

MODEL A223813

KEY FEATURES

- Option module for Chroma 2238 Video Pattern Generator
- DisplayPort 2.1
- Single port resolutions:
 - Up to 16K@144Hz output (with DSC Mode)
 - Up to 16K@23Hz output
- Dual output testing
- Adaptive-Sync
- MST test function
- Panel Replay
- LTPP (Link-Training Tunable PHY Repeater)
- VESA Standard Timing output
- Configurable lane count and rates
 - Lane count: 1 / 2 / 4 / 4+4 lane(s)
 - Lane rate: 1.62 / 2.7 / 5.4 / 8.1 / 10 / 13.5 / 20 (UHBR20) Gbps
- Configurable Swing Level and Pre-Emphasis:
 - Swing Level: 400 / 600 / 800 / 1200 mV
 - Pre-Emphasis: 0 / 3.5 / 6 / 9.5 dB
- Built-in Solid State Drive (SSD)
- RGB 4:4:4 and YCbCr 4:4:4 / 4:2:2 / 4:2:0 format settings
- RGB / ITU-601 / ITU-709 / xvYCC-601 / BT.2020-YC / BT.2020-RGB / DCI-P3 RGB color spaces
- 6 / 8 / 10 / 12 / 16 bit color depths
- HDCP 2.3 / 2.2 / 1.3 test functions
- DPCD Reading and Content Analysis functions
- Forward Error Correction (FEC)
- HDR test functions:
 - Display/edit HDR Metadata
 - HDR10/HLG/HDR10+ formats



DISPLAYPORT SIGNAL MODULE MODEL A223813

Chroma DisplayPort Video Signal Module A223813 is equipped with high-speed graphics processing units and features 2 DisplayPort and 2 USB-C video signal (DP Alt mode) output ports. Fully compliant with the DisplayPort 2.1 specifications, it supports a total 4-lane bandwidth of up to 80 Gbps at a maximum image resolution of 16K@144Hz (with DSC Mode). Besides basic image output test functions, this module also offers functionality for HDCP, MST, HDR10, and HDR10+ testing. A223813 supports image output at a maximum 16-bit color depth with color spaces such as RGB, ITU-601, ITU-709, xvYCC-601, BT.2020-YC, BT.2020-RGB, and DCI-P3 RGB, with pixel encoding formats YCbCr 4:4:4, 4:2:2, and 4:2:0.

16K QUHD (Quad Ultra High Definition) Image Output

The VESA DisplayPort 2.1 UHBR (Ultra High Bit Rate) audio/video standard uses more efficient 128b/132b encoding for transmission. Compared to the previous DisplayPort 1.4 HBR3 (High Bit Rate 3), the new version can achieve a maximum resolution of 16K and meets the functional and performance needs of future displays, supporting up to 4-lane output. In addition to allowing users to set the DP 2.1 UHBR20 (10/13.5/20 Gbps) lane rate, Chroma A223813 also supports lower DP 1.4 HBR3 (1.62/2.7/5.4/8.1 Gbps) lane rates, covering all the requirements for today's DisplayPort test applications.

Dual Output Testing

To enhance testing efficiency and comparison, the A223813's design innovatively incorporates DisplayPort and USB-C output connectors with individual graphics processing units in a 2x2 configuration. It can simultaneously and intermittently achieve maximum lane rates, which enables the unit to test two devices or sets of devices with different timings and pattern content, significantly improving testing efficiency. This functionality enables the user to, for example, compare the image quality, pixels, and timing of two devices simultaneously, or verify port switching functions, performance,

and compatibility on the same device. For extra convenience when using the comparison function, an on-screen display (OSD) can be enabled to easily differentiate between each window's test status, allowing users to clearly understand the on-screen changes happening during the test.

Adaptive-Sync

Defined in the VESA DisplayPort 2.1 specification, Adaptive-Sync's main function is to alleviate issues such as screen latency and tearing, with one of its applications being to meet the needs of rapidly changing imagery during gaming. Gaming frame rates often fluctuate, and Adaptive-Sync adjusts the screen's refresh rate automatically based on changes in the frames per second (FPS) of the transmitted image. This helps to reduce or eliminate issues such as latency, jitter, stuttering, and screen tearing. A223813 comes with four Adaptive-Sync testing modes: Saw, Ramp, Square, and Arbitrary. Users can freely adjust the refresh rate between 20Hz and 560Hz to simulate different refresh rates that a display may experience during gaming. In Arbitrary mode, users can customize the frame rate and duration parameters as required by their specific test application.

MST Testing

MST (Multi-Stream Transport) allows for image output to multiple displays in a daisy-chain setup. This greatly simplifies the cable configuration, as the DisplayPort signal source only requires one output port. Chroma A223813 supports MST transmission for a maximum of 4 streams at a bandwidth of up to 80 Gbps.

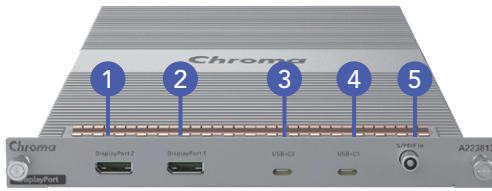
HDR Testing

The A223813 supports HDR (High Dynamic Range) output, and users can freely adjust HDR Metadata to perform the relevant HDR functional tests. A library of diverse HDR test patterns is included, with grayscale, color bars, window patterns, and more. The module also features test items for HDR 10+, HLG, and HDR 10 functionality.



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PANEL DESCRIPTION



DisplayPort Signal Module

- | | | |
|------------------|------------|-------------|
| 1. DisplayPort 2 | 3. USB-C 2 | 5. SPDIF In |
| 2. DisplayPort 1 | 4. USB-C 1 | |

APPLICATIONS



TEST EFFICIENCY 200% ↑



Saw



Ramp



Square



Arbitrary

Adaptive-Sync

- Adaptive-Sync test modes: Saw, Ramp, Square, Arbitrary
- Adaptive-Sync supports testing range of 20Hz-560Hz
- Video Timing EMP (Extended Metadata Packet) display and editing

DisplayPort 2.1 Dual Output

- DisplayPort 2.1 DisplayPort / USB-C dual output capability
- Supports 1.62/2.7/5.4/8.1/10/13.5/20 Gbps (UHBR20) per-lane rates
- Simultaneous output of signals with 2 different timings and patterns for improved test efficiency

SPECIFICATIONS

DisplayPort Signal Module A223813	
Video Output	
DisplayPort Resolution	16K (15360 x 8460) @144Hz 30 bpp HDR (With DSC) 16K (15360 x 8460) @23Hz and 30 bpp 4:4:4 HDR (No Compression)
Main Link Data Rate	1.62 / 2.7 / 5.4 / 8.1 (HBR3) Gbps per lane 10 / 13.5 / 20 (UHBR20) Gbps per lane
3D Format	Frame Sequential / Dual Pipe 3D / Stacked Frame / Pixel Interleaved / Side-by-side
Signal Compliant	DisplayPort v2.1 specification
Video Signal Type	RGB / YCbCr
Sampling Mode	RGB 4:4:4 ; YCbCr 4:4:4 / 4:2:2 / 4:2:0
Color depth	6 / 8 / 10 / 12 / 16 bits per component
Color Space	RGB / ITU-601 / ITU-709 / xvYCC-601 / BT.2020-YC / BT.2020-RGB / DCI-P3 RGB
HDCP	v2.3/2.2/1.3
Lane Count	1 / 2 / 4 / 4+4 lanes
Line Coding	128b / 132b Coding
Pre-emphasis	0dB / 3.5dB / 6dB / 9.5dB selectable
Swing Level	400mV / 600mV / 800mV / 1200mV selectable
HDR	HDR 10+ / HDR 10 / HLG
MST	Supported up to 20Gbps ; Max. 4 streams
SSC	Modulation Frequency 30~63 KHz Down Spread 0.1~5%
EDID	Version 1.3 (Read / Write / Compare / Edit / Analysis)
Video Format	VESA / CTA
DSC (software)	VESA DSC 1.2a (software)
Adaptive-Sync	Frame rate 20~560Hz programmable
Sync Mode	Saw / Ramp / Square / Arbitrary
Feature	Panel replay / LTTPR
FEC	Enable / Disable

Audio Output	
Channel	2 channels (L-PCM) - Internal 8 channels (SPDIF In) - External
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz +/- 1000ppm
Bits per Sample	16/20/24 Bits
Amplitude	-90.3~0.0 dBFS -138.47 ~ 0.0 dBFS programmable
Frequency	10 Hz~20 KHz, 1 Hz/step
Other	
Connector	DisplayPort x 2 USB-C x 2 (Only Video) S/PDIF x 1
Dimensions (HxWxD mm)	25 x 232 x 300 mm
Operating Temperature	+5°C~+40°C
Storage Temperature	-20~60°C
Humidity	20~90%
Weight	<2.5 kgs

* All specifications are subject to change without notice.

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