

TRIPLETT

HotWire Fox & Hound **Live Wire Circuit** **Tracing Kit** *Instruction Manual*



 **TRIPLETT**

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1: Overall Features

- * Trace Live 120VAC and 220VAC Power Lines
- * Locates Wires Through Drywall, Plaster, Wood, Cement, etc.
- * Locate wires up to 3ft away (in open air)
- * Locate buried wires up to 6"
- * Trace wires up to 1000ft in length
- * Uses Common 9V Batteries
- * Carrying Case included
- * Warranty: 1 year

HotWire Hound Features

- * FET and IC Front End
- * Adjustable Sensitivity
- * Powerful Loudspeaker
- * LED Signal Strength Indicator
- * Noise Filter
- * White LED Headlights
- * Auto-Muting Earphone Jack
- * Easy Battery Replacement

HotWire Fox Features

- * Generates Warble or Pulsed Tracing Tones with User Selectable Pitch
- * LED and Beeper 'Voltage Present' Indicators
- * Audible Continuity Test with 120/220 VAC Line Cross Protection
- * **TrueTrace** positively identifies wires (when usable)
- * Transmitter Pilot Tone (Selectable On or Off)
- * Transmitter Level Adjustment
- * Battery Powered or AC Line Powered
- * Modular Test Leads, Alligator Clips, Pointed and Flat Probes Included
- * Battery Test LED
- * Also Generates AF Tracing Tones for use with Inductive Probes (like the Hound 3)
- * Magnetic Back
- * Power Latch on Function Switch
- * Rubber Grips
- * Easy Battery Replacement

2: Introduction

The Triplet **HotWire** is a wire tracer for 120VAC and 220VAC circuits. It consists of the **HotWire Fox** Transmitter and the **HotWire Hound** Receiver. The HotWire Fox applies a Radio Frequency (RF) tracing signal to the wire to be traced, and this RF signal propagates down the wire radiating the signal along the length of the wire. The **HotWire Hound** senses the location and strength of this RF signal, and in doing so, identifies the path of the wire to the user.

The **HotWire** can also trace other common wires, whether powered or unpowered. For example, it can trace telephone and cable TV wires, LAN cables, security system wires, and many others. The **HotWire Fox**, in addition to generating RF signals, also generates Audio Frequency (AF) signals which can be sensed with the Triplet Hound, Hound 2, Hound 3, or Hound Jr. In some cases, tracing a wire using the AF signal is advantageous.

The **HotWire Fox** also includes a very useful feature called **TrueTrace**. In situations where it can be used, it provides positive identification of the wire being traced. This is especially useful in instances where 'crosstalk' makes identifying the wire being traced, called the 'target' wire, difficult.

The **HotWire's** RF signal can be sensed through most building materials (wood, plaster, drywall, concrete, brick, etc) and can often be sensed through metal conduit (because the conduit is often poorly grounded, as far as RF is concerned). The HotWire can even trace shallowly buried underground wires, like those commonly used for 'Invisible Fences', cable television, telephone, or low voltage landscape lighting.

The **HotWire** also includes many other useful features that make it a valuable test tool for many wire tracing applications.

3: Warnings and Cautions

- * The **HotWire** is designed for use on 120VAC and 220VAC circuits. It is intended to be used on fused circuits that are not considered 'High Energy'. This generally means that the circuits are appropriately fused to prevent explosive 'follow on' currents that can develop in response to an accidental arc. This usually means that the circuit is fused at 40A or less.
- * Never connect the **HotWire** to circuits exceeding 250VAC or 250VDC.
- * The modular test leads are designed to insure safety when properly used. Always follow the instructions for using these leads.
- * Whenever possible, connect the **HotWire Fox** to the wire to be traced with the AC power turned off. Turn on the **HotWire Fox** and set it appropriately, lay the **HotWire Fox** down and move away from it, then apply AC power to the circuit.
- * If connecting to a live circuit, always wear eye protection, insulating gloves, and non-flammable clothing. Connect one lead of the **HotWire Fox** to the Neutral wire first, and then connect the other lead to the **HotWire**.
- * When connecting the **HotWire Fox** to a live AC circuit, do not touch the exposed metal on the alligator clips or probes. When one clip or probe is connected to a live circuit, dangerous voltages can appear on the other clip or probe. Do not touch!
- * When searching for the tracer signal with the **HotWire Hound**, do not accidentally make body contact with any exposed live circuits.
- * In some situations, unconnected wires can "float up" to potentially dangerous voltages and cause user injury. Treat any unknown wires as having dangerous voltage present, and take the appropriate precautions.
- * Do not use the **HotWire Fox** with the battery cover removed. Dangerous voltages can appear on the battery during use.

4: Specifications for HotWire Fox

- * Operating Frequency (RF): 400KHz to 500KHz
- * Operating Frequency (AF): 800Hz to 2400Hz
- * Output Voltage (RF): adjustable from approx. 5Vpp to 30Vpp (open circuit)
- * Output Voltage (AF): fixed, approx 10Vpp (open circuit)
- * Tracer Tone: Warble or Pulsed, High or Low Pitch
- * TrueTrace: Tracer Tone changes Cadence (from approx 2Hz to approx 7Hz) when leads are 'shorted' by less than 1,000 Ohms
- * Continuity Test: Detects Continuity up to 5,000 Ohms, sounds beeper
- * Voltage Test: Sounds beeper, Flashes LED
 - AC: Detects voltage from approx. 30VAC to 250VAC (50/60Hz)
 - DC: Detects Positive applied to Red Test Lead from 40VDC to 250VDC
- * Acceptable AC (50/60Hz) or DC voltage on wire to be traced: 0 to 250V
- * Safety: Designed to tolerate 250V AC/DC CAT II without damage
- * Test Leads and Accessories: 2' and 5' red and black test lead sets. 1 set of red and black pointed probes. 1 set of red and black flat probes. 1 set of red and black alligator clips. 1 set of red and black screw-on alligator clips.
- * Battery: 9 volt alkaline
- * Battery Test: Flashes green LED to indicate good battery
- * Battery Life: Approx 200 Hours in Trace Mode (Alkaline Battery)
- * Self Powered Voltage Range: approx 30VAC to 250VAC, 60Hz
- * Fuses: Two 0.5A / 250VAC, 5 x 20mm
- * Size: 3 1/2" x 4 1/2" x 1 1/2"
- * Weight: Less than 7 ounces (including battery, not including test leads)

5: Specifications for HotWire Hound

- * Operating Frequency (RF): 400KHz to 500KHz
- * Signal Indicators: Speaker outputs Tracer Signal and LED indicates signal strength
- * Earphone Jack: Accepts 1/8" mono or stereo earphone plug, 8 Ohms to 50 Ohms. Automatically mutes speaker.
- * Headlights: 2 High Brightness White LEDs
- * Speaker: Rugged 1.5" Mylar Cone with Alnico Magnet
- * Thumbwheel RF Sensitivity adjustment
- * Power Switch: Pushbutton turns on HotWire Hound as long as the button is held in
- * Battery: 9 volt alkaline
- * Battery Life: Approx 5 Hours continuous in Trace Mode when receiving signal, 25 Hours continuous when not receiving signal
- * Size: 1-7/8" dia at speaker, 1-3/8" dia at body, 7-1/2" long
- * Weight: Less than 9 ounces including battery

6: General Characteristics

There are many different types of wire tracers using different technologies to trace wires. While a single technology can be used to trace wires in many different scenarios, there is often a specific technology that works best for a specific scenario.

While this instruction manual provides information on how to use the Triplet **HotWire** to perform various wire tracing tasks, the user should be aware that in some cases, other testing devices may work better than the **HotWire**. The principle use for which the **HotWire** is designed is, as its name implies, to locate or trace a specific 'hot' or 'live' electrical wire. For this purpose, the **HotWire** works as well as, and often better than, other products that use a similar technology.

Other Triplet Products

The **HotWire** can be used to identify Circuit Breakers attached to a particular wall outlet. However, the Triplet **Breaker Sniff-It** usually works better for this application than the **HotWire**. The **HotWire** often has difficulty identifying a specific circuit breaker, because the tracer signal used by the **HotWire** is often distorted by the metal in the breaker panel, and the tracer signal crosstalks (more on this later) into other breakers in the panel. The **Breaker Sniff-It** uses a different technology that usually positively identifies the correct circuit breaker. The drawback to the **Breaker Sniff-It** is that it only works on 'live' circuits. Additionally, the **Breaker Sniff-It** will not trace the path of the wire between the wall outlet and the circuit breaker. The **HotWire** will work on 'dead' circuits (depending on why they're dead) as well as 'live' circuits, and it will trace the path of the wire.

The **HotWire** does not work well for identifying a specific wire in a bundle of wires. This is due to crosstalk (more on this later). The standard Triplet **Fox and Hound** products (**Fox**, **Fox 2**, **Fox Jr**, **Hound**, **Hound 2**, **Hound 3**, and **Hound Jr**) use a different technology (AF) than the **HotWire** (RF). AF works better for identifying specific wires in a group of wires. The **HotWire Fox** does have an AF feature built into it, but the **HotWire Hound** does not work with AF. Most of the **HotWire**'s circuits are used to support its RF features. AF was included in the **HotWire Fox** because it was easy to implement, and added some additional flexibility to the product..... but AF does not work on live circuits. To use the **HotWire Fox**'s AF feature, a standard **Hound**, **Hound 2**, **Hound 3**, or **Hound Jr** must be used.

The **HotWire** can be used to trace the path of a live AC power wire. In cases where there are numerous hidden wires, the **HotWire** is a good choice for this task. However, when there are only a few AC power wires in the vicinity, a possible alternative to the **HotWire** is the Triplet **Sniff-It 2**. The **Sniff-It 2** can trace live wires through walls and ceilings. It cannot identify a specific live wire. It just detects any live wire. In some cases, this is enough to satisfy a particular user's needs.

The **HotWire** can be used to identify, for example, the end of a specific Cable TV wire among a group of Cable TV wires. However, if the wires are bundled together, crosstalk between the wires can make identifying a specific wire problematic. The Triplet **WireMaster Coax** or the Triplet **WireMaster Mapper** are better suited to this task, allowing up to 8 wires to be easily identified.

The **HotWire** can be used to identify LAN cables.... and again crosstalk is a problem if the cables are bundled together. The Triplet **WireMaster Mapper, WireMaster XR-2, XR-5** or the Triplet **PairMaster** can be used to provide positive identification of LAN cables.

HotWire Technology

The Triplet **HotWire** is a Radio Frequency (RF) Wire Tracer. RF tracers like the Triplet **HotWire** share certain characteristics that can be perplexing to an inexperienced user. While the RF signal provides the **HotWire** with the ability to trace AC power wires that are 'live', a disadvantage to using the RF signal is its increased tendency to produce 'crosstalk' in adjacent wires and conductors.

Crosstalk is the bleeding of the tracer signal from the 'target' wire onto adjacent wires and electrical conductors. Because the signal is a radio signal... it wants to radiate out of the target wire into the space around it... in the same way that a radio signal radiates off of an antenna. Consequently, it's easy for the RF signal to crosstalk from the target wire to adjacent wires and conductors. The **HotWire** works best when the target wire is 'in the clear'.... that is, not bundled with other wires or run adjacent to metal pipes or other metal structures.

If the RF signal is applied to a wire that goes through a conduit with numerous other wires, the signal can crosstalk onto the other wires, making identification of the target wire difficult (because all of the wires will have some RF signal on them).

If the target wire is in a metal conduit, the RF signal can crosstalk onto the conduit itself. If this occurs, the **HotWire Hound** will trace the path of the conduit, not the wire inside. This is OK if the wire and the conduit go to the same place. But in some instances, the target wire may take a different path if the conduit has junction boxes with other wires in it.

Sometimes, a metal conduit may contact a metal structural element (like an I-Beam or metal furnace duct). In some instances, the RF signal can appear on these other metal structures.

Throughout this instruction manual, the user will be reminded of instances in which a 'false trace' can occur. After the user has some experience with using the **HotWire**, and sees firsthand how it behaves in various test scenarios, he will become more proficient at using the product, and recognize cases in which the **HotWire** will or will not produce reliable results.

Distance, Length, and Depth

The Distance, Length, or Depth at which the **Hotwire Hound** can detect the signal from the **HotWire Fox** varies depending on the application. The greatest sensing distance from the target wire, and the longest length of wire that can be traced, occurs when the wire is in 'free space' and connected to one wire from the **HotWire Fox** (this is the Single Wire Method). The other wire from the **HotWire Fox** connects through a short wire to an actual earth ground. This means the target wire is out in the open. Its not in a conduit or inside of a wall, floor, ceiling, or buried in the earth, and its not connected to anything. The ground wire from the **HotWire Fox** is connected to a metal rod driven into the earth (not a 'ground' in a wall outlet, or other electrical ground). As each of these variables change, the distance, length, or depth is reduced.

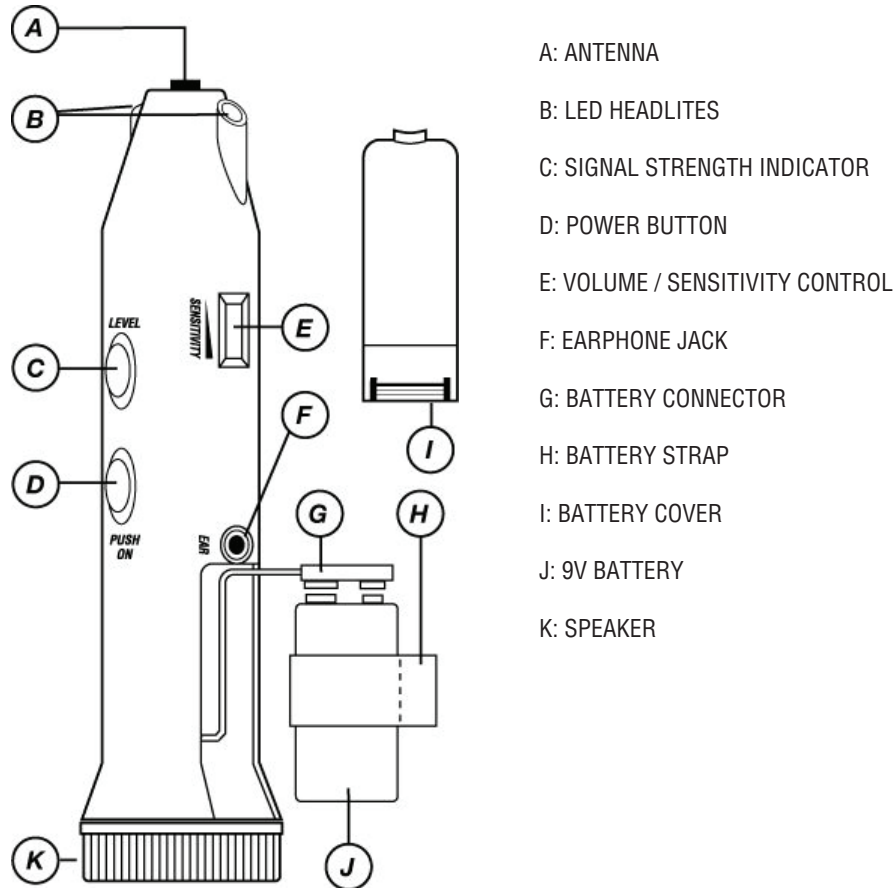
A key variable is whether the **HotWire** is connected using the Single Wire or Double Wire Method. These methods exhibit very different operating characteristics, and performance varies greatly. In general, the Single Wire Method works best to trace a hidden wire through a wall or ceiling, and the Double Wire Method works best to identify a wire at the end opposite the **HotWire Fox** transmitter. However, this is not a 'rule' to be followed, and it often benefits the user to try both methods (if possible) to find out which works better in the given situation.

When the Single Wire Method is used, so much crosstalk can occur that tracing the wire is difficult, because it seems to be everywhere. The settings of the Output Level Control on the **HotWire Fox** and the Sensitivity control on the **HotWire Hound** can have significant effect on the ability to trace the wire.

When the Double Wire Method is used, the type of wire being traced has a significant effect on the length of wire that can be traced. In general, small diameter wires are harder to trace than large diameter wires. Wires in which the conductors are twisted around each other are harder to trace than wires with parallel conductors. For example, 'Romex' electrical wire (a large wire with parallel conductors) is easier to trace than LAN cable (a small wire with twisted conductors).

The **HotWire Hound** senses RF current flowing in a conductor or the Electromagnetic waves in free space. In our application, we are interested in sensing the RF current in a conductor. In order for current to flow, there must be a complete 'circuit'. When it comes to RF, the 'circuit' is not obvious, as it is with regular 60Hz AC household power. With AC, its easy to see how the power source, a light switch, and a light bulb are connected together to form a circuit. There are wires that connect these items to each other. In contrast, because RF can 'propagate' through the air, it can form a circuit without any connecting wires. Simply placing items next to each other will allow RF to form a circuit between them. To use the **HotWire** effectively, we must understand how to manipulate these invisible circuits to our advantage, making the current flow in the circuit we want to trace. Simply connecting a wire from the **HotWire Fox** to the wire we want to trace doesn't necessarily produce a 'circuit' that the **HotWire Hound** will locate and trace.

7: HotWire Hound Control Locations



A) Antenna

This area contains the RF sensing antenna. When using the HotWire Hound, this area is positioned for the strongest signal pickup, or for finding the “null” (more on this later).

B) LED Headlights

Two white LED headlights help illuminate the immediate area.

Helpful Hint

The LED headlights can be used as a low battery indicator. Their brightness is regulated when the battery is good, but as the battery is depleted, a point will be reached where the brightness of the LEDs will begin to decrease. It is a good idea to consider replacing the battery at this time (or at least have a spare one on hand). The HotWire Hound will continue to work for a while, but some reduction in sensitivity and loss of loudness may be noticed. Replace the battery for maximum performance.

C) Signal Strength Indicator

The Signal Strength LED is used to indicate the presence of a signal when it may be difficult to hear the signal coming from the speaker (because of high ambient noise levels). It will glow brighter as the received signal strength increases. The brightness will be seen to pulsate with the characteristics of the received signal.

Helpful Hint

The Signal Strength LED responds to any received signal. Any sound normally heard in the speaker will cause the LED to light. The user will note that the HotWire Hound will “pick up” signals from electrical devices other than the HotWire Fox. Equipment with motors and electronic displays often produce RF noises that can be heard with the HotWire Hound. The Signal Strength LED can’t differentiate between these signals..... so if the user is observing just the LED, without being able to hear the speaker, he may mistake an interfering signal for the target signal. This is where the earphone is handy. By using the earphone, the user can determine if the signal that the LED is responding to is the target signal.

D) Power Button

This momentary pushbutton turns the unit on. Press and release the button for momentary operation, or hold the button in for continuous operation.

E) Volume / Sensitivity Control

The Volume / Sensitivity Thumbwheel controls the loudness of the sound from the speaker. Usually, when initially searching for the target signal, the thumbwheel is set to maximum. At this maximum setting, electronic noises from electrical wiring or devices may be heard. When the target signal is heard, the user can track the signal to its source by moving the HotWire Hound in the direction that makes the sound of the target signal get louder. As the loudness of the target signal increases, the thumbwheel setting can be reduced, which will reduce the loudness of the other interfering sounds. Repeating this process will lead the user in the direction of the wire with the target signal on it.

F) Earphone Jack

The earphone jack accepts a standard 1/8” (3.5mm) mini-plug. This type is often used with portable music playing devices. The earphone may be either a stereo or mono type. When the plug is inserted into the jack, the speaker is turned off, and the sound can only be heard through the earphone.

To use the earphone, set the Volume / Sensitivity thumbwheel to minimum, plug the earphone into jack, and press the Power button. Adjust the thumbwheel for a comfortable sound level in the earphone.

Helpful Hint

Setting the Volume / Sensitivity thumbwheel to minimum prior to using the earphone, as previously described, can often save the user from a jarring experience. Sounds that are not very loud in the speaker, can be very loud in the earphone. While the HotWire Hound does provide some compensation for this, the earphone loudness can vary greatly depending on the earphones actually used.

G) Battery Connector

Observing proper polarity, attach to 9V alkaline battery

H) Battery Strap

Slip over battery before installing in Hound. Position tab so it can be grabbed with fingers. This allows battery to be removed easily when it needs to be replaced.

I) Battery Cover

Removed and replaced easily using snap tab.

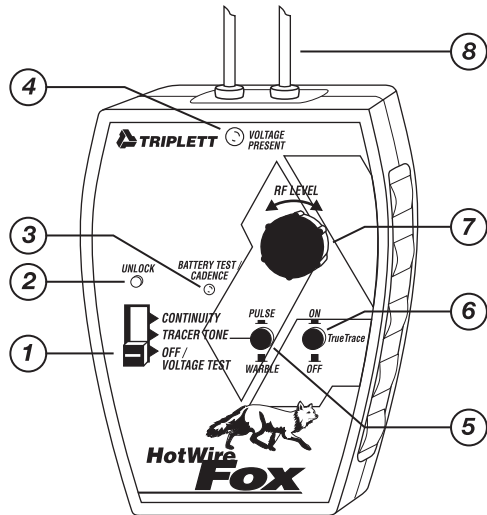
J) Battery

Standard 9V alkaline battery

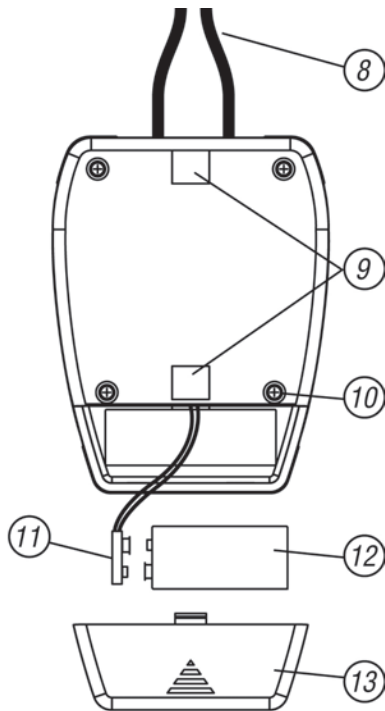
K) Speaker Cover

Received tracer tone emanates from speaker

8: HotWire Fox Control Locations



- 1) FUNCTION SWITCH
- 2) UNLOCK BUTTON
- 3) BATTERY TEST / CADENCE LED (GREEN)
- 4) VOLTAGE PRESENT LED (RED)
- 5) PULSE / WARBLE BUTTON
- 6) TRUETRACE ON/OFF BUTTON
- 7) RF LEVEL CONTROL
- 8) TEST LEADS (PIGTAILS)



- 8) TEST LEADS (PIGTAILS)
- 9) MAGNETS
- 10) SCREWS (4 PLACES)
- 11) BATTERY CONNECTOR
- 12) 9V BATTERY
- 13) BATTERY COVER

Test Leads



- 1) 24" Test Leads
- 2) 60" Test Leads
- 3) Pointed Test Probe
- 4) Flat Test Probe
- 5) Alligator Clips

HotWire Fox Control Description

1) Function Switch

The Function Switch has 3 settings..... OFF / VOLTAGE TEST, TRACE / BATTERY TEST, and CONTINUITY BEEPER.

a) In the OFF / VOLTAGE TEST setting, the **HotWire Fox** is turned off (not using any battery power) and is configured to test for AC or DC voltage on its Test Leads. If AC or DC voltage is detected (see Specifications for details), the beeper sounds and the VOLTAGE LED flashes.

b) In the TRACER TONE setting, the **HotWire Fox** is turned on and generating the tracer signal. The BATTERY TEST / CADENCE LED flashes to indicate that the battery is OK.

c) In the CONTINUITY setting, the **HotWire Fox** is configured to test for DC Continuity between its test leads. If Continuity is detected, the beeper sounds.

2) UNLOCK Button (Power Latch)

The **HotWire Fox** Function switch incorporates a Power Latch feature to prevent the product from accidentally being turned on, which could result in a dead battery. When the **HotWire Fox** is turned off, its Function switch is locked into the OFF / VOLTAGE TEST position. To turn the product on, the UNLOCK button must be pressed, and while the button is pressed, the Function switch is moved to the TRACER TONE position, at which time the UNLOCK button may be released. When the Function switch is returned to the OFF / VOLTAGE TEST position, the switch will lock in this position, requiring the user to once again press the UNLOCK button to turn the product on.

3) BATTERY TEST / CADENCE LED (green)

When in the TRACER TONE mode, this LED flashes to indicate that the battery is OK. If the LED does not flash, replace the battery. The flashing speed of the LED indicates if the cadence of the tone is fast or slow.

4) VOLTAGE PRESENT LED (red)

This LED flashes when AC or DC voltage is present (see Specifications for details). In the OFF / VOLTAGE TEST and CONTINUITY modes, the flashing is accompanied by the beeper sounding. In the TRACER TONE mode, the Voltage Present LED will flash to indicate a voltage, but the beeper will not sound.

5) PULSE / WARBLE Button

This button allows the user to select the 'tone' of the Tracer Signal. When PULSE is selected (button 'in'), the Tracer Signal is a tone that pulses on and off. When WARBLE is selected (button 'out'), the Tracer Signal is a tone that shifts up and down in pitch. The user may choose either setting. It is often found that the WARBLE setting works better when detecting a "null" (more on this later).

6) **TrueTrace** ON/OFF Button

TrueTrace allows the user to positively identify a pair of wires, but it only works when certain conditions are satisfied. In some instances, it may cause a 'peculiar' or an undesired behavior of the **HotWire Fox**. If this occurs, this button allows **TrueTrace** to be turned off. **TrueTrace** is 'on' when the button is 'in'. Its 'off' when the button is 'out'.

7) RF LEVEL Control

This knob allows the RF level of the Tracer Signal to be adjusted (the level of the AF signal is fixed, and not adjusted by this knob). While in many cases, the strongest signal is best, in some cases, too strong of a signal will 'overload' the **HotWire Hound**, or may cause excessive crosstalk into adjacent wires or conductors.

8) Test Leads

The short 'pigtail' Test Leads connected to the **HotWire Fox** are designed to connect to the 2' or 5' leads. Either of these leads can be used to connect to any of the supplied probes.

9) Magnets

Magnets on the rear of the **HotWire Fox** allow it to be temporarily attached to steel surfaces, like electrical panels, appliances, junction boxes, etc.

10) Screws

4 screws hold the case of the **HotWire Fox** together. Remove these screws to access the fuses.

11) Battery Connector

The battery connector mates to a standard 9V battery

12) 9V Battery (not included)

13) Battery Cover

The battery cover allows access to the 9V battery which can be used to power the product. Always replace the battery cover before using the product. Using the product without the cover in place is dangerous and may injure the user.

9: Getting Started

Installing / Replacing Battery

Refer to the HotWire Fox and Hound Control Locations drawing. To install or replace the 9 volt battery in the **HotWire Hound**, remove the Battery Cover (I) by pressing the release tab towards the nose end of the case. Remove the Battery Connector (G) and the Battery Strap (H). Snap the Connector to a 9 volt battery (J) and slide the Strap over the battery. Position the Strap so that the finger tab is on the side of the battery. Making sure foam block is against the back of the speaker, insert battery into the **HotWire Hound** case, placing the bottom of the battery against the foam, and compressing the foam while completing the battery insertion. The battery wires should be behind the battery and positioned to allow battery to be fully inserted. The finger tab on the Strap should be sticking out of the Battery Compartment. This tab is used to remove the battery. Fold the tab over, and secure the Battery Cover to the case by inserting the end near the Earphone Jack (F) first, and snapping the opposite end of the Cover to the case.

To install or replace the 9 volt battery in the **HotWire Fox**, remove the Battery Cover (10) by inserting a fingernail or small screwdriver into the slot below the bottom magnet. The Cover will snap loose. Remove the Cover completely by sliding it straight down. If a battery is already installed, the Cover may be a little difficult to remove because the battery is pushing against the cover. Snap the Battery Connector (11) onto a fresh 9V battery. Install the battery into the battery cavity taking care to position the battery wires so they do not interfere with inserting the battery and replacing the Battery Cover.

WARNING:

Never use the HotWire Fox with its battery cover removed. Do not remove the battery cover if the HotWire Fox is connected to any wires. The wires may be 'live' which causes the battery to be 'live'. Failure to heed this warning may result in user injury.

HotWire Fox Battery Test

Press the UNLOCK button and set the Function switch to the TRACER TONE position. The green BATTERY TEST/CADENCE LED must flash. If the BATTERY TEST/CADENCE LED does not flash, the battery should be replaced. If the Pilot Tone feature is activated (by a jumper inside the product), the tracing signal, a pulsing or warbling sound, may be heard.

Basic Operational Test

Hold the **HotWire Hound** and press its POWER button. The white LED headlights should come on. If they don't come on, replace the battery. Rotate the VOLUME / SENSITIVITY thumbwheel to its mid position and hold the nose of the Hound within a few inches of the Fox. The Fox's tracing signal should be heard coming from the Hound's speaker. Depending on the setting of the Fox, the signal may sound like a Warble or a Pulse. Move the Hound slowly over the Fox noting how the loudness of the signal changes, and how the Hound's LED lights in response to the strength of the signal.

10: Detailed Operation

Using the Test Leads

Any test performed with the HotWire Fox requires the use of test leads. The HotWire kit includes a set of Modular Test Leads that can be configured for various test scenarios. Included is a set of short (2') and long (5') leads, Flat and Pointed Probes, and modular and screw-on Alligator Clips. The Probes and Clips can be connected to any of the leads, providing the versatility needed to use the HotWire in many different test setups.

A typical test setup to trace a 120VAC power line would use the 2' Test Leads and the Flat Probes. These would be plugged together and attached to the HotWire Fox's 'pigtail' leads. The Flat Probes are designed to plug directly into a standard 'American Blade' wall outlet. Notice that the circular finger guards are flat on one side to allow the probes to be plugged in next to each other.

WARNING:

AVOID CONNECTING TO A CIRCUIT THAT IS ENERGIZED. If possible, de-energize the circuit, connect the HotWire Fox, then re-energize the circuit. If this is not possible, wear gloves and connect the probes to the circuit, one at a time, avoiding hand contact with any electrically energized metal, including the HotWire's Probes as well as components in the electrical circuit.

If connecting to a wire or wires, the Alligator Clips would typically be used.

Any combination of probes can be used to suit the situation. For example, one lead may be connected with an Alligator Clip, and the other lead with a Flat Probe.

The different lengths of Test Lead wire are provided not only for convenience in testing, but in some tests, the length of the leads has an effect on the traceability of the wire or circuit. This will be explained in more detail later.

OFF / VOLTAGE TEST Function

The **HotWire Fox** has a built-in Voltage Detector. It is intended to warn the user that voltage is present, and the proper precautions should be taken.

To use the Voltage Detector, set the Function switch on the **HotWire Fox** to the OFF / VOLTAGE TEST position. Connect the Test Leads and suitable Probes or Clips to the leads. Connect the Probes or Clips to the circuit to be tested. If voltage is present, The **HotWire Fox** will beep repeatedly and the VOLTAGE PRESENT LED will flash.

WARNING:

DO NOT EXCEED THE VOLTAGE SPECIFICATION OF THE HOTWIRE FOX (250v AC/DC). CONNECTING TO A HIGHER VOLTAGE MAY DAMAGE THE HOTWIRE FOX OR MAY INJURE THE USER.

WARNING:

Always test the Voltage Detector function on a circuit of known voltage before using the HotWire Fox to detect voltage on an unknown circuit. A loose Test Lead or Probe, a blown fuse, or a circuit defect may prevent the HotWire Fox from indicating that dangerous voltage is present. MAY SURE THE HOTWIRE FOX IS OPERATIONAL BEFORE USING IT TO TEST AN UNKNOWN CIRCUIT.

CONTINUITY TEST Function

Set the Function switch to the CONTINUITY position. When the test leads are connected to a circuit with continuity, the beeper will sound. Use this feature to test switches, light bulbs, fuses, wiring, etc.

If the test leads of the **HotWire Fox** are accidentally connected to a live circuit while in the CONTINUITY Test function, the VOLTAGE PRESENT LED will flash and the beeper will sound.

TRACER TONE Test Function

Several different methods can be and should be employed to trace wires.

Set the Function switch to the TRACER TONE position. The BATTERY TEST / CADENCE LED must flash. If it does not flash, replace the battery.

Select the PULSE or WARBLE mode as desired. If the Pilot Tone is activated, you should be able to faintly hear the sound produced by the PULSE and WARBLE settings.

If connecting to a live circuit, set the ***TrueTrace*** to OFF.

Wire Tracing Basics

Locating or tracing hidden wires is often a challenge. This is because the various methods used to perform the task all have limitations and a 'false trace' can be the result. Despite claims to the contrary, all wire tracing technologies suffer from problematic operation in some test situations. The unique characteristics of a particular situation usually determine the technology that must be used to perform the trace. To trace a 'live' wire, an RF (Radio Frequency) tracer signal is usually placed on the wire. The ***HotWire*** uses this technique. Some limitations of this technique have been previously mentioned.

RF behaves differently than 60Hz AC. Users familiar with 60Hz will often be baffled by RF. Sometimes, RF seems to behave counter intuitively (does the opposite of what the user thinks it will do).

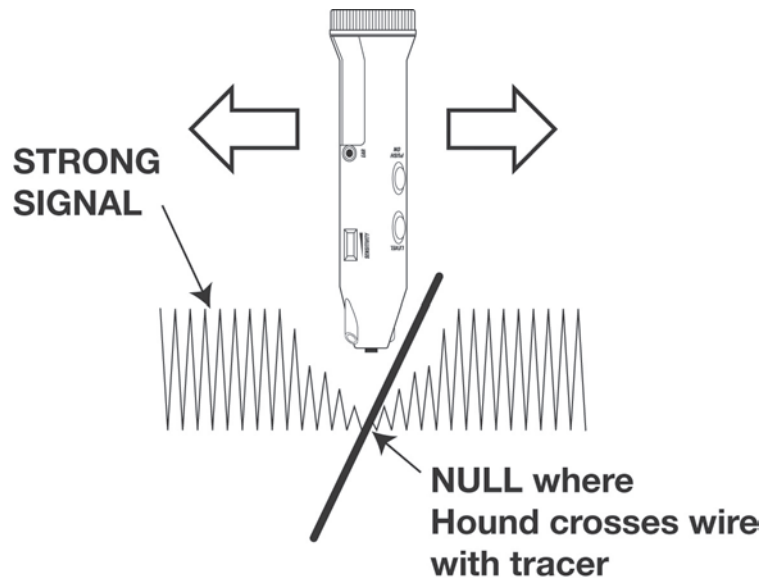
When sensing the tracer signal, the ***HotWire Hound*** will either detect a "null" in the signal, or a "peak" in the signal.

The most accurate method for locating a wire is by making it "null" the RF field, and then finding this "null" with the ***HotWire Hound***.

The ***HotWire Hound*** can also sense a "peak". This is a useful tracing method, but not as accurate as the null method. Given a choice, it is generally best to try to use the null method.

The Null Method

The concept of the “null” is illustrated in the following drawing.



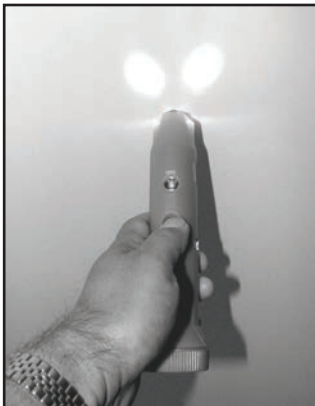
When the **HotWire Hound** is passed perpendicularly over the wire with the **HotWire Fox's** tracer signal, a strong signal will be picked up on either side of the target wire, and a 'null' (dead spot) will appear right over the wire. The null locates the wire within a few inches.

While it is possible to take special steps to promote the formation of a null, it is generally easiest to just connect the **HotWire Fox** to the target circuit and see if it nulls by itself.

For example, connect the **HotWire Fox** to a wall outlet (the polarity is not important), trace the wire through the wall by finding the null, and locate the target circuit breaker by finding the null over the breaker. The sound from the **HotWire Hound's** speaker and the brightness of it's LED indicator will show the location of the null. The following photos illustrate the process.



HotWire Fox connected to wall outlet



Tracing wire in wall



Identifying breaker by locating the "null".

Helpful Hints

It is usually best to start with the RF Level control all the way up on the **HotWire Fox**, adjusting the Sensitivity on the **HotWire Hound** so the tracer signal produces a comfortable loudness. If it is found that the Sensitivity of the **HotWire Hound** is turned almost all the way down, it may be hard to detect the peak or null of the target wire. In this case, reduce the RF Level setting on the **HotWire Fox**, and increase the Sensitivity setting on the **HotWire Hound**. Doing so can improve the ability to find a null over the target wire.

The **HotWire Hound** may null over several breakers in the panel. Experimentally turn the breaker off. If the null effect disappears and tracer signal drops dramatically in level, its likely that the correct breaker has been found. For positive indication, remove the battery from the **HotWire Fox** before connecting it to the target wires. The voltage on the wires will power the **HotWire Fox** unit. If the breaker is experimentally turned off, the **HotWire Fox** loses its power and tracer signal is completely gone.

For more accurate breaker identification, use a Triplet **Breaker Sniff-It**.

While tracing along the length of the target wire, it may be found that at some places the signal nulls and at other places, it peaks. This normal behavior and is affected by the orientation of the wire.

In some cases, adjusting the Sensitivity of the **HotWire Hound** can improve the null effect. When a null is found, adjust the Sensitivity to see if the null becomes 'sharper', allowing more precise locating ability.

Using Null to Locate 'Invisible Fence'

'Invisible Fences' are used to contain animals within a designated grassy area. The area is outlined with a 'boundary wire' that is usually buried 3 or 4 inches below the surface of the ground. The ends of the boundary wire are connected to a generator unit usually located in a garage or basement. At times, it may be necessary to locate the wire (when doing excavation). While the 'radio collars' detect the presence of the boundary wire, they are not very useful for actually locating the wire. The **HotWire** will locate the boundary wire quickly and accurately.

Disconnect the boundary wire from the invisible fence generator unit. Connect the wires of the HotWire Fox. The polarity is not important. Locate the boundary wire by holding the HotWire Hound close to the ground and locating the null. See following pictures.



HotWire Fox connected to boundary wires

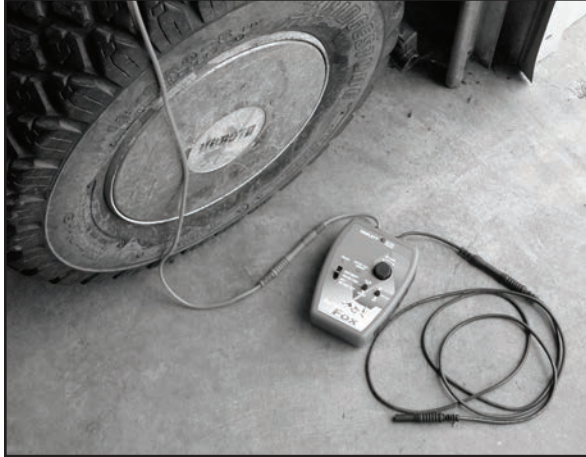


HotWire Hound locates boundary wire using null method.

Improving Null with Earth Ground

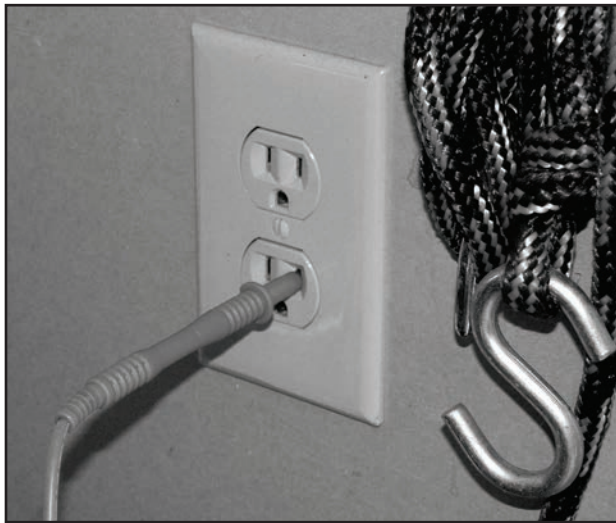
When tracing a wire and the actual earth ground is available, it may be possible to improve the null effect and create a stronger tracer signal for the **HotWire Hound** to pick up. It's important that 'actual' earth is used... not a wire leading to the earth. An 'actual' earth is the soil itself, or concrete laid on the soil (like a garage floor or a factory floor).

When the actual earth is available, lay the **HotWire Fox** on the earth and connect the 5' black lead to the **HotWire Fox's** black pigtail, and string the black lead out on the surface of the earth. In the following photo, the black lead is coiled up. This is just so it fits in the photo. It will work better if it is strung straight out.



HotWire Fox on 'Earth'

Connect the red pigtail to either the 2' or 5' red test lead (use the shortest one you can), and connect the other end of the test lead to the wire to be traced. In the following photo, the target wire is connected to a wall outlet.



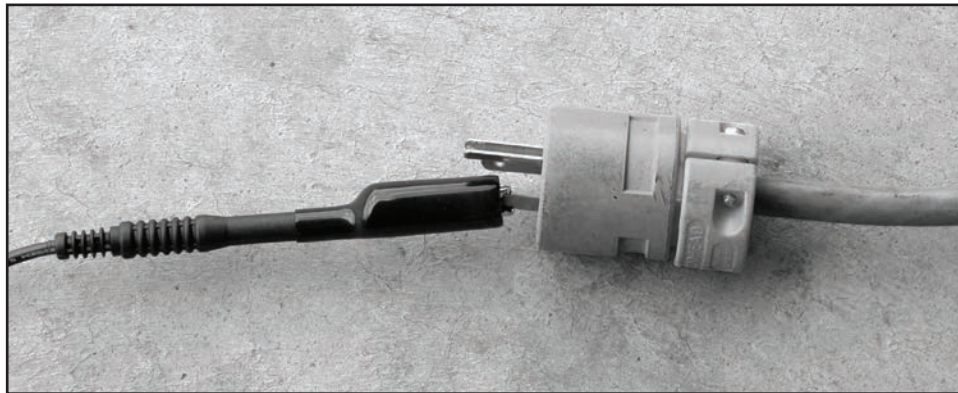
Single Test Lead in Wall Socket

CAUTION:

If the wall outlet is 'live', the black test lead will be live also. Use appropriate caution. Failure to do so could result in user injury.

When using 'single wire' connection, the HotWire Fox will not indicate if the target wire is 'live'. If you do not know if the target wire is 'live', use appropriate caution. Failure to do so could result in user injury.

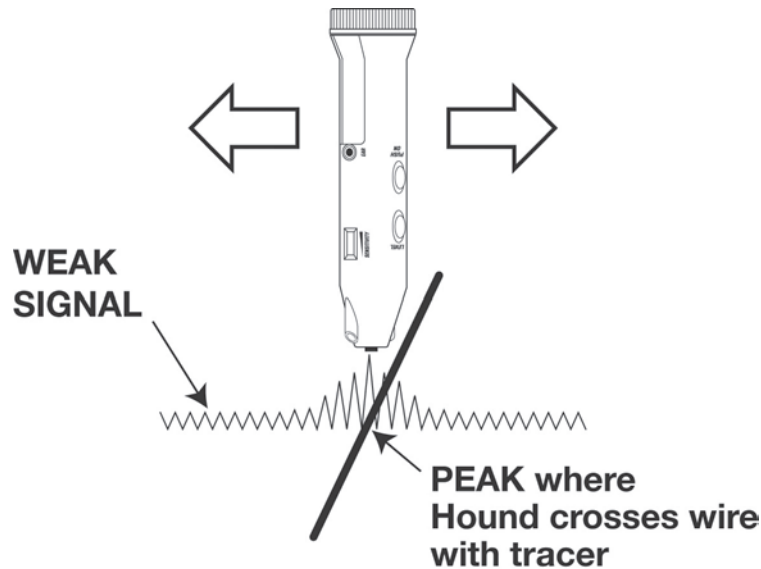
If the target wire is not 'live' the length of the black test lead can be increased by using the alligator clip to connect the lead to, for example, an extension cord. The extension cord is then laid out straight on the ground to enhance the 'earth effect'.



Using these techniques, the power of the tracer signal is maximized, and a stronger more accurate trace usually results.

The Peak Method

The concept of the 'peak' method is illustrated in the following drawing.



When the **HotWire Hound** is passed perpendicularly over the wire with the **HotWire Fox's** tracer signal, a strong signal will be picked up as the Hound passes over the target wire. The signal will be strongest directly over the wire.

Peak signal pick up usually happens when short wires are being traced, and the wires have no predominant RF path to earth ground.

On a long wire run, the signal near the **HotWire Fox** may display null characteristics, and gradually change to peak characteristics towards the far end of the wire.

Crosstalk and TrueTrace:

Crosstalk is the bleeding of the tracer tone from the target wire onto adjacent wires. This often happens in multi-wire cables, or in cable harnesses where many wires are bundled together in close proximity to each other. A tracer tone applied a pair of wires may crosstalk onto adjacent wires. Some wires/cables are constructed to reduce the crosstalk, but other wires/cables crosstalk readily. So much crosstalk can

occur that the tracer tone on the adjacent wires can be almost as large as the original tone on the target wires. This can make it difficult to identify the target wires with the **HotWire Hound**. To aid in identifying the target wires, the **HotWire Fox** uses **TrueTrace**.... a test technique which greatly improves the accuracy of the trace. Momentarily shorting the target wires together causes the cadence (the speed at which the tracer tone warbles or pulses) of the tracer tone to change, positively identifying the target wires. If shorting the suspect wires together does not cause the cadence to change, the wires have crosstalk on them and are not the target wires.

When the HotWire Fox is initially set to the TRACER TONE mode, it may come on with either fast or slow cadence.

If the TrueTrace feature of the HotWire Fox causes erratic behavior of the product, it may be turned off by pressing the TrueTrace button.

CAUTION:

TrueTrace is only usable on non-powered wires.

NEVER SHORT 'LIVE' WIRES TOGETHER.

Miscellaneous Information

The HotWire is intended to trace wires between the HotWire Fox and the Entrance Panel or Subpanel. It is not intended to trace wires connected to the same breaker, or to trace outlets that may be on the same circuit.

The tip of the HotWire Hound is not necessarily 'pointing' at the signal its receiving. There is a circular pickup pattern around the tip of the Hound. Anything in this area is picked up, whether the tip is actually pointing at it or not.

RF pickup on user's body can be confused with signal pickup on the probe. This can be verified by holding the HotWire Hound to a good earth ground. If signal continues to be picked up, the user's body is probably picking up the signal. Ground body to eliminate the pick up. This usually only happens in 'near field' conditions.

Wires usually do not radiate RF signals in a circular pattern around the wire. There is often a 'lobed' pattern, with the size and the shape of the lobes determined by various factors, including the construction of the wire, the placement of the wire in relationship to other wires or conductive surfaces, and the strength of the signal impressed on the wire by the HotWire Fox. Using the Single Wire Method or the Double Wire Method significantly affects the pattern and strength.

The orientation of the Hound's 'antenna', concealed in the nose of the Hound, has a dramatic effect on the RF sensing.

Under worst case conditions, the tracing length may be reduced to less than 100ft.

If the target wire is in a metal conduit, it is usually possible to trace the wire from up to 6" away. The metal conduit partially shields the RF signal, so the locating distance is reduced.

If the wire is in cement, the water content of the cement acts like a partial shield reducing the tracer distance.

A wire in metal conduit in cement can only be sensed 2" to 3" away, if at all.

Wood frame construction doesn't have much effect upon the performance of the **HotWire**. Plaster and drywall don't have much effect either. If the wood plaster or drywall is soaked with water, the **HotWire Hound** won't pick the signal up as well.

A wire buried in the earth can be traced, depending on soil conditions. The greatest tracing depths are obtained in dry soil with low mineral content.

High gain of the HotWire Hound can mislead the trace. In locations with multiple breaker panels, where the user doesn't know which breaker panel is feeding power to the target wire, check all of the panels initially to find out which one has the strongest signal. It's likely that the RF will crosstalk into all of the panels and may mislead the user unless all the panels are checked initially.

If possible, use the AF mode to identify specific wires in a group of wires. The Triplet Hound 3 is a good inductive amplifier for AF tracing. Keep in mind that AF can only be used on unenergized wires.

Noise Pickup: The HotWire Hound is tuned to the frequency of the HotWire Fox. RF noise is also found in this same frequency range. Noise comes from Light Dimmers, Motor speed controls, Power Paks (Wall Warts), Computers, etc. The HotWire Hound may also pick up radio or TV stations. Because electrical wiring often acts like an antenna, the HotWire Hound may pick up radio or TV stations as the Hound is brought close to these electrical wires.

Various electrical loads on a power line can affect wire tracing performance.

11: Internal Settings

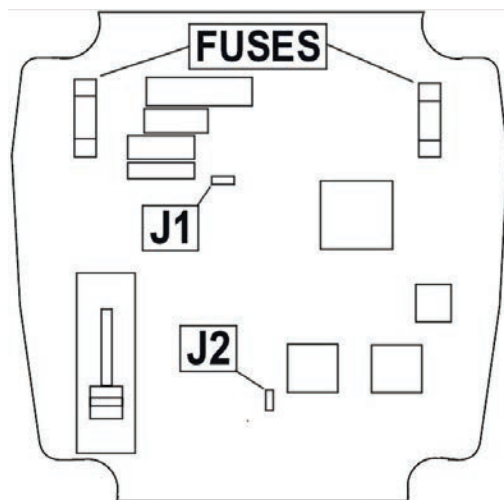
The **HotWire Fox** has several internal settings. To access these settings, remove the 4 case screws from the back of the case, then lift the front off of the case. After setting the 'jumpers' as desired, reassemble the case.

Pilot Tone

When jumper J1 is in position, the audible sound made by the HotWire Fox when in the Tracer Tone function is turned on. If the user prefers the sound to be off, jumper J1 can be removed.

Pitch

When jumper J2 is in position, the pitch (frequency) of the Tracer Tone is 'low'. When jumper J2 is removed, the pitch is 'high'. The 'low' or 'high' pitch is set to user preference.



Internal View of HotWire Fox

12: Included Items

The following items are included with the HotWire Fox and Hound

HotWire Fox	Part Number 3388-FOX
HotWire Hound	Part Number 3388-HOUND
Carrying Case	Part Number 10-4300
Instruction Manual	Part Number 84-877
Two 2' Test Leads (1 red, 1 black)	Part Number 79-805
Two 5' Test Leads (1 red, 1 black)	Part Number 79-806
Two Pointed Probes (1 red, 1 black)	Part Number 79-801
Two Flat Probes (1 red, 1 black)	Part Number 79-802
Two Alligator Clips, Modular (1 red, 1 black)	Part Number 79-803
Two Alligator Clips, Screw-On (1 red, 1 black).....	Part Number 79-813

13: Maintenance

The HotWire Fox contains 2 internal fuses.

WARNING:

The fuses should not blow if the product is used properly. If the fuses blow, it's likely the product is being misused. DO NOT REPLACE WITH LARGER FUSES. DO NOT USE THE PRODUCT IF THE FUSES CONTINUE TO BLOW. DOING SO MAY DAMAGE THE PRODUCT OR INJURE THE USER.

To test the fuses, set the HotWire Fox to it's CONTINUITY function and short the test leads. The beeper should sound. If the beeper does not sound, the fuses maybe blown.

To replace the fuses, disconnect the HotWire Fox from any external circuitry, then remove the 4 screws on the back of the Fox's case. Lift the front off of the case. Locate the fuses and replace them if necessary. Reassemble the case.

No additional maintenance of the HotWire Fox and Hound is required. In the event the product is defective or is damaged, please contact Triplet for repair information.

Triplett Product Return Instructions

In the unlikely event that you must return your Triplett equipment for repair, the following steps must be taken.

- 1) Call 1-800-TRIPLETT to obtain a Return Material Authorization (RMA) number from Customer Service.
- 2) Enclose a copy of the original sales receipt showing date of purchase.
- 3) Clearly print the RMA number on the outside of the shipping container.
- 4) Return to: Triplett / Jewell Instruments
 850 Perimeter Road
 Manchester, NH 03103
 ATTN: Repair Dept.

14: Triplett One Year Limited Warranty

Triplett warrants instruments and test equipment manufactured by it to be free from defective material or workmanship and agrees to repair or replace such products which, under normal use and service, disclose the defect to be the fault of our manufacturing, with no charge within one year of the date of original purchase for parts and labor. If we are unable to repair or replace the product, we will make a refund of the purchase price. Consult the Instruction Manual for instructions regarding the proper use and servicing of instruments and test equipment. Our obligation under this warranty is limited to repairing, replacing, or making refund on any instrument or test equipment which proves to be defective within one year from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries and fuses, not of our manufacture used with this product are not covered by this warranty.

To register a claim under the provisions of this warranty, contact Triplett's Customer Service Department for a Return Authorization Number (RMA) and return instructions. No returned product will be accepted without an RMA number. Upon our inspection of the product, we will advise you as to the disposition of your claim.

ALL WARRANTIES IMPLIED BY LAW ARE HEREBY LIMITED TO A PERIOD OF ONE YEAR FROM DATE OF PURCHASE, AND THE PROVISIONS OF THE WARRANTY ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED.

The purchaser agrees to assume all liability for any damages and bodily injury which may result from the use or misuse of the product by the purchaser, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability Triplett may have, including incidental or consequential damages.

Some states (USA ONLY) do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. No representative of Triplett / Jewell Instruments or any other person is authorized to extend the liability of Triplett in connection with the sale of its products beyond the terms hereof.

Triplett reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

