Test-Um Inc.
The Intelligent Test Solutions Company

TG300
Part No.

Latch-Test™

TONE GENERATOR & CONTINUITY TESTER

FOR SECURITY/ALARM SYSTEMS

Operating Instructions

Latch-Test™ is a tone generator specifically designed for the security and alarm industry, or anyone testing for switch loops. The Latch-Test™ has a state-of-the-art, constant output tone generator integrated with a six-mode continuity tester that both indicates real-time state of a circuit's continuity, or latches the occurrence of the selected-type event. The continuity indication can be both visual and audible, or visual only. As with all Test-Um Inc. products, battery life is maximized by low-power circuitry, regulated outputs, auto-off and battery low indicator.

FEATURES

Tone Generator

- Two tone amplitude levels—normal and half
- Half amplitude is *unbalanced* for stronger signal on twisted pairs
- Three distinctly different tones selected from front panel
- *Constant Amplitude Signal* over life of battery for 100% signal strength all the time
- *Auto-off* of tone after 3 hours—no dead battery if left on

Continuity Tester

- *Six continuity modes*—Normally Open (N.O.), Normally Closed (N.C.) indication modes: either direct reading, latched, or auto-reset latched
- Audible and visual indication of continuity results, audible can be turned off
- *Auto-off* after 20 minutes in continuity mode

General

- Compact, durable case with recessed control panel
- Lanyard attachment loop
- High-quality silicon alligator-clips cable permanently attached
- RJ jack allows use of modular cable without adapters
- Battery low indicator

Note: The RJ jumper cable that has been provided with the Latch-Test™ uses a unique, colored modular connector that can be plugged into a RJ11 jack, or a RJ45 jack, without damaging either. It thereby allows CAT 5 output points to be accessed without using an adapter.

Warning!

Do not attach to live AC circuits. This could cause an extreme shock hazard and damage the Latch-Test™. Attachment to an unknown circuit should always be in *OFF (Status)* mode.

Description of Continuity Modes

The Latch-Test™ has six different continuity modes to aid in the diagnosis of switch and sensor loops. The two basic categories are normally open (N.O.) and normally closed (N.C.), which refer to the state the switch is in when the condition it is sensing is not true or "happening". In N.O., the beeper and continuity LED would be on when the switch closes. In N.C., the beeper and continuity LED would be on when the switch opens, which is why the test leads must be connected to the circuit on entry to this category, or the continuity condition is met immediately by the unconnected tester leads. The Latch-Test™ has three different modes of operation—real-time, latched with manual reset and latched with auto-reset—in either N.O. or N.C. category:

Real-time mode is active when only the N.O. or N.C. LED is on. In real-time mode, the continuity LED and beeper are turned on and off in unison with the switch changing states. Very short events are unlikely to be seen or heard.

Latch mode is active when both a N.O. or N.C. LED and the Latch LED are on. The latch mode will capture any switch change event that lasts a minimum of 150 microseconds (millionths of a second) and turn on the continuity LED and beeper until the TONE button is pressed, or the Latch-Test™ goes off automatically (auto-off).

Auto-reset latch mode is active when both a N.O. or N.C. LED and the Auto-Reset LED are on. In auto-reset mode, any switch change event that lasts a minimum of 150 microseconds (millionths of a second) will turn on the continuity LED and beeper until 1 second after the event ends. So a very short event would cause a 1 second long duration audible beep and illumination of the continuity LED.

INSTRUCTIONS FOR USE

To Check Continuity of a Circuit

Use only on non-energized circuits. Any energy present may damage the Latch-Test™, or cause erroneous results. Terminating resistors should be removed.

1) With Mode Switch set to *OFF (Status)*, connect one lead of Latch-Test™ to each end of the circuit to be tested. Verify status LEDs are off (no voltage present).
2) Move slide switch on left side of Latch-Test™ to the *BEEPER* or *VISUAL* position.
3) Verify that the Latch-Test™ is in the desired continuity mode. See *Description of Continuity Modes* section (on page 3) for details of each mode. If correct mode LEDs are not lit, press *MODE SEL* until the desired mode is displayed.
4) Press TONE as necessary to reset latch mode, if in a latching mode.
5) Move mode slide switch to *OFF (Status)* position when done. Latch-Test™ will turn off 20 minutes after last mode change, if not turned off manually. Press MODE SEL or TONE to turn unit on after an auto-off has occurred.

To Check the Status of a Phone Circuit

1) Move slide switch on left side of Latch-Test™ to the *OFF (Status)* position.
2) Connect black lead to TIP and the red lead to RING, or one lead to each wire of the pair, if designation is unknown. If NRM lights up, it means the polarity is correct and the black lead is connected to TIP. If the REV lights, then the leads are reversed. If the NRM or REV LED is bright, the line is not in use. If the on LED is dim, the circuit is in use. If both NRM and REV are on, or flashing, an AC voltage is present.

Application Hints: The TIP signal is nominally at ground potential. Attaching the black lead to a ground point and connecting the red lead to each wire of the pair can identify the RING line. When the red lead is connected to RING, the NRM LED will light.

The status LEDs also indicate a ringing line by both NRM and REV LEDs flashing brightly. To verify a phone line, connect the Latch-Test™ in *OFF (Status)* mode to the line to be tested, then call that line's number from another line. The Latch-Test™ status LEDs should indicate a ringing line.

To Send a Tone for Tracing

1) Move slide switch on left side of Latch-Test™ to the *OFF (Status)* position. The tone generator works only with the slide switch in this position.
2) Connect leads across the line, or attach one lead to ground and the other lead to one wire of a cable, or pair, to be traced.
3) Press the *TONE* button on the unit briefly to turn on the tone signal. If the desired signal level indicator (HI or LO) is not blinking, press the button repeatedly until the correct signal level is selected. The Latch-Test™ rotates through a HI-LO-OFF sequence.
4) Select a different signal type, if desired, as described in *To Select or Verify Tone Signal Type* section (on page 6).
5) To turn off the signal, press the *TONE* button briefly. If it has been more than 15 seconds since the last press, the Latch-Test™ will go directly to OFF. If not, a second press may be necessary if the unit was set to HI.

Application Hints: When tracing wires terminated to a terminal block, such as a "66 block" or a patch panel, attaching both Latch-Test™ leads to the cable or pair tends to contain the signal within the cable. The tracer must nearly touch the end of the cable to detect the signal, which is helpful when the wires are close together, as when terminated. The LO amplitude setting may generate a stronger signal when connecting both leads of the Latch-Test™ to a cable, by reducing the field canceling effect of having a signal and its return close together, especially in twisted pair cable. A modular phone cable can be used to connect the Latch-Test™ directly to a wall jack with this configuration.

To maximize radiated signal while tracing along a cable run, connect one lead of the Latch-Test™ to the wire or cable and

the other end to ground (such as the case of an electrical box, electrical conduit, metallic water pipe, or ground rod). If no ground is available, do not connect the other lead to anything; let it dangle as near to the earth as possible. Connect the Latch-Test™ to the ungrounded shield of a coax cable. The shield will do its job, if connected to the center lead, and block the tone. The LO amplitude setting is useful if there is too much bleeding of the signal, or the tracer being used has fixed volume and is overloading.

To Select or Verify Tone Signal Type

The Latch-Test™ has three distinctly different tone types available—one steady and two dual (or warble) tones.

1) Press and hold the TONE button until all non-status LEDs turn on (lamp test), this indicates entry into the tone style selection function.
2) Continue holding the button down: one of the two TONE LEDs will turn on steady, or flash, to indicate the currently selected type. The *Sngl* LED will turn on steady to indicate the single frequency type is selected. The *Dual* LED will either flash for one of the dual tones, or be on steady for the other. Releasing the button before two seconds have passed will leave the signal type unchanged.
3) To select another signal type, continue holding the button down until the desired type is displayed. The Latch-Test™ will continue to cycle through the three types until the button is released, or the unit times out and turns off (10 to 12 seconds).

Hint: The currently-selected tone type is generated at the RJ jack, once the signal selection function is entered. Holding a tone tracer near the jack will allow the user to hear each tone type as it is selected.

BATTERY REPLACEMENT

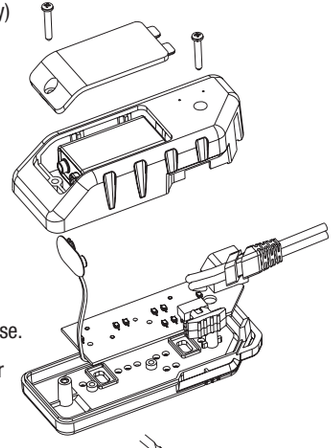
1) Remove screw on the rear of the Latch-Test™ with a #1 Phillips screwdriver and remove battery door.
2) Remove old battery and disconnect from battery leads.
3) Snap the battery leads onto a new battery (9V, alkaline). Place battery in case.
4) Close tester and replace screw. Do not over tighten.

BELT CLIP INSTALLATION

(Belt clip sold separately)

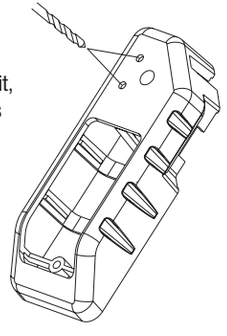
Step #1

1) Remove two (2) #4-.750 body screws, as shown.
2) Remove battery door and battery.
3) Lift off back cover and remove cable assem./strain relief from slot in back case.
4) Separate back cover from rest of unit.



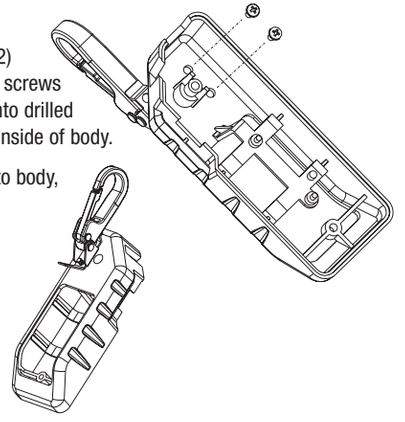
Step #2

1) With back case removed from unit, locate two (2) counter sink marks on back side.
2) With .125 (1/8") dia. drill bit, drill holes into back case at both countersink marks.
3) Clean any burrs and debris from inside of body.



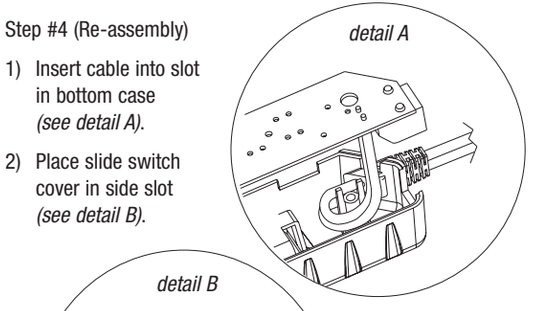
Step #3

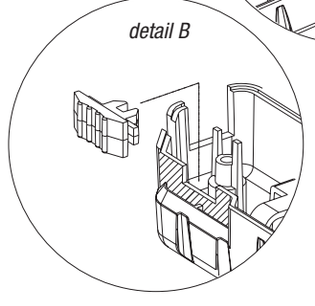
1) Insert two (2) #4-40-.250 screws (supplied) into drilled holes from inside of body.
2) Attach clip to body, as shown.



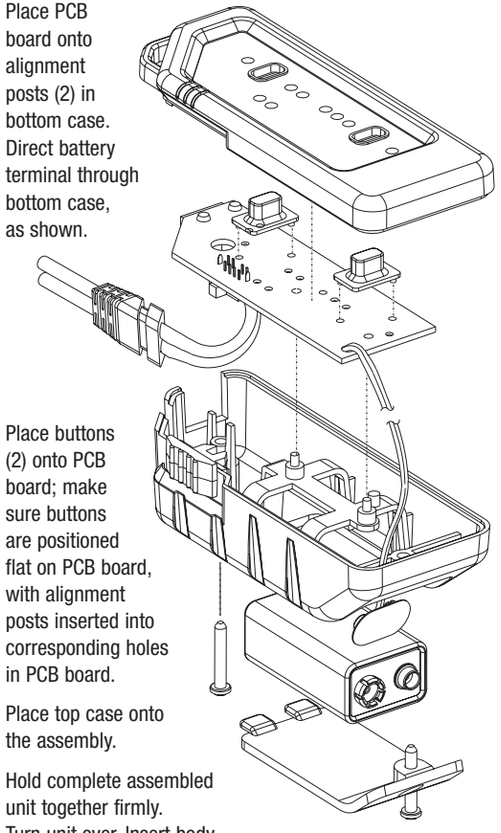
Step #4 (Re-assembly)

1) Insert cable into slot in bottom case *(see detail A)*.
2) Place slide switch cover in side slot *(see detail B)*.





3) Place PCB board onto alignment posts (2) in bottom case. Direct battery terminal through bottom case, as shown.



4) Place buttons (2) onto PCB board; make sure buttons are positioned flat on PCB board, with alignment posts inserted into corresponding holes in PCB board.

5) Place top case onto the assembly.

6) Hold complete assembled unit together firmly. Turn unit over. Insert body screw into top screw hole near RJ connector and tighten.

7) Re-connect 9v battery and insert into battery compartment.

8) Place battery door into position. Insert second body screw into lower screw hole and tighten.

Clip Leads—Red lead is RING and black lead is TIP. NRM LED is on when black lead is positive with respect to red lead (Telco standard).

Lanyard Attachment Point

Mode Switch

VISUAL—Continuity mode on with only visual indication of continuity.

BEEPER—Continuity mode on with both audible and visual indication of continuity.

OFF—Continuity mode off, status LEDs active and tone generator can be enabled by pressing TONE button.

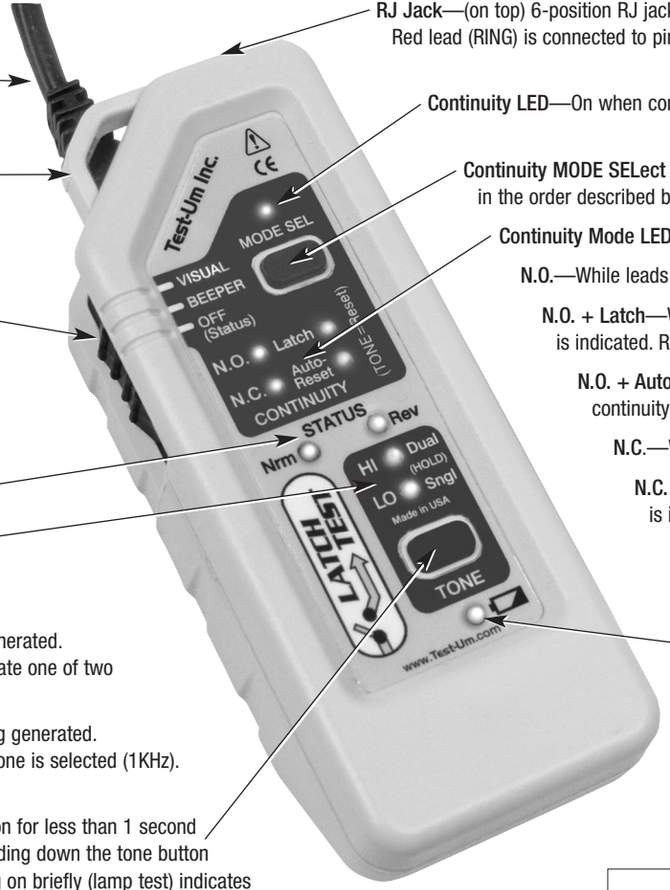
STATUS LEDs—Nrm or Rev LED on indicates DC voltage. Both LEDs on indicates AC voltage.

TONE LEDs

HI LED—Will flash when tone is on and full amplitude tone is being generated. When in tone select function, LED will be on steady or flashing to indicate one of two possible dual (or warble) tones.

LO LED—Will flash when tone is on and half (unbalanced) tone is being generated. When in tone select function, LED will be on steady to indicate single tone is selected (1KHz).

TONE Button—When mode switch is set to off, pressing the tone button for less than 1 second will turn tone on, off or change the amplitude setting. Pressing and holding down the tone button will cause the tone style selection mode to be entered. All LEDs turning on briefly (lamp test) indicates the start of tone selection. Each tone is previewed for 2 seconds. The tone being heard when the button is released is the new tone style selection. When the mode switch is not in the off position, the tone button becomes the reset button for the continuity latch function.



RJ Jack—(on top) 6-position RJ jack has center 2 pins connected to alligator clip leads. Red lead (RING) is connected to pin 4 and Black lead (TIP) is connected to pin 3.

Continuity LED—On when continuity is: closed in N.O. mode, or open in N.C. mode.

Continuity MODE SELect Button—Each press advances to the next continuity mode in the order described below:

Continuity Mode LEDs—Modes are:

N.O.—While leads are closed, continuity is indicated.

N.O. + Latch—When leads are closed for 150uS or more, continuity is indicated. Result is latched on until TONE button is pressed (Reset).

N.O. + Auto-Reset—When leads are closed for 150uS or more, continuity is indicated. Remains on for 1 second after leads open.

N.C.—When leads are open, continuity is indicated.

N.C. + Latch—When leads are open for 150uS or more, continuity is indicated. Result is latched on until TONE button is pressed (Reset).

N.C. + Auto-Reset—When leads are open for 150uS or more, continuity is indicated. Remains on until 1 second after leads close.

Battery Low LED—When the battery low LED comes on, the battery needs to be replaced as soon as possible. The tone amplitude will soon begin to degrade and erroneous operation could occur.

Auto-off—Tone Mode: 3 hours
Continuity Mode: 20 minutes

N.O.—Normally open is the nomenclature used to describe a switch that is usually in the high resistance, or contacts open, state.

N.C.—Normally closed is the nomenclature used to describe a switch that is usually in the low resistance, or contacts closed, state.

ACCESSORY PARTS

All Lil' Buttie™ series test set cords will work with the Latch-Test™:

LB10 Lil' Buttie™ cable set with alligator clips (5.5 ft in length)

LB20 Lil' Buttie™ cable set with angled piercing clips (5.5 ft in length)

LB30 Lil' Buttie™ cable set with angled bed-of-nails clips (5.5 ft in length)

LB75 Telco Clip (requires drilling two holes in case)

SPECIFICATIONS

Power Requirements
one 9 volt alkaline battery

Battery Life (Alkaline, 540 mA-hr)
120 hours typical

Tone frequencies (±1%)
Dual – 1165 and 874 Hz
Single – 999 Hz

Tone power Typical (into 600 ohms, new battery to 5.0V)
LO = 1.7 dBm
HI = 7.6 dBm

Continuity thresholds
Loop R open >4.5 Kohms
Loop R closed <1.5 Kohms
Typical threshold = 3 Kohms

Voltage protection
Status and Tone: DC = 60 volts continuous,
AC = 300V peak, 2 sec
Continuity: DC = 140 volts, AC = 140 volts RMS

Dimensions
Width: 1.75 inches
Length: 4.5 inches
Depth: 1.3 inches

Weight
5.0 oz. with battery

Specifications subject to change

WARRANTY

Test-Um Inc. guarantees to the end-user purchaser that its products, and each of the parts thereof, will be free of all defects in material and/or workmanship. This warranty extends for a period of 12 months from the date of manufacture or proof-of-purchase.

The obligations of Test-Um Inc. under this warranty is limited to the repair or replacement (at our option) during the warranty period of any part that proves to be defective in material or workmanship under normal use, installation and service, provided the product is returned to Test-Um Inc. freight prepaid.

Products returned to us must be accompanied by a copy of the purchase receipt. In the absence of such a receipt, the warranty period will cease 12 months from the date of manufacture.

This warranty does not extend to products which have been subjected to neglect, accidental or improper use, or to units which have been altered, repaired, or inspected by other than Test-Um Inc. authorized personnel. In no event will Test-Um Inc. be liable for any incidental or consequential damages.

Service

The Latch-Test™ is designed and manufactured to provide trouble-free service. However, if for some reason your tester should require repair, please follow these instructions.

Shipping

1. Before returning any product to Test-Um Inc., you must first request a Return Goods Authorization Number by contacting our Customer Services Dept. at 805-383-1500. No shipments will be accepted without this number, which must be clearly marked on the shipping label.
2. Ship the tester with a copy of the sales receipt, if available.
3. Attach a description of the operational problem.
4. Include a contact name, phone number and e-mail address (if possible).
5. Pack securely to prevent damage during shipping.
6. Ship prepaid to: Test-Um Inc.
808 Calle Plano, Camarillo, CA 93012

WARRANTY SERVICE

All units returned for warranty repair will be repaired or replaced free of charge, at the discretion of Test-Um Inc., and will be shipped freight prepaid. In the event that a sales receipt or other dated proof-of-purchase documentation is not available, a period of not more than 12 months from date of manufacture shall apply.