HERITAGE TECHNOLOGIES INC.

USER GUIDE

HT1000™

TechMate®

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HERITAGE TECHNOLOGIES INC.

USER GUIDE

HT1000™

TechMate®

HERITAGE TECHNOLOGIES INC. -

USER GUIDE

HT1000™
TechMate®

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INTRO TO THE *TECHMATE*

METER DESCRIPTION

The TechMate® is a high performance, full feature, hand held instrument designed to provide copper wire provisioning and maintenance technicians with 26 critical tests at the touch of a button. Durable and water resistant the TechMate® is equipped with a highly effective trans-reflective LCD screen and a powerful backlight designed to make testing and troubleshooting easier in all work environments.

The on-screen menu launches many of the standard 26 tests with a single keystroke.

Super Stress™ reaches beyond standard longitudinal balance testing, identifying even hard to find short loop unbalances.

Dual Trace TDR is standard, with 12 trace storage and intermittent fault location.
The TechMate® has User selectable Auto Tests with an Incremental Pair Testing process.

Test for DC and AC volts at the same time, no need to switch between separate screens.

Download updates and upload test results quickly and easily via the integrated USB port.

GENERAL FEATURES

- ▲ Easy to navigate and launch testing; many of the standard 26 tests begin with the push of a single button: either from the numeric keypad, or the soft key navigation 'Wheel'.
- ▲ Direct access to tests: no cumbersome menus. Adds to ease of training new technicians.
- ▲ Voltage, resistance and all standard telecom testing is accessed through the same simple menu layout.
- ▲ Super Stress TM - This test is ten times more sensitive than other technologies available today. What that means is imbalances in twisted pairs can be seen below the 0 dB threshold, zeroing in on those imbalances hiding in short-wire loops, like inside the customer's premise.
- ▲ Automatic Super stress mode- no wire loop too short to read an imbalance in the wire- aids technicians in finding invisible faults on short wire loops or premise wiring.
- ▲ All Transmission and Noise tests for voiceband are included along with an Open Meter which is pinpoint accurate even in the presence of shunt resistance (dirty open).
- ▲ TDR - The built-in TDR locates shorts, crosses & grounds at distances ranging from the end of the test leads to 45,000. It can trace two pairs simultaneously with pair comparison mode to identify potential cable trouble spots.
- ▲ Dual trace TDR allows technician to compare good pair to questionable pair-reads accurately to open of shorted pair. TDR traces can be saved and uploaded to PC for review.
- ▲ Auto Test / Incremental Pair Test - User can choose any number and series of tests to run automatically. Used in conjunction with the Incremental Pair Test, bulk pair recovery.
- ▲ Built in pair recovery program allows technician to gather data on defective pairs and trouble shoots faults for pair recovery- then upload to PC.

Continued...

GENERAL FEATURES
Continued. . .

- ▲ Store Test Results - The HT-1000 stores test results data in a comma delimited format which can be uploaded via the integrated USB port to customer-driven database.
- ▲ Download Firmware updates - Via the integrated USB port.
- ▲ Spectrum Analyzer - Loss readings up through the VDSL range test protocols.
- ▲ Send and receive frequency spectrum through VDSL band
- ▲ Spectrum Analyzer assists the technician in finding interrupters that cause disruptions to DSL service - will read to VDSL band
- ▲ ADSL2+ - With optional card installed ADSL card allows technician to interface with the CO (DSLAM) and measure communication protocols, such as speed- upstream and downstream, signal to noise ratios and percent utilization.
- ▲ Techmate® RFL uses three or four wire setup and pinpoints fault size and location with single degree temperature and cable gage adjustments.

UNIT CONTROLS

Operation of the TechMate® is performed by softkeys located on the front of the unit.

Softkey controls consist of the following:

- ▲ four Multifunctional softkeys
- ▲ a Power Key
- ▲ a Backlight key
- ▲ four Navigation keys
- ▲ an Enter / Return Home key
- ▲ a Alphanumeric Keypad consisting of twelve keys

MULTIFUNCTIONAL SOFTKEYS

The operation of each of the multifunctional softkeys changes depending upon the particular test or operation being performed, according to the label or icon displayed on the screen above the key.

Continued...

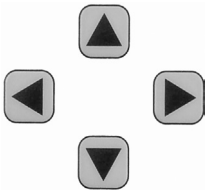
POWER KEY

The POWER KEY turns the TechMate on and off.

BACKLIGHT KEY

The BACKLIGHT KEY illuminates the display screen.

NAVIGATION KEYS



The NAVIGATION KEYS move the various screen cursors around the display

ENTER / RETURN HOME KEY

The ENTER / RETURN HOME key selects particular function or highlighted entries on the display. It also returns the display to previous screens.

ALPHANUMERIC KEYPAD

The ALPHANUMERIC KEYPAD inserts numbers and text on screen. To insert text, sequence through each character by repeatedly pressing the key until the correct letter appears.

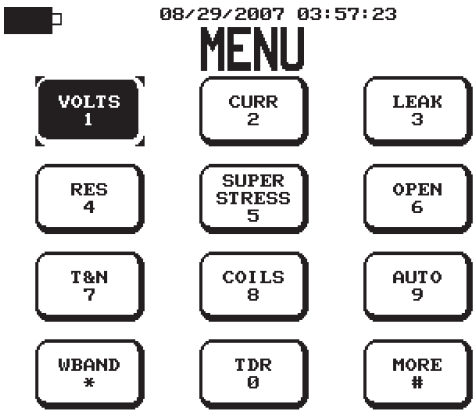
In addition to inserting numbers and text, the keypad is used to directly dial telephone numbers when required.

DISPLAY SCREEN - MAIN MENU

When the POWER KEY is pressed, the unit initializes and then immediately displays the MAIN MENU.

In the top left corner, a battery icon indicates the relative battery charge remaining in the unit.

At the top center the date and time is displayed. To modify date and time see CONFIG - SET DATE & TIME (Pg.61).



From the MAIN MENU, most tests can be directly accessed and activated by pressing the corresponding number on the ALPHANUMERIC KEYPAD.

Alternatively, tests can be accessed and activated by highlighting the desired test with the use of the four NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

In addition to selecting tests from the Main Menu, selecting the MORE KEY accesses two additional features -

- ▲ AUTOSet (the Auto Test Setup Menu)
- ▲ CONFIG (the Config Options Menu)

POWER AND DATA PORTS

Power and Data ports are integrated into the right hand side of the TechMate® -

The Powerport is used to recharge the units rechargeable nickel-metal hydride battery pack, or to run the TechMate® from an AC adapter or a 12V DC Automobile adapter.

The Data Port utilizes a USB cord to upload TDR and AutoTest results, and download Firmware updates to the TechMate® via a windows based PC or Laptop.

TEST CORDS

The TechMate® is equipped with a unique replaceable Test Cord consisting of permanently attached Black (Tip) and Red (Ring) test leads and two Banana Jacks.

The Banana Jacks allow for a Green (Ground) test lead to be attached for use when making most test measurements.

When making TDR (2 pair) measurements, Green and Yellow test leads can be substituted into the banana jacks.

The test leads are equipped with 'popper' style clips with an industry standard 'bed of nails' to pierce wire insulation while minimizing damage.

To replace the Test Cord, (Part Number 1001-1390 Test Lead Assembly), loosen the two screws on the bottom of the unit that secure the cord. Pull the plug gently to release. When replacing the cord, be sure the gasket is in place and aligned with the screw holes. Replace and tighten the two retaining screws.

DC & AC VOLTAGE TESTS

From the MAIN MENU, access the VOLTAGE Tests by -

Pressing 1 on the ALPHANUMERIC KEYPAD

or

Highlighting the VOLTS Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

Both the DCV and ACV scales will display and are active.

The test range for DCV is 0 to 300 Volts.
The test range for ACV is 0 to 250 Volts.

To perform Tip to Ring DCV & ACV tests -

- Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  The Tip to Ring DC and AC volt age measurements will immedi-ately display.

To perform Tip to Ground and Ring to Ground DCV & ACV tests -

- Highlight the T-G or R-G screen icons with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below each of the icons.

  The Tip to Ground or RIng to Ground DC and AC voltage meas--urements will immediately display.

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

LOOP CURRENT TEST

From the MAIN MENU, access the LOOP CURRENT test by -

Pressing 2 on the ALPHANUMERIC KEYPAD

or

Highlighting the CURR Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The LOOP CURRENT test scale will display and is active.

The Loop Current test range is 0 to 100mA

To perform a Loop Current test -

- Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  The Loop Current measurement will immediately display.

Generally Accepted Loop Current Parameters -

Acceptable:	>23 mA
Marginal:	20 to 23mA
Unacceptable:	<20 mA

Refer to your Supervisor or Local Standards for more information

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

LEAKAGE TEST

From the MAIN MENU, access the LEAKAGE test by -

Pressing 3 on the ALPHANUMERIC KEYPAD

or

Highlighting the LEAK Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The Leakage test scale will display and is active.

The Leakage Test range is 1M ohms to 100M ohms.

To perform a Leakage test -

- ▲ Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  The Leakage test measurement will immediately display.

To perform Tip to Ground and Ring to Ground DCV & ACV tests -

- ▲ Highlight the T-G or R-G screen icons with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below each of the icons.

  The Tip to Ground or RIng to Ground DC and AC voltage measurements will immediately display.

Continued. . .

IDENTIFYING GALVANIC CORROSION -

The Leakage test can be used to look for galvanic corrosion and for clearing the potential fault with use of the Reverse Polarity Icon as follows -

1. Highlight the T-R screen icon with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon.

   The Tip to Ring Leakage measurement will immediately display.

   Continue testing for at least 15 seconds.

2. Highlight the REV screen icon with the use of the MULTIFUNCTIONAL SOFTKEY. to reverse polarity.

   Continue testing for at least 15 seconds.

3. Repeat this process by cycling through the T-G an R-G test functions for at least 15 seconds each and using the Reverse polarity for at least 15 seconds after each test.

   Sudden drops in the resistance or fluctuating readings may indicate galvanic corrosion break down.

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

RESISTANCE TEST

From the MAIN MENU, access the RESISTANCE test by -

Pressing 4 on the ALPHANUMERIC KEYPAD

or

Highlighting the RESISTANCE Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The Resistance test scale will display and is active.

The Resistance Test range is 0 ohms to 1000K ohms.

To perform a Resistance test -

- ▲ Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  The Resistance test measurement will immediately display.

To perform Tip to Ground and Ring to Ground Resistance tests -

- ▲ Highlight the T-G or R-G screen icons with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below each of the icons.

  The Tip to Ground or RIng to Ground Resistance measurements will immediately display.

Continued. . .

CAPACITIVE KICK -

The Resistance test can also be used to measure imbalances in a pair, to measure conductor's relative length of the pair to others, and detect the presence of a ringer(s) by using REV to "Kick' each side of the pair and create a sudden capacitive discharge on the conductors. A variable readout bar located below the digital resistance measurement display will indicate the relative 'Length' of each side of the pair.

To 'Kick' a pair using the Resistance test -

1. Highlight the T-R, T-G or R-G screen icons with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below the icons.

   The Resistance measurement will immediately display.
2. Toggle the REV icon several times with the use of its MULTIFUNCTIONAL SOFTKEY below. Allow the reading to settle between toggles of the key.

   The variable readout bar will indicate relative capacitance by length.

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

SUPER STRESS™ TEST

From the MAIN MENU, access the SUPER STRESS test by -

Pressing 5 on the ALPHANUMERIC KEYPAD

or

Highlighting the SUPER STRESS Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The SUPER STRESS digital display and a variable readout bar located below it will appear and are active.

The test range for SuperStress is.-20dB to +30dB

To perform a test -

- Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  Stressed noise level measure ment will now be indicated on the digital display.

  The variable readout bar located below will indicate 'GOOD', ' MARGINAL' or 'BAD' according to the following values -

GOOD:	*< 20 dBrnC*
MARGINAL:	*20 to 30 dBrnC*
BAD:	*> 30 dBrnC*

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

Continued. . .

SUPER STRESS™ FAULT IDENTIFICATION -

The Super Stress test can be used to identify the following types of faults -

- High Resistance Opens
- Capacitive Imbalances
- Imbalance in Load Coils
- Crosses
- Split Pairs
- Grounds

Important:

- The TechMate® must be properly grounded in order to make an accurate SUPER STRESS test measurements.
- A SUPER STRESS test will not identify shorted pairs. Shorted pairs are balanced and will indicate an acceptable reading.
- Use comparative testing of pairs to help identify faults.
- Shorts can be identified by performing the RESISTANCE or LEAKAGE tests.

OPEN METER

From the MAIN MENU, access the OPEN METER by -

Pressing 6 on the ALPHANUMERIC KEYPAD

or

Highlighting the OPEN Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The OPEN METER digital display will appear and is active.

The test range for the OPEN METER is 0 to 50,000ft.

To perform a test -

- Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

  A Tip to Ring distance measure ment will immediately be indicated on the digital display.

- Highlight the T-G and then the R-G screen icons with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below each of the icons.

  The Tip to Ground or Ring to Ground distance measurements will immediately display.

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

Continued. . .

Important:

- The TechMate® must be properly grounded in order to make accurate OPEN METER test measurements.

- The Open Meter should be used only on pairs where no CO battery is present.

- The pair should be open at the opposite end.

- The Open Meter clearly distinguishes between capacitance and resistance thereby allowing accurate readings even in a ‘dirty’ environment.

TRANSMISSION & NOISE TESTS

Three separate Transmission and Noise tests can be accessed from the T&N icon on the Main Menu as follows -

- ▲ **LOSS** - Circuit Loss
- ▲ **NOISE** - Circuit Noise
- ▲ **POWER INF** - Power Influence

In addition, a DIAL LIST containing up to twelve preprogrammed telephone numbers is integrated into the T&N testing process.

From the MAIN MENU, access these TRANSMISSION AND NOISE tests by -

Pressing 7 on the ALPHANUMERIC KEYPAD

or

Highlighting the T&N Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The three T&N test icons will appear along with the DIal List icon.

NOTE: *As soon as the T&N menu is entered the TechMate goes 'off-hook'. At that point you can dial using the keypad or dial list and then enter Loss, Noise or Power Influence. The T&N menu must be exited to go back on-hook.*

Continued. . .

CIRCUIT LOSS TEST

From the TRANSMISSION AND NOISE display, access the Circuit Loss test by selecting the LOSS icon with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below the icon.

The CIRCUIT LOSS digital display will appear along with a variable readout bar located directly below. Both are active.

The test range for voiceband CIRCUIT LOSS is -40dBm to +10dBm.

To perform a LOSS test -

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

2. The C.O. Milliwatt (1004Hz) test number must be dialed as follows -

2A. Use the ALPHANUMERIC KEYPAD to directly dial the Milliwatt telephone number.

When the Milliwatt reference tone is received, the Circuit Loss reading will display.

Or

Continued. . .

TRANSMISSION & NOISE

CIRCUIT LOSS TEST *Continued. . .*

2B. Use a pre-programmed test number by opening the DIAL LIST with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. A phone number Picklist will appear.

To select the appropriate telephone number from the pick list, press the number or symbol desired on the AlphaNumeric Keypad.

(see pg. 56 for info on how to pre-program the Dial List)

The display will return to the LOSS screen.

When the Milliwatt reference tone is received, the Circuit Loss reading will display.

ACCEPTABLE: 0 to -8.5dB
MARGINAL: -8.6 to -10dB
BAD: < -10dB

See your Supervisor or Local Standards for more information

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

CIRCUIT NOISE TEST

From the TRANSMISSION AND NOISE display, access the CIRCUIT NOISE test by selecting the NOISE icon with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below the icon.

The NOISE digital display will appear along with a variable readout bar located directly below. Both are active.

The test range for CIRCUIT NOISE is 0dBrnC to +75dBrnC.

To perform a NOISE test -

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

2. The C.O. Quiet Line termination test number must be dialed as follows -

2A. Use the ALPHANUMERIC KEYPAD to directly dial the Quiet Line telephone number.

When the Quiet Line is connected, the Circuit Noise level will display.

Or

Continued. . .

TRANSMISSION & NOISE

CIRCUIT NOISE TEST *Continued. . .*

2B. Use a pre-programmed test number by opening the DIAL LIST with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. A phone number Picklist will appear.

To select the appropriate telephone number from the pick list, press the number or symbol desired on the AlphaNumeric Keypad.

(see pg. 56 for info on how to pre-program the Dial List)

The display will return to the NOISE screen.

When the Quiet Line is connected, the Circuit Noise level will display.

ACCEPTABLE: 0 to 20dBrnC
MARGINAL: 21 to 30dBrnC
BAD: > 30dBrnC

See your Supervisor or Local Standards for more information

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

POWER INFLUENCE TEST

From the TRANSMISSION AND NOISE display, access the POWER INFLUENCE test by selecting the POWER INF icon with the use of the MULTIFUNCTIONAL SOFTKEYS located on the keypad below the icon.

The POWER INFLUENCE digital display will appear along with a variable readout bar located directly below. Both are active.

The test range for POWER INFLUENCE is +40dBrnC to +100dBrnC.

To perform a POWER INFLUENCE test -

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

2. The C.O. Quiet Line termination test number must be dialed as follows -

2A. Use the ALPHANUMERIC KEYPAD to directly dial the Quiet Line telephone number.

When the Quiet Line is connected, the POWER INFLUENCE level will display.

Or

Continued. . .

TRANSMISSION & NOISE

POWER INFLUENCE TEST *Continued. . .*

2B. Use a pre-programmed test number by opening the DIAL LIST with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. A phone number Picklist will appear.

To select the appropriate telephone number from the pick list, press the number or symbol desired on the AlphaNumeric Keypad.

(see pg. 56 for info on how to pre-program the Dial List)

The display will return to the POWER INFLUENCE screen.

When the Quiet Line is connected, the POWER INFLUENCE level will display.

ACCEPTABLE:	*60 to 80dBrnC*
MARGINAL:	*81 to 90dBrnC*
BAD:	*> 90dBrnC*

See your Supervisor or Local Standards for more information

To return to the MAIN MENU, press the ENTER / RETURN HOME key.

DIAL LIST

The TechMate has the internal capability to store, edit and dial up to 12 telephone numbers.

TO STORE OR EDIT A TELEPHONE NUMBER IN THE DIAL LIST:

1. From the MAIN MENU, select MORE by -
   Pressing # on the ALPHANUMERIC KEYPAD
   Or
   Select MORE by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.
2. From the MENU, select CONFIG by pressing 2 on the ALPHANUMERIC KEYPAD.
3. From the CONFIG option list, open the Number Picklist by pressing 2 on the ALPHANUMERIC KEYPAD.
4. 12 lines are available to program. Press the key on the ALPHANUMERIC KEYPAD to select one.

5. To add or edit a name, access NAME EDIT with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. Use the 'Left' NAVIGATION KEY to erase an existing entry.

   Use the ALPHANUMERIC KEYPAD to enter the desired name. To insert text, sequence through each character by repeatedly pressing the key until the correct letter appears.

   Press the 'Right' NAVIGATION KEY to add spaces .

6. When the NAME entry is complete, press the ENTER / RETURN HOME key to return to the Picklist.

7. To add or edit a telephone number, press the key on the ALPHANUMERIC KEYPAD to select the line desired.

8. Press NUMBER EDIT with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. Use the 'Left' NAVIGATION KEY to erase an existing entry.

   Use the ALPHANUMERIC KEYPAD to enter the desired number.

9. When the Number entry is complete, press the ENTER / RETURN HOME key to return to the Picklist.

8. To return the the Main Menu, press EXIT and then BACK with the use of the MULTIFUNCTIONAL SOFTKEY on the keypad below the screen icon.

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Load Coil Test

From the Main Menu, access the Load Coil test by -

Pressing 8 on the AlphaNumeric Keypad

or

Highlighting the Load Icon on screen by utilizing the Navigation Keys and then pressing the Enter / Return Home Key.

The Load Coil screen will display with a Start icon in the lower right corner of the display.

The Load Coil Test can detect up to four Load Coils on a pair.

To perform a Load Coil test -

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.
2. To begin the test, press the Start icon Multifunctional SoftKey located on the keypad below the icon.

   ▲ The unit will display 'Acquiring' and then display the number of coils detected.

   ▲ In addition, a graph with a waveform will indicate the number of coils detected. The number of dips displayed on the graph will also indicate the amount of load coils detected.

Load Coil Test
Continued. . .

To return to the Main Menu, press the Enter / Return Home key.

Important:

- ▲ The presence of AC or DC current on the pair can inhibit the ability to detect the correct number of load coils.
- ▲ Removal of C.O. battery is recommended.

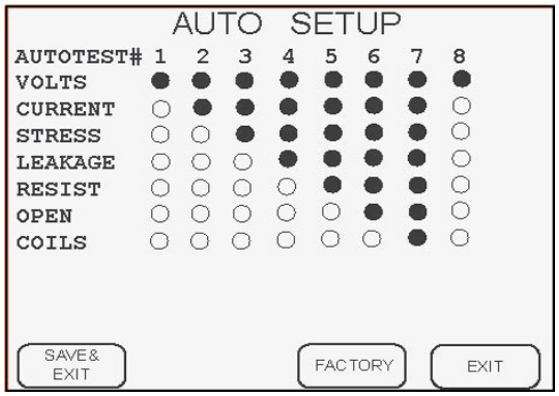
AUTO TEST

The Auto Test function provides the ability to make, store, recall and upload a preprogrammed series of tests. Up to 36 tests can be stored in memory.

INCREMENTAL PAIR TESTING - Pairs can be identified by Name and Pair Number. If the pair count is tested in sequence, the TechMate can automatically designate the pair. If the pairs tested are out of sequence, the user can quickly record the pair number with the keypad and continue testing.

Up to eight custom combinations of tests can be programmed by the user and selected for use on an as needed basis for individual pairs, bulk pair recovery, etc.

The Factory default series of tests are built as follows:



(see pg. 54 for info on how to view and customize the Auto Test Setup)

Continued. . .

AUTO TEST

Continued. . .

TO PERFORM AN AUTO TEST ON A SINGLE PAIR -

From the MAIN MENU, access AUTOTEST by pressing 9 on the ALPHANUMERIC KEYPAD

or

Highlighting the AUTO Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The AutoTest screen will display.

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.
2. Press key 1-8 on the ALPHANUMERIC KEYPAD to select the group of auto tests to perform.

(see pg. 54 for info on how to view and customize the Auto Test Setup)

3. Start the test by pressing the MULTIFUNCTIONAL SOFTKEY located on the keypad below the START icon.

The Auto Tests selected will be performed, the results will display, and be labeled by Date (MM/DD/YYYY) and Time (HH:MM:SS). These test results are Autosaved into the AutoTest List, and can be recalled using the RECALL Icon.

(See pg. 58 for info on how to Recall an Auto Test)

INCREMENTAL PAIR TESTING

TO PERFORM AN AUTO TEST ON A SERIES OF PAIRS -

From the MAIN MENU, access AUTOTEST by pressing 9 on the ALPHANUMERIC KEYPAD

or

Highlighting the AUTO Icon on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY.

The AutoTest screen will display.

1. Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

2. Press key 1-8 on the ALPHANUMERIC KEYPAD to select the group of auto tests to perform.

(see pg. 54 for info on how to view and customize the Auto Test Setup)

3. Press the MULTIFUNCTIONAL SOFTKEY located on the keypad below the INCREMENTAL icon to name the test.

4. Name the test by using the ALPHANUMERIC KEYPAD. The name can be up to 16 AlphaNumeric characters long.

5. Press the ENTER / RETURN HOME KEY to move to the PAIR # screen.

6. Identify the first pair to be tested using the ALPHANUMERIC KEYPAD. The label can be up to 20 numbers long.

Continued. . .

Continued. . .

7. To begin the series of tests press the START MULTIFUNCTIONAL SOFTKEY located on the keypad below the START icon.

The Auto Test will be performed and the results will display with the Name, Pair Number, Date and Time. The test results are Autosaved.

8A. To test and save the next pair in sequence, move the test cords to the next pair and press the START MULTIFUNCTIONAL SOFTKEY located on the keypad below the START icon.

The Auto Test will be performed and the results will display with the Name, the next sequential Pair Number, Date and Time. The test results are Autosaved.

Or

8B. To test and save a pair **out of sequence**, move the test cords to that pair and press the NEXT MULTIFUNCTIONAL SOFTKEY located on the keypad below the NEXT icon. The next pair in sequence will display. Press the NEXT key multiple times to scroll through the count.

Continued. . .

When the correct pair number is displayed, press the START MULTIFUNCTIONAL SOFTKEY located on the keypad below the START icon.

The Auto Test will be performed and the results will display with the Name, the Pair Number, Date and Time. The test results are Autosaved.

Or

8C. To test and save a pair **in a different sequence**, move the test cords to that pair and press the PAIR MULTIFUNCTIONAL SOFTKEY located on the keypad below the PAIR icon. The Pair # screen will display. Identify the pair to be tested using the ALPHANUMERIC KEYPAD. The label can be up to 20 numbers long.

9. Press the ENTER / RETURN HOME KEY to move to the PAIR # screen.

10. To continue testing, press the START MULTIFUNCTIONAL SOFTKEY located on the keypad below the START icon.

The Auto Test will be performed and the results will display with the Name, Pair Number, Date and Time. The test results are Autosaved.

Repeat steps 8A, 8B or 8C until testing is complete. Up to 24 Incremental Pair tests can be saved.

RECALL AN AUTO TEST

The TechMate can store up to 36 tests in it's Auto Test List.

The first 12 entries are single pair Auto Tests and are automatically stored by Date (MM/DD/YYYY) and Time (HH:MM:SS) on the first page of the Auto Test list.

When more than 12 single pair Auto Tests are made, the oldest stored test results are replaced.

Up to 24 Incremental Pair Auto Test results are stored on the next two pages of the Auto Test list. Use the 'Up' and 'Down' NAVIGATION KEYS to scroll through the pages.

Tests are automatically stored by Name and Pair Number as designated by the user when tested.

When more than 24 Incremental Pair Auto Tests and are made, the oldest stored test results are replaced.

To recall a specific Auto Test:

1. Press the RECALL MULTIFUNCTIONAL SOFTKEY located on the keypad below the RECALL icon.
2. Use the 'Up' and 'Down' NAVIGATION KEYS to scroll through the Auto Test List pages.
3. Use the ALPHANUMERIC KEYPAD to view the desired test.

WBAND - SPECTRUM ANALYZER

The Spectrum Analyzer identifies the Frequency and Amplitude (Loss, measured in dBm) of an input signal. These measurements can aid in identifying interrupters that can affect service.

The TechMate has both a Receive and a Send mode. To receive and make measurements a second TechMate or other appropriate signal source must be provided.

In Receive Mode, two frequency ranges can be scanned:

LESS FREQ = 0MHZ TO 1.8 MHZ
MORE FREQ = 0MHZ TO 18.4 MHZ

In Send Mode, Voice Band and Wide Band Tones can be transmitted:

VOICE BAND:	WIDE BAND:
200Hz	20KHz
577Hz	50KHz
1KHz	100KHz
2KHz	200KHZ
5KHz	500KHZ
10kHz	1MHZ
ID Tone	2MHZ
	5MHZ
	9MHZ
	ADSL Multi Tone
	ADSL2+ Multi Tone
	VDSL Multi Tone

Continued. . .

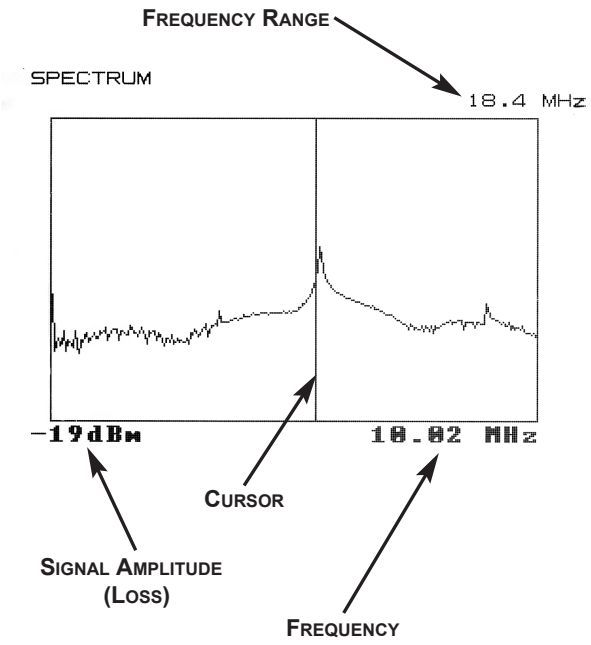
WBAND - SPECTRUM ANALYZER
Continued. . .

RECEIVE MODE -

When WBAND - SPECTRUM ANALYZER is selected from the Main Menu, the unit defaults to Receive mode.

Connect the test leads, Black to Tip, Red to Ring and Green to Ground.

The display contains the following information:



FREQUENCY RANGE - Identifies the range of frequencies viewed on the display.

Selecting LESS FREQ with the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon will display a frequency range from 0MHZ to 1.8 MHZ.

Selecting MORE FREQ with the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon will display a frequency range from 0MHZ to 18.4 MHZ.

CURSOR - The vertical line on the Spectrum display that can be moved anywhere across the screen with the use of the 'Left' and 'Right' NAVIGATION KEYS. The cursor is used to identify specific Signal Amplitude (measured in dBm) and Frequency.

FREQUENCY - As the cursor is moved, the Frequency of the signal being measured will display.

SIGNAL AMPLITUDE - As the cursor is moved, the specific Amplitude of a specific frequency will display.

Continued. . .

WBAND - SPECTRUM ANALYZER
Continued. . .

SEND MODE -

In Send Mode, Voice Band and Wide Band Tones can be transmitted.

To send tones with the TechMate -

1. Connect the test leads, Black to Tip, Red to Ring and Green to Ground.

2. Select VBAND TONE or WBAND TONE with the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icons.

The Tone List will display.

3. Send tone by pressing the appropriate key on the ALPHANUMERIC KEYPAD. The screen will display the tone being transmitted.

4A. To discontinue sending tone and return to Receive mode, press EXIT with the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon.

Or

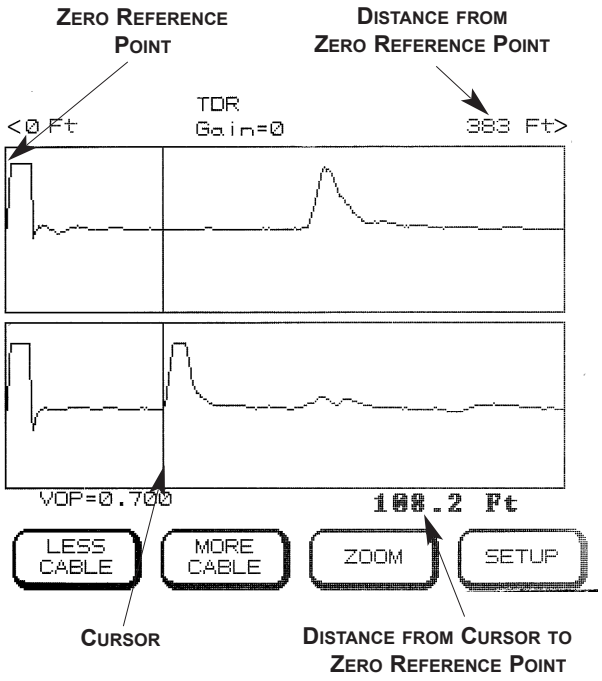
4B. To send another Tone, press the ENTER / RETURN HOME KEY to return to the Tone List.

TDR - TIME DOMAIN REFLECTOMETER

The TechMate TDR features the capability to locates shorts, crosses and grounds and opens at distances ranging from the end of the test leads to 45,000 feet. Test functions are as follows -

- ▲ Single Trace Line 1
- ▲ Single Trace Line 2
- ▲ Dual Trace
- ▲ Difference (L1 - L2)
- ▲ XTalk (L1 - L2)

Each of the TDR test screens have the same basic setup and data displays -



ZERO REFERENCE POINT - The left edge of the TDR display screen. The Zero Reference Point indicates the end of the test cord attached to the TechMate.

CURSOR - The vertical line on the TDR display. Move the Cursor anywhere across the screen with the use of the 'Left' and 'Right" NAVIGATION KEYS. The cursor is used to indicate distances in feet from the zero reference point on the left edge of the display. The distance between the Cursor and the Zero Reference Point is displayed on the bottom right corner of the TDR screen.

VoP - Velocity of Propagation - The speed of the test signal pulse in relation to the speed of light. Select the proper VoP by pressing the SETUP button to open the TDR Options Menu. Then press 1- CABLE SELECTION to view the Cable Pick List. By selecting the proper Cable Type and Wire Gauge to be tested, the correct VoP will be set. The VoP is displayed on the bottom left corner of the TDR screen.

ZOOM - Based on the position of the Cursor, the zoom button positions the waveform to the center of the screen.

MORE / LESS CABLE - Adjusts the screen to view the distance of the line being tested. The range values are approximately 0 to 45,000 feet, depending on the VOP that is set. The distance under test is displayed on the top right corner of the screen.

Continued. . .

TDR - TIME DOMAIN REFLECTOMETER
Continued. . .

TDR SETUP OPTIONS:

Access the TDR Options menu by pressing the MULTIFUNCTIONAL SOFTKEY located on the keypad below the SETUP icon.

The following TDR Options are available by pressing the corresponding key on the ALPHANUMERIC KEYPAD -

1- CABLE SELECTION - Opens the Cable Pick List. A predefined selection Cable Types and Wire Gauges are listed. Press the corresponding key on the ALPHANUMERIC KEYPAD to select. By selecting the proper Cable Type and Wire Gauge, the correct VoP will be set and the display will return to the TDR Test Screen.

2 - TEST SELECTION - Opens the TDR Test Type List. Press the corresponding key on the ALPHANUMERIC KEYPAD to select a test.

SINGLE TRACE LINE 1 - activates the single line test for the pair selected. Line 1 should be connected to the Black & Red test leads.

SINGLE TRACE LINE 2 - activates the single line test for the pair selected. Line 2 should be connected to the optional Yellow & Green test leads.

Continued. . .

2 - TEST SELECTION
Continued. . .

DUAL TRACE - tests two pairs simultaneously. Line 1 should be connected to the Black & Red test leads. Line 2 should be connected to the optional Yellow & Green test leads.

DIFFERENCE (LINE 1-LINE 2) - display indicates the difference between lines 1 and 2. Line 1 should be connected to the Black & Red test leads. Line 2 should be connected to the optional Yellow & Green test leads.

XTALK (LINE 1 TO LINE 2) - when selected, a pulse is sent out on line one, and returned on line two. Line 1 should be connected to the Black & Red test leads. Line 2 should be connected to the optional Yellow & Green test leads.

3 - SMOOTHING - Opens the TDR Averages List. Press the corresponding key on the ALPHANUMERIC KEYPAD to select. More averages smooths-out the presence of line noise displayed on the waveform providing a cleaner signal, but slows the display response. The default filter level is 1.

Continued. . .

TDR SETUP OPTIONS:
Continued. . .

4 - SAVE - Saves the current TDR display for RECALL and/or UPLOAD. When the SETTINGS button is pressed the TDR display is captured. If 4 - SAVE is then selected, the captured waveform is saved in chronological order and identified by Date (MM/DD/YYYY) and Time (HH:MM:SS).

Up to 12 TDR tests can be stored. When more than 12 tests and are made, the oldest stored test results are replaced.

5 - RECALL - Displays up to 12 saved TDR tests. To recall a specific TDR Test use the ALPHANUMERIC KEYPAD to view the desired test.

6 - UPLOAD - Used in conjunction with a PC and USB cable, saved TDR test results can be uploaded for analysis and used in a customer-driven data base. The Software must first be loaded from the provided CDROM and setup on the PC.

(see pg. 62-65 for info on how to Install & Setup the TDR Uploader Software)

TO UPLOAD STORED TDR TEST RESULTS TO THE PC -

1. Connect the TechMate to the PC via the provided USB cable.

Continued. . .

UPLOAD STORED TDR TEST RESULTS TO THE PC - *Continued. . .*

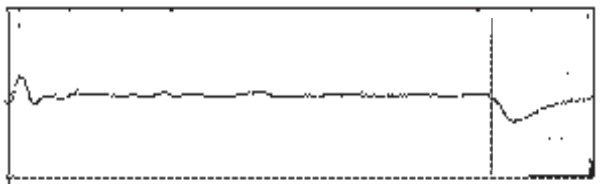
2. Turn the unit on.
3. Double click the TDRUPLOADER Icon on the desktop or from the 'START' > 'ALL PROGRAMS' Menu. The TDR Uploader window will open.
4. Assure that the Com Port is set to the Com Port identified when initially setting up the software. (see Pg. 65)
5. From the TechMate Main Menu, open the TDR function with the AlphaNumeric Keypad.
6. Press the 'SETUP' Multifunctional Key.
7. Press 6 on the AlphaNumeric Keypad to begin uploading the stored TDR test results. The Uploader window will show the status of the upload.
8. When complete, click 'Save' and identify where the data is to be saved on the PC.

   By default, the Data is saved as an Excel file.

TDR - TIME DOMAIN REFLECTOMETER
Continued. . .

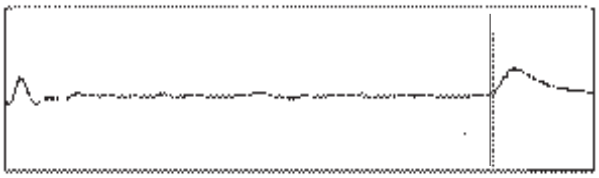
TDR WAVEFORM EXAMPLES -

SHORT OR GROUND -



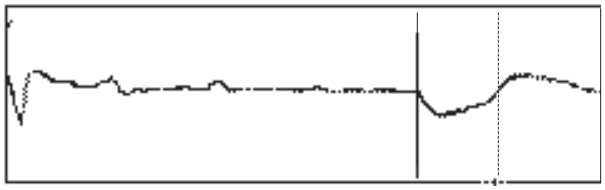
Typical Resistive Fault waveforms drop below the plane of the pulse reference line.

OPEN -



Capacitive Fault waveforms break above the plane of the pulse reference line.

SINGLE BRIDGED TAP -

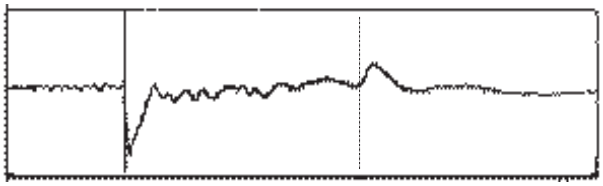


Bridged Tap length is indicated by the distance between lines. The distance to the Tap is indicated by the first line.

TDR - TIME DOMAIN REFLECTOMETER
Continued. . .

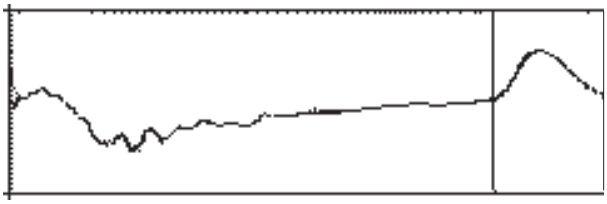
TDR WAVEFORM EXAMPLES -

SPLIT PAIR -



In XTALK mode the split displays as indicated by the first line. If re-split the waveform will display as indicated by the dotted line.

LOAD COIL -

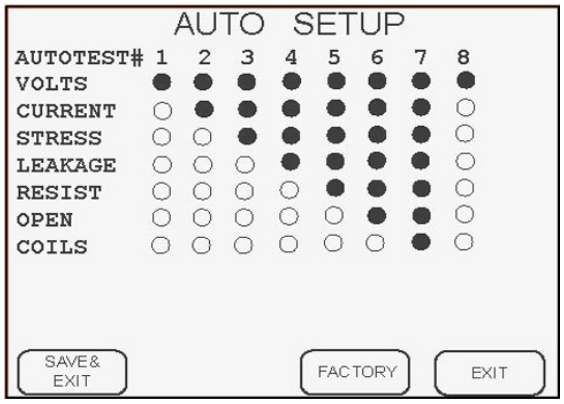


Load coils display waveforms similar to opens. To distinguish, look for equal spacing appropriate to a particular loading scheme.

AUTOSET - AUTOTEST SETUP

The TechMate can perform up to eight custom combinations of tests, programmed by the user and selected for use on an as needed basis for individual pairs, bulk pair recovery, etc.

The Factory default series of tests are built as follows:



Each darkened dot indicates an active test in an AutoTest series.

For example if AutoTest #2 is selected, the Voltage Test and Current Test will be performed.

Continued. . .

TO MODIFY AUTOTEST -

1. Use the 'Up' & 'Down' and 'Left & 'Right' NAVIGATION KEYS to move the flashing cursor to the Test and number desired.
2. Press the ENTER / RETURN HOME KEY to turn the test on or off.
3. When complete, press the SAVE MULTIFUNCTIONAL SOFTKEY located on the keypad below the PAIR icon.
4. Press the BACK MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon to return to the Main Menu Screen.

CONFIG - CONFIGURATION OPTIONS

From the CONFIG - CONFIGURATION OPTIONS menu the following functions and features can be selected by pressing the corresponding key on the ALPHANUMERIC KEYPAD -

1. SET VOLUME
2. NUMBER PICKLIST
3. AUTOTEST LIST
4. UPLOAD AUTOTEST RESULTS
5. SET DATE / TIME
6. ADJUST TIME

1. **SET VOLUME** - Modify the TechMate speaker volume by pressing the corresponding key on the ALPHANUMERIC KEYPAD as follows:

0 - OFF
1 - LOW
2 - MEDIUM
3 - HIGH

2. **NUMBER PICKLIST** - 12 telephone numbers can be stored in the Phone Number Picklist. To Add or Edit a phone number:

1. Press the corresponding key on the ALPHANUMERIC KEYPAD to select a line.

Continued. . .

2. To add or edit a name, access NAME EDIT with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. Use the 'Left' NAVIGATION KEY to erase an existing entry.
3. Use the ALPHANUMERIC KEYPAD to enter the desired name. To insert text, sequence through each character by repeatedly pressing the key until the correct letter appears.

   Press the 'Right' NAVIGATION KEY to add spaces .
4. When the NAME entry is complete, press the ENTER / RETURN HOME key to return to the Picklist.
5. To add or edit a telephone number, press the key on the ALPHANUMERIC KEYPAD to select the line desired.
6. Press NUMBER EDIT with the use of the MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon. Use the 'Left' NAVIGATION KEY to erase an existing entry.

   Use the ALPHANUMERIC KEYPAD to enter the desired number.
7. When the Number entry is complete, press the ENTER / RETURN HOME key to return to the Picklist.
8. To return the the Main Menu, press EXIT and then BACK with the use of the MULTIFUNCTIONAL SOFTKEY on the keypad below the screen icon.

CONFIG - CONFIGURATION OPTIONS
Continued. . .

3. **AUTOTEST LIST** - The TechMate can store up to 36 tests in it's Auto Test List.
The first 12 entries are single pair Auto Tests and are automatically stored by Date (MM/DD/YYYY) and Time (HH:MM:SS) on the first page of the Auto Test list.

When more than 12 single pair Auto Tests are made, the oldest stored test results are replaced.

Up to 24 Incremental Auto Test results are stored on the next two pages of the Auto Test list. Use the 'Up' and 'Down' NAVIGATION KEYS to scroll through the pages.

Tests are automatically stored by Name and Pair Number as designated by the user when tested.

When more than 24 Incremental Auto Tests and are made, the oldest stored test results are replaced.

To Recall and/or Rename a specific Auto Test:

1. Use the 'Up' and 'Down' NAVIGATION KEYS to scroll through the Auto Test List pages.
2.. Use the ALPHANUMERIC KEYPAD to view the desired test.

Continued. . .

3. Use the 'Left' NAVIGATION KEY to erase an existing entry.
4. Use the ALPHANUMERIC KEYPAD to enter the desired name. To insert text, sequence through each character by repeatedly pressing the key until the correct letter appears.

   Press the 'Right' NAVIGATION KEY to add spaces .

4. **UPLOAD AUTOTEST** - The TechMate can upload the test results stored in the current Auto Test list for analysis, and used in a customer-driven data base with the use of a Windows PC, the supplied USB cable and the Uploader/Downloader software, also supplied. The software must first be installed and setup on the PC.

(see pg. 62-63 for info on how to Install and Setup the Uploader Software)

TO UPLOAD STORED AUTO TEST RESULTS TO THE PC -

1. Connect the TechMate to the PC via the provided USB cable.

Continued. . .

UPLOAD STORED AUTO TEST RESULTS TO THE PC - *Continued. . .*

2. Turn the unit on.

3. Double click the UPLOADER Icon on the desktop or from the 'START' > 'ALL PROGRAMS' Menu. The Uploader window will open.

4. Assure that the Com Port is set to the Com Port identified when initially setting up the software. (see Pg. 65)

5. From the TechMate Main Menu, press 'MORE' on the AlphaNumeric Keypad.

6. Press 'CONFIG' on the AlphaNumeric Keypad.

7. Press 4 on the AlphaNumeric Keypad to begin uploading the stored Auto test results. The Uploader window will show the status of the upload.

8. When complete, click 'Save' and identify where the data is to be saved on the PC.

   By default, the Data is saved as an Excel file.

CONFIG - CONFIGURATION OPTIONS *Continued. . .*

5. **SET DATE/TIME** - To set the current Date and Time:

1. Use the 'Up' & 'Down' NAVIGATION KEYS to change MM/DD/YY. USE THE 'LEFT' & 'RIGHT' NAVIGATION KEYS to move the cursor to each entry.

2. The Unit requires a 24 Hour (Military Time) setting HH:MM. Use the 'Up' & 'Down' NAVIGATION KEYS to change the time. USE THE 'LEFT' & 'RIGHT' NAVIGATION KEYS to move the cursor to each entry.

3. When the the time and date are entered, press the ENTER / RETURN HOME key to return to the Menu.

6. **ADJUST CONTRAST** - The display screen contrast can be lightened or darkened from the CONTRAST ADJUST screen.

1. Press the 'UP' NAVIGATION KEY repeatedly to Darken the screen contrast.

2. Press the 'DOWN' NAVIGATION KEY repeatedly to Lighten the screen contrast.

3. When complete, press the ENTER / RETURN HOME key to return to the Menu.

xDSL TEST FEATURES

With the optional ADSL card installed, the TechMate can interface with the CO (DSLAM) and measure communication parameters such as upstream and downstream speed, signal to noise ratios, percent utilization and more. A BINS Graph can be displayed, a Rates & Levels table can be viewed and multiple IP addresses can be stored and Pinged. The TechMate can be custom configured with basic and advanced option settings for the type of connection - Bridge, PPoE or PPoA. The C Model of the Techmate can also be used to emulate a CO.

TO PERFORM xDSL TESTING -

Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

From the MAIN MENU, access DSL by pressing # on the ALPHANUMERIC KEYPAD and then pressing 4 on the next MENU,

or

Highlighting MORE (#) on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY. When the next menu appears, Highlight ADSL (0) on screen with the NAVIGATION KEYS and then press the ENTER / RETURN HOME KEY .

The initial ADSL startup screen will display indicating the TechMate is starting its handshake with the DSLAM. The unit must be configured for the type of xDSL connection before continuing.

Continued...

xDSL TESTING -
Continued. . .

TO CONFIGURE THE xDSL MODEM EMULATION TYPE - (*MODEL C ONLY*)
(FOR MODEL B, START ON PAGE 65: CONFIGURE THE xDSL CONNECTION TYPE)

1. At the DSL Startup screen, press the DSL CONFIG MULTIFUNCTIONAL SOFTKEY located on the keypad below the DSL CONFIG Icon.

2. Identify the modem emulation type of connection by pressing (0) MODEM EMULATION, on the ALPHANUMERIC KEYPAD.

3. Use the Alpha Numeric Keypad to identify the Modem Emulation type-

1 - ADSL RT (ADSL, ADSL2, or ADLS2+ residence modem)

2 - ADSL CO (ADSL, ADSL2, or ADLS2+ central office modem)

3 - VDSL RT (VDSL or VDSL2 residence modem)

4 - VDSL CO (VDSL or VDSL2 central office modem)

Once selected the display will return to the DSL CONFIG SCREEN.

Go to Step 2 of Configure the xDSL Connection Type on Pg. 65.

TO CONFIGURE THE xDSL CONNECTION TYPE

1. At the ADSL Startup screen, press-the ADSL CONFIG MULTIFUNCTIONAL SOFTKEY located on the keypad below the ADSL CONFIG Icon.

2. Identify the type of connection bypressing (1) CONNECTION TYPE, on the ALPHANUMERIC KEYPAD.

3. Use the ALPHANUMERIC KEYPAD to identify the connection type-

1 - Bridge

2 - PPoE (Ethernet)

3 - PPoA (ATM)

When the type has been selected,the display will return to the ADSL SETTINGS Screen. Use the ALPHANUMERIC KEYPAD to continue entering settings as needed.

4a. If required, identify PVC VPI (Virtual Path Indicator), or PVC VCI (Virtual Channel Indicator), press 1 or 2 respectively on the ALPHANUMERIC KEYPAD.

Up to three characters can be entered using the ALPHANUMERIC KEYPAD.

Continued...

Continued. . .

4b. To enter a PPP (Point to Point Protocol) USERNAME or PASSWORD if needed, press 4 or 5 respectively on the ALPHANUMERIC KEYPAD.

Up to thirtynine Username characters and sixteen Password Characters can be entered using the ALPHANUMERIC KEYPAD.

Use the left SOFTKEY to toggle through -

123 - Numbers

@!? - Characters

ABC1 - Uppercase Letters & Numbers

abc2 - Lowercase Letters & Numbers

Press the SAVE or CANCEL Softkey to return to the ADSL SETTINGS Menu.

4c. To store up to four PING HOST Addresses, press 6 through 9 respectively on the ALPHANUMERIC KEYPAD.

Characters can be entered using the ALPHANUMERIC KEYPAD.

Press the SAVE or CANCEL Softkey to return to the DSL SETTINGS Menu.

Once all required settings have been completed, press the EXIT SOFTKEY to return to the DSL RATES & LEVELS display.

Continued...

Continued...

xDSL RATES AND LEVELS DISPLAY

Once the TechMate connects to the DSLAM, the following information will display -

STATUS - SHOWTIME indicates the TechMate is operating online and the duration of time it has been connected to the DSLAM.

Type Indicates the DSL Connect Type or Rate.

Upstream and Downstream Test Result Information is displayed as follows -

ACTUAL DATA RATE - speed in kbps with which data is currently transmitted.

ATTAINABLE RATE - value of the maximum up & downstream data rate the connection is capable of providing, measured in kbps.

% CAPACITY - Percent of the Actual Data Rate as compared to the Attainable Data Rate.

SIG./NOISE RATIO - Measure of DSL signal strength relative to background noise, measured in dB.

Continued. . .

Continued. . .

LINE ATTENUATION - The measured difference in the total power transmitted and the total power received over all subcarriers *during diagnostics mode and initialization*. Line attenuation ranges from 0 to +127 dB with 0.1 dB steps.

SIGNAL ATTENUATION - The measured difference in total power transmitted and total power received over all subcarriers during *Showtime*. Line attenuation ranges from 0 to +127 dB with 0.1 dB steps.

TRANSMIT POWER - Value of the total output power of the modems, measured in dBm.

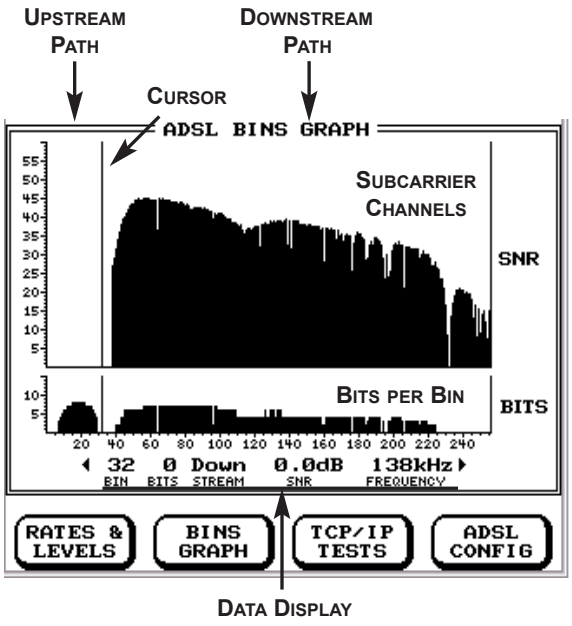
NOTE – During Showtime, only a subset of the subcarriers may be transmitted as compared to diagnostics mode and initialization (Line Attenuation). Therefore, Signal Attenuation may be significantly lower than Line attenuation.

Continued. . .

xDSL BINS GRAPH

To display the ADSL BINS Graph, press the BINS GRAPH MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon.

The ADSL BINS Graph displays test results as follows -



Continued. . .

Continued. . .

Use the Left and Right NAVIGATION KEYS to move the cursor across the graph to measure specific test results in a given BIN and Channel. These results appear in the Data Display below the BITS per BIN Graph as follows -

BIN - Indicates the specific BIN the unit is testing.

BITS - Measurement of the actual number of Bits per Tone designated to the BIN under test.

STREAM - Indicates the direction of the data stream, either Upstream or Downstream, under test.

SNR - Measure of signal strength relative to background noise in the Subcarrier Channel currently under test, measured in dB.

FREQUENCY - Indicates the specific Frequency or Tone currently under test.

TCP/IP TESTS

To perform a TCP/IP Test, press the TCP/IP Tests MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon.

The resulting display will indicate the connection type and the IP Address obtained.

PING

Access the PING function from the TCP/IP Test screen. To Ping a particular host across an IP network, press the PING MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon.

The Ping address display will appear.

If a Ping Host was previously built into the Configuration setup -

Select the Ping Host Address 1 through 4 using the ALPHANUMERIC KEYPAD.

OR

If required, press 5 on the ALPHANUMERIC KEYPAD to enter a new or different host address. Characters can be entered using the ALPHANUMERIC KEYPAD.

The results will indicate the IP Address reached, number of Transmit and Receive Packets and the RTT (Round Trip Time) Minimum, Maximum and Average, in milliseconds.

TO PERFORM AN IMPULSE NOISE TEST -

Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

From the MAIN MENU, press # on the ALPHANUMERIC KEYPAD and then press 5 on the next MENU,

or

Highlight MORE (#) on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY. When the next menu appears, Highlight IMP NOISE (5) on screen with the NAVIGATION KEYS and then press the ENTER / RETURN HOME KEY .

The Impulse Noise test screen will appear and begin testing Hits immediately.

SETUP OPTIONS -

Several SETUP options are available by pressing the SETUP MULTIFUNCTIONAL SOFTKEY located on the keypad below the icon -

1. TRIGGER LEVEL - sets a predetermined dBrn threshold level for noise detection. The available number of levels varies with the Filter Selection setting.
2. FILTER SELECTION - Select the G filter (ADSL) to test only within the G-Band. Selecting None will test across the entire bandwidth.

Continued. . .

IMPULSE NOISE TEST

Continued. . .

When the options have been set, the display returns to the IMPULSE NOISE Test Screen. The display will indicate -

TOTAL HITS - Continuous tally of all hit during an uninterrupted test.

SECONDS - Continuous duration time of an uninterrupted test.

HITS 1 MIN -
3 MIN -
5 MIN - Number of hit totals in the first 60 seconds, 180 seconds and 300 seconds of a test.

TO PERFORM A RINGER TEST -

Connect the test leads, Black to Tip, Red to Ring, and Green to Ground.

From the MAIN MENU, access RINGERS by pressing # on the ALPHANUMERIC KEYPAD and then pressing 4 on the next MENU,

or

Highlighting MORE (#) on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY. When the next menu appears, Highlight RINGERS (4) on screen with the NAVIGATION KEYS and then press the ENTER / RETURN HOME KEY.

There are no options or settings required.

The Ringers test screen will appear and perform the test immediately.

Ringer Equivalency Number (REN) represents the ringer loading effect on a line. A REN of 1 represents the loading effect of a single traditional telephone set ringing circuit.

NOTE: Modern telephone sets may have a REN lower than 1.

RFL / RESISTANCE FAULT LOCATOR -

The RFL function is used to locate a resistive type fault of less than 2 Meg ohms on a pair or on a single conductor.

The most common types of resistive faults are:

SHORTED PAIR
TIP CROSS
RING CROSS
TIP GROUND
RING GROUND

TESTING REQUIREMENTS -

- ▲ In order for the HT1000 to perform an RFL test the cable section must be at least 10m long.
- ▲ There must be at least one wire without any faults in the section of cable. A second optional good wire allows for a measurement of the distance from the fault to strap (FTS).
- ▲ The known good wire or wires should be the SAME length and gauge as the faulted test pair.
- ▲ Before using the RFL function, first use Resistance or Leakage tests to identify the fault and to identify the known good wire or wires required (See Strapping Procedure).

STRAPPING PROCEDURE -

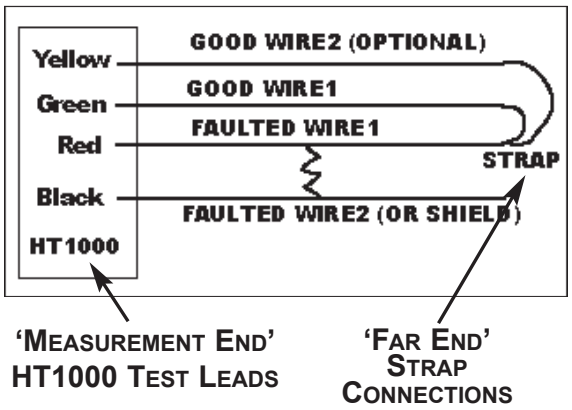
In addition to proper connection and operation of the HT1000 at the testing or 'MEASUREMENT END', accurate test readings require strapping of the fault to a known good wire or wires.

The strap is connected at the 'FAR END' of the pair, in such a location within the network so the fault lies between the test point and the strap.

The strap creates continuity between the legs so that a resistance measurement can be made.

NOTE: A proper strap connection has a significant effect on the ability to obtain an accurate measurement. Twist the conductors together, or be sure an appropriate wire strap is used and connections are properly tightened and secured.

Connect the strap at the 'Far End' of the pair as follows -



Continued. . .

RFL TESTING -

AT THE FAR END -

Before starting the test, place the strap at the 'FAR END' of the wire or wires to be tested. When the RFL Test is activated, the opening screen displays the proper STRAP connection procedure.

Use the HT1000 Resistance or Leakage tests to identify the fault and to identify the known good wire or wires required

AT THE MEASUREMENT END -

Connect the HT1000 at a location beyond the suspected fault section.

When the RFL Test is activated, the opening screen displays the HT1000 TEST LEAD connection procedure.

Connect the test leads as indicated. When complete, press the ENTER / RETURN KEY to proceed to the RFL Test Screen.

At the RFL test screen you have the option of EXITing the test function, STARTing the test or entering SETUP information.

Continued. . .

RFL Testing -

From the MAIN MENU, access THE RFL function by pressing # on the ALPHANUMERIC KEYPAD and then pressing 7 on the next MENU,

or

Highlighting MORE (#) on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY. When the next menu appears, Highlight RFL (7) on screen with the NAVIGATION KEYS and then press the ENTER / RETURN HOME KEY.

When the RFL Test is activated, the opening screen displays the STRAP CONNECTION procedure.

After the connections have been made, press the ENTER / RETURN HOME KEY. The HT1000 will go through a calibration and connection check before continuing.

If there is no straps detected or there is cable section is too short, the HT1000 will indicate there is no strap and give the user the option of quitting or retrying.

No RFL testing is possible without at least one strap. If only one strap is detected a warning is displayed and the user is given the option of quitting, retrying or continuing.

TO PERFORM THE RFL TEST -

RFL SETUP -

To obtain accurate test results, the cable GAUGE and the Temperature appropriate to the cable being tested must be entered into the HT1000. From the RFL main screen check to see that the wire gauge and temperature are properly set. If not, press the SETUP softkey to enter the SETUP menu.

If the DISTANCE TO STRAP is know it can be entered in lieu of the Cable Gauge. Readings can also be changed from FEET to OHMS.

At the RFL Test screen, press the SETUP MULTIFUNCTIONAL SOFTKEY located on the keypad below the SETUP Icon. The RFL Setup Screen will be displayed -

1. **GAUGE SELECTION** - Use the ALPHANUMERIC KEYPAD to identify:
   1. 22 Gauge
   2. 24 Gauge
   3. 26 Gauge
   4. B Service Wire
   5. OHMS - Selecting this option changes the readings between test sections from feet to OHMS on the RFL Test Results Screen.
   6. KNOWN DISTANCE TO STRAP - USE the ALPHANUMERIC KEYPAD to enter the Distance to Strap (Measurement End to Far End) When the entry is made, press the ENTER / RETURN KEY to return to the RFL Test Results Screen.

2. **TEMPERATURE SELECTION** - Use the ALPHANUMERIC KEYPAD to identify the TEMPERATURE (in Fahrenheit) appropriate to the <u>cable</u> being tested. When the entry is made, press the ENTER / RETURN KEY to return to the RFL Test Results Screen. Testing starts immediately when the RFL Test Results Screen displays.

RFL TEST RESULTS -

Measurements are displayed as follows -

DTS - DISTANCE-TO-STRAP, measurements are displayed in Feet or OHMS

DTF - Distance-to-Fault, measurements are displayed in Feet or OHMS

FTS - Fault-to-Strap measurements are displayed in Feet or OHMS

FTS VERIF - The FTS measurement is verified when the optional second good wire IS USED at the Far End Strap

FTS CALC - The FTS measurement is verified when the optional second good wire is NOT USED at the Far End Strap

SIZE - Indicates the resistive measurement of the fault

GROUND TEST -

The GROUND TEST function is used to measure the Resistance between the Central Office Ground and the Local Ground.

Note: The test can only be performed using a good working pair.

Test results may not be accurate if the C.O. is a floating type switch such as the AT&T 5ESS

C.O. Battery, proper polarization and correct test lead connection - Black to Tip, Red to Ring, and Green to Ground is required.

TO PERFORM THE GROUND TEST -

From the MAIN MENU, access THE GROUND TEST function by pressing # on the ALPHANUMERIC KEYPAD and then pressing 8 on the next MENU,

or

Highlighting MORE (#) on screen by utilizing the NAVIGATION KEYS and then pressing the ENTER / RETURN HOME KEY. When the next menu appears, Highlight GROUND TEST (8) on screen with the NAVIGATION KEYS and then press the ENTER / RETURN KEY.

The GROUND TEST screen will display.

To begin testing, press the START MULTIFUNCTIONAL SOFTKEY located on the keypad below the START Icon.

The Resistance between the Central Office Ground and the Local Ground will display.

PC SOFTWARE INSTALLATION & SETUP

The CD ROM provided with the TechMate® contains software that, when installed on a Windows PC, will allow the unit to upload Autotests and TDR tests stored in the TechMate, and download the latest firmware updates found on the Heritage Technologies website. Once the software has been installed, a few setup steps may be required.

(See Software Setup Pg. 65)

LOADING SOFTWARE AUTOMATICALLY

1. Close all applications running on the Windows PC.

2. Insert the CDROM into the CDROM drive. A startup screen will appear and the program will prompt you through the installation.

3. When complete, three icons will be installed on the desktop and in the 'Start' > 'All Programs' Menu -

   UPLOADER - (for Autotest Uploads)
   TDR UPLOADER - (for TDR Uploads)
   RFU - (for Firmware Downloads)

NOTE: *If the CDROM does not install automatically, the software can be manually installed as follows -*

Continued. . .

LOADING SOFTWARE MANUALLY

If the CDROM does not install automatically, the software can be manually installed as follows -

UPLOADER - (for Autotest Uploads)

1. Close all applications running on the Windows PC.

2. Insert the CDROM into the CDROM drive.

3. From the 'START' menu select 'RUN'.

4. Use 'BROWSE" to locate the 'UPLOADER' folder on the CDROM

5. In the 'UPLOADER' folder double click 'SETUP', the program will prompt you through the installation.

TDR UPLOADER - (for TDR Uploads)

1. Close all applications running on the Windows PC.

2. Insert the CDROM into the CDROM drive.

3. From the 'START' menu select 'RUN'.

4. Use 'BROWSE" to locate the 'TDRUPLOADER' folder on the CDROM.

5. In the 'TDRUPLOADER' folder double click 'SETUP', the program will prompt you through the installation.

Continued. . .

LOADING SOFTWARE MANUALLY

Continued. . .

RFU - (for Firmware Downloads)

1. Close all applications running on the Windows PC.
2. Insert the CDROM into the CDROM drive.
3. Open the CDROM and locate the folder 'RFU'.
4. Copy/Drag the folder from the CDROM to the desired location on the PC.

SOFTWARE SETUP

TO IDENTIFY THE PROPER COM PORT -

Once the Uploader, TDR Uploader and RFU software is installed on the PC the correct Com Port for USB connection of the TechMate may need to be set. The default setup is COM1.

1. Plug the TechMate into the PC via the provided USB cable.
2. From the Windows 'START' Menu, open the 'CONTROL PANEL'.
3. Open 'SYSTEM'.
4. In the Systems Properties window, click on the 'HARDWARE' tab.
5. Click on 'DEVICE MANAGER'.
6. Double click on 'PORTS' (Com &
7. Locate - 'USB SERIAL PORT' and note the Com Port identified in parenthesis next to it.

Important: *This is the Com Port setting to use when operating the Uploader and Downloader Software*.

Continued. . .

SOFTWARE SETUP
Continued. . .

1st TIME SETUP OF RFU DOWNLOADER SOFTWARE

Once the RFU Software has been installed, assure proper operation of the RFU Downloader by checking that the following settings are correct -

1. Double click the RFU Icon on the desktop or from the 'START' > 'ALL PROGRAMS' Menu.
2. Click 'SETUP'.
3. Click 'COMMUNICATIONS'.
4. In the Communications Options Menu, select the Com Port you identified earlier in the Setup process.
5. Select the 'USE SERIAL CONNECTION' radio button.
6. Insure the 'ENABLE PROCESSOR DETECTION' Check Box is selected.
7. Insure the 'USE USB TO SERIAL CONVERTER' Check Box is selected.
8. Click 'OK'.

DOWNLOAD FIRMWARE UPDATES

A unique feature of the TechMate is the ability to download the latest firmware updates when available from the Heritage Technologies Website or other media.

Once the Firmware is on the PC, use the following steps to download to the unit -

1. Double click the RFU Icon on the desktop or from the 'START' > 'ALL PROGRAMS' Menu.
2. Make sure the unit is turned off. Connect the TechMate to the PC via the provided USB cable.
3. With the unit turned off, press the Asterisk key on the AlphaNumeric keypad. The backlight will begin to flash on and off.
   Press the # Key. The backlight will stop flashing. The TechMate is now ready for update.
4. On the PC, click 'FILE' > 'LOAD FLASH IMAGE'.
5. In the Dialog Box, locate the Firmware Update previously downloaded to the PC from the Heritage Website or other media. *(The file extension is **.bin**)*

Continued. . .

DOWNLOAD FIRMWARE UPDATES
Continued. . .

6. Double click the file or highlight and click 'OPEN'.

7. The screen will return to the Dialog Box. Click 'OK'.

8. While the Firmware is downloading to the TechMate, the PC screen will display the progress. The TechMate display will remain blank with the-backlight on.

   NOTE: *Do not turn off the unit until the download is complete.*

9. When the PC screen indicates the download is complete, turn the TechMate off.

   NOTE: *The unit will delay a few moments before shutting down.*

   Upon restarting the TechMate the initial screen will display the firmware version installed

BATTERY AND POWER MANAGEMENT

The TechMate is powered by a 7.2V rechargeable Nickel-Metal Hydride battery pack.

The battery pack has an extended life and is not field replaceable.

Battery use per charge is approximately 4 hours continuous use and 12 hours normal use.

CHARGING THE BATTERY PACK

To recharge the battery pack, an AC charger Adapter Part Number 1001-2020, and a Cigarette Lighter Charger Part Number 1001-2025 are provided. Both chargers are connected to the unit via the power port on the right side of the unit.

The battery pack can be recharged when the unit is off or during operation. When recharging while turned off, the display screen will flash - 'CHARGING', and stop flashing when fully charged.

During operation, a full charge is indicated by a 'full' battery icon viewed in the top left corner of the Main Menu.

The battery pack should be recharged when received from the factory to assure a full charge.

PRODUCT WARRANTY

Heritage Technologies Incorporated warrants the HT-1000 against defects in material or workmanship for a period of one year from the date of shipment to the original purchaser.

All units returned to the Heritage Factory, delivery charges pre-paid and deemed to be defective under this warranty will be replaced or repaired at Heritage Technologies discretion.

No other warranty is expressed or is implied, nor will responsibility for the operation of this device be assumed by Heritage Technologies Incorporated.

SERVICE AND RETURN MATERIAL AUTHORIZATION

To assist in the rapid repair of the unit, the user is requested to call 888-933-8378 to obtain a Return Material Authorization (RMA) number.

The user is requested to include a statement giving a complete description of the problem, including the conditions under which the failure or damage occurred.

Complete return information (Name, Company, address and phone number) must be included with each unit returned.

PART NUMBERS

The parts and accessories for the TechMate listed below are available from Heritage Technologies.

For assistance please contact Heritage at -

888-933-TEST or 760-931-TEST

or

sales@heritagetechnologiesinc.com

PART NUMBER:	DESCRIPTION:
1001-1390	Test Lead Assembly
1001-2015	USB interface cable
1001-2010	Supplied CD with PC Software and Manual
1001-2001-A	Soft Case
1001-2005	Manual
1001-2020	AC Charger
1001-2025	Cigarette Lighter Charger
1000-5001	HT1000A
1000-5002	HT1000AV
1000-5003	HT1000B

TECHMATE SPECIFICATIONS

(Model HT1000-A Unless Otherwise Noted)

FEATURE: **RANGE**: / Accuracy, whichever is greater.

ACV: 0V to 250V (± 2%, ± 1V)

DCV: 0V to ±300V (± 2%, ± 1V)

RESISTANCE: 0ohms to 1,000K ohms (± 2%, ± 1 ohm)

LONGITUDINAL BALANCE: +30dB to +80dB (± 2dB)

SUPER STRESS™: -20dB to +30dB (± 2dB)

LEAKAGE: 1M ohm to 100M ohm (± 3%)

LOAD COIL DETECTION: 0 coils to 4 coils (± 1 coil)

LOOP CURRENT: 0mA to ±100mA (± 2%, ± 1mA)

POWER INFLUENCE: +40dBrnC to +100dBrnC (± 2dBrnC)

NOISE: 0dBrnC to +75dBrnC (± 2dBrnC)

TONE SEND (Voiceband):
Frequency:100Hz to 20KHz (± 1%)
Amplitude: 0dBm, 600 ohm (± 1dBm)

FEATURE:	RANGE: / Accuracy, whichever is greater.
LOSS (Voiceband):	-40dBm to +10dBm (± 1dBm)
OPEN METER:	0ft to 3,000ft (± 2%, ± 5ft) 3,000ft to 50,000ft (± 3%)
ID TONE:	Frequency: 577.5Hz (± 1%) Amplitude: 0dBm, 600 ohms (± 1dBm)
CALLER ID:	Yes
CALLER ID ON CALL WAITING:	Yes
WIDEBAND TONE SEND:	Frequency:20KHz to 1200KHz (± 1%) Amplitude:0dBm, 135 ohm (± 1dBm)
WIDEBAND TONE RECEIVE:	Frequency: 20KHz to 15MHz *–Optional to 25MHz (in model HT1000-AV)* Amplitude: -50dBm to +2dBm (± 2dBm)
WIDEBAND LOSS:	Frequency: 20KHz to 15MHz *–Optional to 25MHz* Amplitude:-50dBm to +2dBm (± 2dBm)

Continued. . .

TECHMATE SPECIFICATIONS

FEATURE:	RANGE: / Accuracy, whichever is greater.
WIDEBAND SPECTRUM ANALYZER:	Frequency: 20KHz to 1200KHz Frequency Range, 5KHz Freq. Resolution Frequency: 200KHz to 15MHz Frequency Range, 5KHz Freq. Resolution Amplitude:-50dBm to +2dBm (± 2dBm)
TDR:	Dual Trace, 12 trace memory storage, Automatic pulse width selection, Pair comparison mode, Split/crosstalk mode, Intermittent fault location, Closest range 0 – 25ft, Longest range 0 – 49,000ft (@VOP = 0.7), Zoom mode
RFL:	Distance to Fault: 0 . 10,000ft (¡¾ 0.5%, ¡¾ 3ft) Maximum measurable fault resistance: 100M§Ù Maximum locatable fault resistance: 2M§Ù

Continued. . .

FEATURE:	RANGE: / Accuracy, whichever is greater.
DISPLAY:	High resolution, 1/4 VGA
DIMENSIONS:	10” x 4.5” x 2.5”
WEIGHT:	28oz.
BATTERIES:	Rechargeable nickel-metal Hydride
BATTERY LIFE:	Approximately 4 hours continuous use / 12 hours normal use.
ENVIRONMENTAL:	Weather and drop resistant in accordance with MIL-STD-810F.

OPTIONAL FEATURES
HT1000B (ADSL2+) Specifications
In Addition to Features of HT1000A

FEATURE :	DESCRIPTION:
STANDARDS COMPLIANCE:	ADSL G.dmt G.992.1/2 Annex A, B ADSL2 G.992.3/4 Annex A, L, M ADSL2+ G.992.5 Annex A, L, M
LINK STATISTICS:	Modem Status Connection Type (ADSL, ADSL2, ADSL2+) Actual Data Rate Upstream and Downstream Attainable Data Rate Upstream and Downstream % Capacity Upstream and Downstream S/N Ratio Upstream and Downstream Line Attenuation Upstream and Downstream Signal Attenuation Upstream and Downstream Transmit Power Upstream and Downstream

Continued. . .

FEATURE :	DESCRIPTION:
Link Graphs:	S/N Ratio in each bin Bits in each bin
Internet working Protocols:	Bridge PPPoE PPPoA DHCP
Ping Tests:	IP address assigned Packet echo statistics • Transmitted • Received • % successfully echoed • Round trip time (max, min, and average)

HT1000C (VDSL2) SPECIFICATIONS IN ADDITION TO FEATURES OF HT1000A AND HT1000B

STANDARDS COMPLIANCE:	VDSL2 G.993.2 • Bandplans: 8, 12, 17, 30MHz • Profiles: 8a, 8b, 8c, 8d, 12a, 12b, 17a, 30a • Plan 997, Plan 998 Capable of emulating a CO/DSLAM
LINK STATISTICS:	Connection Type (VDSL2, RT, CO)

For More Information Contact:

sales@heritagetechnologiesinc.com

888-933-TEST or 760-931-TEST

HERITAGETECHNOLOGIESINC.COM