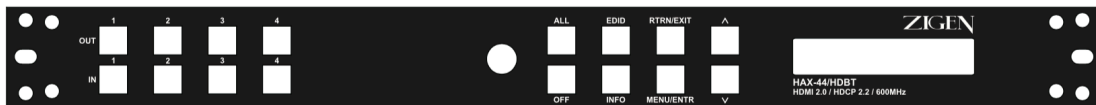


# ZIGEN

## Zigen HAX-44/HDBT HDMI 2.0 UHD 600 MHz 4x4 Matrix Switch w/HDCP 2.2 & WebOS. Mirrored Long Distance HDBaseT POE 70M Ports.

HAX-44/HDBT



USER MANUAL Ver. 1.0

[zigencorp.com](http://zigencorp.com)

Toll Free: 877-650-5252  
International: +1 818-654-5252

# ZIGEN

## Table of Contents

Copyright and Trademark	3
Introduction	4
Package Contents	4
Features	4
Specifications	5
Block Diagram	8
General Operation	9
Dip Switch Settings	10
Remote Control	12
WebOS	13
Commands	16
Warranty	18



## **Copyright and Trademarks:**

All rights reserved by ZIGEN, INC. No part of this document may be reproduced in any form or by any means without written permission from the product manufacturer. Changes are periodically made to the information in this document. They will be incorporated in subsequent editions. The product manufacturer may make improvements and /or changes in the product described in this document at any time.

All the registered trademarks referred to this manual are belonging to their respective companies.

## **Before You Begin**

Follow all instructions marked on the device during using. Do not attempt to maintain the device by yourself, any faults, please contact your vendor.

- Provide proper ventilation and air circulation and do not use near water.
- It is better to keep it in a dry environment.
- The system should be installed indoor only.
- Only use the power cord supplied with the device.
- Do not use liquid or aerosol cleaners to clean the device.
- Always unplug the power to the device before cleaning.
- Unplug the power cord during lightning or after a prolonged period of non-use to avoid damage to the equipment.

# ZIGEN

## Introduction

The New 600 MHz HDMI matrix switch designed for switching in home and commercial environments where switching of high-bandwidth UHD (up to 2160P60 4:4:4) content is required. The HAX-44/HDBT features 4 HDMI 2.0 Inputs and 4 HDMI 2.0 outputs.

The HAX-44/HDBT includes two 70 meter (228') HDBaseT mirrored ports (ports 2 & 4) with IEEE 802.11af POE (48V) and includes two HDBaseT POE receivers.

All HDMI and HDBaseT Ports are HDCP 2.2 compliant enabling high value content playback and distribution.

Digital and analog audio de-embedding - with volume control is provided for each output.

For installation and control an Ethernet port and WebOS are included providing access for switching, EDID management, firmware updates, remote reset and 3rd party control and more.

Bi-directional IR - The HAX-44/HDBT is controllable via built in IR receiver. Additionally, full bi-directional IR with IR routing is included.

Bi-directional RS-232 - A serial connection is provided for 3rd party control connection and device control.

HAX-44/HDBT routes Ethernet and is compliant with the entire Zigen ecosystem of products by routing network commands and control in receiver nodes.

## Typical Applications:

- Classrooms, Boardrooms, Conference rooms for switching UHD content sources via multiple control options (3<sup>rd</sup> party controllers, WebOS, simple remote or front panel buttons)
- High-end home theaters for switching UHD 2.0 content with HDCP 2.2 copy protection
- Long distance applications where the rack is up to 70 meters from the display.



## Package Contents

- 1 x HAX-44/HDBT
- 2 x HAX-POE-RX Receivers
- IEC USA AC Cord 3'
- Remote Control
- 1 x User Manual

## Features

- HDMI 2.0 (600 MHz UHD) on all HDMI ports.
- 18 GBP/sec video bandwidth HDMI, 10.2 GBP/sec HDBaseT
- WebOS Interface
- Supports digital video formats up to 4K UHD (2160P60 @4:4:4 pixel format)
- Advanced EDID management.
- Supports uncompressed PCM 2- Ch., 5.1, 7.1, Dolby Digital, DTS, Dolby TrueHD, DTS HD-Master Audio and more.
- Built in IR sensor plus 3.5mm jack and remote control
- Bi-directional IR plus IR routing on all ports
- Bi-directional RS-232 – Control switch or integrate 3<sup>rd</sup> party control.
- SPDIF (coax) and PCM (L/R) ports for audio de-embedding of each output
- HDCP 2.2 compliant - all ports
- 2 HDBaseT receivers included

## Specifications

### Video Bandwidth

HDMI - 18 GBP/sec  
HDBaseT - 10.2 GPBS Max

### Video Resolutions

All SMPTE & VESA in HDMI 2.0 Specification. Max SMPTE UHD - 4096x2160P60/RGB/4:4:4 8-bit.

Max for HDBaseT port is 2160P60/4:2:0 8-bit (HDBaseT/CAT limitation)

[zigencorp.com](http://zigencorp.com)

Toll Free: 877-650-5252  
International: +1 818-654-5252

# ZIGEN

## Color Space

RGB, YUV

## Color Bit Depth

8-bit, 10-bit, 12-bit & 16-bit per pixel

Note: Resolution and video bandwidth limited – ex. 2160P60 RGB or 4:4:4 8-bit would use almost the entire 18 GBPS of bandwidth. 2160P60 4:2:2 10-bit (new Blu Ray) would exceed the previous 10.2 GBPS maximum of HDMI 1.4a and would not be able to travel over category cable using HDBaseT as of this writing.

## Chroma Subsampling

4:4:4, 4:2:2, 4:2:0

See note above – chroma subsampling or color compression is related to bit depth and video resolution settings with regard to total bandwidth requirements. A 4K/60 signal at 4:4:4 chroma subsampling can have a maximum bit depth of 8 bits.

## Audio

HDMI in & Out – Up to Dolby TrueHD and DTS-HD Master

SPDIF – Up to Dolby Digital & DTS 5.1

Audio Sampling Rates – Up to 1536 KHz

**Distance** - HDMI – Up to 5M @ 4K, HDBaseT – Up to 100M at 4K/60 4:2:0 8-bit

**HDCP** - 2.2, 1.4 or None

**CEC** - Pass through

## Connections

4 x HDMI type A HDMI Input

4x HDMI type A HDMI Output

2 x RJ45 HDBaseT 70M Ports (2 & 4)

# ZIGEN

- 4 x SPDIF (coax) Digital Audio Outputs - 1 per output port
- 1 x RJ45 LAN Port for TCP/IP Control
- 1 x 9-pin RS-232 port
- 4 x 3.5mm global IR In ports
- 4 x 3.5mm global IR Out ports
- 1 x 5-pin Locking IR Connection (phoenix) in/out 3-12 VDC
- 1 x IR Sensor (In) - built in on front panel
- 1 x IEC 110-220VAC

**Temperature** – Operating 32-122 F (0-50 C), Humidity: 20-90% non-condensing.

## **Dimensions**

1RU – Rack Mountable  
HDBaseT Receivers - 3x3x1 inch

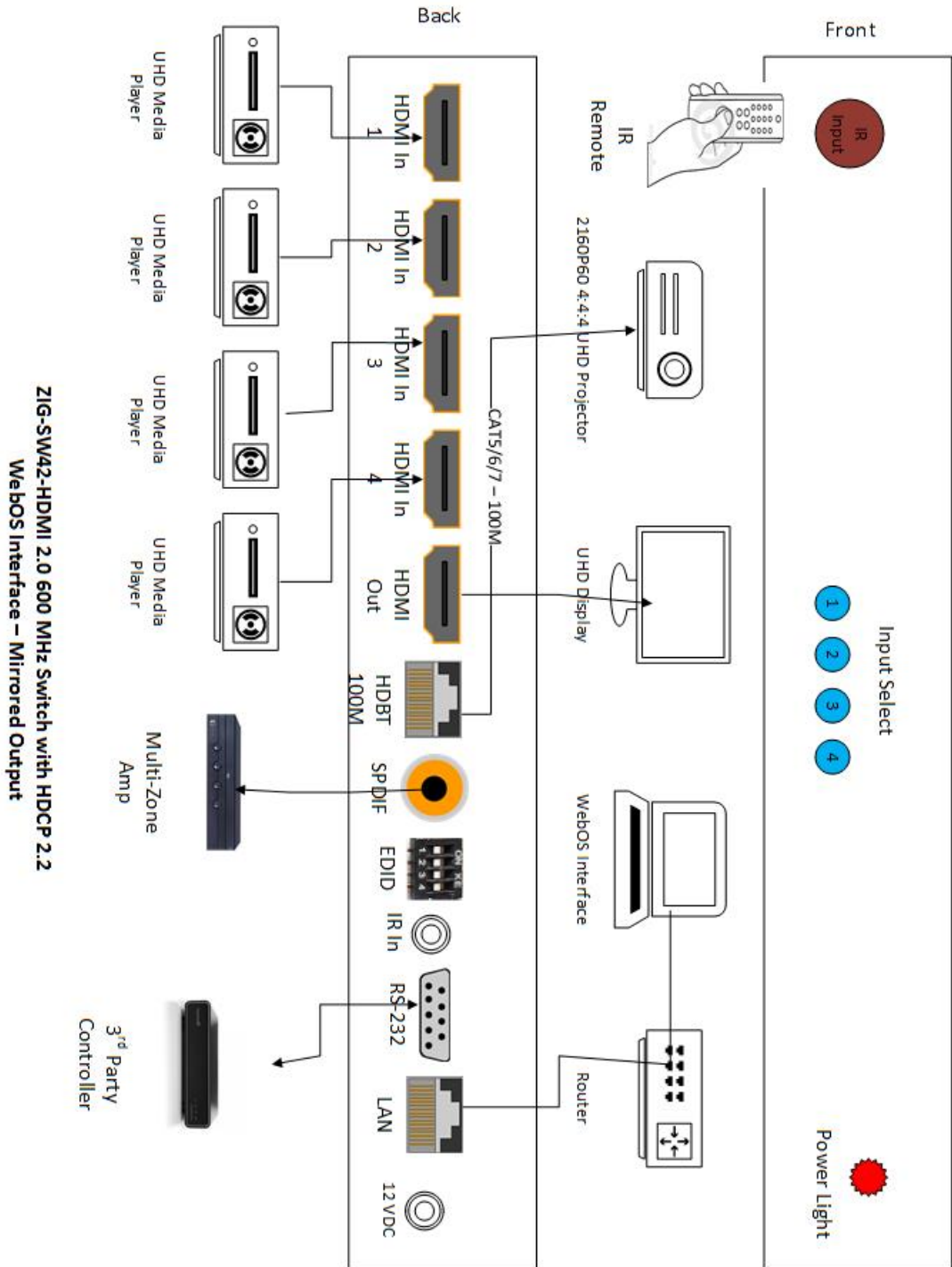
## **Weight**

3 Pounds

## **Certifications/Compliance**

FCC, HDBaseT, CE, RoHS, HDCP, HDMI

# ZIGEN







## Block Diagram – Zigen ZIG-HAX-44/HDBT

### General Operation

HAX-44/HDBT is the ultimate in high-bandwidth UHD switchers. With a full 600 MHz pixel clock the HAX-44/HDBT support high bandwidth sources and displays. Additionally, the HAX-44/HDBT supports HDCP 2.2 copy protection so you can be sure your customer is able to view the latest 4K UHD content – either protected (movies) or computer content (un-protected).

Basic connections are 4 HDMI 2.0 sources (or below) and one HDMI output to the display or projector. There is a SPDIF port that de-embeds audio from the currently selected input and routes it to your audio matrix or multi-zone amplifier. Additionally, with the HAX-44/HDBT there is a 100 meter HDBaseT port for long distance runs. Note HDBaseT is limited to 4K/60 4:2:0 8-bit.

Advanced EDID management is available through a combination of the 4-pin dipswitch and WebOS. 15 EDID tables are available, plus you can load custom EDID tables. Or, leave the HAX-44/HDBT in the default mode and it will pull the EDID from the connected/selected display. By being able to manage the EDID and HPD (Hot Plug Detection) you can speed up switching in mixed format systems.

Control the HAX-44/HDBT via the supplied remote control (IR – to built-in sensor or run an IR receiver to the 3.5mm IR jack). You can also control the HAX-44/HDBT via 3<sup>rd</sup> party control, RS-232, LAN (WebOS/Telnet), or via the input selector switch on the front panel.

### DIP Switch Settings

DIP 1: EDID

OFF (UP): As a default the downstream EDID is copied and used from output port 1.

**While DIP 1 is OFF (UP) DIP 2 & 3 are active as follows:**

DIP 2: (OFF/UP) audio according to downstream capabilities

DIP 2: (ON/DOWN) audio is restricted to 2-channel regardless of downstream EDID.

DIP 3: (OFF/UP) audio according to downstream capabilities.

[zigencorp.com](http://zigencorp.com)

Toll Free: 877-650-5252  
International: +1 818-654-5252

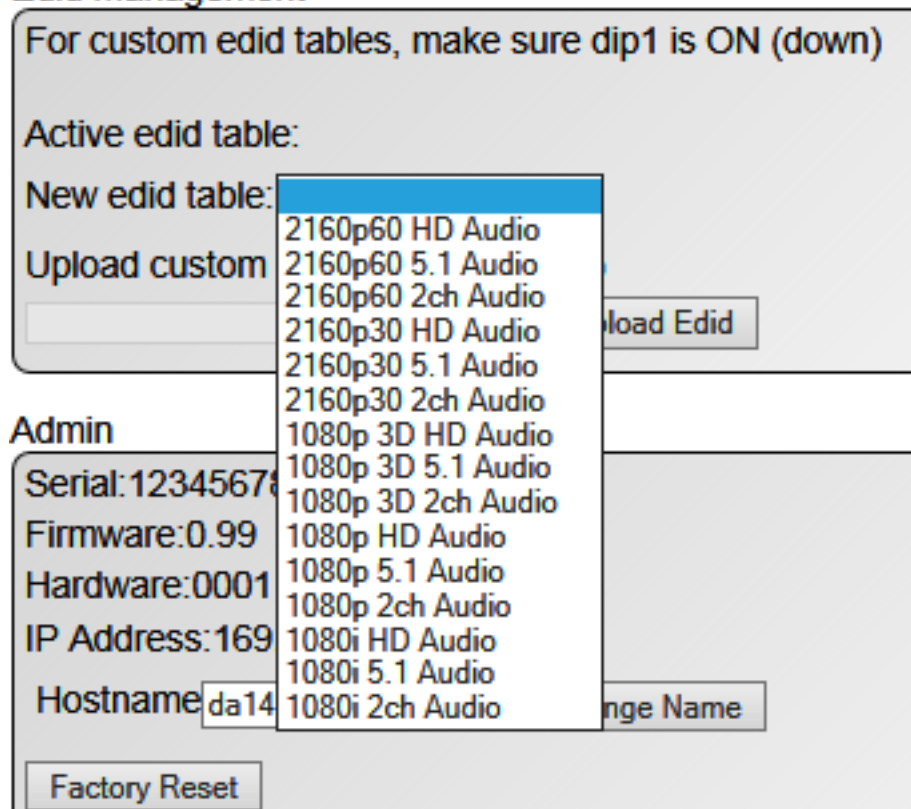
# ZIGEN

DIP 3: (ON/DOWN) audio is modified for SPDIF maximum capabilities. This ensures that the SPDIF output always outputs all SPDIF supported formats. DIP 2 overrides DIP 3. If DIP 2 is down, stereo is selected.

## While DIP 1 is ON (DOWN) the EDID is selected using the WebOS

WebOS has 15 EDID tables to select from (more to come) for various use cases (see screen shot below). Additionally via the WebOS and custom EDID table can be loaded into the device. This gives maximum flexibility as customers can load any EDID they want for the desired application.

### Edid Management



Screen Shot – EDID Tables in WebOS

Note: While DIP 1 is ON (DOWN), DIPs 2 and 3 are not used.

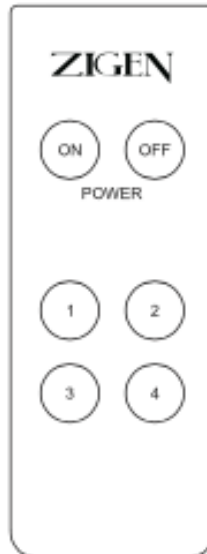
## DIP 4: Hot Plug Force

UP (OFF) – Hot Plug Detection (HPD) is normal

# ZIGEN

DOWN (ON) – HPD is forced active. In this mode the HAX-44/HDBT does not process HPD events from downstream to upstream (from the sink back to the source). This speeds up the HDMI pipeline and can be very useful to avoid a looping condition when multiple HDMI devices are connected in series.

## ZIG-HAX-44/HDBT Remote Control



HAX-44/HDBT remote control can be used for switching between inputs and powering the HAX-44/HDBT up or down.

# ZIGEN

# ZIGEN

The screenshot shows a web browser window with the address bar displaying 'sw41-0000/'. The page title is 'ZIGEN ZIG-SW41 Control Panel'. The interface is organized into several sections:

- Device Information:** Shows 'Device Name: sw41-0000' and a 'Notes' text area with a 'Save Notes' button.
- Video Input:** Features four buttons labeled 'HDMI 1', 'HDMI 2', 'HDMI 3', and 'HDMI 4'. Below them, it indicates 'Active Input: 1'.
- Edid Management:** Includes a note: 'For custom edid tables, make sure dip1 is ON (down)'. It shows 'Active edid table: downstream' and a 'New edid table:' dropdown menu. There is an 'Upload custom edid file: (sw41.edid)' section with a 'Choose Files' button (displaying 'No file chosen') and an 'Upload Edid' button.
- Admin:** Displays system information: 'Serial: 123456780000', 'Firmware: 0.98', 'Hardware: 0001', and 'IP Address: 192.168.1.113'. It includes a 'Hostname' field with 'sw41-0000' and a 'Change Name' button. At the bottom, there are buttons for 'Factory Reset', 'Choose Files' (displaying 'No file chosen'), 'Upload Firmware', 'Reset SW41', and 'Install Update'.

**SW41/2 Web OS Screenshot**

[zigencorp.com](http://zigencorp.com)

Toll Free: 877-650-5252  
International: +1 818-654-5252

# ZIGEN

## WebOS

### Device Name & Notes

- Device Name – default out of the box is HAX-44/HDBT-XXXX (last 4 digits of the serial number). Example - for PC <http://HAX-44/HDBT.0001/> for Mac <http://HAX-44/HDBT-0001.local/>. You should change it if you are using more than 1 device (Change Name below) to whatever you want – ex. CR100SW – for conference room number 100 switcher.
- Notes – free form field for entering installer notes.

### Video Input

- Use to select the input you want showing on the display

### EDID Management

#### Edid Management

For custom edid tables, make sure dip1 is ON (down)

Active edid table:

New edid table:

Upload custom

Admin

Serial: 12345678

Firmware: 0.99

Hardware: 0001

IP Address: 169

Hostname: da14

Factory Reset

2160p60 HD Audio

2160p60 5.1 Audio

2160p60 2ch Audio

2160p30 HD Audio

2160p30 5.1 Audio

2160p30 2ch Audio

1080p 3D HD Audio

1080p 3D 5.1 Audio

1080p 3D 2ch Audio

1080p HD Audio

1080p 5.1 Audio

1080p 2ch Audio

1080i HD Audio

1080i 5.1 Audio

1080i 2ch Audio

Load Edid

Change Name



**Note: To use WebOS EDID management make sure DIP 1 is ON (UP)**

Active EDID table is shown. You can load one of the presets from the previous page or load a custom EDID table from your PC – simply browse and upload the custom EDID if required.

### **Admin/Firmware/Reset/Info**

- Serial Number – serial number of HAX-44/HDBT
- Firmware – Current firmware revision
- Hardware – for internal use
- IP Address – IP address of the unit assigned by your DHCP Server
- Hostname – this is what you want to call the unit – syntax example CR100RX\_k123. This is also the name you type into your browser to access the WebOS. Don't use spaces or special characters.
- Factory Reset – will erase user entered data like installer notes.
- Choose File/Upload Firmware – when necessary, this is where you select a new firmware file and upload firmware.
- Reset DA14 – will reset the ZIG-HAX-44/HDBT remotely.
- Install Update – when necessary is for installing new software updates to the unit.

# ZIGEN

## Command Syntax

**RS-232 & IP Commands – note the same commands are available via RS-232 and IP – use @ for RS232, nothing for IP.**

### RS-232

@HAX-44/HDBT-XXXX(last 4 of SN) <sp> <parameter> <sp>... <parameter>  
<sp> <end of response>

**Default RS232 Protocol Settings (can be changed in WebOS if required):**

Baud Rate = 115200 Data Bits = 8  
Parity = None  
Stop Bit = 1

Flow control = None

### IP

DA14-XXXX <sp> <parameter> <sp>... <parameter> <sp> <end of response>

**Commands (shown in RS-232 format):**

### Help

@HAX-44/HDBT-XXXX help

Shows a list of available commands

### Disco

@HAX-44/HDBT-XXXX disco

### Uptime

@HAX-44/HDBT-XXXX uptime

Shows day, hours, minutes and seconds the HAX-44/HDBT has been running.



# ZIGEN

## **Version**

*@HAX-44/HDBT-XXXX version*

Shows Zigen HAX-44/HDBT, firmware release, firmware revision, build date and serial number.

## **Get Device Status**

*@HAX-44/HDBT-XXXX st*

Shows active and inactive ports – ex. Port 1 active, port 2 off, etc.

## **HDMI Input Selection**

*@HAX-44/HDBT-XXXX insel <1|2|3|4>*

Lets you change the input.

## **Power**

*@HAX-44/HDBT-XXXX <on or off>*

Powers device on or off. Ports remain active – no picture or sound.

# ZIGEN

## Warranty Information

LIMITED WARRANTY – with the exceptions noted in the next paragraph, ZIGEN warrants the original purchaser that the equipment it manufactures or sells will be free from defects in materials and workmanship for a period of three years from the date of purchase. The proof of sale is required in order to claim warranty. Should this product, in ZIGEN's opinion, prove defective within this warranty period, ZIGEN, at its option, will repair or replace this product without charge. Customers outside of US are responsible for shipping charges to and from ZIGEN. Any defective parts replaced become the property of ZIGEN. This warranty does not apply to those products which have been damaged due to accident, unauthorized alterations, improper repair, modifications, inadequate maintenance and care, or use in any manner for which the product was not originally intended for. Items integrated into ZIGEN products that are made by other manufacturers, notably computer hard drives and liquid crystal display panels, are limited to the term of the warranty offered by the respective manufacturers. Such specific warranties are available upon request to ZIGEN.

ZIGEN makes no other representation of warranty as to fitness for the purpose or merchantability or otherwise in respect of any of the products sold. The liability of ZIGEN with respect to any defective products will be limited to the repair or replacement of such products. In no event shall ZIGEN be responsible or liable for any damage arising from the use of such defective products whether such damages be direct, indirect, consequential or otherwise, and whether such damages are incurred by the reseller, end-user or any third party. The information in this manual has been carefully checked and is believed to be accurate. However, ZIGEN assumes no responsibility for any inaccuracies that may be contained in this manual, even if advised of the possibility of such damages. The technical information contained herein regarding the features and specifications is subject to change without notice.