MULTIDYNE
Video and Fiber Optic Systems

**INSTRUCTION MANUAL**

# DVM-2700

**2 CHANNEL DIGITAL VIDEO,
AUDIO & DATA FIBER OPTIC
TRANSPORT SYSTEM**


# MultiDyne

***Video & Fiber Optic Systems***

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

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# INTRODUCTION

The **DVM-2700** stand-alone and **DVM-2700-xxx-MOD** modular, 12 Bit Video and 24 Bit Audio Fiber Optic Transport offers state-of-the-art performance exceeding RS250C Short-haul and Broadcast Specifications with a Signal to Noise ration exceeding 75 dB. The system will support 2 video, 8 audio (4 stereo pairs), and, in the portable version, 2 data channels **uni-directionally** over **ONE** fiber. The system includes optical modules with a laser transmitter and pin receiver. The digital information is transported through the fiber at a 1310nm or 1550nm wavelength in one direction. Applications include links from studio to transmitter, studio to studio, studio to CATV head-end, distance learning and backhaul feeds from special events. The transmit and receive units are available in a stand-alone **(no designation)** and modular **(-MOD)** card configurations making the system ideal for both field and studio applications.

**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**
**HIGH 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 sync-tip clamped.

The system has a video bandwidth of 8 MHz (10 MHz optional). 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.

### FRONT PANEL, DVM-2700 and DVM-2700-xxx-MOD

On the **transmitter** front panel, the **MUX LOCKED** LED indicates that the transmitter multiplexer is locked and sending data. A **LASER FAIL** LED indicates laser failure. On the **receiver** front panel there are 2 **VIDEO GAIN** controls for adjusting the local video output gain. The **DATA ERROR** LED indicates that the receiver multiplexer is failing to lock. This can also indicate an optical failure. On both the **transmitter** and **receiver** front panels, there are 2 **VIDEO PRESENT** LEDs for the INPUT and OUTPUT video signals, respectively.

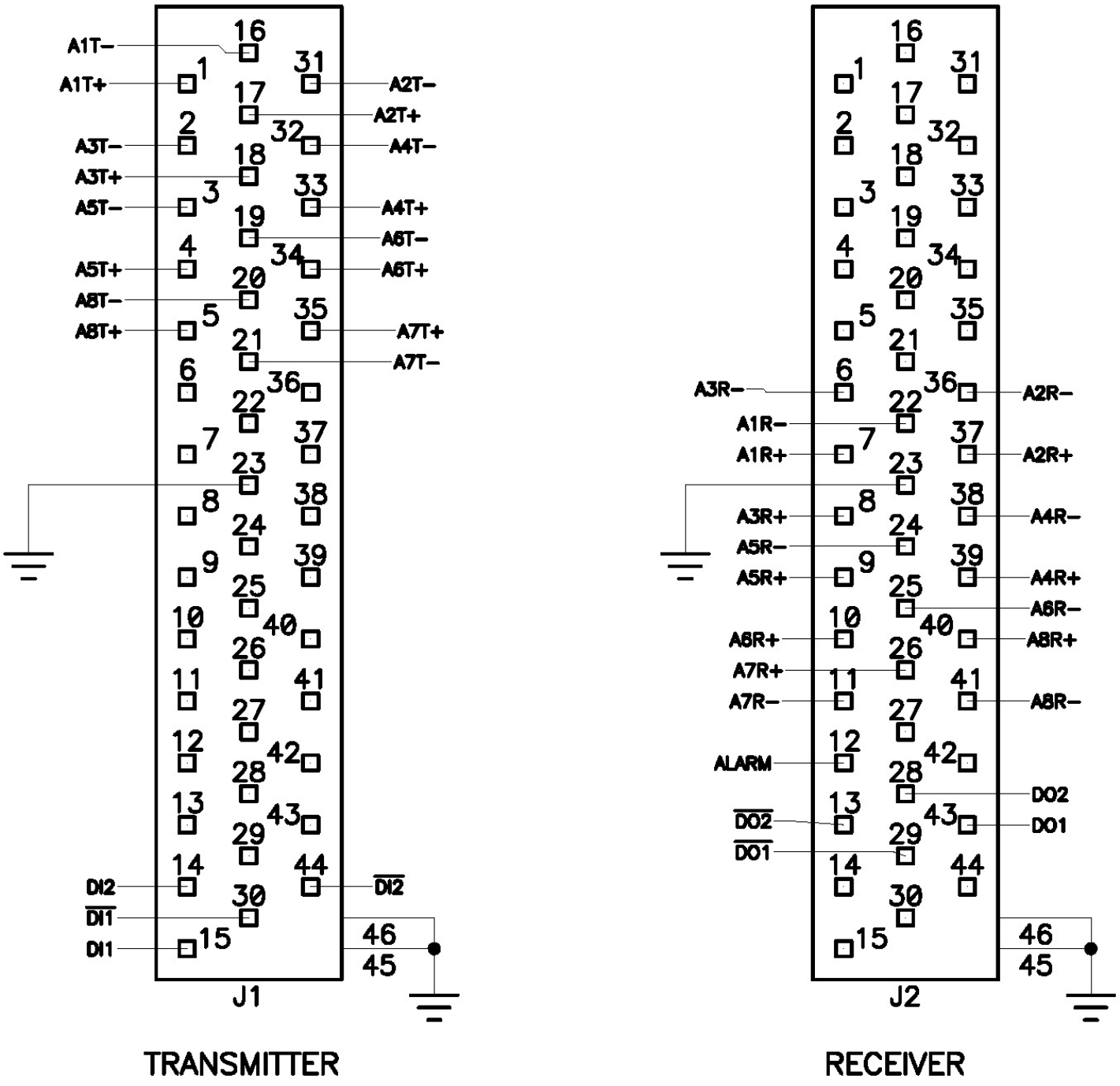
### REAR PANEL, DVM-2700

The portable DVM-2700 rear panels have 44-pin D-type connectors labeled **AUDIO & DATA I/O & ALARMS**. All the audio, data, and alarm I/O's are made through these connectors. The wiring of these connectors is given below in Figure 1. The portable units come standard with male 44-pin D-type connectors with solder cups for hand wiring of the interconnections. An optional –DVMAUDIO27 Screw Terminal Audio Adapter and –DVMXLR27 XLR Audio Adapter is available. A **POWER** connector is also on the rear panels of the portable units. The system includes 110 or 220 VAC wall-mount power supplies. The OPTICAL I/O is also on each rear panel. The default connector is FC unless otherwise specified. The **VIDEO INPUT** and **VIDEO OUTPUT** BNC connectors are on the rear panels as well.

### AUDIO CHANNELS

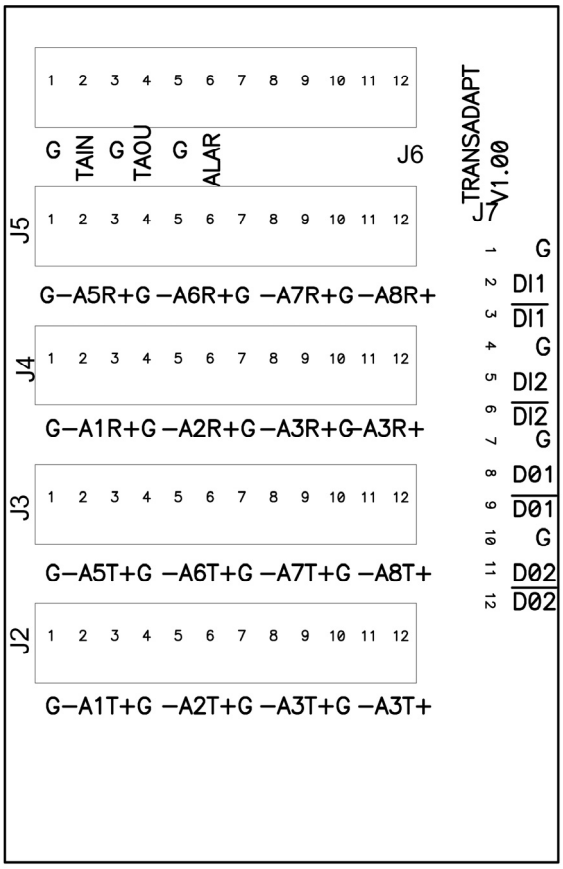
The DVM-2700 and DVM-2700-xxx-MOD includes 8 channels of high quality CD grade audio encoded in 24 bits. The balanced audio inputs are configurable High impedance by default. A 600 Ohm termination can be found on the optional –DVMAUDIO27 screw terminal audio adapter board. The 600 Ohm termination may 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 8 audio inputs for the **"T"** for **transmitter** side are labeled **A1T+, A1T-** through **A8T+, A8T-** respectively. See figure 1 above. The 8 audio outputs for the **"R"** for **receiver** side are labeled **A1R+, A1R-** through **A8R+, A8R-** respectively. The terminal labeled **GND** is the audio ground connection. The **ALARM** terminal indicates an alarm or error condition in the unit.

**Audio Wiring for DVM-2700, Stand-Alone**

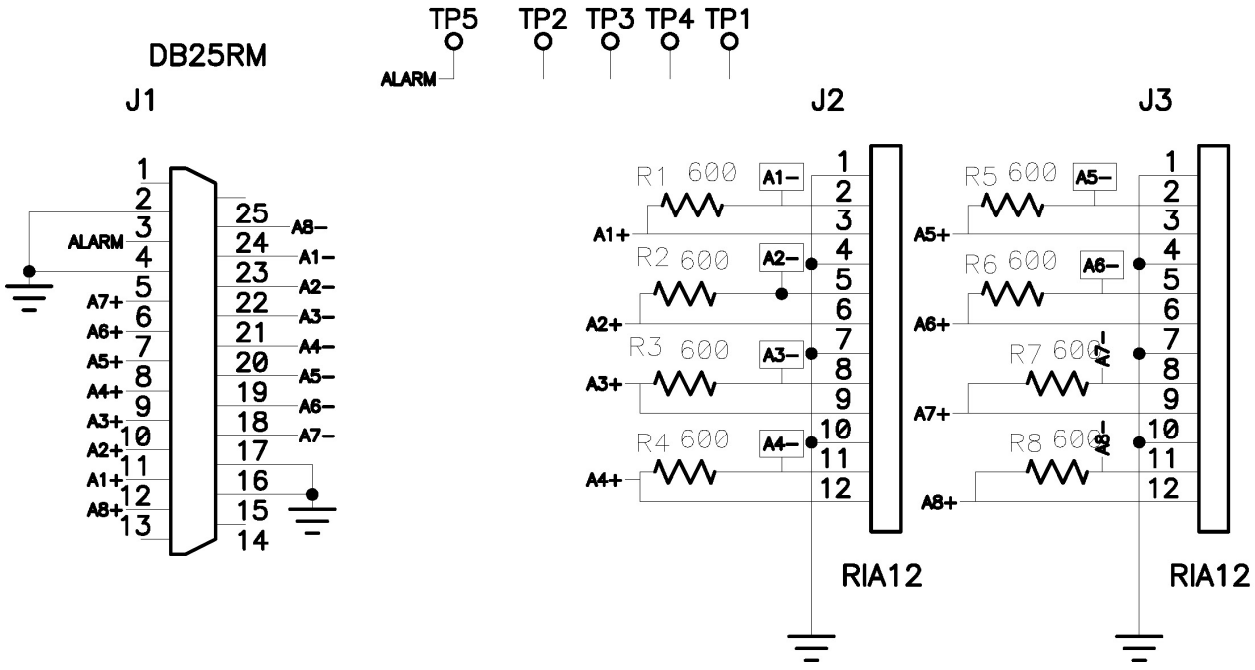



**44 Pin Audio, Data, Tally and Alarm I/O's for the DVM2700 Stand-alone, Figure 1**

## Audio Screw Terminal Adapter –DVMAUDIO27 for the DVM-2700 Stand-alone

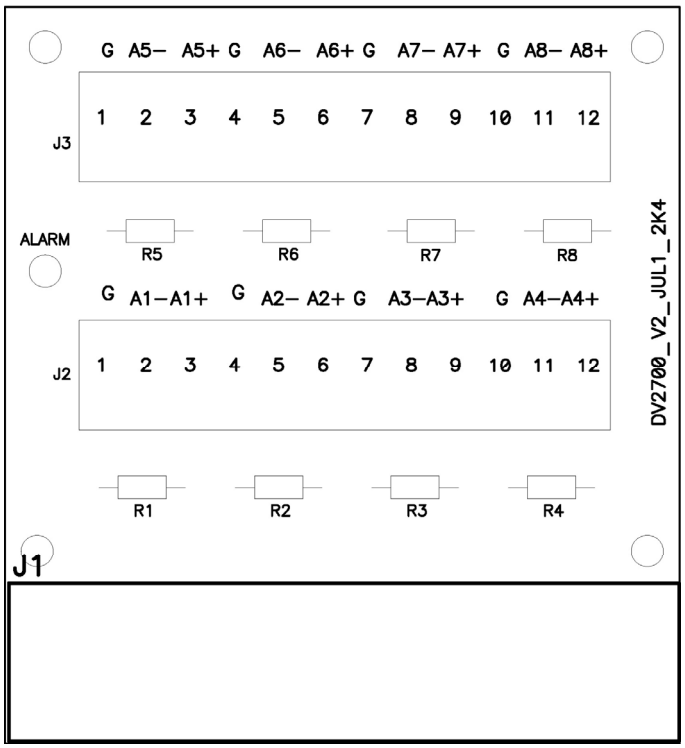



## Audio Wiring for DVM-2700-xxx-MOD, Modular




**27 Pin Audio, Data, Tally and Alarm I/O's for the DVM2700-xxx-MOD Modular and Schematic for –DVMAUDIO27 Screw Terminal Adapter Board, Figure 2**

**Audio Screw Terminal Adapter –DVMAUDIO27M for the DVM-2700-xxx-MOD Modular**




**DATA CHANNELS (PORTABLE VERSION ONLY)**

The DVM-2700 can accommodate 2 simplex data channels of RS232, RS422, RS423 or RS485. **This feature is on the portable version only.** The 2 data channel input connections are labeled as **DI1, ~DI1, DI2, and ~DI2** where **"~" indicates NOT or INVERTED.** The 2 data channel output connections are labeled as **DO1, ~DO1, DO2, and ~DO2.** The terminal labeled **GND** is the data ground connection.

**OPTICAL OPTIONS**

The DVM-2700 and DVM-2700-xxx-MOD in the standard configuration uses a 1310nm or 1550nm Singlemode laser with a 0 dBm output power. The 1310/1550nm pin receivers typically have a sensitivity of -24dBm. 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. When installing a 1310 nm or 1550nm 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 –24 to +3 dBm with out over-load. The video, audio, data and optical connections can be found in the sections above.

To use the data channels on the DVM-2700, it is necessary to open the units and set some **internal jumpers**. Internal jumpers **J2** and **J7** on the transmitter and **J11** and **J7** on the receiver are used to set the data ports to the **RS232, RS423** or **RS422/485** protocols. On the **transmitter**, to enable **RS232**, place a jumper across pins 1 and 2 of **J2** and pins 2 and 3 of **J7**. To enable **RS422**, place the jumpers across pins 1 and 2 of both **J2** and **J7**. To enable **RS422/485**, place the jumpers across pins 2 and 3 of **J2** and pins 1 and 2 of **J7**. On the **receiver** do likewise, noting that the jumpers are labeled **J11** and **J7** instead of **J2** and **J7**, respectively. On the transmitter the internal jumpers **J9** and **J15** enable 100 ohm terminations for RS422 and 485 protocols. To enable the terminations, a jumper is placed across pins 1 and 2 of both **J9** and **J15**. To disable, place across pins 2 and 3. On both transmitter and receiver, pin 1 of all jumpers is the leftmost pin when viewed with the front panel towards you. The jumpers are located in the upper right quadrant of each PCB.

There are no user serviceable parts or adjustments inside the system other than the jumper settings described above. The only other 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.

## CIRCUIT DESCRIPTION

The Multidyne DVM-2700 DVM-2700-xxx-MOD and is a highly linear low noise, low distortion fiber optic link. The circuitry in the transmitter processes and digitizes 2 analogue video, 8 analog audio and 2 data signals and, through high speed time division multiplexing, serializes them into a single, self clocking bit stream that modulates the output of an LED or a laser. At the receiving end a high speed de-multiplexer extracts the imbedded clock and then the data in a parallel format to be presented to 10 digital to analogue converters that reconstruct the 10 analogue signals. The 2 data channels are presented as well.

# 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 nsec |
| Frequency response to 8 MHz | < +/- 0.05 dB |
| 3 dB Bandwidth | 8 MHz |
| Luminance non-linearity | < 0.2 % |
| Ringing | < +/- 0.5 % |
| Tilt | < +/- 0.2 % |
| Video output & input impedance | 75 Ohms |

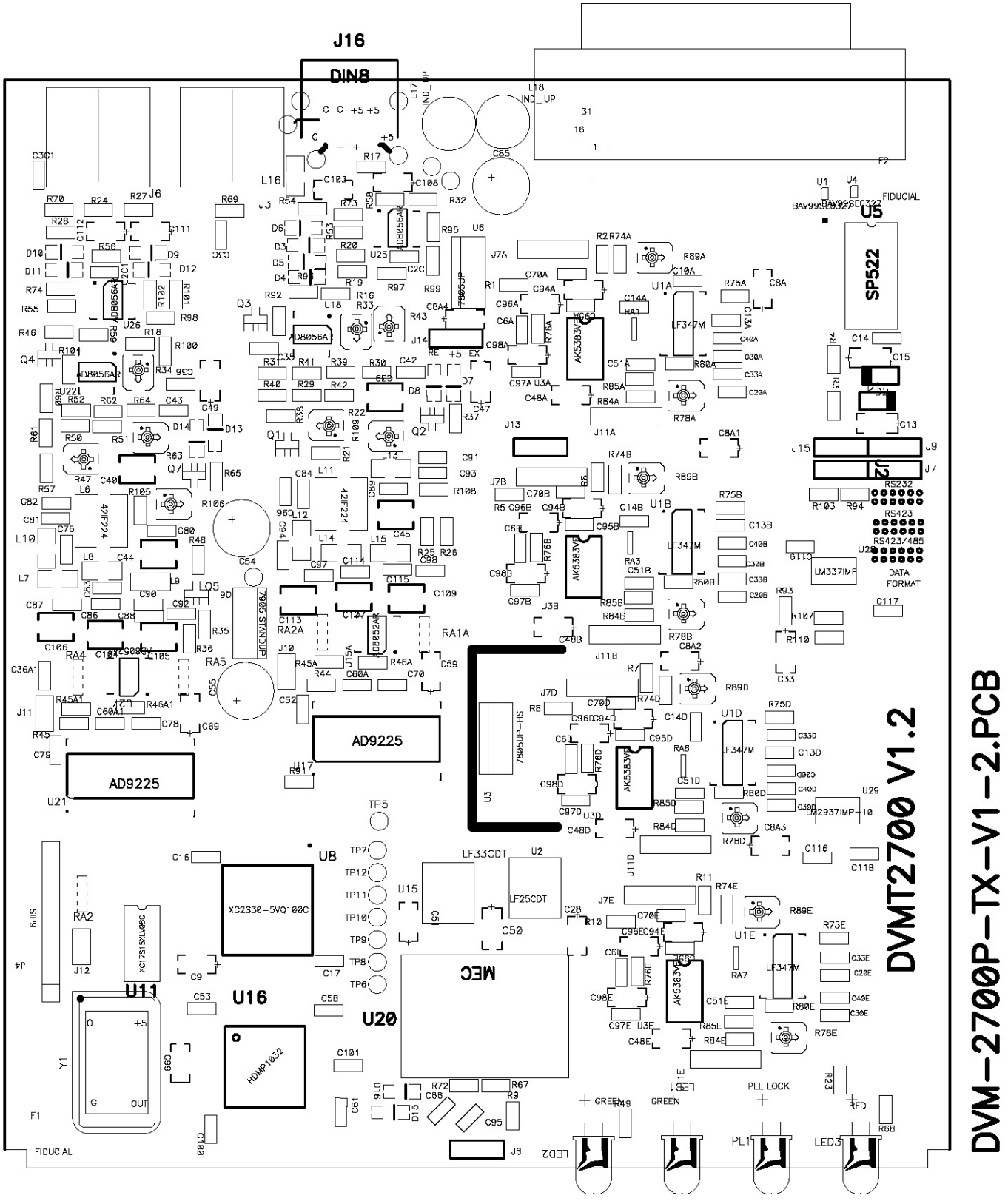
## Audio Performance:

| | |
|---|---|
| Signal to noise | > 90 dB |
| Frequency response to **20 Hz to 20 KHz** | < +/- 0.1 dB |
| Distortion | < 0.05 % |
| Audio output level, adjustable | Unity, +/- 6 dBm |
| Maximum input & output level, 600 Ohm termination | +18 dBm |
| Audio output impedance, balanced | 50 Ohms |
| Audio input impedance, balanced | 600 Ohms or High |
| Data channels | RS-232C, RS-422, CMOS |
| Power dissipation | < 15 Watts, per unit |
| AC operation | 110 or 220 VAC (optional 48VDC) |
| Operating temperature | 0 to +50 °C |
| Portable and Wall-mount: | 7” L x 5 ¾” W x 1 ¾” H |
| Triple Rack-mount Kit for 3 modules (Part number -RMT): | 7” L x 19” W x 1 ¾” H |

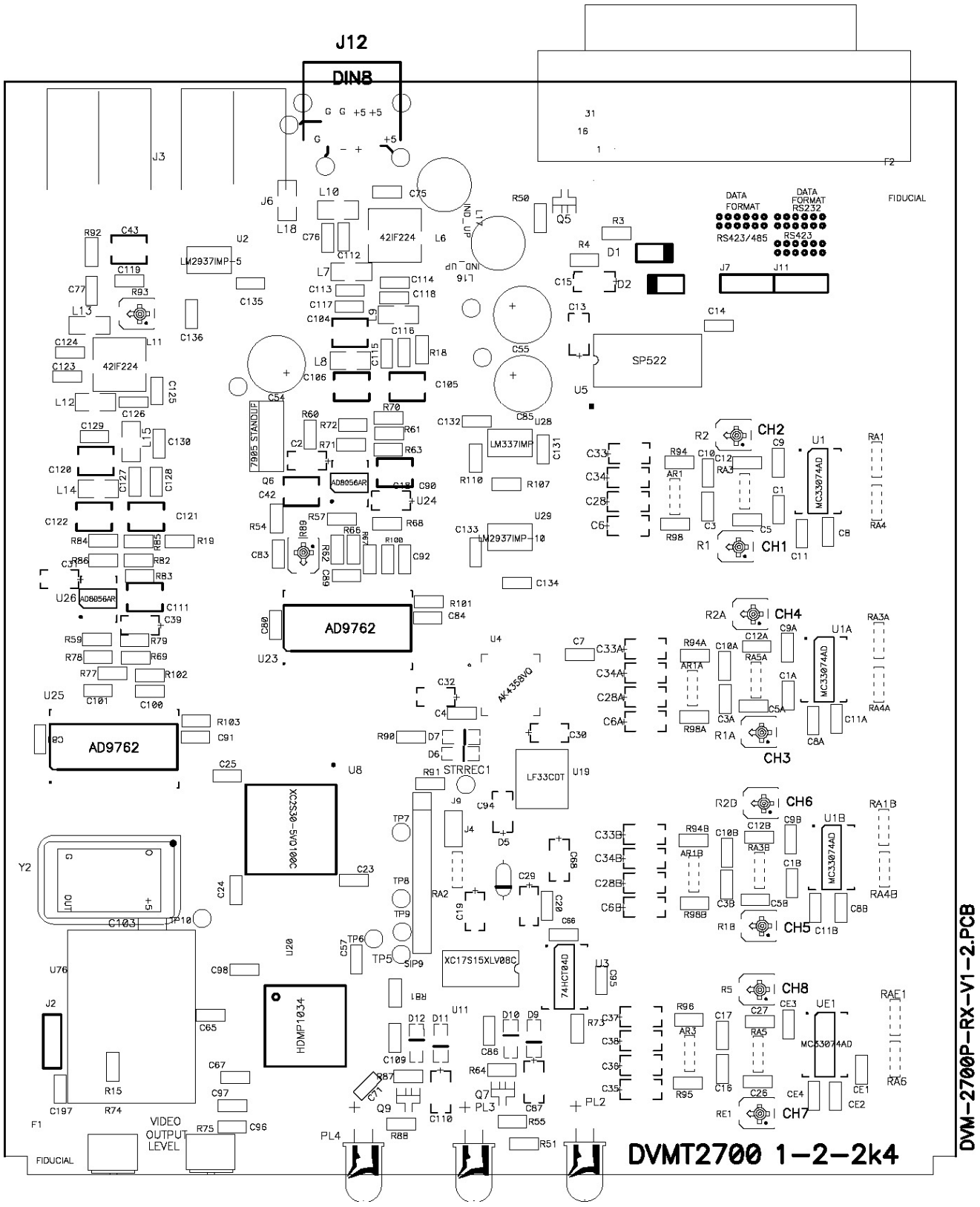
Specifications subject to change without notice.

# DRAWINGS

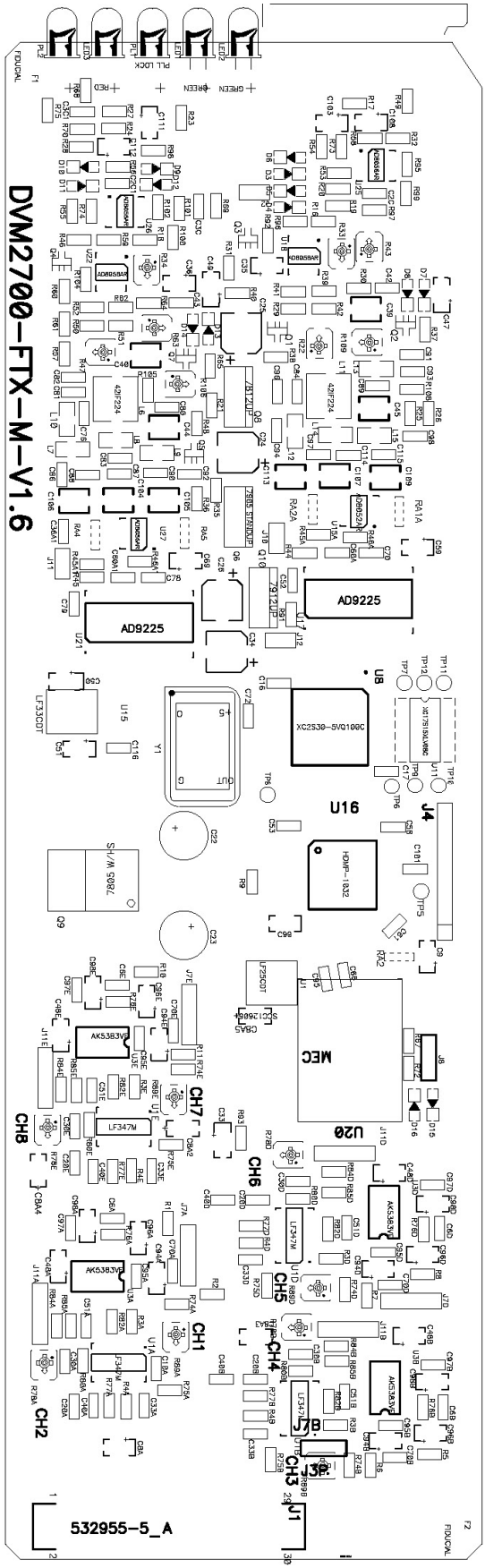
## DVM-2700-FTX Stand-alone, Mechanical Drawing



## DVM-2700-FRX Stand-alone, Mechanical Drawing



## DVM-2700-FTX-MOD Modular, Mechanical Drawing



## DVM-2700-FRX-MOD Modular, Mechanical Drawing