Optimux-108, Optimux-106

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

- 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

Optimux

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.

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:

- 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.

Fiber optic interfaces can be ordered either built-in (single/dual) or in the form of additional link interface modules (Optimux-108 only).

RAD
Your Network's Edge

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 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.
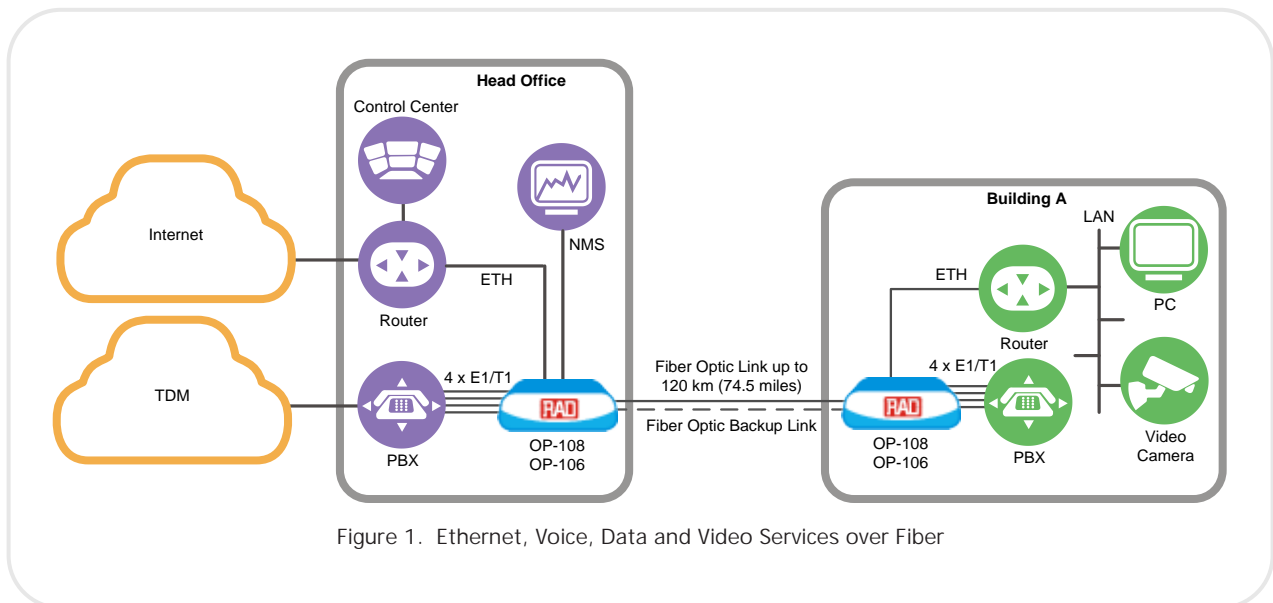

Figure 1. Ethernet, Voice, Data and Video Services over Fiber

Specifications

FIBER OPTIC INTERFACES

Characteristics
See *Table 1*

Note: *Fiber optic interfaces can be ordered either built-in (single/dual) or in the form of additional OP-108-M/* link interface modules (Optimux-108 only). For link interface module options, please contact your local RAD partner.*

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, 120W
T1 balanced, 100W
E1 unbalanced, 75W

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
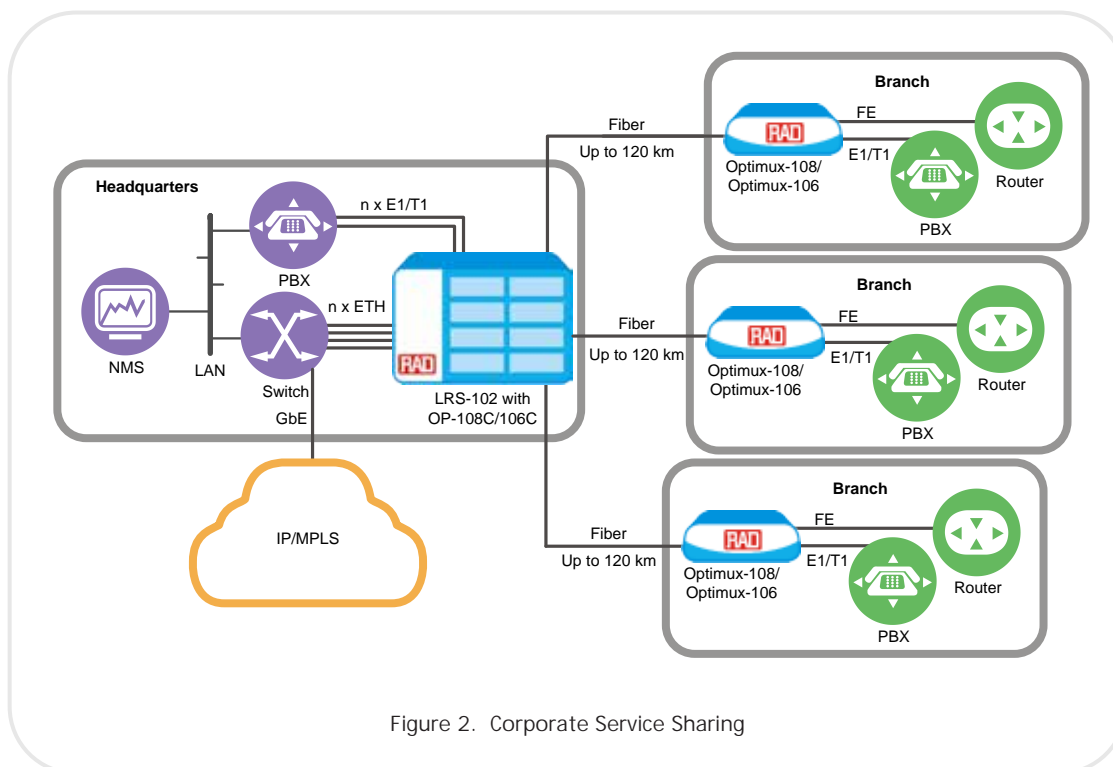V.35 DCE

Connector
Smart Serial

Throughput
2.048 Mbps

Figure 2. Corporate Service Sharing

Table 1. Fiber Optic Interface Characteristics

Wavelength	Fiber Type	Trans-mitter Type	Output Power		Receiver Sensitivity w/o USER ETH port	Receiver Sensitivity with USER ETH port	Typical Max. Range w/o USER ETH port		Typical Max. Range with USER ETH port		Connector Type	Extended Temperature Version
			Max	Min								
[nm]	[mm]		[dBm]		[dBm]	[dBm]	[km]	[miles]	[km]	[miles]		
1310	9/125 single mode	Laser	-8	-15	-34	-28	47	29.2	20	12.4	ST, SC, FC/PC	Yes
1310	62.5/125 multimode	LED	-14	-20	-32	-30	7	4.3	2	1.2	ST, SC	No
1550	9/125 single mode	Laser	-8	-15	-34	-28	76	47.2	20	12.4	ST, SC, FC/PC	Yes
1310	9/125 single mode	Laser (long haul)	0	-5	-34	-34	72	44.7	40	24.8	ST, SC, FC/PC	Yes
1550	9/125 single mode	Laser (long haul)	0	-5	-34	-34	120	74.5	80	49.7	ST, SC, FC/PC	Yes
Tx 1310 Rx 1550	9/125 single mode	Laser WDM (SF1)	-8	-15	-34	-28	47	29.2	20	12.4	SC	No
Tx 1550 Rx 1310	9/125 single mode	Laser WDM (SF2)	-8	-15	-34	-28	47	29.2	20	12.4	SC	No
1310	9/125 single mode	Laser (SF3)	-8	-15	-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)	0	-5	-36	-34	76	47.2	40	24.8	SC	Yes
Tx 1550 Rx 1310	9/125 single mode	Laser WDM (long haul SF5)	0	-5	-36	-34	76	47.2	40	24.8	SC	Yes

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

MANAGEMENT

Autentification
· 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

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)

Storage temperature: -40° to 65°C (-40° to 149°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
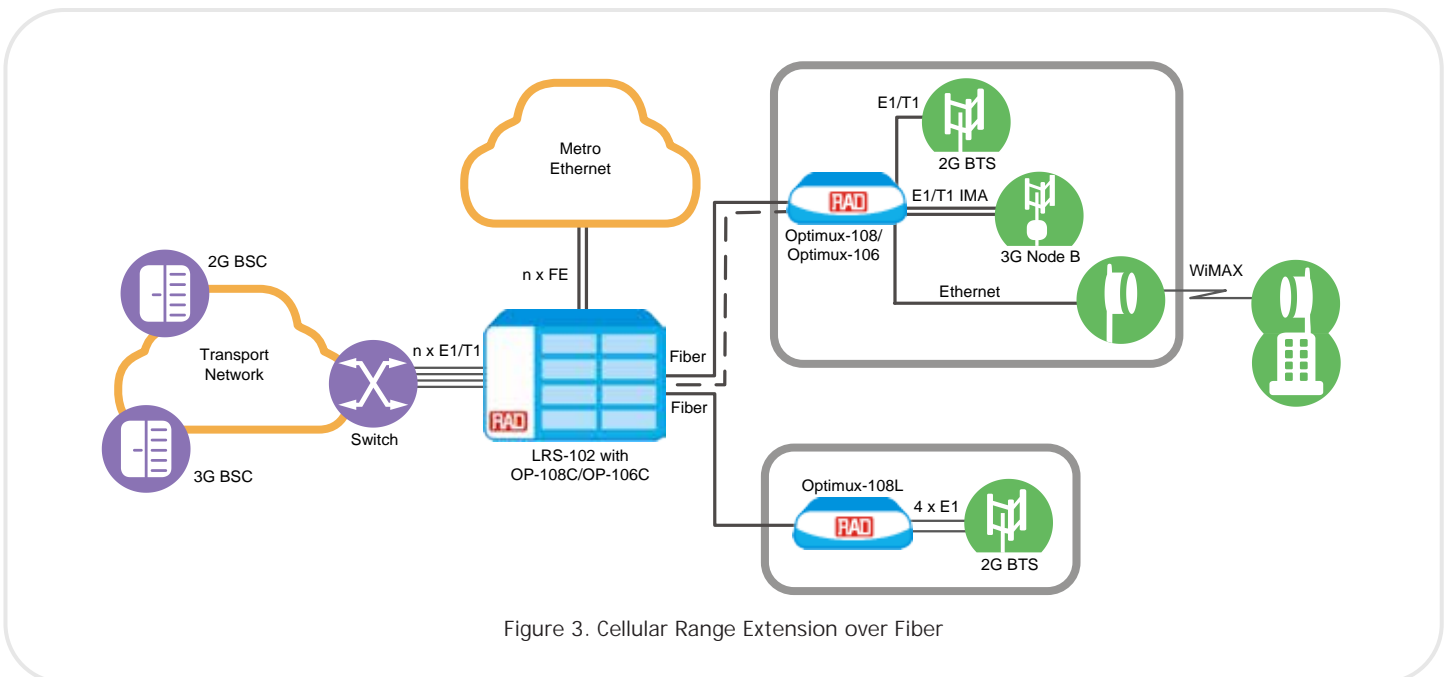· DC (-48 VDC): 9W max
24 VDC power supply
· 9W max

Figure 3. Cellular Range Extension over Fiber

Ordering

RECOMMENDED CONFIGURATIONS

OP-108/B/ETH/FC/13L

Fiber multiplexer for 4E1 and Ethernet data, balanced E1 interface, 10/100BaseT Ethernet interface, FC connector, Tx/Rx 1310 nm single mode laser

OP-108/U/FC/13L

Fiber multiplexer for 4E1 data, unbalanced E1 interface, FC connector, Tx/Rx 1310 nm single mode laser

OP-108/U/ETH/FC/13L/ME

Fiber multiplexer for 4E1 and Ethernet data, unbalanced E1 interface, 10/100BaseT Ethernet interface, FC connector, Tx/Rx 1310 nm single mode laser, metal enclosure

OP-108/B/ETH/SC/SF1

Fiber multiplexer for 4E1 and Ethernet data, balanced E1 interface, 10/100BaseT Ethernet interface, SC connector, Tx 1310 nm WDM laser, Rx 1550 nm, single fiber

OP-108/B/ETH/SC/SF2

Fiber multiplexer for 4E1 and Ethernet data, balanced E1 interface, 10/100BaseT Ethernet interface, SC connector, Tx 1550 nm WDM laser, Rx 1310 nm, single fiber

OP-108/U/SC/SF4

Fiber multiplexer for 4E1 data, unbalanced E1 interface, SC connector, Transmit 1310 nm laser (WDM), receive 1550 nm, long haul

OP-106/ETH/ST/13L

Fiber multiplexer for 4T1 and Ethernet data, balanced T1 interface, 10/100BaseT Ethernet interface, ST connector, Tx/Rx 1310 nm single mode laser

OP-106/SC/13L

Fiber multiplexer for 4T1 data, balanced T1 interface, SC connector, Tx/Rx 1310 nm single mode laser

OP-106/SC/SF3

Fiber multiplexer for 4T1 data, balanced T1 interface, SC connector, Tx/Rx 1310 nm single mode laser, single fiber

OP-106/ETH/SC/13L

Fiber multiplexer for 4T1 and Ethernet data, balanced T1 interface, 10/100BaseT Ethernet interface, SC connector, Tx/Rx 1310 nm single mode laser

OP-106/R/SC/13L

Fiber multiplexer for 4T1 data, redundant power supply, balanced T1 interface, SC connector, Tx/Rx 1310 nm single mode laser

OP-108/U/SC/SF4

Fiber multiplexer for 4E1 data, unbalanced E1 interface, SC connector, Transmit 1310 nm laser (WDM), receive 1550 nm, long haul

OP-108-M/SC/SF4

Additional uplink module for Optimux-108, SC connector, Transmit 1310 nm laser (WDM), receive 1550 nm, long haul

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for additional configuration options.

SUPPLIED ACCESSORIES

AC power cord
DC adapter plug

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

CBL-MUSB-DB9F
Control port cable

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