

Optimux-1551

STM-1/OC-3 Terminal Multiplexer



Any Traffic Over Fiber

- STM-1 or OC-3 terminal multiplexer providing access to SDH and SONET networks
- Multiplexes 21/42/63E1, or 28/56/84T1 data channels over a single link, providing a cost-effective and reliable solution
- 1+1 unidirectional SDH/SONET automatic protection for main link, as well as 1+1 protection on E1/T1 tributaries
- Plug-and-play operability



Optimux-1551 is an STM-1/OC-3 multiplexer that combines high capacity, operational simplicity, and cost benefits. Up to 21/42/63 E1 or 28/56/84 T1 tributary channels are mapped into a single channelized STM-1/OC-3 uplink, for extending the local loop up to 80 km (50 miles), while creating a transmission layer fully compatible with regional and national SDH/SONET networks.

E1/T1 over SDH/SONET applications are supported via preset software configurations for operation in multinational environments.

All modules, including fans and power supplies, are hot-swappable, making Optimux-1551 fully compatible with carrier class requirements.

Main link 1+1 unidirectional redundancy is supported in compliance with the G.841 and GR-253-CORE standards. Tributary channel 1+1 protection is provided through an optional redundant module.

Optimux-1551 is available with a choice of either standard coaxial or fiber optic short/long-haul aggregate main link interfaces.



data communications

The Access Company

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Three dual-purpose multiplexer cards each with 21E1/28T1, 42E1/56T1 and 63E1/84T1 tributary channels support transparent data transfer in compliance with the G.703 recommendation. The TDM traffic is mapped into SDH or SONET containers, while retaining full use of the 155 Mbps capacity.

An optional station clock card can be installed on the OP-6384/OP-2128/OP-4256 card. When both the station clock and an external clock are used, the unit's transmit clock for transmission over the STS-3/OC-3/STM-1 uplink is locked to the station clock input source. The input source can be either one of the E1/DS1 tributaries or a dedicated external E1/DS1 input.

Compact size and low power consumption of Optimux-1551 allow easy installation at customer premises or in telecommunication buildings.

Setup, control, status monitoring, and diagnostics information can be performed using one of the following methods:

- ASCII terminal connected to the DB-9 control port
- Telnet host via the dedicated Ethernet port
- Network management station (NMS) running RADview-EMS, RAD's client-server CORBA-based SNMP network management application. NMS is connected via the dedicated Ethernet port
- ConfiguRAD, RAD's Web-based remote access terminal application, via the dedicated Ethernet port
- TFTP for software update and remote configuration, via the dedicated Ethernet port

The unit provides high-quality performance monitoring of the traffic path, from the SDH/SONET network to the customer premises, thereby assuring high availability

Specifications

STM-1/OC-3 UPLINK (NETWORK)

Compliance

Bellcore GR-253-CORE, Bellcore GR-499-CORE, ITU-T G.703, G.707, G.783, G.841, G.957, RFC 3592

Redundancy

1+1

Line Rate

155.52 Mbps \pm 20 ppm

ELECTRICAL (COAX) INTERFACE

Line Attenuation

Typically 12.7 dB at 78 MHz using RG-59-B/U cable

Impedance

75 Ω

Connectors

BNC

Line Code

CMI

FIBER OPTIC INTERFACE

Line Code

NRZ scrambled

Specifications and Ranges

See *Table 1*

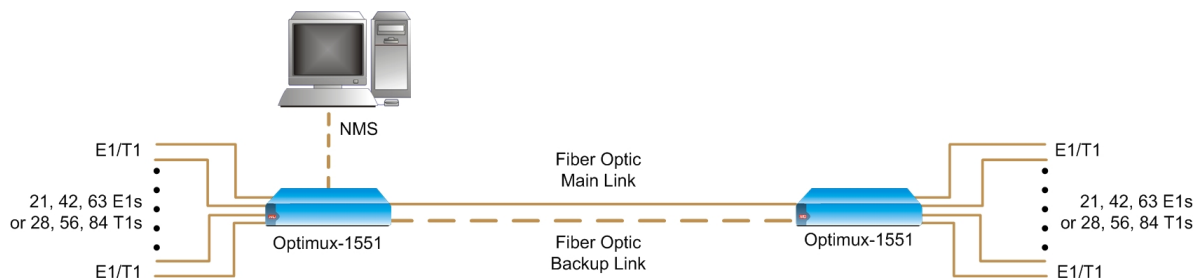


Figure 1. Point-to-Point Application

E1 TRIBUTARY CHANNELS

Standards

ITU-T Rec. G.703, G.823, RFC 3895

Data Rate

2.048 Mbps

Line Code

HDB3 or AMI

Impedance

120Ω balanced
75Ω unbalanced

Range

According to ITU-T rec. G.703

Jitter

According to ITU-T rec. G.823

Connectors

Six 64-pin unshielded Telco

T1 TRIBUTARY CHANNELS

Standards

ITU-T Rec. G.703, G.824, RFC 3895

Data Rate

1.544 Mbps

Line Code

B8ZS or AMI

Impedance

100Ω balanced

Range

According to ITU-T rec. G.703

Jitter

According to ITU-T rec. G.824

Connectors

Six 64-pin unshielded Telco

SUPERVISORY AND MANAGEMENT PORTS

Control Port

Format: asynchronous
Baud rate: 9,6 kbps, 19,2 kbps,
38,4 kbps, 57,6 kbps, 115,2 kbps
Character: 8 or 7 bit, odd, even or no
parity

Interface: V.24/RS-232

Connector: DB-9, female

Ethernet Port

Mode of operation: autonegotiation,
full/half duplex

Interface: 10/100BaseT

Connector: RJ-45 shielded

ALARM RELAY

Rating

60 VDC max or 30 VAC max, at 0.5A max

Input Alarm

10 VDC min, 48 VDC max, at 0.5A max

Connector

Dry contact, DB-9 female

INDICATORS

Power A, B

Green: Power is OK

Red: Power fault

Off: No power

System

TST (yellow):

- On: Unit is in test mode
- Flashing: Downloading soft

FLT (red): OP-6384/OP-2128/OP-4256
card is in fault condition

ON A/B (green):

- On: Active OP-6384/OP-2128/OP-4256
card
- Flashing: During auto-baud detect
process.

Alarm

MAJ (red):

- On: Major Alarm
- Flashing: Major Alarm + ACO button
pressed

MIN (yellow):

- On: Minor Alarm
- Flashing: Minor Alarm + ACO button
pressed

Uplink

SYNC A/B LOSS (red): Electrical/optical
signal not present or out-of-frame
detected on uplink (A/B)

AIS A/B (yellow): AIS signal detected on
uplink A/B

SIG (green): Signal detected on the
respective uplink card

Channels

SYNC LOSS/AIS (red/yellow):

- Red: Loss of signal detected on the
respective non masked channel.
- Yellow: AIS signal detected on the
respective non masked channel
- Flashing: The channel is masked and
the LED status for the masked
channels' parameter is set to Blink by
the user.

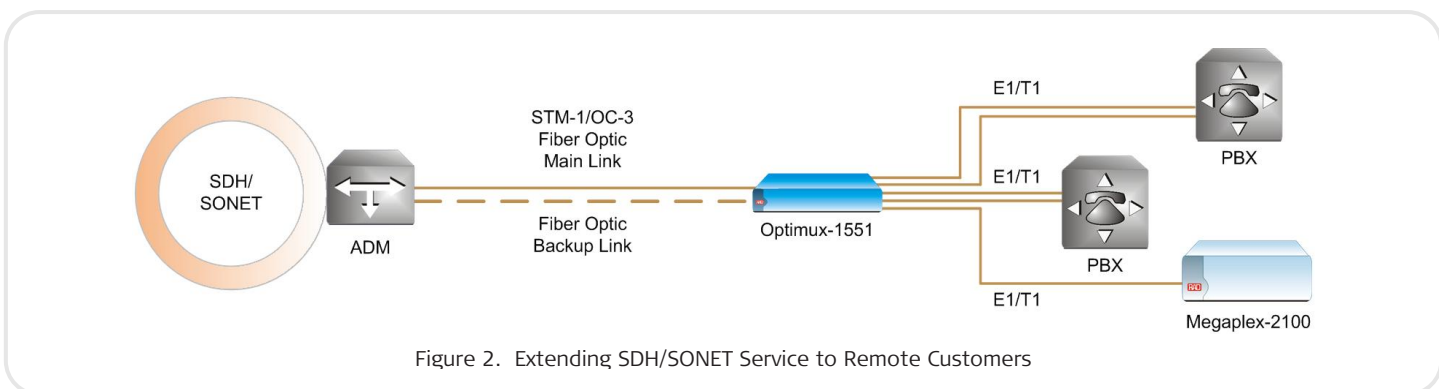


Figure 2. Extending SDH/SONET Service to Remote Customers

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- Off: The channel is masked and the LED status for the masked channels' parameter is set to Off by the user or when the channel is not masked and no Loss of Signal or AIS is detected on the respective channel.

DIAGNOSTICS

Uplink and Tributary Links

Local Loopback
Remote Loopback

GENERAL

Power

AC: 100 - 240 VAC ($\pm 10\%$), 50 to 60 Hz
DC: -48 VDC (-40 to -72 VDC)

Power Consumption

AC: 160 VA max, 1.6A max
DC: 80W max, 2A max

Physical

Height: 8.9 cm (3.5 in)
Width: 43.5 cm (17.1 in)
Depth: 31.5 cm (12.4 in)
Weight: 5.0 kg (11.0 lb)

Environment

Temperature: 0°–55°C (32°–131°F)
Humidity: Up to 90%, non-condensing

Ordering

Main link modules, tributary modules, interface adaptors, cables and rack mount kits are all ordered separately.

OP-1551/*/\$/#/!/!/?/+/^

Legend

* Tributary interface module:

2128 Module with 21×E1 or 28×T1 links

4256 Module with 42×E1 or 56×T1 links

6384 Module with 63×E1 or 84×T1 links

2X2128 Two 2128 modules

2X4256 Two 4256 modules

2X6384 Two 6384 modules

\$ Station clock:

STC Optional station clock

Note: For tributary module redundancy, order two modules. Each tributary module can be set for operation with either E1 or T1 channels.

Power supply:

AC 100 to 240 VAC

48 -48 VDC

AD 100 to 240 VAC power supply plus redundant -48 VDC power supply

! Redundant power supply:

R Redundant power supply of same type

? Main link connector type:

ST ST type fiber

SC SC type fiber

FC FC type fiber

Note: For single fiber connection, only SC type connectors are available. For 1310 nm multimode LED option, only SC and ST type connectors are available.

- + Optical wavelength and transmitter type (not relevant with CX option):
- CX** Electrical interface with coaxial BNC connectors
 - 13** 1310 nm, multimode LED
 - 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
 - 85L** 850 nm, multimode VCSEL
 - SF1** Transmit 1310 nm, receive 1550 nm
 - SF2** Transmit 1550 nm, receive 1310 nm
 - SF3** 1310 nm single wavelength laser

Note: For single-fiber applications, a device with the SF-1 connector should always be used opposite the device with the SF-2 connector, and vice versa. The SF-3 connector can be used on both sides of the link.

^ Second main link:

D Optional second main link

SUPPLIED ACCESSORIES

AC power cord (when AC power supply is ordered)

DC adapter plug (when DC power supply is ordered)

OP-1551-FT

Fan tray module (one included)

RM-36

Hardware for mounting a single Optimux-1551 in a 19-inch rack

Table 1. Main Link Interface Options

| Module Name (Ordering Option) | Wavelength | Fiber Type | Transmitter Type | Power Coupled into Fiber | Receiver Sensitivity | Typical Max. Range | | Connector Type |
|--|----------------------|--|----------------------|-----------------------------|-------------------------|--------------------|---------|-------------------|
| | [nm] | [μ m] | | [dBm] | [dBm] | [km] | [miles] | |
| OP-M/CX/155 | - | Copper cable | - | - | - | 135m | 443 ft | Coax interface |
| OP-M/SC/85L OP-M/FC/85L OP-M/ST/85L | 850 | 62.5/125 multimode | Laser (VCSEL) | -14 to -20 | -26 | 2.0 | 1.2 | SC, FC, ST |
| OP-M/SC/13M OP-M/ST/13M | 1310 | 62.5/125 multimode | LED | -14 to -20 | -31 | 2.0 | 1.2 | SC, ST |
| OP-M/SC/13L OP-M/FC/13L OP-M/ST/13L | 1310 | 9/125 single mode | Laser | -8 to -15 | -31 | 20 | 12.4 | SC, FC, ST |
| OP-M/SC/15L OP-M/FC/15L OP-M/ST/15L | 1550 | 9/125 single mode | Laser | -8 to -15 | -31 | 20 | 12.4 | SC, FC, ST |
| OP-M/SC/13LH OP-M/FC/13LH OP-M/ST/13LH | 1310 | 9/125 single mode | Laser (long haul) | 0 to -5 | -34 | 40 | 24.8 | SC, FC, ST |
| OP-M/SC/15LH OP-M/FC/15LH OP-M/ST/15LH | 1550 | 9/125 single mode | Laser (long haul) | 0 to -5 | -34 | 80 | 49.7 | SC, FC, ST |
| OP-M/SC/SF1 | Tx: 1310 Rx: 1550 | 9/125 single mode (single fiber) | Laser WDM | -8 to -15 | -29 | 20 | 12.4 | SC |
| OP-M/SC/SF2 | Tx: 1550 Rx: 1310 | 9/125 single mode (single fiber) | Laser WDM | -8 to -15 | -29 | 20 | 12.4 | SC |
| OP-M/SC/SF3 | Tx/Rx: 1310 | 9/125 single mode (single fiber) | Laser (SF3) | -8 to -15 | -27 | 20 | 12.4 | SC/APC |

Notes: 1. For copper cables (coax interface), a range of 135m is attainable when using RG-59 B/U (at 78 MHz, in accordance with the square root frequency law).

2. 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

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OPTIONAL ACCESSORIES

OP-1551-M/*/\$

Additional tributary module (see Legend)

Note: Each module should be ordered separately.

OP-M/?/+

Main link interface module only (see Legend)

OP-1551-PS/AC

100 to 240 VAC Power Supply

OP-1551-PS/48

-48 VDC Power Supply

OP-A/ADAPTOR/%

Legend

% Patch panel interface:

- 21BNC/1551** Patch panel with 21 BNC unbalanced E1 interfaces
- 28RJ** Patch panel with 28 RJ-45 balanced E1/T1 interfaces

Note: Two CBL-TELCO-TELCO/2M cables are included with each patch panel

CBL-TELCO-OPEN/2M

Adapter cable if patch panel is not required, Telco 64-pin, open-ended, 2 meters (6.5 feet).

CBL-TELCO-RJ45/2M

Adapter cable if patch panel is not required, Telco 64 pin to RJ-45, 2m (6.5 ft)

CBL-TELCO-RJ45-CROSS/2M

Extension cable Telco 64-pin to 14 RJ-45 connectors with cross connections, 2m (6.5 ft)

CBL-TELCO-TELCO/2M

Extension cable for balanced interface, Telco 64-pin to Telco 64-pin, 2m (6.5 ft)

Note: Five (E1) or six (T1) Telco-Telco cables are required to support all the tributary channels. Two CBL-TELCO-TELCO/2M cables are included with each OP-A/ADAPTOR patch panel

Blank Panels

Note: To ensure good ventilation during operation, all empty slots must be covered by blank panels.

OP-1551-PS-BP

Power supply blank panel

OP-M-BP

Main module blank panel

OP-1551-M-BP

Tributary interface module blank panel

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 |

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