

FOMi-40

Fiber Optic Modem with Remote Management



Provides a secure and long-range data link of up to 100 km (62 mi)

- Selectable data rates from 56 to 2048 kbps
- Multimode or single mode operation
- Extended transmission range up to 100 km (62 mi) with 1550 nm laser diode option
- Full local and remote management from the front panel
- Single- or double-modem card version for the LRS-24, a 19-inch modem rack with SNMP management

FOMi-40 is a fiber optic modem that provides a secure and long-range (up to 100 km/62 mi) data link between computers, routers, multiplexers, or other data communication devices. It operates at 14 selectable synchronous data rates from 56 kbps to 2048 kbps.

FOMi-40 converts electrical signals from a DTE into optical signals via an infrared light emitting diode or a laser diode. At the opposite end of the fiber, the optical signals are converted back into electrical signals in compliance with the appropriate interface.



data communications

The Access Company

FOMi-40

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Master and slave versions of FOMi-40 are available. The master standalone version features a front panel LCD. The slave unit has a blank front panel with a 20-pin connector that connects to a Portable Control Unit (PCU). The PCU is used to monitor and change parameters of the slave or master modem and monitor system alarms.

The modem uses an inband management channel for controlling and monitoring the remote unit. Data and management are simultaneously transmitted over the same fiber link, without interference.

Menu-driven software, accessed from the front panel, allows the user to monitor and control the following parameters on local and remote modems:

- Data rate (when set to internal or receive mode)
- Clock source
- Loop activation
- Internal BER tester activation
- LED status of local and remote units
- Local and remote unit settings
- Real-time alert of fault conditions.

FOMi-40 supports the following three timing modes:

- Internal, from a built-in oscillator
- External, from the attached DTE
- Receive, from the signal received over the line.

In the external mode setting, FOMi-40 automatically detects the clock rate coming from the digital interface and sets the remote unit to work at the same rate. When the data rate of the external clock changes, both local and remote units automatically synchronize to the new rate.

FOMi-40 utilizes a phase locked loop (PLL) circuit to recover jitter-free data and clocking from the optical signal.

FOMi-40 is designed to operate with several grades and sizes of fiber optic cable and offers the following optical interfaces:

- 850 nm LED/VCSEL for multimode fibers
- 1310 nm laser for single-mode fibers
- 1550 nm laser for single-mode fibers.

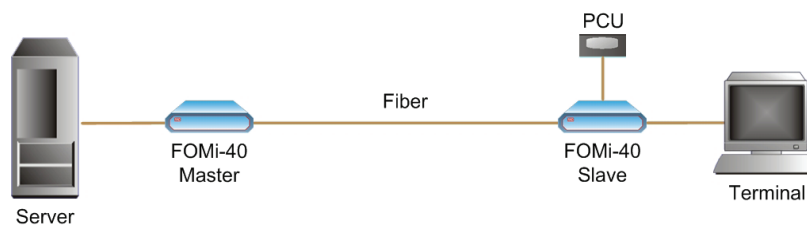


Figure 1. Point-to-Point Application

Immunity is provided against electrical interference such as EMI, RFI, spikes and differential ground loops. Protection is provided against sparking and lightning, and a secure link is maintained in hazardous or hostile environments.

Diagnostics include V.54 local analog, remote digital loop tests, and an internal V.52 BER tester.

The loops can be activated from the front panel, the PCU, the central SNMP management, or the digital interfaces that support loop activation signals. An internal BER tester that complies with V.52/511 pattern is also available.

FOMi-40's field-changeable interface includes an optional built-in Ethernet bridge interface. This option can be used for LAN-to-LAN connectivity over the fiber link, using only a pair of FOMi-40 units.

The FOMi-40 system configuration is stored in non-volatile memory to minimize system downtime when power is lost or when a faulty unit is replaced.

The inband management channel provides real-time alerts for:

- Disconnection of the digital data transmission
- Disconnection of the management channel
- Remote modem failure
- Loop activation.

The front panel LCD provides real-time indication of system status on both the local and the remote modem.

The card versions FOMi-40C (single modem) and FOMi-40CD (double modem) are available for installation in LRS-24, a 19-inch modem rack with SNMP management that accommodates up to 24 modems. These card versions can be managed in an LRS-24 hub from an ASCII terminal or by RADview, RAD's SNMP management application that runs on PC or HPOV UNIX platforms.

FOMi-40 supports a variety of digital interfaces, including V.24/RS-232 (64 bps), V.35, X.21, RS-530, V.36/RS-449, G.703 Codirectional (64 kbps), G.703 E1, G.703 T1, and 10/100BaseT bridge supporting IEEE 802.3x flow control and backpressure.

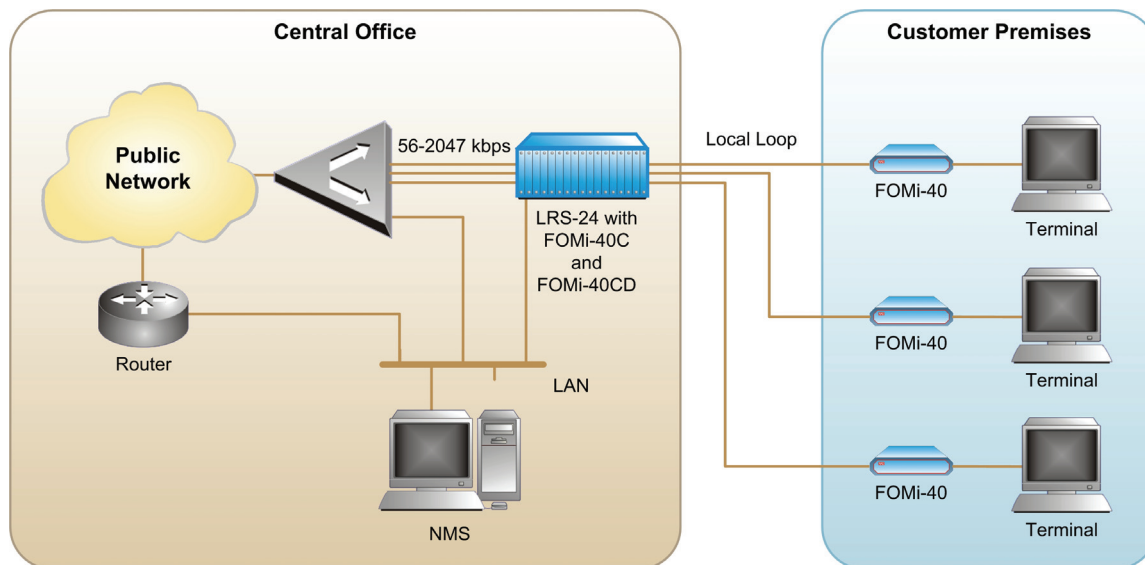


Figure 2. Central Site Application with SNMP Management

SPECIFICATIONS

ELECTRICAL INTERFACE

Transmission Rates

56, 64, 96, 112, 128, 192, 256, 384, 512, 768, 1024, 1536, 1544 and 2048 kbps

Interfaces and Connectors

V.24/RS-232: 25-pin D-type, female

V.35: 34-pin D-type, female

X.21: 15-pin D-type, female

RS-530: 25-pin D-type, female

V.36/RS-449: 37-pin D-type, male using an adapter cable

IR-ETH/QN (Ethernet/Fast Ethernet bridge): RJ-45

G.703 Codirectional (64 kbps): terminal block or RJ-45

G.703 E1: RJ-45 and two BNC

G.703 T1: RJ-45

Note: End-to-end byte synchronization is not maintained for the G.703 interface.

OPTICAL INTERFACE

Transmission Line

Dual-strand fiber optic cable

Interface Characteristics

See *Table 1*

Connectors

SC, ST, or FC/PC (see *Ordering*)

GENERAL

Timing Elements

Receive clock derived from the receive signal

Transmit clock derived from:

- Internal signal, from a built-in oscillator
- External signal, from the attached DTE
- Receive signal, looped back from the received signal

Diagnostics

Remote Digital Loopback (RLB):

Activated from the front panel or by DTE interface signals (V.35, RS-530 or V.24/RS-232)

Local Analog Loopback (LLB):

Activated from the front panel or by DTE interface signals (excluding X.21 and G.703)

BER Test (BERT):

Activated from the front panel to generate and detect a pseudo-random BERT V.52/511 data pattern

Table 1. Fiber Optic Modem Comparison Chart

Feature	FOM-E1/T1	FOMi-E1/T1	FOM-20	FOM-40	FOMi-40	FOM-E3/T3	FOMi-E3/T3	FOM-E3/T3 ETH
Max. Data Rate [kbps]	E1/T1	E1/T1	19.2–256	56–2048	56–2048	E3/T3	E3/T3	E3/T3
Interfaces	G.703	G.703	Serial, Ethernet	Serial, Ethernet	Serial, Ethernet, E1/T1	G.703	G.703, HSSI	10/100BaseT VLAN Bridge
Laser Diode Option	✓	✓	✓	✓	✓	✓	✓	✓
SNMP Management		✓			✓		✓	
Card Version for Rack	ASM-MN-214	LRS	ASM-MN-214	ASM-MN-214	LRS		LRS	

FOMi-40

Fiber Optic Modem with Remote Management

Indicators

- PWR (green) – On when power is on
- RTS (yellow) – On when DTE activates Request To Send
- TD (yellow) – On when steady SPACE is transmitted;
Blinks when data is transmitted
- RD (yellow) – On when steady SPACE is received;
Blinks when data is received;
Not active when the RLB is active
- DCD (yellow) – On when a valid received line signal is present
- TEST (red) – On when in two loopback modes and/or when BERT is activated
- ERR (red) – On when alarm is initiated;
Blinks when an error is detected in BER tests

Power Supply

AC: 115 or 230 VAC ($\pm 10\%$), 47–63 Hz
DC: -48 VDC ($\pm 10\%$) or 24 VDC ($\pm 10\%$)

Power Consumption

- FOMi-40 AC model – 5 VA
- FOMi-40 DC model – 3.5W
- FOMi-40C single-modem card – 2.9W
- FOMi-40CD double-modem card – 5.6W (both modems with IR-ETH/QN)

Physical

- FOMi-40 standalone
Height: 4.4 cm (1.7 in)
Width: 24.0 cm (9.6 in)
Depth: 19.3 cm (7.6 in)
Weight: 1.4 kg (3.1 lb)
- PCU (Portable Control Unit)
Height: 2.5 cm (0.98 in)
Width: 13.0 cm (5.12 in)
Depth: 6.5 cm (2.56 in)
Weight: 220 g (0.49 lb)
- Card
Fits in a single slot of the LRS-24 chassis
- Environment**
Temperature: 0° to 50° C (32° to 122° F)
Humidity: up to 90%, non-condensing

Table 2. FOMi-40 Fiber Optic Interface Characteristics

Wavelength [nm]	Fiber Type [μm]	Transmitter Type	Typical Output Power [dBm]	Receiver Sensitivity [dBm]	Typical Max. Range	
					[km]	[mi]
850	62.5/125 multimode	LED/VCSEL	-18	-38	4.8	3.0
1310	9/125 single mode	Laser	-12	-40	50	31
1550	9/125 single mode	Laser	-12	-40	100	62

FOMi-40

Fiber Optic Modem with Remote Management

Ordering

FOMi40/~/*/#/^

Fiber optic modem, standalone unit

FOMi40CB/#/^

Single fiber optic modem, back card version for ANSI LRS-24 modem rack

FOMi40CF/#/^

Single fiber optic modem, front card version for ETSI LRS-24 modem rack

FOMi40CDB/#/^

Double fiber optic modem, back card version for ANSI LRS-24 modem rack

FOMi40CDF/#/^

Double fiber optic modem, front card version for ETSI LRS-24 modem rack

Legend

~	Standalone unit power supply
115	115 VAC
230	230 VAC
48	-48 VDC
24	24 VDC
*	Standalone unit type:
M	Master unit
S	Slave unit
#	Optical interface
SC85	850 nm multimode, SC
ST85	850 nm multimode, ST
FC85	850 nm multimode, FC/PC
SC13L	1310 nm laser diode, SC
ST13L	1310 nm laser diode, ST
FC13L	1310 nm laser diode, FC/PC
SC15L	1550 nm laser diode, SC
ST15L	1550 nm laser diode, ST
FC15L	1550 nm laser diode, FC/PC
^	DTE interface type:
V24	V.24 RS-232
V35	V.35
530	RS-530
X21	X.21
V36	V.36/RS-449
703/%	G.703 Codirectional (64 kbps)
E1	E1 (2048 kbps) (not available in FOMi-40CD)
T1	T1 (1544 kbps) (not available in FOMi-40CD)
UTP/QN	10/100BaseT built-in Ethernet/802.3 bridge
%	G.703 interface connector (standalone unit only):
TB	terminal block
RJ	RJ-45

PCU

Portable control unit with protective casing

SUPPLIED ACCESSORIES

AC power cord

DC adapter plug (when DC power option is ordered)

OPTIONAL ACCESSORIES**RM-9**

Hardware kit for mounting one or two FOMi-40 units in a 19-inch rack

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