



Seeker Lite Leakage Detector

OPERATION MANUAL



TRILITHIC
INNOVATIVE ENGINEERING

Trilithic Company Profile

Trilithic is a privately held manufacturer founded in 1986 as an engineering and assembly company that built and designed customer-directed products for telecommunications, military and industrial customers. From its modest beginnings as a two-man engineering team, Trilithic grew over the years and broadened its offerings of RF and microwave components by adding broadband solutions to its product line. This was accomplished with the acquisition of components manufacturer Cir-Q-Tel and instruments manufacturer Texscan.

Today, Trilithic is an industry leader providing telecommunications solutions for major broadband, RF and microwave markets around the world. As an ISO 9000:2001 certified company with over 40 years of collective expertise in engineering and custom assembly, Trilithic is dedicated to providing quality products, services and communications solutions that exceed customer expectations.

Trilithic is comprised of three major divisions:

- **Broadband Instruments & Systems**
Offers test, analysis and quality management solutions for the major cable television systems worldwide.
- **RF Microwave Components**
Provides components and custom subsystems for companies specializing in cellular, military and other wireless applications.
- **Emergency Alert Systems**
Leading supplier of government-mandated emergency alert systems used by HFC service providers.

Table of Contents

1. General Information	5
Helpful Website	5
Where to Get Technical Support	5
How this Manual is Organized	6
Conventions Used in this Manual	6
Precautions	7
Optional Software	7
2. Introduction	8
What is the Seeker Lite?	8
Seeker Lite Features	8
Easy Frequency Configuration	8
Multiple Frequency Presets	9
Superior Antenna	9
Channel Tag Compatibility	9
GT Noise Discrimination	9
Squelch Operation	10
Source Localization	10
Equipment Supplied with Your Seeker Lite	11
Optional Accessories for Your Seeker Lite	11
A Guided Tour of Your Seeker Lite	12
Front View with Lid Closed	12
Front View with Lid Open	12
Bottom View	13
Top View	13
Display Screen	14
About Your Seeker Lite's Battery	15
Overview	15
If Your Seeker Lite Does Not Turn On	16
Checking the Battery Level	16
Charging the Battery	16
Updating Your Seeker Lite's Firmware	16

3. Operation	17
Configure Settings	17
Seeker Lite's Operation Modes	17
Measurement Mode	17
Cruise Mode	18
Charge Mode	19
PC Communications Mode	19
Guide for Moving Between Measurement, Cruise, and Off Modes	20
Display Modes	20
Signal Level	21
Battery Charge Level	22
Speaker Volume	23
Peak Hold	24
Preset Frequencies	25
Channel Tag	26
4. Leakage Testing	27
Before You Begin Leakage Testing	27
Testing For Leaks	27
5. Appendix	29
Specifications	29
Error Codes	30
Warranty Information	31

General Information



Helpful Website

The following website contains general information which may be of interest to you:

<http://www.trilithic.com>

Trilithic's website contains product specifications and information, tips, release information, marketing information, Frequently Asked Questions (FAQs), bulletins and other technical information. You can also check this website for product updates.

Where to Get Technical Support

Trilithic technical support is available Monday through Friday from 8:00AM to 5:00PM EST. Callers in North America can dial 1-317-895-3600 or 1-800-344-2412 (toll free). International callers should dial 1-317-895-3600 or fax questions to 1-317-895-3613. You can also e-mail technical support at techsupport@trilithic.com.

For quicker support response when calling or sending e-mail, please provide the following information:

- Your name and your company name
- The technical point of contact (name, phone number, e-mail)
- The version numbers for both the Seeker Setup software and Seeker Lite firmware
- The version of Windows you are using (including any Service Packs and patches)
- A detailed description of the problem you are having, including any error or information messages

How this Manual is Organized

This manual is divided into the following chapters:

- Chapter 1, “General Information” provides Trilithic contact information and describes how this Operation Manual is structured.
- Chapter 2, “Introduction” describes the Seeker Lite and its features. This chapter also discusses the connections and controls of the Seeker Lite. Finally, this chapter discusses the Seeker Lite’s battery and how to update your firmware.
- Chapter 3, “Operation” describes how to configure and operate the Seeker Lite.
- Chapter 4, “Leakage Testing” describes the steps needed to perform leakage testing using the Seeker Lite.
- Chapter 5, “Appendix” shows the technical specifications of the Seeker Lite and includes a table of error codes.

Conventions Used in this Manual

This manual has several standard conventions for presenting information.

- Connections, Menus, and menu options appear in **bold**.
- Section names, Web and email addresses appear in *italics*.



Note: A note is information that will be of assistance to you related to the current step or procedure.



CAUTION: A caution alerts you to any condition that could cause a mechanical failure or potential loss of data.



WARNING: A warning alerts you to any condition that could cause personal injury.

Precautions



WARNING: Do not use the Seeker Lite in any manner not recommended by the manufacturer.



CAUTION: A strong electromagnetic field may affect the accuracy of Seeker Lite's measurements.



CAUTION: Use only the battery charger supplied with the Seeker Lite.

Optional Software

Although the Seeker Lite comes preconfigured and ready to use from the factory, the Seeker Setup software is required for advanced configuration of the Seeker Lite. This software enables the operator to assemble files containing channel frequencies, squelch levels, and other settings. Users can efficiently download configurations to one or more leakage detectors.

This Chapter:

- Describes the Seeker Lite's purpose
- Gives an overview of the Seeker Lite's features
- Lists the Seeker Lite's supplied equipment and optional accessories
- Gives a guided tour of the Seeker Lite and explains the display screen
- Discusses the Seeker Lite's battery
- Discusses updating the Seeker Lite's firmware

What is the Seeker Lite?

Seeker Lite is a tough, convenient and flexible tool used to perform leakage tests. It can assist in subscriber installs by verifying that leakage in the house is not great enough to contribute to the cable system's Cumulative Leakage Index (CLI). It can also be used to find leaks during troubleshooting.

Seeker Lite works by measuring ambient RF leakage in and around a subscriber's premises and can be used to identify and locate all RF leaks greater than 10 $\mu\text{V}/\text{m}$.



Note: The Seeker Lite is not made for use with an external dipole antenna. It is calibrated only with the built-in antenna.

Seeker Lite Features

Easy Frequency Configuration

The Seeker Setup software simplifies the configuration process. Instead of going to the factory to make hardware modifications, you can use the Seeker Setup software to adjust frequencies.

Multiple Frequency Presets

Your Seeker Lite can be setup to operate on up to 10 different frequency presets, which makes it easier to monitor and maintain multiple cable systems. These presets define the leakage monitoring frequency and, if desired, the tag detection frequency as well. You have the option of setting up only one frequency preset for simple operation, or multiple leakage frequencies for maintaining multiple cable systems. Frequency settings range from 118.50 MHz to 147.2500 MHz in 6.25 kHz increments (these increments are sufficient for use with HRC).



Note: Your Seeker Lite monitors one frequency at a time. It does not scan several frequencies at once.

Superior Antenna

An improved antenna design provides more directionality than typically available from other leakage meters.

Channel Tag Compatibility

Compatibility with both the Trilithic CT-2 and CT-3 channel tag devices is another feature of your Seeker Lite. Channel Tag refers to the process of adding frequency tags to a broadcast channel signal. Your Seeker Lite can be setup to detect a tagged leak and to ignore leaks that are not tagged. With this feature, you are saved from chasing false alarms from signals that do not originate in your system.

Channel Tag values range between 10 Hz and 23 Hz and are configured using the Seeker Setup software.

GT Noise Discrimination

Your Seeker Lite works with systems employing digital set top terminals that cannot tolerate “tagged” leakage carriers. Therefore, enhanced “false alarm” resistance can be provided without the use of a tagged leakage signal. The Seeker Lite analyzes the detected RF energy and automatically rejects all noise and signals that are not caused by leaks from your system.

GT noise discrimination is enabled/disabled using the Seeker Setup software.

Squelch Operation

Squelch level is the RF signal threshold that the Seeker Lite uses to determine the validity of the signal. The signal “breaks squelch” when the RF leakage is greater than the squelch level, as long as any enabled tag or GT noise qualifiers are met as well. The receiver will not alarm for signals below the squelch level.

The squelch level has a factory default of 20 $\mu\text{V}/\text{m}$. However, it can be reconfigured using the Seeker Setup software.

Source Localization

The Seeker Lite emits an audible tone to help you pinpoint the leakage source. The tone frequency increases with signal strength. As you move closer to the leak, the tone frequency will increase.



Note: Common leakage areas are around the tap, drop cable and any connection of the cable to other devices.

Equipment Supplied with Your Seeker Lite

The Seeker Lite comes with the following:

- Seeker Lite Leakage Detector
- Battery Charger (AC Adapter)
- Built-in Battery
- Operation Manual on CD

Optional Accessories for Your Seeker Lite

Part Number	Description	Notes
2131142000	Seeker Lite Bag with Holster	
0610169001	Vehicle Power Adaptor	
0610169000	Replacement Charge Cube	
0090048000	Replacement Battery	
2071585000	Serial Data Cable	
0930109000	Seeker Setup Software (Includes Seeker Lite Serial Data Cable P/N 2071585000)	

To place an order, please call Trilithic at (800) 344-2412 or (317) 895-3600.

A Guided Tour of Your Seeker Lite

Front View with Lid Closed



Lid

The lid contains a built-in antenna. If the lid ever becomes disconnected, return your Seeker Lite for repair.

ON/OFF/MODE SELECT Button

Press and hold this button to turn your Seeker Lite on or off or to switch between Measurement and Cruise Modes.

Latch

Press this latch to open the Seeker Lite's lid.

Front View with Lid Open



ON/OFF/MODE SELECT/BACKLIGHT Button

Press and hold this button to turn your Seeker Lite on or off or to switch between Measurement and Cruise Modes. (This can be done whether the lid is open or closed.)

When the lid is up and your Seeker Lite is in Measurement Mode, a short press activates the display's backlight.

SELECT Button

Press to advance to the next display mode.

CHANGE Button

Toggles or alters the current display selection.

Bottom View



Charging and Serial Data Connection

The Charging and Serial Data Connection is used to charge the Seeker Lite by attaching the power cable and/or configure the unit using a serial data cable and the Seeker Setup software.



CAUTION: If you are having trouble detaching your cables from the bottom panel connector, both the serial data cable and power cable may have a release button on one side that must be pressed before the cable can be detached.

Top View



Mode Indicator

The Mode Indicator will blink slowly when Cruise Mode is active and quickly to show Measurement Mode is active.

Display Screen



1. **PK** - This icon is shown when the Peak Hold feature is active. When the icon is not shown, the Peak Hold feature is turned off.
2. **FREQ** - This icon indicates the number of the currently selected frequency preset.
3. **Tag** - This icon is shown when tag detection is active. The icon is not shown when tag detection is turned off.
4. **Measurement Units** - This indicator will show the measurement units that are selected in the Seeker Setup software and the selected icon will blink when GT noise qualifiers have been met.
5. **Main Display** - This is used to show various parameters, and its function depends on the current display mode selection.
6. **Antenna** - This icon blinks when the signal mode is selected. This is the normal mode for leakage detection.
7. **Bar Graph** - This is used to show the level of various Seeker Lite parameters, and its function depends on the current display mode selection.

8. **Battery** - This icon blinks when the Battery Charge Level display is selected. The icon will stay on when the battery needs to be recharged.
9. **Speaker** - This icon blinks when the speaker (volume control) mode is selected.
10. **Charge** - This icon blinks when the battery is being charged and when the Battery Charge Level screen is displayed.

If you see any of the following messages on your display:

- **The word “Err” along with a number** – Please call Trilithic Application Engineering at (800) 344-2412 or (317) 895-3600.
- **PC** – Appears when Seeker Lite is connected to a PC and is in PC Communications Mode.
- **CH** – Appears when Seeker Lite is connected to a battery charger and is in Charge Mode.
- **LO** – Appears when Seeker Lite’s battery is too low for the meter to function.

About Your Seeker Lite’s Battery

Overview

- The Seeker Lite uses a Lithium-Ion battery. The battery is charged during manufacture and should be ready to use as long as it has not been stored for a long period of time.
- Lithium-Ion batteries operate differently than Ni-Cad batteries. They should be charged daily, and should not be deeply discharged as this could damage the battery. There is no memory effect and concerns about charging too soon or with little use are unwarranted.



Note: All worn out batteries should be disposed of according to local laws and guidelines.

If Your Seeker Lite Does Not Turn On

- A very low battery may cause your Seeker Lite not to turn on. Try charging your battery for a few minutes to see if that fixes the problem.

Checking the Battery Level

- To check the battery level, turn your Seeker Lite on and press the **SELECT** button once. The **Battery** icon will flash to show you are in the Battery Charge Level display. The bar graph at the bottom of the display shows the amount of battery charge available. As long as there are at least a few bars left, your Seeker Lite has enough charge to operate. If the battery meter shows less than 50%, the Seeker Lite should be placed on the charger.
- If the battery icon appears while you are on any of the other menus, this is a warning that your battery is getting low and needs to be recharged soon.
- When your battery is too low for your Seeker Lite to function, “LO” will appear in its display.
- Typical operating time from a full battery charge (in Measurement Mode) is 8 hours.

Charging the Battery

- To charge your Seeker Lite’s battery, connect the Seeker Lite charger to the bottom panel connector.
- Typical full charging time should be three hours or less.



CAUTION: Use only the battery charger supplied with the Seeker Lite.

Updating Your Seeker Lite’s Firmware

To update your Seeker Lite’s firmware, you must use the Seeker Setup software. For more information on how to update your firmware, see the ***Seeker Setup Software Operation Manual***.

This chapter:

- Provides information on the Seeker Lite's operation and display modes

Configure Settings

You must configure the Seeker Lite's settings using the Seeker Setup software. The Seeker Lite comes from the factory with default settings, but it is likely they will need to be customized.

Detailed instructions can be found in the ***Seeker Setup Software Operation Manual***.

- The following settings are configured with the Seeker Setup software: Display Units, Squelch, GT Noise Discrimination (enable or disable), the entering of leakage frequency values, and Tag Frequencies. You can also use the Seeker Setup software to update your instrument's firmware.
- The Tag Enable and Enable Peak Hold settings can be turned on or off using either the Seeker Setup software or the Seeker Lite.
- The speaker volume setting can only be changed with the Seeker Lite.

Seeker Lite's Operation Modes

Measurement Mode

Measurement Mode is used to accurately determine the strength of a leak, pinpoint its location and provide a leakage value for documentation. Measured RF leakage values can range from 10 to 2000 $\mu\text{V}/\text{m}$ and are displayed in large, easy-to-read numbers. A bar graph at the bottom of the display illuminates proportionally to the signal strength of the leak.

Additionally, an audible tone will sound if the measured signal breaks squelch. The signal breaks squelch when the RF leakage is greater than the squelch level, as long as any enabled tag or GT Noise Discrimination qualifiers are also met. This tone can be used to help locate the potential source of the leak.

Enter Measurement Mode by:

Flipping open your Seeker Lite's lid and then pressing and holding the red button until you hear three ascending tones. Also, the LED on top of your Seeker Lite will blink quickly to show Measurement Mode is active. Within a few moments your Seeker Lite will begin to measure and then display ambient RF leakage.



Note: When taking measurements, you must leave the lid open to obtain accurate results.

Cruise Mode

In contrast to the continuous monitoring done during Measurement Mode, Cruise Mode monitoring is done in cycles. Your Seeker Lite “sleeps” for a short period of time, wakes up and then takes a measurement. The display mode is never on in Cruise Mode. An alarm will beep if the measured signal breaks squelch. If the user wants to investigate the alarm, opening the Seeker Lite's lid and pressing the red button down until three ascending tones are heard returns the meter to Measurement Mode.

Less battery life is used during Cruise Mode than Measurement Mode.

Enter Cruise Mode by:

Holding down the red button until you hear two beeps. Also, the LED on the top of your Seeker Lite will slowly blink to show Cruise Mode is active.



Note: When using Cruise Mode, you must leave the lid closed to obtain accurate alarm results.

Charge Mode

The Charge Mode occurs when your charger is connected and the Seeker Lite is charging.

Enter Charge Mode by:

Connecting a battery charger to your Seeker Lite will cause it to go into Charge Mode. The letters “CH” will be displayed and the Charge icon will blink when your Seeker Lite is in this mode.

Also:

- The battery charger must be connected to both the Seeker Lite and a working power outlet before Charge Mode can begin.
- The onscreen bar graph shows charging progress.
- Active measurement mode is disabled while your Seeker Lite is charging.

For more information about battery operation and charging, see **Chapter 2: Introduction, About the Seeker Lite’s Battery.**

PC Communications Mode

This mode is used by the Seeker Setup software to send and retrieve configuration parameters from your Seeker Lite. The letters “PC” will be displayed while your Seeker Lite is in this mode.

Enter PC Communications Mode by:

Turning on your Seeker Lite and then connecting it by a serial cable to a personal computer.

Guide for Moving Between Measurement, Cruise, and Off Modes

To put your Seeker Lite into this mode:	Do this with the red button:	When your Seeker Lite is in this mode the front panel display:	When your Seeker Lite is in this mode the indicator light:
Measurement	Press down and hold until you hear three ascending tones	Shows signal measurements	Blinks quickly
Cruise	Press down and hold until you hear two beeps	Is blank	Blinks slowly
Off	Press down and hold until you hear three descending tones*	Is blank	Is off

* Your Seeker Lite will first cycle through other modes before turning off. As a result, you will hear other mode tones before the three descending tones sound.

Display Modes

While testing for leaks you will need to view the information shown by the Seeker Lite's display modes.

- Use your Seeker Lite's **SELECT** button to toggle through its display modes.
- As you toggle, the display modes will appear in the same order in which they are discussed in this section.



Signal Level

The Signal Level display is the normal display mode for leakage testing.



In this mode the **Antenna** icon on the display blinks to show the Signal Level display is selected.

The signal level detected for the selected frequency will be displayed numerically and the bar graph will indicate the relative signal level.

Also:

You can freeze the numerical display to make documenting the leakage value easier.

- **To freeze the display**, press the Seeker Lite's **CHANGE** button.
- **To unfreeze the display**, press either the Seeker Lite's **CHANGE** or **SELECT** button.

The display will blink to remind you it has been frozen. Even though the numerical display doesn't change, the bar graph will continue to update and the audible tone will still sound if the measured signal breaks squelch.

Battery Charge Level

The Battery Charge Level display is used to test the charge level of the battery.



In this mode the **Battery** icon on the display will blink to show the Battery Charge Level display is selected.

The bar graph at the bottom of the display will indicate the relative battery charge level. The numerical display will continue to display the RF signal level.

Pressing the **CHANGE** button will display the Seeker Lite Firmware version for 5 seconds. A display of 0123 would indicate a Firmware version of 1.23.



Note: For detailed instructions on how to update the Seeker Lite Firmware, see the ***Seeker Setup Software Operation Manual***.

Speaker Volume

The Speaker Volume display is used to increase or decrease the volume of the Seeker Lite.



In this mode the **Speaker** icon on the display will blink to show the volume mode is selected.

The bar graph at the bottom of the display will indicate the relative volume level. The numerical display will continue to display the RF signal level.

Press the **CHANGE** button to change the volume. Brief presses increase the volume to maximum and then it rolls over to the minimum volume.

Peak Hold

The Peak Hold display is used to turn the Peak Hold function on or off.



In the Peak Hold display, the **PK** icon at the top of the display will blink if the Peak Hold function is off. The **PK** icon will be constantly displayed if the Peak Hold function is on.

Press the **CHANGE** button to turn the Peak Hold function on or off.

When Peak Hold function is on, the numerical display will hold the latest RF level reading for up to 5 seconds unless the RF level increases. This is useful if you are not able to look at the display immediately or if you want to confirm the highest level reading.

With Peak Hold function on, the peak element of the bar graph at the bottom of the display will also hold its peak indication for 5 seconds while the other elements of the bar graph continue to indicate the signal strength of the live signal.

Preset Frequencies

The Preset Frequency display is used to view the preset frequencies and select the one used for leakage testing by your Seeker Lite. Preset frequencies are numbered from 0 to 9 and are configured and downloaded with the Seeker Setup software.



In the Preset Frequency display, the **FREQ** icon at the top of the display will blink and be followed by the preset frequency number.

To change the frequency selection, press the **CHANGE** button.

When entering the Preset Frequency display or selecting a new frequency preset, the numeric display will momentarily show the leakage frequency and tag frequency for the preset channel. First the MHz digits will be displayed. After this, the fractional digits are displayed. Finally a “t” is displayed followed by the tag frequency for the preset channel.

For example: For a frequency of 121.2625 MHz. with a tag frequency of 20 Hz., the display will indicate:

121

2625

t 20

When the numerical display has cycled through the frequency information for the selected channel, the display will resume indication of the signal level for that channel.

Channel Tag

The Channel Tag display is used to enable or disable the channel tag feature for the selected frequency preset.

A Channel Tagger adds a low frequency tag (10-23 Hz, excluding 16 Hz) to a CATV channel. When the Channel Tag feature is enabled in the Seeker Lite, it will alarm and produce an audible tone only when the leakage signal has the required tag. This eliminates false alarms from signals that do not originate in the user's system.



In the Channel Tag display, the **Tag** icon in the upper right corner of the display will blink if the tag feature is not enabled. The **Tag** icon will be constantly displayed if the tag feature is on.

Press the **CHANGE** button to turn the tag feature on or off. When the tag feature is turned on, the display will momentarily show the tag frequency for the selected frequency preset.



Note: The Channel Tag feature requires the installation, use, and proper set-up of the CT-2 or CT-3 Channel Tagger. It also requires the corresponding setup of the Seeker Lite.

Leakage Testing

This Chapter:

- Discusses how to test for leaks using the Seeker Lite

Before You Begin Leakage Testing

- A low battery may cause the Seeker Lite to **NOT** turn on. Try charging your battery for 3 hours to see if that fixes the problem.
- The Seeker Lite will retain the setup from when the meter was last shut off. For example, if you were testing frequency preset number two and then turned off your Seeker Lite, when you turned it back on again the meter would automatically begin testing that same preset.

Testing For Leaks

The Seeker Lite should be configured with the Seeker Setup software before beginning leakage testing.

1. Turn on the Seeker Lite

Press the red on/off button until you hear 3 ascending tones. The Seeker Lite will power up in Measurement Mode.

2. Confirm the desired frequency (0 to 9) is selected

If using the Seeker Lite for the first time, the default frequency set during configuration with the Seeker Setup software will be selected.

If the Seeker has been used since configuration with Seeker Setup software, the last frequency used will be selected.

Also, confirm the Tag Feature is enabled or disabled as required for testing. This will be in the state last set for the selected frequency.



Note: For more information about using the Preset Frequency or Channel Tag features, see **Chapter 3: Operation**, [Seeker Lite Display Modes](#).

3. Confirm the Seeker Lite is in Measurement Mode.

The **Antenna** icon on the display should be blinking for the Measurement Mode. If necessary use the **SELECT** button to move to the Measurement Mode.

4. Begin Leakage Testing

Move your Seeker Lite around the test area. If the detected leakage level exceeds the squelch level (default 20 $\mu\text{V}/\text{m}$), the Seeker Lite will alarm.

The frequency of the alarm tone will increase as the detected signal strength increases. Continue to move the Seeker Lite in the direction producing the highest tone frequency to locate the source of the leak.

5. Cruise Mode

If an alarm is not detected in Measurement Mode and you wish to continually monitor leakage levels with your Seeker Lite, you can select the Cruise Mode to shutdown the display and conserve the battery charge.

To select Cruise Mode from the Measurement Mode, press the red on/off button until 2 beeps are heard. The Mode indicator LED at the top of your Seeker Lite will blink slowly to indicate Cruise Mode operation.

If a signal greater than the squelch level is detected in Cruise Mode, the Seeker Lite will beep to alert the user. Measurement Mode can then be used to measure and find the leak.

6. Turn OFF The Seeker Lite

When testing is complete, turn off the Seeker Lite by holding down on the red on/off button until 3 descending tones are heard.

Specifications

- **Frequency Range:** 118.50 to 147.25 MHz, settable using the Seeker Setup software.
- **Frequency Presets:** Up to ten selectable operating frequencies. Selections are loaded into the detector using the Seeker Setup software.
- **Level Range:** 10 to 2000 $\mu\text{V}/\text{M}$. Can freeze current numeric reading or hold peak readings.
- **Numerical Display:** LCD readout of any detected leakage within sensitivity range.
- **Audible Tone:** Tone is present if leakage amplitude exceeds squelch setting. Pitch is proportional to strength of leak.
- **Channel Tag Range:** 10 Hz to 23 Hz
- **Power:** Built-in Lithium Ion Battery
- **Operation Time:**
 - Measurement Mode:** 8 Hours Typical
 - Cruise Mode:** 100 Hours Typical
 - Charge Time:** Less than 3 hours for full-charge
- **Other:**
 - Dimensions:** 162mm X 75mm X 40mm
 - Weight:** 0.60 lbs (272g)

Error Codes

The codes shown below are displayed on the Seeker Lite display screen as “**Err##**” to indicate an error with the Seeker Lite.

"Err##" Code	Description
01	Factory 1 Parameters - The checksum is not valid for this area or the calibration date for this area is not set. Factory 1 contains the filter, level, and GT calibration items. If a power cycle does not fix this, return to the factory for recalibration.
02	Factory 2 Parameters - The checksum is not valid for this area or the calibration date for this area is not set. Factory 2 contains the temperature calibration items. If a power cycle does not fix this, return to the factory for recalibration.
03	Bad Identity - The identity voltage read does not correspond to a known configuration. If a power cycle does not fix this, return to the factory for repair.
04	Temperature Calibration Trigger - There was an error re-writing the temperature calibration trigger pattern when starting the temperature cal cycle. Retrigger the meter with the CalibrATE function.
05	Temperature Calibration Write - An error occurred while writing values during the temperature calibration cycle. Power cycle the meter to return to the "THnn" display and start the temperature calibration cycle over again.
06	Factory 2 Parameters Pending - This happens when the meter is power-cycled after the temperature calibration cycle has completed, but CalibrATE has not yet read and checked the results.

Warranty Information

Trilithic, Inc. warrants that each part of this product will be free from defects in materials and workmanship, under normal use, operating conditions and service for a period of two (2) years from date of delivery. Trilithic, Inc.'s obligation under this Warranty shall be limited, at Trilithic, Inc.'s sole option, to replacing the product, or to replacing or repairing any defective part, F.O.B. Indianapolis, Indiana; provided that the Buyer shall give Trilithic, Inc. written notice.

Batteries are not included or covered by this Warranty.

The remedy set forth herein shall be the only remedy available to the Buyer under this Warranty and in no event shall Trilithic, Inc. be liable for incidental or consequential damages for any alleged breach of this Warranty. This Warranty shall not apply to any part of the product which, without fault of Trilithic, Inc., has been subject to alteration, failure caused by a part not supplied by Trilithic, Inc., accident, fire or other casualty, negligence or misuse, or to any cause whatsoever other than as a result of a defect.

Except for the warranty and exclusions set forth above, and the warranties, if any, available to the Buyer from those who supply Trilithic, Inc., there are no warranties, expressed or implied (including without limitation, any implied warranties of merchantability of fitness), with respect to the condition of the product or its suitability for any use intended for it by the Buyer or by the purchaser from the Buyer.



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