

## Programmable Video Pattern Generator



### Programmable Video Pattern Generator Model: 2228/2328

Chroma 2228 / 2328 Video Pattern Generators combine the signals of analog (250MHz) and TMDS (165MHz) / LVDS (224MHz) / TTL (200MHz) to provide the VESA standard video signal source for LCM / LCD Monitor / multi-media Monitor, it also integrates the TV (NTSC / PAL / SECAM) / SDTV / HDTV signal to fit in the multi-media display applications for the newly risen LCD TV, PDP TV, LCOS TV and DLP RPTV industries.

Users can utilize the software application, VPG PLUS, either on PC or on the Video Pattern Generator itself to edit various timing parameters, patterns and test procedures. Its complete test functions can fully meet the requirements for R&D, production test and quality assurance in all video related industries.

ANALOG / TMDS / LVDS / TTL / TV / SDTV / HDTV seven in one 2228 / 2328 Video Pattern Generators equipped with microprocessor and precision Phase Locked Loop (PLL) circuit have accuracy up to 25PPM/1PPM after calibration are featured in high accuracy, high stability and high speed. Moreover, all of its horizontal timing parameters are in one-pixel resolution, which can provide the video signal with 256-color per pixel.

For analog signal output, its pixel frequency can up to 250MHz and the RGB signals meet the RS-343A standard. It also supports Y/R-Y/B-Y, Y/Pr/Pb, Y/Cr/Cb and sync signals for tri-level output to fulfill the test requirements for HDTV.

The digital signal is in TMDS/LVDS/TTL output, the pixel frequency from TMDS is 25~165MHz/LVDS is 20~224MHz/TTL is 5~200MHz and test screen resolution over UXGA.

As to the TV output spec, the image and chromaticity of 2228 / 2328 meet the regulations of NTSC443, NTSC M/J, PAL BDGHI, SECAM standard, which the output signals include VBS composite signal with BNC and Y/C (Luminance / Chrominance) image / chromaticity separation signal with S-Video output connector.

Chroma 2228 / 2328 output patterns and timings can be programmed by PC via RS232C and loaded to memory card via the 22xx Series VPGs, meanwhile the operation sequences can be programmed and controlled by VPGplus on PC via RS232C interface. VPGplus provides a convenient operating environment for VPG users. Users can set the VPG parameters for the data of timing, pattern, program and icon, etc.

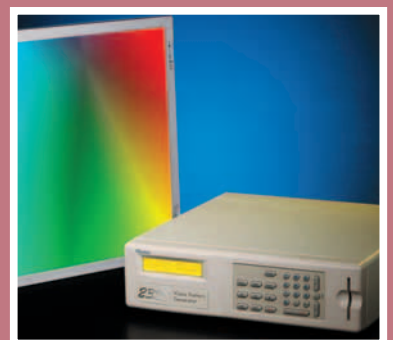
Chroma 2228 / 2328 seven in one Video Pattern Generators with high resolution test quality and multi-output can meet the multi-media display applications at present, and the features described above make the Video Pattern Generator a indispensable testing tool for the RD engineers and production manufacturers.

### MODEL 2228/2328

#### Key Features :

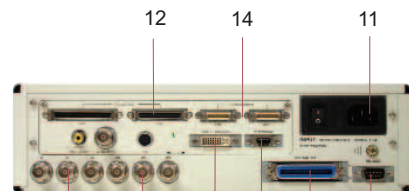
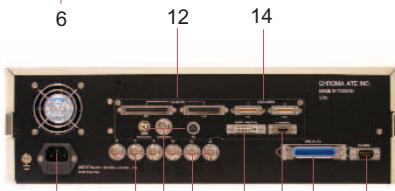
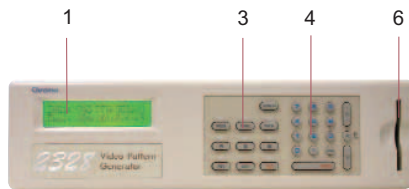
- Analog pixel rate 250MHz
- TMDS pixel rate 165MHz
- LVDS pixel rate 224MHz
- TTL pixel rate 200MHz
- TV NTSC/PAL/SECAM signal support
- S-Video / CVBS composite output
- Bi-level SDTV & Tri-level HDTV Format
- HDCP V.1.0 support
- Closed Caption function (NTSC)
- V-Chip function (NTSC)
- Teletext function (PAL)
- Y,Pb,Pr/Y,Cb,Cr/Y,R-Y,B-Y output
- One-pixel resolution
- Display size up to 4096x2048 max
- Picture for BMP format support
- DDC2B Read / Write/Compare
- PC remote control
- Storing data with memory cards
- Supporting Gamma calibration
- ESD circuit protection built-in
- DI-D5-terminal for SDTV to HDTV

#### Model 2328



**Chroma**

## PROGRAMMABLE VIDEO PATTERN GENERATOR



1. LCD Display
2. Icon Keys: For icon type selection
3. Function Key: Timing & Pattern
4. Alphanumeric Keys: For data input
5. Config Key: General information setting
6. Memory Card: For storage memory expansion
7. Analog Signal Output R.G.B.
8. Sync Output: For analog R.G.B.
9. I/O Port: Panel remote input & control output
10. RS-232 Interface
11. AC Input : Auto Range
12. TTL Output : Parallel ch1/ch2
13. TV Output: CVBS:RCA/BNC ; S-Video
14. LVDS output: Serial ch1/ch2
15. TMDS output: DVI-I
16. HDTV output: D5-Terminal

## SPECIFICATIONS

ANALOG OUTPUT	
Display Size	2048X2048 / 4096X2048(Option)
Pixel Rate Range	3.126~250MHz
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 programmable
HORIZONTAL TIMING	
Total Pixels	128~8192 pixels / 1 pixels resolution
VERTICAL TIMING	
Total Pixels	6~4096 lines (non-interlace) 6~2047 lines (interlace) / 1 line resolution
COMPOSITE SYNC	
	H OR V · H XOR V · with RS-343A Equalization & Serration Pulse
SEPARATE SYNC	
	Hs,Vs,Xs

TMDS OUTPUT	
Pixel Rate Range	25MHz~165MHz
EDID	Read / Write / Compare / Edit
HDCP	Support HDCP V.1.0 Production-Key
Compliant	DVI 1.0 specification
Video Signal Type	RGB or YCbCr
Sampling Mode	4:4:4

LVDS OUTPUT	
Pixel Rate Range	20~112MHz / 1 link · 40~224MHz / 2 link
TTL OUTPUT	
Pixel Rate Range	5~100MHz / 1 link · 10~200MHz / 2 link

DATA STORAGE DEVICE	
Flash Memory (read only)	100 timings + 100 patterns
NVRAM (R/W)	300 timings + 100 patterns + 100 programs
Memory Card (R/W)	Unlimited data storage
OTHERS	
AC Input	90~132 V / 180~250 V · 47~63 Hz auto range
Operation/Storage Temp.	+5~+40 deg.C / -20~+60 deg.C
Humidity	20~90 %
DIMENSION / WEIGHT	
2228	430x133x380 mm/9.0 kg 16.9x5.2x15 inch/19.82 lb
2328	318x100x320 mm/5.0 kg 12.5x3.9x12.6 inch/11.01 lb

All specifications are subject to change without notice

TV OUTPUT					
Output Mode	NTSC 443	NTSC M,J	PAL BDGHI	SECAM	
Subcarrier Frequency	4.433618	3.579545	4.433618	4.462500	4.250000 MHz
Subcarrier Stability	+50				Hz
Video Output	Composite (BNC,RCA),S-Video				
	Burst On/Off (NTSC,PAL)				
	Contrast programmable				
	Brightness programmable				
	Saturation programmable				
Closed Caption Support (NTSC)	C1~C4, T1~T4				
	V-CHIP				
Teletext (PAL)	Teletext System B Level 1 · 1.5				

SDTV OUTPUT : All SDTV Timing can be programmable				
Timing	Progressive Mode Frame Rate (Hz)	Interlace Mode Frame Rate (Hz)	Standard	
720X483	59.94P	60/1.001		SMPTE 293
			59.94I	59.94/2 ITU 601 SMPTE 170M
720X576	50P	50		ITU 1382
			50I	25 ITU 601

HDTV OUTPUT					
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

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