SUNRISE TELECOM

HTT

Home Test Toolkit

User's Manual

SA976

SUNRISE TELECOM®

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WARNING

Using the supplied equipment in a manner not specified by Sunrise Telecom may impair the protection provided by the equipment.

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DO NOT dispose of Waste Electrical and Electronic Equipment (WEEE) as unsorted municipal waste. For proper disposal return the product to Sunrise Telecom. Please contact our local offices or service centers for information on how to arrange the return and recycling of any of our products.

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EC Directive on Waste Electrical and Electronic Equipment (WEEE)
The Waste Electrical and Electronic Equipment Directive aims to minimize the impact of the disposal of electrical and electronic equipment on the environment. It encourages and sets criteria for the collection, treatment, recycling, recovery, and disposal of waste electrical and electronic equipment.

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Introduction

Welcome to the HTT.

This User's Manual describes the general structure of the HTT along with it's functions.

Contained within the shipping box are the following items:

HTT Test Set, Carrying Case, AC Charger, and User's Manual: The charger can simultaneously charge the battery and run the test set.

Cable ID Devices: These are used to identify coax or RJ runs into each wall jack in the residence.

Wiremap Probe: Used primarily for Cable Loss and Wiremap testing.

Cable Testing Cable: This is an RJ-45 to RJ-11/Coax connection cable used for Cable Loss, and Cable ID testing. The single RJ-45 connects to the HTT, and other ends connect to the circuit under test.

RJ-11 to clips Cable: Used for VDSL and POTS/DC testing.

RJ-11 to Coax Cable: Used for VDSL testing on Coax.

Coax Cable: Used for SLM or HPNA testing.

RJ-11 to RJ-11 Cable: Used for POTS/DC, VDSL, or HPNA testing via an RJ-11 jack.

F-type Snap On Connector: Used on Coax cables to facilitate connection.

F-type to F-type Barrel Adapter Coupler: Used to connect two ends of male Coax cables together.

Headset: Used for POTS talk/listen applications.

Getting Around

The test set uses a hierarchical menu structure. From the test set's startup menu, make selections by pressing the appropriate part of ● to move the cursor (CURSOR SAMPLE 01:11:2006). Once the selection has been made, press ↵ or an indicated key.

Throughout this User's Manual, the following shorthand is used to indicate how to get to a particular menu function, such as: "SYSTEM SETUP > CLOCK", where the ">" means to press ↵. To return to the previous screen, press ESC.

FCC ID: UEBHTT01

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Caution: Exposure to Radio Frequency Radiation.

To comply with FCC RF exposure compliance requirements, this device must not be co-located or operating in conjunction with any other antenna or transmitter.

1 Physical Description

1.1 Front View

Slide this cover to access the main port panel.

Figure 1 HTT Front View

Figure 1 shows the front view of the HTT. The major components shown in this view are:

Display: This is an 8 line by 21 column LCD screen. Details of the screen are show in Figure 2:

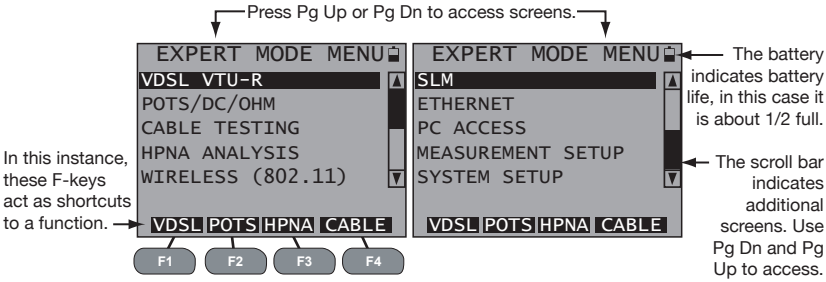

Figure 2 HTT Screen

LEDs:

PASS/FAIL: Indicates pass (green) or fail (red) results for a test.

SIGNAL: Indicates various signals specific to menu selection, such as link up (green) and link down (red).

POWER: When the HTT is on, it is green.

BLUETOOTH: Indicates the presence of a Bluetooth network.

BATTERY: When the battery is low, it is red and the on-screen battery indicator displays 1/4. It is green when charging.

Keypad

Pg Up, Pg Dn: Used to page up or page down through screens. Look for Pg Up and Pg Dn in this manual.

⏻: Use to power up/down the HTT. To turn on, press and hold ⏻ for 3 seconds and the POWER LED illuminates green. To turn off, press and hold ⏻ for 5 seconds and the POWER LED will turn off. Look for ⏻ in this manual.

F1 F2 F3 F4: These are used to perform selections shown on the bottom of the screen as in Figure 2. Look for F1, F2, F3, F4, or F-keys in this manual.

AUTO: Starts a programed Auto Test sequence with on screen prompts. Look for AUTO in this manual.

MENU: Use to display the EXPERT MODE MENU. Look for MENU in this manual.

: Use to move the cursor in the indicated direction. Look for ▲,◀,▶,▼ in this manual.

ESC : Use to move 1 step back in the menu. Look for ESC in this manual.

↵: Use to invoke a selection or action. Look for ↵ in this manual.

1.2 Top Side Panel

As shown in Figure 1, slide the transparent cover to access the main port panel shown in Figure 3:

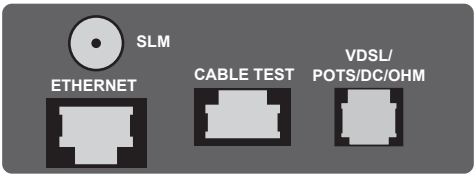

Figure 3 Main Port Panel

This panel contains:

SLM: Signal Level Meter Coax port used to test the quality of the signal on the back of the STB (Set Top Box).

ETHERNET: Use this Ethernet port for basic Ethernet testing.

CABLE TEST: RJ-45 port used for Cable ID, Wiremap, Cable Loss (over both twisted pair and Coax), and Diplexer testing.

VDSL/POTS/DC/OHM: RJ-11 port is used to test VDSL, POTS, and check for DCV and OHM.

1.3 Right Side Panel

Figure 4 Right Side Panel

Pull at the bottom part of the plastic protective cover to reveal the panel shown in Figure 4.

Note: Do not try to remove the cover as it will be damaged.

HEADSET: Use this port to connect a headset.

HPNA: F-type coax and RJ-11 ports used to test the HPNA signal running over a coax or RJ-11 interface.

1.4 Bottom Side Panel

This side contains the DC power port. Use it to connect the supplied AC to 5 volt DC power supply to run and charge the HTT.

1.5 Back Side

The back side contains:

Battery Compartment: Remove the screw to access the battery pack. Refer to *Section 1.5.1*.

Serial Number Label: Contains the serial number along with Sunrise Telecom contact information.

1.5.1 Battery Replacement

When the battery does not hold a charge it needs to be replaced. To do so follow these steps:

1. Turn off the HTT.
2. Remove the one screw that retains the battery cover.
3. Pull the cover away from the chassis.
4. Pull the battery away from the chassis.
5. Insert new battery into position in the chassis.
6. Place the cover in position and secure with screw.
7. Connect the supplied AC power supply and fully charge the battery before use.

1.5.2 Battery Care and Storage

Observe these basic battery care procedures in order to avoid possible damage to the battery and to maintain it's performance.

⚠WARNINGS

- Failure to observe the following procedures and precautions can result in electrolyte leaks, heat generation, bursting, fire, and serious personal injury.
- Battery electrolyte is a strong colorless alkaline solution, which is extremely corrosive and will burn skin.
  - If skin comes in contact with the electrolyte from the battery, thoroughly wash the area immediately with clean water.
  - If clothing comes in contact with the electrolyte from the battery, discard the clothing.
  - If any fluid from the battery comes in contact with eyes, immediately flush thoroughly with clean water and immediately consult a doctor. The electrolyte can cause permanent loss of eyesight.
- Keep the battery out of reach of children.

CAUTIONS

- Never dispose the battery in a fire.
- Never heat the battery.
- Never strike or drop the battery.
- Do not apply water, or other oxidizing agents to the battery. This will cause corrosion and heat generation. If the battery becomes rusted, the gas release vent may no longer operate and cause the battery to burst.
- Do not charge the battery using an AC adapter or charger not specified by Sunrise Telecom. Charge the battery only with the Sunrise Telecom charger/AC adapter that came with your test set.
  - If the battery is not fully charged after the battery charger's predetermined charging period has elapsed, stop the charging process. Prolonged charging may cause leakage of battery fluid, heat generation, and or bursting.
  - Charge the battery within a temperature range of 0°C (+32°F) to +40°C (+104°F).
- Do not use the battery if it leaks fluid or changes shape; otherwise it may cause heat generation, bursting, and fire.
- Do not short circuit the battery by connecting the positive (+) and negative (-) terminals together with electrically conductive materials, such as lead wires, etc.
- Do not connect the battery directly to a power source or the cigarette lighter socket in a car. Use the optional specified cigarette lighter charger from Sunrise Telecom.

- Never disassemble the battery. Doing so may cause an internal or external short circuit, or result in exposed material of battery reacting chemically with the air. It may also cause heat generation, bursting, and/or fire.
- Never modify or reconstruct the battery pack. Protective devices are built into the battery pack. If damaged, excessive current flow may cause loss of control during charging or discharging of the battery, which can result in leakage of battery fluid, heat generation, bursting, and/or fire.
- When the battery operating time becomes much shorter than its initial operating time even after recharged, the battery has reached its end of life and should be replaced with a new one.

Extended Battery Storage

- Fully charge the battery before storing.
- Remove the battery from the test set as shown in *Section 1.5.1.*
- Do not store the battery in high temperatures, such as direct sunlight, in cars during hot weather, or near any other heat source. This will impair the performance and shorten the operating life of the battery, and may cause battery leakage.
  - For maximum battery life, store the battery between -20°C (-4°F) and +30°C (+86°F).
- During storage, the battery will need to be regularly recharged. The interval ranges from approximately 30 to 90 days at temperatures between -20°C (-4°F) and +30°C (+86°F). In general the higher the storage temperature the shorter the recharge cycle.
  - To recharge, install the battery into the test set and use the supplied Sunrise battery charger to recharge the battery.
  - Charge the battery within a temperature range of 0°C (+32°F) to +40°C (+104°F).
- After long-term storage, there is a possibility that the battery will not fully recharge. To fully charge it, charge and discharge the battery for a few times. Use the test set to discharge the battery.

2 Auto Key

Press and hold ⏻ for 3 seconds to power up the HTT. When the screen shown in Figure 5 is displayed, press AUTO as indicated to perform automated testing. The HTT will prompt you through all steps involved in the test procedure from connection to the conclusion of the test.

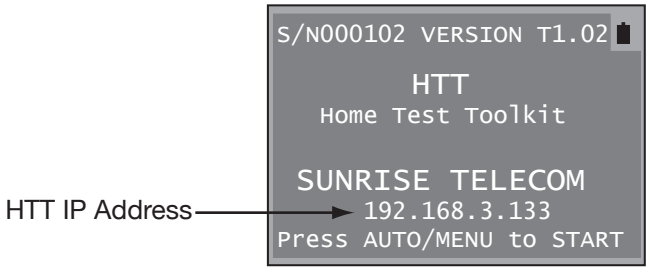

Figure 5 HTT Initial Startup Screen

If desired, press MENU as indicated in Figure 5 and see *Section 3*.

3 Expert Mode Menu

Press ⏻ to power up the test set and then press MENU, refer to Figure 6 for the menu structure:

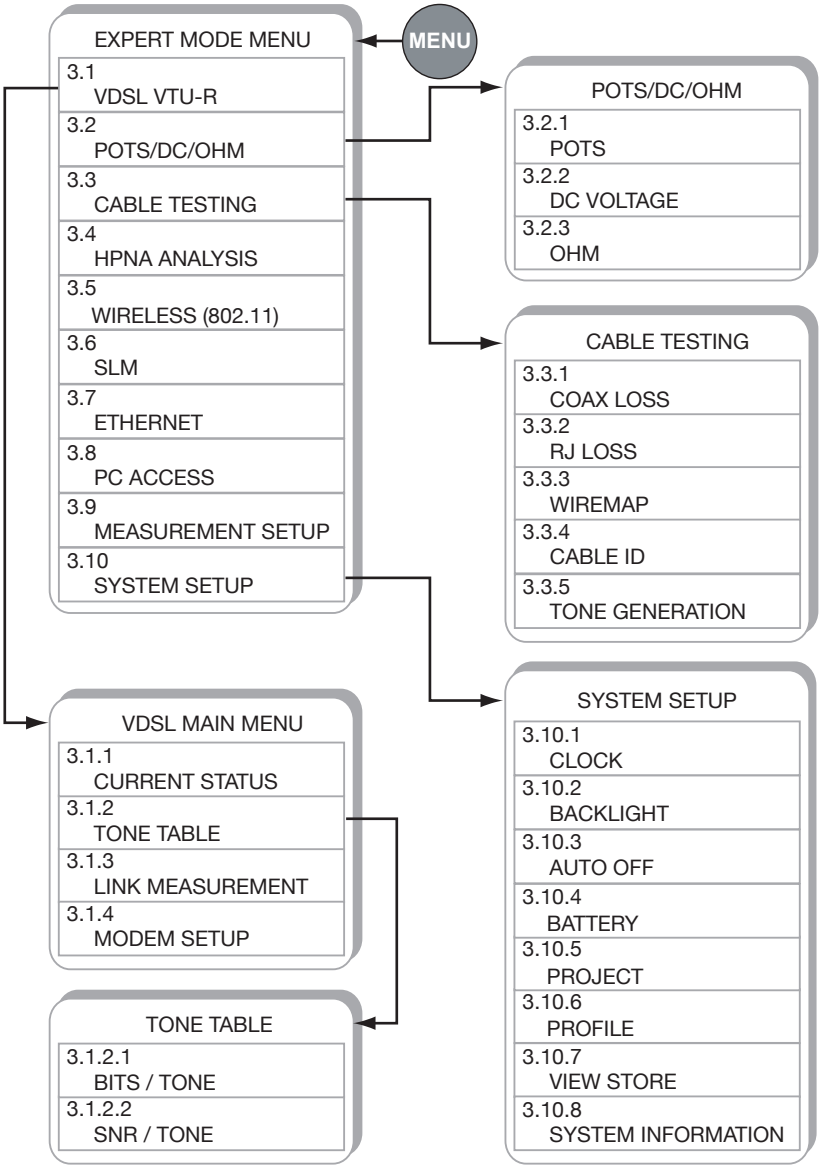

Figure 6 Expert Mode Menu Tree

3.1 VDSL VTU-R

When the HTT is in this function, the SIGNAL LED indicates:

- Green: Link up
- Blinking Red: Attempting to open link and or training
- Red: Link down

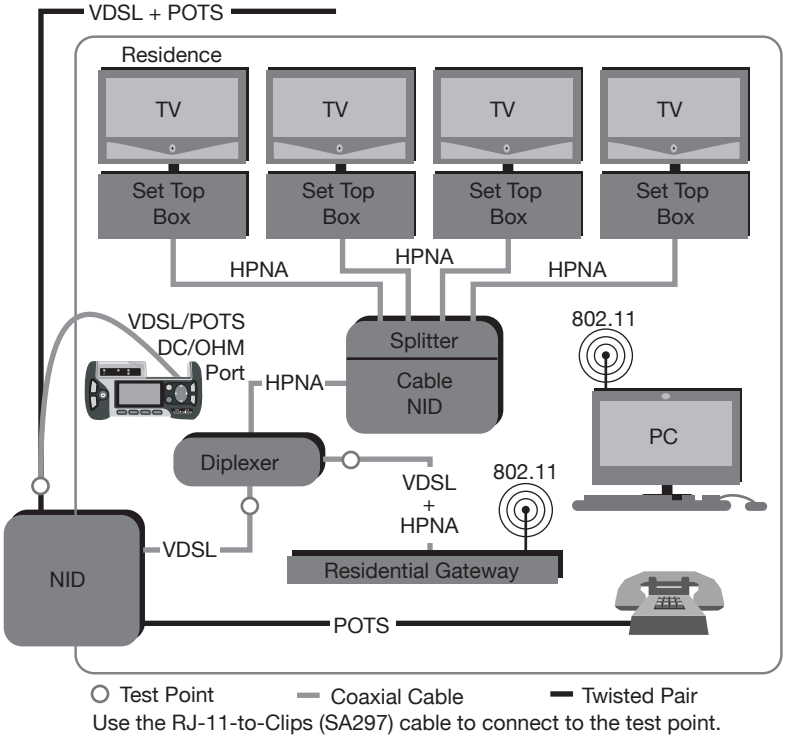

Figure 7 VDSL Testing Connection Points

Figure 7 shows where to connect the HTT for VDSL testing and what should be checked is:

- VDSL parameters outside the house before and after the balun at the NID.
- VDSL parameters inside the house before RG installation.
- The following VDSL synch information:
  - Downstream and Upstream rates (shown in the RATE field, Interleaved Speed)
  - Downstream Max Rate, Capacity, SNR, and Delay
  - Upstream Power and Delay

The VDSL main menu screen contains:

- CURRENT STATUS
- TONE TABLE
- LINK MEASUREMENT
- MODEM SETUP

3.1.1 Current Status

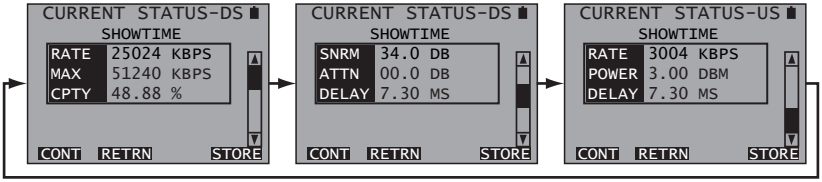

Figure 8 Current Status Screens

These screens report:

Link status is shown above the box, SHOWTIME is shown in Figure 8, but this line can report:

LINK CLOSED: The HTT is idle and not trying to establish a link with the DSLAM.

ATTEMPTING OPEN LINK: The HTT is attempting to establish a link with the DSLAM.

TRAINING: The HTT has detected the DSLAM, and has begun the VDSL training process.

SHOWTIME: The Link is up between the HTT and the DSLAM.

The following is reported inside the box:

DS: Downstream
RATE: This is the link up speed of the VDSL connection.

MAX: This is the maximum downstream rate the VDSL line can support.

CPTY: This is the downstream Capacity in percentage of utilization of the VDSL connection (derived from the RATE/MAX speeds).

SNRM: Signal-to-Noise Ratio Margin is the downstream margin above the noise floor where the signal and noise would be the same causing the VDSL connection to drop.

ATTN: This is the aggregate downstream Attenuation of the signal from the DSLAM to the HTT.

DELAY: This is the downstream Delay time from the DSLAM to the HTT.

US: Upstream
RATE: This is the Upstream link up speed.

POWER: This is the aggregate downstream Power of the signal from the HTT to the DSLAM.

DELAY: This is the delay time from the HTT to the DSLAM.

These screens contain the following F-keys

CONT (F1): Press to return to the previous screen.

RETRN (F2): Press to retrain the modem and restart measurements.

STORE (F4): Press to store the measurements.

Interpreting the Results

Fixed Rate Circuits
Fixed rate circuits specify an exact data rate for the customer. If testing a Fixed Rate service, look at the following:

Rate: Confirm that the value equals the fixed rate set for the circuit, in both the upstream and downstream directions. For example, if the circuit under test is configured for 384 downstream/128 upstream, a downstream rate at 384 and a upstream rate at 128 should be seen.

SNR Margin: Confirm that the signal-to-noise margin complies with your company's requirements. A common standard is 6 dB, higher values can provide more room for any introduced noise.

Rate Adaptive Circuits
Rate adaptive circuits specify minimum and maximum data rates for a circuit, and try to attain the maximum rate set by the DSLAM. If testing a Rate Adaptive service, look at the following:

Rate: This value should be between the minimum and maximum thresholds set for the circuit.

SNR Margin: The signal-to-noise margin value also needs to be above the minimum allowable margin. Commonly it is 6 dB, your margin might be higher. Since rate adaptive circuits try to use all the possible bandwidth, the noise margin will typically be very close to 6 dB (or the minimum value).

3.1.2 Tone Table

This menu screen contains:

- BITS/TONE
- SNR/TONE

3.1.2.1 Bits/Tone

This feature measures the bits per tone distribution used by the modem to transmit the provisioned rate. It displays the number of bits assigned per tone as a graphic or as a table.

The first screen allows selection of the following MHz ranges:

If Plan 997, use these:	If Plan 998, use these:
SUMMARY: 0.138M–12.0M	SUMMARY: 0.138M–12.0M
DS1: 0.138M–3.0M	DS1: 0.138M–3.75M
USI: 3.0M–5.1M	USI: 3.75M–5.2M
DS2: 5.1M–7.05M	DS2: 5.2M–8.5M
US2: 7.05M–12.0M	US2: 8.5M–12.0M

Note: US is upstream, DS is downstream frequencies.

After making a selection, press ↵ to view the BIT TABLE screen for the selection made.

During modem initialization, a signal-to-noise measurement for each tone is made. Bit distribution is then optimized to meet the desired bit rate. Each tone can support a theoretical maximum of 15 bits. During operation, the bit distribution may be adjusted to optimize bandwidth. The modem constantly monitors the signal-to-noise ratio for each tone. If a tone degrades in quality, it sends a bit swap command to adjust the amount of bits assigned to that particular tone. These bits may be added to a different tone or taken out completely. An example is shown in Figure 9:

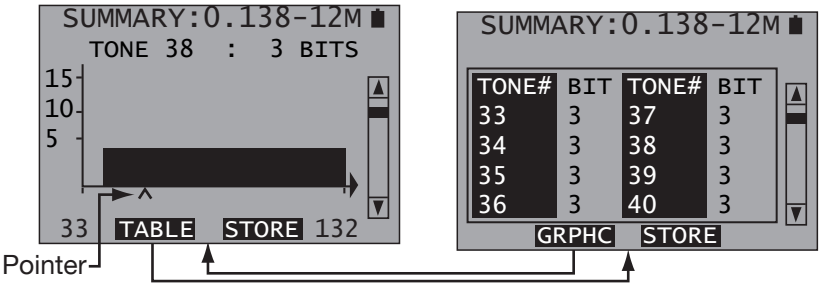

Figure 9 Bits/Tone Screens

A table of the tones is shown on the right of Figure 9. Listed for each tone is the number of bits assigned to it. Press ▲ , ▼ or Pg Up, Pg Dn to scroll through all tones. Press F2 to view a graph of the tones shown in the left screen in Figure 9.

In the Graph view, to learn the exact bit count of a specific tone, refer to the line above the graph. This line provides the bit count for the tone marked by the pointer arrow. In the left screen shown in Figure 9, the pointer arrow is at tone 38 with 3 bits.

To move the pointer (∧):

1. Press ◄ ,► to move it one tone at a time.
2. Press Pg Up or Pg Dn to move to the next or previous screen in the graphic sequence.

When finished viewing the graphic, press F2 to return to the table.

In either screen, press F3 to save the graph and table.

To view a narrower range of frequencies (less pages), press ESC and select a range from the previously described list.

3.1.2.2 SNR/Tone

This feature measures the signal-to-noise ratio for each downstream tone used by the modem to transmit the provisioned rate. It displays the SNR per tone as a graphic or as a table.

During modem initialization, a signal-to-noise measurement is made for each tone; bit distribution is then optimized to meet the desired bit rate. During operation, the bit distribution may be adjusted to optimize bandwidth. The modem constantly monitors the signal-to-noise ratio for each tone. If a tone degrades in quality, it sends a bit swap command to adjust the amount of bits assigned to that particular tone. These bits may be added to a different tone or taken out completely. An example is shown in Figure 10:

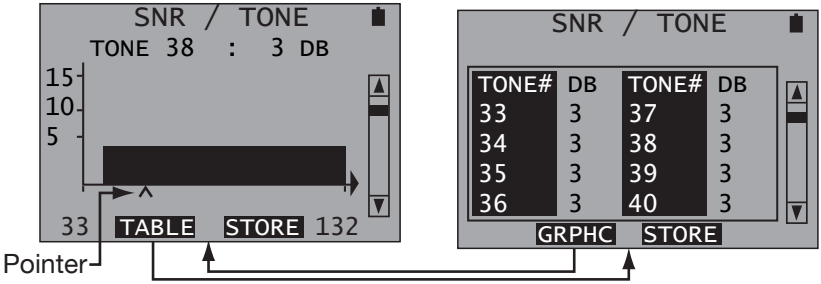

Figure 10 SNR Per Tone Screens

A table of the tones is shown on the right of Figure 10. Listed for each tone is the number of bits assigned to it. Press ▲ , ▼ or Pg Up, Pg Dn to scroll through all tones. Press F2 to view a graph of the tones shown in the left screen in Figure 10.

In the Graph view, to learn the exact SNR for a specific tone, refer to the line just above the graph. This line provides the SNR for the tone marked by the pointer arrow. In the right screen shown in Figure 10, the pointer arrow is at tone 38 with a 3 dB SNR.

To move the pointer (^):

1. Press ◄ ,► to move it one tone at a time.
2. Press Pg Up or Pg Dn to move to the next or previous screen in the graphic sequence.

When finished viewing the graphic, press F2 to return to the table.

In either screen, press F3 to save the graph and table.

3.1.3 Link Measurement

These screens provide information on errors and events.

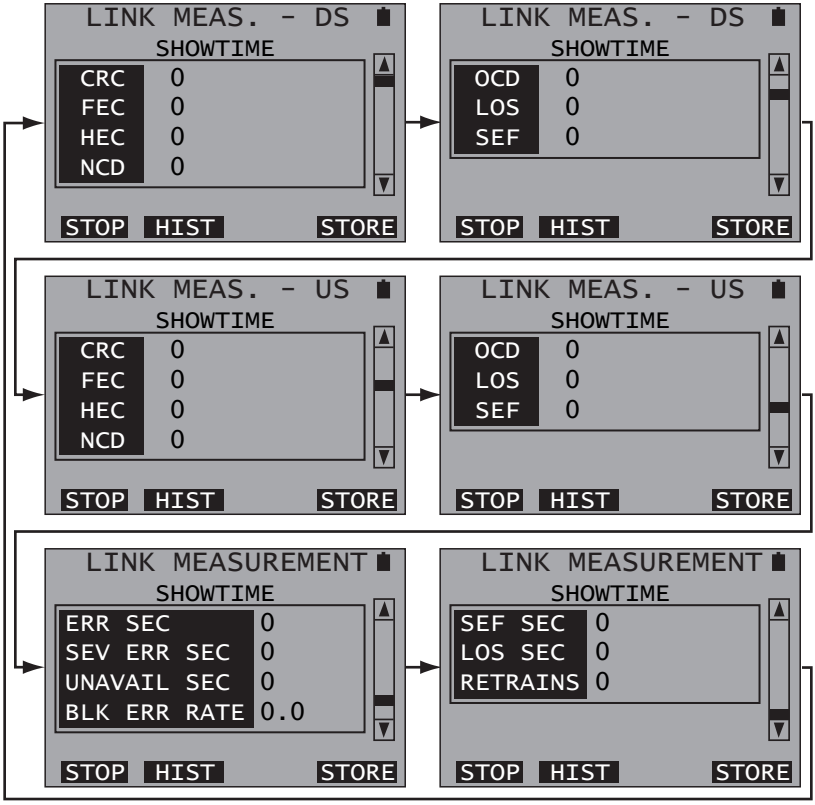

Figure 11 Link Measurements Screens

The first four screens report the following for both DS (Downstream) and US (Upstream):

CRC: Cyclic Redundancy Check anomaly indicates that in the datastream, a received CRC-8 code is not identical to the locally calculated CRC-8 code.

FEC: Forward Error Correction anomaly indicates that errors have been corrected in the datastream.

HEC: Header Error Control anomaly indicates that an ATM cell with an incorrect HEC is contained in the datastream.

NCD: No Cell Delineation anomaly occurs after ATM cell TC start-up when ATM data is allocated to the buffer and as long as the cell delineation process operating on this data is in the HUNT or PRESYNC state.

OCD: Number of Out of Cell Delineation occurrences during the measurement if it has been in synch, then goes out of synch.

LOS: Number of Loss Of Signal occurrences during measurement.

SEF: Number of Severe Error Frames occurrences during measurement.

The last two screens report on the status of the received signal only. Therefore, for VTU-R emulation, it shows results for the downstream direction. The following results are shown:

ERR SEC: An Errored Second is defined as one second containing 1 or more CRC-8 anomalies or loss of signal.

SEV ERR SEC: A Severely Errored Second is defined as one second containing 18 or more CRC-8 anomalies (a 30% errored block rate). A severely errored second is also counted at loss of signal.

UNAVAIL SEC: An Unavailable Second begins after 10 consecutive severely errored seconds.

BLK ERR RATE: The Block Error Rate during measurement.

SEF SEC: Total Severe Error Frame Seconds.

LOS SEC: Loss Of Signal Seconds.

RETRAINS: Number of resynchronizations (retrains) that have occurred during measurement.

The following F-keys are available:

STOP/START (F1): Press to stop measurement, press again to start.

HIST (F2): Press History to reset all measurements to zero.

STORE (F4): Press to store the results.

3.1.4 Modem Setup

Note: As soon as this screen is accessed, if the link is up, the HTT will close the link.

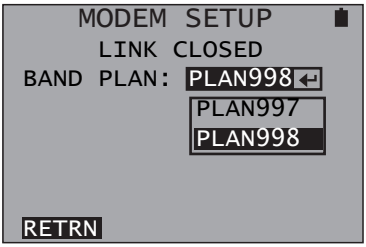

Figure 12 Modem Setup Screen

This screen contains one item:

BAND PLAN

Options: PLAN997 or PLAN998

Press ↵ to select a BAND PLAN and press F1 to retrain and open the link.

- PLAN997: Band Plan A, specified in Annex A of ITU-T G.993.1 standard.
- PLAN998: Band Plan B, specified in Annex B of ITU-T G.993.1 standard.

3.2 POTS/DC/OHM

This menu screen contains:

- POTS
- DC VOLTAGE
- OHM

Figure 13 shows where to connect the HTT for POTS/DC/OHM testing, what should be checked is:

- Voltage is provided to the residence.
- Line is active and it can be used to dial out.

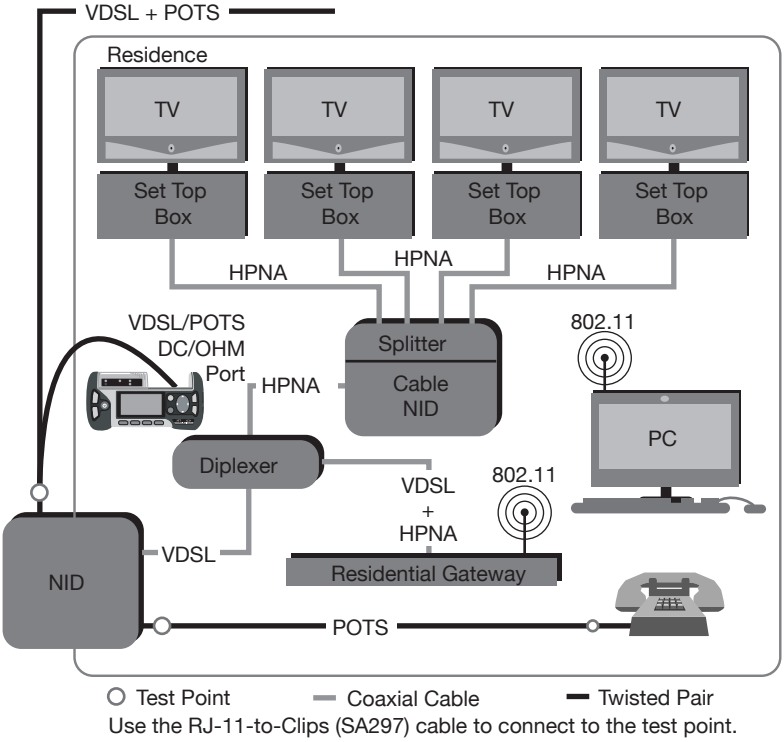

Figure 13 POTS/DC/OHM Testing Connection Points

3.2.1 POTS

Use this function to dial out telephone numbers from a programed list. In addition the HTT can accept or reject incoming calls. Before using this feature, plug the supplied headset into the HEADSET port on the HTT and use it to speak and listen during the call.

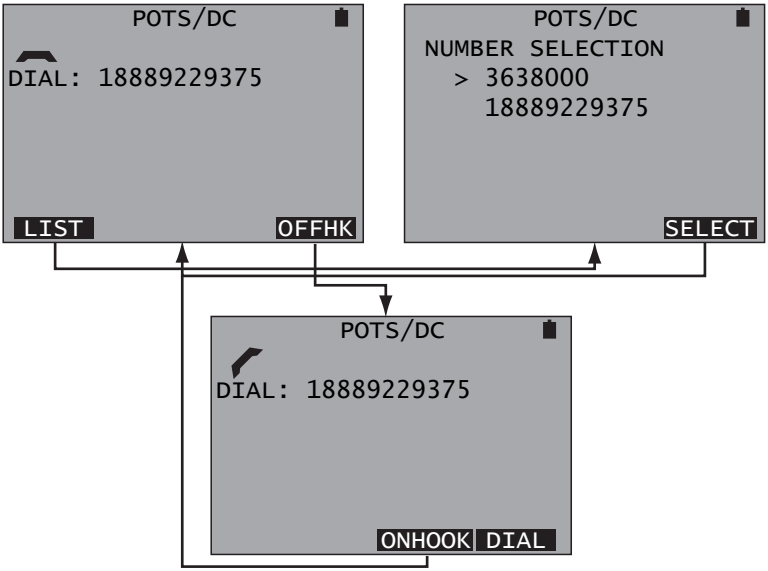

Figure 14 POTS Control and Phone List Screens

In the left screen shown in Figure 14, dial the displayed number by pressing F4 to go off hook and in the bottom screen press F4 to dial the number. When finished, press F3 to go on hook and return to the left screen.

Change the number to dial by pressing F1 to display the right screen in Figure 14. In it, use ▲ ,▼ to select a number and press F4 to return to the previous screen with new number displayed.

Note: Numbers can only be entered into the NUMBER SELECTION screen using a PC.

At any time while in the POTS menu, a call can be received if not engaged in a call. If a call is received, the screen on the right is displayed. In it, the date, time, and caller ID info is displayed. Press F4 to accept the call. When finished, press F3 to go on-hook.

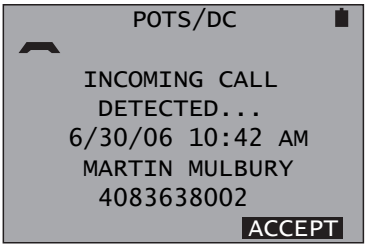

Figure 15 Incoming Call Screen

3.2.2 DC Voltage

The HTT can measure between 0 and +/- 200 DCV. To do so, connect the HTT to the POTS circuit through it's VDSL/POTS/DC/OHM RJ-11 port, select DC VOLTAGE, and the following screen is displayed:

Notes:

- If a voltage of more than 200 is present, the HTT will display ">200 VOLTS".
- If a voltage of less than -200 is present, the HTT will display "< -200 VOLTS".

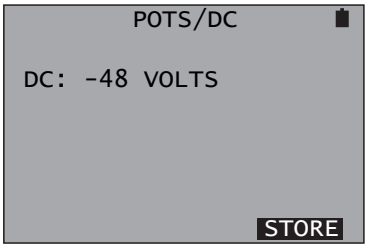

Figure 16 DC Voltage Screen

In the DC VOLTAGE screen, press F4 to store the measurement.

3.2.3 Ohm

The HTT can measure resistance on a POTS circuit. To do so, connect the HTT to the POTS circuit through it's VDSL/POTS/DC/OHM port and select OHM and the measurement begins in the left screen of Figure 17:

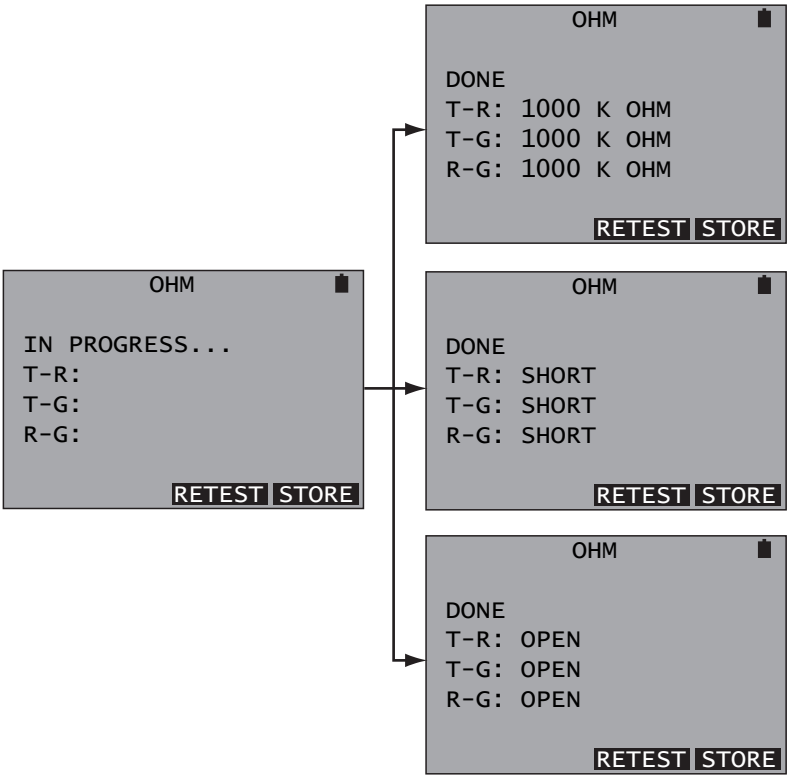

Figure 17 Ohm Screens

At any time, press F3 to retest. Press F4 to save the measurement. In the right screens shown in Figure 17, the measured results are shown.

3.3 Cable Testing

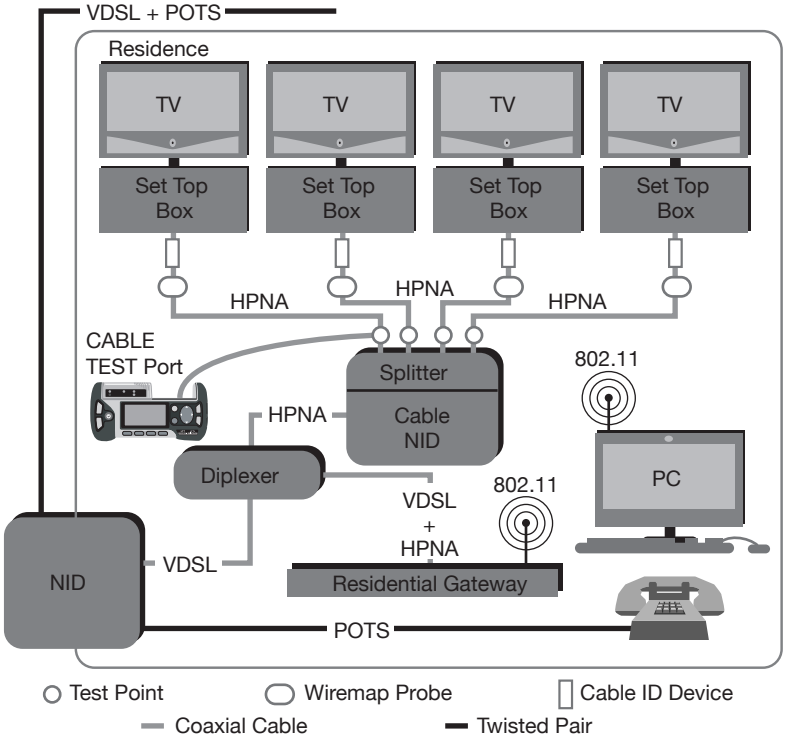

Figure 18 Cable Testing Connection Points

Figure 18 shows where to connect the HTT for Cable testing. Use the following tests to help identify cable faults inside the residence:

- Coax and RJ Loss: Provides cable loss measurement for coaxial and twisted pair cable. Requires the Wiremap Probe.
- Wiremap: Verify that all 8 wires are properly connected in a Cat 5 cable. Requires the Wiremap Probe.
- Cable ID: Provides up to 5 different identifications for cable runs inside the residence. Requires up to five Cable ID Devices.
- Diplexer test: Verifiy frequency split by the diplexer. Requires the Wiremap Probe.
- Tone Generation: Provides a tone used with a separate testing device to detect a cable.

This menu screen contains:

- COAX LOSS
- RJ LOSS
- WIREMAP
- CABLE ID
- TONE GENERATION

These functions require the use of the Wiremap Probe shown in Figure 19:

- Coaxial Loss
- RJ Loss
- Wiremap

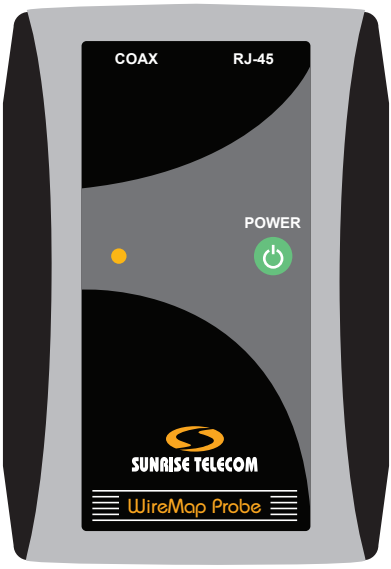

Figure 19 Wiremap Probe

The Wiremap Probe generates frequencies used for measurements.

3.3.1 Coaxial Cable Loss

This provides a coaxial cable loss measurement with the use of the Wiremap Probe. To do so:

1. Perform the following calibration prior to testing:
   A. Connect the SA318 test cable to the HTT's CABLE TEST port and to the COAX port on Wiremap Probe.
   B. Power ON the Wiremap Probe.
   C. Select from the EXPERT MODE MENU, CABLE TESTING > COAX LOSS. When the screen gives a measurement for 7 and 14 MHz, press F1 to calibrate the HTT to the Wiremap Probe and test cable. This will zero out any losses from the test cable and Wiremap Probe.
2. Connect the HTT using the calibrated SA318 test cable as shown in Figure 18 to a desired test point.
3. Connect the calibrated HTT Wiremap Probe as shown in Figure 18 to a desired test point.
4. Select from the EXPERT MODE MENU, CABLE TESTING > COAX LOSS and observe the results in the following screen:

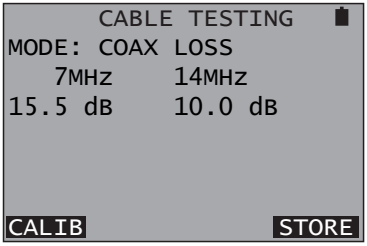

Figure 20 COAX Loss Screen

   The following is reported:
   - dB loss at 7 MHz (VDSL frequency range)
   - dB loss at 14 MHz (HPNA frequency range)
5. If desired, repeat steps 2 through 4. Step 1 does not need to be performed unless the HTT was powered down.

The screen contains the following F-keys:

CALIB (F1): Press to calibrate and zero out the Wiremap Probe and the SA318 test cable.

STORE (F4): Press to store the information in the screen.

3.3.2 RJ Cable Loss

This provides an RJ cable loss measurement across any type of twisted pair, whether CAT3 or CAT5 with the use of the Wiremap Probe. To do so:

1. Perform the following calibration prior to testing:
   A. Connect the SA318 test cable to the HTT's CABLE TEST port and to the RJ-45 port on Wiremap Probe.
   B. Power ON the Wiremap Probe.
   C. Select from the EXPERT MODE MENU, CABLE TESTING > RJ LOSS. When the screen gives a measurement for 7 and 14 MHz, press F1 to calibrate the HTT to the Wiremap Probe and test cable. This will zero out any losses from the test cable and Wiremap Probe.
2. Connect the HTT using the calibrated SA318 test cable as shown in Figure 18 to a desired test point.
3. Connect the calibrated HTT Wiremap Probe as shown in Figure 18 to a desired test point.
4. Select from the EXPERT MODE MENU, CABLE TESTING > RJ LOSS and observe the results in the following screen:

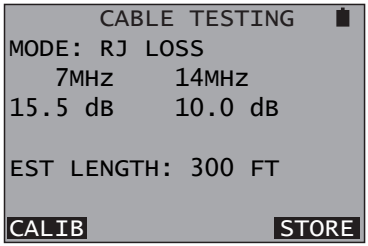

Figure 21 RJ Loss Screen

   The following is reported:
   - dB loss at 7 MHz (VDSL frequency range)
   - dB loss at 14 MHz (HPNA frequency range)
   - EST LENGTH: Estimated cable length
5. If desired, repeat steps 2 through 4. Step 1 does not need to be performed unless the HTT was powered down.

The screen contains the following F-keys:

CALIB (F1): Press to calibrate and zero out the Wiremap Probe and the SA318 test cable.

STORE (F4): Press to store the information in the screen.

3.3.3 Wiremap

This provides for CAT5 RJ-45 cable mapping, straight or crossover with the use of the Wiremap Probe. To do so:

1. Connect one end of the CAT5 RJ-45 cable to the CABLE TEST RJ-45 port on the HTT and the other end of the cable to the Wiremap Probe's RJ-45 port.
2. Select from the EXPERT MODE MENU, CABLE TESTING > WIREMAP and observe the results in the following screens:

Straight Cable

```
      CABLE TESTING
MODE: WIREMAP
TESTSET -- PROBE
1--1        5--5
2--2        6--6
3--3        7--7
4--4        8--8
                STORE
```

Straight Cable with Open

```
      CABLE TESTING
MODE: WIREMAP
TESTSET -- PROBE
1--OPEN     5--5
2--OPEN     6--6
3--3        7--7
4--4        8--8
                STORE
```

Figure 22 Wiremap Screens

The following can be displayed:

OPEN: Indicates a open conductor on the indicated conductor.

SHORT: Indicates a short between 2 or more indicated conductors.

The screen contains one F-key:

STORE (F4): Press to store the information in the screen.

3.3.4 Cable ID

This identifies up to five lines using the plug-in Cable ID devices. If the Cable ID device is detected, it's matching number is displayed as shown:

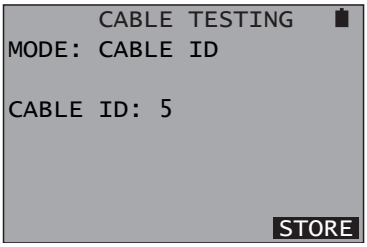

Figure 23 Cable ID Screen

Use this procedure:

1. Plug the Cable ID devices into the wall ports that need to be identified. Note that each device is numbered as shown in Figure 24.

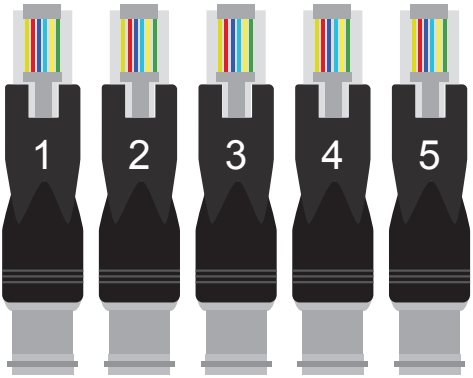

Figure 24 Cable ID Devices

2. Connect the SA318 cable to the CABLE TEST RJ-45 port on the HTT. Then connect the other end of the SA318 cable to the line to be identified.
3. Select from the EXPERT MODE MENU, CABLE TESTING > CABLE ID and observe the ID results.

The screen contains one F-key:

STORE (F4): Press to store the information in the screen.

3.3.5 Tone Generation

Use this screen to generate a 570 Hz tone to detect cables with a separate testing device.

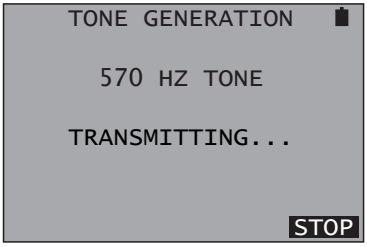

Figure 25 Tone Generation Screen

In this screen, press F4 to stop transmitting the tone, press again to start.

3.4 HPNA Analysis

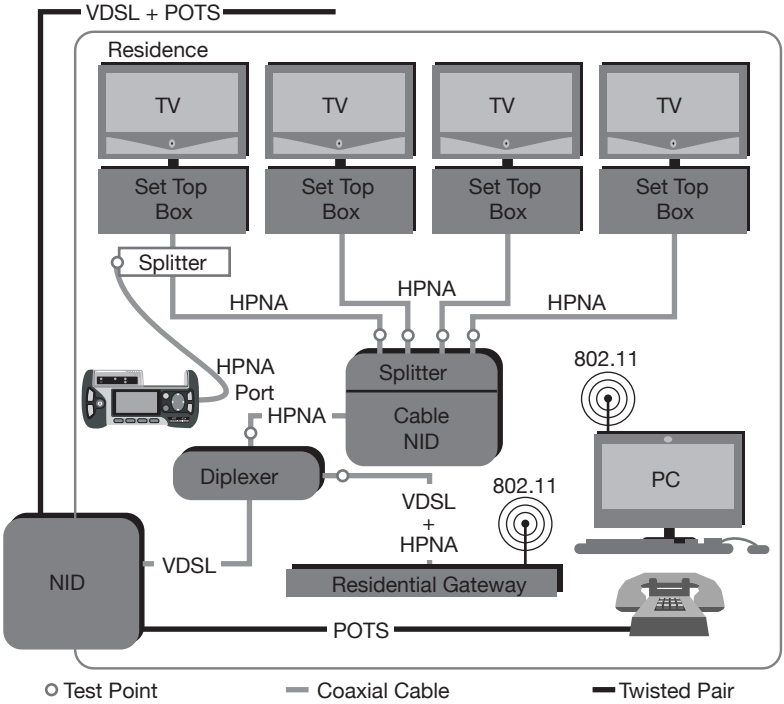

Figure 26 HPNA Testing Connection Points

Connect the test set as an additional station by using an empty coaxial drop or an added splitter. It provides results for:

- Station detection, verifies that all stations are detected (up to 5 can be present).
- HPNA Network Testing; Data Rate, Power, SNR, and Packet Loss.

Connect to the network by:

- Standard Coax/RJ-11 patch cord.
- Either the HPNA Coax port or the HPNA RJ-11 port depending on the type of cable on the HPNA network.

The first step in HPNA testing is to setup the configuration screen shown in Figure 27:

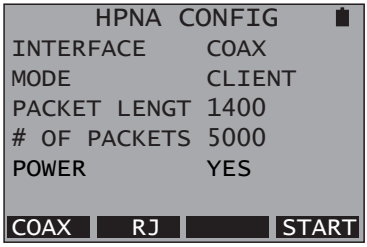

Figure 27 HPNA Configuration Screen

Configure the following:

INTERFACE
Options: COAX (F1), RJ (F2)
Select the interface to be tested.

MODE
Options: CLIENT (F1) HOST (F2)
Select the side to test.

PACKET LENGT
Displays the preset Packet Length, 1400

 # OF PACKETS
Displays the preset Number Of Packets, 5000

POWER
Options: NO (F1), YES (F2)
Choose whether the received Power is measured.

When finished, connect to the network and press F4 to start and the HTT will download all working stations. The left screen shown in Figure 28 shows the active stations with their MAC addresses. Select a station using ▲ ,▼ and press ↵ to perform the test between the selected station. An example is shown in the right screen of Figure 28:

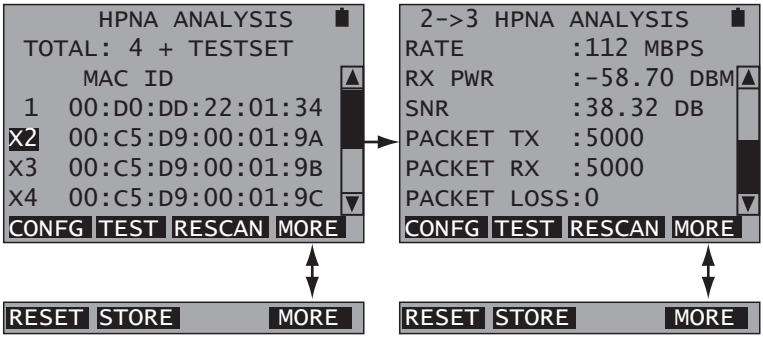

Figure 28 HPNA Analysis Screens

The following is reported for each station:

RATE: Data rate between each HPNA device.

RX PWR: Received Power in DBM.

SNR: Signal-to-Noise in dB.

PACKET TX: Number of transmitted packets.

PACKET RX: Number of received packets.

PACKET LOSS: Number of lost packets.

The following F-keys are available:

CONFG (F1): Displays the Configuration Screen.

TEST (F2): Press to restart the test.

RESCAN (F3): Press to refresh the MAC address.

RESET (MORE, F1): Press to perform another HPNA network scan (redownload HPNA software).

STORE (MORE, F2): Press to store the results.

3.5 Wireless (802.11)

The HTT can detect and reveal information about wireless 802.11 networks. The HTT uses the SIGNAL LED to indicate the presence of a network, green indicates a network, red indicates none are present. The HTT must be in this menu in order to detect networks. The following left screen is displayed after selecting this menu, the information displayed is derived from any detected networks.

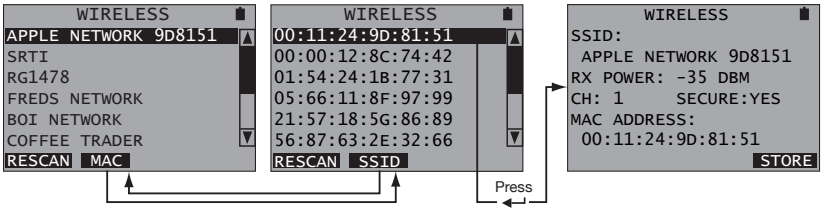

Figure 29 Wireless Screens

In the left or middle screens of Figure 29, select an available network using ▲ ,▼ and press ↵. The screen shown on the right of Figure 29 is then displayed with the following reported:

SSID: Network name, in this case APPLE NETWORK 9D8151.

RX POWER: Received power in dBm.

CH: Channel

SECURE: Either YES or NO, indicating if the network has security codes.

MAC ADDRESS: In this case 00:11:24:9D:81:51.

This right screen in Figure 29 contains the following F-key:

STORE (F4): Press to store the information in the screen.

When finished, press ESC to return to the left or middle screen shown in Figure 29. This screen contains the following F-keys:

RESCAN (F1): Press to rescan for wireless networks.

MAC/SSID (F2): Press to display in the AVAILABLE NETWORKS screen either the SSID (common name) or MAC Address (number address shown in the middle screen of Figure 29).

3.6 SLM

This feature will be available at a later date through a software update.

3.7 Ethernet

This screen reports the status of the HTT ETHERNET port.

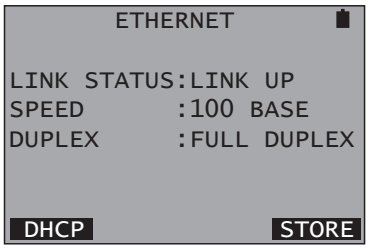

Figure 30 Ethernet Screen

The following is reported:

LINK STATUS: LINK UP or LINK DOWN, if it is down the other items in this screen are reported as N/A.

SPEED: 10 or 100 Mbps

DUPLEX: FULL of HALF

Note: Speed determination issues may result in connectivity issues, see Table 1.

This screen contains the following F-keys:

DHCP (F1): Press to request an IP address.

STORE (F4): Press to store the information in the screen.

Configuration Local Device Interface/ Mode	Configuration Link Partner Interface/ Mode	Resulting Local Device Interface/ Mode	Resulting Link Partner Interface/ Mode	Comments
Auto Negotiation	Auto Negotiation	Maximum common capacity	Maximum common capacity	The module displays 100BaseT full-duplex.
Auto Negotiation	100 Mbps full-duplex	100 Mbps half-duplex	100 Mbps full-duplex	Duplex mismatch[1]
Auto Negotiation	10 Mbps full-duplex	10 Mbps half-duplex	10 Mbps full-duplex	Duplex mismatch[1]
Note[1]	A duplex mismatch will result in performance issues, intermittent connectivity, and possible loss of communication. When troubleshooting local device issues, verify that the local device and link partner are using a valid configuration.			

Table 1 Ethernet Auto-Negotiation

3.8 PC Access

Currently this menu screen contains BLUETOOTH. Use it along with the PC Companion software to transfer stored results, update the HTT's software, or profiles through a Bluetooth equipped PC.

Press F1 to turn the HTT Bluetooth on and see Figure 31:

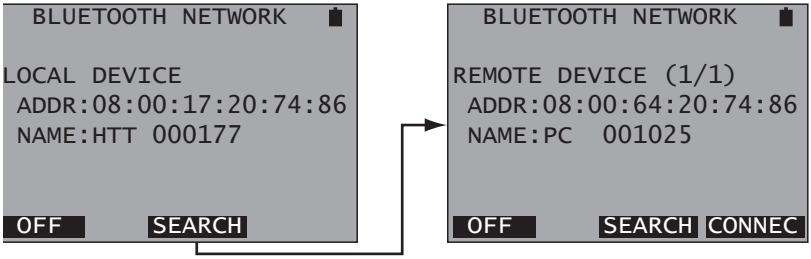

Figure 31 Bluetooth Network Screens

In the left screen shown in Figure 31, the HTT detects itself. Press F3 to detect other devices. If another device is detected SIGNAL stops flashing and is green. Press F4 to connect to it. Once connected the BLUETOOTH LED will be green.

Notes:

- If more than 1 remote device is found, press PgDn to select.
- The numbers (1/1) after REMOTE DEVICE indicate the first device is displayed out of 1 available device.

3.9 Measurement Setup

Use this screen to enable or disable a preset threshold. The screen is shown on the right:

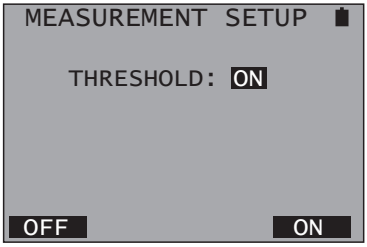

Figure 32 Measurement Setup Screen

This screen contains:

THRESHOLD

Options: OFF (F1), ON (F4)

Choose whether or not to use the preset threshold. When on, the PASS/FAIL LED is used to indicates the test result.

3.10 System Setup

This menu screen contains:

- CLOCK
- BACKLIGHT
- AUTO OFF
- BATTERY
- PROJECT
- PROFILE
- VIEW STORE
- SYSTEM INFORMATION

3.10.1 Clock

Use the screen in Figure 33 to set the Date and Time of day:

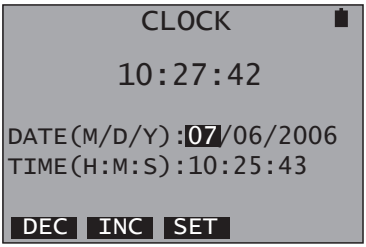

Figure 33 Clock Setup Screen

Set the following:

DATE
Use ◄,► to select the Month/Date/Year and press F1 to decrease or F2 to increase the selected field.

TIME
Use ◄,► to select the Hour/Minute/Second and press F1 to decrease or F2 to increase the selected field.

When finished, press F3 to set the clock.

3.10.2 Backlight

Use the screen in Figure 34 to set the backlight on time and adjust the screen contrast:

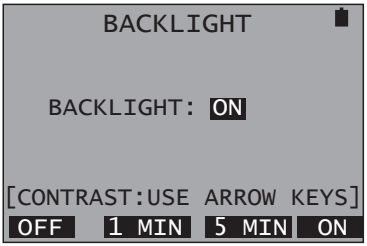

Figure 34 Backlight Setup Screen

Set the following:

BACKLIGHT
Options: OFF (F1), 1 MIN (F2), 5 MIN (F3), ON (F4)

Choose the option that fits your needs.

CONTRAST
Use ◄,► to adjust the screen contrast.

3.10.3 Auto Off

Use the screen shown in Figure 35 to control a shut off timer for the HTT:

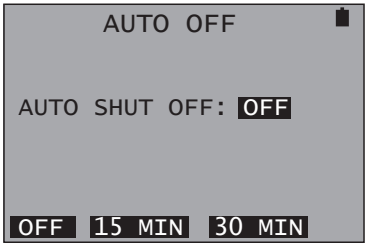

Figure 35 Auto Off Setup Screen

Set the following:

AUTO SHUT OFF
Options: OFF (F1), 15 MIN (F2), 30 MIN (F3)

Choose the option that fits your needs.

3.10.4 Battery

When this screen is accessed, the HTT calculates the percentage of remaining battery life. As shown in Figure 36, the screen shows 84%, but the on-screen battery indicator looks full. The on-screen indicator has a resolution of 25% increments.

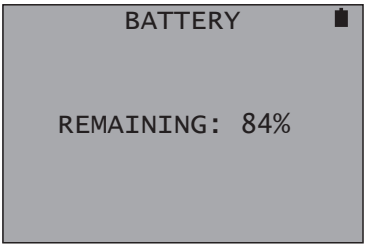

Figure 36 Battery Screen

3.10.5 Project

Use this screen to view preloaded assignments. The screens are shown in Figure 37:

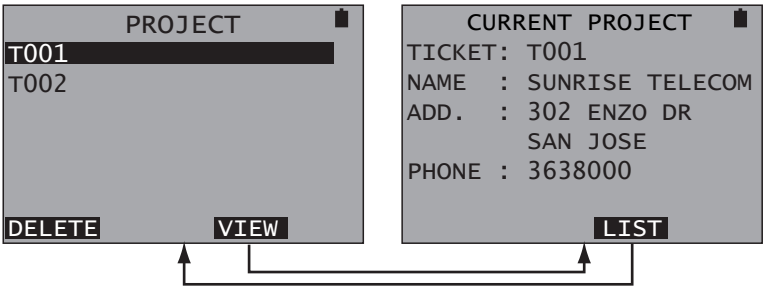

Figure 37 Project Screens

In the screen shown on the left, press ▲ , ▼ to select a project downloaded from a PC. Press F3 to view the details of a project as in the right screen shown in Figure 37. The available detail fields are:

- TICKET number
- ADD. (address)
- PHONE number

Press F3 to return to the list. When a project is completed, select it and press F1 to delete it.

3.10.6 Profile

This feature will be available at a later date through a software update.

3.10.7 View Store

Use this screen to confirm stored test results, use Pg Dn and Pg Up to view the screens. Most test results are stored in CSV format and will only be useful when they are downloaded to a PC and into a spreadsheet.

3.10.8 System Information

This screen gives information on the software versions loaded into the HTT and MAC address reserved for it. The screen is shown in Figure 38:

```
   SYSTEM INFORMATION
   SW VERSION: T1.02
   AT VERSION: 0A.01
   XL VERSION: 04.05

MAC0:00:D0:DD:22:01:32
MAC1:00:D0:DD:22:01:33
MAC3:00:D0:DD:22:01:34
```

Figure 38 System Information Screen

4 General Information

4.1 Customer Service

Sunrise Telecom Customer Service is available from 7:30 AM to 5:30 PM Pacific Standard Time (California, U.S.A.).

Customer Service performs the following functions:

- Answers customer questions over the phone on such topics as product operation and repair.
- Facilitates prompt repair of malfunctioning test sets.
- Provides information about product upgrades.

A Return Merchandise Authorization (RMA) Number is required before any product may be shipped to Sunrise Telecom for repair. Out-of-warranty repairs require both an RMA and a Purchase Order before the unit is returned. All repairs are warranted for 90 days.

Contact Customer Service if you need additional assistance at:

Customer Service
Sunrise Telecom Incorporated
302 Enzo Drive
San Jose, CA 95138
USA

Tel: 1-408-360-2200 or 1-800-701-5208
Fax: 1-408-363-8313
Internet: http://www.sunrisetelecom.com
e-mail: support@sunrisetelecom.com

4.2 Testing and Calibration Statement

Sunrise Telecom certifies that this product was manufactured, tested, and verified according to the applicable Sunrise Telecom Incorporated manufacturing and test procedure(s). These formal procedures are designed to assure that the product meets its required specifications.

This product has no user-adjustable settings. During normal usage, periodic calibration is not a requirement. However, if the product fails during the self-verification test, during power up, the product can be returned to the manufacturer for evaluation and repair.

4.3 Express Limited Warranty

A. Hardware Coverage. COMPANY warrants hardware products against defects in materials and workmanship. During the warranty period COMPANY will, at its sole option, either (i) refund of CUSTOMER'S purchase price without interest, (ii) repair said products, or (iii) replace hardware products which prove to be defective; provided, however, that such products which COMPANY elects to replace must be returned to COMPANY by CUSTOMER, along with acceptable evidence of purchase, within twenty (20) days of request by COMPANY, freight prepaid.

B. Software and Firmware Coverage. COMPANY warrants software media and firmware materials against defects in materials and workmanship. During the warranty period COMPANY will, at its sole option, either (i) refund of CUSTOMER'S purchase price without interest, (ii) repair said products, or (iii) replace software or firmware products which prove to be defective; provided, however, that such products which COMPANY elects to replace must be returned to COMPANY by CUSTOMER, along with acceptable evidence of purchase, within twenty (20) days of request by COMPANY, freight prepaid. In addition, during the warranty period, COMPANY will provide, without charge to CUSTOMER, all fixes and patches to the original product specifications sold which COMPANY issues during the warranty period. COMPANY does not warrant or represent that all software defects will be corrected. In any case where COMPANY has licensed a software product "AS-IS," COMPANY'S obligation will be limited to replacing an inaccurate copy of the original material. This warranty does not cover upgrade or enhancements to product software and firmware.

C. Period. The warranty period for Hardware, Software and Firmware will be Three (3) Years from date of shipment to CUSTOMER. The COMPANY may also sell warranty extensions or provide a warranty term of three years with the original sale, which provide a longer coverage period for the test set chassis, software and firmware, in which case the terms of the express limited warranty will apply to said specified warranty term.

D. Only for CUSTOMER. COMPANY makes this warranty only for the benefit of CUSTOMER and not for the benefit of any subsequent purchaser or licensee of any merchandise.

E. LIMITATION ON WARRANTY. THIS CONSTITUTES THE SOLE AND EXCLUSIVE WARRANTY MADE BY COMPANY WITH RESPECT TO HARDWARE, SOFTWARE AND FIRMWARE. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED. COMPANY SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PUR-

POSE. COMPANY'S LIABILITY UNDER THIS AGREEMENT WITH RESPECT TO A PRODUCT, INCLUDING COMPANY'S LIABILITY FOR FAILURE AFTER REPEATED EFFORTS TO INSTALL EQUIPMENT IN GOOD WORKING ORDER OR TO REPAIR OR REPLACE EQUIPMENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OR LICENSE FEE FOR THAT PRODUCT, NOR SHALL COMPANY IN ANY EVENT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, INDIRECT, OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, ARISING FROM OR RELATED TO THE SALE OF THE MERCHANDISE HEREUNDER, INCLUDING BUT NOT LIMITED TO DAMAGES ARISING FROM OR RELATED TO LOSS OF BUSINESS, LOSS OF PROFIT, LOSS OF GOODWILL, INJURY TO REPUTATION, OVERHEAD, DOWNTIME, REPAIR OR REPLACEMENT, OR CHARGE-BACKS OR OTHER DEBITS FROM CUSTOMER OR ANY CUSTOMER OF CUSTOMER.

F. No Guaranty, Nonapplication of Warranty. COMPANY does not guaranty or warrant that the operation of hardware, software, or firmware will be uninterrupted or error-free. Further, the warranty shall not apply to defects resulting from:
   (1) Improper or inadequate maintenance by CUSTOMER;
   (2) CUSTOMER-supplied software or interfacing;
   (3) Unauthorized modification or misuse;
   (4) Operation outside of the environmental specifications for the product;
   (5) Improper site preparation or maintenance; or
   (6) Improper installation by CUSTOMER.

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