

# Multiformat Pattern Generator

Test Equipment  
Depot  
1-800-517-8431



LT 448

The LT 448 Multiformat Pattern Generator is designed to output analog component and composite signals applicable to the DTV systems. There is also a DVI-D output connector. This innovative generator includes a total of 29 digital television video signal formats conforming to Advanced Television Systems Committee (ATSC), and Digital Video Broadcast (DVB) Integrated Services Digital Broadcasting (ISDB), standards throughout the world. Component analog signals are output for 17 formats of DTV conforming to ISDB, ATSC, and DVB standards based on 1920 x 1080, 1280 x 720, 720 x 480, and 720 x 576 raster formats. The NTSC/PAL/SECAM composite output and VGA, used for a computer monitor, are provided. These 29 formats are suitable for production line applications of projectors, etc. Computer D-15 outputs are available in VGA, SVGA, XGA and SXGA. The test patterns, generated in the digital domain, include five types of color bars, raster, ramp, 10/15/32/64 stair steps, convergence, crosshatch, multiburst, character, small and normal windows, demodulation, monoscope, ANSI gray scale, checker and optional natural picture. Natural picture allows user to download custom bit maps into internal RAM.

## Features

### Applicable to Multiformat

17 formats of component signals are provided for DTV conforming to ISDB, ATSC and DVB standards based on 1920 x 1080, 1280 x 720, 720 x 480, 720 x 576 formats. The NTSC/PAL/SECAM composite output and VGA output used for a computer monitor are provided. These 29 formats are suitable for production line applications of projectors.

### GBR / YP<sub>B</sub>P<sub>R</sub> Signal Output

Two component signal formats (i.e., G, B, R/Y, P<sub>B</sub>, P<sub>R</sub>) can be selected.

### Sync Signal Output

CS (tri-level or binary level), HD, and VD sync signals are output.

### Monoscope Pattern

Monoscope pattern (i.e., 16:9 for HDTV, 4:3 for SDTV interlace, 16:9(S) for SDTV progressive) suitable for inspecting resolution is provided as standard for the format applicable to DTV.

### S Connector

Provided to output separate Y/C signals, this instrument is suitable for adjusting and inspecting equipment with an S connector. The S connector identifies S1 and S2 signals.

### D Connector

The D5 output connector conforms to JEITA CP-4120 standards is provided as standard.

### Preset/Recall Function

Allows up to 100 setting conditions of format and patterns, which can be stored and recalled.

### RS-232C Interface

Allows the instrument to be remotely controlled by using a personal computer.

### Remote Controlling Address

Can be recalled, incremented or decremented by grounding the remote connector pin.

### Signal Generated in a Digital Format

The digital signal generator produces highly stable and accurate signals (except audio signals)

### DVI-D

Conforms to DDWG standards is provided as standard.

### NATURAL PICTURE PATTERN



Test Equipment Depot - 800.517.8431 - 99 Washington Street Melrose, MA 02176

FAX 781.665.0780 - TestEquipmentDepot.com

## Applicable Format

No.	Format	Standards	Y Signal Number of Horizontal Dots	Blanking Period/ Active Picture ( $\mu$ s)	Horizontal Frequency (kHz)	Field Frequency (Hz)	Frame Frequency (Hz)	Aspect Ratio
COMPONENT, HDTV								
1	1080p/ 59.94	274M	2200	1.887/ 12.94	67.432	—	59.94	16:9
2	1080i/ 59.94 (30sF)	274M RP211	2200	3.775/ 25.88	33.716	59.94	29.97	16:9
3	1080p/ 29.97	274M	2200	3.775/ 25.88	33.716	—	29.97	16:9
4	1080p/ 23.98	274M	2750	11.19/ 25.88	26.973	—	23.976	16:9
5	1080PsF/ 23.98	RP211	2750	11.19/ 25.88	26.973	47.952	23.976	16:9
6	1080p/50	274M	2640	4.848/ 12.93	56.25	—	50	16:9
7	1080p/25	274M	2640	9.697/ 25.86	28.125	—	25	16:9
8	1080i/50 (25sF)	274M RP211	2640	9.697/ 25.86	28.125	50	25	16:9
9	720p/ 59.94	296M	1650	4.988/ 17.26	44.955	—	59.94	16:9
10	720p/ 29.97	296M	3300	27.23/ 17.26	22.477	—	29.97	16:9
11	720p/ 23.98	296M	4125	38.35/ 17.26	17.982	—	23.98	16:9
12	720p/50	296M	1980	9.428/ 17.24	37.5	—	50	16:9
13	720p/25	296M	3960	36.09/ 17.24	18.75	—	25	16:9
COMPONENT, SDTV								
14	480p/60	293M	858	5.111/ 26.67	31.469	—	59.94	16:9(S)
15	480i/60	601	858	10.22/ 53.33	15.734	59.94	29.97	4:3 or 16:9(S/L)
16	576p/50	601	864	5.333/ 17.24	31.250	—	50	16:9(S)
17	576i/50	601	864	10.67/ 17.24	15.625	50	25	4:3 or 16:9(S/L)
COMPOSITE								
18	NTSC-M	170M	858	10.22/ 53.33	15.734	59.94	29.97	4:3 or 16:9(S/L)
19	NTSC-J	170M	858	10.22/ 53.33	15.734	59.94	29.97	4:3 or 16:9(S/L)
20	NTSC 4.43	—	858	10.22/ 53.33	15.734	59.94	29.97	4:3 or 16:9(S/L)
21	PAL	470	864	10.67/ 17.24	15.625	50	25	4:3 or 16:9(S/L)
22	PAL-M	470	858	10.22/ 53.33	15.734	59.94	29.97	4:3 or 16:9(S/L)
23	PAL-N	470	864	10.67/ 17.24	15.625	50	25	4:3 or 16:9(S/L)
24	PAL-60	—	858	10.22/ 17.24	15.734	59.94	29.97	4:3 or 16:9(S/L)
25	SECAM	470	864	10.67/ 53.33	15.625	50	25	4:3 or 16:9(S/L)

## Applicable Format Cont'

COMPUTER MONITOR								
26	VGA (640 x 480 @ 60Hz)	VESA	800	6.356/ 25.422	31.469	_____	59.94	4:3
27	SVGA (800 x 600 @ 60Hz)	VESA	1056	6.400/ 20.000	37.879	_____	60.317	4:3
28	XGA (1024 x 768 @ 60Hz)	VESA	1344	4.923/ 15.754	48.363	_____	60.004	4:3
29	SXGA (1280 x 1024)	VESA	1688	3.778/ 12.000	63.981	_____	60.02	4:3

\* Typical values are listed for time and frequency.

\* Number of effective lines are as follows:

NTSC-M, NTSC-J, NTSC 4.43, PAL-M, PAL-60: 480 lines

PAL, PAL-N, SECAM: 574 lines

\* Abbreviations

274M: SMPTE 274M, SMPTE 293M: SMPTE 293M, 296M: SMPTE 296M, 170M: SMPTE 170M,

601: ITU-R BT. 601, 470: ITU-R BT. 470, VESA: VESA STANDARDS

\* Abbreviations

(S): SQUEEZE, (S/L): SQUEEZE/LETTER BOX selection

## Output Connectors

No.	Format	Component Output (BNC)	D Connector (D Connector)	Composite Output (BNC, RCA Jack)	Y/C Output (S Connector)	Output HD, VD, CS (BNC)	RGB Output (15-pin mini D-sub)	DVI-D
COMPONENT, HDTV								
1	1080p/ 59.94	★	★			○	★	
2	1080i/ 59.94	★	★			○	★	○
3	1080p/ 29.97	★	★			○	★	○
4	1080p/ 23.98	★	★			○	★	○
5	1080PsF/ 23.98	★	★			○	★	○
6	1080p/50	★	★			○	★	
7	1080p/25	★	★			○	★	○
8	1080i/50	★	★			○	★	○
9	720p/ 59.94	★	★			○	★	○
10	720p/ 29.97	★	★			○	★	○
11	720p/ 23.98	★	★			○	★	
12	720p/50	★	★			○	★	○
13	720p/25	★	★			○	★	○
COMPONENT, SDTV								
14	480p/60	★	★			○	★	○
15	480i/60	★	★			○	★	
16	576p/50	★	★			○	★	○
17	576i/50	★	★			○	★	

## Output Connectors Cont'

No.	Format	Component Output (BNC)	D Connector (D Connector)	Composite Output (BNC, RCA Jack)	Y/C Output (S Connector)	Output HD, VD, CS (BNC)	RGB Output (15-pin mini D-sub)	DVI-D
<b>COMPOSITE</b>								
18	NTSC-M			○	○	○		
19	NTSC-J			○	○	○		
20	NTSC 4.43			○	○	○		
21	PAL			○	○	○		
22	PAL-M			○	○	○		
23	PAL-N			○	○	○		
24	PAL-60			○	○	○		
25	SECAM			○	○	○		
<b>COMPUTER MONITOR</b>								
26	VGA	⊛				○	⊛	○
27	SVGA	○				○	○	○
28	XGA	○				○	○	○
29	SXGA	○				○	○	

\* For items marked with ⊛, select output format (i.e., G, B, R/Y, P<sub>B</sub>, P<sub>R</sub>) via the front panel controls.

\* Output connectors marked with ⊛ and ○ are enabled when the format is selected.

Connectors without marking are disabled (i.e., high impedance state) when the format is selected.

\* No signal is output from the DVI-D connector when Y, P<sub>B</sub>, P<sub>R</sub> is selected in the VGA format, however.

## Video Signal

<b>Video Signal</b>	
Video Data	Number of Bits
Quantization Parameter	(Common to G/Y, B/P <sub>B</sub> , R/P <sub>R</sub> ): 8 bits (except sync signals)
Component Signal	<p>* Specifications are common to both HDTV and SDTV unless otherwise noted.</p> <p>Specifications            HDTV: Conforms to SMPTE PR160 Standards.            SDTV: Conforms to EBU-N10, SMPTE 253M standards.</p> <p>Video Signal Format: G, B, R or Y, P<sub>B</sub>, P<sub>R</sub> can be selected via the front panel controls.</p> <p>Output Impedance: 75 Ω            Output Connector: BNC, 15-pin mini D-sub, D connector, Simultaneous output            Number of Outputs            BNC (G, B, R/Y, P<sub>B</sub>, P<sub>R</sub>, selectable): 2            15-Pin Mini D-sub: 1            D connector: 1</p> <p>Sync Signal            Tri-Level            HDTV: Added to G/Y, B/P<sub>B</sub>, and R/P<sub>R</sub>            Binary Level            SDTV: Added to G/Y</p> <p>Output Control Function            Sync Signal ON/OFF: Settable for G, B, R            INVERT: Inverts Pattern</p>

## Video Signal Cont'

<p>Composite Signal</p>	<p>* In NTSC system, specifications are common to NTSC-M (USA) and NTSC-J (Japan unless otherwise noted.</p> <p>Specifications: Conforms to SMPTE 170M, ITU-R BT.470 standards            Color System: NTSC, NTSC 4.43, PAL, PAL-M, PAL-N, PAL-60, SECAM</p> <p>Setup Level: 0% fixed for monoscope pattern            NTSC-M, PAL-M: 7.5%            NTSC-J, NTSC 4.43, PAL, PAL-N, PAL-60: 0%            SECAM: 0%</p> <p>Output Impedance: 75 <math>\Omega</math>            Output Connector: BNC, RCA Jack            Number of Outputs: 1 each            Output Control Function            INVERT: Inverts luminance only.</p>
<p>Y/C Separation Signal</p>	<p>Specifications: Conforms to JEITA CPR-1201 standards            Signal Specifications: Same as the composite signal (except NTSC-J)            Output Connector: S connector            Number of Outputs: 1</p> <p>Aspect Ratio ID Signal: Superimposed on the C signal in NTSC-J mode            Output Impedance in DC: 10 k<math>\Omega</math> <math>\pm</math> 3k<math>\Omega</math></p> <p>Aspect Ratio ID Signal Voltage: 0V fixed for all formats (except NTSC-J)            S1 (squeeze signal output): 5V            S2 (letter box signal output): 2.2V            4:3 Signal Output: 0V</p> <p>Output Control Function            INVERT: Inverts luminance only.</p>
<p>Computer Monitor Signal</p>	<p>Specifications: Conforms to VESA STANDARDS            Video Signal Format: G, B, R</p> <p>Output Impedance: 75 <math>\Omega</math>            Output Connector: BNC, 15-pin mini D-sub, simultaneous output            Number of Outputs            BNC (G, B, R only): 2            15-Pin Mini D-sub: 1</p> <p>Sync Signal            Binary Level: Added to G</p> <p>Output Control Function            SYNC ON G: ON/OFF, selectable            INVERT: Inverts pattern.</p>

## Video Signal Cont'

D Connector Output (Applicable to D5)		Specifications: Conforms to JEITA CP-4120 (D1/D2/D3/D4/D5 outputs), RC-5237 standards									
		<p>Video Signal</p> <p>Signal Specifications: Same as the component signal</p> <p>Format: G, B, R or Y, P<sub>B</sub>, P<sub>R</sub> can be selected via the front panel controls.</p> <p>Output: Always output; does not detect whether a plug is inserted.</p>									
		ID Signal									
		No.		Line			No.		Line		
		Format		1 (V)	2 (V)	3 (V)	Format		1 (V)	2 (V)	3 (V)
		Component, HDTV					Composite				
1		1080p/59.94	5	5	5	18	NTSC-M	0	0	0	
2		1080i/59.94	5	0	5		NTSC-J 4:3	0	0	0	
3		1080p/29.97	5	2.2	5	19	(S)	0	0	0	
4		1080p/23.98	5	2.2	5		(L)	0	0	0	
5		1080PsF/23.98	5	5	5	20	NTSC 4.43	0	0	0	
6		1080p/50	5	5	5	21	PAL	0	0	0	
7		1080p/25	5	2.2	5	22	PAL-M	0	0	0	
8		1080i/50	5	0	5	23	PAL-N	0	0	0	
9		720p/59.94	2.2	5	5	24	PAL-60	0	0	0	
10		720p/29.97	2.2	2.2	5	25	SECAM	0	0	0	
11		720p/23.98	2.2	2.2	5	Computer Monitor					
12		720p/50	2.2	2.2	5	26	VGA	0	0	0	
13		720p/25	2.2	2.2	5	27	SVGA	0	0	0	
		Component, SDTV					28	XGA	0	0	0
14		480p/60	0	5	5	29	SXGA	0	0	0	
15		480i/60 4:3 (S) (L)	0 0 0	0 0 0	0 5 2.2	Note that the formats not prescribed by JEITA CP-4120 standards are dedicated for this instrument.					
16		576p/50	0	2.2	5						
17		576i/50 4:3 (S) (L)	0 0 0	2.2 2.2 2.2	0 0 2.2						
		Output Impedance in DC: 10 k Ω ±3 k Ω									
		Auxiliary Lines 1, 2, 3: No connection									
		Connector: D connector conforming to JEITA RC-5237 standards									
		D Connector Pin Assignments									
Pin No.		Signal			Pin No.		Signal				
1		G/Y			8		Line 1				
2		G/Y GND			9		Line 2				
3		B/P <sub>B</sub>			10		Auxiliary line 2				
4		B/P <sub>B</sub> GND			11		Line 3				
5		R/P <sub>R</sub>			12		Detects whether a plug is inserted. GND				
6		R/P <sub>R</sub> GND			13		Auxiliary line 3				
7		Auxiliary line 1			14		Detects whether a plug is inserted				

## Video Signal Cont'

<p>DVI Output</p>	<p>Specifications: Conforms to DDWG (Digital Display Working Group) DVI standards.            Signal Format: Single Link T.M.D.S (digital signal only)            Applicable Format:                VGA, SVGA, XGA                HDTV (except 1080p/60, 1080p/50, 720p/24)                SDTV (except 480i/60, 576i/50)</p> <p>DDC Function: Not available            HOT PLUG Detection: Not available</p> <p>Output Control Function                INVERT: Inverts pattern.            Output Connector: DVI-D            Number of Outputs: 1</p> <p>DVI Connector Pin Assignments</p> <table border="1" data-bbox="548 667 1169 1129"> <thead> <tr> <th>Pin No.</th> <th>Signal</th> <th>Pin No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>T.M.D.S Data 2 -</td><td>13</td><td>No Connect</td></tr> <tr><td>2</td><td>T.M.D.S Data 2 +</td><td>14</td><td>+5 V Power</td></tr> <tr><td>3</td><td>T.M.D.S Data 2 Shield</td><td>15</td><td>GND (for +5 V)</td></tr> <tr><td>4</td><td>No Connect</td><td>16</td><td>No Connect</td></tr> <tr><td>5</td><td>No Connect</td><td>17</td><td>T.M.D.S Data 0 -</td></tr> <tr><td>6</td><td>No Connect</td><td>18</td><td>T.M.D.S Data 0 +</td></tr> <tr><td>7</td><td>No Connect</td><td>19</td><td>T.M.D.S Data 0 Shield</td></tr> <tr><td>8</td><td>No Connect</td><td>20</td><td>No Connect</td></tr> <tr><td>9</td><td>T.M.D.S Data 1 -</td><td>21</td><td>No Connect</td></tr> <tr><td>10</td><td>T.M.D.S Data 1 +</td><td>22</td><td>T.M.D.S Clock Shield</td></tr> <tr><td>11</td><td>T.M.D.S Data 1 Shield</td><td>23</td><td>T.M.D.S Clock +</td></tr> <tr><td>12</td><td>No Connect</td><td>24</td><td>T.M.D.S Clock -</td></tr> </tbody> </table> <p>* No signal is output when Y, P<sub>B</sub>, P<sub>R</sub> is selected in the VGA format.</p>				Pin No.	Signal	Pin No.	Signal	1	T.M.D.S Data 2 -	13	No Connect	2	T.M.D.S Data 2 +	14	+5 V Power	3	T.M.D.S Data 2 Shield	15	GND (for +5 V)	4	No Connect	16	No Connect	5	No Connect	17	T.M.D.S Data 0 -	6	No Connect	18	T.M.D.S Data 0 +	7	No Connect	19	T.M.D.S Data 0 Shield	8	No Connect	20	No Connect	9	T.M.D.S Data 1 -	21	No Connect	10	T.M.D.S Data 1 +	22	T.M.D.S Clock Shield	11	T.M.D.S Data 1 Shield	23	T.M.D.S Clock +	12	No Connect	24	T.M.D.S Clock -
Pin No.	Signal	Pin No.	Signal																																																					
1	T.M.D.S Data 2 -	13	No Connect																																																					
2	T.M.D.S Data 2 +	14	+5 V Power																																																					
3	T.M.D.S Data 2 Shield	15	GND (for +5 V)																																																					
4	No Connect	16	No Connect																																																					
5	No Connect	17	T.M.D.S Data 0 -																																																					
6	No Connect	18	T.M.D.S Data 0 +																																																					
7	No Connect	19	T.M.D.S Data 0 Shield																																																					
8	No Connect	20	No Connect																																																					
9	T.M.D.S Data 1 -	21	No Connect																																																					
10	T.M.D.S Data 1 +	22	T.M.D.S Clock Shield																																																					
11	T.M.D.S Data 1 Shield	23	T.M.D.S Clock +																																																					
12	No Connect	24	T.M.D.S Clock -																																																					
<p>15-Pin Mini D-Sub</p>	<p>15-pin mini D-sub Connector Pin Assignments</p> <table border="1" data-bbox="548 1281 1169 1600"> <thead> <tr> <th>Pin No.</th> <th>Signal</th> <th>Pin No.</th> <th>Signal</th> </tr> </thead> <tbody> <tr><td>1</td><td>R/P<sub>R</sub></td><td>9</td><td>Auxiliary</td></tr> <tr><td>2</td><td>G/Y</td><td>10</td><td>SYNC GND</td></tr> <tr><td>3</td><td>B/P<sub>B</sub></td><td>11</td><td>Auxiliary</td></tr> <tr><td>4</td><td>GND</td><td>12</td><td>Auxiliary</td></tr> <tr><td>5</td><td>GND</td><td>13</td><td>HD</td></tr> <tr><td>6</td><td>R/P<sub>R</sub> GND</td><td>14</td><td>VD</td></tr> <tr><td>7</td><td>G/Y</td><td>15</td><td>Auxiliary</td></tr> <tr><td>8</td><td>B/P<sub>B</sub> GND</td><td></td><td></td></tr> </tbody> </table> <p>* For the G/Y, B/P<sub>B</sub>, R/P<sub>R</sub>, selecting the format can output Y, P<sub>B</sub>, P<sub>R</sub> or G, B, R.</p>				Pin No.	Signal	Pin No.	Signal	1	R/P <sub>R</sub>	9	Auxiliary	2	G/Y	10	SYNC GND	3	B/P <sub>B</sub>	11	Auxiliary	4	GND	12	Auxiliary	5	GND	13	HD	6	R/P <sub>R</sub> GND	14	VD	7	G/Y	15	Auxiliary	8	B/P <sub>B</sub> GND																		
Pin No.	Signal	Pin No.	Signal																																																					
1	R/P <sub>R</sub>	9	Auxiliary																																																					
2	G/Y	10	SYNC GND																																																					
3	B/P <sub>B</sub>	11	Auxiliary																																																					
4	GND	12	Auxiliary																																																					
5	GND	13	HD																																																					
6	R/P <sub>R</sub> GND	14	VD																																																					
7	G/Y	15	Auxiliary																																																					
8	B/P <sub>B</sub> GND																																																							
<p>G, B, R Level Control</p>	<p>Function: G, B, R output level can be respectively adjusted by using the screwdriver adjustment on the bottom.</p> <p>Adjustable Range: 0 to 1.0 V p-p (into 75 Ω load, active picture)</p>																																																							

## Video Signal Cont'

Sync Signal Output	
CS Output	Output Impedance: 75 Ω Output Connector: BNC Number of Outputs: 2
HD Output	Level: TTL level Output Connector: BNC, 15-pin mini D-sub Number of Outputs BNC: 2 15-pin mini D-sub: 1  Output Polarity: Negative (positive for SVGA, SXGA), Selectable in user setting mode
VD Output	Level: TTL level Output Connector: BNC, 15-pin mini D-sub Number of Outputs BNC: 2 15-pin mini D-sub: 1  Output Ploarity: Negative (positive for SVGA, SXGA), Selectable in user setting mode

## Pattern vs Format

No.	Format	Aspect Ratio	Pattern																			
			Color Bar						Step													
			Full Field	Split Field	Multiformat	SD Multi	HD Multi	Raster	Ramp	10	15	32	64	Convergence	Crosshatch	Multiburst	Character	1/2 Window	1/10 Window	Demodulation	Monoscope	Natural Picture (Option)
COMPONENT, HDTV																						
1	1080p/59.94	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	1080i/59.94	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	1080p/29.97	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	1080p/23.98	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	1080PsF/23.98	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	1080p/50	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	1080p/25	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	1080i/50	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	720p/59.94	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	720p/29.97	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	720p/23.98	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	720p/50	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	720p/25	16:9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COMPONENT, SDTV																						
14	480p/60	16:9(S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	480i/60	4:3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		16:9(S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	576p/50	16:9(L)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		16:9(S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	576i/50	4:3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		16:9(S)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		16:9(L)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Pattern vs Format Cont'**

No.	Format	Aspect Ratio	Pattern																			
			Color Bar					Step				Convergence	Crosshatch	Multiburst	Character	1/2 Window	1/10 Window	Demodulation	Monoscope	Natural Picture (Option)	ANSI Gray Scale	Checker
			Full Field	Split Field	Multiformat	SD Multi	HD Multi	Raster	Ramp	10	15											
<b>COMPOSITE</b>																						
18	NTSC-M	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
19	NTSC-J	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
20	NTSC 4.43	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
21	PAL	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
22	PAL-M	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
23	PAL-N	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
24	PAL-60	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
25	SECAM	4:3 16:9(S) 16:9(L)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
<b>COMPUTER MONITOR</b>																						
26	VGA	4:3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
27	SVGA	4:3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
28	XGA	4:3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
29	SXGA	4:3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

\* (S): Squeeze, (L): Letter Box  
 \* Natural Picture pattern is optionally equipped as factory option.

## Audio Signal

Audio Signal	
Frequency	OFF/ 1 kHz/ 400 Hz, selectable
Output Level	1.2 V p-p $\pm$ 0.12 V (into 600 $\Omega$ load)
Output Impedance	600 $\Omega$
Output Connector	RCA Jack
Number of Outputs	2 each
Functions	
Startup Memory	Front panel settings are stored in internal memory when power is turned on.
Preset/Recall	Up to 100 front panel settings (address 00 to 99) can be stored/recalled.
Area Settings	Consecutive addresses, out of 100 addresses, can be recalled. Begin address: BEGIN End address: END
Remote Control	Front panel controls can be remotely controlled with a personal computer via the RS-232C interface.
Address Remote Control Mode	By grounding the connector, the address to be recalled can be incremented (INC) or decremented (DEC). The begin address (BEGIN) can also be set by grounding the pin.
User Setting Mode	HD Output, VD Output: Output polarity can be set in each format. Ramp Pattern: Superimposing this signal on the P <sub>B</sub> , P <sub>R</sub> output can be set ON/OFF. Step Pattern: Superimposing this signal on the P <sub>B</sub> , P <sub>R</sub> output can be set ON/OFF. Multiburst Pattern: Superimposing this signal on the P <sub>B</sub> , P <sub>R</sub> output can be set ON/OFF.
Environmental Conditions	
Operating Temperature	0 to 40° C
Operating Humidity	$\leq$ 90% RH (without condensation)
Spec Guaranteed Temperature	10 to 30° C
Spec Guaranteed Humidity	$\leq$ 85% RH (without condensation)
Operating Environment	Indoor use
Operating Altitude	Up to 2,000 m
Overvoltage Category	II
Pollution Degree	2
Power Requirements	90 to 250 VAC (50 Hz/60Hz), 60 W max
Dimensions	
Size (W) x (H) x (D)	426 x 88 x 400 mm (excluding projections)
Weight	5.6 kg
Accessories	Power Cord.....1 Instruction Manual.....1