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CALIBRATION PROCEDURE

COMMUNICATIONS SERVICE MONITOR

IFR-1900 CSA

PUBLISHED BY
Aeroflex

10200 West York / Wichita, Kansas 67215 U.S.A. / (316) 522-4981 / FAX (316) 524-2623

SAFETY FIRST: TO ALL OPERATIONS AND SERVICE PERSONNEL

REFER ALL SERVICING OF UNIT TO QUALIFIED TECHNICAL PERSONNEL.

CASE, COVER OR PANEL REMOVAL

Removing protective covers, casings or panels from this Test Set 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: THIS TERM IDENTIFIES CONDITIONS OR ACTIVITIES THAT, IF IGNORED, CAN RESULT IN EQUIPMENT OR PROPERTY DAMAGE (e.g., FIRE).

WARNING: THIS TERM 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 documentation. (Symbol refers to specific CAUTIONS represented on unit.)

INFORMATION: Refer to accompanying documentation

AC OR DC TERMINAL: Terminal that may supply or be supplied with ac or dc voltage.

DC TERMINAL: Terminal that may supply or be supplied with dc voltage.

AC TERMINAL: Terminal that may supply or be supplied with ac or alternating voltage.

SWITCH IN STAND-BY: AC line power is applied but the device is in stand-by mode.

SWITCH ON/OFF (Push-Push): AC line power to remainder of device is connected ON or disconnected OFF.

SWITCH ON: AC line power to the device is ON.

EQUIPMENT GROUNDING PRECAUTION

Improper grounding of equipment can result in electrical shock.

USE OF PROBES

Check the specifications for the maximum voltage, current and power ratings of any connector on the Test Set 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 are supplied specifically for use with this Test Set. Power cords must not be frayed, broken nor expose bare wiring when operating this equipment.

USE RECOMMENDED FUSES ONLY

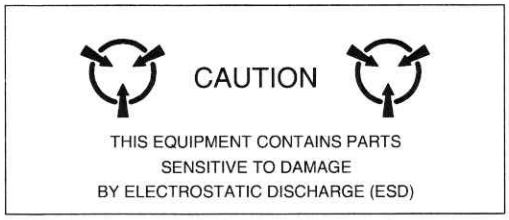
Use only fuses specifically recommended for the equipment at the specified current and voltage ratings.

WARNING: THE HOST AND SPECIAL TEST PROCESSOR PC BOARD ASSEMBLIES USE LITHIUM BATTERIES. LITHIUM IS A TOXIC SUBSTANCE AND THE FOLLOWING WARNINGS CONCERNING LITHIUM BATTERIES MUST BE HEEDED:

- **DO NOT CRUSH, INCINERATE OR DISPOSE OF IN NORMAL WASTE.**
- **DO NOT ATTEMPT TO RECHARGE.**
- **DO NOT SHORT CIRCUIT OR FORCE DISCHARGE AS THIS MIGHT CAUSE THE BATTERY TO VENT, OVERHEAT OR EXPLODE.**

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 WITH THE FOLLOWING PRECAUTIONS:

- 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.
- WHEN REMOVING DEVICES FROM THEIR CONTAINERS, GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.
- TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.
- DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.
- PC BOARDS, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAG. REMOVE ANY BUILT-IN POWER SOURCE, SUCH AS A BATTERY, BEFORE LAYING PC BOARDS ON A CONDUCTIVE MAT OR STORING IN A CONDUCTIVE BAG.
- PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGED 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 SERVICES OUT TO A DISTANCE OF SEVERAL MILES. USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION THAT RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY).

CAUTION: 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 (≈4S CENTIMETERS) OF CLEARANCE BETWEEN THE EQUIPMENT REAR EXHAUST FAN SCREEN AND OBJECTS OR WALLS.

LIST OF EFFECTIVE PAGES

The manual pages listed below which are affected by a current change or revision, are so identified by revision number.

Date of Issue for original and changed pages are:

Original ..... 0 ..... Mar 1998

TOTAL NUMBER OF PAGES IN THIS MANUAL IS 158 CONSISTING OF THE FOLLOWING

Pg. No.	Rev No.	Pg. No.	Rev No.
Title	0	1-1 through 1-132	0
Copyright	0	2-1 through 2-7	0
Safety	0	2-8 Blank	0
Caution	0	A-1 through A-3	0
A	0	A-4 Blank	0
B Blank	0	B-1 through B-4	0
i through iv	0		

SCOPE

This Manual contains Instructions for performing Calibration on the IFR-1900 CSA Communication Service Monitor and Dual Mode/Tri-Band Cellular System Analyzer (referred to as the Test Set). It is recommended that the Technician be thoroughly familiar with this Manual before attempting to perform any maintenance action on the Test Set.

ORGANIZATION

The Calibration Procedure is composed of the following Chapters:

SECTION 1 - CALIBRATION

Provides step by step procedures for verifying the proper operation of the Test Set and calibrating as needed. The procedures are to be used at normal calibration intervals or after repair or replacement of an assembly.

SECTION 2 - REMOVE/INSTALL INSTRUCTIONS

Provides step by step procedures for removing and installing assemblies within the Test Set as required by the Calibration procedures.

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SECTION 1 - CALIBRATION

CHAPTER 2- REMOVE/INSTALL INSTRUCTIONS

APPENDICES

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION 1 - CALIBRATION

1-1 GENERAL

The Calibration procedures are performed together as an unit or individually.

These procedures should be performed every 12 months.

1-1-1 SAFETY PRECAUTIONS

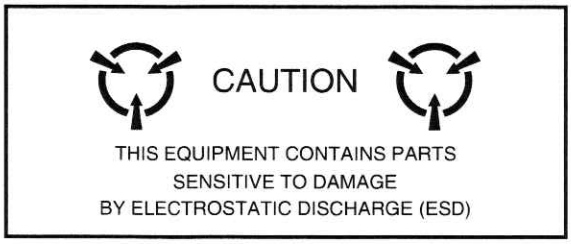
As with any piece of electronic equipment, caution should be taken when working with "live" circuits. Certain circuits and/or components within the Test Set contain high voltage potentials, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH (see following WARNINGS)! When performing the Calibration, be sure to observe the following precautions:

WARNING: REMOVE ALL JEWELRY OR OTHER COSMETIC APPAREL BEFORE PERFORMING ANY CALIBRATION PROCEDURES INVOLVING LIVE CIRCUITS.

HEED ALL WARNINGS AND CAUTIONS CONCERNING MAXIMUM VOLTAGES AND POWER INPUTS.

1-1-2 ESD PRECAUTIONS

CAUTION: THE CALIBRATION SHOULD ONLY BE PERFORMED IN AN ESD ENVIRONMENT AND ALL PERSONNEL PERFORMING THE CALIBRATION SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES OR BE ESD CERTIFIED.



1-2 TEST EQUIPMENT REQUIREMENTS

Appendix A contains a comprehensive list of test equipment suitable for performing any of the procedures listed in this manual. Any other equipment meeting the specifications listed in Appendix A may be substituted in place of the recommended models.

For certain procedures in this manual, the equipment listed in Appendix A may exceed the minimum required specifications.

1-3 POWER REQUIREMENTS

The following procedures are performed with an ac power source connected unless otherwise stated.

1-4 DISASSEMBLY REQUIREMENTS

To perform the Calibration, the Top and Bottom Case Assemblies must be removed from the Test Set (refer to para 2-2-1 and 2-2-2).

1-5 CALIBRATION ADJUSTMENTS

Before making any calibration adjustments, always observe the measurement. If the measurement is within the tolerances given, do not proceed with that adjustment. When an adjustment is required, attempt to obtain a precise measurement, instead of just within tolerance.

If settings are changed in the Calibration Screens, an on-screen message prompts the operator to backup the cal data factors in the backup RAM. Pressing "Y" is recommended.

1-6 CONTROLS, CONNECTORS AND INDICATORS

Refer to Para 3-1 in the IFR-1900 Operation Manual for the location of each Control, Connector or Indicators used in the Calibration.

1-7 COMPLETION OF CALIBRATION PROCEDURES

Upon completion of a specific Calibration Procedure, the Calibration may be terminated.

1-8 FACTORY DEFAULTS

The Factory Defaults for the Test Set should be reset prior to performing any of the Calibration Procedures.

1-9 CALIBRATION PASSWORDS

The technician is required to enter a password to gain access to the HOST or Special Test Calibration Menus accessible from Auxiliary Functions Menu for each.

To gain access to the HOST Calibration Menu, the technician must enter the password "CSMATE." This password permits access to the Calibration Menu for that one instance. To obtain continued access to the Calibration Menu (until power is cycled on the Test Set), substitute the following password: "CSMATED."

To gain access to the Special Test Calibration Menu, the technician must enter the password "1900CSA." This password permits access to the Calibration Menu for that one instance.

1-10 CALIBRATION RECORD

A Calibration Record is provided for recording the results obtained while performing the Calibration (para 1-11). It is recommended the technician reproduce copies of the Calibration Record, rather than use the copy in this manual.

Intended use of user input columns:

	RESULT	CAL ADJ?
• Check (√) if calibration is made:		__(√)
• Verify value (enter value or check [√]):	_____(√)	
• Indicate value during calibration; check (√) only if adjustment is made:	_____	__(√)
• Record value only:	_____	

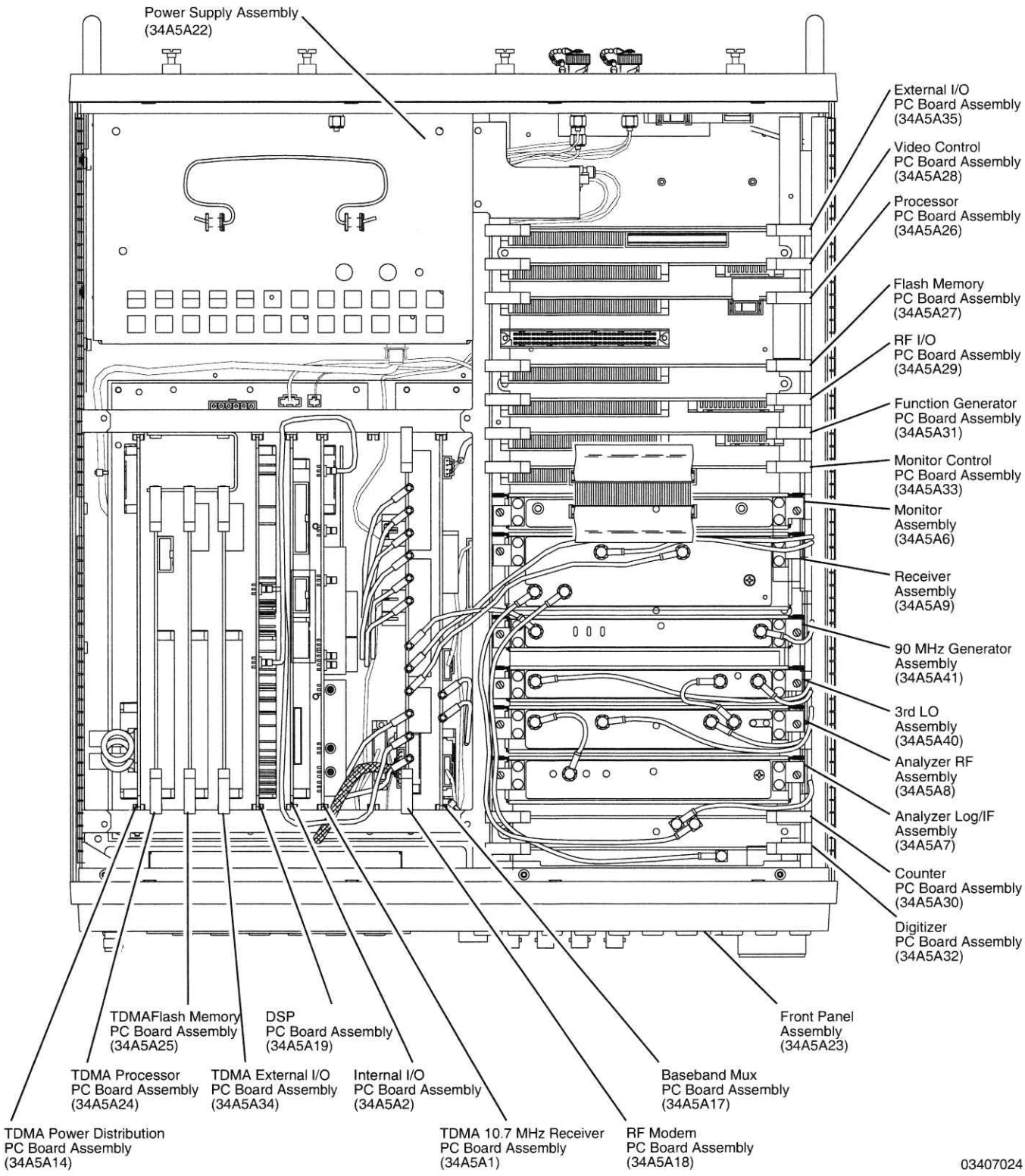


Figure 1-1 Calibration Adjustments and Test Points - Top View

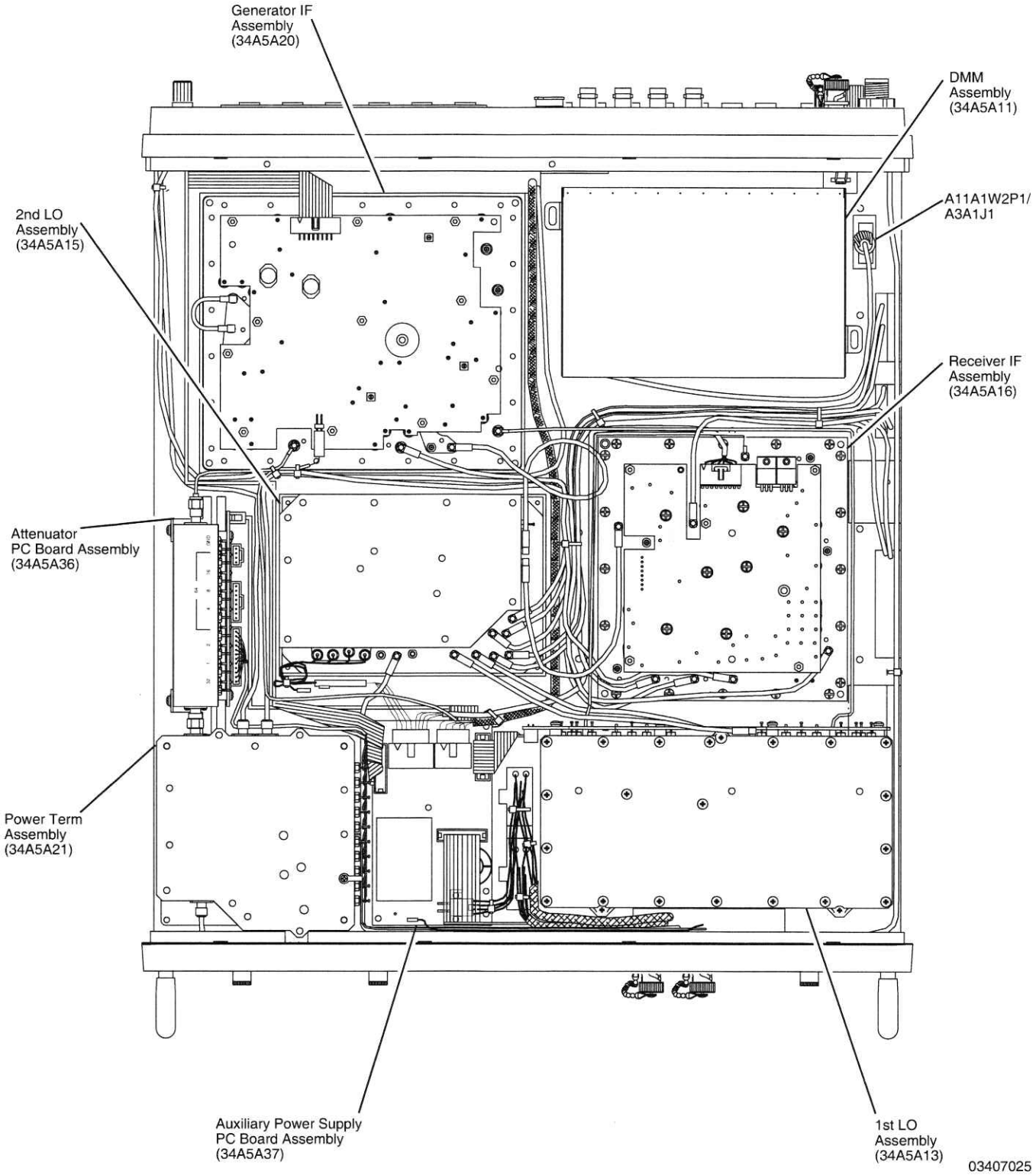


Figure 1-2 Calibration Adjustments and Test Points - Bottom View

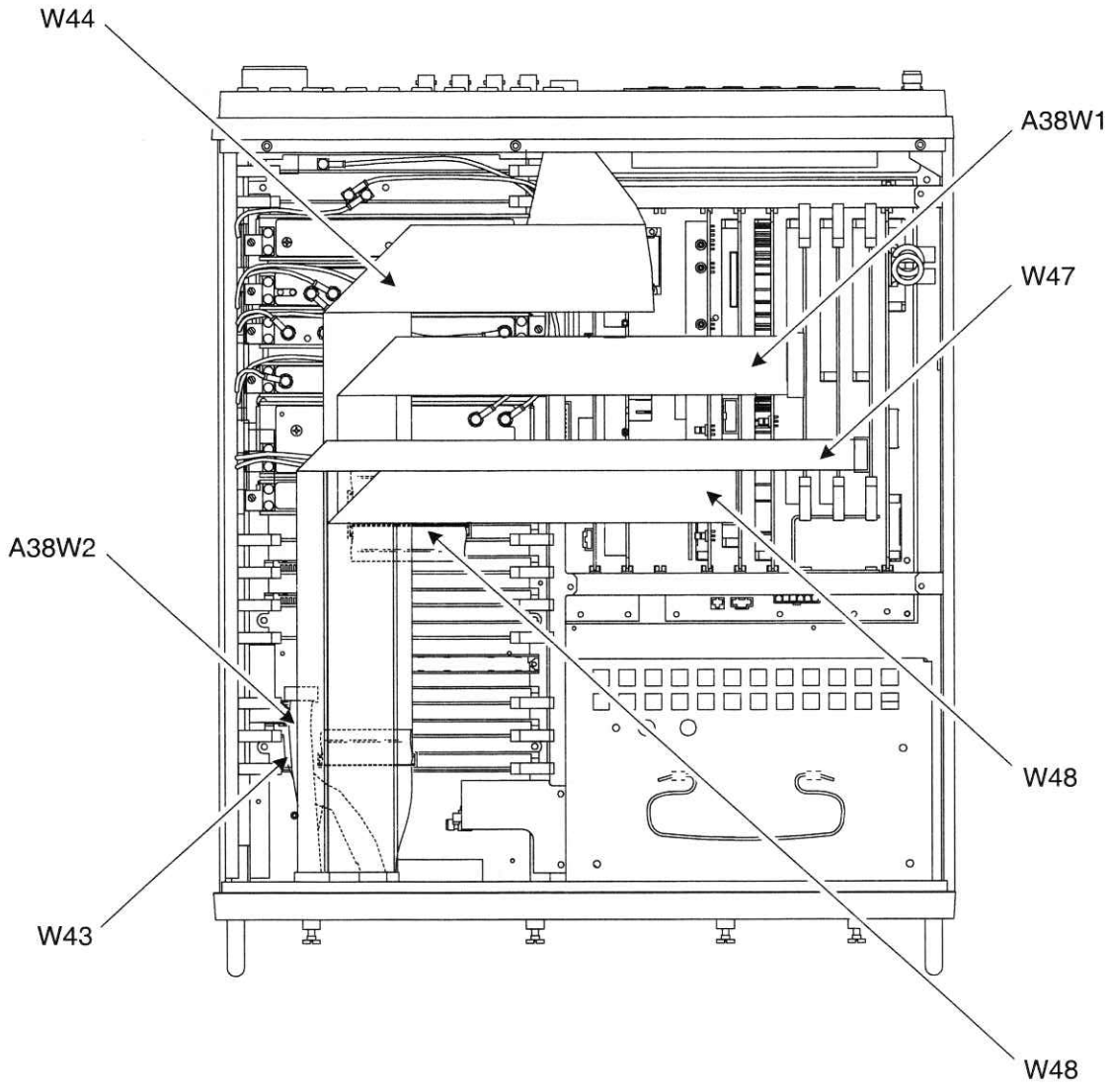


Figure 1-3 Ribbon Cable Arrangement - Top View

IFR-1900 CSA CALIBRATION RECORD

Technician:_____ S/N:_____

Date:_____

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-1		**POWER-UP CHECK/POWER SUPPLY CALIBRATION**		
	1	Verify beep sequence of 1-2-4		__(√)
	2	Verify start-up screen appears and space balls are moving in elliptical orbits		__(√)
	3	Verify no "Board Inactive" messages appear		__(√)
	8	Verify Firmware versions and Option settings: IFR 1900 _____ Func Gen Board _____ Monitor Cntl Board _____ Counter Board _____ Options _____ 1900CSA _____		__(√)
	12	Verify "All Tests" Pass (P)		__(√)
	24	5.0 Vdc (±0.1 Vdc)	_____	__(√)
	26	15.05 Vdc (±0.05 Vdc)	_____	__(√)
	28	-15.05 Vdc (±0.8 Vdc)	_____	__(√)
	31	Verify 34.0 Vdc (±1.0 Vdc)	_____(√)	
1-11-2		**METERING DVM CALIBRATION**		
	7	4.096 Vdc (±0.01 Vdc)	_____	__(√)
1-11-3		**VCXO FREQUENCY STANDARD CALIBRATION**		
	11	Verify 900.000000 MHz (±90 Hz)	_____(√)	
	16	VCXO Soft Cal	_____	__(√)

PARA	STEP	DATA	CAL RESULT ADJ?

1-11-4 FUNCTION GENERATOR LEVEL AND VRMS METER CALIBRATION

8 Verify levels:

TONE	FREQ (Hz)	LOAD (Ω)	LEVEL	TOL	RESULTS	VRMS METER	DIST	FREQ
1	1000	600	10 mV	±3%, ±LSD		(10% of Reading)	(<1%)	
	1000		2.5 V	±3%, ±LSD				
	25000		10 mV	±5%, ±LSD			(<1%)	(±25 Hz)
	25000		2.5 V	±5%, ±LSD				
2	1000		10 mV	±3%, ±LSD			(<1%)	
	1000		2.5 V	±3%, ±LSD				
	25000		10 mV	±5%, ±LSD			(<1%)	(±25 Hz)
	25000		2.5 V	±5%, ±LSD				

FUNC GEN LEVEL

28 199.9 mV (±1 mV) _____(√)

29 199.90 mV (±0.03 mV) _____ __(√)

31 2.50 V (±75 mV) _____(√)

32 2.50 V (±10 mV) _____ __(√)

54 0.00 V (±10 mV) _____ __(√)

57 0.00 V (±10 mV) _____ __(√)

62 Record DMM reading for GEN 1 _____

63 Distortion <1% _____(√)

66 GEN 2 reading matches GEN 1 reading (±5 mV) _____ __(√)

VRMS METER

69 VRMS Meter Soft Cal _____ __(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-5		**GENERATOR TRACKING FILTER CALIBRATION**		
	7	Record 5 numerical values on Gen IF Assy:	(1)_____ (2)_____ (3)_____ (4)_____ (5)_____	
	12	Soft Cals	(1)_____ (2)_____ (3)_____ (4)_____ (5)_____	__(√) __(√) __(√) __(√) __(√)
1-11-6		**COMPLEX MODULATION GENERATOR CALIBRATION**		
	13	Verify -1.76 Vdc (±0.03 Vdc)	_____(√)	
	14	-1.76 Vdc (±0.03 Vdc)	_____	__(√)
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST)**		
		DUPLEX CONNECTOR OUTPUT (HOST VERIFICATION)		
	14	Verify +10.0 dBm (±3.0 dB) at 50 MHz	_____(√)	
	15	Verify -5.0 dBm (±3.0 dB) at 50 MHz Verify -1.0 dBm (±3.0 dB) at 50 MHz Verify -8.0 dBm (±3.0 dB) at 50 MHz Verify -16.0 dBm (±3.0 dB) at 50 MHz Verify -32.0 dBm (±3.0 dB) at 50 MHz Verify -64.0 dBm (±3.0 dB) at 50 MHz	_____(√) _____(√) _____(√) _____(√) _____(√) _____(√)	
	17	Verify -99.0 dBm (±3.5 dB) at 50 MHz	_____(√)	
	19	Verify -110.0 dBm (±4.0 dB) at 50 MHz	_____(√)	
	23	Verify -5.0 dBm (±1.5 dB) at 440 MHz	_____(√)	

PARA	STEP	DATA	CAL RESULT ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**	
	24	Verify -5.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -5.0 dBm (±1.5 dB) at 2010 MHz	_____(√)
	25	Verify -8.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -8.0 dBm (±1.5 dB) at 2010 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 2010 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 2010 MHz	_____(√)

PARA	STEP	DATA	CAL RESULT	ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		Verify -64.0 dBm (±1.5 dB) at 440 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 455.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 500 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 800 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 1750 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 2010 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 440 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 455.5 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 500 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 800 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 1750 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 2010 MHz	_____	(√)
	28	Verify -99.0 dBm (±2.0 dB) at 440 MHz	_____	(√)
	29	Verify -99.0 dBm (±2.0 dB) at 455.5 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 500 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 800 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 855.5 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 900 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 1750 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 1920.5 MHz	_____	(√)
		Verify -99.0 dBm (±2.0 dB) at 2010 MHz	_____	(√)
	32	Verify -110.0 dBm (±3.0 dB) at 440 MHz	_____	(√)
	33	Verify -110.0 dBm (±3.0 dB) at 455.5 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 500 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 800 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 855.5 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 900 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 1750 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 1920.5 MHz	_____	(√)
		Verify -110.0 dBm (±3.0 dB) at 2010 MHz	_____	(√)
		T/R CONNECTOR OUTPUT (HOST VERIFICATION)		
	38	Verify -10.0 dBm (±3.0 dB) at 50 MHz	_____	(√)

PARA	STEP	DATA	CAL RESULT ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**	
	39	Verify -16.0 dBm (±3.0 dB) at 50 MHz	_____(√)
		Verify -32.0 dBm (±3.0 dB) at 50 MHz	_____(√)
		Verify -64.0 dBm (±3.0 dB) at 50 MHz	_____(√)
		Verify -110.0 dBm (±3.0 dB) at 50 MHz	_____(√)
	41	Verify -115.0 dBm (±3.5 dB) at 50 MHz	_____(√)
	43	Verify -127.0 dBm (±4.0 dB) at 50 MHz	_____(√)
	46	Verify -10.0 dBm (±1.5 dB) at 440 MHz	_____(√)
	47	Verify -10.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -10.0 dBm (±1.5 dB) at 2010 MHz	_____(√)
	48	Verify -16.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -16.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
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		Verify -32.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 855.5 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 900 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 1750 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 1920.5 MHz	_____(√)
		Verify -32.0 dBm (±1.5 dB) at 2010 MHz	_____(√)

PARA	STEP	DATA	CAL RESULT	ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		Verify -64.0 dBm (±1.5 dB) at 440 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 455.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 500 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 800 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 1750 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -64.0 dBm (±1.5 dB) at 2010 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 440 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 455.5 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 500 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 800 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 1750 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 2010 MHz	_____	(√)
	51	Verify -115.0 dBm (±2.0 dB) at 440 MHz	_____	(√)
	52	Verify -115.0 dBm (±2.0 dB) at 455.5 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 500 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 800 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 855.5 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 900 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 1750 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 1920.5 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 2010 MHz	_____	(√)
	55	Verify -127.0 dBm (±3.0 dB) at 440 MHz	_____	(√)
	56	Verify -127.0 dBm (±3.0 dB) at 455.5 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 500 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 800 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 855.5 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 900 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 1750 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 1920.5 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 2010 MHz	_____	(√)

PARA	STEP	DATA	CAL RESULT ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**	
		SPECIAL TEST VERIFICATION	
	68	Verify -20.0 dBm (±1.5 dB) at 440 MHz	_____(√)
	69	Verify -45.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -60.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -75.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -95.0 dBm (±1.5 dB) at 440 MHz	_____(√)
		Verify -110.0 dBm (±1.5 dB) at 440 MHz	_____(√)
	70	Verify -115.0 dBm (±2.0 dB) at 440 MHz	_____(√)
	71	Verify -127.0 dBm (±3.0 dB) at 440 MHz	_____(√)
	72	Verify -20.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -45.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -60.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -75.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -95.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -110.0 dBm (±1.5 dB) at 455.5 MHz	_____(√)
		Verify -115.0 dBm (±2.0 dB) at 455.5 MHz	_____(√)
		Verify -127.0 dBm (±3.0 dB) at 455.5 MHz	_____(√)
		Verify -20.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -45.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -60.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -75.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -95.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -110.0 dBm (±1.5 dB) at 500 MHz	_____(√)
		Verify -115.0 dBm (±2.0 dB) at 500 MHz	_____(√)
		Verify -127.0 dBm (±3.0 dB) at 500 MHz	_____(√)
	77	Verify -20.0 dBm (±1.5 dB) at 800 MHz	_____(√)
	78	Verify -45.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -60.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -75.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -95.0 dBm (±1.5 dB) at 800 MHz	_____(√)
		Verify -110.0 dBm (±1.5 dB) at 800 MHz	_____(√)
	79	Verify -115.0 dBm (±2.0 dB) at 800 MHz	_____(√)
	80	Verify -127.0 dBm (±3.0 dB) at 800 MHz	_____(√)

PARA	STEP	DATA	CAL RESULT	ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
	81	Verify -20.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -45.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -60.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -75.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 855.5 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 855.5 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 855.5 MHz	_____	(√)
		Verify -20.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -45.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -60.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -75.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 900 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 900 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 900 MHz	_____	(√)
	86	Verify -20.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
	87	Verify -45.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
		Verify -60.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
		Verify -75.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 1800 MHz	_____	(√)
	88	Verify -115.0 dBm (±2.0 dB) at 1800 MHz	_____	(√)
	89	Verify -127.0 dBm (±3.0 dB) at 1800 MHz	_____	(√)
	90	Verify -20.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -45.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -60.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -75.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 1920.5 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 1920.5 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 1920.5 MHz	_____	(√)
		Verify -20.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -45.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -60.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -75.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -95.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -110.0 dBm (±1.5 dB) at 2000 MHz	_____	(√)
		Verify -115.0 dBm (±2.0 dB) at 2000 MHz	_____	(√)
		Verify -127.0 dBm (±3.0 dB) at 2000 MHz	_____	(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		HOST CALIBRATION		
	111	+7.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
	114	0.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
	115	-4.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-96.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-118.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
	128	+7.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
	131	0.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
	132	-4.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-96.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-118.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
	136	+7.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
	137	+7.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		+7.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-17		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
	140	0.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
	141	-4.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (50 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (50 MHz)	_____	__(√)
	142	0.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (125 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (125 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (200 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (200 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (400 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (400 MHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		0.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (490 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (490 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (700 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (700 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (824 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (824 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (880 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (880 MHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		0.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (960 MHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (960 MHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.20 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.20 GHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.50 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.50 GHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.72 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.72 GHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		0.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.80 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.80 GHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.88 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.88 GHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (1.96 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (1.96 GHz)	_____	__(√)
		0.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-4.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-8.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-16.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-17.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-32.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		-64.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
		Copy -64 dBm col. into -96 dBm col. (2.01 GHz)	_____	__(√)
		Copy -64 dBm col. into -118 dBm col. (2.01 GHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		SPECIAL TEST CALIBRATION		
	164	-20.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
	165	-24.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-84.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
		-118.0 dBm (±0.2 dB) at 1 MHz	_____	__(√)
	166	Copy -118 dBm col. into -130 dBm col. (1 MHz)	_____	__(√)
	176	-20.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
	177	-24.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-84.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
		-118.0 dBm (±0.2 dB) at 10 MHz	_____	__(√)
	178	Copy -118 dBm col. into -130 dBm col. (10 MHz)	_____	__(√)
	182	-20.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
	183	-24.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 50 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (50 MHz)	_____	__(√)
	184	-20.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 125 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (125 MHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		-20.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 200 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (200 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 400 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (400 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 490 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (490 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 700 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (700 MHz)	_____	__(√)

PARA	STEP	DATA	CAL RESULT	ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		-20.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 824 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (824 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 880 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (880 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 960 MHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (960 MHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1.20 GHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (1.20 GHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-7		**GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**		
		-20.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1.50 GHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (1.50 GHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1.72 GHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (1.72 GHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1.80 GHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (1.80 GHz)	_____	__(√)
		-20.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-24.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-28.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-36.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-37.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		-52.0 dBm (±0.2 dB) at 1.88 GHz	_____	__(√)
		Copy -52 dBm column into -84, -118 and -130 dBm columns (1.88 GHz)	_____	__(√)

PARA	STEP	DATA	RESULT	CAL ADJ?

1-11-7 **GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST) (cont)**

-20.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
-24.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
-28.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
-36.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
-37.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
-52.0 dBm (±0.2 dB) at 1.96 GHz	_____	__(√)
Copy -52 dBm column into -84, -118 and -130 dBm columns (1.96 GHz)	_____	__(√)
-20.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
-24.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
-28.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
-36.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
-37.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
-52.0 dBm (±0.2 dB) at 2.01 GHz	_____	__(√)
Copy -52 dBm column into -84, -118 and -130 dBm columns (2.01 GHz)	_____	__(√)

1-11-8 **GENERATOR FM DEVIATION CALIBRATION**

14 Record FM Residuals:

TEST SET	MEASURING RECEIVER		FM RESIDUAL
FREQ (MHz)	HP (Hz)	LP (kHz)	
85	300	3	
121			
500			
855.5			
1920.5			
2010			

1-11-8 GENERATOR FM DEVIATION CALIBRATION (cont)

17 Verify FM Deviation:

TEST SET				MEASURING RECEIVER		TOLERANCE	CALCULATED TOLERANCE	RESULTS
FREQ (MHz)	MOD	DEV	MOD RATE	HP (Hz)	LP (kHz)			
85	FM	±10 kHz	1 kHz	300	3	±5%, +Res., ±LSD		
121	FM	±10 kHz						
500	FM	±25 kHz				±10%, +Res., ±LSD		
855.5	FM	±75 kHz						
1920.5	FM	±100 kHz						
2010	FM	±50 kHz						

25 Record Peak Residual FM _____
Verify Residual FM is <140 Hz _____(√)

29 Verify deviation reading minus Peak Residual = 2.4 kHz (±5%, ±LSD) (855.5000 MHz) _____(√)

31 Verify deviation reading minus Peak Residual = 2.4 kHz (±5%, ±LSD) (855.5001 MHz) _____(√)

36 FM Narrow Soft Cal _____ __(√)

38 FM Hard Cal __(√)

45 FM Wide Soft Cal _____ __(√)

46 80 kHz deviation reading is within 5% (±LSD) of deviation setting less Peak Residual FM _____(√)

PARA	STEP	DATA	RESULT	CAL ADJ?

1-11-9 DEVIATION METER CALIBRATION

10 Record RF Signal Generator FM Residual _____

23 Verify deviation:

RF SIGNAL GENERATOR			TEST SET	TOLERANCE	CALCULATED TOLERANCE	RESULT
FREQ (MHz)	MOD RATE (kHz)	DEV (kHz)	DEV METER RANGE (kHz)	(kHz)	(kHz)	(kHz)
455.5	1.0	7.5	10	±5.0%, ±2 LSD, + FM Residual		
455.5	1.0	15	20			
855.5	1.0	7.5	10			
855.5	1.0	15	20			
1920.5	1.0	7.5	10			
1920.5	1.0	15	20			

26 Record FM Residual of RF Signal Generator _____

35 Plus (+) and Minus (-) deviation is within 200 Hz _____(√)

42 10 kHz (+) Deviation Meter Soft Cal _____ __(√)

44 10 kHz (-) Deviation Meter Soft Cal _____ __(√)

45 Deviation readings are within 5% (±LSD +FM Residual of RF Signal Generator) of reading on Measuring Receiver _____(√) (+) _____(√) (-)

49 20 kHz (+) Deviation Meter Soft Cal _____ __(√)

51 20 kHz (-) Deviation Meter Soft Cal _____ __(√)

52 Deviation readings are within 5% (±LSD +FM Residual of RF Signal Generator) of reading on Measuring Receiver _____(√) (+) _____(√) (-)

PARA	STEP	DATA	CAL RESULT	ADJ?

1-11-10 MODULATION METER CALIBRATION

10 Record Residual AM for the following frequencies:

100 MHz _____
455.5 MHz _____
855.5 MHz _____
1920.5 MHz _____
2010 MHz _____

20 Verify modulation:

RF SIGNAL GENERATOR			TEST SET	TOL	CALCULATED TOLERANCE	RESULT
FREQ (MHz)	MOD RATE (kHz)	MOD (%)	MOD METER RANGE (%)			
100	1	35	40	±5%, ±LSD, +AM Residual		
455.5		35	40			
855.5		35	40			
1920.5		55	100			
2010		55	100			

30 Modulation Meter Soft Cal _____ __(√)

1-11-11 DISTORTION METER CALIBRATION

9 Verify 0.00 dB is displayed _____(√)

11 Record 0 dB Amplitude setting _____

12 Record Amplitude settings:

A.	-14.9 dB (18%)	
B.	-20.0 dB (10%)	
C.	-40.0 dB (1%)	

22 18% (±2.0%, ±LSD) at 770 Hz _____(√)

24 10% (±0.5%, ±LSD) at 770 Hz _____(√)

26 1% (±0.5%, ±LSD) at 770 Hz _____(√)

31 18% (±2.0%, ±LSD) at 1000 Hz _____(√)

33 10% (±0.5%, ±LSD) at 1000 Hz _____(√)

35 1% (±0.5%, ±LSD) at 1000 Hz _____(√)

PARA	STEP	DATA	CAL RESULT	ADJ?

1-11-11 **DISTORTION METER CALIBRATION (cont)**

39 0.00 dB is displayed _____(√)

41 Record 0 dB Amplitude setting _____

42 Record Amplitude setting:

-20.0 dB (10%)	

48 Distortion Soft Cal __(√)

1-11-12 **SINAD METER CALIBRATION**

9 Verify 0.00 dB is displayed _____(√)

11 Record 0 dB Amplitude setting _____

12 Record Amplitude settings:

	dB RELATIVE	SINAD	
A.	-4.74 dB	6 dB SINAD	
B.	-9.54 dB	10 dB SINAD	
C.	-11.70 dB	12 dB SINAD	
D.	-20.00 dB	20 dB SINAD	

22 6 dB (±2.0 dB, ±LSD) at 770 Hz _____(√)

24 10 dB (±2.0 dB, ±LSD) at 770 Hz _____(√)

26 12 dB (±2.0 dB, ±LSD) at 770 Hz _____(√)

28 20 dB (±2.0 dB, ±LSD) at 770 Hz _____(√)

33 6 dB (±2.0 dB, ±LSD) at 1000 Hz _____(√)

35 10 dB (±2.0 dB, ±LSD) at 1000 Hz _____(√)

37 12 dB (±2.0 dB, ±LSD) at 1000 Hz _____(√)

39 20 dB (±2.0 dB, ±LSD) at 1000 Hz _____(√)

43 0.00 dB is displayed _____(√)

45 Record 0 dB Amplitude setting _____

46 Record Amplitude settings:

dB RELATIVE	SINAD	
-9.54 dB	10 dB	

52 SINAD Soft Cal __(√)

PARA	STEP	DATA	CAL RESULT	ADJ?

1-11-13 OSCILLOSCOPE CALIBRATION

OSCILLOSCOPE BANDWIDTH

12 Record peak signal amplitude _____

14 Verify peak signal amplitude is >70.7% of value recorded _____(√)

OSCILLOSCOPE VERTICAL ACCURACY

19 Verify vertical accuracy:

TEST SET	CALIBRATOR	VERTICAL ACCURACY		RESULTS
SCALE (V/Div)	**LEVEL (Vrms)**	**DISPLAY (P-P)**	**TOL**	
0.002	3.54 mV	10 mV	±1.6 mV	
0.01	17.7 mV	50 mV	±4 mV	
0.1	177 mV	500 mV	±40 mV	
0.2	354 mV	1 V	±80 mV	
0.5	884 mV	2.5 V	±200 mV	
1.0	1.77 V	5 V	±400 mV	
10.0	17.7 V	50 V	±4 V	

40 VDC COUPLING

24 Verify signal moves 4 major divisions (±2 minor divisions) _____(√)

OSCILLOSCOPE HORIZONTAL SWEEP ACCURACY

31 Verify horizontal sweep accuracy:

TEST SET	MULTIFUNCTION SYNTHESIZER	HORIZONTAL SWEEP ACCURACY	RESULTS
SWEEP (ms)	**FREQ**		
10	11.1 Hz	90 ms (±1 ms)	
1.0	111.1 Hz	9 ms (±0.1 ms)	
0.1	1.111 kHz	900 µs (±10 µs)	
0.01	11.11 kHz	90 µs (±1 µs)	

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-13		**OSCILLOSCOPE CALIBRATION (cont)**		
		OSCILLOSCOPE CALIBRATION		
	41	Oscilloscope Offset 0.00 Vdc (±0.01 V)	_____	__(√)
	43	Oscilloscope Preamp Offset 0.00 Vdc (±0.01 V)	_____	__(√)
	64	Amplitude Cal 120 mVp-p (±8 mV)	_____	__(√)
	70	Square Wave Shape (500 mV)	_____	__(√)
	72	Square Wave Shape (1 V)	_____	__(√)

1-11-14 DIGITAL MULTIMETER CALIBRATION

AC VOLTS

11 Verify AC Volts:

CALIBRATOR		TEST SET	TOL	RESULTS
FREQ (Hz)	**LEVEL (VAC)**	**RANGE (VAC)**		**(VAC)**
50	0.0105	0.2	±5% of Full Scale, ±LSD	
1000	0.15	0.2		
1000	1.5	2.0		
1000	15	20		
1000	100	200		
50	450	2000		
50	7	20		
400	7	20		
1000	7	20		
3000	7	20		
10000	7	20		
20000	7	20		
20000	0.0105	0.2		

1-11-14 DIGITAL MULTIMETER CALIBRATION (cont)

DC VOLTS

15 Verify DC Volts:

TEST SET	CALIBRATOR	TOL	RESULTS
RANGE (Vdc)	**LEVEL (Vdc)**		**(Vdc)**
0.2	0.0025	±1% of Full Scale, ±LSD	
0.2	0.15		
2.0	1.5		
20	15		
200	150		
2000	800		
2000	1000		

OHMS

19 Verify resistance:

TEST SET	CALIBRATOR	TOL	RESULTS
RANGE (kΩ)	**RESISTANCE (kΩ)**		**(kΩ)**
0.2	0.1	±5% of Full Scale, ±LSD or ±0.1 Ω (whichever is greater)	
2.0	1		
20	10		
200	100		
2000	1000		
20000	10000		

1-11-14 DIGITAL MULTIMETER CALIBRATION (cont)

DC CURRENT

25 Verify DC Current:

TEST SET	CALIBRATOR	TOL	RESULTS
RANGE (AMPS)	**LEVEL (AMPS)**		**(AMPS)**
0.02	0.00105	±5% of Full Scale, ±LSD or ±0.1 mA (whichever is greater)	
0.02	0.015		
0.2	0.15		
2	1.5		
2	1.8		

AC CURRENT

28 Verify AC Current:

TEST SET	CALIBRATOR	TOL	RESULTS
RANGE (AMPS)	**LEVEL (AMPS)**	**(AMPS)**	
2	1.8	±0.101	±0.1 A, ±LSD or ±0.1 mA (whichever is greater)

INPUT LOAD

34 Verify input loads:

TEST SET	TOL	RESULTS
LOAD (Ω)	**(Ω)**	**(Ω)**
1E6	±50000	±100000
150	±7.5	±7.5
600	±30	±30

46 Ohms Hard Cal (20 kΩ) _____ __(√)

49 DC Volts Hard Cal (20 V) __(√)

54 100 kΩ (±10 kΩ) _____(√)

57 1 kΩ (±100 Ω) _____(√)

58 200 kΩ and 2 kΩ Hard Cal __(√)

PARA	STEP	DATA	CAL RESULT ADJ?

1-11-14 **DIGITAL MULTIMETER CALIBRATION (cont)**

62 AC Volts (20 V) Hard Cal __(√)

65 AC Volts (2 V) Hard Cal __(√)

1-11-15 **SPECTRUM ANALYZER CALIBRATION**

SCAN WIDTH ACCURACY

13 Verify scan accuracy:

TEST SET	RF SIGNAL GENERATOR	SCAN WIDTH ACCURACY	RESULTS	
SCAN WIDTH (FREQ/DIV)	OFFSET FREQUENCY	TOL	(+) OFFSET	(-) OFFSET
1 kHz	±4 kHz	±0.5 kHz		
2 kHz	±8 kHz	±1.0 kHz		
5 kHz	±20 kHz	±2.5 kHz		
10 kHz	±40 kHz	±5.0 kHz		
20 kHz	±80 kHz	±10 kHz		
50 kHz	±200 kHz	±25 kHz		
100 kHz	±400 kHz	±50 kHz		
200 kHz	±800 kHz	±100 kHz		
500 kHz	±2 MHz	±250 kHz		
1 MHz	±4 MHz	±500 kHz		
10 MHz	±40 MHz	±5 MHz		
100 MHz	±400 MHz	±50 MHz		
200 MHz	±800 MHz	±100 MHz		

1-11-15 SPECTRUM ANALYZER CALIBRATION (cont)

SPECTRUM ANALYZER BANDWIDTH AGREEMENT

22 Verify bandwidth agreement:

Test Set	ANALYZER LEVEL READING	BANDWIDTH AGREEMENT	RESULTS
BANDWIDTH (selected by Scan Width setting)	**(dBm)**	**MAXIMUM dB ERROR FROM OTHER READINGS**	**(dBm)**
3 MHz (select 10 MHz Scan)		<3	
300 kHz (select 1 MHz Scan)		<2	
30 kHz (select 50 kHz Scan)		<2	
3 kHz (select 5 kHz Scan)		<2	
0.3 kHz (select 1 kHz Scan)		<3	

SPECTRUM ANALYZER LEVEL ACCURACY

27 Verify level accuracy:

RF SIGNAL GENERATOR	LEVEL ACCURACY	CALCULATED TOLERANCE (dB)	RESULTS
LEVEL (dBm)	**TOL (dB)**		**(dBm)**
-30	±4 (50 to 400 MHz, Normalized)		
-40			
-50			
-60	or		
-70	±5 (400 MHz to 2 GHz, Normalized)		
-80			

LOGARITHMIC AMPLIFIER

42 -48 dBm __(√)

44 1.380 V (±5 mV) (Log Amp Gain) _____ __(√)

46 0.4 V (±5 mV) (Log Amp Offset) _____ __(√)

47 Seven Division Lines meet appropriate Values (±20 mV, 1 dB) _____ __(√)

PARA	STEP	DATA	RESULT	CAL ADJ?
1-11-15		**SPECTRUM ANALYZER CALIBRATION (cont)**		
		NORMALIZER		
	48	1.4 Vdc (±1 mV)	_____	__(√)
	56	Analyzer System Gain Hard Cal		__(√)
		DISPERSION		
	61	Analyzer Dispersion Center Hard Cal		__(√)
	66	Analyzer Dispersion Gain Hard Cal		__(√)
	69	Analyzer Horizontal Offset Soft Cal	_____	__(√)
		SPECTRUM ANALYZER BANDWIDTH AGREEMENT		
	72	3 MHz Bandwidth (Appendix B)	_____	__(√)
		300 kHz Bandwidth Hard Cal		__(√)
		3 kHz Bandwidth Hard Cal		__(√)
		300 Hz Bandwidth Hard Cal		__(√)
1-11-16		**SIGNAL STRENGTH METER CALIBRATION**		
	10	Verify signal is <100	_____(√)	
	12	Verify signal is >97	_____(√)	
	16	Signal Strength Meter Soft Cal		__(√)

1-11-17 POWER METER VERIFICATION

6 Record Forward Coupled Connector Attenuation:

EQUIPMENT	489.990 MHz	879.990 MHz	1960.020 MHz
DIRECTIONAL COUPLER #1			
DIRECTIONAL COUPLER #2			

HOST POWER METER

20 Verify Test Set HOST Power Meter readings against Measuring Receiver:

FREQ (MHz)	POWER LEVEL	POWER METER RANGE	TOL (%)	RESULT
489.990	125 mW	200 mW	10% ±LSD	
	1 W	2 W	10% ±LSD	
	5 W	10 W	6% ±LSD	
	45 W	50 W	6% ±LSD	
879.990	125 mW	200 mW	10% ±LSD	
	1 W	2 W	10% ±LSD	
	5 W	10 W	6% ±LSD	
	45 W	50 W	6% ±LSD	
1960.020	125 mW	200 mW	10% ±LSD	
	1 W	2 W	10% ±LSD	
	5 W	10 W	6% ±LSD	
	45 W	50 W	6% ±LSD	

1-11-17 POWER METER VERIFICATION (cont)

SPECIAL TEST POWER METER

37 Verify Test Set Special Test Power Meter readings against Measuring Receiver:

CHAN/ BAND	SIGNAL GEN. FREQ (MHz)	POWER LEVEL	TOL (%)	RESULT
167/ U4	489.990 (CW)	125 mW	10% ±LSD	
		1 W	10% ±LSD	
		5 W	6% ±LSD	
		45 W	6% ±LSD	
333/ U8	879.990 (CW)	125 mW	10% ±LSD	
		1 W	10% ±LSD	
		5 W	6% ±LSD	
		45 W	6% ±LSD	
1000/ HY	1960.020 (CW)	125 mW	10% ±LSD	
		1 W	10% ±LSD	
		5 W	6% ±LSD	
		45 W	6% ±LSD	

1-11-18 GENERATOR QUADRATURE MODULATION VERIFICATION

BASE SIMULATION

17 Verify Maximum Error Vector Magnitude and I/Q Origin Offset:

TEST SET		MODULATION SPECTRUM ANALYZER	ERROR VECTOR MAGNITUDE	RESULT	I/Q ORIGIN OFFSET	RESULT
BAND	CHANNEL	FREQUENCY (MHz)		(% RMS)		(dBc)
U4	167	489.990	6% rms from ideal, 16 Averages		<-28 dBc	
U8	333	879.990				
HY	1000	1960.020				

1-11-18 GENERATOR IN-PHASE/QUADRATURE MODULATION VERIFICATION

MOBILE SIMULATION

22 Verify Maximum Error Vector Magnitude and I/Q Origin Offset:

TEST SET		MODULATION SPECTRUM ANALYZER	ERROR VECTOR MAGNITUDE	RESULT	I/Q ORIGIN OFFSET	RESULT
BAND	CHANNEL	FREQUENCY (MHz)		(% RMS)		(dBc)
U4	167	444.990	8% rms from ideal, 16 Averages		<-28 dBc	
U8	333	834.990				
HY	1000	1879.980				

1-11-19 ERROR VECTOR MAGNITUDE (EVM) METER VERIFICATION

13 Record 16 consecutive EVM updated values:

SAMPLE	FREQUENCY (MHz)		
	490.020	880.020	1960.050
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

1-11-19 ERROR VECTOR MAGNITUDE (EVM) METER VERIFICATION (cont)

14 Record calculated residual for each frequency:

FREQUENCY (MHz)		
489.990	879.990	1960.020

23 Record 16 consecutive EVM updated values for each channel/frequency tested:

SAMPLE	FREQUENCY (MHz)		
	490.020	880.020	1960.050
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

1-11-19 ERROR VECTOR MAGNITUDE (EVM) METER VERIFICATION (cont)

24 Verify Error Vector Magnitude:

TEST SET		FREQUENCY	ERROR VECTOR MAGNITUDE TOLERANCE	CALCULATED TOLERANCE	RESULT
BAND	CHANNEL	(MHz)		(%)	(%)
U4	167	489.990	±3.0% of Indication, ±LSD, +Meter residual EVM		
U8	333	879.990			
HY	1000	1960.020			

1-11 CALIBRATION PROCEDURES

1-11-1 POWER-UP CHECK/POWER SUPPLY CALIBRATION

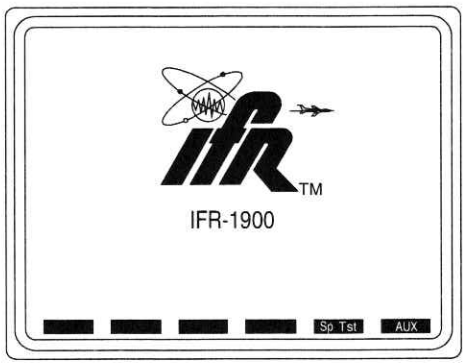
If the Power Supply is adjusted, all Calibration procedures should be performed.

PREREQUISITES:	None
EQUIPMENT REQUIRED:	1 Digital Multimeter (DMM)
FIGURE REFERENCES	Figure 1-9 Figure 1-10 Figure 1-11 Figure 1-12

STEP PROCEDURE

POWER-UP CHECK

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.



03416162

Figure 1-4 IFR-1900CSA Start-Up Screen

3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Press ***SQLCH*** ↓ (S appears) and use ***DATA SCROLL*** Spinner to reduce squelch until no white bar is showing to the right of the "S." Press ***ENTER***.
6. Press ***VOL*** ↓ (V appears) and use ***DATA SCROLL*** Spinner to reduce volume until no white bar is showing to the right of the "V." Press ***ENTER***.
7. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until YES appears. Press ***ENTER***.

HOST Self Test

8. Press ***MTRS*** and ***AUX F6***. Auxiliary Functions Menu appears. Press ***6***. Configuration Report appears. Verify Firmware versions and Option setting appearing on Test Set screen are same or higher as shown in Figure 1-5. If any lower version numbers or other option setting appears on Test Set screen, contact IFR at the number below:

   IFR Customer Service
   1-800-835-2350

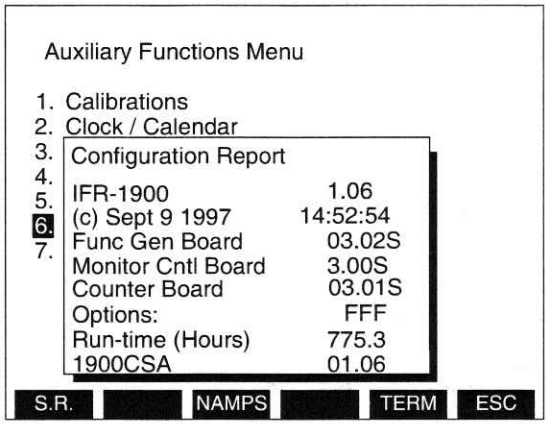


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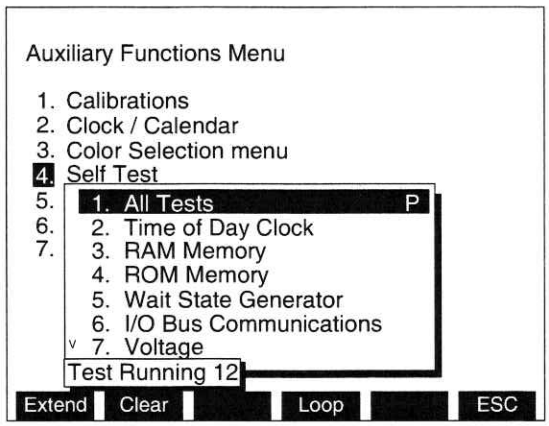
Figure 1-5 Configuration Report

9. Press ***ESC F6*** to return to the Auxiliary Functions Menu.
10. Press ***4***. Self Test menu appears.
11. Observe that "1. All Tests" is highlighted. Press ***ENTER***. A "Test Running" prompt appears with the current test number displayed as shown in Figure 1-6. 24 individual self tests are executed in series.



03416163

Figure 1-6 "All Tests" Running

12. Verify that "P" appears next to "1. All Tests." If "P" appears, indicating all individual tests have passed, go to Step 16. If "F" appears, indicating failure of one or more individual test, proceed to next step.

13. Press ***FIELD SELECT*** ↑ or ↓ to move cursor to view each of the individual self tests to determine which specific test(s) failed.

14. Highlight failed individual self test (see Figure 1-7). Press ***Extend F1***. Subtest window appears. If individual self test consists of only one subtest, then the subtest is executed automatically when the subtest is initially opened; the result of Pass or Fail is displayed. Subsequent subtests are executed by pressing ***ENTER***. However, if an individual test consists of more than one subtest, select each subtest using the cursor and press ***ENTER***.

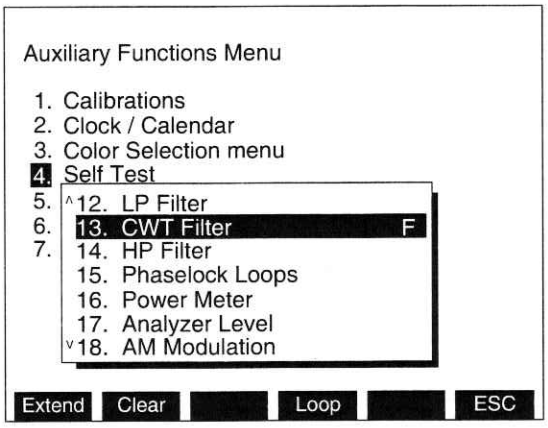


Figure 1-7 Individual Test Failure

15. Note each of the subtests' responses for each the failed individual self test and contact IFR at the number below:

    IFR Customer Service
    1-800-835-2350

    Calibration procedure is terminated. Do not continue.

Special Test Self Test

16. Press ***DPLX***, ***Sp Tst F5*** and ***AUX2 F5***. Special Test Auxiliary Functions Menu is displayed on Test Set.

17. Press ***2***. Special Self Test Menu appears (see Figure 1-8).

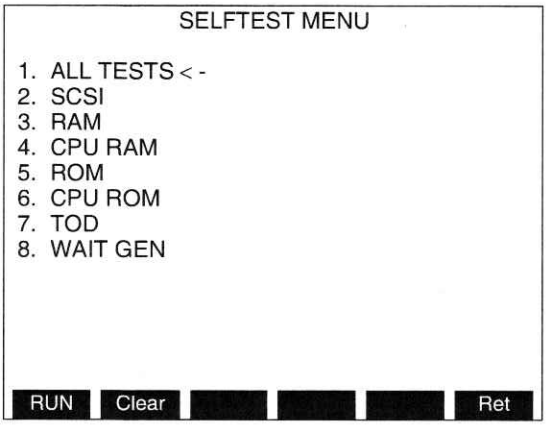


Figure 1-8 Special Test Self Test Menu

18. Ensure test selection indicator ("<-") is at "1. ALL TESTS." (If necessary, use FIELD SELECT Keys to move selection indicator.) Press ***RUN F1***.
19. Test selection indicator moves down list of subtests as each subtest is performed as part of the "ALL TESTS" operation.
    - A "P" (PASS) appears after each subtest as the subtest is successfully completed. If all subtests are successfully completed, the "ALL TESTS" is marked "P" (passed). Go to Step 22.
    - If any subtest fails, a "F" (FAILED) appears next to the failed subtest.
20. If any subtest fails, move test selection indicator to failed subtest, press ***Clear F2*** and ***ENTER*** to run the subtest, individually.
21. If subtest(s) fails when run alone, note each subtest's response and contact IFR at the number below:

    IFR Customer Service
    1-800-835-2350

    Calibration procedure is terminated. Do not continue.

POWER SUPPLY CALIBRATION

22. Set Digital Multimeter (DMM) to DC Volts.
23. Using DMM, connect ground lead to chassis of the Test Set and positive lead to A24TP1 on the TDMA Processor PC Board Assembly (Figure 1-9).
24. Verify 5.0 Vdc (±0.1 Vdc) appears on DMM. Adjust 5 V potentiometer (A22R37) on Power Supply Assembly (Figure 1-10) as required.
25. Connect positive lead of DMM to A15FL2 (red wire) on 2nd LO Assembly (Figure 1-11).
26. Verify DMM reads 15.05 Vdc (±0.05 Vdc). Adjust 15 V potentiometer (A22R25) of Power Supply (Figure 1-10) as required.

27. Connect positive lead of DMM to A15FL3 (yellow wire) on 2nd LO Assembly (Figure 1-11).
28. Verify DMM reads -15.05 Vdc (±0.8 Vdc). Adjust 15 V potentiometer (A22R25) of Power Supply (Figure 1-10) as required.
29. If adjustment is made in Step 28, repeat Steps 25 through 28.
30. Connect positive lead of DMM to A13FL8 on 1st LO (Figure 1-12).
31. Verify DMM reads 34.0 Vdc ±1.0 V.
32. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed with Step 5 of Para 1-11-2.

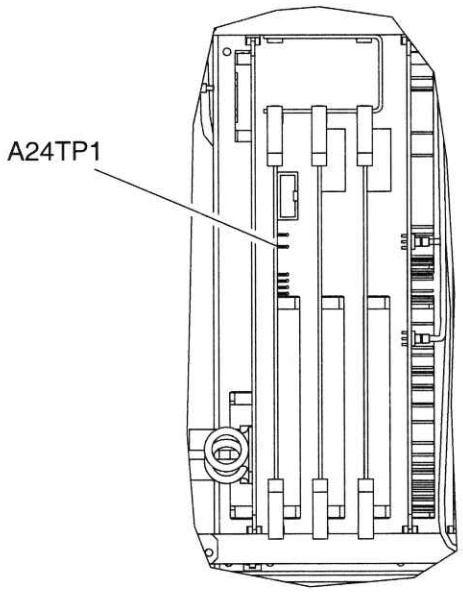
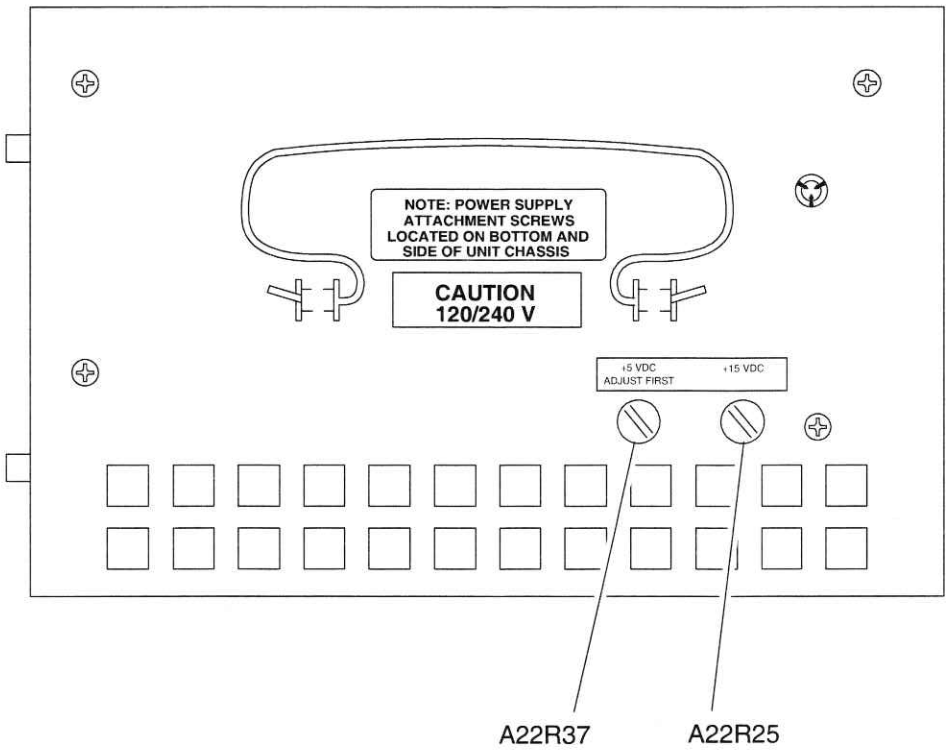
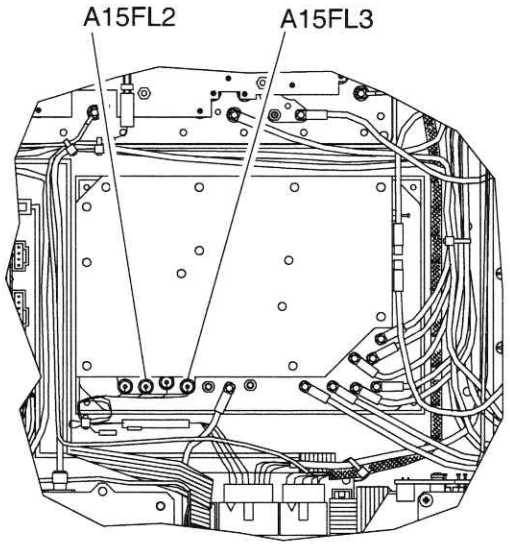


Figure 1-9 Special Test Processor PC Board Assembly (34A5A24) Calibration Points



03407030

Figure 1-10 Power Supply Assembly (34A5A22) Calibration Points



03407029

Figure 1-11 2nd LO Assembly (34A5A15) Calibration Points

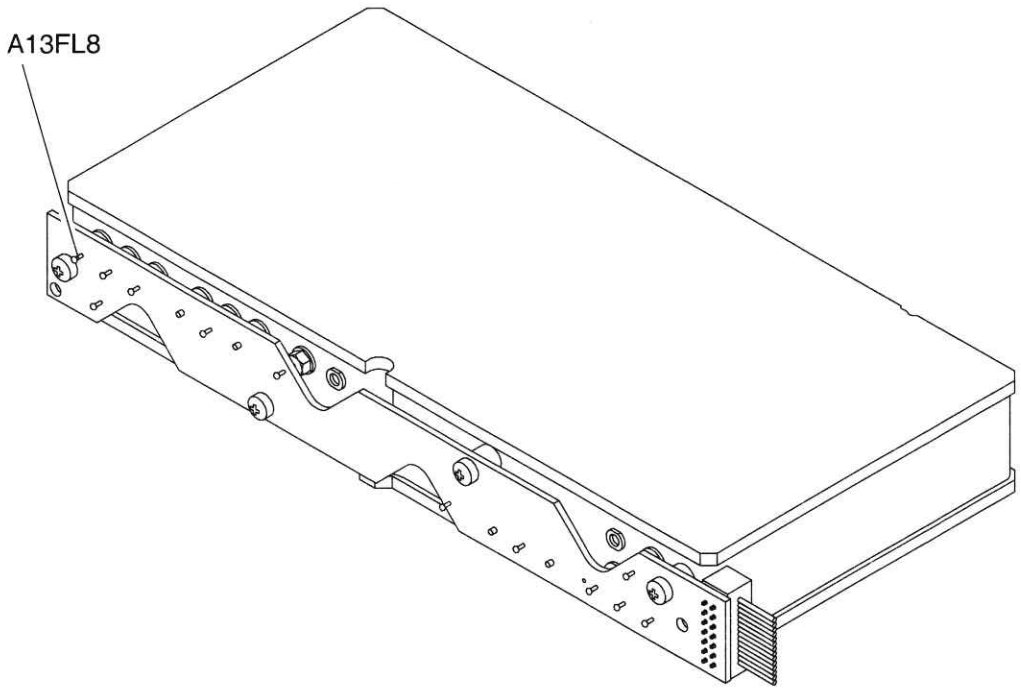


Figure 1-12 1st LO Assembly (34A5A13) Test Points

1-11-2 METERING DVM CALIBRATION

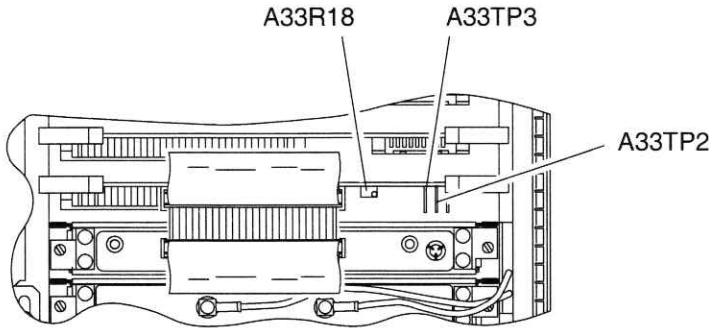
PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1)
EQUIPMENT REQUIRED:	1 Digital Multimeter (DMM)
FIGURE REFERENCES:	Figure 1-13

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
6. Connect DMM negative lead to A33TP3 and positive lead to A33TP2 both of Monitor Control PC Board Assembly (Figure 1-13).

If reading in Step 7 requires adjustment, paragraphs 1-11-4, 1-11-8, 1-11-9, 1-11-10, 1-11-11, 1-11-12, 1-11-14, 1-11-16, 1-11-17 and 1-11-19 are required to be performed.

7. Verify DMM displays 4.096 Vdc (±0.01 Vdc). Adjust A33R18 (Figure 1-13), if necessary, until DMM displays 4.096 Vdc (±0.002 Vdc).
8. Perform one of the following:
   - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
   - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed with Step 5 of 1-11-3.



03407032

Figure 1-13 Monitor Control PC Board Assembly (34A5A33) Calibration Points

1-11-3 VCXO FREQUENCY STANDARD CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1)
EQUIPMENT REQUIRED:	1 10 MHz Frequency Standard 1 Measuring Receiver with Sensor 1 Oscilloscope
FIGURE REFERENCES:	Figure 1-14

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-14.

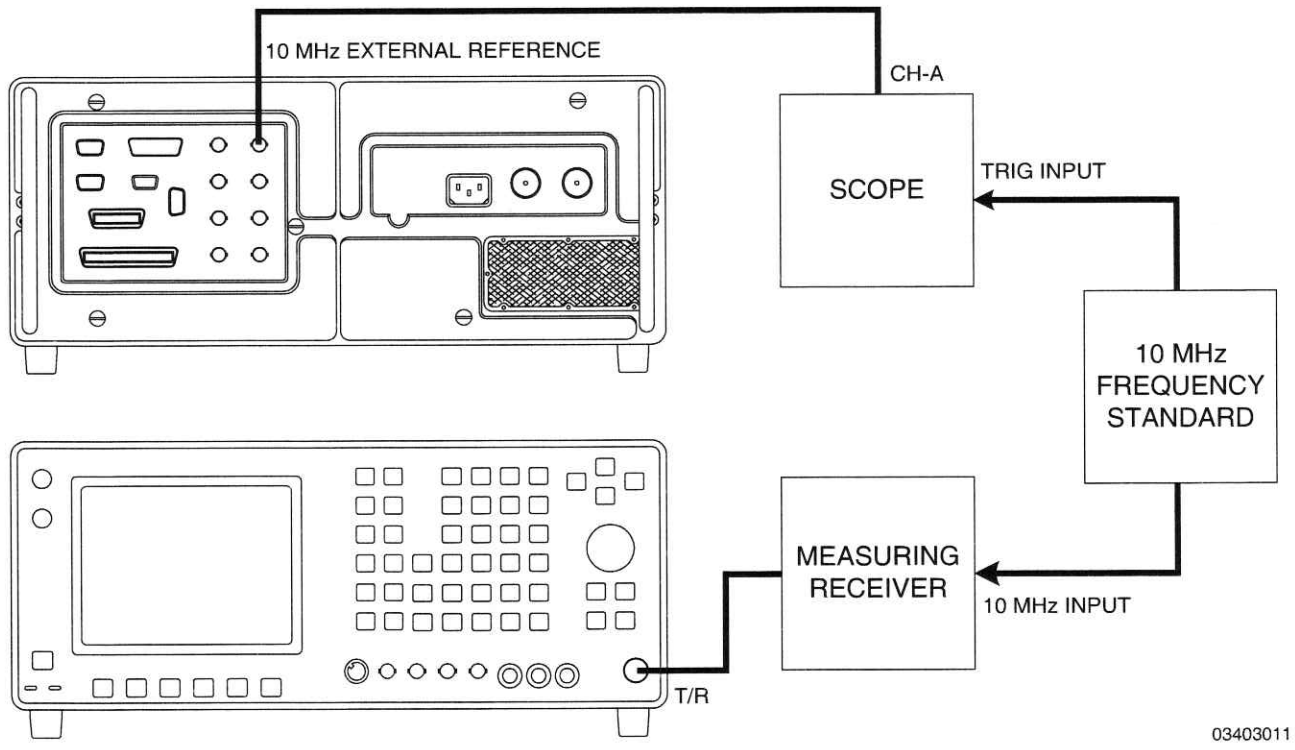


Figure 1-14 VCXO Calibration Test Setup

7. Press ***RF GEN***. RF Generator Operation Screen is displayed on Test Set.
8. Using FIELD SELECT Keys, move cursor to RF and enter ***900***. Press ***ENTER***.
9. Move cursor to LEVEL and enter ***0***. Press ***ENTER***.
10. On Measuring Receiver, press 7.4 SPCL Key to enable 1 Hz frequency resolution.
11. Set Oscilloscope controls as follows:

CONTROL	SETTING
V/Div	As required for Stable Display
Sweep	50 ns
Trigger	Ext

12. Verify Measuring Receiver displays 900.000000 MHz (±90 Hz). If value displayed on Measuring Receiver is within tolerance, go to Step 19; otherwise, proceed to next step.

CALIBRATION

13. Press ***MTRS*** and ***AUX F6***. The Auxiliary Functions Menu is displayed on Test Set and "1. Calibrations" is highlighted. Press ***ENTER***. A small window appears displaying the prompt: "Enter Password:"
14. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Calibration Menu appears on the screen.
15. Press ***SHIFT*** and ***C*** to select "12. VCXO Calibration." "Select Atten" submenu appears with highlighted data field.
16. Press ***DATA SCROLL*** → to move cursor to least significant digit in highlighted data field.

Before performing Step 17, the Test Set should be temperature stable for 1 Hour.

17. While Observing the frequency on Measuring Receiver for coarse frequency reference, use ***DATA SCROLL*** Spinner to adjust waveform on Oscilloscope for minimum motion. Press ***ENTER***.
18. Return to Step 12.

END OF PROCEDURE

19. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of 1-11-4.

1-11-4 FUNCTION GENERATOR LEVEL AND VRMS METER CALIBRATION

PREREQUISITES: Power-Up Check/Power Supply Calibration (Para 1-11-1)
Metering DVM Calibration (Para 1-11-2)

EQUIPMENT REQUIRED:
1 600 Ω Load (1%)
1 Audio Analyzer
1 Digital Multimeter (DMM)
1 Extender Board (7010-7839-900)

FIGURE REFERENCES: Figure 1-15
Figure 1-16

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-15. (Refer to Step 8 for appropriate Load.)

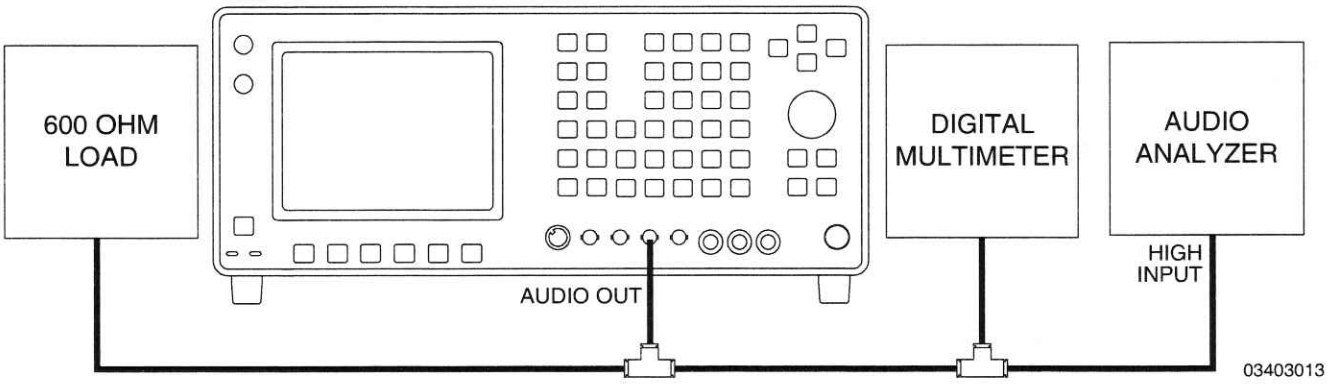


Figure 1-15 Func Gen Level and VRMS Meter Calibration Setup #1

7. Set DMM to VAC RMS and Auto Ranging.
8. Verify levels in Table 1-1 with the appropriate frequency and load applied.
   - If reading is correct, go to Step 29.
   - If reading is out of tolerance, go Step 9.

TONE	FREQ (Hz)	LOAD (Ω)	LEVEL	TOLERANCE	VRMS METER	DIST	FREQ
1	1000	600	10 mV	±3%, ±LSD			
	1000		2.5 V	±3%, ±LSD	10% of DVM Reading	<1%	
	20000		10 mV	±5%, ±LSD			
	20000		2.5 V	±5%, ±LSD		<1%	±25 Hz
2	1000		10 mV	±3%, ±LSD			
	1000		2.5 V	±3%, ±LSD		<1%	
	20000		10 mV	±5%, ±LSD			
	20000		2.5 V	±5%, ±LSD		<1%	±25 Hz

Table 1-1 Func Gen Level and VRMS Meter Verification

CALIBRATION

9. Press ***AF GEN***. AF Generator Operation Screen appears. Ensure cursor is located on GEN 1 field. Press ***ENTER*** until GEN 1 is toggled "On."
10. Using ***FIELD SELECT*** Keys, move cursor to WAVE field for GEN 1 and press ***DATA SCROLL*** ↑ to select "SINE." Press ***ENTER***.
11. Move cursor to AF field for GEN 1 and enter ***1000***. Press ***ENTER***.
12. Move cursor to LEVEL and enter ***2•5***. Press ***ENTER***.
13. Connect test equipment as shown in Figure 1-16.
14. Set DMM to VAC RMS and Auto Ranging.

Function Gen Level

15. Press ***MTRS*** and ***AUX F6***. The Auxiliary Functions Menu is displayed on Test Set and "1. Calibrations" is highlighted. Press ***ENTER***. A small window appears displaying the prompt: "Enter Password:"
16. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Calibration Menu appears on the screen.
17. Press ***SHIFT*** and ***F***. Func Gen Level Calibrations submenu is displayed.
18. Press ***1*** to highlight the "1. 199.9 mV" data field.

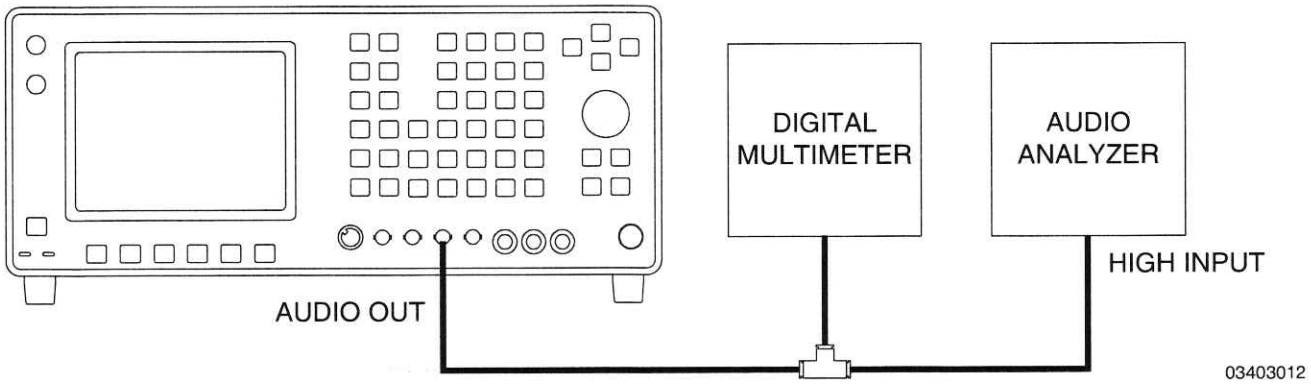


Figure 1-16 Func Gen Level and VRMS Meter Calibration Setup #2

19. Verify DMM displays 199.9 mV (±1 mV). If correct, press ***ESC F6*** and go to Step 21; otherwise, proceed to next step.
20. Press ***DATA SCROLL*** → to move cursor to least significant digit. Using ***DATA SCROLL*** Spinner, adjust value in highlighted data field until reading on DMM equals 199.90 mV (±0.03 mV). Press ***ENTER***.
21. Press ***2*** to highlight the "2. 2.5 V" data field.
22. Verify DMM displays 2.50 V (±75 mV). If correct, press ***ESC F6*** and go to Step 24; otherwise, proceed to next step.
23. Using ***DATA SCROLL*** Spinner, adjust value in highlighted data field until reading on DMM equals 2.50 V (±10 mV). Press ***ENTER***.
24. Press ***ESC F6***. The Calibration Menu is displayed on Test Set.
25. Press ***8***. The VRMS Meter Cal Screen is displayed on Test Set.
26. Press ***ENTER*** to highlight "Proper Reading:" data field and enter ***2•5***. Press ***ENTER***.
27. Press ***AUX F6***. If change to the existing calibration data was made, the message "Backup Cal Data? y/n" appears. Press ***SHIFT*** and ***Y***. The message "Please Wait ... Erasing" appears. When finished, operation is returned to the Auxiliary Functions Menu.
28. Return to Step 6 and, again, perform the verification portion of this calibration procedure.

END OF PROCEDURE

29. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test Equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-5.

1-11-5 GENERATOR TRACKING FILTER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1)
EQUIPMENT REQUIRED:	None
FIGURE REFERENCES:	Figure 1-2

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until 'YES" appears. Press ***ENTER***.
6. Find Generator IF Assembly (34A5A20) on Test Set (see Figure 1-2). Locate label on Generator IF Assembly (34A5A20) with 5 numerical values.
7. Record the 5 numerical values.
8. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
9. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Calibration Menu appears on the screen.
10. Using FIELD SELECT Keys, move cursor to "17. Gen Tracking Filt."
11. Press ***ENTER***. Gen Tracking Filter Calibration Submenu appears (see Figure 1-17).

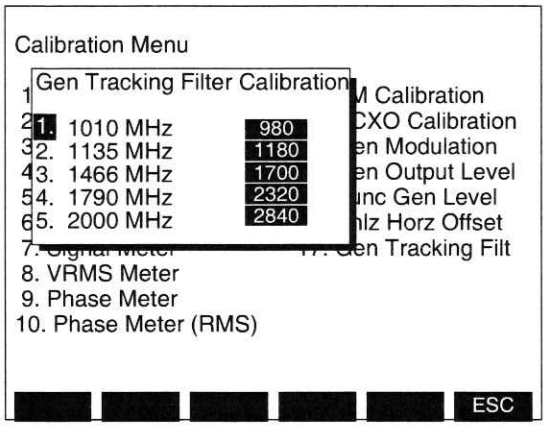


Figure 1-17 Generator Tracking Filter Calibration Submenu

12. Verify that values in the Gen Tracking Filter Calibration Submenu exactly equal the corresponding values recorded in Step 7.
    - If all values match, go to Step 14.
    - Perform the following as required:
        - Using FIELD SELECT Keys, move cursor to desired data field. Press ***ENTER***.
        - Using DATA ENTRY Keypad, enter correct recorded value. Press ENTER.
        - Repeat as required.
13. Press ***ESC F6*** and ***AUX F6***.
14. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set.
    - If this procedure is performed as part of a complete Calibration, proceed to Step 5 of para 1-11-6.

1-11-6 COMPLEX MODULATION GENERATOR CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1)
EQUIPMENT REQUIRED:	1 Digital Multimeter (DMM)
FIGURE REFERENCES:	Figure 1-18

STEP	PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
6. Set DMM to Vdc and Auto Ranging.
7. Connect Positive lead of DMM to pin 4 of A36J5 of Attenuator PC Board Assembly (34A5A36) (see Figure 1-18).
8. Connect Positive lead of DMM to pin 1 of A36J5 of Attenuator PC Board Assembly (34A5A36) (see Figure 1-18).

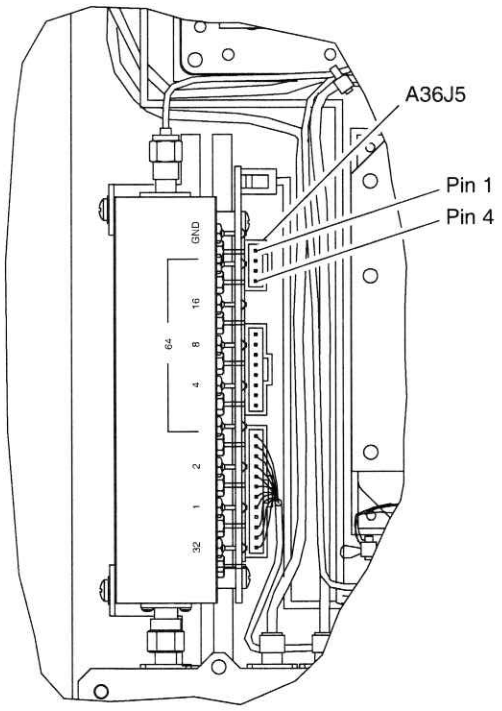


Figure 1-18 Attenuator PC Board Assembly (34A5A36) Calibration Points

9. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
10. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Calibration Menu appears on the screen.
11. Press ***SHIFT E***. Gen Level Calibrations Submenu appears on screen of Test Set.

IMPORTANT: Avoid pressing ***Dflt F1***. As all Gen Level Calibrations are returned to factory default values, making calibration values useless for a specific unit. A full calibration is required to restore to appropriate values. If ***Dflt F1*** is pressed, immediately cycle power to retain stored calibration values.

12. Press ***Cmplx F5***. The Gen Level Calibrations Complex Modulation submenu appears (see Figure 1-19).

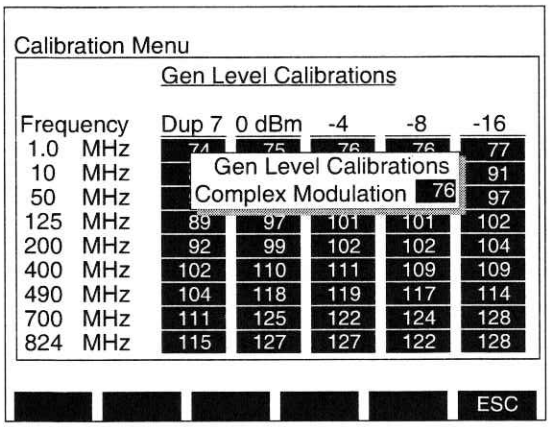


Figure 1-19 Gen Level Calibrations Complex Modulation Submenu

13. Verify -1.76 Vdc (±0.03 Vdc) is displayed on DMM. If within tolerance, press ***ESC F6*** and go to Step 15; otherwise, proceed to next step.
14. Use ***DATA SCROLL*** Spinner to adjust highlighted value in Gen Level Calibrations Complex Modulation submenu as required to display -1.76 Vdc (±0.03 Vdc) on DMM. Press ***ENTER***.
15. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test Equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-7.

1-11-7 GENERATOR OUTPUT LEVEL CALIBRATION (HOST AND SPECIAL TEST)

PREREQUISITES: Power-Up Check/Power Supply Calibration (Para 1-11-1)
Complex Modulation Generator Calibration (Para 1-11-6)

EQUIPMENT REQUIRED:
1 Local Oscillator (LO)
1 Measuring Receiver with Sensor
1 Microwave Converter with Sensor
1 N-to-TNC Adapter
1 RF Power Meter
1 RF Signal Generator

FIGURE REFERENCES: Figure 1-20

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

HOST VERIFICATION

6. Using N-to-TNC Adapter at Duplex Connector on Test Set, connect test equipment as shown in Figure 1-20.

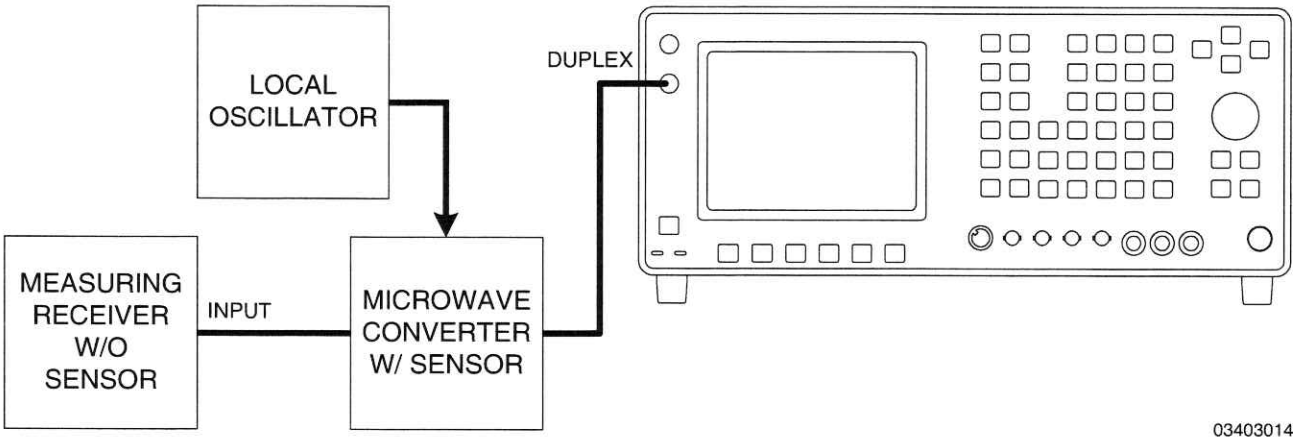


Figure 1-20 Generator Output Level Calibration Hook-Up

7. Set Local Oscillator to 800 MHz at +8 dBm.

8. While leaving the Measuring Receiver connected to the Microwave Converter w/ Sensor, use RF Signal Generator to characterize the Measuring Receiver in Tuned RF Level Mode for the frequencies in Table 1-2.

RF SIGNAL GENERATOR OUTPUT FREQUENCY (MHz)	MEASURING RECEIVER INPUT FREQUENCY SETTING (MHz)
50.0	Same as RF Signal Generator Output
440.0	Same as RF Signal Generator Output
455.5	Same as RF Signal Generator Output
500.0	Same as RF Signal Generator Output
800.0	Same as RF Signal Generator Output
855.5	Same as RF Signal Generator Output
900.0	Same as RF Signal Generator Output
1750.0	950.0
1800.0	1000.0
1920.5	1120.5
2000.0	1200.0
2010.0	1210.0

Table 1-2 Characterization Frequencies for Measuring Receiver

9. Set display units of Measuring Receiver to "dBm."
10. Press ***DPLX***. The Duplex Operation screen appears.
11. Using FIELD SELECT Keys, move cursor to SOURCE (Duplex Receiver portion of screen) and press ***ENTER***.
12. Using DATA SCROLL Keys, select each source and place MOD TYPE for each source to "OFF." Press ***ENTER***.

11. Using FIELD SELECT Keys, move cursor to Output Connector Selection field (see Figure 1-21). Press ***ENTER*** until "DPL" is selected.

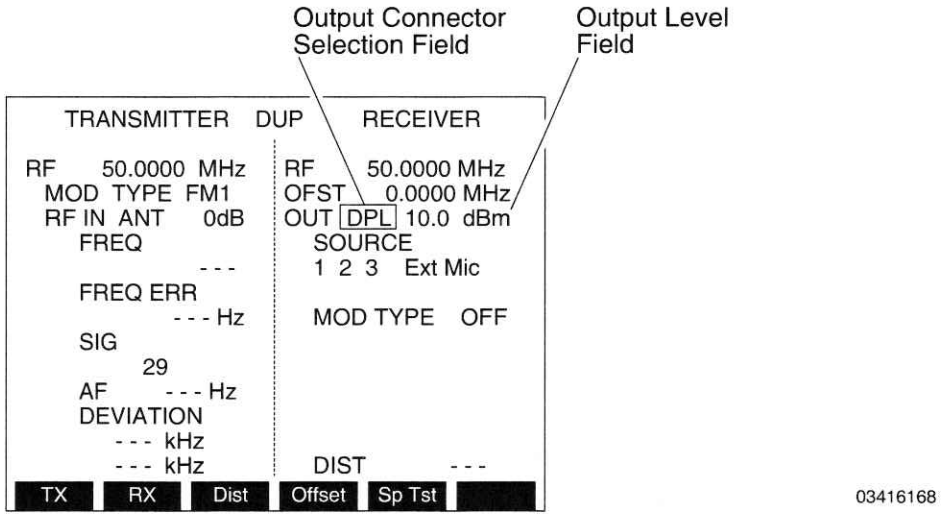


Figure 1-21 Duplex Operation Output Connector Selection Field

Steps 12 through 33 verify output levels of the Duplex Connector for Duplex operation and involve only the Duplex Receiver side of the Duplex Operation Screen.

12. Move cursor to RF and enter ***50***. Press ***ENTER***.
13. Move cursor to Output Level field just to the right of the Output Connector Selection field (refer to Figure 1-21). Ensuring units in dBm, enter ***10***. Press ***ENTER***.
14. Verify Measuring Receiver displays +10.0 dBm (±3.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
15. Repeat Steps 13 and 14 using the following values (again, verify reading within ±3.0 dB):

    -5.0 dBm -1.0 dBm -8.0 dBm -16.0 dBm
    -32.0 dBm -64.0 dBm

16. With cursor at Output Level field, enter ***-99*** and press ***ENTER***.
17. Verify Measuring Receiver displays -99.0 dBm (±3.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
18. With cursor at Output Level field, enter ***-110*** and press ***ENTER***.
19. Verify Measuring Receiver displays -110.0 dBm (±4.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
20. With cursor at Output Level field, enter ***10*** and press ***ENTER***.

21. Move cursor to Output Level field, enter ***-5*** and press ***ENTER***.
22. Move cursor to RF and enter ***440***. Press ***ENTER***.
23. Verify Measuring Receiver displays -5.0 dBm (±1.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
24. Repeat Steps 22 and 23 using the following frequencies (again, verify reading within ±1.5 dB):

455.5 MHz	500.0 MHz	800.0 MHz	855.5 MHz
900.0 MHz	1750.0 MHz	1920.5 MHz	2010.0 MHz

25. Repeat Steps 21 through 24 using the following levels (again, verify reading within ±1.5 dB):

-8.0 dBm	-16.0 dBm	-32.0 dBm	-64.0 dBm
-95.0 dBm			

26. Move cursor to Output Level field, enter ***-99*** and press ***ENTER***.
27. Move cursor to RF and enter ***440***. Press ***ENTER***.
28. Verify Measuring Receiver displays -99.0 dBm (±2.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
29. Repeat Steps 27 and 28 using the following frequencies (again, verify reading within ±2.0 dB):

455.5 MHz	500.0 MHz	800.0 MHz	855.5 MHz
900.0 MHz	1750.0 MHz	1920.5 MHz	2010.0 MHz

30. Move cursor to Output Level field, enter ***-110*** and press ***ENTER***.
31. Move cursor to RF and enter ***440***. Press ***ENTER***.
32. Verify Measuring Receiver displays -110.0 dBm ± 3.0 dB. If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
33. Repeat Steps 31 and 32 using the following frequencies (again, verify reading within ±3.0 dB):

455.5 MHz	500.0 MHz	800.0 MHz	855.5 MHz
900.0 MHz	1750.0 MHz	1920.5 MHz	2010.0 MHz

STEP PROCEDURE

Steps 34 through 57 verify output levels of the T/R Connector and involve only the Generator Operation Screen.

34. Move Microwave Converter Sensor to T/R Connector of Test Set.
35. Press ***RF GEN***. The RF Generator Operation Screen appears.
36. Using FIELD SELECT Keys, move cursor to RF and enter ***50***. Press ***ENTER***.
37. Move cursor to LEVEL and, ensuring units in dBm, enter ***-10***. Press ***ENTER***.
38. Verify Measuring Receiver displays -10.0 dBm (±3.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
39. Repeat Steps 37 and 38 using the following levels (again, verify reading within ±3.0 dB):

    -16.0 dBm -32.0 dBm -64.0 dBm -110.0 dBm
40. With cursor at LEVEL, enter ***-115*** and press ***ENTER***.
41. Verify Measuring Receiver displays -115.0 dBm (±3.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
42. With cursor at LEVEL, enter ***-127*** and press ***ENTER***.
43. Verify Measuring Receiver displays -127.0 dBm (±4.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
44. Move cursor to LEVEL, enter ***-10*** and press ***ENTER***.
45. Move cursor to RF and enter ***440***. Press ***ENTER***.
46. Verify Measuring Receiver displays -10.0 dBm (±1.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
47. Repeat Steps 45 and 46 using the following frequencies (again, verify reading within ±1.5 dB):

    455.5 MHz 500.0 MHz 800.0 MHz 855.5 MHz
    900.0 MHz 1750.0 MHz 1920.5 MHz 2010.0 MHz
48. Repeat Steps 44 through 47 using the following levels (again, verify reading within ±1.5 dB):

    -16.0 dBm -32.0 dBm -64.0 dBm -110.0 dBm

49. Move cursor to LEVEL and enter ***-115***. Press ***ENTER***.
50. Move cursor to RF and enter ***440***. Press ***ENTER***.
51. Verify Measuring Receiver displays -115.0 dBm (±2.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
52. Repeat Steps 50 and 51 using the following frequencies (again, verify reading within ±2.0 dB):

455.5 MHz	500.0 MHz	800.0 MHz	855.5 MHz
900.0 MHz	1750.0 MHz	1920.5 MHz	2010.0 MHz

53. Move cursor to LEVEL and enter ***-127***. Press ***ENTER***.
54. Move cursor to RF and enter ***440***. Press ***ENTER***.
55. Verify Measuring Receiver displays -127.0 dBm (±3.0 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 93 to perform calibration of HOST.
56. Repeat Steps 54 and 55 using the following frequencies (again, verify reading within ±3.0 dB):

455.5 MHz	500.0 MHz	800.0 MHz	855.5 MHz
900.0 MHz	1750.0 MHz	1920.5 MHz	2010.0 MHz

57. Host Verification is complete. Continue with Special Test Verification.

SPECIAL TEST VERIFICATION

58. Press ***DPLX***, ***Sp Tst F5***, ***AUX2 F5*** and ***3***. The 1900CSA Diagnostics Screen is displayed on the screen of Test Set.
59. Press ***FrMode F1*** until RF FREQ is displayed as a frequency in MHz.
60. Press Softkey F2 (FWD/REV) until "FORWARD" is displayed in upper right-hand corner.
61. Move cursor to STEP and press ***1***. Press ***ENTER***.
62. Move cursor to OP MODE and press ***DATA SCROLL*** ↑ until "CW" is displayed. Press ***ENTER***.
63. Move cursor to SLOT and press ***DATA SCROLL*** ↑ until "1" is displayed.
64. Move cursor to Band Selection field (see Figure 1-22).

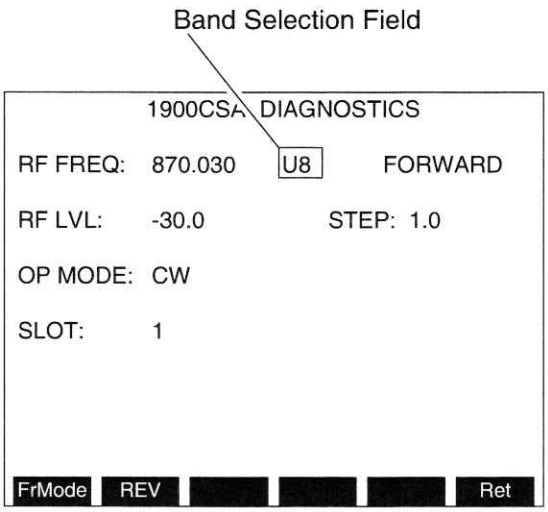


Figure 1-22 Band Selection Field - 1900CSA Diagnostics Screen

65. Press ***DATA SCROLL*** ↑ until "U4" appears. Press ***ENTER***.
66. Move cursor to RF FREQ and enter ***440***. Press ***ENTER***.
67. Move cursor to RF LVL and enter ***-20***. Press ***ENTER***.
68. Verify Measuring Receiver displays a power level of -20.0 dBm (±1.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 146 to perform calibration of Special Test.
69. Repeat Steps 67 and 68 using the following values (again, verify each reading within ±1.5 dB):

    -45.0 dBm -60 dBm -75.0 dBm -95.0 dBm
    -110.0 dBm
70. Repeat Steps 67 and 68 using -115 dBm, but verify reading within ±2.0 dB.
71. Repeat Steps 67 and 68 using -127 dBm, but verify reading within ±3.0 dB.
72. Repeat Steps 66 through 71 using the following frequencies (verify within same tolerances specified):

    455.5 MHz 500.0 MHz

73. Move cursor to Band Selection field (see Figure 1-22).
74. Press ***DATA SCROLL*** ↑ until "U8" appears. Press ***ENTER***.
75. Move cursor to RF FREQ and enter ***800***. Press ***ENTER***.
76. Move cursor to RF LVL and enter ***-20***. Press ***ENTER***.
77. Verify Measuring Receiver displays a power level of -20.0 dBm (±1.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 146 to perform calibration of Special Test.
78. Repeat Steps 76 and 77 using the following values (again, verify each reading within ±1.5 dB):

    -45.0 dBm -60 dBm -75.0 dBm -95.0 dBm
    -110.0 dBm

79. Repeat Steps 76 and 77 using -115 dBm, but verify reading within ±2.0 dB.
80. Repeat Steps 76 and 77 using -127 dBm, but verify reading within ±3.0 dB.
81. Repeat Steps 75 through 80 using the following frequencies (verify within same tolerances specified):

    855.5 MHz 900.0 MHz

82. Move cursor to Band Selection field (see Figure 1-22).
83. Press ***DATA SCROLL*** ↑ until "HY" appears. Press ***ENTER***.
84. Move cursor to RF FREQ and enter ***1800***. Press ***ENTER***.
85. Move cursor to RF LVL and enter ***-20***. Press ***ENTER***.
86. Verify Measuring Receiver displays a power level of -20.0 dBm (±1.5 dB). If within tolerance, proceed to next step; otherwise, disconnect test equipment and go to Step 146 to perform calibration of Special Test.
87. Repeat Steps 85 and 86 using the following values (again, verify each reading within ±1.5 dB):

    -45.0 dBm -60 dBm -75.0 dBm -95.0 dBm
    -110.0 dBm

88. Repeat Steps 85 and 86 using -115 dBm, but verify reading within ±2.0 dB.
89. Repeat Steps 85 and 86 using -127 dBm, but verify reading within ±3.0 dB.
90. Repeat Steps 84 through 89 using the following frequencies (verify within same tolerances specified):

    1920.5 MHz 2000.0 MHz

91. Disconnect Measuring Receiver from Test Set.
92. Go to Step 186.

HOST CALIBRATION

The HOST Calibration portion of this Calibration Procedure utilizes Measuring Receiver w/ the lower frequency Sensor (100 kHz to 2.6 GHz). The Microwave converter w/ the high frequency Sensor (50 MHz to 26.5 GHz) is required only when performing (or repeating) the HOST or Special Test Verification portions of this calibration procedure.

93. Set RF Signal Generator to 5 MHz at 0.0 dBm.
94. Connect Measuring Receiver w/ Sensor to RF Signal Generator
95. Set Measuring Receiver to Tuned RF Level Mode.
96. Calibrate Measuring Receiver to output signal from RF Signal Generator.
97. Change output of RF Signal Generator to -32.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
98. Change output of RF Signal Generator to -74.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
99. Change output of RF Signal Generator to 0.0 dBm.
100. Place Measuring Receiver into Auto Tuning mode.
101. Change frequency of RF Signal Generator to 1 MHz.
102. Change Measuring Receiver input frequency setting to 1 MHz.
103. Calibrate Measuring Receiver to output signal from RF Signal Generator.
104. Change output of RF Signal Generator to -32.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
105. Change output of RF Signal Generator to -74.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
106. Change output of RF Signal Generator to 0.0 dBm.
107. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
108. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
109. Press ***SHIFT E***. Gen Level Calibrations Submenu appears on screen of Test Set with the "1.0 MHz at +7 dBm (Duplex)" cell highlighted (i.e., cell in 1.0 MHz row and Dup 7 column highlighted).

IMPORTANT: Avoid pressing ***Dflt F1*** as all gen level calibrations are returned to factory default values, making calibration values useless for a specific unit. A full calibration is required to restore to appropriate values. If ***Dflt F1*** is accidentally pressed, immediately cycle power to retain stored calibration values.

110. Using N-to-TNC Adapter, connect Measuring Receiver Sensor to Duplex Connector of Test Set.

111. Verify Measuring Receiver displays +7.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***ENTER***.

112. Move Measuring Receiver Sensor to T/R Connector on Test Set.

113. Using FIELD SELECT Keys, move cursor to "1.0 MHz at 0 dBm" cell.

114. Verify Measuring Receiver reads 0.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***ENTER***.

115. Repeat Steps 113 and 114 using the 1.0 MHz Power Level column positions and corresponding Measuring Receiver readings in Table 1-3.

- Press ***Right F3*** as required to access right portion of Gen Level Calibrations table. After Softkey F3 is pressed, the softkey label changes to ***Left*** to allow user to return to left portion of table.
- The Gen Level Calibrations table displayed on the screen of the Test Set is actually made up of 4 quadrants, each accessible using Softkeys F2 (Down/Up) and F3 (Right/Left).

TEST SET CONNECTOR	1.0 MHz POWER LEVEL	MEASURING RECEIVER READING (± 0.2 dB)	
Duplex	+7 dBm	+7.0 dBm	Already completed
T/R	0 dBm	0.0 dBm	
T/R	-4 dBm	-4.0 dBm	
T/R	-8 dBm	-8.0 dBm	
T/R	-16 dBm	-16.0 dBm	
T/R	-17 dBm	-17.0 dBm	
T/R	-32 dBm	-32.0 dBm	
T/R	-64 dBm	-64.0 dBm	
T/R	-96 dBm	-96.0 dBm	
T/R	-118 dBm	-118.0 dBm	

Table 1-3 Measuring Receiver Readings for 1.0 MHz Power Levels (HOST)

116. Disconnect Measuring Receiver from Test Set.

STEP	PROCEDURE

117. Set RF Signal Generator to 10 MHz at 0.0 dBm.
118. Change Measuring Receiver input frequency setting to 10 MHz.
119. Connect Measuring Receiver Sensor to output of RF Signal Generator.
120. Set Measuring Receiver to Tuned RF Level Mode.
121. Calibrate Measuring Receiver.
122. Change RF Signal Generator output power level to -32.0 dBm.
123. Calibrate Measuring Receiver.
124. Change RF Signal Generator output power level to -74.0 dBm.
125. Calibrate Measuring Receiver.
126. Move Measuring Receiver Sensor to Duplex Connector of Test Set (using N-to-TNC Adapter).
127. Move cursor to "10 MHz at +7 dBm (Duplex)" cell (i.e., cell in 10 MHz row and Dup 7 column).
128. Verify Measuring Receiver reads +7.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***ENTER***.
129. Move Measuring Receiver Sensor to T/R Connector of Test Set.
130. Using FIELD SELECT Keys, move cursor to "10 MHz at 0 dBm" cell.
131. Verify Measuring Receiver reads 0.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***ENTER***.

132. Repeat Steps 130 and 131 using the 10 MHz Power Level column positions and corresponding Measuring Receiver readings in Table 1-4.

TEST SET CONNECTOR	10 MHz POWER LEVEL	MEASURING RECEIVER READING (±0.2 dB)	
Duplex	+7 dBm	+7.0 dBm	Already completed
T/R	0 dBm	0.0 dBm	
T/R	-4 dBm	-4.0 dBm	
T/R	-8 dBm	-8.0 dBm	
T/R	-16 dBm	-16.0 dBm	
T/R	-17 dBm	-17.0 dBm	
T/R	-32 dBm	-32.0 dBm	
T/R	-64 dBm	-64.0 dBm	
T/R	-96 dBm	-96.0 dBm	
T/R	-118 dBm	-118.0 dBm	

Table 1-4 Measuring Receiver Readings for 10 MHz Power Levels (HOST)

133. Disconnect Measuring Receiver from Test Set.

134. Using N-to-TNC Adapter, connect RF Power Meter w/ Sensor to Duplex Connector of Test Set.

135. Move cursor to "50 MHz at +7 dBm (Duplex)" cell.

136. Verify RF Power Meter reads +7.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on RF Power Meter as required, then press ***ENTER***.

137. While remaining in the "Dup 7" column in Gen Level Calibrations screen, repeat Steps 135 and 136 for the following frequencies: 125 MHz, 200 MHz, 400 MHz, 490 MHz, 700 MHz, 824 MHz, 880 MHz, 960 MHz, 1.20 GHz, 1.50 GHz, 1.72 GHz, 1.80 GHz, 1.88 GHz, 1.96 GHz and 2.01 GHz. (Press ***Down F2*** to access bottom left quadrant of Gen Level Calibrations table. When finished, press ***Up F2*** to return to upper left quadrant of table.)

138. Move RF Power Meter Sensor to T/R Connector.

139. Move cursor to "50 MHz at 0 dBm" cell.

140. Verify RF Power Meter reads 0.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on RF Power Meter as required, then press ***ENTER***.

141. While remaining in the 50 MHz row, perform the following

- Verify RF Power Meter reading within ±0.2 dB for -4 dBm through -64 dBm columns. If within tolerance, go to next column to the right; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on RF Power Meter as required, then press ***ENTER***.
- Copy value in -64 dBm column into the -96 and -118 dBm cells (see Figure 1-23).

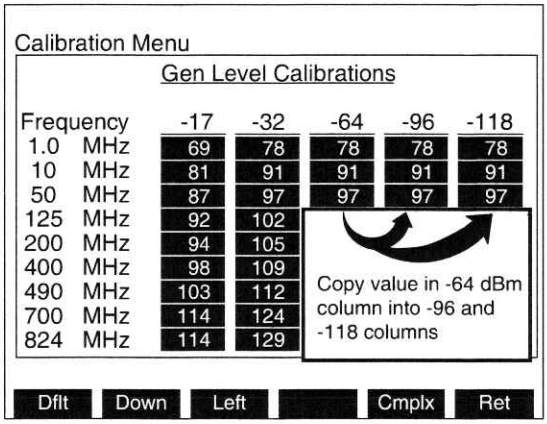


Figure 1-23 Copying -64 Column into -96 and -118 Columns

142. Repeat Steps 139 through 141, but for 125 MHz to 2.01 GHz rows.
143. Press ***Ret F6*** and ***AUX F6***. If "Backup Cal Data? y/n" message appears, press ***SHIFT*** and ***Y***.
144. Disconnect RF Power Meter.
145. Return to Step 6 and repeat HOST Verification.

SPECIAL TEST CALIBRATION

The Special Test Calibration portion of this Calibration Procedure utilizes Measuring Receiver w/ the lower frequency Sensor (100 kHz to 2.6 GHz). The Microwave converter w/ the high frequency Sensor (50 MHz to 26.5 GHz) is required only when performing (or repeating) the Special Test or HOST Verification portions of this calibration procedure.

146. Set RF Signal Generator to 5 MHz at 0.0 dBm.
147. Connect Measuring Receiver Sensor to RF Signal Generator
148. Set Measuring Receiver to Tuned RF Level Mode.
149. Calibrate Measuring Receiver to output signal from RF Signal Generator.
150. Change output of RF Signal Generator to -32.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
151. Change output of RF Signal Generator to -74.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.
152. Change output of RF Signal Generator to 0.0 dBm.

STEP	PROCEDURE

153. Place Measuring Receiver into Auto Tuning mode.

154. Change frequency of RF Signal Generator to 1 MHz.

155. Change Measuring Receiver input frequency setting to 1 MHz.

156. Calibrate Measuring Receiver to output signal from RF Signal Generator.

157. Change output of RF Signal Generator to -32.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.

158. Change output of RF Signal Generator to -74.0 dBm. Calibrate Measuring Receiver to output signal from RF Signal Generator.

159. Change output of RF Signal Generator to 0.0 dBm.

160. Press ***DPLX***, ***Sp Tst F5***, ***AUX2 F5*** and ***1***. A small window appears displaying the prompt: "ENTER PASSWORD:"

161. Press ***1900***, ***SHIFT***, ***C***, ***S***, ***A***. Press ***SHIFT*** and ***ENTER***. The Special Test Attenuation Calibration Screen appears displaying the Attenuation Error Table.

IMPORTANT: Avoid pressing ***Dflt F1*** as all attenuation error calibrations are returned to factory default values, making calibration values useless for a specific unit. A full calibration is required to restore to appropriate values. If ***Dflt F1*** is accidentally pressed, immediately cycle power to retain stored calibration values.

162. Move Measuring Receiver Sensor to T/R Connector on Test Set.

163. Using FIELD SELECT Keys, move cursor to "1 MHz at -20 dBm" cell.

164. Verify Measuring Receiver reads -20.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***Save F4***.

    When an attenuation error value is changed, the label for Softkey F4 (Save) turns red, indicating a changed value.

165. Repeat Steps 163 and 164 using the 1.0 MHz Power Level column positions and corresponding Measuring Receiver readings in Table 1-5.

- Press ***Right F3*** as required to access right portion of Attenuation Error Table. After Softkey F3 is pressed, the softkey label changes to ***Left*** to allow user to return to left portion of table.
- The Attenuation Error Table displayed on the screen of the Test Set is actually made up of 4 quadrants, each accessible using Softkeys F2 (DOWN/UP) and F3 (RIGHT/LEFT).

1.0 MHz POWER LEVEL	MEASURING RECEIVER READING (±0.2 dB)	
-20 dBm	-20.0 dBm	Already completed
-24 dBm	-24.0 dBm	
-28 dBm	-28.0 dBm	
-36 dBm	-36.0 dBm	
-37 dBm	-37.0 dBm	
-52 dBm	-52.0 dBm	
-84 dBm	-84.0 dBm	
-118 dBm	-118.0 dBm	

Table 1-5 Measuring Receiver Readings for 1.0 MHz Power Levels (Sp Tst)

166. Copy the value in -118 dBm column into -130 dBm column.
167. Set RF Signal Generator to 10 MHz at 0.0 dBm.
168. Change Measuring Receiver input frequency setting to 10 MHz.
169. Connect Measuring Receiver Sensor to output of RF Signal Generator.
170. Set Measuring Receiver to Tuned RF Level Mode.
171. Calibrate Measuring Receiver.
172. Change RF Signal Generator output power level to-32.0 dBm. Calibrate Measuring Receiver to output of RF Signal Generator.
173. Change RF Signal Generator output power level to -74.0 dBm. Calibrate Measuring Receiver to output of RF Signal Generator.
174. Move Measuring Receiver Sensor to T/R Connector of Test Set.
175. Using FIELD SELECT Keys, move cursor to "10 MHz at -20 dBm" cell.
176. Verify Measuring Receiver reads -20.0 dBm (±0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on Measuring Receiver as required, then press ***Save F4***.

177. Repeat Steps 175 and 176 using the 10 MHz Power Level column positions and corresponding Measuring Receiver readings in Table 1-6.

10 MHz POWER LEVEL	MEASURING RECEIVER READING (± 0.2 dB)	
-20 dBm	-20.0 dBm	Already completed
-24 dBm	-24.0 dBm	
-28 dBm	-28.0 dBm	
-36 dBm	-36.0 dBm	
-37 dBm	-37.0 dBm	
-52 dBm	-52.0 dBm	
-84 dBm	-84.0 dBm	
-118 dBm	-118.0 dBm	

Table 1-6 Measuring Receiver Readings for 10 MHz Power Levels (Sp Tst)

178. Copy the value in -118 dBm column into -130 dBm column.

179. Disconnect Measuring Receiver from Test Set.

180. Connect RF Power Meter w/ Sensor to T/R Connector of Test Set.

181. Move cursor to "50 MHz at -20 dBm" cell of Attenuation Error Table.

182. Verify RF Power Meter reads -20.0 dBm (± 0.2 dB). If within tolerance, go to next step; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on RF Power Meter as required, then press ***Save F4***.

183. While remaining in the 50 MHz row, perform the following

- Verify RF Power Meter reading within ±0.2 dB for -24 dBm through -52 dBm columns. If within tolerance, go to next column to the right; otherwise, use ***DATA SCROLL*** Spinner to adjust reading on RF Power Meter as required, then press ***Save F4***. (Press Softkey F3 [RIGHT/LEFT] as required to move to the upper right quadrant of error table.)
- Copy value in -52 dBm column into the -84, -118 and -130 dBm columns (see Figure 1-24).

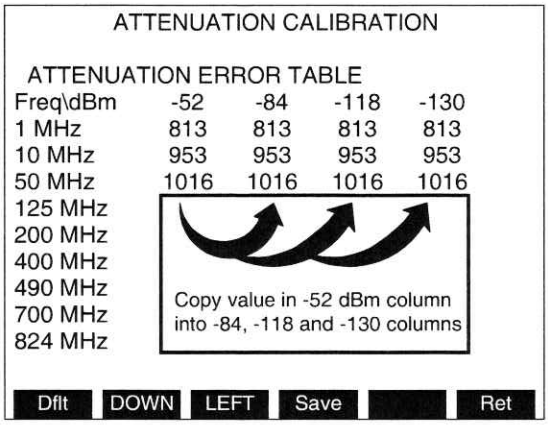


Figure 1-24 Copying -52 Column into -84, -118 and -130 Columns

184. Repeat Steps 181 through 183 for 125 MHz to 2.01 GHz rows.

185. Return to Step 58 and repeat Special Test Verification.

END OF PROCEDURE

186. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test Equipment.
- If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-8.

1-11-8 GENERATOR FM DEVIATION CALIBRATION

PREREQUISITES:
- Power-Up Check/Power Supply Calibration (Para 1-11-1)
- Metering DVM Calibration (Para 1-11-2)
- VCXO Frequency Standard Calibration (Para 1-11-3)
- Func Gen Level and VRMS Meter Calibration (Para 1-11-4)
- Generator Output Level Calibration (Para 1-11-7)

EQUIPMENT REQUIRED:
- 1 Local Oscillator (LO)
- 1 Measuring Receiver without Sensor
- 1 Microwave Converter with Sensor
- 1 N-to-TNC Adapter

FIGURE REFERENCES:
- Figure 1-25
- Figure 1-26

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Set up test equipment as shown in Figure 1-25.

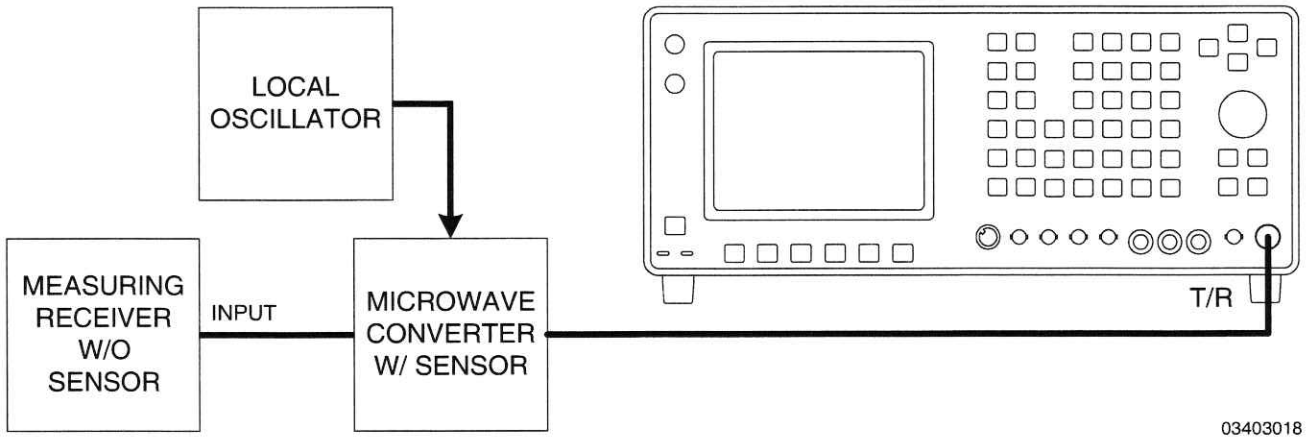


Figure 1-25 Generator FM Deviation Calibration Hook-Up

7. Set LO to 800 MHz at +8 dBm.
8. Set Measuring Receiver as follows:

CONTROL	SETTING
Detector	Peak+
Measurement	FM

9. Press ***RF GEN***. RF Generator Operation Screen is displayed on Test Set.
10. Using FIELD SELECT Keys, move cursor to LEVEL. Enter ***0*** and press ***ENTER***.
11. Move cursor to SOURCE. Press ENTER. Observe that small cursor appears at Source 1.
12. Use DATA SCROLL Keys to set MOD field to "OFF" for Sources 1, 2, 3, Ext and Mic.
13. Move cursor to RF and set Frequency on Test Set per Table 1-7.
14. Set Measuring Receiver High and Low-Pass filters per Table 1-7. Record the Residual FM reading for each frequency in Step 13.

TEST SET	MEASURING RECEIVER	
FREQ (MHz)	**HP (Hz)**	**LP (kHz)**
85	300	3
121		
500		
855.5		
1920.5		
2010		

Table 1-7 Test Set and Measuring Receiver Settings for Residual Readings

Steps 15 through 17 utilize Source 1 of Test Set.

15. Set Frequency, FM Deviation and Modulation Rate on Test Set per Table 1-8.
16. Set High and Low-Pass filters on Measuring Receiver per Table 1-8.

17. Verify Deviation in Table 1-8. (FM residuals recorded in Step 13 are utilized in the calculation of acceptable range of deviation readings.)
    - If reading is correct, go to Step 48.
    - If reading is out of tolerance, proceed to next step.

TEST SET				MEASURING RECEIVER		TOLERANCE
FREQ (MHz)	**MOD**	**DEV**	**MOD RATE**	**HP (Hz)**	**LP (kHz)**	
85	FM	±10 kHz	1 kHz	300	3	±5%, ±Residual, ±Least Significant Digit
121	FM	±10 kHz				
500	FM	±25 kHz				±10%, ±Residual, ±Least Significant Digit
855.5	FM	±75 kHz				
1920.5	FM	±100 kHz				
2010	FM	±50 kHz				

Table 1-8 Generator FM Deviation Verification

CALIBRATION

18. Set Measuring Receiver controls as follows:

CONTROL	SETTING
Detector	Peak+
High-Pass Filter	Off
Low-Pass Filter	3 kHz
Measurement	FM

19. While still in the RF Generator Operation Screen, press ***More F6*** until "Disp" appears at Softkey F1.
20. Press ***Disp F1*** and ***2***. Full analyzer display appears.
21. Press ***Scan F5*** and press ***DATA SCROLL*** ↑ to select "1 kHz." Press ***ENTER***.
22. Move cursor to RF and enter ***855•5***. Press ***ENTER***.
23. Move cursor to SOURCE and press ***ENTER***. Ensure small cursor is at Source 1.
24. Use DATA SCROLL Keys to set MOD to "OFF." Press ***ENTER***.
25. Record Peak Residual FM displayed on Measuring Receiver. Verify Residual FM is <140 Hz.
26. With cursor on SOURCE, press ***ENTER***. Use DATA SCROLL Keys to set MOD field to "FM" and press ***ENTER***.

27. Using FIELD SELECT Keys, move cursor to DEVIATION and enter ***2•4***. Press ***ENTER***.
28. Using FIELD SELECT Keys, move cursor to AF FREQ and enter ***1000***. Press ***ENTER***.
29. Verify 2.4 kHz deviation reading on Measuring Receiver is within 5% (±LSD) of deviation setting less Peak Residual FM. If deviation is within tolerance, proceed to next step; otherwise, go to Step 32.
30. Using FIELD SELECT Keys, move cursor to RF and enter ***855•5001***. Press ***ENTER***.
31. Verify 2.4 kHz deviation reading on Measuring Receiver is within 5% (±LSD) of deviation setting less Peak Residual FM. If deviation is within tolerance, go to Step 41; otherwise, proceed to next step.

If Steps 32 through 37 were accomplished once while conducting this calibration procedure, proceed to Step 38.

32. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
33. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The HOST Calibration Menu appears on the screen.
34. Press ***SHIFT*** and ***D***. Gen Modulation Calibration Submenu appears on screen of Test Set.
35. Press ***2***. "2. FM Deviation (20 kHz)" data field is highlighted.
36. Enter ***200*** and press ***ENTER***.
37. Press ***RF GEN***. RF Generator Operation Screen is displayed on Test Set.
38. Adjust, as necessary, A41A1R14 (FM MOD ADJ) (Figure 1-26) for minimum amplitude of carrier (<-35 dBc on Analyzer Display). (Null at 855.5000 MHz, then balance Null at 855.5001 MHz.)

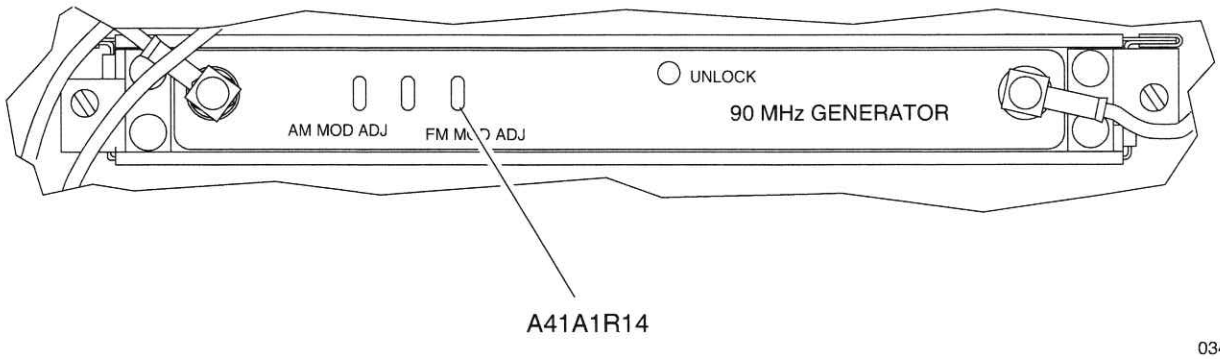


Figure 1-26 90 MHz Generator PC Board Assembly (34A5A41A1) Calibration Points

39. With cursor at RF, enter ***855•5***. Press ***ENTER***.
40. Return to Step 29.

41. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
42. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The HOST Calibration Menu appears on the screen.
43. Press ***SHIFT*** and ***D***. Gen Modulation Calibration Submenu appears on screen of Test Set.
44. Press ***3***. "3. FM Deviation (80 kHz)" data field is highlighted.
45. Using ***DATA SCROLL*** Spinner to set FM Deviation reading on Measuring Receiver to 80 kHz plus Peak Residual FM reading recorded in Step 25. Press ***ENTER***.
46. Verify 80 kHz deviation reading on Measuring Receiver is within 5% (±LSD) of deviation setting less Peak Residual FM.
47. Return to Step 8 and repeat the verification portion of this calibration procedure.

END OF PROCEDURE

48. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test Equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-9.

1-11-9 DEVIATION METER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (Para 1-11-2)
EQUIPMENT REQUIRED:	1 10 MHz Frequency Standard 1 Local Oscillator (LO) 1 Measuring Receiver without Sensor 1 Microwave Converter with Sensor 1 N-to-TNC Adapter 1 Power Splitter
FIGURE REFERENCES:	Figure 1-27

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-27.

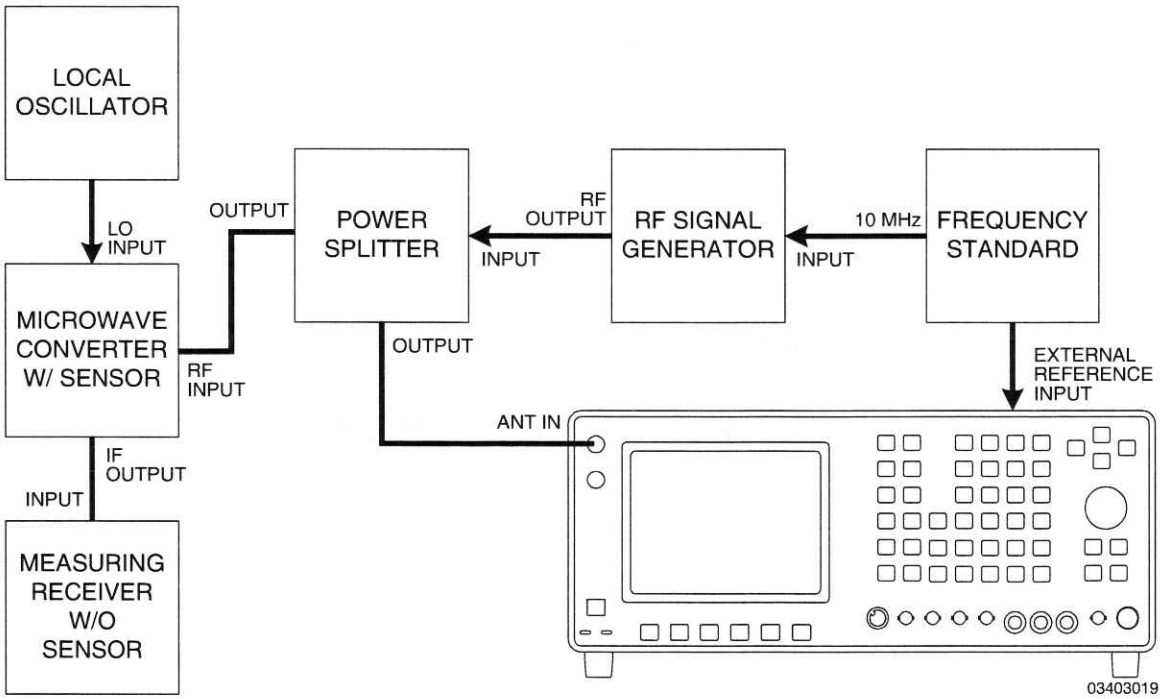


Figure 1-27 Deviation Meter Calibration Hook-Up

7. Set Local Oscillator (LO) to 800 MHz at +8 dBm.
8. Set RF Signal Generator to 855.5 MHz at -10 dBm with no modulation.
9. Set Measuring Receiver controls as follows:

CONTROL	SETTING
Detector	Peak ±/2
High-Pass Filter	300 Hz
Low-Pass Filter	3 kHz
Measurement	FM

10. Record RF Signal Generator FM Residual reading on Measuring Receiver.
11. Press ***MTRS*** and ***4***. Deviation Meter (Peak) Operation Screen appears on Test Set.
12. Use FIELD SELECT Keys to move cursor to AVERAGE. Press ***ENTER*** to turn AVERAGE "On."
13. Move cursor to MODE and press ***DATA SCROLL*** ↑ to select "+/–Peak/2." Press ***ENTER***.
14. Press ***RCVR***. Receiver Operation Screen is displayed on Test Set.
15. Using FIELD SELECT Keys, move cursor to Receiver Input Source field (see Figure 1-28). Press ***ENTER*** to select "ANT."
16. Move cursor to Receiver Input Attenuation Level field (see Figure 1-28). Press ***DATA SCROLL*** ↑ to select "30 dB." Press ***ENTER***.

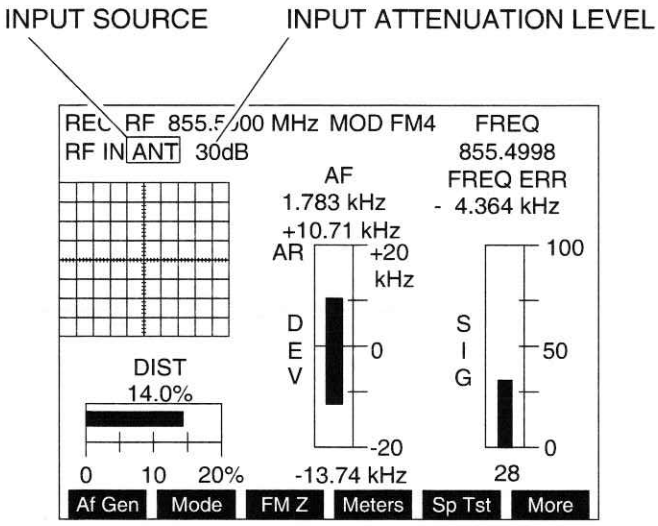


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Figure 1-28 Location of Input Source and Attenuation Level Fields - Receiver Screen

17. Move cursor to MOD and press ***DATA SCROLL*** ↑ to select "FM4." Press ***ENTER***.
18. Set Frequency on Test Set (RF Signal Generator frequency) as per Table 1-9.
19. Move cursor to DEV and press ***ENTER*** (Deviation Meter [Peak] Operation Screen appears). Set Deviation Meter Range on Test Set per Table 1-9.

20. Press ***Ret F6*** to return to Receiver Operation Screen.
21. Press ***FM Z F3***.
22. Set RF Signal Generator per Table 1-9.
23. Verify deviation in Table 1-9, comparing the Measuring Receiver and the Test Set.
    - If all readings are correct, go to Step 55.
    - If any reading is out of tolerance, proceed to next step.

RF SIGNAL GENERATOR			TEST SET	TOLERANCE
FREQ (MHz)	**MOD RATE (kHz)**	**DEV (kHz)**	**DEV METER RANGE (kHz)**	**(kHz)**
455.5	1.0	7.5	10	±5.0%, ±2 LSD, plus RF Signal Generator FM Residual
455.5	1.0	15	20	
855.5	1.0	7.5	10	
855.5	1.0	15	20	
1920.5	1.0	7.5	10	
1920.5	1.0	15	20	

Table 1-9 Deviation Meter Verification

CALIBRATION

24. Set Measuring Receiver controls as follows:

CONTROL	SETTING
Detector	Peak+
High-Pass Filter	<20 Hz
Low-Pass Filter	15 kHz
Measurement	FM

25. Set RF Signal Generator to 121.1 MHz at -10 dBm with no modulation.
26. Record FM Residual of RF Signal Generator.
27. Press ***RCVR***. Receiver Operation Screen is displayed on Test Set.
28. Press ***SETUP***. Receiver Menu Screen appears.
29. Press ***2***, ***9***, ***1***, ***1***, ***2***, ***3***, ***3***, ***2***, ***15*** and ***ENTER*** to set up FM Modulation, 300 kHz IF Filter and 15 kHz Low-Pass Post Detection Filter. Press ***Ret F5*** to return to Receiver Operation Screen.
30. Using FIELD SELECT Keys, move cursor to RF and enter ***121•1***. Press ***ENTER***.
31. Move cursor to DEV and press ***ENTER***. Deviation Meter (Peak) Operation Screen appears.
32. Move cursor to MODE and press ***DATA SCROLL*** ↑ to select "+/-Peak." Press ***ENTER***.
33. Press ***Range F1*** and press ***DATA SCROLL*** ↑ to select "2 kHz." Press ***ENTER***.

STEP	PROCEDURE

34. Press ***Ret F6*** to return to Receiver Operation Screen.
35. Press ***FM Z F3***. Verify plus (+) and minus (-) deviation on deviation meter is within 200 Hz. If >200 Hz, press ***FM Z F3***, again.
36. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
37. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
38. Press ***2*** to access the Deviation Meter (Peak) submenu.
39. Set RF Signal Generator output to 8 kHz deviation at a 3 kHz rate.
40. Press ***Range F1*** until "+10 kHz" is displayed (with AR [Auto Range] off) for range of Deviation Meter.
41. Press ***ENTER*** to highlight "Proper Reading" data field.
42. Use DATA ENTRY Keypad to enter value displayed on Measuring Receiver into data field. Press ***ENTER***.
43. Set Measuring Receiver Detector to Peak-.
44. Use DATA ENTRY Keypad to enter value displayed on Measuring Receiver into data field. Press **+/-** and ***ENTER***.

A negative value is displayed.

45. Verify positive and negative deviation readings on Test Set are within 5% (±LSD +FM Residual of RF Signal Generator recorded in Step 26) of reading of Measuring Receiver.
46. Press ***Range F1*** to select "20 kHz" range for Deviation Meter.
47. Set RF Signal Generator output for 16 kHz deviation.
48. Set Measuring Receiver Detector to Peak+.
49. Press ***ENTER***. Use DATA ENTRY Keypad to enter value displayed on Measuring Receiver into data field. Press ***ENTER***.
50. Set Measuring Receiver Detector to Peak-.
51. Use DATA ENTRY Keypad to enter value displayed on Measuring Receiver into data field. Press **+/-** and ***ENTER***.
52. Verify positive and negative deviation readings on Test Set are within 5% (±LSD +FM Residual of RF Signal Generator recorded in Step 26) of reading of Measuring Receiver.
53. Press RCVR. Receiver Operation Screen is displayed on Test Set.
54. Return to Step 8 and repeat the verification portion of this calibration procedure.

END OF PROCEDURE

55. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
- If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-10.

1-11-10 MODULATION METER CALIBRATION

PREREQUISITES: Power-Up Check/Power Supply Calibration (Para 1-11-1)
Metering DVM Calibration (Para 1-11-2)

EQUIPMENT REQUIRED:
- 1 10 MHz Frequency Standard
- 1 Local Oscillator (LO)
- 1 Measuring Receiver without Sensor
- 1 Microwave Converter with Sensor
- 1 N-to-TNC Adapter
- 1 Power Splitter

FIGURE REFERENCES: Figure 1-29

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-29.
7. Set Local Oscillator (LO) to 800 MHz at +8 dBm.
8. Set RF Signal Generator to 100.0 MHz at -10 dBm with no modulation.
9. Set Measuring Receiver controls as follows:

CONTROL	SETTING
Detector	Peak+
High-Pass Filter	300 Hz
Low-Pass Filter	3 kHz
Measurement	AM

10. Record Residual AM displayed on Measuring Receiver from the RF Signal Generator at the following frequencies:

    100 MHz 455.5 MHz 855.5 MHz 1920.5 MHz
    2010 MHz

11. Press ***RCVR***. Receiver Operation Screen is displayed on Test Set.
12. Using FIELD SELECT Keys, move cursor to Receiver Input Attenuation Level field (see Figure 1-28). Press ***DATA SCROLL*** ↑ to select "30 dB." Press ***ENTER***.
13. Press ***More F6*** until label on Softkey F2 is "Mod." Press ***Mod F2*** and press ***DATA SCROLL*** ↑ to select "AM2." Press ***ENTER***.

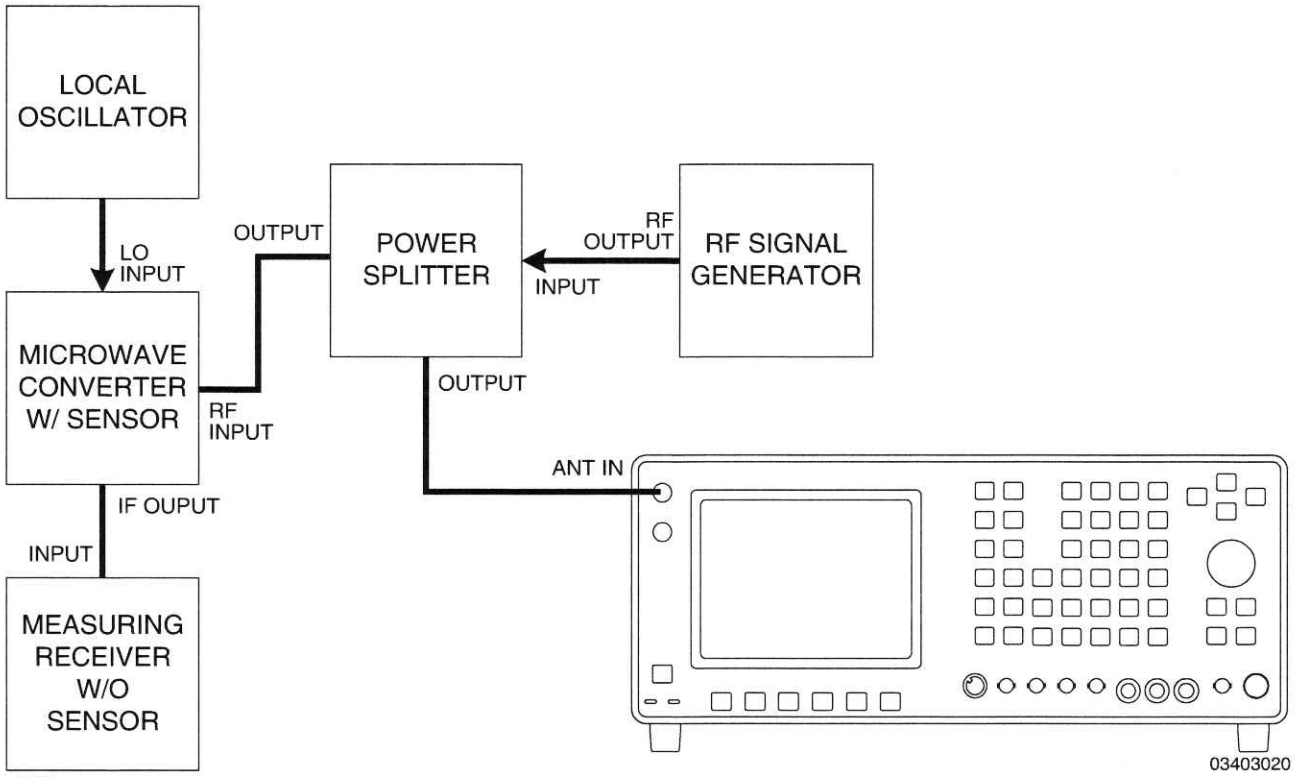


Figure 1-29 Modulation Meter Calibration Hook-Up

14. Press ***SETUP***, ***5***, ***1***, ***1*** and ***Ret F5*** to select "Measurement" for User Defined AGC Type and return to Receiver Operation Screen.
15. Set Frequency on Test Set as per Table 1-10 (RF Signal Generator frequency).
16. Move cursor to MOD (Modulation Meter display) and press ***ENTER***.
17. Set Modulation Meter Range on Test Set per Table 1-10.
18. Set RF Signal Generator per Table 1-10.

RF SIGNAL GENERATOR			TEST SET	TOL
FREQ (MHz)	**MOD RATE (kHz)**	**MOD (%)**	**MOD METER RANGE (%)**	
100	1	35	40	±5%, ±LSD, +AM Residual
455.5	1	35	40	
855.5	1	35	40	
1920.5	1	55	100	
2010	1	55	100	

Table 1-10 Modulation Meter Verification

20. Verify modulation in Table 1-10, comparing the Measuring Receiver and Test Set.
    - If reading is correct, go to Step 33.
    - If reading is out of tolerance, proceed to next step.

CALIBRATION

21. Press ***Ret F6*** to return to Receiver Operation Screen.
22. Set RF Signal Generator to 855.5 MHz with 60% AM modulation at a 1 kHz rate.
23. Using FIELD SELECT Keys, move cursor to RF and enter ***855•5***. Press ***ENTER***.
24. Move cursor to MOD (Modulation Meter display). Press ***ENTER***. Modulation Meter Operation Screen appears.
25. Press Range F1 and press ***DATA SCROLL*** ↑ to select "100%." Press ***ENTER***.
26. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
27. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
28. Press ***4*** to access METER CAL MODULATION Screen.
29. Press ***ENTER*** to highlight "Proper Reading" data field.
30. Use DATA ENTRY Keypad to enter value displayed on Measuring Receiver into data field. Press ***ENTER***.
31. Press ***Ret F5*** and ***AUX F6***.
32. Return to Step 8 and repeat the verification portion of this calibration procedure.

END OF PROCEDURE

33. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-11.

1-11-11 DISTORTION METER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (Para 1-11-2) Func Gen Level and VRMS Meter Calibration (Para 1-11-4)
EQUIPMENT REQUIRED:	1 Audio Analyzer 1 Multifunction Synthesizer
FIGURE REFERENCES:	Figure 1-30

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-30 (Test Set is connected to test equipment in Step 21).

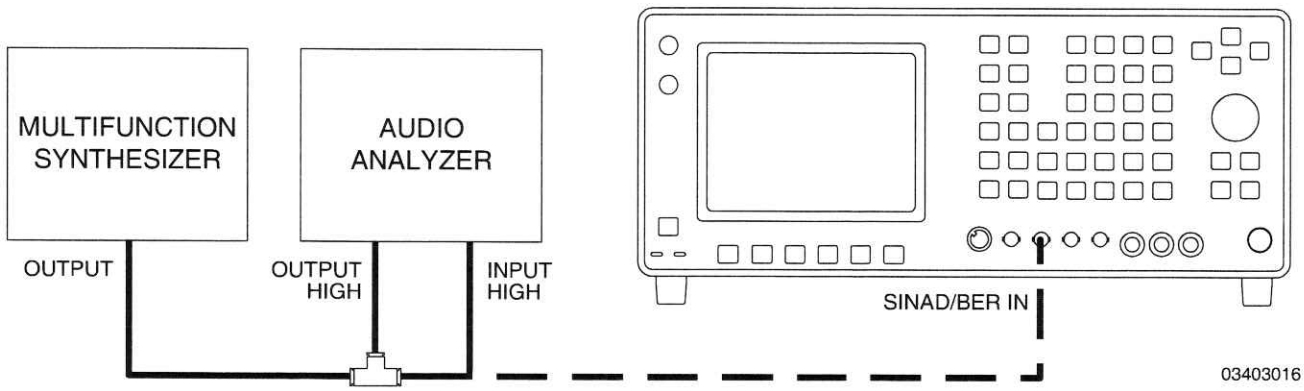


Figure 1-30 Distortion Meter Verification Hook-Up

7. Set Multifunction Synthesizer controls as follows:

CONTROL	SETTING
Channel A	ON
Frequency	3000 Hz
Level	1 µV

8. Set Audio Analyzer controls as follows:

CONTROL	SETTING
Source Frequency	770 Hz
Source Amplitude	6 V
Log/Linear	LOG
Input Float	GND
Output Float	GND
Source Impedance	50 Ω

9. Press RATIO on Audio Analyzer and verify 0.00 dB is displayed.
10. Set Audio Analyzer Source Amplitude to 1 mV.
11. Set Multifunction Synthesizer Amplitude to 8.5 V initially and adjust Multifunction Synthesizer Amplitude until 0.00 dB is displayed on Audio Analyzer. Record Amplitude setting.
12. Adjust Multifunction Synthesizer Amplitude until following values are displayed on Audio Analyzer. Record Amplitude settings.

A.	-14.9 dB (18%)
B.	-20.0 dB (10%)
C.	-40.0 dB (1%)

13. Set Audio Analyzer Amplitude to 6.0 V.
14. Press ***MTRS*** and ***6***. The Distortion Meter Operation Screen appears.
15. Using FIELD SELECT Keys, move cursor to INPUT.
16. Press ***DATA SCROLL*** ↑ until "SINAD/BER" is displayed in data field. Press ***ENTER***.
17. Move cursor to NOTCH FREQ and enter ***770***. Press ***ENTER***.
18. Move cursor to FILTER and press ***ENTER*** to select "Low Pass Filter Freq" field.
19. Move cursor to Low Pass Filter Freq field and enter ***10***. Press ***ENTER***.
20. Set Multifunction Synthesizer Amplitude to "A" value recorded in Step 12.
21. Disconnect coaxial cable from Audio Analyzer High Input and connect to Test Set SINAD/BER IN Connector.
22. Verify Test Set Distortion Meter reading is 18% (±2.0%, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.
23. Set Multifunction Synthesizer Amplitude to "B" value recorded in Step 12.
24. Verify Test Set Distortion Meter reading is 10% (±0.5%, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.

25. Set Multifunction Synthesizer Amplitude to "C" value recorded in Step 12.
26. Verify Test Set Distortion Meter reading is 1% (±0.5%, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.
27. Set Multifunction Synthesizer Frequency to 2400 Hz.
28. Set Audio Analyzer Frequency to 1000 Hz.
29. Use FIELD SELECT Keys to move cursor to NOTCH FREQ and enter ***1000***. Press ***ENTER***.
30. Set Multifunction Synthesizer Amplitude to "A" value recorded in Step 12.
31. Verify Test Set Distortion Meter reading is 18% (±2.0%, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.
32. Set Multifunction Synthesizer Amplitude to "B" value recorded in Step 12.
33. Verify Test Set Distortion Meter reading is 10% (±0.5%, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.
34. Set Multifunction Synthesizer Amplitude to "C" value recorded in Step 12.
35. Verify Test Set Distortion Meter reading is 1% (±0.5%, ±Least Significant Digit).
    - If reading is correct, go to Step 51.
    - If reading is out of tolerance, go to Step 36 to perform calibration of Distortion Meter.

CALIBRATION

36. Disconnect coaxial cable from Test Set SINAD/BER IN Connector and connect to Audio Analyzer High Input.
37. Set Multifunction Synthesizer controls as follows:

CONTROL	SETTING
Channel A	ON
Frequency	1800 Hz
Level	1 µV

38. Set Audio Analyzer controls as follows:

CONTROL	SETTING
Source Frequency	1000 Hz
Source Amplitude	6 V
Log/Linear	LOG
Input Float	GND
Output Float	GND
Source Impedance	50 Ω

39. Press RATIO on Audio Analyzer and verify 0.00 dB is displayed.
40. Set Audio Analyzer Source Amplitude to 1 mV.
41. Set Multifunction Synthesizer Amplitude to 8.5 V initially and adjust Multifunction Synthesizer Amplitude until 0.00 dB is displayed on Audio Analyzer. Record Amplitude setting.
42. Adjust Multifunction Synthesizer Amplitude until -20.0 dB (10%) is displayed on Audio Analyzer. Record Amplitude setting.
43. Set Audio Analyzer Amplitude to 6.0 V.
44. Disconnect coaxial cable from Audio Analyzer High Input and connect to Test Set SINAD/BER IN Connector.
45. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
46. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
47. Press ***5***. The Distortion Meter Calibration Screen appears.
48. Press ***ENTER*** to highlight "Proper Reading" field. Enter ***10*** and press ***ENTER***.
49. Press ***Ret F5*** and ***AUX F6*** to exit Calibration Menu. Disconnect test equipment from Test Set.
50. Return to Step 6 and repeat the verification portion of this calibration procedure.

END OF PROCEDURE

51. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-12.

1-11-12 SINAD METER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (Para 1-11-2) Func Gen Level and VRMS Meter Calibration (Para 1-11-4)
EQUIPMENT REQUIRED:	1 Audio Analyzer 1 Multifunction Synthesizer
FIGURE REFERENCES:	Figure 1-31

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

6. Connect test equipment as shown in Figure 1-31 (Test Set is connected to test equipment in Step 21).

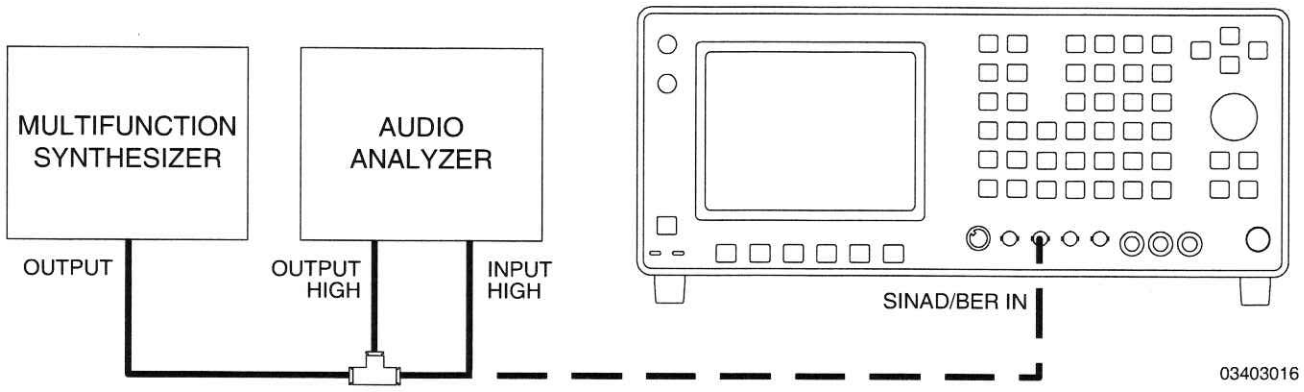


Figure 1-31 SINAD Meter Verification Hook-Up

7. Set Multifunction Synthesizer controls as follows:

CONTROL	SETTING
Channel A	ON
Frequency	3000 Hz
Level	1 μV

8. Set Audio Analyzer controls as follows:

CONTROL	SETTING
Source Frequency	770 Hz
Source Amplitude	6 V
Log/Linear	LOG
Input Float	GND
Output Float	GND
Source Impedance	50 Ω

9. Press RATIO on Audio Analyzer and verify 0.00 dB is displayed.
10. Set Audio Analyzer Source Amplitude to 1 mV.
11. Set Multifunction Synthesizer Amplitude to 8.5 V initially and adjust Multifunction Synthesizer Amplitude until 0.00 dB is displayed on Audio Analyzer. Record Amplitude setting.
12. Adjust Multifunction Synthesizer Amplitude until following values are displayed on Audio Analyzer. Record Amplitude settings.

A.	-4.74 dB (6 dB SINAD)
B.	-9.54 dB (10 dB SINAD)
C.	-11.70 dB (12 dB SINAD)
D.	-20.00 dB (20 dB SINAD)

13. Set Audio Analyzer Amplitude to 6.0 V.
14. Press ***MTRS*** and ***7***. The SINAD Meter Operation Screen appears.
15. Using FIELD SELECT Keys, move cursor to INPUT.
16. Press ***DATA SCROLL*** ↑ until "SINAD/BER" is displayed in data field. Press ***ENTER***.
17. Move cursor to NOTCH FREQ and enter ***770***. Press ***ENTER***.
18. Move cursor to FILTER and press ***ENTER*** to select "Low Pass Filter Freq" field.
19. Move cursor to Low Pass Filter Freq field and enter ***10***. Press ***ENTER***.
20. Set Multifunction Synthesizer Amplitude to "A" value recorded in Step 12.
21. Disconnect coaxial cable from Audio Analyzer High Input and connect to Test Set SINAD/BER IN Connector.
22. Verify Test Set SINAD Meter reading is 6 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
23. Set Multifunction Synthesizer Amplitude to "B" value recorded in Step 12.
24. Verify Test Set SINAD Meter reading is 10 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.

STEP	PROCEDURE

25. Set Multifunction Synthesizer Amplitude to "C" value recorded in Step 12.
26. Verify Test Set SINAD Meter reading is 12 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
27. Set Multifunction Synthesizer Amplitude to "D" value recorded in Step 12.
28. Verify Test Set SINAD Meter reading is 20 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
29. Set Multifunction Synthesizer Frequency to 2400 Hz.
30. Set Audio Analyzer Frequency to 1000 Hz.
31. Use FIELD SELECT Keys to move cursor to NOTCH FREQ and enter ***1000***. Press ***ENTER***.
32. Set Multifunction Synthesizer Amplitude to "A" value recorded in Step 12.
33. Verify Test Set SINAD Meter reading is 6 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
34. Set Multifunction Synthesizer Amplitude to "B" value recorded in Step 12.
35. Verify Test Set SINAD Meter reading is 10 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
36. Set Multifunction Synthesizer Amplitude to "C" value recorded in Step 12.
37. Verify Test Set Distortion Meter reading is 12 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.
38. Set Multifunction Synthesizer Amplitude to "D" value recorded in Step 12.
39. Verify Test Set Distortion Meter reading is 20 dB (±2.0 dB, ±Least Significant Digit).
    - If reading is correct, go to Step 55.
    - If reading is out of tolerance, go to Step 40 to perform calibration of SINAD Meter.

CALIBRATION

40. Disconnect coaxial cable from Test Set SINAD/BER IN Connector and connect to Audio Analyzer High Input.

41. Set Multifunction Synthesizer controls as follows:

CONTROL	SETTING
Channel A	ON
Frequency	1800 Hz
Level	1 μV

42. Set Audio Analyzer controls as follows:

CONTROL	SETTING
Source Frequency	1000 Hz
Source Amplitude	6 V
Log/Linear	LOG
Input Float	GND
Output Float	GND
Source Impedance	50 Ω

43. Press RATIO on Audio Analyzer and verify 0.00 dB is displayed.

44. Set Audio Analyzer Source Amplitude to 0.0 V.

45. Set Multifunction Synthesizer Amplitude to 8.5 V initially and adjust Multifunction Synthesizer Amplitude until 0.00 dB is displayed on Audio Analyzer. Record Amplitude setting.

46. Adjust Multifunction Synthesizer Amplitude until -9.54 dB (10 dB SINAD) is displayed on Audio Analyzer. Record Amplitude setting.

47. Set Audio Analyzer Amplitude to 6.0 V.

48. Disconnect coaxial cable from Audio Analyzer High Input and connect to Test Set SINAD/BER IN Connector.

49. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"

50. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.

51. Press ***6***. The SINAD Meter Calibration Screen appears.

52. Press ***ENTER*** to highlight "Proper Reading" field. Enter ***10*** and press ***ENTER***.

53. Press ***Ret F5*** and ***AUX F6*** to exit Calibration Menu. Disconnect test equipment from Test Set.

54. Return to Step 6 and repeat the verification portion of this calibration procedure.

END OF PROCEDURE

55. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
- If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-13.

1-11-13 OSCILLOSCOPE CALIBRATION

PREREQUISITES: Power-Up Check/Power Supply Calibration (Para 1-11-1)
Func Gen Level and VRMS Meter Calibration (Para 1-11-4)

EQUIPMENT REQUIRED:
1 50 Ω Termination
1 600 Ω Load
1 Calibrator
1 Digital Multimeter (DMM)
1 Extender Board (7010-7839-900)
1 Multifunction Synthesizer

FIGURE REFERENCES: Figure 1-32
Figure 1-33

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until 'YES" appears. Press ***ENTER***.

VERIFICATION

Oscilloscope Bandwidth

6. Connect Calibrator (Wide Band Output) and 50 Ω Termination to SCOPE IN Connector.
7. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Analyzer Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
8. Using FIELD SELECT Keys, move cursor to INPUT and enter ***7*** to set data field to "AC."
9. Press ***More F6*** until the label for Softkey F3 is "Sweep."
10. Press ***Sweep F3*** to highlight the Sweep Rate selection field. Press DATA SCROLL to set the sweep rate to "1 ms." Press ***ENTER***.
11. Set Calibrator controls as follows:

CONTROL	SETTING
Level	1 kHz
Amplitude	1.414 Vrms
Wide Band	ON

12. Adjust Calibrator level and Test Set vertical offset until the positive peak touches the line two major divisions up from the center and the negative peak is two major divisions down from the center. Record peak signal amplitude.

13. Set Calibrator frequency to 1 MHz.
14. Verify peak signal amplitude is >70.7% of setting in Step 12. (Each minor division is =10%.)
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, remove power from Test Set, disconnect test equipment and go to Step 32.
15. Disconnect Calibrator (Wide Band Output) and 50 Ω Termination from SCOPE IN Connector. Connect Calibrator (High/Low Output) to SCOPE IN Connector.

Oscilloscope Vertical Accuracy

16. Set Oscilloscope Scale on Test Set per Table 1-11 (use ***Scale F1*** and ***DATA SCROLL*** ↑ to make selections).
17. Set Level on Calibrator per Table 1-11.
18. Set Frequency on Calibrator to 1 kHz.
19. Verify vertical accuracy in Table 1-11.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, remove power from Test Set, disconnect test equipment and go to Step 32.

TEST SET	CALIBRATOR	VERTICAL ACCURACY	
SCALE (V/Div)	LEVEL (Vrms)	DISPLAY (P-P)	TOL
0.002	3.54 mV	10 mV	±1.6 mV
0.01	17.7 mV	50 mV	±4 mV
0.1	177 mV	500 mV	±40 mV
0.2	354 mV	1 V	±80 mV
0.5	884 mV	2.5 V	±200 mV
1.0	1.77 V	5 V	±400 mV
10.0	17.7 V	50 V	±4 V

Table 1-11 Oscilloscope Vertical Accuracy Verification

40 Vdc Coupling

20. Using FIELD SELECT Keys, move cursor to INPUT and enter ***9*** to set data field to "GND."
21. Move cursor to VERT and use ***DATA SCROLL*** Spinner to set ground reference 2 Major divisions from bottom graticule line. Press ***ENTER***.
22. Set Calibrator level to 40 Vdc.
23. Move cursor to INPUT and enter ***8*** to set data field to "DC."

24. Verify signal moves 4 major divisions (±2 minor divisions).
    - If reading is correct, proceed next step.
    - If reading is out of tolerance, remove power from Test Set, disconnect test equipment and go to Step 32.

Oscilloscope Horizontal Sweep Accuracy

25. Disconnect Calibrator from SCOPE IN Connector and connect Multifunction Synthesizer to SCOPE IN Connector.
26. Press ***Scale F1*** and use ***DATA SCROLL*** ↑ to select scale of "1 V/div." Press ***ENTER***.
27. Move cursor to VERT and use ***DATA SCROLL*** Spinner to center trace. Press ***ENTER***.
28. Set Oscilloscope Sweep on Test Set per Table 1-12 (use ***Sweep F3*** and ***DATA SCROLL*** ↑ to make selections).
29. Set Level on Multifunction Synthesizer to 5 Vp-p (2.5 Vp).
30. Set Frequency on Multifunction Synthesizer per Table 1-12.
31. Using Test Set Oscilloscope Markers on the left edge and the next equal crossing (≈9 divisions to the right), verify horizontal sweep accuracy in Table 1-12.
    - If reading is correct, go to Step 80.
    - If reading is out of tolerance, contact IFR Customer Service.

TEST SET	MULTIFUNCTION SYNTHESIZER	HORIZONTAL SWEEP ACCURACY
SWEEP (ms)	FREQ	
10	11.1 Hz	90 ms (±1 ms)
1.0	111.1 Hz	9 ms (±0.1 ms)
0.1	1.111 kHz	900 µs (±10 µs)
0.01	11.11 kHz	90 µs (±1 µs)

Table 1-12 Oscilloscope Horizontal Accuracy Verification

CALIBRATION

32. Install Digitizer PC Board Assembly (34A5A32) on Extender Board:
    - Remove Digitizer PC Board Assembly (34A5A32) (para 2-2-4).
    - Install Extender Board.
    - Install Digitizer PC Board Assembly (34A5A32) on Extender Board.
33. Power up Test Set. Verify 1-2-4 beep sequence.
34. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
35. Verify no "Board Inactive" messages appear in upper left hand corner of screen.

36. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
37. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Analyzer Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
38. Connect DMM positive lead to A32TP4 (Figure 1-32) and negative lead to A32TP16 (Figure 1-32).

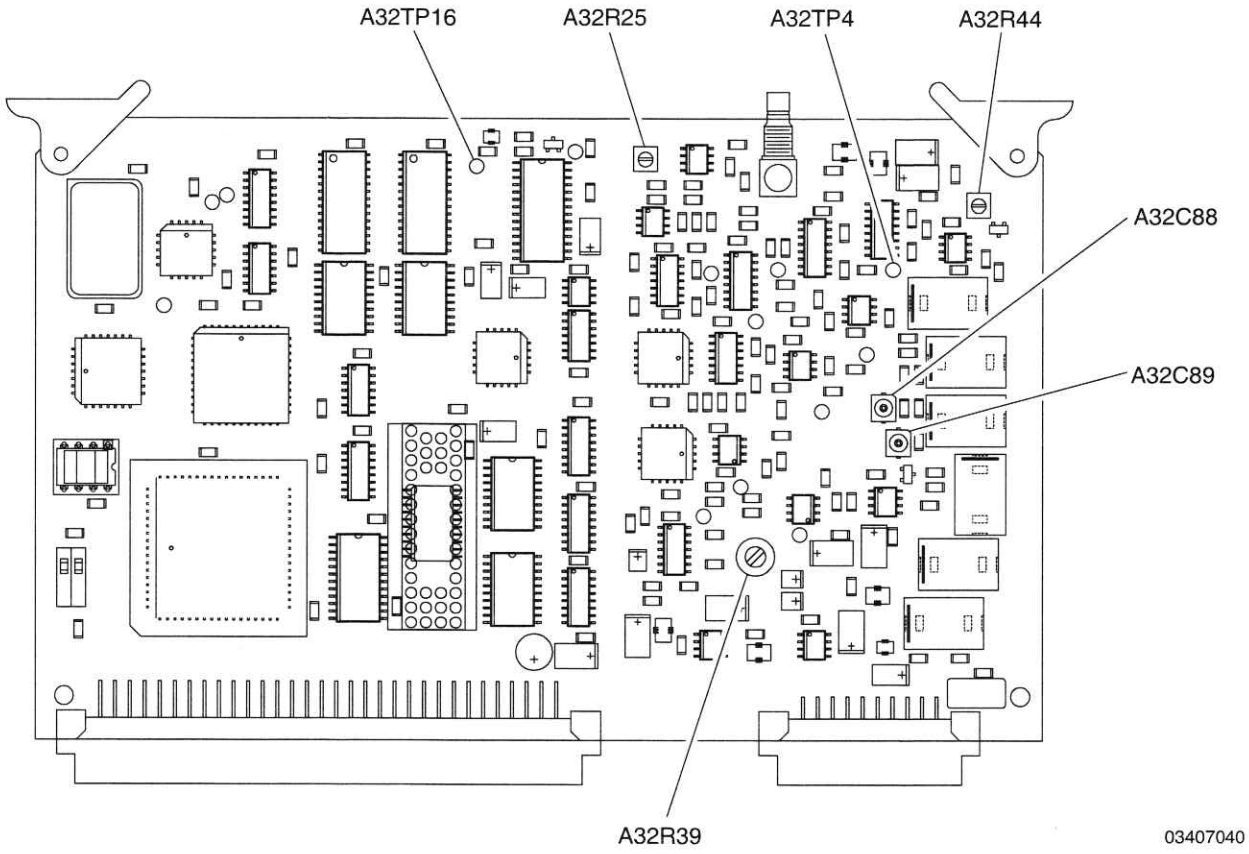


Figure 1-32 Digitizer PC Board Assembly (34A5A32) Calibration Points

39. Move cursor to INPUT and enter ***9*** to set data field to "GND."
40. Press ***Scale F1*** and use ***DATA SCROLL*** ↑ to set Scale data field to "10 mV." Press ***ENTER***.
41. Adjust, if needed, A32R44 (Figure 1-32) for 0.00 Vdc (±0.01 V) on DMM.
42. With cursor at Scale Selection field, press ***DATA SCROLL*** ↑ to select "2 mV." Press ***ENTER***.
43. Adjust, if needed, A32R39 (Figure 1-32) for 0.00 Vdc (±0.01 V) on DMM.

44. Connect test equipment to Test Set as shown in Figure 1-33.

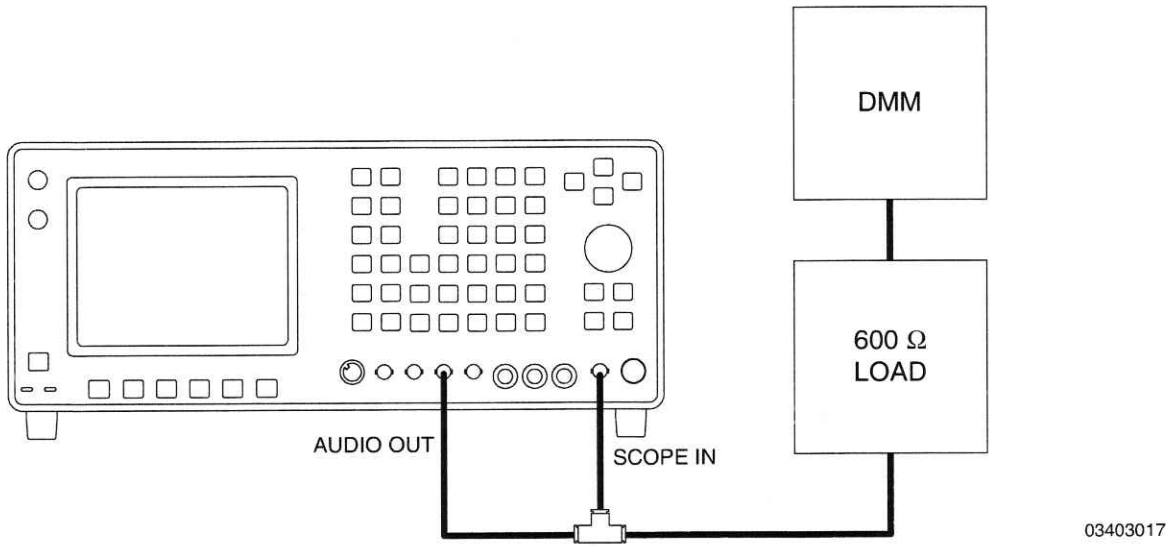


Figure 1-33 Oscilloscope Calibration Hook-Up

45. Press ***AF GEN***. AF Generator Operation Screen is displayed on Test Set.
46. Press ***SETUP***.
47. Press ***5*** to activate the AF Output Setup submenu. Press ***5*** to turn off Proportional Output.
48. Press ***AF GEN*** to return to AF Generator Operation Screen.
49. Using FIELD SELECT Keys, move cursor to GEN 1 and press ***ENTER*** to set data field to "On."
50. Move cursor to WAVE (for GEN 1) and press ***DATA SCROLL*** ↑ to select "Sine." Press ***ENTER***.
51. Move cursor to AF (for GEN 1) and enter ***1000***. Press ***ENTER***.
52. Move cursor to GEN 2 and press ***ENTER*** to set AF Generator 2 to "Off."
53. Move cursor to LEVEL and enter ***•0424*** (0.0424 V). Press ***ENTER***.
54. Press ***ENTER*** to activate Level data field. Press ***DATA SCROLL*** → to move cursor to least significant digit. Use ***DATA SCROLL*** Spinner, as required, to adjust output for 42.43 mVrms (±0.12 mV) on DMM. Press ***ENTER***.
55. Press ***SCOPE/ANLZ***. Oscilloscope Operation Screen is displayed on Test Set.
56. Press ***Scale F1*** and press ***DATA SCROLL*** ↑ to select "20 mV." Press ***ENTER***.
57. Using FIELD SELECT Key, move cursor to INPUT and press ***7*** to select "AC" (ensure that the trigger source is set to Int [internal]).
58. Press ***Sweep F3*** and press ***DATA SCROLL*** ↑ to select "100 µs." Press ***ENTER***.
59. Move cursor to TRIG press ***DATA SCROLL*** ↑ to select "Auto." Press ***ENTER***.

60. Press ***Horiz F4*** and enter ***0***. Press ***ENTER***.
61. Press ***Vert F2*** and use ***DATA SCROLL*** Spinner to vertically center waveform. Press ***ENTER***.
62. Move cursor to TRIG LVL and use ***DATA SCROLL*** Spinner to position trace start on center graticule.
63. One cycle is displayed on Test Set. Press ***ENTER***.
64. Verify 120 mVp-p (±8 mV). If necessary, adjust A32R25 (Figure 1-32) to correct for vertical amplitude.
65. Press ***AF GEN***. AF Generator Operation Screen is displayed on Test Set.
66. Move cursor to WAVE (for GEN 1) and press ***DATA SCROLL*** ↑ to select "Square." Press ***ENTER***.
67. Move cursor to LEVEL enter ***1•0605***. Press ***ENTER***.
68. Press ***SCOPE/ANLZ***. Oscilloscope Operation Screen is displayed on Test Set.
69. Press ***Scale F1*** and press ***DATA SCROLL*** ↑ to select "500 mV." Press ***ENTER***.
70. Adjust A32C88 (Figure 1-32), as required, until square wave shape is displayed with no overshoot or undershoot.
71. Press ***Scale F1*** and press ***DATA SCROLL*** ↑ to select "1 V." Press ***ENTER***.
72. Adjust C32C89 (Figure 1-32), as required, until square wave shape is displayed with no overshoot or undershoot.
73. Repeat Steps 69 through 72 until no further adjustments are required.
74. Perform the following:
    - Remove power from Test Set and disconnect test equipment.
    - Remove Digitizer PC Board Assembly (34A5A32) from Extender Board.
    - Remove Extender Board.
    - Install Digitizer PC Board Assembly (34A5A32) (para 2-2-4).
75. Power up Test Set. Verify 1-2-4 beep sequence.
76. Verify start-up screen appears. Verify space balls are moving in elliptical orbits.
77. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
78. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
79. Return to Step 6 and, again, perform the verification portion of this calibration procedure.

END OF PROCEDURE

80. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-14.

1-11-14 DIGITAL MULTIMETER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (Para 1-11-2)
EQUIPMENT REQUIRED:	1 Calibrator 1 Digital Multimeter (DMM)
FIGURE REFERENCES:	Figure 1-34 Figure 1-35

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

AC Volts

6. Connect Calibrator (Output High) to DMM VΩ Connector and Calibrator (Output Low) to DMM COM Connector.
7. Set Frequency and Level on Calibrator per Table 1-13.
8. Press ***MTRS***, ***SHIFT*** and ***A***. Multimeter Operation Screen is displayed on Test Set.
9. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "ACV." Press ***ENTER***.
10. Set Meter Range on Test Set per Table 1-13.
11. Verify AC Volts in Table 1-13.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 35.

CALIBRATOR		TEST SET	TOL
FREQ (Hz)	LEVEL (VAC)	RANGE (VAC)	
50	0.0105	0.2	±5% of Full Scale, ±LSD
1000	0.15	0.2	
1000	1.5	2.0	
1000	15	20	
1000	100	200	
50	450	2000	
50	7	20	
400	7	20	
1000	7	20	
3000	7	20	
10000	7	20	
20000	7	20	
20000	0.0105	0.2	

Table 1-13 AC Volts Verification

DC Volts

12. Set Level on Calibrator per Table 1-14.
13. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "DCV." Press ***ENTER***.
14. Set Meter Range on Test Set per Table 1-14 (concurrently with Calibrator settings being performed in Step 12).
15. Verify DC Volts in Table 1-14.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 35.

TEST SET	CALIBRATOR	TOL
RANGE (Vdc)	LEVEL (Vdc)	
0.2	0.0025	±1% of Full Scale, ±LSD
0.2	0.15	
2.0	1.5	
20	15	
200	150	
2000	800	
2000	1000	

Table 1-14 DC Volts Verification

Ohms

16. Set Resistance on Calibrator per Table 1-15.
17. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "Ohm." Press ***ENTER***.
18. Set Meter Range on Test Set per Table 1-15 (concurrently with Calibrator settings being performed in Step 16).
19. Verify resistance in Table 1-15.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 35.

TEST SET	CALIBRATOR	TOL
RANGE (kΩ)	RESISTANCE (kΩ)	
0.2	0.1	±5% of Full Scale, ±LSD or ±0.1 Ω (whichever is greater)
2.0	1	
20	10	
200	100	
2000	1000	
20000	10000	

Table 1-15 Ohms Verification

DC Current

20. Disconnect Calibrator (Output High) from DMM VΩ Connector.
21. Connect Calibrator (Output High) to DMM AMP Connector.
22. Set DC Current Level on Calibrator per Table 1-16.
23. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "DCC." Press ***ENTER***.
24. Set Meter Range on Test Set per Table 1-16 (concurrently with Calibrator settings being performed in Step 22).
25. Verify DC Current in Table 1-16.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 35.

TEST SET	CALIBRATOR	TOL
RANGE (AMPS)	**LEVEL (AMPS)**	
0.02	0.00105	±5% of Full Scale, ±LSD or ±0.1 mA (whichever is greater)
0.02	0.015	
0.2	0.15	
2	1.5	
2	1.8	

Table 1-16 DC Current Verification

AC Current

26. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "ACC." Press ***ENTER***.
27. Set Frequency on Calibrator to 60 Hz.
28. Verify AC Current in Table 1-17.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 35.

TEST SET	CALIBRATOR	TOL
RANGE (AMPS)	**LEVEL (AMPS)**	
2	1.8	±0.1 A, ±LSD or ±0.1 mA (whichever is greater)

Table 1-17 AC Current Verification

Input Load

29. Disconnect Calibrator from DMM COM Connector and DMM AMP Connector.
30. Connect external Digital Multimeter positive lead and negative lead to the Test Set DMM VΩ Connector and DMM COM Connector, respectively.
31. Set Load on Test Set per Table 1-18.
32. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "ACV." Press ***ENTER***.
33. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "2.0 V." Press ***ENTER***.
34. Verify input loads in Table 1-18.
    - If reading is correct, proceed to Step 73.
    - If reading is out of tolerance, contact IFR Customer Service.

TEST SET	TOL
LOAD (Ω)	(Ω)
1E6	±100000
150	±7.5
600	±30

Table 1-18 Input Load Verification

CALIBRATION

35. Remove power from Test Set and disconnect test equipment.
36. Remove DMM Assembly (34A5A11) from Test Set (2-2-5).
37. Remove cover from DMM Assembly (34A5A11) and reconnect A11A1W2P1/A3A1J1 (Figure 1-2).
38. Connect external Digital Multimeter positive lead to A11A2TP1 (Figure 1-34) and negative lead to A11A2TP3 (Figure 1-34).
39. Power up Test Set. Verify 1-2-4 beep sequence.
40. Verify start-up screen appears. Verify space balls are moving in elliptical orbits.
41. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
42. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
43. Press ***MTRS***, ***SHIFT*** and ***A***. Digital Multimeter Operation Screen appears on Test Set.
44. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "Ohm." Press ***ENTER***.
45. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "20 kΩ". Press ***ENTER***.
46. Verify 1.00 Vdc (±0.05 Vdc) is displayed on external Digital Multimeter. Adjust A11A2R13 (Figure 1-34) if needed.

47. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "DCV." Press ***ENTER***.
48. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "20 V." Press ***ENTER***.
49. Verify 100 mV (±0.5 mV) is displayed on external Digital Multimeter. Adjust A11A2R16 (Figure 1-34) if needed.
50. Disconnect external Digital Multimeter positive lead from A11A2TP1 (Figure 1-34) and negative lead from A11A2TP3 (Figure 1-34). Connect Calibrator to DMM VΩ Connector.
51. Set Calibrator output to 100 kΩ.

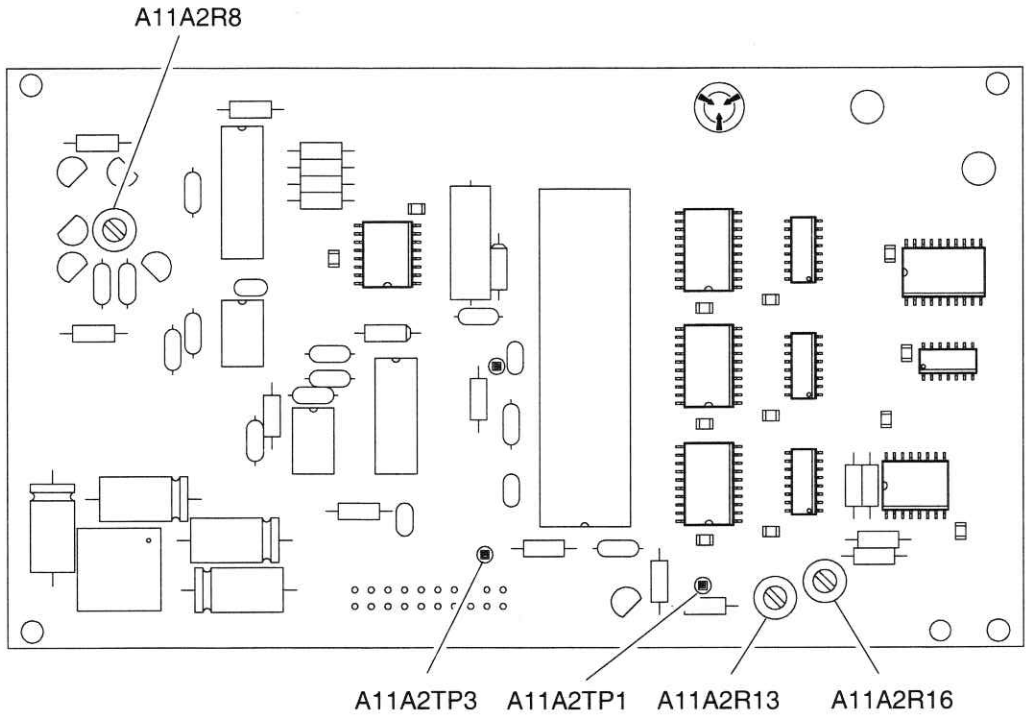


Figure 1-34 DMM Digital PC Board Assembly (34A5A11A2) Calibration Points

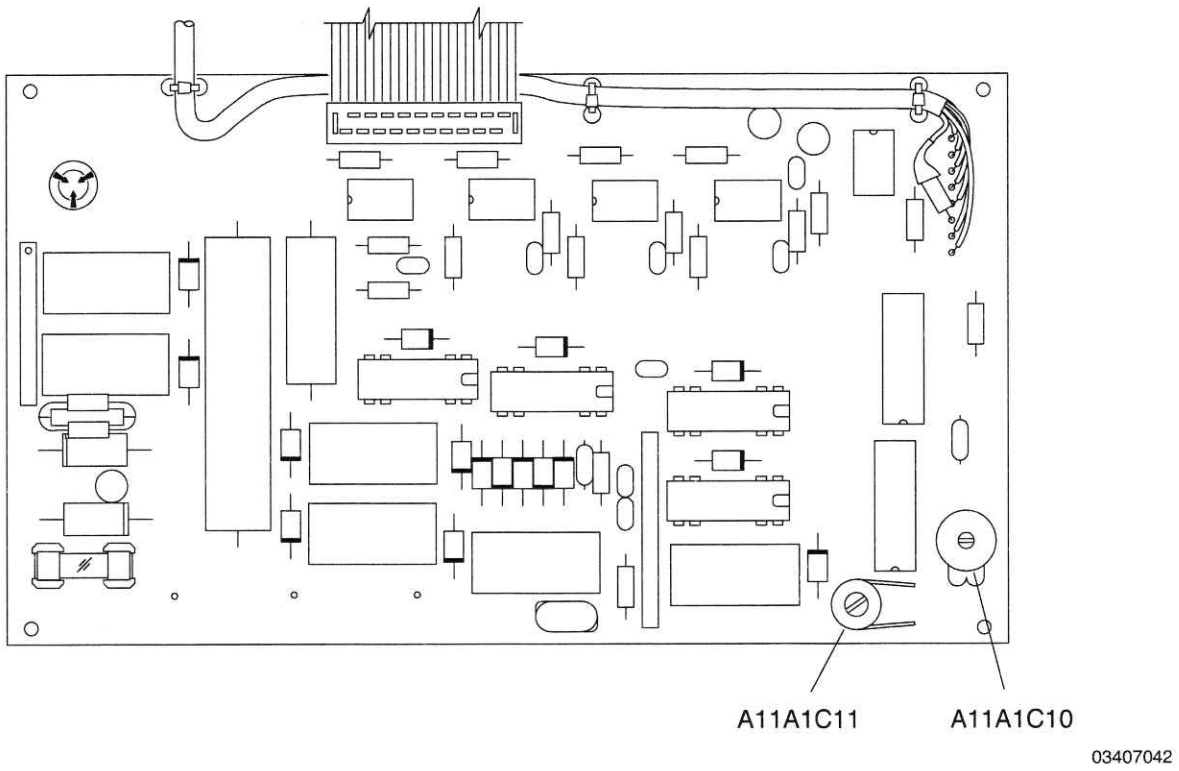


Figure 1-35 DMM Relay PC Board Assembly (34A5A11A2) Calibration Points

52. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "Ohm." Press ***ENTER***.
53. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "200 kΩ." Press ***ENTER***.
54. Verify meter reading is 100 kΩ (±10 kΩ).
55. Set Calibrator output to 1 kΩ.
56. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "2 kΩ." Press ***ENTER***.
57. Verify meter reading is 1 kΩ (±100 Ω).
58. Adjust, if needed, A11A2R8 (Figure 1-34) to obtain proper measurement between both ranges.
59. Press ***Func F1*** and press ***DATA SCROLL*** ↑ to set MULTIMETER to "ACV." Press ***ENTER***.
60. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "20 V." Press ***ENTER***.
61. Set Calibrator output to 20 kHz Sine Wave at 7 Vrms.
62. Verify meter reading is 7 V (±1 V). Adjust, if necessary, A11A1C11 (Figure 1-35) to obtain proper level

AC V accuracy applies for AC Volts multiplied by kHz frequency product. Resultant should be <140.

63. Set Calibrator output to 20 kHz Sine Wave at 1 Vrms.
64. Press ***Range F2*** and press ***DATA SCROLL*** ↑ to set RANGE to "2 V." Press ***ENTER***.
65. Verify meter reading is 1 V (±0.1 V). Adjust, if necessary, A11A1C10 (Figure 1-35) to obtain proper level.

AC V accuracy applies for AC Volts multiplied by kHz frequency product. Resultant should be <140.

66. Repeat Steps 59 through 65 for best overall response.
67. Perform the following:
    - Remove power from Test Set and disconnect test equipment.
    - Disconnect A11A1W2P1/A3A1J1 (Figure 1-2).
    - Install cover on DMM Assembly (34A5A11).
    - Install DMM Assembly (34A5A11) (para 2-2-5).
68. Power up Test Set. Verify 1-2-4 beep sequence.
69. Verify start-up screen appears. Verify space balls are moving in elliptical orbits.
70. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
71. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
72. Return to Step 6 and, again, perform the verification portion of this calibration procedure.

END OF PROCEDURE

73. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-15.

1-11-15 SPECTRUM ANALYZER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Oscilloscope Calibration (Para 1-11-13)
EQUIPMENT REQUIRED:	1 10 MHz Frequency Standard 1 Digital Multimeter (DMM) 1 Extender Board (7010-7839-600) 1 Measuring Receiver with Sensor 1 RF Signal Generator
FIGURE REFERENCES:	Figure 1-36 Figure 1-38 Figure 1-39

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

VERIFICATION

Scan Width Accuracy

6. Connect test equipment as shown in Figure 1-36.

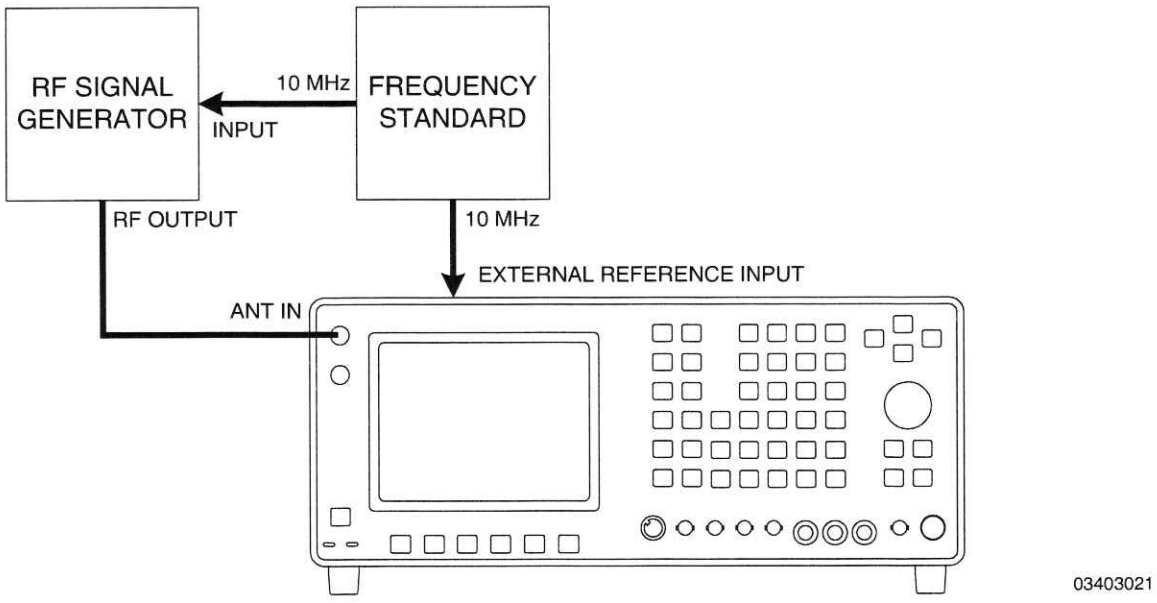


Figure 1-36 Spectrum Analyzer Calibration Hook-Up

7. Set RF Signal Generator controls as follows:

CONTROL	SETTING
Center Frequency	500 MHz
Level	-40 dBm

8. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Oscilloscope Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
9. Using FIELD SELECT Keys, move cursor to RF and enter ***500***. Press ***ENTER***.
10. Set Scan Width on Test Set per Table 1-19.
11. Press ***More F6*** until label for Softkey F1 changes to "Norm" appears. Press ***Norm F1***.
12. Set Offset Frequency on RF Signal Generator per Table 1-19.
13. Verify scan width accuracy in Table 1-19.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, go to Step 28.

TEST SET	**RF SIGNAL GENERATOR**	**SCAN WIDTH ACCURACY**
SCAN WIDTH (FREQ/DIV)	**OFFSET FREQUENCY**	**TOL**
1 kHz	±4 kHz	±0.5 kHz
2 kHz	±8 kHz	±1 kHz
5 kHz	±20 kHz	±2.5 kHz
10 kHz	±40 kHz	±5 kHz
20 kHz	±80 kHz	±10 kHz
50 kHz	±200 kHz	±25 kHz
100 kHz	±400 kHz	±50 kHz
200 kHz	±800 kHz	±100 kHz
500 kHz	±2 MHz	±250 kHz
1 MHz	±4 MHz	±500 kHz
10 MHz	±40 MHz	±5 MHz
100 MHz	±400 MHz	±50 MHz
200 MHz	±800 MHz	±100 MHz

Table 1-19 Spectrum Analyzer Scan Accuracy Verification

14. Set RF Signal Generator center frequency to 1500 MHz.
15. Move cursor to RF and enter ***1500***. Press ***ENTER***.
16. Repeat Steps 10 through 13.

Spectrum Analyzer Bandwidth Agreement

17. Set RF Signal Generator center frequency to 855.5 MHz.
18. Set Bandwidth on Test Set per Table 1-21.
19. Press ***More F6*** until label on Softkey F2 changes to "2 dB." Press ***2dB F2***. The Units/Div indicator at bottom left of screen changes to "2 dB" and Analyzer scale changes to 2 dB per vertical division.
20. Set RF Signal Generator level to -40 dBm.
21. Press ***Ref lvl F4*** and use ***DATA SCROLL*** Spinner to adjust display, as required, for a center screen reference.
22. Verify bandwidth agreement per Table 1-20.
    - If reading is correct, proceed to next step.
    - If reading out of tolerance, go to Step 28.

TEST SET	BANDWIDTH AGREEMENT
BANDWIDTH (selected by Scan Width setting)	**TOL (dB)**
3 MHz (select 10 MHz Scan)	<3
300 kHz (select 1 MHz Scan)	<2
30 kHz (select 50 kHz Scan)	<2
3 kHz (select 5 kHz Scan)	<2
0.3 kHz (select 1 kHz Scan)	<3

Table 1-20 Spectrum Analyzer Bandwidth Agreement Verification

Spectrum Analyzer Level Accuracy

23. Press ***More F6*** until label for Softkey F1 changes to "Norm" and press ***Norm F1***.
24. Press ***More F6*** until label for Softkey F3 changes to "Scan" and press ***Scan F3***. Press ***DATA SCROLL*** ↑ to select "50 kHz" and press ***ENTER***.
25. Press ***More F6*** until label on Softkey F2 changes to "10 dB." Press ***10dB F2***. The Units/Div indicator at bottom left of screen changes to "10 dB" and Analyzer scale changes to 10 dB per vertical division.
26. Set level on RF Signal Generator per Table 1-21.

27. Verify level accuracy in Table 1-21.

Frequency may be varied to desired user needs.

- If reading is correct, go to Step 75.
- If reading is out of tolerance, proceed to next step.

RF SIGNAL GENERATOR	LEVEL ACCURACY
LEVEL (dBm)	TOL (dB)
-30 -40 -50 -60 -70 -80	±4 (50 to 400 MHz, Normalized) or ±5 (400 MHz to 2 GHz, Normalized)

Table 1-21 Spectrum Analyzer Level Accuracy Verification

CALIBRATION

28. Remove power from Test Set and disconnect test equipment.
29. Install Analyzer Log/IF PC Board Assembly (34A5A7A1) on Extender Board:
    - Remove Analyzer Log/IF Assembly (34A5A7) (para 2-2-6).
    - Remove 2 screw (1) from enclosure (2) (Figure 1-37).
    - Remove Analyzer Log/IF PC Board Assembly (34A5A7A1) (4) from enclosure (2) (Figure 1-37).
    - Remove two nuts and washers (3) (Figure 1-37).
    - Remove enclosure cover (5) (Figure 1-37).
    - Install Extender Board.
    - Install Analyzer Log/IF PC Board Assembly (34A5A7A1) on Extender Board.
30. Power up Test Set. Verify 1-2-4 beep sequence.
31. Verify start-up screen appears. Verify space balls are moving in elliptical orbits.
32. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
33. Allow Test Set to warm up for 2 hours before continuing with this calibration procedure.
34. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

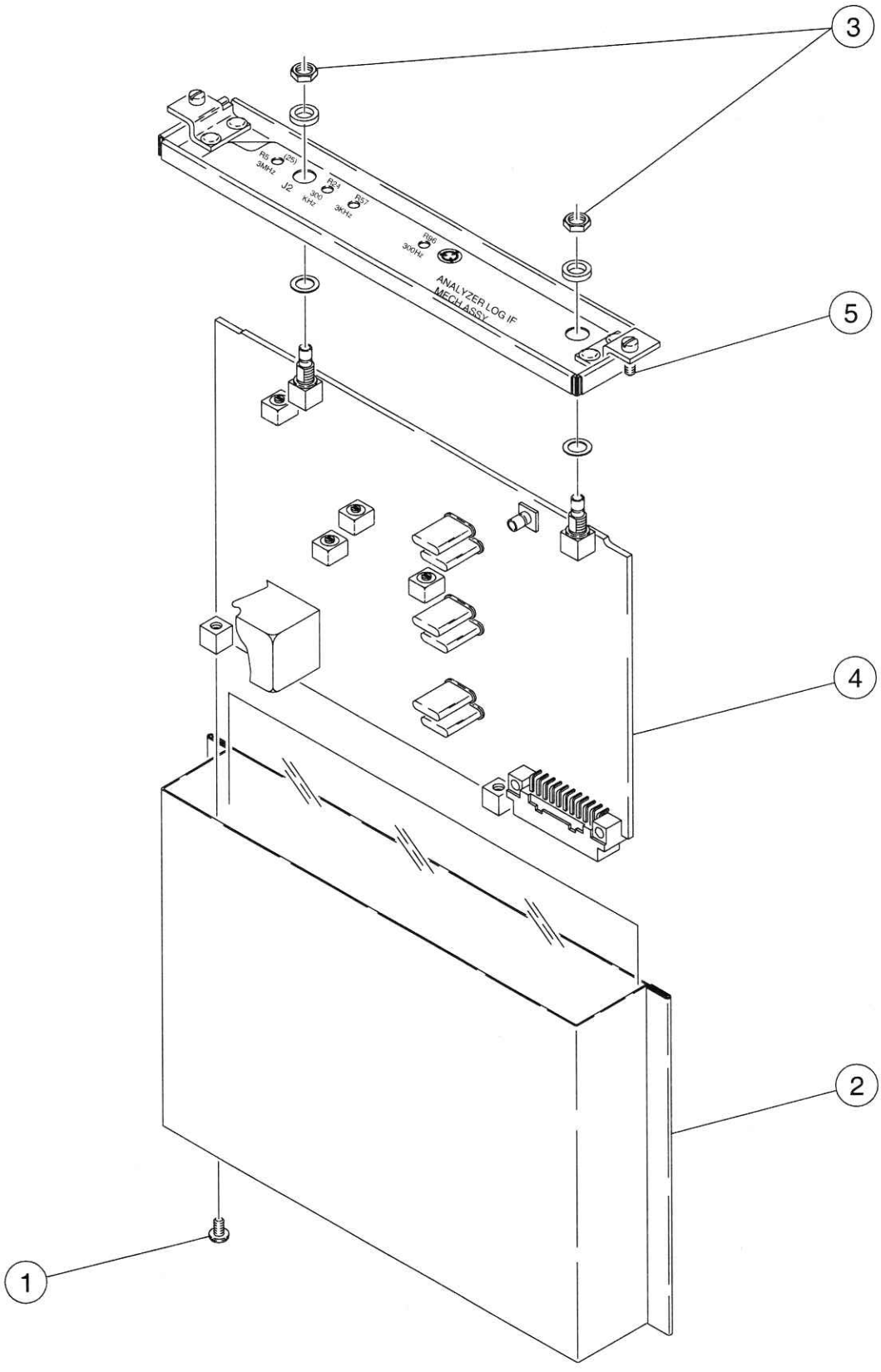


Figure 1-37 Analyzer Log/IF PC Board Assembly (34A5A7A1) Removal

STEP	PROCEDURE

Logarithmic Amplifier

35. Calibrate Measuring Receiver RF Power Meter and Tuned RF Level Meter at 10.7 MHz.
36. Connect RF Signal Generator to A7J2 (Figure 1-38).
37. Set RF Signal Generator to 10.7 MHz at -30 dBm with no modulation.
38. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Oscilloscope Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
39. Using FIELD SELECT Keys, move cursor to RF and enter ***120***. Press ENTER.
40. Press ***More F6*** until label for Softkey F3 changes to "Scan" and press ***Scan F3***. Press ***DATA SCROLL*** ↑ to select "50 kHz" and press ***ENTER***.
41. Connect Measuring Receiver to A7A1TP1 (Figure 1-38).
42. Adjust A7A1R5 (Figure 1-38), as necessary, until -48 dBm is displayed on Measuring Receiver.
43. Connect Digital Multimeter to A7A1TP3 (Figure 1-38).
44. Adjust A7A1R179 (ANALYZER VIDEO GAIN) (Figure 1-38), as necessary, until 1.380 Vdc (±5 mV) is displayed on Digital Multimeter. (Normally 1.4 Vdc; this point is characteristically 1 dB low.)
45. Set RF Signal Generator level to -80 dBm.
46. Adjust A7A1R182 (ANALYZER VIDEO OFFSET) (Figure 1-38), as necessary, until 0.4 Vdc (±5 mV) is displayed on Digital Multimeter.
47. Repeat Steps 44 through 46 until the top seven major division lines meet the appropriate value (±20 mV, 1 dB).

Normalizer

48. Adjust RF Signal Generator level until 1.4 Vdc (±1 mV) is displayed on Digital Multimeter.
49. Press ***More F6*** until label of Softkey F1 changes to "Norm." Press ***Norm F1***.
50. Disconnect RF Signal Generator from A7J2 (Figure 1-38).
51. Disconnect coaxial cable from A8J3 (Figure 1-39).
52. Connect extended coaxial cable between A7J2 (Figure 1-38) and A8J3 (Figure 1-39).
53. Set RF Signal Generator to 120.0000 MHz at -40 dBm with no modulation.
54. Calibrate Measuring Receiver Tuned RF Power Meter at 120.0000 MHz. Check level in Step 53.
55. Connect RF Signal Generator to ANTENNA IN Connector.
56. Adjust A7A1R5 (Figure 1-38), as necessary, until signal is displayed on the -40 dBm line (first major division from top).

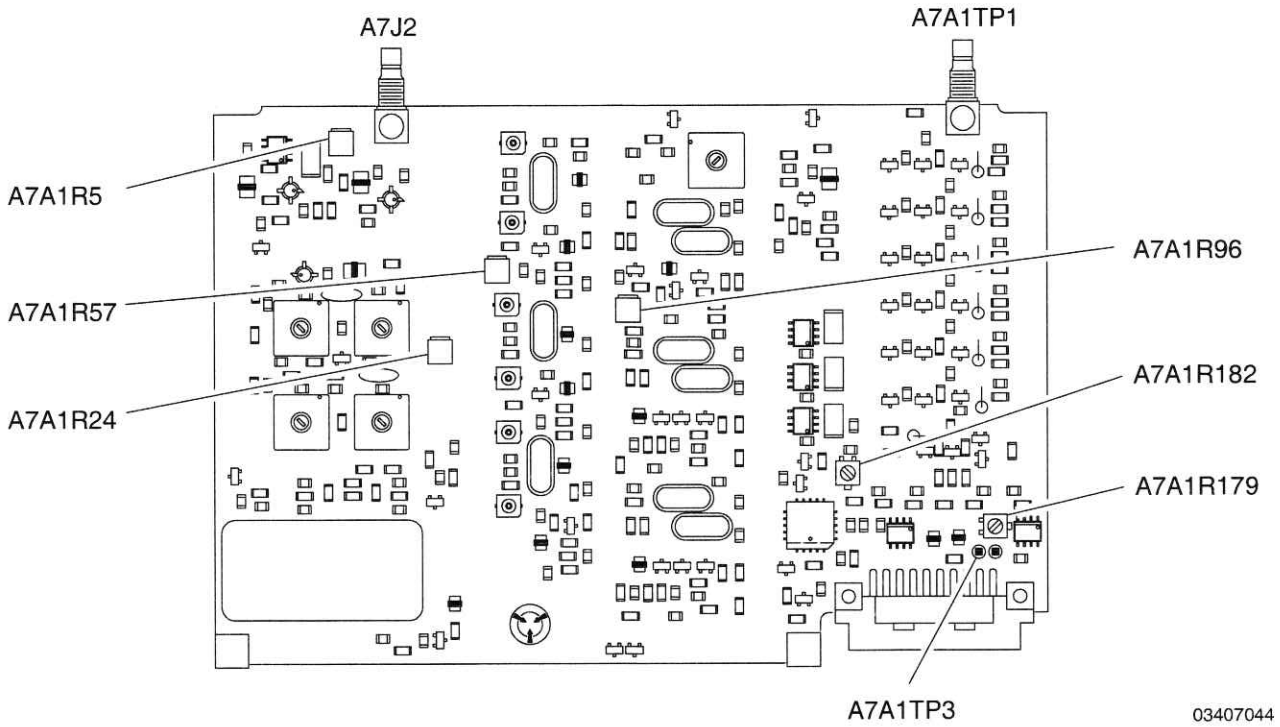


Figure 1-38 Analyzer Log/IF PC Board Assembly (34A5A7A1) Calibration Points

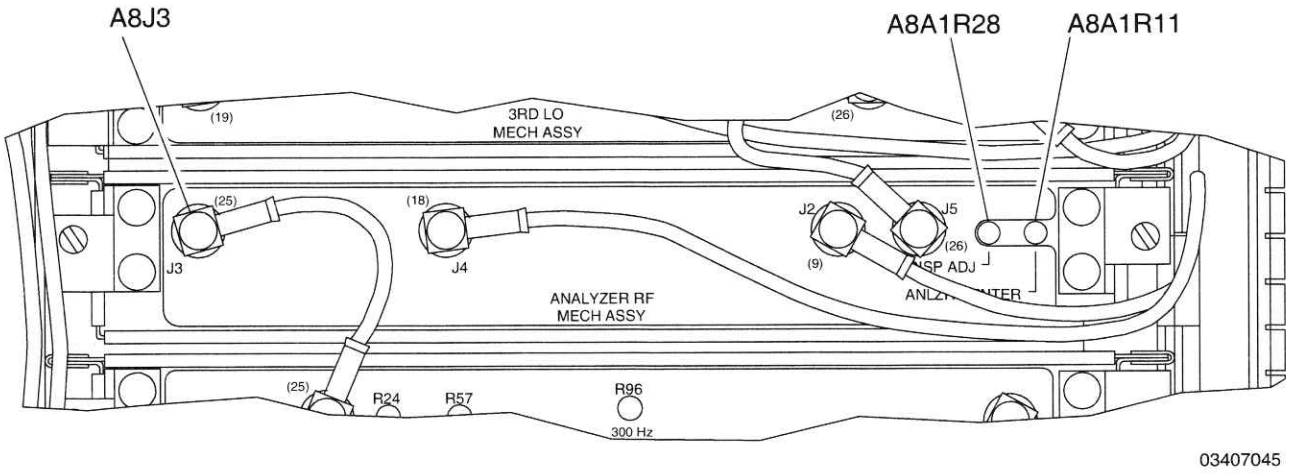


Figure 1-39 Analyzer RF Assembly (34A5A8A1) Calibration Points

Dispersion

57. Press ***RF GEN***. RF Generator Operation Screen is displayed on Test Set.
58. Using FIELD SELECT Keys, move cursor to LEVEL. Enter ***0*** and press ***ENTER***.
59. Press ***More F6*** until label of Softkey F1 changes to "Disp." Press ***Disp F1*** and ***2*** to select full spectrum analyzer display.
60. Press ***More F6*** until label of Softkey F5 changes to "Scan." Press ***Scan F5***.
61. Use DATA SCROLL Keys and ENTER Key to set Scan Width data field to "20 kHz" and then "200 kHz," compromising the centering error between the two settings with A8A1R11 (Figure 1-39).
62. Using FIELD SELECT Keys, move cursor to SOURCE. Press ***ENTER***. Use DATA SCROLL Keys to select Source 1. Use DATA SCROLL Keys to set MOD to "FM." Press ***ENTER***.
63. Move cursor to DEVIATION and enter ***65***. Press ***ENTER***.
64. Move cursor to AF FREQ and enter ***20000***. Press ***ENTER***.
65. Press ***More F6*** until label of Softkey F5 changes to "Scan." Press ***Scan F5***.
66. Use DATA SCROLL Keys and ENTER Key to set Scan Width data field to 10 kHz and then 20 kHz, compromising the dispersion error between the two settings with A8A1R28 (Figure 1-39). (On 10 kHz, the displayed spurs are every other division; on 20 kHz, displayed spurs are every division.)
67. Using FIELD SELECT Keys, move cursor to SOURCE. Press ***ENTER***. Use DATA SCROLL Keys to select Source 1. Use DATA SCROLL Keys to set MOD to "OFF." Press ***ENTER***.
68. Press ***Scan F5*** and press ***DATA SCROLL*** ↑ to select "1 kHz" and press ***ENTER***.
69. Alternate between RF Generator Operation Screen and Calibration Screen (16. Anlz Horz Offset) until signal is centered on RF Generator Operation Screen:
    - Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
    - Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***, ***D***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
    - Move cursor to "16. Anlz Horz Offset" and press ***ENTER***. Use DATA SCROLL Keys to set data field to desired level. Press ***ENTER***.
    - Press ***RF GEN***. RF Generator Operation Screen is displayed on Test Set.
    - Verify signal is centered on RF Generator Operation Screen.
    - Repeat as required.

Spectrum Analyzer Bandwidth Agreement

70. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Oscilloscope Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
71. Press ***More F6*** until label of Softkey F3 changes to "Scan." Press ***Scan F3*** and press ***DATA SCROLL*** ↑ to select "50 kHz." Press ***ENTER***.

72. Using the 50 kHz/Div range (30 kHz Resolution Bandwidth) as a reference, change scan widths and compare displayed amplitude differences. Perform adjustments as shown in Table 1-22 to achieve the specified agreement between the other resolution bandwidths and the displayed 30 kHz resolution bandwidth reference amplitude.

TEST SET		TOL	ADJUSTMENT
RESOLUTION BANDWIDTH (MHz)	**SCAN WIDTH (/DIV)**		**(Figure 1-38)**
3 MHz	10 MHz	<3dB	Appendix B
300 kHz	1 MHz	<2dB	A7A1R24
30 kHz	50 kHz	<2dB	(Reference)
3 kHz	5 kHz	<2dB	A7A1R57
300 Hz	1 kHz	<3dB	A7A1R96

Table 1-22 Spectrum Analyzer Bandwidth Adjustments

73. Perform the following:
    - Remove power from Test Set and disconnect test equipment.
    - Remove Analyzer Log/IF PC Board Assembly (34A5A7A1) from Extender Board.
    - Remove Extender Board.
    - Install Analyzer Log/IF PC Board Assembly in enclosure. (Reverse procedure as detailed in Step 29.)
    - Install Analyzer Log/IF Assembly (2-2-6).
74. Return to Step 1 and repeat verification portion of this calibration procedure.

END OF PROCEDURE

75. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-16.

1-11-16 SIGNAL STRENGTH METER CALIBRATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (para 1-11-2)
EQUIPMENT REQUIRED:	1 RF Signal Generator
FIGURE REFERENCES:	None

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
6. Press ***RCVR***. Receive Operation Screen is displayed on Test Set.
7. Using FIELD SELECT Keys, move cursor to RF and enter ***855•5***. Press ***ENTER***.

   RF Signal Generator frequency may be varied to desired user needs.

8. Connect RF Signal Generator output to ANTENNA IN Connector.
9. Set RF Signal Generator output for 855.5 MHz at -33 dBm.
10. Verify signal is <100. If correct, proceed to next step. If out of tolerance, go to Step 13.
11. Set RF Signal Generator output for 855.5 MHz at -30 dBm.
12. Verify signal is >97. If correct, go to Step 18. If out of tolerance, go to next step.
13. Press ***MTRS***, ***AUX F6*** and ***1***. A small window appears displaying the prompt: "Enter Password:"
14. Press ***SHIFT***, ***C***, ***S***, ***M***, ***A***, ***T***, ***E***. Press ***SHIFT*** and ***ENTER***. The Host Calibration Menu appears on the screen.
15. Press ***7***. The Signal Strength Meter Calibration Screen appears.
16. Press ***ENTER*** to highlight "Proper Reading:" data field. Enter ***100***. Press ***ENTER***.
17. Press Ret F5 and AUX F6.
18. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to para 1-11-17.

1-11-17 POWER METER VERIFICATION

PREREQUISITES: Power-Up Check/Power Supply Calibration (para 1-11-1)
Metering DVM Calibration (para 1-11-2)

EQUIPMENT REQUIRED:

1	1 GHz Low-Pass Filter
1	1 GHz 100 W RF Amplifier
1	10 dB (10 W) Attenuator
1	2 GHz 100 W RF Amplifier
1	2.2 GHz Low-Pass Filter
1	50 Ω Microwave Coaxial Cable
1	50 Ω Termination
1	700 MHz Low-Pass Filter
2	Directional Coupler (#1 and #2)
1	Measuring Receiver with Sensor
1	RF Signal Generator
1	Triple Stub Tuner

FIGURE REFERENCES: Figure 1-40
(Table 1-23, Table 1-24, Table 1-25)

Equipment used to present power to the Test Set for Verification must comply with the following criteria:

- Source must present >30 dB return loss to the Test Set input.
- All spurious signals, other than the desired (harmonic or non-harmonic), must be ≤-40 dBc relative to the desired signal.

The Reflected Connector on the Directional Coupler should be terminated to 50 Ω when this procedure is being performed.

STEP	PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.

6. Using the RF Signal Generator and the Measuring Receiver, record the Forward Coupled Connector Attenuation in Table 1-23.

EQUIPMENT	489.990 MHz	879.990 MHz	1960.020 MHz
DIRECTIONAL COUPLER #1			
DIRECTIONAL COUPLER #2			

Table 1-23 Directional Coupler Forward Coupled Connector Attenuation

HOST Power Meter

7. Press ***RCVR***. Receiver Operation Screen is displayed on Test Set.
8. Using FIELD SELECT Keys, move cursor to RF IN. Press ***ENTER*** to select "T/R."
9. Press ***MTRS***. Meter Menu is displayed on Test Set.
10. Press ***3***. Power Meter Operation Screen is displayed on Test Set.
11. Press Zero Key on Measuring Receiver.
12. Calibrate Measuring Receiver Power Meter.

Notes:

- Steps 13 through 21 are repeated for each of the power levels for each of the frequencies in Table 1-24 to verify Power Meter operation.
- Allow 3 minutes of cooling time between power measurement and zeroing Test Set Power Meter after measuring power levels of 5 W or greater.

13. Set Range on Test Set Power Meter per Table 1-24.
14. Move cursor to ASSUMED RF and press ***ENTER***. Enter frequency at which measurement is taken (per Table 1-24).
15. Press ***Zero F4***.
16. Connect Test Equipment as per Figure 1-40 and Table 1-24.
17. Set RF Signal Generator frequency per Table 1-24 and output to OFF.
18. Set appropriate external attenuation offsets, from Table 1-23, for frequency in Table 1-24 on Measuring Receiver. (Measuring Receiver should read actual power supplied to the Test Set.)
19. Set Measuring Receiver frequency per Table 1-24.
20. Set RF Signal Generator output to ON and increase output level until power level in Table 1-24 is displayed on Measuring Receiver.
21. Verify value displayed on Test Set Power Meter is within tolerance per Table 1-24 of power level displayed on Measuring Receiver.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, note current test setup and contact IFR Customer Service.

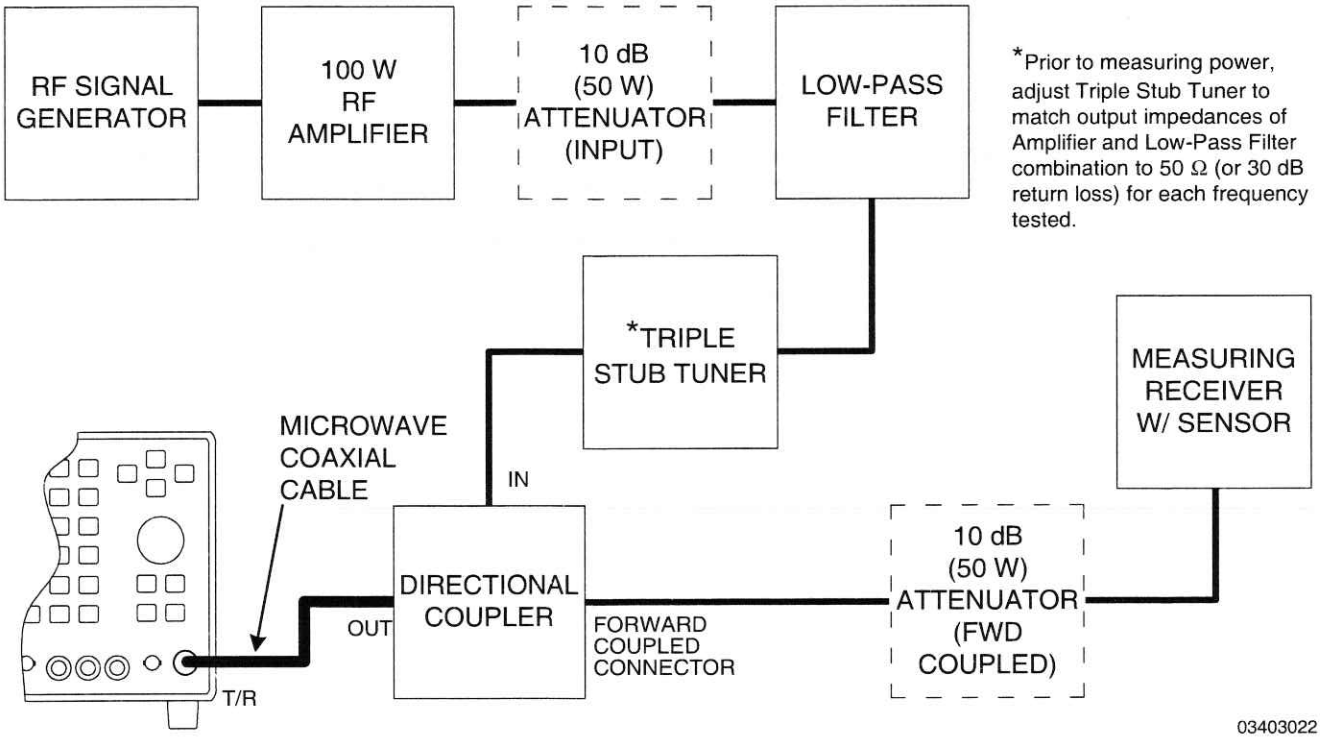


Figure 1-40 Power Meter Verification Hook-Up

FREQ (MHz)	POWER LEVEL	100 W RF AMPLIFIER		LOW-PASS FILTER (GHz)			10 dB ATTENUATOR		DIRECTIONAL COUPLER		POWER METER RANGE	TOL (%)
		(1 GHz)	(2 GHz)	0.7	1.0	2.2	INPUT	FWD COUPLED	#1	#2		
489.990	125 mW	●		●			●		●		200 mW	10% ±LSD
	1 W	●		●					●		2 W	10% ±LSD
	5 W	●		●				●	●		10 W	6% ±LSD
	45 W	●		●				●	●		50 W	6% ±LSD
879.990	125 mW	●			●		●		●		200 mW	10% ±LSD
	1 W	●			●				●		2 W	10% ±LSD
	5 W	●			●			●	●		10 W	6% ±LSD
	45 W	●			●			●	●		50 W	6% ±LSD
1960.020	125 mW		●			●	●			●	200 mW	10% ±LSD
	1 W		●			●				●	2 W	10% ±LSD
	5 W		●			●		●		●	10 W	6% ±LSD
	45 W		●			●		●		●	50 W	6% ±LSD

Table 1-24 HOST Power Meter Verification Test Equipment Settings and Details

STEP	PROCEDURE

Special Test Power Meter

22. Press ***DPLX*** and ***Sp Tst F5*** . Dual Mode IS-136 Cellular Menu is displayed on Test Set.
23. Press ***4***. Modulation Accuracy and Power Screen appears.
24. Press ***More F6*** until label of Softkey F3 changes to "ANLZ." Press ***ANLZ F3***. Duplex Transmitter Operation Screen is displayed on Test Set.
25. Using FIELD SELECT Keys, move cursor to RF IN. Press ***ENTER*** to select "T/R."
26. Press ***Sp Tst F5*** to return to Modulation Accuracy and Power Screen.
27. Press Zero Key on Measuring Receiver.
28. Calibrate Measuring Receiver Power Meter.
29. Press More F6 until label of Softkey F2 changes to "Zero." (Softkey Zero F2 is used in Step 31.)

Notes:

- Steps 30 through 38 are repeated for each of the power levels for each of the channels/frequencies in Table 1-25 to verify Special Test Power Meter operation.
- Allow 3 minutes of cooling time between power measurement and zeroing Special Test Power Meter after measuring power levels of 5 W or greater.

30. Set Band and Channel per Table 1-25.
31. Press ***Zero F2***.
32. Connect Test Equipment as per Figure 1-40 and Table 1-25.
33. Set RF Signal Generator frequency per Table 1-25 and output to OFF.
34. Set appropriate external attenuation offsets, from Table 1-23, for frequency in Table 1-25 on Measuring Receiver. (Measuring Receiver should read actual power supplied to the Test Set.)
35. Set Measuring Receiver frequency per Table 1-25 (same as RF Signal Generator frequency).
36. Set RF Signal Generator output to ON and increase output level until power level in Table 1-25 is displayed on Measuring Receiver.
37. Press Start F1 to begin sampling.
38. Verify BASE POWER value displayed on Modulation Accuracy and Power Screen is within tolerance per Table 1-25 of power level displayed on Measuring Receiver.
    - If reading is correct, proceed to next step.
    - If reading is out of tolerance, note current test setup and contact IFR Customer Service.

CHAN/ BAND	SIGNAL GEN. FREQ (MHz)	POWER LEVEL	100 W RF AMPLIFIER		LOW-PASS FILTER (GHz)			10 dB ATTENUATOR		DIRECTIONAL COUPLER		TOL (%)
			(1 GHz)	(2 GHz)	0.7	1.0	2.2	INPUT	FWD COUPLED	#1	#2	
167/ U4	489.990 (CW)	125 mW	●		●			●		●		10% ±LSD
		1 W	●		●					●		10% ±LSD
		5 W	●		●				●	●		6% ±LSD
		45 W	●		●				●	●		6% ±LSD
333/ U8	879.990 (CW)	125 mW	●			●		●		●		10% ±LSD
		1 W	●			●				●		10% ±LSD
		5 W	●			●			●	●		6% ±LSD
		45 W	●			●			●	●		6% ±LSD
1000/ HY	1960.020 (CW)	125 mW		●			●	●			●	10% ±LSD
		1 W		●			●				●	10% ±LSD
		5 W		●			●		●		●	6% ±LSD
		45 W		●			●		●		●	6% ±LSD

Table 1-25 Special Test Power Meter Verification Test Equipment Settings and Details

39. Perform one of the following:

- If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
- If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-18.

1-11-18 GENERATOR IN-PHASE/QUADRATURE MODULATION VERIFICATION

PREREQUISITES: Power-Up Check/Power Supply Calibration (Para 1-11-1)

EQUIPMENT REQUIRED: 1 Modulation Spectrum Analyzer

FIGURE REFERENCES: Figure 1-41

STEP	PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
6. Connect test equipment as shown in Figure 1-41.

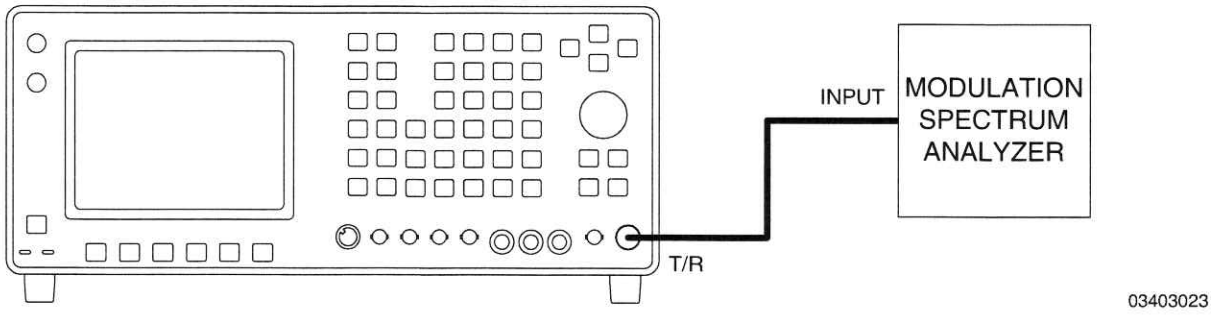


Figure 1-41 Generator In-Phase/Quadrature Modulation Verification Hook-Up

7. Press ***DPLX***, ***Sp Tst F5***, ***AUX2 F5*** and ***3***. The 1900CSA Diagnostics Screen is displayed on Test Set.
8. Press ***Fr Mode F1*** to display RF FREQ as a channel (not frequency).
9. Press Softkey F2 until label changes to "REV" (Forward Channel).
10. Using FIELD SELECT Keys, move cursor to RF LVL and enter ***-20***. Press ***ENTER***.
11. Move cursor to OP MODE and press ***DATA SCROLL*** ↑ to select "TDMA BASE." Press ***ENTER***.
12. Move cursor to SLOT and enter ***1***.

13. Press STD (Standard) and set Modulation Spectrum Analyzer as follows:

MEASUREMENT PARAMETER	SETTING
Type	NADC
Link	DOWNLINK
Sync Type	NO SYNC WORD
Codec	FULL RATE
Trigger Source	AUTO
Root Nyquist Filter	ON
Freq Meas Range	NORMAL
Auto Level Set	ON

14. Perform the following on Modulation Spectrum Analyzer:
    - Press TRANSIENT.
    - Press "Modulation Accuracy" Softkey.
    - Press "AVG Times" Softkey until "ON" is selected. Red border must appear around Softkey label.
    - Set AVG (Modulation) to "16 Times."
15. Set Band and Frequency on Test Set per Table 1-26.
16. Perform the following on Modulation Spectrum Analyzer:
    - Enter Center Frequency per Table 1-26.
    - Press "Auto Level Set" Softkey. Confirm that "Auto Level Completed" message appears (perform this for every channel frequency tested).
    - Press SINGLE START.
17. When results are returned, verify Maximum Error Vector Magnitude and I/Q Origin Offset per Table 1-26.
    - If readings are correct, proceed to next step.
    - If any reading is out of tolerance, note current test setup and contact IFR Customer Service.

TEST SET		MODULATION SPECTRUM ANALYZER	ERROR VECTOR MAGNITUDE	I/Q ORIGIN OFFSET
BAND	CHANNEL	FREQUENCY (MHz)		
U4	167	489.990	6% rms from ideal, 16 Averages	<-28 dBc
U8	333	879.990		
HY	1000	1960.020		

Table 1-26 Generator In-Phase/Quadrature Modulation Verification (Base Simulation)

18. Press Softkey F2 until label changes to "FWD" (Reverse Channel).

18. Move cursor to OP MODE and press ***DATA SCROLL*** ↑ to select "TDMA MOBILE." Press ***ENTER***.

19. Perform the following on Modulation Spectrum Analyzer:
    - Press STD.
    - Set Link to "UPLINK."
    - Set Sync Type to "SYNC WORD."
    - Set Sync Word to "S1."
    - Set Meas Mode to "1 BURST."
    - Press TRANSIENT.
    - Press "Modulation Accuracy" Softkey.
    - Press "AVG Times" Softkey until "ON" is selected. Red border must appear around Softkey label.

20. Set Band and Frequency on Test Set per Table 1-27.

21. Perform the following on Modulation Spectrum Analyzer:
    - Enter Center Frequency per Table 1-27.
    - Press "Auto Level Set" Softkey. Confirm that "Auto Level Completed" message appears (perform this for every channel frequency tested).
    - Press SINGLE START.

22. When results are returned, verify Maximum Error Vector Magnitude and I/Q Origin Offset per Table 1-27.
    - If readings are correct, proceed to next step.
    - If any reading is out of tolerance, note current test setup and contact IFR Customer Service.

TEST SET		MODULATION SPECTRUM ANALYZER	ERROR VECTOR MAGNITUDE	I/Q ORIGIN OFFSET
BAND	CHANNEL	FREQUENCY (MHz)		
U4	167	444.990	8% rms from ideal, 16 Averages	<-28 dBc
U8	333	834.990		
HY	1000	1879.980		

Table 1-27 Generator Quadrature In-Phase/Modulation Verification (Mobile Simulation)

23. Perform one of the following:
    - If this procedure is performed as a stand-alone procedure, remove power from Test Set and disconnect test equipment.
    - If this procedure is performed as part of a complete Calibration, disconnect test equipment and proceed to Step 5 of para 1-11-19.

1-11-19 ERROR VECTOR MAGNITUDE (EVM) METER VERIFICATION

PREREQUISITES:	Power-Up Check/Power Supply Calibration (Para 1-11-1) Metering DVM Calibration (para 1-11-2)
EQUIPMENT REQUIRED:	1 10 MHz Frequency Standard 1 Digital Signal Generator 1 RF Signal Generator
FIGURE REFERENCES:	Figure 1-42

STEP PROCEDURE

1. Power up Test Set. Verify 1-2-4 beep sequence.
2. Verify start-up screen appears (see Figure 1-4). Verify space balls are moving in elliptical orbits.
3. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
4. Allow Test Set to warm up for 30 minutes before continuing with this calibration procedure.
5. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
6. Connect test equipment as shown in Figure 1-42.

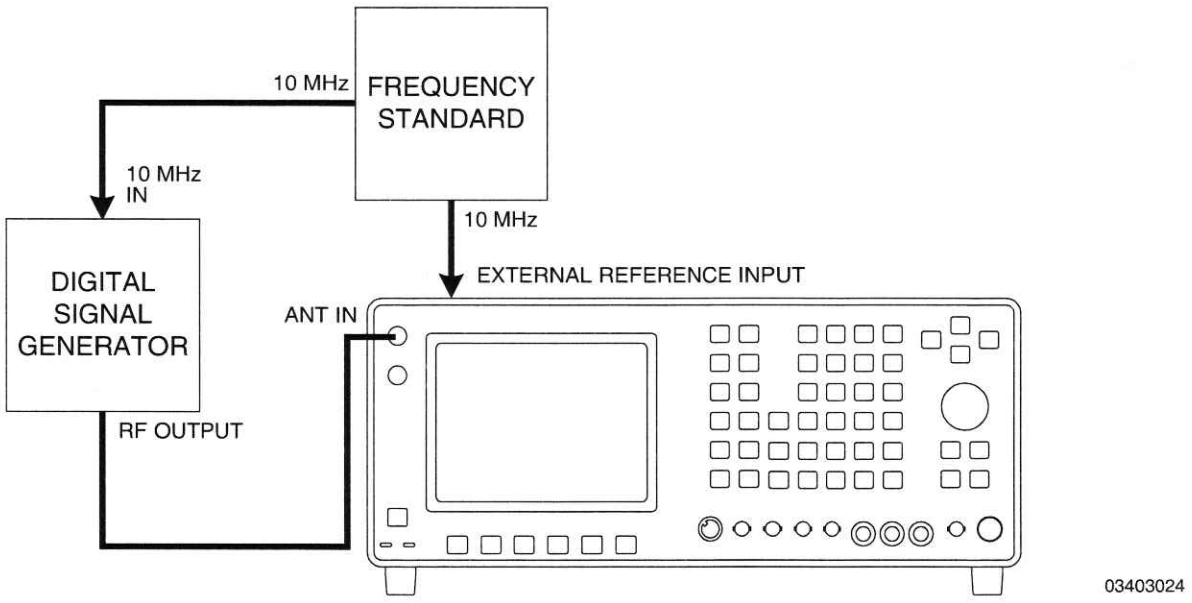


Figure 1-42 EVM Meter Verification Hook-Up

7. Press ***DPLX***, ***Sp Tst F5*** and ***4***. Modulation Accuracy and Power screen is displayed on Test Set.
8. Press ***More F6*** until label of Softkey F3 changes to "ANLZ." Press ***ANLZ F3***. Duplex Transmitter Operation Screen appears.

9. Using FIELD SELECT Keys, move cursor to RF IN. Press ***ENTER*** to select "ANT."
10. Move cursor to Input Attenuation Level Field (see Figure 1-43). Press ***DATA SCROLL*** ↑ to select "LNA." (Low Noise Amplifier) Press ***ENTER***.

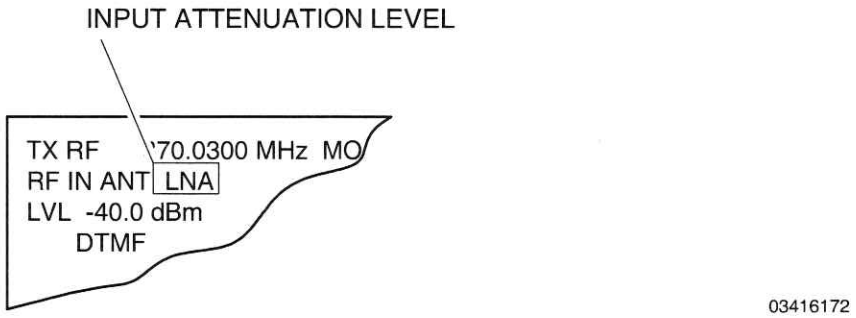


Figure 1-43 Input Attenuation Level Field

11. Press ***Sp Tst F5*** to return to Modulation Accuracy and Power Screen.
12. Set Digital Signal Generator output to -40 dBm with modulation OFF.
13. To determine EVM Meter residual for the channel/frequencies tested, perform the following:
    - Set Band and Channel on Test Set per Table 1-28.
    - Set center frequency on Digital Signal Generator per Table 1-28. (An offset of 30 kHz from center frequency of channel is used.)

TEST SET		FREQUENCY
BAND	**CHANNEL**	**(MHz)**
U4	167	490.020
U8	333	880.020
HY	1000	1960.050

Table 1-28 EVM Meter Residual Calculation Settings

    - Press ***Start F1*** to begin Test Set modulation accuracy sampling. Observe that Test Set Modulation Accuracy and Power Screen parameters are being continually updated.
    - Record 16 consecutive EVM updated values.
    - Average the 16 recorded samples to calculate EVM Meter residual.
14. Record calculated residual for each frequency (489.990 MHz, 879.990 MHz, 1960.020 MHz).
15. Press ***Stop F1***.
16. Press MODE and Softkey "NADC" on Digital Signal Generator.

17. Set the NADC settings on Digital Signal Generator as follows:

CONTROL	SETTING
NADC	ON
Burst	OFF
Data	PN9
Pattern Repeat	CONT
Phase Polarity	NORMAL
Filter	RNYQ
Ext Data Clock	NORMAL

18. Set Digital Signal Generator output to -40 dBm with modulation ON.
19. Set Digital Signal Generator output to ON.
20. Set Band and Channel on Test Set per Table 1-29.
21. Set center frequency on Digital Signal Generator per Table 1-29.
22. Press ***Start F1*** to begin Test Set modulation accuracy sampling. Observe that Test Set Modulation Accuracy and Power Screen parameters are being continually updated.
23. Record 16 consecutive EVM updated values for each channel/frequency tested.
24. Average each set of recorded values to calculate the result EVM for each channel/ frequency tested; verify per Table 1-29.
    - If readings are correct, proceed to next step.
    - If any reading is out of tolerance, note current test setup and contact IFR Customer Service.

TEST SET		**FREQUENCY)**	**ERROR VECTOR MAGNITUDE TOLERANCE**
BAND	**CHANNEL**	**(MHz)**	
U4	167	489.990	±3.0% of Indication, ±LSD + Meter Residual EVM
U8	333	879.990	
HY	1000	1960.020	

Table 1-29 EVM Meter Verification

25. Remove power from Test Set and disconnect test equipment.

SECTION 2 - REMOVE/INSTALL INSTRUCTIONS

2-1 GENERAL

2-1-1 SAFETY PRECAUTIONS

Power should be removed from the Test Set before any replacement procedure is initiated.

WARNING: DANGEROUS VOLTAGES MAY BE PRESENT WITH CASE ASSEMBLIES REMOVED IF POWER IS PRESENT.

2-1-2 ESD PRECAUTIONS

CAUTION: THE REMOVE/INSTALL PROCEDURES FOR THE TEST SET SHOULD ONLY BE PERFORMED IN AN ESD ENVIRONMENT AND ALL PERSONNEL PERFORMING THE REMOVE/INSTALL PROCEDURES SHOULD HAVE KNOWLEDGE OF ACCEPTED ESD PRACTICES AND/OR BE ESD CERTIFIED.

2-2 REMOVE/INSTALL PROCEDURES

2-2-1 TOP CASE ASSEMBLY (34A3)

DESCRIPTION

This procedure covers: Remove. Install.

WARNING

Dangerous voltages may be present with case assemblies removed.

CAUTION

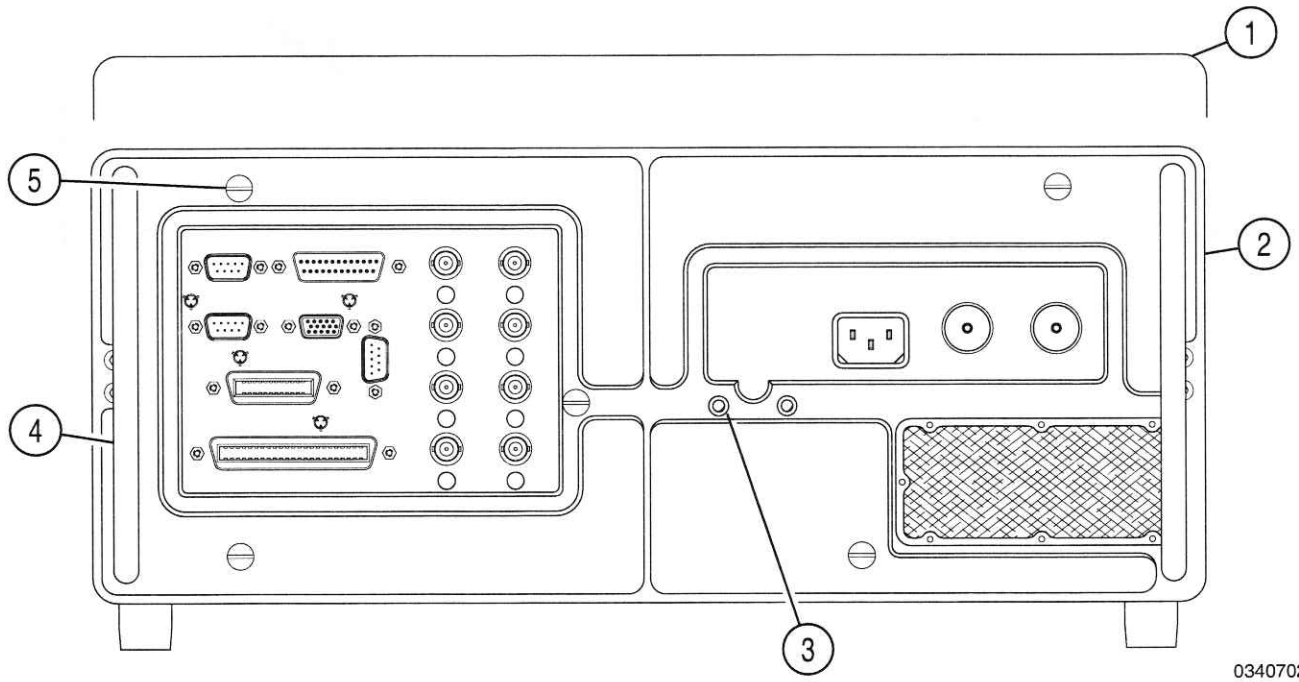
Do not disconnect or remove any assemblies in Radio Test Set unless instrument is unplugged.

REMOVE

1. Loosen 5 captive screws (5).
2. Remove 2 screws (3).
3. Using Rear Panel Handles (4), slide Rear Panel Assembly (34A5A5) (2) toward rear 1/2 inch.
4. Grasp Top Case Assembly (34A3 (1) near Rear Panel Assembly (34A5A5) (2) and carefully lift up end of Top Case Assembly 1 inch.
5. Remove Top Case Assembly (34A3) (1).

INSTALL

1. Install Top Case Assembly (34A3) (1) with decal on Top Case Assembly toward front.
2. Slide Rear Panel Assembly (34A5A5) (2) toward front.
3. Tighten 5 captive screws (5).
4. Install 2 screws (3).



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END OF TASK

2-2-2 BOTTOM CASE ASSEMBLY (34A2)

DESCRIPTION

This procedure covers: Remove. Install.

WARNING

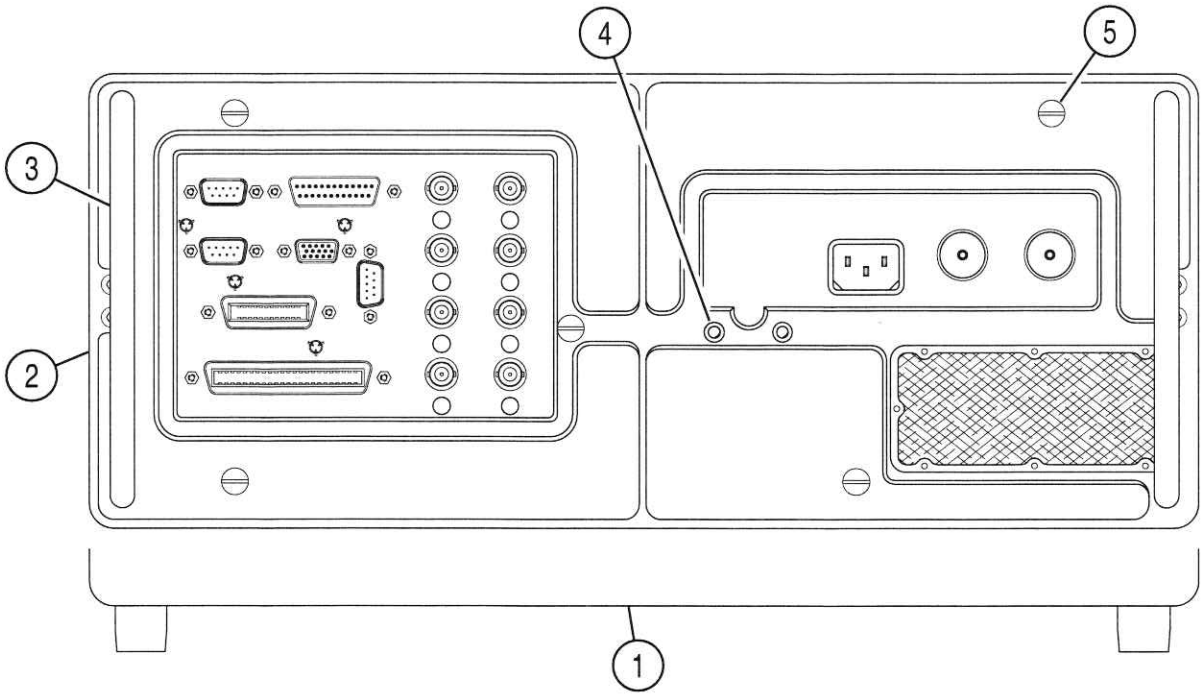
Dangerous voltages may be present with case assemblies removed.

REMOVE

1. Loosen 5 captive screws (5).
2. Remove 2 screws (4).
3. Using Rear Panel Handles (3), slide Rear Panel Assembly (34A5A5) (2) toward rear 1/2 inch.
4. Grasp Bottom Case Assembly (34A2) (1) near Rear Panel Assembly (34A5A5) (2) and carefully lift up end of Bottom Case Assembly 1 inch.
5. Remove Bottom Case Assembly (34A2) (1).

INSTALL

1. Install Bottom Case Assembly (34A2) (1) with decal on Bottom Case Assembly toward front.
2. Slide Rear Panel Assembly (34A5A5) (2) toward front.
3. Tighten 4 captive screws (5).
4. Install 2 screws (4).



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END OF TASK

2-2-3 FUNCTION GENERATOR PC BOARD ASSEMBLY (34A5A31)

DESCRIPTION

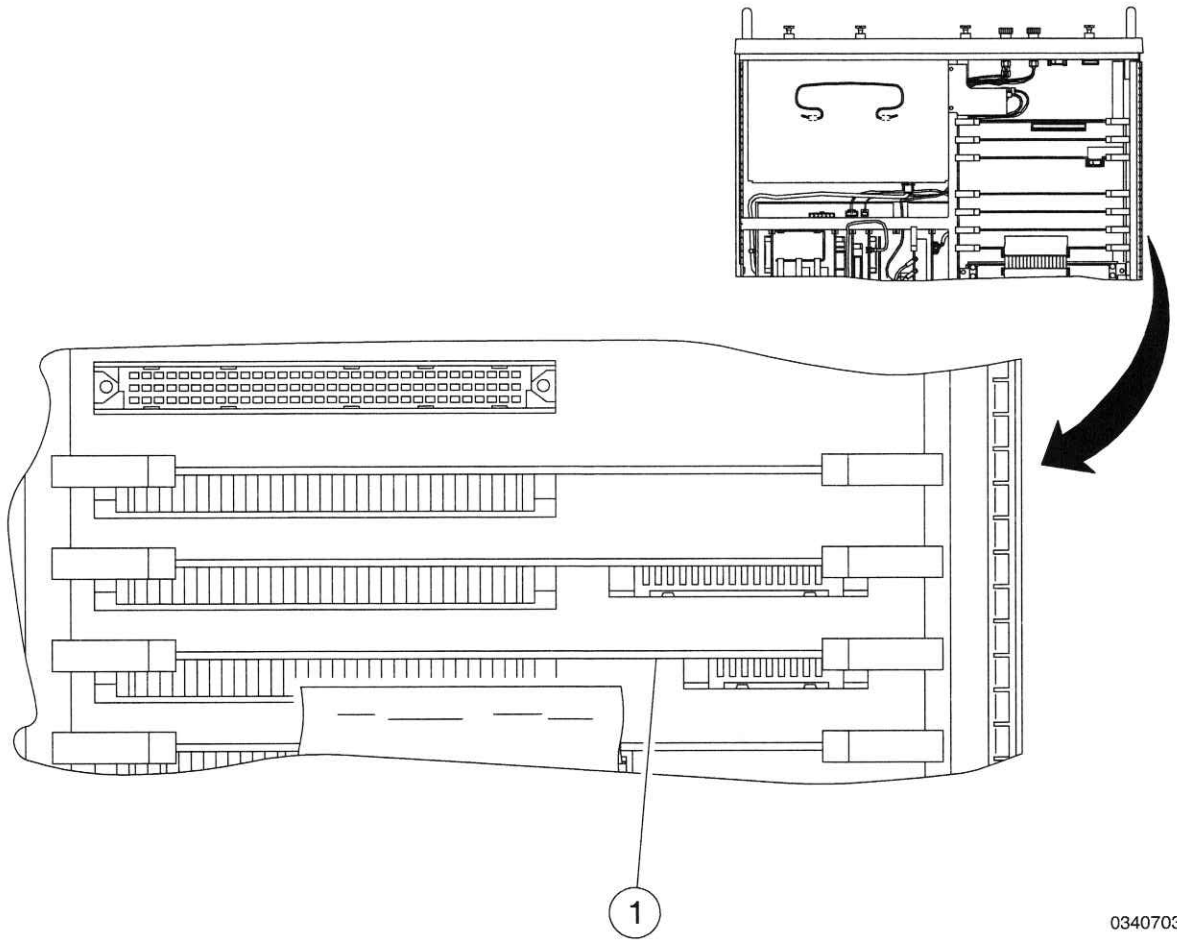
This procedure covers: Remove. Install.

REMOVE

1. Lift back ribbon cables (Figure 1-3) to make room for removal.
2. Raise card ejectors and remove Function Generator PC Board Assembly (34A5A31) (1).

INSTALL

1. Install Function Generator PC Board Assembly (34A5A31) (1) in guides and close card ejectors.
2. Return ribbon cables to original positions (Figure 1-3).



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END OF TASK

2-2-4 DIGITIZER PC BOARD ASSEMBLY (34A5A32)

DESCRIPTION

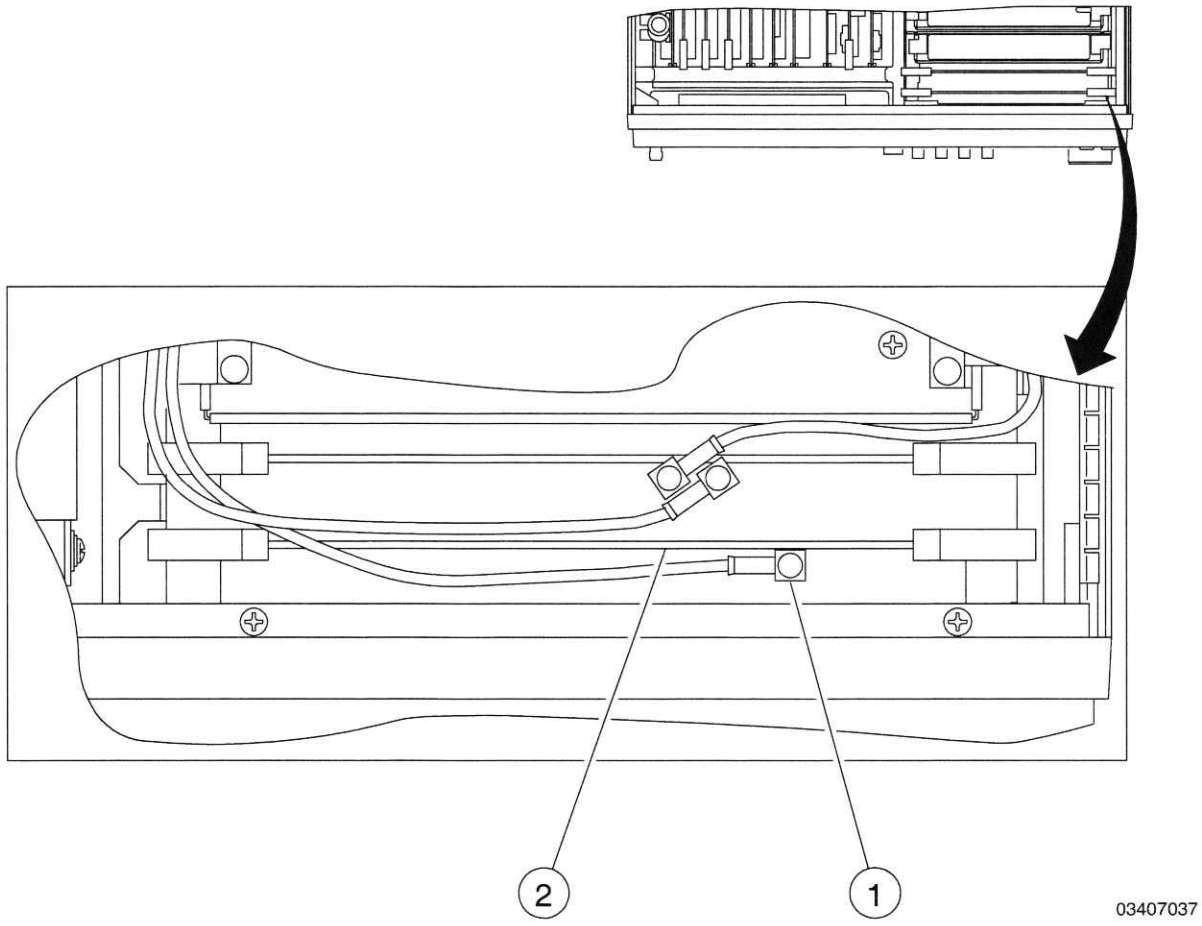
This procedure covers: Remove. Install.

REMOVE

1. Disconnect coaxial cable (1).
2. Raise card ejectors and remove Digitizer PC Board Assembly (34A5A32) (2).

INSTALL

1. Install Digitizer PC Board Assembly (34A5A32) (2) in guides and close card ejectors.
2. Reconnect coaxial cable (1).



END OF TASK

2-2-5 DMM ASSEMBLY (34A5A11)

DESCRIPTION

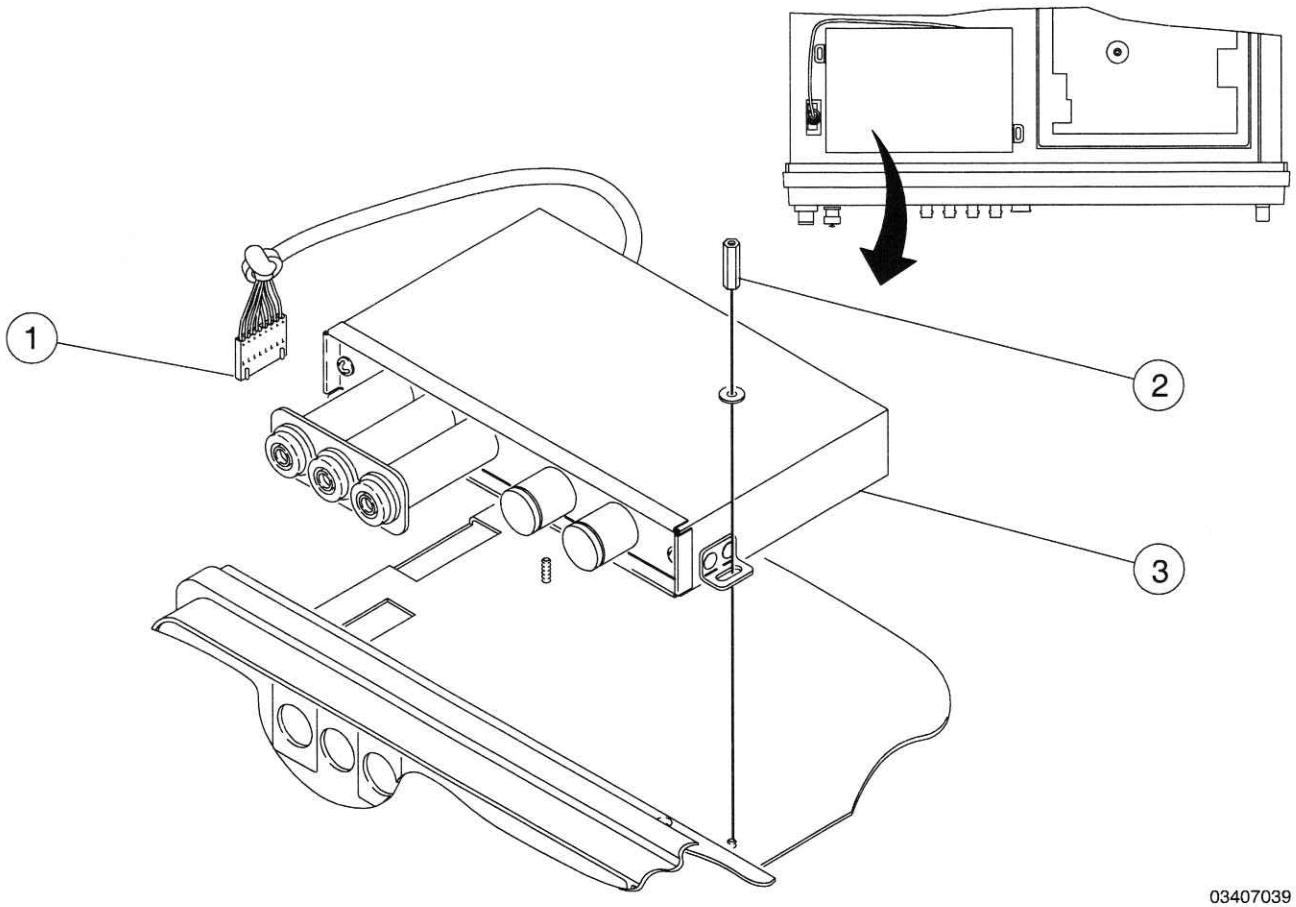
This procedure covers: Remove. Install.

REMOVE

1. Disconnect wire cable connector (1).
2. Remove 2 spacer nuts and 2 washers (2).
3. Slide DMM Assembly (34A5A11) (3) to rear and remove.

INSTALL

1. Install DMM Assembly (34A5A11) (3) and slide forward until tight against Front Panel Assembly (34A5A23).
2. Reconnect wire cable connector (1).
3. Install 2 spacer nuts and 2 washers (2).



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END OF TASK

2-2-6 ANALYZER LOG/IF ASSEMBLY (34A5A7)

DESCRIPTION

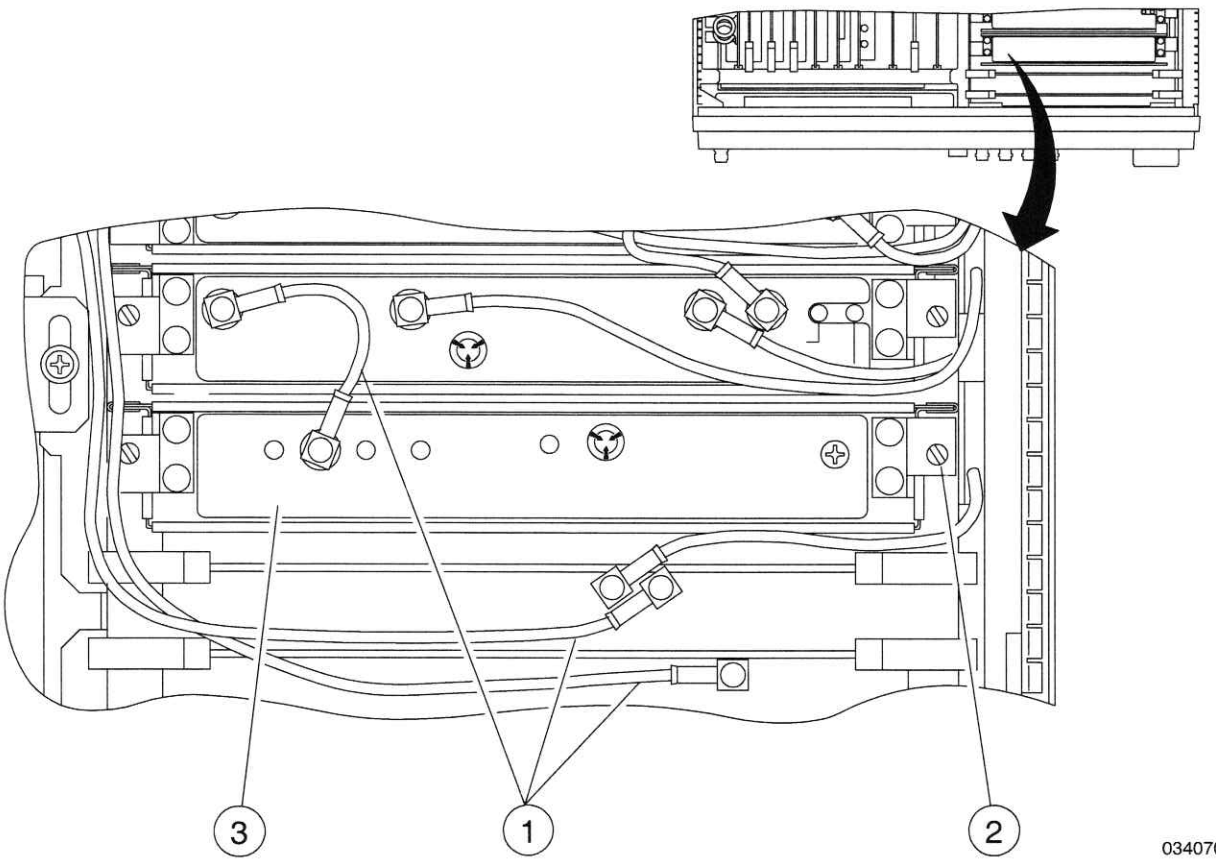
This procedure covers: Remove. Install.

REMOVE

1. Disconnect 3 coaxial cables (1).
2. Loosen 2 captive screws (2).
3. Remove Analyzer Log/IF Assembly (34A5A7) (3).

INSTALL

1. Install Analyzer Log/IF Assembly (34A5A7) (3).
2. Tighten 2 captive screws (2).
3. Reconnect 3 coaxial cables (1).



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END OF TASK

APPENDIX A - TEST EQUIPMENT REQUIREMENTS

TYPE	MODEL	MINIMUM SPECIFICATIONS
10 MHz Frequency Standard	HP58503A or Equivalent	Accuracy: 1 X 10^{-9} NIST
Audio Analyzer	HP8903B or Equivalent	Frequency Range: 20 Hz to 20 kHz SINAD/Distortion Accuracy: ±1.0 dB
Calibrator	FLUKE 5100B or Equivalent	AC, DC, Ohms, Current Accuracy: ±0.1% of setting
Digital Multimeter (DMM)	HP 34401A or Equivalent	Resolution: 5.5 Digit, 0.01 mV Accuracy: ≤0.4% ac/dc, ±1 count
Digital Signal Generator	HP ESG-D3000A with Opt UN3 or Equivalent	Frequency Range: 100 MHz to 3 GHz Resolution: 10 Hz NIST RF Output Range: 0 to -127 dBm Resolution: 0.1 dB Accuracy: ±1.0 dB Modulation: Modes: π/4 DQPSK Resolution: 0.01 kHz, 1% I/Q Modulation: NADC (North American Digital Cellular)
Directional Coupler #1	NARDA 3020A or Equivalent	Coupler Attenuation: 20 dB Directivity: 35 dB Frequency Range: 50 MHz to 1 GHz
Directional Coupler #2	NARDA 3022 or Equivalent	Coupler Attenuation 20 dB Directivity: 30 dB Frequency Range: 1 to 3 GHz
Extender Boards	IFR 7010-7839-600 IFR 7010-7839-900	N/A

TYPE	MODEL	MINIMUM SPECIFICATIONS
Measuring Receiver Measuring Receiver Sensor	HP8902A with Opt 003 or Equivalent HP11722A or Equivalent	RF Power: Range: -20 to +30 dBm Freq Range: 0.001 to 1.3 GHz Accuracy: 3% RF Tuned: 0 to -127 dBm Relative Accuracy: ±0.1 dB FM Meter Range: ±50 Hz to ±100 kHz Accuracy: ±1% AM Meter Range: 1% to 95% Accuracy: ±1%
50 dB Microwave Coaxial Cable	Storm A90-088-048 or Equivalent	Frequency Range 0.4 to 2 GHz Low Loss (<0.5 dB) Return Loss 30 dB Connectors N-Type Female Repeatable Characteristics
Microwave Converter Microwave Converter Sensor	HP11793A or Equivalent HP11792A or Equivalent	RF Mixer (auto-switching: signals below 1.3 GHz are routed directly from RF input to IF Output, bypassing mixer) Freq range: 1300 to 3000 MHz (Input) 100 to 1300 MHz (IF) Relative Accuracy 0.1 dB RF Power: Range: 50 to 3000 MHz Relative Accuracy: 3% Input SWR <1.15, fc <1300 MHz <1.25, fc ≥1300 MHz, fc <3 GHz
Modulation Spectrum Analyzer	Advantest R3465 with Opt 75 or Equivalent	Contact IFR
Multifunction Synthesizer	HP8904A or Equivalent	Frequency Range: 0.1 Hz to 600 kHz Resolution: 0.1 Hz Accuracy: ±50 ppm Amplitude: Range: 0 to 10 Vp-p Resolution: 3.5 digits Accuracy: ±1% Spectral Purity: 0.1%
Oscilloscope	TDS 430A or Equivalent	Bandwidth: 150 MHz Digital

TYPE	MODEL	MINIMUM SPECIFICATIONS
Power Attenuator	Weinchel 24-10-34 or Equivalent	'N' Male to 'N' Female VSWR <1.2 Power: 50 W at 25°C Frequency Range: DC to 4 GHz Attenuation: 10 dB
Power Splitter	HP11667A or Equivalent	DC to 3 GHz: 6 dB Nominal Insertion Loss
RF Amplifier	ENI 6100L or Equivalent	Gain: 50 dB Nominal Minimum Output: 100W Linear Bandwidth: 0.4 to 1 GHz
	PST ARD1929-100 or Equivalent	Gain: 50 dB Nominal Minimum Power at 1 dB Compression: 100W Linear Bandwidth: 1 to 2 GHz
RF Power Meter	HP EPM-441A or Equivalent	Frequency Range: 50 MHz to 2.01 GHz Power: Range: -70 to +20 dBm Resolution: 0.1 dB
Power Sensor	HP ECP-E18A or Equivalent	Frequency Range: 50 MHz to 2.01 GHz Power Range: 100 pW to 100 mW
RF Signal Generator	HP 8643A with Opt 002 or Equivalent	Frequency Range: 300 kHz to 2.01 GHz Resolution: 10 Hz NIST RF Output Range: +10 to -127 dBm Resolution: 0.1 dB Accuracy: ±1.0 dB Modulation: Modes: FM, AM Resolution: 0.01 kHz, 1%
Triple Stub Tuner	Microlab FXR S3-05N or Equivalent	Frequency Range 0.5 to 3 GHz Insertion Loss ≤0.2 dB Connectors N-Type (Male and Female)

APPENDIX B - 3 MHz RESOLUTION BANDWIDTH ADJUSTMENT

EQUIPMENT REQUIRED:
1 Extender Board (7010-7839-600)
1 RF Signal Generator

FIGURE REFERENCES: Figure B-2

STEP PROCEDURE

1. Restore Factory defaults. Press ***MTRS***, ***AUX F6*** and ***RCL***. The Recall Parameters Menu (System) appears. Press ***SHIFT*** and ***A***. Factory Defaults window appears. Press ***DATA SCROLL*** ↑ until "YES" appears. Press ***ENTER***.
2. Connect RF Signal Generator to ANTENNA IN Connector.
3. Set RF Signal Generator to 120 MHz at -40 dBm with no modulation.
4. Press ***SCOPE/ANLZ***. Oscilloscope or Analyzer Operation Screen is displayed. If Oscilloscope Operation Screen is displayed, press ***SCOPE/ANLZ***, again.
5. Using FIELD SELECT Keys, move cursor to RF and enter ***120***. Press ***ENTER***.
6. Press ***Scan F3*** and press ***DATA SCROLL*** ↑ to select "10 kHz." Press ***ENTER***.
7. Press Softkey F2 until label changes to "10 dB" (2 dB selected for Unit/Div).
8. Press ***More F6*** until label of Softkey F2 changes to "Trk Gen." Press ***Trk Gen F2***.
9. Move cursor to TRK RES and press ***ENTER*** to select "Hi."
10. Press ***More F6*** until label of Softkey F4 changes to "Ref lvl." Press ***Ref lvl F4***.
11. Use ***DATA SCROLL*** Spinner to display signal at mid-screen. Press ***ENTER***.
12. Press ***More F6*** until label of Softkey F1 changes to "Res bw." Press ***Res bw F1***. Press ***DATA SCROLL*** ↑ to select "30 kHz." Press ***ENTER***.
13. Record signal peak level (30 kHz Filter).
14. Press ***More F6*** until label of Softkey F3 changes to "Scan." Press ***Scan F3***. Press ***DATA SCROLL*** ↑ to select "1 MHz." Press ***ENTER***.
15. Press ***More F6*** until label of Softkey F1 changes to "Res bw." Press ***Res bw F1***. Press ***DATA SCROLL*** ↑ to select "3 MHz." Press ***ENTER***.
16. Record error between current displayed signal (3 MHz Filter) and level in Step 13. If signal error is <3 dB, perform Spectrum Analyzer Calibration (para 1-11-15). If signal error is ≥3 dB, proceed to next step.

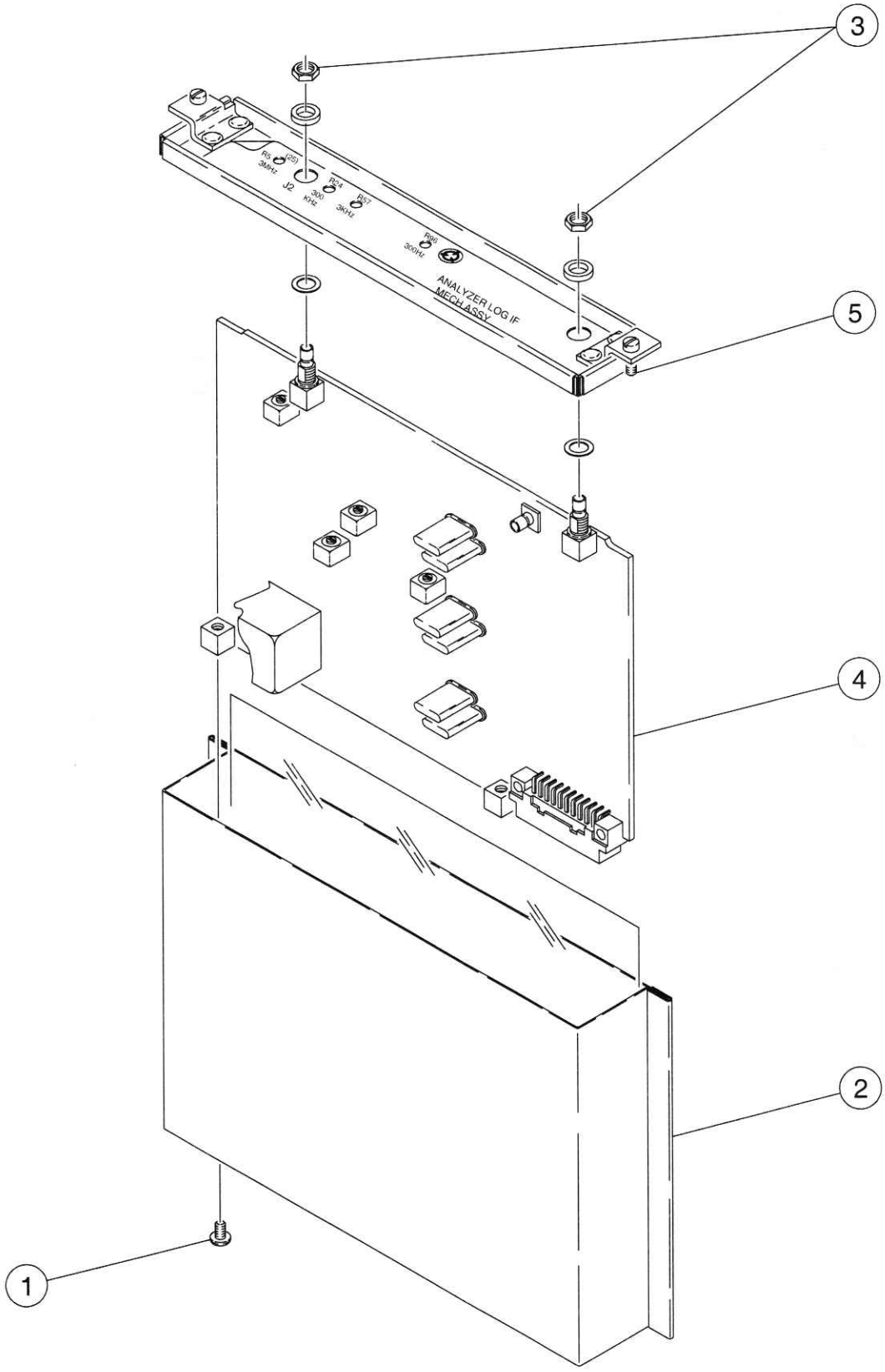

Figure B-1 Analyzer Log/IF PC Board Assembly (34A5A7A1) Removal

17. Remove Analyzer Log/IF PC Board Assembly (34A5A7A1) from enclosure (Figure B-1):
    - Remove power from Test Set.
    - Remove Analyzer Log/IF Assembly (34A5A7) (para 2-2-6).
    - Remove 2 screw (1) from enclosure (2) (Figure B-1).
    - Remove Analyzer Log/IF PC Board Assembly (34A5A7A1) (4) from enclosure (2) (Figure B-1).
    - Remove two nuts and washers (3) (Figure B-1).
    - Remove enclosure cover (5) (Figure B-1).
18. Compare A7A1R8, A7A1R9, A7A1R11 and A7A1R12 (reference Figure B-2) to the values in the following table:

	A7A1R8 (Ω)	**A7A1R9 (Ω)**	**A7A1R11 (Ω)**	**A7A1R12 (Ω)**
1 dB	12.1	12.1	909	909
2 dB	12.1	*	432	432
3 dB	18.2	*	301	301
4 dB	24.3	*	221	221
5 dB	30.1	*	182	182
6 dB	36.5	*	150	150
7 dB	45.3	*	130	130

* NOT INSTALLED

19. Increase or decrease 3 MHz Pad values in Step 18 by the amount of error found in Step 16 (to allow the 3 MHz Filter to correctly exhibit the insertion loss of the 30 kHz Resolution Bandwidth Filter).
20. Perform the following:
    - Remove power from Test Set.
    - Install Analyzer Log/IF PC Board Assembly (34A5A7A1) in enclosure. (Reverse procedure as shown in Step 17.)
    - Install Analyzer Log/IF Assembly (34A5A7) (2-2-6).
21. Power up Test Set. Verify beep sequence of 1-2-4.
22. Verify start-up screen appears. Verify space balls are moving in elliptical orbits.
23. Verify no "Board Inactive" messages appear in upper left hand corner of screen.
24. Allow Test Set to warm up for 5 minutes.
25. Return to Step 4.

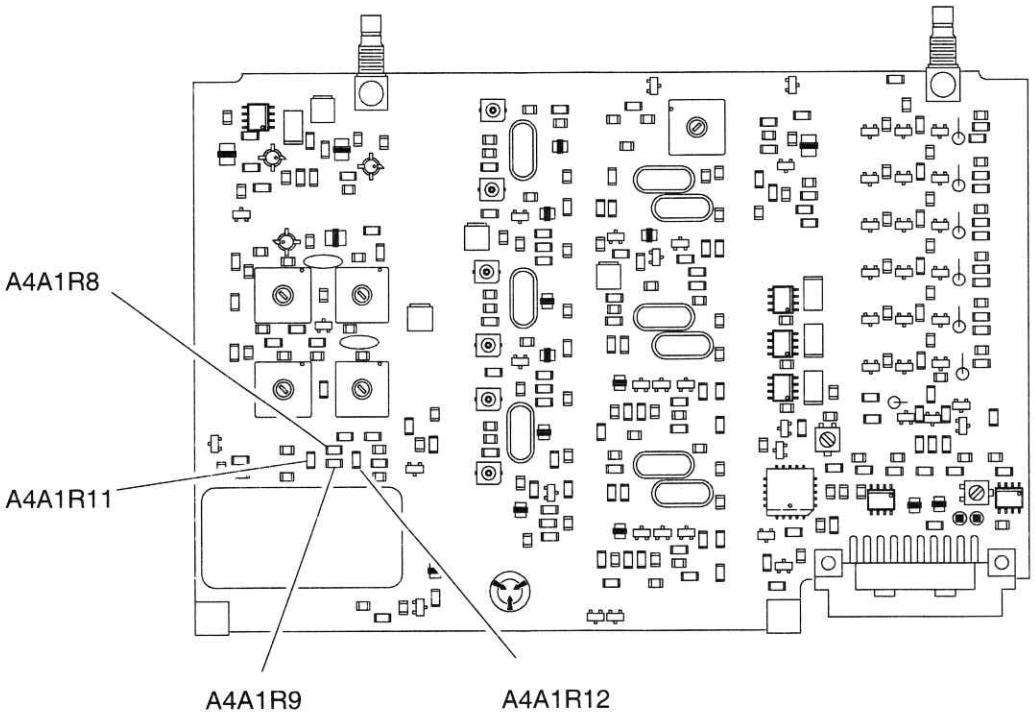

Figure B-2 Analyzer Log/IF PC Board Assembly (34A5A7A1) Calibration Points