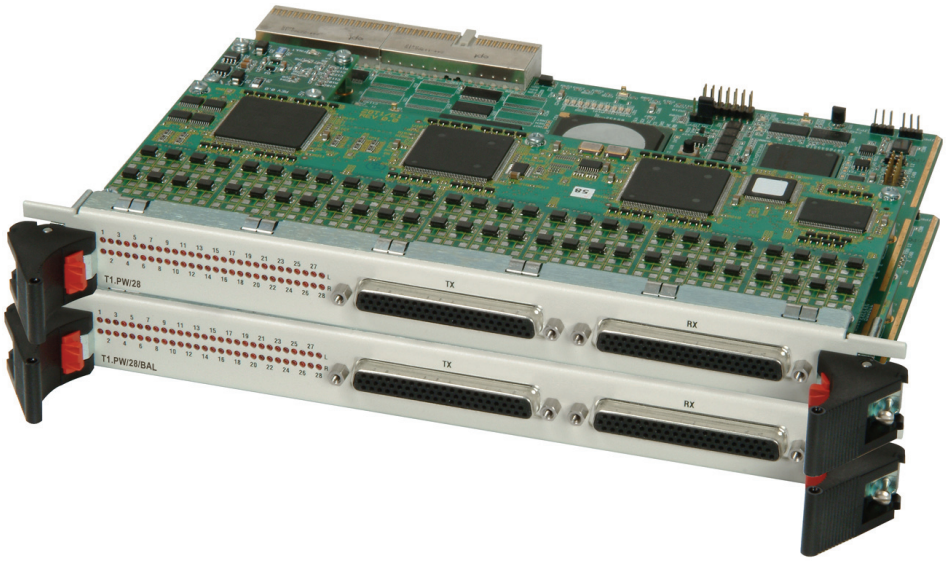
Data Sheet

Gmux-2000 Modules

E1-PW/28, T1-PW/28

Pseudowire E1, T1 Circuit Emulation Modules with External Interfaces



E1/T1 or HDLC emulation over Ethernet, MPLS and IP networks

TDMoIP Driven®

- E1/T1 or HDLC emulation over Ethernet, MPLS and IP networks, using TDMoIP, CESoPSN, SAToP or HDLCoPSN encapsulation
- Up to 28 external E1 or T1 interfaces per module, with up to 196 E1 or T1 interfaces for a fully loaded Gmux-2000 chassis
- Independent timing for each E1/T1 port
- CAS and CCS as well as clear channel data support in both framed (full and fractional) and unframed modes
- Extended diagnostic mechanism, including self-test and loopbacks on the E1 and T1 ports, and end-to-end alarm propagation

The E1-PW/28 and T1-PW/28 modules enable Gmux-2000 to provide circuit emulation services for transporting E1 or T1 data streams over packet-switched networks (PSNs) using TDMoIP, CESoPSN, SAToP or HDLCoPSN encapsulation.

The modules have 28 external E1 or T1 ports.

Each E1 or T1 stream is converted into a pseudowire (PW), which is sent to the PSN GbE module. The Gmux-2000 GbE module forwards the PW to its destination over a packet-switched network.

RAD data communications
The Access Company

E1-PW/28, T1-PW/28
Pseudowire E1, T1 Circuit Emulation Modules with External Interfaces

Packets sent over MPLS networks use smaller overhead in comparison to the IP encapsulation. This makes communication over MPLS ideal for networks with bandwidth constraints.

Each E1 or T1 port can be independently configured to handle the relevant payload in accordance with different framing modes and signaling formats:

- E1 – G732N/G732S, with or without CRC-4, or unframed
- T1 – D4 (SF) or ESF or unframed.

Packet structure is independently selectable for each PW, for compatibility with the various pseudowire protocols (TDMoIP/TDMoMPLS, CESoPSN, HDLCoPSN, SAToP) and the UDP/IP and MPLS/ETH network standards.

Each E1 or T1 port operates using one of the following clocking modes:

- Loopback, recovered from received E1 or T1 stream
- Adaptive, recovered from the PW payload
- System nodal clock.

Comprehensive diagnostic capabilities include:

- Automatic self-test at power-up to monitor the module subsystems
- Local and remote loopbacks on the external E1 and T1 ports
- LED to indicate local/remote loss of frame synchronization for E1 or red/yellow alarm for T1.

When the OAM functionality is enabled, the PW modules transmit RDI, LOS and AIS condition end-to-end over the PSN.

Optional patch panel adapters can be used to convert the external E1 and T1 ports terminated in two DB-62 connectors into 28 balanced (RJ 45) or unbalanced (BNC) ports for simplified user equipment connection.

***Note**: For additional information on the available patch panels, see the Patch Panels data sheet.*

Specifications

TDMoIP PROCESSING

Number of External TDM Ports
28

Number of PWs per Module
Up to 112

Protocols
- TDMoIP (RFC 5087)
- TDMoMPLS (RFC 5087 and ITU-T Rec. Y.1413)
- HDLCoPSN (RFC 5087 and RFC 4618 (except Clause 5.3 – PPP))
- CESoPSN (RFC 5086)
- SAToP (RFC 4553)

PSN Types
UDP over IP, MPLS over ETH

E1 INTERFACE

Bit Rate
2048 kbps

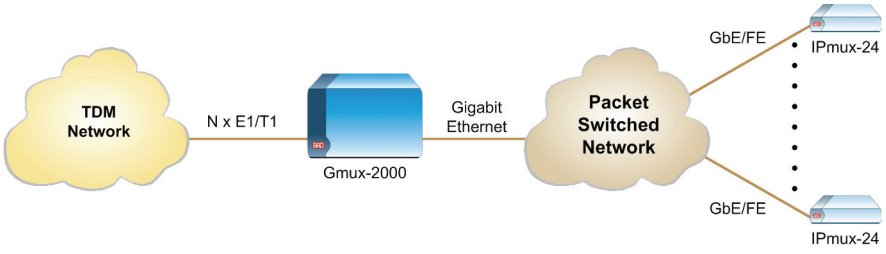
Line Code
HDB3

Framing Mode
G.732N/G.732S with or without CRC-4, or unframed

Line Interface
Software-selectable:
- 120Ω, balanced
- 75Ω, unbalanced

Transmit Level
±3V ±10%, balanced

±2.37V ±10%, unbalanced



Emulated Legacy Services over PSN

Receive Level
0 through -12 dB (short-haul applications)

0 through -36 dB (long-haul applications)

Standards Compliance
ITU-T Rec. G.703, G.704, G.732

T1 INTERFACE

Bit Rate
1544 kbps

Line Code and Zero Suppression
AMI, B8ZS, B7ZS

Framing Mode
D4 (SF), ESF, unframed

Line Interface
100W, balanced

Transmit Level
- DSU emulation: ±3V ±10%, user-selectable, measured at 0–655 ft
- CSU mode: 0, -7.5, -15, -22.5 dB, user-selectable LBOs

Receive Level
- 0 through -12 dB (short-haul applications)
- 0 through -36 dB (long-haul applications)

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

GENERAL

Connectors (per module)
Two 62-pin D-type female, one for Tx, one for Rx

Indicators
E1 interface:

L 1–28 (red): Local loss of signal or loss of sync

R 1–28 (red): Remote loss of sync

T1 interface:

L 1–28 (red): Red alarm

R 1–28 (red): Yellow alarm

External E1 or T1 module:

ACT (green): Module activity status

FLT (red): Module fault detected

Diagnostics
- Self-test at start-up
- Local and remote loopback per external E1 or T1 port

Physical
Fits a single slot of the Gmux 2000 chassis (slots 1–5, 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

E1-PW/28, T1-PW/28

Pseudowire E1, T1 Circuit Emulation Modules with External Interfaces

Ordering

GMUX-M-E1-PW-28/@

GMUX-M-T1-PW-28

Legend

@ E1 interface type:

- **BAL** Balanced E1 interface
- **UNBAL** Unbalanced E1 interface

OPTIONAL ACCESSORIES

GMUX-PPANEL-28-PW/#
Patch panel and cable assembly, 28 connectors

Legend

Interface type:

- **BAL** Balanced interface, RJ-45
- **UNBAL** Unbalanced interface, BNC

CBL-G703-14-PATCH
Cable for connecting E1-PW/28 to a patch panel

International Headquarters
24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel. 972-3-6458181
Fax 972-3-6498250, 6474436
E-mail market@rad.com

North America Headquarters
900 Corporate Drive
Mahwah, NJ 07430, USA
Tel. 201-5291100
Toll free 1-800-4447234
Fax 201-5295777
E-mail market@radusa.com

www.rad.com

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