Optimux-1551

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

Any Traffic over Fiber

Optimux

- 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.

RAD
data communications
The Access Company

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.
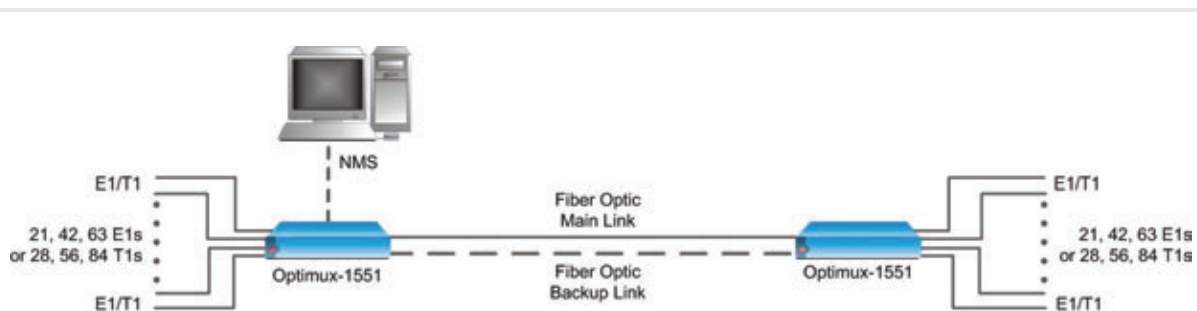

Figure 1. Point-to-Point Application

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 ±20 ppm

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

Copper Impedance
75Ω

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
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

Compliance
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
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
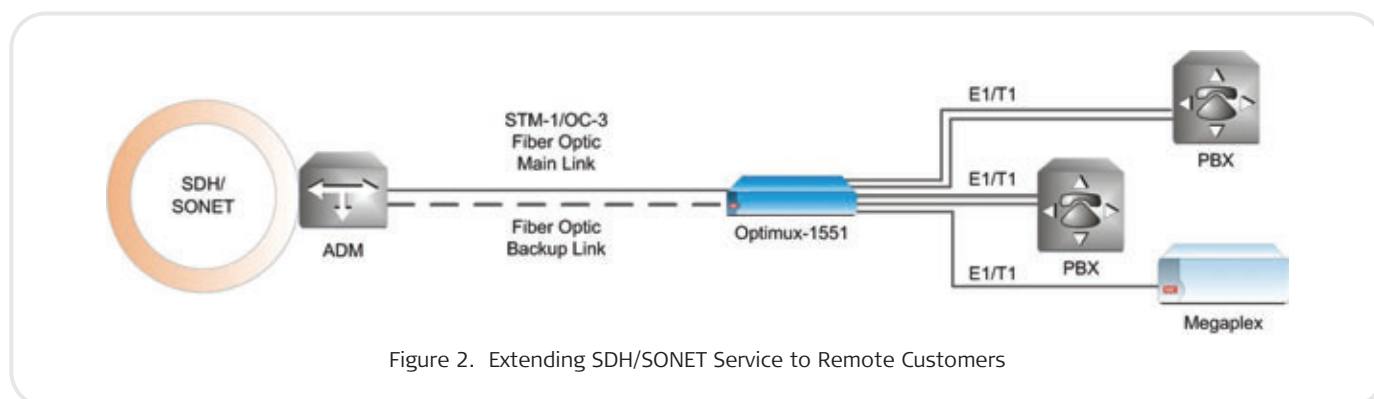
Connector
Dry contact, DB-9 female

Figure 2. Extending SDH/SONET Service to Remote Customers

Optimux-1551
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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 (±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

Table 1. Uplink Interface Options

Module Name (Ordering Option)	Wavelength [nm]	Fiber Type [μm]	Transmitter Type	Power Coupled into Fiber [dBm]	Receiver Sensitivity [dBm]	Typical Max. Range [km]	[miles]	Connector Type
OP-M/CX/155	-	Copper cable	-	-	-	135m	443 ft	Coax interface See *Note 1*
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

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:

2128	21×E1 or 28×T1 links
4256	42×E1 or 56×T1 links
6384	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 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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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
Number of trunks	4 E1	4 E1/4 T1	16 E1/16 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	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	✓	Works with OP-34C/OP-25C	–	–	–	–

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