
quantumdata™ 780 Series Handheld Test Instruments Overview of Applications



quantumdata 780 Series

Model 780



780 Handheld Test Instrument – Interfaces / Options



780 Front Edge



780 Rear Edge without optional ACA board



780 Rear Edge with optional ACA board

780 Handheld Test Instrument – Interfaces / Options

Interfaces:

- HDMI Tx & Rx ports – 165MHz pixel rate.
- VGA output port - RGB and component YCbCr up to 80MHz pixel rate.
- Digital audio – SPDIF/Optical.

Standard Features:

- 4.3 inch touch screen – 480 x 272 resolution.
- Battery-power, convenient size.
- Format and test pattern library, add custom bitmaps.
- Command line control via USB serial.
- Software upgradable.

Options:

- Network Analyzer – Test HDMI protocols and timing on source and sink devices.
- Cable Test – Test HDMI cables and distribution networks.
- Test pattern packs – ISF, THX China Resolution
- Auxiliary Channel Analyzer (emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages with source or sink DUT.
- Auxiliary Channel Analyzer (passive) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between multiple source or sink DUTs.

quantumdata 780 Series

Model 780AH



780AH Handheld Test Instrument – Interfaces / Options



780AH Front Edge



**780AH Rear Edge
without optional ACA board**



780AH Front Edge



**780AH Rear Edge
with optional ACA board**

780AH Handheld Test Instrument – Interfaces / Options

Interfaces:

- HDMI Tx & Rx ports – 300MHz pixel rate.
Note: Supports HDCP 2.2 testing.
- VGA output port - RGB and component YCbCr up to 80MHz pixel rate.
- Digital audio – SPDIF/Optical.

Standard Features:

- 4.3 inch touch screen – 480 x 272 resolution.
- Battery-power, convenient size.
- Format and test pattern library, add custom bitmaps.
- Headphone jack and speakers.
- Command line control via USB serial.
- Software upgradable.

Options:

- Network Analyzer – Test HDMI protocols and timing on source and sink devices.
- Cable Test – Test HDMI cables and HDMI / HDBaseT distribution networks.
- Test pattern packs – ISF, THX China Resolution.
- Auxiliary Channel Analyzer (emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages with source or sink DUT.
- Auxiliary Channel Analyzer (passive ACA board) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between multiple source or sink DUTs.

quantumdata 780 Series

Model 780BH



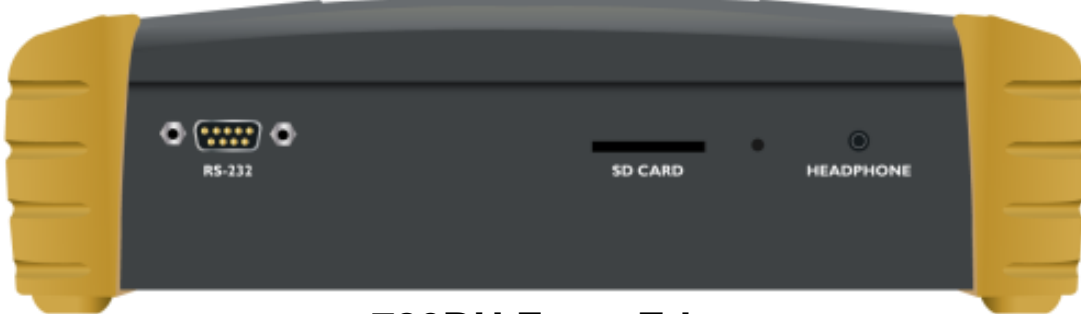
780BH Video Generator / Protocol Analyzer – Interfaces / Options



780BH Front Edge



**780BH Rear Edge
without optional ACA board**



780BH Front Edge



**780BH Rear Edge
with optional ACA board**

780BH Video Generator / Protocol Analyzer – Interfaces / Options

Interfaces:

- HDMI Tx & Rx ports – 300MHz pixel rate.
Note: Supports HDCP 2.2 testing.
- VGA output port - RGB and component YCbCr up to 80MHz pixel rate.
- Digital audio – SPDIF/Optical.

Standard Features:

- 7 inch touch screen – 800 x 480 resolution.
- Battery-power, convenient size.
- Format and test pattern library, add custom bitmaps.
- Real time status bar.
- Headphone jack and speakers.
- Command line control via RS-232 or USB serial.
- Software upgradable.

Options:

- Cable Test – Test HDMI cables and HDMI / HDBaseT distribution networks.
- Test pattern packs – ISF, THX China Resolution.
- Auxiliary Channel Analyzer (emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages with source or sink DUT.
- Auxiliary Channel Analyzer (passive ACA board) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between multiple source or sink DUTs.

quantumdata 780 Series

Model 780C



780C Video Generator / Protocol Analyzer – Interfaces / Options



780C Top



780C Rear Edge

780C Video Generator / Protocol Analyzer – Interfaces / Options

Interfaces:

- HDMI Tx & Rx ports – 300MHz pixel rate.
- HDBaseT Tx & Rx ports – 300MHz pixel rate.
- 3G-SDI Tx & Rx ports – 2.97Gb/s data rate.
- VGA output port - RGB and YCbCr up to 80MHz pixel rate.
- Digital audio – SPDIF/Optical.

Standard Features:

- 7 inch touch screen – 800 x 480 resolution. Convenient size.
- Format and test pattern library, add custom bitmaps.
- Real time status bar.
- Headphone jack and speakers.
- Command line control via RS-232 or USB serial.
- Software upgradable.

Options:

- Cable Test – Test HDMI cables and distribution networks.
- Test pattern packs – ISF, THX China Resolution.
- Auxiliary Channel Analyzer (passive & emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between source and sink DUTs.

quantumdata 780 Series

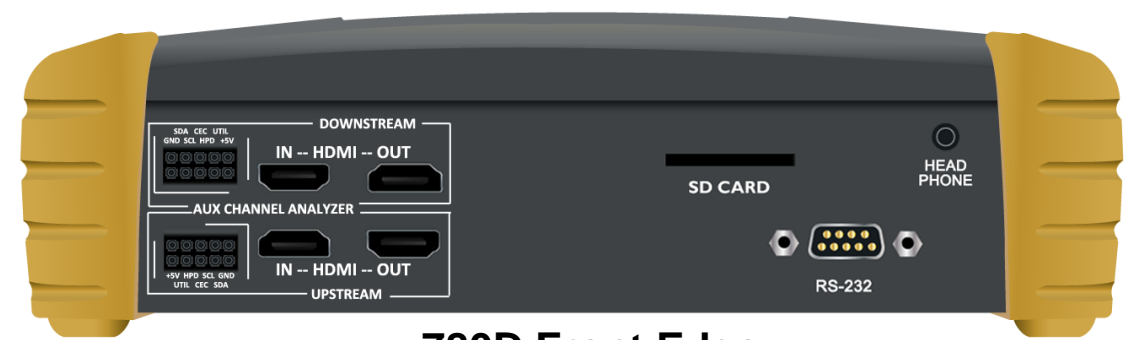
Model 780D



780D Video Generator / Protocol Analyzer – Interfaces/Options



780D Top



780D Front Edge



780D Rear Edge

780D Video Generator / Protocol Analyzer – Interfaces/Options

Interfaces:

- HDMI Tx & Rx ports – 600MHz pixel rate.
Note: Supports HDCP 2.2 testing.
- HDBaseT Tx & Rx ports – 300MHz pixel rate.
- VGA output port - RGB and YCbCr up to 80MHz pixel rate.
- Digital audio – SPDIF/Optical.

Standard Features:

- 7 inch touch screen – 800 x 480 resolution. Convenient size.
- Format and test pattern library, add custom bitmaps.
- Real time status bar.
- Headphone jack and speakers.
- Command line control via RS-232 or USB serial.
- Software upgradable.

Options:

- Cable Test – Test HDMI cables and distribution networks.
- Test pattern packs – ISF, THX China Resolution.
- Auxiliary Channel Analyzer (passive & emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between source and sink DUTs.

quantumdata 780 Series

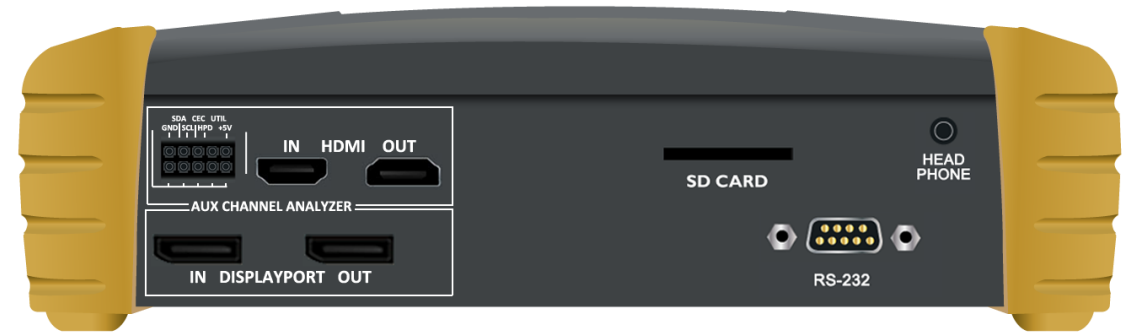
Model 780E



780E Video Generator / Protocol Analyzer – Interfaces/Options



780E Top



780E Front Edge



780E Rear Edge

780E Video Generator / Protocol Analyzer – Interfaces/Options

Interfaces:

- HDMI Tx & Rx ports – 600MHz pixel rate.
Note: Supports HDCP 2.2 testing.
- HDBaseT Tx & Rx ports – 300MHz pixel rate.
- DisplayPort Tx & Rx ports – 5.4 Gb/s link rate; 1, 2, 4 lanes.
Note: Supports HDCP 2.2 testing.
- Digital audio – SPDIF/Optical.

Standard Features:

- 7 inch touch screen – 800 x 480 resolution. Convenient size.
- Format and test pattern library, add custom bitmaps.
- Real time status bar.
- Headphone jack and speakers.
- Command line control via RS-232 or USB serial.
- Software upgradable.

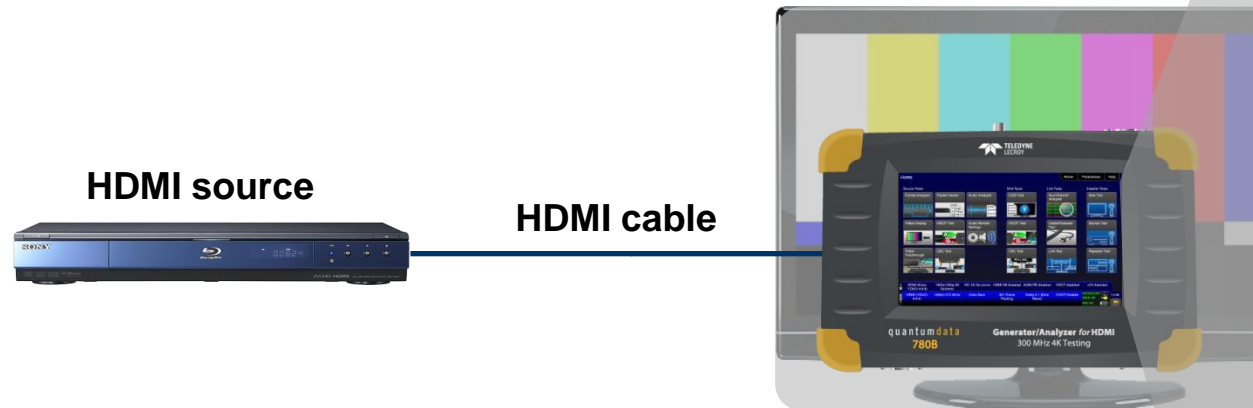
Options:

- Cable Test – Test HDMI cables and distribution networks.
- Test pattern packs – ISF, THX China Resolution.
- Auxiliary Channel Analyzer (passive & emulation) – Monitor HDCP, EDID transactions, hot plug events and CEC messages between source and sink DUTs.

Applications - HDMI

780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Verify video and timing and video parameters of an HDMI source device.



Video Display Home Preferences Help



Timing: 3840 x 2160
~60 frames/sec, Progressive
Video type: HDMI
Color space: YCbCr 4:2:2
Colorimetry: ITU-709
Range: Limited
VIC code: 4
AV Mute: Disabled
HDCP: Disabled

Format Analyzer Home Preferences Help

Read

Errors:
None

Video type: HDMI
Total: 2200 x 1125
Active: 1920 x 1080
Frames/sec: 60.5 (121.1 fields)
Scan type: Interlaced
HSYNC delay: 88
HSYNC width: 44
VSYNC delay: 2
VSYNC width: 5
HSYNC polarity: +
VSYNC polarity: +

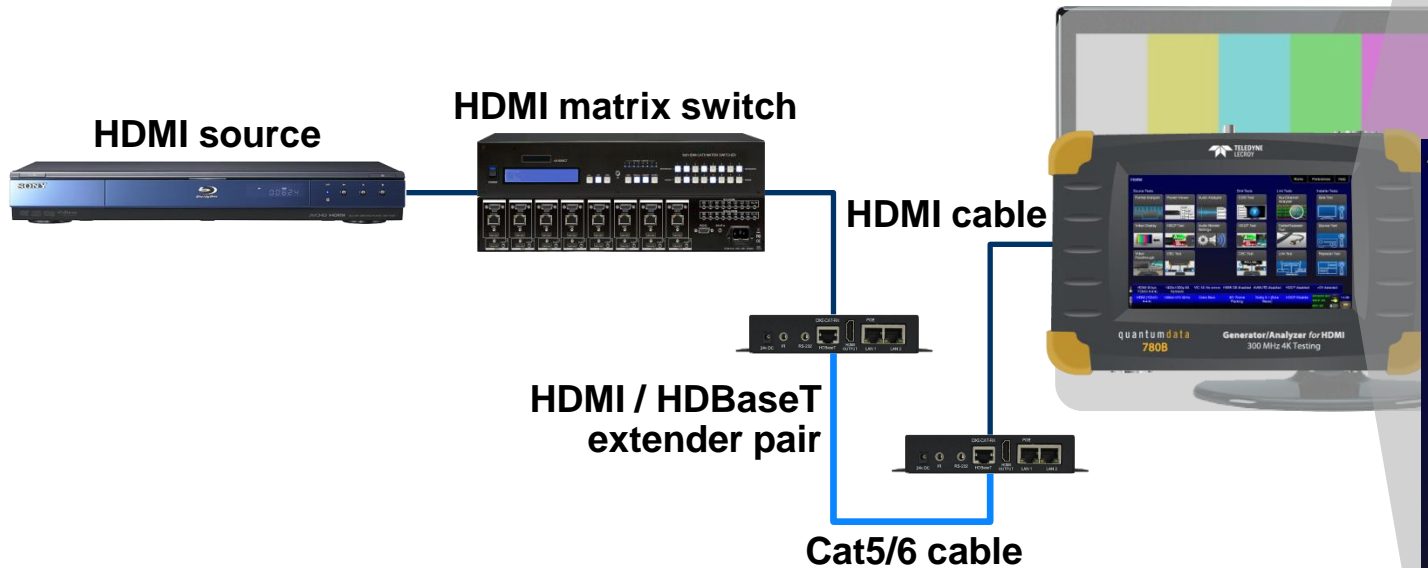
Color space: YCbCr 4:2:2
Colorimetry: ITU-709
Pixels repeated 0 times
Video ID code (VIC): 46 (1920 x 1080 i) @119.88/120Hz 16:9
AV Mute Status: Not muted
HDCP: Not encrypted

I	HDMI (8 bpc YCbCr 4:2:2)	3840x2160p 30 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP enabled	+5V detected
O	Interface: HDMI (8 bpc YCbCr 4:2:2)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Disable HDCP	AVMUTE OFF HDCP OK HPD OK

00:44

780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Verify video, video parameters and timing of an HDMI upstream distribution network.



The screenshot shows two software windows from the Teledyne Lecroy interface. The top window, **Video Display**, shows a video of a horse and displays the following parameters:

- Timing: 3840 x 2160
- ~60 frames/sec, Progressive
- Video type: HDMI
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Range: Limited
- VIC code: 4
- AV Mute: Disabled
- HDCP: Disabled

The bottom window, **Format Analyzer**, shows a **Read** button and the following parameters:

- Video type: HDMI
- Total: 2200 x 1125
- Active: 1920 x 1080
- Frames/sec: 60.5 (121.1 fields)
- Scan type: Interlaced
- HSYNC delay: 88
- HSYNC width: 44
- VSYNC delay: 2
- VSYNC width: 5
- HSYNC polarity: +
- VSYNC polarity: +
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Pixels repeated 0 times
- Video ID code (VIC): 46 (1920 x 1080 i @119.88/120Hz 16:9)
- AV Mute Status: Not muted
- HDCP: Not encrypted

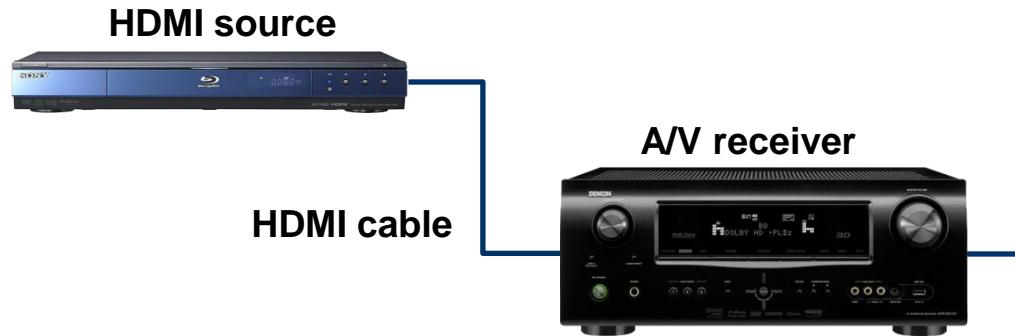
At the bottom of the Format Analyzer window, there is a status bar with the following information:

HDMI (8 bpc YCbCr 4:2:2)	3840x2160p 30 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP enabled	+5V detected
Interface: HDMI (8 bpc YCbCr 4:2:2)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Disable HDCP	AVMUTE OFF HDCP OK HPD OK

The status bar also shows a timer at 00:44 and a page number 14.

780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Verify audio (and video) and audio metadata of an HDMI audio source device.



Video Display

Home Preferences Help

Timing: 3840 x 2160
~60 frames/sec, Progressive
Video type: HDMI
Color space: YCbCr 4:2:2
Colorimetry: ITU-709
Range: Limited
VIC code: 4
AV Mute: Disabled
HDCP: Disabled

IN

OUT

HDMI (8 bpc YCbCr 4:2:2) 3840x2160p 30 frames/s Unknown HDMI 3D disabled AVMUTE disabled HDCP enabled +5V detected

Interface: HDMI (8 bpc YCbCr 4:2:2) Format: 3840x2160 30Hz Pattern: Color Bars 3D: Disabled Audio (Optical): LPCM 2.0ch 48KHz

Disable HDCP AVMUTE OFF HDCP OK HPD OK 00:44

Audio Analysis

Home Preferences Service

Read

Dolby: 5ch. [L, C, R, SL, SR]
48KHz sampling rate
448 KHz target bitrate

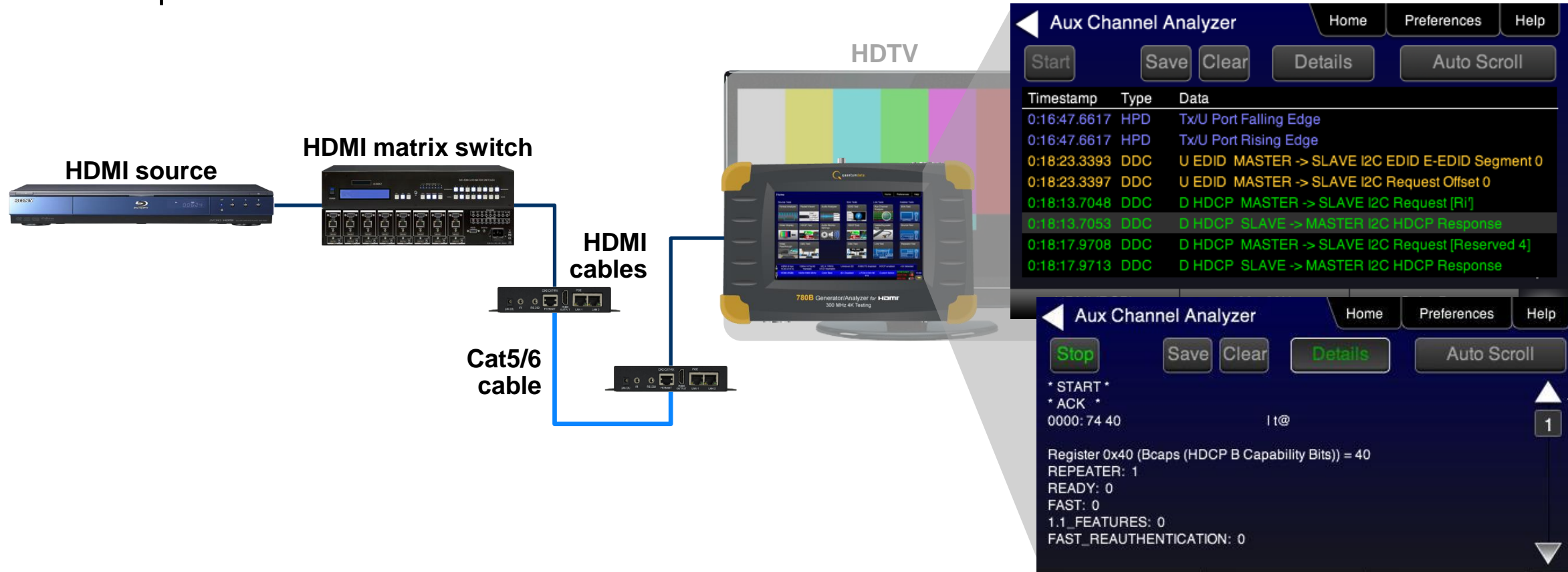
Audio InfoFrame data:
Channel count: 6 channels
Coding type: 0 (Refer to stream header)
Word length: Refer to stream header
Sampling freq.: Refer to stream header
Channel allocation:
--- RR RL FC LFE
FR FL

Channel status bits:
Application: Consumer
Sample words: Other
Copyright asserted: Yes
Format info: 2 ch., no pre-emph.
Mode: 0
Category code: 00
Source number: 0
Channel number: 0
Sampling freq.: 48 KHz
Word length: 16 bits

HDMI (RGB) 1080p 60Hz 3D Contrast

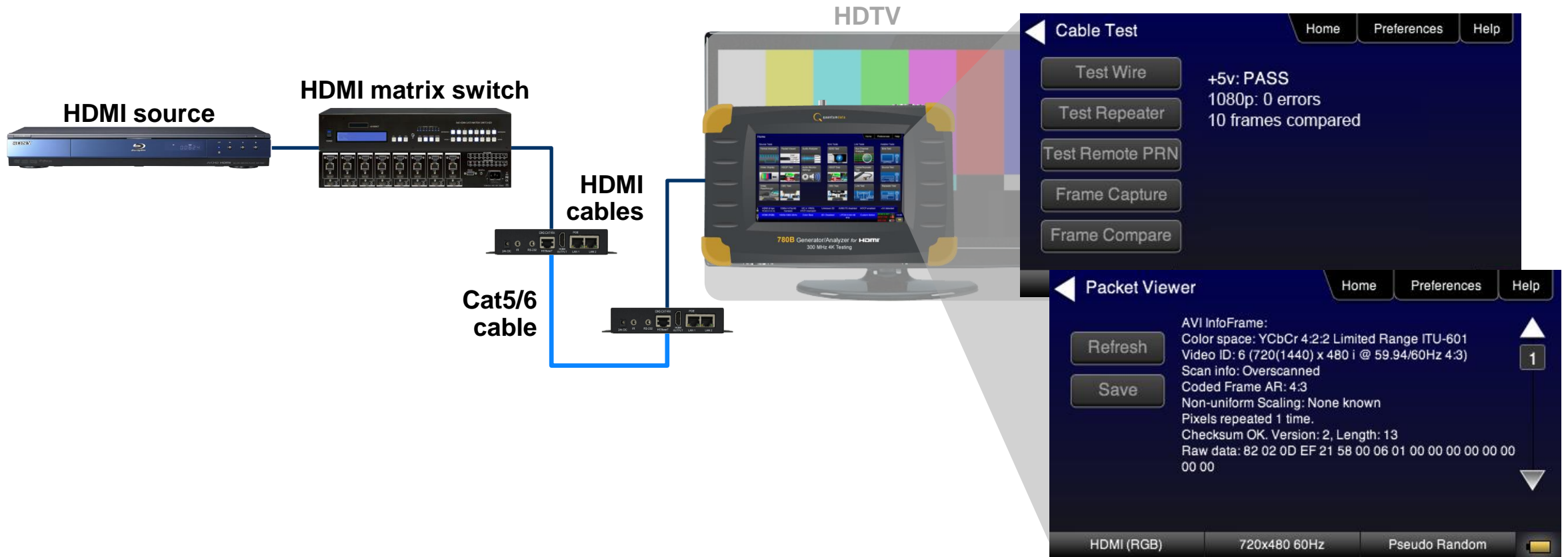
780 Sample Application – HDMI Distribution Network

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Monitor DDC (HDCP & EDID) and hot plug events of an HDMI source device or upstream distribution network.



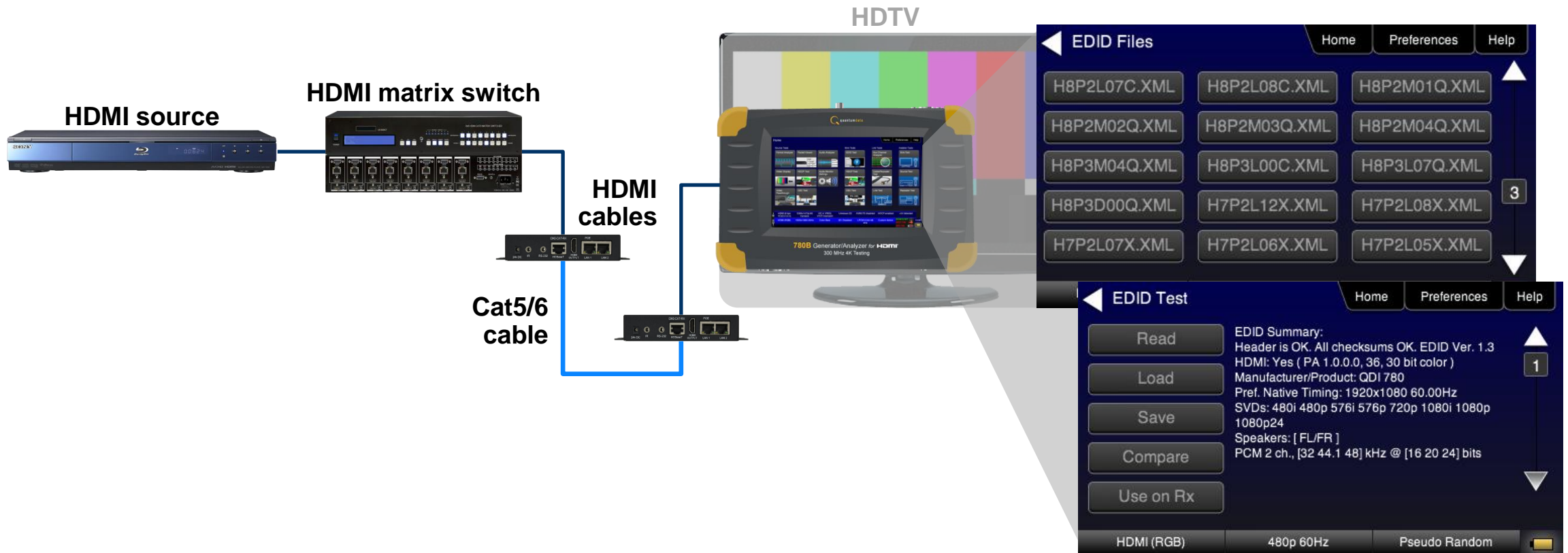
780 Sample Application – HDMI Distribution Network

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Check for pixel errors and view metadata packets on an upstream HDMI / HDBaseT distribution network.



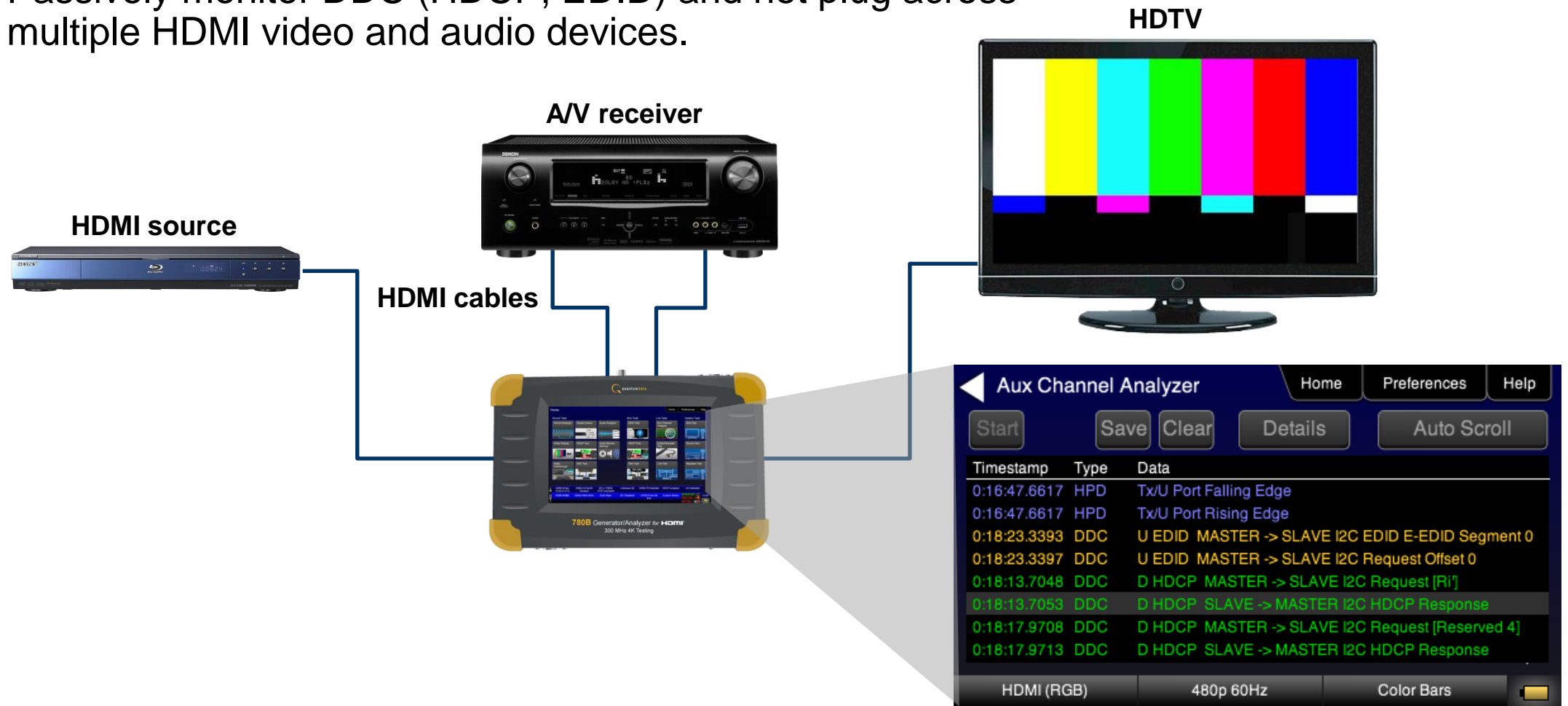
780 Sample Application – HDMI Network EDID Test

- HDMI Source Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Verify HDMI source or distribution network's handling of various HDMI EDIDs.



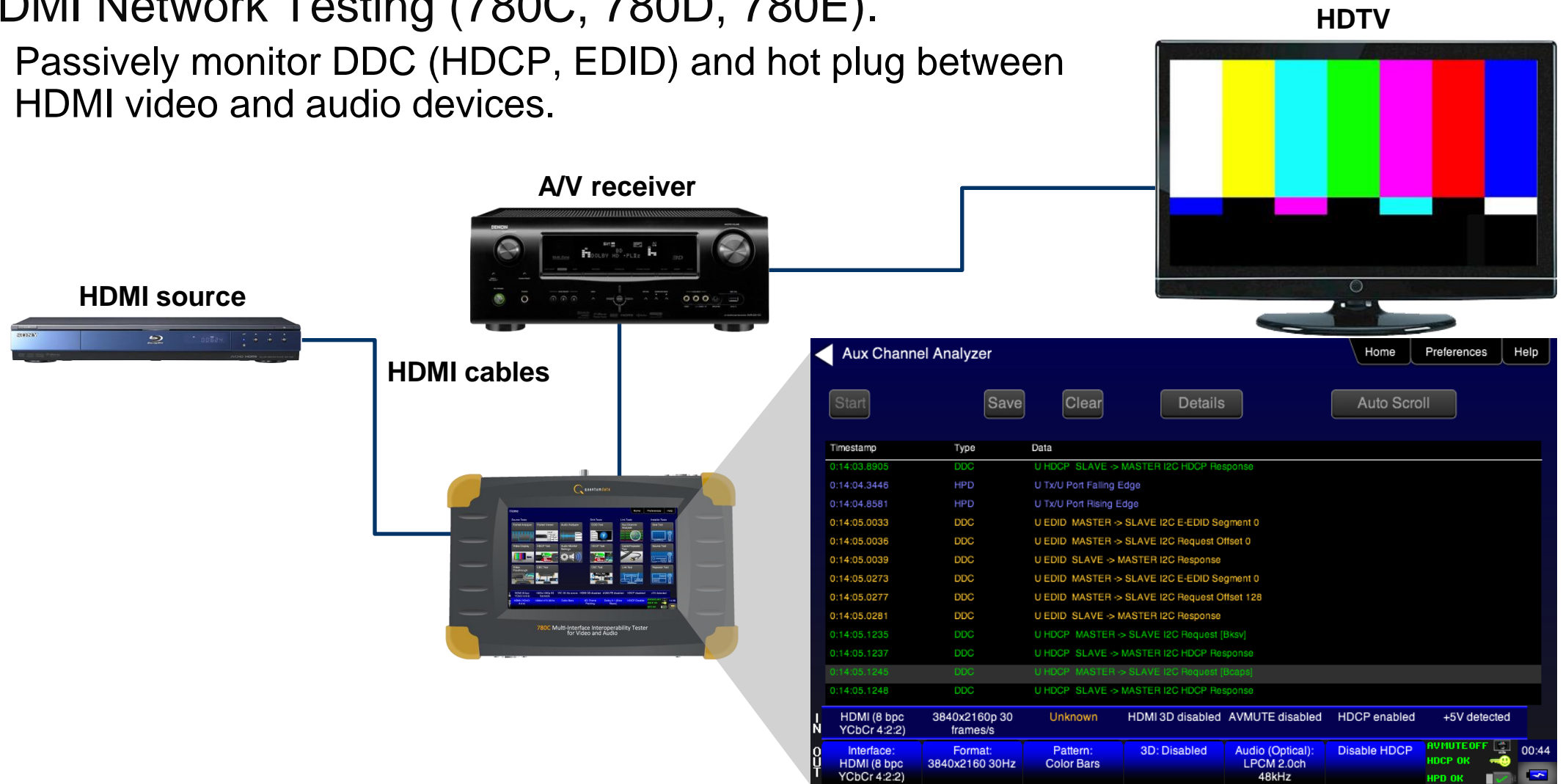
780 Sample Application – HDMI Network Testing

- HDMI Network Testing (780, 780AH, 780BH, 780D, 780E)
 - Passively monitor DDC (HDCP, EDID) and hot plug across multiple HDMI video and audio devices.



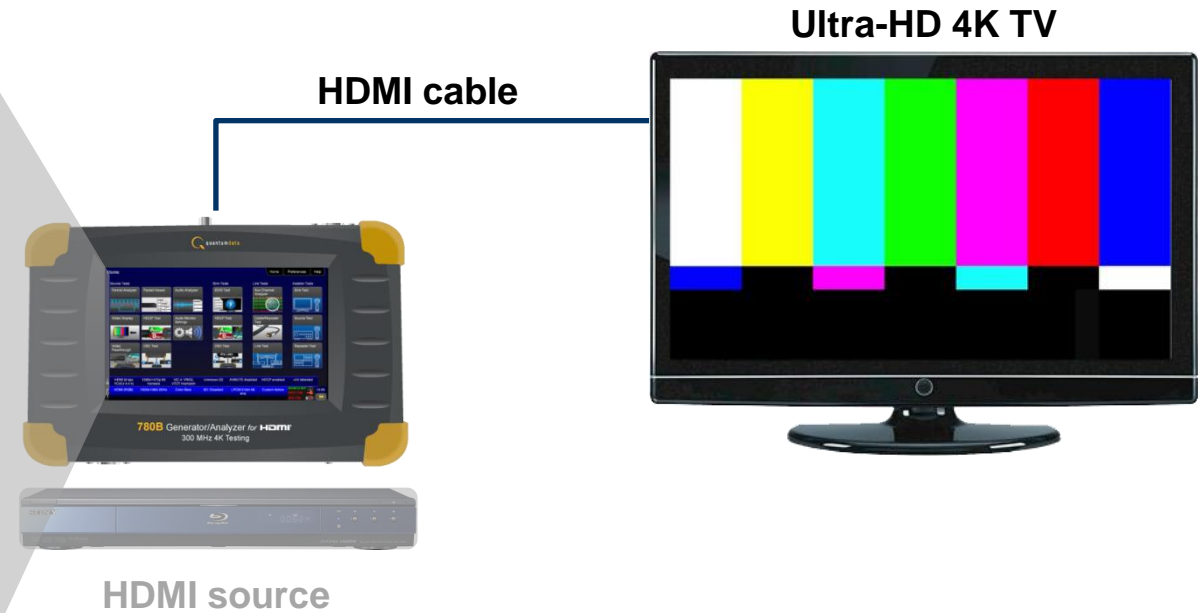
780 Sample Application – HDMI Network Testing

- HDMI Network Testing (780C, 780D, 780E).
 - Passively monitor DDC (HDCP, EDID) and hot plug between HDMI video and audio devices.



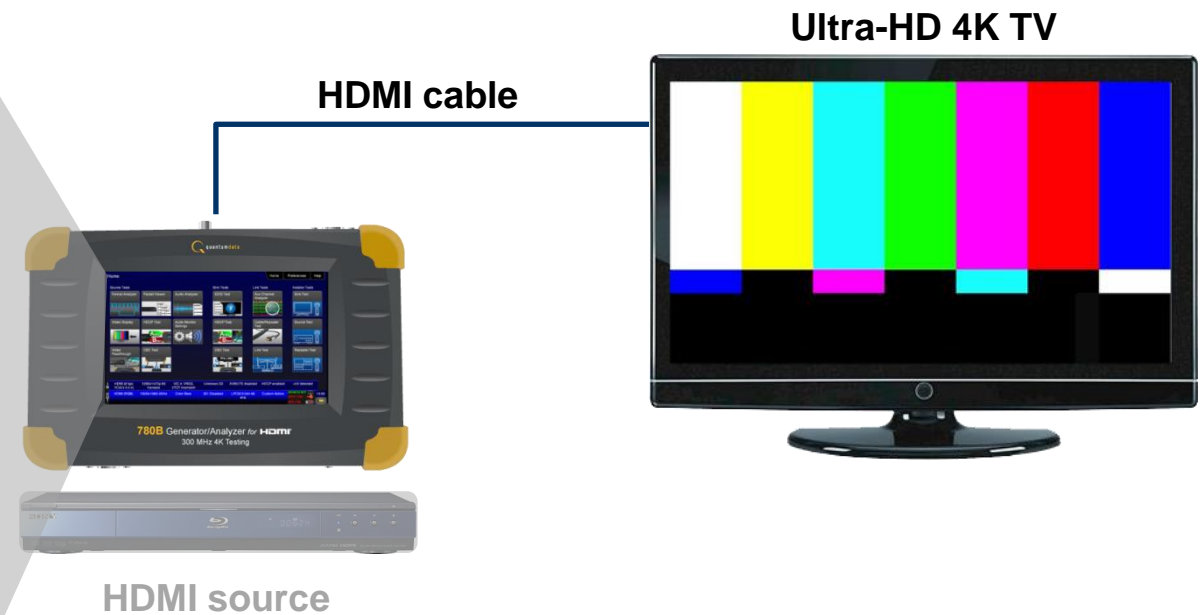
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Basic video functional test of an HDMI sink device.
 - Supports UHD 4K formats & HDMI 2.0 4:2:0 pixel encoding (780AH, 780BH, 780C, 780D, 780E).



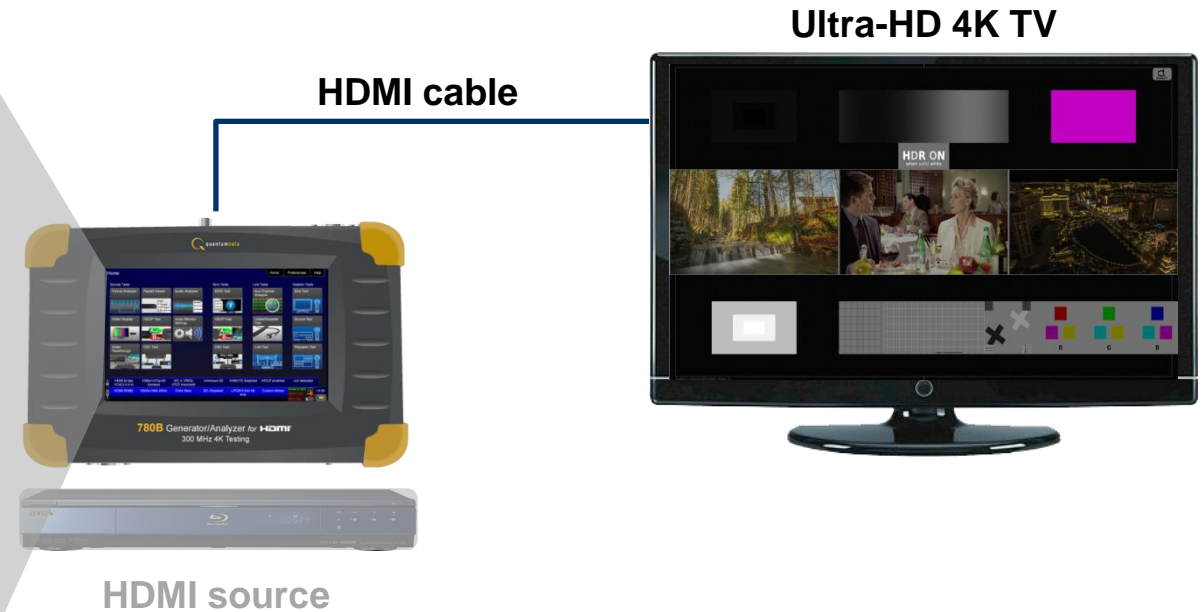
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Basic video functional test of an HDMI sink device.
 - Provides library of standard test patterns.



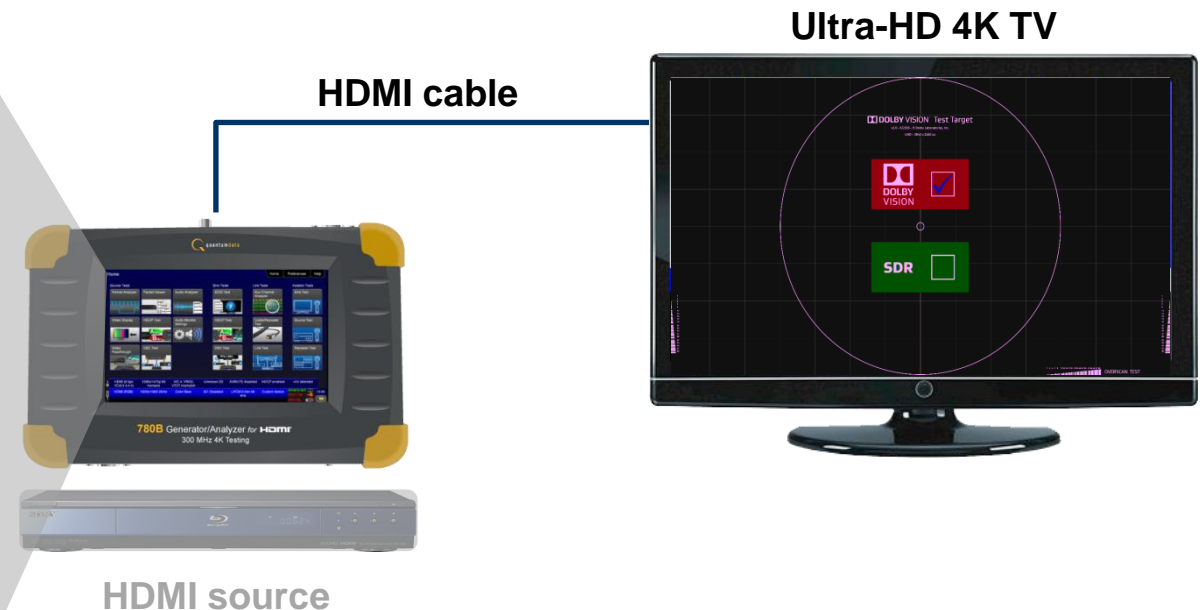
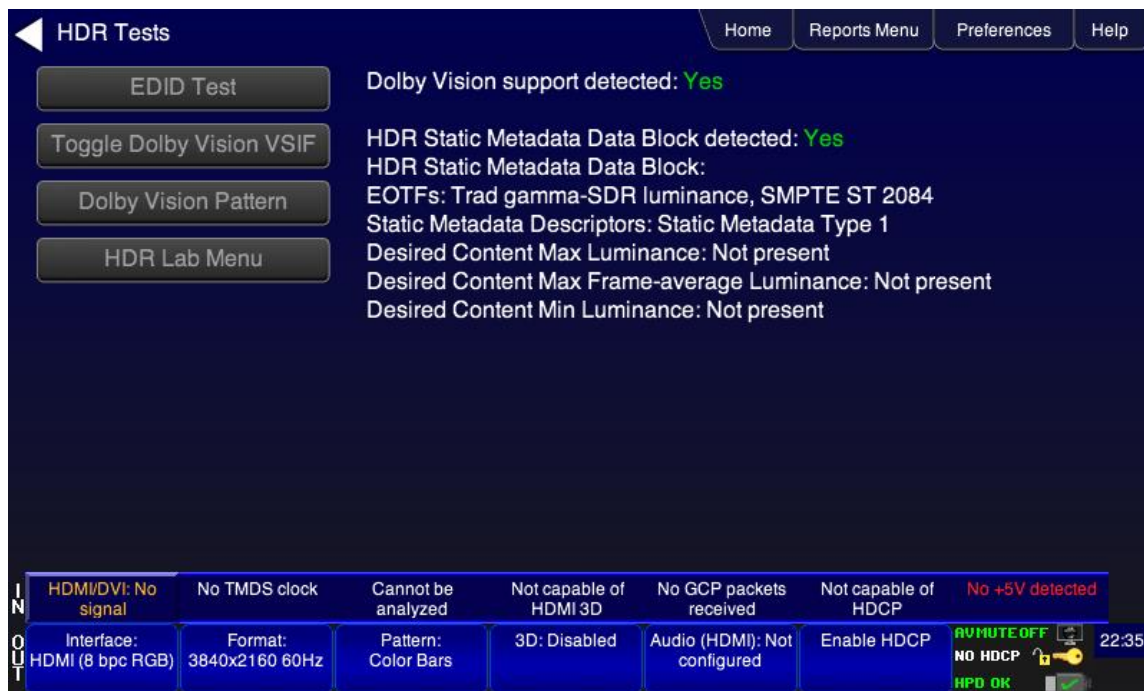
780 Sample Application – HDMI Sink Testing with "HDR Lab"

- HDMI High Dynamic Range (HDR) Sink Testing with "HDR Lab" (780E)
 - Verify an Ultra HD TV's HDR capabilities.
 - Use "HDR Lab" test images and test patterns.
 - Test for peak brightness, native contrast, average brightness level, clipping and color gamut.



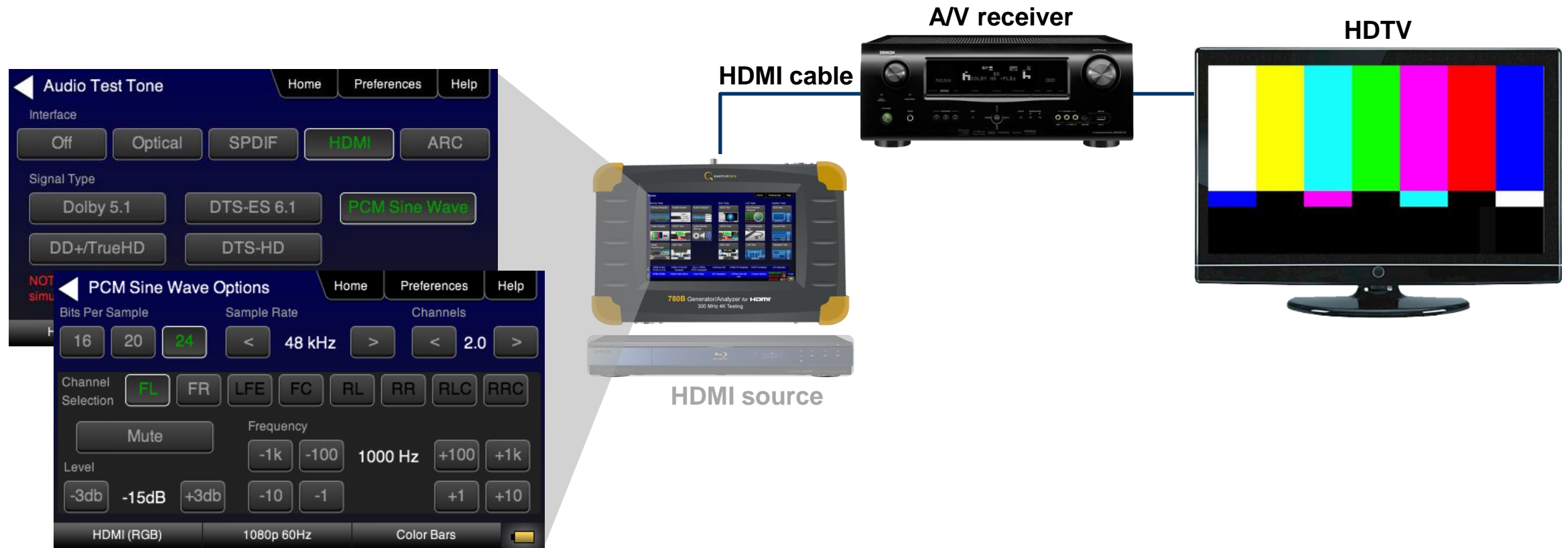
780 Sample Application – HDMI Sink Testing with HDR Dolby Vision

- HDMI High Dynamic Range (HDR) Sink Testing with Dolby Vision (780E)
 - Dolby Vision test image verifies embedded HDR metadata.



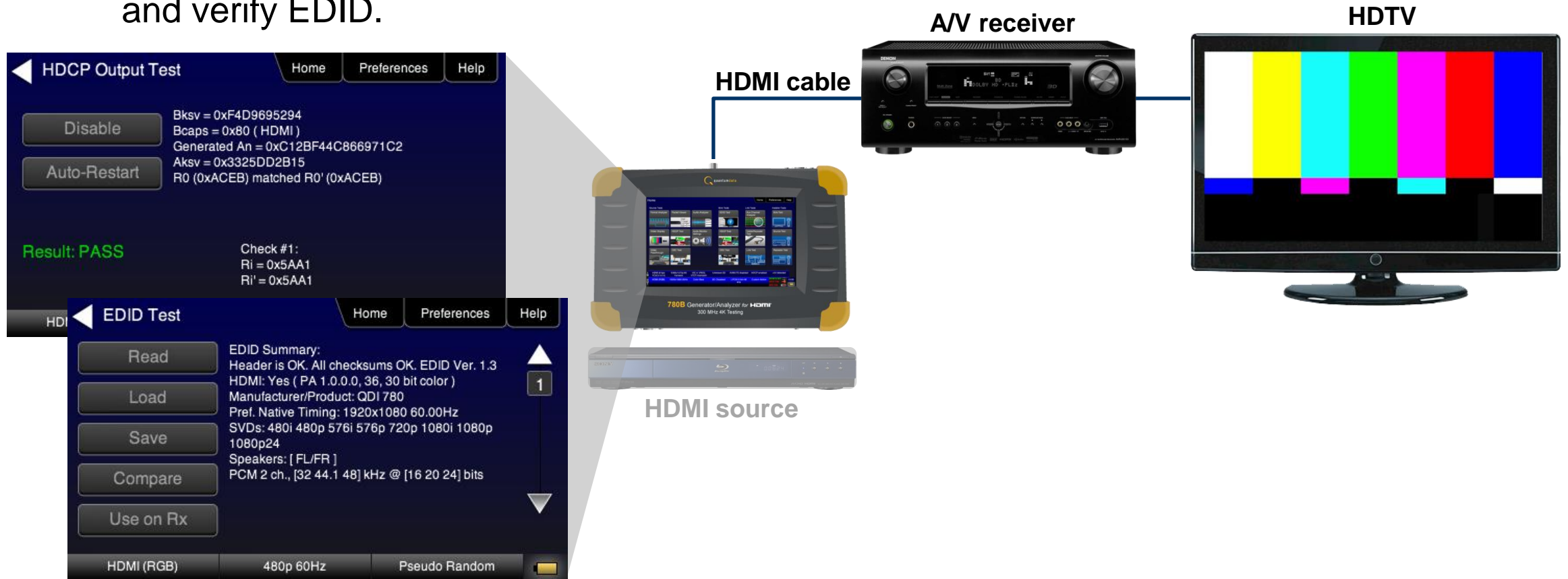
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Audio functional test of an HDMI audio rendering sink device.
 - Supports uncompressed LPCM and Dolby or DTS compressed formats.



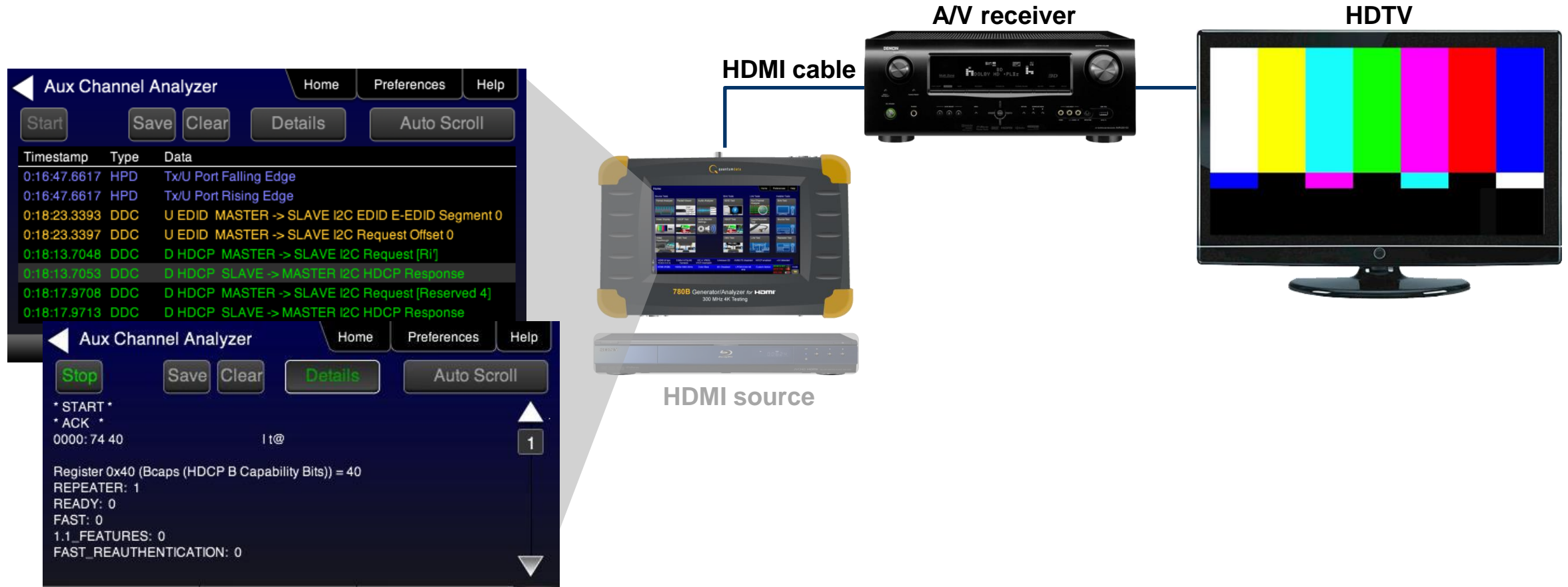
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Basic protocol functional test of an HDMI sink device.
 - Test HDCP (780AH, 780BH, 780D & 780E support HDCP 2.2) authentication and verify EDID.



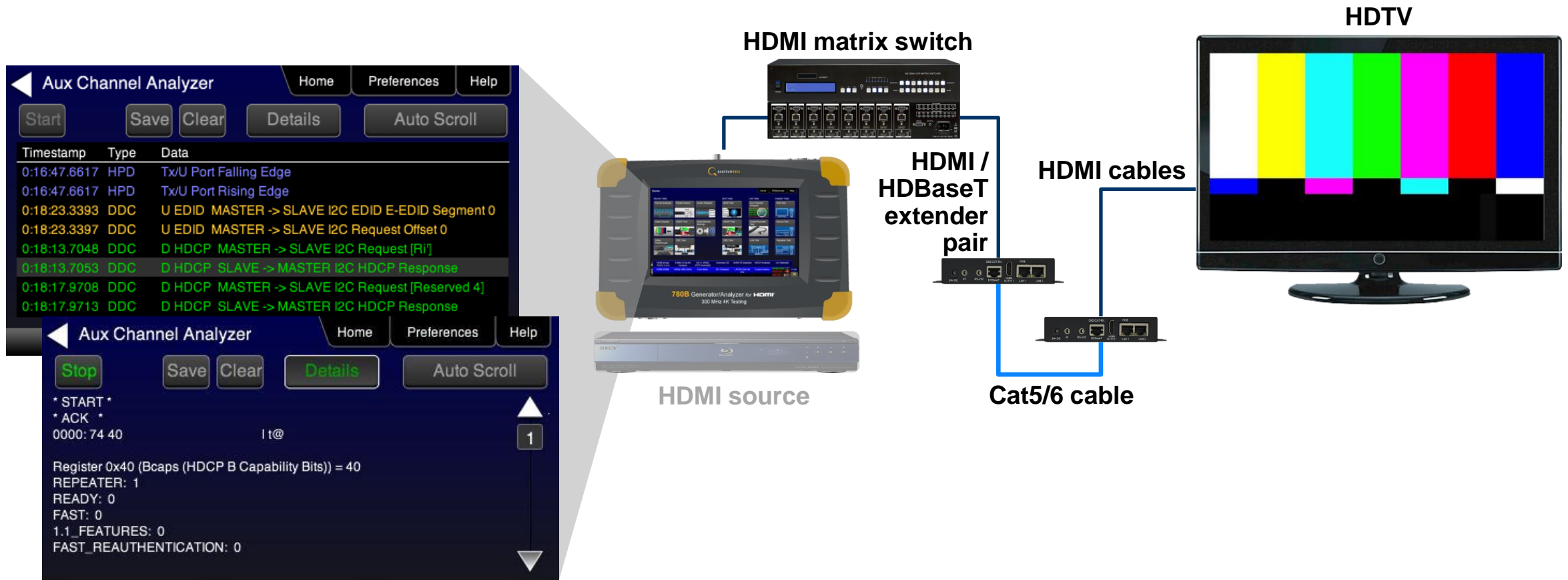
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Monitor DDC (HDCP & EDID) and hot plug events with an HDMI sink device.



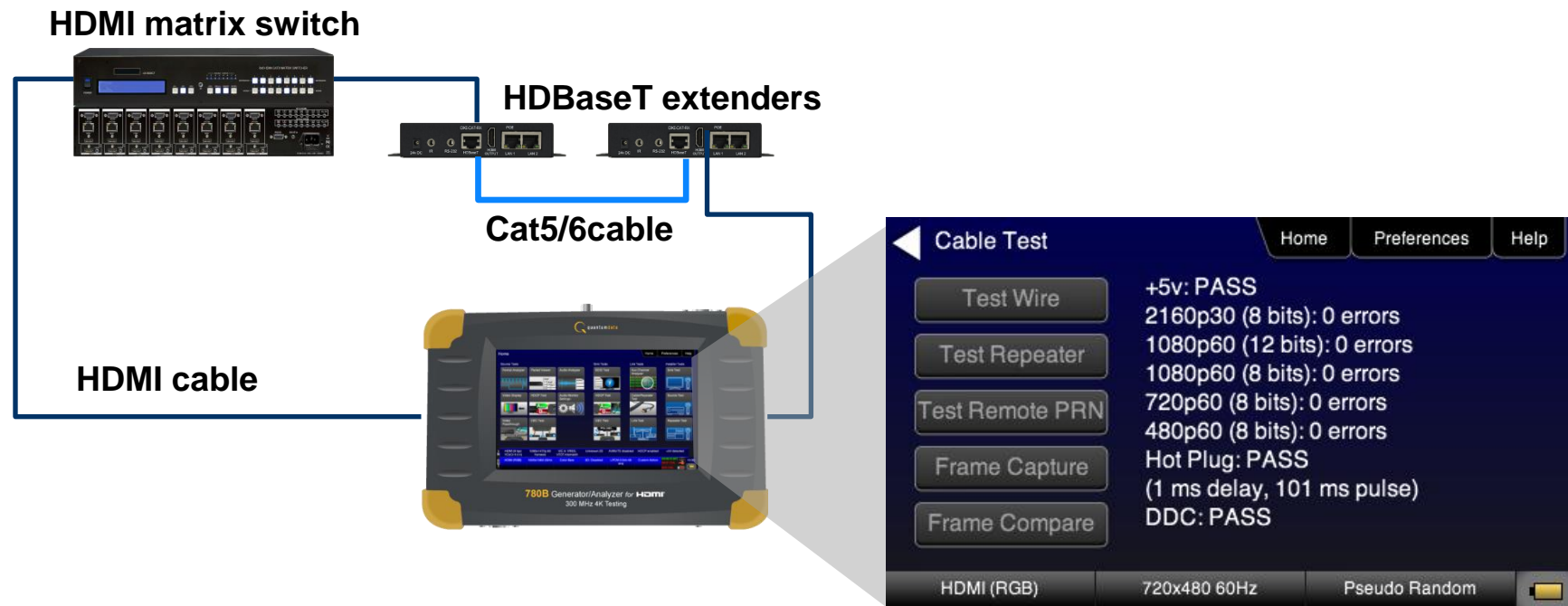
780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Monitor DDC (HDCP & EDID) and hot plug events with an HDMI sink device or downstream distribution network.



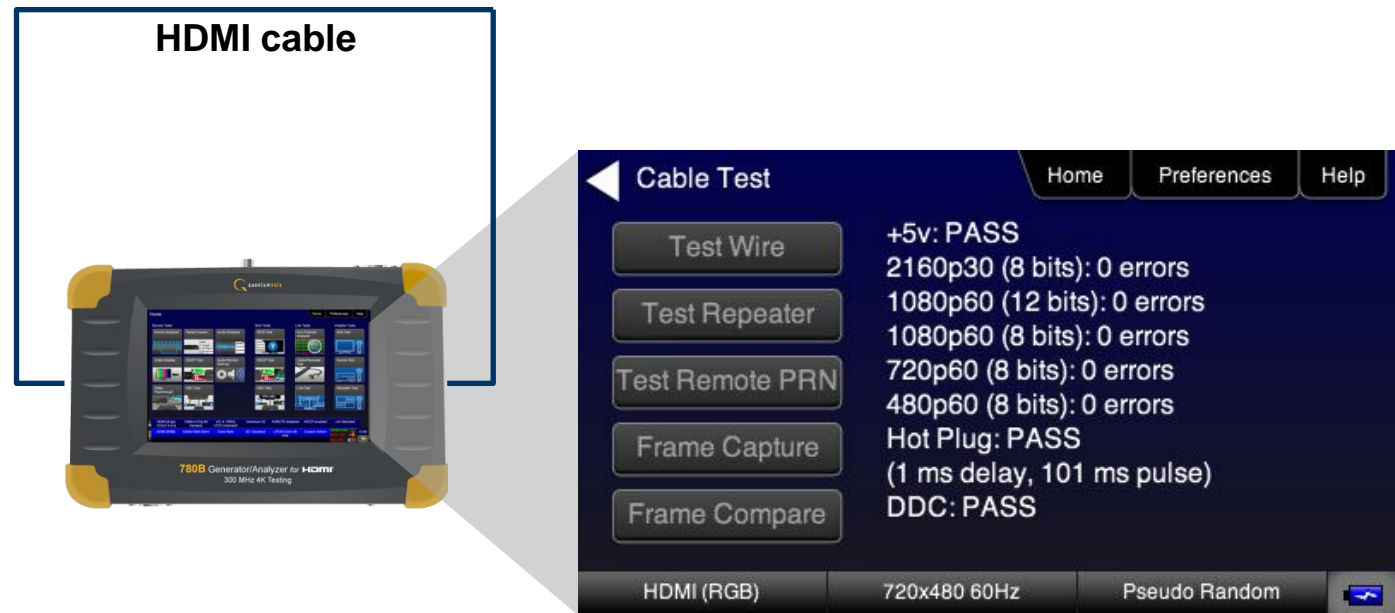
780 Sample Application – HDMI Distribution Network

- HDMI Distribution Network Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Check for pixel errors on an HDMI / HDBaseT distribution network.



780 Sample Application – HDMI Cable Test

- HDMI Cable Testing (780, 780AH, 780BH, 780C, 780D, 780E)
 - Check for pixel errors on an HDMI cable.



Applications - HDBaseT

780 Sample Application – HDBaseT Device Testing

- HDBaseT Sink Testing (780C, 780D, 780E)
 - Basic video functional test of an HDBaseT sink device.
 - Supports 4K formats.



HDBaseT
Cat5/6 cable

HDBaseT Projector



780 Sample Application – HDBaseT Device Testing

- HDBaseT Sink Testing (780C, 780D, 780E)
 - Basic video functional test of an HDBaseT sink device.
 - Provides library of standard test patterns.



HDBaseT
Cat5/6 cable

HDBaseT Projector



780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C, 780D, 780E)
 - Monitor DDC (HDCP & EDID) and hot plug events with an HDBaseT device connected to an HDMI sink.

Aux Channel Analyzer

Home Preferences Help

Start Save Clear Details Auto Scroll

Timestamp	Type	Data
0:14:03.8905	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:04.3446	HPD	U Tx/U Port Falling Edge
0:14:04.8581	HPD	U Tx/U Port Rising Edge
0:14:05.0033	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0036	DDC	U EDID MASTER -> SLAVE I2C Request Offset 0
0:14:05.0039	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.0273	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0277	DDC	U EDID MASTER -> SLAVE I2C Request Offset 128
0:14:05.0281	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.1235	DDC	U HDCP MASTER -> SLAVE I2C Request [Bksv]
0:14:05.1237	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:05.1245	DDC	U HDCP MASTER -> SLAVE I2C Request [Bcaps]
0:14:05.1248	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response

IN

HDBaseT (8 bpc RGB)	3840x2160p 30.00 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
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OUT

Interface: HDBaseT (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF HDCP OK HPD OK	17:51
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HDBaseT Cat5/6 cable

HDBaseT Projector



780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C, 780D, 780E)
 - Monitor DDC (HDCP & EDID) and hot plug events with an HDBaseT device connected to an HDMI sink.

Aux Channel Analyzer

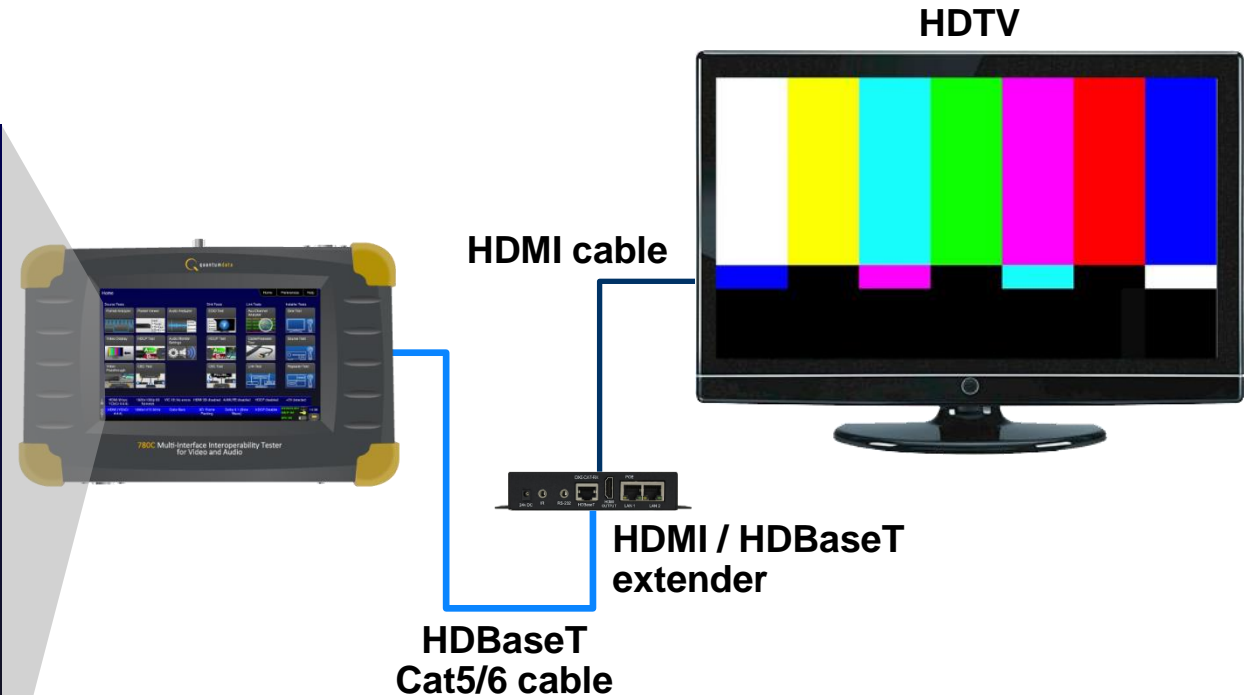
Start Save Clear Details Auto Scroll

Timestamp	Type	Data
0:14:03.8905	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:04.3446	HPD	U TxU Port Falling Edge
0:14:04.8581	HPD	U TxU Port Rising Edge
0:14:05.0033	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0036	DDC	U EDID MASTER -> SLAVE I2C Request Offset 0
0:14:05.0039	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.0273	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0277	DDC	U EDID MASTER -> SLAVE I2C Request Offset 128
0:14:05.0281	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.1235	DDC	U HDCP MASTER -> SLAVE I2C Request [Bkvs]
0:14:05.1237	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:05.1245	DDC	U HDCP MASTER -> SLAVE I2C Request [Bcaps]
0:14:05.1248	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response

I N
O U T

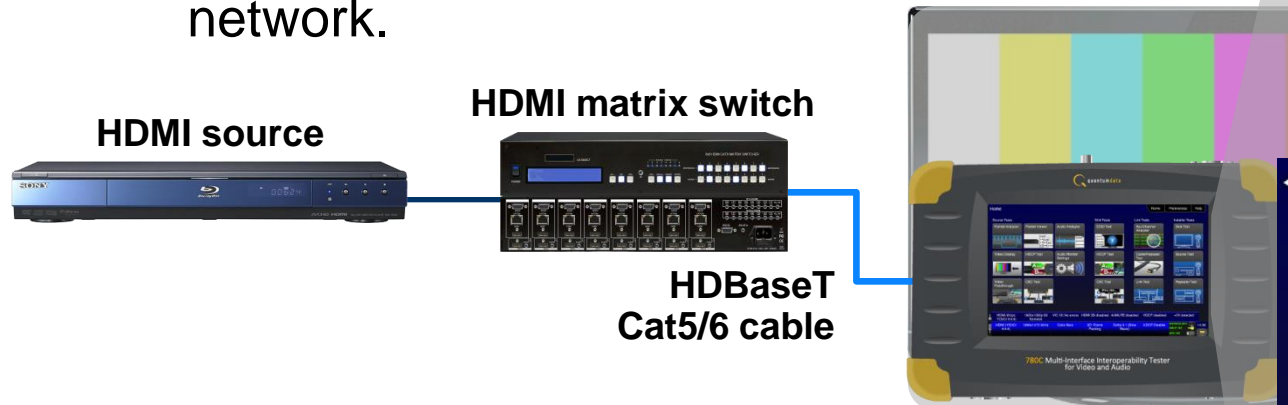
HDBaseT (8 bpc RGB)	3840x2160p 30.00 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF HDCP OK HPD OK

17:51



780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C, 780D, 780E)
 - Verify video and timing from an HDBaseT device through an upstream distribution network.



Video Display
Home Preferences Help



Timing: 3840 x 2160
~60 frames/sec, Progressive
Video type: HDMI
Color space: YCbCr 4:2:2
Colorimetry: ITU-709
Range: Limited
VIC code: 4
AV Mute: Disabled
HDCP: Disabled

Format Analyzer
Home Preferences Help

Errors:
None

Read

Video type: HDMI
Total: 2200 x 1125
Active: 1920 x 1080
Frames/sec: 60.5 (121.1 fields)
Scan type: Interlaced
HSYNC delay: 88
HSYNC width: 44
VSYNC delay: 2
VSYNC width: 5
HSYNC polarity: +
VSYNC polarity: +

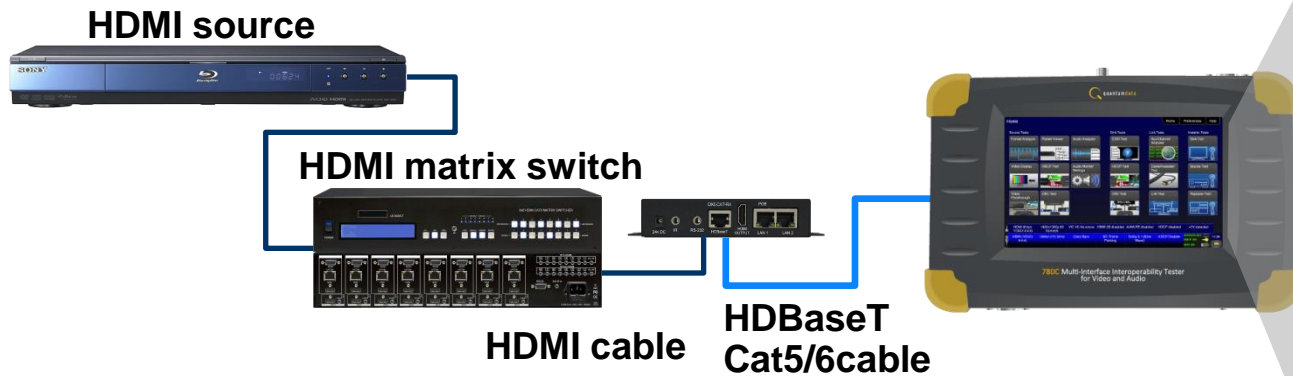
Color space: YCbCr 4:2:2
Colorimetry: ITU-709
Pixels repeated 0 times
Video ID code (VIC): 46 (1920 x 1080 i @119.88/120Hz 16:9)
AV Mute Status: Not muted
HDCP: Not encrypted

HDBaseT (8 bpc RGB)	3840x2160p 30.00 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF HDCP OK HPD OK

17:51

780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C, 780D, 780E)
 - Verifying HDCP authentication on an HDBaseT device through an upstream distribution network.



Aux Channel Analyzer

Start Save Clear Details Auto Scroll

Timestamp	Type	Data
0:14:03.8905	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:04.3446	HPD	U Tx/U Port Falling Edge
0:14:04.8581	HPD	U Tx/U Port Rising Edge
0:14:05.0033	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0036	DDC	U EDID MASTER -> SLAVE I2C Request Offset 0
0:14:05.0039	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.0273	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0277	DDC	U EDID MASTER -> SLAVE I2C Request Offset 128
0:14:05.0281	DDC	U EDID SLAVE -> MASTER I2C Response
0:14:05.1235	DDC	U HDCP MASTER -> SLAVE I2C Request [Bksv]
0:14:05.1237	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:05.1246	DDC	U HDCP MASTER -> SLAVE I2C Request [Bcaps]
0:14:05.1248	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response

IN

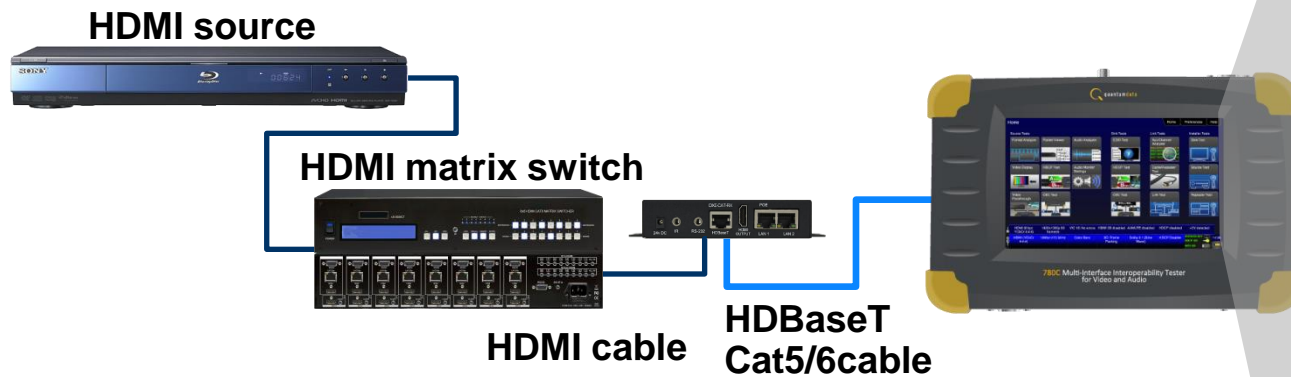
HDBaseT (8 bpc RGB)	3840x2160p 30.00 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
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OUTPUT

Interface: HDBaseT (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF HDCP OK HPD OK	17:51
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780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C, 780D 780E)
 - Check for pixel errors and view packets on an HDBaseT device through a distribution network.



Cable Test

Home Preferences Help

Test Wire +5v: PASS
1920 x 1080p: 0 errors
10 frames compared.

Test Repeater

Test Remote PRN

Frame Capture

Frame Compare

Packet Viewer

Home Preferences Help

Refresh

Save

AVI InfoFrame:
Color space: RGB Default Range
Video ID: 16 (1920 x 1080 p @ 59.94/60Hz 16:9)
Coded Frame AR: 16:9
Non-uniform Scaling: None known
Pixels repeated 0 times.
Checksum OK. Version: 2, Length: 13
Raw data: 82 02 0D 09 00 28 00 10 00 00 00 9E 08 00 00 81 07

IN
OUT

HDBaseT (8 bpc RGB)	3840x2160p 30.00 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF HDCP OK HPD OK

17:51

Sample Applications – HDBaseT Cat5/6 Remote Cable Test

- HDBaseT Remote Cable Testing (780C, 780D, 780E)
 - Check quality of signal from near end to a far end HDBaseT Remote Terminal.
 - Solution checks main video channel and aux channel.

Cable Test

Home Reports Menu Preferences Help

Test Wire
Test Repeater
Test Remote PRN
Frame Capture
Frame Compare
Test Remote HDBaseT

Detected official Teledyne LeCroy HDBaseT device connected to HDBaseT TX port.

HDBaseT Tx Local Info:
Firmware Version: 13131510 (2016/09/26)
Operation Mode: HDBaseT
Cable length estimated to be < 20 meters

HDBaseT Tx Remote Info:
HDBT device connected to Tx: VS100RX
Firmware Version: 13131500 (2016/09/26)
Error (MSE): -22dB, -22dB, -22dB
Operation Mode: HDBaseT
Cable length estimated to be < 20 meters

Aux Channel MaxErr:
35, 34, 36, 34- GOOD

Main Channel MaxErr (2160p30):
36, 36, 38, 38- GOOD

Main Channel MaxErr (1080p60):
19, 18, 19, 18- EXCELLENT

HDBaseT (8 bpc RGB)	1920x1080p 60.00 frames/s	VIC 16: No errors	HDMI 3D disabled	AVMUTE disabled	Not HDCP encrypted	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 1920x1080 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP HPD OK

IN
OUT

20:58



HDBaseT
Cat5/6 cable


HDBaseT
Remote
Terminal



Sample Applications – HDBaseT Cat5/6 Cable Test

- HDBaseT Cable Testing (780C, 780D, 780E)
 - Check for pixel errors on an HDBaseT Cat5/6 cable.

HDBaseT Cat5/6 cable



Cable Test

Test Wire
Test Repeater
Test Remote PRN
Frame Capture
Frame Compare

+5v: **PASS**
2160p30 (8 bits): **0 errors**
1080p60 (12 bits): **0 errors**
720p60 (8 bits): **0 errors**
480p60 (8 bits): **0 errors**
Hot Plug: **FAIL**
(Never saw low HPD)
CEC: **Rx FAIL, Tx FAIL**
DDC: **FAIL (EDID read failed)**

HDBaseT Tx local info:
FW version 13072110 (2013/11/21)
Operation Mode: HDBaseT
Cable is too short to estimate length
HDBaseT Tx remote info:
HDBT device connected to Tx: VS100RX
FW version 13072100 (2013/11/21)
Signal Quality: -23db, -23db, -23db, -22db
Operation Mode: HDBaseT
Cable is too short to estimate length

HDBaseT Rx local info:
FW version 13072100 (2013/11/21)
Signal Quality: -22db, -22db, -23db, -22db
Operation Mode: HDBaseT
Cable is too short to estimate length
HDBaseT Rx remote info:
HDBT device connected to Rx: VS100TX
FW version 13072110 (2013/11/21)
Operation Mode: HDBaseT
Cable is too short to estimate length

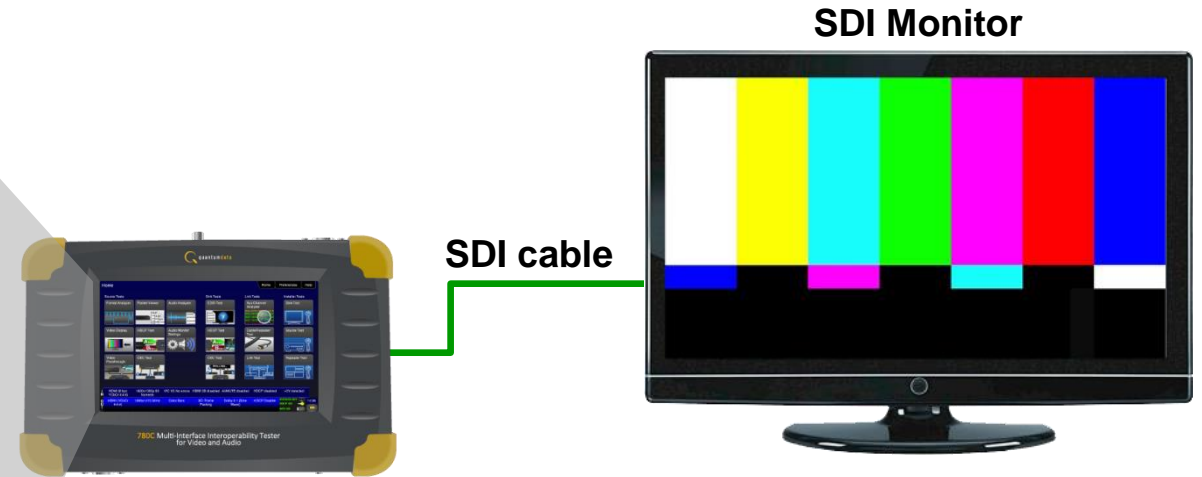
HDBaseT (8 bpc RGB)	720x480p 60 frames/s	VIC 2: No errors	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 720x480 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP HPD OK

02:03

Applications - SDI

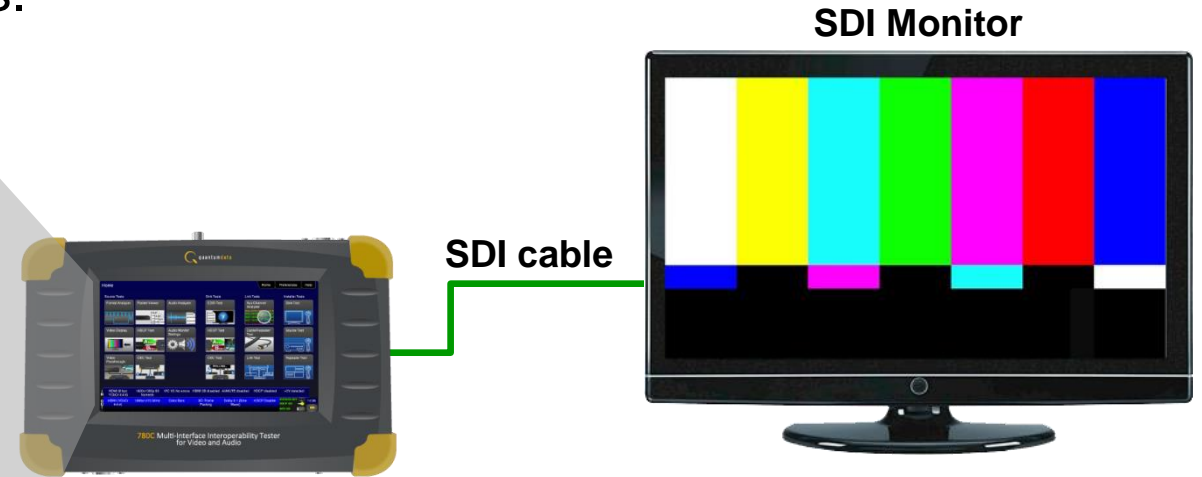
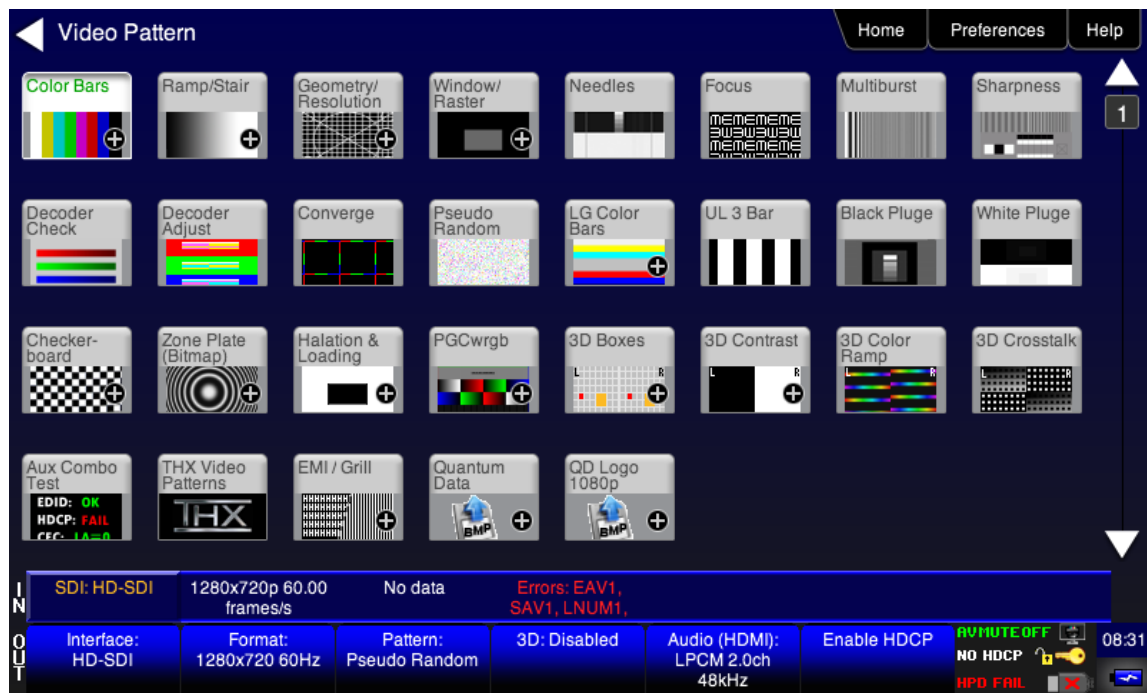
780C Sample Application – SDI Device Testing

- SDI Sink Device Testing (780C)
 - Test video on an SDI display device.



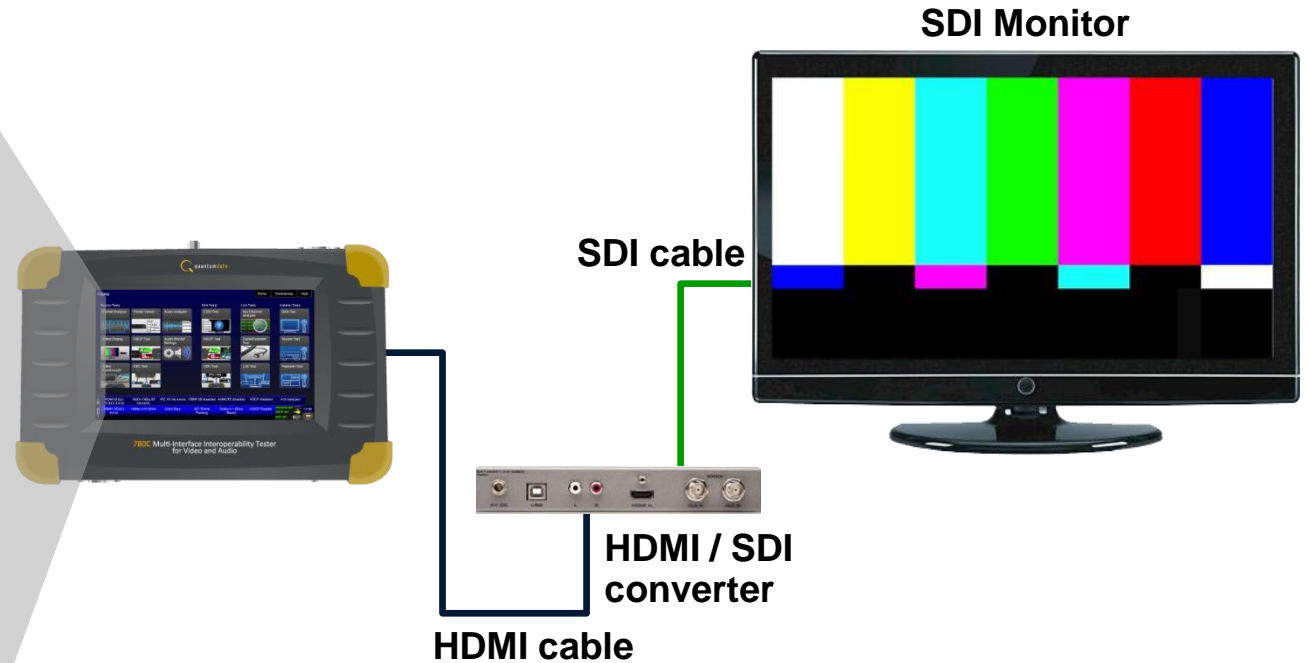
780C Sample Application – SDI Device Testing

- SDI Sink Device Testing (780C)
 - Test video on an SDI display device.
 - Supports library of standard test patterns.



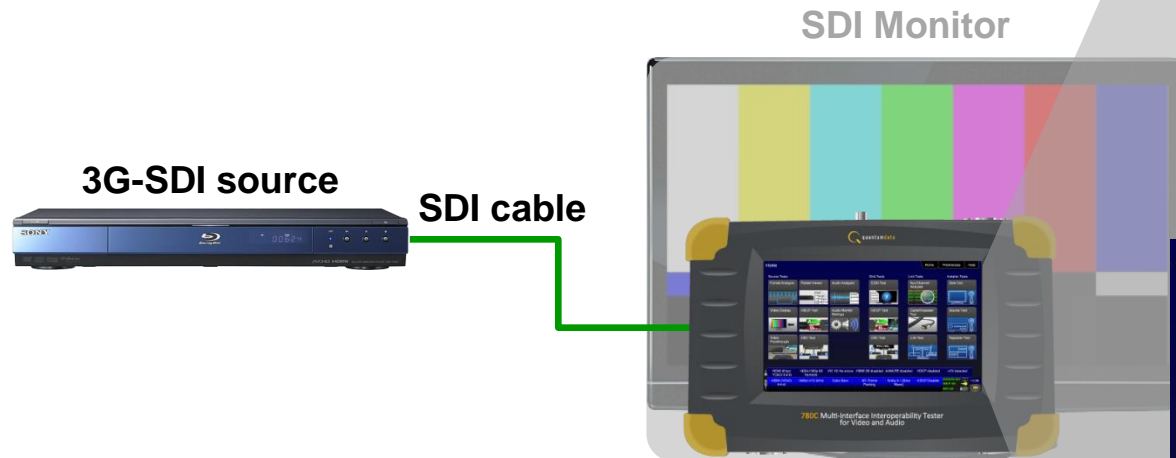
780C Sample Application – SDI Device Testing

- SDI Device Testing (780C)
 - Test video on an HDMI to SDI converter device.



780C Sample Application – SDI Device Testing

- SDI Source Device Testing (780C)
 - Verify video and timing from an SDI source device.



The screenshot shows the '780C Multi-Interface Interoperability Tester for Video and Audio' software interface. It features a 'Video Display' window showing a horse in a field and a 'Format Analyzer' window displaying detailed video format information.

Video Display Timing: 1920 x 1080
60 frames/sec, Progressive

Format Analyzer

Read

Errors: None

Total: 2200 x 1125
Active: 1920 x 1080
Frames/sec: 60.00
Scan type: Progressive

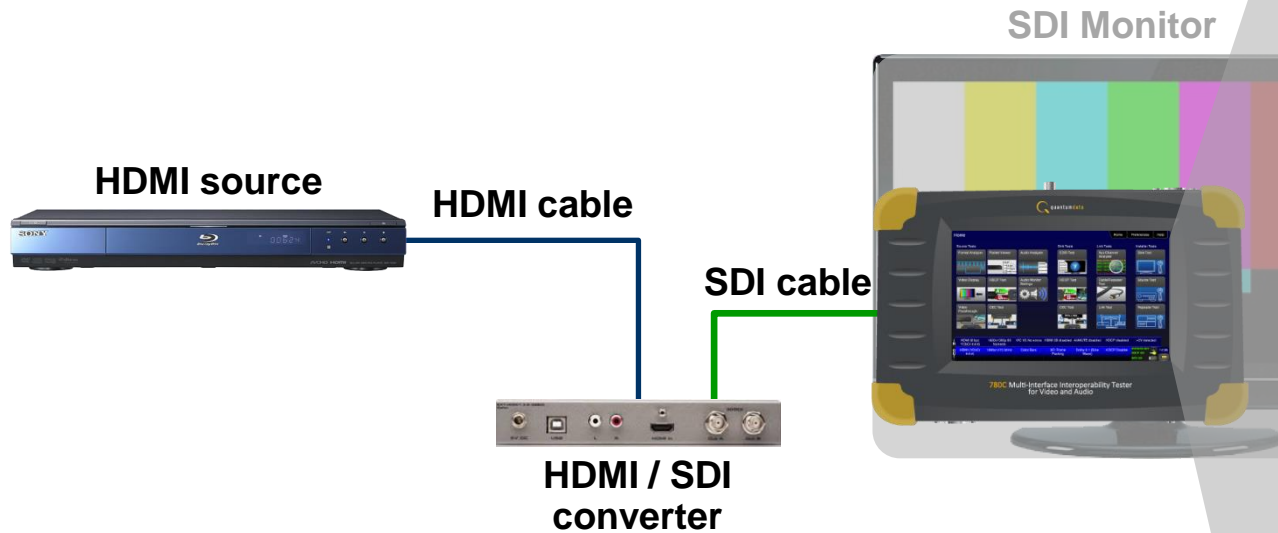
SMPTM 352M embedded packet (Stream 1):
Raw data: 0x89 0xCB 0x00 0x01
Description: 1080-line on Level A 3G-SDI
Picture rate: 0xB (60)
Sampling structure: 0x0 (4:2:2 Y/Cb/Cr)
Transport: Progressive
Picture: Progressive
Aspect ratio: Unknown
Horizontal samples: 1920
Bit depth: 10 bit

SMPTM 352M embedded packet (Stream 2):
Raw data: 0x89 0xCB 0x00 0x01
Description: 1080-line on Level A 3G-SDI
Picture rate: 0xB (60)
Sampling structure: 0x0 (4:2:2 Y/Cb/Cr)
Transport: Progressive
Picture: Progressive
Aspect ratio: Unknown
Horizontal samples: 1920
Bit depth: 10 bit

IN	SDI: 3G-SDI	1920x1080p 60.00 frames/s	3G A 1080p 60 YCC 4:2:2 1920px	Errors: None					
OUT	Interface:	Format:	Pattern:	3D: Disabled	Audio (HDMI):	Enable HDCP	AVMUTE OFF	NO HDCP	08:32
	3G-SDI	1920x1080 60Hz	Pseudo Random		LPCM 2.0ch 48kHz			MPD FAIL	

780C Sample Application – SDI Device Testing

- SDI Device Testing (780C)
 - Verify video and timing through HDMI to SDI converter device.

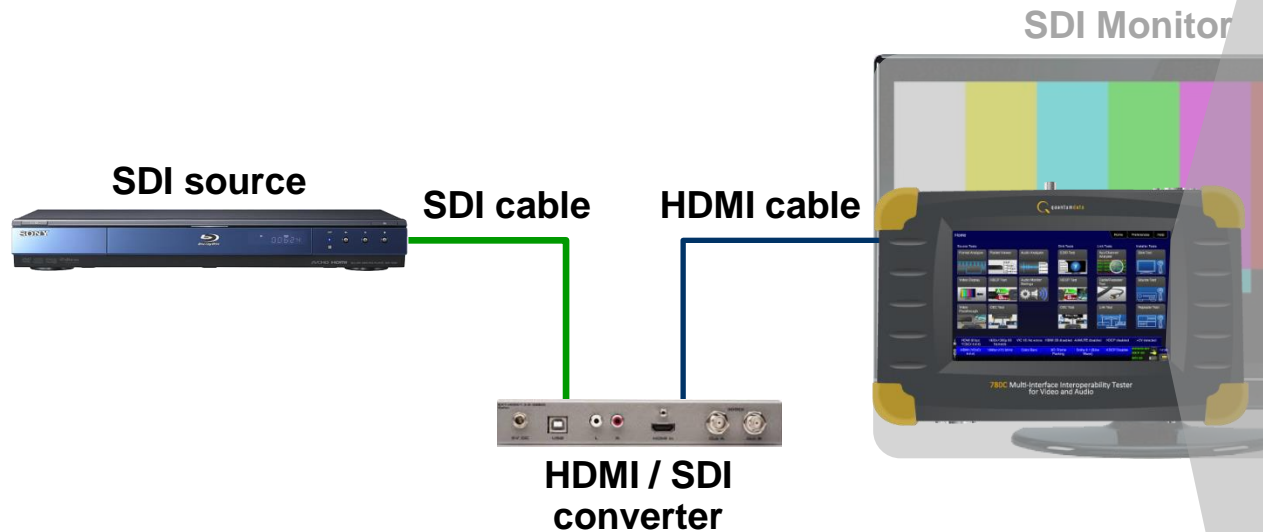


The screenshot shows the 780C software interface. The top window, titled "Video Display", shows a video of a horse and displays the following timing information: "Timing: 1920 x 1080 60 frames/sec, Progressive". The bottom window, titled "Format Analyzer", shows a "Read" button and the following information: "Total: 2200 x 1125", "Active: 1920 x 1080", "Frames/sec: 60.00", "Scan type: Progressive". Below this, it shows "Errors: None". The bottom status bar displays the following information: "SDI: 3G-SDI", "1920x1080p", "60.00 frames/s", "3G A 1080p 60", "YCC 4:2:2 1920px", "Errors: None". The bottom right corner shows "08:32" and "MPD FAIL".


IN	SDI: 3G-SDI	1920x1080p	3G A 1080p 60	Errors: None					
OUT	Interface: 3G-SDI	Format: 1920x1080 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF	NO HDCP	08:32

780C Sample Application – SDI Device Testing

- SDI Device Testing (780C)
 - Verify video, video parameters and timing through SDI to HDMI converter device.



Video Display
Home Preferences Help



Timing: 1920 x 1080
60 frames/sec, Progressive

Format Analyzer
Home Preferences Help

Read

Errors: None

Total: 2200 x 1125
Active: 1920 x 1080
Frames/sec: 60.00
Scan type: Progressive

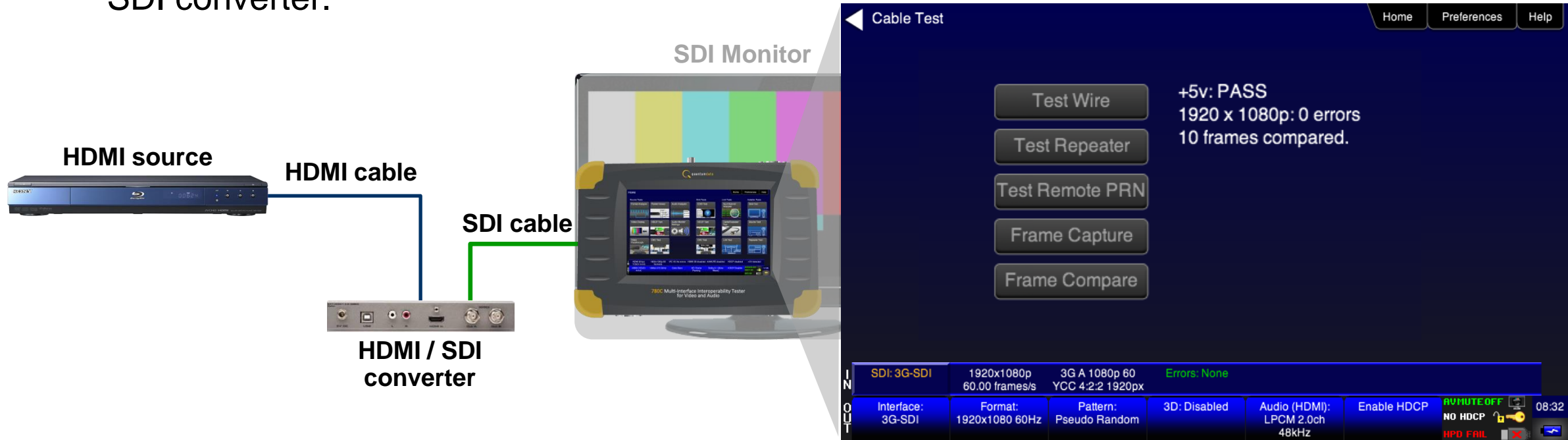
SMPTE 352M embedded packet (Stream 1):
Raw data: 0x89 0xCB 0x00 0x01
Description: 1080-line on Level A 3G-SDI
Picture rate: 0xB (60)
Sampling structure: 0x0 (4:2:2 Y/Cb/Cr)
Transport: Progressive
Picture: Progressive
Aspect ratio: Unknown
Horizontal samples: 1920
Bit depth: 10 bit

SMPTE 352M embedded packet (Stream 2):
Raw data: 0x89 0xCB 0x00 0x01
Description: 1080-line on Level A 3G-SDI
Picture rate: 0xB (60)
Sampling structure: 0x0 (4:2:2 Y/Cb/Cr)
Transport: Progressive
Picture: Progressive
Aspect ratio: Unknown
Horizontal samples: 1920
Bit depth: 10 bit

SDI: 3G-SDI	1920x1080p 60.00 frames/s	3G A 1080p 60 YCC 4:2:2 1920px	Errors: None		
Interface: 3G-SDI	Format: 1920x1080 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP AVMUTE OFF NO HDCP MPD FAIL

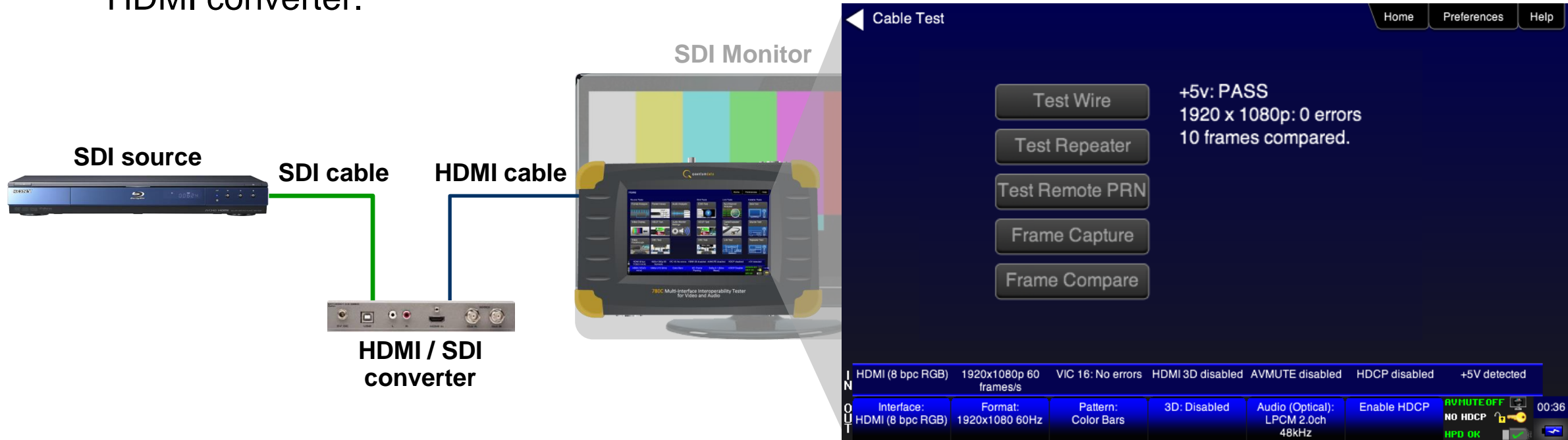
780C Sample Application – SDI Device Testing

- SDI Device Testing (780C)
 - Check for pixel errors on HDMI to SDI converter.



780C Sample Application – SDI Device Testing

- SDI Device Testing (780C)
 - Check for pixel errors on SDI to HDMI converter.



Sample Applications – 3G-SDI Cable Test

- SDI Cable Testing (780C)
 - Check for pixel errors on an 3G-SDI cable.

The image shows a physical device, the 780C Multi-Interface Interoperability Tester, with a green box highlighting the 'SDI cable' label above it. To the right is a screenshot of the device's software interface. The interface is titled 'Cable Test' and features a menu with options: 'Test Wire', 'Test Repeater', 'Test Remote PRN', 'Frame Capture', and 'Frame Compare'. The test results are displayed as follows:

- 1080p60 (3G-SDI): 0 errors
- 720p60 (HD-SDI): 0 errors
- 576i25 (SD-SDI): 0 errors

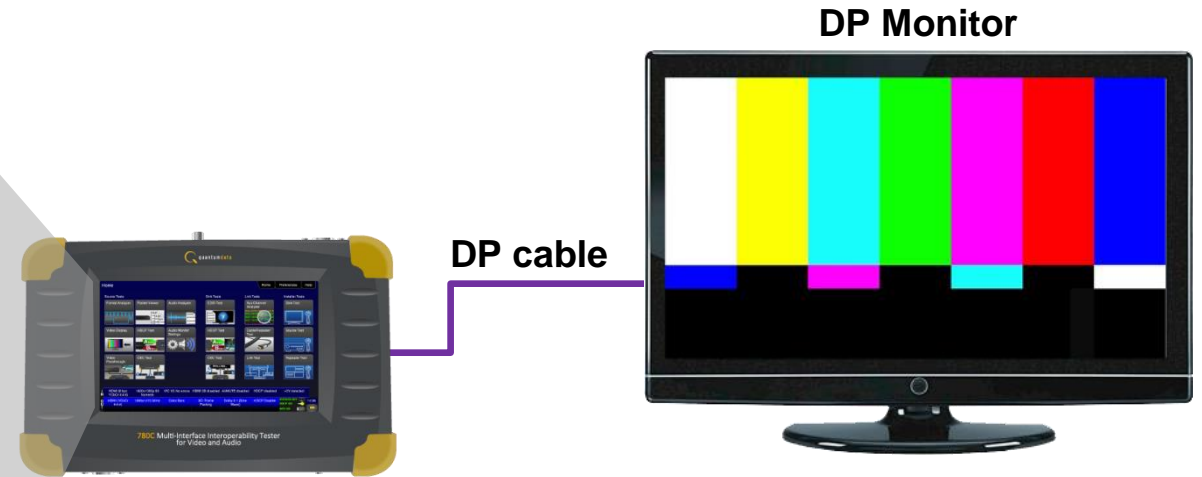
At the bottom of the interface, there is a status bar with the following information:

IN	SDI: SD-SDI	720x576i 25.00 frames/s	48x/576i 25 YCC 4:2:2 4:3 720px	Errors: None								
OUT	Interface: SD-SDI	Format: 720x576i 25Hz	Pattern: Pseudo Random	3D: Disabled	Audio (Disabled): LPCM 2.0ch 44.1kHz	Enable HDCP	AUMUTE OFF	NO HDCP				23:30

Applications - DisplayPort

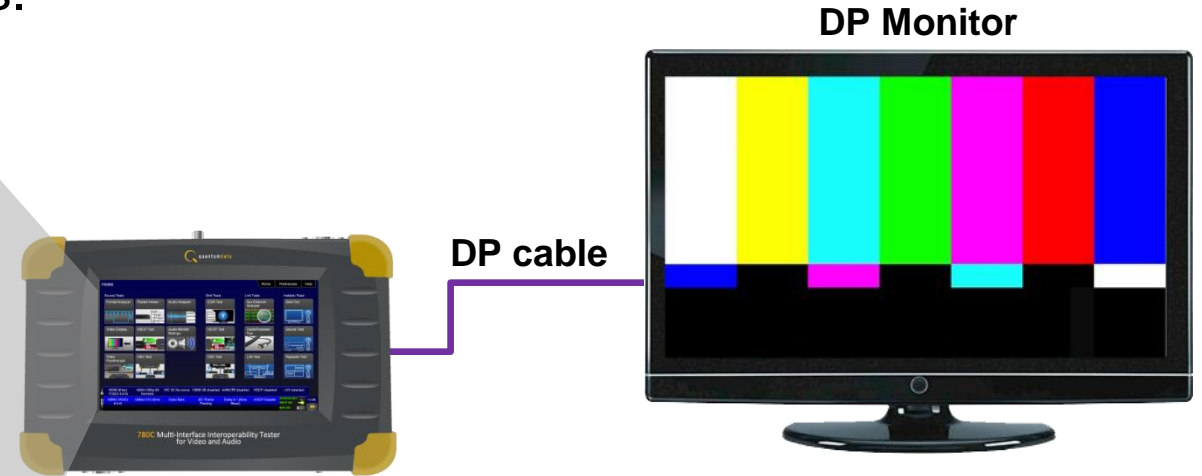
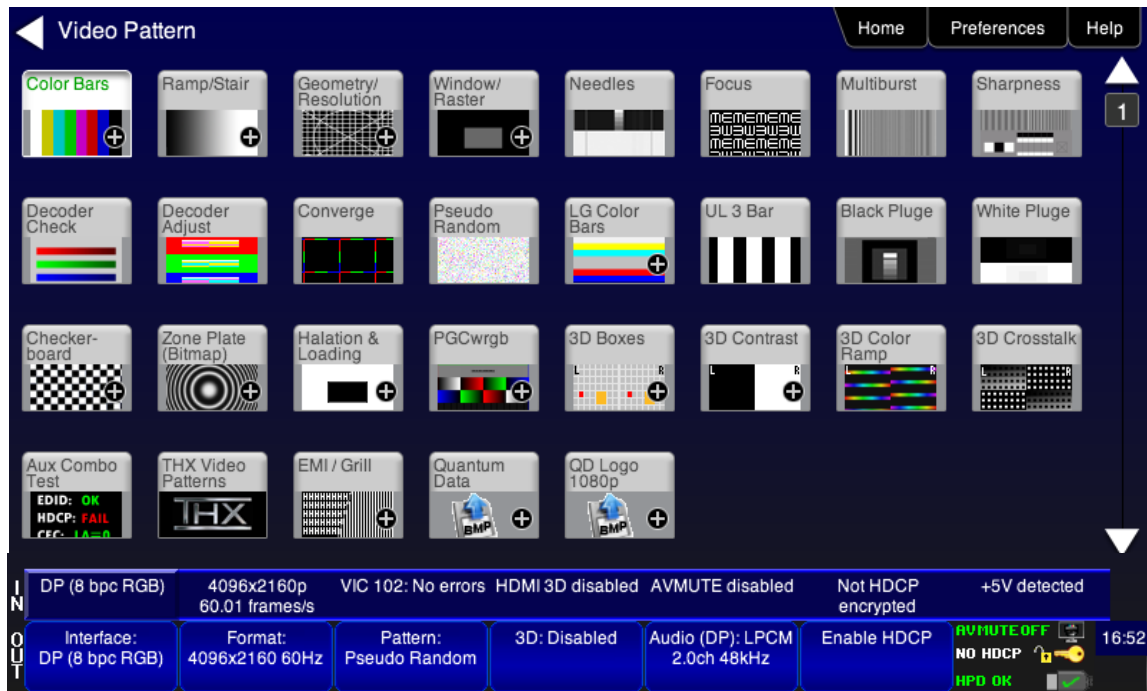
780E Sample Application – DisplayPort Device Testing

- DisplayPort Sink Device Testing (780E)
 - Test video on an DisplayPort display device.



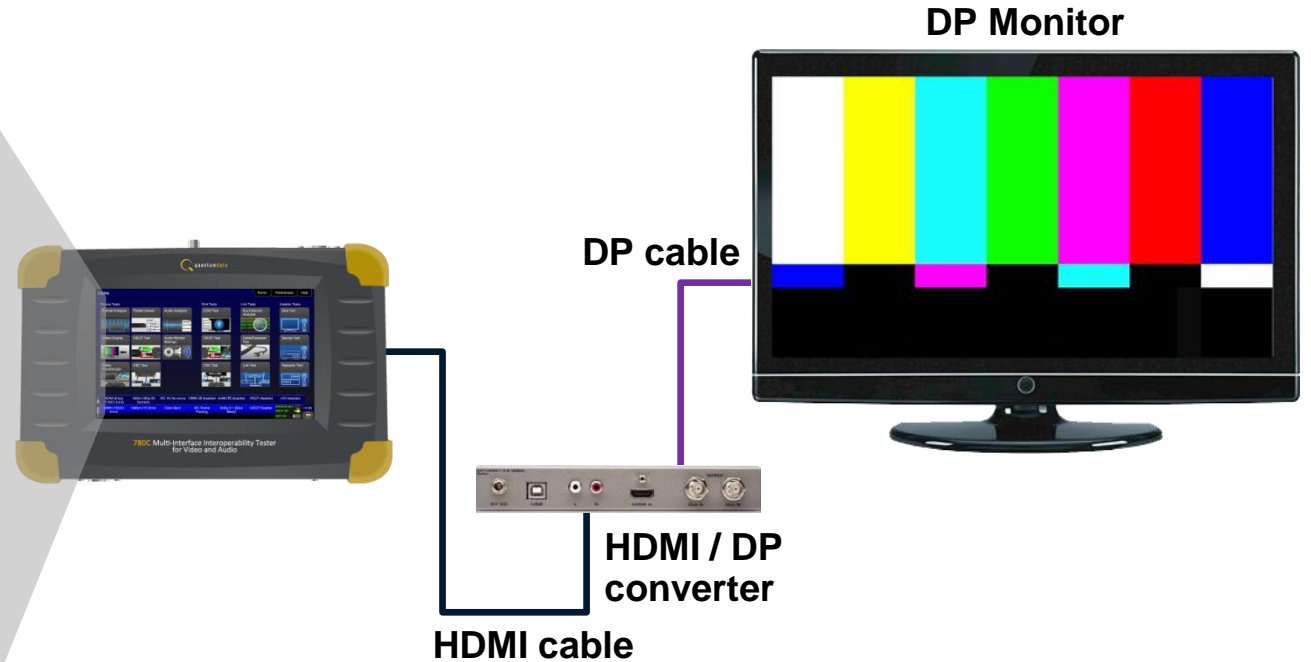
780E Sample Application – DisplayPort Device Testing

- DisplayPort Sink Device Testing (780E)
 - Test video on an DisplayPort display device.
 - Supports library of standard test patterns.



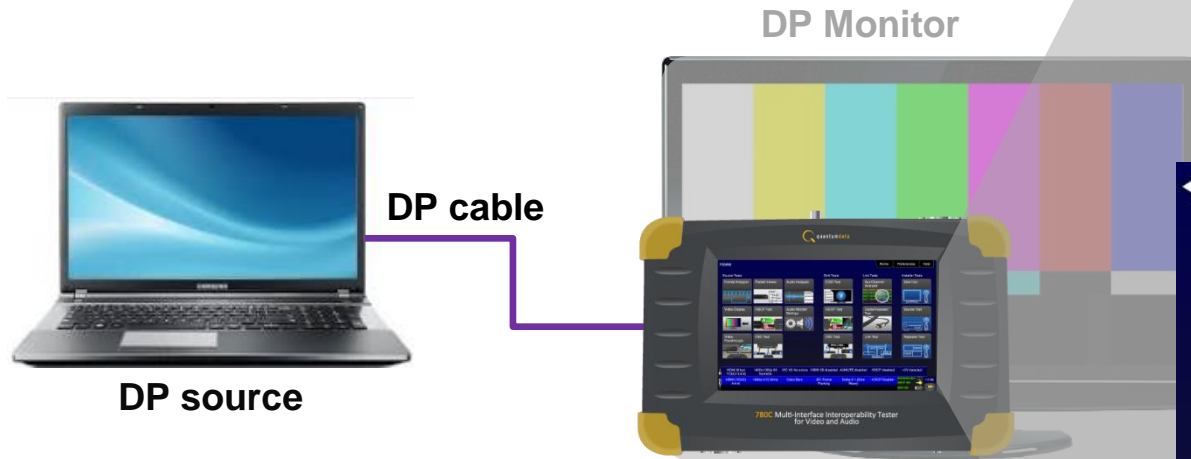
780E Sample Application – DisplayPort Device Testing

- DisplayPort Device Testing (780E)
 - Test video on an HDMI to DisplayPort converter device.



780E Sample Application – DisplayPort Device Testing

- DisplayPort Source Device Testing (780E)
 - Verify video and timing from an DisplayPort source device.



The software interface displays two main sections: "Video Display" and "Format Analyzer".

Video Display shows a video of a horse and the following metadata:

- Timing: 3840 x 2160
- ~60 frames/sec, Progressive
- Video type: DisplayPort
- Bits per color: 8
- Color space: RGB
- Colorimetry: No data
- Range: Full
- VIC code: 97
- AV Mute: Disabled
- HDCP: Disabled

Format Analyzer shows the following details:

- Video type: DisplayPort
- Total: 4400 x 2250
- Active: 3840 x 2160
- Frames/sec: 60.00
- Scan type: Progressive
- HSYNC delay: 176
- HSYNC width: 88
- VSYNC delay: 8
- VSYNC width: 10
- HSYNC polarity: +
- VSYNC polarity: +
- Bits per comp.: 8
- Color space: RGB
- Colorimetry: No data
- Pixels repeated 0 times
- Video ID code (VIC): 97 (3840 x 2160 p @ 59.94Hz/60Hz 16:9)
- AV Mute Status: Not muted
- HDCP: Not encrypted

Errors: None

Read button is present.

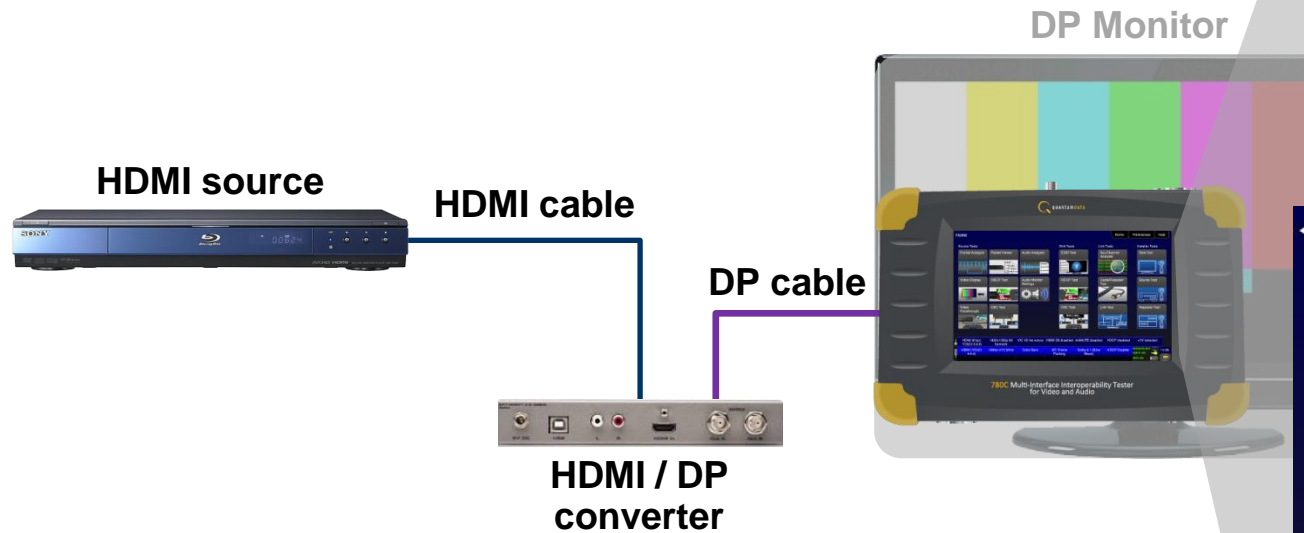
INFORMATION bar at the bottom:

DP (8 bpc RGB)	3840x2160p 60.00 frames/s	VIC 97: No errors	HDMI 3D disabled	AVMUTE disabled	Not HDCP encrypted	+5V detected
Interface: DP (8 bpc RGB)	Format: 3840x2160 60Hz	Pattern: PGCwrgb	3D: Disabled	Audio (Disabled): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP HPD OK

21:01

780E Sample Application – DisplayPort Device Testing

- DisplayPort Device Testing (780E)
 - Verify video and timing through HDMI to DisplayPort converter device.



The screenshot shows the software interface with two main panels: 'Video Display' and 'Format Analyzer'. The 'Video Display' panel shows a horse in a field and technical details. The 'Format Analyzer' panel shows a 'Read' button and detailed video format information. At the bottom, there is a status bar with 'INPUT' and 'OUTPUT' sections.

Video Display

Timing: 3840 x 2160
~60 frames/sec, Progressive
Video type: DisplayPort
Bits per color: 8
Color space: RGB
Colorimetry: No data
Range: Full
VIC code: 97
AV Mute: Disabled
HDCP: Disabled

Format Analyzer

Read

Errors: None

Video type: DisplayPort
Total: 4400 x 2250
Active: 3840 x 2160
Frames/sec: 60.00
Scan type: Progressive
HSYNC delay: 176
HSYNC width: 88
VSYNC delay: 8
VSYNC width: 10
HSYNC polarity: +
VSYNC polarity: +

Bits per comp.: 8
Color space: RGB
Colorimetry: No data
Pixels repeated 0 times
Video ID code (VIC): 97
(3840 x 2160 p @ 59.94Hz/60Hz 16:9)
AV Mute Status: Not muted
HDCP: Not encrypted

INPUT

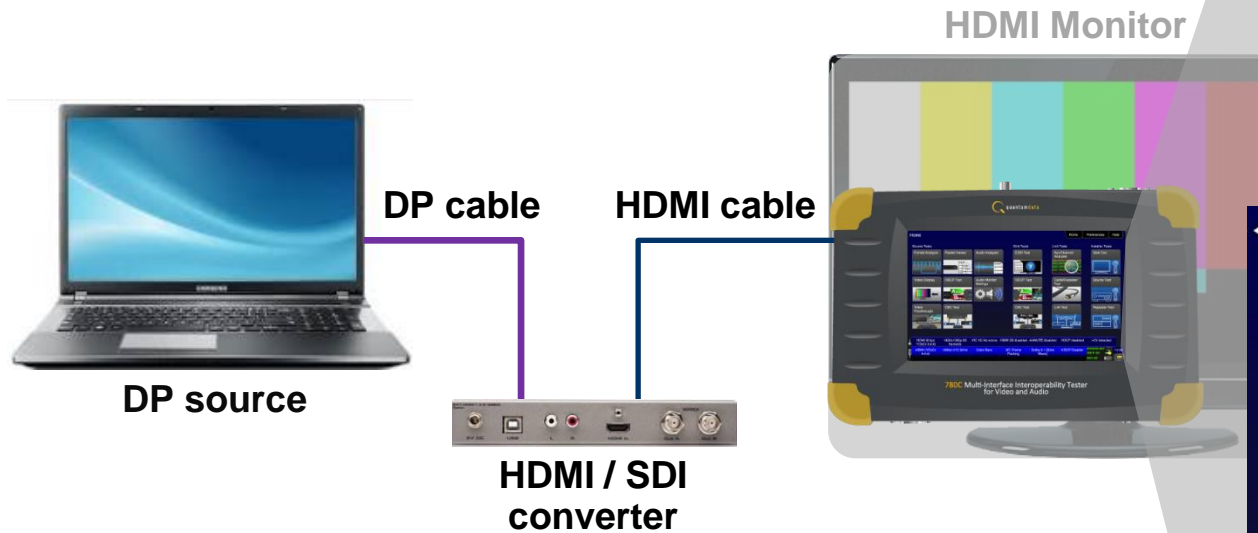
DP (8 bpc RGB)	3840x2160p 60.00 frames/s	VIC 97: No errors	HDMI 3D disabled	AVMUTE disabled	Not HDCP encrypted	+5V detected
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OUTPUT

Interface: DP (8 bpc RGB)	Format: 3840x2160 60Hz	Pattern: PGCwrgb	3D: Disabled	Audio (Disabled): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP MPD OK	21:01
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780E Sample Application – DisplayPort Device Testing

- DisplayPort Device Testing (780E)
 - Verify video, video parameters and timing through DP to HDMI converter device.



The screenshot shows the 780E software interface. The top panel, titled "Video Display", shows a video frame of a horse and the following parameters:

- Timing: 3840 x 2160
- ~60 frames/sec, Progressive
- Video type: HDMI
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Range: Limited
- VIC code: 4
- AV Mute: Disabled
- HDCP: Disabled

The bottom panel, titled "Format Analyzer", shows a "Read" button and the following parameters:

- Errors: None
- Video type: HDMI
- Total: 2200 x 1125
- Active: 1920 x 1080
- Frames/sec: 60.5 (121.1 fields)
- Scan type: Interlaced
- HSYNC delay: 88
- HSYNC width: 44
- VSYNC delay: 2
- VSYNC width: 5
- HSYNC polarity: +
- VSYNC polarity: +
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Pixels repeated 0 times
- Video ID code (VIC): 46 (1920 x 1080 i @119.88/120Hz 16:9)
- AV Mute Status: Not muted
- HDCP: Not encrypted

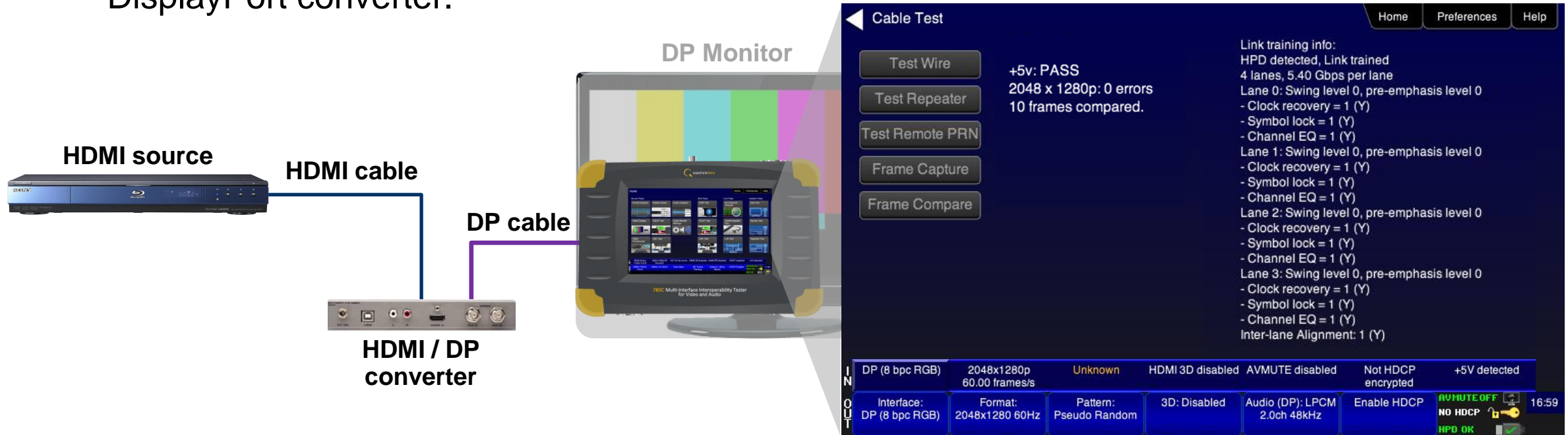
At the bottom, there is an "IN" and "OUT" status bar with the following information:

IN	HDMI (8 bpc YCbCr 4:2:2)	3840x2160p 30 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	HDCP enabled	+5V detected
OUT	Interface: HDMI (8 bpc YCbCr 4:2:2)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Disable HDCP	AVMUTE OFF HDCP OK HPD OK

The bottom right corner shows a clock reading 00:44.

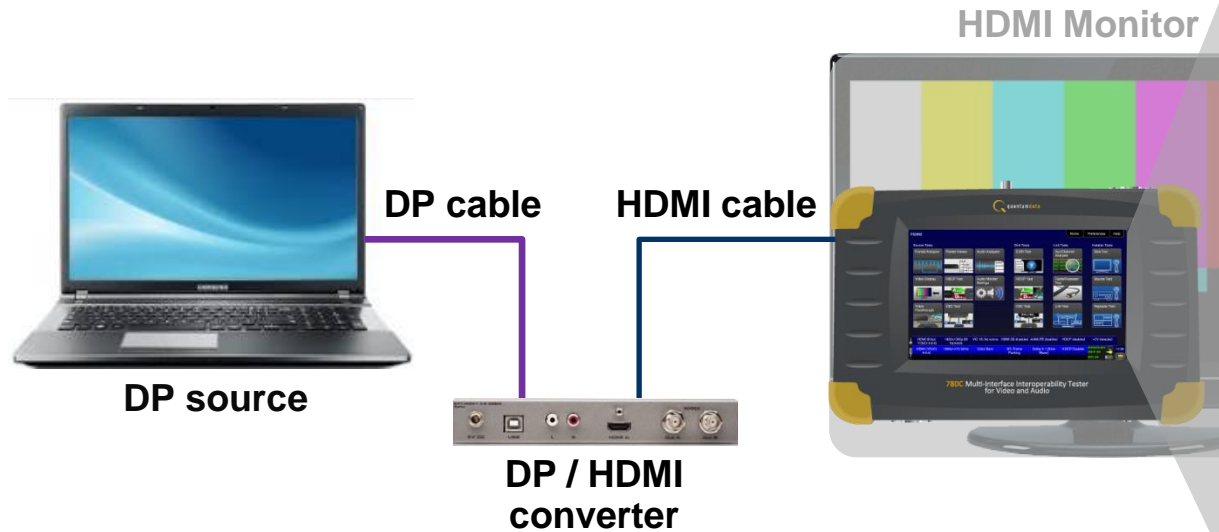
780E Sample Application – DisplayPort Device Testing

- DisplayPort Device Testing (780E)
 - Check for pixel errors on HDMI to DisplayPort converter.



780E Sample Application – DisplayPort Device Testing

- DisplayPort Device Testing (780E)
 - Check for pixel errors on DisplayPort to HDMI converter.



The screenshot shows the "Cable Test" software interface. The main display area shows the results of a test:

- Test Wire**: +5v: PASS
- Test Repeater**: 1920 x 2160p: 0 errors
- Test Remote PRN**: 10 frames compared.

Below the main display, there are several buttons: "Test Wire", "Test Repeater", "Test Remote PRN", "Frame Capture", and "Frame Compare".

At the bottom, there is a status bar with the following information:

HDMI (8 bpc YCbCr 4:2:0)	3840x2160p 60 frames/s	VIC 97: No errors	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDMI (8 bpc RGB)	Format: 3840x2160 30Hz	Pattern: Color Bars	3D: Disabled	Audio (HDMI): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP

Additional status indicators include "MPD FAIL" and a time display of "05:31".

Sample Applications – DisplayPort Cable Test

- DisplayPort Cable Testing (780E)
 - Check for pixel errors on a DisplayPort cable.

DisplayPort cable



Cable Test

Test Wire
Test Repeater
Test Remote PRN
Frame Capture
Frame Compare

2160p30 (8 bits): 0 errors
1080p60 (12 bits): 0 errors
1080p60 (8 bits): 0 errors
720p60 (8 bits): 0 errors
480p60 (8 bits): 0 errors
AUX (EDID Read): PASS

Link training info:
HPD detected, Link trained
4 lanes, 5.40 Gbps per lane
Lane 0: Swing level 0, pre-emphasis level 0
- Clock recovery = 1 (Y)
- Symbol lock = 1 (Y)
- Channel EQ = 1 (Y)
Lane 1: Swing level 0, pre-emphasis level 0
- Clock recovery = 1 (Y)
- Symbol lock = 1 (Y)
- Channel EQ = 1 (Y)
Lane 2: Swing level 0, pre-emphasis level 0
- Clock recovery = 1 (Y)
- Symbol lock = 1 (Y)
- Channel EQ = 1 (Y)
Lane 3: Swing level 0, pre-emphasis level 0
- Clock recovery = 1 (Y)
- Symbol lock = 1 (Y)
- Channel EQ = 1 (Y)
Inter-lane Alignment: 1 (Y)

IN	DP (8 bpc RGB)	2048x1280p 60.01 frames/s	Unknown	HDMI 3D disabled	AVMUTE disabled	Not HDCP encrypted	+5V detected
OUT	Interface: DP (8 bpc RGB)	Format: 2048x1280 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (DP): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP HPD OK

16:59