

FOM-20

Fiber Optic Modem



Provides a secure and long-range data link of up to 140 km (87 miles)

- Selectable data rates from 19.2 to 256 kbps
- Multimode or single mode operation
- Extended transmission range of up to 140 km (87 miles) with 1550 nm laser diode option
- V.54 diagnostic loopbacks and built-in V.52 BERT
- Single modem card version for RAD's ASM-MN-214 modem rack

The FOM-20 fiber optic modem provides a secure, long-range data link between computers, routers, multiplexers, and other data communication devices. It operates at 16 selectable synchronous or asynchronous data rates from 19.2 kbps to 256 kbps.

The built-in Ethernet bridge enables cost-effective LAN-to-LAN connectivity without the need for an external bridge.

FOM-20 converts electrical signals from DTE equipment into optical signals using an infrared light emitting diode (LED) or laser diode.

The following DTE interfaces are available:

- V.24/RS-232
- V.35
- X.21
- RS-530
- V.36 (RS-449)
- Built-in Ethernet bridge
- G.703 codirectional (64 kbps).



FOM-20

Fiber Optic Modem

FOM-20 operates with several grades and sizes of fiber optic cable, and can be ordered with the following interfaces:

- 850 nm LED/VCSEL for multimode fibers
- 1300 nm laser for single-mode fibers
- 1550 nm laser for single-mode fibers.

FOM-20 provides immunity against electrical interference, such as EMI, RFI, spikes, and differential ground loops. Sparking and lightning protection is provided and a secure link is maintained in hazardous or hostile environments.

Three clocking modes provide maximum flexibility: internal clock, receive loopback clock, and external DTE clock.

A phase locked loop (PLL) circuit recovers jitter-free data and clocking from the incoming optical signal.

V.54 diagnostics include local analog and digital loopbacks, and remote digital loopback. The loopback commands are controlled either by a manual switch, or through DTE interface signals. For testing end-to-end connectivity, BER tests generate an internal pseudo-random test pattern (511 bits) according to the ITU V.52 standard. The ERR LED flashes whenever a bit error is detected.

FOM-20 is available as a standalone unit (1U, 1.75 inches high) or as a card for installation in RAD's ASM-MN-214 rack.

An optional mounting kit (RM-9) is available for mounting one or two standalone units side-by-side in a 19-inch rack.

Specifications

ELECTRICAL

Transmission Rates

Asynchronous:

19.2, 28.8, 38.4, 57.6, 115.2 kbps

Synchronous:

19.2, 32, 48, 56, 64, 72, 112,
128, 144, 192, 256 kbps

Interfaces and Connectors

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

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

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

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

V.36/RS449, 37-pin D-type, male

(via cable adaptor)

Built-in (10/100BaseT) Ethernet bridge,

RJ-45

G.703 codirectional (64 kbps),

terminal block or RJ-45

Note: For G.703 codirectional interfaces, end-to-end byte synchronization is not maintained.

Table 1. FOM-20 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	-48	7.7	4.8
1310	9/125 single mode	Laser	-12	-50	70	43.7
1550	9/125 single mode	Laser	-12	-50	140	87

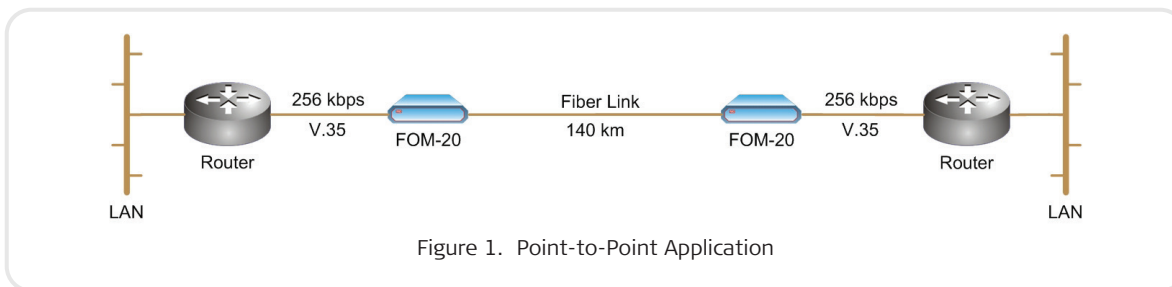


Figure 1. Point-to-Point Application

OPTICAL

Operating Wavelength

850 nm multimode fiber, LED/VCSEL
 1300 nm single mode fiber, laser diode
 1550 nm single mode fiber, laser diode

Transmission Line

Dual fiber optic cable

Interface Characteristics

See *Table 1*

Optical connectors

ST, SC, or FC

GENERAL

Diagnostics

Local digital loopback (DIG), activated by a front-panel switch

Local analog loopback (ANA), activated by a front-panel switch or by DTE interface signals (excluding X.21 and G.703 interfaces)

Remote loopback (REM), activated by a front-panel switch or by DTE interface signals (V.35 or RS-530 and V.24/RS-232)

Timing Elements

Receive clock: derived from the receive signal

Transmit clock: derived from three possible sources:

- Internal oscillator (INT)
- External from the DTE (EXT)
- Recovered from the receive signal, looped back as a transmit clock (RCV).

Table 2. Fiber Optic Modem Comparison Chart

Feature	FOM-E1/T1	FOMi-E1/T1	FOM-20	FOM-40	FOMi-40	FOM-E3 FOM-T3	FOMi-E3 FOMi-T3	FOM-E3/ETH FOM-T3/ETH
Data rates [kbps]	E1/T1	E1/T1	19.2-256	56-2048	56-2048	E3 T3	E3 T3	E3 T3
DTE 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	-	✓	-	-	✓	-	✓	-

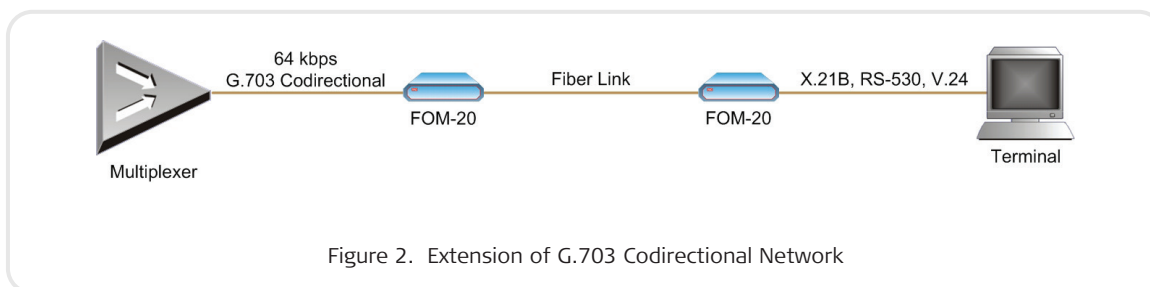


Figure 2. Extension of G.703 Codirectional Network

FOM-20

Fiber Optic Modem

Indicators

PWR (green):

On: Unit is powered on

RTS (yellow):

On: DTE activated Request To Send

TD (yellow):

On: Transmitting steady SPACE

Flashing: Transmitting data

RD (yellow):

On: Receiving steady SPACE

Flashing: Receiving data

DCD (yellow):

On: Valid receive signal present

ERR (yellow):

On: Alarm initiated

Flashing: Error detected during BER tests

TEST (red):

On: Loopback mode and/or BERT activated

Power Supply

115 or 230 VAC (±10%), 47-63 Hz, 5 VA
-48 VDC (±20%), 24 VDC

Power Consumption

AC: 5 VA

DC: 4.3W

Physical

FOM-20 Standalone:

Height: 4.4 cm (1.7 in)

Width: 19.3 cm (7.6 in)

Depth: 24.0 cm (9.6 in)

Weight: 1.5 kg (3.3 lb)

FOM-20R Card:

Fits the ASM-MN-214

modem rack

Weight: 0.27 kg (0.6 lb)

Environment

Temperature: 0°-50°C (32°-122°F)

Humidity: Up to 90%, non-condensing

Ordering

FOM-20/~/#/^^

Standalone unit

FOM-20R/#/^^

Card version for ASM-MN-214 modem rack

Legend

~ Power supply:

115 115 VAC

230 230 VAC

48 48 VDC

24 24 VDC

Optical interface:

SC85 850 nm multimode, SC

ST85 850 nm multimode, ST

FC85 850 nm multimode, FC

SC13L 1310 nm laser diode, SC

ST13L 1310 nm laser diode, ST

FC13L 1310 nm laser diode, FC

SC15L 1550 nm laser diode, SC

ST15L 1550 nm laser diode, ST

FC15L 1550 nm laser diode, FC

^ DTE interface:

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)

UTP 10/100BaseT built-in Ethernet bridge

% G.703 interface connector (standalone only):

TB Terminal block

RJ RJ-45

SUPPLIED ACCESSORIES

AC power cord (for standalone units, with AC power supply)

DC connection kit (for standalone units, with DC power supply)

OPTIONAL ACCESSORIES

RM-9

Hardware kit for mounting one or two FOM-20 units in a 19-inch rack

CIA/ε

Connector interface adapter for FOM-40R (card version only) in an ASM-MN-214 rack

Legend

ε Adapter:

V35/1 one 25-pin rack DTE connector to one V.35 34-pin connector

X21/1 one 25-pin rack DTE connector to one X.21 15-pin connector

ETH one 25-pin rack DTE connector to one RJ-45 connector

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data communications

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