quantumdata M42d Video Analyzer/Generator

November – 2020





quantumdata Product Family...Our Mission:

Help silicon and product developers bring their next-generation video solutions to market—faster, without interoperability problems and at reduced cost



Our solutions quicken Time-to-Insight



M42d Video Analyzer/Generator – Features and Functions

- Provides Protocol Analysis and Video Generation for DisplayPort 2.0 source and sink testing through standard DP ports and USB-C ports for DP Alt Mode.
- Enables viewing of incoming video and essential video and timing parameters.
- Protocol Capture Analyzer provides deep insight of the DP 2.0 video, audio, metadata, control data, and symbol data including DSC/FEC compression.
- Supports DP 1.4 Link Layer compliance tests for DP sources and sinks. Includes DSC and FEC compliance testing. DisplayPort 2.0 compliance testing planned for future release.
- Video generator outputs user-specified link configurations up to 8.1Gb/s rates for DP 1.4 and UHBR rates for DP 2.0 on four (4) lanes.
- Supports DCP-approved HDCP 2.2/3 source, sink and repeater compliance testing.
- Supports passive monitoring of the DisplayPort Aux Channel and Main Link at UHBR lane rates.
- Advanced Features such as Panel Replay and LTTPR are planned for future releases.

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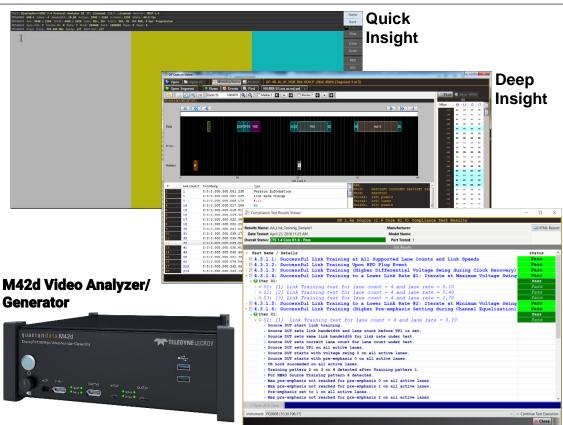
Everywhere**you**look`



What is Time-to-Insight?

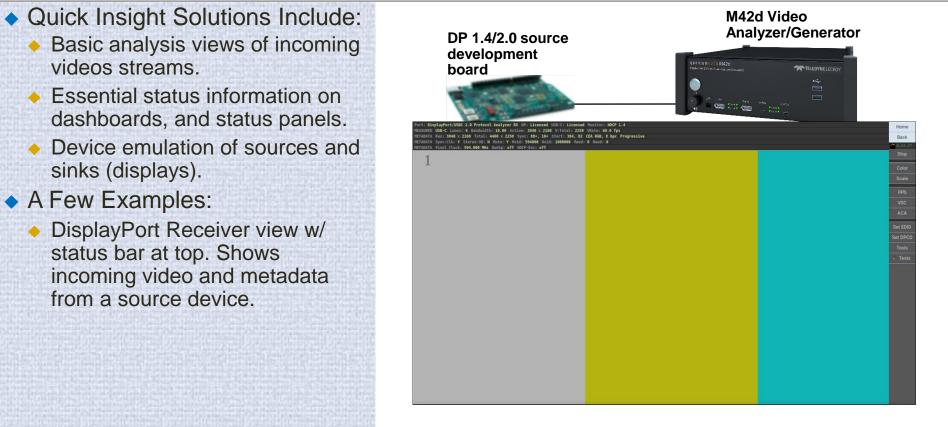


- Time-to-Insight saves time and money. It involves the following:
 - Quick Insight: Provides at-aglance information—insight into the basic functioning of an DisplayPort video device or system.
 - Deep Insight: Provides full visibility—insight—into the low level protocol to verify the proper functioning of an DisplayPort device to improve interoperability.
 - **Compliance Tests:** Provides required test suites for DisplayPort Logo program.



Quick Insight – Example 1







Quick Insight – Example 2

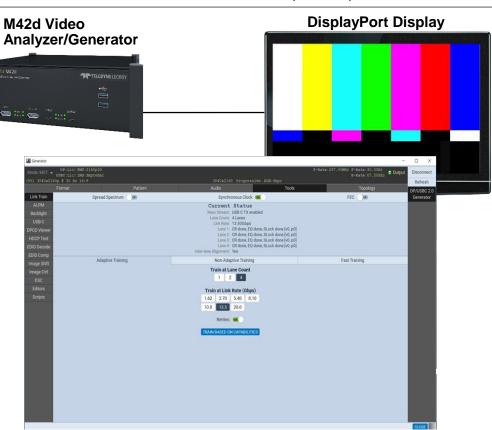


- Quick Insight Solutions Include:
 - Real Time analysis views of incoming videos streams.
 - Essential status information on dashboards, and status panels.
 - Device emulation of sources and sinks (displays).
- A Few Examples:

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 DisplayPort link training control & status with connected display.

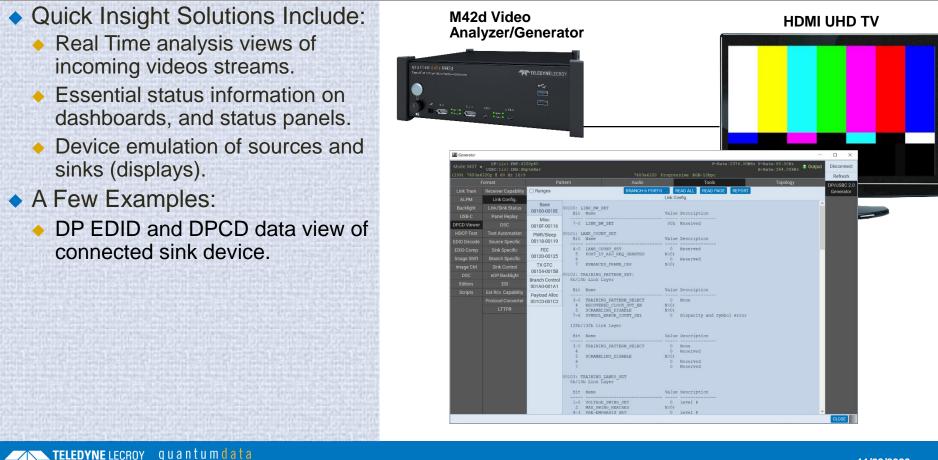




Quick Insight – Example 3

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Deep Insight – Example 2a – DP 2.0 13.5G Capture



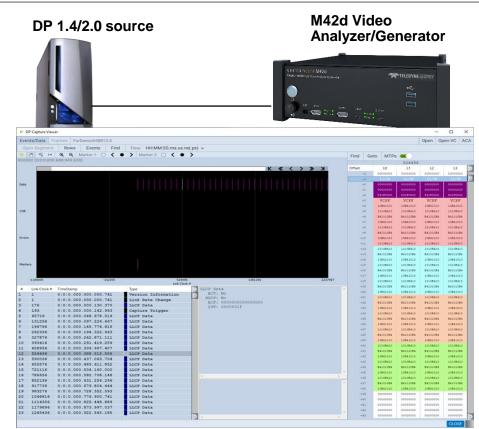
Deep Insight offers:

- In depth analysis of the low level protocol operation over the main video transmission link.
- Analysis of connection sequence protocol transactions over the auxiliary channel.
- A Few Examples:

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 DisplayPort 2.0 MST capture 13.5Gb/s main stream. (Showing MST Link capture with 4 VCs.)



Deep Insight – Example 2a – DP 2.0 Virtual Channel



Deep Insight offers:

- In depth analysis of the low level protocol operation over the main video transmission link.
- Analysis of connection sequence protocol transactions over the auxiliary channel.
- A Few Examples:

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 DisplayPort 1.4/2.0 capture & analysis of 8.1Gb/s or UHBR rates up to 20Gb/s main stream. (Showing Virtual Channel capture.)

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 Example shows DSC PPS metadata packet.

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	319455	0:0:0.001.971.944.444	CTA Audio		dsc version minor: 2		+2	00580300	003FE120	000F000D	00070002
	319458	0:0:0.001.971.962.963	SE		pps_identifier: 0		+3	F0100018	00200003	330B0B06	382A1C0E
	319466	0:0:0.001.972.012.346	SS		bits_per_component: 8 bpc linebuf depth: 16 bits		+4	62544600	79777000	017E7D00	09000100
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Deep Insight – Example 2c DP 1.4 Capture



Deep Insight offers:

- In depth analysis of the low level protocol operation over the main video transmission link.
- Analysis of connection sequence protocol transactions over the auxiliary channel.

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A Few Examples:

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DisplayPort 1.4 capture & analysis of 8.1Gb/s.

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Errors Markers 660728	CL. TimeStamp 0 0:0:0:004,073.52.066,173 0:0:0:004,073.52.246 0:0:0:004,074.052.553 0:0:0:004,074,052.553 0:0:0:004,074,058,754 0:0:0:004,078,584,383 0:0:0:004,078,584,383 0:0:0:004,078,584,783 0:0:0:004,078,584,783 0:0:0:004,078,584,784 0:0:0:004,078,584,784 0:0:0:004,078,584,784 0:0:0:004,078,584,784 0:0:0:004,078,584,0247 0:0:0:004,078,584,785	500 Type 85 85 Data 85 Video Data 85 85 Data 85 Data	 MSA. VEA. VFR0: 1460496064220 Hz HT0541: 4600 pixels Mrdid: 2800 pixels Mrdid: 2800 pixels Mrdid: 2100 pixels Mrdid: 2100 pixels Vstat: 92 lines Vstat: 92 lines Vstat: 92 lines Stema Clock: Synchronous Stema Clock: Synchronous 		-12 2413126 -14 2412126 -14 2412126 -14 2412126 -14 2412126 -14 2412126 -14 2412126 -14 2412126 -15 241 -14 2412126 -15 25 -14 2412126 -15 25 -14 2412126 -15 25 -16 25 -17 241212 -18 241212 -19 241212 -10 252121 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212 -11 241212	20101010 1001010 1001010 1001010 1001010 1001010 1000000	20201028 202029 202020 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202020 202000000	10001000 10101000 10101000 10101000 10101000 10101000 00000000
Errors Markers 660728	Ct. TimeStamp 0 0:0:0.004,073.506.1173 0 0:0:0.004,073.506.152.366 0 0:0:0.004,074.502.583 0 0:0:0.004,074.502.583 0 0:0:0.004,078.502.503 0 0:0:0.004,078.502.503 0 0:0:0.004,078.563.20 0 0:0:0.004,078.563.20 0 0:0:0.004,078.567.361 0 0:0:0.004,078.567.361 0 0:0:0.004,078.567.361 0 0:0:0.004,078.567.361 0 0:0:0.004,078.578.761 0 0:0:0.004,078.378.370	50 Type 35 85 Data 82 Video Data 85 Data 51 Lati of Frame 55 55 MKA 58 55	<pre>Abdox 7 MSA TFRG: 19460496664220 Hr HTotal: 4400 pixels Woodal: 2300 lines Nuidth: 3800 pixels Workai: 2300 lines HTotal: 3900 pixels Write: 300 lines Write: 300 lines Write: 300 lines KiSc: Stream.Clock: Synchronous Interlaced v-even: Vtotal Leven Do Signaling: 8 Kisc: Stream.Clock: Synchronous Interlaced v-even: Vtotal Leven Do Signaling: 8 Kisc: Stream.Clock: Synchronous Interlaced v-even: Vtotal Leven Do Signaling: 8 Kisc: Synchronous Interlaced v-even: Vtotal Leven Do Signaling: 8 Kisc: Synchronous Interlaced v-even: Vtotal Leven Do Signaling: 8 Kisc: Synchronous Kisc: Synchronous Supplice: Synchronous Kisc: Synchronous Supplice: Synchronous Kisc: Synchronous Supplice: Synchronous Suppli</pre>		-12 2412/82 -12 2412/82 -12 2412/82 -2 2512/82 -3 2512/82 -4 2512/82 -7 2512/82 -8 252 -7 252 -8 253 -4 2000002 -2 253 -3 252 -4 2000002 -5 25 -6 25 -7 25 -7 25 -7 25 -7 25 -7 25 -7 25 -7 25 -7 25 -7 25 -8 2000000 -8 2000000 -9 2000000 -9 2000000 -9 2000000 -9 2000000 -9 20000000 -9 20000000	2010)1010 1010)100 1010100 1010100 1010100 1010100 1010100 1000000	20201028 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202029 202020 202000000	10001000 1010100 1010100 1010100 1010100 1010100 000000
Errers 660719 Errers 660719 Errers 660719 Errers 66072 2246 66072 2243 660072 2244 66072 2243 66072 2244 66072 2245 66072 2246 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66072 2256 66150 2255 6256 2255 625 2256 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2255 66150 2256 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 2056 66150 660	Ck. TimeStamp 0 0:0:0:0.004.073.506.173 0 0:0:0.004.073.506.132.346 0 0:0:0.004.074.092.593 0 0:0:0.004.074.092.593 0 0:0:0.004.074.092.593 0 0:0:0.004.078.643.303 0 0:0:0.004.078.643.303 0 0:0:0.004.078.643.303 0 0:0:0.004.078.647.303 0 0:0:0.004.078.647.303 0 0:0:0.004.078.678.901 0 0:0:0.004.078.688.347 0 0:0:0.004.078.370.370 0 0:0:0.004.078.370.370 0 0:0:0.004.088.474	Vyce BS BS Data BS Data BS BS Data BS Data SS SS MSA SS BS Data BS Data BS Data	<pre>Abdox 7 Min. YSA WrBQ: 1946049664220 Hz Htodal: 4400 pixels Wrodal: 2260 lines Wrodal: 2260 lines Htodal: 2260 lines Hstart: 324 Hsygo: (*) 15 lines Hstart: 62 lines Vytart: 62 lines Hstart: 63 lines Hito: (*) 15 pixels Vytart: 62 lines Inseas(Cock: Synchronous Inseas(Synchronous) Inseas(Synchous) Inseas(Synchronous) Inseas(Sync</pre>		-22 24101345 -24 2421326 -24 2421326 -24 2421326 -24 2421326 -24 2421326 -24 2421326 -24 2421326 -24 2421 -25 25 -41 2421 -25 25 -26 25 -27 255 -28 255 -29 255 -20 255 -21 255 -24 2000000 -24 2000000 -24 2000000 -24 2000000 -25 2000000 -26 2000000 -27 2000000 -28 20000000 -29 20000000 -29 20000000 -21 200000000	20101010 1001010 1001010 1001010 1001010 000000	20101030 10101030 10101030 10101030 10101030 00000000	10001000 1010100 1010100 1010100 1010100 1010100 BS 00000000 00000000 00000000 00000000
Errars Markers 660718 Markers 600718 Unk Co 3244 66590 3244 66502 3244 66072 3245 66072 3245 66072 3246 66072 3247 66072 3248 66072 3248 66072 3248 66072 3248 66072 3250 66073 3250	Ck. TimeStamp 0 0:0:0:0.004.073.506.173 0 0:0:0.004.073.506.132.346 0 0:0:0.004.074.092.593 0 0:0:0.004.074.092.593 0 0:0:0.004.074.092.593 0 0:0:0.004.078.643.303 0 0:0:0.004.078.643.303 0 0:0:0.004.078.643.303 0 0:0:0.004.078.647.303 0 0:0:0.004.078.647.303 0 0:0:0.004.078.678.901 0 0:0:0.004.078.688.347 0 0:0:0.004.078.370.370 0 0:0:0.004.078.370.370 0 0:0:0.004.088.474	50 Type 85 85 85 85 85 85 85 85 85 85 85 85 85	<pre>Minks Wink VFRQ: 1446044806420 Hz HOULI 44604806420 Hz Houli 4460 pixels Nuidh: 3840 pixels Hstart: 384 Hstyrc: (*) HS pixels Ysypc: (*) Ito lines Hstyrc: (*) HS pixels Ysypc: (*) Ito lines Hstyrc: (*) HS pixels Hstyrc: (*) Hstyrc: (*) Hstyrc: (*) Hstyrc: (*) Hstyrc: (*) Hstyrc: (</pre>		-12 2013134 -12 201314 -13 201314 -14 201314 -15 201314 -14 201314 -15 201314 -14 201314 -14 201314 -14 201314 -15 21 -14 201314 -15 21 -15 21 -16 201314 -17 201314 -18 201314 -19 201314 -10 201314 -11 201314 -12 201314 -12 201314	20201620 2020172 2020172 2020172 2020172 2020172 2020172 20200000000	101010101 10101010 10101010 10101010 10101010	10101000 1010100 1010100 1010100 1010100 1010100 1010100 1010100 1010100 1000000 0000000 0000000 000000
Emmi 660719 Enk Clo 55901 2440 655901 2444 650721 2443 650721 2443 650721 2444 650721 2444 650721 2445 650721 2445 650721 2445 650721 2446 650721 2456 650721 2556 650732 2556 650732 2556 650732 2556 650732 2556 650732 2556 650732 2556 65073 2556 65073 2555 65150 2555 65550 2555 65550 2555 65550 2555 65550 2555 65550 2555 6555	CL. TimeStamp 0 0:0:0 0:0:0 0:0:0 0:0:0 0:0:0 0:0:0 0:0:0 0:0:0:0:0 0:0:0:0 0:0:0:0:0 0:0:0:0:0 0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:	Vyce BS BS Data BS Data BS BS Data BS Data SS SS MSA SS BS Data BS Data BS Data	<pre>Abdox 7 Min. YSA WrBQ: 1946049664220 Hz Htodal: 4400 pixels Wrodal: 2260 lines Wrodal: 2260 lines Htodal: 2260 lines Hstart: 324 Hsygo: (*) 15 lines Hstart: 62 lines Vytart: 62 lines Hstart: 63 lines Hito: (*) 15 pixels Vytart: 62 lines Inseas(Cock: Synchronous Inseas(Synchronous) Inseas(Synchous) Inseas(Synchronous) Inseas(Sync</pre>		12 201325 12 201325 10 201325 10 201325 11 201325 12 201325 14 201325 14 201325 14 201325 14 201325 14 201325 15 201325 14 201325 15 201325 14 201325 15 201325 16 201325 17 201325 18 201325 19 201325 10 201325 11 201325 12 201325 14 201325 14 201325	20101010 10101010 1010100 1010100 1010100 0000000 0000000 0000000 0000000 000000	10101010 1010101 1010100 1000000	1010110 1010110 1010110 1010110 1010110 1010110 1010100 1000100 000000
Errars Markers 560719 F Link Clo 2240 659500 2243 65070 2243 66072 2244 66072 2244 66072 2244 66072 2245 66072 2248 66072 2248 66072 2248 66072 2248 66072 2255 66150 2252 66150 2253 66150 2255 66314 2255 66314	CL. TimeStamp 0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0:0 0:0:0:0 0:0:0:0:0 0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:	50 Type 85 85 Data 82 Video Data 85 Data 85 Data 85 Data 85 85 Data 85 85 Data 85 85 Data 85 85 Data	A dok 7 YENG: 1946/049664220 Hz HTOGAI: 2200 [Ins] WTOGAI: 2200		-12 2013151 -12 2013151 -13 2013151 -14 2013151 -15 2013151 -14 2013151 -15 2013151 -14 2013151 -15 2013151 -14 2003051 -15 2013151 -14 2003051 -15 2013151 -16 2013151 -17 2013151 -18 2003051 -14 2003051 -15 2013151 -16 2013151 -17 2013151 -18 2013151 -114 2013151	20201620 2020162 2020162 2020162 2020162 2020162 2020162 2020000 2000000 2000000 2000000 2000000	101010101 10101010 10101010 1010101 1010101 1010101 0000000 0000000 0000000 0000000 000000	1010110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 10110 100100
Errers 660719 ELINE Cloc S240 655901 3241 655901 3242 66000 3243 66000 3244 66072 3244 66072 3244 66072 3245 66073 3251 66150 3252 66150 3255 66313 3251 66150	CL. TimeStamp 0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0 0:0:0:0:0 0:0:0:0:0 0:0:0:0:0:0 0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0:0 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:	ype B5 B5 Data B5 Data B5 Data B5 Data B5 Data S5 B5 Data B5 Data B5 Data B5 Data B5 Data B5 Data B5 Data B5 Data	A dok 7 YENG: 1946/049664220 Hz HTOGAI: 2200 [Ins] WTOGAI: 2200		12 201325 12 201325 10 201325 10 201325 11 201325 12 201325 14 201325 14 201325 14 201325 14 201325 14 201325 15 201325 14 201325 15 201325 14 201325 15 201325 16 201325 17 201325 18 201325 19 201325 10 201325 11 201325 12 201325 13 201325	20101010 10101010 1010100 1010100 1010100 0000000 0000000 0000000 0000000 000000	10101010 1010101 1010100 1000000	1010110 1010110 1010110 1010110 1010110 1010110 1010100 1000100 000000

Deep Insight – Example 3a



Deep Insight offers:

- In depth analysis of the low level protocol operation over the main video transmission link.
- Analysis of connection sequence protocol transactions over the auxiliary channel.
- Example:
 - Analysis of DP 1.4/2.0 DPCD register and Link Training transactions. (Showing Link Training.)

		M42	2d Video)		Displa	уРо	rt Mon	itor	
		Ana	alyzer/G	enerator			-			
F	antumdat	A MAGA		1.						
		< W420 wx40gestanegbr	7	TELEDYNELECROY						
	-			• ~ -						
-	5									
÷	- 2.0	(V2) Cur								
	8	= c	n els nong							
			4.6.6							
ACA	Data View	er							-	
Oper	n Clos	e Export	Options Filter	Find						
			ents: 1455 (3125)		_					
407	DNAT		+00:24:58.124398	< ACK 81	•	Start Time: +00:24:58.140221				
408	DPLT		+00:24:58.124509	> W:102 TRAINING_PATTERN_SET: L=1 21		Type: Native Direction: Reply				
409	DPLT		+00:24:58.124687	< ACK	_	Command: ACK				
410			+00:24:58.125873	> W:103 TRAINING_LANE0_SET L=4 24 24 24 24 24		Reply to Read Request.				
411			+00:24:58.126074	< ACK						
412			+00:24:58.130174	> R:202 LANEO_1_STATUS: L=2	_	00100: LINK_BW_SET				
413			+00:24:58.130344	< DEFER	_	Bit Name		Description		
414			+00:24:58.130924	> R:202 LANE0_1_STATUS: L=2	_	7.0 1700 00 000				
415			+00:24:58.131094	< DEFER		7-0 LINK_BW_SET	Uan	13.5 Gbps/lane	(UHBRI3.5)	
416			+00:24:58.131623	<pre>> R:202 LANE0_1_STATUS: L=2 < DEFER</pre>		00101: LANE COUNT SET				
417	DPLT		+00:24:58.131793 +00:24:58.132330			Bit Name		Description		
418	DPLT		+00:24:58.132330	<pre>> R:202 LANE0_1_STATUS: L=2 < DEFER</pre>	e	4-0 LANE COUNT SET				
419			+00:24:58.132499			5 POST_LT_ADJ_REQ_GRANTED	N(0)	4 lanes		
421			+00:24:58.133072	<pre>> R:202 LANE0_1_STATUS: L=2 < DEFER</pre>		6		Reserved		
422			+00:24:58.133242	> R:202 LANEO 1 STATUS: L=2		7 ENHANCED_FRAME_CAP	Y(1)			
423	DPLT		+00:24:58.133949	< DEFER						
424	DPLT		+00:24:58.134488	> R:202 LANEO 1 STATUS: L=2		00102: TRAINING PATTERN_SET: 8b/10b Link Laver				
425			+00:24:58.134657	< ACK 11 11	_	ob/iob bink bayer				
426			+00:24:58.134819	> W:102 TRAINING PATTERN SET: L=1 02		Bit Name		Description		
427	DPLT		+00:24:58.134899	< ACK	_					
428	DPLT		+00:24:58.134967	> W:103 TRAINING LANEO_SET L=4 24 24 24 24 24		3-0 TRAINING PATTERN_SELECT 4 RECOVERED_CLOCK_OUT_EN	0 N(0)	None		
429			+00:24:58.135071	< ACK		5 SCRAMBLING DISABLE	N(0)			
430			+00:24:58.139169	> R:202 LANEO 1 STATUS: L=3		5 SCRAMBLING_DISABLE 7-6 SYMBOL_ERROR_COUNT_SEL	0	Disparity and	Symbol error	
431			+00:24:58.139242	< ACK 77 77 81						
432	DPLT		+00:24:58.139349	> R:204 LANE ALIGN STATUS UPDATED L=2		128b/132b Link Layer				
433	DPLT		+00:24:58.139422	< ACK 01 03		Bit Name	Value	Description		
434	DPLT	DPUSBC-R13	+00:24:58.139515	> W:102 TRAINING PATTERN SET: L=1 00						
435	DPLT		+00:24:58.139595	< ACK		3-0 TRAINING_PATTERN_SELECT	0			
436	DPLT	DPUSBC-R13	+00:24:58.139687	> W:102 TRAINING PATTERN_SET: L=1 00		4		Reserved		
437	DPLT	DPUSBC-R13	+00:24:58.139767	< ACK		5 SCRAMBLING_DISABLE	N(0)	Reserved		
438	DNAT	DPUSBC-R13	+00:24:58.139840	> R:200 SINK_COUNT L=6		7		Reserved		
439	DNAT	DPUSBC-R13	+00:24:58.139912	< ACK 41 00 77 77 01 02						
	DPLT	DPUSBC-R13	+00:24:58.140148	> R:100 LINK_BW_SET L=9		00103: TRAINING_LANE0_SET				
440		and the owner where the party of the local division of the local d	+00:24:58.140221	< ACK 04 84 00 24 24 24 24 00 01		8b/10b Link Layer				
	DPLT	DPUSBC-R13								
440	DPLT		+00:24:58.140353	> R:200 SINK_COUNT L=8		Bit Name	Value	Description		

Deep Insight – Example 3b



Deep Insight offers:

- In depth analysis of the low level protocol operation over the main video transmission link.
- Analysis of connection sequence protocol transactions over the auxiliary channel.
- Example:

vervwhere**vou**look

 Analysis of DP 1.4/2.0 DPCD register and Link Training transactions. (Showing MST Topology discovery.)

	N	142d \	Video		DisplayPort Monitor
	Α	nalvz	er/Gene	rator	
0/01860-p1	ta M42d N. eo Kaayeest	energity Cartel edg	TELEDYN TELEDYN Telefor Telefo		
ACA	Data View	er			×
Open	Clos	e Export	Options Filter	Find	p.
1000		: 1137 (4794)	options milet		
940	DPSB	DPUSBC-T11	+00:05:46.102536	< DN_REP 1:0:1 17	Start Time: +00:05:46.179800
941	DNAT	DPUSBC-T11	+00:05:46.102637	> W:201 DEVICE_SERVICE_IRQ	Type: ACK - Link Address Source: Down Reply
942	DNAT	DPUSBC-T11	+00:05:46.102718	< ACK	Source: Down Reply Sequence No: 1
943	DNAT	DPUSBC-T11		> R:200 SINK_COUNT L=2	Global Unique Identifier: 32 DC C6 CB 77 00 00 00 31 DC C6 CB 77 00 00 00
944 945	DNAT	DPUSBC-T11 DPUSBC-T11	+00:05:46.121599 +00:05:46.121678	< ACK 41 10 > R:1400 DOWN REP L=16	Number_Of_Ports: 5
946	DNAT	DPUSBC-T11		< ACK 10 11 1F 00 00 00 31	Port 0 Description
947	DNAT	DPUSBC-T11	+00:05:46.121942	> R:1410 DOWN REP(16) L=4	Fort 0 Description Input Port: 1 (RX)
948	DNAT	DPUSBC-T11	+00:05:46.122015	< ACK 40 14 34 F8	Peer_Device Type: 1
949	DPSB	DPUSBC-T11	+00:05:46.122016	< DN_REP 1:0:1 17	- Source device or SST Branch device connected to an upstream port. Port Number: 0
950	DNAT	DPUSBC-T11	+00:05:46.122116	> W:201 DEVICE_SERVICE_IRQ	Messaging Capability Status: 1
951	DNAT	DPUSBC-T11	+00:05:46.122196	< ACK	DisplayPort Device Plug Status: 1 Connected & Initialized
952 953	DNAT	DPUSBC-T11 DPUSBC-T11	+00:05:46.140763	> R:200 SINK_COUNT L=2 < ACK 41 10	Port 1 Description
953	DNAT	DPUSBC-T11 DPUSBC-T11		< ACK 41 10 > R:1400 DOWN REP L=16	Input_Port: 0 (TX)
955	DNAT	DPUSBC-T11		< ACK 10 11 1F DC C6 CB 77	Peer_Device_Type: 3
956	DNAT	DPUSBC-T11		> R:1410 DOWN REP(16) L=4	- SST Sink device or stream Sink in an MST Sink/Composite device. Port Number: 3
957	DNAT	DPUSBC-T11	+00:05:46.141250	< ACK 00 00 12 C7	Messaging_Capability_Status: 0
958	DPSB	DPUSBC-T11		< DN_REP 1:0:1 17	DisplayPort_Device_Plug_Status: 1 Connected & Initialized
959	DNAT	DPUSBC-T11		> W:201 DEVICE_SERVICE_IRQ	Legacy_Device_Plug_Status: 0 DPCD_Revision: 14h
960	DNAT	DPUSBC-T11		< ACK	Peer_Global_Unique_Identifier: 31 DC C6 CB 77 00 00 00 31 DC C6 CB 77 00 0
961 962	DNAT	DPUSBC-T11 DPUSBC-T11	+00:05:46.160135	> R:200 SINK_COUNT L=2 < ACK 41 10	Number SDP Streams: 1
962	DNAT	DPUSBC-T11 DPUSBC-T11		< ACK 41 10 > R:1400 DOWN REP L=16	Number_SDP_Stream_Sinks: 2
964	DNAT	DPUSBC-TI1 DPUSBC-T11		<pre>< ACK 10 11 1F 36 40 14 35</pre>	Port 2 Description
965	DNAT	DPUSBC-T11		> R:1410 DOWN REP(16) L=4	Input_Port: 0 (TX)
966	DNAT		+00:05:46.160624	< ACK C6 CB 77 8B	<pre>Peer_Device_Type: 3 - SST Sink device or stream Sink in an MST Sink/Composite device.</pre>
967	DPSB	DPUSBC-T11	+00:05:46.160625	< DN_REP 1:0:1 17	Port_Number: 4
968	DNAT	DPUSBC-T11	+00:05:46.160724	> W:201 DEVICE_SERVICE_IRQ	Messaging_Capability_Status: 0
969	DNAT	DPUSBC-T11		< ACK	DisplayFort_Device_Plug_Status: 1 Connected & Initialized Legacy_Device_Plug_Status: 0
970	DNAT	DPUSBC-T11		> R:200 SINK_COUNT L=2	DPCD_Revision: 14h
971	DNAT	DPUSBC-T11	+00:05:46.179647	< ACK 41 10	Peer_Global Unique_Identifier: 33 DC C6 CB 77 00 00 00 31 DC C6 CB 77 00 C
972 973	DNAT	DPUSBC-T11	+00:05:46.179726	> R:1400 DOWN_REP L=16	Number SDP Streams: 1 Number SDP Stream Sinks: 2
973	DNAT	DPUSBC-T11 DPUSBC-T11		< ACK 10 05 5B 00 00 00 12 < DN REP 1:0E:1 5	Hundre of Stiedn Sliks. 2
974	DPSB	DPUSBC-T11 DPUSBC-T11		< DN_REP 1:0E:1 5	Port 3 Description
975	DNAT	DPUSBC-T11		< NPL: ACK - LINE Address > W:201 DEVICE SERVICE IRQ	Input_Port: 0 (TX)
					Peer_Device_Type: 3
977	DNAT		+00:05:46.180086	< ACK	

Compliance Tests – Example 1

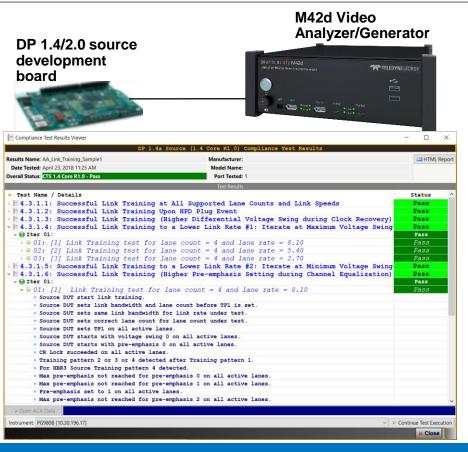


- Compliance Testing Provides:
 - Required test suites to obtain industry logo.
 - Detailed test results and logs that provide insight into the cause of failures.
- Example:

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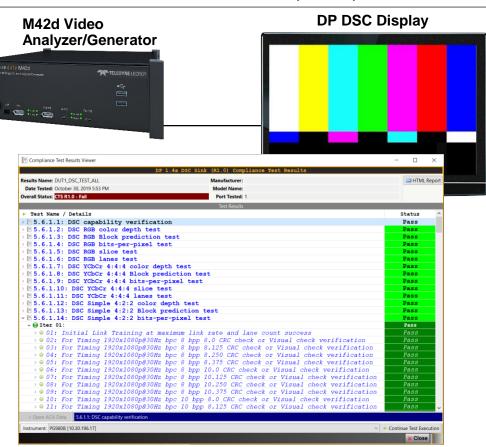
 DisplayPort 1.4 Link Layer source compliance test suite. Link Layer compliance testing for DP 2.0 sources and sinks is planned for a future release.



Compliance Tests – Example 2



- Compliance Testing Provides:
 - Required test suites to obtain industry logo.
 - Detailed test results and logs that provide insight into the cause of failures.
- Example:
 - DisplayPort 1.4 sink compliance for Display Stream Compression (DSC). DSC Compliance testing for DP 2.0 sinks is planned for a future release.





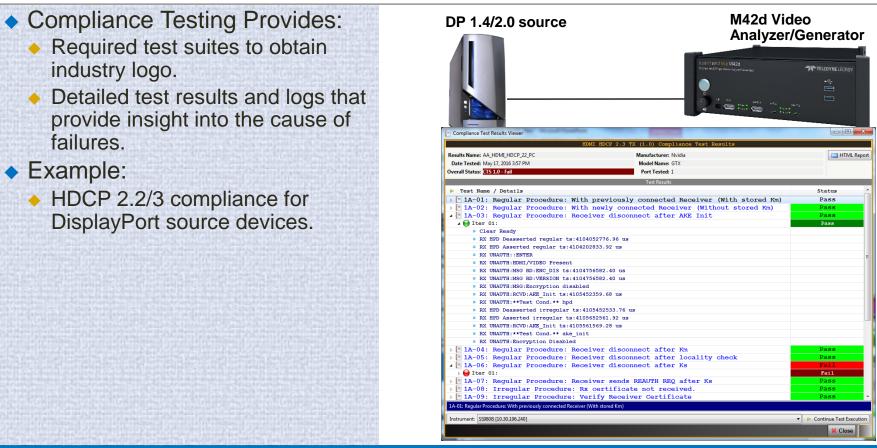
Compliance Tests – Example 3

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M42d Test Setup – DisplayPort 2.0 Source Testing

Source testing

- Use connected HDCP 2.2/3 compatible display to view M42d ATP Manager Graphical User Interface.
- Connection to the HDMI port on back of M42d.

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 Use Keyboard and mouse to control ATP Manager GUI running on the connected display.

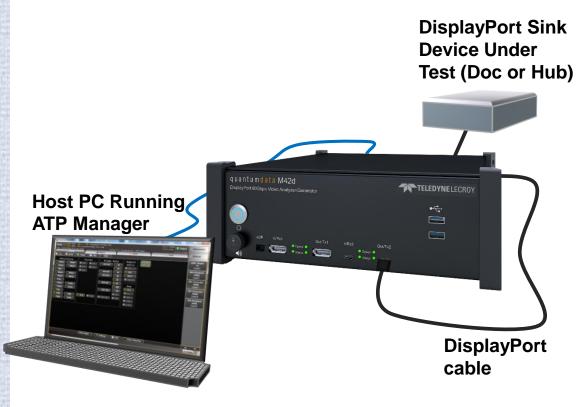


M42d Test Setup – DisplayPort 2.0 Sink Testing

Sink testing

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- Use connected M42d ATP Manager graphical user interface installed on host PC.
- Use Keyboard and mouse to control ATP Manager GUI running on the connected display.
- Connect Host PC to M42d via Ethernet cable, either direct or through corporate LAN.
- Example: Sink hub or docking station.



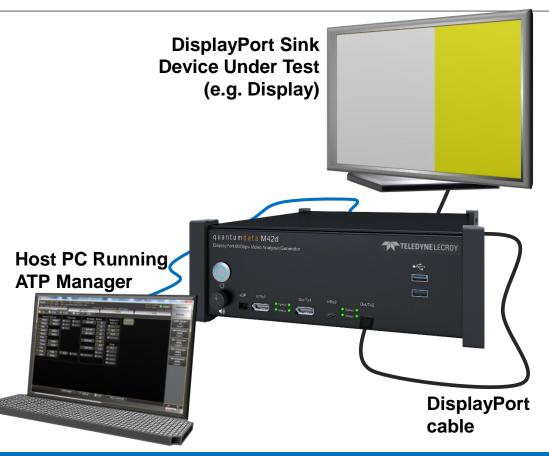
M42d Test Setup – DisplayPort 2.0 Sink Testing

Sink testing

- Use connected M42d ATP Manager graphical user interface installed on host PC.
- Use Keyboard and mouse to control ATP Manager GUI running on the connected display.
- Connect Host PC to M42d via Ethernet cable, either direct or through corporate LAN.
- Example: High resolution display.

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M42d Test Setup – DisplayPort Passive Monitoring Source/Sink

- Passive Monitoring Aux Chan
 - Monitor the Aux Cannel between a DP 1.4/2.0 source and sink device.
 - View Link Training, EDID exchange, HDCP authentication between a source and sink through Aux Channel Analyzer utility.
- Passive Monitoring Main Link
 - Monitor the Main Link between a DP 2.0 source and sink device up to 20Gbps lane rate.
 - View video, audio, control, metadata and symbol data through the basic analyzer viewer and the Capture Viewer.

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