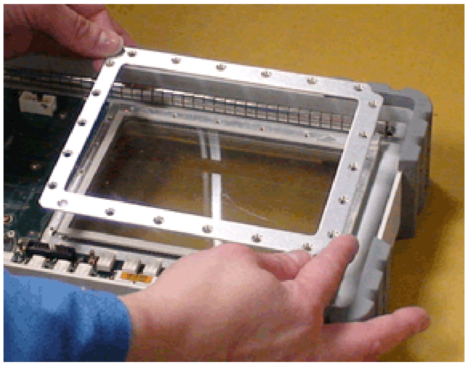
Remove Front Panel Assembly (5 - 76/5 - 100).

Remove LCD Assembly (5 - 38).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove screws securing LCD Bracket to Front Panel Assembly (total of 22 screws). |



| | |
|---|---|
| 2. | Remove LCD Bracket from Front Panel Assembly. |



| | |
|---|---|
| 3. | Remove LCD Lens from Front Panel Assembly. |

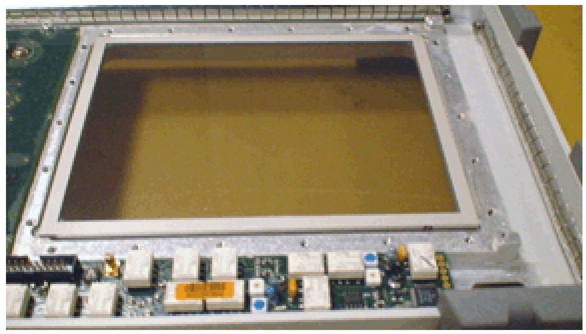
## 5.7.15.B Install LCD Lens

### 5.7.15.B.1 Preliminary Procedures

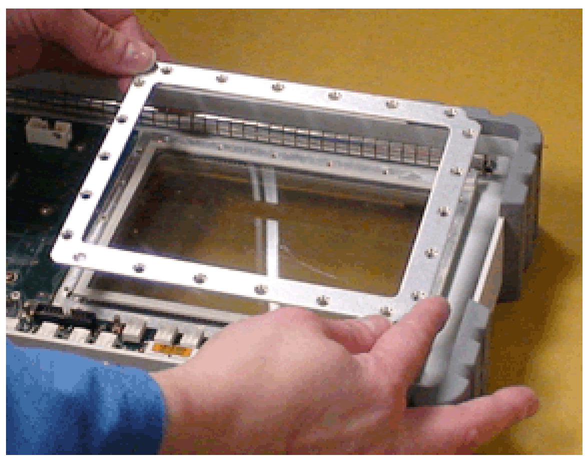
Avoid touching surface of LCD Lens prior to installation. If necessary, LCD Lens may be cleaned with deionized water and a lint free cloth.

| STEP | PROCEDURE |
|---|---|
| 1. | Install LCD Lens in Front Panel Assembly with raised surface facing out. Internal edge of the LCD Lens should be smooth as shown below. |

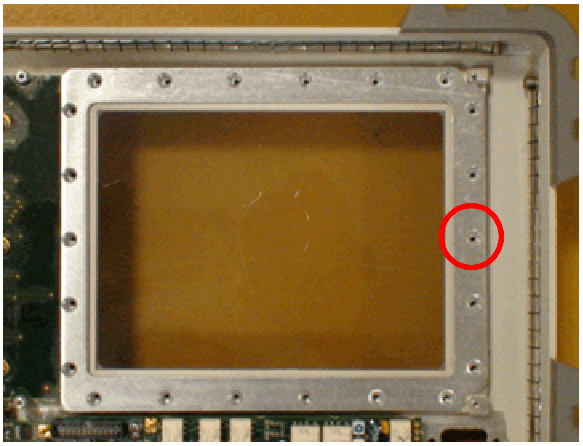
| | |
|---|---|
| CAUTION | VERIFY LCD LENS IS CORRECTLY INSTALLED BEFORE PROCEEDING. INSTALLING THE LCD BRACKET WHEN THE LCD LENS IS INSTALLED "BACKWARDS", MAY RESULT IN DAMAGE TO THE TEST SET. |



2. Install LCD Bracket to secure LCD Lens to Front Panel Assembly. Verify LCD Lens is centered in its frame when installing LCD Bracket.



| STEP | PROCEDURE |
|---|---|
| 3. | Install screws securing LCD Bracket to Front Panel Assembly (total of 22 screws). Torque screws to 8 in/lbs. |



### 5.7.15.B.2 Follow-up Procedures:

Install LCD Assembly (5 - 39).

Install Front Panel Assembly (5 - 78/5 - 102).

Install Case Assembly (5 - 6).

# 5.7.16 Front Panel PCB Assembly

## 5.7.16.A Remove Front Panel PCB Assembly

### 5.7.16.A.1 Description

This procedure covers: Remove. Install.

### 5.7.16.A.2 Preliminary Procedures

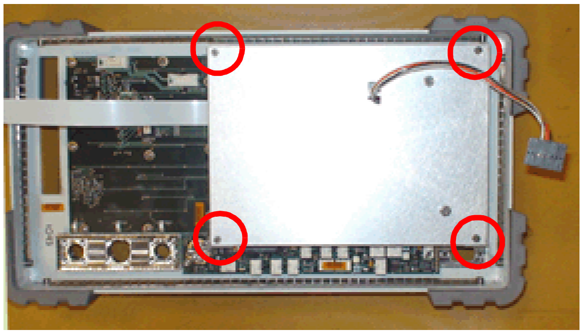
Remove Case Assembly (5 - 4).

Remove Front Panel Assembly (5 - 76/5 - 100).

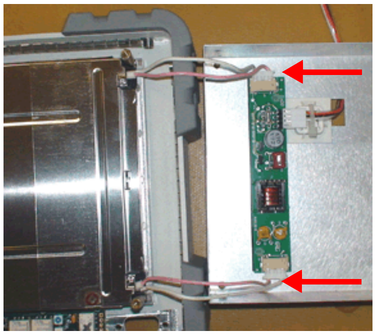
STEP PROCEDURE

1. Remove Rotary Control Knob from Front Panel Assembly. Pull to remove.

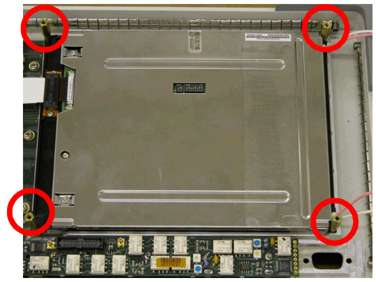

2. Place Front Panel Assembly with display side down on work surface. Remove four screws securing LCD Lens to Front Panel Assembly.



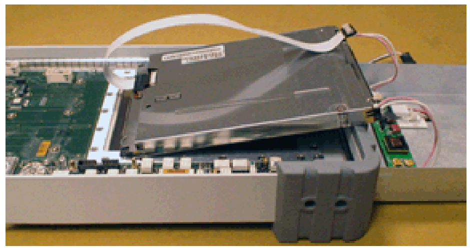
3. Remove LCD Lens and place flat on work surface. Avoid placing tension on connecting cables.



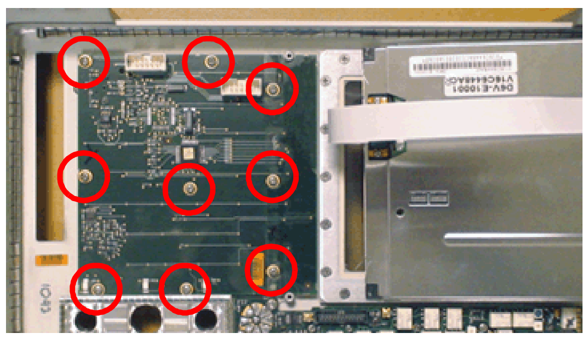
| STEP | PROCEDURE |
|---|---|
| 4. | Remove four standoff pins securing LCD Assembly to Front Panel Assembly. |



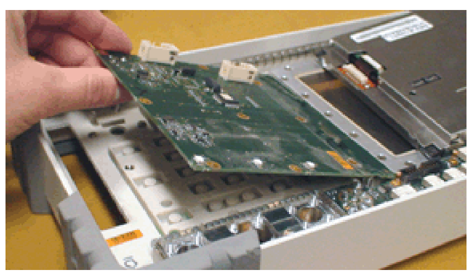
| | |
|---|---|
| 5. | Move LCD Assembly to access Front Panel PCB Assembly. |



| | |
|---|---|
| 6. | Remove nine screws securing Front Panel PCB Assembly to Front Panel Assembly. |



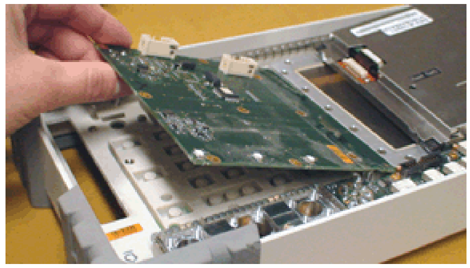
| | |
|---|---|
| 7. | Remove Front Panel PCB Assembly from Front Panel Assembly. |



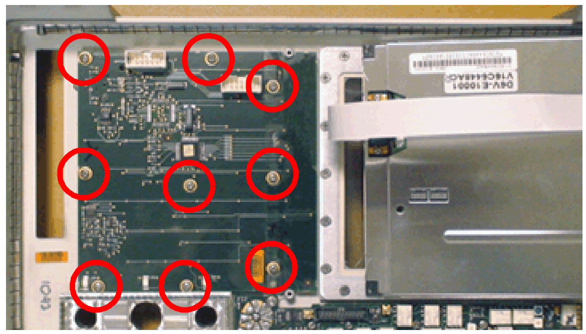
## 5.7.16.B Install Front Panel PCB Assembly

STEP PROCEDURE

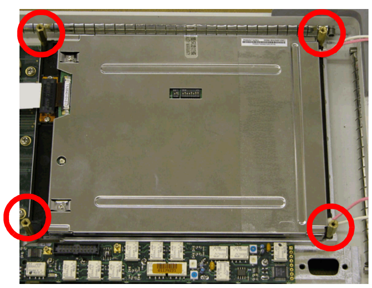
1. Place Front Panel PCB Assembly on Front Panel Assembly.



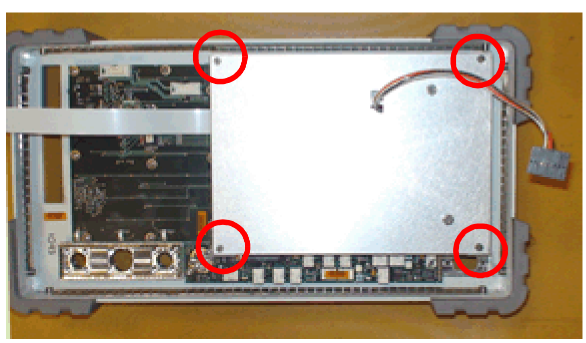
2. Install nine screws securing Front Panel PCB Assembly to Front Panel Assembly. Torque screws to 6 in/lbs.



3. Reposition LCD Assembly. Install four standoff pins securing LCD Assembly to Front Panel Assembly. Torque standoff pins to 2 in/lbs.



4. Install LCD Lens on LCD Assembly. Install four screws securing LCD Lens to LCD Assembly. Torque screws to 2 in/lbs (32 in oz).



| STEP | PROCEDURE |
|---|---|
| 5. | Install Rotary Control Knob on Front Panel Assembly. |


## 5.7.16.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

Install Front Panel Assembly (5 - 78/5 - 102).

## 5.7.17 Keypad Assembly

### 5.7.17.A Remove Keypad Assembly

#### 5.7.17.A.1 Description

This procedure covers: Remove. Install.

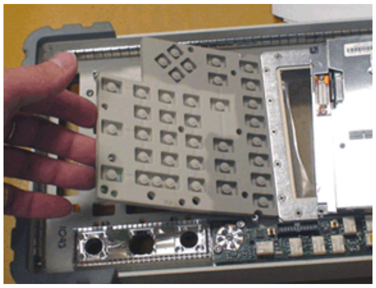
#### 5.7.17.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

Remove Front Panel Assembly (5 - 76/5 - 100).

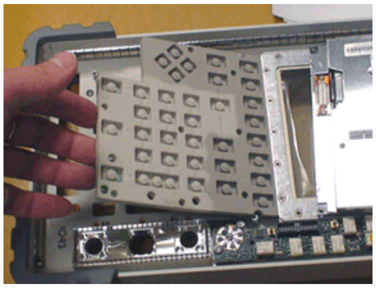
Remove Front Panel PCB Assembly (5 - 80/5 - 104).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove Keypad Assembly from Front Panel Assembly. |



### 5.7.17.B Install Keypad Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Install Keypad Assembly on Front Panel Assembly. Verify keypads are correctly positioned in Front Panel openings. |



#### 5.7.17.B.1 Follow-up Procedures:

Install Front Panel PCB Assembly (5 - 82/5 - 106).

Install Front Panel Assembly (5 - 78/5 - 102).

Case Assembly (5 - 6).

## 5.7.18 Inverter Supply PCB Assembly

### 5.7.18.A Remove Inverter Supply PCB Assembly

#### 5.7.18.A.1 Description

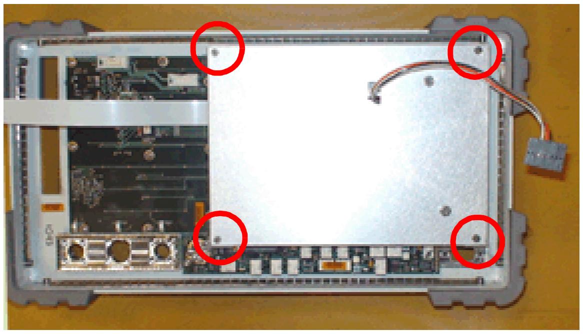
This procedure covers: Remove. Install.

#### 5.7.18.A.2 Preliminary Procedures

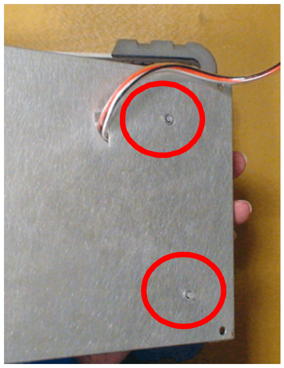
Remove Case Assembly (5 - 4).

Remove Front Panel Assembly (5 - 76/5 - 100).

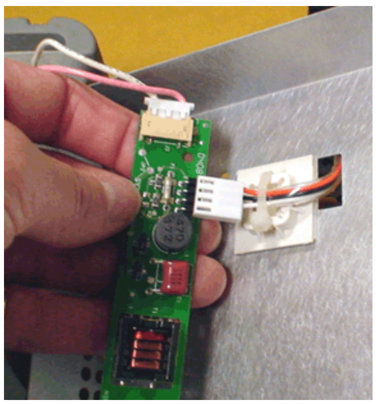
| STEP | PROCEDURE |
|---|---|
| 1. | Remove four screws securing Display Shield to Front Panel Assembly. |



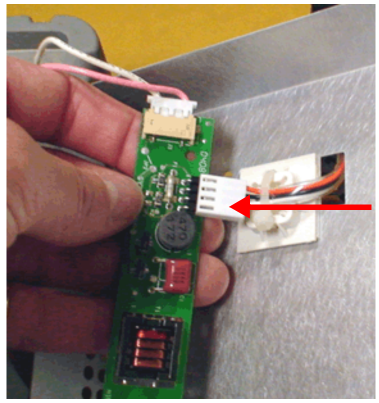
| | |
|---|---|
| 2. | Remove two nuts securing Inverter Supply PCB Assembly to Display Shield. |



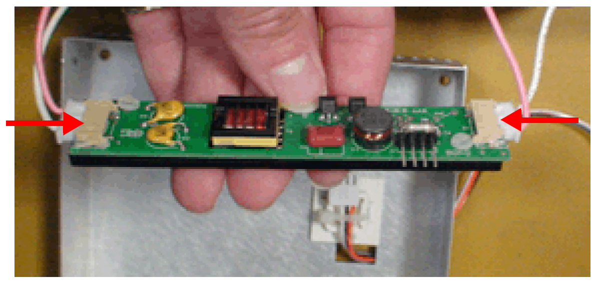
| | |
|---|---|
| 3. | Remove Inverter Supply PCB Assembly and black spacer bar from Display Shield. Avoid placing tension on connecting cables. |



| STEP | PROCEDURE |
|---|---|
| 4. | Disconnect W2 Wire Harness from Inverter Supply PCB Assembly. |



| | |
|---|---|
| 5. | Disconnect wire harnesses from ends of Inverter Supply PCB Assembly. |



## 5.7.18.B Replace Inverter Supply PCB Assembly

The Inverter Supply PCB Assembly is obsolete and has been replaced by the LED Backlight Driver. Refer to 7.3.4, Front Panel Assy (3920/3920B) for replacement parts list.

### 5.7.18.B.1 Preliminary Procedures

| STEP | PROCEDURE |
|---|---|
| 1. | Trim Inverter Insulator to 3” in length. |
| 2. | Center Inverter Insulator between holes in Display Shield. |
| 3. | Remove adhesive backing and apply Inverter Insulator to Display Shield. |

| | |
|---|---|
| 4. | Cut plastic fastener securing W2 Wire Harness, #64985, to Display Shield. Remove W2 Wire Harness, #64985 from Display Shield. |
| 5. | Insert new W2 Wire Harness, #90853, through opening in Display Shield. |
| 6. | Proceed to 5.7.19.B, Install LED Backlight Driver. |

# 5.7.19 LED Backlight Driver

## 5.7.19.A Remove LED Backlight Driver

### 5.7.19.A.1 Description

This procedure covers: Remove. Install.

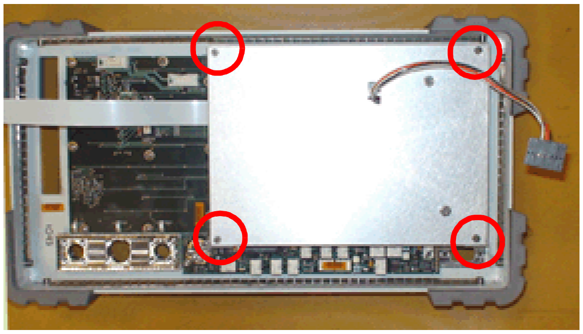
### 5.7.19.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

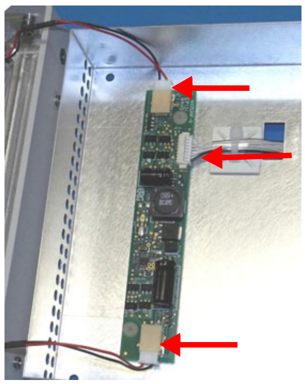
Remove Front Panel Assembly (5 - 76/5 - 100).

STEP PROCEDURE

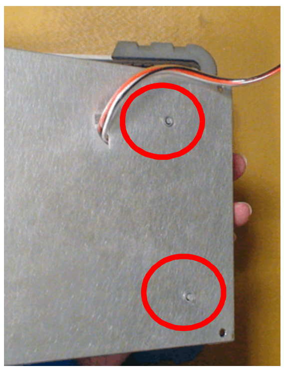
1. Remove four screws securing Display Shield to Front Panel Assembly.



2. Remove Display Shield from Front Panel Assembly. Avoid placing tension on connecting cables.
3. Disconnect wire harnesses from LED Backlight Driver J1, J2 and J3 Connectors.



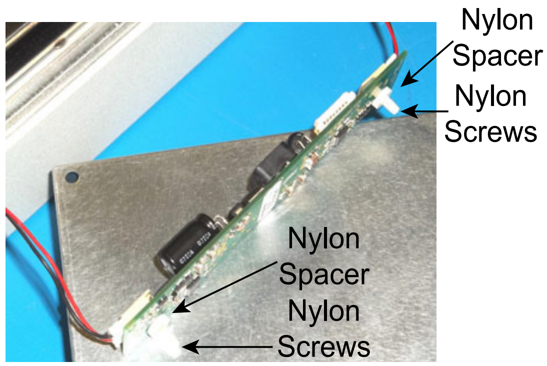
4. Remove two nuts securing LED Backlight Driver to Display Shield.



5. Remove LED Backlight Driver from Display Shield.
6. Remove nylon spacers and nylon screws from LED Backlight Driver.

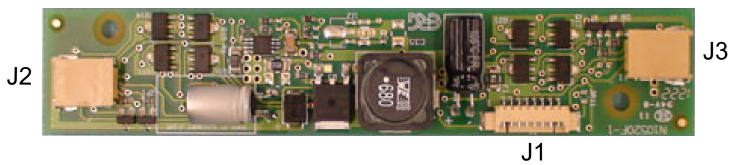
## 5.7.19.B Install LED Backlight Driver

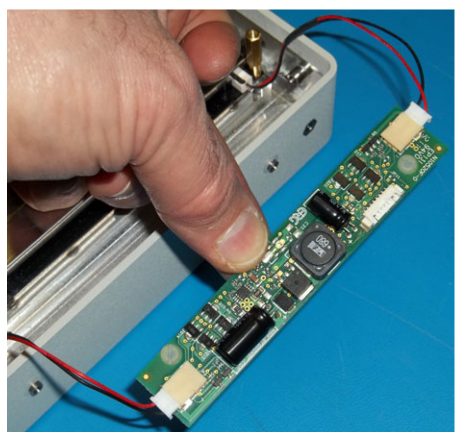
| STEP | PROCEDURE |
|---|---|
| 1. | Insert two nylon screws through holes in LED Backlight Driver. Secure screws with nylon spacers. Tighten spacers until tension is felt. |




**CAUTION** DO NOT OVER TIGHTEN NYLON SPACERS OR NYLON SCREWS MAY BREAK.

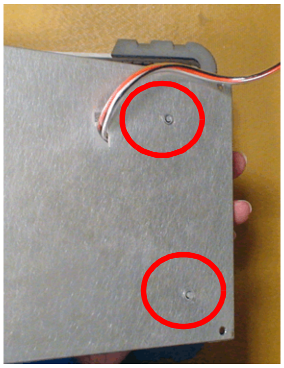
| STEP | PROCEDURE |
|---|---|
| 2. | Connect two wire harnesses from LCD Assembly to LED Backlight Driver J2 and J3 Connectors. |



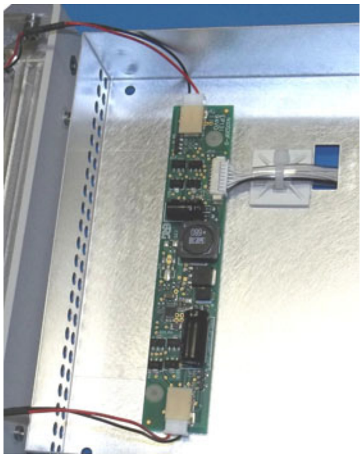



| STEP | PROCEDURE |
|---|---|
| 3. | Align LED Backlight Driver nylon screws with holes in Display Shield. Install LED Backlight Driver on Display Shield. |

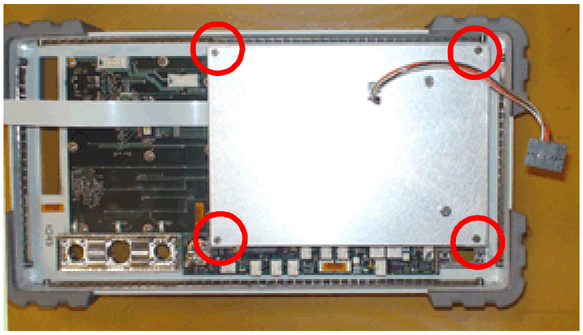
| STEP | PROCEDURE |
|---|---|
| 4. | Install two nuts to secure LED Backlight Driver to Display Shield. Tighten nuts to 32 in/oz. |



| | |
|---|---|
| 5. | Connect W2 Wire Harness to LED Backlight Driver J1 Connector. |
| 6. | Secure W2 Wire Harness to Display Shield with plastic fastener. |



| | |
|---|---|
| 7. | Adjust tension on W2 Wire Harness and ensure it is properly connected to LED Backlight Driver. |
| 8. | Install Display Shield on LCD Assembly. Install four screws securing Display Shield to LCD Assembly. Torque screws to 2 in/lbs. |



## 5.7.19.B.1 Follow-up Procedures:

Case Assembly (5 - 6).

Install Front Panel Assembly (5 - 78/5 - 102).

## 5.7.20 Power Termination Assembly

### 5.7.20.A Remove Power Termination Assembly

#### 5.7.20.A.1 Description

This procedure covers: Remove. Install.

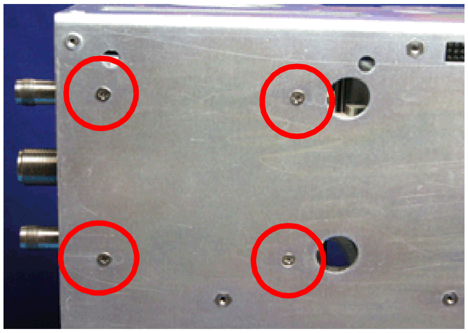
#### 5.7.20.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

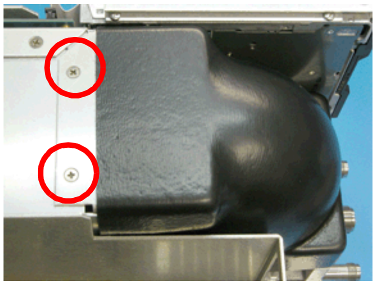
Remove Front Panel Assembly (5 - 76/5 - 100).

STEP PROCEDURE

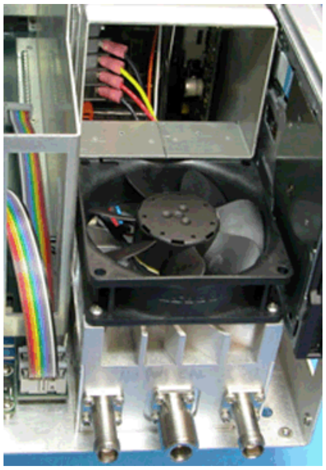
1. Remove four screws securing Power Termination Assembly to bottom of Chassis Assembly.



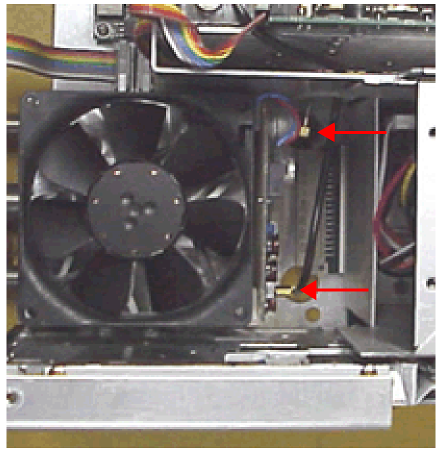
2. Remove two screws securing fan shroud bracket and cover to Power Supply Assembly.



3. Remove fan shroud bracket and cover from Power Termination Assembly.

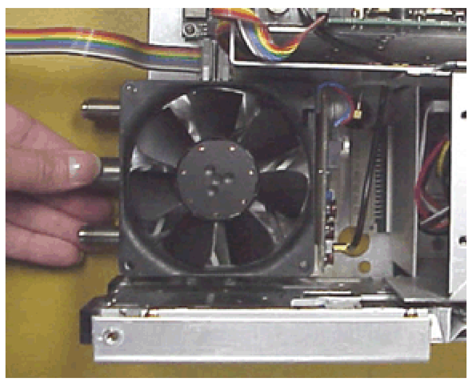


| STEP | PROCEDURE |
|---|---|
| 4. | Disconnect two coaxial cables from back of Power Termination Assembly. |



| | |
|---|---|
| 5. | Pull Power Termination Assembly away from Chassis Assembly to disconnect from Backplane PCB Assembly connector. |

**NOTE** Power Termination Assembly connects directly into Backplane PCB Assembly. Use care when removing Power Termination Assembly to avoid damaging connector pins.

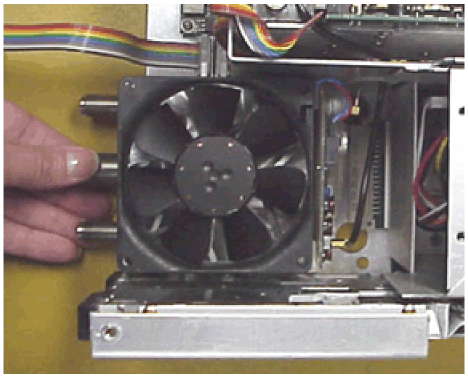


| | |
|---|---|
| 6. | Remove Power Termination Assembly from Chassis Assembly. |

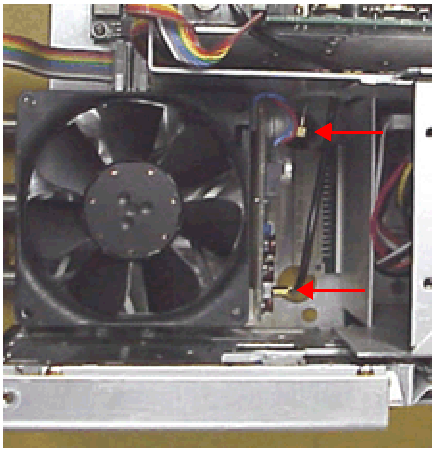
## 5.7.20.B Install Power Termination Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert Power Termination Assembly in Chassis Assembly to align with Backplane PCB Assembly connector. Allow room to connect coaxial cables to back of Power Termination Assembly. |

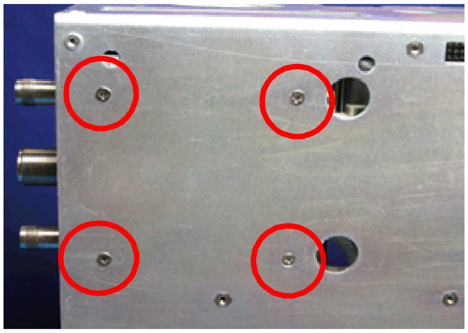
| NOTE | Power Termination Assembly connects directly into Backplane PCB Assembly. Use care when installing Power Termination Assembly to avoid damaging connector pins. |
|---|---|



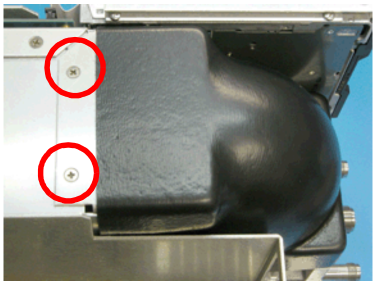
2. Connect two coaxial cables to Power Termination Assembly.



3. Install Power Termination Assembly securely into Chassis Assembly.
4. Install four screws securing Power Termination Assembly to bottom of Chassis Assembly. Torque screws to 6 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 5. | Install fan shroud and bracket over Power Termination Assembly. Install two screws securing fan shroud and bracket to Power Supply Assembly. Torque screws to 6 in/lbs. |



### 5.7.20.B.1 Follow-up Procedures:

Install Front Panel Assembly (5 - 78/5 - 102).

Case Assembly (5 - 6).

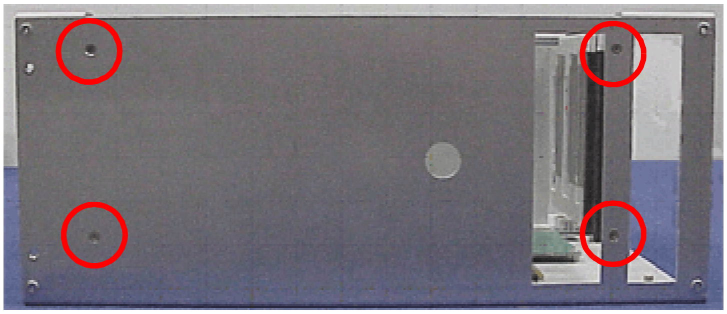
## 5.7.21 Backplane PCB Assembly

### 5.7.21.A Remove Backplane PCB Assembly

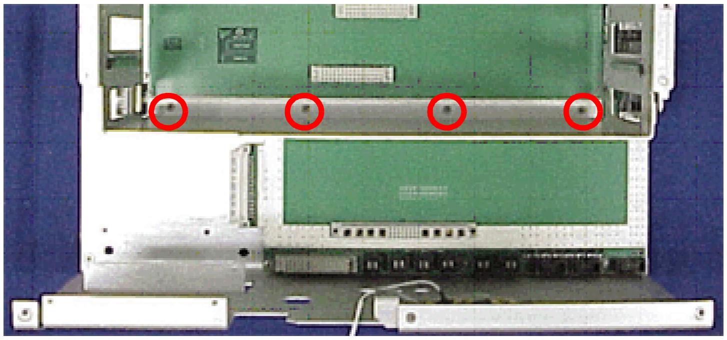
#### 5.7.21.A.1 Preliminary Procedures:

Remove Case Assembly (5 - 4).
Remove Attenuator Assembly (5 - 10).
Remove Generator Assembly (5 - 63/5 - 86).
Remove Receiver Assembly (5 - 67/5 - 91).
Remove IF/Video PCB Assembly (5 - 72/5 - 95).
Remove DAM Carrier PCB Assembly (5 - 12).
Remove CAI PCB Assembly (5 - 14).
Remove CPU Adapter PCB Assembly (5 - 16).
Remove Disk I/O Assembly (5 - 74/5 - 99).
Remove Floppy Disk Assembly (5 - 84) (3901/3902).
Remove DMM Assembly ((5 - 107) (3920).
Remove Power Termination Assembly (5 - 55).
Remove Power Supply Assembly (5 - 33).
Remove Front Panel Assembly (5 - 76/5 - 100).
Remove Front Panel Digital PCB Assembly(5 - 80/5 - 104).
Remove Rear Panel Assembly (5 - 21).
Remove Rear Panel PCB Assembly (5 - 28).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove four screws securing Card Cage Assembly to side of Chassis Assembly. |

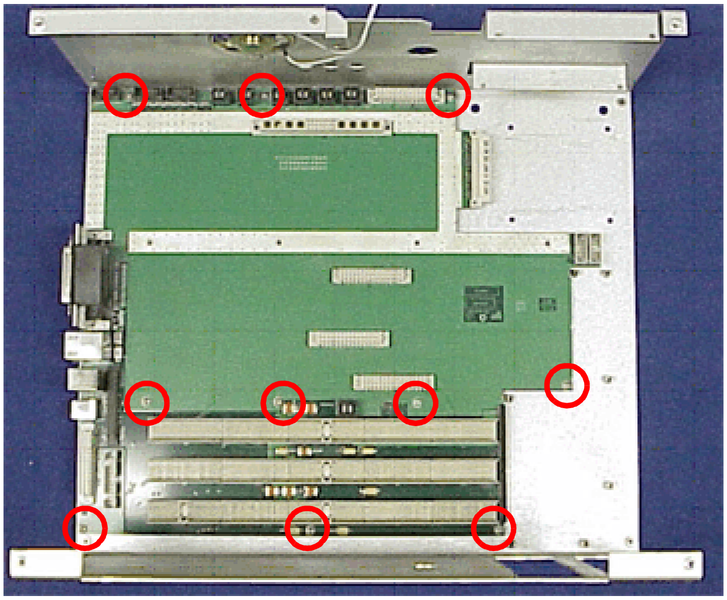


| | |
|---|---|
| 2. | Remove four screws securing Card Cage Assembly to bottom of Chassis Assembly. |



| | |
|---|---|
| 3. | Remove Card Cage Assembly from Chassis Assembly. |

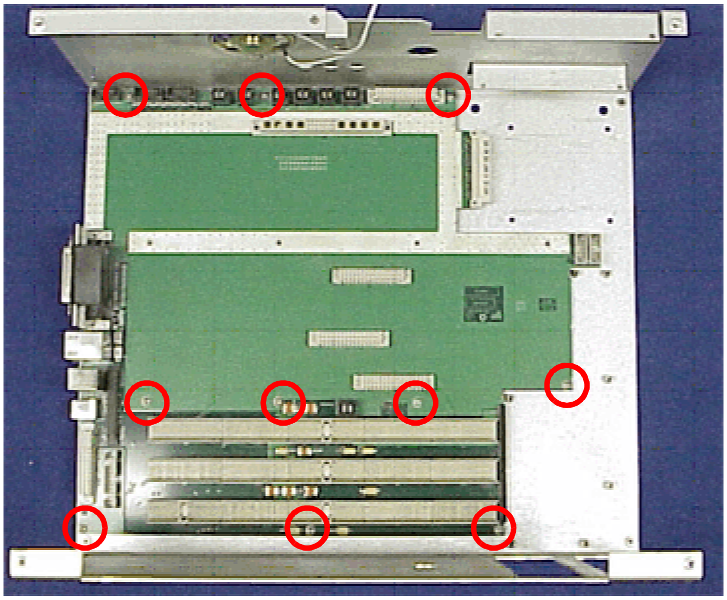
| STEP | PROCEDURE |
|---|---|
| 4. | Remove ten screws securing Backplane PCB Assembly to Chassis Assembly. |



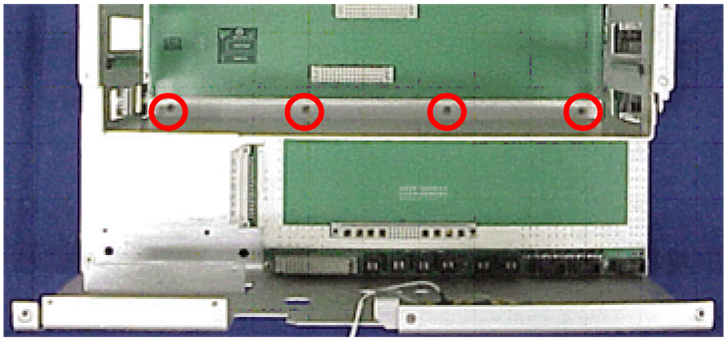
| | |
|---|---|
| 5. | Remove Backplane PCB Assembly from Chassis Assembly. |

## 5.7.21.B Install Backplane PCB Assembly

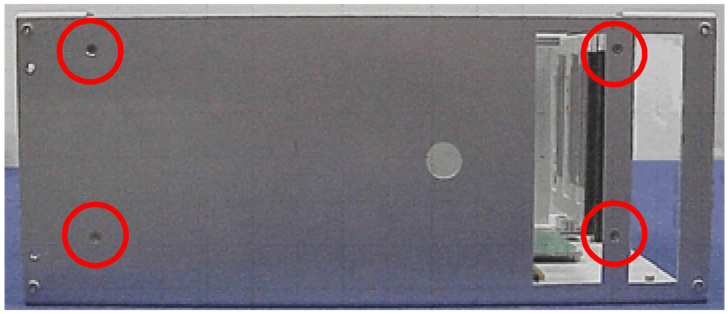
| STEP | PROCEDURE |
|---|---|
| 1. | Install Backplane PCB Assembly in Chassis Assembly. |
| 2. | Install ten screws securing Backplane PCB Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



| | |
|---|---|
| 3. | Position Card Cage Assembly on top of Backplane PCB Assembly. Install four screws securing Card Cage Assembly to bottom of Chassis Assembly. Torque screws to 6 in/lbs. |



| STEP | PROCEDURE |
|---|---|
| 4. | Install four screws securing Card Cage Assembly to Chassis Assembly. Torque screws to 8 in/lbs. |



### 5.7.21.B.1 Follow-up Procedures:

Install Rear Panel PCB Assembly (5 - 28).

Install Rear Panel Assembly (5 - 24).

Install Front Panel Digital PCB Assembly(5 - 82/5 - 106).

Install Power Supply Assembly (5 - 35).

Install Floppy Disk Assembly (5 - 85) (3901/3902).

Install DMM Assembly (5 - 108) (3920)

Install Power Termination Assembly (5 - 57).

Install Disk I/O Assembly (5 - 75/5 - 99).

Install Front Panel Assembly (5 - 78/5 - 102).

Install Generator Assembly 5 - 65/5 - 89).

Install Receiver Assembly (5 - 70/5 - 93).

Install IF/Video PCB Assembly (5 - 73/5 - 97).

Install DAM Carrier PCB Assembly (5 - 13).

Install CAI PCB Assembly (5 - 15).

Install CPU Adapter PCB Assembly (5 - 18).

Install Attenuator Assembly (5 - 11).

Install Case Assembly (5 - 6).

# 5.8 3901/3902 PROCEDURES

The following procedures apply specifically to the 3901 and 3902 models.

## 5.8.1 Generator Assembly 3901/3902

### 5.8.1.A Remove Generator Assembly

#### 5.8.1.A.1 Description

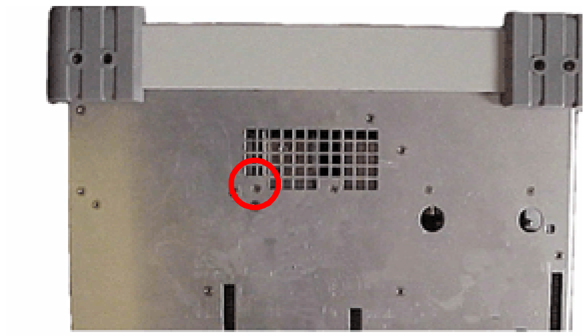
This procedure covers: Remove. Install.

#### 5.8.1.A.2 Preliminary Procedures

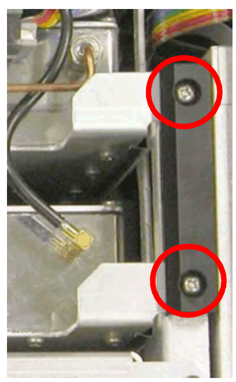
Remove Case Assembly (5 - 4).

Remove Attenuator Assembly (5 - 10).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove screw securing Generator Assembly to bottom of Chassis Assembly. |

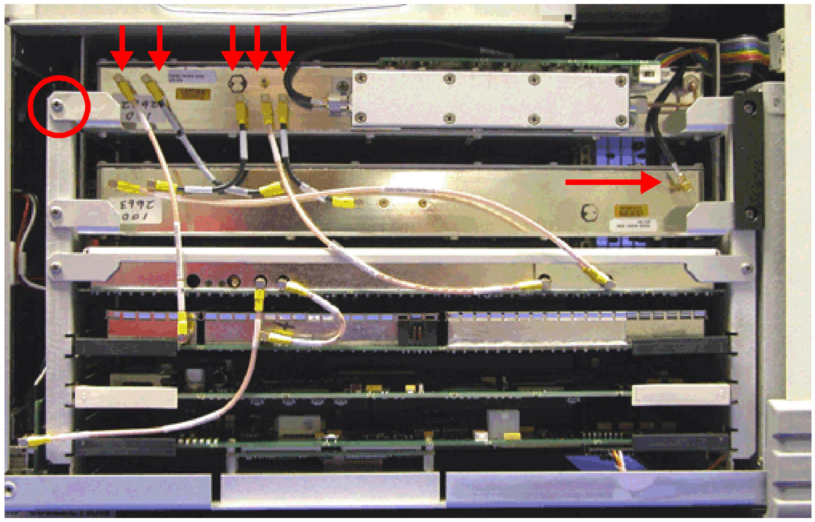


| | |
|---|---|
| 2. | Remove two screws securing black spacer bar and Generator Assembly to Card Cage Assembly. Remove black spacer bar. |

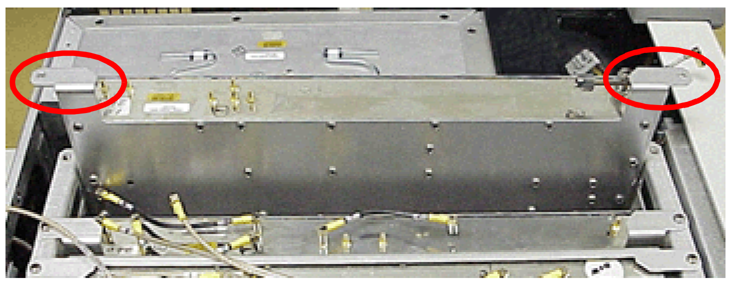


| | |
|---|---|
| 3. | Disconnect coaxial cables from Generator Assembly. |
| 4. | Disconnect coaxial cable from Receiver Assembly. |

| STEP | PROCEDURE |
|---|---|
| 5. | Remove screw securing Generator Assembly to Card Cage Assembly. |



| | |
|---|---|
| 6. | Grasp metal support brackets and remove Generator Assembly from Card Cage Assembly. |

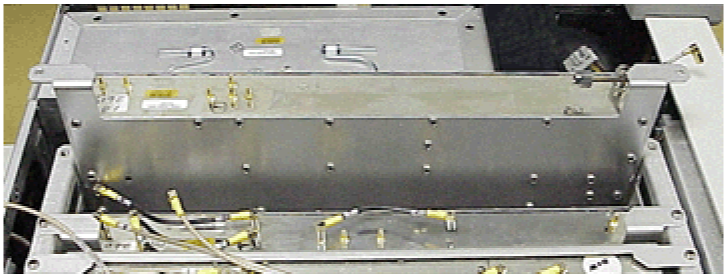


| NOTE | Generator Assembly connects directly into Backplane PCB Assembly. Use care when removing Generator Assembly to avoid damaging connector pins. |
|---|---|

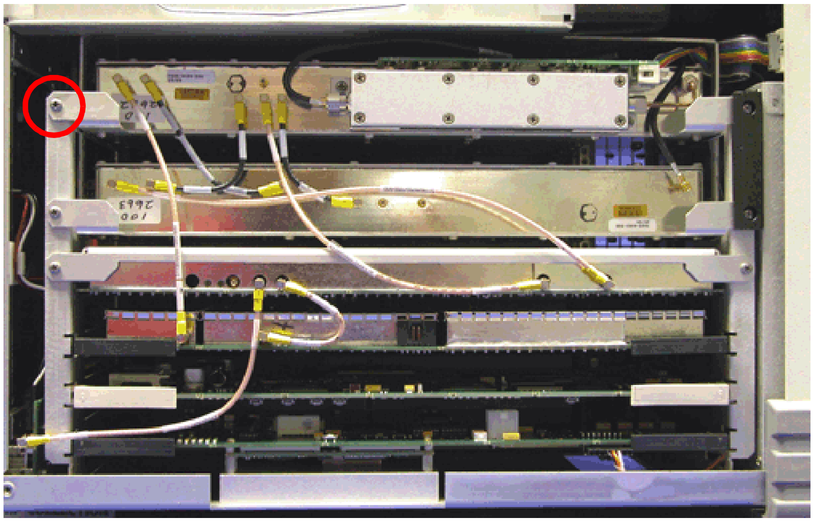
## 5.8.1.B Install Generator Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert Generator Assembly securely into Card Cage Assembly. |

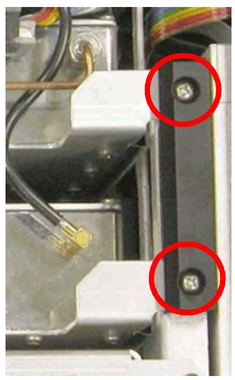
| NOTE | Generator Assembly connects directly into Backplane PCB Assembly. Use care when installing Generator Assembly to avoid damaging connector pins. |
|---|---|



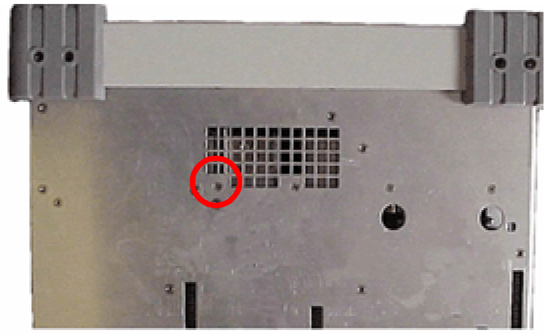
2. Install screw securing Generator Assembly to Card Cage Assembly. Torque screw to 8 in/lbs.



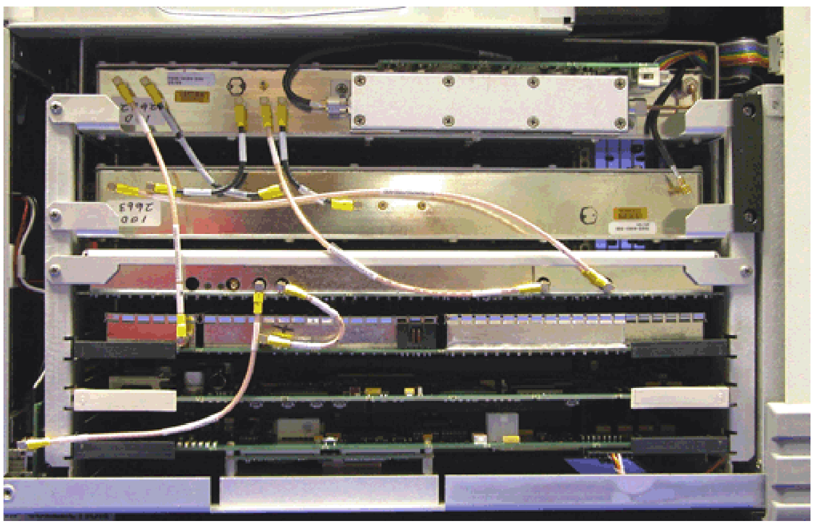
3. Install black spacer bar. Install screws securing black spacer bar and Receiver and Generator Assembly to Card Cage Assembly. Torque screws to 8 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 4. | Install screw securing Generator Assembly to bottom of Chassis Assembly. Torque screw to 8 in/lbs. |



| | |
|---|---|
| 5. | Connect coaxial cables as shown below. |



### 5.8.1.B.1 Follow-up Procedures:

Install Attenuator Assembly (5 - 11).

Install Case Assembly (5 - 6).

## 5.8.2 Receiver Assembly 3901/3902

### 5.8.2.A Remove Receiver Assembly

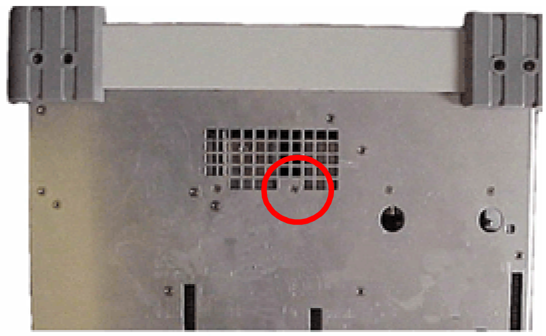
#### 5.8.2.A.1 Description

This procedure covers: Remove. Install.

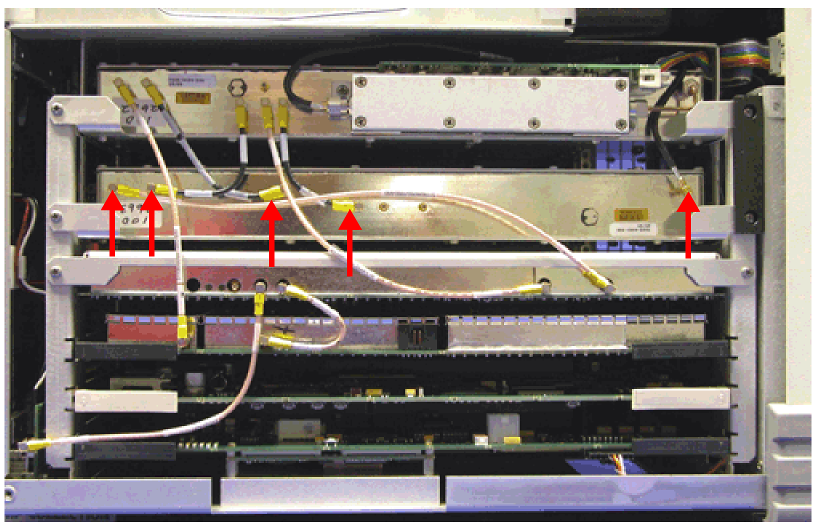
#### 5.8.2.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

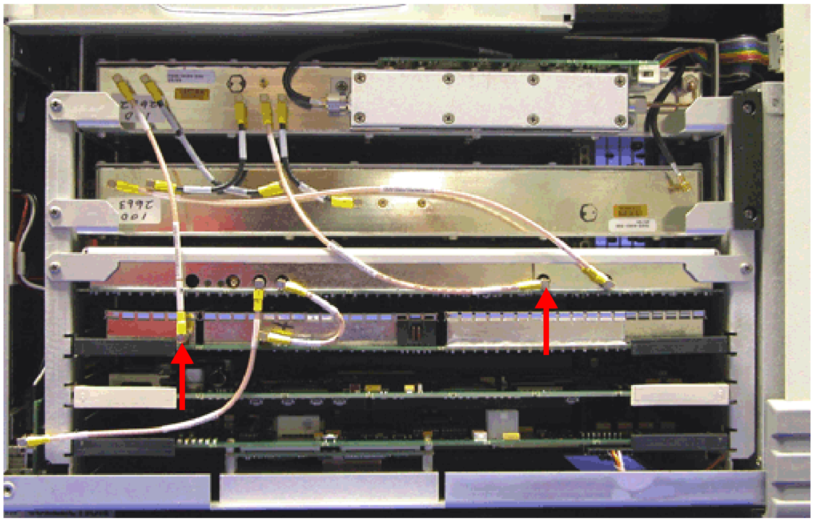
| STEP | PROCEDURE |
|---|---|
| 1. | Remove screw securing Receiver Assembly to bottom of Chassis Assembly. |



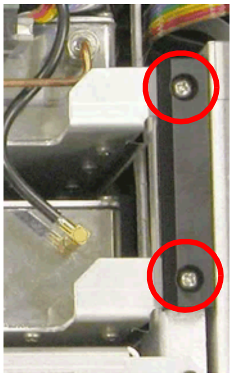
| STEP | PROCEDURE |
|---|---|
| 2. | Disconnect coaxial cables from Receiver Assembly. |



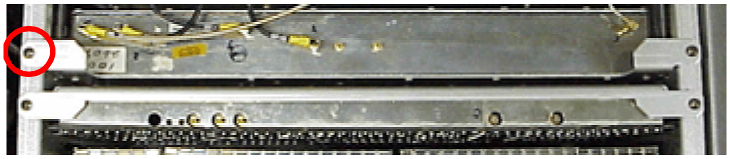
| STEP | PROCEDURE |
|---|---|
| 3. | Disconnect coaxial cables from DAM Carrier PCB Assembly and IF/Video PCB Assembly. |



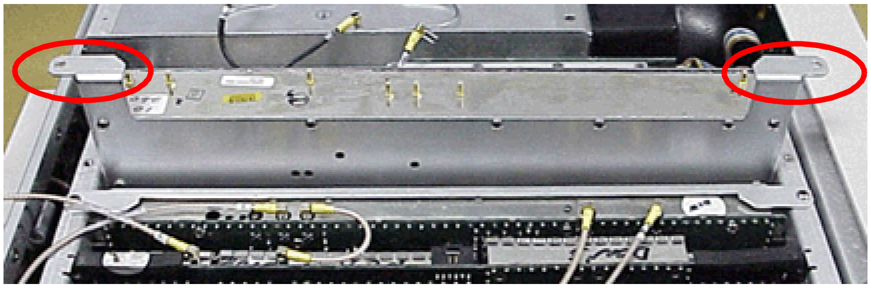
| | |
|---|---|
| 4. | Remove screws securing black spacer bar and Generator and Receiver Assembly to Card Cage Assembly.  Remove black spacer bar. |



| | |
|---|---|
| 5. | Remove screw securing Receiver Assembly to Card Cage Assembly. |



| STEP | PROCEDURE |
|---|---|
| 6. | Grasp metal support brackets and remove Receiver Assembly from Card Cage Assembly. |

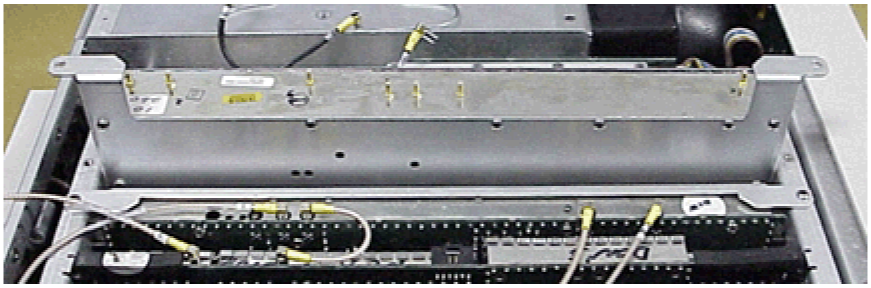


| NOTE | Receiver Assembly connects directly into Backplane PCB Assembly. Use care when removing Receiver Assembly to avoid damaging connector pins. |
|---|---|

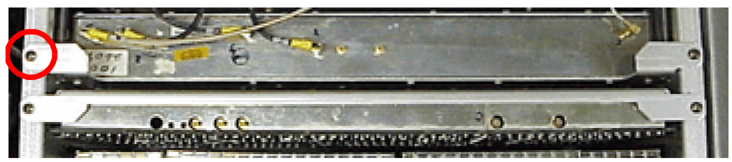
## 5.8.2.B Install Receiver Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert Receiver Assembly securely into Card Cage Assembly. |

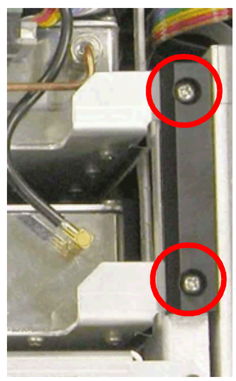
| NOTE | Receiver Assembly connects directly into Backplane PCB Assembly. Use care when installing Receiver Assembly to avoid damaging connector pins. |
|---|---|



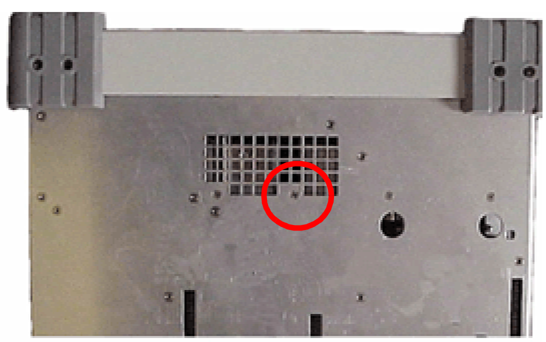
2. Install screw securing Receiver Assembly to Card Cage Assembly. Torque screw to 8 in/lbs.



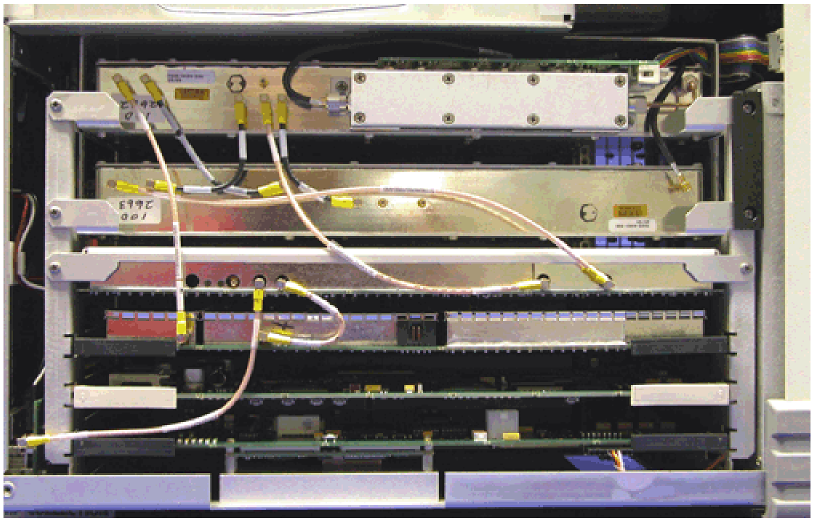
3. Install black spacer bar. Install screws securing black spacer bar and Receiver and Generator Assembly to Card Cage Assembly. Torque screws to 8 in/lbs.



4. Install screw securing Receiver Assembly to bottom of Chassis Assembly. Torque screw to 8 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 5. | Connect coaxial cables as shown below. |



## 5.8.2.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.8.3 IF/Video PCB Assembly 3901/3902

### 5.8.3.A Remove IF/Video PCB Assembly

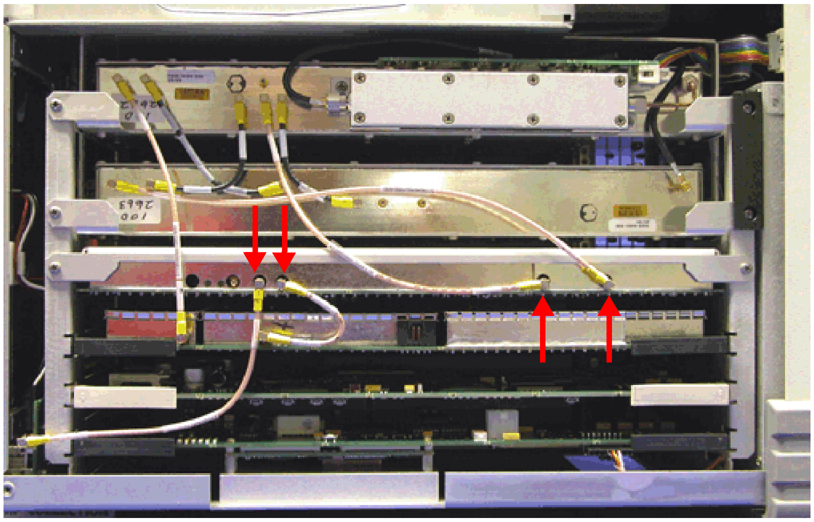
#### 5.8.3.A.1 Description

This procedure covers: Remove. Install.

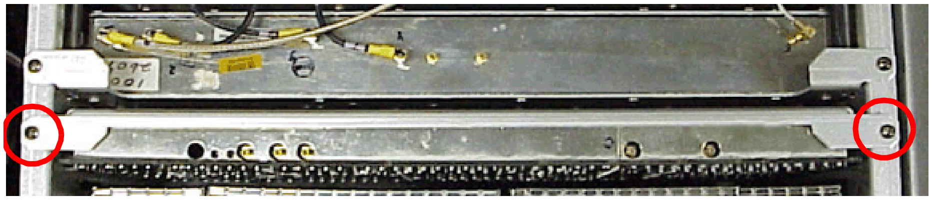
#### 5.8.3.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

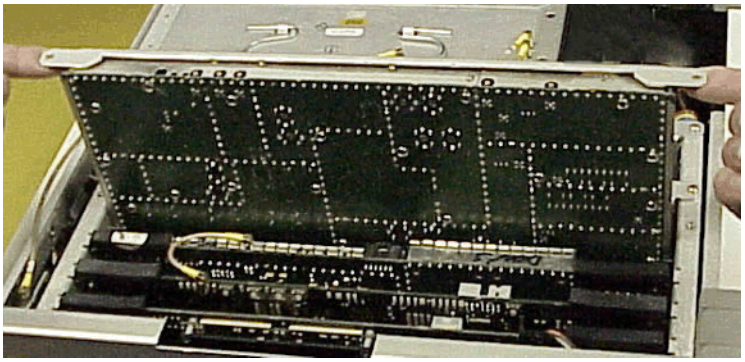
| STEP | PROCEDURE |
|---|---|
| 1. | Disconnect coaxial cable from Generator Assembly. |
| 2. | Disconnect coaxial cables from IF/Video PCB Assembly. |



3. Remove two screws securing IF/Video PCB Assembly to Card Cage Assembly.



4. Grasp metal support brackets and remove IF/Video PCB Assembly from Card Cage Assembly.

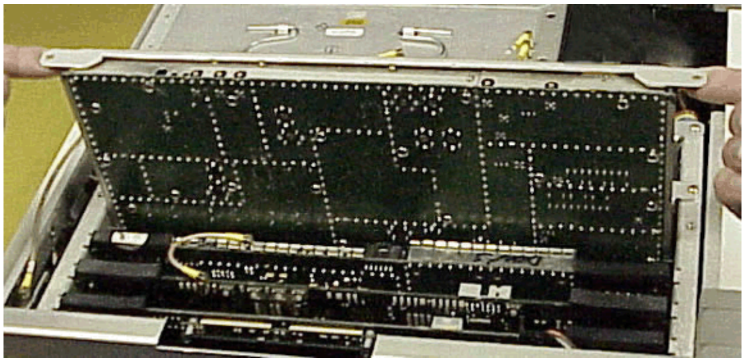


| NOTE | IF Video PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing IF/Video PCB Assembly to avoid damaging connector pins. |
|---|---|

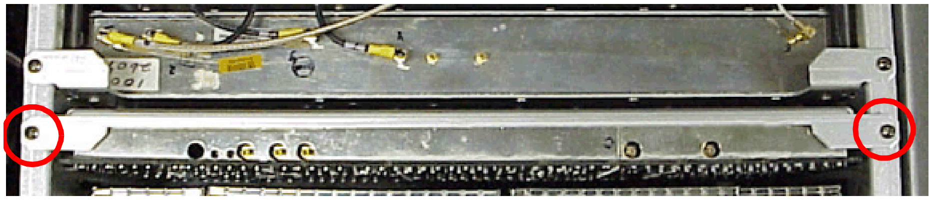
## 5.8.3.B Install IF/Video PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert IF/Video PCB Assembly securely into Card Cage Assembly. |

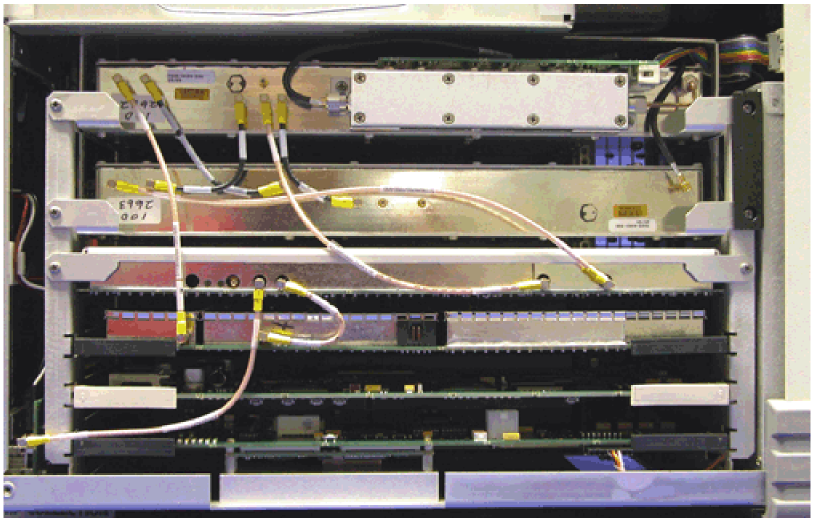
> **NOTE** IF Video PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing IF/Video PCB Assembly to avoid damaging connector pins.



2. Install two screws securing IF/Video PCB Assembly to Card Cage Assembly. Torque screws to 8 in/lbs.



3. Connect coaxial cables as shown below.



### 5.8.3.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.8.4 Disk I/O PCB Assembly 3901/3902

### 5.8.4.A Remove Disk I/O PCB Assembly (3901/3902)

#### 5.8.4.A.1 Description

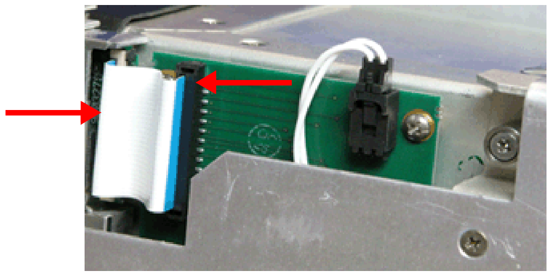
This procedure covers: Remove. Install.

#### 5.8.4.A.2 Preliminary Procedures

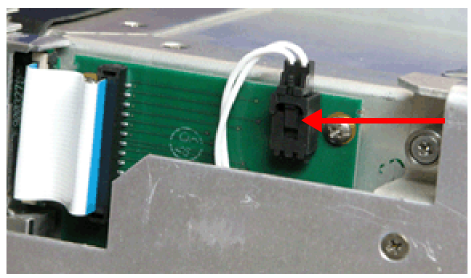
Remove Case Assembly (5 - 4).

STEP PROCEDURE

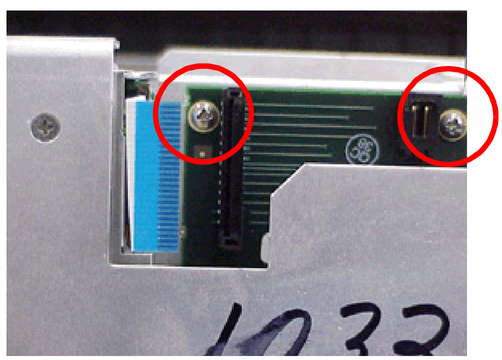
1. Open securing clip and disconnect ribbon cable from Disk I/O PCB Assembly.



2. Disconnect wire harness from Disk I/O PCB Assembly.



3. Remove two screws securing Disk I/O PCB Assembly to Power Supply Assembly.



4. Remove Disk I/O PCB Assembly from Chassis Assembly.

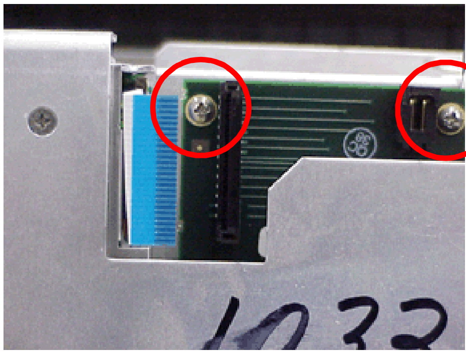
| NOTE | Disk I/O PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing Disk I/O PCB Assembly to avoid damaging connector pins. |
| --- | --- |

## 5.8.4.B Install Disk I/O PCB Assembly (3901/3902)

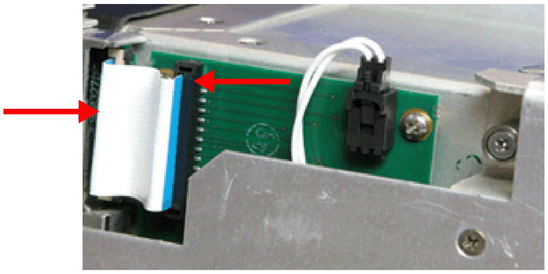
| STEP | PROCEDURE |
|---|---|
| 1. | Install Disk I/O PCB Assembly in Chassis Assembly. |

| NOTE | Disk I/O PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing Disk I/O PCB Assembly to avoid damaging connector pins. |
|---|---|

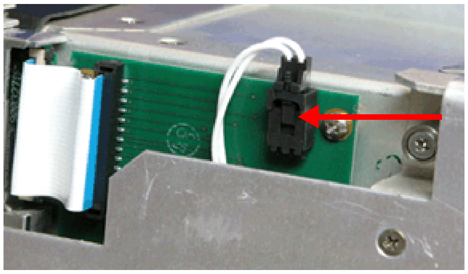
2. Install two screws securing Disk I/O PCB Assembly to Power Supply Assembly. Torque screws to 6 in/lbs.



3. Connect ribbon cable from Floppy Drive Assembly to Disk I/O PCB Assembly and close cable securing clip.



4. Connect wire harness from Speaker Wire Harness Assembly to Disk I/O PCB Assembly.



### 5.8.4.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.8.5 Front Panel Assembly 3901/3902

### 5.8.5.A Remove Front Panel Assembly

#### 5.8.5.A.1 Description

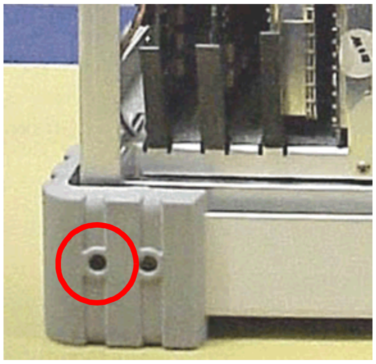
This procedure covers: Remove. Install.

#### 5.8.5.A.2 Preliminary Procedures

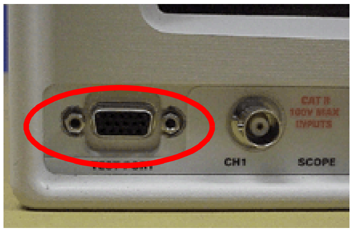
Remove Case Assembly (5 - 4).

STEP PROCEDURE

1. Place Test Set with display side down on stable work surface. Remove outside screw from each corner of Front Panel corner bumper (total of eight screws).

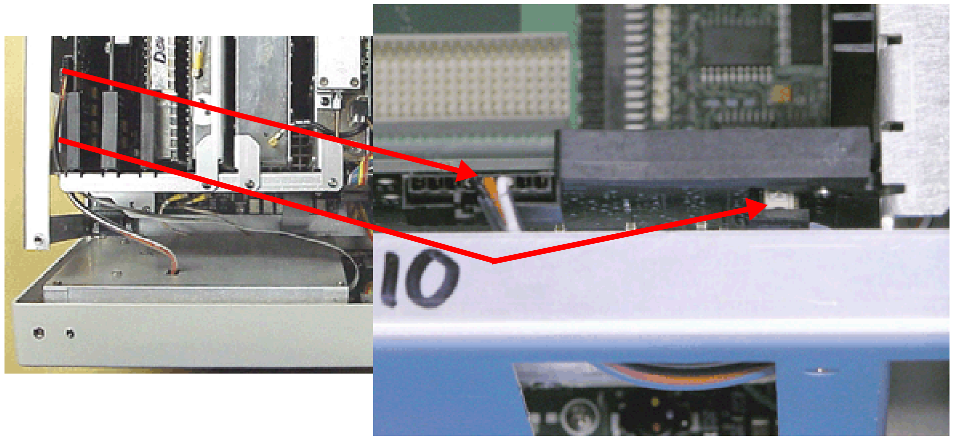


2. Place Test Set on bottom side on stable work surface. Remove two screws from Test Connector.




3. Remove nuts from GEN, T/R and ANT Connectors.

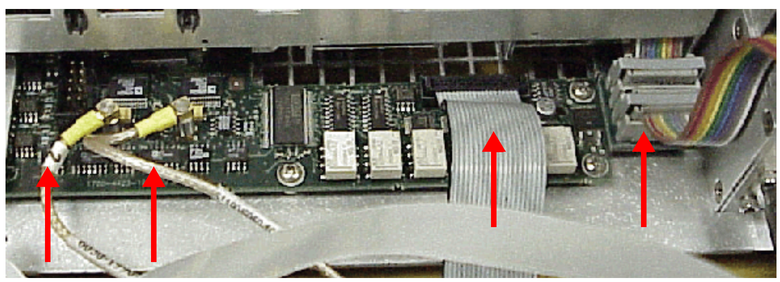
| STEP | PROCEDURE |
|---|---|
| 4. | Disconnect wire harness and ribbon cable from CPU Adapter PCB Assembly. Carefully pull through opening in Card Cage Assembly. |




| | |
|---|---|
| 5. | Remove Front Panel Assembly from Chassis Assembly. |

| | |
|---|---|
| **NOTE** | Use care when removing Front Panel Assembly to avoid damaging fingerstock. |

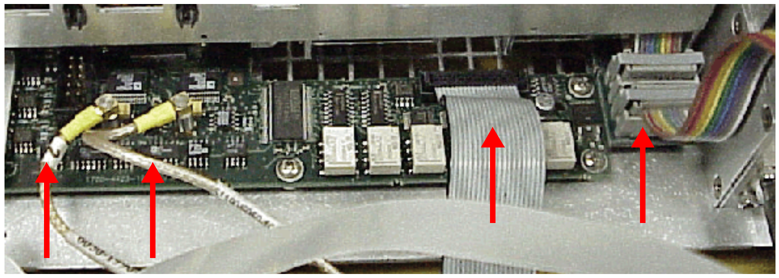
| | |
|---|---|
| 6. | Disconnect cables from Backplane PCB Assembly and Front Panel Digital PCB Assembly. |



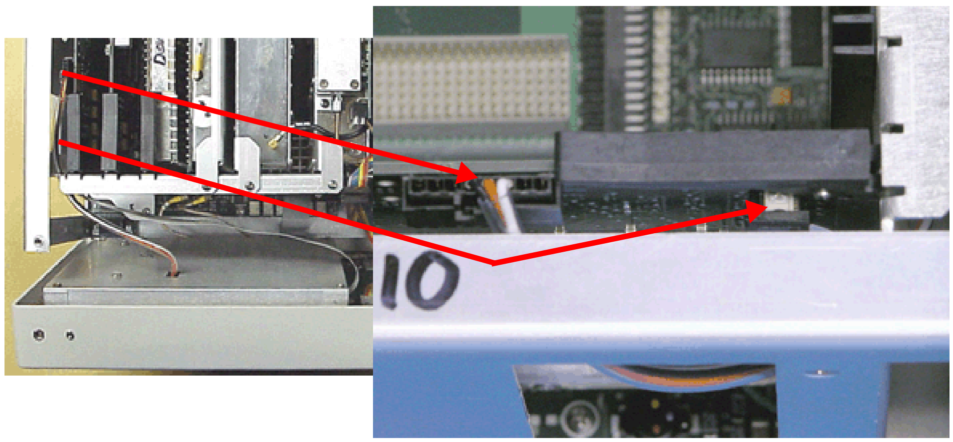
## 5.8.5.B Install Front Panel Assembly

STEP PROCEDURE

1. Attach cables connecting Front Panel Assembly to Backplane PCB Assembly and Front Panel Digital PCB Assembly. Verify cables are secure at both ends.



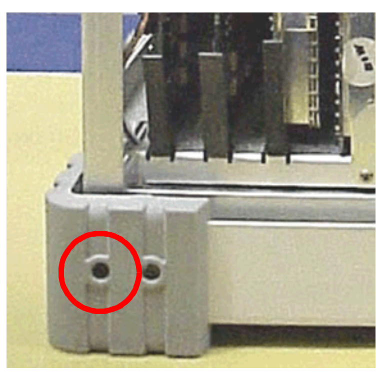
2. Feed wire harness and ribbon cable from Front Panel Assembly through Card Cage Assembly and connect to CPU Adapter PCB Assembly.



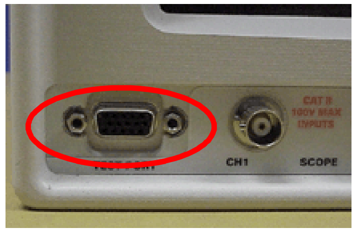
3. Verify all cables and wire harnesses are securely connected and install Front Panel Assembly on Chassis Assembly.

| NOTE | Use care when installing Front Panel Assembly to avoid pinching cables and/or damaging fingerstock. |
|---|---|

4. Install screw at each corner of Front Panel corner bumpers (total of eight screws). Torque screws to 8 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 5. | Install two screws on Test Connector. Torque nuts to 4 in/lbs. |




| STEP | PROCEDURE |
|---|---|
| 6. | Install nuts at GEN, T/R and ANT Connectors. Torque nuts to 40 in/lbs. |


### 5.8.5.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.8.6 Front Panel Digital Interface PCB Assembly 3901/3902

### 5.8.6.A Remove Front Panel Digital Interface PCB Assembly

#### 5.8.6.A.1 Description

This procedure covers: Remove. Install.

#### 5.8.6.A.2 Preliminary Procedures

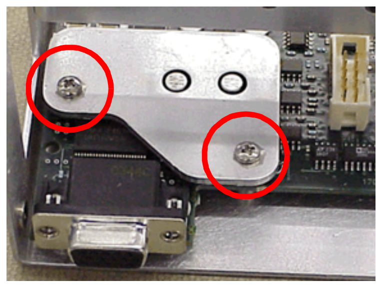
Remove Case Assembly (5 - 4).

Remove IF/Video PCB Assembly (5 - 72).

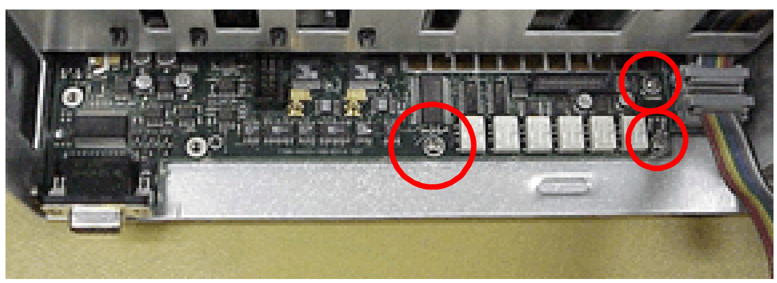
Remove DAM Carrier PCB Assembly (5 - 12).

Remove Front Panel Assembly (5 - 76).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove two screws securing metal heat sink and Front Panel Digital Interface PCB Assembly to Chassis Assembly. |

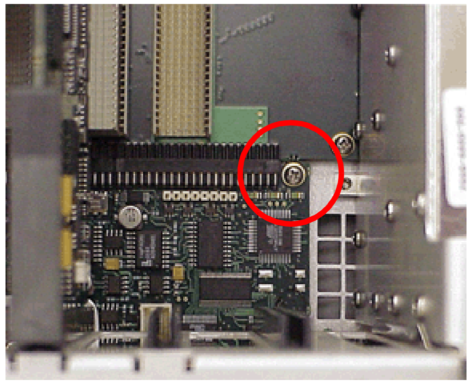


| STEP | PROCEDURE |
|---|---|
| 2. | Remove three screws securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. |



| STEP | PROCEDURE |
|---|---|
| 3. | Remove screw securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. |

| STEP | PROCEDURE |
|---|---|
| 4. | Remove screw securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. |



| | |
|---|---|
| 5. | Remove Front Panel Digital Interface PCB Assembly from Chassis Assembly. |

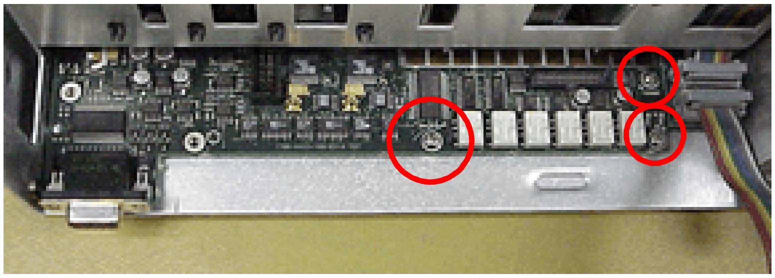
| NOTE | Use care when removing Front Panel Digital Interface Assembly to avoid damaging components on bottom of assembly. |
|---|---|

## 5.8.6.B Install Front Panel Digital Interface PCB Assembly

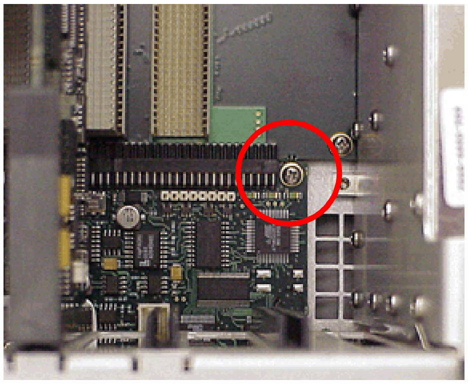
| STEP | PROCEDURE |
|---|---|
| 1. | Place Front Panel Digital Interface PCB Assembly on Chassis Assembly. |

| NOTE | Use care when installing Front Panel Digital Interface Assembly to avoid damaging components on bottom of assembly. |
|---|---|

2. Install three screws securing Front Panel Digital Interface PCB Assembly at front side of Chassis Assembly. Torque screws to 6 in/lbs.

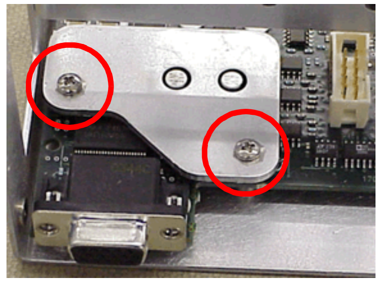


3. Install screw securing Front Panel Digital Interface PCB Assembly inside of Chassis Assembly. Torque screw to 6 in/lbs.



4. Install screw securing corner of Front Panel Digital Interface PCB Assembly at side of Chassis Assembly. Torque screw to 6 in/lbs.

| STEP | PROCEDURE |
|---|---|
| 5. | Install metal heat sink and two screws securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



### 5.8.6.B.1 Follow-up Procedures:

Install Front Panel Assembly (5 - 78).

Install IF/Video PCB Assembly (5 - 73).

Install DAM Carrier PCB Assembly (5 - 13).

Install Case Assembly (5 - 6).

## 5.8.7 Floppy Drive Assembly 3901/3902

### 5.8.7.A Remove Floppy Drive Assembly

#### 5.8.7.A.1 Description

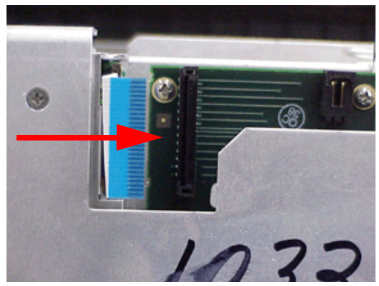
This procedure covers: Remove. Install.

#### 5.8.7.A.2 Preliminary Procedures

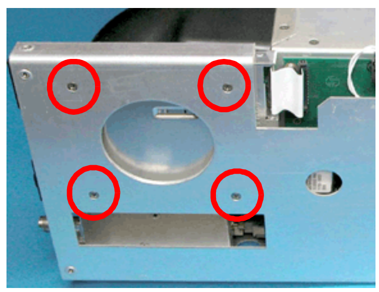
Remove Case Assembly (5 - 4).

Remove Front Panel Assembly (5 - 76).

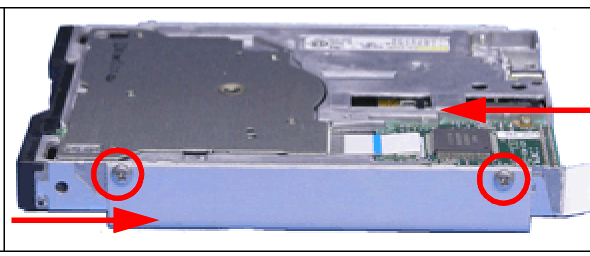
| STEP | PROCEDURE |
|---|---|
| 1. | Open securing clip and disconnect ribbon cable from Floppy Drive Assembly. |



| | |
|---|---|
| 2. | Remove four screws securing Floppy Drive Assembly to Chassis Assembly. |

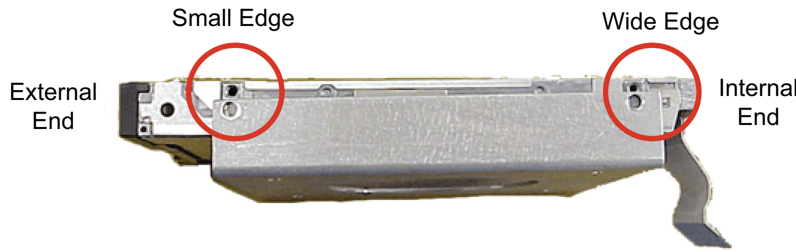


| | |
|---|---|
| 3. | Remove Floppy Bracket containing Floppy Drive Assembly from Chassis Assembly. |
| 4. | Remove two screws securing Floppy Drive Assembly to Floppy Bracket. Repeat procedure on other side. Remove Floppy Drive Assembly from Floppy Bracket. |

| | | |
|---|---|---|
| Floppy Bracket |  | Floppy Drive Assembly |

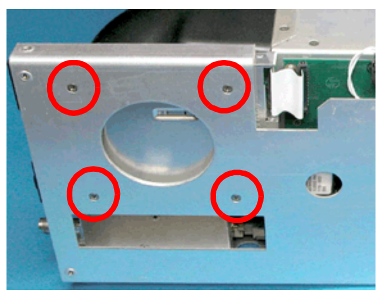
## 5.8.7.B Install Floppy Drive Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Install Floppy Drive Assembly in Floppy Bracket. Align holes in Floppy Bracket with screw holes in Floppy Drive Assembly as shown in picture below. |

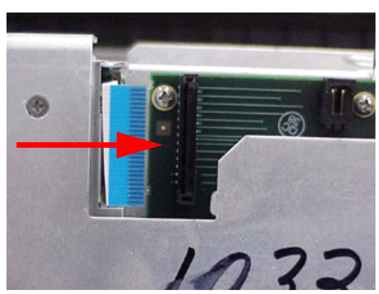



| | |
|---|---|
| 2. | Install two screws securing Floppy Drive Assembly to Floppy Bracket. Torque screws to 6 in/lbs. Repeat procedure on other side. |


| | |
|---|---|
| 3. | Insert Floppy Bracket containing Floppy Drive Assembly in Chassis Assembly. |
| 4. | Install four screws securing Floppy Bracket containing Floppy Drive Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



| | |
|---|---|
| 5. | Connect ribbon cable from Disk I/O PCB Assembly to Floppy Drive Assembly and close securing clip. |



### 5.8.7.B.1 Follow-up Procedures:

Install Front Panel Assembly (5 - 78).

Install Case Assembly (5 - 6).

# 5.9 3920/3920B PROCEDURES

The following procedures apply specifically to the 3920 and 3920B models.

| NOTE | Images show 3920 hardware configuration. 3920B hardware configuration varies slightly from the 3920 but the remove/install procedures are identical. |
|---|---|

## 5.9.1 Generator Assembly 3920/3920B

### 5.9.1.A Remove Generator Assembly

#### 5.9.1.A.1 Description

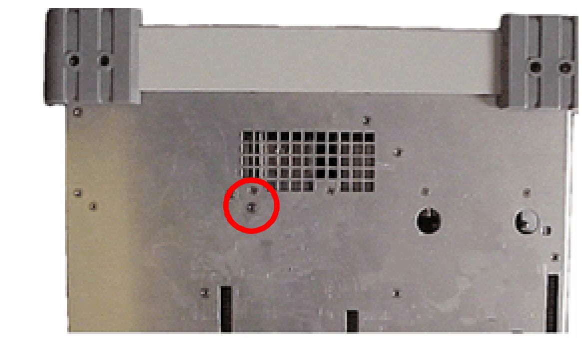
This procedure covers: Remove. Install.

#### 5.9.1.A.2 Preliminary Procedures

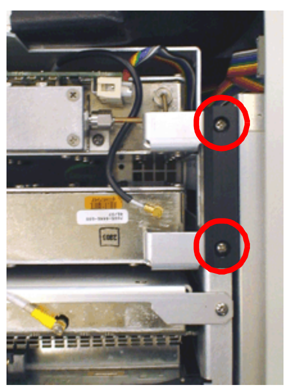
Remove Case Assembly (5 - 4).

STEP PROCEDURE

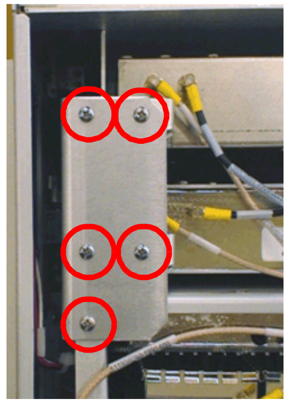
1. Remove screw securing Generator Assembly to bottom of Chassis Assembly.



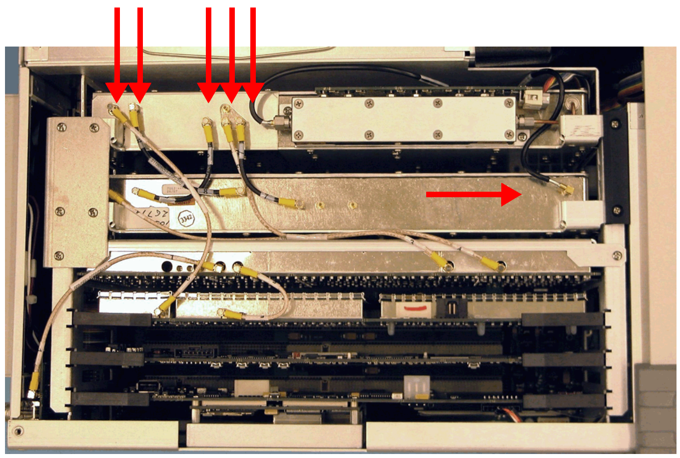
2. Remove two screws securing black spacer bar and Generator Assembly to Card Cage Assembly. Remove black spacer bar.



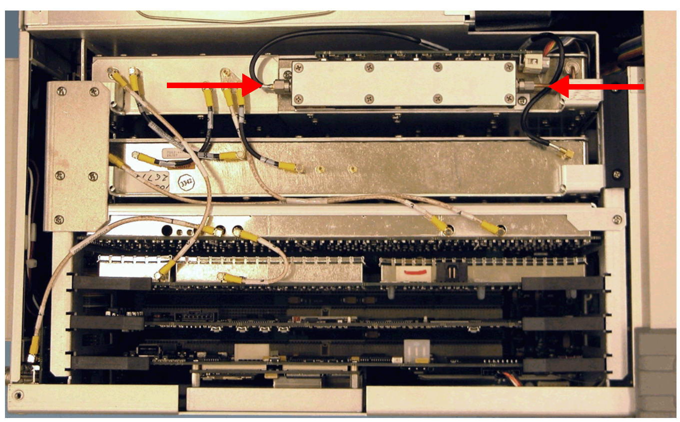
| STEP | PROCEDURE |
|---|---|
| 3. | Remove five screws securing metal support bracket and Generator Assembly to Card Cage Assembly. Remove metal support bracket. |



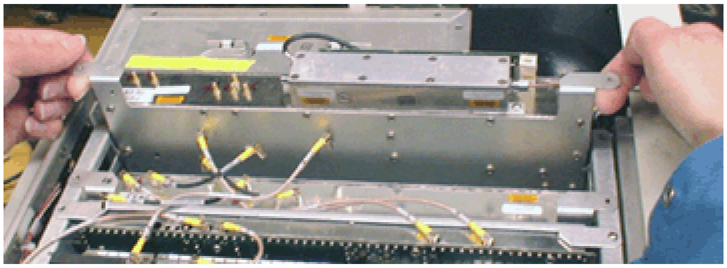
| | |
|---|---|
| 4. | Disconnect coaxial cables connected to Generator Assembly. |
| 5. | Disconnect coaxial cable from Receiver Assembly. |



| | |
|---|---|
| 6. | Disconnect coaxial cable and ribbon cable from Attenuator Assembly. |



| STEP | PROCEDURE |
|---|---|
| 7. | Grasp metal support brackets and remove Generator Assembly from Card Cage Assembly. |



| | |
|---|---|
| NOTE | Generator Assembly connects directly into Backplane PCB Assembly. Use care when removing Generator Assembly to avoid damaging connector pins. |

### 5.9.1.A.3 Follow-up Procedures:

Remove Attenuator Assembly (5 - 10).

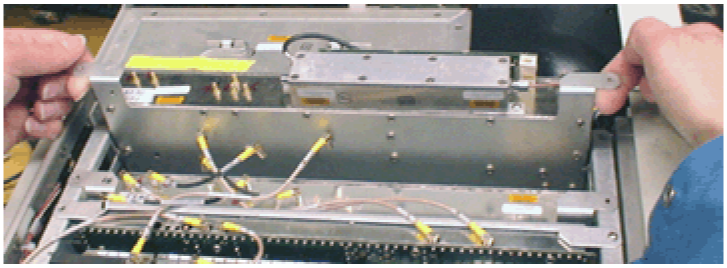
## 5.9.1.B Install Generator Assembly

### 5.9.1.B.1 Preliminary Procedures

Install Attenuator Assembly (5 - 11).

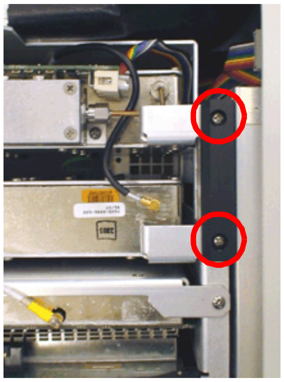
STEP PROCEDURE

1. Insert Generator Assembly securely into Card Cage Assembly.

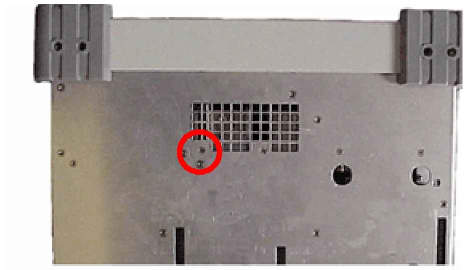


| NOTE | Generator Assembly connects directly into Backplane PCB Assembly. Use care when installing Generator Assembly to avoid damaging connector pins. |
|---|---|

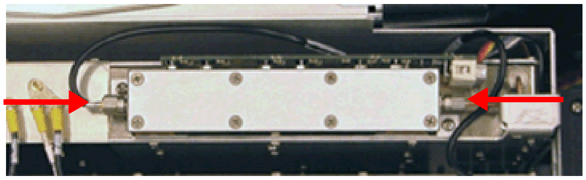
2. Install black spacer bar. Install two screws securing black spacer bar and Receiver and Generator Assembly to Card Cage Assembly. Torque screws to 8 in/lbs.



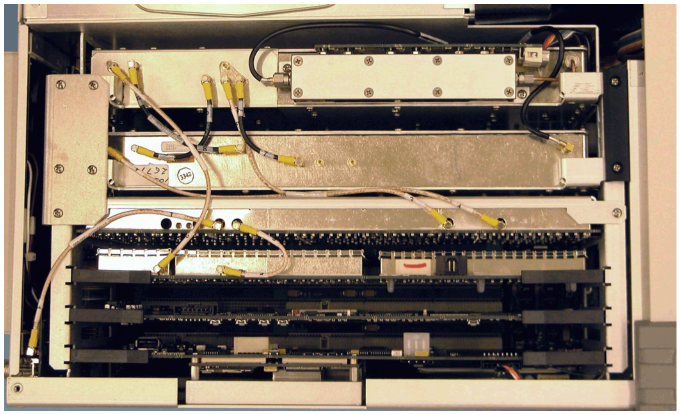
3. Install screw securing Generator Assembly to bottom of Chassis Assembly. Torque screw to 8 in/lbs.



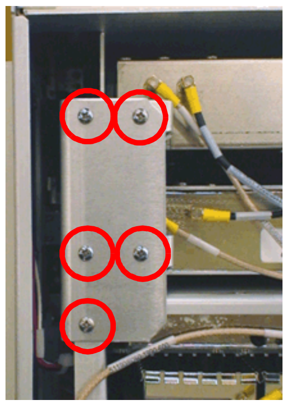
4. Connect ribbon cable and coaxial cable to Attenuator Assembly. Torque coaxial cable to 8 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 5. | Connect cables to Generator and Receiver Assembly as shown below. |



| | |
|---|---|
| 6. | Install metal support bracket. Install five screws securing metal support bracket and Generator Assembly to Card Cage Assembly. Torque screws to 8 in/lbs. |



### 5.9.1.B.2 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.9.2 Receiver Assembly 3920/3920B

### 5.9.2.A Remove Receiver Assembly

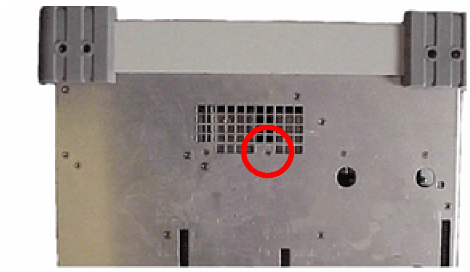
#### 5.9.2.A.1 Description

This procedure covers: Remove. Install.

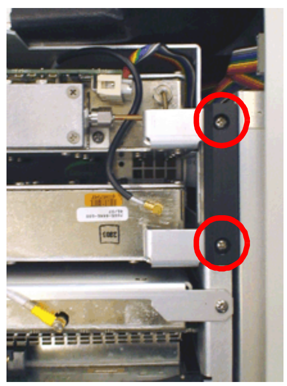
#### 5.9.2.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

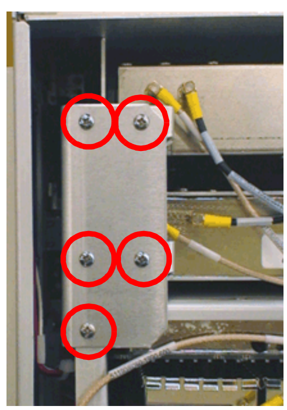
| STEP | PROCEDURE |
|---|---|
| 1. | Remove screw securing Receiver Assembly to bottom of Chassis Assembly. |



| | |
|---|---|
| 2. | Remove two screws securing black spacer bar and Receiver Assembly to Card Cage Assembly. Remove black spacer bar. |

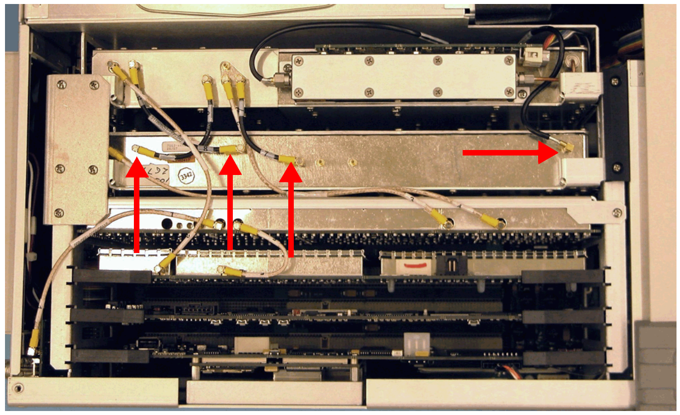


| | |
|---|---|
| 3. | Remove five screws securing metal support bracket and Receiver Assembly to Card Cage Assembly. Remove metal support bracket. |

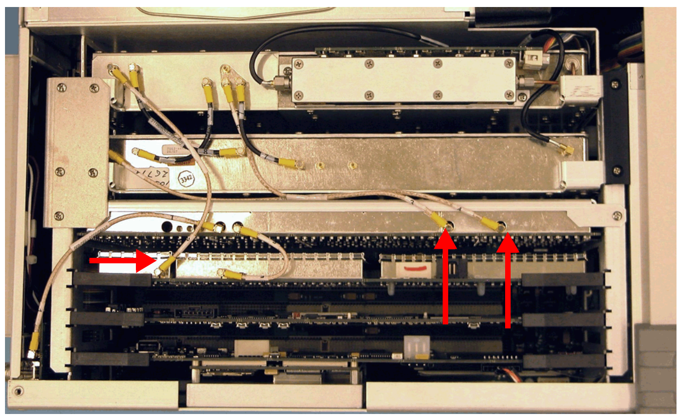


| | |
|---|---|
| 4. | Disconnect coaxial cable from Receiver Assembly. |

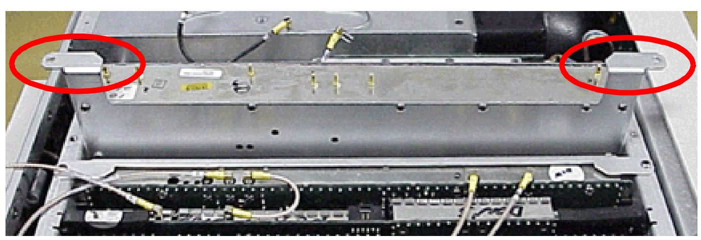
| STEP | PROCEDURE |
|---|---|
| 5. | Disconnect cables from Receiver Assembly. |



| | |
|---|---|
| 6. | Disconnect coaxial cables from IF/Video PCB Assembly. |
| 7. | Disconnect coaxial cable from DAM Carrier PCB Assembly. |



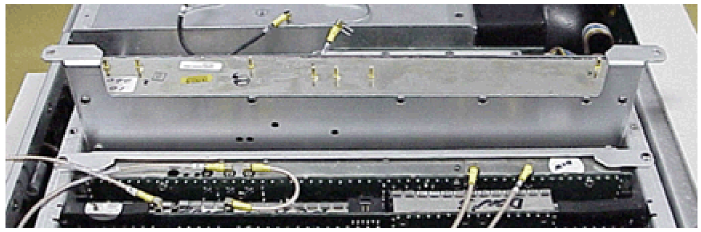
| | |
|---|---|
| 8. | Grasp metal support brackets and remove Receiver Assembly from Card Cage Assembly. |



| NOTE | Receiver Assembly connects directly into Backplane PCB Assembly. Use care when removing Receiver Assembly to avoid damaging connector pins. |
|---|---|

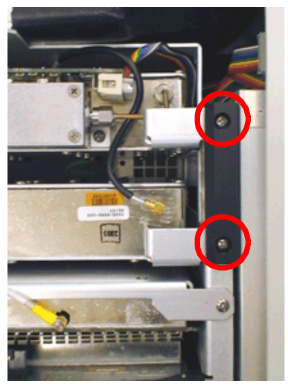
## 5.9.2.B Install Receiver Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert Receiver Assembly securely into Card Cage Assembly. |

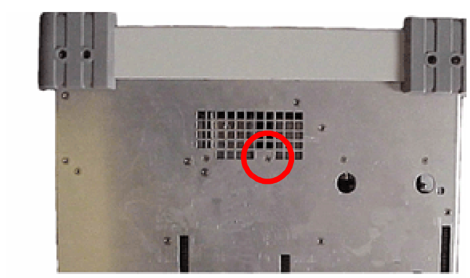


> **NOTE** Receiver Assembly connects directly into Backplane PCB Assembly. Use care when installing Receiver Assembly to avoid damaging connector pins.

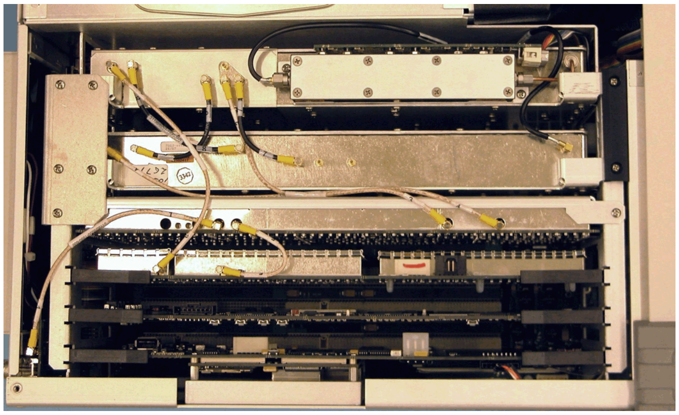
2. Install black spacer bar. Install screws securing black spacer bar and Receiver Assembly to Card Cage Assembly. Torque screws to 8 in/lbs.



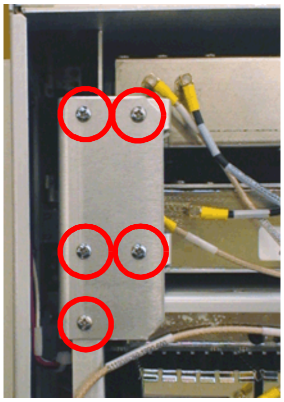
3. Install screw securing Receiver Assembly to bottom of Chassis Assembly. Torque screw to 8 in/lbs.



| STEP | PROCEDURE |
|---|---|
| 4. | Connect cables as shown below. |



| | |
|---|---|
| 5. | Install metal support bracket. Install five screws securing metal support bracket and Receiver Assembly to Card Cage Assembly. Torque screw to 8 in/lbs. |



### 5.9.2.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.9.3 IF/Video PCB Assembly 3920/3920B

### 5.9.3.A Remove IF/Video PCB Assembly

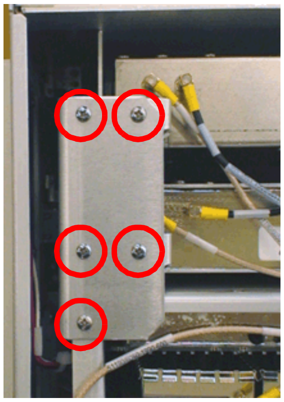
#### 5.9.3.A.1 Description

This procedure covers: Remove. Install.

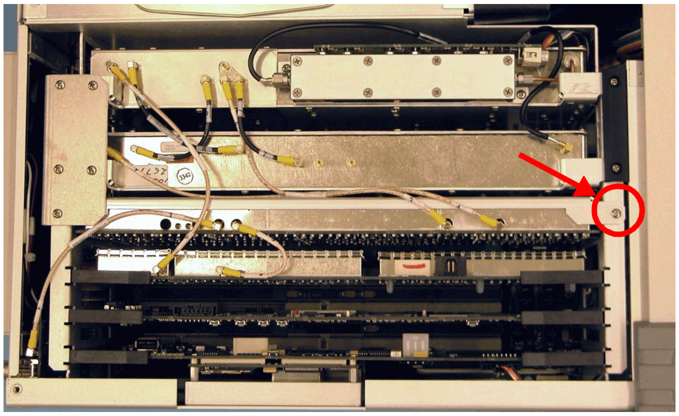
#### 5.9.3.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

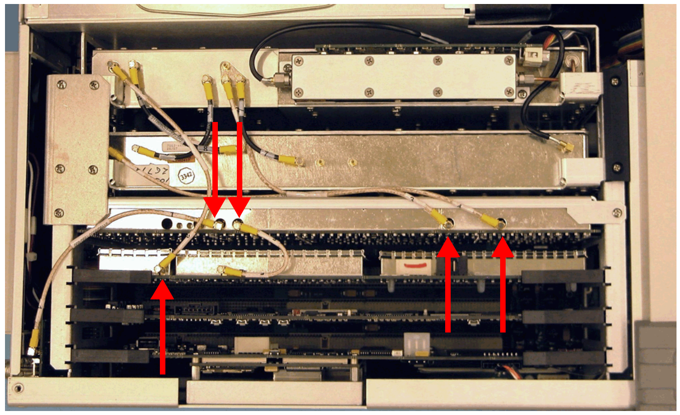
| STEP | PROCEDURE |
|---|---|
| 1. | Remove five screws securing metal support bracket and IF/Video PCB Assembly to Card Cage Assembly. Remove metal support bracket. |



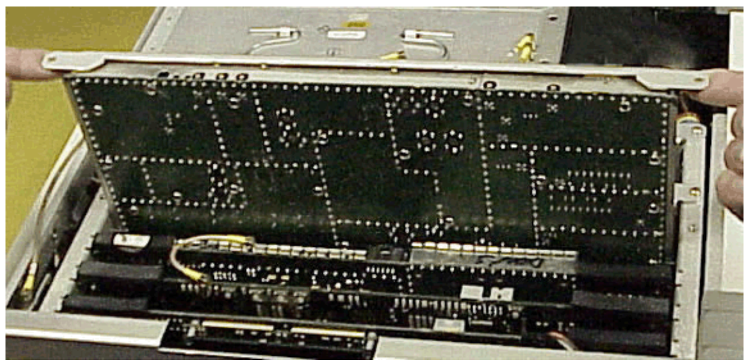
| | |
|---|---|
| 2. | Remove screw securing IF/Video PCB Assembly to Card Cage Assembly. |



| STEP | PROCEDURE |
|---|---|
| 3. | Disconnect coaxial cables from DAM Carrier PCB Assembly and IF/Video PCB Assembly. |



| | |
|---|---|
| 4. | Grasp metal support brackets and remove IF/Video PCB Assembly from Card Cage Assembly. |

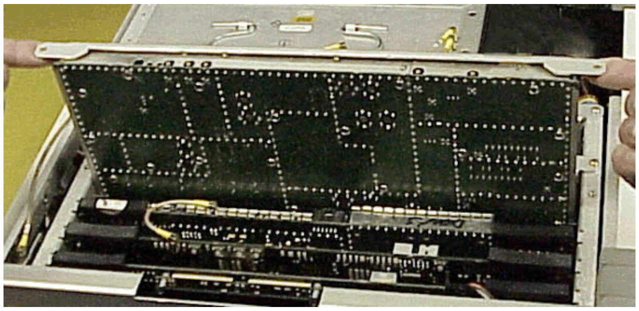


| | |
|---|---|
| NOTE | IF Video PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing IF/Video PCB Assembly to avoid damaging connector pins. |

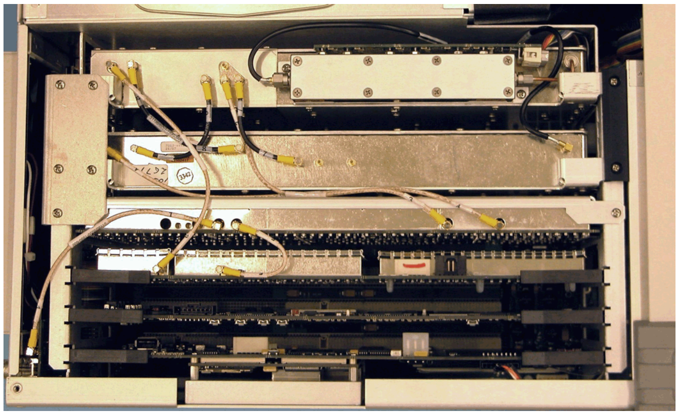
## 5.9.3.B Install IF/Video PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Insert IF/Video PCB Assembly securely into Card Cage Assembly. |

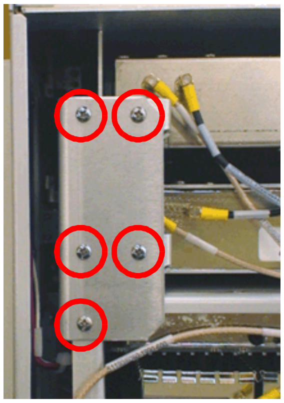
| NOTE | IF Video PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing IF/Video PCB Assembly to avoid damaging connector pins. |
|---|---|



2. Connect coaxial cables as shown below.



3. Install metal support bracket. Install five screws securing metal support bracket and Receiver Assembly to Card Cage Assembly. Torque screw to 8 in/lbs.



### 5.9.3.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.9.4 Disk I/O PCB Assembly 3920/3920B

### 5.9.4.A Remove Disk I/O PCB Assembly

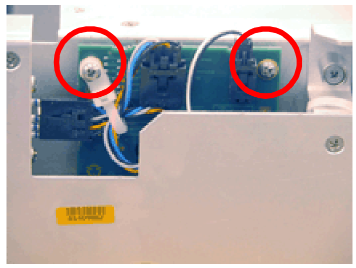
#### 5.9.4.A.1 Description

This procedure covers: Remove. Install.

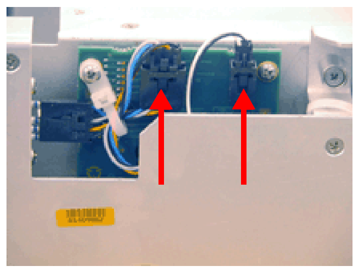
#### 5.9.4.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

| STEP | PROCEDURE |
|---|---|
| 1. | Remove two screws securing Disk I/O PCB Assembly to Power Supply Assembly. |



| | |
|---|---|
| 2. | Disconnect wire harness cables from Disk I/O PCB Assembly. |



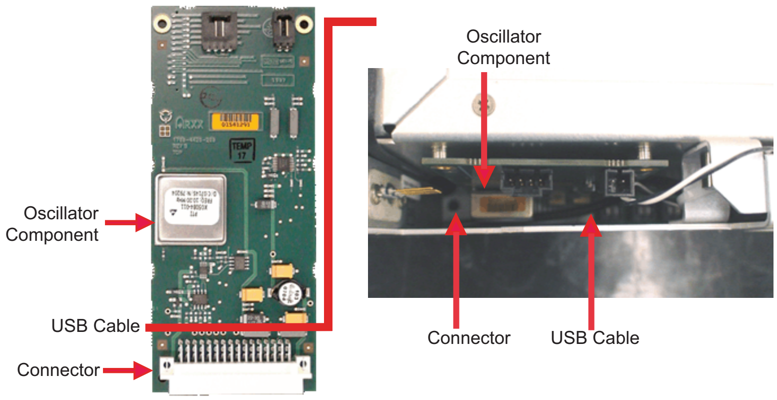
| | |
|---|---|
| 3. | Remove Disk I/O PCB Assembly from Chassis Assembly. |

| NOTE | |
|---|---|
| | Use care when removing Disk I/O PCB Assembly to avoid pulling Front Panel USB Cable.<br>Disk I/O PCB Assembly connects directly into Backplane PCB Assembly. Use care when removing Disk I/O PCB Assembly to avoid damaging connector pins. |

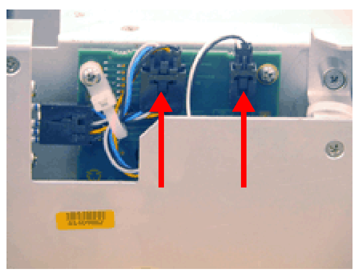
## 5.9.4.B Install Disk I/O PCB Assembly

| STEP | PROCEDURE |
|---|---|
| 1. | Install Disk I/O PCB Assembly in Chassis Assembly. Route Front Panel USB Cable so it is positioned between Disk I/O PCB Assembly Oscillator component and connector. |

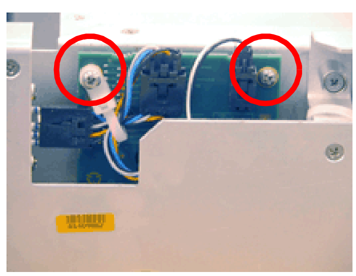
| NOTE | Disk I/O PCB Assembly connects directly into Backplane PCB Assembly. Use care when installing Disk I/O PCB Assembly to avoid damaging connector pins. |
|---|---|




2. Connect wire harness from Speaker Wire Harness Assembly to Disk I/O PCB Assembly.
3. Connect wire harness from DMM Assembly to Disk I/O PCB Assembly.



4. Install two screws securing Disk I/O PCB Assembly to Power Supply Assembly. Torque screws to 6 in/lbs.



### 5.9.4.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

## 5.9.5 Front Panel Assembly 3920/3920B

### 5.9.5.A Remove Front Panel Assembly

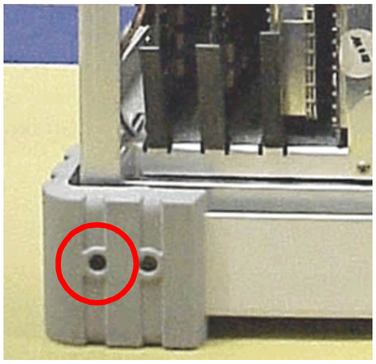
#### 5.9.5.A.1 Description

This procedure covers: Remove. Install.

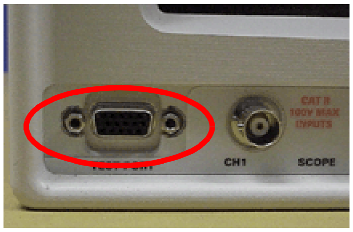
#### 5.9.5.A.2 Preliminary Procedures

Remove Case Assembly (5 - 4).

| STEP | PROCEDURE |
|---|---|
| 1. | Place Test Set with display side down on stable work surface. Remove outside screw from each corner of Front Panel corner bumper (total of eight screws). |

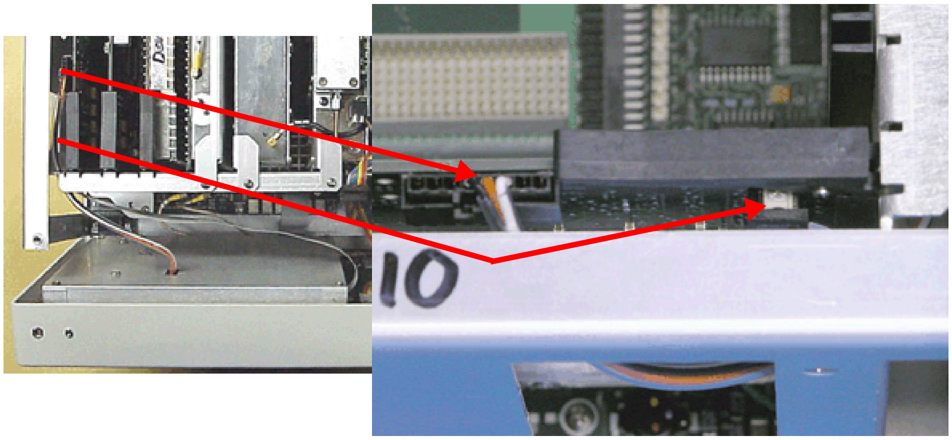


| | |
|---|---|
| 2. | Place Test Set on bottom side on stable work surface. Remove two screws from Test Connector. |

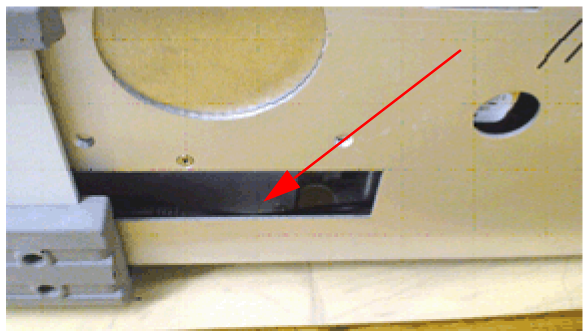



| | |
|---|---|
| 3. | Remove nuts from GEN, T/R and ANT Connectors. |

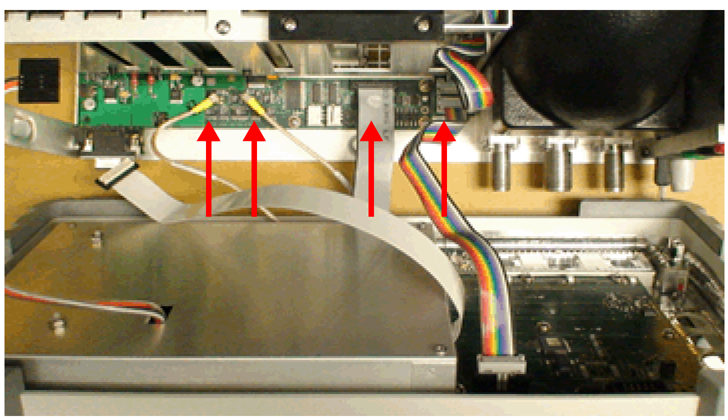
| STEP | PROCEDURE |
|---|---|
| 4. | Disconnect wire harness and ribbon cable from CPU Adapter PCB Assembly. |



| | |
|---|---|
| 5. | Disconnect USB Cable from Front Panel Assembly, accessing from opening in side of Chassis Assembly. |

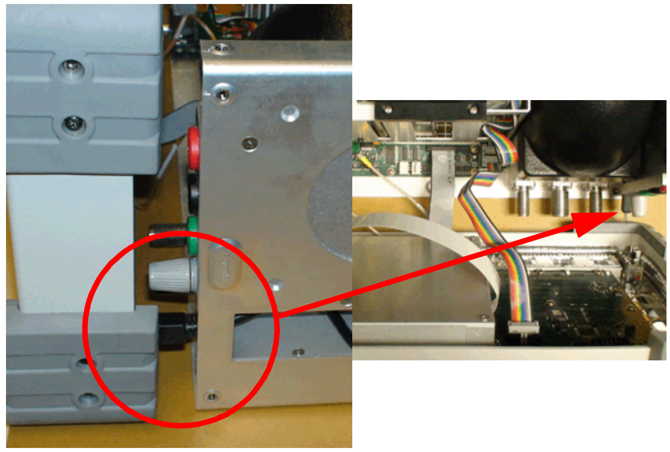


| | |
|---|---|
| 6. | Remove Front Panel Assembly from Chassis Assembly. Use care to avoid damaging fingerstock. |
| 7. | Disconnect ribbon cable and coaxial cables from Front Panel Digital PCB Assembly and Backplane PCB Assembly. |

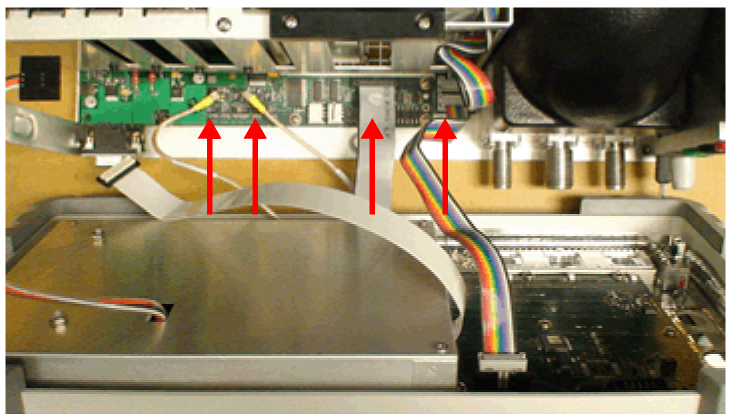


## 5.9.5.B Install Front Panel Assembly

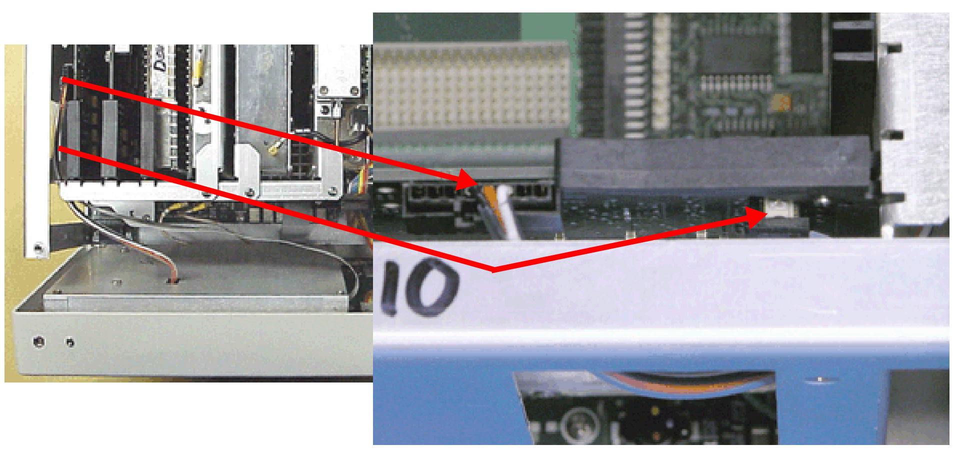
| STEP | PROCEDURE |
|---|---|
| 1. | Connect USB Connector to Front Panel Assembly. Verify USB Cable is positioned properly in Card Cage Assembly, USB Cable should be flat. |



| | |
|---|---|
| 2. | Connect ribbon cable and coaxial cables from Front Panel Assembly to Front Panel Digital PCB Assembly and Backplane PCB Assembly. Verify cables are tightly secured at both ends. |



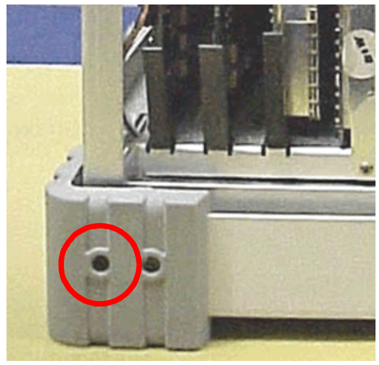
| | |
|---|---|
| 3. | Feed wire harness and ribbon cable from Front Panel Assembly through Card Cage Assembly and connect to CPU Adapter PCB Assembly. |



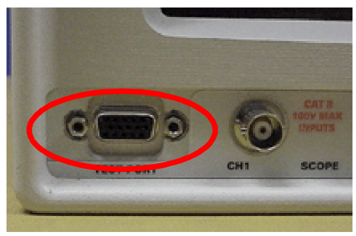
| STEP | PROCEDURE |
|---|---|
| 4. | Verify all cables and wire harnesses are securely connected and install Front Panel Assembly on Chassis Assembly. |

| | |
|---|---|
| **NOTE** | Use care when installing Front Panel Assembly to avoid pinching cables and/or damaging fingerstock. |

| | |
|---|---|
| 5. | Install screw at each corner of Front Panel corner bumpers (total of eight screws). Torque screws to 8 in/lbs. |



| | |
|---|---|
| 6. | Install two screws on Test Connector.  Torque nuts to 4 in/lbs. |




| | |
|---|---|
| 7. | Install nuts at GEN, T/R and ANT Connectors.  Torque nuts to 40 in/lbs. |


## 5.9.5.B.1 Follow-up Procedures:

Install Case Assembly (5 - 6).

# 5.9.6 Front Panel Digital Interface PCB Assembly 3920/3920B

## 5.9.6.A Remove Front Panel Digital Interface PCB Assembly

### 5.9.6.A.1 Description

This procedure covers: Remove. Install.

### 5.9.6.A.2 Preliminary Procedures

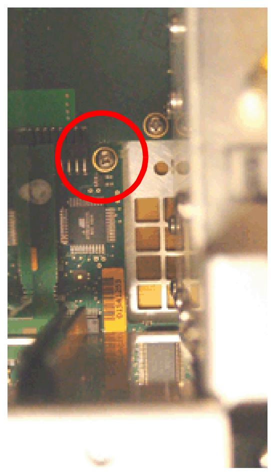
Remove Case Assembly (5 - 4).

Remove IF/Video PCB Assembly (5 - 95).

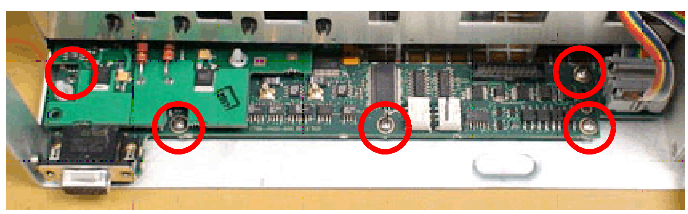
Remove DAM Carrier PCB Assembly (5 - 12).

Remove Front Panel Assembly (5 - 100).

| STEP | PROCEDURE |
| --- | --- |
| 1. | Remove screw securing Front Panel Digital Interface PCB Assembly inside of Chassis Assembly. |



| | |
| --- | --- |
| 2. | Remove five screws securing Front Panel Digital Interface PCB Assembly at front of Chassis Assembly. |



| STEP | PROCEDURE |
|---|---|
| 3. | Remove screw securing Front Panel Digital Interface PCB Assembly at side of Chassis Assembly. |

| | |
|---|---|
| 4. | Remove Front Panel Digital Interface PCB Assembly from Chassis Assembly. |

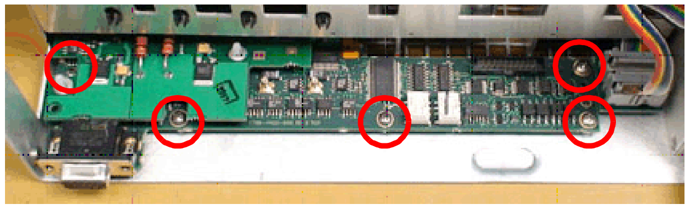
| NOTE | Use care when removing Front Panel Digital Interface PCB Assembly to avoid damaging components on bottom of assembly. |
|---|---|

## 5.9.6.B Install Front Panel Digital Interface PCB Assembly

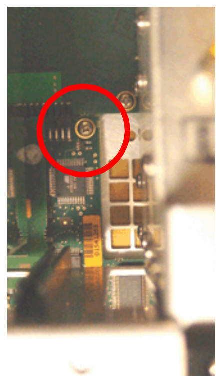
| STEP | PROCEDURE |
|---|---|
| 1. | Place Front Panel Digital Interface PCB Assembly on Chassis Assembly. |

**NOTE** Use care when installing Front Panel Digital Interface PCB Assembly to avoid damaging components on bottom of assembly.

2. Install five screws securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. Torque screws to 6 in/lbs.



3. Install screw securing Front Panel Digital Interface PCB Assembly to Chassis Assembly. Torque screw to 6 in/lbs.



4. Install screw securing corner of Front Panel Digital Interface PCB Assembly to Chassis Assembly. Torque screw to 6 in/lbs.

### 5.9.6.B.1 Follow-up Procedures:

Install Front Panel Assembly (5 - 102).

Install IF/Video PCB Assembly (5 - 97).

Install DAM Carrier PCB Assembly (5 - 13).

Install Case Assembly (5 - 6).

## 5.9.7 DMM Assembly (3920 Optional Hardware)

### 5.9.7.A Remove DMM Assembly

#### 5.9.7.A.1 Description

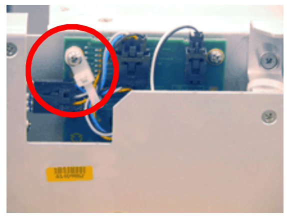
This procedure covers: Remove. Install.

#### 5.9.7.A.2 Preliminary Procedures

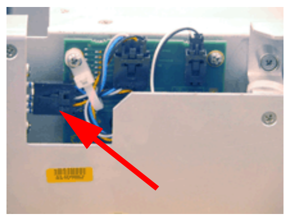
Remove Case Assembly (5 - 4).

Remove Front Panel Assembly (5 - 100).

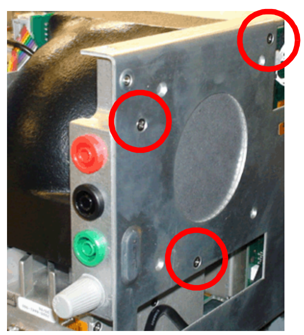
| STEP | PROCEDURE |
|---|---|
| 1. | Remove mounting screw from Disk I/O PCB Assembly. |



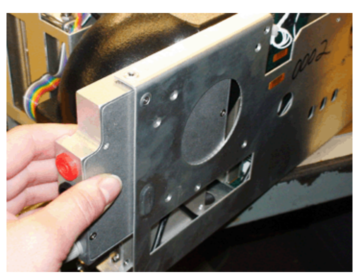
| | |
|---|---|
| 2. | Detach wire harness assembly from DMM Assembly connector pins. |



| | |
|---|---|
| 3. | Remove three screws securing DMM Assembly to Chassis Assembly. |

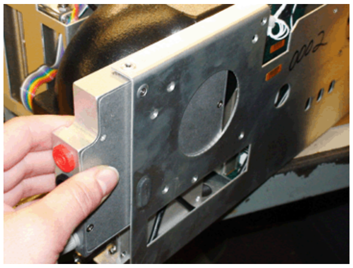


| | |
|---|---|
| 4. | Remove DMM Assembly from Chassis Assembly. |

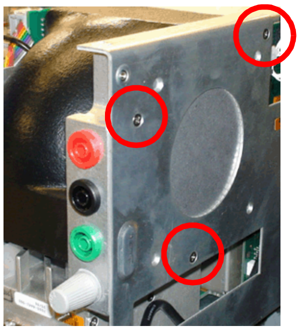


## 5.9.7.B Install DMM Assembly

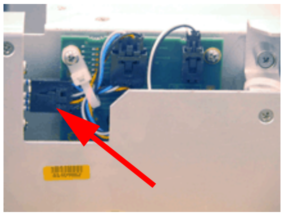
| STEP | PROCEDURE |
|---|---|
| 1. | Insert DMM Assembly in Chassis Assembly. Align DMM connector pins with connector clip when inserting DMM Assembly. |



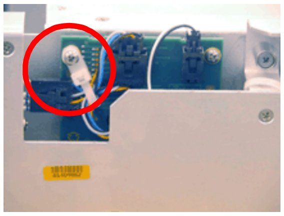
| | |
|---|---|
| 2. | Install three screws securing DMM Assembly to Chassis Assembly. Torque screws to 6 in/lbs. |



| | |
|---|---|
| 3. | Attach wire harness assembly to DMM Assembly connector pins. |



| | |
|---|---|
| 4. | Install mounting screw to Disk I/O PCB Assembly. Torque screws to 6 in/lbs. |



### 5.9.7.B.1 Follow-up Procedures:

Install Front Panel Assembly (5 - 102).

Install Case Assembly (5 - 6).

## 5.9.8 USB Cable (3920 Front Panel)

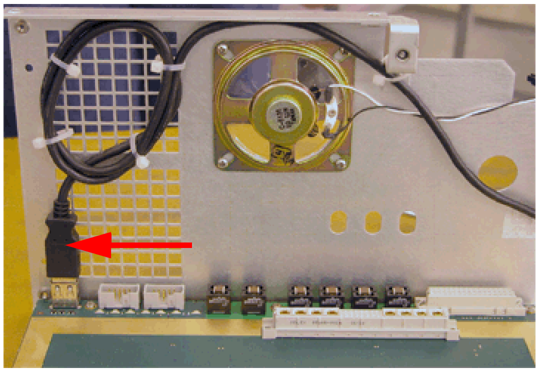
### 5.9.8.A Remove USB Cable (Front Panel)

#### 5.9.8.A.1 Preliminary Procedures:

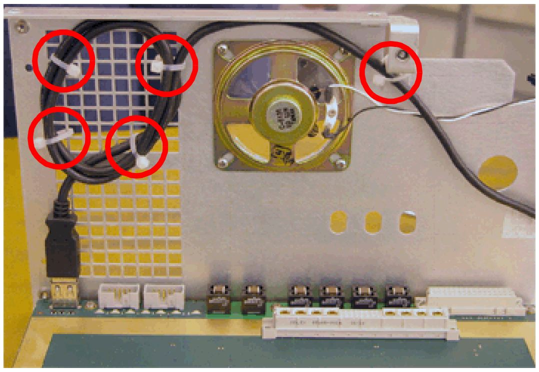
Remove Case Assembly (5 - 4).

Remove Power Supply Assembly (5 - 33).

| STEP | PROCEDURE |
|---|---|
| 1. | Disconnect USB Cable from Backplane PCB Assembly USB Connector. |



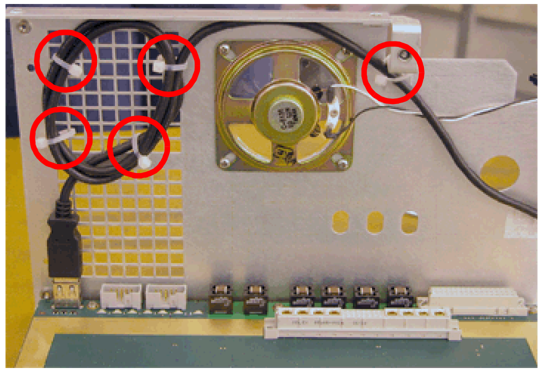
| | |
|---|---|
| 2. | Cut plastic ties (if applicable) securing USB Cable to Card Cage Assembly. |



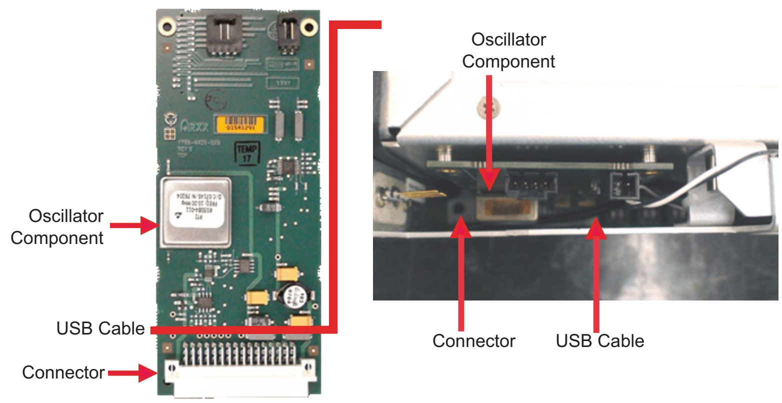
| | |
|---|---|
| 3. | Remove USB Cable from Card Cage Assembly. |

## 5.9.8.B Install USB Cable (3920 Front Panel)

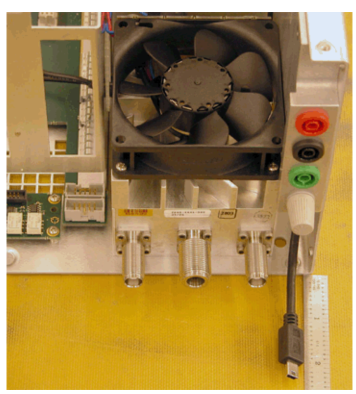
| STEP | PROCEDURE |
|---|---|
| 1. | Wrap USB Cable as shown below and secure to Card Cage Assembly with plastic fasteners. |



| | |
|---|---|
| 2. | Connect female end of USB Cable to Backplane PCB Assembly USB Connector. |
| 3. | Route USB Cable so it is positioned between Disk I/O PCB Assembly Oscillator component and connector. |




| | |
|---|---|
| 4. | Feed male end of USB Cable through front of Card Cage Assembly, under DMM Assembly. Pull USB Cable 2-3” from front edge of Care Cage Assembly. |



### 5.9.8.B.1 Follow-up Procedures:

Install Power Supply Assembly (5 - 35).

Install Case Assembly (5 - 6).

# Chapter 6 - Interconnect and Assembly Diagrams

## 6.1 GENERAL

This chapter contains Interconnect and Assembly Diagrams for the 3901/3902 and 3920/3920B. The table below lists assemblies alphabetically. Refer to Chapter 7, Parts List for reference designator identification and part numbers and photos of replaceable parts.



**NOTE**

Due to variations in hardware configuration, actual cable color and assembly appearance may vary from the pictures provided in this chapter.

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## 6.2 3901/3902 COMPOSITE ASSEMBLY

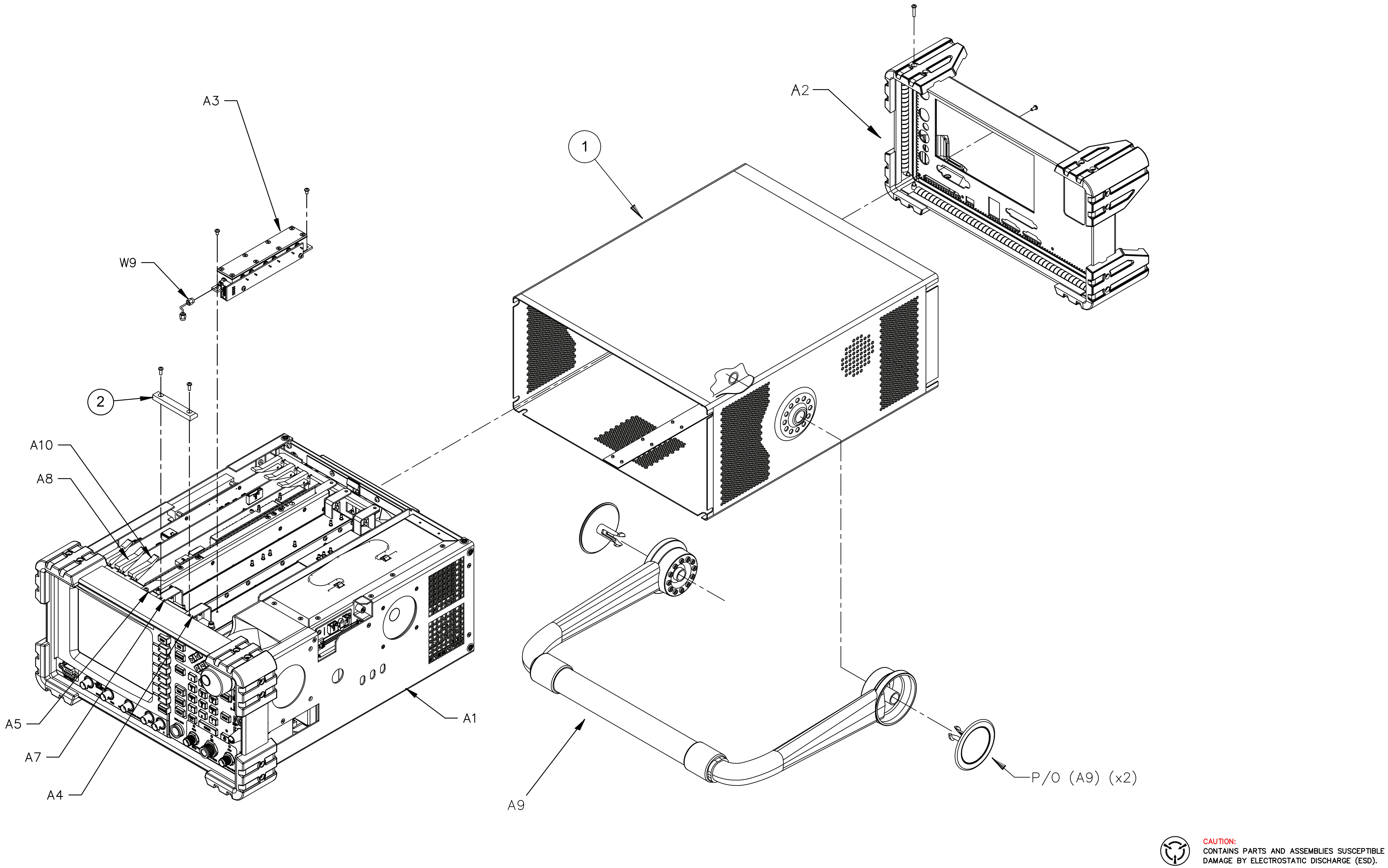



Fig. 6-1 3901 (24711) and 3902 (24710) Composite Assembly

## 6.3 3901/3902 COMPOSITE ASSY INTERCONNECT DIAGRAM

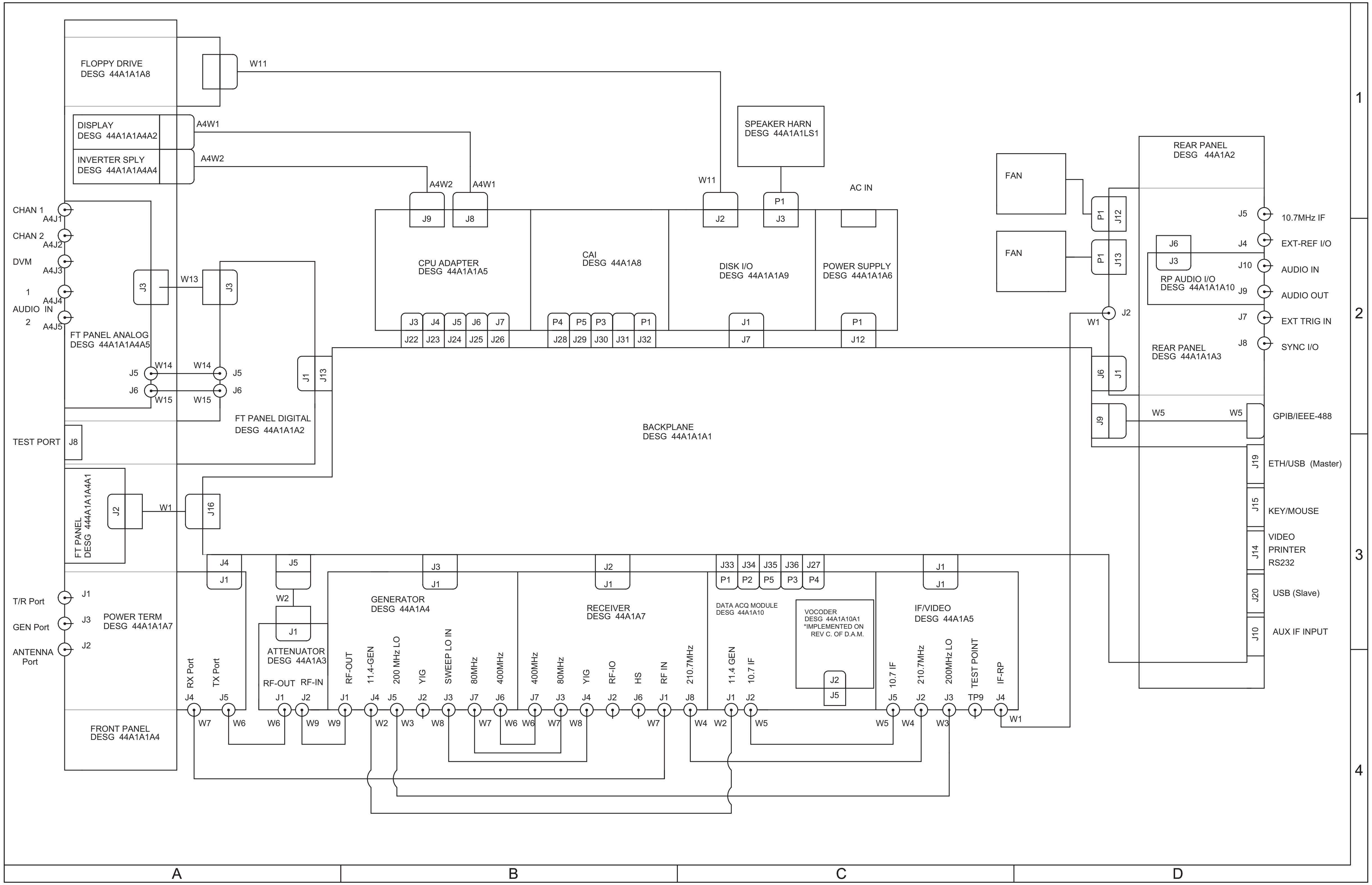



Fig. 6-2 3901/3902 Composite Assy Interconnect Diagram

## 6.4 3901/3902 CHASSIS ASSY

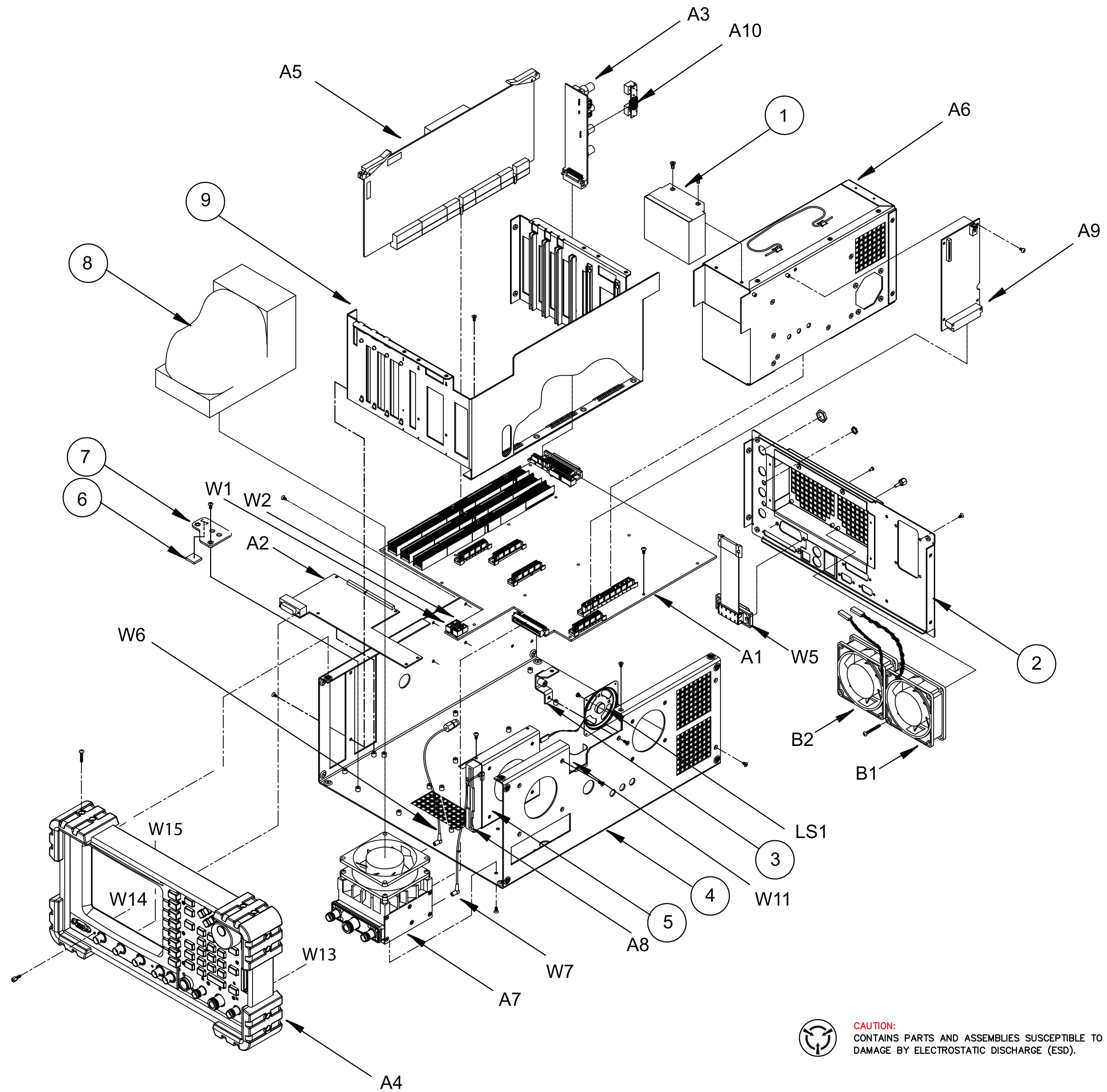



Fig. 6-3 3901/3902 (64400) Chassis Assy

## 6.5 3920/3920B COMPOSITE ASSEMBLY

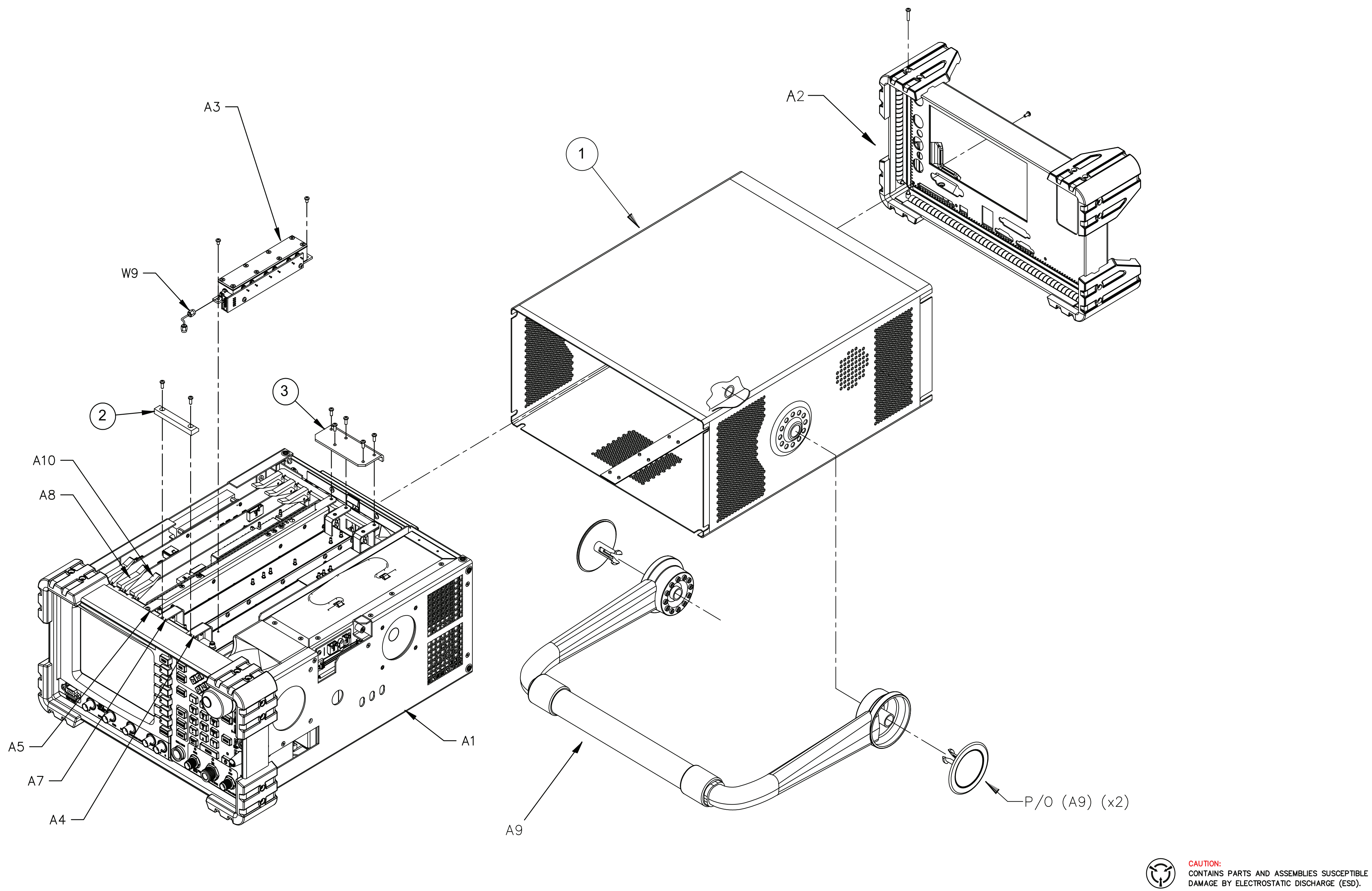



Fig. 6-4 3920 (72412) / 3920B (91164) Composite Assembly

## 6.6 3920 COMPOSITE ASSY INTERCONNECT DIAGRAM

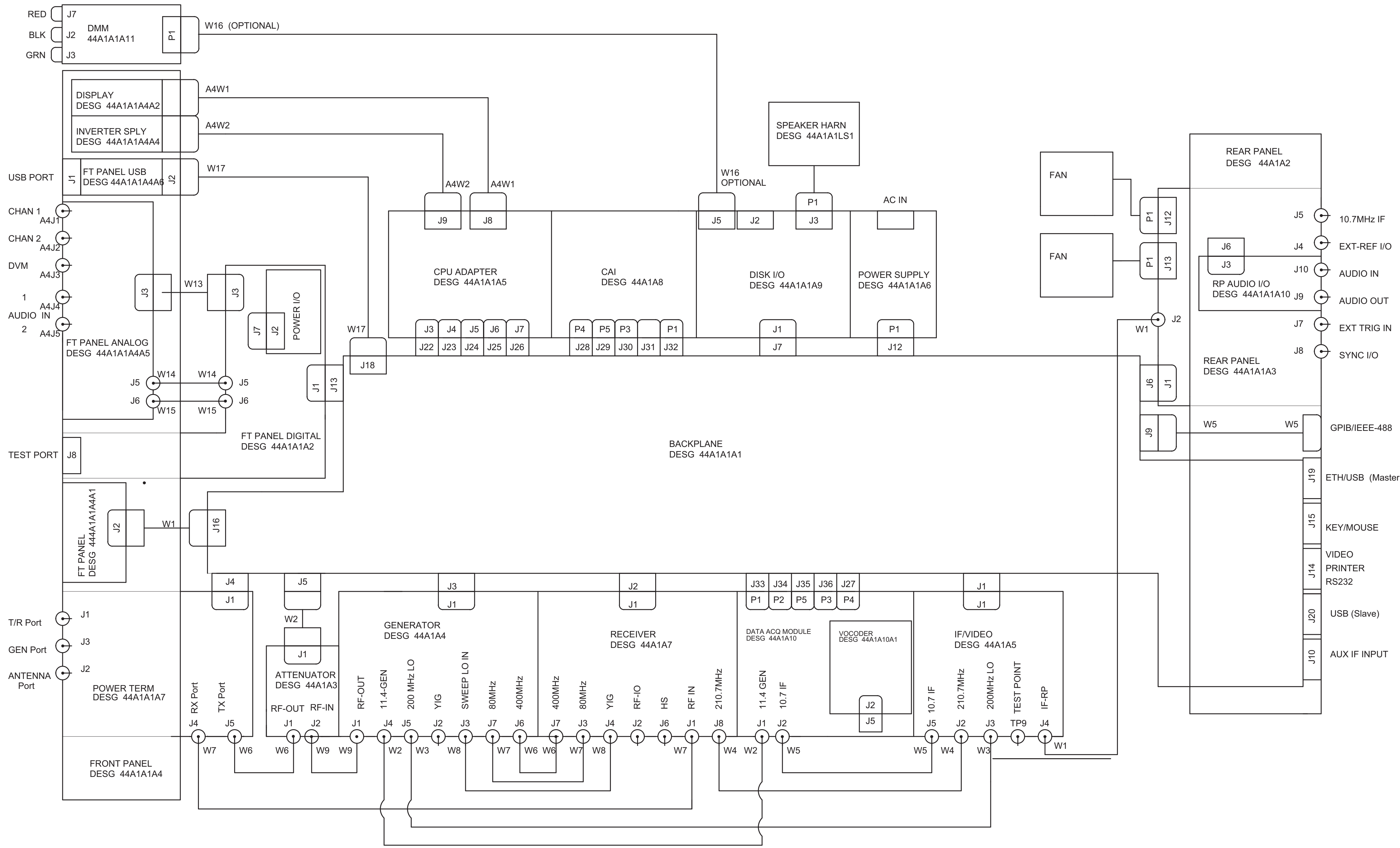



Fig. 6-5 3920 Composite Assy Interconnect Diagram

## 6.7 3920B COMPOSITE ASSY INTERCONNECT DIAGRAM

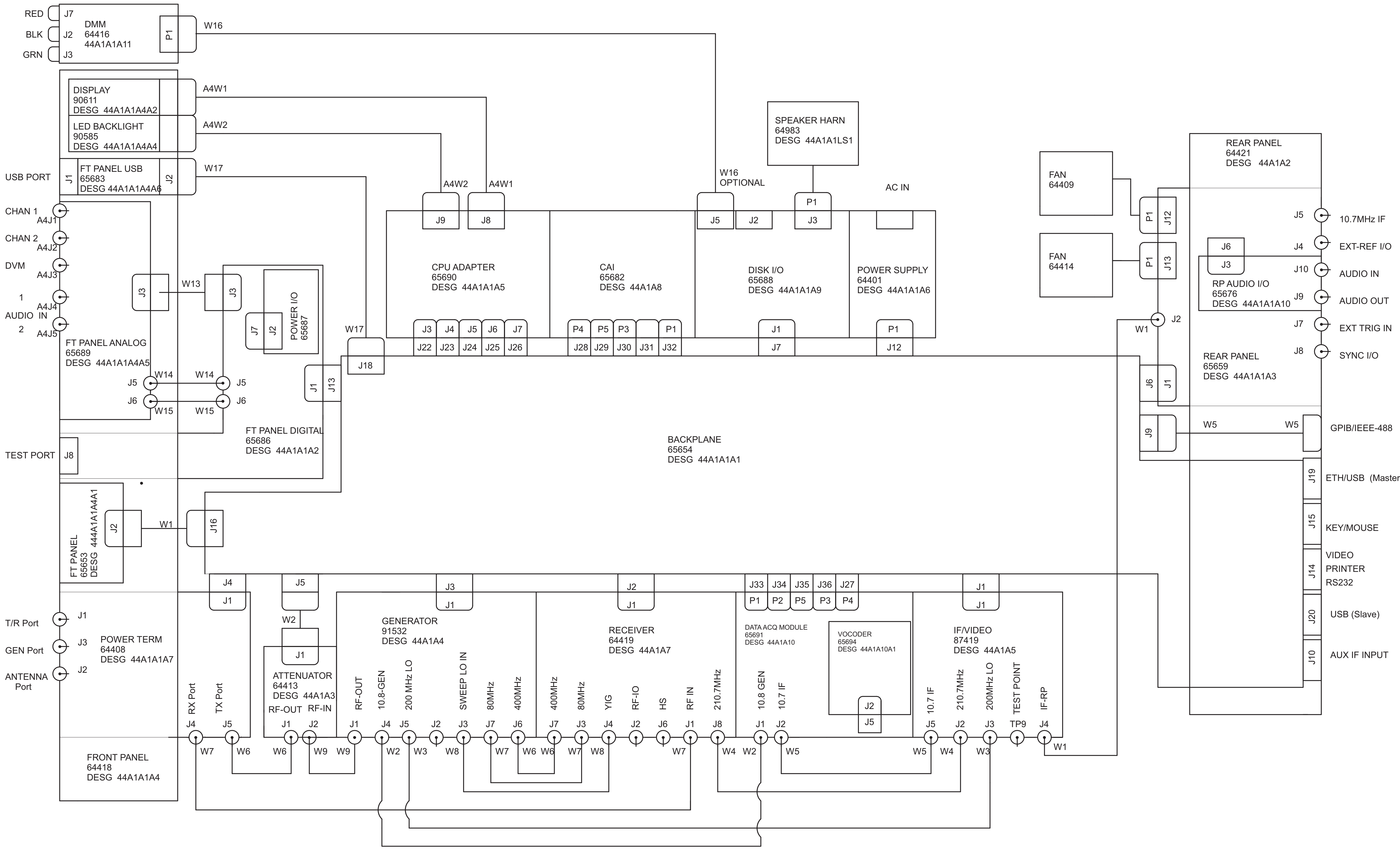



Fig. 6-6 3920B Composite Assy Interconnect Diagram

## 6.8 3920/3920B CHASSIS ASSY

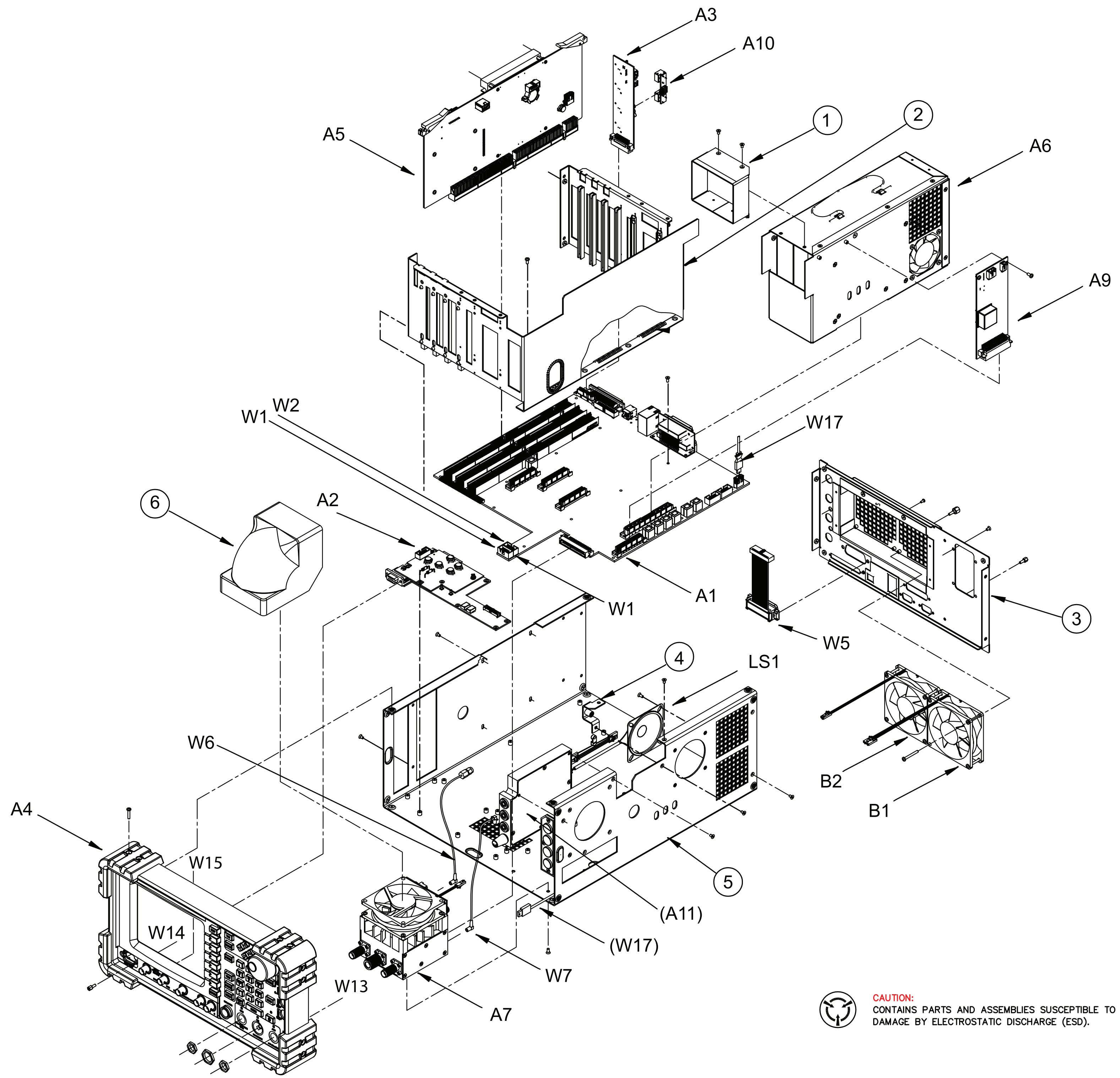



Fig. 6-7 3920/3920B (64417) Chassis Assy

## 6.9 FRONT PANEL CABLES

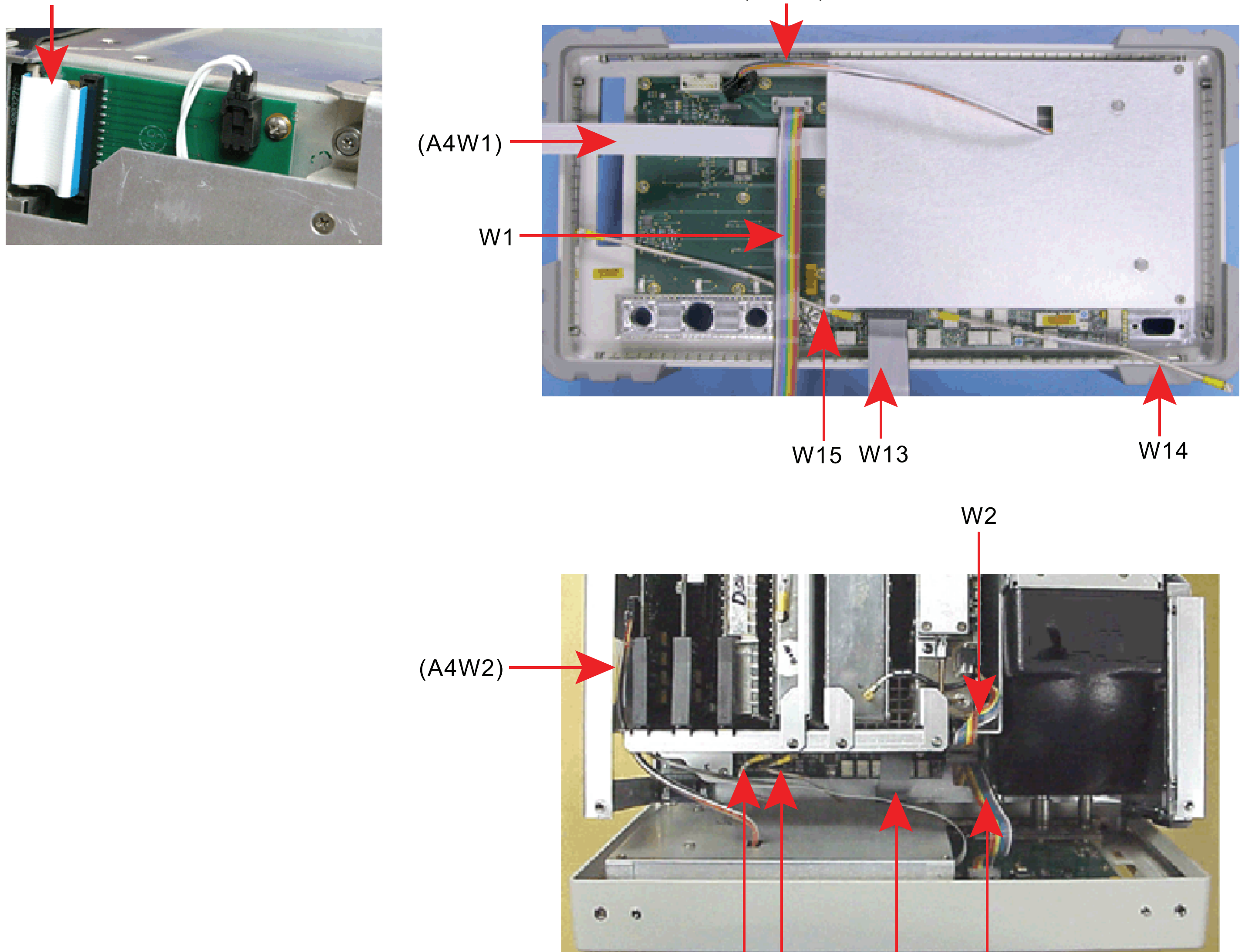



Fig. 6-8 3901/3902 Front Panel Cables

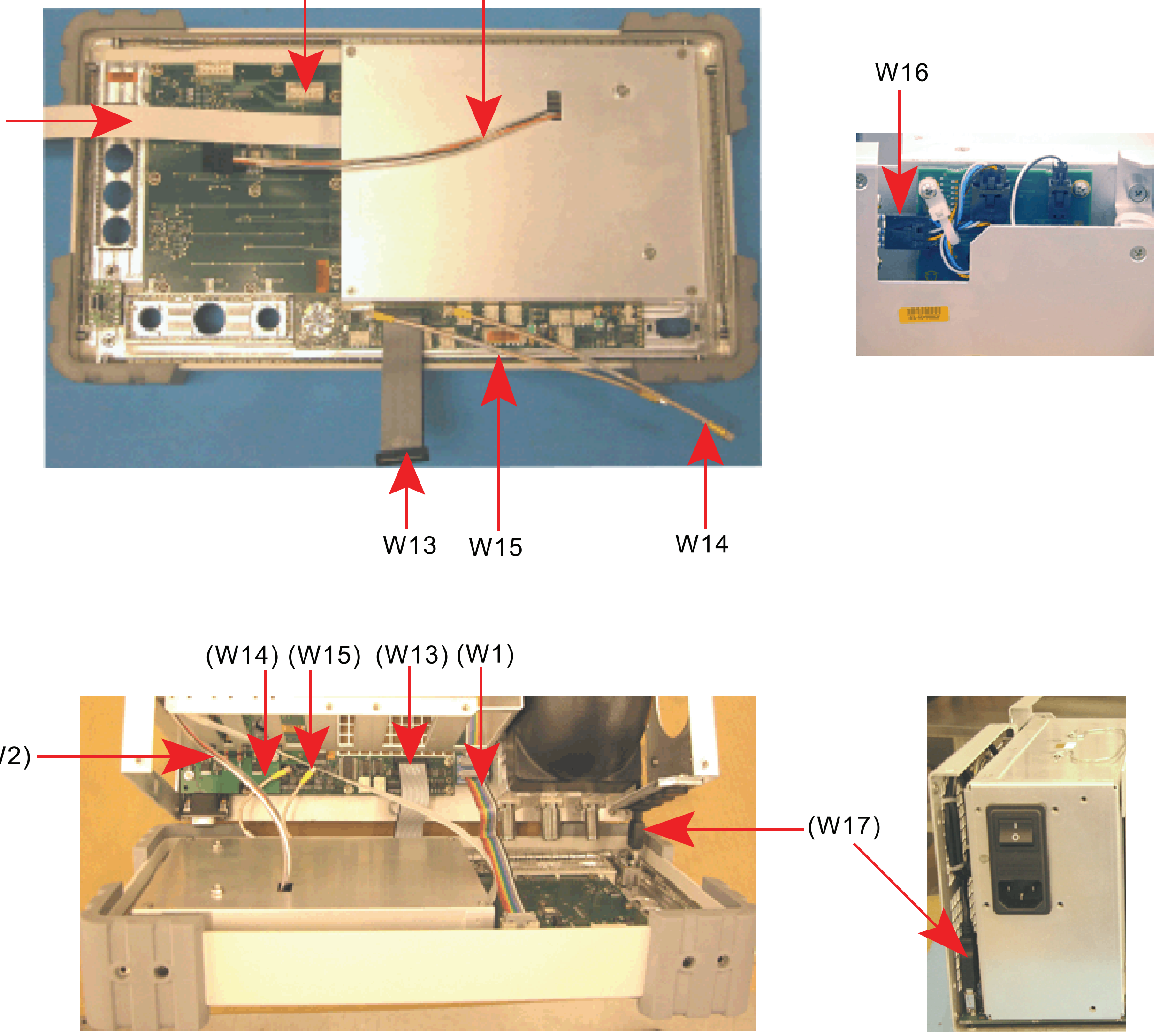



Fig. 6-9 3920/3920B Front Panel Cables

## 6.10 ASSEMBLY AND CABLE LOCATIONS

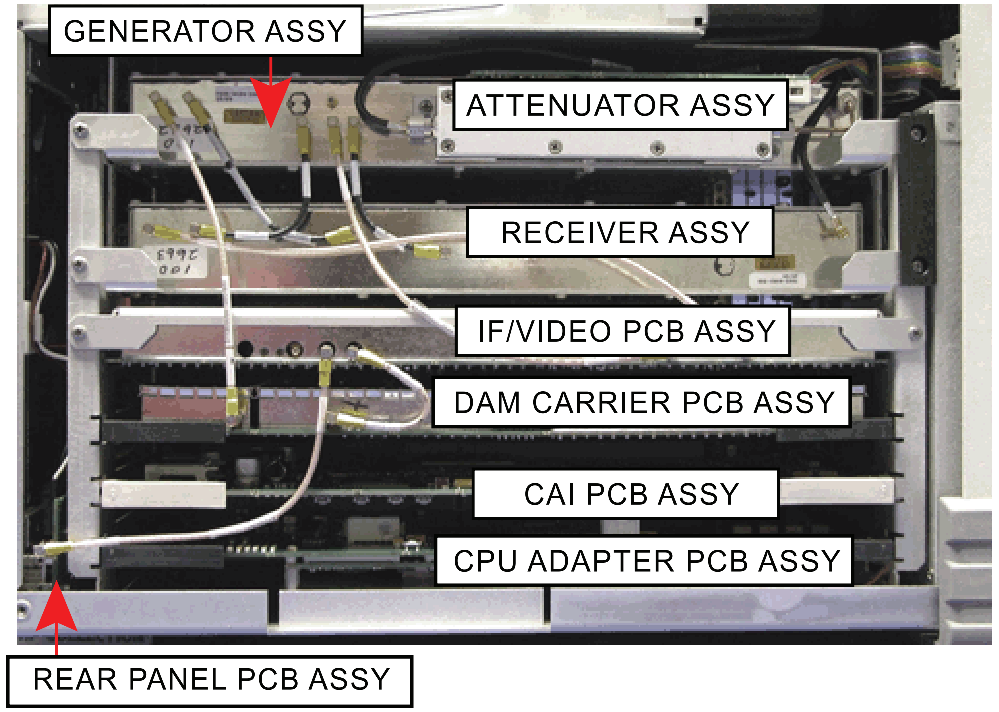



Fig. 6-10 3901/3902/3920 Assembly Locations

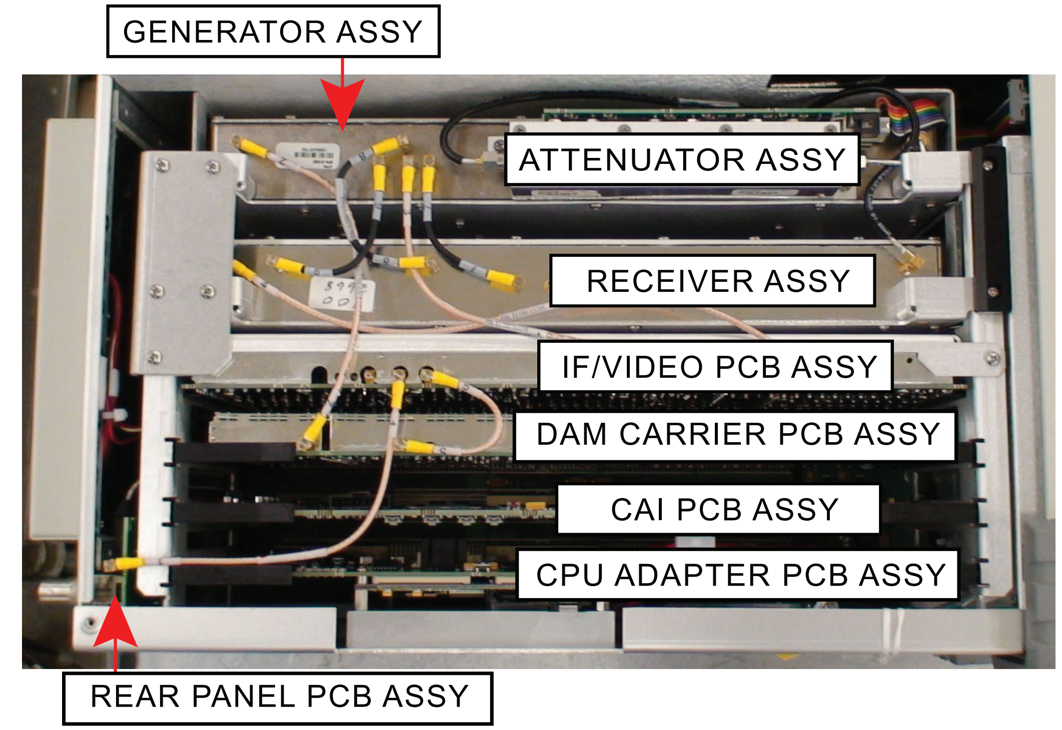



Fig. 6-11 3920B Assembly Locations

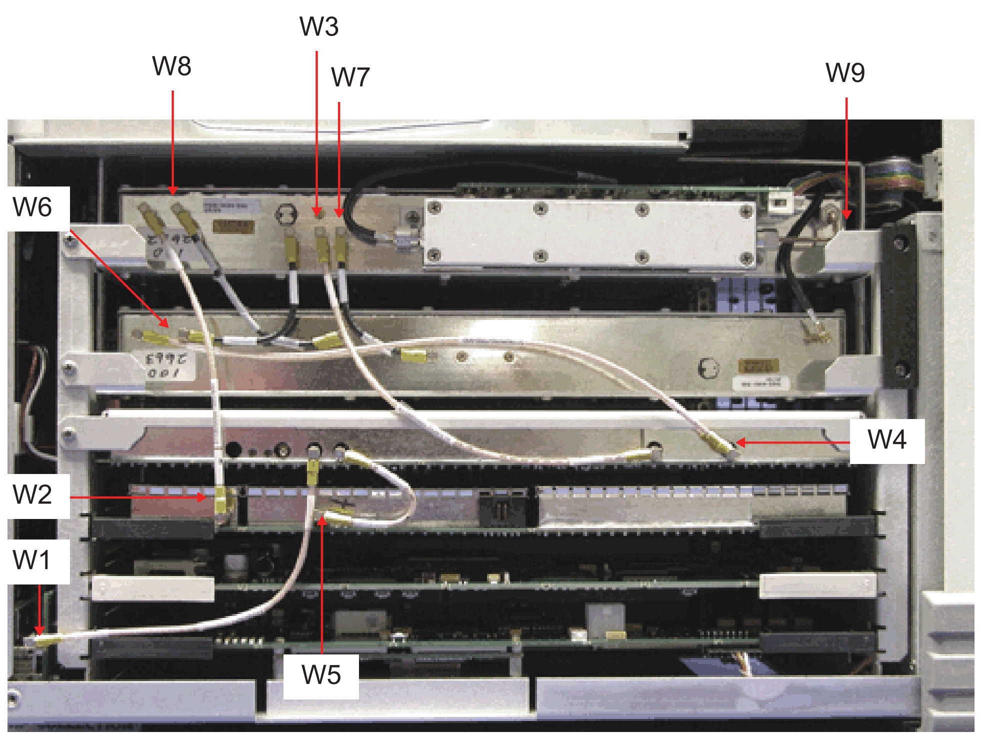



Fig. 6-12 3901/3902/3920 Cable Locations

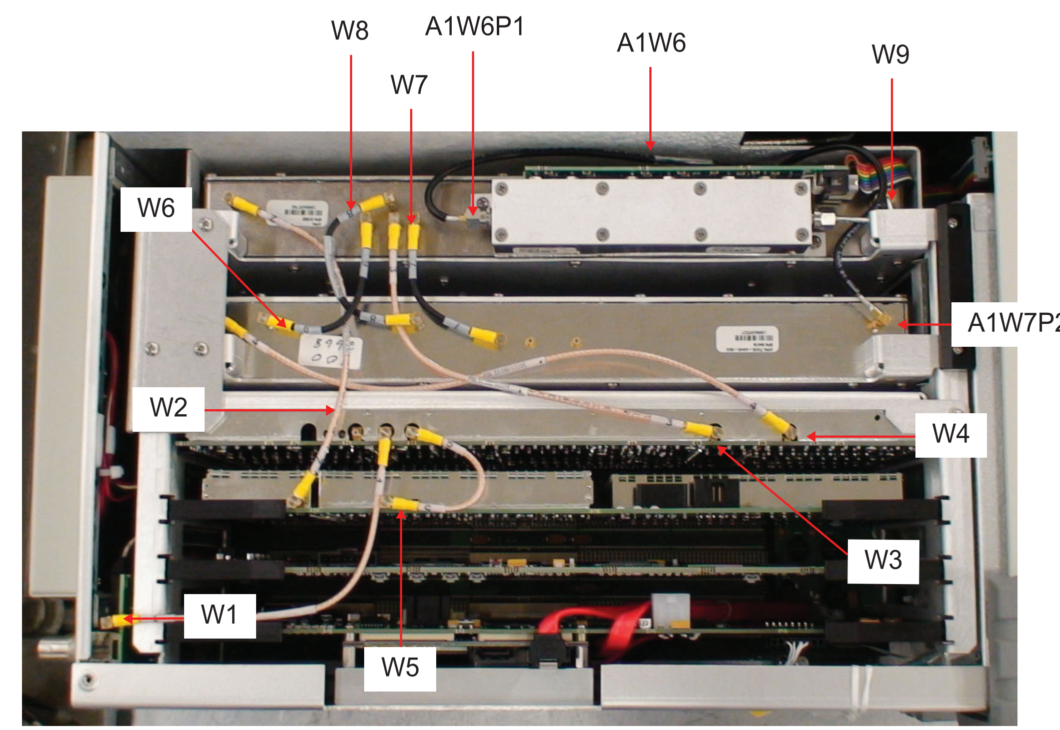



Fig. 6-13 3920B Cable Locations

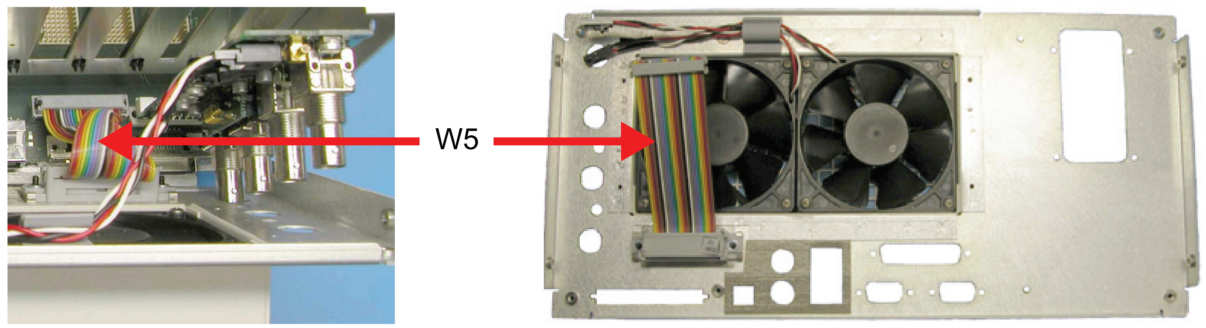



Fig. 6-14 Rear Panel Cables

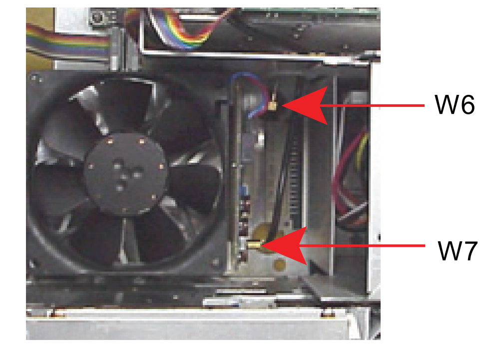



Fig. 6-15 Power Term Cables

## 6.11 FRONT PANEL ASSEMBLY

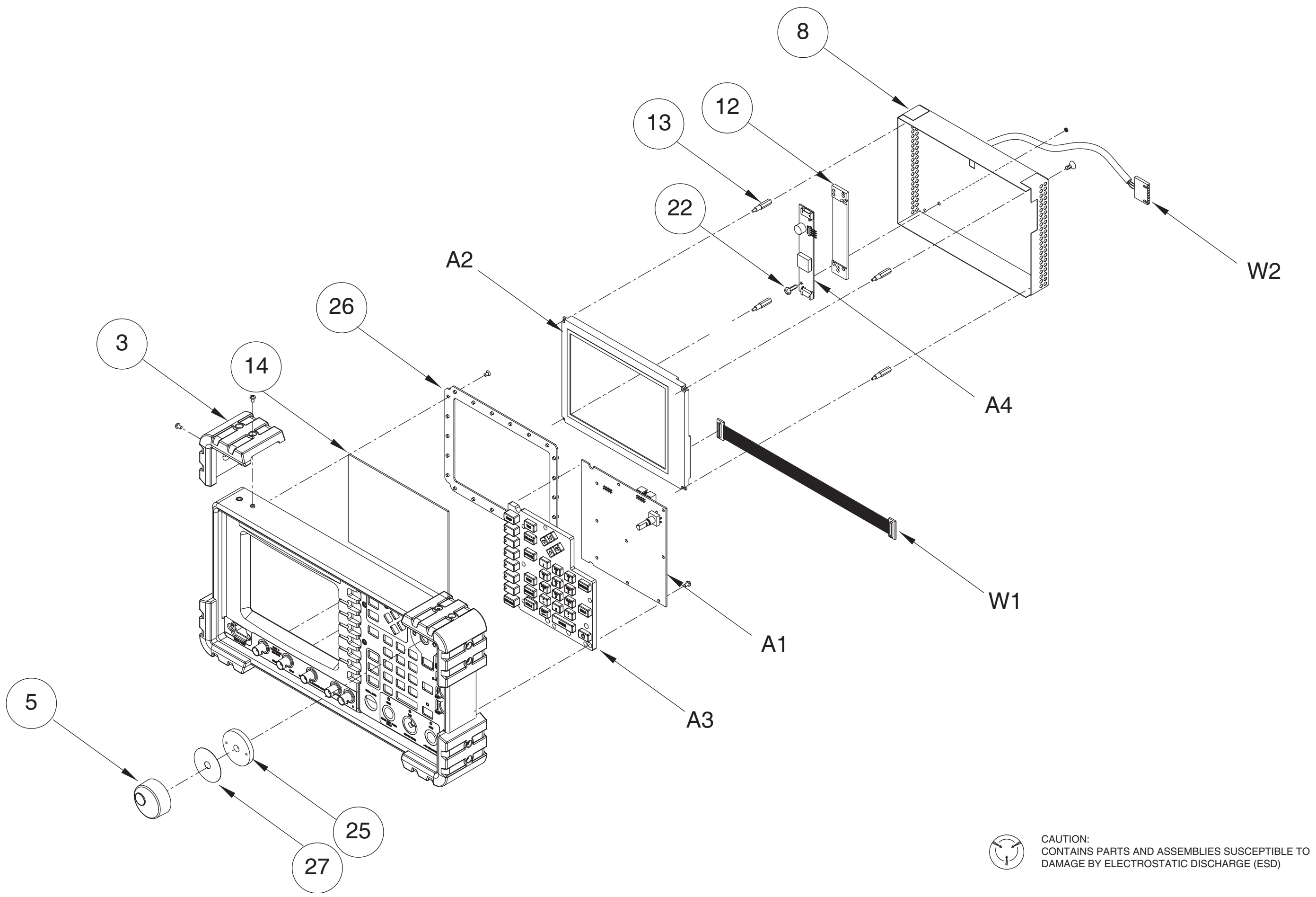



Fig. 6-16 Front Panel Assembly
3901/3902 (64402) / 3920/3920B (64418)

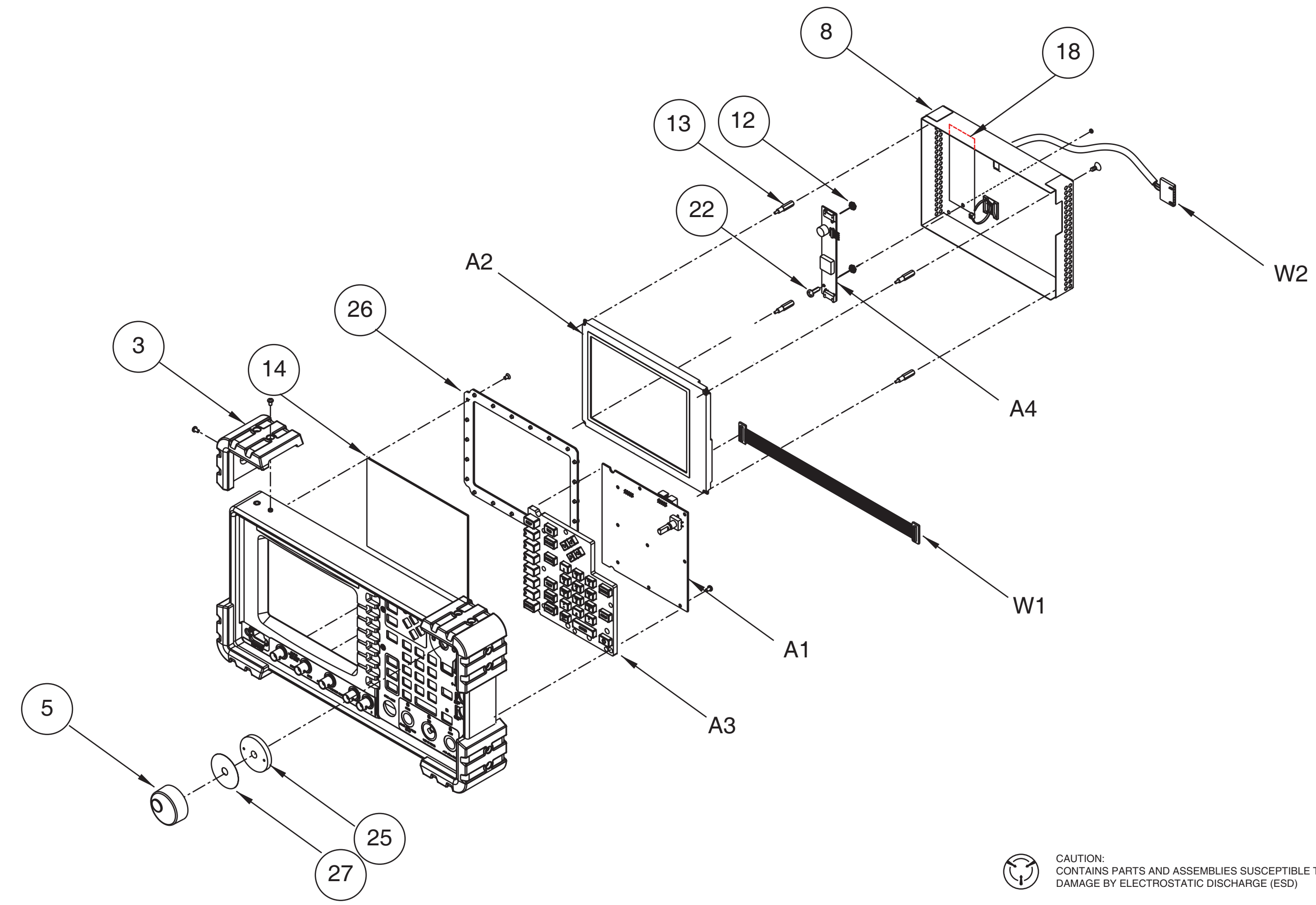
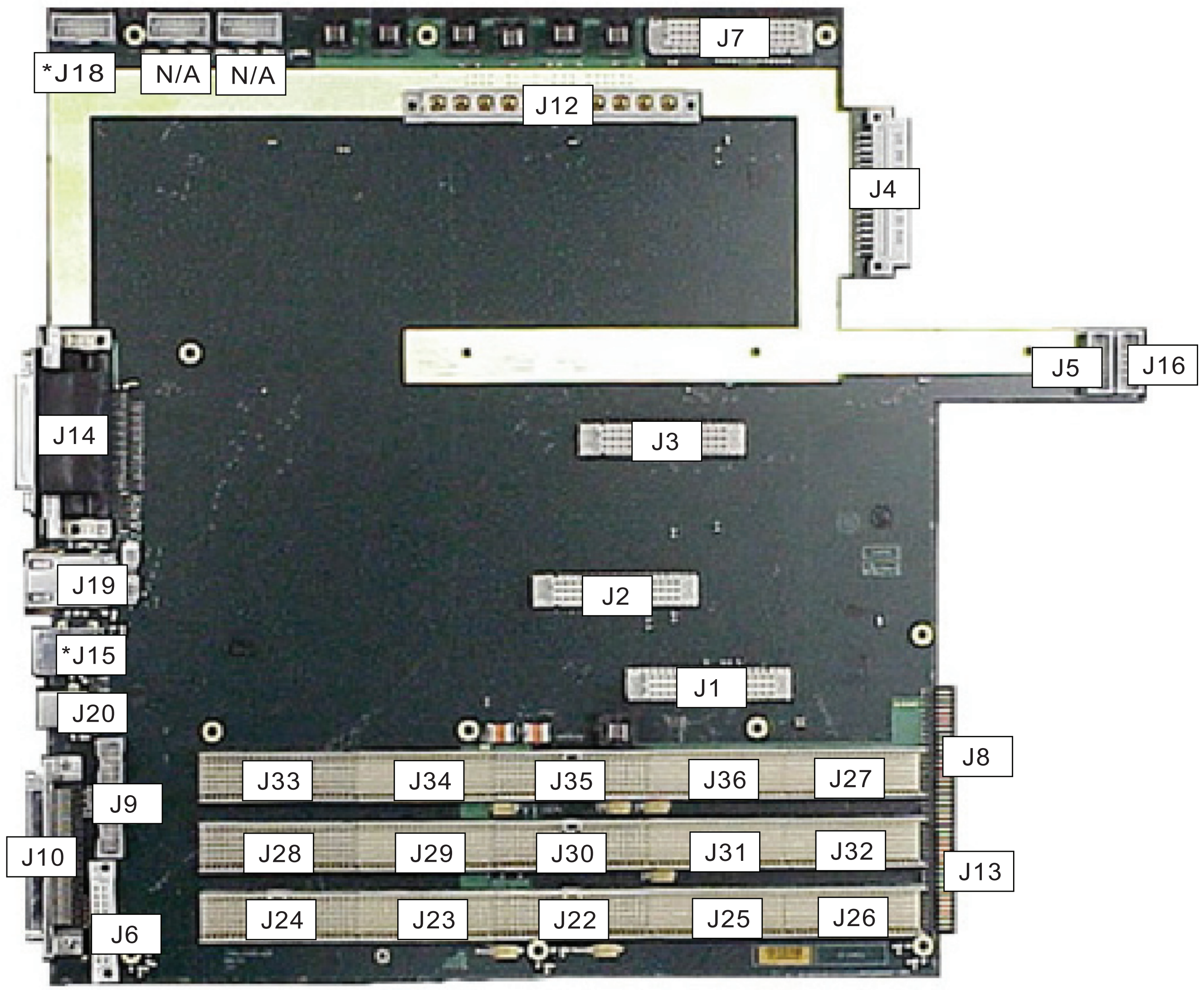



Fig. 6-17 Front Panel Assembly (64418-C0/D0)




*J18 Applies to 3920 only and is a USB connection.
*J15 Applies to 3901/3902 only.

Fig. 6-18 Backplane PCB Assy Connectors (65654)

# Chapter 7 - Parts List

## 7.1 GENERAL

This section contains the part numbers and descriptions for replaceable parts and assemblies in the 3901, 3902, 3920 and 3920B Test Sets. All items apply to 3901, 3902, 3920 and 3920B except as indicated.

# 7.2 3901/3902 ASSEMBLIES/SUBASSEMBLIES

## 7.2.1 3901/3902 Composite Assembly

Refer to Fig. 6.2 3901/3902 Composite Assembly.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 1 | 10226 | CASE,WRAP |
| | 2 | 35404 | SPACER,CASE SUPPORT |
| | A1 | 64400 | MECH ASSY,CHASSIS |
| 1 | A2 | 64405 | MECH ASSY,REAR PANEL |
| | A3 | 64413 | MECH ASSY,ATTENUATOR |
| 2 | A4 | 64420 | MECH ASSY,GENERATOR |
| | A5 | 87419 | PCB ASSY, IF VIDEO |
| | A7 | 64419 | MECH ASSY,RECEIVER |
| 3 | A8 | 65682 | PCB ASSY,CAI |
| | A9 | 67344 | PURCH,MOLDED HANDLE |
| | A10 | 65691 | PCB ASSY,DAM CARRIER |
| | W9 | 62566 | COAX ASSY,ATT/GEN |
| | | 10456 | AC25023 FRONT/REAR COVER |

NOTE

1 64405, Rear Panel Assy must be returned to the factory for model and serial number identification and confirmation before replacement assembly will be shipped.

2 64420, Mech Assy, Generator is obsolete. Contact Customer Service for replacement information.

3 65682, PCB Assy, CAI is obsolete. Replaced by 92823.

## 7.2.2 3901/3902 Chassis Assy

Refer to Fig. 6.4 3901/3902 Chassis Assy.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 1 | 9424 | BRACKET, FAN SHROUD |
| 1 | 2 | 9995 | PANEL, CHASSIS REAR |
| | 3 | 9422 | BRACKET, POWER SUPPLY MTG64417 |
| 1 | 4 | 9831 | CHASSIS, MAIN |
| 1 | 5 | 9426 | BRACKET, FLOPPY |
| 1 | 6 | 69675 | RUBBER, GAP PAD .100 THK |
| 1 | 7 | 56617 | HEATSINK, DIGITAL PCB |
| | 8 | 10455 | COVER, FAN SHROUD |
| | 9 | 9421 | BRACKET, CARD CAGE |
| | A1 | 65654 | PCB ASSY, BACKPLANE |
| | A2 | 65673 | PCB ASSY, FT PNL DIG INTRF |
| | A3 | 65659 | PCB ASSY, REAR PANEL |
| | A4 | 64402 | MECH ASSY, FRONT PANEL |
| | A5 | 65690 | PCB ASSY, CPU ADAPTER |
| | A6 | 64401 | MECH ASSY, POWER SUPPLY |
| | A7 | 64408 | MECH ASSY, POWER TERM |
| | A8 | 67342 | ASSY, FLOPPY DRIVE |
| | A9 | 65650 | PCB ASSY, DISK I/O |
| | A10 | 65676 | PCB ASSY, RP AUDIO I/O |
| | B1 | 64409 | FAN ASSY |
| | B2 | 64414 | FAN ASSY |
| | LS1 | 64983 | WIRE HARN ASSY, SPEAKER |
| | W1 | 62903 | RIBBON CA ASSY, 10-C, 8.3LG |
| | W2 | 62903 | RIBBON CA ASSY, 10-C, 8.3LG |
| | W5 | 62909 | RIBBON CA ASSY, GPIB |
| | W6 | 62831 | COAX ASSY,CONF,11.0,SSMB,F,RA/SMA,M,ST |
| | W7 | 62830 | COAX ASSY,CONF,11.0,SSMB,F,RA/SSMB,F,RA |
| 1 | W11 | 63129 | CABLE ASSY, FFC, TYPE D, 38MM |
| | W13 | 62908 | RIBBON CA ASSY,2MM,20-C,4.0L |
| | W14 | 63313 | COAX ASSY,RG316,6.0,SSMB,F,RA/SSMB,F,RA |
| | W15 | 63313 | COAX ASSY,RG316,6.0,SSMB,F,RA/SSMB,F,RA |

NOTE

1 Indicates obsolete part. Contact Customer Service for replacement information.

## 7.2.3 Front Panel Assy (3901/3902)

Refer to Fig. 6.11 Front Panel Assembly.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 3 | 11235 | BUMPER, CORNER FRONT |
| | 5 | 30704 | KNOB, SPNR, 1.5 DIA, X.66LG, ST DK |
| | 8 | 33785 | SHIELD, DISPLAY |
| 2 | 12 | 35402 | SPACER, INVERTER BRD |
| | 13 | 35866 | STANDOFF, SHIELD HEX |
| | 14 | 46682 | LENS, TS TFT DISPLAY |
| | 22 | 35603 | SCREW, 4-40 3 3/8, NYLON |
| 3 | 25 | 35403 | SPACER, 390X SPINNER |
| | 26 | 9427 | BRACKET, FT PNL LENS |
| 4 | 27 | 34224 | GASKET, SPACER, SPINNER |
| | A1 | 65653 | PCB ASSY, FRONT PANEL |
| 1 | A2 | 67353 | DISPLAY, LCD, 6.4” |
| | A3 | 67355 | ASSY, KEYPAD |
| 1 | A4 | 67330 | PCB ASSY, INVERTER SPLY |
| | W1 | 62902 | CABLE ASSY, DISPLAY |
| 5 | W2 | 64985 | WIRE HARN ASSY, INVERTER |

NOTE

1 Indicates obsolete part. Contact Customer Service for replacement information.

2 35402, Spacer, 390X Spinner is obsolete. Replaced by 90661.

3 35403, Spacer, Inverter Brd is obsolete. Replaced by 89875.

4 34224, Gasket, Spacer, Spinner is obsolete. Replaced by 89874.

5 64985, Wire Harness Assy, Inverter is obsolete. Replaced by 90583.

## 7.2.4 Rear Panel Assy

| Reference Designator | Part Number | Description |
|---|---|---|
| -- | 10227 | BUMPER, CORNER REAR |

## 7.2.5 CPU Adapter Battery

| Reference Designator | Part Number | Description |
|---|---|---|
| -- | 46825 | BATTERY, LITHIUM, 3V |

# 7.3 3920/3920B ASSEMBLIES/SUBASSEMBLIES

## 7.3.1 3920 Composite Assembly

Refer to Fig. 6.5 3920/3920B Composite Assembly.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 1 | 10226 | CASE,WRAP |
| | 2 | 35404 | SPACER,CASE SUPPORT |
| | 3 | 33521 | PLATE,HOLD DOWN |
| | A1 | 64417 | MECH ASSY,CHASSIS,3920 |
| 1 | A2 | 64421 | MECH ASSY,REAR PANEL,3920 |
| | A3 | 64413 | MECH ASSY,ATTENUATOR |
| 2 | A4 | 64420 | MECH ASSY,GENERATOR,3920 |
| | A5 | 87419 | PCB ASSY, IF VIDEO |
| | A7 | 64419 | MECH ASSY,RECEIVER,3920 |
| 3 | A8 | 65682 | PCB ASSY,CAI |
| | A9 | 67344 | PURCH,MOLDED HANDLE |
| | A10 | 65691 | PCB ASSY,DAM CARRIER |
| | W9 | 62566 | COAX ASSY,ATT/GEN |
| | | 10456 | AC25023 FRONT/REAR COVER |
| | | 63938 | KIT,STD CORD/ACCESSORY |

NOTE

1 64421, Rear Panel Assy must be returned to the factory for model and serial number identification and confirmation before replacement assembly will be shipped.

2 64420, Mech Assy, Generator is obsolete. Contact Customer Service for replacement information.

3 65682, PCB ASSY, CAI is obsolete. Replaced by 92823.

## 7.3.2 3920B Composite Assembly

Refer to Fig. 6.5 3920/3920B Composite Assembly.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 1 | 10226 | CASE,WRAP |
| | 2 | 35404 | SPACER,CASE SUPPORT |
| | 3 | 33521 | PLATE,HOLD DOWN |
| | A1 | 64417 | MECH ASSY,CHASSIS,3920 |
| 1 | A2 | 64421 | MECH ASSY,REAR PANEL,3920* |
| | A3 | 64413 | MECH ASSY,ATTENUATOR |
| | A4 | 91532 | MECH ASSY,GENERATOR,LOW NOISE,3920B |
| | A5 | 87419 | PCB ASSY, IF VIDEO |
| | A7 | 64419 | MECH ASSY,RECEIVER,3920 |
| 2 | A8 | 65682 | PCB ASSY,CAI |
| | A9 | 67344 | PURCH,MOLDED HANDLE |
| | A10 | 65691 | PCB ASSY,DAM CARRIER |
| | W9 | 62566 | COAX ASSY,ATT/GEN |
| | | 10456 | AC25023 FRONT/REAR COVER |
| | | 63938 | KIT,STD CORD/ACCESSORY |

NOTE

1 64421, Rear Panel Assy must be returned to the factory for model and serial number identification and confirmation before replacement assembly will be shipped.

2 65682, PCB ASSY, CAI is obsolete. Replaced by 92823.

### 7.3.3 3920/3920B Chassis Assy

Refer to Fig. 6.8 3920/3920B Chassis Assy.

| Reference Designator | Part Number | Description |
|---|---|---|
| 1 | 9424 | BRACKET, FAN SHROUD |
| 2 | 9421 | BRACKET, CARD CAGE |
| 3 | 9999 | PANEL, CHASSIS REAR |
| 4 | 9422 | BRACKET, POWER SUPPLY MTG |
| 5 | 9832 | CHASSIS, MAIN,3920 |
| 6 | 10455 | COVER, FAN SHROUD |
| A1 | 65654 | PCB ASSY, BACKPLANE |
| A2 | 65686 | PCB ASSY, FT PNL DIG INTRFC |
| A3 | 65659 | PCB ASSY, REAR PANEL |
| A4 | 64418 | MECH ASSY, FRONT PANEL, 3920 |
| A5 | 65690 | PCB ASSY, CPU ADAPTER |
| A6 | 64401 | MECH ASSY, POWER SUPPLY |
| A7 | 64408 | MECH ASSY, POWER TERM |
| A9 | 65688 | PCB ASSY, DISK I/O |
| A10 | 65676 | PCB ASSY, RP AUDIO I/O |
| A11 | 64416 | MECH ASSY, DMM, 3920 |
| B1 | 64409 | FAN ASSY |
| B2 | 64414 | FAN ASSY |
| LS1 | 64983 | WIRE HARN ASSY, SPEAKER |
| W1 | 62903 | RIBBON CA ASSY, 10-C,8.3LG |
| W2 | 62903 | RIBBON CA ASSY, 10-C,8.3LG |
| W5 | 62909 | RIBBON CA ASSY, GPIB |
| W6 | 62831 | COAX ASSY,CONF,11.0,SSMB,F,RA/SMA,M,ST |
| W7 | 62830 | COAX ASSY,CONF,11.0,SSMB,F,RA/SSMB,F,RA |
| W13 | 62908 | RIBBON CA ASSY,2MM,20-C,4.0L |
| W14 | 63313 | COAX ASSY,RG316,6.0,SSMB,F,RA/SSMB,F,RA |
| W15 | 63313 | COAX ASSY,RG316,6.0,SSMB,F,RA/SSMB,F,RA |
| W17 | 62376 | CABLE ASSY, USB-A/USB M INI-B |

### 7.3.4 Front Panel Assy (3920/3920B)

Refer to Fig. 6.11 Front Panel Assembly.

| | Reference Designator | Part Number | Description |
|---|---|---|---|
| | 3 | 11235 | BUMPER, CORNER FRONT |
| | 5 | 30704 | KNOB, SPNR, 1.5 DIA, X.66LG, ST DK |
| | 8 | 33785 | SHIELD, DISPLAY |
| 1 | 12 | 35402 | SPACER, INVERTER BRD |
| | 13 | 35866 | STANDOFF, SHIELD HEX |
| | 14 | 46682 | LENS, TS TFT DISPLAY |
| | 18 | 42264 | INSULATOR, INVERTER |
| | 22 | 35603 | SCREW, 4-40 3 3/8, NYLON |
| 2 | 25 | 35403 | SPACER, 390X SPINNER |
| | 26 | 9427 | BRACKET, FT PNL LENS |
| 3 | 27 | 34224 | GASKET, SPACER, SPINNER |
| | A1 | 65653 | PCB ASSY, FRONT PANEL |
| 4 | A2 | 67353 | DISPLAY, LCD, 6.4” |
| 5 | A3 | 67355 | ASSY, KEYPAD |
| 6 | A4 | 67330 | PCB ASSY, INVERTER SPLY |
| | W1 | 62902 | CABLE ASSY, DISPLAY |
| 7 | W2 | 64985 | WIRE HARN ASSY, INVERTER |

NOTE

1 35402, Spacer, 390X Spinner is obsolete. Replaced by 90661.

2 35403, Spacer, Inverter Brd is obsolete. Replaced by 89875.

3 34224, Gasket, Spacer, Spinner is obsolete. Replaced by 89874.

4 67353, Display, LCD 6.4” is obsolete. Replaced by 90611.

5 Replacing Keypad Assy 67355 may require replacement of the following items: 89875 and 89874. Contact Aeroflex Customer Service before ordering replacement for 67355.

6 67330, PCB Assy, Inverter Spply is obsolete. Replaced by 90585. Replacing Inverter Supply PCB Assembly (67330) requires the following items:90585, 90853, 42264 and 90661.

7 64985, Wire Harness Assy, Inverter is obsolete. Replaced by 90583.

### 7.3.5 Rear Panel Assy

| Reference Designator | Part Number | Description |
|---|---|---|
| -- | 10227 | BUMPER, CORNER REAR |

### 7.3.6 CPU Adapter Battery

| Reference Designator | Part Number | Description |
|---|---|---|
| -- | 46825 | BATTERY, LITHIUM, 3V |

### 7.3.7 DMM Fuse

| Reference Designator | Part Number | Description |
|---|---|---|
| -- | 56083 | FUSE,3A,125V,PCB MOUNT |

## 7.4 REPLACEMENT PARTS PICTURES

NOTE Graphics are for reference only. Part appearance may vary depending on part revision.

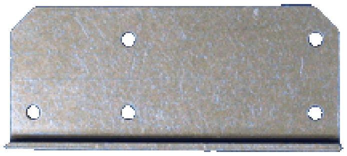
### 7.4.1 Composite Assembly Replacement Parts

10226

CASE, WRAP

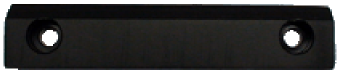
33521

PLATE, HOLD DOWN (3920 only)



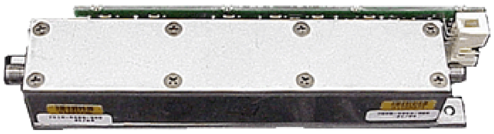
35404

SPACER, CASE SUPPORT



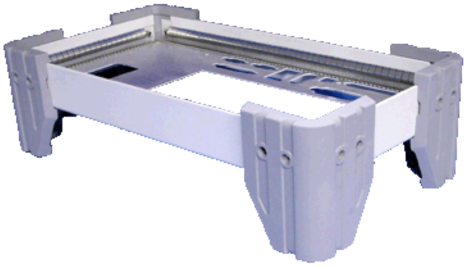
64413

MECH ASSY, ATTENUATOR



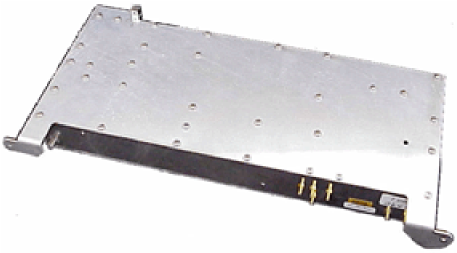
64421
64405

MECH ASSY, REAR PANEL



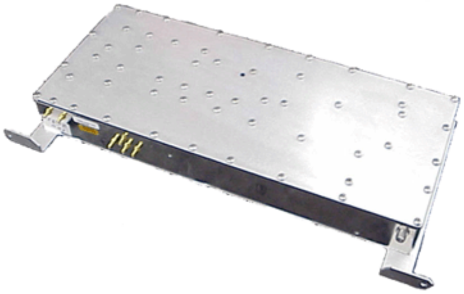
64419

MECH ASSY, RECEIVER



64420 (obsolete)

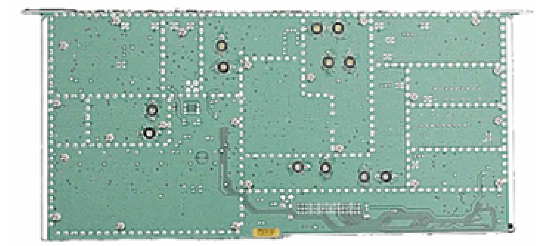
MECH ASSY, GENERATOR



## 7.4.1 Composite Assembly Replacement Parts (cont)

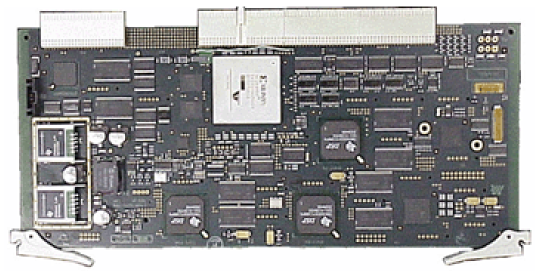
87419

PCB ASSY, IF VIDEO



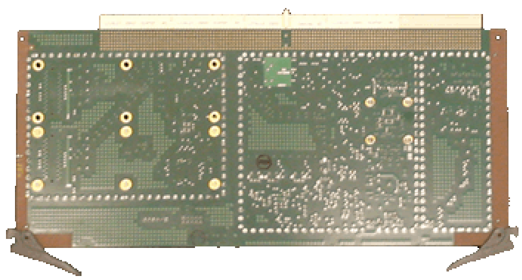
65682 (replaced by 92823)

PCB ASSY, CAI



65691

PCB ASSY, DAM CARRIER



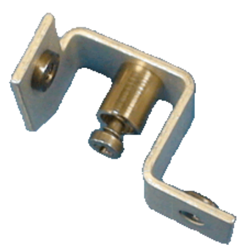
67344

ASSY, HANDLE

## 7.4.2 Chassis Assembly Replacement Parts

9422

BRACKET, POWER SUPPLY MTG

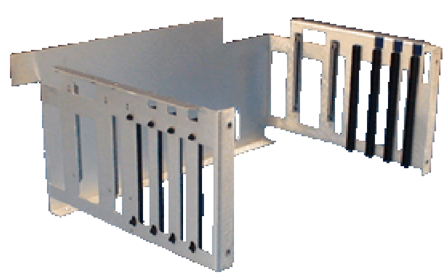


9424

BRACKET, FAN SHROUD

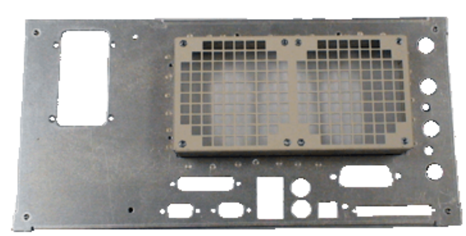
9421

BRACKET, CARD CAGE



9995 (obsolete)

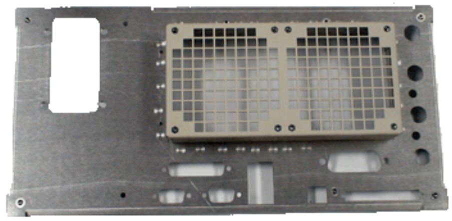
PANEL CHASSIS REAR (390X)



## 7.4.2 Chassis Assembly Replacement Parts (cont)

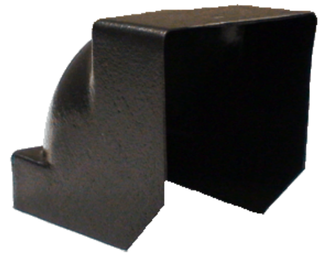
9999

PANEL CHASSIS REAR (3920)



10455

COVER, FAN SHROUD

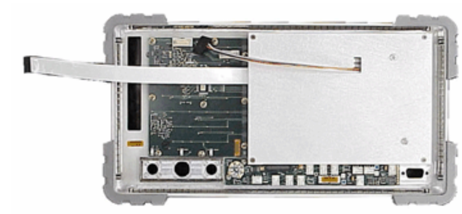


64401

MECH ASSY, POWER SUPPLY

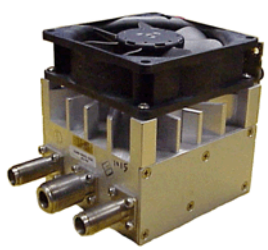
64402 (3901/3902)

MECH ASSY, FRONT PANEL



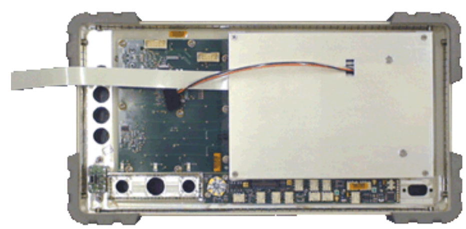
64408

MECH ASSY, POWER TERM



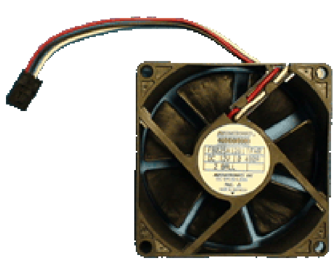
64418 (3920)

MECH ASSY, FRONT PANEL



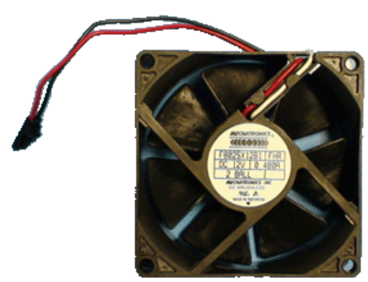
64409

FAN ASSY (B1)



64414

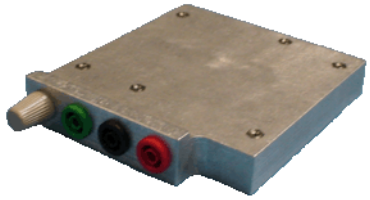
FAN ASSY (B2)



### 7.4.2 Chassis Assembly Replacement Parts (cont)

64416 (n/a 3901/3902)

DMM (DIGITAL MULTIMETER)

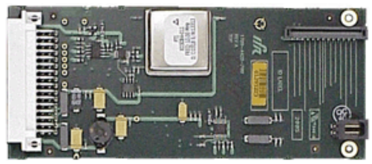


64983

WIRE HARNESS ASSY, SPEAKER

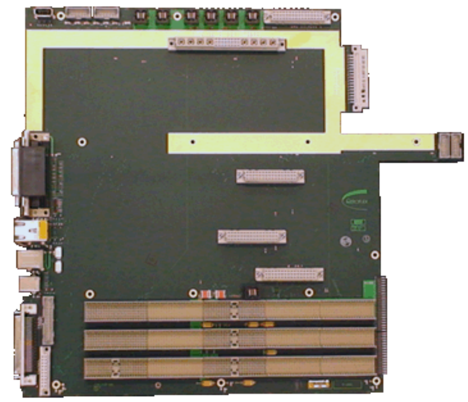
65650 (3901/3902)

PCB ASSY, DISK I/O



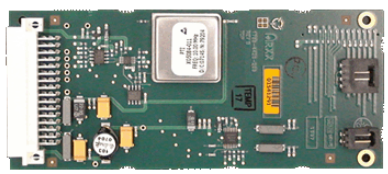
65654

BACKPLANE PCB ASSY



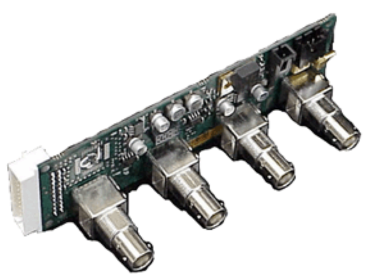
65688 (3920)

PCB ASSY, DISK I/O



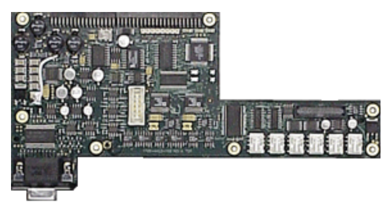
65659

PCB ASSY, REAR PANEL



65673 (obsolete)

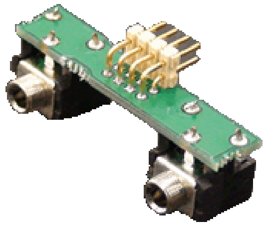
PCB ASSY, FNT PANEL DIGITAL INTERFACE



## 7.4.2 Chassis Assembly Replacement Parts (cont)

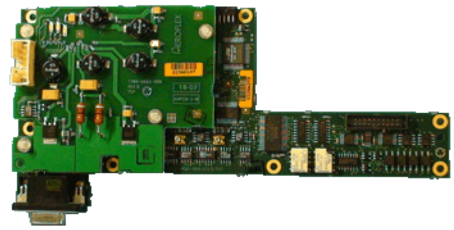
65676

PCB ASSY, REAR PANEL AUDIO I/O



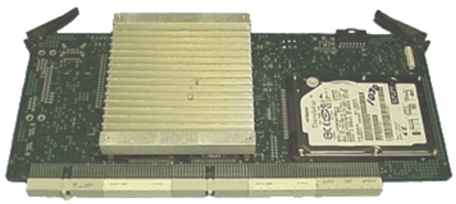
65686 (3920)

PCB ASSY, FNT PANEL DIGITAL INTERFACE



65690

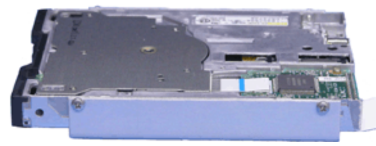
PCB ASSY, CPU ADAPTER



*Appearance varies depending on board revision.

67342

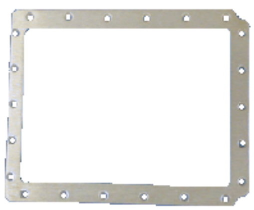
ASSY, FLOPPY DRIVE



## 7.4.3 Front Panel Replacement Parts

9427

BRACKET, FNT PANEL LENS

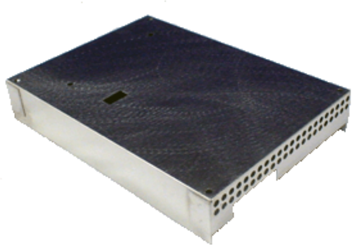


11235

BUMPER, CORNER FRONT

33785

SHIELD, DISPLAY

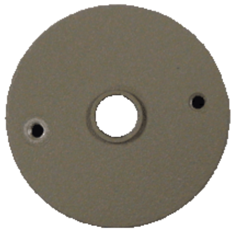


30704

KNOW, SPINNER, 1.5 DIA. X .66LG, ST DK

## 7.4.3 Front Panel Replacement Parts (cont)

89875
SPACER, 390X SPINNER
*Requires 89874

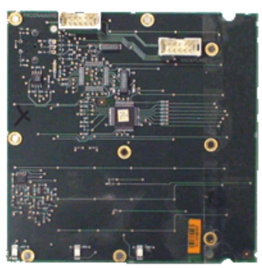


89874
GASKET, SPACER, SPINNER
*Used with 89875

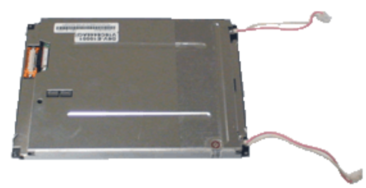
90585
PCB ASSY, LED BACKL

67355
ASSY, KEYPAD


65653
PCB ASSY, FRONT PANEL



90611
DISPLAY, LCD, LED BACKLIGHT, 6.4”



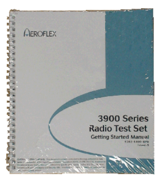
## 7.4.4 Miscellaneous Parts

10227
BUMPER, CORNER REAR

46825
BATTERY, LITHIUM, 3V

# 7.5 ACCESSORIES

## 7.5.1 Standard Accessories

| Item | Part Number | Description |
|---|---|---|
|  | 10456 | AC25023 COVER, LID |
|  | 6047 | MANUAL, CD, OP, 3900 SERIES |
|  | 6050 | MANUAL, GETTING STARTED, 3900 SERIES |

### 7.5.1.A Std Cord/Accessory Kit (63938)

| Item | Part Number | Description |
|---|---|---|
|  | 9143 | AC25044 ANTENNA, BNC, 800 MHZ |
|  | 9145 | AC25045 VHF ANTENNA |
|  | 9147 | AC25043 UHF ANTENNA |
|  | 20327 | CONN, BNC JACK/N PLUG |
|  | 23758 (Qty 2) | AC25027 TNC TO BNC ADAPTER |
|  | 56078 (Qty 2) | FUSE, 3 AMP, FAST, 5MMX20MM, 250V |
|  | 27477 | POWER CORD, RT IEC RECPT, BS PLG |
|  | 27478 | SUPPLY LEAD |
|  | 27480 | POWER CORD, RT IEC RECPT CNT PL |
|  | 27516 | CABLE ASSY MAINS RT-ANG |

### 7.5.2 Optional Accessories

| Part Number | Description |
|---|---|
| 6047 | MANUAL, CD, OP, 3900 SERIES |
| 6048 | MANUAL, CD, MN, 3900 SERIES |
| 9143 | AC25044 ANTENNA BNC 800 MHZ |
| 9145 | AC25045 ANTENNA VHF |
| 9147 | AC25043 ANTENNA UHF |
| 9149 | AC25042 HF ANTENNA |
| 10225 | AC25012 SOFT PADDED CASE |
| 10228 | AC25029 ACCESSORY POUCH |
| 10456 | AC25023 FRONT/REAR COVER |
| 20327 | CONNECTOR, BNC JACK/N PLUG |
| 23758 | AC25027 TNC TO BNC ADAPTER |
| 47293 | AC4105, RETURN LOSS BRIDGE, 1.3 GHZ |
| 58520 | AC25061 50 OHM 250 WATT 5 GHZ |
| 62303 | CORD, AC, NEMAS-15, IEC320-C13, RA |
| 63928 | AC25036 DC/AC CONVERTER, 12 VDC to 110-120 VAC |
| 63931 | AC25055 QMA ADAPTER KIT (3920) |
| 63934 | 390XOPT040, CALIBRATION KIT |
| 63936 | AC24009 DMM TEST LEAD KIT (3920/3920B only) |
| 64009 | AC8645 MICROPHONE |
| 67411 | AC25014 OSCILLOSCOPE PROBE KIT |
| 67442 | AC25013 KIT, 10/20 dB Pads, TNC |
| 67478 | AC24011 20 AMP CURRENT SHUNT 0.01 OHM |
| 67479 | AC24010 10 AMP CURRENT SHUNT 0.01 OHM |
| 82556 | AC25059 6 DB/150 W 1.5 GHZ ATTENUATOR |
| 82557 | AC25060 10 DB/150 W 1.5 GHZ ATTENUATOR |
| 89243 | AC25083 3920 TRANSIT CASE W/WHEELS |
| 90322 | AC25084 RACK MOUNT ASSEMBLY, 6U |
| 90323 | AC25085 RACK MOUNT ASSEMBLY, 5U |

NOTE Contact Aeroflex Sales or Customer Service for the most current list of available accessories.

# Appendix A - I/O Connectors and Pin-Out Tables

## A.1 CONNECTOR FUNCTIONS

| Connector Name | Connector Type | Signal IN/OUT | Signal Type |
|---|---|---|---|
| MIC/ACC | 8 Pin DIN | IN/OUT | See Pin-Out Table |
| GPIB (IEEE-488) | 24 Pin Champ | IN/OUT | See Pin-Out Table |
| Serial Connector | 9 Way, D-Type Plug | IN/OUT | See Pin-Out Table |
| Parallel Connector | 25 Way, D-Type Socket | IN/OUT | See Pin-Out Table |
| VGA Monitor Output | 15 Way, D-Type | OUT | See Pin-Out Table |
| Ethernet | Standard T-RJ45 | IN/OUT | See Pin-Out Table |
| USB | Standard USB | IN/OUT | See Pin-Out Table |
| USB Client Connector | Standard USB | Reserved for future use | See Pin-Out Table |
| PS/2 Interface | Standard PS/2 | Reserved for future use | See Pin-Out Table |
| Test Connector | Open Connector | IN/OUT | See Pin-Out Table |

# A.2 MIC/ACC CONNECTOR PIN-OUT TABLE

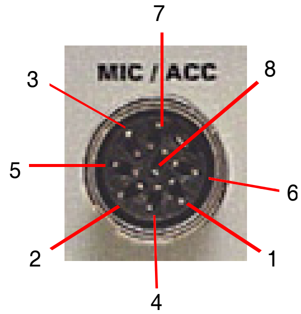



Fig. A-1 Microphone and Accessory Connector

| Pin Number | Signal Name | Signal Type | I/O |
|---|---|---|---|
| 1 | MIC Switch (PTT) | TTL | Out |
| 2 | MIC Audio | Audio | In |
| 3 | Demod Audio | Audio | Out |
| 4 | | No connection | |
| 5 | | 2-13 Vdc | |
| 6 | | No connection | |
| 7 | MIC Switch (PTT) | TTL | In |
| 8 | GND | Instrument ground | |

Table A-1 MIC/ACC Connector Pin-Out Table

# A.3 GPIB CONNECTOR PIN-OUT TABLE

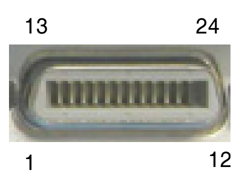



Fig. A-2 GPIB Connector Pin Locations

| Pin Connector | Function | Pin Connector | Function |
|---|---|---|---|
| 1 | Data I/O 1 | 13 | Data I/O 5 |
| 2 | Data I/O 2 | 14 | Data I/O 6 |
| 3 | Data I/O 3 | 15 | Data I/O 7 |
| 4 | Data I/O 4 | 16 | Data I/O 8 |
| 5 | EOI | 17 | REN |
| 6 | DAV | 18 | Pair with 6 |
| 7 | NRFD | 19 | Pair with 7 |
| 8 | NDAC | 20 | Pair with 8 |
| 9 | IFC | 21 | Pair with 9 |
| 10 | SRQ | 22 | Pair with 10 |
| 11 | ATN | 23 | Pair with 11 |
| 12 | Ground Shield | 24 | Logic Grounds |

Table A-2 GPIB Connector Pin-Out Table

## A.4 SERIAL CONNECTOR PIN-OUT TABLE

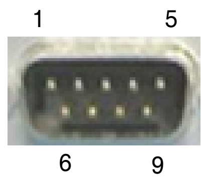



Fig. A-3  Serial Connector Pin Locations

| Pin Connector | Function | Pin Connector | Function |
|---|---|---|---|
| 1 | DCD | 6 | DSR |
| 2 | Rx Data In | 7 | RTS |
| 3 | Tx Data Out | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | Ground | | |

Table A-3  Serial Connector Pin-Out Table

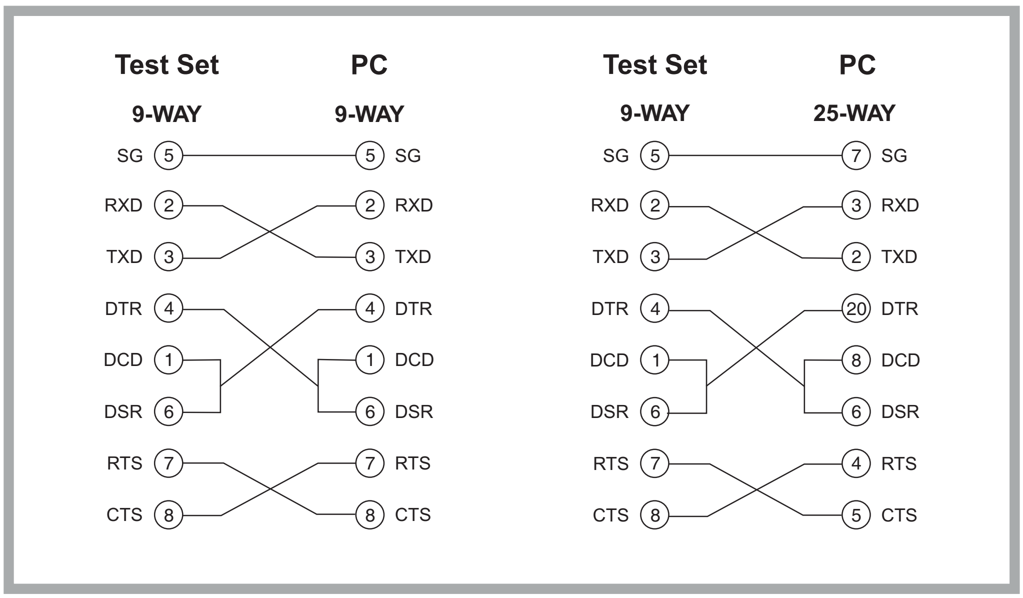



Fig. A-4  Null Modem Connections

## A.5 PARALLEL CONNECTOR PIN-OUT TABLE

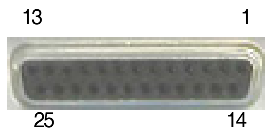



Fig. A-5 Parallel Connector Pin Locations

Parallel Connector Pin-Out Table

| Pin Connector | Function | Pin Connector | Function |
|---|---|---|---|
| 1 | Strobe | 10 | ACK |
| 2 | Data 0 | 11 | BUSY |
| 3 | Data 1 | 12 | PE |
| 4 | Data 2 | 13 | SLCT |
| 5 | Data 3 | 14 | AUTOFD |
| 6 | Data 4 | 15 | EROR |
| 7 | Data 5 | 16 | INIT |
| 8 | Data 6 | 17 | SLCT IN |
| 9 | Data 7 | 18 to 25 | Ground |

## A.6 VGA MONITOR OUTPUT CONNECTOR PIN-OUT TABLE

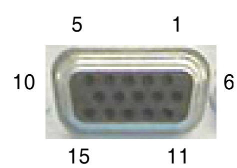



Fig. A-6VGA Monitor Output Pin Locations

| Pin Connector | Function | Pin Connector | Function |
|---|---|---|---|
| 1 | Red video | 9 | No Connection |
| 2 | Green video | 10 | Sync Return |
| 3 | Blue video | 11 | Monitor ID 0 |
| 4 | Monitor ID 2 | 12 | Monitor ID 1 |
| 5 | Ground | 13 | Horizontal Sync |
| 6 | Red return | 14 | Vertical Sync |
| 7 | Green return | 15 | Monitor ID 3 |
| 8 | Blue return | | |

Table A-4 VGA Monitor Output Connector Pin-Out Table

## A.7 ETHERNET AND USB CONNECTORS PIN-OUT TABLE

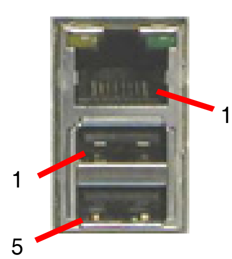



Fig. A-6 Ethernet and USB Connectors

### A.7.0.A Ethernet Connector Pin-Out Table

| Pin Connector | Signal Type | Signal Name | I/O |
|---|---|---|---|
| 1 | DATA | TX (+) | OUT |
| 2 | DATA | TX (-) | OUT |
| 3 | DATA | RX (+) | IN |
| 4 | DATA | Rx(-) | IN |
| 5 | GND | GND | GND |
| 6 | GND | GND | GND |
| 7 | GND | GND | GND |
| 8 | GND | GND | GND |

Table A-5 Ethernet Connector Pin-Out Table

### A.7.0.B USB Connector Pin-Out Table

| Pin Connector | Signal Type | Signal Name | I/O |
|---|---|---|---|
| 1 | PWR | VCC | |
| 2 | DATA | (-) DATA | I/O |
| 3 | DATA | (+) DATA | I/O |
| 4 | PWR | GND | |
| 5 | PWR | VCC | |
| 6 | DATA | (-) DATA | I/O |
| 7 | DATA | (+)DATA | I/O |
| 8 | PWR | GND | |

Table A-6 USB Connector Pin-Out Table

## A.8 PS/2 INTERFACE CONNECTORS PIN-OUT TABLE

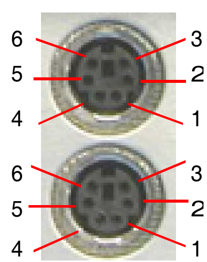



Fig. A-7 PS/2 Interfaces

| Pin Connector | Signal Type | Signal Name | Description |
|---|---|---|---|
| 1 | Bi-Directional | DATA | DATA |
| 2 | No Connection | | |
| 3 | Power | GND | GND |
| 4 | Power | +5 V | Supply Voltage |
| 5 | Bi-Directional | CLK | Clock |
| 6 | No Connection | | |
| Shell | Earth Ground | | Chassis Ground |

Table A-7 PS/2 Interface Connector Pin-Out Table

# A.9 TEST CONNECTOR PIN-OUT TABLE

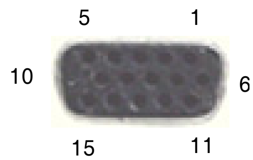



Fig. A-8 Test Connector

| Pin Connector | Signal Type | Pin Connector | Signal Type |
|---|---|---|---|
| 1 | Serial In 1 | 9 | Serial Out |
| 2 | Digital In 2 | 10 | Digital Out 2 |
| 3 | Digital In 3 | 11 | Digital Out 3 |
| 4 | Digital In 4 | 12 | Digital Out 4 |
| 5 | Digital In 5 | 13 | Digital Out 1 |
| 6 | No Connection | 14 | No Connection |
| 7 | Ground | 15 | Ground |
| 8 | PGM V+ Out | | |

Table A-8 Test Connector Pin-Out Table

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# Appendix B - 3900 Platform Specifications

3900 Platform Specifications apply to the 3901, 3902, 3920 and 3920B Test Sets except when otherwise indicated.

## B.1 RF SIGNAL GENERATOR

### B.1.1 Frequency

#### B.1.1.A Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920, 3920B Standard)

*3920B refer to Phase Noise Specifications for freq >1.0 GHz

10 MHz to 2.7 GHz (3902, 3920, 3920B Freq Extension Option [390XOPT058])

#### B.1.1.B Resolution

1 Hz

#### B.1.1.C Accuracy

Frequency Standard ±1 count

### B.1.2 Output Level

#### B.1.2.A Range

T/R: -130.0 to -30.0 dBm

Duplex: -130.0 to +10.0 dBm (+10 dBm max for CW or FM; 0 dBm max for complex modulation)

#### B.1.2.B Resolution

0.1 dB

#### B.1.2.C Accuracy (for level >-110 dBm)

T/R: ±1.0 dB (Typical better than ±0.6 dB), ±2.0 dB (≥1800 MHz)

GEN: ±1.0 dB (Typical better than ±0.6 dB), ±2.0 dB (≥1800 MHz)

# RF Generator (cont)

## B.1.3 Spectral Purity

### B.1.3.A Residual FM

**3901/3901/3920**

<15 Hz RMS (300 Hz to 3 kHz bandwidth)

**3920B**

<5 Hz RMS (300 Hz to 3 kHz bandwidth)

### B.1.3.B Residual AM

<0.1% RMS (300 Hz to 3 kHz bandwidth)

### B.1.3.C Harmonics

<-25 dBc (Typical -30 dBc, RF Level set at +10 dBm)

### B.1.3.D Non Harmonics

**3901/3902/3920**

<-55 dBc (all frequencies except Crossovers)

<-35 dBc (Crossover frequency = 3411.4 MHz - Generator frequency)

**3920B**

<-55 dBc (all frequencies except Crossovers)

<-35 dBc (At 2nd order Crossover frequency)

(10 MHz to 1.0 GHz: Crossover = 1400 MHz - Generator frequency)

(1 to 2.6 GHz: Crossover = 3400 MHz - Generator frequency)

(Tracking Generator: Crossover = 3410.7 MHz - Generator frequency)

### B.1.3.E Phase Noise

**3901/3902/3920**

| | |
|---|---|
| **20 kHz Offset:** | <-93 dBc/Hz (RF <1.05 GHz) |
| | <-90 dBc/Hz (RF >1.05 to 2.7 GHz) |

**3920B**

| | |
|---|---|
| **1 kHz Offset:** | <-100 dBc/Hz (RF ≤500 MHz) |
| | <-96 dBc/Hz (RF >500 to ≤1000 MHz) |
| | <-90 dBc/Hz (RF >1000 to ≤2600 MHz) |
| **10 kHz Offset:** | <-110 dBc/Hz (RF ≤500 MHz) |
| | <-106 dBc/Hz (RF >500 to ≤1000 MHz) |
| | <-95 dBc/Hz (RF >1000 to ≤2600 MHz) |

# RF Generator (cont)

## B.1.4 Modulation

### B.1.4.A Selections

OFF, AM, FM, FM 50 µs, FM 75 µs, FM 750 µs, AM USB, AM LSB

### B.1.4.B Internal FM

#### B.1.4.B.1 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920, 3920B Standard)

*3920B refer to Phase Noise Specifications for freq >1.0 GHz

10 MHz to 2.7 GHz (3902, 3920, 3920B Freq Extension Option [390XOPT058])

#### B.1.4.B.2 Deviation

±0.001 to ± 150 kHz, OFF

#### B.1.4.B.3 Accuracy

3% (From ±1 kHz to ±100 kHz deviation, 20 Hz to 15 kHz rate)

#### B.1.4.B.4 Resolution

1 Hz

#### B.1.4.B.5 Deviation Rate

20 Hz to 15 kHz

#### B.1.4.B.6 Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch (DCS), Dual Tone Multiple Frequency (DTMF)

#### B.1.4.B.7 THD

<1% (1 kHz rate, 6 kHz deviation, 300 Hz to 3 kHz BW, Sine)

# RF Generator (cont)

## Modulation (cont)

### B.1.4.C Internal AM

#### B.1.4.C.1 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920, 3920B Standard)

*3920B refer to Phase Noise Specifications for freq >1.0 GHz

10 MHz to 2.7 GHz (3902, 3920, 3920B Freq Extension Option [390XOPT058])

#### B.1.4.C.2 Modulation Range

0% to 100%

#### B.1.4.C.3 Accuracy

1% (Modulation from 10 to 90%)

#### B.1.4.C.4 Resolution

0.1%

#### B.1.4.C.5 Rate

20 Hz to 15 kHz

#### B.1.4.C.6 Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch (DCS), Dual Tone Multiple Frequency (DTMF)

#### B.1.4.C.7 THD

<1% (1 kHz rate, 30 to 70% AM, 300 Hz to 3 kHz BW, Sine)

### B.1.4.D Internal Single-Sideband (SSB)

#### B.1.4.D.1 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920, 3920B Standard)

*3920B refer to Phase Noise Specifications for freq >1.0 GHz

10 MHz to 2.7 GHz (3902, 3920, 3920B Freq Extension Option [390XOPT058])

#### B.1.4.D.2 Modulation Selection

Upper-Sideband (USB) or Lower-Sideband (LSB)

#### B.1.4.D.3 Modulation Range

0% to 100%

#### B.1.4.D.4 Resolution

0.1%

#### B.1.4.D.5 Rate

300 Hz to 3 kHz

#### B.1.4.D.6 Waveform

Sine, Square, Triangle, Ramp, Digital Coded Squelch (DCS), Dual Tone Multiple Frequency (DTMF)

# RF Generator (cont)

## Modulation (cont)

### B.1.4.E External AM/FM/SSB

#### B.1.4.E.1 Audio Inputs

With 1 Vrms, AM/FM/SSB have same characteristics as internal sources, ±10% of indicated setting.

Audio 1 or Audio 2 Input from 20 Hz to 15 kHz, (300 Hz to 3 kHz SSB), Unbalanced

8 Vrms maximum modulation input level.

#### B.1.4.E.2 Microphone Input

With 50 mVrms, AM/FM/SSB have same characteristics as internal sources, ±10% of indicated setting.

MIC Input from 100 Hz to 15 kHz (300 Hz to 3 kHz SSB)

### B.1.4.F Internal I-Q (Option)

#### B.1.4.F.1 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920, 3920B Standard)

*3920B refer to Phase Noise Specifications for freq >1.0 GHz

10 MHz to 2.7 GHz (3902, 3920, 3920B Freq Extension Option [390XOPT058])

#### B.1.4.F.2 Modulation Selection

IQ Creator® file downloads for custom I-Q modulation

# B.2 RF RECEIVER

## B.2.1 Demodulation Selections

OFF, AM, FM, FM 50 µs, FM 75 µs, FM 750 µs, AM USB, AM LSB

## B.2.2 Frequency Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

## B.2.3 Sensitivity

### B.2.3.A Pre-Amp OFF

<-100 dBm (10 dB SINAD, FM, 25 kHz, 1 kHz rate, 6 kHz FM Deviation, 300 Hz to 3.4 kHz AF Filter)

### B.2.3.B Pre-Amp ON

<-113 dBm (10 dB SINAD, FM, 25 kHz, 1 kHz rate, 6 kHz FM Deviation, 300 Hz to 3.4 kHz AF Filter, Pre-Amp On)

## B.2.4 Selectivity

### B.2.4.A IF Bandwidth

6.25, 8.33, 10, 12.5, 25, 30, 100, 300 kHz Filters

## B.2.5 Demod Output Level

### B.2.5.A FM

2.5 Vrms ±10% (for deviation ±1/2 of selected BW; 25 kHz BW same output level as 30 kHz BW)

### B.2.5.B AM

2.25 Vrms ±10% (for 100% AM)

# B.3 RF RECEIVE MEASUREMENTS

## B.3.1 AM Meter

### B.3.1.A Range

0% to 100%

### B.3.1.B Scales

1% to 100% in a 1, 2, 5 sequence, plus Autoscale

### B.3.1.C Resolution

0.1%

### B.3.1.D Accuracy

±3% + source residual, ±1 count (30 to 90% AM, IF BW set appropriately for the received modulation bandwidth)

### B.3.1.E AM

#### B.3.1.E.1 Rate

20 Hz to 15 kHz (IF BW set appropriately for the received modulation BW)

#### B.3.1.E.2 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

#### B.3.1.E.3 RF Level

T/R: -10 to +50 dBm

ANT: -80 to +10 dBm

# RF Receive Measurements (cont)

## B.3.2 FM Deviation Meter

### B.3.2.A Range

0 to 150 kHz

### B.3.2.B Scales

1 to 200 kHz in a 1, 2, 5 sequence, plus Autoscale

### B.3.2.C Resolution

10 Hz

### B.3.2.D Accuracy

±3% plus source residual, ±1 count (1 to 150 kHz FM deviation, IF BW set appropriately for the received modulation BW)

### B.3.2.E FM

#### B.3.2.E.1 Rate

20 Hz to 20 kHz (IF BW set appropriately for the received modulation BW)

#### B.3.2.E.2 RF Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

#### B.3.2.E.3 RF Level

T/R: -10 to +50 dBm

ANT: -80 to +10 dBm

## B.3.3 RF Counter

### B.3.3.A Frequency

Range (Usable from 100 kHz, Autotune)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

### B.3.3.B Resolution

1 Hz

### B.3.3.C Accuracy

Frequency Standard ± 1 count

### B.3.3.D Level (Range)

T/R: -10 to +50 dBm (Find level is selectable)

ANT: -60 to +10 dBm (Find level is selectable)

# RF Receive Measurements (cont)

## B.3.4 RF Error Meter

### B.3.4.A Counter Range

0 to ±2.5 MHz from Receiver frequency (6 MHz IF BW)

### B.3.4.B Accuracy

Frequency Standard ±1 count

### B.3.4.C Resolution

1 Hz

### B.3.4.D Level

T/R: -10 to +50 dBm

ANT: -60 to +10 dBm

## B.3.5 Demodulation

### B.3.5.A Demod Counter

#### B.3.5.A.1 Frequency

**Range**

20 Hz to 20 kHz (1 to 100 kHz FM Deviation, IF BW set appropriately for the received modulation BW)

20 Hz to 10 kHz (30% to 90% AM, IF BW set appropriately for the received modulation BW).

**Resolution**

0.1 Hz

**Accuracy**

±50 ppm (±10 ppm Typical)

#### B.3.5.A.2 Input Waveform

Sine or Square

#### B.3.5.A.3 RF Characteristics

**Input RF (Usable from 100 kHz)**

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

**RF Level**

T/R: -10 to +50 dBm

ANT: -80 to +10 dBm

# RF Receive Measurements (cont)

## B.3.6 RF Power Meter (Broad band)

### B.3.6.A Frequency

#### B.3.6.A.1 Range (Usable from 2 MHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

#### B.3.6.A.2 Level

100 mW to 125 W (Usable from 10 mW)

#### B.3.6.A.3 Resolution

4 digits for W or 0.1 dB

#### B.3.6.A.4 Accuracy

10%, ±1 digit

### B.3.6.B Power Measurement Range

T/R: 100 mW to 125 W (25% on/off ratio)

## B.3.7 RF Power Meter (In Band)

### B.3.7.A Frequency

#### B.3.7.A.1 Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

#### B.3.7.A.2 Level

T/R: -60 to +51 dBm: Lowest reading is receiver BW dependent (Narrower bandwidths can measure lower levels).

ANT: -100 to +10 dBm: Lowest reading is receiver BW dependent (Narrower bandwidths can measure lower levels).

#### B.3.7.A.3 Resolution

0.1 dB

#### B.3.7.A.4 Accuracy (after User Calibration)

±1 dB (Input Level above minimum for selected BW (display not yellow) typically better than ±0.6 dB).

### B.3.7.B AM Filter BW

6.25, 8.33, 10, 12.5, 25 and 30 kHz

### B.3.7.C FM Filter BW

6.25, 10, 12.5, 25, 30, 100, and 300 kHz

# B.4 AUDIO FUNCTION GENERATOR(S)

Up to 3 function generators can be combined into 1 Output signal

## B.4.1 Waveshape

Sine, Square, Triangle, Ramp, Digital Coded Squelch (DCS), Dual Tone Multiple Frequency (DTMF)

## B.4.2 Frequency

### B.4.2.A Range

Sine: 20 Hz to 40 kHz (usable 1 Hz to 40 kHz)

Square: 20 Hz to 4 kHz (usable 1 Hz to 4 kHz)

### B.4.2.B Resolution

0.1 Hz

### B.4.2.C Accuracy

±50 ppm, ±10 ppm Typical

## B.4.3 Level (Sine)

### B.4.3.A Range

1 mV to 5 Vrms into a 10 kΩ load

### B.4.3.B Resolution

0.1 mV

### B.4.3.C Accuracy

±1% of setting (10 kΩ load)

## B.4.4 Impedance

3901/3902: 600 Ω (nominal)

3920/3920B: <10 Ω

## B.4.5 Spectral Purity

<0.5% (1 kHz, 5 Vrms, 80 kHz BW, 10 kΩ load, Sine)

<1.0% (Typical, 20 Hz to 40 kHz, 100 mV to 5 Vrms, 80 kHz BW, 10 kΩ load, Sine)

# B.5 AUDIO & MODULATION MEASUREMENTS

## B.5.1 AF Counter

### B.5.1.A Frequency Range

20 Hz to 20 kHz (usable from 10 Hz)

### B.5.1.B Resolution

0.1 Hz

### B.5.1.C Accuracy

±50 ppm max, ±10 ppm Typical

### B.5.1.D Waveshape

Sine or Square

### B.5.1.E Input Level Range

3901/3902: 10 mV to 8 Vrms

3920/3920B: 10 mV to 30 Vrms

### B.5.1.F Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2: Balanced, 600 Ω differential input

### B.5.1.G Impedance

Hi-Z (>10 kΩ) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.2 AF Level Meter

### B.5.2.A Frequency Range

20 Hz to 20 kHz

### B.5.2.B Accuracy

3901/3902: 5% (Unbalanced, Hi-Z, 300 to 3 kHz, 0.1 to 8 Vrms)

3920/3920B: 5% (Unbalanced, Hi-Z, 300 to 3 kHz, 0.1 to 30 Vrms)

### B.5.2.C Level Range

3901/3902: 0 to 8 Vrms

3920/3920B: 0 to 30 Vrms

### B.5.2.D Resolution

#### B.5.2.D.1 Volts

1 mV (Input <1 V)

10 mV (Input ≥1 V)

#### B.5.2.D.2 dBr, dBV, dBm

0.01 dB

### B.5.2.E Scales

#### B.5.2.E.1 Volts

20 mV to 50 V in a 1, 2, 5 sequence, plus Autoscale

#### B.5.2.E.2 dBr

1 dBr to 100 dBr in a 1, 2, 5 sequence plus Autoscale

#### B.5.2.E.3 dBV

-40, -20, 0, 20, 40 dBV plus Autoscale

#### B.5.2.E.4 dBm

-30, -20, -10, 0, 10, 20, 30, 40 dBm plus Autoscale

### B.5.2.F Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2: Balanced, 600 Ω differential input

### B.5.2.G Impedance

Hi-Z (>10 kΩ) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.3 SINAD Meter

### B.5.3.A Range

0 to 60 dB

### B.5.3.B Resolution

0.01 dB

### B.5.3.C Accuracy

±1 dB, ±1 count (SINAD >3 dB, ≤40 dB, 5 kHz LP AF Filter)

### B.5.3.D Signal Frequency

300 Hz to 5 kHz

### B.5.3.E Signal Level

3901/3902: 0.1 to 8 Vrms

3920/3920B: 0.1 to 30 Vrms

### B.5.3.F Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2: Balanced, 600 Ω differential input

### B.5.3.G Impedance

Hi-Z (>10 kΩ) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.4 Distortion Meter

### B.5.4.A Range

0.0% to 100.0%

### B.5.4.B Resolution

0.1%

### B.5.4.C Accuracy

<±0.5% (Distortion 1% to 10%, 5 kHz LP AF Filter)

<±1.0% (Distortion 10% to 20%, 5 kHz LP AF Filter)

### B.5.4.D Signal Frequency

300 Hz to 5 kHz (Entry Range 0 to 24,000 Hz)

### B.5.4.E Signal Level

3901/3902: 0.1 to 8 Vrms

3920/3920B: 0.1 to 30 Vrms

### B.5.4.F Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2: Balanced, 600 Ω differential input

### B.5.4.G Impedance

Hi-Z (>10 kΩ) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.5 Hum and Noise

### B.5.5.A Modes

| Mode | Stimulus | Stimulus Port | Measurement Input | Measurement Port |
|---|---|---|---|---|
| 1 | RF Generator | TR/GEN | AF Input | Audio In 1/2 |
| 2 | AF Generator | Fctn Gen Out | RF Receiver | TR/ANT |

### B.5.5.B Meter Range

-100 to 0 dB

### B.5.5.C Resolution

0.01 dB

### B.5.5.D Accuracy

±1 dB, ±1 count (>-60 dB, ≤-20 dB)

### B.5.5.E Signal Frequency

300 Hz to 5 kHz (Entry range 0 to 24,000 Hz)

### B.5.5.F Audio Input Signal Level (Mode 1)

3901/3902: 0.1 to 8 Vrms

3920/3920B: 0.1 to 30 Vrms

### B.5.5.G RF Level Input (Mode 2)

T/R: -10 to +50 dBm

ANT: -80 to +10 dBm

### B.5.5.H Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2; Balanced, 600 Ω differential input

### B.5.5.I Impedance

Hi-Z (>10 kΩ) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.6 Signal to Noise Ratio

### B.5.6.A Modes

| Mode | Stimulus | Stimulus Port | Measurement Input | Measurement Port |
|---|---|---|---|---|
| 1 | RF Generator | TR/GEN | AF Input | Audio In 1/2 |
| 2 | AF Generator | Fctn Gen Out | RF Receiver | TR/ANT |

### B.5.6.B Meter Range

0 to 60 dB

### B.5.6.C Resolution

0.01 dB

### B.5.6.D Accuracy

±1 dB, ±1 count (>3 dB, ≤40 dB, 5 kHz LP AF Filter)

### B.5.6.E Signal Frequency

300 Hz to 5 kHz (Entry range 0 to 24,000 Hz)

### B.5.6.F Audio Input Signal Level (Mode 1)

3901/3902: 0.1 to 8 Vrms

3920/3920B: 0.1 to 30 Vrms

### B.5.6.G RF Level Input (Mode 2)

T/R: -10 to +50 dBm

ANT: -80 to +10 dBm

### B.5.6.H Front Panel Inputs

Audio 1 or 2: Unbalanced, Chassis reference

Audio 1 and 2: Balanced, 600 Ω differential input

### B.5.6.I Impedance

Hi-Z (>10 k Ω) Unbalanced input

600 Ω Unbalanced input (8 Vrms Maximum input*)

600 Ω Balanced input

*600 Ω Unbalanced input auto-switches to Hi-Z @ 8 Vrms (3920 only)

# Audio & Modulation Measurements (cont)

## B.5.7 Audio Filters (Characteristic Response)

| Filter | Type | Ripple | -1 dB | -60 dB |
|---|---|---|---|---|
| NONE | No Filter | -- | -- | -- |
| 300 Hz | Low-Pass | <0.23 dB, above 20 Hz | 330 Hz | 590 Hz |
| 5 kHz | Low-Pass | <0.02 dB, above 20 Hz | 5.5 kHz | 6.7 kHz |
| 15 kHz | Low-Pass | <0.01 dB, above 20 Hz | 16.1 kHz | 17.8 kHz |
| 20 kHz | Low-Pass | <0.01 dB, above 20 Hz | 20.4 kHz | 21 kHz |
| 0.3 to 3.4 kHz | Band-Pass | <1.7 dB | 320 Hz/3.8 kHz | 60 Hz/5.2 kHz |
| 0.3 to 5 kHz | Band-Pass | <1.7 dB | 320 Hz/5.2 kHz | 60 Hz/9.6 kHz |
| 0.3 to 15 kHz | Band-Pass | <1.7 dB | 320 Hz/16.1 kHz | 60 Hz/19.9 kHz |
| 0.3 to 20 kHz | Band-Pass | <1.7 dB | 200 Hz/20.4 kHz | 60 Hz/21 kHz |
| PSOPH/C-MSG | Band-Pass | Per C-MSG Spec | Per C-MSG Spec | Per C-MSG Spec |
| PSOPH/CCITT | Band-Pass | Per CCITT Spec | Per CCITT Spec | Per CCITT Spec |
| 300 Hz | High-Pass | <1.7 dB | 320 Hz | 60 Hz |

# B.6 CHANNEL ANALYZER

With the exception of the following, refer to Spectrum Analyzer Specifications for all other Channel Analyzer specifications.

## B.6.1 Frequency

### B.6.1.A Range (Usable from 100 kHz)

10 MHz to ±2.5 MHz from Receiver Center Frequency within specified range

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

## B.6.2 Span

### B.6.2.A Width

2 kHz to 5 MHz

### B.6.2.B Range

2 kHz to 5 MHz in a 1, 2, 5 sequence (Span may be entered numerically down to 1 Hz resolution)

## B.6.3 Level

### B.6.3.A Ref Level Range

±60 dBm from measured Level within specified range

T/R: -50 to +50 dBm

ANT: -90 to +10 dBm

## B.6.4 Resolution Bandwidth

### B.6.4.A Selections

300 Hz, 3 kHz, 60 kHz

## B.6.5 Sweep

### B.6.5.A Frequency Sweep Time

50 ms to 100 s in a 1, 2, 5 sequence

# B.7 RF SPECTRUM ANALYZER

## B.7.1 Frequency

### B.7.1.A Range (Usable from 100 kHz)

10 MHz to 1.05 GHz (3901, 3920 Standard)

10 MHz to 2.7 GHz (3902, 3920 Freq Extension Option [390XOPT058])

### B.7.1.B Resolution

1 Hz

### B.7.1.C Accuracy

Refer to Frequency Standard I/O Specifications

## B.7.2 Span

### B.7.2.A Mode

Start/Stop, Center/Span, Zero Span

### B.7.2.B Width

2 kHz to full span

### B.7.2.C Range

Selection is 2 kHz to Full Span in a 1, 2, 5 sequence, plus Zero Span (Span may be entered numerically down to 1 Hz resolution)

### B.7.2.D Accuracy

±1% of span width

## B.7.3 Display Accuracy

Span Accuracy + Freq Accuracy +50% of RBW

## B.7.4 Markers

### B.7.4.A Marker Accuracy

±1% of span width

### B.7.4.B Track

Frequencies (or time) and amplitudes

### B.7.4.C Number of Markers

Vertical Markers: 6

Horizontal Markers: 2

# RF Spectrum Analyzer (cont)

## Markers (cont)

### B.7.4.D Marker Functions

Marker to Peak
Marker to Minimum
Marker to Center Frequency
Marker sets Vertical Scale (Zero Span only)
Marker to Next Right/Left
Marker to Ref Level
Marker sets Span

## B.7.5 Level

### B.7.5.A Ref Level Range

T/R: -50 to +50 dBm
ANT: -90 to +10 dBm

### B.7.5.B Vertical Scales

1, 2, 5, 10 dB/division

### B.7.5.C Reference Level Resolution

0.1 dB

### B.7.5.D Ref Level Units

dBm, dBμV, dBmV

### B.7.5.E Dynamic Range

70 dB (Antenna, no attenuation, Ref Level -30 dBm, 30 kHz RBW)

### B.7.5.F Bandwidth Switching Error

±1 dB (After Normalize)

### B.7.5.G Log Linearity

±1 dB (RBW: 3 kHz, 30 kHz, 60 kHz, 300 kHz, 6 MHz)
±1 dB (300 Hz RBW Typical)

### B.7.5.H Accuracy

±1 dB (Input signal -10 dB from Ref Level, Normalized, Pre-Amp OFF)

### B.7.5.I Attenuator Selections

0 to 50 dB of attenuation, controlled by changing the Ref Level.

### B.7.5.J 3rd Order Intermodulation

-60 dBc (Input Level of -30 dBm, Ref Level at -20 dBm)

### B.7.5.K Harmonic Spurious

-55 dBc (Input Level of -30 dBm, Ref Level at -20 dBm)

# RF Spectrum Analyzer (cont)

## Level (cont)

### B.7.5.L Non-Harmonic Spurious

-60 dBc (Input Level of -30 dBm, Ref Level at -20 dBm)

### B.7.5.M Displayed Average Noise Level (DANL)

-125 dBm (Typical, 300 Hz RBW, ANT Port terminated, 20 sweep average)

## B.7.6 Resolution Bandwidth

### B.7.6.A Selections

300 Hz, 3 kHz, 30 kHz, 60 kHz, 300 kHz, 6 MHz

### B.7.6.B RBW 60 dB/3 dB Filter Shape

>10:1

### B.7.6.C Selectivity - Filter Shape

60 dB/3 dB ratio better than 10:1

### B.7.6.D Accuracy

±10% of RBW for 3 kHz, 30 kHz, 60 kHz, 300 kHz
-10%/+25% of RBW for 6 MHz
±20% of RBW for 300 Hz

### B.7.6.E Bandwidth Switching Error

±1 dB

## B.7.7 Video Bandwidth

10 Hz to 1 MHz in a 1, 3, 10 sequence, NONE

## B.7.8 Sweep

### B.7.8.A Frequency Sweep Time

100 ms to 100 S in a 1, 2, 5 sequence

### B.7.8.B Zero Span Sweep Time

50 ms to 100 S in a 1, 2, 5 sequence

### B.7.8.C Sweep Trigger Source

Internal and External

### B.7.8.D Trigger Modes

Continuous (Repeat), Single (Single-shot)

# RF Spectrum Analyzer (cont)

## B.7.9 Function/Feature

### B.7.9.A Display Modes

Live, Average, Max Hold

### B.7.9.B Averages

1 to 100

## B.8 TRACKING GENERATOR (OPTION)

Reference RF Generator Specifications for 3920B Tracking Generator.

### B.8.1 Tracking Generator Output

(measured at Center Frequency)
Refer to RF Signal Generator section for:
Frequency Range and Accuracy
Output Level Range, Resolution, Accuracy and Spectral Purity

### B.8.2 Span and Sweep Time

Same as Spectrum Analyzer

### B.8.3 Tracking Generator Controls

Output Port Selection, RF Level, Reference Call

# B.9 OSCILLOSCOPE

## B.9.1 Display

### B.9.1.A Traces

2

### B.9.1.B Trace Types

Live, Captured, Accumulated

### B.9.1.C Markers

2

### B.9.1.D Marker Functions

Time with Amplitude, deviation or % depth

Delta Marker (including 1/ $\Delta\tau$, e.g., Hz)

## B.9.2 Vertical

### B.9.2.A 3 dB Bandwidth

16 MHz

### B.9.2.B Frequency Range

DC to 4 MHz (40 MS/s sampling rate)

### B.9.2.C Input Range

0 to 100 Vpeak maximum, Category I

### B.9.2.D Scales

2 mV to 20 V/division in a 1, 2, 5 sequence (8(h) x 10 (w) graticule display)

### B.9.2.E Accuracy

5% of full scale (DC to 1 MHz)
10% of full scale (1 to 4 MHz)

### B.9.2.F Resolution

Better than 1% of full scale

### B.9.2.G Coupling

DC, AC, GND

# Oscilloscope (cont)

## B.9.3 Horizontal

### B.9.3.A Sweep Factors

1 µs to 1 Sec/division in a 1, 2, 5 sequence

### B.9.3.B Accuracy

>1.5% of full scale

### B.9.3.C Resolution

>1% of full scale

### B.9.3.D Input Impedance

1 MΩ, 20 pF

1 MΩ, 20 pF

## B.9.4 Trigger

### B.9.4.A Trigger Source

Trace A, Trace B, EXT, (or Trace C with no CH1 or CH2 Input)

### B.9.4.B Trigger Edge

Rising/Falling

### B.9.4.C Trigger Mode

Auto/Normal
Continuous/Single

### B.9.4.D External Trigger Level

Hi-Z BNC Input on the rear panel of the unit
Adjustable from -5 to +5 V

# B.10 FREQUENCY STANDARD I/O

## B.10.1 Internal Frequency Standard Output (OCXO)

### B.10.1.A Frequency

10 MHz (nominal)

### B.10.1.B Output Level

1 Vpp (Nominal) into 50 Ω

### B.10.1.C Temperature Stability (0 to 50° C)

±0.01 ppm

### B.10.1.D Aging Rate

±0.1 ppm/Year after 1 month continuous use.

### B.10.1.E Warm Up Time

Less than 5 min. to ± 0.02 ppm

## B.10.2 External Frequency Input

### B.10.2.A Frequency

10 MHz

### B.10.2.B Input Level

1 to 5 Vpp for Sine waves
3.3/5 V TTL for Square waves

### B.10.2.C Connector

BNC socket (10 kΩ Input/50 Ω Output)

# B.11 AUDIO SPECTRUM ANALYZER (OPTION)

## B.11.1 Frequency Range

Start and Stop Frequency: 0 to 24,000 Hz

## B.11.2 Resolution

1 Hz

## B.11.3 Accuracy

±50 ppm, ±10 ppm Typical

## B.11.4 Span

2 kHz minimum to 24 kHz maximum

## B.11.5 Level

Vertical Scales
1, 2, 5, 10, 20 dB per division

### B.11.5.A Reference Level

0 dB Full Scale (dBr)

### B.11.5.B Dynamic Range

Greater than 120 dB

### B.11.5.C Accuracy

±1 dB from 300 Hz to 15 kHz

## B.11.6 Markers

Number of Markers: 2

# B.12 DIGITAL MULTIMETER (3920 ONLY)

## B.12.1 AC/DC Voltmeter

### B.12.1.A Full Scale Ranges

200 mV, 2 V, 20 V, 200 V, 2,000 V, Auto
(150 VAC RMS or VDC maximum input, Category II)

### B.12.1.B Resolution

3 1/2 digits (2000 counts)

### B.12.1.C Accuracy

DC: ±1% FS, ±1 count
AC: ±5% FS, ±1 count

### B.12.1.D AC Volts Frequency Range

50 Hz to 20 kHz

## B.12.2 AC/DC AM Meter

### B.12.2.A Full Scale Ranges

200 mA, 2 A, 20 A, Auto
(20 A range uses optional external shunt connected to Voltmeter)

### B.12.2.B Maximum Open Circuit Input Voltage

30 Vrms referenced to Common or Earth Ground, Category I

### B.12.2.C Resolution

3 1/2 digits (2000 counts)

### B.12.2.D Accuracy

DC: ±5% FS, ±1 count
AC: ±5% FS, ±1 count
AC Volts Frequency Range
50 Hz to 10 kHz

## B.12.3 Ohm Meter

### B.12.3.A Full Scale Ranges

200 Ω, 2 kΩ, 20 kΩ, 200 kΩ, 2 MΩ, 20 MΩ, Auto

### B.12.3.B Resolution

3 1/2 digits (2000 counts)

### B.12.3.C Accuracy

±5% FS, ±1 count

# Digital Multimeter (cont)

## B.12.4 External Shunt (Optional Accessory)

### B.12.4.A Rating (Category I)

10 AMPS, 100 mV

20 AMPS, ON 1 minute, OFF 4 minutes

### B.12.4.B Accuracy (18 to 28 degrees C)

DC to 10 kHz, ±0.25%

### B.12.4.C Temperature Coefficient

0.005 %/° C

# B.13 INPUT/OUTPUT CONNECTORS

## B.13.1 ANT (RF Input)

### B.13.1.A Connector Type

TNC

### B.13.1.B Function

Receiver Input (Input port)

### B.13.1.C Impedance

50 Ω (nominal)

### B.13.1.D VSWR (with Attenuation ≥10 dB):

Better than 1.44:1 (RF freq. <1.05 GHz)
Better than 1.58:1 (RF freq. >1.05 GHz to <2.7 GHz)

### B.13.1.E Input Protection

10 W with warning above +17 dBm (Remove power immediately when alarm sounds).

## B.13.2 T/R (RF Input/Output)

### B.13.2.A Connector Type

Type N

### B.13.2.B Function

RF Power Input, Generator low-level Output (Input/Output Connector)

### B.13.2.C Impedance

50 Ω (nominal)

### B.13.2.D VSWR

Better than 1.2:1 (RF freq. <1.05 GHz)
Better than 1.3:1 (RF freq. >1.05 GHz to <2.7 GHz)

### B.13.2.E Input Protection

T/R RF Input Power On/Off:

| Peak RF Power | Maximum Time On | Minimum Time Off |
|---|---|---|
| ≤50 W | Continuous | -- |
| >50 W, ≤125 W | 30 seconds | 2 minutes |
| >125 W, ≤200 W ** | 5 seconds** | 5 minutes** |

T/R RF Input Alarm Activation*:

| Alarm | Temperature | | Peak RF Power |
|---|---|---|---|
| ON | >100° C | OR | >125 W |
| OFF | <100° C | AND | <125 W |

*Remove power from Test Set immediately if Overload Alarm triggers.

** Applies to 3920 only.

# Input/Output Connectors (cont)

## B.13.3 GEN (RF Output)

### B.13.3.A Connector Type

TNC

### B.13.3.B Function

Generator high-level Output (Output Connector)

### B.13.3.C Impedance

50 Ω (nominal)

### B.13.3.D VSWR (with level <0 dBm):

Better than 1.7:1 (RF freq. <1.05 GHz)
Better than 1.9:1 (RF freq. >1.05 GHz to <2.7 GHz)

### B.13.3.E Input Protection

10 W with warning above +23 dBm (Remove power immediately when alarm sounds).

## B.13.4 GPIB

### B.13.4.A Connector Type

24 pin IEEE

### B.13.4.B Function

IEEE-488.1-1997

## B.13.5 Ethernet

### B.13.5.A Connector Type

8 Position, RJ-45 100/10 Mbit/s

### B.13.5.B Function

10/100 Base-T Network Connection

## B.13.6 RS-232

### B.13.6.A Connector Type

9-Pin, D-sub Male

### B.13.6.B Baud Rates

300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

### B.13.6.C Stop Bits

1 or 2

### B.13.6.D Parity

Odd, Even, None

# Input/Output Connectors (cont)

## B.13.7 Video

### B.13.7.A Connector Type

15-pin, D-sub, VGA

### B.13.7.B Function

VGA for external monitor

## B.13.8 IF Output

### B.13.8.A Connector Type

BNC

### B.13.8.B Function

10.7 MHz Receiver IF

### B.13.8.C Output Level

Proportional to Receive Signal Level

## B.13.9 MIC/Accessory

### B.13.9.A Connector Type

8 position, Female DIN

### B.13.9.B Function

Microphone connection, Modulation Input, Demod Output, PTT Operation

## B.13.10 Parallel Port

### B.13.10.A Connector Type

25 position, Female D-sub

### B.13.10.B Function

Printer Interface

## B.13.11 USB

### B.13.11.A Connector Type

Twin USB Standard connection (Rear Panel)
Single USB Standard connection (Front Panel 3920 only)

### B.13.11.B Function

USB Version 1.1 interface (Mouse enabled)

# Input/Output Connectors (cont)

## B.13.12 PS/2 Interfaces (3901/3902 only)

### B.13.12.A Connector Type

Dual PS/2 Connectors

### B.13.12.B Function

Keyboard interface

## B.13.13 Test Port

### B.13.13.A Connector Type

15 position, Female 3 Tier D-sub

### B.13.13.B Function

Programmable I/O and voltage Output (optional interface)

## B.13.14 Auxiliary IF Input

### B.13.14.A Connector Type

High-density dual inline

### B.13.14.B Function

External digital receiver input (optional interface)

# B.14 ENVIRONMENTAL

## B.14.1 Operating Temperature

0 to 50°C (Tested in accordance with MIL-PRF-28800F Class 3)

## B.14.2 Warm-up Time

15 minutes

## B.14.3 Storage Temperature

-40 to 71°C (Tested in accordance with MIL-PRF-28800F Class 3)

## B.14.4 Relative Humidity

80% up to 31°C decreasingly linearly to 50% at 40°C
(Tested in accordance with MIL-PRF-28800F Class 3)

## B.14.5 Altitude

4,000 m (13,123 ft) (Tested in accordance with MIL-PRF-28800F Class 3)

## B.14.6 Shock and Vibrations

30 G Shock (Functional Shock)
5-500 Hz random vibrations
(Tested in accordance with MIL-PRF-28800F Class 3)

## B.14.7 Use

Pollution Degree 2

## B.14.8 EMC

3920/3920B: EN 61326, Class A

## B.14.9 Reliability

>8,000 hour calculated MTBF (MIL-HDBK-217F, Notice 2)

# B.15 SAFETY STANDARDS

3901/3902: Ul 61010B-1, EN 61010-1, CSA C22.2 No. 61010-1
3920/3920B: UL 61010-1

# B.16 DIMENSIONS AND WEIGHT

| Height | Width | Depth |
|---|---|---|
| 19.7 cm | 35.6 cm | 52.0 cm |
| 7.75 in | 14.0 in | 20.5 in |
| **Weight** | 16.5 kg (36.8 lbs) | |

# B.17 AC POWER REQUIREMENTS

## B.17.1 Voltage

100 V to 120 VAC @ 60 Hz
220 V to 240 VAC @ 50 Hz

## B.17.2 Power Consumption

Nominally 120 W (200 W Max)

## B.17.3 Mains Supply Voltage Fluctuations

$\leq$10% of the nominal voltage

## B.17.4 Fuse Requirements

3 A, 250 V, Type F

# B.18 GENERAL FEATURES

## B.18.1 LCD Display

### B.18.1.A Screen Size

6.4 in. diagonal

### B.18.1.B Active Area

129.6 mm (h) x 97.44 mm (v)

### B.18.1.C Resolution

640 x 480 pixels

## B.18.2 Disk Storage (3901/3902 only)

3.5 inch Floppy Disk
Internal hard disk of 30 GB available for user storage

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# Appendix C - Controls and Connectors

## C.1 FRONT PANEL CONTROLS AND CONNECTORS

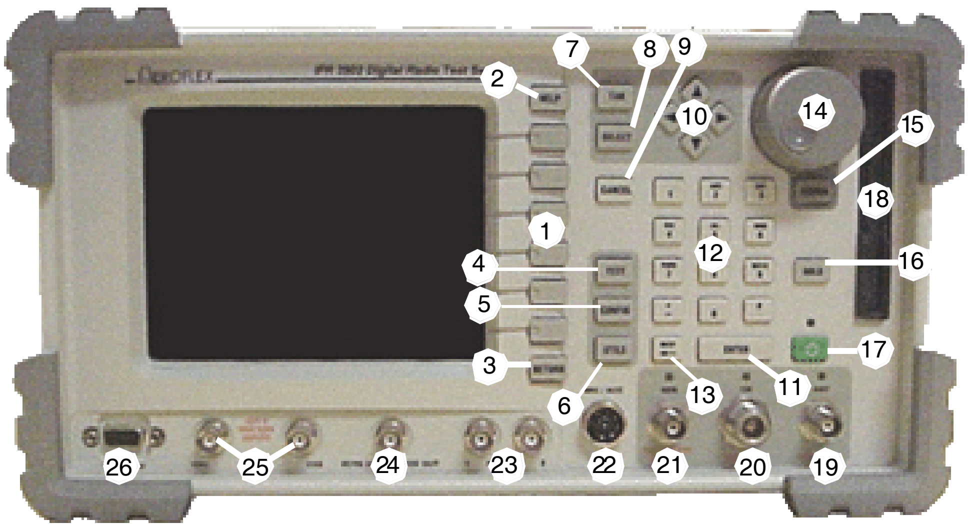



Fig. C-1 3901/3902 Front Panel Controls and Connectors

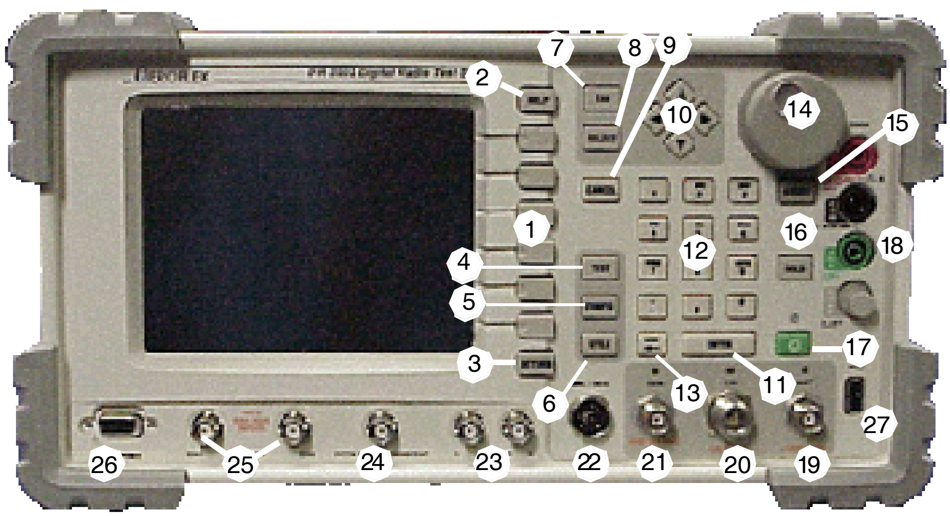



Fig. C-2 3920/3920B Front Panel Controls and Connectors

### C.1.1 Soft Keys (1)

The soft keys perform and activate various Test Set functions.

### C.1.2 HELP Key (2)

Accesses operation description for Test Set fields and functions.

### C.1.3 RETURN Key (3)

Returns the soft key menu back one level each time the key is pressed.

### C.1.4 TEST (4)

Selects the TEST function or displays the TEST floating menu.

### C.1.5 CONFIG (5)

Selects the CONFIG (Configuration) function or displays the CONFIG floating menu.

### C.1.6 UTILS (6)

Selects the Utilities function or displays the Utilities floating menu.

### C.1.7 TAB Key (7)

TAB key sequentially moves screen focus to a different Tile or opens a floating menu.

### C.1.8 SELECT Key (8)

Activates selected fields, selects a field for editing, deselects a field to prevent editing or changes the state of a button.

### C.1.9 CANCEL Key (9)

When data input keys are used to select a Numeric Entry Box or Text Entry Box for editing this key cancels any changes that have been made and restores the original setting as long as the ENTER key or the SELECT key has not been pressed. CANCEL does not restore a value to a previous setting if the setting has been changed using the cursor keys or rotary control knob.

While a menu is displayed, pressing CANCEL closes the menu without activating the highlighted menu item.

### C.1.10 Cursor Keys (10)

Navigates focus to the left, right, up or down between menu levels, fields, boxes and buttons.

### C.1.11 ENTER Key (11)

Enables values entered using the data input keys.

### C.1.12 Data Input and Entry Keys (12)

Enter numeric, alphabetic and symbolic values or text into a selected data entry box.

### C.1.13 Backspace Key (13)

When a numeric entry box or a text box is selected for editing, this key deletes the character or digit to the left of the position indicator.

### C.1.14 Rotary Control Knob (14)

The rotary control sets, selects or adjusts features of the Test Set.

### C.1.15 ASSIGN Key (15)

Various functions are adjusted by assigning the functions to the Rotary Control knob.

### C.1.16 Display HOLD Key (16)

Freezes the display to allow the user to capture and save the current screen display.

### C.1.17 Power Supply On/Standby Key (17)

This key is referred to throughout the manual as the On/Standby key. Initiates the Power-down sequence, saving all current settings and results and placing the Test Set in Standby mode.

## C.1.18 3.5 inch Floppy Disk Drive (18) (3901/3902)

The 3.5 inch floppy disk drive provides an interface to the Test Set for downloading data, settings and captured display files.

## C.1.19 Digital Multimeter (DMM) (18) (3920)

The Digital Multimeter (DMM) Multimeter measures AC and DC voltage, current and resistance within ±5% full scale of the selected range, up to 400 Volts AC or DC, 3 Amps of current and 40 MΩ of resistance.

## C.1.20 RF Input and Output Connectors

### C.1.20.A Audible and Visual Overload Warning

If the RF Signal applied to the ANT Connector exceeds the safe maximum level, an audible and visual warning is triggered. The overload warning is also triggered if excessive reverse power is applied to the RF GEN Connector.

**CAUTION** IF THE WARNING TRIGGERS, REDUCE THE INPUT POWER IMMEDIATELY.

DO NOT POWER DOWN THE TEST SET AS THIS DOES NOT REMOVE THE OVERLOAD POWER FROM THE CONNECTION.

**WARNING** **DO NOT DISCONNECT THE RF CABLE FROM THE TEST SET AS THIS MAY CAUSE BURNS TO HANDS.**

### C.1.20.B ANT (Antenna) Connector (19)

RF analyzer input is a 50 Ω TNC input, providing maximum sensitivity input to the RF Analyzer.

**CAUTION** THE RATED MAXIMUM INPUT LEVEL IS +10 DBM.

### C.1.20.C T/R Connector (20)

Duplexed RF Gen output and high power RF Analyzer input is a 50 Ω N type connector which provides an RF Gen output connection and an RF analyzer input and broadband power meter connection.

**CAUTION** THE MAXIMUM INPUT POWER LEVEL IS 125 W.

### C.1.20.D GEN (Generator) Connector (21)

RF Gen output is a 50 Ω TNC output, providing the maximum RF output level from the RF Generator. Connector is reverse power protected to a level of +10 dBm.

### C.1.20.E MIC/ACC Connector (22)

Microphone and accessory connector is an 8 pin DIN connection with ring-lock. Connector provides EXT MOD Input and DEMOD Out.

### C.1.20.F Audio IN Connectors (Audio Inputs 1 and 2) (23)

AUDIO IN 1 and 2 are the primary AF Input and EXT MOD Input Connectors.

### C.1.20.G FCTN GEN/DEMOD Connector (24)

(Function Generator and Demodulated Signal Output)

FCTN GEN/DEMOD Connector is the primary AF GEN Output. Connector can also be used for Demod Audio, Audio 1, Audio 2 or MIC.

### C.1.20.H Scope CH1/CH2 Connectors (Oscilloscope Inputs) (25)

Scope CH1 and CH2 connectors are the dedicated inputs to the dual-trace oscilloscope providing a maximum input rating of 100 Vpeak.

### C.1.20.I Test Connector (26)

Reserved for future development.

| | |
|---|---|
| CAUTION | DO NOT CONNECT A VGA MONITOR TO THIS CONNECTOR. |

### C.1.20.J USB Connector (27)

The front panel USB Connector is a USB standard connection that allows connection of USB 1.1 devices (e.g. a USB memory stick or network connectors). The Front Panel USB Connector is only found on the 3920 Test Set.

# C.2 REAR PANEL CONTROLS AND CONNECTORS

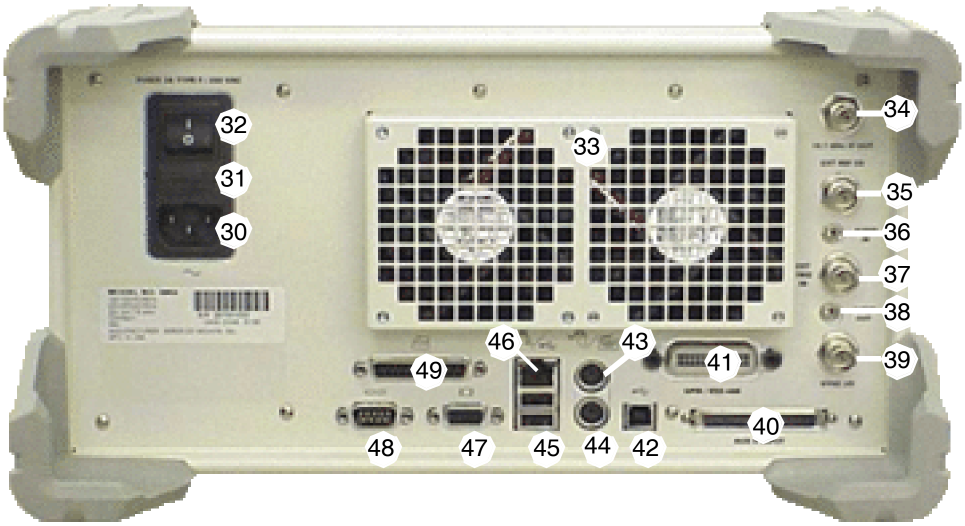



Fig. C-3 Rear Panel Controls and Connectors

## C.2.1 AC Power Connector (30)

AC Power Connector accepts an IEC 320 connector. Refer to Appendix B, *3900 Platform Specifications* for the required supply voltage, frequency and power consumption specifications.

## C.2.2 AC Power Fuse (31)

Refer to Appendix G, *Fuse Replacement Procedure*, for complete fuse replacement instructions.

## C.2.3 AC Power Switch (32)

The AC Power Switch disconnects the 3900 from the AC power supply.

## C.2.4 Rear Cooling Outlets (33)

Observe all CAUTION statements in this manual regarding proper Test Set ventilation. Also refer to the section titled *Installation Requirements*; *Ventilation* in Chapter 2 of the 3900 Series Operation Manual.

## C.2.5 IF Output Signal Connector (34)

IF Output Signal is available at this BNC connector. The 10.7 MHz IF Output is the RF signal received and down-converted by the Test Set RF Analyzer. The output level is -10 dBm typical at 10.7 MHz (50 $\Omega$ nominal).

## C.2.6 Ext Ref I/O External Interface (35)

The External Reference I/O Connector is a BNC connection used to connect the Test Set to an external frequency standard, or to output the internal frequency standard from the Test Set to other equipment.

## C.2.7 Audio Input Connector (36)

Auxiliary I/O Audio Connector is internally connected and ready for future development. Do not make any external connection to this connector.

## C.2.8 External Trigger Signal Input Connector (37)

The External Trigger Signal Input is the external trigger input for the Oscilloscope. Connection has an Input impedance 10 k$\Omega$.

## C.2.9 Audio Output Connector (38)

Auxiliary I/O Audio Connector is internally connected and ready for future development. Do not make any external connection to this connector.

## C.2.10 Synchronization Signal Input/Output Connector (39)

This BNC connection is used with the TETRA Base Station Test System for base station receivers generating a sync output signal.

## C.2.11 Auxiliary IF Input Connector (LVDS) (40)

Reserved for future development.

## C.2.12 GPIB/IEEE-488 Interface Connection (41)

Connector provides for connection to a GPIB/IEEE-488 interface bus.

## C.2.13 Standard USB Client Connector (42)

Reserved for future development.

## C.2.14 PS/2 Mouse Interface Connector (43)

PS/2 mouse support is not enabled at this time. Use USB Connector for mouse option.

## C.2.15 Keyboard Interface Connector (44)

Keyboard Interface Connector is a standard PS/2 connection.

## C.2.16 USB X2 Connector (45)

Connector is a double USB standard connection that allows connection of USB 1.1 devices (e.g. a USB memory stick or Network connectors).

## C.2.17 Ethernet Connector (46)

Ethernet Connector is a standard Base T RJ45 connection.

## C.2.18 VGA Monitor Output Connector (47)

Connector is a standard VGA style, 15 way, D-type connection that allows a VGA monitor or video projector to duplicate the Test Set’s screen display.

## C.2.19 RS-232 Serial Connector (48)

Standard 9 way, D-type connection. Reserved for future development.

## C.2.20 Parallel Printer Output Connector (49)

Parallel Printer Output Connector is a standard 25 way, D-type printer connection.

# Appendix D - Shipping Test Set

## D.1 REPACKING FOR SHIPPING

Aeroflex Test Sets returned to factory for calibration, service or repair must be repackaged and shipped subject to the following conditions:

**CAUTION** FAILURE TO PROPERLY PACKAGE THE TEST SET FOR SHIPMENT MAY RESULT IN DAMAGE DURING SHIPMENT. PRODUCT WARRANTY AND FREIGHT INSURANCE (IF PURCHASED) DO NOT COVER SHIPPING DAMAGES RESULTING FROM IMPROPER PACKAGING.

### D.1.1 Return Authorization

Do not return any products to factory without authorization from Aeroflex Customer Service Department.

#### D.1.1.A CONTACT:

| **Aeroflex** | |
|---|---|
| | Customer Service Dept. |
| | 10200 West York Street |
| | Wichita, Kansas 67215 |
| **Telephone:** | 800-835-2350 |
| **FAX:** | 316-524-2623 |
| **email:** | americas.service@aeroflex.com |

## D.2 TAGGING TEST SETS

All test sets must be tagged with:

- Owner's identification and address.
- Nature of service or repair required.
- Model No. and Serial No.

## D.3 SHIPPING CONTAINERS

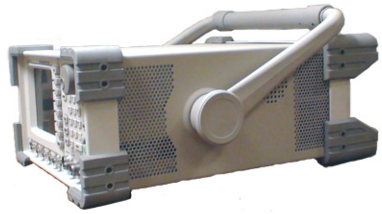
Test Sets must be repackaged in original shipping containers using Aeroflex packing materials. If original shipping containers and materials are not available, contact Aeroflex Customer Service Department for shipping instructions.

## D.4 FREIGHT COSTS

All freight costs on non-warranty shipments are assumed by the customer.

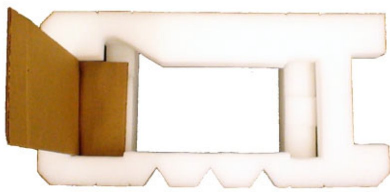
## D.5 REPACKING PROCEDURE

| STEP | PROCEDURE |
|---|---|
| 5. | Place Test Set in storage position as shown with handle adjusted and locked against Test Set. |

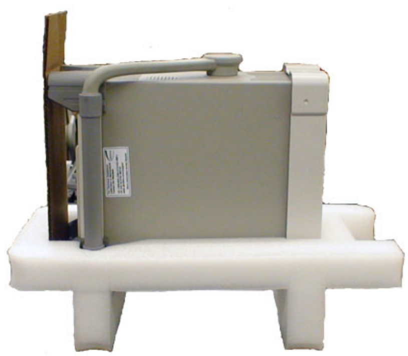


CAUTION — DO NOT SHIP THE TEST SET WITH HANDLE EXTENDED. FAILURE TO PLACE HANDLE AGAINST TEST SET AS SHOWN MAY RESULT IN DAMAGE TO THE UNIT.

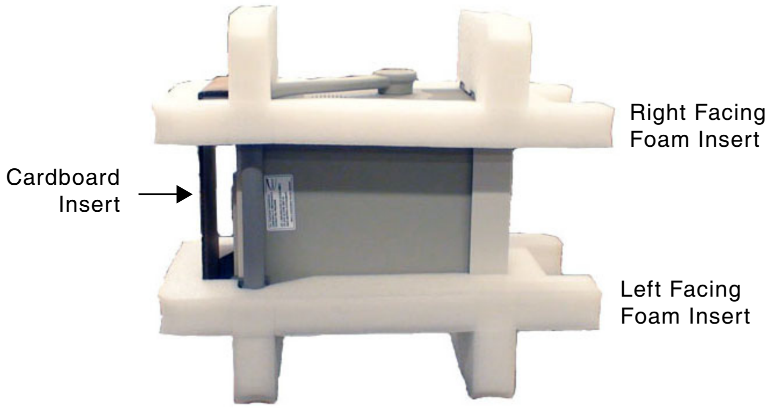
6. Place one foam insert on a solid flat surface. Fold cardboard insert and place in foam insert as shown.



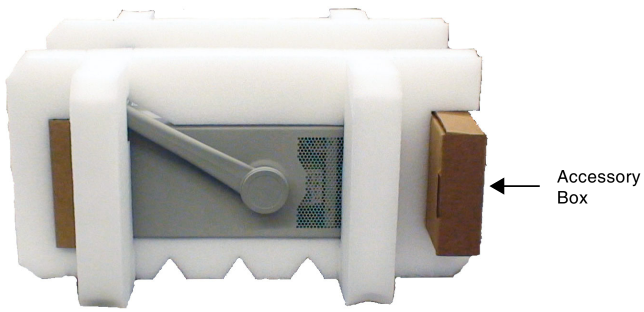
7. Place Test Set in foam insert. Cardboard insert should be against rear bumper guards.



| STEP | PROCEDURE |
|---|---|
| 8. | Fold cardboard insert around Test Set rear bumper guard and secure by attaching other foam insert |




| | |
|---|---|
| 9. | Secure accessory box in foam inserts (if applicable). |




| | |
|---|---|
| 10. | Place secured Test Set in shipping carton. Close shipping container lids and seal with shipping tape or an industrial stapler. |


| NOTE | If returning Test Set to Aeroflex for service, make sure the Return Authorization (RA#) is clearly marked on the exterior of the ship carton. |
|---|---|

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# Appendix E - Calibration/Verification Equipment

## E.1 CALIBRATION EQUIPMENT

The following table identifies test equipment required to perform 3900 calibration procedures. Due to the remote command structure of the calibration software, other equipment meeting the specifications of the equipment listed in this Appendix **may not** be substituted for the required models.

| Equipment | Model |
|---|---|
| 10 MHz Standard | N/A |
| 3900 Calibration Kit | Aeroflex PN 63934 (7001-4444-900) |
| Digital Multimeter | HP 34401A |
| Frequency Counter | HP 53131A w/ Option 030 |
| IEEE 488.2 Cable | N/A |
| Power Meter | Agilent E4418B |
| Power Meter Sensor Head | Agilent E4412A |

## E.2 VERIFICATION EQUIPMENT

The following table identifies test equipment needed to perform 3900 verification procedures. Other equipment meeting the specifications of the equipment listed in this Appendix may be substituted for the listed models.

| Equipment | Model |
|---|---|
| 3900 Calibration Kit | Aeroflex PN 63934 (7001-4444-900) |
| Audio Analyzer | HP 8903A |
| Calibrator | Fluke 5100B or equivalent |
| Digital Multimeter | HP 34401A |
| Frequency Counter | HP 53131A w/ Option 030 |
| Modulation Analyzer | HP 8901A |
| Power Meter | Agilent E4418B |
| Power Meter Sensor Head | Agilent E4412A |
| RF Generator | HP ESG-3000A |

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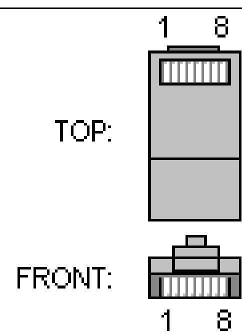
# Appendix F - Ethernet Crossover Cable

## F.1 GENERAL INFORMATION

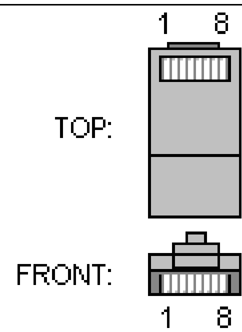
This cable can be used to cascade hubs or for connecting two Ethernet stations back-to-back without a hub.

| NOTE | It is important that each pair is kept as a pair: TX+ and TX- must be in a pair and RX+ and RX- must be together in another pair ( refer to table).<br>The “+” side of each pair is called the "tip" and the “-“ side of each pair is called the "ring." |
|---|---|

| To Network Interface Card 1 | | |
|---|---|---|
| **Common Color** | **Signal Name** | **Pin** |
| WHT/ORN | TX+ | 1 |
| ORN | TX– | 2 |
| WHT/GRN | RX+ | 3 |
| BLU | | 4 |
| WHT/BLU | | 5 |
| GRN | RX– | 6 |
| WHT/BRN | | 7 |
| BRN | | 8 |

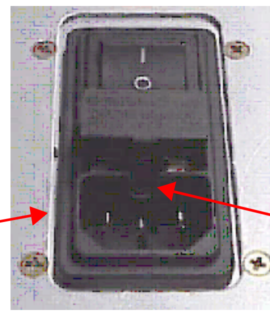


| To Network Interface Card 2 | | |
|---|---|---|
| **Pin** | **Signal Name** | **Common Color** |
| 3 | RX+ | WHT/GRN |
| 6 | RX– | GRN |
| 1 | TX+ | WHT/ORN |
| 4 | | BLU |
| 5 | | WHT/BLU |
| 2 | TX– | ORN |
| 7 | | WHT/BRN |
| 8 | | BRN |



# Appendix G - Fuse Replacement Instructions

| STEP | PROCEDURE |
|---|---|
| 1. | Verify 3900 is OFF and AC Power is disconnected from Test Set. |
| 2. | Press inward on pressure clip to remove Fuse Carrier. |

| | | |
|---|---|---|
| Pressure Clip |  | Fuse Carrier |

| | |
|---|---|
| 3. | Remove Fuse Carrier from Test Set. |

AC Fuse Carrier

| | |
|---|---|
| 4. | Replace fuse: |

3 A, 250 V, Type F
20 mm Cartridge Fuse (F3AL250V)
Aeroflex P/N: 56078 (5106-0000-055)

| | |
|---|---|
| **CAUTION** | FOR CONTINUOUS PROTECTION AGAINST FIRE, REPLACE FUSE WITH FUSES OF THE SPECIFIED VOLTAGE AND CURRENT RATINGS. |

| | |
|---|---|
| 5. | Install Fuse Carrier by pressing into place. |
| 6. | Install Fuse Cover. |

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# Appendix H - Abbreviations

| | |
|---|---|
| AC | Alternating Current |
| ACC | Accessory |
| A/D | Analog to Digital |
| AF | Audio Frequency |
| AGC | Automatic Gain Control |
| AM | Amplitude Modulation |
| AMP | Amplitude |
| ANT | Antenna |
| Aud | Audio |
| Assy | Assembly |
| BW | Bandwidth |
| CAI | Common Air Interface |
| CH | Channel |
| CONFIG | Configuration |
| CPU | Central Processing Unit |
| DAC | Digital to Analog Converter |
| DAM | Data Acquisition Module |
| dB | decibel |
| dBm | decibel relative to 1 mW |
| dBr | decibel relative to arbitrary reference value |
| dBV | decibel relative to 1 Volt |
| dBW | decibel relative to 1 Watt |
| dBV | decibel relative to 1 Micro Volt |
| DC | Direct Current |
| Demod | Demodulated |
| DMM | Digital Multimeter |
| Ext | External |
| FCTN | Function |
| Fig. | Figure |
| FM | Frequency Modulation |
| FPGA | Field Programmable Gate Array |
| Freq | Frequency |
| GEN | Generator |
| GHz | Giga Hertz |
| GND | Ground |
| GPIB | General Purpose Interface Bus |
| Hz | Hertz |
| IC | Internal Component |

| | |
|---|---|
| IF | Intermediate Frequency |
| In | Inch |
| Inc | Increments |
| I/O | Input/Output |
| kHz | Kilo Hertz |
| Lbs. | Pounds |
| LED | Light-Emitting Diode |
| LP | Low Pass (Filter) |
| LVDS | Low Voltage Differential Signal |
| MHz | Mega Hertz |
| MIC | Microphone |
| Mkr | Marker |
| Mod | Modulation |
| MSps | Mega Samples per second |
| mV | Milli Volt |
| PCB | Printed Circuit Board |
| Pk/PK | Peak |
| ppm | Parts per Million |
| Psoph | Psophometric |
| PTT | Push to Talk |
| PWR | Power |
| RAM | Random Access Memory |
| RBW | Resolution Bandwidth |
| REF | Reference |
| RF | Radio Frequency |
| RMS | Root Mean Square |
| Rx | Receive |
| S | Seconds |
| SQ | Squelch |
| TCXO | Temperature Controlled Crystal Oscillator |
| T/R | Transmit/Receive |
| Tx | Transmit |
| UTILS | Utilities |
| UUT | Unit Under Test |
| V | Volts |
| VAC | Voltage Alternating Current |
| VBW | Video Bandwidth |
| VGA | Video Graphics Array |
| Vid | Video |
| W | Watt |
| µs | Micro Seconds |
| µV | Micro Volt |

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