

# FOMi-E3, FOMi-T3

E3 and T3 Manageable Fiber Optic Modems



Transparently transmit E3 and T3 signals over multimode and single-mode fiber optic cables

- Extend the range of E3 or T3 services over fiber optic cables up to 110 km (68 miles)
- Fiber optic redundancy for better service availability
- Transparent to E3 and T3 framing
- Operate opposite RAD's Optimux-34 and Optimux-45 multiplexers (data only)

FOMi-E3 and FOMi-T3 are intelligent fiber optic modems designed for the transparent transmission of E3 or T3 signals over multimode and single-mode fiber optic cables.

The modems operate with a wide range of optical interfaces at various wavelengths over single-mode and multimode cables as well as a variety of physical connectors (ST, FC/PC, SC, and SC/APC), detailed in *Table 1*.

The modems with E3 or T3 electrical interfaces are available with a station clock module that allows them to be synchronized with a central system clock. The station clock E1 and T1 inputs are 2.048 Mbps and 1.544 Mbps, respectively.

FOMi-E3 and FOMi-T3 operation complies with ITU-T G.703, G.921 and G.955 requirements.

Two models are available:

- FOMi-E3 with E3 interface, 34.368 Mbps internal clock, and HDB3 coding
- FOMi-T3 with T3 interface, 44.736 Mbps internal clock, and B3ZS coding.

A dual fiber optic interface allows full redundancy on the fiber optic transmission. A switchover mechanism activates immediately when signal loss on one of the dual optical links is detected.



data communications

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## FOMi-E3, FOMi-T3

### E3 and T3 Manageable Fiber Optic Modems

FOMi-E3 operates opposite RAD's Optimux-34 which multiplexes up to 16 E1 channels or a combination of E1 and Ethernet ports into a single fiber optic link.

FOMi-T3 operates opposite RAD's Optimux-45, which integrates up to 28 T1, 21 E1, or any combination of T1 and E1 channels, over a single 45 Mbps data stream.

Remote FOMi-E3, FOMi-T3 modems are managed using a proprietary inband channel over the fiber link. The operation of the management channel does not interfere with data transmission.

A dry contact alarm relay for activating external alert devices in case of major or minor alarms is available on the rear panel of the modem.

Redundant power supplies are optionally available.

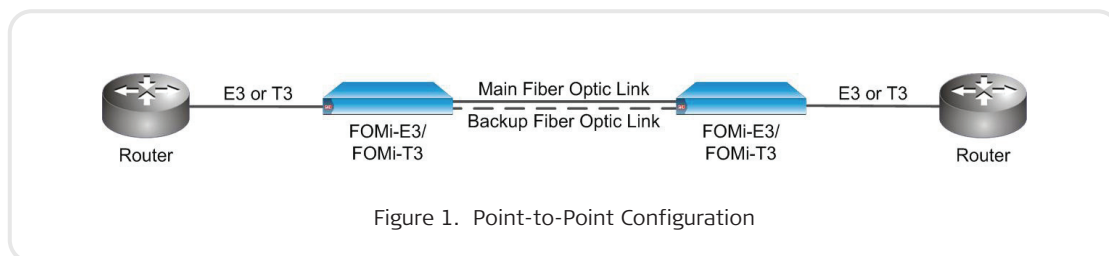


Figure 1. Point-to-Point Configuration

Table 1. FOMi-E3, FOMi-T3 Fiber Optic Interface Characteristics

| Wavelength<br>[nm] | Fiber Type<br>[μm] | Transmitter Type  | Output Power<br>[dBm] | Receiver Sensitivity<br>[dBm] | Connector  | Typical Max. Range |         |
|--------------------|--------------------|-------------------|-----------------------|-------------------------------|------------|--------------------|---------|
|                    |                    |                   |                       |                               |            | [km]               | [miles] |
| 850                | 62.5/125 multimode | VCSEL             | -12                   | -26                           | ST         | 2.5                | 1.5     |
| 1310               | 62.5/125 multimode | LED               | -14                   | -31                           | ST, SC     | 5.5                | 3.4     |
| 1310               | 9/125 single mode  | Laser             | -8                    | -31                           | ST, SC, FC | 38.0               | 23.6    |
| 1310               | 9/125 single mode  | Laser (long haul) | 0                     | -34                           | ST, SC, FC | 65.0               | 40.3    |
| 1550               | 9/125 single mode  | Laser             | -8                    | -31                           | ST, FC     | 25.0               | 15.5    |
| 1550               | 9/125 single mode  | Laser (long haul) | 0                     | -34                           | ST, SC, FC | 110.0              | 68.0    |
| Tx/Rx 1310/1550    | 9/125 single mode  | Laser (WDM), SF1  | -8                    | -29                           | SC         | 40.0               | 25.0    |
| Tx/Rx 1550/1310    | 9/125 single mode  | Laser (WDM), SF2  | -8                    | -29                           | SC         | 40.0               | 25.0    |
| Tx/Rx 1310/1310    | 9/125 single mode  | Laser, SF3        | -8                    | -27                           | SC/APC     | 20.0               | 12.5    |

## Specifications

### ELECTRICAL INTERFACE

#### Data Rate

E3: 34.368 Mbps

T3: 44.736 Mbps

#### Line Code

E3: HDB3

T3: B3ZS

#### Impedance

75Ω, unbalanced

#### Range

According to ITU-T Rec. G.703

#### Connectors

Two shielded BNC connectors  
(unbalanced)

### FIBER OPTIC INTERFACE

#### Data Rate

E3: 34.368 Mbps

T3: 44.736 Mbps

#### Compliance

ITU-T Rec. G.955

#### Line Code

CDP

#### Specifications and Ranges

See *Table 1*

#### Redundancy

Additional link is optional

### STATION CLOCK

#### Input Data Rate

E1: 2.048 Mbps

T1: 1.544 Mbps

#### Line Code

AMI or Square

#### Impedance

75Ω, unbalanced

#### Connectors

Two shielded BNC, female

### MANAGEMENT

#### Control Port

Interface: V.24 (RS-232) DTE

Data Rates: 9.6, 19.2, 38.4, 57.6,  
115.2 kbps

Connector: D-type, 9-pin, female

#### Alarm Relay Port

Dry contact via 9-pin, D-type, female  
connector

Operates as Normally Open and Normally  
Closed, using different pins

### INDICATORS

PWR (dual color LED) –

Green: Power operating correctly

Red: Power fault

ELECTRICAL LOS (red) –

On: E3/T3 electrical signal not detected

ELECTRICAL AIS (red) –

On: AIS detected on the electrical link

OPTICAL LOW (red) –

On: signal loss detected in fiber optic line

OPTICAL AIS (yellow) –

On: AIS detected on fiber optic link

ERR (red) –

On: General error

TST (red) –

On: A test is active

### DIAGNOSTICS

#### Loopbacks

Local analog (LLB)

Remote digital (RLB)

Local digital loopback (DIG)

Dual LLB+DIG (DLB)

#### Statistics collection

BPV (electrical), LCE (fiber optic)

PSES (electrical and fiber optic)

UAS (electrical and fiber optic)

### GENERAL

#### Power

One or two power supplies with  
redundancy

AC: 100 VAC to 240 VAC, 50/60 Hz

-48 VDC: -36 VDC to -72 VDC

24 VDC: 24 VDC ± 10%

Power consumption: 15W max.

#### Physical

Height: 4.4 cm (1.7 in)

Width: 42.7 cm (17.0 in)

Depth: 25.8 cm (10.1 in)

Weight: 2.5 kg (5.5 lb), full configuration

# FOMi-E3, FOMi-T3

## E3 and T3 Manageable Fiber Optic Modems

### Ordering

#### FOMi-E3\*/#&/\$/^

E3 manageable fiber optic standalone modem

#### FOMi-T3\*/#&/\$/^

T3 manageable fiber optic standalone modem

#### Legend

\* Power supply:

- AC 110-230 VAC
- ACR Redundant 110-230 VAC
- 24 24 VDC
- 24R Redundant 24 VDC
- 48 -48 VDC
- 48R Redundant -48 VDC
- AD 110-230 VAC and redundant -48 VDC

# Fiber optic connector:

- ST ST
- SC SC
- FC FC/PC

*Note: For SF1, SF2, and SF3 interfaces, only the SC connector is available. When SF3 interface is ordered, SC/APC connectors are supplied instead of SC.*

& Optical wavelength

- 85 850 nm, multimode, VCSEL
- 13MM 1310 nm, multimode, LED
- 13L 1310 nm, single mode, laser diode
- 13LH 1310 nm, single mode, long-haul laser diode
- 15L 1550 nm, single mode, laser diode
- 15LH 1550 nm, single mode, long-haul laser diode

- SF1 1310 nm transmit and 1550 m receive (over single fiber)
- SF2 1550 nm transmit and 1310 nm receive (over single fiber)
- SF3 1310 nm transmit and 1310 nm receive (over single fiber)


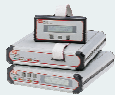



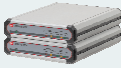

*Note: For single fiber connection (WDM), one of the devices must be ordered with an SF1 interface and the other with an SF2 interface.*

\$ R Redundant fiber optic link (see # and &, above, for options)

^ Station clock

STC Station clock

Table 2. Fiber Optic Modem Comparison Chart

| Feature               | FOM-E1/T1   | FOMi-E1/T1  | FOM-20  | FOM-40  | FOMi-40  | FOM-E3/T3   | FOMi-E3/T3  |
|-----------------------|---|---|---|---|--|---|---|
|                       |  |  |  |  |  |  |  |
| Data rates            | E1: 2.048 Mbps<br>T1: 1.544 Mbps  | E1: 2.048 Mbps<br>T1: 1.544 Mbps  | 19.2-256 kbps   | 56-2048 kbps  | 56-2048 kbps   | E3: 34.368 Mbps<br>T3: 44.736 Mbps  | E3: 34.368 Mbps<br>T3: 44.736 Mbps  |
| DTE Interfaces        | E1/T1   | E1/T1   | Serial, Ethernet  | Serial, Ethernet  | Serial, Ethernet, E1/T1  | E3/T3   | E3/T3   |
| Card version for rack | ASM-MN-214  | -   | ASM-MN-214  | ASM-MN-214  | -  | -   | -   |

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