

ORDERING

FOM-8*/+/#

Synchronous/Asynchronous Short Range Modem

- * Specify 25-pin connector:

F for female

M for male

- + Specify connector:

SMA for SMA connector

ST for ST connector

FC for FC connector

(Default is SMA connector)

- # Specify wavelength:

13 for 1300 nm

(Default is 820 nm)

Specifications are subject to change without prior notice.



data communications

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FOM-8



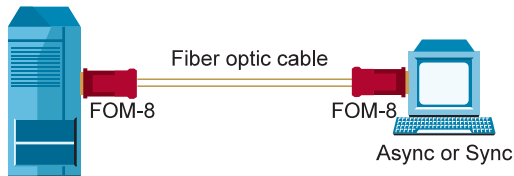
*Miniature
Sync/Async Fiber
Optic Modem*



FEATURES

- Synchronous or Asynchronous transmission
- Data rates up to 19.2 kbps
- V.54 diagnostics, including local and remote tests
- Supports transmission over single mode or multimode fiber
- Full or half duplex
- Plugs directly into the RS-232/V.24 connector
- Internal, external, or receive clock
- Ruggedized metal enclosure
- No AC power required
- Miniature, lightweight, easy to install
- Card version for 19" modem rack

APPLICATION



DESCRIPTION

- The FOM-8, Synchronous/Asynchronous Short Range Modem, is used for local data distribution, connecting full or half duplex Sync or Async DTEs to other DTEs, over fiber optic cable. FOM-8 operates at data rates up to 19.2 kbps.
- FOM-8 performs diagnostic loops in compliance with ITU V.54 standard. Two V.54 loops are available: analog loop (V.54 Loop 3) and remote digital loop (V.54 Loop 2). The loops are activated by DTE interface signals Circuit 141 (Pin 18) and Circuit 140 (Pin 21).
- Asynchronous transmission is provided by internal conversion from Async to Sync in compliance with ITU V.22 bis standard. Different Async formats are switch selectable.
- In the Synchronous mode, transmit timing is provided by three alternative sources:
 - Internal oscillator
 - External clock
 - Loopback clock derived from the receive signal.
- The modem's carrier can be strapped for either continuous operation, or for switched operation. In switched operation, the carrier is controlled by the RTS signal, and enables transfer of a control signal end-to-end.

- FOM-8 is designed to operate with several grades and sizes of fiber optic cable. Two different optical interfaces are available:
 - 820 nm for use with multimode fibers
 - 1300 nm for use with single mode fibers.
- FOM-8 incorporates all the advantages of a fiber optic system:
 - Lower attenuation than with copper wires; additionally, attenuation is not related to frequency.
 - EMI/RFI immunity, which saves the cost of expensive and heavy shielding and complex error checking devices.
 - Security is almost absolute. The cost of data encryption is reduced. Eavesdropping is virtually useless, as the fibers generate negligible power.
 - Safety and electrical isolation - no spark hazard or ground-loop noise problems.
- Innovative circuitry design allows operation without a power supply, by using ultra-low power from the standard RS-232/V.24 data and control signals. For proper operation, both data and at least one control signal must be connected. i.e. Transmit Data, Receive Data, Signal Ground, and either RTS or DTR.
- FOM-8 is compatible with the CMN-CF8 card of the 19" CMN-16 modem rack.

SPECIFICATIONS

- **Data Rates (Sync or Async)**
1.2, 2.4, 3.6, 4.8, 7.2, 9.6, 14.4, 19.2 kbps
Selectable by a rotary switch
- **Number of Data Bits (Async Mode)**
8, 9, 10, or 11 including 1 start and 1 stop bit, with or without parity
- **RTS/CTS Delay**
0, 8, or 64 msec
- **Frequency Allowance (Async Mode)**
Shortening of stop bit on receive end is selectable:
 - 12.5% allows frequency difference between the async terminal and FOM-8 of -2.5% to +1.0%
 - 25% allows frequency difference of -2.5% to +2.3%
- **Transmission Line**
Dual optical cable
- **Transmission Mode**
Sync or async, full or half duplex

- **Transmission Controls**
DCD (Circuit 109) turns ON after recognizing receive signal from the line.
CTS (Circuit 106) turns ON 0, 8, or 64 msec (selectable) after the terminal raises RTS (Circuit 105).
DSR (Circuit 107) is ON when the modem is powered.
Test Mode (Circuit 142) turns ON when the modem is in one of its diagnostic loops.
- **Optical Output Levels**
 - 30 dBm into 100/140 fiber
 - 32 dBm into 62.5/125 fiber
 - 36 dBm into 50/125 fiber
 - 31 dBm into 9/125 fiber
- **Receiver Sensitivity**
 - 45 dBm for 820 nm
 - 47 dBm for 1300 nm
- **Operating Wavelength**
 - Multimode: 820 nm
 - Singlemode: 1300 nm

- **DTE Interface**
EIA RS-232/ITU V.24 integral 25-pin connector, male or female option
- **Optical Interface**
SMA, ST or FC connector (see *Ordering*)
- **Power**
None required; uses ultra-low power from the RS-232/V.24 data and control signals. To ensure proper operation, the equipment connected to FOM-8 should provide at least one of the following signals:
RTS (Circuit 105) or DTR (Circuit 108.2).
The typical power consumption drawn from the DTE is 75 mW (at +6V signal level).
- **Physical**
 - Height: 23 mm / 0.9 in
 - Width: 53 mm / 2.1 in
 - Depth: 110 mm / 4.3 in
 - Weight: 140g / 4.9 oz
- **Environment**
 - Temperature: 0-50°C / 32-122°F
 - Humidity: Up to 90%, non-condensing

Declaration of Conformity

Mfr. Name: RAD Data Communications Ltd.
Mfr. Address: 12 Hanechoshet St.
Tel Aviv 69710
Israel

declares that the product:

Product Name: FOM-8

Conforms to the following standard(s) or other normative document(s):

EMC: EN 55022 (1987): Limits and methods of measurement of radio disturbance characteristics of information technology equipment.
EN 50082-1 (1992):
Electromagnetic compatibility -
Generic immunity standards for residential, commercial and light industry.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC.
The product was tested in a typical configuration.

Tel Aviv, December 28th 1995

Haim Karshen
Quality Manager

European Contact: RAD Data Communications
GmbH, Lyoner Strasse 14, 60528 Frankfurt am
Main, Germany

INSTALLATION

Caution. This is a delicate instrument. Be careful when setting jumpers or performing any actions within the product so that you do not break or shake any components.

Installation of FOM-8 is simple and straightforward. Follow these steps:

1. Separate the two halves of the case by opening the four screws which are located on the bottom cover.
2. Strap the modem according to mode (see *Tables 1 and 2 and Figure 1*):

Sync Mode

The dip switch positions of S1, S2 and S3 have no effect in sync mode.

Async Mode

Set the Clock/Mode switch to Async .
Set switches S1, S2, S3, and S4 according to the application requirements.

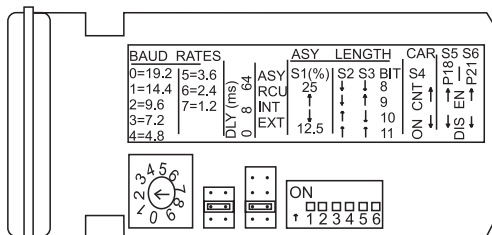


Figure 1. Strapping Diagram

3. Close the unit by pressing the two halves of the cover together. Fasten the four screws.
4. Plug the modem directly into the 25-pin connector of the DTE or computer port. Fasten the screws on each side of the modem connector.
5. Remove the plastic dust caps from the fiber optic connectors and connect the cable to the unit. Observe the following:
 - Connect TX on local FOM-8 to RX on remote FOM-8
 - Connect RX on local FOM-8 to TX on remote FOM-8.

FOM-8 is now ready for operation.

OPERATION

• Normal Operation

Make sure the loopback is not activated (Pins 18 and 21 should not be connected or have negative voltages).

• Test Mode

FOM-8 performs two of the V.54 test loops. *Figure 2* illustrates analog loop (ANA) (V.54 Loop 3) and *Figure 3* shows remote digital loop (REM) (V.54 Loop 2). Both loops are controlled by DTE interface Pin 18 (ANA) and Pin 21 (REM). When the modem performs one of its diagnostic loops, Pin 25 (Circuit 142) is set ON.

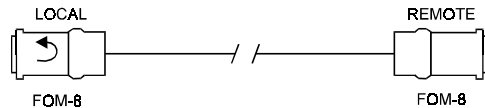


Figure 2. Analog Loop

This loop tests the local modem only. The XMT signal to the line is returned to the receiver.

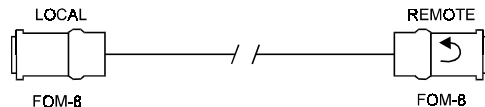


Figure 3. Remote Digital Loop

This loop tests the local modem, the line and the remote modem.

Table 1. Strap Selection

Strap Identity	Function	Possible Settings	Factory Setting															
Baud Rates	Selects data transmit rate (kbps)	0 - 19.2 1 - 14.4 2 - 9.6 3 - 7.2 4 - 4.8 5 - 3.6 6 - 2.4 7 - 1.2	9.6															
RTS-CTS Delay	Selects RTS-CTS delay (msec)	0, 8 or 64	8															
Clock/ Mode	Selects timing clock (in sync mode) or async mode	ASYNC RECEIVE INTERNAL EXTERNAL	INTERNAL															
Async Format	Selects character length in async mode (see Table 2)	<table><tr><td>S2</td><td>S3</td><td>No bits</td></tr><tr><td>OFF</td><td>OFF</td><td>8</td></tr><tr><td>OFF</td><td>ON</td><td>9</td></tr><tr><td>ON</td><td>OFF</td><td>10</td></tr><tr><td>ON</td><td>ON</td><td>11</td></tr></table>	S2	S3	No bits	OFF	OFF	8	OFF	ON	9	ON	OFF	10	ON	ON	11	10 bits
S2	S3	No bits																
OFF	OFF	8																
OFF	ON	9																
ON	OFF	10																
ON	ON	11																
	Selects the amount of stop bit shortening to be used in async mode	<table><tr><td>S1</td><td></td></tr><tr><td>ON- 25%</td><td></td></tr><tr><td>OFF- 12.5%</td><td>12.5%</td></tr></table>	S1		ON- 25%		OFF- 12.5%	12.5%										
S1																		
ON- 25%																		
OFF- 12.5%	12.5%																	
Carrier	Selects carrier constantly on or controlled by RTS	<table><tr><td>S4</td><td></td></tr><tr><td>ON- CONTROLLED</td><td>CONST. ON</td></tr><tr><td>OFF- CONST. ON</td><td></td></tr></table>	S4		ON- CONTROLLED	CONST. ON	OFF- CONST. ON											
S4																		
ON- CONTROLLED	CONST. ON																	
OFF- CONST. ON																		
Pin 18	Enables DTE control of analog loop	<table><tr><td>S5</td><td></td></tr><tr><td>ON- ENABLE</td><td></td></tr><tr><td>OFF- DISABLE</td><td>DISABLE</td></tr></table>	S5		ON- ENABLE		OFF- DISABLE	DISABLE										
S5																		
ON- ENABLE																		
OFF- DISABLE	DISABLE																	
Pin 21	Enables DTE control of remote digital loop	<table><tr><td>S6</td><td></td></tr><tr><td>ON- ENABLE</td><td></td></tr><tr><td>OFF- DISABLE</td><td>DISABLE</td></tr></table>	S6		ON- ENABLE		OFF- DISABLE	DISABLE										
S6																		
ON- ENABLE																		
OFF- DISABLE	DISABLE																	

Table 2. Async Character Length Setting

Start Bit	Data Bits	Parity	Stop Bit	No. of Bits	Switch Setting S2	Switch Setting S3
1	5	none	2	8	OFF	OFF
1	6	none	1.5 2	8	OFF	OFF
1	6	odd, even	1 1.5 2	9	OFF	ON
1	7	none	1 1.5 2	9	OFF	ON
1	7	odd, even	1 1.5 2	10	ON	OFF
1	8	none	1 1.5 2	10	ON	OFF
1	8	odd, even	1 1.5 2	11	ON	ON