TRIPLETT
FOX JR. & HOUND JR.

Instruction Manual

TRIPLETT
Test Equipment & Tools

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1. Introduction

The Triplett FOX Jr and HOUND Jr Wire Tracing Kit consists of the FOX Jr Compact Toner, the Hound Jr Compact Probe, and the convenient belt pouch / carrying case. These compact versions of the popular Triplett FOX and HOUND series of products offer less demanding users a portable low cost wire tracing solution.

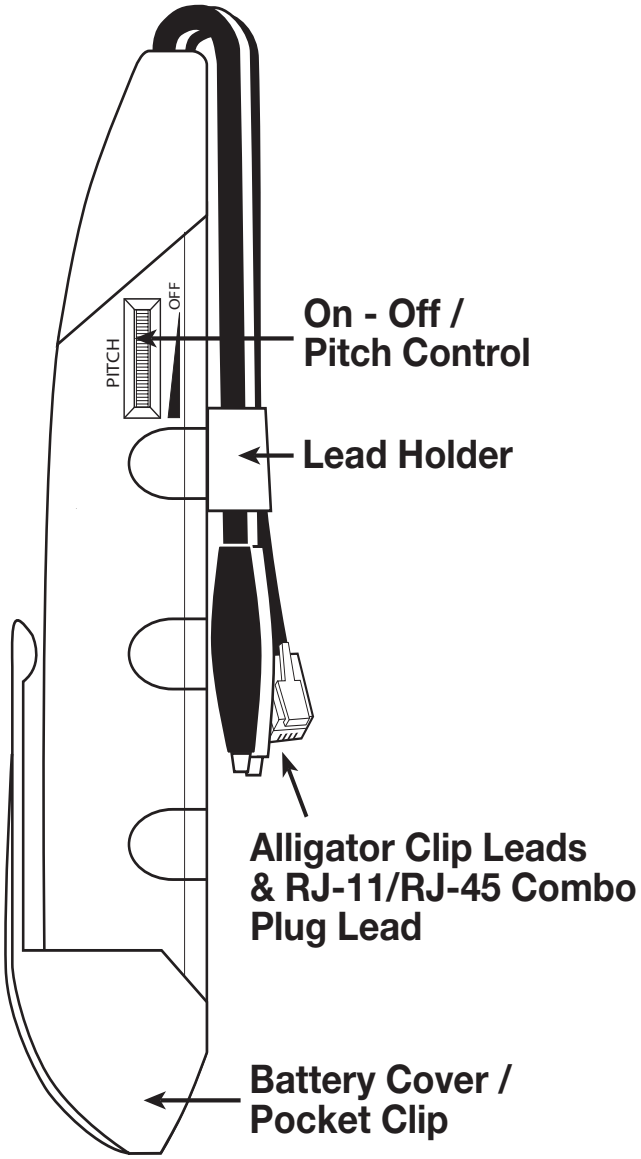
2. FOX Jr. Features

- Pocket-Sized with Pocket Clip
- Connects easily with alligator clips or RJ-11 / RJ-45 combo plug
- Distinctive Warble tone is adjustable over wide range
- 120VAC Line Cross Resistant
- Powered by one A23 Battery (included)
- 1 Year Warranty

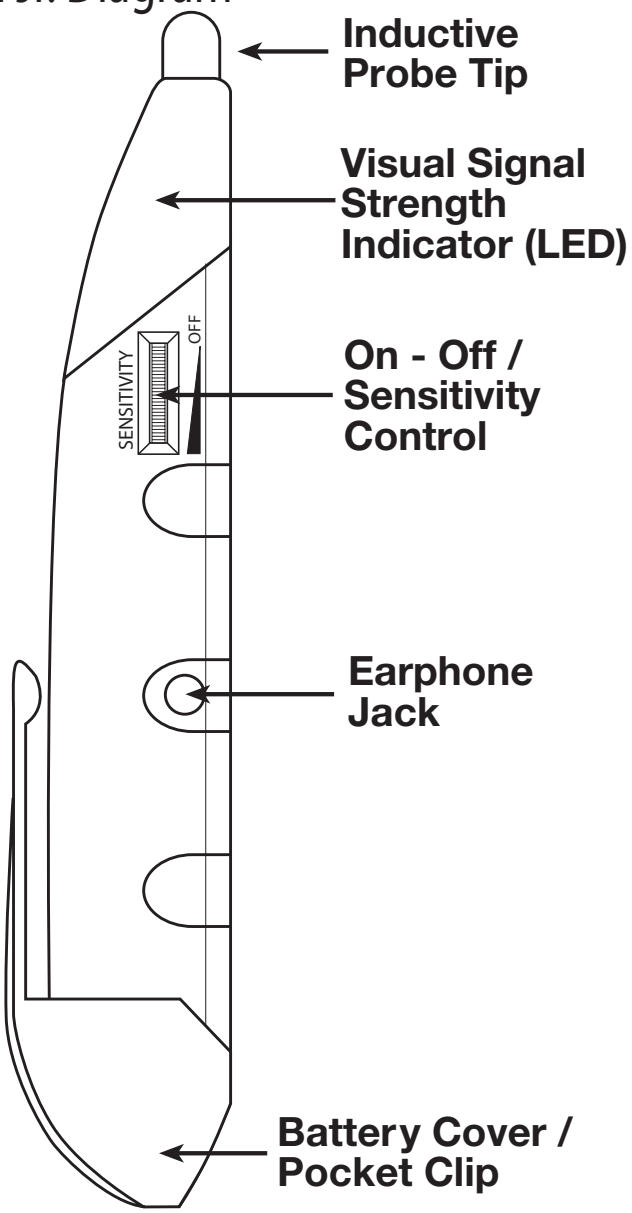
3. HOUND Jr. Features

- Pocket-Sized with Pocket Clip
- Small and Streamlined to get into tight places
- Adjustable Sensitivity / Volume Control
- Visual Signal Strength Indicator
- Contains Hi-Gain Hi-Impedance Amplifier
- Non-Conductive Probe Tip
- Detects FOX Jr Signal from up to 12" away
- Earphone Jack
- Power Beeper Reminder
- Powered by one A23 Battery (included)
- 1 Year Warranty

4. Fox Jr. Diagram



5. Hound Jr. Diagram



6. Safety Warnings and Cautions

6.1

Do not connect FOX Jr or HOUND Jr to any source of AC power. AC voltages above 30 volts can be dangerous, and may result in user injury. The FOX Jr and HOUND Jr are not intended to trace live AC power lines. The FOX Jr will be damaged if connected to a live AC power line.

6.2

Use care when using the HOUND Jr to probe any wire or cable. An unexpected dangerous voltage may be present, which may result in injury to the user.

6.3

Use caution when working with telephone lines. They can support dangerous voltages. 50VDC is often present, and 100VAC may be present during ringing. Additionally, telephone lines may support dangerous levels of common mode voltages. In some circumstances, user injury may result.

6.4

Use caution when working with any long unconnected wire or cable. Under some conditions, unconnected wires may "float up" to dangerous potentials, and touching them may result in user injury.

6.5

Use care when connecting the FOX Jr to any wire or cable. An unexpected dangerous voltage may be present, which may result in injury to the user.

6.6

Potentials applied to any connection of the FOX Jr may appear on other FOX Jr connections. For example, a potential applied to the RJ-11 plug may appear on the alligator clips. This could pose a shock hazard to the user, if for example, a telephone cable with 120VAC on it is connected to the FOX Jr. The 120VAC may appear on the alligator clips, and shock the user.

6.7
Do not use the FOX Jr or HOUND Jr if either unit appears to be damaged. A damaged unit may lead the user to a false conclusion, resulting in user injury.

6.8
Do not use the FOX Jr or HOUND Jr if either unit is wet. A wet unit may result in shock or injury to the user if connected to live circuitry.

WARNING

The FOX Jr and HOUND Jr are designed to work on non-energized (except telephone lines) wires or cables. Attempting to test energized wires may damage the FOX Jr and HOUND Jr, cause user injury, or both.

7. Specifications

7.1 FOX Jr. Specs

Output Voltage:	6 volts peak to peak square wave into an open circuit
Output Type:	Warble
Output Frequency Range:	800Hz to 5KHz
Frequency Adjustment:	Thumbwheel
Overload Protection:	Tolerates 120 volts AC at 60Hz at alligator clips or modular plug
Connections:	Alligator clips and RJ-11 / RJ-45 Combo modular plug
Lead Length:	Approx 4"
Battery:	A23, 12 volt , Triplett 37-60 (protected against the accidental reversal of the battery polarity)
Size:	5.8" (L) x 1.25" (W) x 0.8" (H)

Weight:	Approx 1.6 oz.

7.2 HOUND Jr. Specs

Amplifier:	JFET and Integrated Circuit for Hi-Impedance and Hi-Gain
Sensitivity:	Adjustable with thumbwheel, detects FOX Jr up to 12" away
Probe:	Non-conductive, insulated probe
Earphone Jack:	Accepts standard 1/8" (3.5mm) mini phone plug, either mono or stereo. For use with electromagnetic (dynamic) earphones from 8 Ohms to 2000 Ohms. Automatically mutes loud-speaker when earphone is used. An earphone with a shielded cable is suggested to reduce the possibility of feed-

	back from the cable to the probe tip.
Signal Strength Indicator:	Bright red dual LED visual signal strength indicator
Battery:	A23, 12 volt , Triplett 37-60 (protected against the accidental reversal of the battery polarity)
Power Beeper Reminder:	HOUND Jr beeps and flashes periodically to remind user that it is on.
Size:	5.8" (L) x 1.25" (W) x 0.8" (H)
Weight:	Approx 1.7 oz.

7.3 FOX Jr. & HOUND Jr. Kit

Case Size:	6.2" (L) x 2.8" (W) x 1.3" (H)
Weight:	Approx 4 oz. (both units & case)

8: Getting Started

8.1 Installing Batteries

Remove the black pocket clip from both the FOX Jr and HOUND Jr. Install an A23 battery in each product, observing proper polarity (negative towards tip), and replace the pocket clips.

8.2 Initial Tests

Turn on the HOUND Jr by rotating its thumbwheel from the off position to the fully on position. At this time, you may not hear any sound from the HOUND Jr, or you might hear a buzzing sound if standard fluorescent lights or other electronic equipment are operating in the vicinity. If you leave the HOUND Jr operating this way, it will beep and flash periodically to remind you it is turned on.

With the HOUND Jr's tip positioned near the leads of the FOX Jr, turn on the FOX Jr by rotating its thumbwheel from the off to on position. The FOX

Jr's warbling signal should be heard coming from the HOUND Jr. Adjust the thumbwheel on the FOX Jr while listening to the HOUND Jr. Notice how some pitches of the sound are louder than others. In use, the user will usually adjust the FOX Jr to one of the louder pitches, so the HOUND Jr will be easier to hear while tracing wires.

With the FOX Jr adjusted to one of the louder pitches, experimentally position the tip of the HOUND Jr in different locations around the leads of the FOX Jr, noting how the loudness of the HOUND Jr, and the brightness of the signal strength LEDs, increase as the leads are approached. Adjust the thumbwheel on the HOUND Jr to reduce its loudness when the HOUND's tip is right against one of the FOX's leads.

The HOUND Jr's 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. For best results, the lead wire should be shielded to reduce the

possibility of feedback occurring between the lead wire and the HOUND Jr's probe. When the plug is inserted into the jack, the HOUND Jr's speaker is turned off, and the sound can only be heard through the earphone.

To use the earphone, turn on the HOUND Jr with the Volume / Sensitivity thumbwheel to minimum, and then plug the earphone into jack. Adjust the thumbwheel for a comfortable sound level in the earphone.

Helpful Hints

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.

When using the earphone, the high gain of the HOUND Jr's circuitry may cause "feedback" at high thumbwheel settings. Feedback is a squealing or whining sound, and it can be very loud, so

use caution. Reduce the thumbwheel setting to reduce the feedback.

Because the FOX Jr's test leads are so short, the HOUND Jr may not detect the warble signal more than a few inches away. When the FOX Jr is connected to longer wires, the HOUND Jr's sensing distance will improve.

At high thumbwheel settings, the HOUND Jr's high sensitivity may cause the Signal Strength LED to flash when the tip is tapped or rubbed. This is normal.

9: Detailed Information

9.1 Methods

Two different basic tracing methods are commonly used . . . the "LINE/GROUND" connection, and the "LINE/LINE" connection.

9.1.1 LINE/GROUND Connection

The LINE/GROUND connection produces the strongest tracing signal, but also creates "crosstalk"

of the signal into other wires in the cable. If the user is trying to identify a cable, and not an individual conductor in the cable, the LINE/GROUND method usually produces the best results. This method has been used to trace electrical wires (like Romex), speaker wires, intercom wires, thermostat wires, alarm wires, cable television wires, etc. through drywall, wood flooring, and carpeting.

A "good" earth ground is usually not required. In fact, a large metal object like an office desk, a file cabinet, or a metal plate on the floor, can be used. On vehicles, the metal chassis of the vehicle can be used as the ground. A metal hulled boat can use the hull as a ground, and a wood or fiberglass hulled boat can use the surrounding water as a ground (make connection to a metal fitting in contact with the water or drop a wire into the water). The ground connection is only required at the FOX Jr end of the cable or wire, however, a ground connection at the far end is handy for identification of the target wire (read following text on tracing).

To setup the LINE/GROUND connection, clip one alligator clip (either color) of the Triplett FOX Jr to the "ground", and the other alligator clip to the wire being traced. (See Figure 1)

9.1.2 LINE/LINE Connection

The LINE/LINE connection is useful for identifying a pair of wires in a multi-wire cable, or for identifying a pair of wires in a bundle of wires. When wires are "paired" in a cable, they are often twisted together in a manner that reduces crosstalk of any signal on the wires into adjacent wire pairs. Telephone cables are constructed in this manner, so a LINE/LINE connection is often used to trace telephone cables. The FOX Jr's modular plug applies a LINE/LINE connection when plugged into its mating modular jack (connected to a telephone line). (See Figure 2)

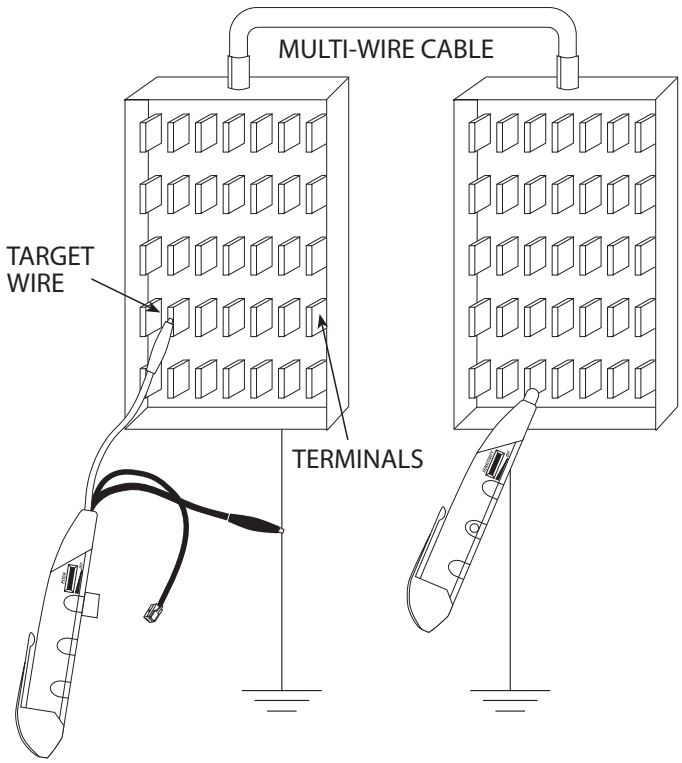


Figure 1 Line/Ground Connection

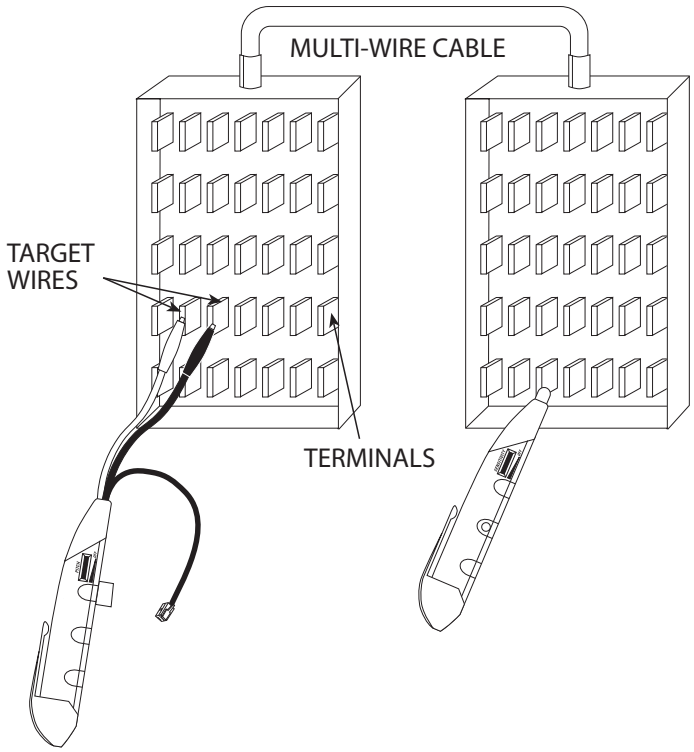


Figure 2 Line/Line Connection

9.1.3 Testing

Whether the LINE/GROUND or LINE/LINE connection is used at the FOX Jr, the use of the HOUND Jr for tracing the signal is the same. In general, the HOUND Jr is used by bringing it into proximity with the wire/cable that is being traced, listening

for the TONE signal from the FOX Jr, and moving the HOUND Jr in such a manner as to increase the loudness of the TONE signal from the HOUND Jr's speaker . . . i.e. searching for the loudest TONE signal. The HOUND Jr's Volume Control is adjusted to a comfortable level. Usually, it is set to maximum when the tracing wires through walls and ceilings, and is set to a lower setting when in close proximity to the signal carrying wires. The HOUND Jr's LED glows brighter when the sound from the speaker is louder. In situations where there is a lot of acoustic noise, observing the brightness of the LED, or using earphones, may prove more useful than attempting to hear the signal from the speaker.

To begin using the HOUND Jr, turn on the HOUND Jr by rotating its thumbwheel from the off position to the fully on position. It is normal to hear a humming or buzzing noise coming from the HOUND Jr's speaker when it is in an area with standard fluorescent lights, neon signs, transformers, etc. In fact, an easy test to verify the HOUND Jr is working is to move it toward an operating standard fluorescent

alligator clip connected to the ground should have very little signal on it when probed by the HOUND Jr. The other clip attached to the wire/cable should have a strong signal on it.

If the LINE/LINE connection is being used, both alligator clips should have about the same signal on them . . . although it will be noted that neither of the signals are as strong as the signal produced by the LINE/GROUND connection.

9.1.4 Tracing Wires in Walls, etc.
After connected the FOX Jr to one end of the wire/cable, bring the HOUND Jr near the suspect wire/cable. The FOX Jr signal can often be heard a foot or more away from the wire. If searching for wires in walls, move the HOUND Jr along the surface of the wall, noting the location of the strongest warble TONE pickup. Using the HOUND Jr, trace the wire through the wall by following the strongest warble TONE pickup. (See Figure 3)

If the end of the wire/cable is exposed, for example,

light and note that the buzzing sound gets louder, and the brightness of the LED increases. When used out-of-doors, away from power wires, the HOUND Jr may make only a slight hissing noise.

Before attempting to trace a wire/cable, with the HOUND Jr's tip positioned near the leads of the FOX Jr, turn on the FOX Jr by rotating its thumbwheel from the off to on position. The FOX Jr's warbling signal should be heard coming from the HOUND Jr. Adjust the thumbwheel on the FOX Jr to peak the loudness of the signal received on the HOUND Jr.

Connect the FOX Jr to the target wire/cable in the desired fashion. Once again, test the FOX Jr's output signal by bringing the HOUND Jr's tip near the FOX Jr's alligator clips (this is called "probing" the wire/cable). The warble TONE should be heard from the HOUND Jr's speaker. If the warble TONE is not heard, the wire/cable may be shorted. The HOUND Jr cannot trace a shorted wire.

If the LINE/GROUND connection is being used, the

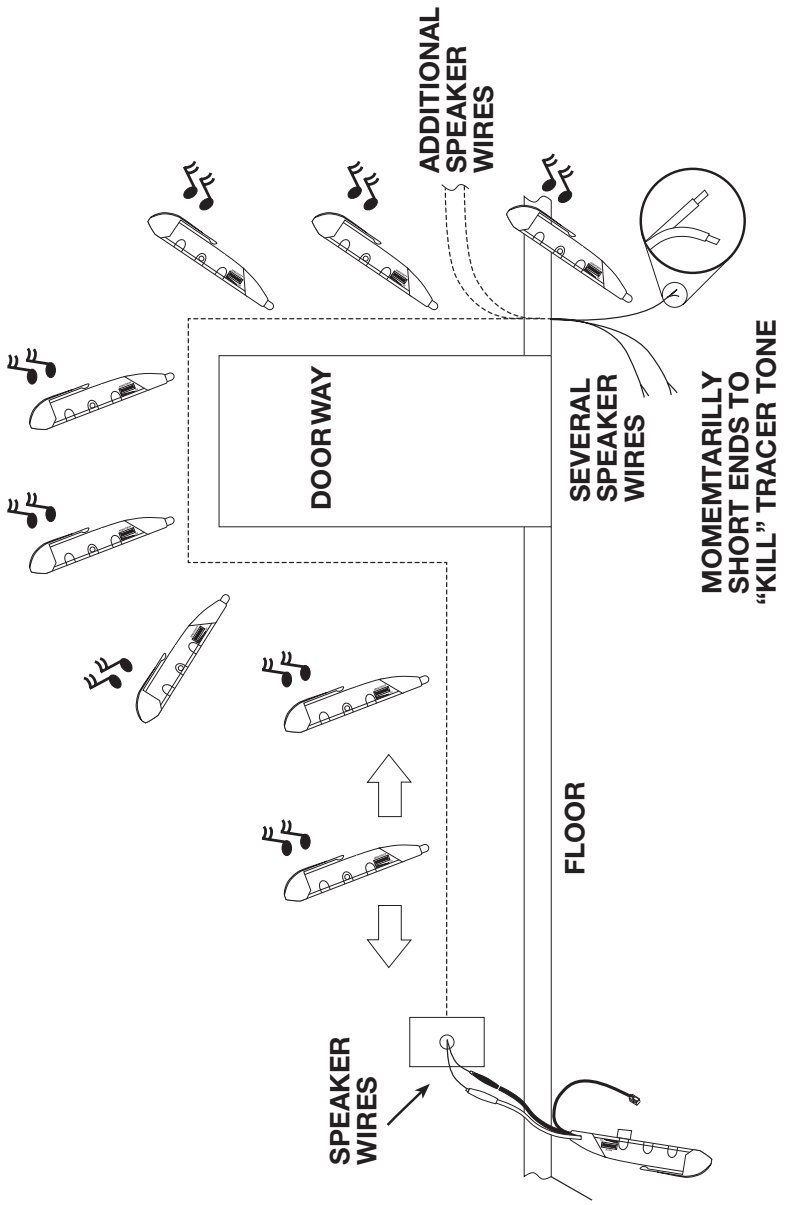


Figure 3

in a junction or wall box, use the HOUND Jr to determine if the FOX Jr warble TONE is present. If so, you may have found the cable you are looking for. You may find that several cables in different junction boxes produce similar strength warble TONEs. This phenomenon is caused by crosstalk . . . or "bleeding" of the TONE signal into other wires or cables in proximity to the target wire. Sometimes, the junction box contains several different wires/cables, which due to size constraints of the box itself, cannot be separated apart far enough to identify the wire/cable with the TONE signal on it. To assist in identifying the target wire, use the "Remote Tone Kill" technique.

The FOX Jr supports the use of the Remote Tone Kill test method. When the wire or wires (pair) that the FOX is connected to, are shorted out, locally or remotely, the warble TONE signal from the FOX Jr is "killed".

In situations where it is difficult to identify the target wire, because of crosstalk from other wires,

the target wire can be identified by shorting the TONE to ground (if the LINE/GROUND connection is being used) or shorting out the wire pair with the TONE on it (if the LINE/LINE connection is being used). (See Figure 3) If you have found the correct wire(s), the TONE will be completely killed. If the TONE is still heard, but reduced somewhat in level, you have not found the target wire(s). This method is not foolproof, and experimentation, common sense, and experience must be used to apply it properly. However, in many instances, it will provide trace verification. A caution . . . if you are at a location where the only wire is not the target wire, but it has a signal on it due to crosstalk . . . it may appear that you have killed the FOX Jr warble TONE when you short out the wire. To make sure, leave the short on the wire in question, and go back to FOX Jr, and test the alligator clips with the HOUND Jr. If the TONE is still there, you have not shorted the target wire.

Note: Even with the FOX Jr's alligator clips shorted

out, the case of the FOX Jr will still radiate some warble TONE. Do not confuse this with the warble TONE coming from the alligator clips. Perform a few experiments by shorting out the clips and probing the FOX Jr with the HOUND Jr so you know what to expect.

9.1.5 Tracing Wires within a Cable

When searching for specific wires within a bundle or cable, it is necessary to separate the individual wires apart from each other at the end of the cable opposite the FOX Jr location. Probe the wires with the HOUND Jr, attempting to identify the wire with the strongest TONE on it. Adjust the HOUND Jr's thumbwheel as necessary. It is not necessary to pierce the insulation of the wire. The wire with the strongest warble TONE is the target wire. In some cases, crosstalk into the other wires will make it difficult to determine which wire has the strongest TONE on it. Use the Remote Tone Kill method, previously described, to identify the target wire.

If tracing a pair of wires, such as those used for a telephone line, a lineman's talkset (also called a "handset", "buttset", or "craftset") can be used to positively identify the pair. Connect the suspect pair to the talkset. If you have located the target pair, the FOX Jr warble TONE will be heard, strong and clear, in the earpiece of the talkset. (See Figure 4)

HINTS:
The HOUND Jr works by capacitively sensing the electrostatic field radiated by wires carrying a signal (tone). The greater the radiated field, the better the HOUND Jr's ability to locate a wire. Anything that reduces the intensity of

the field will impair the HOUND JR's effectiveness in locating a wire. HOUND Jr's ability to locate a wire. Anything that reduces the intensity of the field will impair the HOUND JR's effectiveness in locating a wire.

In general, several things affect field intensity . . .

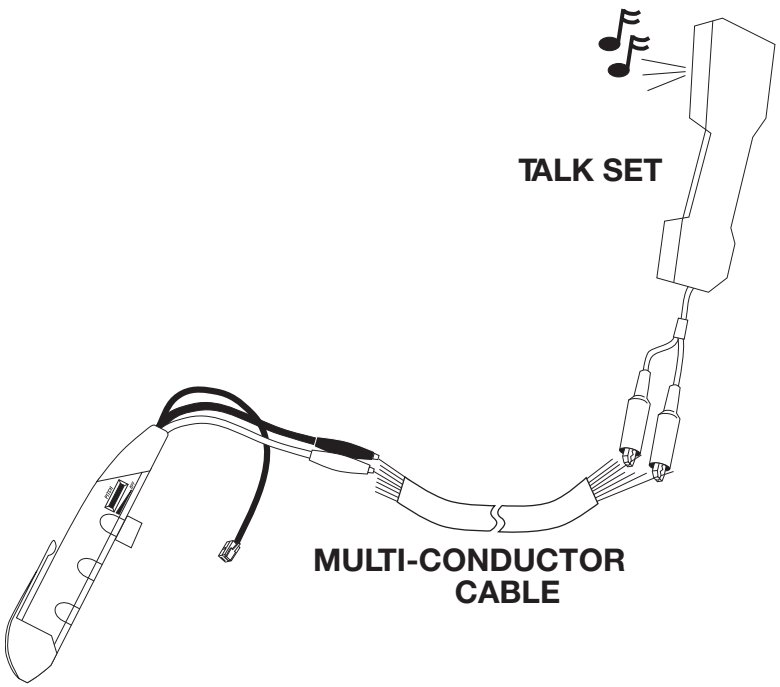


Figure 4 Wire Tracing with a Talkset

shielding, signal (tone) amplitude on the wire, and wire dress. In instances where a system is shielded (shielded wires, metal junction boxes, metal conduit, etc.), the effectiveness of the HOUND Jr is impaired. In multi-wire cables, grounded wires, or wires connected to low impedance

circuits, adjacent to the target wire can act as shields, reducing the HOUND Jr's ability to sense properly. Spreading the wires apart will reduce the shielding effect and allow the HOUND Jr to work better. Defects in a cable or wires, such as shorts or opens, will reduce the signal amplitude and hence the HOUND Jr's ability to locate the target wire. Terminating a wire or line in a low impedance also reduces signal amplitude and the HOUND Jr's locating ability. It is also possible for wire dress to cause nullification of the field. This may happen with tightly twisted pairs of wires.

If the target wire is connected to other wires and circuits, for example, to switches, lights, relays, transformers, etc., the FOX Jr warble TONE will pass through these devices and out onto other wires connected to these devices ... making tracing of the target wire very difficult, if not impossible.

The FOX Jr and HOUND Jr cannot be used to trace wires buried underground or in concrete. This is because the moisture content of the earth or

of concrete allows the surface to be electrically conductive, causing it to act as a shield around the buried wire.

The HOUND Jr will not trace wires through a metal conduit. It can, however, identify the wires after they exit from the conduit.

General Rules for Effective Tracing:

1) Do what works best. Try both LINE/GROUND and LINE/LINE tracing.

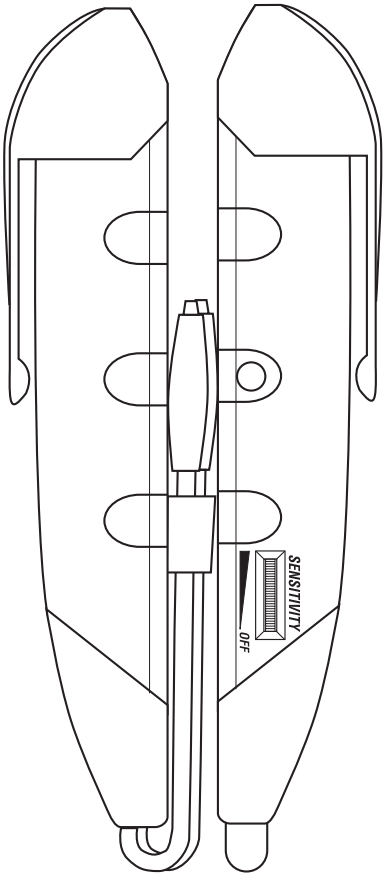
2) Separate wires when possible.

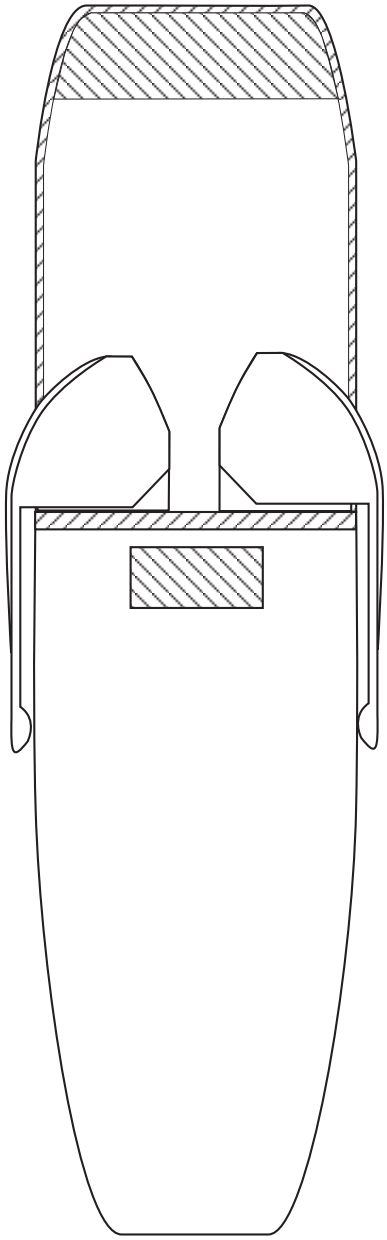
3) Move wires away from shielding when possible.

4) Un-terminate wire if necessary.

5) Turn off noise sources to reduce buzzing.

10: Fox Jr. & Hound Jr. Shown In Carrying Case Notice that Pocket Clips are on the outside of the





11: CUSTOMER SUPPORT

In the unlikely event that you experience problems with your Triplett product, please contact us at sales@triplett.com.

12: Warranty

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.

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 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.