User's Guide

LanExpert™

Inline Gigabit Network Analyzer

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Introduction

The **LANEXPERT**™ Inline Gigabit Network Analyzer is a handheld network tool that features protocol analysis, packet capture, traffic generation, cable testing and IPv4/IPv6 support. The **LANEXPERT**™ utilizes a color touch screen interface to access one of the most complete suites of test and analysis functions available in a portable test tool. The Inline Mode allows users to non-intrusively monitor network traffic (10/100/1000BaseTX) to identify protocols, port usage, VoIP statistics and network utilization. The **LANEXPERT**™ can capture and store up to 10,000 packets with user defined filters for detailed analysis in the field or downloaded over the network or to a USB flash drive. Using either RJ-45 port, tests including Ping, Link, Trace Route, DHCP and Discovery are used to quickly identify network problems. The **LANEXPERT**™ can generate up to 100% traffic loading in 1% increments to demonstrate network performance at various traffic levels. A stress test that generates traffic and measures performance metrics (per RFC 2544) is also provided. The stress test can be conducted using the two independent ports on a single unit or used with a second unit located remotely on a network. PoE tests include voltage and inline current measurement to determine the actual power used by a powered device. The **LANEXPERT**™ also test cables for shorts, opens, split pairs, reversed pairs, measures cable length and generates tons for cable tracing.

This Guide

This guide introduces the analyzer's features. You can:

● Read the entire guide beginning to end.

● Skim through and stop when a topic interests you.

● Use the table of content and index to find specific information.

Read through Part I to familiarize yourself with the parts of the analyzer.

Other documentation

In addition to this user's guide, the **LanExpert**™ comes with the following documentation:

- A Quick Start Guide, which explains the basics to get you up and analyzing networks quickly.

- Electronic help and definition pages built into every screen displayed on the **LanExpert**™.

- Updated help and information available at our web site.

Warranty / Service option

Psiber Data Systems Inc. warrants that the product shall be free from defects in parts or workmanship for a period of 12 months from the date of purchase if used in accordance the Psiber Data Systems Inc. operating specifications.

THIS IS THE ONLY WARRANTY MADE BY PSIBER DATA SYSTEMS INC. AND IS EXPRESSLY MADE IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Should any parts or workmanship prove defective, Psiber Data Systems Inc. will repair or replace at Psibers option, at no cost to the Buyer except for shipping costs from the Buyer's location to Psiber's location. This is the Buyer's **SOLE AND EXCLUSIVE REMEDY** under this agreement. This warranty does not apply to products which have been subject to neglect, accident or improper use, or to units which have been altered or repaired by other than an authorized repair facility.

Chapter   1

Finding Your Way Around

This chapter presents a tour of your Network Analyzer. It serves as a reference when you need to locate specific parts of the analyzer.

Making sure you have everything

This area will list all items that should be included with the **LANEXPERT**™ Network Analyzer.

- **LANEXPERT**™ Gigabit Inline Network Analyzer

- **LANEXPERT**™ Wiremap Terminator

- USB Flash Drive (1GB)

- AC Adapter with County Specific Power Cord

- RJ45 Patch Cable

- USB Cable

- Wrist Strap

- Quick Start Guide

- Carrying Case with Removable Shoulder Strap

If any items are missing or damaged, notify your dealer immediately.

Front port view

10/100/1000BaseT Port with Cable Test mode (Port 2)   **10/100/ 1000 BaseT Port (Port 1)**
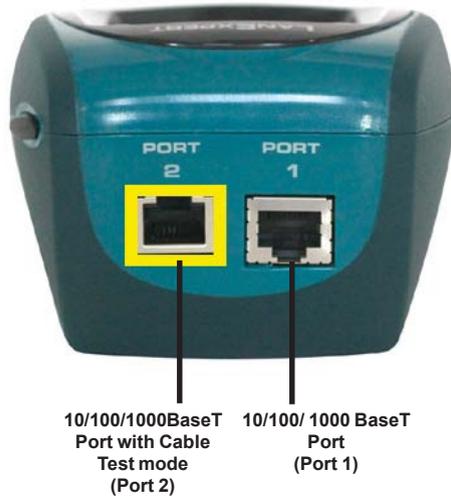
Port 1 is a 10/100/1000BaseT RJ-45 Port.

Port 2 is a 10/100/1000BaseT RJ-45 Port with Cable Test modes. For more information on the Cable test performed by the **LanExpert**™ go to chapter 6, page 67??

Both ports can be used at the same time when running Inline, Independent and Stress Test modes.

Rear port view

External Power
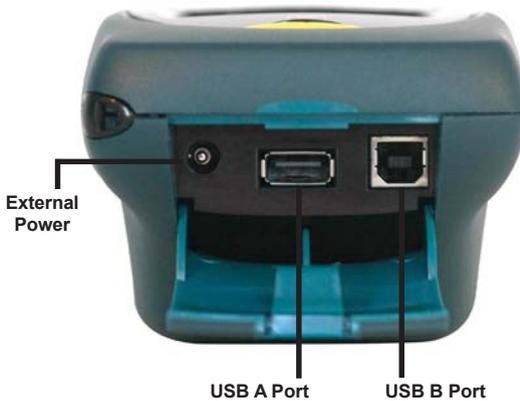
USB A Port   **USB B Port**

The External Power jack is where you plug in the AC adapter. For more information, see Connecting the AC adapter on page 12.

The USB A port is where you can plug in the Flash Drive.

The USB B port allows you to connect the **LanExpert**™ to your computer.

Display view

Status Indicators

Display / Touchscreen Area

Power Button

The Status indicators provide information about various functions of the analyzer. For more information, see Status Indicators (LEDs) on page 16.

The Display / Touchscreen area is the interface of the **LANEXPERT**™. For more information see Navigating the Screen on page 17.

The Power button turns the **LANEXPERT**™ on and off. For more information see Power On on page 14.

Chapter   2

Getting Started

This chapter describes how to connect the **LanExpert**™ to other devices, and what to do to use your Network Analyzer.

Preparing the unit

The **LanExpert**™ Network Analyzer is portable and designed to be used in a variety of circumstances and locations. The analyzer can be hand-held or placed on a surface large enough for it to be stable for use. The analyzer has an optional wrist strap to use to securely tether it to your wrist to avoid dropping the unit.

Environment

To keep your analyzer in prime operating condition, protect the unit from:

- Dust, moisture and direct sunlight.

- Liquids and corrosive materials.

- Equipment that generates a strong electromagnetic field.

- Rapid changes in temperature or humidity.

- Extreme heat or cold. Operate the analyzer within the specified temperature range.

Precautions

Your **LANEXPERT**™ Network Analyzer is designed to withstand the rigors of everyday use and travel. However, you should observe certain precautions to further reduce the risk of personal injury or damage to the analyzer.

- Never apply heavy pressure to the analyzer especially on or around the display area. Avoid subjecting the analyzer to sharp impacts. Excessive pressure or impact can damage components or otherwise cause the analyzer to malfunction.

- Don't submerge, float or allow liquids to spill into or onto the analyzer.

- Don't use excessive force to connect or disconnect cables or peripheral.

- Use wrist strap to prevent accidentally dropping the analyzer.

- Never use a sharp object on the display / touchscreen area. Use the supplied stylus.

Initial start up of analyzer

Your analyzer contains a rechargeable battery pack which needs to be fully charged before you can use it for any length of time. The battery pack should come with enough charge to power the analyzer up and perform a few tasks but should then be connected to the AC adapter to fully charge it.

Connecting the AC adapter

The AC adapter enables you to power the analyzer from an AC outlet and to charge the analyzer's battery pack.

AC adapter and power cable

To connect AC power to analyzer:

- Connect the power cable to the AC adapter.

- Plug the AC adapter into the analyzer's External Power jack.

- Connect the power cable to a live AC outlet.

DANGER: To avoid electric shock, never modify, forcibly bend, damage, place heavy objects on to of, or apply heat to the power cable. If power cable becomes damaged or plug overheats, discontinue use.

Never remove the power plug from the outlet with wet hands.

CAUTION: Using the wrong AC adapter could damage your analyzer. Psiber assumes no liability for damage in such cases.

Never pull directly on the power cable to unplug it. Hold the power plug when removing the cable from the outlet.

Charging the battery

Before you can use the battery pack to power the analyzer for any length of time, you must fully charge it. Connect the analyzer to a live AC outlet using the AC adapter and power cable.

You can charge the battery pack with the analyzer turned off or on. Charging time is reduced if the analyzer is turned off. With the analyzer turned on, the Status indicator and the Battery symbol on the display provides a way to determine the status of the battery pack charging.

For more information on the Status indicators and the Battery icon, see Status indicators on page 16 and Battery symbol on page 18.

Using the analyzer for the first time

Power on

- Turn on the **LanExpert**™ by pressing the power button until the screen lights up then release the button.

- The unit displays the Welcome screen for approximately 3 seconds. THe firmware revision is shown on this screen. The **HOME** screen is then automatically displayed to select an operating mode.

Setting time and date

Initially the analyzer comes from the factory without the time and date set. There will be red dashes in place of the numbers.

Red Dashes

- Click on dashes or displayed time to access **TIME/DATE** screen.

- Select the time format you want to use 12hr or 24hr.

- Select the date format you want to use DD/MM/YY, MM/DD/YY or YY/MM/DD.

- Select your time zone in relations to UTC timeby using the up and down arrows. Use the up or down arrows to set the time and date.

The time and date will automatically update to preview your selections.

NOTE: The **LanExpert**™ *does not automatically update for daylight savings time.*
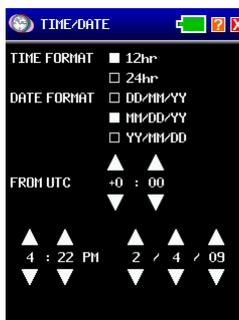
Time/Date Screen

Setting power options

Select the **Battery Symbol** in the top right of the screen. The **POWER** screen displays power timing options and illumination settings.

Power Screen

There are three options for **BATTERY** power off times; **Default (Factory Set), Other** and **Stay On**. Select an option by clicking the square box to the left of the name. A filled in box means that option is selected.

For example, if the default is 5 minutes, then after 5 minutes of inactive use the unit will display a brief message indicating it will shut down unless the user touches the screen.

If selecting **Other** under either the **BATTERY** or **AC** power, then the user can change the time by pressing on the button to the right of the word. A numerical keyboard is displayed. After selecting the desired numbers, select **ENTER** to go back to the **POWER** screen.

Setting illumination options

The Illumination of the **Backlight** of the display and the **LEDs** intensity can be adjusted on the **Power** Screen as well. The intensity of both is the lowest at the leftmost boxes and progressively brightens as boxes to the right are selected.

Status indicators

Status Indicators

From left to right, the indicators are **Power, Port 1, Port 2, and Activity**.

- **Power -** shows battery and external power status.
  - **Green** - Battery has more than 25% charge.
  - **Red** - Battery has less than 25% charge.
  - **Orange** - External power connected.

- **Port 1** and **Port 2** - shows the status of each port when it is connected.
  - **Green** - connected at 1 Gbit
  - **Orange** - connected at 100Mbit
  - **Red** - connected at 10Mbit
  - **Flashing Red** - trying to link.
  - **Off** - not trying to Link or is not linked.

- **Activity -** shows network activity on either port when the **LanExpert**™ receives a frame.
  - **Green** indicates a good frame is detected
  - **Red** indicates a bad frame is detected.

NOTE: When monitoring heavy network traffic the Activity Indicator appears to stay on continuously. Even with a steady flow of good traffic indicated

Navigating the screen

There are five areas on the LanExpert's touch screen display. All screens, aside from the home screen, have the same screen layout.

- **Top Area** includes (from left to right) Mode Identifier Graphic, Screen Title, Time, Battery, Help and Exit buttons.

- **Bottom Area** consists of a left scroll button, three graphical icon buttons and a right scroll button.

- **Data Area** is the main portion of the screen between the top area and the bottom area. This will display all the information, measurements and detection results.

- **Data Action Buttons** are selectable buttons directly above the bottom area. These buttons appear only on certain screens. They perform actions only on the currently displayed screen (i.e. data clear, start test, stop test or data format selection buttons).

- **Data Scroll Bar** is on the left hand side of the screen. This scrolls up and down to view more test results or configuations.
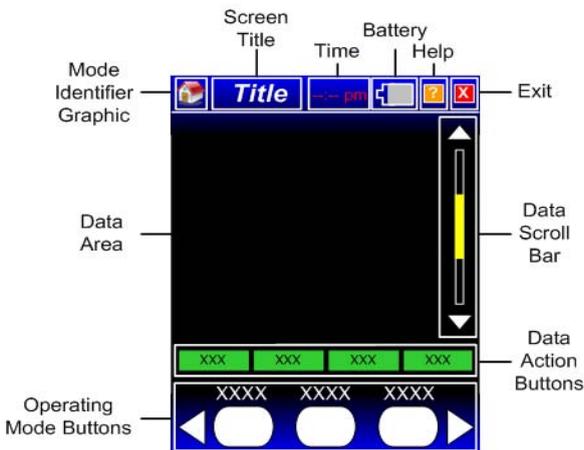
Screen Areas

Active buttons

Help

Select the **Question Mark** button next to the Battery Symbol. This screen displays help information for the current screen. Information could be definitions, step-by-step instructions or other useful information. Select the Exit button to return to the previous screen.

Exit

Select the **Exit** button at the far right in the Top Area. By pressing this button, the LanExpert reverts back to the previous screen.

Battery symbol

The battery status symbol is filled from the right to indicate the approximate percentage of battery remaining.

Battery Power ONLY with 20% or more power remaining.
(Grey with White Outline)

Battery Power ONLY with 20% or less power remaining.
(Yellow with White Outline)

Battery Power ONLY with 5 % or less power remaining.
(Red with White Outline)

AC and Battery Power connected with 100% fully charged.
battery. (Solid Green with White Outline)

>> **>>**

Battery is charging, the symbol will pulse green from the right to the approximate current battery charge level.
(Solid Green with White Outline)

Battery fault, the battery is not connected or the Battery needs to be replaced. (Empty with Red Outline)

Chapter   3

Setup

This chapter describes how to configure the **LanExpert**™ using the setup screens.

Navigating to setup screens

Select the **SETUP** button from the **HOME** screen. The available configurable categories are displayed in the Bottom Area of the screen. Use the left and right scroll arrows to select a different category to change. When completed with any setup configuration, the EXIT button can be selected to return to the previous screen or the Home screen.

Home Screen

Select profile

SELECT PROFILE shows a listing of all the profile names. There are 49 changeable profiles and one factory default. The factory default profile **cannot** be changed. Select a profile by clicking on the box left of the name. This will enable those stored parameters to be used for testing.

Select Profile Screen

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Profile name

PROFILE NAME button changes the name of the **SELECTED** profile (indicated by the filled in white box). A screen with a full keyboard will appear. Select **CLEAR** to remove the currently displayed name. Choose any name with less than 16 characters. If there are more than 16 characters detected, then an error screen is displayed saying "too many characters". Select **CLEAR** and re-enter a new profile name. If no characters were entered for a name and **ENTER** is selected, then an error message is displayed saying "too few characters". After entering a correct profile name, select **ENTER** to go back to the **SELECT PROFILE** screen.
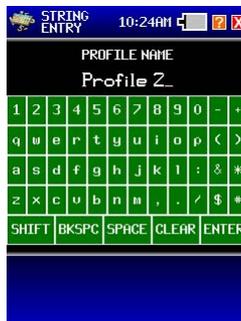
Full Keyboard

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Ports

To edit or view the parameters for the **SELECTED** profile, select the button called **PORTS**.
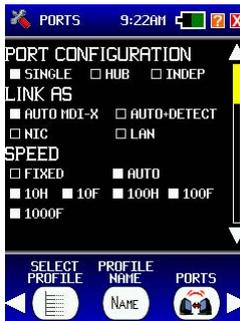
Single Mode
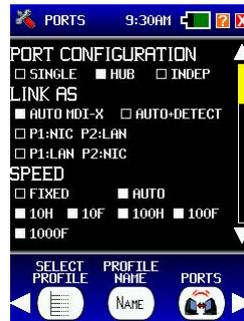
Inline Mode

Port Configuration

PORT CONFIGURATION has three modes the unit can be set to: **SINGLE, INLINE** or **INDEP (INDEPENDENT)**. See Configurations in Apendix A page 64 for more details on how to connect the **LanExpert**™.

● **SINGLE** mode connects one port on the LanExpert straight into a hub, switch or network device. **SINGLE** mode can be plugged into either Port 1 or Port 2. If both Ports are plugged in at the same time, then whichever Port links first will be enabled. Therefore the other port that was not linked will be disabled. The LEDs will indicate which Port is linked.

● **INLINE** mode must have both ports connected to two network devices. **INLINE** mode can be used to observe the traffic flowing between two network devices. Disconnect the cable between the two network devices and connect one end into Port 1. Add a patch cable from the other network device into Port 2. Now the LanExpert is in-between the two network devices. If a Port is not plugged in then the corresponding LED will be flashing red to indicate that no cable is plugged in.

● **INDEPENDENT** mode also must have both Ports connected to one or two network devices. **INDEPENDENT** mode can inject variable traffic from one port onto the network while the other port listens to investigate the effects on the network. **INDEPENDENT** mode can monitor two separate network devices simultaneously. If **INDEPENDENT** mode is selected then both Ports 1 and 2 will need to be configured independently of each other.

Link as

LINK AS parameter determines whether the **LanExpert**™ is going to connect as an **Auto MDI-X, Auto + Detect, LAN or NIC** device on the network.

- **Auto MDI-X** will auto crossover the port (LAN or NIC). It will link at the first compatible mode, which provides faster testing.

- **Auto + Detect** will auto crossover the port (LAN or NIC) and give more link information than auto MDI-X. It will test for all modes available before linking and displays this configuration for the link partners. Some SOHO (Small office, home office) gigabit switches are not fully compatible with **Auto + Detect** detection.

- **LAN** will force the analyzer's port to look like a switch or a hub to the device connecting to it.

- **NIC** will force the analyzer's port to look like a PC to the device connecting to it.

In **INLINE** mode, there are two additional options of forcing Port 1 to connect as NIC while Port 2 connects as LAN **(P1: NIC P2: LAN)** or vise versa **(P1: LAN P2: NIC)**.

Speed/Duplex

SPEED/DUPLEX parameter can be conducted in an **Auto**-negotiating mode or forced to a single **FIXED** speed/duplex . For **AUTO,** select any combination of the five speed/duplex modes; 10H, 10F, 100H, 100F or 1000F. In **FIXED**, only **ONE** port speed/duplex can be selected.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Transmit

TRANSMIT parameter is how the LanExpert is going to communicate with the user's network, i.e. **DISABLED, RFC894, LLC/SNAP or VLAN**.

Ports Setup Screen II

- **DISABLE** turns off all packet generation for non-intrusive testing. No IP address is required for this configuration.

- **RFC894** enables packet transmission. It is the most common standard using IP datagrams.

- **LLC/SNAP** enables packet transmission. It is a legacy standard using IEEE 802.2 frames.

- **VLAN** groups computers together logically across one or more switches. (For example the IT Department VLAN). The VLAN Identifier or tag specifies the VLAN to which the frame belongs. A value of 0 means the frame is not assigned to any VLAN. All other values may be used as VLAN identifiers allowing up to 255 VLANs. VLAN 1 is often reserved for management of a network bridge.

Tag

Next to **VLAN**, the user can select or change the **TAG** number if there is more than one. Select the **TAG=?** button. A Numeric keyboard screen is displayed. Valid entries are 0 to 255. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display. After selecting a valid number, select **ENTER** to go back to the **PORTS** parameters screen.

Transmit - cont.

- **MTU** is used to set the size (in bytes) of the largest frame that a given layer of a communications protocol can process. A higher MTU brings higher bandwidth efficiency. Not all network devices can process large packets which can reduce network performance.

  Select the parameter button next to **MTU**. A Numeric keyboard screen is displayed. Valid entries are 100 to1518. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display. After selecting a valid number, select **ENTER** to go back to the **PORTS** parameters screen.

MAC

MAC address parameters are displayed. The user has a choice of using the **FACTORY** or **USER** MAC address.

- **FACTORY** - MAC Address of the **LanExpert**™ is factory set and **CANNOT** be changed.

- **USER** - User can enter a MAC address of their choice for device cloning purposes. MAC cloning allows the LanExpert to simulate another network device by using its MAC address to detect issues originating from that device. Select the address button to go to a Hexadecimal keyboard screen to enter a MAC address. The **CLEAR** button removes the entered digits from the display before entering a new address. After entering the desired address, select **ENTER** to go back to the **PORTS** parameters screen.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

IP address

IP ADDRESS parameters allow selection of either **Ipv4** or **Ipv6** and **FIXED** or **DHCP**. This must match the network to which the LANEXPERT™ is being connected.

Ports Setup Screen III Fixed

Ports Setup Screen III DHCP

- **Ipv4** - is a protocol type to be used for all transmitted packets used by traffic generation, PING, DHCP and other tests.

- **Ipv6** - is a protocol type to be used for all transmitted packets used by traffic generation, PING, DHCP and other tests. (NA)

- **FIXED** causes the IP, Subnet, Gateway, WINS, DNS1, DNS2 and DNS3 fields to be available to change. Select the buttons next to the names to enter the desired addresses. This will take you to a numerical keyboard. After entering the desired addresses, select **ENTER** to go back to the **PORTS** parameters screen.

- **DHCP** causes the IP, Subnet, Gateway, WINS, DNS1, DNS2 and DNS3 fields not to appear because they are unavailable for change. These will be automatically assigned to the LANEXPERT™ once a link is established with the DHCP server.

*NOTE: If **INDEPENDENT** mode was selected, Port 1's parameters will have been configured first, now Port 2's parameters will be available. The parameters will be port identified for clarity.*

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Port flow control

PORT FLOW CONTROL is only used in full duplex mode. Enabling flow control allows the **LANEXPERT**™ to receive and transmit flow control packets. When a connected device sends a flow control packet, the analyzer will buffer data received from the other connected device until the original device can accept the data. When the analyzer buffer becomes full, it will transmit flow control packets to the transmitting device. Disabling flow control can allow slightly faster packet throughput but may result in lost packets and less accurate test results. Enabling flow control is highly recommended.

Link search timeout

LINK SEARCH TIMEOUT allows the user to select either 5s (factory default) or Other. Link Search Timeout is the time it takes, in seconds, for the **LANEXPERT**™ to acquire a link before it decides there is no link. Select the **Other** button then select the Time button to the right of the word to change the parameter. This will display a number keyboard screen. Valid entries are 1 to 99. After entering a valid time, select **ENTER** to go back to the **PORTS** parameters.

Link lost timeout

LINK LOST TIMEOUT allows the user to select either 3s (factory default) or Other. Link Lost Timeout is the time it takes, in seconds, to decide when there is a lost link after the link was established. Select the **Other** button then select the Time button to the right of the word to change the parameter. This will display a number keyboard screen. Valid entries are 1 to 99. After entering a valid time, select **ENTER** to go back to the **PORTS** parameters.

Ext server timeout

EXT SERVER TIMEOUT allows the user to select either 10s (factory default) or Other. Ext Server Timeout is the time it takes, in seconds, to decide when there is no external server present. Select the **Other** button then select the Time button to the right of the word to change the parameter. This will display a number keyboard screen. Valid entries are 1 to 99. After entering a valid time, select **ENTER** to go back to the **PORTS** parameters.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Protocols

To edit or view the parameters for the **SELECTED** profile, select the button called **PROTOCOLS**.

Protocols Screen

Ephemeral ports

EPHEMERAL PORTS are temporary ports that are used by clients to communicate with a server. These temporary ports within the defined range is disregarded by the **LANEXPERT**™. Select either one of the number's buttons to change this range of ephemeral ports. This will display a numerical keyboard. Valid entries are 0 to 65535. After selecting valid numbers, select **ENTER** to go back to the **PROTOCOLS** parameters.

User defined

USER DEFINED ports allow the user to enter unique port names and numbers. Select whether the port is a TCP, UDP or both. User defined ports take priority over any other factory defined port definition. For example, Port 80 is HTTP (80:HTTP) but if the user defines port 80 to be named Factory it will display Factory instead of HTTP (80:Factory) under PROTOCOLS screen.

Port Names and **Numbers** can be entered or changed by selecting either the name or number button. This will display either a full or a numerical keyboard screen. Valid Port Names are maximum 10 characters in length. Valid Port Numbers entries are 0 to 65535. After entering a valid name or number, select **ENTER** to go back to the **PROTOCOLS** parameters.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Ping / Trace

To edit or view the parameters for the **SELECTED** profile, select the button called **PING / TRACE**.

Ping Trace Screen I

Repeat

REPEAT is how many times you want to ping a device. Ping is a network tool used to test whether a particular host is reachable across an IP network. There are three options; Once, Count or Continuous. Select the Count button then select the number field to the right of the word to change the parameter. This will display a numerical keyboard screen. Valid entries are 1 to 999. After entering a valid number, select **ENTER** to go back to the **PING / TRACE** parameters.

Max rate

MAX RATE is the maximum time between sending one ping to sending the next. There are two options, Default or Other. Default is 1 second (factory default). Other is a user-defined time in milliseconds. Select the time field to display a numerical keyboard. A valid entry is 0 to 99999. After entering a valid time, select **ENTER** to go back to the **PING / TRACE** parameter screen.

Payload

PAYLOAD is the amount of data sent with the ping packet in bytes. There are two options, Default or Other. Default is 50 bytes (factory default). Other is a user-defined amount of bytes. Select the byte field to display a numerical keyboard. A valid entry is 10 to 50000. After entering a valid number, select **ENTER** to go back to the **PING / TRACE** parameters screen.

Timeout

TIMEOUT is the amount of time the **LanExpert**™ waits before a ping response returns. There are two options, Default or Other. Default is 10s (factory default). Other is a user-defined time in seconds. Select the time field to display a numerical keyboard. A valid entry is 1 to 99. After entering a valid number, select **ENTER** to go back to the **PING / TRACE** parameters screen.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Ping Trace Screen II

Ping targets

PING TARGETS allows the user to select what the **LanExpert**™ will PING. Select one target or any combination of Targets from the choices in the list. The choices are Gateway, DHCP Server, IP Range (user defined), or up to sixteen separate User Defined Targets (Ping List Entries). The Deselect All button clears all selected choices from the list.

Gateway

GATEWAY allows for the pinging of the established gateway.

DHCP server

DHCP SERVER allows for the pinging of the established DHCP Server.

Chapter 3

IP range

IP RANGE allows for the pinging of a user defined range of IP Addresses. Select the **EDIT** Field to display a numerical keyboard. Select the box to change the IP range. After entering the desired range, select **ENTER** to go back to the **PING / TRACE** parameters.

Ping list entries 1 to 16

PING LIST ENTRIES 1 to 16 are user defined. Select any of the numbered choices to edit. Select the **EDIT** field to go the **Ping List Entry** parameter screen. Under Ping List Entry:

- **TARGET** selects how to enter the parameters and display on the list. The choices are IP Address, Name (DNS) or Name (WINS).

- **IP ADDRESS** allows for an entry of a Name and an IP. Select the editable fields to enter the desired name or number. After entering the desired name and/or number, select **ENTER** to go back to the **Ping List entry** parameters screen.

- **NAME (DNS)** allows for an entry of a Name. Select the editable fields to enter the desired name. After entering the desired name, select **ENTER** to go back to the **Ping List entry** parameters screen.

- **NAME (WINS)** allows for an entry of a Name and an IP. Select the editable fields to enter the desired name. After entering the desired name, select **ENTER** to go back to the **Ping List entry** parameters screen.

To exit the **Ping List Entry** screens select the **Exit** button in the top right corner to go back to the **PING / TRACE** parameters screen.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Discover

To edit or view the parameters for the **SELECTED** profile, select the button called **DISCOVER**.

Discover Screen

Discover sends out an ARP, NETBIOS and DNS request to actively searches for network devices on your network. When performing a discover, and the ARP checkbox is selected, the **LANEXPERT**™ sends ARPs to the entire range of the configured subnet (or the class C subnet if the **LANEXPERTS**' subnet is wider than the configured subnet). If this subnet is the same as the physical network subnet then the first and last IPs are special IPs used for subnet multicasting so selecting ignore will not send an ARP to them. Example of how to configure are displayed below.

- If you are unsure, or if the LanExpert subnet is the actual subnet of the users' network – set both checkboxes (i.e. neither the first or the last IP will be ARPed).

- If the LanExpert subnet is at the lowermost end of the actual subnet of the users' network – set the IGNORE 1st IP and clear the IGNORE LAST IP checkboxes.

- If the LanExpert subnet is at the uppermost end of the actual subnet of the users' network – clear the IGNORE 1st IP and set the IGNORE LAST IP checkboxes.

- Otherwise, clear both checkboxes.

NOTE: Sending and ARP to the first and last IP address in a class C subnet might have damaging affects if misconfigured depends on the network.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Traffic generation

To edit or view the parameters for the **SELECTED** profile, select the button called **TRAFFIC GENERATION**.

Traffic Generation Screen

WARNING: The **LanExpert**™ *is a high performance machine and can generate a high amount of traffic very quickly. This can take down any network. Psiber is not liable for this action.*

Duration

DURATION has two options either **CONTINOUOS** or **BURST**.
CONTINUOUS is a continuous stream of packets sent from the **LanExpert**™.
BURST is a user-defined amount of packet to be sent. Once that amount of packets is reached the **LanExpert**™ will not send any more packets. To change the **BURST** count, select editable field button next to the word **BURST**. This will display a numerical keyboard to change how many frames in Kilobytes to send. A valid entry is 1 to 10000. After entering a valid number, select **ENTER** to go back to the **TRAFFIC GENERATION** parameters screen.

Size

SIZE is the frame size of the packet in bytes. To change the Size, select the editable field button. This will display a numerical keyboard to change each frame size. A valid entry is 64 to 1518. After entering a valid number, select **ENTER** to go back to the **TRAFFIC GENERATION** parameters screen.

Rate

RATE is how fast the stream of frames is generated by the
LANEXPERT™ . To change the Rate of the frames, select the editable
field button next to the word **RATE**. This will display a numerical keyboard
to change how fast each frame is generate in kilo frame per second. A
valid entry is 1 to 999. After entering a valid number, select **ENTER** to go
back to the **TRAFFIC GENERATION** parameters screen.

Sink IP

SINK IP is a known IP address of a device on the network or a random IP
address. If the IP address selected is not a valid address on the network,
then the **LANEXPERT**™ will send out broadcasts frames to the whole
network. To change the Sink IP Address select the editable field button
next to the word Sink IP. This will display a numerical keyboard to change
the IP Address. After entering the desired IP address, select **ENTER** to go
back to the **TRAFFIC GENERATION** parameters screen.

Check sum

CHECK SUM has two options YES or NO. The CHECKSUM setting enables
or disables the transmission of the traffic generator UDP packets'
checksum. If set to YES then the receiving unit has to check it – which
takes time. If set to NO then nobody needs to check it – so the network is
faster.

WARNING: The **LANEXPERT**™ *is a high performance machine and
can generate a high amount of traffic very quickly. This can take down
any network. Psiber is not liable for this action.*

*NOTE: Select another Setup button visible on the screen or by scrolling to
the right or left with the white arrows or select the Exit button.*

Stress Test

To edit or view the parameters for the **SELECTED** profile, select the button called **STRESS TEST.**
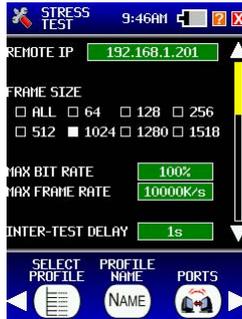
Stress test Screen

Remote IP

Select the IP address button to change the IP address. The LanExpert uses this IP address to send the packets generated.

Frame size

Select one or all seven of the standard frame sizes. These frame sizes are generated by the LanExpert to test the network. This setting is used for all tests.

Max bit rate

Select the maximum bit rate percentage to test at (in percent). Selecting 100% has no affect on the network. This is ignored for the Back-to-Back tests.

Max frame rate

Select the maximum frame rate to test at (in integer Kfps). Selecting a very high number, e.g. 10000K, effectively removes the effect. This is ignored for the Back-to-Back tests.

Inter-test delay

Select the delay between tests to receive all test result before performing another test.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Accuracy

Select one for both throughput and back-to-back to measure the accuracy. The lower the number the faster the test.
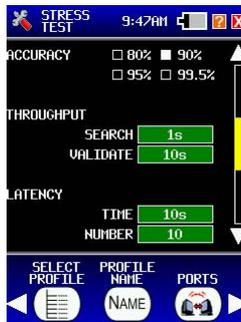
Stress test Screen

Throughput

- **SEARCH** is the test time for each test while searching for the maximum error-free throughput.

- **VALIDATE** is the validation test time for the final error-free throughput validation and all latency tests.

Latency

- **TIME** sets the wait time at the end of every test before checking the results. This allows the data to have propagated to the other end and also allows for all intermediate devices to recover.

- **NUMBER** selects the number of Latency tests. This is the number of times the Latency test is repeated.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Frame loss

- **START** selects where to start the test.

- **STEP** size *increments the starting "Step Size" (above) for each successive test until 100% is reached*.

- **MAX LOSS** sets the maximum frame loss percentage when performing frame loss testing.

  NOTE- when stepping up the percentage rate the LANEXPERT stops when it measure a frame loss rate higher than this setting, thus allowing for significantly faster test results.

- **TIME** is the time it takes to perform one test.

Stress test Screen

Back-to-back

- **START** selects the Initial Back-to-Back Test Time (in integer seconds). This indirectly sets the starting number of frames sent when performing the Back-to-Back test, the result will always be equal to or smaller than the maximum number of frames which can be sent in this time.

- **NUMBER** select the number of Back-to-Back tests. This is the number of times the Back-to-Back test is repeated.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Capture

To edit or view the parameters for the **SELECTED** profile, select the button called **CAPTURE .**

Capture Screen I

CAPTURE allows the user to define a filter to capture certain frame type. The **LanExpert**™ can capture 1000 packet. Once the **LanExpert**™ reaches 1000 packets, then it can **STOP** capturing or **CONTINUE**. If **CONTINUE** is selected then the first packets captured will be the first packets out. Select to capture on one or both ports.

Capture source MAC

CAPTURE SOURCE MAC will either capture packets ONLY from the user defined Source MAC address entered or **ANY** MAC address. Source MAC address is where the packet originated. To change the Source MAC address, select the editable MAC field button. This will display a Hexadecimal keyboard to change the MAC Address. After entering the desired MAC address, select **ENTER** to go back to the **CAPTURE** parameters screen.

Capture destination MAC

CAPTURE DESTINATION MAC will either capture packets ONLY from the user defined Destination MAC address entered, any UNICAST, MULTICASTS, or BROADCASTS. Destination MAC address is where the packet is received. To change the Destination MAC address, select the editable MAC field button. This will display a Hexadecimal keyboard to change the MAC Address. After entering the desired MAC address, select **ENTER** to go back to the **CAPTURE** parameters screen.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Capture frame types

CAPTURE FRAME TYPES allows for the selection of one or a combination for frame types detected. Select RFC894, STP, LLC and/or LLC/SNAP.

Capture Screen 2

Capture VLAN frames

CAPTURE VLAN FRAMES allows for the selection of one or a combination of VLAN options. Select NON-VLAN, ANY and/or a specific VLAN tag. Next to **VLAN**, the user can select or change the **TAG** number. A Numeric keyboard screen is displayed. Valid entries are 0 to 255. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display. After selecting a valid number, select **ENTER** to go back to the **CAPTURE VLAN FRAMES** parameters screen.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Capture primary protocols

CAPTURE PRIMARY PROTOCOLS allows for the selection of one or a combination of protocols to detected. Select from the list below to select certain protocols or select the ANY button to search all protocols. If none are selected then there will be no more parameters to select below.
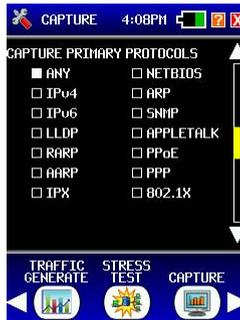
Capture Screen 3

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Capture source IP

CAPTURE SOURCE IP allows for the selection to capture from ANY source IP address or a single user-defined source IP address. Select the address button to go to a numerical keyboard screen to enter a source IP address. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display before entering a new address. After entering the desired address, select **ENTER** to go back to the **PORTS** parameters screen.

Capture Screen 4

Capture destination IP

CAPTURE DESTINATION IP allows for the selection to capture from ANY destination IP address or a single user-defined destination IP address. Select the address button to go to a numerical keyboard screen to enter a destination IP address. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display before entering a new address. After entering the desired address, select **ENTER** to go back to the **PORTS** parameters screen.

Capture IP protocols

CAPTURE IP PROTOCOLS allows for the selection of one or a combination of IP protocols to detected. Select from the list below to select certain protocols or select the ANY button to search all protocols.

NOTE: Press the DOWN arrow on the right of the screen to scroll to the next page of parameters.

Capture UDP / TCP ports

CAPTURE UDP / TCP PORTS allows for the selection to capture ERRORS, ANY PORT and/or a user-defined port number. Select to capture UDP and/ or TCP packets. Select the port number button to go to a numerical keyboard screen to enter a port number. If a non-valid entry is chosen, then an error message will appear indicating the error. The screen will then revert back to the keyboard to re-enter a valid number. The **CLEAR** button removes the incorrect entered digits from the display before entering a new address. After entering the desired address, select **ENTER** to go back to the **CAPTURE UDP / TCP PORTS** parameters screen.

Capture Screen 5

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Lock

To lock the analyzer, select the button called **LOCK / UNLOCK**.
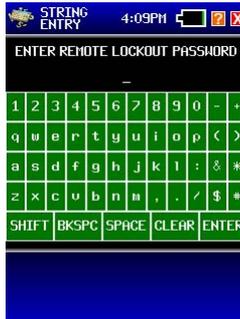
Lock Password Screen

This screen is used to set a password to prevent remote access to the
LanExpert™. A full character keyboard is available to enter a desired
password. The screen graphic will change to a padlock if the password was
correct.

*NOTE: Select another Setup button visible on the screen or by scrolling to
the right or left with the white arrows or select the Exit button.*

Touch panel

To edit or view the parameter, select the button called **TOUCH PANEL**

Touch Panel Screen   **Touch Panel Accept Screen**

This screen is to "Align" the touch screen to active areas displayed on the screen. Select the cross hairs inside the two corner boxes to calibrate the display. Once both boxes were accepted, select **ENTER** to go back to the previous screen.

Colors

To edit or view the parameter, select the button called **COLORS**.

Colors Screen

This screen will change the colors on the display of the Top Area, Middle Area, Bottom Area and Keys. Select the boxes of the desired colors. Colors will automatically update to preview the selections.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Build info

BUILD INFO will display Firmware version, Hardware version, Port 1 and Port 2 MAC addresses, and the Serial Number.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Select language

SELECT LANGUAGE will display the various available languages the **LANEXPERT**™ supports. Select your desired language and the screens will then be represented in that language.

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Chapter 4

Analyze Network

This chapter will explain the screens presented as you use your LANEXPERT™ to analyze the unit under test (i.e. PC, network device).

Home Screen

Preparing to use the analyzer

Before selecting the **ANALYZE NETWORK** button on the HOME screen, determine how the LANEXPERT™ is to be connected to the unit under test (i.e. PC, netwok device, etc.). This will be based on how the analyzer was set up in the Ports Configuration section of the setup.

● **Single Mode** - attach the patch cable to either Port 1 or Port 2.

● **Inline Mode** - attach a patch cable to both Port 1 and Port 2.

● **Indepentent Mode** - attach a patch cable to both Port 1 and Port 2.

If only one port is connected, while in Inline or Independent Mode, then that port will link while the other port keeps searching for a link. The Port LED that has not established a link will keep blinking red and the screen will display a "LINKING" message for the unlinked port until it establishes a link. Only minimum information about the linked port will be displayed. No additional information will be shown unless both ports are connected and established a link.

Selecting the test mode

Select **ANALYZE NETWORK** button with the stylus on the HOME screen. Notice that both Port LEDs are blinking red until a link is established on the connected ports. For detailed information on the LEDs see Status Indicator section page 12.

During the linking process the only buttons that are active are **HOME** and **SETUP**. Once a link is established the rest of the buttons are active.

Information Screens Explained

Link

The first screen that appears is the **LINK** Screen. This screen will display the partner's capabilities and actual link status.

When Link Signals are detected on either/both Ports the Link Screen is displayed. The analyzers linked Port(s) are shown with the actual link parameters including connection type (LAN or NIC), speed (10/100/1000) and duplex mode (Half or Full).

Example Link Screen

Relink

In the Data Action Buttons area, pressing **RELINK** will force a re-establishment of the link partner; **note that this also clears all the data collected**. If no link is established within the timeout period configured then a message is displayed in the Problems Screen, but the unit will attempt to automatically re-link.

Setup

There is also a data action button labeled **SETUP** on this screen. This provides a quick way of navigating to the **SETUP->PORTS** screen for the presently selected profile. Select the **"X"** exit button in the upper right of the **SETUP** screen to go back to the previous screen. For more information on this Port Configuration, see page 22

Partner capabilities

A connection to a network device that can automatically swap the transmit and receive pairs is indicated by AUTO MDI-X. A fixed port is shown as LAN or NIC. The MDI-X mode is provided only if Auto+Detect is selected in **PORTS** Setup. If not then the analyzer displays NOT TESTED. All Speed and duplex modes advertised by the Link Partner are displayed.

Signals

Polarity (normal or reversed) is shown for 10/100BaseT links. Master or slave status is shown for gigabit links. Gigabit links require one end to be the master and the other to be a slave.

*NOTE: Press the **Down** arrow on the right of the screen to scroll to IP information of the unit.*

Link IP information

Link IP Information includes MAC address, IP address, Subnet Mask, Gateway IP address and DHCP Server IP address. The WINS name and up to three DNS Server IP addresses are also provided if assigned. When the port is configured for DHCP, the leases time and time remaining on the lease are displayed.

NOTE: If some of the information fields are blank a longer EXT SERVER TIMEOUT can be selected in PORTS Setup.

Once a link is established if the cable is disconnected the analyzer displays "Linking" while attempting to find a link partner. If the cable is disconnected and reconnected within the timeout period, then the **LanExpert**™ will re-establish a link with the current configurations. The previously collected data is not cleared and new data will be added to the displayed data.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Problems

Select the **PROBLEMS** button in the Bottom Area. The Problems Screen displays any problems the analyzer detects. The **LanExpert**™ can display up to 50 different problems. One page will include the problem number, the problem detected and the recommendation on how to solve the problem.

A "**NO PROBLEMS DETECTED**" message is displayed until a problem occurs.

Clear

Select **Clear** in the data action buttons, this will clear all the problems found.

Problem messages

The following are the problems the **LanExpert**™ detects with the recommendations to correct them:

- **(1) Did not link**
  Recommendations -
    Check the LanExpert **PORT** settings.
    Check the cable between the LanExpert and the device.
    Check the device is powered.
    Replace the device.

- **(2) Lost link for a total of (Seconds)**
  Recommendations -
    Check cable between LanExpert and device.
    Check power to the device.
    Replace the device.

- **(3) High sustained byte traffic**
  Recommendations-
    Use higher speed or split link into segments.

- **(4) High sustained frame traffic**
  Recommendations -
    Check the MTU settings of all devices.
    Check for devices generating unexpected traffic.
    Use higher speed or split link into segments.

- **(5) High peak byte traffic**
  Recommendations -
    Use higher speed or split link into segments.

- **(6) High peak frame traffic**
  Recommendations -
    Check the MTU settings of all devices.
    Check for devices generating unexpected traffic.
    Use higher speed or split link into segments.

- **(7) Detected Pause frames when using half duplex**
       Recommendations -
             Check for device not configured for half duplex.
             Check operation of device bridging full to half duplex.
             Use full duplex throughout network.

- **(8) High volume of Pause frames (Type of traffic)**
       Recommendations -
             Use faster devices.
             Split the link into separate segments.

- **(9) High volume (Type) of traffic from (address)**
       Recommendations -
             Check the device for unexpected activity.
             Use higher speed or split link into segments.

- **(10) Could not obtain address from DHCP server**
       Recommendations -
             Check the DHCP server(s).

- **(11) No response from the DNS server(s)**
       Recommendations -
             Check the DNS IP addresses.

- **(12) Could not resolve a WINS name**
       Recommendations -
             If using a WINS server-
                   Check the WINS IP address.
             If not using a WINS server-
                   Check all computer NetBios names.

- **(13) VoIP device (address) did not authenticate. See VoIP screen
       for details**
       Recommendations-
             Check configuration of the VoIP device.

- **(14) Detected (#) discarded IP fragments. Can indicate there
        are multiple paths between devices**
       Recommendations -
             Check configuration of your network and routers.

- **(15) Detected (#) duplicated or overlapping IP fragments**
             Can indicate there are multiple paths between devices.
             Not unusual when the source is outside of local network.
       Recommendations -
             Check configuration of your network and routers.

- **(16) Detected (#) CRC errors within frames**
       Recommendations -
             Check all cables and devices.

- **(17) Detected (#) frame alignment errors**
    Usually caused by a faulty device.
    Can be caused by improper half duplex operation.
  Recommendations -
    Check all devices within the network.

- **(18) Detected (#) undersize frames (runts)**
    Usually caused by a faulty device.
    Can be caused by improper half duplex operation.
  Recommendations -
    Use faster devices.
    Check all devices within the network.

- **(19) Detected (#) oversize frames**
    Usually caused by a faulty device.
    Can be caused by improper half duplex operation.
    Can be caused by using Jumbo frames.
  Recommendations -
    Check all devices within the network.

- **(20) Detected (#) jabber frames**
  Recommendations -
    Check all devices within the network.

- **(21) Detected (#) improperly formatted frames**
  Recommendations -
    Check all devices within the network.

- **(22) Detected (#) improperly sized frames**
    Can be caused by improper half duplex operation by a
    device.
  Recommendations-
    Check all devices within the network.

- **(23) Detected (#) IP Header errors from (address)**
  Recommendations -
    Check switches and routers between the LanExpert and the
    device.
    Replace the device.

- **(24) Detected (#) UDP Header errors from (address)**
    Can indicate there are multiple paths between devices.
    Not unusual when the source is outside of local network.
  Recommendations -
    Check switches and routers between the LanExpert and the
    device.
    Replace the device.

● **(25) Detected (#) TCP Header errors from (address)**
Recommendations -
Check switches and routers between the LanExpert and the device.
Replace the device.

● **(26) Detected (#) ICMP Header errors from (address)**
Recommendations -
Check switches and routers between the LanExpert and the device.
Replace the device.

● **(27) Detected (#) ICMP Unreachable frames**
Recommendations -
Check switches and routers between the LanExpert and the device.
Replace the device.

● **(28) Detected (#) ICMP Unreachable frames**
Small numbers of these are not unusual. High numbers usually indicate that a device is misconfigured (incorrect server IP or port).
Recommendations -
Change the devices for compatibility.

● **(29) Devices on P1 and P2 have mismatched speed capabilities. They will not operate together**
Recommendations -
Change the devices for compatibility.

● **(30) Devices on P1 and P2 have mismatched MDI/X capabilities. They will not operate together**
Recommendations-
Change the devices for compatibility.

● **(31) Collisions have been detected**
Recommendations -
Check devices are properly configured for half duplex operation.
Change network to only use full duplex.

● **(32) Cable has reversed polarity in 1 (or more) wire pairs**
Recommendations -
Check the cable and the device.

● **(33) VoIP device (address) SIP response timeout. See VoIP screen for details**
Recommendations -
Check configuration of the VoIP device.
Check connectivity to SIP server.

Vitals

Select the **VITALS** button in the Bottom Area. The **VITALS** screen displays Frame information in a List or Bar chart format. While in the List screen, it displays how long the link has been connected (Elasped Time) and time it has unlinked (Time Unlinked) both in milliseconds. It also displays the Maximum Frame Size received.

Example Vitals Screen

Clear

Select **CLEAR** in the data action buttons, this will clear all the data received.

*NOTE: Linked time will **NOT** be cleared because the link never discon-nected*

List / Chart

Select **LIST** in the data action buttons, a bar chart describing good and bad frames are displayed. These colored bars show the percentage of the total frames received that are multicast or broadcast frames in relation to the total frames received. The bars are green if they are good frames and red when they are bad frames. Each bar is logarithmically set in length and is horizontal (there are 0.1%, 1%, 10%, 100% markers shown in the first line of the data area which cannot be changed).

Select **CHART** in the Data Action buttons. The **LIST** will be displayed again showing the good and bad frame counts and percentages.

Total

The **TOTAL** button in the Data Action Area is used to change how the information is presented. The amount of Frames, Good and Bad and Good Bytes collected will be presented in the time frame selected. This function works in both the List and Chart mode.

The choices below are how the information can be presented:

- **avg/s** - shows the average of frames and bytes collected per second.
- **/1s** - shows frames and bytes that were collected within the last second. This will update every second.
- **/10s** - shows frames and bytes that were collected within the last 10 seconds. This will update every 10 seconds.
- **/1m** - shows frames and bytes that were collected within the last minute. This will update every minute.
- **Total** - shows all frames and bytes that were collected since the link was established.

Good frames

GOOD FRAMES are displayed in number of frames and percentage (of total received frames) of good unicast, multicast, and broadcast Ethernet frames received in relation to the total frames. Select the outlined white box to show the breakdown of good frames. Select the filled in box to hide the breakdown.

Good bytes

GOOD BYTES are displayed in number of KB of good multicast and broadcast Ethernet bytes received in relation to the total bytes.

Bad frames

BAD FRAMES are displayed in red if there are any found. They are displayed in number of frames and percentage (of total received frames) of bad unicast, multicast, and broadcast Ethernet frames received in relation to the total frames. Select the outlined white box to show the breakdown of bad frames. Select the filled in box to hide the breakdown.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Protocols

Select the **PROTOCOLS** button in the Bottom Area. The protocols screen shows the number of packets and percentage of the total captured data for each protocol. A protocol is added to the protocol list as it is detected. The protocols at the Ethernet Frame level (i.e. RFC894, IEEE 802.2/3, LLC, LCC+Snap, VLAN, etc.) and Ethernet type level (i.e. ARP, IP, IPX, AppleTalk, NetBIOS, IPv6, etc) are displayed first when detected. It shows how many frames received in KB and the percentage of a given protocol in relation to the total number of protocols received.

An outlined white box to the left of the protocol's name means there are more protocols to be displayed under that Ethernet type. The box will be filled in and shows the rest of the protocols under that type. The LanExpert provides protocol names for standard protocols such as LLC, ARP and NETBIOS. Unknown protocols are indicated by the word TYPE with the transmitting port number. Port numbers in hexadecimal format are indicated by an "h" following the number.

If there are too many protocols to display on one screen, then press the **Down** arrow on the right of the screen to scroll to the rest of the protocols. The LanExpert can display up to 31 different protocols. After 31 protocols are detected, all additional new protocols are counted together in the 32nd slot under OTHERS.

Example Protocols Screen

Clear

Select **CLEAR** in the data action buttons, this will clear all the detected protocols.

List / Chart

Select **LIST** in the Data Action buttons. This will display the percentage of each protocol in a bar chart format. These colored bars show the percentage of the each protocol received. Each bar is logarithmically set in length and is horizontal (there are 0.1%, 1%, 10%, 100% markers shown in the first line of the data area which cannot be changed).

Select **CHART** in the Data Action buttons. The **LIST** will be displayed again showing the good and bad frame counts and percentages.

Total

The **TOTAL** button in the Data Action Area is used to change how the information is presented. The amount of protocols collected will be presented in the time frames selected. This function works in both the List and Chart mode.

The choices below are how the information can be presented:

- **avg/s** - shows the average of protocols collected within the last second.
- **/1s** - shows protocols that were collected within the last second. This will update every second.
- **/10s** - shows protocols that were collected within the last 10 seconds. This will update every 10 seconds.
- **/1m** - shows protocols that were collected within the last minute. This will update every minute.
- **Total** - shows all protocols that were collected since the link was established.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Top talkers

Select the **TOP TALKERS** button in the Bottom Area. This displays the MAC address (if found), IP address, name (if found), the number and percentage of transmitted frames on the network.

The LanExpert lists the devices in order from the highest used bandwidth to the lowest.

Bandwidth usage

● Over 50% is displayed in RED.
● Between 49.9% to 20% is displayed in ORANGE
● 19.9% and below is displayed in WHITE

This allows the user to quickly determine where the problem might be.

Clear

Select **CLEAR** in the data action buttons, this will clear all the detected devices.

Example Top Talkers Screen

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Devices

Select the **DEVICES** button in the Bottom Area. All of the devices the **LANEXPERT**™ found will be displayed.

NOTE: This may not be the complete list of devices that is on the network.

The first layer of devices are **SERVERS, VoIP DEVICES, ROUTERS, PRINTERS,** and **OTHERS**. Select the outlined white box next to the SERVERS names to drill down to see which servers were found. Under SERVERS, there may be **DHCP, POP3, HTTP, DNS, VoIP/SIP, etc.** Select the outlined white box next to the name of the desired server to see the MAC address, IP address, and number of transmitted and received frames. The data for **VoIP DEVICES, ROUTERS, PRINTERS and OTHERS** has the same format as the **SERVERS** detected. **OTHERS** describe PCs or workstations and anything else not described under the other devices described above.

Discover

For a more complete list, select the **DISCOVER** button in the data action buttons. This sends user-defined packets including ARP, NetBios, and DNS to all the devices on the network.

Clear

Select **Clear** in the data action buttons, this will clear all the devices found.

Example Devices Screen

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Ping / Trace

Select the **PING/TRACE** button in the Bottom Area. The PING test is used to verify connectivity, measure round trip communications time, check data integrity, determine a MAC address and search a stored list or a range of IP addresses.

Select **START** in the data action buttons to start Pinging with the selected profile parameters. Select **STOP** in the data action buttons to stop Pinging if using continuous ping. Once the ping test is done, the MAC address of the pinged devices is shown. The LanExpert also displays the last ping response time in milliseconds, how many Attempted, Lost and Bad pings there were. The next line describes the minimum, average and maximum ping response in milliseconds.

Select **SETUP** in the data action buttons to go straight to the **PING / TRACE** setup to change parameters quickly.

Tracert

Select **TRACERT** button under the device's name to trace the route to that device. The device is listed with the number of hops it took the **LANEXPERT**™ to get to the device. The IP address (if available) is displayed with the roundtrip time in milliseconds. If the **LANEXPERT**™ cannot resolve the IP address, it displays "IP NOT KNOWN".

Repeat

Select **REPEAT** to run through the test again.

Return

Select **RETURN** to go back to the **PING** Screen.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Traffic generate

Select the **TRAFFIC GENERATE** button in the Bottom Area. The Traffic Generate Screen displays first how many frames in a Burst or Continuous mode, the number of bytes in each frame and the rate the frames are sent out in seconds.

The Sink IP address is where the frames are sent. If the IP address is not valid then the **LANEXPERT**™ sends the frames to the entire network as a broadcast. If the IP address is another **LANEXPERT**™ then round trip time is displayed.

Select **START** to start the test and watch the actual frame and rate the LanExpert uses. Select **SETUP** to change the **TRAFFIC GENERATE** parameters.

*NOTE: Always in Half Duplex and if you enable the **PORT FLOW CONTROL** in Full Duplex then the netwok can slow down the rate of the **LANEXPERT**™.*

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Email

Select the **EMAIL** button in the Bottom Area.

Example Email Screen   **Example Email Screen 2**

EMAIL displays the device IP address that received an email and the IP address of the email server used(POP3). The **LanExpert**™ displays the email address or the username of the current email session and how many attempts were made to log-in. It describes the Last attempt whether is was sucessfull or not. Next, the **LanExpert**™ displays how many recieved and deleted emails and the total number of bytes the emails contained.

For Sending an email, the **LanExpert**™ displays the IP address of the email server connected(SMTP), Username, attempted log-ins, state of the last attempted log-in and how many sent and failed emails. The email displays the total number of bytes the emails contained.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

VoIP

Select the **VoIP** button in the Bottom Area.

VoIP uses three different protocols so phone lines detected could also be video links or data links.

- **SIP** is used for "Session Management" – the VoIP device/line combination registers with the SIP server at intervals (usually every few minutes). In this way the location and status of the device/line is maintained with the VoIP provider. This authenticates the device/line also. Incoming or outgoing calls are managed through the SIP server also.

- **RTP** is used for the actual "streaming data" (i.e. audio in a phone call) – when a call is made from/to a device/line then the SIP server provides the device/line with the IPs of the RTP server to use. The device/line then sends or receives a data stream to/from the RTP server. Generally this data is at a consistent rate (usually 50fps for audio) and there are two data streams (one for inbound data, the other for outbound).

- **RTCP** is used to allow each end of an active RTP session to communicate link quality information with each other. Not all RTP devices or servers do this. If done, then the sender will generally send one packet every few seconds. This allows the VoIP provider to maintain knowledge of the performance of the network.

There are separate entries for each line/device/server combination. The following example shows one device, one server and two lines). The terminology used is from the definition of SIP.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.
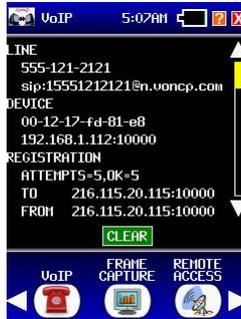
VoIP example

Example VoIP Screen 1

Line

LINE shows the "display name" and SIP "name" for the line. Some devices might not have a "display name", in which case there is only one line of text shown. This identifies the actual line (i.e. phone line).

Device

DEVICES shows the MAC address of the device and IP address: UDP port used by the device for SIP purposes.

Registration

REGISTRATION shows a count of the attempted and successful registrations of the device/line with the server. These numbers "should" be the same, but they can be slightly off due to network losses and server down times.

TO - Shows the IP:UDP port of the server which the device/line last attempted to register with.

FROM - Shows the IP:UDP port for the server which the device/line last received registration info from. These might be different, some systems send registrations to one server, but get the responses from another.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

VoIP example -cont.
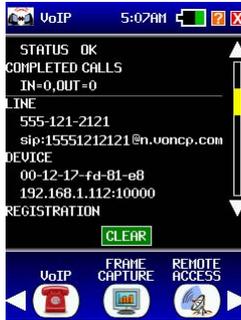
Example VoIP Screen 2

Registration cont.

STATUS - shows the textual (informative) part of the last registration status. Generally this should always be OK, but if there was an issue then this describes what the problem was (e.g. "UNAUTHORIZED" indicates that the device/line did not correctly authenticate with the server).

Completed calls

COMPLETED CALLS shows the number of calls made to (IN) and from (OUT) the device/line. *Note – this includes calls which did not have a data stream (e.g. if the other end never picked up the call).*

In this example, there are two lines being used. The white horizontal line seperates the two phone lines information. Below the white line, the second line is setup exactly how the first line looked.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

VoIP example -cont.
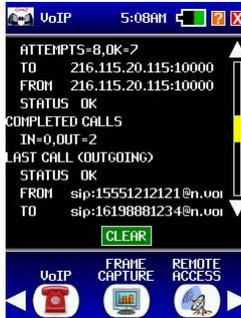
Example VoIP Screen 3

Last call

LAST CALL gives information regarding the last call made or the call in progress (if any). If no calls have been made, or if there is no call in progress, then this section is not displayed at all. Whether the call being displayed is OUTGOING or INCOMING is also displayed.

STATUS – Shows the last SIP status information for the call progress. Generally this should be OK, during origination of the call this will shows textual status, e.g. "RINGING".

FROM – Shows the SIP "name" of the line which originated the call.

TO – Shows the SIP "name" of the line which received the call.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

VoIP example -cont.

Example VoIP Screen 4

Media stream

MEDIA STREAM shows the details of the RTP connections for the calls and the protocols (codecs) being used. This is the information negotiated with the SIP server. For each end, the IP address and the codec (if known) being used are displayed.

SERVER – shows the server "end" of the RTP link.

DEVICE – shows the device "end" of the RTP link – generally this will be the same IP as that used by the device for SIP, but not always.

STATISTICS – shows the statistics for each of the two RTP data streams as measured by the LanExpert (we do NOT use any received RTCP data). The "DEVICE" column shows the data for the stream coming from the device. The "SERVER" column shows the data for the stream coming from the server.

RTCP FRAMES – shows a count of the RTCP frames (if any)

RTP FRAMES – shows a count of the number of RTP (i.e. data stream) frames. Note – since audio is usually 50fps this can be used to provide an estimate of the length of the call. *Note – generally, the DEVICE and SERVER data should be similar.*

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

VoIP example -cont.

Example VoIP Screen 5

Media stream - cont.

RESTARTS, MISORDERS, LOST and **JITTER** shows the corresponding statistics data for the data stream. The meanings of these are exactly as defined in the SIP RFC.

RESTARTS is the number of times that the data stream became so scrambled that it needed to be restarted (these are bad).

MISORDERS is the number of times that frames were not lost but were received out of order (these generate very poor quality of signal, e.g. garbled audio).

LOST is the number of frames which were not found in the data stream (these generate poor quality of signal if they reach a high volume).

JITTER is a measure of the timing of the frames (if the frame rate is 50fps for the data stream then a figure of 1ms corresponds to a 2% uncertainty in the frequency of the audio signal).

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Frame capture

The **FRAME CAPTURE** screen displays a filtered or non-filtered capture of packets detected by the LanExpert. Select **START** to start capturing packets.

Once a packet is detected it displays which LanExperts port number the packet is received on, the packet number received from the start of the capture test sequentially and the size of the packet. It also displays the date and time in microseconds when the packet was detected. Select **STOP** to stop the capture.

Select **START** to start the test and watch the actual frame and rate the LanExpert uses. Select **SETUP** to change the Traffic Generate parameters.

*NOTE: Selecting **START** again will clear detected data for a new capture.*

Example Capture Time Screen	**Example Capture Summary Screen**	**Example Capture Show Screen**

Time / summary

Select **TIME** to toggle to **SUMMARY** where more information if shown about the packets. Under **SUMMARY** the Source and destination MAC is displayed along with the type of packet detected. Select the **SETUP** button to modify the captured data.

Select the **SHOW** button to display the bytes of the packet in HEX or in ASCII. Select **RETURN** to go back to the other captured packets.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Remote access

Select the **REMOTE ACCESS** button in the Bottom Area. The Remote Access Screen displays UDP Sessions and Pings received.

UDP SESSIONS describe the connection to another network device. The **LANEXPERT**™ displays the IP address and the port number the packet comes from. Also the **LANEXPERT**™ will tell if the link is Active or Inactive and how many transmitted and received packets between the two devices.

PINGS RECEIVED displays what IP address sent the Pings and how many pings received. Select **CLEAR** to clear collected data

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

PoE

Select the **PoE** button in the Bottom Area. This is **INLINE PoE**, which is not the same as the PoE under cable test. By selecting this button, make sure the **LanExpert**™ is in **INLINE** mode or a screen will be displayed saying "Only available when configured in inline mode". Make sure one side of the **LanExpert**™ is a Powered device and the other side a Power Source.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Save

Select the **SAVE** button in the Bottom Area. Select which data to save Frame Capture, Detectors (Devices, Vitals, Protocols, etc) or Ping Results.

Select to store the data internally in the **LanExpert**™ and RECALL the test results later or save to an external flash drive.

Example Save Screen

Setup

Select the **SETUP** button in the Bottom Area. This will display the **SELECTED PROFILES** screen. See how to change parameters under the **SETUP** in chapter 3 page 15.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Chapter 5

Stress Test

This chapter describes how to test the network with the RFC2544 stress test. The **LANEXPERT**™ .

Understanding RFC2544

The **LANEXPERT**™ Network Analyzer uses Throughput, Latency, Frame Loss and Back-to-Back frames to test the network.

Throughput - defines the maximum number of frames per second that can be transmitted without any error. It starts at a maximum frame rate and then compare the number of transmitted and received frames. If frame loss occur, then the rate is decreased and the test is restarted until no frames are lost.

Latency - measures the time required for a frame to travel from the originating device through the network to the destination device. A frame will be tagged with a time-stamp during transmission and when that frame is received back at the analyzer, the latency is measured.

Frame Loss - measures the network's response in overload conditions. The analyzer sends traffic at maximum line rate and then measures if the network dropped any frames. If so, the test will restart at a slower rate. This test is repeated until there is no frame loss for three consecutive iterations.

Back-to-Back Frames - measures the maximum number of frames received at full line rate before a frame is lost.

Stress test screen

Select the **STRESS TEST** button from the **HOME** screen. This screen first displays the port link connection and the IP address assosiated with that port. The Remote IP address, which is configured in the Stress Test Setup, is displayed. This is where the packets are going to be sent to. Select one or all four tests to customize the test results. The estimated time of each test is listed under each test. Select **START** to begin the test(s). Select the **EXIT** button to return to the previous screen or the Home screen.

Stress test Screen

Start/Stop

Select **START** in the data action buttons to start the selected tests. Select **STOP** in the data action buttons to stop the test.

Save

Select **SAVE** in the Data action buttons to save the test results. The **SAVE** button can only be used when the set of tests have been performed completely and no changes to **SETUP** or test selection has been made. Select an internal store number to save internally and recall the test results later.

Setup

Select **SETUP** in the data action buttons to go straight to the stress test setup to change the parameters.

Results

Select **RESULTS** in the data action buttons to go to the stress test results screen of selected test.

Throughput

This screen shows 3 colums named Size (in bytes), Frames/sec (in fps) and Bits/sec (in percent). One row of data for each enabled frame size for which data has been obtained (i.e. up to 7 rows). Each data has a 'K' or 'M' multiplier if needed and has a maximum of 5 digits (without multiplier) or 4 digits (with multiplier).

Latency

This screen shows 3 colums named Size (in bytes), Min, Avg and Max (each in seconds). One row of data for each enabled frame size for which data has been obtained (i.e. up to 7 rows). Each latency time has an 'm' after the numeric and has a maximum of four digits plus an optional decimal point (1us smallest resolution shown).

Frame loss

This screen shows 3 colums named Size (in bytes) and four columns of loss rate and % frame rate headings. Two rows per enabled frame size for which data has been obtained (i.e. up to 7 pairs of rows, the first four pairs on the first page, the remaining three on the second), each pair separated by a "half" row. The upper row in each pair is the four heading percentages, the row below it is the corresponding frame loss rates. The four percentages are selected to attempt to give two with a zero result and two with a non-zero result if possible.

Back to back

This screen shows 2 colums named Size (in bytes) and burst(in frames). One row for each enabled frame size for which data has been obtained (i.e. up to 7 rows). Each data has a 'K' or 'M' multiplier if needed and has a maximum of 5 digits (without multiplier) or 4 digits (with multiplier).

NOTE: Select another Setup button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Chapter   6

Cable Test

This chapter will explain the screens presented as you use your LANEXPERT™ to perform Port ID, Tone, Length, Wiremap and PoE tests.

Warning: Cable test is ONLY performed on Port 2. Do not connect anything into Port 1 while performing cable tests. Psiber is not liable for misuse of these ports.

Select **CABLE TEST** from the HOME screen with the stylus.

Home Screen

Port identification

PORT ID is used to determine which port of a hub or switch is wired to a particular wall jack by blinking the Link LED on the port. The blink rate is adjustable for compatibility with most switches and hubs. Select the rate at which the LED will blink either SLOW, MEDIUM, FAST, FASTEST. Select **START** to run the test.
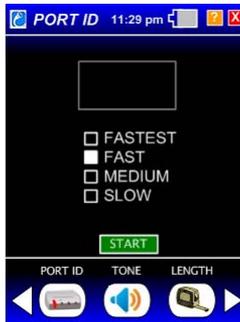
Tone

TONE is used to locate a punchdown or trace a cable using a CT-15 probe (Optional). Select the tone cadence and frequency by selecting the box next to the tone desired. Select **START** to run the test.
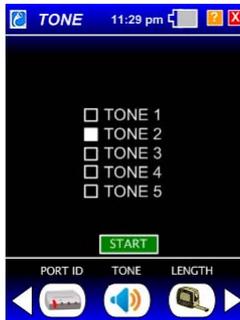
NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Length

LENGTH measures and displays the distance to an open or short of each wire pair in a cable. (The far end of the cable under test should be disconnected from a port or Wiremap Terminator prior to starting the length measurement.) Change the NVP for the connected cable by selecting the up and down arrow next to the NVP number. The highest NVP is 74 and the lowest is 65. Select **START** to run the test. Change the feet to meters by selecting the FEET button.
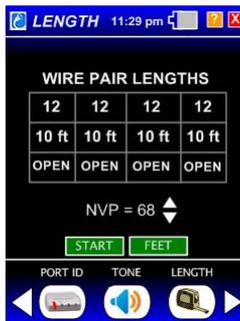
Wiremap

WIREMAP verifies proper cable wiring and detects split pairs. Connect the Wiremap Terminator to the cable under test prior to selecting **START**. Select **START** to run the test. If the Wiremap Terminator in not connected all pairs will display OPEN and a message appears saying" NO TERMINATOR FOUND". If an error is found the incorrect numbers display in red and a message is displayed.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

PoE

PoE tests for IEEE Standard Power. The LanExpert displays the wire pairs that are powered, the voltage measured and the wire pair polarity. Select **TEST** to run the test.

NOTE: Select another Test button visible on the screen or by scrolling to the right or left with the white arrows or select the Exit button.

Chapter 7

Recall Save Data

This chapter will explain the screens presented as you use your LANEXPERT™ to recall internal saved data.

Select **RECALL** from the HOME screen with the stylus. Select the internal number fireld to enter the saved data number. This is where you saved the data under Analyze Network or Stress Test. Press **ENTER** to return back to the **RECALL** screen. Press **RECALL** to find the data.

If the saved number location is valid then the screen information will be displayed. This will look identical to the analyze network button except no new information is being filled in. Select the buttons to navigate to the saved data. Press the **EXIT** button to get back to the **RECALL** screen.

If the saved number location is not valid then a message is displayed above the **RECALL** button saying **INVALID DATA**. Enter a new saved data number or press **EXIT** to get back to the HOME screen.

Note- the Mode screen graphic is the Recall symbol and not the Analyze network symbol.

Home Screen

Appendix A

Connecting the Analyzer

Single Ended
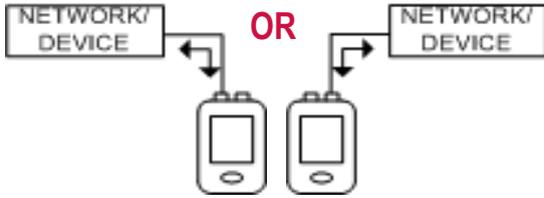
Independent
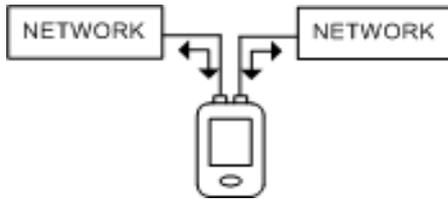
Inline
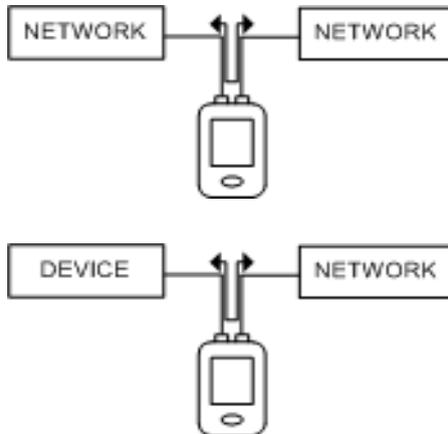
Connecting the Analyzer

Stress Test
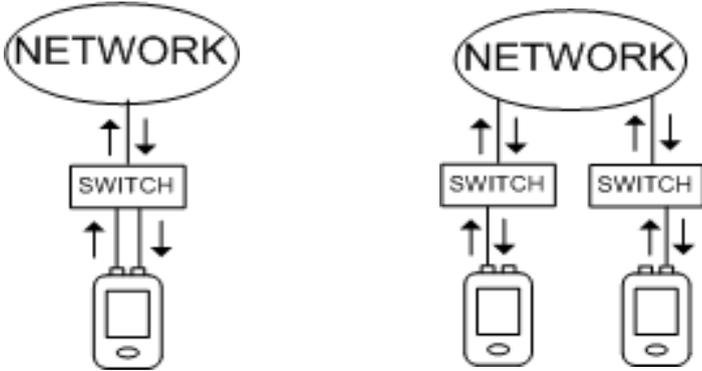
Cable Test (ONLY on Port 2)
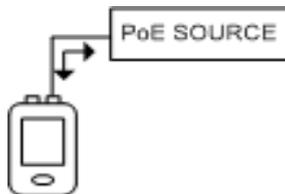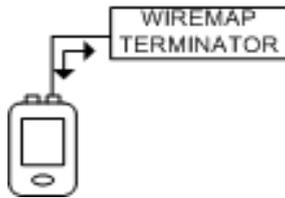
Appendix B

Graphics

Upper Display Area Graphics

Home Graphic. This is the graphic in the upper left corner when the home screen is being shown on the display.

Analyze Network Graphic. This is the graphic in the upper left corner when any of the ANALYZE NETWORK screens is being shown on the display.

Cable Test Graphic. This is the graphic in the upper left corner when any of the CABLE screens is being shown on the display.

Setup Graphic. This is the graphic in the upper left corner when any of the SETUP screens is being shown on the display.

Lock Graphic. This is the graphic in the upper left corner that replaces the SETUP graphic when the user locks the unit with a password.

Power Graphic. This is the graphic in the upper left corner when the power settings screen is being shown on the display (i.e. after the battery symbol has been pressed).

Date/Time Graphic. This is the graphic in the upper left corner when the date/time settings screen is being shown on the display (i.e. after the time has been pressed).

Numeric, Name, MAC, IP and Ping List Entry Graphic. This is the graphic in the upper left corner when any numeric or name entry screen is being shown on the display.

Exit Graphic. This is the exit button/graphic in the top right of almost all screens.

Help Graphic. This is the HELP button/graphic in the top right of almost all screens.

Home Screen Graphics

 Analyze Network Button. This is the graphic for the ANALYZE NETWORK button on the home screen.

 Recall Button. This is the graphic for the RECALL button on the HOME screen.

 Stress Test Button. This is the graphic for the STRESS TEST button on the HOME screen.

 Cable Test Button. This is the graphic for the CABLE TEST button on the home screen.

 Setup Button. This is the graphic for the SETUP button on the home screen and the SETUP button at the bottom of all ANALYZE NETWORK screens.

Setup Graphics - Bottom Area

 Select Profile Button. This is the graphic for the SELECT PROFILE button at the bottom of the SETUP screens.

 Set Profile Name Button. This is the graphic for the PROFILE NAME button at the bottom of the SETUP screens.

 PORTS Button. This is the graphic for the PORTS button at the bottom of the SETUP screens.

 Protocols Button. This is the graphic for the PROTOCOLS button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

 Ping/Trace Button. This is the graphic for the PING/TRACE button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

 Discover Button. This is the graphic for the DISCOVER button at the bottom of the SETUP screens.

Setup Graphics - Bottom Area - cont.

Traffic Generate Button. This is the graphic for the TRAFFIC GENERATE button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Frame Capture Button. This is the graphic for the CAPTURE button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Lock Button. This is the graphic for the LOCK button at the bottom of the SETUP screen.

Touch Panel Button. This is the graphic for the TOUCH PANEL button at the bottom of the SETUP screens.

Colors Button. This is the graphic for the COLORS button at the bottom of the SETUP screens.

Build Info Button. This is the graphic for the BUILD INFO button at the bottom of the SETUP screens.

Select Language Button. This is the graphic for the SELECT LANGUAGE button at the bottom of the SETUP screens.

Analyze Network Graphics - Bottom Area

Link Button. This is the graphic for the LINK button at the bottom of the ANALYZE NETWORK screens.

Problems Button. This is the graphic for the PROBLEMS button at the bottom of the ANALYZE NETWORK screens.

Vitals Button. This is the graphic for the VITALS button at the bottom of the ANALYZE NETWORK screens.

Protocols Button. This is the graphic for the PROTOCOLS button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Analyze Network - Bottom Area - cont.

Top Talkers Button. This is the graphic for the TOP TALKERS button at the bottom of the ANALYZE NETWORK screens.

Devices Button. This is the graphic for the DEVICES button at the bottom of the ANALYZE NETWORK screens.

Ping/Trace Button. This is the graphic for the PING/TRACE button at the bottom of the ANALYSE NETWORK screens and also at the bottom of the SETUP screens.

Traffic Generate Button. This is the graphic for the TRAFFIC GENERATE button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Email Button. This is the graphic for the EMAIL button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

VoIP Button. This is the graphic for the SECURITY button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Frame Capture Button. This is the graphic for the CAPTURE button at the bottom of the ANALYZE NETWORK screens and also at the bottom of the SETUP screens.

Remote Sessions Button. This is the graphic for the REMOTE SESSIONS button at the bottom of the ANALYZE NETWORK screens.

PoE Inline Button. This is the graphic for the PoE Inline button at the bottom of the ANALYZE NETWORK screens. This is a "Button" graphic.

Save Button. This is the graphic for the SAVE button at the bottom of the ANALYZE NETWORK screens.

Cable Test - Bottom Area

Port ID Button. This is the graphic for the PORT ID button at the bottom of the CABLE TEST screens.

Tone Button. This is the graphic for the TONE button at the bottom of the CABLE TEST screens.

Length Button. This is the graphic for the LENGTH button at the bottom of the CABLE TEST screens.

Wiremap Button. This is the graphic for the WIREMAP button at the bottom of the CABLE TEST screens.

PoE Button. This is the graphic for the PoE button at the bottom of the ANALYZE NETWORK screens and the CABLE TEST screens.