FLUKE
networks ™

NetTool™
Inline Network Tester

Users Manual

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Introduction

The Fluke Networks NetTool™ Inline Network Tester (hereafter referred to as NetTool) is a unique handheld device that combines cable, network, and PC configuration testing into a single, handheld unit. NetTool was designed specifically to speed your frontline network troubleshooting, "moves, adds & changes," and desktop-to-network connectivity work.

NetTool is available in two models: NetTool Inline and Inline Pro version.

NetTool Inline features include:

❑   Single-ended mode
❑   Inline mode

ahn010f.eps

Figure 1-1. NetTool

Inline Pro Features include:

❑   Single-ended mode
❑   Inline mode
❑   Reporter
❑   Ping

These features are discussed throughout this manual in their pertinent sections. You can also access **www.flukenetworks.com/nettool** to access software updates, documents, and the latest news on NetTool.

Register Now!

Get a free personalized holster for your NetTool by visiting **www.flukenetworks.com/nettool** and registering your NetTool today. Follow the instructions to get a company or personal name embossed on the holster. Upon registering your NetTool, Fluke Networks will send the personalized holster free of charge.

Table 1-1 shows an overview of what NetTool provides.

Table 1-1. NetTool Overview

Service Identification Telco Token Ring Ethernet **Health** Broadcast/Error meters Utilization **Cable Test** **Wiremap** **PC Configuration** Link Config Health Addresses Used Servers Used **Ping** Single Device Ping Ping Catalog **Reporter** Get Live Reports Get Saved Reports	**Link Configuration** Link ID Rx Pair Advertised Speed Actual Speed Level Polarity Advertised Duplex Actual Duplex **Services (Key Devices)** IP Servers IPX (NetWare) Servers NetBIOS Servers Printers Routers **Problems –** The Problem Log provides a concise list of all problems detected, from physical layer to application layer.	**Single Ended Mode** - This mode enables you to check a network drop or network device for activity, determine its speed and duplex settings, confirm healthy frames are being received from the network; and to check connectivity to the network (when plugged into a hub or switch). **Inline Mode** - Inline mode occurs when NetTool is plugged in between two devices simultaneously like a PC and the network. **Inline Pro -** The Ping and Reporter features are permanently activated in the factory. Trial uses are provided if you have not purchased the option. **Quick Reference Guide** - Read the *NetTool Quick Reference Guide* (P/N 1560839) that came with your purchase to become familiar with and quickly begin using your NetTool. **Upgrade** - Get updates to NetTool software when they are released via the internet. **Personalization** - Get a free holster for your NetTool by visiting the NetTool web site and registering your NetTool.

Software Version

To determine the version of the software in your NetTool, highlight the **Setup** ▣ icon and press the **Select** (middle) button. Highlight **About NetTool** and press **Select** again**.**

The software version number is displayed on the screen as **SW Rev: x.x**. Read the *NetTool Quick Reference Guide* (P/N 1560839) and the NetTool Blaster program helptext for instructions on updating NetTool.

Supplied Equipment

The following equipment is supplied with the NetTool:

❒ Four (4) AA batteries (P/N 1560231)
❒ Serial Cable (P/N 1541340)
❒ RJ-45 Cable (P/N 642774)
❒ Wiremap adapter (P/N 1563930)
❒ CD-ROM Disk (P/N 1560821)
  NetTool Users Manual
  NetTool™ Blaster! (update software) and
  NetTool™ Toolkit (make full use of NetTool options)

Optional Equipment

The following optional items can be purchased through Fluke Networks or your local distributor:

❒ A/C Adapter (P/N 1556346)
❒ Battery Charger (P/N 1572191)
❒ Rechargeable Batteries (P/N 1572184)

Getting Assistance

For operating assistance in the USA, call 1-800-283-5853. For a complete list of contact numbers, check Appendix B or visit the Fluke Networks web site at www.flukenetworks.com.

Getting Acquainted

Use four (4) AA size batteries (supplied P/N 1560231) or the optional rechargeable batteries (P/N 1572184) as shown (optional charger PN 1572191).
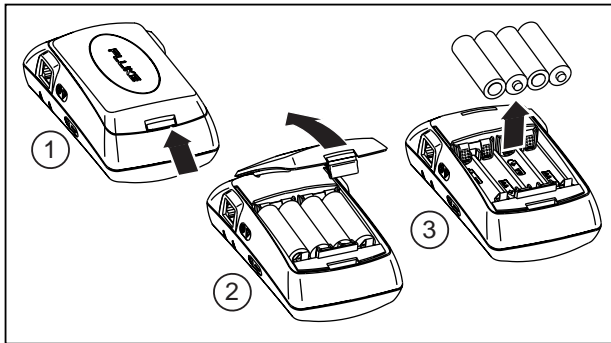
ahn011f.eps

Figure 1-2. Battery Compartment

The optional AC adapter can be used to power the unit and conserve battery power. The adapter plugs in to the left side of NetTool.

Read the *NetTool Quick Reference Guide* that came with your purchase to start using NetTool right away. You can also access **www.flukenetworks.com/nettool** for the latest news on NetTool, troubleshooting tips, and service information.

Buttons and Indicators

⇒ **Power** – press once to turn on or off.

⇒ **Backlight** – Once NetTool has power, you may turn on the *backlight* by pressing the power button quickly. Turn it off by pressing the **Power** button quickly again.

Navigation Buttons

After powering up NetTool, just press the buttons that make up the oval under the screen and highlight an icon or menu item you wish to view (*up*, *down*, *right*, *left*). As you navigate, the highlighted area flashes. Also, if a list is longer than can be displayed, use the up and down buttons to scroll through it.
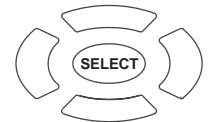
ahn012f.eps

AutoTest flashes (Figure 1-3) on power up. Press the **Select** button to begin. You can also navigate to the NetTool Setup screen by highlighting and selecting the NetTool Setup icon (*NetTool Setup*).


ahn013s.bmp

Figure 1-3. NetTool First Screen

Note

If you have not registered your NetTool, you will see a Registration Reminder Screen followed by a screen that displays how many option trials remain.

Be sure to install NetTool Blaster (NetTool Toolkit installs as part of the NetTool Blaster install process), the PC-based software that came with your purchase on CD-ROM (check the online help for those programs for more information). These software programs enable you to pass data between a NetTool and a PC.

⇒ Press **Select** (middle button) once to view an item and related screens.

⇒ Within a screen that is "scrollable," use the up and down keys to scroll. Within a menu screen, the right button returns you to the ⊠. The right and left buttons act as a page up (left) or page down (right) if there are more items to view.

⇒ Press the **Up** key to navigate to the ⊠ (top right) and press **Select** to close the current screen.

⇒ Certain screens also display a tool 🔧 icon left of the ⊠. Select this icon to access the configuration screen for that function.

NetTool LED Indicators

NetTool has two tricolor LED indicators on each side to reflect link and health information at a glance.
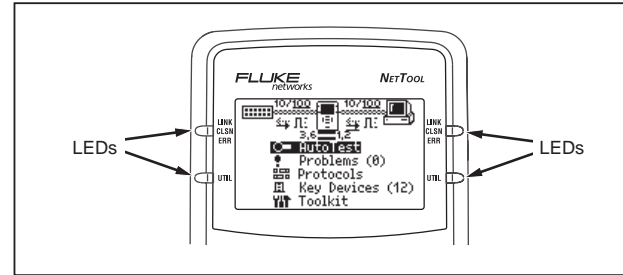
ahn014f.eps

Figure 1-4. NetTool LEDs

Link/Collision/Error LED

Green = Link pulse present

Yellow = Collisions occurring

Red = Errors occurring (FCS, jabbers, etc.)

Utilization LED

The bottom tricolor LED indicates utilization percentages for each side.

Green = utilization levels below 40%

Yellow = levels between 40% and 70%

Red = levels greater than 70%

Serial Connection

Connecting NetTool to a PC via the customized serial cable (supplied PN 1541340) allows you to:

- Download software.

- Enable options.

- Save screens.

- Use NetTool Blaster and NetTool Toolkit programs supplied on the CD-ROM. Read the *Reporter* and *Ping Catalog* sections for more information).

NetTool Modes

NetTool has two RJ-45 jacks, one on each side of the unit. Plug it in and turn it on…either between two devices like a hub and a PC or directly into a wall plate to check a network drop.

NetTool can be used in two modes: **Single-Ended Mode** and **Inline Mode**.

Single-ended Mode

Note

To optimize discovery, connect NetTool with the device (like a PC) off, turn NetTool on, press AutoTest, then turn the device on.

⇒ Plug an RJ-45 cable into a network drop or a single network device, such as a hub, PC, server, or printer.

⇒ Run **AutoTest** by pressing the **Select** button. The NetTool screen displays icons for NetTool itself and the other device.

Use this mode to quickly prove a network drop or network device is active, determine its speed and duplex settings, confirm healthy frames are being sent, and check connectivity to the network (when plugged into a hub or switch). Read Chapter 2, *NetTool Menus,* for more information on the menus and icons.

Inline Mode

Note

NetTool must sense traffic on a network or device so it can supply protocol or health information.

Inline means NetTool is plugged in between two devices simultaneously such as a PC and network hub. Use this mode to verify that a PC will communicate properly with the network.

Cable Testing

Using Cable AutoTest, you can check cable length, detect split pairs, or use the wiremap adapter (supplied P/N 1563930) to verify pin-to-pin continuity from the near to the far end of a cable.

Cable AutoTest

⇒ Plug the cable to test into the jack on either side of the NetTool. Power up NetTool. **AutoTest** flashes. Press **Select**.
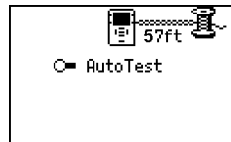
ahn015s.bmp

⇒ Highlight the Spool icon and press **Select** to see cable status. NetTool detects cable length, opens, shorts, and split pairs.
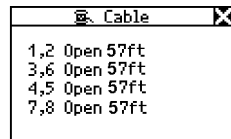
ahn016s.bmp

⇒ This applies for patch

cables as well except you would plug both ends in to the NetTool and then press **Select**.

Wiremap

⇒ To use wiremap, attach the wiremap adapter to the far end of the cable.

⇒ Power up NetTool. **AutoTest** flashes. Press **Select**.

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⇒ Highlight the Wiremap icon and press **Select**.

ahn018s.bmp

1-8

Service Identification

⇒ Plug NetTool in to any RJ-45 wall jack.

⇒ Power up NetTool and select **AutoTest**. Doing so shows you what service is active on the jack being tested:
Telco: Shows the tip and ring pins (in the case of voice being carried on an RJ-45 cable).

⚠**Caution**

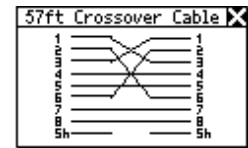**Although NetTool can detect Telco signals, it is not designed to be used on the public telephone network. Disconnect immediately. NetTool cannot reliably discover Telco information with the AC adapter or serial cable connected. It also detects ISDN signals but cannot reliably detect the S/T interface.**

⇒ **Token Ring**: Indicates the presence of a Token Ring network.
Ethernet: Tells you if the jack is hot, what's on the other end (hub, switch, etc.), as well as the speed and duplex, level, and polarity. Also shows the segment ID so you can pick the right network to hook up to a PC (if there are multiple jacks).

Services Discovered

Table 1-2 lists the services detected by NetTool.

Table 1-2. Services Discovered

Device	Services
Servers	**IP Servers** (IP services discovered): DHCP, DNS, email (SMTP, POP, IMAP), Web (HTTP, HTTP proxy), WINS. **NetWare Servers** (IPX service types): Nearest File Server, File Server, NetWare Access server, Time Synchronization Server, NetWare Directory Server (NDS), NetWare Management Server. **NetBIOS Servers**: Primary Domain controllers, Backup Domain controllers, Master Browsers.
Routers	**IP Routers**: RIP, IGRP, EIGRP, OSPF, IRDP, RIP2. **IPX routers**: RIP.
Printers	**IP Printers** - IP Printers, IP Print Spoolers. **IPX Printers** - IPX Print services. **DLC Printers -** Microsoft DLC, HP DLC.

NetTool Updates, etc.

Get updates to NetTool software when they are released. To check the version you have, select the **NetTool Setup** icon then select **About NetTool**.

⇒ To find out if there is a new version, access **www.flukenetworks.com/nettool** and navigate to the update page. Check the software file displayed in that area and determine if it is a later version.

⇒ To update your NetTool, follow the web instructions to download the file. After you download the file to a PC connect supplied serial cable as shown in Figure 1-5.
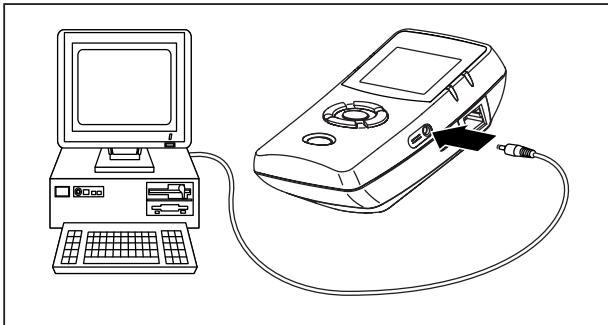
ahn019f.eps

Figure 1-5. Serial Cable Connection

PC/NetTool Link Utility

Updating NetTool is a simple process that requires you to download, or otherwise make accessible to your PC, the latest NetTool firmware file. You can then run the update and link utilities that came on CD-ROM or from the web. There are two PC-based software programs that install from the CD-ROM: NetTool Blaster and NetTool Toolkit.

When you put the CD-ROM that came with your purchase in your PC, a navigation screen displays. Install both link utility programs by running the setup program. After you install the programs, run them from the **Start | Programs | Fluke Networks**...menu. Follow the directions given by the online help of both programs.

NetTool Blaster

After you have the latest NetTool firmware downloaded
and saved locally, NetTool Blaster enables you to:

⇒ Update NetTool – click the **Update** button.

⇒ Get screen shots – download screens by clicking
NetTool Blaster's **Capture** button.

⇒ Add your own splash screen by clicking the
Personalize button.

⇒ Set **Date/Time**.

⇒ If you have purchased options and need to enter
the option key, click **Options**.

⇒ **Change Language** – as translations become
available, choose one of the associated option
buttons.

⇒ Set Communication Parameters.

NetTool Toolkit

Use NetTool Toolkit on your PC in order to take full
advantage of NetTool Pro features. NetTool Toolkit
enables you to:

⇒ Generate reports.

⇒ Download reports.

⇒ Configure ping parameters.

⇒ Configure ping catalogs.

Select **Help** from the top menu of either program and
follow the instructions to use NetTool Blaster or Toolkit.

Introduction

Navigating within NetTool is easy and fast. If a link pulse is detected, NetTool searches for devices on the network and then displays them on its easy-to-read display. Navigation is based the icons and menu below them.

NetTool Menus

There are two sets of menus to assist in troubleshooting: the **top area** (Figure 2-1) containing icons and the **main menu** (Figure 2-2) below the icons.

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Figure 2-1. Top Area

The three top area icons take you through menus corresponding with the three elements of the connection:

 ⇒ **PC**

 ⇒ **NetTool Setup**

 ⇒ **Network**

The main menu takes you through various discovery screens that reflect NetTool's connection to devices.

In addition, link information is displayed between the device icons and cable information is displayed below the NetTool Setup icon (see *Link and Cable Information* later in this chapter)*.*
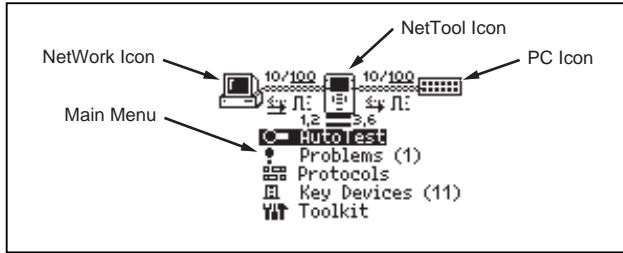
ahn021f.eps

Figure 2-2. NetTool Menus

NetTool Menus - PC

⇒ Connect NetTool to a PC and press the PC 🖳 icon. The icon displays on the left or right, depending on where you connected the cable. Figure 2-3 displays the list of PC information you can access.
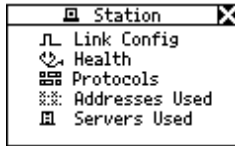
ahn022s.bmp

Figure 2-3. Station Menu

⇒ After the PC sends frames, you can scan the PC configuration by navigating through the menu. This view of the PC is invaluable in troubleshooting networked PCs.

2-2

Link Configuration

The Link Config screen (Figure 2-4) provides the following key link pulse information about the device (e.g., the PC) to which NetTool is connected:

Receive (Rx) Pair	Polarity
Advertised Speed	Advertised Duplex
Actual Speed	Actual Duplex
Level	
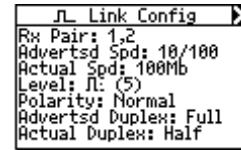
ahn023s.bmp

Figure 2-4. Link Configuration Details

Health

The Health option enables you to check the health of frames the PC has sent since you started **AutoTest** and isolate PC related problems. There are two types of Health screens: one that displays activity since the last **AutoTest** (Figure 2-5) and one that relates to what is going on now. In other words, statistics accessed from a device-related menu (Figure 2-3) are cumulative (as in Figure 2-5) whereas statistics you see from the main menu are a

"snap shot" of what is going on now for a given device
(Read *Health* later in this chapter).
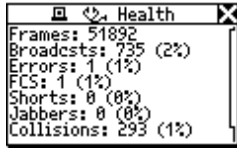
ahn026s.bmp

Figure 2-5. Health Details

Addresses Used

NetTool displays the best-discovered name on the PC as
well as the IP, IPX, and MAC address of the PC.

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Figure 2-6. Addresses Used

Servers Used

This area shows the network resources the PC is using,
including HTTP, SMTP, POP, WINS, Nearest NetWare,
DHCP and DNS servers, as well as the router gateway.

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Figure 2-7. Servers Used

NetTool Menus – Setup (NetTool Icon)

Select the **NetTool** (middle) icon to access Setup
options. The NetTool Setup screen displays (Figure 2-8).

ahn027s.bmp   ahn029s.bmp

Figure 2-8. NetTool Setup   **Figure 2-9. NetTool
Settings**

Access Settings (Figure 2-9) to:

⇒ Check the battery level ▥. The battery level
    indicator displays while you navigate through the
    Setup screens as long as you are running on battery
    power.

⇒ Select feet or meters.

2-3

⇒ Enable/disable **Auto Off**. If you leave the unit on without touching any keys for more than 10 minutes, **Auto Off** automatically shuts the unit down to save battery power.

⇒ Adjust the display contrast. Highlight ◔ and press **Select** to decrease contrast or ◑ to increase it.

⇒ **Set Time/Date…**Highlight each number comprising the time or date display and change each number individually using the up or down arrow key. Use the right or left arrow key to move the cursor over. Press **Select** after you change all the numbers. NetTool Time format is **HOUR:MINUTES:SECONDS**. Date format is **MONTH:DAY:YEAR**. The clock does not self adjust for local time zones changes. NetTool Blaster allows you to set the time for the NetTool and even synch it with the PC clock (check the Help for Blaster for details).

⇒ Select **Restore Defaults** to restore all factory settings. If you have not changed any settings, NetTool displays **Defaults Restored** and no action is required.

More NetTool Setup Options

Other setup options include:
Unwanted Protocols
IP Setup
Ping List Editor

Language
About NetTool

⇒ Select **Unwanted Protocols** to specify protocols that NetTool will warn you are present on the network. This helps in situations like a network-wide migration away from certain protocols. If NetTool sees them, it reports them in the Problem Log.
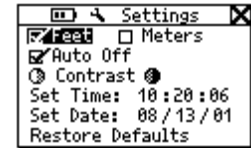
⇒ Choose **IP Setup** to configure your NetTool to ping (read the *Toolkit - IP Setup* section for details).

⇒ Access the **Ping List Editor** to view, edit, or add to the lists of preset IP addresses that you have previously downloaded using NetTool Toolkit. The editor enables you to add to an existing list or edit an existing IP address within a list.

Select one of the lists by highlighting the list name then pressing **Select**. Select **Add New Device** to add an IP address to that list. To edit an existing address, select it then change any of the octets within the address.

⇒ Choose **Language**. Select a language from the available choices. Keeping your NetTool updated ensures access to new languages as they become available.

⇒ View software and hardware details. Select **About NetTool** to view the serial number, MAC address, and revision information. Be sure to record the serial number and MAC address of your NetTool for future reference.

NetTool Menus - Network

The Network ▦ icon displays on the left or right depending on where you connected the cable. Highlight the Network ▦ icon and press **Select** to view network activity (Figure 2-10).
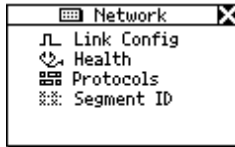
ahn200s.bmp

Figure 2-10. Network Menu

Link Config: (described in the PC section)

Health: (described in the PC section)

Protocols: (described in the Protocols section)

Segment ID: If there are multiple Ethernet drops, knowing the Segment ID tells you which jack to use for the correct configuration.

Link and Cable Information

Notice the link and cable information between the device icons in Figure 2-11. Note the duplex settings and link speeds that are underlined. The underline signifies a determined or negotiated result while the non-underlined value signifies the advertised value.

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Figure 2-11. Top Area

Duplex Settings

NetTool provides duplex settings for each device, advertised or collision-determined. Duplex mismatches can impede communication between devices.

⇄ Full Duplex
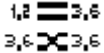
⇄ Half Duplex

Link Level and Polarity: Polarity is displayed via waveform shaped icons as shown in Table 2-1.

Table 2-1. Link and Polarity Level

Indicator	Definition
Л.	Normal level, normal polarity
ᴜ.	Normal level, reverse polarity
ᴨ.	Low level, normal polarity
ᴜ.	Low level, reverse polarity. Link level is displayed by the height of the waveform.

Cable Status

1,2 ▬ 3,6
3,6 ✕ 3,6

NetTool shows you the status of the cables connected to it below the Setup icon and detects whether the cables are straight or swapped. NetTool sees a swap cable problem and swaps it internally, allowing you to troubleshoot past a simple swap cable problem.

NetTool Main Menu

The main menu items are your starting point. View NetTool's discovery screens to resolve connectivity problems. The results are displayed in the top area and within the discovery screens accessed from the main menu.

AutoTest

⇒ Plug NetTool inline between the PC and the network.

⇒ Power up the PC.

⇒ Select **AutoTest**. The sample results shown in Figure 2-13 reflect NetTool connected inline between a PC and a network hub.

ahn201s.bmp

Figure 2-12. AutoTest

ahn202s.bmp

Figure 2-13. AutoTest Results

⇒ Select the **PC** or **Network** icon for more link configuration information, health, Segment ID, and for PCs, address and server information.

Problems

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Figure 2-14. Problems
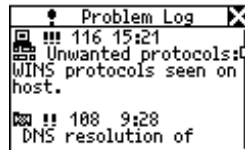
ahn204s.bmp

Figure 2-15. Problem Log

⇒ Select **Problems** to view the Problem Log. The Problem Log provides a concise list of all problems detected, from physical layer to application layer problems. You can think of problems fitting into two categories: **Link Connectivity** level and **Network** level. Read Chapter 3 for full descriptions of problems and general troubleshooting tips.

Protocols
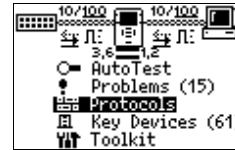
ahn205s.bmp

Figure 2-16. Protocols
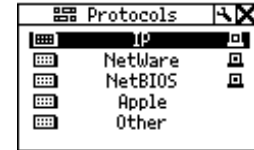
ahn206s.bmp

Figure 2-17. Protocol List

⇒ Select **Protocols** to view the protocols seen on the desktop or network (Figure 2-17). This can be very useful for finding protocol configuration mismatches.

⇒ View details by highlighting any protocol listed and pressing **Select**. Figure 2-18 shows an example of IP Protocols. The icons listed on each side represent the device (i.e., PC, network) and whether that given protocol is running on that device. Table 1-2 lists the protocols that NetTool can discover.
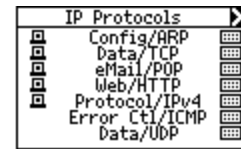
ahn207s.bmp

Figure 2-18. IP Protocols

Key Devices

ahn208s.bmp

Figure 2-19. Key Devices

ahn209s.bmp

Figure 2-20. Key Device List
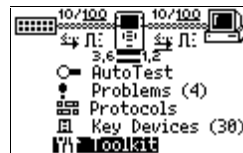
ahn210s.bmp

Figure 2-21. Main Menu
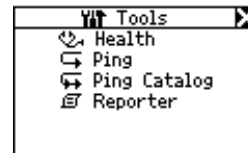
ahn211s.bmp

Figure 2-22. Toolkit Menu

⇒ Select **Key Devices** to view all the servers, routers, and printers NetTool has found on the network (Figure 2-20). NetTool always attempts to display the highest level address possible for that device, be it a NetBIOS name, DNS name, IP address or Mac address. This helps you determine which services or servers exist on the network.

⇒ The list of devices can be invaluable in troubleshooting because it verifies whether a device is seen on the network. This helps pinpoint where a configuration problem may exist. NetTool Toolkit

Select **Toolkit** to access Health statistics, Ping features, and the Reporter option.

Health

⇒ This feature enables you to segment problems. After you select **Health** from the main menu, you can view the health of frames and simultaneously check each side of the connection for healthy frames in real time (Figure 2-24).

⇒ Use the navigational buttons and press **Select** on any item within the screen to change the view. For example, selecting **Util** changes the view to broadcast traffic, collision levels, or errors coming from either device to which NetTool is connected.
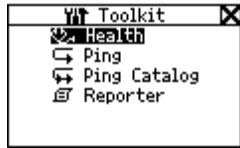
ahn212s.bmp

Figure 2-23. Health
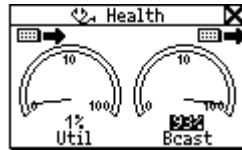
ahn213s.bmp

Figure 2-24. Health Display

⇒ You can also highlight the device in the upper right or left to change what NetTool is viewing in real time and the direction (to/from network or to/from PC). This enables you to make comparisons. For example, you may see a high percentage of network utilization and the PC is also registering high utilization. You can segment what the PC is doing to contribute to that large number by highlighting **Util** and pressing **Select** (broadcasts, errors, etc.).

⇒ Highlight the reading below a meter and press **Select** to view the data expressed as "per second" (frames broadcasts, errors, etc.) or as a percentage of current activity.

Note

*If you exit the Health display and return later without powering down, NetTool displays the "last-saved" settings. If you power down NetTool while viewing the Health display, the readings will not be saved. Access Setup screen and select **Restore Defaults** to restore factory settings.*

Ping

Note

*The Ping option only works in single-ended mode. If you want to ping and are in inline mode you will see ⊘ Ping. Disconnect one of the RJ-45 cables from the NetTool and then rerun **AutoTest**.*

In order to use all of the functions of the Ping option, make sure you install the NetTool Toolkit software on your PC so NetTool can communicate with your PC via the serial connection.

IP Setup

⇒ Currently, by default and "out-of-the-box," NetTool uses DHCP to configure itself. If you have DHCP on

2-9

your network, there is no need to further configure NetTool.

⇒ Choose **Manual** or **DHCP** IP configuration by selecting the **IP Setup** icon 🔧🗙 (wrench) and accessing the IP Setup screen. You can also do this using NetTool's Setup function.

⇒ If you select **Manual** then go back to DHCP, the IP address is acquired after you select that option and any subsequent time you access the **IP Setup** screen. NetTool uses DHCP protocol to acquire an IP address then uses the address according to DHCP rules.
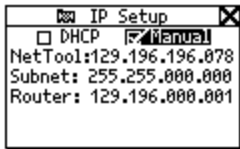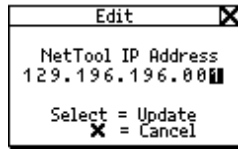
```
┌─────────────────────┐     ┌─────────────────────┐
│ ▨  IP Setup      🗙 │     │       Edit        🗙 │
│ ☐ DHCP   ☑Manual    │     │                      │
│ NetTool:129.196.196.078   │   NetTool IP Address  │
│ Subnet: 255.255.000.000   │   129.196.196.008▮    │
│ Router: 129.196.000.001   │                      │
│                     │     │    Select = Update   │
│                     │     │    🗙 = Cancel        │
└─────────────────────┘     └─────────────────────┘
        ahn214sbmp                   ahn215s.bmp
```

⇒ Selecting **Manual** configuration enables you to statically assign to your NetTool an IP address that complies with your network's addressing scheme. This applies if your network does not use DHCP or if for whatever reason you want to manually configure it.

⇒ Using the down arrow key, highlight the address you wish to configure (in this case NetTool) then press **Select**.

⇒ On the Edit screen use the up and down arrow keys to enter each number of the IP address one at a time (right and left arrow keys move the cursor over) until you enter the whole address.

⇒ Press **Select** after you have entered a valid IP address for your NetTool. NetTool then lists the updated address with the subnet and router IP addresses. In like manner, you will need to configure the subnet mask and router addresses. NetTool assists you by entering the first parts of those addresses based on common addressing rules. Make the final corrections to those addresses as you did the NetTool IP address before you proceed with other tasks.

Note

For manual configuration, make sure any IP address you assign to your NetTool is correct for the subnet you are on.

Pinging a Single Device

From the main menu select **Toolkit** then **Ping** to access NetTool's ping function. You can ping one IP address or a set (Ping Catalog) of addresses that you define using NetTool Toolkit.

⇒ To ping a single device, select **Add New Device**.
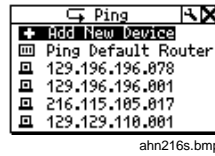
⇒ Enter the address and press **Select**. NetTool pings the device and adds it to a running list (up to 10) of recently pinged devices. The IP address pinged longest ago will drop off the list after the tenth address.

⇒ If you need to ping any address, highlight it and press **Select**.

```
      ↪ Ping        ⬆⬜✕
 ➕ Add New Device
 Ⅲ Ping Default Router
 ⌧ 129.196.196.078
 ⌧ 129.196.196.001
 ⌧ 216.115.105.017
 ⌧ 129.129.110.001
```
ahn216s.bmp

```
      Edit          ✕

      Add New Device
  19█.000.000.000

      Select = Update
         ✖ = Cancel
```
ahn217s.bmp

```
  √ Ping Results    ✕
 IP: 129.196.196.078
 Packets (32 bytes)
  Sent Rcvd Lost Loss
    3    3    0   0%
  Last Min  Max  Avg
   <1   <1   <1   <1 ms
 Done
```
ahn218s.bmp
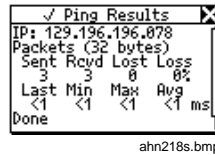
Ping Catalog

The Ping Catalog function enables you to uses lists of IP addresses grouped based on your network configuration. You create the grouping using NetTool Toolkit, the PC-based software that came with your purchase. You can keep lists of common groups of IP addresses (i.e., Marketing, Customer Support, First Floor, etc.). Check out the online help for NetTool Toolkit to learn how to set up and use the Ping List feature.

After defining and uploading the lists using NetTool Toolkit PC software, NetTool displays the catalogs using the names you gave them.

⇒ Select **Ping Catalog** from the **Toolkit** menu.

⇒ Select one of the catalogs by highlighting it then pressing **Select**.

The list of IP address displays with a status icon to the left. Ping results display when you highlight and select one of the IP addresses.

⇒ To ping the list of IP addresses again highlight and select **Restart**.

```
  📶 Toolkit        ✕
 ⚲ Health
 ↪ Ping
 ▣ Ping Catalog
 ▱ Reporter
```
ahn219s.bmp

```
  ↪ Ping Catalog  ⬆⬜✕
 ▦▦ First Floor
 ▦▦ Second Floor
```
ahn220s.bmp

```
  √ Ping Results    ✕
 IP: 129.196.196.001
 Packets (32 bytes)
  Sent Rcvd Lost Loss
    3    3    0   0%
  Last Min  Max  Avg
    0    0    0    0 ms
 Done
```
ahn221s.bmp

⇒ Check *NetTool Setup* to see how to edit a list of addresses.

⧖	Running
✓	Ping Complete
⸬	Problem with the ping. Corresponds with the severity level of problems.
	❗ Low - one packet lost.
	❗❗ Medium - two packets lost.
	❗❗❗ High - three packets lost or device not found.

Introduction

Select **Problems** (Figure 3-1) from the main menu to view the Problem Log. The Problem Log (Figure 3-2) provides a concise list of all problems detected, from physical layer to application layer problems.

ahn300s.bmp

Figure 3-1. Problems

Each type of problem has an icon associated with it. For example, health-related problems are represented by a

stethoscope icon. As you see problems, you will become familiar with the associated icons that display.
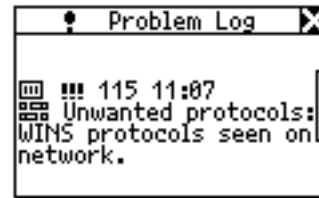
ahn301s.bmp

Figure 3-2. Problem Log

More importantly, you should understand that just because something is listed in the Problem Log does not necessarily indicate a catastrophic problem. For example, Unwanted Protocols are listed in the Problem Log but they are not a major impediment to the operation of the PC on the network.

3-1

Problem Display

The problem display area consists of these elements from left to right: Problem Type, Problem Severity, Problem ID, and Problem Text.

Sample problem →

```
⊠ ‼ 111  9:58
🗄  Unable to connect
to Dns  server:
IP:129.196.196.014
```

Problem type   📖 Naming

 🕒 Health (Util)

 🗄 Server

 🖳 Host

 ⚌ Cable

 🗗 Connectivity

 Ⴌ Link

 🔧 Configuration

 🖮 Network

Problem Severity   ❗ Low   ‼ Medium   ‼❗ High

Problem ID   A problem ID is associated with each problem that helps you reference the problem. Check the online Users Manual to see a text description linked with the numeric code.

Problem Text   This area contains a concise description of the problem found.

You can think of problems fitting into one of two categories, **Link Connectivity** or **Network** level. Link Connectivity problems relate to cabling or cabling properties. Network problems are those involving PC/network configuration settings or PC to server interactions.

Generally, network problems you encounter in setting up or changing a PC's connection to the network can be resolved by checking the network settings area on the PC.

In single-ended mode, NetTool can only report **Unwanted Protocols** and link connectivity level problems. Inline mode is required for all other problems. Read Chapter 1, *Overview*, for an explanation of these two modes.

The great thing about NetTool is that it enables you to see which side the problem lies, between the PC and NetTool or between NetTool and the network itself. Whether it is a

cabling problem or a protocol mismatch, NetTool helps you isolate a problem and keep things running.

The following section lists the problems that NetTool can detect. Each problem is explained in more detail (if needed) and a possible **Remedy** is listed. Every network is complex and the remedy listed is meant to help you start troubleshooting. This is not an exhaustive troubleshooting guide.

Link Connectivity Problems

These problems involve cabling or cabling properties and are classified as follows:

Problem: *Speed mismatch*

Explanation: The network is running at 10 Mbps and the PC is running at 100 (or vice versa). This problem prevents connection to the network.

Remedy: Correct the speed mismatch by making sure both devices are running at the same speed.

Problem: *Pair mismatch*

Explanation: Link pulse is being sourced on the same wire pair by both sides. This problem does not prevent connection to the network. NetTool automatically swaps the pairs to correct this problem.

Remedy: Check cabling. It could be plugged into an uplink port. Also, there could be a crossover cable between NetTool and the device.

Problem: *Duplex mismatch*

Explanation: One side is running at half duplex and the other is running full duplex. This problem prevents connection to the network.

Remedy: Reconfigure the devices so the duplex settings match.

Problem: *Polarity reversed*

Explanation: The polarity of the detected link pulse is reversed.

Remedy: There is most likely a pair reversed. Check cabling to ensure the pairing is corrected.

Problem: *Level low*

Explanation: The link pulse detected from a device is low. This can negatively affect performance.

Remedy: Replace the NIC card or change hub/switch ports. This could also be caused by excessive cable attenuation.

Problem: *Transmit pair open*

Explanation: The wire pair used for transmit (1,2 or 3,6) has an open. This problem prevents connection to the network.

Remedy: Isolate the cable and replace it.

Network Problems

This section lists all the network problems with a brief explanation of each problem. Also listed are some basic corrective steps you can take for each problem (if applicable). Keep in mind this is not an exhaustive list of troubleshooting steps. If you know what you need, the network administrator for the network you are troubleshooting can provide you with a lot of information to correct these problems.

Health ♨

Problem: *Short Frames received (also jabber/FCS).*

Explanation: Short Frame is a frame smaller than the minimum legal size (less than 64 bytes after the preamble) with a good frame check sequence. Jabber is defined as frames longer than the maximum legal size (greater than 1518 bytes). Frame Check Sequence (FCS) Bad means the header information is probably correct but the checksum calculated by the receiving station does not match the checksum appended to the end of the frame.

Remedy: Check NIC card or NIC driver file. This could also be caused by cabling or grounding problems.

Problem: *Excessive utilization seen (also collisions).*

Explanation: Excessive utilization/collisions is defined as a collision rate of greater than 5 percent or a utilization rate of greater than 70 percent.

Remedy: If this problem exists everywhere on the network, it is most likely caused by excessive traffic. If it is isolated to one PC, you can suspect cabling. For collisions, suspect excessive traffic. Reduce traffic on the network. Check cabling. Change the NIC card or switch/hub port. For utilization, reduce the number of stations in the collision domain. Install a switch. Use a tool like the Fluke LanMeter™, OneTouch™ Network Assistant, or Protocol Inspector™ to determine the top contributors to further segment this network.

NetWare

Problem: *Ethernet frame-type mismatches.*

Explanation: In order for the PC and network to communicate they both must be configured for the same frame type (802.3-raw, 802.2, Ethernet II, and SNAP). You can configure a client for a single frame type. A server can optionally be configured to recognize some or all frame types.
Remedy: Use NetTool to determine the frame types used. If the client is suspected, determine the frame type of the client. Determine frame types enabled on server.

Problem: *No nearest server replies seen on network.*

Explanation: After a PC boots up it sends a broadcast to initiate a connection with the closest server. If after three attempts there is not response, this problem is listed in the problem log.

Remedy: Ensure that GNS (Get Nearest Server) is enabled on the server and check connectivity to routers by doing an IPX ping with a Fluke LanMeter™ or OneTouch™ Network Assistant. Check the Key Devices list. If the routers are listed then NetTool is seeing the routers but the PC is not. You might suspect a bad NIC card or NIC card configuration file.

Problem: *No first responder seen on network. Unable to configure PC network number.*

Explanation: During boot up, a PC running IPX sends a query to the router asking for its network number. If after 3 queries there is no response, this problem is listed in the problem log.

Remedy: Check connectivity from the PC to the network drop.

TCP/IP

Problem: *PC using incorrect IP subnet mask.*

Explanation: NetTool has determined that the PC is not properly configured.

Remedy: Access PC network properties and correct the IP subnet mask.

Problem: Router issued ICMP redirect. *Hosts or devices using incorrect gateway/routers.*

Explanation: NetTool has determined that the PC is not properly configured.

Remedy: Access PC network properties and correct the IP address. You should also make sure the DHCP server is giving the correct addresses.

Problem: *Duplicate IP detected.*

Explanation: NetTool has detected a duplicate IP address configured on a remote device. You should never have duplicate IPs running on the network. This problem prevents the PC from connecting to the network until it is resolved.

Remedy: Identify at least one of the devices and change its address to a valid one that is not being used.

Host Configuration

Problem: *BootP/DHCP server not responding.*

Explanation: The PC is dynamically configured to find DHCP servers and none are found.

Remedy: Check the router and the DHCP server itself to make sure they are running. Either could be misconfigured. Check connectivity to the DHCP server.

Problem: *DHCP server issuing IP address that causes duplicate IP on network.*

Explanation: The DHCP server in question is not detecting an address and is provisioning a duplicate.

Remedy: This could be caused by a statically configured PC. Find the statically configured PC on the network and changes its IP address to a valid and unique IP address. Merging two unique networks into one could lead to this

type of problem. It could also point to a DHCP server problem or an implementation bug.

Name Resolution

Problem: *No DNS server found on network to resolve names.*

Explanation: The PC is configured to use DNS (Domain Name Server) and none can be found.

Remedy: Make sure the DNS server is up and running. Access PC network properties and make sure settings are correct.

Problem: *DNS resolution failed.*

Explanation: There are multiple DNS servers on the network and the PC is configured for the wrong one.

Remedy: Find out the correct DNS information, access PC network properties and configure the PC with that information.

Problem: *WINS resolution failed.*

Explanation: The DNS server cannot determine the NetBIOS names.

Remedy: You can manually fix this problem in the DNS configuration section of network properties.

Problem: *Incorrect WINS server xxx.xxx.xxx.xxx configured on PC.*

Explanation: There are multiple WINS servers on the network and the PC is configured for the wrong one.

Remedy: Find out the correct WINS information, access PC network properties and configure the PC with that information.

Problem: *No WINS server found on network to resolve names.*

Explanation: The PC is configured to use WINS (Windows Internet Name Service) and none can be found.

Remedy: Make sure the WINS server is up and running. Access PC network properties.

Problem: *PC WINS incorrect.*

Explanation: NetTool sees a WINS server on the network but not the one configured on the PC in question.

Remedy: View the details of the WINS server by accessing the **Key Devices** list. Change the PC configuration to match.

NetBIOS

Problem: *Incorrect Workgroup or Domain configured on PC.*

Explanation: There are specific names and privileges needed for access to domains or workgroups. The name is incorrectly configured or privileges are not set up.

Remedy: Make sure what domain names and privileges are required and correct the PC configuration.

Problem: *Unable to find Primary Domain Controller (PDC) for network.*

Explanation: These domain controllers act as gatekeepers for domain access. If one of them isn't found on the network, then no access can be granted.

Remedy: Various

Problem: *xxx.xxx.xxx.xxx causing duplicate NetBIOS name.*

Explanation: Only one unique NetBIOS name is allowed on a domain.

Remedy: The name specified on the PC needs to be changed to eliminate duplication.

Problem: *PC involved in MB elections.*

Explanation: NetTool sees packets from the PC that are generating master browser elections on the network. This can be the source of excessive traffic and slow performance.

Remedy: Take preventive measures within the PC configuration to stop the PC from generating Master Browser elections.

Web

Problem: *Unable to connect to HTTP/proxy server.*

Explanation: The standard proxy port is 1080. The HTTP port is 80 on the server.

Remedy: Correct the naming or port assignments in the setup area of the web browser software.

Email

Problem: *Unable to connect to SMTP mail server.*

Explanation: The Simple Mail Transfer Protocol (SMTP) server information is either not configured or configured incorrectly on the PC. The server itself could be down as well.

Remedy: Access NetTool's **Key Devices** list to view information about this server and then make corrections within the mail setup area of the PC.

Problem: *Unable to connect to POP2 server.*

Explanation: The PC cannot find the POP2 server it is configured to find. The server itself could be down as well.

Remedy: Access NetTool's **Key Devices** list to view information about this server then make corrections within the mail setup area of the PC.

Problem: *Unable to connect to POP3 server*

Explanation: The PC cannot find the POP3 server it is configured to find. The server itself could be down as well.

Remedy: Access NetTool's **Key Devices** list to view information about this server then make corrections within the mail setup area of the PC.

Problem: *Unable to connect to IMAP server.*

Explanation: The PC cannot find the IMAP server it is configured to find. The server itself could be down as well.

Remedy: The IMAP server information is either not configured or configured incorrectly on the PC. Access NetTool's **Key Devices** list to view information about this server.

Printer

Problem: *Unable to connect to IP print spool server.*

Explanation: NetTool is detecting that the PC is not able to connect the configured IP printer server. The server itself could be down as well.

Remedy: Access NetTool's **Key Devices** list to view a list of IP printers and correct the problem in the printer setup area on the PC.

Problem: *Unable to connect to IP print spooler.*

Explanation: The print spooler configuration on the PC is either incorrect or the spooler itself is down or offline.

Remedy: Check the spooler itself and then access NetTool's **Key Devices** list to view a list of IP devices and correct the problem in the printer setup area on the PC.

Unwanted protocols (when enabled)

The purpose of the Unwanted Protocols feature is to enable you to find protocols that you do not want on the network. For example, if you have migrated away from NetWare on the network, NetTool will flag a device that still has NetWare configured on it.

Problem: *NetBEUI detected*

Problem: *WINs detected*

Problem: *NetWare detected*

Problem: *MB (master browser) election detected*

Appendices

Appendix A
Specification

General Specifications

Media Access 10Base-T and 100Base-TX.

Cable Tests Internal wiremap, cable length, opens, shorts, and split pairs.

Ports Shielded Hub/NIC connector (RJ-45). Serial port – customized 2.5mm "stereo" input jack.

Interface Push button navigation of icon/menu-driven view.

Battery Removable alkaline batteries or optional rechargeable NiMH batteries.

Dimensions 12.5 cm x 7.8 cm x 4.3 cm

Weight 0.21 kg (0.46 lbs).

Warranty One year. (Extended warranty available).

LED Indicators (4) 2 on each side (Link, Utilization, Collision, and Error).

Environmental Requirements

Operating Temperature	10 °C to 30 °C with up to 95 % Relative Humidity
	10 °C to 40 °C with up to 75 % Relative Humidity
Non-Operating Temperature	-20 °C to +60 °C
Approvals	The Fluke NetTool has the following approvals: European Standard EN 60950, CSA/CAN C22.2 No. 950, and UL 1950.
Approvals (Accessories)	The optional Universal AC Adapter for NetTool has UL, CSA, and TÜV approvals or other approvals valid in the USA, Canada, and Europe.
Electromagnetic Interference	The Fluke NetTool complies with European standard EN 61326 Class B.
Certifications	Complies with European CE directive: EMC directive 89/336/EEC and low voltage directive 73/23/EEC.
Connection to public telephone network	NetTool should never be connected to the public telephone network.

Service and Repairs

To locate an authorized service center, visit us on the World Wide Web at www.flukenetworks.com or call Fluke Networks using the phone numbers listed:

USA : 1-888-99-FLUKE (1-888-993-5853)

Canada: 1-800-36-FLUKE (1-800-363-5853)

Europe: +31-402-678-200

Japan: +81-3-3434-0181

Singapore: +65-738-5655

Anywhere in the world: +1-425-446-4519

For operating assistance in the USA, call 1-800-258-5853.

Maximizing Battery Life

The life of batteries is strongly influenced by the care that they receive.

The greatest enemy of batteries is heat. When using the optional rechargeable batteries, avoid charging them when they are hot.

The battery life will also be shortened if you frequently leave the NetTool in a hot place, such as a car on a warm day, and then charge the batteries immediately upon returning to your office.

Cleaning the Display

Clean the screen by wiping it gently with a soft cloth or tissue moistened with isopropyl alcohol.

10BASE2

Sometimes called ThinLAN or CheaperNet, 10BASE2 is the implementation of the IEEE 802.3 Ethernet standard on thin coaxial cable. The maximum segment length is 185 meters.

10BASE5

Sometimes called ThickLAN, 10BASE5 is the implementation of the IEEE 802.3 Ethernet standard on thick coaxial cable. The maximum segment length is 500 meters.

10BASEF

A point-to-point fiber link. This is the draft specification for IEEE 802.3 Ethernet over fiber optic cable.

10BASE-T

10BASE-T is the implementation of the IEEE 802.3 Ethernet standard on unshielded twisted-pair wiring. It is a star topology, with stations directly connected to a multi-port Hub, and it has a maximum cable length of 100 meters.

100BASE-TX

100BASE-TX is the implementation of the IEEE 802.3u Ethernet standard on two pairs of unshielded twisted-pair wiring. It is a star topology with a maximum cable length of 100 meters. The maximum network diameter is 205 meters with two class II repeaters.

802.2

This IEEE standard specifies Logical Link Control (LLC), which defines services for the transmission of data between two stations at the data-link layer of the OSI model.

802.3

Often called Ethernet, this IEEE standard governs the Carrier Sense Multiple Access/Collision Detection (CSMA/CD) networks. Typical cabling standards are 10BASE-T, 10BASE2, and 10BASE5.

Access Method

The set of rules by which the network determines what node has access to the network. The two most popular access methods are Carrier Sense Multiple Access/Collision Detection (Ethernet) and token passing (Token Ring and ARCNET).

Anomaly

An impedance discontinuity causing an undesired signal reflection on a transmission cable.

AppleTalk

AppleTalk is a networking protocol primarily used for communications between Macintosh computers and Apple printers. The AppleTalk network is segmented into zones.

C-2

ARP (Address Resolution Protocol)

A member of the TCP/IP protocol suite, ARP is the method by which a station's MAC address is determined given a station's IP (Internet Protocol) address.

Attenuation

A reduction in the strength of a signal; the opposite of gain.

Bandwidth

Bandwidth is the rate at which data can be transmitted over a channel, measured in bits per second. For example, Ethernet has a 10 Mbps bandwidth and FDDI has a 100 Mbps bandwidth. Actual throughput is almost always less than the theoretical maximum.

BPS

Bits per second. A measure of speed or raw data rate. Often combined with metric prefixes as in kbps (for thousands of bits per second) or Mbps (for millions of bits per second).

Bridge (Switch)

A device that links two or more networks that use the same OSI Data Link protocol. A bridge evaluates source and destination addresses to pass only frames that have a destination on the connecting network.

Broadcast
A message that is addressed to all stations on a network. For Ethernet networks, the MAC broadcast address is FFFFFFFFFFFF.

Broadcast Storm
A situation in which a large number of stations are transmitting broadcast packets. This typically results in severe network congestion. This problem is usually a result of a misconfiguration.

Bus Topology
A bus topology is a network architecture in which all of the nodes simultaneously receive network traffic. Ethernet is a bus topology.

Byte
A collection of bits. A byte usually contains 8 bits.

Characteristic impedance
Characteristic impedance is the opposition (resistance and reactance) to signal propagation on a cable. It depends on the physical properties of a cable, which are determined at the time of manufacture. Manufacturing variations can cause slight differences in characteristic impedance for the same cable type.

Client
A client is a computer that make requests of a server. A client has only one user; a server is shared by many users.

Collision
A collision is the result of two or more nodes transmitting at the same time. Excessive collisions are most often caused by a problem with the physical media.

Crossed Pair
A wiring error in twisted pair cabling in which a pair on one connector of the cable is wired to a different pair on the other end of the cable.

Crosstalk
Crosstalk is electrical interference generated by signal coupling between wires in a multiwire cable.

CSMA/CD (Carrier Sense, Multiple Access with Collision Detection)
In CSMA/CD, each node or station has equal access to the network. Before transmitting, each station waits until the network is not busy. Since each node has equal access to the network, a collision (two stations transmitting at the same time) can occur. If a collision occurs, the affected nodes will wait a random time to retransmit. Ethernet uses the CSMA/CD access method.

dBm
Decibels below 1 mW (1 milliwatt). The logarithmic measure of the ratio of the output power of a signal to an input signal of 1 mW.

DECnet
Digital Equipment Corporation's set of communication protocols for networking computers.

Destination Address
The address of the station receiving a frame.

DNS
Domain Name Services provides a mechanism that allows users to remember logical machine names rather than IP addresses. DNS provides mapping between a machine name (e.g., www.fluke.com) and its IP address (e.g., xxx.xxx.xxx.xxx).

EIA568
Electronic Industries Association Commercial Building Telecommunications Wiring Standard. Specifies maximum cable lengths, installation practices, and performance specifications for generic building wiring.

Encapsulation
Encapsulation is the method of placing one protocol into another protocol's format. For example, in a Novell Ethernet environment there are four different methods to encapsulate IPX in Ethernet/802.3 frames: 802.3 raw, 802.2, Ethernet II, and SNAP.

Ethernet
Ethernet is a 10 Mbps topology that runs over thick coax, thin coax, twisted-pair, and fiber-optic cabling systems.

EtherTalk
EtherTalk is the AppleTalk network protocol running over the Ethernet network transport.

Fast Ethernet
Industry standard terminology for 100Base-T. Industry groups do not agree on using the term to refer to 100VG-AnyLAN; some call 100VG-AnyLAN a Fast Ethernet technology while others do not.

FCS (Frame Check Sequence)
A field transmitted in LAN frames that encodes error checking information.

Frame
A frame is a unit of data transmission divided into groups of bits. The header and a check sequence form the frame.

Full-Duplex
10Base-T and 100Base-TX network operation using a switching Hub to establish a point-to-point connection between LAN nodes that allows simultaneous sending and receiving of data packets. Full-duplex performance is twice that of half-duplex performance. A 10Base-T full-duplex network is capable of 20 Mb/s data throughput, while a full-duplex 100Base-TX network is capable of 200 Mb/s throughput.

Half-Duplex
Network operation is one direction at a time only; either sending or receiving data packets, but not both at the same time.

Hops
Most commonly defined as the number of routers traveled by a frame to reach its destination.

Hub (Repeater)
Today, most often referred to in 10BASE-T networks. A 10BASE-T Hub is essentially a multiport repeater Hub with each segment dedicated to a single 10BASE-T connection.

ICMP (Internet Control and Message Protocol)
A communication protocol used by every device that uses IP. ICMP reports errors that occur during the delivery of packets on the network.

IP (Internet Protocol)
IP is the network layer protocol for the TCP/IP suite.

IP Address
An IP address is a series of four numbers separated by dots ("."), each of which is between 0 and 255. An IP address must be unique to a machine or the network will not be able to properly deliver network information to that machine. The address is made up of a network number, a subnet number, and a node number.

IP Network Number
The network number consists of the first two numbers of a device IP address on a network.

IPX (Internetwork Packet Exchange)

IPX is the network layer protocol for Novell's NetWare protocol suite.

Jabber

A frame greater than the maximum legal size (greater than 1518 bytes) with a good or bad frame check sequence. In general, you should not see jabbers. The most likely causes of jabbers are a faulty NIC/driver or perhaps a cabling problem.

LAN (Local Area Network)

A physical network technology used over short distances (up to a few thousand meters) to connect many workstations and network devices using a communication standard (Token Ring or Ethernet, for example).

Late Collision

A collision that occurs after the first 64 bytes in a frame. In 10BASE-T networks, late collisions will be seen as frames with a bad FCS. Causes of Late Collisions are a faulty NIC or a network that is too long. A too-long network is one in which the end-to-end signal propagation time is greater that the minimum legal sized frame.

Layer

One of seven levels in the Open Systems Interconnection (OSI) reference model. See OSI.

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Link Pulse

A single-bit test pulse that is transmitted at least every 150 milliseconds during idle periods on 10BASE-T link segments to verify link integrity.

Manufacturer Prefix

The standard partial address used to identify a particular manufacturer. The prefix of the address is predefined uniquely for each manufacturer, while the remainder of the address uniquely identifies the station.

Master Browser

The Master Browser maintains the browse list, a list of all servers in the master browser's domain or workgroup.

MBPS

Millions of bits per second. See BPS.

Multicast

Packets that are directed to a group of nodes rather than to a single node or all nodes. This is contrasted to a broadcast packet, which is directed to all nodes.

NEXT

Near-end crosstalk; crosstalk between two twisted pairs measured at the same end of the cable as the disturbing signal source.

NIC (Network Interface Card)
A network interface card is the adapter card that plugs into a computer to provide a network connection.

Node Number
Node number identifies the device of interest.

NVP (Nominal Velocity of Propagation)
The speed that a pulse travels along a cable, expressed as a percentage of the speed of light in a vacuum.

Packet
A group of bits in a defined format, containing a data message that is sent over a network.

Ping
Packet Internet Groper (ping) is a common method of accessing devices on a network to see if they are active. Ping sends a packet from one device, attempts to "bounce" it off another device, and "listens" for a reply. A successful ping indicates that the network path to that device (including the routers in between) are up and functioning.

Protocol
A "language" that a device uses to communicate on a network. Examples of protocols are: TCP/IP or AppleTalk.

Primary Domain Controller
A device that manages the common security policy and user account databases for a group of NetBIOS servers. The election protocols are such that the primary domain controller has a tendency to become the master browser.

Remote Collision
A collision that occurs on the other side of a repeater. Since a 10BASE-T Hub is a multi-port repeater with a "segment" dedicated to each station, 10BASE-T collisions are remote collisions.

Repeater
A repeater is a layer-1 device that regenerates and retimes frames.

Router or Gateway

A router is a device that connects subnets together. Any packets destined for a device on a different subnet are given the subnet's router. Routing between subnets can involve multiple routers. A user's machine must be configured to know the IP address of the router for its subnet in order to communicate with machines on other subnets. Mis-identified gateways are a common problem for manually configured IP settings.

RJ-45 Connector

A modular connector used for UTP wiring. The RJ-45 connector has eight conductors to accommodate four pairs of wires, and it has become the dominant connector used in Ethernet and Token Ring UTP installations.

Router

A router is a network-layer device that connects networks using like network-layer protocols. Routers can span different network topologies. For example, a router can interconnect two IP subnets. For a router to pass traffic, unlike a bridge, it must be configured for the desired protocol. Routers are more difficult to configure but offer greater security.

Runts

Typically defined as a Ethernet frame which is less than 64 bytes. Depending on what device is counting the runts, the frame check sequence may be good or bad.

SAP (Service Advertising Protocol)

A NetWare protocol used to request and broadcast information about file servers, print servers, and other services on a network.

Short Frame

A frame less than the minimum legal size (less than 64 bytes) with a good frame check sequence. In general, you should not see Short Frames. The mostly likely cause of a Short Frame is a faulty adapter card or driver.

Signal/Noise Ratio

The ratio of worst-case received signal level to noise level measured at the receiver input (expressed in dB). The S/N ratio may be expressed as NEXT(dB) - Attenuation(dB), provided idle channel background noise is low. Higher S/N ratios provide better channel performance.

SNAP (Subnetwork Access Protocol)
An IP protocol that is an extended version of the IEEE LAN logical link control (LLC) frame. SNAP provides access to additional protocols and allows vendors to create their own protocol sub-types.

SNMP (Simple Network Management Protocol)
Designed by the Department of Defense and commercial TCP/IP implementors, SNMP is part of the TCP/IP protocol suite. SNMP operates on top of the Internet Protocol and can manage virtually any network type.

Source Address
The address of the station originating a frame.

Split Pair
The error of using wires from two different twisted pairs. This error cancels the crosstalk elimination characteristics of twisted pair wiring and produces crosstalk. Use a single twisted pair for Transmit and another twisted pair for Receive to minimize crosstalk.

Subnet
A subnet is a section of the TCP/IP network. Each subnet has a unique subnet number and is connected to a router which enables connection to other subnets.

Subnet Number
The subnet number is programmed into the subnet router and follows the network number in an IP address.

TCP/IP (Transmission Control Protocol/Internet Protocol)
TCP/IP is the protocol suite originally developed by the Advanced Research Projects Agency (ARPA) to interconnect a research network. It later evolved into the Internet. The TCP/IP is an open standard not owned by any particular organization. The term TCP/IP is often used to refer to the entire suite of related protocols that includes IP, FTP, Telnet, RIP.

Topology
Topology is the organization of network components. The topology of Token Ring network components is a ring.

Transport
Transport refers to the physical method by which data is transmitted (e.g., Ethernet, Token Ring, etc.). Different physical network hardware and cable layout are required for different transports.

Uptime
The amount of uninterrupted time that a resource (such as a print server) has been available.

Transceiver

In Ethernet networks, a transceiver is used to couple electrical signals to and from an adapter to the transmission media. In ThinLAN and 10BASE-T networks, the transceiver is integrated directly onto the network adapter card.

Twisted Pair

A pair of wires that are twisted together to minimize crosstalk. Crosstalk is minimized with twisted pair wiring by canceling the magnetic fields generated in each of the twisted wires. Twisted pair cable (UTP or STP) is typically made up of several twisted pairs of wires.

UTP (Unshielded Twisted Pair)

Cable that is twisted by pairs but not shielded. This minimizes crosstalk by canceling the magnetic fields generated in each of the twisted wires, but only when a single twisted pair is used for Transmit or Receive

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