Advanced Testing and Troubleshooting

for Carrier and Enterprise Networks

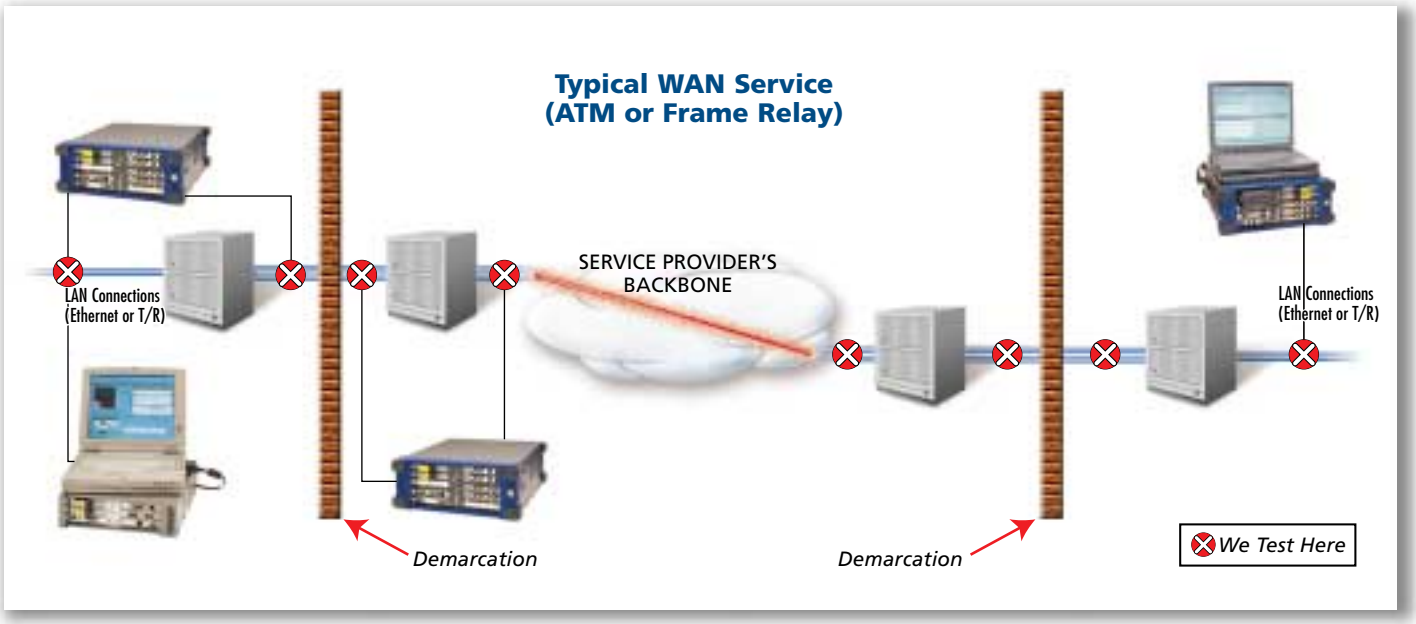
GN Nettest

Total care for networks

WinPharaoh **Versatile** troubleshooting tool that's up to *any* job, on *any* network.

No matter how big or complex your network is, the WinPharaoh ATM/LAN/WAN Analyser gives Network Operations and support staff all the monitoring, analysis and troubleshooting tools they need maintain network availability, reduce the mean time to repair, and improve Quality of Service (QoS).

At its core is fast reliable hardware that is able to tackle whatever high speed technology you need tested. WinPharaoh delivers performance you can depend on, all in a convenient, compact and fully customizable choice of expansion units (QXU-1000, PXU-600).

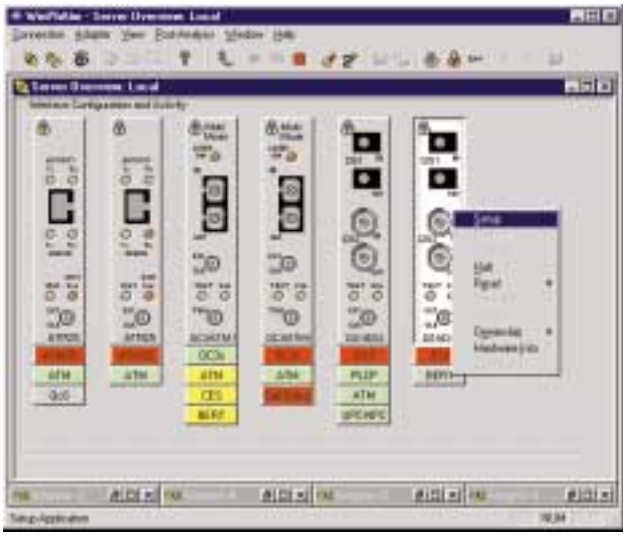


Find trouble fast, anywhere on the network.

WinPharaoh lets you test both sides of inter-connection devices simultaneously, capturing data at full line rate and accurately time-stamping it. Advanced GPS time synchronization and statistical correlation extends your reach to any location on the network, anywhere in the world, and tracks down even the most subtle Private Network/Internet and WAN-related problems.

Powerful WinPharaoh Application Suite

WinPharaoh's intuitive Windows® based applications make short work of tracking down and fixing network problems. Using an easy-to-read, easy-to-learn user interface, even complex testing routines can be performed with just a few mouse clicks.



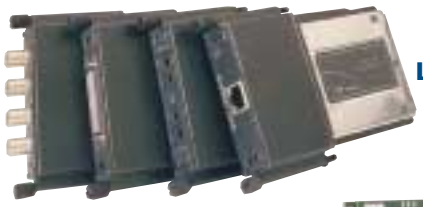
Cost-Effective, Modular Hardware Architecture

In addition to the software, the WinPharaoh testing solution includes high performance data acquisition hardware. The modular design lets you build, and, if needed, re-configure, a tool that's perfectly matched to the needs at hand. Offering the highest interface port density available in a field portable product, the same instrument can be used for LAN, WAN and ATM testing without any hardware swapping.

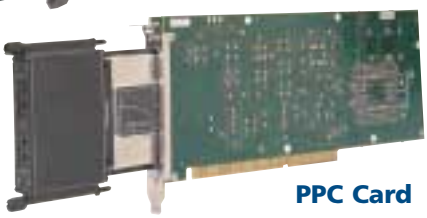
In addition to 6- or 10-slot portable chassis configurations, WinPharaoh can also be rack-mounted for distributed and test-head applications, or incorporated into a desktop PC or luggable PC.

QXU-1000

LAN, WAN and ATM Interfaces



LIMs



PPC Card

A full range of integrated, high performance line interface modules (LIMs) allows line rate monitoring, transmission and microsecond time-stamping of captured network data.

- LAN Ethernet, Fast Ethernet, Token Ring, FDDI
- WAN RS232, RS422, RS423, RS449, RS530, V.35, X.21/V.11, DS1, E1, Primary Rate ISDN T1/E1
- ATM 155 Mbps OC3/STM-1 (Single Mode and Multi Mode), STM-1e, 155 Mbps UTP-5, DS3/DS1, E3/E1, ATM 25.6

* New interfaces are continually in development to keep pace with recent advances in networking technology. Please Contact GN Nettest for availability.

Powerful, easy-to-use interface simplifies complicated troubleshooting routines.

WinPharaoh runs simultaneous ATM and LAN/WAN tests on the same hardware platform, while viewing results—for both segments—either locally or remotely from any PC.

Powerful, flexible monitoring, analysis and emulation capabilities pinpoint LAN/WAN problems fast.

To really earn its keep, a test tool has do more than just monitor packets and watch traffic. It has to perform under actual operating conditions, including worst case scenarios. And it has to help you identify trouble spots and figure out what's causing them.

Your most common LAN/WAN testing activities can be configured and carried out with only a few mouse clicks, including New Services Provisioning, Centralized Monitoring, Maintenance & Troubleshooting, and Service Restoration Verification.

PXU-600

Full line rate capture of network traffic

WinPharaoh captures data at full line rate to on-board RAM or directly to a PC hard drive. With 64MB of base RAM (upgradable to 128MB) it can see more data than any other product in its class.

Real-time monitoring and analysis

Detailed real-time statistics provide the most effective means of troubleshooting most network problems. WinPharaoh delivers extensive real-time traffic statistics with "Expert" protocol analysis, all the way through layers 3 and 4. For most troubleshooting situations, this virtually eliminates the need for time-consuming manual protocol decoding.

Expert Analysis System

WinPharaoh's unique Expert system gives you yet another powerful tool for measuring the performance of your network. It is based on a four-part model that includes:

Statistical Analysis

WinPharaoh monitors traffic patterns on local LAN/WAN segments and detects when statistical parameters have been violated. You can define your own "expert" thresholds for statistics, including broadcast counts, per station or router utilization and datalink layer error conditions such as collisions, ring purges or alignment errors.

Error Code Detection

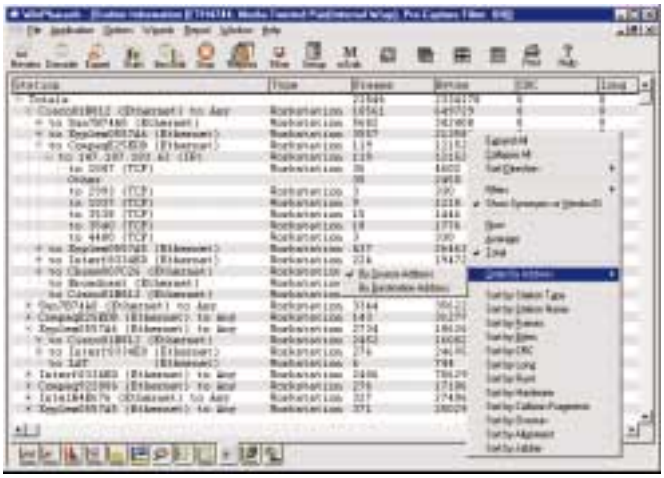
WinPharaoh can automatically detect error codes, flag the individual frames that include an error and provide an English description of the error.

Context-Sensitive Events

The Expert system can examine multiple frames and compare events in time relation, to recognize when errors have occurred.

Detailed Analysis

This includes hundreds of detailed "expert event" descriptions, interpreting the reason for detected errors and suggesting possible network solutions.



Using WinPharaoh's comprehensive Traffic Analysis features, you can monitor traffic patterns and set your own "expert" thresholds.

Baseline statistics help keep your network healthy

A powerful suite of real-time statistical applications report network metrics, reveals long-term trends and defines traffic baselines. Wire speed, hardware-based statistical counters assure no data loss, and accurately monitor layers 1 and 2 for network utilization, broadcast counts, error conditions and frame size distribution.

The Traffic Analysis application combines complex sorting operations on network traffic with powerful statistical analysis functions:

- Matrix view of the conversation pairs on the network details the "top talkers" and measures their communication exchanges with the datalink layer or network layer end stations.
- Network utilization is precisely measured on a Frame Relay line, with a breakdown of the protocol and station utilization of individual DLCIs.
- Error conditions on the network are correlated with stations introducing problems.
- Protocol utilization is detailed as a hierarchical breakdown.

Seven-layer decoding of over 300 protocols

The Detailed Decode option lets you instantly examine a full seven-layer decode of the data captured by the analyser without interrupting the monitoring process. No need to stop the analyser, and no lost frames. The data can be cached in the on-board RAM buffer or saved directly to a hard drive.

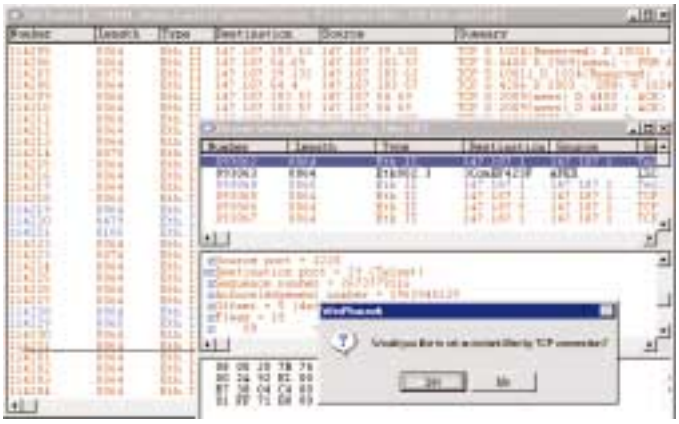
- Major protocol suites*, including: TCP/IP, Novell Netware, SNA, SMB, OSI, DECnet, Vines and Appletalk.
- Standards-based WAN protocols, including: PPP, Frame Relay, X.25, ISDN, SDLC and SMDS.
- Embedded LAN protocols crossing propriety WAN links, such as: Cisco, 3Com, Bay, ASCOM-Timeplex and Proteon.
- Popular database applications such as SQL and Oracle.

* New protocols are continually under development. Please contact GN Nettest for a detailed list of supported protocols.

Flexible, powerful filtering

WinPharaoh's Instant Filter feature lets you filter network data based on address, protocol or specific pattern (hex, ASCII, or binary). Settings can be saved as files and used for a number of different analyser operations such as pre-capture and post capture filtering, start/stop triggers, frame search, event counts and frame correlation.

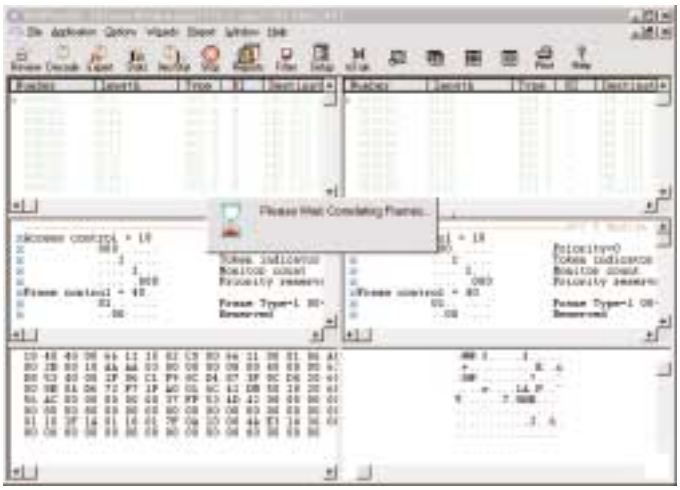
The sophisticated Instant Filter capability links with WinPharaoh's decode functionality to make it easy to create powerful filters based on address, protocol—or even specific patterns including complex TCP/IP connection conditions.



Even new users can easily create and save powerful filtering systems. A unique "Relative To" setting lets the same filter be used across different adapter types.

Remote options let you be anywhere on the network

Using any number of third party remote control programs (PC Anywhere, Netsupport, etc.), WinPharaoh can easily troubleshoot intermittent problems at remote sites via dial-up modem or TCP/IP connection.



WinPharaoh's Autocorrelation feature automatically identifies packets on either side of a router, switch, or other forwarding device. With a single mouse click you can compare entire trace files and precisely measure the latency introduced by a switch over time, or determine if a forwarding device is dropping frames.

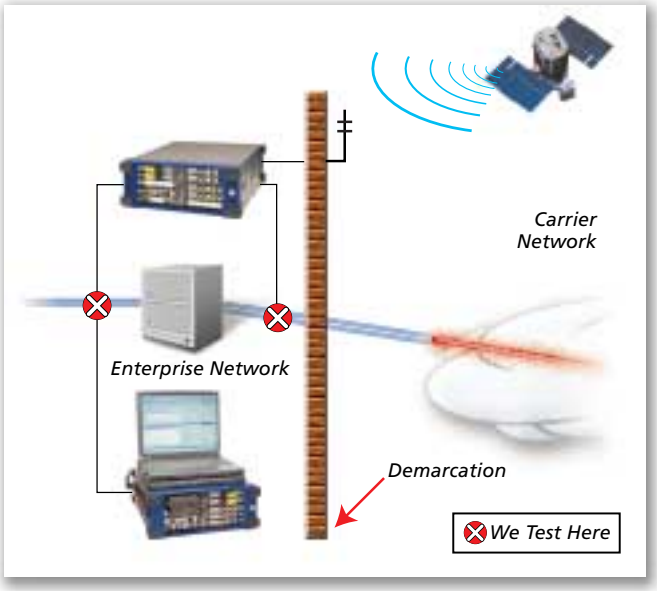
Analyser Access Unit permanently monitors multiple segments

An optional Analyser Access Unit (AAU) provides permanent monitoring connections to multiple segments of LAN or WAN networks. Up to two WinPharaoh adapters can be linked into an AAU; each AAU can be linked into eight different network segments or daisy-chained to support additional connections.

QXU-1000

Treats multiple network segments as a single network

WinPharaoh's Autocorrelation capability accommodates simultaneous testing of both sides of interconnecting devices such as switches, routers and bridges, allowing you to treat any number of multiple network segments as a single network. Test results are displayed in a consistent manner independent of the physical LAN, or WAN network connection, and all tests run concurrently in the same chassis.



MultiTrak synchronized time stamping with optional GPS time synchronization*

WinPharaoh's MultiTrak capability provides synchronized time stamping across multiple adapters in the same chassis, a critical feature for QoS measurements such as data loss and latency. WinPharaoh adapters located in the same physical enclosure remain synchronized within 4 microseconds. With the GPS option, this time stamp synchronization is extended across multiple geographically dispersed analysis units.

* Please contact GN Nettest for availability.

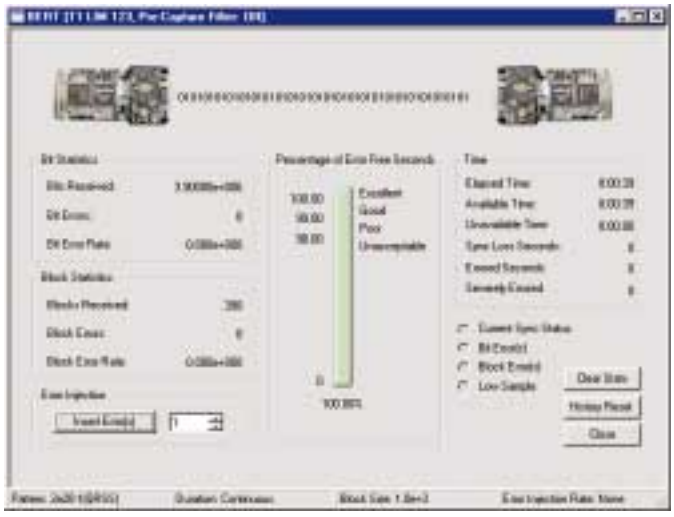
Replay and simulation features enable off-line problem solving

You can replay captured data on the network or simulate specific traffic patterns to isolate error conditions independent of actual network traffic. User specified transmit settings include: Percentage Utilization, Frame Rate, Frame Size and Number of Frames.

On Frame Relay, for example, you can send captured or custom-created frames onto a network, or transmit an entire trace file complete with time simulation. You can also emulate a DTE or DCE device, or use WinPharaoh to send and respond to Frame Relay Link Management Information (LMI) and Full Status Enquiry (FSE) messages. In addition, special statistic displays provide information based on the DLCI for the Frame Relay connection. Connectivity, variable length frame and network verification tests are provided for verifying the type and correctness of network Frame Relay activity.

Physical Layer Testing

All WAN Line Interface Modules support full-duplex operation, and are ideally suited for WAN troubleshooting. Physical layer testing capabilities include specific interface signal monitoring and Bit Error Rate Testing (BERT) with user configurable settings for patterns, block size duration and error injection rates.

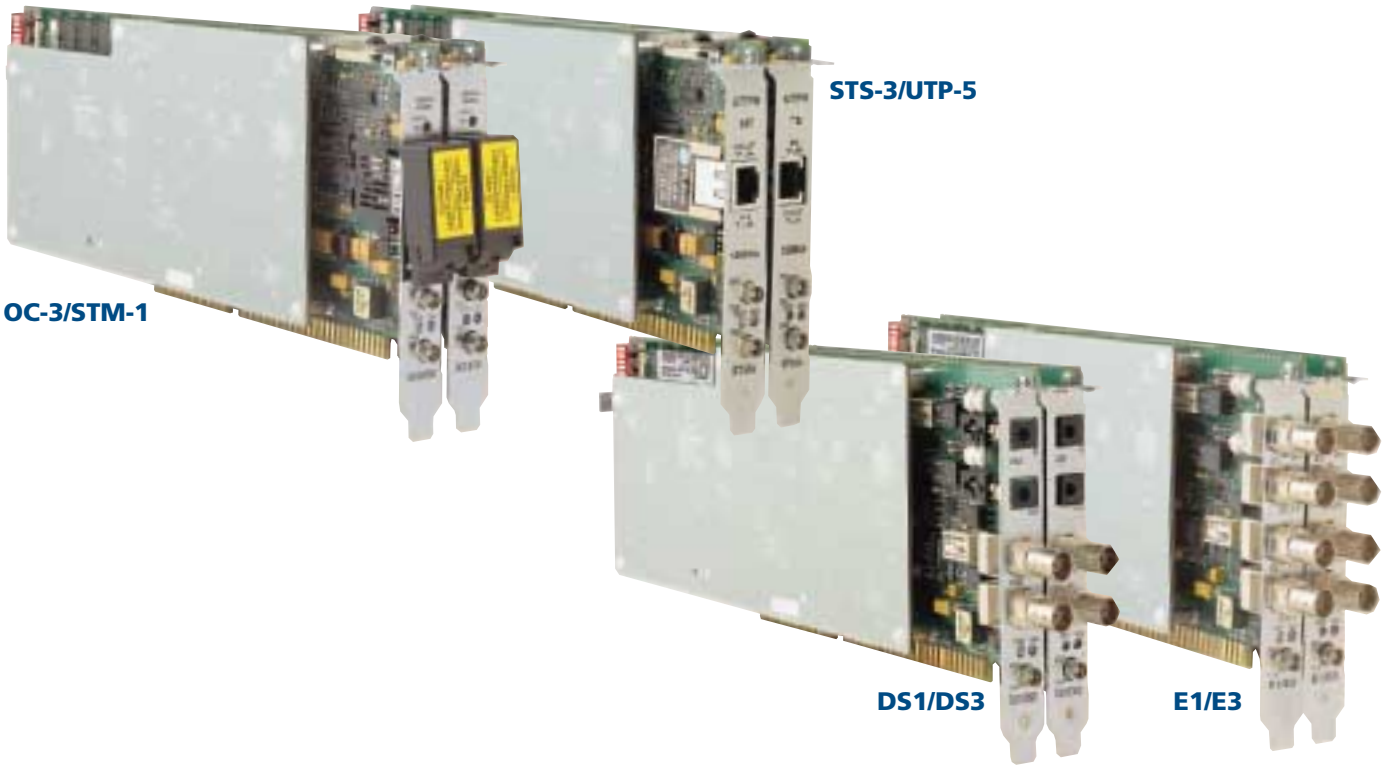


A complete ATM testing solution for verification of end-to-end QoS.

As a network transport, ATM is both extremely scalable and ideally suited to guaranteeing Quality of Service (QoS). However, these benefits can be only realized when switches are properly configured and tuned.

At the physical layer, ATM supports a large number of interfaces, each with unique framing and coding parameters; at the ATM layer, cell mapping parameters introduce further challenges to successfully monitoring a link. Perhaps even more uniquely problematic is ATM's ability to interleave voice and data services in a single cell stream—leaving technicians the unenviable task of distinguishing traffic types by channel identifiers (VPI/VCIs).

With its unique Autoconfiguration feature, WinPharaoh ATM makes the technician's task considerably easier. All parameters associated with layers 1 (Physical) through 3 (Adaptation) are automatically configured by the analyser within seconds of starting a passive monitoring session. WinPharaoh works even further up the stack by automatically identifying the encapsulations used by all AAL5 traffic types.



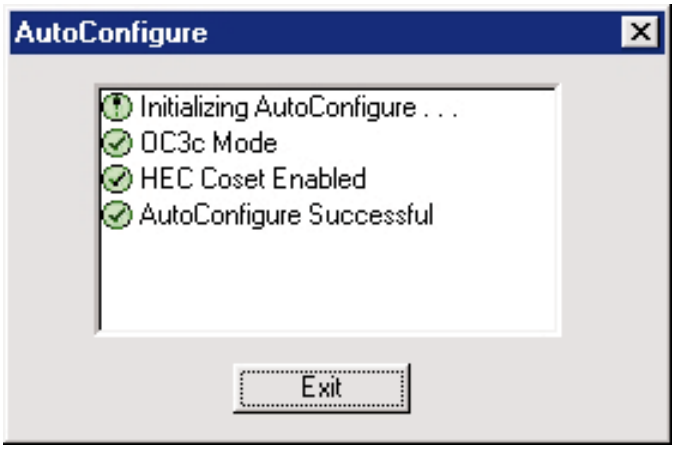
"Test Set on a Board"

Each modular WinPharaoh ATM adapter is actually a high performance, self contained "test set on a board," with programmable hardware and its own on-board dedicated 64 MB capture buffer. A full-duplex circuit is easily accommodated with two adapters interconnected through an internal high speed bus with 128 MB capture buffer.

Designed to work seamlessly within the WinPharaoh architecture, multiple adapters in any test set can be used for simultaneous testing of separate ATM circuits operated by multiple users. Concurrent tests are supported on LAN and WAN adapters in the same chassis.

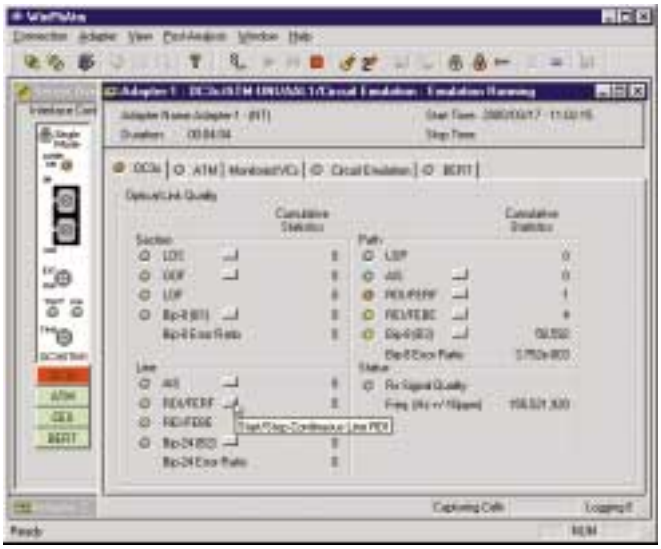
You also get a full complement of other advanced capabilities, such as:

- Full line rate data capture and analysis at speeds up to 155 Mbps
- Real-time monitoring and analysis of up to 1,023 Virtual Connections
- Auto recognition of AAL5 encapsulations
- Non-intrusive UPC/NPC conformance verification on multiple virtual channels
- Integrated remote via CORBA over TCP/IP
- User-defined Emulation Tests



Autoconfiguration simplifies setup.

WinPharaoh automatically configures the test set for the physical layer and ATM layer (framing, coding, PLCP and ATM cell scrambling).



WinPharaoh's simple "point and click" interface puts you in command of powerful performance features.

For example, the Physical Link Quality Results appear as easy-to-read Pass/Fail instrument style LEDs, with push button error insertion for negative testing.

Comprehensive Physical Layer Testing

WinPharaoh ATM delivers extensive physical layer testing capabilities which include LED signal and alarm monitoring, frequency measurement, and physical layer error insertion.

Real-time statistics are reported on three distinct pages: Physical Interface, ATM Layer, and Monitored VCs. Additional tabs are dynamically added as tests are selected in setup. Currently available tests include:

- ATM QoS
- UNI Signalling Emulation
- Circuit Emulation Services (CES) with AAL1 monitor and BERT
- BERT over DS1/DS3 and E1/E3

Quality of Service Testing

WinPharaoh's ATM testing capability includes a battery of standardized (and user-customizable) ATM QoS tests. Tests conform to international standards. Metrics include, Cell Error Ratio (CER), Cell Loss Ratio (CLR), Cell Misinsertion Ratio (CMR), Cell Delay Variation (CDV) and Cell Delay Variation Tolerance (CDVT).

A number of WinPharaoh features simplify the QoS testing process. For example, you can:

- Perform O.191 QoS testing on multiple background channels.
- Specify your own thresholds for Pass/Fail results, or use built-in standards.
- Generate test cells at rates from 1 cell/sec to full line rate.
- Create negative testing conditions to analyse physical layer, PLCP (if used) and ATM layer performance.
- Create traffic profiles based on Generic Cell Rate Algorithm (GCRA) or Markovian Distribution Patterns.

Non-intrusive UPC/NPC testing

UPC/NPC algorithms are used to police traffic contracts and ensure fair allocation of bandwidth and buffering resources among ATM network users. WinPharaoh UPC/NPC tests provide non-intrusive verification of conformance and report the nature and frequency of service agreement violations.

The testing setup includes four typical GCRA parameter configurations using single or dual leaky buckets (based on ATM Forum Traffic Management Specifications). Test results track non-conformance per leaky bucket, using standard or user-specified thresholds. Concurrent tests can be run on two virtual connections; WinPharaoh ATM architecture allows for future testing of up to 1,000 simultaneous VCs.

Pre-capture filtering

Pre-capture filtering allows you to focus your troubleshooting efforts to specific IP source and/or flow destination addresses. This reduces troubleshooting time, while maximizing use of the capture buffer.

Over 300 protocols decoded

WinPharaoh lets you decode directly from the capture buffer or load data previously saved to a file. With autorecognition of numerous AAL5 encapsulations, all traffic is automatically decoded. ATM Layer and signaling protocols include:

- UNI 3.0/3.1 and 4.0
- ILMI
- PNNI Signaling and PNNI Routing
- LANE 1.0, MPOA, RFC 1483
- PPP (LLC and Multiplexed)
- Frame Relay RFC1490

PDU level decodes support over 300 protocols. Additional protocol support is constantly being introduced.

ATM decoding in an understandable form.
Data is displayed in a multi-view window showing reference, VCC, protocol, protocol interpretation and raw data (octets). Full duplex data is displayed interleaved in the same window, showing data flow in the order of arrival for both directions. Reference can be displayed as PDU number, absolute time or delta time.

Typical ATM OC3/STM-1, DS1/DS3, E1/E3

Example configuration for distributed and portable testing of ATM only networks. Ideally suited for carrier test-head applications.

QXU-1000

Typical ATM/WAN OC3/STM-1, DS1/DS3, V Series, E1 WAN

Example configuration for portable testing of ATM and Frame Relay networks. Ideally suited for carrier and ISP applications.

QXU-1000

Typical LAN/WAN FDX Fast Ethernet, T1, Token Ring, FDDI

Example configuration for portable testing of traditional non-ATM networks. Ideally suited for enterprise applications.

PXU-600

WinPharaoh

ATM/LAN/WAN Analyser

GN Nettest
Total care for networks

GN Nettest is a worldwide designer, manufacturer and marketer of advanced equipment and systems for the test and measurement of telecommunication, data communication and optical networks. GN Nettest provides carriers, vendors, enterprises and communication research laboratories with the network testing solutions they need. These solutions troubleshoot and optimize performance in today's most complex and hybrid networks, as well as those planned for tomorrow.

Want to know more?
We'll get back to you — fast.

We're as interested as you are in keeping your network up and running at peak performance. And we're ready to prove it with a complete range of network analysis products, from lab tools to monitoring and troubleshooting tools to field equipment for testing and service deployment.

To find out more about our WinPharaoh solution, give us a call, or visit GN Nettest on the web at www.gnnettest.com.

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