



NuTEA-501

Impairment Emulation for Gigabit Ethernet Traffic

KEY BENEFITS

- Simulate the impairment network situation between the DUT. Building a small stimulant network environment for user.
- Test the DUT performance about the impairment packet procession and validates the packet completeness.
- Reduce the user product develop and research cost, fast the debug phase.
- High performance and useful tool in quality check or production.
- Increase the persuasiveness in the demonstration.

MAIN APPLICATIONS

- Performance and analysis test
 - Similar to the network performance in real network environment
 - Variety of embedded packet counters of NuTEA-501 can verify if the related packet counters of DUT are correct
- For troubleshooting
 - Emulate public network with more poor bandwidth and performance that can examine whether if the DUT has good disaster recovery and consolidate operation.
- Function validation test
 - Test equipment for mass production that might have error settings or damage that are not able to examine faulty DUT
- Assistant for product demonstration
 - Use NuTEA-501 as a good demonstration of packet loss or variation of network packet
- Functional examination for the products of bidding project for Telecom Service Provider



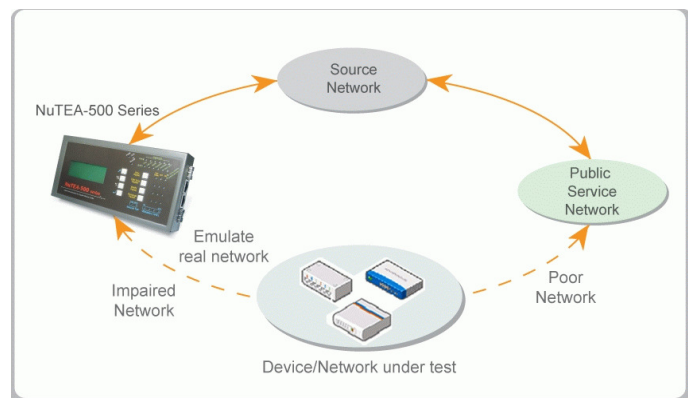
OVERVIEW

NuTEA-501 is a network impairment device that impair Ethernet network to emulate the unstable network condition, especially the network with complex topology, such as Internet in public network.

It is a compact, lightweight and highly cost effective device that provides the function to simulate Ethernet traffic impairment situation, such as CRC Error Packet, Drop Packet, Exchange Packet order (Re-order), Duplicate Packet and Modification (Data Integrity Error). By the selection of adjustable precision, user also can get the accurate test result to suit for test target.

This function is useful for the design of a new network device, because network transmission in the lab is always the best without any interference that can really reflect the real condition of public running network. This machine can generate almost any possible error that is similar to the real public running network. It is a chance that the network devices what your company design can face the real condition and find the problem before receiving complain from your customer after the network device had sold to customer.

By the impairment task above, it makes a controllable blemish environment. User can test the own product performance through **NuTEA-501** at the lab environment. User also can build a similar network and live environment in the demonstration for displaying the own product function. Allowed for dynamically changing impairment setting, **NuTEA-501** provides user a controllable and convenient tool for real network simulation.



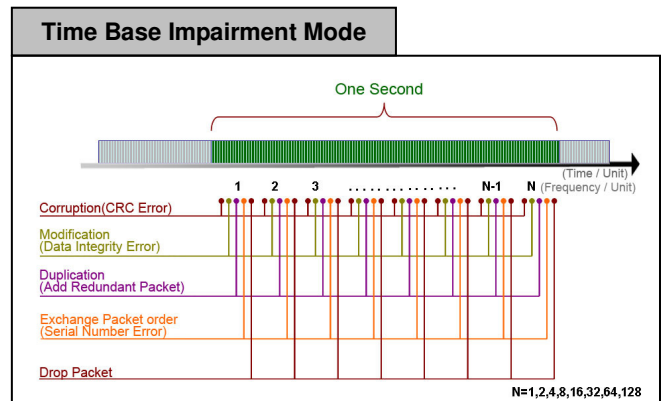
5th Fl., No. 102, Lide St.,
Zhonghe City,
Taipei County 235, Taiwan
TEL: +886-2-8227-6611
FAX: +886-2-8227-6622
sales@xtramus.com

www.xtramus.com

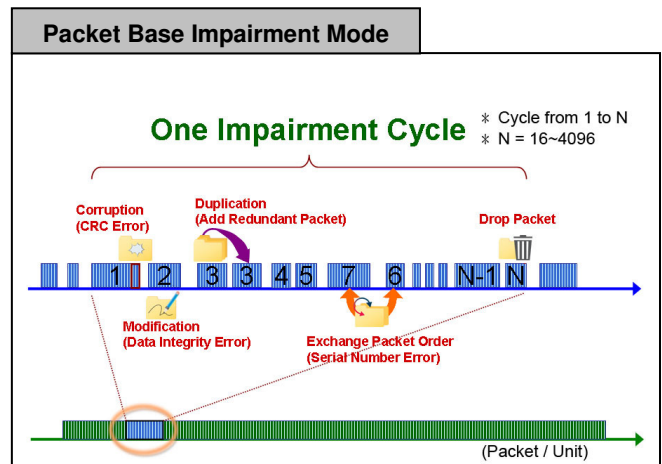


KEY FEATURES

- **Reconstruct real Ethernet traffic impairment situation**
 - Simulate several packet error situation and create the particular error to the selected packet as below
 - Drop
 - Modification
 - Exchange(Re-ordering)
 - Duplication
 - CRC error(Corruption)
 - Simulate the real packet type(Length) of the real network condition
 - 16K Jumbo frame support
 - Simulate the traffic direction of the real network condition
 - Uni- or bi-direction simulation
 - Exactly alter the target packet impairment.
- **Flow Control Capability of Packets**
 - Data flow from Port A to B or Port B to A can be processed simultaneously or individually with independent parameter for both sides.
 - Wire speed duplex forward capability also keep interval of original packet intact.
 - Parameter can be adjusted dynamically without effect on real-time wire speed forwarding.
- **Full Set RMON Counters**
 - RMON is an IETF standard (RFC 2819) for monitoring the status of a network by activating probes/monitors at targeted ports in the network, and using RMON clients to collect and present the status information.
 - Remote Network Monitoring (RMON) Counter provides user to check real-time LAN statistics, define packet data patterns of interest, collect and forward packets matching the Filter, check the traffic statistics for each protocol, etc.
 - User can get the complete record from the counter
- **RJ45 and Fiber combo interface**
 - User can select the suitable interface to connect with for the operating of the NuTEA-501
 - The combo interfaces with All- in- one factor design facilitates the user operation.
- **Calculate packets count of VLAN**
 - VLAN counters that can calculate transmission measurement of VLAN packets.
- **Precision tune of Packet Error rate**
 - The Packet Error rate is adjustable precisely. NuTEA-501 provides different scales with 0.1, 1, 2, 5, 10% and has more precise scales via PC control.
 - Items of Packet error rate includes: CRC, Drop, Modify, Exchange, Duplicate, etc.
 - User can regulate the precision percentage by the respective demand to get the suitable result.
- **Windows UI software for easy operation**
 - With Windows UI software, operator can do system upgrade and also remote control the NuTEA-501
- **Time base Impairment and packet base impairment**
 - By Time: (Time Base Impairment Mode)
 - Different Impairment Effect on 8 intervals in one second. In other words, impairment will active 8 times per second.
 - Nothing happens if there is no packet in that time interval.
 - The effect of impairment is random



- By packet: (Packet Base Impairment Mode)
 - A number of Packets that is pre-configured for the target of impairment on network flows through.
 - Different kinds of impairment effect apply to different packets.
 - The effect of impairment is consistent.



SPECIFICATIONS

- **Interfaces:**
 - Two RJ-45 and Fiber combo ports.
 - USB(for FPGA and Firmware upgrade and control)
- **LED Display:**
 - Impairment (A→B, B→A): Drop, CRC Err, Modify, Duplicate, Exchange, Rate Limit
 - Operation (Drop, CRC Error, Modify, Exchange): User define, OFF, ON
 - Network TAP: A→B, B→A
 - Utilization (A+B): 0%, 1~49%, 50~94% and 95~100%
 - Status: Power, SYS, Remote
 - Ethernet port status: Link/ACT, Speed
- **Power:** DC 12V
- **Power Consumption:** 5.5 Watt(SFP Transceivers excluded)



- **Temperature:**
Operating: 0°C ~ 40°C
Storage: 0°C ~ 50°C
- **Humidity (non-condensing):**
Operating: 0% ~ 85%
Storage: 0% ~ 85%
- **Dimension:** 175 mm x 85.9 mm x 32.6 mm
- **Net Weight:** Approx. 500g

TECHNICAL TERM and APPLICATION

Effect of Impairment

Drop Packet

Ethernet is a family of frame-based computer networking technologies. Frames are transmitted via different devices and media. After the transmission via different media and devices, some of frames might be lost. For layer 2 switching mode of OSI model, packet is the same as frame.

CRC Error Packet

At the tail of a packet, it keeps a checksum value to verify the correctness of the packet when it is received. If the checksum value is not correct that can verify the correctness of the packet, we call it CRC Error Packet.

Modify Packet

For some reason intentionally or unintentionally, the content of packet is modified, owing to poor transmission or manual interference.

Exchange Packet

All of frame/packet should be transmitted sequentially, then it is able to reunite to complete data at destination device. If the frame/packet sent goes different routes, it might be possible that later packet arrives destination earlier, so the sequence of packet is changed, owing to poor device or manual interference.

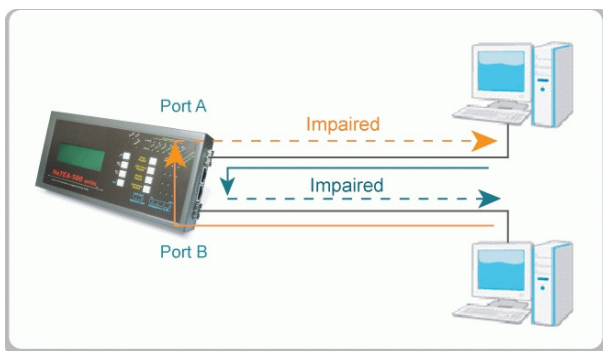
Duplicate Packet

Packet is transmitted one by one via network device. For some reason, the destination had received the packet, however the sending side does not received the acknowledgement, so packet is resent and duplicated packet is generated.

Direction of Impairment

Two Ways Impairment (Default)

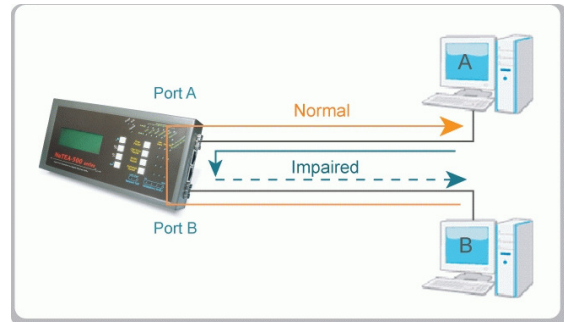
The illustration below shows the concept of impaired network. It is an example that normal network is impaired.



Data streams both way that flow through this machine is impaired

One Way Impairment (User Define)

The illustration below impairs network flow from port A to B only. There is no influence on the network from port B to A



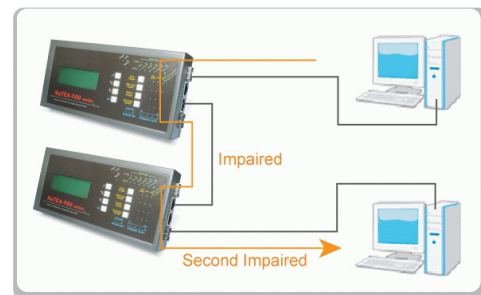
Operator can activate impairment by button with user define selections

Impairment from Multiple Devices

If a single unit of this machine is not enough to generate the impairment environment required, you can connect it in serial or in parallel to create any kinds of possible impairment structure.

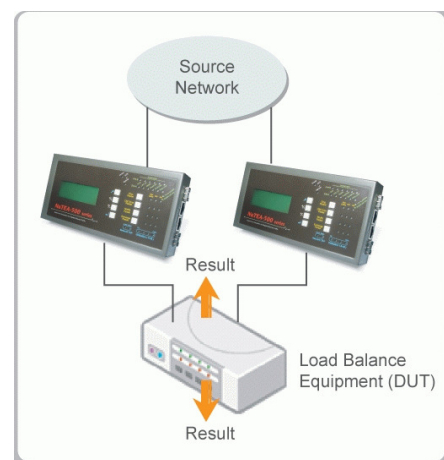
In Serial

NuTEA can be cascaded to create multiple impairment



In Parallel

NuTEA can be connected in parallel to emulate impairment from different source network.



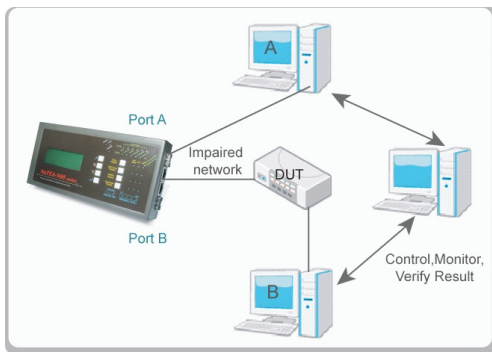


Test and Examination for Lab or Project Bidding

Good network device should have correct reaction on the network data streams that flow through it. For a good device, it not only deals with normal network data streams without problem, it should also perform well if the network is under poor condition.

Poor network is common seen in public service network, however, it does not happen often in your office or lab. To ensure the design of network device in your Lab has correct reaction on poor network condition, create a poor network environment to test is required.

Buyer of bidding project also can verify if the equipment purchased meets the specification.



In the illustration figure above, a good DUT should have correct reaction on impaired network and the computer A and B should get all data correctly. In addition, if A and B get all data correctly, does it fit the performance or recovery action required.

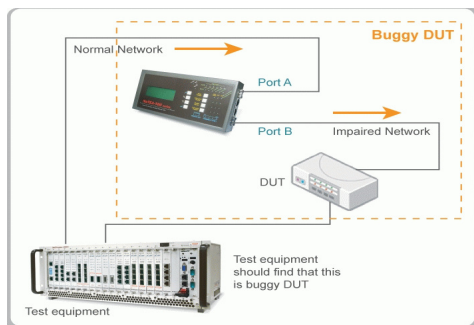
Calibration on Test Equipment for Mass Production

It always has quality control for mass production product, nevertheless, poor or abnormal network products still sold in market after it has passed the quality control examination.

For some cases, it is because manufacturer seldom or never calibrates the test equipment. If test equipment is not correctly calibrated or configured, it may not examine the poor or problem network products.

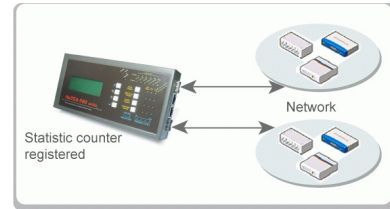
By the combination of the network product manufactured and this machine, operator can emulate a product with poor condition or problem. Use test equipment to test this combination, test equipment should find that there is problem on this combination. If the test machine is not able to find it, then calibrate or re-configure the test equipment is required.

The illustration below shows the connection to calibrate the test machine.



Additional Function Except Impairment Statistic Counters

The statistic counter of this machine is not just for the counter of impairment only. It is also a useful tool to measure the traffic without impairment, or to find problem on your original network.



Counters	Description
Rx Pkt	Packets counts received
Tx Pkt	Packets counts sent
RxRate	Percentage of receiving traffic load of Wirespeed connection
TxRate	Percentage of sending traffic load of Wirespeed connection
R <64	Received frames that are less than 64 bytes length
R =64	Received frames that are 64 bytes length
R >127	Received frames that are between 64 and 127 bytes length
R >255	Received frames that are between 128 and 255 bytes length
R >511	Received frames that are between 256 and 511 bytes length
R >1023	Received frames that are between 512 and 1023 bytes length
R >1522	Received frames that are between 1024 and 1522 bytes length
R ->CrcE	Counts of CRC Error packets that are received from incoming network
R ->VLAN	Counts of VLAN packets that are received from incoming network
R -> Loss	Counts of packets loss happen from incoming network
R ->IPCS	Counts of packets with IP checksum errors happen from incoming network

Operation of NuTEA

Control via Button

Almost all function can be operated via button at top panel Buttons for Configuration

Label	Action	Description
	Push once	Enter main menu or Return to previous menu
	Push once	Move up one selection
	Push once	Move down one selection
	Push once	Execute the selected selection
	Hold for 3 seconds	Confirm (Yes/No) to clear all statistics counters by or button



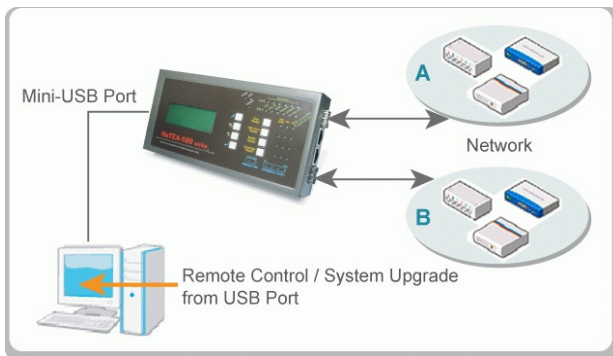
Buttons for Operation

Drop Packet	Push once	Start/Stop drop packet impairment with different scale (user define or default)
CRC Error Packet	Push once	Start/Stop CRC Error Packet impairment with different scale (user define or default)
Modify Packet	Push once	Start/Stop Modify Packet impairment with different scale (user define or default)
Exchange Packet	Push once	Start/Stop Exchange Packet impairment with different scale (user define or default)

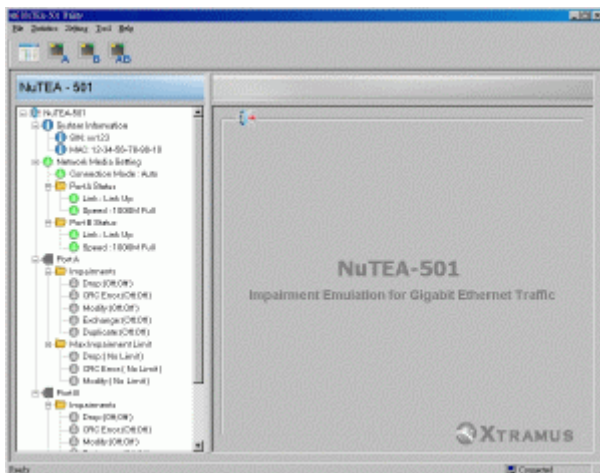
Remote Control from USB

NuTEA-501 comes with a Windows software for controlling of this machine. Operator can operate this machine via USB port with Windows interface, and also collect statistic counter and do system upgrade.

USB cable with mini-USB connector comes with the package of this machine. It is an industrial standard cable with standard male USB connector and standard male mini-USB connector at each side.



NuTEA Remote Control Software is a Windows based software as illustrated below. It is user-friendly and easy to operate.



RELATED PRODUCTS

NuTAP:

Active Network TAP with four pairs of Ethernet 10/100M RJ-45 Port.



NuTAP-302:

Gigabit Active Network TAP with one pair of 10/100/1000M RJ-45 / SFP combo network ports



NuTAP Rackmount series:

NuTAP Rackmount series includes the model as below



- **NuTAP-L Series:**

- Full-Duplex In-Line Management Network TAP
- 10/100/1000M UTP Interface

- **NuTAP-R Series:**

- Full-Duplex In-Line Management Network TAP
- 10/100/1000M Combo Interface(UTP+SFP)

- **NuTAP-A Series:**

- Full-Duplex In-Line Recordable Network TAP
- 10/100/1000M Combo Interface(UTP+SFP)

WHAT'S IN THE BOX

Shipping package includes:

- NuTEA-501 x 1
- Power Adapter x 1 (12V DC)
- Power Plug Adapter x 1 (Depends on region)
- Network Cable x 2 (Cat.6; 1M)
- Mini USB cable x 1
- Installation CD-ROM x 1 (Includes Bundle Software and User's manual)

CONTACT INFORMATION

Website: www.xtramus.com

E-mail: Sales@xtramus.com (for Product Inquiry)

TS@xtramus.com (for Technical Support)

TEL: +886-2-8227-6611

FAX: +886-2-8227-6622

Note: Information and specifications contained in this document are subject to change without notice.

All products and company names are trademarks of their respective corporations.

Copyright © 2008 Xtramus Technologies. All rights reserved.

Do not reproduce, redistribute or repost without written permission from Xtramus. Doc # PBF_NuTEA-501_V1.0_ENG