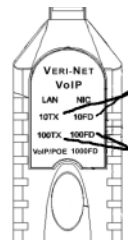


AUTO-NEGOTIATION

When two or more operational mode indicators are lit, the Link being tested is capable of Auto-negotiating to the highest common level of operation with a Link Partner.

After the Veri-Net VoIP begins transmitting Link signals, the Link Partner will Auto-negotiate to the highest common mode and the Veri-Net VoIP indicator for



that mode will light, verifying the Auto-negotiation function. (Note: Auto-negotiation timing varies greatly, therefore, not all equipment will complete Auto-negotiation with the Veri-Net VoIP. For equipment with long time constants, the capabilities are displayed but the nego-

tiation to the mode does not occur. Test a known good port to determine equipment response time.)

LINK SIGNAL TYPE

Three different signals can be used to establish a Link: a Link Code Word, an NLP or an MLT-3 waveform. The Link Code Word is specific in both Link speed and duplex mode. 100BaseTX Links always use Link Code Words. The NLP is specific in speed (10Mbps) but ambiguous in duplex mode (half or full). The MLT-3 waveform is also specific in speed (100Mbps) but ambiguous in duplex mode. Duplex modes for equipment that use NLP or MLT-3 signaling must be carefully managed to ensure proper Link operation.

Example: Most 10/100 switches, when configured to either 100Mbps full duplex or half duplex mode, use the same MLT-3 signal to setup a Link. If a switch port that is set to 100Mbps full duplex is connected to a NIC set for Auto-negotiating, the NIC will establish a half duplex Link based on the MLT-3 signal from the switch. The duplex configuration mismatch will

cause the Link to perform poorly due to high error rates and collisions.

The Veri-Net VoIP indicates an MLT-3 signal by alternately blinking the 100TX and 100FD indicators. An NLP signal is indicated by alternately blinking the 10TX and 10FD indicators. When this condition exists, the Link Partners must be configured as follows:

- same speed and duplex mode
- one in half duplex mode and one in Auto-negotiation mode
- both in Auto-negotiating mode

for the Link to operate properly. Duplex mismatch is a common network problem. For improved network management, the Veri-Net VoIP warns the user when ambiguous duplex mode Link signals are detected.

BATTERY LIFE

Auto Power Down - The Veri-Net VoIP will automatically turn off after approximately 10 minutes of operation.

BLACK BOX
NETWORK SERVICES

JUNE 2004
TS200A

VERI-NET VoIP



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BOX CONTENTS

- Veri-Net VoIP Link Tester
- RJ-45 Coupler
- 9 Volt Alkaline Battery
- User Guide

BATTERY

The Veri-Net VoIP operates on one 9 volt alkaline battery. Remove the battery cover at the bottom of the unit and insert the battery with the terminal orientation as shown. Battery polarity is marked on the back of the battery cover and inside the



TECHNICAL OVERVIEW

The IEEE 802.3 Standards require 10/100/1000 BaseTX LAN equipment to use a signaling system to establish a Link between two devices called Link Partners. 10BaseT Ethernet devices typically use a Normal Link Pulse to establish the Link. 100/1000 BaseT Ethernet equipment (and some 10BaseT products) use a burst of Fast Link Pulses (FLPs) to transmit a Link Code Word defining the capabilities of the device. If both Link Partners have Auto-negotiation capability, a Link is established based on the following priority:

1. 1000BaseTX Full Duplex
2. 1000BaseTX Half Duplex
3. 100BaseTX Full Duplex
4. 100BaseTX Half Duplex
5. 10BaseT Full Duplex
5. 10BaseT Half Duplex

The IEEE 802.3 Standards do *not* require Ethernet equipment to support Auto-negotiation or more than one speed or duplex mode. A second type of signaling called Parallel Detection (a continuous MLT-3 waveform) can also be used to establish a 100BaseT Ethernet Link. Parallel Detection signaling does *not* differentiate between half duplex and full duplex mode which can lead to poor

network performance if both Link Partners are not properly configured. Ethernet LAN equipment that has been manually configured to a specific speed and duplex mode may establish a Link with a Link Code Word, an NLP or a Parallel Detection (MLT-3) signal. Knowing the type of signaling used on a Link is essential to optimizing system performance. The Veri-Net VoIP detects and decodes the different Link signals on 10/100/1000BaseT Ethernet networks and displays the equipment configuration signaling type.

The Veri-Net VoIP also tests Power over Ethernet (PoE) as defined by IEEE Standard 802.3af and VoIP ports for voltage levels.

OPERATION

The Veri-Net VoIP test consists of four steps: (1) detecting and measuring a powered Ethernet port (PoE); (2) detecting a VoIP port, turning on and measuring the voltage; (3) detecting Link signals; (4) transmitting Link signals.

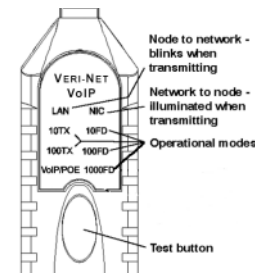
Insert the Veri-Net VoIP plug end in to the RJ-45 port of a hub, switch, network interface card, wall outlet, or attach to a UTP or STP cable with the RJ-45 coupler.

Press and release the "TEST" button. The Veri-Net VoIP/PoE indicator will start blinking while the wire pairs are scanned for voltage. When a voltage of 40VDC or more is detected, the indicator will illuminate green continuously. If the voltage is between 18VDC and 40VDC the indicator will illuminate red continuously. (A device connected to a port that is providing less than 40VDC is unlikely to operate properly.)

When no voltages above 18 VDC are detected, the Veri-Net VoIP tests for a VoIP port. When VoIP

Link Signals are received, the required signals are sent back to the port to turn on the power. The indicator illuminates green or red continuously at the same voltage levels as a PoE port described above.

After the VoIP test times out, the LAN and NIC indicators start blinking while the wire pairs are scanned for Ethernet Link Signals. Link signals



detected on wire pair 3,6 will illuminate the LAN indicator green continuously. Link signals detected on wire pair 1,2 will illuminate the NIC indicator green continuously. Link signals detected on both wire pairs will

illuminate the LAN and NIC indicators green continuously showing the port has auto switching capability. When Link signals are detected on a wire pair, the indicator(s) for the speed and duplex modes are illuminated. After one second, the Veri-Net VoIP automatically transmits a pattern of Link signals to the Link Partner (LAN indicator blinks as the signals are transmitted for a LAN or auto switching port, NIC indicator blinks for a NIC port). The Link indicator on the hub or switch at the far end will also blink indicating which port is connected to the Veri-Net VoIP. (Hubs/switches have different Link indicator time delays. The blink rate of the equipment may not exactly match the blink rate of the Veri-Net VoIP. Determine the blink pattern directly at a hub/switch port prior to running tests from a remote outlet.) The Link light on the NIC will light verifying two-way Link communications.

If no signals are detected, the LAN and NIC indicators illuminate red continuously.