Xcalibur 44
Xcalibur 88

User Manual

SY-HX150-44-18G
SY-HX150-88-18G

4x4 and 8x8 150m Matrix System

HDMI 2.0 (4K60 4:4:4), Down-Scaler, Test Pattern, VKA,
EDID, HDCP & CEC control, Audio de-embed, PoC

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Thank you for purchasing this PRODUCT.

This PRODUCT is designed with the professional AV installers in mind. The many extensive features assist with system integration, validation and maintenance.

Installation precautions

This product has special circuitry to protect it against moderate surges and static discharges. However, to ensure reliable operation and long service life, it is important to take the necessary precautions against any spikes, surges and static discharges.

Place the units away from heat sources and allow adequate ventilation.

Shielded cable and in particular cat6, cat6a or cat7 is highly recommended. As much as possible signal cables should be routed away from any noisy sources and should avoid long runs in close proximity to AC mains cables.

CONTENTS

The Xcalibur-44 and Xcalibur-88 are 4x4 and 8x8 HDMI 2.0 (18Gbps) Matrix, with mirrored HDMI and HX outputs. 4/8 displays can be placed up to 150m @ 1080p or 120m @ 4K2K away, using the Xcalibur-11 Receivers. These high quality matrix are feature rich with facilities such as Test Pattern generator, 4K down-scaler options and much more.

Note: The Xcalibur units are not compatible with HDBaseT products.

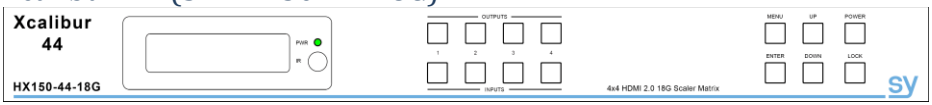
Features

- HDMI 2.0 compatible – 18Gbps signal bandwidth
- Supports all PC and HDMI resolutions up to 4K60 4:4:4
- Mirrored HDMI and HX (cat6) outputs
- **150m** for 1080p or **120m** for 4K, using single Cat5e, 6, 6a, 7
- Built-in **Test Pattern** feature with several pattern types and resolutions
- Video Keep-Alive (**VKA**) option prevents displays entering standby mode
- **Down-Scaler** – Each HDMI and HX outputs can independently scale 4K → 1080p
- HDCP 1.4 and HDCP 2.2 compliant
- **HDCP** and **EDID** management
- Supports HDR, HDR10, HDR10+, HLG and Dolby vision
- HDMI audio support up to 7.1 surround sound
- Audio de-embedding at the Matrix – Balanced analogue stereo (L/R) outputs
- Audio de-embedding at the Matrix – Digital audio coax outputs (5.1 channels max.)
- Audio de-embedding at the Receiver – Analogue stereo (L/R) output
- Selectable RS232 and IR routing to each output
- CEC control – Sources and displays can be controlled via CEC commands
- Control – Front panel, IR, RS232, or LAN
- Built-in web-based control interface
- PoC – All Receivers are powered directly by the matrix

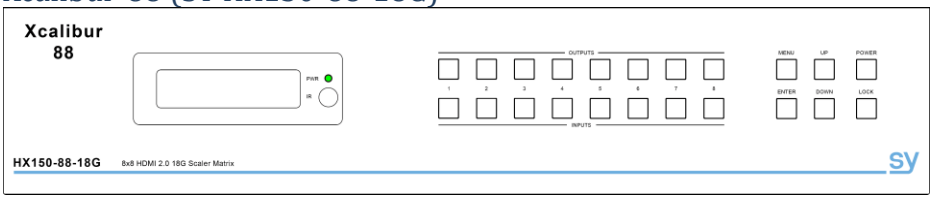
Connectors and Controls

Front

Xcalibur-44 (SY-HX150-44-18G)



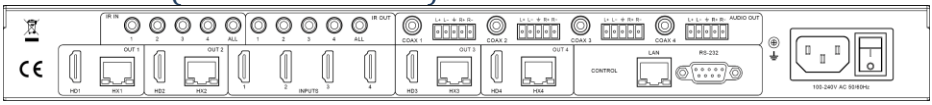
Xcalibur-88 (SY-HX150-88-18G)



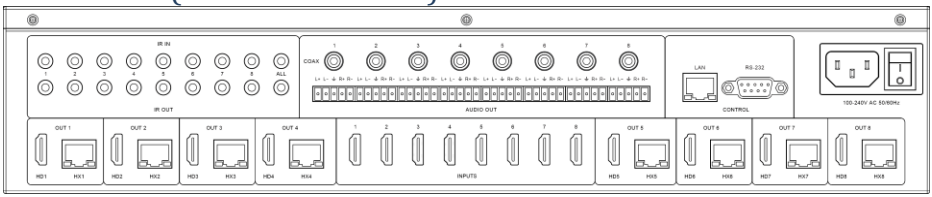
Name	Description
Display Panel	Displays the current signal routing or menu options
Power LED	Green – Unit is powered and functional Red – Unit is in standby mode
IR Sensor	IR control input sensor
Input Selection Buttons	Select the desired input channel
Output Selection Buttons	Select the desired output channel
Menu Button	Activates the menu options on the display panel
Up Button	Use to navigate up through the menu options
Power Button	Press and hold for 3 seconds to turn the unit ON / OFF
Enter Button	Accept the displayed menu option
Down Button	Use to navigate down through the menu options
Lock Button	Press and hold for 3 seconds to Lock / Unlock the front panel

Rear

Xcalibur-44 (SY-HX150-44-18G)



Xcalibur-88 (SY-HX150-88-18G)



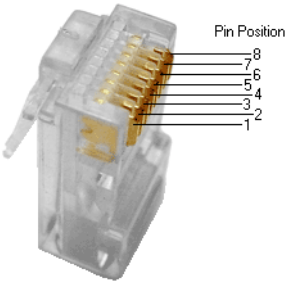
Name	Description
IR IN	Input for IR signals to the Xcalibur Receiver units
IR OUT	IR signal outputs from the Xcalibur Receiver units
AUDIO OUT	RCA connectors – Digital S/PDIF coax audio outputs 5-way pluggable connectors – Differential stereo analogue audio (Balanced outputs)
LAN	RJ45 – TCP/IP control input allowing access to the built-in web interface
RS232	RS232 control port – Matrix control and RS232 comms with Receivers
Power Input	Mains power input and Switch (110-240Vrms)
OUT 1~4	Video output ports 1~4 – Mirrored HDMI and RJ45 to the Xcalibur-11 Receivers
OUT 5~8	Video output ports 5~8 – Mirrored HDMI and RJ45 to the Xcalibur-11 Receivers
INPUTS	HDMI 2.0 video input ports

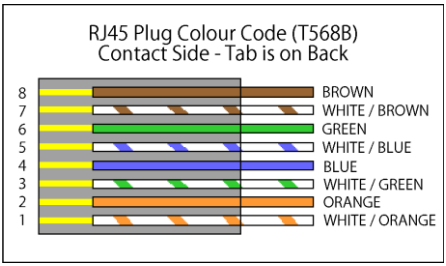
Connecting to the Matrix

1. Connect the HDMI sources to the HDMI inputs
2. Connect the Xcalibur 11 receivers to the HX outputs
3. Connect HDMI display devices to the Xcalibur 11 receivers
4. If required, connect local HDMI displays to the HDMI outputs
5. Connect any other signals such as IR, audio or control inputs
6. Power up the matrix

RJ45 Wiring

Both connectors must be wired identically.





IMPORTANT: The signals used by this extender set will not pass through any Ethernet device. The Matrix and Receivers provided in this set will only work with the Xcalibur product range. Please make sure that the Cat6 cable uses 4 pairs of 23AWG solid copper wires. Do not use inferior copper clad cables as these exhibit high resistances.

It is recommended for the HX cable run between the Transmitter and Receiver units to be continuous cable run of either cat5e/6/6a. Cat6a cabling is preferred for best signal quality.

IR Connector Wiring

The following diagrams detail the IR Eye/Emitter wiring connections for the Xcalibur matrix and the Xcalibur-11 Receivers.

Figure 1 - Xcalibur IR Eye

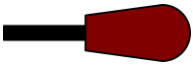


Figure 2 – Xcalibur IR Emitter

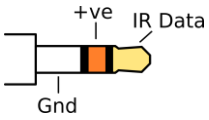


Figure 3 - IR Eye Connector Wiring

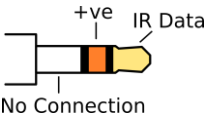


Figure 4 - IR Blaster Connector Wiring

The IR emitter (blaster) connector can be a 3.5mm mono style, in which case the entire sleeve is the +ve signal. IR signals with a carrier frequency in the range of 25-60 KHz can pass through.

Using the Matrix Products

The following table lists the available ports for the two matrix models.

Model	Xcalibur 44	Xcalibur 88
HDMI Inputs	4	8
HX150 Outputs	4	8
HDMI Outputs	4	8
Digital Audio Outputs (Coax)	4	8
Analogue Audio Outputs	4	8
TCP/IP Ports	1	1
RS232 Ports	1	1
IR Inputs	4 + 1 ALL	8 + 1 ALL
IR Outputs	4 + 1 ALL	8 + 1 ALL

Using the Front Panel Controls

If the front display is blank, press any button to wake it up. All the following sections assume this as the starting state. Pressing the MENU button while the display is blank, starts with the **Select EDID** menu option.

Making Video Selections

To make video selections from the front panel:

1. Press the desired output number, which will now flash, then
2. Press the desired input number.

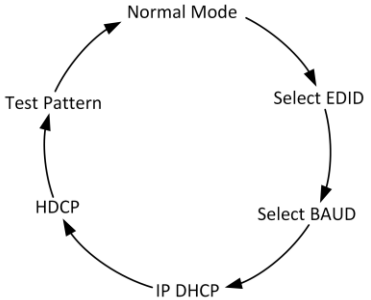
Normal Operating Mode

In this mode the front panel display (when not blank) shows the video routing assignments:

```
OUTPUT: 12345678
 INPUT: 32568324
```

Selecting the Menu Options

Pressing the MENU button will cycle through the following options:



- If the unit is left alone for a few seconds, the menu will close and the unit will revert back to its normal operating mode and the currently selected option is not updated.
- Use the UP / DOWN buttons to scroll through the above menu options.
- Use the ENTER button to confirm menu selections as described for each menu option in the following sections.

Select EDID Menu

The **Select EDID** menu provides the following options on the front panel display:

1080p 2.0 CH	4K*2K 5.1 CH	4K@60 HDR 7.1 CH	**Copy HDMI Out 8**
1080p 5.1 CH	4K*2K 7.1 CH	User Define 1	Copy HX Out 1
1080p 7.1CH	4K*2K@60 420 2.0 CH	User Define 2	Copy HX Out 2
1080i 2.0 CH	4K*2K@60 420 5.1 CH	Copy HDMI Out 1	Copy HX Out 3
1080i 5.1 CH	4K*2K@60 420 7.1 CH	Copy HDMI Out 2	Copy HX Out 4
1080i 7.1CH	4K*2K@60 2.0 CH	Copy HDMI Out 3	**Copy HX Out 5**
1080p 3D 2.0 CH	4K*2K@60 5.1 CH	Copy HDMI Out 4	**Copy HX Out 6**
1080p 3D 5.1 CH	4K*2K@60 7.1 CH	**Copy HDMI Out 5**	**Copy HX Out 7**
1080p 3D 7.1 CH	4K@60 HDR 2.0 CH	**Copy HDMI Out 6**	**Copy HX Out 8**
4K*2K 2.0 CH	4K@60 HDR 5.1 CH	**Copy HDMI Out 7**	

The menu items shown in **bold** in the above table are only available on the Xcalibur 88.
Note: 4K@60 HDR 2.1/51/7.1 resolutions are with 4:2:0 YCbCr colour space setting.
The factory default EDID setting is 1080p 2.0 CH.

To select a new EDID:

1. Press the MENU button until **Select EDID** is displayed
2. Press the UP / DOWN buttons until the desired setting is displayed.
3. Press the ENTER button to accept the EDID selection.
4. Select the input number to copy the EDID setting to by using the UP / DOWN buttons.
5. Then press ENTER again to transfer the EDID setting to that input.

Select Baud

This menu option sets the baud rate for the RS232 control port only. The options are: **4800**, **9600**, **19200**, **38400**, **57600** and **115200**. The factory default baud rate is 115200 (115.2 K).

1. Press the MENU button until **Select Baud** is displayed
2. Use the UP / DOWN buttons to select the desired baud rate.
3. Press ENTER to accept the new baud rate setting selection.

IP Settings

The IP settings menu is used to toggle the DHCP mode to be ON or OFF. Once the menu selection is set, press ENTER to make it active. The factory default IP settings are:

DHCP = ON
IP = Will self-configure to the network settings.

Please note that the IP settings are not affected by a Factory Reset command.

1. Press the MENU button until the **DHCP** option is displayed
2. Use the UP / DOWN buttons to change the DHCP mode.
3. Press ENTER to accept the DHCP setting selection.

HDCP Settings

This menu option configures the HDCP mode for each output channel or for all output channels. Use is as follows:

1. Press the MENU button until **Select HDCP** is displayed
2. Select either ON / OFF using the UP / DOWN buttons
3. Press ENTER
4. Select the desired output number or ALL output using the UP / DOWN buttons
5. Press ENTER to make the change active for that output

Test Pattern Settings

This menu option enables or disables the Test Pattern for each output channel or for all output channels. Use is as follows:

1. Press the MENU button until the **Test Pattern** is displayed.
2. Select either ON / OFF using the UP / DOWN buttons.
3. Press ENTER.
4. Select the desired output number or ALL output using the UP / DOWN buttons.
5. Press ENTER to make the change to the Test Pattern setting.

Power Button

The POWER button toggles the matrix switcher between normal operation and standby mode. To do this, press and hold the POWER button for more than 3 seconds and then release.

Power LED Colour	Operating Mode
Green	Normal Operation
Red	Standby

Lock Button

Press the LOCK button for 3 seconds to Lock / Unlock the front panel buttons. When the front panel is locked, only the POWER and LOCK buttons are functional. The Panel Lock / Unlock state can be changed by using the LOCK button, sending RS232 or Web interface commands.

NOTE: The panel lock status is always remembered, even after a complete power down. Pressing any button other than POWER or LOCK while the front panel is locked will cause the "**Panel Lock!**" message to appear on the front panel display.

IR Remote Controllers

Xcalibur 44 IR Remote

The Xcalibur-44 Matrix can also be controlled using the provided IR remote controller:

The top left button on both the IR remote controllers, toggles the matrix power state.

The numbered buttons in each Output group directly selects the desired input for that output. The left and right arrow buttons cycle, with full wraparound, through the HDMI input ports.

Figure 5 - IR Remote for Xcalibur 44

Xcalibur 88 IR Remote

The Xcalibur-44 Matrix can also be controlled using the provided IR remote controller:

The top left button on both the IR remote controllers, toggles the matrix power state.

Button Sequence: **Output → Input**
The numbered buttons in the lower **Output** section select the desired output channel, or all outputs together.
The numbered buttons in the upper **Input** section select the desired input for the chosen output selected in the previous step. The left and right arrow buttons cycle, with full wraparound, through the HDMI input ports.

Figure 6 - IR Remote for Xcalibur 88

Default Settings

The following table lists the factory default settings for the matrix unit:

Feature	Factory Default Value
Power	On
Beep	On
ID	0
LCD on time	30 seconds
Panel Lock	Off
Command Baud Rate	115200, n, 8, 1
AV Routing	1-1, 2-2, 3-3, etc.
HDMI Stream	Enabled
HX Stream	Enabled
HDMI Scaler	Auto
HX Scaler	Auto
Input HDCP	On
HDMI Output HDCP	Bypass
HX Output HDCP	Bypass
VKA Mode	Off
VKA Timeout	0
Test Pattern	Chequerboard, 1080p60
EDID	1080p, Stereo Audio 2.0
IP Address	192.168.1.100
Gateway	192.168.1.1
Subnet Mask	255.255.255.0
IP Mode	DHCP

IR Routing and Pass-Through

IR Inputs

The numbered IR IN connectors on the rear of the matrix units always go directly to the IR OUT of the Xcalibur-11 receiver connected to the identically numbered HX output in a one-to-one relationship. The IR IN ALL connector sends the IR data to all HX outputs simultaneously.

IR Outputs

The numbered IR outputs will follow with the video routing selections. The IR OUT ALL port sums IR signals from all connected receivers. Take care when using this port to ensure that only one Xcalibur Receiver is passing the IR signal to ensure proper output of that signal.

Coax Digital Audio Outputs

The coax digital audio outputs support any audio up to 5.1 channels. Any HDMI input with more than 5.1 channels will have no sound at the digital audio output when routed to that output.

Analogue Audio Outputs

The differential analogue audio outputs only output the Front Left and Front Right channels when the HDMI input audio has more than 2.0 channels.

RS232 Control Port Wiring

The RS232 control port 9-way DSUB connector uses transmit (TxD), receive (RxD) and Ground only. The wiring of this connector is as follows:

Xcalibur Matrix DSUB Pin	PC DSUB Pin
2 (TxD)	3 (RxD)
3 (RxD)	2 (TxD)
5 (GND)	5 (GND)

RS232 Commands

All the following RS232 commands must be sent to the RS232 D-type connector on rear of the Excalibur matrix units. The default RS232 settings are:

115200 baud, 8 data bits, no parity and one stop bit.

All commands are in lowercase and any spaces shown must always be included. Commands should be sent as a single burst, as manual typing will often result no response being returned or the error code **E00** or **E01**.

Every command must end with an exclamation mark (!). Any carriage-return (0x0d) or line-feed (0x0a) characters sent will be ignored by the device.

Every response message will terminate with a carriage-return and line-feed (0x0d 0x0a) character sequence.

In the following tables, **x**, **y** and **z** represent parameter values that are presented in the description of the respective command.

System Commands

RS232 Command	Description	Response Example
s reboot!	Reboot the matrix switcher.	Reboot…(note 1)
s reset!	Restore the matrix unit to factory defaults.	Reset to factory defaults (note 1)
r fw version!	Get the installed firmware versions.	MCU BOOT: Vx.xx.xx MCU APP: Vx.xx.xx
help!	List all available commands.	(note 2)
s power z!	Set the power state of the matrix, **z** = 0 power off **z** = 1 power on	power on
r power!	Get the matrix power status	Power off
r type!	Get the matrix type	SY-HX150-44-18G
r status!	Get a report of the current status of the matrix unit	(note 3)
r link in x!	Get the connection status for input **x**.	hdmi input 3: connect
r link out y!	Get the connection status for output **y**. Note that both the HDMI and HX outputs are reported on separate lines.	hdmi output 2: disconnect hx output 2: connect
s beep z!	Set keypress buzzer sound. **z** = 0 beep off **z** = 1 beep on	beep off
r beep!	Get the key beep mode current status.	beep on
s lock z!	Set the front panel lock status. **z** = 0 unlock **z** = 1 lock	panel button lock on
r lock!	Get the current front panel lock status.	panel button lock off
s lcd on time z!	Set the dwell time that the front panel LCD remains on. **z** = 0 always off **z** = 1 always on **z** = 2 15 seconds **z** = 3 30 seconds **z** = 4 60 seconds	lcd on 30 seconds
r lcd on time!	Get the lcd on time.	lcd on always
s logo1 ****!**	Set the product name displayed on the LCD to the text in ******. The text is limited to a maximum 16 characters	logo1:SY-HX150-44-18G
s baud rate xxx!	Set the baud rate for control commands where xxx is the desired baud rate(note 4)	Baudrate: 115200
r baud rate!	Get the current baud rate for control commands.	Baudrate: 115200

Notes:

1. The "**s reboot!**" and "**s reset!**" commands both respond with **System initialising…** followed by several other messages.
2. The "**help!**" command lists all available commands present in the installed firmware version. This list is too long to present as in this document, but each command is detailed individually in its own section.
3. The "**r status!**" command returns a very detailed report of all the settings and current configuration of the matrix unit.
4. For the "**s baud rate xxx!**" command, only the following baud rates values are valid for **xxx**: 4800, 9600, 19200, 38400, 57600, and 115200.

Video Routing

The following commands allow the making of video selections as well as discovering which input is assigned to a specific output. Note that for any output **y**, both the HDMI and HX outputs always show the same (mirrored) input HDMI source.

RS232 Command	Description	Response Example
s in x av out y!	Route input **x** video to the output **y**. **x** = HDMI input number **y** = Output number or **0** for all outputs.	input 2 -> output 3
r av out y!	Get the routing for output **y**	input 1 -> output 5

Presets

The four Preset memories can each store video signal routings for later recall. Any of these preset stores can also be cleared at any time.

RS232 Command	Description	Response Example
s save preset z!	Save the current video routing to preset **z**, where **z** = 1~4	save to preset 2
s recall preset z!	Set the video routing to settings in preset **z**, where **z** = 1~4	recall from preset 1
s clear preset z!	Clear the video routing from preset **z**, where **z** = 1~4	clear preset 1
r preset z!	Get the video routing information for preset **z**, where **z** = 1~4	Depends on values stored in preset z

Feedback Messages

The matrix units will also report the following events:

1. A video selection occurred either at the front panel, from an RS232 command, or from the web interface.
2. When an input HDMI signal is detected.
3. When any HDMI or HX cable is connected or disconnected.

RS232 Output Message	Description
input x -> output y	A video selection occurred, where **x** is the input number and **y** is the output number(s).
hdmi input x: connect	A new source was connected to HDMI input **x**
hdmi input x: sync	An HDMI signal was detected at HDMI input **x**
hdmi input x: disconnect	An HDMI signal was lost from HDMI input **x**
hdmi output y: connect	A cable was connected to HDMI output **y**
hdmi output y: disconnect	A cable was disconnected from HDMI output **y**
hx output y: connect	A cable was connected to HX output **y**
hx output y: disconnect	A cable was disconnected from HX output **y**
E00	Unrecognised command
E01	Incorrect parameter value

Enabling or Disabling the Output Stream

The HDMI and HX output video stream can be enabled or disabled individually using the following commands:

RS232 Command	Description	Response Example
s hdmi y stream z!	Enable / Disable the video stream for HDMI output **y**. **y** = desired HDMI output port number **y** = 0 for all HDMI outputs **z** = 0 disable the HDMI output stream **z** = 1 enable the HDMI output stream	enable hdmi output 2 stream
r hdmi y stream!	Get the video stream state for HDMI output **y**, where: **y** is the desired HDMI output port number or **0** for all HDMI outputs.	disable hdmi output 5 stream
s hx y stream z!	Enable / disable the video stream for HX output **y**. **y** = HX output port number **y** = 0 for all HX outputs **z** = 0 disable the HX output stream **z** = 1 enable the HX output stream	enable hx output 2 stream
r hx y stream!	Get the data stream state for HX output **y**, where: **y** is the desired HX output port number or **0** for all HX outputs.	disable hx output 5 stream

Test Pattern Commands

These commands enable or disable the Test Pattern modes of the matrix outputs. Used for diagnostics or VKA mode.

Both the HDMI and HX outputs will display the Test Pattern at the same time. These commands also set the Test Pattern displayed when the Video Keep Alive (VKA) mode is activated.

RS232 Command	Function	Response Example
s out y tp pattern x resolution z!	This command sets the desired Test Pattern and its resolution. Where, **y** is the output channel, **x** is the Test Pattern and **z** is the resolution. **y** = Output number **y** = 0 All outputs **x** = 0 Chequerboard **x** = 1 Red **x** = 2 Green **x** = 3 Blue **x** = 4 Black **x** = 5 White **z** = 0 1080p60 **z** = 1 4K30 **z** = 2 4K60	output 1 test pattern: chequerboard, resolution: 1080p60
r out y tp pattern!	Get the current Test Pattern settings for output **y** or **0** for all outputs	output 3 test pattern: chequerboard, resolution: 4K30
s out y test pattern on!	Enable the Test Pattern for output **y** or **0** for all outputs	output 5 test pattern: on
s out y test pattern off!	Turn off the Test Pattern to output **y** or **0** for all outputs	output 2 test pattern: off
r out y test pattern!	Set the Test Pattern status for output **y** or **0** for all outputs	output 3 test pattern: off

Video Keep-Alive Commands

Whenever the Video Keep-Alive (VKA) feature is enabled for an output, that output will display a Test Pattern when the input HDMI signal assigned to that output is lost. This will keep devices such as projectors active, stopping them from going into standby mode. When a valid input signal assigned to the output is detected, or VKA time-out, then VKA is stopped.

The VKA mode can be set to time out after several minutes or remain on indefinitely. The VKA Test Pattern is displayed on both the HDMI and HX outputs for that output port.

For the following commands **y** is the desired output (or **0** for All Outputs).

RS232 Command	Description	Response Example
s out y vka time z!	Set the time, in minutes, after which the VKA mode is automatically disabled, for output **y**. Where **z** is a value in the range of 0 to 240. **Note:** a value of 0 or greater than 240 will set the VKA mode to never time out.	video keep-alive timeout: 100 minutes
r out y vka time!	Get the current maximum timeout value.	ouptut 2 video keep-alive timeout: 100 minutes
s out y vka mode x!	Set the VKA mode: **x** = 0 VKA mode off **x** = 1 VKA mode on	output 3 video keep-alive on
r out y vka mode!	Get the current state of the VKA mode.	output 1 video keep-alive off

Down-scaler Mode

The HDMI and HX output can be independently set to down-scale any 4K input video to 1080p at the same refresh rate. The Auto Down-scaler option will use the EDID of the display to determine the scaling mode.

RS232 Command	Description	Response Example
s hdmi y scaler mode z!	Set the HDMI output down-scaler. **y** = HDMI output number **y** = 0 All HDMI outputs **z** = 1 Bypass – No scaling **z** = 2 4K → 1080p **z** = 3 Auto, use display EDID for scaling	hdmi output 1 set to bypass mode
r hdmi y scaler mode!	Get the current status of the output downscaler mode for HDMI output y.	hdmi output 3 set to 1080p
s hx y scaler mode z!	Set the HX output down-scaler. **y** = HX output number **y** = 0 All HX outputs **z** = 1 Bypass – No scaling **z** = 2 4K → 1080p **z** = 3 Auto, use display EDID for scaling	hx output 1 set to auto
r hx y scaler mode!	Get the current status of the output down-scaler mode for HX output y.	hx output 2 set to bypass mode

HDCP Options

The following commands control the HDCP options for the inputs and outputs. Note that the HDMI and HX outputs are controlled separately for the same output port number.

RS232 Command	Description	Response Example
s input x hdcp z!	Enable / disable the HDCP for the HDMI inputs **x** = HDMI input number **x** = 0 All HDMI inputs **z** = 0 off **z** = 1 on	Input 2 HDCP:ON
r input x hdcp!	Get the current status of the input HDCP for input **x**, or **0** for all inputs	Input 4 HDCP:OFF
s hdmi y hdcp z!	Set the HDCP mode for the HDMI outputs. **y** = HDMI output number **y** = 0 All HDMI outputs **z** = 0 Cascade mode **z** = 1 HDCP 1.4 **z** = 2 HDCP 2.2 **z** = 3 Bypass mode	hdmi output 3 hdcp:CASCADE
r hdmi y hdcp!	Get the current status HDCP mode for the HDMI output of the receiver,	hdmi output 1:HDCP 1.4
s hx y hdcp z!	Set the HDCP mode for the HX outputs. **y** = HX output number **y** = 0 All HX outputs **z** = 0 Cascade mode **z** = 1 HDCP 1.4 **z** = 2 HDCP 2.2 **z** = 3 Bypass mode	hx output 1:HDCP 1.4
r hx y hdcp!	Get the current status HDCP mode for the HX output **y**	hx output 1:HDCP 1.4

EDID Control

These matrix products provide several EDID management commands to ensure that the source is able to provide the correct image resolution to the display device.

RS232 Command	Description	Response Example
s edid in x from z!	Set HDMI input **x** to use one of the built-in EDID settings. The **z** value is given in the tables below.	Input 2 EDID:1080p, Stereo Audio 2.0
r edid in x!	Get the current EDID setting for HDMI input **x**	Input 1 EDID: 4K2K_444, Dolby/DTS 5.1
r edid data hdmi y!	Get the EDID data from HDMI output **y**	See below
r edid data hx y!	Get the EDID data from HX output **y**	See below

For all EDID commands that either require or return EDID data, the EDID data is always given as pairs of ASCII characters representing the hexadecimal data, for example, where … represent the remainder of the EDID data:

s edid user1 00 FF FF FF FF FF FF 00 …!

The **<edid data>** marker shown in the above table is where the actual EDID, as shown in the above example, should be placed.

The "**r edid data!**", "**r edid data hdmi x!**" and "**r edid user1!**" all return their respective EDID data values as ASCII encoded hexadecimal values.

Note: 4K@60 HDR 2.1/51/7.1 resolutions are with 4:2:0 YCbCr colour space setting.

z Value	HDMI Resolution (max)	Audio Format	Audio Channels
1	1080p	Stereo Audio	2.0
2	1080p	Dolby/DTS	5.1
3	1080p	HD Audio	7.1
4	1080i	Stereo Audio	2.0
5	1080i	Dolby/DTS	5.1
6	1080i	HD Audio	7.1
7	1080p 3D	Stereo Audio	2.0
8	1080p 3D	Dolby/DTS	5.1
9	1080p 3D	HD Audio	7.1
10	4K2K 30Hz 4:4:4	Stereo Audio	2.0
11	4K2K 30Hz 4:4:4	Dolby/DTS	5.1
12	4K2K 30Hz 4:4:4	HD Audio	7.1
13	4K2K 60Hz 4:2:0	Stereo Audio	2.0
14	4K2K 60Hz 4:2:0	Dolby/DTS	5.1
15	4K2K 60Hz 4:2:0	HD Audio	7.1
16	4K2K 60Hz 4:4:4	Stereo Audio	2.0
17	4K2K 60Hz 4:4:4	Dolby/DTS	5.1
18	4K2K 60Hz 4:4:4	HD Audio	7.1
19	4K2K 60Hz 4:4:4 HDR	Stereo Audio	2.0
20	4K2K 60Hz 4:4:4 HDR	Dolby/DTS	5.1
21	4K2K 60Hz 4:4:4 HDR	HD Audio	7.1

The next table allows for reading the EDID data from the connected display devices or enabling the programmable **User EDID** memory location when using the "**s edid in from z!**" command.

z Value	Xcalibur 44	Xcalibur 88
22	User EDID data stored in User1 location	User EDID data stored in User1 location
23	User EDID data stored in User2 location	User EDID data stored in User2 location
24	Copy EDID from HDMI 1 output	Copy EDID from HDMI 1 output
25	Copy EDID from HDMI 2 output	Copy EDID from HDMI 2 output
26	Copy EDID from HDMI 3 output	Copy EDID from HDMI 3 output
27	Copy EDID from HDMI 4 output	Copy EDID from HDMI 4 output
28	Copy EDID from HX 1 output	Copy EDID from HDMI 5 output
29	Copy EDID from HX 2 output	Copy EDID from HDMI 6 output
30	Copy EDID from HX 3 output	Copy EDID from HDMI 7 output
31	Copy EDID from HX 4 output	Copy EDID from HDMI 8 output
32	—	Copy EDID from HX 1 output
33	—	Copy EDID from HX 2 output
34	—	Copy EDID from HX 3 output
35	—	Copy EDID from HX 4 output
36	—	Copy EDID from HX 5 output
37	—	Copy EDID from HX 6 output
38	—	Copy EDID from HX 7 output
39	—	Copy EDID from HX 8 output

Sending RS232 Commands to HX Receivers

The matrix units are able to send RS232 commands from the HX outputs to the connected Xcalibur-11 Receivers Using the control RS232 port as well as the Web interface. The HX ports can be individually selected or the RS232 command can be sent to all the HX outputs.

RS232 Command	Description	Response Example
s rs232 y a b:**END!**	Send an RS232 command to the HX output port **y** at the specified baud rate. **y** = HX Output number **y** = 0 All HX outputs **a** = 0 ASCII Format **a** = 1 Hexadecimal Format **b** is baud rate from one of the following: **b** = 1 115200 **b** = 2 57600 baud **b** = 3 38400 **b** = 4 19200 baud **b** = 5 9600 **b** = 6 4800 baud **b** = 7 2400 ******** is the actual command transmitted to the HX Receiver, this must be 80 characters or less. **END!** marks the end of the command and is required	Hx baud rate is 9600, ascii format command:****

Sending an ASCII Command

The following example shows how the ASCII command **POWR=ON<cr>** is sent from HX output 3 using a baud rate 19200:

```
s rs232 3 0 4:POWR=ON↵
END!
```

Note: the above example is two lines and that the **<cr>** (represented by the ↵ character) is entered by using the Enter on the PC keyboard.

Everything between the colon (**:**) and the **END!** marker, are sent exactly as entered and character the case will not be altered.

Sending an Hexadecimal Command

There are occasions where certain ASCII control characters are not immediately available from the PC keyboard, this is where hexadecimal notation is used. The following example is for a display power on command, this time sent to HX port 1 at 9600 baud:

```
s rs232 1 1 5:99A2B3C402FF0100END!
```

This example shows several values that are not easily accessible as a single character from a PC keyboard and need to use hexadecimal notation. All the values between the colon (**:**) and the **END!** marker are converted to the correct binary values before being sent to the HX output port.

Controlling Devices using CEC Commands

These matrix units are also able to send specific CEC commands to control CEC enabled devices connected to either the input HDMI ports or any of the video output ports.

Input Port CEC Commands

These commands send a CEC instruction to a CEC enabled source device (PC, Blu-ray, …) connected to the input port **x**. Where **x** is 1~4 or 1~8 for each input respectively or **x** = 0 for all inputs.

RS232 Command	Description	Response Example
s cec in x on!	Send a CEC **power on** command to HDMI input port **x**	input 1 power on
s cec in x off!	Send a CEC **power off** command to HDMI input **x**	input 3 power off
s cec in x menu!	Send a CEC command to open the **menu** of the device on input **x**	input 2 open menu
s cec in x play!	Set the playback device on input port **x** to **play** mode.	input 4 open play operation
s cec in x pause!	Set the playback device on input port **x** to **pause** mode.	input 1 open pause operation
s cec in x stop!	Set the playback device on input port **x** to **stop** mode.	input 5 open stop operation
s cec in x ff!	Set the playback device on input port **x** to fast **forward** mode	input 7 open fast forward operation
s cec in x rew!	Set the playback device on input port **x** to **rewind** mode.	input 8 open rewind operation
s cec in x previous!	Set the playback device on input port **x** to select the **previous** chapter.	input 1 open previous operation
s cec in x next!	Set the playback device on input port **x** to select the **next** chapter.	input 2 open next operation
s cec in x mute!	Send CEC **volume mute** command to the device on input port **x**	input 2 open volume mute
s cec in x vol-!	Send CEC **volume down** command to the device on input port **x**	input 4 open volume down
s cec in x vol+!	Send CEC **volume up** command to the device on input port **x**	input 1 open volume up

Output Port CEC Commands

These commands send a CEC command from any of the HDMI or HX port **y**, to control a CEC enabled sink device (display, projector, soundbar,..). Where **y** is 1~4 or 1~8 for each output respectively or **y** = 0 for all outputs.

RS232 Command	Description	Response Example
s cec hdmi out y on!	Send CEC **power on** command to HDMI output port **y**	hdmi output 1 power on
s cec hdmi out y off!	Send CEC **power off** command to HDMI output port **y**	hdmi output 1 power off
s cec hdmi out y mute!	Send CEC **volume mute** command to HDMI output port **y**	hdmi output 1 volume mute
s cec hdmi out y vol-!	Send CEC **volume down** command to HDMI output port **y**	hdmi output 1 volume down
s cec hdmi out y vol+!	Send a CEC **volume up** command to HDMI output port **y**	hdmi output 1 volume up
s cec hdmi out y active!	Send CEC command from HDMI output **y** to the display device to select the connected input and make it **active**.	hdmi output 1 active source
s cec hx out y on!	Send CEC **power on** command to HX output port **y**	hx output 1 power on
s cec hx out y off!	Send CEC **power off** command to HX output port **y**	hx output 1 power off
s cec hx out y mute!	Send CEC **volume mute** command to HX output port **y**	hx output 1 volume mute
s cec hx out y vol-!	Send a CEC **volume down** command to HX output port **y**	hx output 1 volume down
s cec hx out y vol+!	Send CEC **volume up** command from HX output port **y**	hx output 1 volume up
s cec hx out y active!	Send CEC command from HX output **y** to the display device to select the connected input and make it **active**.	hx output 1 active source

Network Configuration Commands

The following list of commands are used to set or discover the network settings of the matrix unit. Note that the MAC address will be different for each matrix unit.

RS232 Command	Description	Response Example
r ipconfig!	Get the IP configuration of the matrix unit.	Returns the same responses for each of the following commands
r mac addr!	Get the MAC address of the matrix.	Mac address: XX:XX:XX:XX:XX:XX
s ip mode z!	Set the IP mode to **static** or **DHCP** **z** = 0 Static mode **z** = 1 DHCP mode	Set IP mode: Static
r ip mode!	Get network IP mode of the matrix unit	IP mode: Static
s ip addr xxx.xxx.xxx.xxx!	Set a new IP address for the matrix unit	Set IP address: 192.168.1.100
r ip addr!	Get the matrix current IP address.	IP address: 192.168.1.100
s subnet xxx.xxx.xxx.xxx!	Set the matrix network subnet mask.	Set subnet Mask: 255.255.255.0
r subnet!	Get the matrix network subnet mask.	Subnet Mask: 255.255.255.0
s gateway xxx.xxx.xxx.xxx!	Set the matrix default gateway address.	Set gateway: 192.168.1.1
r gateway!	Get the matrix default gateway address	Gateway:192.168.1.1
s tcp/ip port x!	Set the TCP/IP port number address **x** for the matrix unit.	Set TCP/IP port:8000
r tcp/ip port!	Get the TCP/IP port number address of the matrix unit.	TCP/IP port:8000
s telnet port x!	Set the Telnet port number address **x** for the matrix unit.	Set Telnet port 23
r telnet port!	Get the Telnet port number address of the matrix unit.	Telnet port 23
s net reboot!	Reboot the matrix network interface.	Network reboot…

Using the Built-In Web Interface

The Xcalibur-44 and Xcalibur-88 matrix products have a built-in web-based control interface that can be accessed from any browser. The factory default setting for the IP settings is with DHCP on. In case a DHCP server is not available, then the following settings can be used:

Default IP Address:	192.168.1.100
Default Subnet Mask:	255.255.255.0
Default Gateway:	192.168.1.1
Telnet Port:	23
TCP/IP Port:	8000
Static/DHCP:	DHCP

Do one of the following to obtain the current IP address for the matrix:

1. Press the **Menu** button until the IP address of the matrix is displayed on the front panel.
2. Use a serial emulation program to send either the "**r ipconfig!**" or the "**r ip addr!**" command to obtain all the current IP settings for the matrix.

Note that the screenshots given in this section are for the Xcalibur-88 matrix, the web pages for the Xcalibur-44 matrix just have fewer options on certain pages.

Login Page

After entering the IP address for the matrix unit, the following login page is displayed requesting a username and the associated password.

The default passwords are:

Username	Default Password	Access
Admin	admin	All pages
User	user	Status and Video pages only

After entering the password, click on the LOGIN button to open the Status Page.

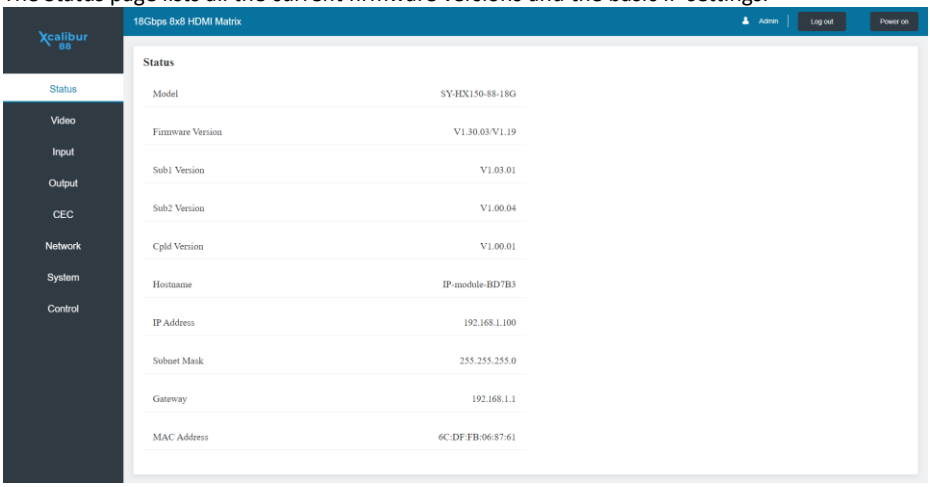
After Logging In

At the top right corner of all the pages displayed after logging in are two buttons labelled **Logout** and **Power**.

The **Logout** button will terminate the current session and return back to the Login screen.
The **Power** button will toggle the power state of the matrix unit.

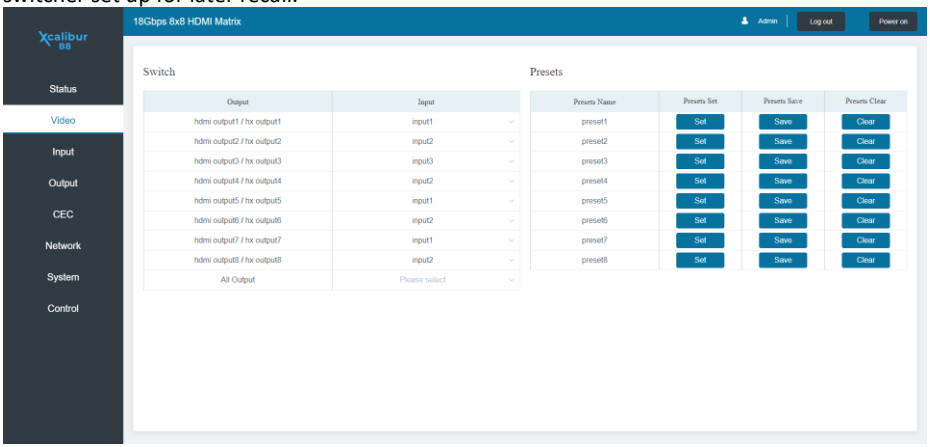
Status Page

The Status page lists all the current firmware versions and the basic IP settings:



Video Page

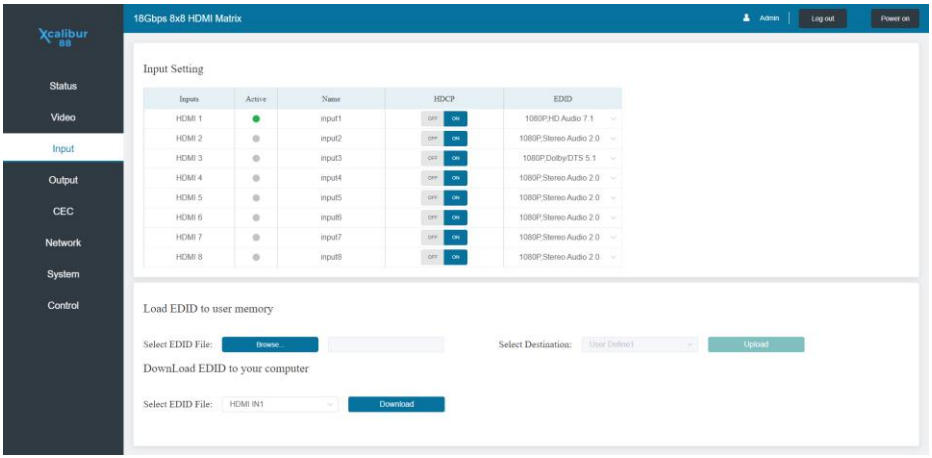
This page controls the video switching and Preset options. Each preset will store the current switcher set up for later recall.



To make a video selection, choose the desired input from the drop-down list for the required output. To set all outputs to the same input, choose that input number from the drop-down list after the **All Output** option.

Input Page

The input page allows for renaming of the inputs, changing the input HDCP setting and choosing the desired input EDID setting:



Input

The input number, this text is fixed by the system.

Active

The green dots in the **Active** column indicate an active HDMI input signal is present at that input.

Name

Change the text in the edit boxes to give them more meaningful names.

HDCP

Enable or Disable the input HDCP option.

EDID

The **EDID** options are identical to those detailed under **Select EDID Menu** on page 10.

Load EDID to User Memory

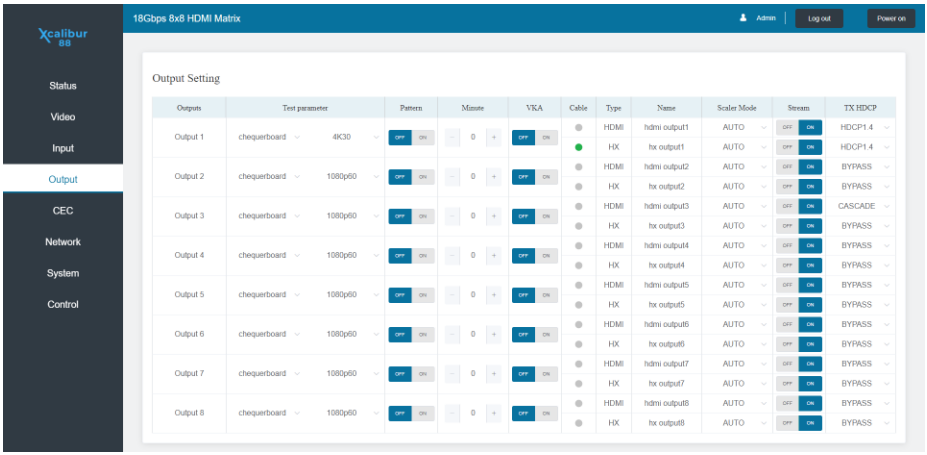
The lower portion is for uploading binary EDID files to a specified user memory selectable from the drop-down list after the **Select Destination:** text.

Download EDID to your computer

The EDID data at any input can be read by using the **Download** button. The EDID file is saved as **edid.bin** in the default download folder.

Output Page

The Output page has several section that are detailed below:



Output

This is the output channel for both the HDMI and HX outputs.

Test Parameter

Select the desired Test Pattern and its resolution for both the HDMI and HX outputs.

Pattern

Enable or Disable the Test Pattern output for both the HDMI and HX outputs.

Minutes

Set the duration time in minutes for the Video Keep-Alive (VKA) feature.

VKA

Enable or disable the VKA mode for both the HDMI and HX outputs. This feature is only activated upon loss of the input HDMI signal. See **Video Keep-Alive Commands** on page 17 for more details about this feature.

Cable

A green dot indicates that a signal is being sent from the respective output port. Note that the HDMI and HX ports are now shown separately.

Name

Used for naming the HMDI and HX outputs, since the displays may be in different locations.

Scaler Mode

Select the Down-scaler mode function from: Auto, 4K → 1080P, or BYPASS. See **Down-scaler** Mode on 17 for more details of this feature.

Stream

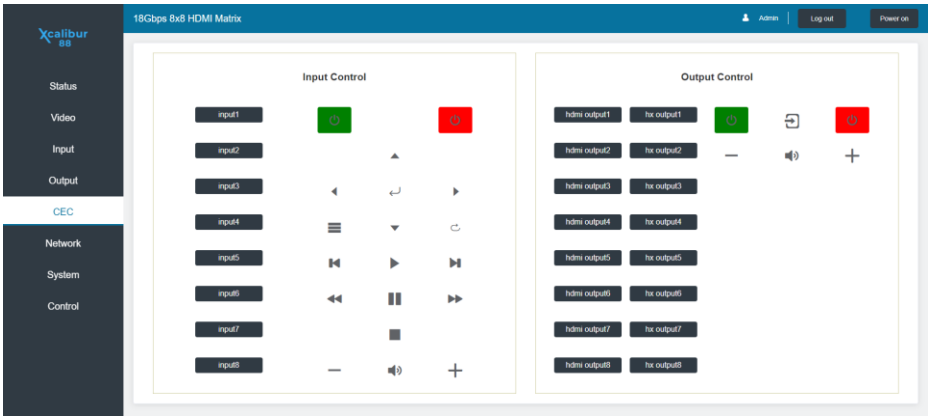
The HDMI and/or HX output data stream are enabled (ON) or disabled (OFF) in this section.

TX HDCP

Set the desired output HDCP separately for every HDMI and HX outputs.

CEC Page

Allows control of any CEC enabled equipment for either the HDMI inputs or the HDMI/HX output ports:



Input Control

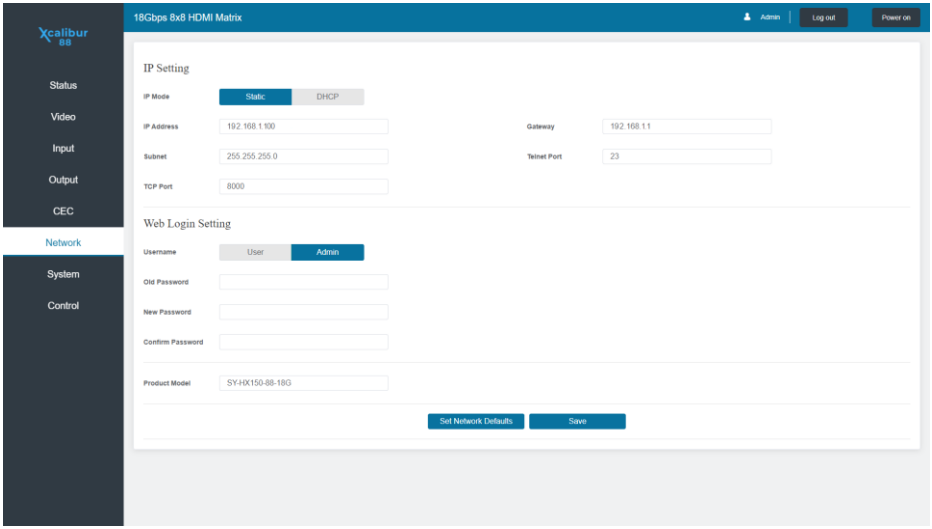
The Input Control section provides for power on / power off, transport controls, menu operations and volume control. Select the numbered input button or buttons to send the CEC command to a source device. The buttons turn blue when selected, then click the desired CEC command button.

Output Control

The Output Control section provides for power on / power off and volume control.
Select the numbered output button or buttons to send the CEC command to a sink device. The buttons turn blue when selected, then click the desired CEC command button.

Network Page

The Network page details the current network settings and allows these settings to be changed.



IP Setting

IP Mode

Switch between Static IP mode and DHCP IP mode.

IP Address, Gateway and Subnet

Set the IP address for the matrix, the Gate IP address and the network subnet mask.

Telnet Port and TCP Port

Set the port numbers for Telnet and TCP/IP respectively.

Web Login Setting

Select User or Admin, the active option of shown in blue, and then a new password can be set.

Set Network Defaults

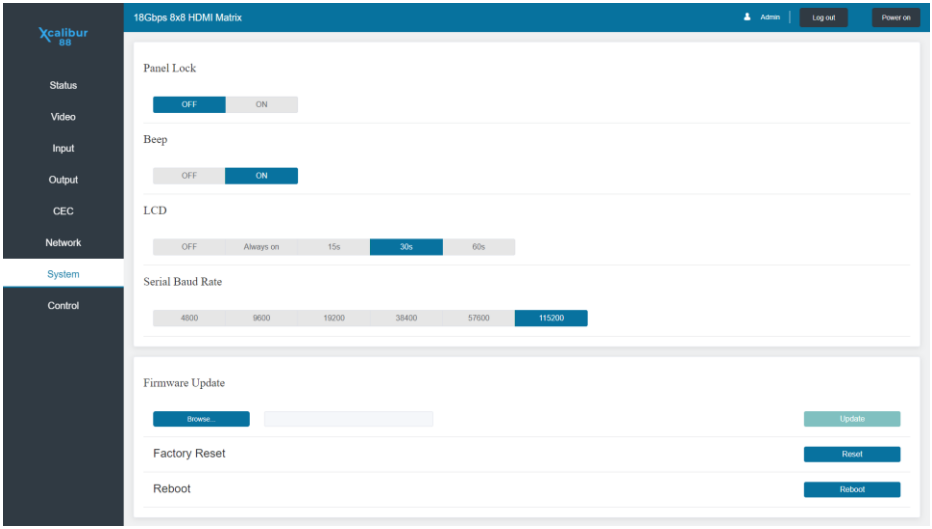
This button will reset the IP settings of the matrix to their factory defaults.

Save

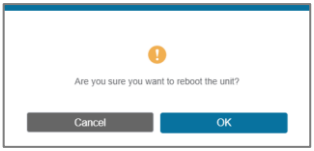
Once all the desired changed are done, click the **Save** button to program the matrix.
Note that any changes to the IP settings will require entering of the new IP address in the web browser URL bar. This will open to the login screen again.

System Page

The System page provides for locking/unlocking the front panel, enabling or disabling the button beep, changing the LCD dwell time changing the control RS232 port baud rate value.

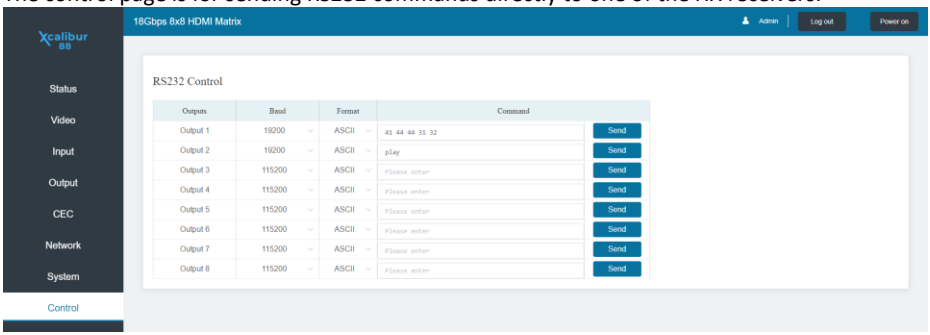


The **Firmware Update** section is only needed when a firmware is required. Choose the firmware update file from the PC after clicking the **Browse** button. Then click the **Update** button.
The **Factory Reset** and **Reboot** commands will require confirmation from a pop-up window:



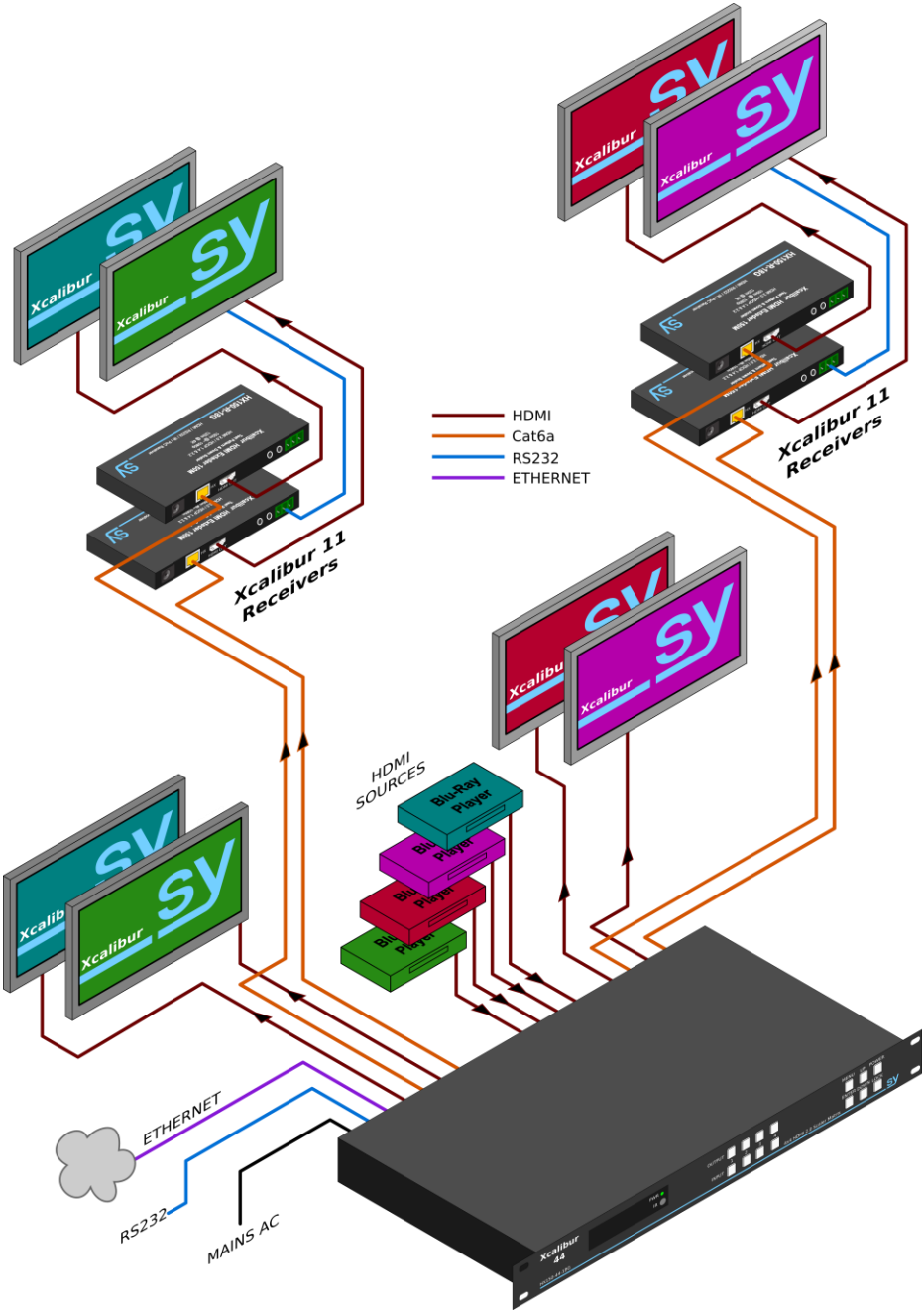
Control Page

The control page is for sending RS232 commands directly to one of the HX receivers:



Choose whether the command is represented as either **ASCII** or **HEX** in the **Format** column, then enter the command to send in the **Command** box for the respective output and click the **Send** button. A “Send Successful” window will appear, click the Confirm button to close it.

System Configuration



Specifications

General

HDMI Resolutions	All HDMI and PC resolutions up to 4K2K 60 Hz 4:4:4 (18Gbps)
HDMI Standard	Up to HDMI 2.0
HDCP Compliance	HDCP 1.4 & HDCP 2.0
HDMI Audio	L-PCM 2.0, 5.1 & 7.1 Dolby Digital, Dolby TrueHD, Dolby Digital+ (DD+), DTS-ES, DTS HD, Master, DTS-HBA, DTS-X
Coax Audio Out (Matrix)	Up to 5.1 audio only
Analogue Audio Out (Matrix)	Balanced Stereo L/R only, at 0.775Vrms max. (Front Left & Front Right only when not using 2.0 audio)
Analogue Audio Out (Receiver)	Stereo L/R only, at 0.775Vrms max. (Front Left & Front Right only when not using 2.0 audio)
HDMI Cable Lengths (in & out)	**15m** @ 1080p60, **10m** @ 4K30, **5m** @ 4K60 Use of **Premium High-Speed HDMI** cable is highly recommended
HX Transmission Distance	**150m** @ 1080p, **120m** @ 4K2K 60
Power Supply	100 ~ 240 VAC 50/60Hz
Power Consumption	Xcalibur-88 50W (Matrix unit only) Xcalibur-44 31W (Matrix unit only) Xcalibur-11 7.25W per Receiver
RS232 Control Port	115200, 8 data, no parity, 1 stop bit for all Control Commands RS232 control for third-party commands via the receivers
IR IN, IR OUT	25-60 kHz carrier frequency

Environmental

Operating Temperature	0 ~ 40°C (32~104°F)
Operating Humidity	10 ~ 90% RH (non-condensing)

Physical

Dimensions (WxHxD)	Xcalibur 88 440 x 88.6 x 374 mm (19in x 2U) Xcalibur 44 440 x 44.5 x 220 mm (19in x 1U) Xcalibur 11 140 x 65 x 18 mm
Weight	Xcalibur 88 6.54 kg Xcalibur 44 3.1 kg Xcalibur 11 250g

Ordering Part Numbers

Xcalibur-88 Matrix	SY-HX150-88-18G-SET
Xcalibur-44 Matrix	SY-HX150-44-18G-SET
Xcalibur-11 Receiver	SY-HX150-11-18G (included with the matrix set)

Packing List

- 1x User Manual
- 1x Matrix unit (Xcalibur-44 or Xcalibur-88)
- Receivers
    - 4x Xcalibur-11 Receivers included with Xcalibur-44
    - 8x Xcalibur-11 Receivers included with Xcalibur-88
- 1x Mains power cable to IEC 60320 Type C13 connector (1.5m long)
- 2x 19 inch rack mounting brackets
- 1x IR remote control
- IR detectors
    - 5x included with Xcalibur-44
    - 9x included with Xcalibur-88
- IR emitters
    - 5x included with Xcalibur-44
    - 9x included with Xcalibur-88
- Receiver mounting brackets
    - 4x pairs included with Xcalibur-44
    - 8x pairs included with Xcalibur-88
- 1x RS232 cable – DSUB-9 plug to DSUB-9 socket (1.5m long)
- Three-way pluggable screw terminal connectors for the Xcalibur-11 Receivers
    - 4x included with Xcalibur-44
    - 8x included with Xcalibur-88
- Five-way way pluggable screw terminal connectors for the analogue audio outputs
    - 4x included with Xcalibur-44
    - 8x included with Xcalibur-88

Safety Instructions

To ensure reliable operation of this product as well as protecting the safety of any person using or handling these devices while powered, please observe the following instructions.

1. This product is powered directly from a mains outlet. **DO NOT** open this product as doing so will increase the risk of electrical shock.
2. **DO NOT** operate this product outside the specified temperature and humidity range given in the above specifications.
3. Ensure there is adequate ventilation as this product generates heat while operating.
4. Repair of this product should only be carried out by qualified professionals as this product contains sensitive devices that may be damaged by any mistreatment.
5. Only use this product indoors and in a dry environment. **DO NOT** allow any liquids or harmful chemicals to come into contact with this product.

After Sales Service

1. Should you experience any problems while using this product, firstly refer to the Troubleshooting section in this manual and/or your local dealer before contacting SY Technical Support.
2. When calling SY Technical Support, please provide the following information:
    - Full Product Name and Model Number
    - Product Serial Number
    - Details of the fault and any conditions under which the fault occurs.
3. This product has a two year standard warranty beginning from the date of purchase as stated on the sales invoice. For full details please refer to our Terms and Conditions.
4. The SY Product warranty is automatically void under any of the following conditions:
    - The product is already outside of its warranty period
    - Damage to the product due to incorrect usage or storage
    - Damage caused by unauthorised repairs
    - Damage caused by mistreatment of the product
5. Please direct any questions or problems you may have to your local dealer before contacting SY Electronics.

NOTES

NOTES