



# UNIGRAF

## UNIGRAF Product Catalog 2020



**USB-C™**

# UNIGRAF New Products in 2020

 DisplayPort™  
2.0

  
USB Type-C

 HDMI®  
HIGH-DEFINITION MULTIMEDIA INTERFACE  
2.1

PRODUCT PICTURE  
COMING SOON

UCD-500



UCD-424



UCD-422

# Target DUT(Device Under Test)



Smartphones



Laptop



Tablet



VR Glasses



PC display controller



AV Switch



Soundbar



High-end monitor and Digital TV



Set Top Box



Surround Systems



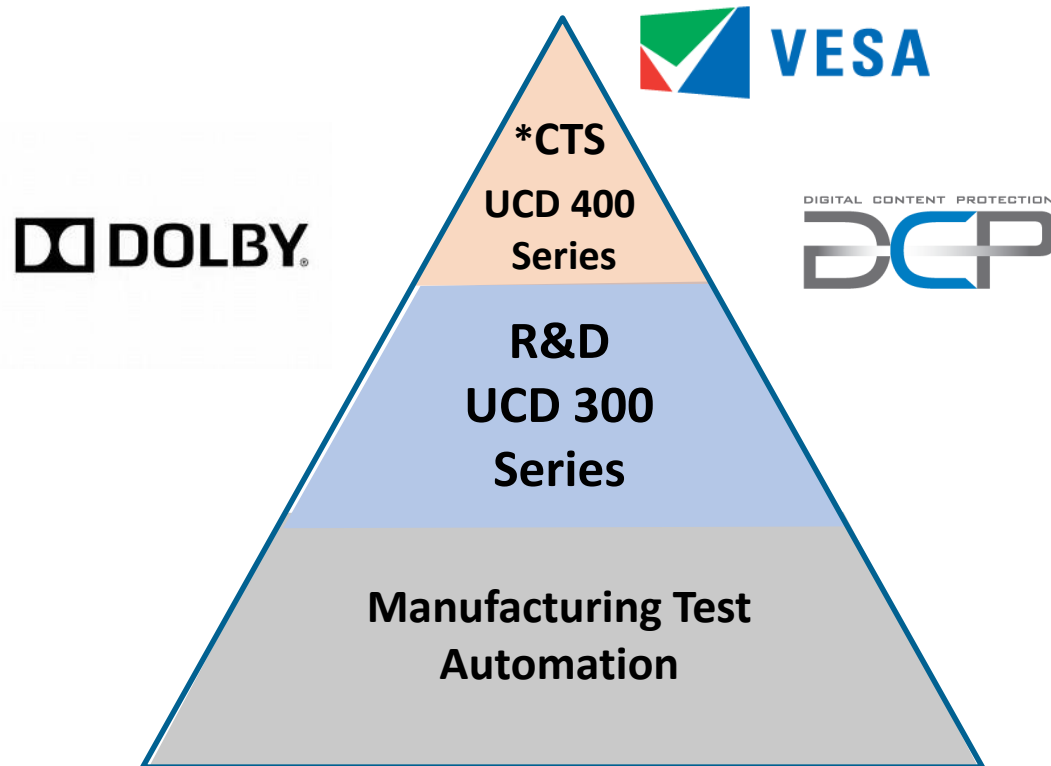
Media Players



Cable

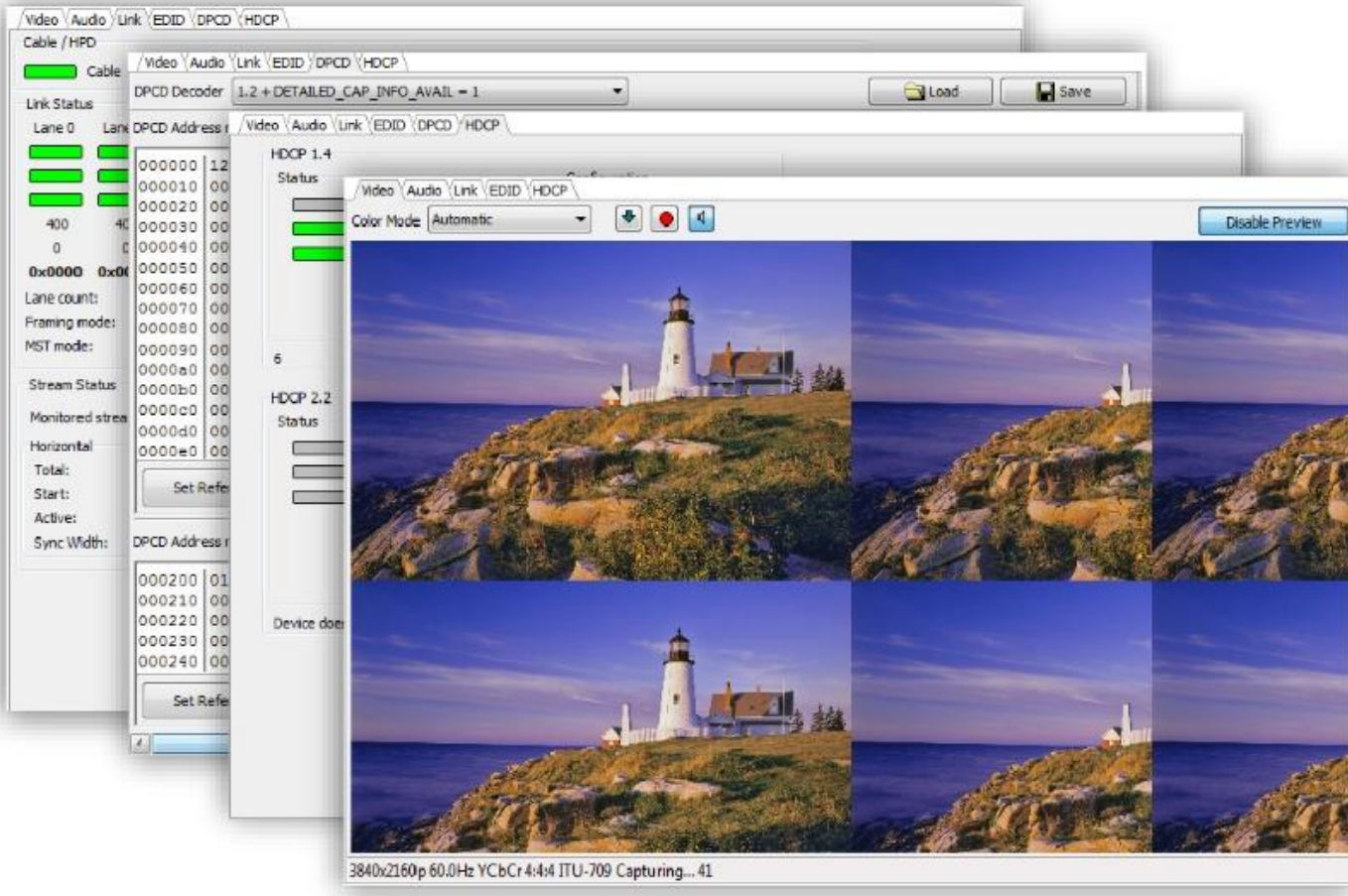
# Key Functions

## \*Compliance Test



Features	UCD-400
DP 1.4a Link Layer CTS	✓
HDCP 2.2/2.3 CTS	✓
Audio CTS Tests	✓
Dolby Vision / Dolby Audio Testing	✓ (UCD-323)
Video Pattern Testing	✓
Display Stream Compression (DSC)	✓
Forward Error Correction (FEC)	✓
Link-Training Tunable PHY Repeaters (LTTTPR)	✓
DisplayPort Configuration Data (DPCD)	✓
Auxiliary Channel Analyzer (ACA)	✓
DP Multi Stream Transport (MST 4 Streams)	✓
Secondary Data Packets (SDP) Capturing	✓

# PC control with GUI Console

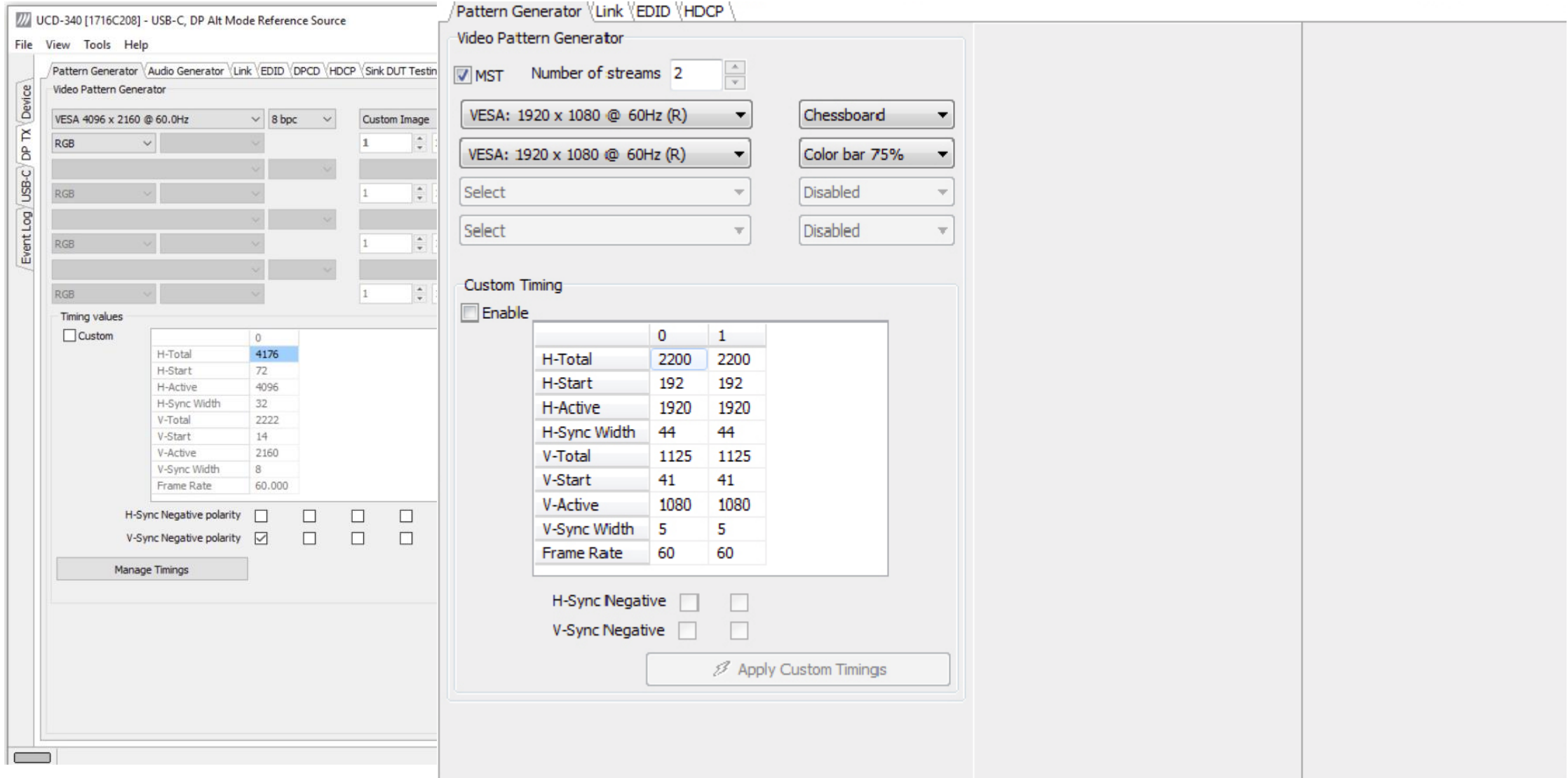


UCD Console GUI(Source, Sink)

TSI SDK(User's own program)



# Signal Generate with MST



The screenshot displays the 'UCD-340 [1716C208] - USB-C, DP Alt Mode Reference Source' software interface. The 'Pattern Generator' tab is active, showing the 'Video Pattern Generator' settings. The 'MST' checkbox is checked, and the 'Number of streams' is set to 2. The video pattern is configured as 'VESA: 1920 x 1080 @ 60Hz (R)' for two streams, with 'Chessboard' and 'Color bar 75%' patterns selected. The 'Custom Timing' section is also visible, with the 'Enable' checkbox checked. Below this, a table shows timing parameters for two streams (0 and 1).

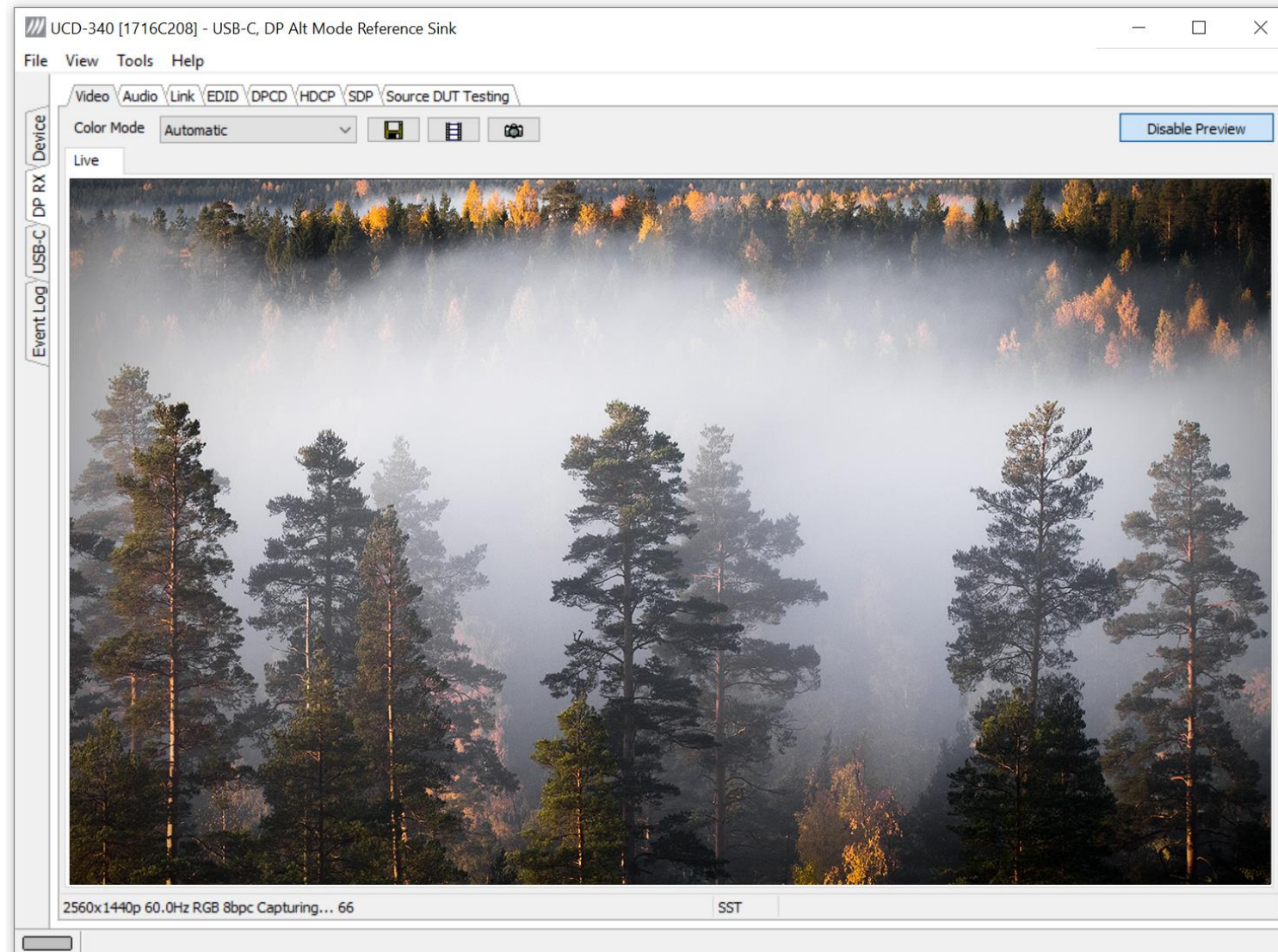
**Timing values**

	0	1
H-Total	4176	2200
H-Start	72	192
H-Active	4096	1920
H-Sync Width	32	44
V-Total	2222	1125
V-Start	14	41
V-Active	2160	1080
V-Sync Width	8	5
Frame Rate	60.000	60

**Custom Timing**

	0	1
H-Total	2200	2200
H-Start	192	192
H-Active	1920	1920
H-Sync Width	44	44
V-Total	1125	1125
V-Start	41	41
V-Active	1080	1080
V-Sync Width	5	5
Frame Rate	60	60

# Video Capturing and Playing



# DP Link Status

UCD-400 [1747C245] - DisplayPort Source and Sink

File View Tools Help

Pattern Generator Link EDID DPCD HDCP Sink DUT Testing

HPD  Asserted

Link Status


Lane 0	Lane 1	Lane 2	Lane 3	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Clock Recovery
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Symbol lock
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Channel equalization
400	400	400	400	Voltage swing (mVpp)
0	0	0	0	Pre-emphasis (dB)

Link Configuration

Number of Lanes:  1  2

Bit rate, Gbps:  1.62  2.70  5.40


Enhanced Framing Mode

Link training 

Output Level

Voltage Swing, mVpp:  400  600  800  1200

Pre-Emphasis, dB:  0  3.5  6.0  9.5

 Apply Overrides

Link Pattern

- Active video
- Idle Pattern
- Training Pattern 1
- Training Pattern 2
- Training Pattern 3
- Training Pattern 4
- PRBS7
- HBR2 Compliance EYE pattern
- SER (Symbol Error Rate)

CRC

Red

Green



Blue

UCD-340 [1716C208] - USB-C, DP Alt Mode Reference Sink

File View Tools Help

Video Audio Link EDID DPCD HDCP SDP Source DUT Testing

Cable / HPD

Cable  HPD  Assert  Deassert  Pulse HPD 500 Length, msec  Short Pulse

Link Status

Lane 0	Lane 1	Lane 2	Lane 3	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Clock Recovery
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Symbol lock
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Channel equalization
600	600	400	400	Voltage swing (mVpp)
3.5	3.5	0	0	Pre-emphasis (dB)

0x226C 0x2334 0x0000 0x0000 [Error Count \(Click to clear\)](#)

Lane count: 2 Bit rate (Gbps): 5.4 (HBR2)

MST mode: Disabled Framing mode: Enhanced

FEC status: Disabled

HDCP status: Disabled

Scrambling: Enabled

Link Configuration

Max Lanes:  1  2  4


Max Bitrate, Gbps:  1.62  2.70  5.40


Other Capabilities

TPS3  TPS4


Enable fast LT

Generate HPD pulse on Apply

 Apply

 Update Link Status

Stream Status

Horizontal		Vertical		Misc		CRC	
Total:	0	Total:	0	Frame Rate, Hz:	0.000	Red:	0x0000
Start:	0	Start:	0	Color Depth:	6	Green:	0x0000
Active:	0	Active:	0	Color Encoding:		Blue:	0x0000
Sync Width:	(+) 0	Sync Width:	(+) 0	RGB unsp. (legacy RGB mode)		 Copy	



# USB-C Power Delivery Status

UCD-340 [1716C208] - USB-C, DP Alt Mode Reference Sink

File View Tools Help

USB Type-C

Roles and Modes Edit PDO information Power Load

**Status**

Power Role  
Data Role

VCONN  
Current

DP Alt Mode status  
DP Alt Mode signalling  
DP Alt Mode config

Fixed supply PDO  
Dual Power Role capable  
USB Suspend supported  
Externally powered  
USB Communication capable  
Dual Data Role capable  
Voltage  
Current

Contract RDO  
Object position  
Give back flag  
Capability mismatch  
USB Comm. capable  
No USB suspend  
Operating current, A  
Maximum current, A

1. Fixed

Pull-up  
Vbus voltage  
Vbus current  
CC1 voltage  
CC2 voltage  
Vconn voltage

**PD Sink**

**UFP**

**Cable info not available in UFP mode disabled**

**Defined by power contract**

**D: DPv1.3 2 lanes + USB 3.1**

**DP v1.3**

**Set UFP\_U as UFP\_D**

**yes**

**no**

**yes**

**yes**

**5.00V**

**0.50A**

**1**

**false**

**yes**

**no**

**yes**

**0.5**

**3.0**

**5.00V / 0.50A**

**Strongest, 3.0A**

**5.33V**

**0.00A**

**0.92V**

**0.02V**

**0.00V**

Reference Sink

Power Load

	9 V	12 V	15 V	20 V	20 V	20 V
Priority	Fixed	Fixed	Fixed	Fixed	Disabled	Disabled
Current	3000	3000	3000	5000		
Power	9000	12000	15000	20000		
Efficiency	125%	125%	110%	100%		

Configuration

Cable Orientation  
 CC1  CC2   CC Pull-up  
 Default

Initial port role  
 DFP  UFP  DRP  1.5A  
 3.0A

DP Alt Mode (DFP)  
 Auto enter on connect  Manual  Disable

DP Alt Mode Capabilities (UFP\_D)  
 DP Alt Mode 4 lanes (C)  
 DP Alt Mode 2 lanes (D)  
 DP Alt Mode 4 lanes (E)  
 Multi-function preferred

Swap

USB Communication Capable  
 PD Source  PD Sink

USB Communication Capable

Cable Orientation: Straight

■ DUT Connected

Cable Orientation: Straight

# DSC Encode and Decode

UCD-400 [1924C312] - DisplayPort Source and Sink

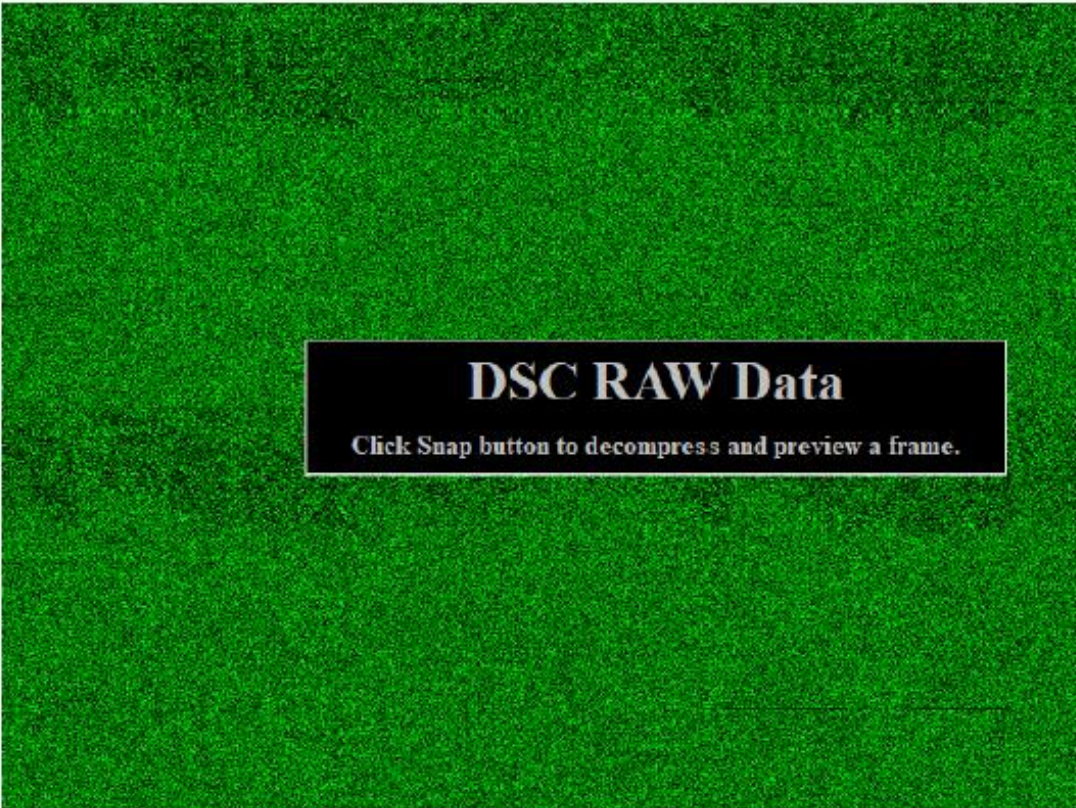
File View Tools Help

Video Audio Link EDID DPCD HDCP SDP FEC Source DUT Testing

Color Mode: Automatic

Virtual Channel: 1

Live



**DSC RAW Data**  
Click Snap button to decompress and preview a frame.

4096x2160p 60.0Hz RGB 8bpc DSC Capturing... 5

SST

UCD-400 [1924C312] - DisplayPort Source and Sink

File View Tools Help


Video Audio Link EDID DPCD HDCP SDP FEC Source DUT Testing

Color Mode: Automatic

Virtual Channel: 1

Disable Preview

Live Snapshot



DSC Log

Taking snapshot ... (NOTE: DSC snapshots may take a while to decompress!)

DSC Version	= 1.2
pps_identifier	= 0x00 (0)
bits_per_component	= 8
linebuf_depth	= 9
block_pred_enable	= 0
convert_rgb	= 1
simple_422	= 0
vbr_enable	= 0
bits_per_pixel	= 0x60 (6.0000)
pic_height	= 2160
pic_width	= 4096
slice_height	= 540
slice_width	= 1024
chunk_size	= 768
initial_xmit_delay	= 768

Snapshot: 4096x2160p 60.0Hz RGB 8bpc DSC - Frame #23

SST

# Compliance Testing

## Unigraf Test Report

### SUMMARY OF INDIVIDUAL TEST RUNS

Test name	Result
<a href="#">DP 1.4 Link Layer CTS Test Set / 5.2.1.1 Read One Byte from Valid DPCD Address</a>	PASSED
<a href="#">DP 1.4 Link Layer CTS Test Set / 5.2.1.2 DPCD Receiver Capability Read (Read 12 Bytes from Valid DPCD Address)</a>	PASSED
⋮	
<a href="#">DP 1.4 Link Layer CTS Test Set / 5.3.1.4 Successful Link Training with Request of a Change to Pre-Emphasis and/or Voltage Swing Setting During Channel Equalization Sequence</a>	FAILED
<a href="#">DP 1.4 Link Layer CTS Test Set / 5.3.1.5 Successful Link Training at Lower Link Rate Due to Loss of Symbol Lock During Channel Equalization Sequence</a>	FAILED

### DP 1.4 Link Layer CTS Test Set / 5.2.2.9 Sink Device Symbol Error Count

Test Result: **FAILED**

#### Test Log

```
0000.000.001: Start test "5.2.2.9 Sink Device Symbol Error Count"
0000.050.854:  AUX RD:  0x000E:  1 80
0000.051.904:  AUX RD:  0x2200: 15 14 14 c4 01 01 00 01 81 02 00 06 00 00 00 80
0000.052.742: DUT MAX_LINK_RATE = 14h, MAX_LANE_COUNT = 4
0000.052.855: Set LINK_BW_SET = 14h, LANE_COUNT_SET = 4
```

NEW!

## Ver.2.0

## Ver.1.4a

PRODUCT PICTURE  
COMING SOON

UCD-500



Test Device



DPA-400 2.0

AUX Channel Monitor



UCD-400

Test Device



UCD-411

Generator

**NEW!**



# UCD-500

## DisplayPort™ 2.0 Test Device with 20 Gb/s Link Rates

- DP 1.4a & DP 2.0 Link Layer CTS Tool for Sinks & Sources
- Support for HDCP 2.2/2.3 including Compliance Testing
- 16K Reference DP Sink & Source
- 10/13.5/20 Gb/s Link Rates
- Playback and capture Dolby Atmos, Dolby Vision, HDR 10 and HDR 10+
- MST (4 streams)
- DSC, FEC and LTTTPR
- Panel Replay and Adaptive Sync

PRODUCT PICTURE  
COMING SOON



Remarks : To be released by end of 2020

# UCD-400

## DisplayPort™ 1.4a Test Device with HBR3 Support

- VESA Approved DP 1.4a Link Layer CTS Test Tool
- DCP Approved HDCP 2.2 and HDCP 2.3 CTS Tool
- 8K and 4K Reference Sink & Source
- DP 1.4a / HBR3 input and output in one unit
- MST support (4 streams)
- DSC 1.2a, FEC and LTTPR support
- HDCP 1.3 and HDCP 2.2/2.3 support
- UCD Console GUI for debugging
- High level API for easy integration



**NEW!**



# UCD-411

## DisplayPort™ 1.4 8K&HBR3 Video Generator

- Video Generator unit for testing DP sinks up to 8K60Hz (with DSC)
- DP 1.4a Link Layer CTS for Sinks
- HDCP 2.2 & 2.3 CTS Tests for Receivers
- 8K and 4K Reference DP Source
- DP 1.4a features:
  - » HBR3 output
  - » DSC, FEC and LTPR support
  - » MST support (4 streams)
- Cable adapter for USB-C devices testing
- HDCP 1.3, HDCP 2.2 and HDCP 2.3 support



**NEW!**

# DPA-400 2.0

## DisplayPort™ 2.0 AUX Channel Monitor

- Compatible with all DP versions
  - **DP 2.0 supported**
- Time stamped interaction log
- Detect and parse all DPCD locations
- Decode Sideband Channel Communication messages
- Flexible in MST testing
- Decode HDCP transactions
- USB controlled & powered, small size.
- Optional USB-C to DP cable enables to test USB-C supported DUT

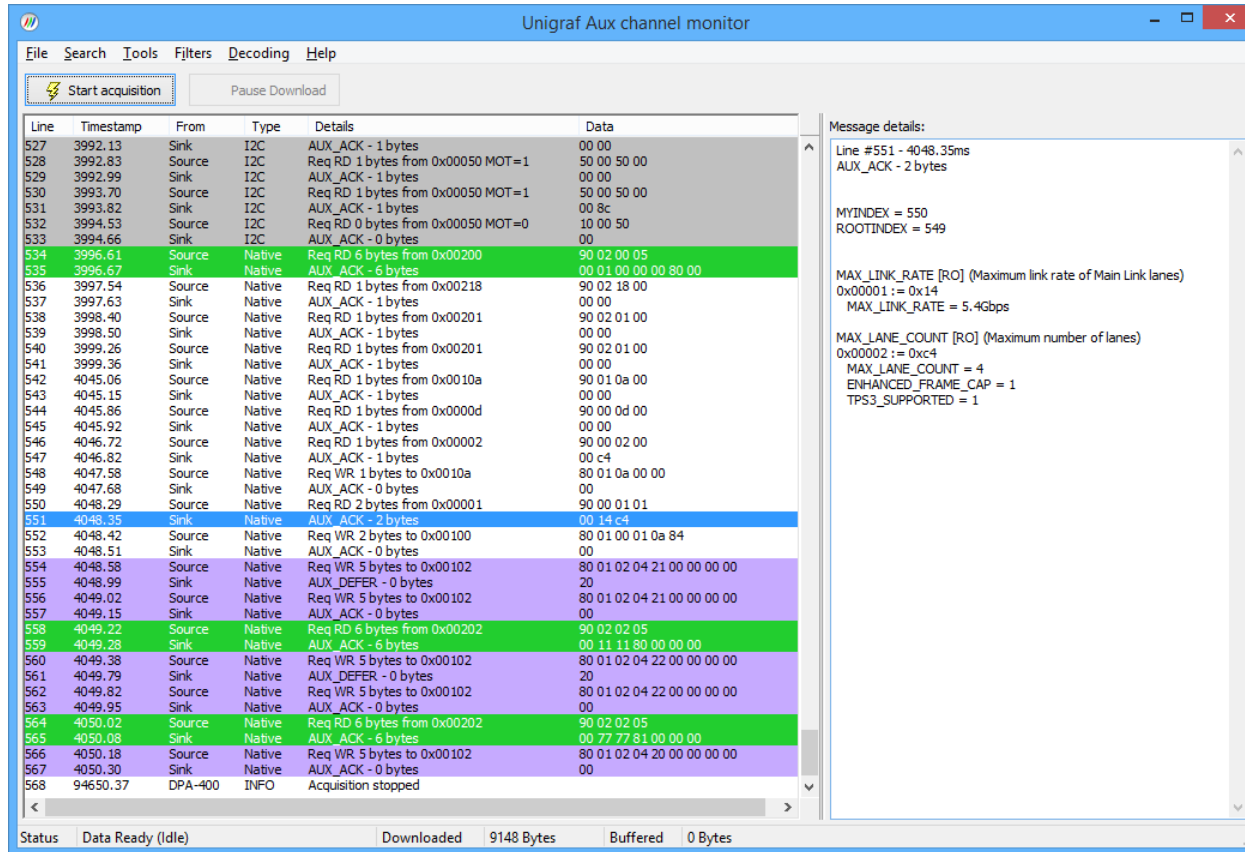


**AUX Channel Monitor is mandatory tool for any engineer verifying or debugging Compliance Test or Interoperability**



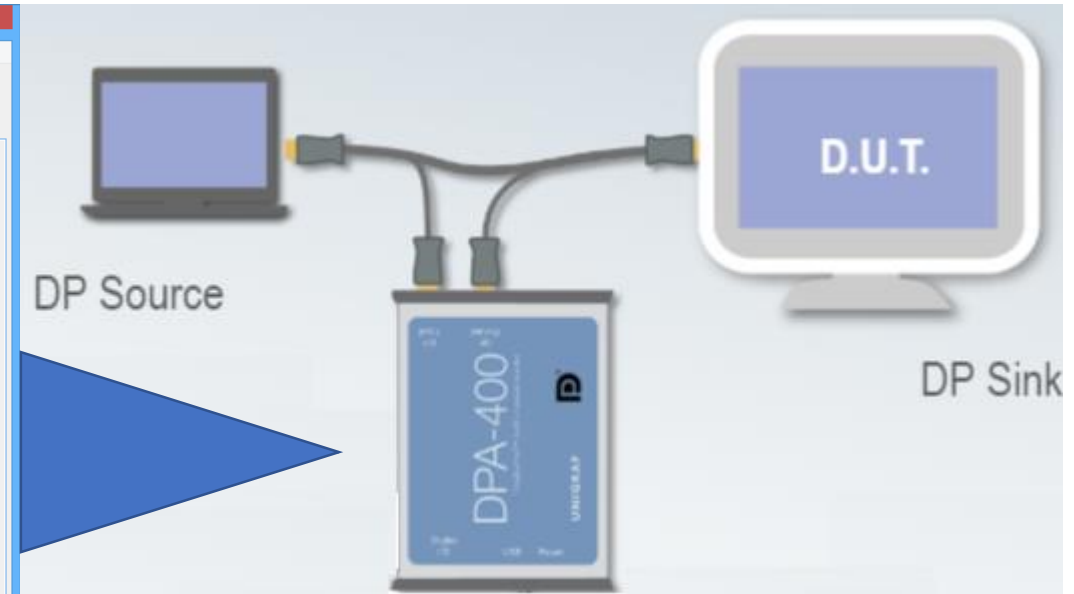
# DPA-400 2.0

## DisplayPort™ 2.0 AUX Channel Monitor



The screenshot shows the Unigraf Aux channel monitor software interface. The main window displays a log of transactions between a DP Source and a DP Sink. The log is organized into columns: Line, Timestamp, From, Type, Details, and Data. The status bar at the bottom indicates 'Data Ready (Idle)', 'Downloaded 9148 Bytes', and 'Buffered 0 Bytes'.

Line	Timestamp	From	Type	Details	Data
527	3992.13	Sink	I2C	AUX_ACK - 1 bytes	00 00
528	3992.83	Source	I2C	Req RD 1 bytes from 0x00050 MOT=1	50 00 50 00
529	3992.99	Sink	I2C	AUX_ACK - 1 bytes	00 00
530	3993.70	Source	I2C	Req RD 1 bytes from 0x00050 MOT=1	50 00 50 00
531	3993.82	Sink	I2C	AUX_ACK - 1 bytes	00 8c
532	3994.53	Source	I2C	Req RD 0 bytes from 0x00050 MOT=0	10 00 50
533	3994.66	Sink	I2C	AUX_ACK - 0 bytes	00
534	3996.61	Source	Native	Req RD 6 bytes from 0x00200	90 02 00 05
535	3996.67	Sink	Native	AUX_ACK - 6 bytes	00 01 00 00 00 80 00
536	3997.54	Source	Native	Req RD 1 bytes from 0x00218	90 02 18 00
537	3997.63	Sink	Native	AUX_ACK - 1 bytes	00 00
538	3998.40	Source	Native	Req RD 1 bytes from 0x00201	90 02 01 00
539	3998.50	Sink	Native	AUX_ACK - 1 bytes	00 00
540	3999.26	Source	Native	Req RD 1 bytes from 0x00201	90 02 01 00
541	3999.36	Sink	Native	AUX_ACK - 1 bytes	00 00
542	4045.06	Source	Native	Req RD 1 bytes from 0x0010a	90 01 0a 00
543	4045.15	Sink	Native	AUX_ACK - 1 bytes	00 00
544	4045.86	Source	Native	Req RD 1 bytes from 0x0000d	90 00 0d 00
545	4045.92	Sink	Native	AUX_ACK - 1 bytes	00 00
546	4046.72	Source	Native	Req RD 1 bytes from 0x00002	90 00 02 00
547	4046.82	Sink	Native	AUX_ACK - 1 bytes	00 c4
548	4047.58	Source	Native	Req WR 1 bytes to 0x0010a	80 01 0a 00 00
549	4047.68	Sink	Native	AUX_ACK - 0 bytes	00
550	4048.29	Source	Native	Req RD 2 bytes from 0x00001	90 00 01 01
551	4048.35	Sink	Native	AUX_ACK - 2 bytes	00 14 c4
552	4048.42	Source	Native	Req WR 2 bytes to 0x00100	80 01 00 01 0a 84
553	4048.51	Sink	Native	AUX_ACK - 0 bytes	00
554	4048.58	Source	Native	Req WR 5 bytes to 0x00102	80 01 02 04 21 00 00 00 00
555	4048.99	Sink	Native	AUX_DEFER - 0 bytes	20
556	4049.02	Source	Native	Req WR 5 bytes to 0x00102	80 01 02 04 21 00 00 00 00
557	4049.15	Sink	Native	AUX_ACK - 0 bytes	00
558	4049.22	Source	Native	Req RD 6 bytes from 0x00202	90 02 02 05
559	4049.28	Sink	Native	AUX_ACK - 6 bytes	00 11 80 00 00 00 00
560	4049.38	Source	Native	Req WR 5 bytes to 0x00102	80 01 02 04 22 00 00 00 00
561	4049.79	Sink	Native	AUX_DEFER - 0 bytes	20
562	4049.82	Source	Native	Req WR 5 bytes to 0x00102	80 01 02 04 22 00 00 00 00
563	4049.95	Sink	Native	AUX_ACK - 0 bytes	00
564	4050.02	Source	Native	Req RD 6 bytes from 0x00202	90 02 02 05
565	4050.08	Sink	Native	AUX_ACK - 6 bytes	00 77 77 81 00 00 00
566	4050.18	Source	Native	Req WR 5 bytes to 0x00102	80 01 02 04 20 00 00 00 00
567	4050.30	Sink	Native	AUX_ACK - 0 bytes	00
568	94650.37	DPA-400	INFO	Acquisition stopped	



Logging transaction between Source and Sink on AUX channel

# HDMI™

HIGH-DEFINITION MULTIMEDIA INTERFACE



NEW!

## Ver.2.1

HDMI™  
HIGH-DEFINITION MULTIMEDIA INTERFACE

## Ver.2.0

DisplayPort™

## Ver.1.4a



UCD-422

Test Device

DOLBY.



UCD-323

Test Device



UCD-301

Analyzer

**NEW!**



# UCD-422

## HDMI 2.1 10K Video Generator and Analyzer

- HDMI 2.1 Test Equipment (FRL)
- 10K@30Hz and 8K@60Hz support
- Enhanced Gaming Features: VRR, ALLM
- TMDS support
- HDCP 2.3 support
- Dolby Vision Test Tool
- eARC support
- DSC support

Remarks : eARC and DSC will be supported  
by end of 2020



# UCD-323(-D,-E,-F)

## HDMI & DP 4K Video Analyzer and Generator

- HDMI 2.0 and DP 1.4a(HBR2) input and output in one unit
- UHD / 4K compliant test equipment
- DCP Approved HDCP 2.3 CTS Test Tool
- HDCP 1.3 and HDCP 2.3 support
- Sink and source video, audio and configuration parameters
- Approved Dolby Vision & Dolby Digital Plus compatibility test tool

**Note : Dolby test program is not included,  
different options for each Sync, Source or both.**

**4K**



# UCD-301

## HDMI & DP 4K Video Analyzer

- Compact, USB 3.0 connected test equipment
- HDMI 2.0 and DP 1.4a(HBR2) compliant
- 4K / UHD @ 60 Hz
- Test video, audio and metadata
- Verify electrical continuity of output signals





USB Type-C

NEW!

Ver.1.4a(HBR3)

Ver.1.4a(HBR2)

8K



UCD-424

Test Device



UCD-340

Test Device

**NEW!**



# UCD-424

## USB-C DP 1.4a Alt Mode Tester

- **USB-C v1.3 input and output with Power Delivery 3.0**
  - Capable to sink & source 9V@3A
  - PD Role swaps supported
- **DP 1.4a / HBR3 input and output in one unit**
  - 8K and 4K Reference Sink, Source & Repeater
  - MST support (4 streams)
  - DSC Sink, FEC and LTTPR support
- **USB3.1Gen2 bypass from port to port**
- **DP 1.4a Link Layer CTS support & HDCP 2.3 CTS support**

**8K**



# UCD-340

## USB-C DP Alt Mode 4K Video Generator and Analyzer

- Test DP Alt Mode video and audio
- Test USB-C Power Delivery with DP Alt Mode
- USB-C and PD2.0 controls
- Power source and load up to 20V/5A
- **Electrical test for DUT connector pins**
- **Cable flip with SW**
- HDCP 1.3 and HDCP 2.3 support
- USB data pass-thru



**4K**



