

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).



data communications

The Access Company

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

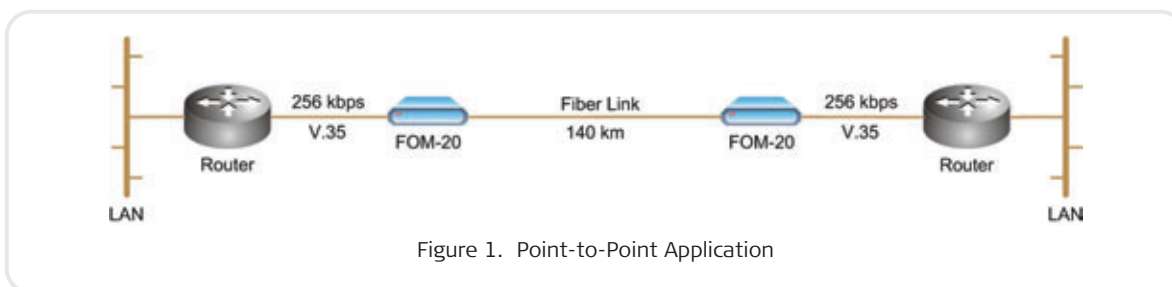


Figure 1. Point-to-Point Application

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	-	✓	-	-	✓	-	✓	-

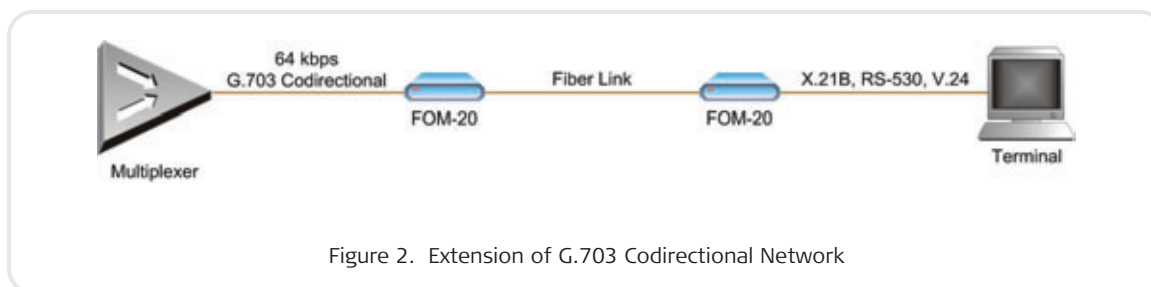


Figure 2. Extension of G.703 Codirectional Network

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 Supply115 or 230 VAC ($\pm 10\%$), 47–63 Hz, 5 VA
–48 VDC ($\pm 20\%$), 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**International Headquarters**24 Raoul Wallenberg Street
Tel Aviv 69719, Israel
Tel. 972-3-6458181
Fax 972-3-6498250, 6474436
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