VIDEO PATTERN GENERATOR MODEL 2233

Chroma 2233 Programmable Video Pattern Generator is a multi-function measurement equipment. Combining Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals with high resolution test quality and multiple output support it is capable of providing a complete test solution to customers.

HDMI is the first industrial supported, uncompressed and full digitalized audio/video interface that can synchronize and integrate video/audio signals through a cable line. Since large scale and high definition have become the trend for video industry, HDMI V1.3 is able to provide higher speed bandwidth and color depth that support 24,30,36 bits (RGB or YCbCr) and new color standard xvYCC to get real natural color and high resolution image.

DsplayPort is the state-of-the-art video output interface defined by Video Electronics Standards Association (VESA). It is an open and extendable interface standard for industrial applications. The objective of this standard is to lower down the platform design cost and provide an interoperable digital communication interface for PC and components. Same as HDMI, the high definition digital audio and video frequency can be received via a digital video transmission cable. Its maximum transmission bandwidth is up to 10.8Gb/s. The sufficient bandwidth is able to fulfill the requirements for large display with higher resolution in the future.

Chroma 2233 is equipped with DisplayPort standard format with the following key features:
The connection of DisplyPort is composed of main channel, AUX CH and Hot Swap (HPD) 3 types of signals. The main channel is formed by 4 lanes (1, 2, 4Lane) and each lane can support 2.7Gbps or 1.62Gbps transmission rate. Up to 10.8Gbps can be transmitted by 4 lanes.

DPCD (DisplayPort Configuration Data) is the main function of DisplayPort that acted as a communication bridge between source and sink. Chroma 2233 is able to adjust the parameters such as Lane, Main link rate and etc. automatically or manually after connection. As the signal attenuation may occur during long distance transmission for DisplayPort, the Pre-emphasis and Swing voltage can also be adjusted.

In addition Chroma 2233 supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

For TV output, the image and chromaticity of 2233 are complies with NTSC, PAL and SECAM regulations. There are CVBS compound signals, BNC and Y/C (Luminance/ Chrominance) image/ chromaticity separation signals for output along with S-Video/SCART output connector. Chroma 2233 also supports special TV function tests such as Closed Caption, V-Chip and Teletext.

Chroma 2233 can use remote control box (optional) instead of editing on the panel directly. The unique Timing/ Pattern/ Program/User key design is the same as the editing icons on panel that can be utilized flexibly for production line test in particular.

For operation, Chroma 2233 has adopted full color graphic interface and built in super capacity memory for storage. Besides using the panel for editing, users can edit various timing parameters and test patterns via the VPG Master application on PC site. Its easy operating interface and complete test functions are applicable for all video and related industries in R&D, production test and quality assurance that can satisfy the test requirements for the multimedia displays of today and in the future.

MODEL 2233

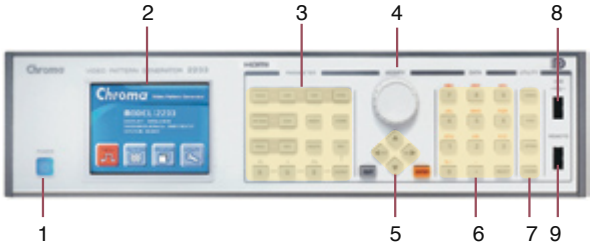
Key Features:

- 4K x 2K Graphic size
- DisplayPort V1.1a pixel rate 270MHz
- DisplayPort with HDCP V1.3 support
- Support Automatically & Manually setting for DisplayPort function
  - 2 Link rate (1.62/2.7Gbps) selectable
  - 1, 2, 4 Video lane selectable
  - 0/3.5/6/9.5dB pre-emphasis selectable
  - 400/600/800/1200mV Swing level selectable
- HDMI V1.3b (with 24, 30, 36bit deep color/xvYCC/CEC)
- DVI & HDMI & DisplayPort with HDCP output
- Y, Pb, Pr/Y, Cb, Cr/Y, R-Y, B-Y output
- S-Video/CVBS/SCART/RGB/ Color Component/D-terminal
- NTSC/PAL/SECAM signal
- EDID Read/Write/Compare
- Easy and variable pattern edit
- HDMI/DVI Plug & Play function
- Power saving mode support
- Gamma correction
- ESD protection circuit
- USB Host / Device
- 3.5" LCD panel display performance

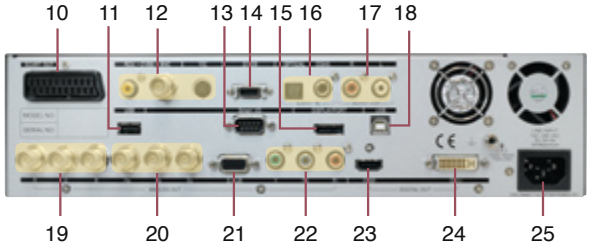
Chroma

PANEL DESCRIPTIONS

Front View



Rear View



1. Power Switch
2. 3.5" LCD Display
3. Function Group
4. Rotary Selector
5. Cursor
6. Data Group
7. Utility
8. USB Port
9. Remote for Chroma optional
10. SCART Port
11. USB port
12. CVBS:RCA, BNC, Y/C
13. Smart I/O control
14. D-Terminal (D1-D5)
15. DisplayPort output
16. Digital Audio Input:Optical & Coaxial
17. Analog Audio output:R/L
18. Host USB port
19. RGB/BNC Analog output
20. Hs/Vs/Xs Sync output
21. RGB/D-SUB Analog output
22. YPbPr Component output
23. HDMI output
24. DVI-I output
25. AC Line Input

SPECIFICATIONS

ANALOG OUTPUT	
Display Size	4096 x 2048
Pixel Rate Range	0.5~250MHz
Video Level	R,G,B (75 ohms) 0~1.0V programmable
Sync on Green/Level	0~0.5V On/Off programmable
White Level	0~1.2V programmable
Blank Level	7.5 IRE / 0 IRE selectable
HORIZONTAL TIMING	
Total Pixels	32~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
COMPOSITE SYNC	
	H+V, H EXOR V, Equalization & Serration Pulse
SEPARATE SYNC	
	BNC : Hs,Vs,Xs D-SUB : Hs(Xs), Vs
VIDEO FORMAT	
Video Output	R, G, B Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)

DVI (TMDS) OUTPUT	
Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	Support HDCP V.1.0 Production-Key
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4

HDMI VIDEO OUTPUT	
Version	HDMI V1.3b (with 24,30,36 bit deep color/xvYCC/CEC)
Pixel Rate Range	25 ~ 165 MHz (TMDS CLK : 225MHz)
Support HDMI Timing	77 Timing (CEA-861D)
Pixel Repetition	4
Video Signal Type	RGB or YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Bits per Component	8 / 10 / 12 @ RGB & YCbCr
Color Space	RGB / ITU-R BT.601 / ITU-R BT.709 / xvYCC
HDCP	HDCP V.1.2
EDID	Read / Write / Compare / Edit
HDMI AUDIO OUTPUT	
Sample Rate	32, 44.1, 48, 88.2, 96,176.4, 192KHz
Number of Channel	8 Channel (FL/FR/LR/RR/FC/LFE/RLC/RRC)
Bits per Sample	16 / 24 bit
Waveform	Sine wave
Amplitude	-90.3 to 0.0 dBFS / -138.4 to 0.0 dBFs
Frequency Range	10Hz to 20KHz
Frequency Resolution	10Hz / Step
External Audio Input	Optical and Coaxial (S/PDIF)
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

DISPALY PORT OUTPUT	
Pixel Rate Range	25~270MHz
Video Signal Type	RGB/YCbCr
Sampling Mode	RGB 4:4:4 / YCbCr 4:4:4 or 4:2:2
Color Depth Transmission	6/8/10/12 bits per component

HDCP	HDCP V1.3
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Pre-emphasis	0dB/3.5dB/6dB/9.5dB selectable
Swing level	400mV/600mV/800mV/1200mV selectable
Audio	2 Channel (L-PCM)-Internal, 8 Channel (AC3/DTS)-External
Bit Per Sample	24bit
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz

TV OUTPUT									
Output Mode	NTSC		PAL					SECAM	
Subcarrier Frequency	443 4.43	M,J 3.58	BDGHI 4.43	M 3.57	60 4.43	N 4.43	Nc 3.58	4.41/ 4.25	MHz
Subcarrier Stability	±50								Hz
Video Output	Composite (BNC, RCA), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
	Saturation programmable								
	Hue programmable								
Closed Caption Support (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
V-CHIP (NTSC)	MPAA Rating : G, PG, PG-13, R, NC-17, X								
	FCC Rating : TV-Y, TV-Y7, TV-G, TV-PG, TV-14, TV-MA								
	Canada English Rating : C, C8+, G, PG, 14+, 18+								
	Canada French Rating: G, 8ans+,13 ans+,16 ans+,18 ans+								
Teletext (PAL)	Teletext System B Level 1 , 1.5								

HDTV FORMAT					
Timing	Progressive Mode Frame Rate (Hz)		Interlace Mode Frame Rate (Hz)		Standard
1920x1080	60P	60	60I	30	SMPTE 274
	59.94P	60/1.001	59.94I	30/1.001	SMPTE 274
	50P	50	50I	25	SMPTE 274
	30P	30			SMPTE 274
	29.97P	30/1.001			SMPTE 274
	25P	25			SMPTE 274
	24P	24			SMPTE 274
	23.98P	24/1.001			SMPTE 274
1920x1035			60I	30	SMPTE 240
			59.94I	30/1.001	SMPTE 240
1280x720	60P	60			SMPTE 296
	59.94P	60/1.001			SMPTE 296
	50P	50			SMPTE 296

DATA STORAGE DEVICE	
Default	2000 timings + 2000 patterns
Internal Memory	3000 timings + 3000 patterns + 1000 programs
External Memory	USB Host interface
OTHERS	
AC Input	100-240V, 50-60Hz, 5A maximum
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION / WEIGHT	
2233 (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch 5.6 kg / 12.33 lbs

All specifications are subject to change without notice.

Developed and Manufactured by :

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