



quantumdata

## VIDEO TEST INSTRUMENTS

Introducing the 881E video test instrument from Quantum Data for manufacturing production lines. The 881E is well suited for your manufacturing environment whether testing HDMI™, analog or DisplayPort interfaces. It is offered at a competitive price and is equipped with automation features and pattern generation functions necessary for manufacturing. The HDMI interface supports the latest HDMI standard, with up to 36 bit/pixel (12-bit/component) Deep Color mode, x.v. Color™ (wide gamut) and high bit rate audio formats. The DisplayPort interface is an optional feature of the model 881E that can deliver blazing fast video at pixel rates up to 268MHz. One (1), 2, and 4-lane configurations are supported at per-lane rates of 1.62Gb/s and 2.7Gb/s.



Note: HDMI unit shown with analog option

## KEY FEATURES + BENEFITS

### HDMI 1.3 Deep Color

Up to 36-bit/pixel (12-bit/component) Deep Color at 1080p; TMDS link up to 2.25 Gb/s.

### x.v.Color

Supports wide gamut color generation with test images and meta data.

### High Bit Rate Audio

Generates Dolby® formats Plus & TrueHD and DTS-HD Master Audio lossless compressed audio format.

### analog video (with HDMI only)

Composite and component up to 250 MHz.

### DisplayPort Tx Interface

Support 1, 2, and 4 lanes at 1.62Gb/s & 2.7Gb/s per lane. Provides 10 bits/component up to 268MHz pixel rate.

### comprehensive timing + patterns

Includes extensive library of standard timings and patterns. Add your own custom timings and patterns.

### composite test image

Test HDCP, CEC, and EDID with a single image.

### rapid image rendering

Image caching features provides for rapid image rendering; typically within a frame.

### Script SDK

API for developing custom images and applications for automated control.

### central administration/network control

Update and configure all networked instruments from a single computer. Fully control instrument from any network location with web browser or Telnet client.

### programmable keyboard

Programmable keypad available for simplified testing.

### rack mounting

Optional rack mount kit for installing in standard 23" relay rack.

# 881E HDMI/DisplayPort

**Configuration Options**

Opt 1 HDMI	1 - HDMI Tx composite and component analog (optional)
Opt 2 DisplayPort	1 - DisplayPort Tx

**HDCP Testing**

HDMI, DVI, and DisplayPort	Authentication and encryption of uncompressed HDMI, DVI, and DisplayPort signals
----------------------------	--

**HDMI Audio Tests**

Rate	Vary audio sampling rate to test sink handling
Frequency	Vary audio frequency to test sink handling
Amplitude	Vary audio amplitude to test sink handling

**EDID Read**

HDMI, DVI, VGA, DisplayPort	Auto-configuration of generator format list
-----------------------------	---

**Data channels**

Physical Protocols	I2C per VESA E-DDC DDC2B, E-DDC & DDC/CI (reads E-EDID Ver 1.3 and 1.4)
--------------------	---

**EDID Testing**

HDMI, DVI, VGA DisplayPort	Reads EDID from display and presents as displayed image or HTML report
----------------------------	--

**DV Swing Test**

HDMI, DVI	Vary TMDS digital video signal swing in 4mV increments from 150 to 1560 mVp-p (programmable)
-----------	--

**Scrolling Image Test (Image Shift)**

All interfaces	Scroll any static image
----------------	-------------------------

**Special Sync Tool**

	Trigger scope or inspection camera anywhere in video
--	--

**Formats**

Standard formats	Over 595 formats for testing IT, CE, military and other display test applications
Custom formats	Graphical format editor

**Patterns**

Pattern file types	Custom object (.o) files, BMP, JPEG, PNG
Standard patterns	Over 320 standard static and dynamic images included for testing CRTs and FPDs
Custom patterns	Graphics SDK to create complex patterns
Internal data storage	15 MB

**Script SDK**

	API for developing custom images and applications for automated control.
--	--

**Programmable Keypad**

	Programmable keypad available for simplified testing.
--	---

**Administration**

Physical user interface (selection keys and display)	
Control interfaces	RS-232 serial AT 10/100 BaseT Ethernet (TCP/IP, FTP, Telnet) GPIB
Browser-based virtual control panel to manage from any network location	
PCMCIA slot	Compact Flash card to boot generator, backup generator configuration, copy generator configuration to other generators, and store patterns

Specifications are based on hardware and firmware revisions available as of March 2010, and are subject to change without notice. HDMI, the HDMI logo and High-Definition Multimedia interface are trademarks or registered trademarks of HDMI Licensing LLC.

Revised 03/18/10 Rev. B

**HDMI (included with HDMI 1.3 option)**

Connector	One HDMI Type A
TMDS (single link)	225MHz clock; 2.25 Gb/s link rate
Video	
TMDS protocols	DVI 1.0 and HDMI 1.3
Encoding	RGB or YCbCr (only RGB in DVI mode)
Sampling modes	4:4:4 or 4:2:2 (only 4:4:4 in DVI mode)
Color depth (HDMI)	24/30/36-bit 4:4:4 RGB / YCbCr 16/20/24-bit 4:2:2 YCbCr
Color depth (DVI)	24-bits per pixel RGB 4:4:4
Clocks per pixel	1 or 2
Pixel repetition	1 to 10 using interactive test image
TMDS differential swing	150-1560 mVp-p (programmable)
Quantization modes	Full with optional gamma correction ITU-R BT.709-5 Part 1, Sec 6.10 SMPTE 296M Sec 7.12 under/overshoot
Colorimetry	Legacy HDTV SMPTE 260M-1999 Table 1, ITU-R BT.601-5 Sec 3.5.1 and ITU-R BT.709-5 Sec 4.2-1125 xvYCC 601 & xvYCC 709 for x.v.Color
Content fitting methods	All AFD cases (Shoot & Protect, Overscan, Under-scan, Letterbox/Pillarbox, Anamorphic Squeeze)
Aspect ratio	
Content	4:3, 14:9, 16:9
Embedded	4:3, 16:9
Format (coded)	4:3, 16:9
Format timings	All EIA/CEA-861-D formats All E-EDID sink-requested < 165 MHz General control packet, audio samples, ACR data, InfoFrames, null frame AVI, SPD, AUD, MPG, GIF (generic)
Data (island) packet generator types	
InfoFrame types	AVI, SPD, AUD, MPG, GIF (generic)
Audio	
Streams	4
Channels	8
Bits per sample	16, 20, 24
Sampling rates	32.0, 44.1, 48, 88.2, 96.0, 176.4, 192 kHz
Stream type	IEC 60958-3 Consumer LPCM Dolby Digital, Dolby Digital Plus, Dolby TrueHD, DTS-HD Master Audio, and other audio formats with external source
Audio content	FL, FR, LFE, FC, RL, RR, RC, FLC, FRC, RLC and RRC
Mixer mux	Sinewave or external audio
Embedded sonic data generator	
Channels	8
Waveform	Sinewave
Amplitude	-96.3 to 0.0 dBFS
Frequency Change	20 Hz to 20 kHz
Controls	Mute, amplitude, frequency
External audio interface	
Type	SPDIF input (coaxial)
Amplitude	As received
Connector	BNC with special SPDIF I/O
Cable	75 ohm coax cable

**DVI**

Connector	HDMI output with HDMI-to-DVI cable
Encoding	RGB (4:4:4 with 8-bits/component)
TMDS differential swing	150-1560 mVp-p (programmable)

**DisplayPort TX Interface**

Connectors	Box to box external per spec
Video	
Lanes	1, 2, 4 (user specified)
Lane data rate	1.62 Gb/s, 2.7 Gb/s (user specified)
Bit depths	6, 8, 10
Colorimetry	RGB, YCbCr
Sampling	4:4:4
Formats	VESA: DMT and CVT
Hot Plug	1) 0.5ms->1.0ms 2) 2ms
Aux channel Mode	1) Native for DPCD link configuration 2) I2C for EDID reads

**Analog Composite (included with analog video option)**

Connectors	CVBS (BNC) and S-Video
Encoding	NTSC and PAL
Sample rate	24.55-29.50 MHz
Pixel rate	12.27-14.75 MHz
Pixel aspect ratio	Standard or square
Swing	1000 mVp-p fixed with programmable calibration
Calibration	self-calibration with internal reference

**Analog Component (included with analog video option)**

Connector	VGA
Color encoding	RGB, YPbPr (unfiltered)
Video levels	
Video swing	0-1000 mV
Sync swing	0-400 mV (bi-level), 0-800 (tri-level)
Video setup	0-100 IRE
Calibration	Self-calibration with internal reference
Protection	Buffered with 75 ohm isolation
Internal data storage	15 MB

**Digital Sync**

Outputs	HS, VS and Special Sync
Swing	> 2V fixed into 75 ohm

**Pixel Clock**

Frequency range	
Analog component	5.16-250 MHz
HDMI	25-165 MHz (single-link)
DVI	25-165 MHz (single-link)
DisplayPort	Maximum: 270MHz (330MHz future)
Step	Less than 0.1 Hz
Accuracy	50 ppm (electronically adjustable to <5 ppm with external frequency counter)

**Horizontal Timing**

Frequency range (kHz)	
Analog composite	15.734 or 15.625
HDMI / DVI	8-1000
DisplayPort	1-300
Total pixels (max)	65,535
Active pixels (max)	4096
Blank pixels (min)	
HDMI	14 (minimum)
DVI	12 (minimum)
Step pixels	
HDMI	1
DVI	1
DisplayPort	1

**Vertical Timing**

Frequency range	1-650 Hz or 23 - 250 Hz
Total lines (max)	4095 progressive, 8193 interlaced and segmented
Active lines (max)	4096
Blank lines (min)	1 to Total-1
Step lines	1
Scan types	Progressive, interlaced, segmented
Composite sync types	ORed, Serrated, Serrated and Equalized, Tri-level

**Video Memory**

Size	16,384,000 pixels at 32-bits/pixel 32,768,000 pixels at 8-bits/pixel
Maximum width	16,384 pixels at 32 bits/pixel 16,384 pixels at 8 bits/pixel
Color depth	36 bit up to 165 MHz 32 (24-bit TrueColor) up to 250 MHz 8 bits up to 250 MHz

**General Specifications**

Size (mm)	330 W, 87 H, 284 D
Humidity	30 to 80% RH (non-condensing)
Operating temp.	0 to 40° C
AC Mains	
Frequency	47 to 63 Hz
Voltage	90-264 VAC