



High-density, flexible, and cost-effective service delivery

Channelized OC-3c/STM-1 DS-1/0 CEM for Marconi ASX and TNX multiservice broadband switches



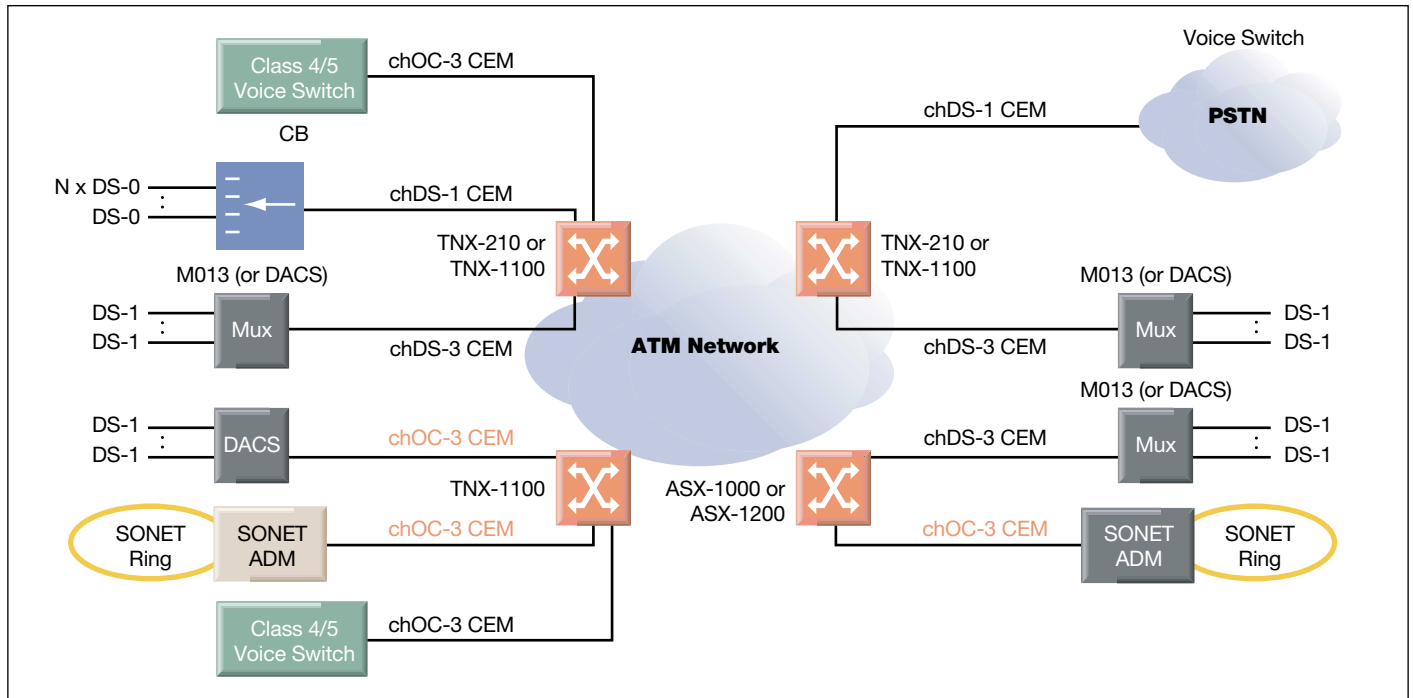
The Marconi channelized OC-3c/STM-1 Circuit Emulation (CEM) network module provides the advanced functionalities required for cost-effective consolidation of Time Division Multiplexing– (TDM-) based circuits carrying voice, video, and data traffic over a common, scalable multiservice Asynchronous Transfer Mode (ATM) network.

Marconi switches have been deployed as ATM multiservice switching elements in federal infrastructures as well as service provider edge, core, and backbone networks. The introduction of the channelized OC-3c CEM network module enhances and extends the applications supported by the ASX®-200BX, ASX-1000, ASX-1200, TNX™-210, and TNX-1100 switches by providing for fast and easy delivery of TDM solutions over an ATM infrastructure.

This new one-port network module offers a cost-effective and space-efficient way to deliver private-line services, voice transport, and switched voice connectivity. By deploying high-density switch interfaces, network operators can reduce footprint requirements and operational costs. In addition, Marconi ForeThought® internetworking software — proven by millions of operation hours — powers this card.

Key benefits

- Flexible bandwidth selection for the consolidation of multiple access lines and traffic types
- Efficient space utilization through high-capacity channelization on the network module, which reduces switching equipment requirements
- Alternate solution for delivery of private-line and voice services through direct connection of TDM-bearing services onto existing multiservice ATM networks
- Network simplification and lower operating/maintenance costs due to fewer network elements, utilization of less rack space, and lower power requirements
- Aggregation of a large number of DS-1s into OC-3s for significantly reduced cabling complexity, simplified troubleshooting and maintenance, and enhanced network reliability



Typical application of the channelized OC-3c/STM-1 CEM network module

Flexible bandwidth selection

An ATM multiservice backbone provides a flexible infrastructure for provisioning services aimed at revenue generation. With this network infrastructure, service providers gain the flexibility to set up multiple connections for delivery of a full range of bandwidth capacities (DS-0, NxDS-0, and DS-1) to meet the varying bandwidth capacity needs of their customers. This flexibility enables a variety of access lines and traffic types (e.g., voice, video, and data) to be consolidated into a bandwidth-efficient multiservice ATM network.

Efficient space utilization

A multiservice ATM network with CEM service support enables grooming of customer service connections. This reduces equipment footprint in the central office (CO) by eliminating the need for additional digital access and cross-connect system (DACS) equipment.

Private-line delivery

Private-line services represent a significant and growing volume of service provider revenue with a large installed base of customers. By delivering incremental private-line services via an ATM multiservice network, service providers can cap their investment in obsolete TDM technology and transition TDM private-line traffic to an ATM backbone — all while maintaining a steady revenue source.

Voice services

Traffic from a Class 4/5 voice switch or private branch exchange (PBX) system can be packaged into ATM cells, sent through the ATM backbone via the most efficient route, and then converted back into TDM for connection to legacy voice equipment. The destination for this traffic could be either another PBX system or a Class 5 switch. A multiservice ATM network with CEM service support enables PBX voice traffic backhaul to the Class 5 switch in the public switched telephone network (PSTN) or Class 4/5 voice switch connectivity.

Simplified network configuration

Using the channelized OC-3c CEM network module in a multiservice backbone creates a solid foundation for delivering other incremental services such as Frame Relay, Ethernet, and ATM. This lessens the need for build-out or expansion of multiple network types, which in turn reduces the number of network elements a service provider has to operate and maintain.

Lower operating costs

By migrating private-line services to a multiservice ATM network, federal and service provider customers can reduce the costs associated with managing, provisioning, maintaining, and upgrading standalone TDM networks. ATM networks also allow for simplified service provisioning. Once the two endpoints of a private-line service have been identified, provisioning, routing, and cross-connecting of the single constant bit rate (CBR) ATM permanent virtual circuit (PVC) can be completed in a matter of minutes through simple point-and-click interfaces incorporated in the network management system. Such convenient service setup and teardown increases staff productivity and reduces operating costs.

Reduced cabling complexity

In a service provider network, cabling complexity contributes significantly to the cost of maintenance, troubleshooting, network upgrades, and modifications. The channelized OC-3c CEM network module allows service providers to aggregate a large number of NxDS-0 and DS-1 cables into a single OC-3 optical cable, significantly reducing overall network cabling complexity. In addition to simplifying operations, a single optical interface also provides a more secure and reliable transmission facility.

Key features

- One channelized OC-3c port (offered in multimode and single mode, intermediate reach versions)
- Supported on the ASX-200BX, ASX-1000, ASX-1200, TNX-210, and TNX-1100 switches
- Planned support on ASX-4000 and ASX-4000M switch routers via the Network Module Carrier Card (NMC)
- ATM Adaptation Layer 1 (AAL-1) Circuit Emulation Service (CES) in compliance with the ATM Forum CES 2.0 specification
- Support for structured AAL-1 CES: DS-1; DS-0 and NxDS-0 within DS-1 channel
- Support for unstructured AAL-1 CES on DS-1: end-to-end DS-1 clear channel; planned support for unstructured DS-3 and E1 mapping
- Ability to implement a controlled migration strategy for legacy services to multiservice networks
- 3/1/0 timeslot interchange provided via ATM's inherit ability to switch virtual circuits (VCs)
- Management support via Web or command line interface (CLI), as well as through the Marconi ServiceOn® Data network management system, which is based on standard Management Information Bases (MIBs)
- Maximum of 2,016 VCs (3 x 28 x 24 DS-0s)
- Support for ATM PVC and smart PVC (SPVC) connections to the DS-0 level
- Support for synchronous residual time stamp (SRTS) at the DS-1 level
- Tributary monitor/status report
- Statistics collection and monitoring
- Alarm history and reports
- Network-invoked loopbacks
- Capability to interoperate with other Marconi CEM products, including the following:
 - Three-port channelized DS-3/1/0 CEM network module
 - Four-port channelized OC-3/STM-1 CEM port card
 - Six-port DS-1/E1 CEM (formerly known as VoicePlus™) network module
 - SE™-400 Series of integrated access devices (IADs)
- Capability to interoperate with ATM Forum CES 2.0 standard-based CES products from other vendors

Data summary

Alarms	Loss of signal (LOS), loss of frame (LOF), loss of pointer (LOP), far end block errors (FEBE), alarm indication signal (AIS), remote defect indication (RDI), far-end receive failure (FERF), bit interleaved parity (BIP) errors, header check sequence (HCS) errors, path unequipped, path label mismatch
Clock accuracy	±20 ppm
Clock source	Primary and secondary 8 kHz reference, internal or network
Compliance	CES per ATM Forum CES Interoperability Specification v2.0 (af-vtoa-0078.000, January 1997)
Connection capacity	
Unicast	Up to 2,016 VCs
Multicast	Up to 672 VCs
Connectors	LC
Data rate	155.52 Mbps

Environmental

	Operating range	Storage range
Altitude	0 to 10,000 ft (0 to 3,048 m)	0 to 30,000 ft (0 to 9,144 m)
Humidity	10% to 90%, non-condensing	5% to 95%, non-condensing
Temperature		
Normal	32° F to 104° F (0° C to 40° C)	-40° F to +158° F (-40° C to +70° C)
Short term (up to 96 hours)	23° F to 122° F (-5° C to +50° C)	N/A

Framing	VT1.5
Line encoding	Non-return to zero (NRZ)
Loopbacks	Transmit and receive
Media	Single mode fiber or multimode fiber
Output buffer capacity	512,000 cells
Port capacity	1 OC-3c/STM-1 Synchronous Optical Network (SONET) port
Power	5 VDC, 18 W

Statistics	
Port level	Errored seconds (ES), severely errored seconds (SES), severely errored framing seconds (SEF), unavailable seconds (UAS), controlled slip seconds (CSS), path coding violations (PCV), line errored seconds (LES), line coding violations (LCV), CRC errors, C-bit code violations (CCV), C-bit errored seconds (CES), C-bit severely errored seconds (CSES)
Connection level	Reassembled cells, lost cells, misinserted cells, buffer underflows, buffer overflows, cell loss status

Ordering information

NMCE-1/155SMIRE	One-port channelized OC-3c/STM-1 CEM network module; single mode, intermediate reach fiber
NMCE-1/155MME	One-port channelized OC-3c/STM-1 CEM network module; multimode fiber

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