



# DUAL-PORT T1/E1 PHYSICAL INTERFACE MODULE

## Product Overview

Dual-port T/E1 Physical Interface Module (PIM) are for use with the Juniper Networks J2320, J2350, J4350, and J6350 Services Routers, as well as the Juniper Networks SSG140, SSG320M, SSG350M, SSG520M and SSG550M Secure Services Gateways.

## Product Description

The Juniper Networks Dual-port T1/E1 PIM provides the physical connection to T1 or E1 network media types, receiving incoming packets from the network and transmitting outgoing packets to the network. The Dual-port T1/E1 PIM is equipped with a dedicated network processor that forwards incoming data packets to the Routing Engine, and receives outgoing data packets from the Routing Engine. During this process, the PIM performs T1 or E1 framing and line-speed signaling.

When a Dual-port T1/E1 PIM is installed in a Juniper Networks® SSG Series Secure Services Gateway running ScreenOS® Software, the dedicated network processor will forward traffic to the SSG Series CPU where traffic decisions are made based upon security policies.

## Features and Benefits

### Dual-port T1/E1 PIM provides the following benefits:

- Dual-port form factor allows for increased bandwidth capabilities while making effective use of the J Series and SSG Series modular interface slots.
- Integrated channel service unit/data service unit (CSU/DSU) eliminates the need to deploy a separate external device, saving valuable space and simplifying management.

### Features

- Fully integrated CSU/DSU
- Full and fractional T1/E1 capabilities
- Onboard network processor
- 56K and 64K modes support
- ANSI T1.102, T1.107, T1.403 T1 support
- G.703, G.704, and G.706 E1 support
- Independent clock
- Loopback, bit error rate test (BERT), facilities data link (FDL) (T1 only),

and long build-out diagnostics

## Specifications

### Product Specifications

#### Dimensions and Weight (W x H x D)

- 5.45 x 0.63 x 6.5 in (13.8 x 1.6 x 16.5 cm)

#### Network Interface Specifications

	DUAL-PORT T1	DUAL-PORT E1
Transmit bit rate	1.544 Mbps	2.048 Mbps
Receive bit rate	1.544 Mbps	2.048 Mbps
Line encoding	- Alternate mark inversion (AMI) - Bipolar with 8-zero substitution (B8ZS) - Framed clear channel - Fractional	- HDB3 - Framed clear channel - Unframed clear channel - Framed fractional
Framing	- Superframe (D4/SF) - Extended superframe (ESF)	- G704 - G704 without CRC4 - Unframed

#### Data Interface

- Clocking Modes: DCE, internal, loop
- Clocking Rates: 1.2 KHz, 2.4 KHz, 9.6 KHz, 19.2 KHz, 38.4 KHz, 56 KHz, 64 KHz, 72 KHz, 125 KHz, 148 KHz, 250 KHz, 500 KHz, 800 KHz, 1 MHz, 1.3 MHz, 2 MHz, 4 MHz, 8 MHz

#### High-Level Data Link Control (HDLC) Features

- N x 64 Kbps or N x 56 Kbps, non-channelized data rates (T1:N=1 to 24; E1:n=1 to 31)
- Cyclic redundancy check (CRC) 16/32
- Shared flag
- Idle flag/fill
- Counters: runts, giants, frame check sequence (FCS) error, abort error, align error

#### Interface Connector

- RJ-48

#### System Timing

- Internal (system clock)
- External (network recovered clocks)

#### Environmental

- Operating temperature: 0° to 40° C
- Storage temperature: -40° to 70° C
- Relative humidity: 5% to 90% noncondensing

## Diagnostics

#### Loopbacks

- Local, remote, payload

#### Test Patterns (BERT)

- All ones
- All zeros
- Alternating ones and zeros (AA/55)
- 1:3 or 1 in 4 pattern
- 1:7 or 1 in 8 pattern
- 3:24 - 3 bits set in every 24 bits
- QRSS20 (modified PRBS 2<sup>20</sup>-1, with 14 zero suppression)
- PRBS 2<sup>7</sup>-1
- PRBS 2<sup>9</sup>-1 (as specified in ITU-T O.153)
- PRBS 2<sup>11</sup>-1 (as specified in ITU-T O.153)/2047 pattern
- PRBS 2<sup>15</sup>-1 (as specified in ITU-T O.151/O.153)
- PRBS 2<sup>20</sup>-1 (as specified in ITU-T O.153)
- Programmable word or 32-bit programmable pattern

#### Network Alarms

- Alarm indication signal (AIS)
- Loss of frame (LOF)
- Loss of signal (LOS)
- Yellow (YLW)

#### Error Counters

- Controlled slipped seconds (CSS or CS)
- Line errored seconds (LES)
- Errored seconds (ES)
- Bursty errored seconds (BES)
- Severely errored seconds (SES)
- Severely errored framing seconds (SEFS)
- LOS seconds
- LOF seconds (LOFS)
- Unavailable seconds (UAS)

#### LEDs

PIM LEDs indicate port status with the following LED states:

COLOR	STATE	DESCRIPTION
Green	On steadily	Online with no alarms or failures.
Red	On steadily	Active with a local alarm; router has detected a failure.

## Standards and Compliance

### Safety

- CAN/CSA-C22.2 No. 60950/UL 60950 Third Edition, Safety of Information Technology Equipment
- EN 60950 (2000) Third Edition, Safety of Information Technology Equipment

### EMC (Emissions)

- FCC Part 15 Class B
- EN 55022 Class B
- AS/NZS 3548 Class B
- VCCI Class B

### Immunity

- EN-61000-4-2 ESD
- EN-61000-4-3 Radiated Immunity
- EN-61000-4-4 EFT
- EN-61000-4-5 Surge
- EN-61000-4-6 Low Frequency Common Immunity

### European Telecommunications Standardization Institute (ETSI)

- ETSI EN-300386-2: Telecommunication Network Equipment Electromagnetic Compatibility

### Telecom

- FCC Part 68/TIA-968
- IC CS-03

### T1 Standards

- ANSI T1.102
- ANSI T1.107
- ANSI T1.403
- Telcordia GR-499-CORE
- ACCUNET TR 62411 (Accunet T1.5)

### E1 Standards

- ITU-T G.703
- ITU-T G.704
- ITU-T G.706
- ITU-T G.823
- ITU-T G.826
- CTR 12/13
- ACA TS 016

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## Ordering Information

MODEL NUMBER	DESCRIPTION
JX-2T1-RJ48-S	Dual-port T1 PIM
JX-2E1-RJ48-S	Dual-port E1 PIM

## Juniper Networks Junos® Operating System Release

Dual-port T1/E1 PIMs are supported on Juniper Networks J Series routers in Junos OS 7.0 and higher releases.

## Juniper Networks ScreenOS Software Release

The Dual-port T1/E1 PIM is supported in ScreenOS 5.1 and higher releases on the SSG500 line, ScreenOS 6.0/r2 and higher releases on the SSG300 line, and ScreenOS 5.4 and higher releases on the SSG140.

## About Juniper Networks

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