HARRIS

User's Guide

TS® 25D Test Set

NOTICE

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TRADEMARKS:

TS is a registered trademark of Harris Corporation.

REGULATORY INFORMATION

WARNING: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. Consult the dealer or an experienced radio/TV technician for help.

HARRIS
next level solutions

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www.harris.testsets.com 1-800-437-2266

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Declaration of Conformity

Manufacturer: Harris Corporation
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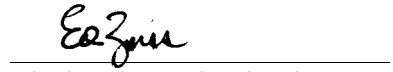

Ed Zoiss, Director of Engineering

Importer: _____
_____
_____

Signature: _____

Standards Used:

- 47 CFR Part 15 Subpart B
- ICES-003 Issue 3
- AS/NZS 3548
- EMC Directive 89/336/EEC
    - EN 55022:98
    - EN 61326:97 A1:98 Annex C
    - EN61000-4-2
    - EN61000-4-3
- LV Directive 73/23/EEC
    - EN610010.1 (1993)...

EMC and Safety Compliance were evaluated by NTS, Fullerton, CA, USA
EMC Report #271-2157-1-0-NE

Product Name: TS25D Test Set

Model Number(s): 25501-009, 25501-109_____

Harris Corporation officially declares the test equipment listed above is in conformity with Electromagentic Compatibility Directive 89/336/EEC and Low Voltage Directive 73/23/EEC based on test results performed in a typical configuration. This Conformity is indicated by the following symbols representing the European Community and compliance organizations:

CE

SAFETY INFORMATION

Please Read First

WARNING:
Means conditions and hazards may pose risk to user.

CAUTION:
Means conditions and hazards may damage the test set.

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

See Manual for details

Earth Ground

Conformité Européenne

Contents

TS®25D Test Set

WARNING:

- *The TS25D Test Set is not designed to meet the outside plant requirements of Bellcore Publication TR-TSY-000344. It is recommended that this product not be used outside during adverse and/or wet weather conditions.*
- *Legal requirements may exist regarding permission to connect equipment to a Telecom network operated by a public network operator.*

CAUTION:

The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

DESCRIPTION

TS25D is a lightweight portable test telephone used by installers, repair technicians and other authorized personnel for temporary communication and for servicing and installing analog voice telephone lines.

Design Features

The TS25D provides a wide range of features for working on analog voice lines, and, in addition, it is equipped with protection features to prevent the accidental disruption of data services.

The following is a list of the TS25D features:

- Three main modes: Talk (off-hook), Monitor (on-hook and listening), and Off
- Tone or Pulse Dialing
- Polarity Indication
- Data Lockout and Override
- Low and High Voltage Lockout
- Mute Function
- Hook Flash
- Memory Dialing
- Detect and Display Caller ID/Call Waiting ID (CIDCW)
- Last Number Redial
- Toner
- Talk Battery
- Displays voltage when on-hook
- Displays current when off-hook
- DTMF Detection including A-D
- Headset Compatible.

Physical Characteristics

Talk/Monitor Switch

The TALK/MONITOR (T/M) switch is a slide switch located on the left side of the test set (see Figure 1). Switching the TALK/MONITOR switch to the TALK (T) position puts the test set into Talk mode. Switching the TALK/MONITOR switch to the MONITOR (M) position puts the test set into Monitor mode. The center position of the switch is OFF.

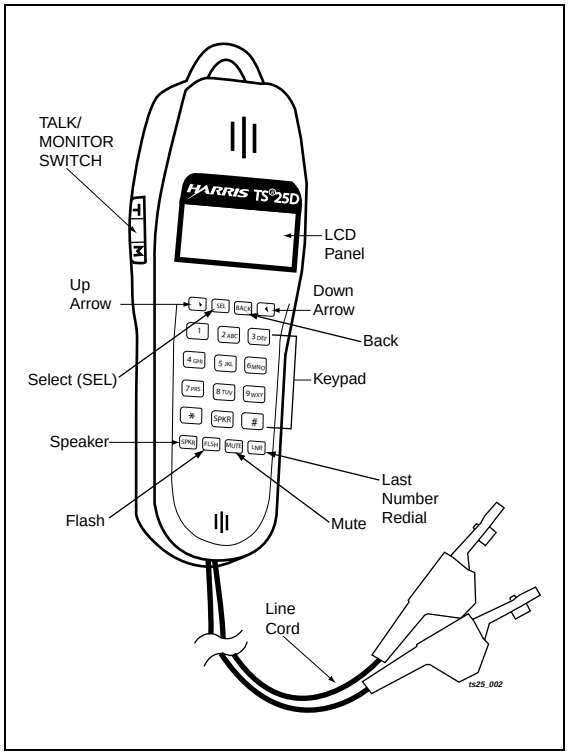

Figure 1. TS25D Test Set Illustrated

Line Cord

The test set is equipped with a field replaceable line cord. The line cord is attached to the test set at the transmitter end of the test set (see Figure 1).

For information on availability of replacement line cords, contact your local Harris authorized distributor.

Battery

The test set provides a battery compartment which makes battery replacement a simple procedure.

Note: *If the test set fails to operate properly at any time, first replace the battery and retest before sending the test set in for repair.*

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

When the Battery icon becomes empty, the battery, and thus the test set has anywhere from a few hours to several days of life remaining depending on how the test set is used. The battery will be used up much faster if the Talk Battery function or the loud speaker is used.

See Maintenance, Battery Replacement for instructions on changing the battery.

If the test set stops working, replace the battery. If it still doesn't work, contact Harris Professional Services at (800) 437-2266.

Loudspeaker

The TS25D is equipped with a loudspeaker allowing hands-free listening in both Talk and Monitor Mode. Pressing the **SPKR** key will turn the loudspeaker ON. Pressing the **SPKR** key again will increase the speaker's volume. Pressing the **SPKR** key a third time will turn the speaker OFF. Be sure the test set is not near your ear when you turn on the loudspeaker, as the volume can be quite loud.

Headset

On the TS25D Test Set, an audio jack is available for the connection of a headset. The 3.5 mm jack is located on the side of test set. The TS25D Kit (Model 25501-109) comes with a headset.

For information on availability of additional headsets or replacement headsets, contact your local Harris authorized distributor.

Belt Clip

An optional battery door with belt clip is available for those who are interested. For information on availability of the optional belt clip, contact your local Harris authorized distributor.

Keys and Icons

Table 1 describes the actions of the various keys. Figure 2 shows the icons used on the TS25D Test Set and Table 2 describes the icons.

Table 1. TS25D Test Set Keys

Key	Description
Up/Down Arrow	On the LCD, the **Up** (▲) arrow key moves the cursor up or to the left. The **Down** (▼) arrow key moves the cursor down or to the right.
SEL	The **SEL** key is used to select the highlighted menu entry. The SEL key allows the user to enter the menu from either Talk or Monitor modes.
BACK	The **BACK** key allows the user to go backwards through the menus. The Toner and Talk Battery functions are turned off by pressing the BACK key.
Numeric Keypad	The numeric keypad (see Figure 1) is used to dial telephone numbers and make function selections. The numeric keypad includes 12 standard dialing keys including the asterisk (*) and the pound (#) keys.
SPKR	The Speaker key is labeled **SPKR**.
FLASH	The **FLASH** key causes a timed interruption of the loop current to occur. Hook flashing is commonly used for call waiting functions on residential lines. Some PBX setups or telephone office switches may use this signal to put a call on hold or to activate some special function. The **FLASH** key is also used to enter a pause when entering telephone numbers in the TS25D's Phonebook.
MUTE	The **MUTE** key is used to mute the microphone. To mute the microphone (handset or headset), press and release the **MUTE** key. Press it again to unmute.
LNR	To redial the most recently dialed number, take the test set off-hook and press LNR.

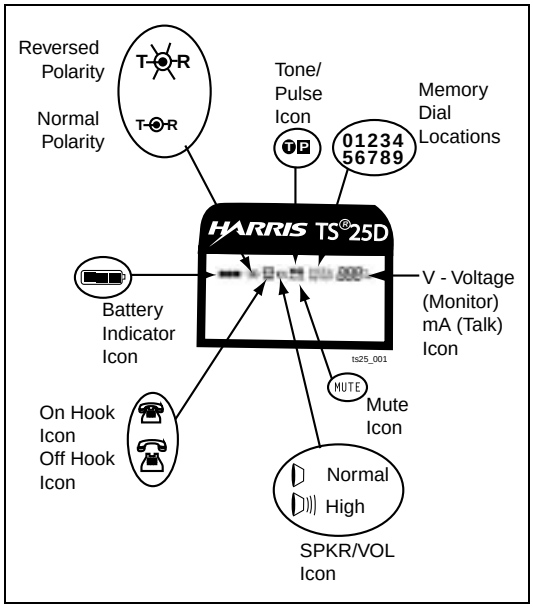

Figure 2. TS25D Test Set Icons

Table 2. TS25D Test Set Icons

Icons	Description
Polarity	When the test set, in Monitor or Talk mode, is connected to a line with DC voltage, one of the two Polarity icons is automatically displayed to indicate the DC polarity of the line. The Tip-Ring icon with no X indicates the red test lead is connected to the Ring (negative) side of the line and the black test lead is connected to the Tip (positive) side of the line. When the Tip-Ring polarity icon has an X through it, the test leads are reversed; that is, the red test lead is

Table 2. TS25D Test Set Icons (Cont'd)

Icons	Description
Polarity (Cont'd)	connected to the Tip (positive) side and the black test lead is connected to the Ring (negative) side. Nothing is shown when the leads are disconnected or the line is not powered.
Battery	The battery condition is indicated to the user through the use of a battery icon. The battery level is continuously displayed in either Monitor or Talk mode.
On/Off Hook	The test set displays a telephone near the upper center of the LCD screen that indicates when the test set is on or off hook. The telephone's receiver lifts up when off-hook.
Mute	When the mic is muted, the word MUTE appears in the upper center of the LCD screen.
Tone/Pulse	Tone mode is represented by a T at the top of the LCD screen. Pulse mode is represented by a P at the top of the LCD screen.
Speaker Volume	A speaker icon is displayed on the LCD screen when the speaker is on.
Memory Dialing	The TS25D Test Set allows the storage of 10 numbers in ten memory locations (0 through 9). The number of the active memory location is represented by a number icon located at the top center of the LCD screen.

Table 2. TS25D Test Set Icons (Cont'd)

Icons	Description
Line Voltage and Current Measurement	The TS25D measures the voltage across Tip and Ring when the test set is on-hook. It displays the Voltage with the V icon in the upper right-hand corner of the LCD screen. The test set measures the current it draws from the line when off-hook and displays the result with the mA icon in the upper right-hand corner of the LCD screen. Voltmeter Range: 0 - 250 Vdc Current Meter Range: 0 - 120 mA

OPERATION

The test set has two basic modes of operation: Talk mode and Monitor mode.

CAUTION:
When testing circuits which are close to a battery source, the pops in the handset receiver that result from clipping onto a line may be quite loud. Although there is protection against acoustic shock built into the test set, if the receiver is held tightly against the ear, acoustical shock may occur.

Monitor Mode

Monitor mode primarily 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 signaling if present. The test set draws no direct current from the line and it transmits no signals to the line. Also, in Monitor mode, the TS25D monitors for high-speed data signals on the line. If the test set detects data it will display DATA DETECTED on the LCD. If there is no high-speed data on the line, the LCD will display NO DATA.

In the Monitor mode, the test set is typically used to perform 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.
- Performing a test for the presence of high frequency data on the line.
- Measuring the DC voltage from Tip to Ring.
- Detecting DTMF signals.
- Monitoring line polarity.

The TS25D will respond to incoming ringing signals when it is in Monitor mode. It does not detect ringing signals when it is off.

Talk Mode

When the TS25D is connected to a working analog telephone line and is switched to Talk mode, the test set will go off-hook and draw dial tone. An off-hook TS25D works like a standard telephone. When off-hook, the TS25D is used to perform its main purpose, which is to verify the proper operation of analog voice telephone lines or to establish temporary communications on a "borrowed" pair.

In both Talk and Monitor mode you can change the receiver's volume level by pressing the Up or Down arrow keys.

Each time the TS25D is switched to Talk mode, it quickly tests the line for high-speed data and for DC voltage before it goes off-hook. If there is no high-speed data on the line, and there is enough DC voltage to go off-hook on (>3V), the test set will go off-hook without you ever noticing that the tests have been performed. Occasionally you may run into the situation where you have accidentally connected to a line carrying high-speed data or where you have connected to a line with either too little or too much DC voltage to go off-hook on. The data and voltage tests are designed to detect these conditions and are discussed in the following sections.

Data Lockout

When the TS25D is switched to Talk mode, it tests the line for high-speed data signals and for DC voltage before it goes off-hook. If data is detected in the frequency band from 20kHz to about 1 MHz, the test set will refuse to go off-hook and the LCD will display DATA DETECTED, DOWN ARROW TO OVERRIDE. This mode is called Data Lockout mode. In the Data Lockout mode, the test set is kept on-hook, "locked out", despite having been switched to Talk Mode. Data Lockout Mode is provided to prevent accidental corruption of data transmissions while working in modern telecommunications cable environments that have a mix of analog telephone and data services. There is often no way to know by inspection or by audio monitoring if the wire pair you are connecting to is a high-speed data line or not. Most high speed data is above the human hearing range so listening to the line in Monitor mode may not allow you to identify it as a data line. If you see the DATA DETECTED message, chances are you have accidentally connected to a data line. If so, disconnect the test set from the line, being careful not to short the clip leads together in the process. If you have accidentally connected to a data line, do not press the DOWN ARROW TO OVERRIDE because "overriding" will cause the test set to go off-hook and take the data service down. In some situations you may want to go off-hook. The next section covers this.

Data Lockout Override

CAUTION:
Shorting the Tip and Ring leads together while connected to a data line will cause disruption to the data.

Whenever you try to go off-hook on a high-speed data line, the TS25D Test Set will go into Data Lockout mode and will refuse to go off-hook. This is to protect data services, most of which would be corrupted by loading the line with the low impedance of an off-hook

telephone. But ADSL (Asymmetrical Digital Subscriber Line) is a different circumstance. ADSL is a high-speed data service intentionally designed to co-exist on the same wire pair as standard analog telephone service. If you try to go off-hook on a wire pair carrying both ADSL and analog telephone service, the TS25D Test Set will detect the ADSL data signal and go into Data Lockout mode as it would on any data line. You will see the message DATA DETECTED, DOWN ARROW TO OVERRIDE. Now, if you want to go off-hook to access the analog phone service sharing the line with ADSL, press the down arrow as instructed on the LCD. The TS25D will override the lockout, will go off-hook and draw dial tone without disturbing the co-existing ADSL service. The TS25D Test Set has circuitry that protects the ADSL service when it is off-hook. Going off-hook on ADSL lines is the most common use of Lockout Override.

There is another case where the override function may be needed. You may encounter the rare circumstance where the analog telephone line you connect to is not carrying any data but there is enough high frequency noise on the line that theTS25D Test Set thinks there is high-speed data on the line. If you know you are connected to such a line, use the Lockout Override function to go off-hook. This usually only happens when the telephone line is near a commercial AM radio broadcast antenna.

There is a provision for turning the data lockout function off. When Data Lockout is turned off, the test set will go off hook on a powered line when switched to Talk (T), even if data is present. Whe Data Lockout is off, the test set will still detect data in Monitor mode. To learn how to turn Data Lockout on and off, refer to the System Configuration section.

High Voltage Lockout

CAUTION:
Do not short the test set leads to each other while it is connected to a line carrying high voltage.

The TS25D Test Set is designed for use in environments where analog voice lines co-exist with lines that carry high DC voltages. When the TS25D Test Set is switched to Talk mode, it tests the line for high-speed data and it measures the DC voltage on the line before it goes off-hook. If the DC voltage exceeds 140 V, the TS25D Test Set will prevent itself from going off-hook and will display HIGH VOLTAGE LOCKOUT. Going off-hook on a line carrying a high DC voltage can damage the power supply feeding the line. The test set will prevent this from occurring. Unlike the data lockout, there is no provision for the operator to override a high voltage lockout. Lines with voltages exceeding 140 Volts DC do not carry analog voice services. If you encounter a high voltage lockout, switch the Talk/Monitor switch back to Monitor (M) and carefully remove the test leads from the line.

Low Voltage Lockout

Each time the TS25D Test Set is switched to Talk mode, it tests the line for high-speed data signals and it measures the DC voltage on the line before it goes off-hook. If there is less than 3 Volts on the line, there is not enough voltage for the test set to go off-hook and the LCD will display LOW VOLT LOCKOUT, DOWN ARROW FOR TALK BATTERY. The Low Voltage Lockout message is an indication that there is very little or no voltage on the telephone line — not enough voltage for the test set to perform off-hook operations. The most common cause of this message is when the test set is switched to Talk mode and it is either not connected to anything or it is connected to an un-powered pair of wires (dry loop). In this state you have the option of activating the TS25D Test Set's Talk Battery function.

There is one additional line condition that should be mentioned. When the test set, connected to a line carrying data signals but no DC voltage, is switched to Talk mode, the LCD will display DATA DETECTED AND LOW VOLT LOCKOUT. Some data services have no associated DC voltage. The low impedance of the TS25D Test Set's off-hook state would corrupt these types of services. Thus the test set does not have any provision to override the lockout when this line condition is encountered.

In any of the test set's lockout states, removing the test set from the line condition that is causing the lockout automatically clears the lockout condition.

Talk Battery

The TS25D Test Set has the ability to power a dry telephone wire pair to enable voice communications between itself and another test telephone connected to the other end of the pair. After turning on Talk Battery at your end, the person at the other end should take his test set off-hook. If the test set at the other end has talk battery capability, it should not be enabled.

The Talk Battery function provides:

- Communications capability on 26 gauge wire pairs up to about 1000 feet, longer on larger gauges.
- A continuity test.

When Talk Battery is active, the LCD displays LINE = SHORTED if the test set is connected to a short circuit of 0 ohms to about 100 ohms.

To enable Talk Battery:

1. Connect the test set to a dry pair.
2. Switch the test set to the Talk (T) position.
3. Press the down arrow when the message LOW VOLT LOCKOUT, DOWN ARROW FOR TALK BATTERY appears.

Note: The Talk Battery function will use up your 9V battery more quickly than other TS25D functions.

Caller ID/Call Waiting ID

The TS25D Test Set will detect and display both on-hook and off-hook caller ID messages. This is useful for verifying that a customer's Caller ID service is working properly. Caller ID (CID) messages are received when the receiving telephone is on-hook. Call Waiting ID (CIDCW) messages are received when the receiving telephone has already established a call to a second party and a third party places a call to your line.

To perform Caller ID detection:

1. Connect the test set to Tip and Ring of the customer's phone line. Either remove the customer's phone from the line or leave it on-hook.

2. Switch the test set to the Monitor (M) position. If there is another line in the building, call from that line to the line the test set is connected to, or arrange for someone to call the line the TS25D Test Set is connected to. When the call comes in, you will hear the first ring, and then the received Caller ID message will be displayed on the test set's LCD.

Performing Call Waiting ID is a little more complicated:

1. Connect the test set to Tip and Ring of the customer's phone line. Either remove the customer's phone from the line or leave it on-hook.

2. Switch the test set to the Talk (T) position and establish a voice call to a second party.

   If there is another line in the building, call from that line to the line the TS25D Test Set is connected to, or arrange for someone to call the line the test set is connected to. When the call comes in, you will hear the Call Waiting Alert tone. This will be followed by the CAS tone and the Caller ID message. When the Caller ID message is received by the test set it will be displayed on the LCD.

If the received Caller ID message has errors, the TS25D Test Set will display LINE ERROR.

Toner

The Toner function is useful when tracing the routing of a pair of wires. When the Toner is activated, the TS25D Test Set generates a tone onto the wire pair the test set is connected to. The routing of the wire pair can then be traced by using an inductive Tone Probe to pick up the tone.

To use the Toner:

1. Connect the test set to the pair of wires you want to trace.

2. Switch the test set to the Monitor (M) position.

3. Press the **SEL** button once to activate the test set's menu.

4. Use the Down arrow key to scroll the cursor down to the TONER entry.

5. Press the **SEL** key. The Toner will be activated and the LCD will display **TONER ACTIVE**.

To turn off the Toner press the **BACK** key.

If you accidentally connect to a data line, when you try to turn on the Toner you will get a message **DATA DETECTED TONER NOT AVAILABLE**. Remove the test set from the line.

The Toner on the test set is intended for use on dry (un-powered) pairs of wire. Before turning on the Toner, verify that the wire pair you are connected to is not carrying DC voltage by checking the test set's voltmeter in the upper right corner of the LCD. The Toner is only available when the TS25D Test Set is in Monitor mode.

DTMF Detection

The TS25D Test Set allows the user to capture DTMF tones generated on a telephone line by telephones, fax machines, modems or any other DTMF generating device. This feature is useful when you suspect the customer's telephone equipment is not generating proper DTMF signals.

1. Connect the TS25D to Tip and Ring of the line under test.
2. Switch the test set to the Monitor (M) position.
3. Put the customer's telephone in tone dialing mode and take it off-hook.
4. Dial a number on the customer's phone. The number dialed will be detected and displayed on the test set's LCD.
5. Verify that the number on the LCD is the same as the number you dialed.

The TS25D Test Set will detect and display the DTMF tones for 0-9, ✻, #, A-D.

To clear the LCD screen, switch the test set Off, and then back to Monitor mode. DTMF detection is only available when the TS25D Test Set is in Monitor mode.

Using Your Test Set

Note: Remove the protective film that covers the LCD display before using your test set.

Originating a Call

To originate a call:

1. Clip the test set to Tip and Ring of a powered subscriber loop.
2. Switch the test set to the Monitor (M) position and listen to the line to verify it is idle.
3. If not idle, disconnect the test set from the line.
4. If the line appears to be idle, switch the test set to the Talk (T) positions.
5. If no data is detected, the test set will go off hook.
6. If high-speed data is detected, the test set will not go off hook (will lockout) and will display DATA DETECTED, DOWN ARROW TO OVERRIDE, indicating the presence of data. Try another line or you can override the data lockout (see Data Lockout Override).
7. The numeric keypad, LNR key, or memory dialing may be used to dial a number for originating a call.

To disconnect a call, switch the test set off, or to monitor, or remove the clip leads from the line.

Answering a Call

To answer an incoming call:

1. Place the test set in Monitor mode to respond to incoming ringing signals.

2. If a ringing signal is received, switch the test set to the Talk (T) position. The test set automatically tests for high-speed data on the line.

3. If no data is detected, the test set will go off hook.

4. If data is detected, test set will lock out and display the message DATA DETECTED, DOWN ARROW TO OVER-RIDE.

5. To go off hook with data present you can override the data lockout (see Data Lockout Override).

To disconnect a call, switch the test set off, or to monitor, or remove the clip leads from the line.

Last Number Redial

If a call is not successful and you wish to redial the same number, do the following:

1. Switch the test set off, then move the slide switch to the Talk (T) position.

2. After the test set goes off-hook press the **LNR** key. The last number dialed will be automatically redialed.

The last number redial function is available in either the Pulse or Tone Mode. The method of dialing is not stored with the number. The redial memory has a 23-digit capacity.

In Tone Dialing mode, the dialing keys that are permitted to be stored in LNR memory include 1,2,3,4,5,6, 7,8,9,0,✻, and #. If the star (✻) and pound (#) keys are pressed in pulse mode they will be ignored.

Memory Dialing

The TS25D Test Set allows the user to dial pre-programmed numbers in either Tone or Pulse mode. If dialing in Pulse mode and the stored number contains an asterisk (✻) or pound (#) symbol, the digits will be ignored.

To activate Memory Dialing:

1. Connect the test set to a working telephone line and go off-hook by moving the slide switch to the Talk (T) position.

2. Press the **SEL** key. The Main menu is displayed.

3. At the Main menu, highlight **CALL PHONEBOOK** with Up/Down arrow keys, then press the **SEL** key. The list of phone book entries is displayed. Pressing the Up/Down arrow keys allows you to scroll through all locations (0 through 9). The small number in the upper right of the LCD tells you which memory location you have selected.

4. Select the desired phonebook entry with Up/Down arrow keys, then press **SEL** key, or enter a number (0 through 9) on the keypad. The number is automatically dialed.

Memory Programming

Each memory location will store a phone number up to 23 digits in length. If you enter more than 23 digits only the first 23 will be remembered.

To store a new phone number:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. Press the **SEL** key.

3. When the Main menu is displayed, highlight **EDIT PHONEBOOK** with Up/Down arrow keys, then press the **SEL** key. The list of phonebook entries is displayed. When you scroll through the entries, the number in the upper right of the screen indicates which one of the 10 memory locations you have selected. If you have no Phonebook entries or if you are viewing this screen for the first time, it will be blank.

4. Select an empty memory location (0 through 9) with the Up/Down arrow keys then press the **SEL** key, or use the number keys. A list of Phonebook editing options appears.

5. Highlight **1** - **EDIT NAME** and press the **SEL** key.

6. The screen will change to **NAME**. Enter the name you want to assign to this Phonebook entry using the test set's keypad. Example: The **2** key gives you four possible characters: **A**, **B**, **C**, and **2**. If you press the **2** key once, the letter **A** is entered at the cursor's location. If you rapidly press the **2** key three times, the letter **C** is entered. If you rapidly press the **2** key four times, the number **2** is entered. After entering the desired character, wait a moment for the cursor to move one space to the right then enter the next character. Enter the remaining characters in the same manner. The asterisk key (*****) provides a space on the first press and an asterisk on the second press. The **1** key provides **&**, dash (**-**), forward slash (***/***), quote (**'**), period (**.**), or **1** depending on how many times you press the key**.** Use the Up arrow to erase characters. In this case, the Up arrow moves the cursor to the left.

7. After the entry is complete, press the **SEL** key to save the entry and return to the list of editing options.

8. Highlight **2** - **EDIT NUMBER** and press the **SEL** key or press the **2** key.

9. The screen will change to **NUMBER**. Enter the phone number using the test set's keypad. This time pressing a dialing key will cause the number on the key to be entered. Use the Up arrow to erase characters. In this case, the Up arrow moves the cursor to the left.

   On the **Number** screen, the **FLASH** key changes its normal meaning and becomes the **PAUSE** key. As you enter numbers into memory, if you press the **FLASH** key, a pause is entered at the cursor location. A comma is used to represent a pause. Pauses are used to put time delays into a string of numbers. The default pause duration is 4 seconds.

10. After the entry is complete, press the **SEL** key to save the entry and return to the list of editing options.

11. Press the **BACK** key twice to return to the Main menu, or press it three times to return to the main operating screen.

To edit an existing stored number:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. Press the **SEL** key.

3. When the Main menu is displayed, highlight **EDIT PHONEBOOK** with Up/Down arrow keys, then press the **SEL** key. The list of phonebook entries is displayed. When you scroll through the entries, the number in the upper right of the screen indicates which one of the 10 memory locations you have selected. Pressing the Up/Down arrow keys allows you to scroll through all locations (0 through 9).

4. Move the cursor to the memory location you wish to edit and press the **SEL** key.

5. If you want to edit the name in the phonebook, highlight **1** - **EDIT NAME** and press the **SEL** key.

6. The screen displays **NAME** and the text entry previously stored in this location. Modify the text using the Up arrow to erase text and the test set's keypad to enter new text. Example: The **2** key gives you four possible characters: **A**, **B**, **C**, and **2**. If you press the **2** key once, the letter **A** is entered at the cursor's location. If you rapidly press the **2** key three times, the letter **C** is entered. If you rapidly press the **2** key four times, the number **2** is entered. After entering the desired character, wait a moment for the cursor to move one space to the right then enter the next character. Enter the remaining characters in the same manner. The asterisk key (**✳**) provides a space on the first press and an asterisk on the second press. The **1** key provides **&**, dash (**-**), forward slash (***/***), quote (**'**), period (**.**), or **1** depending on how many times you press the key. Use the Up arrow to erase characters. In this case, the Up arrow moves the cursor to the left.

7. After the entry is complete, press the **SEL** key to save the entry and return to the list of editing options.

8. If you want to edit the number, highlight **2** - **EDIT NUMBER** and press the **SEL** key.

9. The screen will change to **NUMBER** and will display this memory location's existing phone number. Modify the number using the Up arrow to erase numbers and the test set's keypad to enter new numbers. In this screen, pressing a key will cause the number on the key to be entered.

   On the **Number** screen, the **FLASH** key changes its normal meaning and becomes the **PAUSE** key. As you enter numbers into memory, if you press the **FLASH** key, a pause is entered at the cursor location. A comma is used to represent a pause. Pauses are used to put time delays into a string of numbers. The default pause duration is 4 seconds.

10. After the entry is complete, press the **SEL** key to save the entry and return to the list of editing options.

11. Pressing the **BACK** key three times will take you back up through the menu selections to the main operating screen.

The Edit function will timeout after 15 seconds of inactivity.

To delete a phonebook number:

1. Move the cursor to the desired memory location, using the Up/Down arrow keys, then press the **SEL** key to select.

2. Move cursor to **DELETE ENTRY** using Up/Down arrow keys and press the **SEL** key, or enter **3** for **DELETE ENTRY** on the keypad.

3. Press the **SEL** key to delete the entry and exit from the field.

4. Press the **BACK** key to return to the Main menu.

The Delete function will timeout after 15 seconds of inactivity.

Call List

The TS25D retains the latest 3 outgoing and latest 3 incoming phone numbers in its CALL LIST. Incoming numbers are recorded when Caller ID messages are received. Outgoing numbers are recorded when you dial a number. The most recently received number is always put on top of the list and the other numbers are pushed down. The Call List is available for viewing when the test set is on-hook. You can view and dial from the Call List when the test set is off-hook. To use the Call List:

1. Move the slide switch to the Talk (T) position.

2. Press the **SEL** key. The Main menu is displayed.

3. Highlight the **CALL LIST** option with Up/Down arrow keys, then press the **SEL** key.

4. Highlight **INCOMING** or **OUTGOING** with Up/Down arrow keys, then press the **SEL** key, or press either **1** for **INCOMING** or **2** for **OUTGOING**.

5. Once the incoming or outgoing list is displayed, you can highlight the desired number with the Up/Down arrow keys. Each list is limited to three entries.

6. If the TS25D is off-hook, press the **SEL** key to dial the selected entry.

Test Set Configuration

This section tells you how to access the menu items that allow you to configure the operation of the test set.

Settings

To access the Settings screen:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. Press the **SEL** key.

3. At the Main menu, Highlight **SETTINGS** with the UP/Down arrow keys and press the **SEL** key. You will see a sub-menu with the following three selections: **TONE/ PULSE**, **TIMING** and **SYSTEM CONFIGURATION**. These menu items provide access to the selections for configuring the test set.

Tone/Pulse Dialing

To set Tone or Pulse dialing:

1. At the Main menu, highlight **SETTINGS** with Up/Down arrow keys, then press the **SEL** key.

2. Highlight **Tone/Pulse** with Up/Down arrow keys, then press the **SEL** key, or press **1** on the keypad.

3. Press either **1** for **TONE** or **2** for **PULSE**. When the selection is made, the user is returned to the Settings screen. The Tone or Pulse icon is displayed at the top of the screen (see Figure 2).

Timing

Using the Timing option on the Settings screen, the user is able to set the Pause duration and the Flash duration.

Pause Duration

To set the Pause duration:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. From the Settings screen, highlight **TIMING** with Up/Down arrow keys, then press the **SEL** key, or press **2** on the keypad.

3. Press **1** - **PAUSE DURATION**.

4. Highlight the desired PAUSE seconds with the Up/Down arrow keys, then press the **SEL** key, or press one of the following keys on the keypad:

    a. **1** - 3 Seconds

    b. **2** - 4 Seconds

    c. **3** - 5 Seconds

The default pause length is 4 seconds.

Flash Duration

To set the hook flash duration:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. From the Settings screen, highlight **TIMING** with Up/Down arrow keys, then press the **SEL** key, or press **2** on the keypad.

3. Press **2** - **FLASH DURATION**.

4. Highlight the desired flash seconds with Up/Down arrow keys, then press the **SEL** key, or press one of the following keys on the keypad:

    a. **1** - 400 Msec

    b. **2** - 600 Msec

    c. **3** - 800 Msec

The default hook flash duration is 600 ms.

One flash shall be performed for each press of the flash key. Holding the Flash key down does not repeatedly flash the switch hook.

System Configuration

System Timeout

To conserve battery power, the TS25D has a System Timeout function that automatically puts itself to sleep if you forget to switch the test set off. You can set the amount of time that must expire before the test set goes into sleep mode. The test set will start its system timeout countdown after you stop actively using it. The default system timeout is 60 minutes. After the test set times out and shuts down, you can wake it up by switching the Talk/Off/Monitor switch to Off then to either Talk or Monitor.

To set the system timeout period:

1. Move the slide switch to the Talk (T) or Monitor (M) position.
2. From the Settings screen, highlight **SYSTEM CONFIGURATION** with Up/Down arrow keys, then press the **SEL** key, or press **3** on the keypad.
3. Press **1** - **SYSTEM TIMEOUT**.
4. Highlight the desired time with Up/Down arrow keys, then press the **SEL** key, or press one of the following keys on the keypad:
   a. **1** - 30 Min
   b. **2** - 60 Min
   c. **3** - NEVER

Speaker Timeout

The test set's loudspeaker, when turned on, uses more battery power than most other functions. To extend battery life, the test set has a loudspeaker timeout function. You can set the amount of time that must expire before the test set automatically turns off its loudspeaker. The test set will start its loudspeaker timeout countdown after you stop actively using it. The default timeout for the loudspeaker is 5 minutes. After the loudspeaker times out and shuts off, you can turn it back on by pressing the **SPKR** button.

To set the speaker timeout period:

1. Move the slide switch to the Talk (T) or Monitor (M) position.
2. From the Settings screen, highlight **SYSTEM CONFIG** with Up/Down arrow keys, then press the **SEL** key, or press **3** on the keypad.
3. Press **2** - **SPKR TIMEOUT**.
4. Highlight the desired time with Up/Down arrow keys, then press the **SEL** key, or press one of the following keys on the keypad:
   a. **1** - 2 Min
   b. **2** - 5 Min
   c. **3** - 10 Min

Data Lockout

The Data Lockout function is user programmable for either ON or OFF. The default setting is ON.

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. From the Settings screen, highlight **SYSTEM CONFIGURATION** with Up/Down arrow keys, then press the **SEL** key, or press **3** on the keypad.

3. Press **3** - **DATA LOCKOUT**.

4. Highlight the desired setting with Up/Down arrow keys, then press the **SEL** key, or press **1** for **ON** or **2** for **OFF**.

When data lockout is set to OFF, the test set will still detect data and will display DATA DETECTED, but it will not lockout.

Firmware Version

To view current Firmware version:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. From the Settings screen, highlight **SYSTEM CONFIG** with Up/Down arrow keys, then press the **SEL** key, or press **3** on the keypad.

3. Use the Down arrow key to scroll down to VERSION. Press **4** for **VERSION**. The version of software is displayed on the screen.

4. Use the **BACK** key to return to the previous menu.

Factory Settings

You can reset the TS25D Test Set to its original factory settings. If you do this, the factory settings will be restored and the entries in your Phonebook and the phone numbers in the Call Lists will be deleted. If you don't want to erase the Phonebook entries, don't execute this command. To reset the test set to its factory default settings:

1. Move the slide switch to the Talk (T) or Monitor (M) position.

2. Press the **SEL** key.

3. Select the **SETTINGS** screen and highlight **SYSTEM CONFIGURATION** with the UP/ Down arrow keys and press the **SEL** key.

4. Use the Down arrow key to scroll down to **FACTORY RESET** and then press the **SEL** key.

5. The screen will display **PRESS LNR TO RESTORE FACTORY SETTINGS**. If you are sure you want to restore the factory default settings then press the **LNR** key. If you do not want to restore the factory settings, press the **BACK** key.

MAINTENANCE

WARNING:

- *To avoid electric shock, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so.*

- *Disconnect clips from any metallic connections before performing any maintenance.*

CAUTION:

Do not use CRC Cable Clean® or any similar chlorinated solvent on the TS25D Test Set. Doing so will damage the test set.

If moisture should get inside the test set, let the test set dry at normal room temperature for 24 hours. DO NOT HEAT THE TEST SET. Moisture can provide a leakage path that may conduct hazardous voltages to you. DO NOT USE the test set if wet.

Keypad Care

Daily use of your test set results in various liquids, dirt, and other foreign material building up in your keypad. The keypad may be cleaned by using a soft toothbrush with soap and water. Do not use a petroleum-based or chlorinated cleaning agent as it will harm the keypad. Let the test set dry before using!

Battery Replacement

CAUTION:
Handling batteries should be done with care. Do not allow the terminals to be shorted together. Dispose of battery properly to ensure contacts cannot short. Disposal may be restricted by local laws.

To replace the battery (see Figure 3):

1. Turn the test set off.
2. Place the test set on a work surface, face down. The work surface should be non-abrasive.
3. Using a Phillips screwdriver, remove the single cover screw attaching the battery door cover to the back of the test set.

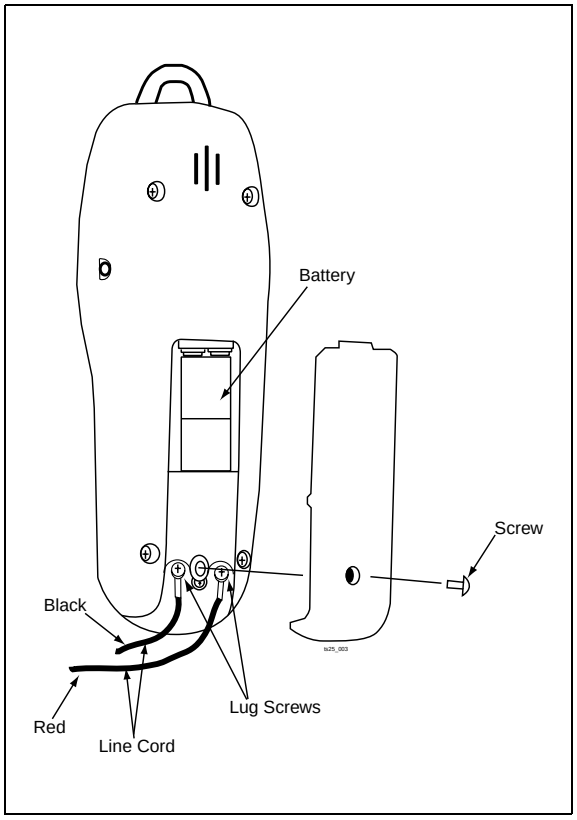

Figure 3. Battery and Line Cord Replacement

4. Remove the battery door cover and the old 9 Volt battery from the test set. Properly discard the battery.
5. Insert a new 9 Volt battery. Make sure the polarity is correct.

Note: *Do not over tighten screw. Over tightening will strip the plastic.*

6. Replace the test set's battery door cover on the test set and secure with single cover screw. Do not over tighten the screw.

Line Cord Replacement

WARNING:
Disconnect from telephone network when replacing line cord.

A worn out or damaged line cord can be replaced by the user. To obtain a replacement line cord contact your local distributor or Harris Corporation at the location given in the Warranty Section.

To replace the line cord (see Figure 3):

1. Turn the test set off.
2. Place the test set on a protected work surface, face down.
3. Using a Phillips screwdriver, remove the single cover screw attaching the battery door cover to the back of the test set.
4. Remove the battery door cover.
5. Loosen the two screws that hold the line cord to the PCB.
6. Using needle nose pliers or one of the line cord clips, remove the two screws and washers from the line cord connectors.
7. Position the screw lugs of a new line cord on the PCB. Make sure the crimp barrel offset side of the screw lugs is up (see Figure 4) and that the line cord screw lugs are flush against the PCB.

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

8. Fasten the red wire lug to the PCB (Ring) with screw and washer (see Figure 3).
9. Fasten the black wire lug to the PCB (Tip) with screw and washer (see Figure 3).

Note: It is important to install the red and black wires as shown in Figure 3 so the polarity icon will work correctly.

10. Push both line cord wires down into the notch in the case.

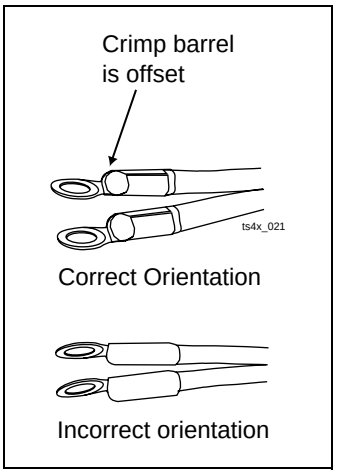

Figure 4. Orientation of Line Cord Screw Lugs

11. Replace the test set's battery door cover on the test set and secure with single cover screw. Do not over tighten the screw—damage to the test set could occur.

Warranty

Harris Corporation agrees to warranty its products are free from defects in material and workmanship for the following periods:

- TS25D Test Set – 18 months from date of manufacture.
- Line Cords and Accessories – 90 days from date of purchase.

THIS WARRANTY CONSTITUTES THE SOLE AND EXCLUSIVE WARRANTY FOR PRODUCTS SOLD BY HARRIS CORPORATION, NETWORK SUPPORT DIVISION, AND IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING THE WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL HARRIS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF ANY PRODUCT OR FROM ANY OTHER CAUSE.

THIS WARRANTY SHALL NOT APPLY TO PRODUCTS WHICH HAVE BEEN SUBJECTED TO MISHANDLING, ABUSE, MISUSE, NEGLIGENCE, OR ACCIDENT, NOR TO PRODUCTS WHICH HAVE BEEN MODIFIED, ALTERED, OR REPAIRED BY PERSONNEL NOT AUTHORIZED BY HARRIS.

Non-Warranty

Out-of-warranty maintenance, service, or repair of products is available from the Harris Corporation, Network Support Division, on a time and materials basis. In addition, Harris offers for sale some replacement components. Harris Corporation recommends that out-of-warranty service and repair of electronic products be completed at its Harris Corporation Network Support Division, facility or authorized representative. Contact Harris Repairs for the location of the Harris authorized repair facility nearest you.

Return of Equipment

The return of any products for credit, other than for warranty service, is done at the sole discretion of Harris Corporation. Before any product is returned, including for warranty service, a Return Authorization (“RA”) number must be obtained from the Customer Service Department by calling (800) 437-2266. If the RA number is not clearly marked on the shipping label, the package will not be accepted by Harris. All authorized returns must be shipped, with shipping charges prepaid, fob destination, and addressed as follows:

Harris Corporation
Network Support Division
809 Calle Plano
Camarillo, California 93012-8516
United States of America
Attn: Customer Service, RA# xxxxx

SPECIFICATIONS

Table 3 lists the specifications for the TS25D Test Set.

Table 3. Specifications

Parameter	Working Limits
ELECTRICAL	
Return Loss	>14 dB (ref 600 ohms)
Current Range (Off-Hook)	10 to 100 mA
DC Resistance	
Off-Hook	150 Ω nominal
On-Hook	>1 MΩ
AC Impedance	
Off-Hook	600 Ω nominal; 300-3400 Hz
On-Hook	>120 kΩ; 300-3400 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	–1.5 dBm combined (typical)
High versus Low Tone Difference	2 dB ± 2 dB
Memory Capacity	10 speed dial memories plus one last number redial memory

Table 3. Specifications (Cont'd)

Parameter	Working Limits
ELECTRICAL (Cont'd)	
Digit Capacity	23 digits per memory
Pause Duration	User programmable; default = 4 seconds
Hook Flash Duration	User programmable; default = 600 ms
Automatic Speaker Shut Off Duration	User programmable; default = 5 minutes
Battery	9 Volt Alkaline or Lithium battery
PHYSICAL	
Length	7.8 inches (20.0 cm)
Width	2.7 inches (6.8 cm)
Height	1.6 inches (4.0 cm
Weight	10 oz. (284 g)
ENVIRONMENTAL	
Temperature Range	Operating: 32° to 122°F (0° to 50°C) Storage: -40° to 150°F (–10 to 60°C)
Relative Humidity	5 to 95%

Notes:

1. Specifications subject to change without notice.
2. Legal requirements may exist regarding permission to connect equipment to a Telecom network operated by a public network operator.

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next level solutions

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