AEROFLEX

Communications Test Set 3500

Operation Manual

OPERATION MANUAL

COMMUNICATIONS TEST SET

3500

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Electromagnetic Compatibility:

For continued EMC compliance, all external cables must be shielded and three meters or less in length.

Nomenclature Statement:

In this manual, 3500, Test Set or Unit refers to the 3500 Communications Test Set.

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SAFETY FIRST: TO ALL OPERATIONS PERSONNEL

REFER ALL SERVICING OF UNIT TO QUALIFIED TECHNICAL PERSONNEL. THIS UNIT CONTAINS NO OPERATOR SERVICEABLE PARTS.

WARNING: USING THIS EQUIPMENT IN A MANNER NOT SPECIFIED BY THE ACCOMPANYING DOCUMENTATION MAY IMPAIR THE SAFETY PROTECTION PROVIDED BY THE EQUIPMENT.

CASE, COVER OR PANEL REMOVAL

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

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 documents. (This symbol refers to specific CAUTIONS represented on the unit and clarified in the text.)

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.

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 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.

INTERNAL BATTERY

This unit contains a Lithium Ion Battery, serviceable only by a qualified technician.

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) AND SHOULD TAKE NECESSARY PRECAUTIONS TO AVOID POTENTIAL COMMUNICATION INTERFERENCE PROBLEMS.

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DECLARATION OF CONFORMITY

The Declaration of Conformity Certificate included with the Unit should remain with the Unit.

Aeroflex recommends the operator reproduce a copy of the Declaration of Conformity Certificate to be stored with the Operation Manual for future reference.

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PREFACE

SCOPE

This Manual contains Instructions for operating the 3500. It is strongly recommended that the Operator be thoroughly familiar with this manual before attempting to operate the equipment.

ORGANIZATION

The Manual is composed of the following Chapters:

CHAPTER 1 - INTRODUCTION

Provides an Introduction and a Brief Overview of Functions and Features. Principles of Operation are also included.

CHAPTER 2 - OPERATING INSTRUCTIONS

Identifies and functionally describes all Controls, Indicators and Connectors.

Identifies and explains all Operation Screens and Menus.

Provides a Turn-On Procedure and Initial Adjustments.

Provides Applications.

CHAPTER 3 - OPERATOR MAINTENANCE

Identifies and explains Routine Service, Troubleshooting, Maintenance and Storage Procedures.

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SERVICE UPON RECEIPT OF MATERIAL

Unpacking

Special-design packing material inside this shipping carton provides maximum protection for the 3500. Avoid damaging the carton and packing material during equipment unpacking. Use the following steps for unpacking the 3500.

- Cut and remove the sealing tape on the carton top and open the carton.
- Grasp the 3500 transit case firmly, while restraining the shipping carton, and lift the equipment and packing material vertically and place the 3500 transit case and end cap packing on a suitable flat, clean and dry surface.
- Remove the protective plastic bag from the 3500 transit case. Place protective plastic bag and end cap packing material inside shipping carton. Store the shipping carton for future use should the 3500 need to be returned.

Checking Unpacked Equipment

- Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage to Aeroflex.
- Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies to Aeroflex.

DESCRIPTION	PART NUMBER		QTY
Adapter (BNC-F to TNC-M)	2200-0410-700	AC25027	5
Breakout Box	7005-6240-900	N/A	1
Breakout Box	7005-6241-200	N/A	1
Cable (BNC) (M-M) (48 in)	6041-4284-400	AC25026	2
Cable (TNC) (M-M)	6041-5680-800	N/A	1
Case, Accessory	1000-6200-800	N/A	1
Case, Soft-Sided Carrying	1412-0006-006	AC27004	1
External DC Power Supply	7110-6200-200	N/A	1
Fuse, Spare (5 A, 32 Vdc, Type F)	5106-0000-057	N/A	2
Handset	7005-6240-200	N/A	1
Handset Cable	6041-6280-000	N/A	1
Handset Holder	6050-6282-500	N/A	1
Getting Started Manual (Paper)	1002-6200-8P0	AC27010PP	1
Operation/ICW Manual (CD)	1002-6200-2C0	AC27008CD	1
Power Cable (AC)	6041-0001-000	N/A	1
Power Cable (DC)	6041-6281-400	N/A	1
VSWR Calibrator (TNC)	2901-0000-050	N/A	1

Checking Unpacked Equipment (cont)

STANDARD

Soft-Sided Carrying Case

(1412-0006-006) (AC27004)

External DC Power Supply

(7110-6200-200)

Breakout Box

(7005-6240-900)

Accessory Case

(1000-6200-800)

Handset

(7005-6240-200)

Handset Cable

(6041-6280-000)

Handset Holder

(6500-6282-500)

Spare Fuse (5 A, 32 Vdc, Type F) (2 ea)

(5106-0000-057)

Checking Unpacked Equipment (cont)

STANDARD

AC Power Cable

(6041-0001-000)

DC Power Cable

(6041-6281-400)

TNC Cable (M-M)

(6041-5680-800)

BNC Cable (M-M) (48 in) (2 ea)

(6041-4284-400) (AC25026)

VSWR Calibrator (TNC)

(2901-0000-054)

Adapter (BNC-F to TNC-M) (5 ea)

(2200-0410-700) (AC25027)

Operation/ICW Manual

(1002-6200-2C0) (AC27008CD)

Getting Started Manual

(1002-6200-8P0) (AC27010PP)

Checking Unpacked Equipment (cont)

OPTIONAL ITEMS

(These optional items may be included if ordered)

DESCRIPTION	PART NUMBER		QTY
Adapter (N-F to BNC-F)	2200-0412-800	p/o AC27002 p/o AC27003	1 1
Adapter (N-M to BNC-F)	2113-0000-004	p/o AC27003 p/o AC27013	1 2
Adapter (N-M to TNC-M)	2200-0412-400	p/o AC27002	1
Antenna (BNC) (50 MHz)	1201-7617-001	AC25044	1
Antenna (BNC) (150 MHz)	1201-7616-801	AC25045	1
Antenna (BNC) (450 MHz)	1201-7616-901	AC25043	1
Antenna (BNC) (800 MHz)	1201-7616-001	AC25042	1
Attenuator (10 dB)	2901-0401-010	p/o AC27013	1
Attenuator (20 dB / 50 W)	2901-0000-049	p/o AC27002	1
Attenuator (20 dB / 150 W)	2901-0000-051	p/o AC27003	1
Battery, Spare	7020-0012-500	AC27005	1
Cable (BNC) (M-M) (16 in)	6041-6282-000	p/o AC27013	2
Case, Transit	1412-6200-500	AC27001	1
Directional Coupler	4100-6200-500	p/o AC27013	1
Flip Cover	7001-6242-100	AC27006	1
Maintenance Manual (CD)	1002-6200-4C0	AC27009CD	1

Checking Unpacked Equipment (cont)

OPTIONAL

Transit Case

(1412-6200-500) (AC27001)

Spare Battery

(7020-0012-500) (AC27005)

Flip Cover

(7001-6242-100) (AC27006)

Directional Coupler

(4100-6200-500) (p/o AC27013)

10 dB Attenuator

(2901-0401-010) (p/o AC27013)

BNC Cable (M-M) (16 in) (2 ea)

(6041-6282-000) (p/o AC27013)

Antenna (BNC) (50 MHz)

(1201-7617-001) (AC25044)

Antenna (BNC) (150 MHz)

(1201-7616-801) (AC25045)

Checking Unpacked Equipment (cont)

OPTIONAL

Antenna (BNC) (450 MHz)

(1201-7616-901) (AC25043)

Antenna (BNC) (800 MHz)

(1201-7616-001) (AC25042)

20 dB / 50 W Attenuator

(2901-0000-049) (p/o AC27002)

20 dB / 150 W Attenuator

(2901-0000-051) (p/o AC27003)

Adapter (N-M to TNC-M)

(2200-0412-400) (p/o AC27002)

Adapter (N-F to BNC-F) (2 ea)

(2200-0412-800) (p/o AC27002) (p/o AC27003)

Adapter (N-M to BNC-F)

(2113-0000-004)
(p/o AC27003, 1 ea) (p/o AC27013, 2 ea)

Maintenance Manual

(1002-6200-4C0) (AC27009CD)

CHAPTER 1 - INTRODUCTION

1-1. GENERAL INFORMATION

A. Scope

Type of Manual:	Operation Manual
Equipment Name and Model Number:	3500 Communications Test Set
Purpose of Equipment:	The 3500 Communications Test Set is used for testing radios and related equipment.

B. Nomenclature Cross-Reference List

COMMON NAME	OFFICIAL NOMENCLATURE
3500	3500 Communications Test Set
Test Set or Unit	3500 Communications Test Set

1-2. EQUIPMENT CAPABILITIES AND FEATURES

The 3500 is a Handheld Communications Test Set for Radio installation testing. The 3500 is capable of measuring high power, up to 200 W, as well as fault finding for antennas, power amplifiers and interconnects. The 3500 meets the needs of a variety of vehicular radios, as well as commercial radio applications.

The 3500 is designed for ease of use, portability, reliability and long service life. The 3500 may also be used for bench testing in the General Communications environment.

Power is derived from an internal battery. For DC input, the DC IN Connector is provided for battery charging, bench operation or servicing.

The 3500 and supplied accessories are stored in a Soft Carrying Case or a Transmit Case.

A. Capabilities

Capabilities

- RF Receiver Testing - Up to 1 GHz bandwidth; AM, FM, frequency and level measurements.
- RF Generator Testing - Up to 1 GHz bandwidth; AM, FM, 1 kHz / 150 Hz and external modulation sources.
- RF Power Meter - 20 W intermittent duty cycle; 200 W with an external attenuator.
- VSWR measurements.
- Simple operation with few key strokes and textual displays.
- Large LCD Display with user adjustable Backlight and Contrast.
- Self Test and Diagnostics for internal validation and testing.
- Internal Battery allows 6 hours intermittent use, 4 hours continuous use before recharge.
- Automatic power shutdown after approximately 5 to 20 minutes (selectable) of non-use when AC power is not connected.
- Compact and lightweight enough to allow for one person operation.

B. Features

Features

- Driveby Screen
- SWR Test Screen
- Self Test Screen
- Benchtop Menu
  - Receiver Test Screen
  - Transmitter Test Screen
  - Duplex Test Screen
  - SWR Test Screen
  - Audio Test Screen
  - Meters Menu
    - SINAD Meter Screen
    - Distortion Meter Screen
    - AF Counter Screen
  - Setup Menu
    - Annunciator Screen
    - Remote Screen
    - Version Screen
    - Date/Time Screen
    - Diagnostics Screen
    - Calibration Screen
    - Default Settings
    - Hardware Config

1-3. EQUIPMENT DATA

NOTE

- Where specified resolution exceeds specified accuracy, the specified resolution takes precedence.
- Accuracy and resolution stated in percentages are referenced to the measured or selected value.
- All RF characteristics are referenced to 50 Ω.
- Allow warm-up period of at least 5 minutes.
- Received (input) signal modulation bandwidth does not exceed selected receiver IF bandwidth.
- Specifications are subject to change without notice.

RF GENERATOR

PORT INPUT PROTECTION

ANT Port: ..... +20 dBm

SWR Port: ..... +20 dBm

T/R Port: ..... +44 dBm (Thermal alarm)

FREQUENCY

Range: ..... 2 to 1000 MHz

Accuracy: ..... Same as Timebase

Resolution: ..... 1 Hz

OUTPUT LEVEL RANGE (TNC FEMALE)

T/R Connector (dBm / μV): ..... -50 to -120 dBm / 707.1 to 0.2 μV

ANT Connector (dBm / μV): ..... -30 to -90 dBm / 7071.1 to 7.1 μV

SWR Connector (dBm / μV): ..... -5 to -65 dBm / 125743.3 to 125.7 μV

Level Accuracy: ..... ±2 dB

Level Resolution: ..... 1 dB / 0.1 μV (1 dB Step Size)

CONNECTOR VSWR

ANT Connector: ..... <1.5 : 1

T/R Connector: ..... <1.25 : 1

SWR Connector: ..... <1.5 : 1

SSB PHASE NOISE: ..... -80 dBc/Hz at 20 kHz offset

SPURIOUS

Harmonics: ..... -30 dBc

Non-Harmonics: ..... -40 dBc (>±20 kHz Offset from Carrier) in Band (2 MHz to 1 GHz)

RESIDUAL FM: ..... <60 Hz in 300 Hz to 3 kHz BW

RESIDUAL AM: ..... <5% in 300 Hz to 3 kHz BW

1-3. EQUIPMENT DATA (cont)

RF GENERATOR MODULATION - FM

Modulation Frequency (Rate) - AM and FM:

Range: ..... 0 Hz to 24 kHz

Resolution: ..... 1 Hz

Accuracy: ..... Timebase ±2 Hz

FM Deviation Range: ..... Off, 0 Hz to 100 kHz (AFGEN1 and AFGEN2 selectable)

Total Harmonic Distortion: ..... 3% (1000 Hz Rate, >2 kHz Deviation, 300 Hz to 3 kHz BPF)

FM Deviation Resolution: ..... 10 Hz

FM Deviation Accuracy: ..... ±10% (2 to 50 kHz deviation, 150 Hz to 5 kHz rate)

Rate Accuracy ..... ±5% (150 Hz to 5 kHz

MIC IN:

Microphone Input: ..... 1 to 30 mVrms

FM Input Frequency Range: ..... 400 Hz to 1.2 kHz

FM Input Slope: ..... Positive voltage yields positive deviation

Ext AUDIN Input:

Switchable Loads: ..... 150 Ω, 600 Ω, High Z

Input Levels: ..... 0.05 to 3 Vrms

FM Input Frequency Range: ..... 300 Hz to 5 kHz

FM Input Level Sensitivity: ..... 1 kHz / 35 mVrms nominal (High Z Load)

RF GENERATOR MODULATION - AM

AM Modulation:

Range: ..... OFF, 0% to 100% (0 Hz to 24 kHz)

Resolution: 0.1%

Accuracy: ..... 10% of setting, 150 Hz to 5 kHz rate, 10% to 90% Modulation

Total Harmonic Distortion: ..... 3% (20% to 90% mod, 1000 Hz rate, 300 Hz to 3 kHz BPF)

Ext AUDIN Input:

Switchable Loads: ..... 150 Ω, 600 Ω, High Z

Input Levels: ..... 0.05 to 3 Vrms

AM Input Frequency Range: ..... 300 Hz to 5 kHz

AM Input Level Sensitivity: ..... 1% / 35 mVrms nominal (High Z Load)

MIC IN AM Input Frequency Range: ..... 400 Hz to 1.2 kHz

1-3. EQUIPMENT DATA (cont)

AUDIO GENERATORS (AFGEN1 AND AFGEN2)

NOTE

If two sources are selected, they are summed together. AFGEN1 and AFGEN2 may be routed to the external AUD Out connection on the handset. Specifications are for each FGEN individually.

Frequency Range: ..... 30 Hz to 5 kHz
0 to 20 kHz (Useable)

Frequency Resolution: ..... 0.1 Hz

Frequency Accuracy:..... Timebase ±2 Hz

Output Level:

Load Impedance: ..... 600 Ω

Audio Level Out: ..... 0 to 1.57 Vrms

Resolution: ..... 0.01 Vrms

Accuracy: ..... ±10%

Distortion: ..... <3% (1 kHz rate, sine 300 Hz to 3 kHz

HANDSET (PROVIDED) OR H-250 HANDSET WITH ADAPTER

Frequency: ..... 300 Hz to 1.2 kHz

Input Level: ..... 0.03 to 8 Vrms

PTT OPERATION

NOTE

PTT ON / OFF changes between TRANSMITTER TEST and RECEIVER TEST.

PTT ON: ..... Low, GND

PTT OFF:..... High, Open with Pullup

1-3. EQUIPMENT DATA (cont)

RF RECEIVER

FREQUENCY RANGE: ..... 2 to 1000 MHz

ACCURACY: ..... Timebase

RESOLUTION: ..... 1 Hz

INPUT AMPLITUDE

Minimum Input Level (Audio Sensitivity):

ANT Connector: ..... -80 dBm typical, 10 dB SINAD / 22.4 μV) (-110 dBm with Preamp)

T/R Connector: ..... -40 dBm typical, 10 dB SINAD , 2236 μV

Useable Input Level Range (Receiver Measurements):

ANT Connector: ..... -60 to -10 dBm (RF Error, Distortion, Modulation)
-80 to -10 dBm with Preamp ON
-90 to -10 dBm (RSSI)
-110 to -10 dBm with Preamp ON

Minimum Input Level (Receiver Measurements)

T/R Connector: ..... -20 dBm (RF Error, Distortion, Modulation)
-50 dBm (RSSI)

Maximum Input Level:

ANT Connector: ..... +20 dBm for 10 seconds, Alarm sounds

T/R Connector: ..... +37 dBm (AM)
+43 dBm (FM)

NOTE

Overtemp Alarm trips if the power is left on too long and the temperature of the Power Termination gets too hot.

FM Demod Output (AUD OUT):

IF BW: ..... 5, 6.25, 8.33, 10, 12.5, 25, 30, 100 and 300 kHz IF BW

Audio Filters BW: ..... C-WT BP, CCITT BP, NONE, 15 kHz LP, 300 Hz LP, 300 Hz HP, 5 kHz LP and 300 Hz to 5 kHz BP

Level Sensitivity: ..... (3 Vrms/kHz Dev) / IF BW (kHz) ±15%

AM Demod Output (AUD OUT):

IF BW: ..... 5, 6.25, 8.33, 10, 12.5, 25 and 30 kHz

Audio Filters BW: ..... C-WT BP, CCITT BP, NONE, 15 kHz LP, 300 Hz LP, 300 Hz HP, 5 kHz LP and 300 Hz to 5 kHz BP

Level Sensitivity: ..... 7 mVrms / %AM ±15%

Speaker Output: ..... 75 dBa minimum at 0.5 m, 600 to 1800 Hz, maximum volume

Volume Control: ..... Level Range, Scale 0 to 100

LO Emissions: ..... >-50 dBc

Quieted Channels: ..... 10 frequencies allowed between 2 and 999.999 MHz, quieted by ≤30 dB

1-3. EQUIPMENT DATA (cont)

DUPLEX

NOTE

Duplex Test is Receiver and Transmitter Tests simultaneously. Performance parameters are the same as the independent Receiver and Transmitter Test Screens.

RF TRANSMITTER TEST METERS

RF ERROR METER

Meter Operating Range: ..... ±200 kHz

Resolution: ..... 1 Hz

Accuracy: .....Timebase ±2 Hz

RSSI METER (RF Power within Receiver IF BW)

Display Range / Units: .....-120 to +43 dBm (10 pW to 20 W)
-120 to +53 dBm (10 pW to 200 W) (Ext Atten set to 20 dB)

Useable Meter Reading - RF Level Range:

ANT Connector:..... -90 to -10 dBm
-110 to -10 dBm (Preamp ON)

T/R Connector:.....-50 to +43 dBm

Resolution: ..... 0.01 dBm

Accuracy: ..... ±3 dB

RF POWER METER (Broadband RF Power into T/R Connector)

Display Range / Units: .....0 to +43 dBm (0 to 20 W)
0 to +53 dBm (0 to 200 W) (Ext Atten set to 20 dB)

Minimum Input Level (w/ dBm): ..... 0.10 W / +20 dBm

Maximum Input Level: ..... +43 dBm / 20 W for 10 minutes at +25°C
or until Thermal Alarm sounds (whichever occurs first)

Alarms:.....+44 dBm for 5 seconds ON, 5 minutes OFF
or until Thermal Alarm sounds (whichever occurs first)

Meter Modes: ..... Average Power

Display Units: .....W or dBm (selectable)

Resolution: ..... 0.01 (W), 0.1 (dBm)

Accuracy (No External Attenuator):..... ±1 dB for internal attenuator
.....±1.5 dB with external attenuator provided

External 20 dB Attenuator Accuracy:..... ±0.5 dB

NOTE

When External Attenuator is selected, 20 dB is added to the measurements - 50 or 200 W.

1-3. EQUIPMENT DATA (cont)

RF POWER METER (Broadband RF Power into T/R Connector) (cont)

External 20 dB Attenuator Power Rating:

50 W Attenuator - 20 dB: ..... 50 W average at 25°C

150 W Attenuator - 20 dB: ..... 150 W average for up to 25°C, linearly de-rated to 125 W at 55°C, horizontal

200 W peak for 30 seconds ON/ 5 minutes OFF at 25°CFM DEVIATION METER

Meter Deviation Range: .....500 Hz to ±100 kHz

Meter Modes: ..... Peak+, Peak-, (Peak-Peak)/2

Resolution: ..... 1 Hz

Accuracy: .....±10%

AM MODULATION METER

Meter Range: .....5% to 100%

Meter Modes: ..... Peak+, Peak-, (Peak-Peak)/2

Resolution: 1%

Accuracy: ..... ±5% of reading, 1 kHz rate, 30% to 90% modulation, 3 kHz LPF

SWR MEASUREMENT

FREQUENCY

Range: .....2 to 1000 MHz

Calibration and Sweep Bandwidth:..... 2 to 1000 MHz, 0.1 MHz Resolution

CONNECTOR NAME / TYPE ..... SWR / TNC Female

SWR READING

Display Range:..... 1.00 to 7.00

Resolution: 0.01

Accuracy: ..... ±10% of SWR readings (calibrated) <300 MHz
± 20% of SWR readings (calibrated) >300 MHz

AUDIO METERS

AUDIO INPUT (EXT AUD IN) (BNC Input on Handset)

EXT AUD IN Input:

Frequency Range: ..... 300 Hz to 10 kHz, (1 kHz for SINAD and Distortion Meters)

Input Level: .....0 to 5 Vp-p

SINAD METER

Measurement Sources:..... EXT AUD IN, DEMOD

Audio Frequency: ..... 1 kHz

Reading Range:.....0 to 40 dB

Resolution: ..... 0.1 dB

Accuracy: .....±1.5 dB, reading >8 dB, <40 dB

1-3. EQUIPMENT DATA (cont)

DISTORTION METER

Measurement Sources: ..... EXT AUD IN, DEMOD

Audio Frequency: ..... 1 kHz

Reading Range: ..... 0% to 100%

Resolution: 0.1%

Accuracy: ..... ±10%, reading >1%, <20%

TIMEBASE

STANDARD OSCILLATOR

Temperature Stability: ..... ±0.25 ppm at 25°C
±0.5 ppm over temperature range

Aging: ..... 1 ppm / year

Warmup Time: ..... 3 minutes

ENVIRONMENTAL / PHYSICAL

OVERALL DIMENSIONS: ..... 231 mm (9.1 in) (W), 285 mm (11.2 in) (L), 70 mm (2.8 in) (D)

WEIGHT: ..... 8.5 lbs.; 12 lbs with accessories and soft carrying case

TEMPERATURE

Storage: ..... -51°C to +71°C

NOTE

Battery must not be subjected to temperatures below -20°C, nor above +60°C.

Operation: ..... -20°C to +55°C

NOTE

Battery to be charged at 0°C to +45°C.

HUMIDITY

Storage ..... MIL-PRF-28800F, Class 2

Operation ..... MIL-PRF-28800F, Class 2

ALTITUDE

Operation ..... MIL-PRF-28800F, Class 2

SHOCK

Operation ..... MIL-PRF-28800F, Class 2

BENCH HANDLING

Operation ..... MIL-PRF-28800F, Class 2

VIBRATION

Operation ..... MIL-PRF-28800F, Class 2

1-3. EQUIPMENT DATA (cont)

COMPLIANCE

USE: ..... Pollution Degree 2

EMC: ..... MIL-PRF-28800F, Class 2

AC INPUT POWER

AC Input Voltage Range: ..... 100 to 240 VAC, 1.5 A maximum, 47 Hz to 63 Hz

AC Input Voltage Fluctuation: ..... <10% of the nominal input voltage

Transient Overvoltage: ..... According to Installation Category II

AC-DC CONVERTER

Usage Environment: ..... Indoor use, Pollution Degree 2

Operating Temperature: ..... 0°C to +40°C

Storage Temperature: ..... -20°C to +85°C

EMI: ..... EN55022 Class B, EN61000-3-2 Class D

Safety: ..... UL 1950, CSA 22.2 No. 234 and No.950, IEC 950/EN 60950

DC INPUT CONNECTOR (DC IN)

DC Input Voltage Range: ..... 11 to 32 Vdc

DC Power Input:

Maximum: ..... 55 W

Nominal: ..... 25 W

DC Fuse Requirement: ..... 5 A, 32 Vdc, Type F

BATTERY

Battery Type: ..... Lithium Ion (Li Ion) Battery pack

NOTE

Battery must not be subjected to temperatures below -20°C, nor above +60°C.

Operation Time: ..... 5 hours continuous use

Charge Time: ..... 4 hours

NOTE

Battery to be charged at 0°C to +45°C. Dead Battery (<10% capacity) to be charged for 20 minutes before operation on AC Power.

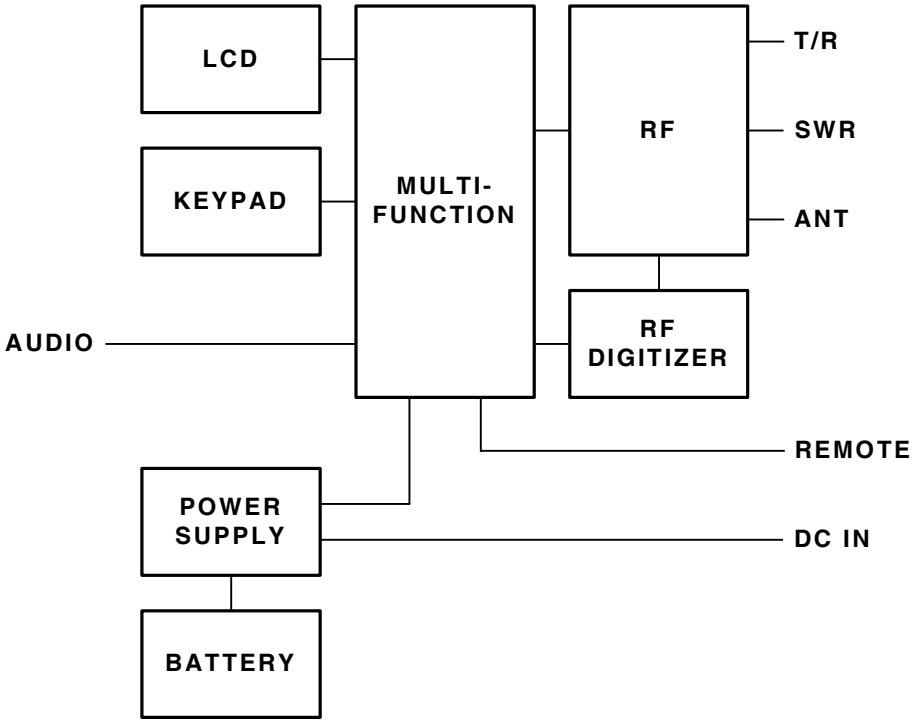
STATIC THERMAL CHARACTERISTICS

Ambient, Power ON, RF Power OFF: ..... <15°C rise after 30 minutes

Ambient, Power ON, RF Power ON: ..... <25°C rise after 30 minutes

1-3. PRINCIPLES OF OPERATION

The 3500 contains the following assemblies:



The **Power Supply PCB Assy** is responsible for supplying power to the internal modules for operation and for charging the internal batteries.

The **RF Digitizer PCB Assy** converts the baseband signal to a modulated 10.5 MHz Tx IF which is upconverted in the RF Assy to provide an RF Generator output. The Receive signals are down-converted to 13 MHz and demodulated to baseband signals.

The **Multi-Function PCB Assy** includes the processors, FPGA and memory to send data from the RF Digitizer PCB Assy through the Power PC to the ColdFire for display on the LCD Display. Keyboard inputs are processed to provide instructions to the RF Assy.

The **RF Assy** consists of the RF Controller PCB Assy and the RF Converter PCB Assy. The RF Converter PCB Assy converts the 10.5 MHz TX IF to the 2 MHz to 1 GHz RF and from the 2 MHz to 1 GHz receiver input to the 13 MHz RX IF. The RF Converter PCB Assy also contains the VSWR coupler and associated circuitry and the Power Termination. The RF Controller PCB Assy provides the TCXO, LOs and digital circuitry necessary for software control and for tuning and level control.

CHAPTER 2 - OPERATING INSTRUCTIONS

2-1. OPERATOR'S CONTROLS, INDICATORS AND CONNECTORS

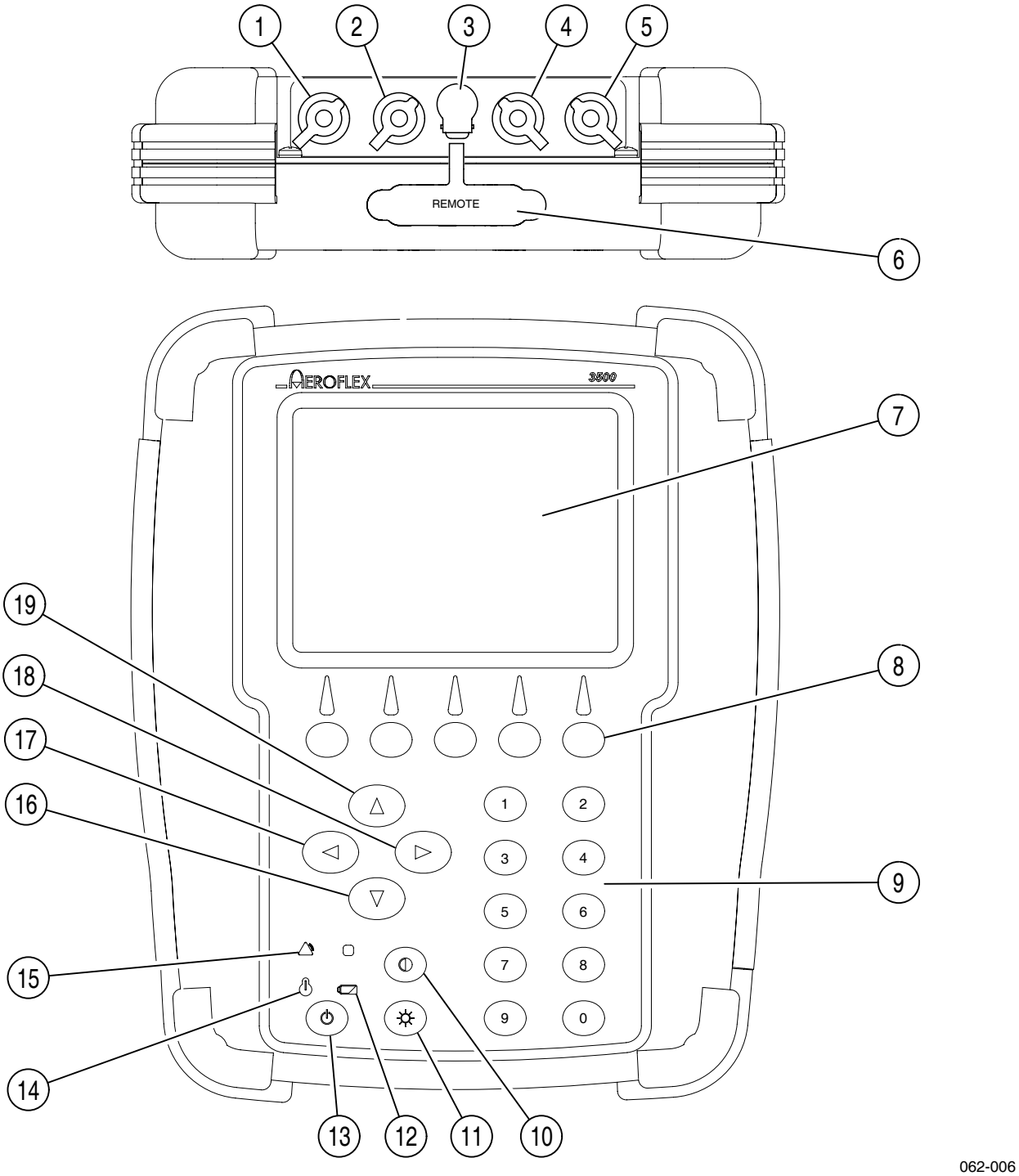
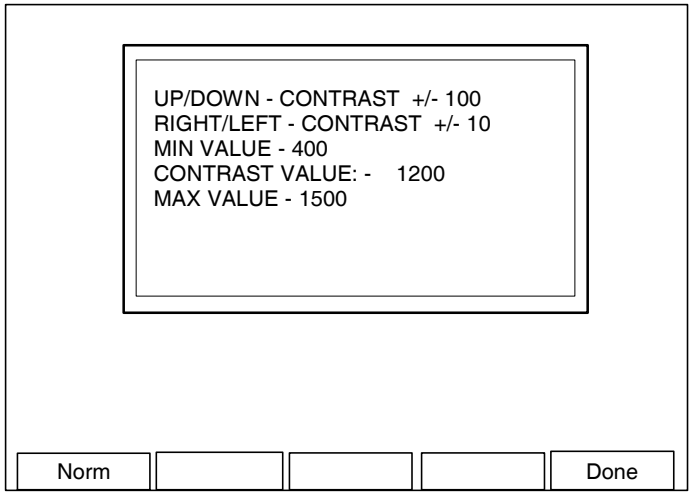
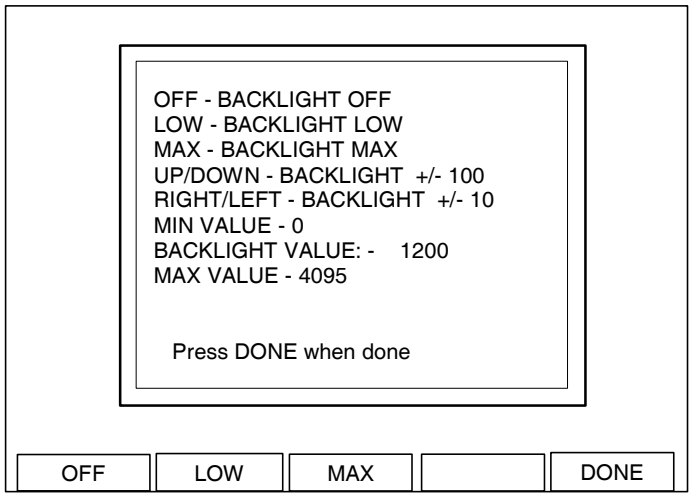


Figure 2-1. Controls, Connectors and Indicators

2-1. OPERATOR'S CONTROLS, INDICATORS AND CONNECTORS (cont)

KEY	CONTROL, INDICATOR OR CONNECTOR	FUNCTION
1	ANT Connector	Used for over-the-air tests.
2	T/R Connector	Used for high power direct connection to Radio equipment.
3	DC IN Connector	Used for operation of the Test Set or battery charging.
4	AUDIO Connector	Used to connect to the Microphone.
5	SWR Connector	Used to measure the VSWR of Antenna systems. Also used as a transmit signal output.
6	REMOTE Connector (External I/O)	Used to communicate with external equipment.
7	Display (LCD)	Used to view menus and screens. Soft Key boxes appear at the bottom of the menus/screens.
8	Multi-Function Soft Keys	Five Soft Keys are provided. The legends are displayed in boxes at the bottom of the Display.
9	Number Keys	Used for data entry or to select a numbered item.
10	CONTRAST / • Key	Used to select the Contrast Adjust Mode. The ▲ UP or ▼ DOWN Keys may be used to adjust the Contrast level.  Used to add a decimal point (•) to values during data entry.

2-1. OPERATOR'S CONTROLS, INDICATORS AND CONNECTORS (cont)

KEY	CONTROL, INDICATOR OR CONNECTOR	FUNCTION
11	BACKLIGHT / ± Key	Used to select the Backlight Adjust Mode. The ▲ UP or ▼ DOWN Keys may be used to adjust the Backlight level.  Used to change between positive (+) and negative (-) values during data entry.
12	CHARGE Indicator	Illuminates when external DC power is applied: GREEN Battery at Full Charge YELLOW Battery is Charging RED Battery Charge Failure
13	POWER Key ⏻	Used to power the Test Set ON and OFF.
14	POWER Indicator	Illuminates when the Test Set is powered: GREEN Battery at >25% capacity or External power is applied YELLOW Battery at <25% capacity
15	FAULT Indicator	The indicator illuminates when a fault exists in the Test Set: YELLOW Caution Condition exists RED Warning Condition exists Refer to para 2-4-2 for more information.
16	▼ DOWN Key	Used to move the on-screen cursor downward or to decrement an edit field.
17	◀ LEFT Key	Used to move the on-screen cursor to the next digit to the left in an edit field.

2-1. OPERATOR'S CONTROLS, INDICATORS AND CONNECTORS (cont)

KEY	CONTROL, INDICATOR OR CONNECTOR	FUNCTION
18	▶ RIGHT Key	Used to move the on-screen cursor to the next digit to the right in an edit field.
19	▲ UP Key	Used to move the on-screen cursor upward or to increment an edit field.

2-2. OPERATION SCREENS AND MENU CONFIGURATIONS

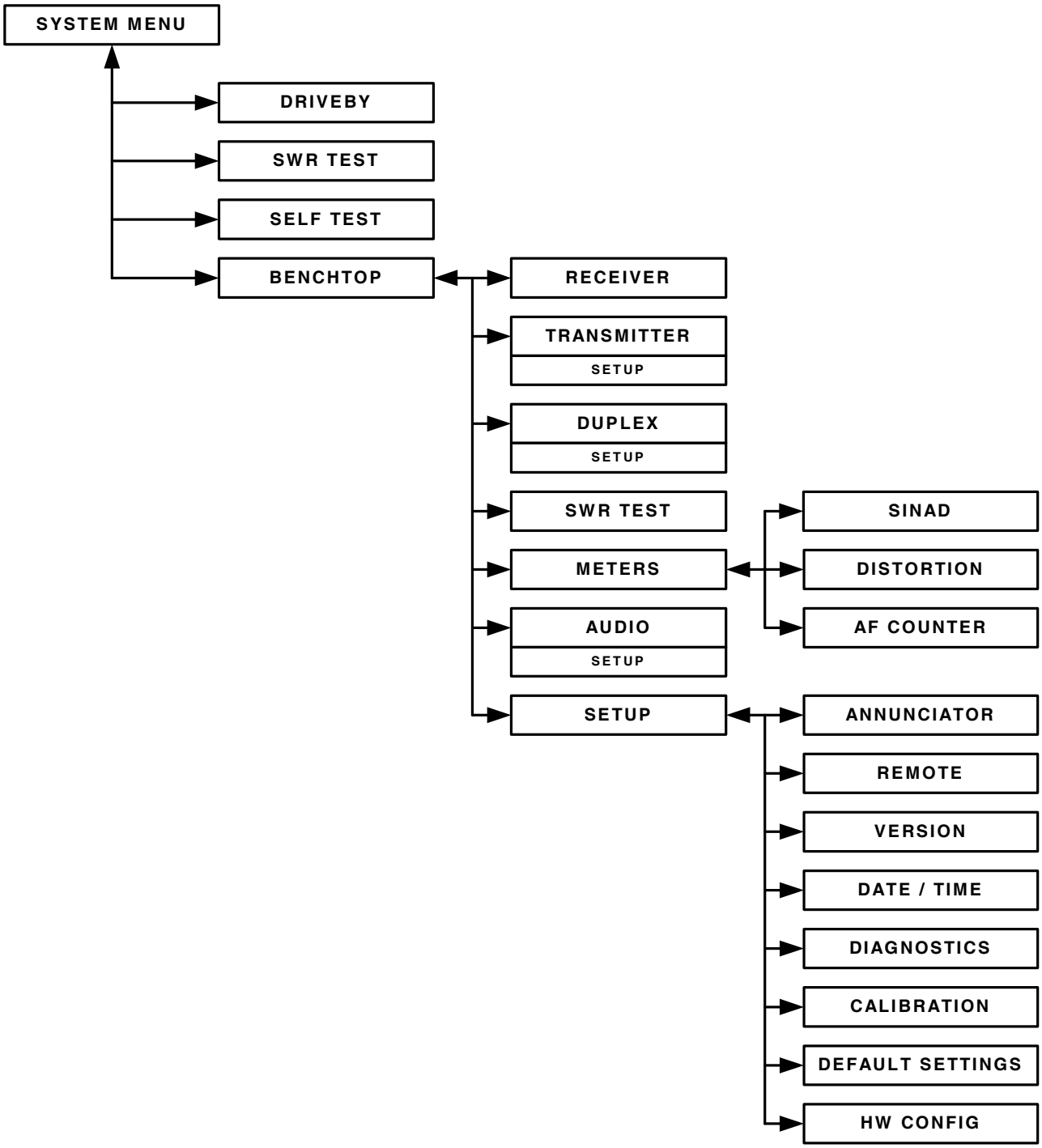
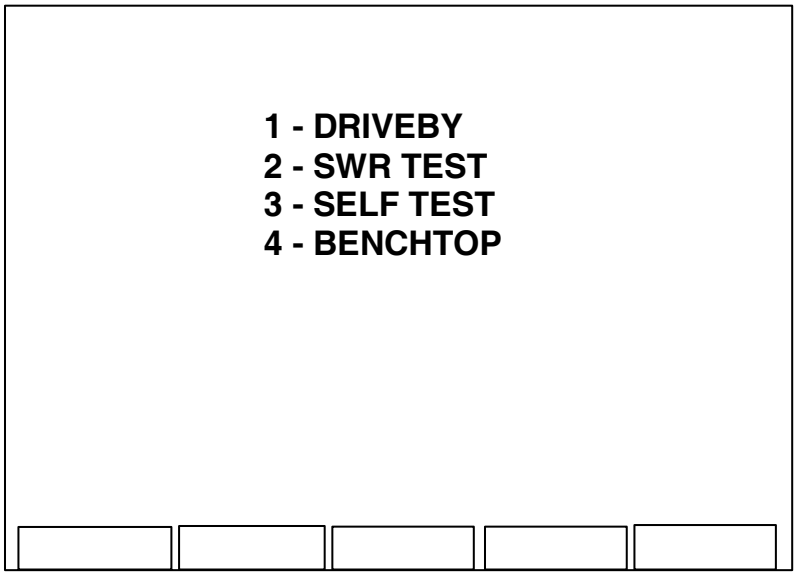


Figure 2-2. Menu / Screen Hierarchy

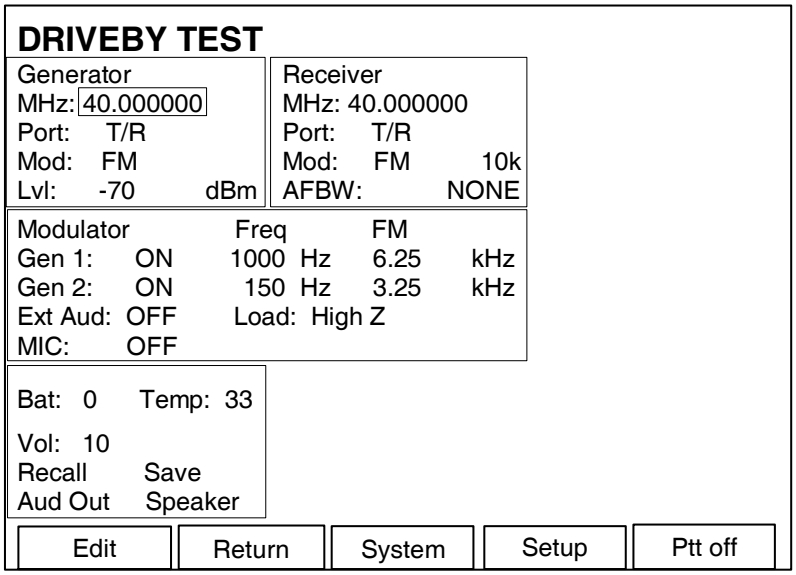
2-2-1. SYSTEM MENU



SCREEN FEATURE	FUNCTION
1 - DRIVEBY	Displays the Driveby Test Screen (para 2-2-2).
2 - SWR TEST	Displays the SWR Test Screen (para 2-2-3).
3 - SELF TEST	Displays the Self Test Menu (para 2-2-4).
4 - BENCHTOP	Displays the Benchtop Menu (para 2-2-5).

2-2-2. DRIVEBY TEST SCREEN

When the System Menu is displayed, press the 1 Key to access the Driveby Test Screen:



SCREEN FEATURE	FUNCTION
MHz (Generator)	Used to select the signal generator frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port (Generator)	Used to select the signal generator output connector. Select: ANT, T/R or SWR
Mod (Generator)	Used to select the signal generator modulation type. Select: AM, FM or OFF
Lvl (Generator)	Used to select the signal generator output level. Select: -90 to -30 dBm in 1 dB increments (ANT Connector) -120 to -50 dBm in 1 dB increments (T/R Connector) -65 to -5 dBm in 1 dB increments (SWR Connector)
MHz (Receiver)	Used to select the signal receiver frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port (Receiver)	Used to select the signal receiver input connector. Select: ANT or T/R
Mod (Receiver)	Used to select the signal receiver modulation type. Select: AM Modulation Meter changes to AM%. FM Modulation Meter changes to FM DEV.

2-2-2. DRIVEBY TEST SCREEN (cont)

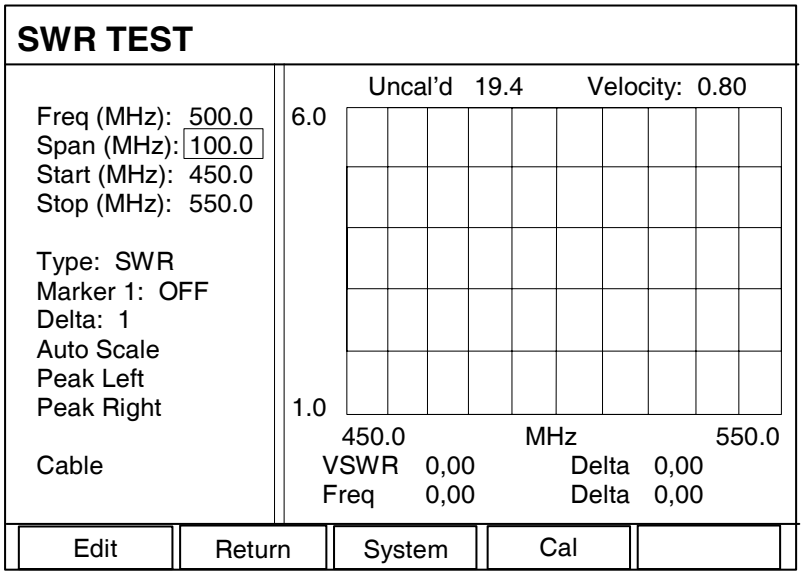
SCREEN FEATURE	FUNCTION
IFBW (field to right of Mod Field)	Used to select the IF bandwidth. Select: (for AM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k or 30k (for FM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k, 30k, 100k or 300k
AFBW	Used to select the bandwidth filter. Select: CCITT BP, C-Wt BP, 0.3-5k BP, 0.3k HP, 0.3k LP, 5k LP, 15k LP or None.
Gen 1	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments
Gen 2	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments
Ext Aud	Used to select external modulation. Select: ON Permits an external tone generator to modulate the 3500 signal generator. OFF Deactivates the external Audio input.
Load	Used to select the Audio input signal load (Ω). Select: 150, 600 or High Z
MIC	Used to select the external Microphone. Select: ON The external Microphone modulates the 3500 signal generator. OFF Deactivates the external Microphone input.
Bat	Displays the percentage of battery life remaining.
Temp	Displays the internal temperature of the 3500 in °C.
Vol	Used to select the Handset volume level. Select: 0 to 100
Recall	Displays the Recall Screen (para 2-2-8A).

2-2-2. DRIVEBY TEST SCREEN (cont)

SCREEN FEATURE	FUNCTION
Save	Displays the Save/Store Screen (para 2-2-8B).
Aud Out	Displays the Audio Out Connector Signal Routing Screen (para 2-2-8C).
Speaker	Displays the Speaker Signal Routing Screen (para 2-2-8C).
Meters (not shown)	Several Meters can be selected to appear on the Driveby Test Screen. Meters are selected in the Driveby Test Setup Screen.
F1 “Edit” / “Done” / “Zoom”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value. Zoom — Displays the screen of the field selected.
F2 “Return”	Displays the System Menu (para 2-2-1).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Setup”	Displays the Driveby Test Setup Screen.
F5 “PTT on” / “PTT off” / “Esc”	PTT on — Activates MIC. Turns RF Generator ON and turns Demod Audio OFF. PTT off — Deactivates MIC. Turns RF Generator OFF and turns Demod Audio ON. Esc — Ends the Field Edit, but does NOT save any changes to the setting or value.

2-2-3. SWR TEST SCREEN

When the System Menu is displayed, press the 2 Key to access the SWR Test Screen:



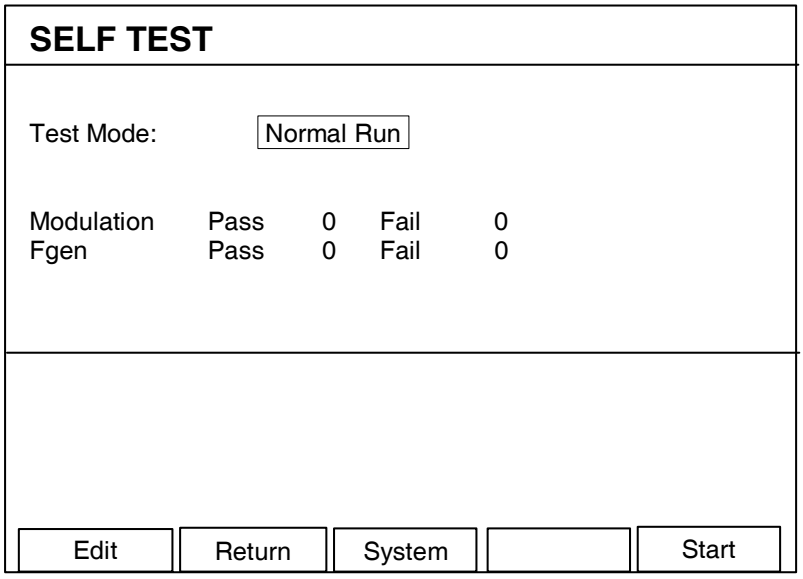
SCREEN FEATURE	FUNCTION
Freq	Used to select/display the Center Frequency of the SWR/DTF Test. Range: 2.0 to 1000 MHz in 0.1 MHz increments Displays the Center Frequency entered by the operator or the calculated Center Frequency if the Start and Stop Frequencies are entered.
Span	Used to select/display the Frequency Span of the SWR/DTF Test. Range: (SWR) 10.0 to 998 MHz in 0.1 MHz increments (DTF) 100 to 998 MHz in 0.1 MHz increments (RL) 100 to 998 MHz in 0.1 MHz increments (LOSS) 100 to 998 MHz in 0.1 MHz increments Displays the Frequency Span entered by the operator or the calculated Frequency Span if the Start and Stop Frequencies are entered.
Start	Used to select/display the Start Frequency of the SWR/DTF Test. Range: 2.0 to 1000 MHz in 0.1 MHz increments Displays the Start Frequency entered by the operator or the calculated Start Frequency if the Center Frequency and Frequency Span are entered.
Stop	Used to select/display the Stop Frequency of the SWR/DTF Test. Range: 12.0 to 1000 MHz in 0.1 MHz increments Displays the Stop Frequency entered by the operator or the calculated Stop Frequency if the Center Frequency and Frequency Span are entered.

2-2-3. SWR TEST SCREEN (cont)

SCREEN FEATURE	FUNCTION
Type	Used to select SWR,DTF, RL or LOSS Testing.
Marker Number	Used to select and enable one of three markers on the Graphical Display. Select: 1 to 3 Ths data corresponding to the active Marker position is shown under in fields under the Graphical Display.
Marker Status	Used to set the Marker selected to ON or OFF.
Delta	Used to enable the Delta Marker Function. Select: 1 to 3 The Delta Fields (below the Graphical Display) show the Delta in Frequency and SWR/Return Loss between the Active Marker selected in the Marker Field and the Marker selected in the Delta Field.
Auto Scale	Used to scale the Vertical Axis of the Graphical Display to 10% above and below the mininum and maximum measured values.
Peak / Move Left	Used to move the Active Marker selected in the Marker Field to the left on the Graphical Display.
Peak / Move Right	Used to move the Active Marker selected in the Marker Field to the right on the Graphical Display.
Cable	Used only in DTF Testing to select the type of coaxial cable used on the system under test.
Graphical Display	A graphical representation of the measurement data. SWR vs. Frequency when testing SWR. Return Loss in dB(dBRL) vs. Distance when testing DTF.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the System Menu (para 2-2-1).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Cal”	Cal — Instruction popups are displayed to calibrate the SWR Connector. Once the SWR Connector is calibrated, the SWR Connector remains in the calibration state until the frequency or span is changed.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

2-2-4. SELF TEST SCREEN

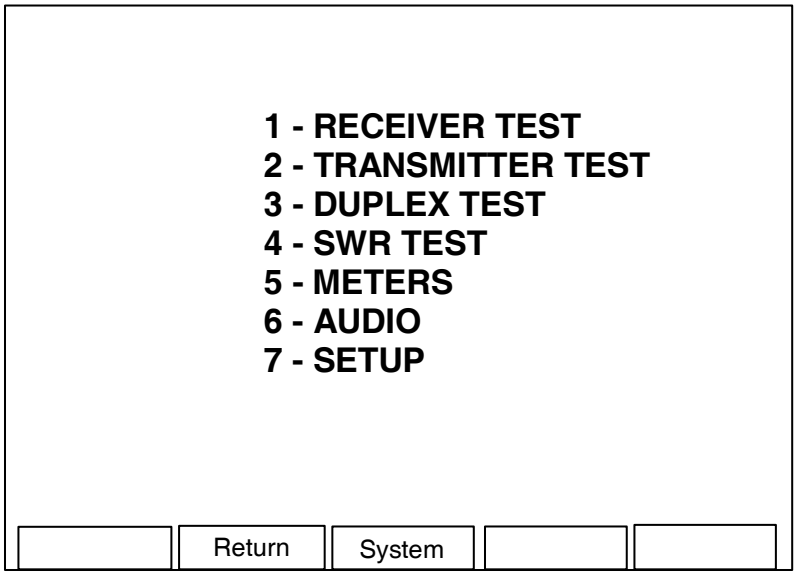
When the System Menu is displayed, press the 3 Key to access the Self Test screen:



SCREEN FEATURE	FUNCTION
Test Mode	Used to select the run mode of the Self Test. Select: Normal Run or Loop All
Modulation	Displays the pass/fail status of the Modulation Self Test. Each time the test is performed, the fields next to Pass or Fail are incremented. The fields are cleared if the Self Test is re-initialized.
Fgenr	Displays the pass/fail status of the Function Generator Self Test. Each time the test is performed, the fields next to Pass or Fail are incremented. The fields are cleared if the Self Test is restarted.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the System Menu (para 2-2-1).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Start” / “Stop” / “Esc”	Start Initiates the Self Test. Stop Terminates the Self Test. Esc Ends the Field Edit, but does NOT save any changes to the setting or value.

2-2-5. BENCHTOP MENU

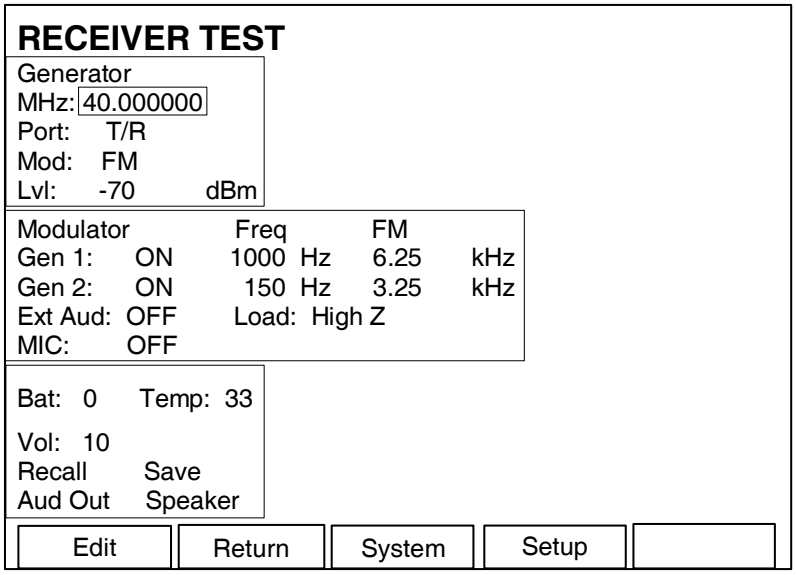
When the System Menu is displayed, press the 4 Key to access the Benchtop Menu:



SCREEN FEATURE	FUNCTION
1 - RECEIVER TEST	Displays the Receiver Test Screen (para 2-2-5A).
2 - TRANSMITTER TEST	Displays the Transmitter Test Screen (para 2-2-5B).
3 - DUPLEX TEST	Displays the Duplex Test Screen (para 2-2-5C).
4 - SWR TEST	Displays the SWR Test Screen (para 2-2-5D).
5 - METERS	Displays the Meters Menu (para 2-2-5E).
6 - AUDIO	Displays the Audio Test Screen (para 2-2-5F).
7 - SETUP	Displays the Setup Menu (para 2-2-5H).
F2 “Return”	Displays the System Menu (para 2-2-1).
F3 “System”	Displays the System Menu (para 2-2-1).

A. Receiver Test Screen

When the Benchtop Menu is displayed, press the 1 Key to access the Receiver Test Screen:



SCREEN FEATURE	FUNCTION
MHz	Used to select the signal generator frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port	Used to select the signal generator output connector. Select: ANT, T/R or SWR
Mod	Used to select the signal generator modulation type. Select: AM, FM or OFF
Lvl	Used to select the signal generator output level. Select: -90 to -30 dBm in 1 dB increments (ANT Connector) -120 to -50 dBm in 1 dB increments (T/R Connector) -65 to -5 dBm in 1 dB increments (SWR Connector)
Gen 1	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments

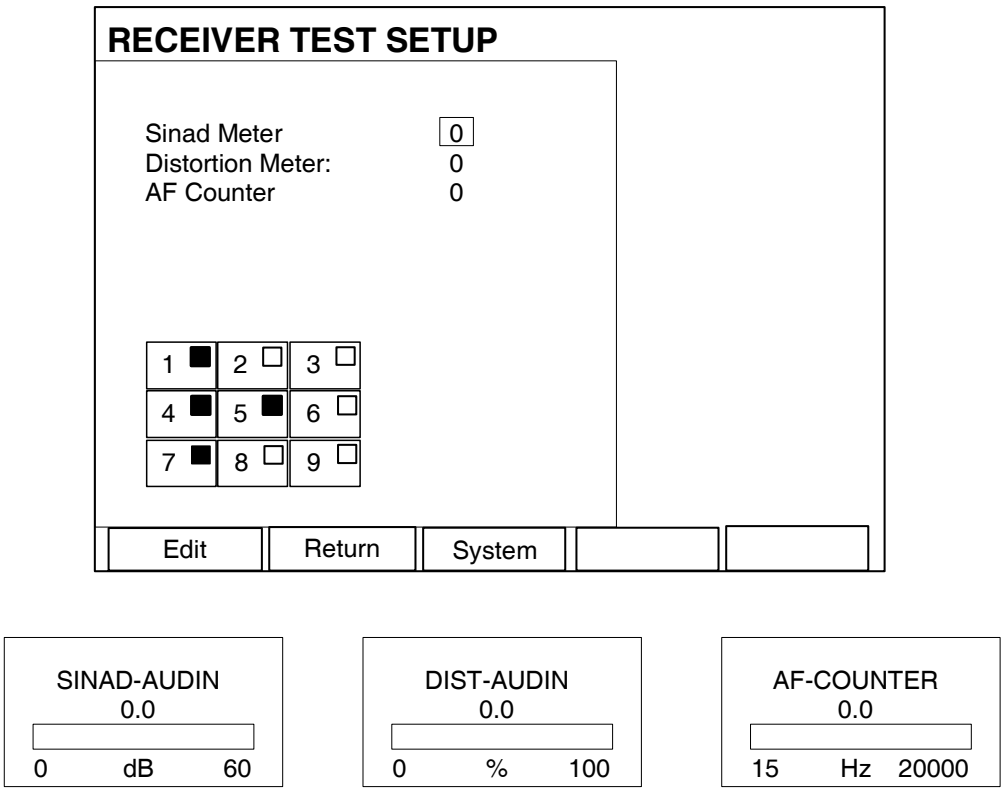
A. Receiver Test Screen (cont)

SCREEN FEATURE	FUNCTION
Gen 2	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments
Ext Aud	Used to select external modulation. Select: ON Permits an external tone generator to modulate the 3500 signal generator. OFF Deactivates the external Audio input.
Load	Used to select the Audio input signal load (Ω). Select: 150, 600 or High Z
MIC	Used to select the external Microphone. Select: ON The external Microphone modulates the 3500 signal generator. OFF Deactivates the external Microphone input.
Bat	Displays the percentage of battery life remaining.
Temp	Displays the internal temperature of the 3500 in °C.
Vol	Used to select the Handset volume level. Select: 0 to 100
Recall	Displays the Recall Screen (para 2-2-8A).
Save	Displays the Save/Store Screen (para 2-2-8B).
Aud Out	Displays the Audio Out Connector Signal Routing Screen (para 2-2-8C).
Speaker	Displays the Speaker Signal Routing Screen (para 2-2-8C).
Meters (not shown)	Several Meters can be selected to appear on the Receiver Test Screen. Meters are selected in the Receiver Test Setup Screen.
F1 “Edit” / “Done” / “Zoom”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value. Zoom Displays the screen of the field selected.
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).

A. Receiver Test Screen (cont)

SCREEN FEATURE	FUNCTION
F4 “Setup”	Displays the Receiver Test Setup Screen.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

A. Receiver Test Screen (cont)



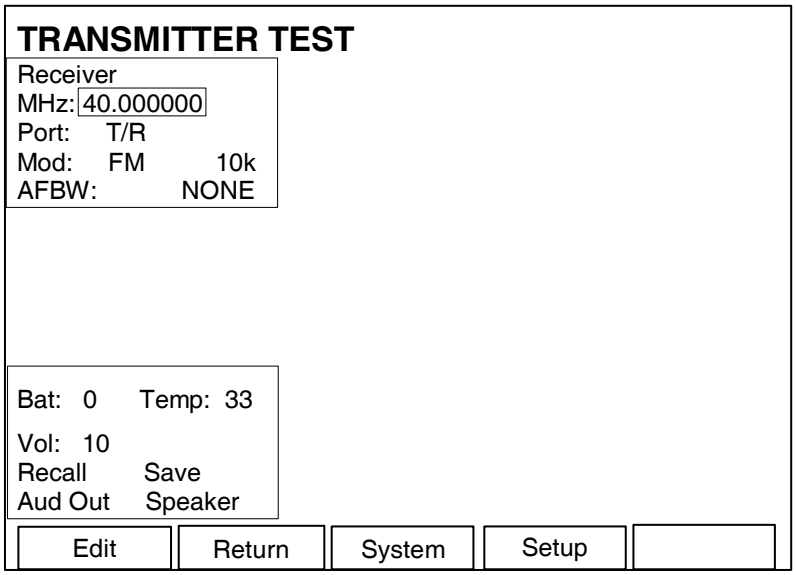
SCREEN FEATURE	FUNCTION
Sinad Meter	Used to select the position of the SINAD Meter on the Receiver Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 6, 8 or 9
Distortion Meter	Used to select the position of the Distortion Meter on the Receiver Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 6, 8 or 9
AF Counter	Used to select the position of the AF Counter on the Receiver Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 6, 8 or 9
Meter Chart	Displays the areas of the Receiver Test Screen and a number representing each area (i.e., 3 is top right on the Receiver Test Screen, etc.).
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Receiver Test Screen.

A. Receiver Test Screen (cont)

SCREEN FEATURE	FUNCTION
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

B. Transmitter Test Screen

When the Benchtop Menu is displayed, press the 2 Key to access the Transmitter Test Screen:



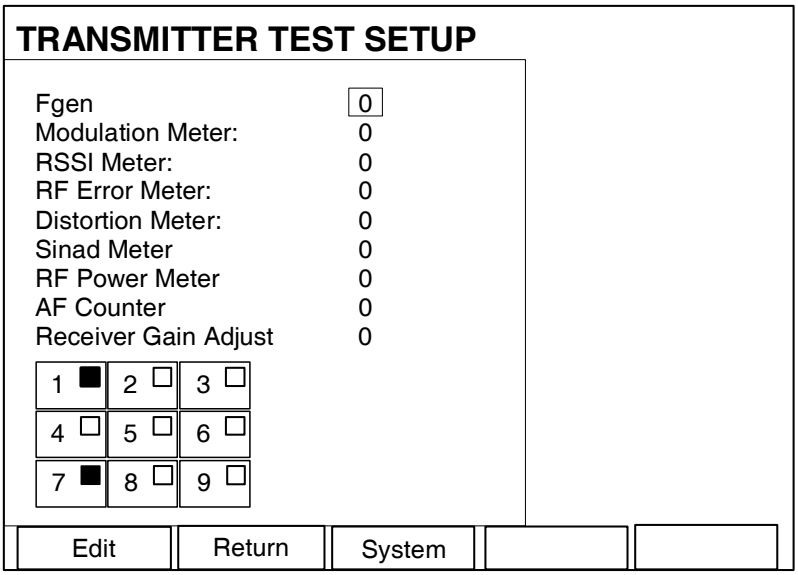
SCREEN FEATURE	FUNCTION
MHz	Used to select the signal receiver frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port	Used to select the signal receiver input connector. Select: ANT or T/R
Mod	Used to select the signal receiver modulation type. Select: AM Modulation Meter changes to AM%. FM Modulation Meter changes to FM DEV.
IFBW (field to right of Mod Field)	Used to select the IF bandwidth. Select: (for AM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k or 30k (for FM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k, 30k, 100k or 300k
AFBW	Used to select the bandwidth filter. Select: CCITT BP, C-Wt BP, 0.3-5k BP, 0.3k HP, 0.3k LP, 3k LP, 5k LP, 15k LP or None.
Bat	Displays the percentage of battery life remaining.
Temp	Displays the internal temperature of the 3500 in °C.

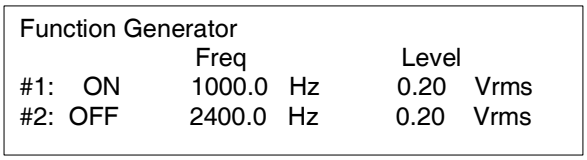
B. Transmitter Test Screen (cont)

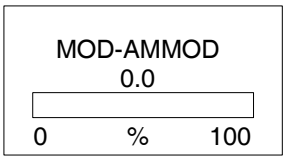
SCREEN FEATURE	FUNCTION
Vol	Used to select the Handset volume level. Select: 0 to 100
Recall	Displays the Recall Screen (para 2-2-8A).
Save	Displays the Save/Store Screen (para 2-2-8B).
Aud Out	Displays the Audio Out Connector Signal Routing Screen (para 2-2-8C).
Speaker	Displays the Speaker Signal Routing Screen (para 2-2-8C).
Meters (not shown)	Several Meters can be selected to appear on the Transmitter Test Screen. Meters are selected in the Transmitter Test Setup Screen.
F1 “Edit” / “Done” / “Zoom”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value. Zoom Displays the screen of the field selected.
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Setup”	Displays the Transmitter Test Setup Screen.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

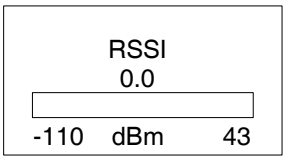
B. Transmitter Test Screen (cont)

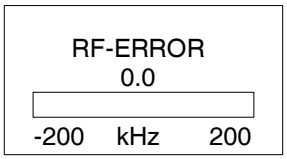
When the Transmitter Test Screen is displayed, press the F4 “Setup” Key to access the Transmitter Test Setup Screen:

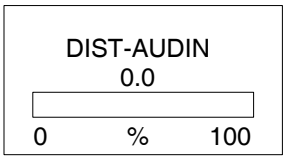


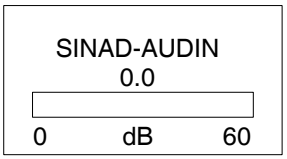


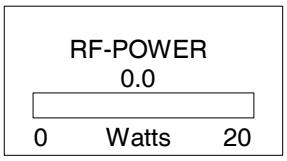


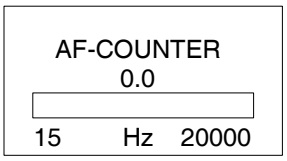


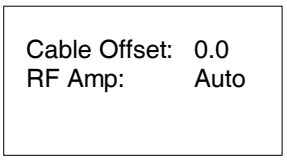












B. Transmitter Test Screen (cont)

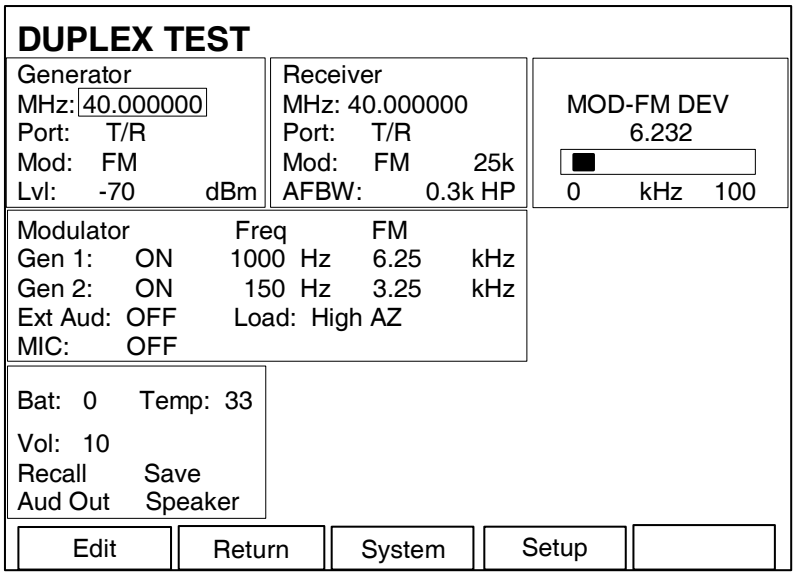
SCREEN FEATURE	FUNCTION
Fgen (Function Generator)	Used to select the position of the Function Generator on the Transmitter Test Screen (refer to Meter Chart). Since the Function Generator occupies the screen space of two functions on the Transmiter Test Screen, the space directly adjacent to the screen space selected must be empty in order for the Function Generator to be displayed. (e.g. To select screen space 2; screen space 3 must be empty) Select: 0 (Meter not shown), 2, 4, 5 or 8 **Freq** Select: 0 to 24000 Hz in 0.1 Hz increments **Level** Select: 0.00 to 1.57 Vrms in 0.01 V increments The Function Generator utilizes the AUDIO Connector for signal output.
Modulation Meter	Used to select the position of the Modulation Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
RSSI Meter	Used to select the position of the RSSI Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
RF Error Meter	Used to select the position of the RF Error Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
Distortion Meter	Used to select the position of the Distortion Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
Sinad Meter	Used to select the position of the SINAD Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
RF Power Meter	Used to select the position of the RF Power Meter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
AF Counter	Used to select the position of the AF Counter on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9
Receiver Gain Adjust	Used to select the position of the Receiver Gain Adjustustable Settings on the Transmitter Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 2, 3, 4, 5, 6, 8 or 9 **Cable Offset** Select: -40.0 to +40.0 in 0.1 increments **RF Amp** Select: ON, OFF or AUTO

B. Transmitter Test Screen (cont)

SCREEN FEATURE	FUNCTION
Meter Chart	Displays the areas of the Transmitter Test Screen and a number representing each area (i.e., 3 is top right on the Transmitter Test Screen, etc.).
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Transmitter Test Screen.
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

C. Duplex Test Screen

When the Benchtop Menu is displayed, press the 3 Key to access the Duplex Test Screen:



SCREEN FEATURE	FUNCTION
MHz (Generator)	Used to select the signal generator frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port (Generator)	Used to select the signal generator output connector. Select: ANT, T/R or SWR
Mod (Generator)	Used to select the signal generator modulation type. Select: AM, FM or OFF
Lvl (Generator)	Used to select the signal generator output level. Select: -90 to -30 dBm in 1 dB increments (ANT Connector) -120 to -50 dBm in 1 dB increments (T/R Connector) -65 to -5 dBm in 1 dB increments (SWR Connector)
MHz (Receiver)	Used to select the signal receiver frequency. Range: 2.000000 to 1000.000000 MHz in 0.000001 MHz increments
Port (Receiver)	Used to select the signal receiver input connector. Select: ANT or T/R
Mod (Receiver)	Used to select the signal receiver modulation type. Select: AM Modulation Meter changes to AM%. FM Modulation Meter changes to FM DEV.

C. Duplex Test Screen (cont)

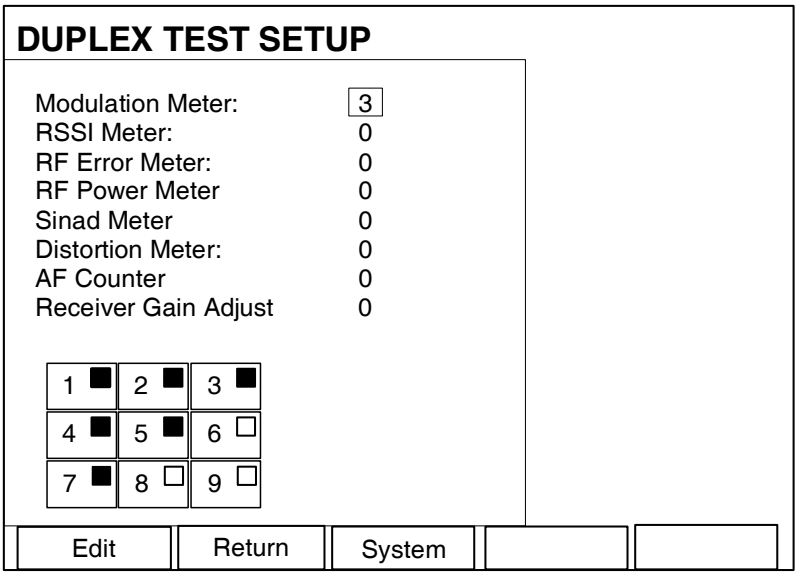
SCREEN FEATURE	FUNCTION
IFBW (field to right of Mod Field)	Used to select the IF bandwidth. Select: (for AM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k or 30k (for FM): 5k, 6.25k, 8.33k, 10k, 12.5k, 25k, 30k, 100k or 300k
AFBW	Used to select the bandwidth filter. Select: CCITT BP, C-Wt BP, 0.3-5k BP, 0.3k HP, 0.3k LP, 3k LP, 5k LP, 15k LP or None.
Gen 1	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments
Gen 2	Used to select internal modulation. Select: ON or OFF AM: Freq 0 to 20000 Hz in 1 Hz increments %Mod 0% to 100% in 0.1% increments FM: Freq 0 to 24000 Hz in 1 Hz increments Dev kHz 0 to 100 kHz in 0.01 kHz increments
Ext Aud	Used to select external modulation. Select: ON Permits an external tone generator to modulate the 3500 signal generator. OFF Deactivates the external Audio input.
Load	Used to select the Audio input signal load (Ω). Select: 150, 600 or High Z
MIC	Used to select the external Microphone. Select: ON The external Microphone modulates the 3500 signal generator. OFF Deactivates the external Microphone input.
Bat	Displays the percentage of battery life remaining.
Temp	Displays the internal temperature of the 3500 in °C.
Vol	Used to select the Handset volume level. Select: 0 to 100
Recall	Displays the Recall Screen (para 2-2-8A).

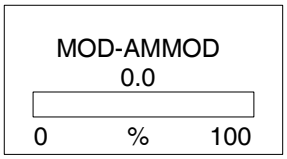
C. Duplex Test Screen (cont)

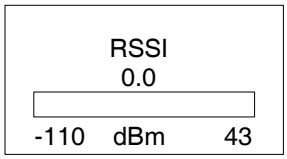
SCREEN FEATURE	FUNCTION
Save	Displays the Save/Store Screen (para 2-2-8B).
Aud Out	Displays the Audio Out Connector Signal Routing Screen (para 2-2-8C).
Speaker	Displays the Speaker Signal Routing Screen (para 2-2-8C).
Meters (not shown)	Several Meters can be selected to appear on the Duplex Test Screen. Meters are selected in the Duplex Test Setup Screen.
F1 “Edit” / “Done” / “Zoom”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value. Zoom — Displays the screen of the field selected.
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Setup”	Displays the Duplex Test Setup Screen.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

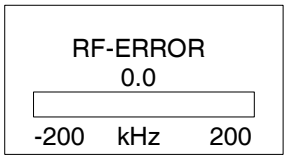
C. Duplex Test Screen (cont)

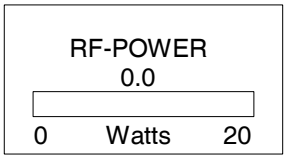
When the Duplex Test Screen is displayed, press the F4 “Setup” Key to access the Duplex Test Setup Screen:

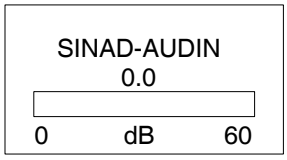


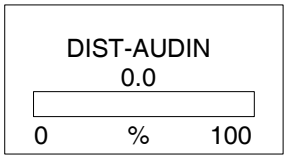


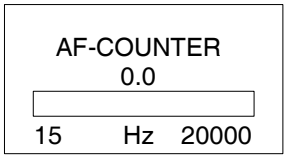


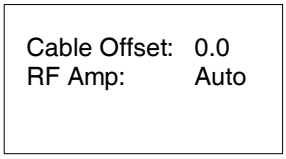










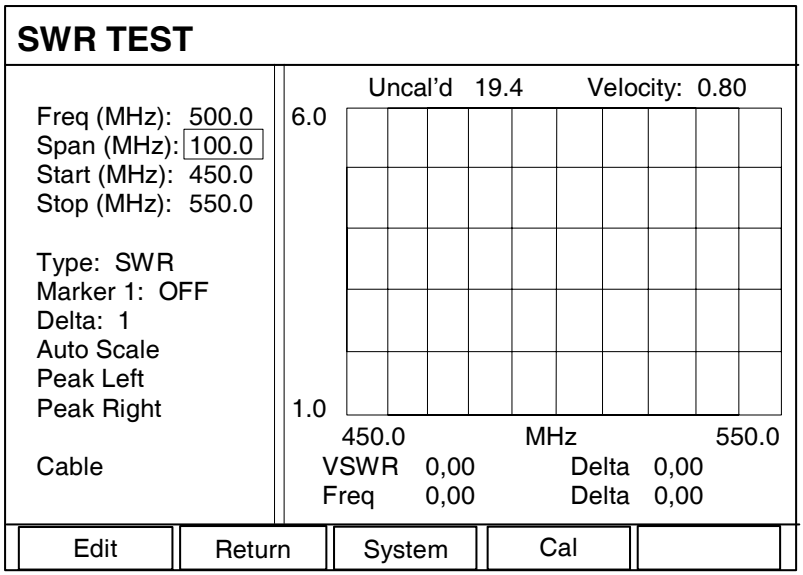


C. Duplex Test Screen (cont)

SCREEN FEATURE	FUNCTION
Modulation Meter	Used to select the position of the Modulation Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
RSSI Meter	Used to select the position of the RSSI Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
RF Error Meter	Used to select the position of the RF Error Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
RF Power Meter	Used to select the position of the RF Power Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
Sinad Meter	Used to select the position of the SINAD Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
Distortion Meter	Used to select the position of the Distortion Meter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
AF Counter	Used to select the position of the AF Counter on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9
Receiver Gain Adjust	Used to select the position of the Receiver Gain Adjustustable Settings on the Duplex Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 6, 8 or 9 **Cable Offset** Select: -40.0 to +40.0 in 0.1 increments **RF Amp** Select: ON, OFF or AUTO
Meter Chart	Displays the areas of the Duplex Test Screen and a number representing each area (i.e., 3 is top right on the Duplex Test Screen, etc.).
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Duplex Test Screen.
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

D. SWR Test Screen

When the Benchtop Menu is displayed, press the 4 Key to access the SWR Test Screen:



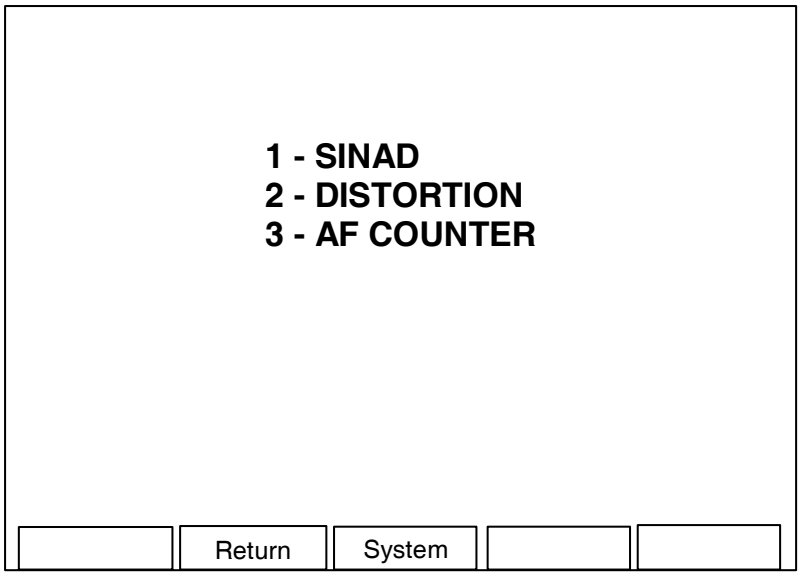
SCREEN FEATURE	FUNCTION
Freq	Used to select/display the Center Frequency of the SWR/DTF Test. Range: 2.0 to 1000 MHz in 0.1 MHz increments Displays the Center Frequency entered by the operator or the calculated Center Frequency if the Start and Stop Frequencies are entered.
Span	Used to select/display the Frequency Span of the SWR/DTF Test. Range: (SWR) 10.0 to 998 MHz in 0.1 MHz increments (DTF) 100 to 998 MHz in 0.1 MHz increments (RL) 100 to 998 MHz in 0.1 MHz increments (LOSS) 100 to 998 MHz in 0.1 MHz increments Displays the Frequency Span entered by the operator or the calculated Frequency Span if the Start and Stop Frequencies are entered.
Start	Used to select/display the Start Frequency of the SWR/DTF Test. Range: 2.0 to 1000 MHz in 0.1 MHz increments Displays the Start Frequency entered by the operator or the calculated Start Frequency if the Center Frequency and Frequency Span are entered.
Stop	Used to select/display the Stop Frequency of the SWR/DTF Test. Range: 12.0 to 1000 MHz in 0.1 MHz increments Displays the Stop Frequency entered by the operator or the calculated Stop Frequency if the Center Frequency and Frequency Span are entered.

2-2-3. SWR TEST SCREEN (cont)

SCREEN FEATURE	FUNCTION
Type	Used to select SWR,DTF, RL or LOSS Testing.
Marker Number	Used to select and enable one of three markers on the Graphical Display. Select: 1 to 3 Ths data corresponding to the active Marker position is shown under in fields under the Graphical Display.
Marker Status	Used to set the Marker selected to ON or OFF.
Delta	Used to enable the Delta Marker Function. Select: 1 to 3 The Delta Fields (below the Graphical Display) show the Delta in Frequency and SWR/Return Loss between the Active Marker selected in the Marker Field and the Marker selected in the Delta Field.
Auto Scale	Used to scale the Vertical Axis of the Graphical Display to 10% above and below the mininum and maximum measured values.
Peak / Move Left	Used to move the Active Marker selected in the Marker Field to the left on the Graphical Display.
Peak / Move Right	Used to move the Active Marker selected in the Marker Field to the right on the Graphical Display.
Cable	Used only in DTF Testing to select the type of coaxial cable used on the system under test.
Graphical Display	A graphical representation of the measurement data. SWR vs. Frequency when testing SWR. Return Loss in dB(dBRL) vs. Distance when testing DTF.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Cal”	Cal — Instruction popups are displayed to calibrate the SWR Connector. Once the SWR Connector is calibrated, the SWR Connector remains in the calibration state until the frequency or span is changed.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

E. Meters Menu

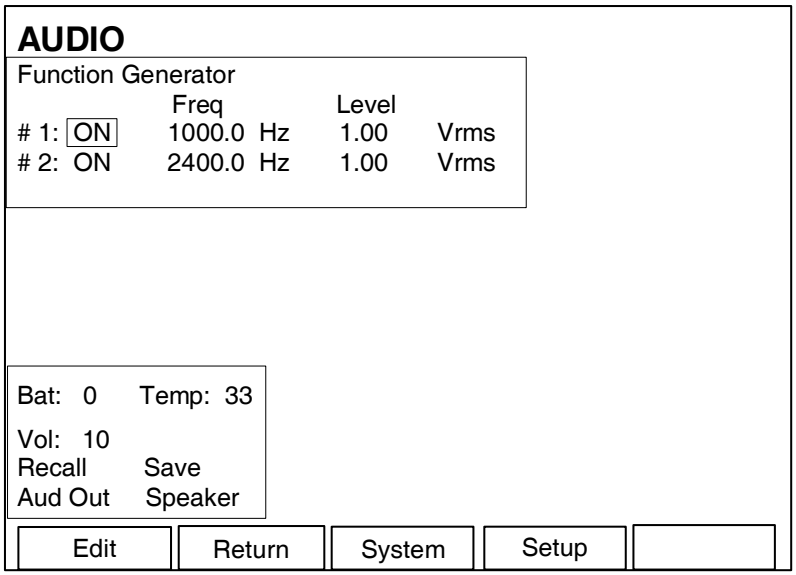
When the Benchtop Menu is displayed, press the 5 Key to access the Meters Menu:



Refer to para 2-2-6 for a description of the Meters Menu.

F. Audio Test Screen

When the Benchtop Menu is displayed, press the 6 Key to access the Audio Test Screen:



NOTE

The Audio Test Screen utilizes the AUDIO Connector for signal output.

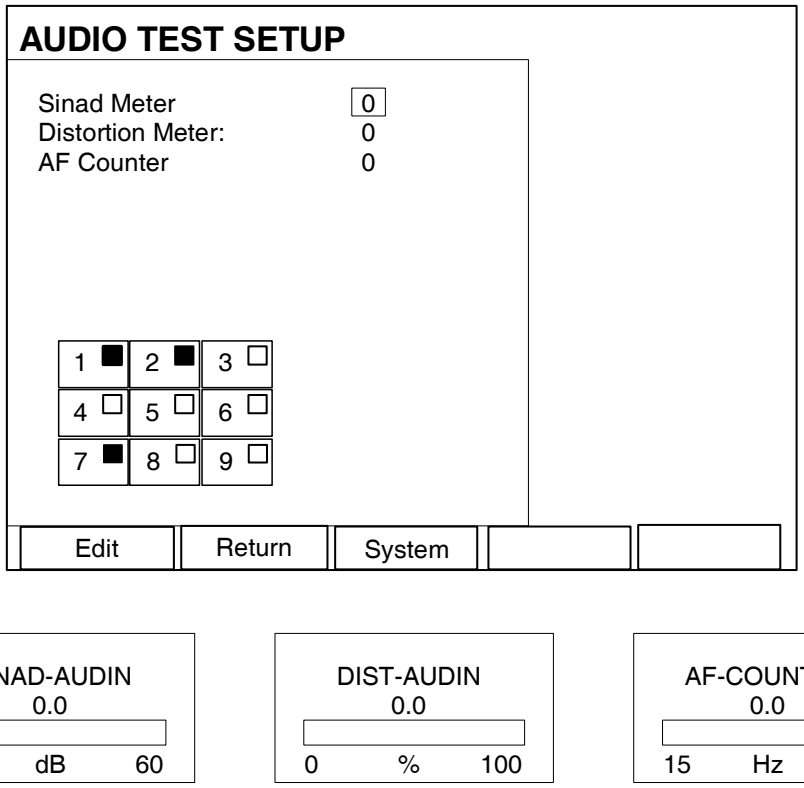
SCREEN FEATURE	FUNCTION
#1 (Function Generator)	Used to select Function Generator #1. Select: ON or OFF Freq 0 to 24000 Hz in 0.1 Hz increments Level 0.00 to 1.57 Vrms in 0.01 V increments
#2 (Function Generator)	Used to select Function Generator #2. Select: ON or OFF Freq 0 to 24000 Hz in 0.1 Hz increments Level 0.00 to 1.57 Vrms in 0.01 V increments
Bat	Displays the percentage of battery life remaining.
Temp	Displays the internal temperature of the 3500 in °C.
Vol	Used to select the Handset volume level. Select: 0 to 100
Recall	Displays the Recall Screen (para 2-2-8A).
Save	Displays the Save/Store Screen (para 2-2-8B).
Aud Out	Displays the Audio Out Connector Signal Routing Screen (para 2-2-8C).
Speaker	Displays the Speaker Signal Routing Screen (para 2-2-8C).

F. Audio Test Screen (cont)

SCREEN FEATURE	FUNCTION
Meters (not shown)	Several Meters can be selected to appear on the Audio Test Screen. Meters are selected in the Audio Test Setup Screen.
F1 “Edit” / “Done” / “Zoom”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value. Zoom — Displays the screen of the field selected.
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Setup”	Displays the Audio Test Setup Screen.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

F. Audio Test Screen (cont)

When the Audio Test Screen is displayed, press the F4 “Setup” Key to access the Audio Test Setup Screen:



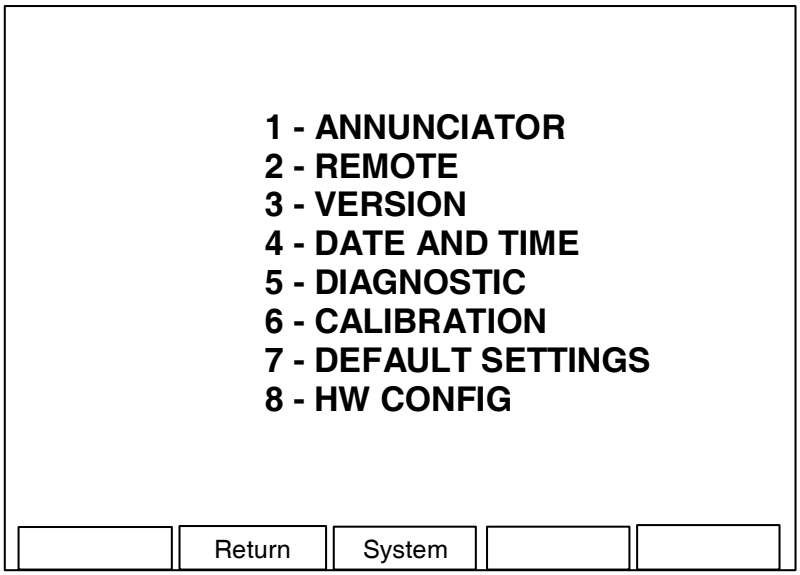
SCREEN FEATURE	FUNCTION
Sinad Meter	Used to select the position of the SINAD Meter on the Audio Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 4, 5, 6, 8 or 9
Distortion Meter	Used to select the position of the Distortion Meter on the Audio Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 4, 5, 6, 8 or 9
AF Counter	Used to select the position of the AF Counter on the Audio Test Screen (refer to Meter Chart). Select: 0 (Meter not shown), 3, 4, 5, 6, 8 or 9
Meter Chart	Displays the areas of the Audio Test Screen and a number representing each area (i.e., 3 is top right on the Audio Test Screen, etc.).
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.

F. Audio Test Screen (cont)

SCREEN FEATURE	FUNCTION
F2 “Return”	Displays the Audio Test Screen.
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

G. Setup Menu

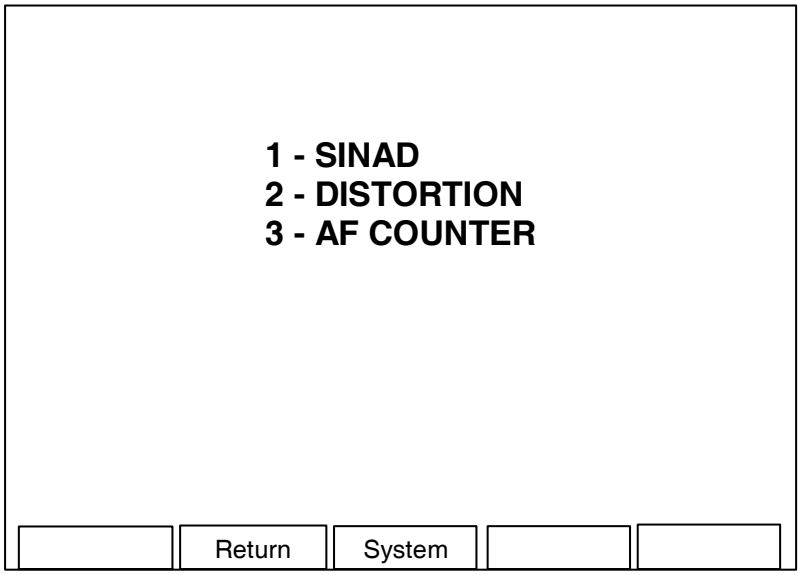
When the Benchtop Menu is displayed, press the 8 Key to access the Setup Menu:



Refer to para 2-2-7 for a description of the Setup Menu.

2-2-6. METERS MENU

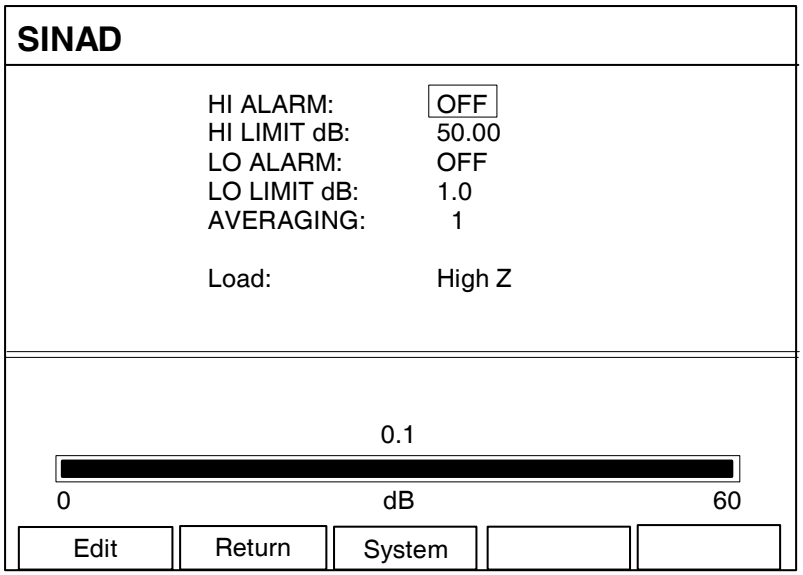
When the Benchtop Menu is displayed, press the 5 Key to access the Meters Menu:



SCREEN FEATURE	FUNCTION
1 - SINAD	Displays the SINAD Meter Screen (para 2-2-6A).
2 - DISTORTION	Displays the Distortion Meter Screen (para 2-2-6B).
3 - AF COUNTER	Displays the AF Counter Screen (para 2-2-6C).
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).

A. SINAD Meter Screen

When the Meters Menu is displayed, press the 1 Key to access the SINAD Meter Screen:



NOTE

The SINAD Meter Screen utilizes the AUDIO Connector for signal input.

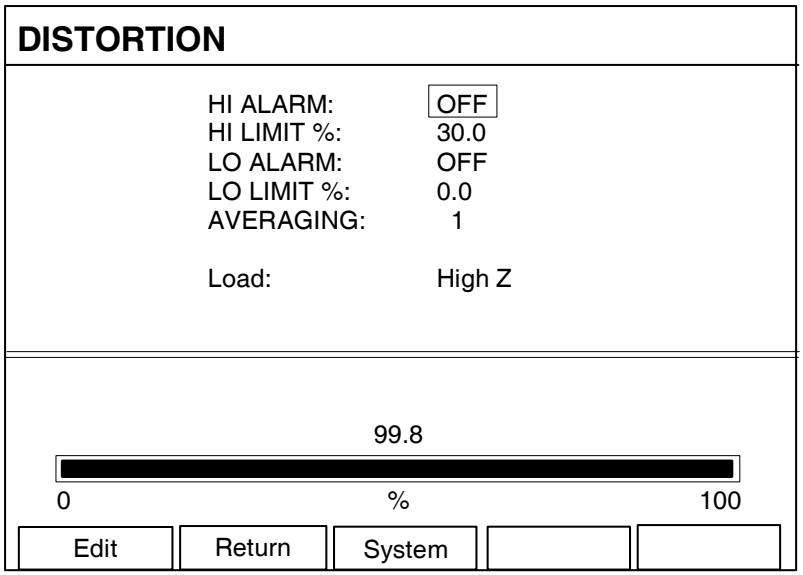
SCREEN FEATURE	FUNCTION
HI ALARM	Used to enable the SINAD Meter High Alarm Marker. Select: ON — SINAD Meter indicates when the current reading exceeds the HI LIMIT value. OFF
HI LIMIT dB	Used to select the SINAD Meter High Limit. Select: 0.0 to 60.0 dBm in 0.1 dB increments Sets the marker on the SINAD Meter Bar when HI ALARM is ON.
LO ALARM	Used to enable the SINAD Meter Low Alarm Marker. Select: ON — SINAD Meter indicates when the current reading is below the LO LIMIT value. OFF
LO LIMIT dB	Used to select the SINAD Meter Low Limit. Select: 0.0 to 80.0 dBm in 0.1 dB increments Sets the marker on the SINAD Meter Bar when LO ALARM is ON.
AVERAGING	Used to select the SINAD Meter Averaging. Select: 1 to 99 This is the number of readings to average for the displayed value.

A. SINAD Meter Screen (cont)

SCREEN FEATURE	FUNCTION
Load	Used to select the Audio input signal load (Ω). Select: 150, 600 or High Z
SINAD Meter Bar	A graphical representation of the received SINAD Meter readings.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Meters Menu (para 2-2-6).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

B. Distortion Meter Screen

When the Meters Menu is displayed, press the 2 Key to access the Distortion Meter Screen:



NOTE

The Distortion Meter Screen utilizes the AUDIO Connector for signal input.

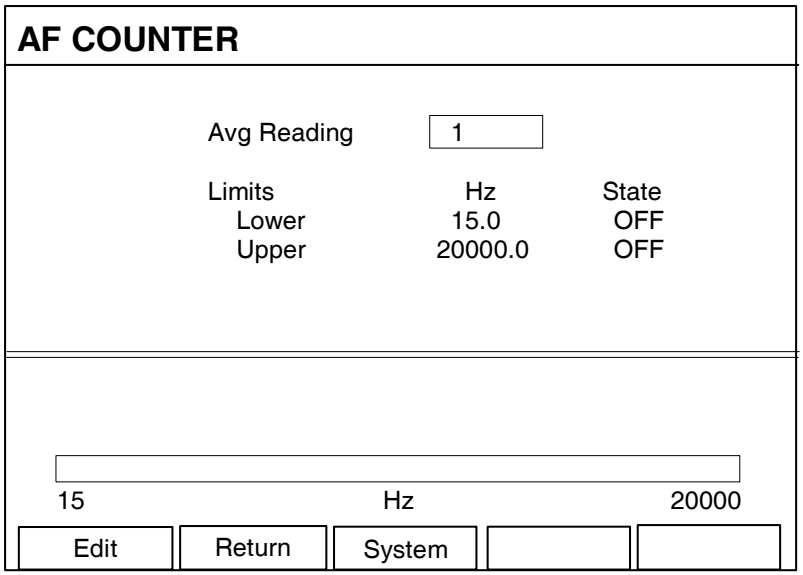
SCREEN FEATURE	FUNCTION
HI ALARM	Used to enable the Distortion Meter High Alarm Marker. Select: ON — Distortion Meter indicates when the current reading exceeds the HI LIMIT value. OFF
HI LIMIT %	Used to select the Distortion Meter High Limit. Select: 0.0% to 100.0% in 0.1% increments Sets the marker on the Distortion Meter Bar when HI ALARM is ON.
LO ALARM	Used to enable the Distortion Meter Low Alarm Marker. Select: ON — Distortion Meter indicates when the current reading is below the LO LIMIT value. OFF
LO LIMIT %	Used to select the Distortion Meter Low Limit. Select: 0.0% to 100.0% in 0.1% increments Sets the marker on the Distortion Meter Bar when LO ALARM is ON.
AVERAGING	Used to select the Distortion Meter Averaging. Select: 1 to 99 This is the number of readings to average for the displayed value.

B. Distortion Meter Screen (cont)

SCREEN FEATURE	FUNCTION
Load	Used to select the Audio input signal load (Ω). Select: 150, 600 or High Z
Distortion Meter Bar	A graphical representation of the received Distortion Meter readings.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Meters Menu (para 2-2-6).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

C. AF Counter Screen

When the Meters Menu is displayed, press the 3 Key to access the AF Counter Screen:



NOTE

The AF Counter Screen utilizes the AUDIO Connector for signal input.

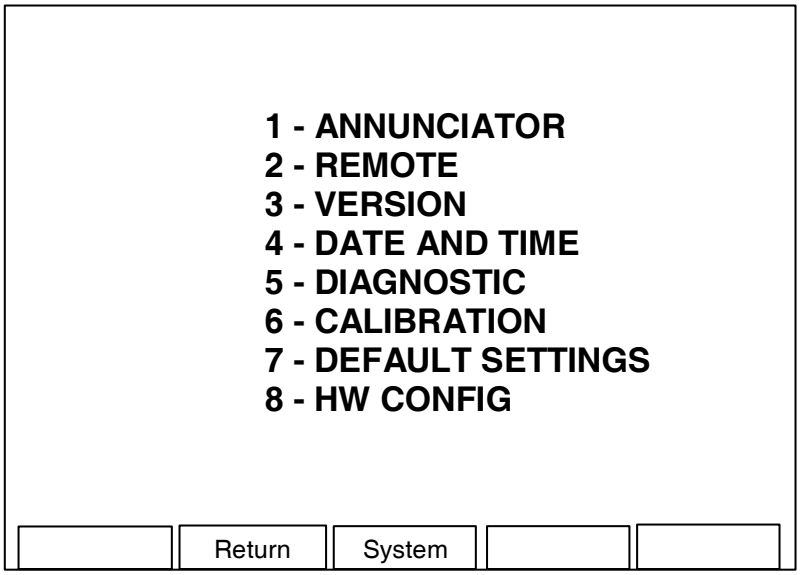
SCREEN FEATURE	FUNCTION
Avg Reading	Used to select the number of readings for the AF Counter Averaging. Select: 1 to 99 This is the number of readings to average for the displayed value.
Limits - Lower	Used to select the AF Counter Lower Limit. Select: 15.0 to 20000.0 Hz in 0.1 Hz increments Sets the marker on the AF Counter Bar to the Lower Limit selected.
Limits - Upper	Used to select the AF Counter Upper Limit. Select: 15.0 to 20000.0 Hz in 0.1 Hz increments Sets the marker on the AF Counter Bar to the Upper Limit selected when .
State - Lower Limit	Used to display the Lower Limit Marker on the AF Counter Bar. Select: ON or OFF
State - Upper Limit	Used to display the Upper Limit Marker on the AF Counter Bar. Select: ON or OFF
AF Counter Bar	A graphical representation of the received AF Counter readings.

C. AF Counter Screen (cont)

SCREEN FEATURE	FUNCTION
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Meters Menu (para 2-2-6).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

2-2-7. SETUP MENU

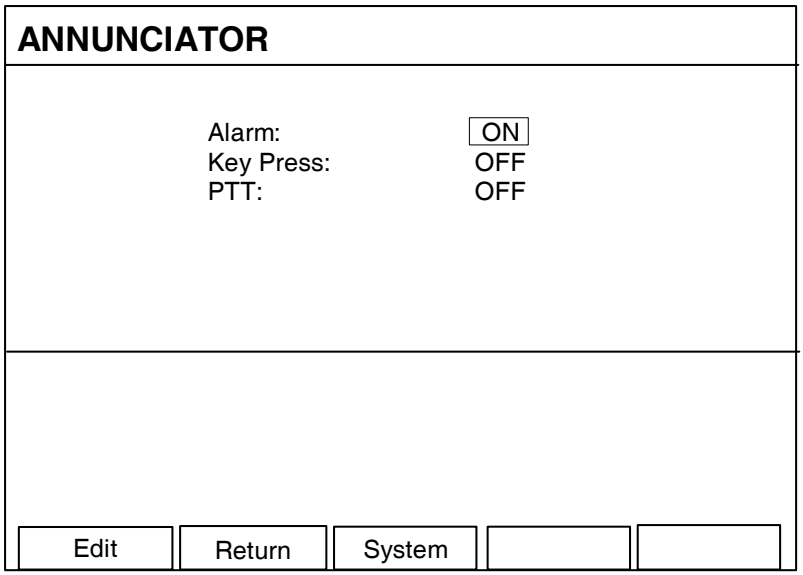
When the Benchtop Menu is displayed, press the 8 Key to access the Setup Menu:



SCREEN FEATURE	FUNCTION
1 - ANNUNCIATOR	Displays the Annunciator Setup Screen (para 2-2-7A).
2 - REMOTE	Displays the Remote Setup Screen (para 2-2-7B).
3 - VERSION	Displays the Version Screen (para 2-2-7C).
4 - DATE / TIME	Displays the Date / Time Screen (para 2-2-7D).
5 - DIAGNOSTIC	Displays the Diagnostics Screen (para 2-2-7E).
6 - CALIBRATION	Displays the Calibration Screen (para 2-2-7F).
7 - DEFAULT SETTINGS	Displays the Default Settings Setup Screen (para 2-2-7G).
8 - HW CONFIG	Displays the HW Config Screen (para 2-2-7H).
F2 “Return”	Displays the Benchtop Menu (para 2-2-5).
F3 “System”	Displays the System Menu (para 2-2-1).

A. Annunciator Setup Screen

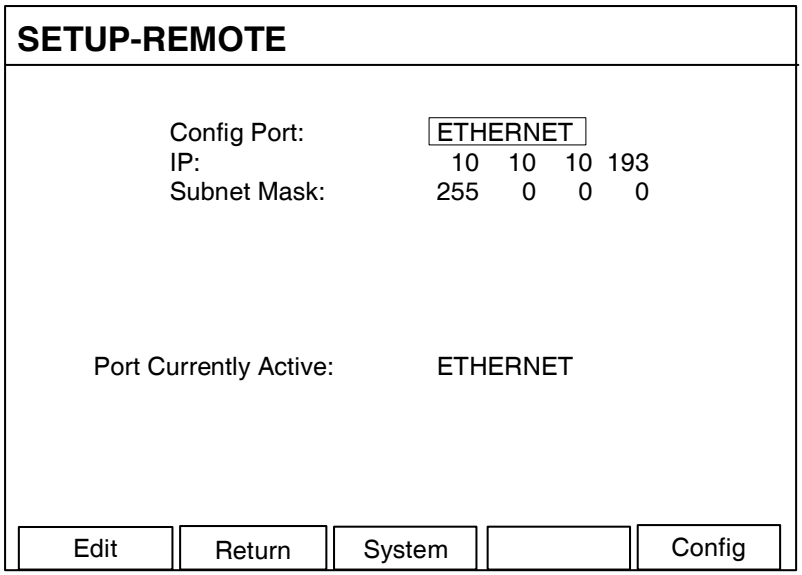
When the Setup Menu is displayed, press the 1 Key to access the Annunciator Setup Screen:



SCREEN FEATURE	FUNCTION
Atarm	Used to enable the audible alarm. Select: ON or OFF
Key Press	Used to enable the audible tone on each key press. Select: ON or OFF
PTT	Used to enable the audible tone when the PTT is pressed on the microphone. Select: ON or OFF
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

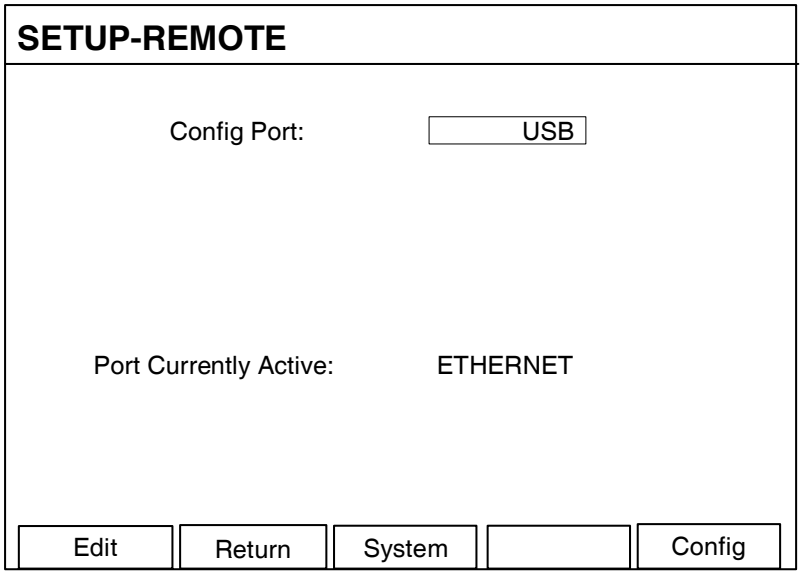
B. Remote Setup Screen

When the Setup Menu is displayed, press the 2 Key to access the Remote Setup Screen:



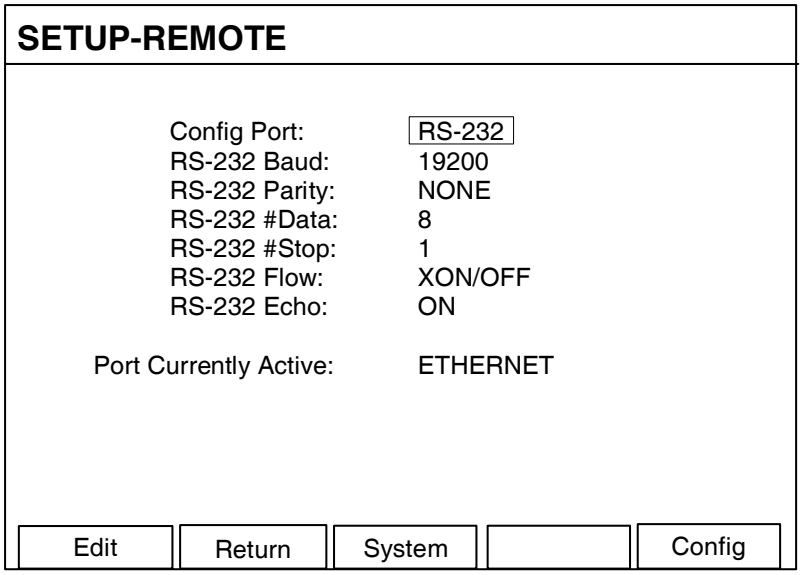
SCREEN FEATURE	FUNCTION
Config Port	Used to select the remote connection. Select: ETHERNET, USB or RS-232
IP	Used to select the IP address. Select: 0 0 0 0 to 255 255 255 255
Subnet Mask	Used to select the Subnet Mask address. Select: 0 0 0 0 to 255 255 255 255
Port Currently Active	Displays the active remote connection.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Config” / “Esc”	Config — Applies the screen parameters for the remote connection settings. Esc — Ends the Field Edit, but does NOT save any changes to the setting or value.

B. Remote Setup Screen (cont)



SCREEN FEATURE	FUNCTION
Config Port	Used to select the remote connection. Select: ETHERNET, USB or RS-232
Port Currently Active	Displays the active remote connection.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Config” / “Esc”	Config Applies the screen parameters for the remote connection settings. Esc Ends the Field Edit, but does NOT save any changes to the setting or value.

B. Remote Setup Screen (cont)



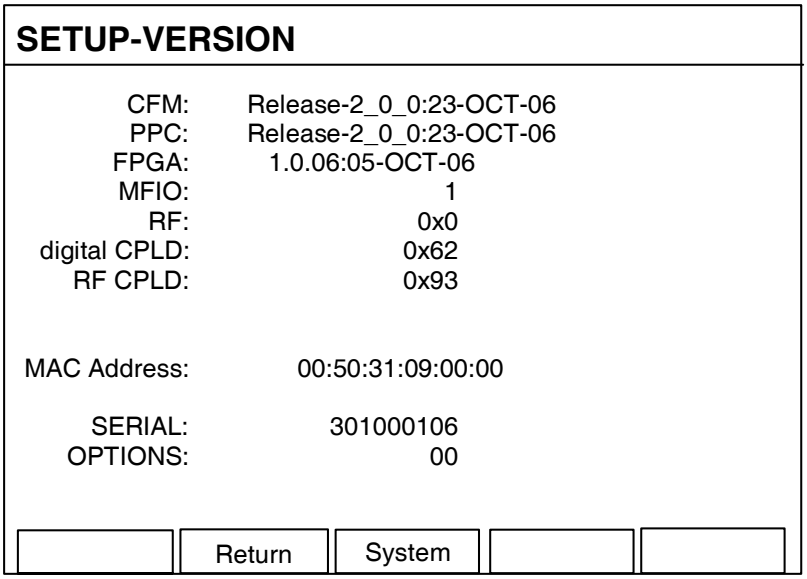
SCREEN FEATURE	FUNCTION
Config Port	Used to select the remote connection. Select: ETHERNET, USB or RS-232
RS-232 Baud	Used to select the Baud Rate. Select: 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 or 230400
RS-232 Parity	Used to select the Parity. Select: EVEN, ODD, SPACE or NONE
RS-232 #Data	Used to select the Data Bits. Select: 5, 6, 7 or 8
RS-232 #Stop	Used to select the Stop Bits. Select: 1 or 2
RS-232 Flow	Used to select the Flow. Select: XON/XOFF or OFF
RS-232 Echo	Used to select the Echo. Select: ON or OFF
Port Currently Active	Displays the active remote connection.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).

B. Remote Setup Screen (cont)

SCREEN FEATURE	FUNCTION	
F3 “System”	Displays the System Menu (para 2-2-1).	
F5 “Config” / “Esc”	Config	Applies the screen parameters for the remote connection settings.
	Esc	Ends the Field Edit, but does NOT save any changes to the setting or value.

C. Version Screen

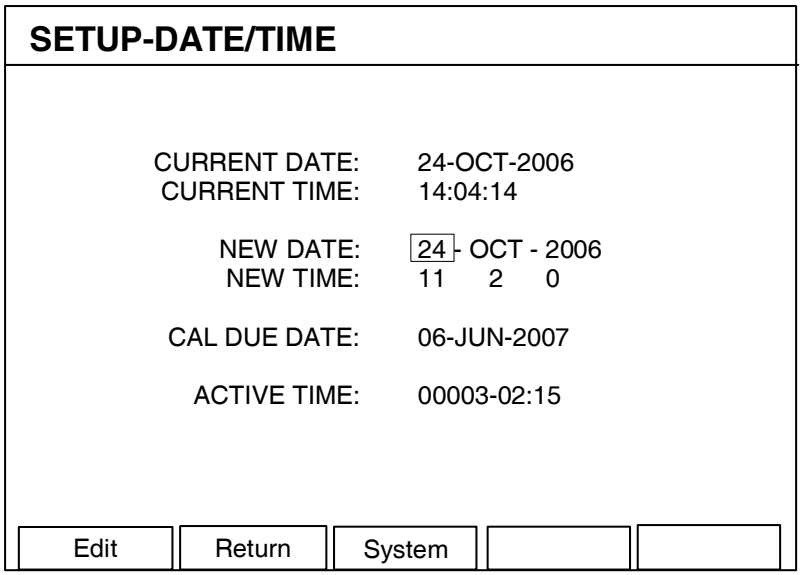
When the Setup Menu is displayed, press the 3 Key to access the Version Screen:



SCREEN FEATURE	FUNCTION
CFM	Displays the Coldfire Version Number/Date.
PPC	Displays the PowerPC Version Number/Date.
FPGA	Displays the Field Programmable Gate Array Version Number/Date.
MFIO	Displays the MFIO (Multi-Function I/O Hardware) Version Number.
RF	Displays the RF Version Number.
digital CPLD	Displays the Digital CPLD Version Number.
RF CPLD	Displays the RF CPLD Version Number.
MAC Address	Displays the MAC Address.
SERIAL	Displays the Unit Serial Number.
OPTIONS	Displays the Installed Options.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).

D. Date / Time Screen

When the Setup Menu is displayed, press the 4 Key to access the Date / Time Screen:



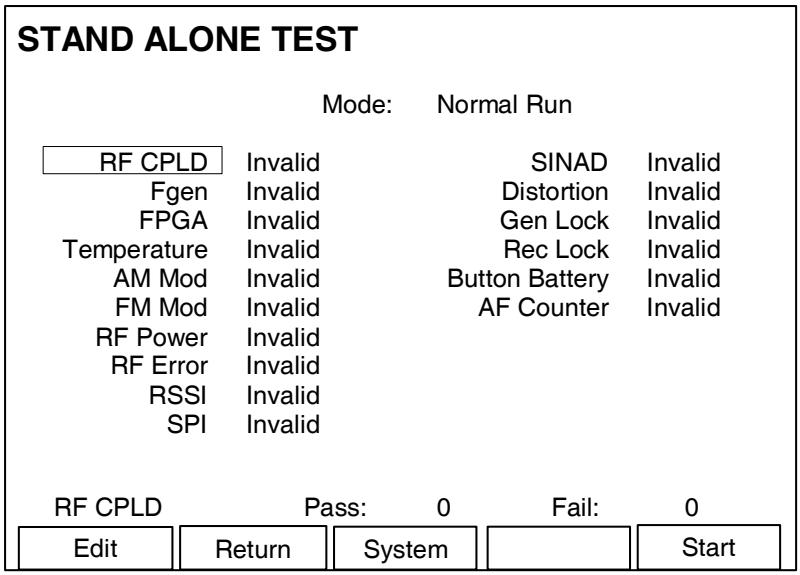
SCREEN FEATURE	FUNCTION
CURRENT DATE	Displays the Date (DD-MMM-YY).
CURRENT TIME	Displays the Time (HH:MM:SS).
NEW DATE	Used to select the Date. Select: Days 01 to 31 (depending upon month selected) Month JAN to DEC Year 2004 to 2099 All Date Fields are scrolling fields.
NEW TIME	Used to select the Time. Select: Hours 00 to 23 Minutes 00 to 59 Seconds 00 to 59 All Time Fields are scrolling fields.
CAL DUE DATE	Displays the Calibration Expiration Date (DD-MMM-YYYY).
ACTIVE TIME	Displays the cummulative time the Test Set has been powered ON (DDDDD-HH-MM).
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).

D. Date / Time Screen (cont)

SCREEN FEATURE	FUNCTION
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

E. Diagnostics Screen

When the Setup Menu is displayed, press the 5 Key to access the Diagnostics Screen:



SCREEN FEATURE	FUNCTION
Mode	Used to select the run mode of the Diagnostic Tests. Select: Normal Run, Loop Selected, Run Selected or Loop All
RF CPLD	Used to test Complex Programmable Logic Device. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Fgen	Used to test the Function Generator. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
FPGA	Used to test the Field Programmable Gate Array. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Temperature	Used to test the Temperature. Sensing Devices in the Test Set. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
AM Mod	Used to test AM Modulation. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
FM Mod	Used to test FM Modulation. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.

E. Diagnostics Screen (cont)

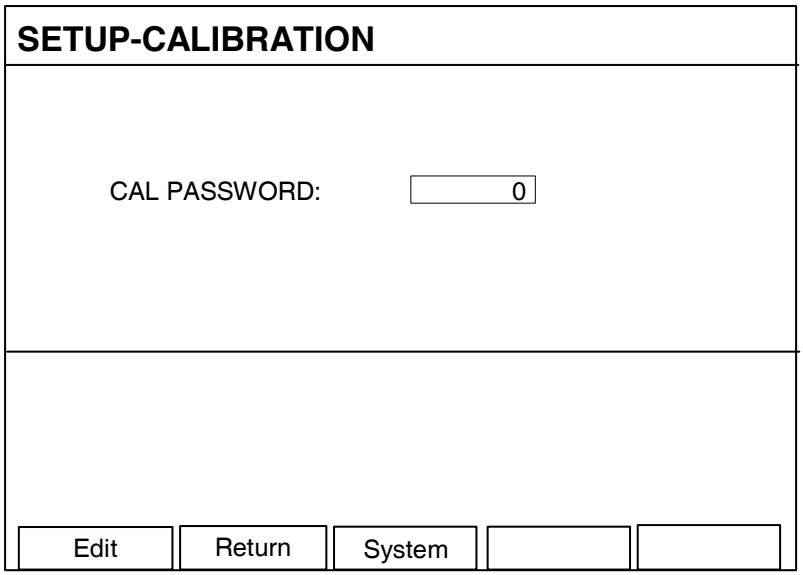
SCREEN FEATURE	FUNCTION
RF Power	Used to test RF Power. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
RF Error	Used to test RF Error. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
RSSI	Used to test the Received Signal Strength Indication. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
SPI	Used to test Serial Peripheral Interface. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
SINAD	Used to test the SINAD Meter. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Distortion	Used to test the Distortion Meter. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Gen Lock	Used to test the Generator (1st LO / 2nd LO). The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Rec Lock	Used to test the Receiver (1st LO / 2nd LO). The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Button Battery	Used to test the battery used to maintain non-volatile memory. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
AF Counter	Used to test the AF Counter. The test status field (right of the test) displays INVALID until the test is run, then displays RUNNING, STOPPED, PASSED or FAILED.
Pass / Fail Counters	Displays Pass / Fail record of the Diagnostic Test selected. The Pass / Fail Counters are incremented each time the test is performed. The Pass / Fail Counters are cleared if the Diagnostics Screen is re-initialized.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.

E. Diagnostics Screen (cont)

SCREEN FEATURE	FUNCTION	
F2 “Return”	Displays the Setup Menu (para 2-2-7).	
F3 “System”	Displays the System Menu (para 2-2-1).	
F5 “Start” / “Stop” / “Esc”	Start	Initiates the Diagnostic Testing.
	Stop	Terminates the Diagnostic Testing.
	Esc	Ends the Field Edit, but does NOT save any changes to the setting or value.

F. Calibration Screen

When the Setup Menu is displayed, press the 6 Key to access the Calibration Screen:

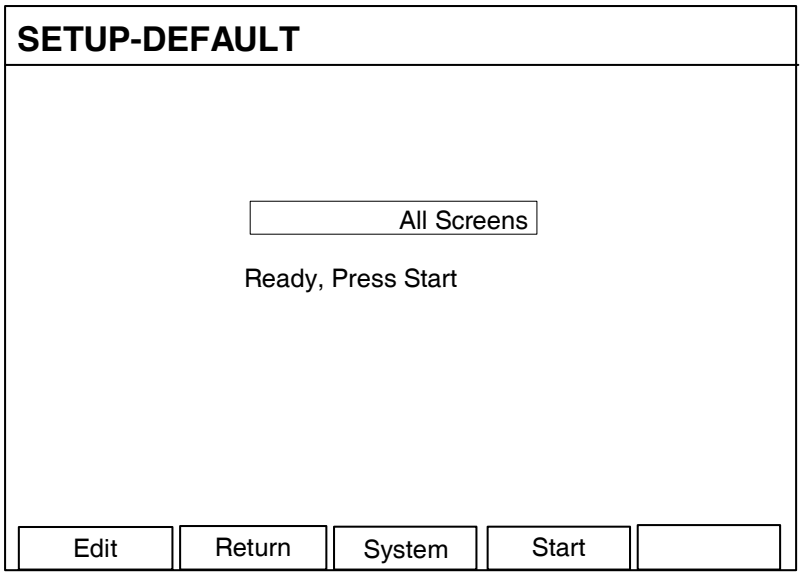


SCREEN FEATURE	FUNCTION
CAL PASSWORD	Used to enter the Calibration Password.
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

Refer to the 3500 Maintenance Manual for more information on the Calibration Screen.

G. Default Settings Screen

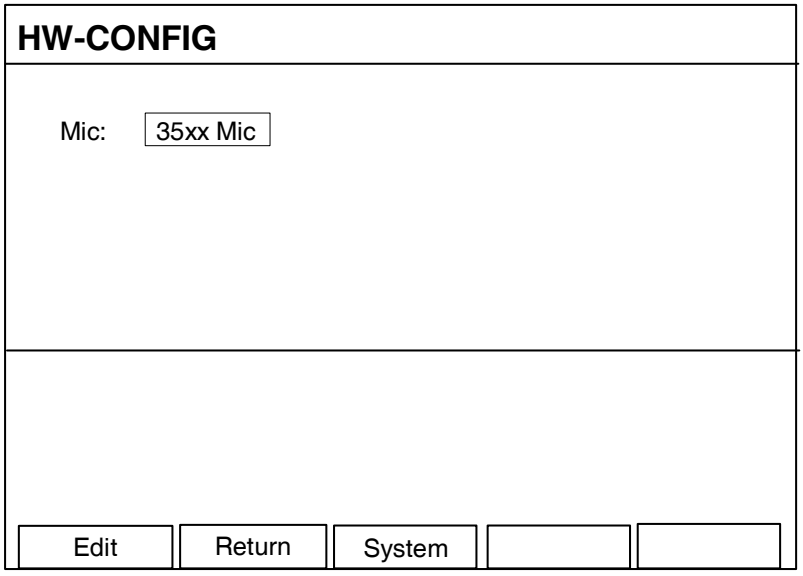
When the Setup Menu is displayed, press the 7 Key to access the Default Settings Setup Screen:



SCREEN FEATURE	FUNCTION
Screen Selection	Used to return to default settings. Select: All Screens All Benchtop Screens All Meters Screens
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F4 “Start”	Initiates the Default Settings.
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

H. HW Config Screen

When the Setup Menu is displayed, press the 8 Key to access the HW Config (Hardware Configuration) Screen:



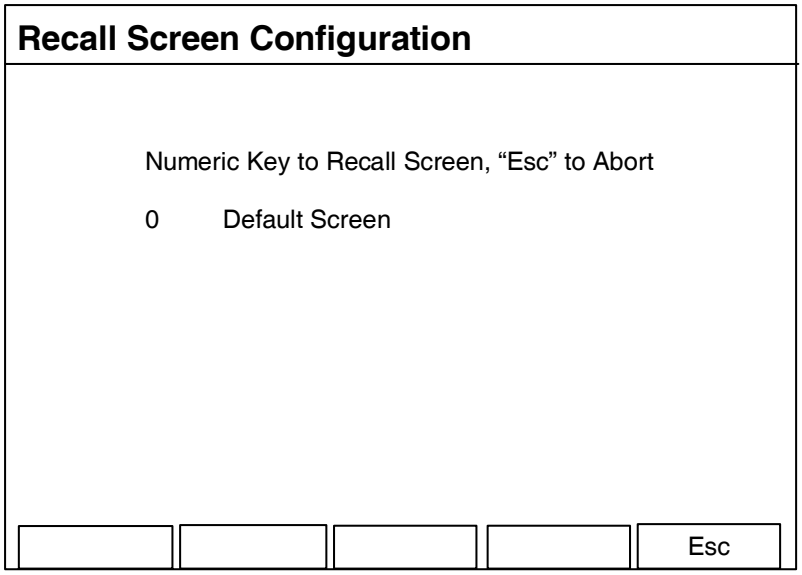
SCREEN FEATURE	FUNCTION
Mic	Used to change the Modulation Scaling for supplied Microphone.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit and saves the new setting / value.
F2 “Return”	Displays the Setup Menu (para 2-2-7).
F3 “System”	Displays the System Menu (para 2-2-1).
F5 “Esc”	Ends the Field Edit, but does NOT save any changes to the setting or value.

2-2-8. OTHER FUNCTIONS

A. Recall Screen Configuration

When the Driveby Test Screen, Receiver Test Screen, Transmitter Test Screen, Duplex Test Screen or Audio Test Screen is displayed, access the Recall Field and press the F1 “Zoom” Key to display the Recall Screen Configuration.

The Recall Screen Configuration gives the user access to recall a test screen from internal memory.

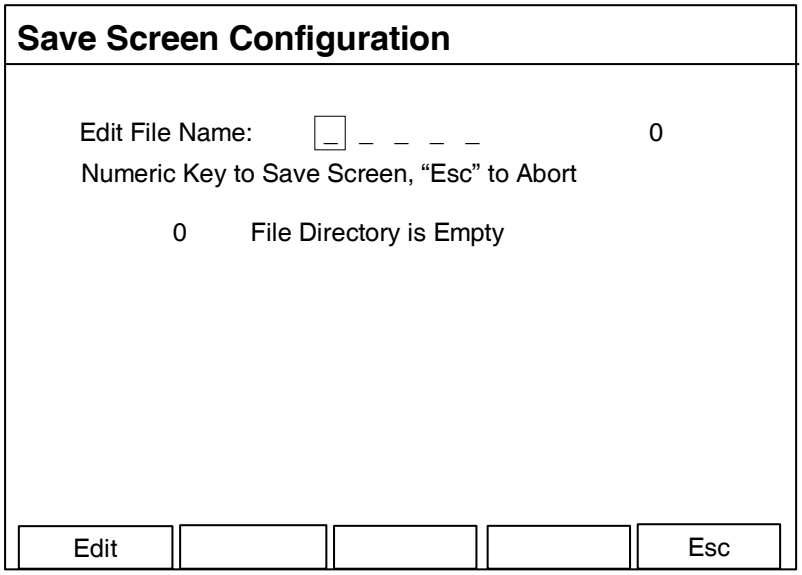


SCREEN FEATURE	FUNCTION
Recall File	Used to select the file to be recalled.
F1 “Edit” / “Done”	Edit — Highlights the selected field to allow for the field to be changed. Done — Ends the Field Edit.
F5 “Esc”	Closes the screen.

B. Save Screen Configuration

When the Driveby Test Screen, Receiver Test Screen, Transmitter Test Screen, Duplex Test Screen or Audio Test Screen is displayed, access the Save Field and press the F1 “Zoom” Key to display the Save Screen Configuration.

The Save Screen Configuration gives the user access to store a test screen in memory.

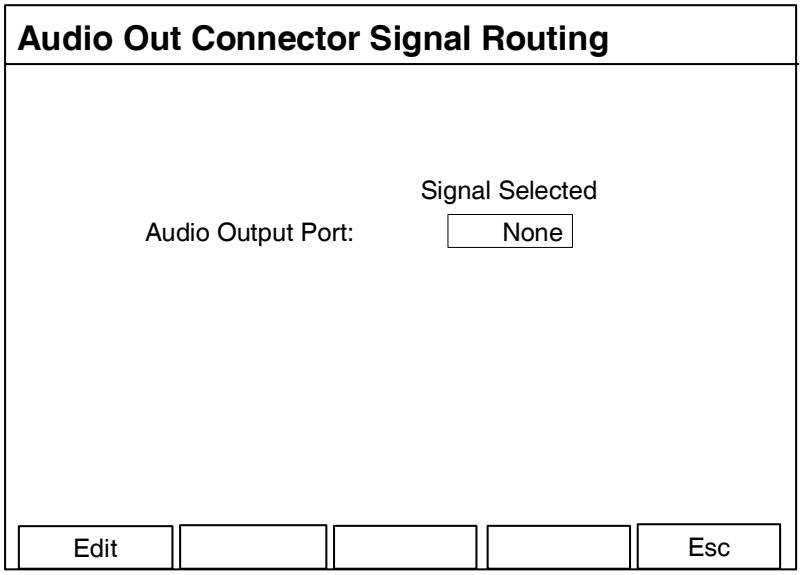


SCREEN FEATURE	FUNCTION
Edit File Name	Used to enter a new file name (5 characters maximum). Characters include: ABCDEFGHIJKLMNOPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 0123456789 _ - (space)
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit.
F5 “Esc”	Ends the Field Edit and closes the screen.

C. Audio Output Connector Signal Routing Screen

When the Driveby Test Screen, Receiver Test Screen, Transmitter Test Screen, Duplex Test Screen or Audio Test Screen is displayed, access the Aud Out Field and press the F1 “Zoom” Key to display the Audio Output Connector Signal Routing Screen.

The Audio Output Connector Signal Routing Screen gives the user access to select the Audio Output.

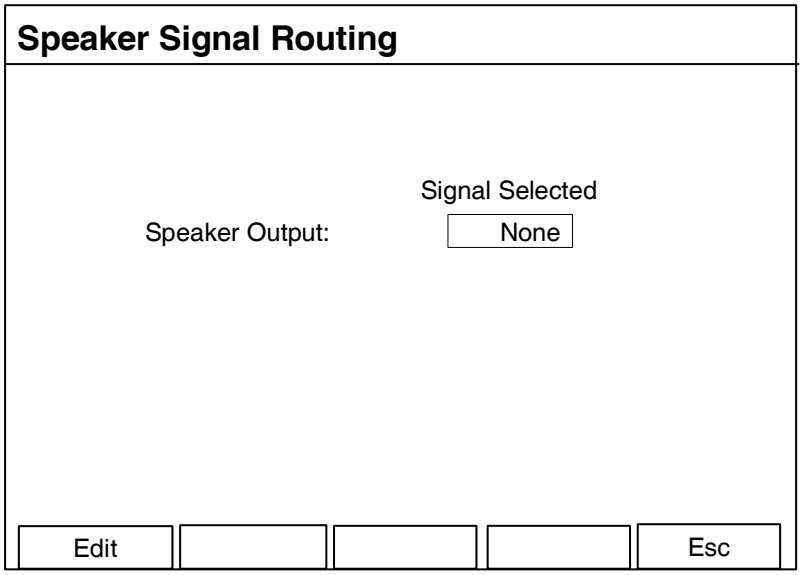


SCREEN FEATURE	FUNCTION
Audio Output Port	Used to select the Audio Output Connector. Select: Audio In, Demod, Fgen or None
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit.
F5 “Esc”	Ends the Field Edit and closes the screen.

D. Speaker Signal Routing Screen

When the Driveby Test Screen, Receiver Test Screen, Transmitter Test Screen, Duplex Test Screen or Audio Test Screen is displayed, access the Speaker Field and press the F1 “Zoom” Key to display the Speaker Signal Routing Screen.

The Speaker Signal Routing Screen gives the user access to select the Speaker Output.



SCREEN FEATURE	FUNCTION
Speaker Output	Used to select the Speaker Output. Select: Audio In, Demod, Fgen or None
F1 “Edit” / “Done”	Edit Highlights the selected field to allow for the field to be changed. Done Ends the Field Edit.
F5 “Esc”	Ends the Field Edit and closes the screen.

2-3. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

2-3-1. GENERAL

When doing any Preventive Maintenance or routine checks, keep in mind the WARNINGS and CAUTIONS about electrical shock and bodily harm.

2-3-2. PREVENTIVE MAINTENANCE PROCEDURES

A. Tools, Materials and Equipment Required

No tools or equipment are required for operator preventive maintenance. Cleaning materials required are a lint free cloth and mild liquid detergent.

B. Routine Checks

Preventive Maintenance is limited to routine checks such as shown below:

- Cleaning
- Dusting
- Wiping
- Checking for frayed cables
- Storing items not in use
- Covering unused receptacles
- Checking for loose nuts, bolts or screws

C. Schedule of Checks

Perform routine checks whenever required.

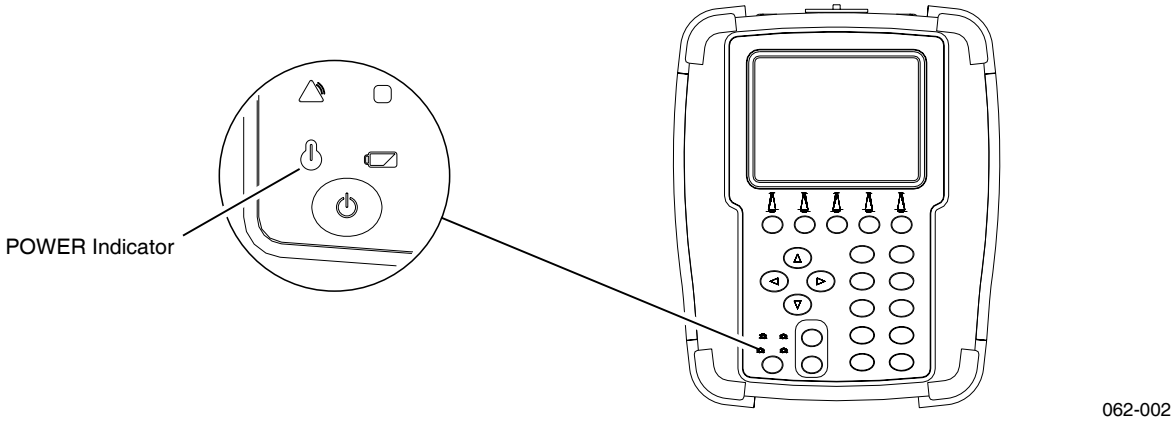
2-4. OPERATION UNDER USUAL CONDITIONS

2-4-1. TURN-ON PROCEDURE

Follow these instructions to initialize the Test Set:

1. Press the POWER Key to initialize the Test Set.
2. Verify the POWER Indicator illuminates GREEN.

   If the Power Indicator is YELLOW, the Battery needs to be charged. (Refer to para 3-3-1.)



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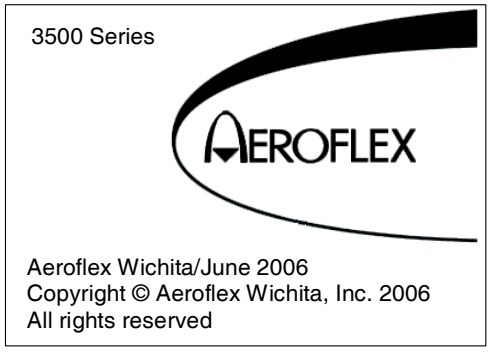
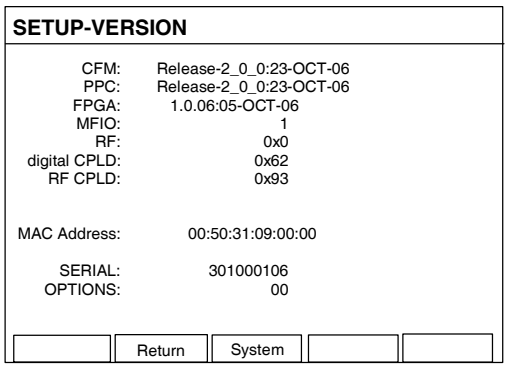
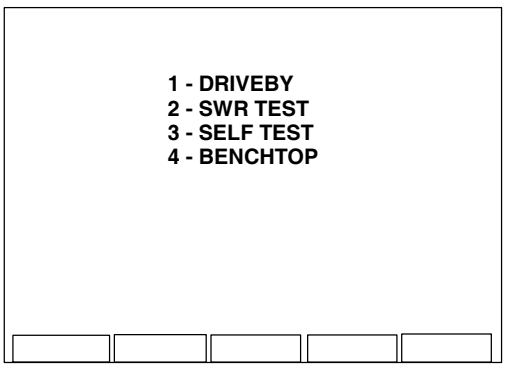
3. The Opening Screen is displayed. After a few minutes, the Startup Startup Screen is displayed and then the 3500 displays the System Menu.





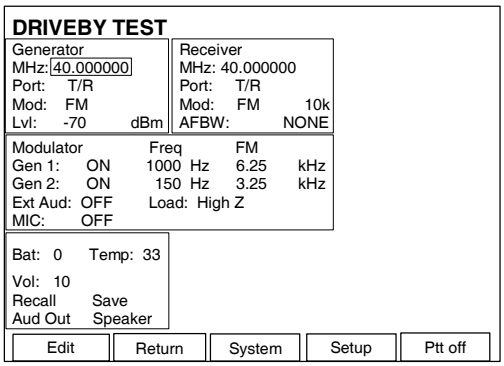


2-4-1. TURN-ON PROCEDURE (cont)

4. The operator can now choose the desired menu / screen:

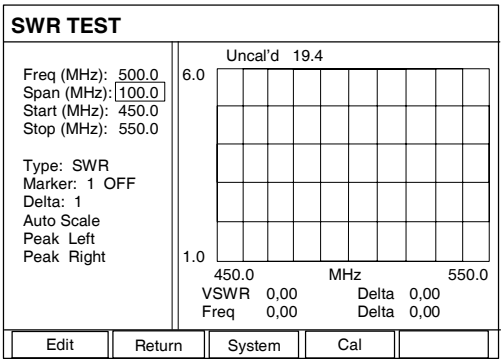
DRIVEBY

Press the 1 Key



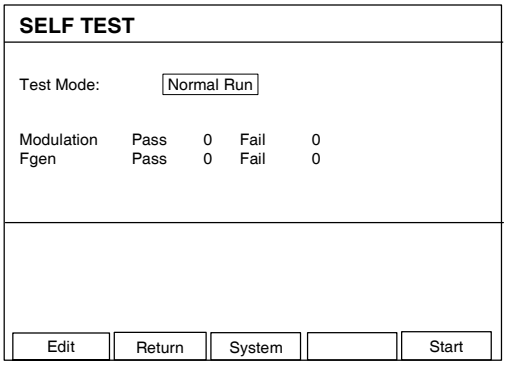
SWR TEST

Press the 2 Key



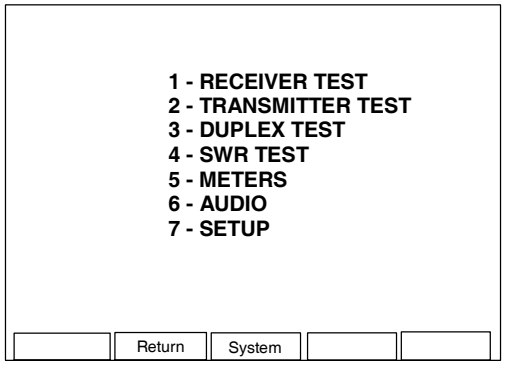
SELF TEST

Press the 3 Key



BENCHTOP

Press the 4 Key

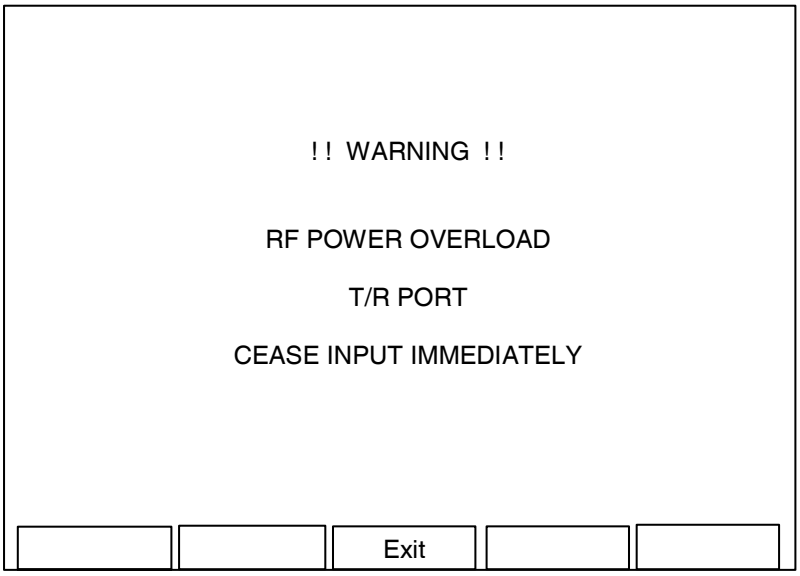


2-4-2. SCREEN WARNINGS AND CAUTIONS

A. Warnings

The Test Set provides the user with messages and indicators to warn the user of an impending condition that might damage the Test Set.

These Warnings interrupt all screen activity and updates. The Warning is displayed until the condition is cleared.



This screen is a representation of the screen that appears.

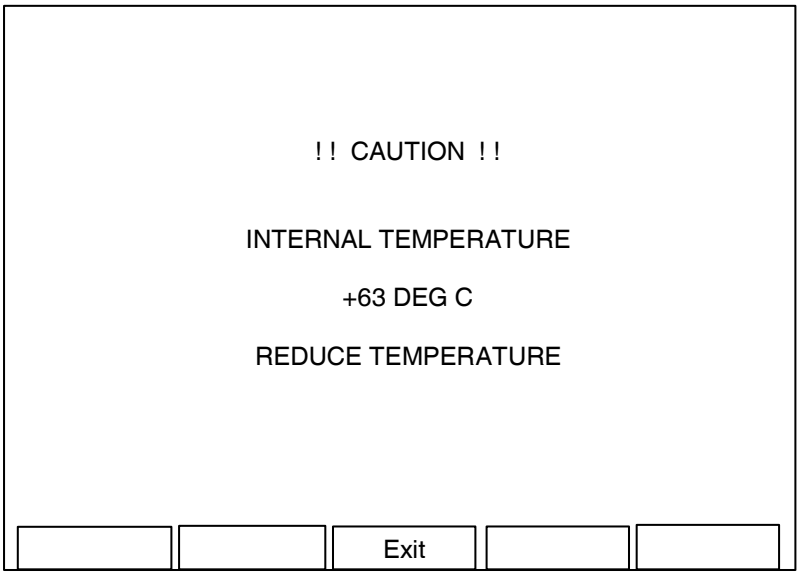
Warnings include:

WARNING	DESCRIPTION
RF Power Overload, T/R Port	Power Termination is >90°C or RF Input is >25 W.
RF Power Overload, ANT Port	ANT Overload Bit = OVERLOAD.
RF Power Overload, SWR Port	SWR Overload Bit = OVERLOAD.
Overvoltage, Audio Input	AUDIO INPUT Voltage is >8 Vrms.
Thermal, Battery Hot	Battery Overload Bit = OVERLOAD.
Thermal, Internal Temp HOT	Internal ambient temperature is >75°C.
Thermal, Internal Temp COLD	Internal ambient temperature is <-20°C.

B. Cautions

The Test Set provides the user with messages and indicators to caution the user of impending conditions that are approaching a potential problem within the Test Set.

These Cautions interrupt all screen activity and updates. The Caution is displayed until the condition is cleared.



This screen is a representation of the screen that appears.

Cautions include:

CAUTION	DESCRIPTION
Thermal, Internal Temp HOT	Internal Ambient Temperature is >65°C.
Thermal, Power Term Temp	Power Termination Temperature is >75°C.
Thermal, Batt Charge Temp	Battery Temperature is >40°C or <5°C.
Thermal, Specification	Internal Ambient Temperature is >55°C or <-20°C.

2-5. OPERATING PROCEDURES

Operating Procedures for the Test Set are provided.

Refer to para 2-1 for further description of the controls, indicators and connectors.

Refer to para 2-2 for further description of the operation screens and menus.

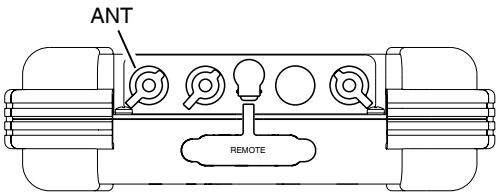
2-5-1. INTRODUCTION

The Test Set is intended to be used to determine that all external connections are in place on the vehicle radio installation and that the antenna is connected and matched to the transmitter.

When the Test Set is used in conjunction with the BIT built into the UUT, the user is able to establish, with a 95% probability rate, that the installation is operational. If the UUT is not operational, the user can determine where the fault lies to such a level as to recommend corrective action (i.e., replace the antenna, return the radio for repair etc.).

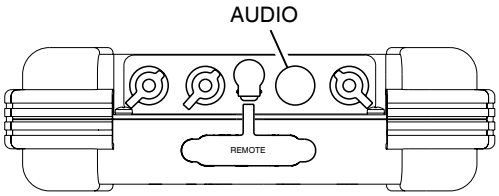
2-5-2. TYPICAL VEHICLE INSTALLATION TEST

1. Connect the appropriate supplied Antenna to the Test Set ANT Connector.



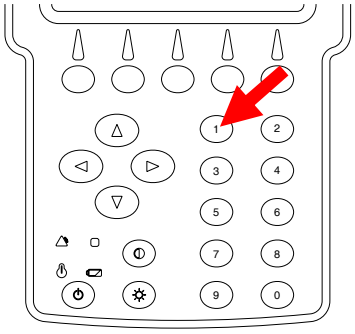
062-007

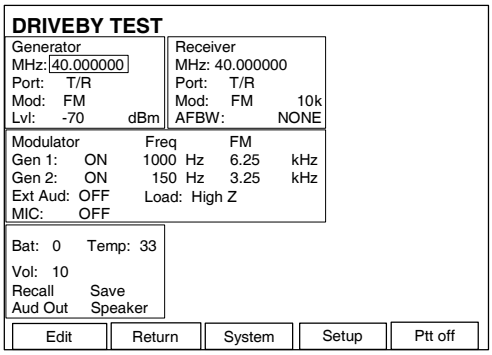
2. Connect the Headset to the Test Set AUDIO Connector.



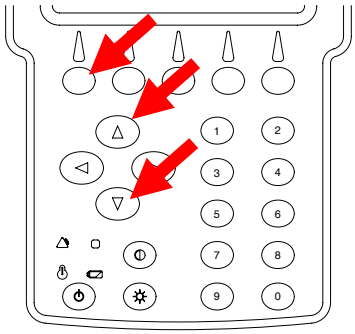
062-008

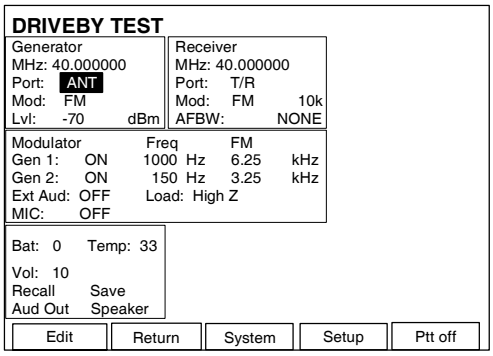
3. With the System Menu displayed, press the 1 Key to display the Driveby Menu.

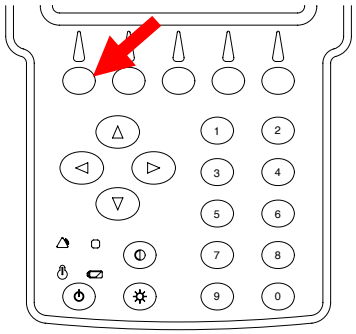




4. With the cursor on the Generator Port Field, press the F1 “Edit” Key and and use the ▲ UP Key or ▼ DOWN Key to select the ANT Connector. Press the F1 “Done” Key to save the setting.

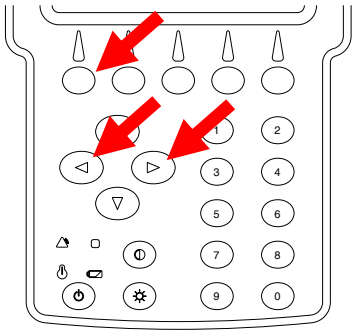


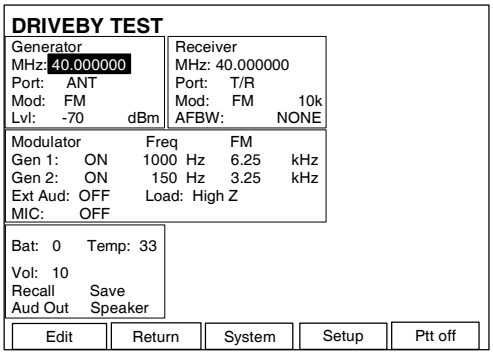


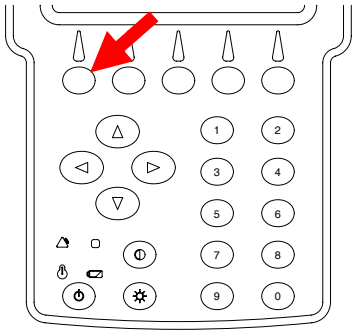


2-5-2. TYPICAL VEHICLE INSTALLATION TEST (cont)

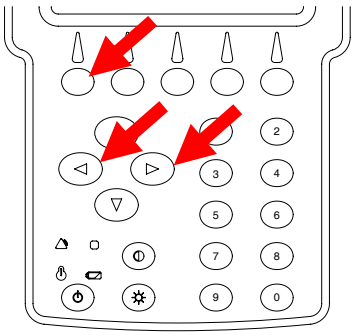
5. With the cursor on the Generator MHz Field, press the F1 “Edit” Key and use the ◀ LEFT, ▶ RIGHT and Number Keys to select the desired frequency. Press the F1 “Done” Key to save the setting.

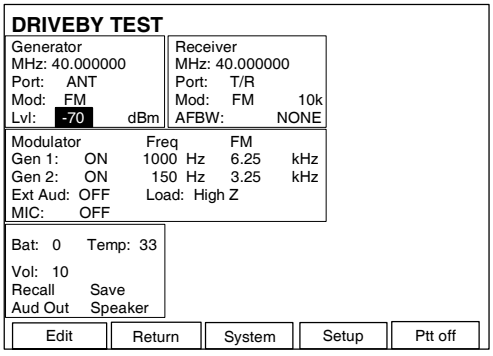


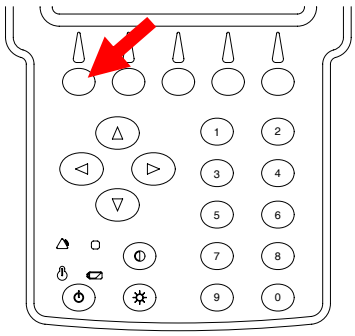




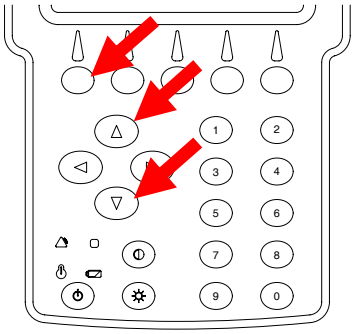
6. With the cursor on the Lvl dBm Field, press the F1 “Edit” Key and use the ◀ LEFT, ▶ RIGHT and Number Keys to select the desired RF level. Press the F1 “Done” Key to save the setting.

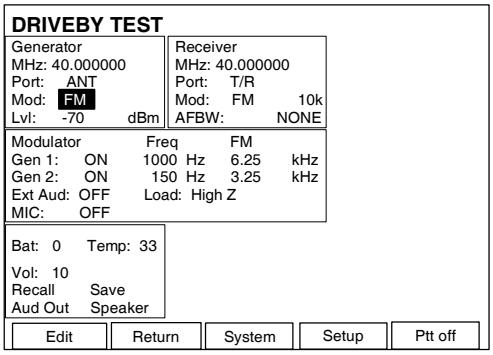


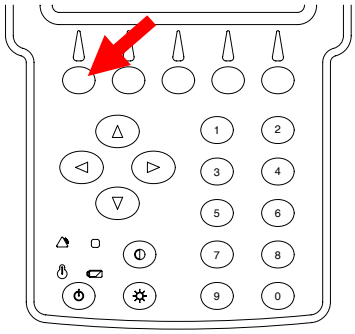




7. With the cursor on the Generator Mod Type Field, press the F1 “Edit” Key and use the ▲ UP Key or ▼ DOWN Key to select the desired Modulation Type. Press the F1 “Done” Key to save the setting.

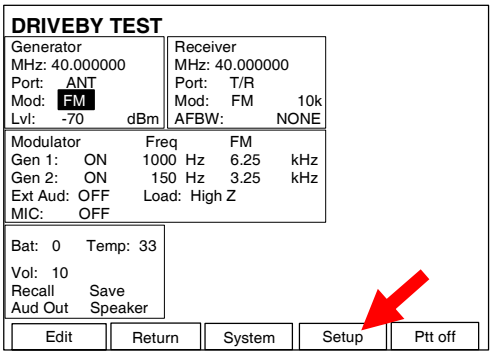


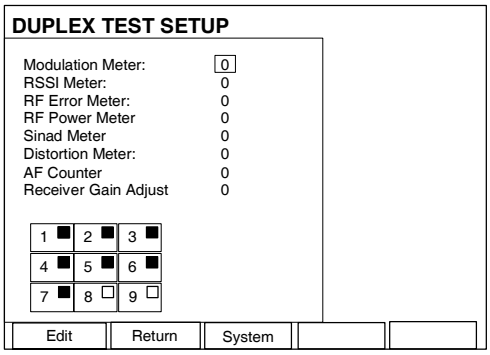




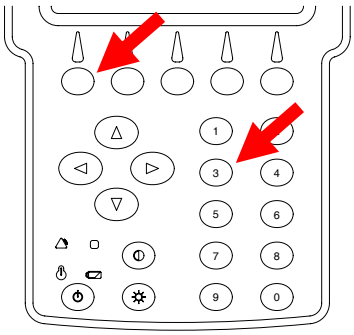
2-5-2. TYPICAL VEHICLE INSTALLATION TEST (cont)

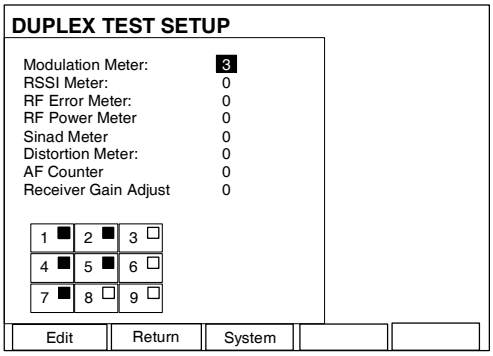
8. Press the F4 “Setup” Key to display the Duplex Setup Menu.

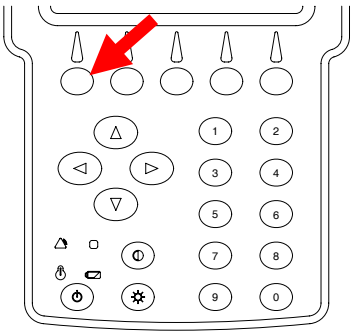




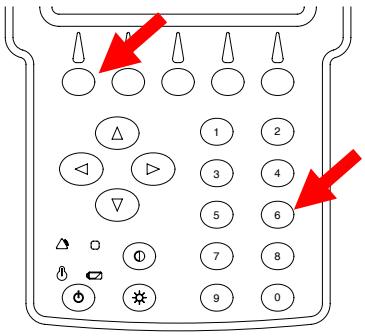
9. With the cursor on the Modulation Meter Field, press the F1 “Edit” Key and the 3 Key to display the Modulation Meter in the top right portion of the Driveby Menu. Press the F1 “Done” Key to save the setting.

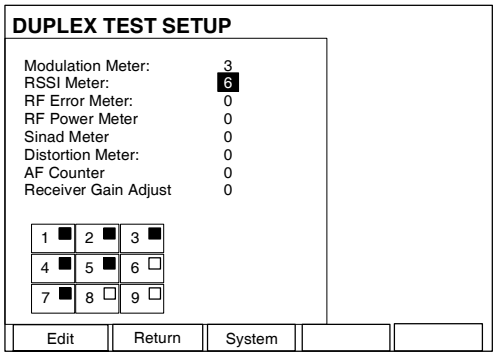


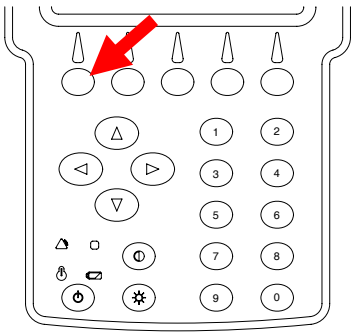




10. With the cursor on the RSSI Meter Field, press the F1 “Edit” Key and the 6 Key to display the RSSI Meter in the middle right portion of the Driveby Menu. Press the F1 “Done” Key to save the setting.

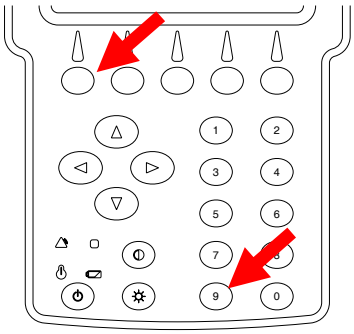


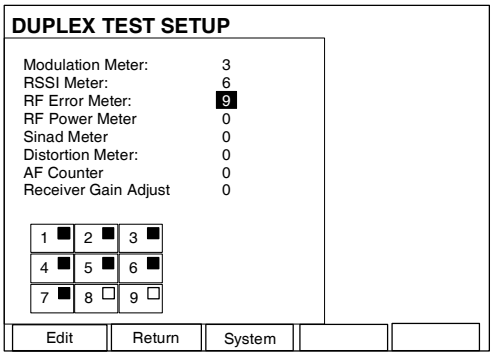


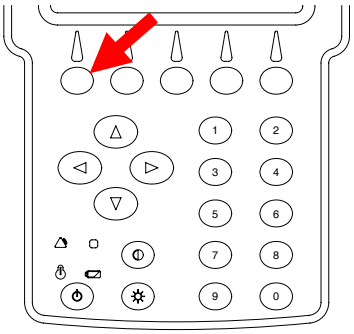


2-5-2. TYPICAL VEHICLE INSTALLATION TEST (cont)

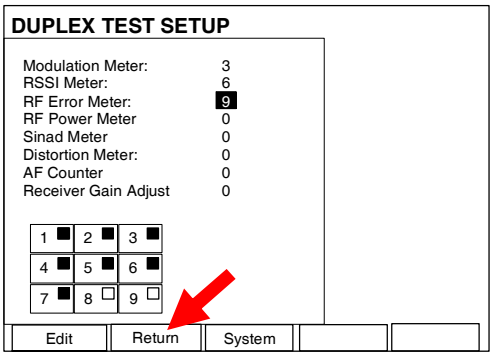
11. With the cursor on the RF Error Meter Field, press the F1 “Edit” Key and the 9 Key to display the RF Error Meter in the bottom right portion of the Driveby Menu. Press the F1 “Done” Key to save the setting.

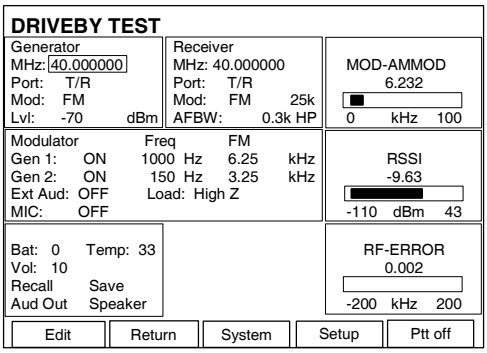






12. Press the F2 “Return” Key to display the Driveby Menu.





13. Stand within 5 ft of the vehicle antenna.

14. With a second operator in the vehicle, talk back and forth on several frequencies to determine that the radio is transmitting and receiving messages over the entire system.

    Monitor field strength indicator for proper signal level.

    Repeat this test at different locations around the antenna.

15. If malfunction(s) occur in the testing process, check the Antenna under test first using SWR.

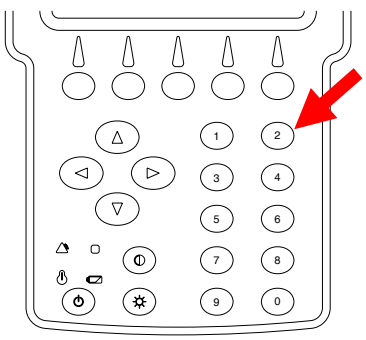
16. If Antenna test is positive, troubleshoot malfunction(s) in Radio.

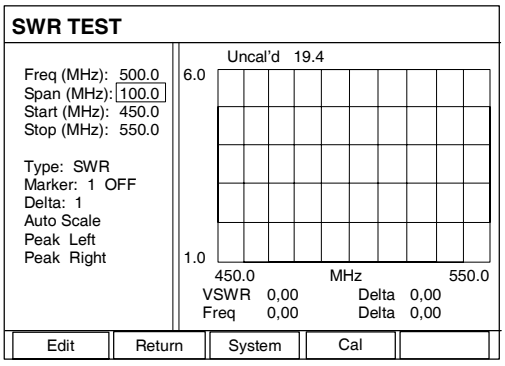
2-5-3. ADVANCED VEHICLE INSTALLATION TESTING

1. Connect the Test Set T/R Connector to the Radio Antenna Port. If the Radio's rated output power is >20 W, insert attenuator between the T/R Connector and the Radio Antenna port. Key the Radio and measure the Radio's forward output power, frequency and modulation.
2. Unkey the Radio, select Receiver Test and set up the RF level so a 1 kHz tone can be heard in the Radio (add 150 Hz squelch tone if required). Select frequency and modulation.
3. Measure sensitivity by reducing the RF level of the 3500 until the audio signal can no longer be heard in the Radio. If a RF Power Amplifier is installed between the Radio and antenna, take a measurement between the RF Power Amplifier and the antenna (install the optional attenuator), then measure between the Radio and the RF Power Amplifier to determine if the Radio or the RF Power Amplifier is faulty.
4. Connect the antenna to the Test Set SWR Connector and measure VSWR. For installations with multiple bulkhead connections, repeat this test at each bulkhead to determine if a bad connection exists between the antenna and the Radio. The Test Set SWR Connector needs to be calibrated the first time.
5. Perform BIT (SELF TEST) on the Radio to detect radio faults not related to the RF output.
6. Operate the Radio in FH Mode. The Field Strength Meter detects the energy and bounces up and down as the Radio is hopping to determine if the Radio is transmitting in FH Mode.

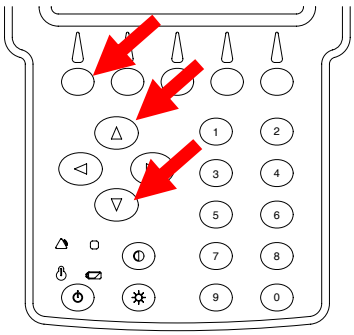
2-5-4. MEASURING SWR

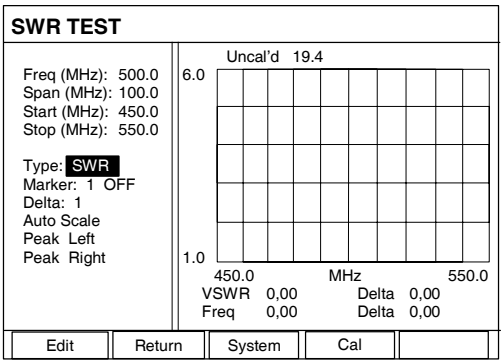
1. With the System Menu displayed, press the 2 Key to display the SWR Test Screen.

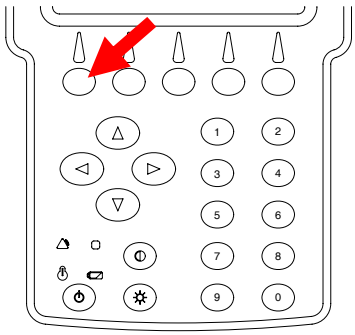




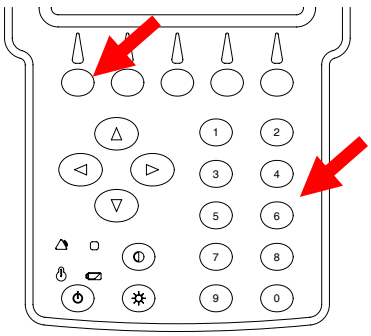
2. With the cursor on the Type Field, press the F1 "Edit" Key and use the ▲ UP Key or ▼ DOWN Key to select SWR. Press the F1 "Done" Key to save the setting.

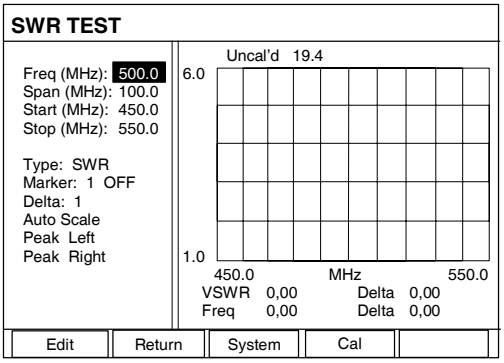


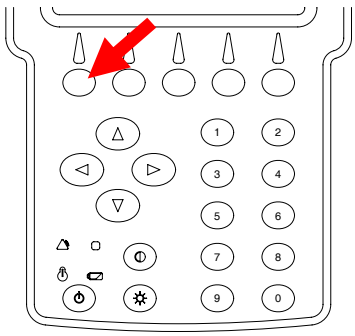




3. With the cursor on the Freq Field, press the F1 "Edit" Key and use the Number Keys to select the desired center frequency. Press the F1 "Done" Key to save the setting.

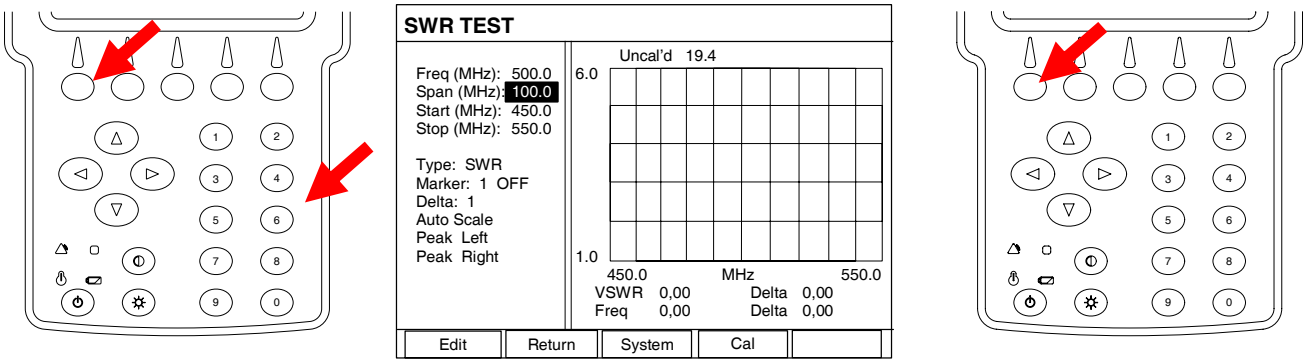






2-5-4. MEASURING SWR (cont)

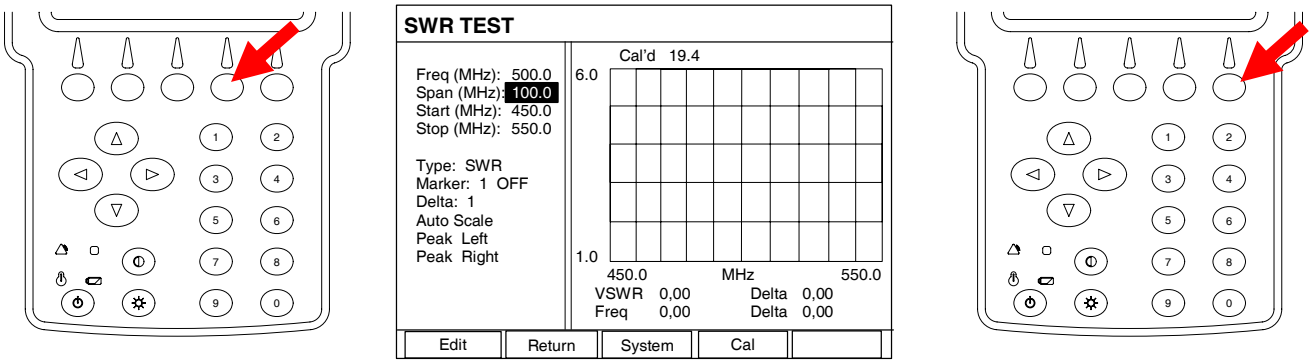
4. With the cursor on the Span Field, press the F1 “Edit” Key and use the Number Keys to select the desired frequency span. Press the F1 “Done” Key to save the setting.



5. Press the F4 “Cal” Key to start the SWR Calibration. Follow the instructions on the screen to complete the SWR Calibration. When SWR Calibration is completed (“Calibration Complete” displayed on screen), press the F5 “Done” Key to return to the SWR Test Screen.

NOTE: Calibration must be performed at the point the operator is connecting to the system under test:

- If the supplied test cable is being used to connect to the system under test, calibration is to be performed at the end of the test cable. Test cable should not to exceed four feet in length.
- If the system under test cable is being connected directly to the Test Set, then calibration is to be performed at the SWR Connector.



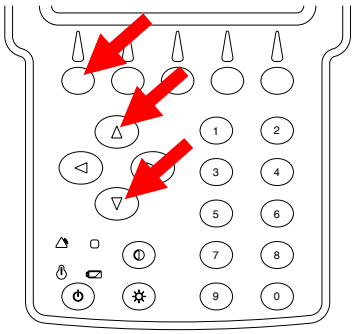
NOTE: Once the SWR Connection is calibrated, the SWR Connector remains in the calibration state until the frequency is changed. The SWR Test Screen displays “CAL’D” above the Graphical Display when calibrated.

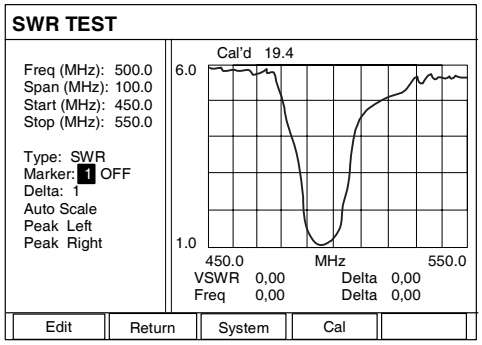
2-5-4. MEASURING SWR (cont)

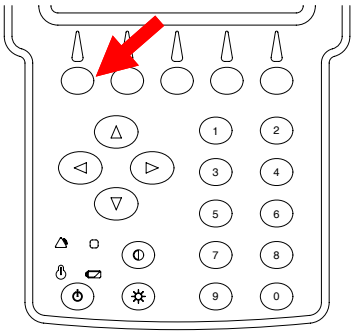
6. Connect the System Under Test to the SWR Connector at the point of calibration.

7. The Graphical Display is updated approximately every 20 seconds. Allow at least two updates of the Graphical Display to insure data is valid.

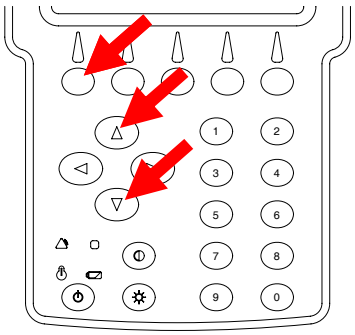
8. With the data displayed on the Graphical Display, the Markers are used to determine the SWR at any point across the span. With the cursor on the Marker Number Field, use the ▲ UP Key or ▼ DOWN Key to select a Marker. Press the F1 "Done" Key to save the setting.

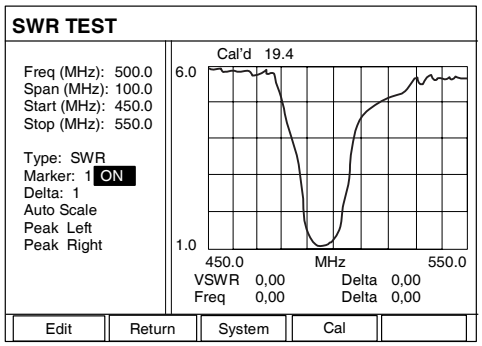


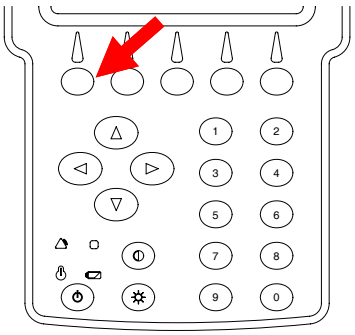




9. Move the cursor to the right, press the F1 "Edit" Key and use the ▲ UP Key or ▼ DOWN Key to select ON. Press the F1 "Done" Key to save the setting.



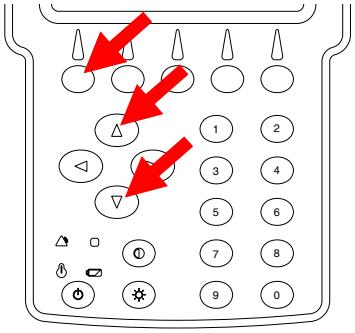


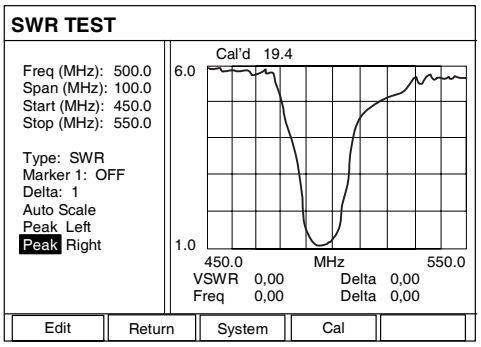


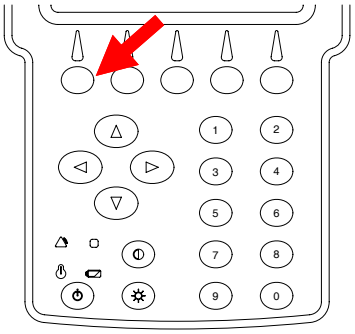
2-5-4. MEASURING SWR (cont)

10. With the cursor on the Peak/Move Right Field, press the F1 “Edit” Key and use the ▲ UP Key or ▼ DOWN Key to select Peak or Move. Press the F1 “Done” Key to save the setting.

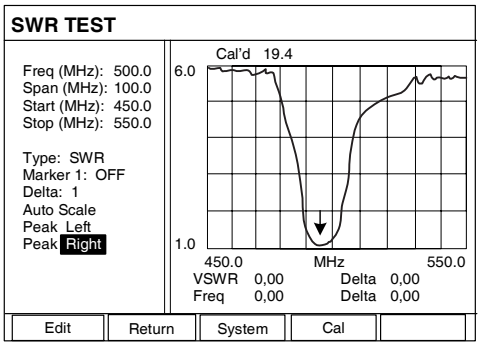
NOTE: Selecting “Peak” moves the Marker to the Next Peak on the Graphical Display. Selecting “Move” moves the Marker to the next Data Point on the Graphical Display.

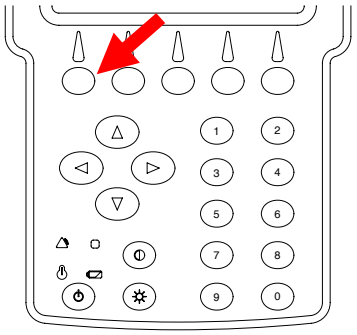






11. With the cursor on the Right Field, press the F1 “Enter” Key to move the Marker to the right on the Graphical Display.

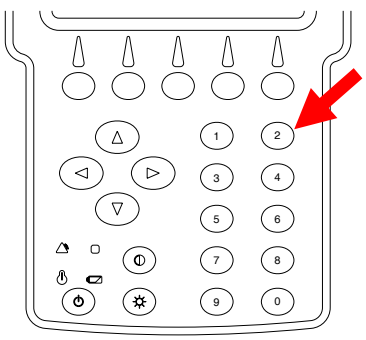


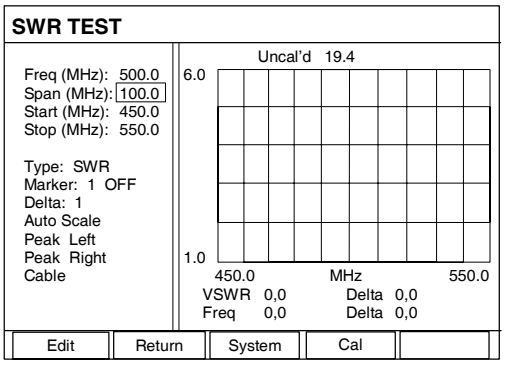


NOTE: When first enabled, a Marker is at the far left of the Graphical Display. Up to six Markers may be placed on the Graphical Display at a time. The Marker shown in the Marker Number Field is active. The active Marker can be moved using the Peak/Move Left Right Fields with the Frequency and SWR Value, corresponding to the Marker position, displayed under the Graphical Display.

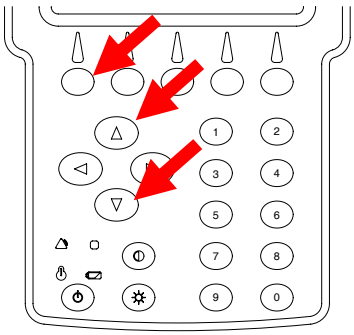
2-5-5. MEASURING DTF (Distance to Fault)

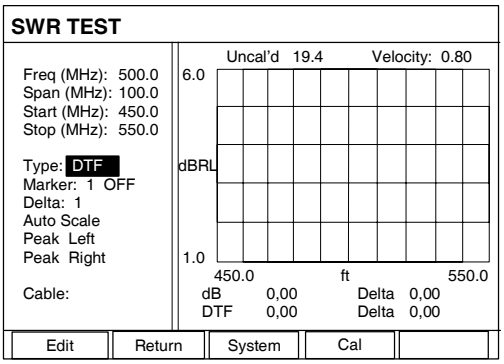
1. With the System Menu displayed, press the 2 Key to display the SWR Test Screen.

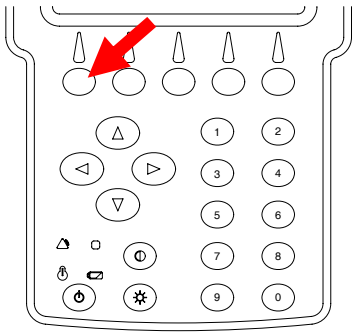




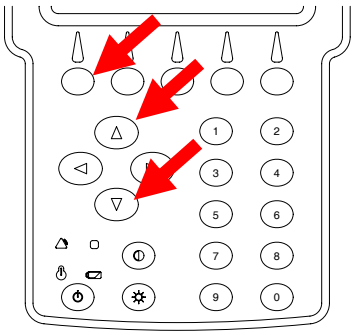
2. With the cursor on the Type Field, press the F1 "Edit" Key and use the ▲ UP Key or ▼ DOWN Key to select DTF. Press the F1 "Done" Key to save the setting.

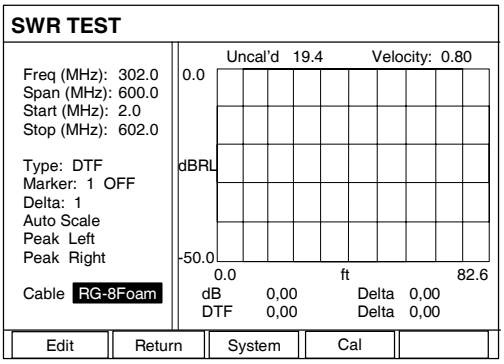


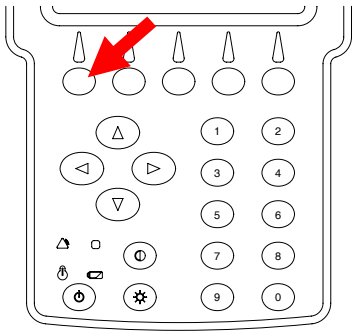




3. With the cursor on the Cable Field, press the F1 "Edit" Key and use the ▲ UP Key or ▼ DOWN Key to select Cable Type used in the System Under Test. Press the F1 "Done" Key to save the setting.







2-5-5. MEASURING DTF (Distance to Fault) (cont)

4. Estimate the total cable length of the System Under Test and add approximately 30%. Use the following Table or Equation to determine the frequency span required to test the length and type of cable used in the System Under Test.

	Vp=0.66	Vp=0.88	
Span (MHz)	Distance (feet)	Distance (feet)	Resolution (feet)
100	409.20	545.60	2.28
150	272.80	363.73	1.52
200	204.60	272.80	1.14
250	163.68	218.24	0.91
300	136.40	181.87	0.76
350	116.91	155.89	0.65
400	102.30	136.40	0.57
450	90.93	121.24	0.51
500	81.84	109.12	0.46
550	74.40	99.20	0.42
600	68.20	90.93	0.38
650	62.95	83.94	0.35
700	58.46	77.94	0.33
750	54.56	72.75	0.30
800	51.15	68.20	0.29
850	48.14	64.19	0.27
900	45.47	60.62	0.25
950	43.07	57.43	0.24
998	41.00	54.67	0.23

Span (MHz) ≈ 62,000 * Vp / (Cable length + 15%)

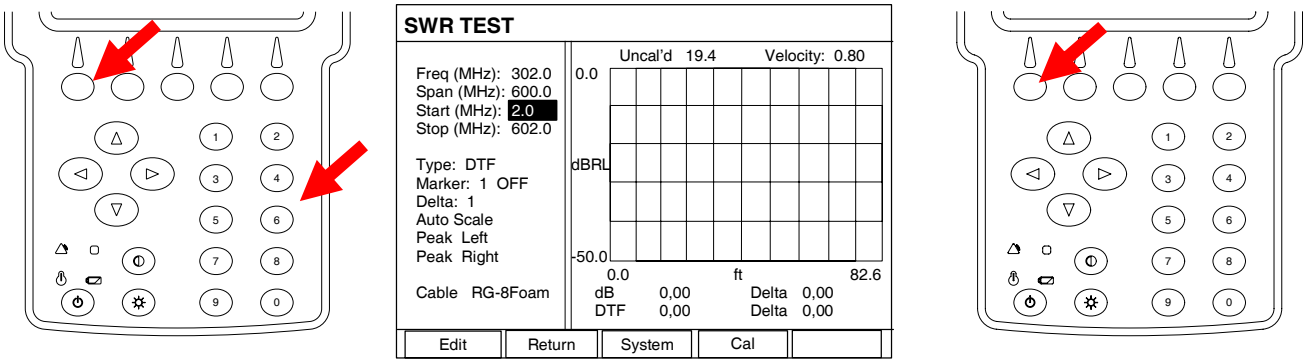
Where Vp is the Velocity of propagation of the cable and Cable length is in feet

5. Determine the Start and Stop frequencies. Insure the span includes the operating frequency band of the system.

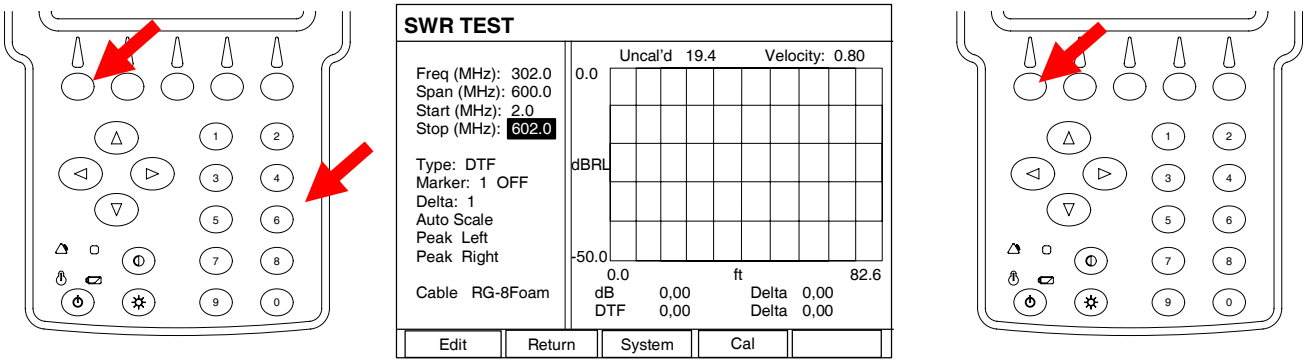
Example: If the cable is approximately 55 feet long, the span is approximately 600 MHz. If the antenna is centered at 83 MHz, the Start Frequency is 2 MHz and the Stop frequency is 602 MHz

2-5-5. MEASURING DTF (Distance to Fault) (cont)

6. With the cursor on the Start Field, press the F1 “Edit” Key and and use the Number Keys to select the desired Start frequency. Press the F1 “Done” Key to save the setting.



7. With the cursor on the Stop Field, press the F1 “Edit” Key and use the Number Keys to select the desired Stop frequency. Press the F1 “Done” Key to save the setting.

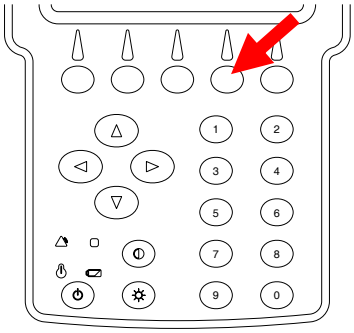


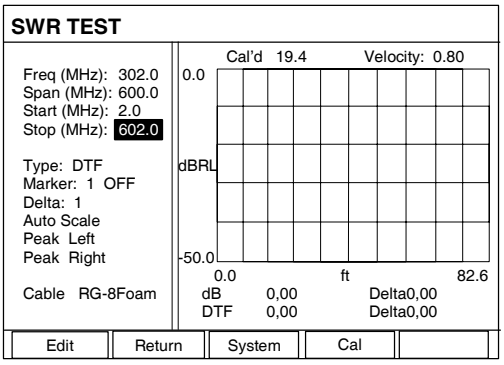
2-5-5. MEASURING DTF (Distance to Fault) (cont)

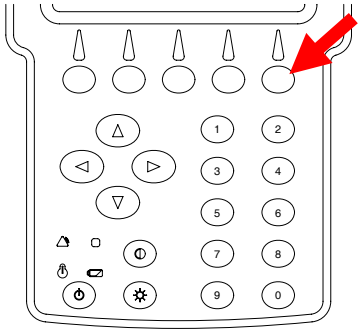
8. Press the F4 “Cal” Key to start the SWR Calibration. Follow the instructions on the screen to complete the SWR Calibration. When SWR Calibration is completed (“Calibration Complete” displayed on screen), press the F5 “Done” Key to return to the SWR Test Screen.

NOTE: Calibration must be performed at the point the operator is connecting to the system under test:

- If the supplied test cable is being used to connect to the system under test, calibration is to be performed at the end of the test cable. Test cable should not to exceed four feet in length.
- If the system under test cable is being connected directly to the Test Set, then calibration is to be performed at the SWR Connector.





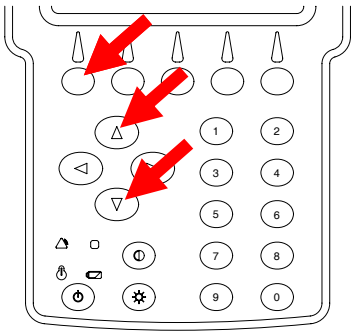


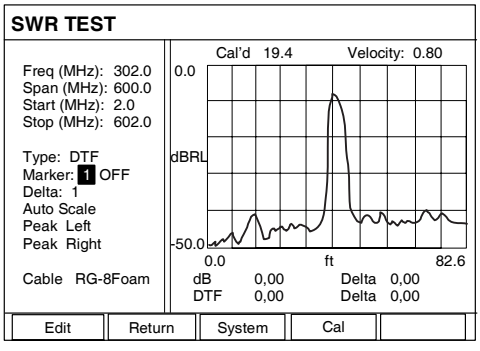
NOTE: Once the SWR Connection is calibrated, the SWR Connector remains in the calibration state until the frequency is changed. The SWR Test Screen displays “CAL’D” above the Graphical Display when calibrated.

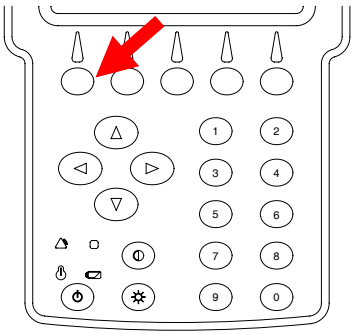
9. Connect the System Under Test to the SWR Connector at the point of calibration.

10. The Graphical Display is updated approximately every 20 seconds. Allow at least two updates of the Graphical Display to insure data is valid.

11. With the data displayed on the Graphical Display, the Markers are used to determine the DTF at any point across the Graphical Display. With the cursor on the Marker Number Field, use the ▲ UP Key or ▼ DOWN Key to select a Marker. Press the F1 “Done” Key to save the setting.

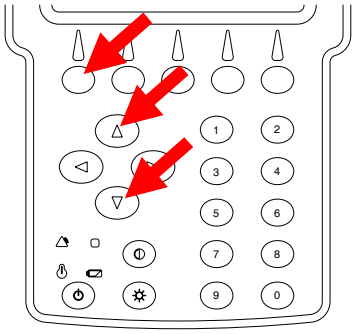


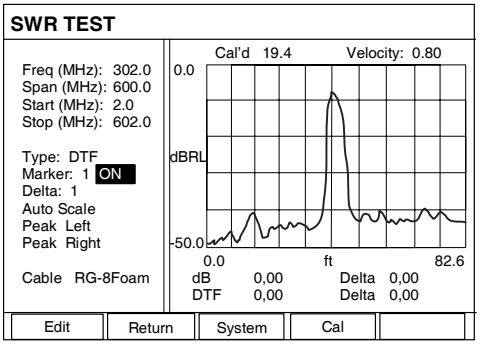


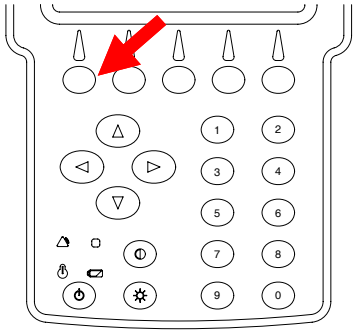


2-5-5. MEASURING DTF (Distance to Fault) (cont)

12. Move the cursor to the right, press the F1 “Edit” Key and use the ▲ UP Key or ▼ DOWN Key to select ON. Press the F1 “Done” Key to save the setting.

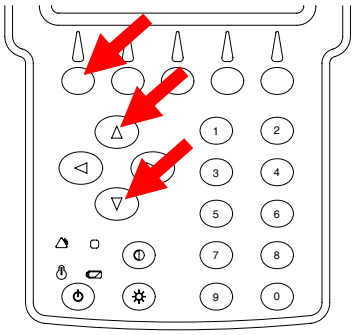


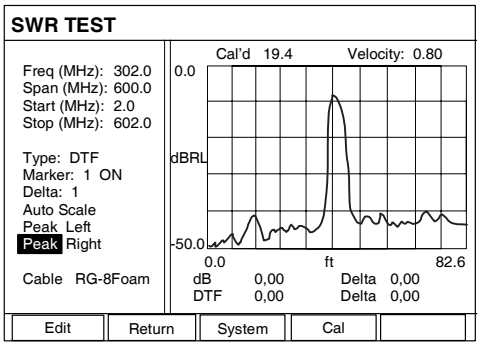


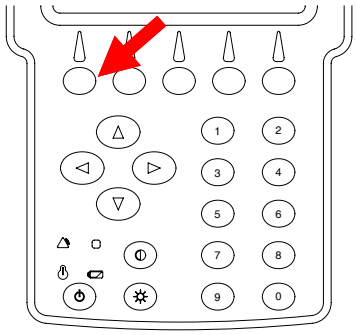


13. With the cursor on the Peak/Move Right Field, press the F1 “Edit” Key and use the ▲ UP Key or ▼ DOWN Key to select Peak or Move. Press the F1 “Done” Key to save the setting.

NOTE: Selecting “Peak” moves the Marker to the Next Peak on the Graphical Display. Selecting “Move” moves the Marker to the next Data Point on the Graphical Display.

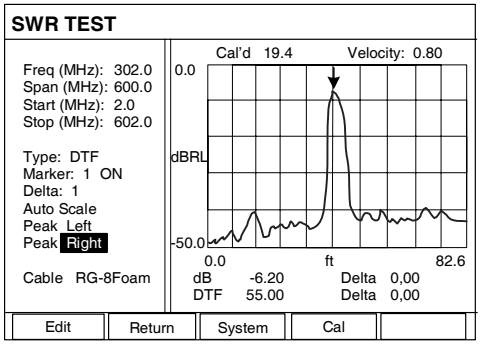


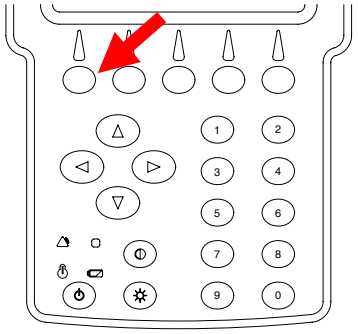




2-5-5. MEASURING DTF (Distance to Fault) (cont)

14. With the cursor on the Right Field, press the F1 “Enter” Key to move the Marker to the right on the Graphical Display.

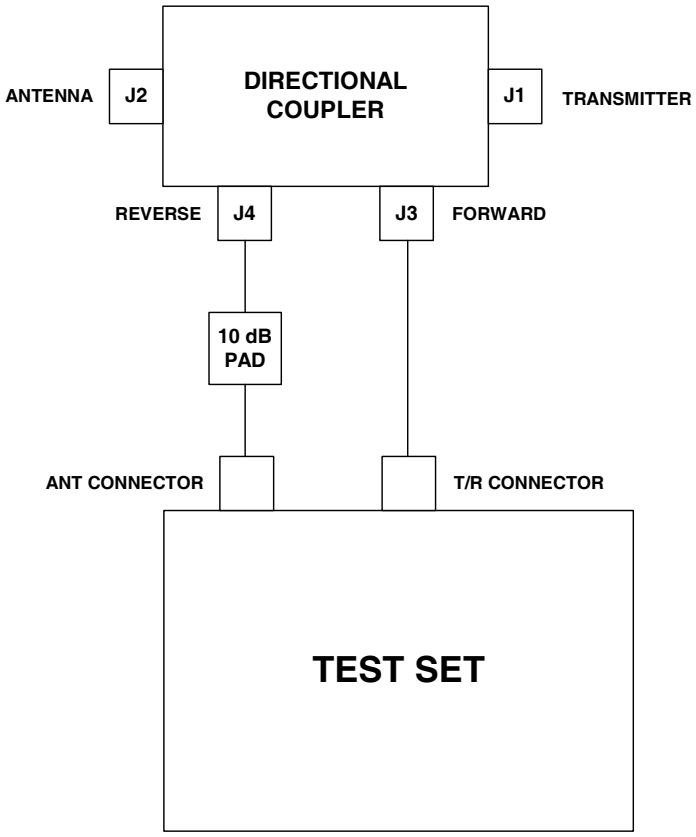




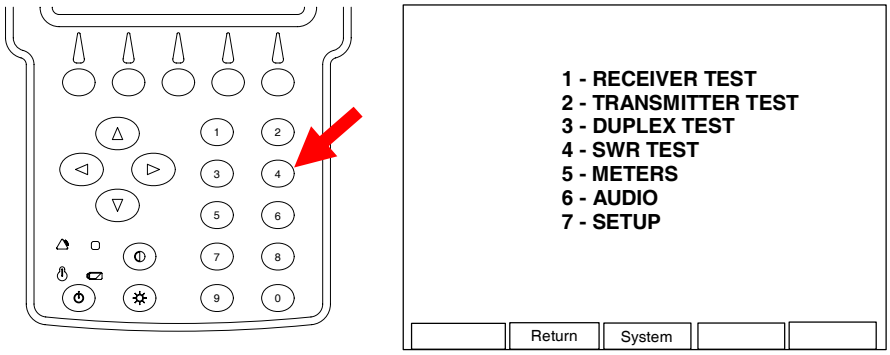
NOTE: When first enabled, a Marker is at the far left of the Graphical Display. Up to three Markers may be placed on the Graphical Display at a time. The Marker shown in the Marker Number Field is active. The active Marker can be moved using the Peak/Move Left Right Fields with the Frequency and SWR Value, corresponding to the Marker position, displayed under the Graphical Display.

2-5-6. MEASURING REVERSE POWER

1. Connect the Directional Coupler in line between the Transmitter and Antenna and to the 3500.

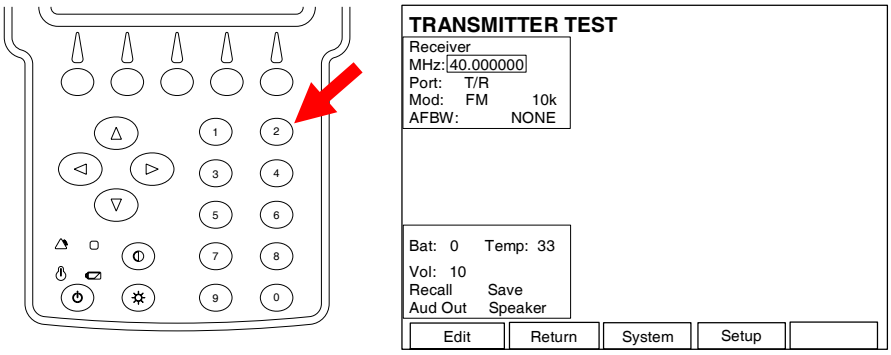


2. With the System Menu displayed, press the 4 Key to display the Benchtop Menu.

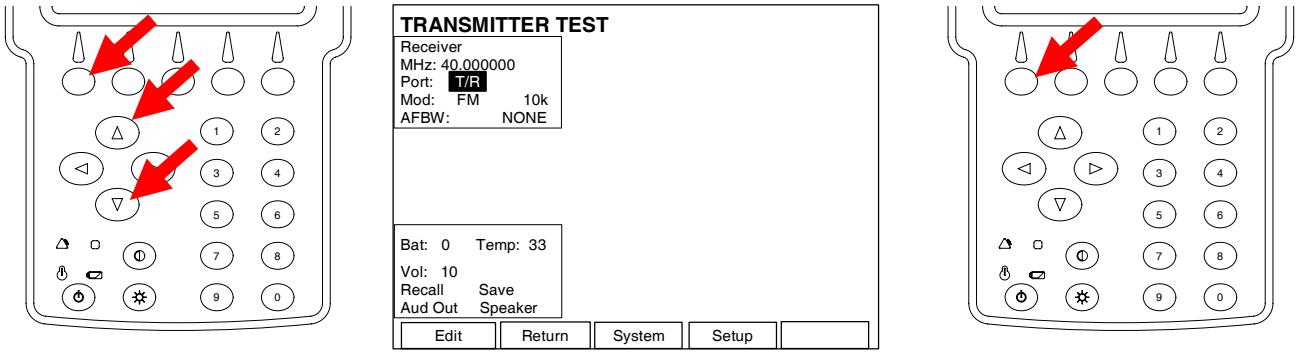


2-5-6. MEASURING REVERSE POWER (cont)

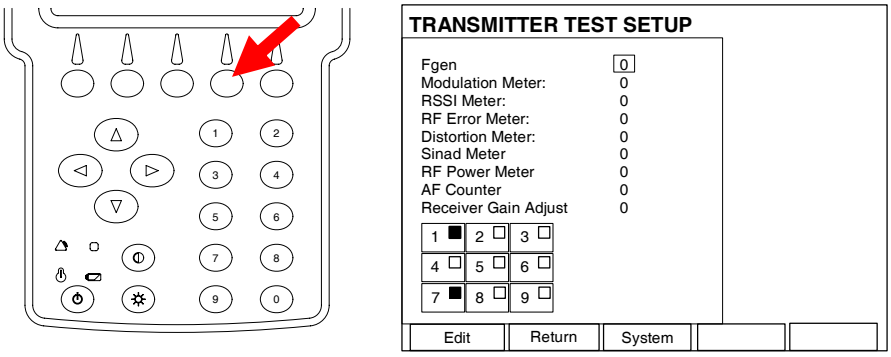
3. With the Benchtop Menu displayed, press the 2 Key to display the Transmitter Test Screen.



4. With the cursor on the RF In Field, press the F1 “Edit” Key and and use the ▲ UP Key or ▼ DOWN Key to select the T/R Connector. Press the F1 “Done” Key to save the setting.

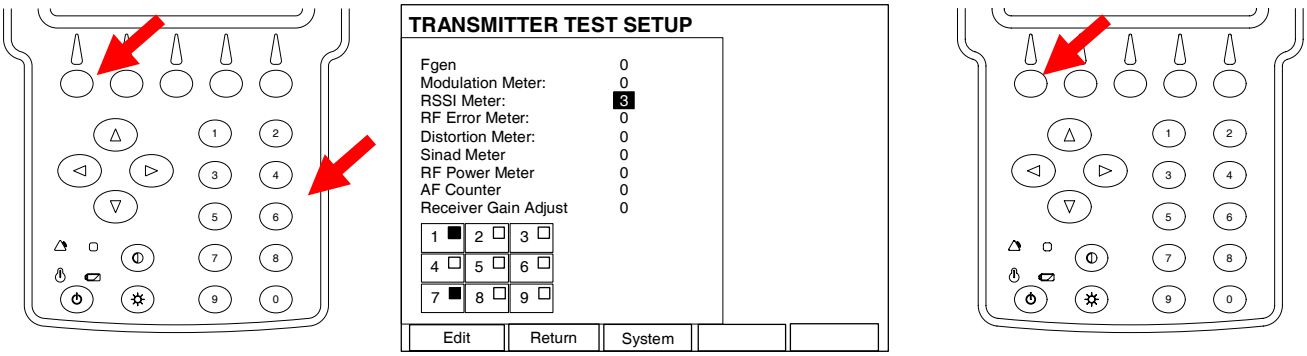


5. Press the F4 “Setup” Key to display the Transmitter Setup Menu.

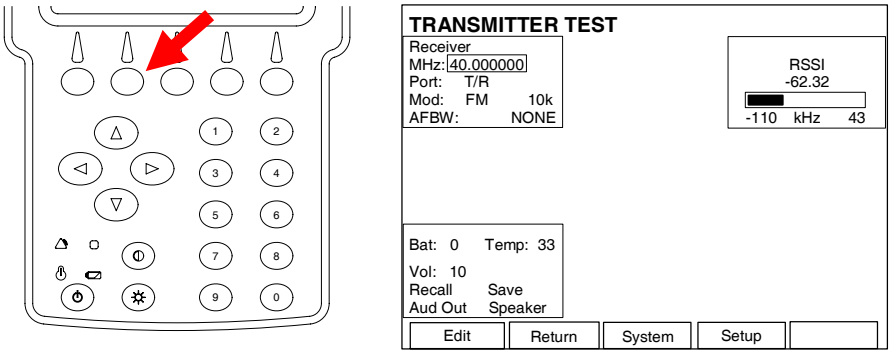


2-5-6. MEASURING REVERSE POWER (cont)

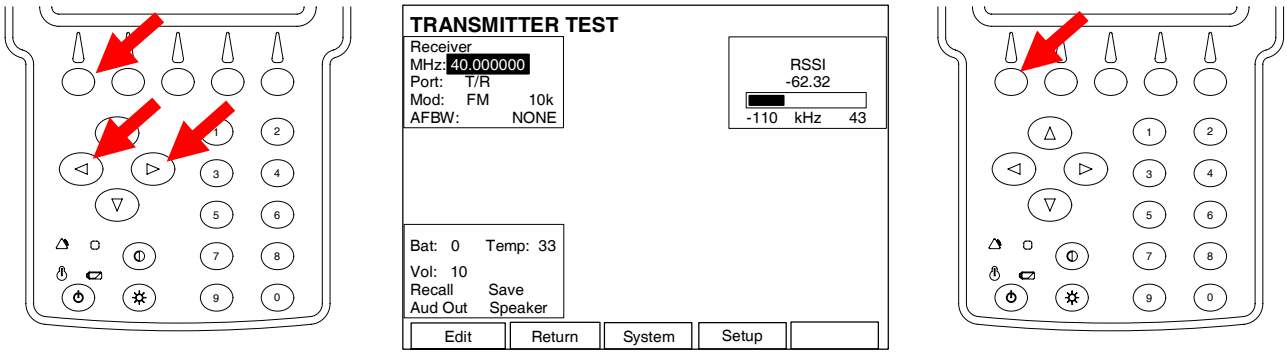
6. With the cursor on the RSSI Meter Field, press the F1 “Edit” Key and the Number Key for an open Meter position (refer to Meter Chart) to display the RSSI Meter in that position on the Transmitter Test Screen. Press the F1 “Done” Key to save the setting.



7. Press the F2 “Return” Key to display the Transmitter Test Menu.



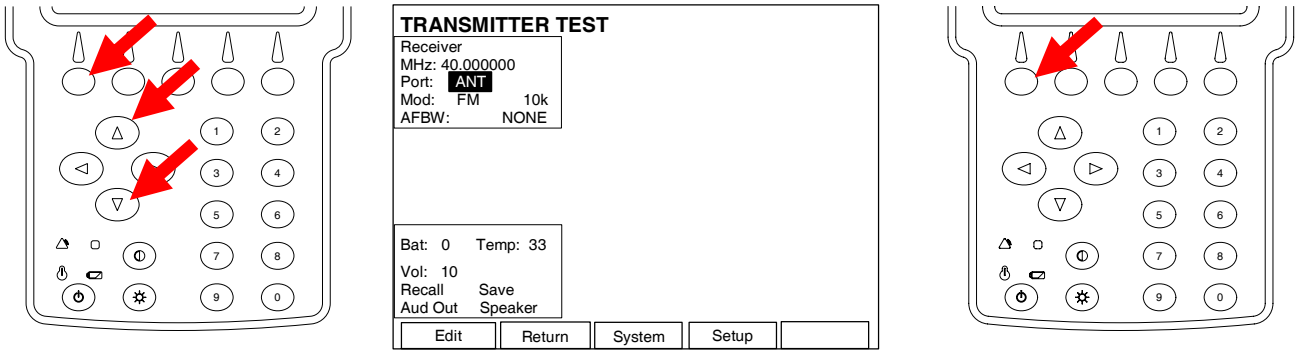
8. With the cursor on the RF MHz Field, press the F1 “Edit” Key and use the ◀ LEFT, ▶ RIGHT and Number Keys to match the Transmit frequency of the UUT. Press the F1 “Done” Key to save the setting.



9. Key the Transmitter and record the RSSI Meter reading.

2-5-6. MEASURING REVERSE POWER (cont)

10. With the cursor on the RF In Field, press the F1 “Edit” Key and and use the ▲ UP Key or ▼ DOWN Key to select the ANT Connector. Press the F1 “Done” Key to save the setting.

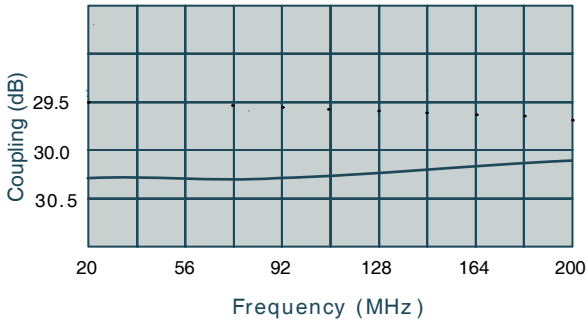


11. Key the Transmitter and record the RSSI Meter reading.

12. Calculate Forward and Reverse Power:

    FWD PWR (dBm) = T/R RSSI (dBm) + FWD Coupling

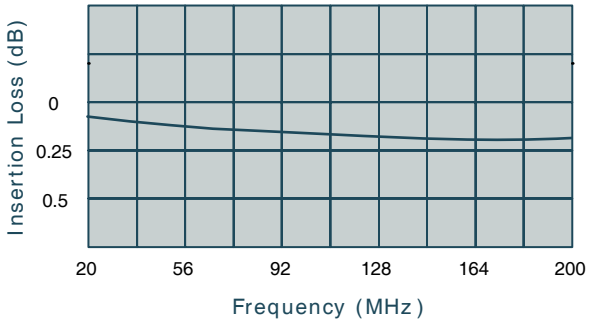
    REV PWR (dBm) = ANT RSSI (dBm) + REV Coupling + Coupler Insertion Loss



13. Calculate Power in Watts and Return Loss:

    Power (Watts) = $10^{(PWR\ (dBm)/10)} * 0.001$

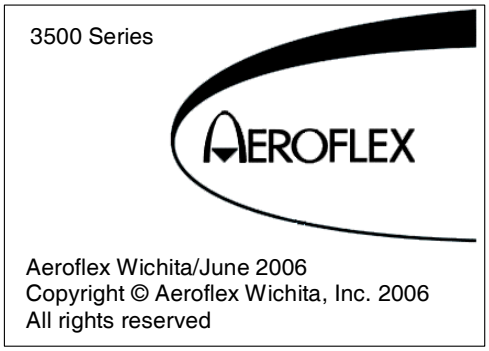
    Return Loss = REV PWR (dBm) - FWD PWR (dBm) + 10 dB

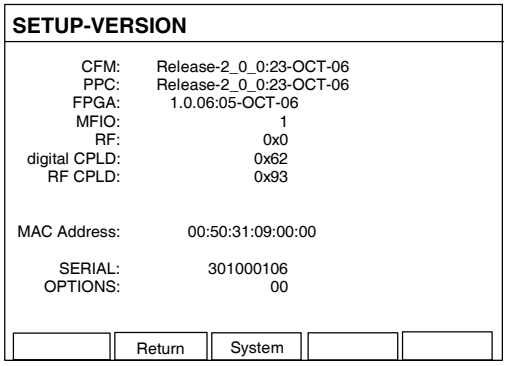


2-5-7. LOADING SOFTWARE USING USB MEMORY DEVICE

NOTE: When loading Software into the Test Set, the Calibration Values are not affected; however any saved Setup Files are deleted.

1. Ensure the Test Set is OFF.
2. Attach the Breakout Box to the REMOTE Connector.
3. Insert the USB Memory Device (marked ColdFire) in the USB Connector on the Breakout Box.
4. Press and hold the F5 Key.
5. Press the POWER Key while continuing to hold the F5 Key until the LOADING Screen appears.
6. The USB Memory Device LED starts to flash when the software is loading. Allow 20 minutes for the software to load.
7. When the software load is completed, the Test Set automatically resets. Press the POWER Key and ensure the Test Set is OFF.
8. Remove the USB Memory Device (ColdFire) and insert the USB Memory Device (marked PPC) in the USB Connector on the Breakout Box.
9. Press and hold the F5 Key.
10. Press the POWER Key while continuing to hold the F5 Key until the LOADING Screen appears.
11. The USB Memory Device LED starts to flash when the software is loading. Allow 20 minutes for the software to load.
12. When the software load is completed, the Test Set automatically resets. Press the POWER Key and ensure the Test Set is OFF.
13. Remove the USB Memory Device (PPC) from the USB Connector on the Breakout Box.
14. Press the POWER Key. The Opening Screen is displayed. After a few minutes, the Startup Startup Screen is displayed. Verify the Software Version displayed on the Version Screen matches the Software Version loaded.





CHAPTER 3 - OPERATOR MAINTENANCE

3-1. SERVICE UPON RECEIPT

3-1-1. SERVICE UPON RECEIPT OF MATERIAL

A. Unpacking

Special-design packing material inside this shipping carton provides maximum protection for the Test Set. Avoid damaging the carton and packing material during equipment unpacking. Use the following steps for unpacking the Test Set.

- Cut and remove the sealing tape on the carton top and open the carton.
- Grasp the 3500 transit case firmly, while restraining the shipping carton, and lift the equipment and packing material vertically.
- Place the 3500 transit case and end cap packing on a suitable flat, clean and dry surface.
- Remove the 3500 transit case from the protective plastic bag.
- Place protective plastic bag and end cap packing material inside shipping carton.
- Store the shipping carton for future use should the 3500 need to be returned.

B. Checking Unpacked Equipment

Use the following steps for checking the equipment.

- Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage.
- Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies.

3-1-2. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT

1. Remove the 3500 from the Soft Carrying Case or Transit Case.

2. Perform the Turn-On Procedure (para 2-4-1).

BATTERY PRECAUTIONS

The 3500 is powered by an internal Lithium Ion battery pack. The Test Set is supplied with an external DC Power Supply that enables the operator to recharge the battery when connected to AC power. The 3500 can operate continuously on AC power via the DC Power Supply, for servicing and/or bench tests.

The internal battery is equipped to power the 3500 for six hours of continuous use, after which time, the 3500 battery needs recharging. When the POWER Indicator is GREEN, the battery is at >25% capacity. When the POWER Indicator is YELLOW, the battery is at <25% capacity.

If the battery level, shown in the BAT Field on most Test Screens, drops to 10 (10%), the 3500 powers down automatically.

The battery charger operates whenever DC power (11 to 32 Vdc) is applied to the Test Set with the supplied DC Power Supply or a suitable DC power source. When charging, the battery reaches an 100% charge in approximately four hours. The internal battery charger allows the battery to charge between a temperature range of 5° to 45°C. The 3500 can operate, connected to an external DC source, outside the battery charging temperature range (5° to 45°C). Allow 20 minutes for the battery to charge when turning the 3500 ON from a dead battery condition.

The battery should be charged every three months (minimum) or disconnected for long term inactive storage periods of more than six months. The Battery must be removed when conditions surrounding the Test Set are <-20°C and >60°C)

3-2. TROUBLESHOOTING

Troubleshooting is divided into a Symptom Index and a Troubleshooting Table.

The Troubleshooting Table lists the common malfunctions which may occur during operation of the Test Set. Perform the tests/inspections and corrective actions in the order listed.

NOTE

- This manual cannot list all the malfunctions that may occur, nor all the tests or inspections and corrective actions.
- If a malfunction is not listed or is not corrected by the listed corrective actions, route the Test Set to an authorized Maintenance Facility for repair.

SYMPTOM	DESCRIPTION	PAGE
1	External DC Power Supply failure	3-4
2	POWER Indicator does not illuminate	3-4
3	CHARGE Indicator does not illuminate	3-5
4	FAULT Indicator is Red	3-5
5	FAULT Indicator is Yellow	3-5
6	Blows Fuse	3-6
7	Battery does not charge	3-6
8	Display is blank or abnormality exists in Display	3-6
9	Display Contrast cannot be adjusted	3-6
10	Display Backlight cannot be adjusted	3-6
11	Keys inoperable	3-6
12	Self Test failure	3-6
13	Connector failure	3-6

TROUBLESHOOTING TABLE

NOTE

The Troubleshooting Table lists common malfunctions found during normal operation of the Test Set. The tests or inspections and corrective actions should be performed in the order listed. Failure to do so may result in troubleshooting recommendations that replace working items.

MALFUNCTION / *TEST OR INSPECTION* / *CORRECTIVE ACTION*	
1	**External DC Power Supply failure**
Step 1.	Connect the External DC Power Supply to a verifiable AC Power Source and verify the LED is lit.
	◆ If incorrect, replace the External DC Power Supply.
Step 2.	Using a DMM on the External DC Power Supply output, verify +18 Vdc (±1 Vdc).
	◆ If incorrect, replace the External DC Power Supply.
2	**POWER Indicator does not illuminate**
Step 1.	Connect the External DC Power Supply to a verifiable AC Power Source and verify the LED is lit.
	◆ If incorrect, replace the External DC Power Supply.
Step 2.	Using a DMM on the External DC Power Supply output, verify +18 Vdc (±1 Vdc).
	◆ If incorrect, replace the External DC Power Supply.
Step 3.	Verify the Battery is installed.
	◆ If incorrect, install the Battery (para 3-3-2).
Step 4.	Verify the Fuse is not blown.
	◆ If incorrect, replace the Fuse (para 3-3-3).
Step 5.	Remove any external power sources from the Test Set. Using a DMM, verify 11.1 Vdc Nominal at the Battery Connector (Red wire).
	◆ If incorrect, replace the Battery (para 3-3-2).
Step 6.	Connect the External DC Power Supply to the Test Set. Using a DMM, verify 12.6 Vdc at the Battery Connector (Red wire).
	◆ If incorrect, refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.

TROUBLESHOOTING TABLE (cont)

MALFUNCTION *TEST OR INSPECTION* *CORRECTIVE ACTION*	
3	**CHARGE Indicator does not illuminate**
	Step 1. Connect the External DC Power Supply to a verifiable AC Power Source and verify the LED is lit.
	◆ If incorrect, replace the External DC Power Supply.
	Step 2. Using a DMM on the External DC Power Supply output, verify +18 Vdc (±1 Vdc).
	◆ If incorrect, replace the External DC Power Supply.
	Step 3. Verify the Battery is installed.
	◆ If incorrect, install the Battery (para 3-3-2).
	Step 4. Verify the Fuse is not blown.
	◆ If incorrect, replace the Fuse (para 3-3-3).
	Step 5. Remove any external power sources from the Test Set. Using a DMM, verify 11.1 Vdc Nominal at the Battery Connector (Red wire).
	◆ If incorrect, replace the Battery (para 3-3-2).
	Step 6. Connect the External DC Power Supply to the Test Set. Using a DMM, verify 12.6 Vdc at the Battery Connector (Red wire).
	◆ If incorrect, refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
4	**FAULT Indicator is Red**
	Step 1. Clear Warning condition in the Test Set.
	Step 2. Press the POWER Key twice to cycle power.
	◆ If FAULT Indicator is still Red, refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
5	**FAULT Indicator is Yellow**
	Step 1. Clear Caution condition in the Test Set.
	Step 2. Press the POWER Key twice to cycle power.
	◆ If FAULT Indicator is still Yellow, refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.

TROUBLESHOOTING TABLE (cont)

MALFUNCTION	*TEST OR INSPECTION*	*CORRECTIVE ACTION*
6	**Blows Fuse**	
	Step 1.	Connect the External DC Power Supply to a verifiable AC Power Source and verify the LED is lit.
		◆ If incorrect, replace the External DC Power Supply.
	Step 2.	Using a DMM on the External DC Power Supply output, verify +18 Vdc (±1 Vdc).
		◆ If incorrect, replace the External DC Power Supply.
	Step 3.	Replace the Fuse (para 3-3-3).
		◆ If the Fuse continues to blow, refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
7	**Battery does not charge**	
	Step 1.	Connect the External DC Power Supply to the Test Set and verify the CHARGE Indicator is Green or Yellow.
		◆ If incorrect, replace the Battery (para 3-3-2).
	Step 2.	Allow four hours for Battery to fully charge and verify the CHARGE Indicator is Green.
		◆ If incorrect, replace the Battery (para 3-3-2).
8	**Display is blank or abnormality exists in Display**	
	Step 1.	Press the POWER Key.
	Step 2.	Check and/or adjust Contrast and Backlight levels.
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
9	**Display Contrast cannot be adjusted**	
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
10	**Display Backlight cannot be adjusted**	
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
11	**Keys inoperable**	
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
12	**Self Test failure**	
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.
13	**Connector failure**	
	Inspect connector for damage and/or wear.	
		Refer to Troubleshooting (para 2-2) in the 3500 Maintenance Manual.

3-3. MAINTENANCE PROCEDURES

3-3-1. BATTERY RECHARGING

The Battery is equipped to power the 3500 for six hours of continuous use, after which time, the Battery needs recharging. The battery charger operates whenever DC power (11 to 32 Vdc) is applied to the Test Set with the supplied External DC Power Supply or a suitable DC power source. When charging, the Battery reaches an 100% charge in approximately four hours. The internal battery charger allows the Battery to charge between a temperature range of 5°C to 40°C. Allow 20 minutes for the battery to charge when turning the 3515 ON from a dead battery condition.

The Battery should be charged every three months (minimum) or disconnected for long term inactive storage periods of more than six months. The Battery must be removed when conditions surrounding the Test Set are <-20°C or >60°C).

DESCRIPTION

This procedure is used to recharge the Battery in the 3500 with an External DC Power Supply.

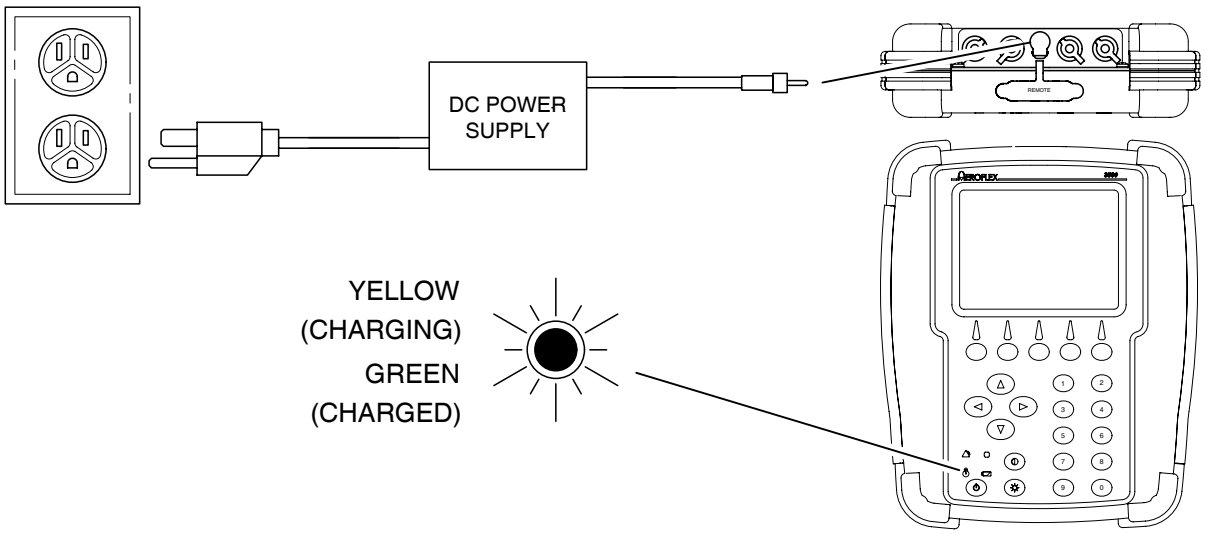
WARNING

Do not recharge the Lithium Ion Battery Pack outside the 3500.

1. Connect the AC Power Cable to the External DC Power Supply and an appropriate AC power source.
2. Connect the External DC Power Supply to the DC IN Connector on the 3500.
3. Verify the CHARGE Indicator is YELLOW.

   If the CHARGE Indicator is RED, refer to Troubleshooting (para 3-2).
4. Allow four hours for Battery charge or until the CHARGE Indicator is GREEN.

   If the CHARGE Indicator is YELLOW and/or the Battery fails to accept a charge and the 3500 does not operate on Battery power, refer to Troubleshooting (para 3-2).



062-001

3-3-2. BATTERY REPLACEMENT

DESCRIPTION

This procedure is used to replace the Battery in the 3500.

⚠ CAUTION

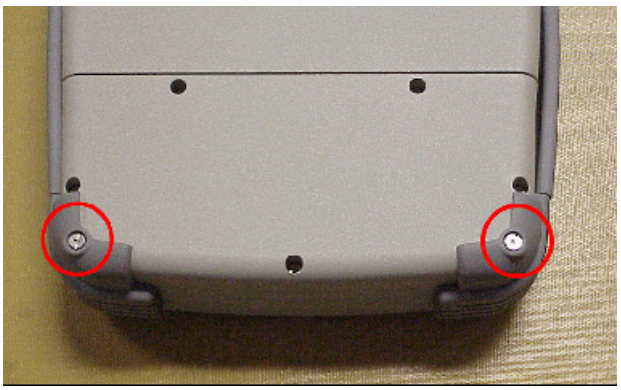
REPLACE ONLY WITH THE BATTERY SPECIFIED. DO NOT ATTEMPT TO INSTALL A NON-RECHARGEABLE BATTERY.

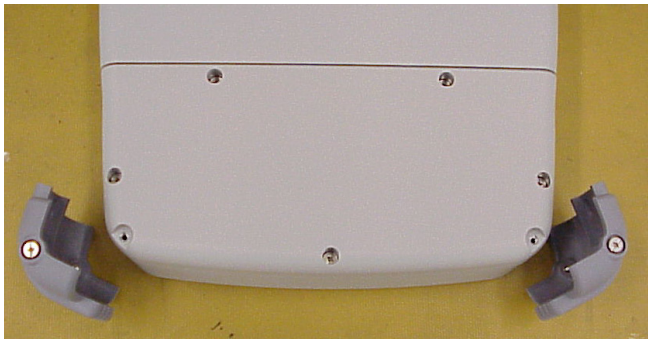
WARNING

- **DISPOSE OF THE LITHIUM ION BATTERY PACK ACCORDING TO LOCAL STANDARD SAFETY PROCEDURES. DO NOT CRUSH, INCINERATE OR DISPOSE OF THE LITHIUM ION BATTERY PACK IN NORMAL WASTE.**
- **DO NOT SHORT CIRCUIT OR FORCE DISCHARGE OF THE LITHIUM ION BATTERY PACK AS THIS MIGHT CAUSE THE LITHIUM ION BATTERY PACK TO VENT, OVERHEAT OR EXPLODE.**

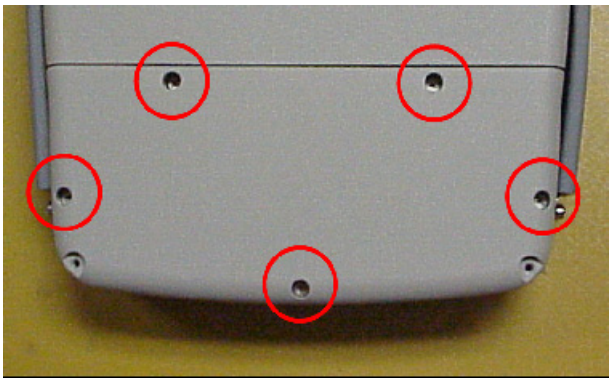
REMOVE

1. Fully loosen the captive screws (on each side of the bumper) in the two lower bumpers and remove the bumpers from the Test Set.





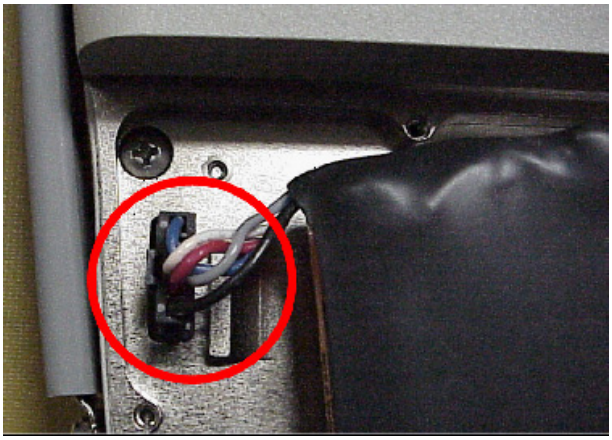
2. Fully loosen five captive screws holding the Battery Cover to the Test Set and remove the Battery Cover from the Test Set.



3-3-2. BATTERY REPLACEMENT (cont)

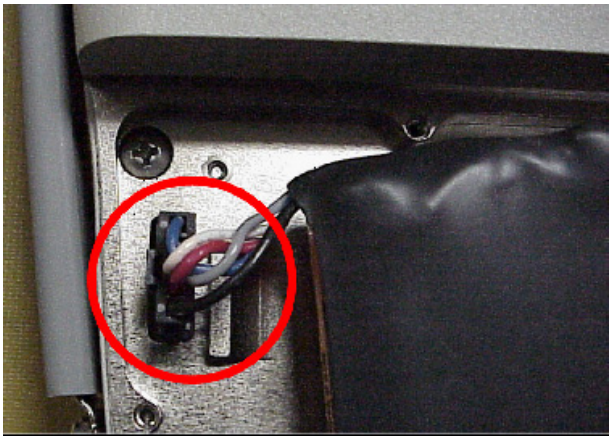
REMOVE (cont)

3. Disconnect the Battery Wire Harness and remove the Battery from the Test Set.

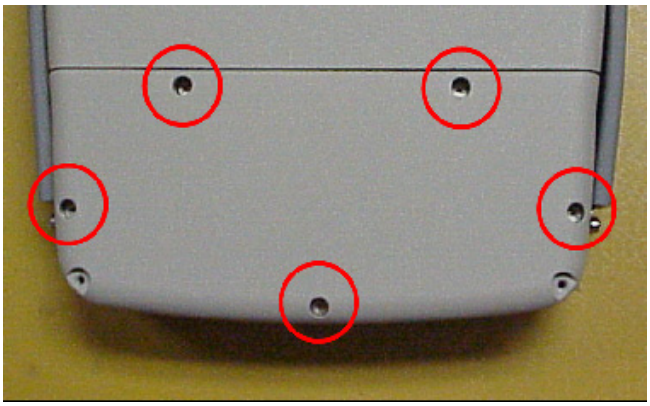


INSTALL

1. Install the Battery in the Test Set and connect the Battery Wire Harness.



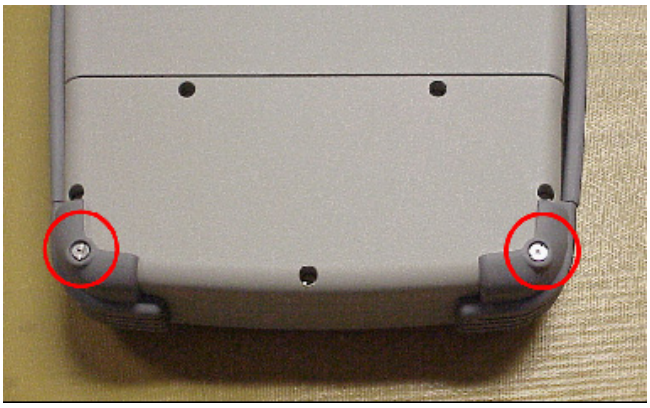
2. Install the Battery Cover on the Test Set and tighten five captive screws (8 in/lbs.).



3-3-2. BATTERY REPLACEMENT (cont)

INSTALL (cont)

3. Install the two lower bumpers on the Test Set and tighten the captive screws (on each side of the bumpers) (8 in/lbs.).



3-3-3. FUSE REPLACEMENT

DESCRIPTION

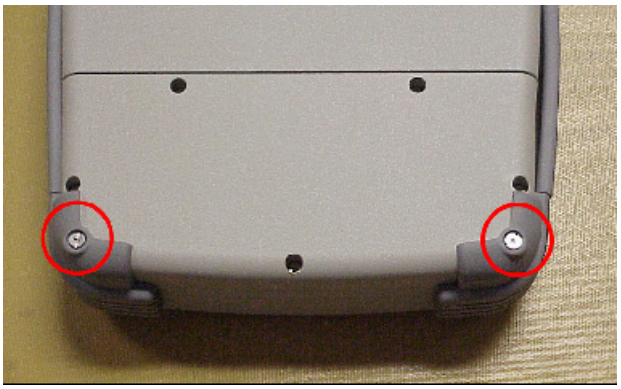
This procedure is used to replace the internal fuse in the 3500.

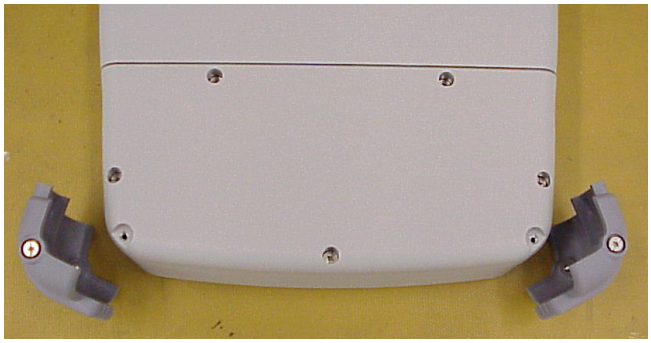
CAUTION

FOR CONTINUOUS PROTECTION AGAINST FIRE, REPLACE ONLY WITH FUSES OF THE SPECIFIED VOLTAGE AND CURRENT RATINGS. (5 A, 32 Vdc, Type F - Mini Blade Fuse)

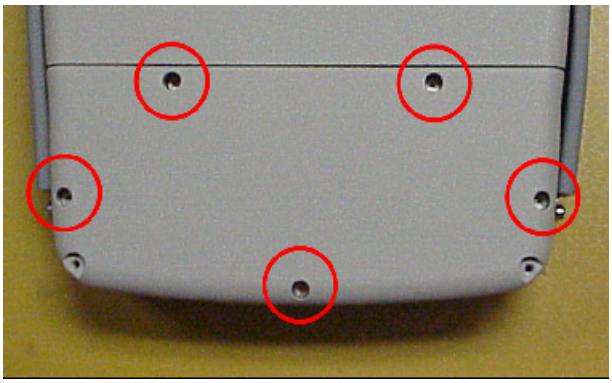
REMOVE

1. Fully loosen the captive screws (on each side of the bumper) in the two lower bumpers and remove the bumpers from the Test Set.





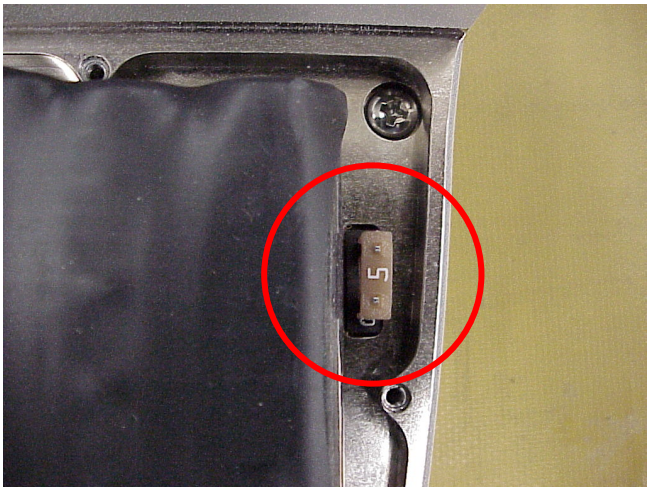
2. Fully loosen five captive screws holding the Battery Cover to the Test Set and remove the Battery Cover from the Test Set.



3-3-3. FUSE REPLACEMENT (cont)

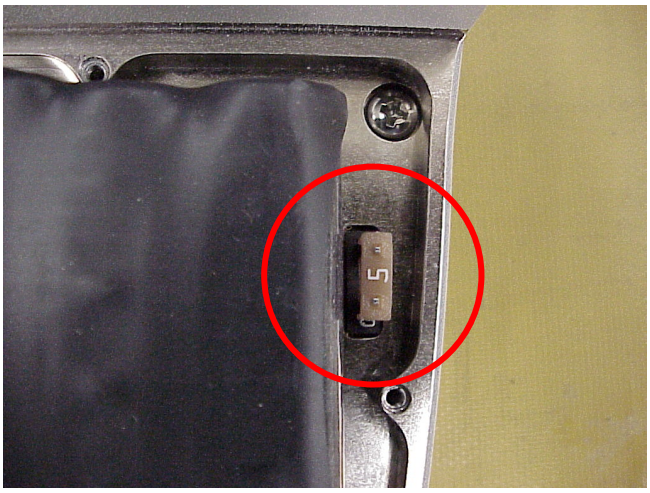
REMOVE (cont)

3. Locate and remove the Fuse.



INSTALL

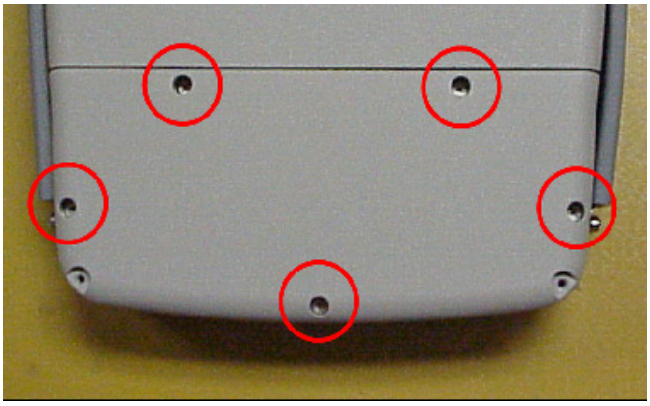
1. Install the Fuse.



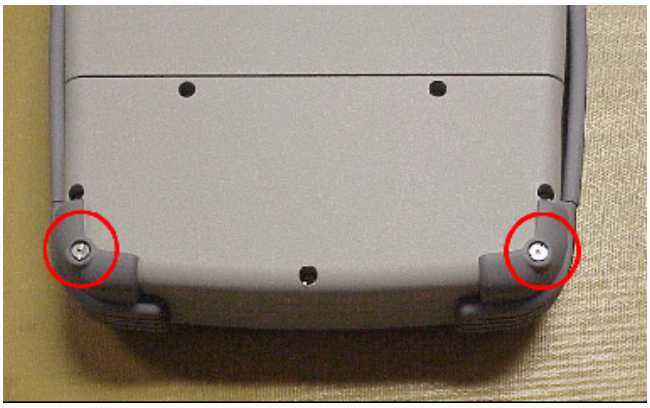
3-3-3. FUSE REPLACEMENT (cont)

INSTALL (cont)

2. Install the Battery Cover on the Test Set and tighten five captive screws (8 in/lbs.).



3. Install the two lower bumpers on the Test Set and tighten the captive screws (on each side of the bumpers) (8 in/lbs.).



3-3-4. HANDLE REPLACEMENT

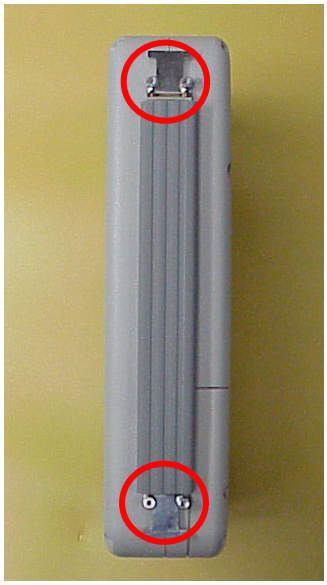
DESCRIPTION

This procedure is used to replace the handle(s) on the 3500.

REMOVE

1. Fully loosen the captive screws (on each side of the bumper) in the two bumpers (on the right or left side of the Test Set) and remove the bumpers from the Test Set.

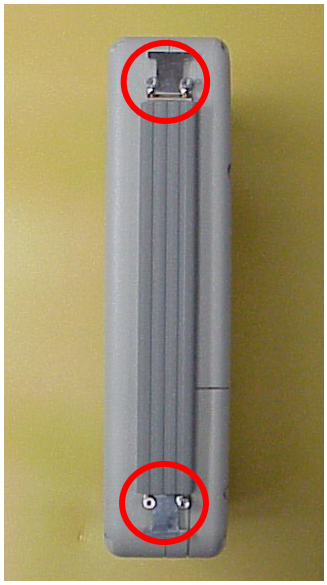
2. Remove the four shoulder bolts securing the Handle to the Test Set and remove the Handle.



3-3-4. HANDLE REPLACEMENT (cont)

INSTALL

1. Install the Handle and the four shoulder bolts (8 in/lbs.).



2. Install the two bumpers (on the right or left side of the Test Set) and tighten the captive screws (on each side of the bumper) (8 in/lbs.).

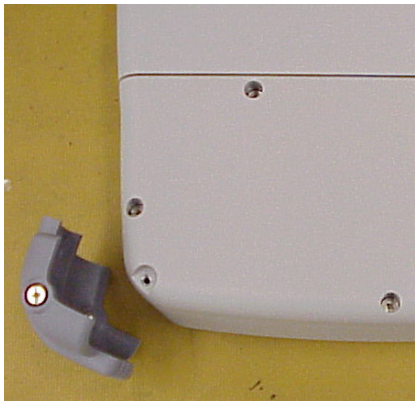
3-3-5. BUMPER REPLACEMENT

DESCRIPTION

This procedure is used to replace the bumper(s) on the 3500.

REMOVE

Fully loosen the captive screws on each side of the bumper and remove the bumper from the Test Set.



INSTALL

Install the bumper on the Test Set and tighten the captive screws (on each side of the bumpers) (8 in/lbs.).

3-4. PREPARATION FOR STORAGE OR SHIPMENT

A. Packaging

Package the Test Set in the original shipping container. When using packing materials other than the original, use the following guidelines:

- Wrap the 3500 transit case in plastic packing material.
- Use a double-wall cardboard shipping container.
- Protect all sides with shock-absorbing material to prevent the 3500 transit case from moving within the container.
- Seal the shipping container with approved sealing tape.
- Mark “FRAGILE” on the top, bottom and all sides of the shipping container.

B. Environment

The Test Set should be stored in a clean, dry environment. In high humidity environments, protect the Test Set from temperature variations that could cause internal condensation. The following environmental conditions apply to both shipping and storage:

Temperature: ..... -30°C to +71°C*

Relative Humidity: ..... 0% to 95%

Altitude: ..... 0 to 4600 m

Vibration: ..... <2 g

Shock: ..... <30 g

* The Battery must not be subjected to temperatures <-20°C or >+60°C.

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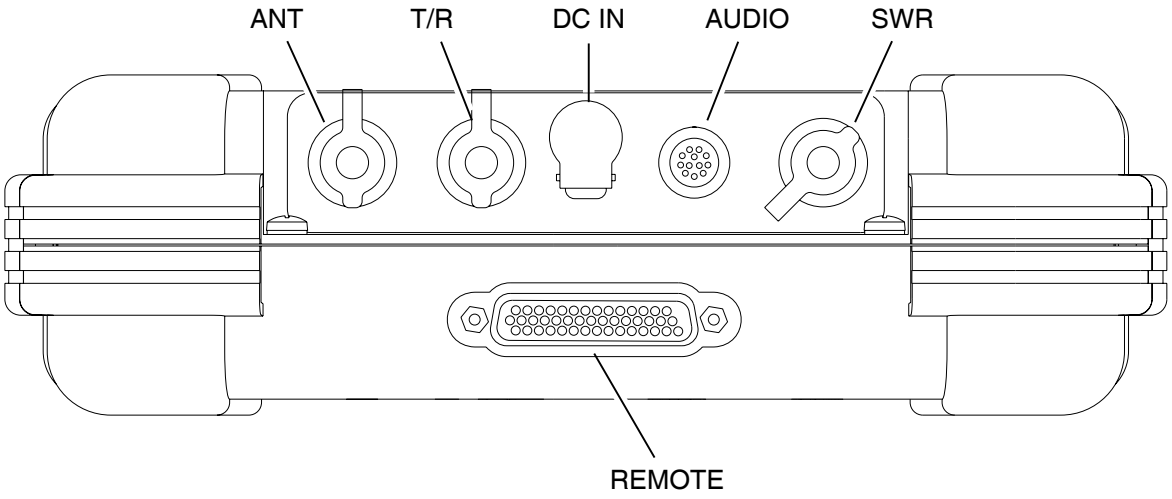
APPENDIX A - CONNECTOR PIN-OUT TABLES

A-1. I/O CONNECTORS

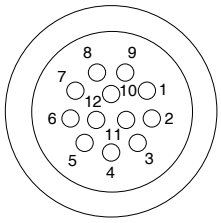


062-005

CONNECTOR	TYPE	SIGNAL TYPE	INPUT/OUTPUT
ANT	TNC Female		INPUT/OUTPUT
T/R	TNC Female		INPUT/OUTPUT
SWR	TNC Female		INPUT/OUTPUT
DC IN	2.5 mm CIRCULAR (2.5 mm center, 5.5 mm outer diameter, center positive)		INPUT
AUDIO	12-Pin CIRCULAR Female	MIXED	INPUT/OUTPUT
	Refer to Appendix A, Table 2 for AUDIO Connector description		
REMOTE	44-Pin D-SUB Female	MIXED	INPUT/OUTPUT
	Refer to Appendix A, Table 3 for REMOTE Connector description		

I/O Connectors
Table 1

A-2. AUDIO CONNECTOR PIN-OUT TABLE

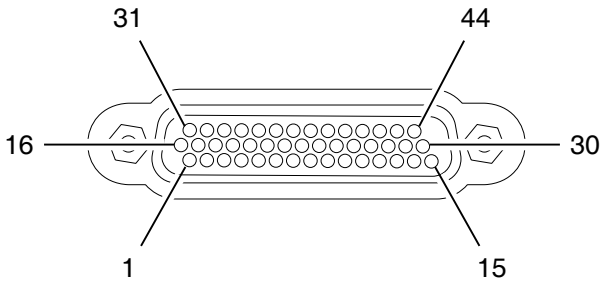


062-004

PIN NO.	SIGNAL NAME
1	PTT
2	AMP_SW
3	MIC
4	GND
5	AUDIO_IN
6	GND
7	DVM+
8	DVM-
9	AUDIO_OUT
10	GND
11	SPKR+
12	SPKR-

AUDIO Connector Pin-Out Table
Table 2

A-3. REMOTE CONNECTOR PIN-OUT TABLE



062-003

PIN NO.	SIGNAL NAME	PIN NO.	SIGNAL NAME
1	VBUS_DN1	23	GND
2	GND_DN1	24	CF_ETD+
3	VBUS_UP	25	GND
4	GND_UP	26	$\overline{\text{PPC\_CTS}}$
5	GND	27	PPC_TXD
6	$\overline{\text{CF0RTS}}$	28	A2
7	GND	29	REM_OUT2
8	CF_ERX-	30	REM_OUT4
9	CF_ETD-	31	VBUS_DN1
10	GND	32	GND_DN1
11	$\overline{\text{PPC\_RTS}}$	33	VBUS_UP
12	PPC_RXD	34	GND_UP
13	B1	35	GND
14	A4	36	CF0RX
15	REM_OUT3	37	GND
16	H_D-	38	CF_ERX+
17	H_D+	39	GND
18	D_D-	40	A1
19	D_D+	41	REM_OUT1
20	GND	42	AUDIOOUTFLEXBUFFER
21	CF0TX	43	AUDIOINFLEXBUFFER
22	$\overline{\text{CF0CTS}}$	44	GND

REMOTE Connector Pin-Out Table
Table 3

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APPENDIX B - ABBREVIATIONS

A

A	Amperes
AC	Alternating Current
AF	Audio Frequency
AFBW	Audio Frequency Bandwidth
AM	Amplitude Modulation
ANT	Antenna
Assy	Assembly
ATTN	Attenuation
Aud	Audio

B

Bat	Battery
Batt	Battery
BP	Bandpass
BW	Bandwidth

C

C	Celsius or Centigrade
CAL	Calibrate/Calibration
CAL'D	Calibrated
CFM	Coldfire Firmware
Config	Configure/Configuration
CPLD	Complex Processing Logic Device
CW	Continuous Wave

D

D	Day
dB	Decibel
dBc	Decibels below Carrier
dBm	Decibels above one Milliwatt
DC	Direct Current
DEV	Deviation
DIST	Distortion

E

e.g.	For Example ...
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
Err	Error
ESC	Escape

F

FH	Frequency Hop
Fgen	Function Generator
FM	Frequency Modulation
FPGA	Field Programmable Gate Array
FREQ	Frequency

G

Gen	Generate
GHz	Gigahertz (10^9 Hertz)

H

H	Hour
HI	High
HP	High-Pass
Hr	Hour
Hz	Hertz

I

i.e.,	That is ...
IF	Intermediate Frequency
IN	Input
In/lbs.	Inch/Pounds
I/O	Input/Output

K

kHz	Kilohertz (10^3 Hertz)

L

LCD	Liquid Crystal Display
LO	Low
LP	Low-Pass
Lvl	Level

M

M, m	Month or Meters or Minutes
Mm	Millimeter
MFIO	Multi-Function I/O
MHz	Megahertz (10^6 Hertz)
MIC	Microphone
MIN, min	Minimum or Minutes
MOD	Modulation
mm	Millimeter (10^{-3} Meters)

N

NORM	Normal or Normalize

O

OUT	Output
Ovr	Overload

P

para	Paragraph
PC	Printed Circuit
PCB	Printed Circuit Board
PPC	PowerPC
ppm	Parts per Million
PTT	Push to Talk
Pwr	Power

R

REC	Receive
RF	Radio Frequency
RSSI	Received Signal Strength Indication
RX	Receive

S

SWR	Standing Wave Ratio

T

Tem	Temperature
Temp	Temperature
T/R	Transmit/Receive
TX	Transmit

U

UNCAL'D	Uncalibrated
UUT	Unit Under Test

V

V	Volt
VAC	Volts, Alternating Current
Vdc	Volts, Direct Current
VHF	Very High Frequency
Vol	Volume
Vrms	Volts Root Mean Square
VSWR	Voltage Standing Wave Ratio

W

W	Watt

Y

Y	Year

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