

Megaplex-4100

OP-34C, OP-25C

Fiber Multiplexer Modules for 16 E1/T1 and Ethernet



- Up to 16 E1/T1 links and high-speed data or Ethernet traffic multiplexed over fiber optic link
- E3 copper or fiber link for OP-34C
- Single-mode, multimode, single-mode over single fiber interfaces
- Range of up to 110 km (68 miles)
- Automatic SFP link backup with optional hot-swappable second link

The OP-34C and OP-25C (Optimum) multiplexer modules for the Megaplex-4100 chassis provide a simple, flexible, and cost-effective solution for transporting multiple E1/T1 links, high-speed data and Ethernet over an E3 copper or a fiber link, at ranges of up to 110 km (68 miles).

The fiber optic link is available with single-mode, multimode, and single-mode over single fiber interfaces. The OP-34C link is compliant with E3 standards and features both optical and coax interfaces.

The unit transports up to 16 E1/T1 links, some of which can be replaced by a user-selectable combination of high-speed data and user Ethernet traffic (see *Table 1*).

The module is supplied with a 10/100BaseT Ethernet user port.

In addition to the resiliency offered by Megaplex-4100 (power and CL redundancy), an optional modular second link in the Optimum modules provides automatic backup upon link failure.

The DS0 cross-connect matrix of the Megaplex-4100 chassis enables flexible payload routing in the Optimum modules, independently configurable for each port, at the individual timeslot (DS0) level.

OP-34C/OP-25C can function as a central site aggregator for remote Optimum-34/Optimum-25 standalone units, and for remote Optimum-134/Optimum-125 standalone units, which are configured to operate as Optimum-34/Optimum-25 (see *Figure 1*).

TDM SERVICES

Various interfaces (based on SFP transceivers) are available for both the active and the backup links:

- Electrical via coax (SMB) connector (OP-34C only)
- 1310 nm short or long-haul laser and 1550 nm long-haul laser interfaces for extended range over single-mode fiber
- Single fiber interface using WDM technology, where the laser transmit signal is at a different wavelength from the receive signal (1310 nm and 1550 nm)

Any Traffic over Fiber



data communications

The Access Company

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- Single fiber single wavelength interface using SC/APC connector, with a 1310 nm laser diode for single wavelength operation.

The link interface is provided by a selection of SFP transceivers, inserted into SFP sockets on the module panel. RAD offers several types of SFPs with optical/electrical interfaces, for meeting a wide range of operational requirements (see *Table 2* and *Ordering Options*).

It is strongly recommended that this device be ordered with original RAD SFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.

ETHERNET SERVICES

The Ethernet services are provided by means of an internal Layer-2 Ethernet switch that fully complies with the IEEE 802.3/Ethernet V.2 standards, including VLANs.

The external Ethernet port has an 10/100BaseTx interface terminated in a RJ-45 connector.

DIAGNOSTICS

Diagnostic capabilities include local and remote loopback on the optical link and internal DS1 ports: per port and per timeslot.

Performance statistics for the DS1 and Ethernet ports may be obtained and analyzed via the Megaplex management system.

Specifications

Number of Ports

- 16 internal DS1 ports
- One external Ethernet port
- One internal Ethernet port
- Two redundant ports for link

INTERNAL DS1 PORTS

Type, Bit Rate, and Framing Options

- OP-34C: E1, 2.048 Mbps, selectable framing (G.732N, G.732N with CRC-4, G.732S, G.732S with CRC-4), unframed
- OP-25C: T1, 1.544 Mbps, selectable framing (SF, ESF)

Compliance

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

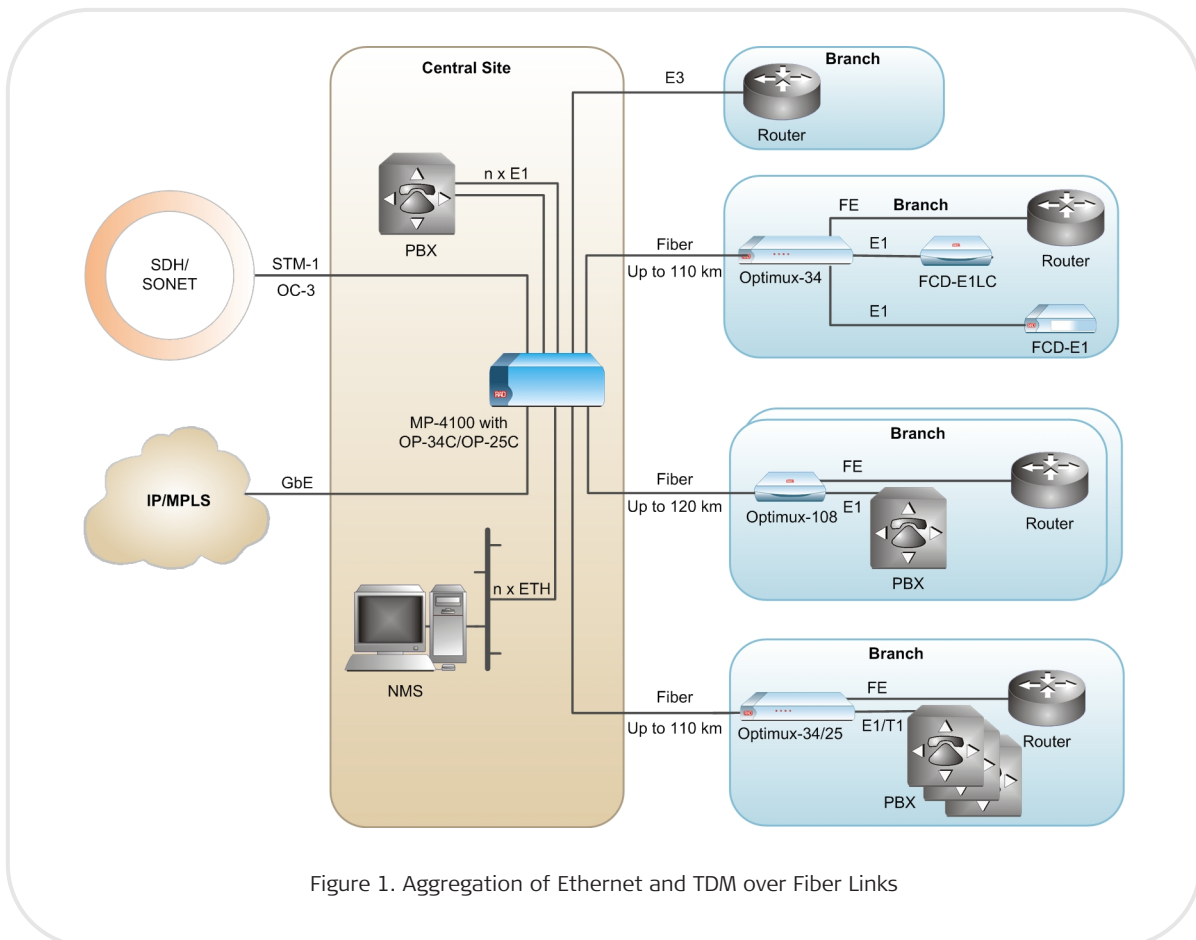


Figure 1. Aggregation of Ethernet and TDM over Fiber Links

Timing

Locked to the MP-4100 nodal clock

Jitter Performance

Per ITU-T Rec. G.823

Diagnostics

Local and remote loopbacks on each

OP-34C, OP-25C DS1 port

Local and remote loopbacks per timeslot

Support for local and remote loopbacks on

Optimux-34/25 E1/T1 and V.35 ports

LINK INTERFACES**(MAIN AND BACKUP)****Data Rate**

OP-34C: E3 (34.368 Mbps)

OP-25C: RAD proprietary (25.910 Mbps)

Interface Options

See *Table 2*

Connectors

SFP interfaces with LC connectors or SC/APC for single wavelength single fiber

OP A/B AIS

On (yellow): AIS detected

Off: Normal operation

(OP A/B LOSS and AIS are on if no SFP is inserted.)

Compliance

OP-34C: ITU G.703, G.742, G.751, G.823, G.955, IEEE 802.3

OP-25C: ITU G.703, G.824, G.955, IEEE 802.3

Indicators

OP A/B LOSS

On (red): Sync/Signal Loss on OP A/B

Off: Normal operation

Diagnostics

Local and remote loopbacks on the optical link

Local and remote loopbacks on internal DS1 ports

Local and remote loopbacks per timeslot on internal DS1 ports

Remote loopbacks on the standalone Optimux-34/25 link

Local and remote loopbacks on the standalone Optimux-34/25 E1/T1 ports

ETHERNET INTERFACE**Type**

10/100BaseT

Connector

Shielded RJ-45

Indicators

LINK/ACT

On (yellow): link is up

Off: link is down

Flashes: frames are transmitted

100

On (green): 100 Mbps mode

Off: 10 Mbps mode

GENERAL**Power Consumption**

10.4W max

Environment

Operating temperature: 0°C to 45°C

(32°F to 113°F)

Storage temperature: -20°C to +70°C

(-4°F to +160°F)

Humidity: up to 95%, non-condensing

Ordering**STANDARD CONFIGURATIONS**

MP-4100M-OP-34/ETH/SFP3

MP-4100M-OP-25/ETH/SFP3

SPECIAL CONFIGURATIONS

MP-4100M-OP-34/ETH/+

16-Channel E1, Ethernet over E3 or Fiber Multiplexer Module

MP-4100M-OP-25C/ETH/+

16-Channel T1, Ethernet over Fiber Multiplexer Module

Table 1. Bandwidth Available for Ethernet Traffic

Model	Maximum Number of Active Ports	Bandwidth Available for Ethernet Traffic [Mbps]
OP-34C	16 E1	No bandwidth available
	12 E1	8
	8 E1	16
	4 E1	24
	No port	32
OP-25C	16 T1	No bandwidth available
	12 T1	6
	8 T1	12
	4 T1	18
	No port	25

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Legend

+ SFP link interface:

SFP-12	Electrical coax, SMB (OP-34C only)
SFP1	LED, 1310 nm, multimode, LC
SFP2	Laser, 1310 nm, single mode, LC
SFP3	Long-haul laser, 1310 nm, single mode, LC
SFP4	Long-haul laser, 1550 nm, single mode, LC

SFP10a	Laser WDM, Tx – 1550 nm, Rx – 1310 nm, single mode, single fiber, LC (SF1)
SFP10b	Laser WDM, Tx – 1310 nm, Rx – 1550 nm, single mode, single fiber, LC (SF2)
2XSFP12	Dual SFP-12 modules
2XSFP1	Dual SFP-1 modules
2XSFP2	Dual SFP-2 modules
2XSFP3	Dual SFP-3 modules
2XSFP4	Dual SFP-4 modules
2XSFP10a	Dual SFP-10a modules
2XSFP10b	Dual SFP-10b modules

Notes:

- For additional SFPs, contact your RAD Partner.
- For single fiber applications, a device with SF1 (SFP-10A) interface is always used opposite a device with SF2 (SFP-10B) interface, and vice versa. An SF3 interface works only opposite another SF3 interface.
- It is strongly recommended to order OP-34C, OP-25C with original RAD SFPs installed. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for OP-34C, OP-25C units using non-RAD SFPs.

SUPPLIED ACCESSORIES

CBL-SMB-BNC/M

SMB to BNC adapter cable for OP-34C
(supplied with SFP-12)

Table 2. Link Interface Options

Module Name (Ordering Option)	Transmitter Type and Wavelength [nm]	Connector Type	Fiber Type	Typical Output Power [dBm]	Receiver Sensitivity [dBm]	Typical Range [km] [miles]	
SFP-12 (OP-34C only)	–	SMB	Coax cable	–	–	(Per ITU-T G.703 standard)	
SFP-1	LED, 1310	LC	62.5/125 Multimode	-18	-31	6.5	4.0
SFP-2	Laser, 1310	LC	9/125 Single mode	-12	-31	38	23.6
SFP-3	Long-haul laser, 1310	LC	9/125 Single mode	-2	-34	70	43.4
SFP-4	Long-haul laser, 1550	LC	9/125 Single mode	-2	-34	110	68.3
SFP-10a	Laser WDM, Transmit: 1310, Receive: 1550	LC	9/125 Single mode (single fiber)	-12	-30	40	24.8
SFP-10b	Laser WDM, Transmit: 1550, Receive: 1310	LC	9/125 Single mode (single fiber)	-12	-30	40	24.8

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

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