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 MEPG2 (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/YPbPr
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

Ktechtelecom

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 quality[1].

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.

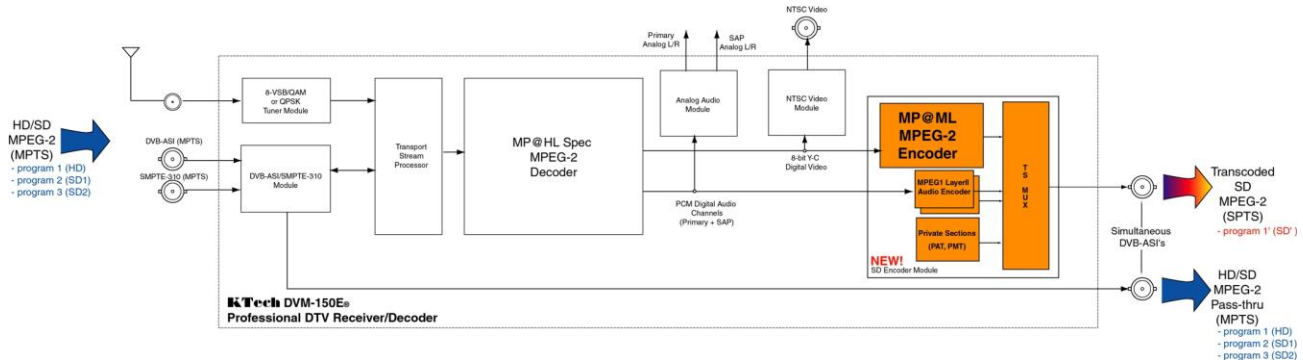
Next is where the DVM-150E ® Professional DTV Receiver/Decoder excels. Using the existing DVM-150E ® platform, KTech's new SD Encoder module directory plugs into the 1RU decoder unit, adding a 4:2:0 MP@ML ISO/IED 13818-1 compliant Transport Stream output. Recoding often hurts the video quality in the 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

Part # RF 1

8-VSB/QAM Tuner Module

Occupies slot #1

8-VSB Mode

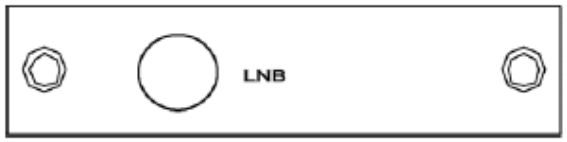
Tuning Range	VHF/UHF CH 2 -69
Connector	75Ω "F" type, female
Input Sensitivity	-28 dBmV to +33 dBmV
Input Data Rate	19.392 Mbps
Modulation Mode	8-VSB – ATSC Compliant
Demod Gen	6TH Generation
Adj Channel	
DTV into DTV	>-33dB D/U @ -19 dBmV Desired Signal
DTV into DTV	>-33dB D/U @ -4 dBmV Desired Signal
DTV into DTV	>-20dB D/U @ +20dBmV Desired Signal
NTSC into DTV	>-40dB D/U @ -19dBmV Desired Signal
NTSC into DTV	>-35dB D/U @ -4 dBmV Desired Signal
NTSC into DTV	>-26dB D/U @ +20dBmV Desired Signal
FP LED Status	(1) Input Lock, (1) ATSC-PSIP Detected

QAM Mode

Tuning Range	CATV 1-125
Connector	75Ω "F" type, female
Input Sensitivity	-28 dBmV to +33 dBmV
Input Data Rate	QAM64 – 26.97035 Mbps
	QAM256 – 38.81070 Mbps
Modulation Mode	QAM64 – Annex B
	QAM256 – Annex B
FP LED Status	(1) Input L ock, (1) ATSC-PSIP Detected

Part # RF2

QPSK Tuner Module



Occupies slot #1

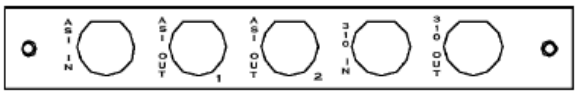
QPSK Mode

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

Transport Stream Specifications

Part # T1

SMPTE-310M/DVB-ASI Module



Occupies slot #2

SMPTE-310M

Connectors	75Ω BNC, (1) Input, (1) Output
Data Rate	19.392 Mbps

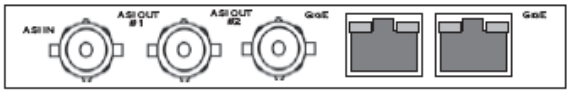
DVB-ASI

Connectors	75Ω BNC, (1) Input, (2) Outputs
Input Data Rate	Up to 50 Mbps
Output Data Rates	**Input Mode – Data Rate** Passthru – up to 50 Mbps 8VSB – 19.392 Mbps QAM64 – Pass-Thru QAM256 – Pass-Thru SMPTE310M – 19.392 Mbps

GigE Transport Specifications

Part # G2

DUAL GigE/ASI I/O Module



Occupies slot #2

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)

DVB-ASI

Connectors	75Ω BNC, (1) Input, (2) Outputs
Input Data Rate	Up to 50 Mbps
Output Data Rates	**Input Mode – Data Rate** Passthru – up to 50 Mbps 8VSB – 19.392 Mbps QAM64 – pass-thru QAM256 – pass-thru SMPTE310M – 19.392 Mbps

RS232 (Included) RJ45 (Optional) Specifications

Part # M2

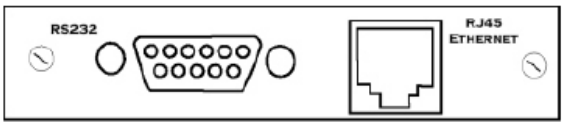
RS232/RJ45 Module

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	
Software	Windows HyperTerminal
RJ45 Ethernet	(Optional)

Management/SNMP Specifications (Optional)

Part # M4

Management/SNMP



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
Display	Ratio, Native Format, SNR, BER
Software	Windows HyperTerminal
SNMP	Ver 2
RJ45 Ethernet	

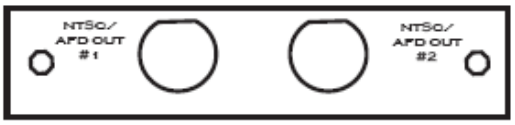
Video Decoder Specifications

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

Part # VV1

AFD Ready NTSC Output



Occupies slot #7

Part # VV7

AFD Ready SDI Output

Occupies slot #7

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

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

Part # V1

NTSC Video Module

Occupies slot #3

NTSC (Composite Video)

Connector	75Ω BNC, (1) Output
Output Level	1 Vp-p
VBI	EIA-608 CC Line 21
Video Format	480i

Part # V2

VGA/ YPbPr Module

Occupies slot #6

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

Part # V3

SDI Module

Occupies slot #5

SDI

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

Part # V5

HDSDI Module

Occupies slot #7

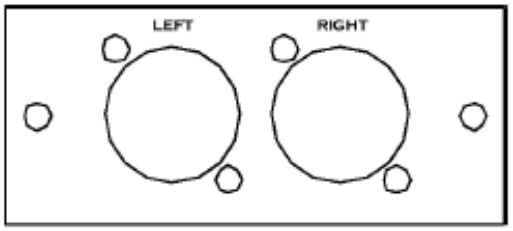
HDSDI

Connector	75Ω BNC, (2) Output
Output Level	800 mVp-p ± 10%
Video Format	1080i, 720p, 480p
Standard	SMPTE-292M
Data Rate	1.485 Gbps

Analog Audio Specifications

Part # A1

XLR Audio Module

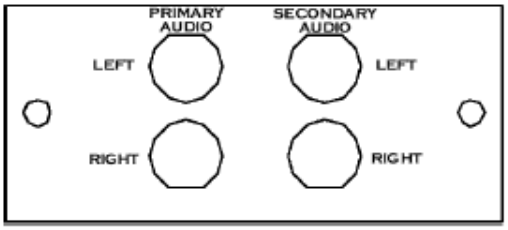


Occupies slot #4

Outputs	(1) Balanced Audio Left (1) Balanced Audio Right
Connectors	600Ω XLR male
Audio Program	Primary or Secondary

Part # A2

BNC Audio Module

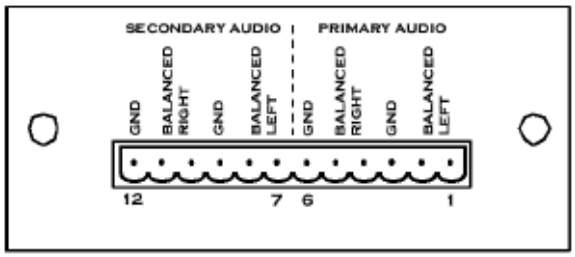


Occupies slot #4

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**)

Part # A4

Terminal Strip Audio Module



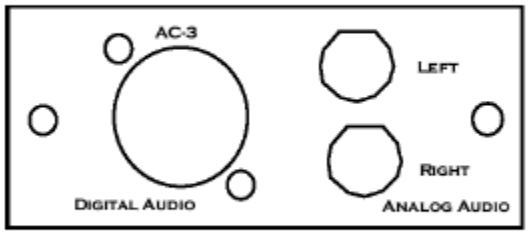
Occupies slot #4

Outputs	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	

Digital Audio Specifications

Part # A6

AC-3 Audio Module



Occupies slot #4

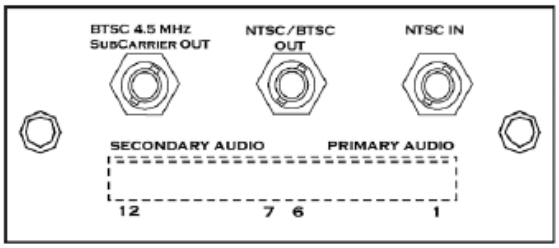
Outputs	(1) AC-3 Digital Audio Output
Connectors	600Ω XLR male
Audio Program	Primary
Output Level	0.5 Vp-p ± 20%
Connectors	(2) BNC's Analog Audio
	(1) Primary Audio Left
	(1) Primary Audio Right

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

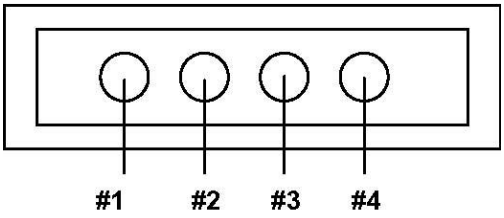
PIN	SIGNAL
1	Primary Balanced Left
2	Primary Balanced Left
3	GND
4	Primary Balanced Right
5	Primary Balanced Right
6	GND
7	Secondary Balanced Left – **w/SAP Option**
8	Secondary Balanced Left – **w/SAP Option**
9	GND
10	Secondary Balanced Right – **w/SAP Option**
11	Secondary Balanced Right – **w/SAP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

Part # SD1

SD Encoder Module

Occupies slot #6

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

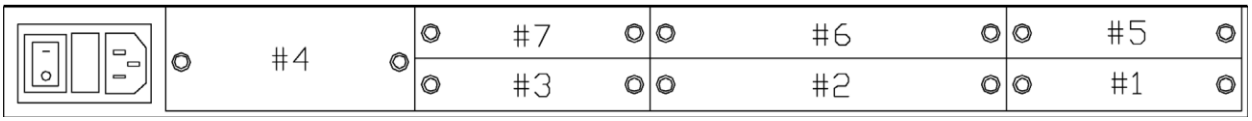
Standard	ISO/IEC 13818-1 (Transport Stream)
Output Format	188 byte
Bit Rate	2 to 60 Mbps
Lip Sync	Yes
Interface	DVB-ASI (BNC 75Ω) x 2

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

Provided by: Mega Hertz 800-883-8839 info@go2mhz.com www.go2mhz.com