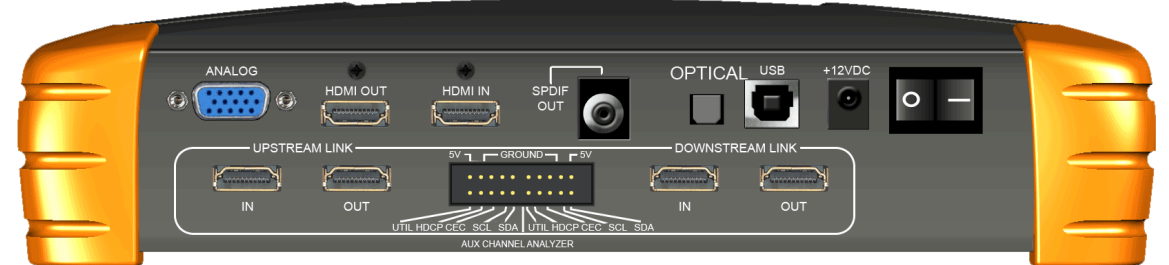


Quantum Data Inc. 780/780A Video Test Instruments



Quantum Data 780/780A - Overview



Quantum Data Inc.

780/780A Video Test Instruments

Overview

Quantum Data 780/780A – Model Options

- Two models available:
 - 780 Handheld Test Instrument – supports pixel rates up to 165MHz on HDMI Tx port and 150MHz on the Rx port for testing 1080p60-capable sources, sinks, repeaters and distribution devices.
 - 780A Handheld Test Instrument – supports pixel/TMDS rates up to 297MHz on HDMI Tx and Rx ports for testing 4K-capable sources, sinks, repeaters and distribution devices.
- 780 HDMI specs - Tx and Rx ports
 - Max pixel clock with 24 bit/pixel color: 165MHz (Tx); 150MHz (Rx) e.g. 1080p at 60Hz.
 - Max TMDS clock: 225MHz (2.25Gb/s per channel); e.g. 1080p at 60Hz with 36 bit/pixel deep color.
- 780A HDMI specs – Tx and Rx ports
 - Max TMDS/pixel clock with 24 bit/pixel color: 297MHz; e.g. 4K x 2K at 30Hz.
 - Max pixel clock with 36 bit/pixel color: 165MHz; e.g. 1080p at 60Hz.
 - Max TMDS clock with 36 bit/pixel color: 225MHz (2.25Gb/s per channel); e.g. 1080p at 60Hz.

Quantum Data 780/780A - Video Test Instrument

- First portable troubleshooting tool for analysis of HDMI products and systems in many different test environments.
- This low cost, flexible and easy to use test instrument with intuitive touch screen control can identify solutions at every level of the supply chain, minimizing the return of goods and maximizing an HDMI product's success.
- In the lab, it is an inexpensive, intuitive tool for troubleshooting and validating product designs Can be used to validate products before they are delivered to be installed.
- For field applications, it is ideal for troubleshooting HDMI interoperability problems and demystifying HDMI.
- Provides confidence in HDMI products within the supply chain, making this product crucial as products with HDMI connectors have increased in demand by consumers.

Quantum Data 780/780A – Standard Features

- HDMI output for testing displays; includes support for deep color and 3D
- Analog video output (RGB and YUV)
- Custom bitmaps for image scrolling to test motion artifacts
- HDMI 3D rendering using custom 3D bitmaps
- Multichannel (up to 8 channel), configurable, digital audio outputs (HDMI, SPDIF, TOSLink)
- Compressed and uncompressed audio formats (LPCM, Dolby Digital, DTS), as well as high bit rate audio (Dolby TrueHD, DTS-HD Master Audio)
- Installer Test utility to verify and troubleshoot HDMI installations.



Quantum Data 780/780A – Optional Features

- Network Analyzer: HDMI input for source testing & analysis including EDID & HDCP testing.
- HDMI Pixel Error Cable, Repeater Test and Frame Compare Tests: Test HDMI cables and distribution networks with repeaters, switches, extenders, etc.
- Auxiliary Channel Analyzer (ACA) monitors hot plug events, HDCP & EDID transactions and CEC messages while emulating an HDMI sink or source.
- Auxiliary Channel Analyzer (ACA) passively monitors hot plug events, HDCP and EDID transactions and CEC messages on an existing HDMI installation. Requires optional hardware board with 4 additional HDMI ports.



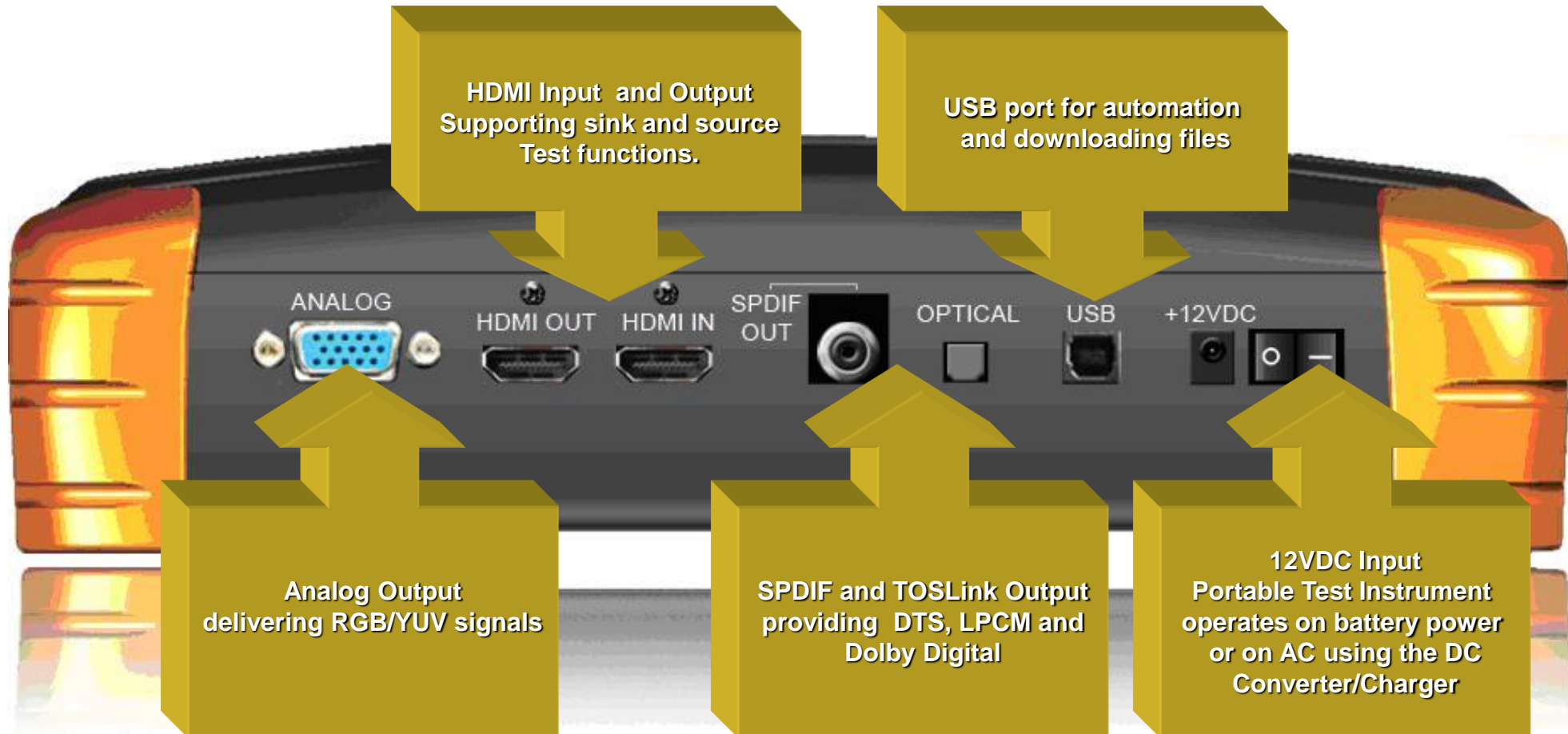
Quantum Data 780/780A – Power, Physical Specs

- Size: 2.7" x 9.75" x 6"
or 6.98 cm x 24.76 cm x 15.24 cm
- Weight: 3.25 lbs. or 1.47 Kg
- Power: DC 6 AA NiMh,
rechargeable – Maximum 6 hour
capacity, AC Charger/Converter
100-240V
- Regulatory
 - FCC Class B
 - RoHS
 - CE



Inputs / Outputs

780/780A Inputs/Outputs – Standard Configuration



780/780A Inputs/Outputs – Optional Configuration



Passive monitoring
(2) Upstream
HDMI ports

Breakout for direct access
to DDC, CEC, 5V for each
side upstream and
downstream

Passive monitoring
(2) Downstream
HDMI ports

780/780A Inputs/Outputs – Optional Configuration



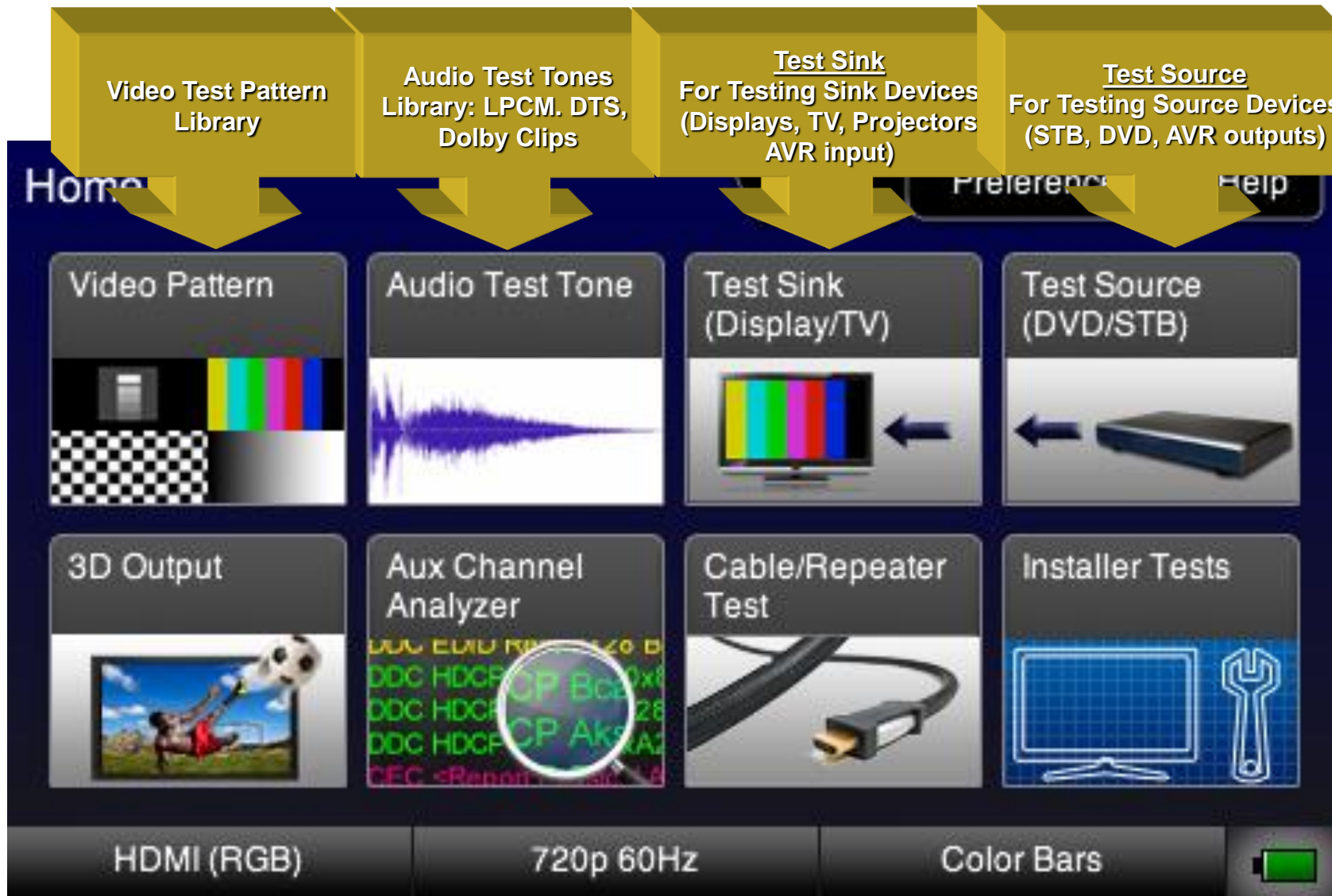
↑
RS-232 port for
command line control
on 780A only

↑
SD card for rebooting
and upgrading

↑
Headphone Jack for
monitoring LPCM audio
on 780A only

User Interface

780/780A User Interface – Home Screen



780/780A User Interface – Home Screen



3D Video Tests using any mandatory 3D format with embedded images and custom bitmap 3D images.

Optional Aux Channel Analyzer feature

Optional HDMI Cable and Repeater Test

Installer Tests
For conducting quick simplified verification tests of sinks, sources and repeaters.)x

780/780A User Interface – Home Screen



Administrative Functions:

- "Home" Returns to main menu
- "Preferences" allows user to change settings and modes.
- "Help" allows user to change settings and update firmware.

Battery Status

Output Selection
HDMI, Analog RGB,
Analog Component

Format Selection

Pattern Selection

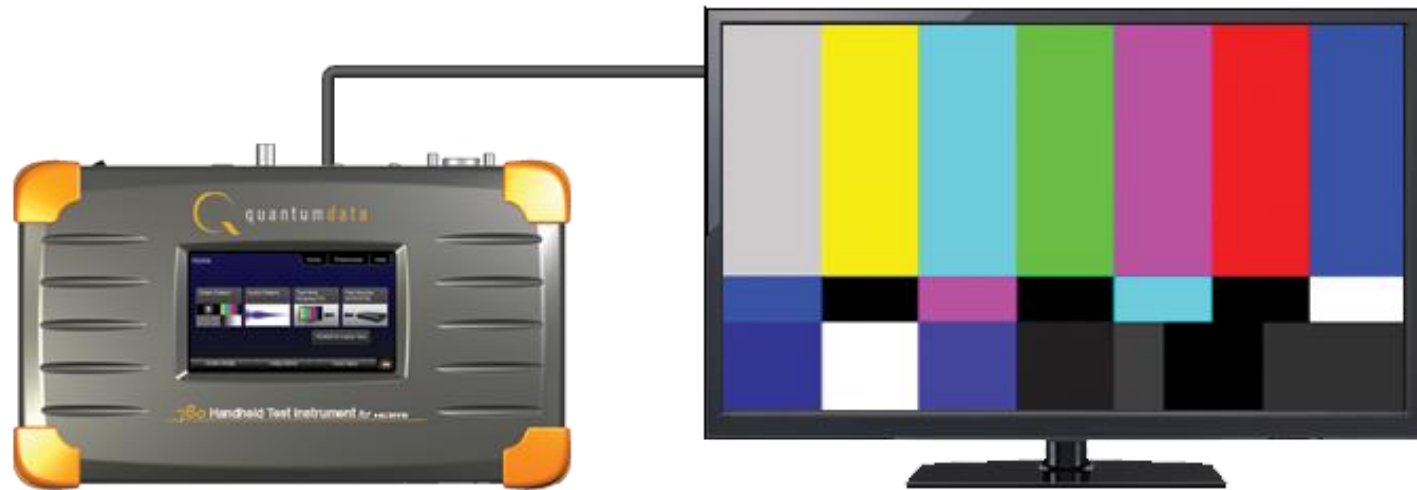
Standard Features

Quantum Data 780/780A Standard Features

- Confidence test for HDMI, analog HDTVs and displays
 - All standard resolutions available or create your own custom formats
 - Use standard test patterns or create custom bitmaps
 - 3D test patterns available
 - Scroll bitmap images for testing motion artifacts
 - Transmit audio patterns including multi-channel compressed formats
- Confidence test of an HDMI source device
 - View incoming video and parameters of an HDMI source
 - Checks HDCP authentication
- HDMI Installer Test utility
 - Verifies HDMI devices and components prior to installation
 - Troubleshoots HDMI interoperability problems on-site

Pattern Testing

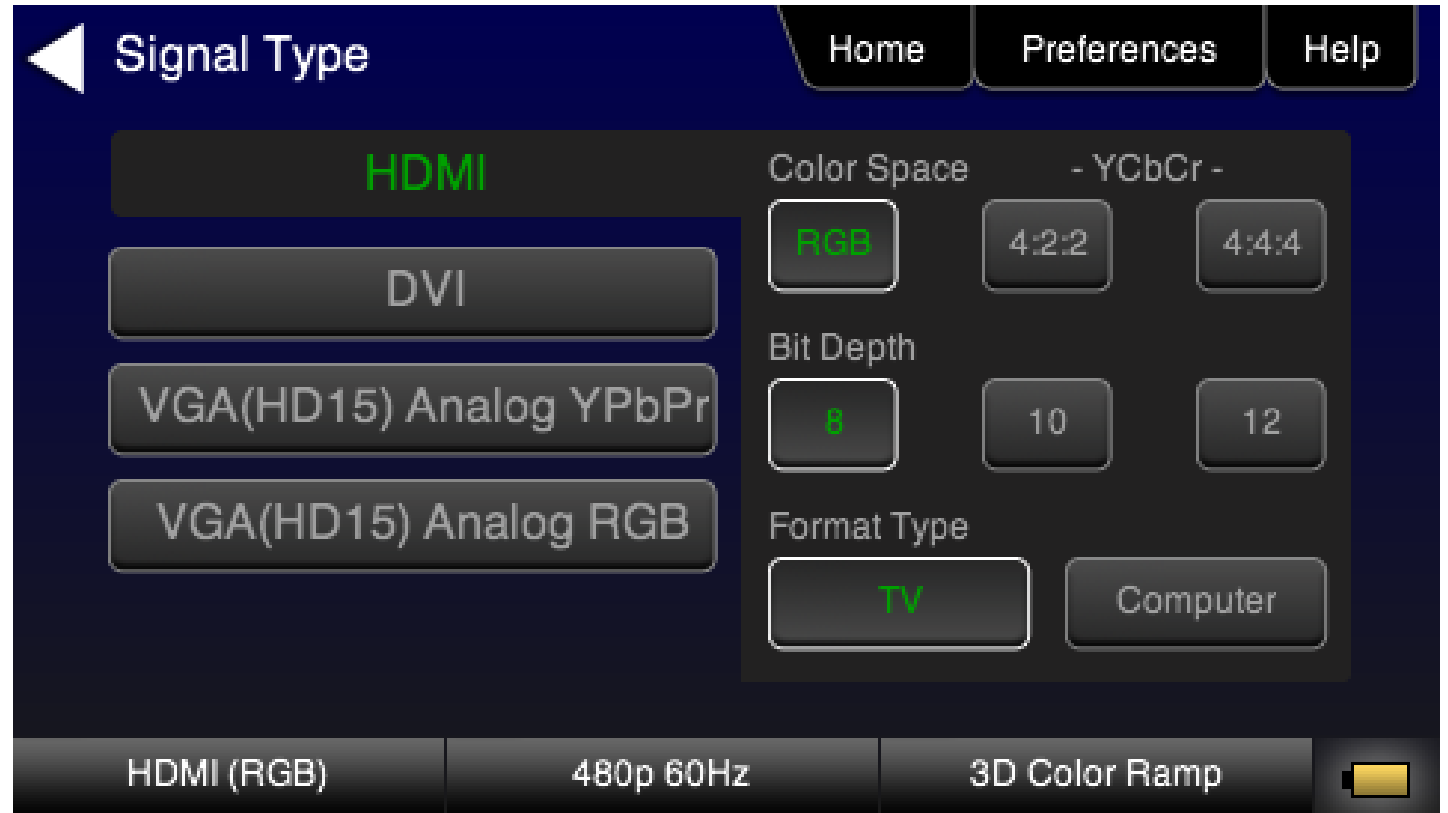
- Confidence test for HDMI, analog HDTVs and displays
 - All standard resolutions available or create your own custom formats
 - Use standard test patterns or create custom bitmaps
 - 3D test patterns available
 - Scroll bitmap images for testing motion artifacts
 - Transmit audio patterns including multi-channel compressed formats



Video Output Selection



Select Signal Type (e.g. HDMI) and configure color space as well as bit depth to test for HDMI "deep color".



Video Output Selection



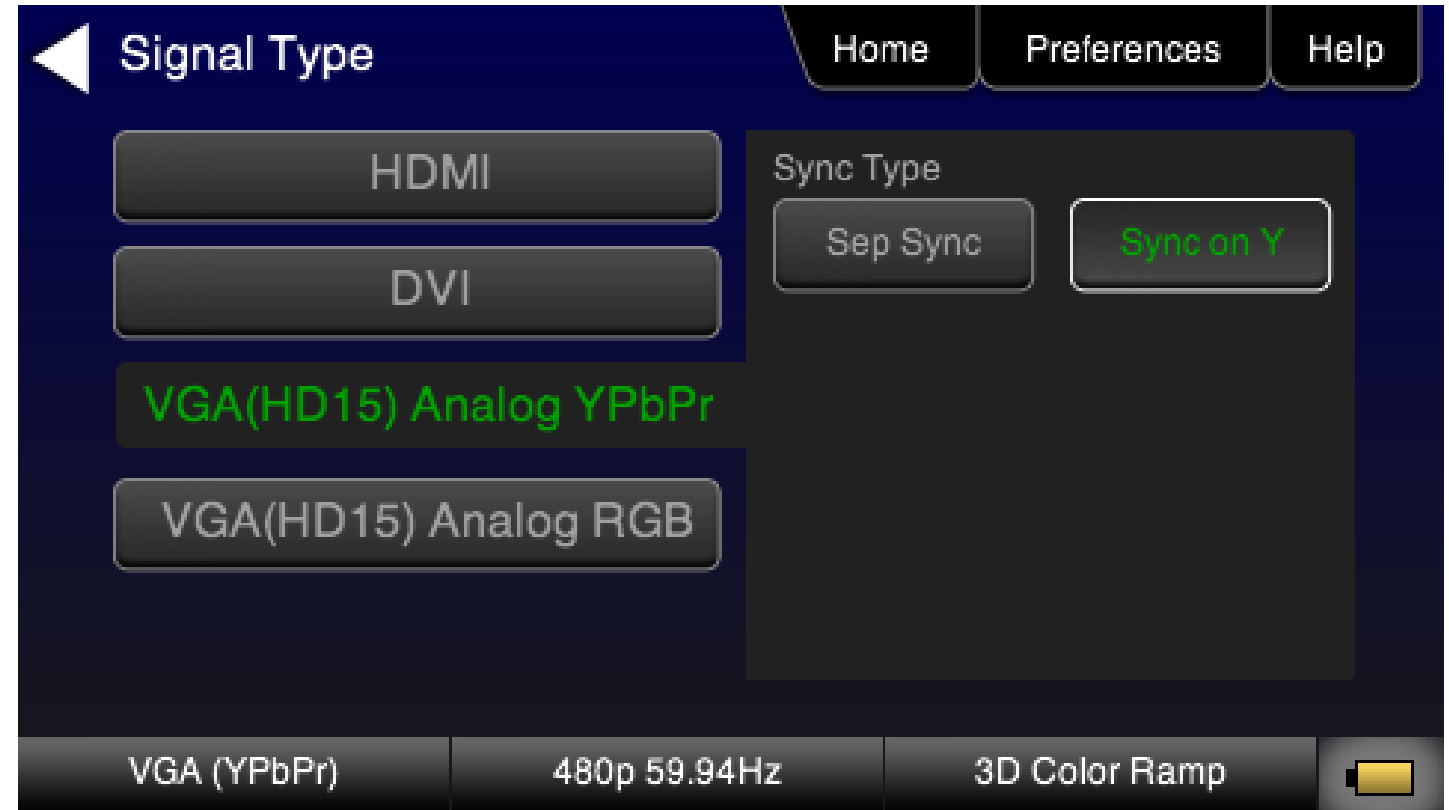
DVI selection provides configuration for TV or PC devices.



Video Output Selection



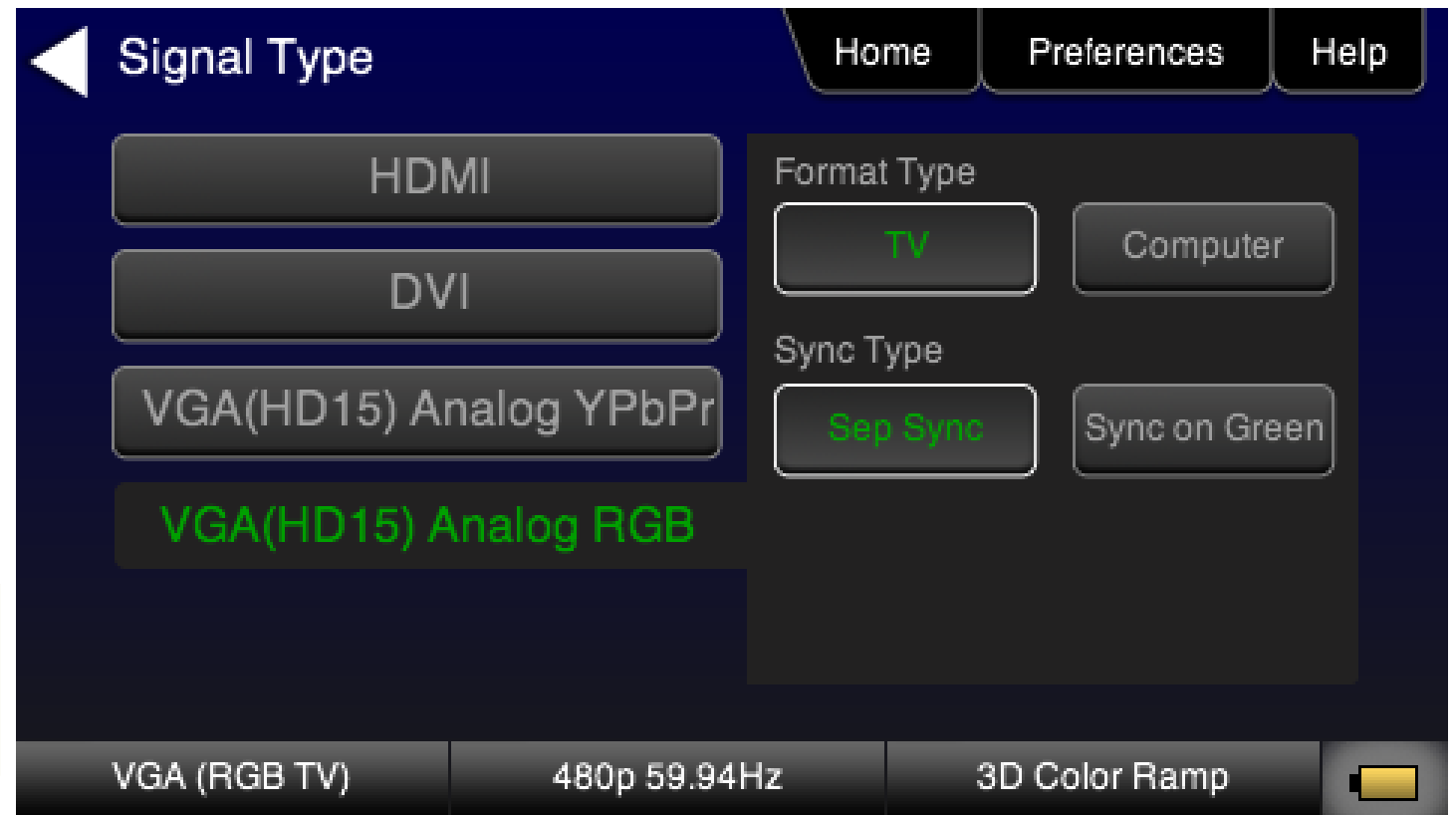
YPbPr Analog is supported through the HD-15 connector and the 3 RCA adaptor cable (provided). Select "Sync on Green" when using this cable.



Video Output Selection



Select RGB Analog sync type: DSS or SOG
Choose format types that are either
CEA (TV) or VESA (PC) timings



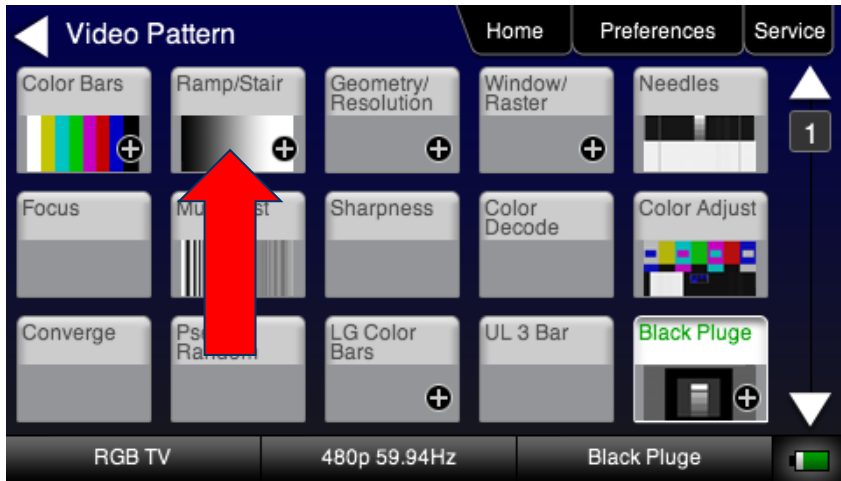
Video Pattern Selection



Use one of 20 built-in images OR download .bmp files to provide custom images.



Video Pattern Selection - Options



“+” indicates that there are optional Settings for the pattern being selected. A “double click” opens up the options



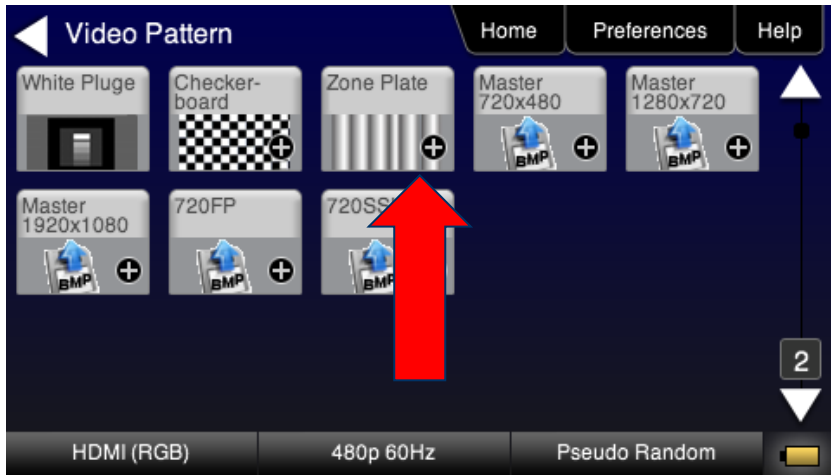
Video Patterns – 3D Pattern Rendering



3D .bmp files can be downloaded to the 780 by using the USB connector. Once an image is downloaded it can be output for testing an HDMI 3D capable HDTV.

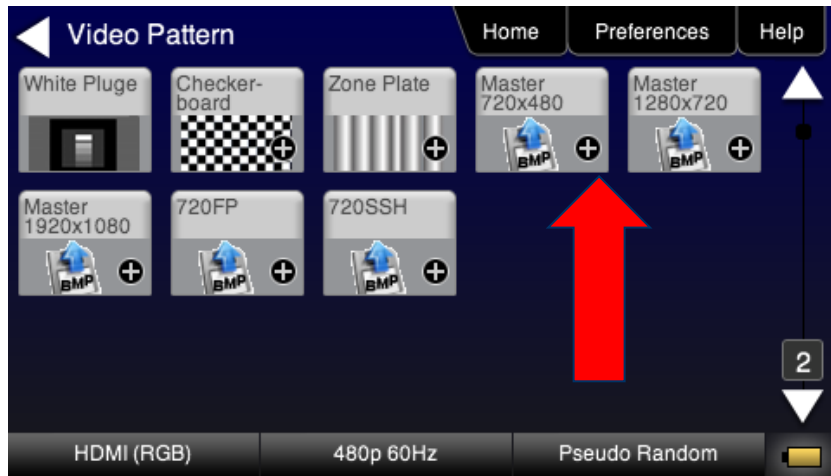


Video Patterns - Bitmap Download & Image Shift



.bmp files can be downloaded to the 780 by using the USB connector. Once an image is downloaded it can be set in motion as a way to test motion artifact. The "Zone Plate" image is stored as a .bmp file and its option settings provide all image shift controls.

Video Patterns - Bitmap Download & Image Shift



.bmp files with higher resolution than the format being output by the generator can be manually Panned to center the test on a portion of the stored .bmp file by the user

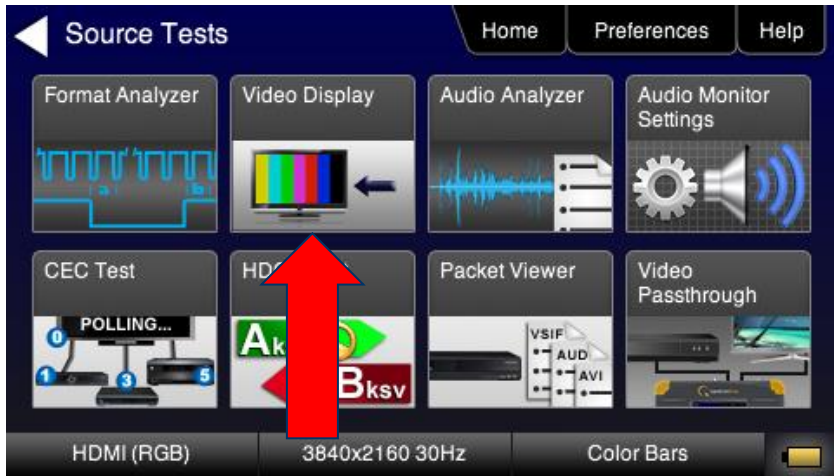
Video Format Selection



Choose resolution then select a video frame rate to create the output format. EDID configures the Available resolutions and frame rates of the generator, “graying” out the ones not supported by the display.



View Incoming Video from an HDMI Source

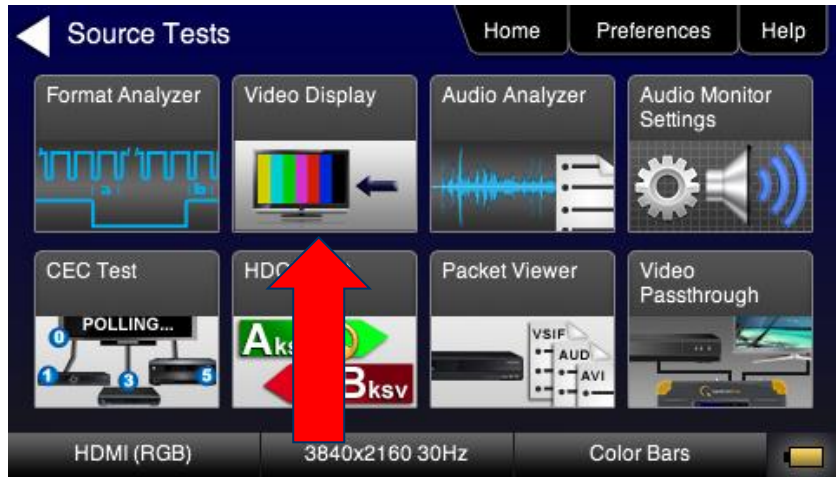


This method of accessing the Video Display feature is used on the base 780 unit.



Video from source is displayed on the 780 LCD

Source Tests – View Incoming Video and Metadata



This method of accessing the Video Display feature is used on 780 units with the Network Analyzer Suite.



Incoming video image and metadata displayed on built-in display

Source Tests – View Incoming 3D Video



This method of accessing the Video Display feature is used on 780 units with the Network Analyzer Suite.

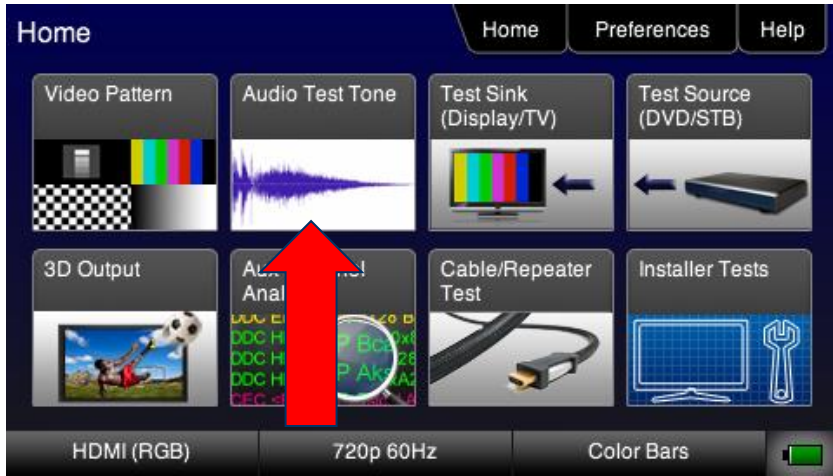
3D Images from source are displayed on the 780 LCD

Audio Testing

- Confidence test for HDMI, analog HDTVs and audio systems
 - Transmit audio patterns including multi-channel compressed formats



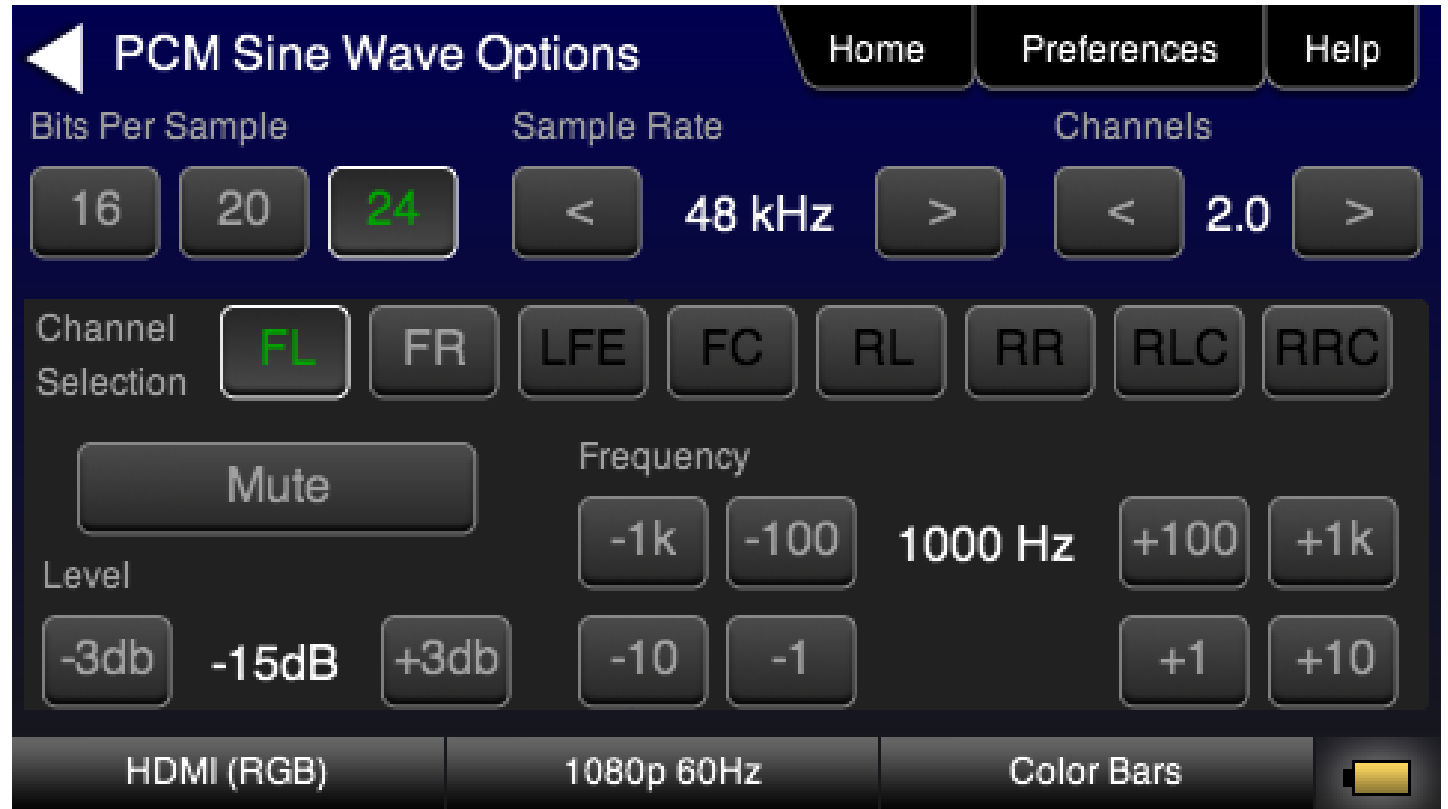
Audio Pattern (Test Tones) Selection



Audio Patterns allow the user to test multichannel audio on different audio formats, bit depth and sampling rates.



Audio Output Setup (PCM Sine Wave)



Audio set up allows changing audio type, bits per channel and sampling rates on the fly.

The Sine Wave test changes frequency and amplitude per channel as a user setting. This test supports up to 8 channels of audio

Audio Pattern Selection (DTS-ES 6.1/Dolby 5.1)



Play compressed DTS audio clips
over any digital audio output.

Audio Pattern Selection (DD+ and TrueHD)



Play compressed Dolby Digital+ or TrueHD audio clips over the HDMI output.



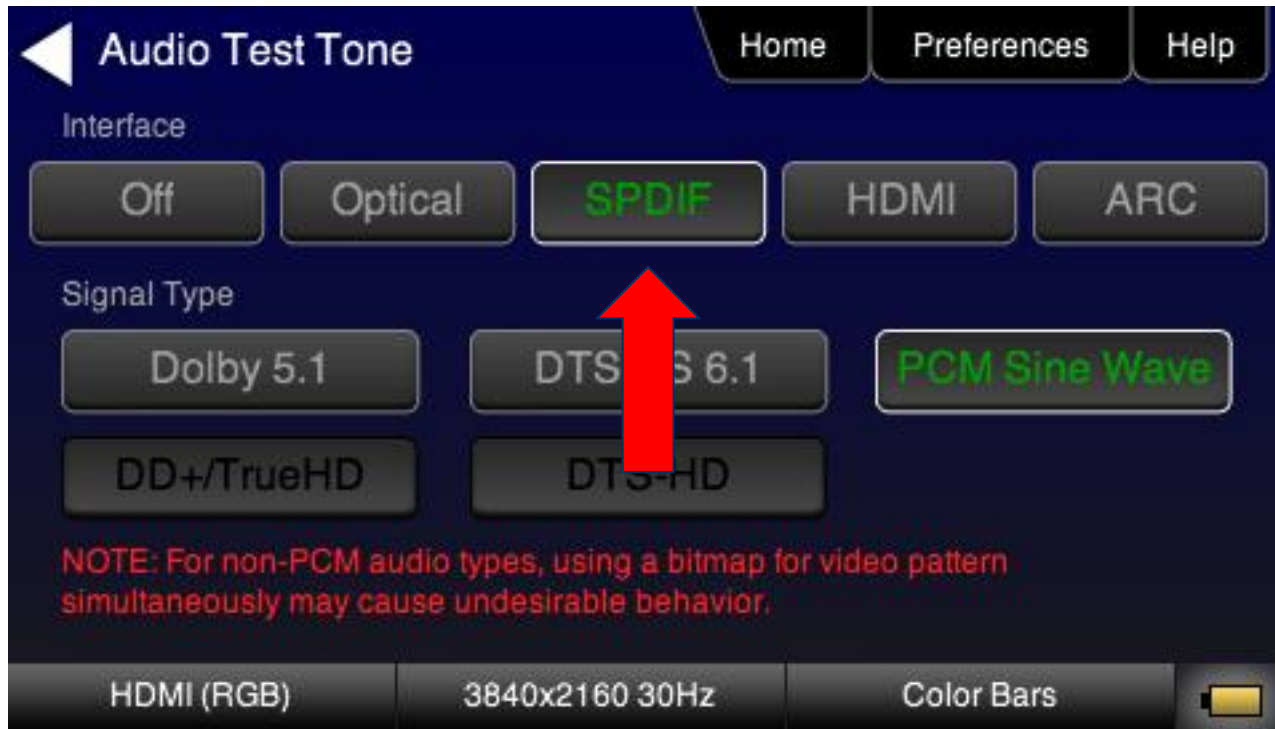
Audio Pattern Selection (DTS-HD)



Play compressed DTS-HD audio clips over the HDMI output.



Audio Pattern Testing - SPDIF / Optical



Test digital audio inputs through 780's SPDIF or Optical output.

Audio Pattern Testing – HDMI 1.4 ARC (780A Only)



Test HDMI 1.4 Audio Return Channel (ARC) with LPCM and compressed formats on audio systems



Installer Test Utility

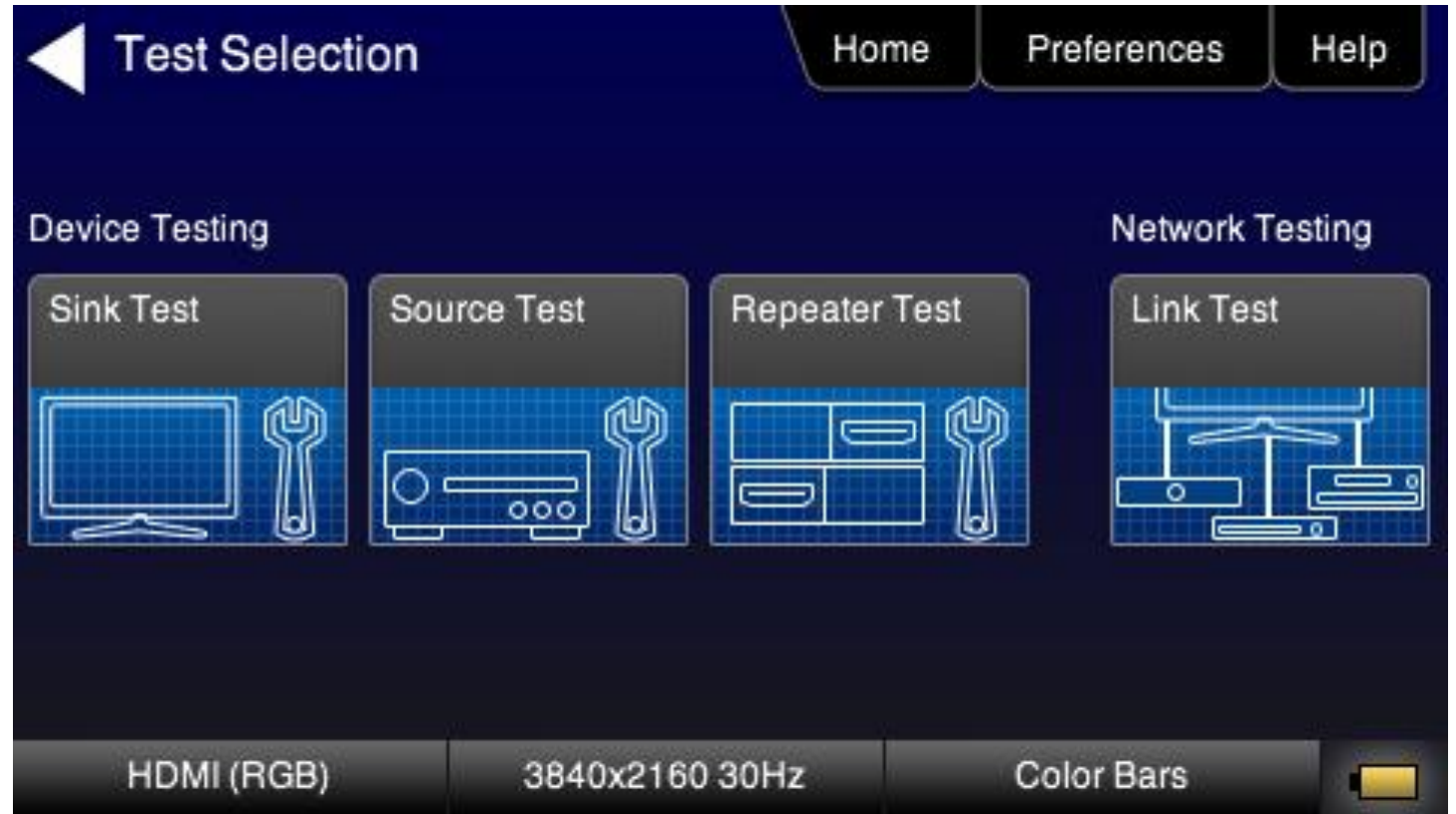
Installer Test Utility

- Troubleshoot HDMI interoperability problems on-site.
 - Easy to use.
 - Provides simple pass/fail results.
 - Isolate interoperability problems to a specific device or component.
 - Tests for proper video, hot plug, EDID and HDCP authentication.
- Evaluate HDMI components prior to installation to avoid on-site problems.
 - Easy to use.
 - Provides simple pass/fail results.
 - Prequalify HDMI sources, sinks and repeaters prior to installation.
 - Tests for proper video, hot plug, EDID and HDCP authentication.

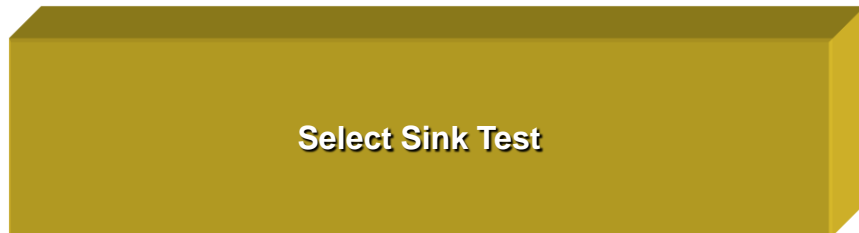
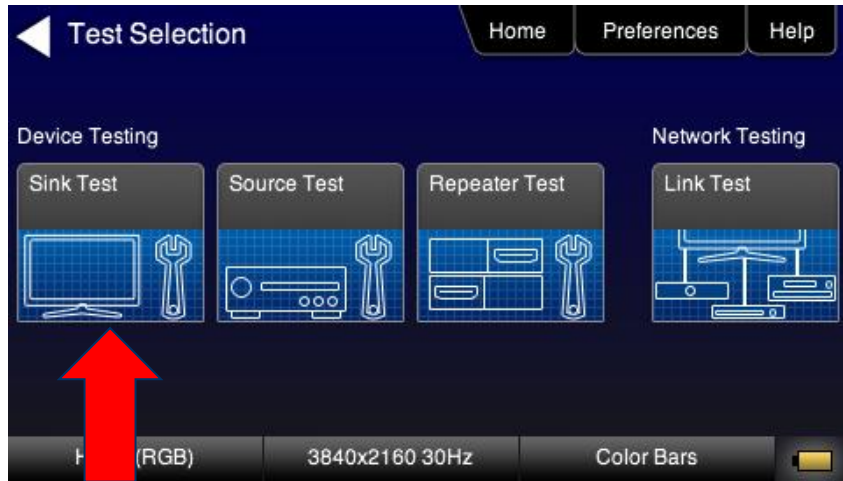
Installer Test Utility - Menu



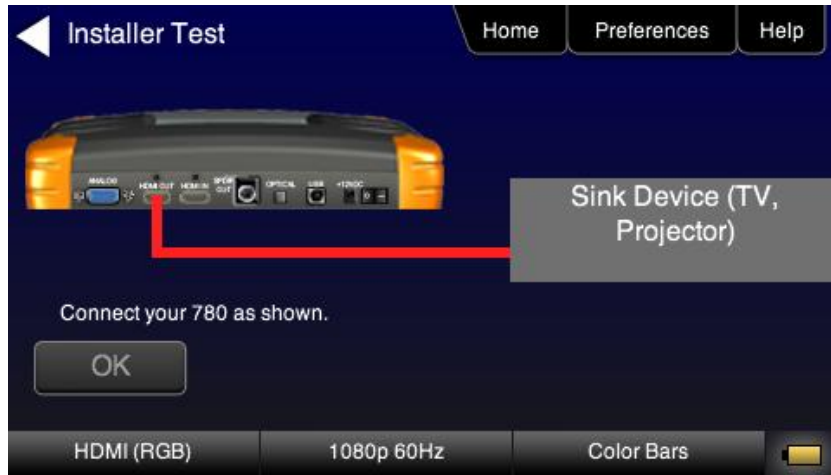
Access Installer test menu from the main screen



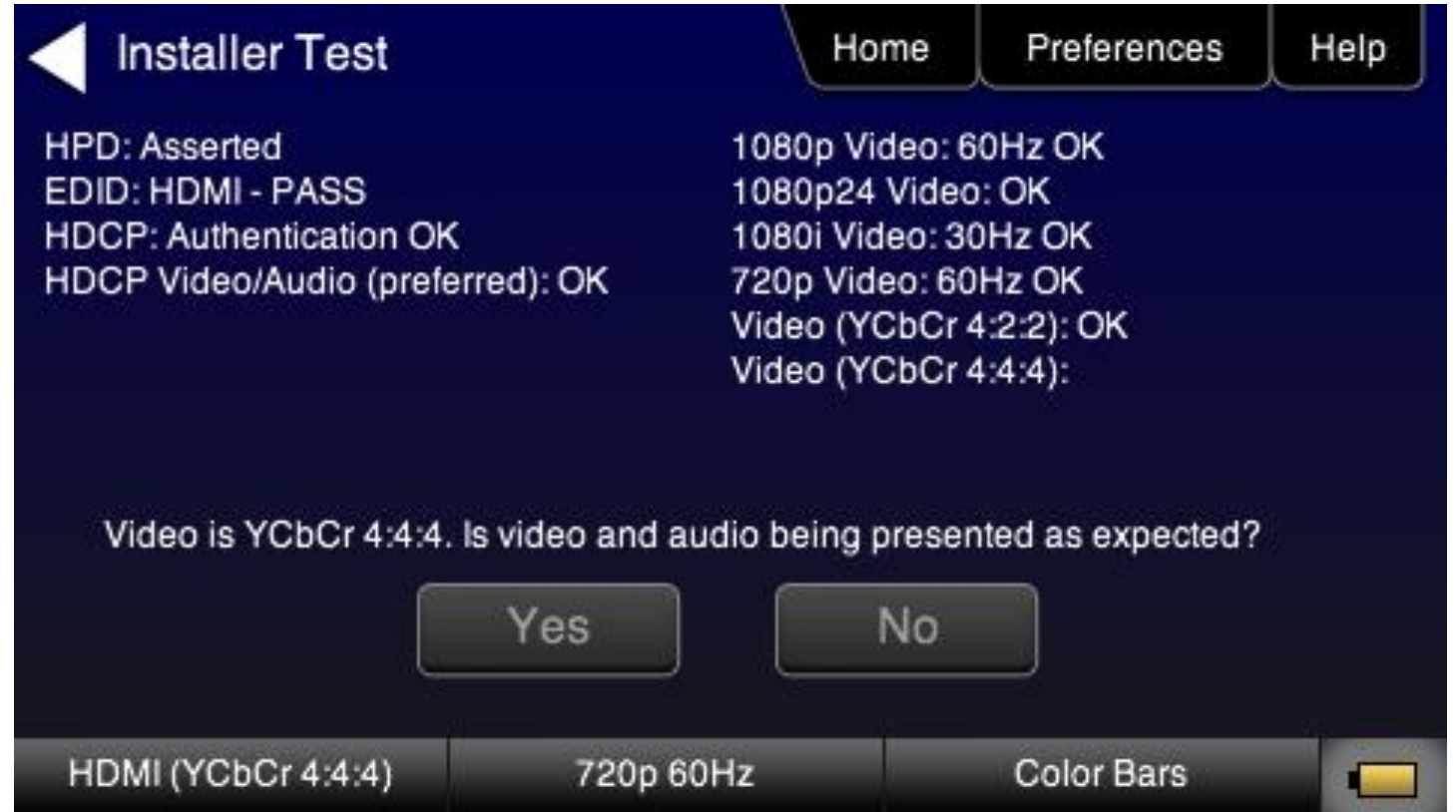
Installer Test Utility – Sink Test Configuration



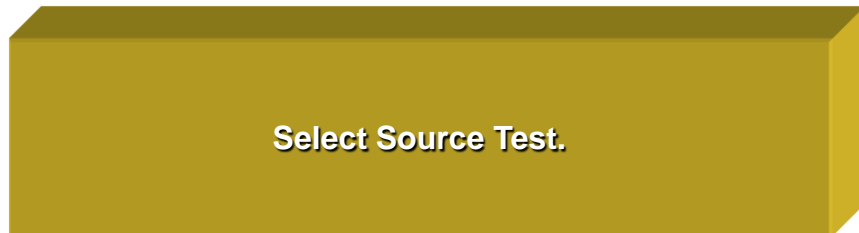
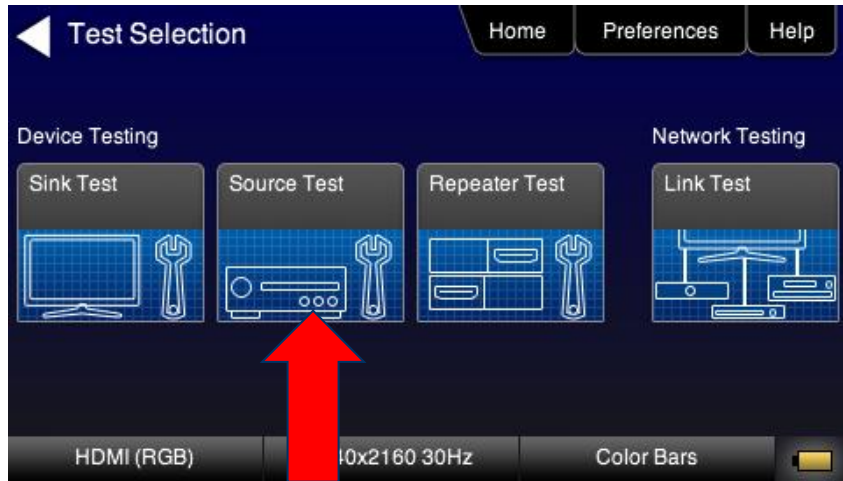
Installer Test Utility – Sink Test Results



Verifies HDCP, EDID, and video of sink device at various resolutions using different video and sampling types



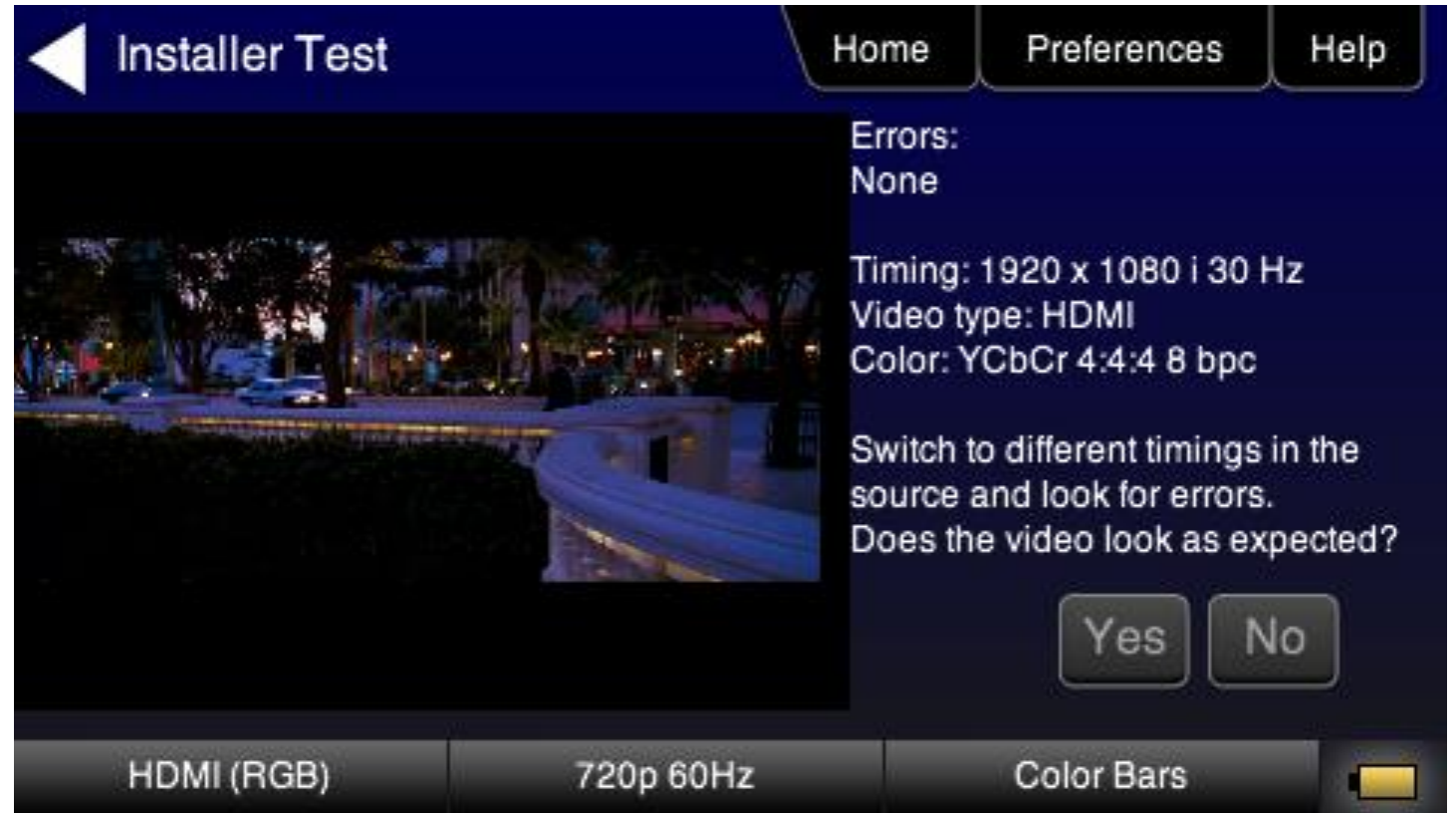
Installer Test Utility – Source Test Configuration



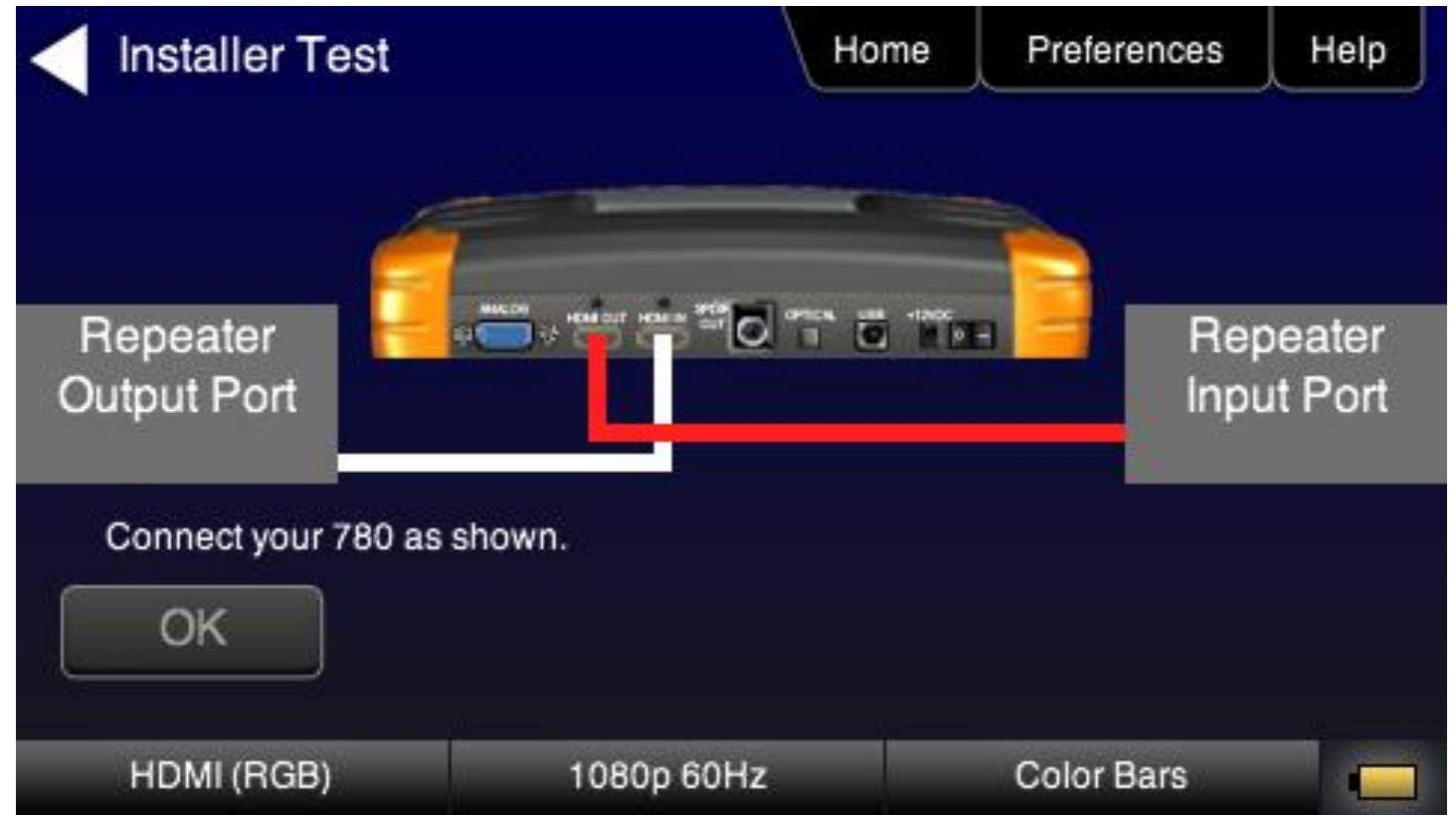
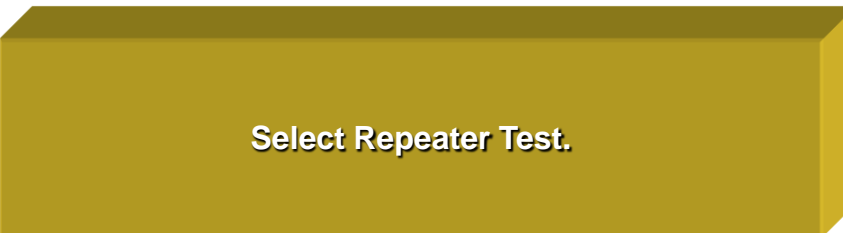
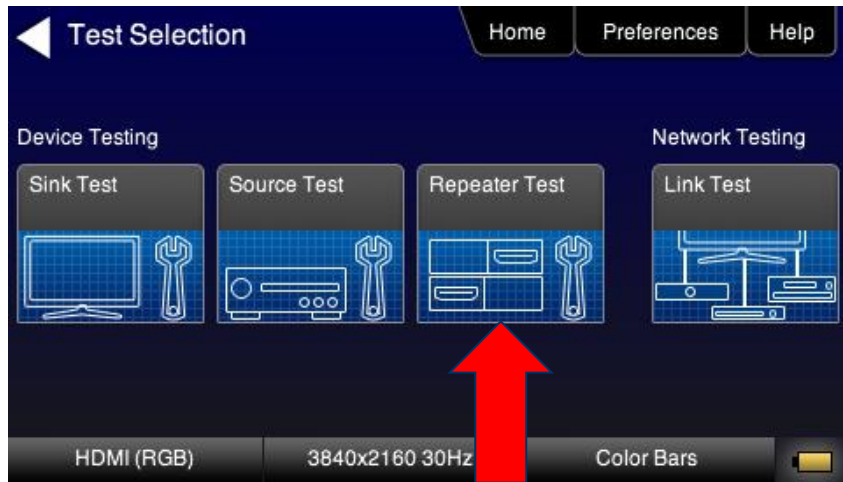
Installer Test Utility – Source Test Results



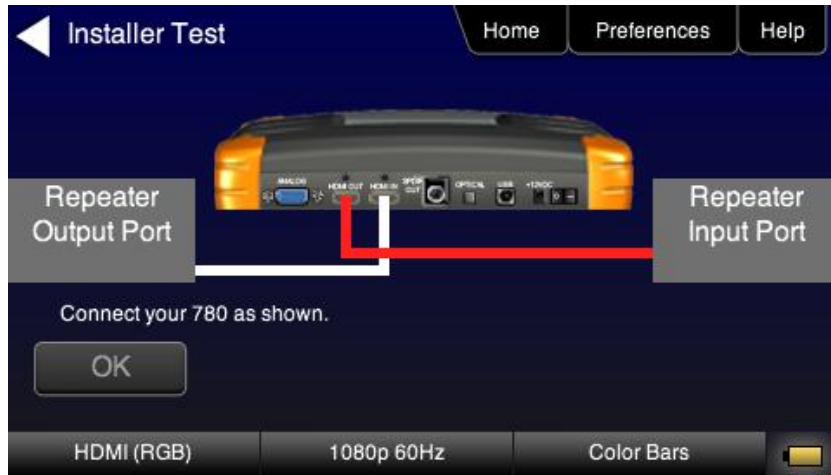
Verifies HDCP, EDID response, and video of source device at various resolutions using different video and sampling types



Installer Test Utility – Repeater Configuration



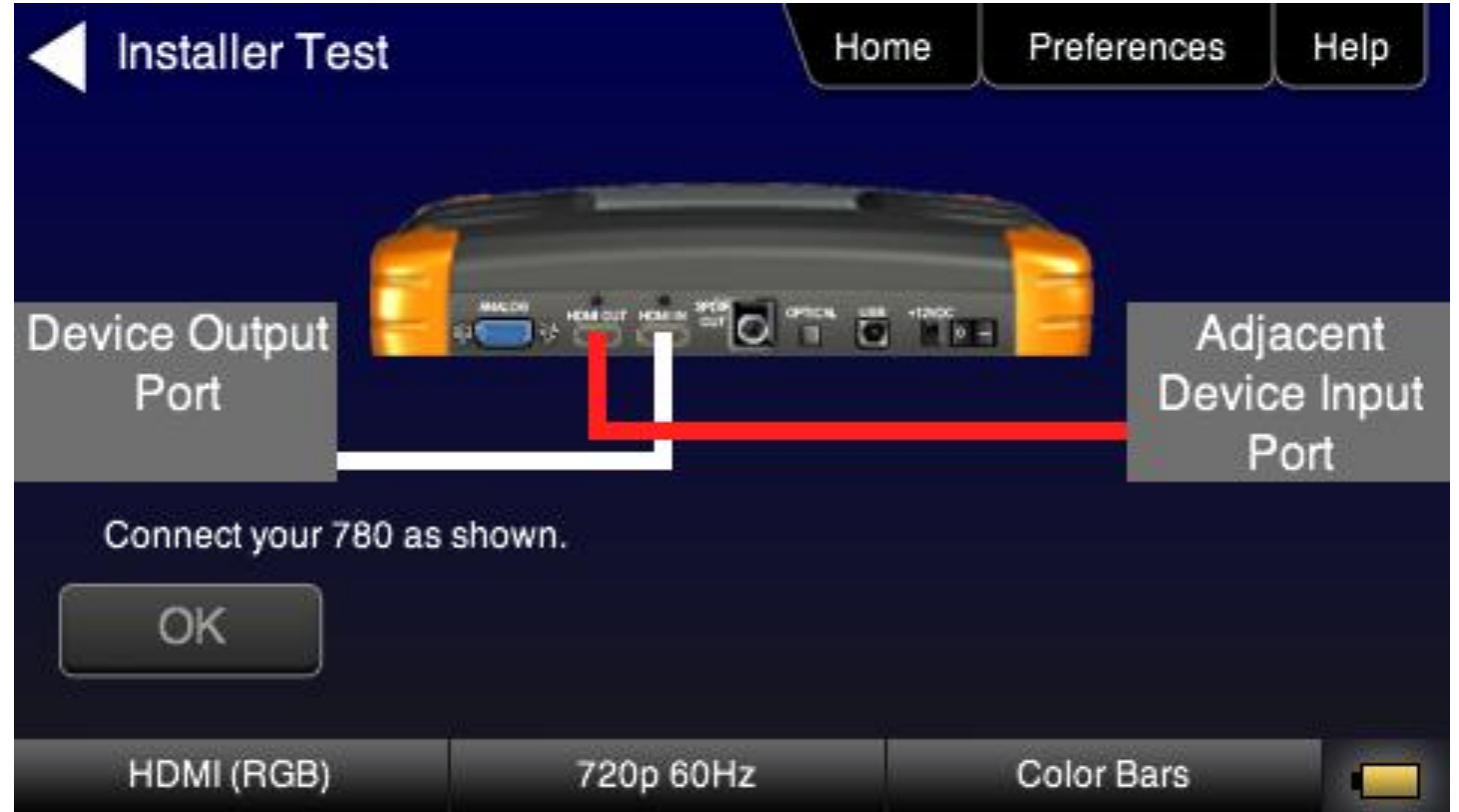
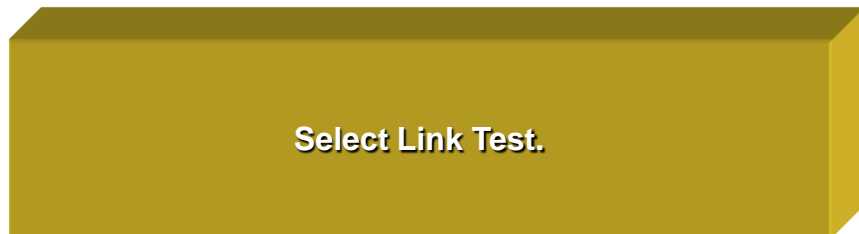
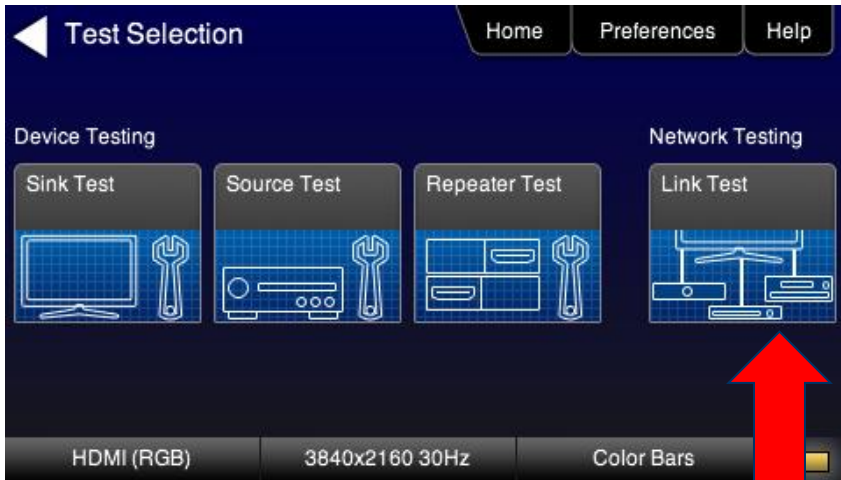
Installer Test Utility – Repeater Test Results



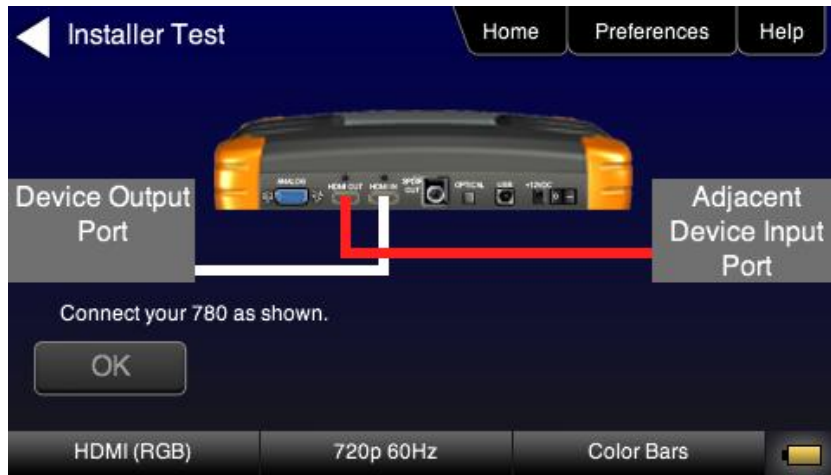
Verifies HDCP, EDID response, and video of source device at various resolutions using different video and sampling types



Installer Test Utility – Link Test Configuration



Installer Test Utility – Link Test Results



Verifies HDCP, EDID response, and video of source and sink devices at various resolutions using different video and sampling types



780/780A Optional Features

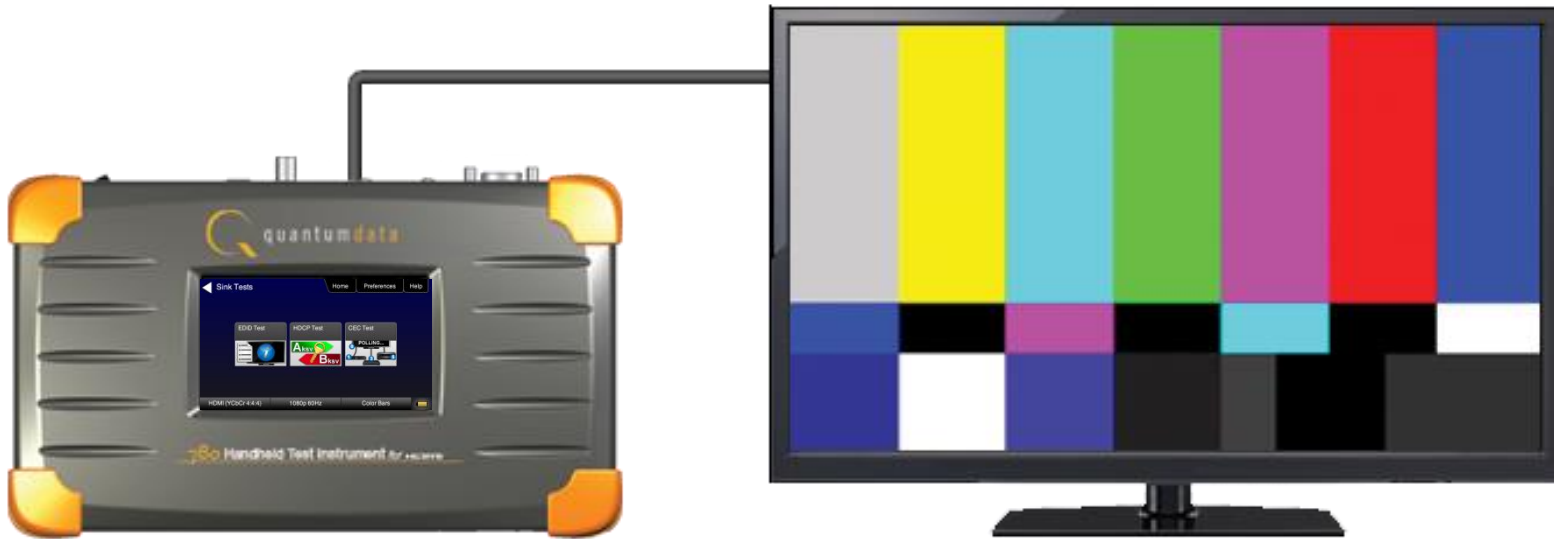
Quantum Data 780/780A Optional Features

- HDMI Network Analyzer; includes the following features:
 - HDMI Sink Protocol Tests.
 - HDMI Source Analyzer Tests.
- HDMI Cable, Link (Repeater) and Frame Compare Test
- HDMI Auxiliary Channel Analyzer (ACA):
 - Option 1: Emulation monitoring of hot plug events and DDC transactions
 - Option 2 (includes Option 1): Passive monitoring of hot plug events, DDC transactions and CEC messages.

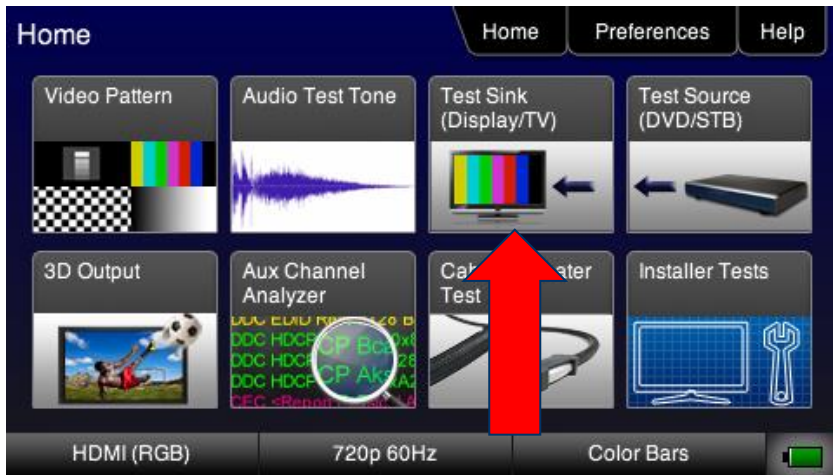
Network Analyzer Option

Quantum Data 780/780A Network Analyzer Option

- HDMI Network Analyzer – Sink Testing:
 - Verify an HDMI sink's handling of HDCP encrypted video
 - EDID verification and listing
 - CEC ping test



Network Analyzer - Sink Testing



“Test Sink” provides a selection of auxiliary channel test functions for TV, Projectors and other displays.



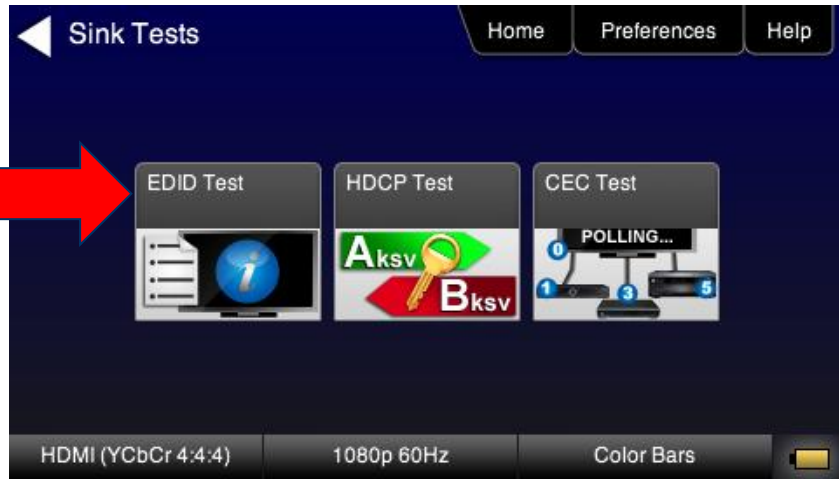
Network Analyzer – EDID Sink Report



The EDID Test reads and parses EDID data from a sink device. Entire EDID is listed.



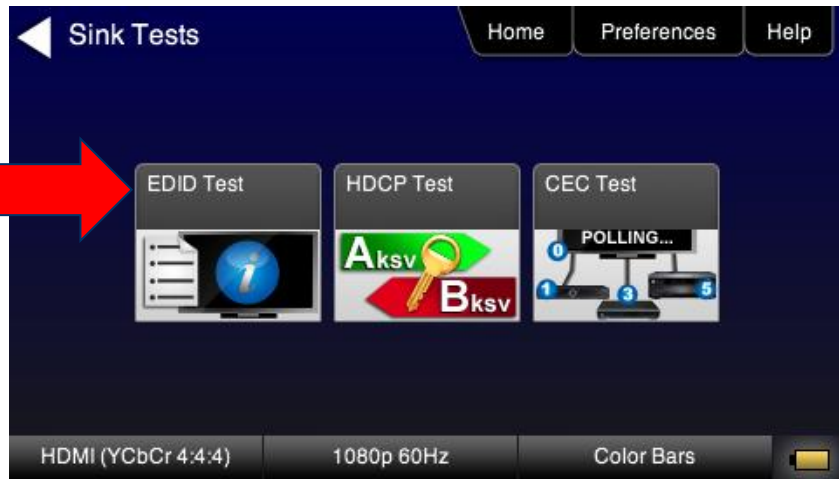
Network Analyzer – EDID Compliance Test



The EDID Compliance Test is also performed when an EDID is read from a sink device or file.



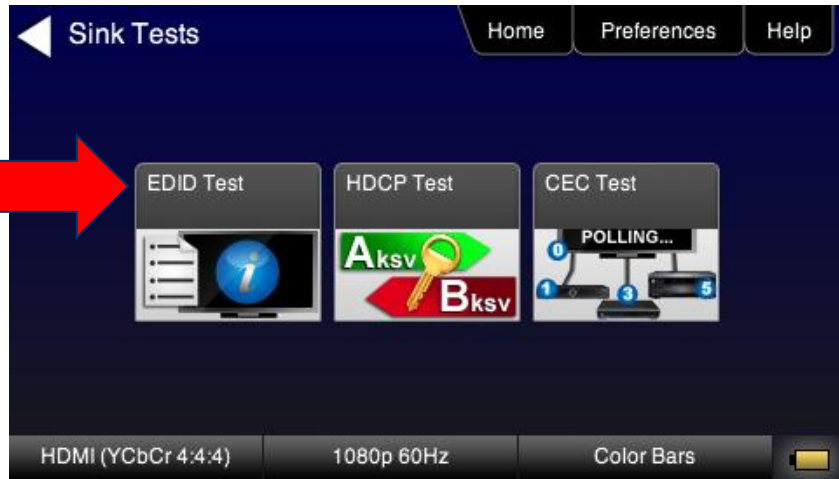
Network Analyzer – EDID Sink Compare



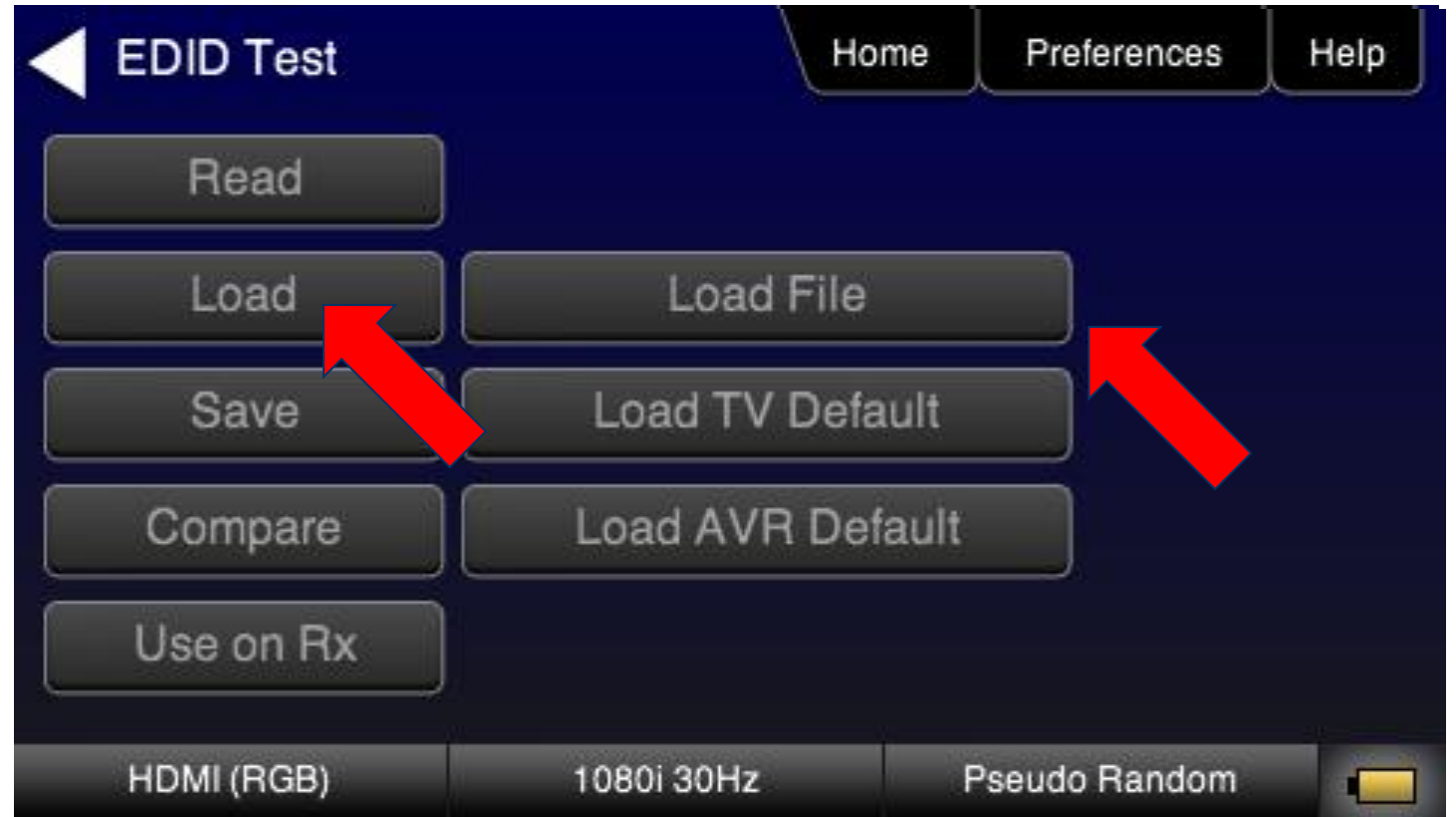
Compare a stored reference EDID with the EDID of a sink device that 780 Tx is connected to..



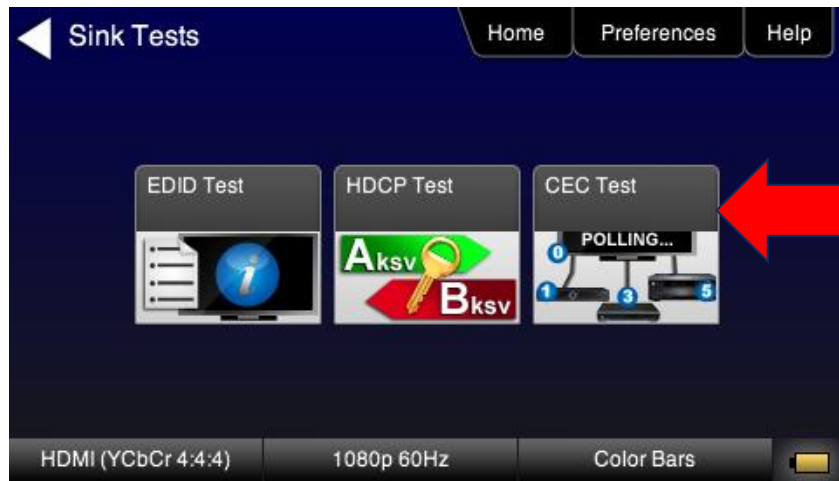
Network Analyzer – EDID Load/Save



Compare a stored reference EDID with the EDID of a sink device that 780 Tx is connected to.

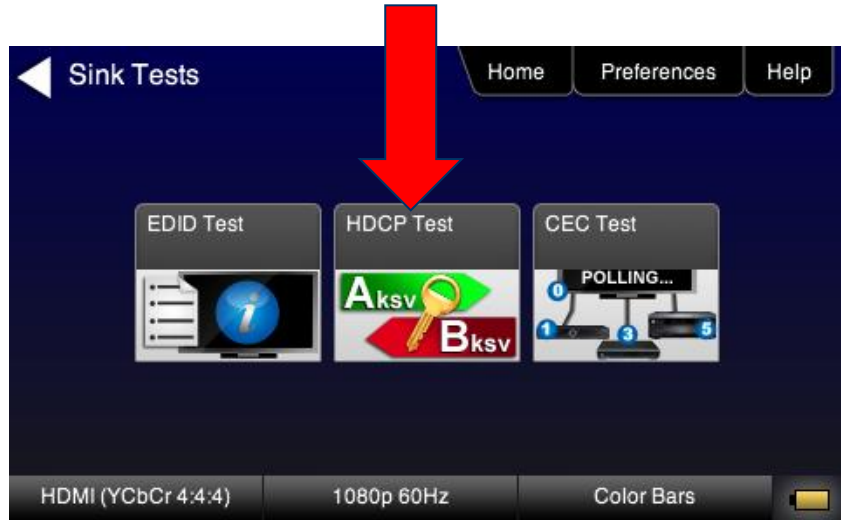


Network Analyzer – CEC Sink Testing



The CEC test not only provides verification of CEC basic function, but requests a device's Logical Address to determine system components.

Network Analyzer – HDCP Sink Testing



Our HDCP test not only verifies the DUT with a PASS/FAIL result, but also shows the exchange of Aksv, Bksv and the on going Ri comparison

Quantum Data 780/780A Network Analyzer Option

- HDMI Network Analyzer – Source Tests:
 - View video InfoFrame and timing data—including 3D metadata—from an HDMI source
 - View audio InfoFrame and metadata from an HDMI source
 - Test an HDMI source device's response to any EDID
 - Check the number of HDCP devices an HDMI source supports



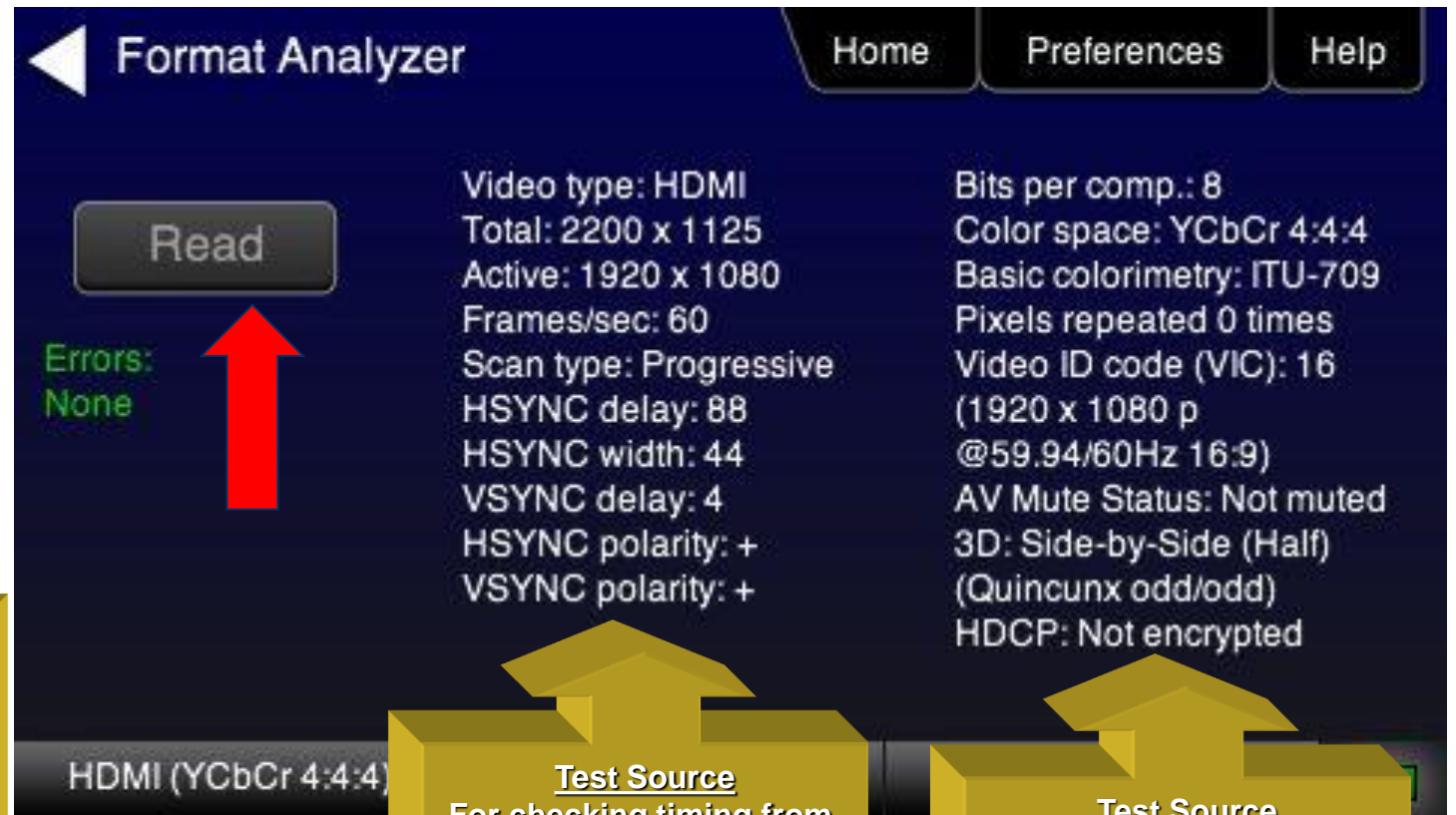
Network Analyzer – HDMI Source Testing



“Test Source” provides tests for source devices such as DVD players, set top box and AVRs.



Network Analyzer – Source Format Analyzer

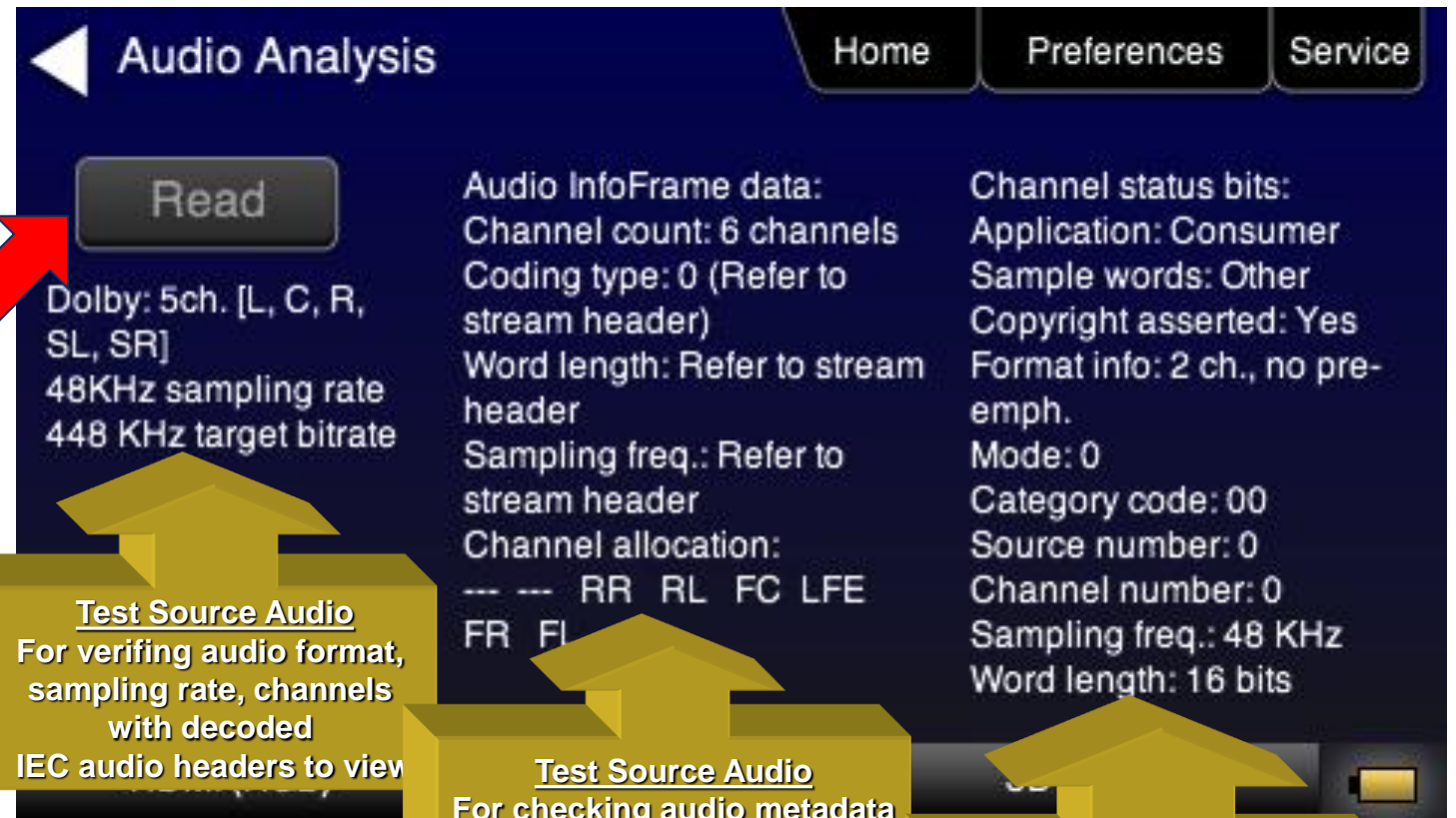


The Format Analyzer is an excellent tool for verifying that a source device is outputting a standard timing or supports deep color. This test displays detail on the incoming video format.

Test Source
For checking timing from Source Devices (STB, DVD, AVR output)

Test Source
For Testing Source Devices shows AVI& 3D metadata (STB, DVD, AVR output)

Source Tests – Audio Analyzer



The Audio Analyzer offers a description from the Audio Infoframe and audio sample packet headers. This provides quick, clear description of the audio data that is being output by an HDMI device.

Test Source Audio
For verifying audio format, sampling rate, channels with decoded IEC audio headers to view

Test Source Audio
For checking audio metadata from Source Devices (STB, DVD, AVR output)

Test Source Audio
For checking audio channel status bits from Source Devices shows AVI& 3D metadata (STB, DVD, AVR output)

Source Tests – Audio Monitoring with Headphone

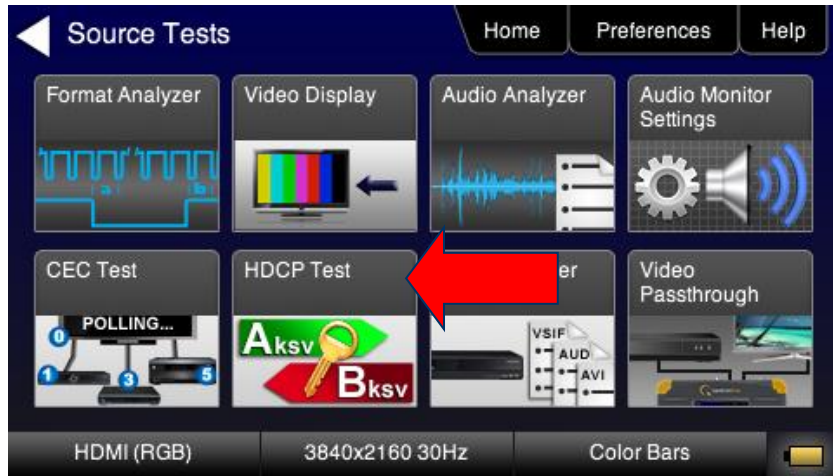


Audio Monitor Headphone Configuration (780A)

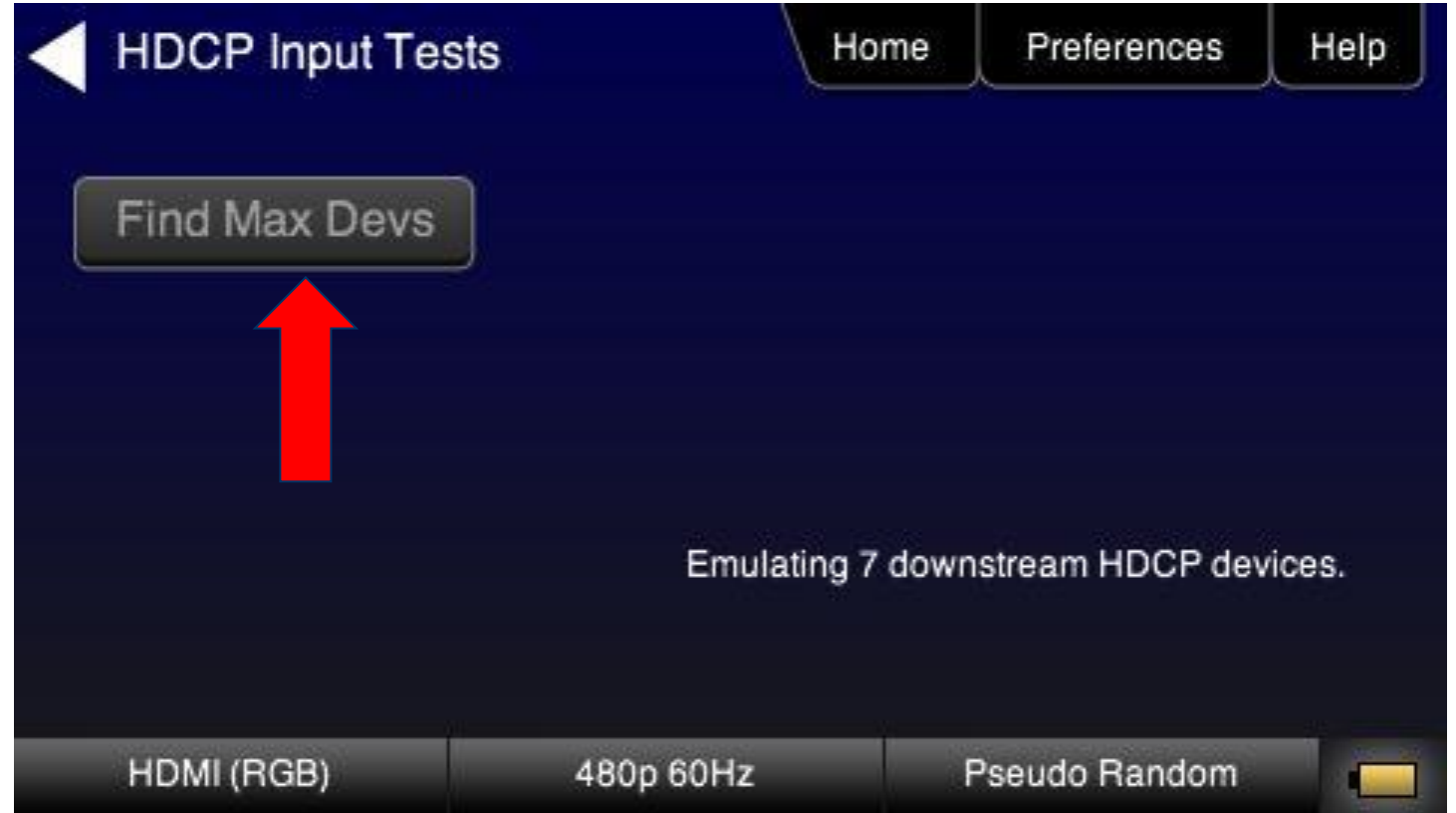


The Audio Monitor setup enables you to configure the audio that comes out of the 780A headphone jack

Network Analyzer – HDCP Source Max Devices Test



HDCP Max devices test checks to see how many downstream devices the HDMI source device can support in an HDCP authentication.



Source Tests – EDID

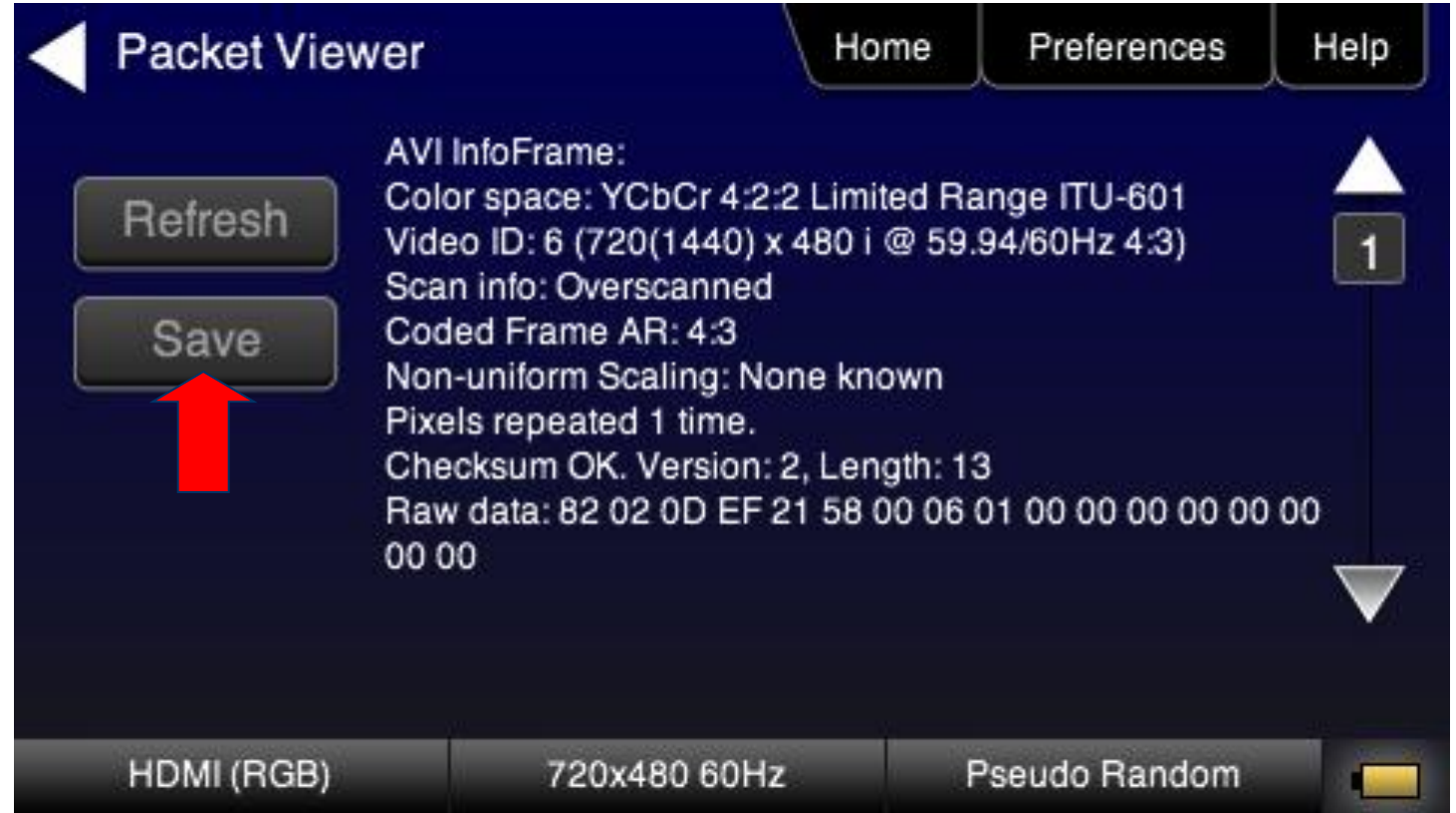
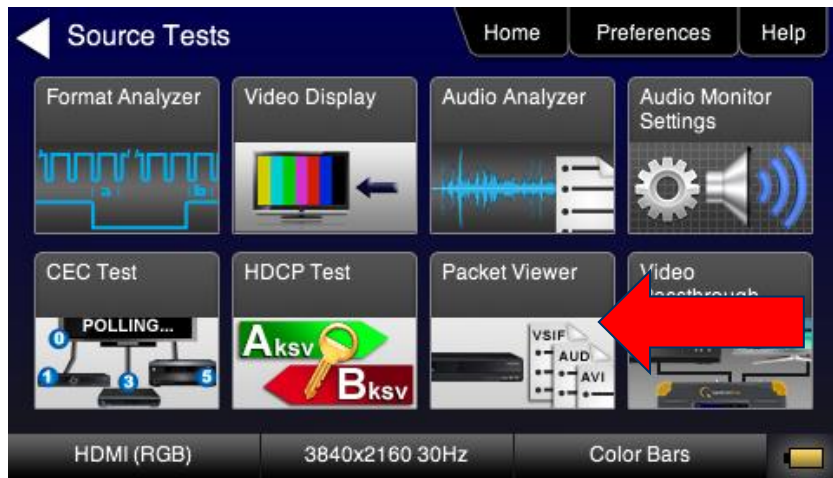


The EDID Test reads EDID data from a sink device. Use the EDID obtained from connected display on the 780 Rx port to emulate that display



Emulate a standard EDID from a TV or AVR on the 780 Rx port.

Network Analyzer – Source Packet Viewer

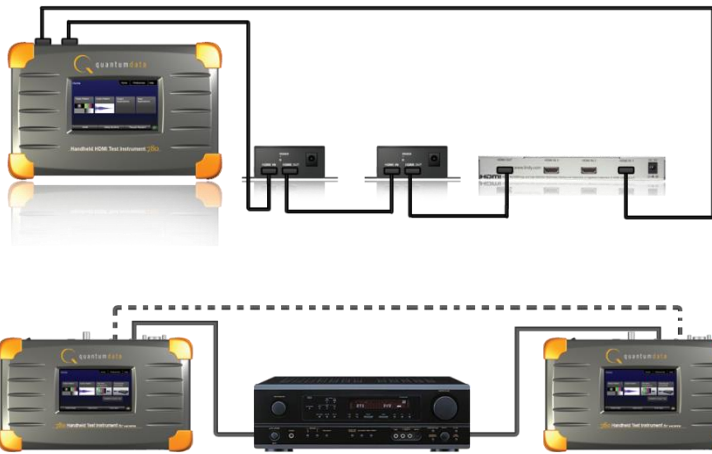


The Packet Viewer tool allows the user to view the data contained within many common types of packets such as InfoFrames, ACP/ISRC packets, and xvYCC gamut metadata.

Save packet data to a file for dissemination to colleagues

780 Test Configurations Recap

HDMI Cable/Link and loop Test Functions



HDMI Source Test Functions



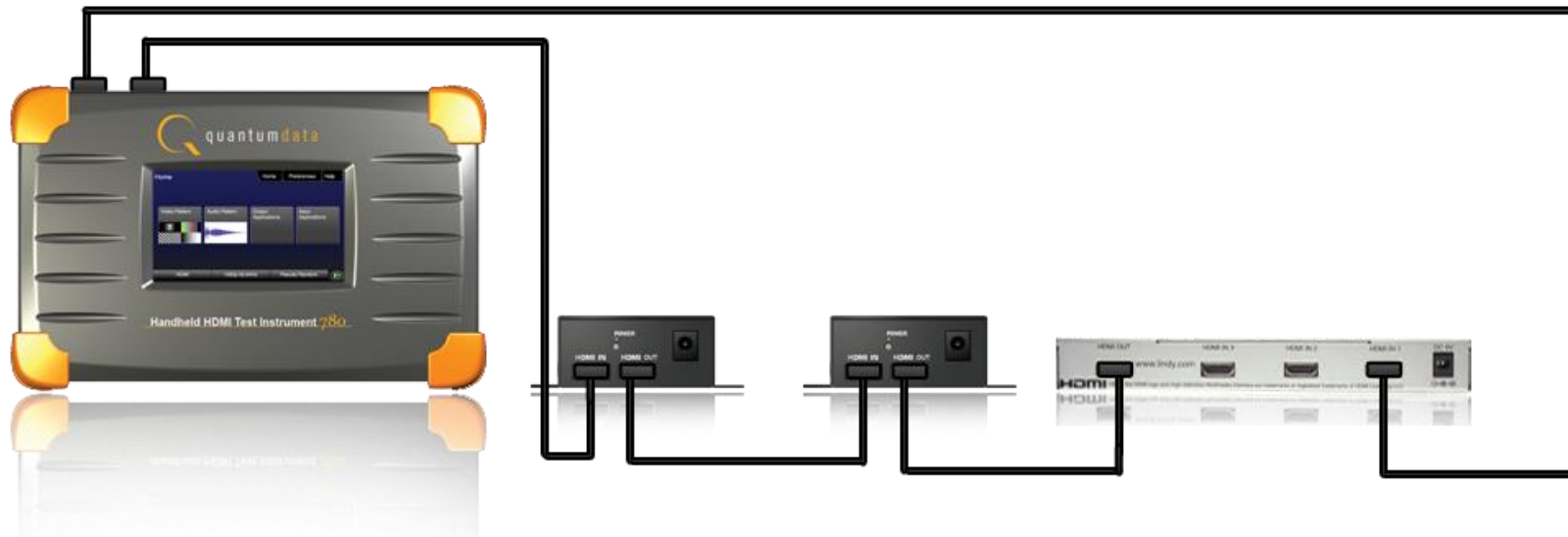
HDMI Sink Test Functions



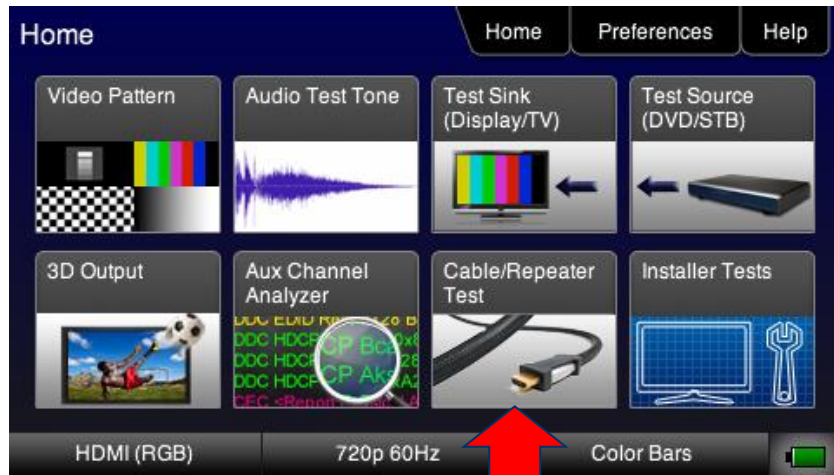
Cable and Link Test Option

780/780A HDMI Cable & Link Test Option

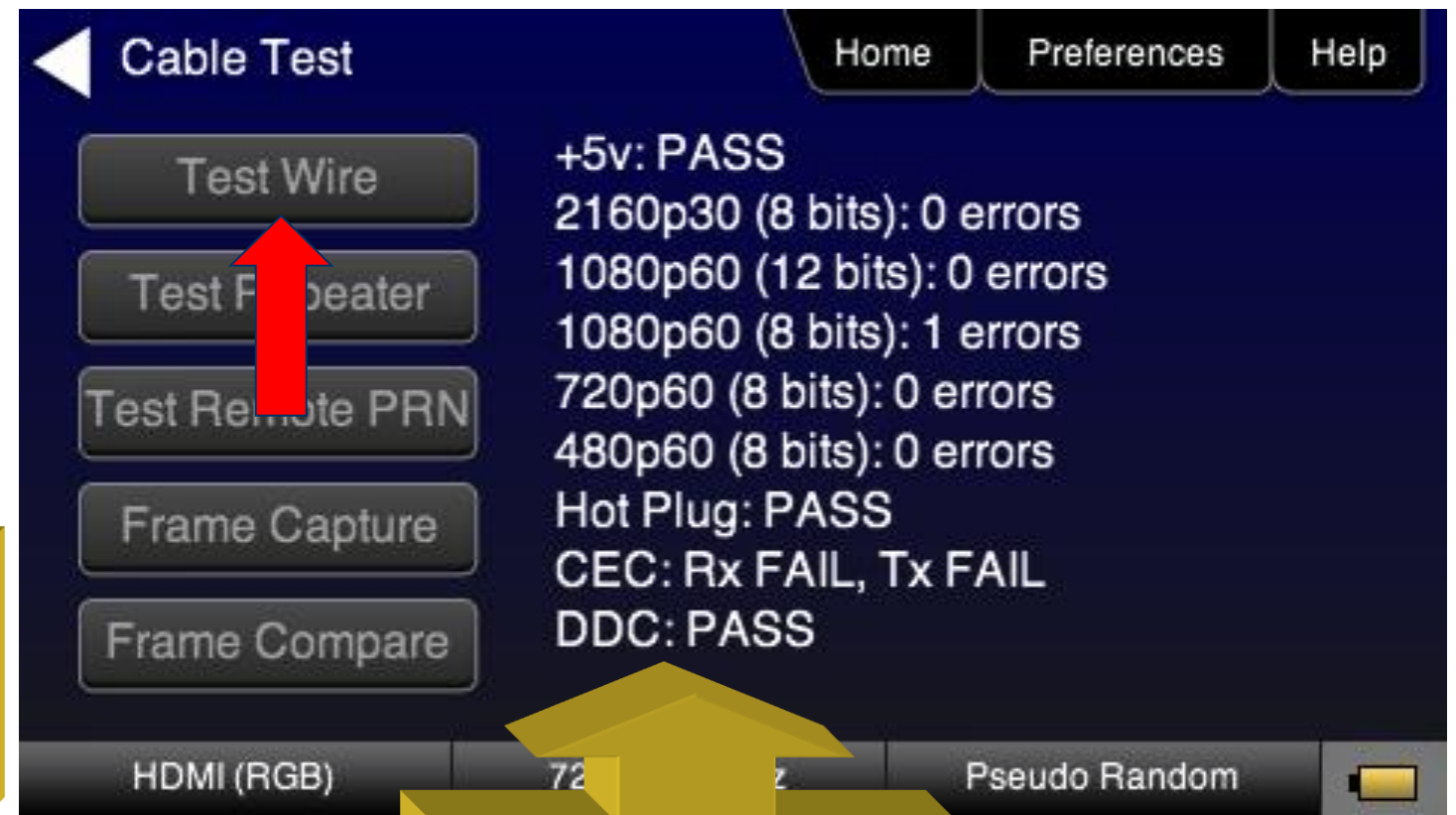
- HDMI Cable and Link (Repeater) Test Option:
 - Tests for video errors using pseudo random noise pattern
 - Tests video at 480p (8bits), 720p (8bits), 1080p (8bits and 12bits).
 - Tests Hot plug & +5V
 - Tests DDC for proper communication



HDMI Cable Test



A basic test for HDMI cable quality is provided. The test is based on a Pseudo Random Noise image that is generated on the Tx and received at the Rx. Every pixel sent should be received or errors are reported.



Test Cables
Test for pixel errors on TMDS at multiple timings (up to 4K resolutions for 780A)
Check continuity on auxiliary data channels

HDMI Repeater Test



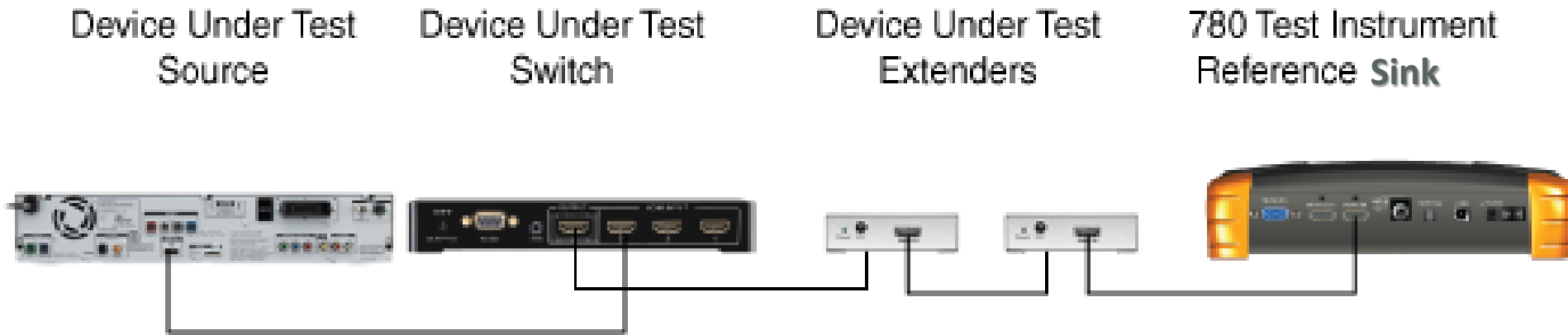
A basic test for HDMI cable quality is provided. The test is based on a Pseudo Random Noise image that is generated on the Tx and received at the Rx. Every pixel sent should be received or errors are reported.



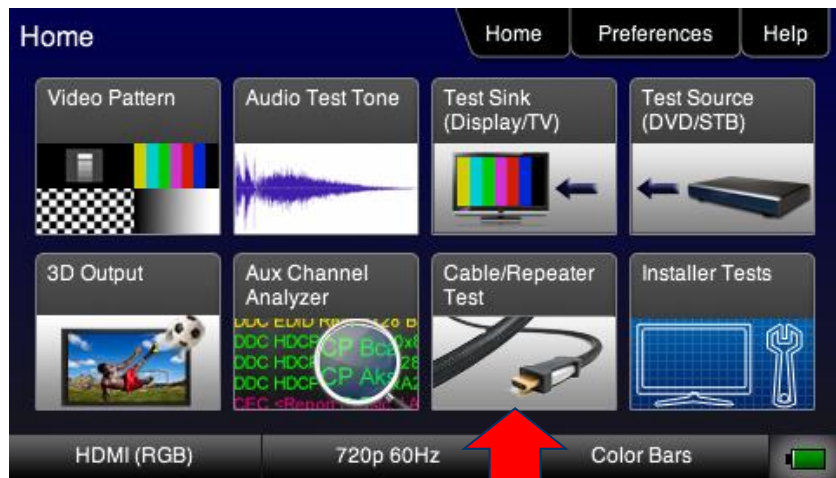
Test Repeaters
Test for pixel errors on TMDS at multiple timings. (up to 4K resolutions for 780A)
Check continuity on auxiliary data channels and measures hot plug delay and pulse width.

HDMI Frame Compare Test

- HDMI Frame Compare Test Option:
 - Tests for video errors using pixel error tests
 - Capture reference frame from network and compare subsequent captured frames.



HDMI Frame Compare Test



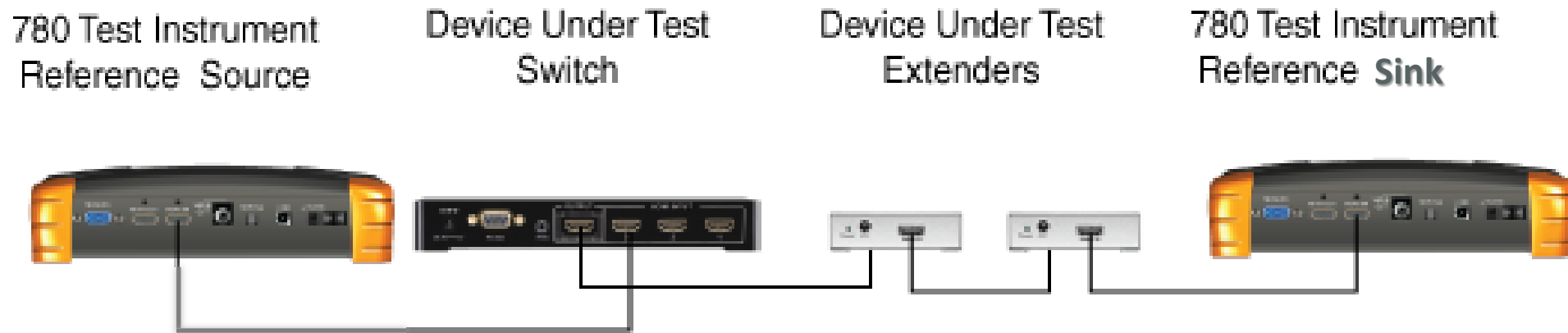
A basic test for HDMI distribution system or cable once installed on site. The test captures a "reference frame" and then compare subsequent frames captured to it.



Test Distribution Networks
Test for pixel errors on TMDS on installed networks..

HDMI Remote PRN Test

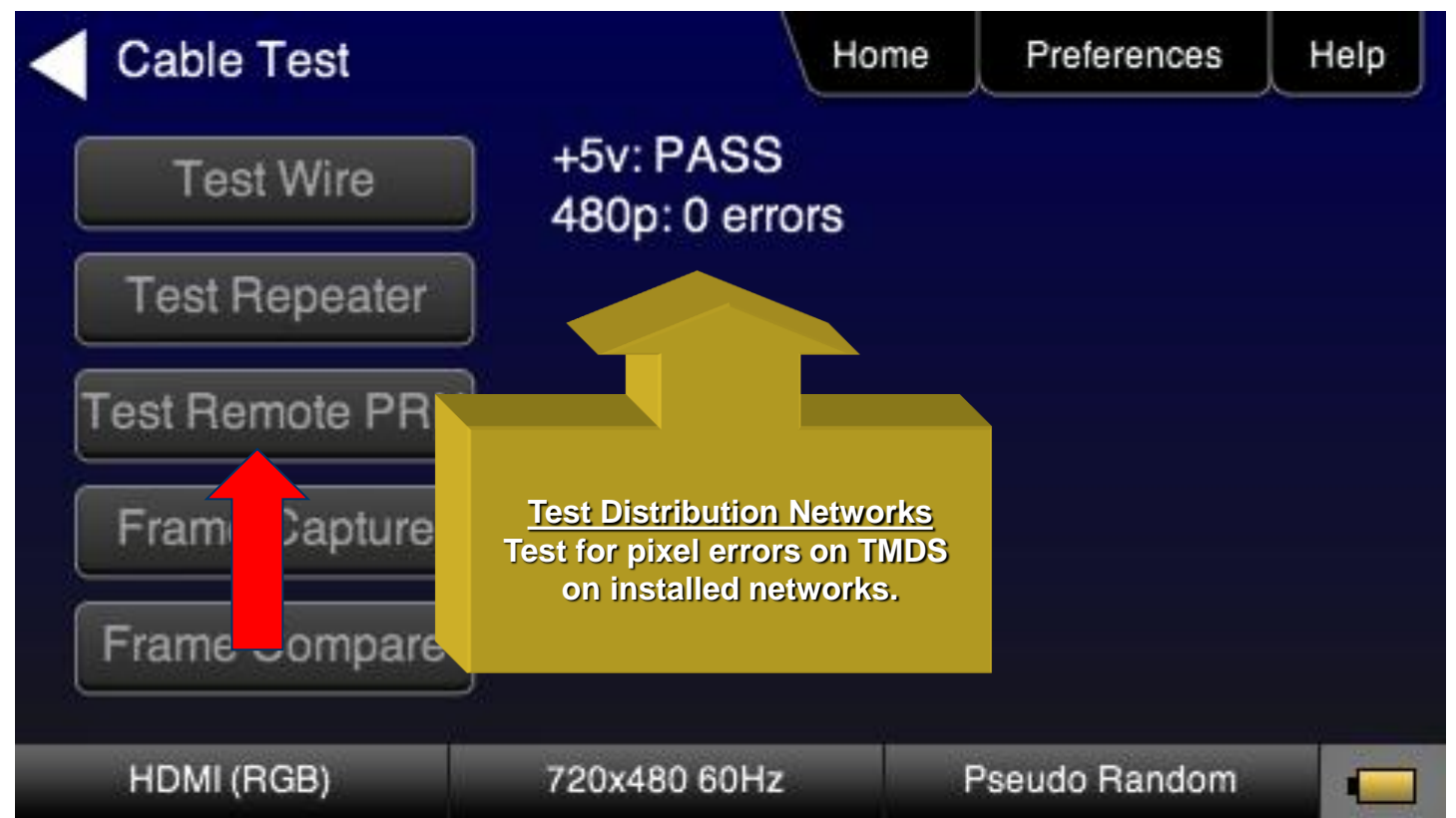
- HDMI Remote PRN Test:
 - Tests for video errors through HDMI distribution network with full control over source.
 - Requires two (2) 780 Test Instruments.



HDMI Remote PRN Test



A basic test for HDMI distribution system or cable once installed on site. The test captures a "reference frame" and then compare subsequent frames captured to it.



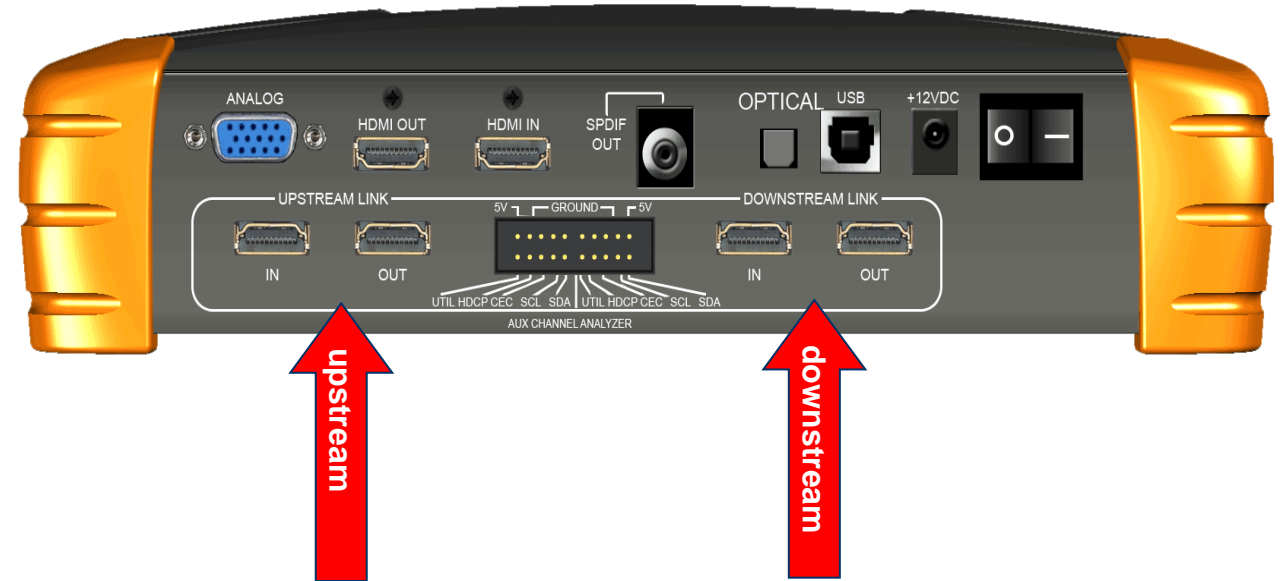
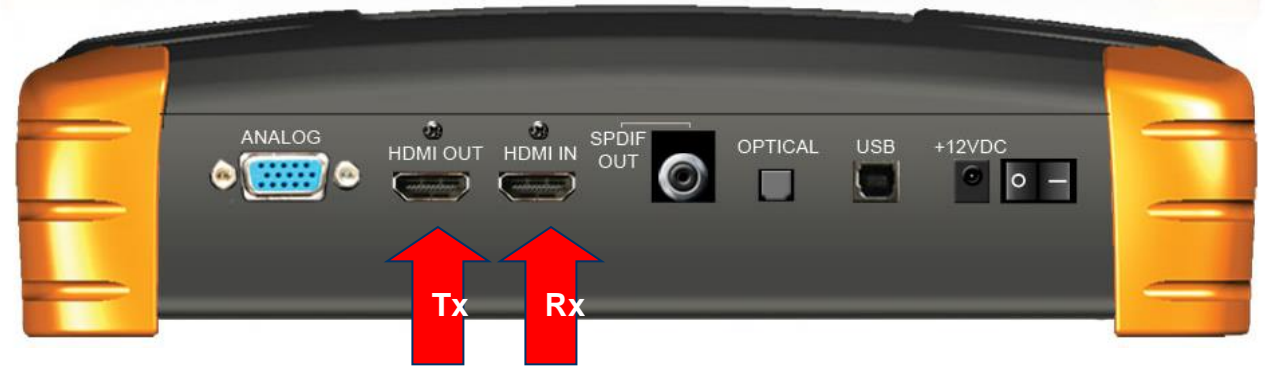
Auxiliary Channel Analyzer Option

Quantum Data 780/780A Auxiliary Channel Analyzer

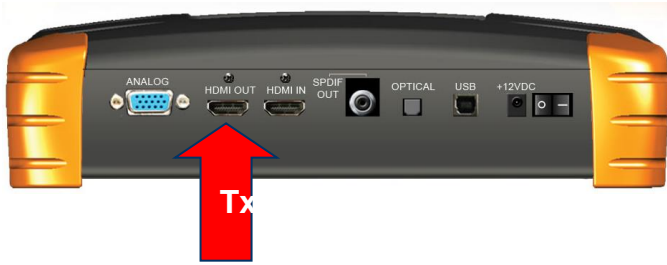
- Auxiliary Channel Analyzer (ACA); two options:
 - Option 1 - Emulation Monitoring:
 - Hot plug events
 - HDCP transactions
 - EDID transactions
 - CEC messages
 - Option 2 - Passive (includes Emulation) Monitoring:
 - Hot plug events
 - 5 volt supply
 - HDCP transactions
 - EDID transactions
 - CEC messages

(Optional) Aux Channel Analyzer (ACA) - Configurations

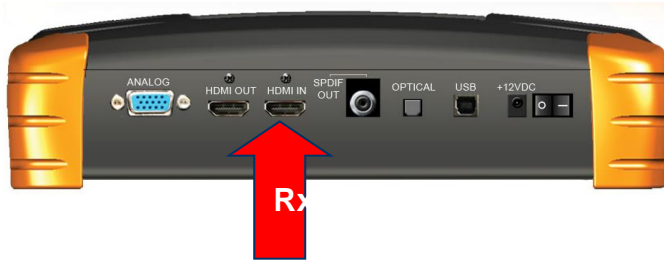
- Emulation Configuration:
 - Tx and Rx ports
 - Monitors DDC, hot plug, CEC while emulating a source and/or a sink device
- Passive Configuration:
 - In addition to Emulation Configuration, adds two (2) Upstream monitoring ports and two (2) downstream monitoring ports
 - Monitors DDC, hot plug/+5V and CEC, while passively monitoring source, repeater and sink devices



Aux Channel Analyzer – Emulation Monitoring



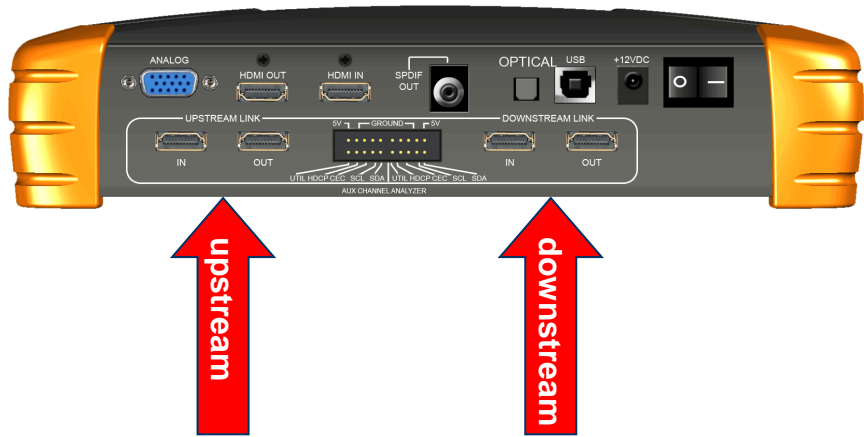
Emulate an HDMI source and monitor DDC traffic, hot plug events and CEC messages with AVR input port



Emulate an HDMI source and sink and monitor DDC traffic, hot plug events and CEC messages with AVR input port



Aux Channel Analyzer – Passive Monitoring



upstream

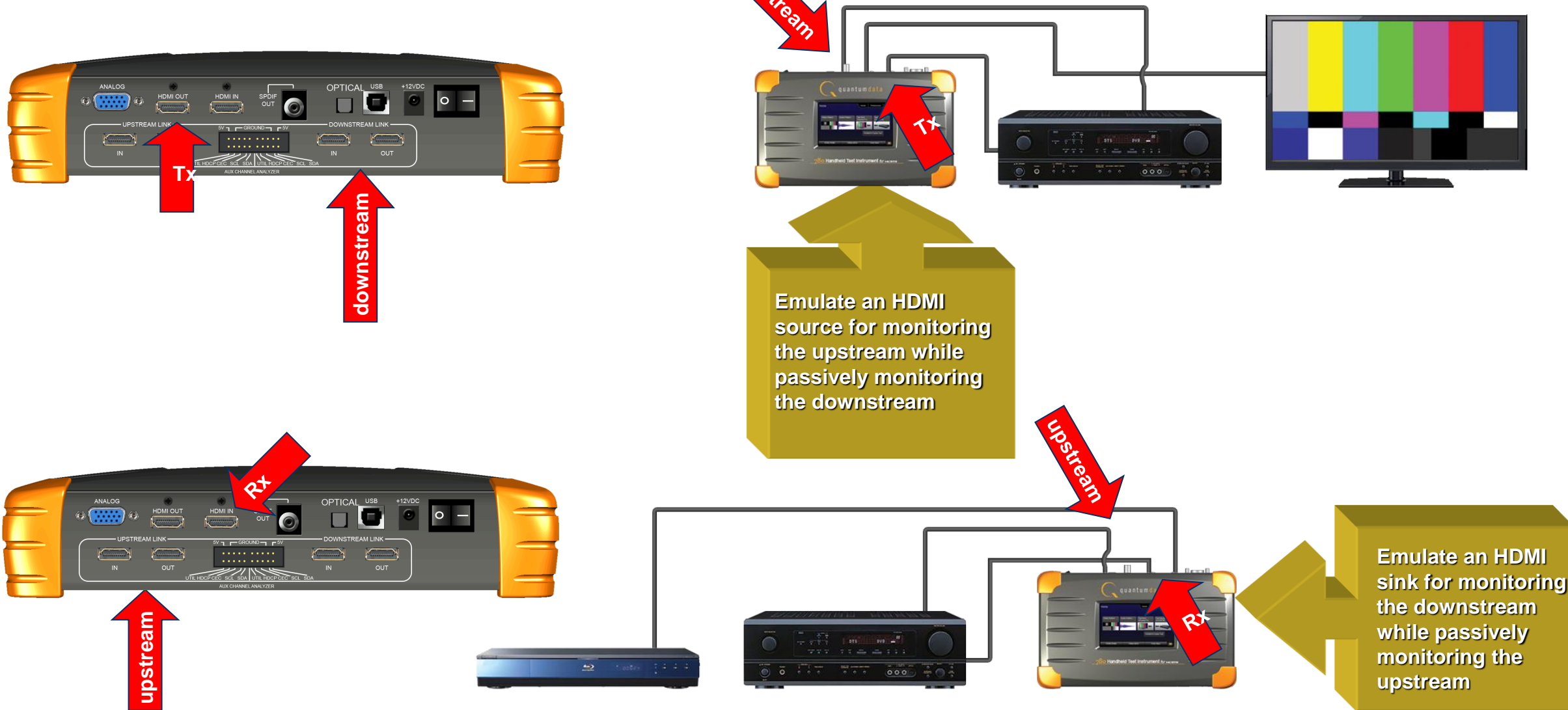
downstream



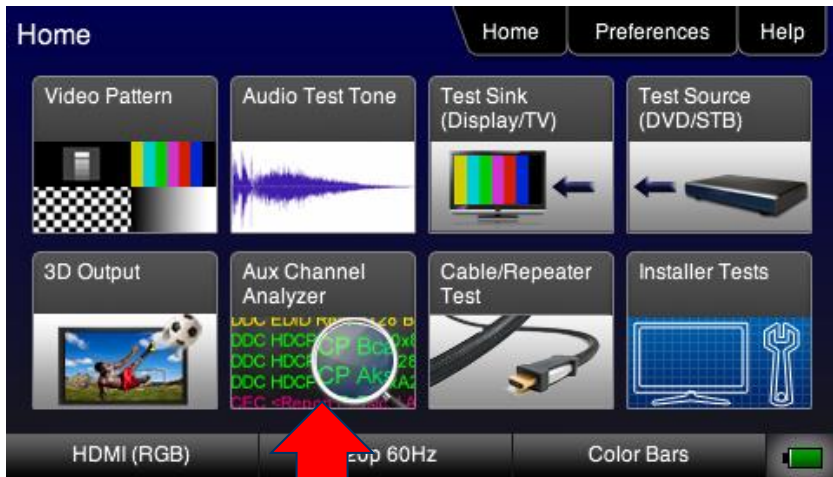
Passively monitor a source, repeater on upstream and repeater, sink on the downstream side



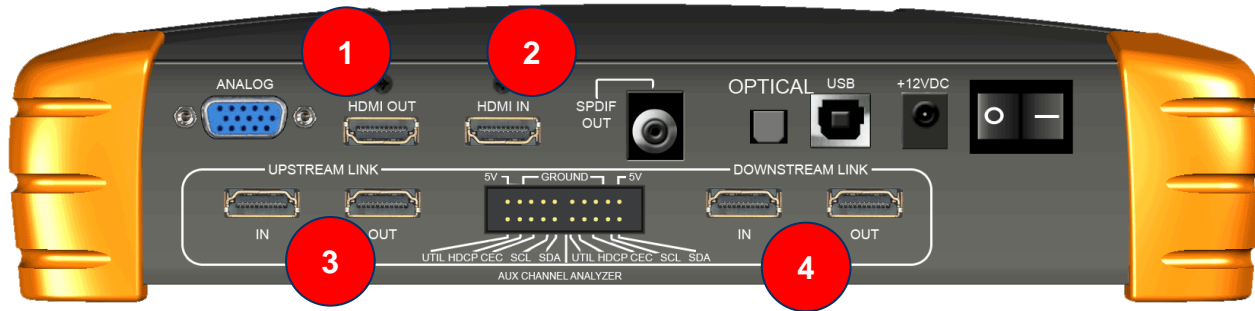
Aux Channel Analyzer – Emulation & Passive Monitoring



Aux Channel Analyzer – Operation (DDC & HPD)



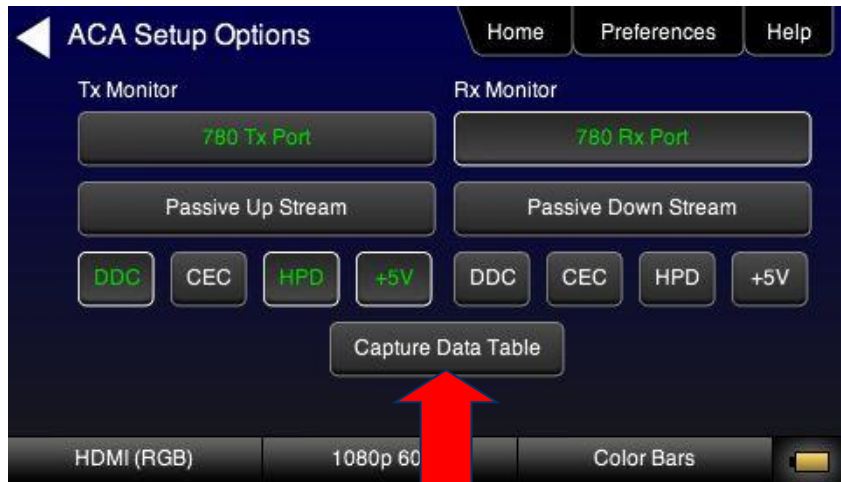
Aux Channel Analyzer Operation – Setup Capture



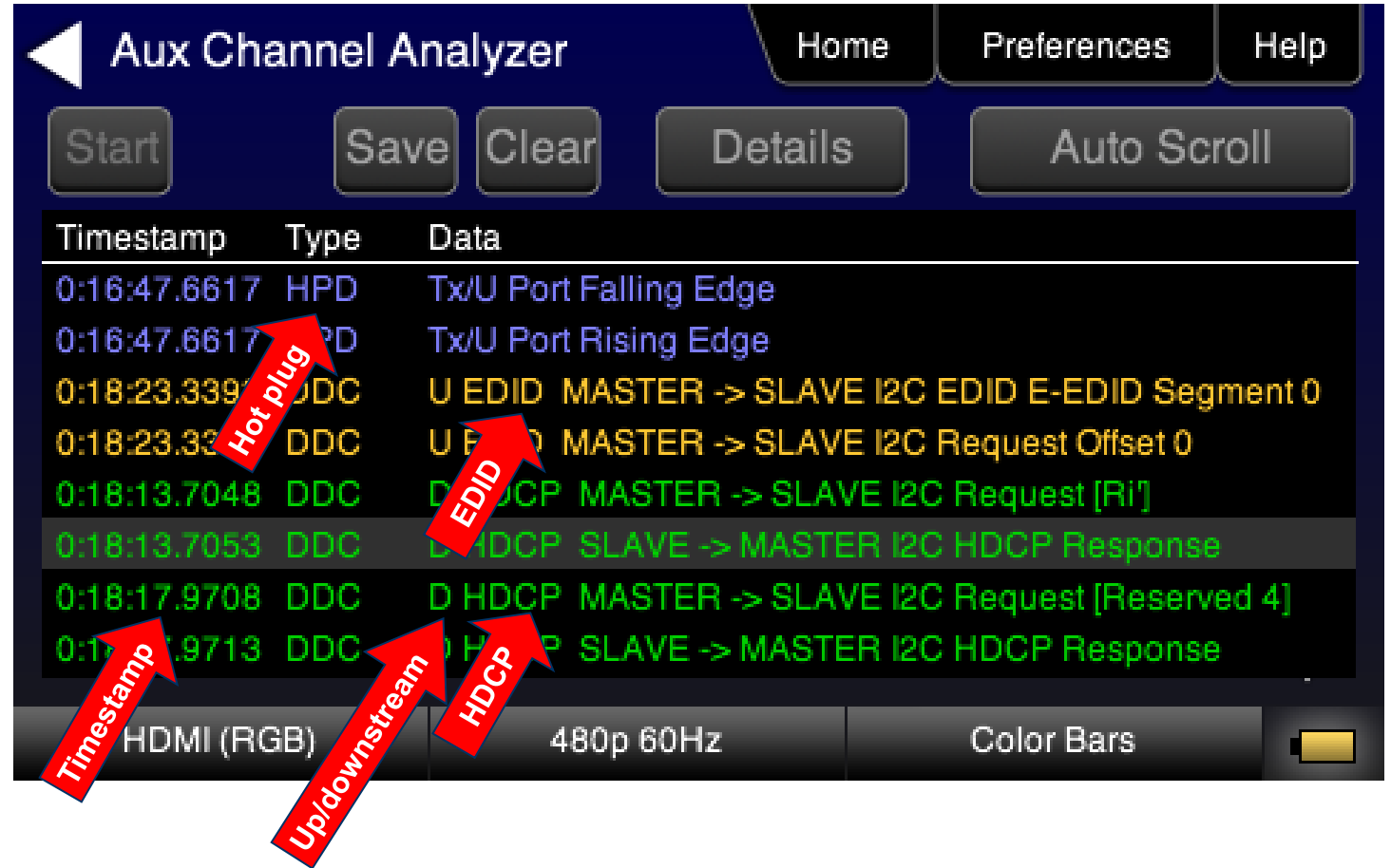
Monitor DDC while emulating a source or a sink at 1 and 2.
Monitor passively DDC using the 4 additional and optional HDMI ports at 3 and 4



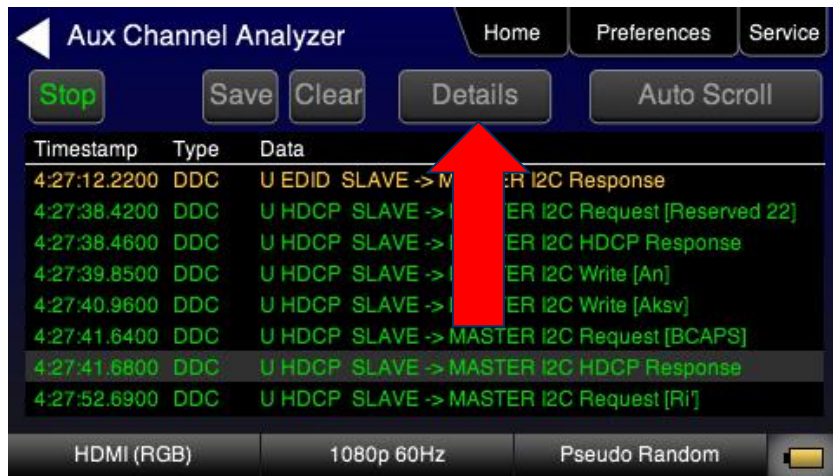
Aux Channel Analyzer Operation – View Trace



Use Capture Data Table button to begin capturing.



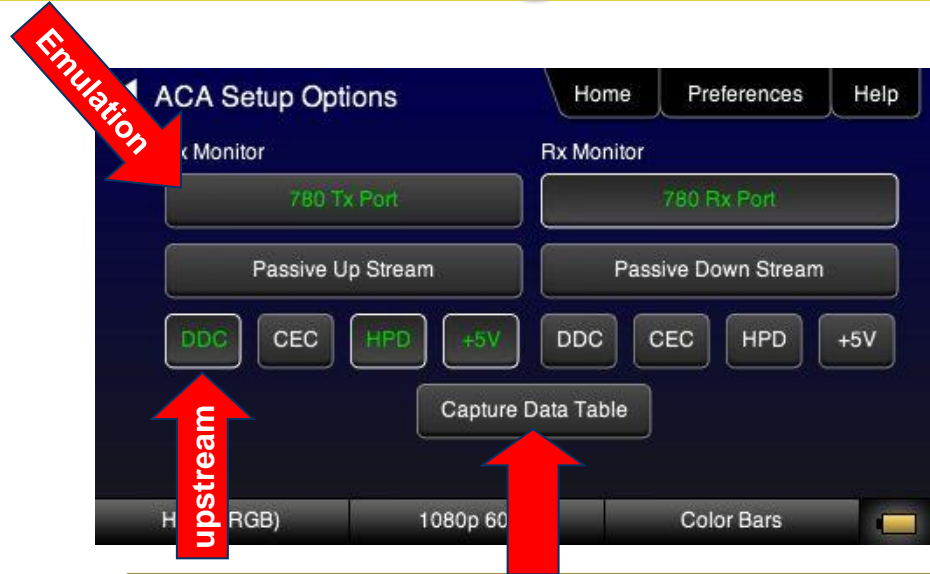
Aux Channel Analyzer Operation – View Details



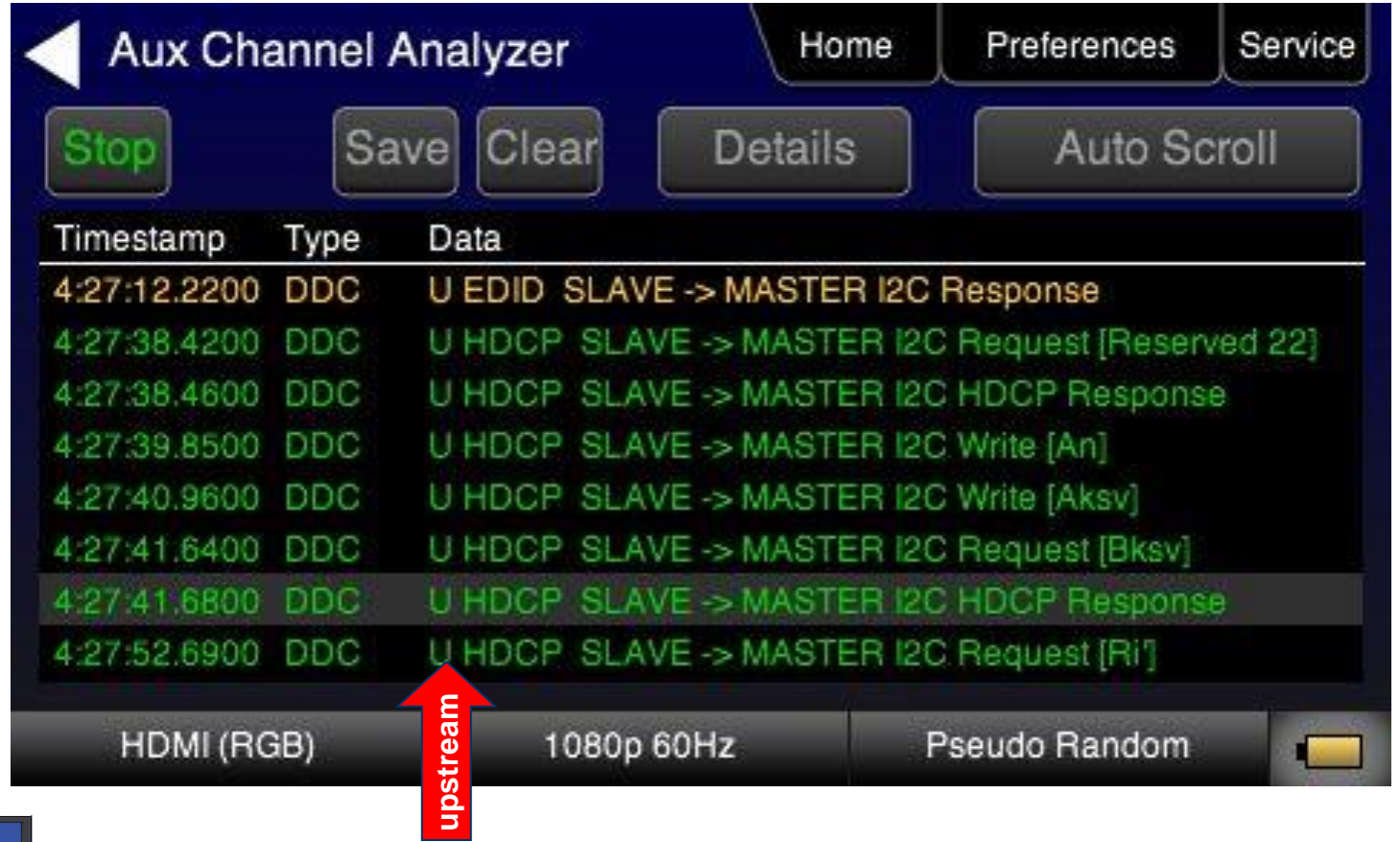
View the details of HDCP/EDID transactions in human readable text as well as raw data. An example of the HDCP Bcaps register is shown.



Emulating Source Upstream Monitoring (DDC)



Example shows capturing traces while emulating an HDMI source and monitoring upstream transactions.



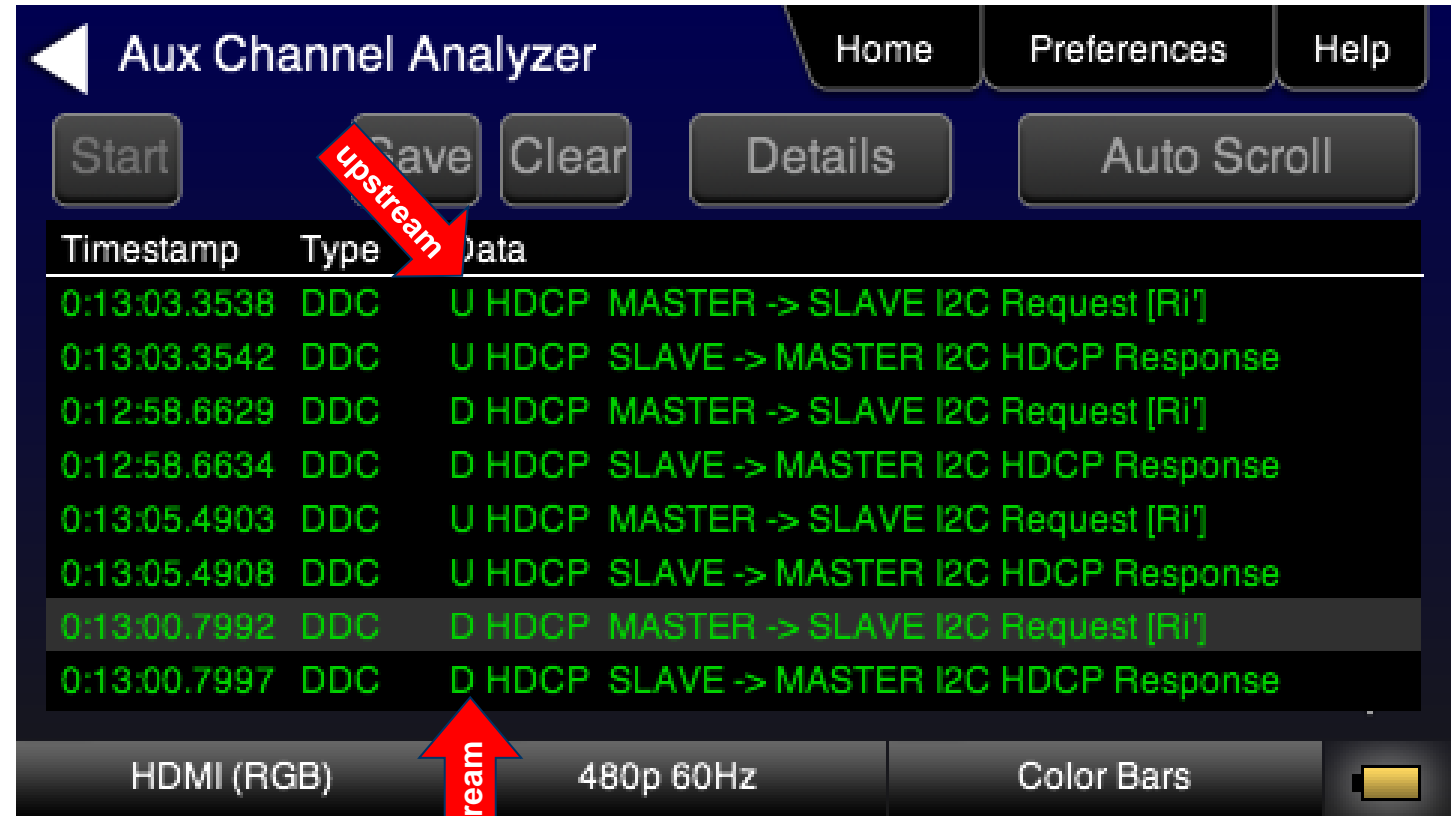
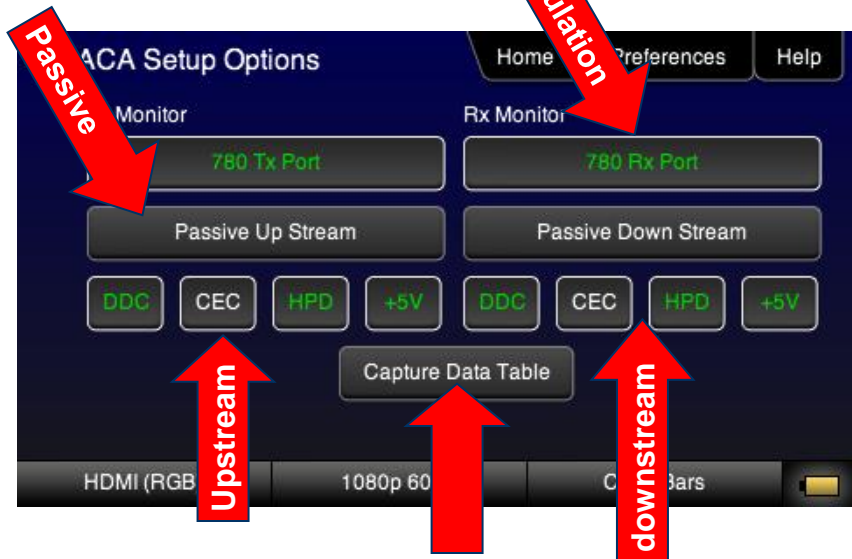
Emulating Sink Downstream Monitoring (DDC)



Example shows capturing only downstream transactions while emulating an HDMI sink device.



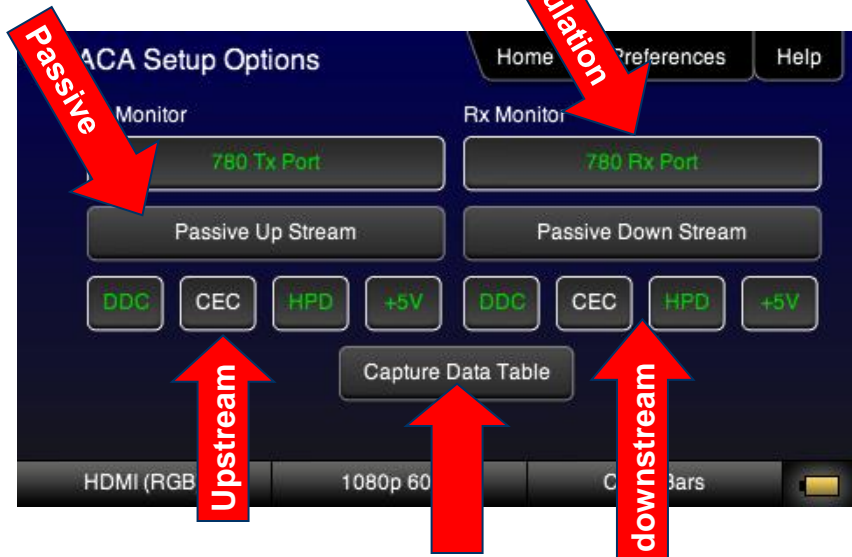
Emulation & Passive Up/Downstream Monitoring (DDC)



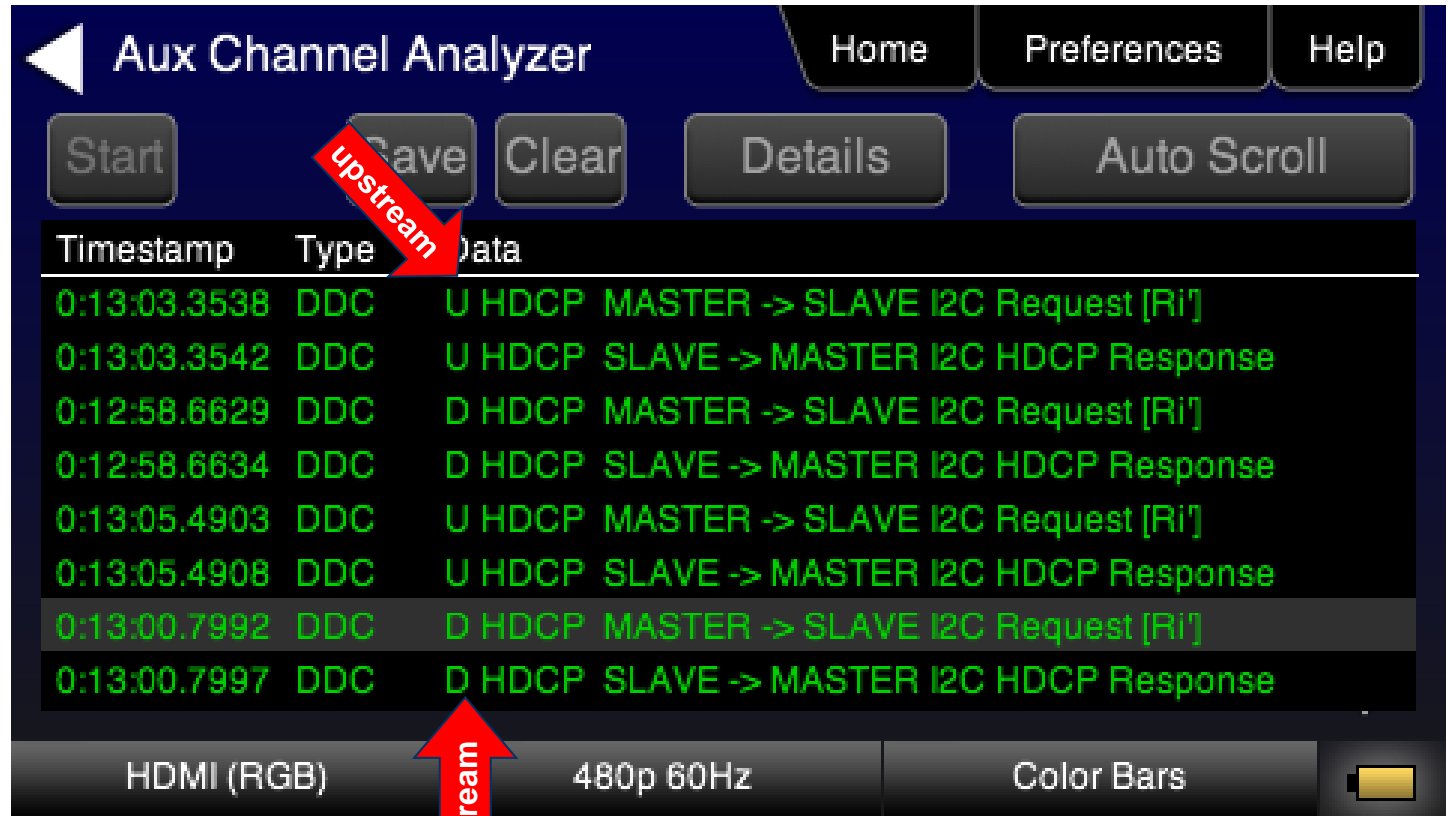
Example shows capturing upstream and downstream transactions while emulating both an HDMI sink and passively monitoring the upstream side of a repeater device.



Emulation & Passive Up/Downstream Monitoring (DDC)



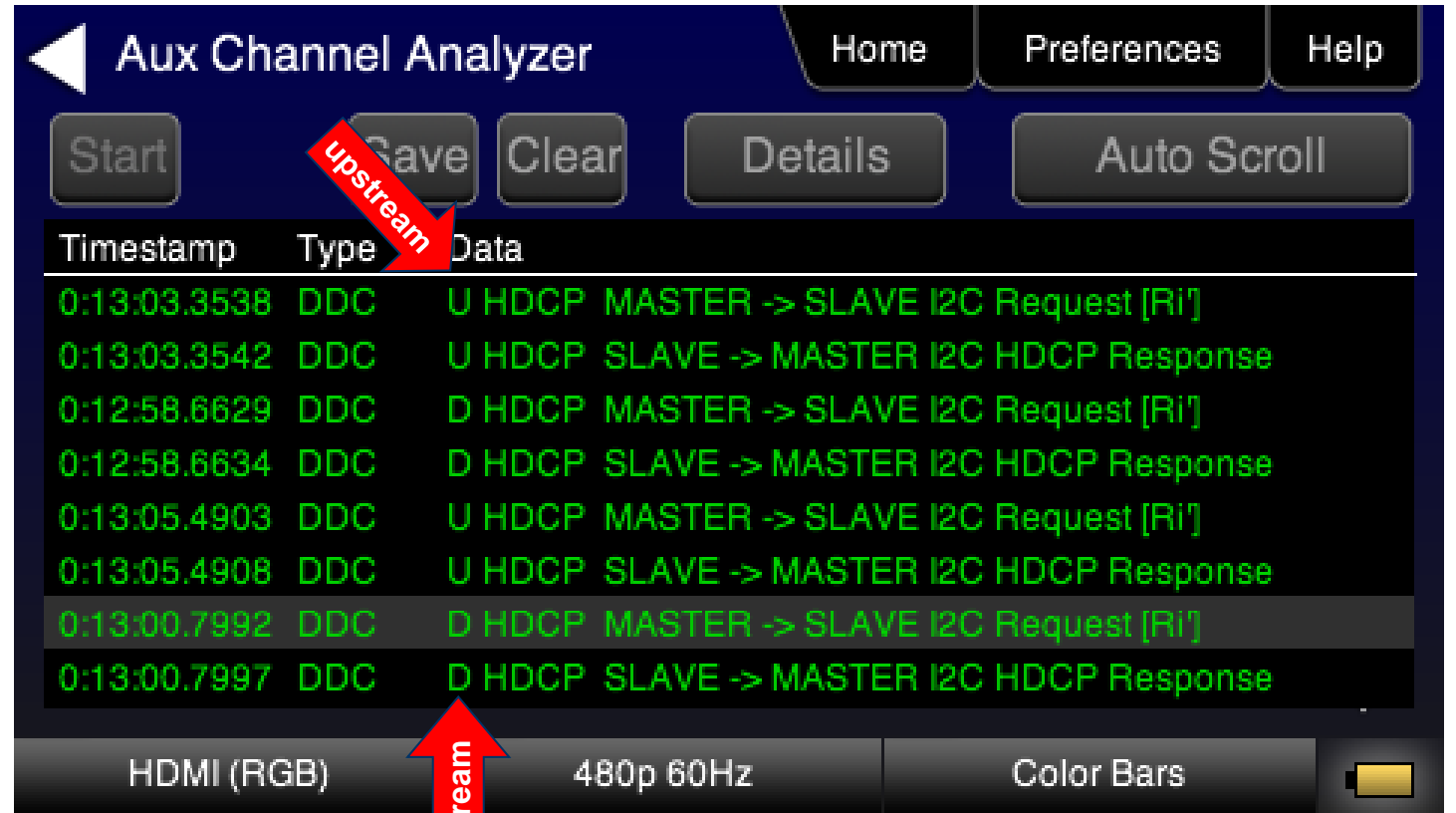
Example shows capturing upstream and downstream transactions while emulating both an HDMI sink and passively monitoring the upstream side of a repeater device.



Passive Monitoring Up/Downstream (DDC)



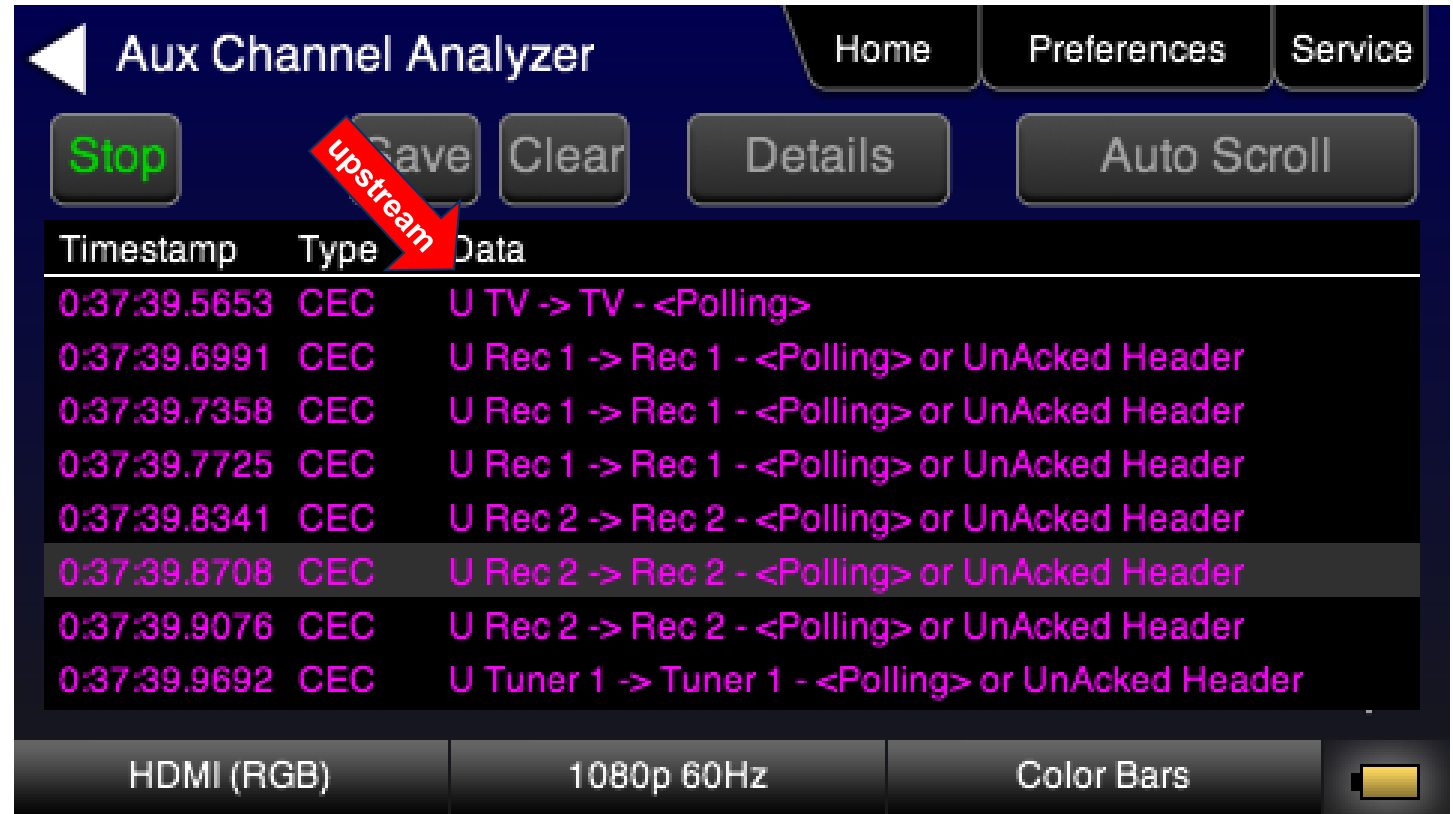
Example shows capturing upstream and downstream DDC transactions while monitoring passively on both sides of a repeater device.



Monitoring Upstream (CEC Messages)



Example shows upstream CEC messages.



Monitoring Upstream (CEC Details)

Aux Channel Analyzer

Home Preferences Service

Stop Save Clear Details Auto Scroll

Timestamp	Type	Data
0:37:39.5653	CEC	U TV -> TV - <Polling>
0:37:39.6991	CEC	U Rec 1 -> Rec 1 - <Polling> or UnAcked Header
0:37:39.7358	CEC	U Rec 1 -> Rec 1 - <Polling> or UnAcked Header
0:37:39.7725	CEC	U Rec 1 -> Rec 1 - <Polling> or UnAcked Header
0:37:39.8341	CEC	U Rec 2 -> Rec 2 - <Polling> or UnAcked Header
0:37:39.8708	CEC	U Rec 2 -> Rec 2 - <Polling> or UnAcked Header
0:37:39.9076	CEC	U Rec 2 -> Rec 2 - <Polling> or UnAcked Header
0:37:39.9692	CEC	U Tuner 1 -> Tuner 1 - <Polling> or UnAcked Header

HDMI (RGB) 1080p 60Hz Color Bars

Upstream

Example shows details of CEC message.



Aux Channel Analyzer

Home Preferences Service

Stop Save Clear Details Auto Scroll

Size of message: 1 bytes (11 bits total)
Message source: TV (0x0)
Message destination: TV (0x0)
Message opcode: None <polling>

Bit Timing:

Num	Lo(us)	Hi(us)	Inv	Dat	Val
0	3730	770	--	N	S
1	1530	860	--	Y	O

HDMI (RGB) 1080p 60Hz Color Bars

1

Aux Channel Analyzer Operation – Save Trace

The image shows the 'Aux Channel Analyzer' interface. On the left, a table displays trace data with columns for 'Timestamp', 'Type', and 'Data'. A red arrow points to the 'Save' button. A yellow callout box with an arrow points to the text 'MyACA.txt' on the virtual keyboard. The keyboard is a standard QWERTY layout with a 'Backspace' key and an 'Enter' key. The interface also shows 'HDMI (RGB)', '1080p 60Hz', and 'Color Bars' at the bottom.

Timestamp	Type	Data
2:43:50.5600	DDC	D HDCP SLAVE -> MASTER I2C HD
2:50:57.2300	DDC	D HDCP SLAVE -> MASTER I2C HD
2:42:48.2100	HPD	HPD Port Falling Edge
2:54:17.1900	HPD	HPD Port Rising Edge
2:29:37.1600	DDC	D HDCP SLAVE -> MASTER I2C HDCP Response
2:54:30.0500	DDC	U EDID SLAVE -> MASTER I2C EDID E-EDID Segment 0
2:47:23.8700	DDC	D HDCP SLAVE -> MASTER I2C Request [Ri]
2:54:30.0900	DDC	U EDID SLAVE -> MASTER I2C Request Offset 0

Virtual Keyboard

Home Preferences Service

< Backspace

0 1 2 3 4 5 6 7 8 9

Q W E R T Y U I O P

A S D F G H J K L

Z X C V B N M Enter

HDMI (RGB) 1080p 60Hz Color Bars

Enter name for trace file using keypad

MyACA.txt

Aux Channel Analyzer Operation – Import Trace to ACA



Number	Err	Time since Boot	Delta Time	Speed (kHz)	Dir	Source	Type	Details
2		00:02:53.8097	00:00:00.0000	96.19	MSTR ->	I2C	HDCP	READ Ri'
6		00:02:53.8101	00:00:00.0004	96.19	SLAVE ->	I2C	HDCP	REPLY Ri' = DC EF
8		00:02:55.9425	00:00:02.1324	96.19	MSTR ->	I2C	HDCP	READ Ri'
12		00:02:55.9429	00:00:00.0004	96.19	SLAVE ->	I2C	HDCP	REPLY Ri' = 60 54
13		00:02:57.0974	00:00:01.1545			Hotplug	HOTPLUG	\ FALLING edge
14		00:02:58.0804	00:00:00.9830			Hotplug	HOTPLUG	/ RISING edge
16		00:02:58.0921	00:00:00.0117	96.19	MSTR ->	I2C	EDID	E-EDID Segment 00
18		00:02:58.0924	00:00:00.0003	96.19	MSTR ->	I2C	EDID	Request @ ofs 00
148		00:02:58.1100	00:00:00.0176	96.19	SLAVE ->	I2C	EDID	Response
150		00:02:58.1419	00:00:00.0319	96.19	MSTR ->	I2C	EDID	E-EDID Segment 00
152		00:02:58.1422	00:00:00.0003	96.19	MSTR ->	I2C	EDID	Request @ ofs 128
282		00:02:58.1595	00:00:00.0173	96.19	SLAVE ->	I2C	EDID	Response
284		00:03:02.3703	00:00:04.2108	96.19	MSTR ->	I2C	HDCP	READ Bcaps
287		00:03:02.3706	00:00:00.0003	96.19	SLAVE ->	I2C	HDCP	REPLY Bcaps = 80
298		00:03:02.4486	00:00:00.0780	96.19	MSTR ->	I2C	HDCP	WRITE An = 4F 52 4E A6 58 F8 1B 83
306		00:03:02.4884	00:00:00.0398	96.19	MSTR ->	I2C	HDCP	WRITE Aksv = 8E 4F AA 33 8A
308		00:03:02.5297	00:00:00.0413	96.19	MSTR ->	I2C	HDCP	READ Bksv
815		00:03:02.5305	00:00:00.0008	96.19	SLAVE ->	I2C	HDCP	REPLY Bksv = 08 B7 E4 B3 55

Details
I2C Message Details

Time since last reset: 00:03:02.3705
Total message time: 0.1 msec
Maximum I2C transfer speed: 96.19 kbps
The master read the following data:
Register 0x40 (Bcaps (HDCP B Capability Bits)) = 0x80
REPEATER: 0
READY: 0
FAST: 0
1.1 FEATURES: 0

Data
Data Size: 4 packets
* START *
0000 75 80- | u .
* STOP *

Connected to 192.168.254.218: 4 DDC, 3 CEC, 0 DisplayPort Aux Channel devices available for monitoring | 338 packets (26 shown)

Send 780 traces to subject matter experts & colleagues for examination. ACA application can be downloaded from Quantum Data website.

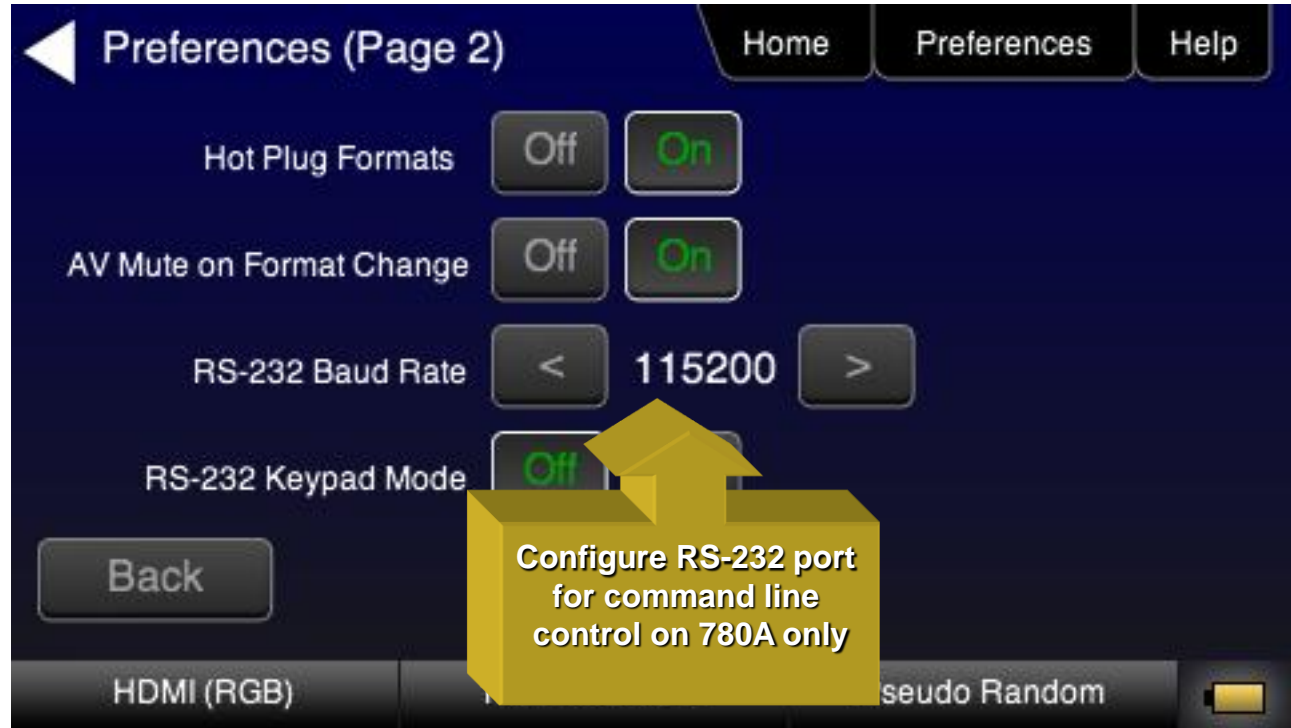
Command Line Control – USB or RS-232 (780A)



USB port for
command line control

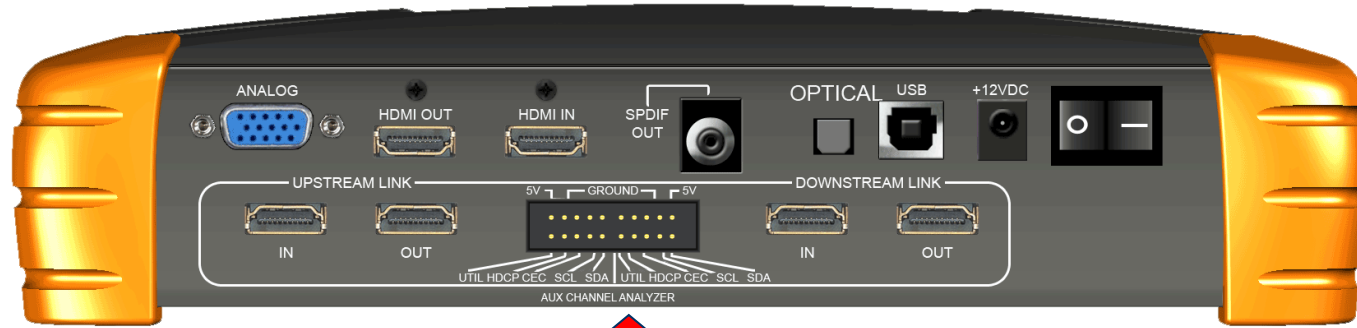


RS-232 port for
command line control
on 780A only

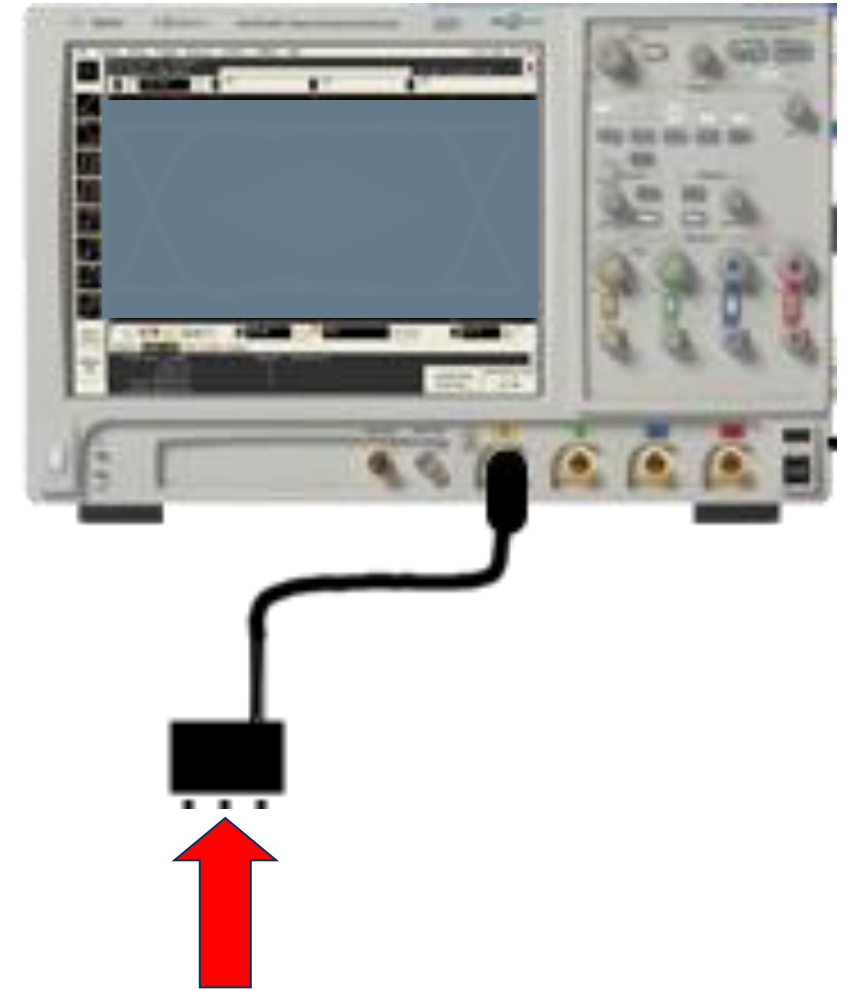


Configure RS-232 port
for command line
control on 780A only

Aux Channel Analyzer (ACA) – Header pins



Monitor physical parameters of the DDC, CEC, Hot plug, +5v and HEAC pins directly with third party instruments.



Quantum Data 780 Video Test Instrument

The Quantum Data 780 Video Test Instrument, a tool designed as a complete HDMI test solution. Easy to use, smart, portable and inexpensive.

