



BG-4K-1616MA

Control4 Driver User Manual

16x16 HDMI 2.0 Matrix Switcher with Audio De-embedding and Independent Routing (4K60 Support)

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Statement

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

Safety Precaution

- 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

This driver has been designed to provide control of the BZBGear BG-4K-1616MA 16x16 HDMI 2.0 Matrix Switcher within a Control4 system via TCP/IP or RS-232.

Built on the Control4 DriverWorks SDK using the AV Switch proxy, the driver exposes the matrix's 16 HDMI inputs and 16 HDMI outputs, along with its 16 de-embedded audio outputs, for independent video and audio routing. Routing a video source moves that output's audio with it, while each HDMI output can additionally break its audio away to a different input. It provides two-way feedback and control of routing, per-output video mode (scaling), HDR conversion, HDCP management, AV mute, ARC, stream enable, ext-audio mode / mute, per-input EDID selection, CEC, the sixteen matrix presets, hot-plug (signal) detection, and front-panel settings.

Installation

Copy the driver (.c4z) into your Control4 driver folder, then in Composer Pro use Driver -> Add or Update Driver... and add it to your project. On the Connections page, bind the sources and displays as described under Connections (Bindings).

To control the device over the network, set the following on the Properties page:

Setting	Value
Connection Type	Network (TCP)
IP Address	The IP address of the matrix (shown on the front-panel LCD, or via the "r ipconfig!" command). Auto-filled when discovered over SDDP.

TCP Port	8000 (factory default)
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To use the RS-232 connection instead, set Connection Type to RS-232 and use the following serial settings:

- 115200 baud, 8 data bits, no parity, 1 stop bit

If the device supports SDDP, it is discovered automatically and the IP Address is filled in for you.

Properties

The driver exposes the following properties on the Composer Properties page. Read-only properties reflect live status reported by the device.

Property	Access	Description
Connection Type	Editable	How the driver talks to the matrix. Network uses the IP Address and TCP Port below; RS-232 uses the serial binding on the Connections page at 115200 8N1.
IP Address	Editable	IP address or hostname of the BG-4K-1616MA. Populated automatically when the matrix is discovered over SDDP. Otherwise read it from the front panel LCD or send 'r ipconfig!' over RS-232.
SDDP Auto-Configure IP	Editable	When Yes, the driver follows the IP address reported by SDDP discovery, so the matrix keeps working after a DHCP lease change. Set to No to pin the IP Address field manually.
Discovered By	Read-only	How the matrix was located: SDDP discovery or manual configuration.
TCP Port	Editable	TCP control port of the matrix. Factory default is 8000.
Connection Status	Read-only	Current state of the IP connection to the matrix.
Model	Read-only	Model reported by the matrix.
Firmware Version	Read-only	MCU firmware version reported by the matrix.
Power State	Read-only	Power state reported by the matrix.
Ext-Audio Mode	Read-only	Current ext-audio mode. Independent ext-audio routing only works in Matrix Mode.
Temperature	Read-only	Internal temperature reported by the matrix.
Uptime	Read-only	Matrix running time as Days:Hours:Minutes:Seconds.
Last Device Error	Read-only	Most recent error string returned by the matrix, e.g. a rejected command.
Poll Interval	Editable	Seconds between status polls, which keep Control4 in sync with front panel and web GUI changes. Set to 0 to disable polling.
Auto Enable Audio Matrix Mode	Editable	When Yes, the driver switches the matrix into Matrix Mode ext-audio the first time an independent ext-audio route is requested. Set to No to manage the ext-audio mode yourself.
Front Panel Lock	Editable	Lock or unlock the matrix front panel buttons.
Buzzer	Editable	Enable or disable the front panel buzzer.
Debug Mode	Editable	Diagnostic output. Automatically returns to Off after one hour.
Driver Version	Read-only	Driver version.

Actions

The following actions are available on the Composer Actions tab.

Action	Description
Reconnect	Tear down and re-establish the connection to the device.

Query Status	Refresh all state from the device.
Print Routing Table	Print the current routing to the Lua output window.
Reboot Device	Reboot the device.
Factory Reset Device (erases matrix configuration)	Reset the matrix to factory defaults (erases configuration, including network settings).

Programming Commands

The following device-specific commands are available in the Composer Programming tab. Parameters are chosen from drop-down lists unless noted.

Command	Parameters	Description
Route Video	Output, Input	Route HDMI input PARAM2 to HDMI output PARAM1 (audio follows)
Route Output Audio	Output, Source	Set the audio source of HDMI output PARAM1 to PARAM2 (breakaway)
Route Ext Audio	Output, Source	Route PARAM2 to ext-audio output PARAM1
Set Ext Audio Mode	Mode	Set ext-audio mode to PARAM1
Set Ext Audio Mute	Output, State	Set ext-audio output PARAM1 mute PARAM2
Set Output Stream	Output, State	Set HDMI output PARAM1 stream to PARAM2
Set Output Video Mode	Output, Mode	Set HDMI output PARAM1 video mode to PARAM2
Set Output HDR	Output, Mode	Set HDMI output PARAM1 HDR mode to PARAM2
Set Output HDCP	Output, Mode	Set HDMI output PARAM1 HDCP to PARAM2
Set Output AV Mute	Output, State	Set HDMI output PARAM1 AV mute PARAM2
Set Output ARC	Output, State	Set HDMI output PARAM1 ARC to PARAM2
Set Input EDID	Input, EDID	Set HDMI input PARAM1 EDID to PARAM2
Copy EDID From Output	Input, Output	Copy the EDID of output PARAM2 to input PARAM1
Set Power	State	Turn the matrix PARAM1
Set Panel Lock	State	Set the front panel lock PARAM1
Set Buzzer	State	Set the buzzer PARAM1
Set LCD Timeout	Timeout	Set the LCD backlight timeout to PARAM1
Set IR	State	Set the front panel IR receiver PARAM1
Recall Preset	Preset	Recall matrix preset PARAM1
Save Preset	Preset	Save the current routing to matrix preset PARAM1
Clear Preset	Preset	Clear matrix preset PARAM1
Set Fan Speed	Fan, Speed	Set fan PARAM1 to PARAM2
CEC Input Command	Input, Command	Send CEC PARAM2 to input PARAM1
CEC Output Command	Output, Command	Send CEC PARAM2 to the display on output PARAM1
Query Status	-	Refresh all state from the matrix
Reboot Device	-	Reboot the matrix
Send Raw Command	Command	Send the raw ASCII command PARAM1 to the matrix (the trailing ! is added if missing)

Events & Variables

Events (available as "when" triggers in Programming):

- Device Online
- Device Offline

- Video Route Changed
- Ext-Audio Route Changed
- Power State Changed
- Input Connection Changed
- Output Connection Changed

Variables (available for programming and conditionals):

Variable	Type	Description
CONNECTED	Bool	True while the driver is connected to the matrix.
POWER_ON	Bool	True when the matrix is powered on.
MODEL	String	Model reported by the matrix.
FIRMWARE	String	MCU firmware version.
EXT_AUDIO_MODE	String	Current ext-audio mode (Follow Input / Follow Output / Matrix Mode).
TEMPERATURE	String	Internal temperature reported by the matrix.
OUTPUT_01_INPUT ... OUTPUT_16_INPUT	Number	The input currently routed to each HDMI output.
OUTPUT_01_AUDIO ... OUTPUT_16_AUDIO	String	The audio source of each HDMI output (Embedded, or a broken-away input).
AUDIO_OUT_01_SOURCE ... AUDIO_OUT_16_SOURCE	String	The source feeding each de-embedded audio output.
INPUT_01_CONNECTED ... INPUT_16_CONNECTED	Bool	Whether a source is detected on each input.
OUTPUT_01_CONNECTED ... OUTPUT_16_CONNECTED	Bool	Whether a display is detected on each output.

Connections (Bindings)

On the Composer Connections page, bind the following. Unused bindings are hidden automatically on Control4 OS 3.3.0 and later.

Binding	Type	Description
HDMI In 1 - 16	Video Input	Connect sources (players, PCs, cable boxes) to the matrix inputs.
HDMI Out 1 - 16	Video Output	Connect displays to the matrix outputs.
Audio Out 1 - 16	Audio Output	De-embedded audio, one per output; bind to receivers/amplifiers.
RS-232	Serial	Optional serial control in place of the network connection.

ASCII Command Reference

The matrix is controlled with ASCII strings terminated by the "!" character. Serial protocol: 115200 8N1. Network protocol: TCP port 8000. Ports use 1-based numbering with 0 meaning "all". The following is a summary of key commands; see the product manual for the full list.

System

Command	Description
status!	Get full device status

power 1! / power 0!	Power the matrix on / off
r type! / r fw version!	Get model / firmware version
r temp! / r uptime!	Get temperature / running time
s lock 1! / s beep 1! / s ir 1!	Panel lock / buzzer / IR on (0 = off)
s fan x speed y!	Fan x (0=all, 1-4) speed y (0=auto..4=100%)
reboot! / reset!	Reboot / factory reset

Routing

Command	Description
s output Y in source X!	Route input X to output Y, audio follows (Y=0 for all)
s output Y in audio X!	Break output Y audio away to input X (X=0 follows video)
r output 0 in source!	Read all video routes
s output Y video mode X!	1=Bypass 2=4K->1080P 3=Auto 4=Audio Only
s output Y hdr X!	1=Bypass 2=HDR->SDR 3=Auto
s output Y hdcp X!	0=Signal Mgmt 1=1.4 2=2.2 3=Auto(Follow Sink) 4=Follow Source
s output Y avmute X! / s output Y arc X! / s output Y stream X!	AV mute / ARC / stream, 0=off 1=on

Ext-Audio

Command	Description
s output exa mode X!	0=Follow Input 1=Follow Output 2=Matrix
s output Y exa in source X!	Route audio source X to ext-audio Y (17-32 = output 1-16 ARC)
s output Y exa mute X!	Ext-audio mute, 0=off 1=on

EDID / Preset / CEC

Command	Description
s input X EDID Z!	Set input X EDID (Z=1-40; 25-40 copy output 1-16)
s save/recall/clear preset Z!	Matrix presets (Z=1-16)
s cec in X ...! / s cec hdmi out Y ...!	CEC to source X / display Y

Tech Support

For technical support, please contact BZBGear:

- Email: support@bzbgear.com
- Phone: +1(888)499-9906
- Address: 830 National Drive #140, Sacramento, CA 95834, USA

Warranty

BZBGear products are backed by a limited product warranty. For full warranty details, please visit www.bzbgear.com or contact BZBGear support.

Mission Statement

BZBGear is dedicated to providing high-quality, professional-grade AV equipment that delivers exceptional performance and reliability for both commercial and residential applications.

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