

# quantumdata™ 780E

## Multi-Protocol Analyzer & Generator

### Test HDMI, HDBaseT & DisplayPort with one instrument



#### Key Features

- HDMI, HDBaseT and DisplayPort input and output ports for testing both source and display devices as well as cables and distribution networks
- Test Ultra High Definition video products supporting 4K resolutions up to 600 MHz for HDMI
- Video pattern and format library with programmable settings
- Protocol tests for digital video sources and displays
- Protocol logging application auxiliary channel analyzer (ACA) enables real time monitoring of EDID exchanges, HDCP (including HDCP 2.2) and HDMI SCDC, DisplayPort Aux Chan link training transactions and CEC messages (for HDMI)
- Passive protocol logging between a source and a sink is also optionally supported on HDMI ports
- Report File Creation feature provides HTML formatted report of tests performed

The Teledyne LeCroy quantumdata 780E Multi-Protocol Analyzer / Generator for HDMI, DisplayPort and HDBaseT offers a wide array of benefits to engineers in R&D as well as professional A/V installers in the field for testing HDMI, HDBaseT and DisplayPort devices. The portable size and user-friendly touch screen interface provide convenience to complement the rich feature set. Because the 780E instrument is equipped with both input and output ports, engineers and pro A/V integrators can run a variety of video, audio and protocol tests on digital video sources, displays, distribution equipment and cables. The user interface design and test functions greatly reduce time to insight whether running tests on distinct devices or entire digital video distribution networks.

#### Diagnose and Troubleshoot

The 780 models provide an at-a-glance status bar on the bottom of the 7" in touch screen. The status bar provides basic information about what the instrument is transmitting to a display and what it is receiving from a source. The instruments can run quick video audio and protocol tests on individual sources, displays, repeaters, distribution gear as well as cables. Protocol tests include tests for EDID, HDCP authentication—1.4 & 2.2—infoframes and timing data. You can place the 780E at any point in a video distribution network and run tests upstream toward the source while emulating a display (or sink). Or you can run tests downstream while emulating a source. Generator reports to demonstrate test series completion.

#### Ease of Use

The 780E's large color touch screen provides ease of use and quick status information. The rich set of routine tests and diagnostic tests are accessible with just a few touch clicks. You can quickly configure settings on the outputs. A rich command set, available either through USB or RS-232 serial ports, supports automated testing.



# SOURCE & NETWORK DIAGNOSTIC TEST FEATURES

## View Incoming Video & Data

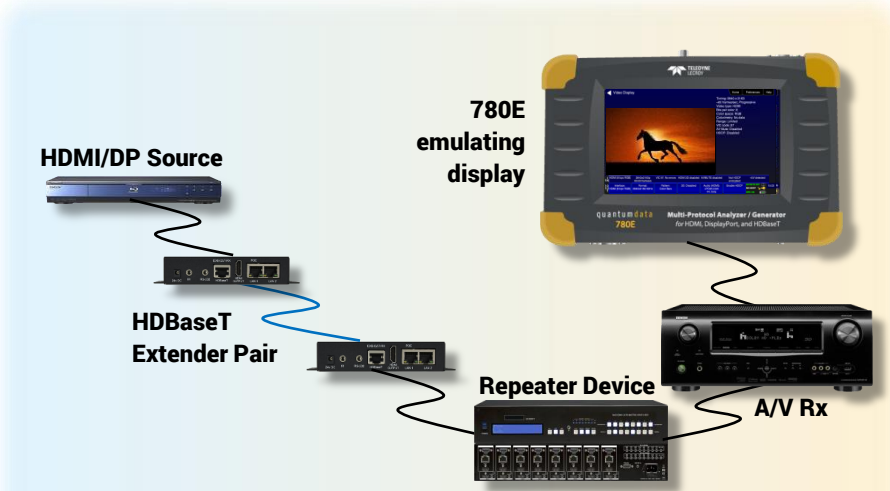
The 780E status bar provides essential information about the incoming video. The Video Display Test shows the incoming video and essential video and audio metadata. Both provide quick *time to insight* when conducting routine tests or diagnosing interoperability problems.

## Test Response to EDIDs

Many interoperability problems are related to EDIDs. 780E enables you to emulate any EDID to test a source's response. You can use commercial EDIDs or test EDIDs with specific video and audio support. Test with EDIDs with known anomalies or grab an EDID from a UHD TV for future testing.

## View Auxiliary Channel Transactions

Complex interoperability problems require visibility into the auxiliary channel. You can monitor HDMI and HDBaseT Display Data Channel data to view EDID, HDCP SCDC (HDMI) and CEC (HDMI) transactions. Also view DisplayPort link training logs on the Aux Channel. Check details of each transaction and distribute to colleagues and subject matter experts.



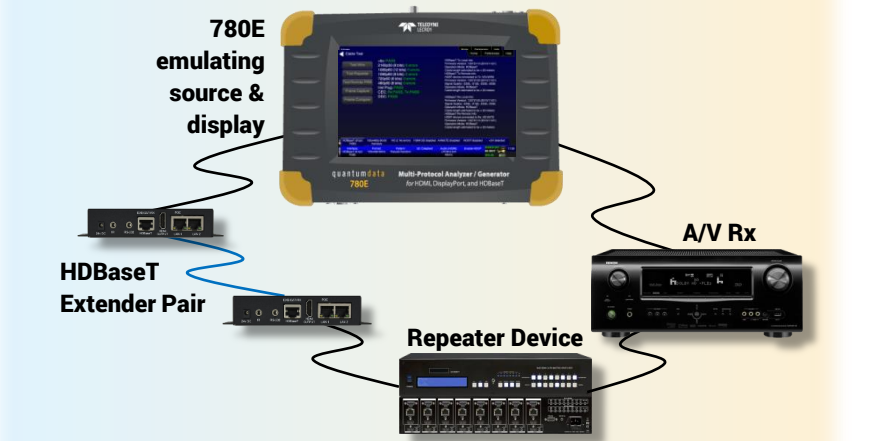
Example Source Test Setup

## Verify Cable / Network (Loop)

The 780E enables you to test distribution equipment to verify integrity of extenders, repeaters, matrix switches and distribution amps. You can test individual devices or entire networks including digital video cables.

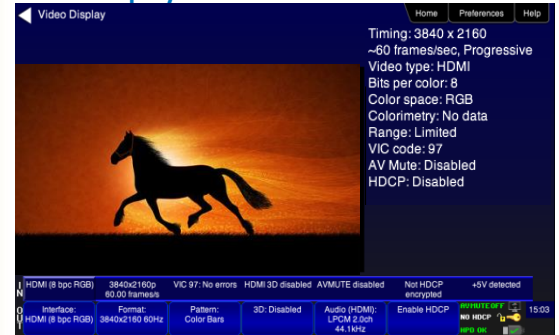
## Verify Video at Far End

The 780E supports testing of installed distribution networks from the far-end at the display.

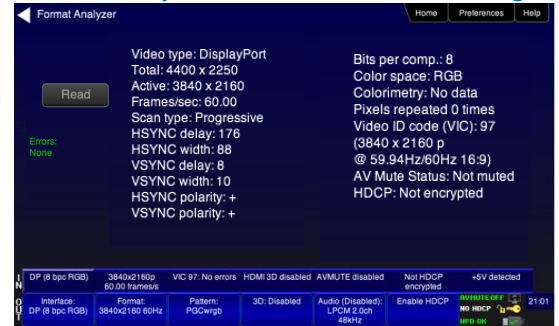


Example Network Test Setup

## Video Display Test – View Video & Metadata



## Format Analyzer – View Metadata & Timing



## Cable Test (HDBaseT) - Verify Networks/Cables



## Verify Distribution Network from Far End



# SINK (DISPLAY) TEST & DIAGNOSTIC FEATURES

## Verify Video

Select from CEA and VESA formats or create your own custom formats including 4K resolutions for UHD testing. Use the test pattern library to verify specific video display elements. Set bit depth, pixel encoding, colorimetry and sampling parameters. Use industry standard patterns for color calibration. Create custom bitmap test patterns. Scroll bitmaps to test motion artifacts.

## Verify Audio

You can use the 780E to verify audio on displays or audio systems using programmable LPCM test tones. Set sampling rate, bit depth, amplitude and number of channels. You can select Dolby and DTS compressed audio clips including Dolby TrueHD & DTS Master Audio.

## Verify EDID Contents

Many interoperability problems are related to EDIDs. The 780E enables you to view the EDID contents of any connected display to verify its audio or video capabilities (including HDR elements). You can verify the structure of an EDID and check for compliance. Save report of EDID contents.

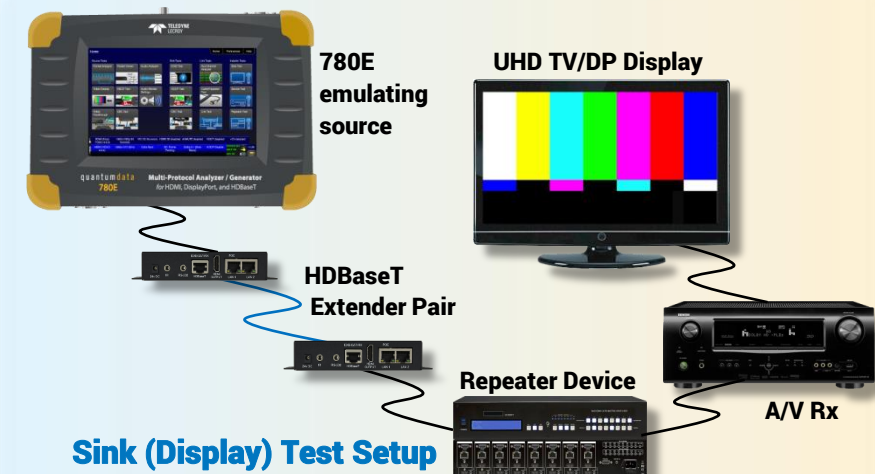
## Verify DisplayPort Link Training

You can use the 780E to test and verify DisplayPort link training using a variety of user settable parameters. You can specify the link rate, the number of lanes as well as the voltage swing and pre-emphasis. You can also link train based on a display's capabilities.

### Video Test – Select Formats & Parameters



### DisplayPort Link Training Test



## Verify HDCP Authentication

HDCP authentication problems occur in complex digital video distribution networks. Use the HDCP test to quickly check HDCP 1.3/1.4 and HDCP 2.2 authentication. Enabling and disabling HDCP can quickly reveal the nature of an interoperability problem. Monitor the HDCP transactions during the HDCP test using the Aux Channel Analyzer.

### Aux Channel Analyzer



### HDCP Authentication Test





# SPECIFICATIONS

## HDMI

Version	HDMI 2.0b
Standard Formats	VESA (DMT, CVT-R, CVT), CEA
Connector	(1) Type A Tx; (1) Type A Rx
Protocol	HDMI, DVI
Video Colorimetry	ITU-R BT.601-5, ITU-R BT.709-5, BT.2020 (Rx only currently)
Video Max Pixel Rate	600MHz (6.00 Gbps/channel TMDS rate)
Color Depths	8, 10, 12, 16 bits per component (bpc) (deep color: 10 bpc up to 480MHz; 12 bpc up to 400MHz; 16 bpc up to 300MHz)
Video Encoding / Sampling	RGB, YCbCr; 4:4:4, 4:2:2, 4:2:0
HDCP	Versions 1.4 and 2.2
Audio Formats	LPCM, Dolby (DD, DD+, TrueHD), DTS (ES, HD, Master Audio)
Audio LPCM Settings	Sampling rates (32 – 192 kHz); Bits per sample (16, 20, 24)

## HDBaseT

Version	HDBaseT 1.0
Standard Formats	VESA (DMT, CVT-R, CVT), CEA
Connector	(1) 8P8C (RJ-45) Tx; (1) RJ-45 Rx
Video Colorimetry	ITU-R BT.601-5, ITU-R BT.709-5
Video Max Pixel Rate	300MHz
Color Depths	8, 10, 12 bits
Video Encoding / Sampling	RGB, YCbCr; 4:4:4, 4:2:2, 4:2:0
HDCP	Version 1.4
Audio Formats	LPCM, Dolby (DD, DD+, TrueHD), DTS (ES, HD, Master Audio)
Audio LPCM Settings	Sampling rates (32 – 192 kHz); Bits per sample (16, 20, 24)

## DisplayPort

Version	DisplayPort 1.2a
Standard Formats	VESA (DMT, CVT-R, CVT), CEA
Connector	(1) Standard Tx; (1) Standard Rx
Link rates / Lanes	1.62, 2.70, 5.40 Gbps Link Rates; 1, 2, 4 Lanes
Color Depths	6, 8, 10, 12, 16 bits
Video Encoding/Sampling Modes	RGB, YCbCr; 4:4:4, 4:2:2
HDCP	Versions 1.3 and 2.2
Audio Formats / LPCM Settings	8 Ch. LPCM; Sampling rates (32 – 192 kHz); Bits per sample (16, 20, 24)

## Digital Audio

Connectors	Optical (JIS FOS); SPDIF (RCA)
Audio Formats	LPCM, Dolby (DD, DD+), DTS (ES, HD)
Audio LPCM Settings	Sampling rates (32 – 192 kHz); Bits per sample (16, 20, 24)

## Options

Auto EDID Test	Run automated EDID test on source devices
Cable Test	Test digital video cables and video distribution networks
ACA Monitor	Monitor aux channel transactions emulating a source or sink or passively
Report File Creation	Provides HTML formatted report of tests performed

## Instrument

AC Adapter	100-240 VAC, 47-63Hz
Weight	3.25 LBS; 1.47 Kg
Embedded Display	800 (H); x 480 (V) resolution; 24 bit RGB color.
Tilt Bail	For convenient viewing
Dimensions	Height: 2.7 in. (6.98 cm) Width: 9.75 in. (24.76 cm) Depth: 6 in. (15.24 cm)
Command Line Control	USB Type B, RS-232
Environmental	Operating Temp: 32 to 104 (F); 0 to 40 (C)
File Access	USB Type B (command line / file transfer; SD card (upgrades/file transfer)



**TELEDYNE LECROY**  
Everywhereyoulook™

1-800-909-7211  
teledynelecroy.com



Local sales offices are located throughout the world.  
Visit our website to find the most convenient location.