

APPLICATION NOTE - TESTING MEDIA DIRECTOR™ SOURCE AND SINK DEVICES

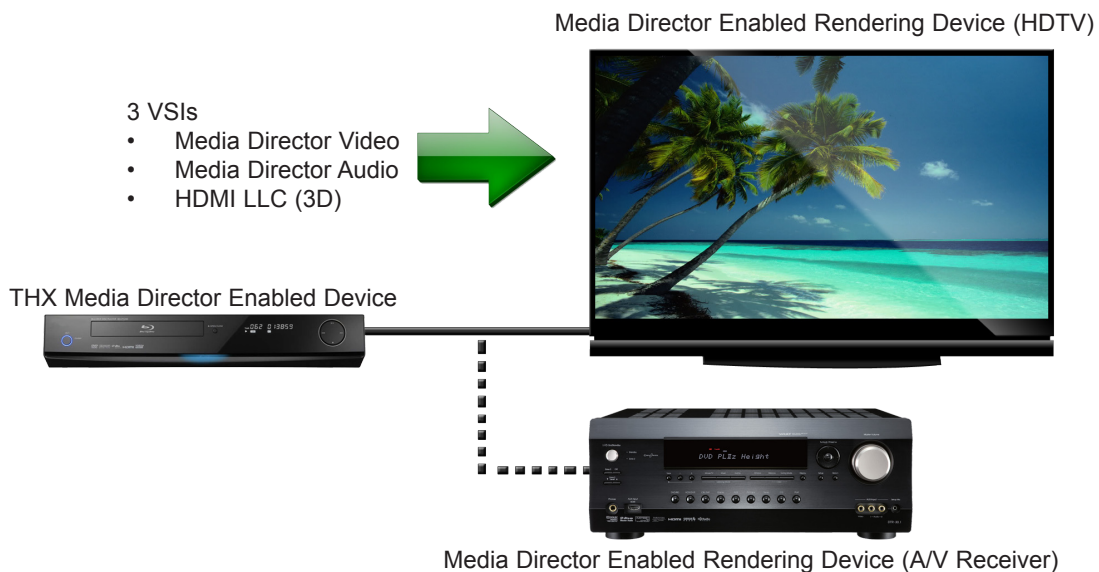
THX has developed a technology for ensuring that the creative intent for content presentation is preserved through production and distribution into the home viewing experience. This technology is called THX Media Director™.

The EIA/CEA-861 specification defines InfoFrames for source devices to communicate information about the content transmitted to a sink (rendering device) such as an HDTV or A/V receiver. When using HDMI as a transport protocol, these InfoFrames are transmitted in the TMDS stream during the vertical blanking period of each video frame. Some of these InfoFrames are mandatory and their functions are very clearly defined in the HDMI specification. Others, called Vendor Specific InfoFrames (VSIs), can be used for functions not explicitly defined in the original HDMI specifications. One use of a Vendor Specific InfoFrame is by HDMI LLC; which delineates support for 3D metadata, latency fields, deep color, etc. THX also utilizes the Vendor Specific InfoFrame for carrying metadata defined in its Media Director specifications.

The HDMI 1.4a specification defines the HDMI LLC Vendor Specific InfoFrame and requires that it be transmitted at least once every two video fields (two V-syncs). THX Media Director uses two additional Vendor Specific InfoFrames; one for video content metadata and one for audio content metadata. Many HDMI 1.4 compliant Tx and Rx HDMI chips provide native support for only one Vendor Specific InfoFrame per V-sync. If there is more than one Vendor Specific InfoFrame transmitted within a V-sync, many current HDMI receiver chips will only recognize the last VSI in the sequence.

As a consequence, manufacturers of HDMI source and sink devices intent on supporting Media Director must be able to test the handling of multiple (at least 3) Vendor Specific InfoFrames. Chip manufacturers wishing to add or verify full VSI handling in their products likewise require this testing capability. THX has partnered with Quantum Data to provide a suite of test solutions for verifying that HDMI source and sink devices properly handle Vendor Specific InfoFrames carrying Media Director information.

Figure 1: Media Director source and rendering device



The screen shots below (Figures 4 and 5) show a 980 capture depicting the three (3) Vendor Specific Infoframes occurring in a single frame. The 980 is able to detect all packets and assign precise timestamps to them. It then decodes the contents of all three Vendor Specific Infoframes even though they occur in rapid succession.

Figure 4: 980 Screen Shot Showing Event Plot View with 3 VSIs in one VSync.

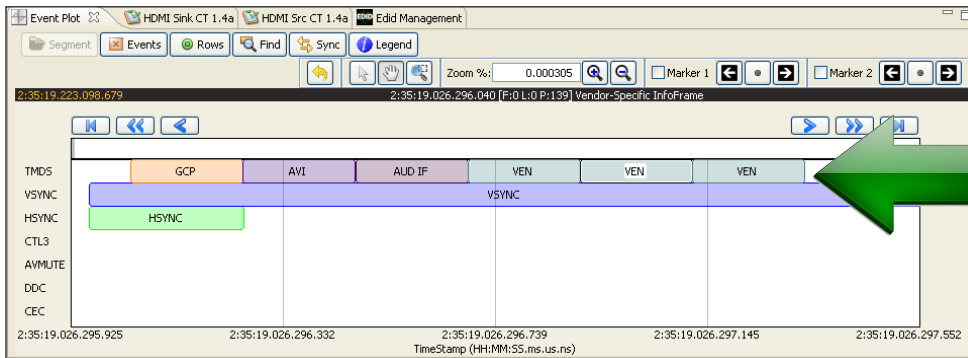
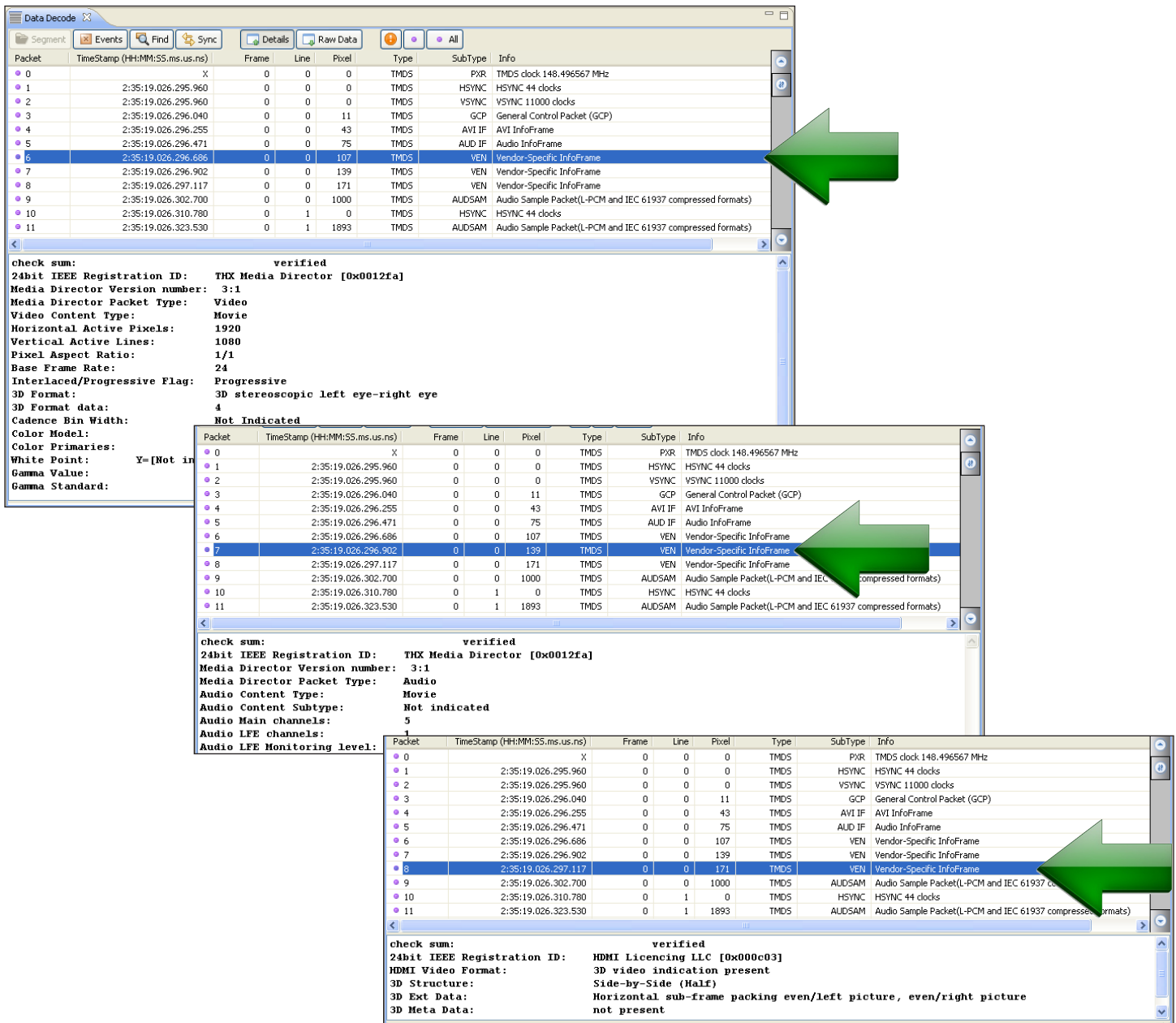


Figure 5: 980 Screen Shot Showing Data Decode Views with each VSI.

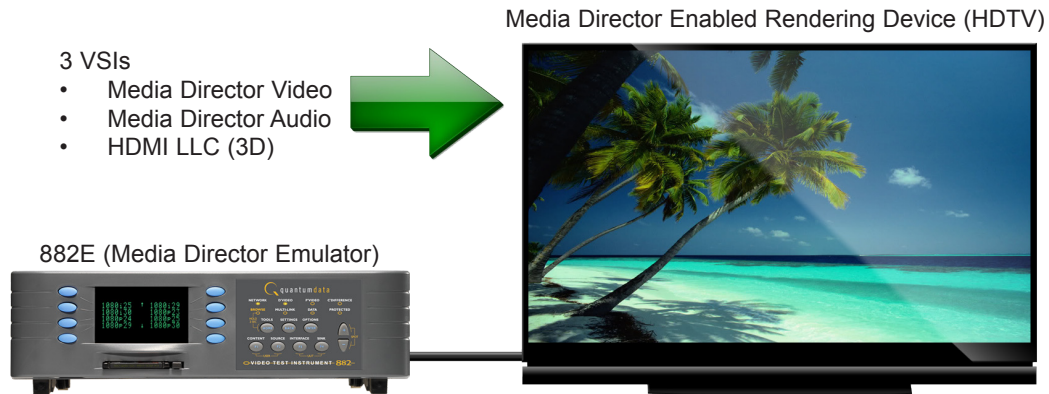


TESTING MEDIA DIRECTOR SINK (RENDERING) DEVICES

For testing Media Director sinks (rendering devices) such as HDTVs and A/V receivers, the Quantum Data 882E Video Test Instrument is used. The 882E enables test personnel to send Vendor Specific Infoframes in a manner that emulates the way Media Director source devices send them.

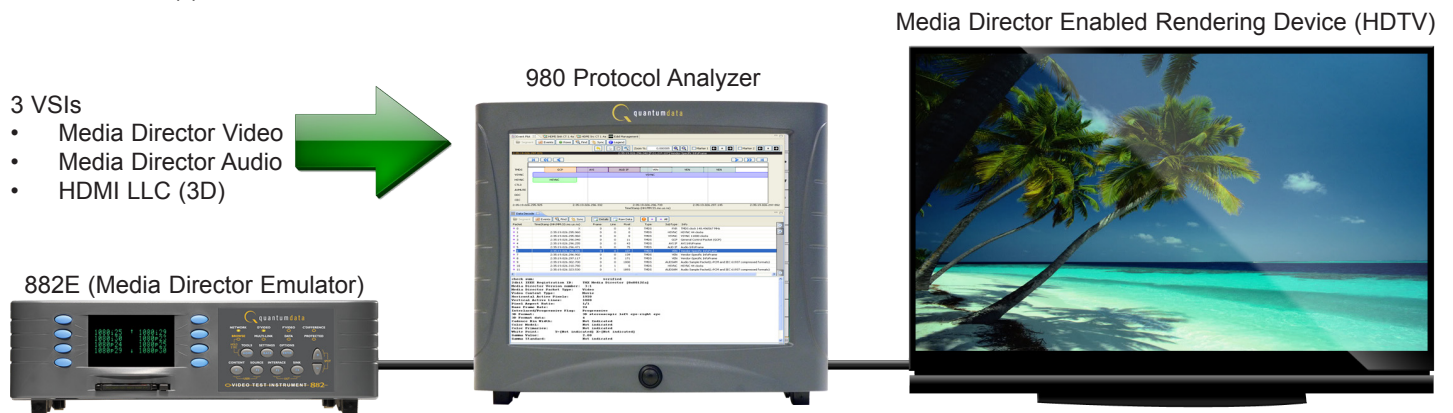
The setups for testing a Media Director rendering device are depicted in Figures 6 and 7 below. The first test setup (Figure 6) shows the 882E emulating an HDMI Media Director source device connected to a Media Director rendering device under test.

Figure 6: Setup for Testing Media Director Rendering Devices.



You can use the 980 in the Pass Through or Encrypted Link Analyzer mode to monitor the multiple (3) Vendor Specific Infoframes as they are transmitted to the Media Director rendering device under test. This is shown in Figure 7. The output from the 980 Protocol Analyzer is the same as that shown in Figures 4 and 5 above.

Figure 7: Setup for Monitoring Media Director Metadata from Source Test Equipment and Media Director Rendering Device(s).



TESTING MEDIA DIRECTOR PASSTHROUGH (Repeater) DEVICES

For testing Media Director pass-through (repeater) devices such as an A/V receiver, video scalar, router, switcher, etc., both the Quantum Data 882E Video Test Instrument and the Quantum Data 980 Protocol Analyzer are used. The 882E enables test personnel to send Vendor Specific InfoFrames in a manner that emulates a Media Director source device, while observing the response of the pass-through device. Depending on the content and metadata and the function(s) of the particular pass-through device under test, there will be cases where the pass-through device will alter the content and thus be required to change the metadata in a corresponding manner. With the 980, test personnel can verify that the VSIs output by the pass-through device carry the correct Media Director information.

The setup for testing a Media Directory repeater device is depicted in Figure 8. The test setup shows the 882E emulating a Media Director source device connected to the Media Director repeater device under test and then to the 980 Protocol Analyzer.

Figure 8: Test setup illustration showing the 882E connected to a Media Director repeater device and then to the 980 Protocol Analyzers.

