

DVM-150E

PROFESSIONAL DTV RECEIVER/DECODER



Performance

The DVM-150E is a single rack, Professional DTV Receiver/Decoder with the capability of handling SD and HD MPEG2 4:2:0 DTV signals. Its modular design minimizes cost for the end user and allows it to be used in a wide variety of DTV applications. Seven module slots are available for end users to customize and choose the inputs and outputs that they desire, thus eliminating the extra cost and space of unwanted or unused inputs and outputs. The basic DVM-150E consists of a 1RU chassis equipped with a fan, power supply, motherboard and RS232.

RF Inputs

There are two types of receivers to choose from. The two available tuner modules are:

- 8-VSB - Tunes to any VHF/UHF channel, CH2-69
- QAM - Tunes to any CATV channel, CATV1-125
- QPSK - Tunes to L-band frequencies

Two LEDs, located on the front panel of the unit, provide the Lock Status and ATSC-PSIP detection of the RF input signal. SNR measurement is displayed on the front panel VFD as well.

Transport Stream I/O

DVB-ASI and SMPTE-310M inputs and outputs are available for users requiring MPEG2 transport stream I/O.

Video Decoding

The unit is capable of decoding MPEG2 (4:2:0) Main Profile @ High Level, Main Profile @ Main Level, Main Profile @ Low Level and Simple Profile @ Main Level. It supports all 18 ATSC formats, including 1080i, 720p, 480i and 480p video formats. Analog video options include: NTSC, S-Video, VGA/Y Pb Pr. Digital video options include: SDI/HDSDI. The unit can decode both EIA-608B and 708B standards.

Audio Decoding

Digital and analog audio outputs are available on a variety of connector types. The unit decodes both AC-3 and MPEG1 audio to Analog Left and Right. An additional module can be internally installed, to provide Secondary Audio Programming on any of the three types of connectors.

User Interface

All settings and controls can be viewed and set using the front panel's VFD screen and directional arrow keys. An RS232 option is available to save time and improve ease of use. Optional Management/SNMP and Ethernet Site Player modules are also available.

Available Modules

8-VSB/QAM Input
QPSK Input
DVB-ASI & SMPTE-310M I/O
GigE I/O
Dual GigE/ASI I/O
NTSC/AFD Output
VGA/YpPr
SDI
HD-SDI
XLR Audio
BNC Audio
Terminal Strip Audio
BTSC 4.5 SubCarrier Audio
RS232 Remote Control Management/SNMP
Secondary Audio Program
MPEG2 SD Encoder Module

Applications

- **8-VSB to NTSC/Analog L&R**
Converting off-air local digital broadcast to analog to carry on existing analog cable network. Benefit: Higher quality analog signal is delivered to viewers.
- **8-VSB to DVB-ASI**
Receiving off-air local digital broadcast and inserting them into digital cable system
- **QPSK to DVB-ASI**
Receiving satellite digital broadcast and inserting them into digital cable system
- **Digital Video Decoding and Monitoring**
- **NEW! Video Transcoding**
Simultaneously output HD and SD encoded video using SD Encoder module



MPEG2 SD Encoder Option for the DVM-150E ®

In the past, cable operators often used transrating (rate shaping) methods to efficiently use the finite bandwidth of their cable networks. These methods have been found to work only up to 25% bit rate reduction before suffering reduced video quality¹.

Now system integrators are trying to find more efficient ways to reduce bandwidth, often using re-coding techniques that are costly both in money and rack space.

Next is where the DVM-150E ® Professional DTV Receiver/Decoder excels. Using the existing DVM-150E ® platform, KTech's new SD Encoder module directory plugs into the 1RU decoder unit, adding a 4:2:0 MP@ML ISO/IEC 13818-1 compliant Transport Stream output. Recoding often hurts the video quality in the instance where an external stand-alone encoder is used. In the DVM-150E's case, the decoder sends digital video to the internal encoder with 4:2:2 chromatic quality, thus preserving every bit of video color information.

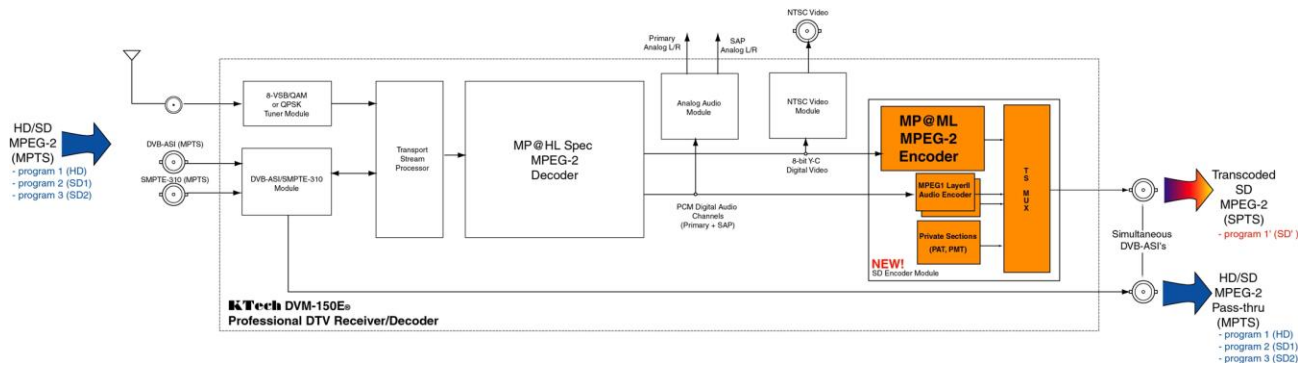
With this field upgradeable module, the DVM-150E, regardless of input format, will generate a Standard Definition video output as well as two (x2) audio streams for primary and SAP, all encapsulated

onto a MPEG2 TS. All bit rates are configurable at the click of a button in order to optimize the output video quality while still being able to squeeze out every bit of bandwidth.

Existing EIA-608 closed captioning is reinserted back into the recoded video header, providing a hassle-free video output. MPEG2 system tables that include the PAT and PMT are also muxed into the TS and are user configurable.

The DVM-150E's versatility is greatly expanded by this new MPEG2 SD encoder module. The existing DVM-150E platform can already provide a MPTS output received terrestrially when a unit is fitted with the 8-VSB tuner and a DVB-ASI/SMPTE I/O card. By simply adding the encoder module, cable operators can now simultaneously provide the same material in both HD (pass-thru) and SD using a single device, as shown in the figure below.


¹ Zou, Bill. DTV over digital cable: Reaching a larger audience. August 1, 2003. Broadcast Engineering



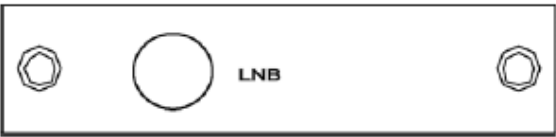
General Specifications (All specifications are preliminary and subject to change)

AC Power		Weight	
Frequency	47-63 Hz	Net	12 lbs
Voltage	90-264 VAC	Gross	15 lbs
Current	1.2 A (Max)		
Fuse	1.5 A, 250 V	Front Panel	
		Keypad	4 Directional Arrow Keys
Operating Conditions		Display	2 lines x 20 characters VFD (Vacuum Fluorescent Display)
Temperature	0° - 50°C		
Altitude	12,000 ft.	User Interface	
Humidity	95% non-condensing	Local	Front Panel
Cooling	Blower	Remote	RS232
Dimensions		Rack Space	1U
Height	1.75"		
Width	19"		
Depth	18"		

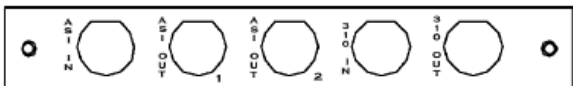
RF Specifications

<p>Part # RF 1</p> <p>8-VSB/QAM Tuner Module</p>  <p>Occupies slot #1</p>	<p>8-VSB Mode</p> <p>Tuning Range VHF/UHF CH 2 -69</p> <p>Connector 75Ω "F" type, female</p> <p>Input Sensitivity -28 dBmV to +33 dBmV</p> <p>Input Data Rate 19.392 Mbps</p> <p>Modulation Mode 8-VSB – ATSC Compliant</p> <p>Demod Gen 6TH Generation</p> <p>Adj Channel</p> <p>DTV into DTV >-33dB D/U @ -19 dBmV Desired Signal</p> <p>DTV into DTV >-33dB D/U @ -4 dBmV Desired Signal</p> <p>DTV into DTV >-20dB D/U @ +20dBmV Desired Signal</p> <p>NTSC into DTV >-40dB D/U @ -19dBmV Desired Signal</p> <p>NTSC into DTV >-35dB D/U @ -4 dBmV Desired Signal</p> <p>NTSC into DTV >-26dB D/U @ +20dBmV Desired Signal</p> <p>FP LED Status (1) Input Lock, (1) ATSC-PSIP Detected</p> <p>QAM Mode</p> <p>Tuning Range CATV 1-125</p> <p>Connector 75Ω "F" type, female</p> <p>Input Sensitivity -28 dBmV to +33 dBmV</p> <p>Input Data Rate QAM64 – 26.97035 Mbps QAM256 – 38.81070 Mbps</p> <p>Modulation Mode QAM64 – Annex B QAM256 – Annex B</p> <p>FP LED Status (1) Input Lock, (1) ATSC-PSIP Detected</p>
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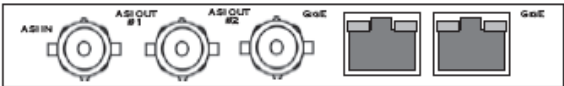


Part # RF2	<p>QPSK Tuner Module</p>  <p>Occupies slot #1</p>	<p>QPSK Mode Tuning Range 950 – 2150 MHz- L-Band Connector 75Ω "F" type, female I.F. Bandwidth 27MHz/36MHz Modulation Type QPSK Sensitivity -65dBm to -25dBm LNB Control 13/18V, 22KHz on/off LNB Current 400mA Symbol Rate 2~45 M symbols per second Code Rate 1/2, 2/3, 3/4, 5/6, 7/8</p>
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Transport Stream Specifications

Part # T1	<p>SMPTE-310M/DVB-ASI Module</p>  <p>Occupies slot #2</p>	<p>SMPTE-310M Connectors 75Ω BNC, (1) Input, (1) Output Data Rate 19.392 Mbps</p> <p>DVB-ASI Connectors 75Ω BNC, (1) Input, (2) Outputs Input Data Rate Up to 50 Mbps Output Data Rates <u>Input Mode – Data Rate</u> Passthru – up to 50 Mbps 8VSB – 19.392 Mbps QAM64 – Pass-Thru QAM256 – Pass-Thru SMPTE310M – 19.392 Mbps</p>
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GigE Transport Specifications

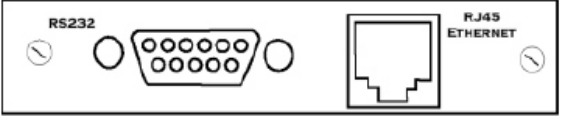
Part # G2	<p>DUAL GigE/ASI I/O Module</p>  <p>Occupies slot #2</p>	<p>Data Rate Up to 1 Gbps Compliance IEEE 802.3 Connector RJ-45 copper. MPEG Format MPEG-2 over IP, UDP based Multi-cast or Uni-Cast IGMP V2 and V3 Program Structure SPTS or MPTS Dual GigE (Redundancy)</p> <p>DVB-ASI Connectors 75Ω BNC, (1) Input, (2) Outputs Input Data Rate Up to 50 Mbps Output Data Rates <u>Input Mode – Data Rate</u> Passthru – up to 50 Mbps 8VSB – 19.392 Mbps QAM64 – pass-thru QAM256 – pass-thru SMPTE310M – 19.392 Mbps</p>
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RS232 (Included) RJ45 (Optional) Specifications

Part # M2	<p>RS232/RJ45 Module</p> 	<p>Baud Rate 19,200, 8 data bits, no parity, 1 stop bit Connector DSUB 9, female Download Capability Firmware Upgrades User Controls All Front Panel functions Stream Information Video Bit Rate, Audio Bit Rate, Aspect Ratio, Native Format, SNR, BER Display Windows HyperTerminal Software (Optional) RJ45 Ethernet</p>
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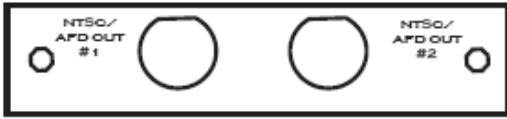

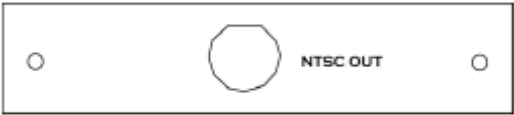

Management/SNMP Specifications (Optional)

 <p>Management/SNMP</p>	Part # M4	Baud Rate 57,600, 8 data bits, no parity, 1 stop bit Connector DSUB 9, female Download Capability Firmware Upgrades User Controls All Front Panel functions Stream Information Video Bitrate, Audio Bitrate, Aspect Ratio, Native Format, SNR, BER Display Windows HyperTerminal Software Ver 2 SNMP Ver 2 RJ45 Ethernet
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Video Decoder Specifications



Up/Down Conversion	1080i, 720p, 480i (NTSC), 480p
Video Formats	18 ATSC Formats
Decoder Bit Rate	1.5 - 45 Mbps
Video Outputs	User Selectable
Video Input	User Selectable
Compatibility	MPEG2 (4:2:0) MP@HL
Closed Captioning Standard	EIA-608B, EIA-708B

Analog Video Specifications

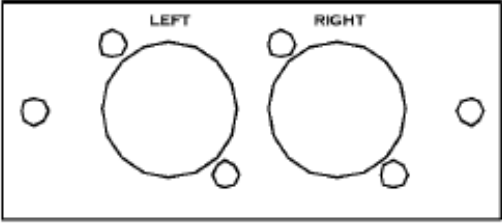
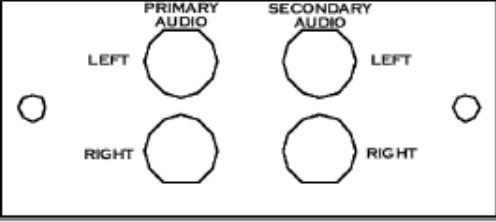
 <p>AFD Ready NTSC Output</p> <p>Occupies slot #7</p>	Part # VV1	AFD NTSC (Composite Video) Connector 75Ω BNC, (1) Output Output Level 1 Vp-p Video Format 480i AFD Support CEA-CEB16, TS-101-154 VBI Support SCTE-127, AMOL, TV Guide, Closed Captioning Line 21
 <p>AFD Ready SDI Output</p> <p>Occupies slot #7</p>	Part # VV7	AFD SDI Connector 75Ω BNC, (1) Output Output Level 800 mVp-p ± 10% Video Format 480i Standard SMPTE-259M Data Rate 270 Mbps Embedded Audio SMPTE-272M AFD Support CEA-CEB16, TS-101-154 VBI Support SCTE-127, AMOL, TV Guide, Closed Captions Line 21
 <p>NTSC Video Module</p> <p>Occupies slot #3</p>	Part # V1	NTSC (Composite Video) Connector 75Ω BNC, (1) Output Output Level 1 Vp-p VBI EIA-608 CC Line 21 Video Format 480i
 <p>VGA/ YPbPr Module</p> <p>Occupies slot #6</p>	Part # V2	VGA/ Y Pb Pr Connectors (3) 75Ω BNC's (1) SVGA 15 pin socket Output Level 1000 mV ± 10 mV Video Format 1080i, 720p, 480p



Digital Video Specifications

<p style="text-align: right;">Part # V3</p> <p style="text-align: center;">SDI Module</p>  <p style="text-align: center;">Occupies slot #5</p>	<p>SDI</p> <p>Connector 75Ω BNC, (2) Output Output Level 800 mVp-p ± 10% Video Format 480i Standard SMPTE-259M Data Rate 270 Mbps Embedded Audio SMPTE-272M</p>
<p style="text-align: right;">Part # V5</p> <p style="text-align: center;">HDSDI Module</p>  <p style="text-align: center;">Occupies slot #7</p>	<p>HDSDI</p> <p>Connector 75Ω BNC, (2) Output Output Level 800 mVp-p ± 10% Video Format 1080i, 720p, 480p Standard SMPTE-292M Data Rate 1.485 Gbps</p>

Analog Audio Specifications

<p style="text-align: right;">Part # A1</p> <p style="text-align: center;">XLR Audio Module</p>  <p style="text-align: center;">Occupies slot #4</p>	<p>Outputs (1) Balanced Audio Left (1) Balanced Audio Right Connectors 600Ω XLR male Audio Program Primary or Secondary</p>
<p style="text-align: right;">Part # A2</p> <p style="text-align: center;">BNC Audio Module</p>  <p style="text-align: center;">Occupies slot #4</p>	<p>Outputs (1) Primary Audio Left (1) Primary Audio Right (1) Secondary Audio Left (1) Secondary Audio Right Connectors (4) BNC's Audio Program Primary and Secondary (with SAP option)</p>



<p>Part # A4</p> <p>Terminal Strip Audio Module</p> <p>Occupies slot #4</p>	<p>Outputs</p> <table border="1"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr><td>1</td><td>Primary Balanced Left</td></tr> <tr><td>2</td><td>Primary Balanced Left</td></tr> <tr><td>3</td><td>GND</td></tr> <tr><td>4</td><td>Primary Balanced Right</td></tr> <tr><td>5</td><td>Primary Balanced Right</td></tr> <tr><td>6</td><td>GND</td></tr> <tr><td>7</td><td>Secondary Balanced Left – w/SAP Option</td></tr> <tr><td>8</td><td>Secondary Balanced Left – w/SAP Option</td></tr> <tr><td>9</td><td>GND</td></tr> <tr><td>10</td><td>Secondary Balanced Right – w/SAP Option</td></tr> <tr><td>11</td><td>Secondary Balanced Right – w/SAP Option</td></tr> <tr><td>12</td><td>GND</td></tr> </tbody> </table> <p>Connector 12 pin Phoenix Terminal Strip</p>	PIN	SIGNAL	1	Primary Balanced Left	2	Primary Balanced Left	3	GND	4	Primary Balanced Right	5	Primary Balanced Right	6	GND	7	Secondary Balanced Left – w/SAP Option	8	Secondary Balanced Left – w/SAP Option	9	GND	10	Secondary Balanced Right – w/SAP Option	11	Secondary Balanced Right – w/SAP Option	12	GND
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2	Primary Balanced Left																										
3	GND																										
4	Primary Balanced Right																										
5	Primary Balanced Right																										
6	GND																										
7	Secondary Balanced Left – w/SAP Option																										
8	Secondary Balanced Left – w/SAP Option																										
9	GND																										
10	Secondary Balanced Right – w/SAP Option																										
11	Secondary Balanced Right – w/SAP Option																										
12	GND																										

Digital Audio Specifications

<p>Part # A6</p> <p>AC-3 Audio Module</p> <p>Occupies slot #4</p>	<p>Outputs (1) AC-3 Digital Audio Output</p> <p>Connectors 600Ω XLR male</p> <p>Audio Program Primary</p> <p>Output Level 0.5 Vp-p ± 20%</p> <p>Connectors (2) BNC's Analog Audio (1) Primary Audio Left (1) Primary Audio Right</p>
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BTSC 4.5 MHz Subcarrier Specifications

Preliminary - Available Sept. 08

Part # B2

BTSC Audio Module

Occupies slot #4

Outputs (1) AC-3 Digital Audio Output
Connectors 600Ω XLR male
Audio Program Primary
Output Level 0.5 Vp-p ± 20%
Connectors (2) BNC's Analog Audio
 (1) Primary Audio Left
 (1) Primary Audio Right

Outputs
 BNC 1 NTSC Input
 BNC 2 NTSC + BTSC Output
 BNC 3 BTSC 4.5MHz Subcarrier Out

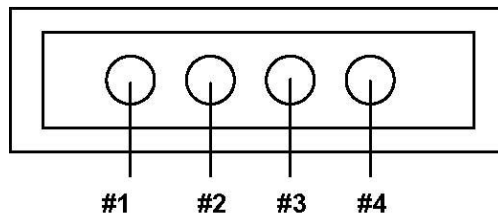
PIN SIGNAL
 1 Primary Balanced Left
 2 Primary Balanced Left
 3 GND
 4 Primary Balanced Right
 5 Primary Balanced Right
 6 GND
 7 Secondary Balanced Left – w/SAP Option
 8 Secondary Balanced Left – w/SAP Option
 9 GND
 10 Secondary Balanced Right – w/SAP Option
 11 Secondary Balanced Right – w/SAP Option
 12 GND

Connector 12 pin Phoenix Terminal Strip, 3x BNC

Contact Relay

Definition of the 4-pin barrier strip:

Part # M1



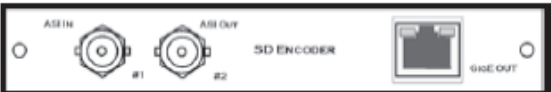
The truth table for the terminals is shown below (default):

Decoding Status	Pin #1 & #4
Bad	Open
Good	Closed

Note: It is possible to change the polarity of the relay contact using the front panel control. A firmware upgrade may be needed.

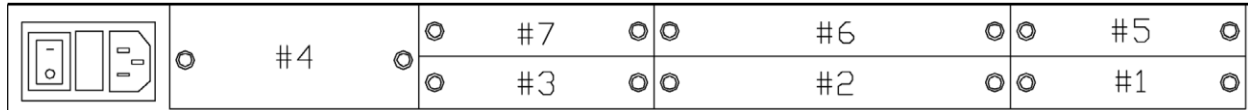


MPEG2 SD Encoder Specifications

<p>Part # SD1</p> <p>SD Encoder Module</p>  <p>Occupies slot #6</p>	<table border="0"> <tr> <td><u>Video</u></td> <td></td> </tr> <tr> <td>Coding Standard</td> <td>ISO/IEC 1381-2 (MPEG-2 MP@ML)</td> </tr> <tr> <td>Encode Size</td> <td>NTSC 720x480@29.97/30 Hz</td> </tr> <tr> <td>Video Rate</td> <td>2 to 15 Mbps</td> </tr> <tr> <td>Picture Structure</td> <td>Field/Frame</td> </tr> <tr> <td>Format</td> <td>4:2:0</td> </tr> <tr> <td>Motion Estimation</td> <td>+/- 300 pixel</td> </tr> <tr> <td>Rate Control</td> <td>CBR/VBR</td> </tr> <tr> <td>Ancillary Data</td> <td>Closed Captioning (EIA-608) Line 21</td> </tr> <tr> <td><u>Audio (Primary)</u></td> <td></td> </tr> <tr> <td>Coding Standard</td> <td>ISO/IEC 11172-3 (Layer II)</td> </tr> <tr> <td>Sampling Rate</td> <td>32, 44.1, 48 kHz</td> </tr> <tr> <td>Audio Rate Max</td> <td>384 kbps</td> </tr> <tr> <td>Channels</td> <td>2 (Left/Right)</td> </tr> <tr> <td><u>Audio (Secondary)</u></td> <td></td> </tr> <tr> <td>Coding Standard</td> <td>ISO/IEC-11172-3 (Layer II)</td> </tr> <tr> <td>Sampling Rate</td> <td>32, 44.1, 48 kHz</td> </tr> <tr> <td>Audio Rate</td> <td>Max 384 kbps</td> </tr> <tr> <td>Channels</td> <td>2 (Left/Right)</td> </tr> <tr> <td><u>Transport</u></td> <td></td> </tr> <tr> <td>Standard</td> <td>ISO/IEC 13818-1 (Transport Stream)</td> </tr> <tr> <td>Output Format</td> <td>188 byte</td> </tr> <tr> <td>Bit Rate</td> <td>2 to 60 Mbps</td> </tr> <tr> <td>Lip Sync</td> <td>Yes</td> </tr> <tr> <td>Interface</td> <td>DVB-ASI (BNC 75Ω) x 2</td> </tr> <tr> <td><u>GigE</u></td> <td></td> </tr> <tr> <td>Data Rate</td> <td>Up to 1 Gbps.</td> </tr> <tr> <td>Compliance</td> <td>IEEE 802.3z draft D5.0-1000BASE-SX</td> </tr> <tr> <td>Connector</td> <td>Supports copper RJ45.</td> </tr> <tr> <td>MPEG format</td> <td>MPEG-2 over IP, UDP based</td> </tr> <tr> <td>Program Capacity (max)</td> <td>1 program @ 2~15 Mbps.</td> </tr> <tr> <td>Configuration Parameters</td> <td>IP address, Subnet mask, and UDP port number</td> </tr> <tr> <td>Program Structure</td> <td>SPTS</td> </tr> <tr> <td><u>Control</u></td> <td>Front panel</td> </tr> </table>	<u>Video</u>		Coding Standard	ISO/IEC 1381-2 (MPEG-2 MP@ML)	Encode Size	NTSC 720x480@29.97/30 Hz	Video Rate	2 to 15 Mbps	Picture Structure	Field/Frame	Format	4:2:0	Motion Estimation	+/- 300 pixel	Rate Control	CBR/VBR	Ancillary Data	Closed Captioning (EIA-608) Line 21	<u>Audio (Primary)</u>		Coding Standard	ISO/IEC 11172-3 (Layer II)	Sampling Rate	32, 44.1, 48 kHz	Audio Rate Max	384 kbps	Channels	2 (Left/Right)	<u>Audio (Secondary)</u>		Coding Standard	ISO/IEC-11172-3 (Layer II)	Sampling Rate	32, 44.1, 48 kHz	Audio Rate	Max 384 kbps	Channels	2 (Left/Right)	<u>Transport</u>		Standard	ISO/IEC 13818-1 (Transport Stream)	Output Format	188 byte	Bit Rate	2 to 60 Mbps	Lip Sync	Yes	Interface	DVB-ASI (BNC 75Ω) x 2	<u>GigE</u>		Data Rate	Up to 1 Gbps.	Compliance	IEEE 802.3z draft D5.0-1000BASE-SX	Connector	Supports copper RJ45.	MPEG format	MPEG-2 over IP, UDP based	Program Capacity (max)	1 program @ 2~15 Mbps.	Configuration Parameters	IP address, Subnet mask, and UDP port number	Program Structure	SPTS	<u>Control</u>	Front panel
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Rear Panel



Position and Signal	Option, Description and Part #	
#1 TUNER	<input type="radio"/> A	(1) 8-VSB/QAM IN (RF1)
	<input type="radio"/> B	(1) QPSK IN (RF2)
	<input type="radio"/> N	NONE
#2 MPEG2	<input type="radio"/> A	(1) SMPTE IN, (1) SMPTE OUT, (1) DVB-ASI IN, (2) DVB-ASI OUT (T1)
	<input type="radio"/> B	Dual GigE I/O, (1) ASI IN, (1) ASI OUT (G2)
	<input type="radio"/> CR	Contact Relay (M1)
	<input type="radio"/> N	NONE
#3 VIDEO	<input type="radio"/> A	(1) NTSC OUT (V1)
	<input type="radio"/> N	NONE
#4 AUDIO	<input type="radio"/> A	(2) XLR (Balanced) -Primary Audio (A1)
	<input type="radio"/> B	(4) BNC (Unbalanced) - without SAP (A2)
	<input type="radio"/> C	(4) BNC (Unbalanced) - with SAP (A3)
	<input type="radio"/> D	Terminal Strip (Balanced) - without SAP (A4)
	<input type="radio"/> E	Terminal Strip (Balanced) - with SAP (A5)
	<input type="radio"/> F	Digital AC-3, (1) XLR (A6)
	<input type="radio"/> G	BTSC (4.5 MHz Sub Carrier) (B1)
	<input type="radio"/> H	BTSC (4.5) MHz Sub Carrier) - with SAP (B2)
#5 VIDEO	<input type="radio"/> A	(2) SDI OUT - embedded audio without SAP (V3)
	<input type="radio"/> B	(2) SDI OUT - embedded audio with SAP (V4)
	<input type="radio"/> E	Ethernet/Site Player (M2)
	<input type="radio"/> M	Management (M4)
	<input type="radio"/> CR	Contact Relay (M1)
	<input type="radio"/> N	NONE
#6 VIDEO	<input type="radio"/> A	VGA/YPbPr Out (V2)
	<input type="radio"/> B	MPEG2 SD Encoder w/ DVB-ASI and GigE Out (SD1)
	<input type="radio"/> CR	Contact Relay (M1)
	<input type="radio"/> N	NONE
#7 VIDEO	<input type="radio"/> A	(2) NTSC/AFD OUT (VV1)
	<input type="radio"/> B	(2) HDSDI OUT - embedded audio (V5)
	<input type="radio"/> C	(2) HDSDI OUT - embedded audio - with SAP (V6)
	<input type="radio"/> E	Ethernet/Site Player (M2)
	<input type="radio"/> S	(1) NTSC/AFD OUT - (1) SDI/AFD OUT - embedded audio (VV7)
	<input type="radio"/> CR	Contact Relay (M1)
	<input type="radio"/> N	NONE

Ordering Information

Part Number	Description
DVM-150E	Professional DTV Receiver/Decoder

Please select an option for each card position and submit via email, phone or fax for pricing and delivery information to:

Email: rcastillo@ktechtelecom.com **Phone:** (818) 773-0333 **Fax:** (818) 773-8330

