ciena

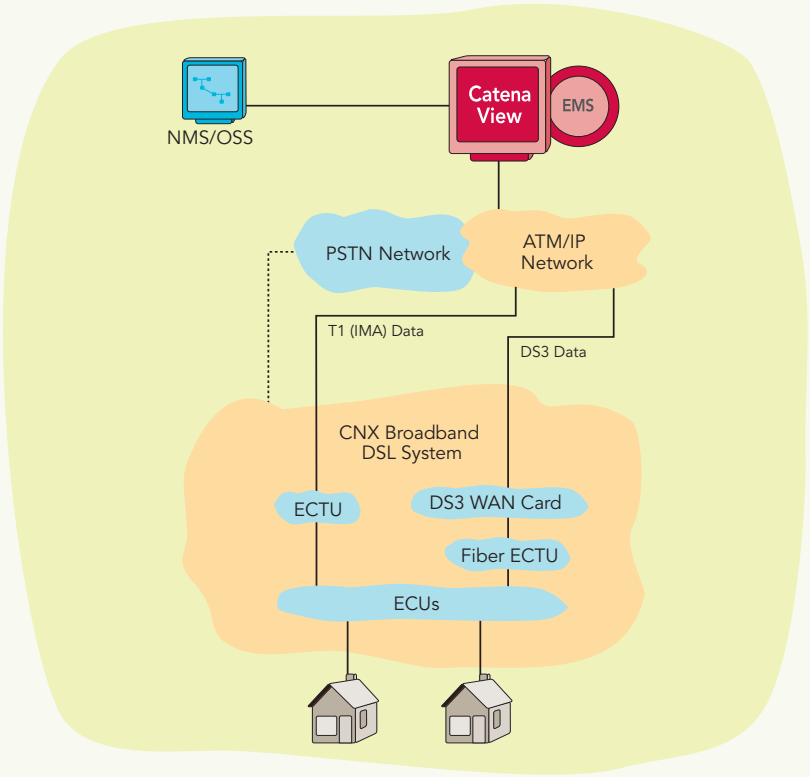
Product Brochure

CNX-5™ Broadband DSL System

Simple, Elegant, Cost-effective Solution

CNX-5 Broadband DSL System

The CNX-5™ Broadband DSL System is a simple, elegant, cost-effective solution that DSL-enables Lucent SLC® Series 5 (SLC-5) Digital Loop Carriers (DLC). This unique approach to DSL deployment enables service providers to deliver both POTS and DSL services on any copper pair without compromising POTS density. The CNX-5 leverages service providers' investments in installed DLC equipment, providing the most cost-effective solution for delivering DSL services from the DLC. Inexpensive to purchase and install, the CNX-5 expands in two-channel increments and provides T1, Inverse Multiplexing over ATM (IMA) and DS3 network interface options to utilize existing backhaul facilities.



This figure illustrates how the CNX-5 fits in the network. The CNX-5 is managed by CatenaView™ EMS.

THE CHALLENGE The exploding demand for broadband service, and rapidly expanding competition from cable providers, has created an urgent need for service providers to deliver DSL to customers serviced by DLCs. However, current solutions for delivering DSL from remote terminals ranging from remote DSLAMs to bolt-on Mini-RAM systems are bulky, cumbersome, and cost-prohibitive. These offerings require additional space in a remote terminal cabinet, or worse, an incremental investment in concrete pads and cabinets. To really compete, service providers require a fast, simple, and reliable upgrade to their installed base of SLC-5 systems, one that is cost-effective and provides considerable capacity for growth.

THE CNX-5 SOLUTION The CNX-5 Broadband DSL System fulfills this need. It allows service providers to introduce DSL service easily while fully leveraging their investments in SLC-5 DLC installations. The CNX-5 is available in T1 IMA and DS3 configurations to accommodate different network architectures. In the DS3 configuration, multiple SLCs in the same cabinet can be connected into a single node group for simple management of DSL services.

CNX-5 IN THE NETWORK Standards-based and interoperable with all major Customer Premises Equipment (CPE), the CNX-5 provides the data transmission and voice interface between end users and the Central Office (CO). Ciena cards operate together to provide the capabilities of a DSLAM, while preserving the functionality of POTS and legacy services on the SLC-5. CNX-5 dual channel banks can be networked into multiple configurations depending on density requirements and backhaul options, so service providers can deploy the simplest and most cost-effective DSL system to suit their unique requirements.

SOLUTION ELEMENTS

The CNX-5 system is available in T1 IMA and DS3 configurations that provide the flexibility to utilize existing backhaul facilities and meet growing DSL demand. Both configurations use Enhanced Channels Units (ECUs) and are managed by the CatenaView EMS. The table below summarizes the cards and their functions, applicable to each configuration.

Configuration	Card	Function
T1 IMA	ECU	Subscriber service card; 2 lines of POTS and ADSL or ADSL2/2+
	SCU	Subscriber service card; 2 lines of SHDSL
	ECTU	ATM fabric and T1 IMA network interface card; one per dual channel bank
DS3	ECU	Subscriber service card; 2 lines of POTS and ADSL or ADSL2/2+
	SCU	Subscriber service card; 2 lines of SHDSL
	Fiber ECTU	ATM fabric and fiber node; one per dual channel bank
	DS3 WAN Card	ATM fabric, traffic management and DS3 network interface card

ENHANCED CHANNEL UNIT (ECU) The ECU is a CNX-5 Subscriber Service Card, employing Ciena's industry-leading integrated POTS+ADSL line interface technology. The ECU replaces the legacy POTS channel unit to provide two standards compliant ports of POTS+ADSL. When inserted into the SLC-5 chassis, the ECU operates as a regular SLC-5 POTS channel unit, complying with relevant TR-57 voice standards. To the service technician, the ECU installs the same way as a regular SLC-5 channel unit with familiar LED indications. For DSL services, the ECU complies with T1.413 (Issue 2), G.992.1 (G.dmt) G992.3 (ADSL2), G992.5 (ADSL2+) and G.994.1 (G.handshake) standards, and is provisioned the same way as typical DSL services from a DSLAM.

CATENAVIEW ELEMENT MANAGEMENT SYSTEM CatenaView is a carrier-class Element Management System (EMS) for all Ciena broadband access products, including the CNX-5 Broadband DSL System, CNX-5Plus Modular BLC and the CN 1000™ Next-Generation Broadband Access Platform. For the CNX-5, CatenaView EMS manages DSL and ATM features,

The CNX-5 Broadband DSL System is designed to DSL-enable the installed base of Lucent SLC Series 5 Digital Loop Carriers, with no reduction in POTS capacity.

CNX-5 BENEFITS

Simple: The CNX-5 allows a SLC-5 to be DSL-enabled with simple card-for-card replacements, with no reduction in POTS capacity.

Elegant: The CNX-5 requires no backplane cabling, "pizza boxes", POTS splitters, or additional pads and cabinets— just a simple card-for-card upgrade.

Cost-effective: Lower start-up, expansion, and inventory costs make the CNX-5 much less expensive than Mini-RAMs and remote DSLAMs.

Scalable: The CNX-5 provides cost-effective DSL growth in two line increments without reducing POTS capacity, and the CatenaView EMS is expandable to hundreds of thousands of lines in many different configurations.

enabling service providers to deliver DSL services on any SLC-5 copper pair. It enables bulk or individual provisioning using template-based or flow-through options. Services can be provisioned in real time or pre-provisioned for improved operational efficiency. This flexibility ensures fast and simple deployment of a variety of volume DSL service offerings. Highly scalable, CatenaView EMS can expand to support many users and hundreds of thousands of managed lines. For flow-through provisioning and reporting, it provides the gateways necessary to link electronically with upstream Operations Support Systems (OSS) and Network Management Systems (NMS).

ECU subscriber service card for all CNX-5 configurations

ECTU for T1 IMA configuration

DS3 WAN Card and Fiber ECTU for DS3 configuration

As service providers strive to deploy mass-market DSL services rapidly, CatenaView EMS enables simple and scalable provisioning, including smooth integration with existing and planned network management and OSS.

It provides a simple service turn-up process and then ensures reliable customer service, including pre-emptive detection, diagnosis, and problem isolation.

ENHANCED CHANNEL TEST UNIT (ECTU) FOR THE T1 IMA CONFIGURATION To support DSL services on the SLC-5, the legacy Channel Test Unit (CTU) is replaced with Ciena's ECTU. The ECTU retains the legacy CTU functionality and adds DSLAM capabilities to the SLC-5. The CNX-5 utilizes existing system resources on the SLC-5 to communicate between ECU cards and the ECTU. This innovative architecture simplifies DSL deployment by eliminating the need for POTS splitters and external cabling. In the event of an AC power failure, the ECTU can disable DSL to preserve power for POTS services. Upon restoration of AC power, the system will automatically re-enable DSL service.

DS3 WAN CARD AND FIBER ENHANCED CHANNEL TEST UNIT (FIBER ECTU) FOR THE DS3 CONFIGURATION The DS3 WAN Card and Fiber ECTU are companion cards in the CNX-5 DS3 configuration. Together, the cards aggregate traffic from multiple CNX-5s and provide a DS3 network interface. One Fiber ECTU is inserted into each dual channel bank, and a single DS3 WAN card provides the DS3 network interface for the multiple CNX-5s, and controls all ATM switching and traffic management. The DS3 WAN card acts as the system manager, monitoring the integrity of the interconnections and managing the overall ATM traffic. In addition, the DS3 WAN card monitors for loss of AC power and can disable DSL service, as required, to preserve lifeline POTS service.

This simple, integrated approach permits service providers to aggregate multiple CNX-5s and respond to increased demand for DSL service.

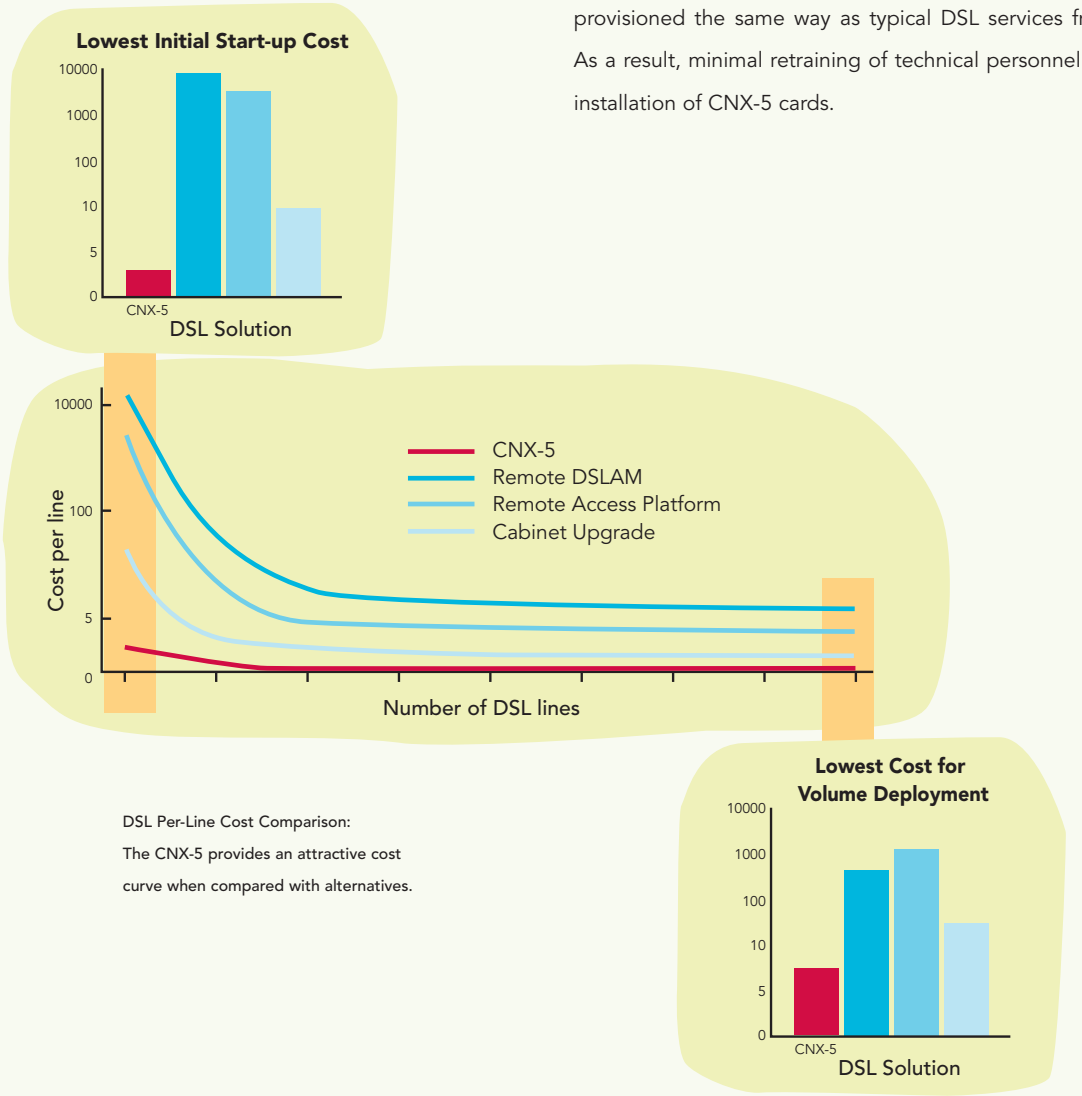
BENEFITS OF THE CNX-5 SYSTEM

NETWORK INTERFACE FLEXIBILITY The CNX-5 system provides T1, IMA and DS3 network interface options to utilize existing backhaul facilities. The T1 interface can be connected to a fiber mux or directly interface to copper backhaul facilities. IMA allows the ATM data stream to be split across T1 circuits, thereby combining the bandwidth of multiple T1 links into a single logical interface. DS3 enables service providers to provide premium service levels and serve greater numbers of subscribers to meet growing DSL demand.

COST-EFFECTIVE AND SCALABLE The CNX-5 provides an attractive price curve when compared with alternative solutions—from initial start-up through deployment and maintenance. It is inexpensive to install, expands in two-line increments and scales to high DSL densities.

AGGREGATION CAPABILITY The DS3 configuration uses a fiber ring to aggregate ATM traffic from multiple CNX-5s onto a single DS3 network interface allowing service providers to optimize utilization of limited backhaul bandwidth.

MINIMAL RETRAINING OF PERSONNEL The ECU installs and operates the same way as legacy SLC-5 channel units, and ADSL is provisioned the same way as typical DSL services from a DSLAM. As a result, minimal retraining of technical personnel is required for installation of CNX-5 cards.



DSL Per-Line Cost Comparison:
The CNX-5 provides an attractive cost curve when compared with alternatives.

Technical Information

ATM FUNCTIONALITY

UNI 3.0, UNI 3.1 and TM 4.0-based ATM interfaces Multiple classes of service including: CBR, UBR, VBR-rt, VBR-nrt, UBRmcdr; and multiple VCs per subsciber

System features large buffers with full multi-grained congestion management, including EPD/PPD and multiple watermarks

Comprehensive ATM OAM (I.610 FM & PM) and ATM/DSL MIBs Multicast-ready, will migrate to support ILMI auto-configuration of ATU-R, subscriber side SVC, UNI-based SPVC for reduced network operations,and packet services

DSL STANDARDS COMPLIANCE

ITU G.991.2 (G.SHDSL)

ITU G.992.1 (G.dmt), ITU G.992.3 (ADSL2), ITU G.992.5 (ADSL2+)

ITU G.994.1 (G.handshake)

ANSI T1.413 (Issue 2)

INTEROPERABILITY

Fully interoperable with all major ADSL chip sets

RELIABILITY AND SERVICEABILITY

Software and configuration downloads from CatenaView EMS Full OAM suite, including F5 loopbacks and performance statistics

POWER REQUIREMENTS

Operating Voltage	Derived from -48V DC in SLC RT

ROBUSTNESS

AC Power Fail Detect Feature	Enables turn-down of DSL service in the event of a power outage to preserve lifeline POTS battery life
Easy Recovery	Relevant DSL provisioning data is stored in non-volatile memory to allow for DSL service recovery from a power outage without EMS intervention

OPERATING ENVIRONMENT

Operating Temperature Range	-40˚ F to 150˚ F; -40˚ C to +65˚ C
Storage Temperature Range	-40˚ F to 158˚ F; -40˚ C to +70˚ C
Altitude	12,000 ft; 4,000 m
Relative Humidity	5% to 90% non-condensing

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