



# LINK BRIDGE™ 18G/4K HDMI SIGNAL GENERATOR & ANALYZER

## LB-H2-SGA



## LB-H2-SGA USER MANUAL

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# SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATION

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS

## **SURGE PROTECTION DEVICE RECOMMENDED**

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection system is highly recommended in order to protect and extend the life of your equipment.

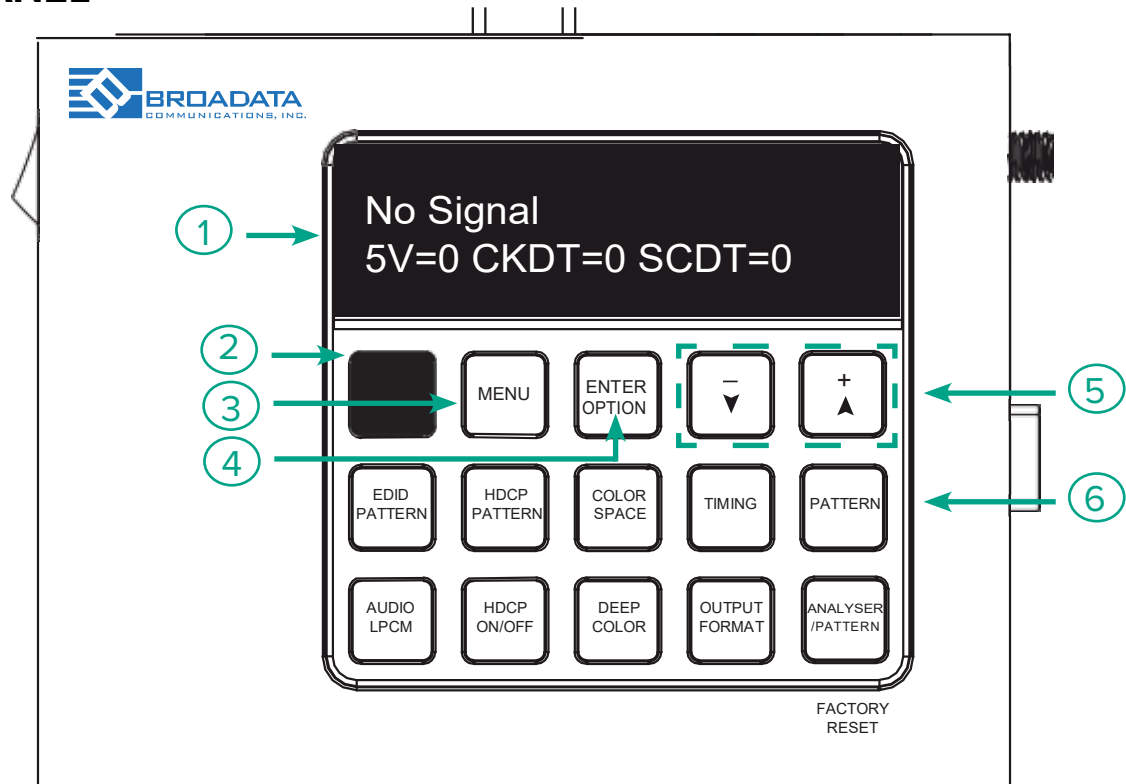
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The 18G/4K HDMI 2.0 Signal Generator & Analyzer is a must-have for all AV System Integrators and Technicians. It is the ideal diagnostic tool for the design, testing, troubleshooting and repair of various source and sink devices. The ability to generate various audio and video signals provides you with the flexibility to easily and accurately diagnose and test various HDMI Video and Audio equipment. The small form-factor provides you with the ability to quickly conduct on-site verification testing.

Features include:

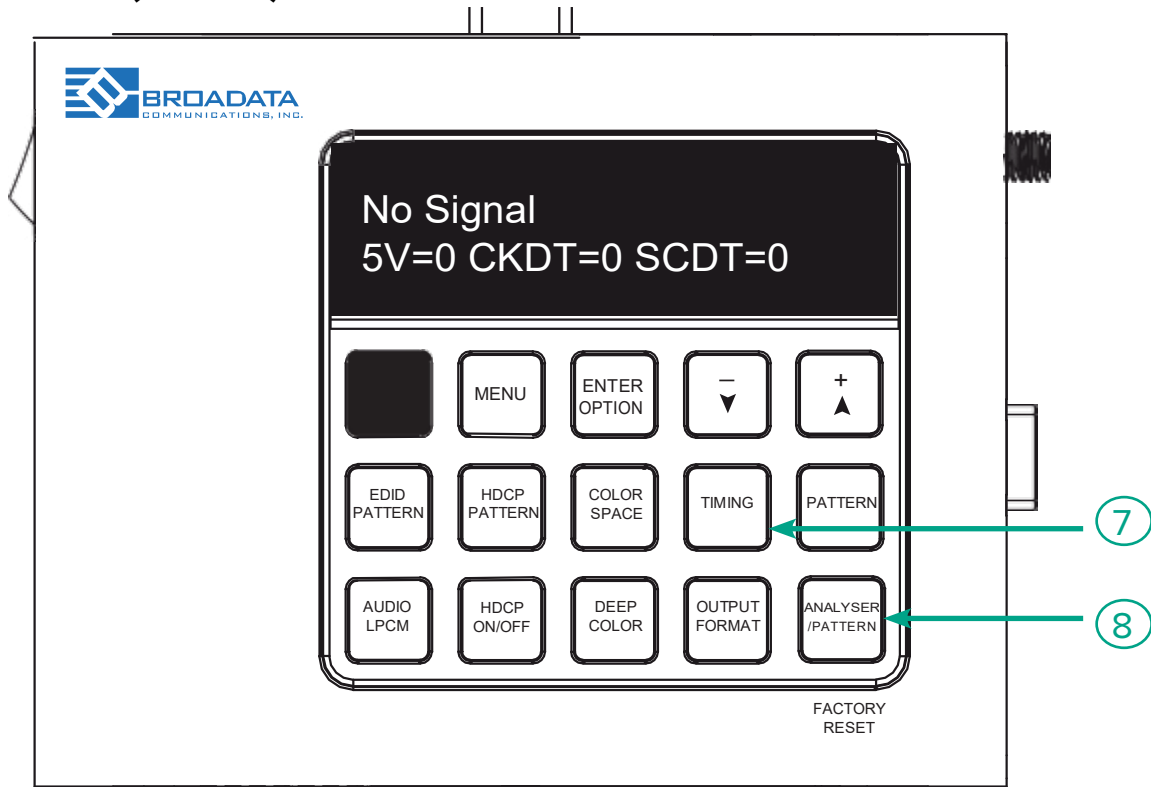
- HDMI 2.0 (up to 4K@60Hz 4:4:4)
- Analysis of source and sink data paths up to 6G HDMI signals
- Analysis of HDMI data packets
- Analysis and control of HDCP 1.4 and 2.2
- Analysis and emulation of EDID data, including SCDC
- Analysis of input audio signals
- HDR bypass and analysis support
- HDMI timings up to 6Gbps (4096×2160@60Hz 4:4:4, 8-bit)
- Generate HDMI and VGA signal outputs
- External stereo audio input and output
- Generation of LPCM sine wave audio on up to 8 channels
- Front-panel, RS-232, Telnet, and IR Remote controls
- Detailed OSD for settings and information display

## FRONT PANEL



- ① **OLED Screen:** Displays the current signal analysis information or test pattern mode selection details including input and/or output resolution timing. The screen layout changes completely depending on the unit's mode.
- ② **IR Window:** Accepts IR signals from the included IR remote for control of this unit only.
- ③ **MENU:** Press to enter the OSD menu, or to back out from menu items.
- ④ **ENTER/OPTION:** Press to confirm a selection or to go deeper into a menu item. When the selected function has optional selections, the associated button's LED will illuminate along with the ¼%/²% (-/+ ) buttons.
- ⑤ **+/- & :** Press to move up and down or adjust selections within menus. These buttons will illuminate when the selected function has values that can be adjusted up or down.
- ⑥ **PATTERN:** Within Pattern mode, press to enable selection of the test pattern used. The ¼%/²% buttons will illuminate and are used to select the new pattern. The new test pattern will automatically become active after selecting it and pausing for 2 seconds. Additional variations (if available) are selected by pressing the button additional times. Within Analyzer mode, press to turn on/off a "title-safe/action-safe" overlay.

## FRONT PANEL (CON'T)



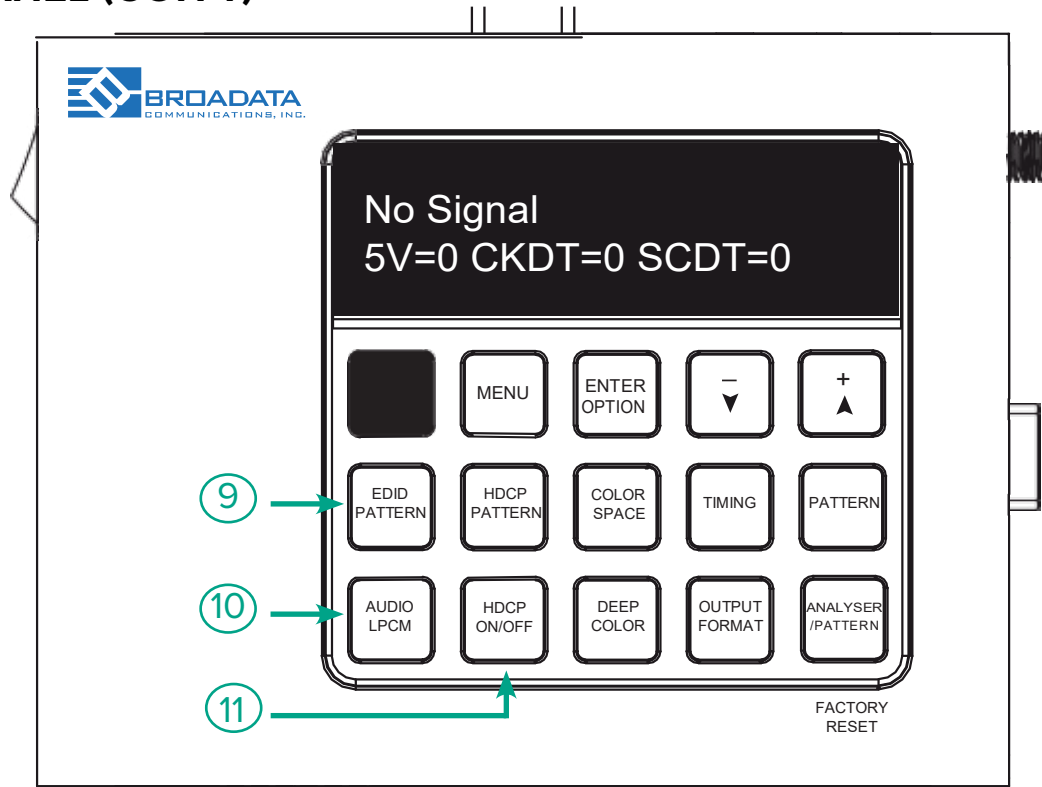
- ⑦ **TIMING:** Press to enable selection of the output timing and resolution used. The buttons will illuminate and are used to select the new timing. The currently selected timing will be shown on the OLED display. The new timing will automatically become active after selecting it and pausing for 2 seconds.

Note: In Analyzer mode, please select the “Bypass” timing if you do not wish for your source’s output signal to be scaled by the unit before being sent to the display. The LED will blink Red when the timing is set to Bypass.

- ⑧ **ANALYSER/PATTERN:** Press to switch the unit between Analyzer Mode (LED=Red) and Pattern Mode (LED=Blue). When in Analyzer Mode, press and hold the button for 2 seconds to force an RX hot-plug. When in Pattern Mode, press and hold the button for 2 seconds to turn on/off the AVmute bit within the output’s GCP (General Control Packet).

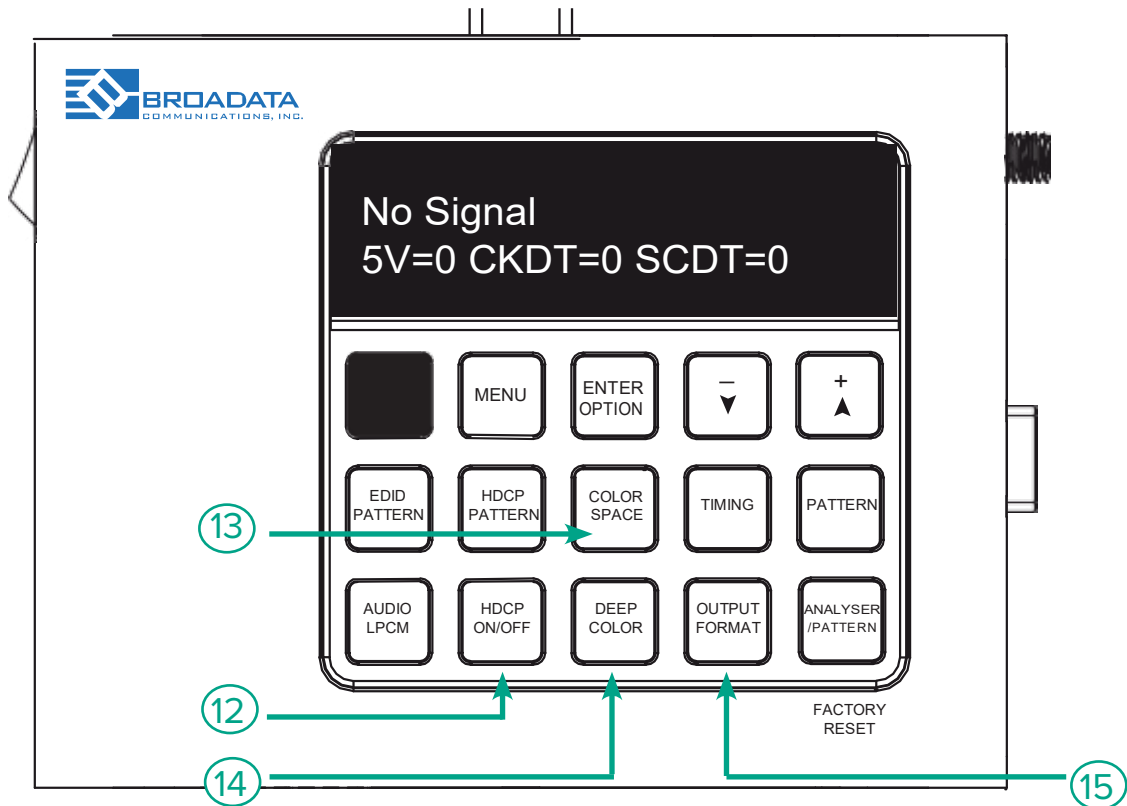
**FACTORY RESET:** Press and hold this button while powering the unit on to perform a factory reset of the unit.

## FRONT PANEL (CON'T)



- 9 EDID PATTERN:** Press to enable selection of the EDID to use on the HDMI input port. The buttons will illuminate and are used to select the new EDID. The currently selected EDID will be shown on the OLED display. The new EDID will automatically become active after selecting it and pausing for 5 seconds.
- 10 AUDIO LPCM:** Within Analyzer mode, press to select which digital audio source pair (0-3) is routed to the primary stereo channel (LPCM 2.0 and headphone output) for monitoring. The LED color indicates the selection (Off=SD0, Red=SD1, Blue=SD2, Purple=SD3). Within Pattern mode, press to switch between LPCM 2.0 (LED=Red), 5.1 (LED=Blue) and 7.1 (LED=Purple) channel test tone output formats. Press and hold this button for 2 seconds to allow adjustment of the output volume.
- 11 HDCP PATTERN:** Press to enable/disable the OSD display of the detected HDCP version support and handshaking information between the sink and source. In Analyzer mode the unit is the RX, in Pattern mode the unit is the TX. In Pattern mode, if HDCP handshaking fails, an error message “HDCP OUT FAIL” will be displayed on the OSD.

## FRONT PANEL (CON'T)

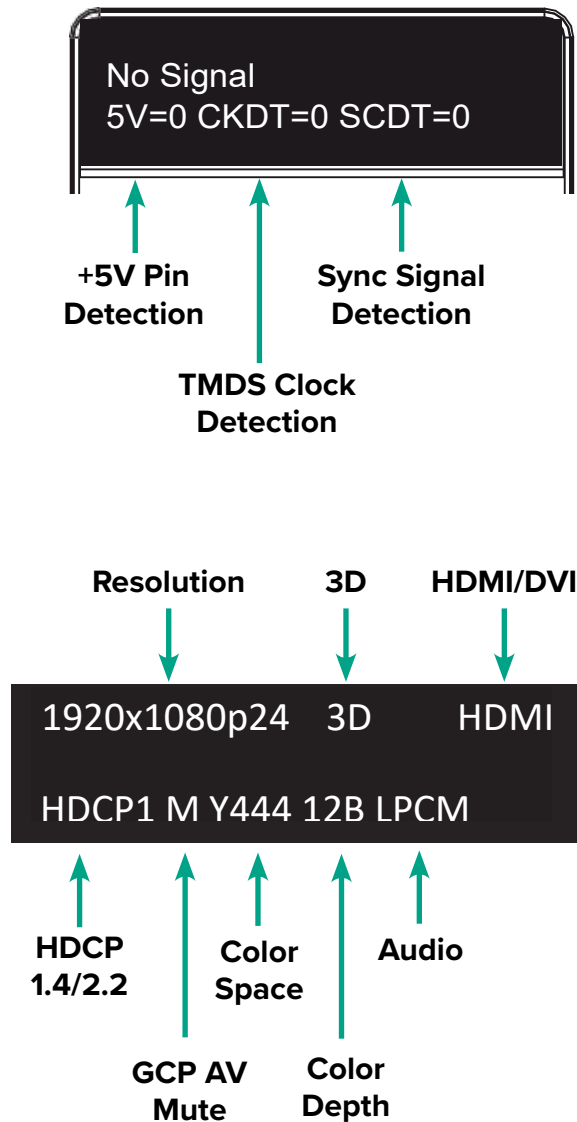


- ⑫ **HDCP ON/OFF:** Press to switch between supported HDCP versions or to disable HDCP. Within Analyzer mode, OFF (LED=Off), HDCP 1.4 (LED=Red), and HDCP 1.4+2.2 (LED=Blue) modes are available for the input port. Within Pattern mode, OFF, HDCP 1.4, and HDCP 2.2 modes are available for the output port.
- ⑬ **COLOR SPACE:** Press repeatedly to switch between the available color space formats. The button's LED is colored to indicate the current color space: Red=RGB, Blue=YCbCr 4:4:4, Purple=YCbCr 4:2:0, Off=YCbCr 4:2:2.
- ⑭ **DEEP COLOR:** Press repeatedly to switch between the available output color bit depth options. The button's LED is colored to indicate the current bit depth: Off=8-bit, Red=10-bit, Blue=12-bit.
- ⑮ **OUTPUT FORMAT:** Press to switch between DVI (LED=Blue) and HDMI (LED=Red) output formats. Press and hold the button for 2 seconds to disable/enable video output completely. The button's LED will turn off when output is disabled.

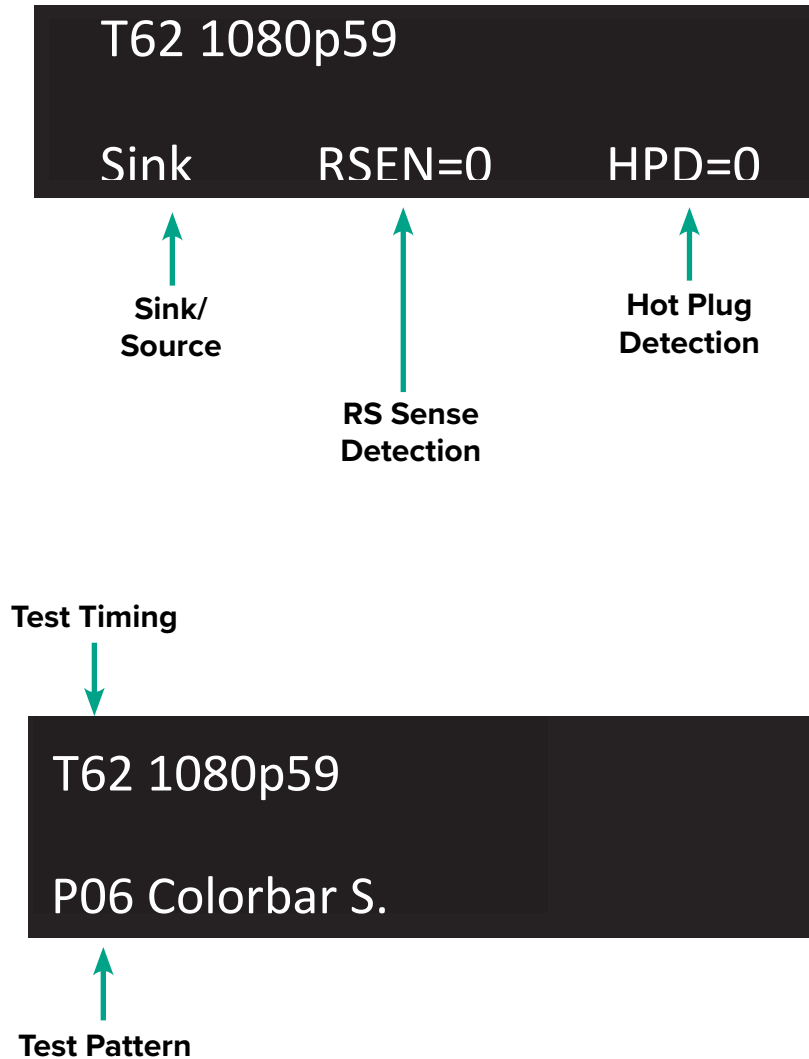


## OLED Screen:

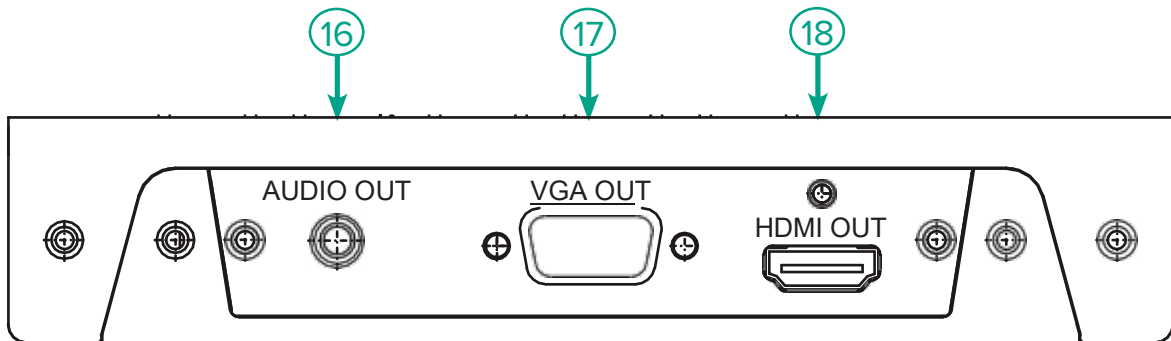
**Analyzer Mode (Analyzer/Pattern button is RED):** In Analyzer mode, if there is no live video source detected on the input port, the OLED will display an voltage, TMDS or sync that might be present. Once a live video signal is detected, the unit will display that signal's current timing, format, HDCP version, AV Mute status, color space, color depth and audio format.



**Pattern Mode (Analyzer/Pattern button is BLUE):** In Pattern mode, when the output isn't connected to a sink, the unit will display the current output timing, RX Sense, and Hot-plug detection status. Once an active sink has been connected, the lower portion of the display will change to indicate the current test pattern number and name.

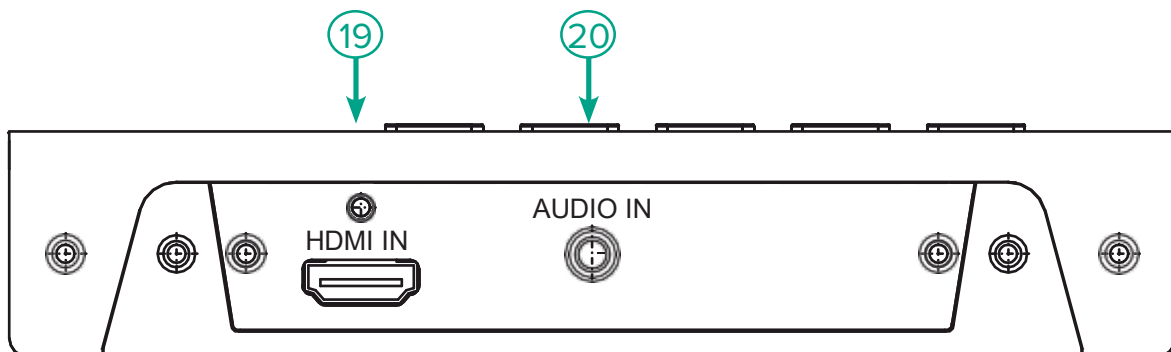


## SIDE PANEL A



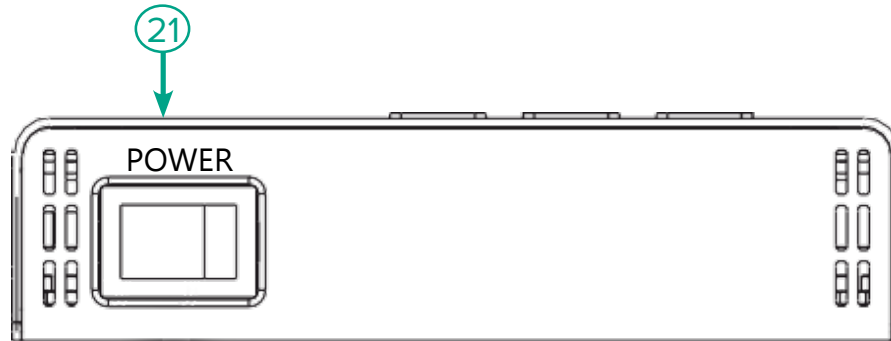
- 16 AUDIO OUT:** Connect to powered speakers or an amplifier for stereo analog audio output with a 3.5mm phone jack cable.
- 17 VGA OUT:** Connect to a VGA (RGB) monitor or display for analog video output.
- 18 HDMI OUT:** Connect to HDMI TVs, monitors or amplifiers for digital video and audio output.

## SIDE PANEL B



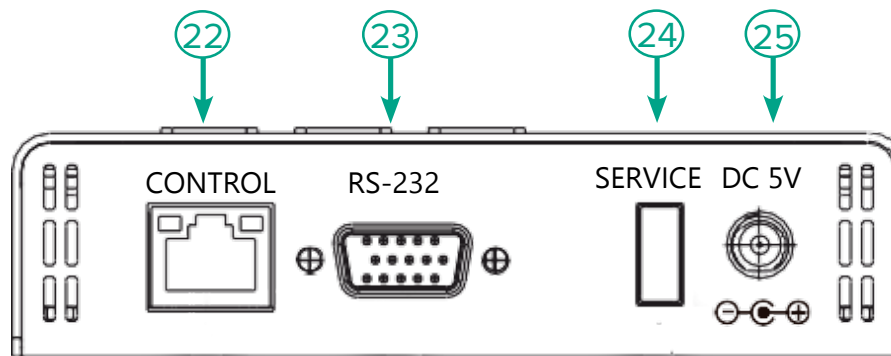
- 19 HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.
- 20 AUDIO IN:** Connect to the stereo analog output of a device such as a CD player or PC.

## SIDE PANEL C



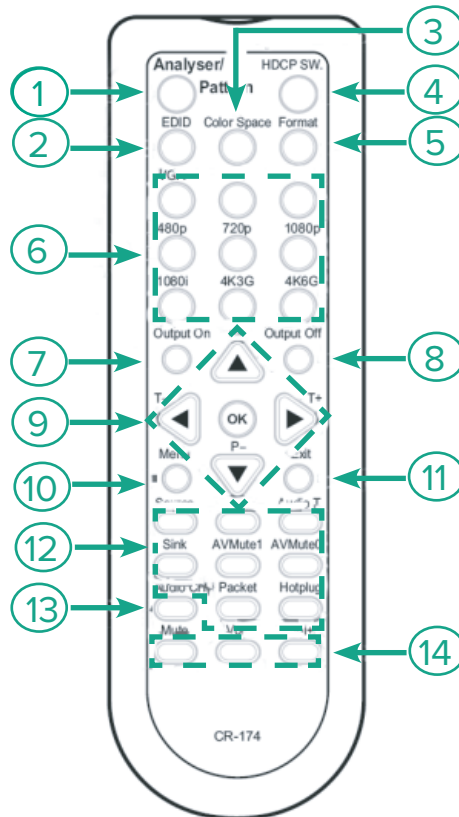
- ②1 **POWER:** Flip this switch to turn the unit ON or OFF after connecting an appropriate power source.

## SIDE PANEL D



- ②2 **CONTROL:** Connect directly, or through a network switch, to your PC/laptop to control the unit via Telnet.
- ②3 **RS-232:** Connect directly to your PC/laptop to send RS-232 commands to control the unit.
- ②4 **SERVICE:** This slot is used for firmware updates and uploading customer designed test pattern files.
- Note: The patterns are restricted to 640×480 and 1920×1080. Both must be 24-bit RGB bitmap files
- ②5 **DC 5V:** Plug the 5V DC power supply into the unit and connect it to an AC wall outlet for power or use the DC to USB adapter cable to connect to a portable USB power bank (2.1A minimum) for power.

## REMOTE CONTROL



- ① **Analyzer/Pattern** Press to switch between Analyzer Mode and Pattern Mode
- ② **EDID:** Press repeatedly to switch between the available EDIDs for the HDMI input
- ③ **Color Space:** Press repeatedly to space formats (RGB, YCbCr 4:4:4, YCbCr 4:2:2 and YCbCr 4:2:0)
- ④ **HDCP SW:** Press to switch between supported HDCP versions or to disable HDCP.
- ⑤ **Format:** Press to switch between DVI and HDMI output formats.
- ⑥ **VGA~4K6G:** Press to directly select the output resolution.
- ⑦ **Output On:** Press to enable video output.
- ⑧ **Output Off:** Press to disable video output.

## REMOTE CONTROL (CON'T)

- ⑨ **T-T+:** Press (+/-) to select a new output resolution timing. Within the OSD menu, press to adjust selections.
- P+P-::** Press (+/-) to change the current test pattern. Within the OSD menu, press to move up and down.
- OK:** After selecting a pattern, press and hold for 2 seconds to switch to alternate variations of the pattern. Within the OSD menu, press to confirm selections.
- ⑩ **Menu** Press to enter the OSD menu.
- ⑪ **Exit:** Press to exit the OSD or cancel the selection.
- ⑫ **Source:** Press to display source signal information on the OSD.
- Video T:** Press to display video analysis details on the OSD. **Audio T\*:** Press to display audio analysis details on the OSD.
- Packet:** Press to display the HDMI input's packet analysis info. **Hot plug\*:** Press to force an RX hot-plug event on the input port.
- Sink\*\*:** Press to display HDMI output detection/information on the OSD.
- AV Mute1\*\*:** Press to turn on the AV Mute but within the output's GCP.
- AV Mute0\*\*:** Press to turn off the AV Mute but within the output's GCP.  
 Note: \* for use in Analyzer Mode only;  
 \*\* for use in Pattern Mode only.
- ⑬ **Audio CH:** Within Analyzer mode, press to select which digital audio source pair (0-3) is routed to the primary stereo channel for monitoring. Within Pattern mode, press to switch between LPCM 2.0, 5.1 and 7.1 channel test tone output formats.
- ⑭ **Mute/Vol-/Vol+:** Press the Mute button to mute both digital and analog audio outputs. Press the Vol-/Vol+ buttons to increase/decrease the volume.

UNIT (DCE*)	
Pin	Pinout
1	
2	TxD →
3	RxD ←
4	
5	GND
6	
7	
8	
9	

SERIAL PORT SETTINGS	
Baud Rate	115200
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None
Termination	CR (xoD)

\* **DCE:** Data Communications Equipment

COMMANDS	
DESCRIPTION	VARIABLES
\$?	
Show full command list.	
\$HELP	
Show full command list.	
\$AUDIO_CH N1	
Set the number of internally sourced audio output channels.	Available values for N1: 2 [2 Channels (2.0)] 6 [6 Channels (5.1)] 8 [8 Channels (7.1)]
\$AUDIO_CH?	
Display the current number of audio	
\$AUDIO_FREQ N1,N2	
Set the internal audio output frequency of the selected channel (in Hz).	Available Values for N1: SD0_L [SD0 Left Channel] SD0_R [SD0 Right Channel] SD1_L [SD1 Left Channel] SD1_R [SD1 Right Channel] SD2_L [SD2 Left Channel] SD2_R [SD2 Right Channel] SD3_L [SD3 Left Channel] SD3_R [SD3 Right Channel]
	<b>N2</b> = MUTE, 200, 400, 600, 800, 1200, 1400, 1600
\$AUDIO_FREQ? N1	
Display the internal audio output frequency of the selected channel (in Hz).	Available Values for N1: SD0_L [SD0 Left Channel] SD0_R [SD0 Right Channel] SD1_L [SD1 Left Channel] SD1_R [SD1 Right Channel] SD2_L [SD2 Left Channel] SD2_R [SD2 RIGHT CHANNEL] SD3_L [SD3 LEFT CHANNEL]



COMMANDS	
DESCRIPTION	VARIABLES
\$AUDIO_MUTE N1	
Turn the audio output mute on or off.	<b>N1</b> = ON, OFF
\$AUDIO_MUTE?	
Display the audio output mute state.	
\$AUDIO_SOURCE N1	
Set the audio output source.	Available values for N1: ANA [Analog Input] HDMI [HDMI Input] INT [Internal]
\$AUDIO_SOURCE?	
Display the audio output source.	
\$AUDIO_SR N1	
Set the internal audio output sampling rate (in kHz).	<b>N1</b> = 48, 96, 192
\$AUDIO_SR?	
Display internal audio output sam-	
\$AUDIO_VOL N1	
Set the audio output volume.	<b>N1</b> = 0 ~ 80
\$AUDIO_VOL?	
Display the current audio output vol-	
\$BOOT GO	
Reboot the unit.	
<i>The unit won't respond to any commands during the boot process.</i>	
\$BOOT?	
Display the current boot state.	
\$CED_ERROR_COUNT?	
Get every channel CED error count.	<b>Response:</b>
CED OSD menu and timer should be	\$ced_error_count? hh:mm:ss,
	ch0 count,ch1 count, ch2 count,
\$CED_RESET	

COMMANDS	
DESCRIPTION	VARIABLES
\$CED_UPDATE_COUNT?	
Gets the CED_update flag count	<b>Response:</b> \$ced_update_count? hh:mm:ss,count
\$COLOR_SPACE N1	
Set the output color space.	Available values for N1: Y444 [YCbCr 4:4:4] Y422 [YCbCr 4:2:2] Y420 [YCbCr 4:2:0]
\$COLOR_SPACE?	
Display the current output color	
\$DEEP_COLOR N1	
Set the output color bit depth.	<b>N1</b> = 8, 10, 12
\$DEEP_COLOR?	
Display the current output color bit	
\$EDID_COPY_SINK N1	
Copy the current HDMI sink's EDID to	<b>N1</b> = C1 ~ C10
<i>If the copy fails "\$err" will be displayed.</i>	
\$EDID_MANUF? N1	
Display the manufacturer name stored in the EDID of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]
<i>If the EDID fails to be read, "\$err_ddc" will be displayed.</i>	
If the EDID has invalid content, "\$err_bad" will be displayed.	
\$EDID_MODEL? N1	
Display the model/monitor name stored in the EDID of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]

COMMANDS	
DESCRIPTION	VARIABLES
\$CED_UPDATE_COUNT?	
Gets the CED_update flag count	<b>Response:</b> \$ced_update_count? hh:mm:ss,count
\$COLOR_SPACE N1	
Set the output color space.	Available values for N1: RGB [RGB 4:4:4] Y444 [YCbCr 4:4:4] Y422 [YCbCr 4:2:2] Y420 [YCbCr 4:2:0]
\$COLOR_SPACE?	
Display the current output color	
\$DEEP_COLOR N1	
Set the output color bit depth.	<b>N1</b> = 8, 10, 12
\$DEEP_COLOR?	
Display the current output color bit	
\$EDID_COPY_SINK N1	
Copy the current HDMI sink's EDID to	<b>N1</b> = C1 ~ C10
<i>If the copy fails "\$err" will be displayed.</i>	
\$EDID_MANUF? N1	
Display the manufacturer name stored in the EDID of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]
<i>If the EDID fails to be read, "\$err_ddc" will be displayed.</i>	
If the EDID has invalid content, "\$err_bad" will be displayed.	
\$EDID_MODEL? N1	
Display the model/monitor name stored in the EDID of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]

COMMANDS	
DESCRIPTION	VARIABLES
<p>If the EDID fails to be read, "\$err_ddc" will be displayed.</p> <p>If the EDID has invalid content, "\$err_bad" will be displayed.</p>	
\$EDID_NAME N1,N2	
Set the EDID name of the selected copy slot.	<b>N1</b> = C1 ~ C10 <b>N2</b> = {Name} [20 characters max]
\$EDID_NAME? N1	
Display the name of the selected	<b>N1</b> = D1 ~ D10, C1 ~ C10
\$EDID_NATIVE? N1	
Display the native resolution value stored in the EDID of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]
<p><i>First detailed timing from Block 0.</i></p> <p>If the EDID fails to be read, "\$err_ddc" will be displayed.</p> <p>If the EDID has invalid content, "\$err_bad" will be displayed.</p>	
\$EDID_READ N1,N2	
Displays the selected data block stored in the EDID of the selected location.	Available values for N1: D1 ~ D10 [Default EDID 1 ~ 10] C1 SINK_V [VGA Sink] Available values for N2: BLOCK0 BLOCK1 [EDID Block 1] BLOCK2 [EDID Block 2] BLOCK3 [EDID Block 3]
<p><i>This data is output as a bit stream of 128 bytes following the &lt;CR&gt;&lt;LF&gt;</i></p> <p>Each hex data unit is composed of 3 digits. The first 2 digits are the hex value. The 3rd digit is a space (0x20).</p> <p>Blocks 2 &amp; 3 are only supported from the HDMI Sink.</p>	

COMMANDS	
DESCRIPTION	VARIABLES
If the EDID fails to be read, “\$err_ddc” will be displayed.	
If block 2 or block 3 doesn't exist, “\$err_block” will be displayed.	
\$EDID_RX N1	
Select the EDID to use with the unit's HDMI input (Rx).	Available values for N1: D1 ~ D10 [Default EDID 1 ~ 10] C1 ~ SINK [Currently connected HDMI sink]
\$EDID_RX?	
Display the current EDID selection for the unit's HDMI input (Rx).	
\$EDID_TYPE? N1	
Display the EDID type of the selected location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink]
<i>If the EDID fails to be read, “\$err_ddc” will be displayed.</i>	
If the EDID has invalid content, “\$err_bad” will be displayed.	
\$EDID_WRITE N1,N2 N3	
Directly write an EDID block to the selected EDID location.	Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] SINK_V [VGA Sink] Available values for N2: BLOCK0 BLOCK1 [EDID Block 1] N3 = <CR><LF>{128 byte hex data}
<i>The data must be sent as a 128 byte hex data bit stream following the</i>	
Each hex data unit is composed of 3 digits. The first 2 digits are the hex value. The 3rd digit is a space (0x20).	

COMMANDS	
DESCRIPTION	VARIABLES
<b>\$FACTORY</b>	
Execute a factory reset and reboot the unit.	
<i>Stored Copy EDIDs and Ethernet settings will not be reset.</i>	
<b>\$FWVER?</b>	
Display the current firmware version.	
<b>\$HDCP_IN_SW N1</b>	
Enable or disable HDCP support for	<b>N1</b> = ON, OFF
<i>Affects Analyzer mode only.</i>	
<b>\$HDCP_IN_SW?</b>	
Display the current HDCP support	
<b>\$HDCP_IN_VER N1</b>	
Set the HDCP version to use on the unit's HDMI input.	Available values for N1: V1.4 [HDCP v1.4 only] V1.4+V2.2 [HDCP v1.4 & v2.2]
<i>Affects Analyzer mode only.</i>	
<b>\$HDCP_IN_VER?</b>	
Display the current HDCP version	
<b>\$HDCP_OUT_SW N1</b>	
Enable or disable HDCP support on	<b>N1</b> = ON, OFF
<i>Affects Pattern mode only.</i>	

COMMANDS	
DESCRIPTION	VARIABLES
\$HDCP_OUT_SW?	
Display the HDMI output's HDCP status. A status of "Talk" means HDCP is currently performing handshaking.	
\$HDCP_OUT_VER N1	
Set the HDCP version to use on the unit's HDMI output.	Available values for N1: V1.4 [HDCP v1.4] V2.2 [HDCP v2.2]
<i>Affects Pattern mode only.</i>	
\$HDCP_OUT_VER?	
Display the current HDCP version for	
\$HDR_EOTF N1	
Set the HDR EOTF (Electro-Optical Transfer Function) mode.	Available values for N1: SDR [Traditional Gamma, SDR Lu- HDR [Traditional Gamma, HDR 2084 [SMPTE ST 2084] RSVD [Reserved for future use]
\$HDR_EOTF?	
Display the current HDR EOTF mode.	
\$HDR_MCLL N1	
Set the maximum HDR content light level.	<b>N1</b> = 0 ~ 65500 [100 unit increments]
\$HDR_MCLL?	
Display the current maximum HDR content light level.	

COMMANDS	
DESCRIPTION	VARIABLES
\$HDR_MFALL N1	
Set the maximum HDR frame-average light level.	<b>N1</b> = 0 ~ 65500 [100 unit increments]
\$HDR_MFALL?	
Display HDR maximum light level of frame-average.	
\$HDR_SET N1	
Select the current HDR setting.	<b>N1</b> = 1 ~ 3
\$HDR_SET?	
Display the current HDR setting.	
\$HDR_SW N1	
Enable or disable HDR support on the	<b>N1</b> = ON, OFF
\$HDR_SW?	
Display the current HDR support sta-	
\$HDR_TX_COL N1	
Set the HDMI output (Tx) AVI Colorimetry mode.	Available values for N1: 1 [No Data] 2 [ITU601] 3 [ITU709] 4 [xvYCC601] 5 [xvYCC709] 6 [sYCC601] 7 [Adobe Y601] 8 [Adobe RGB] 9 [BT.2020 (1) Y' <sub>C</sub> C' <sub>BC</sub> C' <sub>RC</sub> ] 10 [BT.2020 (2) R'G'B' or Y'C' <sub>B</sub> C' <sub>R</sub> ]
\$HDR_TX_COL?	
Display the current HDMI output (Tx) AVI Colorimetry mode.	



COMMANDS	
DESCRIPTION	VARIABLES
\$MODEL?	
Display the unit's model number.	
\$MOTION_TEXT N1	
Set the text used for the Motion-H and Motion-V patterns.	<b>N1</b> = {Text} [20 characters max]
\$MOTION_TEXT?	
Display the current text used for the	
\$NET_GATE?	
Display the current Gateway address.	
\$NET_IP?	
Display the current IP address.	
\$NET_IP_MODE N1	
Set the IP mode.	Available values for N1: DHCP [Automatically get an IP address via DHCP] STATIC [Use the currently defined static Ethernet values]
\$NET_IP_MODE?	
Display the current IP mode.	
\$NET_LINK?	
Display the current Ethernet link sta-	
\$NET_MAC?	
Display the unit's MAC address.	
\$NET_MASK?	
Display the current Netmask address.	

COMMANDS	
DESCRIPTION	VARIABLES
\$NET_STATIC_GATE N1	
Set the static Gateway address.	<b>N1</b> = X.X.X.X [X = 0 ~ 255]
\$NET_STATIC_GATE?	
Display the static Gateway address.	
\$NET_STATIC_IP N1	
Set the static IP address.	<b>N1</b> = X.X.X.X [X = 0 ~ 255]
\$NET_STATIC_IP?	
Display the static IP address.	
\$NET_STATIC_MASK N1	
Set the static Netmask address.	<b>N1</b> = X.X.X.X [X = 0 ~ 255]
\$NET_STATIC_MASK?	
Display the static Netmask address.	
\$PATTERN N1	
Select the test pattern to output.	<b>N1</b> = 1 ~ 58
\$PATTERN?	
Display the current test pattern selec-	
\$RX_DDC N1	
Enable or disable the DDC bus for the HDMI input (Rx).	<b>N1</b> = ON, OFF
\$RX_DDC?	
Display the DDC bus state for the HDMI input (Rx).	
\$RX_HOTPLUG N1	
Set hot plug value for the HDMI input (Rx).	Available values for N1: OFF [Set hot plug low] ON [Set hot plug high] TOGGLE [Toggle low→high]

COMMANDS	
DESCRIPTION	VARIABLES
\$RX_HOTPLUG?	
Display the current hot plug state for the HDMI input (Rx).	
\$RX_HOTPLUG_T N1	
Set the hot plug time (in milliseconds) for the HDMI input (Rx).	N1 = 50 ~ 500 [50ms increments]
\$RX_HOTPLUG_T?	
Display the current hot plug time (in milliseconds) for the HDMI input (Rx).	
\$RX_PC_TOL N1	
Set PC source clock detection tolerance for the HDMI input (Rx).	N1 = 1 ~ 10 [1/1000 ~ 10/1000]
\$RX_PC_TOL?	
Display the PC source clock detec-	
\$RX_SCDC N1	
Enable or disable the SCDC port function on the HDMI input (Rx).	N1 = ON, OFF
\$RX_SCDC?	
Display the current SCDC port state for the HDMI input (Rx).	
\$RX_SENSE N1	

COMMANDS	
DESCRIPTION	VARIABLES
\$SINK_DETECT? N1	
Displays a variety of sink detection	Available values for N1: See below.
HOTPLUG [Sink's hot plug status]	
RSENSE [Sink's RxSense status]	
HDCP [Sink's HDCP port status]	
HDCP_AKSV [Source HDCP AKSV in 2-digit hex (HDCP v1.4)] HDCP_	
SCDC_SCR_ENABLE [Rx SCDC source scrambling setting] SCDC_SCR_	
SCDC_SOURCE_VER [SCDC source version]	
\$SOURCE_DETECT? N1	
Displays a variety of source detection	Available values for N1: See below.
5V [5V detection state]	
CKDT [TMDS clock detection]	
DATA_RATE [Video data rate in Mbps] TMDS_FORMAT [Detected TMDS	
HDCP [Source HDCP status detection] HDCP_AKSV [Source AKSV in	
HDCP_RXID [HDCP Receiver ID in 2-digit hex (HDCP v2.2)] HA [Horizon-	
HBP [Horizontal back porch pixels]	
HFP [Horizontal front porch pixels]	
HSW [Horizontal sync width pixels]	
HT [Total horizontal pixels]	
HSP [Horizontal sync polarity]	
HVS_OFFSET1 [Horizontal/vertical sync offset1 in dot] HVS_OFFSET2	

COMMANDS	
DESCRIPTION	VARIABLES
PIXEL_CLOCK [Pixel clock in kHz]	
SCAN [Video scan mode (P = Progressive, I = Interlaced)]	
TIMING [Video timing (See “Source Video Timing List” below)]	
TMDS_CLOCK [TMDS clock in kHz]	
VA [Vertical active lines]	
VBP [Vertical back porch lines]	
VFP [Vertical front porch lines]	
VSW [Vertical sync width lines]	
VT [Total vertical lines]	
VSP [Vertical sync polarity]	
ACR [Audio-Clock-Recovery packet status]	
ACR_CTS [Audio-Clock-Recovery CTS value]	
ACR_N [Audio-Clock-Recovery N value]	
ASP [Audio-Sample packet status]	
ASP_CH [Audio-Sample packet channel number]	
ASP_FIFO [Audio-Sample packet audio FIFO (error or normal)]	ASP_LAY-
ASP_PLL [Audio-Sample packet PLL (locked or unlocked)]	CHS_CODE
CHS_SR [Channel-status sampling rate in kHz]	
CHS_SS [Channel-status sampling size]	
CHS_TYPE [Channel-status application type (consumer or professional)]	
HBR [High-Bit-Rate packet status]	
AIF [Display packet-AIF data in 2-digit hex]	
AVI [Display packet-AVI data]	
DRMI [Display packet-DMI data]	
GCP [Display packet-GCP data]	
SPD [Display packet-SPD data]	
VSI [Display packet-VSI data]	SCDC_SCR_ENABLE [Rx SCDC source
SCDC_SOURCE_VER [SCDC source version]	

COMMANDS	
DESCRIPTION	VARIABLES
\$TASK_MODE N1	
Set the unit's operation mode to Signal Analyzer or Pattern Generation.	Available values for N1: ANALYSER [Analyzer Mode] PATTERN [Pattern Mode]
\$TASK_MODE?	
Display the unit's current operation	
\$TIMING N1	
Select the output resolution timing to use.	Available values for N1: 1 ~ 91 [All available standard output resolutions] 92 [Bypass (Analyzer mode only)]
\$TIMING?	
Display the unit's current output resolution timing by timing number.	
\$TIMINGX?	
Display the unit's current output resolution timing by timing name.	
\$TMDS_FORMAT N1	
Set the TMDS output format.	<b>N1</b> = HDMI, DVI
\$TMDS_FORMAT?	
Display the current TMDS output	
\$TMDS_SW N1	
Enable or disable TMDS output.	<b>N1</b> = ON, OFF [Off disables video]
\$TMDS_SW?	
Display the current TMDS output status.	

COMMANDS	
DESCRIPTION	VARIABLES
\$TX_5V N1	
Set the unit's output +5V pin state to follow the TMDS output state or to always be on.	Available values for N1: FOLLOW [Only output 5V if there is a live signal] ON [Always output 5V]
\$TX_5V?	
Display the current output +5V pin	
\$UPDATE_FW	
Update firmware from USB & reboot the unit.	
\$UPDATE_IMG1080	
Update the 1920×1080 image from USB & reboot the unit.	
\$UPDATE_IMG480	
Update the 640×480 image from USB & reboot the unit.	

**Note:**

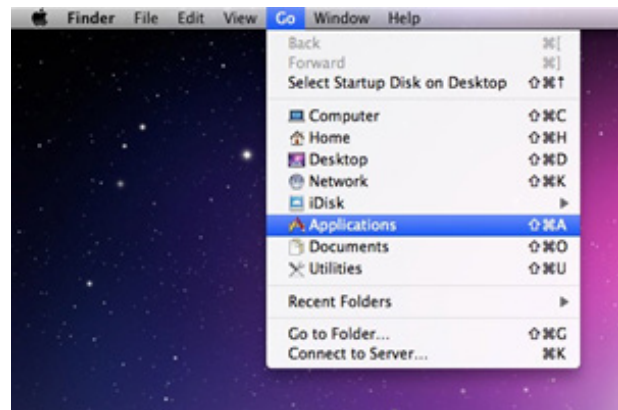
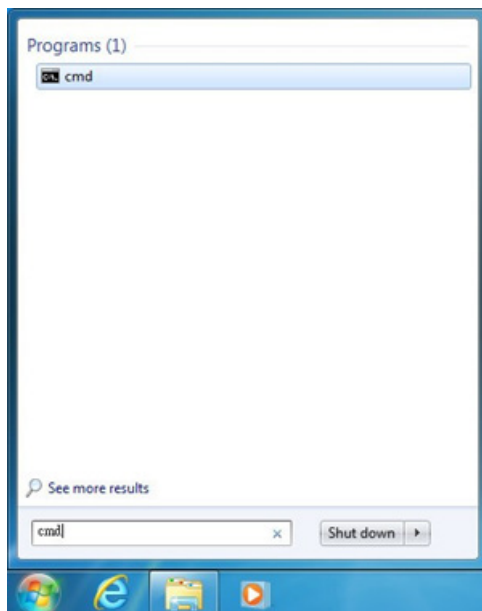
- All commands MUST start with the “\$” character or the command will not be recognized by the unit.
- Commands are not case-sensitive.
- The characters “[“ and “]” are placed around variable command parameters where there is a choice of more than one item. Please type the selected parameter without the “[“ and “]” characters when entering the command.
- The unit will respond to most commands with a repeat of the original command followed by the specified parameters or requested information except where otherwise noted. If an invalid command is entered the unit will respond with “\$err”.
- Only one command may be processed at a time. Do not send additional commands until the response from the previous command has been received.
- Some commands are not supported over Telnet.

Before attempting to use telnet control, please ensure that both the unit and the PC/Laptop are connected to the same active networks.

To access Telnet in Windows 7, click on the “Start” menu and type “cmd” in the search field, then press “Enter”.

Under Windows XP go to the “Start” menu, click on “Run”, type “cmd” then press “Enter”.

Under Mac OS X, go to Go→Applications→Utilities→Terminal  
See below for reference.



Once in the command line interface (CLI) type “telnet”, the IP address of the unit you wish to control, then hit enter.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Administrator>telnet 192.168.5.80 23
```



This will connect us to the unit we wish to control. Type “\$help” or “\$?” to list the available commands.

```

COM7:115200bps - Tera Term VT
File Edit Setup Control Window Help
$?
$audio_ch [2/6/8]
$audio_ch?
$audio_freq [sd0_l/sd0_r/...sd3_r],[0/200/400/...1600]
$audio_freq? [sd0_l/sd0_r/...sd3_r]
$audio_mute [off/on]
$audio_mute?
$audio_source [ana/hdmi/int]
$audio_source?
$audio_sr [48/96/192]
$audio_sr?
$audio_vol [0/1/2/...80]
$audio_vol?
$boot [go]
$boot?
$ced_error_count?
$ced_reset
$ced_update_count?
$color_space [rgb/y444/y422/y420]
$color_space?
$deep_color [8/10/12]
$deep_color?
$edid_copy_sink [c1~c10]
$edid_manuf? [rx/sink_h/sink_v]
$edid_model? [rx/sink_h/sink_v]
$edid_name [c1~c10],[name] Max. 20 Char
$edid_name? [d1~d10/c1~c10]
$edid_native? [rx/sink_h/sink_v]
$edid_read [d1~d10/c1~c10/sink_h/sink_v],[block0~3]
$edid_rx [d1~d10/c1~c10/sink]
$edid_rx?
$edid_type? [rx/sink_h/sink_v]
$edid_write [c1~c10/sink_h/sink_v],[block0~1]<CR,LF>[hex]
$err
$factory
$fwver?
$hdcp_in_sw [off/on]
$hdcp_in_sw?
$hdcp_in_ver [v1.4/v1.4+v2.2]
$hdcp_in_ver?

```

Note: Commands will not be executed unless followed by a carriage return. Commands are not case-sensitive. If the IP address is changed then the IP address required for telnet access will also change accordingly.

ANALYZER MODE		
LEVEL 1	LEVEL 2	LEVEL 3
SOURCE MONITOR	[ANALYTIC DATA]	
VIDEO TIMING	[ANALYTIC DATA]	
AUDIO TIMING	[ANALYTIC DATA]	
PACKET	MONITOR	[ANALYTIC DATA]
	GCP	
	AVI	
	AIF	
	SPD	
	VSIF H14B	
	DRMI (HDR)	
EDID ANALYZER	HDMI SINK	[ANALYTIC DATA]
	VGA SINK	
	RX EDID	
	DEFAULT & COPIED EDID	[D1 ~ 10] DEFAULT EDIDS
EDID EMULATOR	RX EDID SELECT	[C1 ~ 10] COPIED EDIDS
		COPY HDMI SINK
		[D1] DVI
		[D2] VGA
		[D3] 8B 2D 2CH LPCM PC
		<b>[D4] 8B 2D 2CH LPCM HD</b>
		[D5] 12B 2D 8CH BITS 720P
		[D6] 12B 3D 8CH BITS HD
		[D7] 12B 2D 8CH BITS 4K6G
		[D8] 12B 2D 8CH HBR 4K3G
		[D9] 12B 2D 8CH HBR 4K420
		[D10] 12B 2D 8CH HBR 4K6G
		[C1 ~ 10] COPY 01 ~ 10

ANALYZER MODE		
LEVEL 1	LEVEL 2	LEVEL 3
EDID EMULATOR	COPY HDMI SINK EDID	COPY HDMI SINK EDID TO [C1 ~ 10]
	COPY VGA SINK EDID	COPY VGA SINK EDID TO [C1 ~ 10]
	RENAME COPIED SINK EDID	RENAME EDID [C1 ~ 10]
	BURN EDID TO HDMI SINK	BURN EDID [D1 ~ 10] & [C1 ~ 10] TO UNLOCKED HDMI SINK EDID
	BURN EDID TO VGA SINK	BURN EDID [D1 ~ 10] & [C1 ~ 10] TO UNLOCKED VGA SINK EDID
HDCP INPUT MONITOR	[ANALYTIC DATA]	
SCDC INPUT MONITOR		
RX PORT CONTROLS	HOT PLUG PRESET	LOW
		HIGH
		<b>TOGGLE</b>
	HOT PLUG TOGGLE TIME	50MS ~ 500MS ( <b>100MS</b> )
	HOT PLUG RUN	
	RX SENSE*POR	<b>ON</b>
		OFF
	DDC*POR	<b>ON</b>
		OFF
	V.FREQ/1.001 DETECTION	<b>ON</b>
OFF		
PC CLOCK TOLERANCE	1/1000 ~ 10/1000 ( <b>6/1000</b> )	
HDCP PORT ON/OFF*POR	<b>ON</b>	
	OFF	
HDCP PORT VERSION	V1.4	
	<b>V1.4+V2.2</b>	

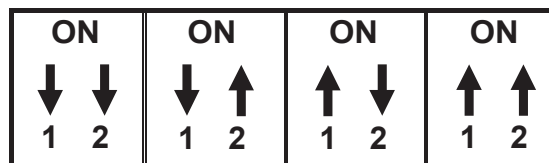
ANALYZER MODE		
LEVEL 1	LEVEL 2	LEVEL 3
RX PORT CONTROLS	HDCP REAUTH_REQ TOGGLE	
	HDCP COUNTER RESET	
RX PORT CONTROLS	SCDC PORT <sup>*POR</sup>	<b>ON</b>
		OFF
	SCDC CED CH AUTO CLEAR	<b>OFF</b>
	<i>AUTO CLEAR WHILE SOURCE READS CED.</i>	
OUTPUT RESOLUTION	SEE "TEST TIMING LIST" BELOW <b>(T66 1080P60)</b>	
OSD SETTINGS	H POSITION	0% ~ 100% <b>(10%)</b>
	V POSITION	0% ~ 100% <b>(10%)</b>
	TRANSPARENCY	0 ~ 7 <b>(4)</b>
	A MODE COLOR (ANALYZER MODE ONLY)	<b>RED</b>
		BLUE
		BLACK
	P MODE COLOR (PATTERN MODE ONLY)	RED
<b>BLUE</b>		
BLACK		
FONT TYPE	<b>NARROW</b>	
	WIDE	
ETHERNET	IP MODE	<b>DHCP</b>
		STATIC
	IP ADDRESS	X.X.X.X <b>(192.168.1.50)</b>
	SUBNET MASK	X.X.X.X <b>(255.255.255.0)</b>
	GATEWAY	X.X.X.X <b>(192.168.1.254)</b>

ANALYZER MODE			
LEVEL 1	LEVEL 2	LEVEL 3	
SETUP	FIRMWARE UPDATE	<b>NO/YES</b>	
	IMAGE 640×480 UPDATE	<b>NO/YES</b>	
	IMAGE 1920×1080 UPDATE	<b>NO/YES</b>	
	[LETTER H] OPTION 2	SMALL	
		<b>MEDIUM</b>	
	3D SOURCE IMAGE BYPASS	<b>NO/YES</b>	
	INFORMATION REFRESH	1 SEC ~ 2 SEC ( <b>2 SEC</b> )	
		MANUAL	
	IR CONTROLLER ADDRESS	0 ~ 3 ( <b>0</b> )	
	COPIED EDID RESET	<b>NO/YES</b>	
ETHERNET RESET	<b>NO/YES</b>		
FACTORY RESET	<b>NO/YES</b>		
INFORMATION	[UNIT VERSION DETAILS]		

## Note:

- Factory Default:
  - o Items in Bold are the factory default settings.
- Power-On Reset:
  - o Settings marked with \*PoR are reset to the default when the unit is powered off and back on.
- Source HDR Ability:
  - o Parse the HDR Static Metadata data block in the sink's EDID.
  - o Output 4K60 (4:2:0, 10/12-bit), or 4K30 (4:4:4, 10/12-bit).
  - o Output DRMI (Dynamic Range & Mastering InfoFrame).
- Sink HDR Ability:
  - o Build an RX EDID that includes the HDR Static Metadata data block.
  - o Receive 4K60 (4:2:0, 10/12-bit), or 4K30 (4:4:4, 10/12-bit) signals.
  - o Receive DRMI and decode the HDR contents

- Unit HDR Capabilities & Limitations:
  - Support HDR bypass & analysis in Analyzer mode.
  - HDR EDID must be copied from an connected sink to the RX EDID through the EDID Emulator menu in Analyzer mode.
  - EDID Analyzer & DRMI Packet Monitor for HDR analysis in Analyzer mode.
  - Output emulated HDR metadata to test sink HDR detection in Pattern mode.
  - No support for test patterns with HDR content in Pattern mode.
- EDID Analyzer Limitation:
  - The EDID Analyzer does not support 4-block analysis.
- EDID Settings:
  - The unit has 10 built-in EDIDs and 10 custom EDID slots.
  - Within the OSD menu's "EDID Emulator" section, the EDID from the currently connected sink, a built-in EDID, or a custom EDID may be selected for use as the unit's EDID.
  - Programming a custom EDID through the RS-232 connection is supported.
- IR Settings:
  - The IR remote uses one out of 4 available address channels for control of the test pattern generator, allowing up to 4 to be located in the same area while being controlled by different remotes.
  - Select "IR Controller Address" within the "Setup" section of the OSD's main menu.
  - Assign an address number (from 0 to 3) that matches the setting on the remote that is to be used with the unit. The default factory setting is 0.
  - The IR remote's address can be set using the two DIP switches located on the back of the remote, inside the battery cover. The default factory setting is 0 (off, off).



- Image File Format
  - Supported image file format uploads:  
640×480/1920×1080 (RGB, 24-bit,bitmap).

PATTERN MODE		
LEVEL 1	LEVEL 2	LEVEL 3
SINK MONITOR	[ANALYTIC DATA]	
PATTERN	SEE "TEST PATTERN LIST" BELOW ( <b>P16 COLORBAR S.</b> )	
AUDIO OUTPUT	SOURCE* <sup>POR</sup>	HDMI IN
		ANALOG IN
		<b>INT. SINEWAVE</b>
	VOLUME	0 ~ 80 ( <b>70</b> )
	ANALOG OUT CH	<b>SD0 L/R</b>
		SD1 L/R
		SD2 L/R
	SAMPLING RATE	SD3 L/R
		<b>48 KHZ</b>
		96 KHZ
	WORD LENGTH	192 KHZ
		16 BITS
		20 BITS
	CHANNELS	<b>24 BITS</b>
2CH		
5.1CH		
SD0-L ~ SD3-L FREQ.	<b>7.1CH</b>	
	MUTE	
SD0-R ~ SD3-R FREQ.	200HZ ~ 1600HZ	
	<b>(1000HZ)</b>	
EDID ANALYZER	SAME AS ANALYZER MODE	MUTE
EDID EMULATOR		200HZ ~ 1600HZ
HDCP OUTPUT MONITOR		<b>(1000HZ)</b>
HDR OUTPUT EMULATOR	HDR OUT ON/OFF	ON
		<b>OFF</b>

PATTERN MODE			
LEVEL 1	LEVEL 2	LEVEL 3	
HDR OUTPUT EMULATOR	SETTINGS	1 ~ 3 <b>(1)</b>	
	VALUE UNIT	HEX <b>NIT (CD/M*M)</b>	
	TX AVI COLORIMETRY		NO DATA
			ITU601
			ITU709
			XVYCC601
			XVYCC709
			SYCC601
			ADOBE Y601
			ADOBE RGB
			BT.2020 (1)
			<b>BT.2020 (2)</b>
	EOTF		[0] SDR LUMINANCE RANGE
			[1] HDR LUMINANCE RANGE
			<b>[2] SMPTE ST 2084.2</b>
			[3] FUTURE EOTF
	METADATA DESCRIPTOR		<b>STATIC METADATA TYPE 1</b>
			RESERVED
	DISPLAY PRIMARIES X0 ~ 2		0.0000 ~ 1.3100 <b>(0.0000)</b>
	DISPLAY PRIMARIES Y0 ~ 2		0.0000 ~ 1.3100 <b>(0.0000)</b>
	WHITE POINT X		0.0000 ~ 1.3100 <b>(0.0000)</b>
	WHITE POINT Y		0.0000 ~ 1.3100 <b>(0.0000)</b>
	MAX DISP MASTERING LUMI		0 ~ 65500 <b>(0)</b>
MIN DISP MASTERING LUMI		0.0000 ~ 6.5500 <b>(0.0000)</b>	
MAX CONTENT LIGHT LEVEL		0 ~ 65500 <b>(0)</b>	
MAX FRAME-AVERAGE L-L		0 ~ 65500 <b>(0)</b>	
TX AVI COLOR SPACE		[ANALYTIC DATA]	
SINK EDID SUPPORTS HDR			



PATTERN MODE		
LEVEL 1	LEVEL 2	LEVEL 3
SCDC OUTPUT MONITOR	[ANALYTIC DATA]	
TX PORT CONTROLS	+5V OUT ON/OFF	<b>FOLLOW TMDS</b> ALWAYS ON
	HDCP OUTPUT ON/OFF*POR	<b>OFF</b>
	HDCP OUTPUT VERSION	V2.2
	HDCP AKE_SEND_STORED_KM()	ON <b>OFF</b>
	HDCP COUNTER RESET	
	SCDC CED COUNTER READ	OFF
	<i>TX DOESN'T READ SINK CH0 ~ 2 ERROR-COUNTER.</i>	
	SCDC CED ALWAYS READ	OFF
	<i>TX IGNORES SINK CED_UPDATE FLAG.</i>	
	SCDC CED CH AUTO CLEAR	<b>OFF</b>
	<i>WHILE SINK CED_UPDATE FLAG=1, TX AUTO CLEARS ITS CH0 ~ 2 ERROR-COUNTER AND READS A NEW COUNTER FROM THE SINK.</i>	
OUTPUT RESOLUTION	SEE "TEST TIMING LIST" BELOW <b>(T66 1080P60)</b>	
OSD SETTINGS	H POSITION	0% ~ 100% <b>(10%)</b>
	V POSITION	0% ~ 100% <b>(10%)</b>
	TRANSPARENCY (SOLID ~ TRANSPARENT)	0 ~ 7 <b>(4)</b>
	A MODE COLOR (ANALYZER MODE ONLY)	<b>RED</b> BLUE BLACK

PATTERN MODE		
LEVEL 1	LEVEL 2	LEVEL 3
OSD SETTINGS	P MODE COLOR (PATTERN MODE ONLY)	RED
		<b>BLUE</b>
		BLACK
ETHERNET	IP MODE	<b>DHCP</b>
		STATIC
	IP ADDRESS	X.X.X.X ( <b>192.168.1.50</b> )
	SUBNET MASK	X.X.X.X ( <b>255.255.255.0</b> )
SETUP	GATEWAY	X.X.X.X ( <b>192.168.1.254</b> )
	FIRMWARE UPDATE	<b>NO</b> /YES
	IMAGE 640×480 UPDATE	<b>NO</b> /YES
	IMAGE 1920×1080 UPDATE	<b>NO</b> /YES
	[LETTER H] OPTION 2	SMALL
		<b>MEDIUM</b>
	3D SOURCE IMAGE BYPASS	<b>NO</b> /YES
	INFORMATION REFRESH	1 SEC ~ 2 SEC ( <b>2 SEC</b> )
		MANUAL
	IR CONTROLLER ADDRESS	0 ~ 3 ( <b>0</b> )
COPIED EDID RESET	<b>NO</b> /YES	
ETHERNET RESET	<b>NO</b> /YES	
FACTORY RESET	<b>NO</b> /YES	
INFORMATION	[UNIT VERSION DETAILS]	

## Note:

- Factory Default:
  - o Items in **Bold** are the factory default settings.
- Power-On Reset:
  - o Settings marked with **\*PoR** are reset to the default when the unit is powered off and back on.
- HDR Output Emulator Limitations:
  - o This function simulates HDR info frame (DRMI) and AVI colorimetry (BT.2020, etc.) output. It does not generate HDR/colorimetry video content.

TEST PATTERN NAME	VARIATIONS	ID
BORDER		<b>P01</b>
CHECKERBOARD	3	<b>P02</b>
CIRCLE 1		<b>P03</b>
CIRCLE 4		<b>P04</b>
BLACK		<b>P05</b>
BLUE		<b>P06</b>
CYAN		<b>P07</b>
GREEN		<b>P08</b>
MAGENTA		<b>P09</b>
RED		<b>P10</b>
WHITE		<b>P11</b>
YELLOW		<b>P12</b>
COLORBAR DELAY		<b>P13</b>
COLORBAR-H		<b>P14</b>
COLORBAR MOTION	2	<b>P15</b>
COLORBAR S.		<b>P16</b>
COLORBAR SPLIT		<b>P17</b>
COLORBAR-V	3	<b>P18</b>
CROSS HATCH 8	2	<b>P19</b>
CROSS HATCH 16	2	<b>P20</b>
CROSS HATCH 32	2	<b>P21</b>
DIAGONAL 1		<b>P22</b>
DIAGONAL 2		<b>P23</b>
DOT		<b>P24</b>
GENERAL	3	<b>P25</b>
GENERAL 2	3	<b>P26</b>
GRAYSCALE 8	3	<b>P27</b>
GRAYSCALE 16	3	<b>P28</b>
GRAYSCALE 32	3	<b>P29</b>

TEST PATTERN NAME	VARIATIONS	ID
GRAYSCALE 64	3	<b>P30</b>
GRAYSCALE 256	4	<b>P31</b>
GRAYSCALE 256RGB		<b>P32</b>
GRAYSCALE ADJUST	256	<b>P33</b>
GRAYSCALE H		<b>P34</b>
GRID		<b>P35</b>
IMAGE	2	<b>P36</b>
LETTER H	2	<b>P37</b>
LINE ON/OFF-H		<b>P38</b>
LINE ON/OFF-V	2	<b>P39</b>
LINE ON/OFF-V 4K		<b>P40</b>
MOTION-H	4	<b>P41</b>
MOTION-V	4	<b>P42</b>
MULTIBURST	3	<b>P43</b>
NEEDLES		<b>P44</b>
OVERSCAN		<b>P45</b>
PLUGE	2	<b>P46</b>
PROCESS 4:4:4		<b>P47</b>
SQUARE H8	2	<b>P48</b>
SQUARE H16	2	<b>P49</b>
SQUARE H32	2	<b>P50</b>
TEXT	4	<b>P51</b>
WINDOW BLUE	4	<b>P52</b>
WINDOW CYAN	4	<b>P53</b>
WINDOW GREEN	4	<b>P54</b>
WINDOW MAGENTA	4	<b>P55</b>
WINDOW RED	4	<b>P56</b>
WINDOW WHITE	4	<b>P57</b>
WINDOW YELLOW	4	<b>P58</b>

TEST TIMING LIST	HZ	ID
1080I	59	<b>T57</b>
	60	<b>T58</b>
1080P	23	<b>T59</b>
	24	<b>T60</b>
	25	<b>T61</b>
	29	<b>T62</b>
	30	<b>T63</b>
	50	<b>T64</b>
	59	<b>T65</b>
	60	<b>T66</b>
	2048×1080P	23
24		<b>T68</b>
25		<b>T69</b>
29		<b>T70</b>
30		<b>T71</b>
50		<b>T72</b>
59		<b>T73</b>
60		<b>T74</b>

TEST TIMING LIST	HZ	ID
3840×2160P	23	<b>T75</b>
	24	<b>T76</b>
	25	<b>T77</b>
	29	<b>T78</b>
	30	<b>T79</b>
	50	<b>T80</b>
	59	<b>T81</b>
	60	<b>T82</b>
	4096×2160P	23
24		<b>T84</b>
25		<b>T85</b>
29		<b>T86</b>
30		<b>T87</b>
50		<b>T88</b>
59		<b>T89</b>
	60	<b>T90</b>
AUTO NATIVE		<b>T91</b>
BYPASS		<b>T92</b>

Note: RB = Reduced Blanking

- Auto Mode (T91) will default to 1080p60 if no supported resolution is detected from the connected sink.
- Bypass (T92) is only available in Analyzer mode

PC RESOLUTION	VERTICAL FREQUENCY (HZ)	INPUT			
		HDMI	HDMI	DVI	VGA
<b>640×350P</b>	85	✓	✓	✓	✓
<b>640×480P</b>	59, 72, 75, 85	✓	✓	✓	✓
<b>720×400P</b>	70, 85	✓	✓	✓	✓
<b>800×600P</b>	56, 60, 72, 75, 85	✓	✓	✓	✓
<b>848×480P</b>	60	✓	✓	✓	✓
<b>1024×768P</b>	60, 70, 75, 85	✓	✓	✓	✓
<b>1152×864P</b>	75	✓	✓	✓	✓
<b>1280×768P</b>	60 (RB), 60, 75, 85	✓	✓	✓	✓
<b>1280×800P</b>	60 (RB), 60, 75, 85	✓	✓	✓	✓
<b>1280×960P</b>	60, 85	✓	✓	✓	✓
<b>1280×1024P</b>	60, 75, 85	✓	✓	✓	✓
<b>1360×768P</b>	60	✓	✓	✓	✓
<b>1366×768P</b>	60 (RB), 60	✓	✓	✓	✓
<b>1400×1050P</b>	60 (RB), 60, 75	✓	✓	✓	✓
<b>1440×900P</b>	60 (RB), 60, 75, 85	✓	✓	✓	✓
<b>1600×900P</b>	60 (RB)	✓	✓	✓	✓
<b>1600×1200P</b>	60	✓	✓	✓	✓
<b>1680×1050P</b>	60 (RB), 60	✓	✓	✓	✓
<b>1920×1200P</b>	60 (RB)	✓	✓	✓	✓
<b>480I</b>	59, 60	✓	✓	✓	
<b>480P</b>	59, 60	✓	✓	✓	✓
<b>576I</b>	50	✓	✓	✓	
<b>576P</b>	50	✓	✓	✓	✓
<b>720P</b>	50, 59, 60	✓	✓	✓	✓
<b>1080I</b>	50, 59, 60	✓	✓	✓	
<b>1080P</b>	23, 24, 25, 29, 30	✓	✓	✓	
	50, 59, 60	✓	✓	✓	✓
<b>2048×1080P</b>	23, 24, 25, 29, 30	✓	✓	✓	
	50, 59, 60	✓	✓	✓	
<b>3840×2160P</b>	23, 24, 25, 29, 30	✓	✓		
	50, 59, 60	✓	✓		
<b>4096×2160P</b>	23, 24, 25, 29, 30	✓	✓		
	50, 59, 60	✓	✓		

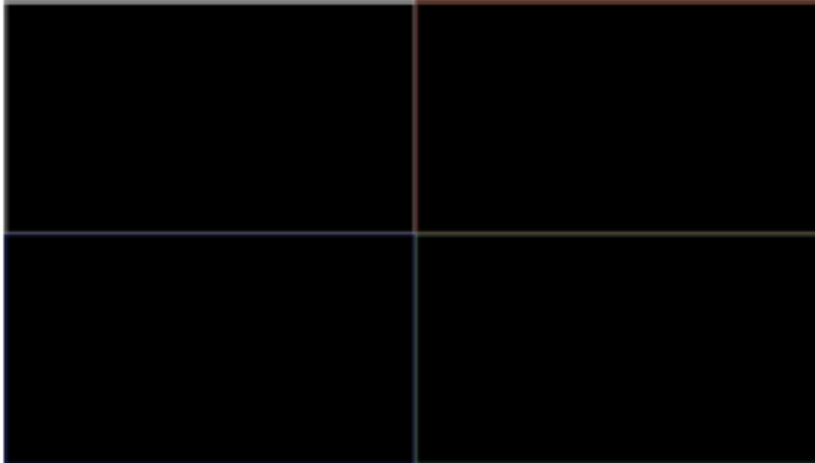
Note:

- RB=Reduced Blanking
- 87 total resolutions.
- VGA output limitations:
  - Only supports RGBHV. (No YUV, RGBS or RGB support)
  - In Analyzer mode: VGA output is turned off.
  - In Pattern mode: VGA output has limited resolution support.
  - OSD Menu display is not supported.

TEST PATTERN NAME	VARIATIONS	ID
BORDER		<b>P01</b>
CHECKERBOARD	3	<b>P02</b>
CIRCLE 1		<b>P03</b>
CIRCLE 4		<b>P04</b>
BLACK		<b>P05</b>
BLUE		<b>P06</b>
CYAN		<b>P07</b>
GREEN		<b>P08</b>
MAGENTA		<b>P09</b>
RED		<b>P10</b>
WHITE		<b>P11</b>
YELLOW		<b>P12</b>
COLORBAR DELAY		<b>P13</b>
COLORBAR-H		<b>P14</b>
COLORBAR MOTION	2	<b>P15</b>
COLORBAR S.		<b>P16</b>
COLORBAR SPLIT		<b>P17</b>
COLORBAR-V	3	<b>P18</b>
CROSS HATCH 8	2	<b>P19</b>
CROSS HATCH 16	2	<b>P20</b>
CROSS HATCH 32	2	<b>P21</b>
DIAGONAL 1		<b>P22</b>
DIAGONAL 2		<b>P23</b>
DOT		<b>P24</b>
GENERAL	3	<b>P25</b>
GENERAL 2	3	<b>P26</b>
GRAYSCALE 8	3	<b>P27</b>
GRAYSCALE 16	3	<b>P28</b>
GRAYSCALE 32	3	<b>P29</b>

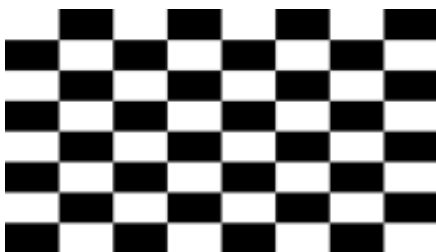
TEST PATTERN NAME	VARIATIONS	ID
GRAYSCALE 64	3	<b>P30</b>
GRAYSCALE 256	4	<b>P31</b>
GRAYSCALE 256RGB		<b>P32</b>
GRAYSCALE ADJUST	256	<b>P33</b>
GRAYSCALE H		<b>P34</b>
GRID		<b>P35</b>
IMAGE	2	<b>P36</b>
LETTER H	2	<b>P37</b>
LINE ON/OFF-H		<b>P38</b>
LINE ON/OFF-V	2	<b>P39</b>
LINE ON/OFF-V 4K		<b>P40</b>
MOTION-H	4	<b>P41</b>
MOTION-V	4	<b>P42</b>
MULTIBURST	3	<b>P43</b>
NEEDLES		<b>P44</b>
OVERSCAN		<b>P45</b>
PLUGE	2	<b>P46</b>
PROCESS 4:4:4		<b>P47</b>
SQUARE H8	2	<b>P48</b>
SQUARE H16	2	<b>P49</b>
SQUARE H32	2	<b>P50</b>
TEXT	4	<b>P51</b>
WINDOW BLUE	4	<b>P52</b>
WINDOW CYAN	4	<b>P53</b>
WINDOW GREEN	4	<b>P54</b>
WINDOW MAGENTA	4	<b>P55</b>
WINDOW RED	4	<b>P56</b>
WINDOW WHITE	4	<b>P57</b>
WINDOW YELLOW	4	<b>P58</b>

## 1) BORDER



The **Border** pattern presents 4 equal-sized squares dividing the screen into 4 quadrants, forming a central white cross, with red, green, blue and white inner squares. Ideal for testing screen boundary, alignment and pincushion issues. All lines should be straight, and edge transitions should be sharp.

## 2) CHECKERBOARD (3 VARIATIONS)



8x8



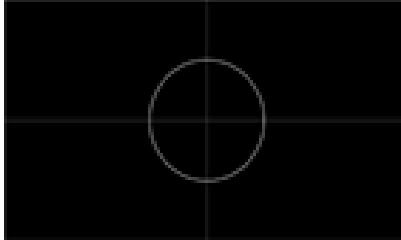
24x24



48x48

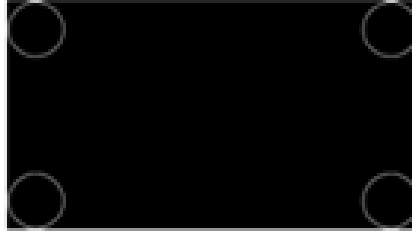
The **Checkerboard** pattern displays a repeating black and white checkerboard image. This is ideal for checking the alignment and corner convergence of TVs or monitors. Bandwidth can be checked by observing the vertical transitions. Transitions from black to white should be sharp. There are 3 variations: 8x8, 24x24 and 48x48.



**3) CIRCLE 1**

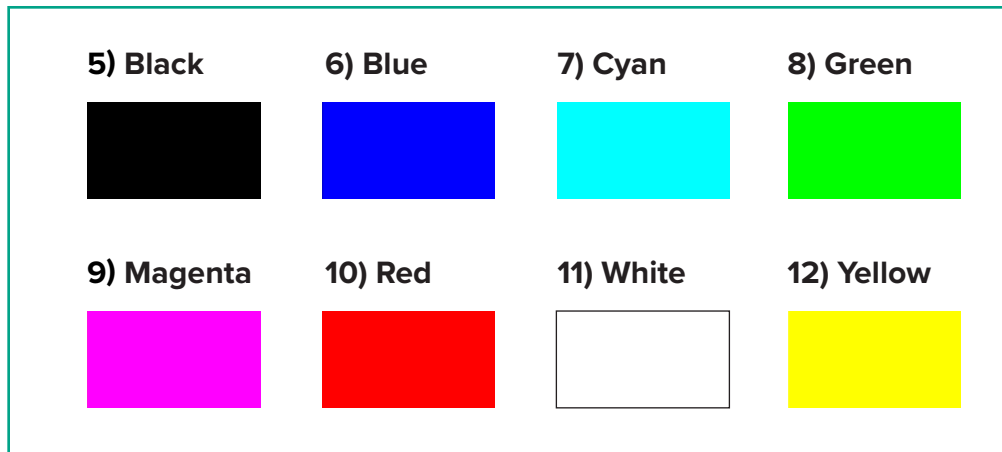
The **Circle 1** pattern provides a single white circle in the middle with a white cross and a white outer border line. This pattern is designed for quickly confirming that the geometry of the scene is correct and that the full source is being displayed, edge to edge.

## 4) CIRCLE 4



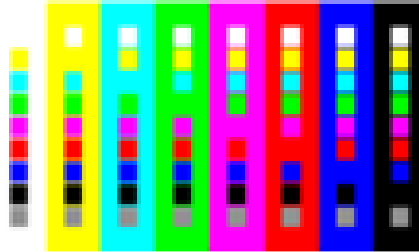
The **Circle 4** pattern provides 4 smaller white circles in each of the 4 corners of the screen. This pattern can help confirm that the display is maintaining correct geometry at the edges of the screen.

## 5-12) FULL FIELD PATTERNS



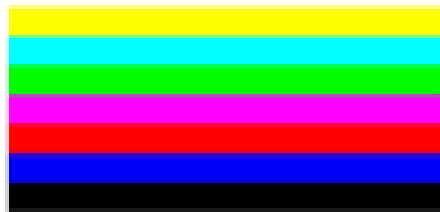
These patterns are full screen purity tests offering eight different full field patterns: **Black, Blue, Cyan, Green, Magenta, Red, White, Yellow**. The color patterns should display an even distribution of brightness and consistent color tone across the screen. The 100% white pattern should display evenly across the screen and not cause the display's overall brightness to lower, or for the image to become unstable. The black pattern will give a good idea of the display's true minimum brightness capability and is helpful for setting the viewing room lighting levels

### 13) COLORBAR DISPLAY

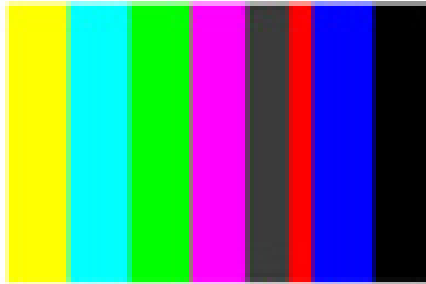


The **Colorbar Delay** pattern provides a sequence of standard 100% color bars with a full set of smaller color squares within each bar. This test is primarily to detect if any of the color components of the video signal are delayed/skewed relative to each other. Pay close attention to the left and right sides of the squares and look for a color shift. This is a common problem when using extreme-length analog extension products, or very long analog cables.

### 14) COLORBAR-H

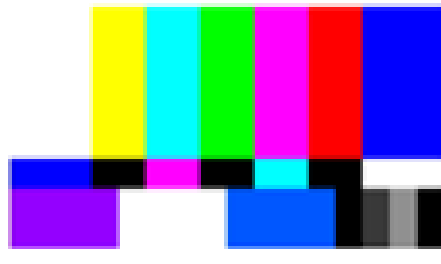


The **Colorbar-H** pattern is a standard (white, yellow, cyan, green, magenta, red, blue, black) 100% color bar pattern using horizontal bars.

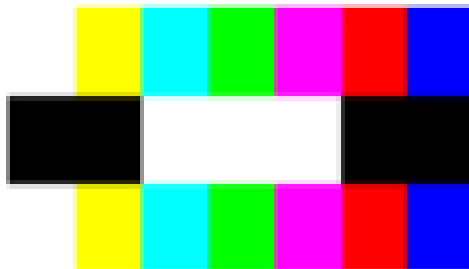
**15) COLORBAR MOTION (2 VARIATIONS)**

Slow/Fast Motion

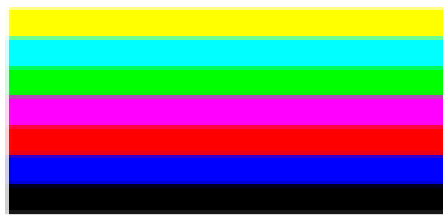
The **Colorbar Motion** pattern is a standard (white, yellow, cyan, green, magenta, red, blue, black) 100% color bar pattern using vertical bars with a grey bar moving horizontally across it. There are 2 variations: slow and fast motion of the grey bar.

**16) COLORBAR S**

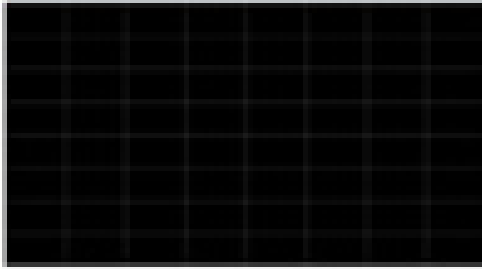
The **Colorbar S** pattern is a standard SMPTE color bar pattern which is used for rapid verification of signal color accuracy and for display setup using the Blue-Only option on your display, if it has one.

**17) COLORBAR SPLIT**

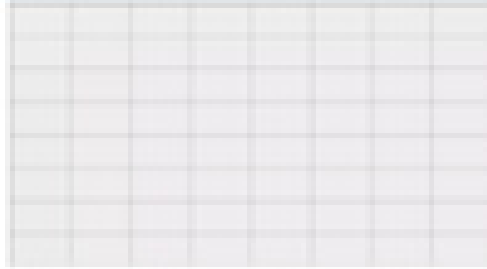
The **Colorbar Split** pattern is a vertical color bar pattern with the color bars split in the middle by large black and white sections. All colors (white, yellow, cyan, green, magenta, red, blue) are at 100% brightness.

**18) COLORBAR-V (3 VARIATIONS)**

The **Colorbar-V** pattern comes in 3 variations. The first is a standard (white, yellow, cyan, green, magenta, red, blue, black) 100% color bar pattern using vertical bars. The 2nd variation has all bars at 75% brightness. The 3rd variation is split with the top half being at 100% and the lower half being at 75% brightness.

**19) CROSS HATCH 8 (2 VARIATIONS)**

Normal

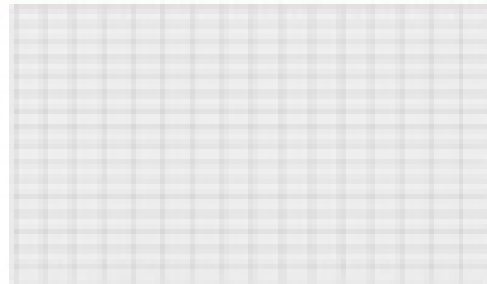


Inverse

The **Cross Hatch 8** pattern is a full field black & white pattern of crossing vertical and horizontal lines dividing the screen into 8 sections in each direction. This pattern is primarily used to check for color convergence and pincushion issues in projectors. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

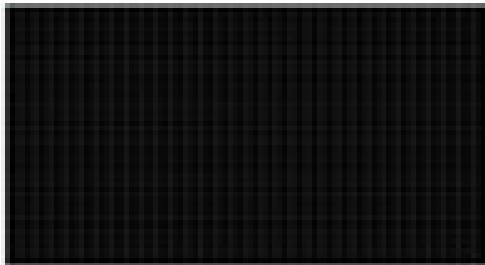
**20) COLOR HATCH 16 (3 VARIATIONS)**

Normal

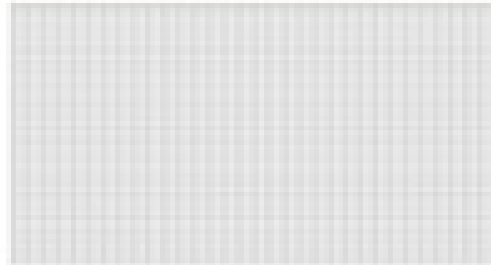


Inverse

The **Cross Hatch 16** pattern is a full field black & white pattern of crossing vertical and horizontal lines dividing the screen into 16 sections in each direction. This pattern is primarily used to check for color convergence and pincushion issues in projectors. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

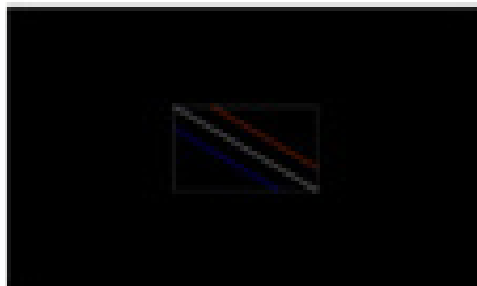
**21) CROSS HATCH 32 (2 VARIATIONS)**

Normal

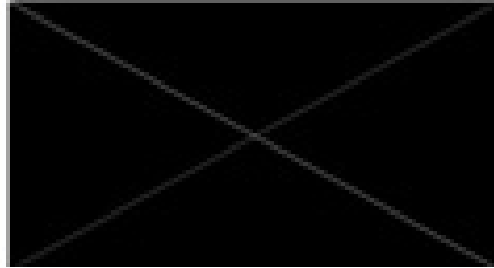


Inverse

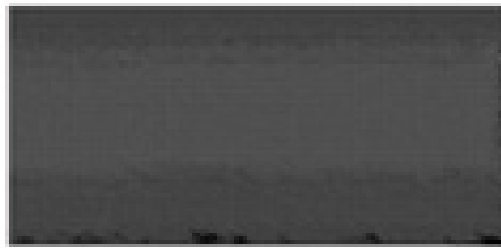
The **Cross Hatch 32** pattern is a full field black & white pattern of crossing vertical and horizontal lines dividing the screen into 32 sections in each direction. This pattern is primarily used to check for color convergence and pincushion issues in projectors. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

**22) DIAGONAL 1**

The **Diagonal 1** pattern is a set of 3 diagonal colored lines (red, white and blue) within a white square in the middle of the screen. This pattern is used to check for distortion and alignment issues in the center of the screen.

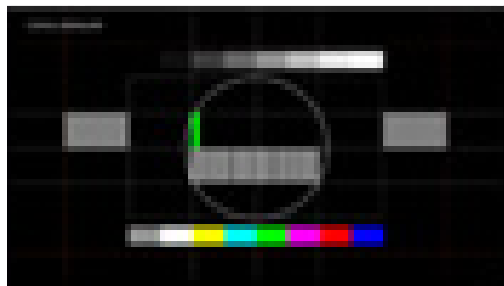
**23) DIAGONAL 2**

The **Diagonal 2** pattern is 2 diagonal lines that travel from the corners to the exact center of the display. This can be used to check for alignment and geometry issues, particularly with projectors. The outer border of the screen also has a white outline to verify that the full image is being displayed.

**24) DOT**

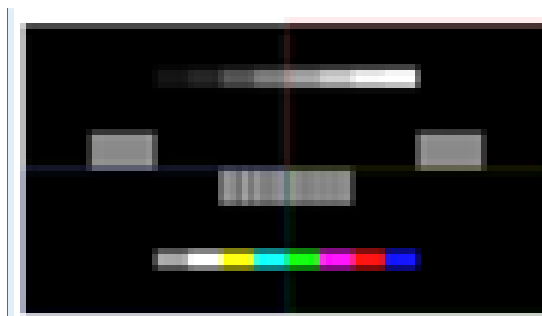
The **Dot** pattern is a full field black & white pattern with a repeating pattern of single-pixel (resolutions below 4K) or 4-pixel (at 4K) white dots surrounded by single pixels of black. This pattern is ideal for testing the signal path/display for bandwidth issues, interference, cross-talk or scaling issues.



**25) GENERAL (3 VARIATIONS)**

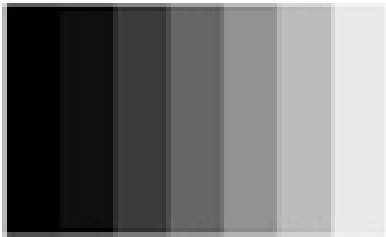
Stop/Slow/Fast Motion

The **General** pattern is an all-purpose, multi-pattern test to visually check for multiple issues simultaneously. It includes color bars, 8-step grayscale, vertical and horizontal multi-burst, cross hatch, circle and motion patterns. There are 3 variations: No motion, slow motion and fast motion.

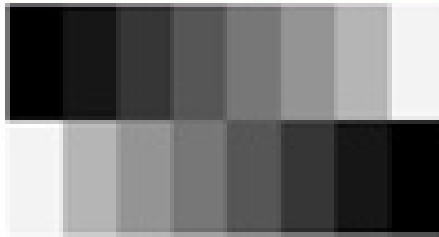
**26) GENERAL 2**

Stop/Slow/Fast Motion

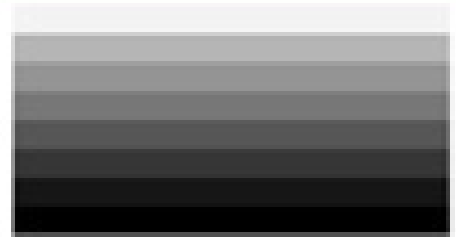
The **General 2** pattern is a simplified all-purpose, multi-pattern test to visually check for multiple issues simultaneously. It includes color bars, 8-step grayscale, vertical and horizontal multi-burst, multi-color center/ edge alignment lines, and an optional block motion pattern. There are 3 variations: No motion block, slow motion and fast motion.

**27) GRAYSCALE 8 (3 VARIATIONS)**

Vert. Bar

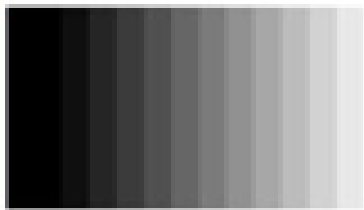


Vert. L/R Bar

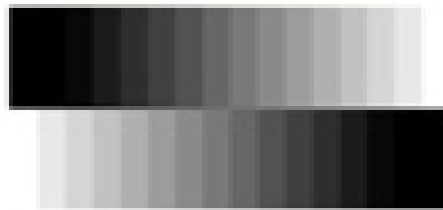


Hori. Bar

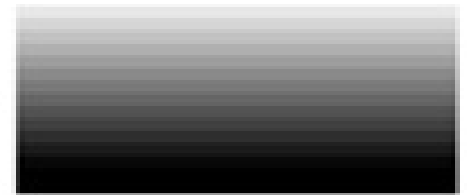
The **Grayscale 8** pattern provides a way to check and adjust the contrast, brightness and grayscale tracking of your display with 8 bars progressing from 0% to 100% brightness in even steps. When testing a display, no color should be visible in any of the bars, and all bars should be visible and distinct. There are 3 variations: 8 vertical bars, two sets of 8 vertical bars with the lower set reversed, and 8 horizontal bars.

**28) GRAYSCALE 16 (3 VARIATIONS)**

Vert. Bar

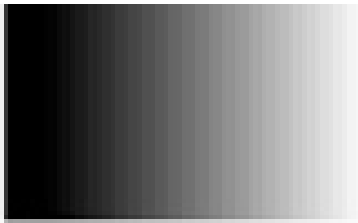


Vert. L/R Bar

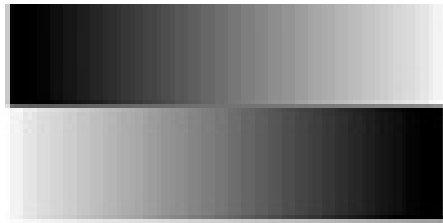


Hori. Bar

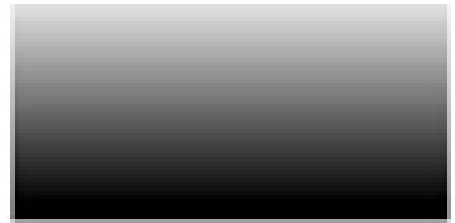
The **Grayscale 16** pattern provides a way to check and adjust the contrast, brightness and grayscale tracking of your display with 16 bars progressing from 0% to 100% brightness in even steps. When testing a display, no color should be visible in any of the bars, and all bars should be visible and distinct. There are 3 variations: 16 vertical bars, two sets of 16 vertical bars with the lower set reversed, and 16 horizontal bars.

**29) GRAYSCALE 32 (3 VARIATIONS)**

Vert. Bar

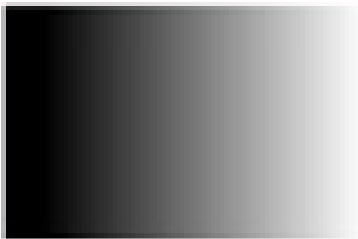


Vert. L/R Bar

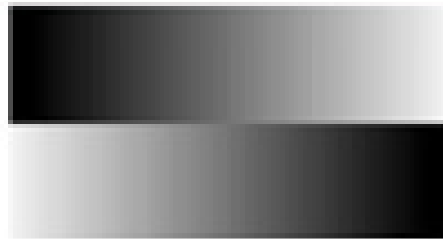


Hori. Bar

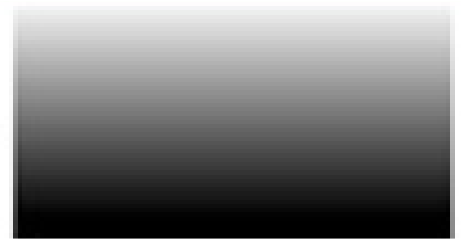
The **Grayscale 32** pattern provides a way to check and adjust the contrast, brightness and grayscale tracking of your display with 32 bars progressing from 0% to 100% brightness in even steps. When testing a display, no color should be visible in any of the bars, and all bars should be visible and distinct. There are 3 variations: 32 vertical bars, two sets of 32 vertical bars with the lower set reversed, and 32 horizontal bars.

**30) GRAYSCALE 64 (3 VARIATIONS)**

Vert. Bar

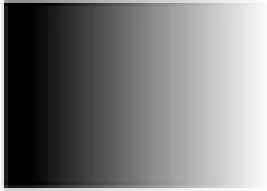


Vert. L/R Bar



Hori. Bar

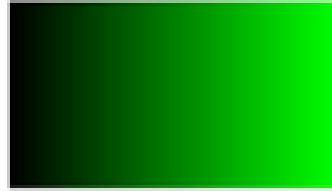
The **Grayscale 64** pattern provides a way to check and adjust the contrast, brightness and grayscale tracking of your display with 64 bars progressing from 0% to 100% brightness in even steps. When testing a display, no color should be visible in any of the bars, and all bars should be visible and distinct. There are 3 variations: 64 vertical bars, two sets of 64 vertical bars with the lower set reversed, and 64 horizontal bars.

**31) GRAYSCALE 256 (4 VARIATIONS)**

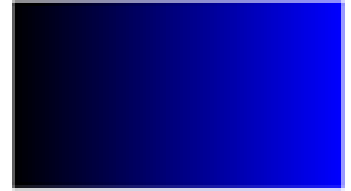
Gray



Red

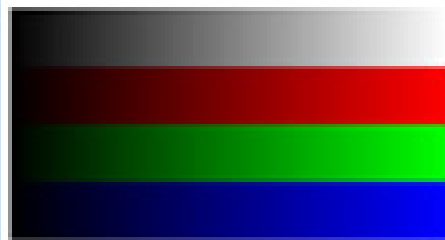


Green



Blue

The **Grayscale 256** pattern provides a way to fine tune the contrast, brightness and grayscale tracking of your display with a full 265 step gradient progressing from 0% to 100% brightness. When testing a display, no color should be visible at any point across the gradient, and the transition from black to white should appear even and consistent. There are 3 variations: 256 vertical bars, two sets of 256 vertical bars with the lower set reversed, and 265 horizontal bars.

**32) GRAYSCALE 256**

The **Grayscale 256RGB** pattern provides a way to fine tune the contrast, brightness, grayscale and color tracking of your display with a four full 265 step gradients (gray, red, green, blue) progressing from dark to light should appear even and consistent across all 4 sections.

### 33) GRAYSCALE ADJUST (256 VARIATIONS)



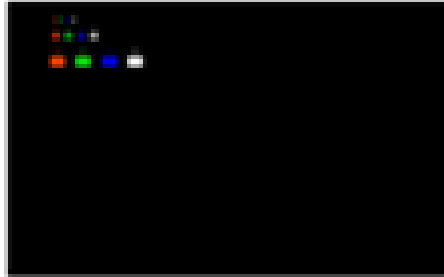
Adjustable from  
0 to 256

The **Grayscale Adjust** pattern provides a full field of grey with user adjustable brightness levels for testing display gray purity and signal response. The brightness can be freely adjusted from 0 to 255 by pressing the PATTERN button followed by the -/+ buttons. The gray level number will appear in text on screen while it is in adjusting mode.

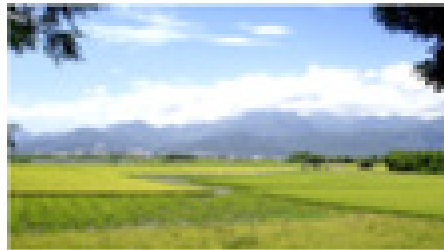
### 34) GRAYSCALE H



The **Grayscale H** pattern provides 4 distinct gray fields in an “H” arrangement for testing luminance transition stability. No color or interference should be visible at the transitions between sections

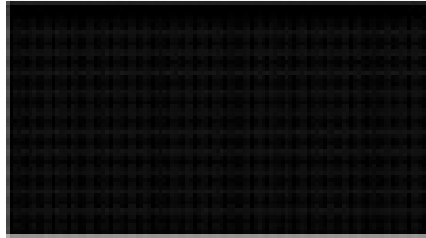
**35) GRAYSCALE 256 (4 VARIATIONS)**

The **Grid** pattern provides a selection of red, green, blue and white boxes with 2×2 grids within and above them to test for pixel on pixel and color offset issues.

**36) IMAGE**

The Image pattern is a user customizable test pattern that holds two bitmap images. One image is for use with low output resolutions (below 1920×1080) and the other is for high output resolutions (1920×1080 and above). The low resolution image is a 640×480 bitmap (RGB, 24-bit) and the high resolution image is a 1920×1080 bitmap (RGB, 24-bit).

Note: To upload new images into the unit please the new replacement image on a USB thumb drive with the file named “IMG\_480.BMP” or “IMG\_1080.BMP” as appropriate. Plug the USB thumb drive into the USB port on the unit and navigate to the “Setup” menu. Next, activate the “Image 640×480 Update” or “Image 1920×1080 Update” menu item, as appropriate, to copy the new image to the unit.

**37) LETTER H (2 VARIATIONS)**

Big/Small H

The **Letter H** pattern is a screen filled with a series of large capital “H” characters moving vertically up the screen. This is a basic test to confirm motion detail. There are 2 variations: Large “H” characters and small “H” characters.

**38) GRAYSCALE H**

The **Line On/Off-H** pattern generates an alternating pattern of single- pixel horizontal white lines. This pattern can be used to analyze the vertical pixel resolution of your display. If the output appears to have mosaic patterns, or appears to be a solid gray field, then it is possible that your display does not fully support the resolution you are currently sending to it.

**39) LINE ON/OFF-V (2 VARIATIONS)**

White &amp; Black Lines

Red & Green Lines  
(Not Supported in 4K)

The **Line On/Off-V** pattern generates an alternating pattern of single-pixel vertical lines. This pattern can be used to analyze the horizontal pixel resolution of your display. If the output appears to have mosaic patterns, or appears to be a solid gray field, then it is possible that your display does not fully support the resolution you are currently sending to it. There are 2 variations: alternating white & black lines and alternating red and green lines.

Note: The red and green variation is not available if the selected output resolution is 4K. The following timings use dual-pixel lines: 3840×2160@50/60Hz & 4096×2160@25/30/50/60Hz.



## 40) LINE ON/OFF-V (4K)

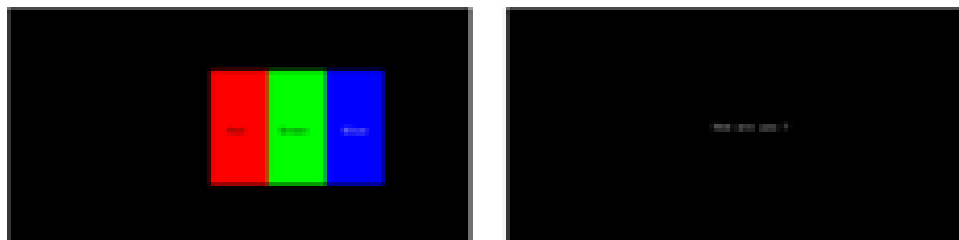


White & Black Lines

The **Line On/Off-V 4K** pattern generates an alternating pattern of single-pixel vertical lines. This pattern can be used to analyze the horizontal pixel resolution of your display. If the output appears to have mosaic patterns, or appears to be a solid field (grey, white or black), then it is possible that your display does not fully support the resolution you are currently sending to it.

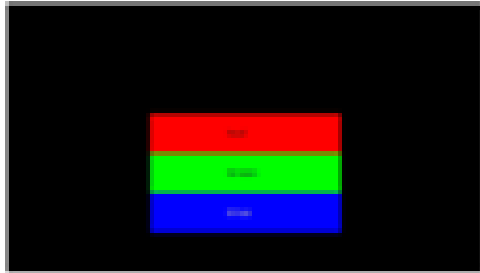
Note: This pattern is only available for the following resolutions: 3840×2160@24/25/30Hz & 4096×2160@24Hz, and the color space will be forced to output as RGB with a color depth of 8-bit. If a non-supported resolution is selected the pattern will automatically change to Line On/Off-V.

## 41) MOTION-H (4 VARIATIONS)



The **Motion-H** patterns are a collection of horizontal motion tests. These can be used to test your display's pixel on/off response time. There are 4 variations: Slow red/green/blue block, fast red/ green/block, slow moving sample text, fast moving sample text. Note: The contents of the text can be modified using an RS-232 or telnet command and can be up to 20 characters long.

## 42) MOTION-V (4 VARIATIONS)



Slow/Fast RGB Block



Slow/Fast Strong

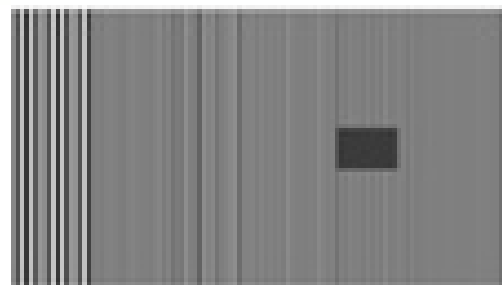
The **Motion-V** patterns are a collection of vertical motion tests. These can be used to test your display's pixel on/off response time. There are 4 variations: Slow red/green/blue block, fast red/ green/block, slow moving sample text, fast moving sample text.

Note: The contents of the text can be modified using an RS-232 or telnet command and can be up to 20 characters long

## 43) MULTIBURST (3 VARIATIONS)



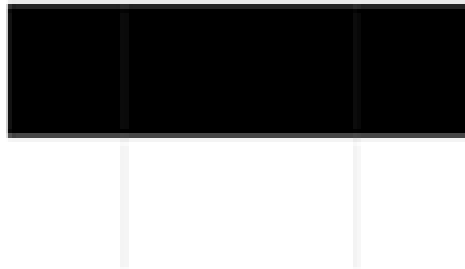
Stop Motion



Slow/Fast Motion

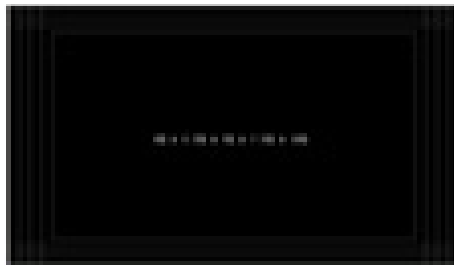
The **Multiburst** pattern provides a standard multiburst pattern consisting of vertical white lines that decrease in thickness from left to right allowing the user to analyze the bandwidth and frequency response of the video path and connected display. There are 3 variations: Standard multiburst, multiburst with a slow moving gray block, and multiburst with a fast moving gray block.

## 44) NEEDLES

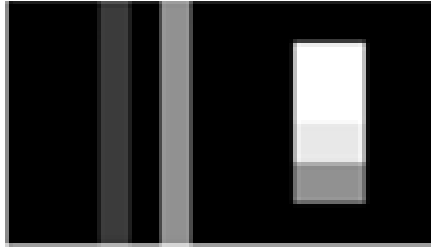


The **Needles** pattern is a standard needle pulse test. The top half of the screen is black and the bottom half is white with 2 thin inverse- brightness lines crossing from top to bottom. This pattern allows for analysis of the sharpness, blooming and screen distortion issues that a display might have.

## 45) OVERSCAN

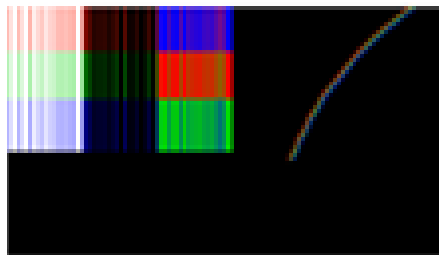


The **Overscan** pattern provides a quick way to determine how much overscan, or clipping, is being caused by a display. It consists of 5 concentric rectangles moving in from the outer edge of the signal. They are positioned at 0%, 2.5%, 5%, 7.5% and 10% of the screen size.

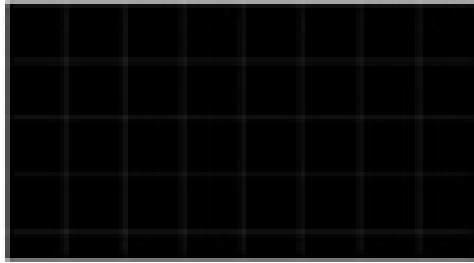
**46) PLUGE (2 VARIATIONS)**

Full/Limited RGB Range

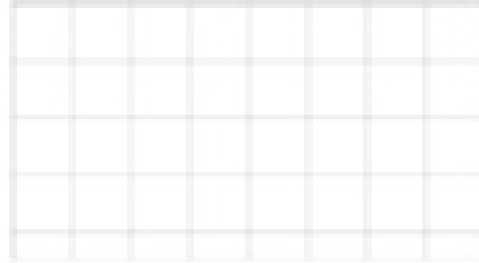
The **Pluge** pattern is used to perform the accurate and consistent brightness and contrast configuration of a display. Typically you will want to adjust the brightness control of the monitor so that the first bar is just barely indistinguishable from the background black while the second bar is still clearly visible. Next you should adjust the contrast so that all four segments of the greyscale box are clearly visible and distinguishable. There are 2 variations: Full RGB range (0 - 255) and Limited RGB range (16-235).

**47) PROCESS 4:4:4**

The **Process 4:4:4** pattern is designed to help determine if a signal path has been color sub-sampled to 4:2:2 or 4:2:0 somewhere in the signal path between the Test Generator and the display's panel. If the signal has not been sub-sampled, the multi-colored curved line will be composed of 3 distinct colored lines (red, blue and green) with no merging or loss of color/detail. The red/green/blue/white patterns on the left will also present clean and distinct color lines without breaks in the vertical pattern.

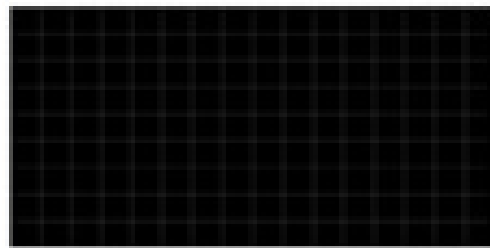
**48) SQUARE H8 (2 VARIATIONS)**

Normal

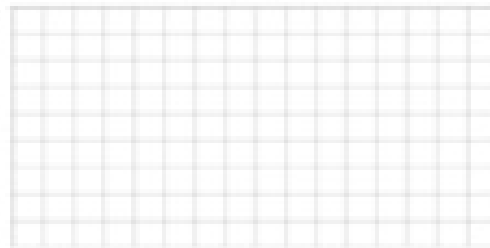


Inverse

The **Square H8** pattern is a full field black & white pattern of squares dividing the screen horizontally into 8 sections. This pattern is primarily used to check projector linearity. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

**49) SQUARE H16 (2 VARIATIONS)**

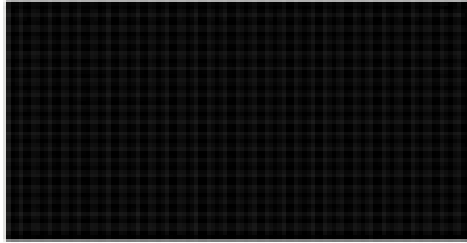
Normal



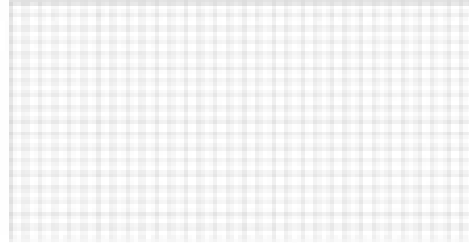
Inverse

The **Square H16** pattern is a full field black & white pattern of squares dividing the screen horizontally into 16 sections. This pattern is primarily used to check projector linearity. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

## 50) SQUARE H32 (2 VARIATIONS)



Normal



Inverse

The **Square H32** pattern is a full field black & white pattern of squares dividing the screen horizontally into 32 sections. This pattern is primarily used to check projector linearity. There are 2 variations: Normal (white lines, black field) and Inverse (black lines, white field).

## 51) TEXT( 4 VARIATIONS)



Normal &amp; Small



Inverse &amp; Small



Normal &amp; Big



Inverse &amp; Big

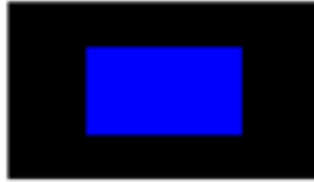
The **Text** pattern is used to check the clarity of text at various sizes and colors. This is primarily a test for projectors. There are 4 variations: Small multi-color text on a black background, small multi-color text on a white background, large multi-color text on a black background, and large multi-color text on a white background.

**52) WINDOW BLUE (4 VARIATIONS)**

Normal 75%



Inverse 75%



Normal 50%



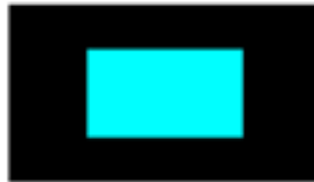
Inverse 50%

**53) WINDOW CYAN (4 VARIATIONS)**

Normal 75%



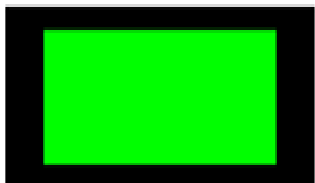
Inverse 75%



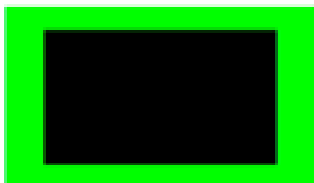
Normal 50%



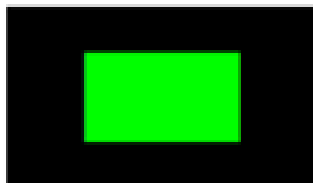
Inverse 50%

**54) WINDOW GREEN (4 VARIATIONS)**

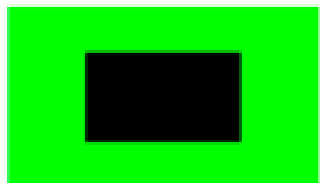
Normal 75%



Inverse 75%



Normal 50%



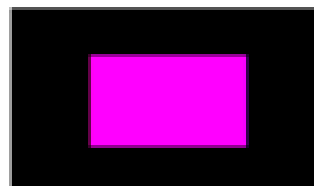
Inverse 50%

**55) WINDOW MAGENTA (4 VARIATIONS)**

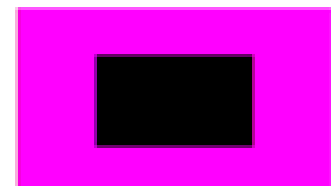
Normal 75%



Inverse 75%

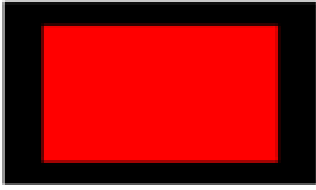


Normal 50%



Inverse 50%

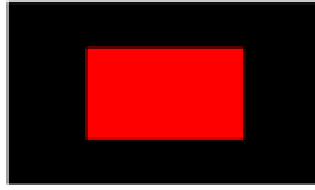
## 56) WINDOW RED (4 VARIATIONS)



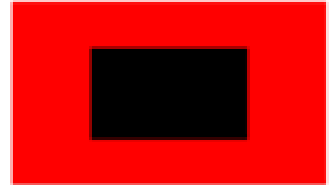
Normal 75%



Inverse 75%



Normal 50%



Inverse 50%

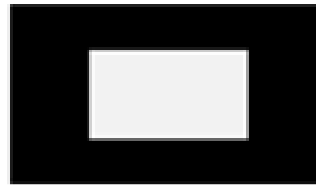
## 57) WINDOW WHITE (4 VARIATIONS)



Normal 75%



Inverse 75%

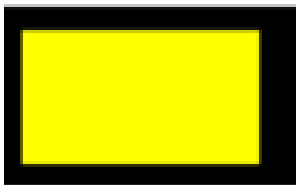


Normal 50%



Inverse 50%

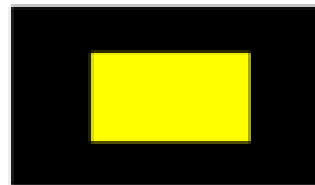
## 58) WINDOW YELLOW (4 VARIATIONS)



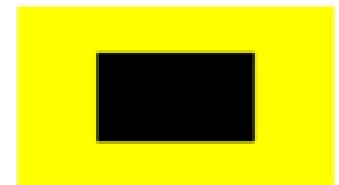
Normal 75%



Inverse 75%



Normal 50%



Inverse 50%

These **Window** patterns are additional screen purity tests offering seven different patterns with different sized windows of each color on a black field: **Blue, Cyan, Green, Magenta, Red, White, Yellow**. The color patterns should display an even distribution of brightness and consistent color tone across the screen. Each pattern has 4 variations: Normal 75% Window, Inverse 75% Window, Normal 50% Window, and Inverse 50% Window.



## INPUT/OUTPUT/CONTROL PORTS

<b>Input</b>	One- HDMI Input Port One- L/R analog audio (3.5mm jack)
<b>Output</b>	One- HDMI Output Port One- VGA Output Port, HD-15 One- L/R Analog Audio (3.5mm jack)
<b>VGA Output</b>	Resolution Support 350p, 480p, 576p, 720p, 1080i, 640x480, 800x600, 1024x768, 1280x1024, 1366x768, 1400x1050, 1440x900, 1600x900 (RB), 1600x1200, 1680x1050, 1920x1200 (RB),2048x1080p
<b>HDMI Output</b>	Resolution Support 350p, 480p, 576p, 720p, 1080i, 640x480, 800x600, 1024x768, 1280x1024, 1366x768, 1400x1050, 1440x900, 1600x900 (RB), 1600x1200, 1680x1050, 1920x1200 (RB),2048x1080p, 4K and much more
<b>Control</b>	RS-232, DB-9 LAN, RJ-45 USB for firmware upgrades

## PHYSICAL

<b>Dimensions</b>	4.73”(W) x 6.11”(D) x 1.19”(H)
<b>Power</b>	5V, 2.6A
<b>Operating Temperature</b>	0 to 40°C
<b>Storage Temperature</b>	-20 to 60°C

## CERTIFICATIONS

CE, FCC

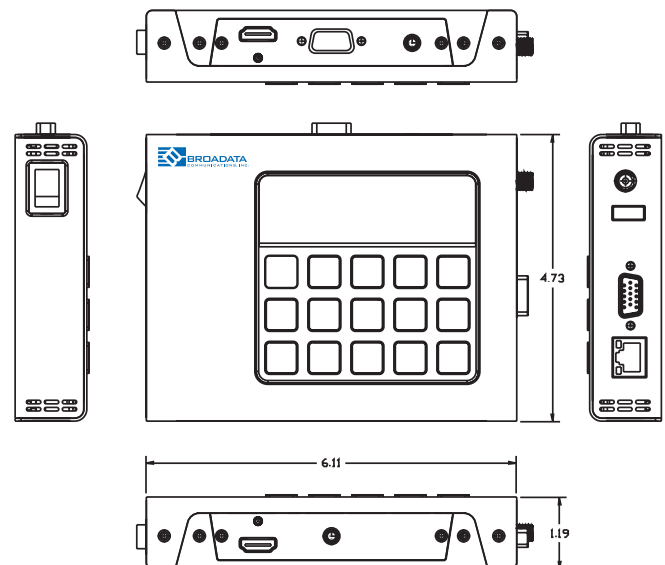
## GREEN COMPLIANCE

RoHS

## ORDER INFORMATION

<b>LB-H2-SGA</b>	LinkBridge™ 18G/4K Signal Generator & Analyzer
<b>Included Accessories</b>	Remote Control 5V DC, 2.6A Power Adapter
<b>Optional Accessories</b>	HDMI 2.0 Cable (2m)

## PANEL DRAWING



## 5.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at 800-214-0222 for information.

## 5.2 Return/Repair Service

The LB-H2-SGA Signal Generator & Analyzer contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/ repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product Model Number
- Serial Number
- Complete Description of Problem
- Hardware Installation Description

Broadata Communications, Inc.  
2545 West 237th Street, Suite K  
Torrance, CA 90505  
1-800-214-0222  
(310) 530-1416  
(310) 530-5958 (Facsimile)  
e-mail: CustomerService@Broadatacom.com

Website: [www.broadatacom.com](http://www.broadatacom.com)

## 6.0 LIMITED WARRANTY

Broaddata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.



2545 West 237th Street

Torrance, CA 90505

800•214•0222

310•530•1416

e-mail: [Sales@broadatacom.com](mailto:Sales@broadatacom.com)

**[www.broadatacom.com](http://www.broadatacom.com)**