# Seeker HL
# Source Transmitter

## Operation Manual




**innovative technology** to keep you a ***step ahead***

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# Putting Innovation Within Reach

Product innovation at Trilithic has always been characterized by one thing: it's practical. It makes life easier for customers. It's the natural result of listening to them. That philosophy has been the driving force behind the company's growth from its beginnings as a two-man engineering team in 1986 to its current position as a global manufacturer with more than 130 employees.

A privately held company, Trilithic broadend its original RF and microwave component product line by acquiring filters manufacturer Cir-Q-Tel and instruments manufacturer Texscan, adding broadband solutions to the product line. The company also expanded operations to Thailand in 2001, to meet increasing demand for its products in the growing markets of Asia.

As new communications applications continue to emerge, part of Trilithic's business has evolved into managing change—helping customers respond quickly to market opportunities with innovative technology and individualized solutions. But the core value of Trilithic's business approach—listening to customers—hasn't changed. Keeping that focus intact will help provide better products in the long run and ensure continued growth for decades to come.

Trilithic is comprised of two major divisions:

**Broadband Instruments**

*The company is best known for innovations in signal level measurement, leakage detection and reverse path maintenance—like the use of Digital Signal Processing (DSP) technology, which lets field technicians upgrade their signal analyzers by simply downloading firmware.*

**Emergency Alert Systems**

*Trilithic's EAS division is a leading supplier of homeland security government-mandated emergency alert systems for broadband and other communication system providers. As the communications industry continues its rapid evolution, Trilithic has begun offering comprehensive systems and services to address a wide variety of emergency alert system needs, including the design and architectural layout of complex analog and digital EAS networks.*

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## Where to Get Technical Support

Trilithic technical support is available Monday through Friday from 8:00AM to 5:00PM EST.

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 serial number for the Seeker HL Source Transmitter
- 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 & Operation” introduces what the Seeker HL Source Transmitter is and what it does. This chapter discusses the practical application, connections and controls of the Seeker HL Source Transmitter.
- Chapter 3, “Appendix” shows the technical specifications and warranty information of the Seeker HL Source Transmitter.

## Conventions Used in this Manual

This manual has several standardized conventions for presenting information:

- Connections, menus, menu options, and user-entered text and commands appear in **bold**.
- Section names, web, and e-mail addresses appear in *italics*.


***A NOTE is information that will be of assistance to you related to the current step or procedure.***


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


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

## Precautions


***Do not use the Seeker HL Source Transmitter in any manner not recommended by the manufacturer.***


***A strong electromagnetic field may affect the measurement accuracy of the Seeker HL Source Transmitter.***

## Periodic Calibration

The chosen frequency must closely match that of the leakage detector or leaks will not be detected properly. If the Seeker HL Source Transmitter appears to be out of calibration, the unit must be returned to Trilithic or a Trilithic authorized repair center for re-calibration.

# What is the Seeker HL Source Transmitter?

## Overview

Mitigation of signal leakage within the subscriber premise is essential for the successful operation of the subscriber's cable and cellular services. To thoroughly evaluate the potential for interference to subscriber services, Trilithic has developed a patent pending approach to signal leakage measurement which will comprehensively test the Aeronautical and LTE bands in both fully digital and analog cable systems.

Historically, signal leakage detectors have required high levels of sensitivity to measure signal leakage radiating from the CATV system. Measurement within the subscriber premise and the migration to all digital services places even greater sensitivity requirements upon the leakage detector combined with a new requirement to simultaneously monitor for signal leakage in both the aeronautical and LTE bands.

In laboratory experiments signal leakage measurements as low as 0.1 uV/m have proven sufficient to allow LTE signals to enter the subscriber network and disrupt cable services. Achieving a measurement sensitivity of 0.1 uV/m is beyond the measurement range of conventional signal leakage detectors and requires a new approach to leakage detection within the subscriber premise.

## Testing Approach

To meet the new measurement and sensitivity requirements, the Seeker HL monitors 138 MHz and 757.5 MHz simultaneously, supporting testing in both the Aeronautical and LTE frequency bands. The Seeker HL Source Transmitter replaces the cable service with two high-output test carriers which pressurize the subscriber cabling, revealing any damage which may lead to service interruption from ingressing LTE carriers.

The Seeker HL Source Transmitter has two output levels: a +60 dBmV for home certification and a +40 dBmV output level should the subscriber network prove too porous for pinpointing the location of a leak at the higher transmit level.

The displayed leakage levels are normalized by the Seeker HL receiver to reflect the value of the leak at nominal systems levels within the subscriber premise. The normalization of the measured and displayed leakage levels simplifies the evaluation of leakage severity and provides consistency for documentation of leakage levels in accordance with established industry practices.

When utilizing the higher +60 dBmV transmit level the Seeker HL is able to locate signal leakage down to a normalized leakage level of 0.1 uV/m with a single flexible antenna; making it possible to locate and repair signal leakage levels far beyond the measurement range of conventional leakage detectors.

## Equipment Supplied with the Seeker HL Source Transmitter

The Seeker HL Source Transmitter comes with the following:

- Seeker HL Source Transmitter
- One Built-In Li-Ion Battery
- AC to DC Power Adapter & Battery Charger

## Replacement Parts

The following replacement parts are available for the Seeker HL Source Transmitter:

| Part Number | Description |
|---|---|
| 0090061000 | Li-ION Replacement Battery (Replacement Requires 1 Battery) |
| 0610198000 | AC to DC Power Adapter & Battery Charger |
| 0190197000 | AC US Power Cable |

## Field Accessories

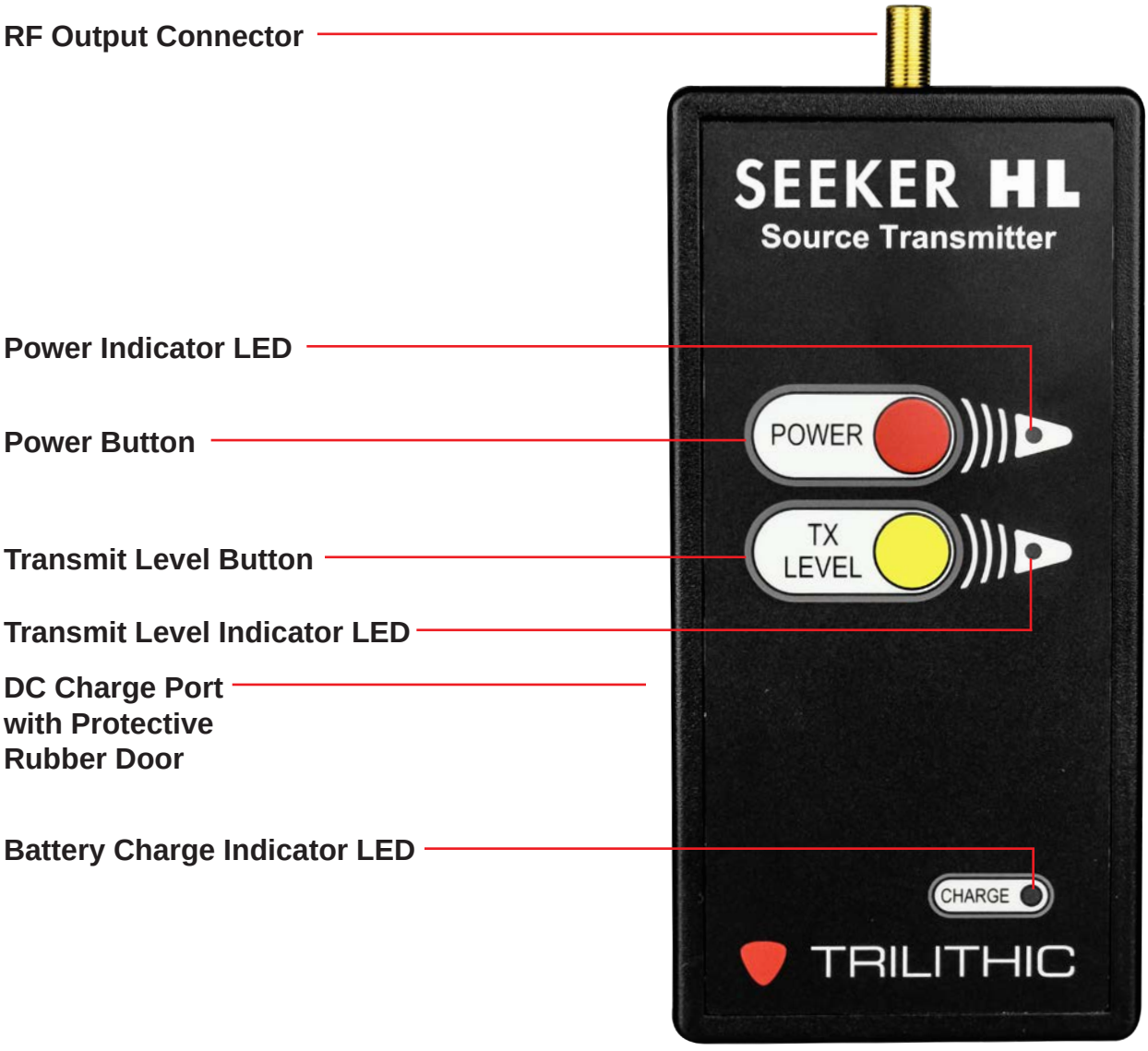
The following accessories are available for the Seeker HL Source Transmitter:

| Part Number | Description |
|---|---|
| 2071527048 | Precision RF Coaxial Test Cable (I/O-15) |
| 2072097000A | Vehicle Power Adapter |
| 0190322000 | AC Euro Power Cable |

# A Guided Tour of Your Seeker HL Source Transmitter

Before using your instrument take a few minutes to familiarize yourself with the instrument, its basic conventions and its navigational tools. This section provides a brief overview of the instrument's features, buttons, and controls.

## Front View

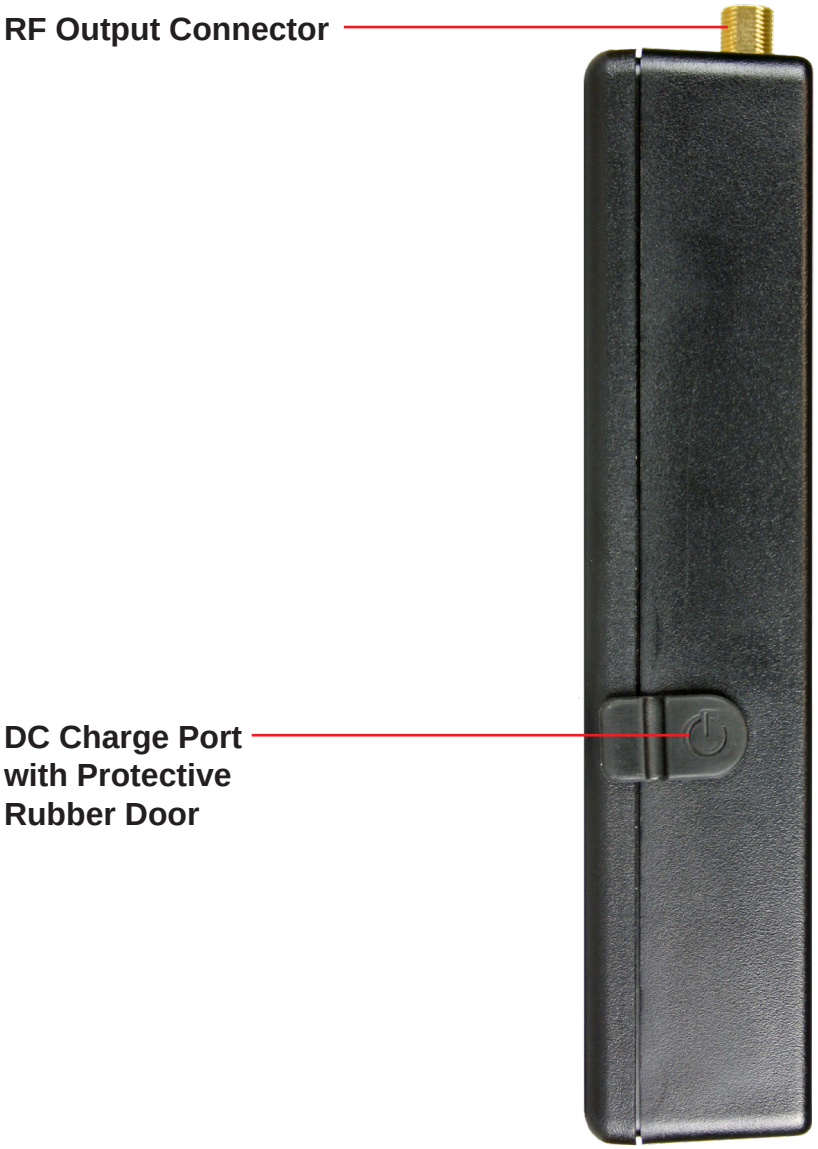


## Rear View

**RF Output Connector**

**LED Legend**

## Left Side View




NOTE

***In the image above, the DC charge port protective rubber door is in the closed position for illustrative purposes. This door should remain closed when not using this port.***

# Battery Charging

Before you can use your instrument, you will need to charge its battery. Your instrument's battery pack provides approximately 8 to 10 hours of power during continuous operation.

The instrument comes with a AC to DC Power Adapter & Battery Charger which can be used to charge the battery in approximately 3 hours or to trickle charge the battery while the instrument is in use.

Plug the power adapter & battery charger into the DC charge port of the Seeker HL Source Transmitter on the left side of the instrument under a protective cover.

Your instrument is equipped with a "smart" battery charging circuit so that the charging method (fast or trickle) is an auto function. Fast Charge is used to charge the battery quickly. Trickle Charge is used to keep the battery fully charged.

Every time your instrument is plugged into the charging cube, it starts charging automatically via the Trickle Charge method. If the unit determines Fast Charge is necessary, it defaults to the Fast Charge method.

## Battery Charge Indicator LED

The **Battery Charge Indicator** LED is located on the front panel of the Seeker HL Source Transmitter. This LED indicator represents the status of the internal battery and its charging status.

The LED will illuminate when the Seeker HL Source Transmitter is connected to the charger and the following conditions are met:

- A solid Green LED is displayed when the battery is fully charged.
- A solid Red LED is displayed when the battery is charging.
- A flashing Red LED is displayed when the battery or charging circuit has a fault. In this case, the meter will need to be serviced by a Trilithic Certified Repair Center. Before sending in the unit for repair, contact Trilithic Repairs for an RMA.
- The LED is not displayed when there is no power supplied to the charger.

# Operation

Once the instrument's battery is charged, you may startup the Seeker HL Source Transmitter by pressing the **ON/OFF** button on the front of the device. To shutdown the Seeker HL Source Transmitter, simply press and hold the power button for two seconds.

If the Seeker HL Source Transmitter has been powered on and idle for 30 minutes, the device will shutdown automatically to conserve battery power.

## Power Indicator LED

The **Power Indicator** LED is located on the front panel of the Seeker HL Source Transmitter. This LED indicator represents the status of the instrument and will illuminate when the Seeker HL Source Transmitter is powered ON and the following conditions are met:

- A solid Green LED is displayed when the battery charge is full and the device is operating normally.
- A solid Red LED is displayed when the battery charge is low. When the battery charge drops to this level, it is recommended that the battery is charged soon.
- A flashing Red LED is displayed when the battery charge is very low. When the battery charge drops to this level, it is recommended that the battery is charged immediately.
- The LED is not displayed when the Seeker HL Source Transmitter is shutdown.

## Transmit Level Adjustment

The **Transmit Level Indicator** LED will illuminate when the Seeker HL Source Transmitter is powered ON. To change the output level, simply press and release the **Transmit Level** button.

This LED indicator will illuminate as follows for the transmit level that is currently selected:

- A solid Green LED is displayed when the transmit level is set to 40 dBmV.
- A solid Red LED is displayed when the transmit level is set to 60 dBmV.
- A flashing LED is displayed when the transmit signal circuit has a fault which can lead to an unreliable source output. In this case, the meter will need to be serviced by a Trilithic Certified Repair Center. Before sending in the unit for repair, contact Trilithic Repairs for an RMA.

# Specifications

**Operation Specifications**

| | |
|---|---|
| **Source Frequencies** | **Low Band:** 138 MHz<br>**High Band:** 757.5 MHz |
| **Modes of Operation** | User selectable High or Low Output via front panel controls |
| **Launch Amplitude** | **High Output:** 60 dBmV<br>**Low Output:** 40 dBmV |
| **Level Stability** | ±2 dB at 25˚ C, stable over operating temperature |

**Physical Specifications**

| | |
|---|---|
| **Construction** | Plastic housing |
| **Control** | Front panel keypad constructed from water resistant membrane |
| **Indicators** | Front panel ON/OFF, Output Level & Charge LEDs |
| **Dimensions (H x W x D)** | 7.50 x 3.25 x 1.50 in (191 x 83 x 38 mm) |
| **Weight** | 0.85 lbs (380 grams) |

**Available Interface Types**

| | |
|---|---|
| **RF Output Port** | Replaceable F-Type connector |

**Battery & Power Specifications**

| | |
|---|---|
| **Operating Time** | 8 hours plus, dependent on use |
| **Charge Time** | 4 hours |
| **Battery** | Single 2600 mAh @ 7.2V Li-Ion internal battery, factory replaceable |
| **Power Adapter** | **Input:** 100 to 240 VAC ~ 47 to 63 Hz, 1.1A Max<br>**Output:** 15 VDC, 3.3A |

**Environmental Specifications**

| | |
|---|---|
| **Storage & Operating Temperature** | **Storage:** -40˚ to +70˚ C (-40˚ to 158˚ F)<br>**Operating:** -20˚ to +50˚ C (-4˚ to 122˚ F) |

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# Trilithic Broadband Instruments 2-Year Limited Warranty

Trilithic, Inc. (“Trilithic”) warrants to the buyer that the 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 reserves the right, before having any obligation under this limited warranty, to inspect the damaged product, and all costs of shipping the product to Trilithic for inspection shall be borne solely by the buyer. Trilithic’s obligation under this limited warranty shall be limited, at Trilithic’s sole option, to replacing or repairing the product, or to replacing or repairing any defective part, F.O.B. Indianapolis, Indiana. If neither of the two options is reasonably available, then Trilithic, in its sole discretion, may provide a prorated refund to the buyer of the purchase price of the product, as evidenced by the proof of purchase, less any applicable service fees in accordance with the following schedule: months 0-3 = 100%; months 4-12 = 50%; and months 13–24 = 25%. Batteries and fans are not included or covered by this limited warranty. Any product or part that is repaired or replaced under this limited warranty shall be covered only for the remainder of the original warranty period which applied to the original product or part, or for ninety (90) days, whichever is longer. All products or parts that are exchanged for replacement shall become the property of Trilithic.

In order to recover under this limited warranty, buyer must make a written claim to Trilithic within sixty (60) days of the occurrence and must present acceptable proof of original ownership of the product (such as an original receipt, purchase order or similar documentation). In order for this limited warranty to be effective, the product must have been handled and used as set forth in the documentation accompanying the product and/or its packaging. This limited warranty shall not apply to any damage due to accident, misuse, abuse, neglect, fire or other casualty. Further, this limited warranty shall not apply to any product which has been altered or where the damage was caused by a part not supplied by Trilithic. Trilithic retains the final decision whether a product is within warranty conditions.

THE REMEDY SET FORTH HEREIN SHALL BE THE ONLY REMEDY AVAILABLE TO THE BUYER AND TO THE FULLEST EXTENT PERMITTED BY LAW, IN NO EVENT SHALL TRILITHIC BE LIABLE FOR ANY SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO, LOST REVENUES, LOST PROFITS, LOSS OF USE OF SOFTWARE, LOSS OR RECOVERY OF DATA, DOWNTIME, REPLACEMENT EQUIPMENT AND ANY THIRD PARTY CLAIMS ARISING OUT OF ANY THEORY OF RECOVERY INCLUDING WARRANTY, CONTRACT, STATUTORY OR TORT IN CONNECTION WITH THE PRODUCT, EVEN IF TRILITHIC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. NOTWITHSTANDING THE FOREGOING, IN THE EVENT THAT THIS LIMITED WARRANTY FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT SHALL TRILITHIC’S ENTIRE LIABILITY TO BUYER EXCEED THE PURCHASE PRICE OF THE DEFECTIVE PRODUCT.

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