

**INSTRUCTION MANUAL**

**DVM-4000P**

**Portable 4 Ch. VIDEO & 16 Ch. AUDIO  
FIBER OPTIC MULTIPLEXER  
TRANSPORT SYSTEM**

**MULTIDYNE Electronics, Inc.**

*Innovations in Television Testing & distribution*

**1-(800)-4TV-TEST, 1-(800)-488-8378**

191 FOREST AVENUE  
LOCUST VALLEY, NY 11560-2132 USA  
(516)-671-7278 FAX (516)-671-3362

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

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DVM-4000-FTX/FRX AUDIO/DATA/ALARM D-TYPE CONNECTOR WIRING DIAGRAM ERROR! BOOKMARK NOT DEFINED

## INTRODUCTION

The DVM-4000P, portable, 4 channels of 12 Bit Video and 16 channels of 24 Bit Audio Fiber Optic Transport offers state-of-the-art performance exceeding RS250C Short-haul and Broadcast Specifications with a Signal to Noise ratio exceeding 75 dB. The system will support 4 videos, 3 simplex datas and up to 16 audios per optical wavelength.

The user can (WDM) Wave Division Multiplex, permitting multiple optical sources to share a single fiber, multiplying the capacity of fiber optic cables by a factor of eight. Applications include links from studio to transmitter, studio to studio, studio to CATV head-end, distance learning and backhaul feeds from special events.

## FEATURES and OPERATION

**!!!!!! 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.**

## VIDEO CHANNELS

The video performance of the fiber optic system exceeds RS-250C Short-haul specifications. The system uses state-of-the-art technology to offer a true 12 bit Video Analog to digital conversion and a 24 bit Audio A to D conversion. By using 12 bits we are able to achieve a Signal to Noise ration of over 75 dB. The system is ultra linear and distortion free giving differential gain and phase of less than 0.3 % and 0.3 degrees, respectively. The video input and output signals are back-porch clamped.

The system has a video bandwidth of 8 MHz. The transmission of NTSC, PAL, SECAM and video with diplexed audio carriers at 4.5 MHz, 5.8 MHz and 6.4 MHz are fully compatible with the fiber optic system.

## TRANSMITTER, DVM-4000-FTX

The transmitter unit, designated by model number DVM-4000-FTX, includes 4 **VIDEO INPUT** BNC connectors on the rear panel. The transmitter front panel includes 4 green **VIDEO PRESENCE** LEDs that glow to indicate the delivery of video to the A to D and 4 red **VIDEO OVERFLOW** LEDs that glow to indicate a video clipping condition. The red **UNLOCK** LED indicates that the multiplexer is unlocked and non-operational. The **UNLOCK** condition is mirrored in an open collector **ALARM** output in the audio/data connector. The green **POWER** LED indicates that power is on.

## RECEIVER, DVM-4000-FRX

The receiver unit, designated by model number DVM-4000-FRX, includes 4 **VIDEO OUT** BNC connectors on the rear panel. The receiver front panel includes 4 green **VIDEO PRESENT** LEDs to indicate the presence of video. The red **UNLOCK** LED indicates that the decoder multiplexer is not locked, perhaps due to a bad fiber or other failure in the transmission path. The **UNLOCK** condition is also mirrored in an open collector **ALARM** output in the audio/data connector. The 4 **VIDEO** gain controls, one for each channel, can be found on the front panel. The green **POWER** LED indicates that power is ON.

## AUDIO CHANNELS

The fiber optic system includes 16 channels of high quality CD grade audio encoded in 24 bits. The balanced audio inputs are High impedance by default. When the optional – DVMAUDIO4000 Screw Terminal Adapters are used, the input impedance is 600 Ohms by default. The 600-Ohm termination may be removed for high impedance operation. The balanced audio outputs have a source termination of 50 Ohms. The system is able to accommodate a maximum input and output level of +18 dBm with a 600-Ohm termination. The input level to the transmitter should not exceed +18 dBm. The audio I/Os are brought to a DB44 type connector on the rear panel. When using the optional –DVMAUDIO4000 adapter board, and in the audio/data connector diagram, the audio I/Os are labeled **A1+**, **A1-** through **A16+**, **A16-** respectively. The terminals labeled **GND** are available for the audio ground connection.

## DATA CHANNELS and ALARM

The system includes 3 simplex data channels which can be configured for either RS232 or RS4xx data protocols. On the adapter board and in the audio/data connector diagram, the data I/Os are labeled **CD1**, **~CD1** thru **CD3**, **~CD3** respectively. The terminals labeled **GND** are available for the data and alarm ground connections. The **ALARM** output is an open collector output which conducts when the alarm is asserted.

## OPTICAL OPTIONS

The DVM-4000 Fiber Optic system is available in several different optical configurations. There are multi-mode systems available with 1310 nm wavelengths. The multi-mode systems are available with ST connectors. The Singlemode laser systems are available in 1310 nm and 1550 nm wavelengths with ST, SC or FC connectors. The 1310 nm single-mode laser system is available with -8 dBm, -3 dBm, 0 dBm and +3 dBm optical powers. The 1550 nm single-mode laser system is available in an optical power of +3 dBm. Please read the section **INSTALLATION** for further information.

## INSTALLATION

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 video, audio, data and optical connections can be found in the sections above. There are no user serviceable parts or adjustments inside the system, except for setting the data protocols. 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 1310 or 1550 nm Singlemode Laser system the launched optical power can vary from -8 dBm to +3 dBm depending on the model purchased. The receiver will compensate for variations in optical attenuation. The receiver unit will operate with an optical signal from -30 to +2 dBm without over-load.

The DVM-4000-FRX Fiber Optic Receiver for Singlemode applications all has an optical window from the wavelength of 1100 to 1600 nm. If a Singlemode system is to be WDM, wave division multiplexed or CWDM, coarse wave division multiplexing 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 units have simplex data channels that are capable of operation in either RS232 or RS4xx data protocols. To select which, the user must set some internal jumpers on the pcbs of the units. When using RS4xx, optional 100 ohm terminations are enabled by jumpering pins 2 and 3 of J12 J13 and J14 on the FTX pcb. If the terminations are not needed, or when using RS232, jumper pins 1 and 2. When using RS232 one must jumper pins 2 and 3 of J14 J15 and J16 on the FRX pcb. For other data protocols, jumper pins 1 and 2. The factory setting of the jumpers is for RS232 operation. So, if you need RS4xx operation, you must open the units to change the jumpers. To open the units, remove the 2 screws on the front panel, remove the front panel and bezel, and slide the top cover off. Do not disturb any other jumpers on the pcbs. When using RS232, use only the **~CDx** I/Os and **GND** on the adapter board or the DB44 connector.

## POWER REQUIREMENTS

The DVM4000P series is powered by universal input desktop power modules which can operate from 100 to 250 VAC at not more than 800ma.

## CIRCUIT DESCRIPTION

The Multidyne DVM4000 is a highly linear low noise, low distortion fiber optic link. The circuitry in the transmitter processes and digitizes twenty analogue signals and, through high speed time division multiplexing, serializes them into a single, self clocking bit stream that modulates the output of a laser. At the receiving end a high speed demultiplexer extracts the imbedded clock and then the data in a parallel format to be presented to twenty digital to analogue converter channels that reconstruct the twenty analogue signals.

## SPECIFICATIONS

### Video Performance:

**Exceeds the RS-250C Short-haul specification.**

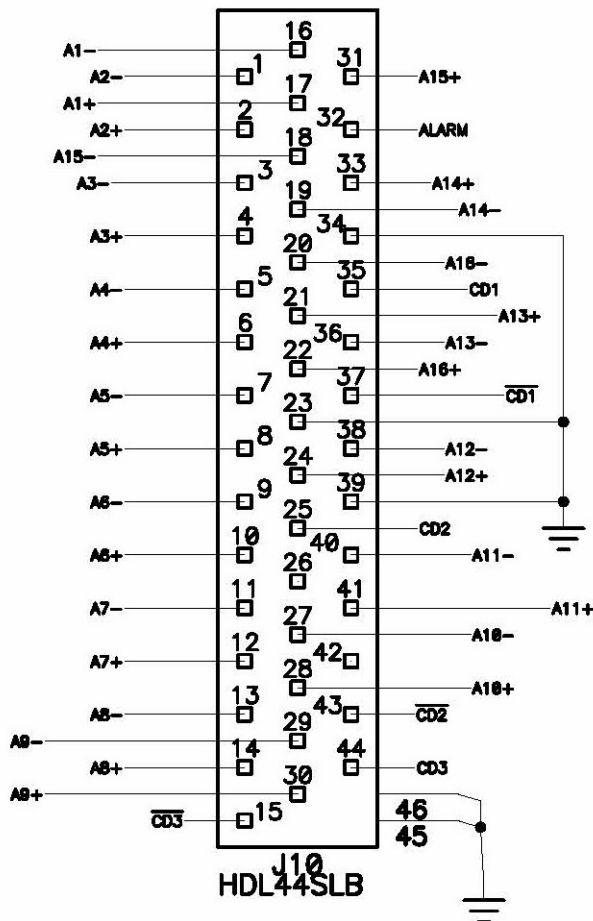
Signal to noise .....	> 75 dB
Differential gain.....	< +/- 0.3 %
Differential phase.....	< +/- 0.3 °
Chrominance to luminance gain .....	< +/- 0.5 %
Chrominance to luminance delay .....	< +/- 5 ns.
Frequency response to 6 MHz.....	< +/- 0.1 dB
3 dB Bandwidth .....	8 MHz
Luminance non-linearity .....	< 0.2 %
Ringing .....	< +/- 0.5 %
Tilt.....	< +/- 0.2 %
Video output & input impedance.....	75 Ohms

### Audio Performance:

Signal to noise .....	> 90 dB
Frequency response to <b>20 Hz to 20 KHz</b> .....	< +/- 0.1 dB
Distortion .....	< 0.05 %
Audio output level .....	Unity
Maximum input & output level, 600-Ohm termination .....	+18 dBm
Audio output impedance, balanced .....	50 Ohms
Audio input impedance, balanced (selectable) ..	600 Ohms or High
Power dissipation .....	< 30 Watts, per unit
AC/DC operation .....	100 - 265 VAC
Operating temperature .....	0 to +50 °C

Specifications subject to change without notice.

DRAWINGS



AUDIO/DATA/ALARM Connector Diagram. Same for FTX and FRX.