FLUKE
networks ™

MicroScanner Pro™

Users Manual

(English)
November 2001, Rev. 2, 9/03

LIMITED WARRANTY AND LIMITATION OF LIABILITY

Each Fluke Networks product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is one year and begins on the date of purchase. Parts, accessories, product repairs and services are warranted for 90 days. This warranty extends only to the original buyer or end-user customer of a Fluke Networks authorized reseller, and does not apply to disposable batteries, cable connector tabs, cable insulation-displacement connectors, or to any product which, in Fluke Networks' opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation or handling. Fluke Networks warrants that software will operate substantially in accordance with its functional specifications for 90 days and that it has been properly recorded on non-defective media. Fluke Networks does not warrant that software will be error free or operate without interruption.

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To obtain warranty service, contact your nearest Fluke Networks authorized service center to obtain return authorization information, then send the product to that service center, with a description of the difficulty, postage and insurance prepaid (FOB Destination). Fluke Networks assumes no risk for damage in transit. Following warranty repair, the product will be returned to Buyer, transportation prepaid (FOB Destination). If Fluke Networks determines that failure was caused by neglect, misuse, contamination, alteration, accident or abnormal condition of operation or handling, or normal wear and tear of mechanical components, Fluke Networks will provide an estimate of repair costs and obtain authorization before commencing the work. Following repair, the product will be returned to the Buyer transportation prepaid and the Buyer will be billed for the repair and return transportation charges (FOB Shipping Point).

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6/01

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MicroScanner Pro™

Introduction

MICROSCANNER PRO™ is an all-in-one network tester that you can use to verify twisted pair and coaxial cables, measure length and distance to faults via TDR, and identify active networks and hubs.
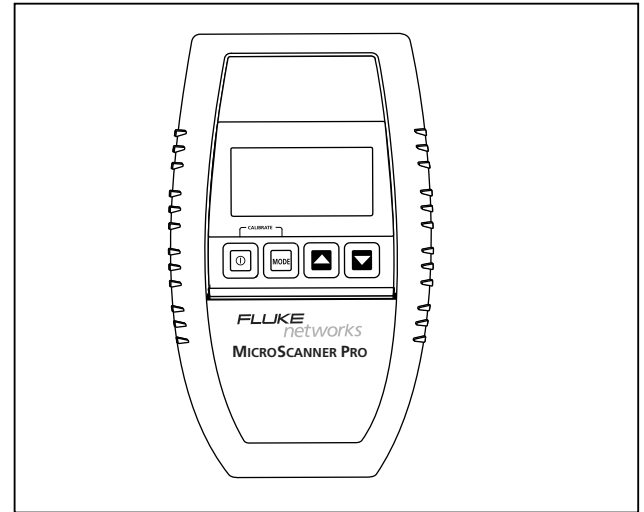

aue28f.eps

Figure 1. MicroScanner Pro

Features

- Tests unshielded twisted pair (UTP), shielded twisted pair (SSTP) and coaxial cable

- Pinpoints opens, shorts, crossed and split pairs

- Measures cable length via TDR

- Checks and verifies wiremap

- Generates four different tracing tones to help identify users

- Identifies active networking 10/100 hubs, switches, and PCs.

MICROSCANNER PRO Kit Content

Your MICROSCANNER PRO kit contains the following:

- 1 MICROSCANNER PRO network cable tester

- Wiremap adapter

- COAX adapter

- 9 Volt alkaline battery

- Quick Reference Guide

- Product Manuals CD

Registration

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services.

To register, go to the Fluke Networks website at www.flukenetworks.com/registration and fill out the online registration form. If you do not have Internet access, print the registration form that is on the CD included with the product. Fill out the form, then mail or fax it to the appropriate address for your country.

Safety Information

⚠Warnings

Do not open the unit or attempt to repair in case of malfunction. Please send it back to your distributor for repair or replacement.

Caution

MICROSCANNER PRO is designed to withstand input voltage conditions that arise from normal telephony applications such as 48 VDC at less than 80 ma or 24 VAC used to power many keysets. Tests cannot be performed when hazard conditions exist on the inputs.

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Contacting Fluke Networks

If you have technical questions, you may contact Fluke Networks' Technical Support by phone, fax or e-mail.

ℹ   www.flukenetworks.com

✉   support@flukenetworks.com

☎   +1-425-446-4519

- Australia: 61 (2) 8850-3333 or 61 3 9329 0244

- Beijing: 86 (10) 6512-3435

- Brazil: 11 3044 1277

- Canada: 1-800-363-5853

- Europe: +44 1923 281 300

- Hong Kong: 852 2721-3228

- Japan: +81-3-3434-0181

- Korea: 82 2 539-6311

- Singapore: +65-6738-5655

- Taiwan: (886) 2-227-83199

- USA: 1-800-283-5853

Visit our website at www.flukenetworks.com for a complete list of phone numbers.

Before calling Technical Support, please have your Hardware and Software Version numbers available. To find out the version numbers, do the following:

1. Turn off the MICROSCANNER PRO.

2. Simultaneously press the ▲ , MODE , and ON/OFF keys.

    The hardware and software versions of the MICROSCANNER PRO are displayed.
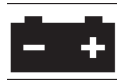
Hardware $\qquad$ 2o00 3o00 $\qquad$ Software

aue02f.eps

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Battery

MICROSCANNER PRO requires a 9 Volt Alkaline battery. The Battery icon is displayed on the screen when MICROSCANNER PRO detects a low battery condition.

Using MICROSCANNER PRO with a low battery may effect the test accuracy.

If MICROSCANNER PRO is stored for more than one month, the battery should be removed.

Note

MICROSCANNER PRO will not function properly with a 9 Volt Carbon Battery.

The Keypad

When turned on, MICROSCANNER PRO flashes the LCD power-up test then resumes the test mode that was last executed. MICROSCANNER PRO turns off automatically when no cable is detected or when no key has been pressed for 10 minutes.

To quickly change pairs or adjust values, press the keys. These keys are active only if the indicators are shown on the display.

Operating Mode

`MODE`

Press **MODE** to select the desired test. The available modes are:

- **WIREMAP**

- **OFFICE IDENTIFIER**

- **LENGTH**

- **TONER**

# Calibration Mode

`MODE` + `ON/OFF`

Turn the MICROSCANNER PRO **OFF**, then hold the **MODE** key down while pressing the **ON** key to start Calibrate mode.

Use MICROSCANNER PRO to calibrate cable lengths of more than 50 feet (15 meters) and up to 1500 feet (457 meters).

Setting the NVP percentage

Once in Calibrate Mode, the default NVP (Nominal Velocity of Propagation) will be displayed followed by the overall cable length. The cable length is measured with the currently stored NVP.

NVP is the measure of how fast a signal travels down a cable compared to the speed of light. The result will be represented as a percentage of the speed of light. For an accurate length test, the NVP must be set correctly.

LENGTH
CAL

67   *100* ft
▲ ▼
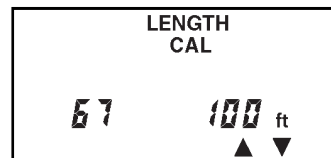
aue01f.eps

If you know a cable's NVP, change the displayed numbers using the ▲ ▼ keys until the appropriate NVP is displayed. The cable length will automatically adjust to the new NVP.

If you know a cable's length, change the shown NVP using the ▲ ▼ keys until the appropriate length is displayed. The NVP can be adjusted in 1% increments, and the length changes accordingly.

Cables used for calibration must be at least 50 feet (15 meters) long. Cable lengths of less than 50 feet will display **FAULT**.

Changing the Display from Meters to Feet

During Calibration you will be able to switch the displayed length from meters to feet by simply pressing the **MODE** key.

Press the **ON/OFF** key once the desired cable length or NVP is displayed to terminate Calibrate mode and store the new calibration factor. MICROSCANNER PRO will use it for future length measurements until another calibration is performed.

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MICROSCANNER PRO Tests

This section describes the tests that you can conduct with MICROSCANNER PRO.

Wiremap

The **Wiremap** function tests twisted-pair cabling for proper wiring. Your cabling configuration is checked for shield continuity, opens, shorts, crossed pairs, split pairs, and reversed pairs.

Test Results are displayed as a numeric representation, where the upper line of fixed digits shows the detected wires at the MICROSCANNER PRO jack, and the lower line of digits indicates the actual wiring. This function requires the use of the Wiremap Adapter at the far end.

To conduct a Wiremap test:

1. Connect the cable to be tested to the **MAIN** jack (identified on the unit right above the modular 8 jack).

2. To display the Wiremap screen, press the **MODE** key until the word **WIREMAP** appears on the screen.
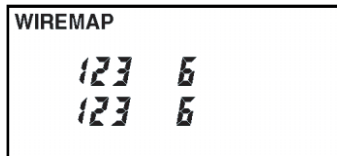
Following are examples where MICROSCANNER PRO did not detect any faults.

Full Wiremap with intact shield shown as Zero '0' on the right (4 pair, 8 wires)
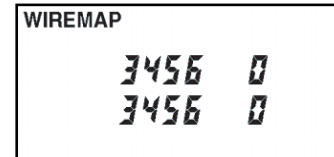
WIREMAP

12345678 0
12345678 0
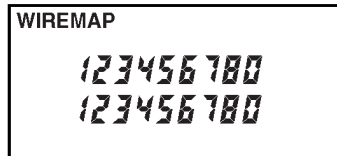
aue03f.eps

10BaseT Cable unshielded (2 pair, 4 wires)

WIREMAP

123   6
123   6

aue04f.eps

Token Ring unshielded shielded (2 pair, 4 wires)

WIREMAP

3456   0
3456   0

aue05f.eps

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Below are examples of wiring faults. The **FAULT** indicator will be displayed and the numerical wire indicators will blink.

Reversed: Pair 3 – 6
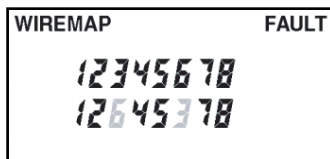
aue06f.eps

Crossed: Pairs 4 – 5, 3 – 6
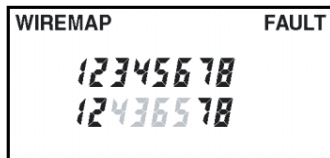
aue07f.eps

Split Pair
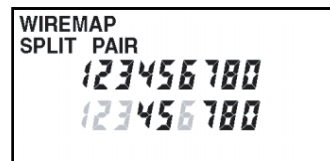
aue08f.eps

Note

If a cable is wired correctly, pin-to-pin, but there is a split pair, Wiremap will display SPLIT PAIR. For example, a wire from the 1 - 2 pair could be twisted with a wire from the 3 - 6 pair.

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If the wire does not go to the far end, the numerical indicator for the open will be left blank. The word **Open** will be displayed. Shorted pairs are indicated with a connecting bracket, and the word **Short** will be displayed.

Open: Pair 4 – 5
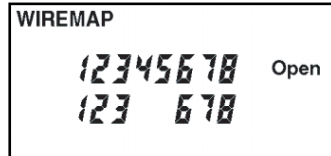
aue09f.eps

Short: Pair 1 – 2
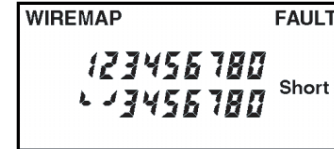
aue10f.eps

When the wiring fault includes shorted or swapped non-pair pins (e.g. non-pair pins 1 - 3), the wiremap will display dashes for those numerical wire indicators.

Note

Shielded cross-over cables cannot be read by MicroScanner Pro. Wiremap will show as a series of dashes.

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Patch Cable Wiremap

The **Wiremap** function can also be used to verify patch cables.

1. Simply plug the two ends of a cable into the two modular 8 jacks (**MAIN** and **LOOP BACK**) on MICROSCANNER PRO.

2. To display the Wiremap screen, press the **MODE** key until the word **WIREMAP** appears on the screen.

If there are any miswires, the number of the faulty wire will blink.

Length

The **Length** function measures the full length of a twisted pair or coaxial cable. Twisted pair: If you are measuring standard pair length, MICROSCANNER PRO will determine whether the cable is open, shorted, or connected to a hub.

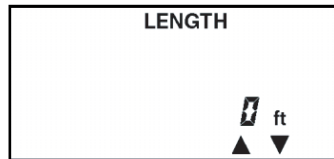*Note*

Accuracy of the length measurement is ± 4 % or ±2 feet— whichever is greater. Any NVP uncertainty is an additional error.

1. Connect the cable to be tested to the **MAIN** jack (identified on the unit right above the modular 8 jack).

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2. To display the length screen, press the **MODE** key until the word **LENGTH** appears on the screen. The overall cable length will be shown.
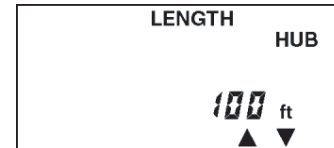
No Cable attached

```
┌─────────────────────────┐
│  LENGTH                 │
│                         │
│                         │
│              0  ft      │
│              ▲  ▼       │
└─────────────────────────┘
```

aue11f.eps

70 feet cable

```
┌─────────────────────────┐
│  LENGTH                 │
│                         │
│               Open      │
│           70  ft        │
│           ▲   ▼         │
└─────────────────────────┘
```

aue12f.eps

If the far end of a cable is connected to a hub, MICROSCANNER PRO will display **HUB** and the cable length. The cable is considered connected to a hub when the 3 - 6 pair is terminated and either pair 1 - 2 or 4 - 5 is terminated.

Length to Hub

```
┌─────────────────────────┐
│  LENGTH      HUB        │
│                         │
│                         │
│         100  ft         │
│         ▲    ▼          │
└─────────────────────────┘
```

aue13f.eps

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Some early model 100TX only network equipment does not generate link pulses and MICROSCANNER PRO will display **HUB**, the cable length and the word **SIGNAL**.
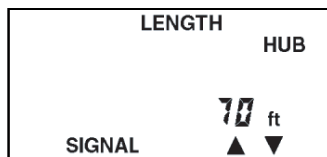

aue14f.eps

Network Link Indicator

The **Network Link Indicator** allows you to find and identify active network 10/100 hubs and confirm to which hub MICROSCANNER PRO is connected. It will blink the hub's status indicator to assist locating a single channel in a busy wiring closet.

1. Connect the cable to be tested to the **MAIN** jack (identified on the unit right above the modular 8 jack).

2. To display the length screen, press the **MODE** key until the word **LENGTH** appears on the screen. MICROSCANNER PRO displays the word **Hub** followed by the length to the hub.

aue15f.eps

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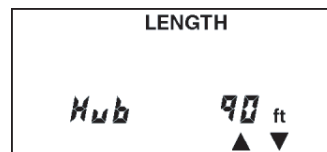
When MICROSCANNER PRO displays **Hub** and the cable length, press the **MODE** key to activate the blinking Hub light.

```
Hub 100H
SIGNAL
```

aue16f.eps

The word **SIGNAL** blinks once every two seconds right below the word **Hub**. Go to the wiring closet to view a light that blinks once every two seconds at the port to which the cable is connected.

MICROSCANNER PRO detects the kind of hub it is connected to: **10**, **100**, or **10/100** alternately will be displayed right after the word **Hub**. The number is followed by the letters **F** and/or **H** as an indication for the hub's full or half duplex capabilities.

Descriptions are as follows:

10 H	10BASE-T
10 HF	10BASE-T full duplex
100 H	100BASE-TX
100 HF	100BASE-T full duplex
100 HF4	100BASE-T full duplex, 100BASE-T4

MICROSCANNER PRO also Identifies workstations.

1. Connect the cable to be tested to the **MAIN** jack (identified on the unit right above the modular 8 jack).

2. To display the length screen, press the **MODE** key until the word **LENGTH** appears on the screen.

   MICROSCANNER PRO displays the word **PC** followed by the length to the PC.
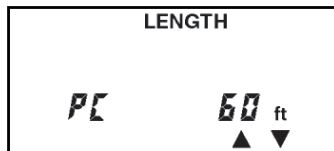
aue17f.eps

3. When MICROSCANNER PRO displays **PC** and the cable length, press the **MODE** key to activate the blinking Hub light.
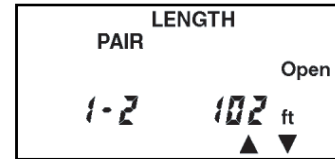

aue18f.eps

Pair Length

If ▲ ▼ are displayed, you will be able to show detailed pair information for each standard conductor pair.

1. Press the ▲ key to display Pair 1 - 2 length.

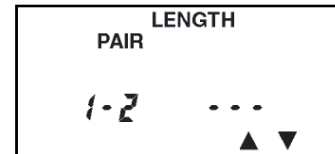2. Press the ▲ key again to display the other pair combinations.

The pair length is not measured if the cable is too long, connected to a hub, or a wiremap adapter is used.

Pair 1 - 2 Length

aue19f.eps

Pair 1 - 2 not measurable

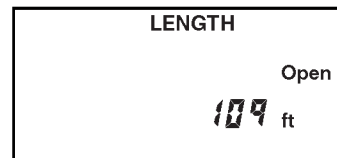aue20f.eps

Coaxial Cabling

Note

This feature is available when you use the COAX upgrade kit.

MICROSCANNER PRO measures the full length of a 50 and/or 75Ω (Ohms) coaxial cable, e.g. RG-6 and identifies its termination state.

1. Attach the supplied COAX adapter to the **MAIN** jack (identified on the unit right above the modular 8 jack).

2. Connect the cable to be tested to the **COAX adapter** jack.

3. To display the length screen, press the **MODE** key until the word **LENGTH** appears on the screen.

The overall cable length will be shown.

```
┌─────────────────────────────┐
│  LENGTH                      │
│                              │
│                    Open      │
│         109  ft              │
│                              │
└─────────────────────────────┘
```

aue21f.eps

If the coaxial cable is not terminated at the far end, the word **Open** will be displayed.

If a shorted cable is detected, the words **FAULT** and **Short** will be displayed, and the length where the short has been found.

aue22f.eps

Office Identifier

The **Office Identifier** function allows you to find the termination of a twisted pair and/or a coax cable drop from a distribution panel. By inserting the Office Identifier adapters into wall outlets, MICROSCANNER PRO can identify office locations at the distribution panel.

The Office Identifier plugs are included in the Office Identifier accessory kit. They are uniquely numbered and have RJ-45 connectors on one end and COAX connectors on the other end to allow identification of RJ-45 and/or COAX outlets.

1. Attach the coax adapter to the **MAIN** jack (identified on the unit right above the modular 8 jack).

2. To display the Office Identifier screen, press the **MODE** key until the word **OFFICE** is displayed on the screen.

3. Insert the Office Identifier plugs into wall outlets in the offices you wish to locate.

4. At the distribution panel, connect the cable to be tested to the coax adapter and run the Office Identifier function to identify which office is connected to a given port.

MICROSCANNER PRO will display the number of the Office Identifier found.

Note

The Wiremap adapter included with the MicroScanner Pro has a default setting of Office ID 4.

Office 1 found

OFFICE 1

aue25f.eps

**No office found**

OFFICE - - -

aue26f.eps

Toner

Toner is a cable tracing function that assists in tracking cables hidden in walls, ceilings, floors, or patch panels by generating four distinct multi-tone signals that can be received by a cable tracer.

To trace a cable, use any inductive probe capable of receiving a 1000 Hz signal, such as the Fluke Networks MicroProbe, IntelliTone Probe, or any equivalent tracing device to convert a signal on the cable into an audible tone. To determine the cable path, simply trace along the wire using the audible tone as a guide.

The tracer needs to be within one foot of the hidden cable. You may select one of four different tone sequences, displayed as the numbers 1-4 on the LCD.

1. To display the Toner screen, press the **MODE** key until the words **SIGNAL and TONE** are displayed on the screen.

2. To select a different tone sequence, press the ▲ or ▼ key.

Display for time frames with #3 signal tone
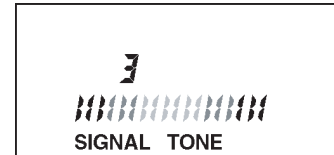
aue27f.eps

To enhance the signal insert a grounding plug into the ground jack located next to the **MAIN** and **LOOPBACK** jacks. You may use any grounding cable that has a standard insulated phone tip plug.

Technical Specifications

Dimensions:

MICROSCANNER PRO: 13.97 cm x 8.25 cm x 2.54 cm (5.5" x 3.25" x 1")

Wiremap Adapter: 7.62 cm x 3.18 cm x 2.11 cm (3" x 1.25" x .83")

Office Identifier: 7.62 cm x 1.60 cm x 1.47 cm (3" x .63" x .58")

Coax Adapter: 7.62 cm x 1.60 cm x 1.47 cm (3" x .63" x .58")

Ground pin receptacle size:

2.03 mm (.08")

Weight:

MICROSCANNER PRO: 171.54 g (.38 lbs)

Wiremap Adapter/Office Identifier: 9.03 g (.02 lbs)

Power Source:

9 V Alkaline battery (NEDA-1604, IEC 6LR61)

User Interface:

Display: Custom LCD
         Size: 4.42 cm x 2.15 cm (1.75" x .85")

Keypad: Four momentary contact keys

Environmental:

Operating Temperature: 0° to 50° C (32° to 122° F)

Storage Temperature: -10° to 55° C (14° to 131° F)

Humidity: 10 % to 90 % non-condensing

Applications:

Shielded and unshielded twisted pair cable, 75 or 50 ohm coaxial cable, 10 or 10/100 BASE-T Networks

Test Interface:

Main: Modular 8 connector for length, 10/100 link identification, wiremap, office identifier/room identifier, trace

Loopback: Modular 8 connector for patch cable wiremap

Calibration:

User selectable NVP

NVP calculation based on known cable length

Minimum length: 15 meters (50 feet)

TDR Accuracy:

±4 % or ±2 feet whichever is greater. Any NVP uncertainty is an additional error.

Length:

Maximum length: 450 meters (1500 feet)

Office Identifier:

Maximum length: 150 meters (500 feet)