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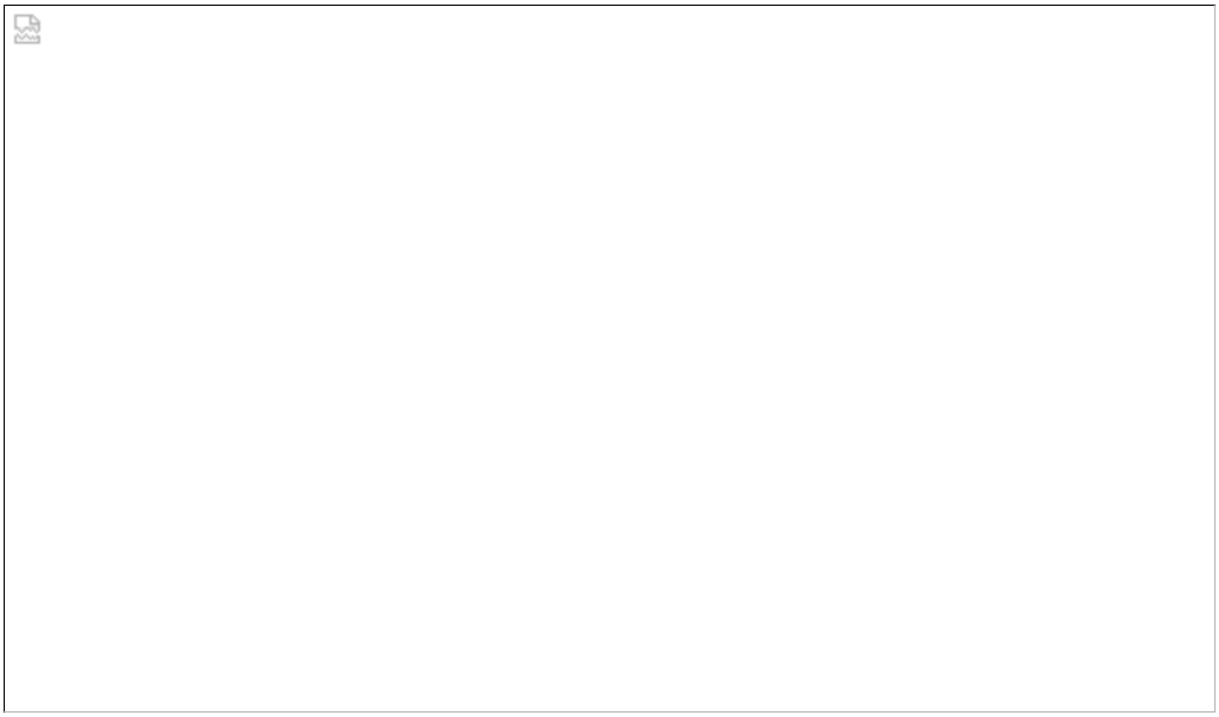
ET-1000

ADVANCED 802.3 ETHERNET TESTER/ SIMULATOR/ ANALYZER



THE ET-1000

An easy to use Ethernet Test instrument for:

Design Engineers
Manufacturers
Network Managers

To Develop, Test or Troubleshoot:

Transceivers **Bridges** **Ethernet Switches** **Live Networks**
Routers **Cables** **Multiport Devices** **Repeaters**

ET-1000: Advanced 802.3 Ethernet Tester/ Simulator/ Analyzer

Design Engineer:

Test and verify your most complex Ethernet designs with ease. Customize your data generation, using the Variable Field Data feature. Analyze your selectively captured data with EtherWindows software. Create and detect any packet errors, measure latency, throughput, preamble, gap and adjust your traffic load with 100 nanosecond resolution.

Manufactures:

Improve the speed and quality of your production with automatic operation, industry standard test sequences, thorough testing and documentation of test results. Create your own automatic test sequence for your multiport Router, Bridge, or Ethernet switch using the ET-1000 with our "SmartBits" SMB-10, 20 port expansion chassis and our ET-1000 "C" Library.

Network Managers:

Test automatically, with the push of a switch, your Ethernet devices before and after network installation. Evaluate performance of equipment before making a purchase decision. Generate traffic load from 0 to 100% with fine adjustment. Monitor accurately network statistics and throughput in real time. Measure round trip delays, packet losses and rate of any traffic parameter. Perform link tests, ping tests and echo tests.

ET-1000 UNIQUE FEATURES:

Automatic Testing of Network Devices:

With the push of a button, the ET-1000 will perform an automated sequence to thoroughly test: Transceivers, Repeaters, and Bridges. For other two port and multiport devices, you can write your own automatic test sequences using the optional ET-100 C Library.

Fine Adjustment of Traffic Generation

Control traffic generation over a wide range:

1. Preamble adjustable from 10 to 128 bits.
2. Packet length adjustable from 4 to 1 million bytes.
3. Interpacket gap adjustable from 0.6 microseconds to 1 second in 1 microsecond increments, or from 0.6 microseconds to 0.1 second in 100 nanosecond increments.

Custom Data Generation, Variable Field Data:

With the ET-1000 you have total control over every bit in the packet you transmit. Using the ET-1000's Variable Field Data (VFD) feature, you can specify a variable field from 1 to 8192 bytes within a packet. You can define the location of the VFD within the packet,

a start value, and a fill pattern. The ET-1000 then transmits, at up to maximum speed, packets or bursts of packets containing the changing VFD overwriting the fill pattern.

Selective Data Capture and Analysis:

The one megabyte receive buffer can be instructed to capture any packet or a selected portion of a packet that meets a criteria, such as trigger conditions or error type. This data can be displayed and analyzed with the EtherWindows software.

Advanced Real Time monitoring of all Network traffic parameters:

The ET-1000 has 16 independent counters to monitor all traffic parameters on both ports. The alphanumeric LED display provides accurate count or rate information in real time for these parameters. Two of these counters provide multifunction capability, such as: gap between packets, number of preamble bits, packet length, trigger rates and counts, timing measurements, etc..

Multiple transmission modes:

The ET-1000 can generate packets in six different modes: single step, free running, burst (up to 16 million packets per burst, with autostore count), ping-pong, collisions and echo test..

Complete error generation, detection

The ET-1000 generates and detects all possible errors in an Ethernet packet such as: fragments, short preambles, alignment errors, CRC errors, short and long collisions, undersized and oversized packets, jabber timeout, short gap and dribbling bits.

Complete Collision Control:

The ET-1000 can create 3 types of collisions:

1. Long collision: where both ports simultaneously transmit the same packet.
2. Adjustable collision between ports: with a maximum 64K bits offset and a maximum of 64K bits duration.
3. Collision On Received Packet (CORP): where the collision can be adjusted with up to 64K bits offset and up to 64K bits duration from the start of the incoming packet. Additionally, a collision counter can be enabled to limit these collisions to any number between 1 and 1,024.

Latency testing and round trip timing measurements:

The ET-1000 can perform timing measurements between its tow ports so the latency of a device connected to these two ports can be measured with 100 nanosecond accuracy. In a live network the ET-1000 can perform ping tests and measure departure and arrival times of specific packets within its own ports. This allows the ET-1000 to detect Ethernet timing protocol violations and to measure the collision window with 100 nanosecond accuracy.

Serial Triggers:

The ET-1000 offers two 96 bit serial triggers, one receive trigger and one transmit trigger. The trigger words can be defined on a bit by bit basis, from 1 to 96 bits. The position of the trigger word within the packet can be specified anywhere from 1 bit to 64K bits from the first bit after the preamble. Serial triggers can be used to qualify the capture and the start or stop of the timing measurement unit. Serial triggers can also be counted with the Multifunction Counter or observed via three rear panel BNC connectors.

Three multiselection BNC's for synchronization or trigger points:

Each one of the three rear panel BNC connectors can provide one of 25 different synchronization trigger points to trigger an oscilloscope or other instruments. These trigger points could be signals such as: receive or transmit triggers, any error, clock, receive or transmit signal, collision, etc. BNC #3 can also be used as an external source clock for the ET-1000

INTERFACES

One of the important advantages of the ET-1000 is its ability to communicate with the outside world in many different ways.

RS-232 Serial Port: The RS--232 Serial Port allows the ET-1000 to be remotely controlled and monitored by a PC running the ET-1000 EtherWindows software or by commands from the ET-1000 "C" Library.

JET-210 Interface/BNC Trigger Points: The three BNC connectors on the back panel provide direct connection to Netcom Systems' JET-210 Ethernet Jitter Simulator, which simulates deterministic and random jitter with 100 picosecond resolution. The ET-1000 can generate any custom packet of up to 8,192 bytes to test any special Jitter pattern. In addition, each one of these BNC's can provide one out of 25 trigger points to trigger an oscilloscope or a logic analyzer.

Hub Expansion Interface: By connecting the ET-1000 to the Netcom Systems' "SmartBits" SMB-10, 20 port expansion chassis, you can test multiport repeaters, bridges, routers or Ethernet switches. The SMB-10 expansion chassis is a 20 slot card chassis. Each card can accommodate 2 ports of any of the following media: thin Ethernet, thick Ethernet, twisted pair or fiber optic. Four SMB-10, 20 port expansion chassis's can be cascaded to accommodate testing of up to 80 ports.

Printer Interface:

Automatic test results can be printed directly from the ET-1000's parallel printer port (Centronics type). They can also be printed indirectly from a PC running EtherWindows.

"C" Library Software Interface:

Using a PC and a "C" compiler from either Borland or Microsoft, you can access the power of the ET-1000 using the ET-1000 "C" Library. The Library contains over 50 functions that allow you to completely control and monitor the ET-1000 through its RS-232 Serial Port. Now you can design your own custom test sequences to accommodate your exact needs!

We are confident that the ET-1000 represents the most advanced, elegant, easy-to-use Ethernet tester, analyzer, simulator on the market today and tomorrow!

THE ETHERWINDOWS INTERFACE

The ET-1000 can operate either in a stand alone mode or be controlled remotely via the RE-232 port with an IBM PC compatible computer running Microsoft Windows and Netcom Systems' optional EtherWindows software package. EtherWindows offers, at a glance, a general view of the activity and status of the ET-1000.

Control Window:

EtherWindows allows full control of the ET-1000. Sixteen independent event counters can monitor in real time the following parameters.

- **Collisions**
- **Alignment Errors**
- **CRC Errors**
- **Oversized Packets**
- **Number of Received Packets**
- **Undersized Packets**
- **Number of Transmitted Packets**
- **Packet Length in Bits**

Rate counters, for port A or B, can display the count per second of any of the 16 event counters. Two of the event counters have multi-function capability and can display any of the following:

- **Preamble Bits**
- **Packet Length**
- **Gap Between Packets**
- **Receive Trigger Rate**
- **Receive Trigger Count**
- **Transmit Trigger Rate**
- **Transmit Trigger Count**
- **Time from Port A to Port B**
- **Time from Port B to Port A**
- **Time from Port A to Port A (or B to B)**

Custom Data Generation, Selective Capture:

EtherWindows allows you to set the Variable Field Data (VFD), allowing the ET-1000 to customize every single bit in each transmitted packet of up to 8,192 bytes. Once the initial start pattern is set, you may then define the offset of the VFD in the packet, an increment or decrement pattern, and a fill pattern. Once the VFD transmission is started, the ET-1000 will transmit packets beginning with the start pattern. Subsequent packets will be transmitted at maximum speed with the VFD incrementing or decrementing over the fill patterns. Using EtherWindows Selective Capture feature, you can monitor, display and analyze every single bit of selected packets or portions of packets.

Automatic Test Sequence:

EtherWindows includes the automatic testing of transceivers, repeaters or bridges. The ET-1000 will run through the sequence of tests within seconds, and EtherWindows can log the result into disk for future reference or analysis. You can also write your own custom automatic test sequences using the ET-1000 "C" Library of commands.

ET-1000 SPECIFICATIONS

TRANSMIT SECTION:

Internal/External Clock Source:
2 0 MHz, 50% duty cycle, 100 ppm.

Preamble
10 bits to 128 bits, in 1 bit increments.

Inter-packet gap:
0.6 microsecond to 0.9999996 second, in 1 microsecond increments, or 0.6 microsecond to 0.9999996 second in 100 nanosecond increments.

Data:

Receive Trigger:
Trigger Word Range:
1 to 96 bits.
Trigger Word Offset:
0 to 65,535 bits.
Capture Buffer Size:
1 Megabyte.

COLLISION:

Adjustable Collision:
Offset 0 to 65,535 bits,
Duration 1 to 65,536 bits.

Long Collision:

Receive Error LED:
The Receive error LED blinks when any of the following choices are selected and active:
CRC error, alignment error, Undersized packet, Oversized packet or any of the above errors. The selection can be made on Port A or Port B or both ports.

Trigger LED:
The Trigger LED blinks when any of the following choices are selected and active:
Receive Trigger, Transmit Trigger, Receive and Transmit Trigger.

0 to 999,999 bytes in one byte increments.

Burst:
1 to 16 million packets per burst with autostore count (stores the burst count once entered.)

Transmission Modes:
Single step, free running, burst, ping-pong, collision and echo test.

Variable Field Data (VFD)
(user defined transmit pattern):

Offset: 0 to 65,535 bits.

Range: 1 to 8,192 bytes in one byte increments.

Start Value: all bits 0 to all bits 1.

Increment Value: all bits 0 to all bits 1.

Preset Patterns: 9 selections.

Fill Patterns: 16 selections.

Transmit Trigger:
Trigger Word Range: from 1 to 96 bits.

Trigger Word Offset: from 0 to 65,535 bits.

Transmit Buffer Size: 1 Megabyte.

RECEIVE SECTION:

Capture:
Capture Offset: 0 to 65,535 bits in 1 bit increments.

Capture Range: 1 to 8,192 bytes, 1 byte increments.

Capture Conditions:
Receive trigger Alignment error, CRC error, Undersized packet, Oversize error, Collision.

duration 1 to 1 million bytes.

Collision on Receive Packets:
Offset 0 to 65,535 bits,
Duration 1 to 65,535 bits.

Collision Count:
adjustable from 1 to 1024.

DISPLAY:

2 line, 24 character, alphanumeric, LED.

Display Event Counters:
The 16 counters (8 for port A and 8 for port B) monitor the count of the following: Received packets, Transmitted packets, Collisions, CRC errors, Alignment errors, Undersize packets, Oversize packets, Packet length in bits.

Display Rate Counters:
Provides the count per second information of the 16 event counters.

Multifunction Counters
Port A and Port B:
Two of the 16 display counters have multiple selection capabilities. Each is capable of monitoring one of the 10 following selections:
Receive Trigger Count, Transmit Trigger Count, Time Measurement from one port to the other, Round Trip Propagation Delay on one port, Receive Trigger Rate, Transmit Trigger Rate, Number of Preamble Bits for each packet, Number of Gap Bits for each packet, SQE and Total Packet Length.

INTERFACES:

RS-232 (EtherWindows), Parallel Printer (Centronics type), JET-210 (Jitter Simulator), SMB-10 (SmartBits 20 slot chassis).

BNC Connectors:
Each one of the 3 rear panel BNC connectors allow selection of one of 25 signals coming from either port A or port B. These signals could be any receive or transmit enable, clock or data signal, collision, any errors, receive and transmit triggers, internal 10 MHz clock, 20 MHz clock (or the inversion).

REAL TIME CLOCK:
Battery Backup clock calendar with + or - 1 second per day accuracy and 1 millisecond resolution. Battery backed up RAM holds 8 user defined set ups.

ENVIRONMENTAL:

Operating Temperature:
0 to 55 degrees C.
Storage Temperature:
-40 to +85 degrees C.

MECHANICAL:

Dimensions:
15.2" W x 5.7" H x 12.0" D

Weight
10 pounds

For further information on the ET-1000 system, it's unique features, specifications and interface capabilities, please contact our Sales Department at: (818) 700-5100 or via E Mail Sales@NetcomSystems.com.