FLUKE networks

TS®52PRO
Test Set

Users Guide

PN 3394309 Rev.
January 2009, Rev. 1, 04/09

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

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TS®52PRO Test Set

Introduction

The TS52PRO Test Set is an analog test telephone used by installers, repair technicians and other authorized personnel to test copper wire voice subscriber lines. In addition to providing standard off-hook operations, such as dialing and voice communications, the TS52PRO model has an on-hook Monitor mode that lets the operator listen to the line without disturbing any voice or data signals present. The test set has a speaker for hands-free listening. The test set also has a speakerphone that allows two way conversations while freeing up the operator's hands for other tasks.

In today's telecommunications environment, a large number of subscriber lines carry data services. The data services are in the same distribution facilities as voice services. It is not always easy to tell the difference between data and voice services. The TS52PRO Test Set uses unique, patented circuitry that prevents disruption of digital data services if the test set is unintentionally connected to a data line.

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

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.
	Conforms to relevant Australian EMC requirements.
	Conforms to relevant Canadian and US standards.
	Conforms to European Union directives.
	Double Insulated - does not require connection to earth ground.
	Do not put products containing circuit boards into the garbage. Dispose of circuit boards in accordance with local regulations.

Warning

Do not use the test set if it is damaged. Before you use the test set, inspect the case. Look for cracks or missing plastic. Pay particular attention to the insulation surrounding the connectors.

Do not use around explosive gases or vapors, or in a damp or wet environment when hazardous voltage is present.

The test set meets IEC Measurement Category I standard. CAT I equipment is designed to protect against transients in equipment on circuits not directly connected to MAINS. Under no circumstances should the line cord of the test set be connected to any CAT II, CAT III, or CAT IV rated circuit.

Warning (Continued)

Replace the line cord if the insulation is damaged or if the cloth cover shows signs of wear.

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

Product Features

- Liquid Crystal Display with backlight
- Caller ID
- DataSafe™ in Monitor mode
- Data detection and lockout in Talk mode
- Data lockout override
- DTMF digit grabbing
- High impedance in Monitor mode
- High voltage protection
- Last number redial up to 23 digits
- Visual ANAC mode
- Microphone mute
- Pause key
- Reverse polarity indication
- Two-way speakerphone
- Receive-Only Loud Speaker
- Speed dialing for ten 23-digit numbers
- Tone and pulse dialing
- Hook flash
- Line voltage / Loop current test
- Low battery indication
- Relocatable belt clip
- Field-replaceable belt clip, battery, and line cord
- Weatherproof case
- High voltage lockout in Talk mode

Physical Characteristics

Housing

See Figure 1.

The TS52PRO Test Set housing is made of high-impact plastic. The test set provides rugged service and withstands the rough handling and shocks associated with field use. The housing permits operation in bad weather, such as heavy rain or dust storms.

Belt Clips

See Figure 1.

The belt clip can be located at either or both ends of the housing. It has a spring-loaded, locking clip that assures a secure connection to belt loops and D-rings. Both forward folding and backwards folding versions of the belt clip may be installed. The test set can be hung by the belt clip in one of two ways: (1) with keypad and speakerphone facing the user for convenient access or (2) with the transmitter facing the user.

The belt clips may be replaced or relocated in the field. See "Replacing or Relocating the Belt Clip" on page 21.

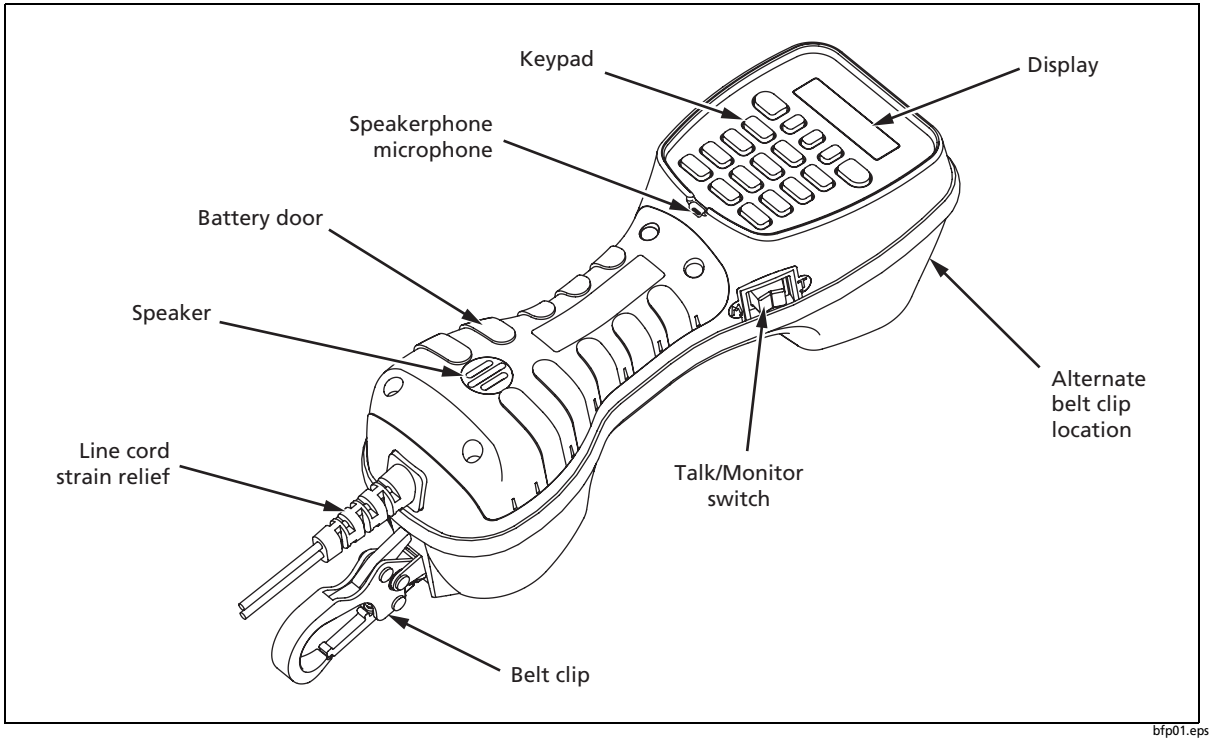

Figure 1. Physical Characteristics

Line Cords

See Figure 1.

The test set has a field replaceable line cord. The line cord is attached through a rubber strain relief at the transmitter end of the test set. Line cords showing damage or abrasion should be replaced before using the instrument. See "Replacing the Line Cord" on page 21.

Several different configurations of line cords are available. See "Accessories (How to Order)" on page 23. for model numbers.

Battery

See Figure 1.

⚠⚠Warning

Use caution when handling batteries. Do not let the terminals short together. Dispose of batteries properly to ensure terminals cannot short. Disposal may be restricted by local laws.

Note

If the test set fails to operate properly, first replace the battery and retest before sending the test set in for repair.

A 9 V alkaline battery must be installed for the test set to operate. Do not use a rechargeable battery.

The battery:

- Powers the test set when on-hook.
- It supplies supplementary current to the speaker (if on) when the test set is off-hook.
- Powers the display.

When the battery icon on the display shows no bars, the battery should be replaced immediately.

The test set's battery compartment makes battery replacement easy. See "Replacing the Battery" on page 20 for instructions on changing the battery.

If the test set stops working, remove the 9 V battery, wait at least 40 seconds, then replace the battery. This resets the test set. Use the same battery if you know it is good or use a new battery if you are not sure. If it still does not work, contact Fluke Networks Technical Support.

Speaker and Speakerphone Microphone

See Figure 1.

The speaker and speakerphone microphone are located on the keypad side of the test set. The speaker uses a lot of battery power. The battery lasts longer if the speaker is used in moderation.

Audio Controls

See Figure 2.

The three audio control keys are located on the inside handle of the test set between the handset receiver and the handset microphone. These controls let the operator switch between the handset and speaker-phone, mute the active microphone, and control the volume of the received audio signal. Table 1 describes the audio control keys.

⚠Warning

Never hold the speaker against your ear when it is on, or when turning it on or off. Sounds emitted by the speaker can be loud enough to damage your hearing.

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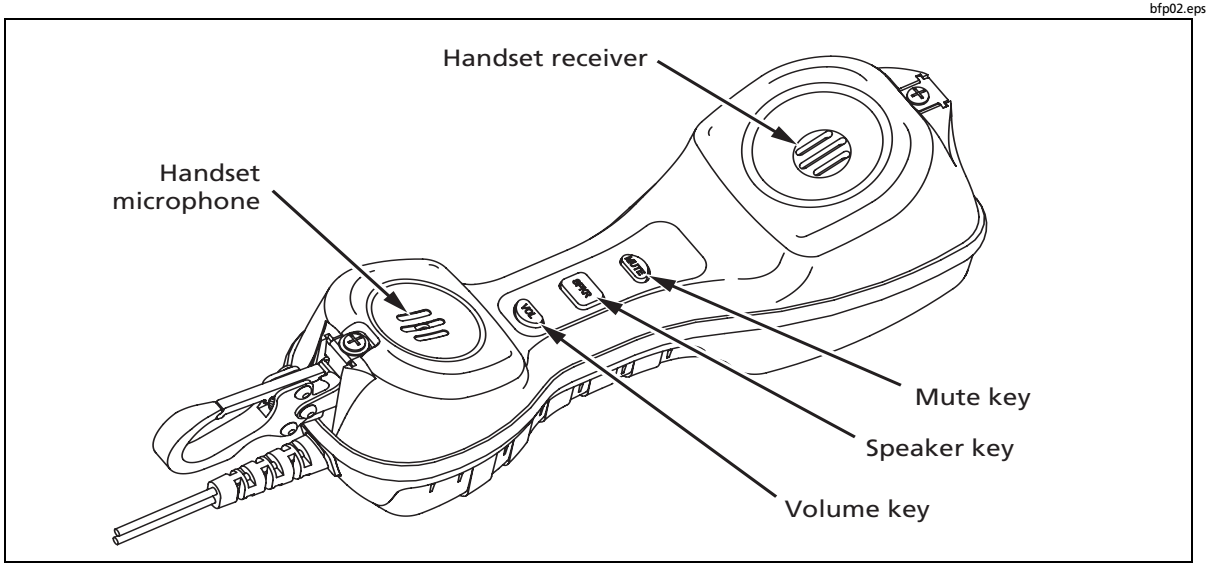

Figure 2. Audio Control Keys

Table 1. Test Set Audio Control Keys

Key	Description (refer to Figure 2)
MUTE	The **MUTE** key functions only when the test set is off-hook. When the test set is off-hook and being used as a handset, pressing the **MUTE** key shuts off the handset's microphone. This is useful in noisy environments such as near heavy traffic. With the mute on, ambient noise is not picked up by the test set's microphone and therefore not transmitted to the receiver. When the mute is on, it is easier to hear the person at the other end of the line and easier to hear static or noise on the line. Pressing the **MUTE** key again turns the microphone on. When the test set is off-hook and is in Speakerphone mode, pressing the **MUTE** key will shut off the speakerphone's microphone and will temporarily put the test set into a Receive-Only Loud Speaker mode. This is a better mode for troubleshooting because it prevents the speaker from cutting out when a medium to loud noise occurs in your vicinity. Pressing the **MUTE** key again will turn the speakerphone microphone on. The TS52PRO allows you to configure the test set to select the Receive-Only Loud Speaker mode as the default mode (see "Make Receive-Only Loud Speaker the Default" on page 17). If you configure the test set to enable the Receive-Only Loud Speaker mode, the Speakerphone will no longer be available. After selecting this option, any time you turn on the speaker, when the test set is off-hook, the Receive-Only Loud Speaker will be activated rather than the Speakerphone. When the unit is configured this way, and the speaker is on, the **MUTE** key has no effect. When mute is activated, the **MUTE** icon is shown on the display.
VOL (Volume)	Pressing the **VOL** key switches the active receiver's sound level between normal and high volume. This occurs in Monitor mode and Talk mode. The state of the **VOL** key is preserved when the active receiver is changed. For example, with the handset receiver volume set to high, if you switch to the speaker, it will also be set to high volume. The **VOL** key affects only the volume of received signals. It does not affect the volume of transmitted signals. Successively pressing the **VOL** key toggles the test set between low and high volume. The volume icon on the display indicates low and high volume mode. High volume is indicated by the volume icon (sound bars) and the absence of the icon indicates low volume. To preserve battery life, the high volume mode will time out. See the section "Speaker/LCD/Test Set Timeout" on page 18 for information on setting the timeout.
SPKR (Speaker)	The **SPKR** key turns the test set's speaker on and off. It functions in both Talk and Monitor modes. In Monitor mode, if the test set is being used as a handset, pressing the **SPKR** key turns on the speaker. This lets you monitor a line while working at a distance from the test set. When the speaker is on, the speaker icon is shown on the display. If the test set is off-hook and is being used as a handset, pressing the **SPKR** key turns on the Speakerphone. The handset microphone and receiver are shut off and the speakerphone microphone and speaker are enabled. This mode is intended for two-way, hands-free conversation. You may also program the test set to operate exclusively in Receive-Only Loud Speaker mode (see "Make Receive-Only Loud Speaker the Default" on page 17). For a test set configured this way, if the test set is off-hook and is being used as a handset, pressing the **SPKR** key will turn on the Receive-Only Loud Speaker rather than the Speakerphone. Receive-Only Loud Speaker mode is intended for listening to the line, hands free.

Display and Keypad

See Figure 3.

The TS52PRO has a 10 digit LCD and a keypad that is recessed into the housing. The recessed bezel protects the keypad and helps prevent accidental key presses. Table 2 describes the keys and display icons.

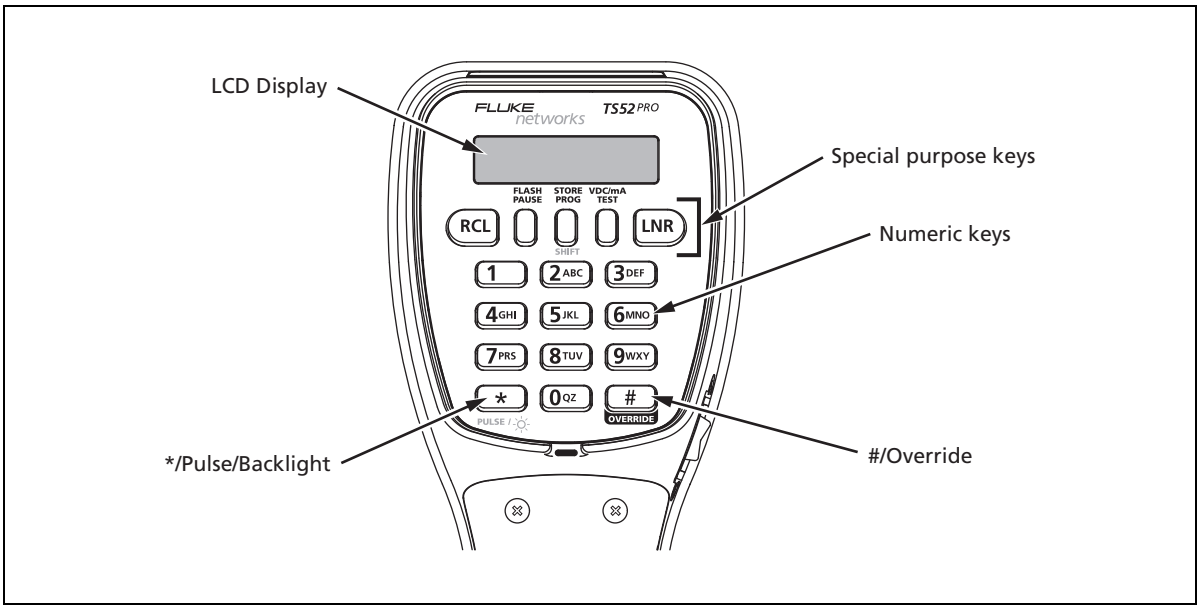

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Figure 3. TS52PRO Display and Keypad

Table 2. Display and Keypad

Key or Indicator	Description (refer to Figure 3)
Numeric Keypad	The numeric keypad is used to dial telephone numbers and make function selections. The numeric keypad includes 12 standard dialing keys including the star (*) and the pound (#) keys.
RCL (Recall) key	The **RCL** key is used for the storing and recalling of repertory dialing numbers. See "Program Speed Dialing Numbers" on page 16.
OVERRIDE key	If you connect the TS52PRO to a telephone line carrying high speed data such as ADSL and you put the test set into Talk mode, the test set will detect the data, it will lock out, and will not go off-hook to protect the data. If you want to go off-hook anyway, you can override the lockout by pressing the **OVERRIDE** (#) key.
LNR (Last Number Redial) key	The **LNR** key redials the number most recently dialed. See "Last Number Redial" on page 16.
STORE/PROG key	The **STORE/PROG** key is used for storing speed dialing numbers and for programming special test set functions.
FLASH/PAUSE key (Hook-Flash)	This is a dual function key. It performs the **FLASH** function when the test set is in Talk mode. It performs the **PAUSE** function when the test set is in Monitor mode. The **FLASH** function is not available in Monitor mode and the **PAUSE** function is not available in Talk mode. If the test set is in Talk mode and is off-hook and you press the **FLASH/PAUSE** key, the test set will generate a flash signal. The factory default flash duration is 600ms, however the duration of the flash signal can be varied by the user. For configuring the test set to generate a flash duration other than 600ms, see "Hook Flash Duration" on page 17. The **PAUSE** function is available when storing speed dial numbers in Monitor mode. When entering a speed dial number, if you press the **FLASH/PAUSE** key, a 4 second pause will be inserted into the number you are entering. This is useful when you want to use speed dialing to dial out through a PBX. To dial out through a PBX, typically you manually dial 9, then wait for the PBX to connect you to an outside line, then you manually dial the rest of the number. The **PAUSE** function removes the need to manually dial when dialing through a PBX. For example, if you have entered 9 PAUSE 2345678 into one of the speed dial memories, when you recall this number, the test set will automatically dial a 9, then it automatically waits for the pause duration of 4 seconds giving the PBX time to connect to an outside line, then it automatically dials the remaining digits 2345678. If you need a delay longer than 4 seconds, press the **PAUSE** key more than once when entering a number into memory. Example: if you press the **PAUSE** key two times in a row, you will get an 8 second pause.

Table 2. Display and Keypad (continued)

Key or Indicator	Description (refer to Figure 3)
PULSE key	The **PULSE** key switches the test set between tone and pulse dialing. The **PULSE** key is active only when the test set is off-hook. Any time the test set goes off-hook, it is automatically set to tone dialing. Once off-hook, press the **Shift** (**STORE PROG**) key and then the **PULSE** key to change the dialing mode to pulse dialing.
Vdc/mA TEST key	When you press the **Vdc/mA TEST** key, one of two tests is performed depending on the operating mode of the test set. If the test set is in Monitor mode and you press the **Vdc/mA TEST** key, the Vdc (dc voltage) test will be executed. If the test set is in Talk mode (off-hook) and you press the **Vdc/mA TEST** key, the mA test (loop current) will be executed. To run the Vdc test, put the test set into Monitor mode and connect it to Tip and Ring of the POTS line you want to measure. Then press the **Vdc/mA TEST** key. The test set measures the dc voltage across Tip and Ring and the measured voltage (0-140 Vdc) is shown on the display. Normal line voltage is between 42 and 54 V dc. To run the mA test, connect the test set to Tip and Ring of the POTS line you want to measure and take the test set off-hook. Then press the **Vdc/mA TEST** key. The test set measures the dc loop current that it is drawing from the line. The measured current (0-120 mA) is shown on the display. Normal loop current is above 23 mA. If the loop current is too low, the telephone line you are testing may not be able to supply enough current to power the customer's telephone devices and you may want to perform some additional testing on that line. The purpose of these tests is to allow you to make a quick assessment of whether or not the line you are working on has normal CO battery voltage or normal loop current. If the voltage is below 2.5 V dc, there is not enough voltage for the test set to go off-hook. If the voltage is above 140 V dc, this is potentially dangerous to you and the test set. If you encounter this, carefully remove the test set's clip leads from the line. Be sure to hold the clip leads by their insulated boots and avoid touching the clip lead's metal parts with your hands. Be careful to avoid shorting the clip leads to each other. See "High Voltage Lockout Operation" on page 15.
Low Battery icon 	When the 9 V battery is nearly discharged, no bars are shown on the battery icon on the display. Replace the battery immediately when this occurs. See "Replacing the Battery" on page 20.
Polarity icon 	The polarity icon indicates the polarity of the dc voltage across the line's Tip and Ring wires is reversed. If the test set's red clip lead is connected to a more positive voltage than its black clip lead (reverse polarity), the icon is shown on the display. If the test set's red clip lead is connected to a more negative voltage than its black clip lead, no icon is shown.

Table 2. Display and Keypad (continued)

Key or Indicator	Description (refer to Figure 3)
On-Hook / Off-Hook icon 	The icon indicates which mode the test set is in. The icon will alternate between on-hook and off-hook when a call is coming in.
Mute icon 	The icon indicates that the **Receive-Only Loud Speaker** mode is on or the test set is muted. See "Make Receive-Only Loud Speaker the Default" on page 17.
Speaker icon	Pressing the **SPKR** key switches the speaker on and off. The speaker icon indicates the status. The speaker icon is shown when the speaker is on. The absence of the icon indicates that the speaker is off.
Volume icon 	Pressing the **VOL** key switches the active receiver's sound level between normal and high volume. The volume icon indicates the level. The icon shown here indicates high volume. Low volume is indicated by the absence of the icon.

Table 3. TS52PRO Key Functions

Key	Monitor Mode	Talk Mode (Off-hook)
MUTE	N/A	Toggle microphone
VOL	Toggle volume	Toggle volume
SPKR	Toggle speaker	Toggle speaker
RCL	Initiate speed dial storage	Initiate speed dial functions
OVERRIDE	N/A	Override data lockout
LNR	N/A	Dial last number
STORE/PROG (+)	Initiate user programmable features	Initiate speed dial storage
(+) FLASH	Select hook flash duration	N/A
(+) MUTE	Toggle receive-only loudspeaker	N/A
(+) SPKR	Select speaker timeout duration	N/A
(+) TEST	Turn on DTMF digit grabbing (active until display timeout)	Legacy data lockout override
(+) * (Star)	Toggle backlight on/off	Toggle pulse mode
(+) # (Pound)	Reset test set to factory default setting	Activate visual ANAC mode (test set is muted)
FLASH/PAUSE	N/A	Generate hook flash in Talk mode or a pause in Monitor mode
TEST	Initiate line voltage test	Initiate loop current test

Table 4. TS52PRO Timeout Defaults

	Monitor Mode/Talk Mode (On-hook)**	Talk Mode (Off-hook)
LCD	30 seconds	Always on
SPKR Mode	2 minutes	240 minutes
Handset Mode	2 minutes	Always on

** Monitor Mode Only - You can monitor a line for 2 minutes. Although the LCD will turn off after 30 seconds, the test set is still on. You can monitor the line for an additional 90 seconds after the LCD turns off. Press the **VOL** or **Vdc/ma TEST** key to turn the LCD on again. See "Speaker/LCD/Test Set Timeout" on page 18 for information on changing the timeout duration.

Operation

The test set has two basic modes of operation: Talk mode and Monitor mode. Talk mode is used for off-hook operations (such as dialing verification, automatic number identification, and audio quality verification). Monitor mode is for audio monitoring of the Tip and Ring pair while on-hook. In Monitor mode, the test set has a high input impedance, which allows monitoring of the line without disrupting conversations or data, if present.

⚠Warning

When testing circuits that are close to a battery source, clipping onto a line may cause loud pops in the receiver. Holding the receiver tightly against your ear may cause acoustic shock. The test set is designed to rest comfortably on the shoulder with some space between the receiver and the ear. It should be used in this position when working close to a battery source.

Shorting the Tip and Ring leads together while connected to a data line will disrupt data on the line.

Talk/Monitor Switch

See Figure 1.

The Talk/Monitor switch is a rocker switch located on the side of the test set. The **T** position puts the test set into Talk mode. The **M** position puts the test set into Monitor mode. Talk mode activates the keypad display.

Operating the Test Set in Monitor Mode

In Monitor mode, the test set is always on-hook. The test set draws no direct current from the line and it transmits no signals to the line. In this mode, the test set has a high ac input impedance, which allows listening for audio signals without disrupting conversations or data signaling that may be present. Either the handset receiver or the speaker can be used to monitor a line.

Note

Monitor Mode Only - You can monitor a line for 2 minutes. Although the LCD will turn off after 30 seconds, the test set is still on. You can monitor the line for an additional 90 seconds after the LCD turns off. Press the **VOL** *or* **Vdc/ma TEST** *key to turn the LCD on again. See* "Speaker/LCD/Test Set Timeout" on page 18 *for information on changing the timeout duration.*

You can press the **SPKR** key to activate the Amplified Monitor Mode. This will disable the handset receiver and all audio signals are routed to the speaker. Two volume levels are available, normal and high. Press the **VOL** key to toggle the volume level. The volume icon on the display indicates the volume level. Press the **SPKR** key again to return to Handset Monitor Mode. The speaker will shut off and signals can be monitored through the handset receiver.

To preserve the battery life, the Amplified Monitor Mode will time out and return to normal mode. The timeout duration is user programmable. See "Speaker/LCD/Test Set Timeout" on page 18 for information on changing the timeout duration.

In the Monitor mode, the test set is typically used for one or more of the following procedures:

- Verification that a line is idle when looking for a line to borrow
- Listening for noise on the line
- Hunting for tracer tones
- Testing for dc voltage on the line by using the **Vdc/mA TEST** key

Caller ID

The display shows the Caller ID (CID) after the first ring while in Monitor mode. The CID messages are:

- The incoming phone number
- **Blocked ID** (if CID is blocked by the originating device)
- **Line error** (CID data is incomplete)
- **Unknown ID** (CID is not available)

Note

Lines carrying high speed data and voice require a splitter (filter) for Caller ID.

Operating the Test Set in Talk Mode

Right after moving the Talk/Monitor switch to **T**, the test set performs a brief test for high-speed data and it looks for talk battery on the line. If high-speed data is detected, the test set generates an audio alarm and remains on-hook. If high-speed data is not detected and talk battery is present, the test set goes off-hook. When off-hook, the test set operates like a standard telephone and is typically used to verify the proper operation of a voice telephone line or to establish temporary communications on a "borrowed pair".

Originating a Call

1 Set the Talk/Monitor switch to **M**.

2 Clip the test set to Tip and Ring of a subscriber loop.

3 Monitor (listen to) the line to verify that it is idle.

4 If not idle, disconnect the test set from the line.

5 If the line is idle, set the Talk/Monitor switch to **T**. The test set automatically tests for high-speed data and talk battery on the line.

6 If data is detected, the test set will not go off-hook and **LOCKOUT** is shown on the display. Try another line.

7 If there is no data and talk battery is present, the test set goes off-hook and draws dial tone.

Note

The test set will not go off-hook if the line voltage exceeds 140 V dc.

8 Dial the desired number.

Note

*If you mis-dial the number, switch the Talk/Monitor switch to **M** and then back to **T** and enter the number again.*

Disconnecting a Call

To disconnect a call, set the Talk/Monitor switch to **M** or remove the test leads from the line.

Answering a Call

1 If a ringing signal is received, set the Talk/Monitor switch to **T**. The test set automatically tests for high-speed data on the line.

2 If there is no data and talk battery is present, the test set goes off-hook.

Note

The TS52PRO will not go off-hook if the line voltage exceeds 140 V dc.

3 If data is detected, the test set will not go off-hook and **LOCKOUT** is shown on the display.

4 To go off-hook with data present, press the **OVERRIDE** key (see "Data Lockout Override Operation" on page 15).

Ground Start

Ground start lines are typically found on PBX installations. To activate an idle ground start telephone line, do the following:

1 Set the Talk/Monitor switch to **M**, and connect the test leads to Tip and Ring of the ground start line. With a third wire, temporarily short the Tip side of the line to earth ground. A wire with an alligator clip at each end is often used for this. Do not allow clips to short network connections.

2 With the short to earth ground in place, set the Talk/Monitor switch to **T**. When dial tone is received, remove the third wire from earth. The circuit is now ready for dialing.

Data Lockout Operation

With the increase in high capacity data lines in the distribution system comes the greater risk of disrupting data services when working on analog lines. The test set is designed to be used by Outside Plant and Central Office technicians to perform their normal duties while greatly reducing the possibility of accidentally disrupting data service.

Accidentally going off-hook on a data line while searching for talk battery or dial tone on an unmarked terminal block or cable splice could bring down a high-capacity data line. To prevent this, the test set provides an automatic data lockout function. When the test set, with its Talk/Monitor switch in the **T** position, is connected to a Tip and Ring pair, it automatically tests the line for high-speed data (data signals that are above the human audio range) before going off-hook. If data is detected, the test set locks out, preventing itself from going off-hook, a warning beep sounds, and **LOCKOUT** is shown on the display.

When the test set is locked out, it remains on-hook, it does not draw direct current from the line, and it presents a high ac impedance to the line to prevent disruption of data. The test set can detect and protect high frequency data services.

Data Safe Practices

Always monitor the line for an audible signal before attempting to go off-hook to draw dial tone. The data detect circuitry on the test set is designed to detect data signals above the human audio range. To detect data signals within the human audio range, such as produced by voiceband modems and subrate DDS transceivers, you must listen to the line using the test set's audio monitoring capability. If you hear the hiss of a voice band modem or low frequency data transceiver, do not move the Talk/Monitor switch to **T**. If you do switch to **T**, the test set will not lock out because it does not detect low frequency data. It will go off hook and will interfere with the voice band modem or data transceiver. To avoid this, try another line or wait until the line is idle.

Data detection is a two part process. The first part requires listening to the line for audible data traffic in Monitor mode as described above. If the line is quiet, then the second part is to use the test set's data detect capability to determine if there is data above the human audio range on the line. This can be done as follows:

1 Switch the Talk/Monitor switch to **T**.

The test set automatically performs a brief test for high-speed data. If there is data on the line, the test set locks out, (remains on-hook), a warning beep sounds, and **LOCKOUT** is shown on the display. If there is no data on the line, the test set goes off-hook.

2 You can now dial a number.

When going from pair to pair searching for tracer tone or dial tone, it is best to connect the test set to Tip and Ring of the pairs. Avoid the practice, either in Talk or Monitor mode, of clipping one lead of the test set to ground, and using the other lead to search for tracer tone or dial tone on a block. This may create an electrical imbalance on a data line that will disrupt service. Once you find the voice line you are searching for then it is OK to test Tip to ground or Ring to ground on that line.

Be careful not to short the test leads together when connecting to a data line (or any line for that matter), as this could bring down the service.

It is best to put the test set in Monitor mode when troubleshooting a line, searching for capacitance kicks, RF signals, craft provided tones, etc.

Data Lockout Override Operation

Normally, when the test set detects data, it means the operator has accidentally connected to a high-speed data line and should immediately disconnect from the line to avoid disrupting the data service. But in some cases the operator must go off-hook on a specific line even though the test set indicates that the line is a data line.

The following are scenarios where the operator may wish to override a data lockout:

- When there is false data detection due to RF pickup on a line that is near an AM radio broadcast antenna. The RF induced in the line may appear to be data.
- When performing a ground start, the test set may lock out when the Talk/Monitor switch is in the **T** position. This is because ground start lines are unbalanced before startup and thus are prone to picking up a lot of noise which may appear to be data to the test set. If this occurs, use the override function to go off-hook on a ground start line.

Telephone lines near AM radio broadcast facilities pick up the RF signals from the broadcast antennas. Normally this is not a problem for the test set. If the line is well balanced, the test set will not see the RF signal because it is a common mode (longitudinal) signal. But if the line is unbalanced, part of the RF signal will be converted to a differential (metallic) signal. If the signal amplitude is high enough, it may be detected as high-speed data by the test set. If you know for sure you are on such a line, use the override function to go off-hook.

The data lockout override can be activated only when the Talk/Monitor switch is in the **T** position. To activate the override, press the **OVERRIDE** key. If dc voltage is present, the test set goes off-hook. To go back on-hook, unclip the test set's test leads from the line or put the test set into Monitor mode.

High Voltage Lockout Operation

⚠⚠Warning

If the voltage on the line is above 140 V dc, this is potentially dangerous to you and the test set. If you encounter this, carefully remove the test set's clip leads from the line. Be sure to hold the clip leads by their insulated boots and avoid touching the clip lead's metal parts with your hands. Do not short the test leads to each other while it is connected to a line carrying high voltage.

The TS52PRO is designed for use by Outside Plant and Central Office technicians in environments where analog voice lines co-exist with lines that carry high dc voltage.

Accidentally going off-hook on a line carrying a high dc voltage can damage the power supply feeding the line. To prevent this, the TS52PRO provides an automatic high-voltage lockout function. When a TS52PRO is connected to a Tip and Ring pair with its Talk/Monitor switch in the **T** position, it measures the voltage on the line before going off-hook. If the measured voltage exceeds 140 V dc, the test set locks out, preventing itself from going off-hook. The display shows **LOCKOUT HI VDC**.

In the event of a high voltage lockout, the Talk/Monitor switch should be set back to the **M** position, and the test set leads should be carefully removed from the line.

Configuring Your Test Set

When you are programming speed dial numbers or setting operating parameters, the test set expects you to press keys in a specific sequence. If, during a programming procedure, you accidentally press a key that's out of sequence, the test set will abort the programming procedure and all you have to do is start the programming procedure over again. When you complete a programming procedure correctly, the test set will give you a confirmation tone. If you do not get a confirmation tone when you expect one, assume you made a programming error and just start the programming procedure over again.

Last Number Redial

To redial in tone dialing mode, go off-hook and press the **LNR** key. To redial in pulse dialing mode, go off-hook, press the **TONE/PULSE** key, then press the **LNR** key. In either case, the test set will automatically redial the last number dialed.

If, after going off-hook, any dialing key is pressed, the LNR memory is cleared and the value of the pressed key is the first number stored in the cleared memory.

The dialing keys that may be stored in LNR memory include 1,2,3,4,5,6,7,8,9,0,*, and #. The star (*) and pound (#) keys will not be redialed when the test set is in pulse dialing mode even if the redial memory includes them.

Program Speed Dialing Numbers

While in Monitor mode, the test set allows the storage of ten speed dialing numbers in ten memory locations (0 through 9). Each location stores up to 23 digits. If an attempt is made to store more than 23 digits, only the first 23 are stored. The **PAUSE** key is accepted as a dialing digit when storing numbers.

To Store a speed dialing number:

1. Set the Talk/Monitor switch to **M**.
2. Press **RCL**. The display turns on.
3. Use the keypad to enter the number to be stored.
4. Press the **STORE/PROG** key.
5. Press a number key (0 through 9) to select the desired memory location. The test set gives a confirmation tone and the display shows **STORED**.

Note

Dialing a number from speed dial location 9 automatically puts the test set into Visual ANAC mode and the test set is automatically muted. If a visual response is not available, an audible response is given. Use one of the other speed dial locations (0-8) if you always want an audible response.

Putting a Pause in a Stored Number

Note

Each time the **PAUSE** *key is pressed, it counts as one dialing digit.*

In some situations it may be necessary to put a pause between digits of a stored number, as when accessing a trunk through a PBX that requires a **9** to get an outside line. You can do this by pressing the **PAUSE** key at the point where the pause is required. A comma is displayed each time the **Pause** key is pressed. For example, to store the number 9-555-1234, with a pause between the **9** and **5**, enter **9[PAUSE]5551234**. When the number is dialed out, there will be a 4 second pause between the **9** and **5**. You can insert a longer pause by pressing **PAUSE** more than once. Each pause inserts a 4 second delay.

Storing the Last Number Dialed

If you dial a number then go on-hook and then decide you want to save that number in speed dialing memory, do the following:

1. Set the Talk/Monitor switch to **M**.
2. Press **RCL**. The display turns on.
3. Press **LNR** (Last Number Redial). The display shows the last number.
4. Press the **STORE/PROG** key.
5. Press a number key (0 through 9) to select the desired memory location. The test set gives a confirmation tone and the display shows **STORED**.

Storing a Number You are Calling

1. Connect the test set to a working telephone line, set the Talk/Monitor switch to **T**, and receive dial tone. The display turns on.
2. Dial the number.
3. Press the **STORE/PROG** key.
4. Press a number key (0 through 9) to select the desired memory location. The display shows **STORED**.

Dialing a Stored Number

1 Connect the test set to a working telephone line.

2 Set the Talk/Monitor switch to **T**.

3 When the test set goes off-hook, press **RCL** (RECALL) and then the number key (0 through 9) for the memory location. The display shows the number. For example, to dial a number stored in location 5, press **RCL** and then **5**. The number will be automatically dialed.

Hook Flash Duration

When the test set is off-hook, pressing the **FLASH/PAUSE** key causes a timed interruption of the loop current to occur. Some PBX setups or telephone office switches may use this signal to put a call on hold or to activate some special function. One flash is generated for each press of the key.

To change the flash duration value:

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the **FLASH/PAUSE** key.

4 Press a number key to select a hook flash time (Table 5). The test set gives a confirmation tone when the entry is accepted.

Table 5. Hook Flash Times

Key	Hook Flash Time
1	100 ms
2	200 ms
3	300 ms
4	400 ms
5	500 ms
6	600 ms (default)
7	700 ms
8	800 ms
9	900 ms
0	1000 ms

Make Receive-Only Loud Speaker the Default

On a TS52PRO fresh from the factory, if you take the unit off-hook and press the **SPKR** key, the Speakerphone will turn on. The Speakerphone allows you to have a two-way, hands-free conversation like with any desk top speakerphone. If now you press the **MUTE** key, the Receive-Only Loud Speaker will be enabled temporarily. When the Receive-Only Loud Speaker is enabled, the speakerphone microphone is shut off and the test set can only receive audio signals – it cannot transmit any audio signals. Receive-only is preferred when your main concern is to listen to the line and you do not want ambient noise such as caused by a passing car to switch the Speakerphone into transmit mode.

Quite a few users have requested that the Receive-Only Loud Speaker be made available on a more permanent basis. In other words, when they press the **SPKR** key on an off-hook unit, they want the Receive-Only Loud Speaker to be activated rather than the Speakerphone. The Receive-Only Loud Speaker suits their working style and they do not want to press the **MUTE** key every time they want to activate the Receive-Only Loud Speaker.

If you frequently have two way conversations, then you probably want the Speakerphone to be the default Loud Speaker mode. If you mostly listen when the loud speaker is on, then you may want the Receive-Only Loud Speaker to be the default Loud Speaker mode. You can configure the test set to make the Receive-Only Loud Speaker the default Loud Speaker mode instead of the Speakerphone by performing the following programming procedure.

To enable Receive–Only Loud Speaker as the default off-hook speaker mode (assuming the unit is presently set for Speakerphone):

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the **MUTE** key. The test set gives a confirmation tone.

If you want to restore the Speakerphone as the default off-hook speaker mode, then repeat the steps above.

Speaker/LCD/Test Set Timeout

The speaker uses a lot of battery power. The battery drains quickly when the speaker is left on continuously. To extend battery life, the test set has a timeout function that automatically turns off the speaker when the test set is on-hook. A timer starts whenever the test set is put on-hook. After the timer times-out, the speaker is automatically shut off.

If the test set is used as a handset in Monitor mode and if the test set's receiver has been set to high volume, the battery is drained quickly. To avoid this, the test set has a timeout function for the high volume state when in Monitor mode. After the timeout, the test set reverts to low volume. The timeout duration for the high volume Monitor receiver is the same as for the speaker.

The speaker timeout duration is program-mable while on-hook and 240 minutes (4 hours) while off-hook. The off-hook timeout cannot be changed. Remember, the longer the selected timeout duration the shorter the battery life.

To change the speaker/ Monitor mode timeout duration:

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the **SPKR** key.

4 Press a number key to select a timeout duration. The test set gives a confirmation tone when the entry is accepted.

Table 6. Timeout Durations

Key	Speaker/Monitor Mode Timeout Duration
1	2 minutes (default)
2	5 minutes
3	10 minutes
4	20 minutes
5	30 minutes
6	40 minutes

LCD Backlight

You can conserve the test set battery life by keeping the display backlight off when it is not needed. The default state of the backlight is off. To turn on the backlight:

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the ***** key. The test set gives a confirmation tone.

Repeat the steps to turn the backlight off.

DTMF Digit Grabbing

The TS52PRO Test Set allows you to capture DTMF (Dual-Tone Multi-Frequency) tones generated on a telephone line. This feature is useful when you suspect that the customer's equipment is not generating proper DTMF signals. In order to maximize battery life, the default state is to turn DTMF Digit Grabbing off. Digit Grabbing is deactivated when the display times out. To turn it on:

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the **TEST** key. The test set gives a confirmation tone.

Visual ANAC Mode

(For service provider use only, visual ANAC not available in all regions)

You can get an ANAC (Automatic Number Announcement Circuit) DTMF response by putting the test set in visual ANAC mode:

1 Set the Talk/Monitor switch to **T**.

2 Press the **STORE/PROG** key.

3 Press the # key. The display shows **ANAC MODE**.

After you dial the ANAC number and get a response, the phone number of the line pair that the test set is connected to is shown on the display. If the ANAC response is greater than 10 digits, the last 10 will be displayed. The test set is automatically muted in visual ANAC mode. If a visual response is not available, an audible response is given.

You can also enter the ANAC number in speed dial location 9 and the test set automatically enters Visual ANAC mode when the speed dial is used. If a visual response is not available, an audible response is given. Use one of the other speed dial locations (0-8) if you always want an audible response.

ANAC mode is turned off when you switch to Monitor mode. If ANAC mode is off, the ANAC voice response is audible on the handset or speaker.

Factory Defaults

The Restore Defaults function lets you restore all programmable features to their original factory settings. This function does not clear stored telephone numbers. The defaults are:

- Hook Flash: 600 ms
- Speaker timeout: 2 minutes
- Speakerphone: enabled
- Receive-Only Loud Speaker: disabled
- Backlight: off
- DTMF Digit Grabbing: off
- Monitor Mode timeout: 2 minutes

To restore the factory default values:

1 Set the Talk/Monitor switch to **M**.

2 Press the **STORE/PROG** key.

3 Press the pound (#) key. The test set gives a confirmation tone when the entry is accepted.

_____ use a rechargeable battery. When inserting the battery, observe the proper polarity.

5 Place the battery door cover on the test set and fasten the four screws securely. Do not over tighten the screws. The battery door screws should be torqued to a maximum of 0.904 N-m or 8 in-lb.

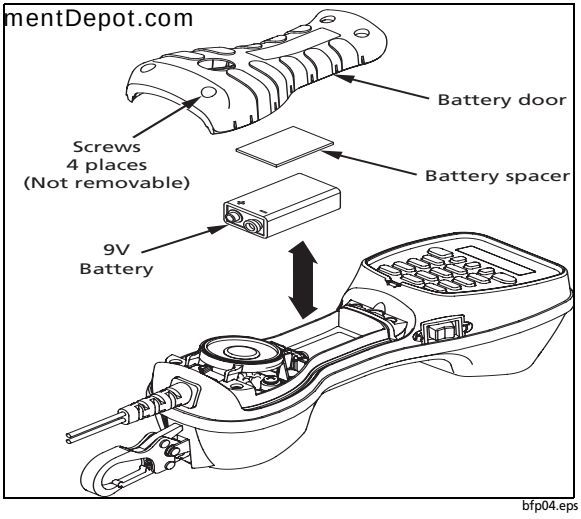


Figure 4. Battery Replacement

Replacing or Relocating the Belt Clip

See Figure 5.

The belt clip assembly is field replaceable in the event of damage or prolonged wear. It also can be relocated to one of two locations. To order a replacement belt clip, contact your local Fluke Networks authorized distributor.

To replace the belt clip assembly:

1 Use a Phillips screwdriver to remove the screw that secures the belt clip to the test set housing.

2 Remove the old belt clip and replace with a new one. Secure the belt clip assembly to the test set housing with the original screw.

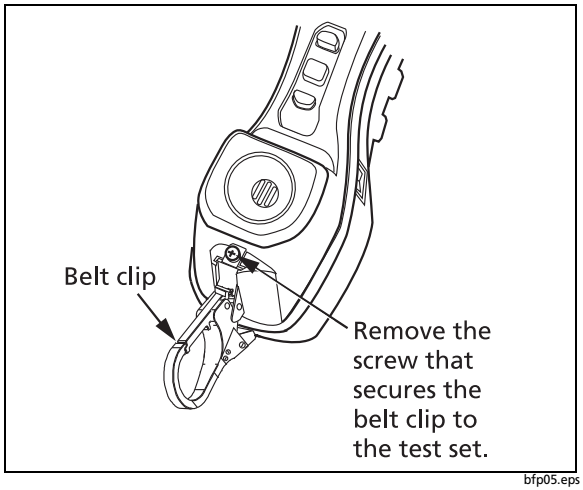


Figure 5. Belt Clip Replacement

To relocate the belt clip:

1 At the unused belt clip slot, use a Phillips screwdriver to remove the screw holding the plastic insert to the case, then remove the plastic insert.

2 Use a Phillips screwdriver to remove the screw that secures the belt clip to the test set housing and remove the belt clip.

3 Slide the belt clip into the slot at the previously unused location, and secure it to the case with one of the Phillips head screws.

4 Slide the plastic insert into the belt clip slot that is not being used and secure it with the remaining Phillips head screw.

Replacing the Line Cord

A worn out or damaged line cord can be replaced by the user. To obtain a replacement line cord, contact your local Fluke Networks authorized distributor.

⚠Warning

Read all instructions completely and understand possible hazards to end user if repairs are not performed properly.

Disconnect test set clips from any metallic connections before performing this maintenance.

Removing the Old Line Cord

To remove the old line cord:

⚠⚠Warning

Be sure to account for all hardware removed. Loose or missing hardware could create a hazard for the end user.

Note

Battery cover screws are retained in the cover and will not come all the way out of the battery cover.

Be careful not to damage or pinch the speaker wires, printed circuit faces or insulating materials.

1 Use a Phillips screwdriver to loosen only the four screws attaching the battery door cover to the back of the test set (Figure 4).

2 Remove the battery door cover (Figure 4) and battery from the test set.

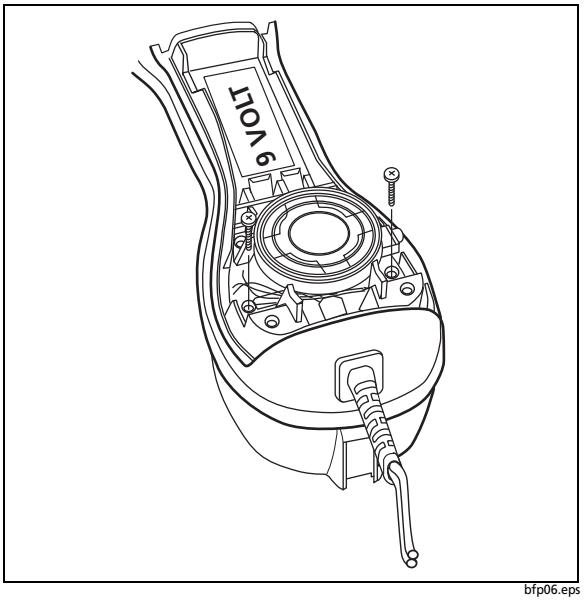
-continued-

3 Loosen the two screws that hold the line cord to the PC board (Figure 6).

4 Using needle nose pliers or one of the line cord clips, remove the two screws and washers from the line cord connectors.

5 Using needle nose pliers, remove the plastic clip (Figure 7) that holds the line cord strain relief in place.

6 Slip the line cord screw lugs (Figure 8) out through the hole in the end of the housing.



bfp06.eps

Figure 6. Removal/Installation of Line Cord Screws

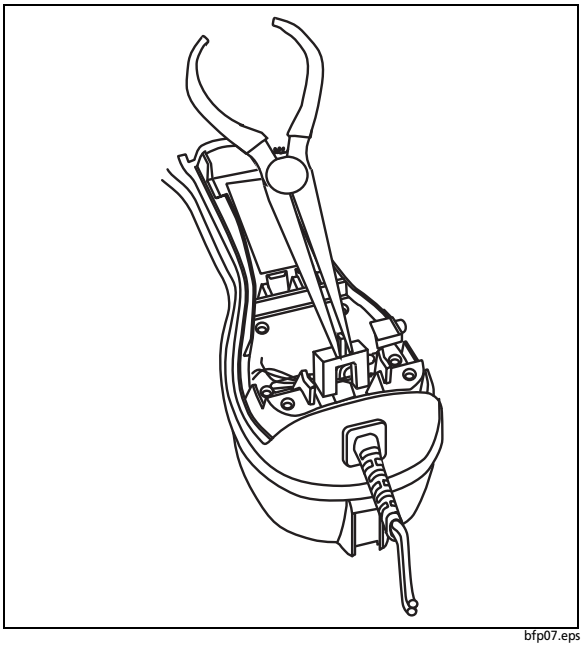


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Figure 7. Removal/Installation of Plastic Clip

Installing a New Line Cord

To install a new line cord:

1 From the outside of the housing, slide the screw lugs of a new line cord through the hole in the end of the test set housing. Make sure the crimp barrel offset side of the screw lugs is up (Figure 9) and that the line cord screw lugs are flush against the circuit board.

Note

Do not over tighten screws. Over tightening will strip the plastic.

2 Fasten the red wire lug to the PC board (Ring) with screw and washer (Figure 8).

3 Fasten the black wire lug to the PC board (Tip) with screw and washer (Figure 8).

4 Insert the plastic clip over the line cord strain relief at the base of the test set housing (Figure 7) and press tightly into place. Inspect all work to ensure no pinched wires or areas where weather resistance and safe operation is affected. Reinstall the battery. Observe the proper polarity.

5 Place the battery door cover on the test set and fasten the four screws (Figure 4). Tighten screws to a maximum torque of 0.904 N-m or 8 in-lb.

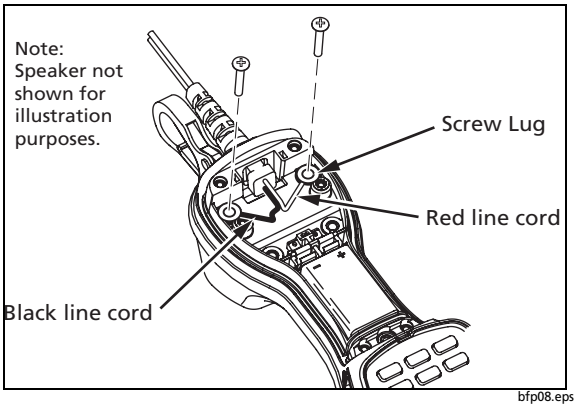

Figure 8. Removal/Installation of Line Cord Screw Lugs

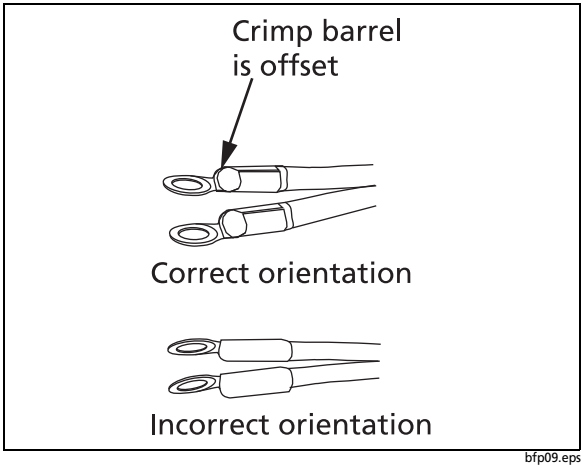

Figure 9. Orientation of Line Cord Screw Lugs

Accessories (How to Order)

To order accessories, contact your local Fluke Networks distributor.

Description	Model Number
Belt clip, lockable (both ends)	P4080248
Belt clip, non-lockable (both ends)	P4080249
Standard Line Cord with Piercing Pin Clips	P4480001
Central Office Line Cord with 346A Plug	P4480004
Angled Bed-of-Nails Cord (ABN) and Piercing Pin Clips	P4480009
Angled Bed-of-Nails Cord (ABN) with Piercing Pin Clips and with RJ-11 Plug	P4480RJ9

Specifications

Electrical	
Current Range (Off-Hook)	10 mA to 100 mA
DC Resistance	
Off-Hook	150 Ω nominal
On-Hook	>3 MΩ
AC Impedance	
Off-Hook	600 Ω nominal; 300 Hz to 3400 Hz
On-Hook	>120 kΩ; 300 Hz to 3400 Hz
Rotary Dial Output	
Pulsing Rate	10 pps ±1 pps
Break/Make Ratio	60/40
Interdigit Interval	>300 ms
Resistance During Break	>100 kΩ
DTMF Output	
Tone Frequency Error	±1.5 % maximum
Tone Level	-3 dBm combined (typical)
High versus Low Tone Difference	2 dB ± 2 dB
Memory Dialing	
Memory Capacity	10 speed dial memories plus one last number redial memory
Digit Capacity	23 digits per memory
PBX Pause Duration	4 seconds
Hook Flash Duration	User programmable; default of 600 ms
Automatic Speaker Shut Off Duration	User programmable; default of 2 minutes
Battery	9 V alkaline battery

Physical	
Measurement	10 in x 3.75 in x 4.25 in (254 mm x 96 mm x 107 mm)
Weight	Less than 1.5 pounds (0.68 kg) with one belt clip
Water Resistance	Designed to be rain and moisture resistant
Environmental	
Temperature Range	
Handset speech and dialing functions	-22°F to 140 °F (-30°C to 60°C)
LCD function	-13°F to 140°F (-25°C to 60°C)
Storage	-22°F to 150°F (-30°C to 66°C)
Altitude	To 10,000 ft. (3,000 m) max
Relative Humidity	95% to 30°C 75% to 40°C 45% to 50°C 30% to 60°C
Safety	
Regulatory Compliance	Complies with ANSI/ISA 82.02.01 (61010-1) 2004, CAN/CSA-C22.2 No 61010-1-04, UL 61010-1 (2004) and IEC/EN 61010-1 2nd Edition for measurement Category I, 300 Vdc Max, Pollution Degree 2
Maximum Transient Voltage	1500V
EMC	Complies with EMC EN61326-1

Note

Specifications subject to change without notice.