PUBLIC SAFETY
SITE ANALYZER™

CABLE AND ANTENNA TESTER
FOR WIRELESS SYSTEMS

OPERATING INSTRUCTIONS

Electronic Corporation
Cleveland (Solon) Ohio USA

Instruction Book Part Number 920-7002A170S Rev. A

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 72 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 µs. 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 HACERIO.

WARTUNG

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

ZUR VERMEIDUNG GEFÄHRLICHE, ELEKTRISCHE SCHOCKS, SIND WARTUNGSARBEITEN AUSSCHLIEßLICH VON QUALIFIZIERTEM SERVICEPERSONAL DURCHZUFÜHREN.

ENTRENTIEN

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 EFFETTUARRE ALCUNA RIPARAZIONE A MENO CHE QUALIFICATI A FARLA.

About This Manual

This manual covers the Bird SA-1700 and SA-1700-P Public Safety Site Analyzers.

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.

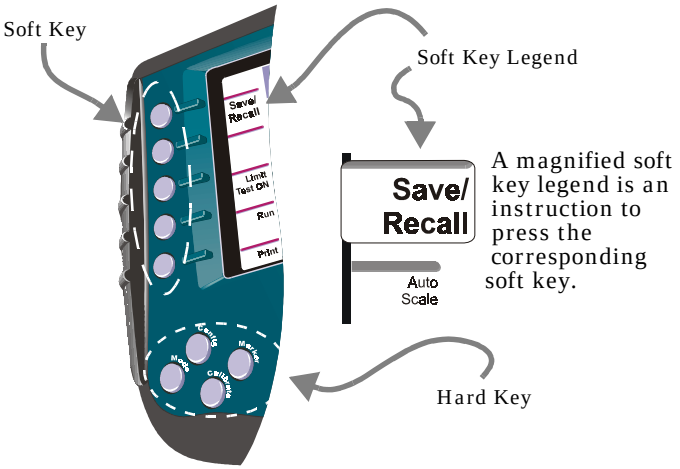
Quick Start and Reference Card

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 — 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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Chapter 1 Introduction

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 Card (Not Shown)

Items Not Supplied

- Calibration Combination

- Bird 5010 Directional Power Sensor

- Bird 5011 Terminating Power Sensor

Site Analyzer Features

General

- Easy to operate and field ready for first-time, occasional, and experienced users.
- High-resolution color display.
- Field replaceable Li-ion battery.
- Automatic power down conserves battery life.
- Operates in temperatures as low as 14°F (–10°C)

Antenna Test

- Rejects on-channel interfering signals to +13 dBm.
- Stores up to 12 setups.
- Adjustable pass/fail limit line with visual indicator.
- Stores up to 250 sets of measurement data in raw format to facilitate conversion between Measure Match (Sweep) and Fault Location (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 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 on or off and to move the active marker.

3. Numeric Keys — Enters 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/0 (On/Off) — Turns the instrument on and off. The key must be pressed for at least one-half (½) second.

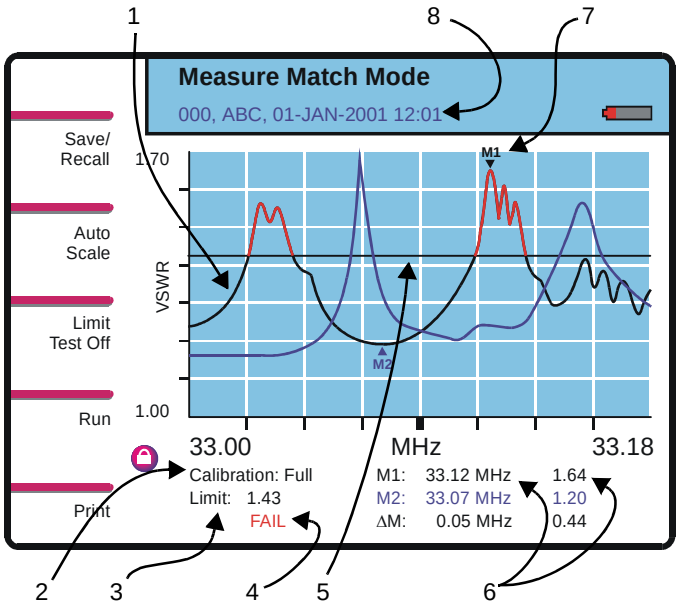
Connection Description

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

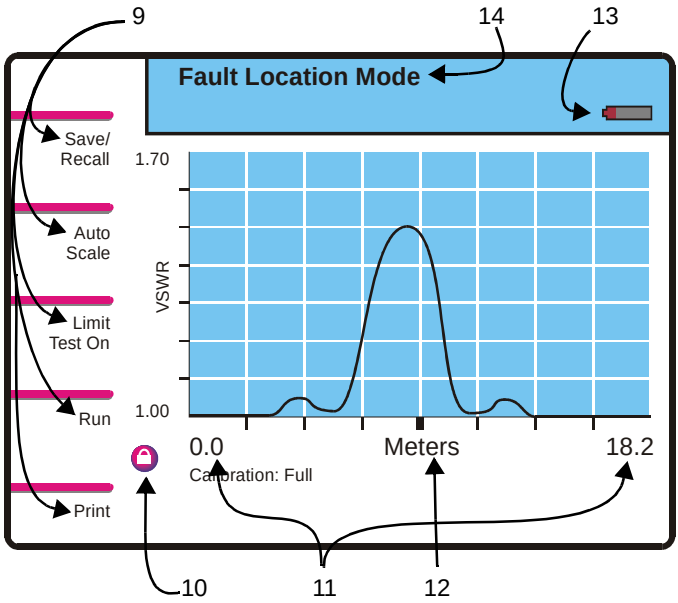
Antenna Test Port	Standard N-type female connector. Use a phase-stable armored cable to connect the Site Analyzer to the antenna. Optional Test Port Extension Cables and adapters are listed in the Accessory Guide Brochure.
Parallel Printer Port	25-pin (DB25) parallel connector. Connect the Site Analyzer 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

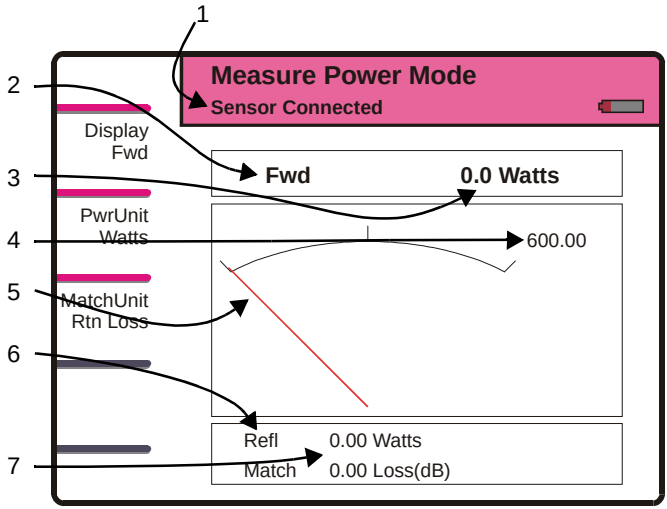


Fault Location Sample Display



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.

Measure Power Sample Display



1.	**Sensor Status**	Indicates the connection status of the 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 measurements not displayed on the dial.
7.	**Secondary Value**	Numeric display of 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 ¼ charge the gauge also displays "LO". When using an external power source, a power cord symbol replaces the battery gauge.

Adapters

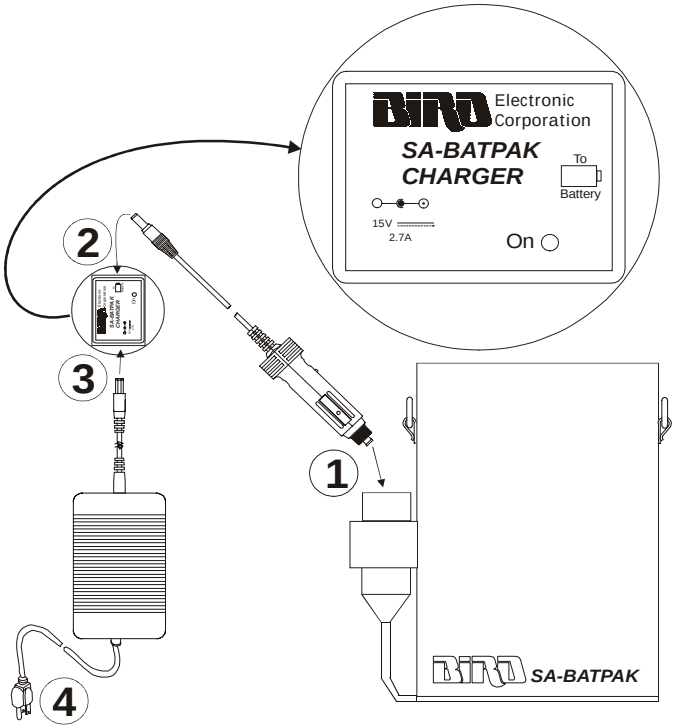
The Bird Site Analyzer can be operated using an ac adapter or a 12V automobile cigarette lighter adapter. Using these will also charge the internal battery.

> 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 83.

Self Test

A self test is run at power up. If the test fails, see “Troubleshooting” on page 90 for instructions. If the problem persists, return the unit for service.

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

Model SA-1700, 25 - 1700 MHz

SN: 00000000

25 Nov 2002

System Information

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

Frequency — ex: 33.00 – 33.18 MHz (emergency band)

Cable Type — ex: LDF 7-50A

Approximate Cable Length — ex: 300 feet

Transmitter Power — ex: 50 W

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

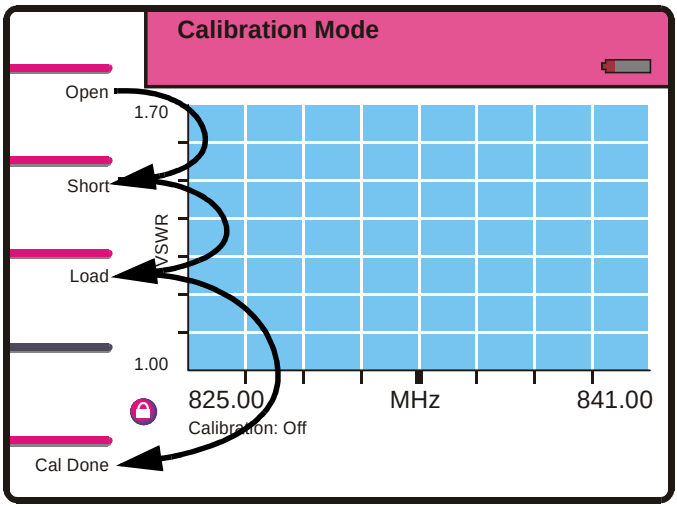
Test Cable (optional) – Phase-stable for reliable, consistent results.

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

Calibrating

☞ NOTE: For best results, calibrate the Site Analyzer immediately before taking measurements.

Press key from either Measure Match or Fault Location mode

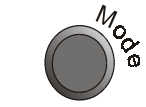


- Press the **CALIBRATE** key.
- Attach the open standard.
  Press the ***OPEN*** key.
  Wait for a “beep” and for the trace to scroll before continuing.
- Attach the short standard.
  Press the ***SHORT*** key.
  Wait for a “beep” and for the trace to scroll before continuing.
- Attach the load standard.
  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.

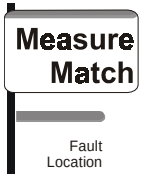
Chapter 4 Measure Match Mode

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.

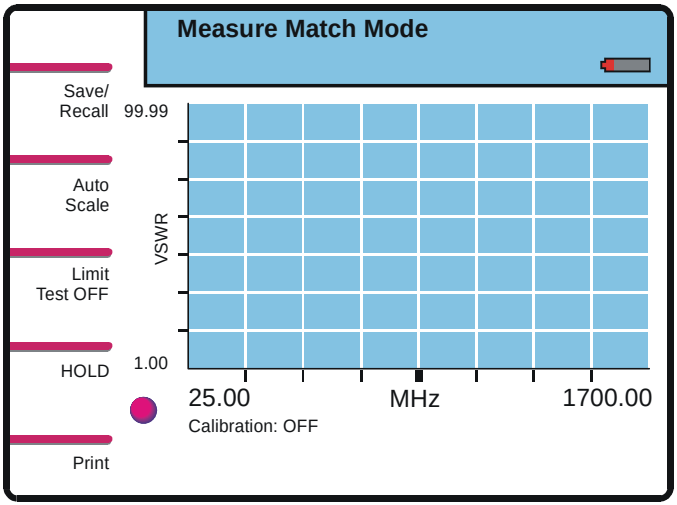
☞ NOTE: For best results, set the frequency and calibrate the Site Analyzer immediately before taking measurements.



Press the Mode key



Press from Select Mode



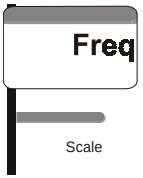
Setting the Frequency

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”.

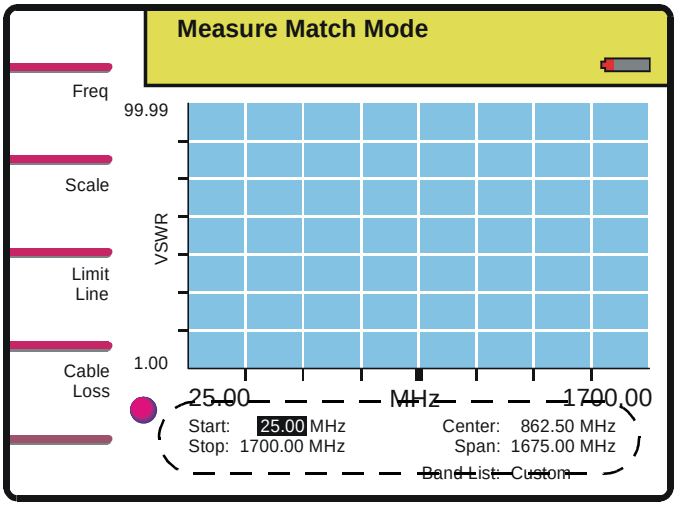
☞ NOTE: Changing the frequency settings will automatically turn calibration off. Always set the frequency before calibrating the unit.

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

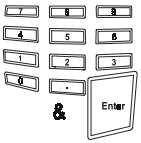
Press from Measure Match Mode



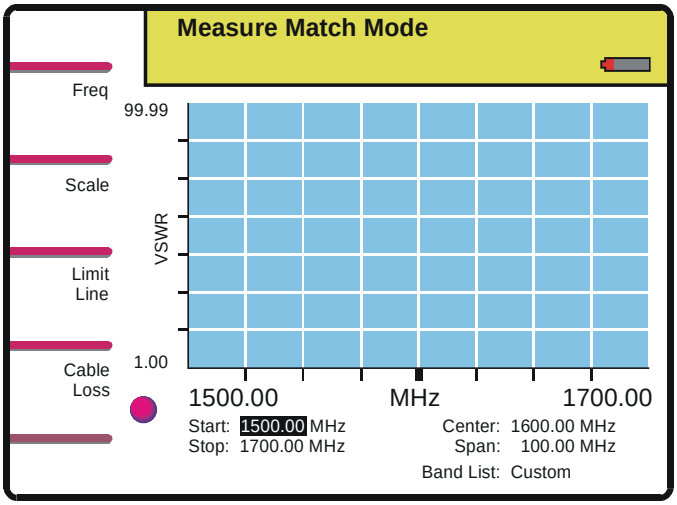
Press to display the frequency settings



Scroll to Start, Stop, Center, or Span



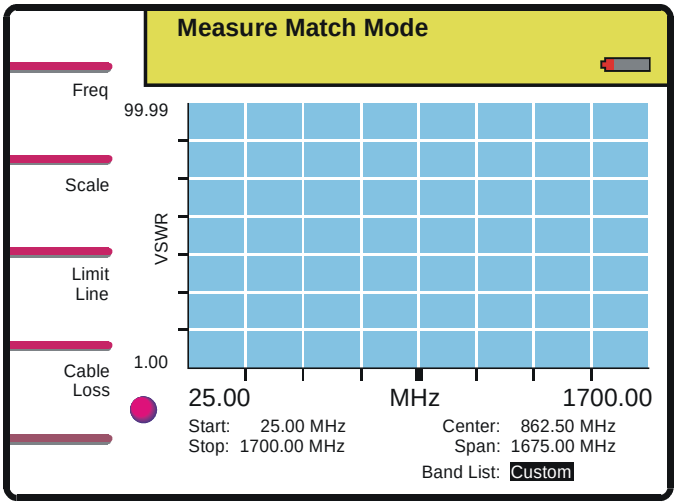
Enter a new value



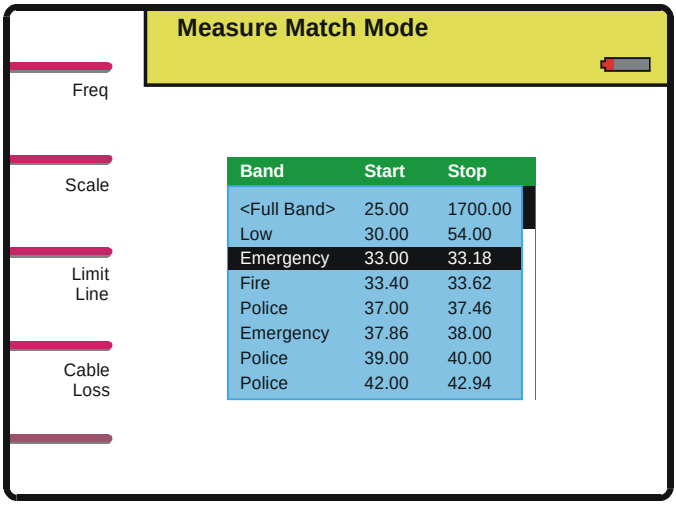
Band List

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.

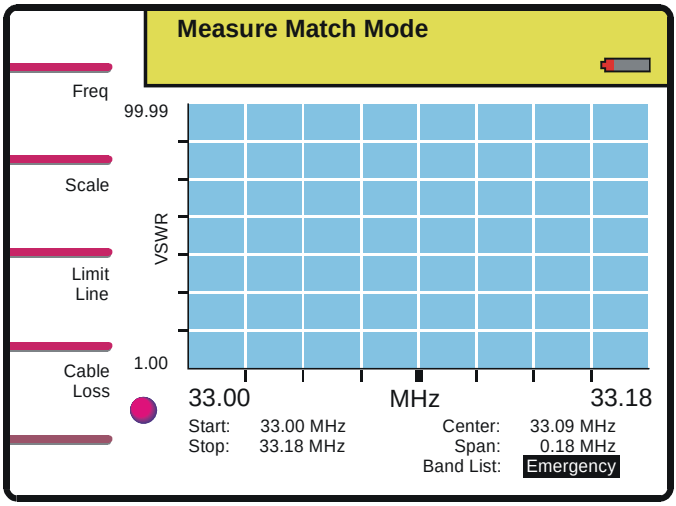
Scroll to Band List



Display the band list and select a frequency band



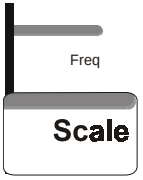
Activate the selected band



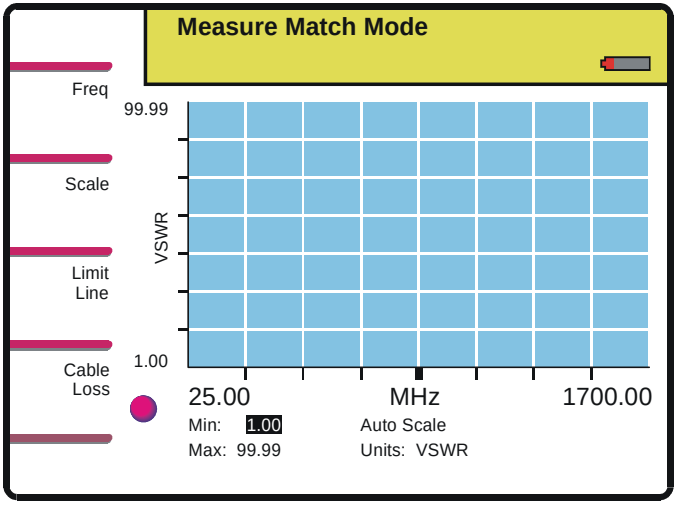
Setting the Scale & Unit of Measure

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].

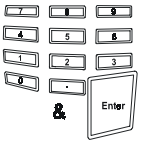
Press from Measure Match Mode



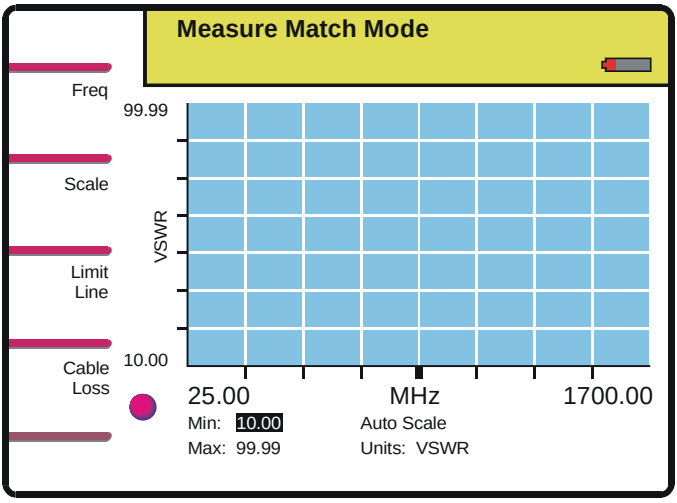
Press to display the scale settings



Scroll to Min or Max



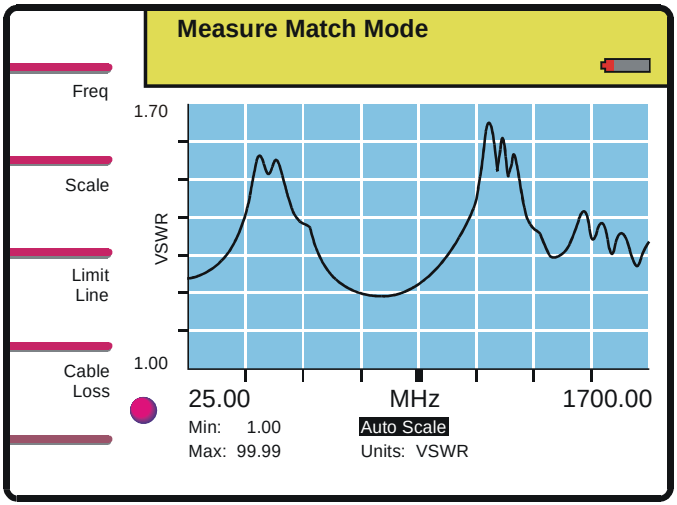
Enter a new value



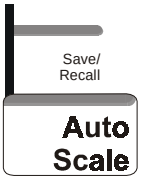
Auto Scale Auto Scale automatically sets the display scale so that the entire trace is displayed.

Scroll to Auto Scale

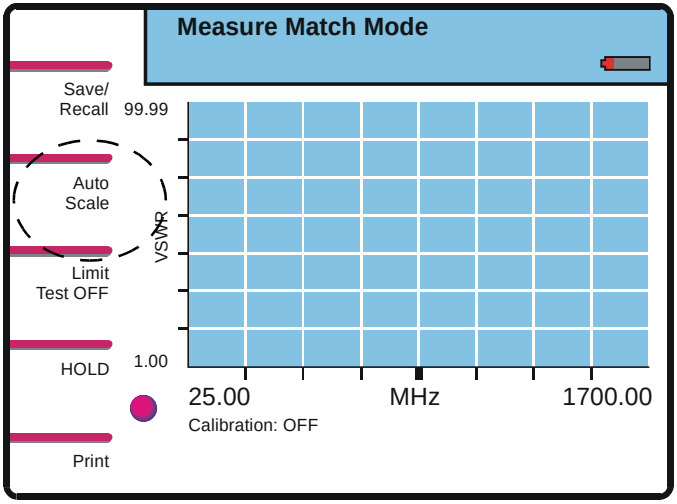
Activate Auto Scale



Auto Scale can also be activated from the main screen.

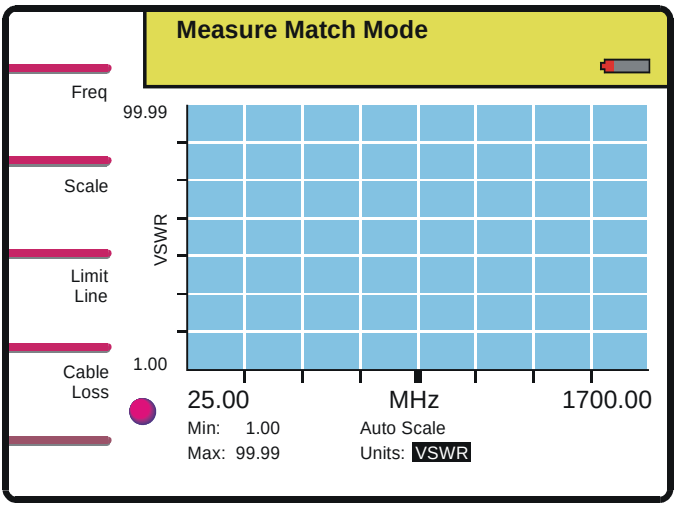


Press from Measure Match Mode

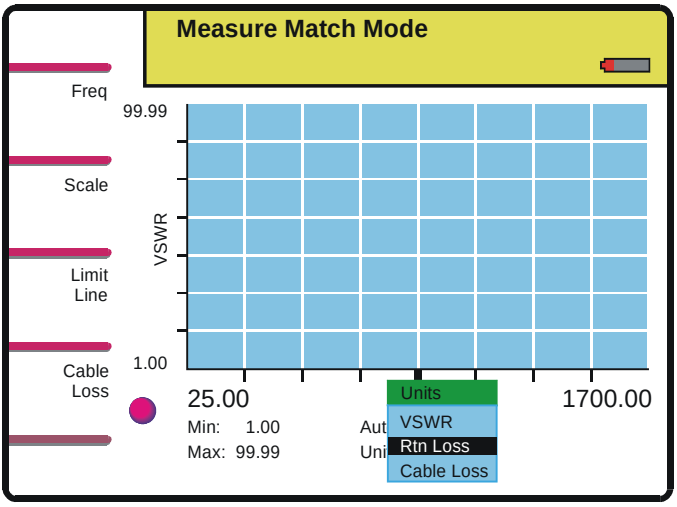


Setting Units

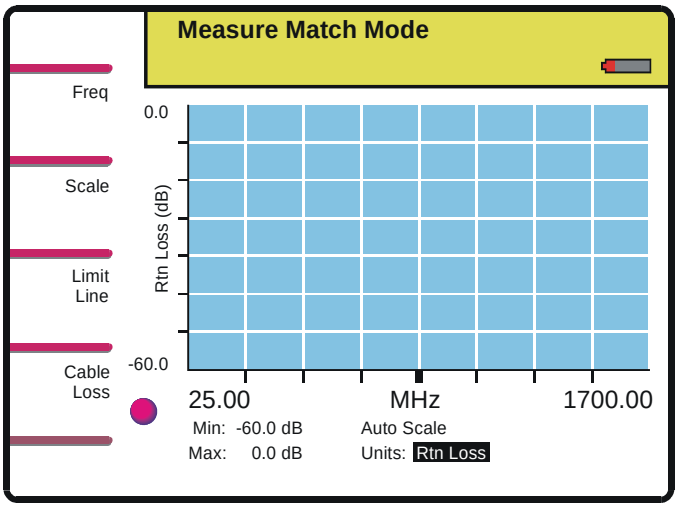
Scroll to Units



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



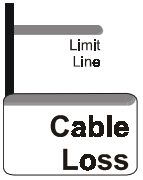
Activate the selected unit



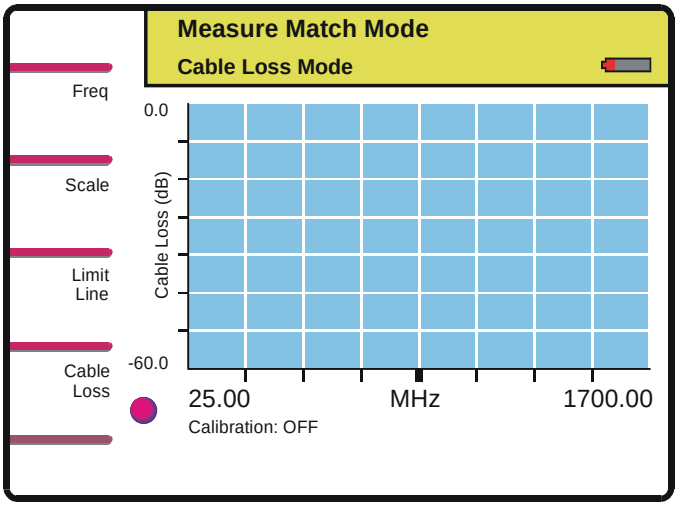
Cable Loss Measurements

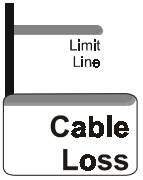
To measure cable loss, the cable being tested should have an open on the far end.

Press from Measure Match Mode

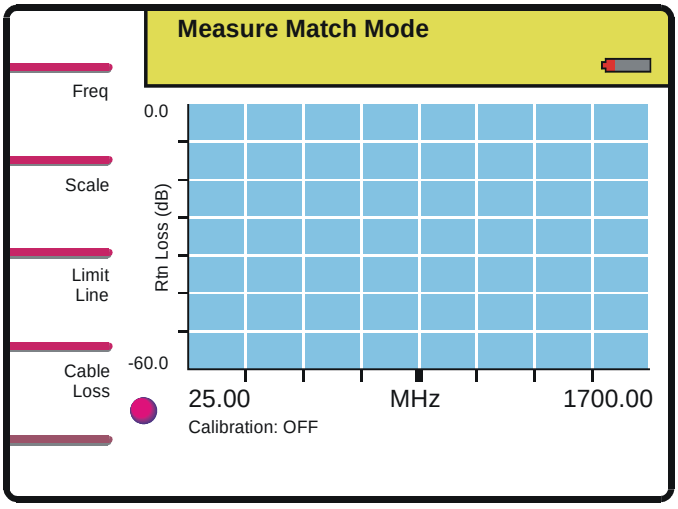


Press to activate Cable Loss





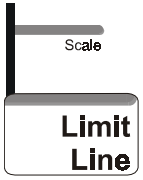
Press to deactivate Cable Loss



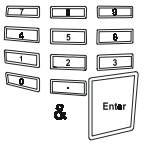
Limit Line

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

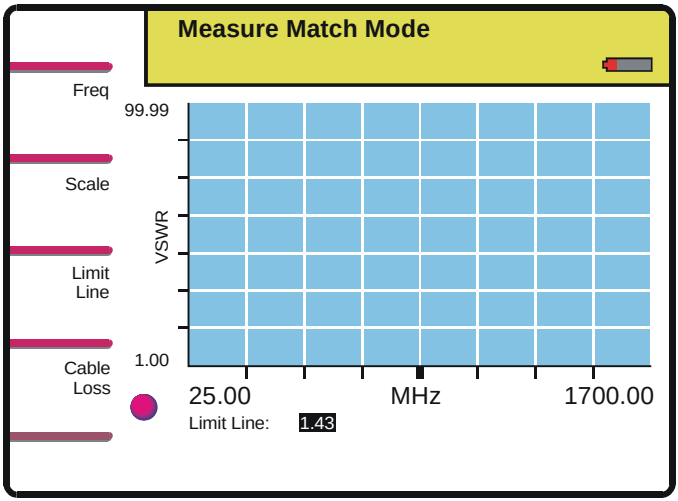
Press from Measure Match Mode



Press to display the limit line value

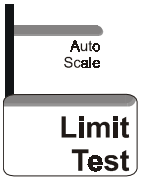


Enter a new value



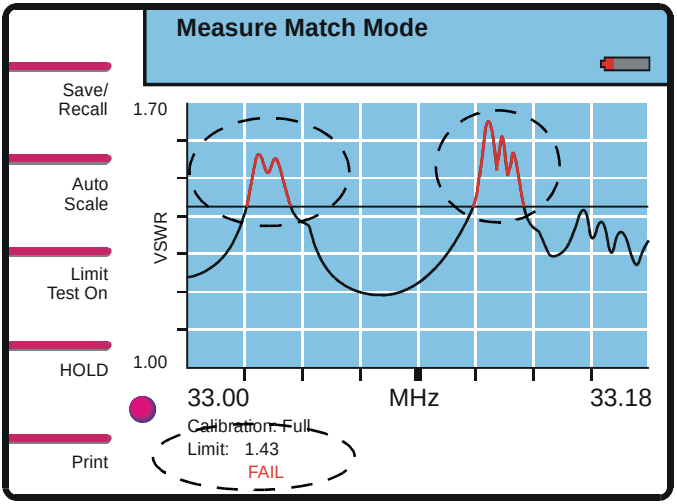
Limit Test

Limit Test compares the trace to the limit line.



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.

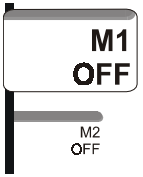
Test Audio — as Test On. In addition, the Site Analyzer will beep if any part of the trace exceeds the limit value.

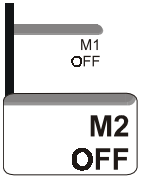
Marker Adjustment

Press from Measure Match Mode

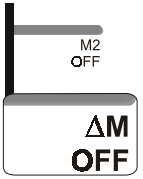
Markers indicate VSWR to 0.01, or Return or Cable Loss to 0.1 dB. The exact values of M1, M2, and the delta marker (difference of M1 and M2) are displayed at the bottom of the screen.

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

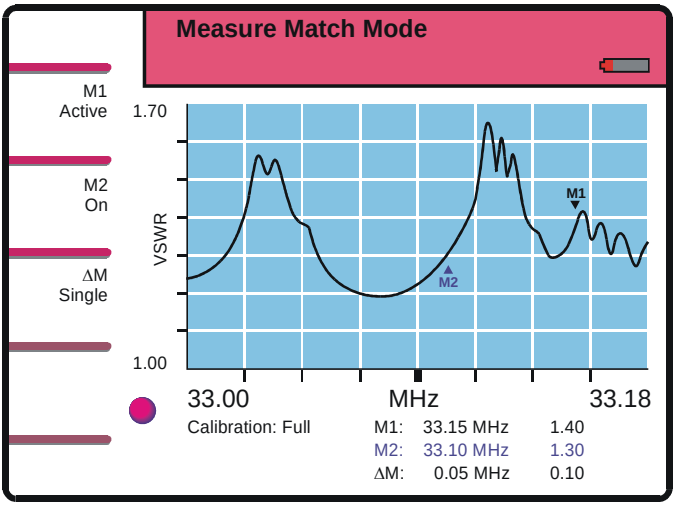




Toggle between Off, On, and Active



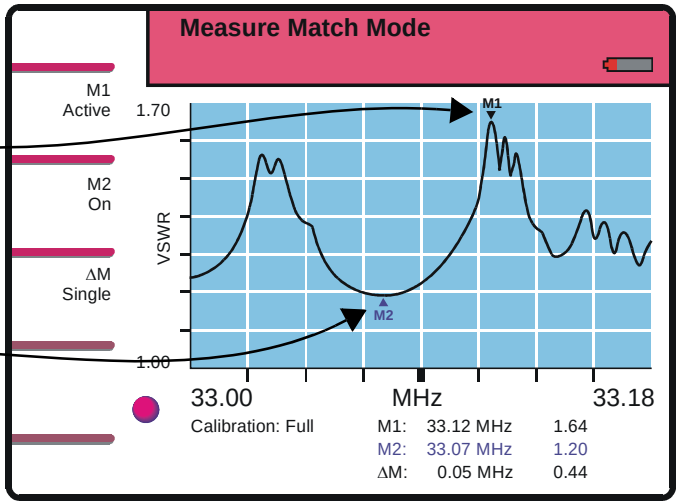
Toggle between Off and Single



Move across the trace

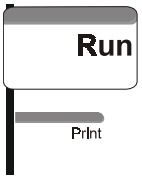
Locate the highest point of the trace

Locate the lowest point of the trace



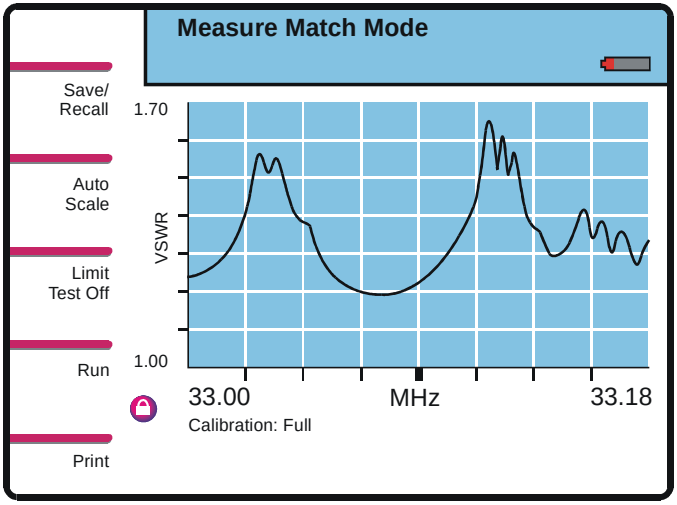
Measurement Hold

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.



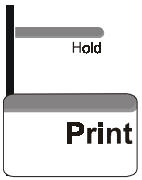
Press from Measure Match Mode

Toggle between Run and Hold



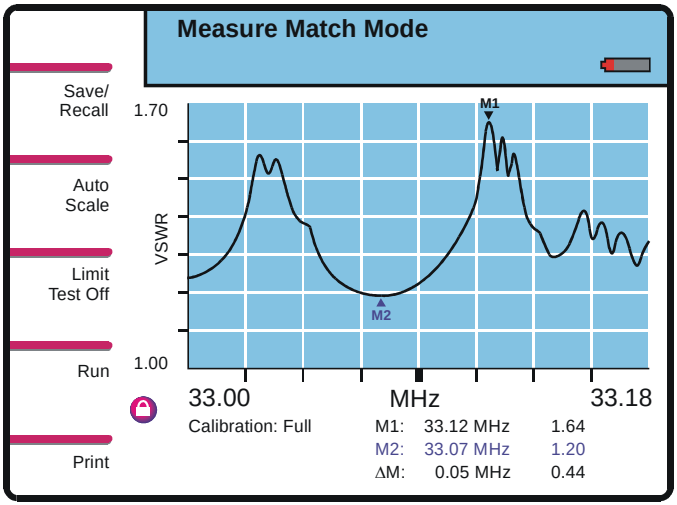
Printing

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

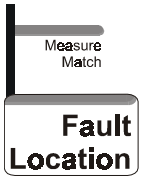
Prints the information on the screen



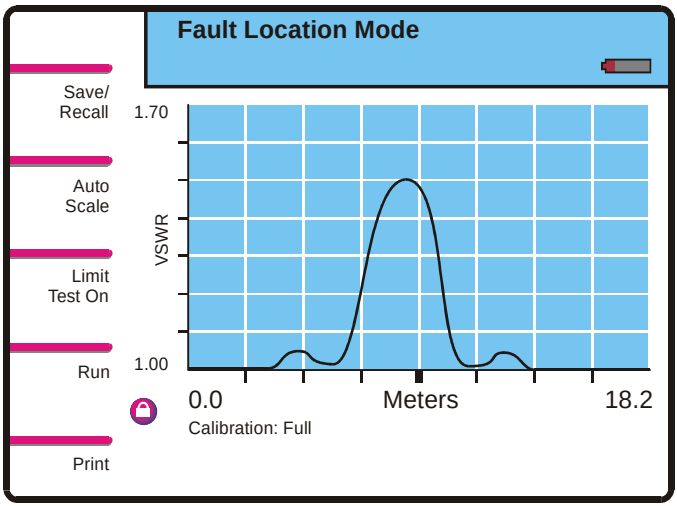
This measurement identifies the position of impedance discontinuities (faults) within the antenna/feeder system. The measurement results are displayed on an x-y graph. Distance from the Site Analyzer is shown on the x-axis, while relative magnitude of the discontinuity is shown on the y-axis.

☞ NOTE: For best results, set the frequency span, the cable type, and calibrate the Site Analyzer immediately before taking measurements.

Press the Mode key



Press from Select Mode



Setting the Frequency Span

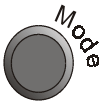
The frequency span and relative propagation velocity determine the maximum distance at which distance-to-fault measurements can be taken. For best results, use the table below to select the frequency span which matches the length and propagation velocity of the cable under test.

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

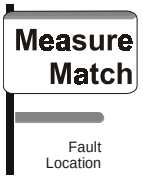
Table 1: Fault Location Distance and Resolution

Velocity Percentage	66 %				88 %			
Freq Span (MHz)	Distance		Resolution		Distance		Resolution	
	m	ft	cm	in	m	ft	cm	in
25	938.5	999.9	396.0	50.6	999.9	999.9	421.9	50.6
50	469.3	999.9	198.0	50.6	625.7	999.9	264.0	50.6
75	312.8	999.9	132.0	50.6	417.1	999.9	176.0	50.6
100	234.6	769.8	99.0	39.0	312.8	999.9	132.0	50.6
200	117.3	384.9	49.5	19.5	156.4	513.2	66.0	26.0
300	78.2	256.6	33.0	13.0	104.3	342.1	44.0	17.3
400	58.7	192.5	24.8	9.7	78.2	256.6	33.0	13.0
500	46.9	154.0	19.8	7.8	62.6	205.3	26.4	10.4
600	39.1	128.3	16.5	6.5	52.1	171.1	22.0	8.7
700	33.5	110.0	14.1	5.6	44.7	146.6	18.9	7.4
800	29.3	96.2	12.4	4.9	39.1	128.3	16.5	6.5
900	26.1	85.5	11.0	4.3	34.8	114.0	14.7	5.8
1000	23.5	77.0	9.9	3.9	31.3	102.6	13.2	5.2
1200	19.6	64.2	8.3	3.2	26.1	85.5	11.0	4.3
1400	16.8	55.0	7.1	2.8	22.3	73.3	9.4	3.7
1600	14.7	48.1	6.2	2.4	19.6	64.2	8.3	3.2
1675	14.0	46.0	5.9	2.3	18.7	61.3	7.9	3.1

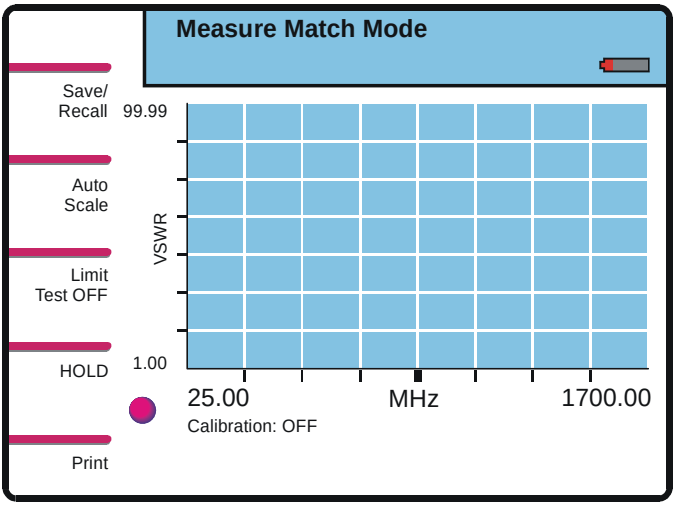
For example, for a cable with a dielectric constant of 2.296, the velocity percentage is 66%. If the cable is 100 feet long, then the Site Analyzer should be set to a frequency span of 700 MHz. The resolution of the graph will be 5 inches.



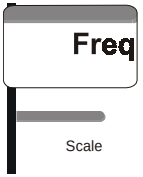
Press the Mode key



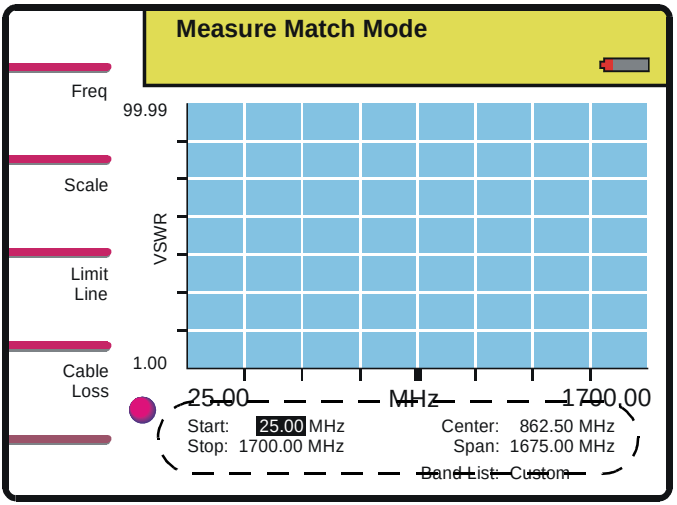
Press from Select Mode



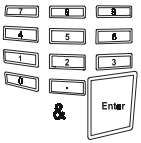
Press the Config key



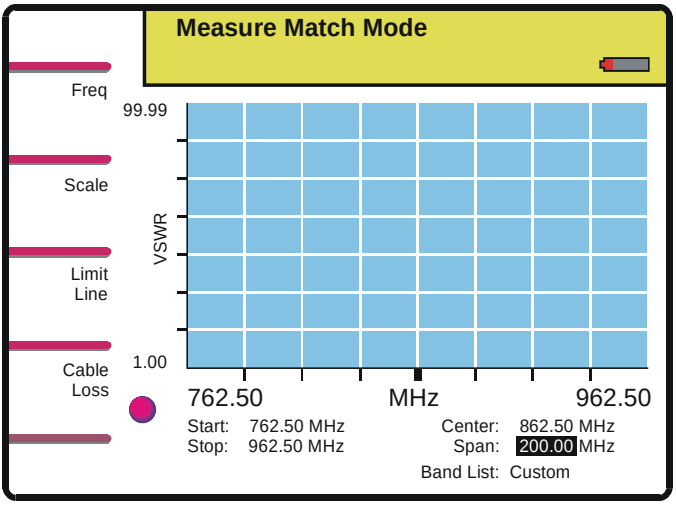
Press to display the frequency settings



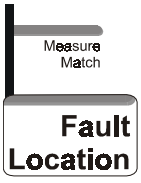
Scroll to the Span value



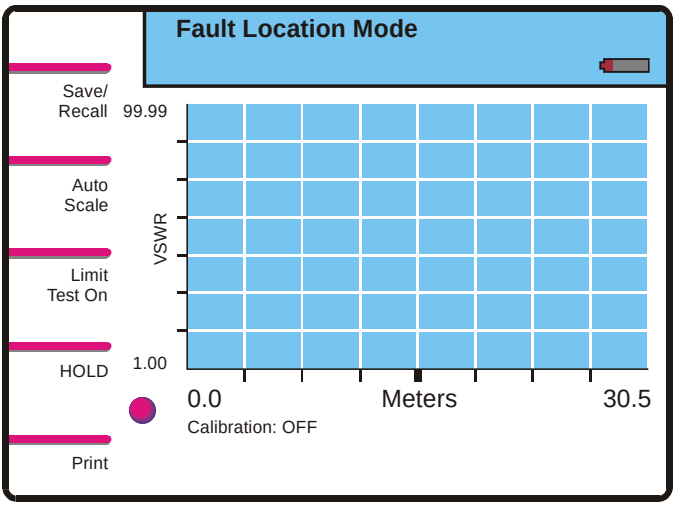
Enter the value from Table 1



Press the Mode key



Press from Select Mode



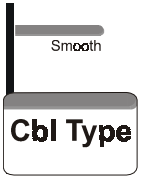
If you enter a span greater than the current settings allow, the span will be set to the maximum possible value. In this case, set the center frequency to 862.5 MHz, the center of the SA-1700's range, and try to set the span again.

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”.

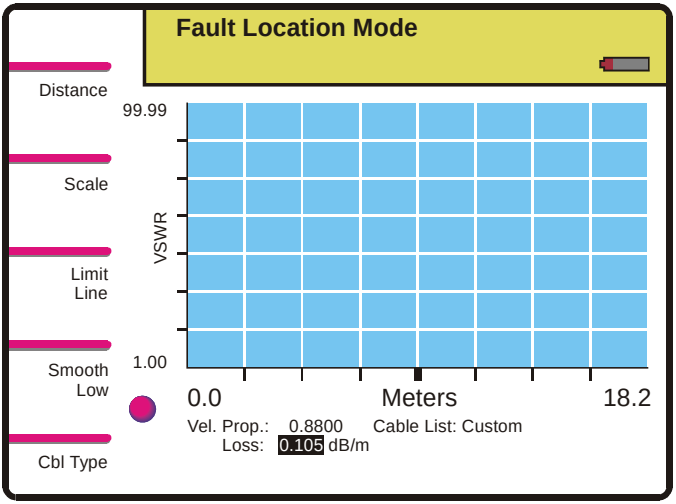
☞ NOTE: Changing the cable type or velocity of propagation will reset the distance scale to the maximum possible distance. Always set the cable type before setting the distance scale.

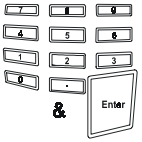
Press from Fault Location Mode



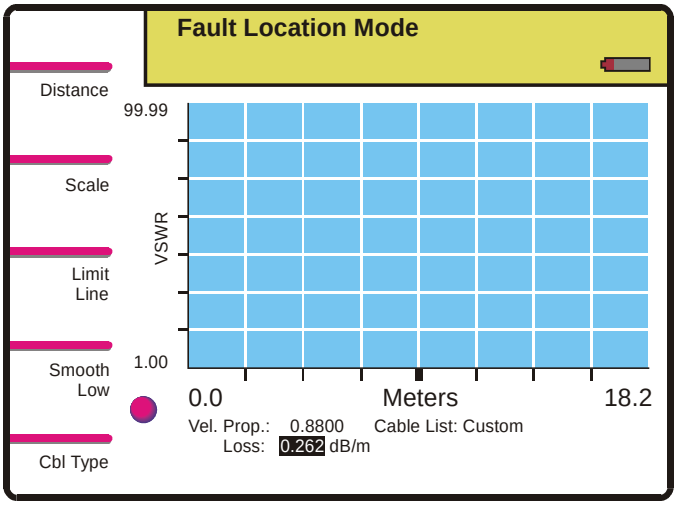
Press to display the cable settings

Scroll to Velocity of Propagation or Loss





Enter a new value

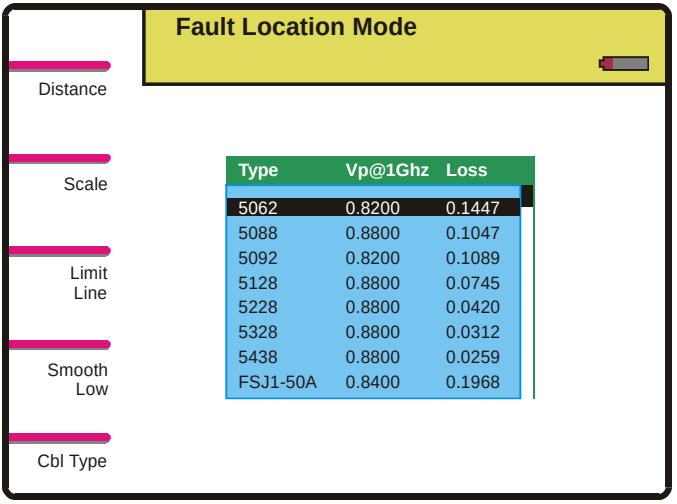


Cable List

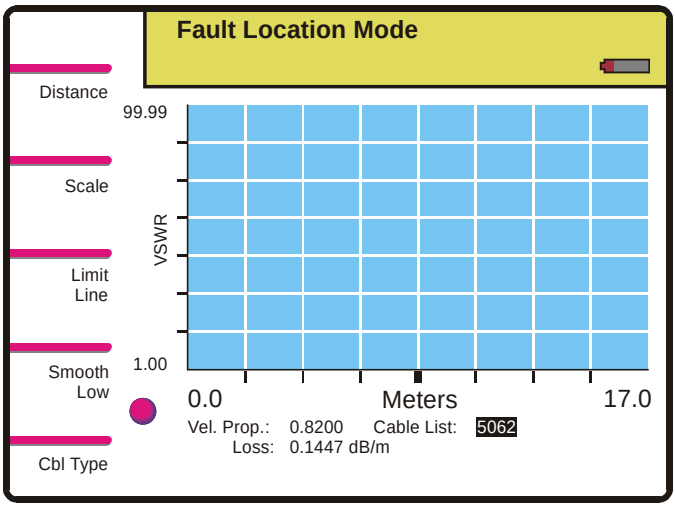
The cable list pop-up menu contains cable presets. Using a preset is quick, easy, and sets test parameters while eliminating a possible source of operator error.

Scroll to Cable Type

Display the cable list and select a cable



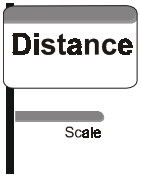
Activate the selected cable



Setting the Distance

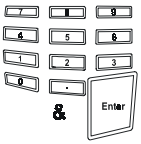
The maximum possible Stop Distance is determined by the frequency span. (See Table 1 on page 34)

Press from Fault Location Mode

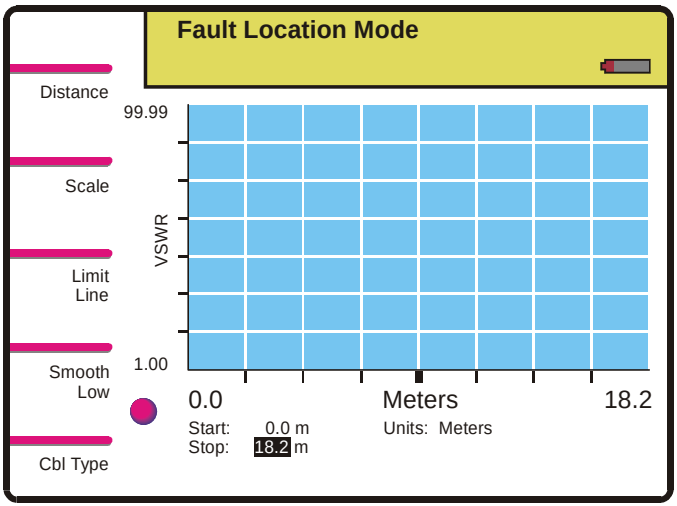


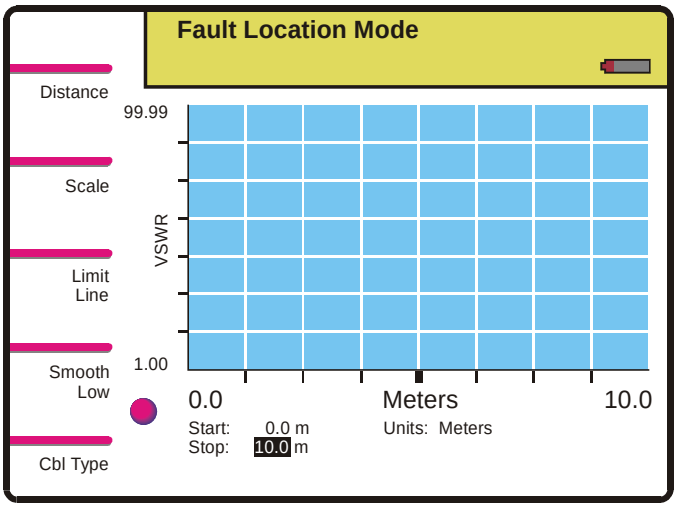
Press to display the distance settings

Scroll to Start or Stop



Enter a new value

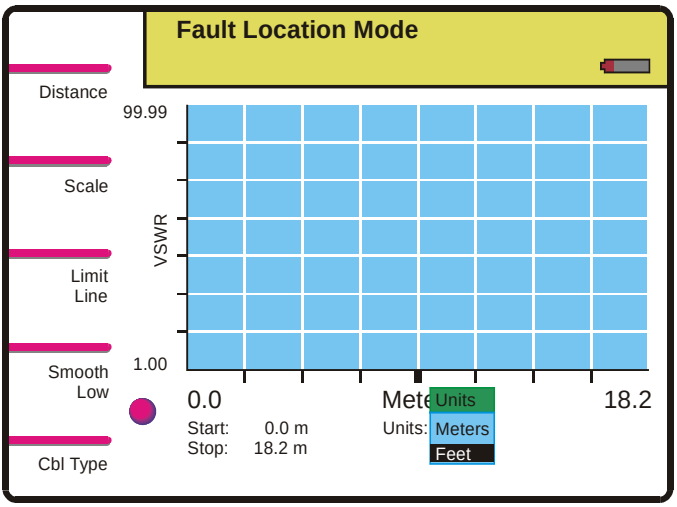




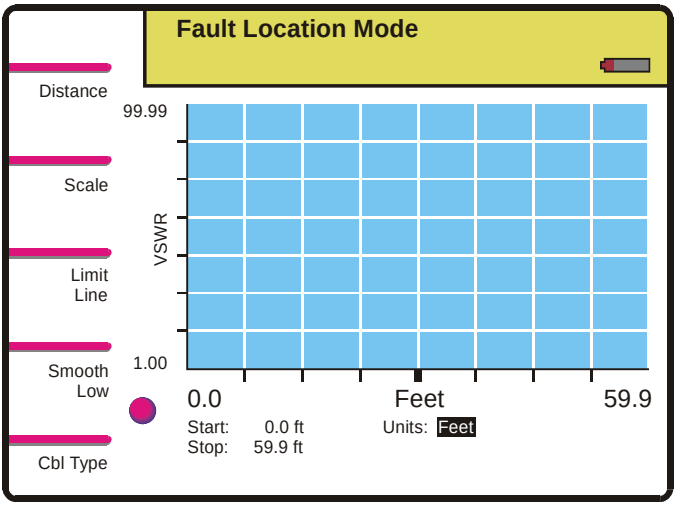
Setting Units

Scroll to Units

Display the units list and select Meters or Feet



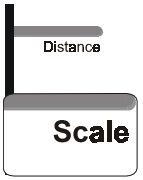
Activate the selected unit



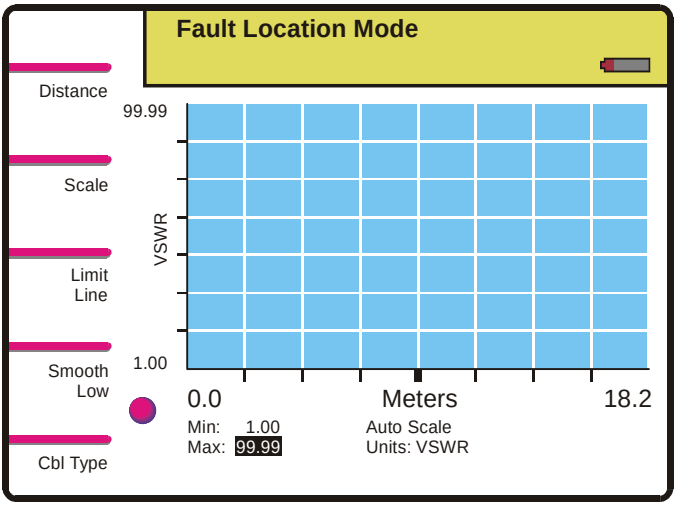
Setting the Scale & Unit of Measure

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

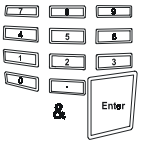
Press from Fault Location Mode



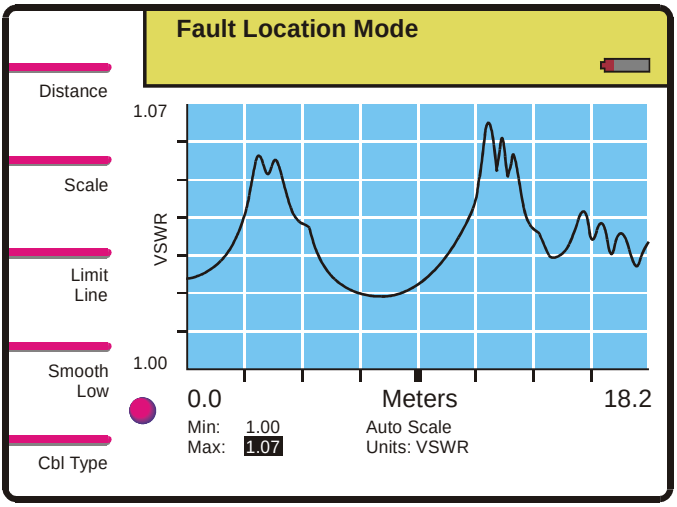
Press to display the scale settings



Scroll to Min or Max



Enter a new value

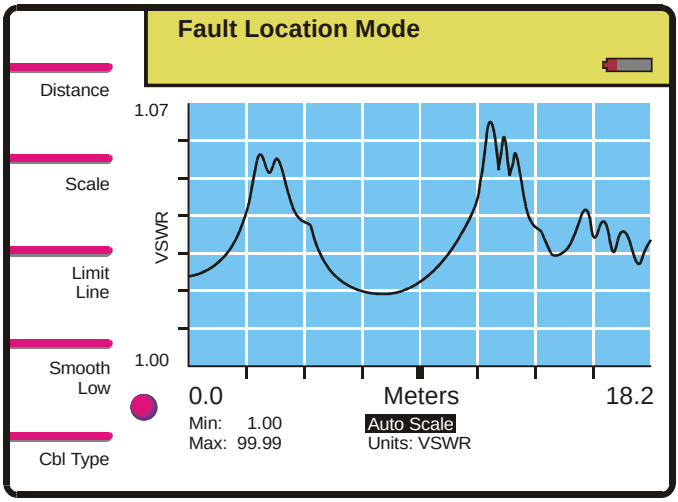


Auto Scale

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

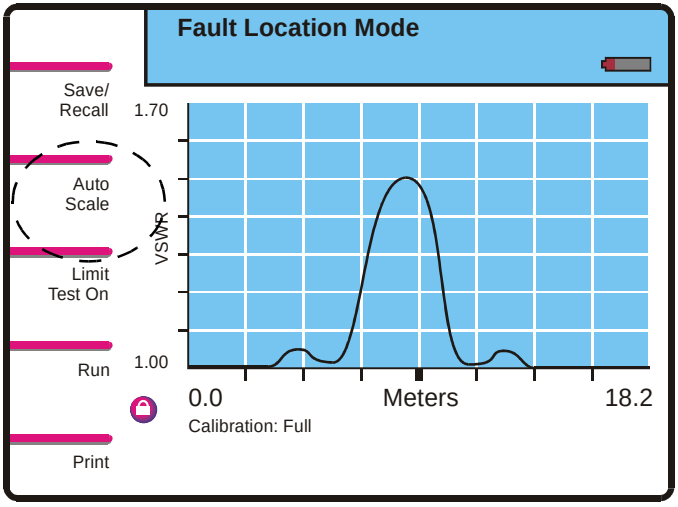
Scroll to Auto Scale

Activate Auto Scale



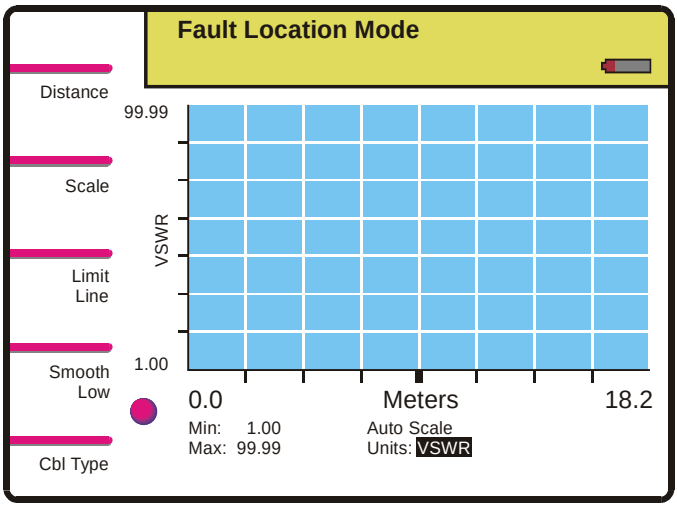
Auto scale can also be activated from the main screen.

Press from Fault Location Mode

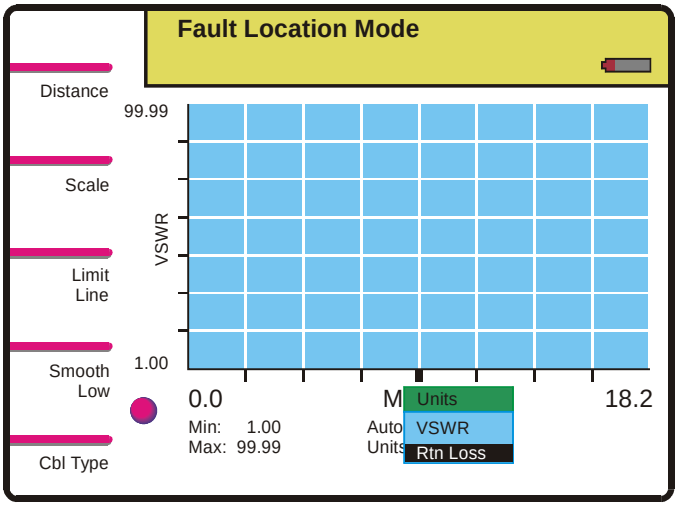


Setting Units

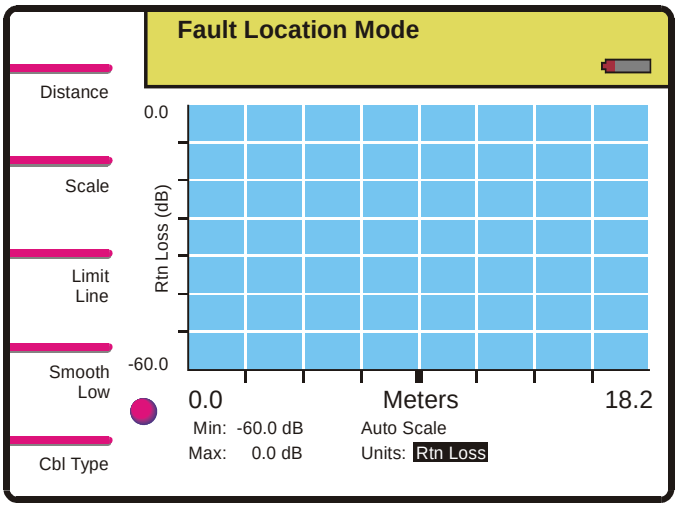
Scroll to Units



Display the units list and select VSWR or Return Loss



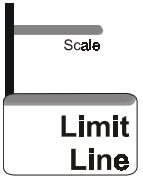
Activate the selected unit



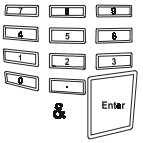
Limit Line

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

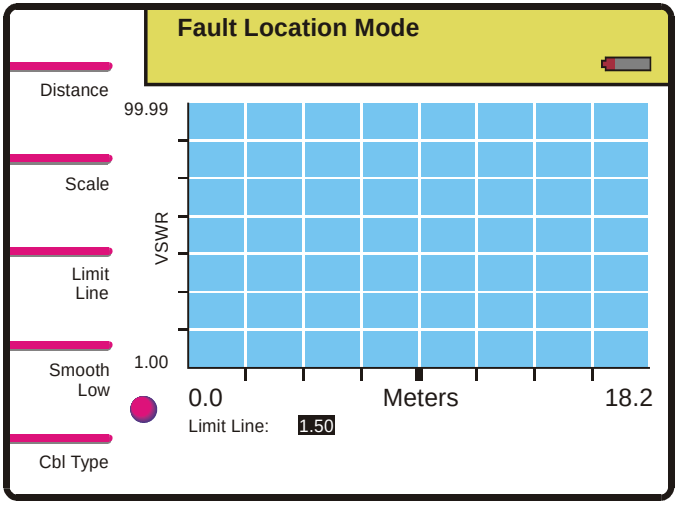
Press from Fault Location Mode



Press to display the limit line value

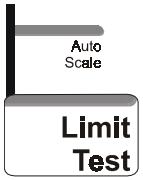


Enter a new value



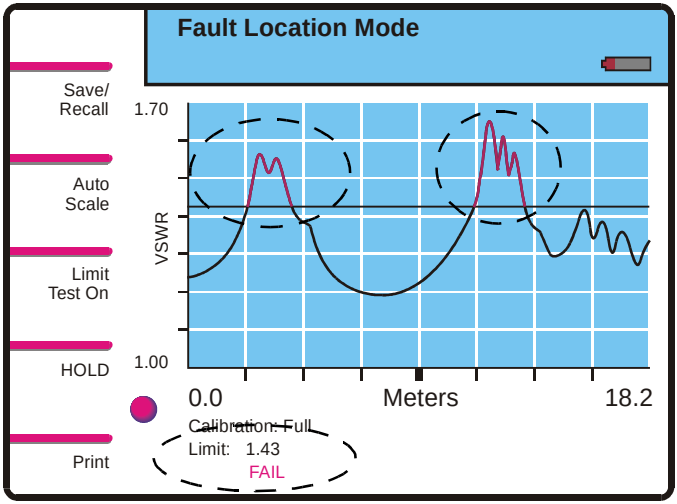
Limit Test

Limit Test compares the trace to the limit line.



Press from Fault Location 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.

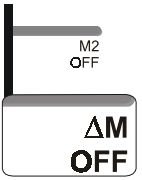
Marker Adjustment

Press from Fault Location Mode

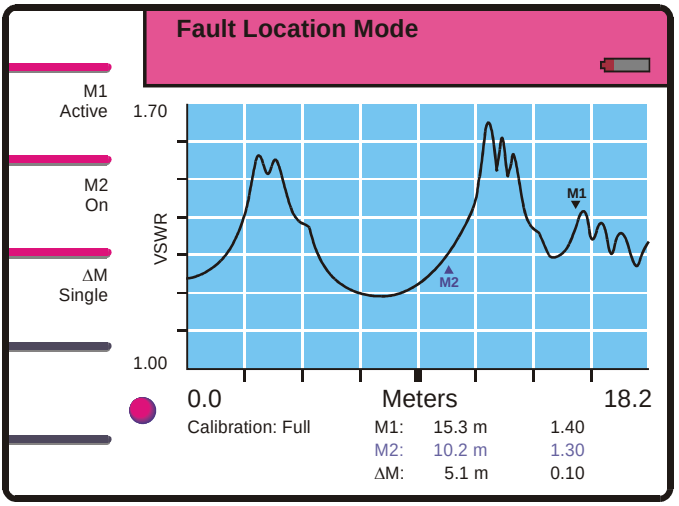
Markers indicate VSWR to 0.01, or Return Loss to 0.1 dB. The exact values of M1, M2, and the delta marker (difference of M1 and M2) are displayed at the bottom of the screen.

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

Toggle between Off, On, and Active



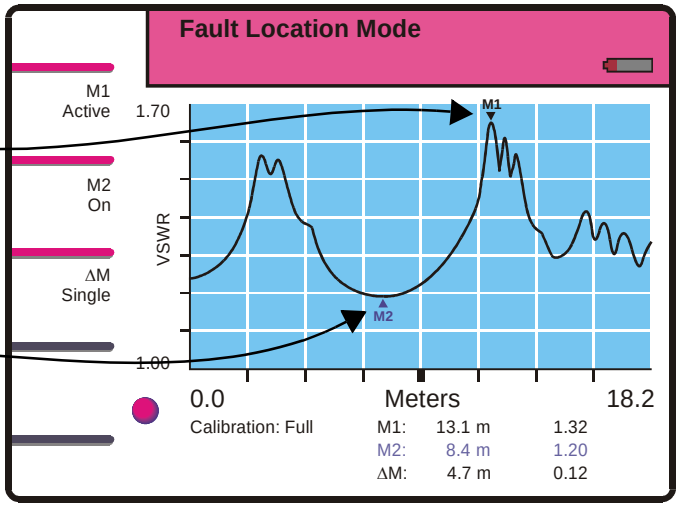
Toggle between Off and Single



Move across the trace

Locate the highest point of the trace

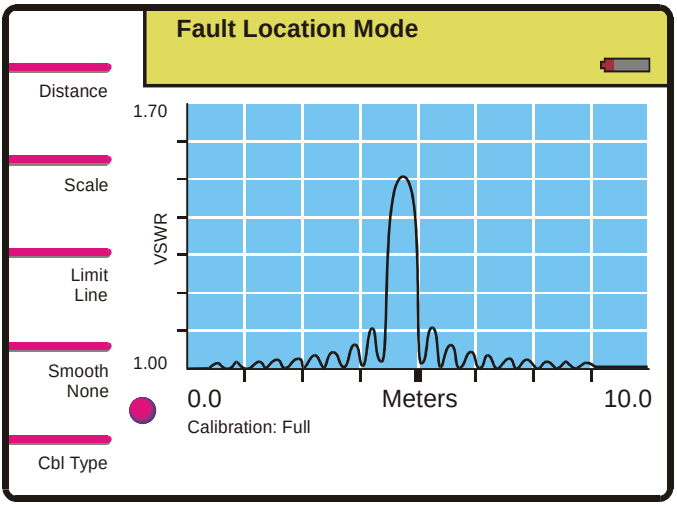
Locate the lowest point of the trace

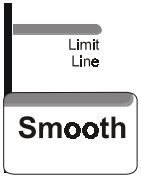


Smooth

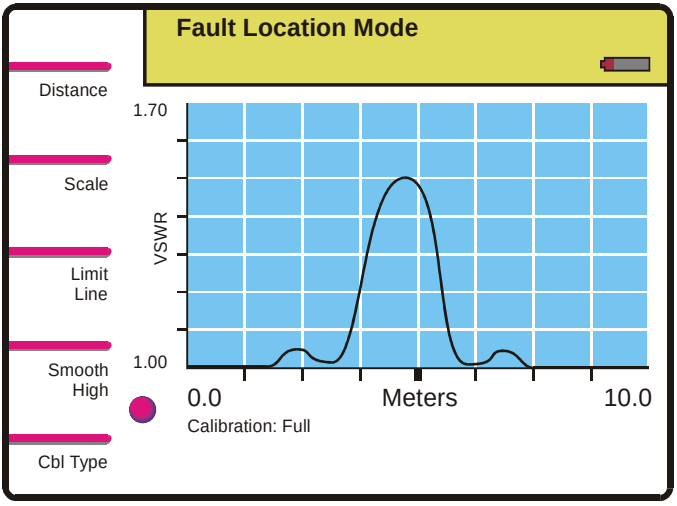
Smooth is an option that will digitally average the displayed trace. Three levels of smooth are available.

Press from Fault Location Mode



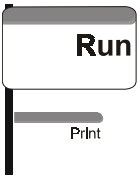


Toggle between None, Low, Medium, and High



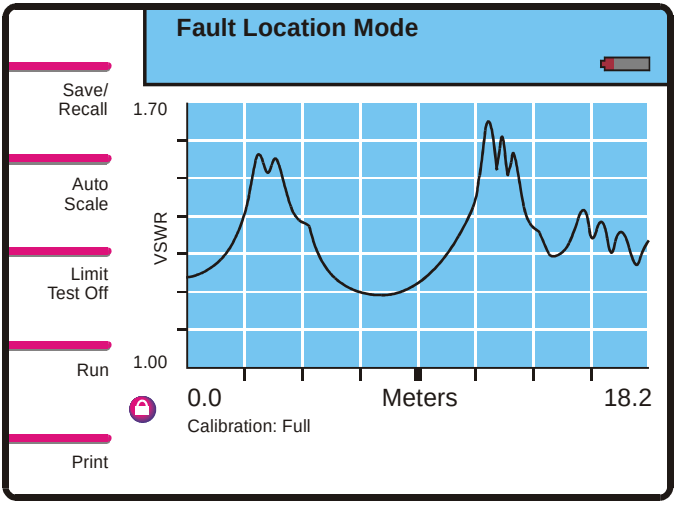
Measurement Hold

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.



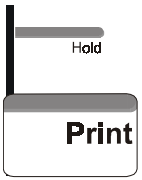
Press from Fault Location Mode

Toggle between Run and Hold



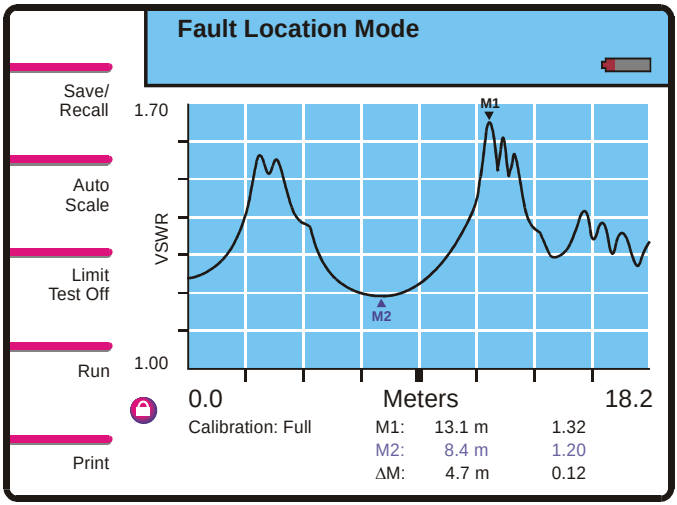
Printing

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

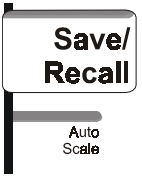


Press from Fault Location Mode

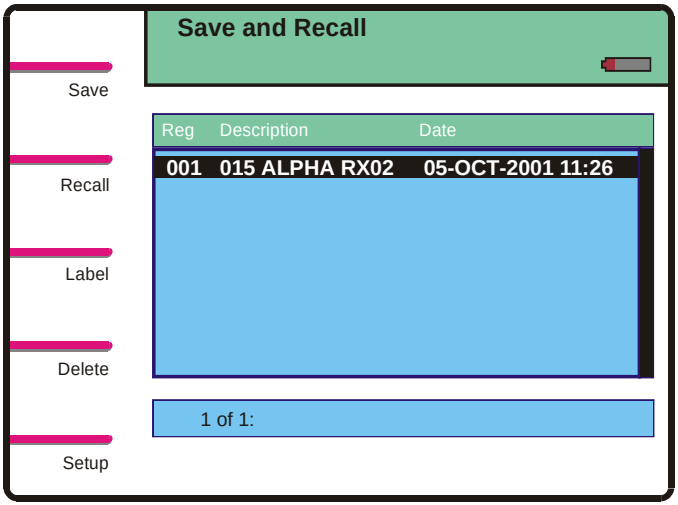
Prints the information on the screen



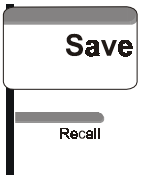
Traces and setups can be stored in nonvolatile memory, along with descriptive labels and a time-date stamp.



Press from Measure Match or Fault Location Mode

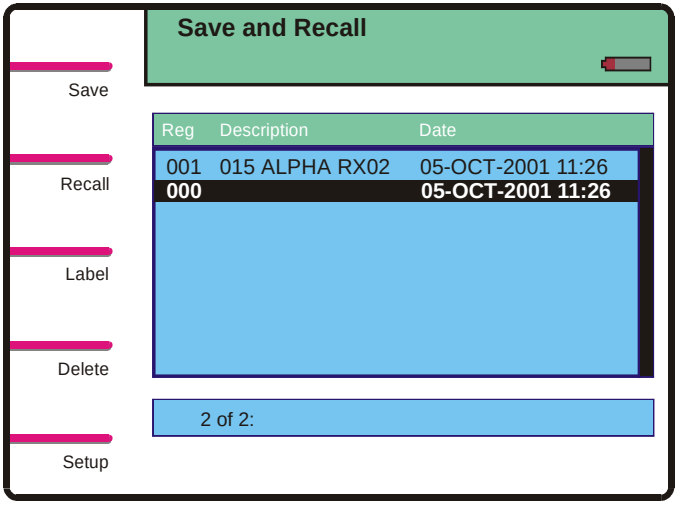


Save Trace

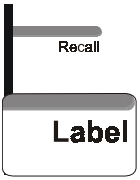


Press from Save and Recall

The trace is saved

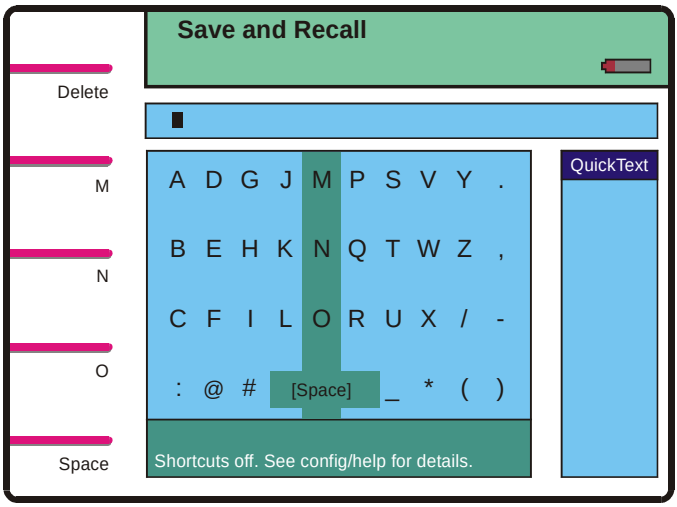


Trace Label



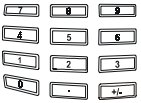
Press from Save and Recall

The Label menu is displayed

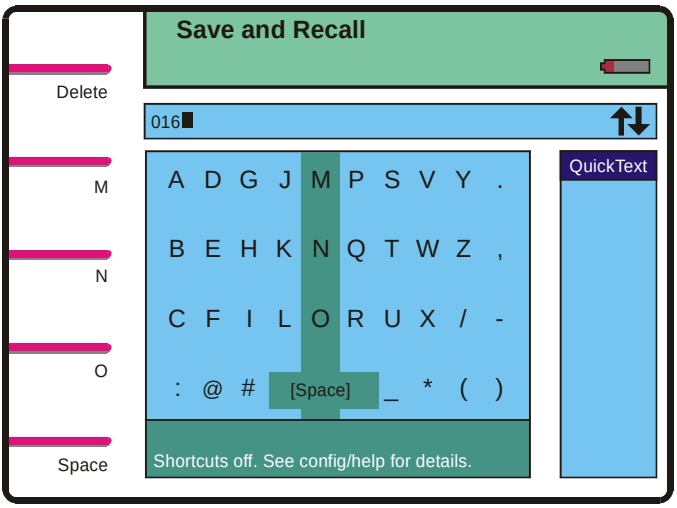


Entering Numbers

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.



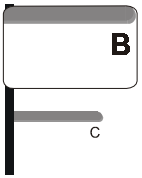
Enter numbers using the number pad.



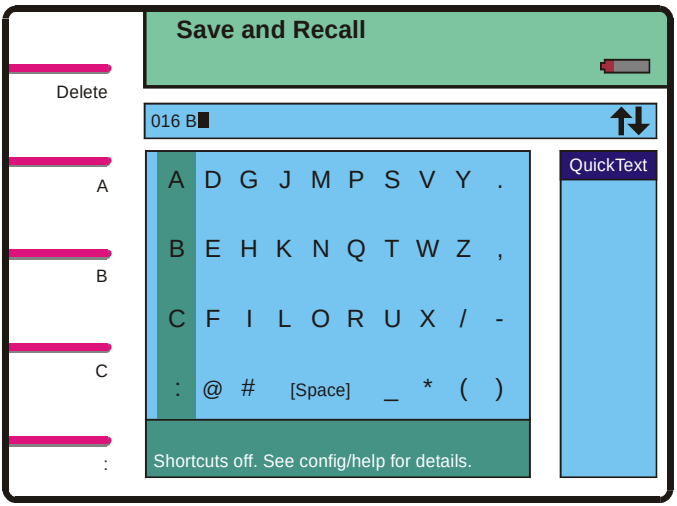
Entering Letters

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

Scroll to a column

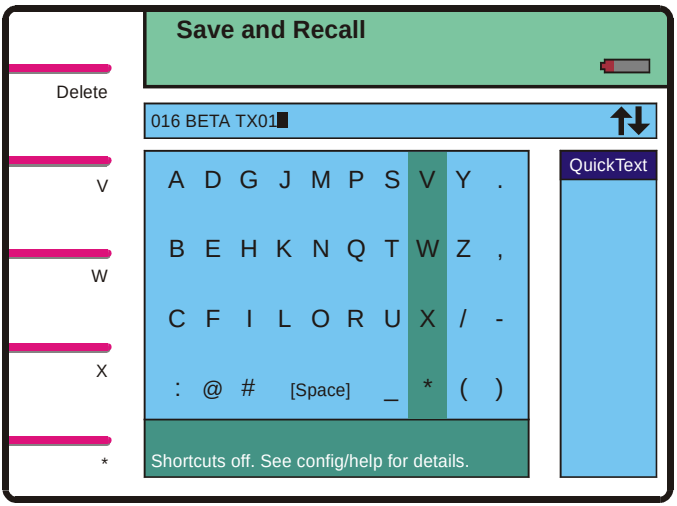


Press to enter a letter, symbol, or space



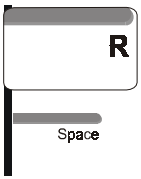
Changing Labels

The label should be RX01, not TX01

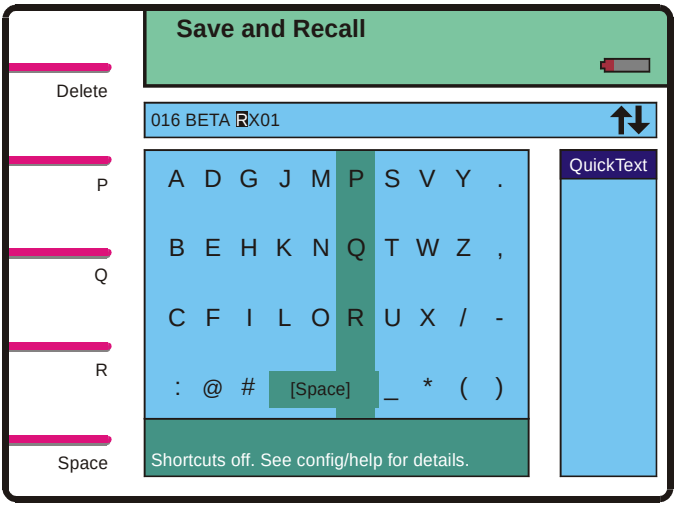


Scroll to the text to be changed

OR



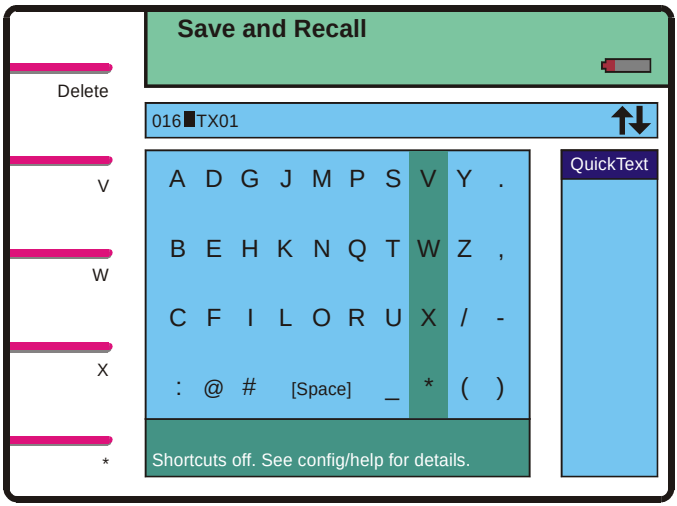
Press to replace the character under the cursor



Deleting Labels

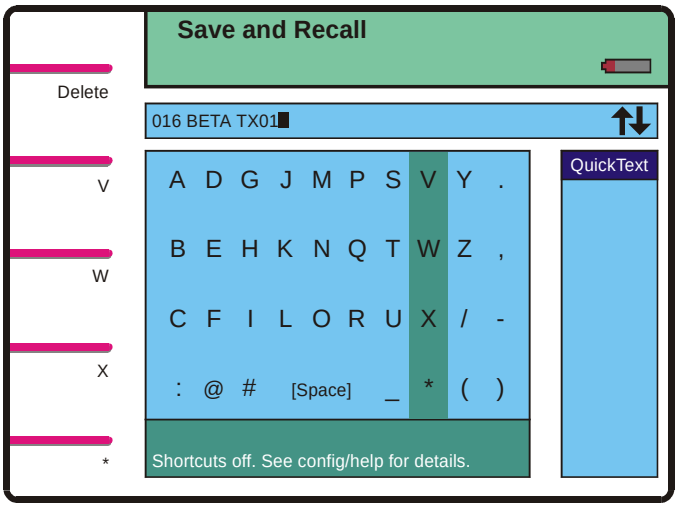
Scroll to the text to be deleted

Press to delete the character to the left of the cursor

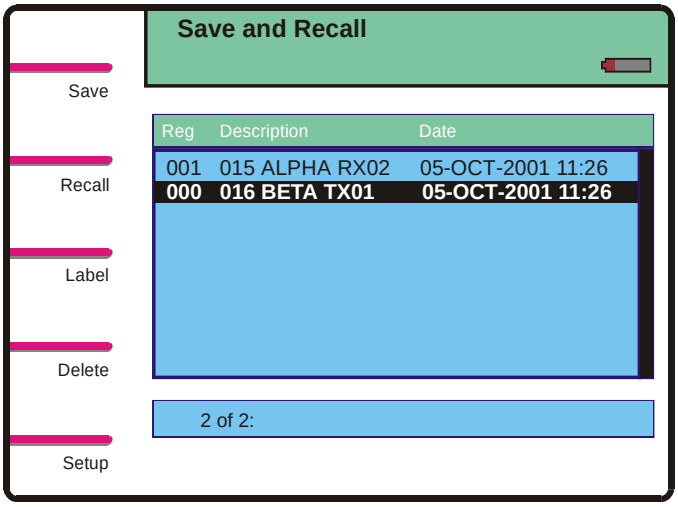


Saving Labels

A complete label



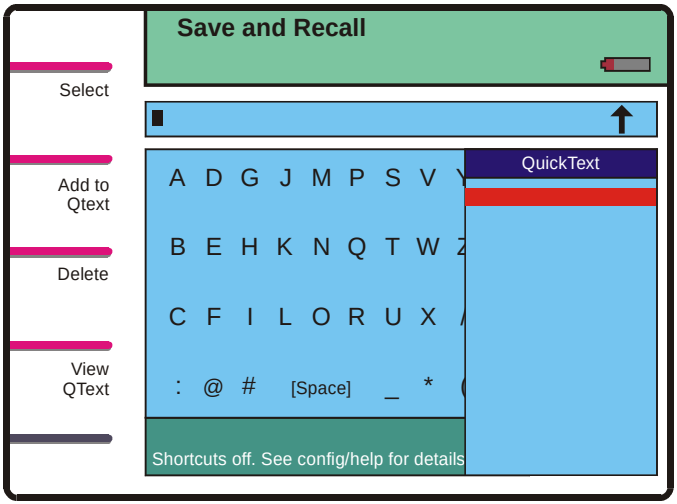
Save the label



Trace Label Quicktext

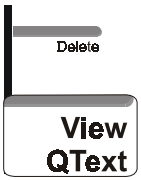
Store commonly used label elements in the Quicktext to speed label entry.

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

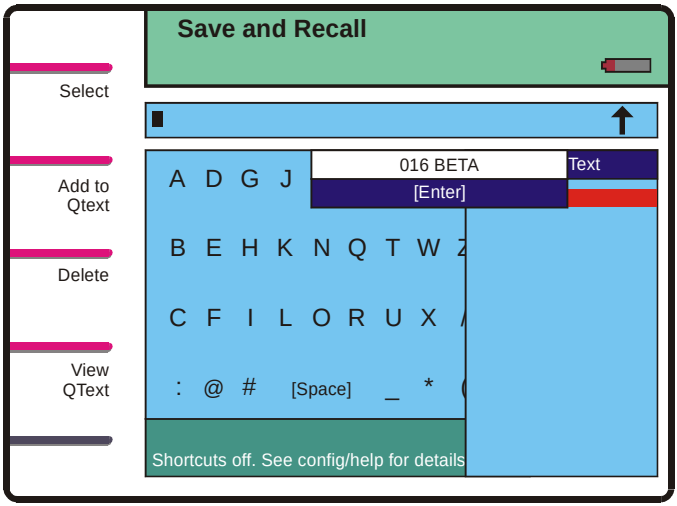


View Quicktext

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

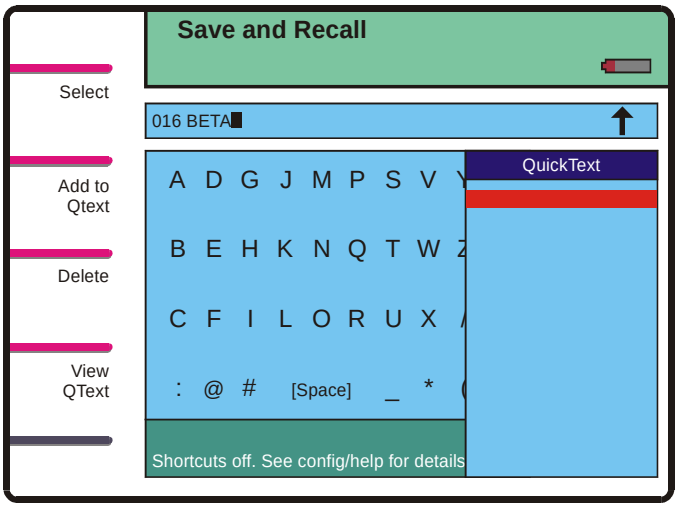


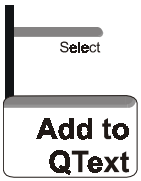
Press to view the full Quicktext entry



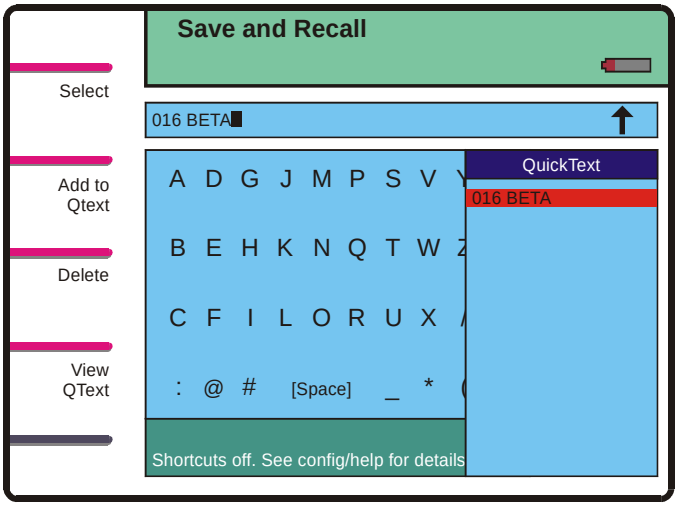
Create Quicktext

Enter text into the label, then activate Quicktext



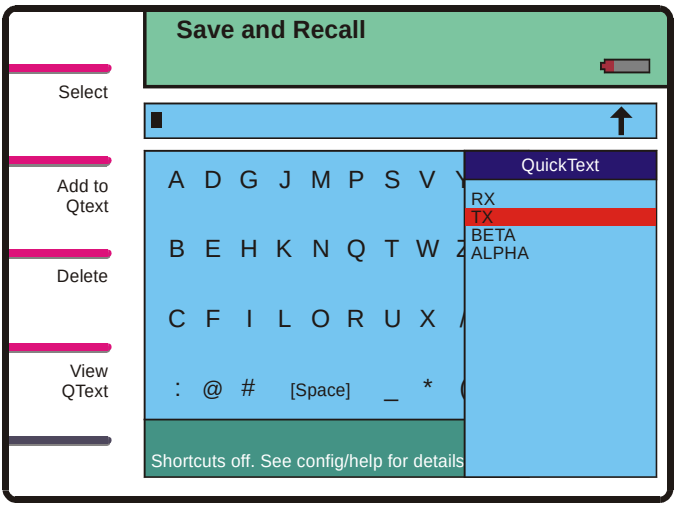


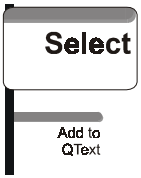
Press to store the label contents in QuickText



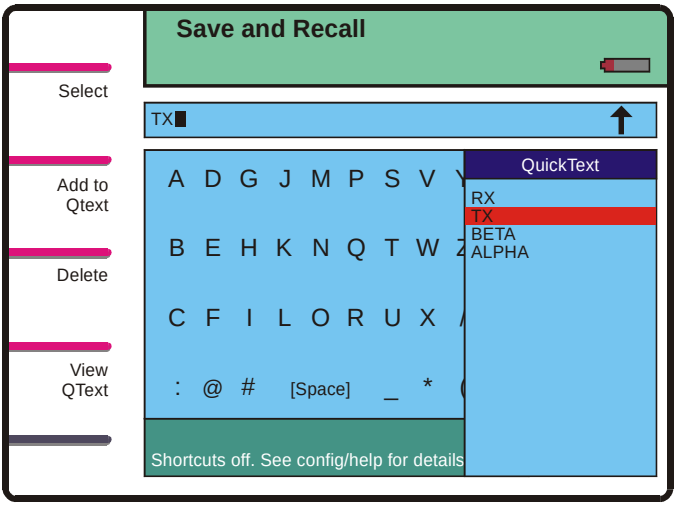
Use Quicktext

Scroll to a Quicktext entry



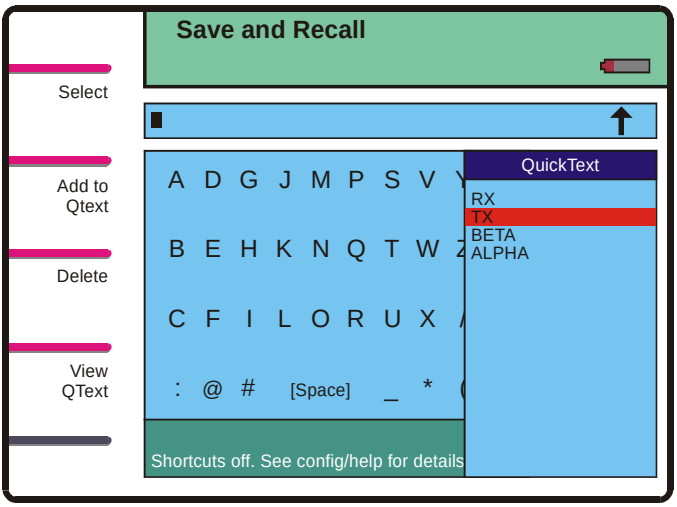


Press to insert the Quicktext at the cursor

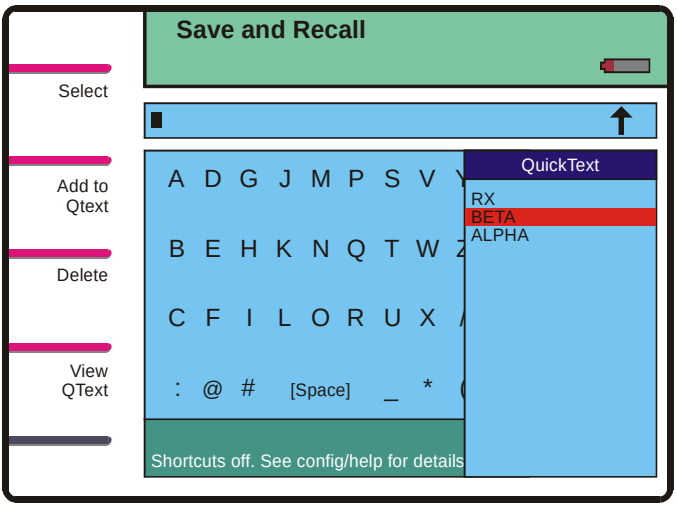


Delete Quicktext

Scroll to a Quicktext entry



Press to delete the Quicktext entry



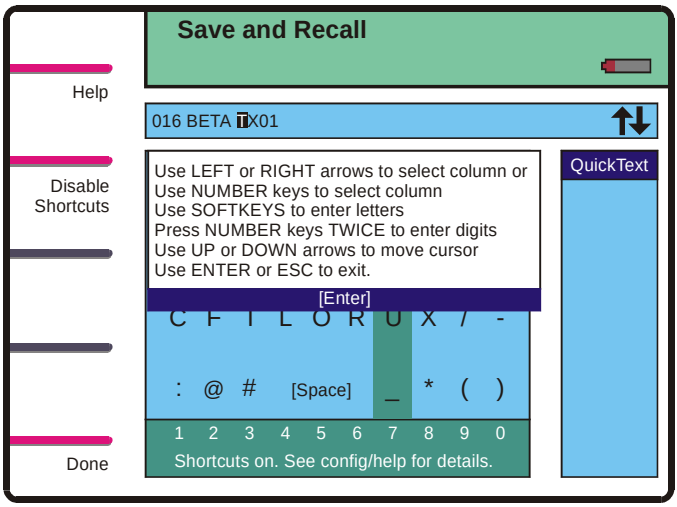
Trace Label Config

Label Help

Label Help provides instructions for labelling traces.

Press from Trace Label

Press to display the help screen

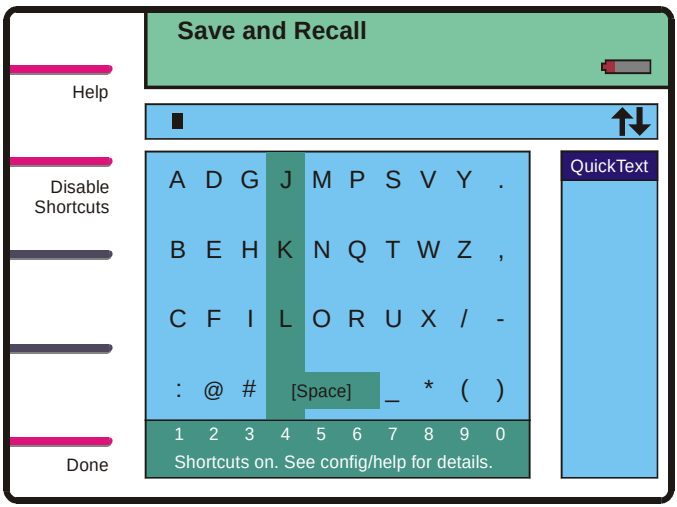


Label Shortcuts

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.

Press from Trace Label

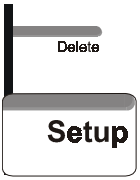
Toggle between Enable and Disable



Save Setup

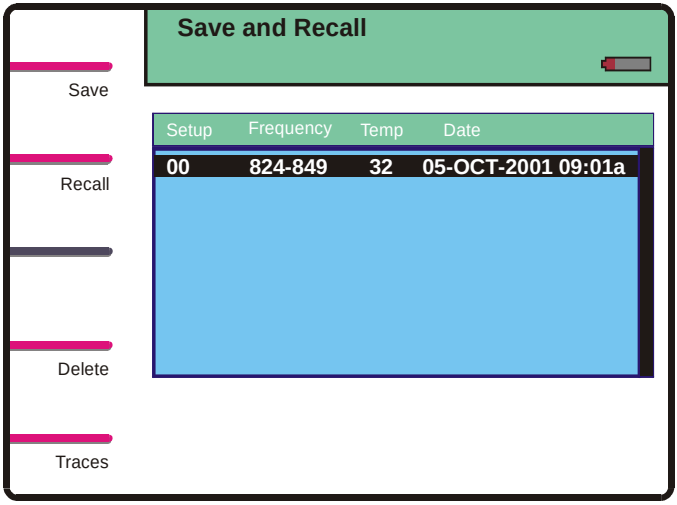
Saving the setup will save the following:

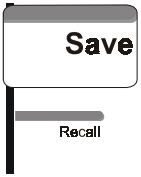
Scale Min	Start Frequency	Center Frequency
Scale Max	Stop Frequency	Span Frequency
Start Distance	Units	Calibration Coeff.
Stop Distance	FM Status	Limit Line



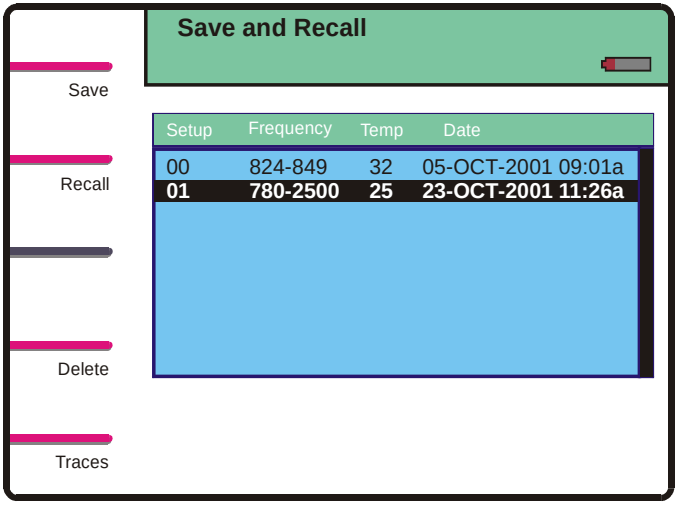
Press from Save and Recall

The Setup menu is displayed





Press to save the current setup

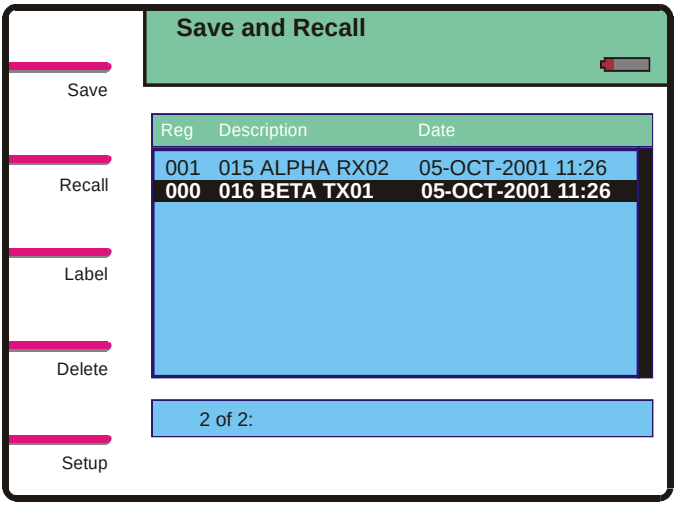


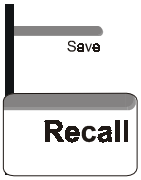
Recall Trace

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.

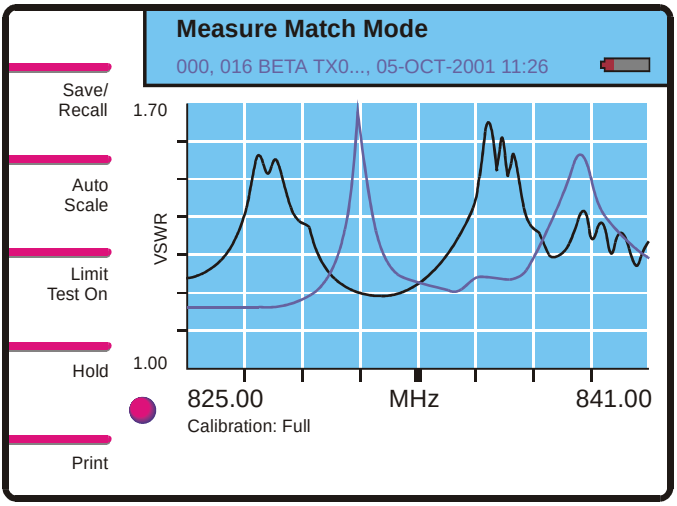
From Save and Recall, scroll to the trace to be recalled





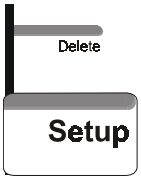
OR

The trace is recalled



Recall Setup

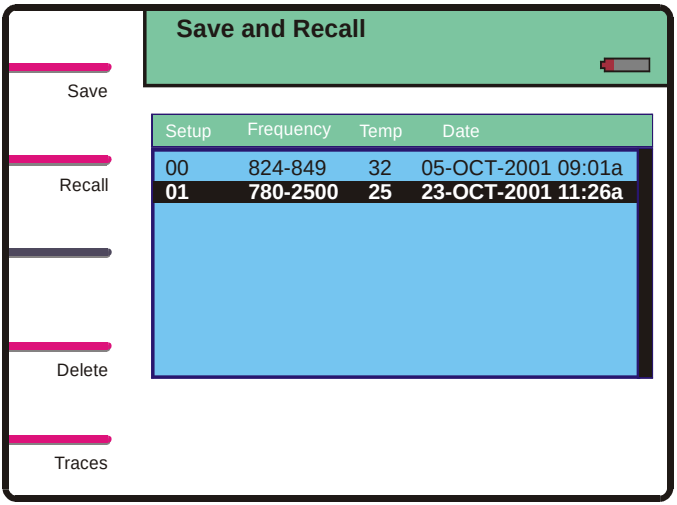
☞ NOTE: For best results, calibrate the Site Analyzer immediately before taking measurements.

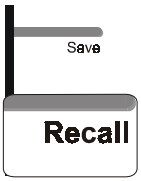


Press from Save and Recall

The Setup menu is displayed

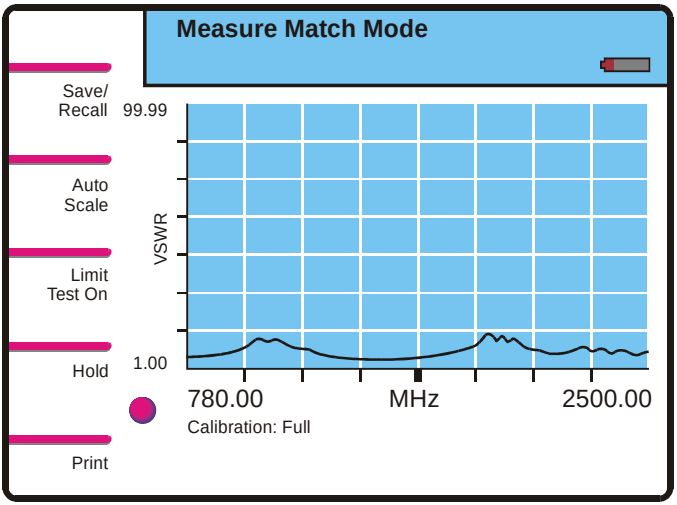
Scroll to the setup to be recalled





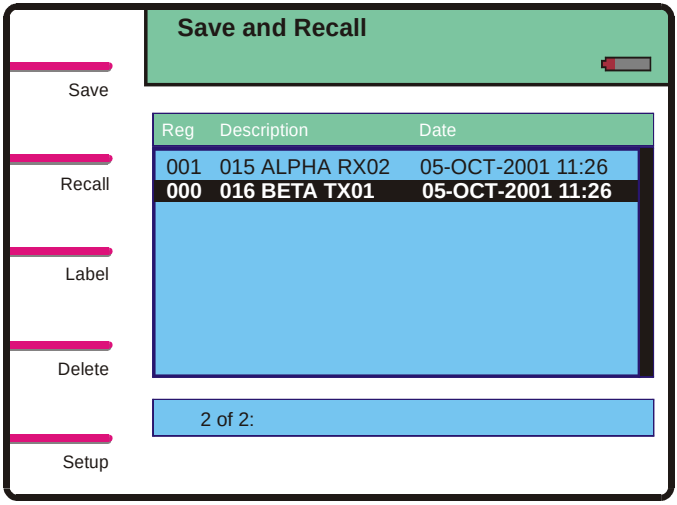
OR

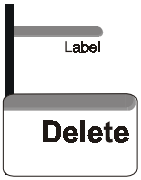
The setup is recalled



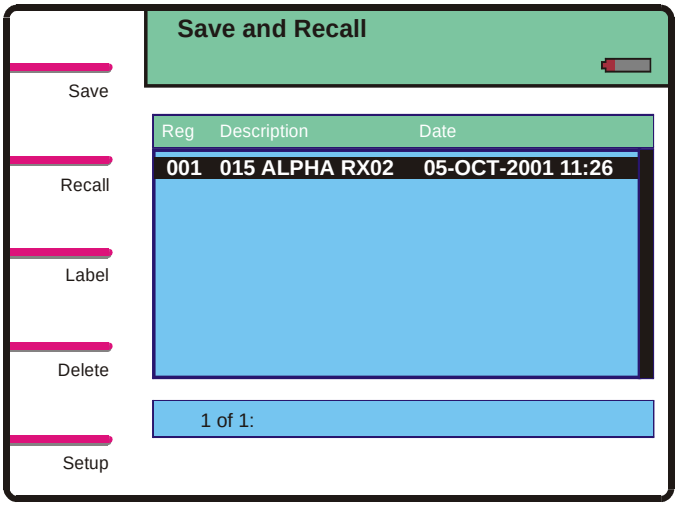
Delete Trace

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

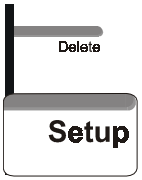




Press to delete the trace. Press again when asked "Are You Sure?"



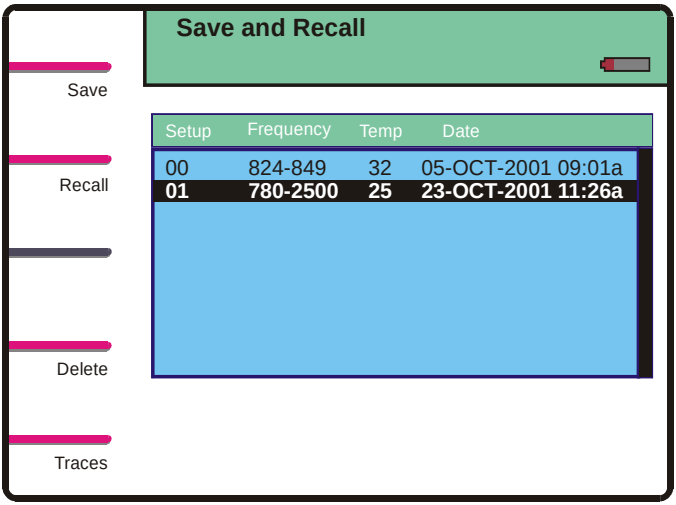
Delete Setup

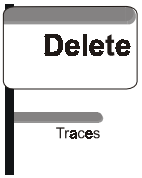


Press from Save and Recall

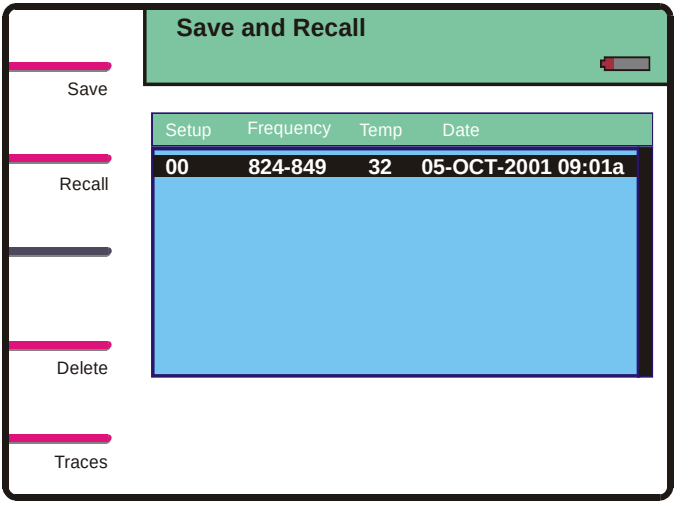
The Setup menu is displayed

Scroll to the setup to be deleted





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

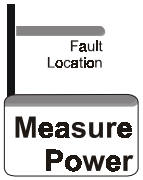


☞ NOTE: Power measurement is only available with the SA-1700-P. To upgrade a standard SA-1700, please contact Customer Service.

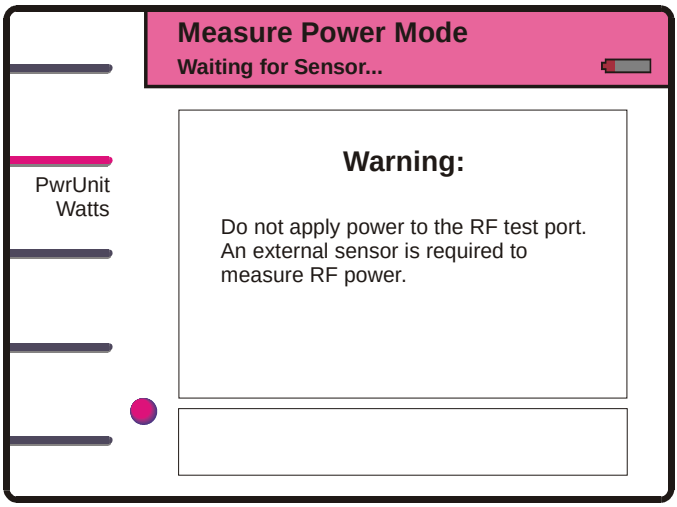
This measurement verifies and monitors the condition of the transmitter system. Up to three measurement values can be simultaneously displayed, depending on the sensor. One measurement is also displayed on an analog dial.

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

Press the Mode key



Press from Select Mode



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

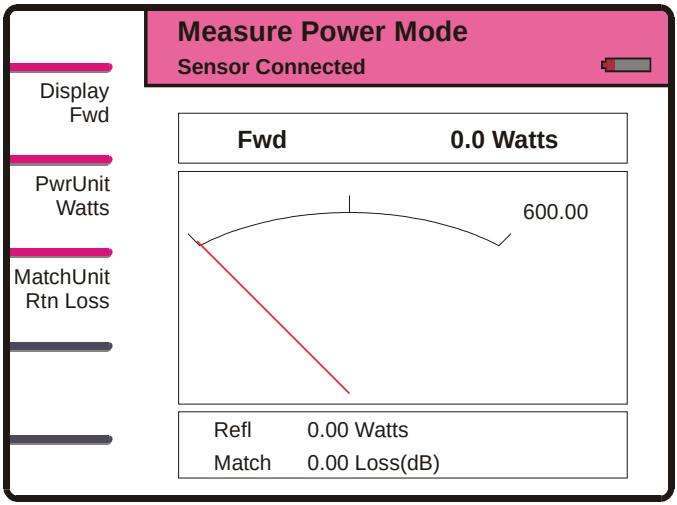
Connecting a Sensor

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

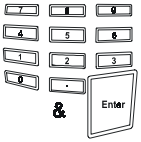


Setting the Full Scale Power

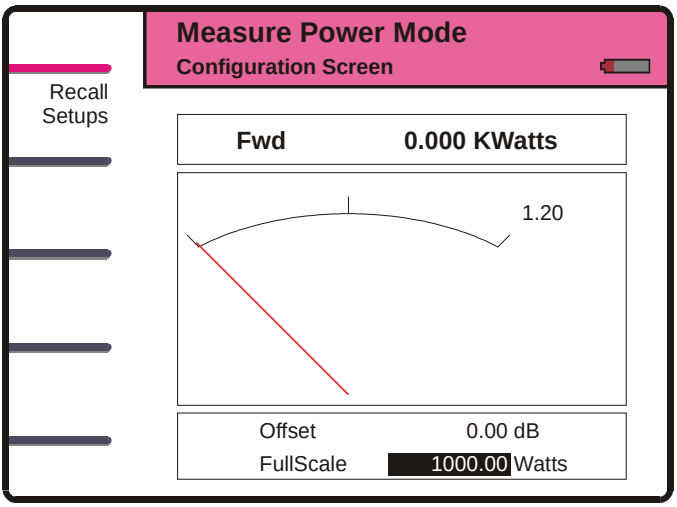
The Bird Site Analyzer will automatically set the full scale power for sensors that do not use elements. For element-based sensors, enter the power listed on the forward element. The reflected element's power rating should be 10% of the forward element's.

Press from Measure Power Mode

Scroll to Full Scale



Enter the forward element power



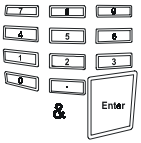
Setting the Offset

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:

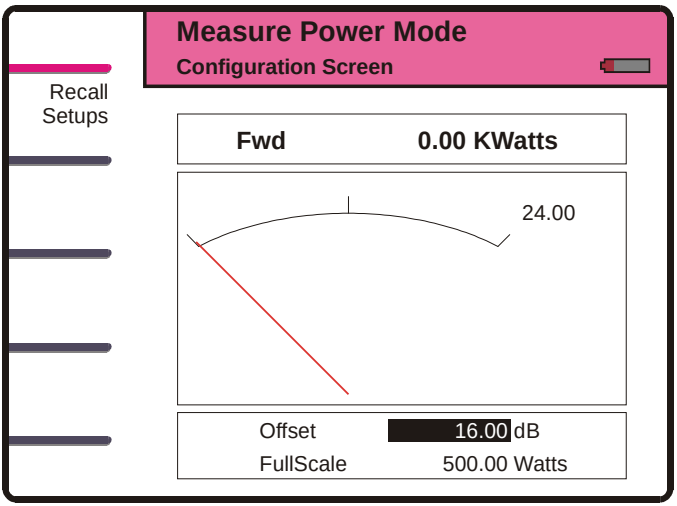
$$\text{Attenuation(dB)} = 10 \times \text{Log}_{10}[\text{Attenuation(\%)} / 100]$$

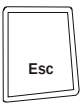
Press from Measure Power Mode

Scroll to Offset

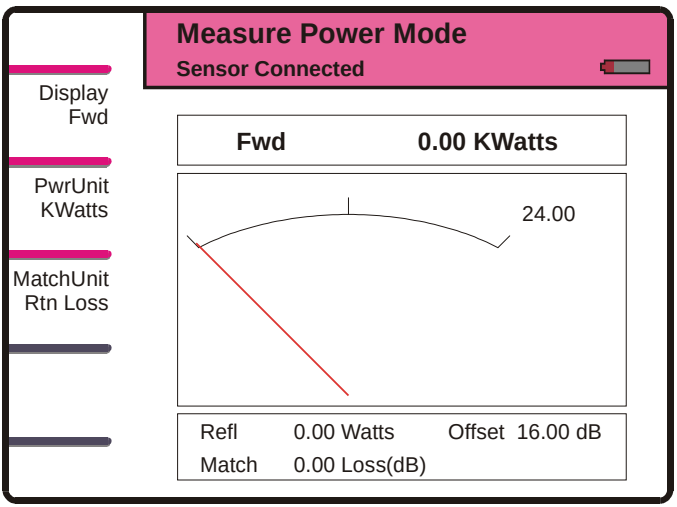


Enter the new value





The offset is displayed at the bottom of the main display

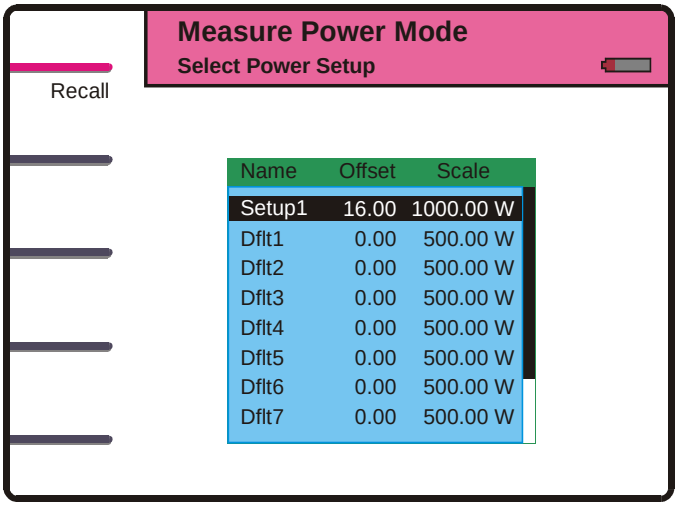


Recall Setups

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.

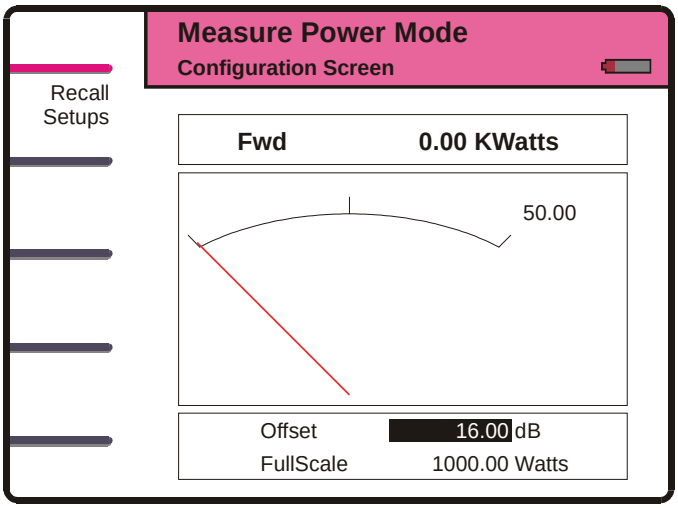
Press from Measure Power Mode

Press to display the Power Setup menu



Scroll to the setup to be recalled

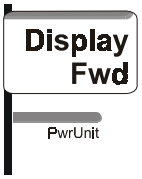
The setup is recalled



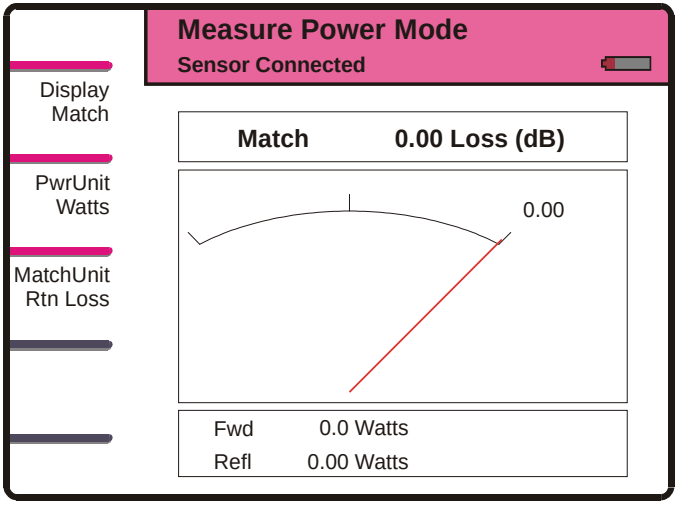
Choosing the Displayed Measurement

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.



Toggle between Fwd, Refl, and Match



Setting Units

Display
Fwd

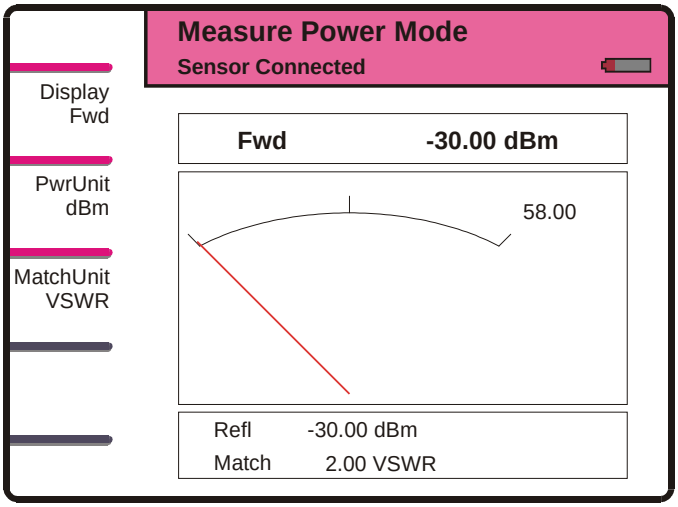
PwrUnit
Watts

Toggle between Watts and dBm

PwrUnit

MatchUnit
Rtn Loss

Toggle between VSWR, Return Loss, and Match Efficiency



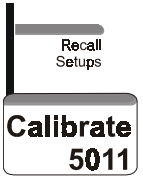
Calibrating the Bird 5011

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

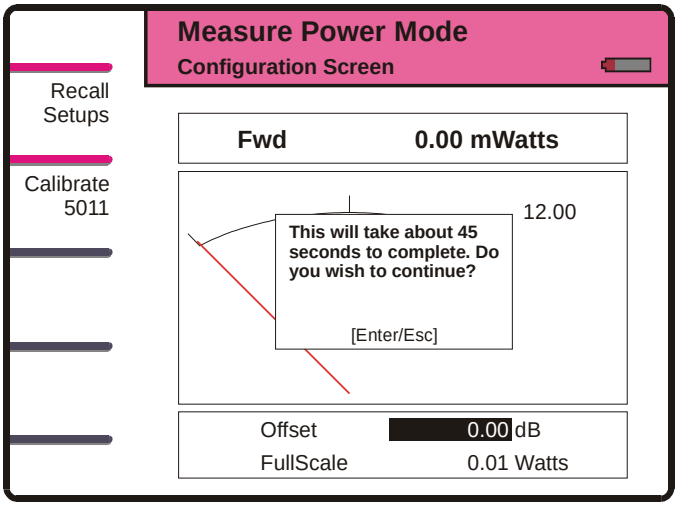
The Bird 5011 is a highly accurate terminating power sensor. Over time, the sensor's "zero value" (reading with no applied RF power) can drift, making all readings inaccurate by this value. For example, if the zero value is –2 µW, measuring a 5 mW signal will give a reading of 4.998 mW, a 0.04% error. Measuring a 50 µW signal will give a reading of 48 µW, 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.

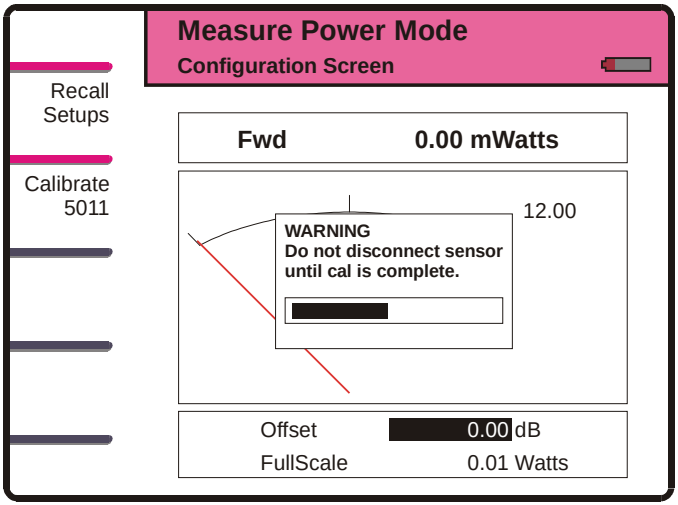
Press from Measure Power Mode



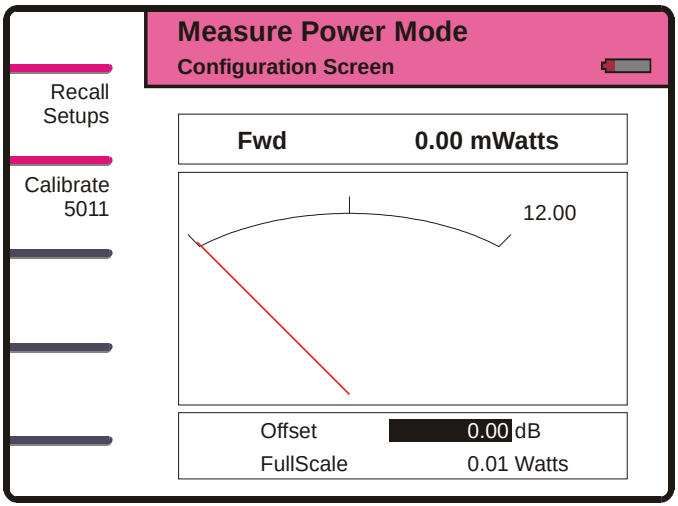
Press to begin the calibration



Press to the warning

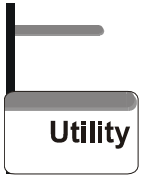


Wait for calibration to finish

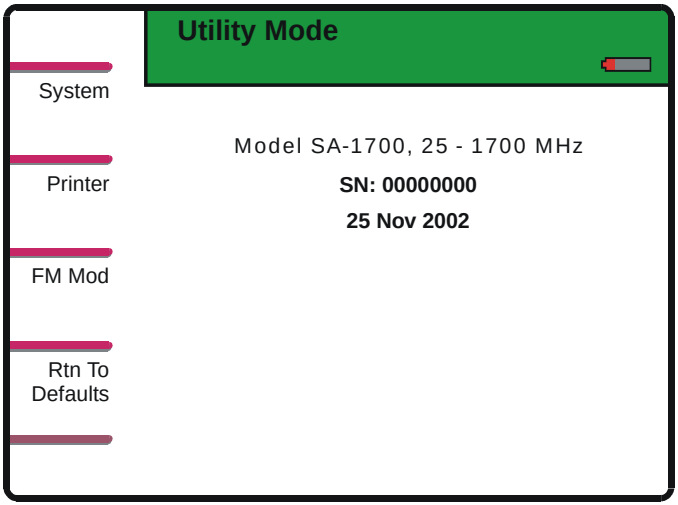


These utilities adjust the Bird Site Analyzer's date and time, return the unit to default settings, or check the printer status.

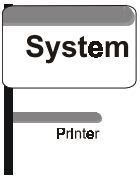
Press the Mode key



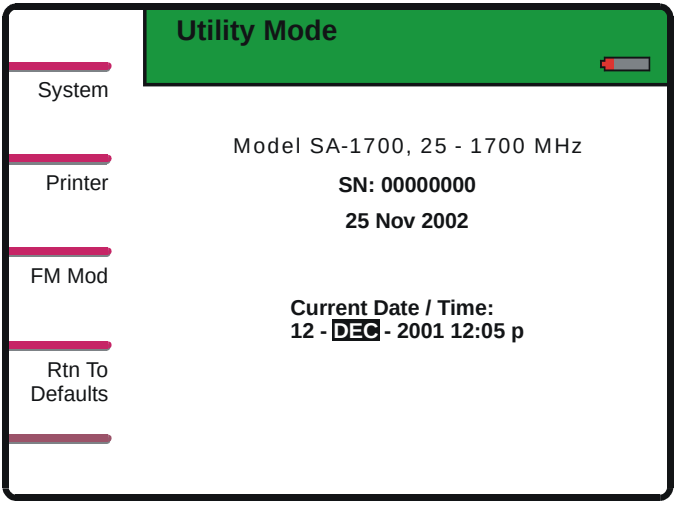
Press from Select Mode



Adjust Date and Time

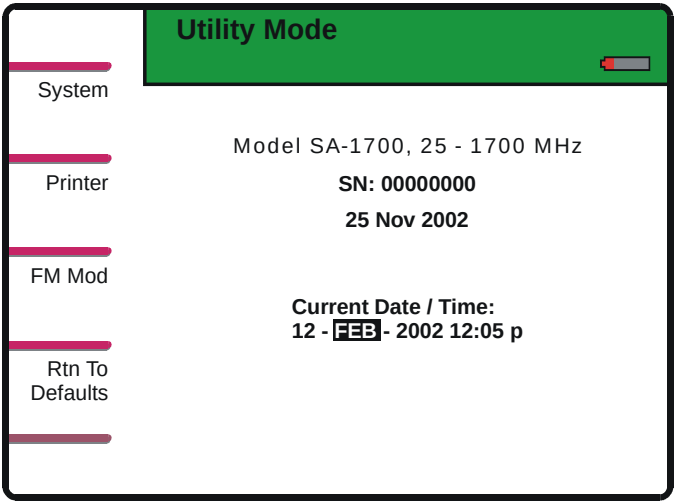


Press to display the system settings



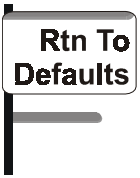
Scroll through the date & time

Change the date or time

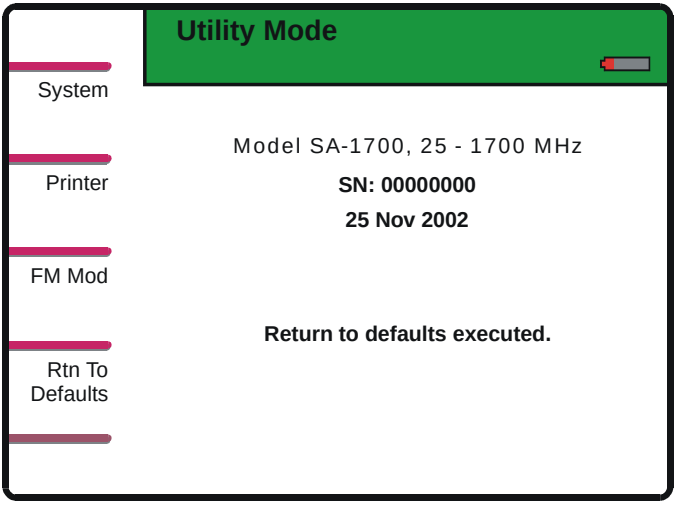


Return to Defaults

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.



Press to return all settings to factory presets

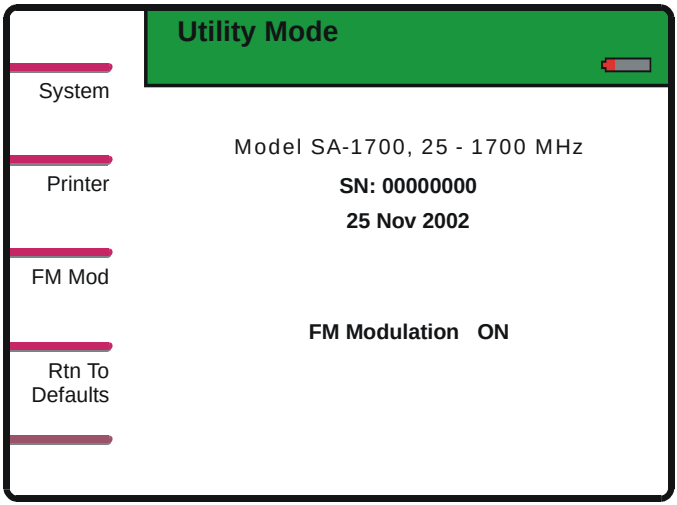


FM Modulation

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.

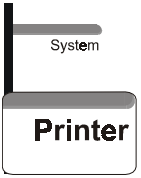
Toggle between ON and OFF



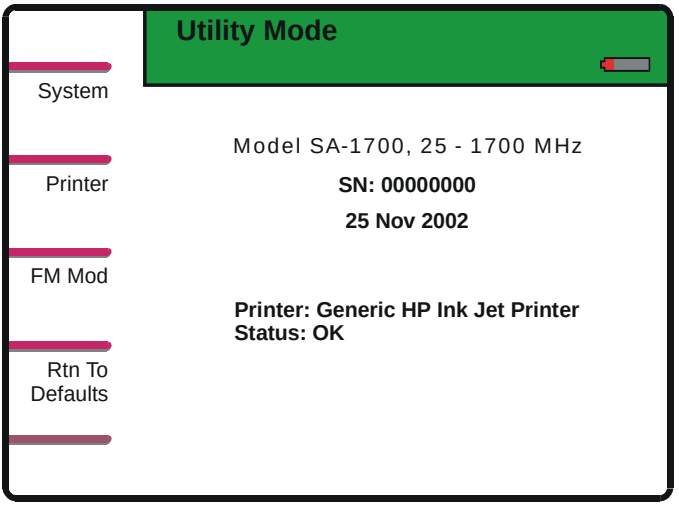
Printer

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.



Press to display the printer status



Chapter 9 Computer Software

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 not 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.

Chapter 10 Maintenance

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 pressing keys.

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.
Trace drifts outside of specifications	Calibration lost	Calibrate the unit immediately before making a measurement.

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 92.
- 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 92.

Flash ROM Upgrade

The Site Analyzer 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.

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	
With Power Measurement	SA-1700-P
Without Power Measurement	SA-1700
AC adapter (15 Vdc output)	5A2436
Automobile cigarette lighter adapter	5A2238-2
Soft Carrying case	7002A850
9-pin Serial interface cable	5A2264-09-MF-10
PC interface software kit	7002A844
Instruction manual	920-7002A170S
Internal Battery Pack	5A2431

Specifications

Antenna Testing

Frequency Characteristics

Frequency Range:	25 MHz to 1700 MHz
Frequency Resolution:	
25 – 800 MHz	25 kHz
800 – 1700 MHz	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:	Refer to the figure on page 100. Determined graphically from composite of 1.12 source VSWR, instrumentation error, and directivity:
VSWR:	Calculated from Return Loss

Test Port

Connectors:	N, Female normally supplied
Impedance:	50 Ohms

Directivity

After calibration:

Connector	Frequency	Directivity
N	25 – 1700 MHz	– 42 dB
7/16	25 – 1700 MHz	– 40 dB

Measurement Speed

< 3 seconds/sweep (13 ms/data point), 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:

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

Where R=Resolution (meters),
V_p=Velocity of propagation†,
ΔF= Frequency span

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%

* Accuracy only guaranteed when using a Bird Type B Calibration Combo (See page 101).

† Dielectric Constant – The dielectric constant (ε_r) of the antenna cable determines the propagation velocity of the cable ($V_p = 1/\sqrt{\varepsilon_r}$), which together with the frequency range of the match data, determines the maximum distance for which the calculation can be done without aliasing errors.

Power Measure Mode (SA-1700P Only)

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

General

Data Storage: 250 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)

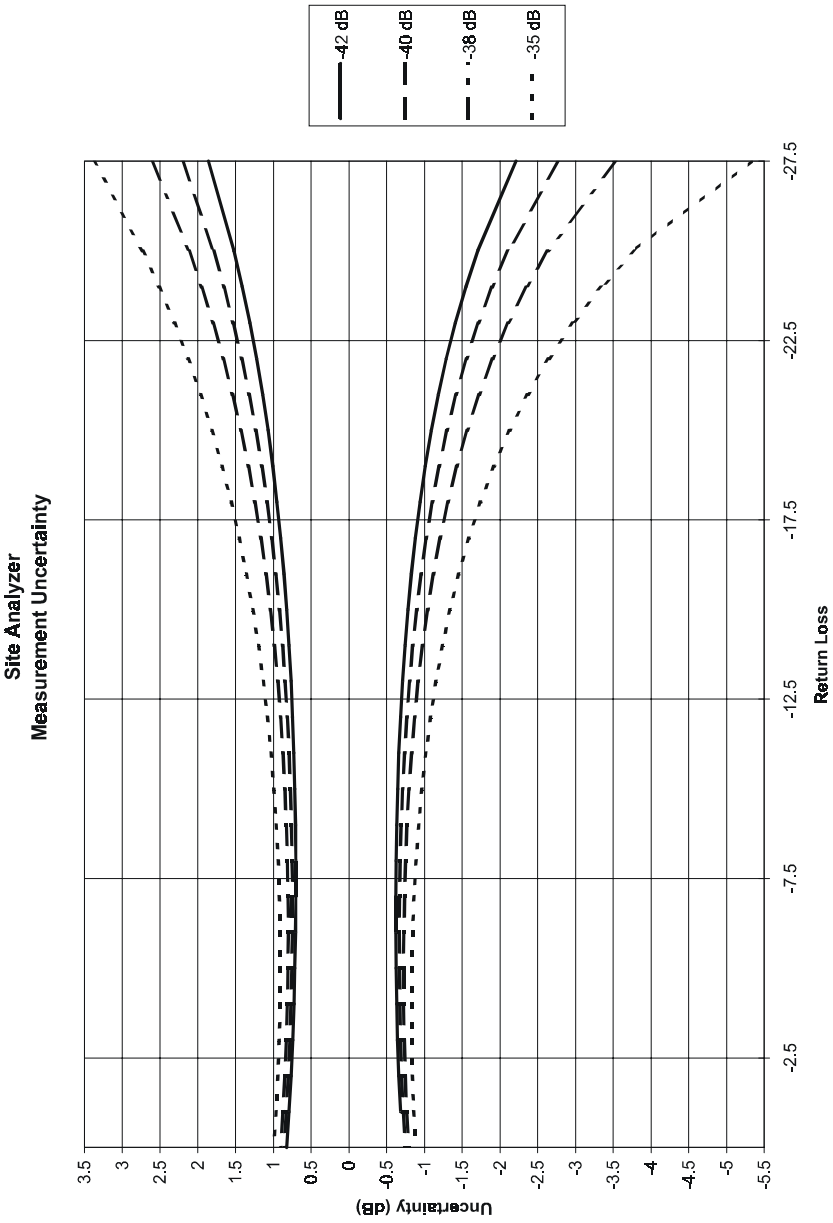
International Standards

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

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, and dc block	

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-1700 SA-1700-P

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