

# Optimux-1551

Fiber Multiplexer for 63E1/84T1 over STM-1/OC-3



Any Traffic over Fiber



- STM-1 or OC-3 terminal multiplexer providing access to SDH and SONET networks
- Multiplexes 21/42/63 E1 or 28/56/84 T1 data channels over a single link, providing a cost-effective and reliable solution
- 1+1 unidirectional SDH/SONET automatic protection for uplink; 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.



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## Fiber Multiplexer for 63E1/84T1 over STM-1/OC-3

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.

Uplink 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 uplink interfaces.

Three dual-purpose multiplexer cards: OP-2128, OP-4256 and OP-6384, with 21E1/28T1, 42E1/56T1 and 63E1/84T1 tributary channels respectively, support transparent data transfer in compliance with the G.703 recommendation. The TDM traffic is mapped into SDH/SONET containers, while retaining full use of the 155 Mbps capacity.

An optional station clock card can be installed on these cards. 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/T1 tributaries or a dedicated external E1/T1 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
- 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.

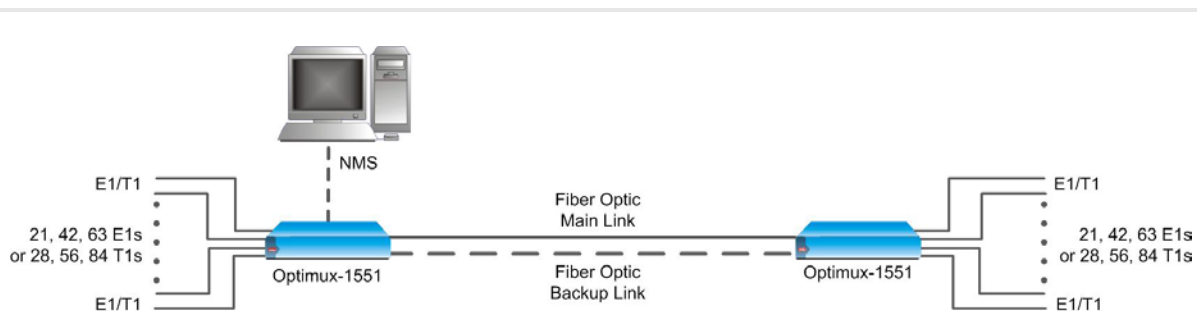


Figure 1. Point-to-Point Application

## Specifications

### UPLINK (NETWORK)

#### Interfaces

Electrical (Coax) – STS-3  
Fiber Optic – STM-1/OC-3

#### 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

#### Copper Line Attenuation

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

#### Copper Impedance

75 $\Omega$

#### Connectors

Electrical: BNC  
Fiber Optic: ST, SC, FC, SC/APC

#### Line Code

Electrical: CMI  
Fiber Optic: NRZ scrambled

#### Specifications and Ranges

See *Table 1*

### E1 TRIBUTARY CHANNELS

#### Compliance

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

#### Data Rate

2.048 Mbps

#### Line Code

HDB3 or AMI

#### Impedance

120 $\Omega$  balanced  
75 $\Omega$  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

#### Compliance

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

#### Data Rate

1.544 Mbps

#### Line Code

B8ZS or AMI

#### Impedance

100 $\Omega$  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

Interface: V.24/RS-232  
Connector: DB-9, female  
Format: asynchronous  
Baud rate: 9,6 kbps, 19,2 kbps,  
38,4 kbps, 57,6 kbps, 115,2 kbps

#### Ethernet Port

Interface: 10/100BaseT  
Connector: shielded RJ-45  
Mode of operation: autonegotiation,  
full/half-duplex

### 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

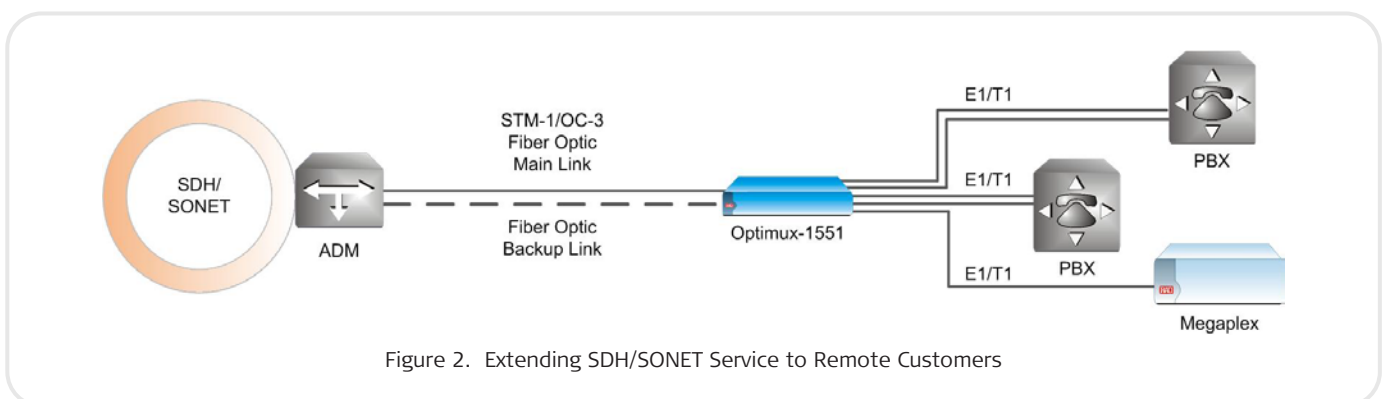


Figure 2. Extending SDH/SONET Service to Remote Customers

# Optimux-1551

## Fiber Multiplexer for 63E1/84T1 over STM-1/OC-3

### INDICATORS

#### Power A, B

- Green: Power is Ok
- Red: Power fault
- Off: No power

#### System

TST (yellow):

- On: Unit is in test mode
- Blinking: Downloading software

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
- Blinking: Auto-baud detect process

#### Alarm

MAJ (red):

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

MIN (yellow):

- On: Minor Alarm
- Blinking: 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
- Blinking (yellow): The channel is masked and the LED status for the masked channels' parameter is set to Blink by the user
- Off: The channel is masked and the LED status for the masked channels' parameter is set to Off by the user OR 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 to 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: 70W 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: 8.0 kg (11.0 lb) max.

#### Environment

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

## Ordering

### STANDARD CONFIGURATIONS

OP-1551/6384/48/R/SC/13L/D  
OP-1551/6384/AC/R/SC/13L  
OP-1551/6384/AC/R/SC/13L/D  
OP-1551/6384/48/R/CX/D  
OP-1551/6384/STC/AC/R/SC/13L/D

### SPECIAL CONFIGURATIONS

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

*Note: Uplink modules, tributary modules, interface adaptors and cables are all ordered separately.*

#### OP-M/?/+

Uplink interface module (see *Table 1*)

#### OP-1551-M/\*/\$

Additional tributary module

#### Legend

\* Tributary interface module:

<b>2128</b>	21×E1 or 28×T1 links
<b>4256</b>	42×E1 or 56×T1 links
<b>6384</b>	63×E1 or 84×T1 links
<b>2X2128</b>	Two 2128 modules
<b>2X4256</b>	Two 4256 modules
<b>2X6384</b>	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.

Table 1. Uplink Interface Options

Module Name (Ordering Option)	Wavelength	Fiber Type	Transmitter Type	Power Coupled into Fiber	Receiver Sensitivity	Typical Max. Range		Connector Type
	[nm]	[ $\mu$ m]		[dBm]	[dBm]	[km]	[miles]	
OP-M/CX/155	-	Copper cable	-	-	-	135m	443 ft	Coax interface See <i>Note 1</i>
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/13 OP-M/ST/13	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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## # 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 the same type

## ? Uplink connector:

- ST** ST fiber  
**SC** SC fiber  
**FC** FC 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.

- ^** Redundant STM-1 uplink (default = single uplink):  
**D** Redundant uplink for unidirectional 1+1 protection

## 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

## OPTIONAL ACCESSORIES

## 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 Telco 64-pin, open-ended, 2m (6.5 ft)

## CBL-TELCO-RJ45/2M

Adapter cable Telco 64-pin to 14 RJ-45 connectors, 2m (6.5 ft)

## CBL-TELCO-RJ45-CROSS/2M

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

## CBL-TELCO-TELCO/2M

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

**Note:** 5 (E1) or 6 (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

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