Extron® Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

HDXP Plus Series

Serial Digital Video Matrix Switchers

68-1200-01 **Rev. A**
06 06

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过 。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

Quick Start — HDXP Plus Series Matrix Switchers

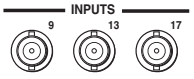
Installation

Step 1

Turn off power to the input and output devices, and remove the power cords from them.

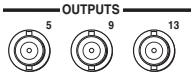
Step 2 — Inputs

Connect up to 16 or 32 high resolution video inputs to the rear panel BNC input connectors. See chapter 2, *Installation*.



Step 3 — Outputs

Connect up to 17 or 33 high resolution video output devices to the rear panel BNC output connectors.

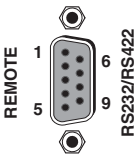


NOTE *One of these outputs is the Preview output, to which you can connect an input to view it.*

See chapter 2, *Installation*.

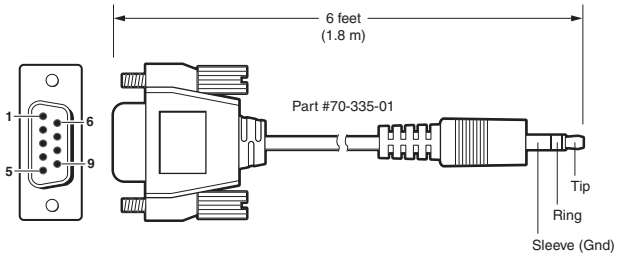
Step 4

If desired, connect a control system or computer to the rear panel Remote RS-232/RS-422 port or the front panel Config RS-232 port.



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX–	Transmit data (–)
3	RX	Receive data	RX–	Receive data (–)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Rear panel Remote RS-232/RS-422 port



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Front panel RS-232 Config port

RS-232 and RS-422 default port settings

Baud rate: 9600 **Parity:** none
Data bits: 8 **Stop bits:** 1
Flow control: none

Step 5

If desired, connect a network WAN or LAN hub, a control system, or computer to the Ethernet RJ-45 port. See chapter 2, *Installation*, for details.

- **Network connection** — Wire as a patch (straight) cable.
- **Computer or control system connection**— Wire the interface cable as a crossover cable.

Ethernet defaults
IP address: 192.168.254.254
Subnet mask: 255.255.0.0
Gateway IP address: 0.0.0.0

Step 6 — Power

Plug the HDXP into a grounded AC source.

Definitions

Tie — An input-to-output connection.

Set of ties — An input **tied** to two or more outputs.

Configuration — One or more **ties** or **sets of ties**.

Current configuration — The currently active **configuration** (also called **configuration 0**).

Global preset — A **configuration** that has been stored. One **global preset** can be assigned to each input button. When a **global preset** is retrieved from memory, it becomes the **current configuration**.

Front Panel Controls

Input and output buttons select inputs and outputs. The buttons light **green** to indicate selection. The buttons light **red** to indicate selection in preview mode. Input and output buttons also select presets.

Enter button saves changes.

Preset button saves a configuration as a preset or recalls a previously-defined preset.

View ▼ button selects a view-only mode that enables viewing of the configuration while preventing inadvertent configuration changes.

Esc ▲ button cancels selections in progress and resets the front panel button indications. This button does **not** reset the current configuration or any presets.

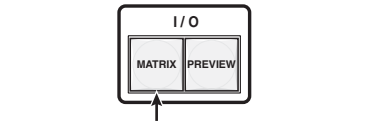
Matrix button places the HDXP in matrix mode, in which any input can be switched to any output.

Quick Start — HDXP Plus Series Matrix Switchers, Cont'd

Preview button places the HDXP in preview mode, in which one input at a time can be selected for viewing.

Creating ties

1. Press and release the Matrix button.



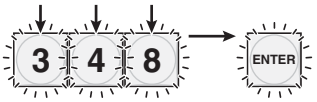
Press the Matrix button to enter matrix mode.
The button lights **green** when selected.

2. Press and release the desired input button.

The button lights to indicate the selection.

3. Press and release the desired output button(s).

The buttons blink green, indicating the need to confirm the change.



4. Press and release the Enter button.

Viewing ties

To view the existing ties, enter view-only mode as follows:

1. Press and release the View ▼ button.
2. Select the input or output whose ties you wish to view by pressing its input or output button. All I/O buttons tied to the one you press, and all output buttons without ties, light.
3. To exit view-only mode, press View ▼ again.

Muting and unmuting an output

To mute an output:

1. Press and release the View ▼ button to enter view-only mode.
2. Press and **hold** an output button until it starts to blink (about 2 seconds).
3. Repeat step **2** for each output to be muted.
4. When finished muting, press View ▼ again.

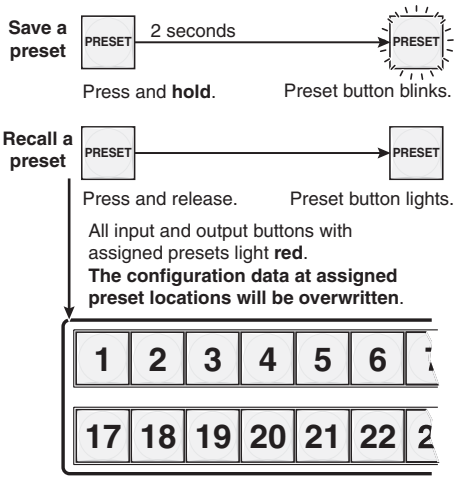
To unmute an output:

1. Press View ▼. The buttons for any muted inputs begin blinking green.
2. Press and **hold** an output button until it lights steadily (approximately 2 seconds).
3. When finished unmuting, press View ▼ again.

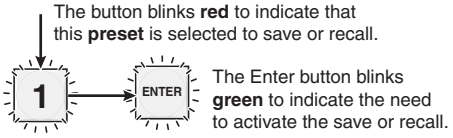
Saving or recalling a preset

1. **Save** a preset — Press and **hold** the Preset button for 2 seconds.

   Recall a preset — Press and release Preset.



2. Press and release the desired input or output button.

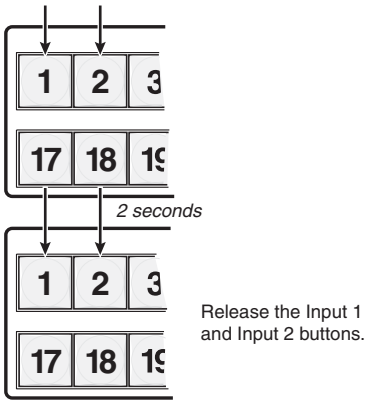


3. Press and release the Enter button.

Selecting button background illumination

To turn the amber button background illumination on and off, press and **hold** the Input 1 and Input 2 buttons until the button background changes (approximately 2 seconds).

Press and **hold** the Input 1 and Input 2 buttons simultaneously to toggle background illumination mode on or off.



Release the Input 1 and Input 2 buttons.

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Chapter One

Introduction

Introduction

About this Manual

This manual contains installation, configuration, and operating information for the Extron HDXP Plus Series matrix switchers, including the HDXP 1616, HDXP 3216, and HDXP 3232 matrix switchers.

The terms “HDXP, “ “switcher,” and “HDXP switcher” are used interchangeably in this manual to refer to all three HDXP models.

About the HDXP Plus Series Matrix Switchers

The Extron HDXP Plus Series are multi-rate digital matrix switchers that distribute any serial digital interface (SDI) or high definition serial digital interface (HD-SDI) input to any combination of SDI/HD-SDI outputs. The HDXP matrix switchers can route multiple input/output configurations simultaneously. They can route all SMPTE and ITU standard serial digital video signals up to 2.97 gigabits per second (Gb/s), including dual-link HD-SDI digital video signals and high resolution signals from computer-video graphics cards equipped with HD-SDI outputs. Three matrix sizes are available:

- HDXP 1616 (16 inputs by 17 outputs)
- HDXP 3216 (32 inputs by 17 outputs)
- HDXP 3232 (32 inputs by 33 outputs)

The HDXP inputs can equalize incoming signals on up to 300 feet (100 meters) of high-quality cable, such as the Extron RG-6 Super High Resolution (SHR) coaxial cable. The outputs can re-clock and drive all digital signals up to 300 feet on RG-6 cable.

The HDXP Plus series switchers conform to SMPTE and ITU-R BT specifications and support data rates of 143 megabits per second (Mb/s) through 2.97 Gb/s.

The HDXP’s zero-skew design ensures that dual-link HD-SDI signals are switched with no timing errors. The inputs automatically adapt to the incoming signal rate, while the output is automatically re-clocked to the rate of the signal routed to it. The output re-clocking can be disabled on a per-output basis (in bypass mode), or it can be set to a fixed rate. For each input, the HDXP can report if a signal is available or missing; and for each output, it can report the signal frequency.

Inputs and outputs can be grouped together to form up to four functional sub-switchers, based on data rate, video format, location, etc. This facilitates installation and front panel control.

The HDXP can operate in two switching modes, selectable via front panel buttons:

- **Matrix switching mode (mode 1):** Any input may be switched to any output.
- **Preview selection mode (mode 2):** Any single input may be selected and previewed.

Each HDXP switcher has the rear panel Remote RS232/RS422 port, the front panel Config RS-232 port, and the LAN port for remote control and configuration. The switcher can be controlled via the front panel, the Extron Simple Instruction Set (SIS™) commands, the HDXP Web pages, and/or Extron’s Windows®-based control software via the RS-232/422 link or an Ethernet connection.

The HDXP 1616 and 3216 models are housed in rack-mountable, 2U (3.5") high, full rack metal enclosures. The HDXP 3232 has a 3U (5.25") high, full rack metal enclosure, also rack mountable. Each model has an internal 100 VAC to 240 VAC, 50/60 Hz, 80 watt, autoswitchable power supply that provides worldwide power compatibility.

Features

Inputs — 16 or 32 SDI/HD-SDI video inputs on BNC connectors

Outputs — 17 or 33 SDI/HD-SDI video outputs (including one preview output) on BNC connectors

Serial digital data rates from 143 Mb/s to 2.97 Gb/s — The HDXP switchers can switch signals conforming to all serial digital and high definition serial digital video transmission standards. They support carriage of embedded audio, ancillary data, and the ID information of the data stream.

SDI-SMPTE 259M and HDSDI-SMTPE 292M compliance

Automatic input cable equalization — Each input signal is equalized. Typically, a 1.485 Gb/s input signal is equalized for distances of 300 feet (100 meters) on high quality cable such as Extron RG-6/SHR coaxial cable.

Automatic rate selection — The HDXP automatically detects and locks onto the incoming data signal. It accepts the following SMPTE data rates:

- **SDI (SMPTE 259M and ITU-R BT .601) —** 143 Mb/s, 177 Mb/s, 270 Mb/s, and 360 Mb/s
- **SDI (SMPTE 344M —** 540 Mb/s
- **HDSDI (SMPTE 292M and ITU-R BT .1129) —** 1.485 Gb/s
- **HDSDI (Dual link) (No Preview function)** — 2.97 Gb/s
- **HDSDI (Double rate) (No Preview function) —** 2.97 Gb/s (with modification)

Digital Sync Validation Processing (DSVP™) — In critical environments or unmanned, remote locations, it may be vital to know that sources are active and switching. Extron's DSVP verifies that input sources are active by scanning all inputs and outputs for active sync signals. It then provides feedback regarding the available input signal and the output signal rate. This information can be displayed via the RS-232/422 interfaces, Ethernet, and the Windows-based control software.

Output re-clocking — Each output has a re-clocker, which detects the rate of the digital input signal stream and retimes the output signal to match it. This enables the signal to travel farther through the cable. All digital signals are re-clocked unless this feature is disabled via remote control (bypass mode).

The following options are available for the output re-clockers:

- They can automatically re-clock the output to the incoming signal rate if it is one of the eight standard SDI/HD-SDI rates. This is the default setting.
- They can be set to a specific rate via SIS commands, the Web pages, or the Windows-based control software.

NOTE *This option is recommended if the signal will always be input at the same rate. Setting to one rate ensures that time will not be lost while the re-clockers detect and retime to the signal rate.*

- They can be bypassed for non-standard signal rates (bypass mode).

Input signal preview — A separate output is provided for previewing any input without tying up one of the matrix outputs.

Channel to channel isolation — Provides a high level of isolation between channels and very low electromagnetic emissions to minimize signal leakage.

Video Genlock (HDXP 3232 only) — Allows for vertical interval switching, and enables smooth, seamless transitions when switching between synchronous video sources. Separate bi-level (SDI) and tri-level (HD-SDI) references are provided on two additional BNC connectors.

Input/output grouping — Allows the matrix to be virtually divided into smaller sub-switchers, making installation and control easier. I/O grouping allows specific outputs, such as those designated for a specific purpose, to be grouped together.

Buffered input and output — Each input and output is individually buffered to provide maximum performance and eliminate nearly all crosstalk.

Viewing input/output mode — Allows you to see which individual inputs and outputs are actively connected.

Global memory presets — You can store up to 32 configurations in memory as global presets. Preset locations are assigned to the input buttons and (where necessary) output buttons. Up to 16 or 32 presets (depending on the number of inputs and outputs) can be selected from the front panel for either saving or retrieving. When a **preset** is retrieved from memory, it becomes the current configuration.

Rooms — Each switcher can be programmed to group multiple outputs to specific "rooms," allowing them to have their own presets. This can be done via SIS commands or the Windows-based control software.

Room Presets — 100 room presets, each consisting of up to 16 outputs in a single room, enable room configurations to be set up and stored. When a room preset is recalled, it becomes the current room configuration.

Switching flexibility — Outputs are individually buffered and independently matrix switched, enabling you to do the following:

- Tie any input to any or all outputs.
- Switch multiple inputs to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.

RS-232/RS-422 connections — An RS-232/RS-422 control port on the rear panel connects the HDXP switcher to a computer running a control system (such as the IP Link Global Configurator), the Windows-based control software, and the SIS command set. In addition, a 2.5 mm TRS configuration port on the front panel provides an RS-232 connection only.

Front panel security lockout (executive mode) — If a matrix switcher is installed in an open area, where operation by unauthorized personnel may be a problem, this security lockout feature can be implemented. When the front panel is locked, a special button combination, SIS command, or selection from the Windows-based control software screens is required to unlock the front panel controller before it can be operated.

Operational flexibility — Operations such as input/output selection and setting of presets can be performed via the front panel, Ethernet, or the RS-232/RS-422 serial ports. The RS-232/RS-422 link allows remote control via a PC or control system. The Ethernet link allows a remote connection with two levels of password protection.

- **Front Panel Control —** The QuickSwitch Front Panel Controller (QS-FPC™) provides a discrete button for each input and each output. An input or output can be selected or switched by a single press of its front panel button. The front panel buttons are large, positive touch, illuminated pushbuttons that can be labeled with text or graphics.
- **Windows-based control program —** Extron's Windows-based control software program provides a versatile range of operational options with its graphical interface and drag-and-drop/point-and-click operation. This program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site. This program can be accessed via either an RS-232/422 or an IP connection.
- **Simple Instruction Set (SIS) —** The Telnet/RS-232/RS-422 remote control protocol uses Extron's SIS commands for easy programming and operation.
- **IP (Ethernet) control —** Allows the switcher to be controlled through an Ethernet local area network (LAN) and/or wide area network (WAN) using standard IP internet protocols. The HDXP Web pages, accessed via Ethernet, provide an alternative method to control and configure the switchers.
- **Remote control panels and keypads —** The HDXP switchers are remote controllable via the optional X-Y switching control MKP 2000 or MKP 3000 keypads, connected to the switcher via Ethernet or the RS-232/422 port. The remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used to select a different input, output, or preset.

Button labeling — Labels for the three-colored front panel buttons may be created with any Brother P-Touch labeler or with the Extron label software, which is shipped with every Extron matrix switcher. Each input and output can be labeled with a name, alphanumeric character(s), or a color bitmap for easy, intuitive input/output selection.

E-mail notification — The built-in SMTP client feature sends out e-mail notifications to specified addresses when a monitored input loses its signal, or when the switcher is powered on. Up to eight e-mail recipients are allowed.

Rack mounting — The HDXP switchers, which have integrated front panel mounting brackets, can be mounted in any conventional 19" wide rack.

Power supply — The 100 VAC to 240 VAC, autoswitchable, internal power supply provides worldwide power compatibility.

Upgradable firmware — The firmware that controls all switcher operations can be upgraded in the field via RS-232/RS-422 or Ethernet, without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip. Firmware upgrades are available for download on the Extron Web site, www.extron.com and they can be installed using the Windows-based control program, SIS commands, or the Web pages.

Application Diagrams

The following diagrams show examples of HDXP applications.

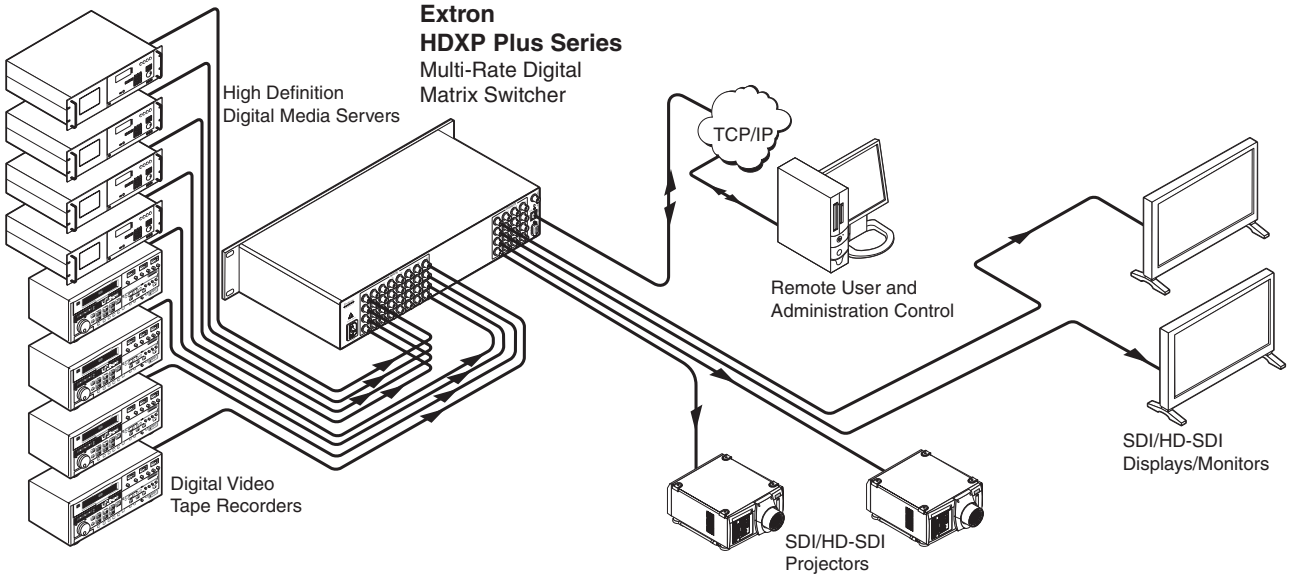


Figure 1–1 — Application diagram for HDXP 3216

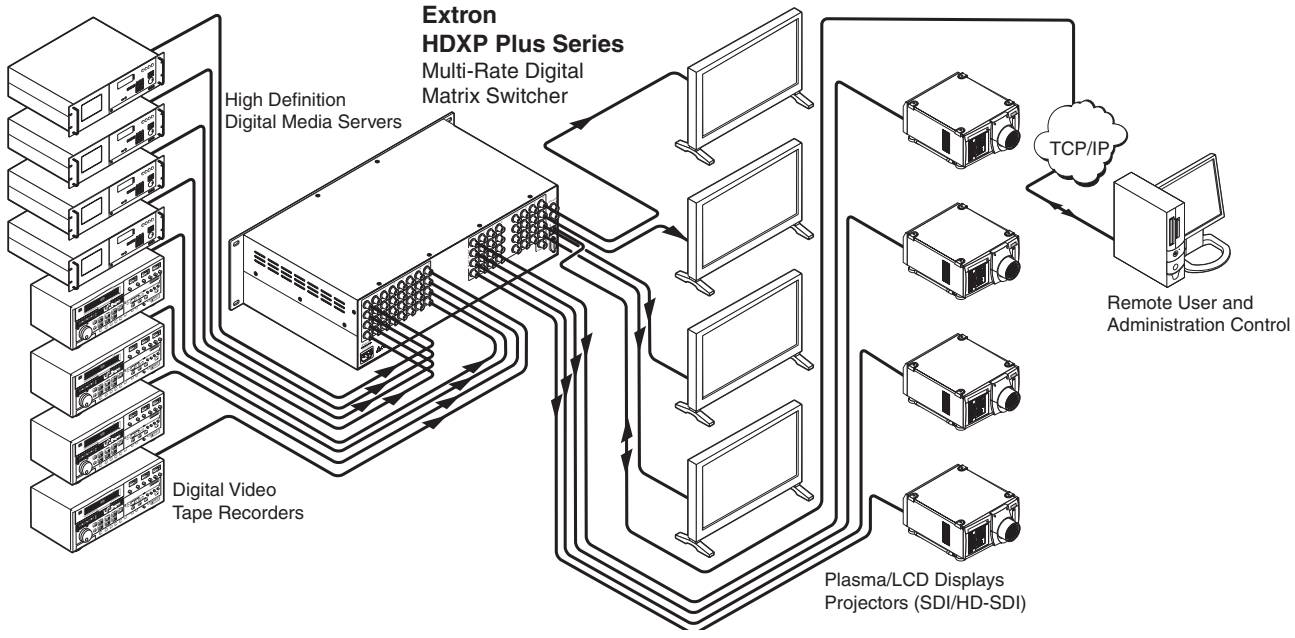


Figure 1–2 — Application diagram for HDXP 3232

Chapter Two

Installation

Mounting the Switcher

Rear Panels and Cabling

Connections

Installation

Mounting the Switcher

The HDXP matrix switchers are housed in rack-mountable metal enclosures with mounting flanges for standard 19" racks. If desired, rack mount the HDXP switcher as follows:

1. Insert the switcher into the rack, aligning the holes in the mounting flanges with those in the rack.
2. Secure the switcher to the rack using the supplied bolts.

The following figure shows a diagram of an HDXP 1616 or 3216 being mounted to a standard 19" rack.

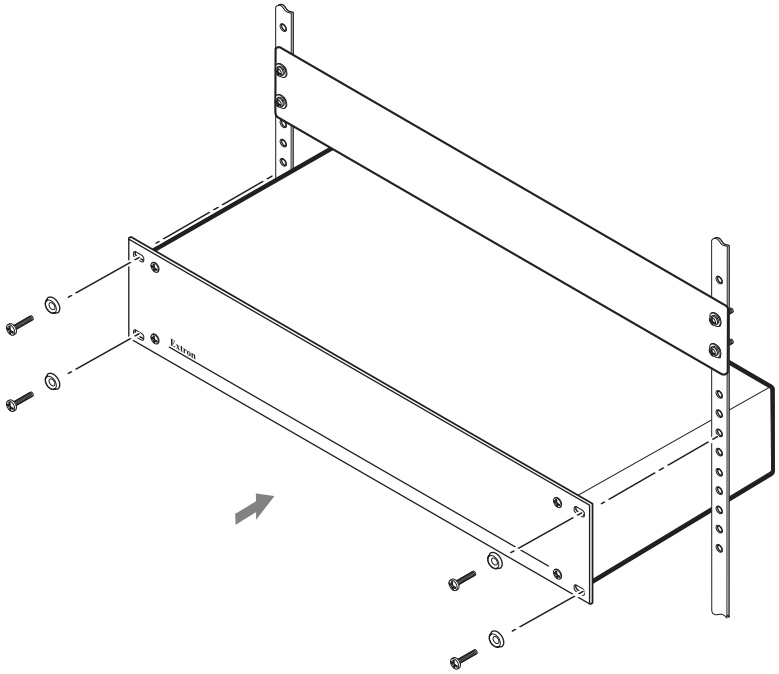


Figure 2–1 — Rack mounting the HDXP

Rear Panels and Cabling

Most of the HDXP connectors are on the rear panel. The following figures show the rear panels of the HDXP 1616, 3216, and 3232 switchers.

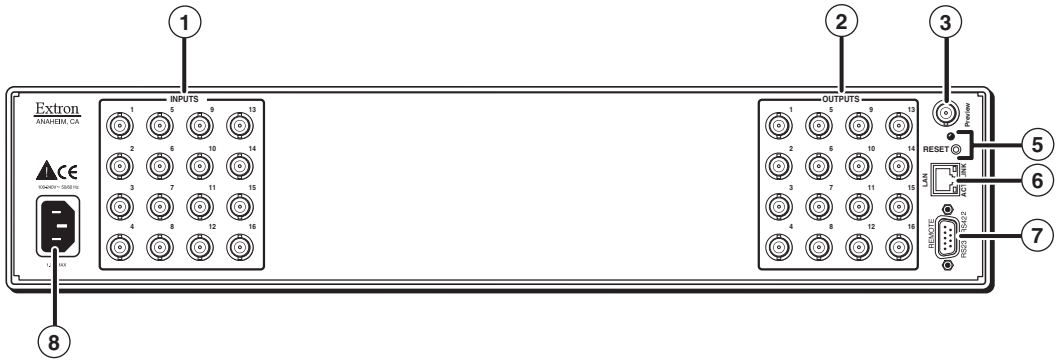


Figure 2–2 — HDXP 1616 rear panel

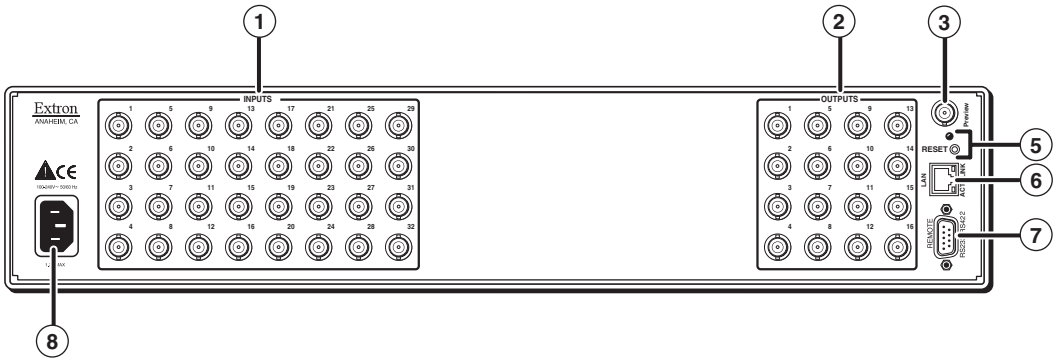


Figure 2–3 — HDXP 3216 rear panel

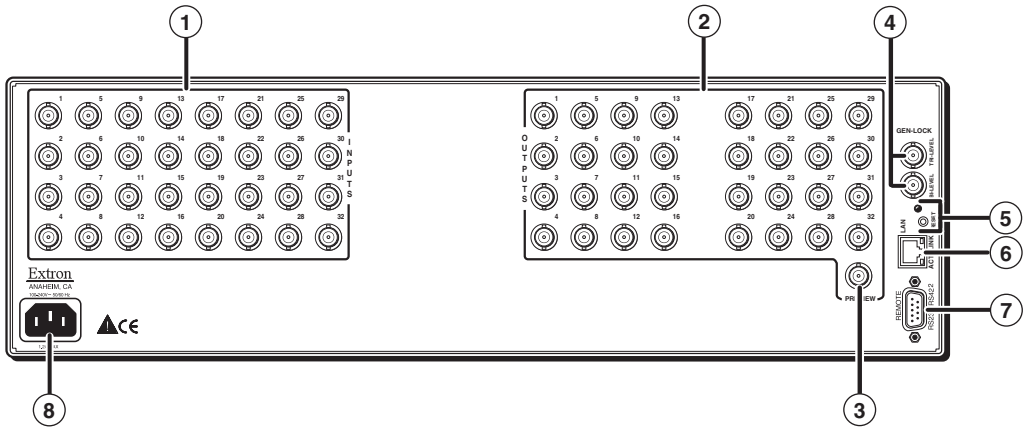


Figure 2–4 — HDXP 3232 rear panel

Connections

CAUTION *Use Electrostatic discharge precautions (be electrically grounded) when making connections. Electrostatic discharge (ESD) can damage equipment, although you may not feel, see, or hear it.*

WARNING *Remove power from the system before making any connections.*

Video connections

NOTE *The switchers do not alter the video signal in any way. The signal that is output by the switcher is in the same format as the input signal.*

① **Video inputs —** Connect serial digital input sources to these female BNC connectors.

② **Video outputs** — Connect serial digital video output devices to these female BNC connectors.

③ **Preview output** — Connect a digital display device to this female BNC connector to enable you to preview a selected input when the switcher is in preview mode.

External sync connections (HDXP 3232 only)

④ **External sync connectors for bi-level and tri-level —** Connect an external sync signal to this BNC connector to genlock the video signal in broadcast or other sync-critical applications.

The HDXP switchers switch between inputs during the vertical interval period, resulting in glitch-free video switching when the input devices are also using the same sync timing. The HDXP can use an external signal to synchronize switching during the vertical interval. Without this external sync locking feature, switching between inputs could result in a brief rolling (sync loss) or a brief change in the picture size.

Figure 2-5 shows a basic external sync configuration. The Bi-level or Tri-level sync connector receives the timing signal. A tee connector attached to the cable allows the signal to be passed on to another video device, if required. Terminate the tee connector if desired.

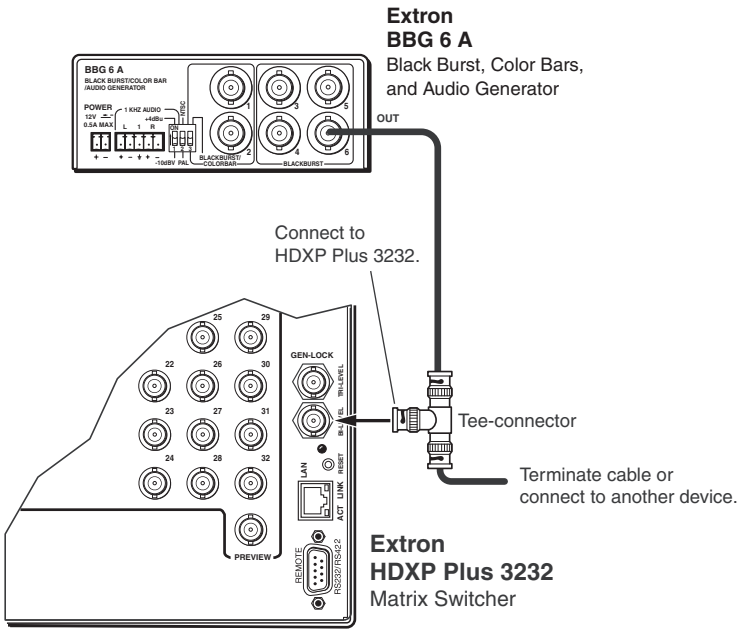


Figure 2–5 — Simple HDXP 3232 external sync connection example

Figure 2-6 shows another configuration, in which the timing source passes through three video cameras and a video scan converter before connecting to the switcher. This type of video camera is capable of synchronizing with the external timing source for video editing applications.

NOTE *I/O grouping is used to set the inputs associated with each reference input. Input group 1 is associated with the tri-level signal; input group 2 is associated with the bi-level signal.*

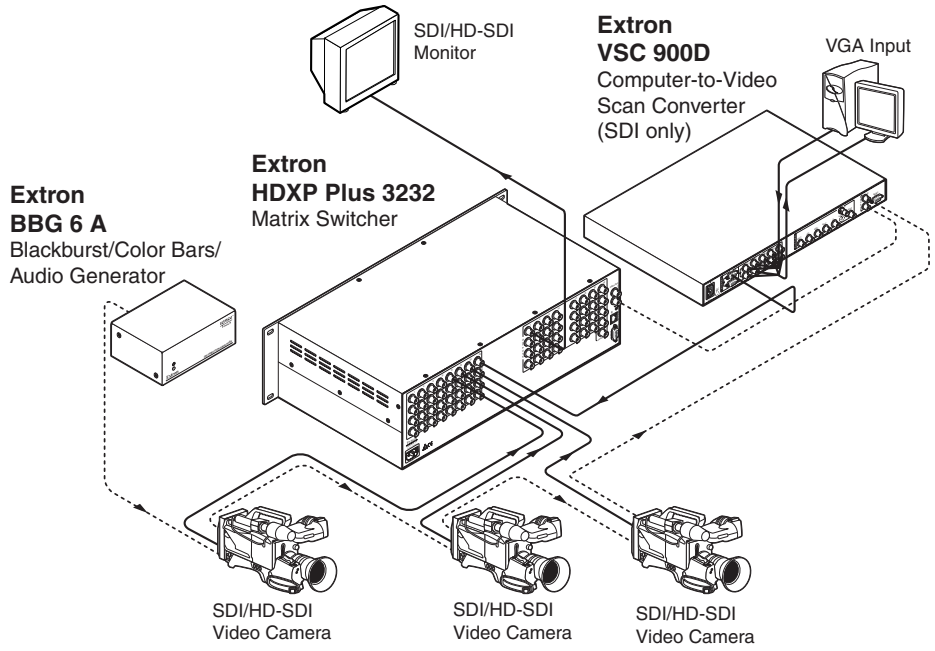


Figure 2–6 — Multiple device example of an HDXP 3232 external sync

If no external sync timing source is connected to the switcher, switching occurs immediately.

Reset button

⑤ **Reset button** — This recessed button initiates three levels of reset on the matrix switcher. To initiate the different levels of reset, use a pointed object such as an Extron Tweeker (small screwdriver) or a pointed stylus to press and hold the Reset button while the switcher is running or while you are powering it up. See *Resetting* in chapter 3, *Operation*, for details.

- **Events (mode 3) reset** — Hold Reset for 3 seconds then release and push again to toggle events monitoring on and off.
- **IP settings (mode 4) reset** — Hold Reset for 6 seconds, then release it and press it again to reset the switcher's IP functions.

NOTE *IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset** — Hold Reset for 9 seconds then release and push again to restore the switcher to the default factory conditions.
- **Hard reset** — Hold Reset while powering up the switcher to restore the switcher to the default factory conditions.

NOTE *This type of reset does not clear the current configuration.*

Ethernet connection

⑥ **Ethernet port** — If desired, connect the HDXP switcher to a PC or to an Ethernet LAN via this RJ-45 connector. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is either running Extron's windows-based control program or that has downloaded HTML pages from the switcher.

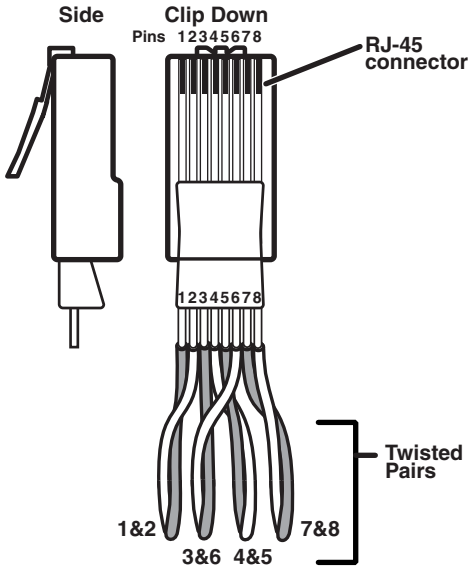
Ethernet connection indicators — The Link and Act LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily. The Act LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling and RJ-45 connector wiring

It is vital that you use the correct Ethernet cables, and that they be properly terminated with the correct pinout. Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length of 328' (100 m).

NOTE *Do not use standard telephone cables. Telephone cables do not support Ethernet or Fast Ethernet.*

Do not stretch or bend cables. Transmission errors can occur.



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure 2–7 — RJ-45 connector and pinout tables

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex, Ethernet connections.

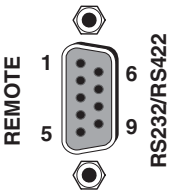
- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

The Ethernet cable must be properly terminated for your application as either a crossover or a straight-through cable.

- **Crossover cable** — Direct connection between the computer and the HDXP switcher.
- **Patch (straight) cable** — Connection of the HDXP to an Ethernet LAN.

RS-232 and RS-422 remote connections

⑦ **Remote RS232/RS422 connector —** Connect a host device, such as a computer, touch panel control, or RS-232 capable PDA to the switcher via this 9-pin D connector for serial RS-232/RS-422 control.



Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX–	Transmit data (–)
3	RX	Receive data	RX–	Receive data (–)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Figure 2–8 — Remote RS232/RS422 connector

See chapter 4, *Serial Communication*, for definitions of the SIS commands (serial commands to control the switcher via this connector) and chapter 5, *Matrix Software*, for details on how to install and use the control software.

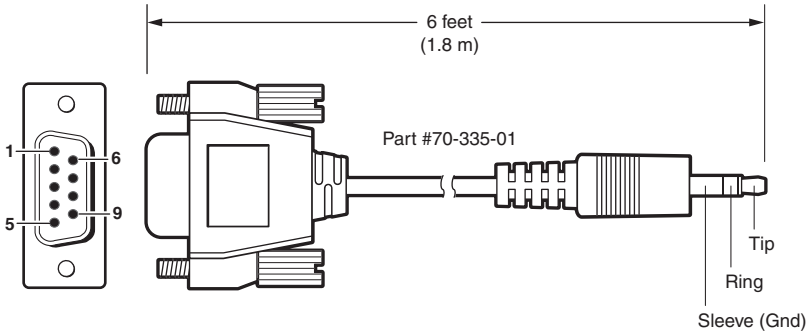
NOTE *The switcher can support either the RS-232 or RS-422 serial communication protocol, and operate at 9600, 19200, 38400, or 115200 baud rates. See* Selecting the RS-232/RS-422 protocol and baud rate *in chapter 3,* Operation*, to configure the RS-232/RS-422 port from the front panel.*

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the switcher's Remote RS232/RS422 connector. Refer to the *MKP 2000 Remote Control Panel User's Manual* and the *MKP 3000 User's Manual* for details.

RS-232 Config connector (front panel) — An additional RS-232 port is located on the front panel. A host device can be connected to this port for serial RS-232 control only. Protocol for the port is:

- 9600 kb/second
- 8 data bits
- 1 stop bit
- No parity
- No flow control

The optional 2.5 mm cable (Extron part #70-335-01) can be used to connect the HDXP to your computer. The figure on the next page shows the pin assignments for this cable.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 3–3 — 2.5 mm connector cable for the configuration port

See chapter 4, *Programmer's Guide*, and chapter 5, *Matrix Software*, for details about using SIS commands and the control software to configure the HDXP.

Power

⑧ **AC power connector —** Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

3

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Troubleshooting

Configuration Worksheets

Operation

Front Panel Controls and Indicators

The front panel controls (shown below) are grouped into two sets. The input and output buttons are located on the left side of the control panel. The control buttons and video (I/O) selection buttons are on the right side of the panel.

These illuminated push buttons can be labeled with text and/or graphics. You can set the buttons to have amber background illumination all the time, or you can turn off the background illumination (see *Background illumination*, later in this chapter). The buttons blink or light steadily (depending on the operation) when pressed.

Definitions

The following terms, which apply to Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection.

Set of ties — An input **tied** to two or more outputs. (An output can never be tied to more than one input.)

Configuration — One or more **ties** or one or more **sets of ties**.

Current configuration — The **configuration** that is currently active in the switcher (also called **configuration 0**)

Global memory preset — A **configuration** that has been stored. Up to 32 **global memory presets** can be stored in memory. Preset locations are assigned to the input buttons and (where necessary) output buttons. All models have 32 presets available from the front panel and under RS-232/RS-422 or Ethernet control.

When a **preset** is retrieved from memory, it becomes the **current configuration**.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration** for the outputs assigned to that room only (none of the other outputs are affected).

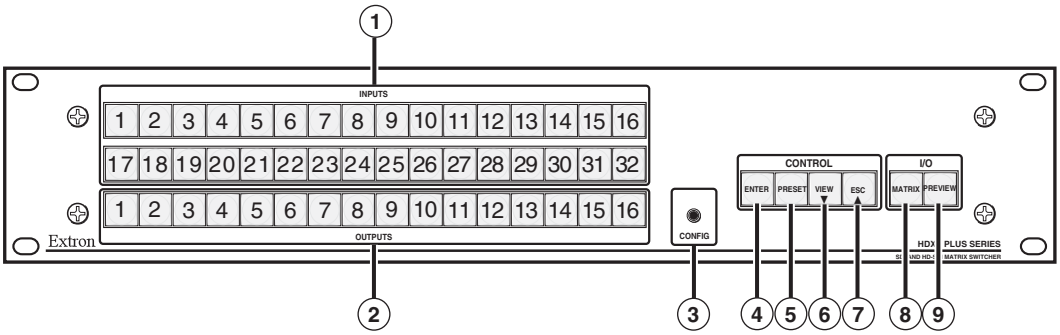


Figure 3–1 — HDXP 1616 and HDXP 3216 front panel

NOTE *On the HDXP 1616, which has only 16 input connectors, the input buttons in the second row (buttons 17 through 32) can be used only for preset selection.*

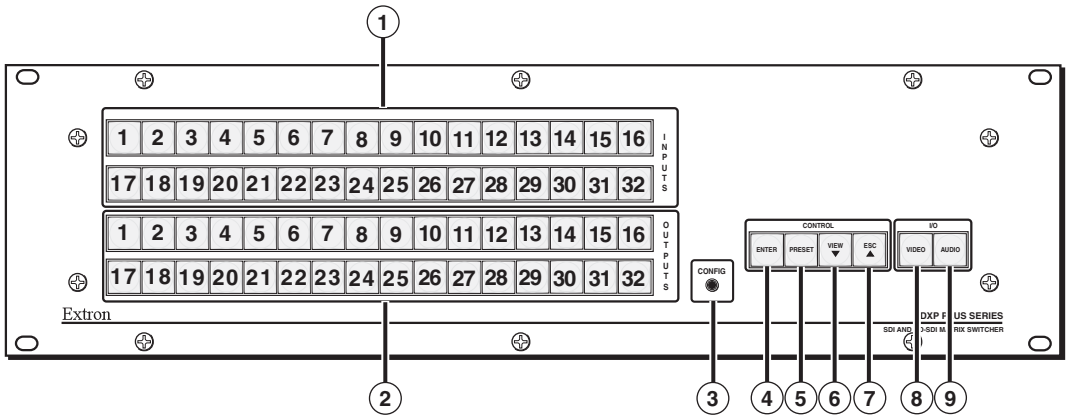


Figure 3–2 — HDXP 3232 front panel

Input and output buttons

① **Input buttons —** The input buttons have two primary functions (•) and three secondary functions (❑):

- Select an input.
- Identify the selected input.
- ❑ **Input 1 only:** With the Output 1 button, place the switcher in I/O grouping mode. See *I/O grouping*, later in this chapter.
- ❑ Select a global preset. See *Saving and recalling presets*, later in this chapter.
- ❑ **Inputs 1 and 2 only:** Activate/deactivate button background illumination. See *Setting the button background illumination*, later in this chapter.

② **Output buttons —** The output buttons have two primary functions (•) and two secondary functions (❑):

- Select output(s).
- Identify the selected output(s).
- ❑ **Output 1 only:** With the Input 1 button, place the switcher in I/O grouping mode. See *I/O grouping*, later in this chapter.
- ❑ Mute/unmute an output. See *Muting and unmuting outputs*, later in this chapter.

Configuration port

③ This RS-232 port is an alternative to the RS232/RS422 connector on the HDXP rear panel (see *Rear Panel* in chapter 2 for a description). This port (RS-232 only) can be used for system configuration and control via SIS commands or the Windows-based control software. For information on connecting to this port, see *RS-232 and RS-422 remote connections*, in chapter 2, *Installation*.

Control buttons

④ **Enter button —** The Enter button has three primary functions (•) and five secondary (❑) functions:

- Saves changes that you make on the front panel. To create a simple configuration:
  1. Specify a Matrix connection (see *I/O buttons* [⑧]).
  2. Press the desired input button (①).
  3. Press the desired output button(s) (②).
  4. Press the Enter button.
- Indicates that a potential tie has been created but not saved.
- Indicates that a global preset has been selected to be saved or recalled but that the preset action has not been accomplished.

❑ In I/O Grouping mode, selects group 1. See *I/O grouping*, later in this chapter.

❑ In I/O grouping mode, indicates that group 1 is selected. See *I/O grouping*, later in this chapter.

❑ With the Preset, View ▼, and Esc ▲ buttons, places the switcher in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Selects 9600 baud for the Remote RS-232/RS-422 and the RS-232 Config ports in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Indicates that the Remote RS-232/RS-422 and the RS-232 Config ports are set to 9600 baud in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

⑤ **Preset button —** The Preset button has two primary functions (•) and five secondary (❑) functions:

- Places the switcher in preset saving mode to save a configuration as a preset, and in preset recalling mode to activate a previously-defined preset.
- Blinks when preset saving mode is active, and lights steadily when preset recalling mode is active.

❑ In I/O grouping mode, selects group 2. See *I/O grouping*, later in this chapter.

❑ In I/O grouping mode, indicates that group 2 is selected. See *I/O grouping*, later in this chapter.

❑ With the Enter, View ▼, and Esc ▲ buttons, places the switcher in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Selects 19200 baud for the Remote RS-232/RS-422 and the RS-232 Config ports in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Indicates that the Remote RS-232/RS-422 and the RS-232 Config ports are set to 19200 baud in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

⑥ **View ▼ button —** The View ▼ button has two primary functions (•) and eight secondary (❑) functions:

- Places the switcher in view-only mode to display the current configuration.

  NOTE *View-only mode also provides a way to mute and unmute outputs. See* Muting and unmuting outputs*, later in this chapter.*

- Indicates that the HDXP is in view-Only mode.

❑ In I/O grouping mode, selects group 3. See *I/O grouping*, later in this chapter.

❑ In I/O grouping mode, indicates that group 3 is selected. See *I/O grouping*, later in this chapter.

❑ With the Enter, Preset, and Esc ▲ buttons, places the switcher in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Selects 38400 baud for the Remote RS-232/RS-422 and the RS-232 Config ports in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Indicates that the Remote RS-232/RS-422 and the RS-232 Config ports are set to 38400 baud in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

⑦ **Esc ▲ button —** The Esc ▲ button has two primary functions (•) and five secondary (❑) functions:

- Cancels operations or selections in progress and reset the front panel button indicators.

NOTE *The* Esc ▲ *button does* ***not*** *reset the current configuration or any presets.*

- Flashes once to indicate that the escape function has been activated.

❑ In I/O grouping mode, selects group 4. See *I/O grouping*, later in this chapter.

❑ In I/O grouping mode, indicates that group 4 is selected. See *I/O grouping*, later in this chapter.

❑ With the Enter, Preset, and View ▼ buttons, selects serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Selects 115200 baud for the Remote RS-232/RS-422 and the RS-232 Config ports in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Indicates that the Remote RS-232/RS-422 and the RS-232 Config ports are set to 115200 baud in serial port configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

I/O buttons

You must select the input/output connection mode when you are creating or viewing a configuration. This is done with the Matrix (⑧) and Preview (⑨) buttons.

⑧ **Matrix button —** The Matrix button has two primary functions (•) and four secondary (❑) functions:

- Places the HDXP in Matrix switching mode, enabling any input to be switched to any output.
- Lights green to indicate that the HDXP is in matrix switching mode, and that any input can be selected for switching to any output.

❑ With the Preview button, toggles the front panel lock on or off. See *Locking out the front panel (Executive mode)*, later in this chapter.

❑ With the Preview button, initiates the front panel system reset. See *Performing a system reset from the front panel*, later in this chapter.

❑ Selects **RS-232** for the rear panel RS-232/RS-422 port, when the HDXP is in Serial Port Configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Flashes to indicate that the Remote RS-232/RS-422 port is set to the RS-232 protocol when the switcher is in Serial Port Configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

⑨ **Preview button —** The Preview button has two primary functions (•) and three secondary (❑) functions

- Places the HDXP in Preview switching mode, enabling selection of one input to preview.
- Lights to indicate that the HDXP is in preview mode, and that only one input can be selected to be viewed.

❑ With the Matrix button, toggles the front panel lock on or off. See *Locking out the front panel (Executive mode)*, later in this chapter.

❑ With the Matrix button, initiates the front panel system reset. See *Performing a system reset from the front panel*, later in this chapter.

❑ Selects RS-422 for the rear panel RS-232/RS-422 port when the switcher is in Serial Port Configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

❑ Flashes to indicate that the RS-232/RS-422 port is set to the RS-422 protocol when the HDXP is in Serial Port Configuration mode. See *Selecting the RS-232/RS-422 protocol and baud rate*, later in this chapter.

Button icons

You can temporarily remove the numbered translucent covers on the input and output pushbuttons to insert labels behind the covers.

Input and output labels can be created easily with Extron's Button-Label Generator software, which is provided with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. See chapter 5, *Matrix Software*, for details on using the labeling software. See appendix B, *Reference Information*, for blank labels and a procedure for removing and replacing the translucent covers.

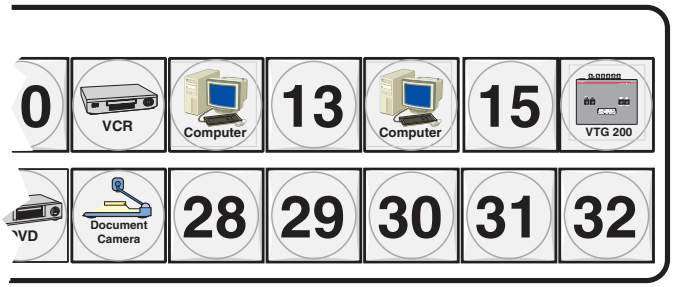


Figure 3–4 — Example of button labels on an HDXP front panel section

Operations

The following sections detail the powering up process and provide procedures for operations that can be performed from the front or rear panel.

Powering on

Apply power by connecting the power cord to an AC source. The switcher performs a self-test that flashes the front panel button indicators green, red, and amber and then turns them off. An error-free power-up self-test sequence leaves all I/O and control buttons either unlit or showing background illumination. The lit or unlit status of the Matrix and Preview buttons is the same as it was when the switcher was powered off.

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact.

If an error occurs during the self-test, the HDXP locks up and does not operate. If your switcher locks up on power-up, call the Extron S^3 Sales & Technical Support Hotline.

Creating a configuration

A configuration consists of one or more inputs, each tied to a set of outputs. To set up a configuration, you must place the HDXP in matrix switching mode, which enables you to switch any input to any output.

NOTE *While an input can be tied to multiple outputs, an output can be tied to only one input.*

This section contains the steps to follow to create or change a configuration. The following subsections contain some examples of configurations that can be created on the HDXP, and instructions on setting them up. The illustrations show the HDXP 3216; however, the procedures apply to all HDXP models.

1. Press the Esc ▲ button to clear any input, output, or control button indicators that may be lit.
2. Press the Matrix button in the I/O section. The Matrix button lights green (the Preview button remains unlit).
3. Select an input by pressing its button. The input button you pressed lights green.

NOTE *If your selected input already has outputs tied to it, the buttons of the tied outputs also light green (steadily) when you press the input button.*

4. Press the button for each output that you want to tie to the selected input.
   - The output buttons blink green when pressed, indicating **potential ties**.
   - The Enter button also blinks green.

NOTE *Outputs that are already tied can remain tied (buttons lit), along with your new blinking selections; or you can untie them by pressing their associated output buttons, which start to blink also.*

5. Press Enter to establish the tie. The input, output, and Enter buttons become unlit.

6. Repeat steps **3** through **5** to create additional ties until the desired configuration is complete.

NOTE
- *Only one input can be tied to an output. If you tie an input to an output that is already tied to another input, the older tie is broken in favor of the newer tie.*
- *If you press the input button for an **I/O grouped** input and then try to select an output in a different group, the associated output button cannot be selected, and the selected input button remains lit. See* Grouping Inputs and Outputs*, later in this chapter, for information on I/O grouping.*

Example 1: Creating a set of ties

In the following example, input 5 is tied to outputs 3, 4, and 8. The steps show the front panel indications that result from your action.

NOTE *This example assumes that there are no ties in the current configuration.*

1. Press and release the Esc ▲ button.

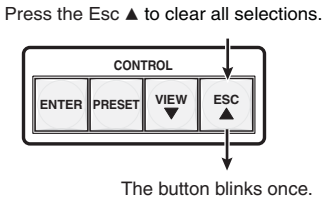


Figure 3–5 — Clearing all selections

2. If necessary, place the HDXP in matrix switching mode by pressing and releasing the Matrix button. The button lights steadily green.

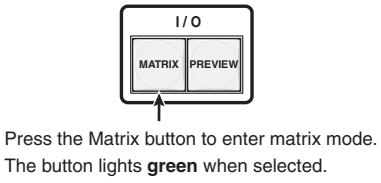


Figure 3–6 — Selecting matrix mode

3. Press and release the Input 5 button.

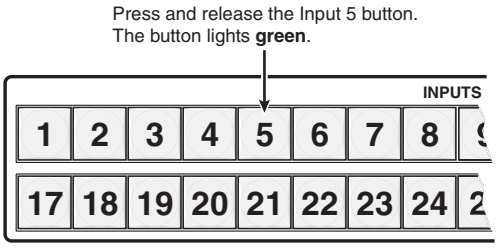


Figure 3–7 — Selecting input 5

4. Press and release the Output 3, Output 4, and Output 8 buttons.

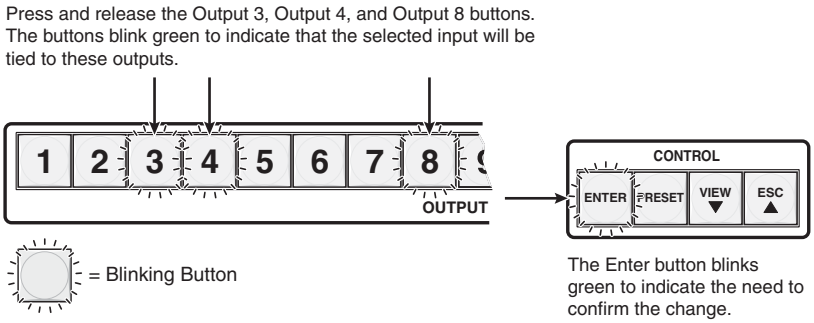


Figure 3–8 — Selecting the outputs

NOTE *The entire set of ties can be canceled at this point by pressing and releasing the Esc ▲ button. The Esc ▲ button flashes red once.*

5. Press and release the Enter button.

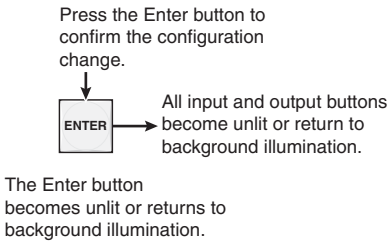


Figure 3–9 — Confirming the tie

The configuration now is:

Input 5 tied to output 3, output 4, and output 8

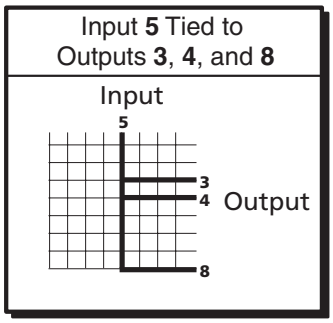


Figure 3–10 — Example 1, final configuration

Example 2: Adding a tie to a set of ties

In the following example, a new tie is added to the current configuration. The illustrations show the front panel indications that result from your actions.

NOTE *This example assumes that you have performed example 1.*

1. Press and release the Esc ▲ button.

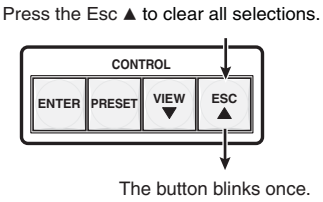


Figure 3–11 — Clearing all selections

2. If necessary, place the HDXP in matrix switching mode by pressing and releasing the Matrix button. The button lights steadily green.

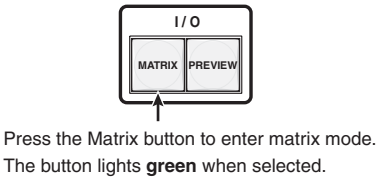


Figure 3–12 — Selecting matrix mode

3. Press and release the Input 5 button.

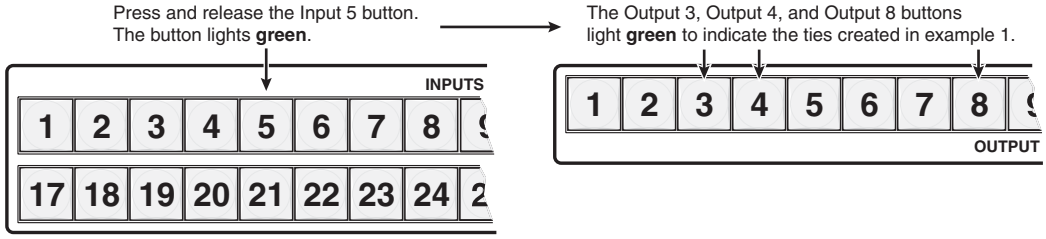


Figure 3–13 — Selecting an input with ties

4. Press and release the output 1 button.

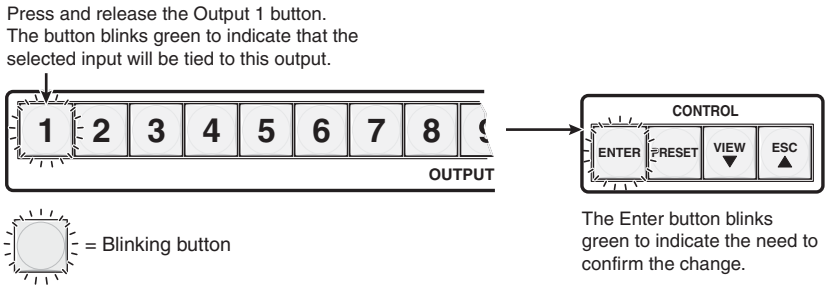


Figure 3–14 — Selecting an additional output

5. Press and release the Enter button.

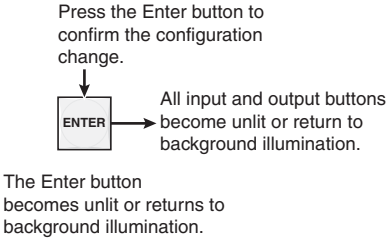


Figure 3–15 — Confirming the tie

The configuration now is:

Input 5 tied to output 1, output 3, output 4, and output 8

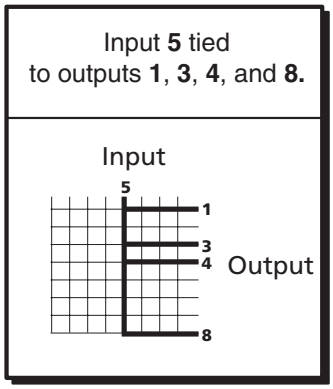


Figure 3–16 — Example 2, final configuration

Breaking ties

To undo an existing I/O tie, follow these steps:

1. Press the Matrix button. The button lights green.
2. Press the input button whose tie you want to dissolve. The input button and its tied output buttons light green.
3. Press one of the lit output buttons. The button you pressed, and the Enter button, start to blink.
4. Press the Enter button. The input, output, and Enter buttons become unlit, and the tie is broken.

Example 3: Removing a tie from a set of ties

In the following example, an existing tie is removed from the current configuration. The steps show the front panel indications that result from your action.

NOTE *This example assumes that you have performed examples 1 and 2.*

1. Press and release the Esc ▲ button.

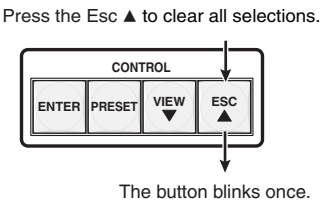


Figure 3–17 — Clearing all selections

2. If necessary, place the HDXP in matrix switching mode by pressing and releasing the Matrix button. The button lights steadily green.

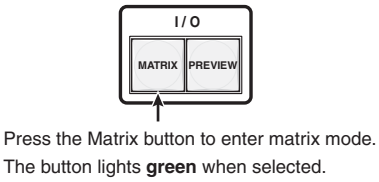


Figure 3–18 — Selecting matrix mode

3. Press and release the input 5 button.

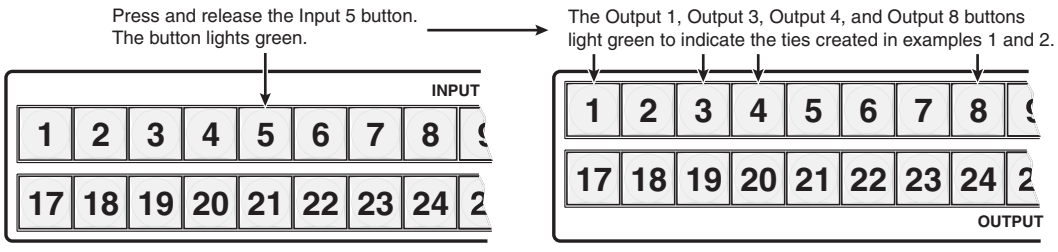


Figure 3–19 — Selecting an input

4. Press and release the Output 4 button.

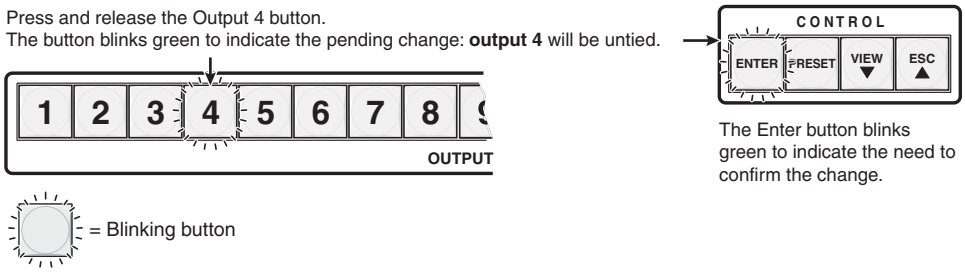


Figure 3–20 — Deselecting the output

5. Press and release the Enter button.

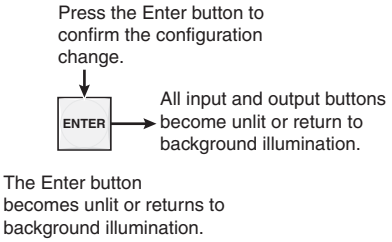


Figure 3–21 — Confirming the tie removal

The configuration now is:

Input 5 tied to output 1, output 3, and output 8 (See the diagram below.)

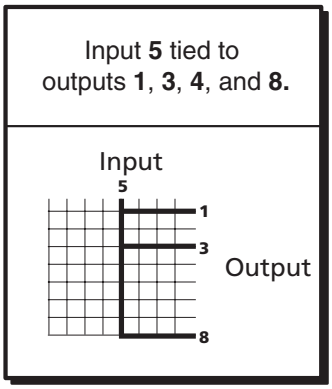


Figure 3–22 — Example 3, final configuration

Previewing an input

You can preview any input by switching it to the preview output when the HDXP is in preview mode. Follow these steps to preview an input:

1. Press the Esc ▲ button to clear any input, output, or control button indicators that may be lit.
2. Press the Preview button in the I/O section. The Preview button lights red (the Matrix button is unlit).

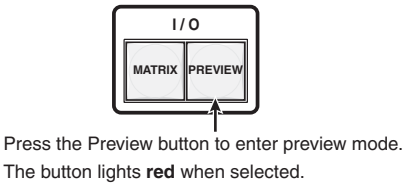


Figure 3–23 — Selecting Preview mode

NOTE *If an input has already been selected in preview mode, its button also lights red when you press Preview.*

3. Press the button for the input that you want to preview. The input button lights **red** when pressed, and the selected input is tied to the Preview output.

NOTE *Preview selection mode times out and returns to matrix mode after 30 seconds of non-use.*

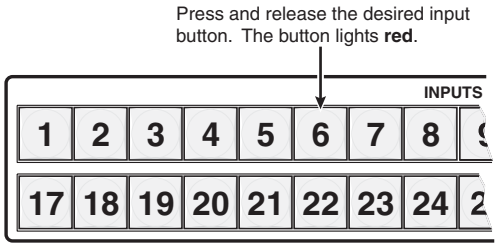


Figure 3–24 — Selecting an input to preview

NOTE *Only one input at a time can be previewed. If another input button was lit when you pressed Preview, it becomes unlit.*

4. Repeat steps **2** and **3** if you want to preview another input.

Viewing the configuration

The current configuration can be viewed using the front panel buttons. The view-only mode prevents inadvertent changes to the current configuration. View-only mode also provides a way to mute outputs (see *Muting and unmuting outputs*, later in this chapter.

NOTE *You cannot view configurations while the HDXP is in preview mode. When you place it in view-only mode, the HDXP also automatically switches to Matrix mode. If you want to return the HDXP to preview mode, you must press the Preview button again.*

View the current configuration as follows:

1. Press the Esc ▲ button to clear any input button indications, output button indications, or control button indications that may be on.

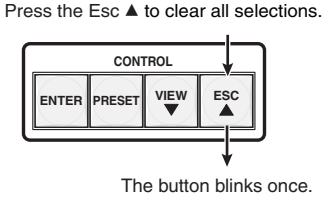


Figure 3–25 — Clearing all selections

2. Press and release the View ▼ button.

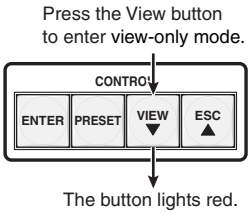


Figure 3–26 — Entering view-only mode

- The View ▼ button lights red.
- The Matrix button lights green.
- All of the buttons for outputs that are **not** tied light green.

3. Select the input or output whose ties you wish to view by pressing its input or output button.

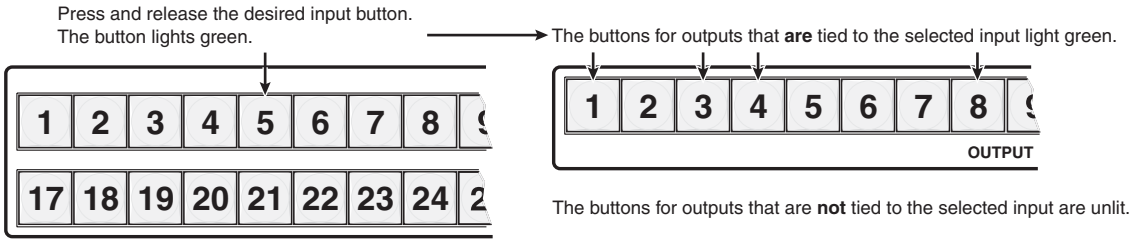


Figure 3–27 — Selecting an input to view in view-only move

- When you press the button for an input or an output that has ties, the buttons for all the inputs and outputs tied to it light green.
- When an output button for which there are no ties is pressed, the buttons also light for all other outputs without ties.

NOTE *You can also view a set of ties by selecting a tied output. To demonstrate this, note the number of a lit output button, and then press and release the output button for an untied (unlit) output. Observe that all of the untied outputs light. Then press the output button that you noted previously and observe that the selected output button, the tied input button, and the output buttons light for all of the outputs that are tied to the input.*

4. To exit view-only mode, press View ▼ again; or wait for the View ▼ button to turn off (approximately 30 seconds).

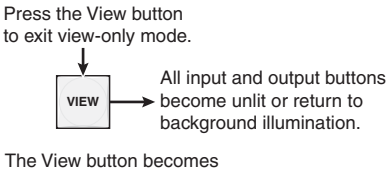


Figure 3–28 — Exiting view-only mode

I/O grouping

I/O grouping is a matrix switcher feature that allows you to subdivide the front panel control of the matrix into four smaller functional sub-switchers and limit tie creation **from the front panel only**. Inputs and outputs can be assigned to one of four groups or not assigned to any group.

Inputs and outputs that are assigned to a group can be tied only to other outputs and inputs within the same group when you are creating ties on the front panel. For example, you cannot tie an input that is assigned to group 1 to an output that is assigned to group 2. Ungrouped inputs and outputs can be switched to outputs and inputs in any group. Ties between groups (e.g., an input in group 1 tied to an output in group 2) **can** be created via SIS commands, the Windows-based control software, or Ethernet control.

HDXP 3232 only: Outputs assigned to I/O group 1 reference the bi-level genlock sync signal for vertical interval switching; outputs assigned to I/O group 2 reference the tri-level genlock sync signal.

The following figure gives an example of input/output grouping of SDI and HD-SDI devices on an HDXP 3232.

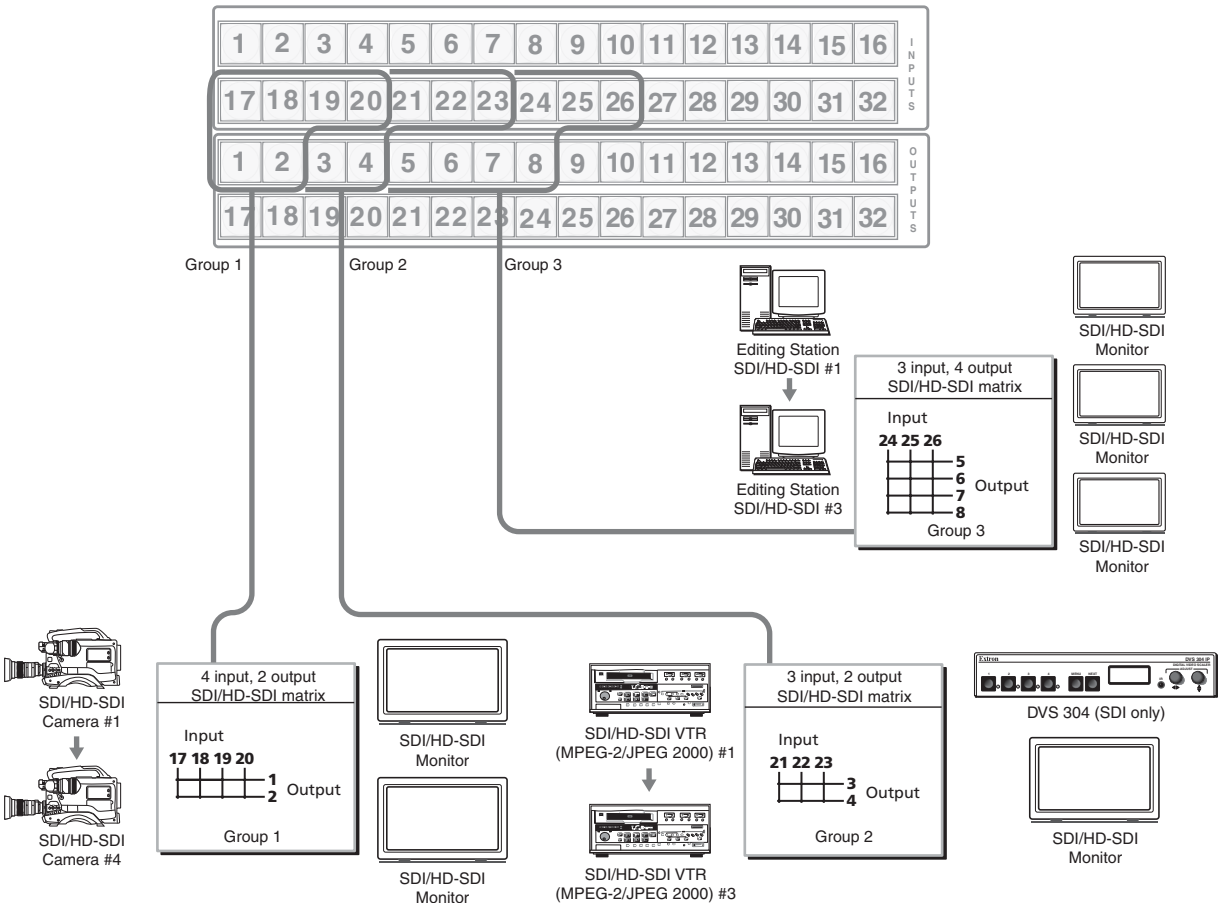


Figure 3-29 — I/O grouping of incompatible video formats

Suggested applications for the I/O grouping feature include:

- Segregating specific video formats to prevent an input in one video format from being inadvertently applied to an output device that supports another video format (see the illustration below).
- Segregating input and output devices that are in separate rooms.
- Isolating video from being displayed on specific output devices for operational security reasons.

The I/O groups can be set up from the front panel (discussed in the next section); SIS commands via RS-232/422 control or the LAN (see chapter 4, *Programmer's Guide)*; or the Windows-based control program via Telnet/RS-232/RS-422 or IP control (see chapter 5, *Matrix Software*).

NOTE

- *Presets can be created under RS-232/RS-422 or Ethernet control to tie inputs and outputs across group boundaries. These presets **are** selectable from the front panel.*
- *An input or output can be assigned to only one group. If you assign an input or output to a group, and that input or output is already assigned to a different group, the older grouping is replaced by the new grouping.*
- *For I/O groups to have any function, at least two groups must be created.*

Creating I/O groups

Follow these steps to create I/O groups using the front panel.

NOTE *The illustrations in this section show the HDXP 3216. However, the procedure applies to all three HDXP models.*

1. Press the Esc ▲ button to clear any input buttons, output buttons, or control buttons that may be lit. The Esc ▲ button blinks once, then turns off.

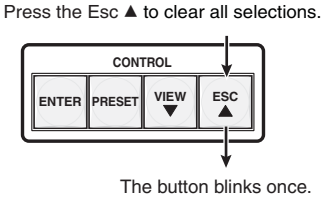


Figure 3–30 — Clearing all selections

2. To enter I/O grouping mode, press and **hold** the Input 1 and Output 1 buttons simultaneously, until the buttons for all the ungrouped inputs and outputs light green (approximately 3 seconds). If no groups have been formed, **all** the input and output buttons light.

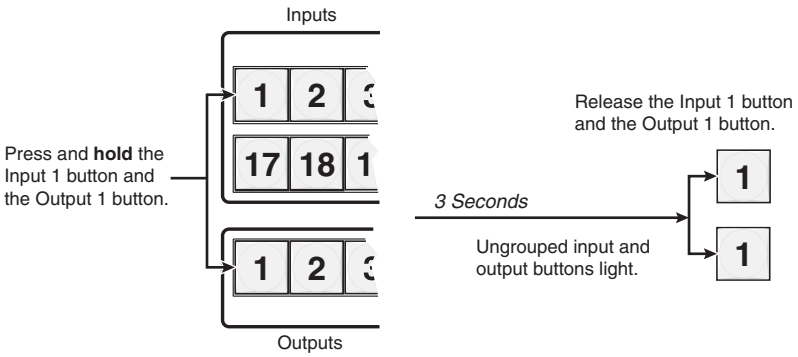


Figure 3–31 — Selecting I/O Group mode

3. Press and release one of the Control buttons to select a group number:
   - Press the Enter button to select group 1.
   - Press the Preset button to select group 2.
   - Press the View ▼ button to select group 3.
   - Press the Esc ▲ button to select group 4.

   In the illustration below, group 1 is being selected.

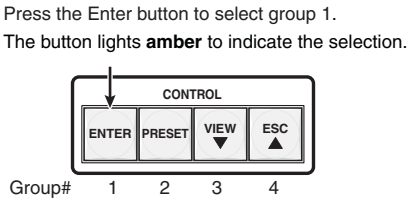


Figure 3–32 — Selecting an I/O group number

4. Select the desired input(s) and output(s) to assign to the group by pressing their input and output buttons. In the example below, inputs and outputs 1 through 4 are being selected.

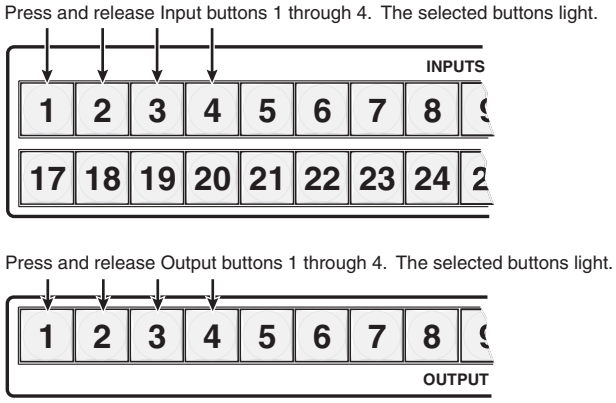
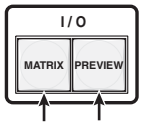


Figure 3–33 — Assigning inputs and outputs to a group

5. In order for an input group to be functional, you must create more than one group. Repeat steps **3** and **4** to create a second input group.

6. If you want to create more I/O groups, repeat steps **3** and **4** again.

7. When finished grouping, press and release the Matrix and Preview buttons to exit the I/O grouping mode.



Press the Matrix and Preview button simultaneously to exit I/O grouping mode.

Figure 3-34 — Exiting I/O grouping mode

Alternatively, you can allow the mode to time out by waiting approximately 30 seconds.

Viewing I/O groups

To see the groupings that have been created, do the following:

1. Press and hold the Input 1 and Output 1 buttons until all ungrouped buttons light green (approximately 3 seconds).

2. Press the Control button for the group number you want to view (Enter = group 1, Preset = group 2, View ▼ = group 3, and Esc ▲ = group 4). The buttons for all inputs and outputs in that group light green.

3. To view another group, repeat step **2**.

4. When finished viewing groups, wait 30 seconds for grouping mode to time out, or press the Matrix and Preview buttons simultaneously.

Saving and recalling presets

The current configuration (configuration 0) can be saved as a preset in any one of 32 preset memory addresses. Preset locations are assigned to the input buttons and (where necessary) output buttons. Up to 32 presets can be selected from the front panel to be either saved or recalled. When a **preset** is recalled from memory via the front panel, it becomes the **current configuration**.

NOTE

- *Presets **cannot** be viewed from the front panel unless recalled as the current configuration. Presets that are not the current configuration **can** be viewed using Extron's Windows-based control program. See chapter 5,* Matrix Software, *for more details.*
- *The current configuration and all other presets are stored in non-volatile memory. When power is removed and restored, the current configuration remains active and all presets are retained.*
- *When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of its own ties.*
- *Figure 3-35 on the next page shows the presets associated with the input and output buttons on each HDXP model. (On the HDXP 1616, which has only 16 input connectors, input buttons 17 through 32 are used for presets, but not for input selection.)*

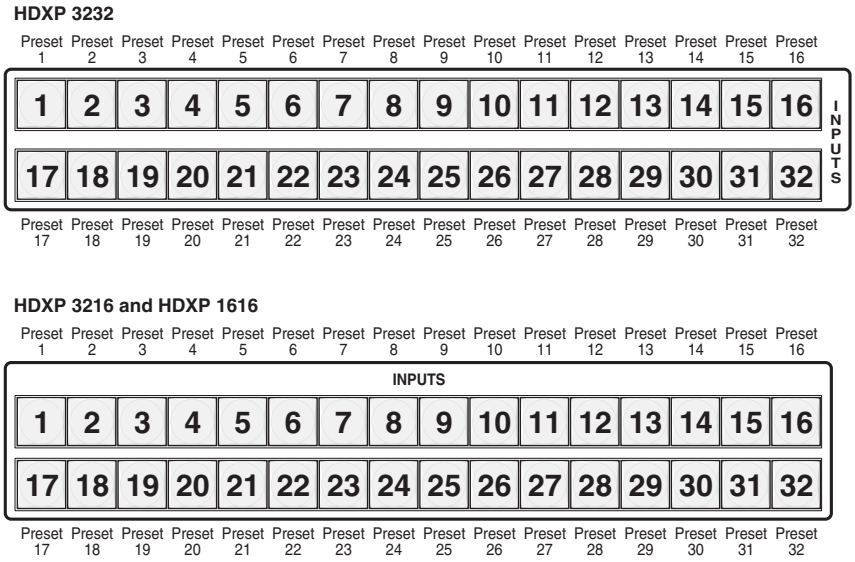


Figure 3–35 — Preset locations on the HDXP 3232, 3216, and 1616

Saving a preset

Follow these steps to save the current configuration (set of ties) as a preset. The steps show the front panel indications that result from your action.

The illustrations for this procedure show the HDXP 3216. However, the information applies to all HDXP models.

1. Press and release the Esc ▲ button.

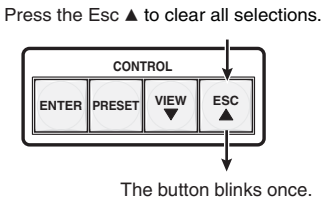


Figure 3–36 — Clearing all selections

2. Press and **hold** the Preset button for approximately 2 seconds, until it blinks.

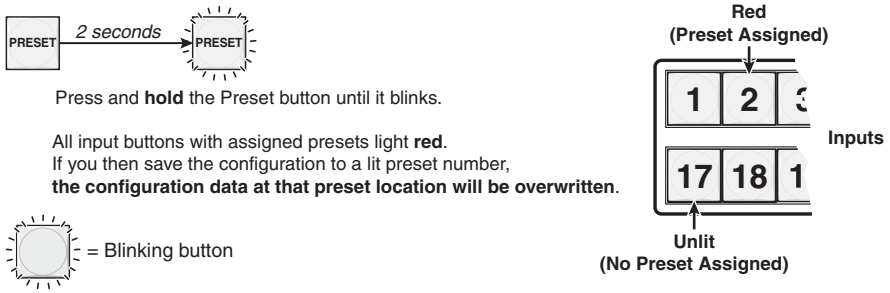


Figure 3–37 — Entering* Save Preset *mode

In this illustration, preset 2 has already been assigned; therefore, the Input 2 button lights red when preset mode is entered.

3. Press and release the input or output button for the desired preset number.

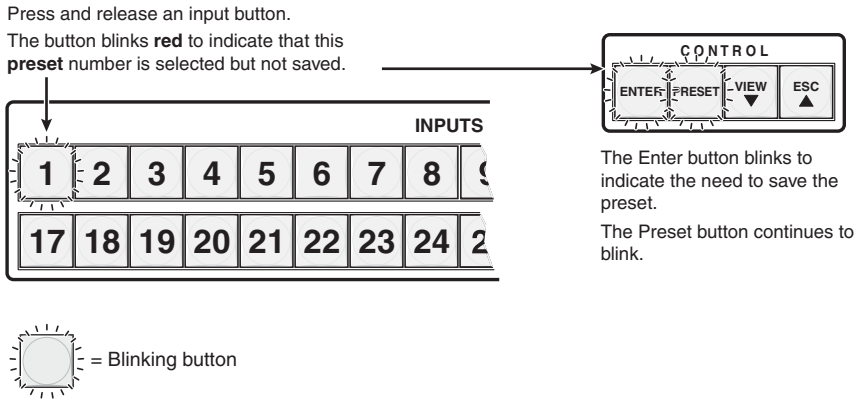


Figure 3–38 — Selecting the preset number

4. Press and release the Enter button (figure 3-39). The current configuration is now stored in the selected memory location.

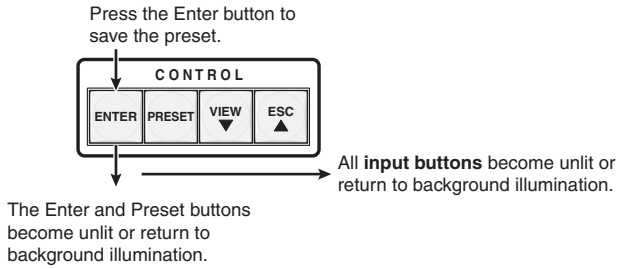


Figure 3–39 — Press the Enter button

Recalling a preset

Follow these steps to recall a preset (set of ties) to be the current configuration. The steps below show the front panel indications that result from your action.

The illustrations for this procedure show the HDXP 3216. However, the information applies to all HDXP models.

1. Press and release the Esc ▲ button.

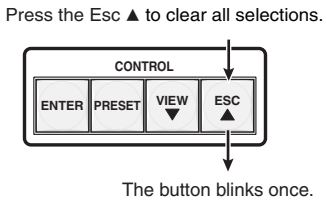


Figure 3–40 — Clear all selections

2. Press and release the Preset button (figure 41).

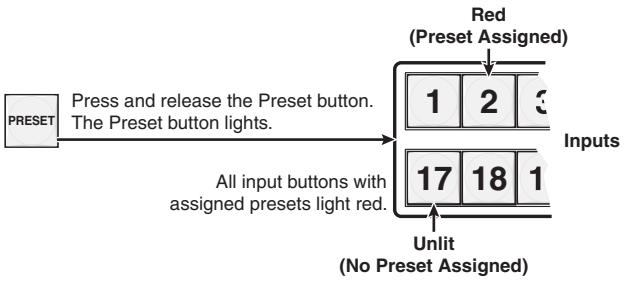


Figure 3–41 — Entering Recall Preset mode

In the example above, the Input 2 button lights red, because a preset has been assigned to it. Input button 17 does not light, because no preset has been assigned to it.

3. Press and release the input or output button for the desired preset. In the example below, preset 1 (Input button 1) is selected.

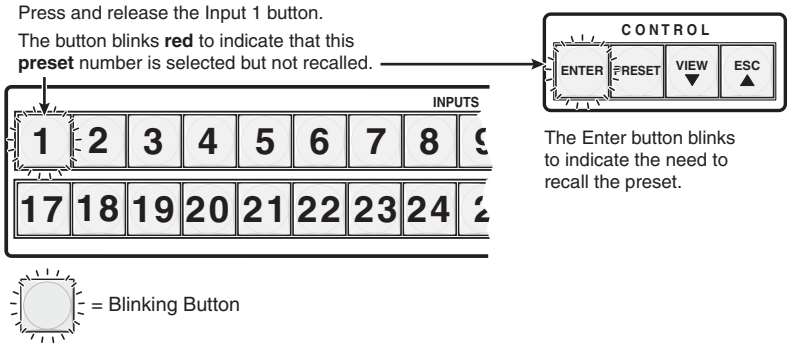


Figure 3–42 — Select the preset

4. Press and release the Enter button (figure 3-43). The configuration stored in selected memory location is now the current configuration and can be viewed in view-only mode (see *Viewing a configuration*, earlier in this chapter).

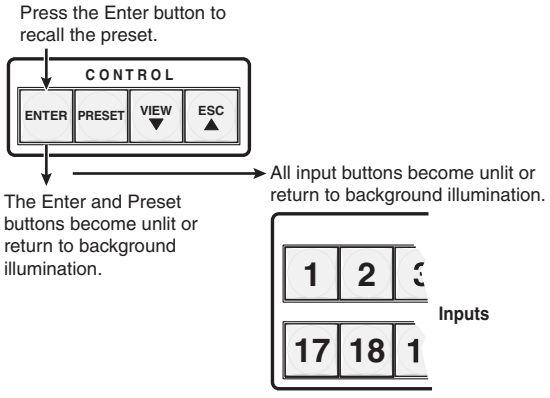


Figure 3–43 — Pressing Enter to recall the preset

5. Press and release the View ▼ button to return the HDXP to normal switcher operation.

Muting and unmuting outputs

You can mute and unmute the outputs on the HDXP using the front panel. (You can also mute/unmute them via SIS commands, the Windows-based control software, and/or the Web pages.)

NOTE *Mutings are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.*

Muting an output

Follow these steps to mute an output:

1. Press the Esc ▲ button to clear any input button indications, output button indications, or control button indications that may be on.

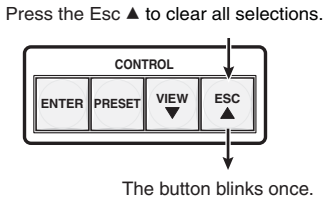


Figure 3–44 — Clearing all selections

2. Press and release the View ▼ button to enter view-only mode. The View ▼ button lights red, and all untied output buttons light green.

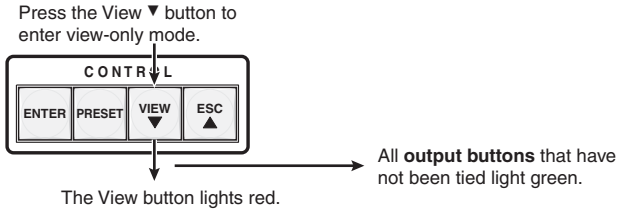


Figure 3–45 — Entering view-only mode

3. Press and **hold** the button for the desired output until the output button starts to blink (approximately 2 seconds). This indicates that the output is muted.
4. Repeat step **3** for each output that you want to mute.

   In the following illustration, outputs 3 and 4 are muted.

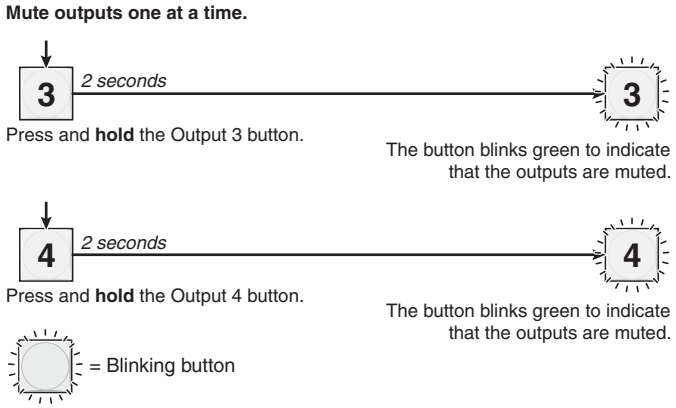


Figure 3–46 — Muting the outputs

NOTE *The front panel times out after 30 seconds, and the View ▼ and the blinking output buttons become unlit or return to background lighting. If you want to mute another output after a timeout, you must press the View ▼ button again (repeat steps **2** and **3**).*

5. When finished muting, press and release the View ▼ button to exit view-only mode, or wait for the front panel to time out (approximately 30 seconds).

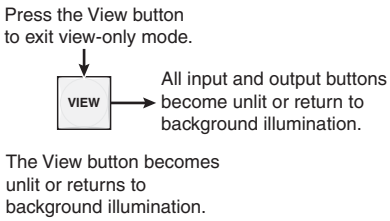


Figure 3–47 — Exiting view-only mode

Unmuting an output

1. Press and release the View ▼ button to enter view-only mode. The View ▼ button lights red, and the buttons for any muted inputs begin blinking green.
2. **One at a time**, press and **hold** the button for each output that you want to unmute until the button lights steadily (approximately 2 seconds).

   In the following illustration, outputs 3 and 4 are unmuted.

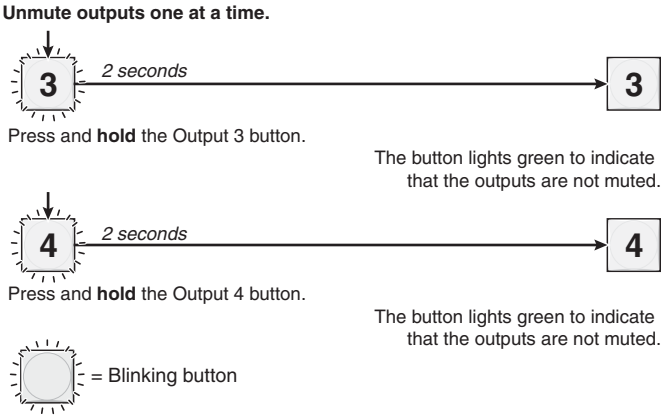


Figure 3–48 — Unmuting the outputs

3. Press the View ▼ button to exit view-only mode, or wait for the front panel to time out after approximately 30 seconds.

Locking out the front panel (executive mode)

The front panel security lockout (executive mode) limits the operation of the HDXP from the front panel. When the switcher is locked, all of the front panel functions are disabled except for the view-only mode functions (see *Viewing a configuration*, earlier in this chapter). Other than in view-only mode, if you press a front panel button when the switcher is locked, the input and output buttons flash twice and return to their previous state.

To toggle executive mode on and off, press and hold the Matrix and Preview buttons until the two buttons blink twice (approximately 3 seconds).

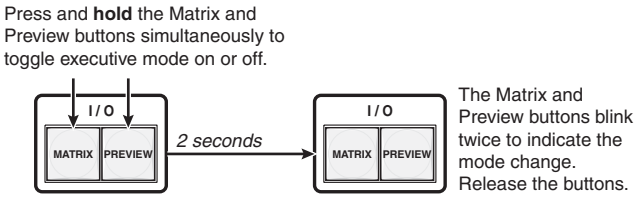


Figure 3–49 — Toggling front panel lock on or off

Setting the button background illumination

You can set the buttons on the front panel to have amber background illumination at all times, or you can turn the background illumination off.

To toggle the background illumination on or off, press and **hold** the Input 1 and Input 2 buttons until the button background changes (approximately 2 seconds).

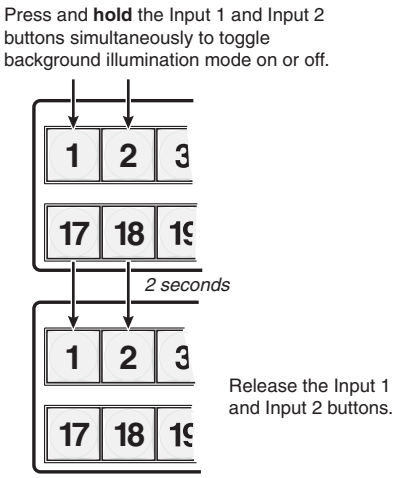


Figure 3–50 — Toggling background illumination on or off

Selecting the RS-232/RS-422 protocol and baud rate

The HDXP switchers can support either RS-232 or RS-422 serial communication protocol, and operate at 9600, 19200, 38400, and 115200 baud rates. The settings of these variables can be viewed and changed from the front panel.

NOTE *This information applies to only the rear panel Remote RS232/RS422 port. The front panel Config port is RS-232 only; RS-422 cannot be selected for it.*

View and configure the switcher's serial communications settings as follows:

1. To enter serial port configuration mode, simultaneously press and **hold all** Control buttons (Enter, Preset, View ▼, and Esc ▲) until all buttons light (approximately 2 seconds) (see figure 3-51, below).

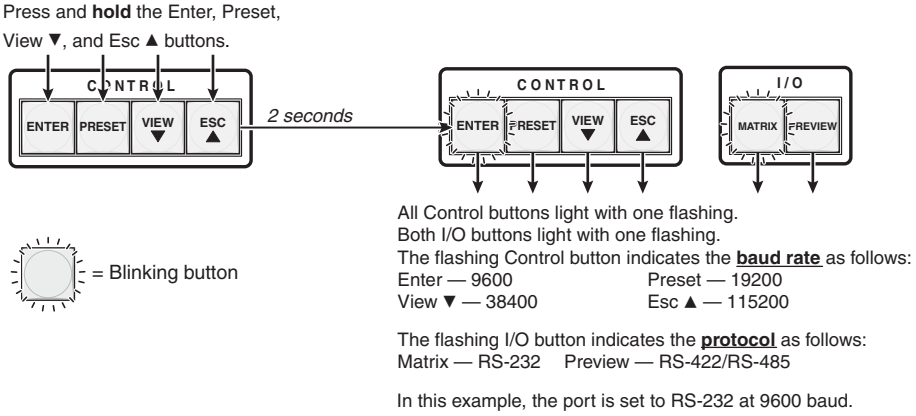


Figure 3–51 — RS-232/RS-422 and baud rate display

2. Release the Control buttons.
3. **To change a value**, press and release the button that relates to the desired value.

   Baud rate:

   - **Enter** selects 9600 baud.
   - **Preset** selects 19200.
   - **View ▼** selects 38400 baud.
   - **Esc ▲** selects 115200 baud.

   Protocol:

   - **Matrix** selects RS-232
   - **Preview** selects RS-422.

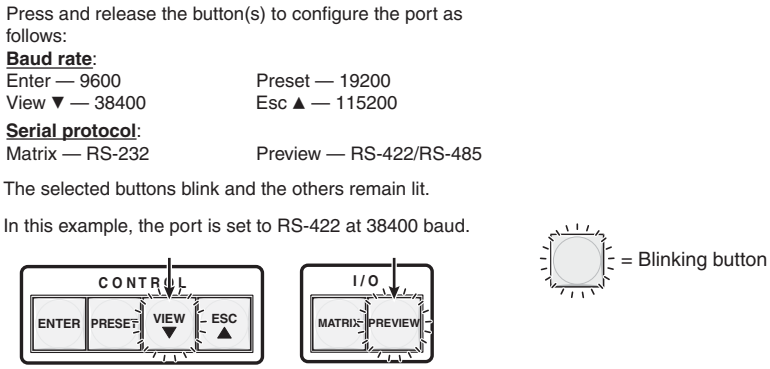


Figure 3–52 — Selecting RS-232/RS-422 and baud rate

4. Press and release an input or output button to exit the serial port configuration mode (figure 3-53).

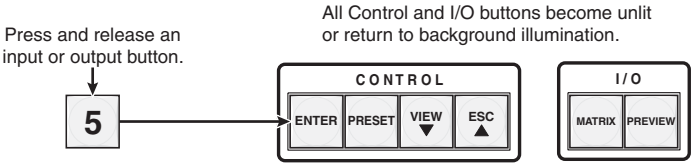


Figure 3–53 — Exiting Serial Port Configuration mode

Resetting

There are several methods by which you can reset the HDXP, and some of these methods allow for four levels of resetting. The following reset methods are available on the HDXP:

- Front panel buttons
- Rear panel reset button
- SIS commands
- Windows-based control software

The front panel and rear panel reset methods are discussed in the following sections. For information about resetting via SIS commands, see chapter 4, *Programmer's Guide*. For information about using the Windows-based software to reset, see chapter 5, *Matrix Software*.

Resetting using front panel buttons

The front panel (system) reset is identical to the Esc ZXXX ← SIS command, which returns the HDXP to its factory-set defaults (see chapter 4, *Programmer's Guide*). A system reset clears all ties, presets, and output muting, and resets all I/O grouping.

To reset the switcher to the factory default settings, press and **hold** the Matrix and Preview buttons **while** you apply AC power to the switcher (figure 3-54 on the next page).

NOTE *System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.*

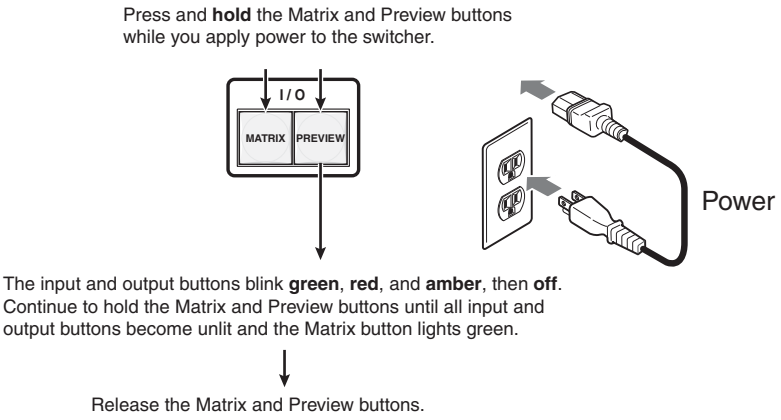


Figure 3–54 — Resetting the system from the front panel

Resetting using the rear panel Reset button

The rear panel has a Reset button that initiates four levels of matrix switcher resets. This button is recessed; it can be accessed with a pointed stylus, ballpoint pen, or an Extron Tweeker (a small screwdriver provided with the unit). While the switcher is running or while you are applying power to it, press and hold in the button for the number of seconds required for the desired reset level.

Soft system resets

The HDXPs have three soft resets available that restore various tiers of switcher settings to their default settings.

- **Events (mode 3) reset —** This function toggles the monitoring of events on or off (if events monitoring was on, this function turns it off; if monitoring was on, the HDXP turns it off).
- **IP settings (mode 4) reset —** The IP settings reset performs the following functions:
  - Enables Arp program capability.
  - Resets the IP address to the factory default (192.168.254.254).
  - Resets the subnet mask to the factory default (255.255.0.0).
  - Resets the gateway address to its factory default (0.0.0.0).
  - Resets port mapping to the factory default (port 80).
  - Turns DHCP off.
  - Turns events off.

NOTE *An IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset —** Absolute reset restores the switcher to the default factory conditions. This function is identical to the Esc ZQQQ ← SIS command (see chapter 4, *Programmer's Guide*).

Follow these steps to perform a soft reset of the HDXP from the rear panel:

1. Press and **hold in** the Reset button until the front panel Matrix and Preview buttons blink once (for events reset), twice (for system reset), or three times (for absolute reset) (figure 3-55).

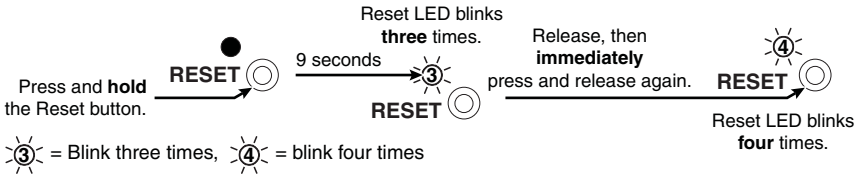


Figure 3–55 — Whole switcher and absolute resets

2. Release the Reset button, then immediately press and release the Reset button again. No reset is performed if the second momentary press does not occur within 1 second.

Hard reset

The hard reset function restores the HDXP to the base firmware with which it was shipped. After a hard reset, events do not automatically start, but user settings and files are restored. Follow these steps to perform a hard reset:

NOTE *The hard reset restores the factory-installed firmware. The switcher reverts to the last successfully loaded firmware the next time power is cycled off and on* ***unless*** *a firmware update is performed before the power cycle.*

1. If necessary, turn off power to the switcher.
2. Press and **hold in** the Reset button on the rear panel **while** you apply AC power to the switcher (figure 3-56).

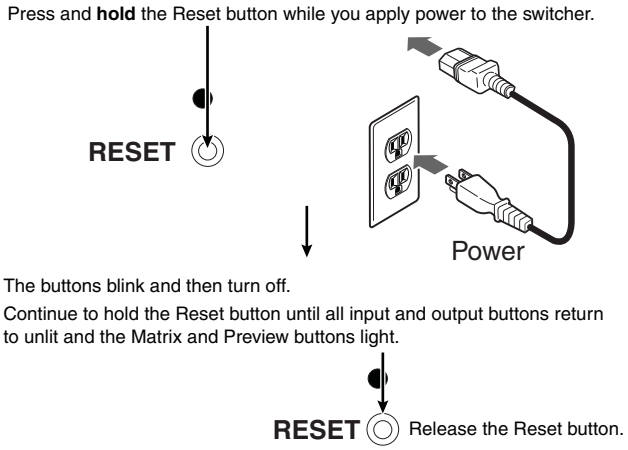


Figure 3–56 — Hard reset

Troubleshooting

This section gives recommendations on what to do if you have problems operating the switcher:

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if one of the front panel Power Supply LEDs is lit green.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S³ Sales & Technical Support Hotline if necessary.

Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet at the end of this chapter, and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. (The worksheet is generic for all models of HDXP. Disregard or cross out boxes for inputs/outputs that your switcher does not have.)

Worksheet example 1: System equipment

Figure 3-57 shows a worksheet for an HDXP in a fictional organization with the system hardware annotated. Inputs 10, 11, and 13 – 16 have no connection in this organization, so they have been crossed out on the worksheet.

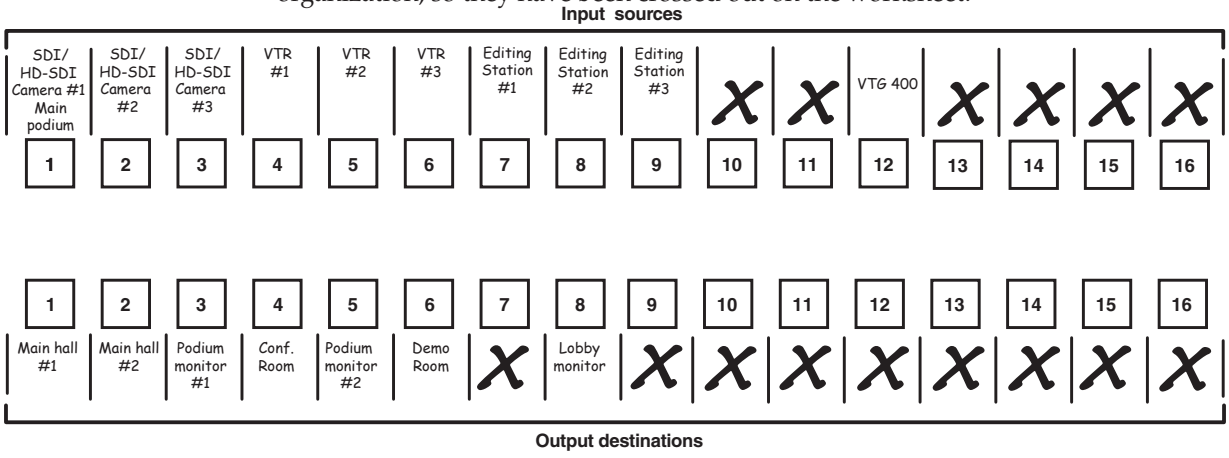


Figure 3–57 — Worksheet example 1: System equipment

Inputs include VTRs, editing stations, SDI/HD-SDI cameras, and an Extron VTG 400. Output devices include various SDI/HD-SDI monitors.

The VTG 400 video test generator connected to input 12 enables a video test pattern to be sent to one, several, or all output devices for problem isolation or adjustment purposes.

Worksheet example 2: Daily configuration

Figure 3-58 continues from worksheet example 1 by showing the video ties that make up the configuration of preset 1. A solid ink line shows video ties.

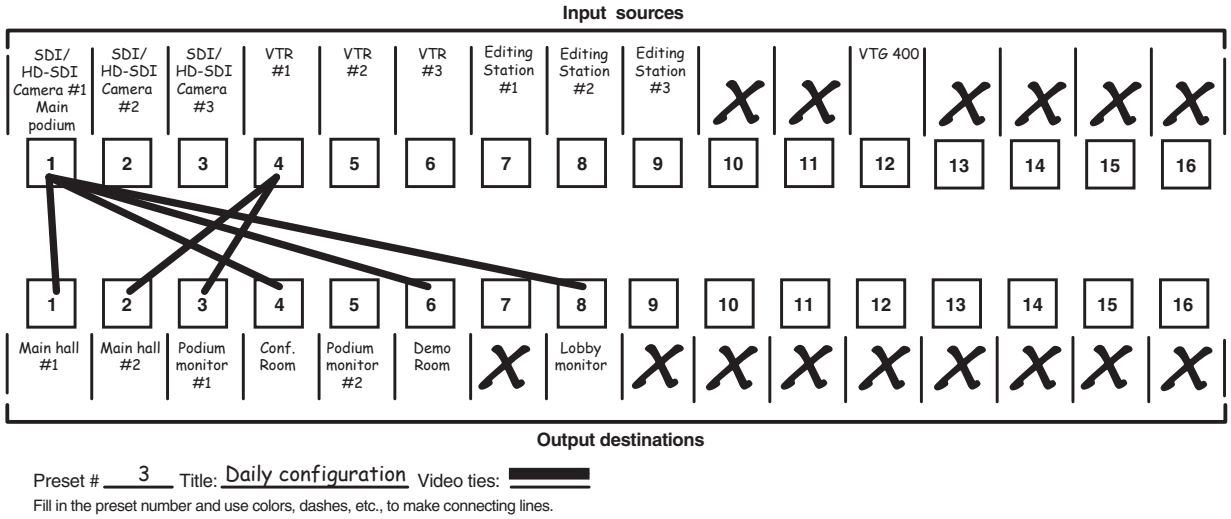


Figure 3–58 — Worksheet example 2: Daily configuration

In this example:

- The image of the presenter, from the main podium camera (input 1), is:
  - Displayed in the main hall (output 1)
  - Displayed in the conference room (output 4) to the overflow crowd
  - Displayed in the lobby (output 8)
  - Displayed in the Demo Room (output 6)
- The presenter has a presentation stored in the VTR (input 4) that is:
  - Displayed in the main hall (output 2)
  - Displayed locally on the #2 podium (output 3).

Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-59 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all monitors (outputs 1, 2, 3, 4, and 8).

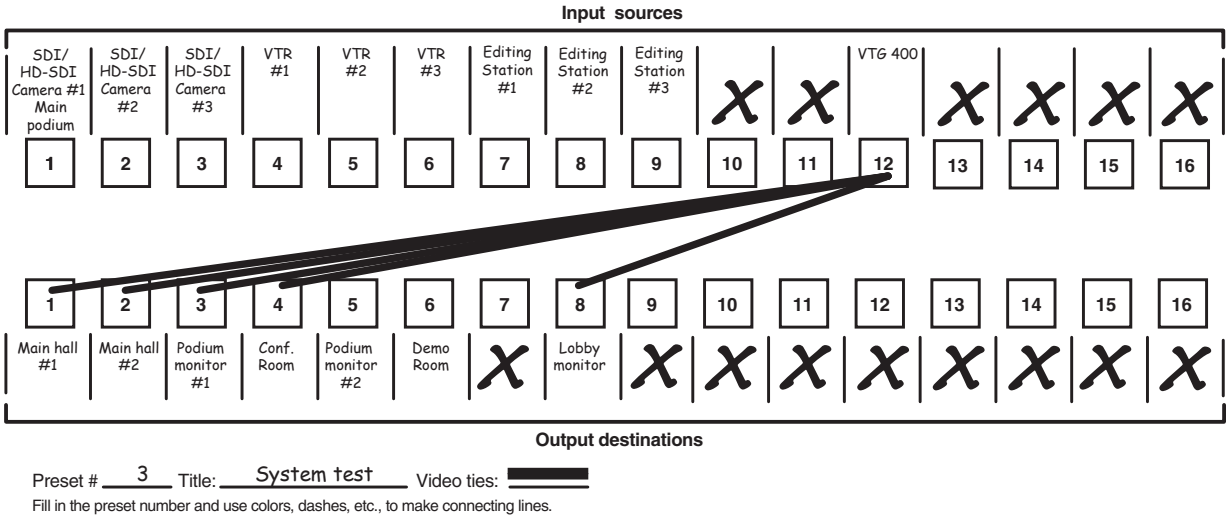
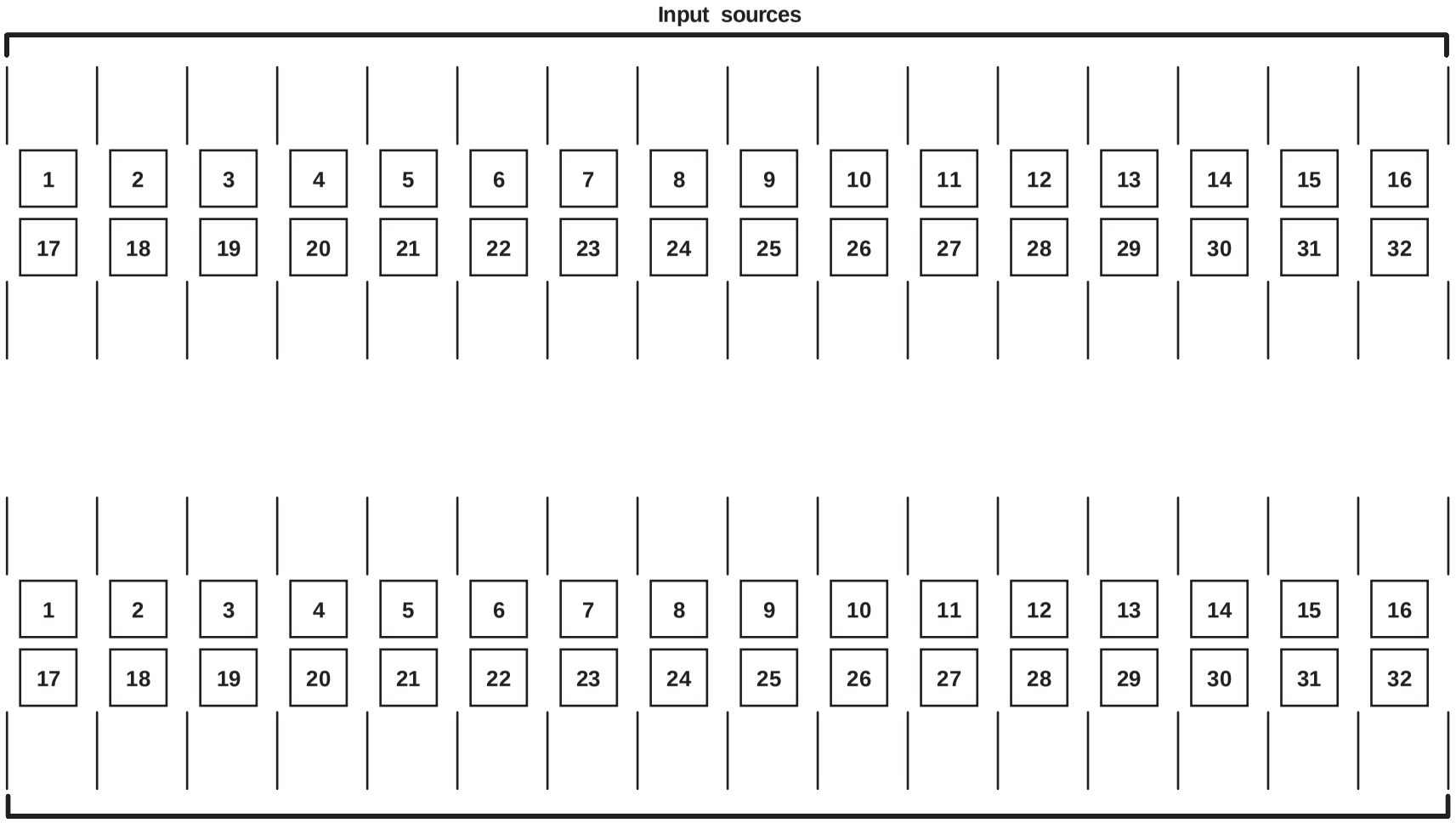


Figure 3–59 — Worksheet example 3: Test configuration



Preset # _____ Title:_____

Fill in the preset number and use colors, or dashes, etc. to make connecting lines. Disregard or cross out the input and output boxes that do not apply to your switcher.

HDXP Configuration worksheet

Chapter Four

Programmer's Guide

RS-232/RS-422 Link

Ethernet Link

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Tables

RS-232/RS-422 Link

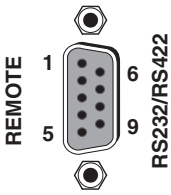
The HDXP has two connectors that can be used for serial control. Both ports enable use of SIS commands and the Windows-based control software.

The default protocol for these ports is as follows:

- 9600 baud
- 1 stop bit
- Parity: none
- Flow control: none
- 8-bit

Rear panel RS-232/RS-422 port

The rear panel 9-pin D female connector labeled Remote RS232/RS422 (figure 4-1) can be connected to the RS-232 or RS-422 serial port of a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. This connection makes software control of the switcher possible.



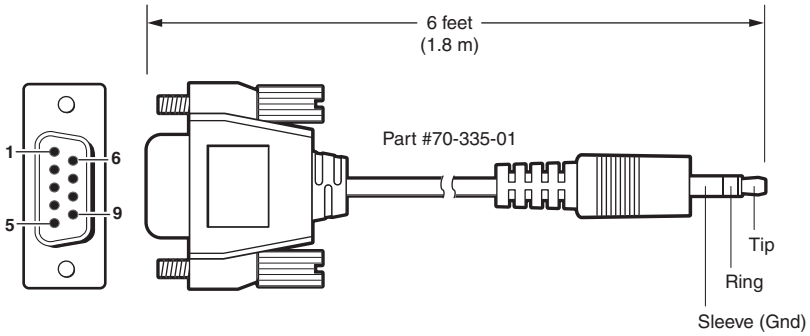
Pin	RS-232	Function	RS-422	Function
1	—	Not used	—	Not used
2	TX	Transmit data	TX–	Transmit data (–)
3	RX	Receive data	RX–	Receive data (–)
4	—	Not used	—	Not used
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	RX+	Receive data (+)
8	—	Not used	TX+	Transmit data (+)
9	—	Not used	—	Not used

Figure 4–1 — Remote connector pin assignments

NOTE *The HDXP switcher can support either RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, or 115200 baud rates. See* Selecting the RS-232/RS-422 protocol and baud rate *in chapter 3,* Operation*, to configure the RS-232/RS-422 port from the front panel.*

Front panel RS-232 port

The front panel TRS connector labeled Config can be connected to a host device for serial RS-232 control only. The optional 2.5 mm cable (Extron part #70-335-01) can be used to connect the HDXP to the host. The figure on the next page shows the pin assignments for this cable.



9-pin D	Connection	TRS Plug
Pin 2	Computer's RX line	Tip
Pin 3	Computer's TX line	Ring
Pin 5	Computer's signal ground	Sleeve

Figure 4–2 — 2.5 mm connector cable for the configuration port

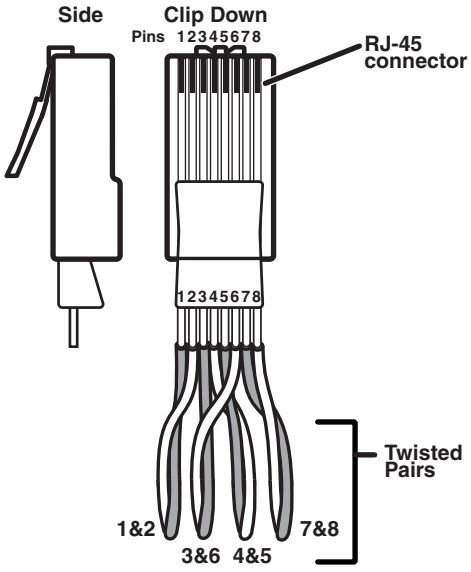
Ethernet Link

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (see figure 4-2 on the next page).

- **Crossover cable** — Direct connection between the computer and the HDXP switcher
- **Patch (straight-through) cable** — Connection of the HDXP switcher to an Ethernet LAN



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure 4-2 — RJ-45 Ethernet connector pin assignments

Default IP addresses

To access the HDXP switcher via the Ethernet port, you need the Extron IP address, and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the ping (ICMP) utility (see appendix A, *Ethernet Connection*, for more details). If the addresses have not been changed, the factory-specified defaults are:

- IP address: 192.168.254.254
- Subnet mask: 255.255.0.0
- Gateway address: 0.0.0.0

Host-to-Switcher Instructions

The HDXP accepts SIS (Simple Instruction Set) commands through the RS-232/RS-422 and Ethernet ports. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

When a local event such as a front panel operation occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

With an RS-232/422 connection:

(c) Copyright 2006, Extron Electronics HDXP Plus Series, Vx.xx, 60-XXX-01↵

With an Internet connection:

(c) Copyright 2006, Extron Electronics HDXP Plus Series, Vx.xx, 60-XXX-01↵

Ddd, DD Mmm YYYY HH:MM:SS

The switcher initiates the copyright message when it is first powered on or when connection via Internet protocol (IP) is established. Vx.xx is the firmware version number.

↵Password:

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or Telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link.

NOTE *The Password prompt dialog box is redisplayed if an incorrect password is entered.*

↵Login Administrator↵

↵Login User↵

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Qik↵

The switcher initiates the Qik message when a front panel switching or preset recall operation has occurred.

Spr*nn*↵

The switcher initiates the Spr message when a memory preset has been saved from the front panel. "*nn*" is the preset number.

Vmt*nn*•*x*↵

The switcher initiates the Vmt message when a video output mute is toggled on or off from the front panel. "*nn*" is the output number, • is a space, and "*x*" is the mute status: 1 = on, 0 = off.

Exe*n*↵

The switcher initiates the Exe message when executive mode is toggled on or off from the front panel. "*n*" is the executive mode status: 1 = on, 0 = off.

Switcher Error Responses

When the HDXP receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the switcher is unable to perform the command because the command is invalid or contains invalid parameters, the switcher returns an error response to the host. The error response codes are:

E01 — Invalid input channel number (too large)
E10 — Invalid command
E11 — Invalid preset number (too large)
E12 — Invalid output number/port number
E13 — Invalid value (out of range)
E14 — Command not available for this configuration
E17 — Timeout (caused only by direct write of global presets)
E21 — Invalid room number
E22 — Busy
E24 — Privilege violation (Ethernet and Extron software only)
E25 — Device not present
E26 — Maximum number of connections exceeded
E27 — Invalid event number
E28 — Bad filename/File not found

NOTE *User privileges extend to all view and read commands except reading the administrator password. Users can also perform the following functions:*

Creating ties
Creating and recalling presets
Muting outputs

Using the Command/Response Table for SIS Commands

The command/response table begins on page 4-11. Lowercase letters are acceptable in the command field except where indicated. The table below shows the hexadecimal equivalent of each ASCII character used in the command/response table.

ASCII to HEX Conversion Table										Esc	1B	CR	ØD	LF	ØA
	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	7Ø	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B	|	7C	}	7D	~	7E	DEL	7F

ASCII to hexadecimal conversion

Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table.

Symbol definitions

↵ = Carriage return/line feed

← = Carriage return (no line feed)

• = Space

Esc = Escape key

NOTE *Input and output numbers in commands may be entered as either 1-digit, 2-digit, or 3-digit numbers. All input and output numbers are reported as 2-digit numbers in the response.*

[24, 27, 28] = E24, E27, and E28 error messages. These superscripts indicate the error message displayed if the command is entered incorrectly or with invalid parameters. See *Error responses*, earlier in this chapter.

X1 = Input number
HDXP 1616: 1 – 16
HDXP 3216 and 3232: 1 – 32

X2 = Input number (for tie)
HDXP 1616: 0 – 16
HDXP 3216 and 3232: 0 – 32

NOTE *Input 0 = muted input*

X3 = Output number
HDXP 1616 and 3216: 01 – 16
HDXP 3232: 01 – 32

X5 = Output re-clocking rate

00 = Auto (default)	03 = 177	06 = 540
01 = Bypass	04 = 270	07 = 1485
02 = 143	05 = 360	08 = 2970

X8 = Room # (for room presets): 0 – 10. (Each room can have up to 10 presets assigned.)

NOTE *A **Room** is a subset of operator-selected outputs that relate to each other. The HDXP switcher supports up to 10 **rooms**, each of which can consist of from 1 to 16 outputs per room.*

X9 = On/off status (muting, executive mode, power supply, etc.)
0 = off/disabled
1 = on/enabled

X10 = Group # (for I/O grouping): 0 – 4 (0 = no group)

X11 = Global preset #: 0 – 32 (0 = current configuration)

X12 = Room preset #: 0 – 10 (0 = current configuration for the room)

NOTE *A Room preset is a stored configuration with all of the outputs assigned to a single room. When a room preset is retrieved from memory, it becomes the current configuration.*

X14 = Output mute status
0 = Unmuted
1 = Muted

X15 = Output rate: ###.##

- - - - = bypass mode
0000 = no connection (rate mismatch)
nnnn = actual rate

X16 = Dirty RAM status
1 = RAM needs to be saved to Flash memory.
0 = RAM has been saved to Flash memory (OK to power off or reset).

X17 = Time in tens of milliseconds to wait for characters coming into a serial port before terminating the connection. Default is 10 = 100 ms; maximum is 32,767.

X18 = Time in tens of milliseconds to wait between characters coming into a serial port before terminating the connection. Default is 2 = 20 ms; maximum is 32,767 ms.

X19 = Firmware version number to second decimal place (#.##)

X20 = Verbose firmware version: version – description – upload date/time.

X21 = Signal status
0 = No signal at input
1 = Signal at input

X22 = Temperature (degrees Fahrenheit)

X23 = Name

- 12 characters maximum for global and room preset names
- 11 characters maximum for room names
- Valid characters are:
  Upper- and lowercase letters (a – z, A – Z)
  Numerals 0 – 9
  Spaces
  Special characters **“ ” + _ : = /** and **space**

X25 = Matrix name (up to 240 characters)

NOTE *The following characters are invalid in the name:*
~ , @ [ ] { } ' < > " " ; \ | and **?**

X26 = GMT date and time (read) in the format
Www,•DD•Mmm•YYYY•HH:MM:SS
Www = day of the week (Mon through Sun)
DD = day of the month (01 through 31)
Mmm = Month (Jan through Dec)
YYYY = year (2000 through 2009)
HH = hour (00 through 24)
MM = minutes (00 through 59)
SS = seconds (00 through 59)
• = space

X27 = IP address (###.###.###.###). Leading zeros in each of the four fields are optional.

X28 = E-mail event number: 1 – 64

X29 = Default name (Factory default name consisting of model name plus the last three character pairs of MAC address)
Example: HDXP-Plus-Serie-00-2E-C7

X30 = Password (12 characters maximum)

NOTE *The following characters are invalid in the password:*
~ , + @ = [ ] { } ' < > " ; : \ | ? *and* **space**.

X31 = Connection security level
0 = anonymous
1 – 10 = Extended security levels 1 through 10
11 = User level
12 = Administrator level
The response is returned as two digits with a leading zero.

X32 = E-mail user name (e-mail name for the HDXP) (240 characters maximum)

X33 = E-mail address: Typical e-mail address format (Example: *nnnnn@xxx*.com)

X34 = Hardware (MAC) address (xx–xx–xx–xx–xx–xx)

X35 = Number of open connections (0 – 255)

X37 = GMT date (MM/DD/YY•HH:MM:SS)

X38 = Mail domain name (Standard domain name conventions apply.
Example: extron.com)

X39 = GMT offset (-12.0 through +14.0 hours and minutes removed from Greenwich Mean Time)

X40 = Daylight Savings time
0 = Daylight savings time off/ignore
1 = Daylight savings time on (used in the northern hemisphere [USA] and parts of Europe and Brazil)

X41 = E-mail account number (65 through 72)

X42 = Notify when?
0 = No response
1 = Fail/missing
2 = Fixed/restored
3 = Both 1 and 2

X43 = Notification selections
HDXP 3216 and 3232: 01 – 32 = Inputs 1 through 32
HDXP 1616: 01 – 16 = Inputs 1 through 16
Power supply: 98

X44 = Notify status for reading (16-digit number). For each digit,
0 = Do not notify
1 = Notify

X45 = DHCP status
0 = Off
1 = On

X46 = Telnet port number
01 = Remote RS232/RS422 port on rear panel
02 = Config port on front panel

NOTE *The port number is represented as two ASCII characters (2 bytes).*
Example: *Port 02 is represented as 30 32 in hexadecimal.*

X47 = Baud rate (9600, 19200, 38400, or 115200)

X48 = Parity (**o**dd, **e**ven, **n**one, **m**ark, or **s**pace). Only the first letter is required.

X49 = Data bits (7 or 8)

X50 = Stop bits (1 or 2)

X51 = Port type
0 = RS-232
1 = RS-422

X52 = Flow control (**H**ardware, **S**oftware, or **N**one). Only the first letter is required.

X53 = Data pacing (0000 – 1000 milliseconds between bytes). Default is 0 ms.

X55 = Command data section

NOTE *For Web encoding only: Data is directed to the specified port and **must** be encoded if it is not alphanumeric. Since data can include either command terminator, it must be encoded as follows when used within the data section:*

- *Space (hex 20) should be encoded as %20 (hex 25 32 30)*
- *Plus sign (hex 2B) should be encoded as %2B (hex 25 32 42)*

X56 = Parameter to set the **L**ength of a message to receive or the **D**elimiter value.
# = Byte count or a single ASCII character in decimal.

X57 = IP address converted into a single 32-bit number. **Example:** 10.13.0.254 becomes (10*256*256*256) + (13*256*256) + (0*256) + 254, which becomes 167,772,160 + 851,968 + 254, which equals 168,624,382.

X58 = Subnet mask (###.###.###.###). Leading zeros in each of the four fields are optional. Default is 255.255.0.0.

X59 = Gateway IP address (###.###.###.###). Leading zeros in each of the four fields are optional.

X60 = Event number (0 – 99)

X61 = Event buffer
0 = Receive
1 = User
2 = NVRAM

X62 = Event buffer offset (0 to maximum buffer size)

X63 = Event data size
b = bit
B = byte (8 bits)
S = short (16 bits)
L = long (32 bits)

NOTE *This parameter is case sensitive.*

X64 = Event data to write

X65 = Number of bytes to read

X66 = Event status fields
event_type
event_state
event_paused
error_status
RcvBuff_startptr
RcvBuff_endptr
UsrBuff_startptr
UsrBuff_endptr

X67 = ASCII digit(s) representing the numeric value of the data element read from the event buffer. (Leading zeros are suppressed.)

X68 = Parameter to set either the **L**ength of the message to receive or a **D**elimiter value
L = byte count (min = 0, max = 32767, and default = 0L [0 byte count])
D = decimal value for the ASCII character (min = 0, max = 00255, and default = 00000L)

This value is placed before the parameter; for example, 3 byte length = 3L, and the ASCII 0A delimiter is 10D. The response contains leading zeros.

NOTE *This parameter is case sensitive; you must use uppercase D and L.*

X69 = Priority status for receiving timeouts.
0 = use Send data string command parameters
1 = use Configure receive timeout command parameters
Default = 0.

X70 = Verbose mode/tagged response status. In verbose mode, system responses to entries made via other connections are displayed. Tagged responses include the command entered as well as the unit's response to it.
0 = neither verbose mode nor tagged responses enabled
1 = verbose mode enabled; no tagged responses (default)
2 = tagged responses enabled; verbose mode not enabled
3 = both verbose mode and tagged responses enabled

Command/response table for SIS commands

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Create ties			
NOTE *Commands can be entered back-to-back, with no spaces between commands. Example:* ***1*1!02*02&003%4*24$****.*			
NOTE *The HDXP switchers support 1-, 2-, and 3-digit numeric entries. Example:* ***1*1****,* ***01*01****, or* ***001*001****.*			
Tie an input to an output	X2 * X3 !	Out X3 • In X2 • All ↵	Tie input X2 to output X3.
	X2 * X3 &	Out X3 • In X2 • RGB ↵	
	X2 * X3 %	Out X3 • In X2 • Vid ↵	
NOTE *These commands activate all I/O switches simultaneously. They can be used interchangeably.*			
Quick multiple tie	Esc + Q X2 * X3 ! ... X2 * X3 ! ←		
		Qik ↵	Make multiple ties with one command entry.
Example:	*Esc+Q3*4!3*5%3*6$* ←	*Qik* ↵	*Tie input 3 to outputs 4, 5, and 6.*
NOTE *This command activates all I/O switches simultaneously.*			
Tie an input to all outputs	X2 * !	In X2 • All ↵	Tie input X2 to all outputs.
	X2 * &	In X2 • RGB ↵	
	X2 * %	In X2 • Vid ↵	
NOTE *These commands activate all I/O switches simultaneously. They can be used interchangeably.*			
Global presets			
Save current ties as a global preset	X11 ,	Spr X11 ↵	Save the current set of ties as preset X11. The command character is a comma (,).
Example:	*9 ,*	*Spr09* ↵	*Save current tie set as preset 9.*
Recall a global preset	X11 .	Rpr X11 ↵	Recall preset X11, which becomes the current configuration. The command character is a period (.).
Example:	*5.*	Rpr05 ↵	Recall preset 5 to be the current configuration.
NOTE *If you attempt to recall a preset that has not been saved, the HDXP responds with the E11 error code.*			
Save current ties as a preset for a room	X8 * X12 ,	Rmm X8 Spr X12 ↵	Save the current set of ties as preset X12 for room X8. The command character is a comma (,).
Example:	*3*9,*	*Rmm03•SPR09* ↵	*Save current tie set as preset 9 for room 3.*
NOTE *If you attempt to save a room preset to a room that has not been defined, the HDXP responds with the E21 error code.*			
Recall a room preset	X8 * X12 .	Rmm X8 Rpr X12 ↵	Recall preset X12 for room X8. The command character is a period (.).
Clear a global preset	Esc + X11 P0 * ! ←	Spr X11 ↵	Clear all ties in preset X11.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Global presets, continued			
Directly write global presets	Esc + X11 P X2 * X3 ! ... X2 * X3 !←		
		Spr X11 ↵	Tie input X2 to output X3 for as many ties as desired, at the same time saving all ties to preset X11.
NOTE *A direct write of a global preset should always be preceded by a Clear Global Preset command for that same preset number. In a directly-written preset, each output position's tied input (or not tied input) remains unchanged unless overwritten or cleared. If you do not clear a global preset number before you directly write a preset to it, ties that are part of the previous version of the specified presets with the same number can unexpectedly become part of the newly-created (directly written) preset.*			
Example:	Esc+27P12*5!10*09!3*2!3*8!←		
		Spr27↵	*(Brackets are shown to separate the ties for clarity only.) Create global preset 27, which ties input 12 to output 5, input 10 to output 9, and input 3 to outputs 2 and 8.*
Directly write room presets	Esc + X8 * X12 P X2 * X3 ! ... X2 * X3 ←		
		Rmm X8 • Spr X12 ↵	Tie input X2 to output X3 for as many ties as desired, at the same time saving all ties to preset X12 for room X8.
Example:	Esc+7*3P12*7!11*5!4*5!6*6!←		
		Rmm 07•Spr03↵	*(Brackets are shown to separate the ties for clarity only.) Create preset 3 for room 7, tying input 12 to output 7, inputs 11 and 4 to output 5, and input 6 to output 6.*
Output muting			
Mute output	X3 * 1 B	Vmt X3 * 1 ↵	Mute output X3.
Unmute output	X3 * 0 B	Vmt X3 * 0 ↵	Unmute output X3.
Read output mute status	1 * B	Vmt X9 ↵	Show mute status X9 of output X3. For X9, 0 = Muting off. 1 = Muting on.
Mute all outputs	1 * B	Vmt 1 ↵	Mute all of the outputs.
NOTE *To mute outputs, you can also use the Input 0 command:* ***0*** * X2 !*, where input X@ is set to 0.*			
Unmute all outputs	0 * B	Vmt 0 ↵	Unmute all of the outputs.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Output re-clocking			
Set output re-clocker	X3 * X5 =	Rte X3 * X5 ↵	Set the re-clocker rate for output X3 to X5. For X5: 00 = Auto (default) 01 = Bypass the re-clocker. 02 = 143 03 = 177 04 = 270 05 = 360 06 = 540 07 = 1485 08 = 2970
Read re-clocker status	X3	Rte X3 * X5 ↵	Show current re-clocker rate X5 for output X3.
Example:	*8*07=*	*Rte 08*07*	*The re-clocker rate for output 8 is 1485.*
View settings			
View video output tie	X3 %	X2 ↵	Show input X2 tied to output X3.
View RGBHV output tie	X3 &	X2 ↵	
Example:	*7%*	*02↵*	*Input 2 is tied to output 7.*
NOTE *The two "view tie" commands shown above can be used interchangeably to display SDI or HD-SDI input/output ties.*			
View global video preset	Esc X11 * X3 * 1 VC←	X2[1] • X2[2] • X2[3] • ... • X2[16] • Vid↵	Show the tie configuration for preset X11. Display 16 sequential output positions, starting with output X3. If an output is tied, its position contains input number X2.
Command description:	*Preset# * starting output# (StO#) * 1(=video) VC*		
Response description:	*Input# (I#) assigned to StO# • I# assigned to StO#+1...I# assigned to StO#+15•Vid↵*		
Each **position** shown in the response is an output. The first position on the left is the starting output; the last position (or the first position on the right) is the starting output + 15. The number actually displayed in each position is the input tied to that output.			
NOTE *For the HDXP 1616 and 3216, the starting output number (StO#) should always be **1**.*			
Example for HDXP 3232:	Esc *4*17*1VC*	*(See below.)*	
Response = tied input: 08•08•24•08•08•29•29•00•08•01•01•01•08•08•08•08•Vid↵ Output: 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32			(input 24 tied to output 19; no tied input; input 8 tied to output 29)
In this example, input 1 is tied to outputs 26 through 28. Input 8 is tied to outputs 17, 18, 20, 21, 25, and 29 through 32. Input 24 is tied to output 19, and input 29 is tied to outputs 22 and 23. No input is tied to output 24.			
View room preset	Esc X8 * X12 * X3 * 1VC←	X2[1] • X2[2] • X2[3] • ... • X2[16] • Vid↵	Show the tie configuration for preset X12 for room X8. Show 16 output positions. If an output is tied, its position contains input number X2.
Command description:	*Room# * room preset# * starting output# (StO#) * 1(=video) VC*		
Response description:	*Input# (I#) assigned to StO# • I# assigned to StO#+1...I# assigned to StO#+15•Vid↵*		
NOTE *For the HDXP 1616, the starting output number (StO#) should always be 1.*			

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
View settings, continued			
View output mutes	Esc VM ←	X14[1] X14[2] ... X14[n]	Each X14 response is the mute status of an output, starting from output 1. *n* is the maximum number of outputs for the model. For X14: 0 = Muted 1 = Unmuted
Example (HDXP 3232):	Esc *VM*←	*0000100000011000000000000000000 mut* ↵	*Outputs 5, 12, and 13 are muted. All other outputs are unmuted.*
View re-clocker status	X3 = ←	X5	Show re-clocking rate X5 of output X3. For X5 : 00 = Auto (default) 01 = Bypass 02 = 143 03 = 177 04 = 270 05 = 360 06 = 540 07 = 1485 08 = 2970
View file directory			
From RS-232:	Esc DF ←	*filename, date/time, length* ↵ *filename, date/time, length* ↵ *filename, date/time, length* ↵	
From Web	Esc DF ←	var file = new Array (); File [1] = 'filename1, date1, filesize1'; File [2] = 'filename2, date2, filesize2'; File [3] = 'filename3, date3, filesize3'; File [*n*] = 'filename *n*, date *n*, filesize *n*'; Space_remaining • byte left ↵↵	
Erase file	Esc *filename* EF ←	Del *filename* ↵	
List DSVP (Digital Sync Validation Processing)			
List available input signals	0LS	X21[1], X21[2], X21[3], ... X21[n]	Each X21 response is the signal availability of an input, starting from input 1. *n* is the maximum number of inputs for the model. For X21 : 0 = No signal at input 1 = Signal at input
Example:	*0LS*	*0000001000000000100000000001000010*	*Inputs 7, 17, 26, and 31 have signals.*
List individual output rate	X3 LS	X15 ↵	Show output rate X15 in megabits per second for output X3. (If there is no connection for the specified output, 0000 is displayed.)

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
I/O grouping			
Write input grouping	Esc X10[1] X10[2] X10[3] ... X10[n] I ←	GrI X10[1] X10[2] X10[3] ... X10[n] ↵	Each X10 entry is the group number to which the input in that position is assigned, starting from input 1. *n* is the maximum number of inputs for the model. X10 can be 1 – 4, or 0, which specifies that the input is not in a group.
NOTE *All input positions must contain a group number or 0; e.g., for the HDXP 3216 or 3232, you must enter 32 group numbers between Esc and I. If you do not want to group a particular input, enter 0 in its position.*			
Example: (HDXP 3232 or HDXP 3216)	Esc*401 ... 3I*←	*See below.*	*Input 1 – Group 4, Input 2 – Group 0, ... Input 32 – Group 3.*
Write output grouping	Esc X10[1] X10[2] X10[3] ... X10[n] O ←	GRO X10[1] X10[2] X10[3] ... X10[n] ↵	Each X10 entry is the group number to which the output in that position assigned, starting from output 1. *n* is the maximum number of outputs for the model. X10 can be 1 – 4, or 0, which specifies that the output is not in a group.
NOTE *All output positions must contain a group number or 0; e.g., for the HDXP 3232, you must enter 32 group numbers between Esc and O. If you do not want to group a particular output, enter 0 in its position.*			
Read input grouping	Esc I ←	X10[1] X10[2] X10[3]... X10[n] ↵	Show one X10 entry (group number) for each input, starting from input 1. *n* is the maximum number of inputs for the model. A zero in an input's position indicates that the input is not in a group.
Example (HDXP 1616):	Esc*I*←	*See below.*	
Read output grouping	Esc O ←	X10[1] X10[2] X10[3]... X10[n] ↵	Show one X10 entry (group number) for each output, starting from output 1. *n* is the maximum number of outputs for the model. A zero in an output's position indicates that the output is not in a group.

Input 1 in group 4 Input 2 not grouped Input 32 in group 3

Response #s = group: GrI 4 0 1 3 3 0 0 0 0 4 4 4 4 1 1 2 2 1 2 2 3 3 3 3 2 1 2 2 3 3 3 3 ↵

Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Input 1 in group 1 Input 9 not grouped Input 16 in group 2

Response = group: 1 1 1 3 3 0 0 0 0 4 4 4 4 1 1 2 ↵

Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Rooms			
Write room outputs	Esc X8 , Y1 , Y2 , ... Yn MR ←		
		Mpr X8 , Y1 , Y2 , ... Yn ↵	Assign outputs Y1 through Yn to room X8.
Example:	Esc *8,3,4,5,6MR*←	*Mpr8,03,04,05,06*↵	*Outputs 3, 4, 5, and 6 are assigned to room 8.*
NOTE • *Maximum number of outputs per room is 16.* • *Maximum number of rooms is 10.* • *An output can be assigned to only one room.*			
Read room outputs	Esc X8 MR ←	*Name* , Y1 , Y2 , ... Yn ↵	Show outputs assigned to room X8.
Example:	Esc*3MR*←	*Class1,01,02,08,09*↵	*Outputs 1, 2, 8, and 9 are assigned to room 3, which is named "Class1."*
Names			
NOTE *Invalid characters for names are* – , ' [ ] { } < > ; | \ *and* ?.			
Write global preset name	Esc X11 , *name* NG ←	Nmg X11 , *name* ↵	Assign a name to preset #X11. The name may have up to 12 characters, including A–Z, a–z, 0–9, ", +, :, =, /, and space.
Example:	Esc1,*Security1NG*←	*Nmg01,Security 1*↵	*Name global preset 1 "Security 1."*
Read global preset	Esc X11 NG ←	X23 ↵	X23 = name of preset X11.
Example:	Esc*2NG*←	*Security 2*↵	
Write input name	Esc X1 , *name* NI ←	Nmi X1 , *name* ↵	Assign a name to input #X1.
Example:	Esc*1,Podium camNI*←	*Nmi01,Podium cam*↵	*Name input 1 "Podium Cam."*
Read input name	Esc X1 NI ←	X23 ↵	X23 = name of input X1.
Write output name	Esc X3 , *name* NO ←	Nmo X3 , *name* ↵	Assign a name to output #X3.
Example:	Esc*1,Main PJ1,NO*←	*Nmo01,Main PJ1,NO*↵	*Name output 1 "Main PJ1."*
Read output name	Esc X3 NO ←	X23 ↵	X23 = name of output X3.
Write room preset name	Esc X8 * X12 , *name* NP ←		
		Nmp X8 * X12 , *name* ↵	Assign a name to room preset X12 for room X8.
Example:	Esc*1*3,Podium_DVDNP*←	*Nmp01*03,*X23↵	*Name room 1, preset 3 "Podium_ DVD."*
Read room preset name	Esc X8 * X12 NP ←	X23 ↵	X23 = name of room preset X12.
NOTE *If a preset has not been assigned,* X23 *is displayed as [unassigned].* *If a global preset is saved but not named, its default name is "Preset* X11*."* *If a room preset is saved but not named, its default name is "Rm*X8 *Prst*X12*."* *If you attempt to name or recall a preset that is unassigned, the HDXP responds with the error message E11.* *If you attempt to read a preset for a room that does not exist, the HDXP responds with [Unassigned].* *If you attempt to save a room preset to a room that does not exist, the HDXP responds with the error message E21.*			

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Front panel lockout (executive mode)			
Lock front panel	1 X	Exe 1 ↵	Enable executive mode.
Unlock front panel	0 X	Exe 0 ↵	Disable executive mode.
View front panel lock status	X	X9 ↵	X9 = on/off status of executive mode
Information requests			
Request information (number of inputs by number of outputs)	I	V X2 x X3 • A X2 x X3 ↵	V X2 x X3 = Number of video inputs by number of outputs. A X2 x X3 = Number of audio inputs and outputs. Because the HDXP does not have audio, this part of the response is always **A00x00**.
Example (HDXP 3216):	*I*	*V32x16 A00x00* ↵	*The HDXP 3216 has 32 video inputs and 16 video outputs. It has no audio inputs or outputs.*
Request part number	N	60-XXX-01 ↵	HDXP 3232 = 60-797-01 HDXP 3216 = 60-790-01 HDXP 1616 = 60-807-01
Request system status	S	X22 ↵	X22 = Power supply voltages and Internal temperature in degrees Fahrenheit.
Example:	*S*	*3.29 5.15 91.40* ↵	*3.29 and 5.51 are the power supply voltages; 91.40 (degrees F) is the temperature.*
Query firmware version	Q	X19 ↵	
Example:	*Q*	*1.00* ↵	*The firmware version is 1.00 (sample value only).*
Query firmware version (verbose)	0 Q	X19 X20 X19 X20 ↵	Provide a detailed description of the Ethernet protocol firmware, the HDXP firmware, and any firmware upgrade. The firmware that is currently running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ?.?? indicates that firmware is not loaded.
Response format: Ethernet protocol firmware version – firmware version – updated firmware version ↵			
Example:	*0Q*	*See below.*	

Description | * indicates the version running | Upload date and time

Response: *n.nn* – 1.00(1.50-SDI Series – Wed, 04 Jan 2006 23:11:29 GMT) – 1.00*(1.57-SDI Series – Thu, 20 Apr 2006 20:02:35 GMT) ↵

Meaningless data for this switcher model | HDXP 3216 firmware version | Updated firmware version

NOTE *There are up to three separate sets of Extron firmware on which the HDXP can report: the HDXP Plus Series controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at www.Extron.com.*

Request model description	2 I	SDI and HD-SDI Matrix Switcher ↵	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
Information requests, continued			
Request system memory usage	3I	*n* bytes used out of *n* kBytes ↵	Show amount of memory used and total available memory for system operations.
Request user memory usage	4I	*n* bytes used out of *n* kBytes ↵	Show amount of user memory used and total available user memory.
Resets (Zap commands)			
Reset global presets and names	Esc ZG ←	Zpg ↵	Clear all global presets and their names.
Reset individual global preset	Esc X11 ZG ←	Zpg X11 ↵	Clear global preset X11.
Unmute all outputs	Esc ZZ ←	Zpz ↵	
Reset switcher	Esc ZXXX ←	Zpx ↵	Clear all ties and presets and reset the HDXP to factory defaults.
Reset flash memory	Esc ZFFF ←	Zpf ↵	Reset flash memory (reset user-supplied files).
Reset room map	Esc ZR ←	Zpr ↵	Clear all room presets.
Reset individual room	Esc X8 ZR ←	Zpr X8 ↵	Clear all presets for room X8.
Reset room presets and names	Esc ZP ←	Zpp ↵	Clear all room presets and their names.
Reset individual room preset	Esc X8 * X12 ZP ←	Zpp X8 * X12 ↵	Clear preset X12 for room X8.
Absolute system reset	Esc ZQQQ ←	Zpq ↵	Clear all ties and presets and reset the HDXP to factory defaults. Reset the IP address to 192.168.254.254 and the subnet mask to 255.255.0.0.
IP setup commands			
Set matrix name (location)	Esc X25 CN ←	Ipn X25 ↵	
Read matrix name (location)	Esc CN ←	X25 ↵	
Reset unit name to factory default[24]	Esc • CN ←	Ipn • X29 ↵	Reset the name of your HDXP to the factory default: combination of its model name and last three pairs of its MAC address.
Example:	Esc • *CN* ←	*Ipn HDXP-Plus-Serie-00-2E-C7* ↵	
Set time/date	Esc X37 CT ←	1pt X37 ↵	X37 is the local time and date in the following format: MM/DD/YY HH:MM:SS
Read time/date	Esc CT ←	X26 ↵	Show day, date, and GMT.
Example:	Esc *CT* ←	*Mon, 08 May 2006 19:01:17* ↵	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
IP setup commands, continued			
Set GMT offset	Esc X39 CZ ←	Ipt X39 ↵	Set the Greenwich Mean Time (GMT) offset value (X39) for the HDXP's location. GMT offset (-12.00 to +14.0 hours) represents the time difference in hours and minutes (± hh.mm relative to Greenwich, England). The plus sign and leading zero are optional. *Example: 5:30 = +05:30.*
Read GMT offset	Esc CZ ←	X39 ↵	
Set daylight savings time	Esc X40 CX ←	Ipt X40 ↵	X40 is the status of daylight savings (DST) time of day. DST is a 1 hour offset that is observed in the USA and parts of Europe and Brazil. For example, California uses GMT -8.00 from April to October and -7.00 GMT from November to March. DST should be turned off in Hawaii, American Samoa, Guam, Puerto Rico, the U. S. Virgin Islands, the eastern time zone part of Indiana, and Arizona (excluding the Navajo Nation). 0 = Off/ignore 1 = On
Read daylight savings time	Esc CX ←	X40 ↵	
Configure port parameters[24]	Esc X46 * X47 , X48 , X49 , X50 CP ←	Cpn X46 • Ccp X47 , X48 , X49 , X50 ↵	Set baud rate X47, parity X48, Data bits X49, and stop bits X50 for the IP connection for port number X46.
Read port parameters	Esc X46 CP ←	X47 , X48 , X49 , X50 ↵	
Set comm port mode	Esc X46 * X51 CY ←	Cpn X46 • Cty X51 ↵	Set type X51 of communication for port X46. For X51: 0 = RS-232 1 = RS-422 **NOTE** X46 *can be* ***01*** *only.*
Read comm port mode	Esc X46 CY ←	X51 ↵	
Configure flow control[24]	Esc X46 * X52 , X53 CF ←	Cpn X46 • Cfl X52 , X53 ↵	Set flow control for port X46. For X52: **H** = hardware **S** = software **N** = none X53 = number of milliseconds between bytes. Can be 0000 – 1000 ms; default = 0.
View flow control	Esc X46 CF ←	X52 , X53 ↵	

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
IP setup commands, continued			
Configure receive timeout[24]	Esc X46 * X17 * X18 * X69 * X68 CE ←	Cpn X46 • Cce X17 , X18 ↵	X17 = time in 10s of ms to wait for characters coming into port X46 before terminating the connection. Default = 10 (100 ms). Maximum = 32,767. X18 = time in 10s of ms to wait between characters coming into port X46 before terminating the connection. Default = 2 (20 ms). Maximum = 32,767.
View receive timeout	Esc X46 CE ←	X17 , X18 , X69 , X68 ↵	
Set DHCP on/off	Esc X45 DH ←	Idh X45 ↵	Set DHCP on or off. For X45: 0 = off 1 = on
Read DHCP status	Esc DH ←	X45 ↵	
Set IP address	Esc X27 CI ←	Ipi X27 ↵	X27 = IP address in the format ###.###.###.###. Leading zeros in each of the four fields are optional for setting values.
Read IP address	Esc CI ←	X27 ↵	
Read hardware (MAC) address	Esc CH ←	X34 ↵	Show the MAC (media access code) address X34 for your unit.
Set subnet mask	Esc X58 CS ←	Ips X58 ↵	X58 = subnet mask in the format ###.###.###.###. Leading zeros in each of the four fields are optional.
Read subnet mask	Esc CS ←	X58 ↵	
Set gateway IP address	Esc X59 CG ←	Ipg X59 ↵	X59 = gateway IP address in the format ###.###.###.###. Leading zeros in each of the four fields are optional.
Read gateway IP address	Esc CG ←	X59 ↵	
Set administrator password	Esc X30 CA ←	Ipa X30 ↵	Set administrator access password X30 (4 to 12 alphanumeric characters). The password is case sensitive. Special characters (spaces or symbols) are not allowed.
Clear administrator password[24]	Esc • CA ←	Ipa • ↵	Clear/remove all passwords (administrator and user).
Read administrator password	Esc CA ←	X30 ↵	Show administrator password X30.
Set user password	Esc X30 CU ←	Ipu X30 ↵	Set user password X30 (4 to 12 alphanumeric characters). The password is case sensitive. Special characters (spaces or symbols) are not allowed.
Clear user password[24]	Esc • CU ←	Ipu • ↵	Clear user password only.
Read user password	Esc CU ←	X30 ↵	Show user password X30.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
IP setup commands, continued			
Set mail server IP address and domain name	Esc X27 , X38 CM ←	Ipm X27 , X38 ↵	Set the e-mail domain name for IP address X27. X38 = domain (e.g., extron.com).
Read mail server IP address, domain name, and password	Esc CM ←	X27 , X38 , X30 ↵	Show mail server IP address X27, e-mail domain name X38, and password X30.
Set e-mail recipient	Esc X41 , X33 CR ←	Ipr X33 ↵	Set the recipient of e-mail. For the recipient to receive e-mail notifications, you must then set the events that the HDXP reports, using one or more separate *Set e-mail events* (EM) commands (see below).
Example:	Esc*72,JSmith@folklore.netCR*←	*IprJSmith@folklore.net,*↵	*E-mail account #72, JSmith, will receive e-mail messages on occasions specified by the Set e-mail events for recipient command.*
Read e-mail recipient	Esc CR ←	X33 ↵	Show e-mail recipient address X33.
Set e-mail events for recipient	Esc X41 , X42 , X43 , X43 , ... X43 EM ←	Ipe X41 ↵	Send e-mail notification(s) X43 to e-mail account number X41. X41 can be 65 – 72. X42 = occasion for sending the notification (notify when?): 0 = no response 1 = failed/missing 2 = fixed/restored 3 = both 1 and 2

NOTE *Before entering this command, you must first set a recipient for e-mail account number* X41*, using the separate* Set e-mail recipient *(CR) command.*

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
IP setup commands, continued			

Read e-mail events for recipient	Esc X41 EM ←	X42 , X44 ↵	Show when notification X44 will be sent to e-mail account # X41. X44 is a 32 digit number that indicates the notification status for e-mail account X41. For each input represented by a digit in X44:
			0 = do not notify (or no input exists)
			1 = notify

Example (HDXP 1616):	Esc *72EM*←	*See below.*	
	Notify failed and fixed / E-mail input 8 status / Ignore input 16 Response: 3, 1 1 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 1 ↵ Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 Power Supply		*E-mail account #72 will receive fail/missing and fixed/restored messages for input signals 1, 2, and 8, and the power supply.*
Send e-mail (event)	Esc X28 SM ←	Eml X28 ↵	X28 can be 1 – 64.
Set verbose mode[24]	Esc X70 CV ←	Vrb X70 ↵	Enable or disable verbose mode and/or tagged responses, in which additional information is provided in response to a query.
NOTE *The HDXP can send out unsolicited information (such as a notice of a change in input or some other setting). That is called a verbose (wordy) relationship between the switcher and a connected device. For a direct RS-232/422 connection, the HDXP is set for verbose mode by default. When the HDXP is connected via Ethernet, verbose mode is disabled by default in order to reduce the amount of communication traffic on the network. If you want to use verbose mode with a switcher connected via Ethernet, you must set this mode to On each time you reconnect to the HDXP.*			
Read verbose mode	Esc CV ←	X70 ↵	Show verbose mode/tagged response status X70: 0 = neither verbose mode nor tagged responses enabled 1 = verbose mode enabled; no tagged responses (default) 2 = tagged responses enabled; verbose mode not enabled 3 = both verbose mode and tagged responses enabled
Read connection's security level	Esc CK ←	X31 ↵	For X31: 0 = anonymous 1 – 10 = extended security levels 1 through 10 11 = user 12 = administrator The response is returned as two digits with a leading zero.
Commit RAM to flash memory	Esc 1FF ←	Nvr X16 ↵	Response is delivered when the process is complete.

Command/response table for SIS commands (continued)

Command	ASCII (Telnet) (host to switcher)	Response (switcher to host)	Additional description
IP setup commands, continued			
View whether RAM needs to be saved to flash memory	Esc FF ←	X16 ↵	Show dirty RAM status X16: 0 = RAM needs to be saved to flash memory. 1 = RAM has been saved to flash memory. The unit can now be powered off or reset.
Bi-directional serial data port			
Send data string	Esc X46 * X17 * X18 * X56 RS ← X55 •	*Response to command* ↵	

NOTE X46 = *port number*
01 = rear panel Remote RS232/422 port
02 = front panel Config port

X17 = *time in tens of milliseconds that the HDXP will wait until receipt of the first response character before terminating the command. (Default = 10 = 100 ms; maximum = 32,767.)*

X18 = *time in tens of milliseconds that the HDXP will wait between characters being received via a serial port before terminating the command. (Default = 2 = 20 ms; maximum = 32,767.)*

X56 = *#L or #D. These parameters are case sensitive (require capital D or capital L).*
L = Length of the message to be received
D = Delimiter value
 # = byte count (for L) or a single ASCII character expressed in decimal form (for D). The byte count number can be 0 through 32767; the default is 0. The ASCII decimal number can be 0 through 00255; the default is the byte count. A 3-byte length = 3L.

A delimiter of ASCII 0A is 10D.

The response includes leading zeros.

X55 = *Command data section*

Esc *05*4*7*3L RS*← *<data>* •
Response to command↵

NOTE *The* X17 * X18 X56 *sequence is optional. If* X17 *and* X18 *are not specified, the default values are used.*

Ethernet data port			
Send data string	Esc X57 * *port#* * X17 * X18 ES ← X55	*Response to command* ↵	X57 is the unit's IP address converted into a single 32-bit number.

Chapter Five

Matrix Software

Matrix Switchers Control Program

Special Characters

Button-Label Generator

Matrix Software

The following software programs accompany the HDXP 3232, 3216, and 1616 switchers:

- The Windows®-based Extron Matrix Switcher Control Program, which communicates with the switcher via the RS-232/RS-422 port and the Ethernet port, provides an easy way to set up ties and sets of ties.
- The Extron Button-Label Generator allows you to design and print labels for the HDXP front panel buttons.

Both programs are compatible with Windows 95/98, Windows NT, Windows ME, Windows 2000, and Windows XP. Updates to these programs can be downloaded from the Extron Web site (http://www.extron.com).

Matrix Switchers Control Program

Installing the software

The Windows-based control software program is contained on a CD-ROM. To install the Matrix software from the CD to your computer's hard drive, load the CD in your computer. The installation should start automatically (if it does not, run **Launch.exe** from the CD), and follow the instructions that appear on the screen. The Matrix software program occupies approximately 1 MB (megabyte) of hard-drive space.

By default, the Windows installation creates a C:\Program Files\Extron\Matrix Software directory and places two files (MATRIX Switcher+ Control Program [MTRX.exe] and MATRIX Switcher+ Help [MTRX.hlp]) in it.

NOTE *The program was designed to control most Extron matrix switchers, but its operation is limited to the features and configuration of your HDXP.*

NOTE *The HDXP switcher can support either RS-232 or RS-422 serial communication protocol from the rear panel Remote RS232/422 connector, and RS-232 from the front panel Config connector. The HDXP operates at 9600, 19200, 38400, or 115200 baud rates. See* Selecting the RS-232/RS-422 protocol and baud rate *in chapter 3,* Operation*, to configure the Remote RS232/RS422 and Config ports from the front panel.*

Software operation via Ethernet

When an HDXP switcher is connected to an Ethernet WAN or LAN, any number of users can operate it, locally or remotely, using the Matrix Switcher Control Program. See *Ethernet Connection* in chapter 2, *Installation*, for information on connecting to the network via Ethernet.

Connection to the switcher via Ethernet can be password protected. There are two levels of password protection: administrator and user. Administrators have full access to all HDXP switching capabilities and editing functions. Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel are logged on with administrator privileges. Fields and functions that exceed user privileges are grayed out in the Windows-based Control software when the operator is logged on as a user.

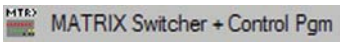
Ethernet protocol settings

The IP Settings/Options screen (figure 5-9, later in this chapter) provides a location for viewing and, if connected via the RS-232/422 link or if you are logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See *IP Settings/Options window*, later in this chapter, for more details.

Using the software

Many items in the Matrix Switcher Windows-based Control Program are also accessible via front panel controls (see chapter 3, *Operation*), under SIS control (see chapter 4, *Programmer's Guide*), and via the Web pages (see chapter 6, *HTML Operation*). The Matrix Switcher Help Program provides information on settings and on how to use the control program itself.

1. To run the Matrix Switcher Control Program, click on the Matrix Switcher + Control Pgm icon (shown at right) in the Extron Electronics group or folder on your Start menu.



You can access this icon from your Start menu by selecting the following:

Start ▶ All Programs ▶ Extron Electronics ▶ Matrix Switchers ▶ Matrix Switcher+ Control Program

The Comm Port Selection window (figure 5-1) opens.

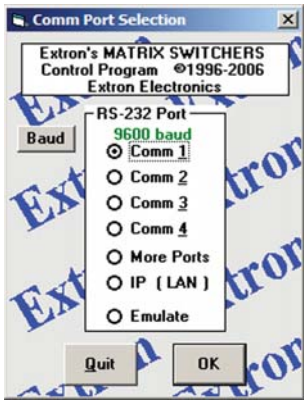


Figure 5–1 — Comm Port Selection window

2. Choose the comm port that is connected to the HDXP's RS-232/RS-422 port, IP [LAN], or Emulate.

- **If you selected a Comm port**, check the baud rate displayed in the Comm Port Selection window. If you need to change the baud rate, click the Baud button to display the baud rate pop-up list. (After you click it, the Baud button changes to OK.) Double-click on the desired baud rate (available rates are 9600, 19200, 38400, and 115200; the default is 9600). Then click OK and proceed to step **4**.

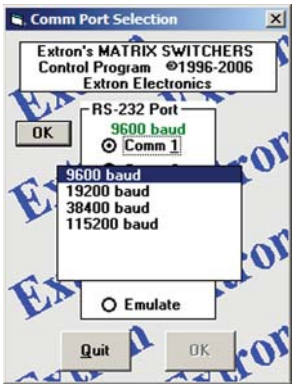


Figure 5–2 — Baud rate pop-up list

- **If you selected** *IP [LAN]*, click OK and proceed to step **3**.
- **If you selected Emulate**, click OK and see *Using emulation mode*, later in this chapter.

3. **If you selected IP [LAN] in step 2**, the IP Connection window opens (figure 5-3).

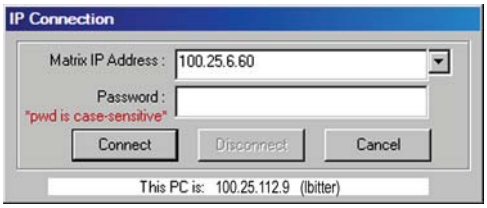


Figure 5–3 — Address and password entry for IP connection

a. Check the Extron IP Address field in the IP Connection window. The field displays the last Extron IP address entered.

If the IP address is correct: Proceed to step **3b**.

If the address is not correct: Either click in the Extron IP Address field and enter the IP address or click on the scroll down button (▾) and select from among the recently used addresses. Then proceed to step **3b**.

NOTE *If your local system administrators have not changed the value, the factory-specified default address, 192.168.254.254, is the correct value for this field.*

b. If your HDXP is password protected, click in the Password field and enter the appropriate administrator or user password.

c. Click *Connect*.

- If you logged on using the administrator password, the Windows program connects you to the HDXP switcher with all of the administrator rights and privileges.
- If you logged on with the user password, the Windows program connects you to the HDXP switcher with only user capabilities.
- If an incorrect password is entered, the program beeps and returns to the password entry display.

4. The Extron Matrix Switcher Control Program window (figures 5-4 and 5-5) appears. The window displays the current configuration of the attached matrix, with numbered boxes representing the video inputs and outputs.

NOTE *The following figures show the HDXP 3232, which has 32 inputs and 32 outputs. The window for the HDXP 3216 has 32 input boxes and 16 output boxes, while the HDXP 1616's window has 16 input boxes and 16 output boxes.*

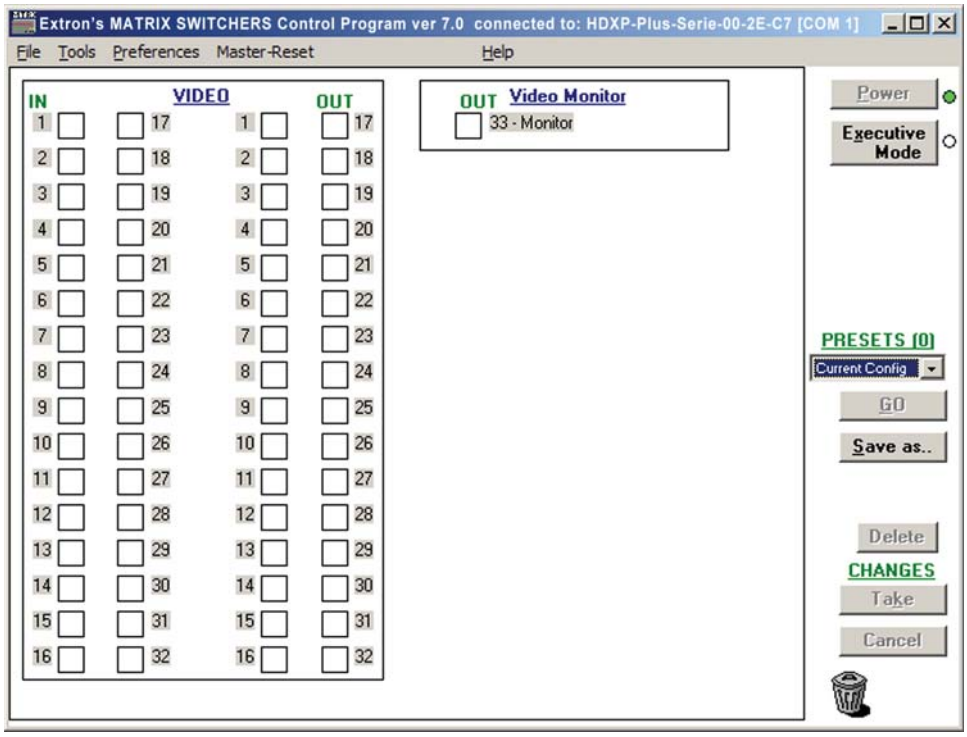


Figure 5–4 — Extron Matrix Switcher Control Program window (no ties or rooms)

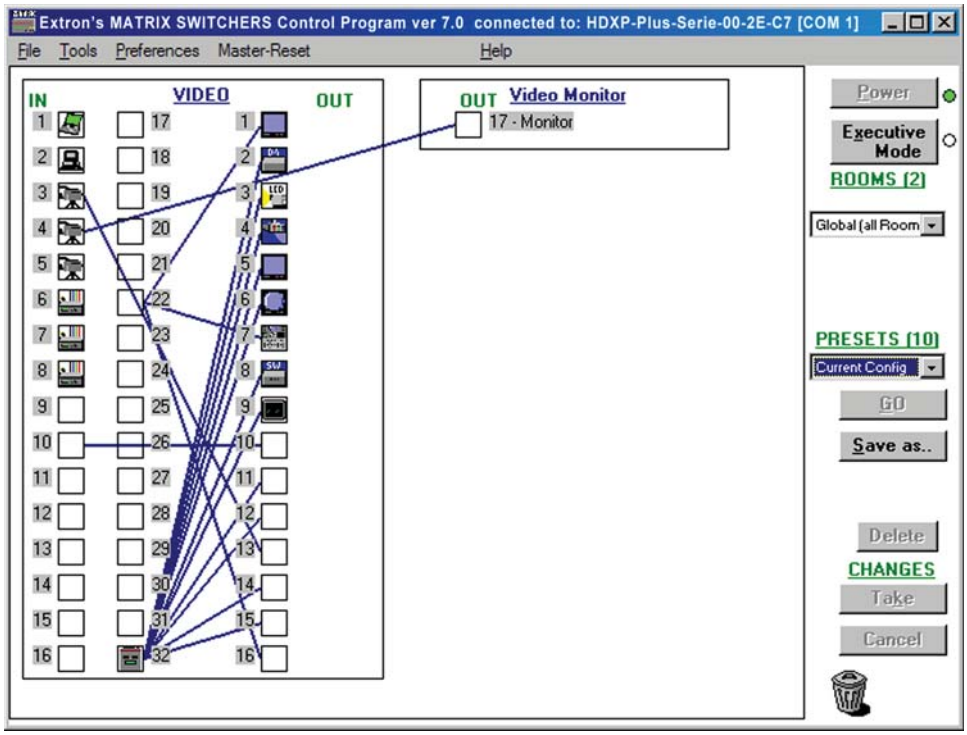


Figure 5–5 — Sample Matrix window with ties and rooms

Setting up the Matrix window

On the Matrix window, the inputs and outputs are represented by boxes. You can make the control program easier to use by assigning device icons that represent your connected devices to each input and output box.

1. Click on an input or an output box. The Input Devices or Output Devices window opens, containing icons representing various types of devices that may be connected to a matrix switcher.

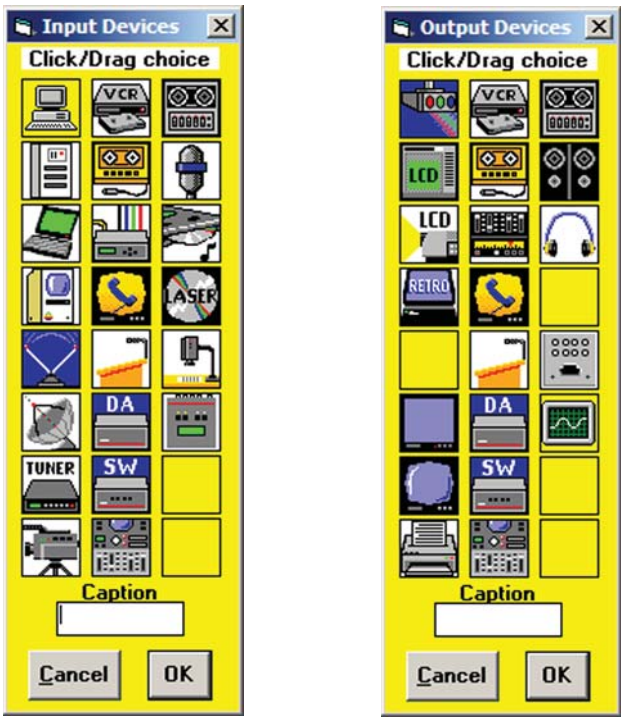


Figure 5–6 — Input Devices and Output Devices icon windows

2. Click and drag an icon from the devices screen to an input or output box on the Matrix window. Repeat for additional devices as desired.
3. In the Caption box, enter a caption for the device, if desired; e.g., Laptop. This caption appears in the descriptive window that pops up when you pass the cursor over an input or output box containing an icon.

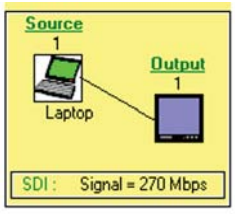


Figure 5–7 — Pop-up window for input 1 containing a caption

4. When finished assigning icons, click OK to close the device window.

To change an icon in an input or output box, drag the new icon to the box. It replaces the previous one.

To remove the icon from a box and leave the box empty, drag an empty square to the box.

Alternatively, you can display the input and output numbers in the boxes instead of icons. To do this, select Numbers in I/O Boxes from the Preferences pull-down menu.

Managing ties

On the Matrix window, you can create, dissolve, and view input-to-output ties as follows:

- **To create a tie**, click and drag from an input box to an output box.
  - **If Hold/Verify Changes has been selected from the Preferences menu**:

    A broken line appears, connecting the two boxes. (If you want to undo the preliminary tie at this point, click the Cancel button. The broken line disappears.) Click Take to confirm the tie. The broken line becomes solid.
  - **If Immediate Changes has been selected from the Preferences menu:**

    The tie is made immediately. (No Cancel button is displayed.)
- **To remove a tie**, drag the output box to its tied input box or to the trash can.
  - **If Hold/Verify Changes has been selected from the Preferences menu**:

    The tie line becomes broken. (If you want to reinstate the tie at this point, click Cancel. The broken line becomes solid again.) Click Take. The broken tie line disappears.
  - **If Immediate Changes has been selected from the Preferences menu:**

    The tie is undone immediately.
- **To view information on a specific input or output device**, position the cursor over that device in the Matrix window. A pop-up window opens, showing the input and output numbers, names (if captions were specified), details on the connections to that device, and the frequency of the video signal being sent to or from it (see figure 5-8 on the next page).

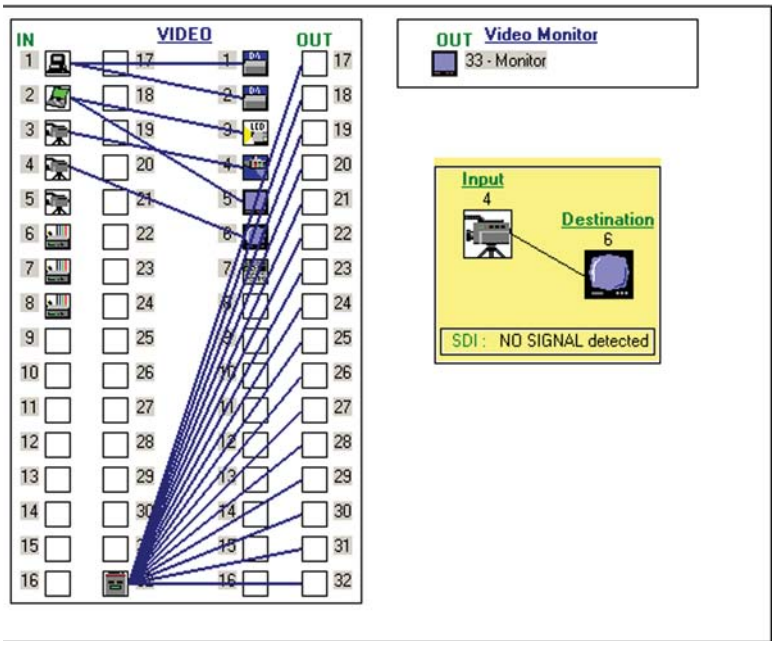


Figure 5–8 — Matrix window section with pop-up information on input 4

IP Setup

The IP Settings/Options window (figure 5-9) lets you view and, if connected via the RS-232/RS-422 link or if you are logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. None of the fields on this screen can be edited while you are logged on as a user. To display the IP Settings/Options window, select IP Options from the Tools pull-down menu.

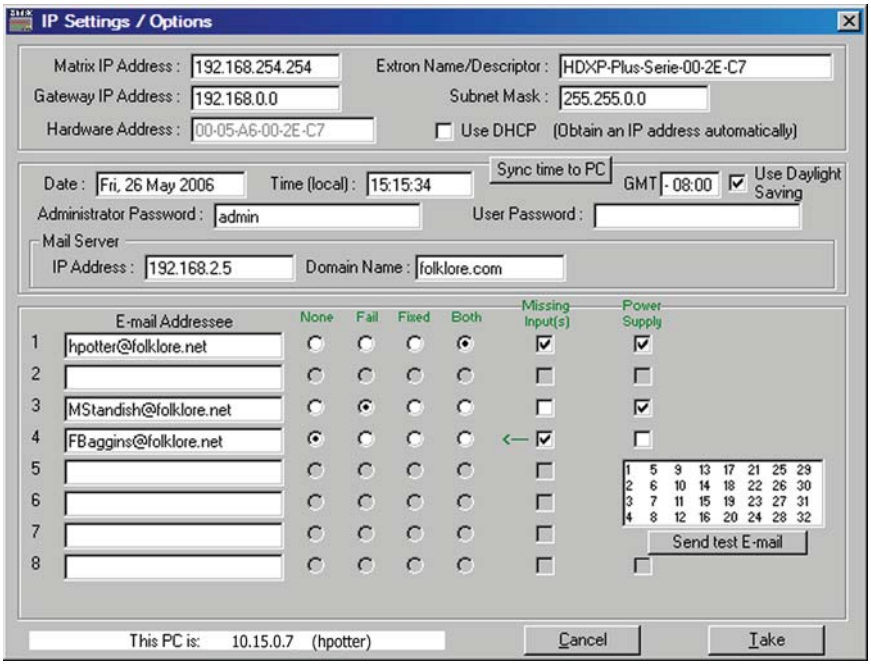


Figure 5–9 — IP Setting/Options window

NOTE *Editing the following fields on the IP Settings/Options screen while connected via the Ethernet port can immediately disconnect your computer from the switcher:*

IP Address
Gateway IP Address
Subnet Mask
Use DHCP
Administration Password

Extron recommends editing the settings on this screen using the RS-232/422 link and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.

NOTE *When the control program is connected to the HDXP via the RS-232/422 link, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.*

See appendix A, *Ethernet Connection*, for basic information about IP addresses.

Setting the IP Address

The Matrix IP Address field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory on the switcher.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

Edit the address field as follows:

1. Click in the Matrix IP address field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the address.
3. Press the Tab key on the keyboard or click in another field to exit the Matrix IP Address field.
4. Click the Take button to make the address change take effect.

NOTE *Editing the IP Address field while connected via Ethernet can immediately disconnect your from the HDXP. It is recommended that you connect via RS-232/422 to edit this field.*

Setting the Extron name or descriptor

The Extron Name/Descriptor field contains the name used as the "from" information when the HDXP switcher e-mails notification of its failed or repaired status. The default name/descriptor shown in this field is a portion of your product's name, followed by the last six characters of the unit's MAC address (for example, HDXP-Plus-Serie-05-A6-2D).

This descriptor can be changed to any valid name, up to 24 alphanumeric characters and/or hyphens.

NOTE *The following characters are invalid in the Extron Name/Descriptor field:* **+ ~ , @ = ‘ [ ] { } < > ’ “ ” ; : | \ ? *and* space**.

Edit the Extron Name/Descriptor field as follows:

1. Click in the Extron Name/Descriptor field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Extron Name/Descriptor field.
4. Click the Take button to make the name change take effect.

Setting the gateway IP address

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the HDXP switcher and the mail server are not on the same subnet.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeros, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

1. Click in the Gateway IP Address field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the address.
3. Press the Tab key on the keyboard or click in another field to exit the Gateway IP Address field.
4. Click the Take button to make the address change take effect.

NOTE *Editing the Gateway IP Address field while connected via Ethernet can immediately disconnect your from the HDXP. It is recommended that you connect via RS-232/422 to edit this field.*

Setting the subnet mask

The Subnet Mask field is used to determine whether the HDXP is on the same subnet as the controlling PC or the mail server when you are subnetting. The subnet mask has the same format as the Matrix IP and Gateway addresses (###.###.###.###).

For more information, see *Subnetting — A Primer*, in appendix A, *Ethernet Connection*.

Edit this field as follows:

1. Click in the Subnet Mask field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the mask.
3. Press the Tab key on the keyboard or click in another field to exit the Subnet Mask field.
4. Click the Take button to make the changes to the mask take effect.

NOTE *Editing the Subnet Mask field while connected via Ethernet can immediately disconnect your from the HDXP. It is recommended that you connect via RS-232/422 to edit this field.*

Hardware Address field

The hardware (MAC) address consists of six pairs of alphanumeric characters in the format xx-xx-xx-xx-xx-xx. The MAC address is hard coded in the HDXP switcher and cannot be changed.

Enabling/disabling DHCP

Selecting the Use DHCP check box directs the HDXP to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator for information about DHCP on your system.

NOTE *Selecting or deselecting this check box while connected via Ethernet can immediately disconnect your from the HDXP. It is recommended that you connect via RS-232/422 to edit this field.*

Setting the date

The Date field displays the current date in the Greenwich Mean Time zone. If necessary, adjust the date as follows:

1. Click in the Date field. A date editing field appears, displaying the date in the format (M)M/(D)D/YYYY, as shown at the right. Leading zeros are not used. The graphic cursor becomes a text cursor in the date editing field.

2. Edit the field as desired to set the proper date. Leading zeros are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set date field.
4. Click the Take button to make the date change take effect.

Setting the local time

The Time (local) field displays the current time in the local time zone. If necessary, click the Sync Time to PC button to set the switcher to your computer's internal time, or adjust the time manually as follows:

1. Click in the Time (local) field. A time editing field appears with the date in the format HH:MM:SS (00:00:00 to 23:59:59), as shown at right. The graphic cursor becomes a text cursor in the time editing field.

2. Edit the field as desired to set the proper time. Remember to use 24-hour time. Leading zeros are optional.
3. Press the Tab key or click in another field to exit the set time field.
4. Click the Take button to make the time change take effect.

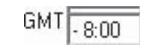
Sync Time to PC button

Clicking the mouse on the Sync Time to PC button causes the computer you are operating to send its internal time to the switcher in a set time command.

Setting the offset from GMT

The GMT field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference. If necessary, adjust the offset as follows:

1. Click in the GMT field. An offset editing field appears with the offset in the format ±HH:MM (–12:00 to +14:00), as shown at right. The graphic cursor becomes a text cursor in the set offset field.



2. Edit the field as desired to set the proper offset. Leading zeros are optional. Some time zones are on the half-hour (30 minutes).
3. Press the Tab key or click in another field to exit the set offset field.
4. Click the Take button to make the offset change take effect.

Enabling daylight savings time

When daylight savings time is enabled, the switcher updates its internal clock between daylight savings time and standard time in the spring and fall on the date that the time change occurs in your location. When daylight savings time is turned off, the switcher does not adjust its time reference.

Select the Use Daylight Savings check box to enable daylight savings time.

Setting the administrator password

The Administrator Password field displays the password required to log on to the HDXP switcher via the Ethernet port with all administrator rights and privileges. Passwords are case sensitive and are limited to 12 uppercase and/or lowercase alphanumeric characters.

While you are logged on as a user, this field is masked with asterisks (**********) as a security measure.

NOTE *The following characters are invalid in passwords:*
+ ~ , @ = ‘ [ ] { } < > ’ “ ” ; : | \ ? *and* **space**.

NOTE *Editing the Administrator Password field while connected via Ethernet can immediately disconnect your from the HDXP. It is recommended that you connect via RS-232/422 to edit this field.*

Edit this field as follows:

1. Click in the Administrator Password field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the case-sensitive password.
3. Press the Tab key on the keyboard or click in another field to exit the Administrator Password field.
4. Click the Take button to make the password change take effect.

Setting the user password

The User Password field displays the password required to log on to the HDXP switcher via the Ethernet port as a user, without all administrator rights and privileges. Passwords are case sensitive and are limited to 12 uppercase and/or lowercase alphanumeric characters.

While you are logged on as a user, this field is masked with asterisks (**********) as a security measure.

NOTE *An administrator password must be created before a user password can be created.*

NOTE *The following characters are invalid in passwords:*
+ ~ , @ = ‘ [ ] { } < > ’ “ ” ; : | \ ? *and* **space**.

Edit this field as follows:

1. Click in the User Password field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the case-sensitive user password.
3. Press the Tab key on the keyboard or click in another field to exit the User Password field.
4. Click the Take button to make the password change take effect.

Setting the mail server IP address

The Mail Server IP Address field displays the IP address of the mail server that handles the e-mail for the facility in which the HDXP switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

1. Click in the mail server IP address field. The graphic cursor becomes a text cursor.
2. Make any desired changes to the mail server IP address.
3. Press the Tab key on the keyboard or click in another field to exit the mail server IP address field.
4. Click the Take button to make the address change take effect.

Setting the mail server domain name

The Mail Server Domain Name field displays the domain name that the HDXP switcher uses to log on to the e-mail server. Standard domain conventions (such as *nnnnn@xxx*.com) apply.

NOTE *The following characters are invalid in a domain name:* **+ ~ , = ‘ [ ] { } < > ’ “ ” ; : | \ ? *and* space**. *The @ character is acceptable only as the lead-in to the domain name (such as @folklore.net).*

Edit this field as follows:

1. Click in the Mail Server Domain Name field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Mail Server Domain Name field.
4. Click the Take button to make the name change take effect.

Entering e-mail addressee information

The eight E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the HDXP switcher e-mails notification of its failure and repair status. Figure 5-10 shows a typical e-mail from the switcher.

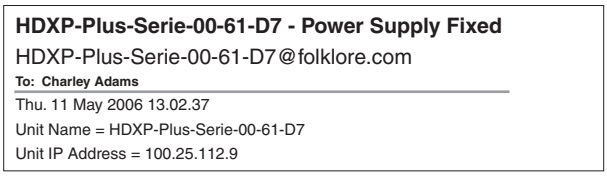


Figure 5–10 — Typical HDXP e-mail

The radio buttons and check boxes associated with each address field permit the administrator to specify specific e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The graphic cursor becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions (such as *nnnnn@xxx*.com) apply.

3. Press the Tab key on the keyboard or click in another field to exit the e-mail addressee field.
4. Use the check boxes associated with each addressee to select the options about which the addressee will be e-mailed: missing input(s) and/or power supply.
5. When you select either a radio button or a check box for an addressee, the floating box that contains the input numbers is displayed on the Input Settings/Options screen. Select the inputs that need monitoring by clicking on their numbers in this box. Selected input numbers are displayed in white on a blue field. To deselect an input number, click on it again.

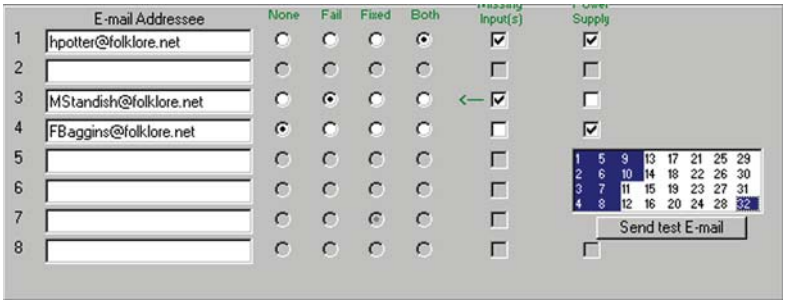


Figure 5–11 — Selecting inputs to monitor

6. Use the round radio buttons associated with each addressee to select whether the addressee will be e-mailed about failures, fixes, both, or not be notified. The None radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as traveling or on vacation.
7. If desired, click on the Send test E-mail button to test the e-mail function.
8. Click the Take button to make the e-mail address changes take effect.

Updating the firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the HDXP's control board without needing to take the switcher out of service, open its enclosure, and replace the firmware chip.

Update the HDXP firmware as follows:

NOTE *The update firmware utility is for replacing the firmware that controls all switcher operation. This is* ***not*** *the page to insert your own HTML pages. See* Uploading HTML files, *later in this chapter, to insert custom HTML pages.*

1. Visit the Extron web site, www.extron.com, and download the latest firmware file to your computer.
   a. On the Extron Web page, select the Downloads tab.
   b. On the Download Center page, click the Firmware link on the left sidebar menu.
   c. Click on the name of your HDXP switcher.
   d. On the next screen, fill in the required information, then click the Download *product name_firmware version*.exe button.
   e. On the File Download - Security Warning window, click Save.
   f. On the Save As window, browse to the folder where you want to save the firmware file, and click Save. The firmware installation file is placed on your hard drive.

2. Start the Matrix Switcher Control Program and connect to the HDXP switcher. (See steps **1** through **4** under *Using the software*, earlier in this chapter, for the procedure.)

NOTE *The Ethernet connection is much faster than the RS-232/RS-422 connection. Extron recommends using the Ethernet connection rather than the serial port for firmware uploads.*

3. From the Tools menu, select Update Firmware... . The Select files window opens (figure 5-12).

4. Navigate to the folder where you saved the firmware file. Select the file.

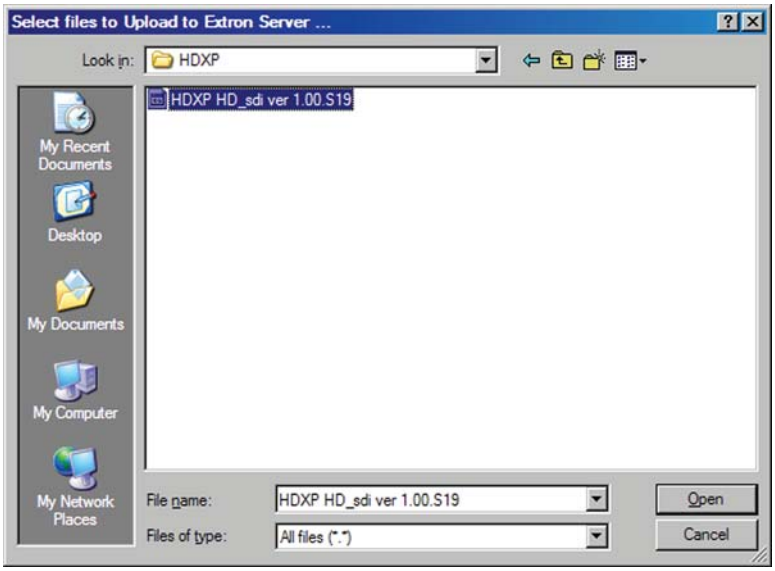


Figure 5– 12 — Select files window with firmware file selected

NOTE *Valid firmware files must have the file extension* .S19. *Any other file extension is not a firmware upgrade.*

NOTE *The original factory-installed firmware is permanently available on the HDXP switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.*

5. Click Open. A confirmation prompt window opens, reminding you that loading the selected .s19 file will reprogram the device's firmware.

6. Click OK to continue with the upload. A status window, which shows the progress of the upload, appears. The firmware upload to the HDXP switcher may take a few minutes.

7. When the upload is complete, another prompt window appears, informing you that the new firmware upgrade will cause the HDXP to reset, which will terminate the connection with your computer and close the control software. Click OK.

   If you want to continue using the Matrix Switcher Control Program, you must restart it.

Uploading HTML files

You can create customized HTML pages for the HDXP to display. The HTML Files List window (figure 5-13) provides a way to view the contents of the HDXP's file system and to upload custom HTML pages to the switcher.

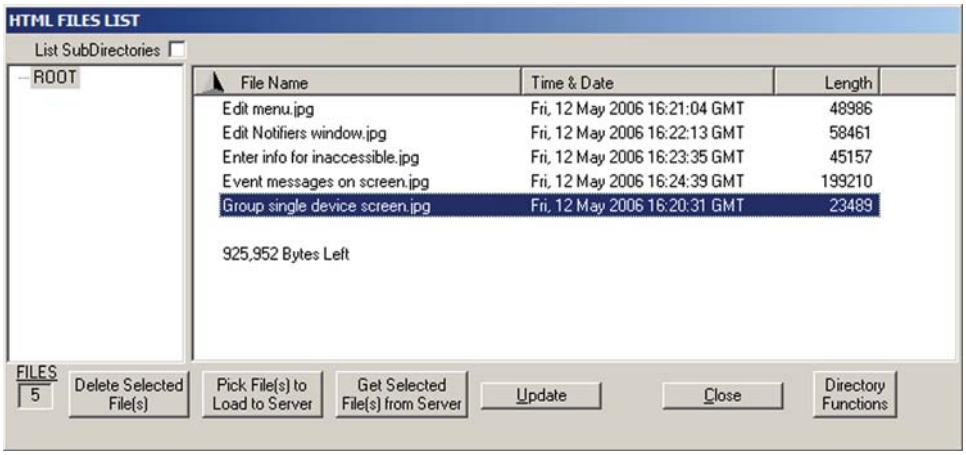


Figure 5–13 — HTML Files List window

Upload HTML pages as follows:

NOTE *The files listed in figure 5-13 are shown for example only and may not be present on your switcher.*

NOTE *The HTML Files List window is for inserting your own HTML pages. This is* ***not*** *the window to replace the firmware that controls all switcher operation. See* Update firmware, earlier *in this chapter to replace the firmware.*

NOTE *The following characters are invalid in file names:*
+ ~ , @ = ‘ [ ] { } < > ’ “ ” ; : | \ ? *and* **space**.

1. Connect the PC to the HDXP via the switcher's RS-232/RS-422 port or Ethernet port.
2. Start the Matrix Switcher Control Program and connect to the HDXP switcher. (See steps **1** through **4** under *Using the software*, earlier in this chapter, for the procedure.)
3. From the Tools menu, select HTML File Manager. The HTML Files List window opens.
4. Click the Pick File(s) to Load to Server button. The Select files window opens.
5. Navigate to the folder where you saved the HTML file(s). Select the file(s).

NOTE *To select multiple files, hold the Ctrl key while you click on the desired files.*

NOTE *If you want one of the HTML files that you created to be the default start-up page, name the file "index.html". The HDXP switcher automatically looks for that file name when you first connect to it using an Internet browser.*

6. Click the Open button. The file uploading process may take a few minutes.
7. Click the Update button to confirm the upload.
8. Click the Close button to exit the HTML Files List window.

Windows buttons, menus, and trash can

The buttons, drop-down menus, and trash can on the right side of the program window perform the following functions:

Power — This button is unavailable for HDXP switchers, because the HDXP cannot be powered on and off via software.

Executive mode — Allows you to lock out front panel operations, except for the view-only mode functions.

Room menu — Displays a list of up to 10 rooms. From this list you can select a room to display in the window.

NOTE *A **Room** is a subset of outputs that are logically related to each other, as determined by the operator. The HDXP switcher supports up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.*

Presets menu — Displays a list of up to 32 global presets and up to 100 room presets (10 rooms with 10 presets per room). From this list you can select a preset to display in the window. You can either activate the selected preset by clicking **Go** or delete it by clicking **Delete**.

Go — Activates the selected preset as the current configuration.

Save as — Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.

Take — Allows you to save to file any changes made to the displayed configuration.

Cancel — Returns to the previous screen, undoing any changes you have made.

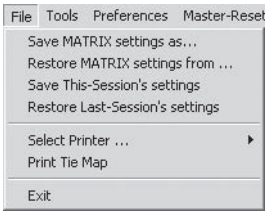
Trash can — Drag and drop from an input or output button to the trash can to undo all ties associated with that input or output.

Windows menus

The menu bar on the Matrix window contains the following pull-down menus.

File menu

The File menu contains the following options:



Save MATRIX settings as — Saves a complete set of up to 132 presets (32 global and 100 room presets), plus the last active setting (preset #0), to a file. Saved settings include assigned icons and icon captions.

Restore MATRIX settings from — Loads and activates a previously saved settings file.

Save This-Session's settings — Performs the same function as "Save MATRIX settings as," but you are not able to specify a file name to which it will be saved.

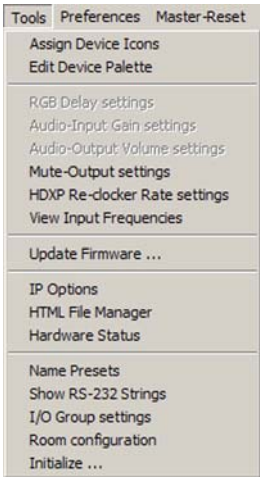
Restore Last-session's settings — Loads the icons and icon captions that were saved during the last session. If you saved the previous session's changes the last time you exited the program, the ties from that session are loaded.

Select Printer — Selects the target printer that will be used to print tie maps.

Print Tie Map — Prints the tie set that is displayed on the screen.

Exit — Closes the Matrix Switcher Control Program.

Tools menu



The Tools menu contains the following options. (Grayed out options are unavailable on your switcher.)

Assign Device Icons — Displays the complete set of input and output device icons. You can drag any of these icons to the input and output boxes.

Edit Device Palette — Allows you to add your own device icon graphics.

Mute-Output settings — Displays the Channel Mute Settings window. On this screen, use the slider bar to select an output to mute, then select the Video check box in the MUTE box. To mute all outputs at once, select the ALL check box.

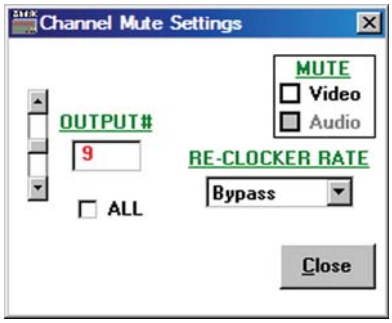


Figure 5–14 — Channel Mute Settings window

HDXP Re-clocker Rate settings — Opens the Channel Mute Settings window (figure 5-14), on which you can use the RE-CLOCKER RATE menu to select a rate at which outputs will be re-clocked to put them in sync with input signals.

View Input Frequencies — (DSVP) Displays the input horizontal and vertical frequencies for each input.

Update Firmware — Allows you to replace the firmware that is coded on the switcher's control board without needing to take the HDXP out of service, open the switcher enclosure, and replace the firmware chip set. See *Updating the firmware*, earlier in this chapter.

IP Options — Allows you to set options for the IP connection. See *IP Setup*, earlier in this chapter.

HTML File Manager — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a connected PC to the switcher. See *Uploading HTML files*, earlier in this chapter.

Hardware status — Provides an overall view of the status of the matrix switcher, including the primary and secondary power supply status and the individual voltages, the internal temperature, the Remote RS-232/RS-422 port configuration, the number of IP connections, and the installed and updated firmware status (figure 5-15).

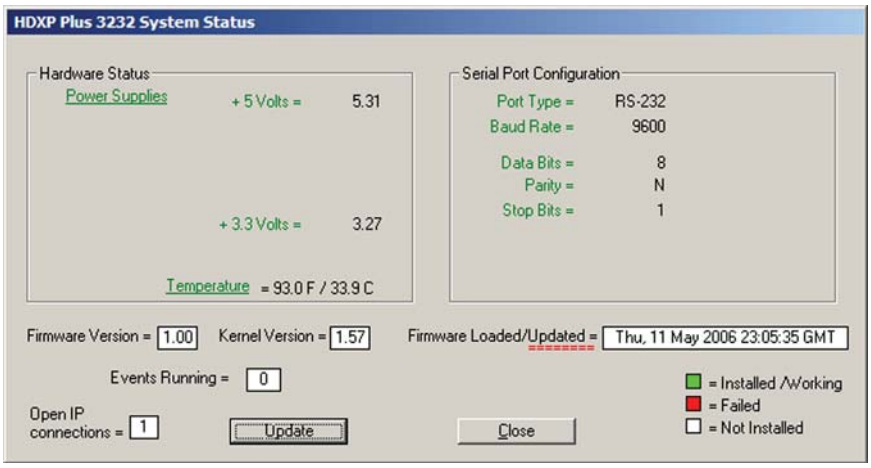
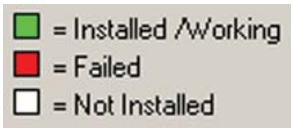


Figure 5–15 — Status window

Green — Proper operation

Red — Component has failed.

White — Components are not installed.



NOTE *The HDXP switchers are not available in custom configurations. Each model has all available monitored components, such as power supplies, installed. If you see the white "not installed" indication, the "not installed" component may have become disconnected during shipment or rough handling.*

Name Presets — Opens the Names for Presets window, which allows you to assign a name to each of the 32 global presets and 100 room presets. Select a preset from the list and enter a name for it in the text box at the top of the screen. Click Take to confirm the name.

NOTE *Preset names are limited to 12 upper- and lowercase alphanumeric characters, space, and the* _ : = and / *characters.*

NOTE *The following characters are invalid in preset names:* + ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ *and* ?.

Show RS-232 strings — Displays the ASCII commands that are used by the current configuration. You can refer to these for SIS programming (see chapter 4, *Programmer's Guide*, for information on entering SIS commands).

I/O Group settings — Allows you to establish I/O groups. Drag two or more of the small boxes representing inputs and/or outputs to one of the input or output Group boxes. Repeat as desired. Click Take to establish the group(s).

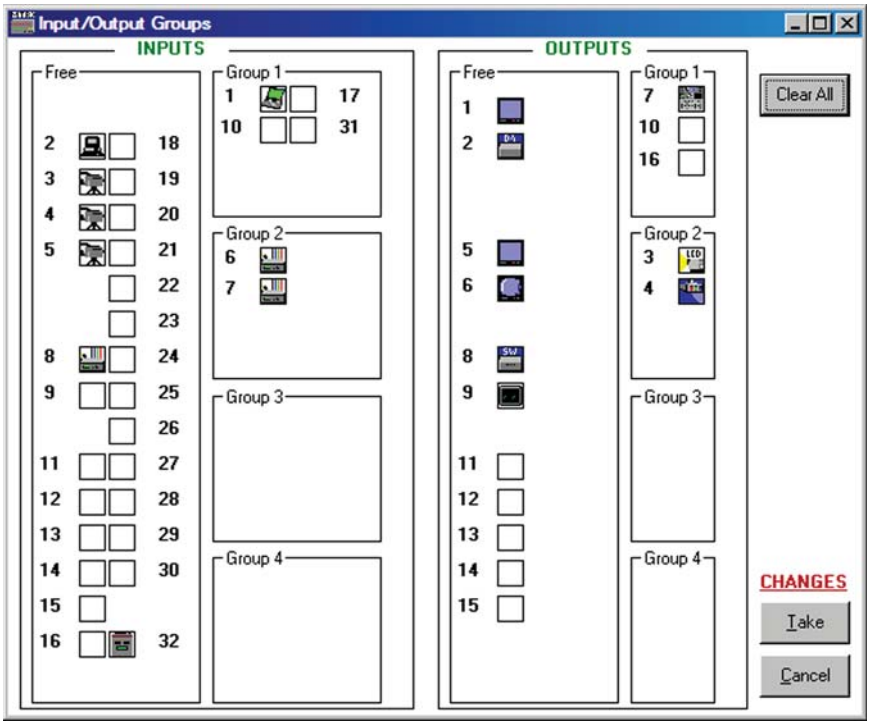


Figure 5–16 — Input/Output Groups window

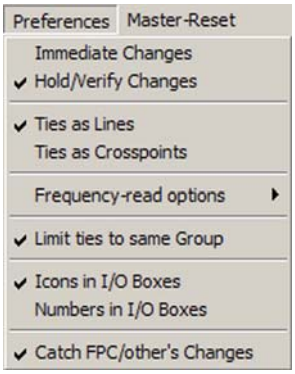
Room configuration — Allows you to assign outputs to rooms or delete outputs from rooms. Drag one or more of the small boxes representing outputs to one of the Room boxes. Repeat as desired to form additional rooms. Click Take to establish the room(s).

NOTE *A **Room** is a subset of outputs that are logically related to each other, as determined by the operator. The HDXP switcher supports up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.*

Initialize — Displays a window on which you can select, initialize, and clear any or all of the following: ties, presets, groups, preset names, icon names, and icons.

Preferences menu

The Preferences menu contains the following options:



Immediate changes — Causes the configuration changes you make to take effect immediately, without the need to click a Take button. (When you select this option, the Take and Cancel buttons are removed from the Matrix window.)

Hold/Verify Changes — Delays implementation of configuration changes until the Take button is pressed.

Ties as Lines — Displays ties as lines (figure 5-17).

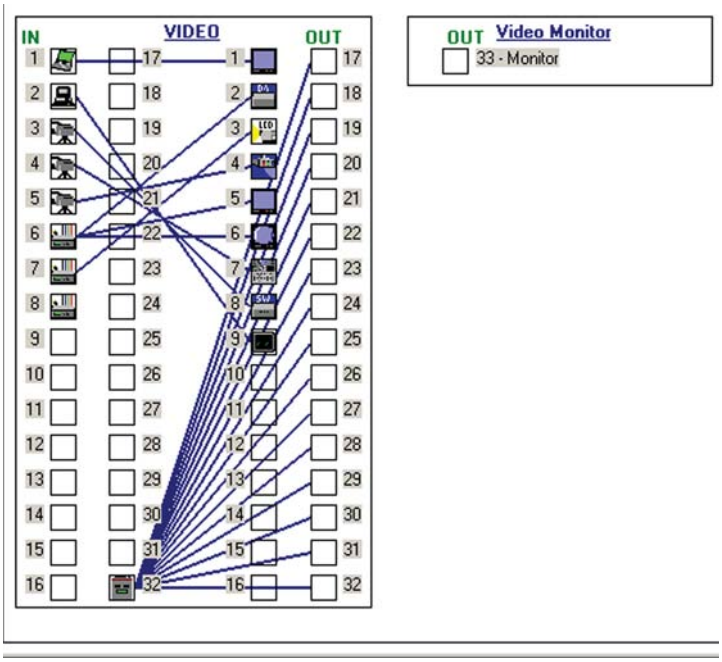


Figure 5–17 — Ties shown as lines

Ties as Crosspoints — Displays ties as a matrix of inputs and outputs (figure 5-17). Ties that have been made are indicated as amber boxes. Ties that will take effect when you click the Take button are indicated by + in the crosspoint box. Ties that will be broken when you click the Take button are indicated by –.

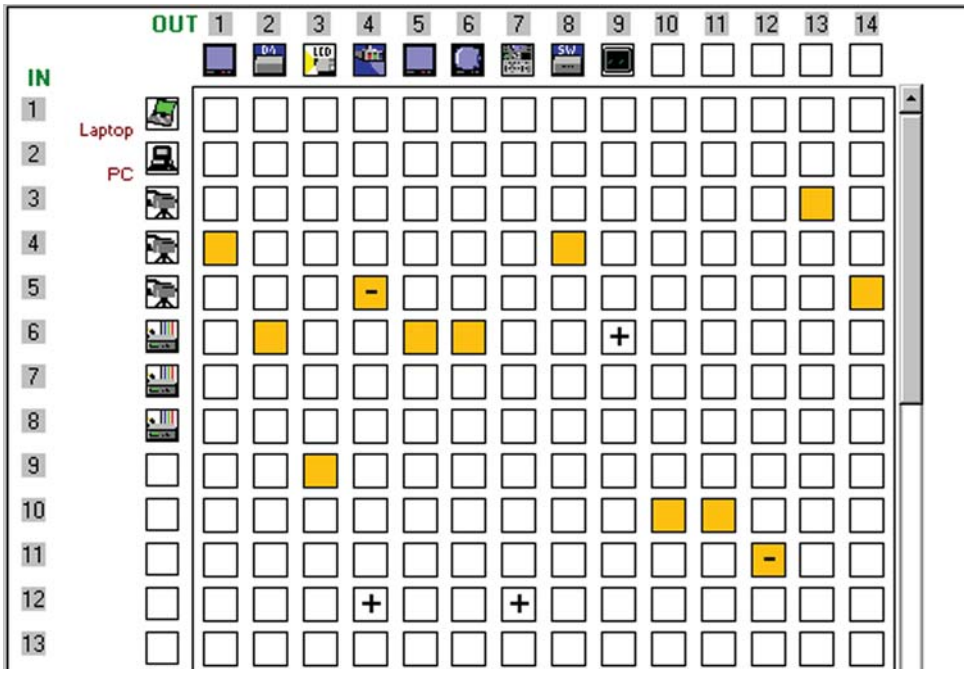


Figure 5–18 — Ties shown as crosspoints

F**requency-read options —** Provides a submenu that allows you to set the input signal detection (DSVP) feature to do one of the following:

- Automatically refresh the display (set this option to **Automatically every 10 seconds**).
- Sample the sync and update the display whenever you make a configuration change (set this option to **On Demand or by Refresh**).
- Never sample and display the sync or no sync status (set this option to **None**).

Limit ties to same group — Allows you to create ties only between inputs and outputs that are in the same group (similar to front panel operation).

Icons in I/O boxes — Displays icons that you place in the I/O boxes in the Matrix window (see figure 5-17 on the previous page).

Numbers in I/O boxes — Displays the input and output numbers in the I/O boxes in the Matrix window (see figure 5-18 on the previous page). (You are not able to place icons in the boxes when this option is selected.)

Catch FPC/other's Changes — When checked, sets the switcher to report all configuration and setting changes to the Remote RS-232/RS-422 or Ethernet connection that turned this selection on. These reports allow the Matrix Switcher Control Program to track the changes that occur in the switcher's configuration and settings, whether commanded via the front panel, the RS-232/RS-422 port, or the Ethernet port.

Master-Reset selection

Master-Reset clears all ties and presets, all output mutes, and all I/O grouping.

NOTE *Master Reset does not reset the Internet protocol (IP) settings.*

Using emulation mode

Emulation mode allows you to set up the software without attaching the switcher to the computer. In emulation mode, you can emulate any matrix switcher that is supported by the Matrix Switcher Control Program; you are not limited to the HDXP.

To use emulation mode, do the following:

1. Double-click the MATRIX Switchers+ Control Program icon in the Extron Electronics group or folder.
2. On the Comm Port Selection window, select Emulate, and click OK.
3. From the Initialize Emulated Matrix Settings From window, select an emulation file (.mtx extension), and click Open.

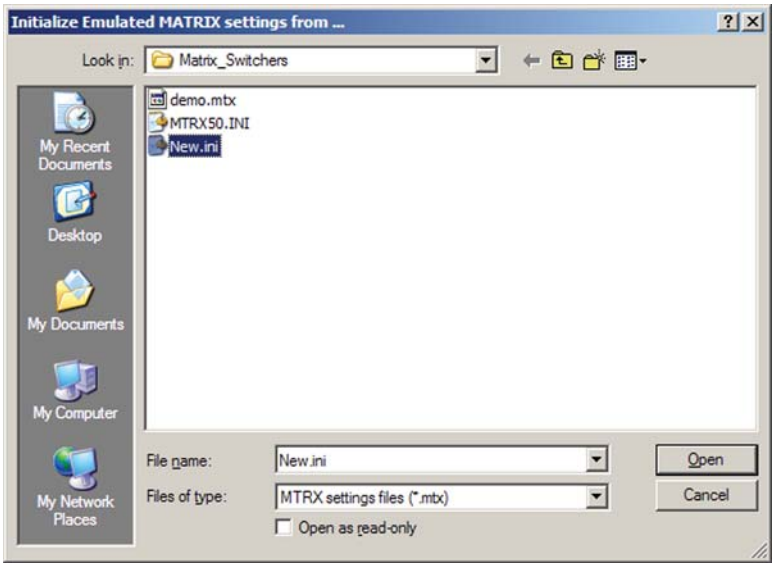


Figure 5–19 — Selecting an emulation file

NOTE *Selecting the* **Demo.mtx** *file provides a sample of a completed matrix setup. Selecting the* **New.ini** *file or clicking Cancel provides a blank setup to get you started.*

4. On the Save Emulated Matrix Settings window, enter a file name under which you want to save any changes to the file, and click Save.

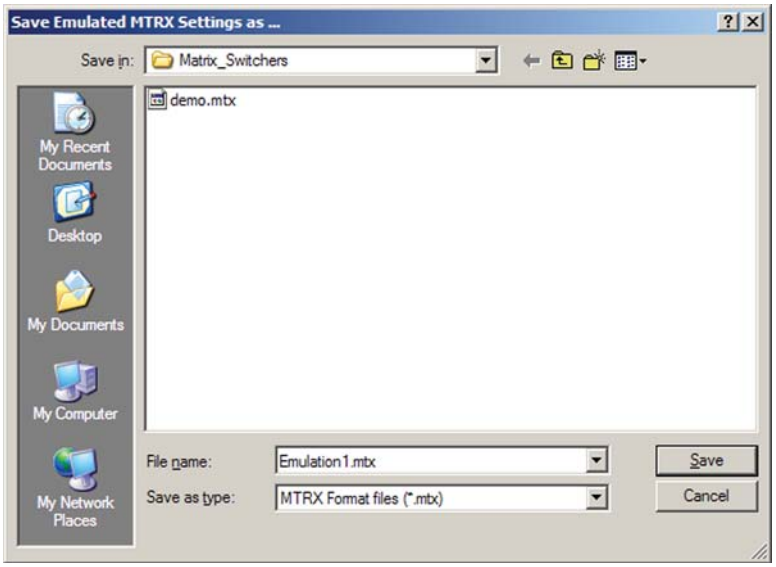


Figure 5–20 — Saving a new emulation file

5. On the Emulation Configuration window, select the number of video boards, audio boards, and the matrix model for which you are preparing a configuration, and click OK.

NOTE *If you are emulating the HDXP, the Audio section is not available.*

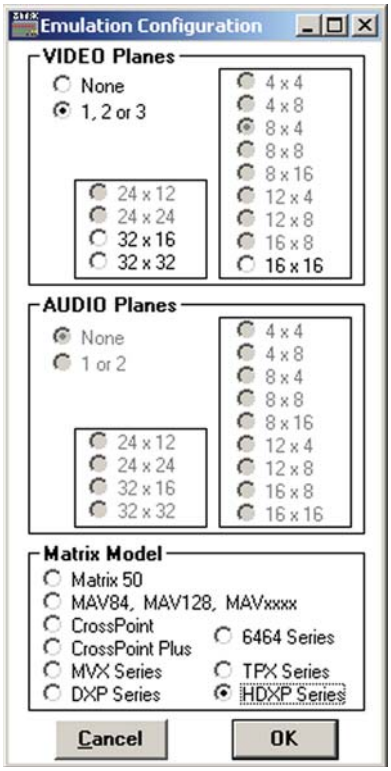
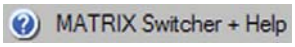


Figure 5–21 — Emulation Configuration window

6. Continue using the program as described under *Using the software*, earlier in this chapter.

Using the Matrix Switcher Help system

For information about program features, you can access the Matrix Switcher Help program in any of the following ways:



- From the Extron Electronics program folder or Start menu group, select the MATRIX Switcher+ Help icon (shown at right).
- From within the Matrix Switcher Control Program, click on the Help menu on the Matrix window.
- From within the Matrix Switcher Control Program, press the F1 key.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters: space (spaces **can** be used in names) + ~ , @ = ‘ [ ] { } < > ’ “ ; (semicolon) : (colon) | \ and ?.

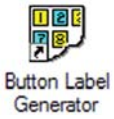
Using the Button Label Generator

The Button Label Generator software creates labels that you can place inside the translucent covers of the input and output push buttons. You can create labels with names, alphanumeric characters, icons, and even colored bitmaps for easy and intuitive input and output selection. See appendix B, *Reference Information*, for blank labels and procedures for removing and replacing the translucent covers.

The program is contained on the same CD-ROM as the Matrix Switcher Control Program, and is installed automatically when you install the control software.

By default, the Windows installation goes in either the C:\Program Files\Extron\ ButtonLabelGenerator directory. The Button Label Generator icon is placed in the "Extron Electronics" group or folder.

1. To run the Button Label Generator program, double-click on the Button Label Generator icon (shown at right) in the Extron Electronics group or folder. The Button-Label Generator window appears (figure 5-19 on the next page).



2. From the Systems pull-down menu, select a system button configuration.

   The MATRIX SWITCHERS 3232 or 1616 selections most closely match the button configuration of the HDXP switchers (the HDXP option gives you four rows of blank buttons). However, you can also select any option from this menu. You can select Customize Button Layouts, which opens a blank worksheet on which you can place your own buttons in the desired configuration.

3. Click on the button representation that you want to edit. A red box surrounds the selected button.

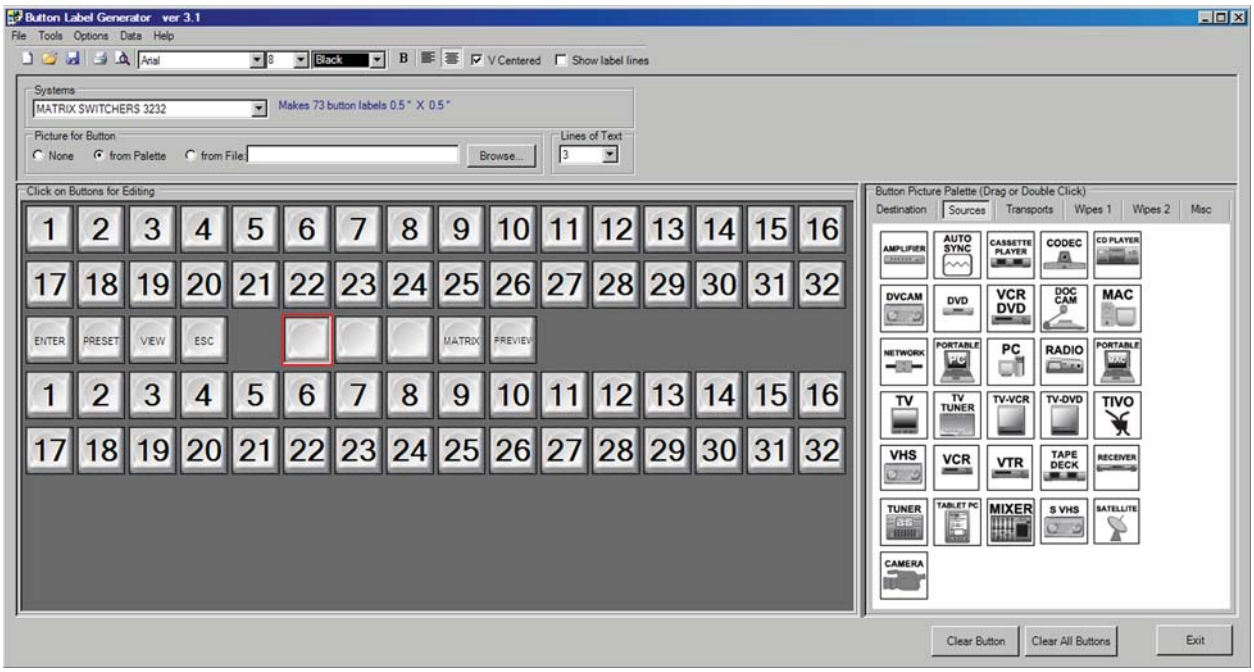


Figure 5–22 — Button Label Generator window

4. Edit the selected button by using any of the tools provided on the Button Label Generator window. Some of the edits you can make are:

   - Enter text, and select the font, text size, and text color from the drop-down menus on the tool bar.
   - Select an icon from the Button Picture Palate and drag it to the desired button.
   - Place a bitmap image from your computer on a selected button.

   To remove all the text or the image from a button, click Clear Button. To remove the text and images from all the buttons, click Clear All Buttons.

   To access the Button Label Generator Help program, select Use Help from the Help menu.

5. When finished creating the labels, print out your labels by selecting Print from the File pull-down menu in the upper-left corner of the Button Label Generator Window.

   To save the button label set as a .xml file on your computer, select Save As from the File menu and give the label file a name.

6

Chapter Six

HTML Operation

Accessing the Web Pages

System Status Page

System Settings Page

Using the File Management Page

Set and View Ties Page

Special Characters

HTML Operation

The HDXP can be controlled and operated through its Ethernet port, connected via a LAN or WAN, using a web browser such as Microsoft's Internet Explorer. The browser displays the switcher's Web pages, which provide an alternative means of viewing and operating the HDXP. This chapter describes these factory-installed Web pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. To do this in Microsoft's Internet Explore, click Tools > Internet Options > Connections > LAN Settings, and clear the "*Use a proxy server...*" check box. Click* OK.

Accessing the Web Pages

Access the HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Enter your HDXP's IP address in the browser's Address field.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the name of the file to open.

NOTE *The browser's Address field should display the address in the following format: xxx.xxx.xxx.xxx/{**optional**_file_name.html}*

NOTE *The following characters are invalid in file names:* + ~ , @ = ' [ ] { } < > ' " ; : | \ *and* space.

5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

   If the switcher is not password protected, the System Status Web page is displayed.

   If the HDXP is password protected, the network password dialog box is displayed (figure 6-1).

Figure 6–1 — Example of a network password dialog box

6. In the Password field, enter the appropriate administrator or user password. If desired, select the check box to have the system input your password the next time you enter your HDXP's IP address. Click OK.

NOTE *A User Name entry is not required.*

The HDXP switcher checks several possibilities, in the following order, and then responds accordingly:

- Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher downloads that HTML page.
- Is there a file in the HDXP's memory that is named "index.html"? **If so**, the switcher downloads "index.html" as the default startup page.
- **If neither of the above conditions is true**, the switcher downloads the factory-installed default startup page, "nortxe_index.html" (figure 6-2), also known as the System Status page.

System Status Page

The System Status page (figure 6-2) provides an overall view of the status of the matrix switcher, including individual voltages and serial port status (if applicable). The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the *Status* tab.

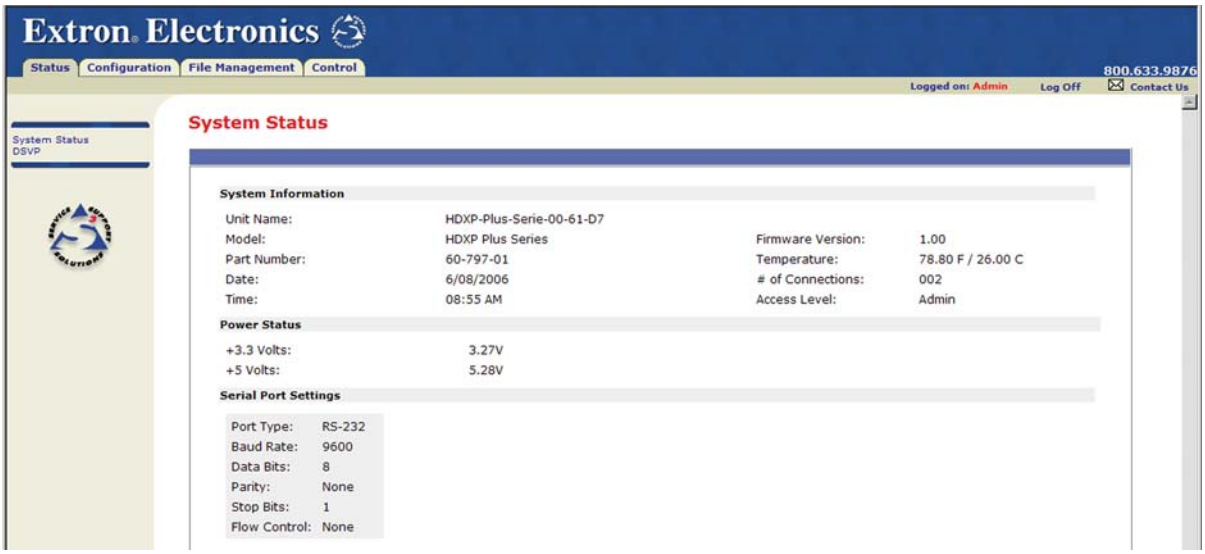


Figure 6–2 — System Status page

The status web page updates itself periodically to reflect the latest status of the switcher components. If a variable changes, the display shows the change in status the next time it updates.

DSVP page

You can view a snapshot-in-time of the input frequencies of connected inputs on the Digital Sync Validation Processing (DSVP) page (figure 6-3). Click the DSVP link on the sidebar menu to the left of the Status page to display the DSVP page.

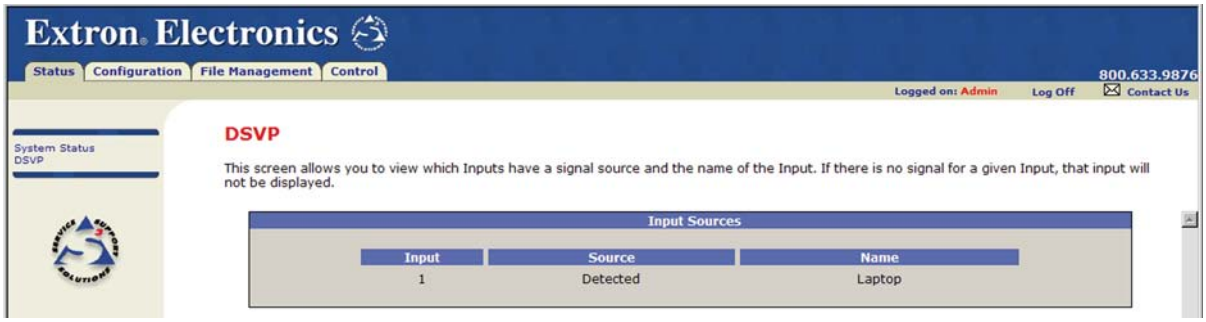


Figure 6–3 — DSVP page

System Settings Page

The HDXP switcher displays the System Settings page (figure 6-4) when you click the *Configuration* tab. The screen consists of fields in which you can view and edit IP administration and system settings. The Email Settings and Passwords pages can be accessed by clicking the appropriate link on the sidebar menu. See appendix A, *Ethernet Connection*, for basic information about IP addresses and subnetting.

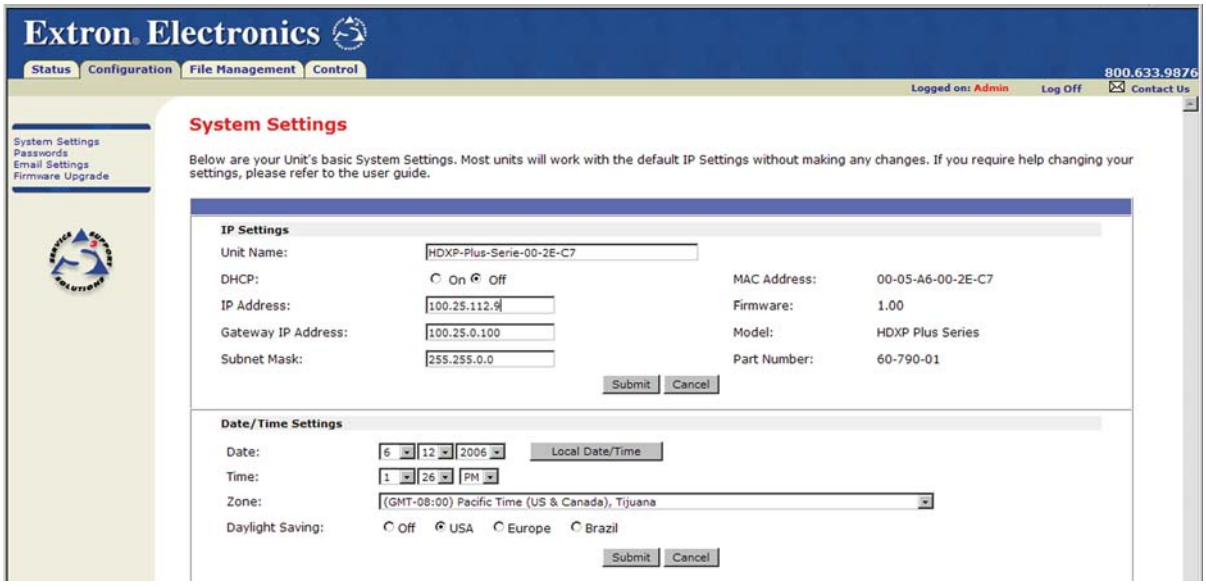


Figure 6–4 — System Configuration page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, create and recall presets, and view all settings with the exception of passwords.

- Ethernet connection to the switcher, either entering SIS commands (see chapter 4, *Programmer's Guide*) or using the Extron Matrix Switcher Control Program (see chapter 5, *Matrix Software*) **is** password protected.
- Connection via the RS-232/RS-422 port **is not** password protected.

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the Submit button at the bottom of the IP Settings section.

Unit Name field

The Unit Name field contains the name used as the "from" information when the HDXP e-mails notification of its failed or repaired status. You can change this name field to any valid name, up to 24 alphanumeric characters.

NOTE *The following characters are invalid in the matrix name:* + ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ *and* ?.

DHCP radio buttons

The DHCP On radio button directs the switcher to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable).

The DHCP Off radio button turns DHCP off. Contact the local system administrator to determine this control's setting.

IP Address field

The IP Address field contains the IP address of the connected HDXP. This value is encoded in the switcher's flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeros, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE *IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.*

Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the switcher and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The Subnet Mask field is used to determine whether the switcher is on the same subnet as the mail server when you are subnetting. For more information, see *Subnetting — A Primer*, in Appendix A, *Ethernet Connection*.

MAC Address field

The Media Access Control (MAC) Address is hard coded in the switcher and cannot be changed.

Date/Time Settings fields

The Date/Time Settings fields (figure 6-5) provide a location for viewing and setting the time functions.

Figure 6–5 — Date/Time Settings fields

Change the date and time settings as follows:

1. Click the desired variable's drop box. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop-down scroll box appears (the month drop box is selected in figure 6-5).
2. Click and drag the slider or click the scroll up button or scroll down button until the desired variable is visible.
3. Click on the desired variable.

NOTE *If setting the time, set the local time. The Zone variable allows you to then enter the offset from Greenwich Mean Time (GMT).*

NOTE *The Zone field identifies the standard time zone that has been selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.*

4. Repeat steps **1** through **3** for other variables that need to be changed.
5. Select the appropriate Daylight Saving radio button. To turn off daylight savings time, select Off.

NOTE *When daylight savings time is enabled, the switcher updates its internal clock between Standard Time and Daylight Savings Time in the spring and fall on the date that the time change occurs in the United States of America and parts of Europe and Brazil. When daylight savings time is turned off, the switcher does not adjust its time reference.*

6. Click the Submit button at the bottom of the Date/Time Settings section to implement your selections.

Passwords page

Access the Passwords page (figure 6-6) by clicking the Passwords link on the sidebar menu on System Settings page.

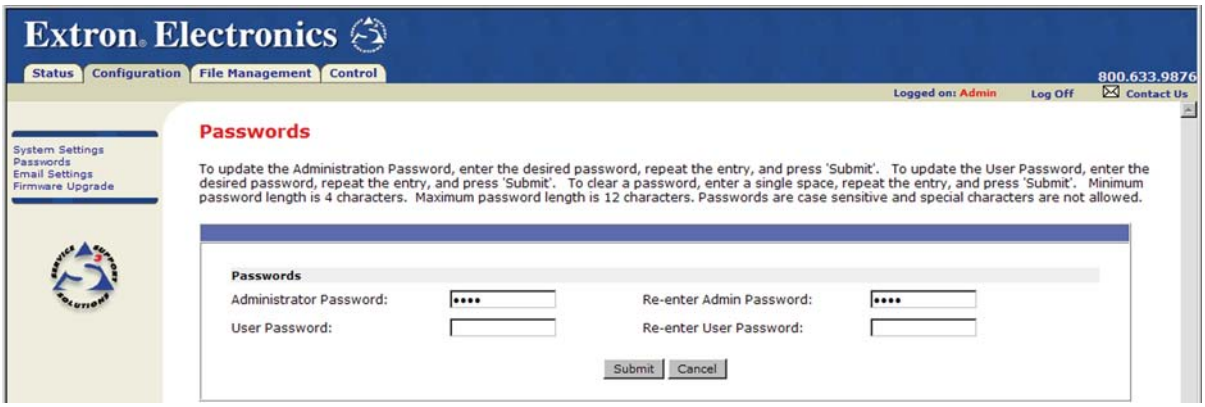


Figure 6–6 — Passwords page

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to 12 upper- and lowercase alphanumeric characters. Each password must be entered twice – once in the Password field and then again in the Re-enter Password field to the right. Characters in these fields are masked by four bullets (••••). If you do not want to password-protect an access level, leave the Password and the Re-Enter password fields blank. After entering the desired password in both fields, click the *Submit* button at the bottom of the page.

NOTE *An administrator password must be created before a user password can be created.*

To clear an existing password so that no password is required, delete the bullets in the Password and Re-enter Password fields and enter a space in each field, then click the Submit button at the bottom of the page.

Email Settings page

Access the Email Settings page (figure 6-7) by clicking the Email Settings link on the sidebar menu on the System Configuration page. The Email Settings page has fields for setting up the HDXP's e-mail notification capabilities.

For the e-mail settings and for each row of the e-mail notification settings, click the Edit button at the right of the field to make the field available for editing. The button changes to Save. After editing the settings associated with the Edit/Save button, click the Save button.

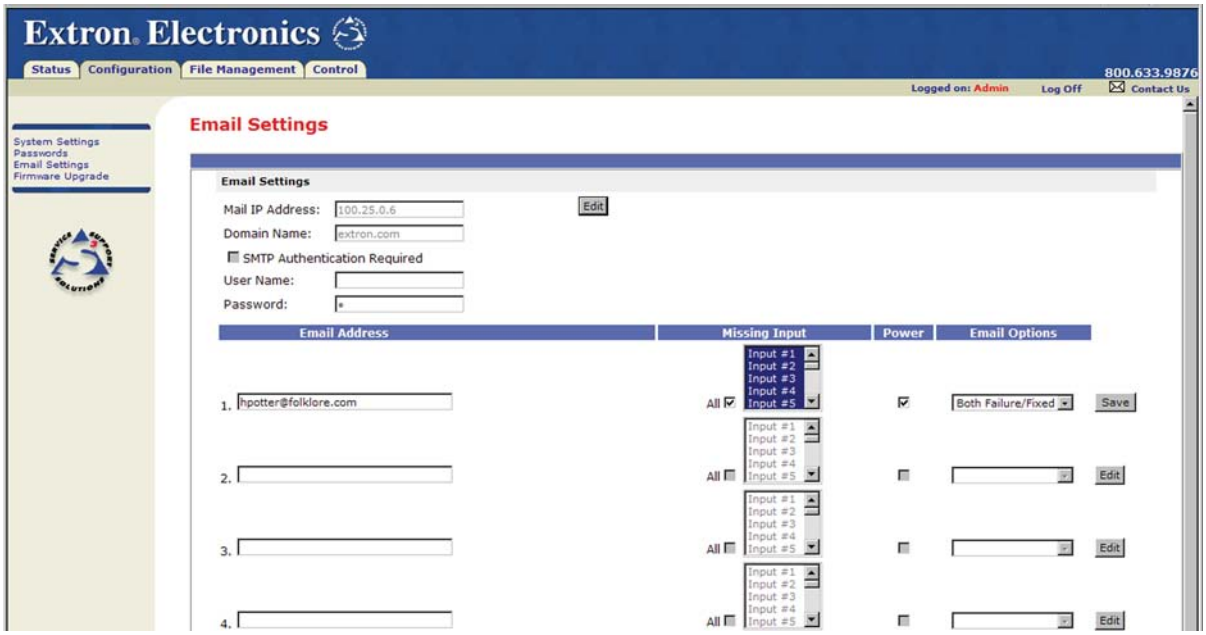


Figure 6–7 — Email Settings page (upper portion)

Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the mail server that handles the e-mail for the facility in which the HDXP switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Domain Name field

The Domain Name field displays the domain name that the HDXP switcher uses to log on to the e-mail server. Standard domain name conventions (for example: *nnnnn@xxx*.com) apply.

NOTE *The following characters are invalid in a domain name:* + ~ , = ‘ [ ] { } < > ’ “ ; : | \ ? *and* space. *The @ character is acceptable only as the lead-in to the domain name (such as @folklore.net).*

SMTP Authorization Required fields

Selecting the SMTP Authorization Required check box sets the HDXP to require SMTP authorization before accepting any e-mail. To set up this authorization requirement, follow these steps:

1. To enable the SMTP authorization fields, click the Edit button at the right of the Mail IP Address field. The Edit button changes to Save.
2. Select the SMTP Authorization Required check box, located below the Domain Name field. This enables the User Name and Password fields below the check box.
3. In the User Name and Password fields, enter a user name and a password that senders must enter in order for the HDXP to accept their e-mail messages.

   For the User name, you can use any combination of letters, numerals, spaces, and symbols **except** the comma (,) and the single and double quotation marks (‘ and “). For the password, you can use all characters except the comma. The user name and password can each be from 1 to 30 characters.

NOTE *You must specify **both** a user name and a password.*

4. Click the Save button next to the Mail IP Address field to save your user name and password.

To remove SMTP authorization, click Edit, deselect the SMTP Authorization Required check box, then click Save.

Email address fields

The eight Email address fields identify the e-mail addresses of the personnel to whom the HDXP switcher e-mails notification of its failure and repair status. Standard e-mail address conventions (*nnnnn@xxx*.com) apply.

The check boxes and drop boxes associated with each address field let you specify specific criteria under which the HDXP will e-mail the recipients.

- In the Missing Input drop box to the left of the address, select the inputs to monitor for presence or absence of a signal.
- Check the Power box to monitor the power supplies.
- In the associated E-Mail Options drop box, select whether the recipient is to be e-mailed of failures, fixes, both, not notified, or to be removed from the e-mail list.

Figure 6–8 — Email Options menu on the Email Settings page

The Suspend option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as traveling or vacation. Deleting an e-mail addressee and clicking the Save button removes the recipient from e-mail notification completely.

Firmware Upgrade page

The Firmware Upgrade page provides a way to replace the firmware that is coded on the HDXP's control board without needing to take the switcher out of service. Access the Firmware Upgrade page (figure 6-9) by clicking the Firmware Upgrade link on the System Configuration page.

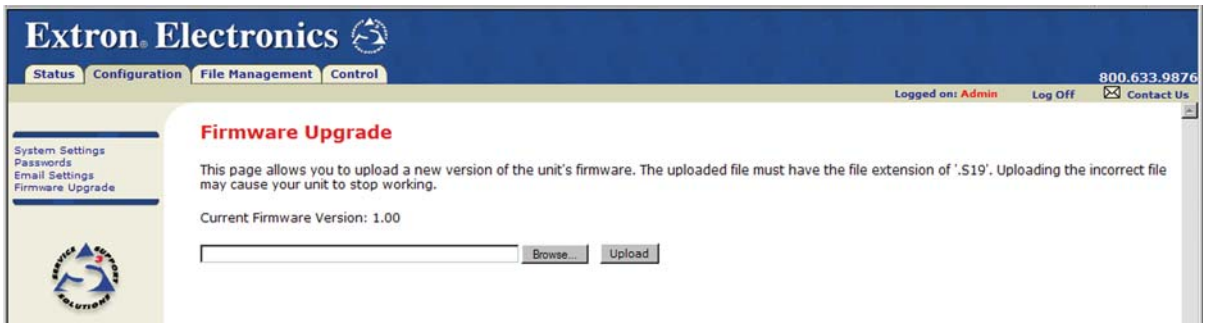


Figure 6–9 — Firmware Upgrade page

NOTE *The Firmware Upgrade page is **only** for replacing the firmware that controls all switcher operation. To insert your own HTML pages, see* Using the File Management Page, *later in this chapter.*

Update the HDXP firmware as follows:

1. Visit the Extron web site, www.extron.com, and download the latest firmware file to your computer.
   a. On the Extron Web page, select the Downloads tab.
   b. On the Download Center page, click the Firmware link on the left sidebar menu.
   c. Click on the name of your HDXP switcher.
   d. On the next screen, fill in the required information, then click the Download *product name_firmware version*.exe button.
   e. On the File Download - Security Warning window, click Save.
   f. On the Save As window, browse to the folder where you want to save the firmware file, and click Save. The firmware installation file is placed on your hard drive.
2. Access the HDXP Web pages.
3. Select the Configuration tab.
4. On the Configuration page, click the Firmware Upgrade link on the left sidebar menu.

5. Click the Browse button. A Choose file window opens.

6. Navigate to the folder where you saved the firmware upgrade file. Select the file.

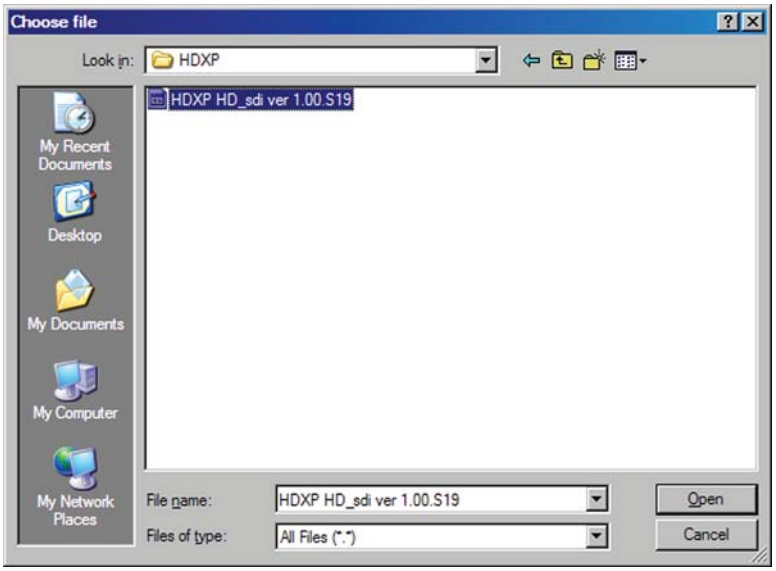


Figure 6–10 — Choose file window with a firmware file selected

NOTE *Valid firmware files must have the file extension ".S19." Any other file extension is* ***not*** *a firmware upgrade.*

NOTE *The original factory-installed firmware is permanently available on the HDXP switcher. If the attempted firmware upload fails for any reason, the HDXP reverts to the factory-installed firmware.*

7. Click Open.

8. On the Firmware Upgrade page, click the Upload button.

   While the firmware is uploading, the Upload button changes to Uploading... . When the uploading process is complete, the button changes back to Upload. The uploading may take a few minutes.

Using the File Management Page

To delete files (such as HTML pages) from the switcher or to upload your own files to the switcher, click the File Management tab. The switcher displays the file management HTML page (figure 6-11).

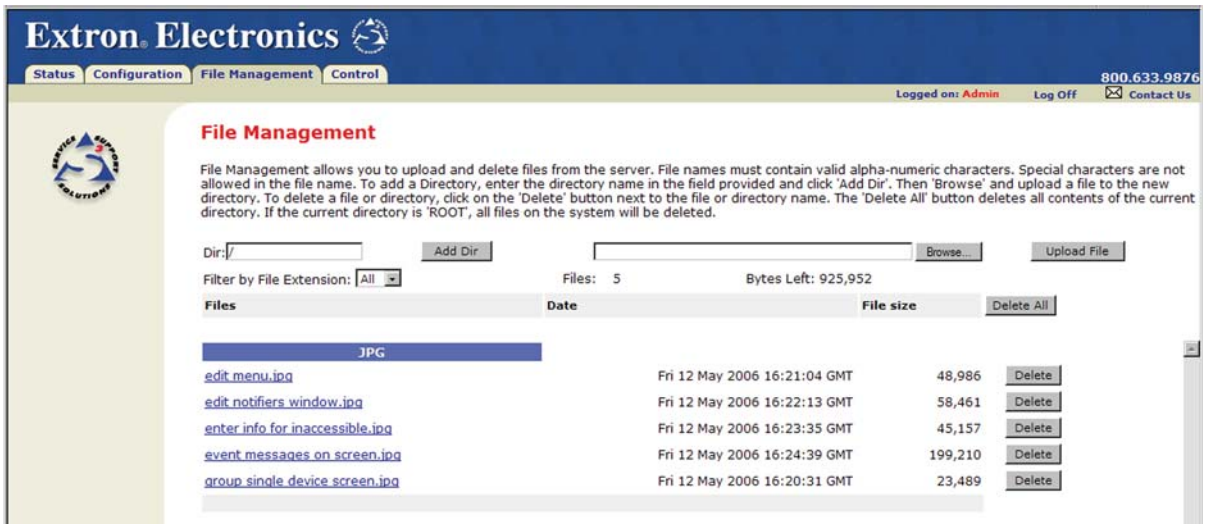


Figure 6–11 — File Management page

NOTE *The files listed in figure 6-11 are shown for example only and may not be present on your switcher.*

Uploading files

Files to be uploaded to the HDXP must contain only valid alphanumeric characters and underscores.

NOTE *The following characters are invalid in file names:*
+ ~ , @ = ‘ [ ] { } < > ’ “ ; : | \ *and* space.

To upload files from the server, follow these steps:

1. Click the Browse button to the right of the file name field.
2. Browse to locate the file that you want to upload, and open it. The file's name and directory path are displayed in the file name field on the File Management screen.
3. Click the Upload File button. The selected file name appears in the Files column on the File Management screen. (Files are listed separately under headings of their extensions.)

NOTE *If you want one of the pages that you create and upload to be the default startup page, name that file "index.html."*

Adding a directory

To add a directory or folder to the HDXP's file system, follow these steps:

1. Enter the directory name in the Dir: field, following the slash (/).
2. Click the Add Dir button.
3. With the directory name displayed, perform the Uploading files procedure described in the previous section to add a file to the directory. The directory name appears at the top of the Files column, preceded by a slash.

To add more files to the directory, click the directory name to open it, then use the Uploading files procedure. To exit the directory, click (root) or (back).

Other file management activities

You can also perform the following tasks on the File Management screen:

Open a file — Click on the name of the file in the Files column.

Delete a file — Click the Delete button at the right end of the line that contains the file you want to remove.

Delete all files — Click the Delete All button.

Display files by file extension — The Filter by File Extension menu lists the extensions of the files that have been uploaded to the HDXP. This menu lets you choose to display only files with the extension you select. Select All to display all uploaded files.

Set and View Ties Page

You can create ties on the Set and View Ties page (figure 6-12). Access the Set and View Ties page by selecting the Control tab.

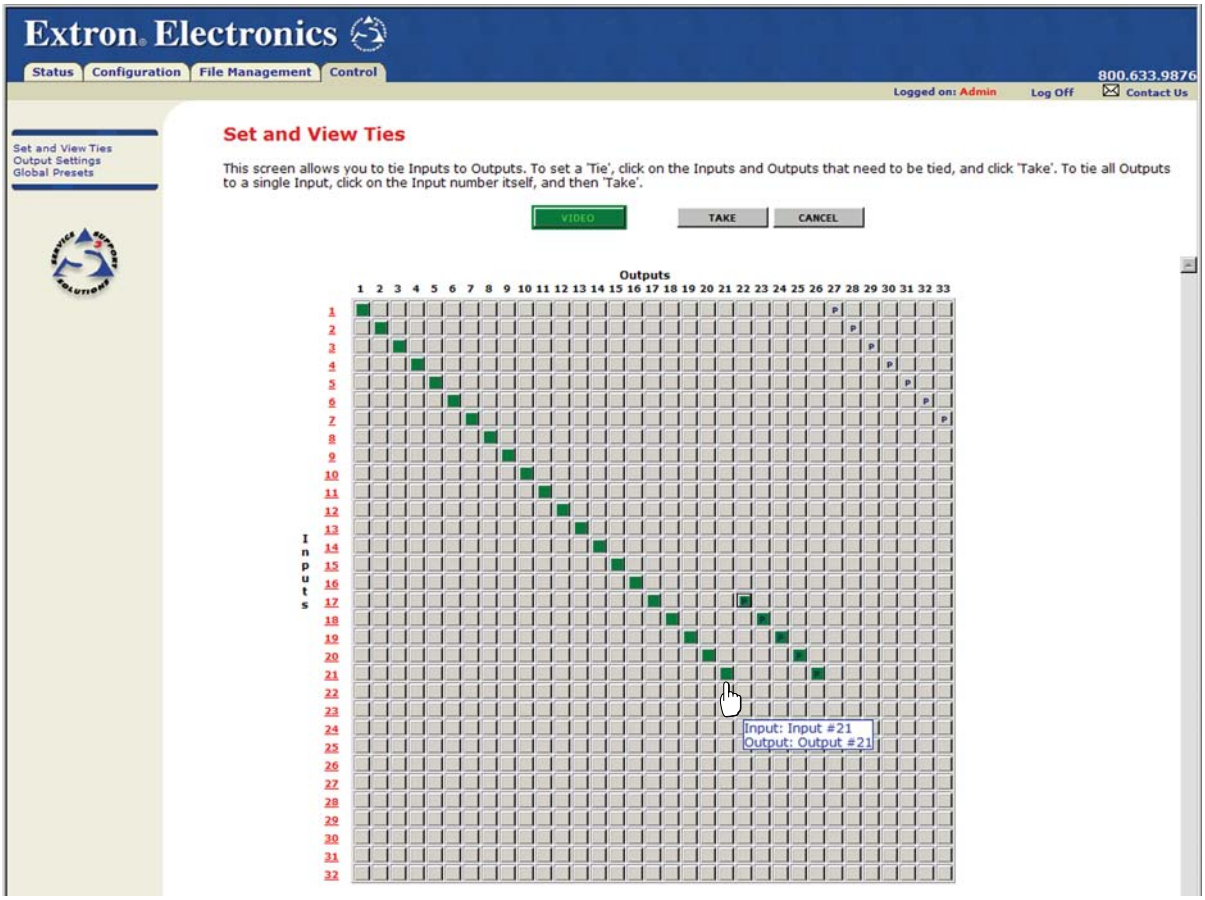


Figure 6–12 — Set and View Ties page

The Set and View Ties page consists of a matrix of input (rows) and output (columns) selection buttons.

Creating a tie

Select and switch an input as follows:

1. Move the mouse over the matrix of input and output selection buttons. Click on a button to create a preliminary tie of the input and output associated with that button (if they are not already tied) or a preliminary untie (if the input and output are tied) . A "P" (for preliminary) appears on the button.

NOTE *If you lose track of the input and output associated with a specific button, let the mouse rest over one of the tie buttons for a moment. A field pops up (as shown on figure 6-12) that identifies the input and output for that button.*

NOTE *To tie an input to all outputs, click that input's input number, located at the left of the matrix.*

2. Click the Take button to make the configuration changes or Cancel button to abandon the changes.

Output Settings page

The Output Settings page allows you to mute/unmute and to change the re-clocker rate of the outputs on your unit.

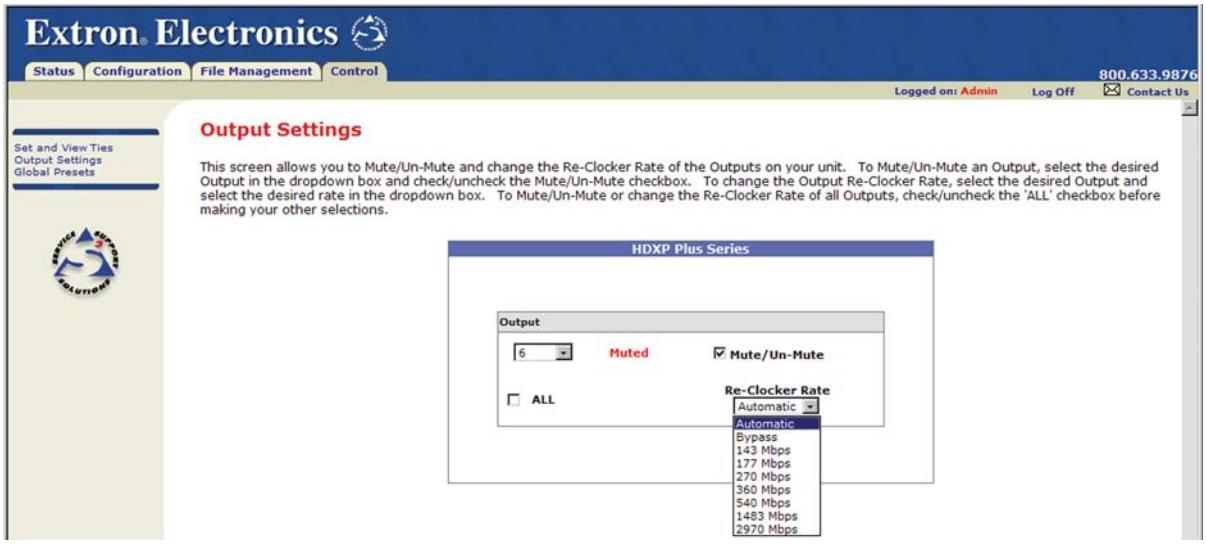
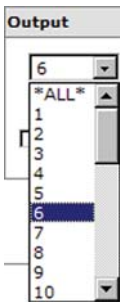


Figure 6–13 — Output Settings page

Muting and unmuting the output

To mute or unmute an output, do the following:

1. To select an individual output to mute or unmute, click the Output drop box. A drop down scroll box appears (shown at right).



2. Select or clear the Mute/Un-Mute checkbox. The word Muted appears in red next to the output selection menu.

Changing the output re-clocker rate

To change the output re-clocker rate, do the following:

1. Select the desired output from the pull-down menu.
2. From the Re-Clocker Rate pull-down menu, select the desired rate.
   - Select Automatic if you want the re-clocker to automatically adapt the output to the input signal.
   - To disable the re-clocker for the selected output, select Bypass.

To mute, unmute, or change the re-clocker rate of all the outputs, select or clear the ALL check box.

Global Presets page

You can save and recall global presets from the Global presets page (figure 6-14). Access the Global presets page by clicking the Global Presets link on the sidebar menu of the Control page.

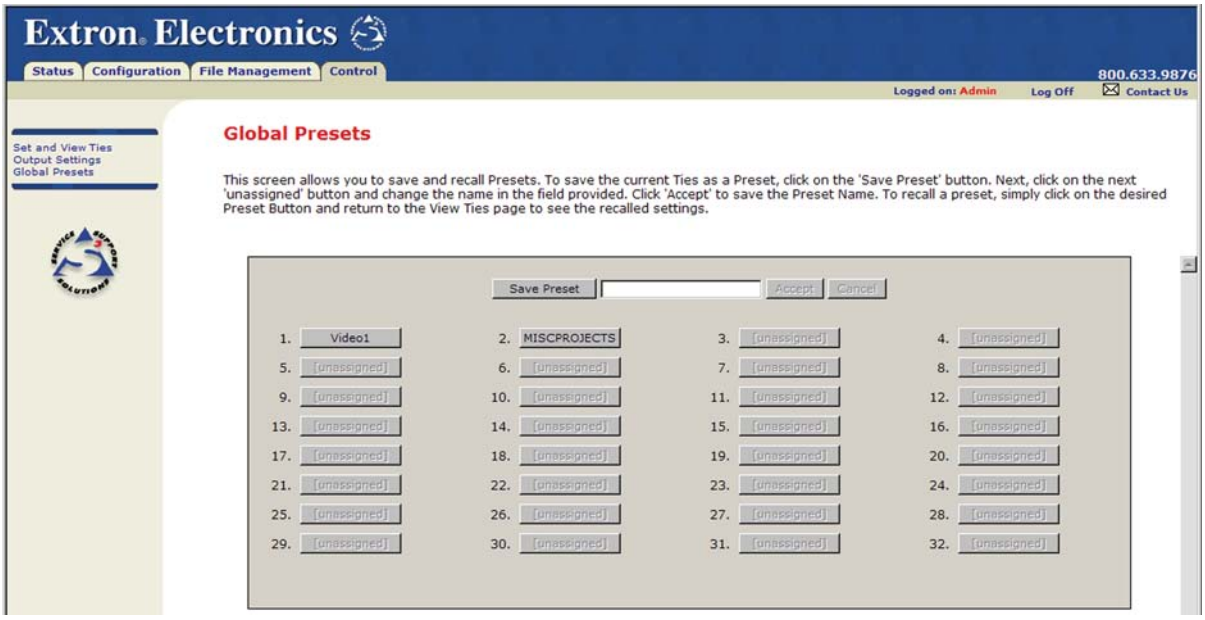


Figure 6–14 — Global Presets page

Saving a preset

Save the current configuration (configuration 0) as a preset as follows:

1. Click the Save Preset button. It changes to Select Preset... .l
2. Select the desired preset by clicking one of the preset buttons.
   - To create a new preset, click one of the [unassigned] buttons.
   - To overwrite an existing preset, click its button.
3. Enter a name for the preset in the text field.

NOTE *Preset names are limited to 12 characters. Valid characters are* **0 – 9**, **a – z**, **A – Z**, *and special characters* **_ : = /** *and* **space**.

NOTE *The following characters are invalid in preset names:* **+ ~ , @ = ‘ [ ] { } < > ’ “ ; : | ** *and* **?**.

4. Click the Accept button.

If you do not rename an unassigned button, the HDXP names the preset as Preset *nn* (*nn* is the next available number).

If you do not rename an existing preset when it is overwritten, the HDXP retains the same name.

Recalling a preset

To recall a global preset to be the current configuration, click the button for the desired preset on the Global Presets page.

Special Characters

The HTML language reserves certain characters for specific functions. The HDXP does not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The HDXP rejects the following characters:
+ ~ , @ = ' [ ] { } < > ' " ; (semicolon) **:** (colon) **| \ ?** and **space**.

Appendix A

Ethernet Connection

Ethernet Link

Subnetting — A Primer

Ethernet Connection

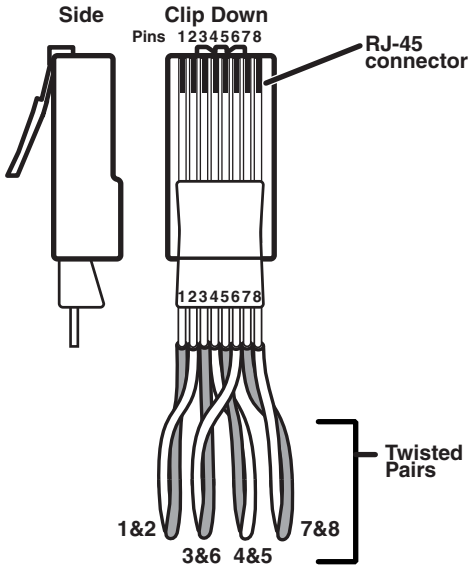
Ethernet Link

The rear panel Ethernet connector on the HDXP switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure A-1).

- **Crossover cable** — Direct connection between the computer and the HDXP switcher.
- **Patch (straight) cable** — Connection of the HDXP switcher to an Ethernet LAN.



Patch (straight) cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-orange
2	Orange	2	Orange
3	White-green	3	White-green
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Green
7	White-brown	7	White-brown
8	Brown	8	Brown

Crossover cable

Side 1		Side 2	
Pin	Wire color	Pin	Wire color
1	White-orange	1	White-green
2	Orange	2	Green
3	White-green	3	White-orange
4	Blue	4	Blue
5	White-blue	5	White-blue
6	Green	6	Orange
7	White-brown	7	White-brown
8	Brown	8	Brown

Figure A–1 — RJ-45 connector pinout tables

Default address

To access the HDXP switcher via the Ethernet port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the HDXP switcher.

Ping to determine Extron IP address

The Microsoft Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and the HDXP switcher. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. From the Windows Start menu, select Run... . The Run window opens.
2. In the Open text field, enter **command**.
3. Click OK. A DOS command window opens.
4. At the DOS prompt, enter **ping *IP address***. The computer returns a display similar to figure A-2.

   The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure A–2 — Ping response

Ping to determine Web IP address

The Ping utility has a modifier, *-a*, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, enter **ping -a IP *address***. The computer's return display is similar to the Ping response shown in figure A-2, except that when you specify the *-a* modifier, the line **Pinging mail...** reports the web IP address instead of the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Connect as a Telnet client

The Microsoft Telnet utility is available from the DOS prompt. Telnet allows you to input SIS commands to the HDXP switcher from the PC via the Ethernet link and the LAN.

Access the DOS prompt and start Telnet as follows:

1. From the Windows Start menu, select Run... . The Run window opens.
2. In the Open text field, enter **command**.
3. Click OK. A DOS command window opens.
4. At the DOS prompt, enter **telnet**. The computer returns a display similar to figure A-3, on the next page.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure A–3 — Telnet screen

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the HDXP switcher via Telnet.

Connecting to the HDXP (Open command)

You connect to the HDXP Plus switcher using the Open command. Once your computer is connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 link.

Connect to the HDXP as follows:

1. At the Telnet prompt, enter **open** ***IP address***.

   If the switcher is not password protected, no further prompts are displayed until you disconnect from the HDXP switcher.

   If the switcher is password protected, Telnet displays the password prompt.

2. If necessary, enter the password at the password prompt.

   Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user.

   A person logged on as an administrator has full access to all HDXP switching capabilities and editing functions.

   Users can select test patterns, mute or unmute the output, select a blue screen, and view all settings with the exception of passwords. By default, the switcher is delivered with both passwords set to *carriage return*.

   Once you are logged in, the switcher returns either **Login Administrator** or **Login User**. No further prompts are displayed until you disconnect the from the HDXP switcher.

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character is 'Ctrl+]'**. Many SIS commands include the keyboard Esc key. Consequently, some confusion may exist between the Escape character and the Esc key.

The Telnet Escape character is a key combination: the Ctrl key and the] key pressed simultaneously. Pressing these keys displays the Telnet prompt while leaving the connection to the HDXP switcher intact.

The Escape key is the Esc key on the computer keyboard.

Local echo

Once your computer is connected to the HDXP switcher, by default Telnet does not display your keystrokes on the screen. SIS commands are entered blindly, and only the SIS responses are displayed on the screen. To command Telnet to show all keystrokes, enter **set local_echo** at the Telnet prompt before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's responses are displayed on the same line. Example: **1*1!In1 Out1 All,** where **1*1!** is the SIS command and **In1 Out1 All** is the response.

Note that all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the keyed-in password and ***** is the masked response.

Local echo can be turned off by entering **unset local_echo** at the Telnet prompt. If your computer is connected to the HDXP switcher, and you need to access the Telnet prompt to turn local echo off, enter the Escape sequence (Ctrl +]).

Setting carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the Enter key. This is the correct setting for SIS communication with the switcher. The Telnet **set crlf** command forces Telnet to transmit carriage return and line feed characters when Enter is pressed; however, if **crlf** is set, the SIS link with the switcher does not function properly.

Closing the link to the switcher

To close the link to the switcher, access the Telnet prompt by entering the Escape sequence (Ctrl +]). At the Telnet prompt, enter **close**.

Help

For Telnet command definitions, enter **?** at the Telnet prompt.

Exiting Telnet (Quit command)

Exit the Telnet utility by entering **quit** at the Telnet prompt. If you are connected to the HDXP switcher, access the Telnet prompt by entering the Escape sequence (Ctrl +]).

Subnetting — A Primer

A subnet is a **sub**set of a **net**work — a set of IP devices that have portions of their IP addresses in common. It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting is necessary in order to understand the interaction of the HDXP switcher and the mail server gateway. To understand subnetting at the level required to install and operate the HDXP switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The HDXP switcher can communicate with the e-mail server that it uses for e-mail notification directly (if they are on the same subnet), or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this manual, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in the HDXP switcher (see *IP Settings/Options window* in chapter 5, *Matrix Software*, and *Email Settings page* in chapter 6, *HTML Operation*). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called *octets*, which are separated by dots (periods) (figure A-4). Each octet can be numbered from 000 through 255. Leading zeros, up to 3 digits total per octet, are optional. Values of 256 and above are invalid.

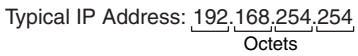


Figure A–4 — IP address and octets

Subnet masks and octets

The subnet mask (figure A-5) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeros, up to 3 digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

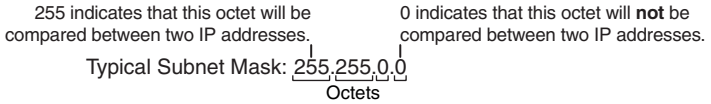


Figure A–5 — Subnet mask and octets

Determining whether devices are on the same subnet

To determine the subnet, the local device's IP address is compared to the remote device's IP address (figure A-6 on the next page). Each address's octets are compared or not, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device's address and the remote device's IP address are unmasked.

  Unmasked octets are compared (indicated by **?** in figure A-6).

- If the subnet mask octet contains the value 0, the related octets of the local device's and remote device's IP addresses are masked.

  Masked octets are not compared (indicated by ***X*** in figure A-6).

If the unmasked octets of the two IP addresses **match** (indicated by **=** in figure A-6, example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by an unequal sign in figure A-6, example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	**Example 2**	**Example 3**
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (*?.?.X.X)*	255.255.0.0 (*?.?.X.X)*	255.255.0.0 (*?.?.X.X)*
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	=.=.*X.X* — **Match** (Same subnet)	≠.≠.*X.X* — **No match** (Different subnet)	=.≠.*X.X* — **No match** (Different subnet)

Figure A–6 — Comparing the IP addresses

Ethernet Connection, cont'd

Appendix B

Reference Information

Specifications — HDXP Plus Series

Part Numbers and Accessories

Button Labels

Reference Information

Specifications

Video

Routing

1616 Series	16 x 17 matrix
3216 Series	32 x 17 matrix
3232 Series	32 x 33 matrix
Gain	Unity
Data rates	19 Mbps to 2.970 Gbps
Auto data rate lock	Yes
Standard	SMPTE 259M, SMPTE 292M, SMPTE 372M, ITU-R BT.601, ITU-R BT.1120
Data types	8 bit or 10 bit

Video input

Number/signal type	16 or 32 SDI or HDSDI digital component video
Connectors	16 or 32 female BNC
Input cable equalization	Automatic
HD-SDI	150 m using Extron RG6 or Belden 1694A cable or equivalent
	100 m using Extron RG59 or Belden 1505A cable or equivalent
SDI	200 m using Extron RG6 or Belden 1694A cable or equivalent
	150 m using Extron RG59 or Belden 1505A cable or equivalent
Nominal level	800 mV ±10%
Impedance	75 ohms
Return loss	<-15 dB @ 1 MHz to 1.5 GHz
External sync (genlock), 3232 Series only	
	-0.4 V to +5.0 Vp-p; 1 bi-level, 1 tri-level

Video output

Number/signal type	
1616 Series, 3216 Series	16 SDI or HDSDI digital component video (8- or 10-bit SMPTE 259M, SMPTE 292M) (Output 17 is a preview output.)
	1 SDI or HDSDI digital component video (for preview output)
3232 Series	32 SDI or HDSDI digital component video (8- or 10-bit SMPTE 259M, SMPTE 292M) (Output 33 is a preview output.)
	1 SDI or HDSDI digital component video (for preview output)
Connectors	
1616 Series, 3216 Series	16 female BNC
	1 female BNC for preview output (labeled as output 17)
3232 Series	32 female BNC
	1 female BNC for preview output (labeled as output 33)
Nominal level	800 mV ±10%
Impedance	75 ohms
Return loss	<-15 dB @ 1 MHz to 1.5 GHz
DC offset (termin. @ 75 ohms)	±500 mV with input at 0 offset
Jitter	<0.2 UI
Rise and fall time (20-80%)	SDI: 700 ps ± 100 ps
	HD-SDI: 250 ps ± 100 ps
Re-clocking	Automatic, or bypass mode for nonstandard rates, or fixed

Control/remote — switcher

Serial control ports	1 RS-232 or RS-422, 9-pin female D connector 1 RS-232 front panel 2.5 mm mini stereo jack
Baud rate and protocol	9600 (default), 19200, 38400, 115200 baud (adjustable); 8 data bits, 1 stop bit, no parity
Serial control pin configurations	
9-pin female D connector	RS-232: 2 = TX, 3 = RX, 5 = GND RS-422: 2 = TX-, 3 = RX-, 5 = GND, 7 = RX+, 8 = Tx+
Mini stereo jack	RS-232: tip = TX, ring = RX, sleeve = GND
Ethernet control port	1 RJ-45 female connector
Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Ethernet protocol	ARP, DHCP, ICMP (ping), TCP/IP, Telnet, HTTP
Program control	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

General

Power	100 VAC to 240 VAC, 50/60 Hz, 80 watts, internal, autoswitchable
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	
HDXP Plus 1616, HDXP Plus 3216	3.5" H x 17.0" W x 9.4" D (2U high, full rack wide) 8.9 cm H x 43.2 cm W x 23.9 cm D (Depth excludes connectors and knobs. Width excludes rack ears.)
HDXP Plus 3232	5.25" H x 17.0" W x 9.4" D (3U high, full rack wide) 13.3 cm H x 43.2 cm W x 23.9 cm D (Depth excludes connectors and knobs. Width excludes rack ears.)
Product weight	
HDXP Plus 1616, HDXP Plus 3216	8.9 lbs (4.1 kg)
HDXP Plus 3232	11.9 lbs (5.4 kg)
Shipping weight	
HDXP Plus 1616, HDXP Plus 3216	15 lbs (7 kg)
HDXP Plus 3232	18 lbs (9 kg)
DIM weight, international	25 lbs (12 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers and Accessories

Included parts

Included part	Replacement part number
HDXP 1616	60-807-01
HDXP 3216	60-790-01
HDXP 3232	60-797-01
US style IEC power cord	
Rubber feet, self-adhesive	
HDXP Plus Series Matrix Switchers User's Manual	
Tweeker (small screwdriver)	
Windows-based control software on CD-ROM	

Optional accessories

Accessory	Part number
MKP 2000 Matrix Switcher X-Y Remote Control Panel: Black White RAL9010 White	 60-682-02 60-682-03 60-682-05
MKP 3000 Matrix Switcher X-Y Remote Control Panel: Black White RAL9010 White	 60-708-02 60-708-03 60-708-05
9-pin D female to 2.5 mm TRS configuration cable	70-335-01

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance.

Cable	Part number
RG6/SHR-1 bulk , 500'	22-098-02
RG6/SHR-1 bulk , 1000'	22-098-03
RG6/SHR-4 bulk , 500'	22-099-02
RG6/SHR-5 bulk , 500'	22-100-02
RG6/SHR male crimp connectors, qty. 50	100-075-51
RG59/HR-1 bulk , 500'	22-145-02
RG59/HR-1 bulk , 1000'	22-145-03
RG59/HR-1 plenum, bulk , 500'	22-146-02
RG59/HR-1 plenum, bulk , 1000'	22-146-03
RG59/HR male crimp connectors, qty. 50	100-075-51

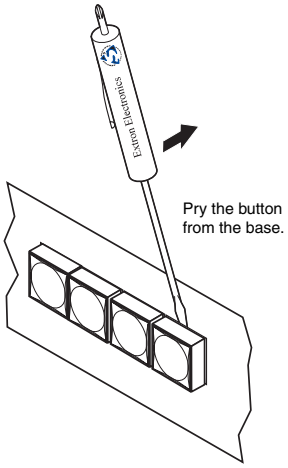
Button Labels

Page B-7 provides strips of blank button labels. If desired, photocopy them or cut them out of the manual, write button information in each button area as desired, and put them in the switcher's input or output buttons' windows. You can also create labels using the Button-Label Generator software (see chapter 5, *Matrix Software*).

Replacing button labels

The button caps are pre-labeled for your convenience by default. However, you can change them with the included button labels.

The button assembly consists of a clear lens cap, the button label, and a white diffuser. (See figure B-1.) Remove the button assembly from the HDXP as follows:



1. Make new labels using either the blanks on page B-7 or the Button-Label Generator software. Cut them out.
2. Remove the button assembly by inserting a small, flat-bladed screwdriver, such as an Extron Tweeker, between the button's base and the diffuser to gently pry the button assembly off the button plunger, as shown in the drawing at right.
3. Locate the small corner notch on the lens cap, and slide the screwdriver between the lens cap and the diffuser. (See ② in the illustration below.)
4. Using a rotating motion of the screwdriver, carefully pry the two pieces apart. (See ③ in the illustration below.)

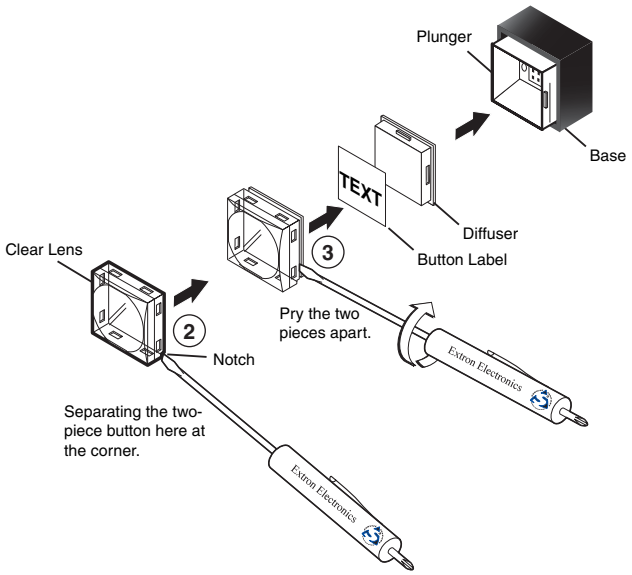
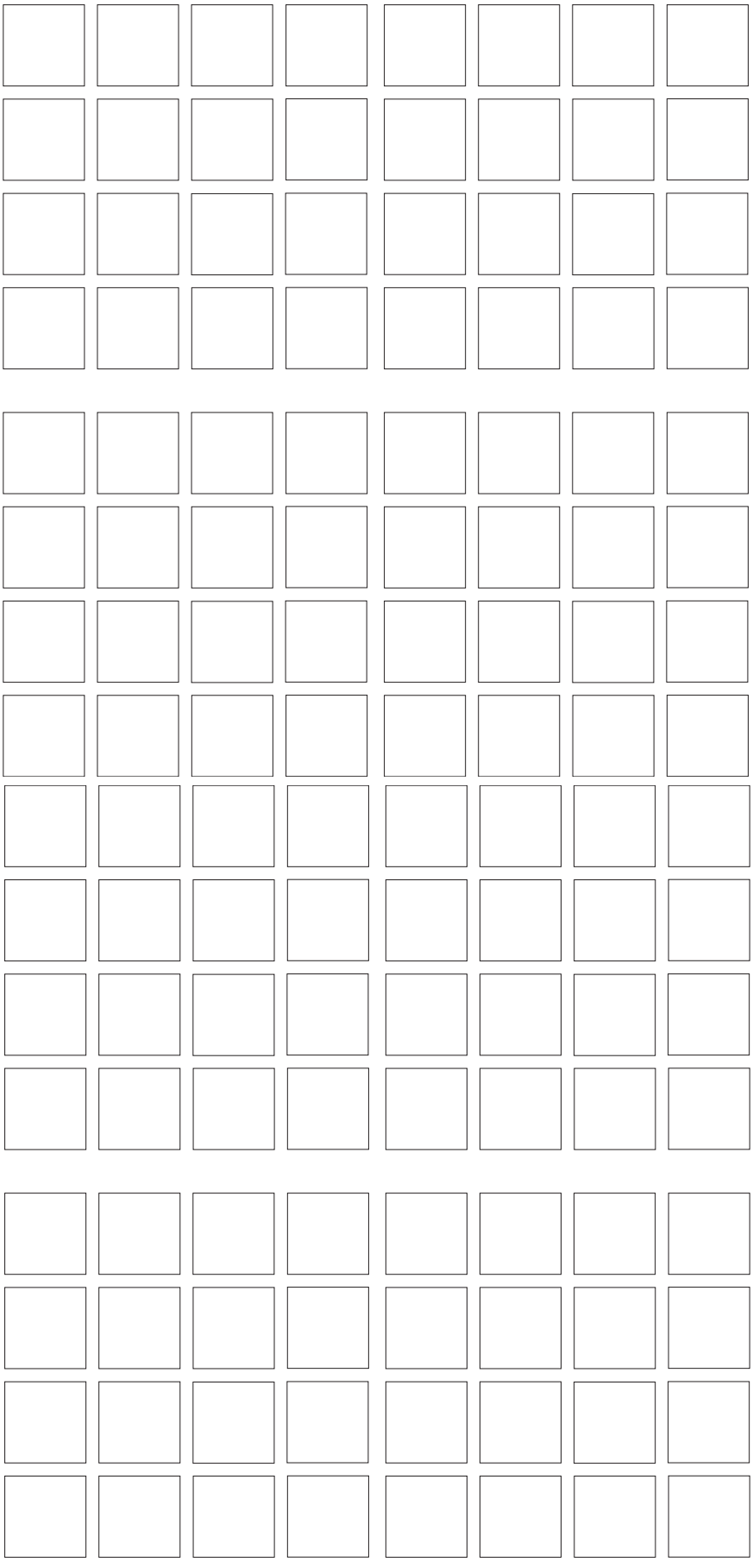


Figure B–1 — Replacing a button label

5. Lift out the transparent square label that you want to replace, being careful not to damage the circuits beneath it. You may need to use the small screwdriver to gently pry the label out.

6. Insert one of the new label you created in step **1** into the clear button cap, align the white backing plate with the cap, and firmly snap it into place.
7. Gently, but firmly, press the reassembled button into place on the HDXP front panel.
8. Repeat steps **1** through **7** as needed to relabel other buttons.



Button label blanks

FCC Class A Notice

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. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
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PM Industrial Bldg.
Singapore 368363

Japan:

Extron Electronics, Japan
Kyodo Building
16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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