



VIDEO PATTERN GENERATOR MODEL 2333-B

Chroma 2333-B is a high value-added test equipment that can meet the diversified demands for multi-media displays. It has high resolution test quality and multiple output types that can support comprehensive tests for large-scale application in the field of R&D, quality assurance and mass production.

Chroma 2333-B combines Analog / DVI / HDMI / DisplayPort / SDTV / HDTV signals that can satisfy the needs for testing various signals from multi-media displays.

For digital signal: The TMDS output with pixel rate 25~330MHz that supports the dual channel HDCP test is able to fit in the high bandwidth test requirements under 120Hz screen refresh rate.

For HDMI output: The 2333-B provides higher speed bandwidth and color depth. It supports 24,30 bits (RGB or YCbCr) and the new generation color standards xvYCC, sYCC, Adobe RGB and Adobe YCC to attain truly natural color and high resolution image screen. It also supports complete CEC and Lip Sync tests.

DisplayPort is the new video output interface promoted by Video Electronics Standards Association; VESA. It is an open and extendable interface standard for display devices. Its maximum transmission bandwidth is up to 10.8Gb/s. With the official certification of VESA, Chroma 2333-B is able to provide the consistency and integrity signals in highest standard.

DisplayPort is composed of main channel, auxiliary channel and hot swap (HPD) 3 types of signals. The main channel is made by 4 lanes (1, 2, 4 Lane) and each lane supports 2.7Gbps or 1.62Gbps transmission rate. The parameters can be adjusted automatically via DPCD connection and complete the test procedure in sequential.

For TV output, the image and chromaticity signals are complying with the NTSC, PAL and SECAM standards. Also, the tests for special TV functions such Closed Caption, V-chip and Teletext are supported.

To fulfill the application of multi-port output test, Chroma 2333-B has built-in 3 HDMI, 2 DisplayPort and 2 SCART ports that can finish testing the displays with multi-port in the fastest speed and reduce the test time in a great deal.

Various test patterns and timing parameters are built-in Chroma 2333-B for operation. Shortcuts are provide for Timing/Pattern/Program/Audio to simplify the settings. The test program edited by the user on PC can be downloaded to Chroma 2333-B directly for storage and recall next time.

Moreover, for the function keys used frequently a special User Key is designed to combine these functions. Up to 32 keys can be memorized for continuous actions and executed by a single key. Besides the panel operation, remote control can be enabled with a remote controller for users to operate the device more easily.

Video Pattern Generator

MODEL 2333-B

Key Features:

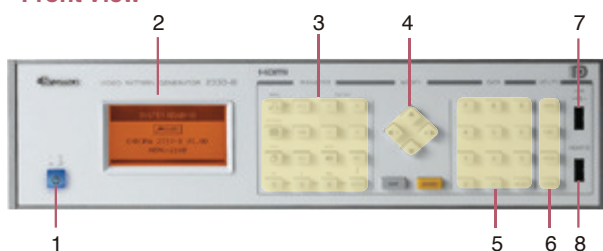
- Multi-port output tests
 - 3 HDMI output ports
 - 2 DisplayPort output ports
 - 2 SCART ports (output x1/ input x1)
- DisplayPort V1.1a pixel rate 270MHz
 - 2 Link Rate (1.62/2.7Gbps)
 - 1,2,4 Video Lane
- HDMI V1.3C
 - True 30 bits color depth output
 - Support xvYCC & sYCC, Adobe RGB, Adobe YCC color space
 - Support CEC Function
 - Built-in Lip Sync test pattern
 - Digital audio output
 - 3 HDMI outputs to provide individual HDCP Enable/Disable
- DVI pixel rate 330MHz (dual channel)
- DVI Dual HDCP test application support
- DVI, HDMI & DisplayPort with HDCP output
- Support HDCP V1.0 (DVI) / V1.2 (HDMI) / V1.3 (DisplayPort)
- 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
- Support Closed caption / V-Chip / Teletext
- Built-in low low-distortion audio output (2ch/8ch)
- Easy-to-use audio hot key
- EDID read/write/compare
- USB (Host & Device)
- User key (up to 32 continuous actions can be combined)



Chroma

PANEL DESCRIPTIONS

Front View



1. Power Switch
2. 160*80 LCD Display
3. Function Group
4. Cursor
5. Data Group

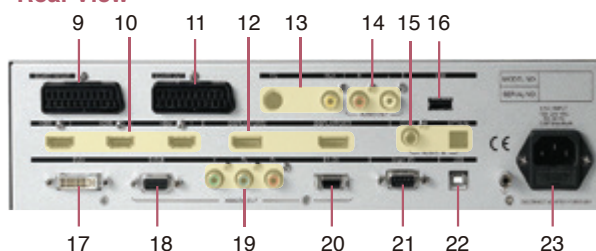
6. Utility
7. USB Port
8. Remote for Chroma optional
9. SCART Input/Output
10. HDMI Output

11. SCART Output
12. DisplayPort Output
13. Y/C,RCA
14. Analog Audio output : R/L
15. Digital Audio Input Optical &

- Coaxial
16. Host USB port
17. DVI-I Output
18. D-SUB Analog Output
19. YPbPr Component Output

20. D-Terminal (D1-D5)
21. Smart I/O control
22. Device USB port
23. AC Line Input

Rear View



SPECIFICATIONS

ANALOG OUTPUT

Display Size	4096 x 2160
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
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VERTICAL TIMING

Total Pixels	4~4096 lines (non-interlace) 4~2048 lines (interlace) / 1 line programmable
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COMPOSITE SYNC

	H+V, H EXOR V, Equalization & Serration Pulse
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SEPARATE SYNC

	D-SUB : Hs(Xs), Vs
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VIDEO FORMAT

Video Output	R, G, B / RS-343A / RS-170 / VESA (VSI) Y, R-Y, B-Y Y, Cb, Cr / ITU 601 Y, Pb, Pr / ITU 709, RP177, SMPTE 240M DDC II B (D-SUB)
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DVI (TMDS) OUTPUT

Pixel Rate Range	25 < 1 link ≤ 165MHz/165 < 2 link ≤ 330MHz
EDID	Read / Write / Compare / Edit
HDCP	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 1.3C (with 24,30 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 @ 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 / 20 / 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

DISPLAYPORT OUTPUT

Version	DisplayPort 1.1a
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 bits per component
HDCP	HDCP V1.3
DPCD	Read / Write
Main Link Data Rate	2.7Gbps or 1.62Gbps per lane
Lane Count	1/2/4 Lanes
Audio	2 Channel (L-PCM)-Internal
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/		MHz
	4.43	3.58	4.43	3.57	4.43	4.43	3.58	4.25		
Subcarrier Stability	±50									Hz
Video Output	S-Video, RCA 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									

AUDIO (ANALOG) OUTPUT

Number of Channel	2 Channel (R / L)
Sample Rate	32, 44.1, 48, 88.2, 96, 176.4, 192KHz
Level Resolution	10mV / Step
Level Range	0V to 2V (at 600 Ohms Load)
Frequency Range	10Hz to 20KHz / 10Hz Step
Special Control Mode	Tone / Sweep / Mute / Repeat / Play Time

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

2333-B (H x W x D)	88 x 350 x 350 mm / 3.46 x 13.78 x 13.78 inch 4.5 kg / 9.9 lbs
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All specifications are subject to change without notice.
Please visit our website for the most up to date specifications.

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