MD640AE-SMA-R2

Bottom of Unit

ON

1 2 3 4 5 6 7 8

REAR

FRONT

◆ BLACK BOX

MultiMode FOM

Power   TD   RD   RTS   CD

Test Modes

- Remote
- Normal
- Local

SPECIFICATIONS:

Cable Required: (1) Multimode fiberoptic cable, 62.5-um core

Interface: EIA RS-232/CCITT V.24, DCE

Protocols: Asynchronous or Synchronous

Clock: Internal or external from attached RS-232 device

Flow Control: Transparent hardware (RTS/CTS and DTR/DSR passed through from DTE) or local hardware or software (RTS/CTS or X-ON/X-OFF), user-selectable

Operating Mode: Point-to-point

Speed: Asynchronous: Up to 38.4 Kbps;
Synchronous: 2.4, 9.6, 19.2, 38.4, 56, 64, 192, or 256.

Max. Distance: 2.5 km (1.5 mi) at all data rates, 5 km (3.1 mi) at data rates of 64 Kbps or below

Modulation: 3B4B

Wavelength: 880 nm

Attenuation: 14 dB

LED-Responsivity Min.: 0.12 amps per watt

User Controls: (2) External: (1) Front-mounted rocker switch: Test;
(1) Bottom-mounted 8-position DIP switch: Asynch/synch operation, data rates, clock source, flow control

Indicators: (6) Front-mounted LEDs: TD, RD, RTS, CTS, Power, Test

Connectors: (3) Rear-mounted:
(1) DB25 female,
(1) SMA female fiberoptic connector,
(1) Barrel-type power jack;

Power: Input: 230 VAC, 50 Hz, 100 mA;
Output: 10 VAC; 700 mA.

DESCRIPTION:

MultiMode FOMs are fiberoptic short-range modems with a special money-saving edge. Many fiberoptic modems can't transmit and receive data through the same port, so they use cables with two fibers. MultiMode FOMs communicate with each other over a much less expensive single-fiber cable, across distance of as much as 5 km (3.1 miles).

The MultiMode FOM is a fiberoptic short-range modem for point-to-point RS-232 communication over a single 62.5-um fiber, such as one of those bundled into our bulk multifiber cables EFN1004 and EFN1006. The FOM supports synchronous data rates up to 256 Kbps, and asynchronous data rates up to 38.4 Kbps. It can also support transparent hardware flow control or local flow control; in the local setting, it automatically adapts to either hardware or software flow control. Synchronous timing can be set for internal or external (from attached RS-232 device) clock.

The MultiMode FOM features extended-data-rate circuitry that allows for single-fiber distances between 1.5 and 3.1 miles (2.5 and 5 km). Depending on which model you have, you can connect optical cable with ST or SMA connectors to the FOM. The MultiMode FOM encodes your data signals using 3B4B modulation, then converts them to an 880-nm optical signal. The MultiMode FOM features two test modes: local and remote loopback. You can activate either of these tests with the FOM's front-panel toggle switch. The local loopback test is used to evaluate the DTE-to-modem connection. The remote loopbck test is used to evaluate the condition of the connection between the modems.

CONFIGURATION:

The MultiMode FOM is easy to install. After configuring the DIP switch, simply connect the single-fiber and RS-232 cable cable to the FOM, plug the power supply's output cord into the unit, and plug the power supply into an outlet.

These short-range modems are designed to work in pairs. You'll need one at each end of a single 62.5-um core, multimode fiber cable. Depending on the data-rate setting you select, your cable can be a maximum of 2.5 or 5 km long. Connect the fiberoptic cable to each MultiMode FOM using a single connector (either ST or SMA type, depending on your model).

To connect the MultiMode FOM to a DTE (Data-Terminal Equiptment: a PC, host, terminal, etc.) use a straight through RS-232 cable. To connect the MultiMode FOM to a DCE (DTE-Communications Equipment: a modem, multiplexor, etc.) use a cross-pinned RS-232 cable of the null-modem type. Whether the cable is straight-through or crossed pinned, it must have a DB25 connector on the FOM end.

LED Indicators:

The MultiMode FOM's six front -panel status LEDs indicate the condition of the modem and communication link. The green "Power" LED glows if the modem is plugged in and getting power. The green "Test Modes" LED glows when the modem has been set to perform a local analog or remote digital test. The "TD" and "RD" indicators blink red or green in response to data activity (transmitting data or receiving data respectively). Red indicates a "low" level of RS-232 logic; green indicates a "high" level of RS-232 logic. These LED's will continuously glow red if the RS-232 cable connections are correct and the RS-232 device to which the FOM is attached is not transmitting or receiving data (this is equivalent to a constant "low" state). The "RTS" and "CD" indicators are also tri-state and will glow red for a "low" signal or green for a "high" signal. The RTS LED lights in responce to an incoming signal on RS-232 Pin 4 (normally Ready to Send). The CD LED lights (a) in responce to an incoming Carrier Detect signal on the line side (from the remote FOM) and (b) when, as a result, the FOM outputs the same signal on RS-232 Pin 8.

Power-Up:

Apply AC power to the MultiMode FOM by first plugging the output cord of the FOM's power supply into the rear-panel power jack, then plugging the power supply's input cord into a working AC power outlet. This should activate the unit immediately-the FOM has no power switch-and the "Power" LED should light. When both the local and remote MultiMode FOMs are powered up, and are passing data normally, the LED will look like this:

PWR = Green
TD and RD = Flashing red and green
RTS and DCD = Green
TEST = Off

Loopback-Test Modes:

The MultiMode FOM can perform two types of loopback tests that will help you to evaluate the condition of the FOM pair, the communication link between them, and the link between each FOM and the attached RS-232 device. These tests are activated from the front panel.

Local loopback:

The local loopback test is an analog test that checks the operation of the local MultiMode FOM, and is performed seperately on each unit. During this test, any data sent to the local MultiMode FOM by the attached RS-232 device will be echoed back to that device. For example, characters typed on the keyboard of a local terminal will appear on the terminal screen. To perform a local test, follow these steps:

A. Activate local loopback by moving the local MultiMode FOM's front-panel toggle switch down to the "Local" setting: This FOM's transmitted output is now connected to its own receiver. Its "Test" LED should glow. (Even though the local FOM cannot communicate with the remote FOM in this mode, the synchronized connection between the two modems remains intact.)
B. Verify that the RS-232 device is operating properly and can be used for a test. If you send data from the RS-232 device and the data is corrupted when it comes back, replace the device.
C. Perform a BERT (bit error rate) test on each FOM. If the BERT test doesn't uncover any faults, but the RS-232 device still indicates a fault, follow the manufacturer's suggested diagnostic procedures for the RS-232 device.   Also, check the cable between the RS-232 device and FOM.

Remote Loopback:

The remote loopback test checks the performance of both the local and remote MultiMode FOMs, and the communication link between them. Any characters sent to the remote FOM in this test mode will be returned to the originating device. For example, if your local RS-232 device is a terminal, characters typed on the terminal's keyboard will appear on the terminal's screen after having been passed to the remote FOM and looped back. To perform a remote loopback test, follow these steps:

A. Activate remote loopback by moving the remote MultiMode FOM's front-panel toggle switch up to the "Remote" setting: this FOM now automatically echoes data across the fiberoptic line to the local FOM. The remote unit's "Test" LED should glow. (As with the local loopback test, the synchronized connection between the two modems remains intact during this test.)
B. Perform a BERT (bit error rate) test on the system.
C. If the BERT test equipment indicates a fault, and the local loopback test was successful for both MultiMode FOMs, this suggest a problem with the fiber cable connecting the modems. You should test the cable for proper connections and continuity.

SUMMARY OF SWITCH SETTINGS, SHOWING FACTORY DEFAULT		
Position	**Function**	**Factory Default**
1	RESERVED	OFF
2 3 4 5	Data Rate (Sync Mode) Data Rate (Sync Mode) Data Rate (Sync Mode) Data Rate (Sync Mode)	ON OFF 0 to 19.2 k OFF Async (2X) ON
6	Reset	OFF Operating Mode
7	Handshaking	ON Control Signal Mode
8	Clocking Method	OFF Internal Clock
Detailed information about the function of each DIP switch in on the next page		

Configuration of Switches:

This section provided detailed information about the function of each DIP switch position, and lists all possible setting. Use this section as a configuration guide for applications where the FOM's default settings would not provide correct results. (Position 1 is reserved for future use.)

Positions 2 through 5: Data Rate (Sync. Mode) determines two configuration parameters:

Synchronous or Asynchronous data rate and the mode of synchronization (Sync Mode) between two FOM's. Here's how the packet-spacing option works: The "2X" setting doubles the space between data packets compared to the "1X" setting, so that each packet is more easily distinguishable from those before and after it. This offsets some of the effects of signal degradation over distance, and allows communication over as much as 5km (3.1miles) as opposed to the "1X" setting's limit of 2.5 km (1.5 miles). The table below shows every possible setting for these four switch positions.

Position 6: Reset. You can use this switch to reset the FOM without powering down the unit. Move position 6 to ON to put the FOM in "reset condition", then move position 6 back to OFF (the default setting) to put the FOM back in "operating condition" (resume normal operation). Don't leave position 6 ON: the FOM will not work properly unless this switch position if OFF.

Position7: Handshake Mode determines the type of flow control. (This switch position must be moved to the same setting on both FOM's). If position 7 is set to ON (the default setting), the FOM's perform transparent hardware flow control by passing the RTS/CTS and DTR/DSR signal pairs from the attached DTE's across the modem link. In this setting, when the FOM drops the RS-232 "RTS" signal, the other FOM drops the "CTS" signal, and when one FOM drops the "DTR" signal, the other drops the "DSR" signal. If position 7 is set to OFF (the "standard modem" setting), each FOM independently performs flow control between itself and the local DTE, automatically adapting to either hardware (RTS/CTS) or software (X-ON/X-OFF) flow control.

Position 8: Clock Source works from an internal clock if position 8 is set to OFF (the default setting) and provides this clock signal on RS-232 Pin 15. The FOM receives an external clock from the attached RS-232 device on RS-232 Pin 24 if position 8 is set to ON.

Table 3-2. Possible Settings of DIP Switch Position 2 Through 5

Pos. 2	Pos. 3	Pos. 4	Pos. 5	Data Rate (Synch Mode)
ON	OFF	OFF	ON	Asynch 0-19.2 Kbps(2X)
ON	OFF	OFF	OFF	Asynch 0-38.4 Kbps(1X)
ON	ON	ON	OFF	Synch at 2.4 Kbps (1X)
OFF	ON	ON	OFF	Synch at 9.6 Kbps (1X)
OFF	ON	ON	ON	Synch at 9.6 Kbps (2X)
ON	ON	OFF	OFF	Synch at 19.2 Kbps (1X)
ON	ON	OFF	ON	Synch at 19.2 Kbps (2X)
OFF	ON	OFF	OFF	Synch at 38.4 Kbps (1X)
OFF	ON	OFF	ON	Synch at 38.4 Kbps (2X)
ON	OFF	ON	OFF	Synch at 48 Kbps (1X)
ON	OFF	ON	ON	Synch at 48 Kbps (2X)
OFF	OFF	ON	OFF	Synch at 56 Kbps (1X)
OFF	OFF	OFF	OFF	Synch at 64 Kbps (1X)
OFF	OFF	OFF	ON	Synch at 64 Kbps (2X)
OFF	OFF	ON	ON	Synch at 192 Kbps (1X)
ON	ON	ON	ON	Synch at 256 Kbps (1X)