

# DigiTest<sup>®</sup> Measurement Nodes

The DigiTest Measurement Node (DMN) is a modular, environmentally hardened test head designed for testing Central Office (CO)- and Remote Terminal (RT)-fed copper facilities. When coupled with Tollgrade's comprehensive LoopCare<sup>™</sup> Test Operations Support System (OSS), DigiTest delivers a robust and highly automated, flow-through testing system that can significantly reduce the cost of qualifying, provisioning and troubleshooting copper loops for POTS, ISDN and DSL services.

While DigiTest provides efficient subscriber loop testability to new locations, its flexible

architecture also makes it an ideal replacement for aging and problematic legacy test equipment within the CO or RT. DigiTest also creates a simplified upgrade path as the network evolves to support new technologies and services.

DigiTest can be configured and expanded to meet the testing needs of any size CO or RT by installing only the amount of nodes required. For high-density CO applications, up to eight DMNs can be linked to a single TCP/IP Ethernet connection. Multiple methods of communications, in addition to TCP/IP Ethernet, are also supported.

*Tollgrade  
is everywhere  
your broadband  
network needs  
to be.<sup>™</sup>*

**tollgrade**  
Network Assurance<sup>®</sup>  
Simplified.<sup>™</sup>

*Replace obsolete  
legacy equipment  
while adding  
advanced testing  
features for DSL  
pre-qualification*



# Primary Components of DigiTest

## Measurement Units

### Digital Measurement Unit Plus (DMU+)

Incorporating the latest in Tollgrade testing technology, the DigiTest DMU+ builds upon the considerable legacy of Tollgrade's widely deployed DMU. The DMU+ offers extended interfaces, functions and options including:



- Multiple communications methods within a single unit
  - TCP/IP Ethernet
  - Analog dial-up
  - RS-232
  - Subtended from a DMU+ configured as "master;"
- Backward-compatibility for interoperability with the DMU, Digital Wideband Unit (DWU), Ethernet DMU (E-DMU) and Ethernet Extender DMU (EE-DMU) measurement units;
- Extension of the rich set of testing functions offered by the DMU;
- Built in No-Test Trunk (NTT) signaling capability; and
- An optional Loop Insertion Loss (LIL) Module for accurate DSL pre-qualification through the existing Class 5 switch infrastructure.

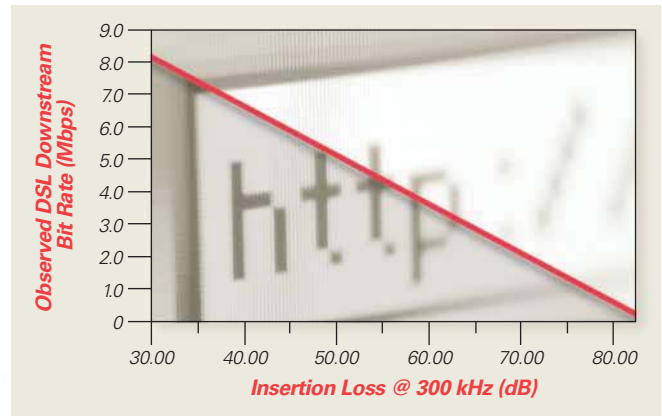
### Digital Wideband Unit

The DigiTest DWU performs a variety of wideband measurements on loops of up to 18,000 feet. Utilizing precision Time Domain Reflectometry (TDR) and wideband noise measurements, the DWU can quickly detect and locate common broadband loop impairments, including bridged taps, crosstalk, gauge changes and wet sections.



## Mounting Chassis

The DMN's compact chassis (one rack-unit high in either a 19" or 23" relay rack) houses up to two plug-in measurement units, enabling it to be configured for various narrowband and wideband test applications. The DMN also includes an Alarm/Fuse Card that holds the fuses for the main power feeds and provides support for hard-wired local alarms.



DSL rate performance degrades as insertion loss of the loop increases.

## Loop Insertion Loss Option

Tollgrade's LIL module is available as a DMU+ factory option. The LIL module uses innovative techniques to perform accurate, single-ended insertion loss measurements at critical DSL frequencies using the Class 5 switch testing fabric. With this technique, POTS subscribers served by the switch can be accurately qualified for DSL service by testing the loop through an existing NTT interface. Insertion loss measurements can be performed through either on-demand or batch-testing.

Measuring insertion loss through the switch fabric offers the best alternative for accurate pre-qualification because no incremental investment for access is required; it is a highly automated solution, yielding low-cost-per-loop testing functionality; and insertion loss measurements highly correlate to DSL performance.

Tollgrade's LIL technology enhances the ability to offer broadband services, including ADSL2+, tiered data rates, VoIP and IP video.



## Primary Applications

### **POTS Testing via Class 5 Switch, NTT and MDF**

A DMN, equipped with DMU+ test heads, serves as a complete replacement for obsolete legacy test equipment such as Lucent Technologies' Line Test Frame (LTF), Line Test System (LTS) and Nortel's Local Test Cabinet. Up to four DMNs, employing eight DMU+ test heads, can be connected to a common TCP/IP Ethernet connection in order to meet the testing demands of both small and large COs.

When managed by LoopCare, complete automated centralized POTS testing can be performed. Testing directly to the MDF is also supported.

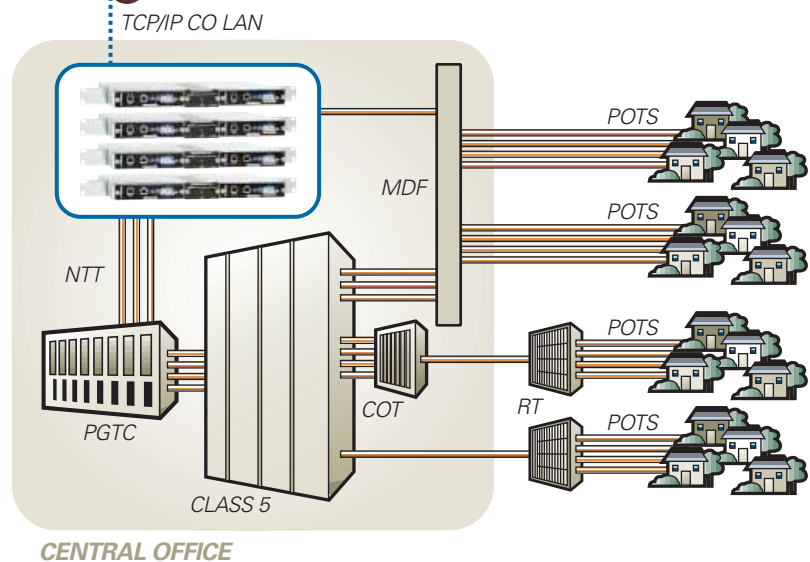
### **DSL Pre-Qualification Using the Loop Insertion Loss Option**

Highly accurate bulk pre-qualification for DSL can be performed by adding the optional Loop Insertion Loss module to a DMU+. This allows potential DSL customers to be identified with higher assurance than current methods (length-based calculations, records look-up, etc.).

### **Remote Terminal Testing**

DigiTest Measurement Nodes can also be installed at the RT for cost-effective testing of loops served by Digital Loop Carrier (DLC) systems. For testing broadband services, a DWU can be added to the DMN to incrementally add wideband testing capability. The DWU performs bridged tap detection and provides wideband spectrum analysis in support of broadband services. Multiple DLC banks can share a common DigiTest test head.

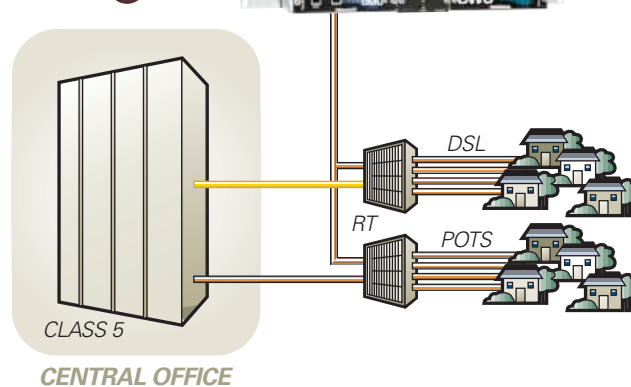
LoopCare has built-in support for flexible test access to various DLC systems, providing transparent testing at the RT.



**POTS Testing via Class 5 Switch, NTT and MDF**

**DSL Pre-qualification Using Loop Insertion Loss**

### **Remote Terminal Testing**



#### **Network Key**

- FIBER
- COPPER
- - - LOOPCARE COMMUNICATIONS INTERFACE



# DigiTest Measurement Node Specifications

## Physical (Chassis)

1.75"(H) •• 17.63"(W) •• 12.00"(D) [4.4cm(H) •• 44.7cm(W) •• 30.5cm(D)]  
 Weight ..... 6.9 lbs. [3.08kg] (DMN and FAC), 9.5 lbs. [4.31kg] fully loaded  
 Mounting ..... 19" or 23" EIA Racks  
 Chassis Capacity ..... Two slots for test heads, one for Fuse Alarm Card

## Environmental

Operating Temp. .... -40°C to +65°C (-40°F to +149°F)  
 Storage Temp. .... -40°C to +70°C (-70°F to +158°F)  
 Humidity range ..... 5 to 95% (non-condensing)

## Certification

NEBS Level 3, CSA/UL 60950

## Power Requirements

Power Dissipation ..... 25 watts  
 Battery Input Voltage ..... -40.5 VDC to -57.0 VDC  
 Current Required ..... 3A

## Communications Interface(s)

Analog Dial-up (50-pin champ or wire wrap adapter)  
 RS-232 Serial (RJ-45)  
 10/100BaseT Ethernet (RJ-45)  
 Local RS-232 Craft Port (RJ-45)  
 Extender Net [Extnet] (wire wrap adapter)

## DMU + Physical

1.4"(H) •• 6.6"(W) •• 10"(D) [3.5cm(H) •• 16.7cm(W) •• 25.4cm(D)]  
 Weight ..... 1.4 lbs. [.64kg]  
 Mounting ..... Plug-in for DMN Chassis  
 Test Trunk ..... Tip, ring, sleeve and ground available

## DMU + Measurements

AC/DC Voltage	Pair Gain Test Controller Access
Capacitance	Coin Station Testing
AC/DC Delta Measurements (three-terminal)	Talk and Monitor Access
Voiceband Level	Load Coil Detection and Location
Voice Detect	Longitudinal Balance
Pulse (rotary) and DTMF Dial Testing Capability	Hazardous Potential Detection
Tone Recognition	Tip-Ring Short
Metallic Pair Identification	DSL Splitter Detection
Longitudinal Tracing Tone	TX/RX Voiceband Tones
Howler Tone	Voiceband Noise
	Loop Insertion Loss (optional)

## DWU Physical

1.4"(H) •• 6.6"(W) •• 10"(D) [3.5cm(H) •• 16.7cm(W) •• 25.4cm(D)]  
 Weight ..... 1.4 lbs. [.64kg]  
 Mounting ..... Plug-in for DMN Chassis

## DWU Measurements

High-performance Time Domain Reflectometry  
 Bridged Tap Location and Detection  
 Wideband Spectrum Analysis  
 Impulse Noise  
 Wideband Disturber Identification

## Ordering Information

Tollgrade Product	Ordering Code
DigiTest Measurement Node (DMN) Chassis	TLGD-DMN
Alarm/Fuse Card	TLGD-DAF
Digital Measurement Unit Plus (DMU +)	TLGD-DMUPLUS
Digital Measurement Unit Plus with Loop Insertion Loss (DMU + w/LIL)	TLGD-DMUPLUS-L
Digital Measurement Unit Plus with Modem	TLGD-DMUPLUS-M
Digital Wideband Unit (DWU)	TLGD-DWU

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