

Gmux-2000

C.STM1, C.OC3

Dual-Port Channelized STM-1 and OC-3 Interface Modules



Direct access to SDH or SONET networks at the STM-1 or OC-3 levels with pseudowire emulation

- Pseudowire service emulation over packet-switched networks
- Two full channelized STM-1 (SDH) or OC-3 (SONET) links
- User-defined mapping of internal VC-12 and VT1.5 streams within the STM-1 and OC-3 streams
- Line redundancy and MSP (Multiplexing Section Protection) between the dual link ports, or module redundancy with two C.STM1/C.OC3 modules
- Extended diagnostic mechanism, including self-test and loopbacks on external and internal ports

The C.STM1 and C.OC3 modules operate as SDH and SONET terminal multiplexers for the Gmux-2000 chassis that terminates the STM-1 or OC-3 link and its overhead.

The modules multiplex up to 63 E1 or 84 T1 streams derived from the Gmux-2000 internal telecom buses into one STM-1 or OC-3 data stream.

Mapping of the traffic flows within the SDH and SONET trunks is configurable as follows:

- SDH – any VC-12 tributary units carried in the STM-1 VC-4 virtual container
- SONET – any VT1.5 tributary units carried in the OC-3 STS-1 virtual container.



data communications

The Access Company

C.STM1, C.OC3

Dual-Port Channelized STM-1 and OC-3 Interface Modules

PSEUDOWIRE FUNCTIONALITY

The modules support E1/T1 pseudowire emulation services over UDP/IP packet-switched networks using the following user-configurable protocols:

- TDMoIP (TDM over IP) in accordance with RFC 5087
- HDLCoPSN (HDLC over PSN) in accordance with RFC 5087 and RFC 4618 (except Clause 5.3 – PPP)
- CESoPSN (structure-aware TDM circuit emulation over PSN) in accordance with RFC5086
- SAToPSN (structure-agnostic TDM over PSN) in accordance with RFC 4553.

Total module capacity is 336 pseudowire connections.

TIMING

Timing can be configured for the following modes:

- SDH/SONET trunk loopback clock
- Internal VC-12/VT1.5 clock
- Nodal (system) reference clock.

EXTERNAL INTERFACES

Various fiber optic SFP transceivers, enabling optimal combination of Capex reduction, ease of network planning and stock flexibility are available for the external STM-1 and OC-3 ports.

REDUNDANCY

The C.STM1 and C.OC3 modules support 1+1 unidirectional, 1+1 bidirectional or 1+1 bidirectional optimized (line) protection with APS, per ITU-T Rec. G.841. Protected STM-1/OC-3 links can be located on the same or different C. STM1 modules.

Hardware redundancy is attained by installing two C.STM1 or C.OC3 modules in a Gmux-2000 chassis. A redundant module is put into service if the active module fails, ensuring continuous system operation.

DIAGNOSTICS

Comprehensive diagnostic capabilities include:

- Automatic self-test at power-up to monitor the module subsystems
- Real-time alarms to alert user on fault conditions
- Local and remote loopbacks on the external STM-1 or OC-3 ports.

Specifications

STM-1 MODULE

Number of Ports

Two, SFP-based

Payload Capacity

63 E1 streams

Physical Layer

ITU-T Rec. G.957

Nominal Bit Rate

155.520 Mbps

Framing

ITU-T Rec. G.707, G.708, G.709

Payload Routing

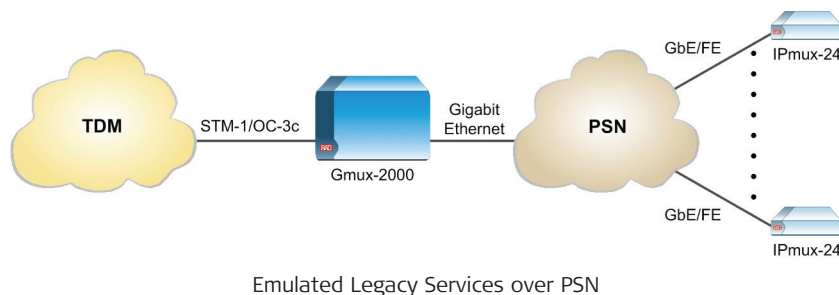
Any E1 port to any VC 12 within the STM-1 payload

Internal E1s

Compliance: ITU-T Rec. G.703, G704, G.706, G.732

Framing modes:

- Unframed
- Basic G.704 framing with or without CRC 4
- G.704 timeslot 16 multiframe with or without CRC-4



STM-1 SFPs

For full details, see the SFP Transceivers data sheet on www.rad.com

Note: It is strongly recommended to order this device with **original RAD SFPs installed**. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs. For detailed specifications of the SFP transceivers, see the SFP Transceivers data sheet.

OC-3 MODULE**Number of Ports**

Two, SFP-based

Payload Capacity

84 T1 streams

Physical Layer

ITU-T Rec. G.957

Nominal Bit Rate

155.520 Mbps

Framing

GR-253-CORE and ANSIT1.105

Payload Routing

Any T1 port to any VT1.5 within the OC-3 payload

Internal T1s

Compliance: AT&T TR-62411, AT&T Pub 54016, ANSI T1.107, ANSI T1.403

Framing modes: unframed, SF (D4), ESF

OC-3 SFPs

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PSEUDOWIRE FUNCTIONALITY**Protocols**

TDMoIP in accordance with RFC 5087

HDLCoPSN in accordance with RFC 5087 and RFC 4618 (except Clause 5.3 – PPP)

CESoPSN in accordance with RFC 5086

SAToPSN in accordance with RFC 4553

CES and SAToP per MEF 8

PSN Types

UDP/IP, Ethernet

Number of Pseudowire Bundles

Up to 336

TIMING**STM-1/OC-3 Receive Port Timing**

Receive clock recovered from the received STM-1/OC-3 line signal

Gmux-2000 nodal clock can be locked to the recovered receive clock signal of an STM-1/OC 3 port

STM-1/OC-3 Transmit Port Timing

Locked to Gmux-2000 nodal clock

Loopback timing (transmit timing locked to clock recovered from selected received STM-1/OC 3 line signal)

Internal Port Receive Timing

Recovered from the received STM-1/OC-3 line signal

E1/T1 Port Transmit Path Timing

Loopback timing (transmit timing locked to clock recovered from the E1 signal received from the SDH mapper)

Adaptive timing (transmit timing locked to the average rate of packets received from the packet-switched network)

Gmux-2000 nodal timing

E1/T1 Port Receive Path Timing

Locked to clock received from the SDH/SONET mapper

GENERAL**Redundancy Type**

1+1 unidirectional, 1+1 bidirectional, 1+1 bidirectional optimized APS

Indicators

Fiber optic port:

LOSS LOC (red): Local loss of STM-1 or OC-3 signal

LOSS REM (red): Remote loss of STM-1 or OC-3 signal

STM1 and OC3 module:

ACT (green): Module activity status

FLT (red): Module fault detected

Diagnostics

Local and remote loopbacks on internal and external ports

Physical

Fits a single slot of the Gmux 2000 chassis (slot 1, 2, 3, 4, 5, 7, 9)

Environment

Operating temperature: 0–55°C (0–131°F)

Storage temperature: -20–50°C (0–150°F)

Humidity: Up to 90%, non-condensing

C.STM1, C.OC3

Dual-Port Channelized STM-1 and OC-3 Interface Modules

Ordering

GMUX-M-CSTM1-CE/SFP

GMUX-M-COC3-CE/SFP

Legend

SFP SFP module:

NULL SFP-ready slots

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For detailed specifications of the SFP transceivers, see the SFP Transceivers data sheet.

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