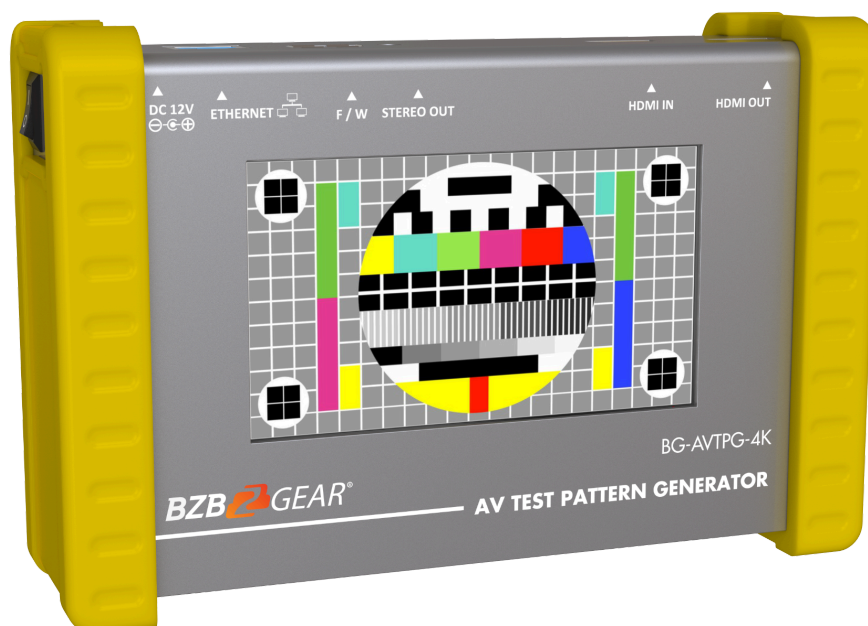


# BG-AVTPG-4K

**1080P/4K UHD HDMI 2.0 18Gbps Video Test Pattern  
Generator/Tester/Analyzer with Ethernet**

## User Manual







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## Statement

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Please read these instructions carefully before connecting, operating, or configuring this product. Please save this manual for future reference.

## Safety Precaution

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- To prevent damaging this product, avoid heavy pressure, strong vibration, or immersion during transportation, storage, and installation.
- The housing of this product is made of organic materials. Do not expose to any liquid, gas, or solids which may corrode the shell.
- Do not expose the product to rain or moisture.
- To prevent the risk of electric shock, do not open the case. Installation and maintenance should only be carried out by qualified technicians.
- Do not use the product beyond the specified temperature, humidity, or power supply specifications.
- This product does not contain parts that can be maintained or repaired by users. Damage caused by dismantling the product without authorization from BZBGear is not covered under the warranty policy.
- Installation and use of this product must strictly comply with local electrical safety standards.





## Introduction

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The BG-AVTPG-4K HDMI 2.0 Generator / Analyzer is a versatile HDMI 2.0 toolbox with full bandwidth and HDCP 2.2 support. For ease of HDMI 2.0 installations, BG-AVTPG-4K is equipped with both HDMI 2.0 pattern generator and analyzer. This handy and portable gadget has long hours of operation with its chargeable battery and features video pattern generation, touch panel control, cloud based firmware upgrade access and many other features. The unit can also be used as an HDCP analyzer or loop test in a single piece of device.

The BG-AVTPG-4K can support 8 channels LPCM audio with selectable sample rate. The BG-AVTPG-4K also allows users to bypass HDMI inputs to the connected display or built-in 4.3" touch panel to allow users to verify HDMI sources instantly.

BG-AVTPG-4K is the most cost-effective HDMI 2.0 tool on the market and makes HDMI installations easier than ever!

## Features

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- 4K2K60 4:4:4 8bit, 4K2K60 4:2:0 16 bit HDR pattern generator
- 4.3" touch panel
- Mouse control
- User control through Ethernet
- Firmware updateable through USB Flash Drive
- User defined patterns up to 2GB
- Embedded LINUX KERNAL system with limitless extensions
- Scrambler supported for videos over 340MHz output wise
- Loop test capability to provide statistical analysis for connection stability
- HDMI loop through function
- HDCP test allow users to verify HDCP of HDMI sources and transmit HDCP encrypted video
- Qualified physical layer performance to ensure the best compatibility
- Rechargeable battery portability for up to 4 hours
- Supports voltage measurement on +5V from HDMI source and hot plug from display



## Packing List

- 1x BG-AVTPG-4K
- 1x DC 12V 5A power supply
- 1x User Manual
- 1x Quick Start Guide

## Technical Specifications

Technical		
Role of usage	Generator / Analyzer	
Video bandwidth	Single link 600MHz (18Gbps)	
HDMI compliance	HDMI 2.0 and below	
HDCP compliance	HDCP 2.2 and below	
Video Support	Up to 4K2K@60 4:4:4 8bit, 4K2K@60 4:2:0 16bit (HDR)	
Video Format Support	HDMI	
Audio support	8ch LPCM up to 192K	
Control	USB mouse / touch panel / Ethernet	
ESD protection	Human body model $\pm 15\text{kV}$ [air-gap discharge] & $\pm 8\text{kV}$ [contact discharge]	
Input	1x HDMI + 1x USB + 1x RJ-45(Ethernet)	
Output	1x HDMI + 1x 3.5mm (Stereo)	
USB Support	USB 2.0	
HDMI connector	Type A (19-pin female)	
USB Connector	Type A	
RJ-45 connector	WE/SS 8P8C with 2 LED indicators	
Mechanical		
Housing	Metal enclosure	
Dimensions (L x W x H)	Model	4.1" x 6.6" x 1.7" [105 x 166 x 42mm]
	Package	1'5" x 6.7" x 3" [371 x 170 x 77mm]
	Carton	1'3" x 1'4" x 1'5" [410 x 368 x 393mm]
Weight	Model	27 oz [765g]
	Package	2.8 lbs [1294g]
Power supply	12V 5A DC / Battery	
Power Consumption	15 Watts	
Operation temperature	32~104°F / 0~40°C	
Storage temperature	-4~140°F / -20~60°C	
Relative humidity	20-90% RH [no condensation]	



## Operation Controls and Functions



1. **Power Switch:** Power ON/OFF switch
2. **Touch Panel:** Touch screen for control
3. **OUTPUT:** HDMI output. Crystal clear images with resolutions up to 4K2K@60Hz
4. **INPUT:** HDMI input. Crystal clear image with resolutions up to 4K2K@60Hz
5. **Stereo Out:** Stereo analog audio output for connecting to local audio systems
6. **USB:** Connect to USB 2.0 device for control or firmware update
7. **Ethernet:** Network Control Connection
8. **+12V DC:** 12V 5A DC power jack. Use supplied Power Adapter



## Menu Operation

The major functions of the device are listed below

- HDMI Generator
- HDMI Receiver
- HDCP Test
- EDID Test
- Loop Test

Please refer to the table below and the following section to know how to operate these functions.

## Output Settings

Menu	Items	Remark
Signal Format	TYPE	select the HDMI/DVI signal type information (color space and color depth)
	RESOLUTION	setting the TV/PC resolution and frequency
VIDEO Pattern	DEFAULT ALBUM	multiple patterns to test HDMI device, it also provides user to set the timer and moving squares
PCM Audio Tone	MUTE	mute / unmute the PCM audio
	TONE	for user setting the audio information to test audio on HDTV or other A/V receivers
Setting	SCRAMBLER	for user to understand the signal encode a message situation

## Test Setting

Menu	Items	Remark
Source	Format	read format information from source
	Video	provide small screen for user to check the video information and also provide video pass through to the display
	Audio	read audio information
	Packet	read packet
	HDCP	enable HDCP function (1.4/2.0)
Sink	EDID	EDID analyzer or learn EDID from RX
	HDCP	HDCP test
Loop		evaluate the quality of cables or EUT
Measure	REFRESH	voltage measurement on +5V from HDMI source and hotplug from display

## System Setting

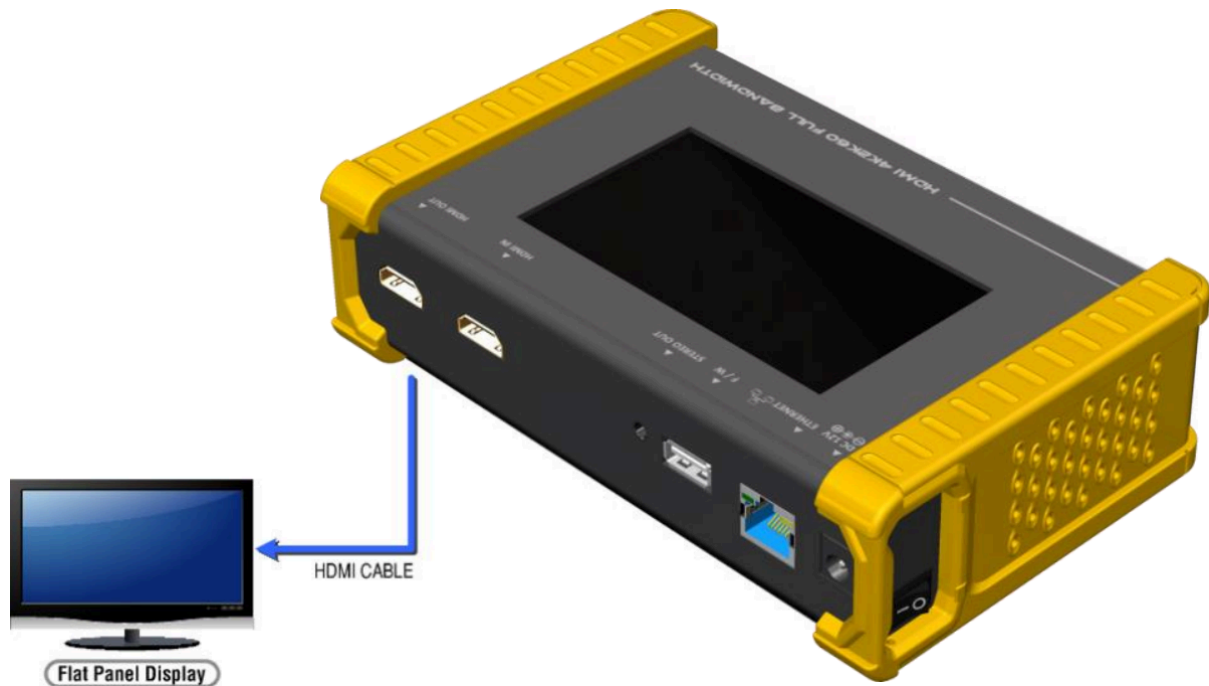
Menu	Items	Remark
Preference	Screen Brightness	adjust the screen brightness
	BEEP	ON/OFF system sound
Ethernet	DHCP	
	Static IP	
Firmware		upgrade the firmware
Battery		battery status

\*Menu items subject to change without notification.



## Generator

### BG-AVTPG-4K as HDMI Generator



After making the physical connections between BG-AVTPG-4K and the display device. Users can select different generator functions to display on the sink device under test.

- 1. Selecting the Signal Format.** BG-AVTPG-4K provides different signal resolutions and signal types for users to select. Users can touch the Signal Format Tab to select the signal type (HDMI / DVI) and signal resolution (HDTV / PC). The HDTV resolution is up to 4K2K 60Hz and PC resolution is up to 1920x1200 60Hz.
- 2. Rendering Test Patterns on an HDTV.** BG-AVTPG-4K provides multiple test patterns for the user to test HDTV. Users can select the desired test pattern from the video pattern menu.
- 3. User Defined Pattern.** Besides the embedded test patterns, BG-AVTPG-4K also allows users to use custom test images. For more details please see the Upgrade BG-AVTPG-4K section.
- 4. Testing Digital Audio on an HDTV or A/V Receiver.** The PCM Audio Tone menu provides users with tools to test audio on HDTV or other A/V receivers. In the PCM SINE WAVE menu, users can set up the bits per sample, sample rate, level, and audio channel.
- 5. Testing HDCP on an HDMI TV or HDMI device.** BG-AVTPG-4K provides a tool to test HDCP on an HDMI equipped HDTV. For more details please see the HDCP test section.



## Receiver

### BG-AVTPG-4K as HDMI Analyzer



1. **Source Information from the HDMI source.** In the Test/Source menu, users can touch the read/refresh button to get the video format, source audio, and packet information from the HDMI source device.
2. **Testing the Video from the HDMI source.** BG-AVTPG-4K supports the incoming video from the HDMI source/device to ensure the user is receiving valid video signals by displaying the information of the incoming signal. The video information also will inform users whether the HDCP is encrypted or not. Return to the Video menu by touching the touch panel (please stay at least 5 seconds).



## HDCP Test

### BG-AVTPG-4K as HDCP Receiver



When BG-AVTPG-4K set as receiver it can verify HDCP of the video player or other device under test. BG-AVTPG-4K provides three options HDCP 1.4 / HDCP 2.2 / no HDCP for users to select and confirm the HDCP authentication of the device under test.

### BG-AVTPG-4K as HDCP Transmitter





When BG-AVTO-4K is set as a transmitter, it can transmit HDCP encrypted video. It also provides three modes (HDCP 1.4 / HDCP 2.2 / no HDCP) and if the user wants to transmit HDCP encrypted video again, simply select the Auto-Restart button.

Procedure for Testing HDCP:

- Connect the BG-AVTPG-4K HDMI output port and the display.
- Select HDCP Test from the Sink Test Menu.
- Touch Enable HDCP 1.4 or Enable HDCP 2.2 button.

## EDID analysis

BG-AVTPG-4K offers the most convenient way for users to analyze EDID signals. Users can verify, view, and learn the EDID of an HDMI HDTV or other devices.



Procedure of EDID Analyze:

- Ensure the connections between the BG-AVTPG-4K HDMI output port and the device are secure.
- Select EDID Analyze from the Sink Test Menu.
- Touch the Read button to get the EDID information of DUT.

Procedure of learning EDID from RX:

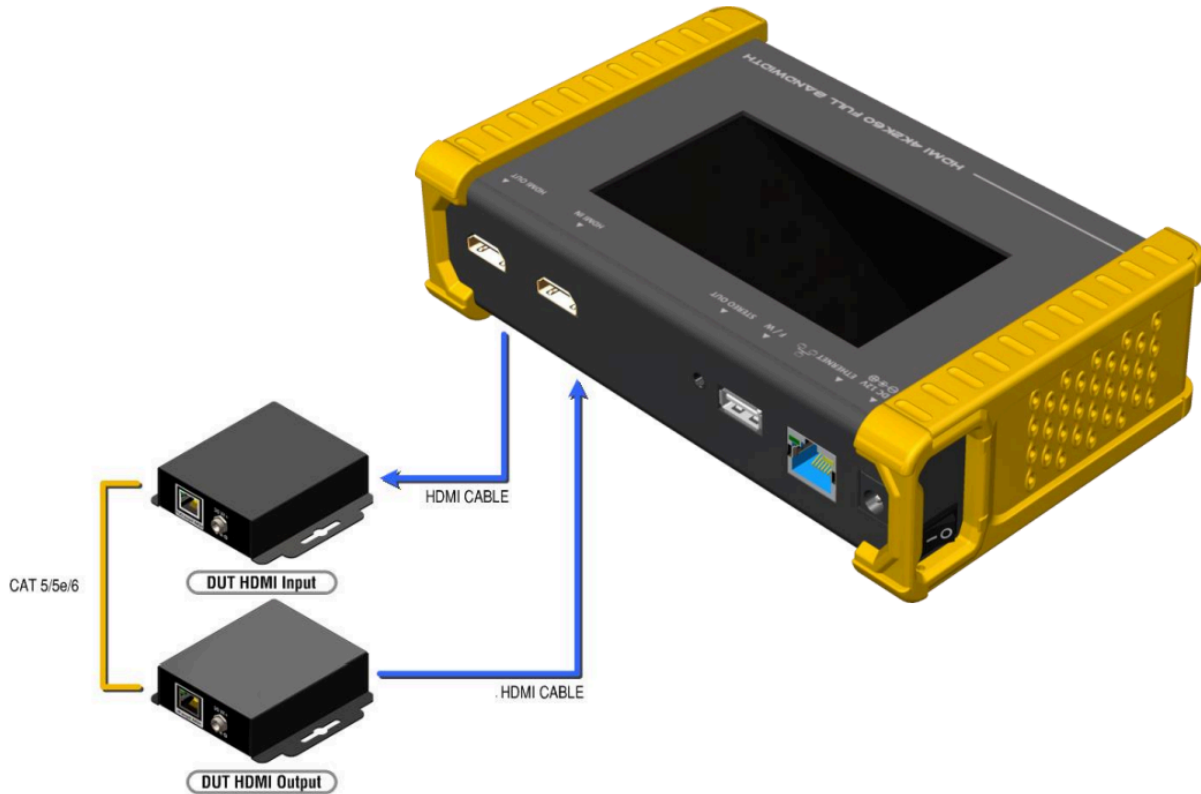
- Ensure the connections between the BG-AVTPG-4K HDMI output port and the device are secure.
- Select EDID Analyze from the Sink Test Menu.
- Touch the Learn from RX button to learn the EDID. The EDID will be saved in the BG-AVTPG-4K input port.





## Loop Test

BG-AVTPG-4K offers a unique estimator for evaluating the quality of cables or devices under test. Users can simply connect the cable or device under test to BG-AVTPG-4K to form a loop, the monitor will examine the HDMI bitstream pixel by pixel. The measurement statistics will be displayed on screen and offer useful information for building a robust A/V system.



Procedure of Loop Test: \*only support 1080p@60, 4K2K 30Hz and 4K2K 60Hz resolutions

- Ensure the connection between the BG-AVTPG-4K and the device under test or cables are fully connected.
- Select Loop Test from the Loop Test Menu.
- Set the test time and touch the START button. The BG-AVTPG-4K will capture the signal from its transmitter through the loop and evaluate the transmission quality.
- The user interface of BG-AVTPG-4K will be locked until testing is terminated.
- Judgement criteria:

Test Result	Definition
Pass	The value of Bit Error Rate is less than 1
Fail	The Bit Error Rate is more than 1

\*Plugging HDMI cable will influence the testing result, so please settle down the connection.



## Ethernet Control (TCP/IP)

BG-AVTPG-4K also provides user control through Ethernet. The Ethernet control includes many major functions and offers users development software to perform advanced settings. (TCP Port: 6133)

Reply Format:

- Received = ACK + Feedback Date
- ACK: 0xaa 0xbb 0xcc
- Feedback Date: Data0 Data1 Data2....

Command Set:

\*Bold word part please refer to corresponding table

COMMAND	ACTION	REMARK
0x4d 0x53 0x5 0x0 0x0 0x5 0x1 Res	Set output resolution	Hexadecimal
0x4d 0x53 0x5 0x0 0x0 0x5 0x2	Get output resolution	
0x4d 0x53 0x5 0x0 0x0 0x5 0x3 Mode	Set output mode	
0x4d 0x53 0x5 0x0 0x0 0x5 0x4	Get output mode	
0x4d 0x53 0x5 0x0 0x0 0x5 0x5 Depth	Set output color depth	
0x4d 0x53 0x5 0x0 0x0 0x5 0x6	Get output color depth	
0x4d 0x53 0x5 0x0 0x0 0x5 0x7 Pattern	Set default pattern	Hexadecimal
0x4d 0x53 0x5 0x0 0x0 0x5 0x8 Pattern	Set user pattern	Hexadecimal
0x4d 0x53 0x5 0x0 0x0 0x5 0x9 Mute	Set audio mute	
0x4d 0x53 0x5 0x0 0x0 0x5 0xa	Get audio mute status	
0x4d 0x53 0x5 0x0 0x0 0x5 0xb Length	Set audio length	
0x4d 0x53 0x5 0x0 0x0 0x5 0xc	Get audio length	
0x4d 0x53 0x5 0x0 0x0 0x5 0xd Level	Set audio level	
0x4d 0x53 0x5 0x0 0x0 0x5 0xe	Get audio level	
0x4d 0x53 0x5 0x0 0x0 0x5 0xf Rate	Set audio sample rate	
0x4d 0x53 0x5 0x0 0x0 0x5 0x10	Get audio sample rate	
0x4d 0x53 0x5 0x0 0x0 0x5 0x11 Number	Set audio channel number	
0x4d 0x53 0x5 0x0 0x0 0x5 0x12	Get audio channel number	
0x4d 0x53 0x5 0x0 0x0 0x5 0x13 HDCP	Set TX HDCP on/off	
0x4d 0x53 0x5 0x0 0x0 0x5 0x14	Get TX HDCP on/off	
0x4d 0x53 0x5 0x0 0x0 0x5 0x15 HDCP	Set RX HDCP on/off	
0x4d 0x53 0x5 0x0 0x0 0x5 0x16	Get RX HDCP on/off	



## Resolution:

Index	Resolution	Index	Resolution	Index	Resolution
0x0	720x480i@60	0x13	1920x1080p@24	0x26	1920x1200pRB
0x1	720x576i@50	0x14	1920x1080p@23.976	0x27	3840x2160p@60
0x2	720x480p@60	0x15	640x480p@60	0x28	3840x2160p@59.94
0x3	720x576p@50	0x16	640x480p@75	0x29	3840x2160p@50
0x4	1280x720p@60	0x17	800x600p@60	0x2a	3840x2160p@30
0x5	1280x720p @59.94	0x18	800x600p@75	0x2b	3840x2160p@29.97
0x6	1280x720p@50	0x19	1024x768p@60	0x2c	3840x2160p@25
0x7	1280x720p@30	0x1a	1024x768p@75	0x2d	3840x2160p@24
0x8	1280x720p @29.97	0x1b	1280x1024p@60	0x2e	3840x2160p@23.976
0x9	1280x720p@25	0x1c	1280x1024p@75	0x2f	1920x1080p@60
0xa	1920x1080i@60	0x1d	1360x768p@60	0x30	4096x2160p@60
0xb	1920x1080i @59.94	0x1e	1366x768p@60	0x31	4096x2160p@59.94
0xc	1920x1080i@50	0x1f	1400x1050p@60	0x32	4096x2160p@50
0xd	N/a	0x20	1600x1200p@60	0x33	4096x2160p@30
0xe	1920x1080p@59.94	0x21	1440x900p@60	0x34	4096x2160p@29.97
0xf	1920x1080p@50	0x22	1440x900p@75	0x35	4096x2160p@25
0x10	1920x1080p@30	0x23	1680x1050p@60	0x36	4096x2160p@24
0x11	1920x1080p@29.97	0x24	1680x1050pRB	0x37	4096x2160p@23.976
0x12	1920x1080p@25	0x25	1920x1080pRB		

## Mode

Index	0x0	0x1	0x2	0x3	0x4
Mode	DVI	RGB	YCbCr444	YCbCr422	YCbCr420

## Depth

Index	0x0	0x1	0x2	0x3
Depth	8 Bit	10 Bit	12 Bit	16 Bit

## Default Pattern

Index	Default Pattern	Index	Default Pattern	Index	Default Pattern
0x0	SMPTE BAR	0x10	Ramp Green V 2	0x20	Black
0x1	TV Bar 100%	0x11	Ramp Blue V 2	0x21	Noise
0x2	TV Bar 75%	0x12	Stair Red 1	0x22	Circle 1
0x3	Checkfield	0x13	Stair Red 2	0x23	Circle 2
0x4	EQ	0x14	Stair Green 1	0x24	Moire
0x5	PLL	0x15	Stair Green 2	0x25	V Stripe Red
0x6	Ramp Red H 1	0x16	Stair Blue 1	0x26	V Stripe Green
0x7	Ramp Green H 1	0x17	Stair Blue 2	0x27	V Stripe Blue
0x8	Ramp Blue H 1	0x18	Stair White 1	0x28	H Stripe Red
0x9	Ramp Red H 2	0x19	Stair White 2	0x29	H Stripe Green
0xa	Ramp Green H 2	0x1a	Red 100	0x2a	H Stripe Blue



Index	Default Pattern	Index	Default Pattern	Index	Default Pattern
0xb	Ramp Blue H 2	0x1b	Green 100	0x2b	Chess 1
0xc	Ramp Black to Red V	0x1c	Blue 100	0x2c	Chess 2
0xd	Ramp Green V 1	0x1d	White 100	0x2d	Multi Burst
0xe	Ramp Blue V 1	0x1e	Gray 70	0x2e	CZP
0xf	Ramp Red V 2	0x1f	Gray 40	0x2f	Overscan

### User Pattern

Index	User Pattern	Index	User Pattern	Index	User Pattern
0x0	Philips	0xa	Ramp W-4	0x14	Graybar64 G-I
0x1	Checker 3x3	0xb	Graybar32 R-I	0x15	Graybar64 B-I
0x2	Checker 6x6-1	0xc	Graybar32 G-I	0x16	Graybar64 W-I
0x3	Checker 6x6-2	0xd	Graybar32 B-I	0x17	Graybar64 R-2
0x4	White 75	0xe	Graybar32 W-I	0x18	Graybar64 G-2
0x5	White 50	0xf	Graybar32 R-2	0x19	Graybar64 B-2
0x6	White 25	0x10	Graybar32 G-2	0x1a	Graybar64 W-2
0x7	Ramp W-1	0x11	Graybar32 B-2	0x1b	User Add..
0x8	Ramp W-2	0x12	Graybar32 W-2	0x1c	User Add..
0x9	Ramp W-3	0x13	Graybar64 R-I	0x1d	....

### Mute

Index	0x0	0x1
Mute	OFF	ON

### Length

Index	0x0	0x1	0x2
Length	24 bits	20 bits	16 bits

### Level

Index	0x0	0x1	0x2	0x3	0x4	0x5	0x6	0x7
Level	Level 0	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7

### Rate

Index	0x0	0x1	0x2	0x3	0x4
Rate	48 KHz	96 KHz	192 KHz	32 KHz	44.1 KHz

### Number

Index	0x0	0x1	0x2	0x3	0x4
Number	2 Ch	2.1 Ch	5.1 Ch	6.1 Ch	7.1 Ch

### TX HDCP

Index	0x0	0x1	0x2	0x3
TX HDCP	off	HDCP 1.4	HDCP 2.2 Type0	HDCP 2.2 Type 1

### RX HDCP

Index	0x0	0x1	0x2	0x3
RX HDCP	off	HDCP 1.4	HDCP 2.2	HDCP 1.4 & HDCP 2.2



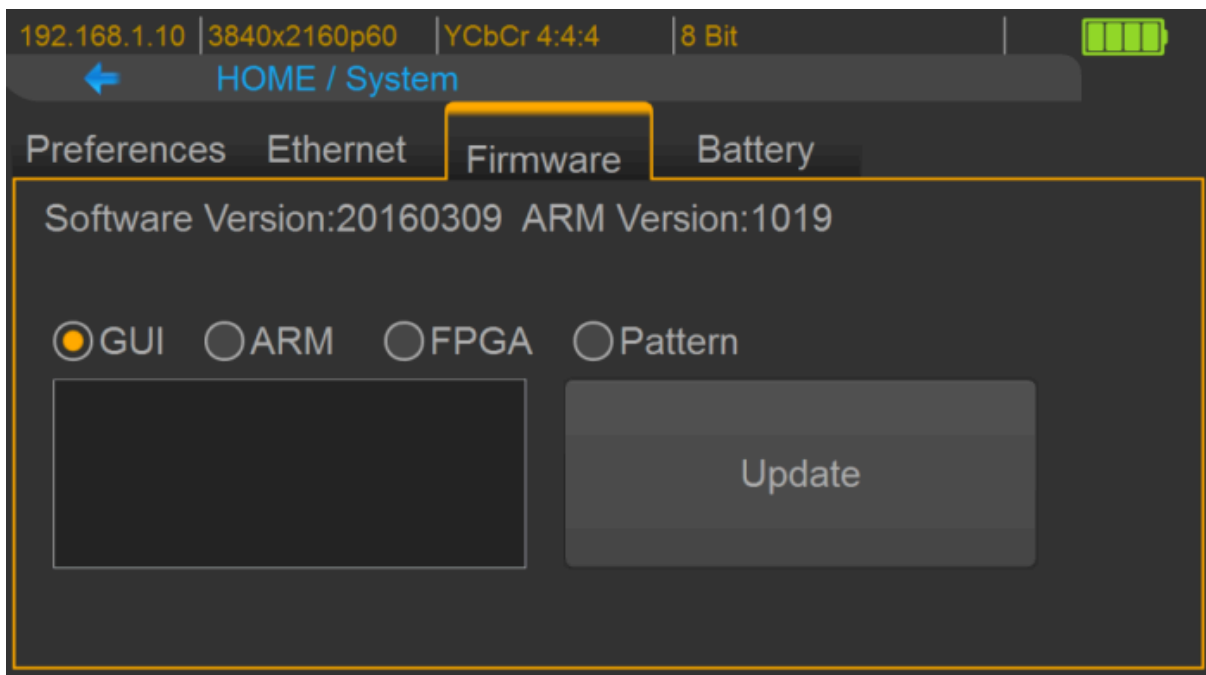
## Upgrade the BG-AVTPG-4K

User can upgrade the firmware and pattern on the BG-AVTPG-4K through the USB interface. If users encounter a problem with the upgrade, please contact the supplier of BG-AVTPG-4K.

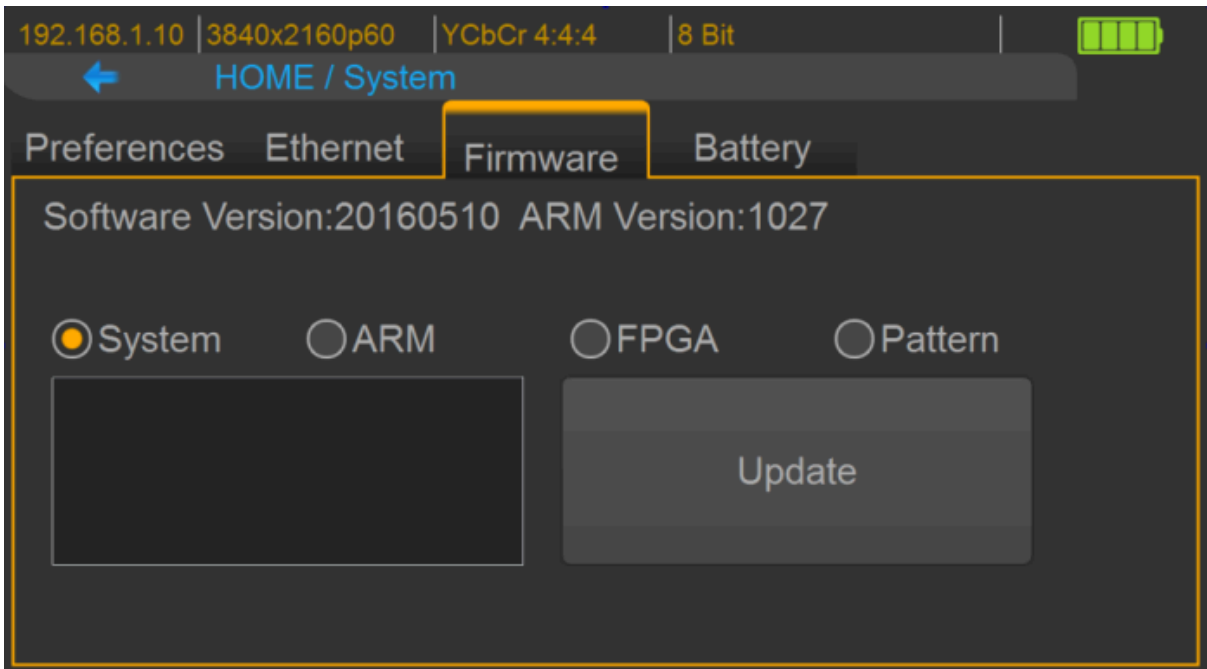
Procedure for Firmware Upgrade:

\*Before updating the firmware of BG-AVTPG-4K, please ensure that the new firmware files are in the root directory of USB Flash Drive. The file suffix is **.dat**.

- System



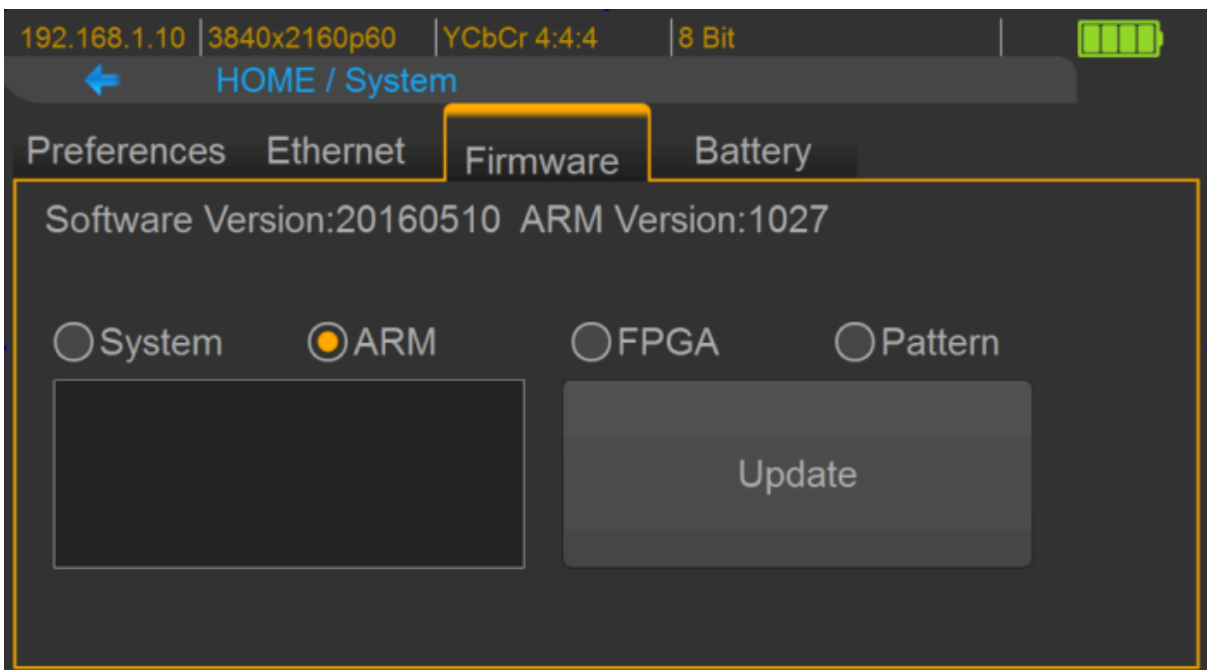
- Ensure the gui.dat and system.dat files are in the root directory of USB.
- Connect the USB Flash Drive on BG-AVTPG-4K USB interface.
- Select the Firmware tab from the System Menu and choose the GUI button.
- Touch the Update button to perform the firmware update. The process of firmware update will take about 3~5 seconds.
- While updating, please do not remove the USB Flash Drive.
- After completing the firmware update, please reboot the BG-AVTPG-4K.
- Select Firmware from the system Menu and choose the System button.



- Touch the Update button to do firmware update. The process of firmware update will take about 3~5 seconds. While updating, please do not remove the USB Flash Drive.

- After completing the firmware update, please reboot the BG-AVTPG-4K

- **ARM**

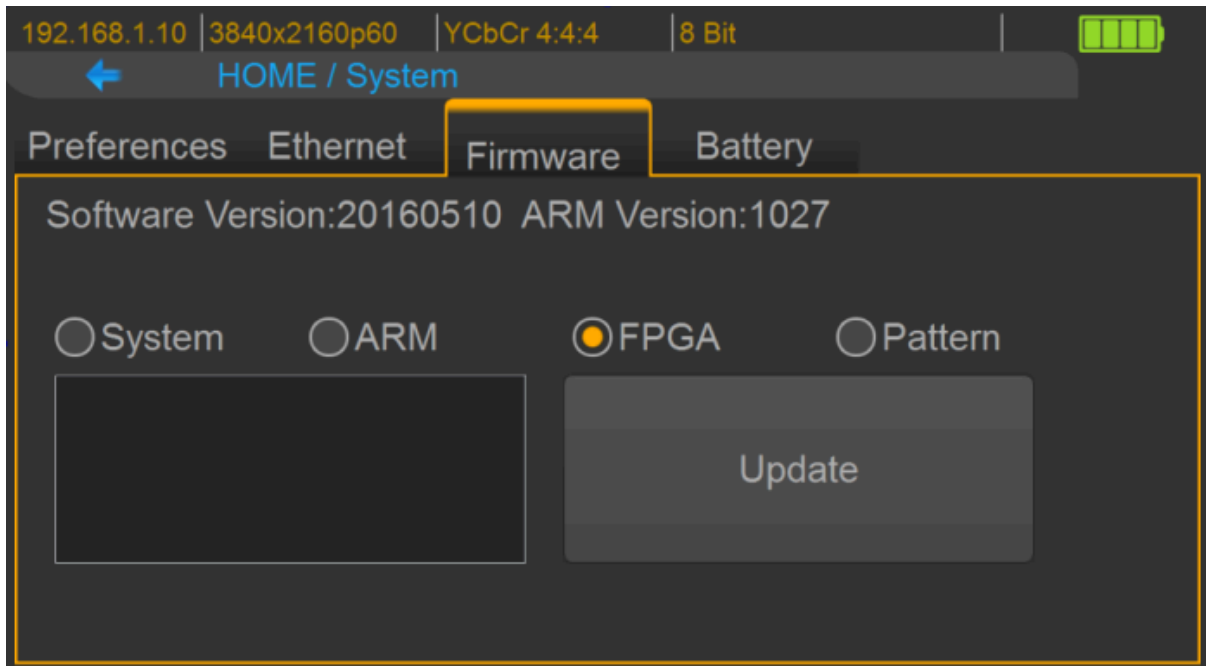


- Make sure the arm.dat file is in the root directory of USB.
- Connect the USB Flash Drive on BG-AVTPG-4K USB interface.



- Select Firmware from the System Menu and choose the ARM button.
- Touch the Update button to do firmware update. The process of firmware update will take about
- 5~10 seconds. While updating, please do not remove the USB Flash Drive.

- **FPGA**



- Ensure the fpga.dat file is in the root directory of USB.
- Connect the USB Flash Drive on BG-AVTPG-4K USB interface.
- Select Firmware from the System Menu and choose the FPGA button.
- Touch the Update button to do firmware update. The process of firmware update will take about 5~10 seconds. While updating, please do not remove the USB Flash Drive.



- **Pattern**



- Create a folder named “usr\_pic” on USB Flash Drive.
- Ensure the file of pattern which user desires to update on the BG-AVTPG-4K is in the usr\_pic directory of USB Flash Drive. The file suffix is .jpg.
- Before updating the user defined pattern, please confirm the capacity of the BG-AVTPG-4K.
- Select Firmware from the System Menu and choose the Pattern button.
- Touch the Update button to upgrade the user defined pattern. The process running time will depend on the file size, please wait patiently.





## Eye Pattern

The device has been approved and supports a high performance oscilloscope (MSOX92004A) to ensure quality. The test result of this device (with Simplo battery) is shown as below:

\*This result is representative of the BG-AVTPG-4K. Each BG-AVTPG-4K’s performance is close to these results but not exactly the same.

### Summary of Results

Test Statistics	
Failed	0
Passed	29
Total	29

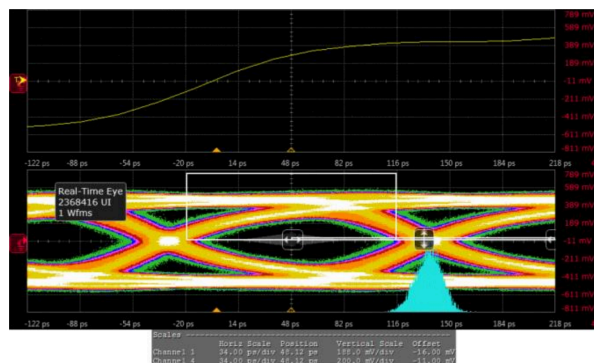
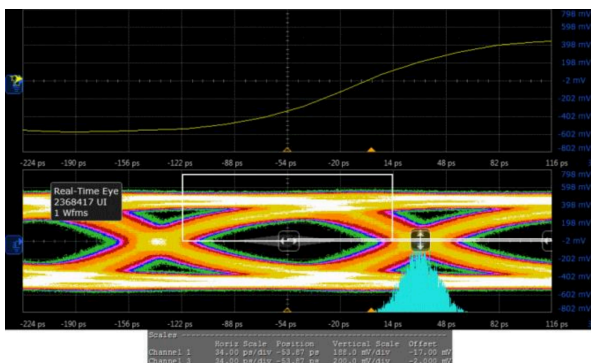
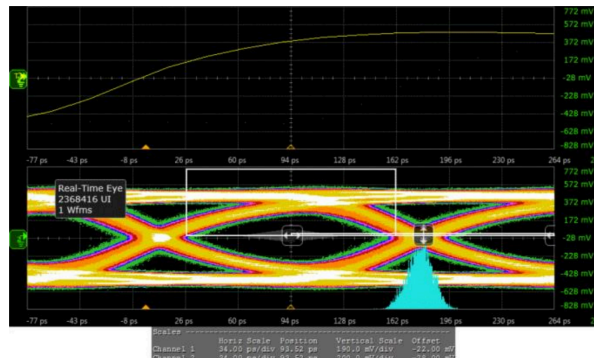
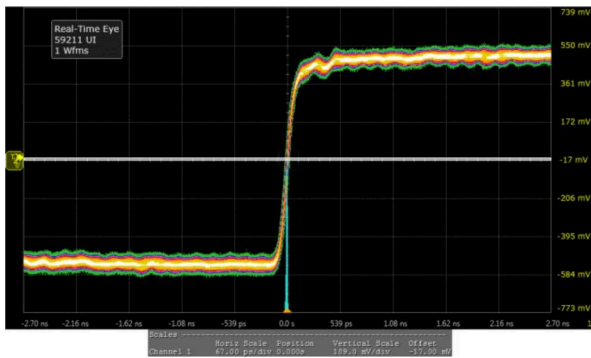
Margin Thresholds	
Warning	<2%
Critical	<0%

Pass	# Failed	# Trials	Test Name	Actual Value	Margin	Pass Limits
	0	1	HF1-2: Clock Rise Time	105.981 ps	41.3%	VALUE >= 75.000 ps
	0	1	HF1-2: Clock Fall Time	98.823 ps	31.8%	VALUE >= 75.000 ps
	0	1	HF1-6: Clock Duty Cycle (Minimum)	49.870	24.7%	>=40%
	0	1	HF1-6: Clock Duty Cycle (Maximum)	50.300	162%	<=60%
	0	1	HF1-6: Clock Rate	148.427200000 MHz	2.4%	85.000000000
	0	1	HF1-7: Differential Clock Voltage Swina. Vs (TP1)	1.023 V	22.1 %	400 mV < VALUE < 1200 V
	0	1	HF1-7: Clock Jitter (TP2 EQ with Worst Case Positive Skew^)	175 mTbit	41.7%	VALUE <= 300 mTbit
	0	1	HF1-7: Clock Jitter (TP2 EQ with Worst Case Negative Skew)	200 mTbit	33.3%	VALUE <= 300 mTbit
	0	1	HF1-5: DO Maximum Differential Voltage	558 m	28.5%	VALUE <= 780 m
	0	1	HF1-5: DO Minimum Differential Voltage	-623 m	20.1 %	VALUE >= -780 m
	0	1	HF1-2: DO Rise Time	91.503 ps	115.3 %	VALUE >= 42.500 ps
	0	1	HF1-2: DO Fall Time	92.436 ps	117.5 %	VALUE >=42.500 ps
	0	1	HF1-8: DO Mask Test (TP2 EQ with Worst Case Positive Skew 1	0.000	50.0%	No Mask Failures
	0	1	HF1-8: DO Mask Test fTP2 EQ with Worst Case Negative Skew)	0.000	50.0%	No Mask Failures
	0	1	HF1-5: D1 Maximum Differential Voltage	593 m	24.0%	VALUE <= 780 m
	0	1	HF1-5: D1 Minimum Differential Voltage	-597 m	23.5%	VALUE >= -780 m
	0	1	HF1-2: D1 Rise Time	102.347 ps	140.8 %	VALUE >= 42.500 ps
	0	1	HF1-2: D1 Fall Time	100.664 ps	136.9 %	VALUE >=42.500 ps
	0	1	HF1-8: D1 Mask Test fTP2 EQ with Worst Case Positive Skew)	0.000	50.0%	No Mask Failures



Pass	# Failed	# Trials	Test Name	Actual Value	Margin	Pass Limits
	0	1	HF1-8: D1 Mask Test (TP2 EQ with Worst Case Negative Skew)	0.000	50.0%	No Mask Failures
	0	1	HF1-5: D2 Maximum Differential Voltage	586 m	24.9%	VALUE <= 780 m
	0	1	HF1-5: D2 Minimum Differential Voltage	-603 m	22.7%	VALUE >= -780 m
	0	1	HF1-2: D2 Rise Time	93.095 ps	119.0 %	VALUE >= 42.500 ps
	0	1	HF1-2:D2 Fall Time	92.460 ps	117.6 %	VALUE >=42.500 ps
	0	1	HF1-8: D2 Mask Test (TP2 EQ with Worst Case Positive Skew)	0.000	50.0%	No Mask Failures
	0	1	HF1-8: D2 Mask Test (TP2 EQ with Worst Case Neqative Skew)	0.000	50.0%	No Mask Failures
	0	1	HF1-3: Inter-Pair Skew - D0/D1	1 mTpixel	49.8%	-200 mTpixel <= VALUE <= 200 mTpixel
	0	1	HF1-3: Inter-Pair Skew - DM22	31 mTpixel	42.3%	-200 mTpixel <= VALUE <= 200 mTpixel
	0	1	HF1-3: Inter-Pair Skew - D0/D2	28 mTpixel	43.0%	-200 mTpixel <= VALUE <= 200 mTpixel

**Clock Jitter and eye pattern**





## Tech Support

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Have technical questions? We may have answered them already!

Please visit BZBGear's support page ([bzbgear.com/support](https://bzbgear.com/support)) for helpful information and tips regarding our products. Here you will find our Knowledge Base ([bzbgear.com/knowledge-base](https://bzbgear.com/knowledge-base)) with detailed tutorials, quick start guides, and step-by-step troubleshooting instructions. Or explore our YouTube channel, BZB TV ([youtube.com/c/BZBTVchannel](https://youtube.com/c/BZBTVchannel)), for help setting up, configuring, and other helpful how-to videos about our gear.

Need more in-depth support? Connect with one of our technical specialists directly:

<u>Phone</u>	<u>Email</u>	<u>Live Chat</u>
1.888.499.9906	support@bzbgear.com	bzbgear.com

## Limited Product Warranty Terms

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Pro Line: 5-year warranty from the date of purchase for AV/Broadcasting products bought on or after August 1, 2024.

Essential Line: 3-year warranty from the date of purchase for AV/Broadcasting products bought on or after August 1, 2024.

Cables: Lifetime Limited Product Warranty.

For complete warranty information, please visit [bzbgear.com/warranty](https://bzbgear.com/warranty).

For questions, please call 1.888.499.9906 or email support@bzbgear.com.

## Mission Statement

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BZBGear is a breakthrough manufacturer of high-quality, innovative audiovisual equipment ranging from AVoIP, professional broadcasting, conferencing, home theater, to live streaming solutions. We pride ourselves on unparalleled customer support and services. Our team offers system design consultation, and highly reviewed technical support for all the products in our catalog. BZBGear delivers quality products designed with users in mind.



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