



# **Telephone Line Simulator TLS-5C and TLS-5D User's Manual**



40-400-00003, Rev. E

**Note**

This manual covers Models TLS-5A, TLS-5B, TLS-5C, and TLS-5D.

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## IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
8. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
9. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
10. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on the product.
11. To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified serviceman when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
12. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
  - A. When the power supply cord or plug is damaged or frayed.
  - B. If liquid has been spilled into the product.
  - C. If the product has been exposed to rain or water.
  - D. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
  - E. If the product has been dropped or the cabinet has been damaged.
  - F. If the product exhibits a distinct change in performance.

**SAVE THESE INSTRUCTIONS!**

## **COMPLIANCE INFORMATION**

**Part 15 Class A Notice:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

## Chapter 1: Overview

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This manual describes the Telephone Line Simulators TLS-5A, TLS-5B, TLS-5C, and TLS-5D which test Caller ID telephone sets and other telecommunications devices. The TLS-5B/5D operates on 230 VAC input power which make it ideal for international use. The TLS-5A/5C operates on 120 VAC input power and includes a power cord where the TLS-5B/D does not. See this chapter and Chapter 8, Electrical Specifications, for more information about differences between these models.

The TLS-5 Telephone Line Simulator offers a convenient means for setting up temporary “telephone line” connections to demonstrate or test equipment where actual central office lines are not easily available. It provides four simulated lines, two “talk paths” or connections, and an audio interface port, making the TLS-5 a versatile device for a variety of applications including:

- Demonstrating or testing telecommunications devices such as telephone sets, fax machines, and modems. Two simultaneous, independent conversations can be set up over the four lines.
- Playing prerecorded presentations over a line when the telephone handset is lifted (for example, at trade show or museum displays).
- As a teaching aid with the audio port configured to allow monitoring and/or recording of a telephone conversation (for example, when teaching children to use “9-1-1”).
- Testing telephone or key system installations.
- Caller ID and other CLASS features.

### Static Protection

Use standard precautions in discharging electrostatic buildup before operating this equipment or any other electrical equipment. The metal case is grounded through the AC power cord, touching the case will discharge any static, as long as the power source is properly grounded.

### Features

- Programmable operations:
  - Two phone numbers for each line
  - Caller ID
  - Dial up Test tones
  - Forced disconnect
  - Hot line (“ringdown”) number
  - Ring cadence 1-3 rings
  - Hunt groups
  - Immediate or dial access to audio port
  - Tone or recorded message when an invalid number is dialed
  - Monitor mode (allows recording phone calls for training use)
  - PBX-like operations: call transfer, conference, hook flash
  - Network timing adjustments

- Second dial tone simulates outside line access
- Tone following disconnect
- Provides four lines and two voice paths
- Portability and quick, convenient setup
- Accepts tone and rotary input
- Ringing voltage source with short circuit protection
- Added attenuation to simulate longer lines
- Non-volatile memory (battery not required)
- Generates precise call progress tones
- Ground reference jack
- -48 V ground referenced line voltage
- Audio port

### **Features added with upgrade from -01 to -02 firmware**

Upgrade option available for TLS-5A and TLS-5B only.

- Visual Message Waiting (Single & Multiple Message Format)
- Stutter dial tone operation with VMW and Test Number
- Call Waiting operation
- Selectable sequence for Caller ID message
- Name/Number rotation for Caller ID messages
- Programmable Date/Time and pseudo real time clock operation
- Selectable dial tone frequencies
- 17 Hz ring frequency selection
- Calling Party Control

### **TLS-5C-01 and TLS-5D-01 Features**

- SCWID (Spontaneous Call Waiting with caller ID) also known as CIDCW (Caller ID in Call Waiting)
- Distinctive Call Waiting
- Visual Message Waiting audible response option (Stuttered Dial Tone)
- Visual Message Waiting format selection (Single vs Multiple)
- Speed Dialing



- Automatic Callback
- Automatic Recall
- Three-Way Calling
- Call Forwarding
- Demonstration/Test Mode

### Basic Calling Operation

The TLS-5 provides dial tone (or Silence or Ringdown, see command 32) to a line when the telephone handset is lifted. When a rotary dialed or DTMF digit is detected, dial tone stops. If a number is misdialled, Reorder tone (or another programmable tone, see command 39) is sent to the caller or the caller is connected to the audio port (see command 31).

When a valid number has been dialed, ring back tone is sent to the caller and the called line rings (see command 11, 12 for numbers, 07 for Ring Type, and 23 for ring cadence). When the called line answers, ring back tone stops and a connection is established between the parties. When either party goes on-hook, the off-hook line receives 2 seconds (default, see command 9) of silence, followed by dial tone, or Cutoff on Disconnect. (See command 38, Forced Disconnect). Calling Party Control supports the operation that if the first party goes back off-hook, the connection to the other party will be re-established. If the Device Disconnect Timer (command 9) expires, the party will receive dial tone.

### Physical Description

The TLS-5 is a portable unit weighing just over 4 pounds. A detachable power cord is supplied with the TLS-5A and TLS-5C; it is not supplied with the TLS-5B and TLS-5D. As shown in Figure 1, the front panel provides four modular RJ-11 jacks for connection of the equipment to be demonstrated or tested, a multi function switch (see Table 1), and the LED indicators listed in Table 2. A 5-pin DIN jack on the back panel enables sending or receiving audio to/from any line. The audio is turned on or off by a software-driven relay. A fused, modular AC power jack and a chassis ground reference point are also located on the back of the unit.

For key telephone and PBX line testing, a modular/alligator clip cable can (Figure 5) enable the connection of lines from a terminal block to the TLS-5.

Table 1 Front Panel Switch Functions		
Position	Label	Functions
Top	MAN/RING	<p>Momentary contact position with multiple uses:</p> <p>(1) <b>Restore defaults:</b> Within 1 second of turning power ON, press and hold for 5 seconds to clear all programming and restore default options. Release after the POWER light turns ON.</p> <p><i>Caution: Do not use the MAN/RING feature at power up.</i></p> <p>(2) <b>Manual ring:</b> With Line 1 on-hook, press and hold to ring Line 1. Ringing continues until the switch is released.</p> <p>(3) <b>Programming mode:</b> With Line 1 off-hook, and all other lines on-hook, press and hold for 1 second to place the TLS-5 in programming mode.</p>
Center	ON	POWER ON (Press and release the top portion of the switch.)
Bottom	OFF	POWER OFF

## LED Operation

The table below explains how the six LEDs on the front panel operate and what the different blinking patterns indicate.

Table 2 LED Indicators		
Indicator	State	Description
Line 1—Line 4	ON	Line is off-hook
	Flashing (fast on/off)	Line is ringing
	Blinking (slow on/off)	Programming mode: Line is selected for programming
	Half brightness	During dialing, indicates that a valid DTMF digit is present
	Fast blinking between rings	Caller ID is being sent to the called phone number(FSK)
	Fast blinking	Visual Message Waiting transmission (FSK)
PWR	Slow blinking	Power is present and processor is running normally
AUDIO	ON	Audio control lead is on

## Chapter 2: Feature Applications

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### Two Numbers Per Line

Each of the four lines can be assigned two telephone numbers, each number a maximum of 16 digits long.

This feature may be used to program one number with a standard ring cadence and the other with a nonstandard ring cadence. You might also assign all lines the same second number in order to set up a hunt group or ring all telephones with one call.

Ring cadences on the second phone number can be varied, confirmation and error tones disabled, and audio port access blocked from certain lines. The TLS-5 is programmed by connecting a tone (DTMF) telephone to Line 1 and entering commands.

### Audio Port

The audio port can be configured for immediate or dial access or as a monitor, may allow single or multiple lines to be connected simultaneously, and can vary the method of turning off a recorded message. Audio from an external source may also be injected into the lines that are connected to the port.

### Distinctive Ringing

The ring cycle timing for the first number on each line is always the standard two seconds on, four seconds off. The ring cycle timing for the second number on each line is programmable. (See Programming.) This gives each line two different ring cycles; one for each of the line's numbers.

### Ring Type (frequency & wave shape)

This feature selects the RING frequency and waveshape. The options are for 17, 20 (default), 25, 30 or 60 Hertz and synthesized (default) sine or square wave.

### Group Ringing

With this feature you can simultaneously ring a group of phones, yet still be able to ring them individually. To use this feature, program different first numbers for each line, but the same second number for each line, and set hunt mode set to "ring all" and disable Caller ID for all four lines. As a result, dialing the first numbers will ring an individual phone (with standard ringing), and dialing the second number will ring all the phones simultaneously (with distinctive ringing.)

### Call Waiting Tones

This feature operates when a third caller dials a number that is already in use. The caller will hear ringing, the called party will hear a Call Waiting Tone. The called party may choose to either ignore the Call Waiting Tone, which will repeat once, 10 seconds after the original tone, or answer the waiting call by generating a flash hook. Subsequent flash hooks will alternate between the two

calls. Any additional callers will receive a busy signal. This feature is supported only when calling using the four lines, calls to Test Tones or the Audio port do not support Call Waiting tones. The TLS-5 supports the ability to Cancel Call Waiting, just like the telephone network, by dialing \*70 prior to dialing a telephone number. Call Waiting may also be turned on or off (see command 40) for each individual line. Additional Call Waiting functionality is available on the TLS-5C and TLS-5D models.

**Note:** Cancel Call Waiting does NOT work in conjunction with any other prefix functions, such as the special Caller ID codes or Visual Message Waiting. Call Forwarding is incompatible with Call Waiting.

### Caller ID

This feature sends identifying information about the calling number to the called number. This can include: the calling telephone number, the name in which that number is listed, the date, and the time of the call.

The amount of information that will display on the Caller ID device depends on how the feature is programmed. For example, if you have entered \*50#2#, the box will show the maximum amount of information: the calling number, name, date, and time of the call. (For more information, see command 50 in Chapter 6).

### Caller ID and Distinctive Ringing

Since there are circumstances, such as privacy blockage, an out of area call, or a transmission error, in which Caller ID is blocked, the TLS-5 simulates these events. (See command 50 in Chapter 6 and Caller ID Prefixes in Chapter 4 for more information.)

**Note:** If you change the distinctive ringing cycles, remember that a three-second silence is required for the Caller ID information to be sent.

### Caller ID with Simultaneous Calls

If two calls are made at the same time, the Caller ID is sent to the first line before the second line rings.

### Visual Message Waiting

Visual Message Waiting (VMW) is an on-hook signal that is issued to a line when there is a recorded message waiting to be picked up. The FSK signal typically turns on a visual indicator for the user to see. This feature is sent when the line number dialed is preceded by a \*50 (ON) or \*51 (OFF) dialing prefix. No ringing is sent to the called line, but the FSK transmission is sent. Also, a three burst stutter dial tone is heard on the line called until the caller dials the audio port number to simulate the pickup of a stored message.

### Compatibility with Caller ID Devices

Since there are a variety of Caller ID devices, the appearance of the information and the amount displayed may differ slightly. For example, the format of the date and time may be displayed differently.

Note the following items when using Caller ID equipment:

- 1) Some Caller ID devices cannot display the calling name and, therefore, do not accept the multiple message format (*default*). If this is the case with your device, use the single message format instead.
- 2) Caller ID will be sent during the first three-second silence in the ring cycle. If you change the distinctive ringing cycles, remember that a three-second silence is required for the Caller ID information to be sent. (If there is not at least a three-second silence, Caller ID will not be sent.)
- 3) Some Caller ID devices require a seven-digit telephone number. If this is the case with the device you are using, program the TLS-5 with seven-digit numbers.

### Invalid Number

You can program how the TLS-5 will respond to an invalid number. It can respond with busy tone, reorder tone, ring back tone, silence, or it can connect the calling line to the audio port. Regardless of the response you select, there will be a delay before the response is activated.

**If an invalid number beginning with any number other than “1” is dialed,** the TLS-5 will respond after seven digits have been entered or after eight seconds have passed.

-or-

**If an invalid number beginning with “1” is dialed,** the TLS-5 will simulate the telephone network’s delay by waiting until 11 digits have been entered or 8 seconds have passed since the last digit was entered.

### Simultaneous Calls with Invalid Numbers

If you program the TLS-5 to connect invalid numbers to the audio port, calls arriving when the audio port is already in use will get a reorder tone.

### Uses for Off-Hook Modes

A detailed explanation of command 32, Off-Hook Modes, is provided in Chapter 6.

### Standard Mode

This provides normal dialing features.

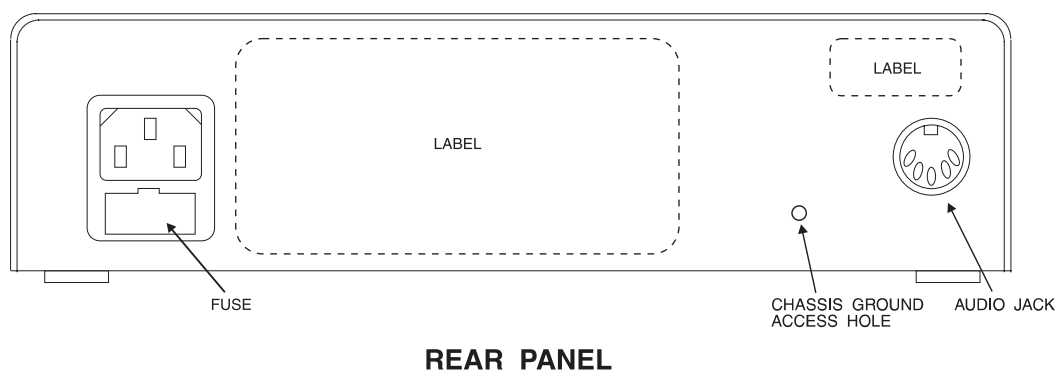
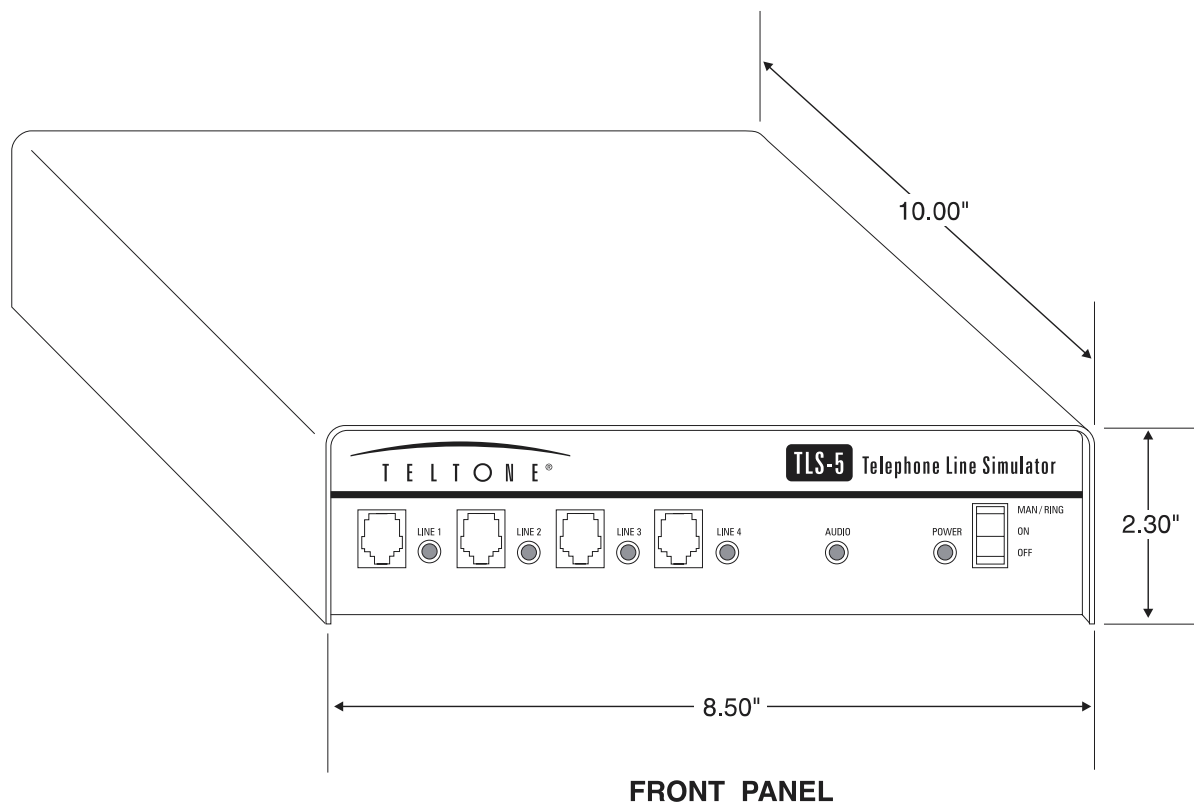


Figure 1 Telephone Line Simulator

### Hot Line Mode

Hot line mode is normally used to ring one phone automatically the moment you pick up another. To use this feature, program the off-hook mode for the line from which you will make the call as “hot line” (see Chapter 6 for details). Program the “revert/hotline” number to the first or second number of the line you wish to ring. When you go off-hook on the originating line, ring back will be heard, and the destination line will ring.

### Silent Mode

This mode can be used to provide silence when you go off-hook. To use this feature, program the off-hook mode for “silence”. Any or all of the lines can be used in this way.

### Uses for Hunt Mode

Hunt Mode, command 35, can be used to Simulate Trunk Groups/Telethons. Please see Chapter 6 for a detailed explanation of this command.

### Ring First/Ring Next/Ring All

When Hunt mode is set to “ring first available”, “ring all”, or “ring next” with multiple lines set to the same phone number, it simulates a group of lines with a single pilot number (like the trunks into a PBX system). “Ring first available” will always ring the lowest non-busy line. This will cause the lowest line to receive the most calls. “Ring next” will ring the next non-busy line in sequence above the last one to have rung. “Ring all” will ring all the lines until one goes off-hook.

Caller ID must be disabled (\*50#0#) for all lines if you use “ring all”. If Caller ID is active on any of the lines, the “ring all” command will be treated as the “ring first available” command. The secondary ring cadence should be programmed the same for all lines in the Hunt group when Caller ID is active.

## TLS-5C & TLS-5D Features

### SCWID or CIDCW

SCWID (Spontaneous Call Waiting with Caller ID) also known as CIDCW (Caller ID in Call Waiting) is a function that supports Caller ID after a Call Waiting Tone. This feature is invoked in the TLS-5C/D whenever a third party places a call to an existing call, if Caller ID is enabled and Cancel Call Waiting has not been enabled. The called party may then ignore the Call Waiting, or generate a Flash to place the first caller on hold, and answer the Call Waiting. If the called party ignores the first Call Waiting alerting sequence, it will be repeated once, ten seconds later. If the called party answers the Call Waiting, the party is allowed to alternate between callers using the Flash function. If one party hangs up, the remaining parties are automatically connected.

### **Distinctive Call Waiting tone**

Normal Call Waiting is a tone that informs a party that there is a call waiting. This tone is repeated a second time, ten seconds later, if the called line does not respond with a flash to answer the waiting call. The TLS-5C/D supports a new tone to inform the called party that a long distance caller is waiting. This Distinctive Call Waiting tone is a double beep compared to the normal single beep.

The TLS-5C/D supports “Cancel Call Waiting” on a per call basis. “Cancel Call Waiting” will not work in conjunction with any of the other prefix dialing features.

### **Visual Message Waiting audible response**

The TLS-5C/D can be programmed to provide one of three different audible responses when Visual Message Waiting is activated. The audible indication to a caller that a message is waiting at their Central Office voice mailbox is either:

- 3 burst then continuous dial tone (default)
- 10 burst then continuous dial tone
- continuous stutter dial tone

### **Visual Message Waiting Format**

The TLS-5C/D allows the format for Visual Message Waiting to be programmed as either single or multiple message. This is a Global command and affects all lines.

### **Speed Dialing                      1#   2#   3#   4#**

The TLS-5C/D allows the caller to dial any line using a speed dial number that is the line number followed by #. Dialing using this method will send the primary telephone number and name for Caller ID purposes.

### **Automatic Callback**

The TLS-5C/D supports the CLASS feature Automatic Callback (aka Busy Number Redial). This feature will call back to a busy line until it is free, and ring back to inform the caller with a distinctive ring that the line is no longer busy.

### **Automatic Recall**

The TLS-5C/D supports the CLASS feature Automatic Recall. This feature recalls the last number that was dialed to a line, whether or not the call was answered.

### **Three-Way Calling**

The TLS-5C/D supports the CLASS feature Three-Way Calling. This feature allows a user to establish a three-way conversation and control the call set up.



### Call Forwarding

The TLS-5C/D supports the CLASS feature Call Forwarding. This feature allows a user to forward a call to another line.

**NOTE:** Each line may have Call Forward activated, however, the TLS-5C/D will only process one call forward.

### Demonstration / Test Mode

A special demonstration or test mode is available in the TLS-5C/D. This will allow features that would normally require three telephones to demonstrate or test a feature to be accomplished with only two phones. For example, dial from Line 1 to Line 2 and establish a call, then Flash to invoke a Conference Call. When dial tone is returned, a call placed again to Line 2 will simulate a third party, causing a Call Waiting tone and (if enabled) a SCWID sequence to be generated.

## Chapter 3: Installation

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**Caution:** The TLS-5 generates up to 95 VAC ringing voltage. *Be sure the TLS-5 power switch is off before handling cord ends.*

### Step 1: Connect power cord

- Connect the AC power cord to the TLS-5 and to the wall receptacle. (A power cord is not supplied with the TLS-5B/D.)

### Step 2: Connect telephones

- Plug up to four telephones or other telecommunications devices into the line jacks on the TLS-5 front panel.

### Step 3: Turn on power

- Turn the TLS-5 power switch on.

### Step 4: Chassis ground (optional)

- If a chassis ground is required, plug a 0.080-inch diameter pin probe into the chassis ground reference Jack on the back panel. See Figure 1.

### Step 5: Audio port (optional)

- To generate or play a recorded tape message, refer to Generating a Tape, later in this chapter.

## Demonstrating Equipment

**Caution:** The TLS-5 generates 95 VAC ringing voltage. *Be sure the TLS-5 power switch is off before handling any cord ends.*

### To demonstrate equipment, do the following:

- With two devices connected to the TLS-5, place a call from one device to the other by dialing the number of the other device. The default numbers for Lines 1 through 4 are 101 through 104, respectively.

**Note:** If you wish, you can change the phone number for any line to any digit string from 1 through 16 digits by reprogramming the line as described in Chapter 6.)

- When the other line rings, answer the call. A connection should be established and equipment features can be demonstrated.
- When the call is completed, hang up both devices.

## Restoring Defaults

If your TLS-5 does not operate as expected, a previous user's feature programming may be the cause. To restore the unit to default operating conditions:

- Be sure all phones are on-hook, then toggle the front panel switch to OFF, then to MAN/RING and hold *until the POWER LED comes on*, then release.

*or:*

- Enter **\*\*99##** to access programming mode and enter: **\*00#0#\*00#0#**

## Installing Caller ID Equipment

- Follow the Caller ID device manufacturer's instructions, treating the TLS-5 as the telephone line.

## Testing Installations

The procedures below assume that the TLS-5 default settings have *not* been changed. If you have trouble with any of the following procedures, the TLS-5 may already be programmed.

### Testing key system and PBX lines

- Connect the TLS-5 lines to Tip and Ring of PBX or key system central office loop start trunks (E&M, DID, or ground start trunks *cannot* be tested with the TLS-5).
- If a ground reference is required, connect a 0.080-inch diameter pin tip probe to the chassis ground reference jack on the unit back panel (Figure 1).

Figure 5 shows the pin connections for the alligator clip cables used to connect TLS-5 lines to a terminal block. See Figure 4 in Chapter 5 for a generalized diagram of key system test connections.



**Caution** When ringing is applied, the Ring lead of the modular jacks carries up to 95 VAC referenced to ground (alternating polarity). *Be sure the TLS-5 power switch is off before handling any cord ends.*

## Chapter 4: Operation

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### Basic Dialing

To dial from one line to another, plug in a telephone device (telephone, modem, fax machine, etc.), then go off-hook and dial one of the telephone numbers associated with another line. The default primary line numbers are 101, 102, 103, and 104 for lines 1 through 4 respectively. The default secondary line numbers for lines 1-4 are 201, 202, 203, and 204. These numbers are programmable (see command 11 for the primary number and command 12 for the secondary number.) The primary numbers will ring at a standard 2 second on and 4 seconds off. The secondary numbers will ring at a distinctive ring cadence (see command 23), the default is 800 ms on, 400 ms off, 800 ms on, and 4 seconds off. The TLS-5C/D supports a Speed Dial feature that uses the line number plus # to dial.

### Setting up a conference call:

Flash detection (command 34) must be enabled (default) in order to set up a conference call or transfer a call by executing the steps below. If you are unable to add a third party or transfer a call, enable flash detection. If flash detection is disabled, a flash will be treated as a disconnect. Conference calls may be limited to three participants (Three-Way Calling/default/command 73) or all four lines may be conferenced if PBX conferencing is enabled.

#### Step 1: Connect devices

- Connect devices to at least three TLS-5 lines.

#### Step 2: Establish call

- Establish a call between two parties.

#### Step 3: Flash the line

- Press the FLASH button (if the telephone has one) or momentarily press the switch in the telephone handset cradle to generate a flash.

#### Step 4: Call the third party

- Three-Way Calling (default) returns a three burst stutter dial tone.
- PBX call conferencing returns a continuous dial tone.
- After dial tone is returned, dial the third number.

#### Step 5: Flash the line

- After the third party answers, flash again to reconnect the second party.

**Step 6: End Call**

- The originator of a Three-Way Call can disconnect the third party with a flash hook.
- The originator can disconnect all parties by going on-hook (Three-Way Calling) or PBX call conferencing connects all remaining parties if one goes on-hook.

**Transferring a call:**

**Note:** TLS-5C/D users must first set Conference Type to PBX call conference to be able to transfer calls.

**Step 1: Establish call**

- With devices connected to three or more TLS-5 lines, establish a call between two parties.

**Step 2: Flash the line**

- Execute a hook switch flash, then dial the third party.

**Step 3: Announce the call**

- After the third party answers, announce the transfer, then hang up.  
If the caller hangs up before the third party answers, the transfer is aborted.

**Calling Party Control**

The U.S. telephone network typically uses Calling Party Control (also known as Calling Party Supervision), meaning that even though the called party hangs up, the connection may be re-established to the calling party when the phone is taken off-hook again. The calling party must hang up for the called party to be fully disconnected before initiating a new call. The telephone network will time out and disconnect the call within 5-20 seconds (based upon traffic activity and priority of other tasks), giving the called party dial tone when he goes off-hook again.

The TLS-5 provides Calling Party Control using the Device Disconnect Timer (Function 09 default = 2.0 seconds). If the called party goes on-hook and comes off-hook again before the Device Disconnect Timer expires, which would then issue the Forced Disconnect (Function 38, default = 850 milliseconds), and/or Tone Following Disconnect (Function 39, default = dial tone), the call will be re-established. However, if the calling party goes on-hook, the Forced Disconnect signal is issued two (2) seconds later to the called party.

The only exception is when a transfer/conference call has taken place. If a three way connection has been established, the first party to go on-hook causes no action to be taken. If one of the remaining two parties stays off-hook after the other party goes on-hook, a two second delay occurs before sending the

Forced Disconnect (Function 38) and/or Tone Following Disconnect (Function 39).

The command for Device Disconnect Timer is:

**\*09#x#** (System Wide Command)

where x = 10 to 200 (1 to 20 seconds)  
default = 20 (2 seconds)

The command for Forced Disconnect is:

**\*38#x#** (Per Line Command)

where x = 0 disabled  
x = 1 enabled (default)

The command for Tone Following Disconnect is:

**\*39#x#** (Per Line Command)

where x = 0 dial tone  
x = 1 busy tone  
x = 2 reorder tone  
x = 3 silence  
x = 4 audio port

## Caller ID

The TLS-5 provides optional Caller ID (FSK) signaling on all lines. The TLS-5 supports both single message (Date/Time/Number) and multiple message format (Date/Time/Number/Name). The Caller ID transmission is sent during the first long silent interval after the first ringing cycle. Distinctive Ringing periods may be several short ringing signals followed by at least a three second silent interval. The TLS-5 is capable of many different types of ringing cycles and silent periods (see Programming Section, command 23), but a silence period of at least 3 seconds is **required** in order to send a Caller ID message.

The display of the Caller ID information depends upon the type of equipment connected to the TLS-5, it may appear on the telephone itself, in the display of a separate device, or on the video display of a personal computer.

## Visual Message Waiting (Per Line Command)

Visual Message Waiting (VMW) is an on-hook FSK signal transmission used to inform users that there is a message waiting at their network switch. These signals may be sent to any of the 4 lines. To send a Visual Message "ON" signal to a line, dial the prefix **\*50** before the called number. To manually send the Visual Message "OFF" signal to a line, dial the prefix **\*51** before the called number. The user will hear confirmation dial tone after

entering either **\*50** or **\*51**. The TLS-5 will provide an open switched interval of 200 ms before transmitting the FSK data. The data will be sent to the called port, and the calling port will revert to dial tone after the message is sent. The data will be sent in either single or multiple message format, per the programmed setting for this format (using **\*72#x#** command). An alternate method of issuing the Visual Message “OFF” signal is as follows; the next time a user goes off-hook on a port which has a message waiting, they will hear stuttered dial tone. When the user dials the number for the audio port (default = 411, see command 06) from this line, thus simulating the retrieval of a message, the dial tone will revert back to normal. When the user goes on-hook after this call, the TLS-5 will send the Visual Message Waiting “OFF” message (FSK data) back to this line. In the case of the manually sent VM “OFF” signal, the dial tone will revert back to normal from the three burst stuttered dial tone. Message formatting is programmable on the TLS-5C and TLS-5D.

**Note:** If the **\*50** or **\*51** prefixes are dialed, and the called line is not programmed to deliver Caller ID (via programming command **\*50#0#**), the caller will receive reorder tone because Voice Message Waiting is turned off..

**Note:** When using the **\*50** or **\*51** prefixes the VMW message can only be sent to one of the other lines; it cannot be sent to the calling line.

## Using Caller ID Prefixes

Caller ID messages can be changed with one of the three prefixes. These prefixes are entered before the number you are dialing. For example, dialing **\*67103** will ring Line 3 (assuming the default phone numbers are used) and change the Caller ID message to a private (i.e., no information displayed) message.

**\*67** = Private

**\*87** = Out of area call

**\*88** = Check sum error

**Note:** The user does not hear confirmation dial tone after dialing prefixes **\*67**, **\*87**, or **\*88**.

- To call Line 2 (using the default number) with a “private” Caller ID information, enter:

**\*67 102**

Depending on the type of Caller ID display you are using, the date and time will be shown, but not the number or name.

- To call Line 1 (using the default number) simulating an out of area call, enter:

**\*87 101**

The Caller ID display indicates that the call originates from an area in which Caller ID is unavailable.

- To call Line 3 (using the default number) simulating a Caller ID checksum error, enter:

**\*88 103**

The Caller ID display will indicate that an error occurred in Caller ID transmission.

**Note:** Caller ID displays react differently to a checksum error. Some attempt to display the data, others display “line error”, and others ignore the data. Also, some Caller ID displays require a seven-digit number. If this is the case with the device you are using, program the TLS-5 with seven-digit numbers.

## Multiple Message Format - Name Selection

The TLS-5 allows the user to select from a list of names that are both fixed and programmable (see command 51 and 52). A special fourth selection is used when the user wishes to simulate multiple callers while calling from the same line. When this function is invoked (command 51, x=3), the names (selections 0 and 2) and the numbers (primary and secondary) for the calling line are sent to the called line alternately with each subsequent call.

## Caller ID Time / Date

The TLS-5 will support advancing month, day, hour, and minute for Caller ID messages. At power-up these parameters will be retrieved from non-volatile memory and will then advance in pseudo real time as long as the TLS-5 has power applied. The month, day, hour, and minute will be user programmable. The TLS-5 will not support February 29th for leap years, nor (during programming) will it validate the number of days for a particular month (e.g. April 31st).

## Caller ID Sequence

The format for the Caller ID data, in multiple message format, will be programmable using programming command, **\*70#x#**, where the variable “x” may be 0 through 9. The order will be as defined in the following table.

**NOTE:** The default sequence for the TLS-5A/C is different from the table. The Private sequence is date, name, reason for no number. The Out-of-Area sequence is date, reason, name, reason for no number.



X	Order Transmitted			
	Normal Message (No Dial Prefix)	Message with Checksum error (Dial Prefix = *88)	Private (Dial Prefix = *67) rn_num = reason for no number rn_name = reason for no name	Out-of-Area (Dial Prefix = *87) rn-num = reason for no number rn_name = reason for no name
0	date,number,name	date,number,name	date, rn_name, rn_num	date, rn_name, rn_num
1	date,name number	date,number,name	date,number,rn_name	date,number,rn_name
2	number,date,name	date,number,name	rn_num,name,date	rn_num,name,date
3	number,name,date	date,number,name	rn_name,number,date	rn_name,number,date
4	name,date,number	date,number,name	rn_num,date	rn_num,date
5	name,number,date	date,number,name	rn_name,date	rn_name,date
6	date only	date,number,name	date only	date only
7	number only	date,number,name	rn_num,name	rn_num,name
8	name only	date,number,name	rn_name,number	rn_name,number
9	name only	date,number,name	date,"P" in number field	date,"O" in number field

## TLS-5C/D Features

### SCWID or CIDCW

SCWID (Spontaneous Call Waiting with caller ID) also known as CIDCW (Caller ID in Call Waiting) is a function that sends the FSK data that supports Caller ID after a Call Waiting Tone. This data transmission burst is typically sent to a specially configured telephone or an adjunct device that mutes the line to the local caller for the duration of the FSK burst. The format of the message is always multiple message format, that is, the Name and Number are sent to the called party. This feature is invoked in the TLS-5C/D whenever a third party places a call to an existing call, if Caller ID is enabled (using the **\*50** programming command), and Cancel Call Waiting has not been enabled. When Caller ID has been enabled (**\*50#1#** or **\*50#2#**), and a third line is calling, the called line will be momentarily isolated and will hear a Call Waiting Tone, followed by a CAS tone to alert the Caller ID phone or adjunct. If the Caller ID phone or adjunct issues a DTMF "D" (from non-ADSI CPE) or a DTMF "A" (from ADSI CPE) acknowledgment tone, the FSK sequence is sent down the line for Caller Identification. The Called Party may then ignore the Call Waiting, or generate a Flash to place the first caller on hold, and answer the Call Waiting. If the Called Party ignores the first Call Waiting alerting sequence, it will be repeated once, ten seconds later. If the Called Party answers the Call Waiting, they are allowed to alternate between callers using the Flash function. If one party hangs up, the remaining parties are automatically connected.

### Distinctive Call Waiting tone

An extension of the Call Waiting functionality now includes a Distinctive Call Waiting tone. The "normal" Call Waiting tone consists of a single tone (440 Hz) for a duration of 300 ms. This tone is repeated a second time, ten seconds later, if the called line does not respond with a flash to answer the waiting call. The new option will inform the called line if the call is a long-distance caller, that is, the number dialed was greater than 7 digits. This Distinctive Call

Waiting tone will be 100 ms on, 100 ms off, 100 ms on. The TLS-5C will have a new programming command to enable this feature on a per-line basis. The new command is :

<b>*40#x#</b>	where x = 0	Call Waiting tone is disabled (default TLS-5A/5B)
	where x = 1	Call Waiting single tone only 300 ms (default TLS-5C/D)
	where x = 2	Call Waiting tone for local calls is single tone and a double tone for long distance calls (the number dialed was greater than 7 digits). (TLS-5C/D only)

The TLS-5C will support the use of “Cancel Call Waiting” on a per call basis by entering **\*70** or **70#** prior to placing a call. “Cancel Call Waiting” will not work in conjunction with any of the other pre-dialing features, such as the special Caller ID codes (**\*67**, **\*87**, **\*88**), the Visual Message Waiting codes (**\*50**, **\*51**), or any of the special CLASS codes (Call Forwarding, Automatic Callback, Automatic Redial).

**Note:** The user will hear confirmation dial tone after entering the dial prefixes **\*70**, or **70#**, but not after entering, **\*50**, **\*51**, **\*67**, **\*87**, or **\*88**.

### Visual Message Waiting audible response

The audible indication to a caller that has a message waiting at their Central Office voice mailbox is now a programmable feature. After Visual Message Waiting Indication is invoked, with the “**\*50**” prefix to the line number, the TLS-5C will generate a distinctive dial tone to the caller when the phone is taken off-hook. This distinctive dial tone will be one of three choices and is programmed as follows:

<b>*71#x#</b>	where x = 0, 3 burst then continuous dial tone (default)
	where x = 1, 10 burst then continuous dial tone
	where x = 2, continuous stutter dial tone

### Visual Message Waiting Format

The enhancement of the telephone network to support new features has prompted Teltone to provide the ability to program the format of the Visual Message Waiting feature. The VMW feature is now able to be set independently of the Caller ID format. e.g. The Caller ID format may be set for Multiple Message format and the Visual Message Waiting feature may be set for Single Message format. The new programming command is as follows:

<b>*72#x#</b>	where x = 1 for Single Message format (default)
	where x = 2 for Multiple Message format

**NOTE:** This is a Global command, it affects all lines. The Caller ID format is set using the **\*50** programming command, and is set on a per line basis.

### Speed Dialing                      1#   2#   3#   4#

This new feature allows for the caller to dial a short DTMF sequence to call any other port. These dialing sequences or, speed dial numbers, are available at

any time, and will send the primary telephone number and name for Caller ID purposes. The numbers for each line are shown below:

Line 1	1#
Line 2	2#
Line 3	3#
Line 4	4#

**Note:** When using speed dial codes, Distinctive Call Waiting is disabled.

#### **Automatic Callback                    \*66 or 66#**

This feature (aka Busy Number Redial) allows a user for any line to set up an Automatic Call Back to a busy number. If the last number dialed is not busy, activating the Automatic Callback feature will dial the last dialed number. For example, if Line 1 called Line 2, and Line 2 is BUSY, the caller on Line 1 will hang up. Line 1 caller then places the telephone off-hook and by dialing the Automatic Callback DTMF code, \*66 or 66#, Line 2 will be called. If Line 2 is available, the call will ring through as normal. However, if Line 2 is still BUSY, the TLS-5C/D will return a confirmation tone to the caller on Line 1 (three burst stutter, then continuous dial tone) informing that Automatic Callback has been activated. Line 1 will then hang up. When both Line 2 and Line 1 are idle (on-hook), Line 1 will be called using the distinctive ring sequence programmed for the secondary telephone number. If Line 1 does not answer within three (3) rings, the Automatic Callback sequence is canceled. When Line 1 is picked up (off-hook), Line 2 is dialed. If Line 1 and Line 2 are not idled within 30 minutes of activation of the Automatic Callback feature, the Automatic Callback sequence is canceled. If the Callback sequence needs to be canceled prior to Callback, Line 1 should go off-hook and dial \*86 or 86# to cancel the Callback. The user will hear confirmation dial tone after dialing either \*86 or 86#. The TLS-5C/D will return a confirmation dial tone, prompting the caller on Line 1 to hang up. The TLS-5C/D will only activate one Callback at any time. If another Callback is initiated, the original Callback is canceled in favor the the newest Callback. If a Line has Caller ID activated, the Caller ID sequence is generated as would be seen in the Public Network. If the last number dialed was the audio port, or one of the test numbers, the \*66 command will cause a callback to those numbers.

**NOTE:** The Out of Area (\*87), Private (\*67) and other dial prefixes will not work when using Automatic Callback.

#### **Automatic Recall                    \*69 or 69#**

This feature allows a user to recall the last number that dialed their line with a simple dial sequence. For example, if Line 1 called Line 2, then regardless if the call was answered or not, Line 2 is able to call Line 1 by dialing a short DTMF sequence, \*69 or 69#. If the last caller to dial the line is busy, the TLS-5C/D will issue a recall dial tone (three burst stutter, then continuous dial tone) to inform the caller that Automatic Recall has been activated. The user (Line 2) will then hang up. When both Line 2 and Line 1 are idle (on-hook), Line 2 will be called using the distinctive ring sequence programmed for the

secondary telephone number. If Line 2 answers before the fourth ring sequence, Line 1 will be automatically recalled. If not answered by the third ring, the Automatic Recall is canceled. If both Line 1 and Line 2 are not idle (on-hook) for greater than 30 minutes after Automatic Recall is activated, Automatic Recall is canceled. Automatic Recall may be canceled by dialing \*89 or 89#. The TLS-5C/D will return a recall dial tone (three burst stutter, then continuous dial tone) when canceled. If a Line has Caller ID activated, the Caller ID sequence is generated as would be seen in the Public Network.

**Note:** The Out of Area (\*87), Private (\*67) and other dial prefixes will not work when using Automatic Recall.

### Three-Way Calling

This feature allows a user to establish a three-way conference call using the flash button or hook-switch of the telephone. The TLS-5C/D is able to be programmed for Three-Way Calling (default, command 73) or PBX call conferencing. This is a global command that affects all lines. Three-Way Calling is initiated after a call has been established between two parties. After either party generates a switchhook flash, a recall dial tone (three burst stutter dial tone) is heard by the originator of the Three-Way Call who then dials the number of the third party to join the conference. After the third party answers, the originator generates another switchhook flash to connect all three parties. If the third party does not answer, the originator can generate a flash to disconnect the ringing line. If the originator goes on hook, the connection to the second party is terminated. After all three parties are connected, the second or third party may go on hook (hang up) and the remaining parties will remain connected. The originator may disconnect the third party if a flash is generated. If the originator goes on hook, all parties will be disconnected.

**Note:** Call Waiting is not supported during Three-Way Calling.

### Call Forwarding \*72 or 72#

This feature allows a user to configure a line to forward a call to another line. This feature is activated by dialing \*72 or 72# after which the TLS-5/D will issue a confirmation dial tone (three burst stutter, then continuous dial tone) where the caller enters the telephone number of the line to ring (forward) when his number is dialed. If the dialed number answers, subsequent calls will be forwarded to that number. If the dialed number does not answer, the user activating the Call Forward must repeat this process within 2 minutes or the forward is canceled. On the second call, the TLS-5C/D will return a confirmation dial tone (three burst stutter, then continuous dial tone), and activate the Call Forward (the call will not be completed to the called number). When a call is placed to a forwarded number, a "ring reminder" is issued to indicate that a call has been received and forwarded. This feature is de-activated or canceled by placing the telephone off-hook on the forwarding line, and dialing \*73 or 73#. The user will hear confirmation dial tone after either \*73 or 73# is entered.

**NOTE:** This feature is stored in volatile memory, if power is turned off to the TLS-5C/D, any Call Forwarding activations will be canceled. Each line may have Call Forward activated, however, the TLS-5C-01 will only

process one call forward. For example, Line 2 may be forwarded to Line 3, and Line 3 may be forwarded to Line 4, but when Line 2 is called, the “ring reminder” is heard, and Line 3 rings. Call Waiting does not work on a line where Call Forwarding has been activated.

### Demonstration / Test Mode

A special demonstration or test mode is available in the TLS-5C/D. This will allow features that would normally require three telephones to demonstrate or test a feature to be accomplished with only two phones. For example, dial from Line 1 to Line 2 and establish a call, then Flash to invoke a Conference Call. When dial tone is returned, a call placed again to Line 2 will simulate a third party, causing a Call Waiting tone and (if enabled) a SCWID sequence to be generated.

### Using the Audio Port

The section below tells you how to generate a tape recorded message and play the message over a TLS-5 line. You can record messages in either of two ways:

- on the tape recorder (use of an external microphone is recommended)
- or-
- using a telephone.

### Tape Recorders

Please use tape recorders *without* automatic or dynamic level control because automatic level control can amplify background noise, ruining the silent period at the end of the message.

**Notes:** (1) Always use a new tape or one that has been erased because the TLS-5 looks for three seconds of silence followed by a sound for an “end-of-message” indication. See “End of Message Tape Sequence” at the end of this section.  
 (2) Be sure the tape used is the correct bias type for the recorder.

### Making a Tape on a Tape Recorder

The commands used in the following steps are explained in Chapter 6: Programming.

#### Step 1: Connect microphone

- Connect a microphone to the cassette recorder/player.

#### Step 2: Turn on player

- Turn on the cassette recorder/player and press the RECORD button.

#### Step 3: Speak message

- Speak the message, taking care that you do not pause for more than three seconds before the end of the message.

#### Step 4: End message

- At the end of the message, pause for at least three seconds, then speak one more word. If you wish to record the message more than once, or make a series of recordings, pause briefly before beginning the next message.

### Generating a Tape from a Telephone

#### Step 1: Program audio port

- With a tone (DTMF) telephone connected to Line 1, lift the handset and press the MAN/RING switch position until the Line 1 light blinks and confirmation tone (three beeps) is heard.
- Enter: \*33#1# (This enables audio port access for Line 1. You will hear three beeps if the command is accepted.)
- Enter: \*05#1#0#0# (This configures the audio port for immediate access, single user, and disconnect when the handset goes on-hook.)
- Hang up.

#### Step 2: Connect player

- Connect a cassette recorder/player to the TLS-5.
- Using a standard cassette player cable (*not supplied*) with a 5-pin DIN connector at one end and three connectors at the other (refer to Figure 2). Cable can be purchased from Radio Shack, catalog number 26-1207. Custom cables can use the 5-pin DIN plug, available at Radio Shack, catalog number 274-003.
- Plug the 5-pin DIN connector into the TLS-5 AUDIO port.
- Plug the connectors at the other end of the cable to the cassette recorder/player as follows:
  - Connect the small gray cable (see Note, below) to the REMOTE jack.
  - Connect the large gray (see Note, below) cable to AUX. (If the machine has no AUX jack, or the recording is unsatisfactory, connect this cable to MIC.)
- Leave the black cable unconnected for recording (it should be connected for playback).

**Note:** Cable colors will vary depending on manufacturer. See Figure 2.

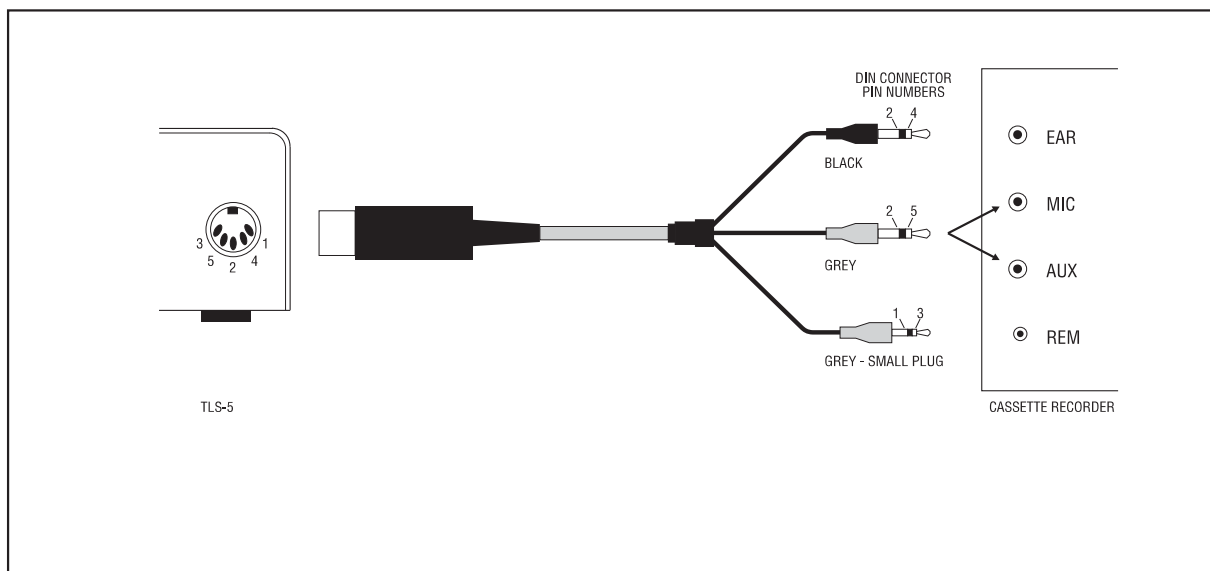


Figure 2 Audio Port Connector Cable

**Step 3: Turn on player**

- Turn on the cassette recorder/player and press the RECORD button.

**Step 4: Lift handset**

- Lift the Line 1 telephone handset. The AUDIO light turns on.

**Step 5: Speak message**

- Speak the message, taking care that you do not pause for more than three seconds before the end of the message.

**Step 6: End message**

- At the end of the message, pause for at least 3 seconds, then press any digit key (0-9) or speak a word. If you wish to record the message more than once, or make a series of recordings, pause briefly before beginning the next message.

**Playing a Message from the Audio Port**

Follow these instructions to play a message through the TLS-5 audio port to a line. This is the default mode, *Step 1 is only necessary if you have changed the default settings.*

**Step 1: Program audio port**

Program the TLS-5 audio port as follows:

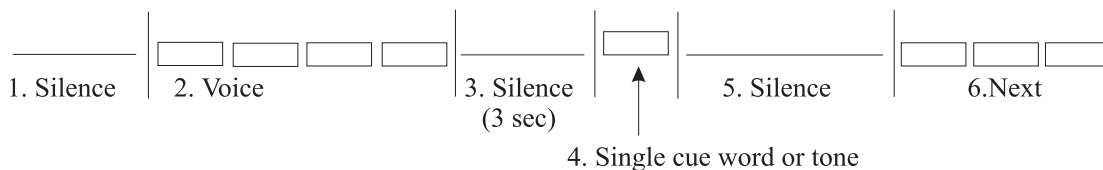
- With a tone (DTMF) telephone connected to Line 1, lift the handset and press the MAN/RING switch position until the Line 1 light blinks and you hear a confirmation tone (three beeps).



- Key the following: \*33#1#. (This enables audio port access for Line 1. You will hear three beeps if the command is accepted.) \*05#1#0#1# (this configures the audio port for immediate access, single user, disconnect at end-of-message.)
- Hang up.

## Step 2: Connect Audio Source

- Use a standard cassette player cable (not supplied) with a 5-pin DIN



1. Audio port accessed. Audio connected, tape starts.
2. First recorded message.
3. After 3 seconds of silence, the audio path is disconnected
4. Cue word or tone. Indicates that start of next message is approaching.  
The cue is not heard in the telephone.
5. Tape is stopped at end of cue, before beginning of next message, and remains stopped awaiting next access.
6. Next message on tape..

**Figure 3 End of Message Tape Sequence**

connector at one end and three connectors at the other (refer to Figure 2 to connect the audio source to the TLS-5.

- Plug 5-pin DIN connector into the TLS-5 Audio port.
- Plug the connectors at the other end of the cable to the audio source as follows:
  - Connect the small gray cable to the control jack. (Remote.)
  - Connect the black cable to the audio output from the source. (Ear.)
  - The large gray cable is not used.

**Note:** Cable colors will vary depending on manufacturer. See Figure 2.

- Apply power and turn on the audio source (e.g., tape recorder.) If using a tape recorder, press the play button.



**Step 3: Play message**

- Lift the Line 1 telephone handset. The message will begin playing. At the end of the message, the TLS-5 will turn off the cassette player.
- Hang up.
- Each time the telephone handset is lifted, the message will be repeated (continuous loop tape) or the next message will be played (normal tape.)
- To cancel immediate access, lift the handset on Line 1 and press the MAN/RING switch position until the Line 1 light blinks. Then enter the following:

\*06#2## This specifies dial access, single user, disconnect at on-hook.

- Hang up.

**End of Message Tape Sequence**

An “end of message” tape sequence is a method for automatically turning off a tape recorder (connected to the audio port) at the end of a message, and positioning the tape for the start of the next message. This allows a single message to be played each time the audio port is accessed.

Refer to Figure 3. The sequence consists of a 3-second (minimum) silent period followed by a single short word or tone. When the TLS-5 detects 3 seconds of silence, it removes the audio path between the audio port and the telephone. When it hears the cue tone or word, it opens the control contacts of the audio port to turn the recorder off, leaving the tape at the beginning of the next message.

If the telephone that has accessed the audio port hangs up before the end of message sequence is found, the tape will continue to run and cue itself for the next message. If no audio was heard from the tape (if the tape was blank or not connected), the control will be turned off when the phone hangs up.

Multiple copies of the message may be consecutively recorded on a long tape (which would need to be manually rewound at the end of the tape), or a single message may be recorded on a continuous loop tape.

## Chapter 5: Testing Equipment and Installations

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**Note:** Default options are assumed. If you have trouble with any of the following procedures, a previous user's programming may be the cause. Refer to Programming.

To test key system and PBX lines, connect TLS-5 lines to Tip and Ring of PBX or key system Central Office loop start trunks (E&M, DID, or ground start trunks cannot be tested with the TLS-5. If a ground reference is required, connect a 0.080-inch diameter pin tip probe to the chassis ground reference jack on the unit back panel (Figure 1). Figure 5 shows the pin connections for the alligator clip cables used to connect TLS-5 lines to a terminal block (cables not supplied). Figure 4 gives a generalized diagram for key system test connections.



**Caution:** When ringing is applied, the Ring lead of the modular jacks carries up to 95 VAC referenced to ground (alternating polarity). Be sure the TLS-5 power switch is off before handling any cord ends or alligator clip cables.

### Manual Continuous Ring Test

- Connect a telephone to Line 1 of the TLS-5.
- With Line 1 on-hook, press and hold the front panel switch in the MAN/RING position.
- Verify that the telephone rings continuously while the button is depressed and that the Line 1 indicator blinks.

### Line Wiring/Basic Function Test

The following test is used with Tone or Rotary phones.

- Connect at least two telephones (or other telecom devices) to the TLS-5.
- Go off-hook with one telephone and dial the first telephone number for the other telephone. Default numbers are 101, 102, 103, and 104 for Lines 1 through 4, respectively. Up to 16 digits can be programmed for each line, as described in Programming.
- Verify that a standard ring (2 seconds on, 4 seconds off) occurs at the other telephone.
- Go off-hook at the other telephone and verify that a connection is established.
- Go on-hook with both telephones. Repeat with other telephones and lines as necessary.

## Nonstandard Ring Cadence Test

To test equipment that looks for particular ring cadences, proceed as follows:

**Note:** Line 1 is used to enter programming mode, but any line can be used for test. Lines 1 and 2 are used as examples in the steps below.

- Go off-hook on Line 1 and press and hold the MAN/RING switch position until the Line 1 LED blinks and three beeps are heard.
- or-
- Go off-hook on Line 1 and dial **\*\*99##**, Line 1 LED blinks and 3 beeps are heard.
- Select Line 2 with the command **\*02#**, then program the desired ring cadence as described in Chapter 6, command 23. (The default cadence is 1 second on, 1 off, 1 on, and 3 off.)
- Change the second phone number for Line 2 with the command **\*12#NNN...N#**. (The default for the second phone number is 202.)
- Hang up Line 1. Programming complete.
- Go off-hook on Line 1 and dial the second phone number for Line 2.
- Verify that Line 2 rings with the programmed ring cadence and the device under test recognizes rings.

## Dial Pad Check

The following verifies that all seven frequencies generated by the tone pad are operating and that the telephone can receive audio signals.

- Plug a known working phone into Line 1.
- Go off-hook on Line 1 and press and hold the MAN/RING switch position until the Line 1 light blinks.
- Enter the following command: **\*12#1234567890#**. (This programs the second phone number for Line 2.)
- Make sure the number does not conflict with other telephone numbers programmed into the unit.
- Listen for a three-beep confirmation and hang up.
- Connect the telephone under test into Line 1.
- Go off-hook on the phone to be tested, wait for dial tone. Enter: **1234567890**.
- Verify that dial tone stops, ring back tone is heard, and Line 1 rings after the last digit is dialed. Go on-hook.

## Telephone Handset Check

- Check that the telephone mouthpiece works by doing one of the following: go off-hook, break dial tone, blow on the mouthpiece, and listen for that sound in the ear piece.

## Call Progress Tone Test

- Go off-hook on Line 1 and dial any seven-digit number that is not assigned to a TLS-5 line.
- Listen for the programmed “Response to Invalid Number” (see command 31, in Chapter 6). If the number starts with “1”, there will be an eight-second delay between the last digit and the programmed response.
- Hang up the telephone.

## Test Numbers

The following numbers are used to demonstrate or to test how a device responds to dial tone, busy tone, reorder tone, silence and stuttered dial tone. All of the numbers below are defaults and can be changed. To change these defaults, see Chapter 6 .

### To test a device’s response to dial tone:

- Lift a handset from a phone on any of the lines and dial: 83781

### To test a device’s response to busy tone:

- Lift a handset from a phone on any of the lines and dial: 83782

### To test a device’s response to reorder tone:

- Lift a handset from a phone on any of the lines and dial: 83783

### To test a device’s response to ring back tone:

- Lift a handset from a phone on any of the lines and dial: 83784

### To test a device’s response to silence:

- Lift a handset of a phone on any line and dial: 83785

### To test a device’s response to confirmation dial tone:

- Lift a handset of a phone on any line and dial: 83786

## Silent Off-hook Mode

If you need an indefinitely open, silent line (i.e., a line that will not revert to dial tone after a time-out period) to run a test, this can be set up by selecting 2 (silent) when programming command 32. See Chapter 6 for more information.

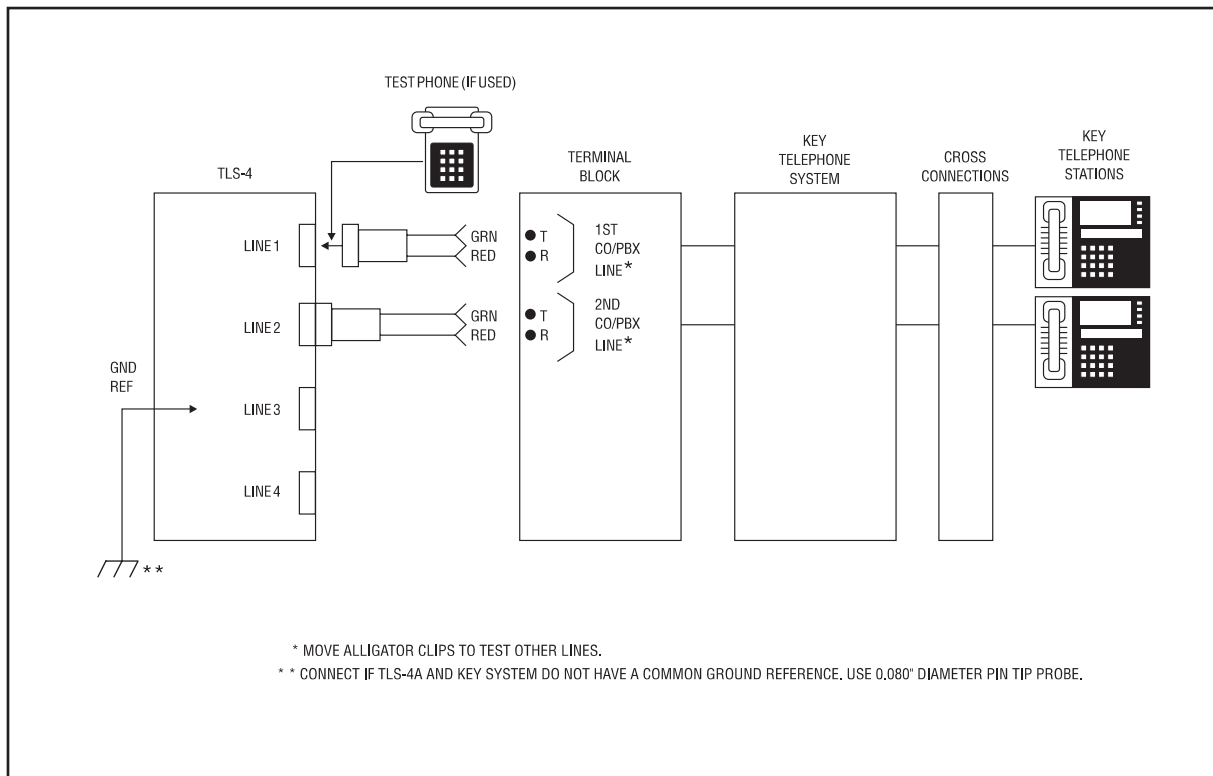


Figure 4 Key System Test Connections

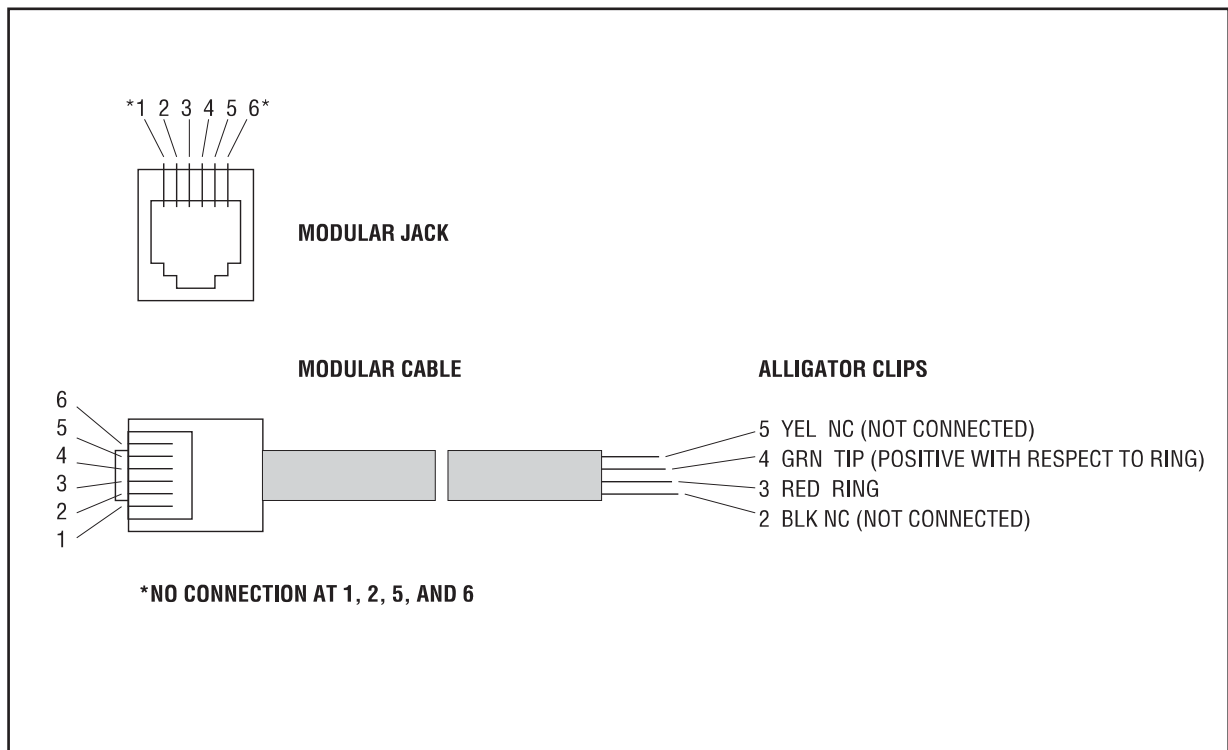


Figure 5 Clip Cable Connectors (Used with Terminal Block)

## Chapter 6: Programming

---

The TLS-5 allows the user to program items such as telephone numbers, delays, call progress tone responses, ring frequency, and Caller ID functions. Other functions may be turned on or off. This is done by accessing the Program mode and keying commands using a tone (DTMF) telephone plugged into the Line 1 jack.

### Power Loss

Since the TLS-5 utilizes non-volatile memory, programming will not be lost during a power outage. When confirmation tones are heard (three beeps) after a valid command has been entered and accepted, the command has been stored in non-volatile memory.

**Note:** If command 08 is set to 0 (disabled), you will not hear three confirmation beeps nor the error tone.

**Note:** All commands must consist of two digits. That is, codes 00 through 09 must be entered as shown; entering 0 through 9 will not work.

### Types of Commands

There are three types of commands. The first type, which are dial prefixes, can be entered from any line as part of the dialing string. These commands initiate sequences such as Visual Message Waiting, various Caller ID functions, and CLASS features, such as Cancel Call Waiting. The second and third type of commands must be entered while in the Program mode, using a DTMF telephone plugged into Line 1. The second type are system wide commands, that is, they affect all lines. The third type is a per-line command; that is, the command must be set separately for each line.

### Command Format

For each feature to be programmed, a command is entered at the telephone keypad. All commands start with \* and end with #. The # is also used to separate data fields if the command has more than one field. That is:

**\*<two digit command>#<data field>#**

*-or-*

**in the case of commands with multiple data fields:**

**\*<two digit command>#<data field>#<data field>#**

For example, to program 123 as the audio port access number, enter: **\*06#123#**

To program the audio port to immediate access, multiple user, and disconnect at end of message, enter:

**\*05#1#1#1#**

Commands having multiple data fields can be abbreviated if the latter fields are to be set to zero. For example, \*05#2## sets the audio access port to dial access, single user, disconnect at off-hook.

If the TLS-5 accepts the code, you will hear a confirmation tone of three short beeps. If the code is rejected, you will hear the error tone. If you hear error tone, verify that the code and values you are trying to enter are valid, and try again.

#### **To correct command mistakes:**

If you made an error in entering a command and have not yet entered a #, key \* to cancel the command. When you hear three beeps, enter the command again. Or re-enter the command from the beginning.

#### **To correct data field mistakes:**

If you made an error in entering within a data field, (that is, after one or more #s have been entered prior to the final #, key \* to erase the current field back to, but not including, the #, or \*\* to cancel the entire command. When you hear three beeps, re-enter the command.

#### **To access Program mode**

As explained below, there are two methods of accessing programming mode. Generally, you can use either one. However, the second method (\*\*99##) *cannot* be used if the TLS-5 is programmed for “hot line” or direct audio port access on Line 1. If Line 1 has been programmed for “hot line”, then use the MAN/RING switch to enter the Program mode.

- Lift the handset of the Line 1 phone. Press and hold the MAN/RING switch position until you hear three beeps and the Line 1 light begins blinking. Line 1 is automatically selected.

-or-

- With Lines 2 through 4 on-hook. Pick up Line 1 and when you hear dial tone, dial: \*\*99##
- Listen for three beeps and watch for the Line 1 light to blink.
- To enter any of the per-line programming commands for Lines 2 through 4, you must first select the line using the commands \*02#, \*03#, or \*04#. While any of these lines is selected, you can also enter any system wide programming command. Enter any of the per-line programming commands for Line 1, or any of the system wide programming codes.

#### **To exit Program mode**

When you are finished programming, hang up.

The program codes and options are summarized for quick reference in Appendix B.

**Note:** If you make a mistake while programming a Caller ID name, you will have to program the entire name again to erase the error.

## Dial Prefixes

The following dial strings are dialed as a prefix before a primary or secondary telephone number:

- \*50+telephone # Visual Message Waiting ON command
- \*51+telephone # Visual Message Waiting OFF command
- \*67+telephone # Caller ID "Private" message sent
- \*87+telephone # Caller ID "Out of Area" message sent
- \*88+telephone # Caller ID Check Sum error (simulates a bad FSK transmission, the message is still good but the checksum is in error)
- \*70+telephone # Cancel Call Waiting

## CLASS Feature Codes

The following dial strings are dialed to activate or cancel a CLASS feature.

- \*66 or 66# Automatic Callback
- \*86 or 86# Cancel Automatic Callback
- \*69 or 69# Automatic Recall
- \*89 or 89# Cancel Automatic Recall
- \*72 or 72# Call Forwarding
- \*73 or 73# Cancel Call Forwarding

**Note:** These CLASS features are stored in volatile memory. Upon exiting the program mode, or after power is cycled, all features are reset.

- 1# Line 1 Speed Dial number
- 2# Line 2 Speed Dial number
- 3# Line 3 Speed Dial number
- 4# Line 4 Speed Dial number



## Command Dictionary

With this table, commands are listed in numerical order, split between System Wide commands, and Per Line Commands. The description provides information explaining the basic use of each command. In-depth explanations are provided in the text on the indicated page.

There are two types of programming commands: system wide and per-line. commands 00 through 09, 69, 71, and 72 are system wide and can be entered with any line selected and with the unit in programming mode. All other commands are per-line-programmable features; all commands entered for the Line selected (Line 1 when entering the Program mode) until another line is selected.

Appendix C provides a quick reference list of commands.

The Model Number column indicates which version supports the command.

Command Number	Command	Description	Model #
<b>Systemwide Commands</b>			
	**99##	Use this command to enter programming mode.	All
00	Reset to defaults	Use this command to erase programming and return to the original settings.  There is no default for this command.	All
01	Program Line 1	Enter this command to program Line 1. After you enter this command, you can enter others to change how Line 1 operates.  There is no default for this command.	All
02	Program Line 2	Enter this command to program Line 2. There is no default for this command.	All
03	Program Line 3	Enter this command to program Line 3.  There is no default for this command.	All
04	Program Line 4	This command programs Line 4.  There is no default for this command.	All
05	Audio Access Mode	This command sets which mode the audio port will be in when you access it and when you disconnect from it. There are three modes to choose from: monitor, immediate access, and dial access.  The default is: dial access, one person can access the audio port at a time, and disconnect at on-hook.	All

<b>Command Number</b>	<b>Command</b>	<b>Description</b>	<b>Model #</b>
06	Audio Port Access Number	Use this command to set the number you dial to access the audio port when the Audio Access Mode (command 05) is set to "dial access".  The default number is 411.	All
07	Ring Type	Use this command to select the type of ringing that best fits your application.  The default is a 20 Hz synthesized sine wave	All
08	Confirmation and Error Tones	Use this command to have the TLS send confirmation tones or error tones after you enter a command. You turn this option on by entering *08#1#. The TLS will send confirmation tones after a command is entered correctly or an error tone if the command is incorrect. If you do not want to hear any tones, enter *08#0#.  The default is enabled, you will hear confirmation and error tones.	All
09	Device Disconnect Timer	Use this command to set the amount of time that the TLS waits, after the called party goes on hook, before sending a forced disconnect to the calling party.  The default is 2 seconds.	All
60	Dial Tone Number	Use this command to program a number that will respond with continuous dial tone until you hang up.  The default number is 83781 (TEST1).	All
61	Busy Tone Number	Use this command to program a number that will respond with busy tone until you hang up.  The default number is 83782 (TEST2).	All
62	Reorder Tone Number	Use this command to program a number that will respond with reorder tone until you hang up.  The default number is 83783 (TEST3).	All
63	Ring Back Tone Number	Use this command to program a number that will respond with ring back tone until you hang up.  The default number is 83784 (TEST4).	All
64	Silence Number	Use this command to program a number that will respond with silence until you hang up.  The default number is 83785 (TEST5).	All
65	Confirmation Dial Tone Number	Use this command to program a number that will respond with 3 bursts of Stuttered dial tone (recall dial tone), then continuous dial tone until you hang up.  The default number is 83786 (TEST6).	A-02 B-02 C-01 D-01

Command Number	Command	Description	Model #
68	Time/Date for Caller ID	Use this command to set the Month/Day/Hour/Minute for Caller ID messages.  The default date/time is 08/06 05:30	A-02 B-02 C-01 D-01
69	Dial Tone Selection	Use this command to select one of 6 different dial tone frequencies.  The default dial tone is 350 + 440 Hz	A-02 B-02 C-01 D-01
71	Visual Message Waiting Audible Response	Use this command to select 1 of 3 different dial tones to be used when Visual Message Waiting is activated.  The default is three burst stutter, then continuous dial tone	C-01 D-01
72	Visual Message Waiting Format	Use this command to select the format of the Visual Message Waiting transmission.  The default is single message format.	C-01 D-01
73	Conference Type	Use this command to select the type of conference to use Three-Way Calling or PBX call conferencing.	C-01 D-01
<b>Per-line commands</b>			
<i>Note:</i> A line must be selected before using the following commands. See commands 01 - 04.			
11	First Phone Number	Use this command to program the first telephone number for all four lines.  The default numbers are 101 - 104.	All
12	Second Phone Number	Use this command to program the second telephone number for all four lines.  The default numbers are 201 - 204.	All
13	Dial Tone/Hot Line Number	This command has two functions. Use it to set a "hot line" number so that whenever a phone on that line is picked up, a programmed number is dialed. Or, use the command to send dial tone when the "Revert to Dial Tone Number" is dialed.  The default number is 711.	All
20	Dial Tone Delay	Use this command to set the amount of time between when you lift the receiver (i.e., when you go off-hook) and when you hear dial tone.  The default is 0.1 second.	All
21	Network Response Delay	Use this command to create a delay between the end of dialing and when you hear ringing, busy, or reorder tone. (This does not apply to the test numbers set by commands 60-65 or when dialing an invalid string.)  The default time for this delay is 0.2 second.	All

Command Number	Command	Description	Model #
22	Second Dial Tone Delay	Use this command to set the time from the end of dialing until dial tone is sent back to the line when you dial the "Second Dial Tone Number". This command works with command 13.  The default is 0.5 second delay.	All
23	Ring Cadence Second Phone Number	Use this command to set a different ring for the second numbers.  The default ring is: 800 ms on, 400 ms off, 800 ms on, 4 seconds off.	All
30	Response to Busy Signal	Use this command to set the response that calls from other lines will get when calling this line: busy signal or reorder tone.  The default is a busy signal.	All
31	Response to Invalid Number	Use this command to set the tone heard if someone dials an Invalid number from this line. The options are: busy, reorder, ring back, silence, and connect to audio port.  The default is reorder tone.	All
32	Off-hook (Hot Line/Silent/Normal)	Use this command when you want to pick up one phone and have another ring ("ringdown") or to use the line without hearing call progress tones and without hearing dial tone.  The default is normal dial operation.	All
33	Audio Port Permission	Use this command to allow or prevent dial access to the audio port. If you deny access and dial the number for the audio port, you will hear reorder tone. (This does not affect audio port access for invalid numbers.)  The default is enabled so that callers can access the audio port.	All
34	Flash Detection	Use this command to turn flash detection on or off.  The default is enabled, the TLS-5 will detect a switchhook flash.	All
35	Hunt Mode	Use this command to set how a "hunt group" or group of phones sharing a single telephone number responds when the shared telephone number is dialed.  The default is ring all or "hunt mode".	All
36	Attenuation	This command can be turned on or off. If it is turned on, the TLS will lower the volume (i.e., loudness) of a call.  The default is disabled or no attenuation.	All
38	Forced Disconnect	Use this command to determine whether a line gets a forced disconnect when the <i>other</i> line hangs up.  The default is forced disconnect on.	All

Command Number	Command	Description	Model #
39	Tone Following Disconnect	Use this command to determine what tone will be heard after a forced disconnect or, if forced disconnect is disabled, what will be heard after the delay before disconnect. You can select from: dial tone ( <i>default</i> ) , busy, reorder, silence, or you can have the call connected to the audio port upon disconnect.  The default is dial tone.	All
40	Call Waiting Tone	Use this command to turn on or off the Call Waiting Tones for the line selected. (TLS-5A and 5B default is OFF) TLS-5C default is ON. (Normal Call Waiting) TLS-5C and TLS-5D users are allowed to select Distinctive Call Waiting.	5A-02 5B-01 5C-01 5D-01
50	Caller ID Type	Use this command to select the format of caller identification information, if sent. You can select single message format (date, time, and phone number), or multiple message format (date, time, phone #, and name, or no Caller ID.  The default is multi-message format: date, time, phone #, and name.	All
51	Select Caller ID Name	Use this command to select a simulated name to associate with each line for Caller ID purposes. You can choose from four sets of names.  The default is x = 2	All
52	Program Caller ID Name	Use this command to program a name to accompany Caller ID information.	All
70	Caller ID Sequence	Use this command to set the sequence of Caller ID data transmission.  The default is date, number, name	5A-02 5B-01 5C-01 5D-01
90	Clone Line X	Use this command to copy the programming from one line to the line you are calling from. For example, if you enter *90#1# from Line 2, the programming from Line 1 is copied to Line 2.  There is no default for this command.	All
99	Programming Query	Use this command to find out how a particular command is set. For example, enter *99#50# to find out which type of Caller ID is being used. This command does <i>not</i> work with commands 00-04.  There is no default for this command.	All

## Systemwide Commands

Systemwide commands can be entered with any line selected when the unit is in programming mode.

---

**\*\*99##: Programming Mode**

Use this command to enter programming mode from Line 1 with the other lines on-hook.

---

**00: Reset to Defaults**

This command resets the factory default operating conditions, either for the entire unit, or for one or more lines. Each command must be entered twice, as shown below.

- To restore **all** defaults, enter:

**\*00#0#\*00#0#**

- To restore defaults for **Line 1**, enter:

**\*00#1#\*00#1#**

- To restore defaults for **Line 2**, enter:

**\*00#2#\*00#2#**

- To restore defaults for **Line 3**, enter:

**\*00#3#\*00#3#**

- To restore defaults for **Line 4**, enter:

**\*00#4#\*00#4#**

---

**01 - 04: Select Line 1, 2, 3, or 4 for Programming**

This command selects Line 1, 2, 3, or 4 so you can set any of the per-line-programmable features for Line 1.

**Note:** Use this command only if you have previously selected another line for programming. On the first access to programming mode, Line 1 is automatically selected.

**\*01#**

The Line 1 light begins blinking. When you have finished programming Line 1, you can either (1) select another line, or (2) hang up to exit programming mode.

To select Line 2, enter:

**\*02#**

To select Line 3, enter:

**\*03#**

To select Line 4, enter:

**\*04#**

---

## 05: Audio Access Mode

Use this command to specify the methods of access to and disconnection from the audio port. This command is effective system wide. You can also enable or disable each line's access to the audio port. See command 33, Audio Port Permission.

- To program Audio Access mode, enter the command:

**\*05#x#y#z#**

*where:* **x = access mode**

x = 0, monitor mode

x = 1, immediate access

x = 2, dial access (*default*)

**y = connection mode**

y = 0, single user (*default*)

y = 1, multiple user

**z = disconnect mode**

z = 0, disconnect at on-hook (*default*)

z = 1, disconnect at end-of-message

**Monitor mode:** The audio port is automatically connected to the first line on which the handset is lifted (if permitted by the setting of command 33) and the call, including dialing, will be recorded. To use this mode, the command must be entered as shown below:

**\*05#0#0#0#**

*where:* The command must be entered as shown above.

**Immediate access:** The audio port is connected directly to one or more lines (if permitted by the setting of command 33). No dial tone is given and dialing is ignored.

**\*05#1#y#z#**

*where:* \*05#1#0#0# - One user gets immediate access and remains connected until on-hook

\*05#1#0-#1# - One user gets immediate access and remains connected until end-of-tape message is heard

\*05#1#1#0# - Multiple users get immediate access remain connected until phones go on-hook

\*05#1#1#1# - Multiple users get immediate access and remain connected until end-of-tape message is heard.

**Dial up access:** Connects one or more users to the audio port (audio both to and from the port) after the user dials the Audio Access number (command 06). The default is x = 2.

**\*05#2#y#z#**

- where:* \*05#2#0#0# - One user can dial up the port and remain connected until on-hook (default)  
 \*05#2#0#1# - One user can dial up the port and remain connected until the end-of-tape message.  
 \*05#2#1#0# - Multiple users can dial up the port and remain connected until on-hook.  
 \*05#2#1#1# - Multiple users dial up the port and remain connected until end-of-message is heard.

**Note:** If programmed for single user access, the TLS will send a Reorder tone, if a second line attempts to connect.

**Note:** See “End-of- Message Sequence” in Chapter 4, for more information.

---

## 06: Audio Port Access Number

This command sets the dial access number when the system is configured for “dial access” (see command 05).

- To set the dial access number, enter:

\*06#x#

*where:* x is a 1 to 16 digit number (digits 0 through 9), *default:* 411

- To delete the current audio port access number, enter:

\*06##

---

## 07: Ring Type

This command selects the ringing frequency. (The frequencies listed below are within 5% of nominal.) The square wave options are intended for use with certain devices that may not detect the synthesized sine wave.

\*07#x#

*where:* x=0, 20 Hz synthesized sine wave (*default*)

x=1, 25 Hz synthesized sine wave

x=2, 30 Hz synthesized sine wave

x=3, 60 Hz synthesized sine wave

x=4, 20 Hz square wave

x=5, 25 Hz square wave

x=6, 30 Hz square wave

x=7, 60 Hz square wave

x=8, 17 Hz synthesized sine wave

x=9, 17 Hz square wave

**Note:** The 17,25-60 Hz frequencies are provided to simulate ringing frequencies used outside the United States.



---

**08: Confirmation and Error Tones**

This command determines whether or not the TLS-5 will return confirmation and error tones at the end of each programming command.

- To disable the function so that no tones will be given.

**\*08#0#**

- To enable the function so that tones will be given (*default*), enter:

**\*08#1#**

---

**09: Device Disconnect Timer**

This command sets the time that the TLS-5 will wait before sending a disconnect to the calling line if it remains off-hook at the end of a conversation after the called line goes on-hook. The TLS-5A/B-02 and future releases, support Calling Party Control (see Chapter 4 for details.)

Refer to command 38, Forced Disconnect.

**\*09#x#**

*where:* x is a number between 10-200 representing tenths of seconds (For example, x=199=19.9 seconds)

*(Default is 20 or 2 seconds.)*

**Note:** If a conference call is established, the disconnect timer value defaults to 2 seconds for the conference call. Subsequent calls revert back to the programmed value.

---

**60: Dial Tone Number**

This command programs a number that you can dial to hear continuous dial tone. This is used to test or demonstrate how a device responds to continuous dial tone.

**\*60#x#**

*where:* x = 0-16 digits  
83781 or "TEST1" (*default*)

---

**61: Busy Tone Number**

This command programs a number that you can dial to hear busy tone. It is used to test or demonstrate how a device responds to busy tone.

**\*61#x#**

*where:* x = 0-16 digits  
83782 "TEST2" (*default*)

---

**62: Reorder Tone Number**

This command programs a number that you can dial to hear reorder tone. It is used to test or demonstrate how a device responds to reorder tone.

**\*62#x#**

*where:* x = 0 - 16 digits  
83783 or "TEST3" (default)

---

**63: Ring Back Tone Number**

This command programs a number that you can dial to hear ring back tone. It is used to test or demonstrate how a device responds to ring back tone.

**\*63#x#**

*where:* x = 0 - 16 digits  
83784 or "TEST4"

---

**64: Silence Number**

This command programs a number you can dial to hear silence. It is used to test or to demonstrate how a device responds to silence on the line.

**\*64#x#**

*where:* x = 0 - 16 digits  
83785 or "TEST5"

---

**65: Stutter Dial Tone Number**

This command programs a number you can dial to hear stuttered dial tone. It is used to test or to demonstrate how a device responds to silence on the line.

**\*65#x#**

*where:* x = 0 - 16 digits  
83786 or "TEST6"

The Stuttered dial tone will consist of 1 second of silence, followed by 3 dial tone bursts of 100 ms on / 100 ms off, followed by continuous dial tone.

---

**68: Set Date/Time for Caller ID**

**\*68#MM#dd#hh#mm#**

MM = month (1-12), dd = day (1-31), hh = hour (0-23), mm = minute (0-59)

**Note** If programming is RESET to defaults, the date/time will revert to 08/06 05:30.

---

## 69: Selectable Dial Tone

The TLS-5 will support the ability to select different dial tone frequencies. This is a global selection which controls all instances of dial tone.

**\*69#x#**

*where* x = 0 standard 350/440 Hz

x = 1 400 Hz single tone

x = 2 440 Hz single tone

x = 3 480 Hz single tone

x = 4 620 Hz single tone

x = 5 350/440 Hz stutter dial tone @ 150 ms on/150 ms off

**Note** If configured for continuous stutter dial tone (x = 5), the user will receive the “3 burst then continuous dial tone” normally issued when there is a Visual Message Waiting for a line.

---

## 71 Visual Message Waiting audible response

The TLS-5C/D can be programmed with a distinctive tone to alert the user of a message waiting. This distinctive dial tone will be one of three choices and is programmed as follows:

**\*71#x#** where x = 0, 3 burst then continuous dial tone (default)  
 where x = 1, 10 burst then continuous dial tone  
 where x = 2, Continuous stutter dial tone

---

## 72 Visual Message Waiting Format

The TLS-5C/D Visual Message Waiting feature is now able to be set independently of the Caller ID format. e.g. The Caller ID format may be set for Multiple Message format and the Visual Message Waiting feature may be set for Single Message format. The new programming command is as follows:

**\*72#x#** where x = 1 for Single Message format (default)  
 where x = 2 for Multiple Message format

---

## 73 Conference Type

The TLS-5C/D Conference Type feature changes the way the TLS-5C/D reacts when a conference call is invoked. The conference type is either Three-Way Calling or PBX call conferencing. The new programming command is as follows:

**\*73#x#** Where x = 0, Three-Way Calling  
 Where x = 1, PBX call conferencing

## Per-line Commands

Before entering any of the following commands, you must select a line by entering a 01, 02, 03, or 04 command.

---

### 11: First Telephone Number

Each of the four TLS-5 lines can be rung by other lines upon dialing one of two numbers. The first number always rings the line with a standard single ring having a ring cadence of 2 seconds on, 4 seconds off.

Enter the following to set the first number for the selected line:

**\*11#xx...x#**

*where* xx...x is any number up to 16 digits long. Any combination of digits 0 through 9 may be used.

*Default:* 101 through 104 for Lines 1 through 4, respectively.

---

### 12: Second Telephone Number

The second telephone number provides an alternate number that can be used to dial the line. Ring cadence can be varied for this number (unlike the first number); see command 23 on page 44.

Enter the following to set the second number for the selected line:

**\*12#xx...x#**

*where* xx...x is any number up to 16 digits long. Any combination of digits 0 through 9 may be used.

*Default:* 201 through 204 for Lines 1 through 4, respectively.

---

### 13: Dial Tone/Hot Line Number Entry

This command can serve either of two purposes:

- If the dialing mode (see command 32) has been set to “hot line”, whenever a caller on THIS line (the line you have selected for programming) picks up the handset, the TLS-5 will ring the number you enter with this command.

For example (assuming default phone numbers are in effect), to set Line 3 to ring Line 1 whenever the handset is lifted:

1. Enter programming mode.
2. Select Line 3 for programming: dial \*03#.
3. Set dialing mode for Line 3 to hot line: \*32#1#.
4. Set hot line number for Line 3 to 101 (first number) or 201 (second number): Dial \*13#101# or \*13#201#.
5. Hang up.

- If the dialing mode, command 32, has been set to “normal”, a second dial tone is given on this line when this number is dialed.

The command format is:

**\*13#xx...x#**

*where* xx...x is any number up to 16 digits long. Any combination of digits 0 through 9 may be used. *Default:* 711.

**Note:** The TLS-5C/D Call Forwarding is not compatible with hotline/ringdown.

## **20: Dial Tone Delay**

This command establishes the interval from the time the receiver is lifted to the time dial tone is heard on the line. The actual time may be longer than that programmed if calls are also being set up on other lines.

- To set the dial tone delay, enter:

**\*20#x#**

*where* x is a number between 0-511 representing tenths of seconds (511 = 51.1 seconds). *Default:* 0.1 second

## **21: Network Response Delay**

This command determines the delay time from end of dialing until a “network response” (ring back and ringing to the called line, busy, or reorder). This command does *not* apply when dialing the test numbers assigned by commands 60 - 65 or, when dialing an invalid number. (See “Response to Invalid Number”, command 31, later in this chapter.)

- To set the network response delay, enter:

**\*21#x#**

*where* x is a number between 0 and 511 representing tenths of seconds (511 = 51.1 seconds). *Default:* 0.2 seconds.

## **22: Second Dial Tone Delay**

This command sets the time from end of dialing until a second dial tone is returned to the line when the caller dials the dial tone number set by command 13. (Not applicable if the line is in hot line mode; see command 32 on page 45.)

The command is:

**\*22#x#**

*where:* x is a number between 0 and 255 representing tenths of seconds (255 = 25.5 seconds). *Default:* 0.5 second.

---

### 23: Ring Cadence, Second Phone Number

This command sets second phone numbers which can be programmed to ring a single, double, or triple ring, with on and off times as specified in this command:

**\*23#a#b#c#d#e#f#**

*where:* a is the “on” time of the first ring, b is the “off” time of the first ring, c is the on time of the second ring, and so on.

a, c, and e can be any numbers from 0 through 30 representing tenths of seconds (30 = 3.0 seconds).

b, d, and f can be any numbers from 0 through 63 representing tenths of seconds (63 = 6.3 seconds).

*Default:* 800 ms on, 400ms off, 800 ms on, 4 seconds off.

- To disable ringing, enter:

**\*23# #**

- To set the first on time and first off time to 30 and set the rest to 0 for continuous 3 seconds on/3 seconds off ringing, enter:

**\*23#30#30#**

- To set the on time to 30 and the first off time to 0 (i.e., continuous ringing), enter:

**\*23#30#0# #**

**Note** Programming a “0” for any value will cause all values following the “0” to be ignored. All lines in a hunt group must be programmed identically to avoid problems with Caller ID.

---

### 30: Response to Busy

Determines the response that will be given to callers on *other lines* if this line is busy when dialed.

- To respond to callers with a busy signal (*default*), enter:

**\*30#0#**

- To respond to callers with a reorder tone, enter:

**\*30#1#**

---

### 31: Response to Invalid Number

This command determines the response that will be given to callers on *this line* who dial a number that does *not* match any of phone numbers programmed for the other lines. The fourth response, connecting a caller to the audio port, can be used to play a recorded message or to simulate pre-recorded Special Information Tones (SITs) used by the telephone network. If a second invalid number is dialed while the first call is connected to the audio port, the second line will get reorder tone.

Regardless of the response you select, there will be a delay before the response is activated. If an invalid number beginning with “1” is dialed, the TLS-5 will simulate the telephone network’s delay by waiting until 11 digits have been entered or 8 seconds have passed.

If an invalid number beginning with any number other than “1” is dialed, the TLS-5 will respond after 7 digits have been entered or after 8 seconds have passed.

There are four responses:

**\*31#x#**

*where* x = 0, callers will hear busy tone  
 x = 1, callers will hear reorder tone (*default*)  
 x = 2, callers will hear ring back tone  
 x = 3, callers will hear silence  
 x = 4, callers will be connected to the audio port.

---

### 32: Off-hook Modes

This command may be used for either of the following:

- (1) To enable the line to ring another line without dialing (i.e., “ringdown mode” or “hot line”). A ringdown number must also be programmed.
- (2) To provide a quiet battery feed source with no call progress tones and no response to dialing “silent mode”.

A 0 setting provides normal dial operation.

- To disable ringdown and provide normal dial operation (*default*), enter:

**\*32#0#**

- To put this line in ringdown mode so that the TLS-5 automatically rings the number programmed in command 13 whenever the receiver is lifted on this line, enter:

**\*32#1#**

- To put this line in silent mode so that no dial tone is provided and the line will not respond to dialing, enter:

**\*32#2#**

**Note:** To ensure that the caller cannot dial out if the line stays off-hook at the end of a call, set the tone following disconnect command to silence:

**\*39#3#**

The default for Tone Following Disconnect is dial tone

---

### 33: Audio Port Permission

This command permits or denies access to the audio port. (This command does *not* affect the audio port access for command 31.)

- To disable audio access from this line, enter:

**\*33#0#**

- To enable audio access from this line (*default*), enter:

**\*33#1#**

---

### 34: Flash Detection

This command determines whether or not the TLS-5 will recognize a “flash” issued on this line.

A flash is used to signal for services such as calling an attendant, setting up a conference call, or transferring a call. A flash can be executed **either** by using the FLASH button (on phones that have one) **or** by momentarily pressing the switch in the telephone handset cradle (don’t do both).

- To disable switchhook flash detection; callers on this line will not be able to transfer calls or exercise other PBX-like functions, enter:

**\*34#0#**

**Note:** If you disable switchhook flash detection, the on-hook detect time will be shorter. In this situation, a switchhook flash could result in a disconnect.

- To enable switchhook flash detection (*default*), enter:

**\*34#1#**

---

### 35: Hunt Mode

This command determines how the TLS-5 will respond when more than one line is programmed with the same number, in effect setting up a “hunt group”. In a hunt group, when a dialed line is busy, the system will attempt to ring other lines in the group until it finds an available line. For more information, see Chapter 2. The options are:



This feature is activated from the line making the call and must be programmed on *each* line that makes calls in hunt mode.

Program the lines between which you want to hunt with the same number, either first or second.

**Note:** All numbers in a hunt group must be programmed in the same number type: they must all be first or second numbers.

For example: To set up a hunt group consisting of Lines 3 and 4, enter \*03# to select Line 3. (In this example “789” is the number being dialed.)

\*12# 789#, second number is 789

\*04#, select Line 4

\*12# 789#, second number is 789

**Note:** If you pick up one of the phones in the hunt group and place a call to the hunt group number, the next higher line will ring. If you pick up the phone on Line 3 from the hunt group in the above example and call 789, Line 4 will ring.

- To disable hunt mode so that the TLS-5 will only attempt to ring the first line that has this number, enter:

\*35#0#

- To cause the TLS-5 to ring simultaneously **all** lines programmed with this number. The first line to answer will be connected; all others will revert to normal operation (*default*), enter:

\*35#1#

**Note:** Caller ID, command 50, must be disabled on **all** four lines for this option to work. If Caller ID is not disabled, this setting responds like \*35#2#.

- To cause the TLS-5 to ring the *first available line* that has this number, starting from Line 1, enter:

\*35#2#

- To cause the TLS-5 to ring the *next available line* that has this number; that is, the next higher line number after the last one used (if Line 2 was the last line rung, Line 3 will be rung), enter:

\*35#3#

**Note:** For Caller ID to be sent correctly, lines in a hunt group must be programmed with the same ring cadence.

---

### 36:      **Attenuation**

This command turns down the volume of sound transmitted on this line. When there are two active calls, the TLS-5 will apply attenuation to both calls; however, attenuation will not be doubled if one attenuated line calls another.

- To disable attenuation (*default*), enter:

**\*36#0#**

- To enable attenuation, enter:

**\*36#1#**

---

### 38:      **Forced Disconnect**

This feature determines whether the calling line gets a forced disconnect when the *called* line goes back on-hook.

- To enable (*default*) forced disconnect, enter:

**\*38#1#**

**Note:** The TLS-5 cannot ring one line while sending a forced disconnect to another. If these actions are attempted simultaneously, either the ringing or the forced disconnect will be delayed until the other is finished.

- To disable forced disconnect, enter:

**\*38#0#**

---

### 39:      **Tone Following Disconnect**

This command sets the tone that will be heard after a forced disconnect or, if forced disconnect is disabled, the tone will be heard after the delay before disconnect.

If x=4, the caller will be connected to the audio port and will hear any announcement you have recorded.

**\*39#x#**

*where: x=0, dial tone (default)*

x=1, busy

x=2, reorder

x=3, silence

x=4, audio port

---

### 40:      **Call Waiting Tone**

This feature support the ability to enable or disable Call Waiting tones.

**\*40#x#**

*where* x = 0, Call Waiting tone is disabled (default TLS-5A/5B)  
 x = 1, Call Waiting single tone only 300 ms (default TLS-5C/D)  
 x = 2, Call Waiting tone for local calls is single tone and a double tone for long distance calls (the number dialed was greater than 7 digits). (TLS-5C/D only)

The TLS-5 supports the ability to Cancel Call Waiting on a per call basis by dialing \*70 prior to dialing a telephone number. The TLS-5 will not support the ability to dial \*70 in conjunction with any of the special Caller ID codes (\*67, \*87, or \*88), or the Visual Message Waiting codes (\*50, \*51).

The Call Waiting tone is a 300 ms burst of 440 Hz. The distinctive Call Waiting tone is a 100 ms on/off/of burst of 440 hz (TLS-5C/D only). The connection to the far end caller will be interrupted for a maximum of 400 ms, so that they do not hear the Call Waiting tone. If a call is waiting, and the active caller goes on-hook, the TLS-5 will send ringing to the on-hook phone.

---

### 50: Caller ID Type

This feature is programmed for the called line which will transmit the Caller ID message to the answering device. Please read Compatibility with Caller ID Devices in Chapter 2.

**\*50#x#**

*where:* x=0, no Caller ID  
 x=1, Caller ID in single message format (calling number only)  
 x=2, Caller ID in multiple message format (calling number, name, date, and time) (*default*)

- To turn Caller ID off, enter:

**\*50#0#**

- To turn Caller ID on in single message format, enter:

**\*50#1#**

- To turn Caller ID on in multiple message format (*default*), enter:

**\*50#2#**

---

### 51: Select Caller ID Name

This feature enables you to select a variety of names that can be associated with each line to simulate Caller ID information. If you wish to change the default names, see x=2, below.

**\*51#x#**

*where:* x=0, Fixed names from memory (EEPROM) for each line  
 line 1 = CLINTON BOB  
 line 2 = REAGAN RICK  
 line 3 = CARTER JOHNNY  
 line 4 = FORD GARY

x=1, Fixed names from memory  
 line 1 = MONTANA JIM  
 line 2 = MARINO DON  
 line 3 = AIKMAN TOM  
 line 4 = KELLY JOHN  
 x=2, (default) Programmable names from EEPROM  
 line 1 = ANDERSON ALLEN  
 line 2 = JONES JENNIFER  
 line 3 = SMITH SHARON  
 line 4 = MACDONALD MIKE  
 x=3, Rotating Names/Numbers  
 Alternate between names for x = 0 and 2  
 using primary and secondary numbers.

**Note:** When a line is cloned, Caller ID names are *not* cloned.

- when x = 3 each subsequent call from a line will alternate between the primary number/name (x=0) and the secondary number/name (x=2).  
 i.e. call #1 - Caller ID = 101, CLINTON BOB  
 call #2 - Caller ID = 201, ANDERSON ALLEN  
 call #3 - Caller ID = 101, CLINTON BOB

---

## 52: Program Caller ID Name

Use this command to enter the decimal equivalent of the name. Each name can have a maximum of 15 characters (e.g., Jones A., has eight characters: 6 letters, 1 space, and 1 decimal point). In order to output the Caller ID name, the following two commands must be set.

To select multiple message format for the Caller ID information, enter :

**\*50#2#**

To select the programmable default names, enter :

**\*51#2#**

Please refer to the ASCII conversion chart in Appendix C when programming the Caller ID name.

**\*52#x...#x...x#x...x#.....#x...x##**

*where:* x...x is the decimal value of the equivalent ASCII character

For example, to program Jones A., enter: **\*52#74#111#110#101#115#32#65#46##**

Note that ASCII character "32" inserts a space between the last name and the initial of the first name.

**Caution:** Using ASCII codes 0-31 may cause unknown actions for Caller ID devices. It is recommended that only codes 32-127 be used.

---

**70: Caller ID Sequence**

This command sets the sequence for the Caller ID transmission.

**\*70#x#**

*Where: see table*

**NOTE:** The default sequence for the TLS-5A/B is different from the table. The Private sequence is date, reason for no number. The Out-of-Area sequence is date, reason for no number.

X	Order Transmitted			
	Normal Message (No Dial Prefix)	Message with Checksum error (Dial Prefix = *88)	Private (Dial Prefix = *67) rn_num = reason for no number rn_name = reason for no name	Out-of-Area (Dial Prefix = *87) rn-num = reason for no number rn_name = reason for no name
0	date,number,name	date,number,name	date,rn_name,rn_num	date,rn_name,rn_num
1	date,name number	date,number,name	date,number,rn_name	date,number,rn_name
2	number,date,name	date,number,name	rn_num,name,date	rn_num,name,date
3	number,name,date	date,number,name	rn_name,number,date	rn_name,number,date
4	name,date,number	date,number,name	rn_num,date	rn_num,date
5	name,number,date	date,number,name	rn_name,date	rn_name,date
6	date only	date,number,name	date only	date only
7	number only	date,number,name	rn_num,name	rn_num,name
8	name only	date,number,name	rn_name,number	rn_name,number
9	name only	date,number,name	date,"P" in number field	date,"O" in number field

---

**90: Clone Line X**

This command copies the features programmed for another line to the current line.

**Note:** When a line is cloned, Caller ID names and the line's telephone numbers (primary, secondary, dial tone/hot line) are not cloned.

- To copy Line 1 programming to the current line, enter:

**\*90#1#**

- To copy Line 2 programming to the current line, enter:

**\*90#2#**

- To copy Line 3 programming to the current line, enter:

**\*90#3#**

- To copy Line 4 programming to the current line, enter:

**\*90#4#**

---

**99:        Programming Query**

This command is used to find out the current setting for any programmable feature. The TLS-5 will give a voice response to query commands.

- Enter the query command as:

**\*99#xx#**

*where:* xx is any command.

The following commands give special results:

**\*99#99#**, A voice speaks digits 0 through 9.

**\*99#98#**, A voice speaks the firmware version number.

**\*99#00#**, 8 seconds of 1 kHz tone are returned.

Codes 01 through 04 are not applicable query commands.

## Chapter 7: Warranty, Troubleshooting, and Return

---

### Warranty Information

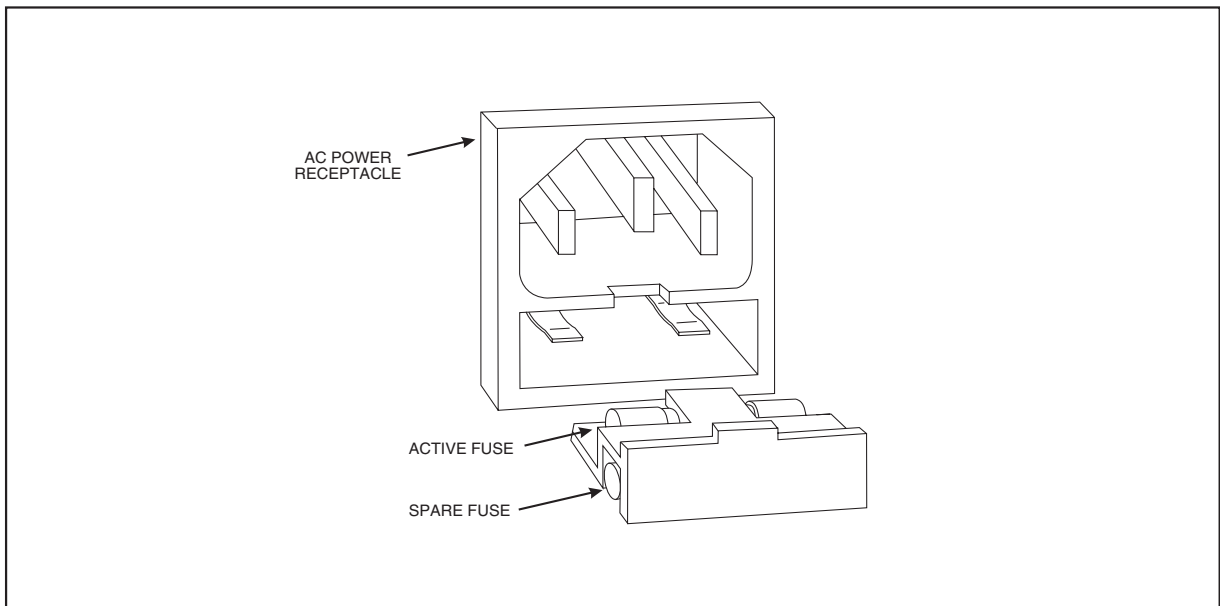
Teltone warrants this product to be free from defects in material and workmanship for a period of one year, given proper installation and usage. At its sole discretion, Teltone will repair or replace free of charge any unit found to be defective during the warranty period. Units found defective beyond the warranty period will be repaired or replaced at a flat rate.

### Troubleshooting

*Before you return a unit, check the fuse.*

If the POWER light does not come on when the unit is plugged in and turned on, change the fuse. The active fuse, and a spare, are both located in a holder on the back panel of the unit, below the power plug, as shown in Figure 6.

1. To remove the fuse holder, insert the blade of a small screwdriver into the groove at the bottom of the power plug and push outward.
2. The active fuse is the one farthest from the labeled panel; the other fuse is the spare. Remove the active fuse by pushing on either end.
3. Remove the spare fuse and insert it into the active fuse holder.



**Figure 6 Fuse Holder Location**

**Note:** If there is no spare fuse in the holder, obtain a replacement fuse of the following type: 5 x 20 mm, 0.25 Ampere, slo blow. See Chapter 9 for recommended replacement fuses.

4. Return the fuse holder to the opening in the TLS-5 back panel.
5. If the POWER light still does not come on, return the unit for repair as instructed below.

## **Return Procedures**

If a unit is found to be defective, contact Teltone customer service to obtain a RMA (Return Material Authorization) number and shipping instructions. When returning units, provide the following information:

- Unit model number, unit part number, and serial number (obtained from the Unit ID label on the bottom of the unit).
- Teltone RMA number
- All available fault information
- Complete shipping and billing address
- Repair purchase order



## Technical Support

For technical assistance on this product, call Teltone technical support at 425-951-3390 or send an email to [support@teltone.com](mailto:support@teltone.com).

## Product History

TLS-5A-01*	Initial release February 1994
TLS-5B-01**	Initial release February 1994.
TLS-5A-02	Update release September 1995
TLS-5B-02***	Update release September 1995
TLS-5C-01	Upgrade release April 1996
TLS-5D-01	Upgrade release November 1996

\* Manufacturer discontinued - replaced by TLS-5A-02.

\*\* Manufacturer discontinued - replaced by TLS-5B-02.

\*\*\* Manufacturer discontinued - replaced by TLS-5D-01.

## Chapter 8: Electrical Specifications

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### AC Power Input

Voltage	TLS-5A/5C: 115 VAC $\pm 15\%$ TLS-5B/D: 230 VAC $\pm 10\%$
Frequency	49 to 61 Hz
Current	TLS-5A/5C: 0.2 A maximum (nominal line voltage) TLS-5B/5D: 0.1 A maximum (nominal line voltage)
Fusing	0.25 A 5 x 20 mm slo blow
Unit dissipation	20 Watts maximum

### Telephone Line Circuit (Loop Start)

On-hook voltage	-48 $\pm 5$ Volts (Tip positive referenced to Ring)
Short circuit loop current	< 30 milliamps
Minimum loop current	18 milliamps with a 500-ohm loop

### Transmission Specifications

Nominal impedance	900 ohms
Insertion loss	Switchable between 3.4 dB and 16 dB $\pm 2$ dB @ 1 kHz when two lines are connected

### Ring Source

Ring voltage	78 VAC $\pm 10\%$ AC @ 20 HZ sine wave
Square wave	72 $\pm 10\%$ VRMS @ 1 REN, 20 Hz
Ring frequency	Selectable 20, 25, 30, 60 $\pm 5\%$ Hz
Drive capacity	Up to 5 ringer equivalents (5 REN) total @ 20 HZ sine wave
Ring termination on answer	Within 250 ms
Ring waveform	Selectable step approximated sine or square wave

### DTMF Detection

Frequency accept	$\pm (1.5\% + 2 \text{ Hz})$
Frequency reject	$\pm 3.5\%$
Tone-on time	40 ms minimum
Tone-off time	40 ms minimum
Amplitude	+4 to -18 dBm per frequency
Twist	6 dB or less

### Rotary Dialing Detection

Rate	8 to 22 PPS
Percent break range	40% to 80% (LSSGR 6.3.4.6)
Break time	18 ms minimum, 100 ms maximum
Make time	9 ms minimum, 75 ms maximum
Interdigit time	300 ms minimum
End-of-digit detection	100 ms minimum

### Loop Current Detect

Minimum off-hook current	15 mA
Maximum on-hook current	10 mA
Off-hook detect time	100 ms max
On-hook detect time	>Flash
Hook flash detect time	300 - 1100 ms (must detect) <280 ms > 1120 must not detect

## Ringing Cadence

Ring programming increment	100 ms
Rings per cycle	1 to 3 (programmable)
Ring "on" time	0 to 3 seconds
Ring "off" time	0 to 6.3 seconds
Reminder Ring	500 ms of power ring issued to a line

## Call Progress Tone Characteristics (Tone levels referenced to 900 ohms)

Dial tone	350 Hz $\pm 0.5\%$ and 440 Hz $\pm 0.5\%$ at -19 dBm $\pm 3$ dB per tone
Busy and reorder tone	480 Hz $\pm 0.5\%$ and 620 Hz $\pm 0.5\%$ at -19 dBm $\pm 3$ dB per tone
Audible ring back tone	440 Hz $\pm 0.5\%$ and 480 Hz $\pm 0.5\%$ at -19 dBm $\pm 3$ dB per tone
Call Waiting Tone (aka SAS)	440 Hz issued for 300 ms, repeated once after 10 seconds
Distinctive Ring/Call Waiting	440Hz issued for 100 ms on/ 100 ms off / 100 ms on, repeated after 10 seconds (indicates dialed number is greater than 7 digits in length)
CAS Tone & timing	2750 Hz + 2130 Hz for 80 ms @ -23 dBm nominal (900 ohm)
Confirmation Dial Tone	Same as 3 burst Stutter Dial Tone
Recall Dial Tone	Same as 3 burst Stutter Dial Tone
3 burst Stutter Dial Tone	3 sequences of 100 ms on / 100 ms off of 350 Hz/440Hz, then continuous
10 burst Stutter Dial Tone	10 sequences of 100 ms on / 100 ms off of 350 Hz/440Hz, then continuous
Continuous Stutter Dial Tone	350 Hz/440Hz at a rate of 150 ms on and 150 ms off

## Audio Input/Output Jack

Audio In impedance	10 k ohms
Audio gain (jack to Tip/Ring)	~ -10.5 dB (-10 dBm out with 1 V in)
Audio Out impedance	600 ohms
Audio gain (Tip/Ring to jack)	~ 0 dB
Relay contact rating	1 Form A contact, 100 Volt maximum, 1 A maximum, 30 volt-amps maximum
Connector pinout	Pin 1: relay contact Pin 2: ground Pin 3: relay contact Pin 4: audio in to TLS-5 Pin 5: audio out from TLS-5 Shell ground: ground

## Caller ID

FSK Output Level	-26dBm $\pm$ 2dB
TR-NWT-000031M, Bellcore Publication, CLASS Feature: Calling Number Delivery (CND), Issue 4, 12/92	
TR-NWT-001188, Bellcore Publication, CLASS Calling Name Delivery (CNAM), Issue 1, 12/91	

## Mechanical Specifications

Dimensions	2.3" H x 8.5" W x 10.0" D (58 x 22 x 254 mm)
Weight	4 lb. 5 oz. (unit only)

## Environmental Specifications

Storage temperature:	
Short-term storage	-40 to +55 degrees C
Long-term storage	-20 to +50 degrees C
Operating temperature	0 to 45 degrees C
Humidity	85% noncondensing, maximum

## **TLS-5 Reference Manual**

### **Regulatory Compliance**

#### **Safety**

United States

UL 1459

Canada

CSA C22.2 No. 225-M90

#### **EMC**

United States

FCC Part 15, Class A

## Chapter 9: Ordering Information

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TLS-5-UP1	UPGRADE KIT for TLS-5 (upgrade from -01 to -02 firmware). Factory installation is optional.
TLS-5-UP2	Upgrades a TLS-5A to a TLS-5C.
TLS-5-UP4	Upgrades a TLS-5B to a TLS-5D.

TLS-5C-01	Telephone Line Simulator with AC power cord and reference manual (this document). This unit accepts 115 VAC.
TLS-5D-01	Telephone Line Simulator includes reference manual (this document). This unit accepts 230 VAC. This unit does <i>not</i> include a power cord.

### Optional Components

730-00039-03 (replacement)	AC power cord, three-pronged, power cord (No. 18-3), type SVT rubber, with NEMA 5-15 P male/SPH-386 female connectors.
----------------------------	--

### Replacement Fuses

Below are a list of fuses, with their part number and manufacturer's name, which you can purchase from an electronics distributor.

Bussman	GMD-250 mA
SAN-O Industrial Corporation	SD6-250
Littlefuse	239.250

## Appendix A: Glossary

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Some terms in this glossary were defined with the assistance of *Newton's Telecom Dictionary*. To order a copy, call 1-800-LIBRARY or write to: Telecom Library Inc., 12 West 21 Street, New York, New York 10010.

**2500 set**

The standard single-line Touch-Tone desk telephone.

**ACK**

Shorthand term for the DTMF ACKnowledgement issued by a CPE device to request sending of the FSK Caller ID information

**Busy Tone**

A signal generated by the Central Office indicating that the line you are calling is busy.

**Call Progress Tone**

A tone sent from the switch to tell the caller of the progress of the call. Examples are audible ringing, re-order, busy, timing, etc.

**CAS**

CPE Alerting Signal - BellCore term for tone used to alert CPE equipment of Call Waiting, asking for ACKnowledgement prior to sending Caller ID.

**Central Office**

Telephone company facility where subscribers' lines are joined to switching equipment for connecting other subscribers to each other, locally and long distance. (Also called CO.)

**CIDCW**

Caller ID in Call Waiting - BellCore term for Caller ID sent during an active call

**DTMF**

Also called Touch-tone. Dual-tone multi-frequency. Push-button telephone signaling.

**Forced disconnect**

Method used by the telephone company to clear a line. When the called party goes on-hook, the Central Office returns an open (that is, drops loop current) of at least 800 ms to the calling party. This is also known as Calling Party Control (CPC), or Cutoff On Disconnect (COD), or Disconnect Supervision.

**FSK**

Frequency Shift Keying - A modulation technique that defines bits 0 and 1 as different frequencies for use in analog data transmissions

**Ground start**

One of two types of switched telephone lines (outside lines) typically leased from telephone companies, the other type being loop start. A ground start telephone line initiates an outgoing telephone line seizure by applying a local resistance up to 550 ohms from ground to the tip conductor.

**Key Telephone System**

A telephone system in which the telephones have multiple buttons that permit a user to select outgoing or incoming Central Office phone lines directly.

**Loop start**

One of two types of switched telephone lines (outside lines) typically leased from telephone companies, the other type being ground start. A loop start telephone line is seized by connecting a low resistance between the tip and ring (both wires) of the telephone line. This occurs whenever a telephone or modem goes off-hook. If you need to find out if a line is loop start, call the telephone company.

**Off-hook**

The telephone is in an off-hook state when the handset is removed from the cradle. A modem or other device is off-hook when it answers a call or when it seizes a line to initiate a call.

**Public Switched Telephone Network (PSTN)**

Refers to the worldwide voice telephone network accessible to those with telephones and access privileges (It was formerly called the Bell System network or the AT&T long distance network.)

**Reorder Tone**

A tone that sounds like the busy signal, but is twice as fast. It indicates that all switching paths are busy. If you hear a reorder or fast busy, hang up and dial the number again.

**SAS**

Subscriber Alerting Signal - BellCore term for Call Waiting Tone

**SCWID**

Spontaneous Call Waiting with ID(Caller ID) - NorTel term - same as CIDCW

## Appendix B: Programming Quick Reference

Description	Command	Option	Default
Reset to Defaults	*00#x#*00#x#	x=0, reset entire unit x=1, reset Line 1 x=2, reset Line 2 x=3, reset Line 3 x=4, reset Line 4	—
Select Line 1 for programming	*01#	—	—
Select Line 2 for programming	*02#	—	—
Select Line 3 for programming	*03#	—	—
Select Line 4 for programming	*04#	—	—
Audio Access Mode	*05#x#y#z	x = 0, monitor mode (y & z must be 0) x = 1, immediate access x = 2, dial access  y =0, single user y =1, multiple user  z = 0, disconnect at on-hook z = 1, disconnect at end-of-message	dial access, single user, on-hook  *05#2#0#0#
Audio Port Access Number	*06#x#	x = 0-16 digits	411 *06#411#
Ring Type	*07#x#	x = 0, 20 Hz synthesized sine wave ( <i>default</i> ) x=1, 25 Hz synthesized sine wave x=2, 30 Hz synthesized sine wave x=3, 60 Hz synthesized sine wave x=4, 20 Hz square wave x=5, 25 Hz square wave x=6, 30 Hz square wave x=7, 60 Hz square wave x=8, 17 Hz synthesized sine wave x=9, 17 Hz square wave	x = 0, 20 Hz synthesized wave
Confirmation and Error Signals	*08#0#	disable	enable *08#1#
	*08#1#	enable	
Disconnect Timer	*09#x#	x=10 - 200 (1 to 20 seconds)	2 seconds *09#20#
First Phone Number	*11#xx...x#	x = 0 to 16 digits (0 through 9)	101-104
Second Phone Number	*12#xx...x#	x = 0 to 16 digits (0 through 9)	201-204
Dial tone/Hotline Number	*13#xx...x.#	x = 0 to 16 digits (0 through 9)	711



Description	Command	Option	Default
Dial Tone Delay	*20#x#	x = 0 to 511 (51.1 seconds)	0.1 sec
Network Response Delay	*21#x#	x = 0 to 511 (51.1 seconds)	0.2 sec
Second Dial Tone Delay	*22#x#	x = 0 to 255 (25.5 seconds)	0.5 sec
Ring Cadence, Second Phone Number	*23#a#b#c#d#e#f#	a, c, e = 0 to 30 (3 seconds) b, d, f = 0 to 63 (6.3 seconds)	TLS-5A/ B 1 sec on, 1 sec off, 1 sec on, 3 sec off TLS-5C/D .8 sec on, .4 sec off, .8 sec on, 4 sec off.
Response to Busy	*30#0#	busy tone	busy *30#0#
	*30#1#	reorder tone	
Response to Invalid Number	*31#x#	x = 0, busy x = 1, reorder x = 2, ring back x = 3, silence x = 4, audio port connection	reorder *31#1#
Off-hook (hotline/silent/ normal)	*32#0#	normal	normal *32#0#
	*32#1#	hotline (ringdown)	
	*32#2#	silent	
Audio Port Permission	*33#0#	disable	enable *33#1#
	*33#1#	enable	
Flash Detect	*34#0#	disable	enable *34#1#
	*34#1#	enable	
Hunt Mode	*35#x#	x = 0, off x = 1, ring all x = 2, ring first available x = 3, ring next	ring all *35#1#
Attenuation	*36#0#	disable	disable *36#0#
	*36#1#	enable	
Forced Disconnect	*38#0#	disable	enable *38#1#
	*38#1#	enable	
Tone Following Disconnect	*39#x#	x = 0, dial tone x = 1, busy x = 2, reorder x = 3, silence x = 4, audio port	dial tone *39#0#

Description	Command	Option	Default
Call Waiting Tone	*40#x#	x = 0, disable x = 1, enable single tone alert x = 2, enable single & distinctive tone (5C only)	TLS-5A/B, x = 0 TLS-5C, x = 1
Caller ID Type	*50#x#	x = 0, no Caller ID  x = 1, Caller ID in single message format (SMF)  x = 2, Caller ID in multiple message format (MDMF)	x=2
Select Caller ID Name	*51#x#	x=0, fixed names are retrieved from memory (EEPROM) for each line line 1 = CLINTON BOB line 2 = REAGAN RICK line 3 = CARTER JOHNNY line 4 = FORD GARY  x=1, fixed names retrieved from memory line 1 = MONTANA JIM line 2 = MARINO DON line 3 = AIKMAN TOM line 4 = KELLY JOHN  x=2, (default) names retrieved from user programmable EEPROM, the default names are: line 1 = ANDERSON ALLEN line 2 = JONES JENNIFER line 3 = SMITH SHARON line 4 = MACDONALD MIKE  x=3, will alternate between selections 0 and 2 with the primary and secondary numbers:	x=2
Program Caller ID Name	*52#x..x#x..x#x..x##	x...x = decimal value of the equivalent ASCII character. Names can have a maximum of 15 characters.	—
Dial Tone Number	*60#x#	x = 0 - 16 digits	83781 or "TEST1"
Busy Tone Number	*61#x#	x = 0 - 16 digits	83782 or "TEST2"
Reorder Tone Number	*62#x#	x = 0 - 16 digits	83783 or "TEST3"
Ring Back Tone Number	*63#x#	x = 0 - 16 digits	83784 or "TEST4"
Silence Number	*64#x#	x = 0 - 16 digits	83785 or "TEST5"
Stuttered Dial Tone	*65#x#	X = 0 - 16 digits	83786 or "TEST6"
Set Date/Time for Caller ID	*68#mm#dd#hh#mm#	mm = month (1-12) dd = day (1-31) hh = hour (0-23) mm = minute (0-59)	*68#8#6#5#30# (08/06 05:30)

Description	Command	Option	Default
Selectable Dial Tone	*69#x#	x = 0, standard 350/440 Hz x = 1, 400 Hz single tone x = 2, 440 Hz single tone x = 3, 480 Hz single tone x = 4, 620 Hz single tone x = 5, 350/440 Hz continuous stutter dial tone 150 ms on, 150 ms off continuous stutter	*69#0#
Caller ID Sequence	*70#x#	x = 0 date, number, name x = 1 date, name, number x = 2 number, date, name x = 3 number, name, date x = 4 name, date, number x = 5 name, number, date x = 6 date only x = 7 number only x = 8 name only x = 9 name only	*70#0# date, number, name
Visual Message Waiting Audible Response	*71#x#	x = 0 three burst then continuous dial tone x = 1 10 burst then continuous dial tone x = 2 continuous stutter dial tone	*70#0#
Visual Message Waiting format	*72#x#	x = 1 single message format x = 2 multiple message format	*72#1#
Conference Type	*73#x#	X = 0 Three-Way Calling X = 1 PBX call conferencing	*73#0#
Clone Line x	*90#x#	x = 1, clone from Line 1 x = 2, clone from Line 2 x = 3, clone from Line 3 x = 4, clone from Line 4	—
Programming query	*99#x#	x = any valid command (05 and higher)	—

## Appendix C: ASCII Conversion Chart

Character	Decimal	Character	Decimal	Character	Decimal	Character	Decimal
NUL	0	SP (space)	32	@	64	'	96
SCH	1	!	33	A	65	a	97
STX	2	"	34	B	66	b	98
ETX	3	#	35	C	67	c	99
EOT	4	\$	36	D	68	d	100
END	5	%	37	E	69	e	101
ACK	6	&	38	F	70	f	102
BEL	7	'	39	G	71	g	103
BS	8	(	40	H	72	h	104
HT	9	)	41	I	73	i	105
LF	10	*	42	J	74	j	106
VT	11		43	K	75	k	107
FF	12	,	44	L	76	l	108
CR	13	-	45	M	77	m	109
SO	14	.	46	N	78	n	110
SI	15	/	47	O	79	o	111
DLE	16	0	48	P	80	p	112
DC1	17	1	49	Q	81	q	113
DC2	18	2	50	R	82	r	114
DC3	19	3	51	S	83	s	115
DC4	20	4	52	T	84	t	116
NAK	21	5	53	U	85	u	117
SYN	22	6	54	V	86	v	118
ETB	23	7	55	W	87	w	119
CAN	24	8	56	X	88	x	120
EM	25	9	57	Y	89	y	121
SUB	26	:	58	Z	90	z	122
ESC	27	;	59	[	91	{	123
FS	28	<	60	\	92		124
GS	29	=	61	]	93	}	125
RS	30	>	62		94	~	126
US	31	?	63	—	95	DEL	127

Caution: Using ASCII codes 0-31 may cause unknown actions for Caller ID devices. It is recommended that only codes 32-127 be used for programming Command 52.