

# PureLink

## Owner's Manual HX-4400S



4x4 HDMI/VGA Integrated Matrix Switcher with  
Scaling, Multi-View, and Video wall Function

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## Chapter 1. Introduction

### 1.1 Safety Precautions

- All safety instructions should be read and understood before the unit is operated.
- The owner's manual and safety instructions should be retained for future reference.
- Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth only.
- Keep away from wet, magnetic, and flammable surfaces or substances.
- Always use the correct external power supply (indicated on the product label) when operating this unit.
- This unit may be equipped with a 3 wire grounding-type plug - a plug having a third (grounding) pin. This pin will only fit in to a grounding type power outlet. If you are unable to insert the plug in to the outlet, contact your electrician to replace your obsolete outlet.
- Air vents should be kept clean and unobstructed at all times.
- Please refrain from using frayed power cords and damaged wall outlets.
- Do not place any heavy objects or equipment on top of the unit.
- To prevent electrical damage, TURN OFF the power to this unit before inserting or removing INPUT/OUTPUT slot cards.

**If you experience any malfunctioning of product or have any question as to operation of the product, please contact our customer service center.**

**PureLink™**

Tel: 201.488.3232

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## 1.2 Declaration of Conformity

According to Council Directive 73/23/EEC (February 19, 1973) on the Harmonization of the Laws of Member States relating to Electrical Equipment; Council Directive 89/336/EEC (May 3, 1989) on Electromagnetic Compatibility; Council Directive 93/68/EEC (July 22, 1993)-Amending Directives 89/336/EEC (MC) and 73/23/EEC (Low Voltage Equipment Safety), and/or CPU Boards and Power Supplies used Council Directive 93/68/EEC with Matrix, Dtrovision LLC, 535 E Crescent Ave Ramsey, NJ 07446 201-488-3232, declares under sole responsibility, that the product identifies with 93/66/EEC of the Council Directive Low Voltage Equipment Safety. Each product marketed is identical to the representative unit tested and found to be compliant with the standards.

## 1.3 What's in the Box

- Main Frame: HX-4400S
- Power Adapter – DC 12V, 2.5A
- 4 x IR Tx cable
- 5 x IR Rx cable
- IR remote
- RS-232C & LAN cables
- Rack Ears
- Owner's manual

## 1.4 Product Introduction

The new **HX-4400S HDMI/VGA Integrated Matrix Switcher with Scaling** provide switching for up to four (4) HDMI or four (4) VGA inputs to any four (4) HDMI outputs with PureLink's legendary don't blink instantaneous switching technology. With built-in scaler, it features various seamless switching modes, video wall and Multiview output functions. PureLink's legendary EDID/HDCP Management System, consistently praised by system integrators as the most reliable in the industry. Together with full HDCP, PureLink's uncompromising design and manufacturing standards, the HX-4400S delivers unparalleled quality and value.

### \* Features

- **Matrix Switching for up to 4 HDMI/VGA/Composite Inputs to any 4 HDMI Outputs**
- **Scaling Output for Seamless Switching, Video wall, and Multi view functions**
- **Three Input types**
  - HDMI
  - VGA + audio
  - Composite + audio
- **Four Control Options**  
Front panel, IR, RS-232C, and LAN control
- **Full HD resolution support**  
HDTV resolution up to 1080p @ 60Hz
- **Auto EDID management**  
EDID library
- **Control Options:**  
Built-in RS-232C and LAN for external control via PC or Controller
- **HDCP compliant**
- It has an instantaneous noise protection circuit in input and output ports; therefore it can protect expensive equipment from fault caused by noises (if any)
- Convenient to change firmware through direct update by PC

- 19" standard rack type case (1U)

## Multiview function

There are 4 layout modes for multi view function

Mode 1:



Mode 2:



Mode 3:

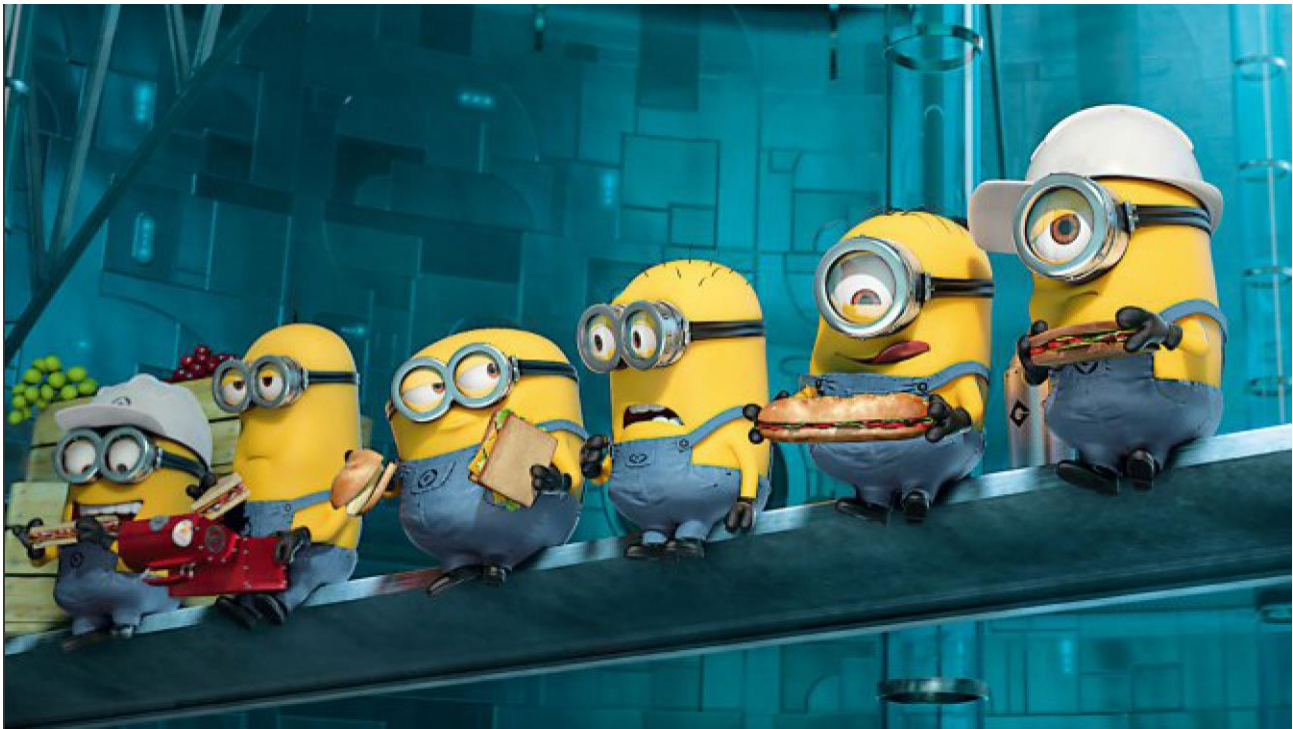


Mode 4:

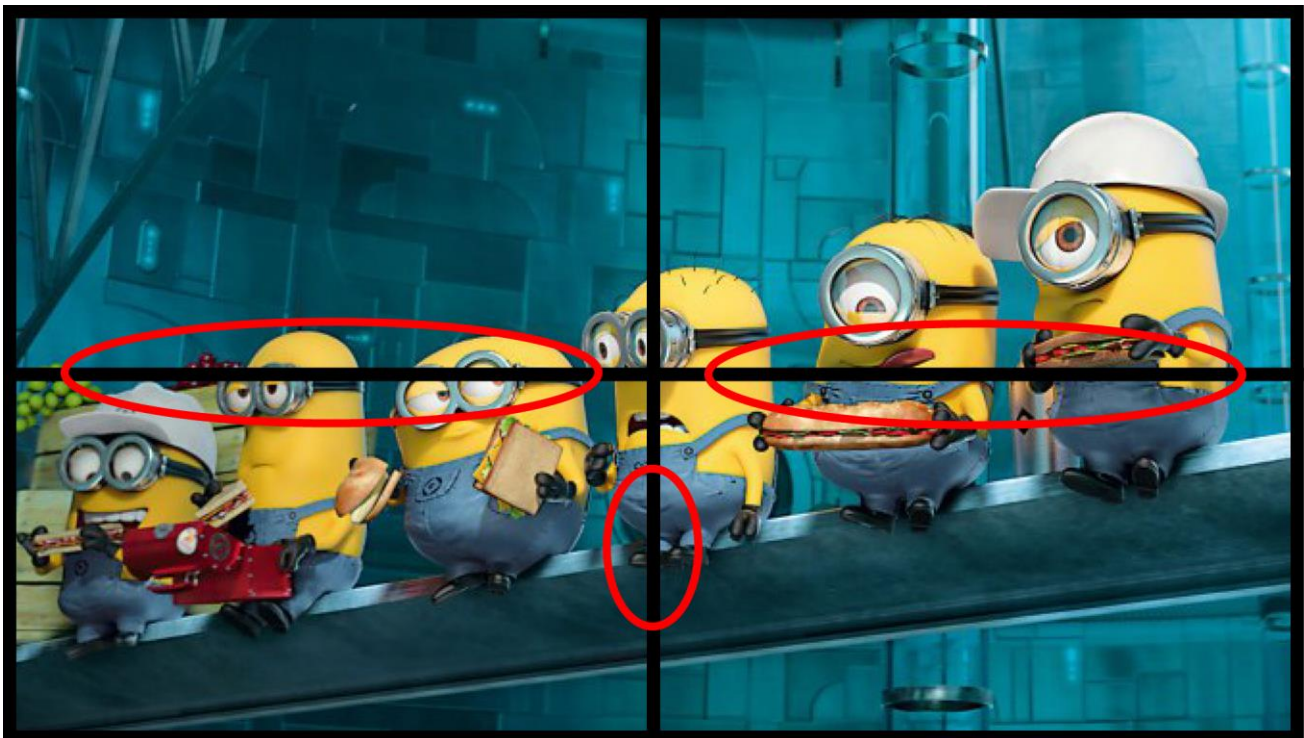




## Video wall function



<Original Input Image>



<Videowall splitted image to 4 displays>



## 1.5 Product Specifications

<b>HX-4400S General Specification</b>	
Power	External Power Supply DC12V, 2.5A (US/EU standards, CE/FCC/UL certified)
Operational Temperature	32° ~ 117° F (0° to 47° C)
Storage Temperature	- 40° ~ 158° F (-40° to 70° C)
Humidity	0 ~ 90% non-condensing
MTBF	50,000 hours
Dimensions (W x D x H)	17.3" x 7.9" x 1.8" (440 x 200 x 45mm)
Shipping Dimensions (with cover box)	TBD
Rack mounting	Yes, 19" standard rack, 1RU
Weight	5.2 lbs (2.38 kg)
Shipping Weight (with accessories and cover box)	TBD

### \* Functional Specification

<b>Communication</b>	
HDMI	HDMI, HDCP, EDID
RS-232	2-way device control and monitoring. Fixed baud rate at 115200, 8 data bits, no parity, and 2 stop bits
LAN	TCP/IP (Default IP: 192.168.0.100)

<b>Video</b>	
Switcher	Multi-format digital/analog source inputs, 4x4 matrix switcher
Input Signal Types	HDMI, DVI, VGA/Component, Composite
Output Signal Types	HDMI, DVI
Formats	HDMI v1.3, DVI 1.0, HDCP content protection support, HD up to 1080i/1080p, computer up to UXGA/WUXGA, RGBHV, RGBS, RGSB, YPbPr, Y/C, NTSC, PAL
HDMI Input resolutions	480i to 1080p@60Hz, plus any other resolution allowed by HDMI up to 165MHz pixel clock
VGA Input Resolutions	640x480@60Hz, 800x600@60Hz, 1024x768@60Hz, 1280x720@50Hz (720p50), 1280x720@60Hz (720p60), 1280x1024@60Hz, 1360x768@60Hz, 1366x768@60Hz, 1920x1080@60Hz
Composite Input Resolutions	PAL, NTSC3.58, NTSC4.43, SECAM, PAL/M, PAL/N standard TV formats
Output Resolutions	1024x768@60Hz, 1360x768@60Hz, 1280x1024@60Hz, 1280x720p@60Hz,

	1920x1080p@60Hz
--	-----------------

Control	
Input ports	1 x RJ-45 5 x IR input 1 x RS232
Output ports	4 x IR output

## 1.6 Front View of HX-4400S

The HX-4400S chassis is mountable on 19" standard rack with brackets. On front panel, there are some function keys, input-output buttons and a status display window placed as shown in Figure 1-1.

<Front Panel>



(Figure 1-1)

**POWER:** Main power switch ON / OFF

**DISPLAY:** View menu and system mode

**EDID:** EDID setup menu

**MODE:** Output mode (matrix, video wall, multi view) selection menu

**UP:** Up button

**DOWN:** Down button

**INPUT:** Input source selection (HDMI, VGA, Composite) menu

### Creating a switching

- Press Output # button
- Press Input # button
- Switching is completed

### Scaling output mode

- Press Mode button one time for matrix mode
- Press Mode button two times for video wall mode
- Press Mode button three times for multi view mode

## EDID

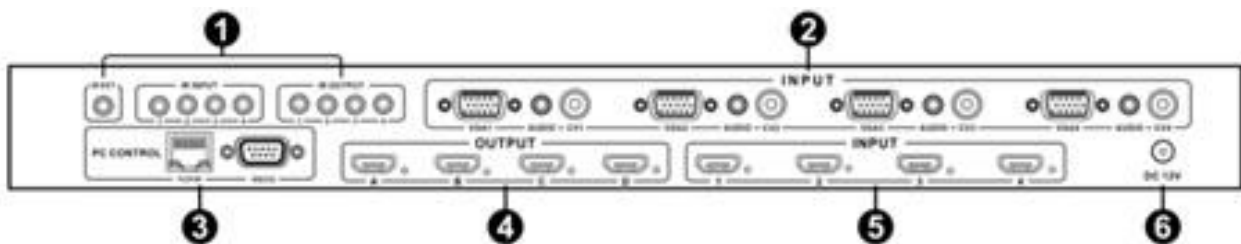
- Press EDID button
- Use Up and Down buttons to select EDID from the EDID library list
- Press Enter button
- Select input# which you want to save selected EDID to
- Press Enter button

## Input selection

- Press INPUT button
- Use Up and Down buttons to select among HDMI, VGA and Composite inputs
- Press Enter button

## 1.7 Rear View of HX-4400S

<Back Panel>



(Figure 1-2)

**1 IR IN/OUT:** IR port for HX-4400S control, IR Inputs, and IR outputs

**2 Analog Input:** VGA , Composite, and 3.5mm stereo audio inputs

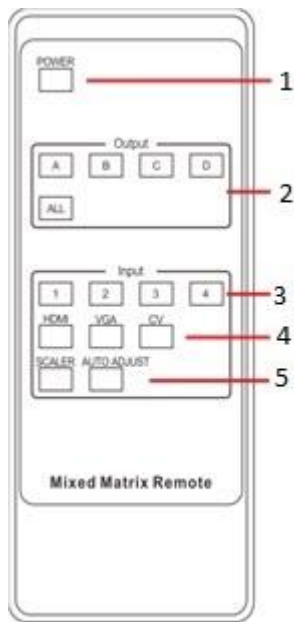
**3 Control Interface:** LAN (TCP/IP) and RS232 control ports

**4 Digital Output:** HDMI outputs

**5 Digital Input:** HDMI inputs

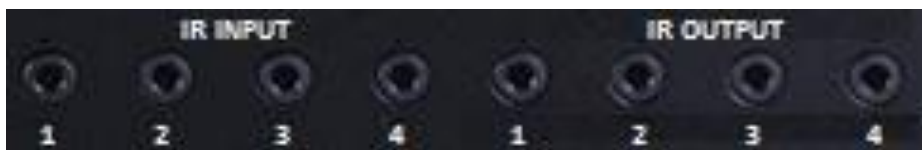
**6 DC Power:** 12V/2.5A DC power supply

## 1.8 IR remote control



1. Power On/Off button
2. Output selection buttons  
A – Output 1 B – Output 2  
C – Output 3 D – Output 4
3. Input selection buttons  
1 – Input 1 2 – Input 2  
3 – Input 3 4 – Input 4
4. Input type selection buttons
5. Scaler  
- Scaler adjust function  
Press A and Scaler button for output 1 scaler adjust
5. Auto Adjust  
- Video input sync (only works for VGA In)

## 1.9 IR control



At Matrix end: Insert the 3.5mm jacks of the IR TX Emitters included with the unit into the IR TX Emitter ports at the rear of the matrix according to input. The IR signal is added to the HDMI of the input device so, for example, if the user is watching Blu-ray on input 1, the IR signal will be directed through the IR TX1 socket to control the device.

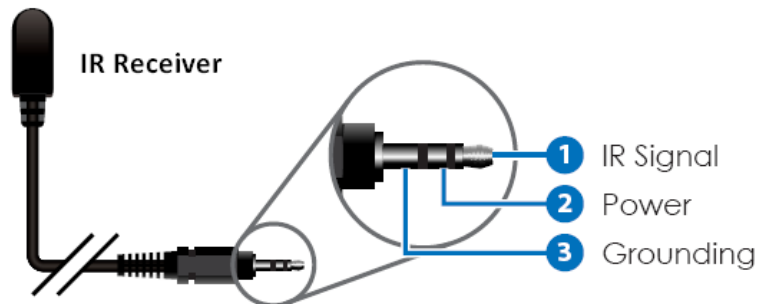
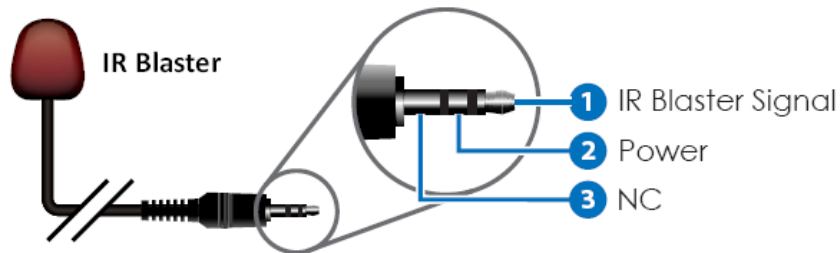
As each IR TX port is allocated to an individual HDMI input port, if the user is unable to establish IR control of the device, care should be taken to check firstly, that the IR emitter and HDMI input ports match (Input 1-TX1, Input2-TX2 etc.) with plugs secured in correct ports, and secondly, that the IR TX emitter sensors are firmly attached directly to the front of inputs and covering infrared sensor windows of the source devices. Some later adjustment may be needed to the location of the sensor to achieve the best performance results - sometimes moving the sensor to different areas on the source can improve IR performance.

NOTE: Infrared receiving areas of devices can be located by shining a flashlight onto the front of the device – the sensor should be able to be seen through the plastic as a small, round object inside. Insert 3.5mm jacks of IR RX receivers into RX ports, making sure the receivers themselves are placed in clear view to receive an infrared signal from the remote handset used to control the display outputs.

IR RECEIVER



IR BLASTER



## 1.10 Installation Guidelines

The following installation settings are recommended for optimal performance.

- Operational temperature should be 30° C or below
- Operational humidity should be 60% or below
- Operational environment should be dust-free and well ventilated
- Stabilized AC input power (AVR-based power supply) is highly advised

## 1.11 Communication Settings (LAN and RS232)

### Default RS232 communication parameters:

Baud rate: 115200

Data bit: 8 bits

Stop bit: 2 bits

Parity: none

### Default LAN communication parameters:

IP address: 192.168.0.100

Mac address: 0x00,0x15,0x09,0x22,0x4c,0x87



## Chapter 2. Communication Code Configuration

### 2.1 Control Programmer's Guide (Code Structure and Examples)

This section is designed for programmers who wish to create their own control programs using the command code. All PureLink digital matrix routers provide a simple character stream control used by external control devices attached to a PureLink device. Command codes are used primarily for control, during system installation and setup, and for diagnostic purposes.

### 2.2 Overview

Command code is a set of alphanumeric characters that combine to form control commands. Command code strings are entered into a terminal emulation program (such as windows HyperTerminal) running on an external control device. The control device (PC, third-party controller) sends the commands to the system. Control devices must be able to send and receive ASCII or HEXA code via an RS-232 or Ethernet port.

### 2.3 Command Code Formats

A command code is a series of command characters and numbers used to send commands to the system. Commands include basic formulas for creating and disconnecting switches, as well as for verifying the status of switches.

In a command code, each character is either general command (e.g., C for connect) or an identifier that indicates what the following number designates (e.g., "O" and the number following it designate an "output number"). The command code \*999CI01O01! Can be interpreted as follows: (\*) Starting the command code (999) Router ID is 999 (C) Create connection on (I01) Input 01 to (O01) Output 01 (!) take the command. For a complete list of command characters and their functions, see pages 16 -

Ack value (Acknowledge value: Response from Pure Link device) will be echoed back to the terminal screen as the unit accepts them. When a command is successfully executed, all of the characters appear containing the character "s" which stands for status. For example,

Ex 1) Command (Connect Input 1 to Output 1)

```
*999CI01O01! ↵
```

Ack value

```
*999sC I01O01!
```

Ex 2) Command (Check Input connection status on Output 3)

```
*999?O03! ↵
```

Ack Value

```
*999s? I03O03!
```

## 2.4 General Rules for Command Codes

The commands are coded in ASCII and HEXA. Please refer to Table 2.1 on pg. 17 for detailed descriptions of keys and functions. A basic command code setup is shown below;

Ex) \*999CI01O01!↵

Start (\*) + Router ID (999) + Command (C) + Input number (I01) + Output number (O01) + End (!) + Enter (↵)

- ▶ A command line allows execution of only one command. Multiple commands require execution of multiple strings; one command per string.
- ▶ All s begin with \* (Start) byte.
- ▶ All s end with ! (End) byte.
- ▶ All s will be executed when ↵ (Enter) is entered.
- ▶ The correct Router ID must be entered in a command code. Systems will not react to the command if a wrong Router ID is entered. The Factory Default Router ID is set to 999 and the universal Router ID is 999. Systems will react to the command whenever universal Router ID is entered in command code.
- ▶ Command codes typically are not case-sensitive.
- ▶ To specify multiple inputs and outputs, enter a “,” (Comma) between numbers.  
(Ex., \*999CI01O01,02,03! ↵: Connects Input 01 to Output 01, 02, and 03)
- ▶ Use - (Hyphen) for range connection.  
(EX., \*999CI01O01-04! ↵: Connects Input 01 to Output 01,02,03, and 04)

**Table 2.1 Command Codes Characters Table**

The table below shows command code characters (keys), which are used to generate control commands, their functions, and short function descriptions.

Key		Function	Description and Example	Byte
HEX	ASCII			
0x2A	*	Start the command	Header Code	1
0x21	!	End the command	Tail Code	1
	↵	Execute the command	Execute the command	
0x43 0x63	C C	Connect	Initiates a Connect (switch) command for Video; this must precede input and output specification	1
0x3F	?	Status	Status command; this must precede input and output specification	1
0x44 0x64	D D	Disconnect	Disconnect command for both Video and Audio; this must precede input and output specification	1
	,	Space	Separates the numbers within entries that contain multiple numbers	1
	-	Range	Specifies a range of numbers in entries containing multiple numbers	1
	?version	Firmware version check	Firmware version check command; *255?version! ↵	

## 2.5 Command Ack (Acknowledge) Value Response

When command codes are entered into a terminal emulation program (such as HyperTerminal) and are accepted by the system, they respond back to the terminal screen one at a time, as noted below in the table. The complete command has executed successfully when all of the entered characters including “s” which stands for status, appear. If a command character is not accepted, a different character than the one entered appears and all or part of the command has not been executed.

### Ack (Acknowledge) Value Response Table

The following table shows ack value response characters along with their descriptions and meanings, which may appear instead of the initially entered character or number. If these characters appear, all or part of the command has not been executed.

**Table 3.2 Descriptions of Acknowledge (ACK) Signals**

Ack value	Description
Input 1 is not connected	No information in each channel.
Command Code Error	Indicates that system has rejected all or part of the command

Router ID Error	Indicates that the wrong ID number was entered
-----------------	--

### Command Code Ack Value Examples

Command Code Entered	Ack Value as appears in the control program	Explanation of Result
*999CI01O01! ↵	*255sC I01O01 !	The command was successfully executed
*999CO01! ↵	Command Code Error	The command was not executed because the input number was not included
*999CI01O01 ↵	Command Code Error	The command was not executed because “!” (End) was not included
*300CI01O01! ↵	Router ID Error	The command was not executed because the actual Router ID and entered Router ID did not match

## 2.6 Connecting Switches

A switch is an active connection between an input (source) signal and one or more output (display) devices. The signals connected in a switch command are either individual signals or groups of signals coming through the connectors on the rear of the unit.

The “C” key initiates a Connect command for routing a switch. The characters and numbers that follow the “C” command tell the system, which inputs and outputs to connect. The last character “!” is found at the end of a command code which tells the system to execute the command.

For example, the command code \*999CI01O01! ↵

can be interpreted as follows: (\*) Starting the command code (999) Router ID is 999 (C) Create connection on (I01) Input 01 to (O01) Output 01 (!) take the command. For a complete list of command characters and their functions, see examples below.

To connect a switch:

1. Enter the Connect command below. Replace the “#”s with the input and output number(s).

\*999CI#O#! ↵

Examples (Connect) :

Command Codes	Action
*999CI01O01! ↵	Connect Input 1 to Output 1
*999CI01O04,I04O02! ↵	Connect Input 1 to Output 4 and Input 4 to Output 2
*999CI01O01,I02O02,I03O03! ↵	Connect Input 1 to Output 1, Input 2 to Output 2, and Input 3 to Output 3
*999CI01O01,02,03! ↵	Connect Input 1 to Output 1, 2, and 3

*999CI01O01-04! ↵	Connect Input 1 to Output 1, 2, 3, and 4
*999PTP! ↵	Connect Input 1 to Output 1, Input 2 to Output 2, Input 3 to Output 3 and Input 4 to Output 4

## 2.7 Disconnecting Switches

The characters and numbers in a Disconnect command tell the system which input or output to disconnect. The “D” key initiates a Disconnect command for routing a switch. The characters and numbers that follow the “D” command tell the system that inputs and outputs to disconnect. The last character “!” is found at the end of the Command code, which tells the system to execute the command.

For example, the command code

\*999DI01O00! ↵

It can be interpreted as follows: (\*) Starting the command code (999) Router ID is 999 (D) Disconnect on (I01) Input 01 to (O00) Output 00 (!) take the command. For a complete list of command characters and their functions, see the command list below

1. Enter the Disconnect command below. Replace the “#”s with the input and output number(s).

\*999DI#O#! ↵

Examples (Disconnect) :

Command Codes	Action
*999DI01O00! ↵	Disconnect Input 1 to no Output (00)
*999DI00O03,04! ↵	Disconnects Outputs 3, and 4
*999DI00O03-04! ↵	Disconnects output 3, and 4
*999DALLIO! ↵	Disconnects all inputs and outputs

### EDID Setting

\*999EDIDI01E3! ↵

E1 = 1080i 2Ch audio E2 = 1080p 2ch audio E3 = DVI 1920x1080

### Beep On

\*999BeepON! ↵

### Beep Off

\*999BeepOFF! ↵

### Front panel buttons Lock On

\*999lockon! ↵

### **Front panel buttons Lock Off**

\*999lockoff! ←

### **Power on**

\*999poweron! ←

### **Power off**

\*999poweroff! ←

### **Factory setting restore**

\*999restore! ←

### **Reboot**

\*999reboot! ←

### **Output resolution setting**

\*999resolution1! ←

1 = 1080p 2 = 720p 3 = 1280x1024 4 = 1360x768 5 = 1024x768

### **Output mode setting**

\*999modemtx! ←

Mtx = matrix MV = multi viewer VM = video wall

### **Multi view mode (POP) setting**

\*999pop1! ←

1 = mode 1 2 = mode 2 3 = mode 3 4 = mode 4

### **Muti view (POP) main video setting**

\*999popmain1! ←

1 = input 1 2 = input 2 3 = input 3 4 = input 4

### **Multi view (POP) audio setting**

\*999popaudio1! ←

1 = input 1 2 = input 2 3 = input 3 4 = input 4

### **Video wall input setting**

\*999vwi01! ←

i01 = input 1 i02 = input 2 i03 = input 3 i04 = input 4



**Video wall horizontal value setting**

\*999vwx10! ←

Value range : 1 – 32

**Video wall vertical value setting**

\*999vwy10! ←

Value range : 1 – 32

**Output seamless mode setting**

\*999o01sm1! ←

Seamless mode type : 1 – 16

**Output seamless complete time setting**

\*999o01st0.5! ←

Time value range: 0.5 – 4.0

**Input signal type setting**

\*999i01t1! ←

T1 = HDMI T2 = VGA T3 = Composite

**2.8 Status Check**

A connection status can be checked to confirm that the switch has been correctly executed or to confirm correct routing to multiple outputs. The characters and numbers in a status command tell the system which input or output to check.

1. Enter the Connection status check command below. Replace the “#”s with the input and output number(s).

\*999?I#!← or \*255?O#! ←

Examples:

Command Codes	Action
*999?I01! ←	Check Output connection status on Input 1
*999?O04! ←	Check Input connection status on Output 4
*999?ALLIO! ←	Check all Input and Output connection status

**Input EDID status**

\*999?EDIDI01! ←

I01 = input 1 I02 = input 2 I03 = input 3 I04 = input 4

### **Output mode status**

\*999?mode! ←

Mtx = matrix MV = multi viewer VM = video wall

### **Multi view mode (POP) status**

\*999?pop! ←

1 = mode 1 2 = mode 2 3 = mode 3 4 = mode 4

### **Muti view (POP) main video setting status**

\*999?popmain! ←

1 = input 1 2 = input 2 3 = input 3 4 = input 4

### **Multi view (POP) audio setting status**

\*999?popaudio! ←

1 = input 1 2 = input 2 3 = input 3 4 = input 4

### **Video wall input setting status**

\*999?vw! ←

i01 = input 1 i02 = input 2 i03 = input 3 i04 = input 4

### **Video wall horizontal value setting status**

\*999?vwx! ←

Value range : 1 – 32

### **Video wall vertical value setting status**

\*999?vwy! ←

Value range : 1 – 32

### **Output seamless mode setting status**

\*999?o01sm! ←

Seamless mode type : 1 – 16

### **Output seamless complete time setting status**

\*999?o01st! ←

Time value range: 0.5 – 4.0

### **Firmware version check**

\*999?version! ←

## Chapter 3. Additional Information

### 3.1 Manufacturer's Warranty (3-Years)

PureLink warrants this HX Series HDMI integrated matrix switcher to be free from defects in workmanship and materials, under normal use and service, for a period of three (3) year from the date of purchase from PureLink or its authorized resellers.

If the product does not operate as warranted during the applicable warranty period, PureLink shall, at its option and expense, execute one of the following as necessary:

1. Repair the defective product or part
2. Deliver to customer and equivalent product or part to replace the defective item
3. Refund to customer the purchase price paid for the defective product

All products that are replaced become the property of PureLink. Replacement products may be new or reconditioned. Repaired or replacement products or parts come with a 90-day warranty or the remainder of the warranty period. Dtrovision shall not be responsible for any software, firmware, information, or memory data loss of contained in, stored on, or integrated with any products returned to Dtrovision for repair under warranty.

### 3.2 Customer Service

Any customer service inquiries can be submitted electronically through the Q&A form on our website ([www.purelinkav.com](http://www.purelinkav.com)).

For immediate assistance please contact us at (201) 488-3232 to reach our customer care or tech support team.