

# HDTV Digital /Analog Waveform Monitor



LV5152DA

- Full Monitoring Facilities for 1035/60i, 1080/60i, 1080/50i, 1080/30p, 1080/25p, 1080/24p, 1080/24sF, 720/60p
- Separates and Outputs 8 Channels of Embedded Audio
- Color Gamut Error Detection with Error Logging
- Auto and Manual Format Selection
- Color Matrix Selection Follows Selected Format
- Two SDI Inputs (A&B) with Switched Active SDI Output
- Handles Component 3-Wire Analog Inputs
- YPbPr or GBR Waveforms in Overlay or Parade
- YPbPr or GBR Analog Outputs
- Choice of Electronic or External Vector Scale
- Full Error Reporting in Video (Y&C) ANC and Audio
- Hex Readout of All Data Points
- Precision Cursor Measurements of Level and Time
- Full Line Select, all Formats
- Ten Presets with One-Touch and Remote Recall
- Picture Display from Y or G
- GBR Waveform Sequence May be Set to RGB
- White Phosphor Standard

The LV5152DA builds on the NAB 98 Broadcast Engineering "Pick Hit" award winner, LV5152D, to add the following features: extended HDTV format coverage, automatic colorimetry selection to match the selected format, separation and delivery of eight channels of embedded audio, detection and logging of color-gamut errors, hex readout of all data points on a line selected manually or by error, and a refinement of the preset system that allows one-touch recall of stored observation setups. Features retained from the LV5152D include analog component as well as two digital inputs with an active digital output from the selected input. Waveforms may be viewed as YPbPr or GBR in both overlay and parade forms.

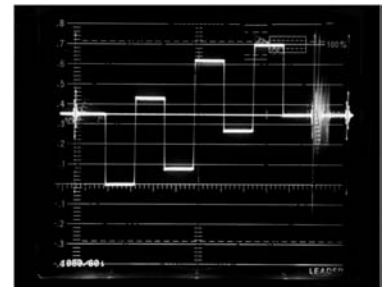
Extensive menu-operations afford far reaching control of sweep, response, timing, DC clamp parameters, vector setup, preset assignment and naming, clock/calendar setup, cursor units, line-select properties and instrument calibration. EAV/SAV may be blanked or shown and the latter also shows the presence of data codes and embedded audio. An extensive error detection system captures the time of first data error, total errors since that time and time elapsed since the first error. Error details are spotted in Y or C, ANC and embedded audio.



Component Data



Error Status



Cb EAV/SAV Pass Showing Embedded Audio



LV5152DA Rear Panel

# key specifications LV5152DA

## APPLICABLE STANDARDS

BTA S-004B, S-005B, S-006B  
SMPTE 274M, 291M, 292M, 296M, 299M

## SERIAL DIGITAL INPUTS

Number of Inputs  
2 BNC  
Impedance  
75  $\Omega$ , internally terminated

Return Loss  
 $\geq 15$  dB 5 MHz to 742.5 MHz  
 $\geq 10$  dB 742.5 MHz to 1.485 GHz

Max Input  
 $\pm 2$  V dc or ac peak

## ANALOG INPUTS

1 set 3 BNC inputs, passive loop-through  
CH1 Y/G, CH2 Pb/B, CH3 Pr/R  
1 loop-through set BNC EXT REF

Return Loss  
 $\geq 30$  dB (50 kHz to 30 MHz)

Max Input  
 $\pm 12$  V dc or ac peak

Impedance  
 $\geq 15$  k $\Omega$

External Reference Sensitivity  
0.3 V p-p  $\pm 6$  dB

## OUTPUTS

SDI Active Output  
Selected A or B Input  
Output Level  
800 mV p-p  $\pm 10\%$   
Analog Picture Monitor Outputs  
YPbPr or GBR selectable  
Output Level  
1 V p-p  $\pm 5\%$   
Frequency Response  
25 Hz to 30 MHz within  $\pm 5\%$

## AES/EBU OUTPUTS

Output Signals  
CH 1/2, CH 3/4, CH 5/6, CH 7/8  
Output Impedance  
75  $\Omega$

Output Connectors  
4 BNC

Amplitude  
1.0 V  $\pm 10\%$

Sampling Frequency  
48 kHz

Quantizing Accuracy  
Selected from 16, 18, 20, 24 bits

## VERTICAL SECTION

Deflection Accuracy  
Within  $\pm 1\%$ , GAIN x1  
Within  $\pm 3\%$ , GAIN x5

GBR Matrix  
Within  $\pm 1\%$ , GAIN x1

Frequency Response, Analog  
Flat: Within 1% 25 Hz to 30 MHz  
Low Pass:  $\geq 20$  dB at 20 MHz  
DIF'D Step:  $\geq 20$  dB at 30 kHz  
 $\geq 20$  dB at 7 MHz

DC Restorer Speed  
Slow:  $\leq 20\%$  at 60 Hz  
Fast:  $\geq 80\%$  at 60 Hz

Transient Response (2T Pulse & Bar)  
Pulse-bar Ratio, Overshoot, Pre-shoot,  
Ringing, Sag: Within  $\pm 1\%$

DC Restorer Clamp Timing  
Fixed: Back porch  
Variable: 0.5 to 12  $\mu$ s relative to sync  
rising edge

Field: 1V, 2V, 3V (Parade)  
1V MAG, 2V MAG, 3V MAG (Parade)

## HORIZONTAL SECTION

Modes  
Overlay, Parade, Timing (for use with  
Bowtie signal). Use of the Bowtie  
authorized by Tektronix, Inc.

Sweep Displays  
Line: 1H, 2H, 3H (Parade)  
1H MAG, 2H MAG, 3H MAG  
(Parade)

Time Base Accuracy  
Within  $\pm 3\%$

## VECTOR MODE

Amplitude Accuracy  
 $\pm 2\%$  (YPbPr and GBR inputs)

## PICTURE MODE

Displays Y or G signal with line-select  
strobe

## AUDIO MODE

Input  
Direct coupled balanced

Input Impedance  
 $\geq 20$  k $\Omega$

Full Scale Reading  
0, 2, 4 dBm (menu selectable)

Accuracy  
 $\pm 0.5$  dB

X-Y Phase Accuracy  
Within  $1^\circ$  at 20 kHz

## CALIBRATION SIGNAL

1 V  $\pm 0.5\%$

## DIGITAL FUNCTIONS

Error Display  
Time of first error  
Total error count from first error  
Elapsed time from first error  
Error Details: Video Y/C, ANC, AUDIO  
Settable Alarms: Video, ANC, AUDIO  
Alarm Display: Front panel LED, remote

Data Dump Function  
10 bit data converted to Hex

Equivalent Cable Length  
Based on cable LS-5CFB

## LINE SELECT

Trigger  
Field 1, Field 2, All (interlaced signal)  
frame for progressive

Selectable Lines  
1 to 1125 or 1 to 750

Line Window  
1 to 15 lines

## PRESET FUNCTION

Number of Presets  
10 front panel settings  
Controls Covered  
All controls and mode selections  
including DIGITAL, CURSORS, LINE  
SELECT  
Control settings not stored: INTEN,  
READOUT INTEN, ROTATION, FOCUS,  
scale ILLUM, POWER ON/OFF  
On-screen display of preset identifiers  
for single keystroke recall

## REMOTE CONTROL

Remote Preset Selection  
8 presets  
Control Signal  
TTL low active

Control Input  
D-sub 25-pin (REMOTE), rear panel  
CURSOR MEASUREMENTS

Configuration  
2 horizontal REF,  $\Delta$   
2 vertical REF,  $\Delta$

Vertical Measurement Range  
0-2000 mV, 0-280.0 %

Accuracy  
 $\pm 0.5\%$

Resolution  
1 mV or 0.1%

Ratio Measurement  
X% with respect to 100% REF

Time Measurement Range  
At least  $\pm 6$  div from screen center

Accuracy  
 $\pm 3\%$

Resolution  
1/80 div

Time Ratio  
X% with respect to 100% REF

Frequency Measurement  
Calculated from cursor span of 1 period

## CRT

Effective Display Area  
80 x 100 mm

Graticule  
Internal and External (vector)  
Electronic (vector and audio)

Phosphor  
White standard

## POWER REQUIREMENTS

90 V - 250 V ac, 48 to 440 Hz, 130 VA max

## PHYSICAL

Size (W x H x D)  
8<sup>3</sup>/<sub>8</sub> x 5<sup>1</sup>/<sub>4</sub> x 17 in.

215 x 132 x 429 mm

Weight  
12 lbs., 5.5 kg

## ENVIRONMENTAL

Guaranteed Accuracy  
10 to 35 $^\circ$  C, 10 to 80% RH

Operating Temperature  
0 to 40 $^\circ$  C, 10 to 90% RH

## SUPPLIED ACCESSORIES

5 Spare Illumination Lamps  
1 Spare Fuse

1 25-pin D-Sub Connector  
1 25-pin D-Sub Connector Shell

1 Power Cord Retainer

## OPTIONAL OPTIONS

Carrying Case with Handle & Feet  
(LR-24271-U)  
CH1, 2 & 3 Level p-p Readouts (NS-323)  
NTSC Analog Composite Waveform  
(NS-325)  
525/60 & 625/50 Analog Component  
Waveform (NS-333)  
Continuous Overlaid Error Display  
(NS-334)  
RS-232C Data Dump (NS-335)