

Ethernet and IP-layer network condition statistics, such as packet sequence errors (loss or misorder) and packet delay variation (jitter), are monitored and stored by the device.

The carrier-class version of IPmux-24 includes an alarm relay mechanism. The minor and major alarms are forwarded to a remote alarm device via dedicated pins of the external clock RJ-45 connector.

Specifications

E1 INTERFACE

Number of Ports

1, 2 or 4

Compliance

ITU-T Rec. G.703, G.704, G.706, G.732, G.823

Data Rate

2.048 Mbps

Line Code

HDB3

Framing

Unframed, framed, multiframe; with or without CRC-4

Signaling

CAS, CCS (transparent)

Line Impedance

120 Ω , balanced

75 Ω , unbalanced

Signal Levels

Receive:

0 to -36 dB with LTU (long haul)

0 to -10 dB without LTU (short haul)

Transmit balanced: $\pm 3V \pm 10\%$

Transmit unbalanced: $\pm 2.37V \pm 10\%$

Jitter and Wander Performance

Per AT&T TR-62411, ITU-T G.824 (for internal, loopback and external clock modes)

Connector

Balanced: RJ-45

Unbalanced: BNC (RJ-45 to BNC adapter cable is supplied)

T1 INTERFACE

Number of Ports

1, 2 or 4

Compliance

ANSI T1.403, ITU-T Rec. G.703, G.704, G.824

Data Rate

1.544 Mbps

Line Code

B8ZS, B7ZS, AMI

Framing

Unframed, SF, ESF

Signaling

CAS (bit robbing), CCS (transparent)

Line Impedance

100 Ω , balanced

Signal Levels

Receive: 0 to -36 dB

Transmit pulse amplitude:

$\pm 3V \pm 20\%$; 0 dB, -7.5 dB, 15 dB (CSU), user-selectable

$\pm 2.7V \pm 10\%$, 0 to 655 feet, (DSU), user-selectable

Jitter and Wander Performance

Per AT&T TR-62411, ITU-T G.824 (for internal, loopback and external clock modes)

Connector

RJ-45

IPmux-24

TDM Pseudowire Access Gateway

ETHERNET INTERFACE

Compliance

IEEE 802.3, 802.3u, 802.1p&Q

Number of Ports

3, network or user

Port Combinations

3 fiber optic SFPs

2 fiber optic SFPs + 1 UTP

1 fiber optic SFP + 2 UTPs

3 UTPs (Fast Ethernet unit only)

Type

SFP-based:

Gigabit Ethernet – 1000BaseSx,
1000BaseLX10, 1000BaseBx10
(metal enclosure only)

Fast Ethernet – 100BaseFx,
100BaseLX10, 100BaseBx10

10/100/1000BaseT with SGMII

Built-in copper:

10/100BaseT

Fast and Gigabit Ethernet SPFs

For full details, see the SFP Transceivers data sheet at 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.

Connector

LC

PSEUDOWIRE

Compliance

IETF: RFC 4553 (SATOIP), RFC 5087
(TDMoIP), RFC 5086 (CESoPSN),
RFC 4618 (excluding clause 5.3 – PPP)

ITU-T: Y.1413

MFA: IA 4.1, IA 8.0.0

MEF: 8, 9, 14 (EPL-certified)

Number of PW Connections

64

Jitter Buffer Size

0.5–180 msec (unframed) with 0.1 msec granularity

2.5–180 msec (framed) with 0.5 msec granularity

IPmux-24/A Adaptive Clock

(Metal enclosure only)

Frequency accuracy: ± 16 ppb and G.823 synchronization interface requirements (clause 6), when locked to a PRC (stratum 1) or SSU (stratum 2) clock
Frequency accuracy in holdover: ± 16 ppb ± 1 ppb of aging per day

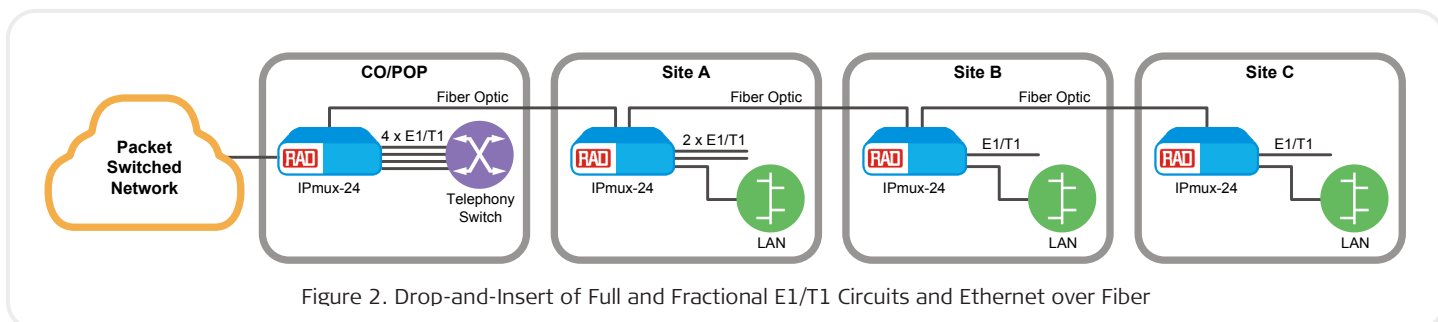


Figure 2. Drop-and-Insert of Full and Fractional E1/T1 Circuits and Ethernet over Fiber

GENERAL**Timing**

Internal

Loopback

Adaptive

External input or output via optional dedicated RJ-45 port: E1/T1 or 2048/1544 kHz squarewave (RS-422 electrical levels)

Management

SNMPv1, SNMPv3

Telnet

RADview Service Center TDMoIP (ordered separately)

ASCII terminal via V.24 (RS-232) DCE port

Diagnostics

E1/T1 local loopback

E1/T1 remote loopback

Facility Type 1 (FAC1) inband loopback

CSU loopback as per Telecordia GR-54

Statistics

E1/T1 (per G.826 and RFC 2495)

Ethernet (per RFC 2819)

Jitter buffer indication (overflow, underflow, sequence error)

Alarm Relay*(Metal enclosure only)*

Via pin 6, pin 7 and pin 8 of the EXT. CLK connector (RJ-45), optional

Indicators

PWR (green) – Power status

TST/ALM (red/yellow) – Test/alarm status

E1/T1 SYNC (green/red) – E1/T1 synchronization status

LINK/ACT (green) – Ethernet link/activity status

EXT. CLK (red/green) – External clock status

Physical

Plastic enclosure:

Height: 43.7 mm (1.7 in)

Width: 217 mm (8.5 in)

Depth: 170 mm (6.7 in)

Weight: 0.5 kg (1.1 lb)

Metal enclosure:

Height: 47 mm (1.8 in)

Width: 215 mm (8.4 in)

Depth: 147 mm (5.8 in)

Weight: 0.7 kg (1.5 lb)

Power

Plastic Enclosure:

AC: 100–240 VAC, 50/60 Hz

Metal Enclosure:

AC/DC: 100–240 VAC, 50/60 Hz or 48/60 VDC nominal (40 to 72 VDC)

DC: 24/48/60 VDC nominal (18 to 72 VDC)

Power Consumption

12W max

Environment

Temperature:

Plastic enclosure:

IPmux-24: 0 to 45°C (32 to 113°F)

Metal enclosure:

IPmux-24: 0 to 50°C (32 to 122°F)

IPmux-24/H: -30 to 65°C

(-22 to 149°F)

Humidity: Up to 90%, non-condensing

IPmux-24

TDM Pseudowire Access Gateway

Ordering

RECOMMENDED CONFIGURATIONS

IPMUX-24/1E1/N/N/N

TDM pseudowire access gateway, 1 E1 port, 3 empty SFP GbE ports

IPMUX-24/1E1CX/N/N/N

TDM pseudowire access gateway, 1 unbalanced E1 port, 3 empty SFP GbE ports

IPMUX-24/1T1/N/N/UTP

TDM pseudowire access gateway, 1 T1 ports, 2 empty SFP GbE ports and 1 RJ45 FE port

IPMUX-24/4T1/N/N/UTP

TDM pseudowire access gateway, 4T1 ports, 2 empty SFP GbE ports and 1 RJ45 FE port

IPMUX-24/FE/1E1CX/UTP/UTP/UTP

TDM pseudowire access gateway, 1 unbalanced E1 port, 3 RJ45 FE ports

IPMUX-24/FE/2E1/UTP/UTP/UTP

TDM pseudowire access gateway, 2 E1 ports, 3 RJ45 FE ports

IPMUX-24/FE/2T1/UTP/UTP/UTP

TDM pseudowire access gateway, 2 T1 ports, 3 RJ45 FE ports

IPMUX-24/FE/4E1/UTP/UTP/UTP

TDM pseudowire access gateway, 4 E1 ports, 3 RJ45 FE ports

IPMUX-24/FE/4T1/UTP/UTP/UTP/PE

TDM pseudowire access gateway, 4 T1 ports, 3 RJ45 FE ports, plastic enclosure

IPMUX-24/FE/A/4T1/N/N/UTP

TDM pseudowire access gateway, advanced clock recovery, 4 T1 ports, 2 empty SFP FE ports , RJ45 FE port

IPMUX-24/FE/4T1/N/N/N/PE

TDM pseudowire access gateway, 4 T1 ports, 3 empty SFP FE ports, plastic

enclosure

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options

SUPPLIED ACCESSORIES

AC power cord (when AC power supply is ordered)

DC connection kit (when DC power supply is ordered)

CBL-RJ45/2BNC/E1/X

Adapter cable (if unbalanced E1 interface is ordered)

OPTIONAL ACCESSORIES

RM-35/@

Hardware kit for mounting one or two IPmux-24 units with metal enclosure into a 19-inch rack

RM-33-2

Hardware kit for mounting one or two IPmux-24 units with plastic enclosure in a 19-inch rack

CBL-DB9F-DB9M-STR

Control port cable

Table 1. GbE Interface Options

Network	Network/User	User
N	N	N
N	N	UTP
N	UTP	UTP
UTP	UTP	UTP
UTP	UTP	N
UTP	N	N

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