

# FOM-20

Fiber Optic Modem



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

- Selectable data rates from 19.2 to 256 kbps
- Multimode or single mode operation
- Extended transmission range up to 140 km (87 mi) 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).



**data communications**

Innovative Access Solutions

# 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 are used for 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	Fiber Type	Transmitter Type	Typical Output Power	Receiver Sensitivity	Typical Max. Range	
[nm]	[μm]		[dBm]	[dBm]	[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

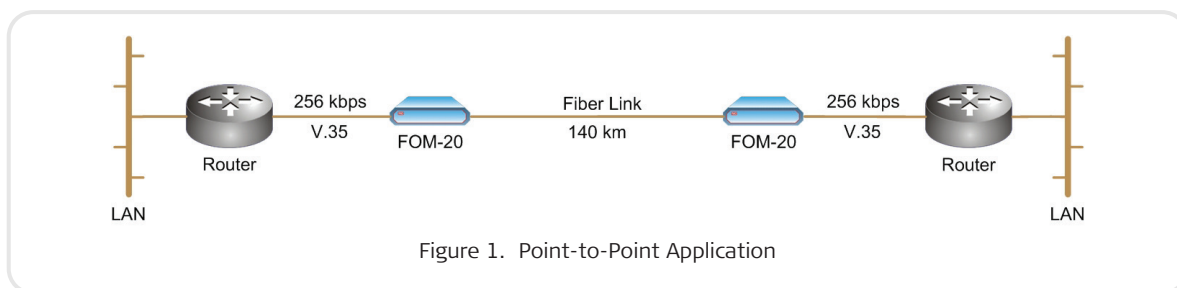


Figure 1. Point-to-Point Application

**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	–	✓	–	–	✓	–	✓	–
Card version for rack	ASM-MN-214	LRS-24	ASM-MN-214	ASM-MN-214	LRS-24	–	LRS-24	–

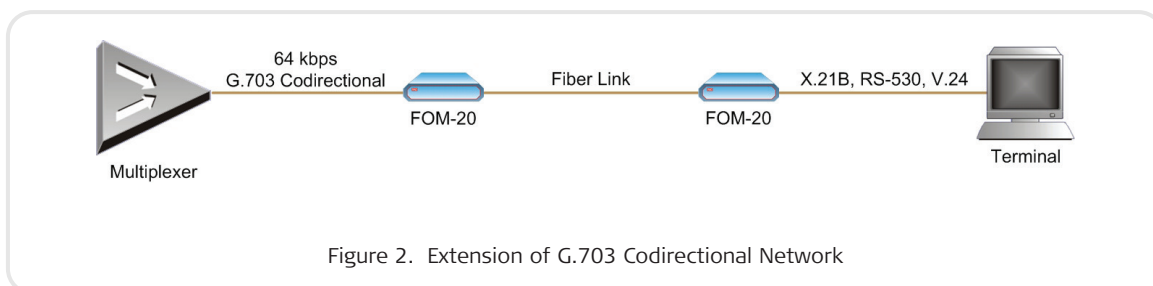


Figure 2. Extension of G.703 Codirectional Network

## 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

Blinks: Transmitting data

RD (yellow):

On: Receiving steady SPACE

Blinks: Receiving data

DCD (yellow):

On: Valid receive signal present

ERR (red):

On: Alarm initiated

Blinks: Error detected in BER tests

TEST (red):

On: Loopback mode and/or

BERT activated

## Power Supply

115 or 230 VAC ( $\pm 10\%$ ), 47–63 Hz, 5 VA–48 VDC ( $\pm 20\%$ )

## Physical

Height: 4.4 cm (1.7 in)

Width: 19.3 cm (7.6 in)

Depth: 24.0 cm (9.6 in)

Weight: 1.4 kg (3.1 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 type:

**115** 115 VAC**230** 230 VAC**48** 48 VDC

# Optical interface type:

**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 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)**UTP** 10/100BaseT built-in  
Ethernet bridge

% G.703 interface connector type:

**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

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