MODEL

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 quality[i].

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).

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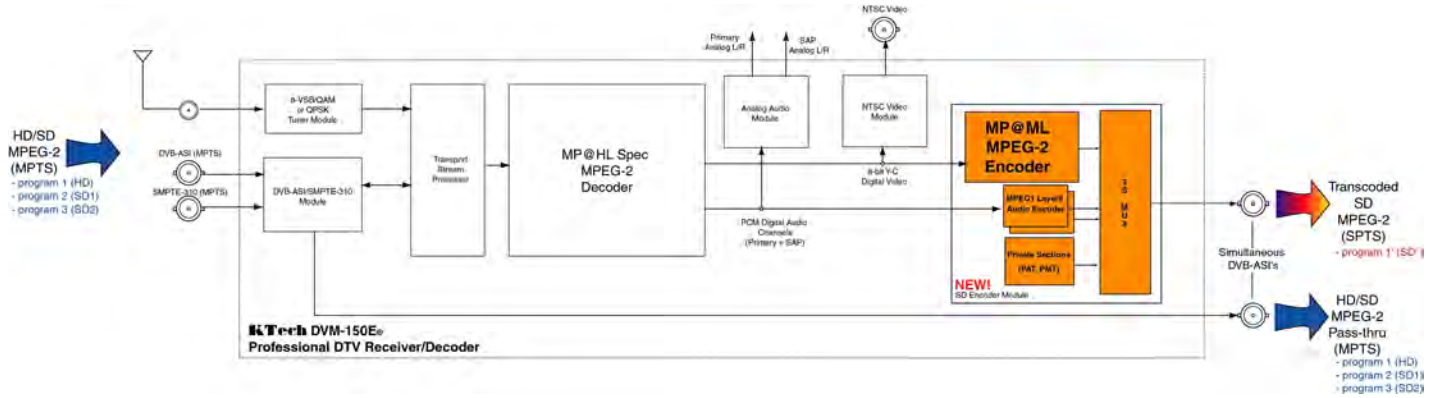
[i] Zou, Bill. DTV over digital cable: Reaching a larger audience. August 1, 2003. Broadcast Engineering



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

AC Power	
Frequency	47-63 Hz
Voltage	90-264 VAC
Current	1.2 A (max)
Fuse	1.5A, 250V
Operating Conditions	
Temperature	0º - 50ºC
Altitude	12,000 ft.
Humidity	95% non-condensing
Cooling	blower
Dimensions	
Height	1.75”
Width	19”
Depth	18”

Weight	
Net	12 lbs
Gross	15 lbs
Front Panel	
Keypad	4 Directional Arrow Keys
Display	2 lines x 20 characters VFD (Vacuum Fluorescent Display)
User Interface	
Local	Front Panel
Remote	RS232
Rack Space	1U

RF Specifications

Part# RF1

8-VSB/QAM Tuner Module

Occupies slot #1

8-VSB Mode

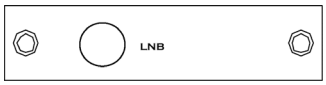
Tuning Range	VHF/UHF CH 2 -69
Connector	75Ω “F” type, female
Input Sensitivity	-28 dBmV to +33 dBmV
Input Data Rate	19.392 Mbps
Modulation Mode	8-VSB – ATSC Compliant
Demod Gen	6TH Generation
Adj Channel	
DTV into DTV	>-33dB D/U @ -19 dBmV Desired Signal
DTV into DTV	>-33dB D/U @ -4 dBmV Desired Signal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

Part# RF2

QPSK Tuner Module



Occupies slot #1

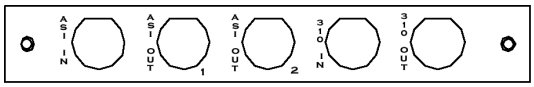
QPSK Mode

Tuning Range	950 – 2150 MHz- L-Band
Connector	75Ω “F” type, female
IF 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

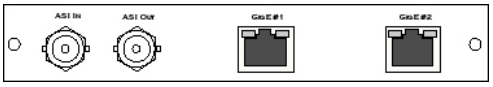
DVB-ASI

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)

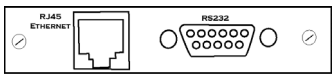
DVB-ASI

Connectors	75Ω BNC, (1) Input, (1) Input, (1) Output
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

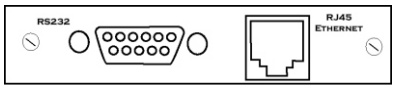


Baud Rate	19,200, 8 data bits, no parity, 1 stop bit
Connector	DSUB 9, female
Download Capability	Firmware Upgrades
User Controls	All Front Panel functions
Stream Information Display	Video Bitrate, Audio Bitrate, Aspect ratio, Native Format, SNR, BER
Software	Windows HyperTerminal
RJ45 Ethernet	(Optional)

Management/SNMP Specifications (Optional)

Part# M4

Management/SNMP



Occupies slot #5

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 Display	Video Bitrate, Audio Bitrate, Aspect ratio, Native Format, SNR, BER
Software	Windows HyperTerminal
SNMP	Ver 2
RJ45 Ethernet	

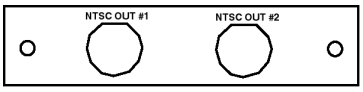
Video Decoder Specifications

Up/Down Conversion	1080i, 720p, 480i (NTSC), 480p	**Closed Captioning Standard**	EIA-608B, EIA-708B
Video Formats	18 ATSC Formats		
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

Part# VV1

AFD Ready NTSC 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

Part# V1

NTSC Video Module

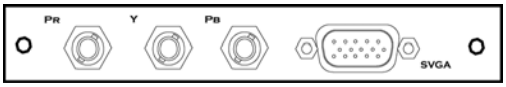
Occupies slot #3

NTSC (composite video)

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

Part# V3

VGA/ YPbPr Module



Occupies slot #6

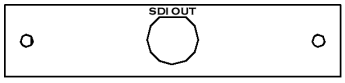
VGA/ Y Pb Pr

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# V4

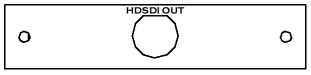
SDI Module



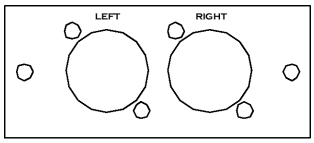
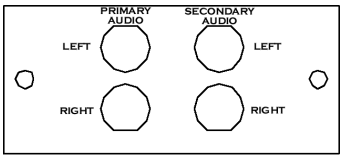
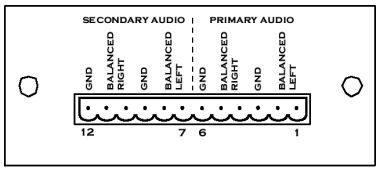
Occupies slot #5

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

HDSDI Module **Part# V5**  Occupies slot #7	**HDSDI** **Connector** 75Ω BNC, (1) Output **Output Level** 800 mVp-p ± 10% **Video Format** 1080i, 720p, 480p **Standard** SMPTE-292M **Data Rate** 1.485 Gbps

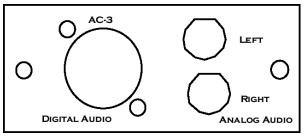
Analog Audio Specifications

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

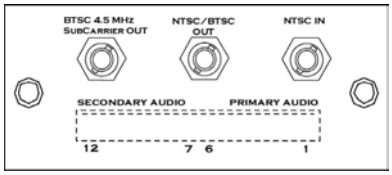
Outputs	(1) AC-3 Digital Audio Output
Connectors	600Ω XLR male
Audio Program	Primary
Output Level	0.5 Vp-p ± 20%
Connectors	(2) BNC's Analog Audio
	(1) Primary Audio Left
	(1) Primary Audio Right

BTSC 4.5MHZ 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

MPEG-2 SD Encoder Specifications

Preliminary – Available Sept 08

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

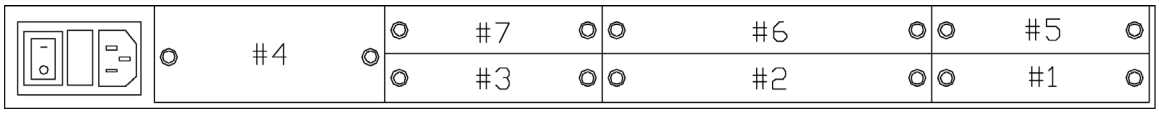
Standard	ISO/IEC 13818-1 (Transport Stream)
Output Format	188 byte
Bit Rate	2 to 60 Mbps
Lip Sync	Yes
Interface	DVB-ASI (BNC 75Ω) x 2

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
- 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 **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 **(B1)**
- 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 **N** NONE

#6 VIDEO
- O **A** VGA/ YPbPr Out **(V2)**
- O **B** MPEG-2 SD Encoder w/ DVB-ASI and GigE out **(SD1)**
- O **N** NONE

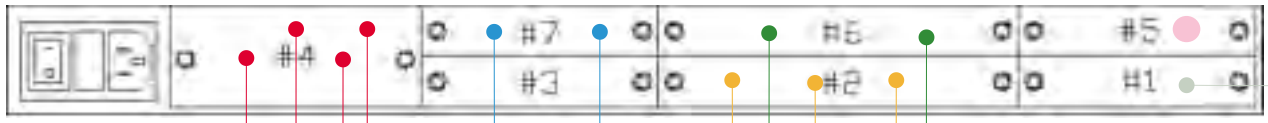
#7 VIDEO
- O **A** (2) NTSC/AFD OUT **(VV1)**
- O **B** (2) HDSDI OUT – embedded audio **(V5)**
- O **C** (2) HDSDI OUT – embedded audio – with SAP **(V6)**
- O **E** Ethernet/Site Player **(M2)**
- O **N** NONE

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)

DVB-ASI with SD program (Prg 1 re-encoded)
GigE with SD program (Prg 1 re-encoded)
GigE Out (whole stream) #1 - (Prog 1 + Prog 2)
GigE Out (whole stream) #2 - (Prog 1 + Prog 2)
DVB-ASI Out (whole stream - (Prog 1 + Prog 2)
NTSC/AFD Video Out (prg 1 Downconverted)
Primary Audio Out (L + R)
Secondary Audio Out (L + R)
BTSC 4.5 Mhz Sub Carrier Out
BTSC 4.5 Mhz Sub Carrier/Video Out

Simultaneous Outputs

NTSC/AFD Video Out
for monitoring or for BTSC

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	VV1 Module (NTSC/AFD Ready)
#3	Future Service growth

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