



VIDEO PATTERN GENERATOR MODEL 2233-B

Chroma 2233-B 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.

For the digital signal of TMDS output, the pixel rate is up to 330MHz with resolution supporting above UXGA. Moreover, for the higher frequency test application, Chroma 2233-B supports DVI Dual HDCP for 2 Link DVI transmission.

As large scale and high definition have become the trend for video industry, Chroma 2233-B supports the up-to-date high resolution multimedia digital video transmission interface, HDMI V1.3 is able to provide higher speed bandwidth and color depth. It supports 24,30,36 bits (RGB or YCbCr) and new color standard xvYCC, SYCC, Adobe RGB, and Adobe YCC(CEA-861E) to get real natural color and high resolution image.

DisplayPort 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 provides 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.

The 2233-B is equipped with DisplayPort standard format with the following key features:

The connection of DisplayPort is composed of main channel, AUX CH and Hot Plug Detect (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 acts as a communication bridge between source and sink. The 2233-B is able to adjust the parameters such as Lane, Main link rate, 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 the 2233-B 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.

In the meantime to fulfill the test application for multi-port output, the 2233-B has built-in 3 HDMI, 2 DisplayPort and 2 SCART ports to reduce a great deal of test time, so as to finish the tests in the fastest way.

For operation, the 2233-B 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.

Video Pattern Generator

MODEL 2233-B

Key Features

- Multi-port independent output test application
 - HDMI port output x 3
 - DisplayPort port output x 2
 - SCART port (output x 1 / input x 1)
- 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 V1.3C (with 24,30,36bit deep color / xvYCC / CEC / Lip Sync function)
- DVI pixel rate 330MHz
- Support DVI Dual HDCP test application
- 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 output
- NTSC / PAL / SECAM TV signal
- EDID Read / Write / Compare
- Easy and variable pattern edit
- HDMI/DVI plug & play function
- Power saving mode support
- USB host / Device

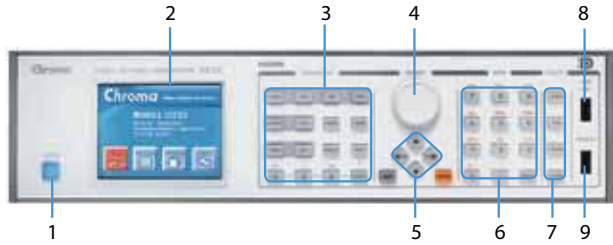


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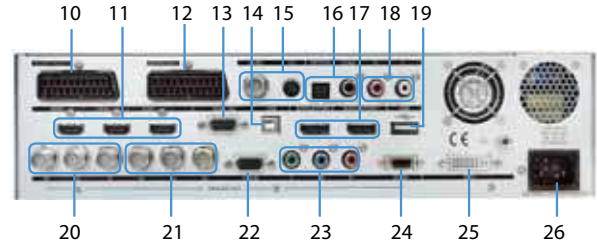
PANEL DESCRIPTIONS

Front 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 Input/Output
11. HDMI Output
12. SCART Output
13. Smart I/O control
14. Device USB port
15. CVBS : BNC, Y/C
16. Digital Audio Input : Optical & Coaxial

Rear View



17. DisplayPort output
18. Analog Audio output: R/L
19. Host USB port
20. RGB/BNC Analog output
21. Hs/Vs/Xs Sync output
22. RGB/D-SUB Analog output
23. YPbPr Component output
24. D-Terminal (D1-D5)
25. DVI-I output
26. 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
Black 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 / RS-343A 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 (with Dual Mode)
Compliant	DVI 1.0 specification
Video Signal Type	RGB
Sampling Mode	4:4:4
HDMI VIDEO OUTPUT	
Version	HDMI V1.3C (with 24,30,36 bit deep color/xvYCC/CEC)/Lip sync
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 (IEC61966-2-4)/ SYCC/Adobe RGB/Adobe YCC
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	M,J	BDGHI	M	60	N	Nc	4.41/ 4.25	MHz
Subcarrier Stability	4.43	3.58	4.43	3.57	4.43	4.43	3.58		Hz
Video Output	± 50								
	Composite (BNC), S-Video								
	Burst On/Off (NTSC, PAL)								
	Contrast programmable								
	Brightness programmable								
Closed Caption Support (NTSC)	Saturation programmable								
	Hue programmable								
V-CHIP (NTSC)	C1, C2, C3, C4/ T1, T2, T3, T4								
	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+								
Teletext (PAL)	Canada French Rating: G, 8ans+, 13 ans+, 16 ans+, 18 ans+								
	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	1Ø 110~240V ± 10% V _{IN} 47~63Hz
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %

DIMENSION & WEIGHT	
2233-B	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch (HxWxD) 5.6 kg / 12.33 lbs

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

Developed and Manufactured by :

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