

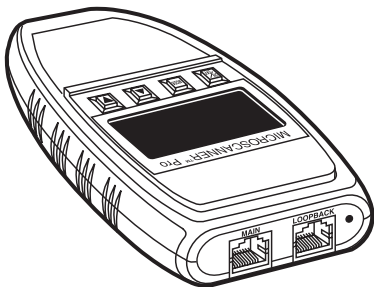


JANUARY 2001

TS825A

TS826

Microscanner Pro



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S.: Call **877-877-BBOX**
(outside U.S. call **724-746-5500**)

FREE technical support 24 hours a day, 7 days a
week: Call **724-746-5500** or fax **724-746-0746**

Mailing address: **Black Box Corporation**,
1000 Park Drive, Lawrence, PA 15055-1018

Web site: **www.blackbox.com** •

E-mail: **info@blackbox.com**

FEDERAL COMMUNICATIONS COMMISSION

AND

INDUSTRY CANADA

RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

NORMAS OFICIALES MEXICANAS (NOM) ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos liquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

TRADEMARKS USED IN THIS MANUAL

Any trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

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1. Specifications

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

User Interface—*Display:* Custom LCD (1.75" x 0.85" [4.5 x 2.2 cm]); *Keypad:* Four momentary-contact keys

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 is 50 ft. [15.2 m])

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Maximum Length—1500 ft.
(457.2 m)

Office Identifier—Maximum
length: 500 ft. (152.4 m)

Temperature Tolerance—
Operating: 32 to 122°F (0 to
50°C); *Storage:* +14 to +131°F
(-10 to +55°C)

Humidity—10 to 90%
noncondensing

Power—9-V alkaline battery
(included)

Size—*Microscanner Pro:* 5.5"H
x 3.25"W x 1"D (14 x 8.3 x
2.5 cm); *Wiremap Adapter:*
3"H x 1.25"W x 0.8"D (7.6 x
3.2 x 2.1 cm); *Office Identifier
or Coax Adapter:* 3"H x 0.6"W
x 0.6"D (7.6 x 1.5 x 1.5 cm)

Weight—*Microscanner Pro:* 0.38
lb. (0.2 kg)

2. Introduction

2.1 Description

The Microscanner Pro is an all-in-one network tester that verifies twisted-pair and coaxial cables. It measures length via true TDR and identifies active network ports from 10/100 hubs or workstations.

2.2 What the Package Includes

Your package for the TS825A should contain the following items.

- Microscanner Pro (TS825A),
- 9-V battery,
- Carrying case,
- Wiremap adapter,
- COAX adapter, and
- This users' manual.

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Your package for the TS826 should contain the “F” Connector Office Identifiers, 6-pack (TS826).

If anything is missing or damaged, contact Black Box at 724-746-5500.

3. Operation

3.1 The Keypad



When powered on, the Microscanner Pro will flash the LCD power-up test and then resume the test mode that was last executed. Microscanner Pro will turn off automatically when no cable is detected and no key has been used for 10 minutes.



Press ▲ ▼ to quickly change pairs or adjust values. The ▲ ▼ keys are only active if the indicators are shown on the display.

3.2 Operating Mode

A black square button with the word "MODE" in white capital letters.

Press **MODE** to select the desired test. The available modes are: **WIREMAP**, **OFFICE IDENTIFIER**, **LENGTH**, and **TONER**.

3.3 Calibration Mode

A black square button with the word "MODE" in white capital letters.

+

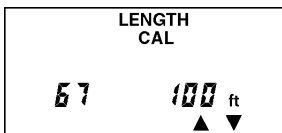
A black square button with a diagonal line from the top-left to the bottom-right. The word "ON" is in the top-left triangle and "OFF" is in the bottom-right triangle, both in white capital letters.

Turn the Microscanner Pro off, then hold the **MODE** key down while pressing the **ON** key to start “Calibrate” mode. Use the Microscanner Pro to calibrate cable lengths of more than 50 ft. (15.2 m) and up to 1500 ft. (457.2 m).

3.4 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.



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 ft. (15.2 m) long. Cables of less than 50 ft. will display FAULT.

3.5 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. The Microscanner Pro will use it for future length measurements until you calibrate the factor again.

3.6 Battery

The Microscanner Pro requires a 9-volt alkaline battery (included). The Battery icon is displayed on the screen when the Microscanner Pro detects a low battery.



3.7 High Voltage Protection

The Microscanner Pro is designed to withstand input voltage conditions that arise from normal telephony applications (for

MICROSCANNER PRO

example, 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.

3.8 Product Versions



Turn the Microscanner Pro OFF, then hold the ▲ and MODE keys down while pressing the ON key to display your hardware and software versions.



Hardware

Software

4. Microscanner Pro Tests

4.1 Wiremap

The Wiremap function tests twisted-pair cabling for proper wiring. It checks your cabling configuration for shield continuity, opens, shorts, crossed pairs, split pairs, and reversed pairs. The Microscanner Pro displays test results numerically. 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. For this function to work, you must use the Wiremap Adapter at the far end.

1. Connect the cable you want to test to the MAIN jack.
2. To display the Wiremap screen, press the MODE key

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until the word WIREMAP appears on the screen.

Below are examples where Microscanner Pro did not detect any faults.

Full Wiremap with intact shield shown as a (zero) "0" on the right (4 pair, 8 wires).

```
WIREMAP
123456780
123456780
```

10BASE-T cable unshielded (2 pair, 4 wires)

```
WIREMAP
123 6
123 6
```

CHAPTER 4: Microscanner Pro Tests

Token Ring shielded (2 pair, 4 wires)

WIREFMAP	
3456	0
3456	0

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

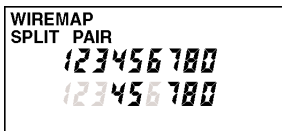
Reversed Pair 3/6

WIREFMAP	FAULT
12345678	
12645378	

Crossed Pairs 4/5, 3/6

WIREFMAP	FAULT
12345678	
12436578	

Split Pair

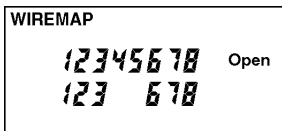


NOTE

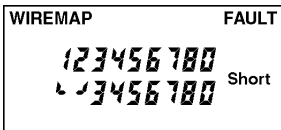
If a cable is wired correctly, pin-to-pin, but there is a split pair, Wiremap will display SPLIT PAIR. For example, a wire from the 1/2 pair could be twisted with a wire from the 3/6 pair.

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



Short: Pair 1/2



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

PATCH CABLE WIREMAP

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

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1. Simply plug the two ends of a cable into the two modular 8 jacks (MAIN and LOOPBACK) on the 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.

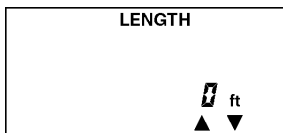
4.2 Length

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

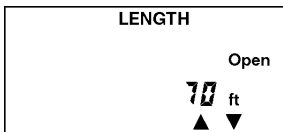
CHAPTER 4: Microscanner Pro Tests

1. Connect the cable you want to test to the MAIN jack.
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



70-ft. cable

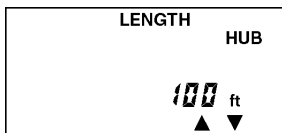


If the far end of a cable is connected to a hub, the Microscanner Pro will display

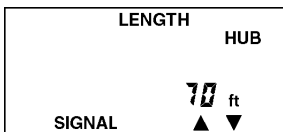
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HUB and the cable length (see the example on the next page). The cable is considered connected to a hub when the 3/6 pair is terminated and either pair 1/2 or 4/5 is terminated.

Length to Hub



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

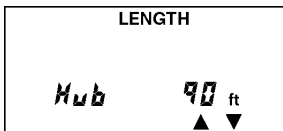


4.2.1 NETWORK LINK INDICATOR

The Network Link Indicator allows you to find and identify active network 10/100 hubs and confirm to which hub the 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 you want to test to the MAIN jack.
2. To display the length screen, press the MODE key until the word LENGTH appears on the screen. The Microscanner Pro displays the word Hub followed by the length to the hub.

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3. When the Microscanner Pro displays Hub and the cable length, press the MODE key to activate the blinking Hub light.



The word SIGNAL blinks once every two seconds 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.

The Microscanner Pro detects the kind of hub it is connected to: 10, 100, or 10/100 alternately will be

displayed after the word Hub. The number is followed by letters that describe the hub's capabilities (for example, H F for 10BASE-T half- and full- duplex. Descriptions are as follows:

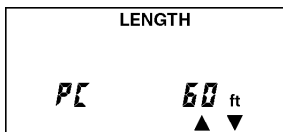
Use...	Or...
10 H	10BASE-T
10 HF	10BASE-T full duplex
100 H	100 BASE-TX
100 HF	100 BASE-T full duplex
100 HF4	100BASE-T full duplex, 100BASE-T4

The Microscanner Pro also identifies workstations.

1. Connect the cable you want to test to the MAIN jack.
2. To display the length screen, press the MODE key until the word LENGTH appears. The Microscanner Pro displays the word PC

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followed by the length to the PC.



3. When the Microscanner Pro displays PC and the cable length, press the MODE key to activate the blinking Hub light.



4.2.2 PAIR LENGTH

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

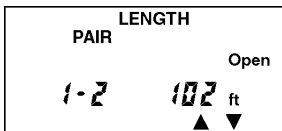
1. Press the ▲ key to display Pair 1/2 length.

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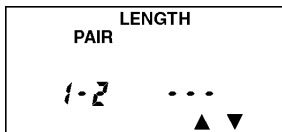
2. Press the ▲ key again to display the other pair combinations.

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



Pair 1/2 not measurable



4.2.3 COAXIAL CABLE

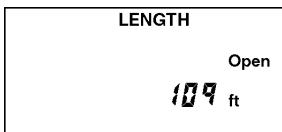
NOTE

This feature is available in the residential version.

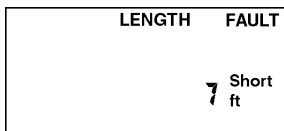
The Microscanner Pro measures the full length of a 50- or 70-ohm coaxial cable (for example, RG-6), and identifies its termination state.

1. Attach the supplied coax adapter to the MAIN jack.
2. Connect the cable you want to test 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.

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 was found.



4.3 Office Identifier

The Office Identifier function allows you to find the termination of an office cable drop from a wiring closet. By inserting the Office Identifier adapters into RJ-45 office wall outlets, the Microscanner Pro can identify office locations at the patch panel.

The Office Identifier plugs are included in the optional Office Identifier accessory kit (TS826). They are uniquely numbered and have RJ-45 connectors on one end and coax connectors on the other end. This allows identification of RJ-45 and coax outlets. The Wiremap Adapter may also serve as an Office Identifier plug and will be displayed as OFFICE 4.

1. Connect the cable you want to test to the MAIN 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 that you wish to locate.

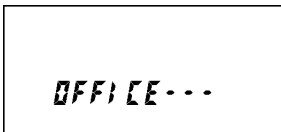
4. At the patch panel, run the Office Identifier function to identify which office is connected to a given port.

The Microscanner Pro will display the number of the Office Identifier found.

Office 4 found



No office found



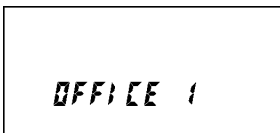
The Office Identifier function allows you to find the termination of a twisted pair and/or a coax

cable drop from a distribution panel. By inserting the Office Identifier adapters into wall outlets, the Microscanner Pro can identify office locations at the distribution panel.

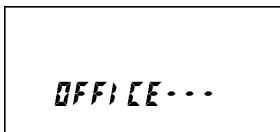
1. Attach the coax adapter to the MAIN jack.
2. To display the Office Identifier screen, press the MODE key until the word OFFICE is displayed on the screen.
3. Insert the Office Identifier plugs into wall outlets in the offices you want to locate.
4. At the distribution point, connect the cable you want to test to the coax adapter and run the Office Identifier function to identify which office is connected to a given port.

The Microscanner Pro will display the number of the Office Identifier found.

Office 1 found



No office found



4.4 Toner

Toner is a cable-tracing function that assists in tracking cables hidden in walls, ceilings, floors, or patch panels. The Toner tracks this by generating four distinct

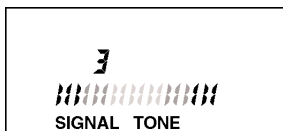
multi-tone signals that can be received by a cable tracer.

To trace a cable, use a tone probe, wand, or any equivalent cable 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 (see the example on the next page).

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Display for time frames with #3 signal tone



To enhance the signal, insert a grounding plug into the ground jack located next to the MAIN and LOOPBACK jacks. You'll need to use a tone probe or wand (call Black Box Technical Support at 724-746-5500 for details). You may use any grounding cable that has a standard insulated phone tip plug.

5. Troubleshooting

5.1 Calling Black Box

If you determine that your Microscanner Pro is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to

create the problem or make it worse.

5.2 Shipping and Packaging

If you need to transport or ship your Microscanner Pro:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the Microscanner Pro for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Material Authorization (RMA) number.



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