

HDX80, HDX576

SDI Fiber Matrix Switch

Product Manual



Subject: HDX80, HDX576 SDI Router Product Manual

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PREFACE

About this Product Manual

This product manual is divided into three sections, for Hardware, Safety Requirements and Product Support. These are sub-divided to help you easily find the topics and procedures you are looking for. This manual also contains Appendices.

Part 1 – Hardware: This section of the manual contains all the information and instructions on how to assemble your equipment.

Part 2 – Safety Requirements: Thinklogical™ strongly recommends that you read this section of the manual prior to starting the hardware assembly.

Part 3 – Product Support: Thinklogical™ provides the best customer support available. If you have any questions or need to contact the company, please refer to this section of the manual.

Conventions Used in this Manual

As you read this manual you will notice certain conventions that bring your attention to important information. These are **Notes** and **Warnings**. Examples are shown below.



Note: Important Notes appear in blue text preceded by a yellow exclamation point symbol, like this.

A note is meant to call the reader's attention to helpful information at a point in the text that is relevant to the subject being discussed.



Warning! All Warnings appear in red text, followed by blue text, and preceded by a red stop sign, like this.

A warning is meant to call the reader's attention to critical information at a point in the text that is relevant to the subject being discussed.

BEFORE STARTING ANY PROCEDURE, IT IS RECOMMENDED THAT YOU READ THE INSTRUCTIONS THOROUGHLY BEFORE PROCEEDING.

Introduction

The Logical Solution

The HDX80 and HDX576 routers are high performance SDI routers and are non-blocking matrix switches for complete, end-to-end routing of SDI signals over multi-mode or single-mode fiber optic cable. These highly reliable and resilient routers are expandable from (HDX80) 5x5 up to 80x80 and (HDX576) 16x16 up to 576x576 which allows for flexible deployment configurations.

The HDX Routers from ThinklogicalTM includes:

- Redundant, Current Sharing Power Supply Modules
- Redundant Controller Cards
- Single Fan Tray (includes three fans)

Optional Modules (Spares):

HDX 576 Matrix Router Data Input/Output Card, 16 Ports, SFP+

HDX 576 Matrix Router Controller

HDX 576 Matrix Router Fan Tray

HDX576 Matrix Router Sync Card

HDX576 Power Module

HDX576 Switch Card

HDX 80 Matrix Router Data Input/Output Card, 5 Ports, SFP+

HDX 80 Matrix Router Controller

HDX 80 Matrix Router Sync Card

HDX 80 Matrix Router Fan Tray

HDX 80 Power Module

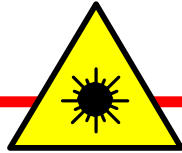
The HDX80 and HDX576 Video Routers are available with LC-type fiber connectors.



See **Appendix A** for the complete line of the Thinklogical HDX Routers.



Warning! The HDX Routers are a Class 1 LASER product that emits near infrared light. Do not look directly into the fibers or the fiber optic ports.



CLASS 1 LASERS do not require any special precautions under conditions of normal use.

Theory of Operation

Thinklogical HDX Routers can be used together as a system with our Thinklogical SDI Xtreme 3G+ extenders using standard SFP optics. The modular approach of the HDX routers allows all critical components to be hot swappable including power supplies, cooling fans, and pluggable optics (SFP+). The hot-swappable I/O boards also provide expansion capabilities in steps of 5 (HDX80) or 16 (HDX576), allowing the HDX routers to be reconfigured without interrupting signal processing by powering down the router.

The HDX routers are configurable with any combination of multi mode, single mode and coaxial I/O ports, which supports both short and long haul applications. Our modular design allows reclocking at any input using coaxial pluggable modules. Our SDI Xtreme 3G+ products also include a reclocking feature.

The HDX 576 also offers the option of operating two independent 288 x 288 matrixes that can be utilized as a redundant system to eliminate down time. Two HDX 576 routers can also be used to create a fully redundant 576 x 576 system that is controllable via one interface for mission critical applications.

System Features

System Features	HDX80	HDX576
Matrix Size	80x80	576x576
Scalability	5 Ports	16 Ports
Compatible with SDI Xtreme 3G+ Extenders	✓	✓
Each Video Connection Supports 4Gbps	✓	✓
Single Mode and Multi Mode	✓	✓
Coaxial I/O Modules	✓	✓
Redundant, Hot-Swappable and Current Sharing Power Supply Modules	✓	✓
Hot Swappable SFP+ Optical Modules	✓	✓
Hot Swappable Fan Tray with Annunciator Port (for alarms)	✓	✓
Hot Swappable Redundant Controller Card (optional)	✓	✓
Controllable via LAN or Serial Connection	✓	✓
SNMP (2C) Control Protocol	✓	✓
X4 Configurator Software Included	✓	✓
Multicasting and Macros Supported	✓	✓

Table 1: HDX Router System Features

Technical Specifications

Humidity	5-95% RH, non-condensing
Operating Temperature	0-50°C (32-122°F)
Alarm Relay contacts	Maximum DC: 1A at 30VDC Maximum AC: 0.3A at 125VAC Contact resistance maximum: 100 mΩ
Power Requirements	AC Input: 100-240VAC, 47-63 Hz Universal AC Power Supply

Technical Specifications	HDX80	HDX576
Physical Dimensions- Rack Size	EIA 19" (48.26 cm)	EIA 19" (48.26 cm)
Physical Dimensions- Height	6 RU 10.50" (26.70 cm)	26 RU 45.5" (115.6 cm)
Physical Dimensions- Width	17.16" (43.59 cm)	17.19" (43.7 cm)
Physical Dimensions- Depth	15.32" (16.57" including card pulls; 42.09 cm)	Depth: 23" (including fiber management tray)
Power Consumption	Approximately 400 Watts Fully Loaded	Approximately 1700 Watts Fully Loaded
Actual Weight	37.1 lbs. (16.83 kg)	132.0 lbs. (59.87 kg)
Shipping Weight	100 lbs. (45.36 kg)	170 lbs. (77.1 kg)

Table 2: HDX Router Technical Specifications

NOTE: All modules may be replaced without interruption to other module functions.

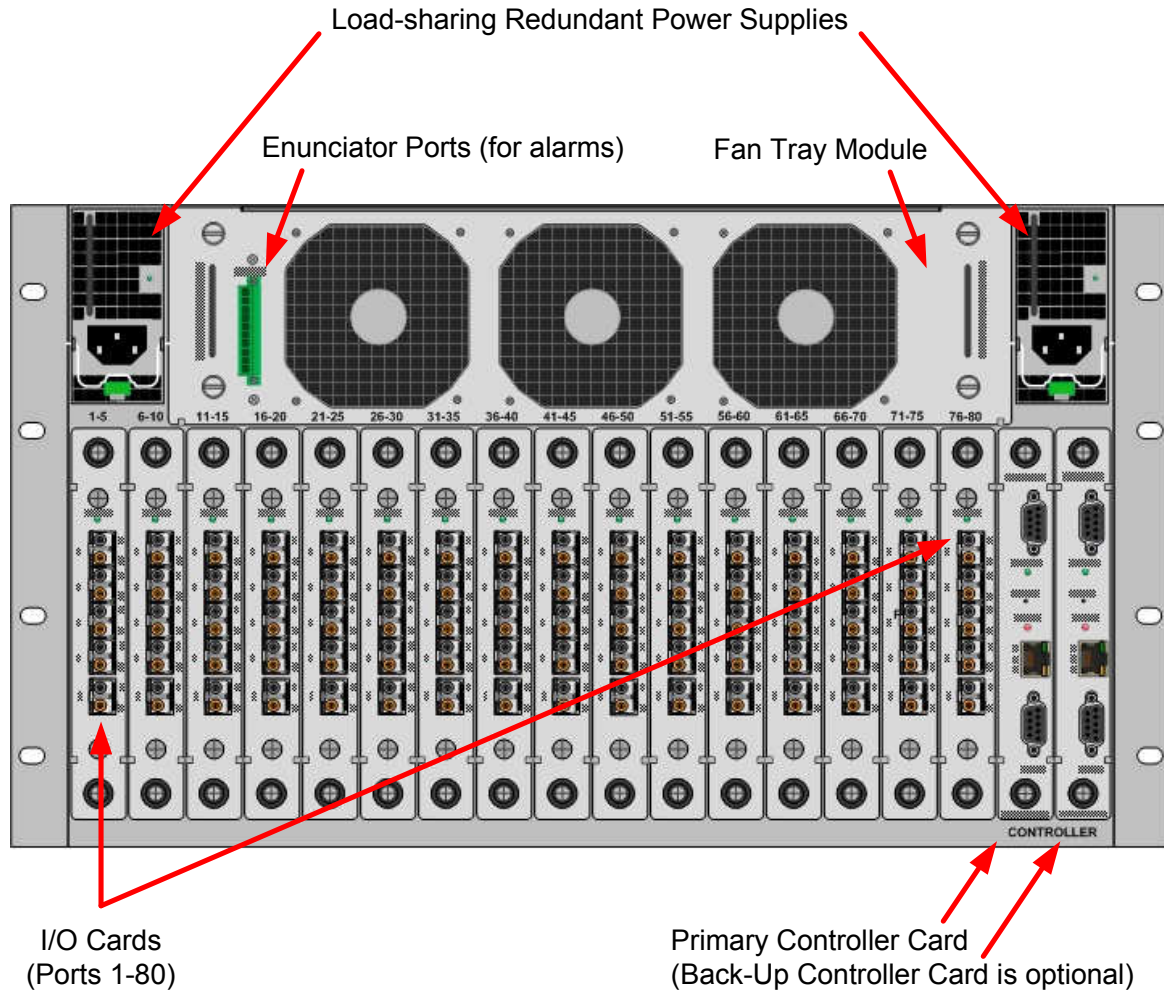


Figure 1: HDX80 Router – Rear View

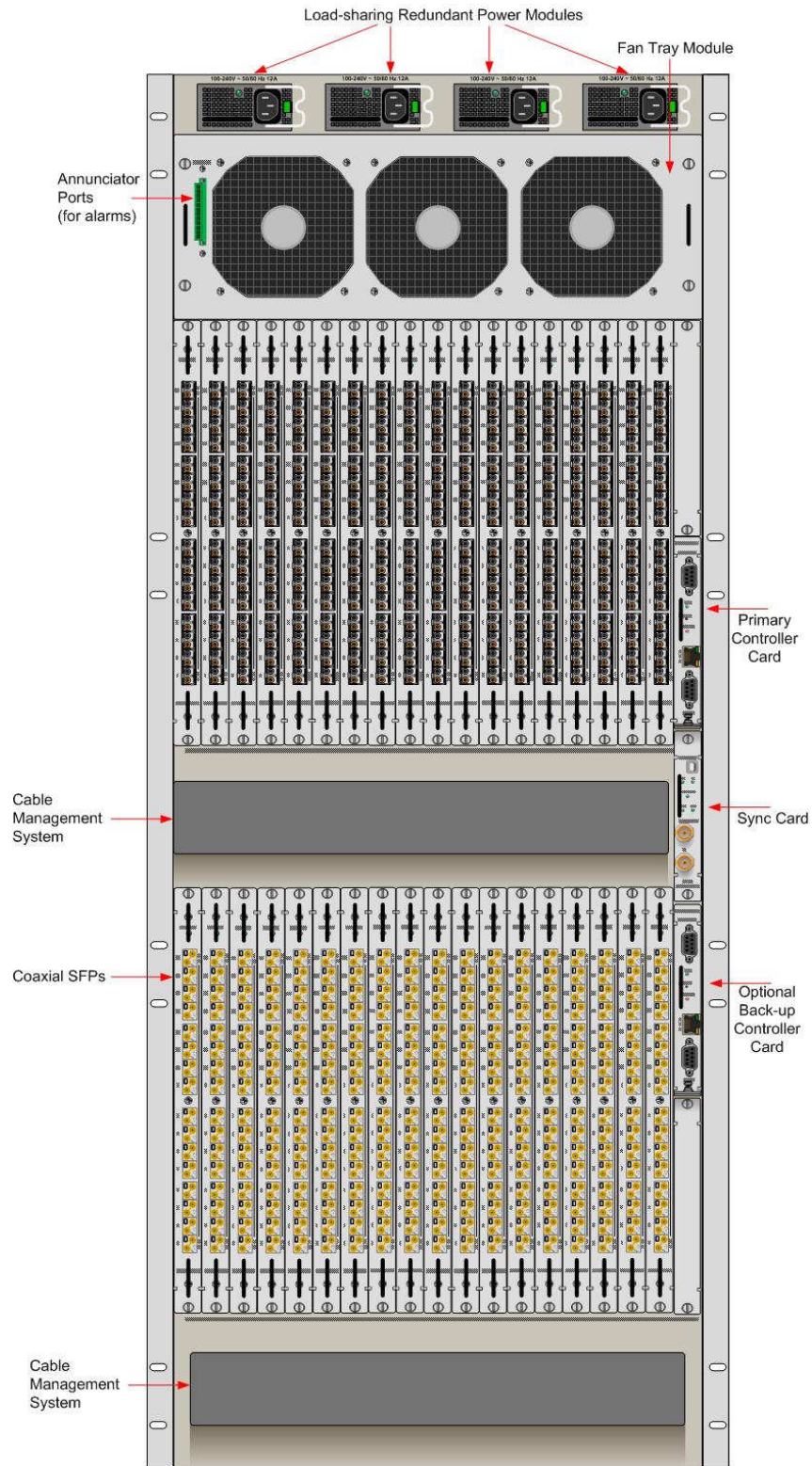


Figure 2: HDX576 Router – Rear View



Part 1: Hardware

Contents

When you receive your Thinklogical™ HDX80 Router, you should find the following items:

- HDX80 Chassis (includes 2 Power Modules, 1 Fan Tray Unit, and 1 Controller Card)
- Power Cords – (2) PWR-000006-R (International connections may differ)
- CAT5 Cable Assembly, 15 Feet – CBL000001-015FR
- Product Manual CD
- Product Quick Start Guide
- Chassis Options:
 - HDX80 Redundant Controller Card – HDM-000006
 - HDX80 Spare Fan Tray – HDM-000007
 - HDX80 Spare Power Module(s) – HDM-000009
 - HDX80 Data I/O Card, 5 Ports – HDM-D00005
 - HDX80 Sync Card - HDM-000008

The HDX80 ships configured to customer specifications. All physical connections to the product use industry-standard connectors.

When you receive your Thinklogical™ HDX576 Router, you should find the following items:

- HDX576 Chassis (includes 4 Power Modules, 1 Fan Tray Unit, and 1 Controller Card)
- Power Cords – (4) PWR-000006-R (International connections may differ)
- CAT5 Cable Assembly, 15 Feet – CBL000001-015FR
- Product Manual CD
- Product Quick Start Guide
- Chassis Options:
 - HDX576 Redundant Controller Card – HDM-000001
 - HDX576 Spare Fan Tray – HDM-000002
 - HDX576 Spare Power Module(s) – HDM-000004
 - HDX576 Data I/O Cards, 16 Ports- HDM-D00016
 - HDX576 Switch Card - HDM-000005
 - HDX576 Sync Card- HDM-000003

The HDX576 Video Router ships configured to customer specifications. All physical connections to the product use industry-standard connectors.

HDX Modules

The inspired modular approach of the HDX80 and HDX576 allows for all critical system components including power supplies, cooling fans and pluggable optics (SFP+) to be hot-swappable, thus minimizing business impact in the unlikely event that a component should fail.

Power Supplies

The dual redundant power supplies ensure continuous, uninterrupted power. The supplies are current sharing which means the supplies equally share the load. If a power supply were to fail, a single power supply can withstand the entire current load of the HDX Router system. Although the HDX Routers functions properly with one Power Module, it is recommended that both Modules be used, preferably connected to two independent power sources (for redundancy). Additionally, the hot-swappable feature allows for easy replacement of a module (in case of failure) without interrupting the HDX Routers system functionality.

Fan Tray

The HDX Routers use 3 DC fans all located conveniently in one modular fan tray. The tray is designed to move air horizontally through the enclosure. This hot-swappable fan tray allows for easy replacement of the module (in case of failure) without interrupting the system functionality. Any 2 DC fans will adequately cool either system.

The Fan Tray is also equipped with an Annunciator Port for the use of alarms. The system alarms can be configured to trigger an external control system or generate SNMP Traps.

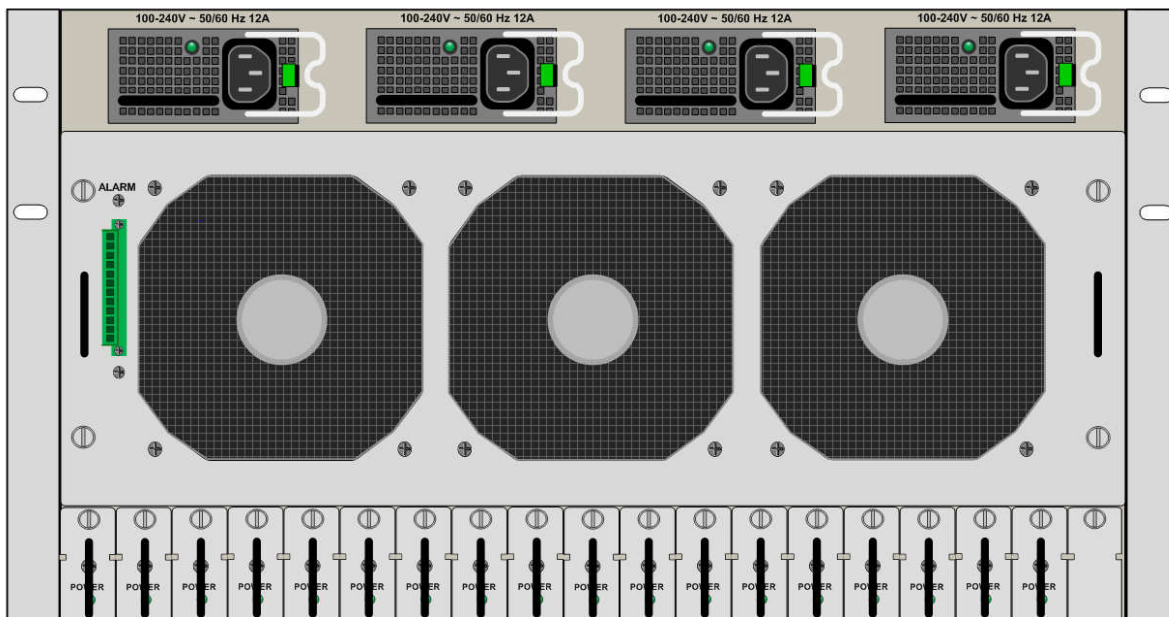
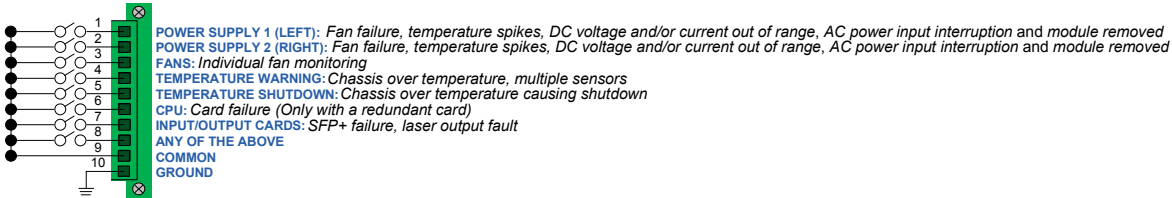


Figure 3: HDX Router Fan Tray with Alarm Annunciator

The HDX Routers Critical Hardware Alarms are as follows:

The HDX80 Router Critical Hardware Alarms:



The HDX576 Router Critical Hardware Alarms:

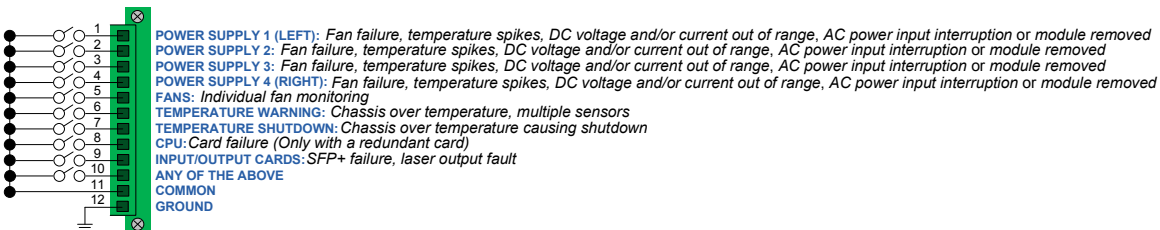



Figure 4: Alarm Descriptions and Drawing for the HDX80 and HDX576

Controller Card

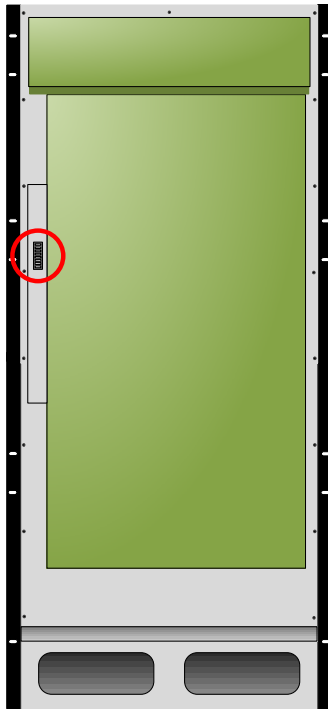
The hot-swappable Controller Card connects the Router to an external Linux or Windows CPU. The serial port can also be used for 3rd party controller integration (such as Crestron, AMX or home-spun interfaces). Also, the X4 Configurator Software (Appendix C) can be used to control the Router via the LAN port.

If the HDX Router is to be controlled via ethernet, it will require a static IP address. This value can be set via the DIP switch to the values listed below. The factory default setting will be 192.168.13.15.

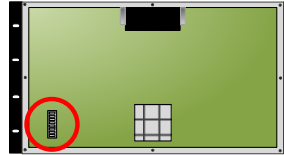
HDXRouter DIP Switch Location & Settings

 8 Position DIP Switch (Located on the backplane on all HDX Router models)

HDX576 Router with front cover removed



HDX80 Router with front cover removed



								Primary Controller IP Addresses	Back-up Controller IP Address
8	7	6	5	4	3	2	1		
0	0	0	0	0	0	0	0	192.168.13.15 & 192.168.13.115	192.168.13.16
0	0	0	0	0	0	0	1	192.168.13.17 & 192.168.13.117	192.168.13.18
0	0	0	0	0	0	1	0	192.168.13.19 & 192.168.13.119	192.168.13.20
0	0	0	0	0	0	1	1	192.168.13.21 & 192.168.13.121	192.168.13.22
0	0	0	0	0	1	0	0	192.168.13.23 & 192.168.13.123	192.168.13.24
0	0	0	0	0	1	0	1	192.168.13.25 & 192.168.13.125	192.168.13.26
0	0	0	0	0	1	1	0	192.168.13.27 & 192.168.13.127	192.168.13.28
0	0	0	0	0	1	1	1	192.168.13.29 & 192.168.13.129	192.168.13.30
0	0	0	0	1	0	0	0	192.168.13.31 & 192.168.13.131	192.168.13.32
0	0	0	0	1	0	0	1	192.168.13.33 & 192.168.13.133	192.168.13.34
0	0	0	0	1	0	1	0	192.168.13.35 & 192.168.13.135	192.168.13.36
0	0	0	0	1	0	1	1	192.168.13.37 & 192.168.13.137	192.168.13.38
0	0	0	0	1	1	0	0	192.168.13.39 & 192.168.13.139	192.168.13.40
0	0	0	0	1	1	0	1	192.168.13.41 & 192.168.13.141	192.168.13.42
0	0	0	0	1	1	1	0	192.168.13.43 & 192.168.13.143	192.168.13.44
0	0	0	0	1	1	1	1	192.168.13.45 & 192.168.13.145	192.168.13.46

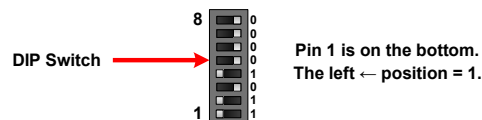


Figure 5: HDX Router DIP Switch Locations and Setting

The simplest network connection is an isolated network with only the HDX Router, the control server, and any control clients using static IP addresses. The HDX Router can be set to any of the above settings. The control server must be at **192.168.13.9**, and the control clients could then be set to any other addresses in the **192.168.13.X** family.

If static IP addresses for the control server and its clients are not possible, then the control server will require two (2) network interfaces with one interface set to the static address **192.168.13.9** and dedicated to the HDX Router(s) while the other network interface can be configured as required by the facility's network administrator.

A **Back-Up Controller Card is optional** to ensure uninterrupted functionality if the Primary Controller Card should fail or need to be replaced. The Primary Controller Card should always be in the left or upper controller slot. This card must have a LAN connection that allows it to communicate with both the Primary Controller and a server having an IP address of **192.168.13.9**. Without this interface the back-up controller will never take control of the router. The server should have the firewall turned off or be configured so that it is able to respond to pings from the Primary and back-up controllers.



Note: Removing the Primary Controller Card when it is Active will power down the HDX Router and interrupt service. Refer to page 39 “How to Replace a Controller Card”.



Note: When using a Back-up Controller configuration in a Secure Application with Restrictive Switching, both controllers must have the same Restrictive Switching Table files (see Appendix D: Secure Applications).

Sync Card

The hot-swappable Sync Card provides a Reference Input and loop output so that switch connections can be made synchronously with an external reference or “House Sync”. All switch connection timing complies with SMPTE RP 168 and with SMPTE 274M depending on signal format. The Reference Input accepts any of the following signal formats:

NTSC 525i
PAL 625i
1280x720p60
1280x720p59.94
1280x720p50
1280x720p30
1280x720p29.97
1280x720p25
1280x720p24
1280x720p23.98
1920x1080p60
1920x1080p59.94
1920x1080p50
1920x1080i60
1920x1080i59.94
1920x1080i50
1920x1080p30
1920x1080psf30
1920x1080p29.97
1920x1080psf29.97
1920x1080p25
1920x1080psf25
1920x1080p24
1920x1080psf24
1920x1080p23.98
1920x1080psf23.98

Input/Output Cards

The hot-swappable Input/Output (I/O) cards provide excellent in-service expansion capabilities in convenient sets of 5 ports per I/O card for the HDX80 or sets of 16 ports per I/O card for the HDX320 and HDX576, thus allowing re-configuration without interrupting signal processing.

Each I/O card consists of one Transmit (T) and one Receive (R) optic per port. I/O Cards are available with LC-type fiber connectors and can be assembled with Single-mode or Multi-mode optics (SFP+). Each individual I/O Card lists the ports as 1 through 5 on the HDX80 and as 1 through 16 on the HDX320 and HDX576 Video. The Fan Tray module lists the port numbers (all numbering is bottom to top, left to right. See figs. 10-12 on pg. 13). A LED located at the top of each I/O card indicates when power is ON to that card.

The HDX80 Router configuration can have a minimum of one I/O Card. The HDX80 Router is constructed with one fully non-blocking 80x80 switch matrix.. Each HDX80 I/O card contains 5 ports, so that when fully configured, the HDX80 will contain 16 I/O cards. The 16 I/O cards provide a total of 80 Optical Input/Output connections (SFP+ T/R). The switching matrix connects any optical input (SFP+ R) to any optical output (SFP+ T), even if it is the same Port number (i.e. Port 1 R connected to Port 1 T).

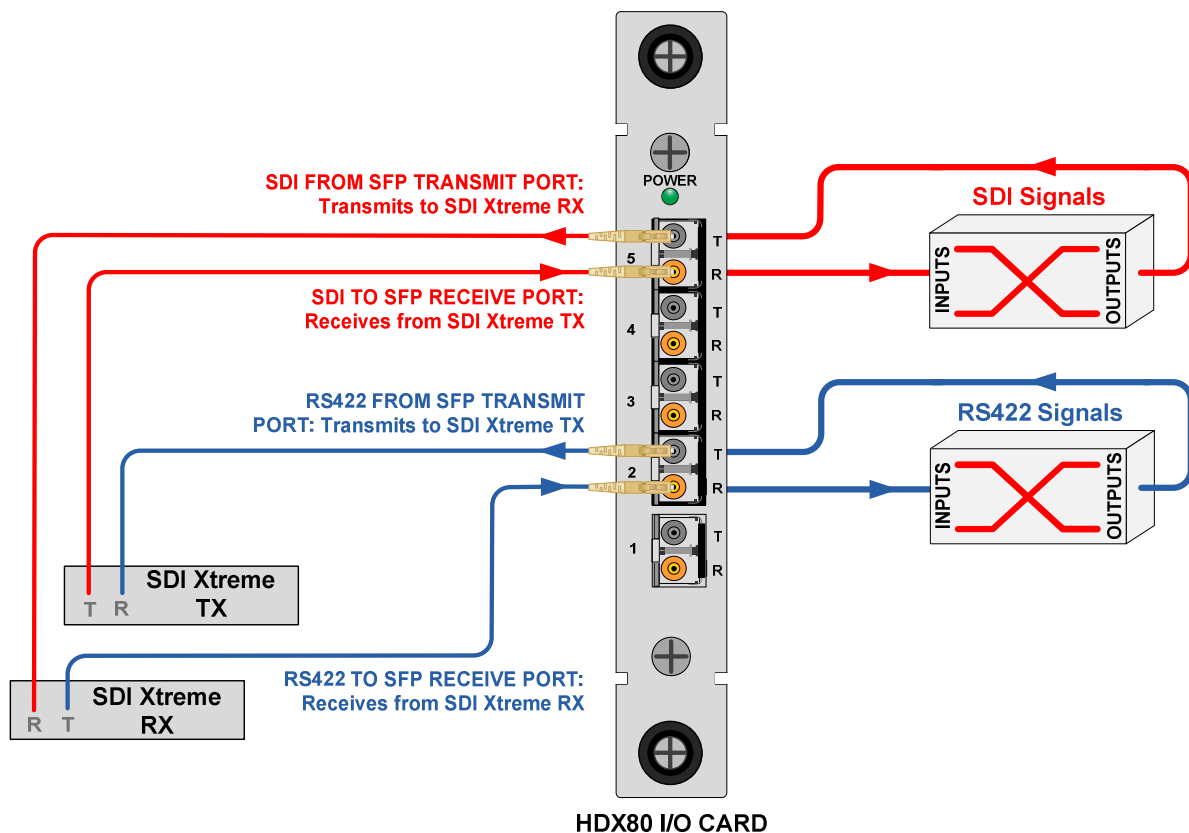


Figure 6: Concept of HDX80 I/O Flows

The HDX320 Router configuration can have a minimum of one I/O Card. The HDX320 Router is constructed with one fully non-blocking 320x320 switch matrix.. Each HDX320 I/O card contains 16 ports, so that when fully configured, the HDX320 will contain 20 I/O cards. The 20 I/O cards provide a total of 320 Optical Input/Output connections (SFP+ T/R). The switching matrix connects any optical input (SFP+ R) to any optical output (SFP+ T), even if it is the same Port number (i.e. Port 1 R connected to Port 1 T).

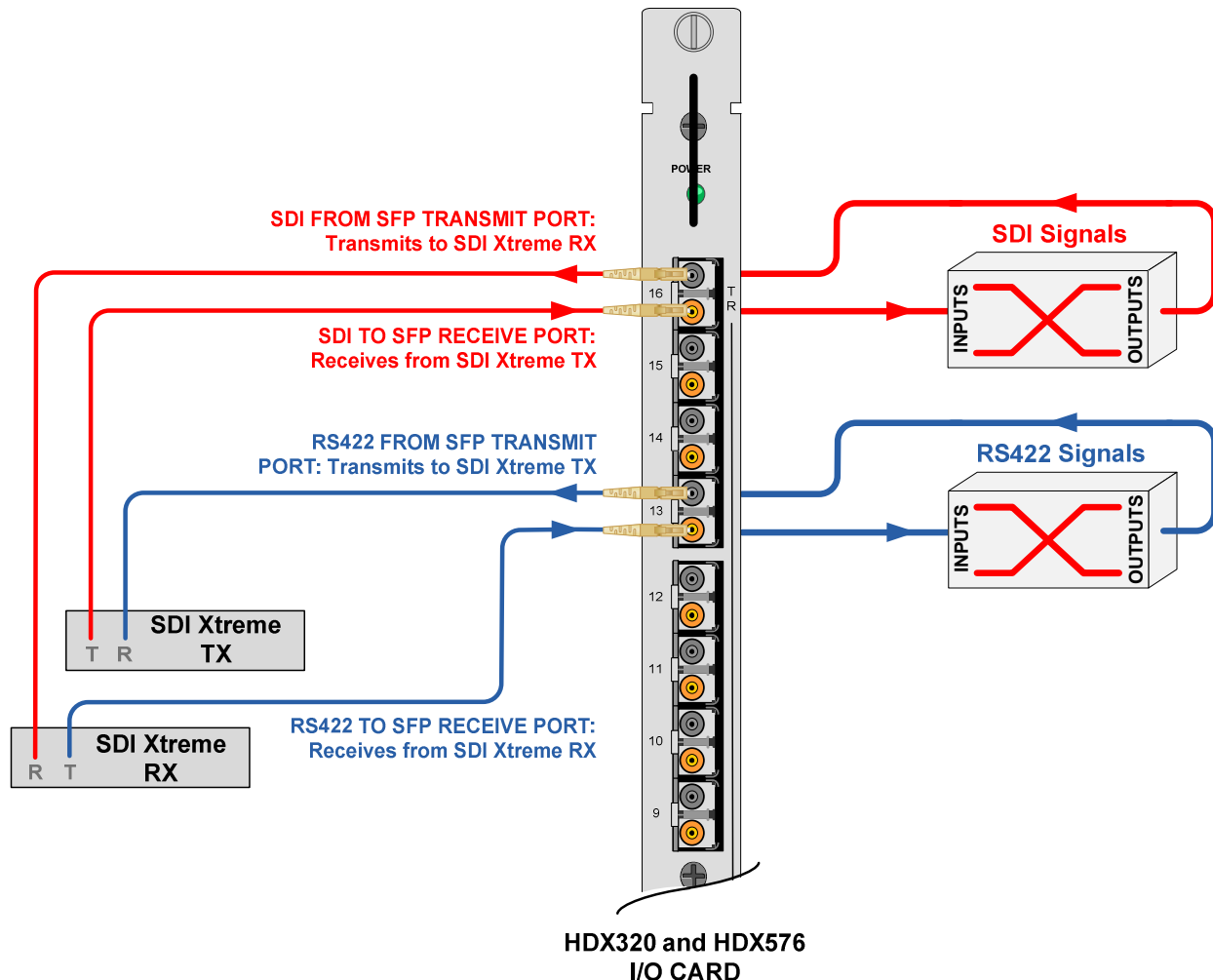


Figure 7: Concept of HDX320 and HDX576 I/O Flows

The HDX576 Router configuration can have a minimum of one I/O Card. The HDX576 Router is constructed with one fully non-blocking 576x576 switch matrix.. Each HDX576 I/O card contains 16 ports, so that when fully configured, the HDX576 will contain 36 I/O cards. The 36 I/O cards provide a total of 576 Optical Input/Output connections (SFP+ T/R). The switching matrix connects any optical input (SFP+ R) to any optical output (SFP+ T), even if it is the same Port number (i.e. Port 1 R connected to Port 1 T).

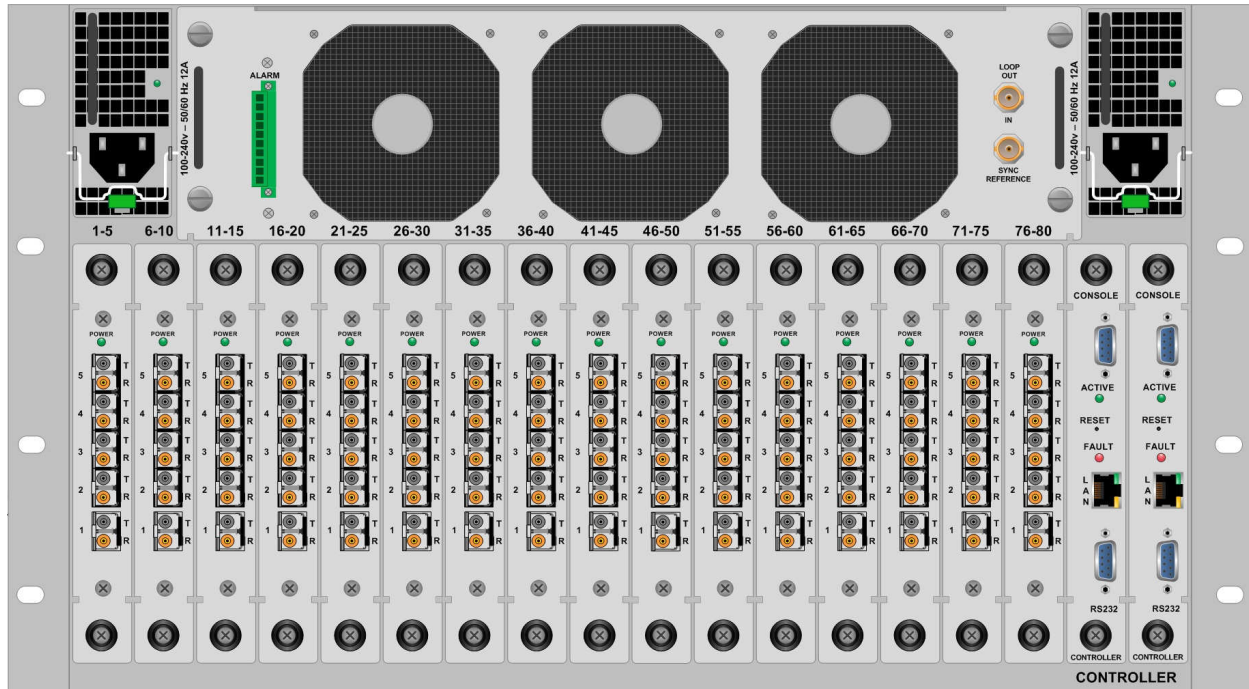


Figure 8: Input / Output Port Numbering on the HDX80

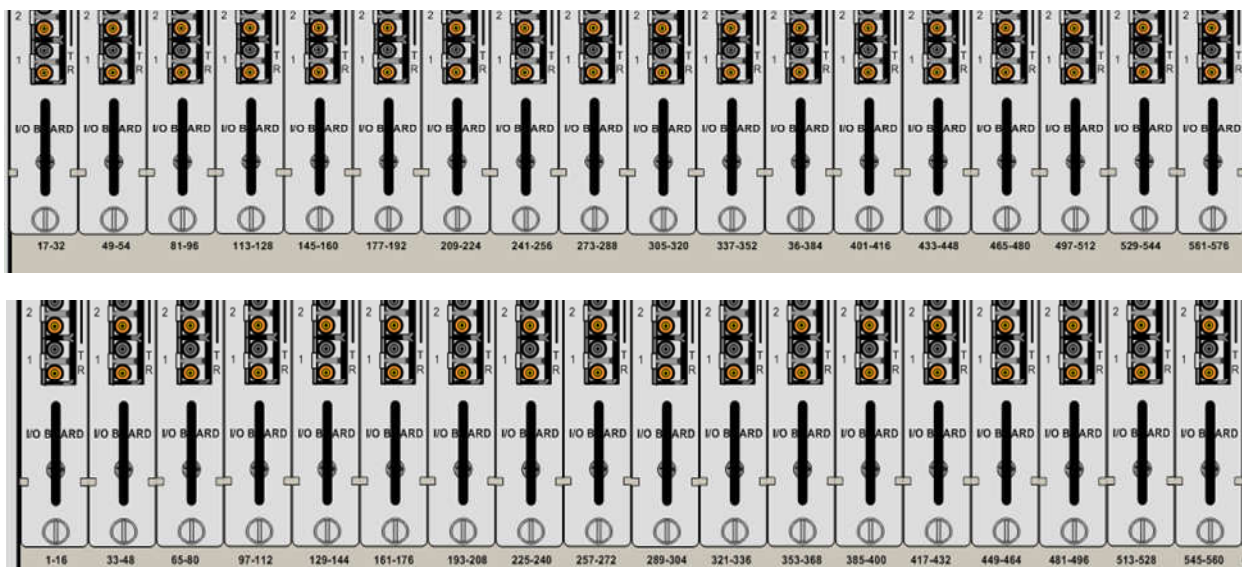


Figure 9: I/O Board Port Numbering on the HDX576 (Upper and Lower Card Cages)

Pluggable SFP+

The SFP+ Optical Module is a 4Gb/s Short-Wavelength Transceiver designed for use in bi-directional Fiber Optic Channel links. The modules are hot-pluggable and operate with 3.3VDC.

Each Input and Output card contains rows of SFP+ modules that serve as the fiber-optic couplers for the fiber cables to and from the Thinklogical Tx and Rx Extenders. Individual cards can be removed for ease of access to the SFP+ modules.

Always use dust caps to protect against damage when a fiber optic connector is not attached to its coupling device (fiber optic equipment, bulkheads, etc.)



Figure 10a: SFP+ Module

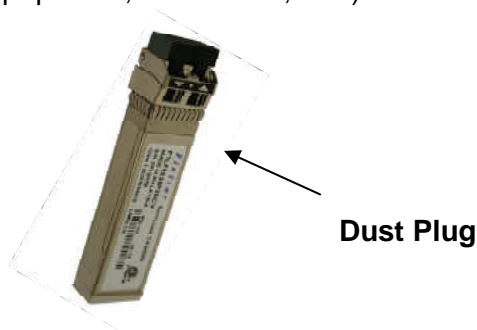


Figure 10b: It is good practice to install dust plugs in unused SFP+s.

Each I/O card can have as many as 5 SFP+ for an HDX80 and 16 SFP+ for a HDX576 each mounted within a grounded metal enclosure. Each SFP+ module is locked into its enclosure with a built-in latch handle that can be opened for removal or locked for installation.

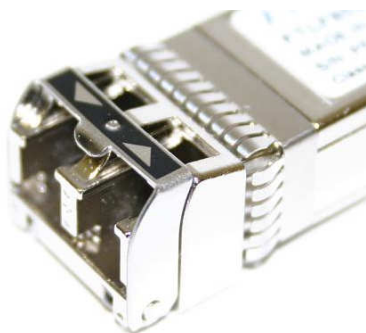


Figure 11a: SFP+ latch closed

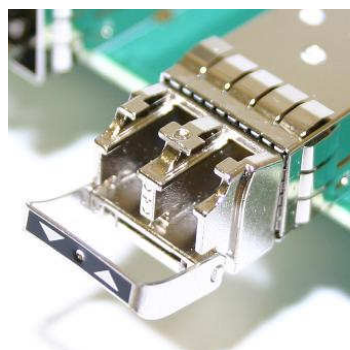


Figure 11b: SFP+ latch open

The latch handle spans the two LC ports and arrows printed on the handle indicate which port is an INPUT (▲) and which is an OUTPUT (▼).

Pluggable Coaxial SFP

The HDX line of routers can also utilize coaxial SFP's to send signals directly through the routers without the use of extenders. The Thinklogical CSA-000001 is an electrical SFP Transceiver module with reclockers designed to transmit and receive SDI signals up to 2.97Gbps over 75Ω coaxial cables via DIN 1.0/2.3 connectors.



Figure 12a: Coaxial SFP



Figure 12b: HD-BNC on Coaxial SFP

Fiber Optic Cable

Fiber Optic Cable Requirements

Thinklogical recommends SX+ Laser Enhanced (50μm) fiber for your HDX Router and SDI Xtreme 3G+ Extension System. Multi-mode fiber has the ability to extend up to a maximum of 1000m, where Single-mode fiber has the ability to extend distances beyond 1000m.



Warning! Do not use APC (Angle Physical Contact) Connectors! If inserted into an SFP+, APCs will destroy the SFP+.

Patch Panels

A Patch Panel is a panel of connectors/ports that connect incoming and outgoing lines. Patch panels are typically chosen for cable management, allowing long fiber runs to be kept in place and to minimize handling. **If your application involves the use of Single-Mode Extenders, your patch panel connectors must be APC.**

Handling Fiber Optic Cable

Unlike copper cabling, fiber optic cable requires special handling. A small spec of dust or a scratch to the ferrule tip can attenuate the optical signal so that it becomes unusable.



Warning! The ends of the connectors (the ferrule) should never come in contact with any foreign object, including fingertips.



Warning! Minimum bend radius must be 1.5". Be careful not to pinch the fiber when using ties.

Installing Fiber into Input/Output Cards

Step 1: Grasp the LC connector of the fiber optic cable by the sides and remove the dust cap.



Warning! Laser in use! Do not look directly into the opening.

Step 2: Open the LC retractable and carefully insert the fiber connector into the SFP+ port until it locks into place.

Removing Fiber from Input/Output Cards

Step 1: The LC connector has a locking feature that can be released by depressing the latch-release tab located on the side of the connector. With the tab depressed, slowly remove the cable by pulling the connector straight out of the SFP+ port.



Warning! Laser in use! Do not look directly into the opening.

Step 2: Immediately install a dust cap on the ferrule to protect the fiber tip.

Connecting to Thinklogical™ SDI Xtreme 3G+ Extenders

The HDX Routers are designed to work with the Thinklogical SDI Xtreme 3G+ product line as well as ImageEvolution X3, SDI to HDMI Converter and extenders, and HDMI to SDI Converters and extenders.

Connecting to the Receiver

The SDI Xtreme 3G+ Receiver serves as the Destination (theaters, editing suites, control consoles, video walls, etc). Power can then be supplied to the unit. The Receiver then connects to the HDX Router I/O ports using fiber (Multi-mode fiber for distances up to 1000m; Single-mode fiber for distances beyond 1000m).

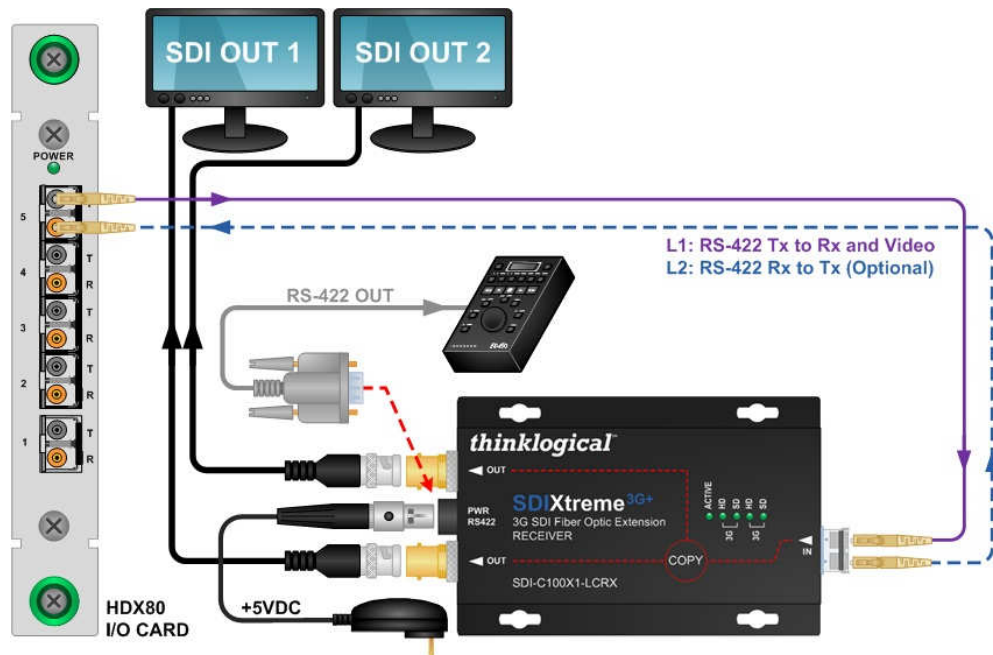


Figure 13: Connecting the *Thinklogical*™ SDI Xtreme 3G+ Extender Receiver to the HDX80

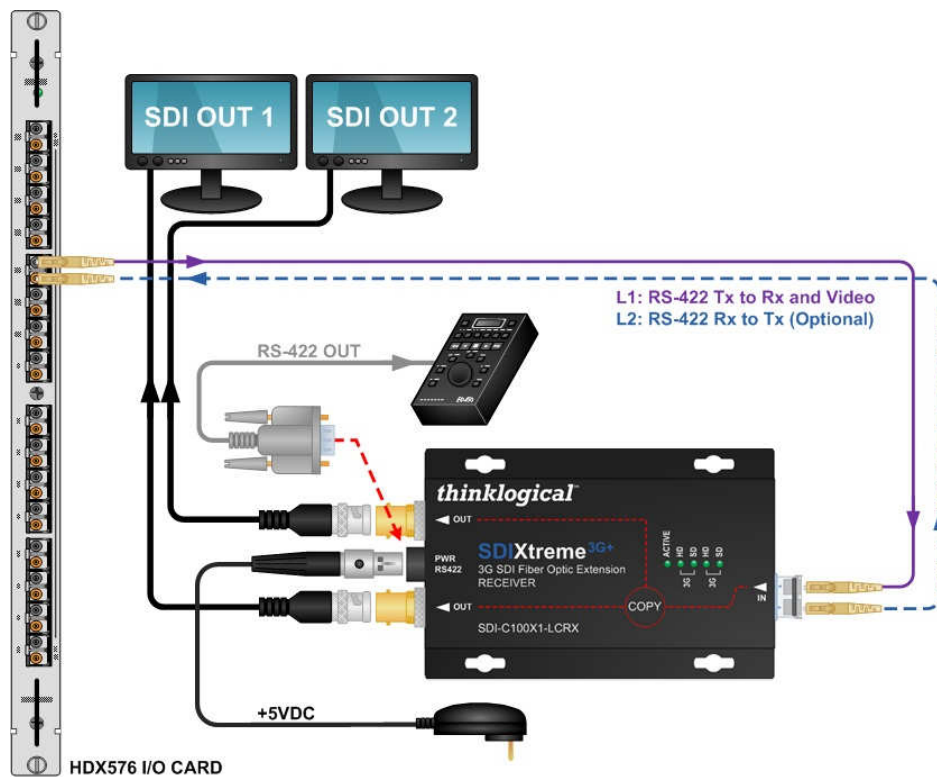


Figure 20: Connecting the *Thinklogical*™ SDI Xtreme 3G+ Extender Receiver to the HDX576

Connecting to the Transmitter

The Transmitter serves as the Source (computer and video entities). Depending on your configuration, your local KMASS devices (keyboard, mouse, etc) are first connected. The video sources (e.g. computers) are then connected followed by any local video devices. Power can then be supplied to the unit. The Transmitter connects to the HDX I/O ports using fiber (Multi-mode fiber for distances up to 1000m; Single-mode fiber for distances beyond 1000m).

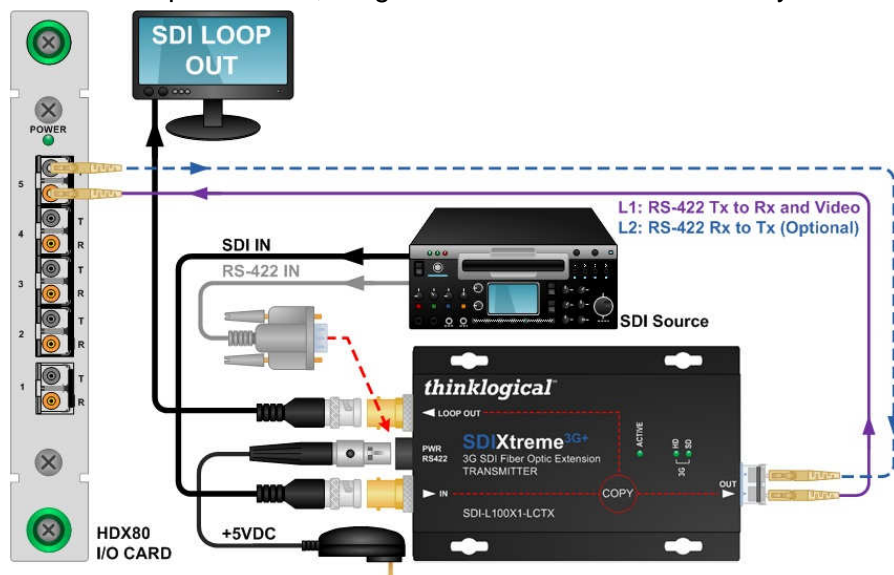


Figure 21: Connecting the *Thinklogical*™ SDI Xtreme 3G+ Extender Transmitter to the HDX80

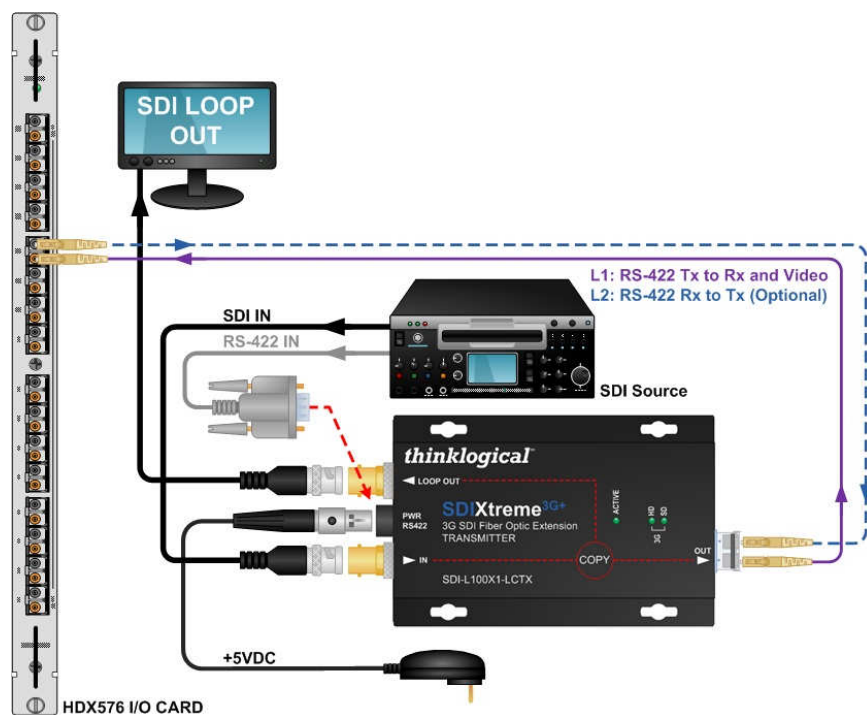


Figure 22: Connecting the *Thinklogical*™ SDI Xtreme 3G+ Extender Transmitter to the HDX576

Installation

All physical connections to the product use industry-standard connectors. Non-supplied cables that may be needed are commercially available. All connections are found on the rear of the unit.

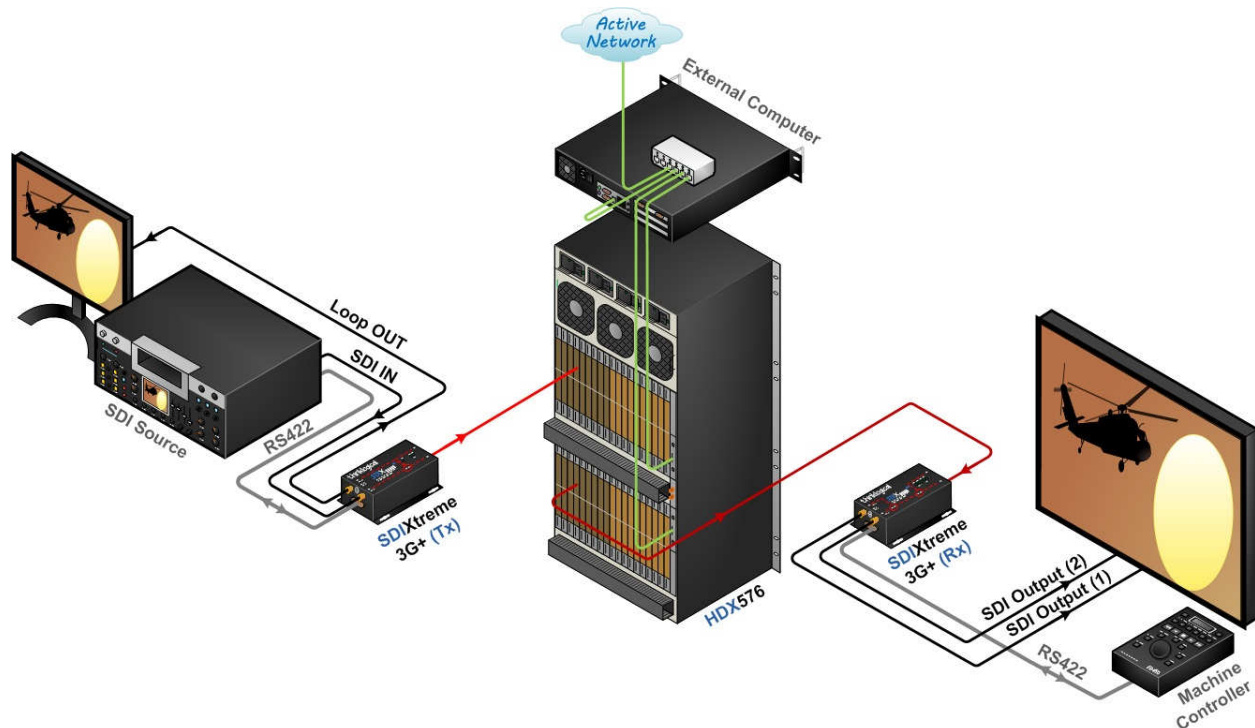


Figure 23: Typical HDX576 Router Application using SDI Xtreme 3G+ Extenders

Set-Up



Note: Insure that all thumb screws are finger tight so that all the modules are properly held in the chassis.

1. Carefully remove the HDX Router from its shipping container. Inspect the HDX Router to make certain that no damage occurred during shipment.
2. All of the I/O cards are installed at the factory to meet the configuration. Insure that the I/O cards are properly seated in the unit. All of the I/O cards have thumb screw retainers.
3. After checking the I/O cards, go to the top of the unit. There are two power supplies located in the top part of the chassis. Verify that the power supplies are secure in the chassis.



Note: The HDX576 must have ALL four power modules powered ON within a 5 second time frame.

4. Located directly below the power modules is a fan tray. The fan tray has thumb screws holding them into the chassis. Verify that the fan tray is secure. Cooling is accomplished by the fan trays and fans in the power supply units. Air is forced into the chassis from the fan tray. This cools the vertically mounted I/O cards, the integrated circuits on the Backplane, as well as removing any heat generated by the power modules.



Note: When mounting the chassis in a rack, insure that none of the fans have restricted air flow.

5. The temperature in the chassis is monitored in several locations. The power supplies have an internal temperature sensor that is monitored constantly for any conditions that may indicate a problem. Other temperature sensors are mounted in the fan trays, on the Controller card(s), on the I/O cards, and on the Backplane.



Note: If any of these sensors detect an over temperature condition, power will be removed from all sensitive components and the system will shut down.

6. As a further safeguard, all fan speeds are monitored and any fan speed that does not meet specification will cause the unit to set alarm condition.



Warning! Do not remove the Front Door when the unit is powered. The Backplane Integrated Circuits will overheat when operating without the Front Door attached.



Note: All of these conditions send out notifications prior to shut down. For a detailed list of the alarm descriptions, see Figure 8: *Alarm Descriptions and Drawing* on page 15.

7. When the HDX Router has been inspected and found to be in good condition, the installation process can begin.

Order of Installation Events

Please refer to the **Quick Start Guides** included with your products for detailed instructions. The Quick Start Guides are also available in **Appendix B**.

How to Replace Modules

How to Install or Replace Input/Output Cards



Note: No shutdown is required prior to installing/replacing Input/Output Cards.

Step 1

Turn the two thumbscrews counterclockwise until they disengage from the chassis. Pull the card out using both handles.



Warning! Do not pull on the thumbscrews when removing the module – damage may occur!

OR

If a blank panel is present, remove the blank panel from the desired location using the thumbscrews.

Step 2

Place the new module upright so that the POWER LED is on the top. Grasp the module by the handles or by the outer edge of the aluminum housing. The card should slide freely until it reaches the backplane connector. At this point, use just enough force to firmly engage the card with the mating connector.



Warning! If the module does not slide into the connector, do not force it! Damage may occur. Remove the card and start over.

Step 3

Once the module is completely seated, hand-tighten the thumbscrews.



Warning! Do not tighten the thumbscrews with a screwdriver.

How to Install or Replace a Controller Card



Note: When using a single Controller, the left Controller slot is always Primary.



Note: Replacing the Active Controller Card will interrupt service.

When replacing a Controller Card in a system with redundant controllers you may remove the Controller that is not active (Active LED is Off) without interrupting service. Before removing a Primary Controller that is active you should cause a Fail-over to the Back-up Controller. This can be done by removing the LAN connection from the active Controller and waiting approximately 20-50 seconds for the Back-up Controller to take control, as indicated by the Active LED. After the Primary Controller is removed and replaced (following Steps below), the Primary Controller will re-take control of the system and become the Active Controller.

Step 1

Turn the thumbscrews counterclockwise until they disengage from the chassis. Pull the Controller Card out using both black handles.

Step 2

Place the new module upright so that the ACTIVE LED is on the top. Grasp the module by the handles or by the outer edge of the aluminum housing. The card should slide freely until it reaches the backplane connector. At this point, use just enough force to firmly engage the card with the mating connector.



Warning! If the module does not slide into the connector, do not force it! Damage may occur. Remove the card and start over.

Step 3

Once the module is completely seated, hand-tighten the thumbscrews.



Warning! Do not tighten the thumbscrews with a screwdriver.

Step 4

Replace the LAN cable connection and/or the RS232 cable connection.

How to Replace a Fan Tray

The HDX Routers use three DC fans to move air horizontally through the enclosure. Be sure not to block the air vents on the front and rear of the unit, and leave at least 2" of space on both sides.



Note: Be sure to leave adequate ventilation space on both sides of the units (2" minimum), especially if the units (e.g. Extenders) are being stacked above or below the HDX Router.



Note: No shutdown is required prior to replacing the Fan Tray.

Step 1

Turn the four thumbscrews counterclockwise until they disengage from the chassis.

Step 2

Pull the Fan Tray module out using both black handles.

Step 3

Place the new module so that the aluminum housing is on the bottom. Hold the new Fan Tray by the black handles and slide the aluminum housing into the black card guides.



Warning! Do not operate the unit without a Fan Tray installed for greater than 10 minutes.

Step 4

Hand-tighten the thumbscrews.



Warning! Do not tighten the thumbscrews with a screwdriver.

How to Replace a Power Supply



Warning! Disconnect the power cord before proceeding!



Note: No shutdown is required prior to replacing a Power Supply.

- a. The Power Modules are universal input 120-240VAC 50-60Hz. Use the proper power cord for your region (supplied with the unit). Although the HDX Router functions properly with one Power Module, it is recommended that both Modules be used, preferably connected to two independent power sources (for redundancy).

Step 1

Grasp the black handle with one hand.

Step 2

Slide the green tab to the left with the other hand.

Step 3

Pull the Power Module out of the chassis.

Step 4

Insert the new Power Module into the chassis and slide it in until it reaches the backplane connector. The module should slide freely until it reaches the backplane connector. At this point, use just enough force to firmly engage the card with the mating connector.



Warning! If the module does not slide into the connector, do not force it! Damage may occur. Remove the module and start over.

Part 2: Safety Requirements

Symbols found on the product

Markings and labels on the product follow industry-standard conventions. Regulatory markings found on the products comply with requirements.

Regulatory Compliance

Thinklogical™ products are designed and made in the U.S.A. Products have been tested by a nationally recognized testing laboratory and found to be compliant with the following standards (both domestic USA and many international locations).

North America

These products comply with the following standards:

Safety

ANSI/UL60950-1: 1st Edition (2003)

CAN/CSA C22.2 No. 60950-1-03

LASER Safety

CDRH 21CFR 1040.10

Class 1 LASER Product

Electromagnetic Interference

FCC CFR47, Part 15, Class A

Industry Canada ICES-003 Issue 2, Revision 1

Australia & New Zealand

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

European Union

Declaration of Conformity

Manufacturer's Name & Address: **Thinklogical™**
100 Washington Street
Milford, Connecticut 06460 USA
Telephone (203) 647-8700

Product Name

Model: HDX80 Router, HDX576 Router

These products comply with the requirements of the Low Voltage Directive 72/23/EEC and the EMC Directive 89/336/EEC.

Standards with Which Our Products Comply

Safety

CENELEC EN 60950-1, (2006)

LASER Safety

IEC60825:2001 Parts 1 and 2

Class 1 LASER Product

Electromagnetic Emissions

EN55022: 1994 (IEC/CSP1R22: 1993)

EN61000-3-2/A14: 2000

EN61000-3-3: 1994

Electromagnetic Immunity

EN55024: 1998 Information Technology Equipment-Immunity Characteristics

EN61000-4-2: 1995 Electro-Static Discharge Test

EN61000-4-3: 1996 Radiated Immunity Field Test

EN61000-4-4: 1995 Electrical Fast Transient Test

EN61000-4-5: 1995 Power Supply Surge Test

EN61000-4-6: 1996 Conducted Immunity Test

EN61000-4-8: 1993 Magnetic Field Test

EN61000-4-11: 1994 Voltage Dips & Interrupts Test

Supplementary Information

The following statements may be appropriate for certain geographical regions and might not apply to your location.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



Warning! This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.



Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications in which case the user may be required to take adequate corrective measures at their own expense.



Note: This Class A digital apparatus complies with Canadian ICES-003 and has been verified as being compliant within the Class A limits of the FCC Radio Frequency Device Rules (FCC Title 47, Part 15, Subpart B CLASS 1), measured to CISPR 22: 1993 limits and methods of measurement of Radio Disturbance Characteristics of Information Technology Equipment.



Note: The user may notice degraded audio performance in the presence of electromagnetic fields.



Note: If using a keyboard that is noise susceptible, a ferrite ring on the keyboard cable may be needed to comply with Immunity Requirements

Product Serial Number

ThinklogicalTM products have a unique serial number, imprinted on an adhesive label that is fixed to the bottom of the chassis. The serial number includes a date-code. The format for the date-code is 2 digits for the month, 2 digits for the day and 2 digits for the year, plus two or three digits for a unique unit number. This serial number is also found on the original shipping carton.

Connection to the Product

Connections and installation hardware for our products use industry-standard devices and methods. All wiring connections to the customer equipment are designed to minimize proprietary or customized connectors and cabling. Power connections are made with regionally appropriate power cords and approved methods.

Part 3: ThinklogicalTM Support

Customer Support

Thank you for choosing ThinklogicalTM products for your application. We appreciate your business and are dedicated to helping you successfully use our products. ThinklogicalTM is always here to help.

ThinklogicalTM is an engineering company and we will make every effort to ensure that you receive the information you require directly from our most knowledgeable engineers. We believe that the first line of support is the design engineer that developed the product. Therefore, your questions will be handled promptly by our in-house engineers who are most familiar with your products.

To contact ThinklogicalTM use the following telephone numbers and internet-based methods:

Website

Check out our website for current product offerings, support information and general information about all of the products we offer.

Our internet website offers product information on all current systems, including technical specification sheets and installation guides (for viewing online or for download), product diagrams showing physical connections and other information you might need.

Internet: www.thinklogical.com



Note: Most online documents are stored as Adobe Acrobat “PDF” files. If you do not have the Adobe Acrobat reader needed to view PDF files, visit www.adobe.com for a download.

Email



Thinklogical™ is staffed Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. We will try to respond to your email inquiries promptly, use the following email addresses for your different needs:

info@thinklogical.com – Information on Thinklogical™ and our products.

sales@thinklogical.com – Sales Department - orders, questions or issues.

support@thinklogical.com – Product support, technical issues or questions, product repairs and request for Return Authorization.

Telephone

Telephone Sales: Contact our expert, technically oriented sales staff via telephone in Milford, CT at **(203) 647-8700** or if in the continental US, you may use our **toll-free number (800) 291-3211**. We are here Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. Ask for their direct dial phone number when you call.

Telephone Product Support: Contact Product Support via telephone in Milford, Connecticut at **(203) 647-8700**. The support lines are manned Monday through Friday, 8:30am to 5:00pm, Eastern Time Zone.

International Sales: Please contact our US sales staff in Milford, CT at **(203) 647-8700**. We are here Monday through Friday, 8:30am to 5:00pm, Eastern Time Zone (same as New York City). If leaving a voice message, please provide a “best time to call back” so we may reach you at your convenience.

Our switchboard attendant will direct your call during regular business hours. We have an automated attendant answering our main telephone switchboard after regular business hours and holidays. You can leave voice messages for individuals at any time. Our Sales Representatives have direct numbers to speed up your next call to us.

Fax

Our company facsimile number is **(203) 783-9949**. Please indicate the nature of the fax on your cover sheet and provide return contact information.

Product Support

Thinklogical's™ support personnel are available Monday through Friday from 8:30am to 5:00pm, Eastern Time Zone. If your application might require assistance at some time outside

of our normal business hours, please contact us beforehand and we will do our best to make arrangements to help you with your Thinklogical™ products.

Warranty

Thinklogical™ warrants this product against defects in materials and workmanship for a period of one year from the date of delivery. Thinklogical™ and its suppliers disclaim any and all other warranties.



Note: *Thinklogical™* Inc. products carry a one year warranty, with longer term available at time of purchase on most products. Please refer to your product invoice for your products Warranty Terms & Conditions.

Defect remedy shall be, repair or replacement of the product, provided that the defective product is returned to the authorized dealer within a year from the date of delivery.

If you wish to return your device, contact the *Thinklogical™* authorized dealer where you purchased the device, or if you purchased directly, call Thinklogical™ at 1-800-291-3211 (USA).

Return Authorization

If you must return a product to *Thinklogical™* directly:

Contact **Customer Support** at **1-800-291-3211** or **203-647-8700**.

Customer Support will ask you to describe the problem and will issue you a **Return Merchandise Authorization** number (RMA#).

Pack the device in its original box, if possible, and return it with the RMA# on the box.



Note: Do not return a product to Thinklogical™ without a **Return Material Authorization Number**.

Return address for products with Return Material Authorization:

thinklogical™
a subsidiary of logical solutions

Attn: RMA#

100 Washington Street

Milford, CT 06460 USA

PH: 800-291-3211 (USA only)



Our Address

If you have any issue with the product, have product questions or need technical assistance with your Thinklogical™ system, please call us at **800-291-3211 (USA only)** or **(203) 647-8700** and let us help. If you'd like to write us, our mailing address is:

**Thinklogical™ Inc.
100 Washington Street
Milford, CT 06460 USA**

Appendix A: Ordering Information

<i>Thinklogical's</i> HDX80 Router	
Part Number	Description
HDX-000080	High Definition Matrix Router 80 Chassis
HDM-D00005	High Definition Matrix Router 80 Data I/O Card, 5 Ports, SFP+, Multi-Mode
HDM-D00S05	High Definition Matrix Router 80 Data I/O Card, 5 Ports, SFP+, Single Mode
HDM-D00C05	High Definition Matrix Router 80 Data I/O Card, 5 Ports, SFP+, Coaxial
HDM-000008	High Definition Matrix Router 80 Sync Card
	High Definition Matrix Router 80 Spare Modules
HDM-000006	High Definition Matrix Router 80 Spare Controller Card
HDM-000007	High Definition Matrix Router 80 Spare Fan Module
HDM-000009	High Definition Matrix Router 80 Spare Power Module

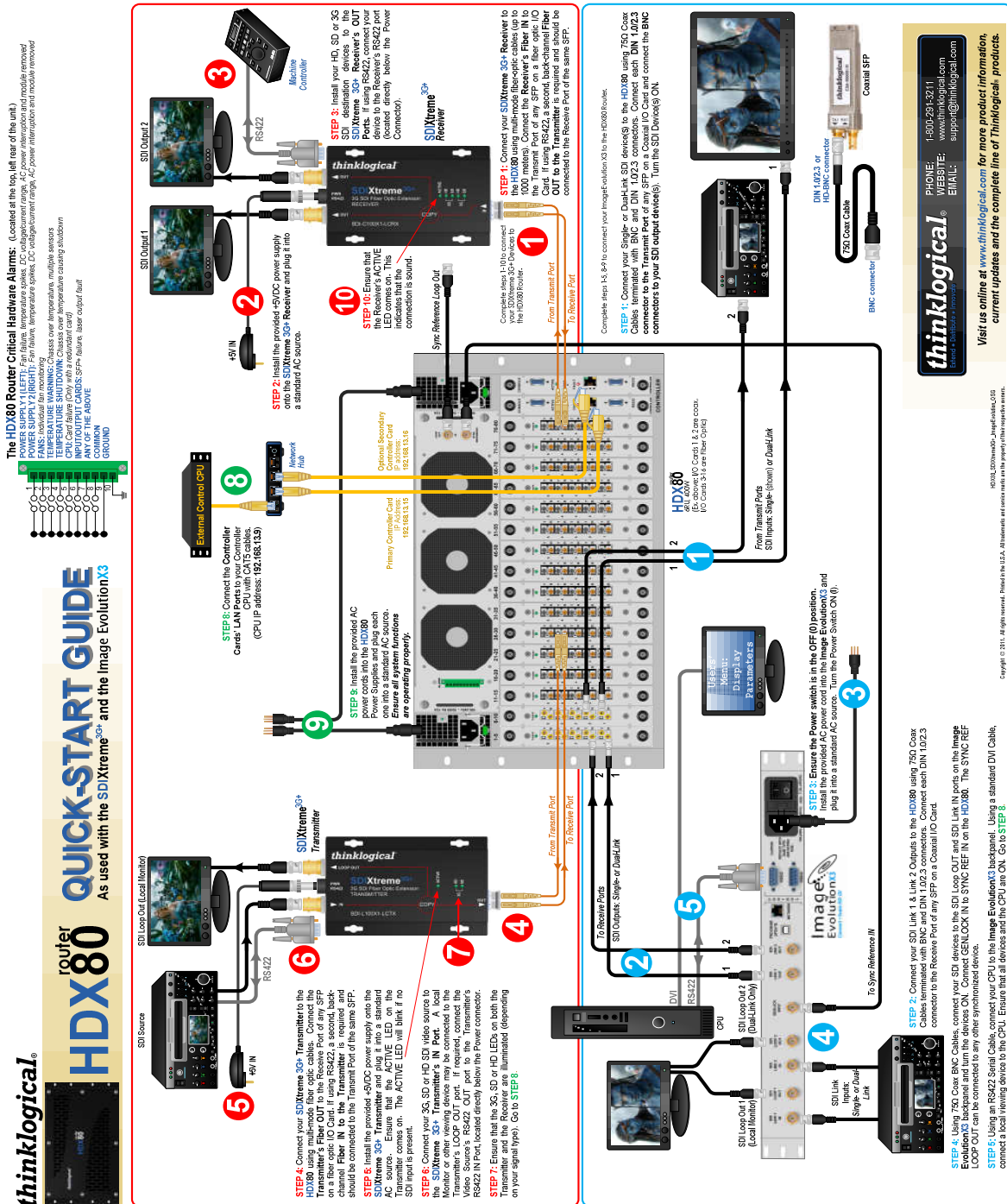
Table 3: HDX80 Router Ordering Information

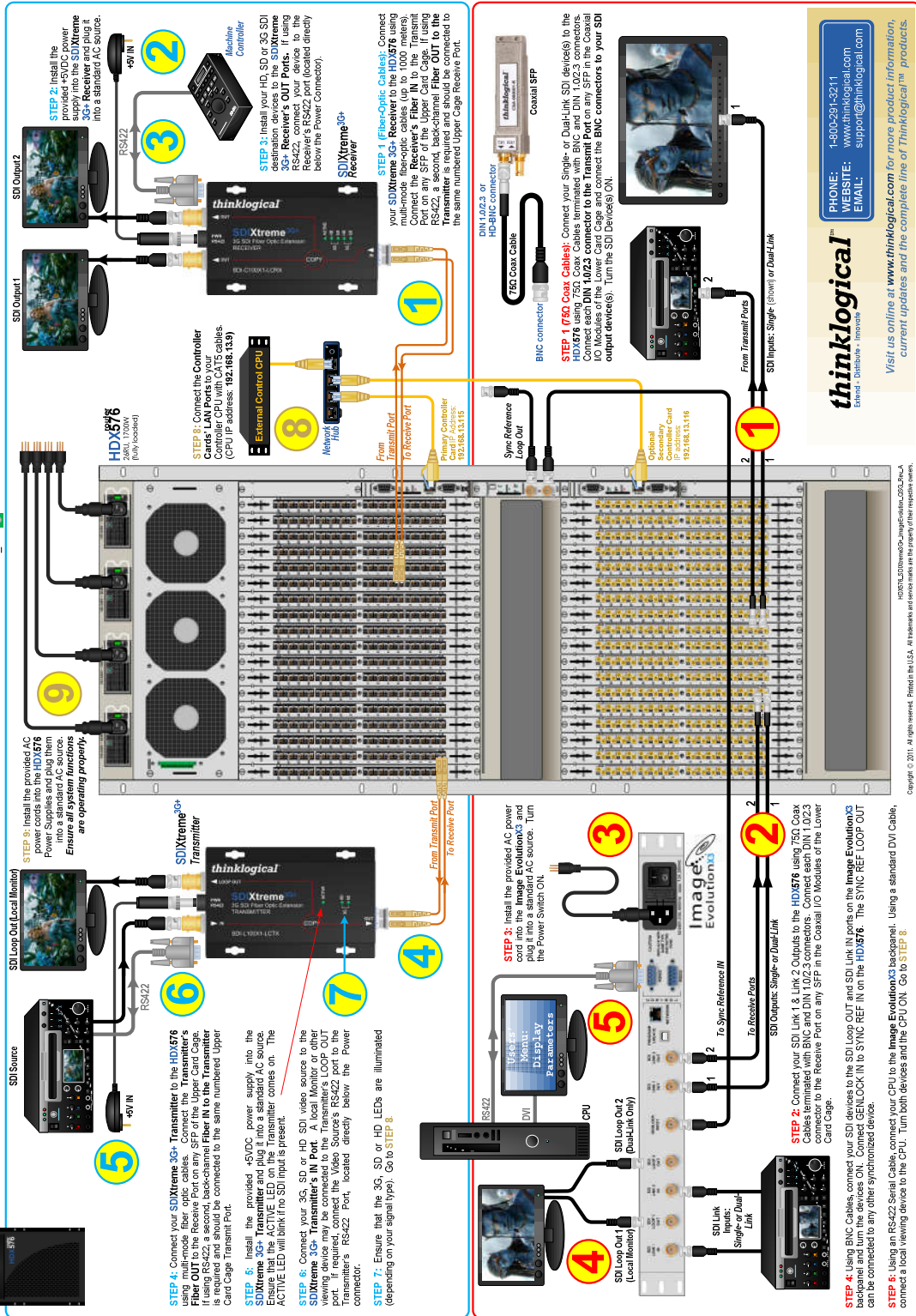
Thinklogical's HDX576 Router	
Part Number	Description
HDX-000576	High Definition Matrix Router 576 Chassis
HDM-D00016	High Definition Matrix Router 576 Data I/O Card, 16 Ports, SFP+, Multi-Mode
HDM-D00S16	High Definition Matrix Router 576 Data I/O Card, 16 Ports, SFP+, Single Mode
HDM-D00C16	High Definition Matrix Router 576 Data I/O Card, 16 Ports, SFP+, Coaxial
HDM-000005	High Definition Matrix Router 576 Switch Card*
HDM-000003	High Definition Matrix Router 576 Sync Card
	High Definition Matrix Router 576 Spare Modules
HDM-000001	High Definition Matrix Router 576 Spare Controller Card
HDM-000002	High Definition Matrix Router 576 Spare Fan Module
HDM-000004	High Definition Matrix Router 576 Spare Power Module

**Router configured to 288x288 requires one (1) HDM-000005, 288x288 Redundant requires two (2) HDM-000005 and 576x576 requires four (4) HDM-000005.*

Table 4: HDX576 Router Ordering Information

Appendix B: Quick Start Guides






HDX578_S01D9me3G+ImageEvolution_CSQ_RivA
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Visit us online at www.thinklogical.com for more product information, current updates and the complete line of Thinklogical™ products.

Appendix C: SD Flash Card Replacement

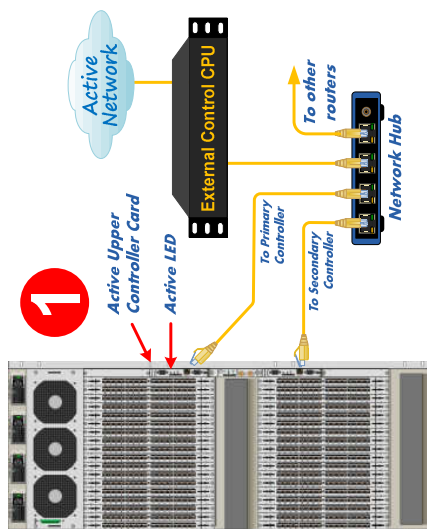


HDX576
Router

SD Flash Drive Replacement Procedure

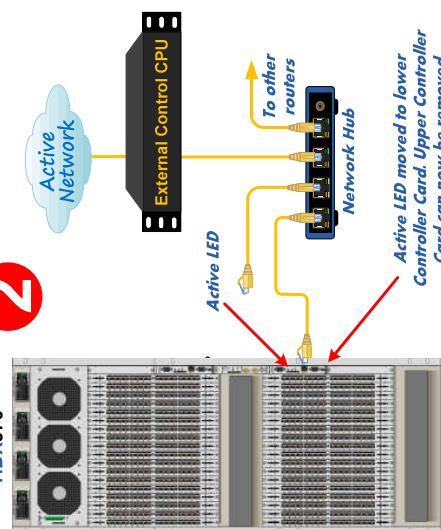
PHONE: 1-800-291-3211
WEBSITE: www.thinklogical.com
EMAIL: support@thinklogical.com

1



thinklogical®
Gigaset • Ubiquiti • Innovate

2



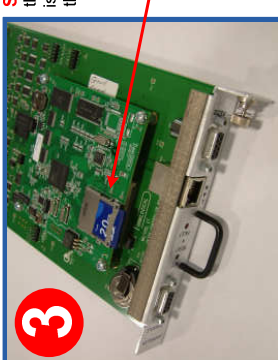
STEP 1: To replace the SD Flash Drive on a HDX576 Controller Card it is not necessary to power down the HDX576 if both Controller Cards are installed and connected to an active network.

STEP 2: When removing the Primary (upper) Controller Card, first remove the network CAT5 cable from the upper card's LAN Port. The Active LED will extinguish on the upper card and illuminate on the lower card. The upper card can now be removed to replace the SD Flash Drive. (Proceed to STEPS 3-4.) Reinstall the Primary Card and reconnect to the network.

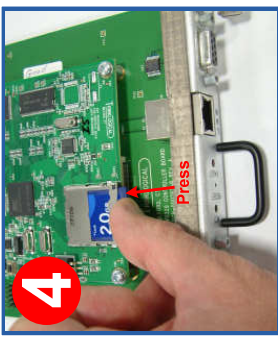
Before removing the Secondary (lower) Controller Card, reinstall the Primary Card and reconnect it to the network. Wait for the Primary Active LED to illuminate. Remove the secondary CAT5 cable. The active LED will remain with the Primary Controller Card. The lower card can now be removed. (Proceed to STEPS 3-4.) Reinstall the Secondary Card and reconnect to the network.

If there is only one Controller Card (upper) installed, the unit will power down when the Controller Card is removed. (Proceed to STEPS 3-4.) Reinstall the Primary Card and reconnect to the network.

3



4




STEP 3: Remove the Controller Card that will have the SD Flash Drive replaced. The SD Flash Drive is the small Secure Digital Memory Drive at J1 on the AVR Processor Board (PCB-000170-R).

STEP 4: To eject the SD Flash Drive from its connector bracket at J1, press the exposed edge of the card into the bracket. A spring-hatch will release and eject the SD Flash Drive. The new SD Flash Drive can now be inserted into the J1 connector bracket until it snaps into place.

STEP 5: When both updated Controller Cards have been reinstalled into the HDX576 Chassis and connected to the network, verify that the Active LED is illuminated on the Primary Controller and that all system functions are operating properly. If reinstalling a single Controller Card, it must go into the Primary (upper) slot.

SD Flash Drive



Appendix D: X4 Configurator Software

The X4 Configurator Software allows for easy and intuitive setup and control of the switching between source computer or video entities and user display destinations such as desktops, theaters, conference rooms, editing suites, control consoles, video walls, biomedical imaging arenas, satellite mapping, etc. In addition, single video sources may be multi-cast (one to more than one) or broadcast (one to all) to desired destinations. Additionally, macro presets may be created for saving and recalling commonly used input and output ties.



Note: The HDX Router line can also be controlled via an ASCII interface. There is an additional manual for the ASCII Interface found on our website or available upon request (VxRouter-ASCII-API)

Controlling the HDX Router(s) with the X4 Configurator software requires an external Control Computer. This computer may be configured to fit in with your facility's existing network, but HDX Routers require static IP addresses. If your facility will not allow static IP addresses on its own network, then it may be necessary for the Control Computer to have two network cards—one for the facility interface, and an additional one for controlling the routers. Router information is stored by IP Address so it should not change. A web browser is used to manage the HDX Router(s).

One or more HDX Routers can be controlled via a web-based software package running on a Control Computer running Microsoft Windows or Linux.

Installation, Linux:

The Linux installation is automatic and allows few options.

Installation, Windows:

There are options available during the Windows installation. If, for example your Windows machine already has Python and the pyWin extensions installed, then the first two checkboxes can be unchecked as they are for installing (or unnecessarily reinstalling) those packages.

The install process also asks if the configuration files should be available to just you or to all users. This determines where the configuration files will be placed.

Install Python2.6 _____ (unnecessary if previously installed)
Install Python win32 extension _____ (unnecessary if previously installed)
Create LSI/X44 Directory Tree _____ (leave checked)
Install X44 Configurator Programs _____ (leave checked)
Install X44 Default Configuration Files _____ (leave checked)
Create X44 Configurator Service _____ (leave checked)
Start X44 Configurator Service _____ (leave checked)

After installation (which also starts the web server as a Windows service), open a browser and set the URL to the address of the server machine. Once the network(s) are configured and the control software is running, the control pages can be accessed from any connected client PC by



starting a browser and setting the URL to the name/address of the control server as set by the network administrator.

The user will be greeted with the following login screen:

The login screen features the 'thinklogical' logo at the top, with the tagline 'The Future of Access and Control' underneath. Below the logo, it says 'Please log in...'. There is a central form with two input fields: 'USERNAME' and 'PASSWORD'. A 'Submit' button is located at the bottom right of the form.

Figure 24: X4 Configurator Log In Screen

The installation software includes two default accounts as show below. Please log in using admin for first time set up.

Username:	admin	Password:	admin
Username:	user	Password:	user

When the router is first being configured, there will be stations defined. The setup process is described starting on page 43.



NOTE- There is a **HELP** tab located on each page. This tab will provide you with version information as well as information on the specified page.

CONNECTIONS

When logged in, you will land on the Connections page. This page displays destinations on the left side of the screen and sources on the right. These settings can be changed to meet your preferences.

To make a Connection

- Click a source to select it
- Click one or more destinations to make connections



Figure 25: PC 01 has been selected as a source

A connection is made when the name of the source appears in half of the destination box, and the 'X' becomes the same color as the stripe(s) above the source. Many additional destinations can be clicked and connected to the same source.

When a serial control signal is required from destination to source, many destinations can be connected to view the video *from* the source but only one can have control of the source. The method used for determination of which connected destination has control is described starting at page 45.

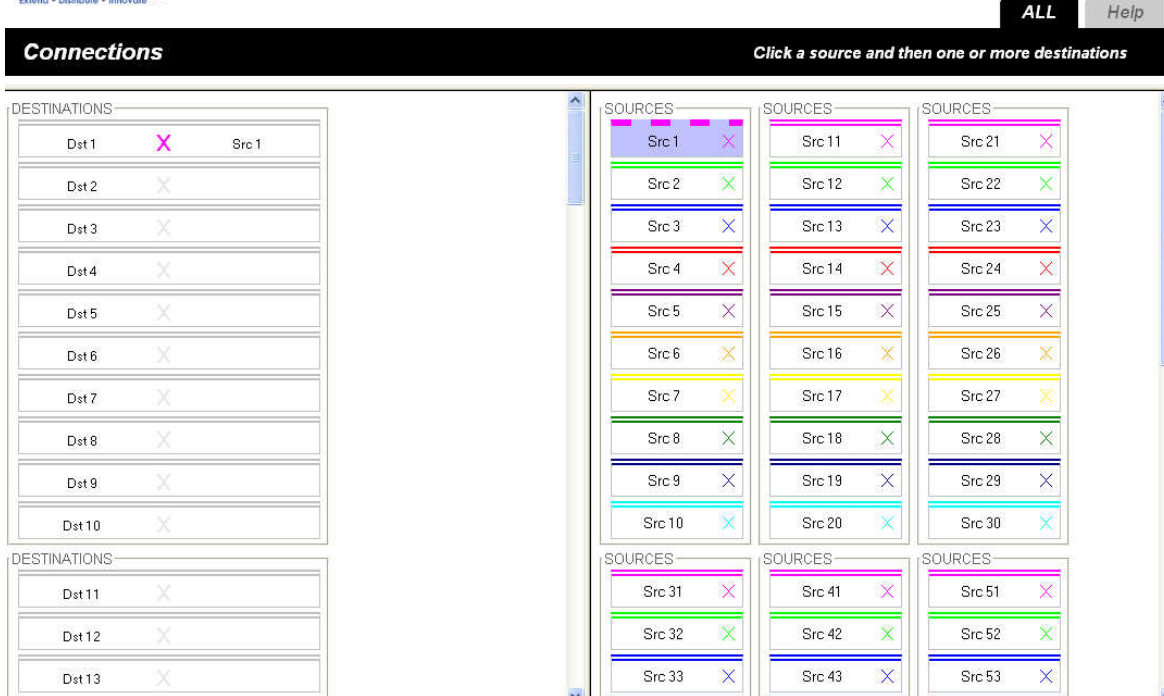


Figure 26: Source PC01 has been connected to Destination DESK 01

When a destination is receiving the video from the source and has the connection necessary to control the source (if serial control is to be used), that destination will display both the source's name and a small mouse icon. Only the destination with the control signal connected will show the icon for that source.

To disconnect a source from a destination, simply click the 'X' on the destination.

ADMINISTRATION

When logged in as administrator you use the ADMIN link from the top of the browser window to load the ADMIN page and edit:

- Stations
- Groups
- Router
- Macros
- Snapshots

From the ADMIN page you can also access the "Tests" functions and/or view "Help" information on whichever page is current.



NOTE- There is a "Backup" button located on each page that will save a backup file to your desktop for all the current settings. This will allow you to revert to previous settings by reverting to saved files.

You can alternately edit all of the configuration files using a spreadsheet program or text editor. All the files are in .csv format and their locations are described below. Changes made will be automatically updated on the web interface when they are saved.

Configuration Files

The HDX routers use .csv formatted spreadsheet files as configuration files. Every configuration file used to setup the web interface has the extension “.csv” for “comma separated values” and can be viewed, modified, and saved using most modern spreadsheets (Microsoft Excel, OpenOffice Calc, GNUmeric, etc.).

The three (3) most important configuration files are found in X44/setup/ and are named: *groups.csv*, *router.csv*, and *stations.csv*.

Linux:

When running in Linux, these files will be found in:
`/opt/lsi/hdxrouter/intuicon/X44/setup/`

Windows7:

If during installation you selected to make it available to all users, then the configuration files will be found in: `\ProgramData\LSI\X44\setup\`

*(*Note: The “ProgramData” directory is hidden by default. It can be made visible in: Control Panel > Folder Options > View)*

If installed for just one user, the files are in:

`\Users\<user's name>\AppData\Roaming\LSI\X44\setup`

WindowsXP:

If the installation was performed for all users, the configuration files will be found in:

`C:\Documents and Settings\All Users\Application Data\LSI\X44\setup`

If installed for one user:

`C:\Documents and Settings\<user's name>\Application Data\LSI\X44\setup`

STATIONS

Stations are user defined source or destination signals that should be treated as a single object. A source station may be a single video source, a video source with a control return signal, or even multiple video signals that should always be switched together.

Some stations may need to be protected from accidental (or malicious) connections and disconnections by unauthorized users. To facilitate this, each station has one or more fields used to specify which "groups" (collections of users) can see and control that station.

A station needs: a name, one or more ports within a router chassis, and, if access is to be restricted, some way to determine who has access to the station ("Viewable").

In addition, sources can have different colored stripes across the top to help make connections easier to see. When a destination is connected to a source, the "X" that separates the destination from its active source is given the same color as that assigned to the source. If a connected destination or source has the cursor over it, the stripes at the top of the source and all the destinations connected to it will become thicker and turn the color of that source to make connections easier to discern at a glance.

stations.csv This file creates sources and destinations and determines which router ports are part of which stations.

To view and edit the stations.csv file using web access, set your browser's URL to the web server and select "ADMIN" from the links at the top and then "STATIONS" from the tabs on the ADMIN page.

[CONNECT](#) [ADMIN](#) [MACROS](#) [STUDIO](#) [GROUPS](#) [QUICKCONNECT](#) [LOGOUT](#)

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Administration
Select from the tabbed choices above

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any **column header** to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

Width:	Height:	Font Size:	Update Interval:	Destination Side:	Connection Type:
120	28	12	2000	RIGHT	SHARE

Source Category:	Source Category:	Source Category:	Source Category:	Source Category:	Source Category:	Source Category:
ALL	Rack 107	Rack 109				

Destination Category:	Destination Category:	Destination Category:	Destination Category:	Destination Category:	Destination Category:	Destination Category:
ALL	Rack 107	Rack 109				

Source Name:	Router Name:	L1:	L2:	L3:	Category:	Category:	Color:
Src 1	40	UR-001	UT-001		ALL	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		ALL	Rack 107	lime
Src 3	40	UR-003	UT-003		ALL	Rack 109	blue
Src 4	40	UR-004			ALL		red
Src 5	40	UR-005			ALL		purple
Src 6	40	UR-006			ALL		orange
Src 7	40	UR-007			ALL		yellow
Src 8	40	UR-008			ALL		green
Src 9	40	UR-009			ALL		navy
Src 10	40	UR-010			ALL		aqua
Src 11	40	UR-011			ALL		fuchsia
Src 12	40	UR-012			ALL		lime

Figure 27: View of Stations on the Administration Page

The first set of rows are for global values that will apply to all the stations and browsers. These include the width, height, and font size for the on-screen icons that represent the stations. The interval (in milliseconds) between browser updates and the type of connection are also global values.

The **connection type** setting in the stations.csv file deserves additional detail: Connections are

made on the connect page, which represents sources and destinations as individual boxes on opposite sides of the screen. Connections are made by clicking a source to select it and then clicking one or more destinations. The connection type determines how these connections are made.

Update Interval:	Destination Side:	Connection Type:
2000	RIGHT	SHARE

Source Category:	Source Category:	Source Category:	Source Category:

Destination Category:	Destination Category:	Destination Category:	Destination Category:

❌ Connect

VIEW
SHARE
TAKE

Figure 28: Connection Type Setting

- *VIEW* will cause the newly clicked destination to be fed by the currently selected source in addition to any previously connected destinations. If the source has a back channel for serial control of the source, then only the first destination connected will be able to transmit that control. All additional destinations will see the video (if there is any), but only the first will have control.

- *SHARE* is much like *VIEW*, except the last destination connected will be able to supply the return control signal instead of the first. This allows rapid switching of control among multiple destinations which is particularly valuable during collaborative work.

- *TAKE* is the final connection type. In the case of a *TAKE* style connection, only the last destination connected to a source will have both video and control. Any existing video connections between the selected source and other destinations will be lost so that only the last destination connected will have video from and serial control to the source.

*(*Note: If there is no serial control signal to be sent to the source, then VIEW and SHARE behave identically.)*

Source Category and Destination Category

In the STUDIO page, only a small subset of the sources and destinations can be seen at a single time. Source and destination categories segment the sources and destinations into smaller, more manageable collections. While the CONNECT page allows all the sources to be seen in the same window (with scrolling when necessary), it still makes good sense to separate the stations into smaller related categories to organize the available stations.

To create a category, add the chosen name to the rows with headers titled “Source Category” and “Destination Category”. This will insure that a tab (on the CONNECT page) or a button (on

the STUDIO page) will be visible. Adding stations to the categories will be covered in the next section.

The next collections of rows are where the administrator will spend most of their configuration time. The headers for the source stations will have (at least) columns for “Source Name”, “Router Name”, one or more headers with names ranging from “L1” to “L5”, one or more “Category” headers, and “Color”.

Source Name:	Router Name:	L1:	L2:	L3:	Category:	Category:	Color:
Src 1	40	UR-001	UT-001		ALL	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		ALL	Rack 107	lime
Src 3	40	UR-003	UT-003		ALL	Rack 109	blue
Src 4	40	UR-004			ALL		red
Src 5	40	UR-005			ALL		purple
Src 6	40	UR-006			ALL		orange
Src 7	40	UR-007			ALL		yellow
Src 8	40	UR-008			ALL		green
Src 9	40	UR-009			ALL		navy
Src 10	40	UR-010			ALL		aqua
Src 11	40	UR-011			ALL		fuchsia
Src 12	40	UR-012			ALL		lime

Figure 29: Required Station Headers

Required Headers:

- *Source Name*: This is the name that will appear in the CONNECT and STUDIO screens, and it is also the name that macros will use in connect and disconnect steps.
- *Router Name*: The web server can support multiple HDX routers, and a station may span more than one router (perhaps with video on one, data on another). Each router name applies to the port names that follow it until another router name is encountered.
- *L1 through L5*: The port names below these headers become part of the station. New columns can be added by right-clicking on an existing L column header and selecting “Append” from the drop down menu.
- *Category*: As described previously, categories are subsets of the stations. These let stations be grouped together according to the administrator’s wishes. Each station can belong to multiple categories. New category columns can be added by right-clicking on the Category: header and selecting “Append” from the drop down menu.
- *Color (only found in the Source rows)*: In the “CONNECT” screen, each source icon has a stripe and an “X” whose color is assigned by the “color” field. When a connection is made between source and destination, the name of the source will appear in the destination and the X inside the destination will become the same color as the source’s.

Deleting Unused Columns:

Some columns are not always used. If, for example, the router will only be serving single headed sources and destinations, then only L1 (first video) and possibly L2 (serial control, if

present) are required and L3 (second video) is unnecessary. To clean up the spreadsheet, right click the L3 header and select “Delete” from the drop down menu, and then confirm your choice. The L3 column will be removed.

Source Name:	Router Name:	L1:	L2:	L3:	Category:	Category:	Color:
Src 1	40	UR-001	UT-001		Column	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		Append	Rack 107	lime
Src 3	40	UR-003	UT-003		Delete	Rack 109	blue
Src 4	40	UR-004			ALL		red
Src 5	40	UR-005			ALL		purple
Src 6	40	UR-006			ALL		orange
Src 7	40	UR-007			ALL		yellow
Src 8	40	UR-008			ALL		green
Src 9	40	UR-009			ALL		navy
Src 10	40	UR-010			ALL		aqua
Src 11	40	UR-011			ALL		fuchsia
Src 12	40	UR-012			ALL		lime

Figure 30: Deleting Unused Column

Optional Columns:

- *Viewable*: This column is necessary whenever non-admin user groups are used. Each station, source or destination, is by default hidden from all groups except the admin. To make a station viewable to a group, the group’s name must appear in the “Viewable” column on the station’s row. This column is created by right-clicking the header for the last column and selecting “Append” from the drop down menu, and then clicking the header in the new column and selecting “Viewable” from the drop down menu. Multiple “Viewable” columns can be added and used so stations can be seen by multiple groups.

- *Takeable*: This column is used in special situations where the ability of one group to take control of a source station’s serial control (if present) must be restricted. Only groups whose name is in the takeable column can take the control signal from an existing destination. This column is created by right-clicking the header for the last column and selecting “Append” from the drop down menu, and then clicking the header in the new column and selecting “Takeable” from the drop down menu. (*Note: In practice, the Takeable column is almost never needed.)

Adding Viewable and/or Takeable Columns:

Source Name:	Router Name:	L1:	L2:	Category:	Category:	Color:	
Src 1	40	UR-001	UT-001	ALL	Rack 107	fuchsia	
Src 2	40	UR-002	UT-002	ALL	Rack 107	lime	
Src 3	40	UR-003	UT-003	ALL	Rack 109	blue	
Src 4	40	UR-004		ALL		red	
Src 5	40	UR-005		ALL		purple	
Src 6	40	UR-006		ALL		orange	
Src 7	40	UR-007		ALL		yellow	
Src 8	40	UR-008		ALL		green	
Src 9	40	UR-009		ALL		navy	
Src 10	40	UR-010		ALL		aqua	
Src 11	40	UR-011		ALL		fuchsia	
Src 12	40	UR-012		ALL		lime	

Column
Append
Delete

Right click on last column header and select "Append"...

Source Name:	Router Name:	L1:	L2:	Category:	Category:	Color:	Color:
Src 1	40	UR-001	UT-001	ALL	Rack 107	fuchsia	
Src 2	40	UR-002	UT-002	ALL	Rack 107	lime	
Src 3	40	UR-003	UT-003	ALL	Rack 109	blue	
Src 4	40	UR-004		ALL		red	
Src 5	40	UR-005		ALL		purple	
Src 6	40	UR-006		ALL		orange	
Src 7	40	UR-007		ALL		yellow	
Src 8	40	UR-008		ALL		green	
Src 9	40	UR-009		ALL		navy	
Src 10	40	UR-010		ALL		aqua	
Src 11	40	UR-011		ALL		fuchsia	
Src 12	40	UR-012		ALL		lime	

New column is added with same header name.

Source Name:	Router Name:	L1:	L2:	Category:	Category:	Color:	Color:
Src 1	40	UR-001	UT-001	ALL	Rack 107	fuchsia	
Src 2	40	UR-002	UT-002	ALL	Rack 107	lime	
Src 3	40	UR-003	UT-003	ALL	Rack 109	blue	
Src 4	40	UR-004		ALL		red	
Src 5	40	UR-005		ALL		purple	
Src 6	40	UR-006		ALL		orange	
Src 7	40	UR-007		ALL		yellow	
Src 8	40	UR-008		ALL		green	
Src 9	40	UR-009		ALL		navy	
Src 10	40	UR-010		ALL		aqua	
Src 11	40	UR-011		ALL		fuchsia	
Src 12	40	UR-012		ALL		lime	

Station Labels
Router Name:
L1:
L2:
L3:
L4:
L5:
Category:
Color:
Viewable:
Takeable:

Left click on new columns header and select "Viewable".

Source Name:	Router Name:	L1:	L2:	Category:	Category:	Color:	Viewable:
Src 1	40	UR-001	UT-001	ALL	Rack 107	fuchsia	user
Src 2	40	UR-002	UT-002	ALL	Rack 107	lime	
Src 3	40	UR-003	UT-003	ALL	Rack 109	blue	
Src 4	40	UR-004		ALL		red	
Src 5	40	UR-005		ALL		purple	
Src 6	40	UR-006		ALL		orange	
Src 7	40	UR-007		ALL		yellow	
Src 8	40	UR-008		ALL		green	
Src 9	40	UR-009		ALL		navy	
Src 10	40	UR-010		ALL		aqua	
Src 11	40	UR-011		ALL		fuchsia	
Src 12	40	UR-012		ALL		lime	

New "Viewable" column now ready for user group names for stations that should be seen.

Figure 31: Adding Optional Columns

GROUPS

"Groups" are used to restrict access to stations and macros. The admin account can access any page, macro, or stations. Other collections of users - "groups" - can be defined to have their access rights strictly limited to specific assets.

groups.csv : This file determines who can use the router's web control and what they will be able to do.



Note: A user is loosely defined as an individual, and a group is a collection of users that share the same permissions and general behaviors. Each user can have a separate username and password, but once logged in the user, while still identified as an individual user, will be treated as a member of a group and will have the permissions allowed to that group.)

The groups.csv file can be edited either directly with a spreadsheet program, or from the web. To use the web browser, enter the URL for the web server in the address field and then select **GROUPS** from the blue links across the top. Only user groups that the admin has authorized can see, modify, and save the **GROUPS** page.

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Help

Groups/Users Administration

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any column header to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

Groups/Users (format: X44)

Logins Required:	Default Group:
no	admin

Group definitions

Group Name:	Startpage:	Page:	Page:	Page:	Page:	Page:	Page:
admin	connect	admin	macros	studio	groups	quickconnect	
user	connect	macros	touchscreen				
touch	touchscreen						

User definitions

Username:	Group:	Local Password:
admin	admin	admin
user	user	user

Groups assigned by IP address (touchpanels)

IP Address:	Group:	Comment:
192.168.13.9	admin	

Figure 32: Columns on Groups Page

The first header of the first row is “Logins Required”. If the value beneath is “yes”, then any user attempting to access the web server via a browser will be greeted with a login screen and will not see any pages until successfully logging in. If logins are required, then the value of the next header, “Default Group”, has no meaning.

If logins are *not* required, then users accessing the web server without logging in will always be treated as the group listed beneath “Default Group”. This allows one general use group for casual users without logging in. Administrators and other users can still log in to their accounts and be part of their normally assigned groups.

The next set of lines define the groups. Each row describes a group with a “Group Name”, the “Startpage” they will first see after logging in and then any additional pages that will be available to members of that group. *(These additional pages are the blue links across the top of the pages.)*

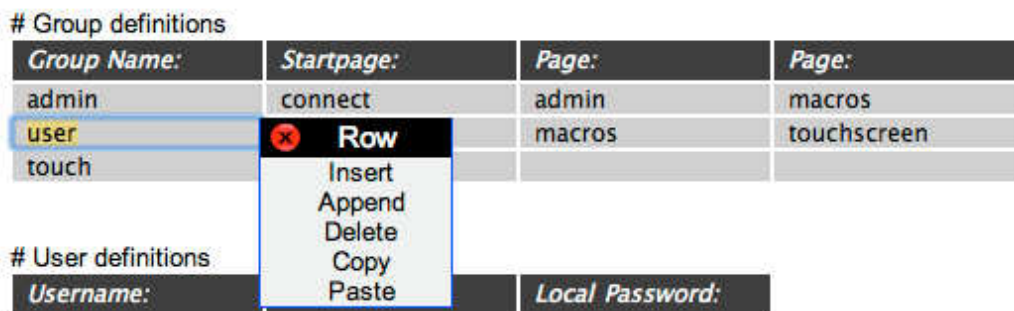
To add a new user group, right-click any field in the row directly above where it should appear and select “Append” from the drop down menu. A new row will appear and the new group’s values should be added there.

Group definitions

Group Name:	Startpage:	Page:	Page:
admin	connect	admin	macros
user		macros	touchscreen
touch			

User definitions

Username:	Local Password:
-----------	-----------------



Right click in previous row pop up the menu, and select “Append” to add a new group row.

Group definitions

Group Name:	Startpage:	Page:	Page:
admin	connect	admin	macros
user	connect	macros	touchscreen
user2	connect	macros	
touch	touchscreen		

After “Append” is selected and “user2”, a startpage, and an additional page entered.

Figure 33: Add New User Group

The next set of rows define users. Each row assigns the values for a user, including the Username, the Group that this user belongs to, and the Local Password for this user. New users can be added in the same manner that a new group was added in the example above.

The final set of rows defines a special class of users that are automatically assigned to a Group based solely on their IP address. These are most often touchpanels that may not have keyboards or sufficient resolution to let a user log in conveniently. Requests from these addresses will *always* be seen as coming from their assigned group - logins from these addresses are not possible.

This allows multiple touchpanels to be part of a common group, or each touchpanel can be an individual group so that each can see only the stations and macros allowed to that group.

The web server software is delivered with logins required set to “no” and the default group set to admin. This is to allow the installer a chance to configure the server right out of the box. After that the administrator can set more restrictive settings if necessary.

Members of the “admin” group can always see every station. Other groups must explicitly be given permissions for each station and macro.

ROUTER

The router tab loads a page that defines the physical routers that the X4 Configurator software will control. Each row describes a different router and requires values for “Router Name”, “Type”, “IP Address”, “Socket” and “Enabled”.

Where appropriate, a drop down list of choices is offered to fill in these values, but it is important that the Type, IP Address (usually 192.168.13.15), and Socket (usually 17567) match the values of the physical router.

The “Enabled” setting determines whether the server will attempt communications with that router. This value can be set to “no” when the router is not available; otherwise the server will periodically attempt to communicate with the router and will show errors. If you are having issues making connections on the router, make sure that this column is set to “Yes”.

The CREATE button will create and save a new default stations.csv file with single head stations (and no back-channel) for every source and destination port for the type of router selected. This function should be used carefully since it will replace the existing station file.



Note: When the CREATE button is used, the previous station file is temporarily saved in the directory setup/backup in case the CREATE button was used accidentally. This directory's contents are temporary and may not persist for more than a few days. If the stations.csv file is accidentally replaced, the administrator should immediately recover the lost file from the setup/backup directory and place it in the setup directory. The location of these directories is described in the previous Configuration Files section.

Administration

Select from the tabbed choices above

Backup

SAVE

Cancel

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any *column header* to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

Routers (version: X4.4)

Router Name:	Type:	IP Address:	Socket:	Enabled:	Default Stations:	Sync Format:	House Sync:	Sync Status:
RouterOne	HDX 80	192.168.7.100	17567	yes	CREATE	AUTO (follow input)	NTSC 525i	locked

Figure 34: View of Router from Administration Page

The “Sync Format” field describes how routers equipped with the sync card will synchronize new connections. The simplest choice is “AUTO (follow input)” which will attempt to use the format of the supplied “House Sync” signal. Clicking in this field will pop-up a list of choices as seen in figure 35.

The “House Sync” field will display the format of the sync detected at the sync input. If no card is present it will display “card not installed”.

“Sync Status” will indicate whether the router has been able to lock to the House Sync using the Sync Format chosen by the user. This field will display “locked” or “not locked”, or, if the card is not present, it will be blank.

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any *column header* to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

Routers (version: X4.4)

Router Name:	Type:	IP Address:	Socket:	Enabled:	Default Stations:	Sync Format:	House Sync:	Sync Status:
RouterOne	HDX 80	192.168.7.100	17567	yes	CREATE	AUTO (follow input)	NTSC 525i	locked

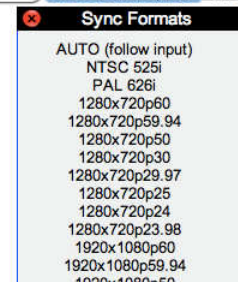


Figure 35: Sync Format choices in drop down list.

MACROS

A macro is a sequence of operations the user can create, save, and recall to repeat steps that will be executed frequently. They can be restricted to specific user groups or made available to all.

Please note that you can also use a .csv file to create, save, edit, and delete macros directly.

To create a new macro, execute the desired commands from the CONNECT page, and then select the MACROS page and press the “Macro from History” button.

Macros

Pressing a button (below) will execute that macro

Back to Macros

New Macro name?

SAVE

Action:	Destination/Macro:	Source:
<input type="checkbox"/> SHARE	DstUp 1	SrcUp 1
<input type="checkbox"/> SHARE	DstUp 2	SrcUp 2
<input type="checkbox"/> SHARE	DstUp 3	SrcUp 3
<input type="checkbox"/> SHARE	DstUp 4	SrcUp 4
<input type="checkbox"/> SHARE	DstUp 1	SrcUp 5
<input type="checkbox"/> SHARE	DstUp 2	SrcUp 6
<input type="checkbox"/> SHARE	DstUp 3	SrcUp 7
<input type="checkbox"/> SHARE	DstUp 4	SrcUp 8

Select All Deselect All Clear History

Figure 36: Create a New Macro

Select the steps that should be part of the macro and give it a name (here it's "1-4") and press SAVE. Once saved the Macro will appear as a new button on the MACROS page.

1-4

Action:	Destination/Macro:	Source:
<input checked="" type="checkbox"/> SHARE	DstUp 1	SrcUp 1
<input checked="" type="checkbox"/> SHARE	DstUp 2	SrcUp 2
<input checked="" type="checkbox"/> SHARE	DstUp 3	SrcUp 3
<input checked="" type="checkbox"/> SHARE	DstUp 4	SrcUp 4
<input type="checkbox"/> SHARE	DstUp 1	SrcUp 5
<input type="checkbox"/> SHARE	DstUp 2	SrcUp 6
<input type="checkbox"/> SHARE	DstUp 3	SrcUp 7
<input type="checkbox"/> SHARE	DstUp 4	SrcUp 8

Select All Deselect All Clear History

Figure 37: Select Steps for Macro

To edit a Macro, navigate to the "ADMIN" page and then select the "Macros" tab. Then, select the macro's name from the "First Select Macro..." drop down box.

Administration

Select from the tabbed choices above

Backup

SAVE

Cancel

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any *column header* to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

- ✓ First Select Macro...
- 1-4
- macro 1
- Create New Macro

New Name? (or leave unchanged)

Delete This Macro

Figure 38: Selecting a Macro to Edit

Once a macro has been selected you can view and edit information about the macro.

CONNECT ADMIN MACROS STUDIO GROUPS QUICKCONNECT LOGOUT

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Macros Stations Router Snapshots Tests Log Help

Administration Select from the tabbed choices above

Backup SAVE Cancel

Click inside any cell to change the contents of that cell, *right-click* inside any cell to see additional row options, *right-click* inside any *column header* to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

1-4 New Name? (or leave unchanged) 1-4

Delete This Macro

Groups that can see this macro

Group:	Group:
admin	

Action:	Destination:	Source:
SHARE	DstUp 1	SrcUp 1
SHARE	DstUp 2	SrcUp 2
SHARE	DstUp 3	SrcUp 3
SHARE	DstUp 4	SrcUp 4

Figure 39: Editing a Macro

The “Group” rows define which user group(s) will be able to see and execute this macro.

Steps can be added or deleted by right-clicking within any element in a row. Existing steps can be modified by left clicking within the *Action*, *Destination*, or *Source* columns.

To change the name of a macro, type the changed name into the text input area to the right of the label, “New Name? (or leave unchanged)”, and press the “SAVE” button on the right.

To delete a macro, select it from the “First Select Macro...” pull down list and then press the “Delete This Macro” button at the far right. This step cannot be undone.

It is also possible to create new macros from the ADMIN-MACROS page. From the “First Select Macros...” pull down menu, find and select the “Create New Macro” line (at the very bottom of the list).

The screenshot shows the 'thinklogical X4Configurator' interface. At the top, there are navigation links: CONNECT, ADMIN, MACROS, STUDIO, GROUPS, QUICKCONNECT, and LOGOUT. Below these is a header bar with the 'thinklogical' logo and 'X4Configurator' text. A tabbed interface is visible with 'Macros' selected, and other tabs include Stations, Router, Snapshots, Tests, Log, and Help. The main content area is titled 'Administration' and includes a prompt to 'Select from the tabbed choices above'. There are three buttons: Backup, SAVE, and Cancel. A text box contains instructions: 'Click inside any cell to change the contents of that cell, right-click inside any cell to see additional row options, right-click inside any column header to add or delete columns (if appropriate), and press the SAVE or Cancel buttons (above) when changes are complete.' Below this is a form with a dropdown menu labeled 'First Select Macro...' and a text input field labeled 'New Name? (or leave unchanged)' with the value 'Needs Name'. A 'Delete This Macro' button is on the right. A table below the form has a header row with six 'Group:' labels and a body row with the value 'admin'. Another table below that has a header row with 'Action:', 'Destination:', and 'Source:' labels, and a body row with the value 'VIEW'.

CONNECT ADMIN MACROS STUDIO GROUPS QUICKCONNECT LOGOUT

thinklogical X4Configurator

Extend • Distribute • Innovate

Macros Stations Router Snapshots Tests Log Help

Administration Select from the tabbed choices above

Backup SAVE Cancel

Click inside any cell to change the contents of that cell, right-click inside any cell to see additional row options, right-click inside any column header to add or delete columns (if appropriate), and press the **SAVE** or **Cancel** buttons (above) when changes are complete.

First Select Macro... New Name? (or leave unchanged) Needs Name

Delete This Macro

All groups that should see this macro must be listed below

Group:	Group:	Group:	Group:	Group:	Group:
admin					

Action:	Destination:	Source:
VIEW		

Figure 40: Create a New Macro

The recommended first step is to change the name from “Needs Name” to something more appropriate. After that, the action, destination, and source fields should be filled in with the appropriate values for the desired activity. More action rows can be added in the usual fashion (right click on the last row, select “Append” from the drop down menu, fill in the new line) until the macro contains all the actions necessary. Then press “SAVE”. The new Macro will appear on the Macros page.

TOUCHSCREENS

Please see Appendix F for configuration instructions.

TESTS

The Test tab allows you to test the port connections of a HDX Router.

How to Perform a Test

- a. From the Router drop down list, select the router you want to test.
- b. Choose from the 'Select a Test' drop down menu:
 1. 1 to 1, 2 to 2, etc
 2. Broadcast chosen source to all
 3. Cycle through sources
 4. Cycle through destinations

The screenshot shows the 'thinklogical X4Configurator' interface. At the top, there are navigation links: CONNECT, ADMIN, MACROS, STUDIO, GROUPS, QUICKCONNECT, BLUEPRINT, and LOGOUT. Below these is a header bar with tabs: Macros, Stations, Router, Snapshots, Tests (selected), Log, and Help. Under the 'Tests' tab, there is a section titled 'Administration' with the instruction 'Select from the tabbed choices above'. Below this, there are two dropdown menus: 'Router Name: Testing VX40' and '1 to 1, 2 to 2, etc.'. To the right of these is a red button labeled 'Disconnect ALL'. Below the dropdowns, there are two large boxes, each containing the text '1,2...' and labeled 'Source Port:' and 'Destination Port:' respectively. To the right of these boxes is a green button labeled 'START'.

Figure 41: Test Function

SNAPSHOTS

Snapshots are recorded and executed from the "Snapshot" tab of the ADMIN page. Snapshots are a way of recording and saving the connections of every single port on one or more routers, including whether or not they are connected at all. When a snapshot is played back or "executed" every port will be reset to the connections that were present when the snapshot was recorded.



NOTE- This process can be disruptive. It should only be used to set all connections to a known state. Since every port is reset and reconnected, even ports that are already connected the same way the snapshot recorded will temporarily lose their connections before being reconnected.

To create a new snapshot, select "Create New Snapshot" from the pull-down list. "Press to record" will appear and should be pressed when the system is connected and ready to be recorded. A name box will also appear with a default name for the new snapshot. Clicking the

"Press to Record" button will cause the system to interrogate every port and save the settings to a new .csv file in the setups/snapshots/ directory with the same name as the snapshot.

To change the name of a snapshot or delete it, select it from the pull-down list. Its name will appear in the text input box next to "Change name here", as well as a "Delete This Snapshot" button. To change the name, change the text in the input box. To delete it, click the "Delete" button and then accept the action on the confirmation pop-up.

Existing Snapshots will appear as buttons and selecting one of these buttons will execute the snapshot after an "Are you sure?" confirmation pop up.

The screenshot shows the thinklogical X4Configurator web interface. At the top, there are navigation links: CONNECT, ADMIN, MACROS, STUDIO, GROUPS, QUICKCONNECT, and LOGOUT. Below these is the thinklogical X4Configurator logo with the tagline "Extend • Distribute • Innovate". A horizontal menu contains tabs for Macros, Stations, Router, Snapshots (which is active), Tests, Log, and Help. Below the menu is a black bar with the word "Administration" on the left and the instruction "Select from the tabbed choices above" on the right. The main content area has a "Create New Snapshot" dropdown menu, a "Change name here" text input field containing "newname", and a green "Press to Record" button. To the right of these are three buttons: "Backup", "SAVE", and "Cancel".

Figure 42: Snapshots

STUDIO

The Studio page is an alternate view to the Connections tab. Connecting ports in the Studio view is a different process and has additional options. (To add this page to the links please see the Groups section.) This page is not designed for use as an administration page. To navigate back to other pages use the back arrow in your browser.

To make a connection, select both a destination and a source (in any order). They will turn blue when selected.

"TAKE" will cause any existing destinations for the selected source to be disconnected, and then the chosen destination will be given the only connection for the chosen source, as well as being connected to the serial control of the source (if present).

"(VIEW)" will not disturb any existing connections from the source, but the new destination will not receive control of the source (if present). This is useful if a user wishes to monitor a source without disturbing any existing users of that source.

The (VIEW) button is rendered with parenthesis to remind users that VIEW only gives them the ability to see the source and not control it. Destination boxes with sources that are connected using VIEW will show the source name in parenthesis meaning that the source can be seen but not controlled. Only one destination will show the source name without parenthesis, and that is the one with the serial control channel (if present).



NOTE: If no other destination is using the source at the time the (VIEW) button is pressed, then the new destination will also get the back channel serial control (if present).

"SHARE" is a hybrid of the first two commands. No existing video connections for the given source are broken, but the new destination will also take over the control (if present). This is useful when two or more user destinations are viewing the same source and they wish to take turns controlling the source. The video will be present at both destinations, but whoever presses SHARE last will be connected to the back channel for serial control (if present).

And as described previously in the (VIEW) section, if SHARE is used to connect a source to a destination, the source name will appear *without* parenthesis in that destination and *with* parenthesis in any other previous destinations also showing that source.

There are also Lock and Unlock buttons to keep control of chosen sources and destinations. When a user has a source or destination (or both) locked, they can be assured that no other user will be able to take video from control of that source.



Figure 43: Studio View

LOGS

To view a log of the activity of the switch you can click on the Logs tab under ADMIN. This will allow you view logins, operations, connections, errors and system updates. This

```

2010.11.17 08:43:38 (system notice) routerCheck
2010.11.17 08:43:38 (system notice) found router "Testing VX40" 127.0.0.1/17567/0080,0000,0000
2010.11.17 08:43:38 (system notice) routerCheck complete
2010.11.17 08:43:52 <X44server.MinHandler instance at 0x010B2FA8> save changes stations
2010.11.17 08:43:52 127.0.0.1 no uname admin save changes stations
2010.11.17 08:43:52 admin config save stations
2010.11.17 08:43:52 (system notice) config reload
2010.11.17 08:43:52 (system notice) loading configuration files...
2010.11.17 09:09:44 <X44server.MinHandler instance at 0x010E0558> save changes stations
2010.11.17 09:09:44 127.0.0.1 no uname admin save changes stations
2010.11.17 09:09:44 admin config save stations
2010.11.17 09:09:44 (system notice) config reload
2010.11.17 09:09:44 (system notice) loading configuration files...
2010.11.17 09:09:44 (system notice) routerCheck
2010.11.17 09:09:44 (system notice) found router "Testing VX40" 127.0.0.1/17567/0080,0000,0000
2010.11.17 09:09:44 (system notice) routerCheck complete
2010.11.17 09:15:30 (system notice) config reload
2010.11.17 09:15:30 (system notice) loading configuration files...
2010.11.17 09:15:30 (system notice) routerCheck
2010.11.17 09:15:30 (system notice) found router "Testing VX40" 127.0.0.1/17567/0080,0000,0000
2010.11.17 09:15:30 (system notice) routerCheck complete
2010.11.17 09:19:58 <X44server.MinHandler instance at 0x00F69030> save changes groups
2010.11.17 09:19:58 127.0.0.1 no uname admin save changes groups
2010.11.17 09:19:58 admin config save groups
2010.11.17 09:19:58 (system notice) config reload
2010.11.17 09:19:58 (system notice) loading configuration files...
2010.11.17 09:19:58 (system notice) routerCheck
2010.11.17 09:19:58 (system notice) found router "Testing VX40" 127.0.0.1/17567/0080,0000,0000
2010.11.17 09:19:58 (system notice) routerCheck complete

```

Figure 44: View of Log File

CONFIGURATION FILE STRUCTURE

The configuration files (stations, groups, router, macros) all share a similar structure. They are encoded in the .csv (comma separated values) format to allow easy access from spreadsheet programs, text editors, and the web-server program itself.

Configuration Files, In General

There are four kinds of rows: blank, comments, headers, and values.

If a row is blank, it is ignored. This allows the creation of white space between blocks of data.

If the first character in the first field of a row is '#', then the contents of the entire row will be ignored. This gives the administrator the ability to enter and save comments.

If the first field in a row ends with ':' (colon), then the program interprets the entire row as a series of "headers". A header describes the meaning and usage of all the fields below the header in that column, until a new series of headers replaces the current ones and supplies new meanings for the values below it.

There are three ways of interpreting the values found in the fields below a header:

- The first is "global". This value is assigned to the name defined in the header above it and it

will apply throughout the application. Examples of a global value would be: “Font Size”, “Connection Type”, and “Update Interval”.

<i>Width:</i>	<i>Height:</i>	<i>Font Size:</i>	<i>Update Interval:</i>	<i>Destination Side:</i>	<i>Connection Type:</i>
120	28	12	2000	RIGHT	SHARE

Figure 45: Global Values

- The second type of value is part of a list. If there are multiple headers with the same name, then the values found below those headers will be added to a list with that name. Examples of lists include “Source Category”, “Destination Category”, and “Viewable”.

<i>Source Category:</i>	<i>Source Category:</i>	<i>Source Category:</i>	<i>Source Category:</i>
ALL	Rack 107	Rack 109	

Figure 46: List Values

- The final type of value is defined when the entire row is meant to be thought of as an “object”. A good example of an object would be a “station” which has its own name, some number of input and/or output ports that should all be switched at the same time, and additional other fields.

<i>Source Name:</i>	<i>Router Name:</i>	<i>L1:</i>	<i>L2:</i>	<i>L3:</i>	<i>Category:</i>	<i>Category:</i>	<i>Color:</i>
Src 1	40	UR-001	UT-001		ALL	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		ALL	Rack 107	lime
Src 3	40	UR-003	UT-003		ALL	Rack 109	blue
Src 4	40	UR-004			ALL		red

Figure 47: Object Values

In the example above, the station with the source name “Src 1” has fields for the router name “40”, the ports used in that router (“UR-001” and “UT-001”), the categories that will show it (“ALL” and “Rack 107”), and the color that this source and the destinations will display when they are connected (“fuchsia”).

X4 Configurator imitates a simplified model of a spreadsheet within the user’s browser. Rows can be added or removed by left-clicking on any of the light gray “value” rows and choosing the proper choice from the drop down menu. New columns can be added by right-clicking on any of the dark “header” fields and selecting “Append” or “Delete” from the drop down menu.

Source Name:	Router Name:	L1:	L2:	L3:	Category:	Category:	Color:
Src 1	40	UR-001	UT-001		ALL	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		ALL	Rack 107	lime
Src 3	40	UR-003	UT-003		ALL	Rack 109	blue
Src 4	40				ALL		red
Src 5	40				ALL		purple
Src 6	40				ALL		orange
Src 7	40				ALL		yellow
Src 8	40				ALL		green
Src 9	40	UR-009			ALL		navy

Figure 48: Right clicking a row

Source Name:	Router Name:	L1:	L2:	L3:	Category:	Category:	Color:
Src 1	40	UR-001	UT-001		ALL	Rack 107	fuchsia
Src 2	40	UR-002	UT-002		ALL	Rack 107	lime
Src 3	40	UR-003	UT-003		ALL	Rack 109	blue
Src 4	40	UR-004			ALL		red
Src 5	40	UR-005			ALL		purple

Figure 49: Right clicking a column

Source Name:	Router Name:	L1:	L2:	L3:	L3:	Category:	Category:
Src 1	40	UR-001	UT-001			ALL	Rack 107
Src 2	40	UR-002	UT-002			ALL	Rack 107
Src 3	40	UR-003	UT-003			ALL	Rack 109
Src 4	40	UR-004				ALL	
Src 5	40	UR-005				ALL	
Src 6	40	UR-006				ALL	
Src 7	40	UR-007				ALL	
Src 8	40	UR-008				ALL	
Src 9	40	UR-009				ALL	
Src 10	40	UR-010				ALL	
Src 11	40	UR-011				ALL	
Src 12	40	UR-012				ALL	

Figure 50: After selecting “Append” from the “Column” drop down

Source Name:	Router Name:	L1:	L2:	L3:	L3:	Category:	Category:
Src 1	40	UR-001	UT-001			ALL	Rack 107
Src 2	40	UR-002	UT-002			ALL	Rack 107
Src 3	40	UR-003	UT-003			ALL	Rack 109
Src 4	40	UR-004				ALL	
Src 5	40	UR-005				ALL	
Src 6	40	UR-006				ALL	
Src 7	40	UR-007				ALL	
Src 8	40	UR-008				ALL	
Src 9	40	UR-009				ALL	
Src 10	40	UR-010				ALL	
Src 11	40	UR-011				ALL	
Src 12	40	UR-012				ALL	

Figure 51: Left click a column header to see header name choices

While each file uses a similar method to define and populate various objects, the kinds of objects created by each file depends on the file name and the software module that reads it.

1. "groups.csv" will be read and interpreted by the module "groups.pyc" to create user groups, individual user accounts, and IP addresses that will always be assigned to specific groups.
2. "stations.csv" will be read and interpreted by "stations.pyc" to set general values for station button sizes and fonts, and also to create the source and destination objects and their constituent ports.
3. "macros" is a directory. Within it are individual files - one for each macro. Since macros can be limited to specific groups, there are "Group:" columns at the top that set who can see and execute each group.

APPENDIX E: Touch Panel Configuration

The Touch Panel allows user-friendly access to the Thinklogical X4 Configurator software for simple actions to be made with the touch of the screen. The unit connects independently to a network and with a onetime configuration, the set-up is easily performed.



NOTE: There is an additional Touch Panel manual available with further detail on set-up and use available from Thinklogical.

There are two ways to configure a touchpanel. One is to use a USB keyboard connected directly to the touchpanel and make any necessary changes directly on that panel. The other is to connect one or more touchpanels to a network and log into them remotely. Both methods are described below.

In both cases, you will first need to decide the IP address of the web server before configuring the touchpanel(s).

Direct Configuration:

1. Attach the USB keyboard to a USB port on the Touch Panel
2. Press Ctrl - Alt - F1 on the Touch Panel to go into text mode
3. When the login appears, type in the following-
username: root

password: emacs_inc

Remote Configuration: Each touchpanel is shipped with DHCP enabled by default.

1. Attach one or more touchpanels to a network with a DHCP server
2. Use "ssh" to access each touchpanel in turn
3. When the login appears, log in with the following values:
username: root

password: emacs_inc

To set up the network:

4. Type cd /etc/network
5. Using vi, edit "interfaces"
6. In the section for eth0,
 - a. Modify the dhcp line to say "static"
 - b. Insert a line "address 192.168.13.161" (with whatever IP address you've chosen for this Touch Panel)
 - c. Add "netmask 255.255.255.0"

d. Save and exit

The completed interface file should look something like this after modification:

```
# /etc/network/interfaces -- configuration file for ifup(8), ifdown(8)

# The loopback interface
auto lo
iface lo inet loopback

allow-hotplug eth0
iface eth0 inet static
address 192.168.13.171
netmask 255.255.255.0
gateway 192.168.13.1
```

To set the browser to find the server:

7. Type `cd /home/user`
8. Using `vi`, edit “homepage” (a single line file that, by default, reads:
["http://192.168.13.9/touch"](http://192.168.13.9/touch))
 - a. Change the IP address to match that of the web server (also called the “Control Computer”)
 - b. Save and exit

The files have now been configured, but the Touch Panel will not use them yet:

9. Type “sync”
10. Type “reboot”

The touch panel will blank its screen and reboot with the new values.

If you are using the Remote Configuration method on multiple touch panels, watch to see which panel blanks and reboots so you can tell which one you've just configured and label it with the proper IP address.

USING THE TOUCHPANEL

The Touch Panel starts up in Detail mode by default, with destinations on the left and sources on the right.

Selecting one or more destinations and a source and then pressing the “Connect” button at the bottom will cause those destinations to be fed by that source, *but only the first destination connected will have the serial control of source (if present).*

Pressing and continuing to press a destination that is already connected to a source (but does not have the control for that source) will cause the connected source’s control to be assumed (taken) by the selected destination.

Macro buttons are available on a separate screen which can be viewed by pressing the “Macros” button at the top of the page.

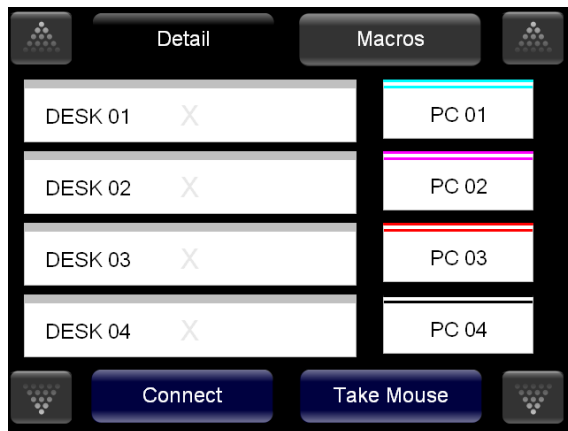


Figure 52: View of Touch Screen

To “take” control of the keyboard and mouse on a different connection simply press the connection for 1.5 seconds. You will be able to tell that the keyboard mouse connection has been switched when the mouse icon appears next to the source.

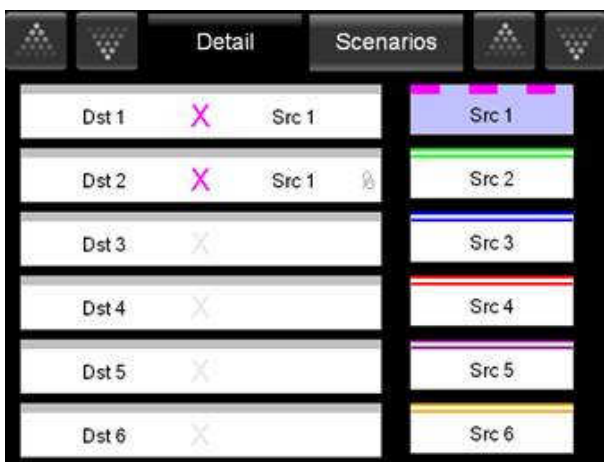


Figure 53: Touch Screen Take control of keyboard mouse

APPENDIX F: MIB FILE

The MIB (Management Information Base) file contains information on the operational status of the HDX Router hardware. The file is located on our FTP site and on the install disk included with your HDX Router. It is also included on the HDX Router SD Card in the directory
/user/share.snmp/mibs

LSI-ROOT.txt

LSI-ROUTER-API-INTERFACE.txt

LSI-SFP.txt

LSI-HDXROUTER.txt