

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



Chroma



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.

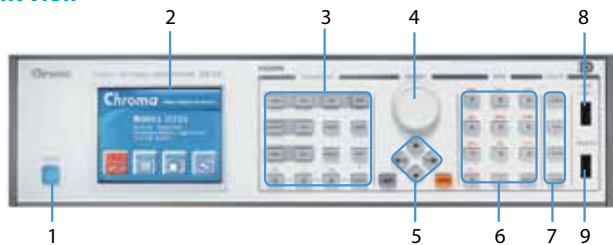
In addition the 2233-B supports SSC (Spread Spectrum Clock, the technology to eliminate EMI) test that can significantly reduce the EMI problems occurred among displays and components, and simplify the product design.

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.

PANEL DESCRIPTIONS

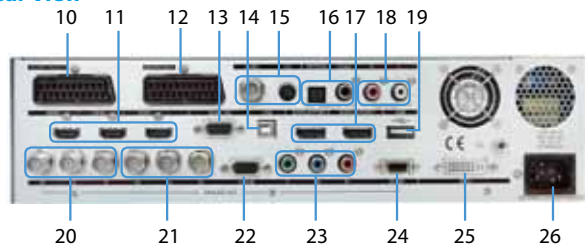
Front View



- 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

- 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 | 4.25 | Hz |

| | |
|-------------------------------|---|
| Video Output | Composite (BNC), 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) | MCAA 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 |
|-----------|----------------------------------|----------|--------------------------------|----------|-----------|
| | 60P | 60 | 60I | 30 | |
| 1920x1080 | 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 _N 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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