

TLS-3B

Telephone Line Simulator



40-400-00032, Rev. A
Covers Model TLS-3B-01

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Regulatory Compliance:

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 when the equipment is operated 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 in which case the user will be required to correct the interference at his own expense.

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Introduction

The Teltone TLS-3B is a portable, two-line device that emulates the public telephone network. The TLS-3B is a tool for demonstrating telephone instruments and other telecommunications equipment such as fax machines and modems. The TLS-3B's small size and light weight make it ideal for trade shows and other sales presentations, and for testing telephone sets, key systems, and PBX installations.

Like the public telephone network but on a smaller scale, the TLS-3B can provide dial tone, audible ring and busy signals to the telephone or other device connected to it. When a caller uses one phone or other device to dial up the second phone, the TLS-3B sends ringing current to the second phone until it goes off-hook. The TLS-3B then establishes a connection between the two phones. Either telephone can then initiate a disconnect sequence by going on-hook.

Many of the TLS-3B's features are programmable, including telephone numbers, off-hook modes, signal delays, test tone frequencies and line attenuation. The TLS-3B also provides Caller Identification information to both lines, and lights a Visual Message Waiting indicator.

In other words, the TLS-3B is a simple telephone network in a box. When a telephone connection is not available, or when installing a temporary telephone line would be costly, the TLS-3B provides all the signals and functions you will need to demonstrate or test your telephones, modems, and other telecommunications equipment.

1. TLS-3B Connectors and Lights

The front panel of the TLS-3B has two telephone line jacks, with a green status indicator light for each line, and a green Power indicator light. The power input connector is on the rear panel.

Status Lights

When a telephone (or other device) connected to one of the Line connectors is off hook, the corresponding Line indicator lights. The Line light dims (not totally dark) when the TLS-3B decodes valid DTMF from the off-hook device. If the off-hook device sends rotary dialing signals, the line indicator will flicker on and off during dialing.

When the TLS-3B sends a ringing signal to a telephone attached to one of the Line connectors, the corresponding Line indicator flickers on and off rapidly.

The green Power indicator alternates between full and half brightness (blink) when the TLS-3B is operating. (Single blink = Setup 1, double blink = Setup 2. See Section 5 for more information.) If the Power indicator is dark, no power is connected to the TLS-3B. If it lights, but does not flicker, the TLS-3B's internal processor is not working properly.

Line Jacks

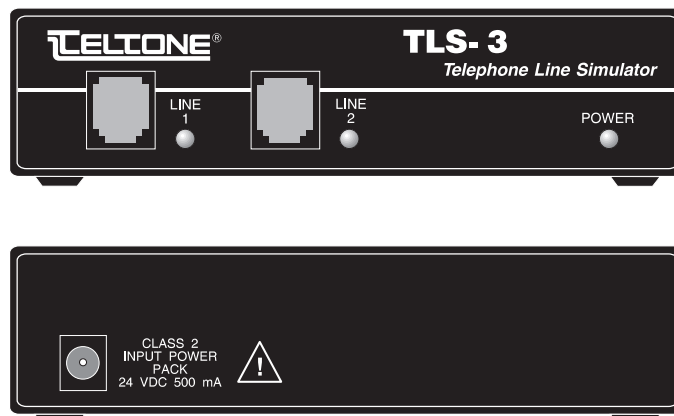
Two Line connectors (RJ-11 modular telephone jacks) are located on the front panel. These connectors mate with the plugs on standard modular telephone cords.

Power Connector



The power connector requires a 24-volt DC power source. A 120-VAC 24-volt DC power pack is supplied with the TLS-3B. Do not use the TLS-3B with a power pack that supplies a different voltage. Use only with a Class 2 power supply!

Figure 1 TLS-3B Front and Rear Panels



2. How to Install the TLS-3B

The TLS-3B works with analog loop start telephone sets only. It will not work with ground start, proprietary, or digital phone sets.

Follow these steps to install the TLS-3B:

1. Plug the connector at the end of the power pack cable into the connector on the rear panel of the TLS-3B.
2. Plug the power pack into a 120-volt AC wall outlet. The POWER indicator will light.
3. Use a modular telephone cable to connect the telephones (or other devices such as modems or fax machines) to the Line 1 and Line 2 connectors of the TLS-3B.
4. Lift the handset of the telephone connected to Line 1. The Line 1 indicator should light. Hang up and do the same thing for Line 2.

Figure 2 shows a typical installation.

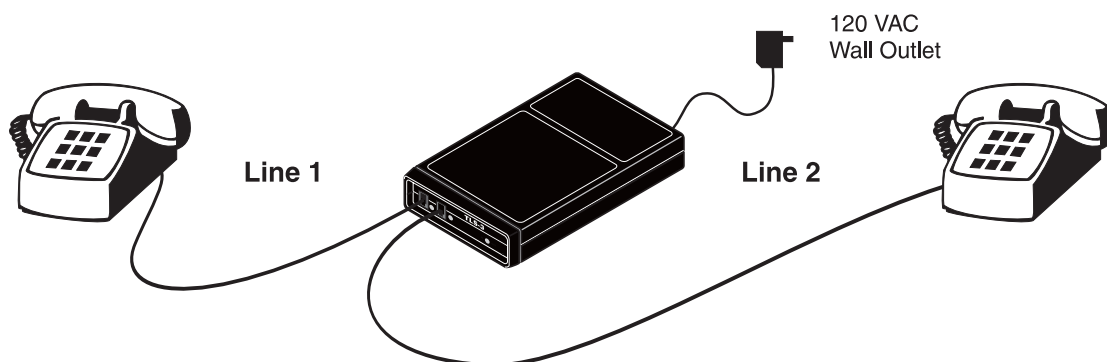
WARNING: Do not try to connect the TLS-3B to the public telephone network. Incoming ringing signals use voltages that can damage internal components in the TLS-3B.

WARNING: The TLS-3B generates a 100-volt ringing signal. Keep your hands away from the plugs at the end of modular cables plugged into the TLS-3B when the other line is off hook.

Installing a Call Identifier

In order to use the TLS-3B's Caller ID feature, you must use an external call identifier, or a telephone set with Caller ID built in. In most cases, the call identifier goes between the TLS-3B and the telephone set, but follow the instructions supplied with the call identifier. When the call identifier manual tells you to plug a cable into a wall outlet, connect it to the TLS-3B.

Figure 2 Typical TLS-3B Installation



3. How to Operate the TLS-3B

The TLS-3B has one talk path between the two lines. When a telephone connected to either line goes off-hook while the other is still on-hook, the off-hook telephone receives dial tone. If a telephone is already off-hook, the second telephone will not receive dial tone (silence).

The TLS-3B stores two separate configurations, called Setup 1 and Setup 2. This enables two different users to store settings they use often (for example, the sales staff might use the TLS-3B in one setup, and engineering the other). In Setup 1, the Power LED blinks once; in Setup 2 it blinks twice. See Section 5 for more information.

Each line has two programmable telephone numbers. Section 5 of the User's Guide contains instructions for setting the telephone numbers. To call the other telephone, lift the handset and dial one of the numbers assigned to the telephone you want to call. The TLS-3B recognizes both rotary (pulse) and tone dialing.

The default telephone numbers for the two lines are:

Line 1 = 101 and 201

Line 2 = 102 and 202

To call Line 2:

(Primary) Dial 102

One long ring, repeated until answer
2 seconds on, 4 seconds off

(Secondary) Dial 202

Two short rings (programmable)
(800 mS on, 400 mS off, 800 mS on,
4 seconds off

To call Line 1:

(Primary) Dial 101

One long ring, repeated until answer
2 seconds on, 4 seconds off

(Secondary) Dial 201

Two short rings (programmable)
(800 mS on, 400 mS off, 800 mS on,
4 seconds off

When the other telephone rings, lift the handset to answer. The two telephones are now connected. To break the connection, hang up either telephone.

The Caller ID transmission sends the primary telephone number of the caller's line.

Calling Party Supervision

The U.S. telephone network typically uses Calling Party Supervision, meaning that even though the called party hangs up, he may be reconnected 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 timeout and disconnect the call within 5-20 seconds, giving the called party dial tone when he goes off-hook again.

The TLS-3B also provides Calling Party Answer Supervision. If the called party goes on-hook and comes off-hook again before the forced disconnect or disconnect tone is sent, the call will be reestablished. However, if the calling party goes on-hook and then goes back off-hook again after the forced disconnect is sent, the call will not be reestablished.

Forced Disconnect

Cutoff On Disconnect (COD) or Forced Disconnect, as it is also called, is a feature provided by the TLS-3B. COD is a break in loop current that is sent to the off-hook telephone when the other party goes on-hook (hangs up). The COD pulse duration is programmable as explained in Section 5 (default is 850 ms). The COD delay (the time from on-hook until the COD pulse is sent) is also programmable, but only for the calling party when the called party goes on-hook. When the calling party goes on-hook, the COD delay is always two seconds before the COD is issued to the called party.

Off-Hook Modes

The off-hook mode specifies what you hear when you lift the receiver on one of the telephones connected to the TLS-3B. The three off-hook modes are Normal, which provides dial tone; Ringdown, which causes the other telephone to ring; and Silence, which connects the telephone to silence. The Normal mode is the default. Section 5 of this User's Guide contains instructions for setting the off-hook mode.

Table 1 LED Indicators

Indicator	State	Description
Line 1/Line 2	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
	Dim blinking between rings	Caller ID is being sent to the called phone number
PWR	Single blink	Setup 1
	Double blink	Setup 2

4. Caller ID

The TLS-3B provides optional Caller ID (FSK) signaling on both lines. It supports both Single Message Format (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. A typical standard ringing period is composed of a two second ringing cycle and a four second silent interval. Distinctive ringing periods may be several short ringing cycles followed by at least a three second silent interval. The TLS-3B is capable of many different types of ringing cycles and silent periods (see Programming section), 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-3B, it may appear on the telephone itself, in the display of a separate device, or on the video display of a personal computer.

Caller ID Date/Time

The TLS-3B issues a Date/Time value of 01/01 1:05 for the initial call after power is applied. Subsequent calls will increment the time by 5 minutes. The Date/Time will be reset back to the initial value of 01/01 1:05 if power is cycled on the TLS-3B.

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-3B can simulate these events.

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

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.

Please 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-3B with seven-digit numbers.

Using Caller ID Prefixes

Caller ID messages can be changed with one of three prefixes, entered before the number you are dialing:

- *67 = Private
- *87 = Out of area call
- *88 = Check sum error

For example, dialing *67 102 will ring Line 2 (assuming the default phone numbers are used) and change the Caller ID message to a private message.

Dialing *87 102 will change the Caller ID message to an “out of area” call. The Caller ID display will indicate that the call originated from an area in which Caller ID is unavailable.

Note: Depending on the type of Caller ID display you are using, if private or out-of-area feature is invoked, the date and time will be shown, but not the number or name.

Dialing *88 102 will simulate a Caller ID checksum error. 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 or ten digit number. If this is the case with the device you are using, program the TLS-3B with seven or ten digit numbers as required.

Visual Message Waiting Indication

VMWI (Visual Message Waiting Indication) is a FSK signal issued by the Central Office when a customer has a recorded voice message waiting to be retrieved. This FSK burst is an on-hook signal that is sent after an OSI (Open Switching Interval) which is a period of silence after some action. The TLS-3B can be used to simulate this signal (VMWI) by going off-hook on one of the lines and entering *50 to activate VMWI or *51 to de-activate VMWI for the other line.

Note: Different manufacturers Caller ID equipment react differently to this signal. See your equipment manual for details.

Commands:	*50	Activates VMWI
	*51	De-activates VMWI

5. Programming the TLS-3B

The TLS-3B has a long list of features and functions that a user can configure from a touchtone telephone connected to either line. The TLS-3B will store two separate configurations in memory. This enables, for example, two separate groups (such as Engineering and Sales) to set up and use the TLS-3B for their applications. When programming and using Setup 1, the Power LED will blink once, when programming and using Setup 2, the Power LED will blink twice.

All programming commands begin with an asterisk (*) and end with a pound sign (#). You can cancel a command before it is complete, by entering an asterisk before the final pound sign. In some cases, a second asterisk may be necessary to cancel the command. The response from the TLS-3B will be three short tones.

Many commands either enable or disable specific functions in the TLS-3B. In all of these commands, 0 disables the function, and 1 enables it. For example, the command *10#0# disables the hook-flash detect function. *10#1# enables the hook-flash detect function.

Commands are broken into two types, System Functions that affect both lines, and Individual Line Functions that affect only the line being programmed.

Follow these steps to enter Programming Mode:

1. Lift the handset on one of the telephones.
2. When you hear dial tone, enter **99## for Setup 1 mode, or **98## for Setup 2 mode. You will hear three short beeps verifying proper program mode access. The LED for the line selected will blink on and off at a slow rate indicating the programming mode and the Power LED will blink once for Setup 1 and twice for Setup 2.
3. When you enter a programming command correctly, you will hear three short tones (confirmation beeps). If you enter an incorrect command, you will hear alternating high and low tones (error beeps).

SYSTEM COMMANDS

Programming Mode

To enter programming mode from

Line 1 or Line 2:	**99## (Setup 1)
	**98## (Setup 2)

Reset	*00#0#*00#0#
--------------	--------------

This command resets all options to the factory defaults, both Setup 1 and Setup 2.

Tone Following Disconnect

These commands define the type of tone a caller hears when the other line disconnects:

Dial Tone	*04#0# (default)
Busy Signal	*04#1#
Reorder Signal	*04#2#
Silence	*04#3#

Forced Disconnect (COD) Duration *05#time#

This command sets the time duration of the line break to the off-hook device. The time specifies the number of 50 mS increments. The range is from 0 to 100 (100 = 5 seconds). For example, to set disconnect to 850 mS (default), use 17 X 50 = 850 mS).

Cut-off on Disconnect Delay *06#time#

This command sets the amount of time after the called party hangs up until the calling party is sent the forced disconnect signal (COD). The time specifies the number of 100 mS increments. The range is from 11 (1.1 seconds) to 200 (20 seconds) and the factory default is 2 seconds, i.e., *06#20#.

Ringling Frequency

This command defines the frequency of the signal that the TLS-3B will use as a "RING".

- 20 Hz *07#0# (default)
- 25 Hz *07#1#

Hook-flash Detect

When Hook-flash detect is active, the TLS-3B will detect a switchhook flash after the other line has answered. The TLS-3B will return dial tone and allow the user to dial test numbers or one of the port numbers.

- Disable Hook-flash Detect *10#0# (default)
- Enable Hook-flash detect *10#1#

Line Attenuation

This command defines the signal loss of the talk path from one line to the other. This command also affects the level of the call progress signals, e.g. Dial Tone, Busy, Reorder, and Ringback.

- Set attenuation to 6 dB *09#0# (default)
- Set attenuation to 16 dB *09#1#

Test Numbers

These commands define the test telephone numbers. The name of the tone indicates the type of signal you will hear when you dial the number. Test numbers may be up to sixteen digits long. Valid digits are 0-9.

- Dial Tone Default = 83781 (Test 1) *60#number#
- Busy Signal Default = 83782 (Test 2) *61#number#
- Reorder Tone Default = 83783 (Test 3) *62#number#
- Ringback Tone Default = 83784 (Test 4) *63#number#
- Silence Default = 83785 (Test 5) *64#number#

Busy Signal

This command defines the response to a busy condition. If the other line is off-hook when you dial its number, the TLS-3B will return an audible busy indication, which may be either a busy signal or a reorder tone.

Busy Signal	*30#0# (default)
Reorder Tone	*30#1#

Non-Valid Number Signal

This command defines the non-valid number signal. When you dial a number that is not programmed to ring the other line or reach a test tone, the TLS-3B returns an audible non-valid number signal, which may be either a busy signal or a reorder tone.

Busy Signal	*31#0#
Reorder tone	*31#1# (default)

Off-Hook Mode

The off-hook mode specifies what you hear when you lift the receiver on one of the telephones connected to the TLS-3B. The three off-hook modes are Normal, which provides dial tone; Ringdown, which causes the other telephone to ring; and Silence, which connects the telephone to silence. The Normal mode is the default. Use one of these commands to set the Off-Hook Mode:

Normal (dial tone)	*32#0# (default)
Ringdown	
Primary Ringing Cadence	*32#1#
Secondary Ringing Cadence	*32#2#
Silence	*32#3#

Caller ID Format

This command specifies the type of Caller ID/Visual Message Waiting Indicator (VMWI) message format the currently selected line will use. This option is controlled by the called line.

No Caller ID/VMWI	*50#0#
Single Message Format	*50#1#
Multiple Message Format	*50#2# (default)

Caller ID Names

This command selects the Caller ID name that the calling line will send. This option is controlled by the calling line.

Line 1: Clinton Bob / Line 2: Reagan Rick	*51#0#
Line 1: Montana Jim / Line 2: Marino Jim	*51#1#
Line 1: Anderson Allen / Line 2: Jones Jennifer	*51#2# (default)
Sequence through all names and numbers	*51#3#

Dial Tone Delay *20#time#
Range = 0 to 511 in 100 mS increments. The factory default is 100 mS.

Network Response Delay *21#time#
Range = 0-511 in 100 mS increments. The factory default is 200 mS.

Second Dial Tone Delay *22#time#
Range = 0-255 in 100 mS increments. The factory default is 500 mS.

Secondary Number Ring Cadence *23#x#y#x#y#x#y# Default
is 800 ms on, 400 ms off, 800 ms on, and 4000 ms off. The factory
default is *23#8#4#8#40#0#0# .

Busy Signal *30#X#
Busy Signal X = 0 (default), Reorder Tone X = 1

Non-Valid Number Signal *31#X#
Busy Signal X = 0, Reorder Tone (default) X = 1

Off-Hook Mode *32#X#
Normal (dial tone) X = 0 (default), Ringdown Primary # - X = 1,
Ringdown Secondary # - X = 2, Silence - X = 3

Caller ID/VMWI Format *50#X#
None X=0, Single Message Format X = 1, Multiple Message Format X=2
(default)

Caller ID Names

Line 1: Clinton Bob / Line 2: Reagan Rick	*51#0#
Line 1: Montana Jim / Line 2: Marino Don	*51#1#
Line 1: Anderson Allen / Line 2: Jones Jennifer	*52#2# (default)
Sequence through all names and numbers	*51#3#

7. Specifications

Physical

Dimensions	5.5" x 1.5" x 9.0"
Weight	1 lb, 5 oz

Environmental

Operating temperature	0° to +50° C @ 95% humidity, non-condensing
Storage temperature	-20° to +60° C long term

Electrical

Power input	24 VDC nominal, 500 mA minimum
On hook voltage	-42 VDC nominal
Ringing voltage	≥ 50 VAC RMS @ 20 Hz, @ 3 REN

Signaling

Ring frequency	20 or 25 Hz
Ring wave form	Rounded square wave
Dial tone delay	0 - 511 mS in 100 mS increments. Default = 100 mS.
Network response delay	0 - 511 mS in 100 mS increments. Default = 200 mS.
Line attenuation	-6 dB or -16dB
Call progress signals	
Dial tone	350 + 440 Hz continuous
Ringback	440 + 480 Hz follows ringing cadence
Busy	480 + 620 Hz 500 ms on/500 ms off
Reorder	480 + 620 Hz 250 ms on/250 ms off
Tone output level	-19 dBm nominal w/low attenuation -24 dBm nominal w/high attenuation
Forced disconnect duration	850 mS ± 25 ms
Line impedance	900 Ω ± 20%
Dialing requirements	
Rotary	8 - 12 pps
DTMF tone on/off	>40 ms
On/off-hook detect	<6 ma = on-hook >18 ma = off-hook
Off-hook loop current	>25 ma with 400 Ω total loop resistance
On-hook detect	>400 mS (switchhook flash disabled) >1100 mS (switchhook flash enabled)

Caller ID/VMWI

Operation is per guidelines set in Bellcore Document TR-NWT-000030, Issue 2, Oct 92

Output level:

low attenuation	-17dBm +3 to -4dBm
high attenuation	-28 dBm +3 to -4dBm
Transmission Rate	1200 ± 12 baud
Mark (Logic 1)	1200 Hz ± 12 Hz
Space (Logic 0)	2200 Hz ± 22 Hz

Visual Message Waiting Indicator (VMWI) will operate as specified in Bellcore Document TR-NWT-001401, Issue 1, Sept 93 and FSD 01-02-2000.

8. Warranty and Service

Warranty Information

Teltone warrants this product to be free from defects in material and workmanship for a period of two years, 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.

Return Procedures

If a unit is found to be defective, contact Teltone Repair Order Entry at 1-800-426-3926 or 425-487-1515 to obtain a Material Return Authorization (MRA) number. When returning units, provide the following information:

Unit model number, unit part number, and serial number

- Teltone MRA number
- All fault information available
- Complete shipping and billing address
- Repair purchase order

When returning a unit, ship it to:

Teltone Corporation
ATTN: (write MRA number here)
22121-20th Avenue SE
Bothell, WA 98021-4408

Technical Assistance

For technical assistance on this product, call Teltone Corporation at **1-800-426-3926** or 425-487-1515 and ask for TLS Technical Support.