SPECIFICATIONS

**DisplayPort Tx and Rx Ports**

- **Version**: DisplayPort 1.4a
- **Standard Formats**: VESA
- **Connectors**: Tx (1) DP Standard; Rx (1) DP Standard
- **Aux Chan Adjunct Board**: DisplayPort
- **Protocol**: DisplayPort
- **Video Data Rates**: 1.62, 2.7, 5.4, 8.1 Gb/s Link rates
- **1, 2, 4 Lanes**
- **Color Depths**: 8, 10, 12, 16 bits
- **Video Encoding**: RGB, YCbCr
- **Video Sampling Modes**: 4.4:4, 4:2:2
- **HDCP**: Versions 2.2 & 2.6 (1.3 on 1 & 2 lanes only)
- **Audio**: 8 Channel LPCM programmable sine wave
- **Capture memory**: 8 GBytes

**Options**

- **DisplayPort Tx / Rx**: Either or both:
  - DP Tx for display testing
  - DP Rx port, two options:
    - Basic Analyzer
    - Capture/Store Protocol Analyzer (requires Basic analyzer option)
- **DP Aux Channel Analyzer**: Monitor DisplayPort Aux Channel transactions in real time either while emulating a source or sink.
- **DP Passive Aux Channel Analyzer**: Monitor DisplayPort Aux Channel transactions in real time passively between a source or sink.
- **DP Capture Analysis of DSC Streams**:
  - NEW! Video Generation of DSC/FEC Streams
  - NEW! DPCD/FEC Streams
  - NEW! DPCD 2.2 Functional Test
  - NEW! DPCD 2.2 Compliance Test
- **UPDATED** DP 1.4 Source Link Layer Compliance (Package #3)
  - Run DisplayPort 1.4 source Link Layer compliance test.
  - (Sections: 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.4.4, 4.5.1 [NEW! FEC])
- **UPDATED** DP 1.4 Sink Link Layer Compliance (Package #4)
  - Run DisplayPort 1.4 sink Link Layer compliance test (displays).
  - (Sections: 5.2.1, 5.3.1, 5.3.2, 5.4.1/2, 5.4.3, 5.4.4, 5.5.1 [NEW! FEC])
- **DP 1.4 Video Generator / Protocol Analyzer Module**

**980 Test Platforms**

- **Embedded Display**:
  - 980B: 15' diagonal; Resolution: 1024(H) x 768 (V) resolution; 24 bit RGB color.
  - 980B: 7" diagonal; Resolution: 800 (H) x 480 (V); 24 bit RGB color.
- **Power**: 90-264 Vac, 47-63Hz
- **Weight**: 23.76 LBS; 10.78 Kg
- **Size**:
  - 980B: Height: 15.25 in. (38.7 cm); Width: 14.57 in. (36.5 cm); Depth: 6.29 in. (15.9 cm)
  - 980B: Height: 6.29 in. (15.9 cm); Width: 15.25 in. (38.7 cm); Depth: 14.57 in. (36.5 cm)
- **Command Line Control**: Ethernet (RJ-45) for external GUI and telnet
- **Environmental**: Operating Temp: 32 to 104 (F); 0 to 40 (C)

**quantumdata™ 980 DisplayPort 1.4 Video Generator / Protocol Analyzer Module**

**Video Generation and Analysis Testing up to 8.1 Gb/s Link Rates With DSC/FEC Video Generation & FEC Compliance!**

**Key Features**

- Run functional tests on DP displays up to 8.1 Gb/s link rates with standard format library consisting of 600 standard timings and over 300 test patterns
- Generate NEW! Display Stream Compression (DSC) select patterns and configure slices and video parameters
- Configure link training parameters to test display's handling of various link training configurations
- View EDID and DPCD registers of connected display to verify contents
- NEW! Access DSC Test CRC registers for automated verification of source DSC compression
- Run functional tests on DisplayPort sources up to 8.1 Gb/s link rate, view incoming video and metadata—NEW! including DSC compressed—from a source device in real time
- Capture and decode incoming video, protocol and control packets—NEW! including Display Stream Compression (DSC) streams—such as main stream attributes and secondary data.
- Monitor Aux Channel while emulating either a DP source or display to view Link training, HDCP and EDID with the Auxiliary Channel Analyzer feature
- Passively monitor Aux Channel between a DP source and display to view Link training, HDCP and EDID transactions between devices
- DP 1.4 HBR3 Link Layer compliance tests on DisplayPort sources and sinks
- NEW! DP 1.4 HBR3 Forward Error Correction (FEC) compliance tests on DisplayPort sources and sinks
- Run DCP-approved HDCP 2.2 compliance tests on DisplayPort sources, sinks and repeaters
- Run audio tests using programmable LPCM sine wave audio tones

**Source Testing**

- The 981 DP 1.4 Video Generator / Protocol Analyzer module supports video, audio and protocol functional testing of high-end DP displays and sources. The module supports HBR3 data rates including 1.62, 2.7, 5.4 & 8.1 Gb/s on 1, 2 & 4 lanes on both its Tx ports and its Rx port. The module’s Rx analyzer port supports analysis of incoming DSC compressed streams and FEC compliance testing.

- The module features a DisplayPort output for testing displays. The module is equipped with all the standard video timings and test patterns necessary for testing modern displays. The video generator’s NEW! supports transmission of DSC compressed streams with FEC parity blocks.

- The 980 DP 1.4 Video Generator / Protocol Analyzer module can be equipped in either the 980B or 980 Advanced Test Platform. The module can be controlled either through the PC-based 980 GUI Manager or through the embedded 980 GUI Management running on the 980 platform itself. The 980’s built-in color touch screen provides a graphical user interface (GUI) to control the module.

**Display Testing**

- The 980 DP 1.4 Video Generator / Protocol Analyzer module supports video, audio and protocol functional testing of high-end DP displays. The module supports HBR2 data rates including 1.62, 2.7, 5.4 & 8.1 Gb/s on 1, 2 & 4 lanes on both its Tx ports and its Rx port. The DisplayPort module is equipped with all the standard video timings and test patterns necessary for testing modern displays.

- The DP video generator also supports HBR2 Link Layer HDCP 2.2 compliance testing for DisplayPort source, sink and repeater devices and link layer compliance testing for sink devices.
**DISPLAY TESTS - VIDEO PATTERN TESTING FOR UHD TVS**

**Video Generation**
The 980 DP 1.4 Video Generator / Analyzer module supports video and audio functional testing at link rates up to 8.1 Gb/s on 1, 2 and 4 lanes to support high resolution formats. The module has an extensive set of video formats and library of test patterns. You can set any pattern in motion to test motion artifacts with the Image Shift feature. The module’s NEW! DSC/FEC video generator feature enables display developers to transmit DSC/FEC streams. Users can select from several test patterns and configure the colorimetry and DSC slice configurations.

**Audio Testing**
The module offers a programmable LPCM audio sine wave generator enabling you to set the number of channels (up to 8), the amplitude, frequency, sampling rate and bit depth for uncompressed formats.

**Link Training Control and Configuration**
The module’s link training control feature enables you to configure the link training parameters during testing. You can set limits on the lane count and link rate and allow the link training engine to establish link training based on those limitations or you can force link training parameters—lane count, link rate, voltage swing, pre-emphasis.

**DSC / FEC Video Generation**

**Format Selection**

**Link Training Control and Configuration**

**Protocol Testing**
The 980 DP 1.4 Video Generator / Analyzer module offers a variety of features for testing DisplayPort protocols. You can verify HDCP 1.3 and HDCP 2.2 authentication transactions between the module’s Tx port and a DP display. The module’s EDID Decode feature enables you to examine the EDID of the connected display in text. The DPCD Decode feature enables you to examine the DPCD registers of the connected display. You can read the EDID and/or the DPCD of downstream MST nodes.

**EDID Decode View**

**DPCD Register View**

**Multi-Stream Transport**
The DP 1.4 Video Generator / Analyzer module emulates an MST source for testing an MST branch device or MST-capable monitor. Up to four (4) streams are supported with a depth of one. The Auxiliary Channel Analyzer (ACA) utility depicts the MST negotiations with the connected MST Rx device.

**Auxiliary Channel Analyzer**
The 980 DP 1.4 Video Generator / Analyzer module’s Auxiliary Channel Analyzer (ACA) feature enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between the DP 1.4 module and a connected display. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.

**HDCP 2.2 Test**
DISPLAY TESTS - VIDEO PATTERN TESTING FOR UHD TVs

Video Generation
The 980 DP 1.4 Video Generator / Analyzer module supports video and audio functional testing at link rates up to 8.1 Gb/s on 1, 2 and 4 lanes to support high resolution formats. The module has an extensive set of video formats and library of test patterns. You can set any pattern in motion to test motion artifacts with the Image Shift feature. The module’s NEW! DSC/FEC video generator feature enables display developers to transmit DSC/FEC streams. Users can select from several test patterns and configure the colorimetry and DSC slice configurations.

Audio Testing
The module offers a programmable LPCM audio sine wave generator enabling you to set the number of channels (up to 8), the amplitude, frequency, sampling rate and bit depth for uncompressed formats.

Link Training Control and Configuration
The module’s link training control feature enables you to configure the link training parameters during testing. You can set limits on the lane count and link rate and allow the link training engine to establish link training based on those limitations or you can force link training parameters—lane count, link rate, voltage swing, pre-emphasis.

Protocol Testing
The 980 DP 1.4 Video Generator / Analyzer module offers a variety of features for testing DisplayPort protocols. You can verify HDCP 1.3 and HDCP 2.2 authentication transactions between the module’s Tx port and a DP display. The module’s EDID Decode feature enables you to examine the EDID of the connected display in text. The DPCD Decode feature enables you to examine the DPCD registers of the connected display. You can read the EDID and/or the DPCD of downstream MST nodes.

Multi-Stream Transport
The DP 1.4 Video Generator / Analyzer module emulates an MST source for testing an MST branch device or MST-capable monitor. Up to four (4) streams are supported with a depth of one. The Auxiliary Channel Analyzer (ACA) utility depicts the MST negotiations with the connected MST Rx device.

Auxiliary Channel Analyzer
The 980 DP 1.4 Video Generator / Analyzer module’s Auxiliary Channel Analyzer (ACA) feature enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between the DP 1.4 module and a connected display. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.

DISPLAY TESTS - PROTOCOL TEST FEATURES

EDID Decode View
EDID Decode View

DPCD Register View
DPCD Register View

HDCP 2.2 Test
HDCP 2.2 Test

Test Setup for Sink Test
Test Setup for Sink Test

Link Training Control and Configuration
Link Training Control and Configuration

980 with DisplayPort Video Generator / Analyzer
980 with DisplayPort Video Generator / Analyzer

DisplayPort Monitor
DisplayPort Monitor

Test Setup for Sink Test
Test Setup for Sink Test

DSC / FEC Video Generation
DSC / FEC Video Generation

980 with DP Video Generator / Analyzer module
980 with DP Video Generator / Analyzer module

DisplayPort Monitor
DisplayPort Monitor
Capture and Decode
The 980 DP 1.4 Video Generator / Analyzer module captures and decodes the main link attributes in order to diagnose interoperability issues related to them. The Protocol Analyzer captures and stores main link data and provides visibility into main stream attributes, secondary data elements, K-Characters and protocol errors. The Protocol Analyzer presents these elements on a graphical timeline and in a table. You can search for data and select any transaction in the table to view its details. The capture utility also enables you to capture specific MST streams from the source.

NEW! Access DSC Test CRC registers for automated verification of source DSC compression.

Capture and Decode (Filter View showing only Audio Packets)

Capture and Decode (Search for MSA Packets)

Real Time Analysis (Basic Analyzer)
The 980 DP 1.4 Video Generator / Analyzer module’s Real Time analysis feature enables you to view the incoming video, lanes and link rate, timing, colorimetry and various other metadata—NEW! including DSC compressed video streams—in real time at a glance. The Real Time mode provides a basic confidence test to verify that the incoming video is essentially correct. The Rx port emulates any EDID on to test a source devices handling of various EDIDs. You can also configure DPCD registers for emulating on the DP Rx port using the DPCD Editor (below).

Aux Channel Analyzer
The 980 DP HBR3 Video Generator / Analyzer module’s Auxiliary Channel Analyzer (ACA) feature enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between the DP 1.4 module and a connected source. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.

(Passive) Auxiliary Channel Analyzer
The 980 DP 1.4 Video Generator / Analyzer module’s Adjunct Auxiliary Channel Analyzer board enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between a DisplayPort source and display device. This enables developers to investigate interoperability problems between DisplayPort devices involving link training, HDCP and EDID. Solution is provided using a custom cable provided by Teledyne LeCroy. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.
Capture and Decode

The 980 DP 1.4 Video Generator / Analyzer module captures and decodes the main link attributes in order to diagnose interoperability issues related to them. The Protocol Analyzer captures and stores main link data and provides visibility into main stream attributes, secondary data elements, K-Characters and protocol errors. The Protocol Analyzer presents these elements on a graphical timeline and in a table. You can search for data and select any transaction in the table to view its details. The capture utility also enables you to capture specific MST streams from the source.

NEW! Access DSC Test CRC registers for automated verification of source DSC compression.

Capture and Decode (Filter View showing only Audio Packets)

Capture and Decode (Search for MSA Packets)

Real Time Analysis (Basic Analyzer)

The 980 DP 1.4 Video Generator / Analyzer module’s Real Time analysis feature enables you to view the incoming video, lanes and link rate, timing, colorimetry and various other metadata — NEW! including DSC compressed video streams — in real time at a glance. The Real Time mode provides a basic confidence test to verify that the incoming video is essentially correct. The Rx port emulates any EDID on to test a source devices handling of various EDIDs. You can also configure DPCD registers for emulating on the DP Rx port using the DPCD Editor (below).

Aux Channel Analyzer

The 980 DP HBR3 Video Generator / Analyzer module’s Auxiliary Channel Analyzer (ACA) feature enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between the DP 1.4 module and a connected source. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.

(Passive) Auxiliary Channel Analyzer

The 980 DP 1.4 Video Generator / Analyzer module’s Adjunct Auxiliary Channel Analyzer board enables you to monitor the DP Aux Channel for link training and MST negotiations, HDCP transactions and EDID exchanges between a DisplayPort source and display device. This enables developers to investigate interoperability problems between DisplayPort devices involving link training, HDCP and EDID. Solution is provided using a custom cable provided by Teledyne LeCroy. The ACA logs these events and assigns precise timestamps to them. You can view the details of each transaction. These ACA logs can be saved and disseminated for further analysis by colleagues and other subject matter experts.
DISPLAY STREAM COMPRESSION (DSC) ANALYSIS

DSC Analysis
The 980 DP 1.4 Video Generator / Analyzer module’s DSC analysis feature enables developers to view the DisplayPort DSC related protocol elements such as the picture parameter set, end of chunk packets and compression flag settings in the VBID to ensure that these elements are occurring in the video stream and that they are occurring in the proper sequence. The DSC analysis feature also captures and decompresses the video frames enabling developers to examine them for compression artifacts. The Forward Error Correction (FEC) transport mechanism, which ensures reliable, error free video transport, can also be verified.

DSC Analysis showing Picture Parameter Set (PPS)

DSC Analysis Compression flag set in the VB-ID

ACA DPCD Reads for DSC Capabilities
The 980 DP 1.4 Video Generator / Analyzer module’s ACA utility provides a log of the Aux Channel transactions. The link training can be viewed as well as the DPCD register reads and writes involved in the setup and maintenance of Display Stream Compression (DSC) and Forward Error Correction (FEC).

ACA showing DPCD reads for DSC capabilities

DP 1.4 LINK LAYER SOURCE COMPLIANCE

DisplayPort 1.4 Source LL Compliance
The 980 DP source HBR3 link layer compliance tests are ideal for pre-testing your HBR3-capable DisplayPort 1.4 source product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP Aux Channel Traces – From LLC Test

DP 1.4 Link Layer Source Compliance – Test Suite

DP 1.4 Source Link Layer Compliance - Test Selection

DP Source
980 DP 1.4 Video Generator / Analyzer module

Test Setup for Source Analysis (Capture/Decode)
DISPLAY STREAM COMPRESSION (DSC) ANALYSIS

DSC Analysis
The 980 DP 1.4 Video Generator / Analyzer module’s DSC analysis feature enables developers to view the DisplayPort DSC related protocol elements such as the picture parameter set, end of chunk packets and compression flag settings in the VBID to ensure that these elements are occurring in the video stream and that they are occurring in the proper sequence. The DSC analysis feature also captures and decompresses the video frames enabling developers to examine them for compression artifacts. The Forward Error Correction (FEC) transport mechanism, which ensures reliable, error free video transport, can also be verified.

DSC Analysis showing Picture Parameter Set (PPS)

DSC Analysis showing DPCD reads for DSC capabilities

The 980 DP 1.4 Video Generator / Analyzer module’s ACA utility provides a log of the Aux Channel transactions. The link training can be viewed as well as the DPCD register reads and writes involved in the setup and maintenance of Display Stream Compression (DSC) and Forward Error Correction (FEC).

ACA DPCD Reads for DSC Capabilities

AC showing DPCD reads for DSC capabilities

DP 1.4 LINK LAYER SOURCE COMPLIANCE

DisplayPort 1.4 Source LL Compliance
The 980 DP source HBR3 link layer compliance tests are ideal for pre-testing your HBR3-capable DisplayPort 1.4 source product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP 1.4 Source Link Layer Compliance - Test Selection

DP 1.4 Source Link Layer Compliance Test Results

DP Aux Channel Traces – From LLC Test

DP 1.4 Link Layer Source Compliance – Test Suite

DP Source
980 DP 1.4 Video Generator / Analyzer module

Test Setup for Source Analysis (Capture/Decode)

Test Setup for Source Compliance (Capture/Decode)

DP Source
980 DP 1.4 Video Generator / Analyzer module

DP Aux Channel Traces – From LLC Test

DP 1.4 Source Link Layer Compliance Test Results

DP 1.4 Source Link Layer Compliance - Test Selection

DP Aux Channel Traces – From LLC Test

DP 1.4 Source Link Layer Compliance Test Results

DP Source
980 DP 1.4 Video Generator / Analyzer module

Test Setup for Source Analysis (Capture/Decode)

Test Setup for Source Compliance (Capture/Decode)
HPD 2.2 Source, Sink & Repeater Compliance

DisplayPort 1.4 Sink Layer Compliance
The 980 DP sink (display) link layer compliance tests are ideal for pre-testing your DisplayPort 1.4 display product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP 1.4 Sink Layer Compliance – Test Results

HDCP 2.2 Compliance (DCP Approved)
The 980 HDCP 2.2 compliance tests are ideal for pre-testing your DisplayPort source, sink or repeater product prior to submission to an Authorized Test Center for approval. Pre-testing provides assurance that your product will pass at the ATC when submitted. The compliance tests enable you to view the auxiliary channel analyzer traces logged during the test to help diagnose the cause of compliance test failures.

DP 1.4 Link Layer Compliance
- Test Selection

HDCP 2.2 Source Tests - Test Selection

DisplayPort 1.4 Sink Link Layer Compliance
The 980 DP sink (display) link layer compliance tests are ideal for pre-testing your DisplayPort 1.4 display product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP 1.4 Sink Link Layer Compliance – Test Suite

DP Aux Channel Traces – From LLC Test

Test Setup for Sink Test

DP 1.4 Sink Link Layer Compliance - Test Results

DP Source
980 DP 1.4 Video Generator / Analyzer module

Test Setup for Source Analysis (Capture/Decode)

DP Aux Channel Traces – From LLC Test

DP 1.4 Sink Link Layer Compliance - Test Results

HDCP 2.2 Sink Tests - Test Selection

HDCP 2.2 Sink Tests - Test Results

DP 1.4 Link Layer Compliance
- Test Selection

HDCP 2.2 Source Tests - Test Selection

DisplayPort 1.4 Link Layer Compliance
The 980 DP sink (display) link layer compliance tests are ideal for pre-testing your DisplayPort 1.4 display product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP 1.4 Link Layer Compliance – Test Suite

DP Aux Channel Traces – From LLC Test

DP 1.4 Link Layer Compliance - Test Results

DP Source
980 DP 1.4 Video Generator / Analyzer module

Test Setup for Source Analysis (Capture/Decode)

DP Aux Channel Traces – From LLC Test

DP 1.4 Link Layer Compliance - Test Results

HDCP 2.2 Sink Tests - Test Selection

HDCP 2.2 Sink Tests - Test Results

DP 1.4 Link Layer Compliance
- Test Selection

HDCP 2.2 Source Tests - Test Selection
HDCP 2.2 SOURCE, SINK & REPEATER COMPLIANCE

DP 1.4 LINK LAYER SINK COMPLIANCE

DisplayPort 1.4 Sink Link Layer Compliance
The 980 DP sink (display) link layer compliance tests are ideal for pre-testing your DisplayPort 1.4 display product prior to submission to an Authorized Test Center for approval. Pre-testing provides added assurance that your product will pass at the ATC when submitted. The compliance tests (below right) enable you to view the captured data and detailed test results which help pinpoint the cause of compliance test failures. You can link to the aux channel traces in the Aux Channel Analyzer (ACA) to view the root cause of failures (below).

DP 1.4 Link Layer Compliance - Test Selection

DP 1.4 Link Layer Compliance - Test Results

DP Aux Channel Traces – From LLC Test

DP 1.4 Link Layer Compliance – Test Suite

HDCP 2.2 Compliance (DCP Approved)
The 980 HDCP 2.2 compliance tests are ideal for pre-testing your DisplayPort source, sink or repeater product prior to submission to an Authorized Test Center for approval. Pre-testing provides assurance that your product will pass at the ATC when submitted. The compliance tests enable you to view the auxiliary channel analyzer traces logged during the test to help diagnose the cause of compliance test failures.

HDCP 2.2 Sink Tests - Test Selection

HDCP 2.2 Sink Tests - Test Results

DP Source

980 DP 1.4 Video Generator / Analyzer module

DisplayPort Monitor

Test Setup for Sink Test

DP 1.4 Video Generator / Analyzer module

DisplayPort Monitor

Test Setup for Sink Test

DP 1.4 Video Generator / Analyzer module

DisplayPort Monitor

Test Setup for Source Analysis (Capture/Decode)

HDCP 2.2 Source Tests - Test Selection

HDCP 2.2 Source Tests - Test Results

DP Source

980 DP 1.4 Video Generator / Analyzer module

DisplayPort Monitor

Test Setup for Sink Test

DP 1.4 Video Generator / Analyzer module

DisplayPort Monitor

Test Setup for Source Analysis (Capture/Decode)
## DisplayPort Tx and Rx Ports

**Version**
DisplayPort 1.4a

**Standard Formats**
VEGA

**Connectors**
- TX (1) DP Standard
- RX (1) DP Standard

**Aux Chan Adjunct Board**
- DisplayPort

**Protocol**
- DisplayPort

**Video Data Rates**
1.62, 2.7, 5.4, 8.1 Gb/s Link rates
- 1, 2, 4 Lanes

**Color Depths**
8, 10, 12, 16 bits

**Video Encoding**
RGB, YCbCr

**Video Sampling Modes**
4:4:4, 4:2:2

**HDCP**
Versions 2.2 & 2.3 (1 & 2 lanes only)

**Audio**
8 Channel LPCM programmable sine wave

**Capture memory**
8 GBytes

### Options

**DisplayPort Tx / Rx**
- Either or both:
  - DP Tx for display testing
  - DP Rx port, two options:
    - Basic Analyzer
    - Capture/Store Protocol Analyzer (requires basic analyzer option)

**DP Aux Channel Analyzer**
Monitor DisplayPort Aux Channel transactions in real time either while emulating a source or sink.

**DP Passive Aux Channel Analyzer**
Monitor DisplayPort Aux Channel transactions in real time passively between a source or sink. Includes custom cable and Aux Adjunct board.

**DP Capture Analysis of DSC Streams**
- NEW! DP Video Generation of DSC/FEC Streams
- DP DCC 2.2 Functional Test
- DP DCC 2.2 Compliance Test

**NEW! DP 1.4 Source Link Layer Compliance (Package #3)**
- Run DisplayPort 1.4 source Link Layer compliance test.
  (Sections: 4.3.1, 4.3.2, 4.3.3, 4.4, 4.5.1 [NEW: FED])

**UPATED! DP 1.4 Sink Link Layer Compliance (Package #4)**
- Run DisplayPort 1.4 sink Link Layer compliance test.
  (Sections: 5.2.1, 5.3.1, 5.3.2, 5.4.1/2, 5.4.3, 5.4.4, 5.5.1 [NEW: FED])

### 980 Test Platforms

**Embedded Display**
- 980B: 15" diagonal; Resolution: 1024x1024 (V); 24 bit RGB color
- 980R: 7" diagonal; Resolution: 800 (H) x 480 (V); 24 bit RGB color

**Power**
- 90-264 VAC, 47-63Hz

**Weight**
- 23.76 lbs; 10.78 Kg

**Size**
- 980B: Height: 15.25 in. (38.7 cm); Width: 14.57 in. (36.5 cm); Depth: 6.29 in. (15.9 cm)
- 980R: Height: 6.29 in. (15.9 cm); Width: 15.25 in. (38.7 cm); Depth: 14.57 in. (36.5 cm)

**Command Line Control**
Ethernet ( RJ-45 ) for external GUI and telnet

**Environmental**
- Operating Temp: 32 to 104 (F); 0 to 40 (C)

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**Key Features**

- Run functional tests on DP displays up to 8.1 Gb/s link rates with standard format library consisting of 600 standard timings and over 300 test patterns
- Generate NEW! Display Stream Compression (DSC) select patterns and configure slices and video parameters
- Configure link training parameters to test display's handling of various link training configurations
- View EDID and DPCR registers of connected display to verify contents
- NEW! Access DSC Test CRC registers for automated verification of source DSC compression
- Run functional tests on DisplayPort sources up to 8.1 Gb/s link rates; view incoming video and metadata — NEW! including DSC compressed — from a source device in real time
- Capture and decode incoming video, protocol and control packets — NEW! including Display Stream Compression (DSC) streams — such as main stream attributes and secondary data.
- Monitor Aux Channel while emulating either a DP source or display to view Link training, HDCP and EDID with the Auxillary Channel Analyzer feature
- Passively monitor Aux Channel between a DP source and display to view Link training, HDCP and EDID interactions between devices
- DP 1.4 HBR3 Link Layer compliance tests on DisplayPort sources and sinks — NEW! DP 1.4 HBR3 Forward Error Correction (FEC) compliance tests on DisplayPort sources and sinks
- Run DCP-approved HDCP 2.2 compliance tests on DisplayPort sources, sinks and repeaters
- Run audio tests using programmable LPCM sine wave audio tones

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**Source Testing**

The DP 1.4 module’s optional RX analyzer port emulates a DisplayPort device (sink) including EDID and DPCR emulation, RX Link Training function and MST Rx function. The analyzer supports HBR2 data rates including 1.62, 2.7, 5.4 & 8.1 Gb/s on 1, 2 & 4 lanes on both the Tx ports and its Rx port. The DisplayPort module is equipped with all the standard video timings and test patterns necessary for testing modern displays. The video generator NEW! supports transmission of DSC compressed streams with FEC parity blocks.

The 980 DP 1.4 Video Generator / Protocol Analyzer module can be equipped in either the 980B or 980R Advanced Test Platform. The 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.

An optional Adjunct Aux Chan monitoring board supports passive monitoring of the DP aux channel between a source and display. This enables analysis of link training and HDCP interoperability between devices. The solution uses a custom cable provided by Teledyne LeCroy.

**Display Testing**

The 980 DP 1.4 Video Generator / Analyzer module supports video, audio and protocol functional testing high-end DP displays and sources. The module supports HBR3 data rates including 1.62, 2.7, 5.4 & 8.1 Gb/s on 1, 2 & 4 lanes on both its Tx ports and its Rx port. The DisplayPort module is equipped with all the standard video timings and test patterns necessary for testing modern displays. The DP video generator also supports HBR3 Link Layer HDCP 2.2 compliance testing for DisplayPort source, sink and repeater devices and link layer compliance testing for sink devices.