Optimux-108
Four-Channel E1 and Ethernet Multiplexer

Any Traffic Over Fiber

OPTIMUX

- Multiplexes four E1 channels and 100 Mbps Ethernet or V.35 link over a fiber optic link with various fiber interfaces: multimode, single-mode (up to 120 km), and single-mode over single fiber
- 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 ConfiguRAD Web-based remote access terminal

The Optimux-108 multiplexer combines four E1 channels and an optional Ethernet or V.35 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 E1 signals of the tributary interface is transmitted independently, so that each E1 channel can be set to a different clock source.

Various optical uplink interfaces include:

- 850 nm VCSEL (Vertical Cavity Surface Emitting Laser) for multimode fiber
- 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

RAD
data communications
The Access Company

- Single fiber (SF3 option) using SC/APC (Angled Polished Connector) technology, with a 1310 nm laser diode for single wavelength operation.

The basic model includes a fiber optic uplink and four tributary E1 links, which can be ordered with a balanced or unbalanced interface.

Optimux-108 can be also ordered with an additional Ethernet or V.35 user port, and with redundant uplink or power supply.

Optimux-108 has comprehensive test and diagnostics capabilities that include local and remote loopbacks on the uplink interface and on each E1 tributary link. A local loopback is also supported on the optional V.35 user port.

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

Optimux-108 can be configured and monitored locally via an ASCII terminal, or remotely via Telnet, Web-based remote access terminal (ConfiguRAD) or RADview-TDM running in a Windows or Unix environment.

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

Optimux-108 is a compact standalone unit. A rack mount adapter kit enables installation of one or two (side-by-side) units in a 19-inch rack.
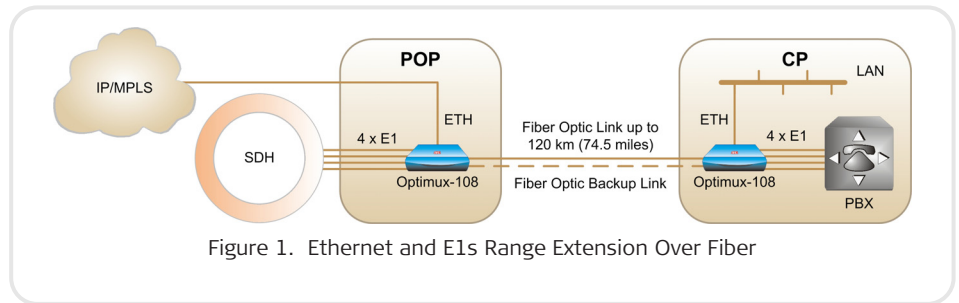

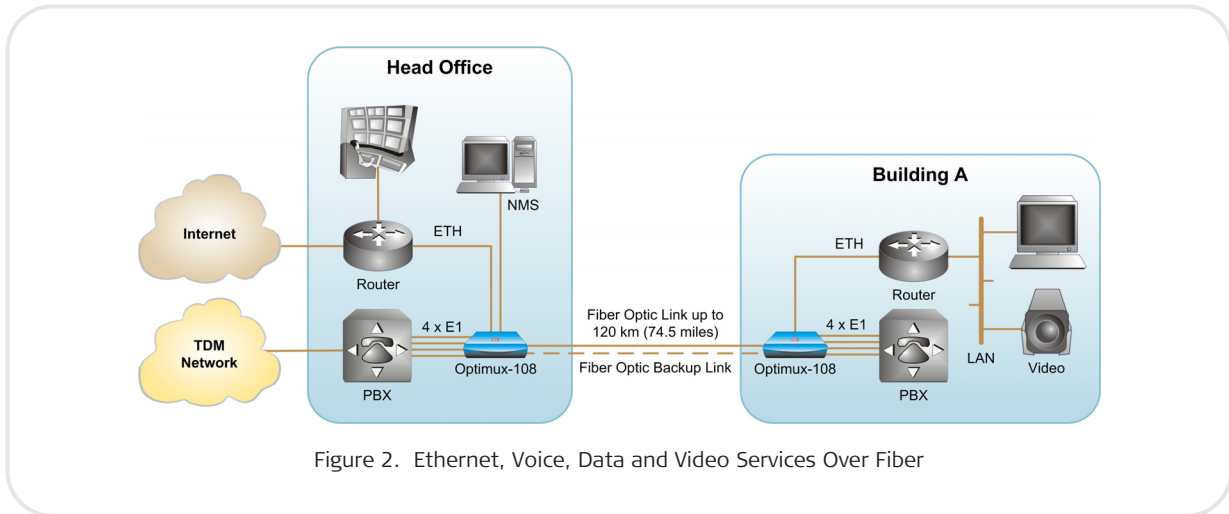Figure 1. Ethernet and E1s Range Extension Over Fiber

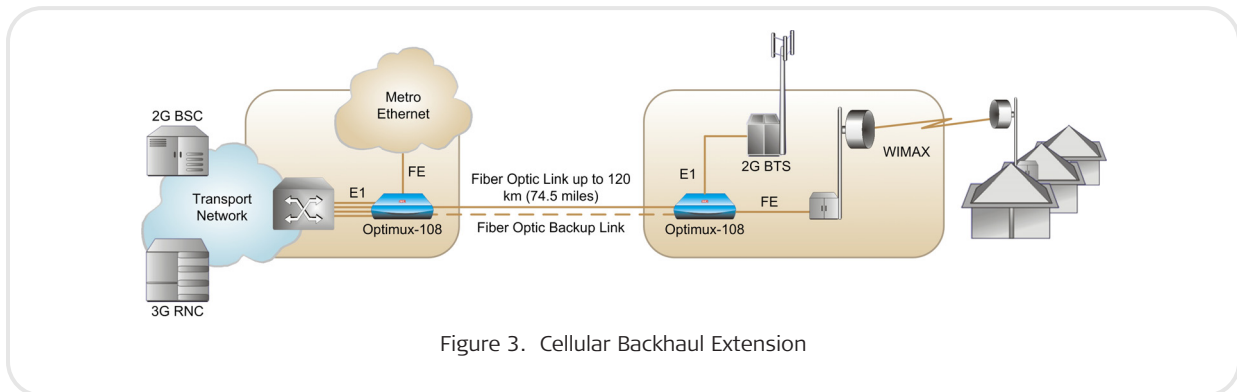Figure 2. Ethernet, Voice, Data and Video Services Over Fiber

Figure 3. Cellular Backhaul Extension

Specifications

FIBER OPTIC UPLINK

See *Table 1*

TRIBUTARY E1 CHANNELS

Number of Channels
4

Data Rate
2048 kbps

Line Code
HDB3

Impedance
120Ω, balanced
75Ω, unbalanced

Connectors
RJ-45, balanced
Two BNC, unbalanced

MNG–ETH and USER-ETH PORTS

Type
10/100BaseT

Connector
Shielded RJ-45

USER-ETH Port Throughput
100 Mbps

V.35 USER PORT

Type
DCE

Connector
Smart Serial

CONTROL PORT

Type
RS–232 DCE asynchronous

Data Rate
9.6, 19.2, 38.4, 57.6, 115.2 kbps

Connector
Mini-USB 5

ALARM PORT

Type
Dry relay contacts for major and minor
  alarms

Connector
RJ-45

GENERAL

Standards
G.703, G.823, G.955, IEEE 802.3

Diagnostics
Local and remote loopbacks on uplink and
  on each E1 tributary link
Local loopback on optional V.35 user port

Timing
Uplink: internal
E1 tributary: transferred transparently,
  independent for each channel
V.35: internal, external, loopback

Front Panel Indicators
PWR
    On (green): both power supplies OK
    On (red): power supply A fault
    On (yellow): power supply B fault
    Off: power supply fault

LINK A/B
    On (red): Sync/Signal Loss on Link A/B
      (yellow): not used
    Off: normal operation

CH1 to CH4
    On (red): Signal Loss on channel
    On (yellow): AIS received on channel
    Off: normal operation

Rear Panel Indicators
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
    Blinks: frames are transmitted

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

Power
Wide range: 100 to 240 VAC or
    –48 VDC (–40 to –72 VDC)

Power Consumption
AC: 25 VA max
DC: 9W max

Physical
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)

Environment
Temperature: 0°–50°C (32°–122°F)
Humidity: Up to 90%, non-condensing

Table 1. Fiber Optic Interface Characteristics

Wavelength [nm]	Fiber Type [µm]	Transmitter Type	Typical Power Output [dBm]	Receiver Sensitivity [dBm]	Typical Max. Range [km]	[miles]	Connector Type
850	62.5/125 multimode	Laser (VCSEL)	-7	-34	6	3.7	ST, SC, FC/PC
1310	9/125 single mode	Laser	-12	-34	47	29.2	ST, SC, FC/PC
1310	62.5/125 multimode	LED	-18	-32	7	4.3	ST, SC
1550	9/125 single mode	Laser	-12	-34	76	47.2	ST, SC, FC/PC
1310	9/125 single mode	Laser (long haul)	-2	-34	72	44.7	ST, SC, FC/PC
1550	9/125 single mode	Laser (long haul)	-2	-34	120	74.5	ST, SC, FC/PC
Tx: 1310 Rx 1550	9/125 single mode	Laser WDM (SF1)	-12	-34	47	29.2	SC
Tx: 1550 Rx 1310	9/125 single mode	Laser WDM (SF2)	-12	-34	47	29.2	SC
Tx/Rx: 1310	9/125 single mode	Laser (SF3)	-12	-27	20	12.4	SC/APC

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*
  - *0.4 dB/km for 1310 nm single mode*
  - *0.25 dB/km for 1550 nm single mode*

Optimux-108

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Ordering

OP-108/^/%/!/#/+/*

Legend

^ E1 connector type:
  B Balanced (RJ-45)
  U Unbalanced (BNC)

% Optional power supply:

  R Second redundant power supply (default is one power supply only)

! Optional user port:

  ETH 10/100BaseT User Ethernet port

  V35 V.35 interface (see *Optional Accessories*)

Uplink interface connector type:
  ST ST type connector
  FC FC/PC type connector
  SC SC type connector

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

+ Fiber optic link interface type:
  85L 850 nm, multimode, VCSEL
  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 m laser diode

* Optional uplink module:
  D Second redundant uplink module (of same type as first uplink module). Default is a single uplink module

  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.*

OP-108-M/#/+
Additional uplink module

Note: *For ordering the Optimux-108 card version or coax uplink, please contact the Optimux Product Line Manager.*

SUPPLIED ACCESSORIES

AC power cord
DC adapter plug

CBL-MUSB-DB9F
Control port cable

CBL-RJ45-DB9/F
Alarm port cable

OPTIONAL ACCESSORIES

RM-33-2
Kit for mounting 1 or 2 units in a 19-inch rack

V.35 interface cables:

CBL-AMP-M34
Smart Serial to M34 interface

CBL-AMP-DB25-ISO2110
Smart Serial to ISO 2110 interface

CBL-AMP-DB25-TLBS
Smart Serial to Telebras interface

Table 2. Optimux Comparison Chart

Feature	Optimux-108/106	Optimux-34	Optimux-25	Optimux-45/45L	Optimux-1551	Optimux-1553
Uplink	Fiber Optic	E3, Fiber Optic	Fiber Optic	T3, Fiber Optic	Copper, STM-1/OC-3	Copper, STM-1/OC-3
Bandwidth (Mbps)	108/81	34	25	45	155	155
Number of trunks	4 E1 4 T1	16 E1	16 T1	21 E1 28 T1	21/42/63 E1 28/56/84 T1	3 E3 3 T3
Ethernet support	✓	✓	✓	–	–	–
Special features	Redundant, hot-swappable uplinks	SFP-based uplinks	Modular	Ring support (Optimux-45)	Full redundancy	Full redundancy