

MCU[®] Test Extension for Digital By-pass

Tollgrade's patented MCU channel units for digital by-pass pair circuits extend the reach of embedded, switch-based test systems to widely deployed Digital Loop Carrier (DLC) systems via an emulated "metallic channel."

This emulated metallic by-pass pair solution is compatible with most common centralized loop test systems such as Tollgrade's LoopCare[™] and Nortel's AccessCare[™].

Channel banks provisioned with MCU digital by-pass pair channel units provide centralized loop test system functionality and eliminate the need for metallic by-pass pairs or remote measuring units for testing subscriber lines served by DLC systems. This provides a cost-effective means to transition metallic pairs to fiber-based DLC systems, complementing programs to either retire or better utilize existing

copper facilities in the local exchange plant. A digital by-pass pair also has a much greater Central Office (CO) to Remote Terminal (RT) operating range than a metallic pair.

At the same time, customers can be served by the DLC systems to receive the full benefit of higher bandwidth services available on the shorter loops with the confidence of switch-based access to centralized test heads.



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

tollgrade
Network Assurance[®]
Simplified[™]

*Extend the reach
of switch-based
test access
through fiber loops
via a simulated
"metallic channel."*

MCU[®]
**CHANNEL
UNIT**

Primary Features of the MCU Test Extension Solution

Extended Test Capability

MCU digital by-pass pair technology permits centralized loop test systems (like Tollgrade's DigiTest® Measurement Nodes) to perform a full range of tests with the speed and accuracy of a high quality metallic by-pass pair, while not subject to inductive interference, ground potential problems or other environmental conditions. In addition, a DLC channel provisioned with MCU digital by-pass pair channel units emulates a 1350 ohm copper pair, regardless of the length of the DLC system.

Simple to Use

The MCU digital by-pass pair channel units allow for immediate test capability via telephone number, as no special database changes are required. An MCU channel unit contains a number of user-selectable options, depending on the requirements of the DLC system in which it is installed. Only three leads at the CO and two leads at the RT are required to be cross-connected. An MCU digital by-pass pair channel unit occupies a single physical slot in the CO terminal and RT.

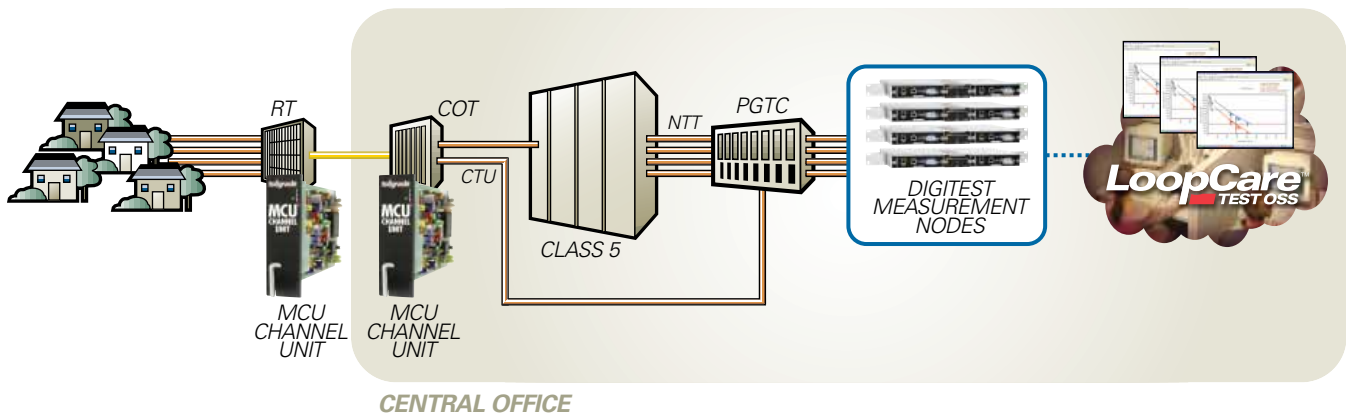
Depending on the DLC system, the MCU channel unit may be installed in any available slot.

Compatibility

An MCU digital by-pass pair channel unit is available for the most commonly deployed DLC and D4-compatible channel banks, providing for a uniform testing solution across subscriber loop deployments. Furthermore, every MCU channel unit is end-to-end compatible with all other licensed or manufactured MCU channel units designed for the digital by-pass pair application.

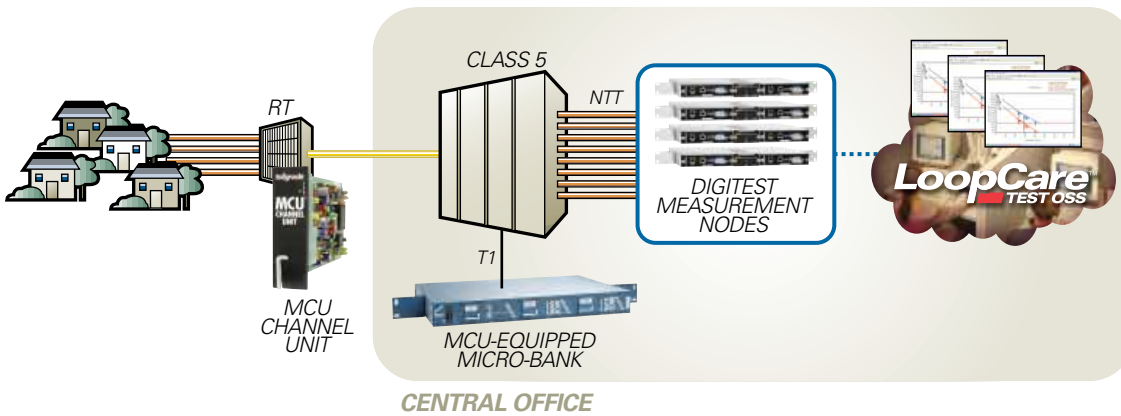
The following architectures depict typical configurations illustrating how MCU channel units may be deployed to create a digital by-pass pair.

Typical Universal DLC Configuration



In Universal DLC applications, MCU channel units are inserted in both the COT and RT to provide a digital by-pass pair to emulate the metallic by-pass pair.

Typical Integrated DLC Hair-Pin Configuration

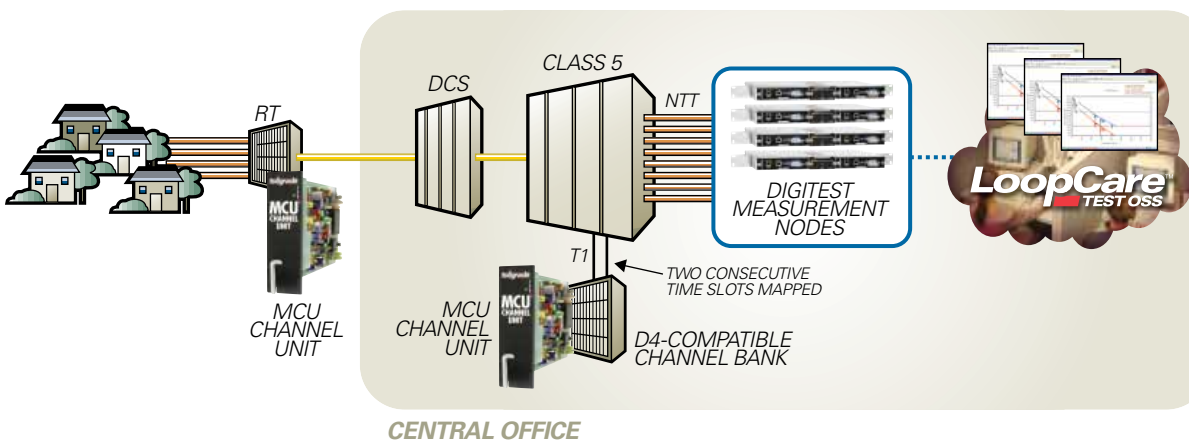


In Integrated DLC applications, hair-pin arrangements use switch-based devices, such as an IDCU in a 5ESS or an MTA in a DMS-100, to route two consecutive DS0 time slots to a D4-compatible channel bank (e.g., Tollgrade Micro-Bank® equipped with an MCU channel unit). This channel unit, along with an RT-based MCU channel unit, provides the digital by-pass pair.

Network Key

- FIBER
- COPPER
- - - - LOOPCARE COMMUNICATIONS INTERFACE

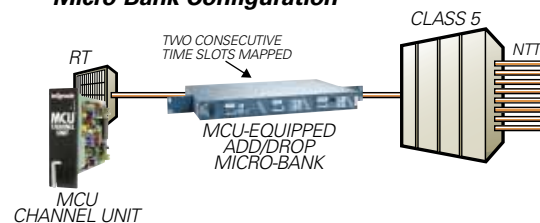
Typical Integrated DLC DCS Device Configuration



In integrated applications, a DCS can be used to map two consecutive time slots between a D4-compatible channel bank and a DLC RT (both equipped with MCU channel units), to provide the digital by-pass pair.

Alternatively, a Tollgrade Add/Drop Micro-Bank can be used to house the CO-based MCU channel unit and provide the mapping of the two time slots.

Tollgrade Add/Drop Micro-Bank Configuration



Specifications

Specifications of MCU channel units may vary slightly based on the DLC system in which they are deployed. Please refer to individual product documentation for exact specifications.

Operating Range in the DC to 200Hz band

DC Resistance (T to T)	675 ohms
DC Resistance (R to R)	675 ohms
Signaling Voltage Range	+140/-140 V
DC Current Limit	110 to 120mA

Power Requirements

System-dependent

Voiceband Parameters

Insertion Loss at 1004 Hz	5.5+/-1.0db
Frequency Response vs. 1 Khz (504 to 3204 Hz)	+/-1.5db
Impedance/2-wire Drop (terminated)	900 ohms +2uF
Idle Circuit Noise	<25dBmC

Other

Status LED(s) are provided for SYNC and BUSY indications.

Automatic calibration three minutes after insertion and at subsequent 30-minute intervals.

NEBS Level 3 Certified, meeting applicable requirements of GR-1089-CORE and GR-0063-CORE.

Ordering Information

Product (System Compatibility)	Part Number	CLEI/HECI
MCU-5405, List 4 (Lucent SLC * Series 5, SLC-2000 and AnyMedia *)	TLGD-5405-L4	5SC26T02AE
MCU-4496ER, List 5 (Lucent SLC 96 and D4* -Compatible Channel Banks)	TLGD-4496ER-L5	S9CS678BAE
MCU-A405 (Adtran TA 1500)	TLGD-A405	VAI1SK0CAB
MCU-D405, List 2 (Alcatel Litespan * 2000/2012)	TLGD-D405-L2	SLCIDED2AB
MCU-F405, List 3 (Fujitsu FDLC)	TLGD-F405-L3	5SC3FG03AC
MCU-N405, List 2 (Zhone ISC-303)	TLGD-N405-L2	5SC26508AB
MCU-R405, Issue 2, List 2 (Tellabs DISC*S *)	TLGD-SCU26A-I2-L2	SLCIDEG2AB
AFC now Tellabs DBP Card (AccessMAX™)	Contact Tellabs at 707-794-7700	
Calix ADP Card (C7) (GA Q106)	Contact Calix at 877-766-3500	
Motorola DBP Card (Wireline FTTN USAM and BDT)	Contact Motorola at 707-584-6820	
Zhone MAC/ITBP Card (AccessNode™ UE9000)	Contact Zhone at 877-946-6320	
Zhone ITU/ITBP Card (AccessNode Express)	Contact Zhone at 877-946-6320	

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