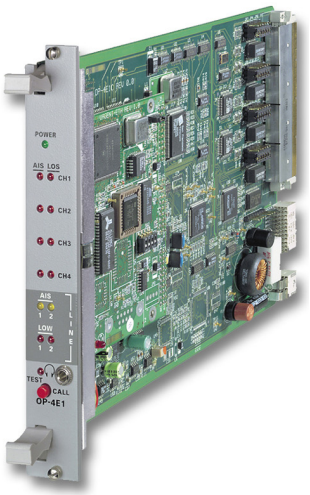
Optimux-4E1, Optimux-4T1

Four E1/T1 Multiplexers



Optimux

FEATURES

- Optimux-4E1 multiplexes four E1 channels over a single coax E2 link or fiber optic link
- Optimux-4T1 multiplexes four T1 channels over a single fiber optic link
- Operate with various fiber interfaces:
  - Multimode fiber
  - Single mode fiber
  - Single mode over single fiber
- Laser diode option with an extended range of up to 120 km (74.5 miles)
- Voice service channel
- Optimux-4E1 conforms to ITU G.703, G.742, G.823, G.956
- Optimux-4T1 conforms to ITU G.703, G.823, G.824, G.955
- Optional second main link provides automatic backup
- Optional second power supply for redundancy
- Management via ASCII terminal, dedicated Ethernet port, SNMP management station or ConfiguRAD web-based remote access terminal
- Remote management using in-band channel
- Compact 1U high standalone unit versions
- Card versions for RAD's LRS-24 19" rack with central SNMP management

Optimux-4E1, Optimux-4T1

Four E1/T1 Multiplexers

DESCRIPTION

- The Optimux-4E1 multiplexer combines up to four E1 channels over a single coax E2 link or a fiber optic link. The Optimux-4T1 multiplexer combines up to four T1 channels over a single fiber optic link.
- A pair of Optimux units provides a simple and low-cost solution for connectivity over distances of up to 120 km (74.5 miles).
- For transmission reliability, an optional second link provides automatic backup upon link failure. An optional second power supply provides power redundancy for fail-safe operation.
- Optimux-4E1/ Optimux-4T1 transmit each one of the four E1/T1 signals independently, so that each E1/T1 channel can be set to a different clock source.
- The T1 tributary channel interface is 100Ω balanced. The E1 tributary interface can be either 120Ω balanced or 75Ω unbalanced.
- Various optical interfaces are available for Optimux-4E1 and Optimux-4T1 links:
  - 850 nm VCSEL (Vertical Cavity Surface-Emitting Laser) for multimode fiber
  - 1310 and 1550 nm with laser diode transmitter for extended range over single mode fiber
  - Single fiber (SF3 option) using SC/APC (Angled Polished Connector) technology, with a 1310 nm laser diode for single wavelength operation in applications opposite Optimux-4E1L or Optimux-4T1L units with SF3 interface
  - *Standalone versions only:* Single fiber (SF1, SF2 options) using a 1310 and 1550 nm laser diode transmitter with WDM technology, which enables the laser to transmit the signal at a different wavelength than the receive signal.

  Alternatively, Optimux-4E1 and Optimux-4E1C are available with single or redundant electrical E2 coax links.
- To facilitate system diagnostics, Optimux-4E1/ Optimux-4T1 feature LED status indicators, AIS alarm generation and recognition, and dry contact closure upon link failure.
- A voice service channel is available for end-to-end communication between maintenance personnel (not available with E2 coax link).
- Setup, control and diagnostics can be performed via a supervisory port using an ASCII terminal, an Ethernet connection to an SNMP management station, or a dedicated 10BaseT Ethernet port (for the standalone units). An Optimux card in the LRS-24 rack can also be configured, maintained and monitored over Ethernet, via LRS-24's CL-2 card.
- The SNMP management supports:
  - RADview-PC/TDM running in a Windows environment
  - RADview-HPOV/TDM for HP OpenView UNIX platforms
  - ConfiguRAD web-based remote access terminal.
- Optimux units are available as compact 1U high standalone units, which can be mounted in 19" racks. Optimux units are also available as card versions for RAD's LRS-24 19" rack with central SNMP management. This option provides a compact, cost-effective central solution.

APPLICATION

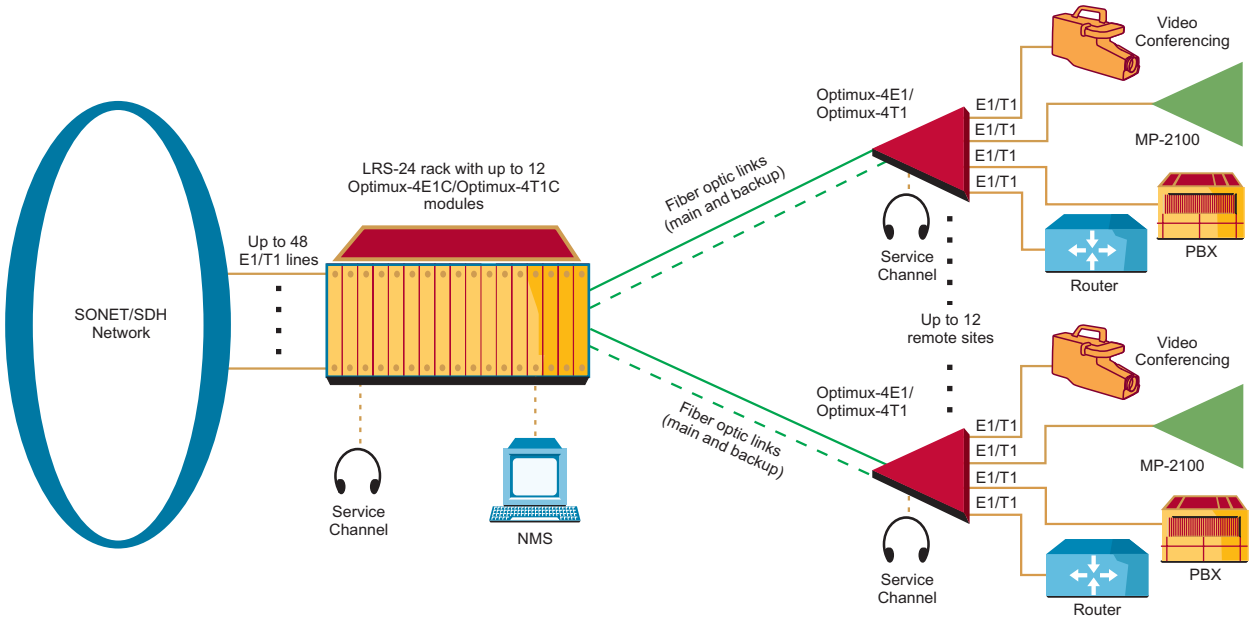


Figure 1. Standalone and Card versions of Optimux-4E1/Optimux-4T1 in a Point-to-Multipoint Topology

Optimux-4E1, Optimux-4T1

Four E1/T1 Multiplexers

SPECIFICATIONS

FIBER OPTIC MAIN LINK

- **Interface Characteristics**
  See *Table 1*
- **Connectors**
  ST, FC/PC, SC or SC/APC
  (SC/APC is only for SF3 interface)

ELECTRICAL MAIN LINK

(Available for Optimux-4E1 and Optimux-4E1C only)

- **Data Rate**
  8448 kbps
- **Line Code**
  HDB3
- **Impedance**
  75Ω, unbalanced
- **Connectors**
  Pair of BNC
- **Maximum Range**
  Up to 180 meters

TRIBUTARY E1 CHANNELS

- **Number of Channels**
  4
- **Data Rate**
  2048 kbps
- **Line Code**
  - HDB3
  - AMI (for standalone version only)
- **Impedance**
  - 120Ω, balanced
  - 75Ω, unbalanced
- **Connectors**
  - Optimux-4E1 standalone:
    Balanced: RJ-45
    Unbalanced: BNC pair
  - Optimux-4E1 card:
    Balanced:
    Terminal Block or SCSI
    Unbalanced:
    mini-BNC pair
    (coax 1.0/2.3 mm)

TRIBUTARY T1 CHANNELS

- **Number of Channels**
  4
- **Data Rate**
  1544 kbps
- **Line Code**
  - B8ZS
  - AMI (for standalone version only)
- **Impedance**
  100Ω, balanced
- **Connectors**
  - Optimux-4T1 standalone:
    RJ-45
  - Optimux-4T1 card:
    Terminal Block or SCSI

Table 1. Fiber Optic Interface Characteristics

Wavelength [nm]	Fiber Type [µm]	Transmitter Type	Typical Power Coupled Into Fiber [dBm]	Receiver Sensitivity [dBm]	Typical Maximum Range [km]	Typical Maximum Range [miles]	Available Connector Type
850	62.5/125 multimode	Laser (VCSEL)	–18	–32	3	1.8	ST, SC, FC/PC
1310	62.5/125 multimode	LED	–18	–32	7	4.3	ST, SC, FC/PC
1310	9/125 single mode	Laser	–12	–34	48	29.8	ST, SC, FC/PC
1550	9/125 single mode	Laser	–12	–34	75	46.6	ST, SC, FC/PC
1310/1550 (WDM)	9/125 single mode	Laser WDM (SF1, SF2)	–12	–34	40	24.8	SC only
1310	9/125 single mode	Laser (long haul)	–2	–34	64	39.7	ST, SC, FC/PC
1550	9/125 single mode	Laser (long haul)	–1	–34	110	68.3	ST, SC, FC/PC
1310	9/125 single mode	Laser (SF3)	–12	–27	20	12.4	SC/APC only

Note: The ranges specified above were calculated according to the following typical attenuation rates (with a 3 dB margin):

- 3.5 dB/km for 850 nm multimode
- 1.5 dB/km for 1310 nm multimode
- 0.4 dB/km for 1310 nm single mode
- 0.25 dB/km for 1550 nm single mode

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GENERAL

- **Voice Service Channel**
  Fits standard head-set
  Input impedance: 33 kΩ
  Input level: 5 mV
  Output power: 50 mW, at 8Ω
  Bandwidth (at 3 dB): 300 to 3000 Hz
- **Physical**
  Standalone Versions
  Height: 4.4 cm / 1.75 in
  Width: 44 cm / 17.5 in
  Depth: 24 cm / 9.5 in
  Weight: 2.0 kg / 4.4 lb
  Card Versions
  Fits single slot of LRS-24 hub
  Weight: 352g / 0.78 lb
- **Ethernet Port**
  10BaseT dedicated Ethernet port for management, with RJ-45 connector
- **Power**
  Standalone Versions
  - AC/DC: 100 to 240 VAC, 50 to 60 Hz, 13.5 VA;
    Or
    -48 VDC (-40 to -72 VDC), 9.5W
  - DC: 24 VDC (18 to 36 VDC), 7.5W

  Card Versions
  Cards receive power from the LRS-24's AC and DC power supplies. Maximum power consumption of LRS-24: 160W
- **Environment**
  Temperature: 0° to 50°C
  32° to 122°F
  Humidity: Up to 90%, non-condensing

ORDERING

OP-4E1/^/*/R/#+/D
Four E1 Channel Multiplexer Standalone Unit

OP-4E1C/&/?/#+/D
Four E1 Channel Multiplexer Card for LRS-24

OP-4T1/*/R/#+/D
Four T1 Channel Multiplexer Standalone Unit

OP-4T1C/&/?/#+/D
Four T1 Channel Multiplexer Card for LRS-24

^ Specify E1 connector type for standalone version:
B for balanced (RJ-45)
U for unbalanced (BNC)

* Specify power supply:
24 for -18 to -36 VDC

Note: The default power supply is a wide-range AC/DC power supply. The unit can be connected to either an AC power source (100 to 240 VAC), or to a DC power source (48 VDC).

R Specify **R** for second redundant power supply (of same type as first power supply). Default is one power supply only.

& Specify LRS-24 rack type:
F for ETSI version
B for ANSI version

? Specify E1/T1 tributary channel connector type on card versions:
TB for terminal block
SC for SCSI (includes SCSI-to-RJ-45 adapter cable)
U for unbalanced mini-BNC (Optimux-4E1C only)

Specify main link interface connector type:
CX for electrical interface with coaxial connectors (Optimux-4E1/4E1C only)
ST for ST type connector
FC for FC/PC type connector
SC for SC type connector

Note: ST and FC connectors are not available for the single fiber options.

+ Specify fiber optic link interface type (not relevant with the CX option):
85 for 850 nm, multimode, VCSEL laser diode
13M for 1310 nm, multimode, LED
13L for 1310 nm, single mode, laser diode
15L for 1550 nm, single mode, laser diode
13LH for 1310 nm, single mode, long haul laser diode
15LH for 1550 nm, single mode, long haul laser diode
SF1 for transmit 1310 nm laser (WDM), receive 1550 nm (standalone versions only)
SF2 for transmit 1550 nm laser (WDM), receive 1310 nm (standalone versions only)
SF3 for transmit and receive at 1310 nm laser diode

Note: For single fiber applications, a device with SF1 interface is always used opposite a device with SF2 interface, and vice versa. An SF3 interface works only opposite another SF3 interface.

D Specify **D** for second redundant link (of same type as first link). Default is one link only.

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