

# N(x)Test™ Broadband Remote Test Unit

Tollgrade's N(x)Test is a next-generation modular, standalone (switch-independent) subscriber loop measurement unit utilizing an open architecture, standardized interfaces and DSP measurement technology.

The N(x)Test unit can be controlled at the Remote Terminal (RT) of a Next-generation Digital Loop Carrier (NGDLC), any domestic or international PCM system or a switching system that has a Direct Digital Interface (DDI) or test trunk.\*

Tollgrade's Line Test System Controller (LTSC™) or any OSS that communicates using TL1 protocol can control the unit.

Engineered for maximum application and location flexibility, the N(x)Test unit can address broadband testing, standard demand and interactive testing as well as OSS-controlled ALT batch processing on subscriber loops. The unit also offers expanded capability for testing and loop pre-qualification for DSL services through the network element without the need for an external matrix.

The N(x)Test unit receives commands and returns the test results to the user. Accessed over a dial-up or an IP network through a terminal server, the N(x)Test unit is controlled by the LTSC. Access to the subscriber loop is gained through direct communications with the network elements having an embedded metallic access unit (MTAU).



**Tollgrade**  
is everywhere  
your broadband  
network needs  
to be.™

**N(x)Test™**  
**tollgrade**  
Network Assurance  
Simplified.™

Directly communicating with network elements, eliminating the need for pair gain controller and switch dependency.

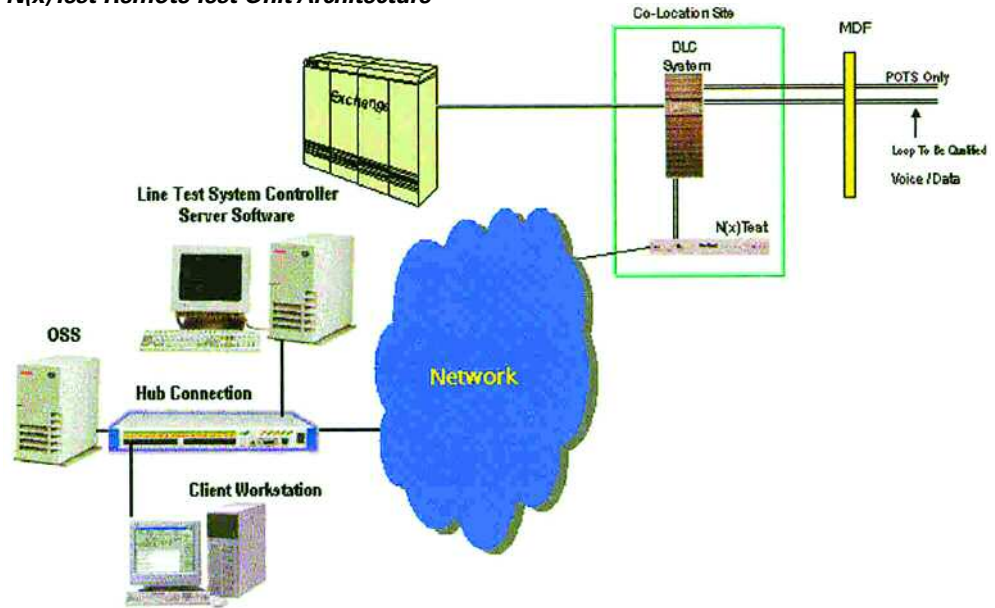
\*Access to subscriber lines is controlled by a V.24/RS-232 port on domestic/international carrier systems.

## Key Features & Benefits

The key features and benefits of the N(x)Test Broadband RTU include:

- Direct communications with network elements eliminates need for pair gain controller and switch dependency;
- Open architecture uses TL1-compliant subset commands defined by Telcordia® standards GR202, GR834 and GR835;
- Expanded bandwidth test capability (to 140 kHz) provides broadband measurements;
- NEBS level 1-3-compliant;
- Leading-edge DSP microprocessor technology;
- Plug-in modular design supports expandable hardware/software features;
- Easy installation and maintenance;
- Downloadable flash memory for remote software upgrade;
- Hazardous potential access test;
- Environmentally hardened;
- Configuration occupies only one rack unit;
- Performs look-in/look-out and loop line testing;
- Embedded line fault location commands;
- Self-diagnostics, remote access and front panel maintenance port reduce N(x)Test trouble clearing times;
- 38.4 kbits/s modem; and
- 10-Base-T LAN/terminal Server connection.

## N(x)Test Remote Test Unit Architecture



The reliable, proven and future-proofed modular design of N(x)Test allows the remote upgrading of system firmware through its dial-up port.

Software enhancements and upgrades no longer require a site visit, disassembly of the unit or replacement of plug-in memory devices. Because N(x)Test is modem-accessible, new software can be easily loaded in a matter of minutes into the

unit's embedded flash memory via the dial-in port from a remotely located workstation.

Built-in password security guards against unauthorized access using Telcordia GR835 standards.

The N(x)Test unit is compatible with Tollgrade's LTSC Classic and other OSSs using the Telcordia GR834/202 TL1 command set.

## Application

The N(x)Test unit can be used both domestically and internationally in a variety of applications. These include switching systems, remote terminals, DSLAMs with test access or co-location applications.

In applications, the N(x)Test unit can be easily and conveniently installed in the existing network, enabling the testing of more lines at much faster speeds.

## Test Capabilities

### Remote Terminal Tests

The following TL1 commands are supported by N(x)Test:

#### Summary Test Functions

- TSTLOOP-QUAL
- TSTFULL
- TSTLOOP
- TSTCO

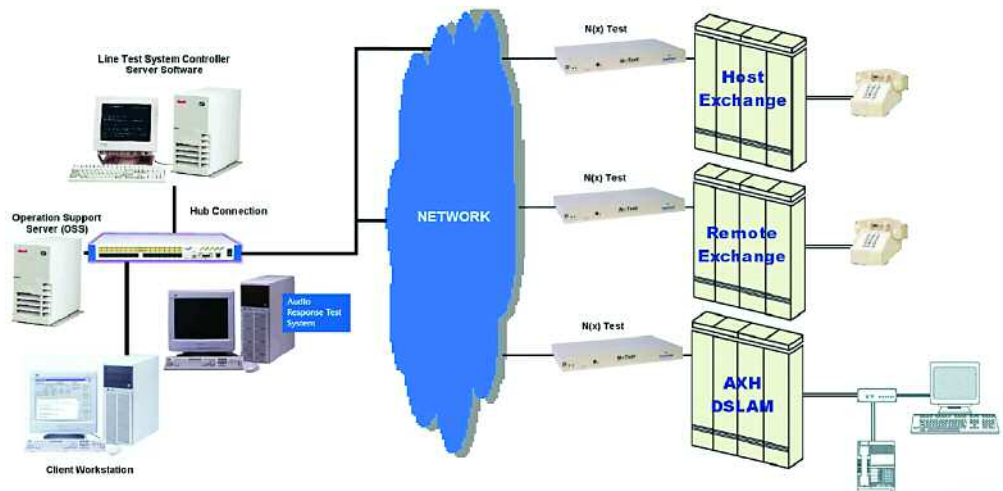
#### Loop- and CO-side Testing

- Ringing and ringer tests
- DTMF touchtone testing
- Dial pulse testing
- Dial tone test
- Monitor
- Talk
- Automatic Number Identification (ANI)
- Pulse metering (Tone or DC)

#### Measurements

- AC & DC impedance
- AC & DC current and voltage
- Capacitance
- Noise
- Impulse noise
- Longitudinal balance
- Echo Return loss
- Load Coil Detection
- Load Coil Location
- Bridged Tap Detection
- Detect Wide Band Disturbance
- MTU Detection
- BT Termination Detection

### N(x)Test Testing Architecture



#### Send Tone

- Low band (300 Hz to 3 kHz)
- High band (3 kHz to 140 kHz)
- Tracer tone
- Howler tone

#### Measure Tone

- Low Band (300 Hz to 3 kHz)
- High Band (3 kHz to 2.5 MHz)

#### Talk and Monitor

The N(x)Test uses a separate callback line to establish a unity gain talk/monitor path to the line under test. The callback number is provided by the LTSC for DTMF or rotary dialing by the N(x)Test unit. This patented procedure reduces loss when performing talk monitoring.

#### Administrative and Maintenance Functions

Both user- and automatically configurable, N(x)Test unit is accessible through a dial-up modem, 10-Base-T connection or a local RS-232 port located on the front panel.

# N(x)Test Specifications

## Power

Input Voltage ..... -44 to -56 Volts DC  
Current ..... 1.5 A maximum  
Noise Immunity ..... Fully functional with 40 dBm0 on power input.  
    A 3% additional error to DC voltage, DC current, DC resistance and capacitance;  
    10% additional error to AC resistance should be expected in the presence of 40 volts  
        RMS of longitudinal noise to ground at 60 Hz and/or 180 Hz

## Environment

Operating Temperature ..... -40 to +65°  
Relative Humidity ..... 10% to 95% (non-condensing)

## Physical

Dimensions ..... 1.75"(H) × 12"(D) × 17"(W)  
Weight ..... 7.5 lbs.  
Mounting ..... 19" and 23" mid- or front-mount rack  
        with 1" (telecom) or 1.25" (EIA) spaced mounting holes.

# Ordering Information

*Please contact your Tollgrade representative for ordering information.*



### Corporate Headquarters:

493 Nixon Road  
Cheswick, PA 15024

### Other Locations:

Bridgewater, NJ  
Sarasota, FL  
Fort Worth, TX

1-800-878-3399

[www.tollgrade.com](http://www.tollgrade.com)

N(x)DSL-3

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NON SWITCHED ACCESS MATRIX

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