SIGNAL HAWK™

SPECTRUM ANALYZER

Operations Manual

Model SH36

...

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

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

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
> Always turn off the Signal Hawk before connecting or disconnecting a sensor.

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

> CAUTION
> +20 dBm (100 mW) max. input.
> Do not apply high-power RF to the RF In test port. Exceeding the maximum input will damage the Signal Hawk.

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

Changes to This Manual

We have made every effort to ensure this manual is accurate. If you 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 on the title page.

Start-up Instructions

The Start-up Instructions 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.

Chapter Layout

Introduction — Describes the features of the Bird Signal Hawk, lists equipment supplied and optional equipment, and provides power-up instructions.

Spectrum Analyzer — Describes how to connect Signal Hawk to the user's system, describes the spectrum analyzer measurements, and provides quick start steps for each measurement.

Power Measurements — Describes the power measurement feature, lists compatible power sensors, describes how to connect Signal Hawk to the user's system, and provides quick start steps to make power measure-ments.

Power Measurement Settings — Describes the Menu key and Soft key functions for setting up power measurements.

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

Utilities — Describes built-in instrument utility features and how to use them.

Appendix A, Menu Maps — Contains soft key maps for each Menu key for all measurement modes.

Table of Contents

Chapter 1   **Introduction**

The Signal Hawk is a multifunction test instrument for use in the installation and maintenance of RF and wireless systems. The model number is identified on the unit and also on the display screen at the end of the power-on sequence.

Items Supplied

Figure 1, Figure 2, and Figure 3 illustrate and identify items supplied with the Signal Hawk.

Figure 1   Items Supplied, Hardware and Software

Item	Description
1	Signal Hawk analyzer
2	9-Pin serial communications cable
3	Cigarette lighter adapter
4	USB cable
5	1 GB USB memory drive
6	Cord for AC power adapter
7	Audio head set
8	PCTool software on CD
9	AC power adapter
---	Standard LiIon "smart" battery pack (installed in unit)
---	Start-up Instructions (not shown)
---	Operations Manual (not shown)
---	Rain flap for connector panel (not shown)
---	Soft carry case (see Figure 2 and Figure 3)

Figure 2   Items Supplied, Soft Carry Case (front view)

Item	Description
1	Shoulder carry strap
2	Connector panel weather cover (two covers)
3	Instrument cover flap with transparent pocket
4	Carry handle (one on each side)
5	Accessory pouch (detachable)

Figure 3   Items Supplied, Soft Carry Case (rear view)

Item	Description
1	Accessory pouch (detachable)
2	Cable holder (three places)
3	Soft case carry handle (two handles)
4	Air flow intake opening - *do not block this opening*

Controls and Indicators

Figure 4   Controls and Indicators, Front of Instrument
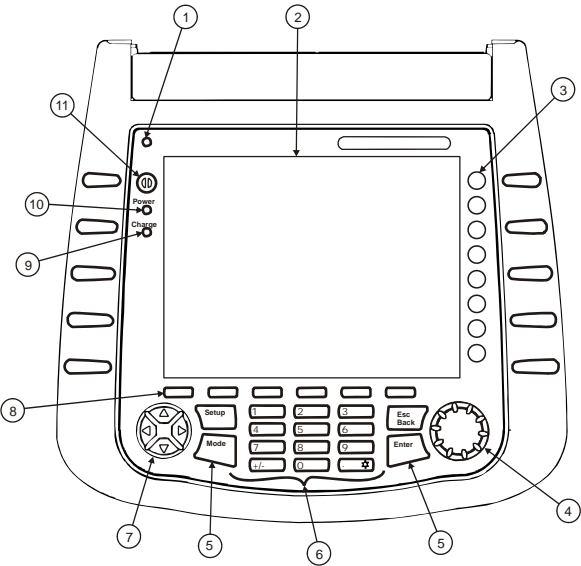
Item	Description
1	Light sensor (adjusts display backlight)
2	Display screen
3	Soft selection keys, activate the function or option described on the display screen to the left of the key
4	Selection dial (for screen navigation)
5	Function keys (Setup, Mode, Esc/Back) and Enter key
6	Numeric keypad, used to enter values
7	Navigation arrow keys (up, down, left, right), move the selection highlight, move markers
8	Menu selection keys, selects a mode or main function of the instrument or a sub-category of a mode
9	Battery charge indicator Off when not connected to external ac On continuously when battery is fully charged Blinking slowly when battery is charging Blinking rapidly when battery is disconnected, malfunctioning, or outside the temperature range for safe charging
10	Power ON/OFF indicator, Illuminates when the instrument is ON
11	Power ON/OFF switch

Figure 5   Features, Back of Instrument
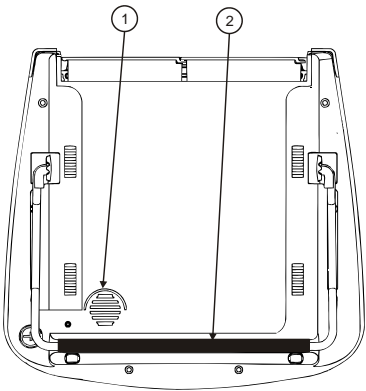
Item	Description
1	Air inlet for internal cooling fan. DO NOT block.
2	Carry handle

Figure 6   Connector Panel, Model SH-36S
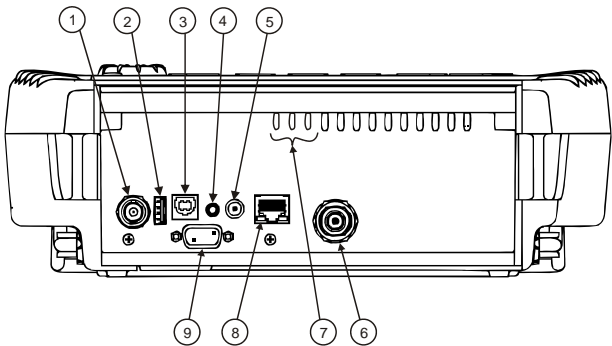
Item	Description
1	External trigger input (5 V max)
2	USB connector
3	USB connector
4	Head set connector
5	External power connector
6	RF input
7	Speaker (inside case)
8	Network (LAN) connector (RJ-45)
9	RS-232 connector (DB-9)

Selection Keys

The Signal Hawk has two groups of selection keys - **six** (orange) **rectangular menu keys** located below the display screen and **eight** (blue) **round soft keys** located at the right of the display screen.

Menu keys select a feature within a measurement (such as frequency, amplitude, marker). The function of the key is indicated on the display screen directly above the key (refer to Fig. 4).

Soft keys select various features (such as start frequency, auto scale, marker On) based upon the menu key selected. The function of the key is indicated on the display screen directly oppoasite the kys (refer to Fig. 4).

Navigation Keys

Arrow Keys and Selection Dial -Use these keys to move among list items, certain options, and some test setup parameters. Use the arrow keys or selection dial to select the next or previous item. These keys also increase or decrease values in certain data input fields.

Function Keys

There are **four** (green) **function keys** - Setup, Mode, Esc/Back, Enter.

Setup - Go to the Setup Menu screen. In setup, you can select and load pre-defined measurement parameters. Factory setups cannot be changed. User defined setups can be created, changed, and deleted.

Mode - Go to the Start Menu.

Esc/Back - Return to the previous screen or cancel an entry.

Enter - Completes a selection or a key pad action.

Numeric Keypad

Use the numeric keypad to enter certain measurement setup values where required.

Power Supply

Internal Battery

The Signal Hawk has an internal, rechargeable, lithium-ion battery pack that will operate the unit for a minimum of 3 hours of continuous use. Recharging time, from a full discharge, is approximately 4 hours.

For information about charging the battery before using the instrument for the first time and about replacing the battery, refer to the Reference Manual.

☞ **Note:** When the unit is shipped from the factory, the battery may not be fully charged. Use an ac adapter when you operate the unit for the first time.

Power Adapters

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

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

Starting Signal Hawk

To start the instrument, press the Power button. After a few seconds, the display screen will show the Bird logo and then launch the application software. During the startup initialization process, the unit performs an automatic self test, sounds an audible tone, cycles the cooling fan for 2-3 seconds, and displays the model number and software version on the screen. When the initialization process is finished, the instrument displays the Start Menu screen (Fig. 7).

Figure 7   Signal Hawk Start Menu Screen
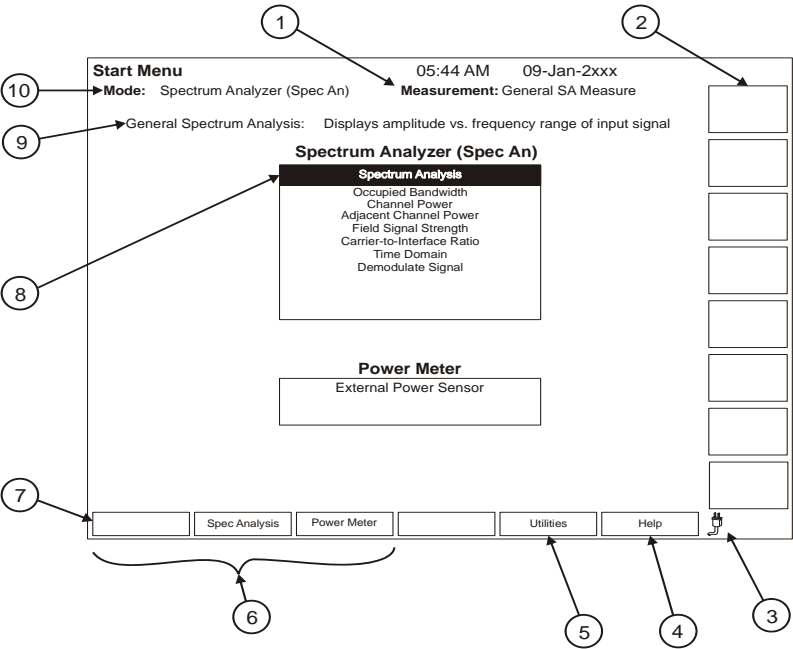
Item	Description
1	Name of currently selected measurement setup
2	Soft keys
3	Power source icon (ac, battery, or battery charging)
4	Go to Help menu
5	Go to Signal Hawk utilities
6	Select a measurement mode list window
7	Meny keys
8	Selected text (highlighted)
9	Name and brief description of highlighted test
10	Current active operating mode

Start Menu, Menu Keys

Menu keys are the six rectangular orange keys located below the display screen. Press a menu key to move the highlight selection bar to the menu list with the same name as the key you pressed. When you are in a menu list, use the selection dial or the up- and down-arrow

keys to move the highlight bar through the list. Use the left- and right-arrow keys to move to a different list box. When the highlight selection bar is at the end of a list, use the selection dial or press the Down arrow key to move it to the top of the next Mode menu list.

Spec Analysis Menu Key

Press this key to move the highlight selection bar into the Spectrum Analyzer list box.

Power Meter Menu Key

Press this key to move the highlight selection bar into the Power Meter list box.

Utilities Menu Key

Pess this key to display the Utility Menu main screen. The Utilities menu provides information about the instrument software, amount of available memory, battery charge status, system date and time, and how to contact Bird Technologies Group. For more information about the utilities feature, refer to Chapter 6, Utilities, page 67.

Help Menu Key

Displays the Help soft keys but does not exit the current screen. Press the Back... soft key to redisplay the default soft keys for the current menu. The Signal Hawk does not have a separate Help Menu screen. Pressing the Help menu key displays the help soft keys only.

Operations Manual (Quick Start Guide) - This manual contains quick start steps for measurements and for the Menu keys.

Reference Manual (User Manual) - This manual expands upon the information in the Operations Manual to include complete descriptions of features, measurement setup parameters, and system setup options.

Back... - This soft keys exits Help and returns to the features for the currently active menu.

Prepare the Instrument to make a Measurement

1. Measure the power level of the signal to be measured. All signals that are directly connected to the RF In connector must be less than +20 dBm.

2. Connect a signal to the instrument - attach a system cable or an optional receiving antenna to the RF In connector.

3. Turn on the instsrument, select a measurement, set parameters for the measurement (such as frequency, span, amplitude, resolution bandwidth).

Chapter 2   **Spectrum Analyzer**

Introduction

In the Spectrum Analyzer mode, the Signal Hawk sweeps the RF In connector and measures the power level and frequencies of the signal being received. The full sweep range is from 100 kHz to 3.6 GHz.

Test System for Power

Before connecting the Signal Hawk to your RF system, use a service monitor, a power meter, or a spectrum analyzer to check that the power from the system or component being tested is not greater than +20 dBm.

> **CAUTION**
> +20 dBm (100 mW) max. input.
> Do not apply high-power RF to the RF In test port.
> Exceeding the maximum input will damage the Signal Hawk.

Connect Signal Hawk to the System

You can connect your system cable directly to the RF In connector or you can connect an optional receiving antenna to the RF In connector.

Spectrum Analyzer Screen Features

The measurements in the Spectrum Analyzer group feature similar display screens. Figure 8 illustrates and identifies the Spectrum Analyzer group screen features.

Figure 8   Spectrum Analyzer, General Screen Features (Frequency and Span Screen shown)
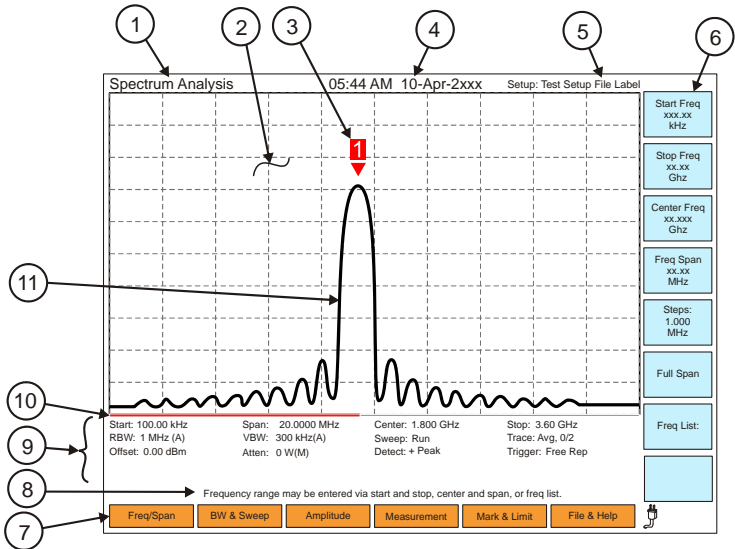
Item	Description
1	Name of selected measurement
2	Display area
3	Marker
4	Current time and date
5	Name of measurement setup file being used
6	Function of soft keys (text)
7	Function of menu keys (text)
8	Help tip for current screen
9	Measurement setup parameters
10	Sweep progress bar
11	Data trace

Quick Save Trace

You can save the trace that is displayed on the screen. To save the trace, press the File & Help menu key then press the Quick Save Trace soft key. The trace is stored as a file in the internal memory of the instrument. Each quick save is stored in a separate file that is named using the measurement and date-time file naming format: *Measurement name(MM-DD HH-MM-SS).shf*. Where the first MM is the month, DD is the day, HH is the hour, the second MM is the minute, and SS is the second of the time when the file was saved.

Using the PCTool utility (supplied on the CD that ships with the instrument), you can copy or move stored files from the internal memory to an external storage device. When you view or recall a saved trace, you will see only the actual trace. For measurements that have calculated values (such as Occupied Bandwidth, Channel Power, etc.), the saved trace does not include the calculated values.

Spectrum Analysis Measurement

Spectrum Analysis determines the presence of frequencies and their amplitudes within a specified frequency range or around a specified center frequency. From the Spectrum Analyzer list on the Start Menu, select Spectrum Analysis then press the Enter key. When you select Spectrum Analysis, the first display is the Frequency and Span screen (Fig. 9).

For a complete discussion about how to specify the sweep range and details about frequency and span settings, refer to Setting Frequency, Span, Bandwidth, and Sweep in the Reference Manual.

Quick Start - Spectrum Analysis Measurement

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. Select the frequency range to sweep:

   a. Press the Freq & Span menu key.

b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

c. Press a soft key to select the frequency units.

d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the span value.

e. Press a soft key to select the span units.

Figure 9   Spectrum Analysis, Frequency and Span Screen
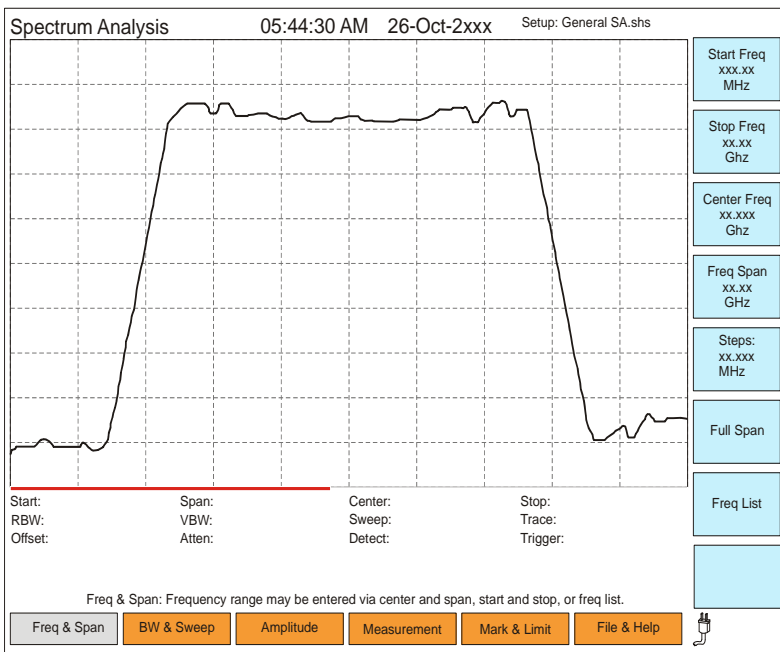
Occupied Bandwidth Measurement

Use this measurement to determine the bandwidth that contains a specific power within the *spectrum displayed on the screen* (range of frequencies occupied by the integrated power specified). You specify the power and Signal Hawk determines the bandwidth containing that power. When you select Occupied Bandwidth, the first display is the Frequency and Span screen (Fig. 10).

Quick Start - Occupied Bandwidth Measurement

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. Select the frequency range to sweep:

    a. Press the Freq & Span menu key.

    b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

    c. Press a soft key to select the frequency units.

    d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the span value.

    e. Press a soft key to select the span units.

Figure 10   Occupied Bandwidth, Frequency and Span Screen

Channel Power Measurement

Use this measurement to determine the total integrated power within a specified frequency range or "channel". When you select Channel Power, the first display is the Frequency and Span screen (Fig. 11).

Quick Start - Measure Channel Power

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. Select the frequency range to sweep as follows:

    a. Press the Freq & Span menu key.

    b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

    c. Press a soft key to select the frequency units.

    d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the span value.

    e. Press a soft key to select the span units.

Figure 11   Channel Power, Frequency and Span Screen
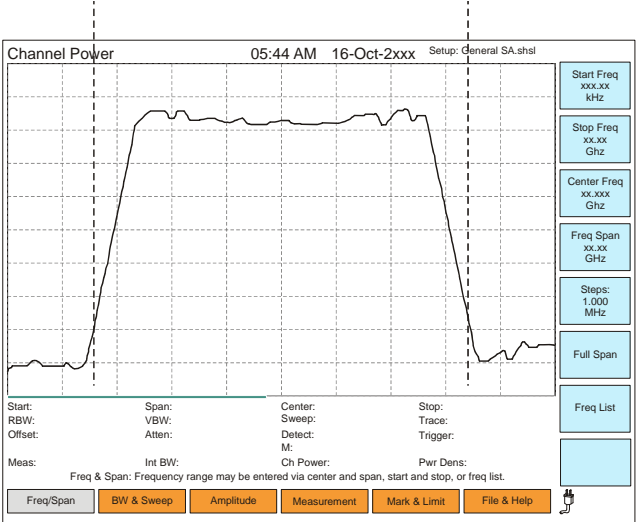
Adjacent Channel Power

Adjacent Channel Power measures and displays the power in a main channel and the leakage power in each channel immediately above and below the main channel (adjacent channels). The instrument also calculates and displays the power ratio between the main channel and each of the two adjacent channels. When you select Adjacent Channel Power, the first display is the Frequency and Span screen (Fig. 12).
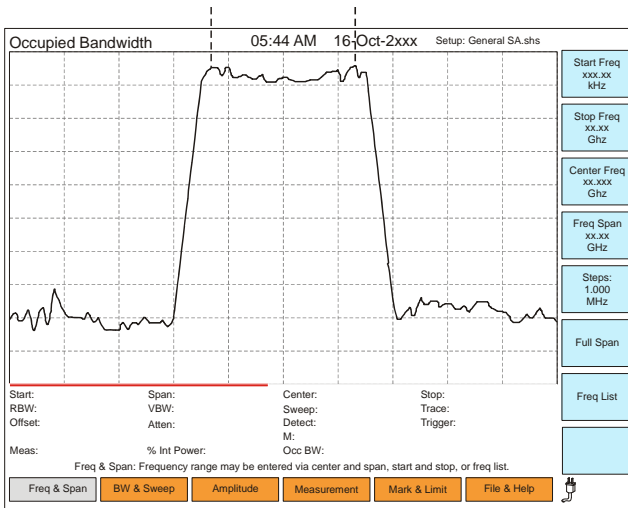
Quick Start - Measure Adjacent Channel Power

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. Select the frequency range to sweep:

    a. Press the Freq & Span menu key.

    b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

    c. Press a soft key to select the frequency units.

    d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the span value.

    e. Press a soft key to select the span units.

The screen displays the lower adjacent channel power (Dn ACPR), the upper adjacent channel power (Up ACPR), and the main channel power (Ch Power).

Figure 12   Adjacent Channel Power, Frequency and Span Screen
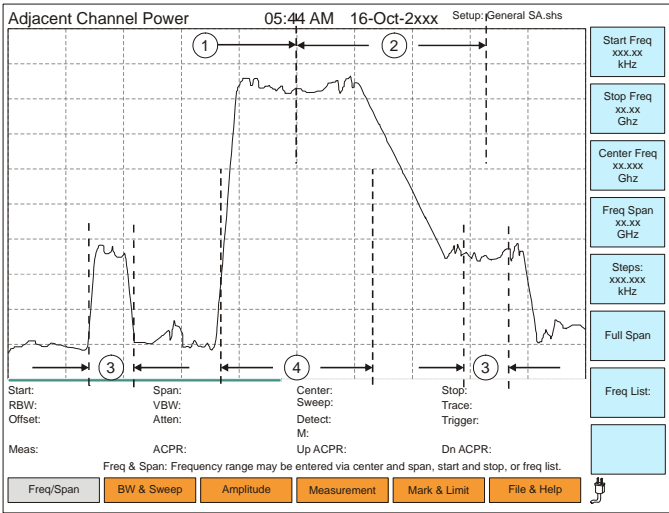
Item	Description
1	Main channel center frequency
2	Channel spacing (center to center)
3	Adjacent channel bandwidth (markers)
4	Main channel bandwidth (markers)

Field Signal Strength

Using an antenna with known gain characteristics connected to the RF In connector on the Signal Hawk, you can measure the strength of the signal eminating from a transmission antenna (within the frequency range of the antenna connected to the RF In port). When you select Field Signal Strength, the first display is the Frequency and Span screen (Fig. 13).

Quick Start - Measure Field Signal Strength

1. Connect a receiving antenna to the RF In connector on the instrument.

2. Select the frequency range to sweep (based upon the range of the connected antenna) as follows:

a. Press the Freq & Span menu key.

b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the value that is the center of the range of the connected antenna

c. Press a soft key to select the frequency units.

d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the value that is the full range of the connected antenna.

e. Press a soft key to select the span units.

6. Set the detection mode to Positive Peak:

a. Press the BW & Sweep menu key.

b. Press the Detection Mode soft key.

c. Press the Positive Peak soft key.

4. Set the Amplitude - press the Amplitude menu key then press the AutoScale soft key.

5. Activate the transmission system and observe the amplitude of the signal displayed on the screen.

6. Move to various positions relative to the transmtting source and observe the signal value.

Figure 13   Field Signal Strength, Frequency and Span Screen

Carrier-to-Interference Ratio

This measurement calculates the ratio of the carrier signal power to the power level of the noise and interference signals. To determine the ratio, you must make two measurements. First measure the signal strength with the carrier turned on (carrier level). Second measure the noise level with the carrier turned off (noise and interference signal level). When you select Carrier-to-Interference Ratio, the first display is the Frequency and Span screen (Fig. 14).

Quick Start - Measure Carrier-to-interference Ratio

☞ **Note:** Because the transmitted carrier must be turned off for the second portion of this measurement, you must have access to the transmitter to complete this procedure.

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. Turn on the transmitter.

4. Select the frequency range to sweep:

    a. Press the Freq & Span menu key.

    b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

    c. Press a soft key to select the frequency units.

    d. Press the Freq Span xxx.xxx XHz soft key then use the key pad to enter the span value.

    e. Press a soft key to select the span units.

6. Set the detection mode to Positive Peak:

    a. Press the BW & Sweep menu key.

    b. Press the Detection Mode soft key.

    c. Press the Positive Peak soft key.

4. Set the Amplitude:

    a. Press the Amplitude menu key.

    b. Press the AutoScale soft key.

3. Measure the carrier signal:

    a. Press the Measuement menu key.

    b. Press the C/I On soft key.

    c. Press the Measure Carrier (Carrier ON) soft key

4. Turn off the transmitter.

5. Measure the noise and interference signal levels as follows:

    a. Press the Measurement menu key.

    b. Press the C/I On soft key.

c. Press the Measure Interference (Carrier Off) soft key

Figure 14   Carrier-to-Interference Ratio, Frequency and Span Screen

Time Domain

In Time Domain, you display the amplitude of a single frequency rather than sweeping a range of frequencies (zero span). Signal Hawk measures and displays the amplitude of the frequency for a specified time period (sweep time). The display is refreshed during each sweep time. The Time Domain trace resembles the horizontal line display on an oscilloscope. When you select Time Domain, the first display is the Frequency and Span screen (Fig. 15).

Quick Start - Measure Signals in Time Domain

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect the system input signal to the RF In connector on the instrument.

3. When you select Time Domain from the Spectrum Analyzer menu, the span is set to zero and the sweep time is set to 5 seconds. Set the center frequency as follows:

   a. Press the Freq & Span menu key.

   b. Press the Center Freq xxx.xxx XHz soft key then use the key pad to enter the frequency value.

   c. Press a soft key to select the frequency units.

Figure 15   Time Domain, Frequency and Span Screen
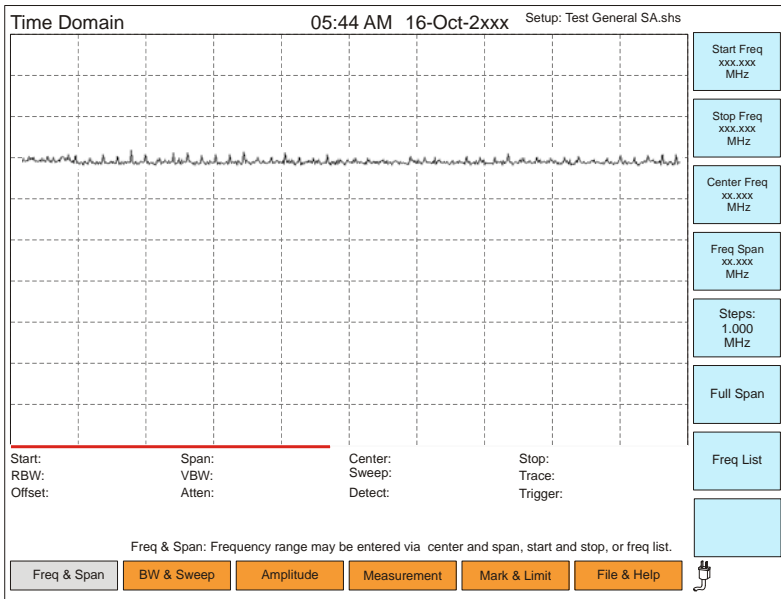
Demodulate Signal

At times, hearing the sound of a signal can help identify its source. The Demodulate Signal measurement removes the carrier and sends the demodulated signal to the internal speaker or to a headset connected to the Headset jack on the connector panel. Signal Hawk can demodulate AM, narrowband FM, and wideband FM signals. When

you select Demodulate Signal, the first display is the Frequency and Span screen .

Quick Start - Demodulate a Signal

1. Measure the power of the signal to be analyzed - input signal must be less than +20 dBm (100 mW).

2. Connect an optional receiving antenna to the RF In connector on the instrument. Make sure the receiving antenna has an appropriate range to recieve the frequency of interest.

3. Set the demodulation carrier frequency as follows:

   a. Press the Measurement menu key.

   b. Press the AM/FMdemod: On soft key.

   c. Press the Demod Freq xxx.xxx XHz soft key then use the key pad to enter the frequency.

   d. Press a soft key to select the frequency units.

5. Set the time to demodulate the signal as follows:

   a. Press the Demod Time xx.xxx s soft key then use the key pad to enter a value.

   b. Press a soft key to select the time units.

3. Set the type of demodulation as follows:

   a. Press the Demod Type xxxxxx soft key.

   b. Press the soft key for the type of demodulation you want (AM, FM Wide Band, FM Narrow Band).

Figure 16   Demodulate Signal, Frequency and Span Screen
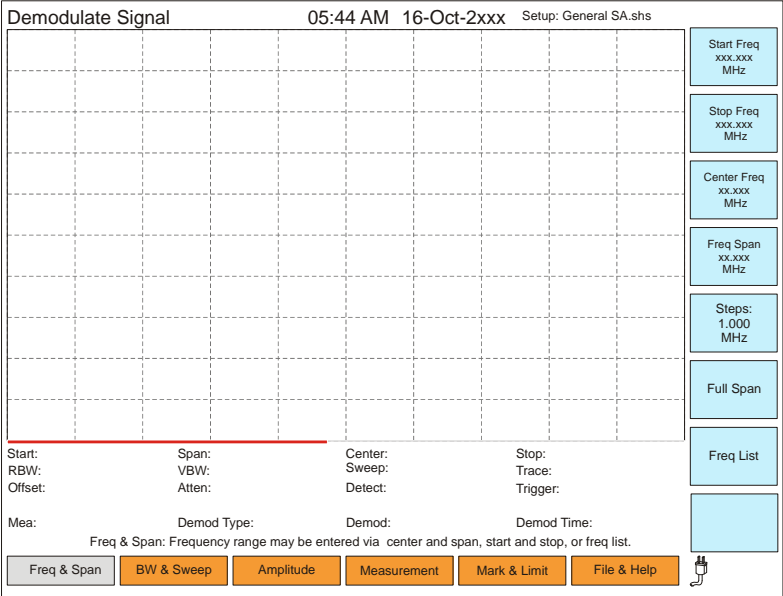
Chapter 3   **Power Measurements**

Introduction

Power measurements verify and monitor the condition of a transmitter system. To measure transmitter power, connect an external power sensor to the Signal Hawk then select the Power Meter mode from the Start Menu screen. Power sensors that are compatible with the Signal Hawk are the Bird 5010B, the Bird 5011, and the Bird 5012 (Fig. 17). The Power Meter mode has the following features:

- Display forward power, reflected power, match efficiency, peak power, burst, and crest factor depending upon the capabilities of the sensor.

- Display power measurements in Watts or dBm.

- Display match units in either VSWR, return loss, or % match efficiency.

Figure 17   Signal Hawk Compatible Sensors, Bird 5012 (top), Bird 5010B (center), Bird 5011 (bottom)

Connecting a Sensor

> CAUTION
> Always turn off the Signal Hawk before connecting or
> disconnecting a sensor.

In electronic devices that contain firmware (program instructions stored in a special circuit chip), there always exists a slight risk of damaging the firmware if the devices are connected or disconnected while power is applied. To prevent firmware damage, always turn off the Signal Hawk before connecting or disconnecting a power sensor.

Use a 9-pin serial cable to connect a power sensor to the Signal Hawk's serial port, labeled "RS-232" (Figure 18). If no power sensor is connected or detected, the Power Meter screen displays the message Acquiring Power Sensor (Fig. 19). The screen also displays this message during the time a power meter is being detected. When a power sensor is properly connected (and detected), the status message (at the top of the Power Meter screen) will indicate the model number of the power sensor (i.e. Bird model number) (Figure 20).

> **CAUTION**
> +20 dBm (100 mW) max. input.
> Do not apply high-power RF to the RF In test port.
> Exceeding the maximum input will damage the
> Signal Hawk.

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

For best results with element-based power sensors such as the Bird 5010B, connect the sensor and enter the forward element's power rating before taking data (refer to Power Measurement Settings, Configure, Forward average -).

Figure 18   Connecting the Signal Hawk to Measure Power
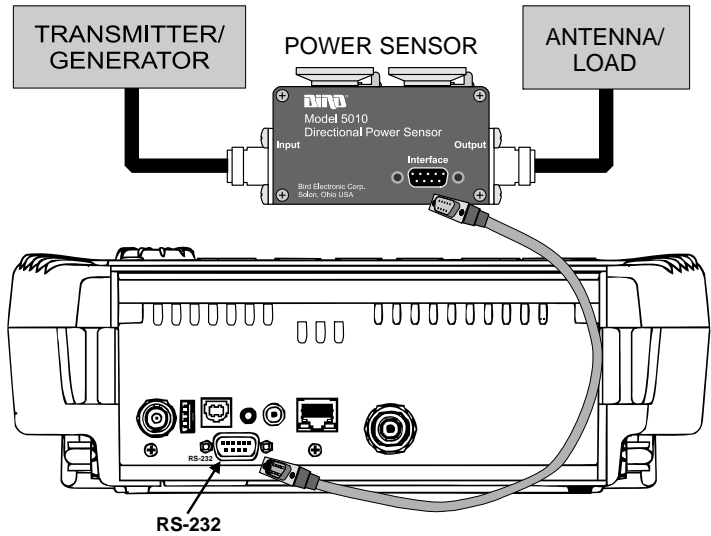
Figure 19   Acquiring a Power Sensor
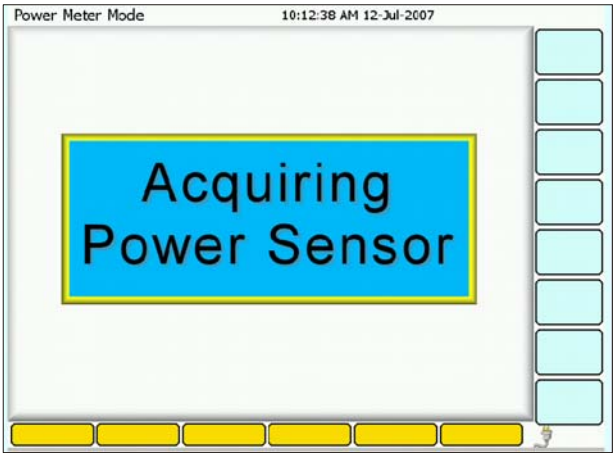
Figure 20   Power Meter, Digital Display, Screen Features (with Bird 501B sensor)

Item	Description
1	Identification of power sensor connected to unit.
2	Function of soft keys
3	Power source indicator for instrument (ac power shown)
4	Function of menu keys
5	Help tip for current screen
6	Measured and calculated values
7	Measurements or values not selected for large display.
8	Value of measurement selected for large display.
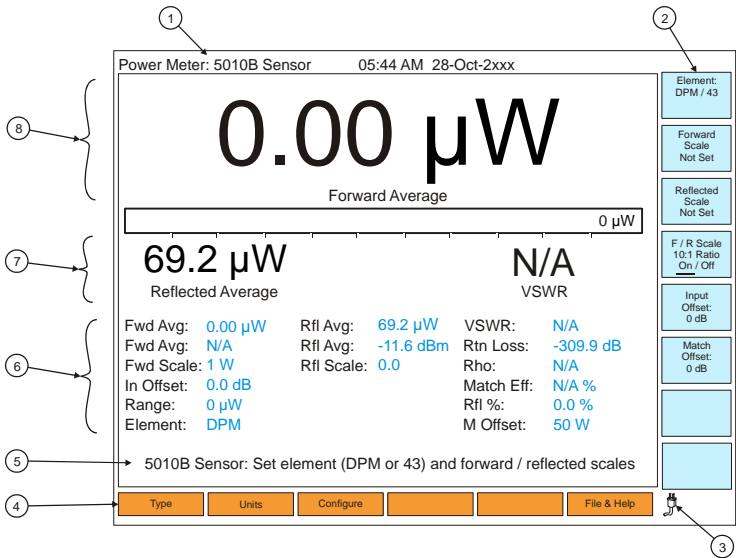
Power Meter Measurement (external power sensor)

When the Signal Hawk is connected to an external power sensor, the function of menu keys and soft keys on the first Power Meter screen (Figure 20) vary according to the capabilities of the sensor being used.

Typical functions are for selecting the type of measurement, type of element, units of measure, measurement scales, offset values, and zeroing the sensor.

Quick Start - Measure Power with External Bird 5010B Power Sensor

1. With power turned off, connect a communication cable from the Signal Hawk RS-232 port to an external Bird power sensor that is connected to a transmission system.

2. Turn on Signal Hawk, press the Power Meter menu key at the Start Menu, select External Power Sensor from the list, and press Enter.

3. After Signal Hawk acquires the sensor, use the soft keys to specify the type of element (DPM or type 43) (Fig. 21).

4. Press the Forward Scale soft key then use the up- and down-arrow keys to enter the wattage value of the forward element.

5. Press the Type menu key then press the Forward Average soft key. The Forward Average value displays in large characters at the top of the screen.

6. Press the Units menu key then press the Power: Watts soft key.

Figure 21   Power Meter, Digital Display, Initial Screen (Bird 5010B sensor)
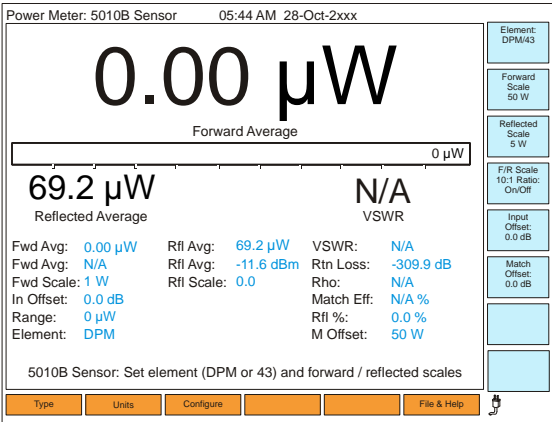
For more information about all soft key features available for each menu key, refer to the Power Measurement Settings section.

Quick Start - Measure Power with External Bird 5011 Power Sensor

1. With power turned off, connect a communication cable from the Signal Hawk RS-232 port to an external Bird power sensor that is connected to a transmission system.

2. Turn on Signal Hawk, press the Power Meter menu key at the Start Menu, select External Power Sensor from the list, and press Enter.

3. After Signal Hawk acquires the sensor, press the Configure menu key (Fig. 22) then press the Power: Watts soft key.

4. If the input to the power sensor is intentionally attenuated, press the Input Offset: soft key and use the key pad to enter the amount of attenuation applied to the signal.

Figure 22   Power Meter, Digital Display, Initial Screen (Bird 5011 sensor)
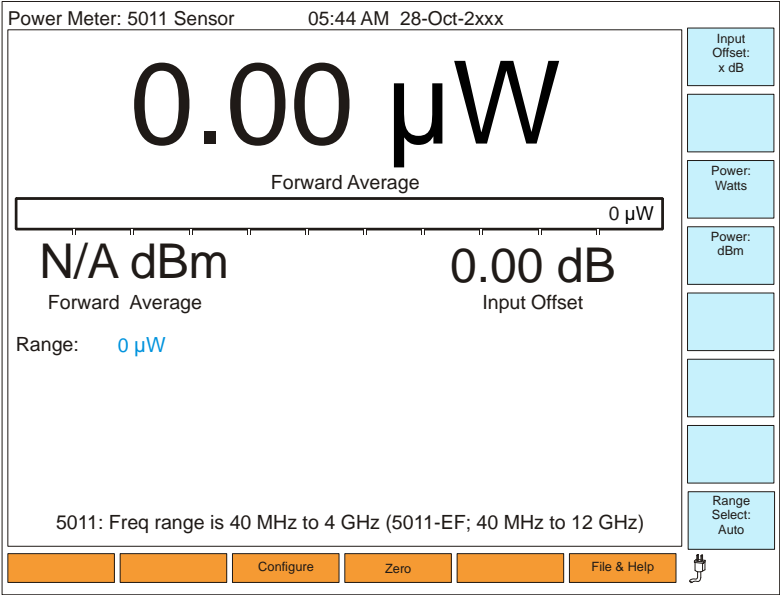
For more information about all soft key features available for each menu key, refer to the Power Measurement Settings section.

Quick Start - Measure Power with External Bird 5012 Power Sensor

1. With power turned off, connect a communication cable from the Signal Hawk RS-232 port to an external Bird power sensor that is connected to a transmission system.

2. Turn on Signal Hawk, press the Power Meter menu key at the Start Menu, select External Power Sensor from the list, and press Enter.

3. After Signal Hawk acquires the sensor, press the Type menu key (Fig. 23) then press the Forward Average soft key. The screen displays forward average power in large characters at the top of the screen.

4. Press the Units menu key then press the Power: Watts soft key.

5. If the input to the power sensor is intentionally attenuated, press the Configure menu key then press the Input Offset: soft key and use the key pad to enter the amount of attenuation applied to the signal. Press the Enter key to close the dialog box.

Figure 23   Power Meter, Digital Display, Initial Screen (Bird 5012 sensor)
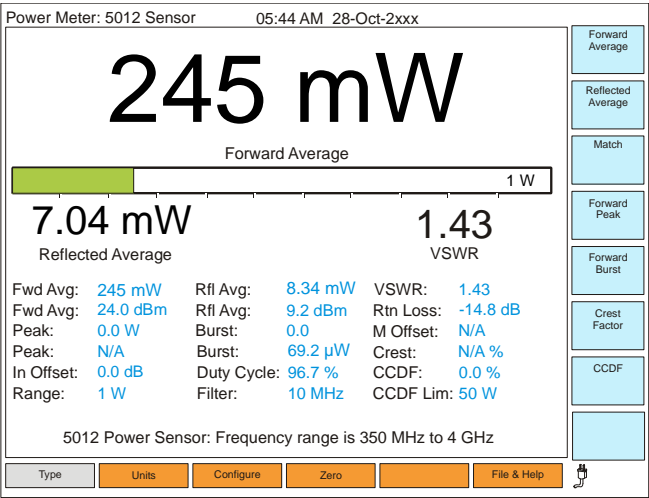
For more information about all of the soft key features available for each menu key, refer to the Power Measurement Settings section.

Chapter 4   **Power Measurement Settings**

Introduction

Power measurements verify and monitor the output of a transmitter system. To measure transmitter power, connect an external power sensor to the Signal Hawk then select the Power Meter mode from the Start Menu screen. The Power Meter mode has the following features:

- Display forward power, reflected power, match efficiency, peak power, burst, and crest factor depending upon the capabilities of the sensor.

- Display power measurements in Watts or dBm.

- Display match units in VSWR, return loss, or % match efficiency.

When the Signal Hawk is connected to an external power sensor, the function of menu keys and soft keys vary according to the capabilities of the sensor being used. Typical functions are for selecting the type of measurement, type of element, units of measure, measurement scales, offset values, and zeroing the sensor.

For information about connecting Signal Hawk to an external power sensor, a list of compatible power sensors, and a description of the Power Meter screen features, refer to the Power Measurements section.

Menu Keys and Associated Soft Key Features

When you set Signal Hawk to the Power Meter function, one or more of the following menu keys will be available depending upon the capabilities of the sensor being used: Type, Units, Configure, Zero, File & Help

Type

Not all power sensors have the Type selection option. When you press the Type menu key, you enable the soft key functions that select the primary measurement to be made (such as forward average power, reflected average power, match). Specific measurement types depend upon the power sensor being used (Fig. 24, 5010B sensor or Fig. 25,

5012 sensor). The measurement you select will display in large characters above the bar graph. The remaining measurements will display in smaller characters below the bar graph. If one of the measurements is not available or does not apply to the current application, it will be identified as N/A (not applicable).

Figure 24   Power Meter, Digital Display, Type Screen (Bird 5010B sensor)
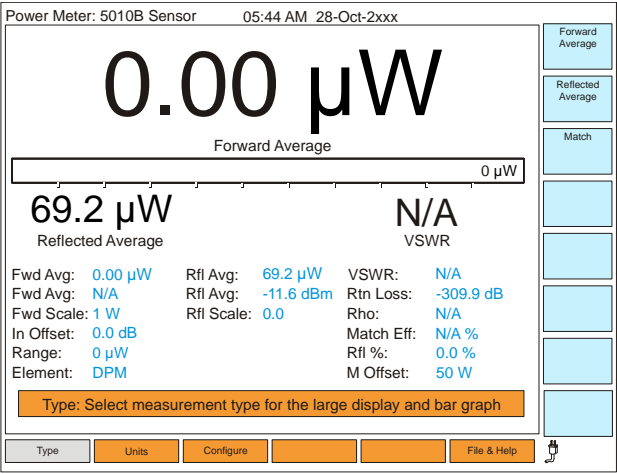
Figure 25   Power Meter, Digital Display, Type Screen (Bird 5012 sensor)
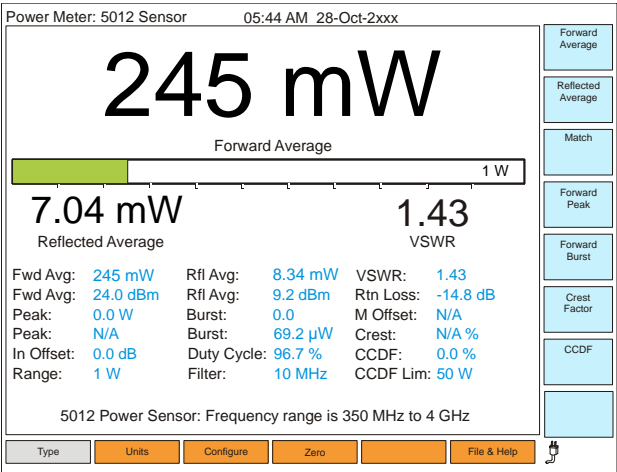
Soft Key Features for the Type Menu Key

Some soft key features will not be available for certain power sensors.

Forward average - Measure the forward average power of the transmitter.

Reflected average - Measure the reflected average power of the transmitter.

Match - Measure the match between the transmitted forward average power and the reflected average power.

Forward peak - Measure the transmitted forward power peak.

Forward burst - Measure the average power of a transmitted pulse. For additional information about burst, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

Crest factor - Measure the difference between the peak power and the average power. For additional information about crest factor, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

CCDF (complimentary cumulative distribution function) - Measure the amount of time that the power is above a pre-defined limit (the CCDF Limit) This feature is available only with the Bird 5012 power sensor. For additional information about CCDF, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

For additional information about options for Type, refer to the Signal Hawk Refernece Manual.

Units

Not all power sensors have the Unit selection option. When you press the Units menu key, you enable the soft key functions that select the units of measure (Fig. 26). For power measurements, you can select watts or dBm. For match measurements, you can select VSWR, dB, rho, and percent (%).

Figure 26   Power Meter, Digital Display, Units Screen (soft keys are typical for all sensors, 5010B shown)
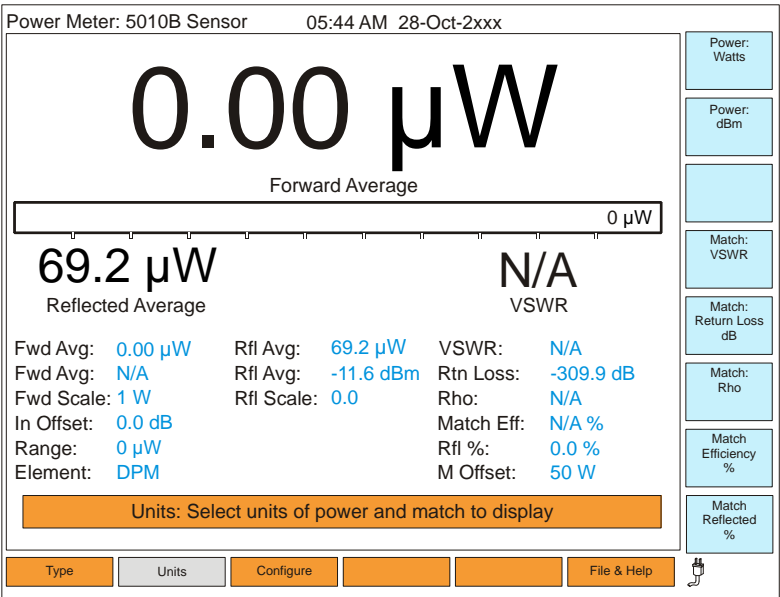
Soft Key Features for the Unit Menu Key

Some soft key features will not be available for certain power sensors.

Power: Watts - Measure power in watts.

Power: dBm - Measure power in dBM.

Match: VSWR - Measure match, a complex ratio of reflected average power to forward average power expressed in VSWR.

Match: Return Loss dB - Measure match, a complex ratio of reflected average power to forward average power expressed in dB.

Match: Rho - Measure match, a complex ratio of reflected average power to forward average power expressed in Rho.

Match Efficiency % - Measure match, a complex ratio of reflected average power to forward average power ecpressed in percent effeciency.

Match Reflected % - Measure match, a complex ratio of reflected average power to forward average power expressed in percent.

For additional information about options for Units, refer to the Signal Hawk Refernece Manual.

Configure

When you press the Configure menu key, you enable the soft key functions that allow you to specify setup information about the sensor and the measurement, such as the type of element in the power sensor, offsets for input and match, duty cycle, and the scale for forward and reflected power. Specific configuration features depend upon the power sensor being used (Fig. 27 5010B sensor, Fig. 28 5011 sensor, Fig. 29 5012 sensor).

Figure 27   Power Meter, Digital Display, Configure Screen (Bird 5010B sensor)

```
Power Meter: 5010B Sensor          05:44 AM  28-Oct-2xxx          ┌──────────┐
                                                                  │ Element: │
                                                                  │ DPM/43   │
                                                                  ├──────────┤
           0.00 µW                                                │ Forward  │
                                                                  │ Scale    │
                                                                  │ 50 W     │
               Forward Average                                    ├──────────┤
                                                                  │ Reflected│
  ┌──────────────────────────────────────────────┐    0 µW       │ Scale    │
  └──────────────────────────────────────────────┘               │ 5 W      │
                                                                  ├──────────┤
      69.2 µW                          N/A                        │ F/R Scale│
     Reflected Average                 VSWR                       │ 10:1 Ratio:│
                                                                  │ On/Off   │
  Fwd Avg:   0.00 µW    Rfl Avg:  69.2 µW    VSWR:     N/A         ├──────────┤
  Fwd Avg:   N/A        Rfl Avg:  -11.6 dBm  Rtn Loss: -309.9 dB   │ Input    │
  Fwd Scale: 1 W        Rfl Scale: 0.0       Rho:      N/A         │ Offset:  │
  In Offset: 0.0 dB                          Match Eff: N/A %      │ 0.0 dB   │
  Range:     0 µW                            Rfl %:    0.0 %       ├──────────┤
  Element:   DPM                             M Offset: 50 W        │ Match    │
                                                                  │ Offset:  │
  ┌────────────────────────────────────────────────────┐         │ 0.0 dB   │
  │ Configure: Set element (DPM or 43) and forward / reflected scales │    ├──────────┤
  └────────────────────────────────────────────────────┘         │          │
                                                                  ├──────────┤
  [  Type  ] [  Units  ] [ Configure ] [        ] [        ] [ File & Help ] │          │
```

Figure 28   Power Meter, Digital Display, Configure Screen (Bird 5011 sensor)

```
Power Meter: 5011 Sensor          05:44 AM  28-Oct-2xxx          ┌──────────┐
                                                                  │ Input    │
                                                                  │ Offset:  │
           0.00 µW                                                │ x dB     │
                                                                  ├──────────┤
               Forward Average                                    │          │
                                                                  ├──────────┤
  ┌──────────────────────────────────────────────┐    0 µW       │ Power:   │
  └──────────────────────────────────────────────┘               │ Watts    │
                                                                  ├──────────┤
     N/A dBm                      0.00 dB                         │ Power:   │
    Forward  Average              Input Offset                    │ dBm      │
                                                                  ├──────────┤
  Range:     0 µW                                                 │          │
                                                                  ├──────────┤
                                                                  │          │
                                                                  ├──────────┤
  ┌────────────────────────────────────────────────────┐         │ Range    │
  │ Configure: Setup power meter and sensor parameters │          │ Select:  │
  └────────────────────────────────────────────────────┘         │ Auto     │
                                                                  └──────────┘
  [        ] [        ] [ Configure ] [  Zero  ] [        ] [ File & Help ]
```
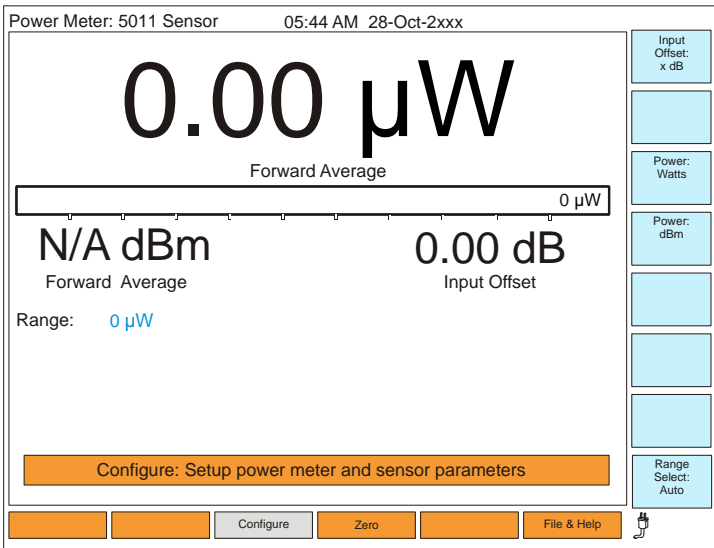
Figure 29   Power Meter, Digital Display, Configure Screen (Bird 5012 sensor)
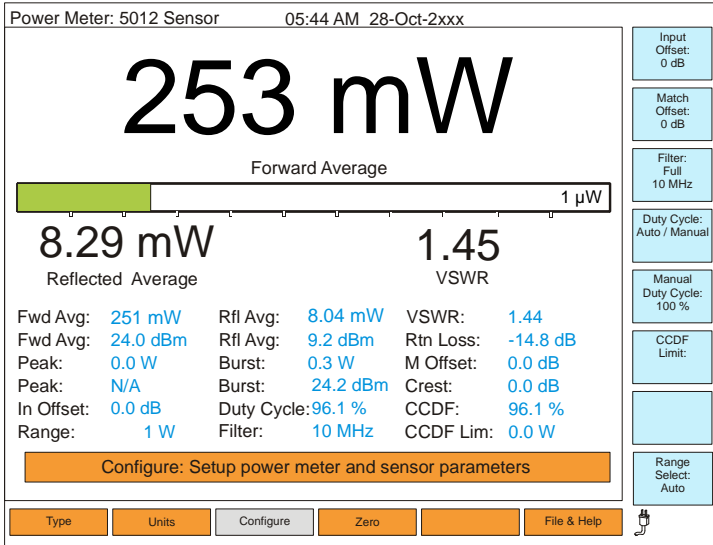
Quick Setup - Configure Sensor and Instrument

1. With power turned off, connect a communication cable from the Signal Hawk RS-232 port to an external Bird power sensor.

2. Turn on Signal Hawk, press the Power Meter menu key at the Start Menu, select External Power Sensor from the list, and press Enter.

3. After Signal Hawk acquires the power sensor, press the Confgure menu key.

For the following steps, if the soft key feature exists, perform the action indicated.

4. Press the Power: Watts soft key (sensor: 5011).

5. Press the soft key to select the type of element (sensor: 5010B)

6. Press the Forward Scale soft key then use the arrow keys to enter the watt rating of the forward element (sensor: 5010B).

7. Press the F/R Scale 10:1 Ratio: soft key to select ON (sensor: 5010B).

8. Press the Input Offset: soft key and use the key pad to enter the amount of attenuation then press the Enter key (sensor: 5010B, 5011, 5012).

9. Press the soft key to select Auto duty cycle (sensor: 5012).

10. Press the soft key to select Auto range (sensor: 5012).

For additional information about options for Configure, refer to the Signal Hawk Refernece Manual.

Soft Key Features for the Configure Menu Key

Some soft key features will not be available for certain power sensors.

Element - Select the type of element that is in the power sensor, choose from Bird type DPM or Bird type 43.

Forward scale- Set the measurement scale for forward measurements by entering the power rating of the forward element installed in the sensor. Use the up- and down-arrow keys to enter the value.

Reflected scale - Set the measurement scale for reflected measurements by entering the power rating of the reflected element installed in the sensor. Use the up- and down-arrow keys to enter the value.

F/R Scale 10:1 Ratio - Specify the power ratio between the forward element and the reflected element installed in the sensor. Press this soft key to select either ON or OFF. The default value is ON. When set to ON, the value of the reflected scale will be automatically set to 1/10th the value you enter for the forward scale.

Input Offset - Use the key pad to enter the value of any known external attenuation inserted between the signal source and the Signal Hawk connector.

Power: Watts - Measure power in watts.

Power: dBm - Measure power in dBM.

Match Offset - Use the key pad to enter the value of any known cable loss (attenuation) inserted between the signal source and the Signal Hawk connector.

Filter: Full - Press this key to select a video filter value. Narrowing the filter limits noise contributed by interference signals. Press the soft key to select one of three filter values: Full (10 MHz), Medium (400 kHz), or Low (4.5 kHz). For additional information about video filtering, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

Duty Cycle: - Press this key to measure the signal duty cycle, select Auto or Manual, the default setting is Auto. For additional information about duty cycle, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

Manual Duty Cycle: - Use this feature if the duty cycle is known and if the burst is less than 10 W. Press this soft key then use the key pad to enter the duty cycle percent.

CCDF Limit (complimentary cumulative distribution function) - Press this soft key then use the key pad to enter a wattage limit for CCDF. Set the limit before you select the CCDF measurement Type. For additional information about CCDF, refer to the owner's instruction book for the Bird 5012 Wide Band Power Sensor.

Range Select: - Press this soft key to select the range for the bar graph display, the default is Auto. The range is from 100 µW to 1 MW and Auto in the following sequence: Auto, 100 µW, 1 mW, 10 mW, 100 mW, 1 W, 10 W, 100 W, 1 kW, 10 kW, 100 kW, 1 MW, 150 mW, 1.5 W, 15 W, 150 W.

Zero

The Zero menu key is not available for all power sensors. When you press the Zero menu key, you enable the Start Zero Calibration soft key which begins the zero calibration of the sensor (Fig. 30 5011 sensor, Fig. 31 5012 sensor).

45

Figure 30   Power Meter, Digital Display, Zero Screen (Bird 5011 sensor)

Power Meter: 5011 Sensor	05:44 AM 28-Oct-2xxx	

0.00 µW

Forward Average

0 µW

N/A dBm
Forward Average

0.00 dB
Input Offset

Range: 0 µW

Start Zero Calibration

Zero: Ensure no RF power is applied and press Start Zero Calibration

Configure	Zero	File & Help
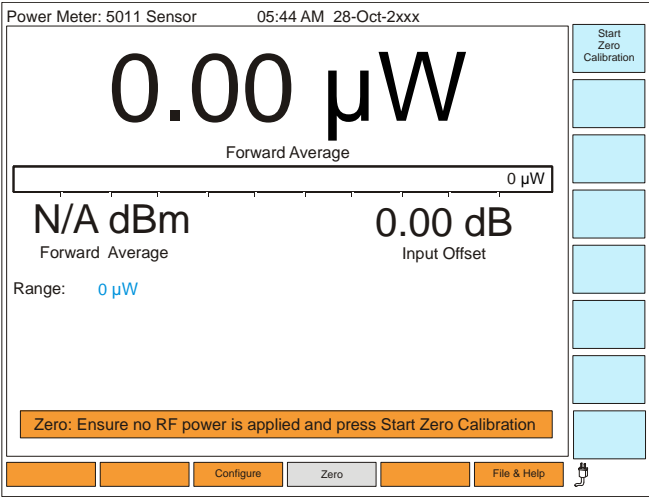
Figure 31   Power Meter, Digital Display, Zero Screen (Bird 5012 sensor)

Power Meter: 5012 Sensor	05:44 AM 28-Oct-2xxx	

253 mW

Forward Average

1 µW

8.29 mW
Reflected Average

1.45
VSWR

Fwd Avg:	251 mW	Rfl Avg:	8.04 mW	VSWR:	1.44
Fwd Avg:	24.0 dBm	Rfl Avg:	9.2 dBm	Rtn Loss:	-14.8 dB
Peak:	0.0 W	Burst:	0.3 W	M Offset:	0.0 dB
Peak:	N/A	Burst:	24.2 dBm	Crest:	0.0 dB
In Offset:	0.0 dB	Duty Cycle:	96.1 %	CCDF:	96.1 %
Range:	1 W	Filter:	10 MHz	CCDF Lim:	0.0 W

Start Zero Calibration

Zero: Ensure no RF power is applied and press Start Zero Calibration

Type	Units	Configure	Zero	File & Help

46

Quick Setup - Zero a Sensor

1. With power turned off, connect a communication cable from the Signal Hawk RS-232 port to an external Bird power sensor.

2. Turn on Signal Hawk, press the Power Meter menu key at the Start Menu, select External Power Sensor from the list, and press Enter.

3. After Signal Hawk acquires the power sensor, press the Zero menu key.
Press the Start Zero Calibration soft key

Soft Key Features for the Zero Menu Key

Some soft key features will not be available for certain power sensors.

File & Help

When you press the File & Help menu key, you enable soft keys for saving the current trace, selecting the utility option, activating the logging feature, and and accessing help features (Fig. 32). A trace is saved as a file and stored in the internal memory of the instrument. Using the PCTool utility that is supplied on the CD that ships with the instrument, stored files can be copied or moved from the internal memory to an external storage device.

Figure 32 Power Meter, Digital Display, File & Help Screen (typical soft keys for all sensors)
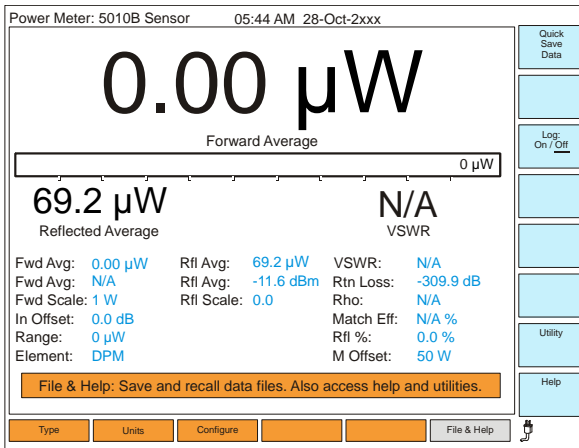
Soft Key Features for the File & Help Menu Key

Some soft key features will not be available for certain power sensors.

Quick Save Data - Press this soft key to save the data that is displayed on the screen. The saved data is stored as a file in the internal memory of the instrument. Each quick save is stored in a separate file that is named using the date-time file naming format *PwrYYYYMMD-DHHMMSS.csv* where YYYY is the year, the first MM is the month, DD is the day, HH is the hour, the second MM is the minute, and SS is the second of the time when the file was saved. The data files can be viewed by any software program that can read a comma separated value (.csv) format (such as a spreadsheet).

☞ **Note:** The spreadsheet viewer that is part of the Signal Hawk operating system is not sufficiently robust to read the data files.

Using the PCTool utility supplied on the CD that ships with the instrument and ActiveSync® (version 4.2 or later), you can copy or move stored files from the internal memory to an external storage device.

☞ **Note:** Download the latest version of ActiveSync® at the Microsoft® web site.

Log: On / Off - Press this soft key to activate or deactivate the internal logging feature. When logging is ON, a thin line appears under the word ON on the soft key text and the screen displays the logging icon below the bar graph (Figure 33). When logging is OFF, a thin line appears under the word OFF.

Logging captures and stores the set of data that is sent from the external power sensor and displayed on the screen. While logging is ON, each set of data is stored as text on a separate line in the same computer file. Logging stops when you press the Log: On / Off soft key. The log file is named using the date and time file naming convention *PwrYYYYMMDDHHMMSS.csv* where YYYY is the year, the first MM is the month, DD is the day, HH is the hour, the second MM is the minute, and SS is the second of the time when the file was saved.

When the logging feature is ON, you can elect to log (store) every data set received or one set from a group. Press the up- or down-arrow keys to change the number of data sets to store. The options are:

- 1 of 1 - store every data set received

- 1 of 10 - store every tenth data set received

- 1 of 100 - store every one-hundredth data set received

- 1 of 1000 - store every one-thousandth data set received

Figure 33 Power Meter, Digital Display, Log Feature ON (log icon is circled)

| Power Meter: 5010B Sensor | 05:44 AM 28-Oct-2xxx |

0.00 μW

Forward Average

0 μW

69.2 μW
Reflected Average

N/A
VSWR

Fwd Avg:	0.00 μW	Rfl Avg:	69.2 μW	VSWR:	N/A
Fwd Avg:	N/A	Rfl Avg:	-11.6 dBm	Rtn Loss:	-309.9 dB
Fwd Scale:	1 W	Rfl Scale:	0.0	Rho:	N/A
In Offset:	0.0 dB			Match Eff:	N/A %
Range:	0 μW			Rfl %:	0.0 %
Element:	DPM			M Offset:	50 W

Enables or disables data logging to a local file. Rate: 1 of 1

| Type | Units | Configure | | | File & Help |

Quick Save Data

Log: On / Off

Utility

Help

Utility - Press this soft key to leave the Power Meter function and go to the Utility Menu (Fig. 34). When you access the utility menu, you activate new menu keys and soft keys for getting help, setting the date and time, peforming certain unit diagnostics, adjusting the backlight brightness, and exiting to the Windows operating system. The Utility Menu screen displays status information about the instrument and about the operating system. For a full discussion about the Signal Hawk utilities, refer to the Utilities section.

Figure 34   File and Help, Utility Screen

Utility Menu	05:44 AM	09-Jan-2xxx

Bird Technologies Group
30303 Aurora Road
Solon, Ohio 44139-2794
USA

Phone: 886-695-4569
Www.bird-technologies.com

Application Version:	X.X.XXXXXXXX	Temperature:	212 F (100 C)
Model:	SH-36S	Internal Storage:	67.9% available
Serial Number:	00000001	External Storage:	Not Present
DSP Version:	X.X	Internal RAM:	61.5% available
		Battery Status:	100% charged
Build Number:	122206DP		

Quick Start Guide

User Manual

Date Time

Unit Diagnostics

Backlight Control

Exit To Windows

Version Info

Chapter 5 Maintenance

Cleaning

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

Clean the Bird Signal Hawk only 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 will automatically recharge when the Signal Hawk is powered from the ac or cigarette lighter adapter. Recharging time, from a full discharge, is approximately 4 hours.

Battery Replacement

1. Lay the instrument, display side down, on a clean non-abrasive surface.

2. Remove the two screws and the battery cover. Refer to Figure 35, page 54.

   ☞ **Note:** The large screw in the battery cover is a captive screw that does not separate from the cover.

3. Disconnect the battery cable connector (Figure 36, page 55) and use the pull tab to remove the old battery pack from the battery compartment (Figure 37, page 55).

4. Insert the new battery into the battery compartment then connect the battery cable.

5. Replace the battery cover and secure the two screws.

6. Connect the AC adapter to the unit.

7. Apply power to the unit and verify that it operates properly

8. Charge the battery if needed

Figure 35   Removing Battery Cover Screws

.
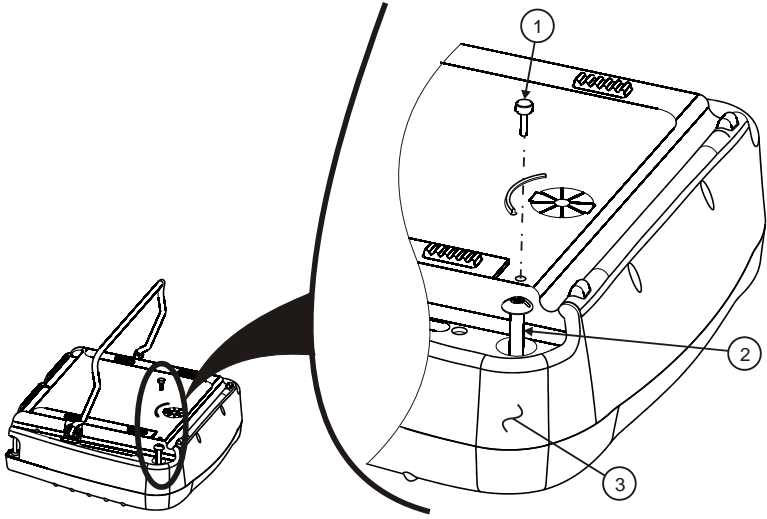
Item	Description
1	Battery cover screw, removeable
2	Battery cover screw, captive
3	Battery cover

Figure 36   Battery Connector

Figure 37   Removing the Battery

Troubleshooting

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

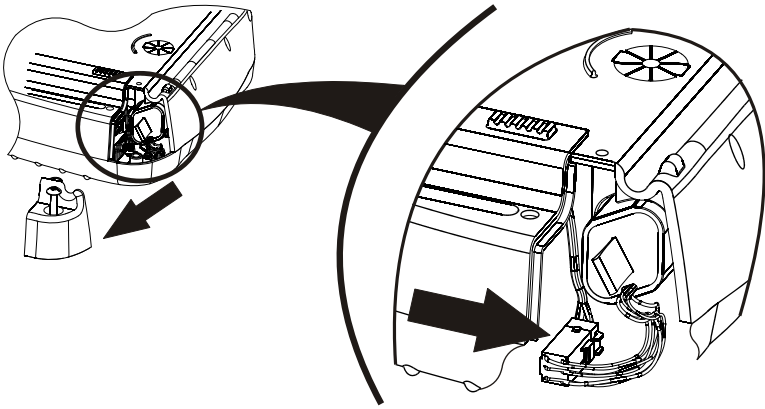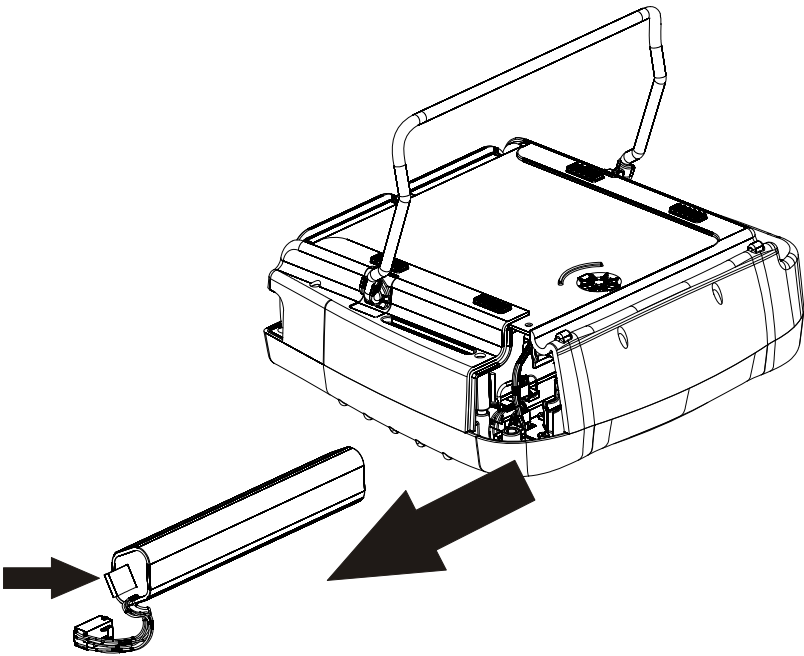Locate the problem, review the possible causes, and perform the action listed. If the problem is not corrected, give us a call or return the unit for service.

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 damaged	Replace the ac adapter.
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 smaller.
	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 keys beep when pressed without performing any function	Context switching operations taking place	Wait for screen changes to complete before.
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	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	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.

Problem	Possible Cause	Possible Correction
	Unit was last shut down because the battery was too low to operate the unit	Operate the unit from the AC adapter
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.
Unit operates erratically	System has become unstable.	Turn off power, wait 15 seconds, then reapply power.
Unit ceases to operate (locks up)	System has become unstable.	Turn off power, wait 15 seconds, then reapply power.

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

Specifications

Frequency	
Range	100 kHz to 3.6 GHz
Resolution	1 Hz
Uncertainty	± 1 ppm (2σ) of measured frequency
Aging	± 1 ppm / year (2σ)
Temperature drift	± 2 ppm / °C (2σ)
Span	1 kHz to 3.5999 GHz; 0 Hz (zero span)
Spectral Purity, Max @ 1 GHz	
30 kHz from carrier	-85 dBc / (RBW Hz)$^{1/2}$
100 kHz from carrier	-100 dBc / (RBW Hz)$^{1/2}$
1 MHz from carrier	-124 dBc / (RBW Hz)$^{1/2}$
Sweep Time:	2 s, full span; 1 ms to 100 s, zero span
Displayed Data Points	705
Resolution Bandwidth (RBW):	100 Hz to 1 MHz in 1, 3, 10 steps
Video Bandwidth (VBW):	10 Hz to 300 kHz in 1, 3, 10 steps

Amplitude	
Display Range	-150 dBm to +30 dBm
Intermodulation-Free Dynamic Range	66 dB; Third-order IM products, Two -20 dBm inputs, Reference = -10 dBm
Accuracy	± 1.5 dB max (2σ), ±1.0 dB typical, >-50 dB ref, 15 to 35 °C, max detector
Displayed Average Noise Level (DANL)	-135 dBm; 24 dB gain, 100 Hz RBW, 10 Hz VBW, average detection
Reference Level	-140 dBm to +30 dBm
Units	dBm, µW, mW, W, dBµV, dBmV, dBV, µV, mV, V, dB/m^2, µV/m^2
Offset Range	-99 to +99 dB
Attenuator	Built-in: 0, 10, 20, 30 dB
Pre-Amp	Built-in: +24 d
Inherent Spurious	-80 dBm, reference ≤ -10 dBm, f > 30 MHz, RBW ≤ 100 kHz
Input-Related Spurious	-70 dBc; mixer level ≤ -30 dBm, carrier offset ≥ 1 MHz

Resolution
  dB-based units
  W or V-based units
	1 to 15 dB per division in 1 dB steps
	1%, 2%, 5%, or 10% of reference level per division

Measurements	
Spectrum Analysis	Analyzes radio frequency spectrum. Measures intended and interfering signals. Allows setup of parameters such as frequency, amplitude and markers. Graphically displays signals amplitude vs. frequency and saves traces.
Worldwide Applications	Cellular, PCS, DCS, 2 G, 3 G, CDMA, cdmaOne, CDMA 2000, 1x, 1x EV-DO, GSM, GPRS, EDGE, UMTS, HSDPA, W-CDMA, TDMA, AMPS, 802.11, Bluetooth, Broadcast, Emergency, Fire, GPS, HDTV, IBOC, Microwave, NPSPAC, Paging, Police, Private, Project 25, Public Safety, Tactical Military, Telematics, Tetra, Trunking, Utilities, WiMAX, WLAN and WLL.
Single-Button Measurements	Spectrum Analysis, Occupied Bandwidth (OBW), Channel Power, Adjacent Channel Power Ratio (ACPR), Field Strength, Zero Span, AM/FM Demodulation, Carrier-to-Interference Ratio (C/I), and Frequency Counter. The user manual includes step-by-step procedures for these one-button measurements as well as Out-of-Band Spurious and In-Band, Out-of-Channel Spurious measurements.
Power Meter	Supports external power sensor models 5012, 5010B, 5011, 5011-EF, 5010T and 5010. Connect sensors via RS-232 port. Power sensors are optional accessories.
One-Button Setup	Press the setup button and select configuration from the setup list. Setups may also be saved to the list.
Help Functions	Help menu displays on-board user manual. Tip line provides helpful hints with each key stroke. Clear pocket on inside cover for quick start instruction card and test procedures.
Averaging	Running display average, 2 to 1024 sweeps
Detection Modes	Positive peak, negative peak, sample, average
Trigger Modes	Continuous, single
Trigger Sources	Internal, external TTL, internal video

External Trigger types	Rising edge, falling edge, any edge, trigger on HIGH, trigger on LOW
External trigger level	TTL Levels
External trigger delay	User-settable, 100 µs to 1000 ms after trigger received before starting sweep
External trigger connector	BNC(F)
Markers	6 Markers; Modes: On/Off, Standard, Marker to Max Peak, Marker to Next Peak, Marker Freq to Center, Marker Ampt to Ref Level, Marker Delta, Marker Type Line/Icon, Marker Noise, Freq Counter, All Marker to Peaks, All Markers Off. Also, Marker to Max/Min Peak via Up/Down Arrow Keys, Marker Left/Right via Left/Right Arrow Keys and Wheel.
Internal Memory	Store 300 traces and setups
USB Drive	May store 90,000 traces and setups on 1 GB USB drive standard accessory. The contents of the internal memory can be copied to and from a removable USB drive. Note, USB drive must be Windows CE compatible.
Windows CE	Includes Microsoft Word Viewer, Excel Viewer, Power Point Viewer, PDF and Image Viewers. Also, WordPad, Media Player, Internet Explorer and Messenger. Use of USB mouse and hub recommended (see optional accessories).
User Interface	Reference the user manual for further details.

General	
Model	Name: Signal Hawk Model: SH-36S Component: Spectrum Analyzer
Housing	PC/ABS housing, rubber over-mold and shock-mounted hardware.

General	
Display	8.4" diagonal (34 sq in), TFT, LCD, full color, SVGA, 800 x 600 pixels, 120 dpi, dual-backlight, viewable indoors and outdoors
Ambient Light Sensor	Ambient light sensor automatically adjusts display backlight when in auto backlight mode.
Keypad	Single-piece integrated unit is sealed to protect against water. Also protects against impacts to display.
Buttons	Power On/Off, Mode, Setup, Enter, Escape/Back keys Left, right, up, and down arrow keys and rotating wheel 6 yellow soft keys along bottom of display 8 blue soft keys to right of display 12-key numeric keypad (0-9.+/-)
Power Indicator	Green LED labeled "Power". On continuously when operating.
Charge Indicator	Amber LED labeled "Charge". Slow blink rate (2.5 s) when charging battery On continuously when battery fully charged Rapid blinking when battery disconnected, failed or wall adaptor problem.
Audio	Internal speaker and external headphone
Connectors	N(F) for RF input 2.5mm DC Jack for AC adapter/charger external power USB Type A for USB drive and accessories USB Type B for PC connection RS-232 DB-9(F) for external power sensors BNC(F) for external trigger 3.5mm for mini-headphone RJ-45 LAN jack for factory diagnostics only
RF Input Impedance	50 ohms, nominal
RF Input VSWR	1.8:1 typ, 2.0:1 max (internal attenuator = 10dB or greater)
Maximum RF Input	+20 dBm; damage level is +30dBm for 30 sec
Maximum DC input	± 50 V

General	
Lanyard Connect	Two reinforced features for attaching a lanyard and/or other quick attach/release connector. Reinforcing supports > 10 lbs.
Stand	Stand can open to angles of 15°, 45°, 180° or close flat. May use as desk/bench top stand, carry handle, or hook hanger.
Soft Carry Case	Includes 2 carry handles, shoulder strap, cover flap with clear pocket (insert quick start card), zippered back pocket (insert quick start manual, etc.), 2 clear connector covers (velcro back for access and forward for weather protection, antenna may protrude between covers). Also, detachable accessory pouch with 3-snap cable holder. Note, do not block air flow intake (round opening on back).
Rain Flap	May attach to further protect connectors from weather. Not required under normal conditions. Consists of 2 flaps and a bar. Attaches with 2 screws and 4 prongs on connector panel.
AC Adapter/Charger	External DC power supply, 15 Vdc, 5 A (65 W) max, 2.5mm pin connector
Internal Battery	Rechargeable, field replaceable, lithium-ion battery. 8.8 A-hr capacity, 5.5 hours continuous operation, extends to 7.5 hours with display backlight on low, 25°C.
Warm-Up	Specifications apply after a 30 minute warm-up period at ambient temperature. Typical values are provided for reference and are not guaranteed.
Operating Temperature	0 to 50 °C (MIL-PRF-28800F, Class 3)
Storage Temperature	-20 to +80 °C Note: If storing above 60°C for prolonged periods it is recommended that the battery be stored separately
Humidity, Max	95% non-condensing (MIL-PRF-28800F, Class 2)
Altitude, Max	4600m above sea level (MIL-PRF-28800F, Class 2)
Weight, with battery, Max	7.8 lbs

General	
Dimensions, Max	11.5 x 10.5 x 3.8 inches (29.2 x 26.7 x 9.6 cm)
CE Compliance	61326:1997 +A1:1998 and A2:2001 - EMC 61010-1:2001 - Safety 89/336/EEC - EMC 73/23/EEC and Amendment 93/68/EEC - Low Voltage
Drop Tested	1 meter drop in most severe position per EN 61010-1
Transit Drop	10 drops on corners and faces per MIL-PRF-28800F, Class 2
Bench Handling	4 drops on each face per MIL-PRF-28800F, Class 2
Vibration	Random 10 to 500 Hz per MIL-PRF-28800F, Class 2
Shock, Functional	30 G half-sine shock pulse per MIL-PRF-28800F, Class 2
Drip Proof	Water flow 16 liters per hour per MIL-PRF-28800F, Class 2
Salt Exposure	Salt fog tested for 48 hours, constantly wetted with 5% salt solution at 35°C per MIL-PRF-28800F, Class 2
Fungus Resistance	5 species for 28 days at 30°C and 95% humidity per MIL-PRF-28800F, Class 2

PC Tool Software	
General Features	Transfer saved traces to and from Signal Hawk and PC via USB cable or removable USB drive. Graphically display traces on the PC for further analysis. Generate printed reports with customized labels. Archive saved traces to disk or USB drive.
Communication Method	USB port

Power Sensors Supported

Sensor	Description
5010B	Directional Power Sensor for Thruline power measurements, 2 to 2700 MHz, 12.5 mW to 10 kW. Measure forward/reflected average, VSWR, return loss (dB), and peak. Forward average power accuracy is 5% (0.2 dB). Requires two Bird DPM series elements
5010T	Directional Power Sensor for Thruline power measurements, Tetra Version, 2 to 2700 MHz, 12.5 mW to 10 kW, req elements. Measure fwd/rfl avg, VSWR, return loss (dB), and peak. Forward average power accuracy is 5% (0.2 dB).
5011	Terminating Power Sensor, 40 MHz to 4 GHz, 10μW to 10 mW (-20 dBm to +10 dBm). Measures forward average power. Accuracy is 5% (0.2 dB).
5011-EF	Terminating Power Sensor, 40 MHz to 12 GHz, 10μW to 10 mW (-20 to +10 dBm) Measures forward average power. Accuracy is 5% (0.2 dB).
5012	Wideband Power Sensor for Thruline measurement, 350 MHz to 4 GHz, 150 mW to 150 W Avg, 400 W Peak. Measure fwd/rfl avg, VSWR, return loss (dB), peak, burst avg, crest, CCDF. Fwd avg power accuracy is 4% (0.2 dB).

Parts List

Contact Bird Service Center for parts information.

Standard Accessories		
Description	**Part No.**	**Qty**
Instructions, Start-up [1]	920-SH36-REF	1
Operations Manual[1]	920-SH36-OPS	
Carry Case, Soft	7002A220-1	1
Adapter/charger,AC, input 100 to 240 Vac @ 50 to 60 Hz, output +15 V, < 2.2 A	5A2743-1	1
Adapter/charger, Car, input 12 Vdc, output +12 V, < 3 A	5A2238-3	1
Battery, Rechargeable Li-Ion	5A2720-2	1
Cable, RS-232, 10 ft, 9-pin, M/F connectors	5A2264-09-MF-10	1

Cable, USB, 10 ft, USB 2.0 certified, one USB A male, one USB B male connector	5A2653-10	1
USB Drive, 1 GB, Win CE Compatible	5A2745-1	1
CD-ROM, includes PC Tool Software and manuals[1]	7002A210	1
Headphones	5A2746-1	1
Connector Cover, Rain Flap	7002A221	
[1] Manuals, software, and firmware updates are available at www.bird-elec-tronic.com.		

Optional Accessories		
Description	**Part No.**	**Qty**
Case, Hard Transit	7002A225-1	1
Manual, Reference[1]	920-7002A300	1
USB Mouse, Portable, Optical	USB-MOUSE	1
USB Hub, 4-Port, Ultra Mini	USB-HUB	1
Antenna, Field Strength, 136 to 221 MHz, SMA-M*	ANT-100	1
Antenna, Field Strength, 400 to 512 MHz, SMA-M*	ANT-400	1
Antenna, Field Strength, 824 to 894 MHz, SMA-M*	ANT-800	1
Antenna, Field Strength Antenna, 890 to 960 MHz, SMA-M*	ANT-900	1
Antenna, Field Strength Antenna, 1710 to 1880 MHz, SMA-M*	ANT-1800	1
Antenna, Field Strength Antenna, 1850 to 1990 MHz, SMA-M*	ANT-1900	1
Antenna, Field Strength Antenna, 2400 to 2500 MHz, SMA-M*	ANT-2400	1
Attenuator, 100 W, 40 dB, NM/NF, 2.4 GHz	100-SA-MFN-40	1
Attenuator, 50 W, 30 dB, NM/NF, 2.4 GHz	50-A-MFN-30	1
Attenuator, 25 W, 30 dB, NM/NF, 4 GHz	25-A-MFN-30	1
Attenuator, 10 W, 30 dB, NM/NF, 4 GHz	10-A-MFN-30	1
Attenuator, 10 W, 20 dB, NM/NF, 4 GHz	5-A-MFN-20	1
Attenuator, 2 W, 20 dB, NM/NF, 4 GHz	2-A-MFN-20	1

Note: Specifications are subject to change.
* Recommended N(M) to SMA(F) adapter (model 4240-500-10) for field strength antennas.
[1] Manuals, software, and firmware updates are available at www.bird-elec-tronic.com

Optional Cables and Adapters

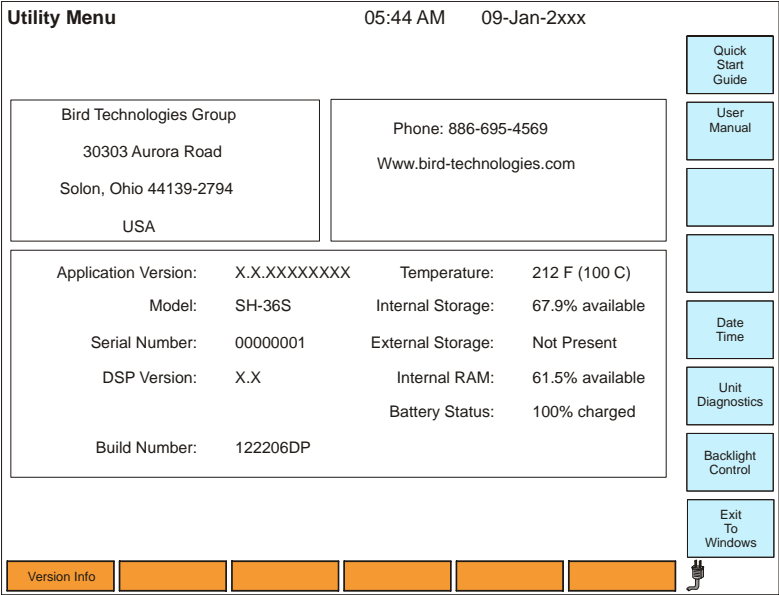| Description	Part No.	Qty
Test Cable, 1.5 m, N(M) to N(F)	TC-MNFN-1.5	1
Test Cable, 3.0 m, N(M) to N(F)	TC-MNFN-3.0	1
Test Cable, 1.5 m, N(M) to N(M)	TC-MNMN-1.5	1
Test Cable, 3.0 m, N(M) to N(M)	TC-MNMN-3.0	1
Test Cable, 1.5 m, N(M) to 7/16 DIN(F)	TC-MNFE-1.5	1
Test Cable, 3.0 m, N(M) to 7/16 DIN(F)	TC-MNFE-3.0	1
Test Cable, 1.5 m, N(M) to 7/16 DIN(M)	TC-MNME-1.5	1
Test Cable, 3.0 m, N(M) to 7/16 DIN(M)	TC-MNME-3.0	1
Adapter, N(M) to 7/16 DIN(M)	PA-MNME	1
Adapter, N(F) to 7/16 DIN(M)	PA-FNME	1
Adapter, N(M) to 7/16 DIN(F)	PA-MNFE	1
Adapter, N(F) to 7/16 DIN(F)	PA-FNFE	1
Adapter Kit, 7/16 DIN	4240-550	1
Adapter, N(F) to N(F)	4240-500-1	1
Adapter, N(M) to N(M)	4240-500-6	1
Adapter, N(M) to SMA(F)	4240-500-10	1

Chapter 6   **Utilities**

With Signal Hawk's built-in utilities, you can view information about the instrument and change selected default settings.

You can access the utilities by pressing the Utilities menu key from the Start Menu screen, or by pressing the File & Help menu key from a measurement screen then pressing the Utility soft key. To exit the Utility mode, press the Esc/Back function key to return to the previous screen, or press the Mode key to go to the Start Menu screen.

Figure 38   Utility Menu, Main Screen, Version Info Screen

Utility Menu			05:44 AM 09-Jan-2xxx	

Utility Menu   05:44 AM   09-Jan-2xxx

		Quick Start Guide

Bird Technologies Group
30303 Aurora Road
Solon, Ohio 44139-2794
USA

Phone: 886-695-4569
Www.bird-technologies.com

User Manual	

Application Version:	X.X.XXXXXXXX	Temperature:	212 F (100 C)
Model:	SH-36S	Internal Storage:	67.9% available
Serial Number:	00000001	External Storage:	Not Present
DSP Version:	X.X	Internal RAM:	61.5% available
		Battery Status:	100% charged
Build Number:	122206DP		

Date Time

Unit Diagnostics

Backlight Control

Exit To Windows

Version Info

Utility Main Menu - Menu Keys and Associated Soft Key Features

Version Info

Press this menu key to view general information such as how to contact Bird Technologies Group, the software version, the model and serial numbers of the instrument, available memory, the internal unit temperature, available storage memory, and battery status (Fig. 38).

The Soft keys for this menu selection provide access to user help, date and time setup, backlight settings, diagnostic software, and the Windows operating system.

Utility Main Menu Soft keys

Quick Start Guide - Press this soft key to display the Signal Hawk Start-up Instructions. Press the up- and down-arrow keys or the Selection Dial to scroll through the displayed text. Press the Exti Menu key to return to the Utility Menu.

Date Time - When you press this soft key, the screen displays a dialog box showing the date and time (Fig. 39). Use the up- and down-arrow keys or the key pad to increase or decrease the selected value. Use the right- and left-arrow keys to move to the next or previous component of time or date. Use the Selection Dial to move between the Time and Date data fields. Press the Enter key to exit the dialog box and return to the Utility Menu screen. The new time and date is displayed at the top of the screen.

Figure 39   Utility, Set Time and Date
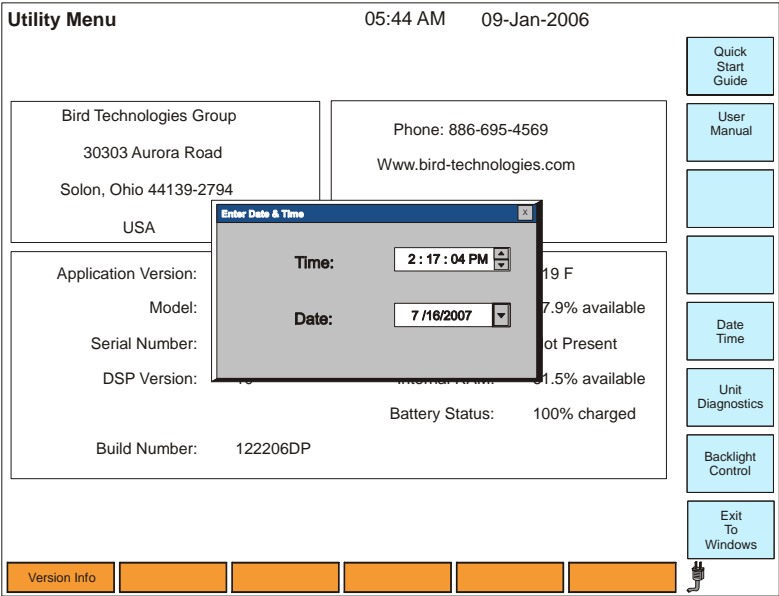
Unit Diagnostics - Press this soft key to leave the Utility screen and go to the unit diagnostic screen. For a full discussion of the unit diagnostics, refer to the Unit Diagnostics - Menu Keys and Associated Soft Key Features section.

Backlight Control - Press this soft key to display the backlight options (Fig. 40). Press the Esc/Back function key to return to the previous screen.

Figure 40   Utility, Backlight Options Screen

Utility Menu	05:44 AM	09-Jan-2006	

Backlight Mode Auto/ Man

Backlight High

Backlight Medium

Backlight Low

Backlight Custom 100%

Sensor Gain 0

Bird Technologies Group

30303 Aurora Road

Solon, Ohio 44139-2794

USA

Phone: 886-695-4569

Www.bird-technologies.com

Application Version:	0, 0, 0, 37	Temperature:	219 F
Model:	SH-36S	Internal Storage:	67.9% available
Serial Number:	Unknown	External Storage:	Not Present
DSP Version:	10	Internal RAM:	61.5% available
		Battery Status:	100% charged
Build Number:	122206DP		

Version Info

Backlight Control Soft Keys

Backlight Soft Key	Function
Backlight Mode Auto / Man	Set the backlight brightness Auto - adjusted by internal circuitry Man - set by user
Backlight High	Manual - Set backlight to brightest intensity
Backlight Medium	Manual - set backlight to middle intensity (default setting - provides approximately 5.5 hr. battery life)
Backlight Low	Manual - set backlight to lowest intensity (provides approximatley 7.5 hr. battery life)
Backlight Custom xx%	Manual - set backlight to a specific percent intensity between 0 (off) and 100 (brightest)
Sensor Gain	Set a threshold at which the ambient light sensor increases the backlight Low threshold - backlight intensity increases after a small change in ambient light. High threshold - backlight intensity increases after a large change in ambient light.

Exit to Windows - Press this soft key to quit the Signal Hawk measurement application and go to the Windows operating system. Use the left- and right-arrow keys to select Yes or No at the confirmation dialog box then press the Enter key to continue.

Use the arrow keys to select an icon on the desktop then press Enter to launch the selected application. From within a Windows application, press the Mode function key to activate the File Menu bar item, use the down-arrow key to select Close from the drop-down list, and press Enter to exit the application and return to the desktop. To return to the Signal Hawk program, use the arrow keys to select the Bird Signal Hawk icon then press the Enter key.

☞ **Note:** To fully utilize the features in Windows applications, connect an optional mouse or keyboard to the USB port.

71

Unit Diagnostics - Menu Keys and Associated Soft Key Features

When you press the Unit Diagnostics soft key on the Utility Main Menu screen, you launch the Windows based diagnostic software (Fig. 41). To use the diagnostic software, you can use a USB mouse connected to the connector panel or the navigation and selection keys on the instrument.

To return to the Signal Hawk measurement software, use the mouse to close the diagnostic program then double-click on the Signal Hawk icon, or use the instrument keys and do the following steps:

1. Press the Esc/Back function key.

2. Use the arrow keys to select the Bird Signal Hawk icon on the screen.

3. Press Enter

Figure 41   Utility, Unit Diagnostics Screen
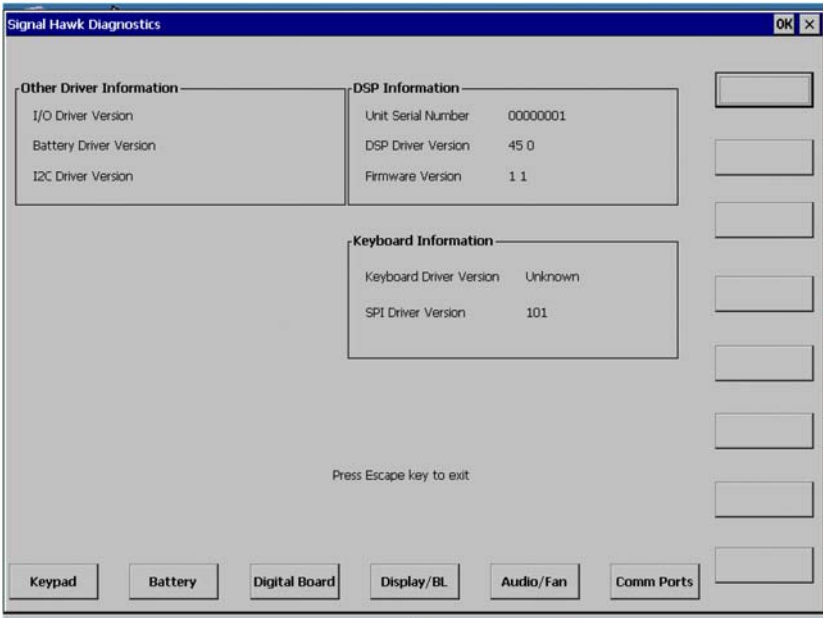
Keypad

When you press the this menu key, you enable the soft keys that test the user keys and the light sensor.

Key Test - Press this soft key to test the operation of the user keys.

On the front of the instrument, press and briefly hold each key. While the key is depressed, the response field in the dialog box displays the name of the key. The following keys are not tested: Mode, Setup, +/-, Power, and the period / star key.

Press the Esc/Back key to test the key and end the test.

Light Sensor - Press this soft key to test the light sensor settings.

Press the Light Sensor soft key to cycle the display field in the dialog box through the light sensor settings (0, 1, 2).

Press the Esc/Back key to test the key and end the test.

Battery

When you press the this menu key, you enable the soft keys that report the status of the battery.

Status - Press this soft key to display the Battery Status dialog box. The dialog box displays the charge level and temperature of the battery.

Use the mouse to close the test dialog box.

Digital Board

When you press the this menu key, you enable the soft keys that permit updating the FPGA (field programmable gate array) firmware and the DSP (digital signal processing) firmware.

Update FPGA - Press this soft key to display the list of FPGA firmware files that can be updated. Use the arrow keys to select an item on the list then press the Enter key to open the file. Press the Esc/Back key to exit the list box.

Update DSP - Press this soft key to display the list of DSP firmware files that can be updated. Use the arrow keys to select an item on the list then press the Enter key to open the file. Press the Esc/Back key to exit the list box.

Audio / Fan

When you press the this menu key, you enable the soft keys that test the cooling fan.

Fan On - Press this soft key to turn on the cooling fan.

Fan Off - Press this soft key to turn off the cooling fan.

Appendix A   Menu Maps

This appendix contains menu maps for Signal Hawk features.

Spectrum Analyzer Menu Maps

The illustrations in this section show the soft key options that are available when you select a measurement function.
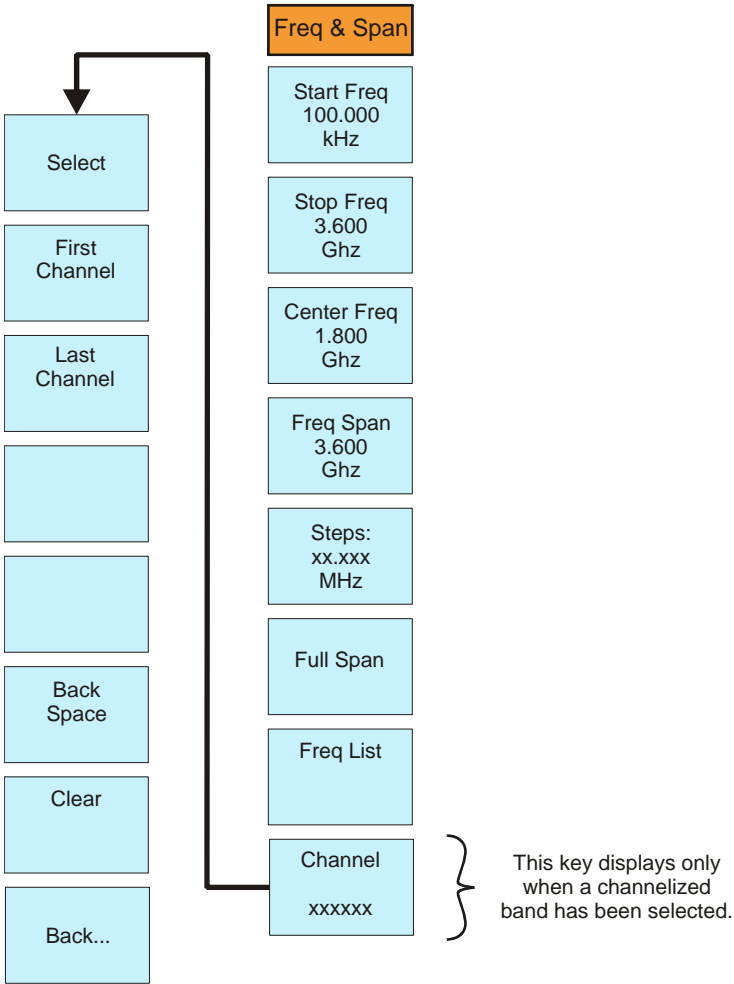
Figure 42   MenuMap, Freq/Span Menu, All Measurements

If you select a channelized band, there will be an extra soft key named Channel (see Fig. 43).
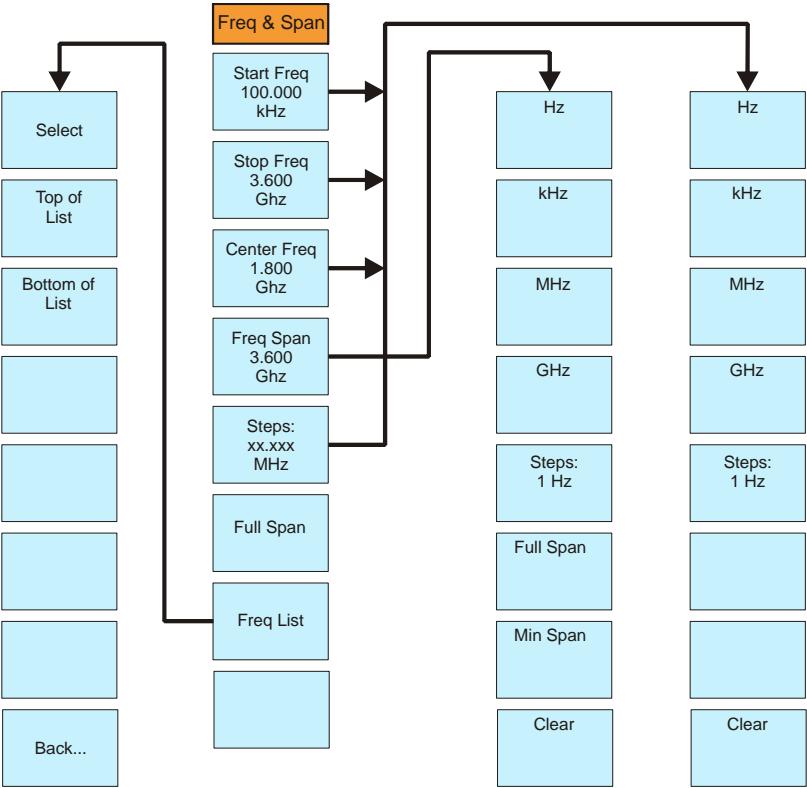
Figure 43   MenuMap, Freq/Span Menu, Channelized Band

When you select a channelized band, the system displays the Channel soft key in addition to those shown in Fig. 42.
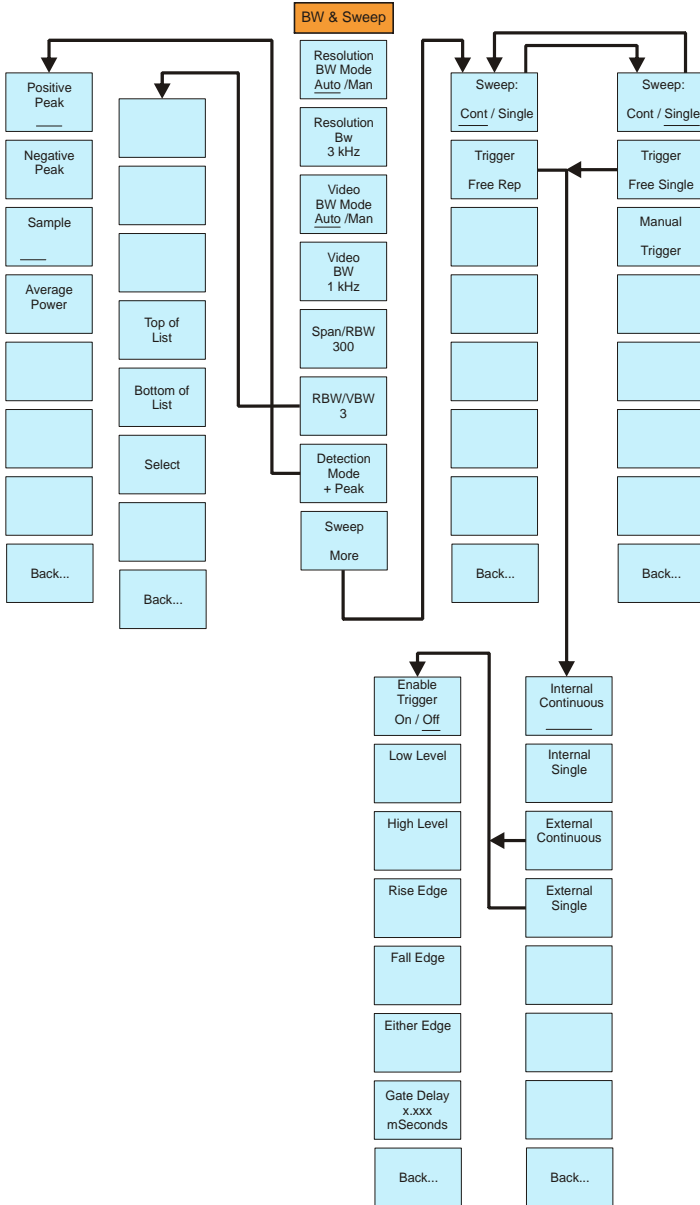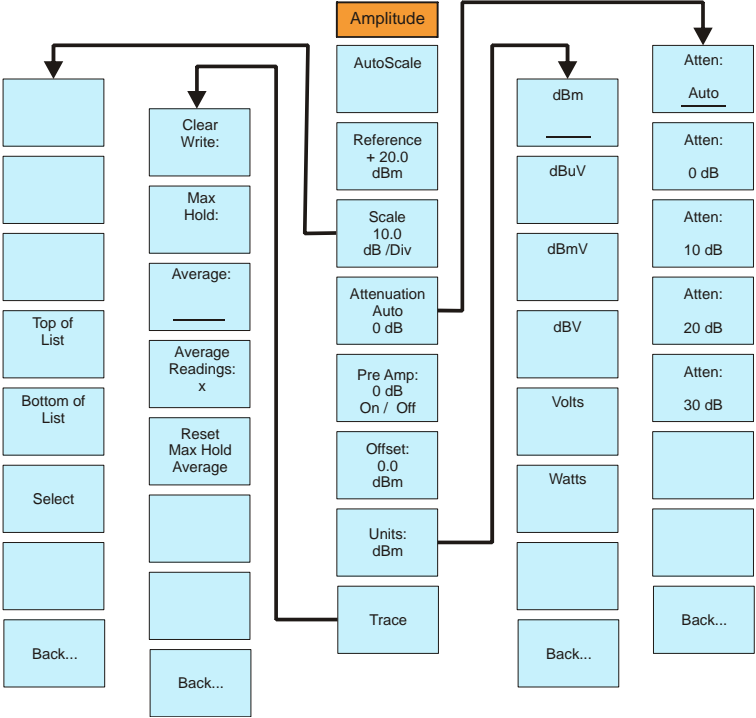
Figure 44   Menu Map, BW & Sweep Menu, All Measurements

Figure 45   Menu Map, Amplitude, All Measurements

Figure 46   Menu Map, Measurement, All Measurements
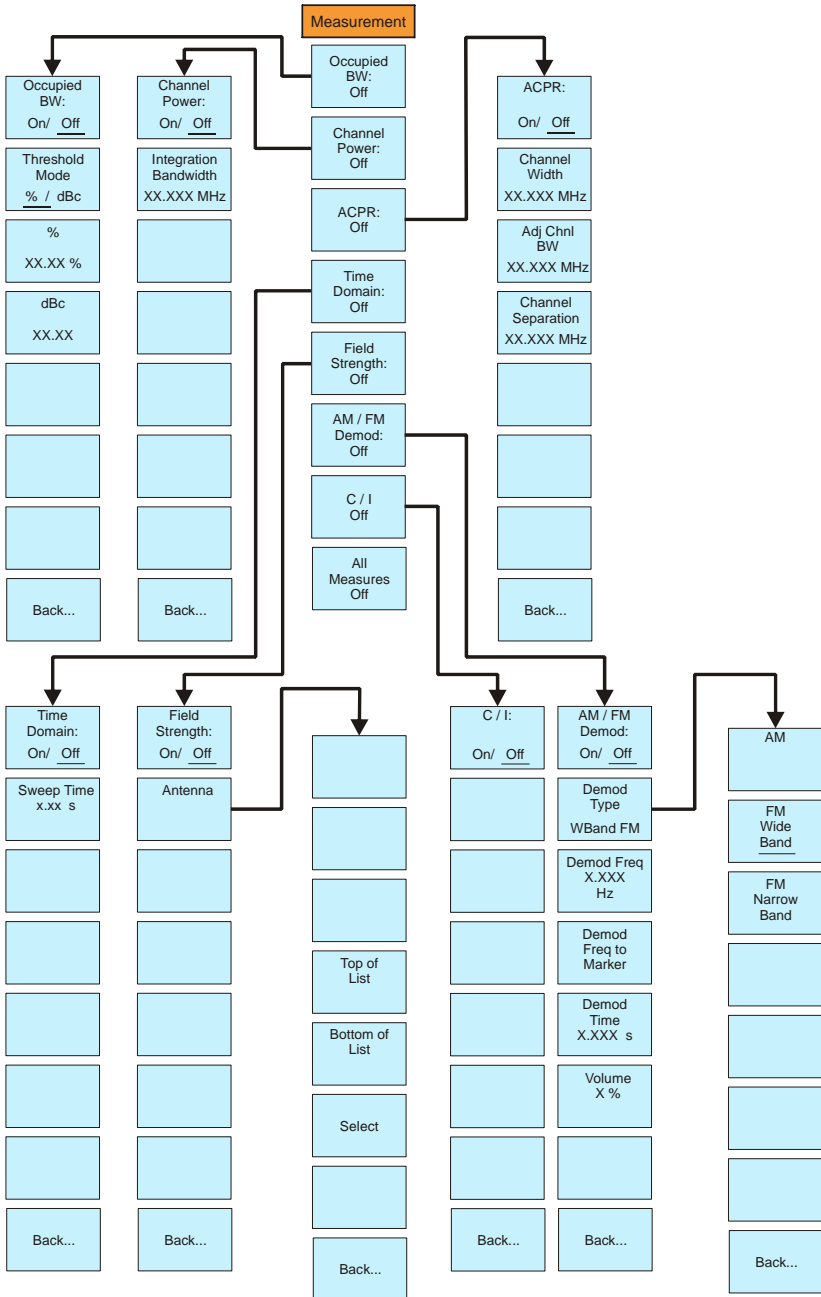
Figure 47   Menu Map, Mark & Limit Menu, All Measurements

Mark & Limit

Current Marker: 12[3]456

Marker Delta: [OFF]23456

Marker Type: Line /Icon

Markers Display Pos Top - R

Frequency Counter On/ Off

Marker Noise On/ Off

All Markers to Peaks

All Markers Off

Back...

Marker: On/ Off

Marker to Max Peak

Marker to Next Peak

Marker Freq to Center

Marker Ampt to Ref Level

Marker More

Limit Lines

Limit: Upper/Lower

Limit: On/ Off

Limit Edit

Limit Alarm: On/ Off

Back...

Move Limit

Back...

Figure 48   Menu Map, File & Help, All Measurements

File & Help

- Log Trace On / Off
- Log Interval xx.xxx s
- Back...

- Recall Trace
- Recall and Compare
- Clear Recalled Trace
- Back...

- Quick Save Trace
- Label & Save Trace
- Log Traces:
- Recall Trace
- Manage Trace Files
- Full Screen
- Utility
- Help

- Copy Trace to USB Drive
- Copy All Traces to USB Drive
- Copy Trace from USB Drive
- Delete Trace
- Delete All Traces
- Back...

- Save File
- Back...

- Quick Start Guide
- User Manual
- Back...

- Quick Start Guide
- User Manual
- Date Time
- Unit Diagnostics
- Backlight Control
- Exit to Windows

- Backlight Mode Auto/ Man
- Backlight High
- Backlight Medium
- Backlight Low
- Backlight Custom 100%
- Sensor Gain 0

81

Power Meter Menu Maps

Figure 49   Menu Map, Power Meter, Type (Bird 5010B sensor)

```
                    ┌──────────────┐
                    │     Type     │
                    ├──────────────┤
                    │   Forward    │
                    │   Average    │
                    ├──────────────┤
                    │   Reflected  │
                    │   Average    │
                    ├──────────────┤
                    │    Match     │
                    └──────────────┘
```
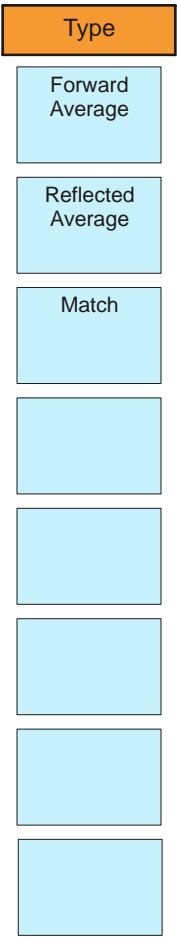
Figure 50   Menu Map, Power Meter, Type (Bird 5012 sensor)

Type
Forward Average
Reflected Average
Match
Forward Peak
Forward Burst
Crest Factor
CCDF
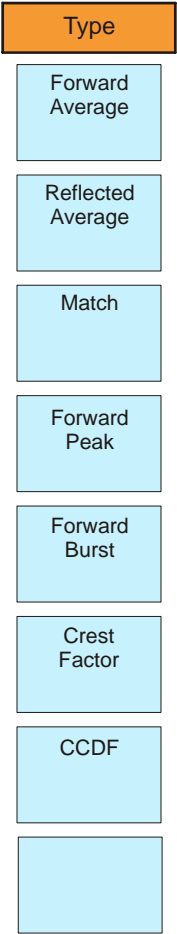
Figure 51   Map, Power Meter, Units (Bird 5010B and 5012 sensors)

Units
Power: Watts
Power: dBm
Match: VSWR
Match: Return Loss dB
Match: Rho
Match Efficiency %
Match Reflected %
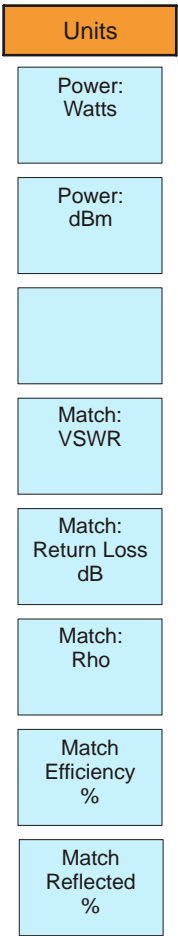
Figure 52   Map, Power Meter, Configure (Bird 5010B sensor)

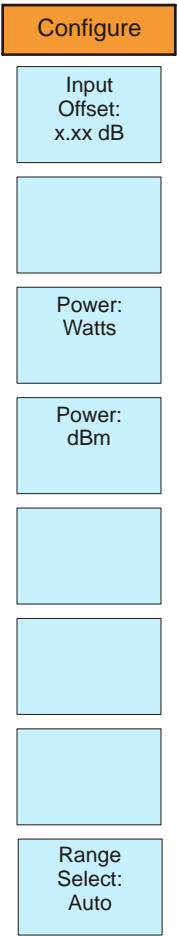| |
|---|
| Configure |
| Element: DPM / 43 |
| Forward Scale 50 W |
| Reflected Scale 5 W |
| F/R Scale 10:1 Ratio: On/Off |
| Input Offset: 0.0 dB |
| Match Offset: 0.0dB |
| |
| |

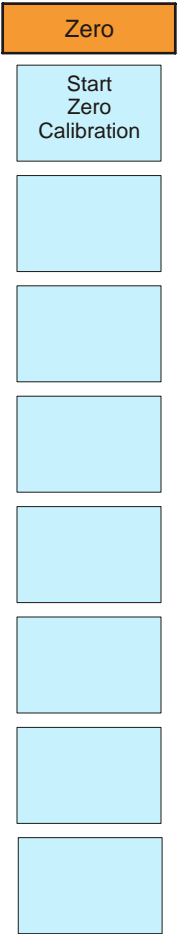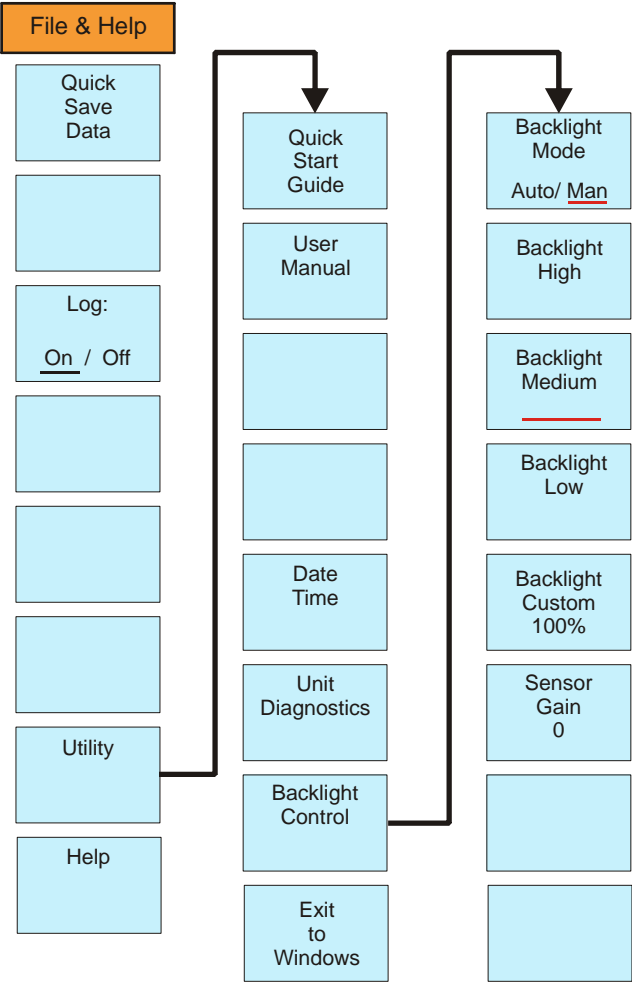**Figure 53   Map, Power Meter, Configure (Bird 5011 sensor)**

Configure
Input Offset: x.xx dB
Power: Watts
Power: dBm
Range Select: Auto

Figure 54   Map, Power Meter, Configure (Bird 5012 sensor)

Configure

Input
Offset:
x.xx dB

Match
Offset:
x.xx dB

Filter:
Full
xx MHz

Duty Cycle:
Auto / Manual

Manual
Duty Cycle:
xxx %

CCDF
Limit:

Range
Select:
Auto
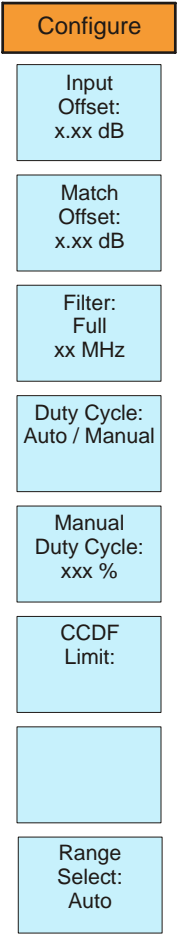
**Figure 55   Map, Power Meter, Zero (Bird 5011 and 5012 sen-
sors)**

Figure 56   Map, Power Meter, File & Help (Bird 5010B, 5011, and 5012 sensors)

File & Help

Quick Save Data

Log: On / Off

Utility

Help

Quick Start Guide

User Manual

Date Time

Unit Diagnostics

Backlight Control

Exit to Windows

Backlight Mode Auto/ Man

Backlight High

Backlight Medium

Backlight Low

Backlight Custom 100%

Sensor Gain 0

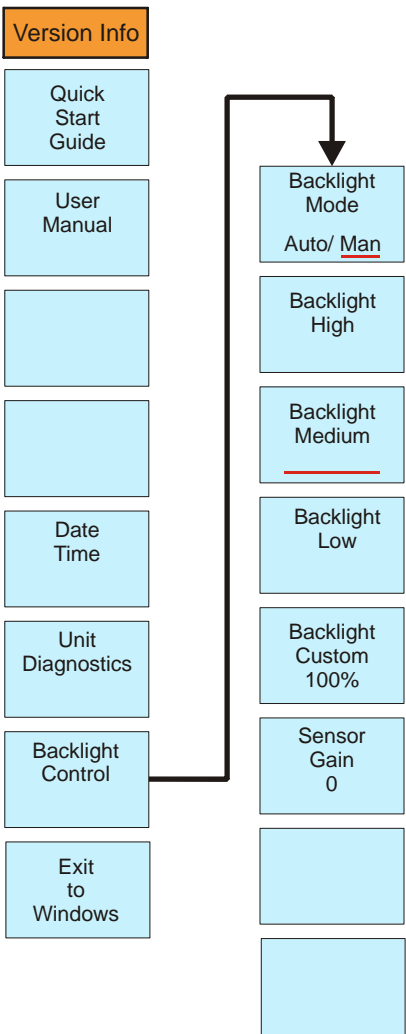# Start Menu, Help Menu Maps

Figure 57   Map, Start Menu, Help
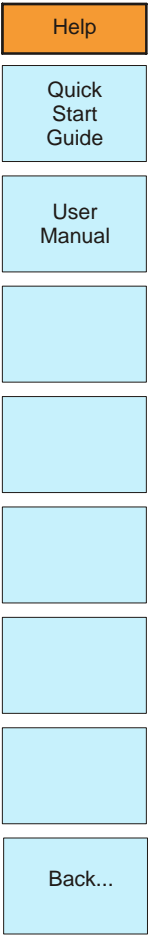
Start Menu, Utilities Menu Map

Figure 58   Map, Utilities, Version Info

Version Info	
Quick Start Guide	
User Manual	
	Backlight Mode Auto/ Man
	Backlight High
	Backlight Medium
Date Time	Backlight Low
Unit Diagnostics	Backlight Custom 100%
Backlight Control	Sensor Gain 0
Exit to Windows	

Setup Function Menu Maps

Figure 59   Map, Setup (Mode), Main Screen
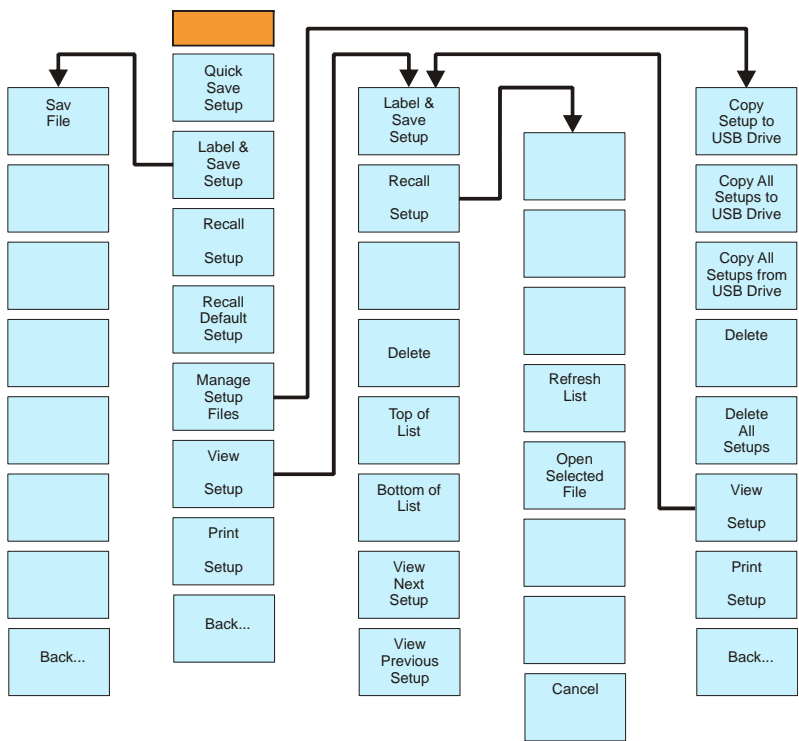
Figure 60   Map, Setup (Mode), Help

Help
Quick Start Guide
User Manual
Back...

Limited Warranty

All products manufactured by Seller are warranted to be free from defects in material and workmanship for a period of one (1) year, 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.