Gmux-2000

Modular TDMoIP Gateway

TDMoIP Driven®

FEATURES

- Carrier-class modular TDMoIP gateway, extending high capacity TDM traffic over packet-switched networks (PSNs)

- Operates opposite other members of TDMoIP family of products, offering a complete cost-effective TDMoIP solution

- Handles up to 63 E1 or 84 T1 streams to fully populate a channelized STM-1 or OC-3 trunk

- Handles up to 196 E1 or T1 streams transported via seven 28-port external E1/T1 interface modules

- Packet-switched network interface via a dual-port Gigabit Ethernet module

- SDH and SONET interface via dual-port STM-1 and OC-3 module with link protection

- Full redundancy of the STM-1/OC-3 links, clocks, control and power supply modules

- Management via ASCII terminal, Telnet host, Web terminal or SNMP-based network management station

- Provisioning and monitoring of TDMoIP services using the RADview Service Center for TDMoIP applications

- Non-volatile flash memory for software upgrade and configuration download

- AC and DC power supplies

- 6U chassis suitable for ETSI or ANSI installations

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◼ DESCRIPTION

- Gmux-2000 is a modular TDMoIP gateway that extends the TDM traffic (originating from legacy circuit-switched networks) over packet-switched networks (PSNs). This is achieved by converting TDM data streams coming from the TDM ports into IP packets transported over the PSN. Gmux-2000 features the following ports:
  - TDM ports: SDH/SONET port at the STM-1/OC-3 level (155.52 Mbps), or external PDH ports at the E1/T1 level
  - PSN port: GbE optical interface via SFP modules.

- The Gmux-2000 capacity is 63 E1 streams (full STM-1 payload) for the SDH version, and 84 T1 (full OC-3 payload) streams for the SONET version. The E1 streams are transparently transported using a circuit emulation method, while supporting all the signaling protocols and payload types. Advanced packet handling capabilities, VLAN and ToS support ensure the highest quality of service (QoS) that modern packet-switched networks can provide.
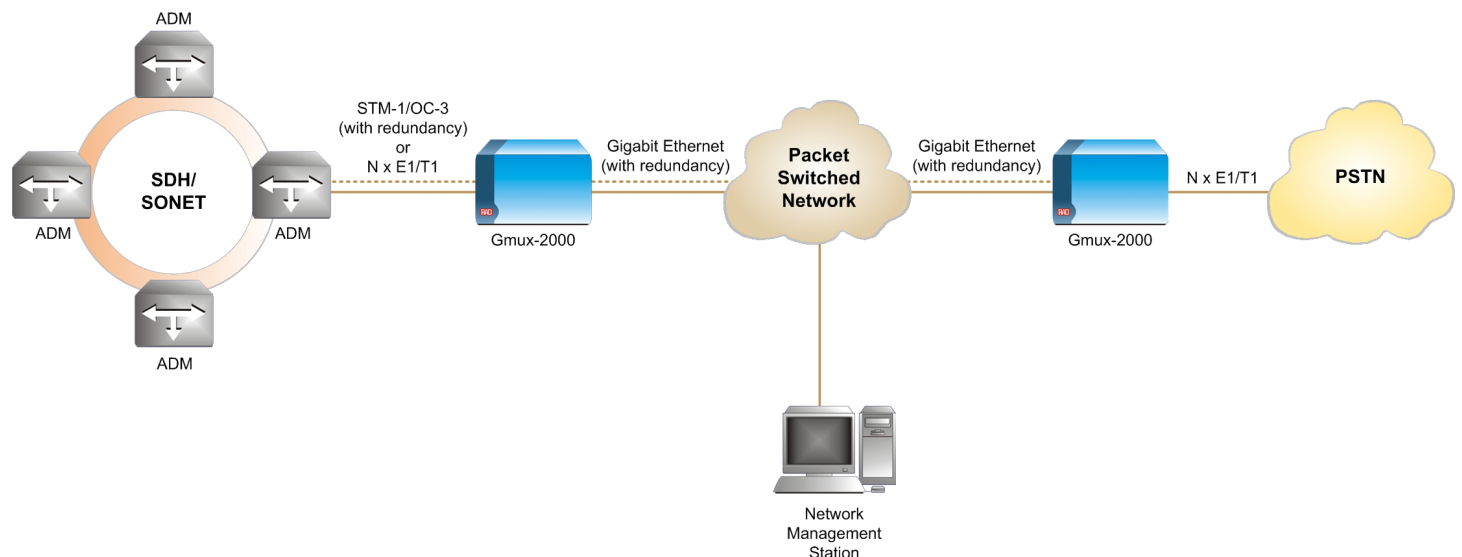
◼ APPLICATIONS

- Gmux-2000 is designed as a central site solution for TDMoIP products, operating opposite all members of the IPmux product line and Megaplex ML-IP.

CHASSIS

- The modular chassis of Gmux-2000 can accommodate up to seven I/O modules, two Gigabit Ethernet trunk modules, two SDH/SONET modules, two control/clock modules, three power supply modules (AC or DC), one power inlet module (AC or DC) and a fan unit. The modules are hot-swappable.

- Gmux-2000 comes in a 6U-high chassis, mountable in a 19-inch ETSI or ANSI rack.

PSN INTERFACE MODULE

- The Gigabit Ethernet module serves for packet network connection to the PSN. The module is equipped with a pair of redundant replaceable SFP-based fiber optic GbE interfaces.

- Operating as a Level-3/4 switch, the Gigabit Ethernet module routes the packets coming from the packet network to the I/O modules and the system modules connected to the packet bus. The routing is performed at wire speed, minimizing delays on the packet bus.

- The GbE interface operation complies with the IEEE 802.3, 802.1Q and 802.1p requirements.

SDH/SONET INTERFACE MODULE

- Gmux-2000 uses STM-1/OC-3 modules for the SDH/SONET connection. Each STM-1/OC-3 module has two ports that can be ordered with electrical (75Ω coax), or optical interfaces with various characteristics (850 nm or 1310 nm with laser and LED transmitters). The module complies with the applicable requirements of ITU-T Rec. G.957, G.958, I.432 and G.703.

- The STM-1/OC-3 module operates as a terminal multiplexer and is usually connected to an STM-1/OC-3 add/drop multiplexer port for access to the SDH/SONET backbone.

- The STM-1/OC-3 module provides 1+1 line redundancy to ensure rapid restoration of service in case of line failure.

Figure 1. Extending Multiple TDM Trunks over a Packet-Switched Network

TDMoIP CIRCUIT EMULATION MODULES

- Gmux-2000 uses the following TDMoIP Circuit Emulation (CE) modules, in accordance with the required external TDM interface:
  - When external E1/T1 interfaces are required, 28-port external E1/T1 modules are used
  - When STM-1 or OC-3 interface to SDH/SONET is required, dedicated TDMoIP server modules are used to bridge between the PSN interface module and the STM-1/OC-3 interface module.

CONTROL MODULES

- The control modules interface with the external SNMP-based network management stations, supervision terminals, Telnet hosts and Web browsers. Each control module has two out-of-band ports: a serial RS-232 synchronous port and a 10/100BaseT Ethernet port.
- The control modules store the application software in flash memory. This software can be remotely updated through the management link.

- The control modules collect the operational history (alarms, configuration error messages, performance statistics, etc).
- The Gmux-2000 chassis uses two control modules, providing hot-standby system control.

MANAGEMENT CAPABILITIES

- The chassis can be managed using different ports and applications:
  - Local out-of-band management via an ASCII terminal connected to the RS-232 port
  - Remote out-of-band management via the dedicated 10/100BaseT port
  - Remote inband management via the GbE interface. Remote management is performed using Telnet, Web browser or RADview-SC/TDMoIP, SNMP-based network management system.

ALARM REPORTING

- The chassis features a dry-contact connector for reporting alarms to external equipment. The connector also has an external alarm input for monitoring external sensors.

TIMING

- Gmux-2000 includes a central timing subsystem, located on the control module (two station clock ports per module), and local timing subsystems located on the individual I/O modules. If a control module providing a system clock fails, Gmux-2000 switches to the second control module, without affecting system performance.
- Gmux-2000 provides a flexible clock management using the timing signals coming from:
  - Station clock source
  - SDH/SONET interface
  - SDH/SONET internal virtual container clock
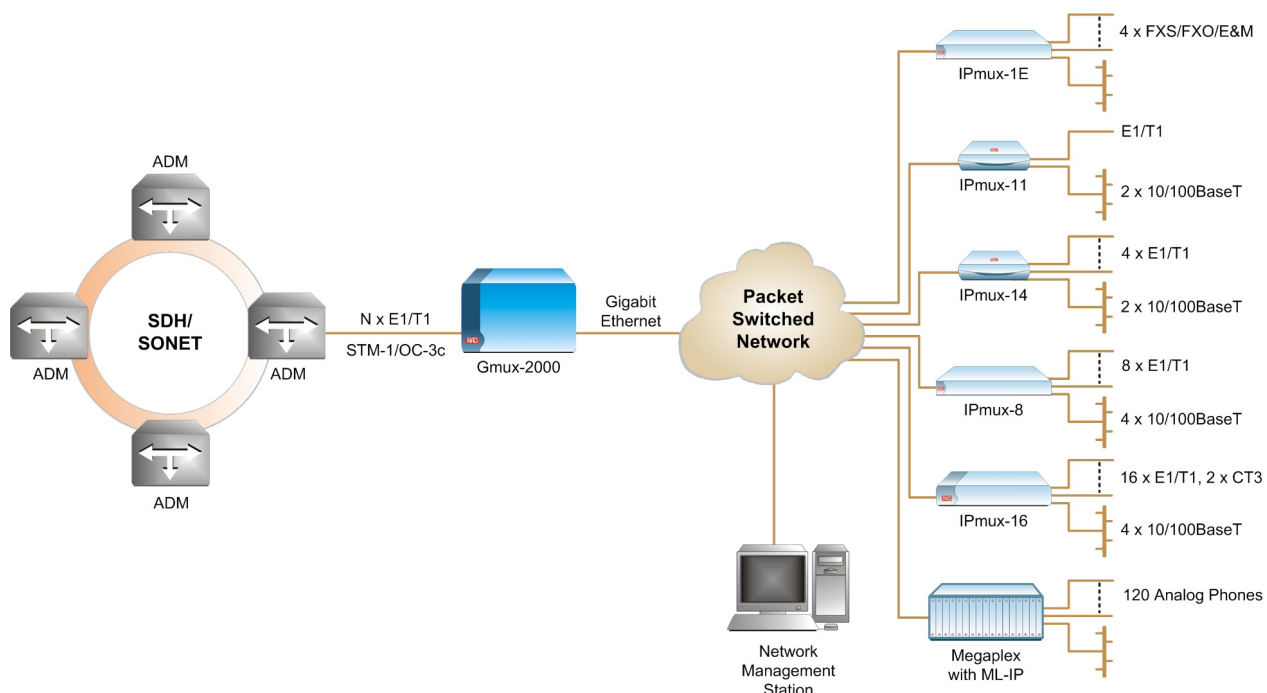 - Clock recovered from a TDMoIP flow generated by a remote TDMoIP gateway.

Figure 2. Aggregating TDMoIP Links for Transmission over an SDH/SONET Network

SPECIFICATIONS

- **TDM Interfaces**
  - Two SDH/SONET ports (155.52 Mbps):
    STM-1 (63 E1)
    OC-3 (84 T1)
  - PDH: 196 E1 or T1

- **PSN Interface**
  Two GbE ports (1.25 Gbps) via SFP modules

- **Routing Capabilities**
  Any E1/T1 stream from any PDH or SDH/SONET interface to any IP destination

MANAGEMENT

- **Methods**
  - Supervision terminal, directly or via modem link
  - Telnet
  - Web browser
  - RADview-SC/TDMoIP or other SNMP-based NMS

- **Interfaces**
  - Serial ports on control modules
  - 10/100BaseT ports on control modules
  - Inband via PSN interface ports

- **Serial Port**
  - Type: RS-232 (V.24) async DCE
  - Data rate: 0.3–115.2 kbps
  - Connector: 9-pin, D-type, female

EXTERNAL ALARM INTERFACE

- **Alarm Outputs**
  - Major alarm indication by floating change-over dry contacts
  - Minor alarm indication by floating change-over contacts

- **Output Contact Ratings**
  - Maximum 60 VDC/30 VAC across open contacts
  - Maximum 1 ADC through closed contacts
  - Maximum load switching capacity: 60W

- **External Alarm Input**
  One active-low input, RS-232 levels

POWER

- **Source**
  - AC: 100 to 240 VAC, 50/60 Hz
  - DC: -48 VDC

- **Power Consumption**
  200W max

- **Number of PS Modules**
  3

- **Number of Power Inlets (via separate power inlet module)**
  - AC: 3
  - DC: 2

- **Redundancy**
  2+1

PHYSICAL

- **Number of Slots**
  - 1 power inlet slot
  - 3 power supply slots
  - 2 control slots
  - 9 I/O slots
  - 1 cooling fan tray slot

- **Dimensions**
  Height: 265 mm (10.4 in)
  Width: 440 mm (17.3 in)
  Depth: 210 mm (8.2 in)
  Weight: 12 kg (26.4 lb), max

- **Environment**
  Operating temperature:
    0 to 55°C (0 to 131°F)
  Storage temperature:
    -20 to +70°C (0 to 150°F)
  Humidity: Up to 90%, non-condensing

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ORDERING

Standard Gmux-2000 systems are comprised of a chassis, service modules (control, power supply, etc), and interface modules (GbE, STM-1, OC-3, E1, T1 and servers). *Figure 3* illustrates minimal required combinations of the service and interface modules in the chassis. See separate module data sheets for interface module details and ordering information.

GMUX-2000-SYS/*
Gmux-2000 chassis

* Specify rack type:
  A for ANSI rack
  E for ETSI rack

GMUX-M/@/#
Gmux-2000 service module

@ Specify service module type:
  PI for power inlet module
  PS for power supply module
  CL for control and timing module
  FANS for fan unit module

Specify power inlet and power supply module type:
  AC for AC power inlet module and 100–240 VAC power supply module
  DC for DC power inlet module and -48 VDC power supply module

SUPPLIED ACCESSORIES

RM-2000
Hardware kit for mounting one Gmux-2000 chassis into a 19-inch rack

RM-2000E
Hardware kit for mounting one Gmux-2000 chassis into an ETSI rack

1 Power Inlet Module	1 GbE Module	Fan Unit
2 or 3 Power Supply Modules	1 STM1 or OC3 Module	
1 or 2 Control Modules	1–3 Circuit Emulation E1/T1 Modules (E1-CE-SRV/21 or T1-CE-SRV/28)	

Channelized STM-1/OC-3 Service

1 Power Inlet Module	1 GbE Module	Fan Unit
2 or 3 Power Supply Modules	1–7 Circuit Emulation E1/T1 Modules (E1-CE/28 or T1-CE/28)	
1 or 2 Control Modules		

N × E1/T1 Service

Figure 3. Minimal Required Module Combinations in the Gmux-2000 Chassis