

Quantum Data 780 Series

Model 780C

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780C Multi-Interface Interop Tester – Interfaces / Options



780C Rear Edge

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780C Multi-Interface Interop Tester – 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.

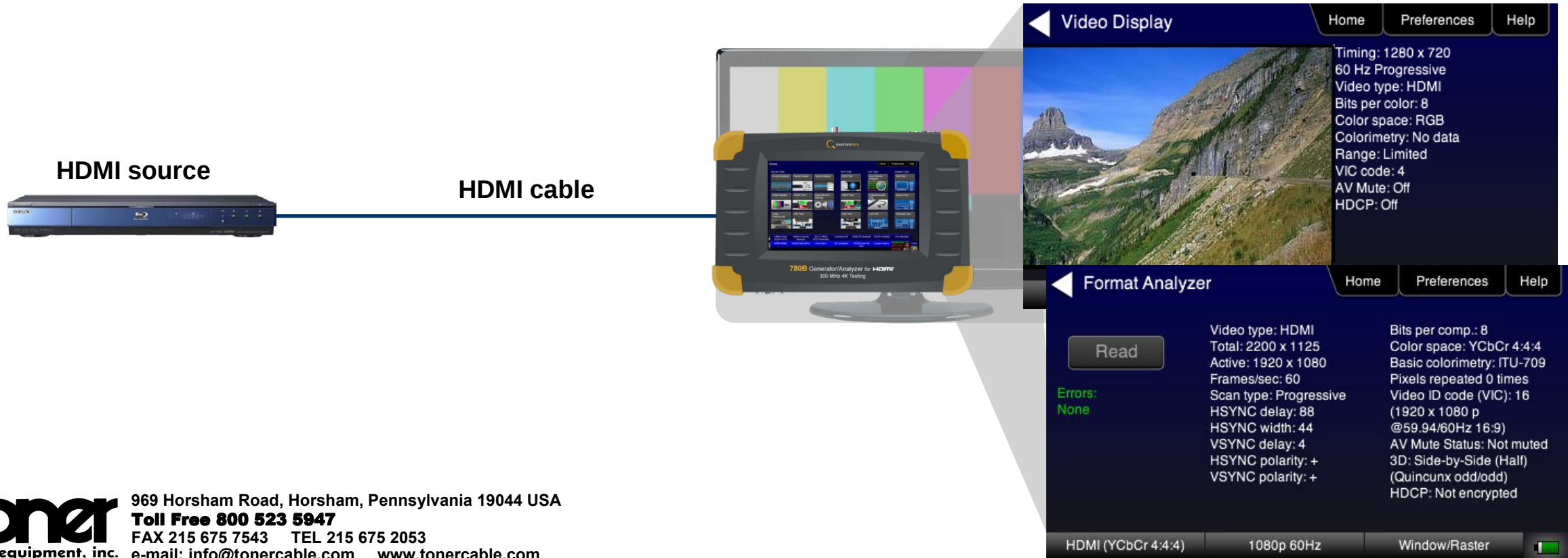


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Applications - HDMI

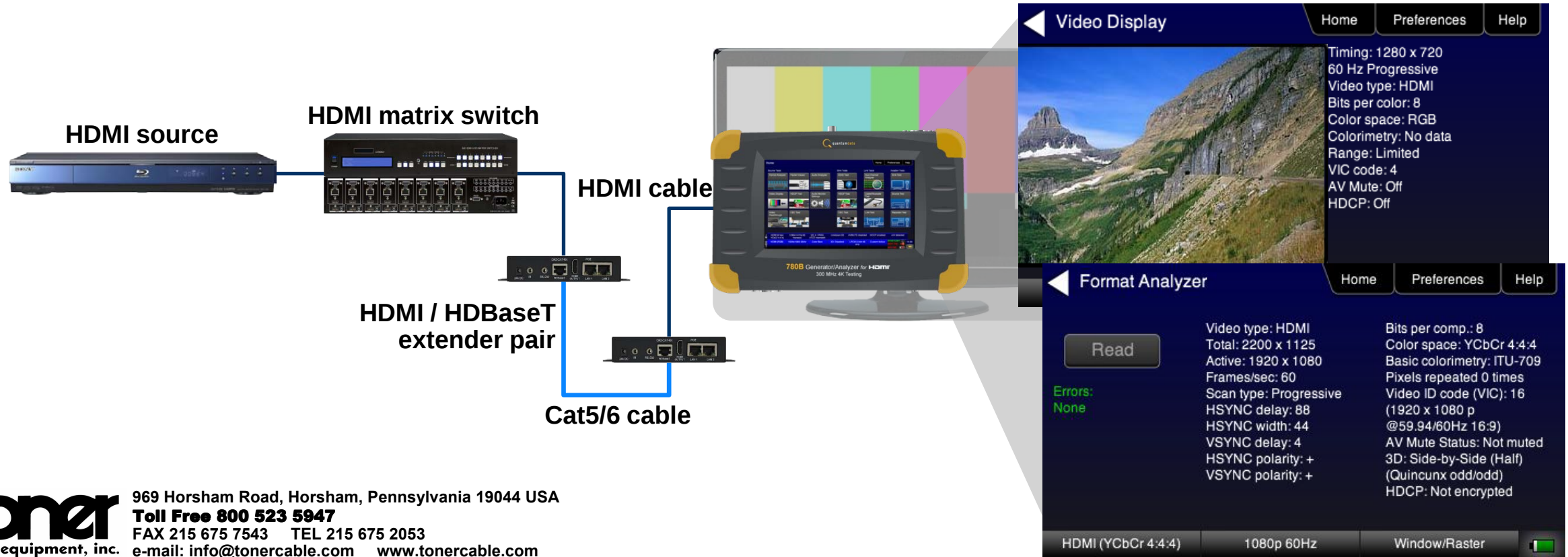
780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780A, 780B, 780C)
 - Verify video and timing and video parameters of an HDMI source device.



780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780A, 780B, 780C)
 - Verify video, video parameters and timing of an HDMI upstream distribution network.



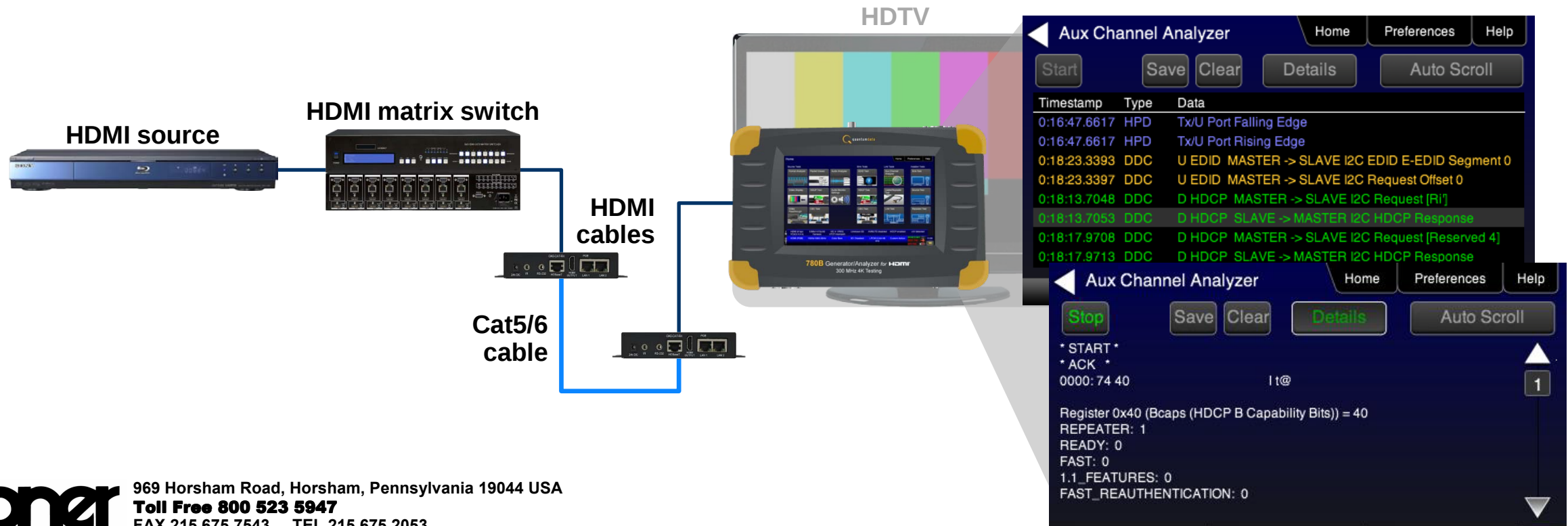
780 Sample Application – HDMI Source Testing

- HDMI Source Testing (780, 780A, 780B, 780C)
 - Verify audio (and video) and audio metadata of an HDMI audio source device.



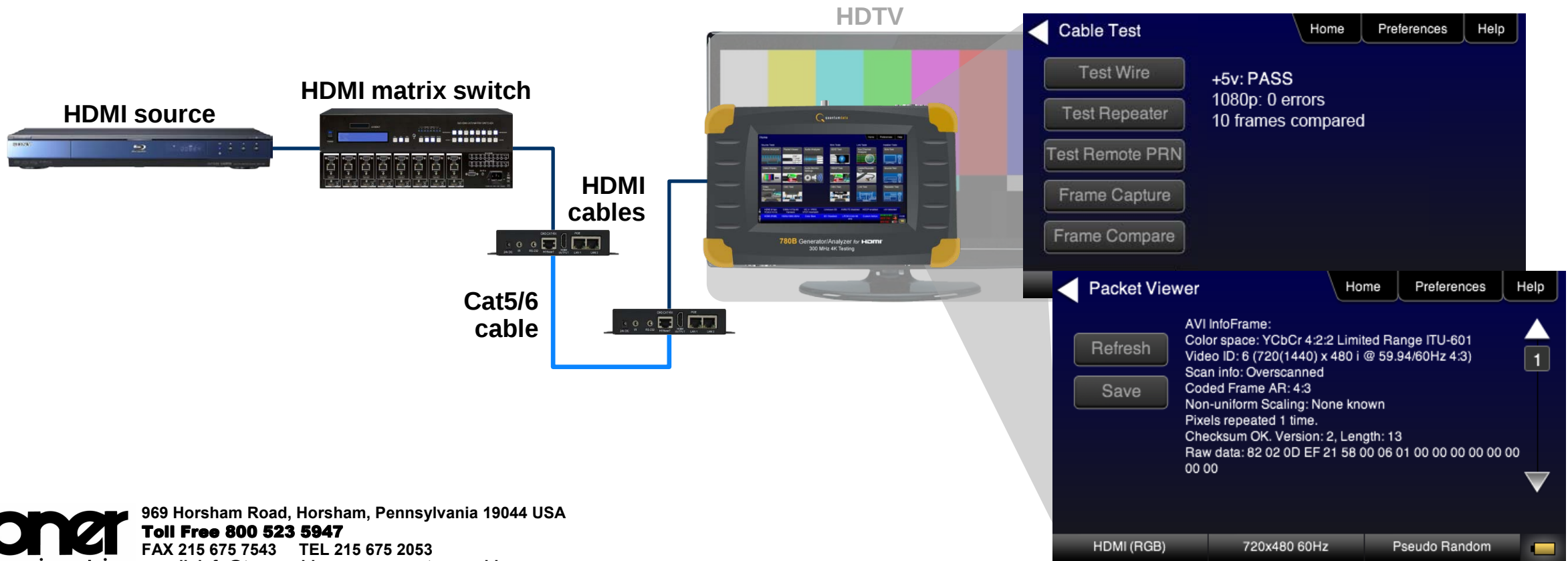
780 Sample Application – HDMI Distribution Network

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



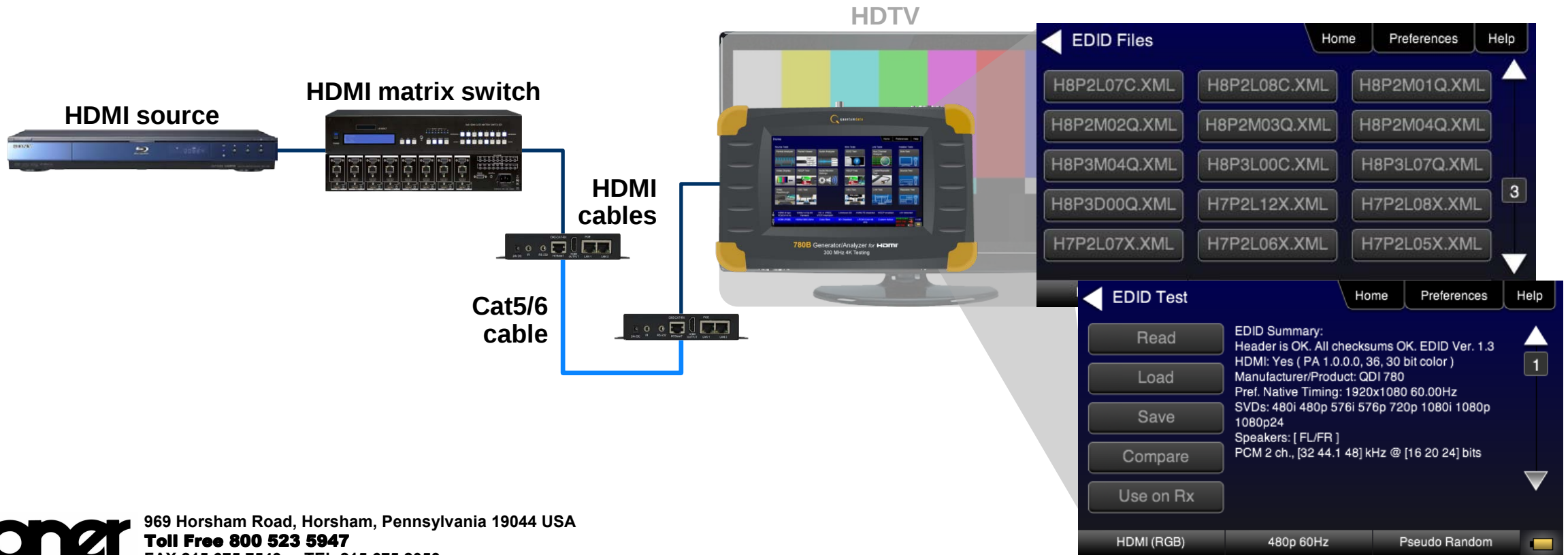
780 Sample Application – HDMI Distribution Network

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



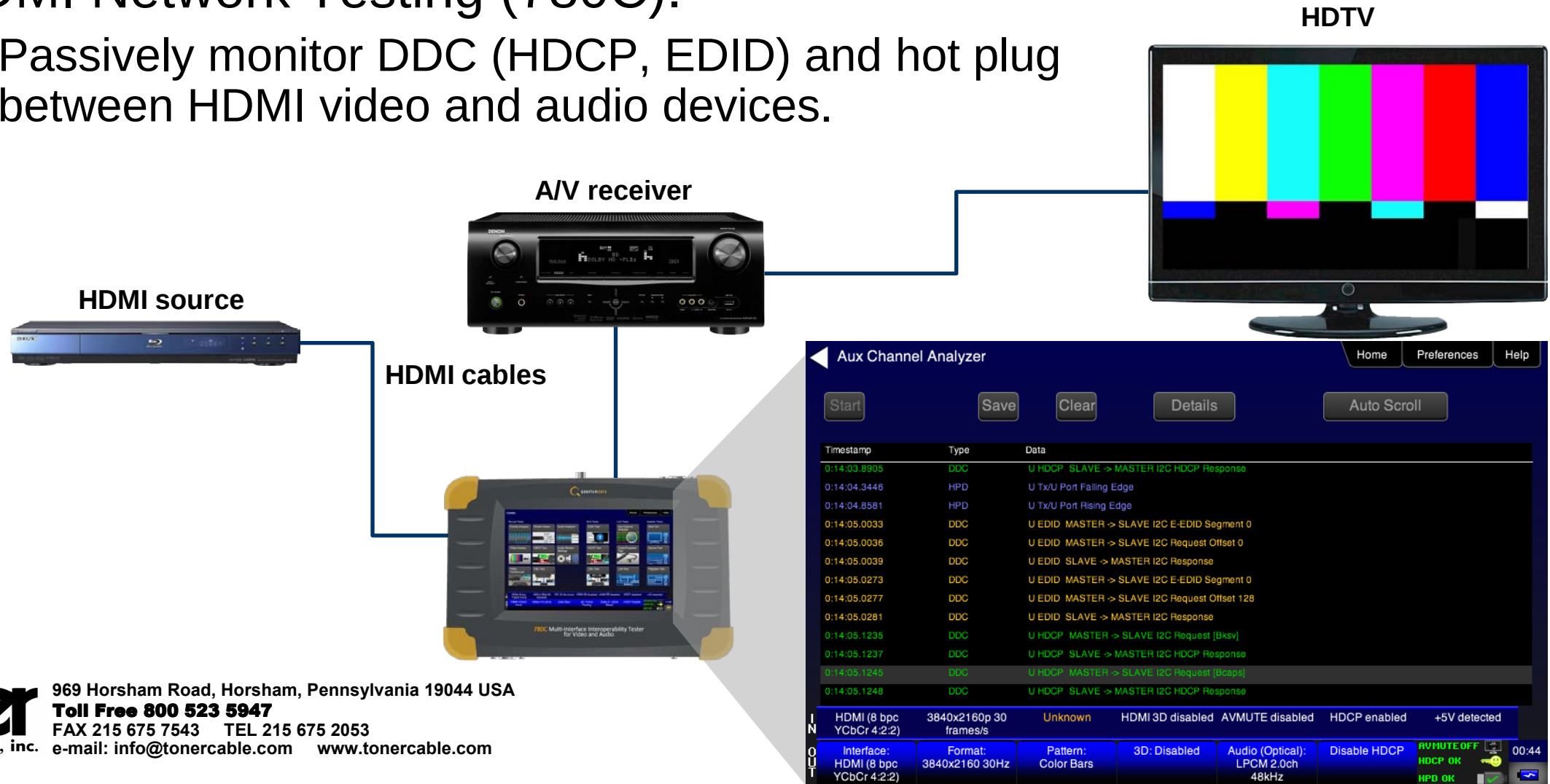
780 Sample Application – HDMI Network EDID Test

- HDMI Source Testing (780, 780A, 780B, 780C)
 - Verify HDMI source or distribution network's handling of various HDMI EDIDs.



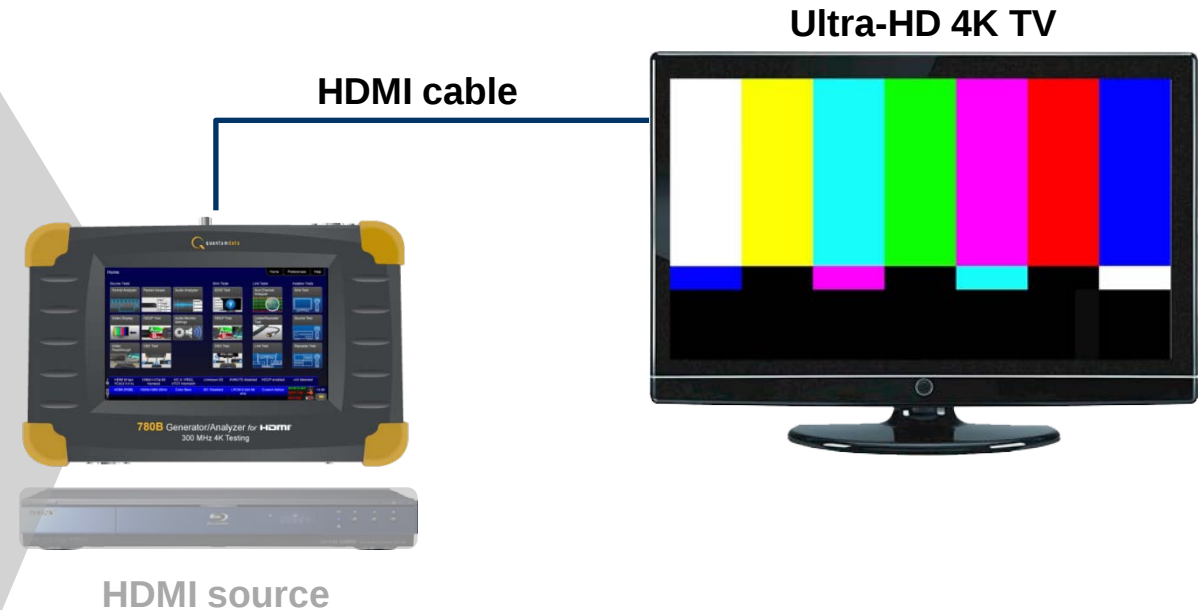
780 Sample Application – HDMI Network Testing

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



780 Sample Application – HDMI Sink Testing

- HDMI Sink Testing (780, 780A, 780A, 780C)
 - Basic video functional test of an HDMI sink device.
 - Supports 4K formats and HDMI 2.0 4:2:0 pixel encoding.

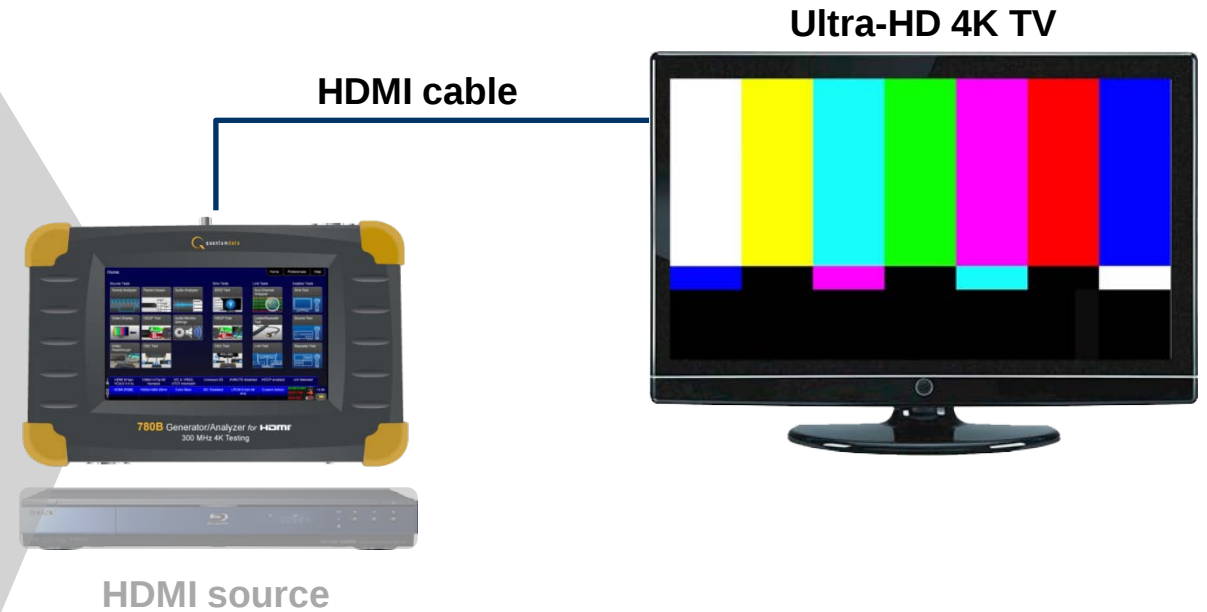


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780 Sample Application – HDMI Sink Testing

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

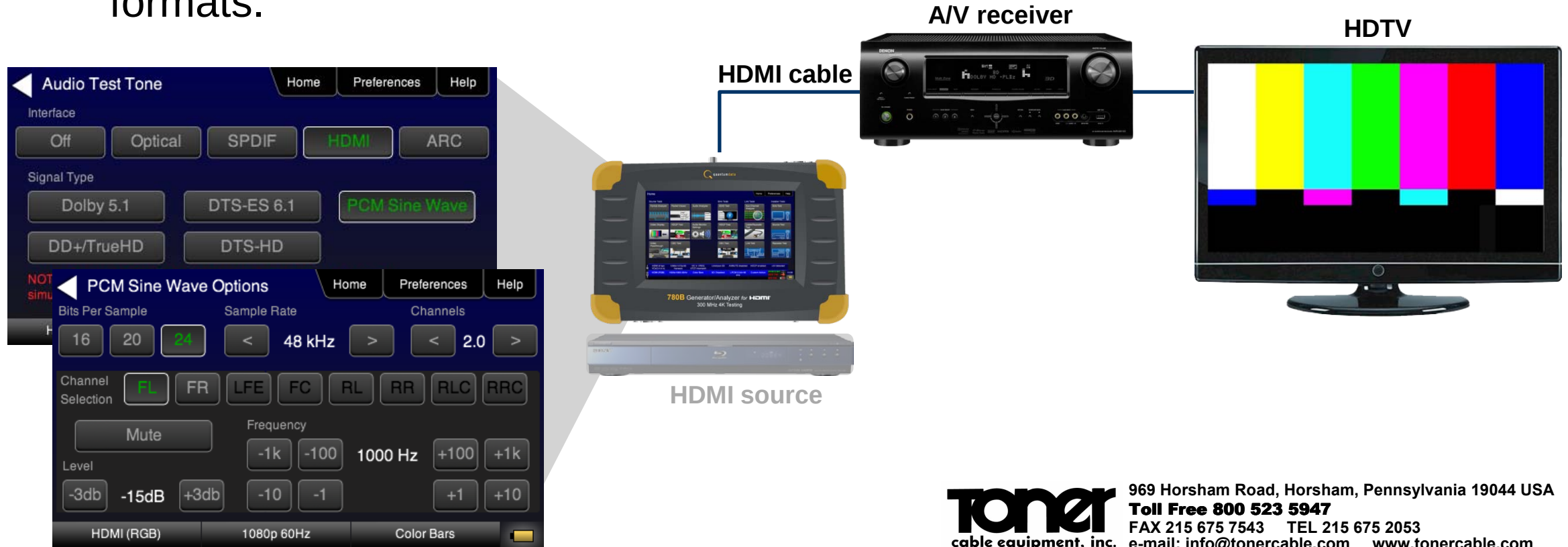


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780 Sample Application – HDMI Sink Testing

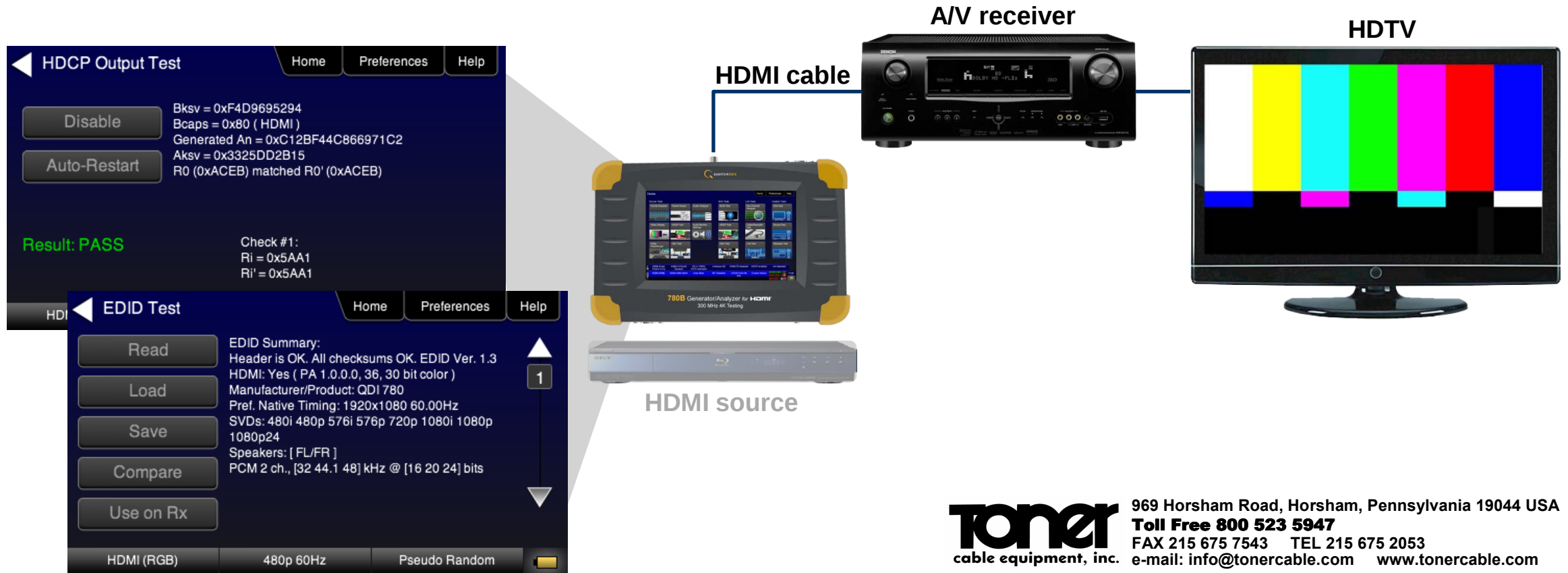
- HDMI Sink Testing (780, 780A, 780A, 780C)
 - Audio functional test of an HDMI audio rendering sink device.
 - Supports uncompressed LPCM and Dolby or DTS compressed formats.



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780 Sample Application – HDMI Sink Testing

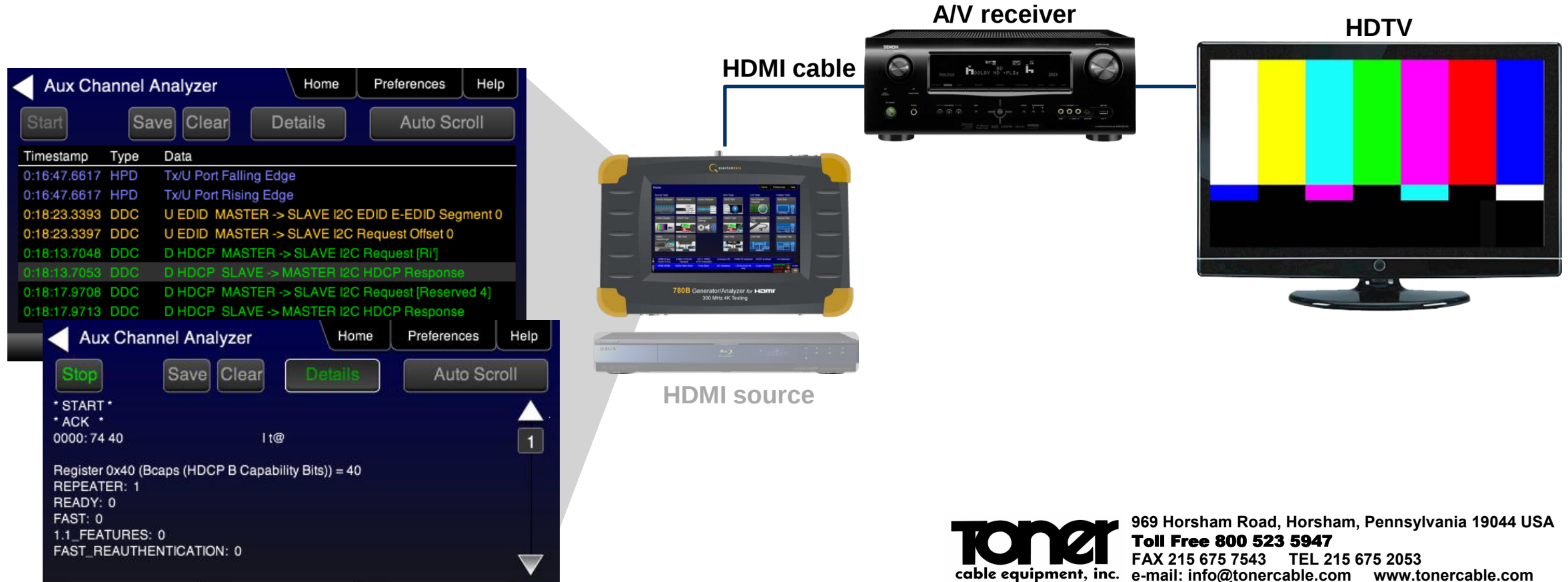
- HDMI Sink Testing (780, 780A, 780A, 780C)
 - Basic protocol functional test of an HDMI sink device.
 - Test HDCP authentication and verify EDID.



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780 Sample Application – HDMI Sink Testing

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

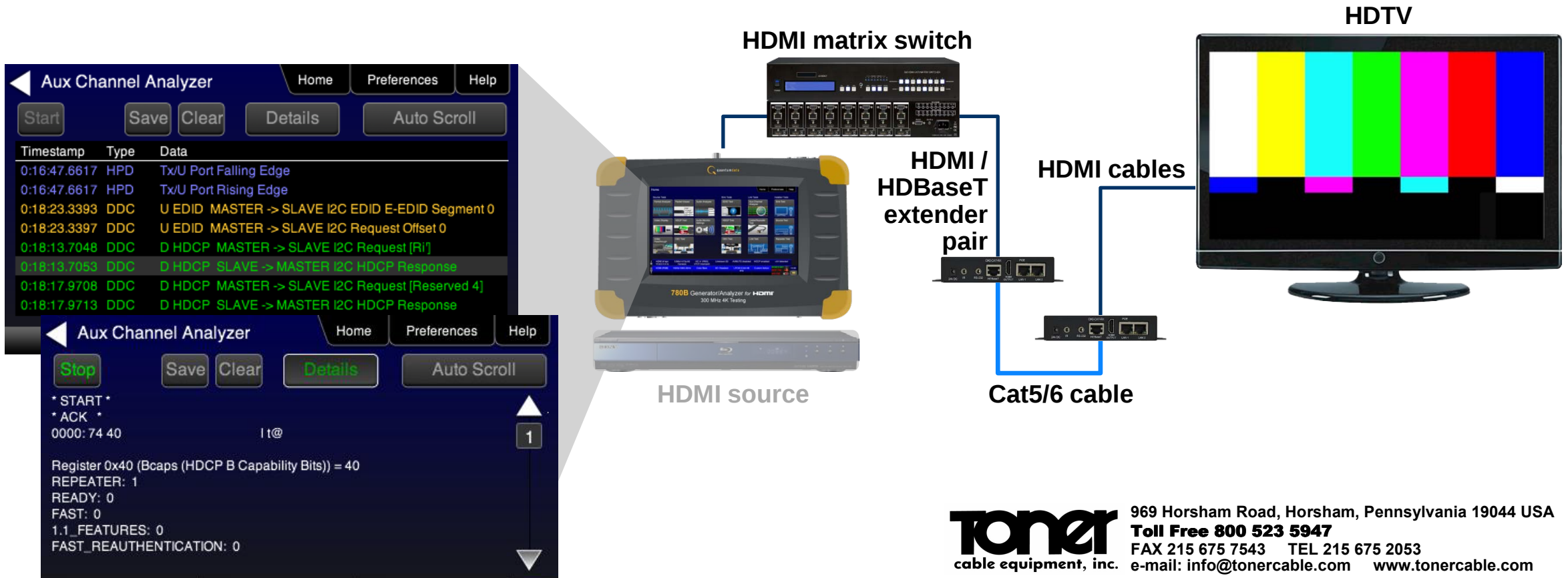


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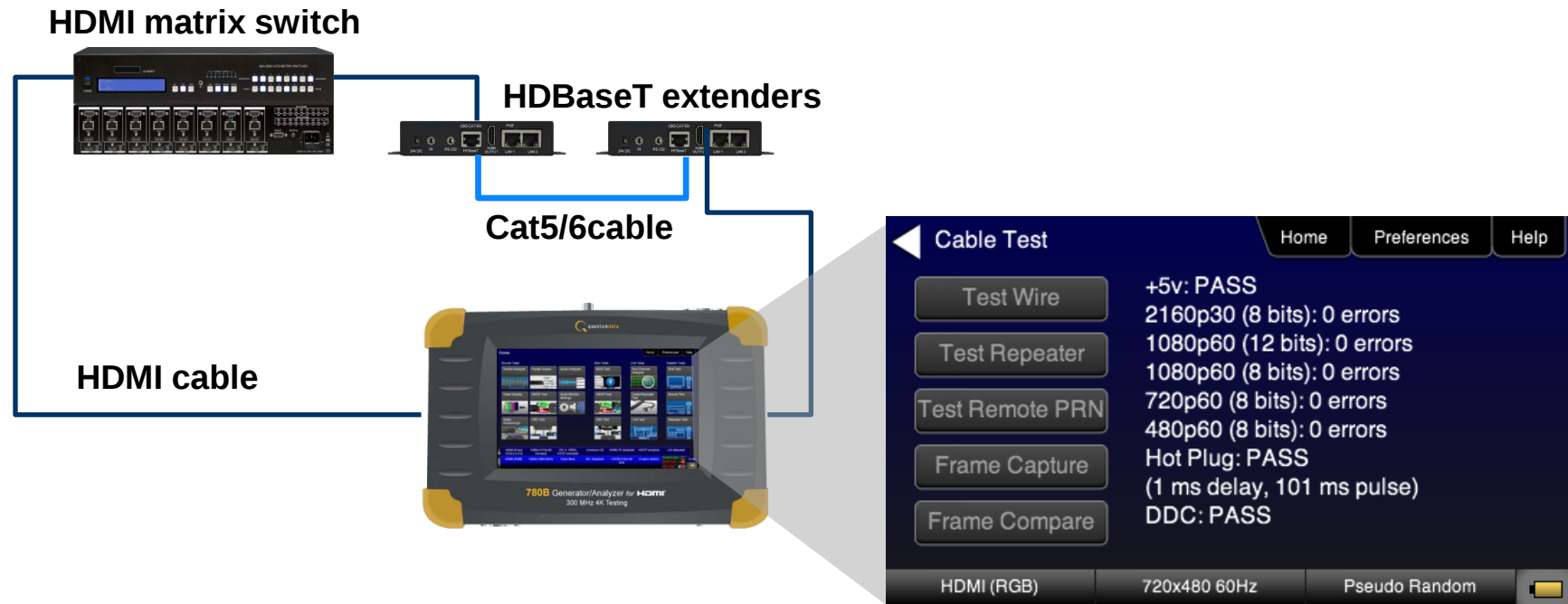
780 Sample Application – HDMI Sink Testing

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



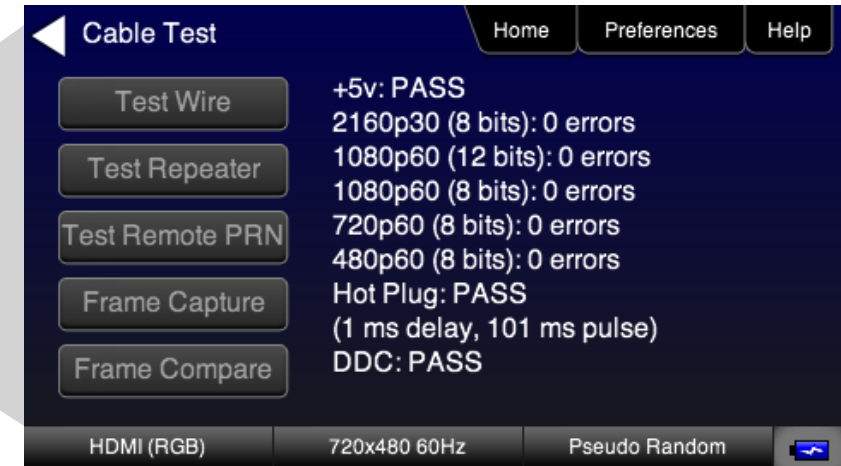
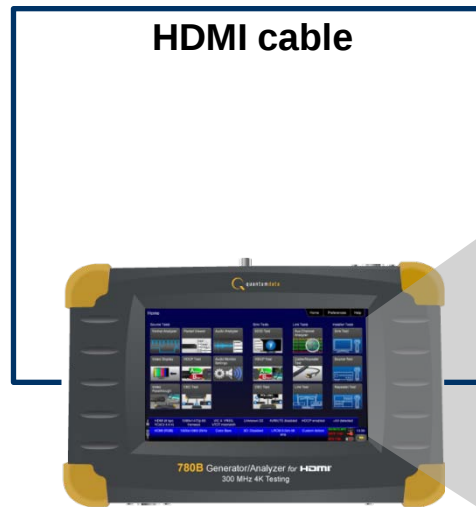
780 Sample Application – HDMI Distribution Network

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



780 Sample Application – HDMI Cable Test

- HDMI Cable Testing (780, 780A, 780A, 780C)
 - Check for pixel errors on an HDMI cable.



Applications - HDBaseT

780 Sample Application – HDBaseT Device Testing

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



HDBaseT
Cat5/6 cable

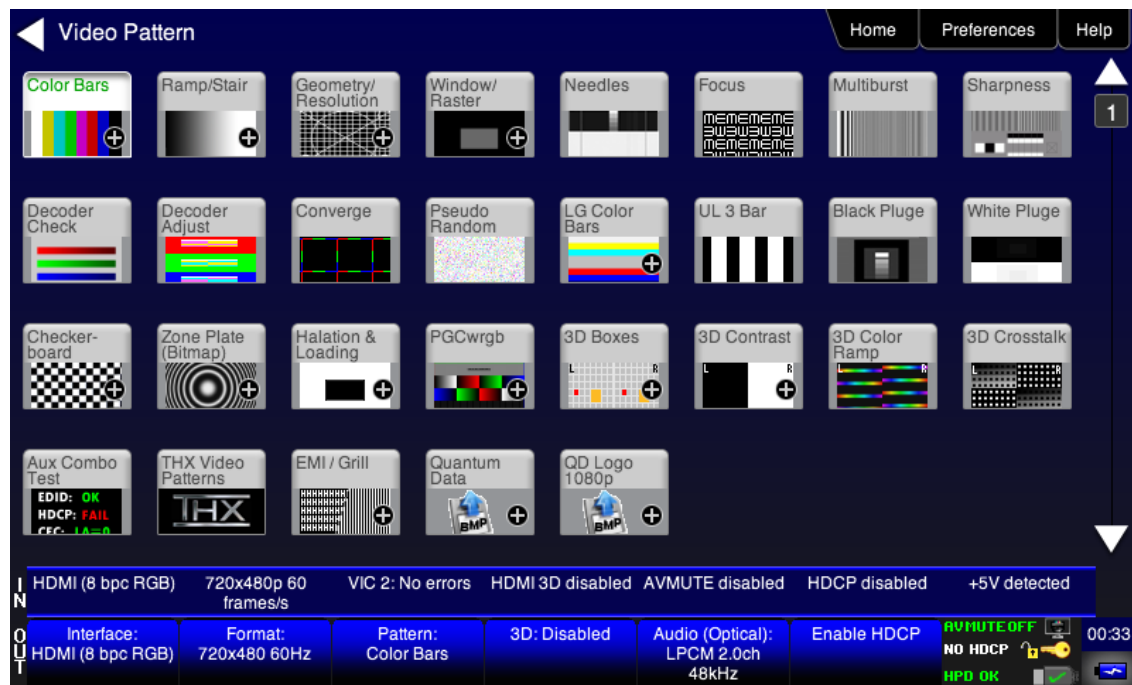
HDBaseT Projector



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780 Sample Application – HDBaseT Device Testing

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



HDBaseT
Cat5/6 cable

HDBaseT Projector



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780 Sample Application – HDBaseT Device Testing

- HDBaseT Device Testing (780C)
 - 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 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 [Bcscs]
0:14:05.1248	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response

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



HDBaseT Cat5/6 cable

HDBaseT Projector



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780 Sample Application – HDBaseT Device Testing

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

Aux Channel Analyzer

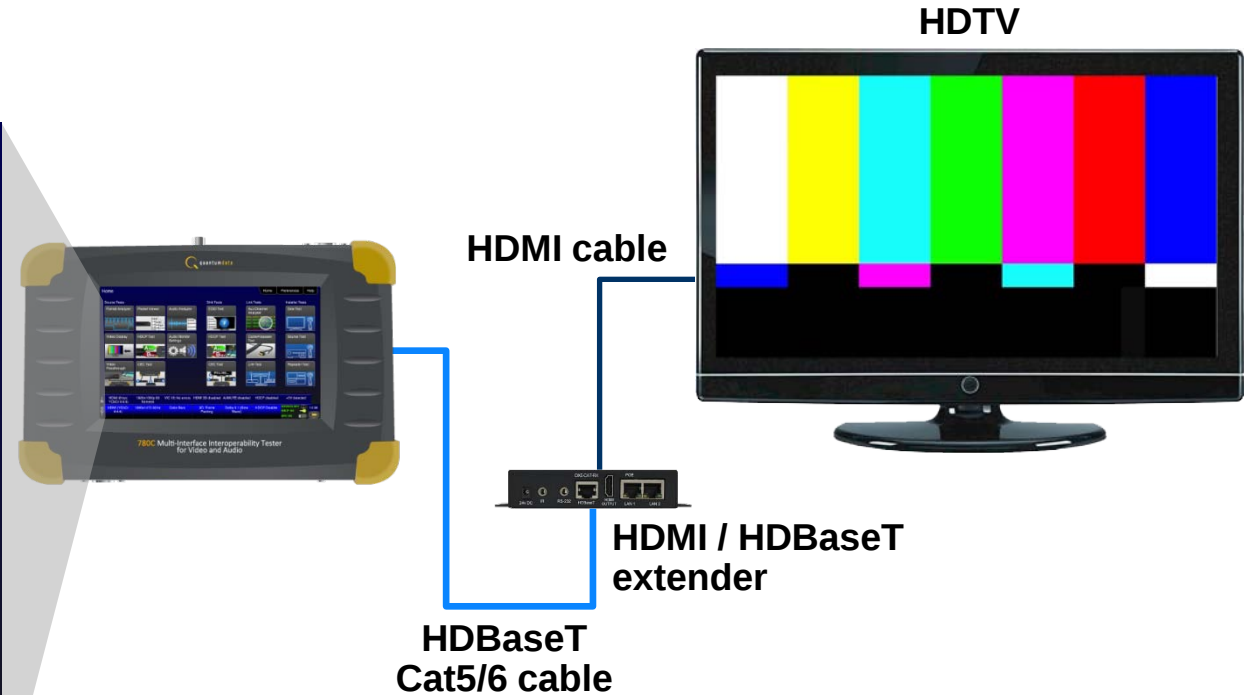
Start Save Clear Details Auto Scroll

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 [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
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

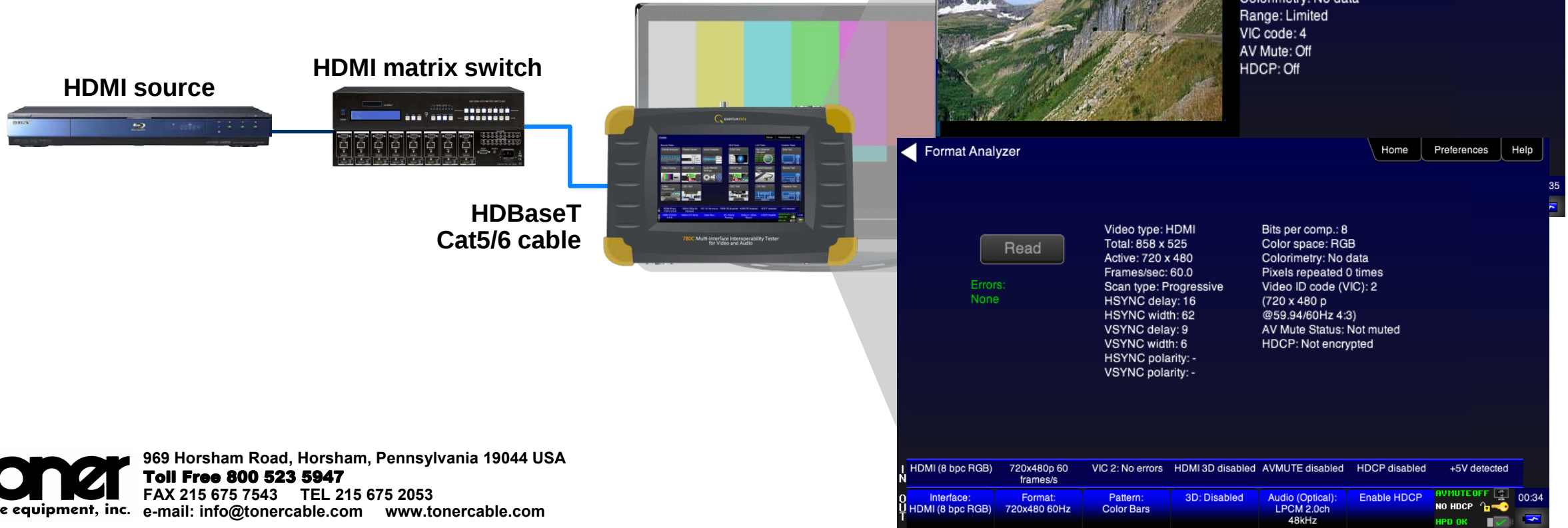


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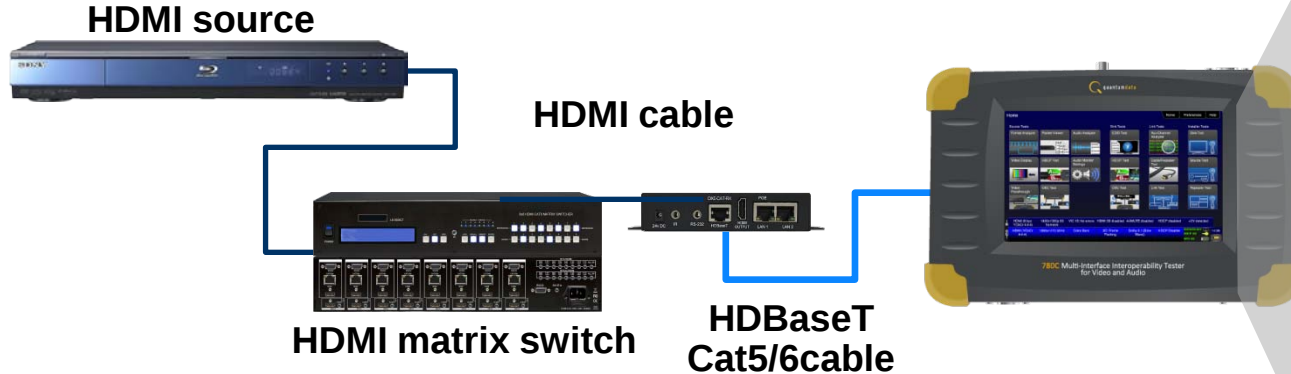
780 Sample Application – HDBaseT Device Testing

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



780 Sample Application – HDBaseT Device Testing

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



Aux Channel Analyzer

Start Save Clear Details Auto Scroll

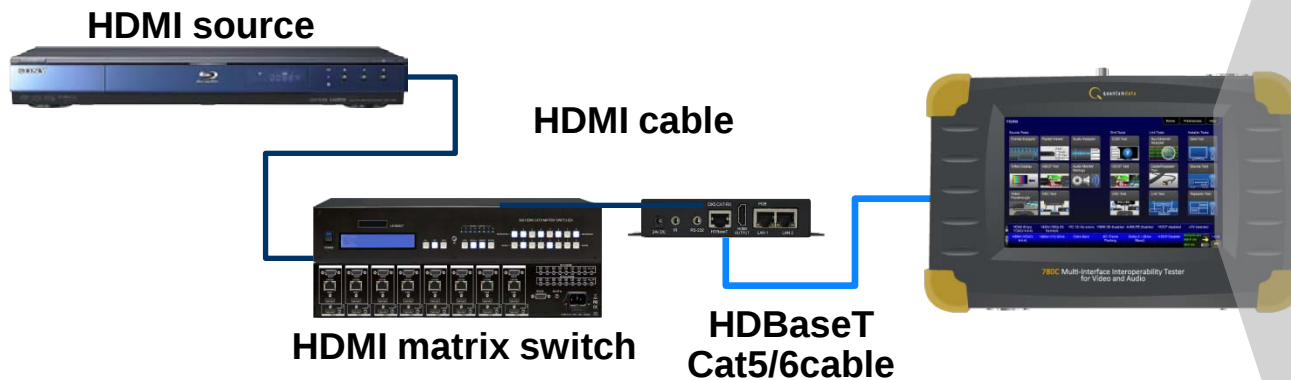
Timestamp	Type	Data
0:14:03.8905	DDC	U HDCP SLAVE -> MASTER I2C HDCP Response
0:14:04.3446	HPD	U Tx/U Port Falling Edge
0:14:04.8581	HPD	U Tx/U Port Rising Edge
0:14:05.0033	DDC	U EDID MASTER -> SLAVE I2C E-EDID Segment 0
0:14:05.0036	DDC	U EDID MASTER -> SLAVE I2C Request Offset 0
0:14:05.0039	DDC	U 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	OUT
HDMI (8 bpc YCbCr 4:2:2)	Interface: HDMI (8 bpc YCbCr 4:2:2)
3840x2160p 30 frames/s	Format: 3840x2160 30Hz
Unknown	Pattern: Color Bars
HDMI 3D disabled	3D: Disabled
AVMUTE disabled	Audio (Optical): LPCM 2.0ch 48kHz
HDCP enabled	Disable HDCP
+5V detected	AVMUTE OFF
	HDCP OK
	HPD OK

00:44

780 Sample Application – HDBaseT Device Testing

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



The screenshot shows the interface of the 780C Multi-Interface Interoperability Tester. It features two main sections: **Cable Test** and **Packet Viewer**.

Cable Test section includes buttons for **Test Wire**, **Test Repeater**, **Test Remote PRN**, **Frame Capture**, and **Frame Compare**. The test results show: **+5v: PASS**, **1920 x 1080p: 0 errors**, and **10 frames compared.**

Packet Viewer section includes buttons for **Refresh** and **Save**. The packet details are as follows:

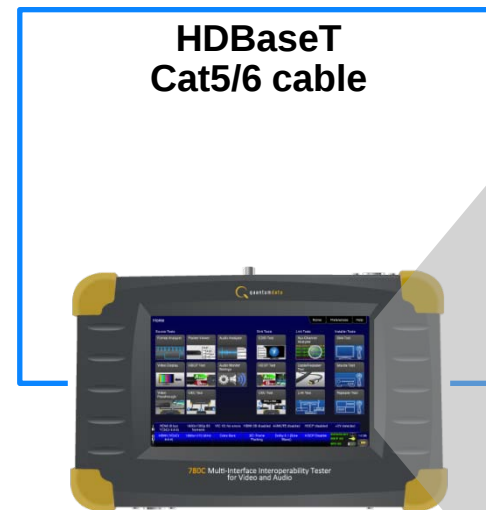
- AVI InfoFrame:**
- Color space:** RGB Default Range
- Video ID:** 16 (1920 x 1080 p @ 59.94/60Hz 16:9)
- Coded Frame AR:** 16:9
- Non-uniform Scaling:** None known
- Pixels repeated:** 0 times.
- Checksum OK. Version:** 2, Length: 13
- Raw data:** 82 02 0D 09 00 28 00 10 00 00 00 9E 08 00 00 81 07

The bottom status bar displays the following information:

- IN:** HDMI (8 bpc RGB) 1920x2205p 60 frames/s
- OUT:** HDMI (8 bpc RGB) 1920x2205 60Hz
- VIC:** 16: No errors
- HDMI 3D:** Frame packing
- AVMUTE:** disabled
- HDCEP:** disabled
- +5V:** detected
- Interface:** HDMI (8 bpc RGB)
- Format:** 1920x2205 60Hz
- Pattern:** Color Bars
- 3D:** Frame Packing
- Audio (Optical):** LPCM 2.0ch 48kHz
- Enable HDCEP:** NO HDCEP
- AVMUTE OFF**
- HPD OK**
- 00:38**

Sample Applications – HDBaseT Cat5/6 Cable Test

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



Cable Test Home Preferences Help

Test Wire Test Repeater Test Remote PRN Frame Capture Frame Compare

+5v: **PASS**
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**
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

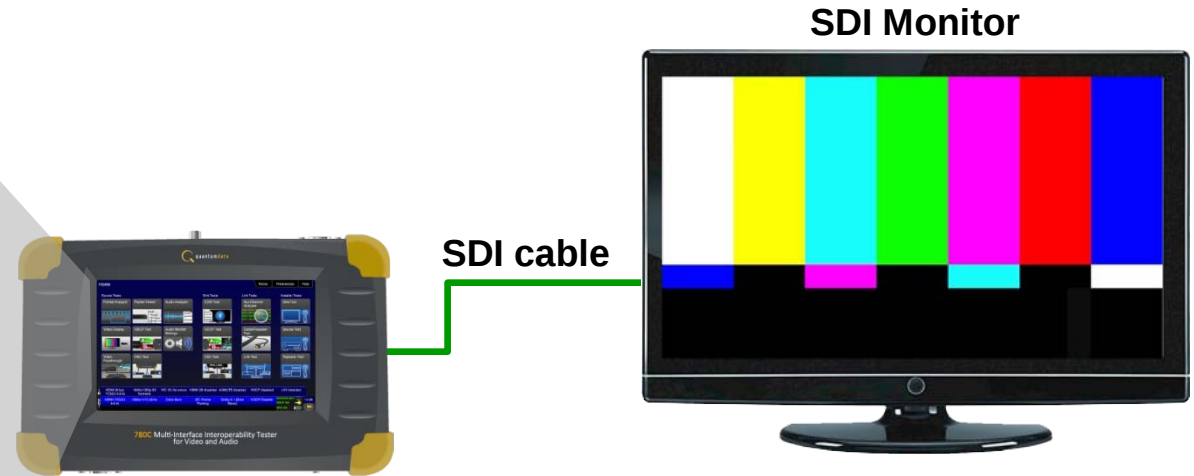
HDBaseT (8 bpc RGB)	720x480p 60 frames/s	VIC 2: No errors	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
Interface: HDBaseT (8 bpc RGB)	Format: 720x480 60Hz	Pattern: Pseudo Random	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Enable HDCP	AVMUTE OFF NO HDCP HPD OK

02:03

Applications - SDI

780C Sample Application – SDI Device Testing

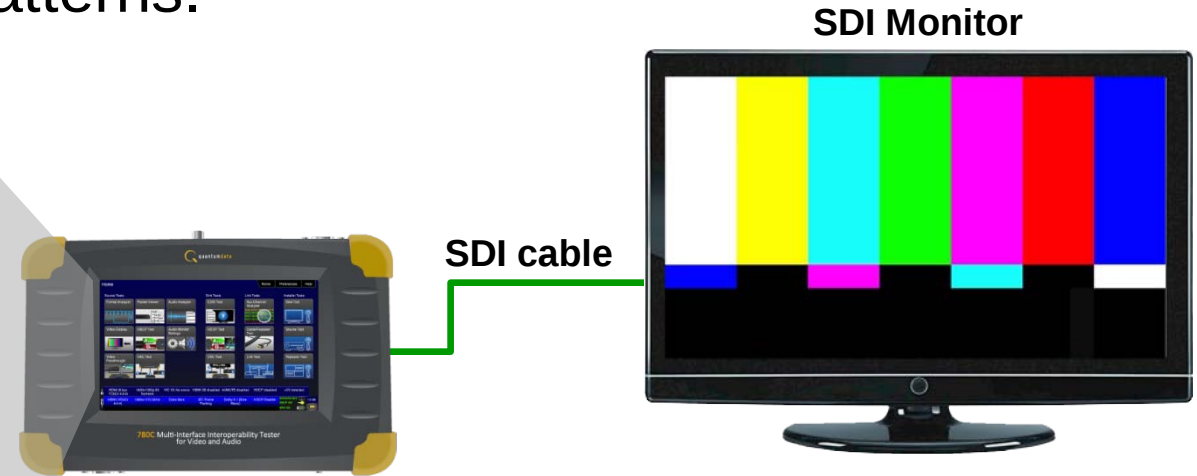
- SDI Sink Device Testing (780C)
 - Test video on an SDI display device.



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780C Sample Application – SDI Device Testing

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

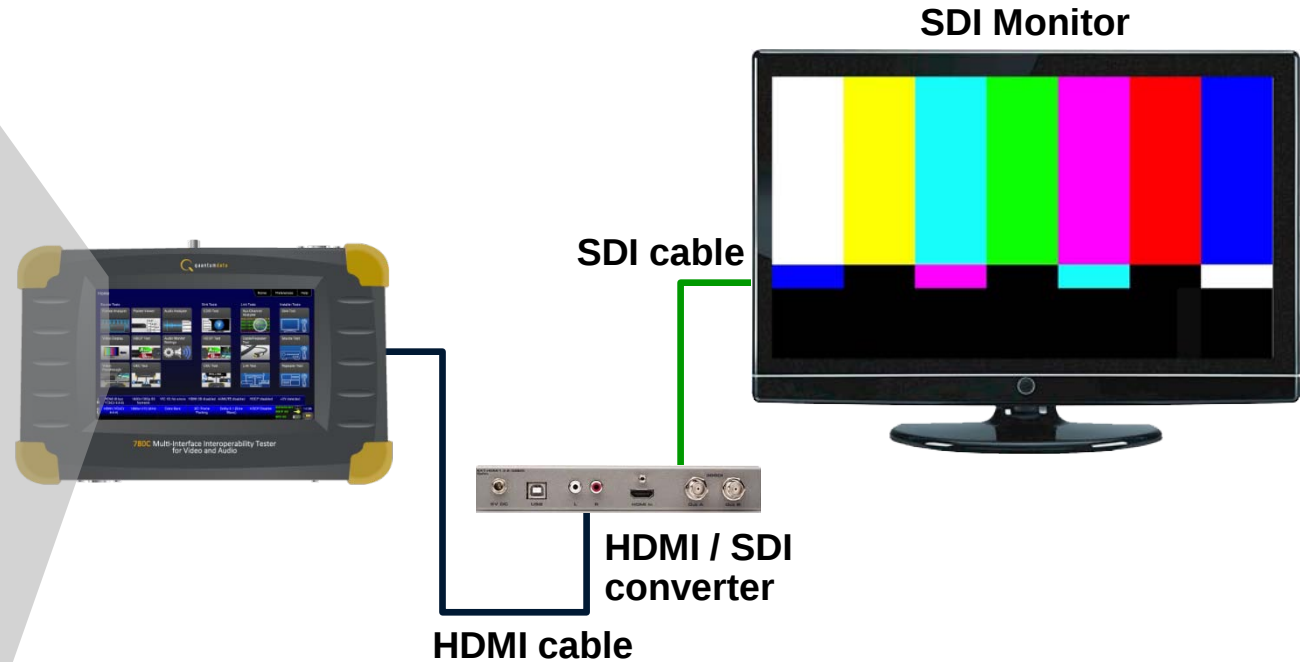


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780C Sample Application – SDI Device Testing

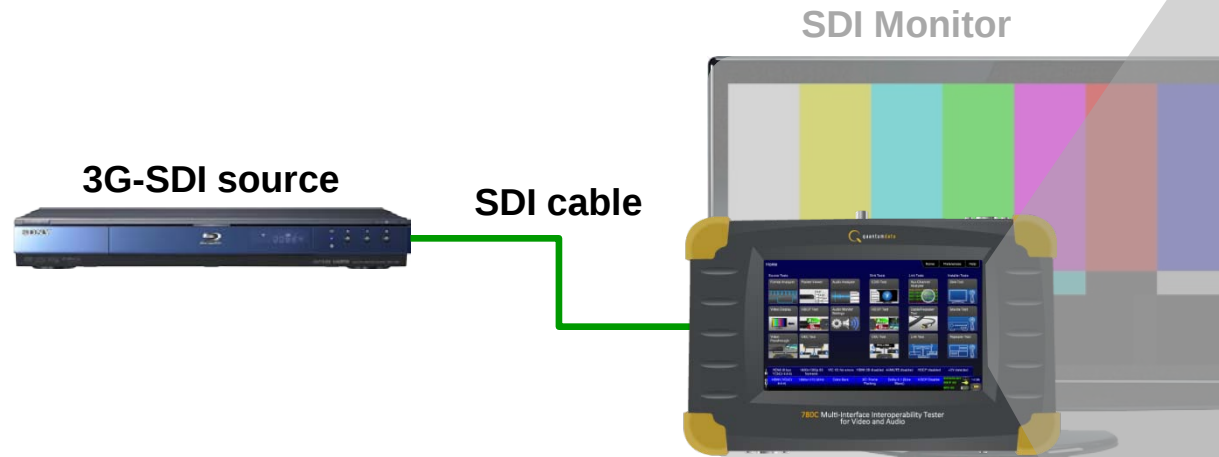
- SDI Device Testing (780C)
 - Test video on an HDMI to SDI converter device.



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780C Sample Application – SDI Device Testing

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



The screenshot shows the 'Format Analyzer' interface of the 780C Multi-Interface Interoperability Tester. It displays video and timing information for an HDMI signal.

Video Display

- Timing: 1280 x 720
- 60 frames/sec, Progressive
- Video type: HDMI
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Range: Limited
- VIC code: 4
- AV Mute: Disabled

Format Analyzer

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

IN

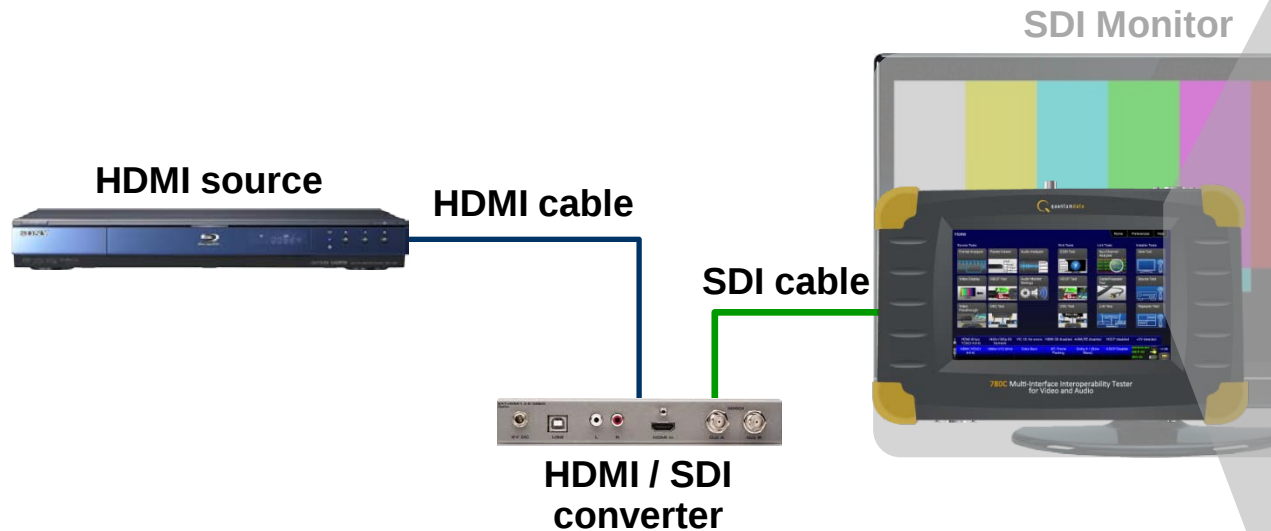
HDMI (8 bpc YCbCr 4:2:2)	1920x1080i 60 frames/s	VIC 46: No errors	HDMI 3D disabled	AVMUTE disabled	HDCP disabled	+5V detected
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OUT

Interface: HDMI (8 bpc YCbCr 4:2:2)	Format: 1920x1080i 60Hz	Pattern: Color Bars	3D: Disabled	Audio (Optical): LPCM 2.0ch 48kHz	Enable HDCP	AV MUTE OFF	NO HDCP	HPD OK	00:43
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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 Multi-Interface Interoperability Tester software interface. It features two main sections: **Video Display** and **Format Analyzer**.

Video Display section:

- Timing: 1280 x 720
- 60 frames/sec, Progressive
- Video type: HDMI
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Range: Limited
- VIC code: 4

Format Analyzer section:

- 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
- VSYSN delay: 2
- VSYSN width: 5
- HSYNC polarity: +
- VSYSN 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

Read button and **Errors: None** status.

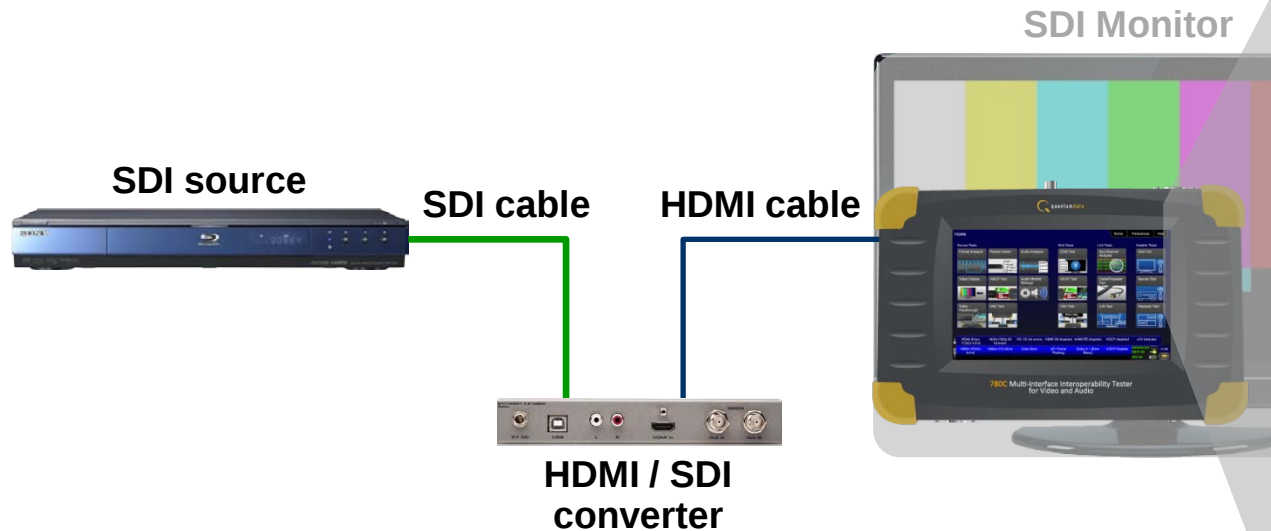
IN and **OUT** labels are visible on the left side of the interface.

Bottom status bar:

- HDMI (8 bpc YCbCr 4:2:2)
- 1920x1080i 60 frames/s
- VIC 46: No errors
- HDMI 3D disabled
- AVMUTE disabled
- HDCP disabled
- +5V detected
- Interface: HDMI (8 bpc YCbCr 4:2:2)
- Format: 1920x1080i 60Hz
- Pattern: Color Bars
- 3D: Disabled
- Audio (Optical): LPCM 2.0ch 48kHz
- Enable HDCP
- AVMUTE OFF
- NO HDCP
- HPD OK
- 00:43

780C Sample Application – SDI Device Testing

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



The screenshot shows the interface of the 780C Multi-Interface Interoperability Tester. It features two main sections: 'Video Display' and 'Format Analyzer'.

Video Display shows a landscape image and the following parameters:

- Timing: 1280 x 720
- 60 frames/sec, Progressive
- Video type: HDMI
- Color space: YCbCr 4:2:2
- Colorimetry: ITU-709
- Range: Limited
- VIC code: 4

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
- VSING delay: 2
- VSING width: 5
- HSYNC polarity: +
- VSING 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

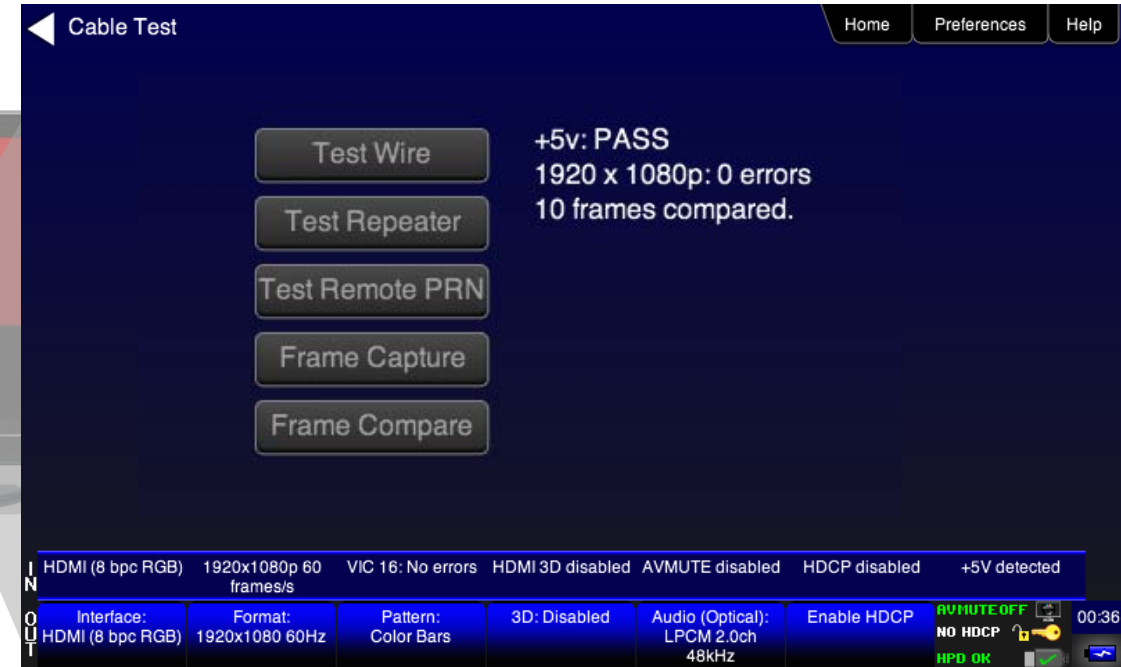
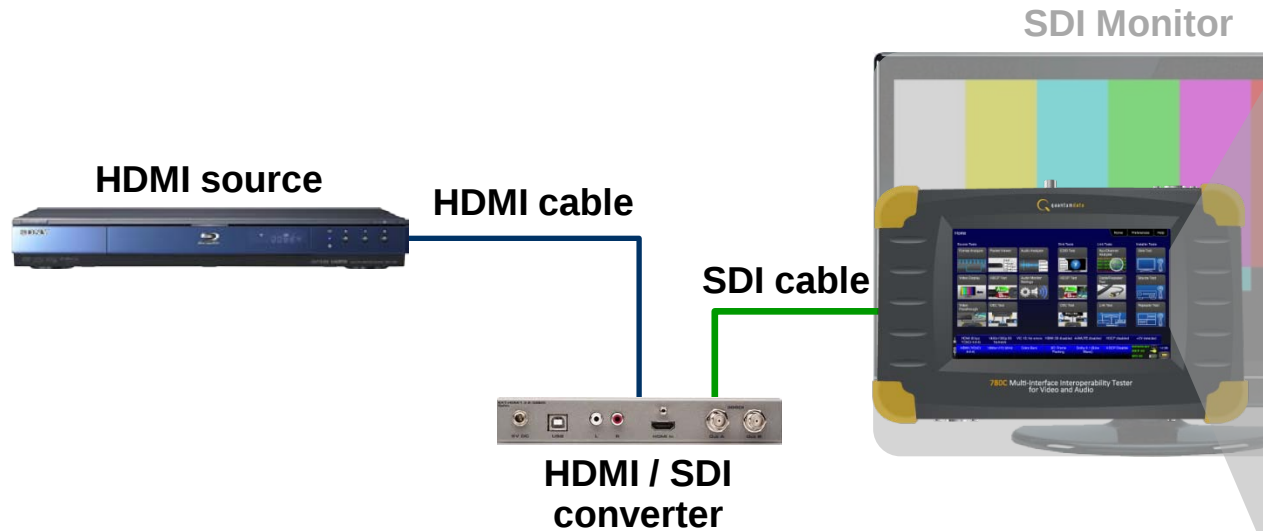
Errors: None

Bottom Status Bar:

- HDMI (8 bpc YCbCr 4:2:2)
- 1920x1080i 60 frames/s
- VIC 46: No errors
- HDMI 3D disabled
- AVMUTE disabled
- HDCP disabled
- +5V detected
- Interface: HDMI (8 bpc YCbCr 4:2:2)
- Format: 1920x1080i 60Hz
- Pattern: Color Bars
- 3D: Disabled
- Audio (Optical): LPCM 2.0ch 48kHz
- Enable HDCP
- AVMUTE OFF
- NO HDCP
- HPD OK
- 00:43

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.

