

# SHV 8K



## VIDEO PATTERN GENERATOR MODEL 2238

The Chroma 2238 Video Pattern Generator is equipped with various video standards including analog and digital signal output functions. A modular design with built-in high-speed independent graphics core provides standard test signals and patterns for the required resolutions. This unit can be used in a variety of display test requirement for today's multimedia industry. It supports the latest high-definition multimedia interface, HDMI as well as DisplayPort standard with key features listed below.

### 8K Super Hi-Vision

Full 8K (7680x4320/8192x4320) resolution is provided for testing @30/60Hz (HDMI, Display Port interface).

### Modular Signal Interface Design

This VPG supports up to 4 signal modules for various test requirement. The Multi-out function can provide 4 different types of timing and pattern from each of the 4 modules simultaneously. Each module has a built-in high-speed independent graphics core that significantly increase video speed for drawing and data transmission applications. 8K SHV image switch occurs in less than 200ms.

### HDMI 2.0b Testing (HDMI module)

This VPG supports HDMI 2.0b highest 6Gbps TMDS signal output (TMDS rate), 24/30/36 bit for color depth (RGB/YCbCr) and YCbCr 4:2:0 signal sampling output formats. It provides high resolution test functions with color standard ITU-R BT2020 and HDCP 2.2 & 1.4/ARC/CEC/EDID/SCDC (Status & Control Data Channel)/HDR (High Dynamic Range).

### DisplayPort 1.4 Testing (DP module)

The 2238 VPG supports the highest HBR3 (High Bit Rate 3, 8.1Gbps bandwidth) output as defined by DisplayPort 1.4 with audio transmission and 3D/EDID/MST/DPCD (Display Port Configuration Data).

### Intuitive Touch Panel and Graphical User Interface

Equipped with a 7 inch 1024x600 touch panel and a friendly graphical user interface, this VPG unit has an Instant Pattern View function that allows users to view and edit patterns directly on the device screen. The Program function allows a combination of timing/pattern/audio as required for testing to increase production efficiency. Its VPG Master software allows users to edit distinctive programs and parameters. Complete test functions and an easy-to-operate interface make it suitable for a variety of R&D and production test as well as quality verification in all video related industries.

### Network Management via Ethernet

The 2238 VPG also has a built-in Ethernet high-speed network communication interface that provides remote setting functions, along with uploading and downloading of data such as BMP File/Timing /Pattern/Program /Setting/FW Update. For test security and revision control, the unit is password protected. Its unique serial no. and IP address allows system managers to remotely monitor production throughput, efficiency and yield.

## MODEL 2238

### KEY FEATURES

- Support 8K Super Hi-Vision (7680x4320/8192x4320)
- Independent graphics core for 8K Super Hi-Vision pattern with less than 200 ms switch time
- Up to 4 signal modules per unit
- Multi-out function
- 7 inch 1024x 600 high-resolution touch panel, GUI interface
- BMP file format support
- USB 3.0 data access
- Gigabit Ethernet high-speed network interface
- HDMI 2.0b signal module (option)
  - 8K x 4K 60 Hz (4 HDMI port)
  - 4K x 2K 60 Hz (1 HDMI port)
  - Pixel rate up to 600MHz (6Gbps TMDS rate)
  - RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
  - HDCP 2.2 / 1.4
  - Wide color gamut
  - HDR (High Dynamic Range) Testing (HDR infocode & metadata / EOTF)
  - SCDC (status & control data channel) Reader
- DisplayPort 1.4 signal module (option)
  - 8K x 4K 60 Hz (2 DP port )
  - 8K x 4K 30 Hz (1 DP port )
  - 1.62 / 2.7 / 5.4 / 8.1 Gbps per lane
  - HDCP 2.2 / 1.3
  - DPCD (Display Port Configuration Data) Reader
  - MST (Multi-Stream Transport) testing

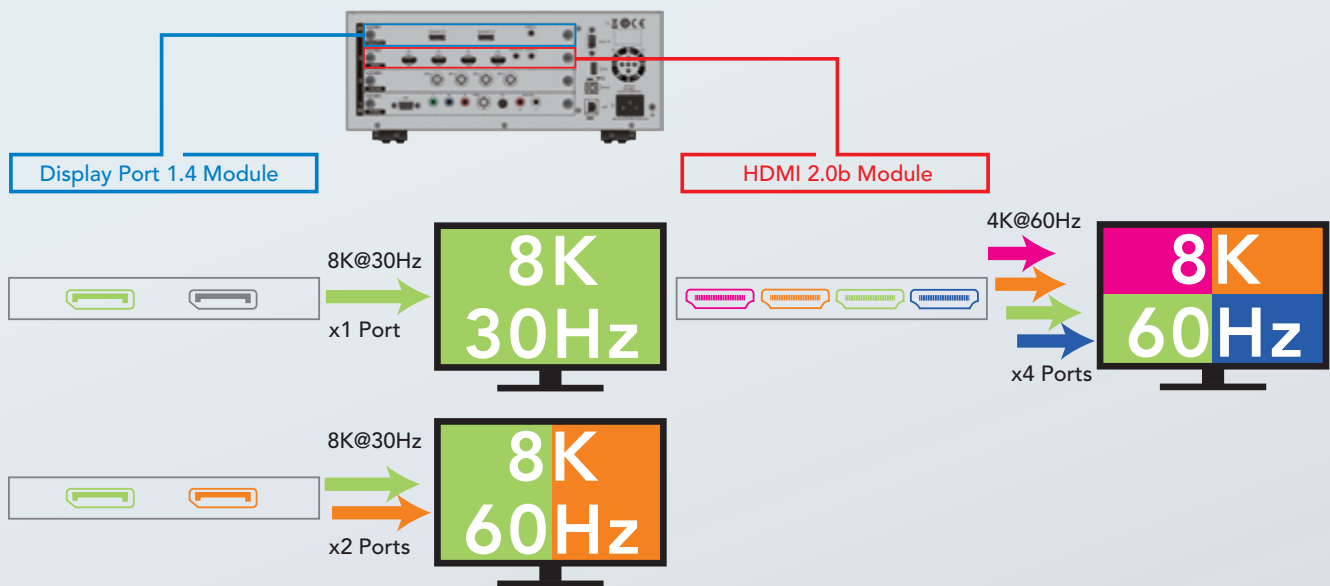


# Chroma



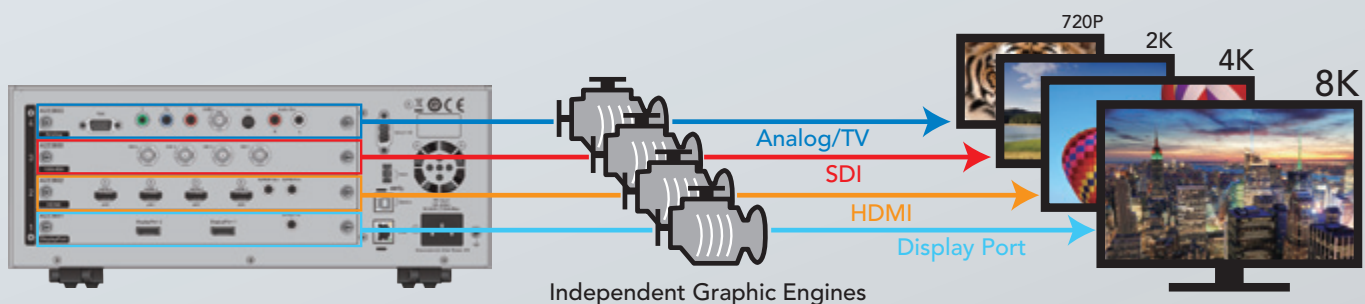
# 8K Super Hi-Vision Application

- Featured in modular design, the 2238 Video Pattern Generator is capable of providing 8K Super Hi-Vision (7680 x 4320 / 8192 x 4320) resolution for testing. Full 8K at 30/60 Hz resolution is supported by one single module (via a HDMI Display Port), and up to 4 modules can be installed and configured as required for all testing application to 8K.



## Multi-Out Function

- Independent graphics modular design
- Up to 4 modules providing independent timing and pattern outputs



# Next Generation for 8K Super Hi-Vision

The Reference of Today and Tomorrow



## Gigabit Ethernet / USB 3.0 Interface

- Gigabit Ethernet (100 Mbps) control
- Remote test setup and data upload/download via internet network
- IP address configuration enables users to control/monitor test device status
- USB 3.0 ultra-high speed data transmission interface with bandwidth up to 5Gbps



## Instant Pattern View / Touch panel

- Instant pattern view function : "what you see is what you get"
- Icon pattern editing allows users to edit and create patterns directly on the touch panel
- 7 inch touch panel with resolution of 1024 x 600
- Intuitive and user friendly operation



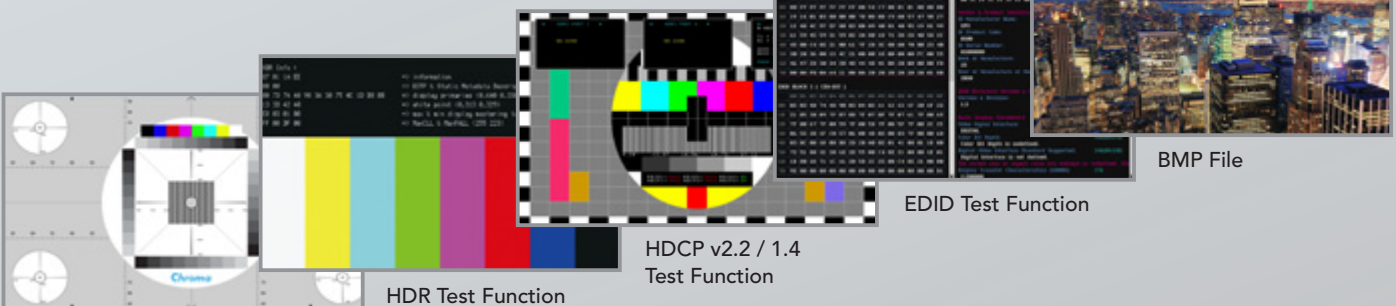
## Graphic User Interface

- Easy-to-use GUI
- Simple and clear timing/pattern parameter setup
- Real time pattern editing and preview
- Complete program editing to meet diversified testing requirements.



## Comprehensive Library of Test Patterns and Functions

- Supports geometry patterns (Color Bar, Grayscale and Dot), 8KBMP and various functions required for testing industrial displays
- EDID test functions to read, write and analyze UUT related info in real time
- HDR test functions to set the HDR Metadata for sending



8K Resolution Test Pattern

HDR Test Function

HDCP v2.2 / 1.4 Test Function

EDID Test Function

BMP File

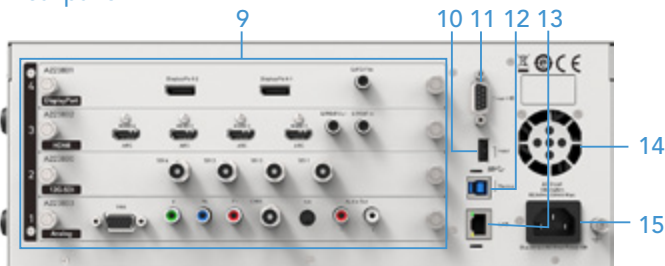
## PANEL DESCRIPTION

Front panel



1. Power Switch
2. USB Port
3. 7" Touch Panel
4. Function Group
5. Data Group
6. Operation Group
7. Rotary Selector
8. Cursor

Real panel



9. Modules
10. Host USB Port
11. SMART I/O Control
12. Device USB Port
13. Ethernet
14. Fan
15. AC Power Input

## SPECIFICATIONS

### Model 2238 Main Frame

#### SYSTEM

Display	1024 x 600
Signal Slot	4 signal slot
Data Storage	5000 timings + 5000 patterns + 2000 programs
AC input Voltage Range	100 ~ 240V, 50~60Hz, 1.5 A Max.
Fan Noise	< 65dB (with fan control circuit)
Operating Temperature	+5°C ~ +40°C
Storage temperature	-20°C ~ 60°C
Humidity	20% ~ 90%
Dimensions	132 x 350 x 350 mm (HxWxD)

### A223800 12G-SDI SIGNAL MODULE

#### VIDEO OUTPUT

Signal Compliant	SD/HD/3G/6G/12G - SDI specifications
Video Signal Type	RGB / YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	8 / 10 / 12 / 16 bits per component
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709

#### AUDIO OUTPUT

Channel	8 channels (L-PCM)
Sample Rate	48KHz

### A223801 DISPLAYPORT SIGNAL MODULE

#### VIDEO OUTPUT

Signal Compliant	Display Port v1.4 specifications
Resolution	8Kx4K@30Hz (1 port) ; 8Kx4K@60Hz (2 ports)
Main Link Data Rate	1.62 / 2.7 / 5.4 / 8.1 (HRB3) Gbps per lane
Pixel Rate Range	Max. 2.4GHz
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	6 / 8 / 10 / 12 / 16 bits per component
HDCP	v1.3 / v2.2
MST	4K (3840x2160) x 4 stream max.

#### AUDIO OUTPUT

Channel	2 channel (L-PCM)-Internal 8 channel (AC3/DTS)-External 8 channel HBR-audio
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz, +/-1000ppm

\* All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

### A223802 HDMI SIGNAL MODULE

#### VIDEO OUTPUT

Signal Compliant	HDMI v2.0b specifications
Resolution	4Kx2K@60Hz (1 port) ; 8Kx4K@60Hz (4 ports)
Pixel Rate Range	Max. 600MHz (TMDS CLK : Max. 300MHz)
Video Signal Type	RGB / YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2 or 4:2:0
Color Depth	24 / 30 / 36 / 48* @ RGB & YCbCr (*Max. 150MHz)
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / SYCC / xvYcc (IEC61966-24) / Adobe RGB / Adobe YCC / ITU-R BT.2020
HDCP	v1.4 / v2.2

#### AUDIO OUTPUT

Channel	8 channels (FL / FR / RL / RR / FC / LFE / LRC / RRC)
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz +/-1000ppm

### A223803 ANALOG SIGNAL MODULE

#### ANALOG

Pixel Rate Range	Max. 300MHz
Video Signal	R, G, B (75 ohms)
Video Level	0~1.0V, 1 mV/step

#### TV OUTPUT

Output Mode	NTSC			PAL			SECAM	
Subcarrier	443	M, J	BDGHI	M	60	N	Nc	4.41/
Frequency	4.43	3.58	4.43	3.57	4.43	4.43	3.58	4.25
Subcarrier Stability	± 50							Hz

Video Output	Composite (BNC), S-Video Burst On/Off (NTSC, PAL) Contrast/Brightness/Saturation/Hue programmable
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Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4
V-CHIP (NTSC)	MPAA/FCC/Canada English/Canada French Rating
Teletext (PAL)	Teletext System B Level 1, 1.5

#### AUDIO OUTPUT

Channel	2 channels ( R , L)
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Frequency	10Hz~20KHz, 1Hz/step

### A223806 DVI SIGNAL MODULE

#### VIDEO OUTPUT

Signal Compliant	DVI 1.0 specifications
Video Signal Type	RGB
Pixel Rate Range	1 link : Max. 165MHz ; 2 link : Max. 330MHz
Sampling Mode	4:4:4
EDID	Version 1.3 (Read/Write/Compare/Edit/Analysis)
HDCP	Version 1.0 (with dual-link mode)

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