

DVM-150E

PROFESSIONAL DTV RECEIVER/DECODER



Performance

The DVM-150E is a single rack, Professional DTV Receiver/Decoder with the capability of handling SD & HD MPEG-2 4:2:0 DTV signals. Its modular design minimizes cost to 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 & space of unwanted or unused inputs & 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 LED's, 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 those users requiring MPEG-2 transport stream I/O.

Video Decoding

The unit is capable of decoding MPEG-2 (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 & 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 MPEG-1 audio to Analog Left & 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. An 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/ Y Pb Pr
SDI
HD-SDI
XLR Audio
BNC Audio
Terminal Strip Audio
BTSC 4.5 SubCarrier Audio
RS232 Remote Control
Management/SNMP
Secondary Audio Program
MPEG-2 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)

MPEG-2 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 reduce 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.

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

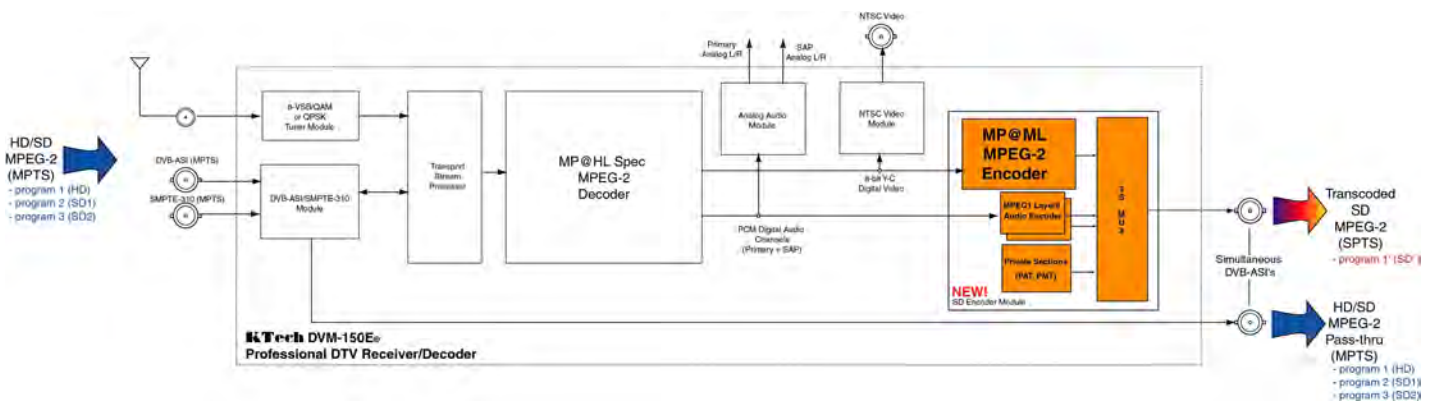
Regardless of input format, the DVM-150E, with this

field upgradeable module, will generate a Standard Definition video output as well as two (x2) audio streams for primary and SAP all encapsulated onto a MPEG-2 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 re-inserted back into the re-coded video header providing a hassle free video output. MPEG-2 System tables 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 MPEG-2 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 (see figure).


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

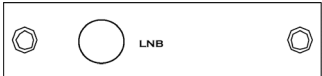


General Specifications (all specifications are preliminary and subject to change)

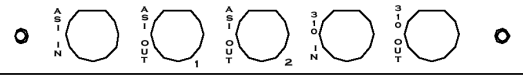
AC Power		Weight	
Frequency	47-63 Hz	Net	12 lbs
Voltage	90-264 VAC	Gross	15 lbs
Current	1.2 A (max)		
Fuse	1.5A, 250V	Front Panel	
		Keypad	4 Directional Arrow Keys
Operating Conditions		Display	2 lines x 20 characters VFD (Vacuum Fluorescent Display)
Temperature	0° - 50°C		
Altitude	12,000 ft.	User 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# RF1</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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<p>Part# RF2</p> <p>QPSK Tuner Module</p>  <p>Occupies slot #1</p>	<p>QPSK Mode</p> <p>Tuning Range 950 – 2150 MHz- L-Band</p> <p>Connector 75Ω "F" type, female</p> <p>IF Bandwidth 27MHz/36MHz</p> <p>Modulation Type QPSK</p> <p>Sensitivity -65dBm to -25dBm</p> <p>LNB Control 13/18V, 22KHz on/off</p> <p>LNB Current 400mA</p> <p>Symbol Rate 2~45 M symbols per second</p> <p>Code Rate 1/2, 2/3, 3/4, 5/6, 7/8</p>
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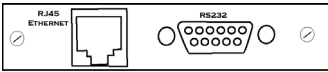
Transport Stream Specifications

<p>Part# T1</p> <p>SMPTE-310M/DVB-ASI Module</p>  <p>Occupies slot #2</p>	<p><u>SMPTE-310M</u> Connectors 75Ω BNC, (1) Input, (1) Output Data Rate 19.392 Mbps</p> <p><u>DVB-ASI</u> 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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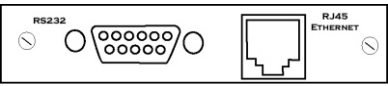
GigE Transport Specifications

<p>Part# G2</p> <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><u>DVB-ASI</u> Connectors 75Ω BNC, (1) Input, (1) Input, (1) Output Input Data Rate Up to 50 Mbps</p> <p>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

<p>Part# M2</p> <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 Bitrate, Audio Bitrate, Aspect ratio, Native Format, SNR, BER Display Software Windows HyperTerminal RJ45 Ethernet (Optional)</p>
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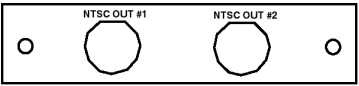
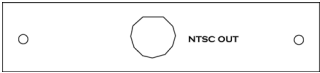

Management/SNMP Specifications (Optional)

<p>Part# M4</p> <p>Management/SNMP</p>  <p>Occupies slot #5</p>	<p>Baud Rate 57,600, 8 data bits, no parity, 1 stop bit</p> <p>Connector DSUB 9, female</p> <p>Download Capability Firmware Upgrades</p> <p>User Controls All Front Panel functions</p> <p>Stream Information Video Bitrate, Audio Bitrate, Aspect ratio, Native Format, SNR, BER</p> <p>Display Windows HyperTerminal</p> <p>Software Ver 2</p> <p>SNMP Ver 2</p> <p>RJ45 Ethernet</p>
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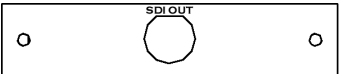
Video Decoder Specifications

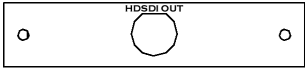
Up/Down Conversion	1080i, 720p, 480i (NTSC), 480p	Closed Captioning	
Video Formats	18 ATSC Formats	Standard	EIA-608B, EIA-708B
Decoder Bitrate	1.5 –45 Mbps		
Video Outputs	User Selectable		
Video Input	User Selectable		
Compatibility	MPEG-2 (4:2:0) MP@HL		

Analog Video Specifications

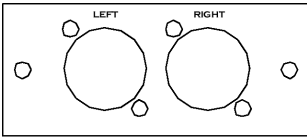
<p>Part# VV1</p> <p>AFD Ready NTSC Output</p>  <p>Occupies slot #7</p>	<p>AFD NTSC (composite video)</p> <p>Connector 75Ω BNC, (1) Output</p> <p>Output Level 1 Vp-p</p> <p>Video Format 480i</p> <p>AFD Support CEA-CEB16, TS-101-154</p> <p>VBI Support SCTE-127, AMOL, TV Guide, Closed Captioning Line 21</p>
<p>Part# V1</p> <p>NTSC Video Module</p>  <p>Occupies slot #3</p>	<p>NTSC (composite video)</p> <p>Connector 75Ω BNC, (1) Output</p> <p>Output Level 1 Vp-p</p> <p>VBI EIA-608 CC Line 21</p> <p>Video Format 480i</p>
<p>Part# V3</p> <p>VGA/ YPbPr Module</p>  <p>Occupies slot #6</p>	<p>VGA/ Y Pb Pr</p> <p>Connectors (3) 75Ω BNC's (1) SVGA 15 pin socket</p> <p>Output Level 1000 mV ± 10 mV</p> <p>Video Format 1080i, 720p, 480p</p>

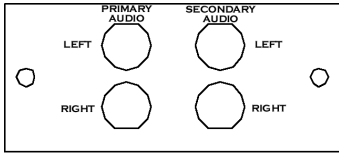
Digital Video Specifications

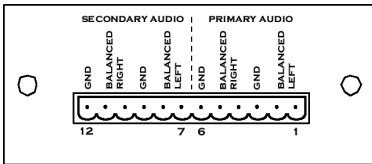
<p>Part# V4</p> <p>SDI Module</p>  <p>Occupies slot #5</p>	<p>SDI</p> <p>Connector 75Ω BNC, (1) Output</p> <p>Output Level 800 mVp-p ± 10%</p> <p>Video Format 480i</p> <p>Standard SMPTE-259M</p> <p>Data Rate 270 Mbps</p> <p>Embedded SMPTE-272M</p> <p>Audio</p>
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<p>HDSI Module Part# V5</p>  <p>Occupies slot #7</p>	<p>HDSI</p> <p>Connector 75Ω BNC, (1) Output</p> <p>Output Level 800 mVp-p ± 10%</p> <p>Video Format 1080i, 720p, 480p</p> <p>Standard SMPTE-292M</p> <p>Data Rate 1.485 Gbps</p>
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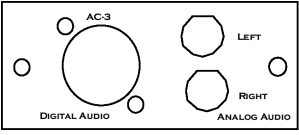
Analog Audio Specifications

<p>XLR Audio Module Part# A1</p>  <p>Occupies slot #4</p>	<p>Outputs (1) Balanced Audio Left (1) Balanced Audio Right</p> <p>Connectors 600Ω XLR male</p> <p>Audio Program Primary or Secondary</p>
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<p>BNC Audio Module Part# A2</p>  <p>Occupies slot #4</p>	<p>Outputs (1) Primary Audio Left (1) Primary Audio Right (1) Secondary Audio Left (1) Secondary Audio Right</p> <p>Connectors (4) BNC's</p> <p>Audio Program Primary and Secondary (with SAP option)</p>
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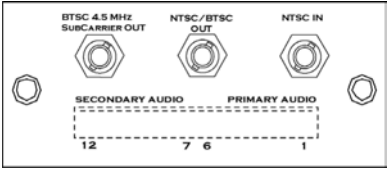
<p>Terminal Strip Audio Module Part# A4</p>  <p>Occupies slot #4</p>	<p>Outputs</p> <table border="0"> <thead> <tr> <th>PIN</th> <th>SIGNAL</th> </tr> </thead> <tbody> <tr><td>1</td><td>Primary Balanced Left</td></tr> <tr><td>2</td><td>Primary Balanced Right</td></tr> <tr><td>3</td><td>GND</td></tr> <tr><td>4</td><td>Secondary Balanced Left</td></tr> <tr><td>5</td><td>Secondary Balanced Right</td></tr> <tr><td>6</td><td>GND</td></tr> <tr><td>7</td><td>Primary Balanced Left – w/SAP Option</td></tr> <tr><td>8</td><td>Primary Balanced Right – w/SAP Option</td></tr> <tr><td>9</td><td>GND</td></tr> <tr><td>10</td><td>Secondary Balanced Left – 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 Right	3	GND	4	Secondary Balanced Left	5	Secondary Balanced Right	6	GND	7	Primary Balanced Left – w/SAP Option	8	Primary Balanced Right – w/SAP Option	9	GND	10	Secondary Balanced Left – w/SAP Option	11	Secondary Balanced Right – w/SAP Option	12	GND
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9	GND																										
10	Secondary Balanced Left – 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</p> <p>(1) Primary Audio Left</p> <p>(1) Primary Audio Right</p>
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BTSC 4.5MHZ Subcarrier Specifications

Preliminary – Available Sept 08

<p>Part# B2</p> <p>BTSC 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</p> <p>(1) Primary Audio Left</p> <p>(1) Primary Audio Right</p> <p>Outputs</p> <p>BNC 1 NTSC Input</p> <p>BNC 2 NTSC + BTSC Output</p> <p>BNC 3 BTSC 4.5MHZ Subcarrier Out</p> <table border="0"> <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, 3x BNC</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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9	GND																										
10	Secondary Balanced Right – w/SAP Option																										
11	Secondary Balanced Right – w/SAP Option																										
12	GND																										

Part# SD1

SD Encoder Module



Occupies slot #5

Video

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

Audio (Primary)

Coding Standard ISO/IEC 11172-3 (Layer II)
Sampling Rate 32, 44.1, 48 kHz
Audio Rate Max 384 kbps
Channels 2 (Left/Right)

Audio (Secondary)

Coding Standard ISO/IEC-11172-3 (Layer II)
Sampling Rate 32, 44.1, 48 kHz
Audio Rate Max 384 kbps
Channels 2 (Left/Right)

Transport

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

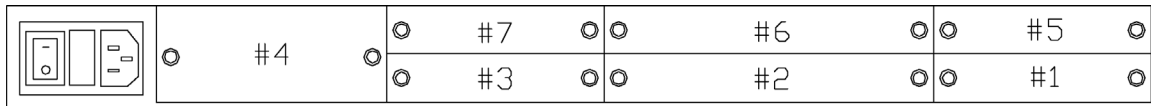
GigE

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

Control

Front panel

Rear Panel



POSITION & SIGNAL	OPTION & DESCRIPTION + PART#
#1 TUNER	<p>O A (1) 8-VSB/QAM IN (RF1)</p> <p>O B (1) QPSK IN (RF2)</p> <p>O N NONE</p>
#2 MPEG2	<p>O A (1) SMPTE IN, (1) SMPTE OUT, (1) DVB-ASI IN, (2) DVB-ASI OUT (T1)</p> <p>O B Dual GigE I/O, (1) ASI In, (1) ASI Out (G2)</p> <p>O N NONE</p>
#3 VIDEO	<p>O A (1) NTSC OUT (V1)</p> <p>O N NONE</p>
#4 AUDIO	<p>O A (2) XLR (balanced) – Primary Audio (A1)</p> <p>O B (4) BNC (unbalanced) – without SAP (A2)</p> <p>O C (4) BNC (unbalanced) – with SAP (A3)</p> <p>O D Terminal Strip (balanced) – without SAP (A4)</p> <p>O E Terminal Strip (balanced) – with SAP (A5)</p> <p>O F Digital AC-3, (1) XLR (A6)</p> <p>O G BTSC (4.5 MHz Sub Carrier) (B1)</p> <p>O H BTSC (4.5 MHz Sub Carrier) – with SAP (B1)</p> <p>O N NONE</p>
#5 VIDEO	<p>O A (2) SDI OUT – embedded audio without SAP (V3)</p> <p>O B (2) SDI OUT – embedded audio with SAP (V4)</p> <p>O E Ethernet/Site Player (M2)</p> <p>O M Management (M4)</p> <p>O N NONE</p>
#6 VIDEO	<p>O A VGA/ YPbPr Out (V2)</p> <p>O B MPEG-2 SD Encoder w/ DVB-ASI and GigE out (SD1)</p> <p>O N NONE</p>
#7 VIDEO	<p>O A (2) NTSC/AFD OUT (VV1)</p> <p>O B (2) HDSDI OUT – embedded audio (V5)</p> <p>O C (2) HDSDI OUT – embedded audio – with SAP (V6)</p> <p>O E Ethernet/Site Player (M2)</p> <p>O N NONE</p>

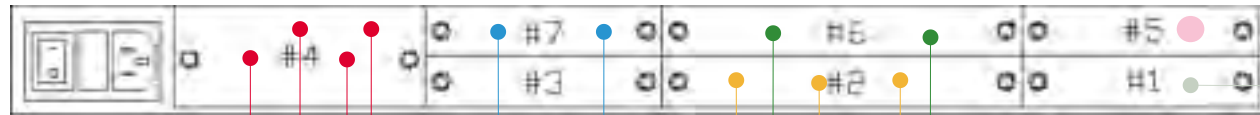
Ordering Information

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

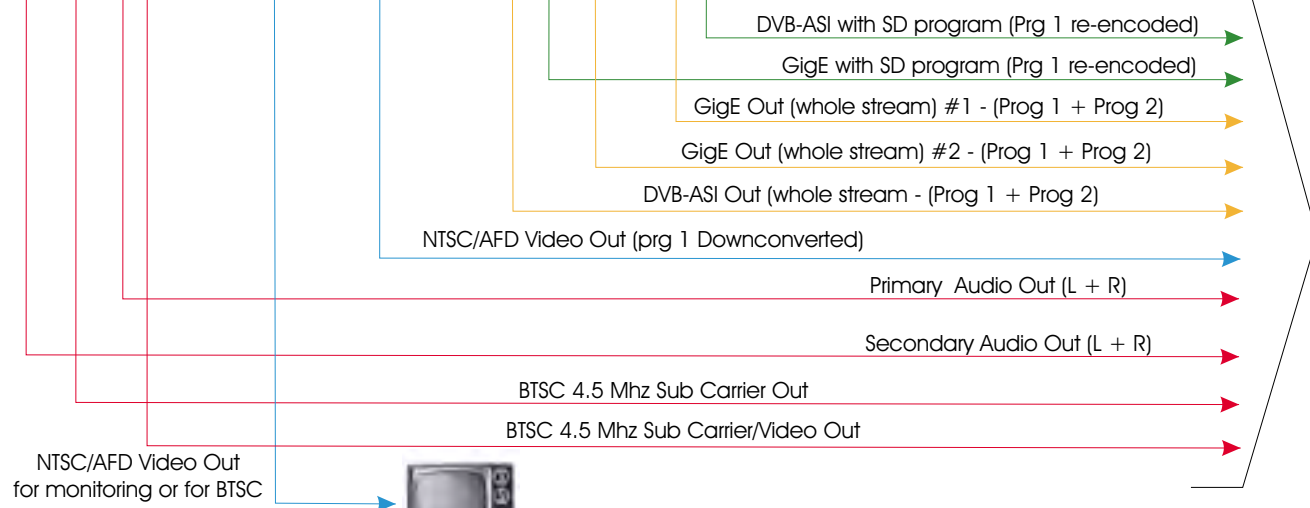
Digital/Analog System Using KTech DVM-150E



BACK PANEL VIEW



INPUT
Ch 11
(HD Prog 1 + SD Prog 2)



Simultaneous Outputs

SLOT#

- #1 RF Input (8-VSB/QAM)
- #2 G2 Module (Dual GigE and ASI I/O)
- #4 B2 Module (4.5 Mhz Subcarrier Audio with SAP)
- #4 A5 Module (Terminal strip Audio with SAP)
- #5 RJ45 Ethernet remote with SNMP (management)
- #6 Sd1 Module (SD encoder with ASI and GigE outputs)
- #7 W1 Module (NTSC/AFD Ready)
- #3 Future Service growth

