FLUKE networks

PRO3000™
Toner and Probe

Users Guide

PN 2440799 (English) October 2005

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Fluke Networks guarantees this product to be free from defects in material and workmanship for 18 months from the date of purchase. Parts, accessories, product repairs and services are warranted for 90 days, unless otherwise stated. Ni-Cad, Ni-MH and Li-Ion batteries, cables or other peripherals are all considered parts or accessories.

This warranty does not cover damage from accident, neglect, misuse, alteration, contamination, or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke Networks' behalf.

To obtain service during the warranty period, contact your nearest Fluke Networks authorized service center to obtain return authorization information, then send your defective product to that Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE NETWORKS IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY.

Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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Fluke Networks
PO Box 777
Everett, WA 98206-0777
USA

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Introduction

The PRO3000 Toner and PRO3000 Probe helps you identify cables, wires, and wire pairs. You connect the PRO3000 Toner to a line, then trace and follow the signal with the PRO3000 Probe.

Safety Information

The following IEC symbols are used either on the test set or in the manual:

Warning: Risk of personal injury. See the manual for details.
Caution: Risk of damage or destruction to equipment or software. See the manual for details.

Warning: Risk of electric shock.

Earth ground

Conformité Européenne. Conforms to relevant European Union directives.

CAN/CSA-C22.2 No. 60950-1-03
CAN/CSA-C22.2 No. 1010.1-92 + CSA-C22.2 No. 1010.1B-97, UL/ANSI 3111-1

Do not put circuit boards in the garbage. Dispose of circuit boards in accordance with local regulations.

Warning

This product is certified for indoor use only.

To avoid electrical shock, do not use the toner or probe if they are wet. If they get wet, let them dry for 24 hours before use.

⚠⚠ Warning

When connecting to metallic network wires, handle alligator clips by the insulated boot.

The maximum voltage allowed across the test leads is 60 Vdc in toner and polarity modes. Do not connect to circuits carrying AC voltage in toner or polarity mode. Do not connect to circuits carrying AC or DC voltage in continuity mode.

Disconnect clips from any metallic connections before performing any maintenance. Read all instructions completely and understand possible hazards to the end user if maintenance is not performed by authorized service personnel.

Do not use the toner or probe if they are damaged. Before you use the toner or probe, inspect the case. Look for cracks or missing plastic. Pay particular attention to the insulation surrounding the connectors.

If this product is used in a manner not specified by the manufacturer, the protection provided by the product may be impaired.

Installing Batteries

⚠⚠Warning

To avoid electrical shock, turn the unit off and disconnect its leads from any circuit before opening the unit's battery door.

Use only 9 volt alkaline batteries (not included). Open the battery compartment with a screwdriver to insert a new battery. Properly attach the connection wires and close the compartment. Do not over tighten the screw.

The PRO3000 Probe

The PRO3000 probe is a highly sensitive inductive probe with amplified speaker, which makes signals transmitted by the PRO3000 toner audible. The non-metallic tip allows testing in distribution blocks without disturbing other services (see Figure 1).

⚠⚠Warning

Though the tip is non-metallic, never touch the tip to exposed power sources such as electrical outlets.

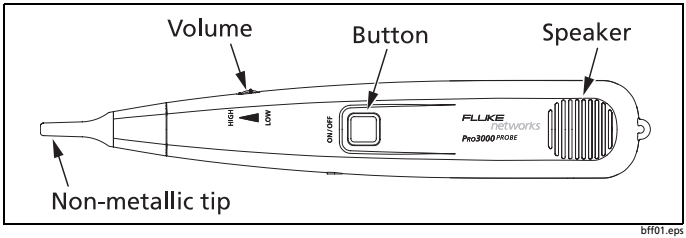

Figure 1. PRO3000 Probe

The PRO3000 Probe has a 3.5 mm monaural earphone jack on its side. When you connect the optional earphone, the speaker is muted and you hear the tones in the earphone. The earphone lets you avoid disturbing people nearby. A compatible earphone is available from Fluke Networks.

When using the optional earphone, start with a low volume. Always approach wires cautiously to avoid loud tones in the earphone. Adjust the volume as necessary.

The probe tip is replaceable. If the tip is damaged, replace it with the spare tip found inside the probe's battery compartment.

To remove the tip, turn it counterclockwise a quarter turn and pull it out. To install a new tip, insert it into the hole in the front of the probe and turn it clockwise a quarter turn until it stops.

The PRO3000 Toner

The PRO3000 toner emits two distinctive tones: constant and alternating. With the slide switch in the TONE position, press the tone button once for the constant tone. Press the button again for an alternating tone. The tone LED is constantly on or flashing to match the toner mode. (see Figure 2).

Press the button again to turn off the toner. The tone LED turns off, indicating that the toner is off.

The polarity/continuity LED is just above the toner's slide switch. The function of this LED depends on the toner's mode:

- In continuity mode, it is a single-color LED (red), which indicates whether or not there is continuity.
- In polarity mode, it is a dual-color LED (red and green), which indicates the polarity of a DC- powered pair of wires (e.g., a telephone line).

The toner can drive up to 10 miles (16 km) of 24 AWG twisted pair.

Note

To preserve the 9 V battery, turn the toner off and put the slide switch in the TONE position when the toner is not in use.

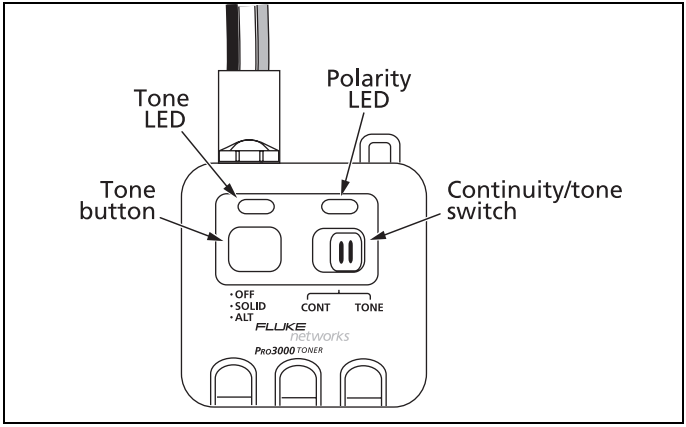

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Figure 2. PRO3000 Toner

Tracing Cables

Tracing cables lets you find the path of a cable run hidden inside or behind a wall or otherwise unseen.

Note

Because adjacent pairs may pick up some of the toner's signal, you should work quickly to minimize the effect on other services in the cable.

1. Put the toner's slide switch in the TONE position.
2. Connect the red test lead to a wire of the unknown cable (see Figure 3).
3. Connect the black test lead to another wire in the cable, but preferably not of the same pair, or connect the black wire to ground, if available.

   When tracing a shielded cable, connect the red lead to the outer shield and the black lead to the center conductor or to ground, if available.
4. Turn on the toner by pressing the button once for the continuous tone or twice for the alternating tone.
5. To find the cable behind a wall, move the probe tip toward the wall where you think the cable is located. The cable is behind the wall where the tone is loudest.

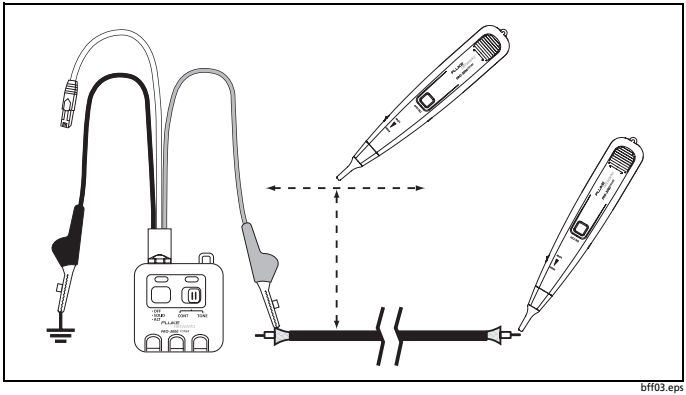

Figure 3. Tracing Cables

Tracing Pairs

To identify a specific pair of wires within a multi-pair cable, do the following:

1. Put the toner's slide switch in the TONE position.
2. Connect the toner's red lead to one of the wires of the pair and connect the black lead to the other wire.
3. Press the button once for the continuous tone or twice for the alternating tone.
4. At the far end of the cable, use the probe to scan the cable's wire pairs by moving the probe's tip near each pair. You have found the target wire pair when you find the pair with the loudest tone.

To further verify you have found the target pair you can use the toner's SmartTone™ function (see "SmartTone Positive Identification"). If you are beyond the range of SmartTone, try the following:

1 Spread the wires of the pair at the far end about 2 inches (5 cm) apart.

2 Move the probe tip slowly at a right angle to the wires (see Figure 4). If the tone's volume is HIGH over the first wire, LOW in the middle between the two wires, and HIGH over the second wire, then you have located the target pair.

SmartTone Positive Identification

The PRO3000 toner's Smart Tone function ensures positive identification of the wire pair you are tracing within a multi-pair cable.

To use the SmartTone function (see Figure 4):

1 Put the toner's slide switch in the TONE position.

2 Connect the toner's red lead to one of the wires of the pair and connect the black lead to the other wire.

3 Press the button twice for the alternating tone.

4 At the far end of the cable, place the probe near the wires you are tracing. Pick the pair that produces the loudest tone.

5 With the probe still on, short then open the two wires of the pair. A change in the tone indicates you have located the target pair. If you don't hear a change in the tone, then pick a different pair and try again until you find the pair that causes the tone to change.

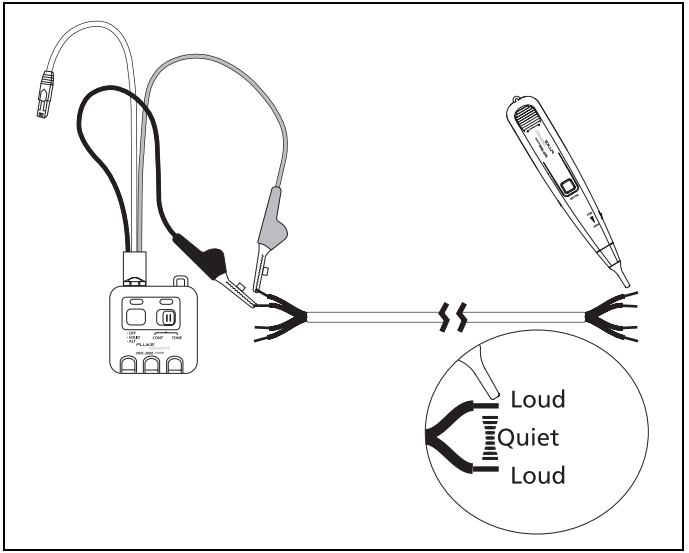

Figure 4. Tracing Pairs

The SmartTone function is available when the toner is in alternating tone mode. SmartTone is intended for use on dry pairs of wires that are un-terminated at both ends of the run. It is not intended to work on wires connected to DC power sources (e.g.,live telephone lines), nor will it work on wire pairs that are carrying AC signals (other than the toner's AC signal).

The SmartTone function works only if the toner's red lead is connected to one of the wires of the pair and its black lead is connected to the other wire of the pair.

SmartTone works on many types of wire pairs including twisted pair, house wiring, and coax (the shield is one wire and the center conductor is the other wire). SmartTone has a range of 2 miles (3.3 km). Using this function on wire runs greater than 2 miles in length may cause misleading results.

Checking Polarity

To determine the polarity of a wire pair:

1. Put the toner's slide switch in the TONE position.
2. Connect the unit's red lead to one of the wires, and connect the black lead to the other wire.

- If the polarity LED is green, the toner's red lead is more negative than its black lead.
- If the polarity LED is red, the toner's red lead is more positive than its black lead.
- If the polarity LED is off, there is no DC voltage on the line.

If you know which of the two wires of a telephone line is Tip and which is Ring, you can determine if the 48 V Central Office Battery is connected in its standard manner by doing the following:

1. Connect the toner's red wire to Ring of the telephone line.
2. Connect the toner's black wire to Tip of the telephone line.

- If the polarity LED is green, the CO battery is connected normally.
- If the polarity LED is red, the CO battery is connected reverse from normal.

Checking Continuity

The PRO3000 toner's continuity function lets you determine if there is DC continuity between two un-powered wires.

⚠ Caution

Before connecting the toner to unknown wires in continuity mode, use the polarity mode to verify that the wires are not powered. Connecting to powered wires in continuity mode can damage the toner.

To check for DC continuity between two wires, do the following:

1. Connect the PRO3000 toner's red lead to one of the wires and connect its black lead to the other wire.
2. Put the slide switch in the CONT position. If there is DC continuity between the two wires, the continuity LED is red. The brighter the LED, the lower the resistance between the two wires. The toner indicates continuity up to 10 kΩ.

Using the RJ11 Modular Plug

The PRO3000 toner has an RJ11 phone plug, which you can use instead of the clip leads when the pair of wires you are testing is terminated with an RJ11 jack. The RJ11 plug is directly connected to the toner's red and black clip leads. The plug's green wire (pin 4 of the plug) is connected to the black clip lead; the plug's red wire (pin 3 of the plug) is connected to the red clip lead. You can use the RJ11 plug in any of the unit's operating modes.

In-House Communications (Talk Battery)

Two PRO3000 toners can power two telephone test sets on a pair of dry wires (see Figure 5). This lets two people communicate on up to 1 mile (1.6 km) or more of a dry wire pair.

To use the talk battery:

1. Connect the two toners in series by clipping the red lead of one of the toners to the black lead of the other toner.
2. Connect one of the toner's free leads to one of the wires of the pair you want to talk over.
3. Connect the other toner's free lead to one of the leads of your test telephone.
4. Connect the test telephone's free lead to the other wire of the pair you want to talk over.
5. Put the slide switch on both toners into the CONT position.
6. Have the person at the other end of the wire pair connect his test telephone to the wire pair.
7. Put both test telephones in talk mode then begin your conversation.

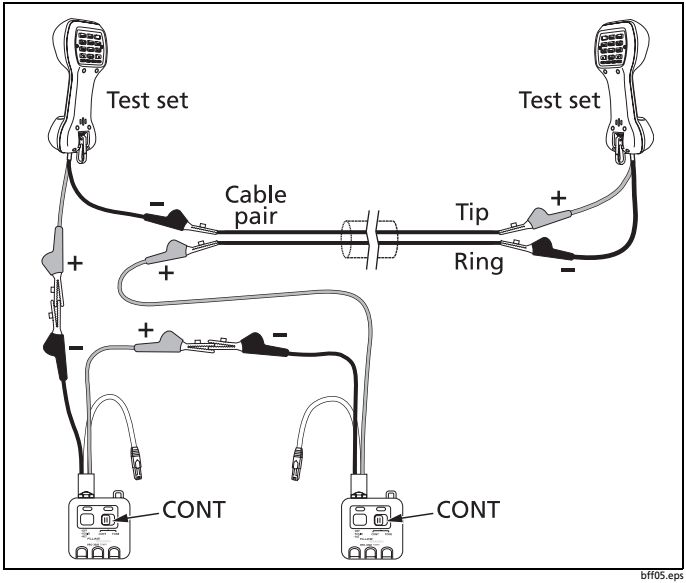

Figure 5. Talk Battery

Replacement Parts and Accessories

To order replacement parts or accessories, contact your local Fluke Networks distributor.

Description	Fluke Networks Model Number
Probe tip	26100103
Earphone	26300000

Registration

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services. To register, fill out the online registration form on the Fluke Networks website

Specifications

PRO3000 Toner	
User Interface	Slide switch selects continuity or tone mode Button selects continuous, alternating, or off Tone mode LED Continuity/polarity LED
Frequency	Continuous: 1000 Hz nominal Alternating: 1000 Hz/1500 Hz nominal
Over Voltage Protection	60 Vdc in Toner/Polarity Mode
Output Power in Tone Mode	8 dbm into 600 Ω
Output Voltage in Continuity Mode	8 Vdc with fresh battery
Battery	9 V alkaline
Temperature	Operating: -20 °C to +60 °C Storage: -40 °C to +70 °C
Dimensions	2.7 in x 2.4 in x 1.4 in (6.9 cm x 6.1 cm x 3.6 cm)
Certifications and Compliance	CE Conformité Européenne. Conforms to relevant European Union directives. C SP US CAN/CSA-C22.2 No. 60950-1-03 CAN/CSA-C22.2 No. 1010.1-92 + CSA-C22.2 No. 1010.1B-97, UL/ANSI 3111-1

PRO3000 Probe	
User Interface	On/off button Volume dial Replaceable tip 3.5 mm earphone jack
Battery	9V alkaline
Temperature	Operating: -20 °C to 60 °C Storage: -40 °C to +70 °C
Dimensions	9.8 in x 1.6 in x 1.3 in (24.9 cm x 4.1 x 3.3 cm)
Certifications and Compliance	CE Conformité Européenne. Conforms to relevant European Union directives. C SP US CAN/CSA-C22.2 No. 60950-1-03 CAN/CSA-C22.2 No. 1010.1-92 + CSA-C22.2 No. 1010.1B-97, UL/ANSI 3111-1