
SITE ANALYZER™

**CABLE AND ANTENNA TESTER
FOR WIRELESS SYSTEMS**

OPERATING INSTRUCTIONS



**Electronic Corporation
Cleveland (Solon) Ohio USA**

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Instruction Book Part Number 920-7002A800 Revision K

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Safety Precautions

Remove Power

Observe general safety precautions. Do not open the instrument with the power on.

Safety Earth Ground

An uninterruptible safety earth ground must be supplied from the main power source to the instrument. Grounding one conductor of a two conductor power cable is not sufficient protection. Serious injury or death can occur if this grounding is not properly installed.

Safety Symbols

WARNING


Warning notes call attention to a procedure, which if not correctly performed, could result in personal injury.

CAUTION

Caution notes call attention to a procedure, which if not correctly performed, could result in damage to the instrument.



The caution symbol appears on the equipment indicating there is important information in the instruction manual regarding that particular area. See page 82 for specific cautions.

 NOTE: Calls attention to supplemental information.

Warning Statements

The following safety warnings appear in the text where there is danger to operating and maintenance personnel, and are repeated here for emphasis.

WARNING

The SA-BATPAK is shipped charged. Be careful when removing the safety cap, 12Vdc @ 2.0 AH/20 hour rate can be present inside the receptacle. Do not touch the inside of the receptacle. The possibility of an electric shock exists.

WARNING

This equipment should not be connected to an antenna or operated during a storm that has the potential to produce lightning. The possibility exists for electrical shock.

WARNING

When using the ac adapter, only connect the plug to a properly grounded receptacle. Serious injury or death can occur if grounding is not properly installed.

Caution Statements

The following equipment cautions appear in the text and are repeated here for emphasis.

CAUTION

Harsh or abrasive detergents, and some solvents, can damage the display unit and information on the labels.

CAUTION

When using a Bird 5011, do not exceed 2 W average or 125 W peak power for 5 μ s. Doing so will render the sensor inoperative.

CAUTION

+22 dBm max. input

Do not apply RF power to Antenna Test Port. Exceeding the maximum input will damage the Site Analyzer.

Safety Statements

USAGE



ANY USE OF THIS INSTRUMENT IN A MANNER NOT SPECIFIED BY THE MANUFACTURER MAY IMPAIR THE INSTRUMENT'S SAFETY PROTECTION.

USO

EL USO DE ESTE INSTRUMENTO DE MANERA NO ESPECIFICADA POR EL FABRICANTE, PUEDE ANULAR LA PROTECCIÓN DE SEGURIDAD DEL INSTRUMENTO.

BENUTZUNG

WIRD DAS GERÄT AUF ANDERE WEISE VERWENDET ALS VOM HERSTELLER BESCHRIEBEN, KANN DIE GERÄTESICHERHEIT BEEINTRÄCHTIGT WERDEN.

UTILISATION

TOUTE UTILISATION DE CET INSTRUMENT QUI N'EST PAS EXPLICITEMENT PRÉVUE PAR LE FABRICANT PEUT ENDOMMAGER LE DISPOSITIF DE PROTECTION DE L'INSTRUMENT.

IMPIEGO

QUALORA QUESTO STRUMENTO VENISSE UTILIZZATO IN MODO DIVERSO DA COME SPECIFICATO DAL PRODUTTORE LA PROZIONE DI SICUREZZA POTREBBE VENIRNE COMPROMESSA.

SERVICE



SERVICING INSTRUCTIONS ARE FOR USE BY SERVICE - TRAINED PERSONNEL ONLY. TO AVOID DANGEROUS ELECTRIC SHOCK, DO NOT PERFORM ANY SERVICING UNLESS QUALIFIED TO DO SO.

SERVICIO

LAS INSTRUCCIONES DE SERVICIO SON PARA USO EXCLUSIVO DEL PERSONAL DE SERVICIO CAPACITADO. PARA EVITAR EL PELIGRO DE DESCARGAS ELÉCTRICAS, NO REALICE NINGÚN SERVICIO A MENOS QUE ESTÉ CAPACITADO PARA HACERLO.

WARTUNG

ANWEISUNGEN FÜR DIE WARTUNG DES GERÄTES GELTEN NUR FÜR GESCHULTES FACHPERSONAL.

ZUR VERMEIDUNG GEFÄHRLICHER, ELEKTRISCHER SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

ENTRETIEN

L'EMPLOI DES INSTRUCTIONS D'ENTRETIEN DOIT ÊTRE RÉSERVÉ AU PERSONNEL FORMÉ AUX OPÉRATIONS D'ENTRETIEN. POUR PRÉVENIR UN CHOC ÉLECTRIQUE DANGEREUX, NE PAS EFFECTUER D'ENTRETIEN SI L'ON N'A PAS ÉTÉ QUALIFIÉ POUR CE FAIRE.

ASSISTENZA TECNICA

LE ISTRUZIONI RELATIVE ALL'ASSISTENZA SONO PREVISTE ESCLUSIVAMENTE PER IL PERSONALE OPPORTUNAMENTE ADDESTRATO. PER EVITARE PERICOLOSE SCOSSE ELETTRICHE NON EFFETTUARE ALCUNA RIPARAZIONE A MENO CHE QUALIFICATI A FARLA.

About This Manual

This instruction book covers the Bird Site Analyzer Models SA-2000, SA-2000A, and SA-2500A.

Changes to This Manual

We have made every effort to ensure this manual is accurate. If you should discover any errors, or if you have suggestions for improving this manual, please send your comments to our Solon, Ohio factory. This manual may be periodically updated. When inquiring about updates to this manual refer to the part number and revision level on the title page.

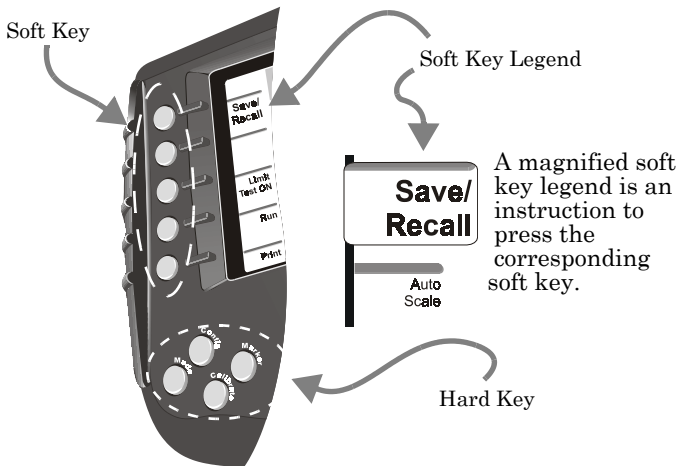
Quick Start and Reference Card

The Quick Start and Reference Card contains minimum operational steps and the order they should be performed. Use this manual for reference or if further explanation of any step is required.

Site Analyzer Keys

There are two types of keys on the Site Analyzer. The first type is a hard key with a particular function. The function is indicated on or next to the key. Hard key names are set in a bold type, e.g., Press the **ENTER** key.

The second type is a soft key. Each of the soft keys (there are five to the left of the display), has a corresponding soft key legend which depends on the function selected. The name will be at the left of the display, directly to the right of the corresponding key. Soft key names are set in a bold italic type, e.g. Press the ***SCALE*** key. Refer to the figure below.



Chapter Layout

Introduction — Identifies the parts, functions, and features of the Site Analyzer as well as optional equipment available.

Getting Started — Provides power up information for the Site Analyzer.

Calibration — Provides step by step instructions for calibrating the Site Analyzer, which must be done before using Measure Match or Fault Location modes.

Measure Match Mode — Lists the steps required to make match measurements, as well as providing instructions for all functions available in Measure Match mode.

Fault Location Mode — Lists the steps required to make distance to fault measurements, as well as providing instructions for all functions available in Fault Location mode.

Save and Recall — For units with the most recent firmware revision. Describes how to save, recall, and delete traces and setups in Measure Match or Fault Location modes.

Old Save and Recall — For firmware older than 1-Nov-2001. Describes how to save, recall, and delete traces and setups in Measure Match or Fault Location modes.

Measure Power Mode — Lists the steps required to make power measurements, as well as providing instructions for all functions available in Measure Power mode.

Utilities — Describes utilities to set up the Site Analyzer.

Computer Software — Provides installation instructions and lists the features of the Bird Site Analyzer PC Software.

Maintenance — Lists routine maintenance tasks for the Site Analyzer, as well as troubleshooting for common problems. Specifications and parts information are also included.

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The Bird Site Analyzer is a multifunction test instrument for use in installation and maintenance of wireless systems.

Antenna systems are tested by using a Site Analyzer to measure match conditions. Data is graphed at 238 points across a user-specified frequency band or distance range. Transmitter systems are tested by using a Site Analyzer and a Bird power sensor to measure RF power. Data is displayed as power or match efficiency, depending on the sensor.

Items Supplied

1. Site Analyzer
2. Soft-Sided Carrying Case
3. PCTool Software
4. AC Power Adapter
5. Automobile Cigarette Lighter Adapter
6. 9-Pin Serial Communications Cable
7. Instruction Manual (Not Shown)
8. Quick Start and Reference Cards (Not Shown)



Items Not Supplied

- Calibration Combination



- Bird 5010 Directional Power Sensor



- Bird 5011 Terminating Power Sensor



Site Analyzer Features

General

- Field replaceable Li-ion battery.
- Automatic power down conserves battery life.

Antenna Test

- Rejects on-channel interfering signals to +13 dBm.
- Stores up to 15 calibration profiles.
- Adjustable pass/fail limit line with visual indicator.

- Stores up to 300 sets of measurement data in raw format to facilitate conversion between antenna match and DTF.
- On-screen comparison between current measurement and stored data – no PC required.
- Pop-up menus contain over 70 cable types and 30 frequency band presets.
- X and Y scales and units are user adjustable.
- Dual measurement markers and one difference marker.
- Measurement hold to temporarily store a trace.
- Printing capability. The Bird Site Analyzer is compatible with all printers that use HP PCL Level 3, including most HP inkjet printers.

Measure Match Mode

- Fast swept measurement.
- Frequency can be set using either Start/Stop or Center/Span frequencies.
- Measurement units can be either return loss [dB], cable loss [dB], or VSWR [ratio].

Fault Location Mode

- Transform Algorithm - Fast Fourier Transform (FFT) with three levels of smoothing.
- Distance units can be either feet or meters.
- Measurement units can be either return loss [dB] or VSWR [ratio].

Transmitter Test**Measure Power Mode**

- Numerical readout and analog dial.
- Can display either forward power, reflected power, or match efficiency depending on the sensor.
- Power measurement units can be either Watts or dBm. Match units can be either VSWR, return loss, or % match efficiency.
- Compatible with the Bird Directional Power Sensor, Terminating Power Sensor, VSWR Alarms, and Broadcast Power Monitors.

Component Description



-
1. **Soft Keys** Activates the function described directly to the right of the key.

 2. **Mode Keys**
 - Mode Activates the mode menu. This menu allows the user to select Measure Match, Fault Location, Measure Power, or Utilities modes.

 - Config Activates the configuration menu for the current mode. This menu provides access to the variable measurement parameters (e.g. frequency band, distance, and units).

 - Calibrate Activates the calibration menu.

 - Marker Activates the marker menu. This menu allows the user to turn markers is on or off and to move the active marker.

 3. **Numeric Keys** Enter numeric data into the selected item, or as defined by the function description.

 4. **Escape Key**
During:
 - Menu Selection Backs up one menu level.

 - Data Entry Exits data entry without changing the value.

 5. **Enter Key**
During:
 - List Selection Selects the highlighted item in the list.

 - Data Entry Exits data entry, changing the value.

 6. **Cursor Keys**
Left Arrow
During:
 - Data Entry Deletes previously entered data one character at a time.

 - Marker Control Moves active marker left one point at a time.

 - All other times As defined by the function description.

Right Arrow

During:

- | | |
|-----------------|--|
| Marker Control | Moves active marker right one point at a time. |
| All other times | As defined by the function description. |

Up Arrow

During:

- | | |
|---------------------------------|--|
| Data Entry | Increases the numeric value. |
| Marker Control | Moves the marker to the maximum trace value. |
| While pressing the contrast key | Increases the display contrast. |
| All other times | As defined by the function description. |

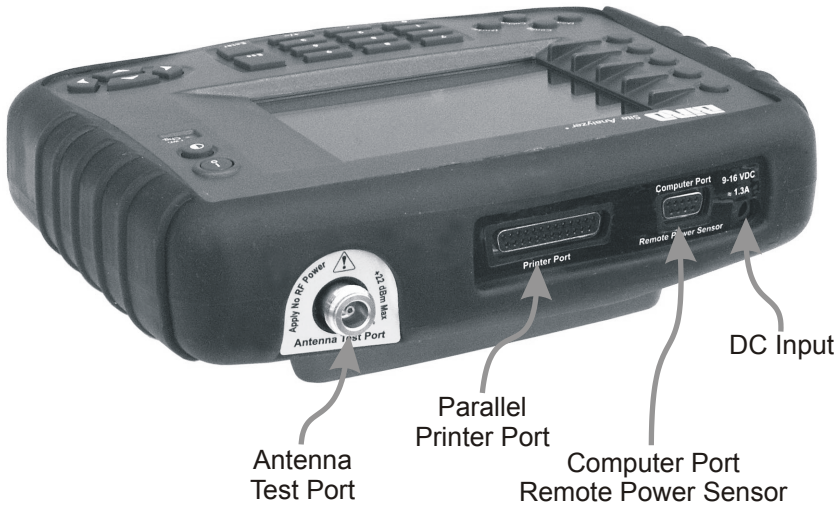
Down Arrow

During:

- | | |
|---------------------------------|--|
| Data Entry | Decreases the numeric value. |
| Marker Control | Moves the marker to the minimum trace value. |
| While pressing the contrast key | Decreases the display contrast. |
| All other times | As defined by the function description. |

- 7. Battery LED** The yellow LED lights when the unit is powered by an external dc power source. When charging the internal battery pack, the yellow LED blinks. Once the battery is fully charged the yellow LED stops blinking.
- The green LED lights whenever the unit is on.
- 8. Contrast Key** Hold while pressing the up/down arrow keys to adjust the contrast of the display.
- 9. I/O (On/Off)** Turns the instrument on and off. The key must be pressed for at least one-half (½) second.

Connection Description



CAUTION
 +22 dBm max. input
 Do not apply RF power to Antenna Test Port. Exceeding the maximum input will damage the Site Analyzer.

Antenna Test Port

Standard N-type female connector. Use a phase-stable armored cable to connect the Site Analyzer to the antenna.

Optional Test Port Extension Cables and adapters are listed in the Accessory Guide Brochure.

Parallel Printer Port

25-pin (DB25) parallel connector. Connect the Site Analyzer to a HP-type inkjet printer. The cable is not included.

Computer/Power Sensor Port

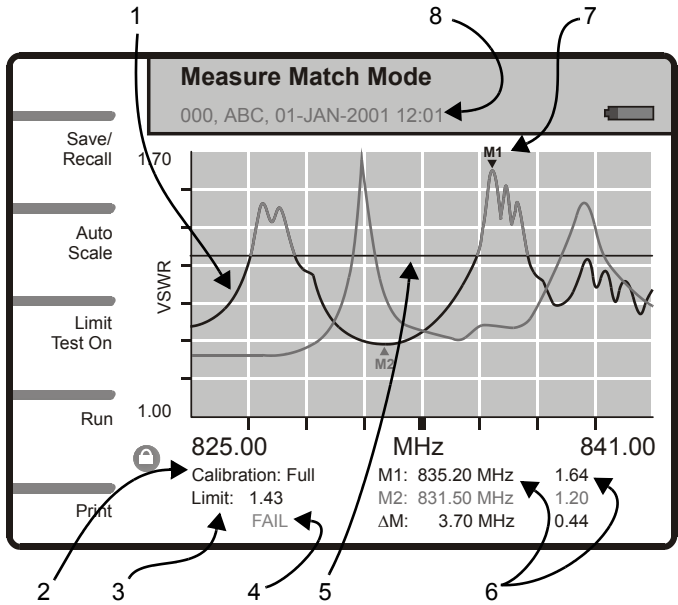
9-pin RS-232 (DB9) serial connector. 9600 baud, 8 data bits, 1 stop bit, no parity, and no handshake. Connect the Site Analyzer to a PC serial port or to Bird power sensors.

DC Input

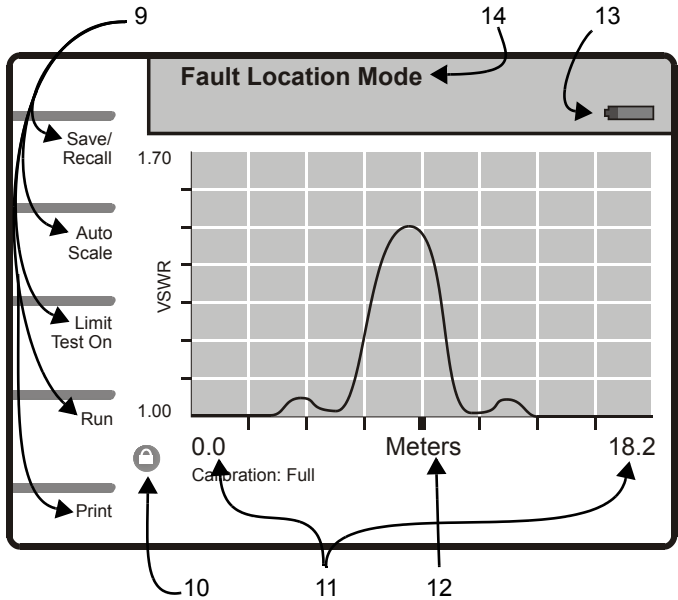
Input for external power supplies. Plug either the ac power supply or the cigarette lighter adapter into the dc input. The external supplies operate the unit and charge the internal battery.

Display Description

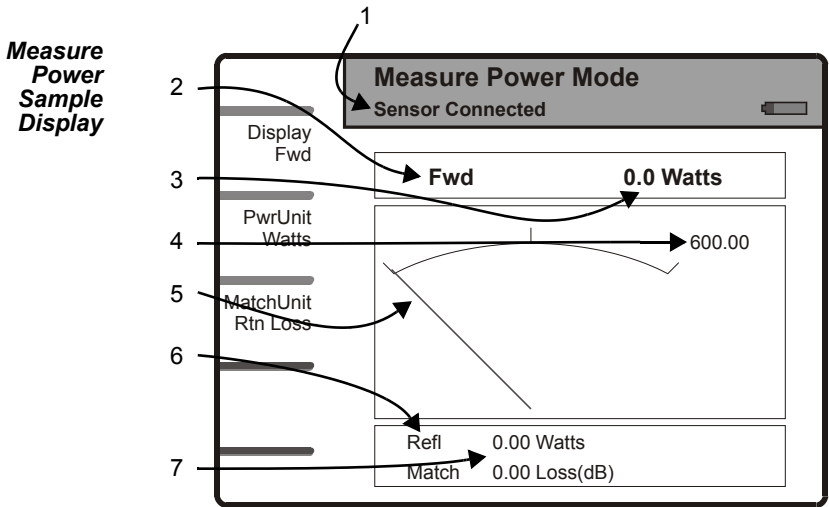
Measure Match Sample Display



Fault Location Sample Display



1. **Trace** Graphic display of the measurement.
2. **Calibration Indicator** Indicates the calibration status.
3. **Limit Line Value** Indicates the limit value.
4. **Limit Test Indicator** Displays FAIL if any part of the trace exceeds the limit value.
5. **Limit Line** A horizontal line that graphically displays the limit value.
6. **Marker Value** Indicates the position and value of a trace point.
7. **Marker Cursor** Identifies the trace point displayed in the marker value.
8. **Recalled Name** Indicates the name of a recalled trace.
9. **Soft Key Description** Describes the function of the soft key to the left of the description.
10. **Indicator Ball** Indicates if the trace is sweeping.
11. **Scale** Indicates the minimum and maximum values displayed on that axis.
12. **Units** Indicates the measurement units for that axis.
13. **Battery Gauge** Indicates whether the Site Analyzer is using the internal battery or an external power supply, and indicates the amount of battery life remaining.
14. **Mode Indicator** Name of the current mode.



- | | |
|----------------------------------|--|
| 1. Sensor Status | Indicates the current status of power sensor. |
| 2. Primary Measurement | Identifies the measurement displayed on the analog dial. |
| 3. Primary Value | Numeric display of the primary value. |
| 4. Measurement Scale | Indicates the dial's full scale. |
| 5. Dial | Graphic display of the primary measurement. |
| 6. Secondary Measurements | Identifies the measurements not displayed on the dial. |
| 7. Secondary Value | Numeric display of the secondary values. |

Power Supply

Internal Battery

The Bird Site Analyzer has an internal, rechargeable lithium-ion battery pack. This will operate the unit for a minimum of 3 hours of continuous usage. Recharging time, from a full discharge, is approximately 4 hours.

☞ NOTE: When the unit is received the battery may not be fully charged. An ac adapter should be used when operating the unit for the first time.

The battery gauge indicates the approximate battery life remaining. At $\frac{1}{4}$ charge the gauge also displays “LO”. When using an external power source, a power cord symbol replaces the battery gauge.

Adapters

The Bird Site Analyzer can be operated using an ac adapter or a 12 V automobile cigarette lighter adapter. Using these will also charge the internal battery.

WARNING

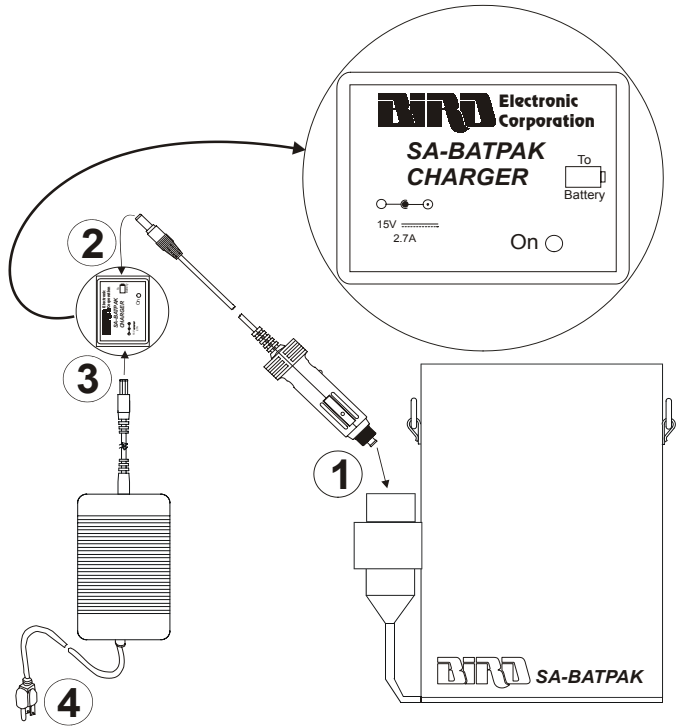
When using the ac adapter, only connect the plug to a properly grounded receptacle. Serious injury or death can occur if not properly grounded.

External Battery Pack (Optional)

The SA-BATPAK is an optional external battery pack. This will operate the unit for approximately 2 hours. The liquid acid gel battery will fully charge, from a full discharge, in about 6-8 hours.

WARNING

The SA-BATPAK is shipped charged. Be careful when removing the safety cap, 12Vdc @ 2.0 AH/20 hour rate can be present inside the receptacle. Do not touch the inside of the receptacle. The possibility of an electric shock exists.



To charge the external battery pack:

1. Plug the automobile cigarette lighter adapter into the external battery pack on the side that says "To Battery". Refer to the figure above.
2. Plug the other end of the automobile cigarette lighter adapter into the charger adapter.
3. Plug the ac adapter into the charger adapter.
4. Plug the ac adapter into a properly grounded outlet. The charger's "On" LED comes on and stays on until the charger is disconnected.

To use the external battery pack with a Site Analyzer:

1. Plug the automobile cigarette lighter adapter into the adapter of the charged external battery pack.
2. Plug the other end of the automobile cigarette lighter adapter into the dc input of the Site Analyzer.

Power Up

On first power up or after a failure set the unit to default parameters. Refer to “Return to Defaults”, page 93.

Self Test A self test is run at power up. If the test fails, see “Troubleshooting” on page 100 for instructions. If the problem persists, return the unit for service.

The software revision information is displayed during the self test, as shown below.

BIRD
Electronic Corporation

Model SA-2500A, 780 - 2500 MHz

SN: 00000000

8 Feb 2002

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System Information

Have the following system information ready before you begin using the Site Analyzer:

Frequency Span — ex: 806-960 MHz (Top end of cellular band)

Cable Type — ex: RG-8

Approximate Cable Length — ex: 300 feet

Transmitter Power — ex: 1 kW

WARNING


This equipment should not be connected to an antenna or operated during a storm that has the potential to produce lightning. The possibility exists for electrical shock.

Calibration Accessories

Calibration Combination including:

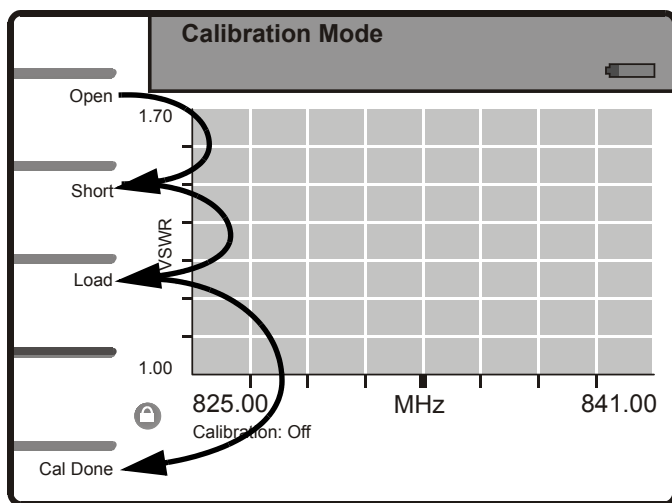
- One 50 ohm load
- One Open standard
- One Short standard


Test Cable (optional) – Phase-stable for reliable, consistent results.

 **NOTE:** If a test cable is used to connect the Site Analyzer system under test, attach the standards to the end of the test cable during calibration.

Calibrating


Press key from either Measure Match or Fault Location mode



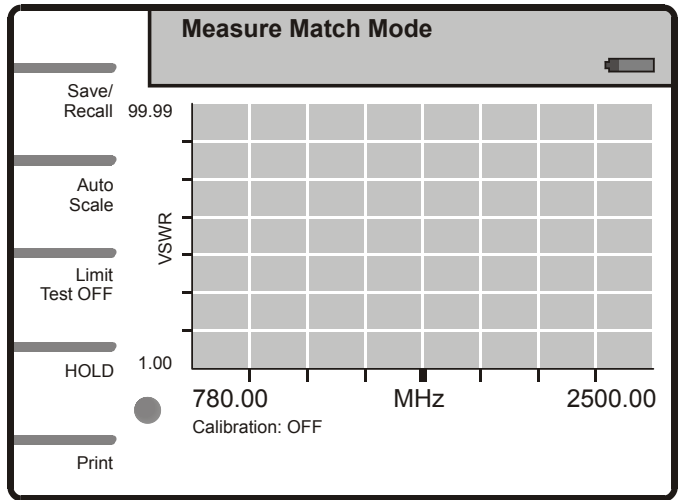
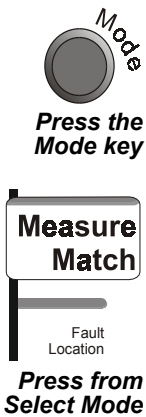
- Press the **CALIBRATE** key.
 - Attach the open standard.
Press the **OPEN** key.
Wait for a “beep” and for the trace to scroll before continuing.
 - Attach the short standard.
Press the **SHORT** key.
Wait for a “beep” and for the trace to scroll before continuing.
 - Attach the load standard.
Press the **LOAD** key.
Wait for a “beep” and for the trace to scroll before continuing.
 - Press the **CAL DONE** key. New coefficients are calculated. The Site Analyzer is now calibrated.
-  **NOTE:** Now is a good time to save the setup. Saving after calibration will save the new calibration coefficients. See “Save Setup”, page 75.

Chapter 4

Measure Match Mode


This measurement verifies and monitors the match conditions in the antenna system at various frequencies. The results are shown on an x-y graph. Frequency is shown on the x-axis while return loss, cable loss, or VSWR is shown on the y-axis.


Set the frequency and calibrate the Site Analyzer before taking any readings.

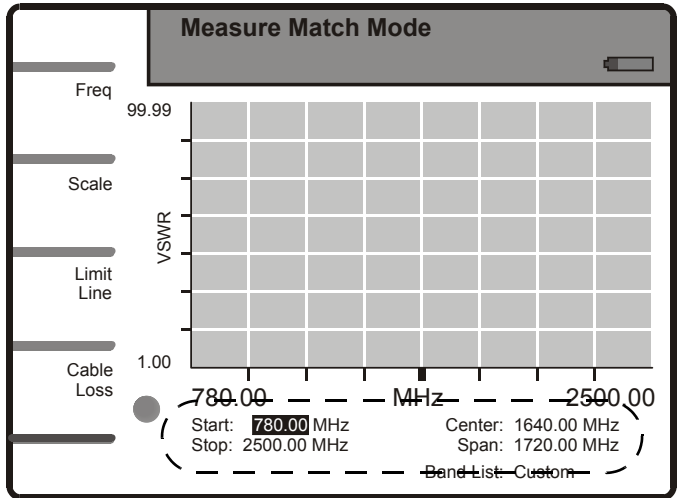
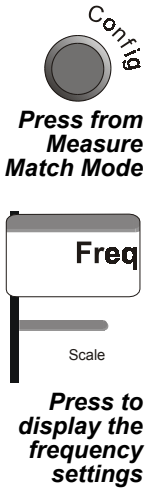


Setting the Frequency

Frequencies can be set manually or chosen from a list of presets. If the start, stop, center, or span is manually changed, the band will become “Custom”.

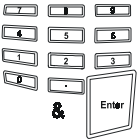
 **NOTE:** Changing the frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

 **NOTE:** If a frequency outside of the Site Analyzer’s range is entered, the unit’s minimum or maximum frequency will be set instead.

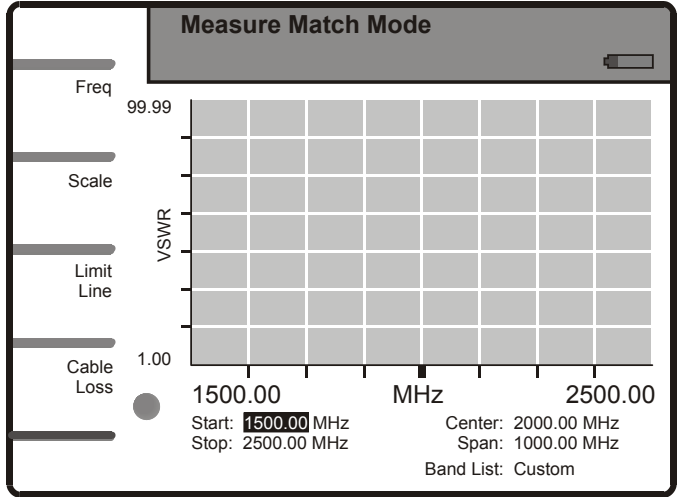




**Scroll to
Start, Stop,
Center, or
Span**



**Enter a new
value**

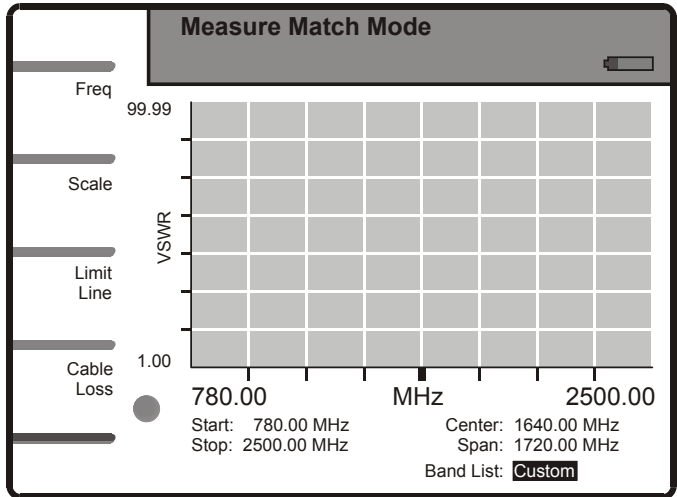


Band List

The band list pop-up menu contains frequency band presets. Using a preset is quick, easy, and sets test parameters while eliminating a possible source of operator error.



**Scroll to
Band List**





Display the band list and select a frequency band

Measure Match Mode 🔋

Freq

Scale

Limit Line

Cable Loss

Band	Start	Stop
<Full Band>	780.00	2500.00
IS-553(Rx)	824300	849.00
IS-553(Tx)	869.00	894.00
IS-54(Rx)	824.00	849.00
IS-54(Tx)	869.00	894.00
IS-95(Rx)	1850.00	1910.00
IS-95(Tx)	1930.00	1990.00
IS-95(Rx)	824.00	849.00



Activate the selected band

Measure Match Mode 🔋

Freq

Scale

Limit Line

Cable Loss

99.99

1.00

824.00
MHz
849.00

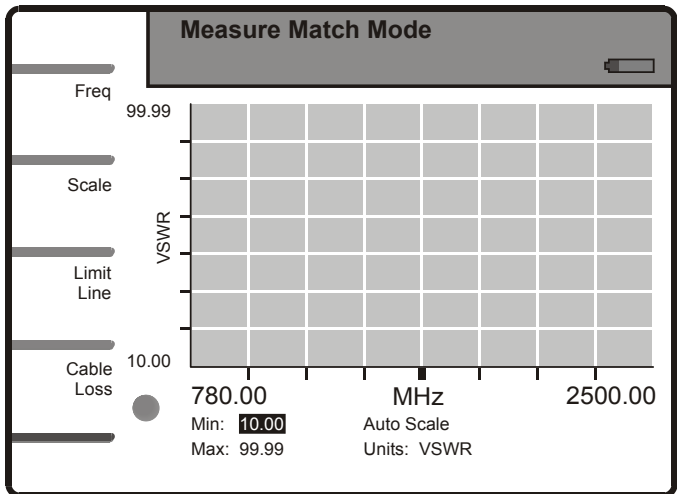
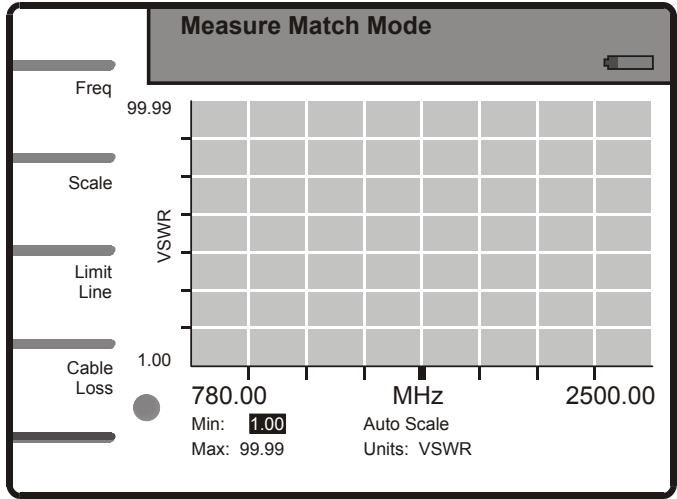
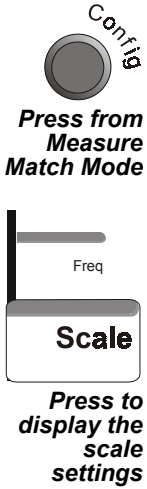
Start: 824.00 MHz
Center: 836.50 MHz

Stop: 849.00 MHz
Span: 25.00 MHz

Band List: IS-54(Rx)

Setting the Scale & Unit of Measure

The display scale can be set manually or by using Auto Scale. The display can have units of return loss [dB], cable loss [dB], or VSWR [ratio].



Auto Scale

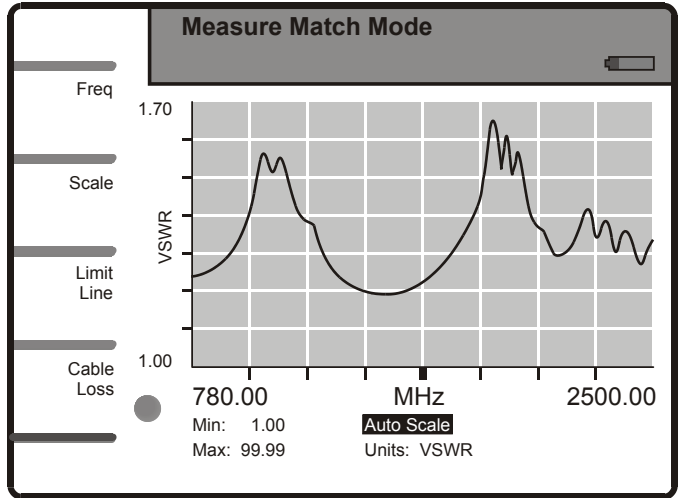
Auto Scale automatically sets the display scale so that the entire trace is displayed.



Scroll to Auto Scale



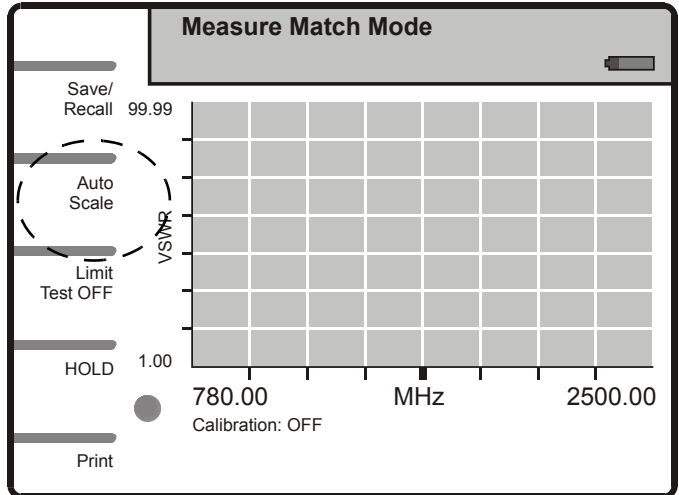
Activate Auto Scale



Auto Scale can also be activated from the main screen.



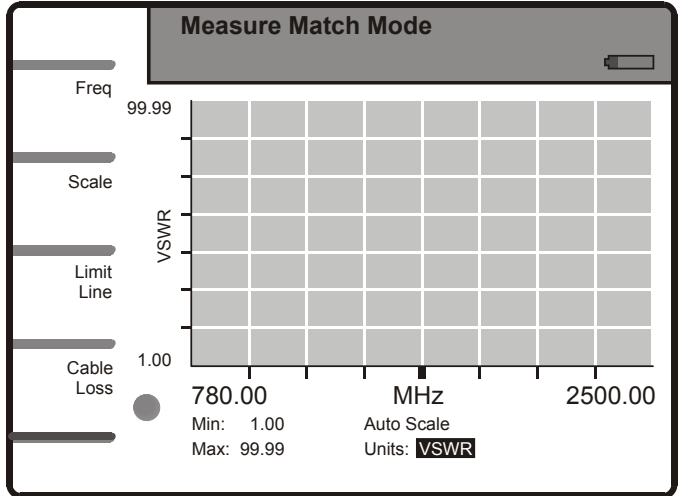
Press from Measure Match Mode



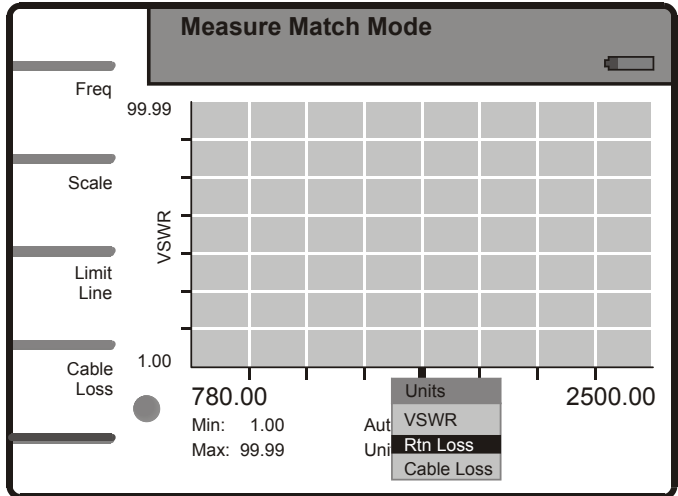
Setting Units



Scroll to Units

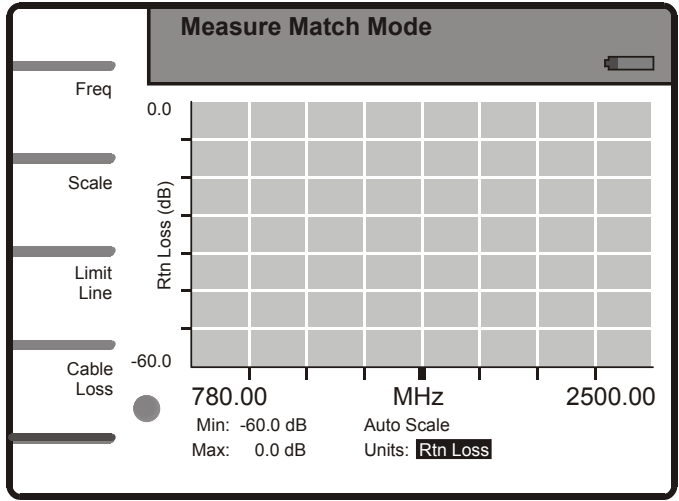


Display the units list and select VSWR, Cable Loss, or Return Loss



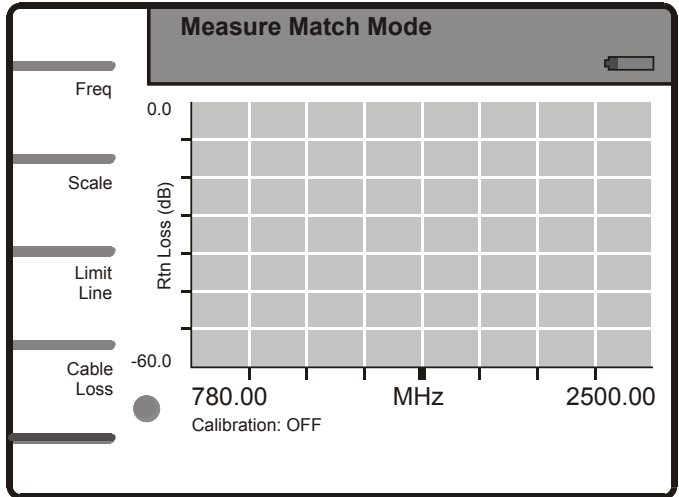
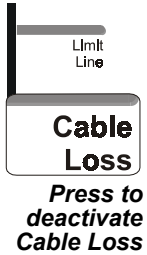
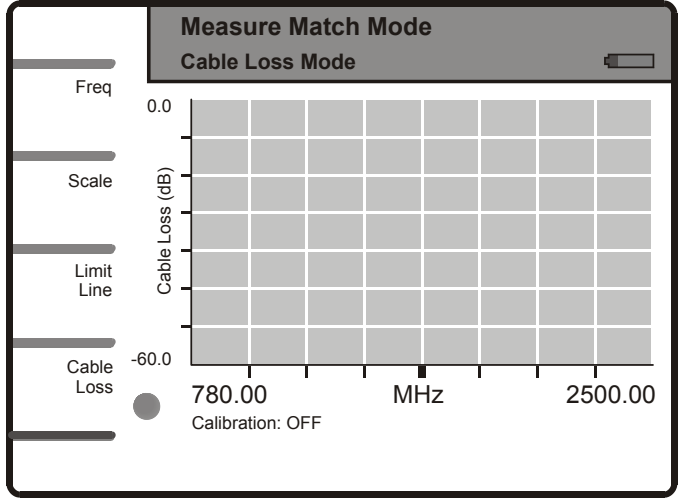
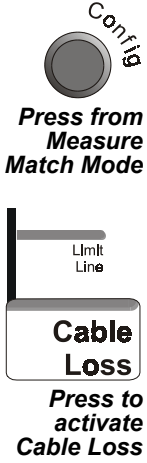


Activate the selected unit



Cable Loss Measurements

To measure cable loss, the cable being tested should have an open on the far end.

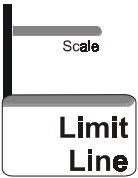


Limit Line

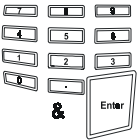
The limit line is an option that helps you see a failure. It appears as a horizontal line at the limit line value.



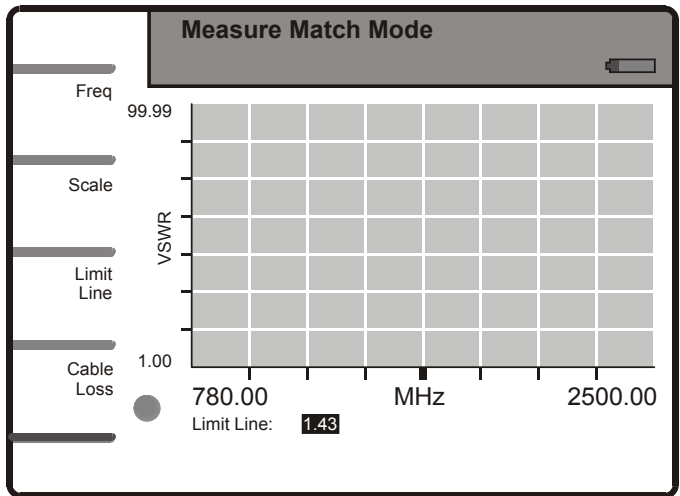
Press from
Measure
Match Mode



Press to
display the
limit line
value



Enter a new
value



Limit Test

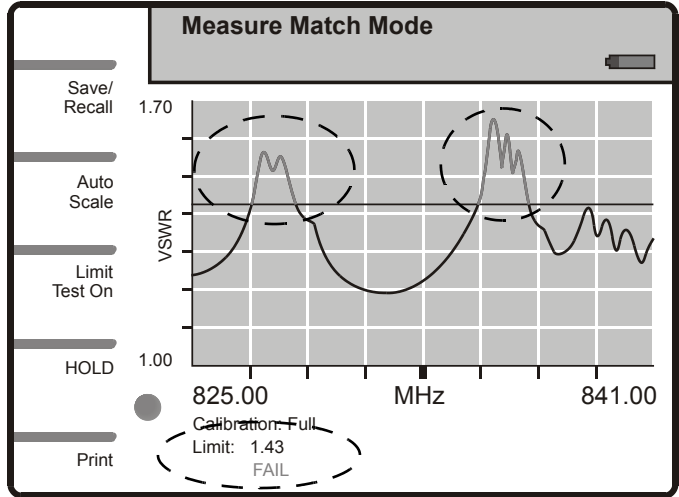
Limit Test compares the trace to the limit line.

Auto Scale

Limit Test

Press from Measure Match Mode

Toggle between Off, Audio, & On



Test Off — disables the comparison and the pass/fail indicator.

Test On — enables the comparison. If all of the trace is below the limit value, “PASS” is displayed at the bottom of the screen. If any part of the trace exceeds the limit value, that portion is displayed in red and “FAIL” is displayed at the bottom of the screen.

Test Audio — as Test On. In addition, the Site Analyzer will beep if any part of the trace exceeds the limit value.

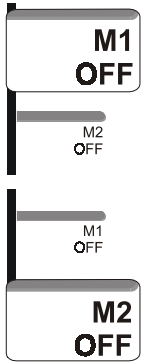
Marker Adjustment



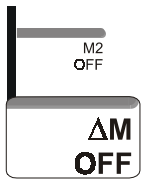
Press from Measure Match Mode

Markers indicate VSWR to 0.01, or Return or Cable Loss to 0.1 dB. The exact values of M1, M2, and the delta marker (difference of M1 and M2) are displayed at the bottom of the screen.

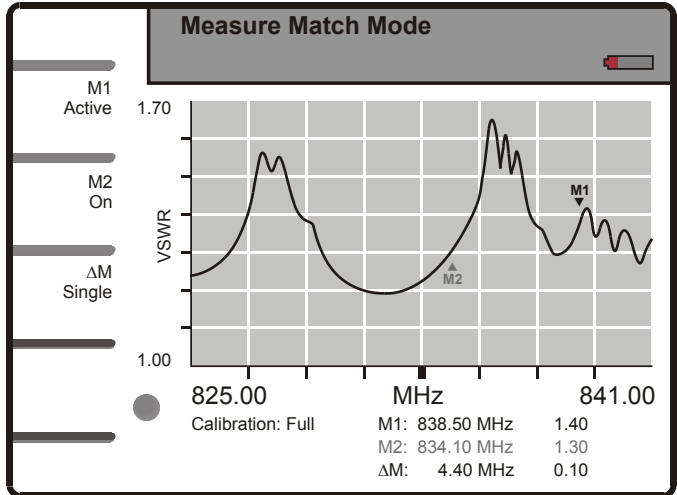
NOTE: If M1 was Active, it becomes ON (displayed) when M2 becomes Active.



Toggle between Off, On, and Active



Toggle between Off and Single





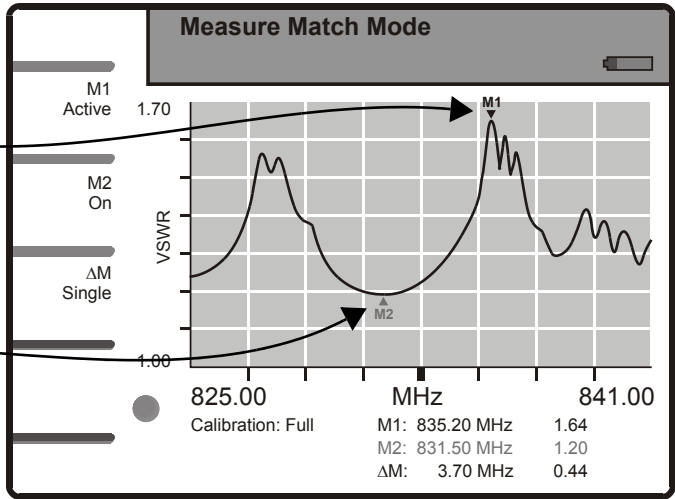
Move across the trace



Locate the highest point of the trace

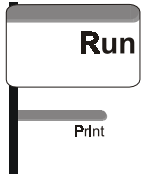


Locate the lowest point of the trace



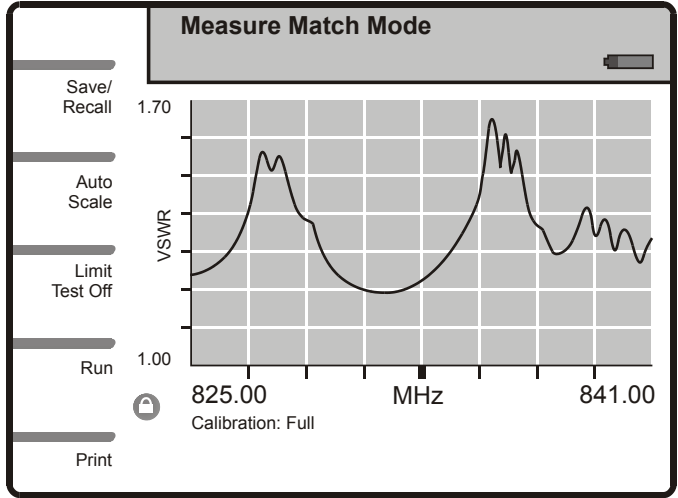
Measurement Hold

Measurement Hold stops tracing at the end of the current measurement and displays the last measurement result. It is active when a lock appears in the indicator ball.



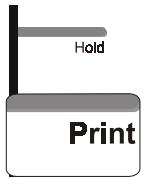
**Press from
Measure
Match Mode**

**Toggle
between
Run and
Hold**



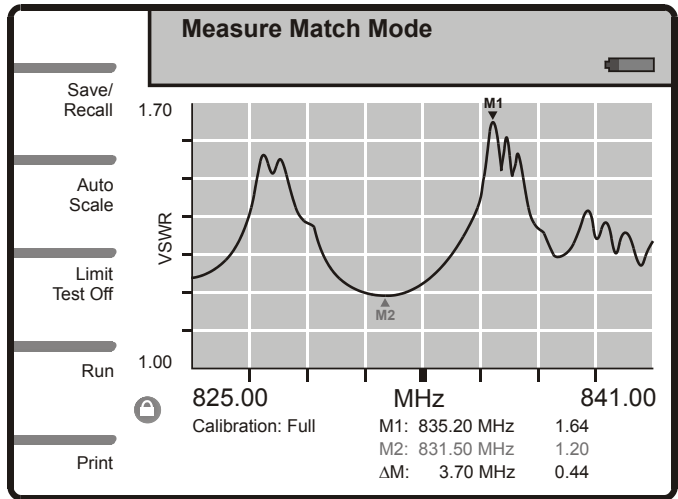
Printing

The Bird Site Analyzer can print the information displayed on the screen to any HP Deskjet printer that supports the PCL Level 3 protocol.



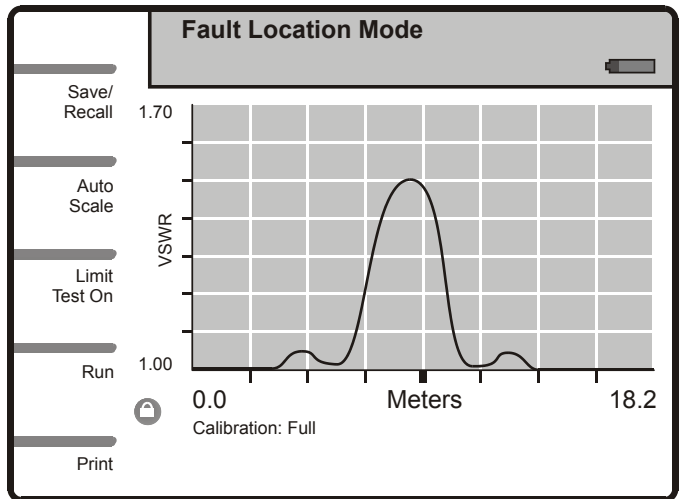
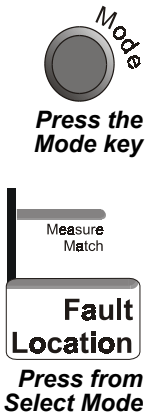
**Press from
Measure
Match Mode**

**Prints the
information
on the
screen**



This measurement identifies the position of impedance discontinuities (faults) within the antenna/feeder system. The measurement results are displayed on an x-y graph. Distance from the Site Analyzer is shown on the x-axis, while relative magnitude of the discontinuity is shown on the y-axis.

Set the frequency span, cable type, and calibrate the Site Analyzer before taking any readings.



Setting the Frequency Span

The frequency span and relative propagation velocity determine the maximum distance at which distance-to-fault measurements can be taken. For best results, use the table below to select the frequency span which matches the length and either the propagation velocity or dielectric constant of the cable under test.


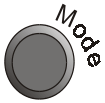
 NOTE: Changing the frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

Table 1: Frequency Span vs. V_p

Velocity Percentage Dielectric Constant	60% 2.778		80% 1.562		100% 1	
Frequency Span (MHz)	Distance ft (m)	Resolution in (cm)	Distance ft (m)	Resolution in (cm)	Distance ft (m)	Resolution in (cm)
1900	37 (11)	1.9 (4.7)	49 (15)	2.5 (6.3)	62 (19)	3.1 (7.9)
1800	39 (12)	2.0 (5.0)	52 (16)	2.6 (6.7)	65 (20)	3.3 (8.3)
1700	41 (13)	2.1 (5.3)	55 (17)	2.8 (7.1)	69 (21)	3.5 (8.8)
1600	44 (13)	2.2 (5.6)	59 (18)	3.0 (7.5)	73 (22)	3.7 (9.4)
1500	47 (14)	2.4 (6.0)	62 (19)	3.2 (8.0)	78 (24)	3.9 (10.0)
1400	50 (15)	2.5 (6.4)	67 (20)	3.4 (8.6)	84 (26)	4.2 (10.7)
1300	54 (16)	2.7 (6.9)	72 (22)	3.6 (9.2)	90 (27)	4.5 (11.5)
1200	59 (18)	3.0 (7.5)	78 (24)	3.9 (10.0)	98 (30)	4.9 (12.5)
1100	64 (19)	3.2 (8.2)	85 (26)	4.3 (10.9)	106 (32)	5.4 (13.6)
1000	70 (21)	3.5 (9.0)	94 (29)	4.7 (12.0)	117 (36)	5.9 (15.0)
900	78 (24)	3.9 (10.0)	104 (32)	5.3 (13.3)	130 (40)	6.6 (16.7)
800	88 (27)	4.4 (11.2)	117 (36)	5.9 (15.0)	146 (45)	7.4 (18.8)
700	100 (31)	5.1 (12.9)	134 (41)	6.8 (17.1)	167 (51)	8.4 (21.4)
600	117 (36)	5.9 (15.0)	156 (48)	7.9 (20.0)	195 (60)	9.8 (25.0)
500	141 (43)	7.1 (18.0)	187 (57)	9.5 (24.0)	234 (71)	11.8 (30.0)
400	176 (54)	8.9 (22.5)	234 (71)	11.8 (30.0)	293 (89)	14.8 (37.5)
300	234 (71)	11.8 (30.0)	312 (95)	15.8 (40.0)	390 (119)	19.7 (50.0)
200	351 (107)	17.7 (45.0)	469 (143)	23.6 (60.0)	586 (179)	29.5 (75.0)

For example, for a cable with a dielectric constant of 2.778, the velocity percentage is 60%. If the cable is 100 feet long, then the Site Analyzer should be set to a frequency span of 700 MHz. The resolution of the graph will be 5 inches.

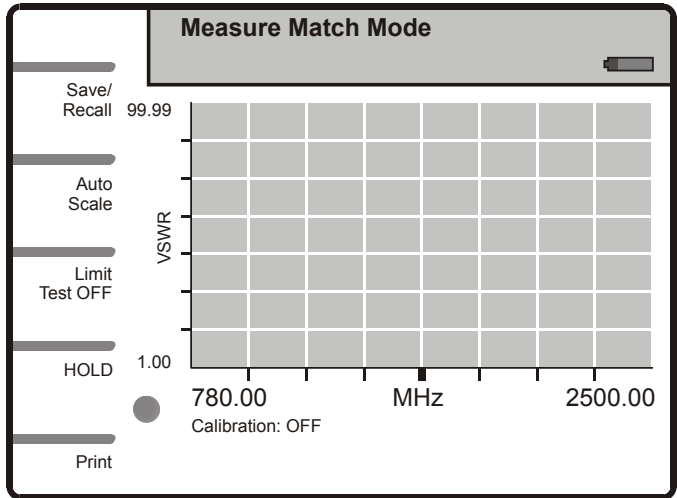


Press the Mode key

Measure Match

Fault Location

Press from Select Mode

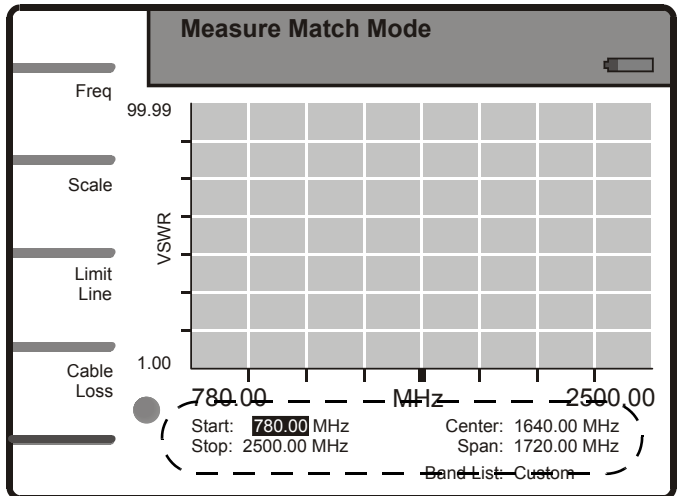


Press the Config key

Freq

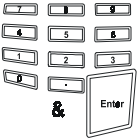
Scale

Press to display the frequency settings





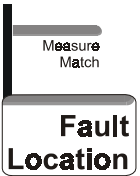
Scroll to the Span value



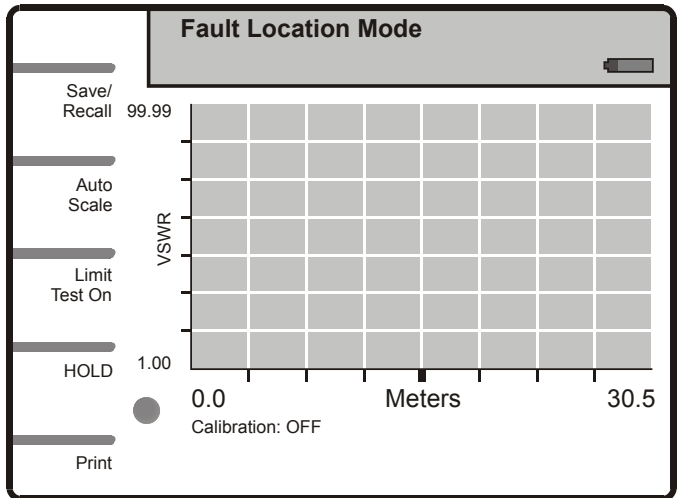
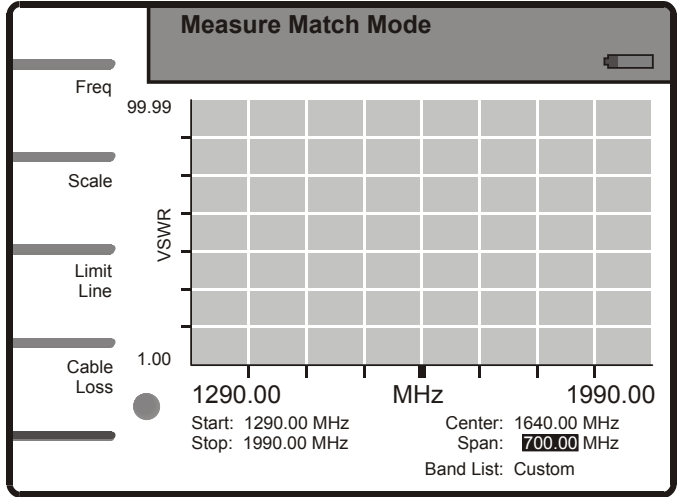
Enter the value from Table 1



Press the Mode key



Press from Select Mode




If you enter a span greater than the current settings allow, the span will be set to the maximum possible value. In this case, set the center frequency shown below for your model and try to set the span again.

SA-2000	1403 MHz
SA-2000A	1553 MHz
SA-2500A	1640 MHz

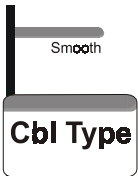
Setting the Cable Type

The cable type can be set manually or chosen from a list of presets. If the velocity of propagation or loss is manually changed, the cable will become “Custom”.

 **NOTE:** Changing the cable type or velocity of propagation will reset the distance scale to the maximum possible distance. Always set the cable type before setting the distance scale.



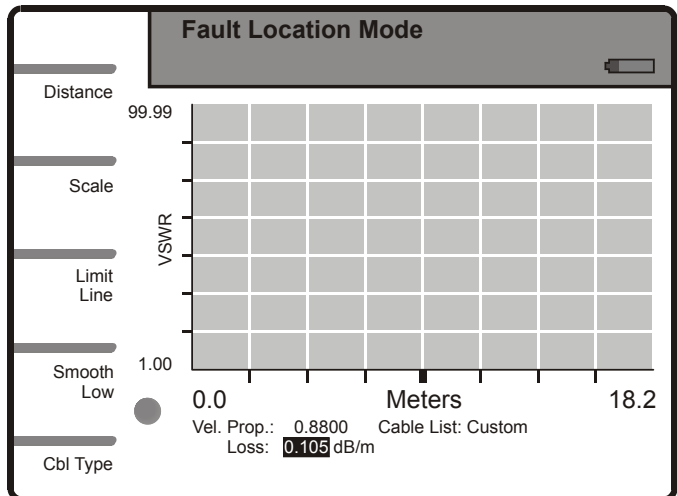
Press from
Fault
Location
Mode

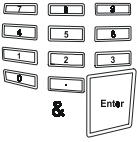


Press to
display the
cable
settings

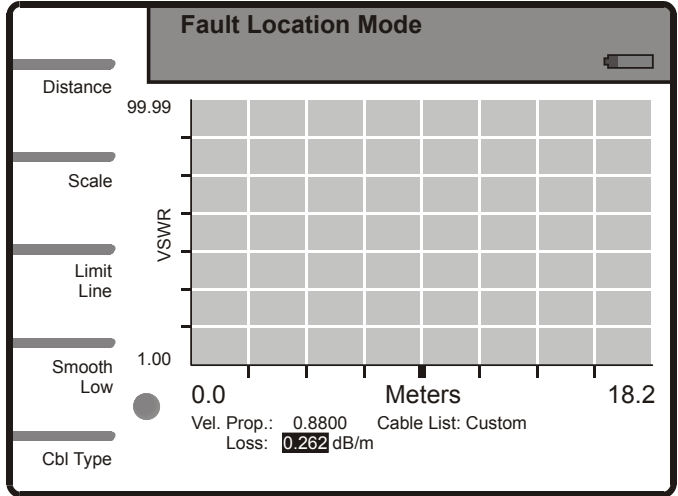


Scroll to
Velocity of
Propagation
or Loss





Enter a new value



Cable List

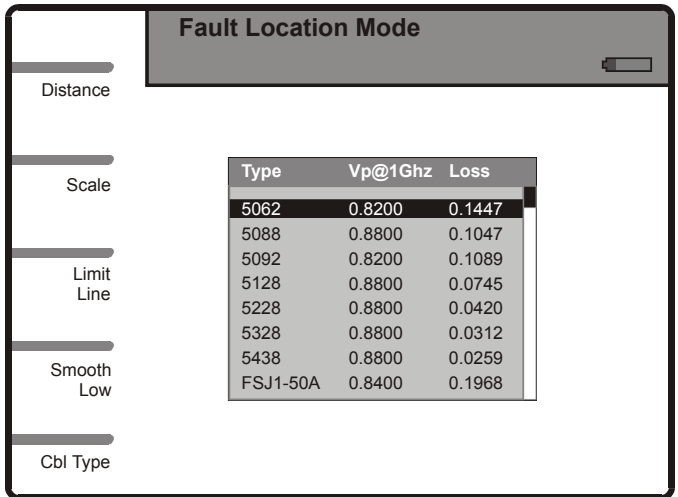
The cable list pop-up menu contains cable presets. Using a preset is quick, easy, and sets test parameters while eliminating a possible source of operator error.



Scroll to Cable Type

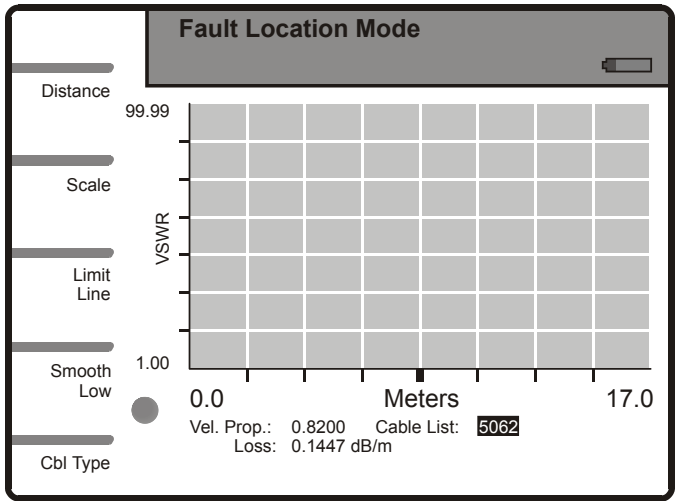


Display the cable list and select a cable





Activate the selected cable

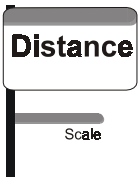


Setting the Distance

The maximum possible Stop Distance is determined by the frequency span. (See Table 1 on page 34)



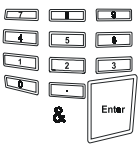
Press from Fault Location Mode



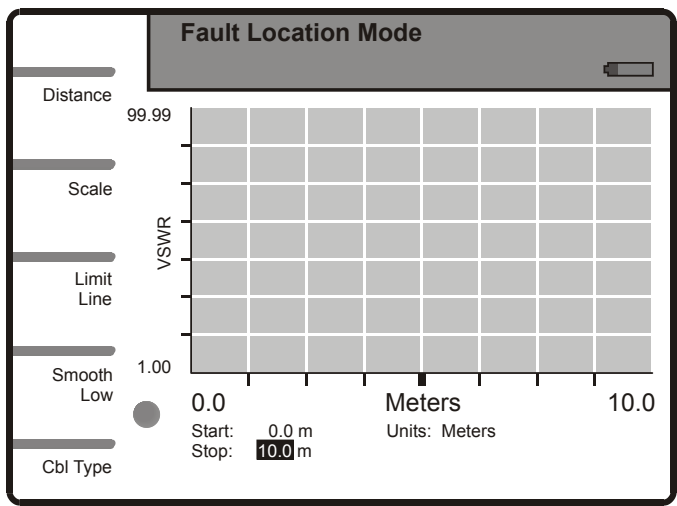
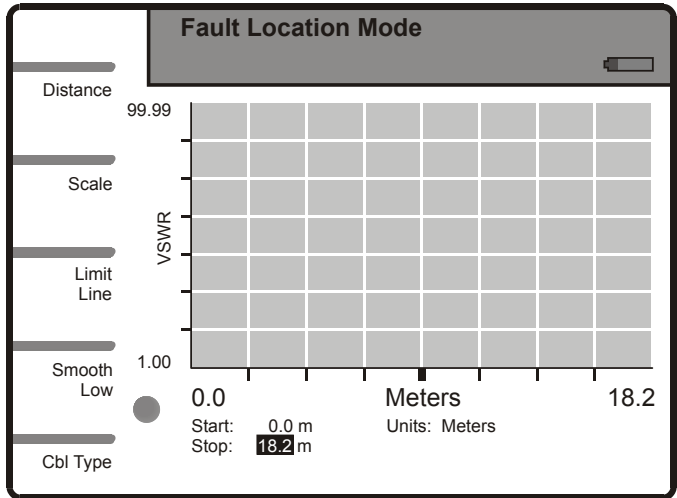
Press to display the distance settings



Scroll to Start or Stop



Enter a new value



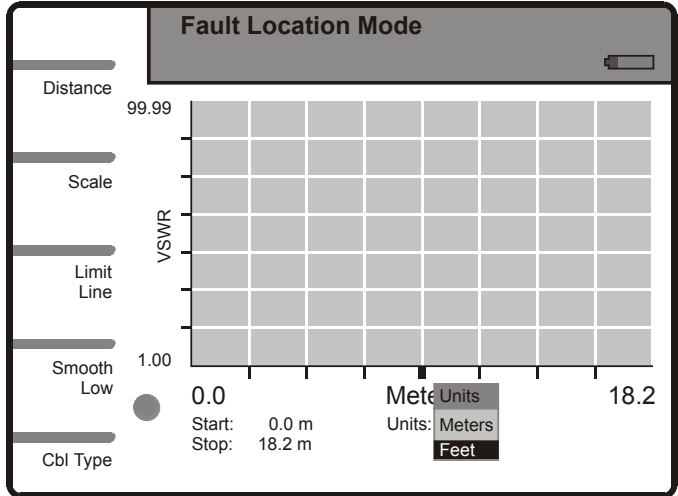
Setting Units



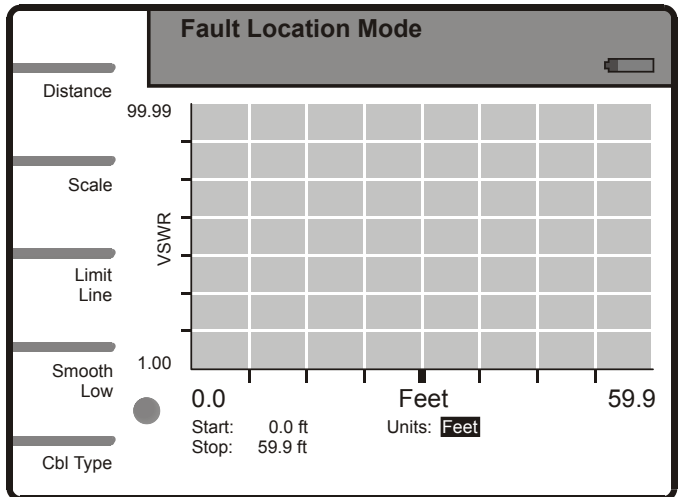
Scroll to Units



Display the units list and select Meters or Feet



Activate the selected unit

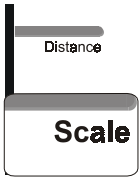


Setting the Scale & Unit of Measure

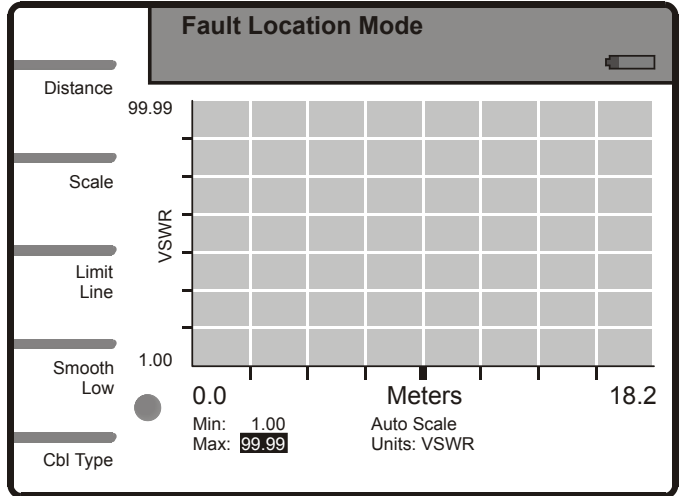
The display scale can be set manually or by using Auto Scale. The display can have units of return loss [dB] or VSWR [ratio].



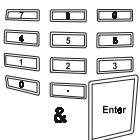
Press from
Fault
Location
Mode



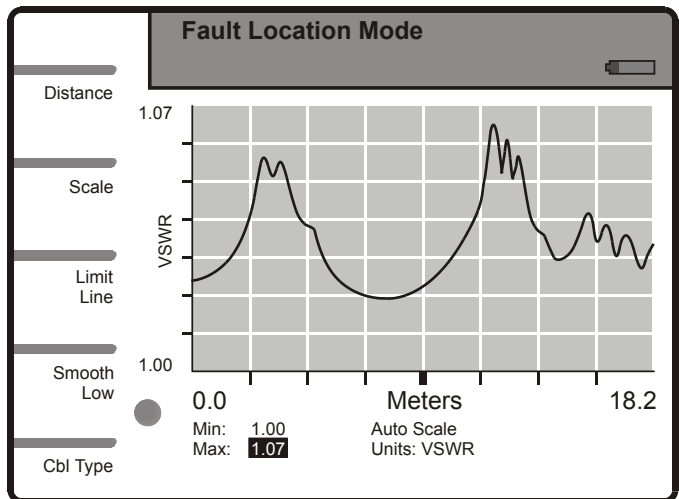
Press to
display the
scale
settings



Scroll to Min
or Max



Enter a new
value



Auto Scale

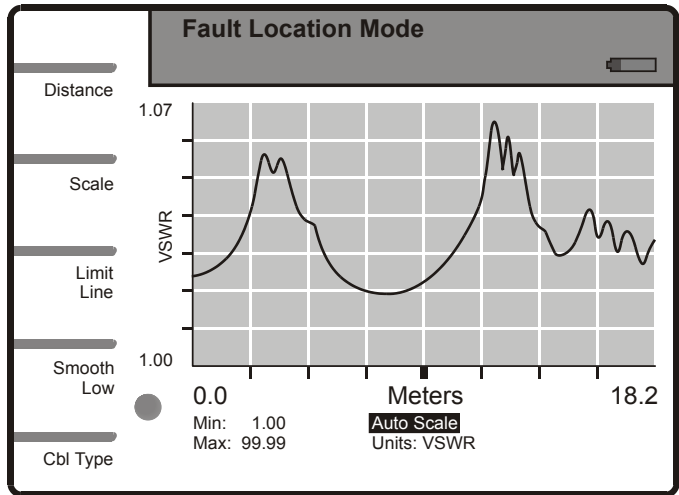
Auto Scale automatically sets the display scale so that the entire trace is displayed.



Scroll to Auto Scale



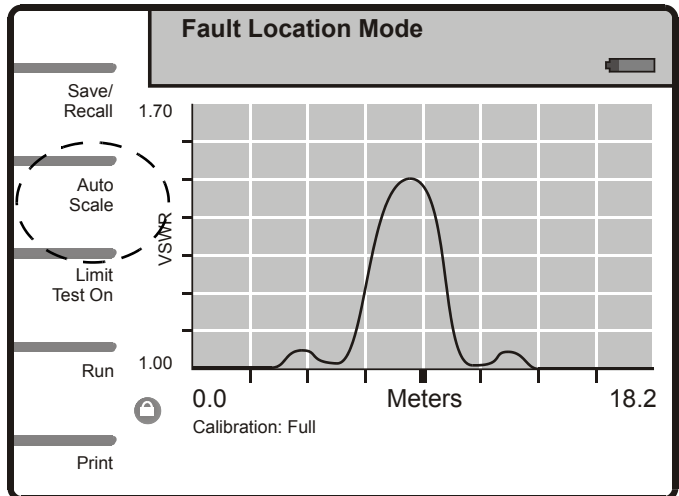
Activate Auto Scale



Auto scale can also be activated from the main screen.



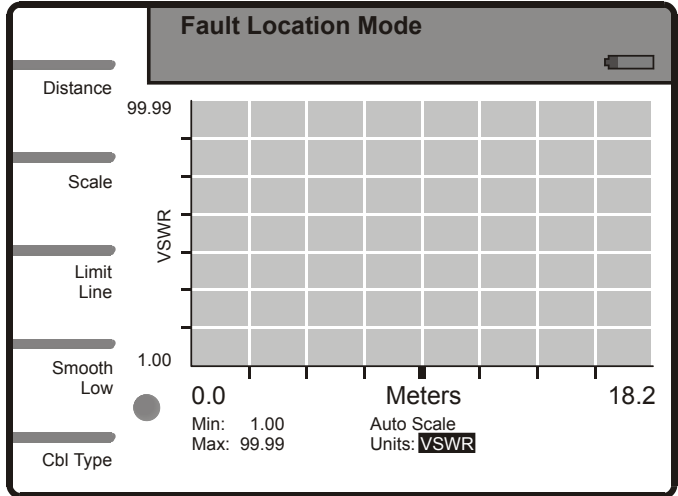
Press from Fault Location Mode



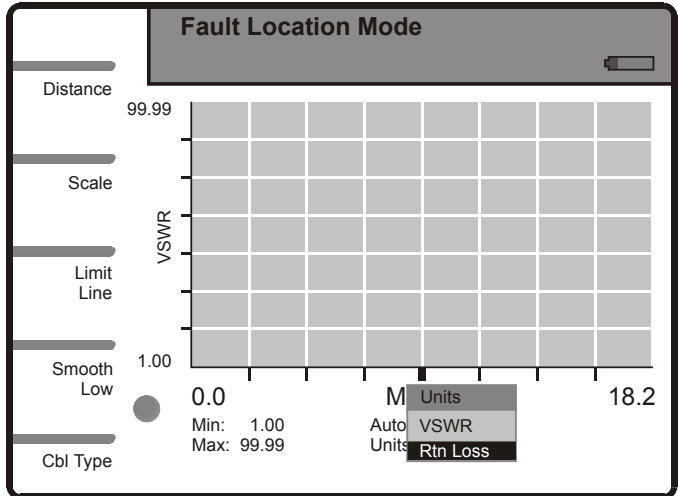
Setting Units



Scroll to Units

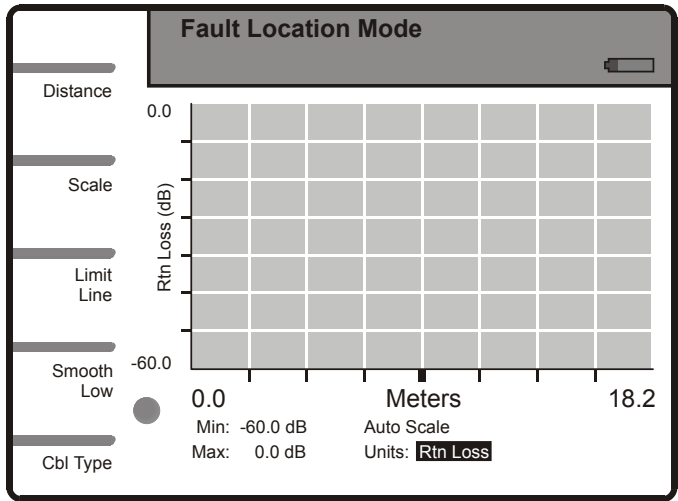


Display the units list and select VSWR or Return Loss





Activate the selected unit

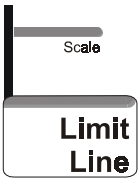


Limit Line

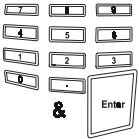
The limit line is an option that helps you see a failure. It appears as a horizontal line at the limit line value.



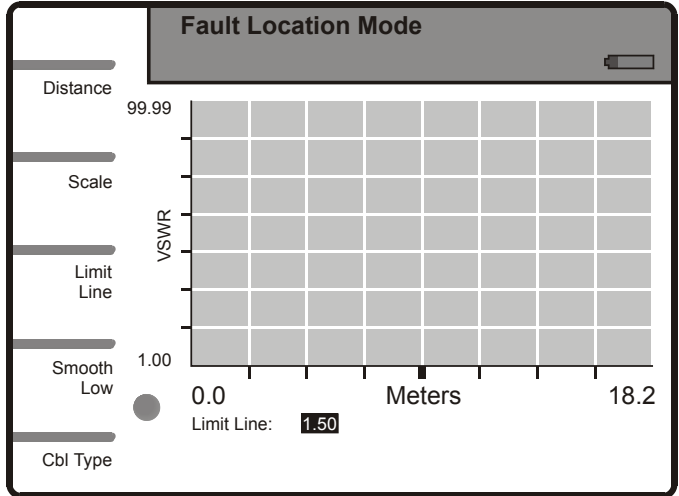
Press from
Fault
Location
Mode



Press to
display the
limit line
value

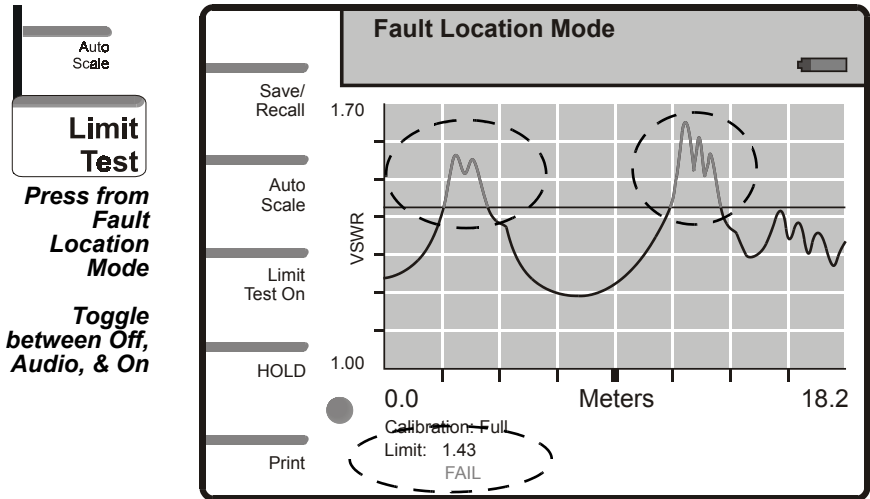


Enter a new
value



Limit Test

Limit Test compares the trace to the limit line.



Test Off — disables the comparison and the pass/fail indicator.

Test On — enables the comparison. If all of the trace is below the limit value, “PASS” is displayed at the bottom of the screen. If any part of the trace exceeds the limit value, that portion is displayed in red and “FAIL” is displayed at the bottom of the screen.

Test Audio — as Test On. In addition, the Site Analyzer will beep if any part of the trace exceeds the limit value.

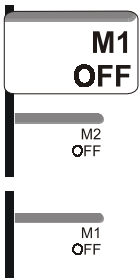
Marker Adjustment



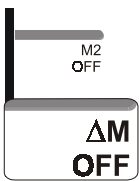
**Press from
Fault
Location
Mode**

Markers indicate VSWR to 0.01, or Return Loss to 0.1 dB. The exact values of M1, M2, and the delta marker (difference of M1 and M2) are displayed at the bottom of the screen.

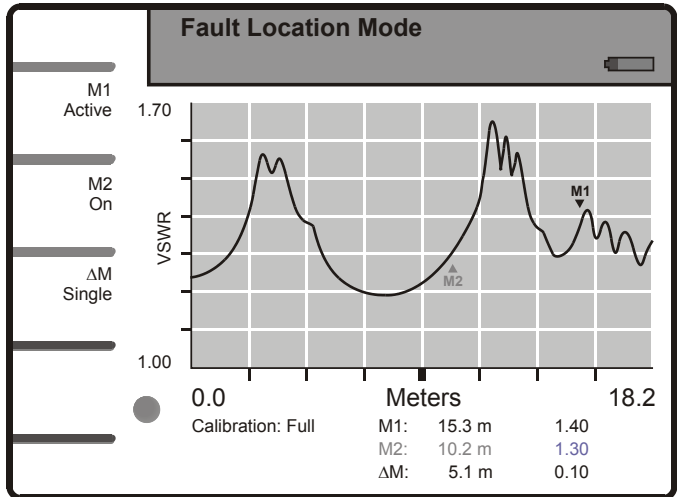
NOTE: If M1 was Active, it becomes ON (displayed) when M2 becomes Active.



**Toggle
between Off,
On, and
Active**



**Toggle
between Off
and Single**





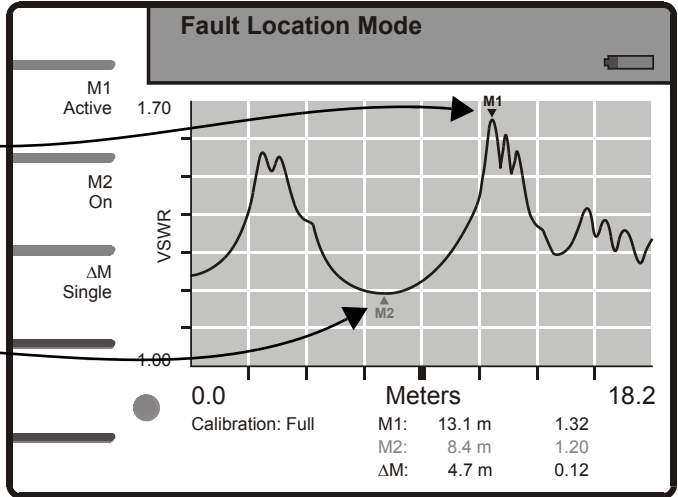
**Move
across the
trace**



**Locate the
highest
point of the
trace**



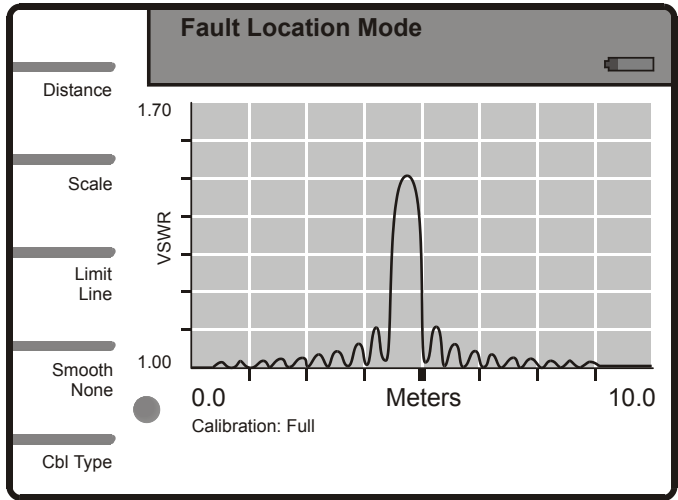
**Locate the
lowest point
of the trace**



Smooth

Smooth is an option that will digitally average the displayed trace. Three levels of smooth are available.

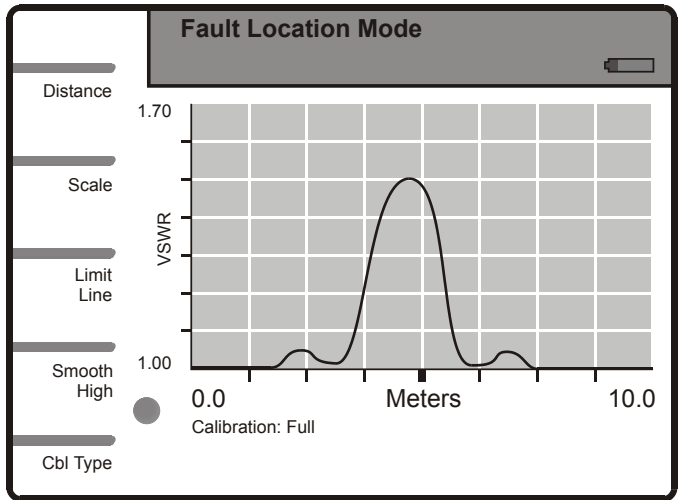
Config
Press from
Fault
Location
Mode



Limit Line

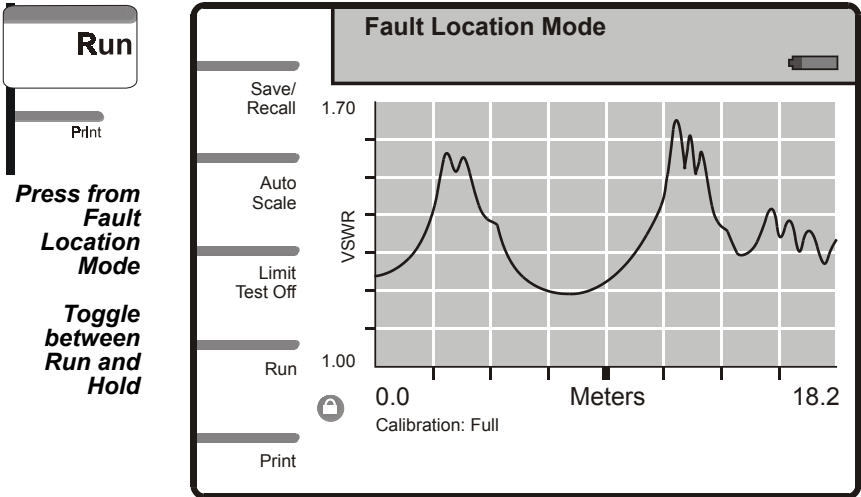
Smooth

Toggle
between
None,
Low,
Medium,
and High



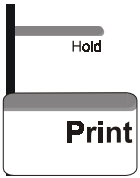
Measurement Hold

Measurement Hold stops tracing at the end of the current measurement and displays the last measurement result. It is active when a lock appears in the indicator ball.



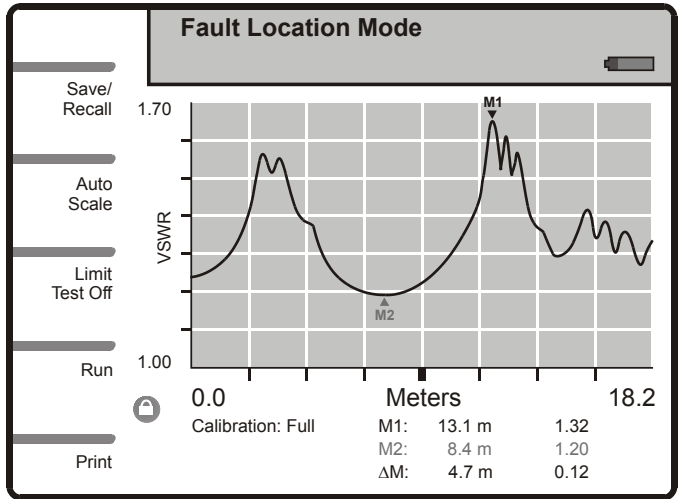
Printing

The Bird Site Analyzer can print the information displayed on the screen to any HP Deskjet printer that supports the PCL Level 3 protocol.



**Press from
Fault
Location
Mode**

**Prints the
information
on the
screen**



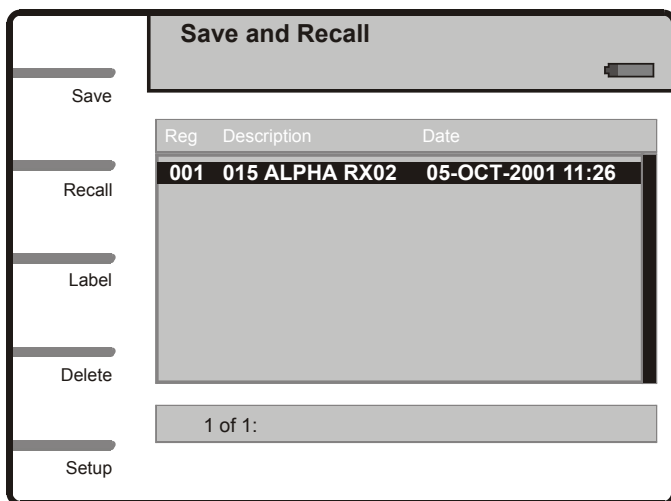
This chapter applies to Bird Site Analyzers with firmware from 1-Nov-2001 or later. If you have an older firmware version, see “Old Save and Recall” on page 71.

Traces and setups can be stored in nonvolatile memory, along with descriptive labels and a time-date stamp.

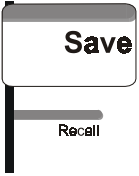


Auto
Scale

**Press from
Measure
Match or
Fault
Location
Mode**



Save Trace



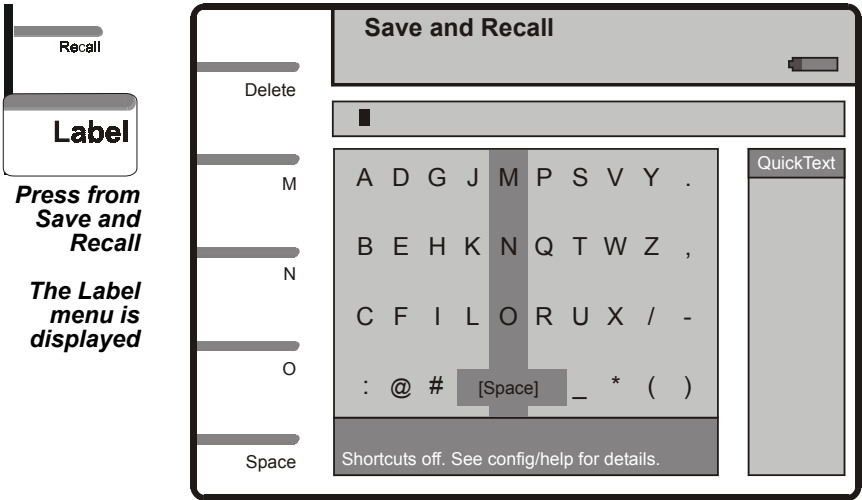
**Press from
Save and
Recall**

**The trace is
saved**

The "Save and Recall" screen features a title bar at the top with the text "Save and Recall" and a battery level indicator on the right. On the left side, there is a vertical menu with five options: "Save", "Recall", "Label", "Delete", and "Setup". The main area of the screen displays a table with three columns: "Reg", "Description", and "Date". The table contains two rows of data. The first row shows "001", "015 ALPHA RX02", and "05-OCT-2001 11:26". The second row, which is highlighted in black, shows "000" and "05-OCT-2001 11:26". Below the table, there is a status bar that reads "2 of 2:".

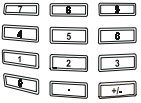
Reg	Description	Date
001	015 ALPHA RX02	05-OCT-2001 11:26
000		05-OCT-2001 11:26

2 of 2:

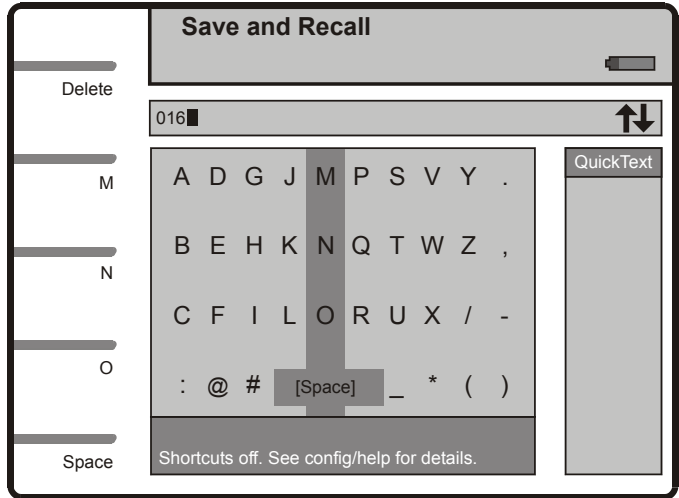
Trace Label

Entering Numbers

If the numeric shortcuts are off, press a number key once to enter a number. If the numeric shortcuts are on, press the key twice.



Enter numbers using the number pad.

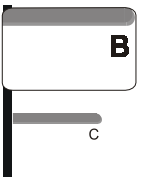


Entering Letters

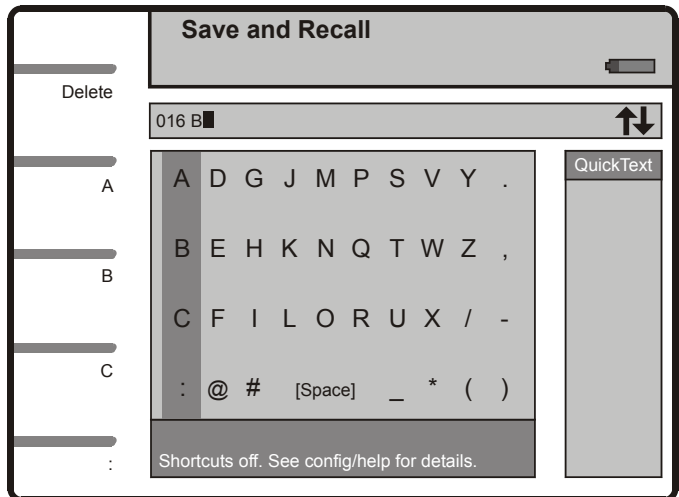
Delete is always the first softkey. The characters in the highlighted column can be entered using the other softkeys.



Scroll to a column

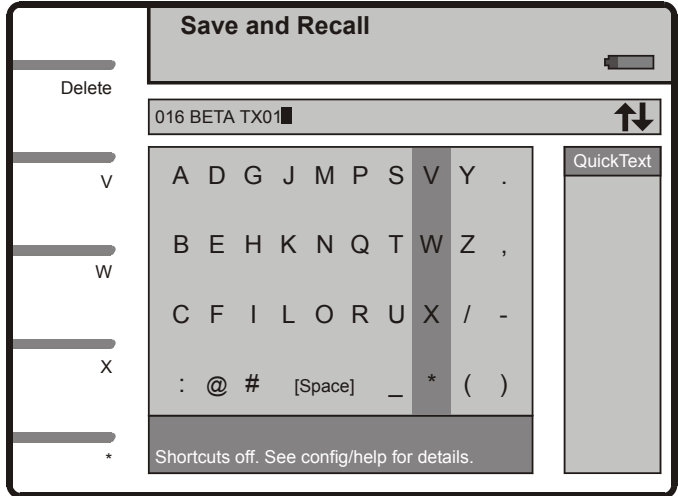


Press to enter a letter, symbol, or space

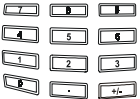


Changing Labels

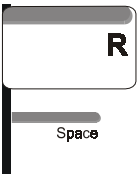
The label should be RX01, not TX01



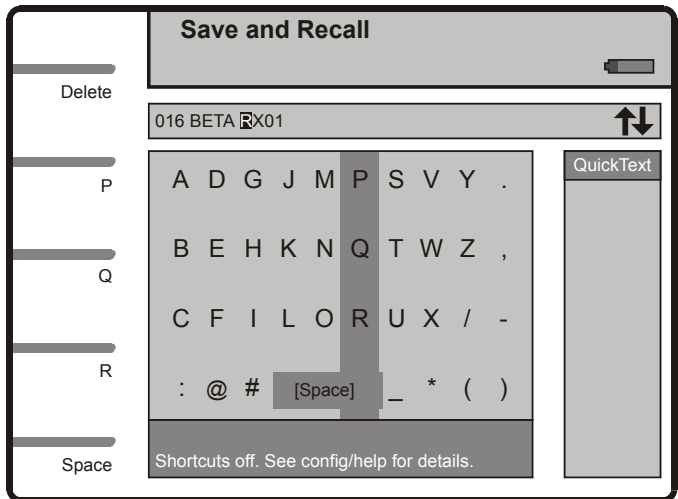
Scroll to the text to be changed



OR



Press to replace the character under the cursor



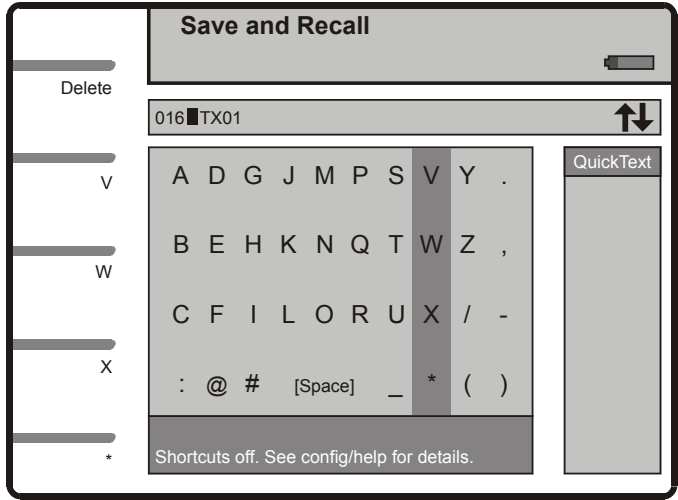
Deleting Labels



Scroll to the text to be deleted

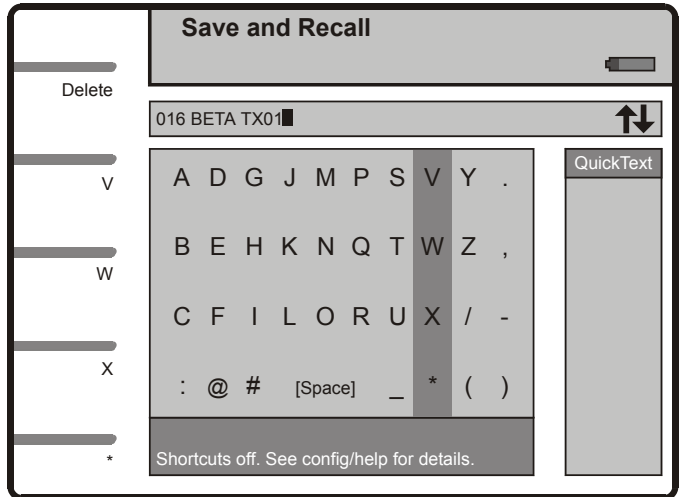


Press to delete the character to the left of the cursor

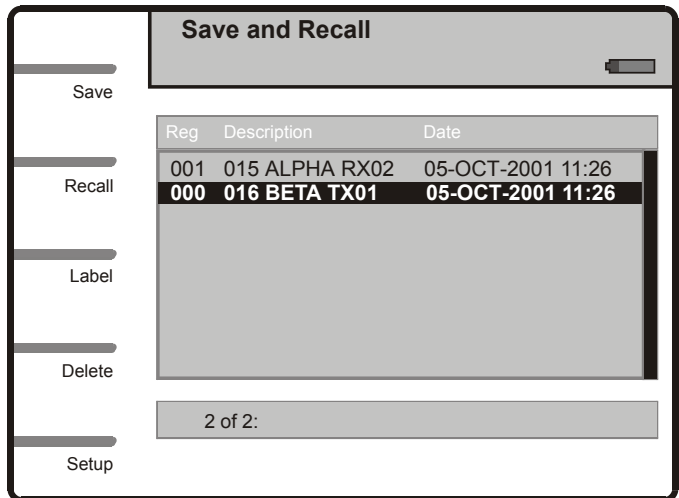


Saving Labels

A complete label



Save the label

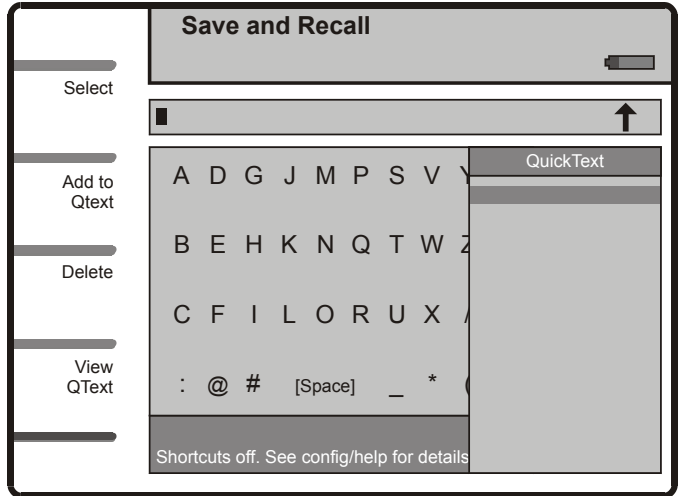


Trace Label Quicktext

Store commonly used label elements in the Quicktext to speed label entry.

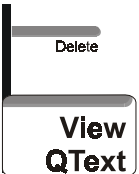


From Trace Label, scroll past the rightmost column to activate Quicktext

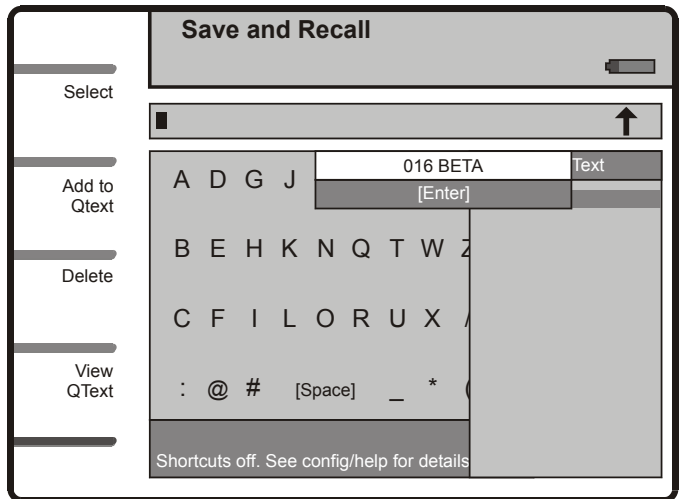


View Quicktext

If a Quicktext entry is more than 15 characters long, the complete entry will not be shown in the QuickText column.

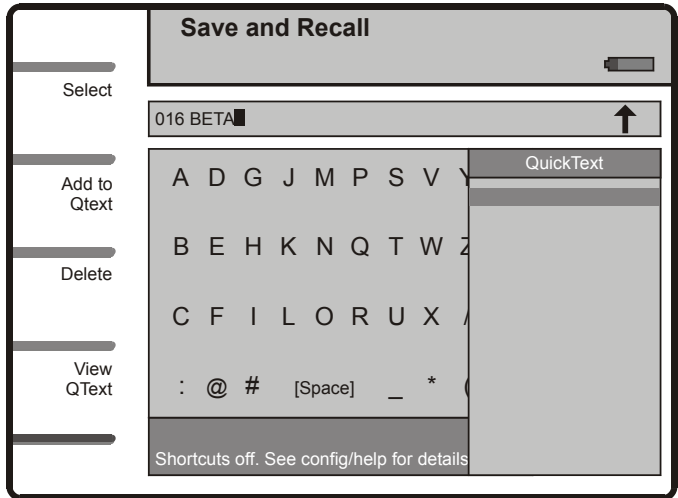


Press to view the full Quicktext entry

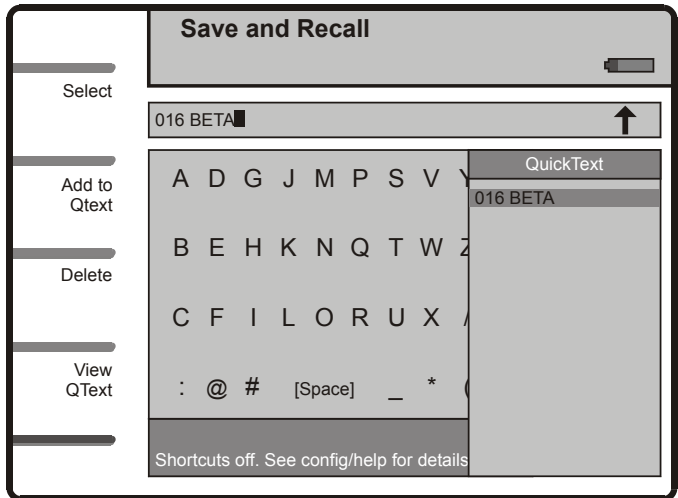


Create Quicktext

Enter text into the label, then activate Quicktext



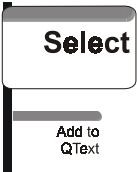
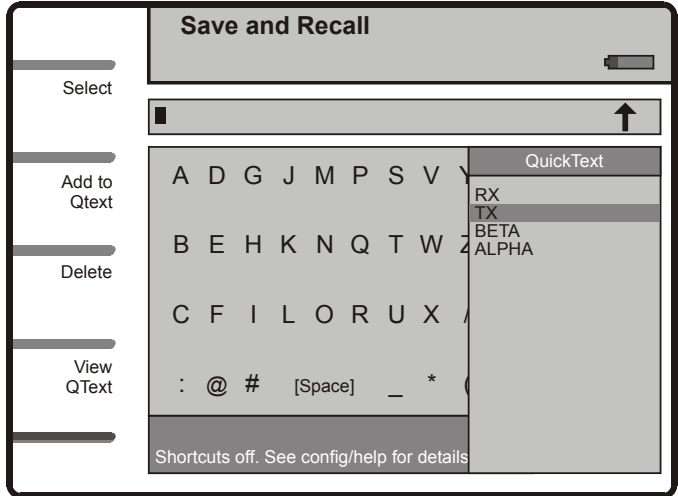
Add to QText
Press to store the label contents in QuickText



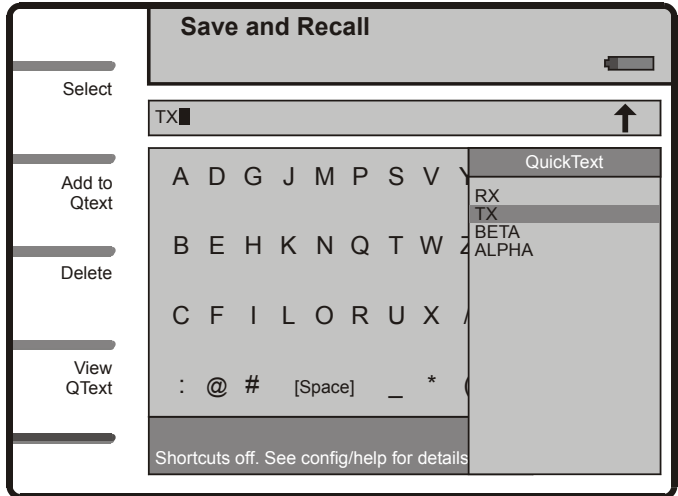
Use Quicktext



Scroll to a Quicktext entry



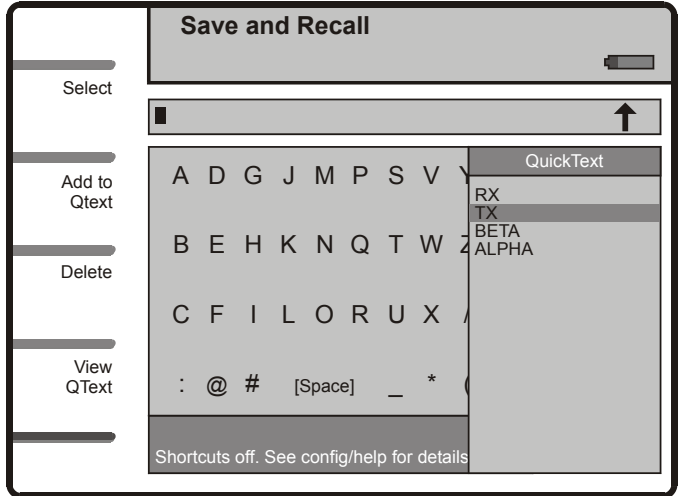
Press to insert the Quicktext at the cursor



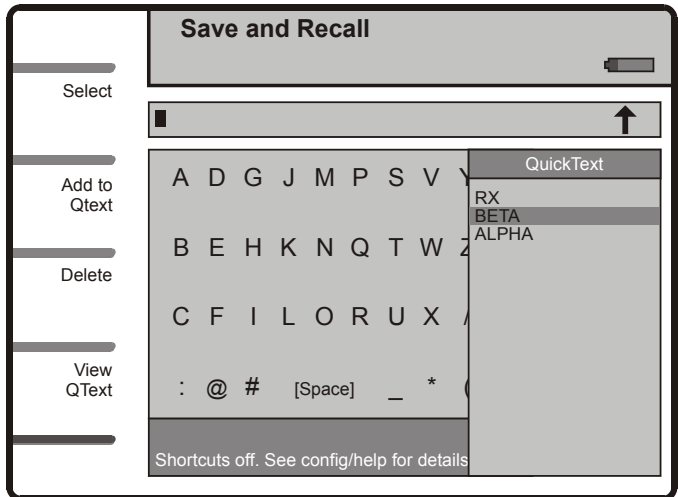
**Delete
Quicktext**



**Scroll to a
Quicktext
entry**



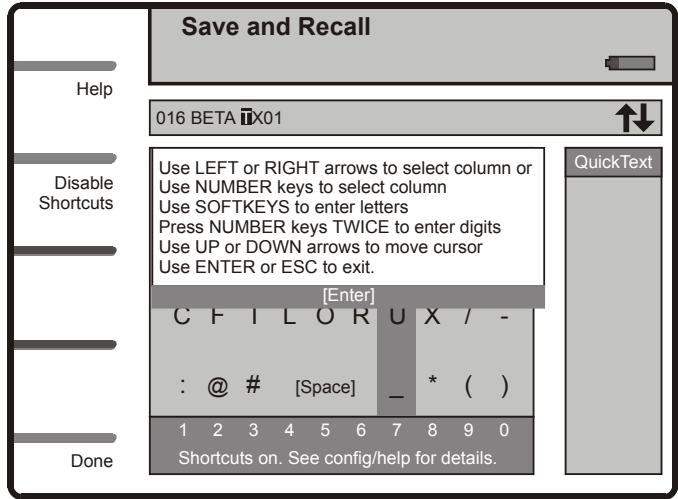
**Press to
delete the
Quicktext
entry**



Trace Label Config

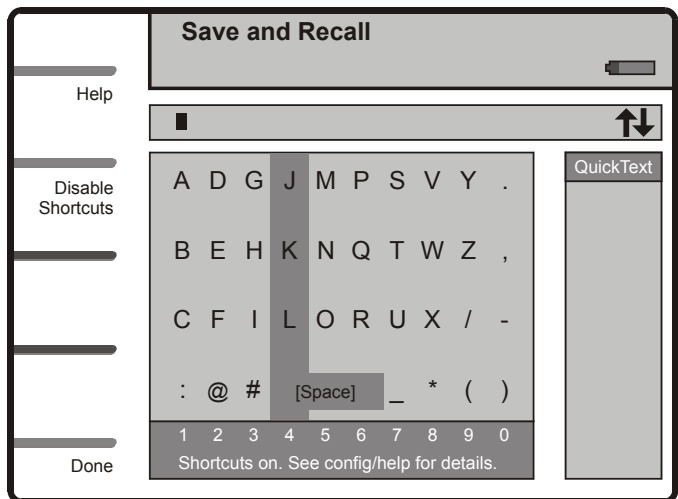
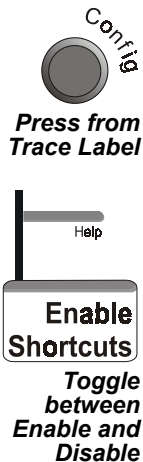
Label Help

Label Help provides instructions for labelling traces.



Label Shortcuts

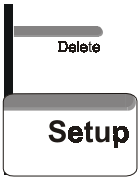
Enabling shortcuts allow you to select a column by pressing the key corresponding to the column number. When shortcuts are enabled, press the number key once to move the column, and twice to enter a number.



Save Setup

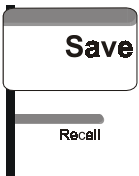
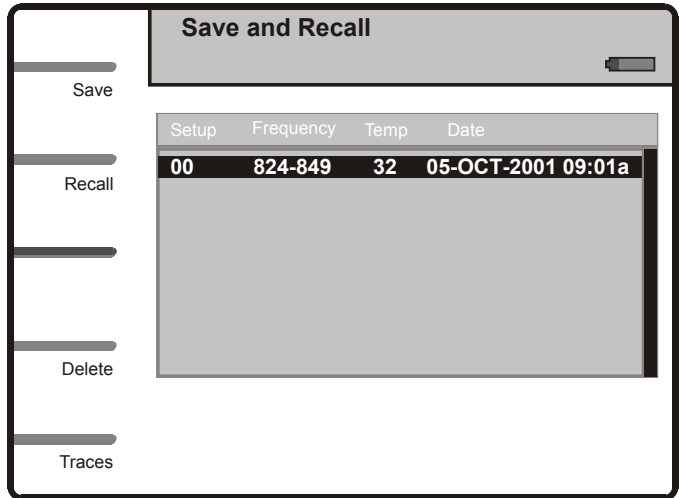
Saving the setup will save the following:

Calibration Coeff.	Start Frequency	Center Frequency
Limit Line	Stop Frequency	Span Frequency
Scale Min	Start Distance	Units
Scale Max	Stop Distance	

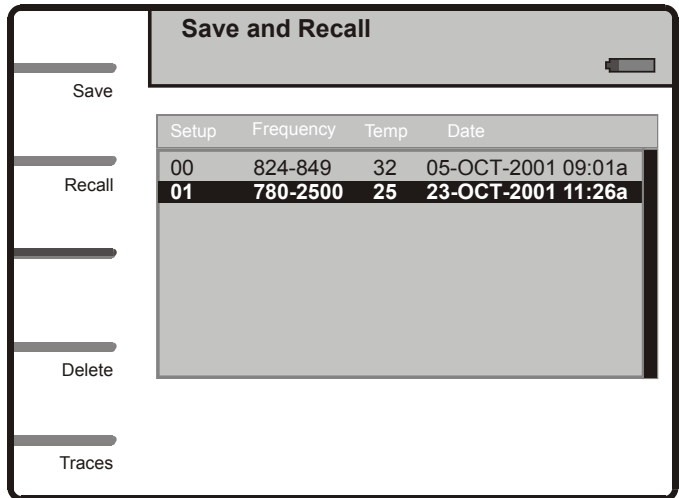


**Press from
Save and
Recall**

**The Setup
menu is
displayed**




**Press to
save the
current
setup**



Recall Trace

When a trace is recalled it is displayed along with the trace currently being measured. The frequency range will be changed to the recalled trace's settings. To remove a recalled trace from the display, press the **ESCAPE** key from the Save and Recall screen.

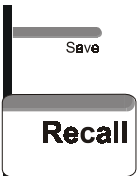
 **NOTE:** Calibration is automatically turned off if the recalled trace has a different frequency range.



From Save and Recall, scroll to the trace to be recalled

Reg	Description	Date
001	015 ALPHA RX02	05-OCT-2001 11:26
000	016 BETA TX01	05-OCT-2001 11:26

2 of 2:

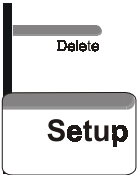


OR



The trace is recalled

Recall Setup

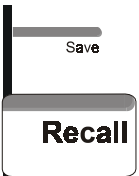
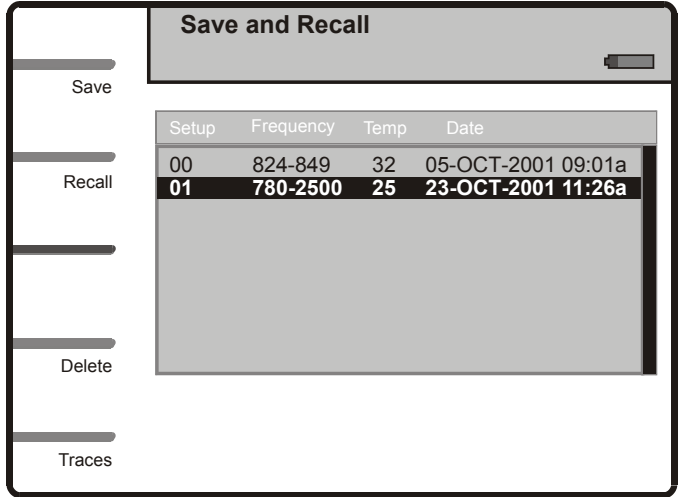


Press from
Save and
Recall

The Setup
menu is
displayed



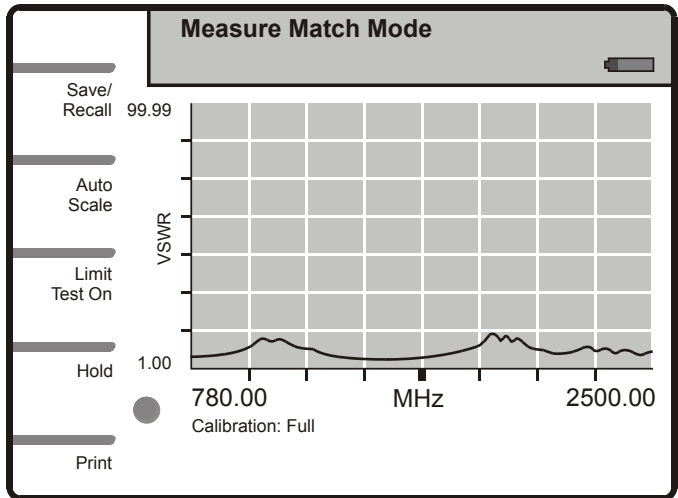
Scroll to the
setup to be
recalled



OR



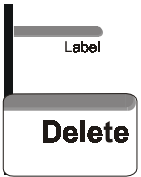
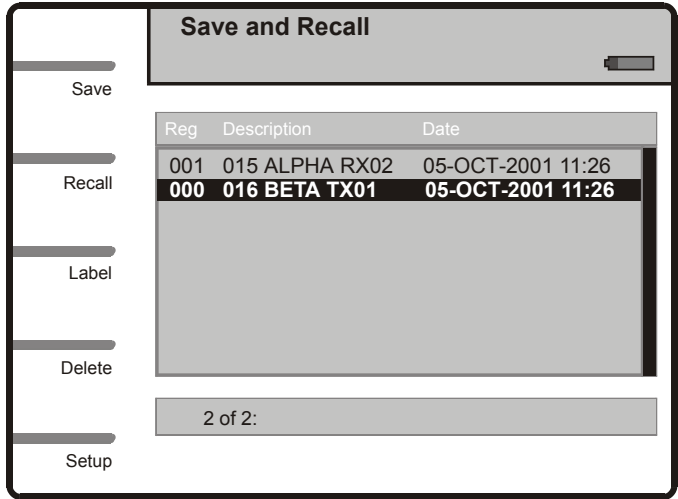
The setup is
recalled



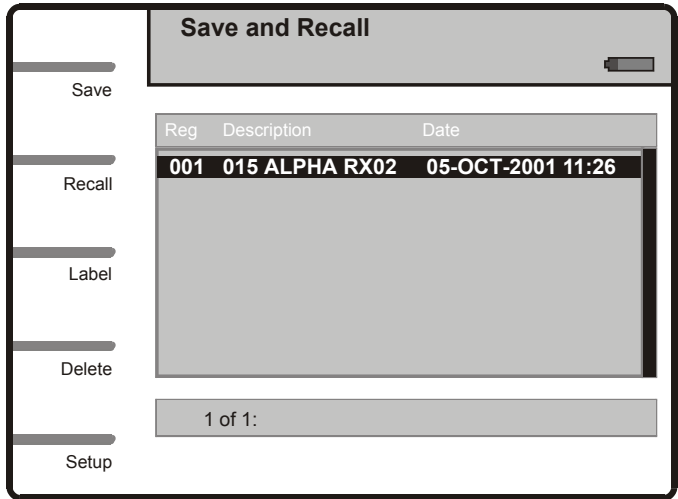
Delete Trace



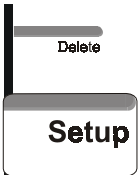
From Save and Recall, scroll to the trace to be deleted



Press to delete the trace. Press again when asked "Are You Sure?"



Delete Setup

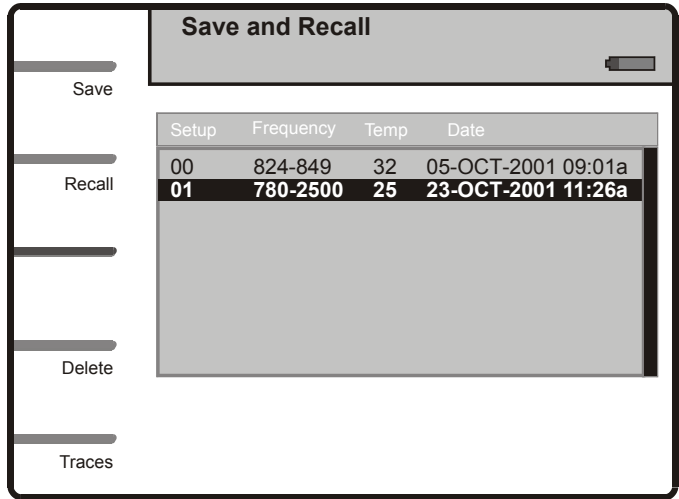


**Press from
Save and
Recall**

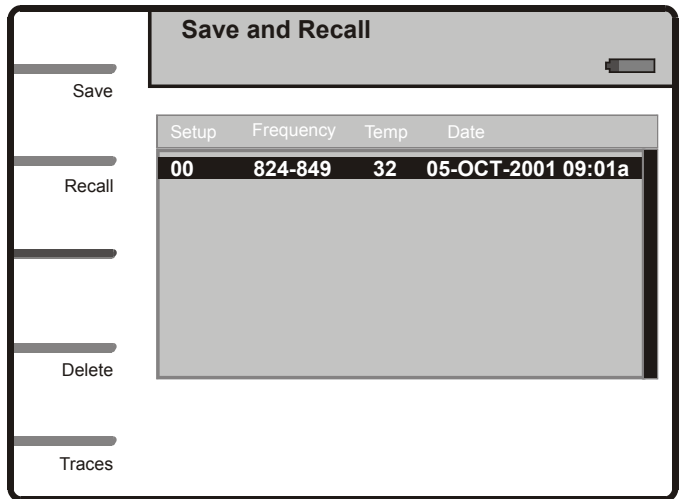
**The Setup
menu is
displayed**



**Scroll to the
setup to be
deleted**



**Press to
delete the
setup. Press
again when
asked "Are
You Sure?"**



This chapter applies to Bird Site Analyzers with firmware from before 1-Nov-2001. If you have a more recent firmware version, see “Save and Recall” on page 53.

Measurement data is stored in non-volatile memory. Data labeling allows descriptive naming of measurement data. The time-date stamp is automatic.

Save Trace



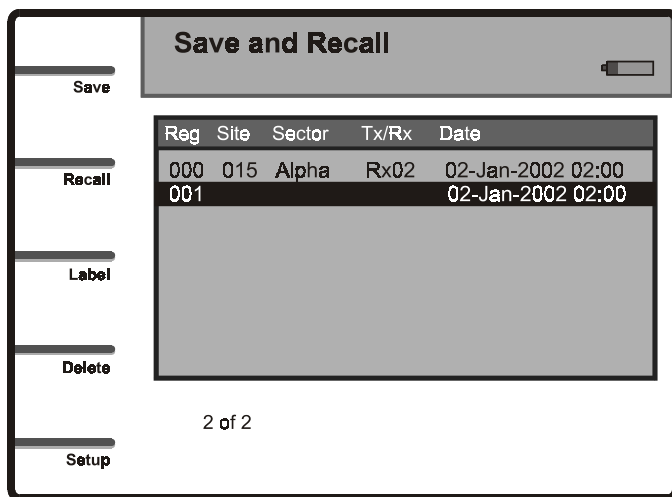
Auto
Scale

**Press from
Measure
Match or
Fault
Location
Mode**

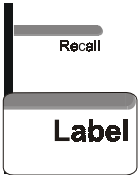


Recall

**The trace is
saved**

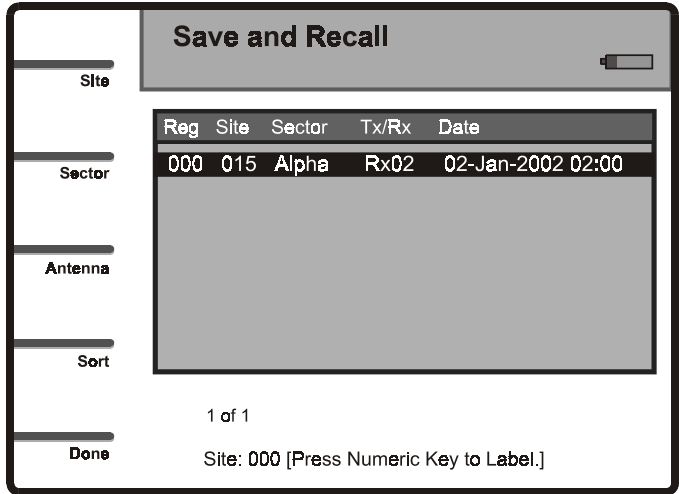


Label and Sort Trace

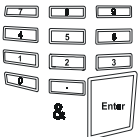


**Press from
Save and
Recall**

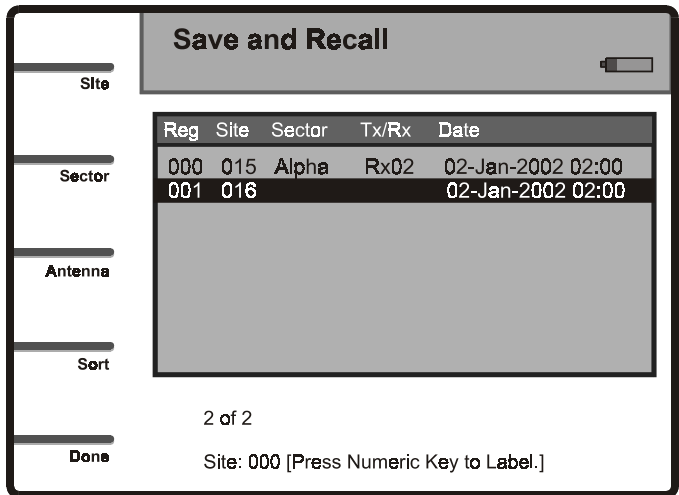
**The Label
menu is
displayed**

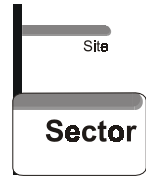


**Press to
display the
Site setting**

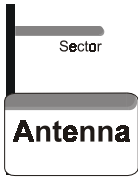


**Enter site
number**

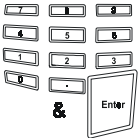




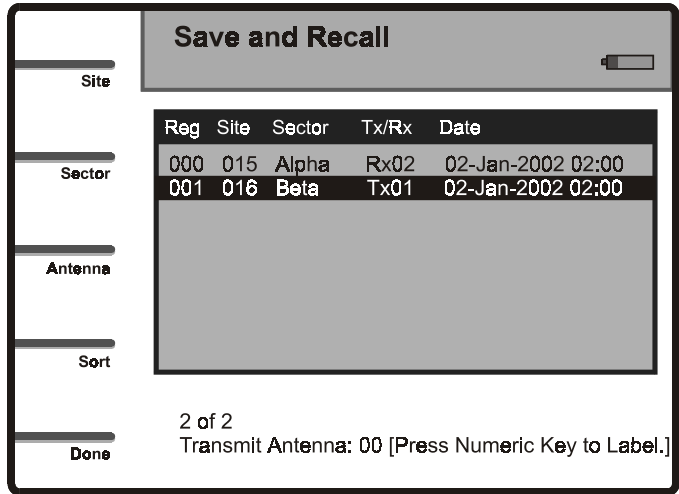
Toggle between [Blank], Alpha, Beta, and Gamma



Toggle between [Blank], Transmit, and Receive. Also displays the antenna number



Enter antenna number



Traces are automatically sorted in the order of Site, Sector, Antenna, and Date (with unlabeled traces at the top of the list) when the **Done** key is pressed. To sort them in the Label menu, press the **Sort** key.

Antenna

Sort

Press to sort traces

Sort

Done

Press to complete trace labeling

Save and Recall

Site

Sector

Antenna

Sort

Done

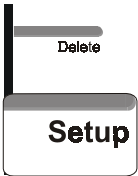
Reg	Site	Sector	Tx/Rx	Date
000	015	Alpha	Rx02	02-Jan-2002 02:00
001	016	Beta	Tx01	02-Jan-2002 02:00

2 of 2
Site: 000 [Press Numeric Key to Label.]

Save Setup

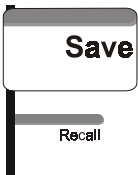
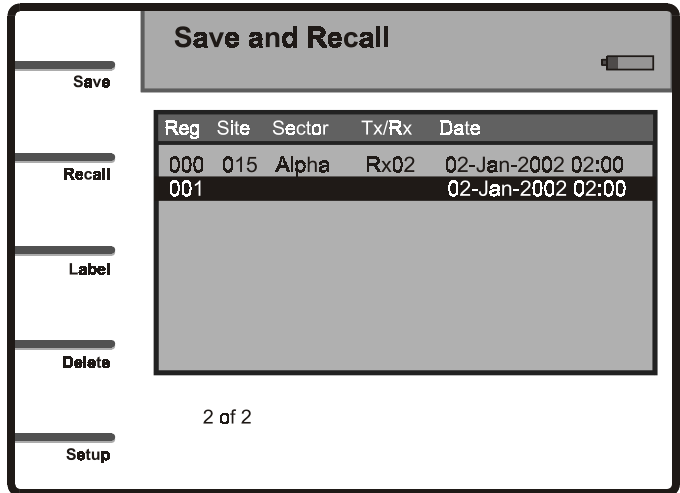
Five setups can be stored in the unit. Saving the setup will save the following:

Calibration Coefficients	Dielectric	Start Frequency
Stop Frequency	Center Frequency	Span Frequency
Mode	Scale Units	Minimum
Maximum	Smoothing	Limit Test Settings
Cable Type		

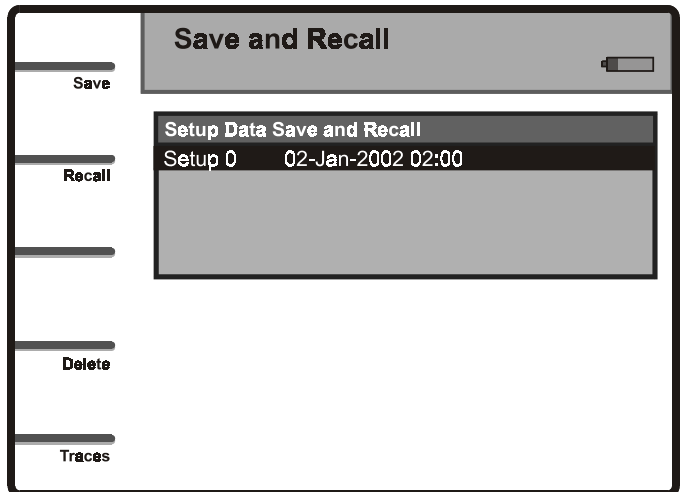


**Press from
Save and
Recall**

**The Setup
menu is
displayed**




**The setup is
saved**



Recall Trace

When a trace is recalled it is displayed along with the trace currently being measured. The frequency range will be changed to the recalled trace's settings. To remove a recalled trace from the display, press the **ESCAPE** key from the Save and Recall screen.

 **NOTE:** Calibration will automatically be turned off if the recalled trace was saved with a different frequency range.



From Save and Recall, scroll to be recalled

Reg	Site	Sector	Tx/Rx	Date
000	015	Alpha	Rx02	02-Jan-2002 02:00
001				02-Jan-2002 02:00

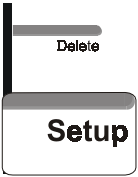
OR



The trace is recalled

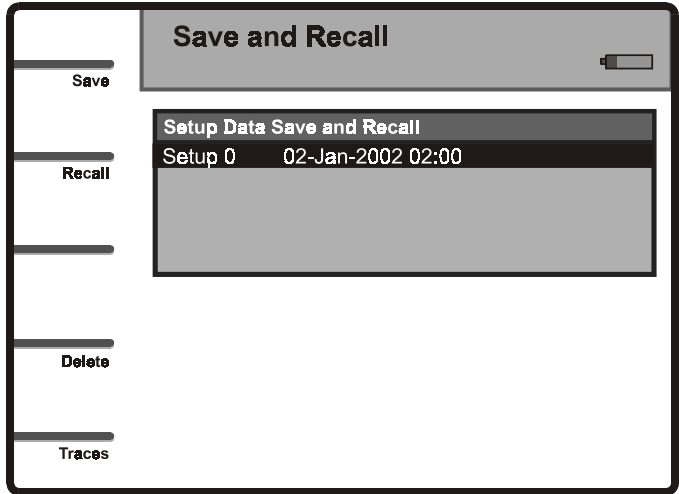
Calibration:	FULL	M1: 13.13	1.32
Limit:	1.43	M2: 8.43	1.20
	FAIL	M: 4.7	0.12

Recall Setup

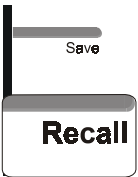


Press from
Save and
Recall

The Setup
menu is
displayed



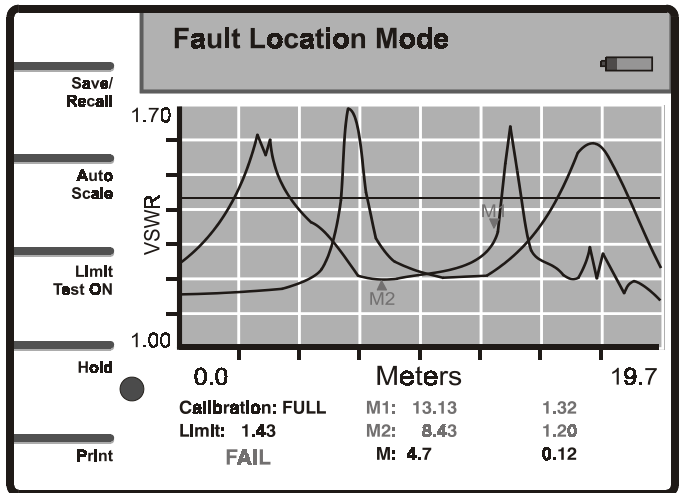
Scroll to the
setup to be
recalled



or



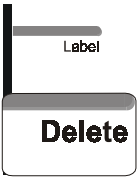
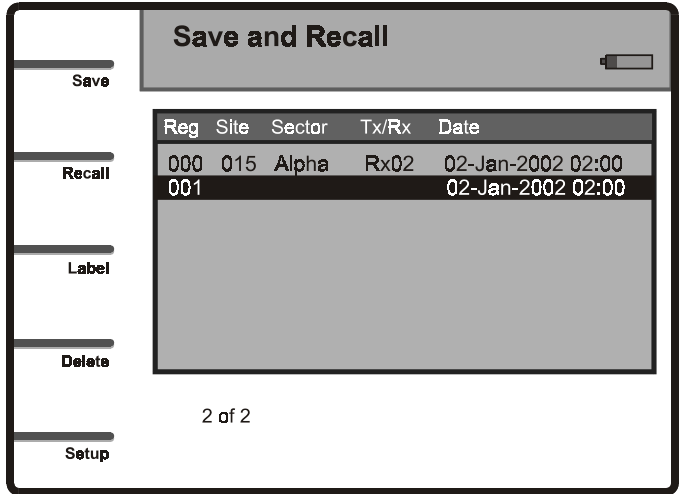
The setup is
recalled



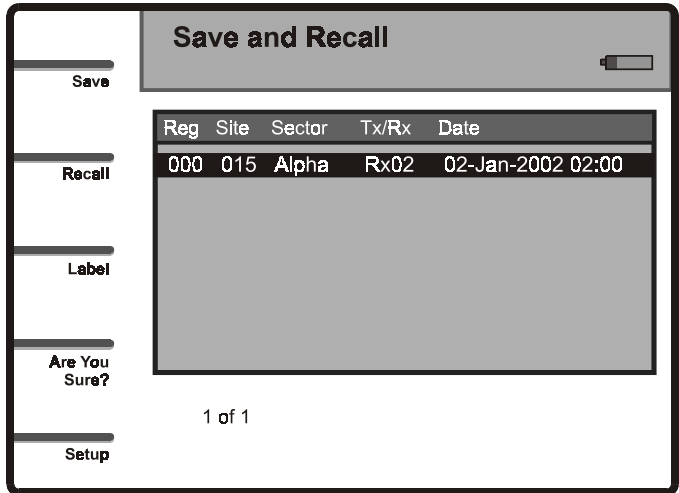
Delete Trace



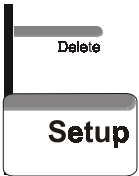
From Save and Recall, scroll to the trace to be deleted



Press to delete the trace. Press again when asked "Are You Sure?"

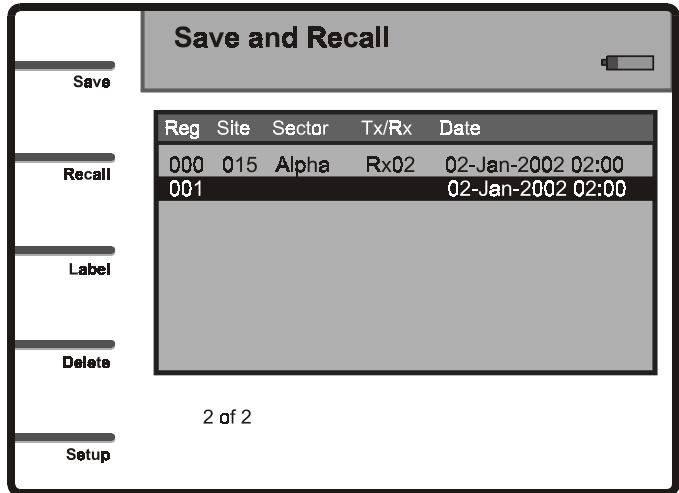


Delete Setup

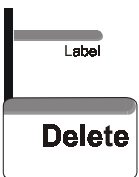


**Press from
Save and
Recall**

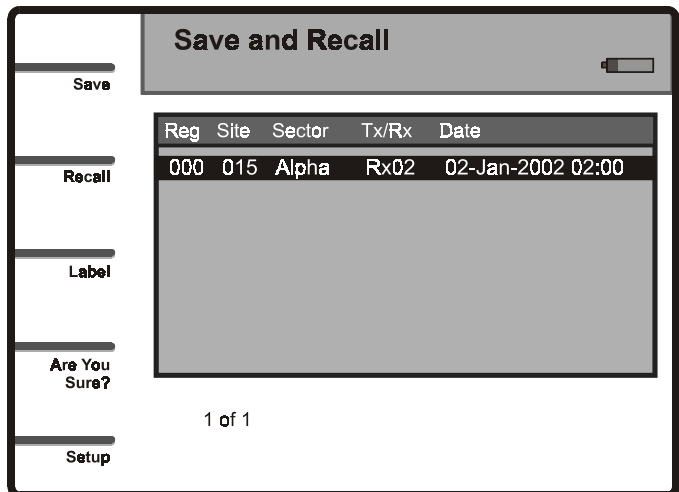
**The Setup
menu is
displayed**



**Scroll to the
setup to be
deleted**

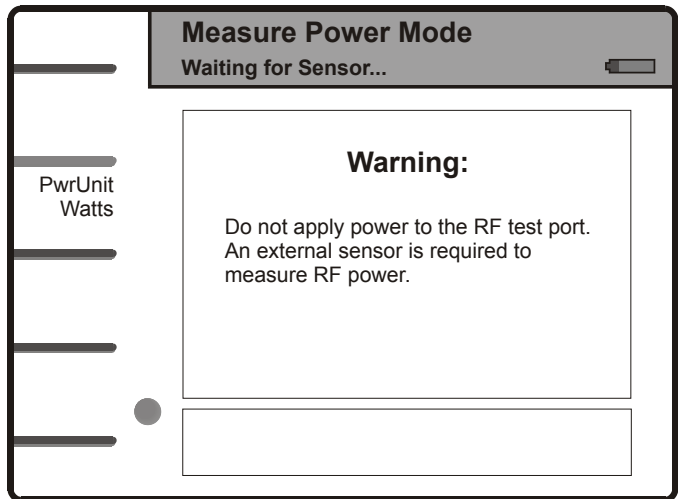
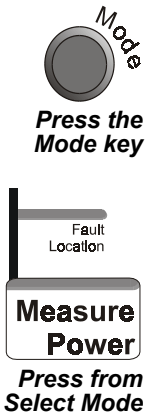


**Press to
delete the
setup. Press
again when
asked "Are
You Sure?"**



This measurement verifies and monitors the condition of the transmitter system. Up to three measurement values can be simultaneously displayed, depending on the sensor. One measurement is also displayed on an analog dial.

For best results with element-based sensors, connect the sensor and enter the power rating of the forward element before taking any readings.



CAUTION

When using a Bird 5011, do not exceed 2 W average or 125 W peak power for 5 μ s. Doing so will render the sensor inoperative.

Connecting a Sensor

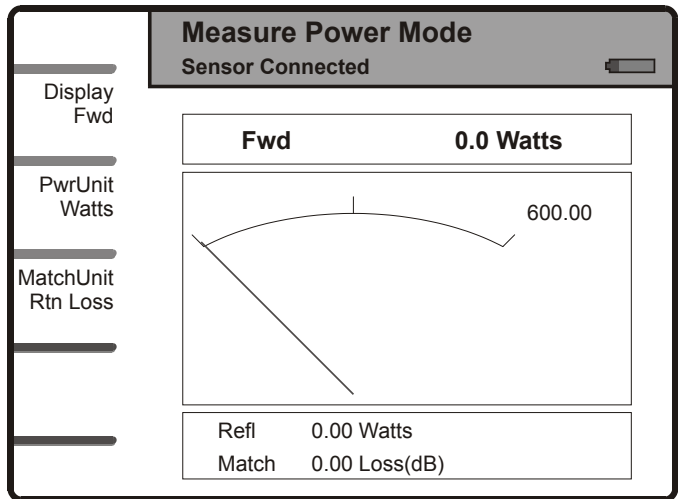


CAUTION
+22 dBm max. input
Do not apply RF power to Antenna Test Port. Exceeding the maximum input will damage the Site Analyzer.

The antenna test port is only used for testing unpowered systems. For power measurement, an external power sensor connected to the Remote Power Sensor Port *must* be used.

Connect the Bird Site Analyzer to power sensors using the built-in serial port, labeled “Remote Power Sensor” (see “Connection Description” on page 7). A 9 pin serial cable should be used. When a sensor is properly connected to the Site Analyzer, the sensor status message will change from “Waiting for Sensor” to “Sensor Connected” and the warning message will be replaced by the main display.

A sensor is properly connected



Setting the Full Scale Power

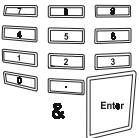
The Bird Site Analyzer will automatically set the full scale power for sensors that do not use elements. For element-based sensors, enter the power listed on the forward element. The reflected element's power rating should be 10% of the forward element's.



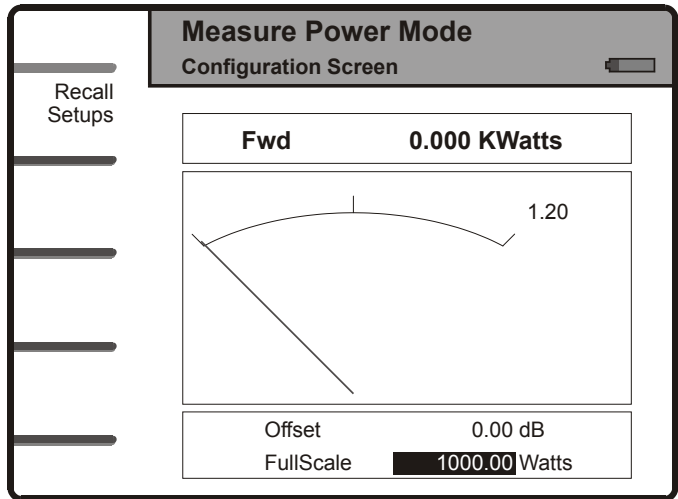
Press from
Measure
Power Mode



Scroll to Full
Scale



Enter the
forward
element
power



Setting the Offset

To read unattenuated power when using a coupler or attenuator, enter (in dB) the attenuation or coupling factor. To convert percentages to dB, use the equation:

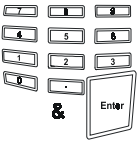
$$\text{Attenuation(dB)} = 10 \times \text{Log}_{10}[\text{Attenuation}(\%) / 100]$$



Press from Measure Power Mode



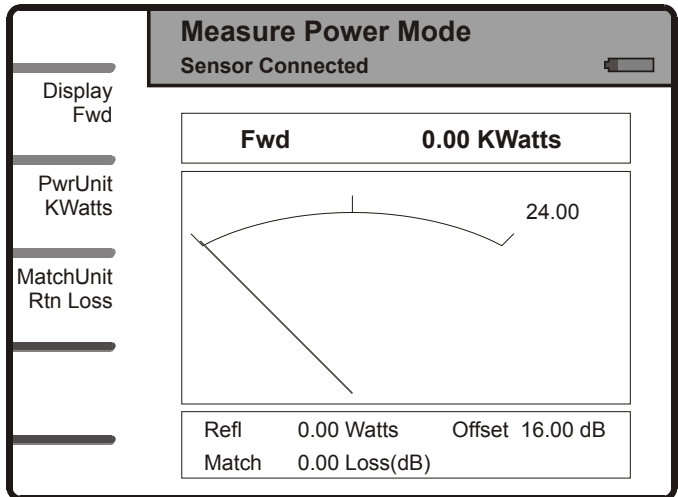
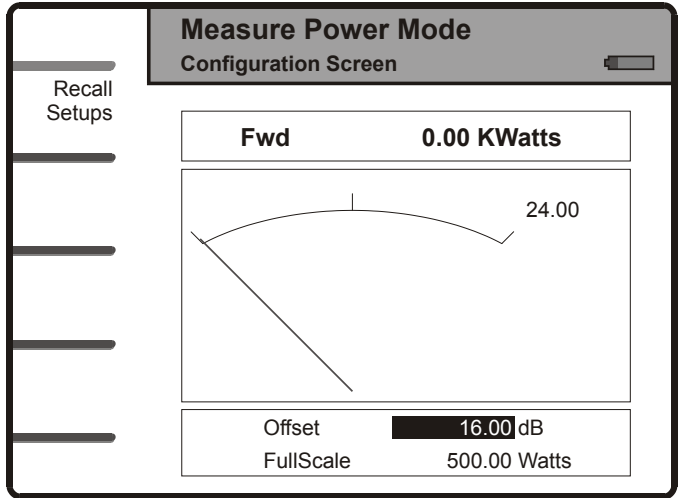
Scroll to Offset



Enter the new value



The offset is displayed at the bottom of the main display



Recall Setups

Power measurement setups can be created using the Bird Site Analyzer PCTool Software, then stored in the Site Analyzer's nonvolatile memory. These setups store both the offset and full scale power.



Press from Measure Power Mode



Press to display the Power Setup menu

Measure Power Mode
Select Power Setup

Name	Offset	Scale
Setup1	16.00	1000.00 W
Dflt1	0.00	500.00 W
Dflt2	0.00	500.00 W
Dflt3	0.00	500.00 W
Dflt4	0.00	500.00 W
Dflt5	0.00	500.00 W
Dflt6	0.00	500.00 W
Dflt7	0.00	500.00 W



Scroll to the setup to be recalled



The setup is recalled

Measure Power Mode
Configuration Screen


Fwd 0.00 KWatts

50.00

Offset 16.00 dB
FullScale 1000.00 Watts

Choosing the Displayed Measurement


The primary display shows one value on the large numerical display and the dial. Other measurements are displayed numerically below the dial.

 **NOTE:** When using a terminating power sensor, only forward power can be measured. Reflected power and match will not be displayed.

Display Fwd

PwrUnit

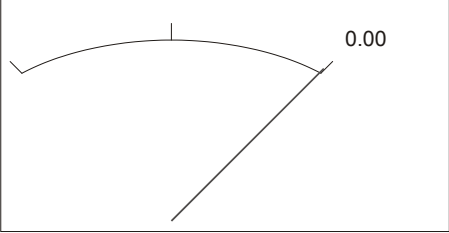
Toggle between Fwd, Refl, and Match

Measure Power Mode
Sensor Connected 

Display Match

PwrUnit Watts

MatchUnit Rtn Loss

Match	0.00 Loss (dB)
	
Fwd	0.0 Watts
Refl	0.00 Watts

Setting Units

Display
Fwd

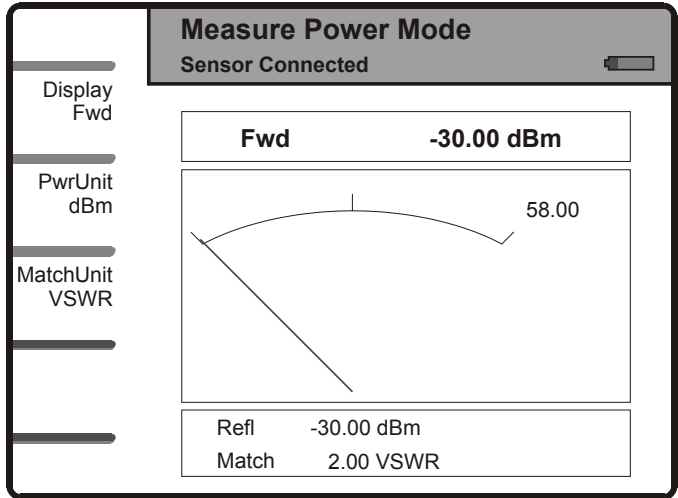
**PwrUnit
Watts**

*Toggle
between
Watts and
dBm*

PwrUnit

**MatchUnit
Rtn Loss**


*Toggle
between
VSWR,
Return
Loss, and
Match
Efficiency*

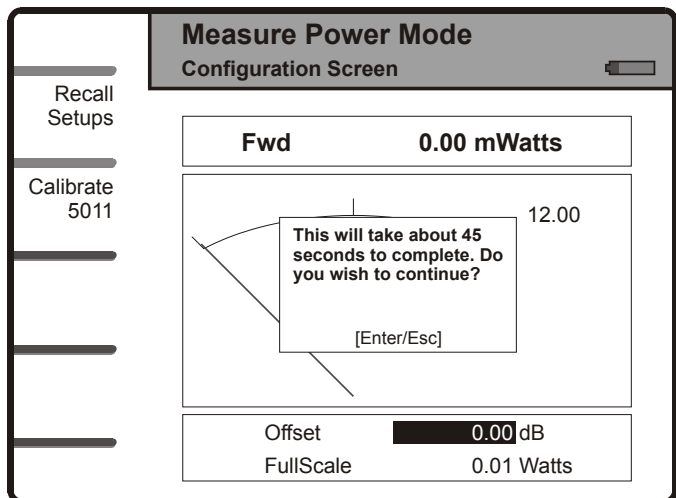
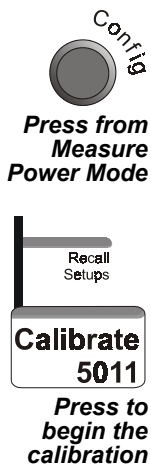


Calibrating the Bird 5011

CAUTION
When using a Bird 5011, do not exceed 2 W average or 125 W peak power for 5 μ s. Doing so will render the sensor inoperative.

The Bird 5011 is a highly accurate terminating power sensor. Over time, the sensor's "zero value" (reading with no applied RF power) can drift, making all readings inaccurate by this value. For example, if the zero value is -2μ W, measuring a 5 mW signal will give a reading of 4.998 mW, a 0.04% error. Measuring a 50 μ W signal will give a reading of 48 μ W, a 4% error. To keep this drift from causing a significant error, rezero the sensor as necessary.

 **NOTE:** For best results, make sure the sensor has been connected to the Site Analyzer and the SA turned on for at least 5 minutes. Do not apply RF power to the sensor during calibration.





Press to the warning

Measure Power Mode
 Configuration Screen ▢

Recall
Setups

Fwd
0.00 mWatts

12.00

WARNING
Do not disconnect sensor until cal is complete.

Offset

0.00 dB

FullScale

0.01 Watts

Wait for calibration to finish

Measure Power Mode
 Configuration Screen ▢

Recall
Setups

Fwd
0.00 mWatts

12.00

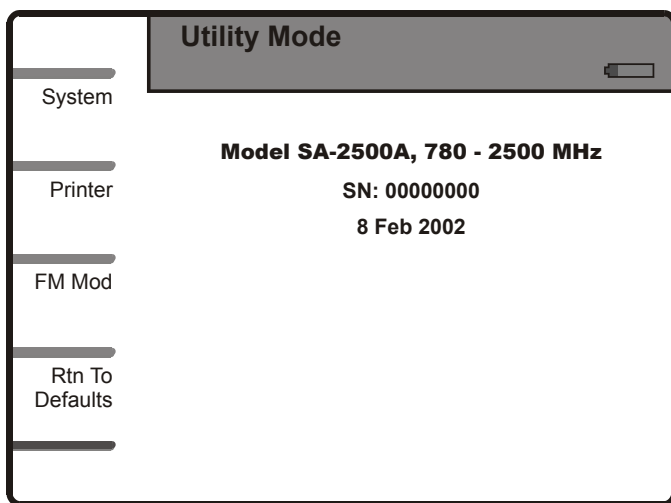
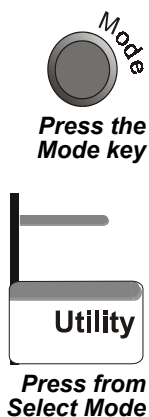
Offset

0.00 dB

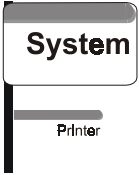
FullScale

0.01 Watts

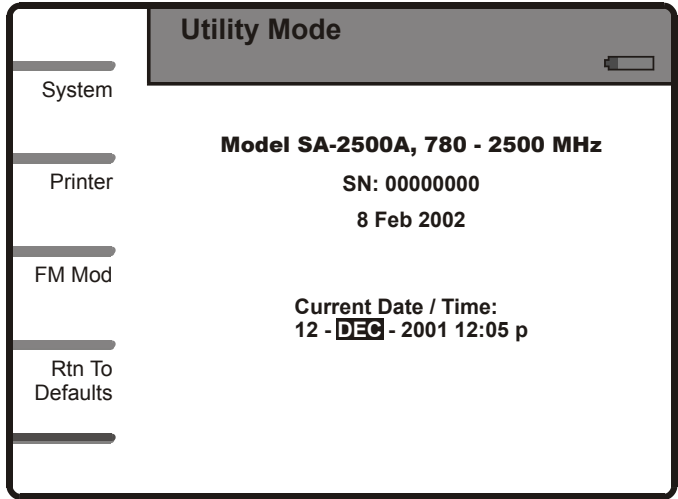
These utilities adjust the Bird Site Analyzer's date and time, return the unit to default settings, or check the printer status.



Adjust Date and Time



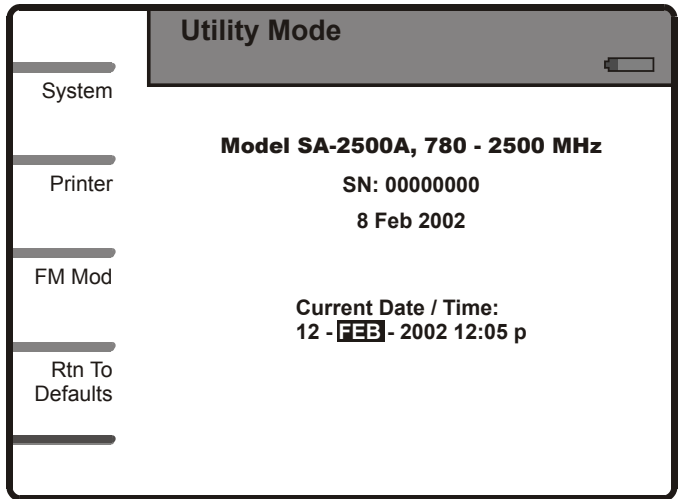
Press to display the system settings



Scroll through the date & time



Change the date or time

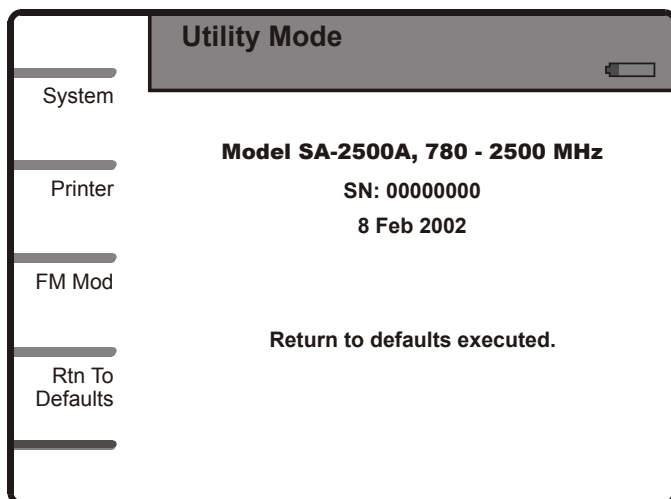


Return to Defaults

All settings will be returned to the factory presets. Saved traces and setups will not be affected. This function should be used after a unit failure and on first power up.

**Rtn To
Defaults**

*Press to
return all
settings to
factory
presets*



FM Modulation

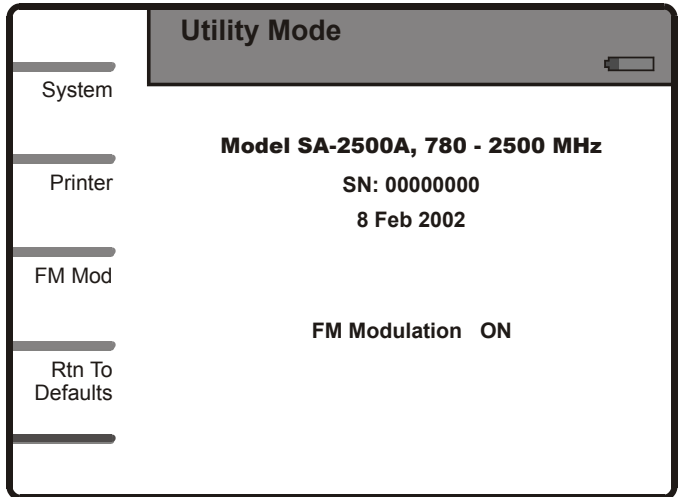
The Bird Site Analyzer uses FM modulation to improve its immunity to interfering signals. Under certain circumstances, such as while making cable loss or other high reflection measurements with long cables, FM modulation may reduce signal quality. In that case, the modulation should be turned off.

- FM modulation is on by default, and will be turned back on whenever the unit is reset to defaults.
- FM modulation is automatically turned off while the unit is in Cable Loss Mode and returned to its previous state on exiting Cable Loss Mode.
- Saving a setup saves the status of the modulation.



Rtn To Defaults

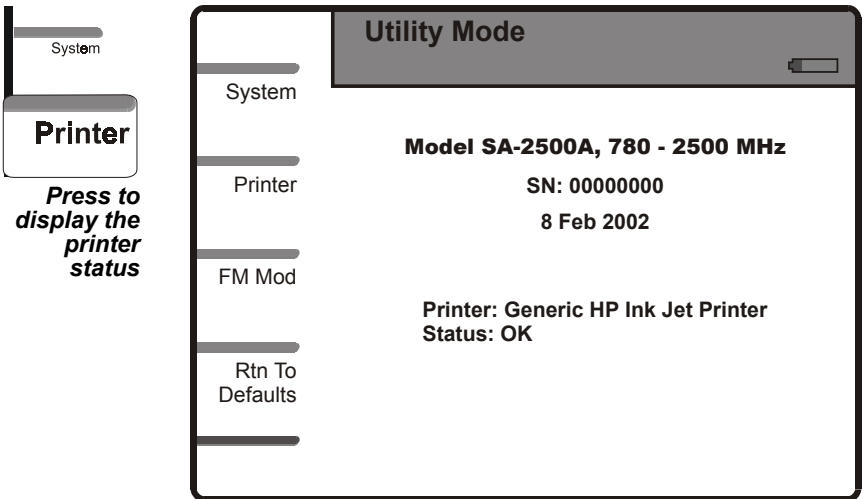
Toggle between ON and OFF



Printer

The Bird Site Analyzer is compatible all printers that use HP PCL Level 3, including most HP printers.

When a printer error occurs, this screen will display an error message describing the printer problem.



The Bird Site Analyzer Software is designed to help you use the Site Analyzer more effectively. The software enables use of a PC for archiving and analyzing measurement data.

Features

- Multiple Document Interface - allows any number of trace documents to be open simultaneously.
 - Intelligent drag-and-drop automatically converts traces to a common scale for precise and reliable comparisons.
 - Documents can be viewed in the frequency or distance domains, or as a Smith chart.
 - Data values can be read off the status bar as the mouse is moved along the trace.
 - Compatible with other cable and antenna testers including the Bird AT Series.
- ☞ NOTE: The Bird Site Analyzer and PCTool software are no longer compatible with trace data from the Anritsu Site Master.
- Automatic cursor calibration maintains accurate readouts of trace data even if the x-axis changes.
 - Supports long file names for easy identification.

Computer Requirements

To install and run the software, your computer system must meet the following requirements:

- Windows 95 or later
- 486 or better microprocessor running enhanced mode (66 MHz or better recommended)
- 1 MB of free memory
- Hard disk with 3 MB of free space
- 1.44 MB Floppy Drive

☞ NOTE: For more instructions refer to the help files included with the software.

Cleaning**CAUTION**

Harsh or abrasive detergents, and some solvents, can damage the display unit and labels.

Only clean the Site Analyzer with a soft cloth dampened with mild detergent and water. Do not use any other type of cleaning solution.

Charging the Battery

The internal battery pack is charged while the Site Analyzer is connected to the ac adapter or the automobile cigarette lighter adapter. Recharging time, from a full discharge, is approximately 4 hours.

Troubleshooting

Any service procedure not covered in this manual should be referred to an authorized service facility.

Locate the problem, review the possible causes, and perform the action listed. If the problem is not corrected, give us a call or return the unit for service.

Problem	Possible Cause	Possible Correction
Unit will not power up	Battery pack drained	Charge the battery pack.
	Battery pack unable to keep a charge	Replace the battery pack.
	AC adapter is not securely connected or is damaged	Securely connect the ac adapter to the unit.
		Replace the ac adapter.
	No power supplied at the wall receptacle.	Restore power to the wall receptacle.
Self test fails	Error condition	Turn the unit off and then back on. If the problem persists, return the unit for service.
Date and time appear, hiding the display	Internal error	Press Mode , Utility , and then Escape .
Fault Location trace appears incorrect	Scale too large	Press Auto Scale to make the scale is small enough.
	Incorrect cable loss or velocity of propagation	Check the cable loss and V_p settings.
Erratic antenna test measurements	Bad calibration combo	Use a different calibration combo.
Soft Key One beeps when pressed without actually performing any function.	Context switching operations taking place	Wait for screen changes to complete before.

Problem	Possible Cause	Possible Correction
Keys do not respond	Unit is “Locked Up”	Turn the unit off and then back on.
		Perform a full system initialization. Disconnect the AC adapter, hold down the Contrast key and turn the unit off. Turn the unit back on.
Limit line disappears in Fault Location Mode. The limit value is valid, the test is performed and reported, the failing portion of the trace is drawn in red.	Limit line not drawing	Turn the limit line off and then back on.
Recalled fault location trace is invalid.	No fault location measurement made since last full system initialization (holding down the Contrast key while turning the unit Off).	Change to Measure Match Mode and then back to Fault Location Mode.
Unit beeps and turns off.	Internal error	Turn the unit back on and continue.
Unit is unable to print. “Error” is displayed after pressing PRINT .	Printer error	Check the error condition in Utility Mode (Mode, Utility, Printer). Correct the error.

Battery Replacement

- Lay the Site Analyzer, display side down, on a clean surface.
- Remove the four screws and the battery cover. Refer to the figure below.
- ☞ NOTE: Check the direction of the notch in the Battery Cover. It is important to replace the cover the same way it was removed.
- Disconnect and remove the old battery pack from the battery compartment.
- ☞ NOTE: Do not tear the protective label covering the EPROM and Reset access. Hold the wires coming from the unit while disconnecting the battery.
- Install the new battery. Make sure the wires are firmly connected.
- Place the battery in the battery compartment. Make sure the battery is flat in the compartment, and will not damage any wires when the cover is installed.
- Replace the battery cover and the screws.




Unit Reset

- Lay the Site Analyzer, display side down, on a clean surface.
- Remove the battery. Follow the instructions in “Battery Replacement”, page 102.
- Remove the label covering the Reset and EPROM access. Refer to the figure on the previous page.
- Press the Reset button with a nonconductive instrument.
- Place a new label over the Reset and EPROM access area.
- Replace the battery and battery cover. Follow the directions in “Battery Replacement”, page 102.

Flash ROM Upgrade (SA-2500A Only)


The SA-2500A uses flash-programmable ROM. It is not necessary to replace the EPROM to upgrade the firmware.

 **NOTE:** The update process will erase the memory of the Site Analyzer, including all saved traces and setups. Use the PC software to save all traces to a PC before updating the flash ROM.

- Install the FlashLoader program on a PC.
- Turn off the Site Analyzer and disconnect the external power supply.
- Connect the PC to the Site Analyzer's serial port with the supplied serial cable.
- Run the FlashLoader and click the Begin button. The status will change to "Waiting to Connect".
- Connect the Site Analyzer to the power supply. The green LED on the SA will turn on and the Flash Updater will display "Connected."
- Select the data file (e.g. 04May2001.sre) and click "Open".
- Select "Yes" to accept the warning and update the flash, or "No" if you do not want to proceed.
- The update process takes 3 to 5 minutes. After this the Site Analyzer will beep several times, the green power LED will turn off and the amber charging LED will start blinking.

EPROM Replacement

The EPROM should not need to be replaced by the user. If the EPROM does ever need to be replaced, it should only be replaced by qualified service personnel.

 **NOTE:** The Model SA-2500A uses flash-programmable ROM. It is not necessary to replace the EPROM to upgrade the firmware.

- Make sure the power is turned off and the ac adapter is removed from the unit.
- Lay the Site Analyzer, display side down, on a clean surface.
- Remove the battery. Follow the instructions in “Battery Replacement”, page 102.
- Remove the label covering the Reset and EPROM access. Refer to the figure below.
- Move the battery wires away from the EPROM.
- Remove the EPROM with an EPROM removal tool.
- Insert the new EPROM in the socket, keeping it in the same orientation as the old one.
- Put the battery wires back in place.
- Place a new label over the Reset and EPROM access.
- Replace the battery and battery cover. Follow the directions in “Battery Replacement”, page 102.



Customer Service

If you need to return the unit for any reason, contact the Bird Service Center for a return authorization. All instruments returned must be shipped prepaid and to the attention of Bird Service Center.

Service Facility

Bird Service Center

30303 Aurora Road
Cleveland (Solon), Ohio 44139-2794
Phone: (440) 519-2298
Fax: (440) 519-2326
E-mail: bsc@bird-technologies.com

Sales Facilities

For the location of the Sales Office nearest you, give us a call or visit our Web site at:

<http://www.bird-electronic.com>

Parts List

Part Name	Part Number
Site Analyzer - Complete	
806-2000 MHz	SA-2000
806-2300 MHz	SA-2000A
780-2500 MHz	SA-2500A
AC adapter (15 Vdc output)	5A2436
Automobile cigarette lighter adapter	5A2238-2
Soft Carrying case	7002A850
9-pin Serial interface cable	5A2264-9MF-10
PC interface software kit	7002A844
Instruction manual	920-7002A800
Internal Battery Pack	5A2431

Specifications

Frequency Characteristics

Frequency Range:	
Model SA-2000	806 MHz to 2000 MHz
Model SA-2000A	806 MHz to 2300 MHz
Model SA-2500A	780 MHz to 2500 MHz
Frequency Resolution:	50 kHz
Frequency Accuracy:	± 150 kHz (75 ppm)
Number of Points:	238

Measurement Range and Resolution

	Range	Resolution
Return Loss:	0.0 to -60.0 dB	0.1 dB
VSWR:	1.00 to 99.99	0.01

Measurement Uncertainty (after 1 display refresh)

Return Loss:	Determined graphically from composite of 42 dB directivity, 1.2 source VSWR, and instrumentation error. Refer to the figure on page 110.
VSWR:	Calculated from Return Loss

Test Port

Connectors:	N, Female normally supplied
Impedance:	50 Ohms

Directivity 42 dB, after calibration

Measurement Speed Better than 1 sweep per 4 seconds, test port open, y-axis set to full scale

Immunity to Interfering Signals ≥ 13 dB interferer at desired measurement frequency.

Maximum Input Signal (Damage Level) ≥ 22 dBm

Output Power < 0 dBm

Distance to Fault (DTF) Measurement

Mode Internal

Resolution [R]

X-Axis:

$$R \equiv \frac{3 \times 10^8}{2 \times \sqrt{\epsilon_r} \times \Delta F}$$

Where R=Resolution (meters),
 ϵ_r =Dielectric Constant*, ΔF = frequency
bandwidth

Y-Axis:

0.1 dB, 0.01 VSWR

Range

X-Axis:

238 x R

Y-Axis:

0 to -60 dB

Accuracy

X-Axis:

± 2% of full-scale range with $V_p = 1$

Y-Axis:

Same as for Return Loss Measurements

V_p Range

0.20 to 1.00, or 1.00 to 99 percent

Power Measure Mode

Function:

Displays power from Bird power sensors,
VSWR alarm and BPM
(specifications determined by sensor)

General

Data Storage

300 traces in fundamental data format
stored in non-volatile memory. Traces
may be recalled and displayed in any of
the display formats.

PC/Remote Power Sensor Interface Port

Connector:

Female DB-9, compatible with PC serial
port.

Protocol:

Serial RS-232, 9600 baud, 8 data bits, 1
stop bit, no parity, and no handshake.

Printer Interface Port

Connector:	Female DB-25, compatible with PC parallel port.
Compatibility:	HP Deskjet printers with PCL Level 3 protocol

Power Requirements

Internal:	Lithium-ion rechargeable battery 3 hours minimum operating time
External DC:	9 to 16 Vdc
External AC:	90 to 264 Vac @ 45 to 66 Hz

Physical Specifications

Dimensions:	10.44" x 8.38" x 3.28" (265 x 212 x 83 mm)
Weight:	< 5 lbs. (2.3 Kg)

Environmental Specifications

Operating Temp:	-10° to 50°C (14° to 122°F)
Storage Temp:	-40° to 80°C (-40° to 176°F)
Humidity:	95% maximum (non-condensing)
Altitude:	up to 15,000 feet (4,572 m)

International Standards

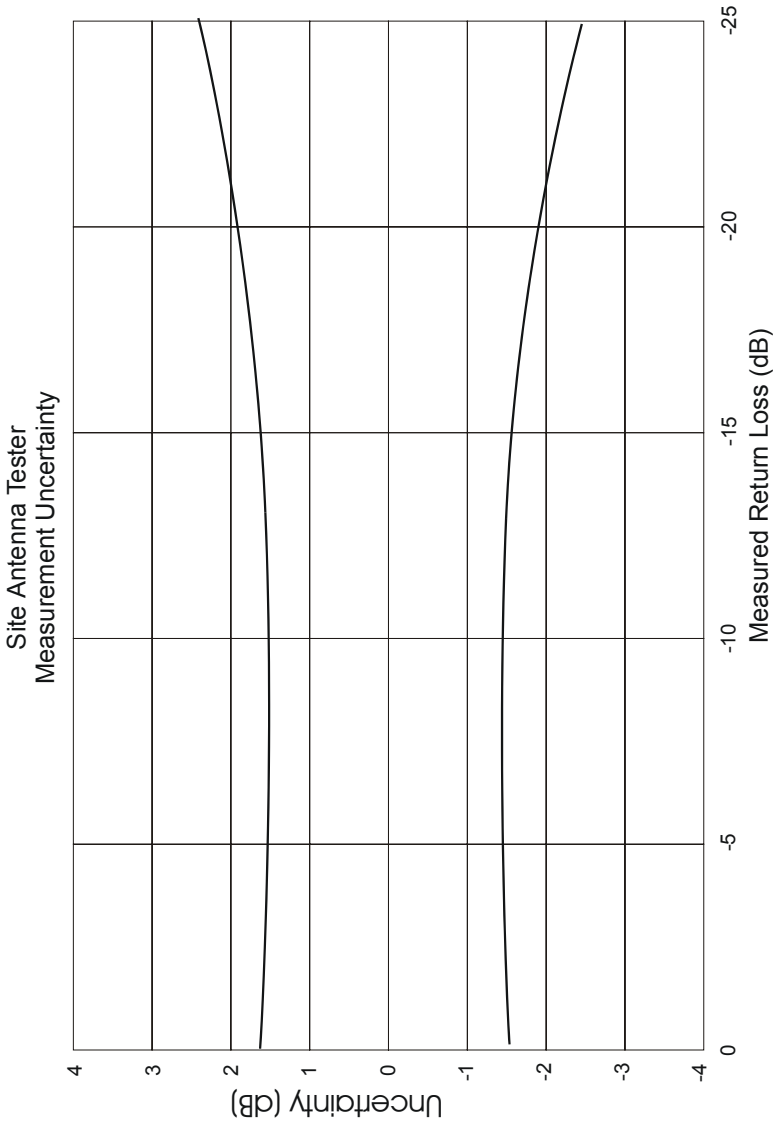
EMC:	Conforms to: EN 63126-1:1997
Safety:	Conforms to: EN 61010-1:1993, with Amendment A2:1995

Calibration

Calibration Cycle:	User Defined
Recommended Calibration Interval:	12 months

*Dielectric Constant - The dielectric constant of the antenna cable determines the propagation velocity of the cable, which together with the frequency range of the match data, determines the maximum distance for which the calculation can be done without aliasing errors.

Measurement Uncertainty (Return Loss after one refresh)



Optional Equipment Available

Precision Open/Short/Load Combination:

Connector Type	Part Number
Male N	CAL-MN-B
Female N	CAL-FN-B
Male 7/16 DIN	CAL-ME-B
Female 7/16 DIN	CAL-FE-B

Armored (phase stable) Test Cables:

Connector Types	Length	Part Number
Male N to Male N	1.5 meter	TC-MNMN-1.5
Male N to Male N	3.0 meter	TC-MNMN-3.0
Male N to Male N	5.0 meter	TC-MNMN-5.0
Male N to Female N	1.5 meter	TC-MNFN-1.5
Male N to Female N	3.0 meter	TC-MNFN-3.0
Male N to Female N	5.0 meter	TC-MNFN-5.0
Male N to Female 7/16 DIN	1.5 meter	TC-MNFE-1.5
Male N to Female 7/16 DIN	3.0 meter	TC-MNFE-3.0
Male N to Female 7/16 DIN	5.0 meter	TC-MNFE-5.0

Precision Adapters:

Connector Types	Part Number
Male N to Male 7/16 DIN	PA-MNME
Female N to Male 7/16 DIN	PA-FNME
Male N to Female 7/16 DIN	PA-MNFE
Female N to Female 7/16 DIN	PA-FNFE
Female N to Female N	4240-500-1
Female N to Male N, Right Angle	4240-500-3
Female N to Female SMA	4240-500-4
Female N to Male SMA	4240-500-5

- Hard Transit Case** P/N: 7002C870
Holds Site Analyzer, standard accessories, calibration combo, armored cable assembly, and adapters.
- External Battery Pack** P/N: SA-BATPAK
Includes ac adapter and dc power cord.
- Directional Power Sensor** P/N: 5010
Sensor for Thruline power measurement. Requires two DPM elements.
- DPM Elements** Refer to DPM Element Guide, P/N 871-DPM-019-901, for a complete list of Bird DPM elements.
- Terminating Power Sensor** P/N: 5011
Sensor for terminating power measurement.

Terminating Power Sensor Accessories:

Description	Part Number
Female N to Male N Attenuators (RF power range using TPS)	
30 dB (10 mW – 10 W)	8353A030-10
40 db (100 mW – 50 W)	8353A040-50
DC Block	5011A035-1
General Purpose Test Cable Male N to Female N, 1.5 m	TC-MNFN-1.5-G
Calibration Data	5011-CALDATA
Recommended for attenuators, test cables, dc block, and right angle adapter	

Limited Warranty

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of two (2) years, unless otherwise specified, from date of shipment and to conform to applicable specifications, drawings, blueprints and/or samples. Seller's sole obligation under these warranties shall be to issue credit, repair or replace any item or part thereof which is proved to be other than as warranted; no allowance shall be made for any labor charges of Buyer for replacement of parts, adjustment or repairs, or any other work, unless such charges are authorized in advance by Seller.

If Seller's products are claimed to be defective in material or workmanship or not to conform to specifications, drawings, blueprints and/or samples, Seller shall, upon prompt notice thereof, either examine the products where they are located or issue shipping instructions for return to Seller (transportation-charges prepaid by Buyer). In the event any of our products are proved to be other than as warranted, transportation costs (cheapest way) to and from Seller's plant, will be borne by Seller and reimbursement or credit will be made for amounts so expended by Buyer. Every such claim for breach of these warranties shall be deemed to be waived by Buyer unless made in writing within ten (10) days from the date of discovery of the defect.

The above warranties shall not extend to any products or parts thereof which have been subjected to any misuse or neglect, damaged by accident, rendered defective by reason of improper installation or by the performance of repairs or alterations outside of our plant, and shall not apply to any goods or parts thereof furnished by Buyer or acquired from others at Buyer's request and/or to Buyer's specifications. Routine (regularly required) calibration is not covered under this limited warranty. In addition, Seller's warranties do not extend to the failure of tubes, transistors, fuses and batteries, or to other equipment and parts manufactured by others except to the extent of the original manufacturer's warranty to Seller.

The obligations under the foregoing warranties are limited to the precise terms thereof. These warranties provide exclusive remedies, expressly in lieu of all other remedies including claims for special or consequential damages. **SELLER NEITHER MAKES NOR ASSUMES ANY OTHER WARRANTY WHATSOEVER, WHETHER EXPRESS, STATUTORY, OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS, AND NO PERSON IS AUTHORIZED TO ASSUME FOR SELLER ANY OBLIGATION OR LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE FOREGOING.**

DECLARATION OF CONFORMITY

Manufacturer: Bird Electronic Corporation
30303 Aurora Road
Cleveland, Ohio 44139-2794

Products: Site Analyzer

Models: SA-2500A

The undersigned hereby declares, on behalf of Bird Electronic Corporation of Cleveland, Ohio, that the above-referenced products, to which this declaration relates, are in conformance with the provisions of the following standards.

- European Standard EN 55011,1998 - Conducted & Radiated Emissions
- European Standard EN 61000-3-2,1995 - Harmonic Emissions
- European Standard EN 61000-4-2,1995 - ESD Immunity
- European Standard EN 61000-4-3,1995 - Radiated RF & EMF Immunity
- European Standard EN 61000-4-4,1995 - Fast Transient & Burst Immunity
- European Standard EN 61000-4-5,1995 - Surge Immunity
- European Standard EN 61000-4-6,1995 - Conducted Immunity
- European Standard EN 61000-4-11,1995 - Voltage Dips & Interruptions

These standards are in accordance with EMC Directive (89/336/EEC). Electrical equipment for measurement, control and laboratory use, EN 61326-1, 1997.

- European Standard EN 61010-1:1993 - Part 1: General Requirements
Including Amendment 2, 1995.

This standard is in accordance with Low Voltage Directive (73/23/EEC), 1973
Including Amendment (93/68/EEC), 1993

The technical documentation file required by this directive is maintained at the corporate headquarters of Bird Electronic Corporation, 30303 Aurora Road, Cleveland, Ohio 44139



Bob Gardiner
Director of Quality
Bird Electronic Corporation