

INSTRUCTION MANUAL

FMX-125

**FIBER OPTIC, BI-DIRECTIONAL
DATA, CONTACT CLOSURE and AUDIO
MULTIPLEXER SYSTEM**

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This product was designed and manufactured in the
UNITED STATES of AMERICA

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INTRODUCTION

The Multidyne FMX-125 Series of Fiber Optic Multiplexers support transport of twelve bi-directional RS-232 or RS-422/485 data channels, with the option of up to two audio or intercom channels. It also supports 8 dry contact closures.

!!!!!! DANGER !!!!!

INVISIBLE LASER RADIATION

AVOID DIRECT EXPOSURE TO BEAM

OUTPUT POWER MAX: 2 mW. WAVELENGTH: 1300/1550 NM. CLASS III b LASER

The optical laser transmitter may harm the human eye. Proper eye protection should be used at all times when working with laser. Please read the entire manual before operating the Fiber Optic devices.

WARNING

VOLTAGES INSIDE

**The unit should be only serviced or opened by qualified personnel.
There are no user serviceable parts or adjustments inside.**

OPERATION and CONNECTIONS

BASIC FUNCTIONALITY

FMX-125 OPERATION

The FMX-125 has 12 bi-directional RS-232 or RS-422/485 channels and 8 dry contact-closure channels. The data I/O's are connected through the 68 pin high density SCSI connector to a screw terminal adapter/breakout board. A SCSI cable is used to connect the data portion of the breakout board to the FMX-125. The contact closure relays and screw terminals for same are on the breakout board. The contact closure portion of the breakout board connects to the FMX-125 via a DB9 cable. Do not use a standard RS232 cable for this, as the pins may not be connected one-for-one. Use only a cable that has all 9 pins connected individually one for one. SCSI and DB9 cables are available from Multidyne. You'll need 2 FMX-125s and 2 breakout boards, plus cables, to form a complete link.

FMX-125 AUDIO OPTION

If the FMX-125 is equipped with the audio/intercom option, the audio inputs and outputs are found on RIA connectors on the breakout board. By connecting a headset/microphone to them, it becomes an intercom link with side tone.

CIRCUIT DESCRIPTION

TRANSMITTER SECTION

All data, contact closure and audio inputs are through the rear panel connectors. A breakout board with screw terminals connects to the FMX-125 with a SCSI cable for data and contact closure control. The RS-422/485 or RS-232 inputs are converted to TTL by data convertors. A parallel to serial convertor (SERDES) converts the 8 control and 12 TTL data channels into one serial bit stream which is outputted to a fiber optic transceiver module, modulated onto the fiber and sent to the other FMX-125.

The optional audio input is through the 68 pin SCSI connector from a headset mic attached to the screw-terminal adapter breakout board. The analog audio is then sent to a PCM (pulse code modulated) CODEC, where it is modulated into a TTL digital bit stream. The digital audio bit stream is then sent to the SERDES as described above.

RECEIVER SECTION

The optical data is received by a fiber optic transceiver, demodulated and sent to a serial to parallel convertor (SERDES) where it is de-multiplexed into the 12 TTL data channels and 8 contact closure controls. The TTL channels are converted back into RS-232 or RS-422/485 data by data convertors. The data is then outputted through the 68 pin SCSI connector and the relay controls via the DB9 connectors to the breakout board.

In the case of audio, the TTL audio data from the SERDES is sent to a PCM CODEC, and converted back into analog audio. It is sent to the breakout board via the SCSI connectors.

INSTALLATION and PRECAUTIONS

OPTICAL PRECAUTIONS and REQUIREMENTS:

Extreme caution should be used when handling Laser equipment. Appropriate eye protection should be worn at all times. Direct exposure to the eyes and skin can be harmful. The audio, data and optical connections can be found in the sections above. There are no user serviceable parts or adjustments inside the system. The only user controls and interfaces are present on the front and rear panels. If service or calibration adjustments are necessary, please return the system to the factory.

When installing a 1300nm Singlemode Laser system the launched optical power can vary from -10 dBm to +3 dBm depending on the model purchased. The receiver will compensate for variations in optical attenuation. If the systems are used over very short distances with minimal optical attenuation, the receiver may become over loaded. In this case, an external optical attenuator should be used:

For a 1300 nm Laser System, use a -5 to -10 dBm attenuator for short distances.

The FMX-125 for Singlemode applications all have an optical window from the wavelength of 1100 to 1600 nm. If a Singlemode system is to be Wave Division Multiplexed with other optical wavelengths in the 1100 to 1600 nm range, the appropriate optical filters and wave division multiplexers should be used. The user may contact MULTIDYNE to purchase such devices.

The optical fiber should be free of defects or flaws. The optical fiber should not have any excessive bends or micro-bends as this will attenuate or cause optical power to be lost. Proper splicing and connectorization techniques should be used. Improperly assembled, cleaved and polished optical connectors can cause significant optical losses and reflections. All optical connectors should be inspected with a microscope for cracks, chips or any blemishes on the optical surface.

INSTALLATION

BREAKOUT BOARD

The DB9 and SCSI connections to the FMX-125 are on the rear of the board. The breakout board front panel is divided into several sections, from left to right:

1. Jumpers for 100 ohm terminations for the data inputs. There is a jumper for each of the 12 data channels. Place a jumper in the "on" position if RS422/485 is used for that channel.
2. Screw terminals for the 12 data inputs to the breakout board. There are 3 rows, from top to bottom: Ground, inverting input, non-inverting input for each channel. When using RS232, use only the ground and inverting connections. If an input is RS422/485, set its corresponding termination jumper accordingly.
3. Screw terminals for the 12 data outputs. There are 3 rows as above.
4. Balanced audio inputs and outputs. The AUOx labels refer to audio output; the AUIx labels refer to audio input, where the x denotes the channel. The G label is ground. If your audio is unbalanced, connect to the non-inverting audio terminal and ground.

5. Screw terminals for contact closure control inputs. Apply TTL logic 1 to close relay.
6. Screw terminals for the 8 dry contact closures. The contact closures are to a common return, which is floating.

FMX-125 SETTINGS

The front panel of the FMX-125 has level adjustments for the 2 audio channels. These are for receiver audio output level. Adjust to personal taste.

There are dip switches to set the data protocol for each of the 12 data channels. Set the switch for each channel to either RS422/485 or RS232. Be sure the termination jumper selections on the breakout board are consistent with the switch settings on the FMX-125 connected to it. Normally, for a given channel, you would select both ends of the link to have the same protocol, but this is not necessary if you want to use the link to convert from one protocol to another.

MOUNTING, POWER and INSTALLATION REQUIREMENTS

The fiber optic system dissipates a significant amount of heat due to the high-speed circuitry and optics. The units should have adequate ventilation. The units are powered by a desktop universal-input supply.

SPECIFICATIONS

ELECTRICAL

Power Requirements:	100-250 VAC @ 0.8A Max. with desktop supply
Input and Output Level:	Audio: 0 dBm (+10dBm)
Input and Output Impedance:	Audio: High or 600 Ohms, 22 ohms respectively
Bandwidth:	Audio: 100 Hz to 8 KHz (standard) Data: DC to 230KBaud
Data:	Standard RS-232 or RS-422/485
Contact closure control:	5 volt TTL/CMOS compatible

OPTICAL

Optical Wavelength:	850 nm and 1300 nm Multimode 1300 nm Singlemode
Optical Budget	>19 dB for 850 nm MM, 62.5 μ >15 dB for 1300 nm MM, 62.5 μ >28 dB for 1300 nm SM, 8.3 μ
Sensitivity	>-28 dB

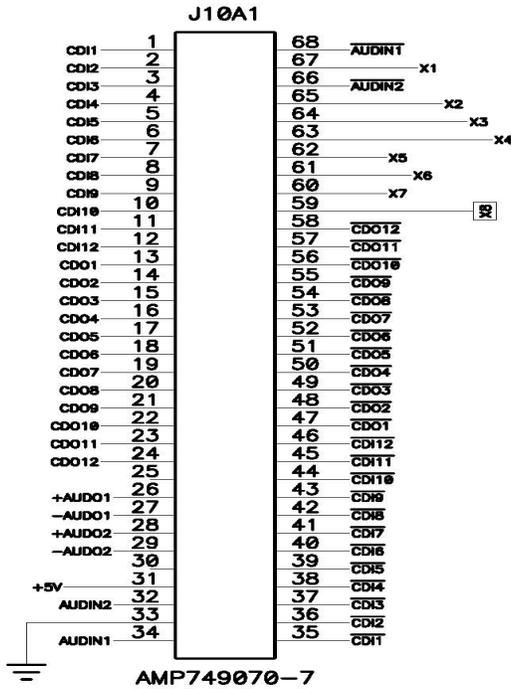
MECHANICAL

Portable and Wall-mount:	7" L x 5 3/4" W x 1 3/4" H
Triple Rack-mount Kit for 3 modules (Part number -RMT):	7" L x 19" W x 1 3/4" H

DRAWINGS

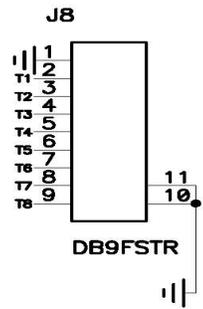
Sheet 1: SCSI and DB9 Connector wiring

SCSI CONNECTOR SIGNALS



Xx IS CLOSURE CONTROL
 CDIx IS DATA IN
 CDIx IS DATA IN INVERTED
 CDOx IS DATA OUT
 CDOx IS DATA OUT INVERTED

DB9 RELAY SIGNALS



EACH Tx SIGNAL IS CONNECTED TO A RELAY COIL
 OTHER END OF EACH COIL CONNECTED TO 5V

Sheet 2: Mechanical

