980 HDMI 2.0 PROTOCOL ANALYZER MODULE OPERATING UP TO 600MHZ PIXEL RATE!

The 980 HDMI 2.0 Protocol Analyzer module supports analysis of HDMI 2.0 streams up to character rates of 600MHz (6Gbps data rate) which supports testing of HDMI 2.0 4K Ultra HD sources at 50/60Hz. The module provides full visibility into the HDMI protocol, metadata, timing, control data and can fully emulate the EDID and HDCP—HDCP 2.2 functions of an HDMI 2.0 6G sink. The 980 HDMI 2.0 Protocol Analyzer module can be equipped in the Quantum Data 980B or 980R Advanced Test Platforms (ATP).

ANALYSIS - DIAGNOSING INTEROPERABILITY ISSUES

The 980 HDMI 2.0 Protocol Analyzer module captures and decodes metadata, protocol data, audio sample, infoframes and other data islands. The 980 captures all data islands and control packets with accurate timestamps even when they are transmitted in rapid succession. You can then analyze the data to identify and resolve interoperability problems early in a product's life cycle.

Once the data is captured, the 980 GUI Manager presents the data in an easy to understand way through its graphical user interface. You can filter and search through the captured data by data element type.

HDMI 2.0 COMPLIANCE

The 980 HDMI 2.0 Protocol Analyzer module supports HDMI 2.0 source compliance testing for sections 7.2 (Protocol), 7.4 (Timing), 7.7 (AVI InfoFrame and GCP) tests. Solution is ideal for pre-testing and self-testing (where permitted) and shortens time to market and reduces costs. Some of the compliance test IDs are approved by HDMI Forum.

REAL TIME MODE

The Real Time mode enables you to view the incoming video and metadata in real time. Infoframes and other data islands, control, timing data, HDCP and EDID transactions can all be viewed in real time. You can observe changes in these data as changes are made in the source device.

DATA PORTABILITY

The captured data can be stored permanently and disseminated to subject matter experts and colleagues at other locations. The 980 instrument is not required to view captured data. The data can be viewed through the 980 GUI Manager which is available from the Quantum Data website.

980 GUI MANAGER

The 980 HDMI 2.0 Protocol Analyzer module can be controlled either through the PC-based 980 GUI Manager or through the embedded 980 GUI Manager running on the 980 platform itself. The 980's built-in color touch screen provides a graphical user interface (GUI) to control the module.

980 HDMI 2.0 Protocol Analyzer module
Datasheet – Rev A11 – 8/5/2015

MAIN FEATURES

HDMI 2.0 sink emulation – Full emulates an HDMI 2.0 6G sink device including EDID and HDCP 2.2.

HDMI 2.0 compliance testing – You run compliance tests on your HDMI 2.0 source devices up to 600MHz pixel rate.

Data island decoding - Decodes all metadata, control data, data islands, infoframes and auxiliary channel data, etc. Decodes audio sample packets—including the Channel Status Bits, and audio clock regeneration packets.

DDC data decoding – Decodes DDC transactions including EDID reads and HDCP authentication and displays in table form (Data Decode window).

Graphical depiction of data – Displays captured data elements graphically in a timeline (Event Plot) to enable quick insights into the sequence of data in the HDMI stream and arrangements between data elements.

View detailed timing – The Timing Analyzer enables you to view the frame and line timing parameters and displays errors from standard timings when they occur.

View pixel data – The Video Analyzer enables you to view the video capture frames and the RGB values for each pixel.

Triggering and pre-capture filtering – Set up triggers on specific data island values and set pre-capture filtering to capture specific data. By capturing only the data necessary to your application you can capture more frames of data.

Filtering and searching data captures – You can filter on the captured data to view only the data that you are interested in viewing. And you can search through the data by data element type to find the data that you are looking for.

DDC monitoring with Auxiliary Channel Analyzer – View the DDC transactions such as HDCP authentication, EDID exchanges and SCDC register updates in real time.

Viewing video and metadata in Real Time mode – The Real Time mode will enable you to view the incoming video and metadata such as infoframes and data islands in real time from an incoming HDMI 2.0 stream.

TEST SETUP

The diagram below shows the test setup with the module installed in the 980B Test Platform. The module can be controled either through the external 980 Manager running on a host PC or the embedded 980B front panel touch display. The module can be installed in the 980R Test Platform (not shown). When installed in the 980R Quantum Data recommends using the external 980 Manager as it provide the necessary GUI real estate for viewing HDMI 2.0 captured data.
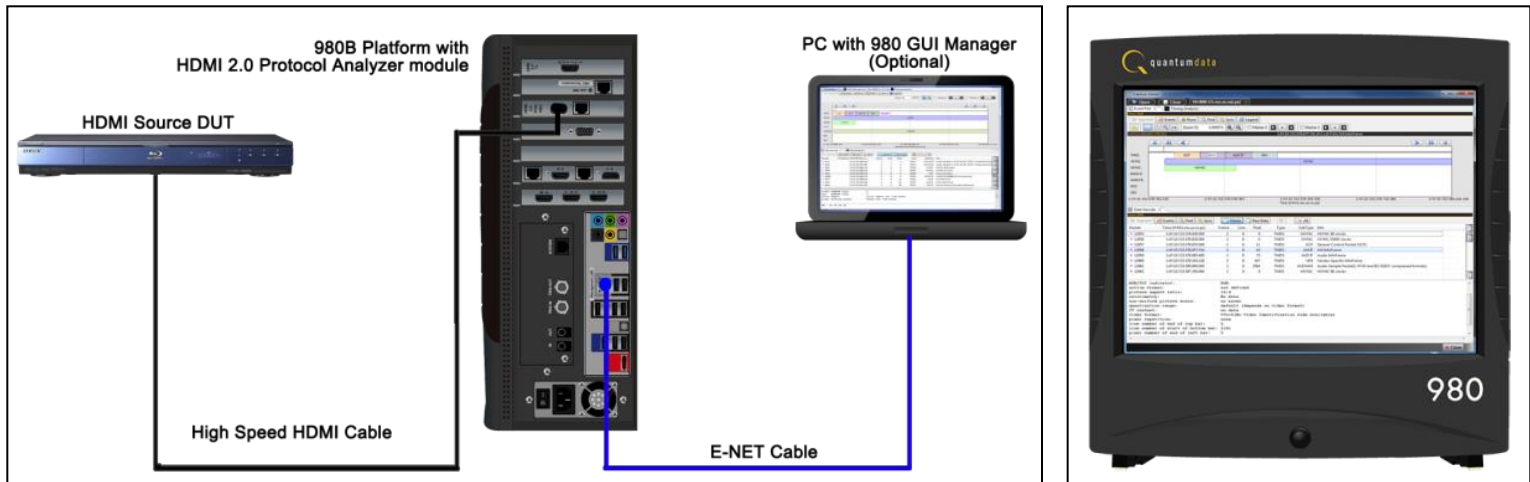
SPECIFICATIONS

The following is a list of key specifications for the 980 HDMI 2.0 Protocol Analyzer rmodule.

HDMI INPUT – ITEM	SPECIFICATION
Function	HDMI input for capture and store
Version	HDMI 2.0
HDCP	2.2
HDMI Connector	(1) Type A Rx
HEAC Connector	RJ45
Video Colorimetry	ITU-R BT.601-5, ITU-R BT.709-5
Video Max Pixel Rate	600MHz (6.00Gbps TMDS rate)
Color Depths	8, 10, 12 bits/component
Video Encoding	RGB, YCbCr
Video Sampling Modes	4:4:4, 4:2:2, 4:2:0 per HDMI 2.0
Audio – Formats	LPCM, Dolby (DD, DD+ TrueHD), DTS (ES, HD, Master Audio)
Audio LPCM Settings	Sampling rates (32.0 – 192kHz) Bit per sample (16, 20, 24)
Capture memory	4Gbytes

Notes:
1. Jitter tolerance test may fail at margin of spec depending on test configuration.

OPTIONS

The following options are available with the 980 HDMI 2.0 Protocol Analyzer module.

OPTION	DESCRIPTION
HDMI 2.0 Compliance Test Package #3	**Sections 7.2 – Source TMDS Protocol**. Test IDs supported: - HF1-11 (HDMI Forum approved) - HF1-12 (HDMI Forum approved) - HF1-13 (HDMI Forum approved) - HF1-21 (HDMI Forum approved) - HF1-22 (HDMI Forum approved) **Section 7.4 Source Timing Tests.** Test IDs supported: - HF1-14 (HDMI Forum approved) - HF1-15 (HDMI Forum approved) - HF1-16 (HDMI Forum approved) - HF1-24 (HDMI Forum approved) - HF1-25 (HDMI Forum approved) - HF1-35 (HDMI Forum approved) **Section 7.7 Source AVI InfoFrame** Test IDs supported: - HF1-18 (HDMI Forum approved) - HF1-28 (HDMI Forum approved)

KEY FEATURES NOT CURRENLTY SUPPORTED

The following features are planned to be supported in a future release.

FEATURE
- HDMI Ethernet Channel (HEAC)   - HDCP 1.4   - Audio Return Channel (ARC)

QUANTUMDATA

The following screen examples from the 980 GUI Manager depict key applications of the HDMI 2.0 Protocol Analyzer module.

Event Plot showing capture of a 600MHz format

Timing Analyzer showing parameters for 600MHz format

HDMI 2.0 source capture of video frames (SMPTEBar Pattern)

HDMI 2.0 source compliance test screen

Real Time view of video and metadata

Auxiliary Channel Analyzer showing HDCP 2.2 transactions