

Optimux-108, Optimux-106

Fiber Multiplexer for 4E1/4T1 and Ethernet or Serial Data



Fiber Multiplexers, Transmit Any Traffic over Fiber

- Four E1 or T1 channels and Fast Ethernet link multiplexed over a fiber optic link
- Various fiber interfaces: multimode, single-mode (up to 120 km), and/or single-mode over single fiber, using SFP optical modules
- Automatic link backup with optional hot-swappable second main link
- Power redundancy with optional second wide-range power supply
- Management via ASCII terminal, dedicated Ethernet port, SNMP management station, or a Web-based remote access terminal



The Optimux-108 and Optimux-106 multiplexers combine four E1 or T1 channels and an optional Ethernet link over a fiber optic uplink.

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 modular second link provides automatic backup upon link failure. An optional second power supply provides power redundancy for failsafe operation.

Each of the four signals of the tributary interface is transmitted independently, so that each channel can be set to a different clock source.



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MARKET SEGMENTS AND APPLICATIONS

Typical users of the Optimux-108/106 fiber multiplexers for 4E1/4T1 and Ethernet or serial data include transportation and utility companies, government and universities, Internet Service Providers (ISPs), and carriers extending data and voice from SDH networks or backhauling cellular traffic. *Figure 1* and *Figure 2* illustrate Optimux-108/106 in typical applications.

INTEROPERABILITY

Optimux-108/106 operates with OP-108C/106C modules of LRS-102 and Megaplex-4100 access nodes.

UPLINK AND TRIBUTARIES

Optimux-108/106 supports a variety of built-in optical uplink interfaces including:

- 850 nm VCSEL (Vertical Cavity Surface Emitting Laser) for multimode fiber
- Note:** Available with FC/PC connector only.
- 1310 nm LED for multimode fiber
 - 1310/1550 nm laser diode or long haul laser diode for extended range over single-mode fiber
 - Single fiber (SF1, SF2 options) using a 1310 nm 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

- Single fiber (SF3 option) using SC/APC (Angle-Polished Connector) technology, with a 1310 nm laser diode for single wavelength operation
- Single fiber (SF4, SF5 options) using a 1310 nm and 1550 nm long haul laser diode transmitter with WDM technology.

Optimux-108 can be ordered with balanced or unbalanced E1 tributary interfaces. Optimux-106 has balanced T1 tributary interfaces.

Optimux-108/106 can be ordered with an additional Ethernet user port (VLAN transparent), or with a V.35 interface in place of the Ethernet user port.

RESILIENCY

Two independent power supplies can be installed to Optimux-106/108 for redundancy.

In the uplink redundancy option, Optimux-108/106 supports fully automatic switching between the main and the backup link.

TIMING AND SYNCHRONIZATION

The uplink interface features only internal timing mode. The clock of each E1 channel is independent for each channel and transferred transparently.

The V.35 interface supports internal, external, and loopback timing modes.

MANAGEMENT AND SECURITY

Optimux-108/106 can be configured and monitored locally using an ASCII terminal connected to the control port or remotely via the Ethernet management port using:

- RADview-EMS running in a Windows or Unix environment
- Web-based remote access terminal
- Telnet.

To enhance security, a password to control access to the Optimux-108/106 management functions can be specified.

In addition, the security of the site can be enhanced by limiting remote management to specific management terminals or nodes.

MONITORING AND DIAGNOSTICS

To facilitate system diagnostics, Optimux-108/106 features LED status indicators, alarms generation and recognition, and dry contact closure upon link failure.

Optimux-108/106 features comprehensive test and diagnostics capabilities that include local and remote loopbacks on the uplink interface and on each E1/T1 tributary link. A local loopback can also be activated on the optional V.35 user port.

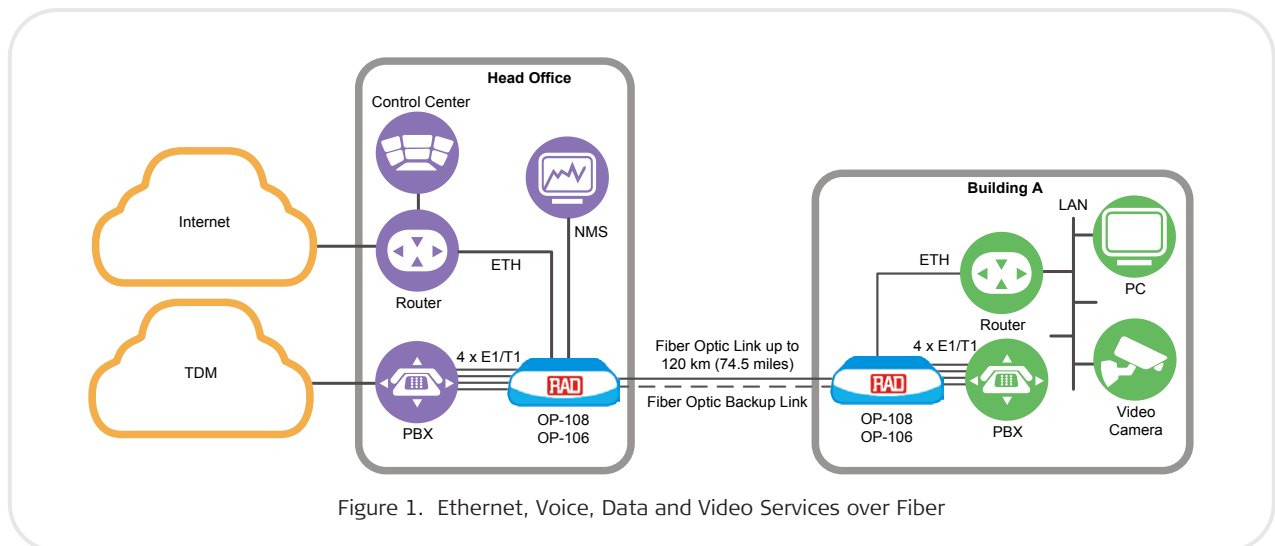


Figure 1. Ethernet, Voice, Data and Video Services over Fiber

Specifications

FIBER OPTIC INTERFACES

Characteristics

See *Table 1*

Compliance

G.955, G.742 (Optimux-108 without Ethernet ports)

E1/T1 USER INTERFACES

Number of Ports

4

Line Rate

E1: 2048 kbps

T1: 1544 kbps

Line Coding

E1: HDB3

T1: B8ZS

Impedance

E1 balanced, 120Ω

T1 balanced, 100Ω

E1 unbalanced, 75Ω

Jitter

ITU-T Rec. G.823

Connectors

Optimux-108

E1 balanced: RJ-45

E1 unbalanced: a pair of BNC

Optimux-106

RJ-45

Compliance

G.703, G.823 (E1), G.824 (T1)

ETHERNET USER INTERFACE

Type

10/100BaseT

Connector

Shielded RJ-45

Throughput

Optimux-108: 100 Mbps

Optimux-106: 75 Mbps

Max. Frame Size

1536 bytes

SERIAL USER INTERFACE

Type

V.35 DCE

Connector

Smart Serial

Throughput

2.048 Mbps

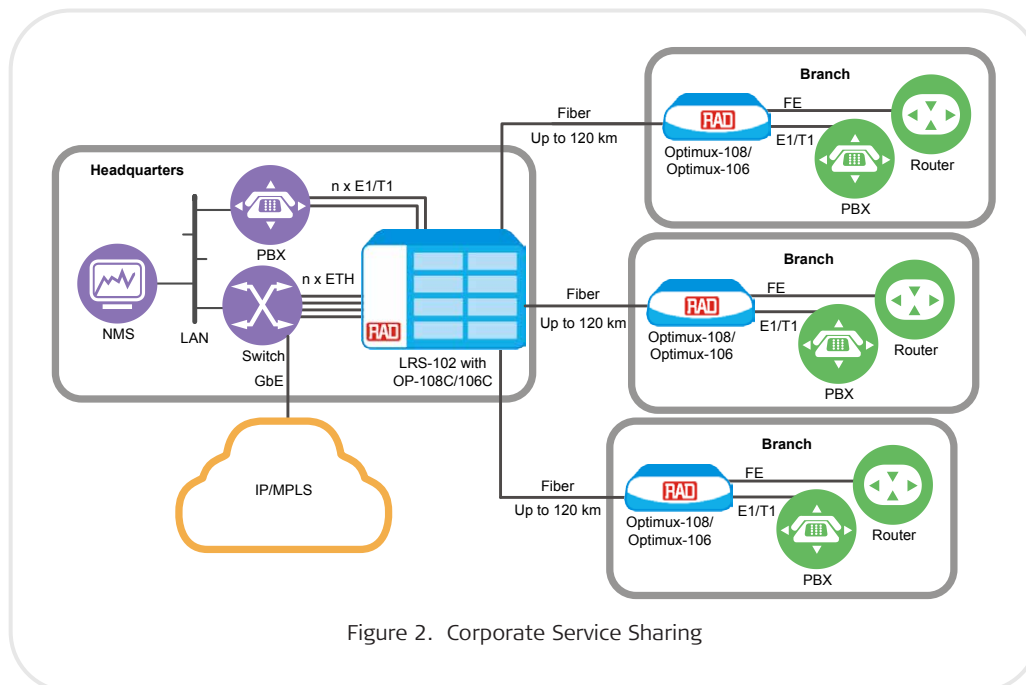


Figure 2. Corporate Service Sharing

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MANAGEMENT

Authentication

- Password
- Manager list

Control Port

Interface: RS-232 DCE asynchronous
 Rate: 9.6, 19.2, 38.4, 57.6, 115.2 kbps
 Connector: Mini-USB 5

Ethernet Management Port

Type: 10/100BaseT
 Connector: shielded RJ-45
 Max. Frame Size: 1536 bytes

TIMING

Uplink

Internal timing mode

E1 Channel

Transparent, independent for each channel

V.35 Interface

Internal
 External
 Loopback timing

RESILIENCY

Power supply redundancy
 Uplink redundancy

DIAGNOSTICS

Alarms

Alarm buffer

Alarm Relay

Normally-closed/normally-open contacts for major and minor alarm indication
 Connector: RJ-45
 Contact rating: maximum 0.5A (at 30 VDC or 30 VAC) through closed contacts

Events

Event log

Table 1. Standalone Fiber Optic Interface Characteristics

Wavelength [nm]	Fiber Type [μm]	Transmitter Type	Typical Power Output [dBm]	Receiver Sensitivity w/o USER ETH port [dBm]	Receiver Sensitivity with USER ETH port [dBm]	Typical Max. Range w/o USER ETH port		Typical Max. Range with USER ETH port		Connector Type	Extended Temperature Version
						[km]	[miles]	[km]	[miles]		
850	62.5/125 multimode	Laser (VCSEL)	-6	-34	-32	6	3.7	2	1.2	FC/PC	No
1310	9/125 single mode	Laser	-12	-34	-28	47	29.2	20	12.4	ST, SC, FC/PC	Yes
1310	62.5/125 multimode	LED	-18	-32	-30	7	4.3	2	1.2	ST, SC	No
1550	9/125 single mode	Laser	-12	-34	-28	47	29.2	20	12.4	ST, SC, FC/PC	Yes
1310	9/125 single mode	Laser (long haul)	-2	-34	-34	72	44.7	40	24.8	ST, SC, FC/PC	Yes
1550	9/125 single mode	Laser (long haul)	-2	-34	-34	120	74.5	80	49.7	ST, SC, FC/PC	Yes
Tx 1310 Rx 1550	9/125 single mode	Laser WDM (SF1)	-12	-34	-28	47	29.2	20	12.4	SC	No
Tx 1550 Rx 1310	9/125 single mode	Laser WDM (SF2)	-12	-34	-28	47	29.2	20	12.4	SC	No
1310	9/125 single mode	Laser (SF3)	-12	-27	-27	20	12.4	20	12.4	SC/APC only	No
Tx 1310 Rx 1550	9/125 single mode	Laser WDM (long haul SF4)	-2	-36	-34	76	47.2	40	24.8	SC	Yes
Tx 1550 Rx 1310	9/125 single mode	Laser WDM (long haul SF5)	-2	-36	-34	76	47.2	40	24.8	SC	Yes

Note: Typical ranges are calculated according to attenuation of 3.5 dB/km for 850 nm multimode fiber, 0.4 dB/km for 1310 nm single mode fiber, and 0.25 dB/km for 1550 nm single mode fiber.

GENERAL**Environment**

Temperature: 0° to 55°C (32° to 131°F)

Extended temperature range (metal enclosure only): -20° to 65°C (-4° to 149°F)

Note: The extended temperature range for Optimux-108 with V.35 interface is 10° to 60°C (14° to 140°F)

Humidity: Up to 90%, non-condensing

Indicators

Front Panel:

PWR

- On (green): both power supplies OK
- On (red): power supply A fault
- On (yellow): power supply B fault
- Off: Both power supplies fault or no power

LOS/AIS – LINK A/B

- On (red): Sync/Signal Loss on Link A/B
- On (yellow): AIS detected (products without Ethernet port only)
- Off: normal operation

LOS/AIS – CH1 to CH4

- On (red): Signal Loss on channel
- On (yellow): AIS received on channel
- Off: normal operation

Rear Panel:

Sig Link A/B (on the fiber optic module)

- On (green): signal exists on Link A/B
- Off: no signal on Link A/B

LINK/ACT

- On (yellow): link is up
- Off: link is down
- Blinking: frames are transmitted

100

- On (green): 100 Mbps mode
- Off: 10 Mbps mode

Physical

Plastic enclosure:

- Height: 4.37 cm (1.7 in)
- Width: 21.7 cm (8.5 in)
- Depth: 17.0 cm (6.7 in)
- Weight: 0.5 kg (1.1 lb)

Metal enclosure:

- Height: 4.37 cm (1.7 in)
- Width: 21.5 cm (8.4 in)
- Depth: 15.3 cm (6.0 in)
- Weight: 0.7 kg (1.5 lb)

Power

Wide range power supply

- AC: 100 to 240 VAC
- DC: -48 VDC (-40 to -125 VDC)

24 VDC power supply

- 24 VDC (20 to 36 VDC)

Power Consumption

Wide range power supply

- AC: 25 VA max
- DC (-48 VDC): 9W max

24 VDC power supply

- 9W max

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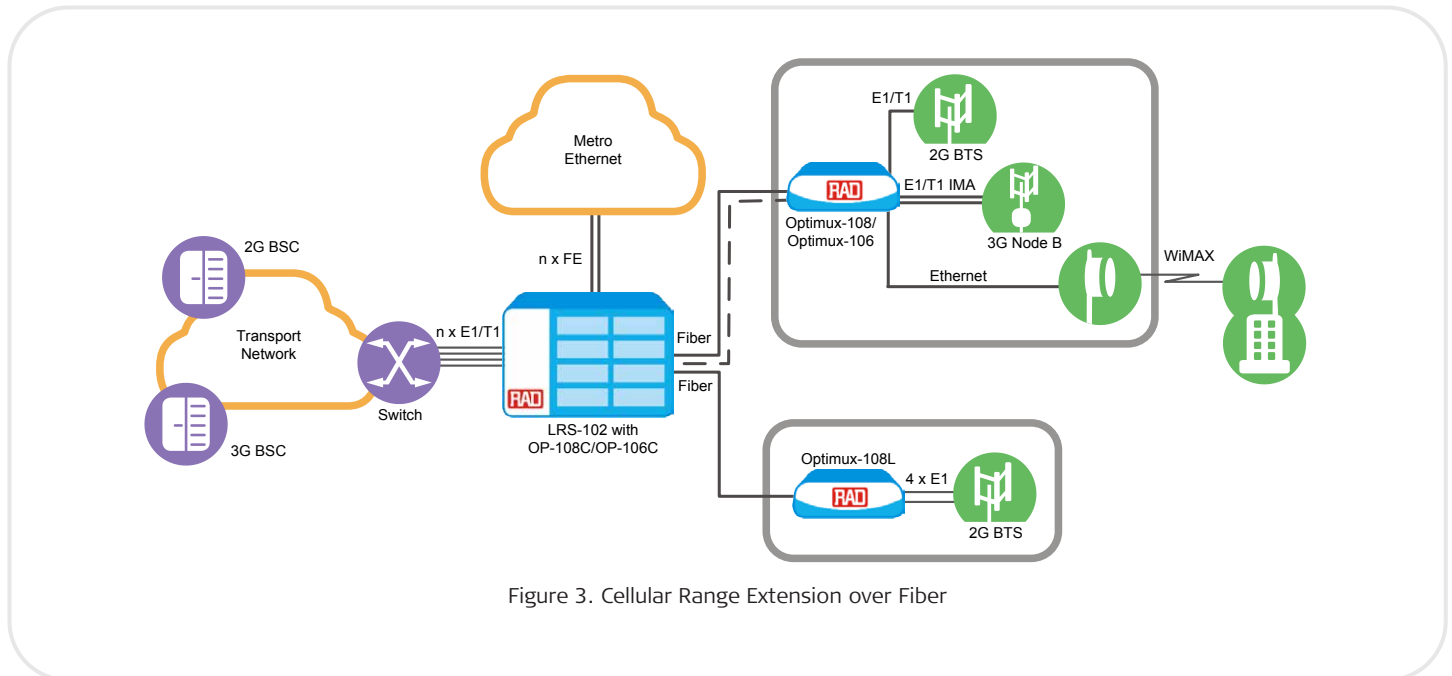









Figure 3. Cellular Range Extension over Fiber

Table 2. Optimux Comparison Table

Feature	OP-108L	OP-108/106	OP-134/125	OP-1032/1025	OP-45/45L	OP-1551	OP-1553
							
Uplink	Fiber Optic	Fiber Optic	E3, Fiber Optic	Fiber Optic	T3, Fiber Optic	Copper, STM-1/OC-3	Copper, STM-1/OC-3
Bandwidth (Mbps)	108	108/106	34/25 or 134/125	Proprietary	45	155	155
User interfaces	4E1, ETH	4E1/4T1, ETH	16E1/16T1, ETH	16E1/16T1, ETH	21E1/28T1	21/42/63E1 28/56/84T1	3E3/3T3
Special features	Reduced power consumption cost-effective	Redundant, hot-swappable uplinks	Full bandwidth, Ethernet license activation	3xGbE User interfaces	Ring support (Optimux-45)	Full redundancy	Full redundancy
Card version for LRS-102/MP-4100	Works with OP-108C	✓	-	-	-	-	-

Ordering

RECOMMENDED CONFIGURATIONS

OP-108/B/ETH/FC/13L
 OP-108/U/FC/13L
 OP-108/U/ETH/FC/13L/ME
 OP-108/B/ETH/SC/SF1
 OP-108/B/ETH/SC/SF2
 OP-106/ETH/ST/13L
 OP-106/SC/13L
 OP-106/SC/SF3
 OP-106/ETH/SC/13L
 OP-106/R/SC/13L

SPECIAL CONFIGURATIONS

OP-108/~/^/%/!/#/+/\$/*/?

Fiber multiplexer for 4 E1 and Ethernet or serial data

OP-106/~/%/!/#/+/\$/*/?

Fiber multiplexer for 4 T1 and Ethernet

Uplink Modules

OP-108-M/#/+/\$/?

OP-106-M/#/+/\$/?

Legend

~ Power supply (Default=AC/DC wide-range power supply):

24 24 VDC

^ E1 connector:

B Balanced (RJ-45)

U Unbalanced (BNC)

% Redundant power supply: (Default=one power supply)

R Redundant power supply of the same type (not for 24 VDC)

! Optional user port:

ETH 10/100BaseT Ethernet

V35 V.35 (Optimux-108 only)

Uplink interface connector

ST ST type connector

FC FC/PC type connector

SC SC type connector

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

+ Fiber optic link interface:

85L 850 nm, multimode, VCSEL

Note: Available with FC/PC connector only.

13 1310 nm, multimode, LED

Note: Available with ST and SC connectors only.

13L 1310 nm, single mode, laser diode

15L 1550 nm, single mode, laser diode

13LH 1310 nm, single mode, long-haul laser diode

15LH 1550 nm, single mode, long-haul laser diode

SF1 Transmit 1310 nm laser (WDM), receive 1550 nm

SF2 Transmit 1550 nm laser (WDM), receive 1310 nm

SF3 Transmit and receive at 1310 nm laser diode

SF4 Transmit 1310 nm laser (WDM), receive 1550 nm, long haul

SF5 Transmit 1550 nm laser (WDM), receive 1310 nm, long haul

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.

\$ Extended temperature version (Default=no extended temperature support):

H Extended temperature support (13L, 15L, 13LH, 15LH fiber link versions and metal enclosure only)

* Redundant uplink module (Default=single uplink)

D Second uplink module (of the same type as first uplink module)

? Enclosure (Default=plastic enclosure)

ME Metal enclosure

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SUPPLIED ACCESSORIES

AC power cord
DC adapter plug

CBL-MUSB-DB9F
Control port cable

CBL-RJ45-DB9/F
Alarm port cable

CBL-AMP-M34
Cable to connect the Optimux-108 Smart Serial interface connector to the M34 connector of the user equipment

OPTIONAL ACCESSORIES

CBL-AMP-DB25-ISO2110
Cable to connect the Optimux-108 Smart Serial interface connector to the user equipment DB-25 connector with ISO 2110 pinout

CBL-AMP-DB25-TLBS
Cable to connect the Optimux-108 Smart Serial interface connector to the user equipment DB-25 connector with Telebras pinout

RM-33-2

Hardware kit for mounting one or two plastic units in a 19-inch rack

RM-35/@

Hardware kit for mounting one or two metal units in a 19-inch rack

Legend

@ Rack mount kit (Default=both kits):

- P1** Mounting one unit
- P2** Mounting two units

WM-35-TYPE4

Hardware kit for mounting 8.5-inch units in metal enclosure on a wall

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