OneExpert DSL

User's Guide

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This guide is a product of JDSU's Technical Information Development Department, issued as part of the OneExpert DSL. You can obtain the manual through StrataSync. A printed quick card ships with the instrument and can be downloaded through StrataSync.

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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.

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This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

EMC Directive Compliance

This product was tested and conforms to the EMC Directive, 89/336/EEC as amended by 92/31/EEC and 93/68/EEC for electromagnetic compatibility.

Low Voltage Directive Compliance

This product was tested and conforms to the Low Voltage Directive, 73/23/EEC as amended by 93/68/EEC. Conformity with this directive is based upon compliance with the harmonized safety standard, EN60950.

WEEE and Battery Directive Compliance

JDSU has established processes in compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC, and the Battery Directive, 2006/66/EC.

This product, and the batteries used to power the product, should not be disposed of as unsorted municipal waste and should be collected separately and disposed of according to your national regulations. In the European Union, all equipment and batteries purchased from JDSU after 2005-08-13 can be returned for disposal at the end of its useful life. JDSU will ensure that all waste equipment and batteries returned are reused, recycled, or disposed of in an environmentally friendly manner, and in compliance with all applicable national and international waste legislation.

It is the responsibility of the equipment owner to return equipment and batteries to JDSU for appropriate disposal. If the equipment or battery was imported by a reseller whose name or logo is marked on the equipment or battery, then the owner should return the equipment or battery directly to the reseller.

Instructions for returning waste equipment and batteries to JDSU can be found in the Environmental section of JDSU's web site at www.jdsu.com. If you have questions concerning disposal of your equipment or batteries, contact JDSU's WEEE Program Management team at WEEE.EMEA@jdsu.com.

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About this Guide

This chapter describes how to use this guide. Topics discussed in this chapter include the following:

Purpose and scope

The purpose of this guide is to help you successfully use the features and capabilities of the OneExpert DSL.

This guide includes task-based instructions that describe how to configure, use, and troubleshoot the general functions of the OneExpert DSL. Additionally, this guide provides a description of JDSU's warranty. For terms and conditions of the licensing agreement, go to www.jdsu.com.

Assumptions

This guide is intended for novice, intermediate, and experienced users who want to use the OneExpert DSL effectively and efficiently. We are assuming that you have basic computer experience and are familiar with basic telecommunication concepts, terminology, and safety.

> **NOTE:**
>
> For information about CE compliance, see the Declaration of Conformity or contact your local JDSU representative. A copy of the declaration is included in the shipping package.

Conventions

The symbols and safety terms used in this guide are described in the following tables.
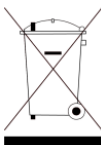
Table 1 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **Typeface**.	Press the **On** switch.
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box
Variables appear in this *typeface*.	Type the new *hostname*.
Book references appear in this *typeface*.	Refer to *Newton's Telecom Dictionary*
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [ ] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	`<password>`

Table 2 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive key strokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 3 Symbol conventions

	This symbol represents a general hazard.
	This symbol represents a risk of electrical shock.
	This symbol represents a risk of explosion
	This symbol represents a Note indicating related information or tip.
	This symbol, located on the equipment, battery, or packaging indicates that the equipment or battery must not be disposed of in a land-fill site or as municipal waste, and should be disposed of according to your national regulations.

Table 4 Safety definitions

	DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

1

Introduction

This chapter provides a general description of the OneExpert DSL. Topics discussed in this chapter include the following:

- "About the OneExpert DSL" on page 2
- "Features and capabilities" on page 2
- "Preparation for use" on page 3

About the OneExpert DSL

The OneExpert DSL is a product that addresses the emerging need for an installation tool for the service provider technicians installing triple play services. The OneExpert DSL is for technicians installing Broadband Data services at customer premises. It is used to test the broadband delivery to the home, the home wiring inside the home and the proper operation of services inside the home.

Figure 1   OneExpert DSL

OneExpert DSL is a modular test platform and with its DSL module, it supports DSL, copper, services and home networks. Its modularity will ensure years of use and the combination of its multi-touch user friendly interface with unique JDSU OneCheck automated tests provides more expertise and ease of use for complex task for field technicians. This enables technicians to fix problems the first time while improving access and home network quality.

In addition, providers can also improve their work process, data flow and OPEX by expanding field tester usage in a connected world with StrataSync and Mobile connectivity.

Features and capabilities

Features and capabilities of the OneExpert DSL include the following:

xDSL

- Turn up and troubleshoot DSL services
- Provide packet statistics and analysis.
- Test ADSL2+/VDSL2 including bonded and vectored pairs
- SELT

IP Data

- Ethernet (Ping Tool)
- IP ping testing (IPoE)

Home Wiring

- Wire Map
- Cable ID/Toner
- Coax Map
- HPNA

Copper

- Multimeter
  - AC volts
  - DC volts
  - Resistance
- TDR
- Opens (distance) and capacitance
- Balance
- Load coil detect
- POTS calls

Preparation for use

This section explains how to start using the OneExpert DSL.

When you unpack the OneExpert DSL, do the following:

- Inspect the OneExpert DSL for damage.
- If undamaged, save the box and packing materials in case you need to ship the OneExpert DSL in the future.
- Remove the protective film from the LCD. This film is in place for protection during shipment. There is tab in the lower right corner for easy removal.

Before using the OneExpert DSL for the first time, do the following:

- Turn the OneExpert DSL ON (use the green button on the front of the unit), and then verify that it is operating properly by navigating through a few menus.
- If the Batt. LED is red, charge the battery.

> **NOTE:**
>
> This handheld instrument is not intended to be body worn, or operated while held against the body.

What ships with the OneExpert DSL?

When you unpack the OneExpert DSL, the following items are included as standard.

- ONX-580 mainframe
- Battery (installed in the unit)
- AC adapter and power cord

Options

The following sections list the options available for the OneExpert DSL base unit.

> **NOTE:**
>
> For additional information about OneExpert DSL options and services, contact your local JDSU representative or contact JDSU through the company web site, www.jdsu.com.

Options

You can order software options to add functionality to the HST-3000. Table 1 lists the available software options and part numbers.

Table 1   Software options

Part Number	Description
ONX580-APPLE	Provides the ability to communicate with Apple mobile devices (iPad, iPod, iPhone) over Bluetooth.
ONX580-BONDED	Allows xDSL testing over two pairs
ONX580-BLUETOOTH	Allows wireless connectivity to either connect/communicate with mobile devices, to test with a SmartID Plus probe, or transfer files from the OneExpert DSL to a PC.
ONX580-HPNA	Allows testing of HPNA networks

2

Quick Tour

This chapter introduces the keypad, LEDs, connectors, and graphical user interface. Topics discussed in this chapter include the following:

Exploring the front panel

The controls and LEDs on the front panel, shown in Figure 2, are used to operate the OneExpert DSL, set up tests, and view data.

Figure 2   OneExpert DSL front panel

The following paragraphs describe each of the controls and LEDs on the front panel.

Status LEDs

These indicators report the status of the OneExpert DSL. The function of each LED is described in Table 2.

Table 2   Status LEDs

LED	Function
Sync	Reports the status of modem synchronization. – Blinking green indicates that the modems are training. – Solid green indicates that the modems are synchronized (reached Showtime).
Network	Indicates the status of network connectivity. – Blinking green indicates that the unit is acquiring an IP address. – Solid green indicates frames an IP address has been acquired. – Blinking amber indicates a timeout - the unit was unable to acquire an IP address. – If the Frame LED is not illuminated, the network is not active (either the unit is not connected or it is logged off.
NOTE: The Sync and Network LEDs alternately blink green when in sleep mode (power saving mode).	
Error	Solid red indicates error and alarm conditions. The type of error varies depending on the application.
Batt	A multi-color LED that indicates the battery status. – Solid green indicates that either the battery charge is higher than 30%, or that an external source is powering the unit. – Solid red indicates that the battery charge is critically low, less than 10%. – Solid amber indicates that the battery is getting low, the charge is between 10% and 30%.
Charge	A multi-color LED located next to the charger connector that indicates the charge status. – Solid green indicates that charging is complete. – Slow flashing red indicates that the battery charge is critically low, less than 10%. – Fast flashing red indicates that the charging was suspended due to a fault and user intervention is necessary (for example, the wrong charger is attached). – Solid red indicates that the charging was suspended due to overheating. The unit can continue to run, no user intervention necessary. – Solid amber indicates that the battery is charging.

LCD

The LCD is a touchscreen that operates similar to a mobile device (such as an iPad or similar Android device), where you swipe to go to the next page or zoom in/out with pinching or opening your fingers.

Function keys

Use to select screen-specific options or to select pop-up menus associated with each key.

Arrow keys

Use the arrow keys to navigate through menu selections.

OK key

The **OK** key is used to accept a changed setting or to proceed to the next menu.

System keys

Under the Navigation arrow keys, there are three system keys:

Key	Description
	Back/Cancel – exit a menu or to go back to the previous menu.
	Home – Return to the main/home screen
	Tray – Launch the Tray menu. From the Tray Menu you can save test reports, turn on/off Bluetooth, or enable/disable Remote Operation.

Power key

Use the power key to turn the OneExpert DSL power on or off. Press and hold until the unit beeps to turn on or off.

Exploring the bottom panel

The OneExpert DSL +12VDC connector is located on the bottom end of the instrument. This connector is used to power the OneExpert DSL and to charge the lithium battery inside.

Figure 3 OneExpert DSL bottom panel

Exploring the connector panel

The connector panel is located on the right side of the instrument and under a rubber flap. When the connectors are not being used, place the rubber flap over the connector panel to keep out dust and rain. Use the connector panel to connect the OneExpert DSL to the line under test. Figure 4 shows the connector panel.

xDSL connector

Figure 4   OneExpert DSL connectors right panel

USB connectors

The USB connectors are used for connecting Smart IDs, exporting test results to a flash drive, or for performing firmware upgrades from a flash drive.

POTS connector

The POTS connector is used for:

- HPNA testing on twisted pair
- POTS testing

Network connectors

Two Ethernet/Network ports are used to connect to Ethernet networks which allows synchronizing with StrataSync, upgrading software, and remotely connecting to the OneExpert DSL.

ERJ45 Wiring connector

The RJ45 Wiring connector is used for:

- Ethernet Ping
- RJ45 wire ID

- RJ45 toning
- Wire mapping to smart remote

RJ11 Wiring connector

The RJ11 Wiring connector is used for:

- RJ11 wire ID
- RJ11 toning
- Coax wire ID (with supplied adapter cable)
- Coax toning (with supplied adapter cable)
- RJ11 wire mapping to smart remote
- Volt/Ohm measurements

DSL connector

The DSL connector, located on the bottom module, is used for:

- Testing VDSL or ADSL on twisted pair cable

WARNING: ELECTRICAL SHOCK

Electrical shock may result in serious injury or death. Use care when connecting to telecommunications circuits, to be sure that you do not come in contact with exposed conductors or power mains. Connect TNV signals to TNV ports only.

CAUTION: FIRE HAZARD

To reduce the risk of fire, use only 26 AWG or larger telecommunications line cord between the DSL connector and the wall.

NOTE: ELECTROSTATIC DISCHARGE IMMUNITY

When using an Ethernet crossover cable, JDSU recommends using a shielded crossover cable for the best immunity to electrostatic discharge (ESD).

Rings

The rings on the corners of the instrument can be used to attach a carry strap.

Exploring the top panel

The Copper connectors are located near the top panel.

Figure 5 OneExpert DSL top panel

The copper connectors are used for:

- Multimeter
  - AC volts
  - DC volts
- TDR
- Opens (distance) and capacitance
- Balance
- Load coil detect
- POTS

CAUTION: INSTRUMENT DAMAGE

Connecting to circuits with voltage higher than 300V, compared to ground, may damage the internal components. Connect only to circuits with less than 300V.

WARNING: ELECTRICAL SHOCK

Electrical shock may result in serious injury or death. Use care when connecting to telecommunications circuits, to be sure that you do not come in contact with exposed conductors or power mains. Connect TNV signals to TNV ports only.

Navigating the user interface

The user interface of the OneExpert DSL is designed to be intuitive and easy to use. The LCD is a touchscreen that operates similar to a mobile device (such as an iPad or similar Android device), where you swipe to go to the next page or zoom in/out with pinching or opening your fingers.Using the interface, you can view test results, set up the OneExpert DSL, and configure test parameters.

When you power up the OneExpert DSL, the user interface appears (see Figure 6).
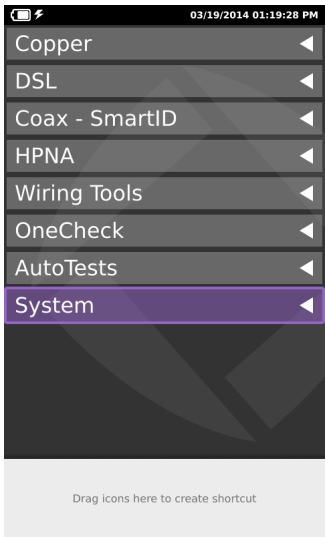
Figure 6 User interface - main menu

This is the main menu. The menu selections change depending on options enabled on your instrument. If a job has been activated (using the job manager), the circuit, ticket, and tech ID appear above the system keys.

The header area provides battery status, indicates whether the adapter is plugged in, and displays the date and time.

Each main item is a collapsible menu.
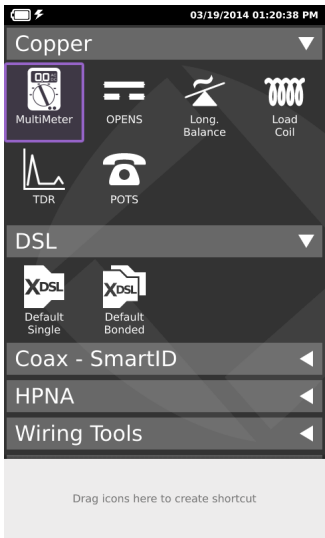
Figure 7 User interface - example of collapsible menus

To expand a menu

Do one of the following:

- Touch the triangle on the right (the triangle rotates from pointing left to pointing down)
- Use the arrow navigation keys to highlight the desired menu item (System is highlighted in Figure 6 above) and then press the OK key.

To select a menu option

Do one of the following:

- Touch the item
- Use the arrow navigation keys to highlight the desired menu item and then press the OK key.

Some menus may require you to enter text or numbers (for example, test settings or user information). The process is similar to data entry on a mobile device.

To enter text or numbers

1 Touch the desired item.

A data entry box appears.

2 Tap in the box.

A keypad appears on the screen.
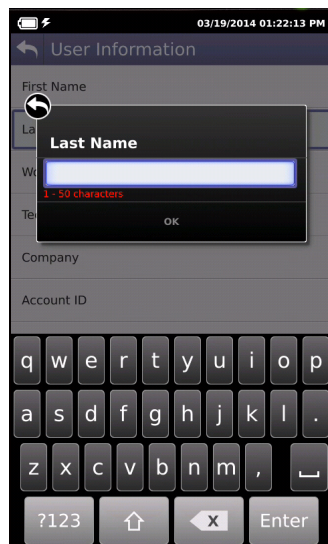
3 Use keypad to enter the data.

- To switch from letters to numbers, use the button in the lower left (123 or ABC).
- On the alphabetic keypad, the second key, the up arrow, is the shift key.
- On the numeric keypad, the second key (1/2) allows you to move among multiple numeric screens.
- The left pointing arrow with the x in it is the backspace key.

4 Touch the enter/return key (the fourth system key) on the screen keypad or press the OK key.

If you have a test or function that you use frequently, you can make it a shortcut.

To create a shortcut

Touch and hold the icon for the function and then drag it to the bottom of the screen to create a shortcut. You can create up to four shortcuts.

3

Utilities

This chapter describes utilities found in the System menu and the Tray menu. These include system settings, upgrading software, specifying user information, saving test reports, capturing a screen shot, and other tasks. Topics discussed in this chapter include the following:

Accessing the System menu

The System menu is available on the main menu screen.

To access the System Settings menu

- From the main menu, touch the System menu item.

  The collapsible menu opens (the triangle rotates from pointing left to pointing down).
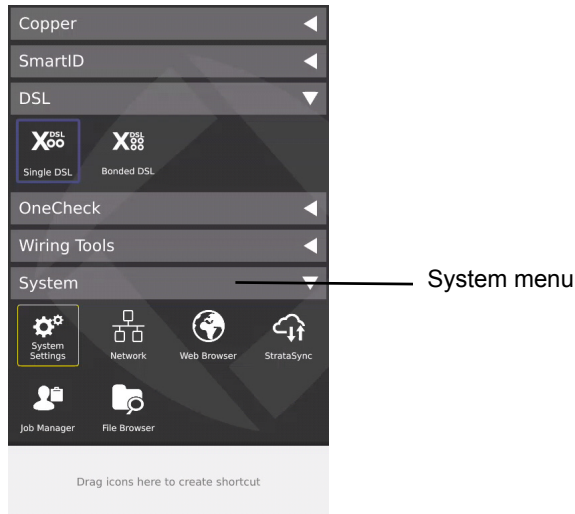
Figure 8   The System menu

Specifying system settings

Using the System Settings menu, you can set the date and time, configure port settings, adjust print settings, adjust remote control settings, and configure international settings.

1   From the System menu (Figure 8 on page 16), touch the **System Settings** button.

The System Settings menu appears.

Setting the date and time

The first selection on the System Settings menu is Date and Time. The OneExpert DSL has an internal clock that you can set to provide accurate time stamps for test results.

The following procedure describes how to set the date and time.

To set the date and time

1   From the System Settings menu, select **Date and Time**.

    The Date and Time Settings menu appears.

2   Set the time by touching **Time**, turning the dials, and then touching **Set**.

3   Set the date by touching **Date**, using the arrows to set the month and year, touching the day on the calendar, and then touching **Set**.

4   Specify the Date Format by touching **Date Format** and then selecting either MM/DD/YYYY or DD/MM/YYYY format.

5   Specify the Time Format by touching **Time Format** and then selecting either 12 Hour or 24 Hour.

6   To change the Time Zone, touch **Time Zone** and then select your time zone.

7   If Daylight Savings Time (DST) is used in your area, touch DST Used to add a check mark.

8   If Time Synchronization is needed, touch **Time Synchronization** and then select **NTP**. If not needed, set Time Synchronization to None. Network Time Protocol (NTP) synchronizes your system clock with a central time server.

9   If you selected NTP Time Synchronization specify the following:

    –   **NTP Server Address type** (IPv4 Address, IPv6 Address, DNS Name)

    –   **NTP Server** (the address of the server that the instruments gets the time from, for example 0.us.pool.ntp.org)

The date and time are set.

Remotely operating a OneExpert DSL unit

The optional Remote Operation features allows you to access the OneExpert DSL user interface from a PC or laptop computer through a virtual network connection (VNC), connecting over an Ethernet interface.

To use this feature, you must have a VNC viewer program on the PC, the OneExpert DSL must be connected to the same network as the PC or laptop, and you must know the IP address of the OneExpert DSL.

Establishing a VNC connection involves the following tasks:

–   Establishing an Ethernet LAN connection between the OneExpert DSL and a PC or laptop

–   Enabling Remote Operation using VNC

–   Control the OneExpert DSL using a PC keyboard

Each of these operations is described in the following sections.

Establishing an Ethernet connection

You must have an Ethernet LAN cable to establish an Ethernet connection to the OneExpert DSL.

To establish an Ethernet connection to the OneExpert DSL

1   Using an Ethernet cable, connect the OneExpert DSL to same Ethernet LAN as the PC or laptop you will use for the VNC:

    a   Connect one end of the Ethernet cable to the OneExpert DSL Ethernet connector located on the side panel (see Figure 4 on page 9).

    b   Connect the other end of the Ethernet cable to the LAN.

2   From the System Settings menu, select **Remote Operation**, and then do the following:

    a   Check **Enable VNC Server**.

    b   If you wish to specify a new password to access the OneExpert DSL, touch **VNC Password**, click in the text box, and then enter a new password.

3   Configure the Network Profile settings to match your LAN settings.

    a   From the System Settings menu, select **Network**.

        If you are connected to the network and the Network is active, the profile settings appear in the box at the top of the menu.

    b   If the settings don't match your LAN touch **Edit Profile** and then modify the settings as needed.

The Ethernet connection is established.

Viewing the device interface on the PC

After you have established an Ethernet connection, you must launch the VNC program to view the device interface.

To view the device interface on the PC

1   Launch the VNC viewer on the PC.

2   In the viewer's server address field, type the OneExpert DSL's IP address, and then select **OK**.

A password entry box appears.

3   Enter the VNC password (found on the Remote Operation menu) and then click OK or press Enter.

The OneExpert DSL user interface appears in the VNC viewer.

4   To use a PC or laptop keyboard with the OneExpert DSL's user interface, see "Using a PC keyboard" on page 19.

5   If the message, "Failed to connect to server" appears, the VNC viewer was not able to communicate with the OneExpert DSL. If this happens, try the following solutions:

– Make sure you are using the correct IP address for the OneExpert DSL.

– From the PC or laptop, ping the OneExpert DSL IP address to verify the network link is working. If the link is not working, restart the OneExpert DSL and repeat step 1 through step 2.

Using a PC keyboard

After you have connected to the OneExpert DSL from a laptop or PC using the VNC viewer, you can use the computer's mouse or keyboard to control the OneExpert DSL. Table 3 shows how the PC/laptop keys map to the OneExpert DSL keypad.

Table 3   PC/laptop to OneExpert DSL key map

PC/Laptop key	OneExpert DSL Keys
F1 through F4	Correspond to the OneExpert DSL system keys
F5	Home
F6	Tray menu
F7	AutoTest
Escape	Cancel
Enter	OK

VNC availability

The VNC program can control the following functions:

In Ethernet TE, you can do a ping, trace route and similar data tests, but *cannot change* any data settings.

In DSL, you can perform modem emulate tests with Data mode *off.*

Ending a remote operation session

To end a remote operation session, either exit the VNC session on the PC/laptop or turn the OneExpert DSL off and then on again (power cycle).

Enabling Bluetooth

The Bluetooth option allows communication with a mobile device.

To enable Bluetooth

1   From the System Settings menu, select **Bluetooth**.

2   Touch the box next to **Enabled**. A check mark appears.

You can now use the OneExpert DSL with a mobile device. See "Using the OneExpert DSL with a mobile device" on page 73

To disable Bluetooth, touch the box to remove the check mark.

Configuring international settings

The International Setting menu is used to select the language, units of measurement, and other international settings. There are two ways to select international settings:

–   Selecting a preset country. These selections automatically configure the settings as appropriate for that country.
–   Configuring each setting individually. If you are not in one of the preset countries, or if the settings aren't appropriate for your situation, you can configure each setting individually.

These settings are stored when the unit is turned off.

To configure international settings

1   From the System Settings menu, select **International Settings**.

The International Settings menu appears.

2   *Optional.* Select **Country** to select a preset country.

Selecting a specific country will automatically change the settings as appropriate for that country. For example, selecting Spain will automatically set the language to Spanish, unit of distance to meters, unit of temperature to celsius, noise filter to CCITT, cable size to millimeters, TDR units to m/us, and numerical separator to a comma.

3   Change the settings as appropriate for Language, Measurement System, Temperature Units, Time Zone, and Cable Terminology.

To change the settings, touch the menu item, and then select an item from the list.

The international settings are configured.

Updating the instrument software over a network

The OneExpert DSL software can be upgraded in the field using the Ethernet Network port.

To update over an intranet or network

1 Obtain the IP or FTP address where the software file is located, as well as the User Name and Password.

2 Connect the OneExpert DSL to the AC charger adapter to ensure an uninterrupted supply of power during the update.

WARNING: ELECTRICAL SHOCK

Electrical shock may result in serious injury or death. Be sure the AC adapter is connected to the correct voltage mains. Do not use outdoors or in wet locations. Use only the AC adapter supplied with the tester.

3 From the System Settings menu, select **Network Software Update**.

4 Touch **Update URL** and then enter the complete IP address where the file is located.

NOTE

In order for the update to work, you must enter the **complete** address, including the server and directory. For example, ftp://ftp.<your company>.com/<directory name>

5 Touch **Username** and then enter the User Name for the address.

6 Touch **Password** and then enter the Password for the address.

7 Select the **Update** system key.

   The update status is displayed on the screen.

NOTE:

The update will take several minutes.

   The unit powers down when done.

Updating software using USB Flash

The OneExpert DSL software can be upgraded in the field using the USB port.

To update over USB

1 Connect the OneExpert DSL to the AC charger adapter to ensure an uninterrupted supply of power during the update.

WARNING: ELECTRICAL SHOCK

Electrical shock may result in serious injury or death. Be sure the AC adapter is connected to the correct voltage mains. Do not use outdoors or in wet locations. Use only the AC adapter supplied with the tester.

2 Connect a USB flash drive to the USB connector on the right panel.

   The OneExpert DSL will auto-detect the USB drive. This USB should contain the update file.

3 From the System Settings menu, select **Network Software Update**.

4   Touch **USB Update Path** and then select the update file.

5   If the update doesn't start automatically after selecting the file, select the **Update** system key.

The update status is displayed on the screen.

> **NOTE:**
>
> The update will take several minutes.

The unit powers down when done.

Viewing unit options and revisions

The following procedure describes how to view unit options and revisions.

To view unit revisions and options

1   From the System Settings menu, select **Hardware/Software Revisions**.

The revisions of the internal components and the software versions appear. The unit's unique ID number also appears on this screen. You will need the unit ID if you are adding options to the unit.

2   From the System Settings menu, select **Options**.

A list of the unit's options appear and reports whether the option is enabled.

Viewing revisions and options is complete.

Restoring factory defaults

The following procedure describes how to reset the OneExpert DSL to factory default settings.

> **NOTE:**
>
> Restoring factory defaults resets test application settings and system settings (such as brightness, contrast, and volume), and powers down the unit.

To reset to factory defaults

1   From the System Settings menu, select **Restore Factory Settings**.

2   At the prompt, press the **OK** key to restore the factory default settings. Press the **Cancel** to exit the prompt.

Changing screen settings

The Screen Settings menu allows you to adjust the brightness of the backlight and set the backlight timeout.

Adjusting the backlight brightness

To adjust the brightness of the backlight

1   From the System Settings menu, select **Screen**.

2   From the Screen Settings menu, select **Backlight**.

3   Change the brightness level using the left or right arrow key.

The brightness is set.

Setting the backlight timeout

The backlight duration specifies the amount of idle time (no key presses and no line activity) to wait before the dimming the backlight to conserve battery life.

To set the backlight duration

1   From the System Settings menu, select **Screen**.

2   From the Screen Settings menu, select **Backlight Timeout**.

3   Select a timeout.

The backlight duration is set.

Setting the power off delay

The power management settings menu allows you to select whether to automatically turn off the unit to conserve battery life, and set the time to wait before the backlight dims ("Setting the backlight timeout" on page 23).

To set the power off delay

1   From the System Settings menu, select **Power Management**.

2   From the Power Management menu, select **Power Off Delay**.

3   Select the amount of idle time to wait before powering the unit off.

Idle time refers to no key presses and no line activity. So, if you set the power off delay to 5 minutes and then begin a 15 minute test, the unit will not power down during the test because there is line activity.

> **NOTE:**
> The OneExpert DSL will not automatically power down when connected to the AC adapter.

The auto power down parameters are set.

Specifying user information

The User Information menu allows you to enter specific information related to the technician using the OneExpert DSL. This includes the technician name, technician ID, location (city, county, state, country, postal code, and garage), and the account ID. This information is used when synchronizing with the StrataSync server.

> **NOTE:**
> A valid account ID must be entered in order to synchronize with the StrataSync server.

To specify user information

1 From the System Settings menu, select **User Information**.

2 Specify the user's first and last name, workgroup, company, email address, and other infor-mation.

3 Press the Back/Cancel function key to exit the menu.

Specifying network profiles

The network button is used to specify and store network profiles and to enable or disable a network profile.

To specify network profiles

1 From the System menu (Figure 8 on page 16), touch the **Network** button.

A list of network profiles appears. If you are currently connected to a network, that profile will appear at the top of the menu.

2 To modify a profile

    a Highlight the profile and then select **Edit Profile**.

    b Select **Profile Name** and then enter a name for the profile.

       A descriptive name such as "Downtown IPv4/IPv6 Stateless" allows easier recognition by other technicians (vs "Garage1" or "Branch7").

    c Select **Network Mode** and then specify the network mode: IPv4, IPv6, or IPv4/IPv6 Dual Stack.

       Depending on the Network Mode, you may have one or more additional settings to specify.

    d If you selected IPv4, do the following:

     – Select **IPv4 Address Mode** and then select **Static** or **DHCP**.
If you selected DHCP, you are finished.

     – If you selected Static address mode, specify the following:
IP Address (The OneExpert DSL's IP address to the access the provider network),
Netmask (IP devices use a netmask IP address to determine if IP packets are to be routed to other networks or sub-networks)
Gateway (The OneExpert DSL OneExpert DSL's gateway address. When an IP device has determined that a packet is not addressed to it or devices on the same sub-network (subnet), it sends all such packets to the gateway address for further routing to the correct address.
DNS Server (If the IP Mode is Static enter the address of the DNS server.)

    e If you selected IPv6, do the following:

     – Select **IPv6 Address Mode** and then select **Manual**, **Stateles** or **DHCPv6**.
If you selected DHCPv6, you are finished.

     – If you selected Stateless address mode, specify the following:
IPv6 DNS Address Mode (how the OneExpert DSL obtains the DNS address) and then select **Manual** or **DHCPv6**.

If you selected DHCPv6, you are finished.
If you selected Manual, enter the **IPv4 DNS Server** address (the address of the DNS server).

– If you selected Manual address mode, specify the following:
IPv6 Global Address (The OneExpert DSL's IPv6 address to the access the network).
IPv6 Subnet Prefix Length (specify the length of the subnet prefix, from 0 to 128).
IPv4 Gateway (The IPv4 gateway address)
IPv6 DNS Address Mode (how the OneExpert DSL obtains the DNS address) and then select **Manual** or **DHCPv6**.
If you selected DHCPv6, you are finished.
If you selected Manual, enter the **IPv4 DNS Server** address (the address of the DNS server).

f If you selected IPv4/IPv6 Dual Stack, do the following:

– Select **IPv4 Address Mode** and then specify settings as described in step d above.

– Select **IPv6 Address Mode** and then specify settings as described in step e above.

g Press the Back/Cancel navigation key to return to the Profiles screen.

The network profile is updated.

3 To disable a network profile, highlight the profile, and then touch the **Network Off** button. The profile is disabled. NOTE: This only disables the profile from being loaded onto the unit; it will not disable the actual network.

Browsing the web

With the web browser feature, you can provide visual proof to customers that a circuit is correctly provisioned all the way to the Internet. The browser works over both DSL and Ethernet interfaces, allowing you to surf the web from the customer's NID or demarcation point using only the OneExpert DSL. For DSL applications, the browser is a separate mode that allows you to connect to any public web site on the Internet through an internet service provider. The browser can also be purchased as a general global application for use with the Ethernet port.

Because the browser's primary purpose is to demonstrate connectivity, it does not have all the capabilities of typical web browsers, such as Internet Explorer or Netscape Navigator. The web browser has the following limitations:

– The browser does not cache web pages. The OneExpert DSL does not have sufficient memory to cache web pages. Each time a page is selected, the OneExpert DSL re-loads the page.

– The browser does not currently support data entry through the browser. For example, you cannot log into a web mail account.

– The browser does not currently support Java applets, and will not display web pages written in Java. Sites optimized for quick downloads, such as DSLReports.com, are not supported because they are based on Java.

The following sections in this chapter describe how to access and use the web browser.

Accessing the web browser

Like IP ping, you must have an established underlying network connection, such as PPP over Ethernet, before you can use the browser. After you have a successful network connection, the OneExpert DSL's Network LED illuminates green. If the LED is red, the underlying connection is not ready, and the web browser (and IP ping) will not work.

To access the web browser

• From the System menu (Figure 8 on page 16), touch the **Web Browser** button.

The web browser display appears.

Navigating the browser

You can navigate the browser as you would with a mobile device, with tapping in text boxes to display the keypad and enter the data, swiping your fingers to scroll, touching links to select them, and so on. In addition, you can connect a USB mouse or a USB keyboard/mouse combination to the OneExpert DSL to navigate the web browser as you would with a desktop computer. Going back or forward one page

Opening a web page

There are two ways to open a web page.

– Enter the address - tap the address box, and then use the keypad on the screen to enter the address.

– Use a bookmark - touch the Bookmarks button and then select a bookmark.

Adding bookmarks

If there is a specific page that you would like to view or if you visit a site frequently, you can bookmark it. There are six bookmark slots available: one for your Home URL and five others.

To add bookmarks

1 On the main Web Browser page, touch the **Bookmarks** button.

2 Select a bookmark and then enter the URL.

Exiting the browser

When you are finished demonstrating internet access to the user, you should exit the browser.

To exit the browser

1 Press the **Home** function key or tap the home icon on the browser menu.

The browser closes.

Synchronizing to the StrataSync server

StrataSync® is a hosted, cloud-based software application that provides JDSU instrument asset, configuration, and test-date management. StrataSync manages inventory, test results, and performance data anywhere with browser-based ease and improves technician and instrument efficiency.

Features include the following:

- Pushing certain configuration settings to the OneExpert DSL
- Adding and/or removing software options on the OneExpert DSL
- Updating the software on the OneExpert DSL
- Updating the software on the modem
- Receiving certain configuration setting from the OneExpert DSL
- Tracking ownership of the OneExpert DSL

To obtain the latest configuration settings, software options and updates, and ownership registration information, the OneExpert DSL can synchronize with a JDSU server via the internet. The synchronization also stores any user files saved on the unit to the StrataSync server. This procedure should be undertaken immediately upon receipt of the unit and on a regular (daily) basis thereafter to ensure that the unit is as up-to-date as possible and to allow all user information to be backed up. Before attempting to synchronize with StrataSync, please confirm your server settings with your manger or your company's IT organization.

To sync with StrataSync

1 If you haven't already done so, specify the user information on the User Info menu (see "Specifying user information" on page 23). A valid account ID must be entered in order to synchronize with the StrataSync server.

2 From the System menu (Figure 8 on page 16), touch the **StrataSync** button.

The StrataSync settings menu appears.

3 Specify the connection and server settings.

Setting	Description
Connection	Specify which connector to use - 10/100 Ethernet or xDSL.
Connection Type	Specify how to connect to the server. – Lookup – Use an intermediate server that will automatically identify ("lookup") the specific StrataSync server to be addressed. The lookup server connection type is typically used when there are multiple StrataSync servers in the user's corporate footprint.) – Direct – Use a direct reference to a specific StrataSync server) **NOTE:** The OneExpert DSL uses HTTPS (secure HTTP) to connect to the server.
Server Method	Specify how to refer to the server (this applies for both connection types) – Address Server by IP (192.168.0.1) – Address Server by Name (myServer)
Lookup Server Port	Enter the server port number.

Setting	Description
Lookup Server Name	Enter the server name.

4 Touch the **Start** button.

As the process runs, the sync state is displayed in the lower left.

- Upon synchronization with the StrataSync server, the unit will send to the server the following information:
  – The unit's serial number.
  – The unit's hardware information - constituent assemblies and their revision levels.
  – The unit's MAC address.
  – The unit's User settings - name (user/technician) and ID.
    If the configuration information contained on the server is newer than that on the unit, the server will be considered to be the most up-to-date.
- The server will then send any files to the unit being synchronized that it determines are newer than those on the unit.
- The unit will then send any Reports, Configuration profiles, screen shots, etc. that have been saved on the unit since the last configuration.
- The server then applies any applicable Options to the unit.

> **NOTE:**
>
> If an Option Code was entered as a part of synchronization, power must be cycled to the unit to complete the process and initialize the option.

- Lastly, if any upgrades are available, the user will be informed of their availability and asked to verify their desire to receive the upgrade.

When synchronization is complete, the Status will indicate "Sync Complete". The unit may be disconnected from the server.

Managing jobs

The Job Manager is used to associate test results from different applications (for example HPNA, Optical Power Meter, DSL, and Copper Pair Check) to a single job. If any jobs have been saved, they appear in the list. The Job Manager allows you to setup a new job, edit an existing job, activate a job, or delete a job.

To manage jobs

1 From the System menu (Figure 8 on page 16), touch the **Job Manager** button.

If any jobs have been created, they will be listed on the screen.

2 To create a new job, touch the **New** button, and then enter the work ticket, BAN, and UUID.

3 To edit an existing job, highlight the job you wish to modify, select the **Actions** system key, and then select **Edit Job**.

4 To select multiple jobs (to activate, export, or delete)

a Touch the **Manage** button. The jobs list appears.

b Touch to select the jobs. A check mark appears next to the job.

c Touch the **Manage** button to return to the Job Manager screen.

5 To activate a job, highlight the job to activate, and then press the **Activate** system key. "Active" appears on the job listing.

6 To export a job, highlight the job you wish to export (or highlight multiple, as described in step 4), select the **Actions** system key, and then select **Export**. The job will be exported as a XML file.

> **NOTE:**
>
> Once a job has been successfully uploaded to the job server, the job is deactivated and locked (i.e., cannot edit the ticket number or other fields). The next job must be a new ticket. This ensures that the correct test data is being saved and exported with the correct job. The check box next to the job will be greyed out.

7 To delete a job, highlight the job you wish to delete (or highlight multiple, as described in step 4), select the **Actions** system key, and then select **Delete**. A confirmation box appears. Select **Yes**.

Associating results to a job

To associate results to a job

1 After running a test, touch the **Setup & Tests** button.

2 Select **Save**.

The file is saved.

Managing files

The OneExpert DSL file browser is used to open, rename, copy, or delete saved result files or screen shots.

To manage saved result files

1 From the System menu (Figure 8 on page 16), touch the **File Browser** button.

The File Manager screen is displayed with all saved results.

> **NOTE:**
>
> If you have a USB flash drive connected to the OneExpert DSL, there is a **USB File Browser** button on the System menu, in addition to the File Browser. Both browsers operate in the same manner.

2 Use the up and down arrow keys to move among folders and files.

Opening files

To open a file

1   Using the up and down arrow keys, highlight the desired file.

2   Press the **OPEN** system key.

     The contents of the file are loaded to the screen for viewing.

Renaming files

To rename a file

1   Using the up and down arrow keys, highlight the desired file.

2   Press the **Rename** system key.

     The Rename screen is displayed.

3   Touch the file name in the box.

     A keypad appears on the screen

4   Touch the enter/return key on the screen keypad or press the OK key.

     The new file name appears in the File Manager screen.

Deleting files

To delete files

1   Using the up and down arrow keys, highlight the desired file.

2   Press **Delete** system key.

     The files are erased.

Copying and pasting files

To copy files

1   Using the up and down arrow keys, highlight the desired file, and then press the **File Options** system key.

2   Do one of the following:

     –   Select **Copy**, navigate to another folder or drive, press the **File Options** system key, and then select **Paste**.

         The file is pasted and the File Manager screen appears.

     –   Select either **Copy to USB** if you are using File Browser or **Copy to Internal** if you are using the USB File Browser.

         The file is copied and the File Manager screen appears.

Uploading files (FTP/HTTP)

To upload files

1   Using the up and down arrow keys, highlight the desired file.

2   Press the **File Options** system key, and then select **Upload FTP/HTTP**.

The Upload settings appear.

3   Specify the **Upload URL**, **Username**, and **Password**.

4   Touch **Apply**.

The upload starts.

When the upload finishes, a message appears stating that the selected files were uploaded. Press OK to close the message.

Using the tray menu

The tray menu, shown in Figure 9, can be accessed either by pressing the Tray function key or by swiping downward from the top of the LCD.
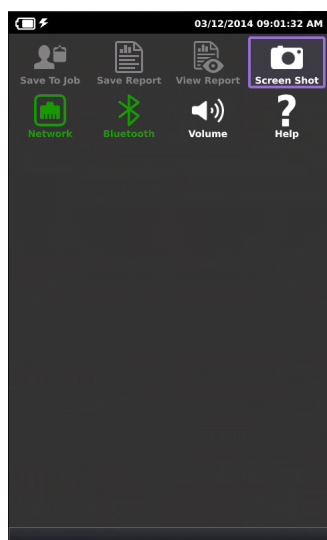
Figure 9   Tray menu

Saving results to a job

If you are currently running a test, you can save test results to a job.

To save results to a job

•   Access the Tray menu and then touch **Save to Job**.

The current test results are saved to the job.

You must have an active job and active test. The text will be gray if there is no active job.

Saving a report

If you are currently running a test, you can save test results as a report.

To save a report

1   Access the Tray menu and then touch **Save Report**.

You must have an active test or the text will be gray.

A Save Report window appears.

2   Enter the name of the report.

3   Specify the format for the report.

4   If there is an active job, select whether to include the job info in the report. This selection only appears if a job is active.

5   Select whether to view the report after saving.

6   Touch **Save**.

The current test results are saved as a report.

Viewing a report

If you have a saved report, you can view the report.

To view a report

1   Access the Tray menu and then touch **View Report**.

You must have a saved report or the text will be gray.

A View Report window appears, showing all of the saved reports.

2   Select a report to view.

The report appears on the screen.

Capturing a screen shot

In addition to or instead of a report, you can capture an image of the current screen.

To capture a screen shot

•   Access the Tray menu and then touch **Screen Shot**.

The PNG file is saved to the internal file manager.

Disabling the network

The tray menu allows you to disable the network profile.

To disable the network

•   Access the Tray menu and then touch **Network: Disabled**.

NOTE: This only disables the profile from being loaded onto the unit; it will not disable the actual network.

Enabling Bluetooth

The tray menu offers a shortcut to enable or disable Bluetooth connection.

To enable or disable Bluetooth connection

•   Access the Tray menu and then touch **Bluetooth**.

To verify whether Bluetooth is enabled, go to the System Settings menu and view the Bluetooth menu. A check mark appears when Bluetooth is enabled.

Setting the volume

The tray menu allows you to control the instrument volume.

1   Access the Tray menu and then touch **Volume**.

The volume scroll bar appears.

2   Either touch the + / - buttons on the screen or swipe your finger across the bar to move the line on the bar, adjusting the volume.

4

DSL Testing

This chapter provides task-based instructions for using the OneExpert DSL to gather DSL (VDSL, ADSL2+/2/1) statistics and verify connectivity. Topics discussed in this chapter include the following:

About xDSL testing

The purpose of the DSL tests are to assess the quality of the xDSL signal and to verify the xDSL rates achieved at various points in the network.

The tests involve three main steps:

- selecting the test mode and specifying test settings
- connecting to the line
- running the tests

The ADSL/VDSL Bonding Option, order number ONX580-BONDED, is available for purchase.

For additional information about OneExpert DSL OneExpert DSL options and services, contact your local JDSU representative or contact JDSU through the company web site, www.jdsu.com.

Selecting the test mode

Before running any DSL tests, you must specify the test mode and specify test settings.

To select the test mode

1 From the main menu, select **DSL**.
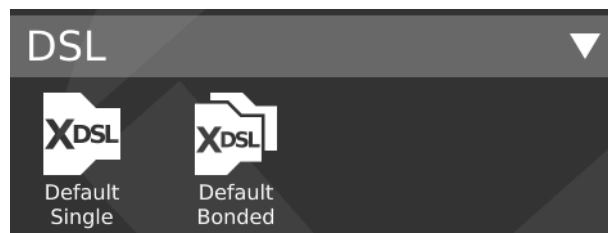
2 Select the test mode.
- – Single DSL (one pair)
- – Bonded DSL (two pairs)

The Connection Details menu appears.

3 Specify test settings. See "Specifying test settings" on page 37.

> ⚠ **CAUTION:**
>
> The modem has an exposed heat sink on the back of the instrument that must maintain unobstructed contact with ambient air. If the heat sink is blocked in any way it can become extremely hot, and modem performance can suffer. It is recommended that the unit not be operated flat on its back (heat sink down), in any DSL mode, for more than 15 minutes.

Specifying test settings

Before you begin testing, make sure the test settings on the OneExpert DSL OneExpert DSL match the settings of the line that you are testing.

• To access the setup screen, select the **Setup & Tests** system key.

Loading a test profile

If you have previously specified the settings and saved the test profile, you can load that profile so you don't have to specify all of the settings again.

To load a saved profile

1 Touch the **Load** button.

A list of Modem Settings profiles appears. (If no profiles have been saved, the list will be empty.)

2 Select the profile to load.

The settings are loaded.

Specifying DSL settings

1 Touch the **Modem Settings** button.

2 Select **DSL Interface** and then specify whether to use the RJ45 connector or T/R/G (Tip/Ring/Ground) as the DSL interface.

3 Select **xDSL Technology**, and then select **VDSL**, **ADSL**, or **xDSL (Auto)**. The Auto setting queries the DSLAM for the technology.

4 The **Analog Technology** is automatically set to xDSL over POTS.

5 Do one of the following:

– If you selected ADSL as the Technology, select **Standard & Annex** and then specify the ADSL standard and annex (such as GLite AnnexA or ADSL2+ Annex M).

– If you selected VDSL as the Technology, specify the **VDSL Profile** (such as 8A or 12B).

6 If you selected either VDSL or Auto as the Technology, select **VDSL Vectoring** and specify **Full**, **Friendly**, or **Off**.

Vectoring technology is used on VDSL2 connections to reduce FEXT from other pairs in a binder group resulting in higher downstream and upstream rates for all the pairs in the group. Vector mode is available for single-line VDSL circuits only (not available for bonded, not available for ADSL2). Vector Friendly mode is suggested when there is a need to emulate CPE incapable of full vectoring, but which have been designed to synchronize to a vectoring DSLAM without losing sync. It is a special software that is downloaded to the VTU-R modem enabling it to respond to a vectored request from a VTU-O to allocate net data rates across all bearer channels and to minimize excess SNR per channel.

7 Select **Transport Mode**, and then specify ATM, PTM, or Auto. This specifies whether data is transported over Asynchronous Transfer Mode (ATM) or Packet Transfer Mode (PTM). The Auto setting queries the DSLAM for the transport.

8 Specify the **ATM Layer** settings. This section only appears if you specified Auto or ATM transport mode.

 a Select **Encapsulation** and then select **LCC-SNAP** or **VC-MUX**.

 b Set the **VC Count** between 1 and 4.

 c Specify the VC settings for each virtual channel (VC 1 through VC 4): VPI, VCI, and VC Mode (**Tx Rx** or **Rx only**)

9 Select **Advanced DSL Settings** and then specify the following:

 a Specify whether to use **DSL Retransmission** upstream or downstream. This setting is only available in non-bonded mode. This specifies whether the unit will advertise upstream or downstream G.INP support to the DSLAM. If the selection is changed, the modem resyncs in order to apply the new setting.

> **NOTE:**
>
> Enabling DSL Retransmission (adding the check mark) only *advertises* support to the DSLAM. It does not guarantee the connection will use DSL Retransmission (G.INP) because G.INP is specified in the CO configuration.

 b Specify whether to use **PhyR** (impulse noise protection technology) upstream or downstream.

 c Specify whether to use **SRA**. Seamless Rate Adaptation changes the data rate while in operation without any interruption to data service.

 d Specify whether to perform **Bitswapping**.

 e If you selected VDSL or Auto as the Technology, select **V43 Tones** and enable or disable V43 tones. V43 tones are typically used during training, but your test requirements may include disabling these tones, This selection is not available if in ADSL mode. If vectoring is enabled, it is recommended that V43 tones are disabled.

 f Select **24k Interlv Depth**, and then select **On** or **Off**. Interleaving splits data packets into smaller bits, and then rearranging them so that contiguous data is now spaced further apart into a non continuous stream (and re-assembled by the modem). This is effective for lines susceptible to bursts of noise.

10 Select **Network Settings** and then specify the following:

> **CAUTION: FAULTY RESULTS**
>
> Any time the Network settings are changed, the network layer resets. If you change these settings during a test, you may cause errors in the test. Only change them before you begin a test.

 a Select **Network Type** and then specify Through-Bridge or Terminate

 The two modes include the same testing capabilities, but the difference is in the IP addressing.

 In **Terminate** mode, the OneExpert DSL replaces the modem and test interface.

 In **Through-Bridge** mode, the OneExpert DSL replaces the modem, hub, and test interface. It does not use a DHCP server so it does not assign IP addresses to other equipment. The end equipment uses either the service provider-supplied IP address or one that is on the same network (same netmask).

b   Select **Data Mode** and then specify **IPoE**, **PPPoE**, or **MultiVLAN**. **None** turns the data layer off.

c   Select whether to do **Automatic Login**.

d   Select **MAC Address Mode** and specify factory default or user defined.

e   Specify whether VLANs are used (a check mark indicates they are used).

f   If VLANS are used, specify the following:

–   Enter the **VLAN ID** and **Priority**.

–   Select **IP mode** and then specify the network mode: IPv4, IPv6, or IPv4/IPv6 Dual Stack.

–   Specify the network settings as described in "Specifying network profiles" step 2d to g

Press the Back/Cancel navigation key to return to the main screen.

Saving test profiles

After specifying the test settings, you can save them as a test profile.

To save test profiles

1   From the Setup & Tests screen, touch the **Save** button.

2   Enter a name for the profile.

3   Specify whether the profile will be shown on the Home screen

4   Touch **Save**.

The profile is saved.

Connecting to the line

The method used to connect to the line varies depending on the test mode and line configuration.

Connecting to a single twisted pair

To connect to a single twisted pair

1   Using the RJ-45 to telco clips cable, connect the **RJ-45 to bed of nails** test lead to the **DSL** connector on the right panel of the OneExpert DSL.

2   Connect the **RJ-45 to bed of nails** test leads to the desired pair, black to tip(A) and red to ring(B).

The line is connected.

Connecting to bonded twisted pairs

To connect to bonded twisted pairs

1   Using the RJ-45 to telco clips cable, connect the **RJ-45 to telco clips** test lead to the **DSL** connector on the right panel of the OneExpert DSL.

2   Connect the **RJ-45 to telco clips** test leads to the pairs: black to tip(A) and red lead to ring(B) for pair one; blue to T1 and yellow to R1.

The line is connected. The modems begin to train on the lines automatically.

> **NOTE:**
> You may see both lines sync, drop, and then re-sync again. This is typical for bonded lines. The modems include a test probe that syncs both pairs, drops, and then re-syncs in bonded mode.

If one of the pairs is not capable of bonding, or the pairs do not bond, a red error message box appears.

Connecting to a single pair at the NID/demarc

To connect to a single twisted pair using the "Y" cable

1   Connect the single end of the test cable to the jack on the side of the OneExpert DSL.

2   Connect the blue end of the cable to Modem on the NID/demarc.

The line is connected.

Connecting to bonded pairs at the NID/demarc

To connect to bonded twisted pairs

1   Using the RJ-45 "Y" cable, connect the single end of the "Y" test cable to the jack on the side of the OneExpert DSL.

2   Connect the blue end of the cable to Modem 1 and the orange end of the cable to Modem 2 on the NID/demarc.

The line is connected. The modems begin to train on the lines automatically.

> **NOTE:**
> You may see both lines sync, drop, and then re-sync again. This is typical for bonded lines. The modems include a test probe that syncs both pairs, drops, and then re-syncs in bonded mode.

If one of the pairs is not capable of bonding, or the pairs do not bond, a red error message box appears.

Testing the physical layer

You can use the OneExpert DSL OneExpert DSL to test the physical layer of the xDSL link. The following procedure describes the basic test for the DSL link.

To perform a basic DSL link test

• Connect to the line and allow the unit to train on the line.

If the unit achieves sync, you have verified the physical layer.

Testing line quality

Once connected to the line, the OneExpert DSL OneExpert DSL gathers statistics for the line. These statistics are used to determine the line quality.

To test line quality

1 Connect to the line. See "Connecting to the line" on page 39.

   The modem begins the training process automatically. When it reaches show time, the OneExpert DSL begins gathering statistics.

2 Use the **Connection Details** and DSL Graph buttons to view different types of statistics.

   If the unit achieves sync at the desired data rates, noise margins, and attenuation, the DSL link is good.

3 Use the Tray menu to save the results. See"Saving results to a job" on page 31 or "Saving a report" on page 32.

For more information on the results, see "DSL Results" on page 79.

Terminating the loop (SELT)

Single End Loop Test (SELT) is used to test a copper loop when there is no equipment installed at the far end. It is typically used for pre-qualification, that is, testing whether a loop is capable of supporting DSL service. In some cases, SELT testing is aided by placing a termination at the far end of the line. This test sets the VDSL modem to provide a line termination where the modem is idle and not transmitting.

To run a SELT termination

1 On the right panel of the OneExpert DSL, connect one end of the test cable to the **DSL** connector, and the other end to the line under test.

2 From the main menu, select **DSL**, and then select **Single DSL**.

3 Access the Tray menu by either swiping downward from the top to the bottom of the screen or by pressing the Tray function key.

4 Select the **SELT** system key

After initializing the modem, the SELT verification screen is displayed.

5 The far end technician can continue testing.

Performing a ping test

The ping test sends a ping packet through the modem to an IP address or DNS name (could be a network switch or web address) to test for connectivity.

> **NOTE:**
> You can also check connectivity using the web browser. See "Browsing the web" on page 25 for more information.

To perform a ping test

1 Select the **Setup & Tests** system key.

2 Touch **Ping**.

3 Touch the **Settings** button and then specify the Ping Test settings.

    a Select **Destination Type** and then select IPv4 Address, IPv6 Address, or DNS Name.

    b Enter the **Destination** IP address or DNS name.

    c Specify the **Transmit Count** (how many total ping packets to send), **Transmit Interval** (amount of time between packet transmittals), and **Transmit Size** (how many ping messages are in each packet).

    d Touch the **Results** button.

4 Use the Tray menu to save the results. See "Saving results to a job" on page 31 or "Saving a report" on page 32.

The ping test is complete.

FTP throughput testing

Using the FTP test, you can perform a file transfer to test the throughput of the circuit.

To test throughput

1 Select the **Setup & Tests** system key.

2 Touch **FTP**.

3 Touch the **Settings** button and then specify the **Direction**, **Concurrent Transfers**, **Repeat Transfer Count**, **Download Protocol**, **Download URL**, **Download Username**, **Download Password**, and **HTTP Auth Type**.

4 Touch the **Results** button.

The File Transfer Results appear on the screen.

See "File Transfer results" on page 84 for information on interpreting the results.

After running the test

When you finish your test, you can put away the test cables in the glove.

•   Wrap the cable in a circle and put into the pocket on the front of the glove.

Wiring Tools

This chapter provides task-based instructions for gathering test statistics and verifying connectivity. Topics discussed in this chapter include the following:

About the Wiring Tools

The purpose of the Wiring Tools tests are to test and map cables/wires, verify that the HPNA links and devices are installed and fully provisioned, and to verify that the entire HPNA network is operating correctly

To access the wiring tools

1   From the main menu, select **Wiring Tools**.
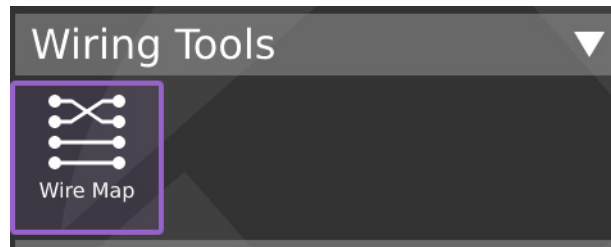
2   Select Wire Map

Wire Mapping

These tests are used to test and map cables/wires. These tests require the use of the smart remote on the far end of the cable.

There are two wire mapping tests:

- Mapping - calculate cable length based on measured capacitance, using the user-specified length constant setting. This test also shows the wire mapping between any two pairs in the cable.

- Toning - mapping the wires by sending a tone across the cable.

Wire Mapping

To map wiring

1   Do one of the following:

    a   If testing a telephone cable, connect RJ-11 cable to the RJ-11 **Wiring** connector on the right panel of the unit.

    b   If testing a network cable, connect RJ-45 cable to the RJ-45 **Wiring** connector on the right panel of the unit.

2   From the Wiring Tools menu, select **Wire Map**.

The Wiremap - Pin Mapping screen appears. If Trace Toning appears, select the **Mapping** system key.

3   Either drag the line across the length constant bar or touch the + or - key to adjust the Length Constant setting.

Table 4 describes some typical constants.

Table 4   Typical data cable length constants

Cable type	pF/ft	pF/m
Data cable		
Cat3	19.0	62.5
Cat5, Cat5eCat, Cat6	15.0	49.0
Coaxial cable		
RG58	27.5	90.0
RG6, RG11, RG59	16.25	53.0
Security wire		
22AWG, Jacketed	24.0	78.5
22AWG, Unjacketed	14.0	46.0
20AWG, Unjacketed	16.0	52.5
18AWG, Unjacketed	17.0	55.5

4   Press the **Start** system key to begin the test.

Table 5 describes the Wiremap test results.

Table 5   Wiremap results

Results	Description	Units	Range/ Values
Length Constant	This is the current SET length constant used to calculate cable length based on measured capacitance.	pF/ft	
Results	This shows the wire mapping between any two pairs in the cable.		
Length	Cable length calculated based on Length constant.	ft	10.1 - 39.3
Skew	Pair skew for each pair. (Cat 5/6 only)	ns	

The test is complete.

Sending tones

The purpose of this test is to send a tone on a network cable. By default, the OneExpert DSL sends tone on all the wires of a cable.

To trace cables using test tones

1   Do one of the following:

   a   If testing a telephone cable, connect RJ-11 cable to the RJ-11 **Wiring** connector on the right panel of the unit.

   b   If testing a network cable, connect RJ-45 cable to the RJ-45 **Wiring** connector on the right panel of the unit.

2   From the Wiring Tools menu, select **Wire Map**.

3   Select the **Toning** system key.

The Trace Toning screen appears.

4   To start toning the cable, select one of the following:

–   **High** - sends a continuous high tone on all leads of the connected cable.

–   **Low** - sends a continuous low tone on all leads of the connected cable.

–   **Alternating 1** - sends a high tone follow by a low tone on all leads of the connected cable.

–   **Alternating 2** - sends a low tone followed by a short high tone on all leads of the connected cable.

5   After you finish the test, select Off.

6

HPNA Testing

This chapter provides task-based instructions for using the optional HPNA testing features. Topics discussed in this chapter include the following:

- "About HPNA Testing" on page 50
- "Monitoring the HPNA network" on page 50

About HPNA Testing

The capabilities of the OneExpert DSL OneExpert DSL's optional HPNA testing features include the following:

Operational mode — This mode monitors the active network during its normal operation and periodically updates statistics.

Network test mode — This transient mode performs a disruptive network test that transfers a configurable number of packets across each unidirectional logical link in the network and gathers statistics.

These features are available if the HPNA software option is enabled.

Connecting to the line

After specifying the test settings, you can connect to the line.

To connect to the line

1   Connect one end of an Ethernet cable to the Ethernet jack on the right side of the unit.

2   Connect the other end of the cable to the Ethernet port of the CPE that is on the HPNA network (such as a set-top-box or residential gateway).

Monitoring the HPNA network

The following procedure describes how to monitor the HPNA network.

To monitor the HPNA network

1   On the Main Menu, select **HPNA**.

The Station List screen appears. See "Node list" on page 85.

2   If desired, use the arrow keys to highlight a specific node and then press the OK key to view more detailed statistics for that node.

Testing the HPNA network

This test verifies that all installed devices are operating correctly.

To test the HPNA network

1   On the Main Menu, select **HPNA**.

A list of HPNA nodes appears.

Verify that all HPNA devices are present on the network before proceeding.

2   Press the ***** key to specify the HPNA settings.

– Specify the **HPNA Minimum Rate** (the minimum rate, in Mbps, that will pass)

– Specify the **HPNA Minimum SNR** (the minimum SNR, in dB, that will pass)

– Specify the **Quick Max Packet Los**t (the maximum packet loss, in number of packets, allowed for the Quick Test)

– Specify the **Chronic Max Packet Los**t (the maximum packet loss, in number of packets, allowed for the Chronic Test)

3   Select the **#** key to select the type of test to run:

Quick – 5,000 packets. Used to quickly test the HPNA network for common issues.

Chronic – 100,000 or more packets. Used to exhaustively test the HPNA network for chronic trouble.

> **NOTE:**
>
> The size and number of packets may be adjusted from the default settings for each Quick or Chronic test prior to proceeding.

4   Select the **#** key to begin the test.

After the network test finishes, the screen updates to report the data rate, modulation, packet error rate, and signal to noise ratio on the current link.

If the packet error rate is zero and the data rate is over 112Mb, the screen will indicate a pass. If the packet error rate is non-zero, SNR is less than -34 dB, or the data rate is less than 112Mb, the screen will indicate a failure in red.

5   Use the up and down arrow keys to view the results.

6   Highlight a specific node and then press the OK key to view node-to-node link information, such as the MAC addresses and the received power.

7   Press the **#** key to view live statistics between the selected HPNA nodes.

8   To save a test report, press the utility (i) key and then select **Save Report** or **Save To Job**, and then specify the report settings such as report name, report format, technician ID, location, and other settings as needed.

For more information on the results, see "HPNA results" on page 84.

Testing with SmartIDs

This chapter provides task-based instructions for gathering test statistics and verifying connectivity. Topics discussed in this chapter include the following:

About the SmartID tests

The purpose of the SmartID tests are to test and map cables/wires, verify that the HPNA links and devices are installed and fully provisioned, and to verify that the entire HPNA network is operating correctly

To access the wiring tools

• From the main menu, select **Smart ID**.
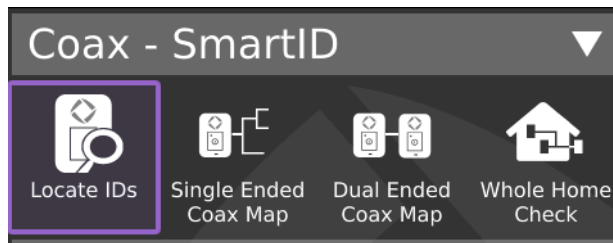
Locating SmartIDs

The purpose of this test is to identify up to 16 the SmartIDs on the network. The SmartIDs will work through splitters, and multiple SmartIDs can be detected simultaneously.

To locate SmartIDs

1 Connect SmartIDs (Figure 10) to the coax at any location in the home where network qualification or troubleshooting is desired, such as set top boxes or residential gateways (see Figure 12 for examples).

Figure 10 SmartID

2 Connect the USB cable from OneExpert DSL to one of the SmartIDs.

3 On the SmartID menu, select **Locate IDs**.

If this is the first test with the Smart IDs, a warning message appears asking you to register the SmartIDs.

This registration applies to the SmartID that the OneExpert DSL is physically connected to. You will need to repeat the procedure for each SmartID, connecting it directly to the OneExpert DSL.

a If the Registration doesn't automatically come up, select the **Actions** system key and then touch **SmartID Registration.**

b Do one of the following:

– Use the up and down arrows to highlight the label letter for the SmartID and then press OK.

– Touch the letter for the SmartID

c Plug in the SmartID or enter the serial number (if the SmartID is plugged in, it will advertise its serial number to the OneExpert DSL).

d Repeat step a through step c for each SmartID.

The SmartIDs are registered.

4 If the test doesn't automatically start, press the **RESTART** system key.

The test runs and then displays the IDs found.

5 To enter Fast-Scan mode, press the SCAN system key.

The Locate SmartIDs test performs a single locate function. Fast-Scan mode continuously scans for connected SmartIDs to allow you to quickly identify multiple coax runs in succession.

6 Use the **SAVE** system key to save the results to the job file.

Coax Map test

The purpose of this test is to map out the topology of a coax network, from a single point, without having to perform a two ended test using far end devices. This measurement can be used to locate devices in a coax cable such as barrels, splitter, and splices.

To run a Coax Map test

1 Connect to a SmartID Plus using Bluetooth.

2 On the SmartID menu, select S**ingle Ended Coax Map**.

The Coax Map screen is displayed.

Select the Mode system key and specify a Map Mode.

– Single Ended Coax Map

– Dual Ended Coax Map

– VDSL Home Run Check

– Whole Home Check (No Diplexer)

– Whole Home Check (Through Diplexer)

Table 6 describes the Coax Map results.

Table 6   Coax Map results

Results	Description	Units	Range/Values
Length	Total length of the coax leg from test instrument.	ft.	0-500
dBrl	Return loss of the coax leg.	dBrl	
Comment	Description of the event that was detected in the coax cable		Unknown, Open, Splitter, Barrel/Splice, Splitter *, and Low Quality Splitter (see Table 7 for descriptions)

Table 7   Comment result descriptions

Label	Description
Unknown	This label is used as a last resort when no other signatures can be identified.
Open	Indicates an event that has high return loss. – A home run cable with no passive devices should indicate an open at close to 0 dBrl – A cable with a 2-way splitter may have two opens at close to -7 dBrl. – A cable with a 3-way splitter may have two opens at -14 dBrl and one open at -7 dBrl
Splitter	Indicates a passive splitter may be present at this length in the cable under test.
Low Quality Splitter	Indicates a low quality splitter may be present at this length. Low quality splitters can induce standing waves and cause poor performance. These low quality splitters can also cause conventional cable ID to function incorrectly since many are DC coupled causing the ID resistive values to be placed in parallel.
Splitter *	Indicates an assumed splitter. The instrument has not detected a splitter signature. However, based on the data signature the instrument has deduced that a splitter is likely present. **NOTE:** If the length to the splitter* and the first open are the same, it is likely a splitter with an open port.
Barrel/Splice	Indicates an event was detected followed by a single low loss open event. This can be caused by barrel splices, Low Quality Splitter with an open port, severely kinked or crimped cable (Stables), poor connector, etc…. The return loss of the Barrel/Splice event should be considered when determining what action, if any, is required. Lower return loss (around -20 dBrl) values may not require action, but high values indicate an event that may be effecting cable performance.

> **NOTE:**
> In the unlikely event that the legs of a splitter are the same length, the instrument will report a single event with a return loss value that approximately equals the sum of the events.

A cable ID is displayed above the system keys. The OneExpert DSL will only find an ID if it's connected to a single cable with an ID on the other end. The RFIDs, however, will work through splitters and multiple tags can be detected.

> **NOTE:**
>
> The cable ID won't work properly if there's a cable plugged into the side of the unit (must use only the coax connector on the top).

For any given coax cable, the coax map test locates each item and presents the results in an easy to read table. The table indicates the location of items in terms of a length in feet, from the test instrument. The table also indicates the return loss at each item in dBrl.

If possible, the OneExpert DSL will also identify items such as opens, splitters, barrels, or splices based on TDR measurements performed on the cable. In some cases, based on reflection characteristics, the test set will indicate the presence of bad splitters. If unusual cable characteristics are measured, the OneExpert DSL will indicate an "unknown" item in the cable.

If the OneExpert DSL is used to measure a home-run cable, it will indicate an 0 dBrl open, and the full length of the cable.

> **TROUBLESHOOTING TIP:**
>
> If the results table indicates four or more events, it may indicate a situation where a complex cable topology is causing multiple reflections. In this case, measurement accuracy can be improved by performing step by step sectionalization starting with the first item in the table.

Figure 11 shows several cable topologies on the left and the corresponding coax map table on the right. The dBrl level at each splitter will be relatively low and depend on the quality of the splitter. Lower return loss indicates a better splitter.

Length (ft)	dBrl	Comment
100	0	Open

Length (ft)	dBrl	Comment
10	-20	Splitter
50	-7	Open
75	-7	Open

Length (ft)	dBrl	Comment
70	-20	Barrel/Splice
85	-3	Open
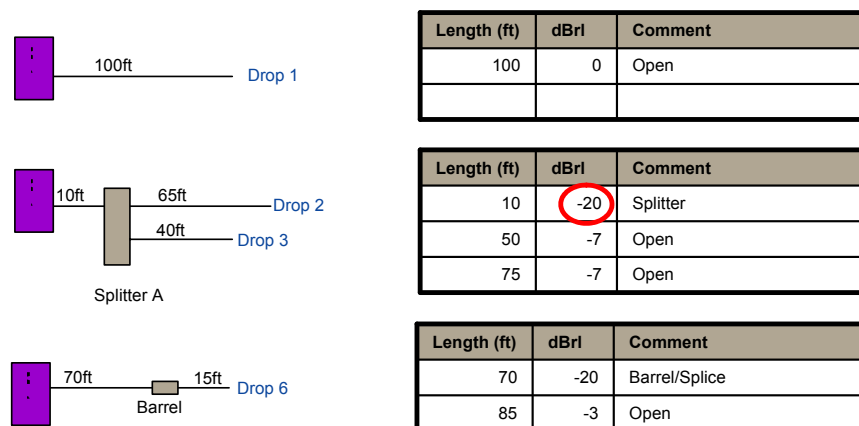
Figure 11 Cable topologies and coax map tables

Whole Home Check

The SmartIDs allow the technician to connect the OneExpert DSL directly to any single SmartID device which then communicates with any other connected SmartID devices (as shown in Figure 12) in order to certify an in-home network and provide distances to found impairments.
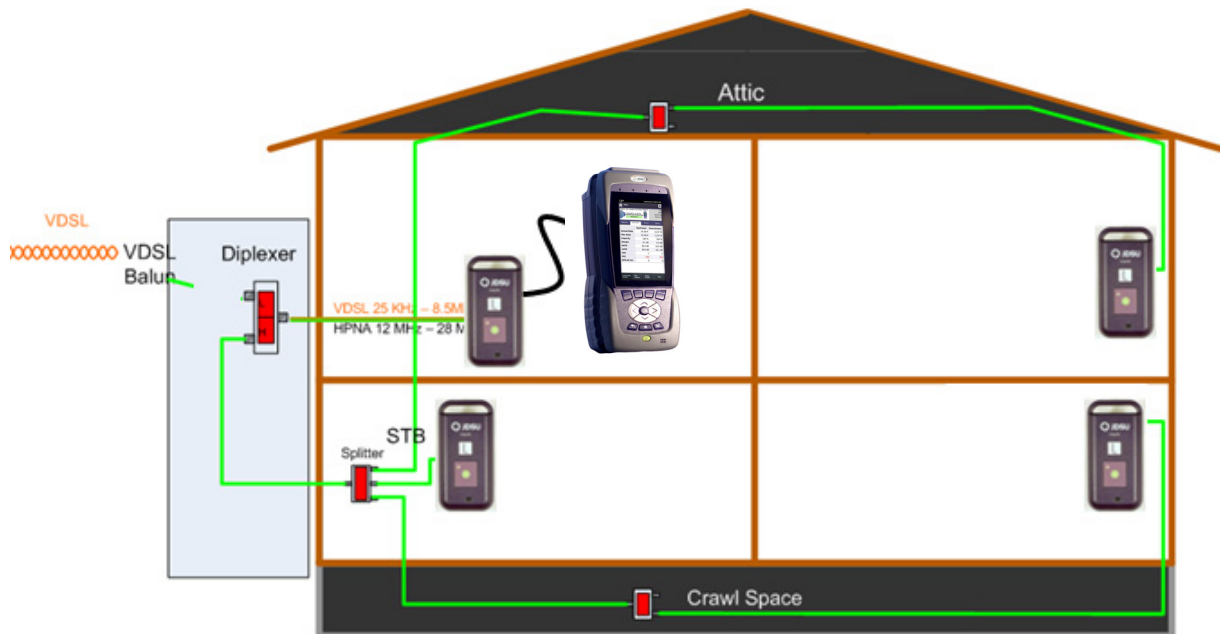
Figure 12 SmartID connection

If a Diplexer is on the network, disconnect the VDSL connection.

The difference in the SmartIDs versus the other terminators is that the terminators only indicate their location; whereas the SmartIDs each also are used to identify their location, but also each SmartID does a broadband noise ingress measurement, dual-ended FDR for coax mapping and frequency sweeping to locate impairments.

There are three test modes

- Locate SmartIDs – finds and identifies all SmartIDs currently connected to the network.
- Home Run Check – a two-point (two SmartIDs) test across the cable connecting at the resi-dential gateway and the diplexer locations.
- Whole Home Check – tests a complex cable network that may or may not include a Diplexer. It is intended to qualify the network for HPNA.

Testing the home link

The Home Run Check tests the cable connecting the residential gateway to the diplexer (see Figure 13) or, if there is no diplexer, to the set top box (STB).

Figure 13 Home Run Check

To run a Home Run Check

1   Connect a SmartID to the coax cable at the residential gateway location.

2   Connect the USB cable from OneExpert DSL to the SmartID at the RG.

3   Disconnect the cable that runs between the diplexer and the residential gateway, and then connect a SmartID to the cable (this takes the diplexer out of the test).

4   Select the **Mode** system key and specify a **VDSL Home Run**.

   The SmartID connected to the OneExpert DSL is highlighted. If any impairments were found, an exclamation point will be shown on the cable, the header will be red, and the background of one or more SmartIDs may be red. To view information for the cable segment or the other SmartID, press the left or right arrow keys. The details appear in the box.

5   To save the results to a report, use the Tray menu ("Saving a report" on page 32).

Testing the home network

The Whole Home Check maps a coax network and provide distances to found impairments.

To run a Whole Home Check

1   Disconnect the cable or DSL feed. If using a diplexer, disconnect the feed to the diplexer (and leave it open).

> **NOTE:**
>
> All live network signals must be disconnect from the coax network under test.

2   Connect a SmartID at the point of entry and use the USB cable to connect the OneExpert DSL to the SmartID.

In order to map the network accurately, make sure that you connect to the primary SmartID (connected to the OneExpert DSL with a USB cable) on the main side of the residential gateway or splitter and not on a branch leg.

3   Place other SmartIDs at any location in the home wherever network qualification or trouble-shooting is desired, such as TVs, set top boxes or cable modems.

There are three possible test configurations:

a   NID without diplexer: The primary SmartID (connected to the SCH with a USB cable) should be connected at the RG (in place of the RG), and the remaining SmartID probes should be connected at the STBs (in place of the STBs).

b   NID with diplexer: The primary SmartID (connected to the SCH with a USB cable) should be connected at the RG (in place of the RG), and the remaining SmartID probes should be connected at the STBs.

When a Diplexer is on the network, the VDSL connection must be disconnected.

c   INID: The primary SmartID (connected to the SCH with a USB cable) should be connected at the INID coax connection feeding into the home (disconnected from the INID), and the remaining SmartID probes should be connected at the STBs.

When connecting a SmartID to a wall plate, it is recommended to use a coax jumper cable of at least 3 feet in length.

Ensure that all devices except SmartIDs are disconnected from the network.

4   Select the **Mode** system key and specify a **Whole Home Check.**

5   On the Select SmartID Test Plan screen, select whether to test through a diplexer (RG - Through Diplexer) or not (RG - No Diplexer).

–   For the NID without diplexer configuration (configuration a, above), select **RG - No Diplexer**.

–   For the NID with diplexer configuration (configuration b, above), select **RG - Through Diplexer**.

–   For the INID configuration (configuration c, above), select **RG - No Diplexer**.

6   Begin the test.

During the test, a pop-up message appears if any of the following is detected:

–   Near-end connection issue (i.e. open, short, loose connection, poor fitting, poor barrel on SmartID)

–   Far-end connection issue (i.e. poor connection, fitting barrel, etc; partial short)

–   SmartID(s) detected but not mapped issue

–   SmartID mapping placement questionable (due to processed FDR data producing ambiguous length/location data for the particular SmartID probe)

–   Excessive noise ingress measured

–   Network Map obscured message warning for diplexer, filter, amplifier, etc.

–   Test FAILs if there is filter(s) or amplifier(s) present in the network

Note, that the "RG – Through Diplexer" test allows Diplexer in the network

After the test completes, the result test summary appears.

The test summary displays the paths between SmartIDs and indicates whether the quality of the path between the two points is passing or failing based on pre-set limits. The upper right area shows how many SmartIDs were detected and now many were mapped; it will be red if the numbers don't match. The left side of the screen will show the frequency sweep and noise ingress measurement results for each highlighted box, which corresponds to the two points between SmartIDs in the coax network.

7 To save the results to a report, use the Tray menu ().

Copper Testing

This chapter provides task-based instructions for using the optional OneExpert DSL copper testing features. Topics discussed in this chapter include the following:

About copper testing

The OneExpert DSL Tester's copper features allow quick turn-up and basic troubleshooting of the copper local loop.

To access the copper tests, touch Copper from the main menu. The drop down menu appears.
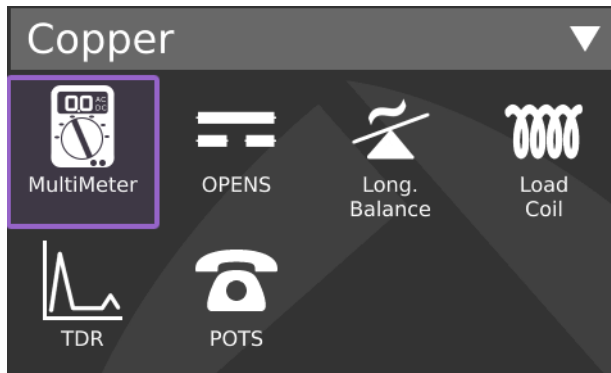
You can also perform specific measurements for the following tests:

- Multimeter
  - AC volts
  - DC volts
  - Resistance
- TDR
- Opens (distance) and capacitance
- Balance
- Load coil detect
- POTS

Each of these tests is described in the following sections.

Measuring voltage

The multimeter function allows measuring of AC and DC voltage.

To measure voltage

1   Select Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2   From the Copper menu, touch the **Multimeter** button.

3   Select **AC Volts** in the lower right.
    The AC Voltage menu appears.

4   To specify the connection, touch the connection:

–   Tip to Ring (A to B)

–   Tip to Gnd (A to E)

–   Ring to Gnd (Ground) (B to E)

> **NOTE:**
>
> You can also press the up or down arrow key to move among the connections.

5   To specify the termination, select **Options**, and then select the one of the following:

–   1MEG-ohm Term

–   100K-ohm Term

6   To measure DC, select **DC Volts** in the lower right.

The DC Voltage menu appears.

7   To switch between continuous and snapshot mode, use the left system key **Snapshot** or **Continuous**.

8   To save the results to a report, use the Tray menu ("Saving a report" on page 32).

9   To learn what your results mean, see "AC voltage" and "DC voltage" in Chapter 10 "Test Results".

Measuring voltage is complete.

Locating faults using the TDR

The Time Domain Reflectometer (TDR) feature helps locate cable faults. The TDR identifies bridged taps, wet sections, load coils, shorts, opens, and splices on the span.

The following procedure describes how to locate cable faults using the TDR.

To locate cable faults using the TDR

1   Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2   From the Copper menu, touch the **TDR** button.

3   Press the **Start TDR** system key.

The TDR graph appears.

4   To change the TDR mode, select the **Mode** system key, and then select **SmartGainTDR** (applies 0 gain to 24 AWG cable), **In Home TDR** (does not include Pulse Width), or **Standard TDR**.

5   To change the cable type, select the **Options** system key, and then select **Cable Type**.

6   To add a DC pulse in order to see changes in the graph, select the **Options** system key, and then select **Stress**. The spike or dip will shift when the pulse is applied.

> **NOTE:**
>
> The TDR must be running for Stress Mode to be available. It is greyed out when the TDR is stopped.

A warning appears during the stress pulse to indicate higher voltage is present.

7 To adjust the **Gain** or **Pulse Width**, either drag the line across the bar or touch the + or - key to adjust it.

Pulse Width only appears when **Pulse Width** is selected on the Options pop-up menu (from the **Options** system key).

8 To help identify small or distant faults, use the up or down arrow keys to gain the vertical axis and enhance the reflection of faults. Do not apply excessive gain. This makes a normal condition appear as a fault.

9 If you want a larger image, you can rotate the screen to Landscape by selecting the **Trace** system key and then select **Landscape**.

10 Using the Peak Hold mode, the OneExpert DSL DSL can display minimum, maximum, and current TDR traces over a test period. This feature is useful for analyzing faults that occur intermittently. To enable Peak Hold mode, select the **Options** system key and then select **Peak Hold**.

11 To save the results to a report, use the Tray menu ("Saving a report" on page 32).

12 You can also view and compare current and saved TDR traces using the Results key. For information on saving your results in graphical form, see "Saving results" on page 78.

13 To learn what your results mean, see "TDR" in Chapter 10 "Test Results".

Locating cable faults with the TDR is complete.

Measuring opens

The opens feature measures the total electrical (capacitive) length of a pair.

To measure opens

1 Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2 From the Copper menu, touch the **Opens** button.

3 For greatest accuracy, JDSU recommends that you compensate the opens measurement to remove the effects of the test leads. To compensate the opens measurements

   a Swipe downward on the screen to access the Tray menu.

   b Select the **OPENS Compensation** system key

   c Follow the instructions on the screen to connect the black, red, and green leads to perform test lead compensation.

   d Touch **Compensate**.

     The compensation stops automatically when finished.

4 Press the **Home** navigation key to return to the Opens menu.

Measuring longitudinal balance

Balance is a number representing the quality of the telephone circuit and the degree to which the Tip (A) and Ring (B) conductors are electrically the same in their ability to cancel noise. The balance measurement is used to identify poor loop quality or cable bonding and grounding issues that allow excessive loop noise. Wideband background noise is covered in the WBTIMS section.

To measure longitudinal balance

1   Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2   From the Copper menu, touch the **Long. Balance** button.

The Longitudinal Balance menu appears.

The test begins automatically.

3   To save the results to a report, use the Tray menu ("Saving a report" on page 32).

4   To learn what your results mean, see "Longitudinal balance" in Chapter 10 "Test Results".

Measuring balance is complete.

Detecting load coils

The OneExpert DSL can detect up to five load coils that may exist on the line, out to 27,000 (8,200 meters) feet. It will also report a short, open, or a high noise condition, if detected. For accurate load coil detection, test on a pair without voltage (supplied by a battery). Although the detector will work with voltage on a pair, accuracy will be compromised. In addition, the detector works best when the last coil is followed by 1200 feet (336 meters) of cable.

To detect load coils

1   Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2   From the Copper menu, touch **Load Coil**.

The Load Coil Detector menu appears.

The count appears in the box. If at least one load coil is detected, the distance to the first load appears.

> **NOTE:**
>
> The distance to first load measurement assumes no other impairments are present between the OneExpert DSL and the first load coil. If other impairments are present, accuracy is reduced.
>
> If voltage greater than 50V peak is present, the test will abort.

If noise, a short, or an open is detected, it appears on this screen.

3   To save the results to a report, use the Tray menu ("Saving a report" on page 32).

4   To learn what your results mean, see "Load coil" in Chapter 10 "Test Results".

Detecting load coils is complete.

Testing voice service and Caller ID

The POTS dialer allows you to place and receive voice calls to verify that the service is working properly. You can also use the dialer for the following tasks:

– to drop battery for opens testing
– to establish a quiet termination for balance and noise tests
– to determine if loss at 1004 Hz is acceptable
– to test incoming caller ID number and name

The following procedure describes how to test voice service and caller ID.

To test voice service and caller ID

1   Connect the Tip (A), Ring (B), and Ground (Earth) leads to the line under test.

2   From the Copper menu, touch **POTS**.

The POTS Dialer menu appears.

3   Place a call.

   a   Dial the number using the speed-dial (**Speed** system key) or manually enter the phone number using the keypad.

   b   To use pulse dialing, press the **Actions** system key and then select **Pulse Dialing**.

   c   Press the **OK** key to initiate the call.

   d   Speak into the microphone located above the OK key.

   e   *Optional.* To mute the microphone, press the **Actions** system key, and then select **Mute** (or Un Mute) **Microphone**.

   The mute feature is only available when off hook.

   f   Press the **On Hook** system key to end the call.

4   Receive a call.

   a   Request someone to call you.

   b   When the OneExpert DSL indicates an incoming call, press the **Off Hook** system key.

   c   For lines that have caller ID, the name and number information appears in the box.

   d   *Optional.* To mute the microphone, press the **Actions** system key, and then select **Mute** (or Un Mute) **Microphone**.

   e   The mute feature is only available when off hook.

   f   Press the **On Hook** system key to end the call.

Testing voice service and caller ID is complete.

Running a OneCheck Copper test

The OneCheck Copper test is a JDSU out-of-service pair quality test. It automatically performs a series of test including: DVOM (AC/DC volts, resistance), Opens/Capacitance, Balance, and Load Coil Detect. It also compares results to user-defined threshold values and provides a pass/fail indication.

To run a cable check

1 Connect the tip (A), ring (B), and ground (earth) leads to the line under test.

2 From the main menu, select **OneCheck Copper**.

The test begins to run.

As each test runs, the test summary is updated. The summary provides a simple pass/fail indication.

The test stops automatically when complete.

3 To view more detail, use the arrow keys to scroll through the result values.

To learn what your results mean, see Chapter 10 "Test Results".

4 To save the results to a report, use the Tray menu ("Saving a report" on page 32).

Performing a cable check is complete.

Routing the cables through the glove

The glove accessory is designed to hold the copper test leads so you don't have to disconnect them from the instrument.

To route the cables through the glove

1 Turn the OneExpert DSL over, onto the front panel.

2 Unzip the back flap of the glove.

3 Push the cables through the opening at the bottom and pull them up to the copper connectors.

4 Connect the cable leads to the connectors.

5 Pull the cables with the blue and yellow leads to the right side and use the velcro straps to hold the cables in place, as shown in Figure 14.

6 Pull the cables with the red, black, and green leads to the left side and use the velcro straps to hold the cables in place, as shown in Figure 14.

Figure 14 Cable routing through the back of the glove

7   Use the velcro strap in the glove hinge to hold the cables, as shown in Figure 15.

Figure 15 Cable routing through the hinge of the glove

8   Wind the ends of the cable and fit them into the zippered pocket on the inside of the front of the glove.

9   Close the front of the glove and then pull the strap from the back over the top and into the connector just above the JDSU logo.

9

Using the OneExpert DSL with a mobile device

This chapter provides task-based instructions for using the optional app that is available for mobile devices. Topics discussed in this chapter include the following:

-
-

About using the OneExpert DSL with a mobile device

Before using the OneExpert DSL with a mobile device, verify the following:

- The mobile device must have the **OneExpert** app installed (available on the AppStore or from your JDSU representative).

- In order to use the OneExpert DSL with a mobile device, the OneExpert DSL must be have the Apple option enabled.

- In order for the OneExpert DSL to communicate with the mobile device, the OneExpert DSL must have the Bluetooth option enabled.

To verify your options, go to the Options menu in the System Settings.

Controlling the OneExpert DSL user interface

To control the user interface of an OneExpert DSL, the mobile device (iPad or similar) must pair with the OneExpert DSL over Bluetooth. Then, using the OneExpert DSL app on the mobile device, you can connect to an OneExpert DSL and control the user interface.

To control the OneExpert DSL with a mobile device

1 On the OneExpert DSL, verify that Bluetooth is enabled.

To do this, go to the Bluetooth menu (in the System Settings menu) and verify that the box next to Enabled has a check mark.

2 On the mobile device, do the following:

a Go to the Settings menu, and verify that Bluetooth is On.

b Search the devices list to find the OneExpert DSL unit that you wish to connect to.

c You may get a message asking you to confirm the pairing. Touch Ok.

3 On the OneExpert DSL, do the following:

a On the Bluetooth Settings menu, touch **Scan for devices**.

b Find the mobile device that you wish to connect to, and then select it.

c You may get a message asking you to confirm the pairing. Touch Ok.

4 On the mobile device, launch the **OneExpert** app.

The Controller page appears.

5   Select Device Interface.

The OneExpert DSL interface appears on the mobile device. You can now control the instrument as if you were pressing the actual buttons on the device. You can run most of the tests that are available on the OneExpert DSL.

Near the bottom, the Back icon appears on the left and the Tray menu icon appears on the right. These function as if you pressed the function key on the device.
Across the bottom, icons are available for:

- Controller page – the screen above, allows control of the user interface
- Job Manager – used to
- create, edit, view, and export jobs
- Quick Cards – view quick cards (short documents of instructions)
- Manual – read the manual
- Videos – view instructional videos
- Accessories – view the OneExpert DSL accessories, including how to order

Test Results

This chapter describes the test results that are gathered when running a test. To view the different categories of statistics, use either the left and right arrows, or press the number for the desired result category. Topics in this chapter include the following:

- "Saving results" on page 78
- "DSL Results" on page 79
- "IP Data results" on page 84
- "HPNA results" on page 84
- "SmartID results" on page 86
- "Copper results" on page 87

Saving results

After running tests, there are two ways to save results:

as a report - used to save the file as text, HTML, or PDF and then export for viewing or printing using a PC.

to a job - used to associate test results from different applications to a single job

Saving results to a file

After running tests, you can save the results to a report file, and then export for viewing or printing.

To save results to a file

1   After your test is finished, use the Tray menu (swipe the screen from top to bottom) and then select **Save Report**.

2   Specify the report settings.

Setting	Description
Name	Specify a file name for the report. The default file name uses the type of test followed by a three digit number that increments with each file save (for example, cablecheck001 or DSL002).
Format	Specify the file format for the report: Text, HTML, PDF.

3   Touch **Save** to save the file to internal storage.

The test results are stored.

Use the File Browser to copy the file to USB for viewing or printing using a PC.

Saving results to a job

If you have an open/active job, you can save the results to a job.

To save results to a job

1   After running a test, press the **Utility** key, and then select **Save to Job**.

2   After your test is finished, use the Tray menu (swipe the screen from top to bottom) and then select **Save to Job**.

3   Verify the circuit ID and other job information. If the job information is not the desired job, return to the Job Manager screen and activate the desired job.

4   Touch **Save** to save the results to the job.

The OneExpert DSL returns to the last viewed result screen.

DSL Results

The following section describes the results available in DSL mode. Different result categories are available on different tabs on the screen. To view the different statistics, tap the tab on the screen.

 Result category tabs
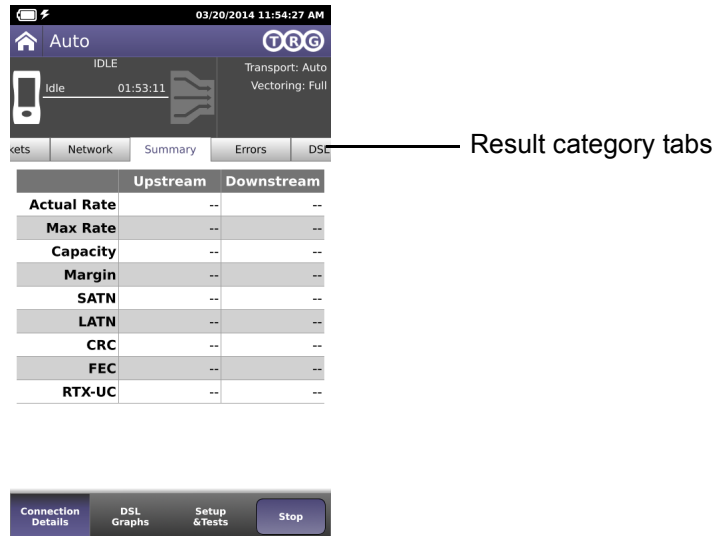
Summary

This category provides a summary of the most frequently used DSL test results. Table 8 describes the DSL Summary results.

Table 8 DSL Summary results

Result	Description	Range
Training State	The state of modem synchronization (appears in the menu heading)	Booting, Idle, Init, Showtime
Trained Mode	The DSL line format agreed upon during training (appears in the menu heading).	T1.413, READSL, ADSL2+, ADSL2, G.Lite, G.DMT, VDSL2
Connection Statistics		
Actual Rate	Current upstream and downstream connection rates	32 kB–3.3 MB[1] (Up) 32 kB–25 MB[1] (Dn) 64 kB–50 MB (Up)[2] 64 kB–100 MB (Dn)[2]
Max Rate	Maximum upstream and downstream connection rates	32 kB–3.3 MB[1] (Up) 32 kB–25 MB[1] (Dn) 64 kB–50 MB (Up)[2] 64 kB–150 MB (Dn)[2]
Capacity	The percentage of total bandwidth currently used by the actual connect rate upstream and downstream.	0–100%
Margin	SNR margin upstream and downstream	0–63.5 dB

Table 8 DSL Summary results (Continued)

Result	Description	Range
ATN	The degradation of signal strength in dB upstream and downstream. It is the differ-ence in Tx power from the transmitter to receiver.	0−126.95 dB (VDLS2) 0−254.9 dB (ADLS2)
Sync Time	The elapsed time (duration) since reaching Showtime.	n/a

1. These are ADSL2 rates.
2. These are VDSL2 rates.

In the saved test report, two additional statistics are included:

- **Start Time** is the time (time of day) when the DSL modem achieves Showtime. The Start time is updated if you clear errors.
- **Stop Time** is the time (time of day) when the report is generated or DSL sync is lost.

DSL statistics

For bonded mode, the same results are shown, but the bonded results are separated into different screens:

- Group - results for both pairs combined
- Pair 1 or Pair 2 - Same results as the non- screen, except the title.

Packet Statistics

Table 9 describes the LAN Statistics.

Table 9 LAN Statistics

Result	Definition
Link Status	Status of the connection.
RX Bytes	Total bytes received
RX Frames	Total frames received
RX Errors	Total errors received
RX Dropped	Total dropped frames received
TX Bytes	Total bytes transmitted
TX Frames	Total frames transmitted
TX Errors	Total errors transmitted
TX Dropped	Total dropped frames transmitted
TX Collisions	Ethernet frames are transmitted "space-available" when there is a break on the signal on the cable; sometimes frames are transmitted at the same time as another transmitter, causing a "collision" of frames.

Network Status

describes the Network Status results.

Table 10 Network Status results

Result	Description
Network Status	Status of the connection. If testing in Router mode, there are separate status indications for WAN and LAN.
LAN x	If using Multi-VLAN, reports the status of up to three LAN connections.
IP Address	The OneExpert DSL OneExpert DSL's IP address to the access the provider network. (IPv4)
Global	If using IPv6oE, this is the OneExpert DSL OneExpert DSL's IP address to the access the global network, beyond the router.
Local	If using IPv6oE, this is the OneExpert DSL OneExpert DSL's IP address to the access the local network.
Subnet prefix	If using IPv6oE, this is the length of the subnet prefix.
Netmask	The OneExpert DSL OneExpert DSL's netmask address. IP devices use a netmask IP address to determine if IP packets are to be routed to other networks or sub-networks. (IPv4)
Gateway	The OneExpert DSL OneExpert DSL's gateway address. When an IP device has determined that a packet is not addressed to it or devices on the same sub-network (subnet), it sends all such packets to the gateway address for further routing to the correct address.
DNS	Domain Name Services. When using internet addresses such as www.jdsu.com, the OneExpert DSL OneExpert DSL (and all IP devices) must translate to an IP address (such as 157.234.12.20) in order to route the packets or data. To do so, it first requests a DNS server to translate an internet address into an IP address; then the OneExpert DSL OneExpert DSL can correctly route IP pings or other data. The DNS address must be that of a real DNS server, preferably in the provider network.
MAC Address	The MAC address of the LAN.

Errors

describes the DSL Errors.

Table 11 DSL Errors

Result	Description
FEC	Forward Error Correction upstream and downstream for Fast Path and Interleave Path.
CRC	Cyclical redundancy check upstream and downstream for Fast Path and Interleave Path.
ES	Errored Seconds. Number of seconds during which a LOS, SEF, LPR, or CRC occurred since starting the test.
SES	Severely Errored Seconds. Number of seconds during which one or more LOS, SEF, or LPR errors were present, or 18 CRCs occurred.

Table 11 DSL Errors (Continued)

Result	Description
UAS	Unavailable Seconds. A count of the number of test seconds which met the ITU-T Rec. G.821 definition of unavailable time.
LOS	Loss of Signal. Number of errored seconds due to loss of signal.
LOF	Loss of Frame. Number of errored seconds due to loss of framing.
LOM	Loss of Margin Errors. Number of errored seconds due to loss of margin.

DSL RTX

Table 12 describes the RTX (DSL Retransmission) results.

Table 12 DSL RTX results

Result	Description
Status	The state of modem synchronization
RTX-TX	The number of retransmitted DTUs that were received.
RTX-C	The number of DTUs we received a correction for
RTX-UC	The number of DTUs that did not get a retransmission in time.
INP Rein	The effective INP that G.INP support is giving us.

Signal

This category provides statistics for the signal. Table 12 describes the DSL Summary results.

Table 13 DSL Signal results

Result	Description
Sync Count	The number of synchronization attempts. it is possible that modems do not synchronize immediately and make multiple attempts before achieving synchronization.
Uptime	Amount of time the modems have been synchronized.
Path	RJ45, (T/R or A/B)
SATN	Signal attenuation. Attenuation average of the bins/tones that contain the actual signal (empty bins are not included).
LATN	Line attenuation. Attenuation average of *all* tones/bins (the entire line, including empty bins/tones).
Tx Power	Power level, in dB, of the VDSL signal, downstream (from the DSLAM) and upstream (transmitted by the OneExpert DSL OneExpert DSL).
INTLV Delay	Interleaving depth set by the DSLAM. This is a measure of latency introduced on the link due to the scrambling of DSL frames to protect data and create a more reliable link.
Actual INP	The INP (Impulse Noise Protection) values negotiated during training.

DSL Identity

Table 14 describes the DSL Identity results.

Table 14 DSL Identity results

Result	Description
HW Type	Type of modem hardware
HW Rev	Revision of the hardware
xTU-R SW Revision	SW revision of the local modem
xTU-R PHY Revision	PHY firmware revision for the local modem
xTU-O Vendor	CO vendor code
xTU-O Rev	CO revision number

DSL Graphs

The graphs provide a graphical representation of the following:

- SNR (signal to noise ratio) Per Tone
- Bits Per Tone (BPT)
- QLN (quiet line noise) Per Tone
- Hlog Per Tone

Troubleshooting using the graphs

The SNR graph indicates line quality. The BPT graph indicates the total bit rate and is a useful tool for finding disturbers. Bits per tone is defined as bits assigned per DMT tone.

Examine the portions of the graphs where there are dips or breaks. These dips represent areas where interference is degrading the DSL signal.

Table 15 lists common noise sources and the corresponding frequencies and tones.

Table 15 Noise sources and tones

Noise Source	Noise Frequency (kHz)	Tone #	Tone Frequency (kHz)
ISDN BRI	40	9	38.8125
HDSL passband center	196	45	194.0625
HDSL passband max	392	91	392.4375
HDSL2	274	64	276
T1 passband center	772	179	772
E1 passband center	1024	237	1022

IP Data results

The following section describes the results available in IP Data mode. To view the different categories of statistics, use either the left and right arrows, or press the number for the desired result category.

Ping results

Table 16 describes the ping results.

Table 16 IP Ping results

Result	Definition
Destination	Destination address where the ping is being sent.
Message	Status message.
Echos TX	The number of ping messages sent.
Replies RX	The number of echo reply messages returned to the OneExpert DSL from the destination.
Replies Lost	The number of pings that did not return to the OneExpert DSL. This could be caused by an unresponsive target (destination) or by heavy congestion on the network; the more packets lost the more congested the network, indicating slow or poor throughput.
Replies Lost %	The percentage of lost echos compared to echos sent.
Echos RX	The number of ping messages sent to the OneExpert DSL from other devices on the network.
Ping Time	The current, minimum, maximum, and average time in milliseconds it has taken one transmitted ping to reach its destination and receive a reply back to the OneExpert DSL.

File Transfer results

Table 17 describes the File Transfer results.

Table 17 File Transfer results

Result	Description
Status	The status of the transfer.
Bytes Transferred	The number of bytes transferred.
Transfer Rate	The speed that the file was uploaded or downloaded.

HPNA results

The following section describes the results available in HPNA mode.

Node list

Table 17 describes the Node List results.

Table 18   Node List results

Results	Description	Units	Range/Values
H	This column indicates the host/client of every HPNA device in the network		**H:** Host device
Id	The station identifier for the HPNA device.	numeric digit	0-9
Hpna MAC	The MAC address of the HPNA device in the network	aa:bb:cc:dd:ee:ff	Each field is 00-FF hex
Ver−Chip	The device's firmware version and CopperGate™ chip ID.	revision-chip id	Chip ID = Chipset 0 3010 1 3110 2 3210 3 3310 4 3320

Node details

Node details provides details for a particular node.

Network Test

Table 19 describes the HPNA results.

Table 19   HPNA results

Results	Description	Units	Range/Values
Station ID -> ID	This is a directional indication of each link denoted by each node ID		
Rate, Mod Mbps	This is the current data rate, and baud/constellation of the specific link.	Mbps, MBaud/bits per symbol	0-112, 2-24/2-10
PER	The Packet Error Rate on the specific link.	Rate x.xxe+yy	0.00e0 - 1.00e0
SNR	This is the Signal to Noise Ratio of the specific link.	dB	
Receive and Transmit Results			
bytes	The number of total (good and bad) transmitted or received bytes	Bytes	
packets	The number of total (good and bad) transmitted or received packets.	Packets	
bcast	The number of transmitted or received broadcast packets.	Packets	
mcast	The number of transmitted or received multicast packets.	Packets	
dropped	The number of transmitted or received packets dropped due to lack of resources.	Packets	

Table 19 HPNA results (Continued)

Results	Description	Units	Range/Values
crc	The number of received packets that have had an invalid checksum. (**NOTE:** There is no count for transmitted packets)	Packets	
Protocol Messages			
ctrl_log_req	The number of control requests from the local host (CERT protocol.)		
ctrl_log_rec	The number of control replies to the local host (CERT protocol.)		
ctrl_rem_req	The number of control requests from a remote host (CERT protocol.)		
ctrl_rem_rec	The number of control replies to a remote host (CERT protocol.)		

SmartID results

The following section paragraphs describes the results available in SmartID tests.

Test Summary

This category provides an overview of the results, including basic pass/fail indications of the links between the SmartIDs. Use the arrow keys to navigate and highlight a section. The details for that section appear. If you navigate to a section/link that failed, the results on the left update and you can see which measurement failed.

Detailed View

This category shows detail of the selected section/link of the network between two SmartIDs. Use the # key to reverse the direction (change the focus from the near end of the cable to the far end).

Network Map

This category shows the layout of the network. The SmartID connected to the OneExpert DSL is on the left and the home network cascades to the right. Use the up and down arrow keys to select different SmartIDs on the map. Press OK to see details of a particular segment.

Sweep Data

This category shows a graph of the frequency sweep. Use the # key to reverse the direction.

Copper results

The copper results are described in the tables below.

AC voltage

You measure AC volts to:

- detect the presence of hazardous voltage.
- measure stray or foreign voltages.
- measure ringer voltage level.

AC voltage results on Tip (A) to Ring (B) should be 0.0 volts. Tip (A) to ground and Ring (B) to ground should be equal to each other. Anything else indicates AC signal interference and/or an unbalanced line.

Table 20 describes the AC voltage result.

Table 20 AC Voltage result specifications

Range (VAC)	Resolution (V)	Accuracy
AC peak + [VDC] ≤ 300	1	2% ± 1.0V

WARNING: INSTRUMENT DAMAGE

Although the OneExpert DSL OneExpert DSL is designed to measure hazardous voltage, it is designed to do so on telecom circuits, not power mains. Hazardous voltages may be on the power lines. 220 mains (RMS) are equivalent to 308 peak. Connecting to these circuits may result in damage to equipment or serious injury.

DC voltage

You measure DC volts to:

- detect and measure CO/exchange battery voltage.
- detect crossed battery conditions.

To measure DC volts, remove the line battery and measure Tip (A) and Ring (B) to ground. It should be < 3.0 volts; anything else indicates crossed battery that inhibits digital signals.

Table 21 describes the DC voltage result.

Table 21 DC voltage result specifications

Range (VDC)	Resolution (V)	Accuracy
AC peak + [VDC] ≤ 300	1	2% ± 1.0V

Resistance

You measure resistance to test line continuity and quality, and to detect corrosion, shorts, opens, and faults.

The OneExpert DSL is able to measure resistance in the presence of noise and foreign voltage, but the accuracy may be reduced, depending on the noise level.

Resistance should be measured with the line disconnected, so that the battery voltage and CO/Exchange termination don't affect the measurement.

Normal resistance should be at least 5 MΩ; lower values indicate the presence of faults.

Table 22 describes the resistance result.

Table 22 Resistance result specifications (no ambient)

Range (Ω)	Resolution (Ω)	Accuracy
0 to 999	1	2% ± 2.5Ω
1.0K to 9.99K	10	2%
10.0K to 99.9K	100	2%
100.0K to 999K	1K	2%
1.0M to 9.9M	10K	6.5%
10.0M to 100M	100K	10%

Distance to short

This result measure the distance to the short. A resistance measurement of 4 kΩ or less typically indicates a short. For values greater than 4 kΩ, this function is disabled.

Table 23 describes the distance to short result.

Table 23 Distance to short result specifications

Range (feet)	Resolution	Range (meters)	Resolution
0 to 3000	30 feet	0 to 999	9 meters
3000 to 30,000	100 feet	1000 to 10,000	30.5 meters

Leakage

Leakage is a resistance measurement using higher voltage.

Table 24 describes the leakage result.

Table 24 Leakage result specifications (no ambient)

Range (Ω)	Resolution (Ω)	Accuracy
0 to 49.99	1	2% ± 2.5Ω

Table 24 Leakage result specifications (no ambient) (Continued)

Range (Ω)	Resolution (Ω)	Accuracy
50 to 999	1	5% ± 2.5Ω
1.0K to 9.99K	10	5%
10.0K to 99.9K	100	5%
100.0K to 999K	1K	5%
1.0M to 9.9M	10K	10%
10.0M to 100M	100K	15%

Opens/Capacitance

You measure opens/capacitance to:

• measure total electrical loop length (includes length of bridged taps).

• find wet sections, bridged taps or open faults.

Opens/Capacitance: < 3% difference between Tip (A) and Ring (B) values indicate an acceptably balanced loop. Anything greater indicates an unbalanced line or open fault, which inhibit digital signals.

Table 25 describes the opens/capacitance result.

Table 25 Opens/Capacitance result specifications (no ambient)

Range (feet)	Resolution (feet)	Range (meters)	Resolution (meters)	Range (capacitance)	Accuracy (applies to capacitance only)
0 to 2,999	1 foot	0 to 999	0.1 meter	0 to 47.1 nF	1% ± 15 pF
3000 to 66000	1 foot	1,000 to 20,000	0.1 meter	47.1 nF to 1.57 µF	2%

DC current

You measure DC current to verify if enough current is present to operate equipment including the phone or caller ID boxes.

DC current on Tip (A) to Ring (B) should be ≥ 23 mA at the NID. Anything less will not allow for differences in temperature and phone equipment will not operate during extremes.

Table 26 describes the DC current result.

Table 26 DC current result specifications

Range	Resolution	Accuracy
0 to 110 ma	1ma	2% ± 1ma

Longitudinal balance

You measure longitudinal balance to:

•   measure the quality of the pair: a measurement of the degree to which the Tip (A) lead is electrically the same as the Ring (B) lead.

The more each lead is electrically identical (capacitance, inductance, impedance), the better the pair will resist induced noise.

The balance result should be >60 dB. Anything less indicates electrical differences between Tip (A) and Ring (B) that can lead to noise and other signal problems.

Table 27 describes the DC current result.

Table 27 Balance result specifications

Range	Resolution	Accuracy
28 to 70 dB	1 dB	± 2 dB
70 to 120 dB	1 dB	indication only

Load coil

You check for load coils to ensure there are no load coils present on a digital line (such as ADSL or ISDN). Load coil detection and elimination is essential in the installation of an xDSL circuit

Table 26 describes the load coil result.

Table 28 Load coil result specifications

Range	Resolution	Accuracy
Up to 27,000 ft (8229.6 m)	up to 5	± 1

TDR

A TDR (Time Domain Reflectometer) is used to identify and locate buried splices, shorts and low resistance faults, opens, bridge taps, load coils, and wet cables.

Velocity of Propagation (VoP) is the speed of the TDR signal travelling down the wire pair relative to the speed of light. The OneExpert DSL uses this value to convert reflections to distance. To ensure an accurate distance calculation at the cursor, the VoP should match the cable gage and fill. The default value is appropriate for 24–26 AWG (4–5 mm) telco aerial cable and provides sufficient accuracy in most situations.

Table 26 describes the TDR result.

Table 29 TDR specifications

Range	Accuracy
0 to 40,000 ft (12000 m)	± 0.5% of distance

A

Troubleshooting

This chapter describes how to identify and correct problems related to the OneExpert DSL. Topics discussed in this chapter include the following:

- "Getting Technical Assistance" on page 92
- "Additional information" on page 92
- "Resolving problems" on page 93

Getting Technical Assistance

If you need assistance or have questions related to the use of this product, use the information in Table 30 to contact JDSU's Technical Assistance Center (TAC) for customer support. For the latest TAC contact information, go to www.jdsu.com or contact your local sales office for assistance. The regional sales office phone numbers are listed on the back of this manual.

Table 30   Technical assistance centers

Region	Phone Number	
Americas	1-855-ASK-JDSU 301-353-1560	tac@jdsu.com
Cable TV/Multimedia Products	1-800-428-4424 Ext. 8350 (America) 1-317-788-9351 Ext. 8350 (World Wide)	catv.support@jdsu.com
Europe, Africa, and Mid-East	+49 (0) 7121-86-1345 (JDSU Germany)	hotline.europe@jdsu.com
Asia and the Pacific	+852-2892-0990 (Hong Kong) +8610-6833-7477 (Beijing-China)	

During off-hours, you can request assistance by doing one of the following: leave a voice message at the TAC for your region; email the North American TAC (tac@jdsu.com); submit your question using our online Technical Assistance request form at www.jdsu.com.

Additional information

For additional information, visit the OneExpert DSL section of the following web page:

http://www.jdsu.com/en-us/Test-and-Measurement/Pages/default.aspx

Resolving problems

If you are having trouble with the OneExpert DSL OneExpert DSL, the following sections describe common problems and solutions. You should verify whether your problem is listed here before contacting technical assistance.

The following section addresses questions that may be asked about completing tests with the OneExpert DSL OneExpert DSL. There are four sections included:

- General
- Copper tests
- Coax tests
- DSL tests
- Data tests

General testing

The following section addresses questions about testing in general using OneExpert DSL.

Issue

Inconsistent test results.

Resolution

Verify that your test leads are good and are connected properly for the test you are performing.

Copper testing

The following section addresses questions about Copper testing.

Issue

The Tip-Ring voltage is reading negative.

Resolution

The Tip and Ring test leads may be swapped. Check your test leads to verify that they are hooked up properly.

Issue

I am performing an Opens test. The mutual value looks good, but the Tip and Ring values are really short.

Resolution

Verify the ground. The module must be grounded to the same ground as the pair under test. the ground. The module must be grounded to the same ground as the pair under test.

DSL testing

The following section addresses questions about DSL testing.

Issue

The modem cannot achieve sync with the CO.

Resolution

Inability to sync can have many causes. Perform the following steps to troubleshoot:

- Disconnect the customer's DSL modem.
- Verify tester connection to the correct pair.
- Verify the Data mode.
- Verify that the Standard is correct (ADSL2+, G.DMT, Auto, etc.).
- Isolate premise wiring.
- Check for premise alarm system.
- Verify the copper pair is provisioned for ADSL at the CO.
- Test at the CO/Exchange on the customer pair.
- Check the DSLAM modem vendor and software version.

Issue

The modem achieves sync with the CO, but the rate is lower than expected.

Resolution

Verify that you are on an ADSL2, ADSL2+, or VDSL line, as appropriate.

Check the DSLAM configuration - the max rate may be limited there.

Check for premise alarm system on the same pair.

Avoid excessive loop length or high attenuation.

Make sure that you are connected on pins 3 and 4.

Verify the noise margin.

Check the attenuation.

Make sure that you are connected on pins 3 and 4 instead of 2 and 5.

Data testing

The following section addresses questions about Data testing.

Issue

The IP ping menu says pings are being sent, but the network statistics are not incrementing.

Resolution

Verify the IP address and netmask.

Make sure you are not behind a firewall; they can block ping responses from reaching the host.

The IP ping function only *attempts* to send a ping every second. Depending on certain conditions, a physical ping packet may not be sent.

If IPoE standards require that the device has to ARP the address first. If this fails eventually you will see a ARP HOST UNREACHABLE message. Check to see that the destination IP address and your configured IP parameters are correct.

Make sure that the Ethernet interface cabling is correct. If the Ethernet cable is not hooked up, or is hooked up incorrectly, a packet will not be sent. Thus the Ethernet statistics will not increment.

B

Specifications

This appendix contains specifications for the OneExpert DSL DSL. Topics discussed in this appendix include the following:

Physical specifications

Table 31 provides the physical specifications for the OneExpert DSL.

Table 31   Physical specifications

Parameter	Specification
Height	9.8" (250 mm)
Width	4.68" (119 mm)
Depth	3.2" (82.4 mm
Weight	4.05 lb. (1.84 kg)

Connector specifications

Table 32 provides the connector specifications.

Table 32   Connector specifications

Connector	Specification
USB	USB 2.0
AC Adapter	see "Power specifications"
T/A R/B Ground	mini-banana
POTS	8-pin modular (RJ-45)
Ethernet	8-pin modular (RJ-45)
Wiring	6-pin modular (RJ-11) and 8-pin modular (RJ-45)
2&4-Wire VDSL/ADSL	8-pin modular (RJ-45)

Environmental specifications

Table 33 provides the environmental specifications.

Table 33   Environmental specifications

Parameter	Specification
Operating Temperature	-5° to +50° C (23° to +122° F)
Storage Temperature	-30° to +60° C (-22° to 140° F)
Humidity	10% to 80% RHNC
Maximum operating altitude	4000 meters (13,123 feet)
Vibration	sinusoidal vibration testing per IEC 60068-2-6 (Sinusoidal Vibration)
Shock	shock testing to IEC 60068-2-29 Ed. 2.0 "Continuous Bumps."

Power specifications

Although battery life varies depending on the type of test, Table 34 provides specifications for the battery life and the specifications for the AC adapter.

Table 34   Power specifications

Parameter	Specification
Operating time	Approximately 20 on/off cycles and tests on a full charge, depending on usage and conditions.
Charging time	5 hours for a fast charge; for a full charge, allow to trickle charge overnight
Power supply input	100-240VAC, 1.5A, 50-60 Hz
Power supply output	12VDC, 5.0A Max
Power supply operating temperature range	0° to +40° C (-22° to 104° F)

Customer Service and Support

JDSU offers an unmatched and comprehensive portfolio of standard support services, add-on services, and training options to help customers successfully use purchased JDSU products. Services that come standard with every product sale include business hour technical assistance, in-warranty repair, calibration services, upgrade services, and immediate return authorizations. Add-on services designed to optimize product capabilities and maximize efficiencies include field engineering and deployment, technical training, 24x7 product support, consulting, and custom software development. Refer to the sections that follow for additional details.

Standard support services

Standard support services that accompany the sale of every JDSU product include:

- Instrument repair and calibration services
- Business hour technical assistance
- Access to general warranty information on the JDSU Web site
- Extensive product documentation and related technical information, accessible on the JDSU Web site

Instrument repair and calibration services

Our service centers provide repair and calibration services for JDSU equipment. JDSU understands the impact of equipment down time on operations and is staffed to ensure a quick turnaround. Available services include the following:

Product Repair — All equipment returned for service is tested to the same rigorous standards as newly manufactured equipment. This ensures products meet all published specifications, including any applicable product updates.

Calibration — JDSU's calibration methods are ISO approved and based on national standards.

For more information, including instructions for returning equipment for repair and/or calibration, go to: www.jdsu.com/en-us/Test-and-Measurement/support/repair-and-calibration/Pages/default.aspx.

Technical assistance (business hours)

Expert business hour technical support is provided with your product. For assistance related to the use of your product, call or e-mail JDSU's Technical Assistance Center (TAC) in your region. For a current listing of TAC phone numbers and e-mail addresses, go to: http://www.jdsu.com/en-us/Test-and-Measurement/services/products-and-systems-support/Pages/default.aspx.

For information about optional 24x7 technical assistance, see "Extended product and systems support services" on page 100.

Warranty information

Information about standard warranties, terms, and conditions specific to JDSU's Test & Measurement products is posted on the JDSU Web site. For more information, go to: http://www.jdsu.com/about-jdsu/pages/jdsu-standard-terms-and-conditions.aspx?rcode=terms.

Product documentation library

An extensive library that includes documentation for JDSU products and related technology-specific documents is available on the JDSU Web site. For more information, go to: www.jdsu.com/en-us/Test-and-Measurement/support/Technical-Library/Pages/TechLibrary.aspx.

Add-on services

JDSU offers a broad portfolio of add-on services to enable customers to aggressively build their competitive advantage within the markets they serve.

Available services include:

- Extended product and systems support, including:
    – Optional extended product warranties
    – Optional extended repair services
    – Calibration management services
    – Around-the-clock technical assistance
    – A certified pre-owned equipment program
    – Tailored support services for your JDSU system
- Various professional and consulting services
- Specialized managed services.

Extended product and systems support services

For information about optional extended product warranties, go to: www.jdsu.com/en-us/Test-and-Measurement/services/a-z-service-list/Pages/ext-warr.aspx.

For information about optional extended equipment repair services, go to: www.jdsu.com/en-us/ Test-and-Measurement/services/a-z-service-list/Pages/ factory-repair.aspx.

For information about equipment calibration management services, go to: www.jdsu.com/en-us/ Test-and-Measurement/services/a-z-service-list/Pages/calibration.aspx.

For information about optional 24x7 technical assistance, go to: www.jdsu.com/en-us/Test-and-Measurement/services/a-z-service-list/Pages/tac.aspx.

For information about JDSU's Assets and Certified Equipment (ACE) Program (for the resale of certified preowned equipment), go to: www.jdsu.com/en-us/Test-and-Measurement/services/a-z-service-list/Pages/ace-prgm.aspx.

For information about tailored support services for your JDSU system, go to: www.jdsu.com/en-us/ Test-and-Measurement/services/products-and-systemssupport/systems-support/Pages/ default.aspx.

Professional and consulting services

For information about optional professional and consulting services available from JDSU, go to: www.jdsu.com/en-us/Test-and-Measurement/services/ professional-and-consulting-services/ Pages/default.aspx.

Managed services For information about specialized managed services avaiable from JDSU, go to: www.jdsu.com/en-us/Test-and-Measurement/services/managed-services/Pages/default.aspx.

Training options

JDSU offers a wide array of training options designed to support customers at various stages of the network life cycle. Training options include:

- Public training
- On-site training
- Virtual classroom
- Self-paced training
- Certifications
- Workshops and blended learning
- Train-the-trainer/course licensing
- Free Webinars
- Contact training

For more information about available training options, go to: www.jdsu.com/enus/Test-and-Measurement/Training/Pages/default.aspx.

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