# Extron. Electronics <br> INTERFACING, SWITCHING AND DISTRIBUTION 

User's Manual


Fiber Matrix 6400
Configurable Fiber Optic Digital Matrix Switcher

## 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．

## 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．

## 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

sen 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．

## 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

eer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad，antes de usar e 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

## 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。

## Warning

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 equipment is intended to be used with a main power system with a grounded
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．

## 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 n 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．

## 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 Gerates 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 zu 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．

## Advertencia

Alimentación eléctrica－Este equipo debe conectarse únicamente a la fuente／tipo de alimentación eléctrica ndicada 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 e 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．

## 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。

## FCC Class A Notice

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. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A 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 with FCC emissions limits.

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Fiber Matrix 6400 Switcher

## Chapter One

## Introduction

About this Manual About the Fiber Matrix 6400 Switcher<br>Definitions<br>Features

## About this Manual

This manual contains installation, configuration, and operating information for the Extron Fiber Matrix 6400 matrix switcher with user-replaceable singlemode fiber optic I/O boards, multimode fiber optic I/O boards, and SDI/HD-SDI I/O boards.

## NOTE The multimode and singlemode fiber optic I/O boards are physically and

 functionally identical, with the exception of the effective range of transmission. In this manual, any reference to fiber optic transmission applies to either transmission mode unless otherwise specified.
## About the Fiber Matrix 6400 Switcher <br> WARNING The Fiber Matrix 6400's fiber optic I/O boards output continuous invisible light, which may be harmful and dangerous to the eyes; use with caution.

- Do not look into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

The Fiber Matrix 6400 (figure 1-1) is a configurable matrix switcher that distributes optical and electrical signals. Fiber optic I/O boards route signals that are compatible with all Extron FOX 500 fiber optic product lines. SDI/HD-SDI I/O boards route serial digital interface (SDI) and high definition serial digital interface (HD-SDI) signals. The matrix switcher routes any input signal to any combination of outputs. An optical input can be tied to optical and/or SDI/HD-SDI outputs and an SDI/HD-SDI input can be tied to SDI/HD-SDI and/or optical outputs. The matrix switcher can route multiple input/output configurations simultaneously.


Figure 1-1 - Typical Fiber Matrix 6400 application

The Extron proprietary fiber optic signal, generated by FOX 500 transmitters, can include video, stereo audio, and transmitter-to-receiver RS-232 serial communications. The video component of the signal can be RGB video, Digital Visual Interface (DVI) video, SDI/HD-SDI video, or low resolution video, depending on the transmitter and receiver. The switcher has two internal, hotswappable 100 VAC to $240 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}, 180$-watt power supplies that provide worldwide power compatibility and reliability.

NOTE Compatible optical signals are digital signals from 270 Mbs through 4.25 Gbps that are sent and received via fiber optic small form factor pluggable (SFP) modules. The Fiber Matrix 6400 supports all compatible optical signals, whether transmitted or received by an Extron FOX system component or not.

NOTE The FOX 500 transmitter-to receiver communications, including the serial link, occupy one matrix switcher input and output.
This matrix switcher also supports the FOX 500 return (receiver-to-transmitter) serial communications, but returning this signal stream to the transmitter occupies a separate matrix switcher input and output.
The matrix switcher is a single box solution to complex fiber optic and/or SDI/HD-SDI signal routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels.

The Fiber Matrix is assembled from individual input/output (I/O) boards. The switcher can include up to eight I/O boards, each of which supports 8 inputs by 8 outputs. By adding or removing I/O boards, the Fiber Matrix is expandable and contractable, from an 8 -input by 8 -output matrix to a 64 -input by 64 -output matrix. The matrix switcher inputs and outputs the optical signals that it routes on fiber optic transceiver modules and the SDI/HD-SDI video signals on BNC connectors.

The matrix switcher can be remotely controlled via its rear panel RS-232/RS-422 Remote port, its rear panel LAN port, and its front panel Configuration (RS-232) port using either Extron's Windows ${ }^{\circledR}$-based Matrix Switchers Control Program or the Simple Instruction Set (SIS ${ }^{\text {TMI }}$ ). The SIS is a set of basic ASCII code commands that provide simple control through a control system or PC without programming long, obscure strings of code. SIS commands can be entered via either serial port.
The switcher can be operated remotely by any of the following connected to either serial port:

- a control system
- a PC
- an Extron MKP 2000 remote control panel
- an Extron MKP 3000 remote control panel
- (RS-232/RS-422 only) an Extron MCP 1000 remote control panel and/or MKP 1000 remote keypad
The matrix switcher is housed in a rack-mountable, 7U high metal enclosure with mounting flanges for standard 19 " racks.


## Fiber cable transmission modes

Two versions of Fiber Matrix switcher fiber optic I/O boards are documented in this manual. They are categorized by the type of fiber optic cable, multimode or singlemode, which defines the effective range of transmission:

- Multimode - Long distance, up to 150 m (450')
- Singlemode - Very long distance, up to 30 km ( 18.75 miles )

NOTE All transceiver modules on a fiber optic I/O board, as delivered from Extron, are configured the same; either all multimode or all singlemode.

NOTE You can mix multimode and singlemode fiber optic I/O boards in a Fiber Matrix switcher, but you must ensure that you connect the proper transmission mode fiber cables to the board.

## Definitions

The following terms, which apply to all 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 64 global memory presets can be stored in memory. When a preset is retrieved from memory, it becomes the current configuration. Presets can be saved and recalled from the front panel and any of the serial or LAN ports. For front panel operations, preset locations are assigned to the input buttons.
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 64 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.

## Features

Fiber optic inputs and outputs - With fiber optic I/O boards, the switchers input and output fiber optic signals on optical connectors. The fiber optic I/O boards support digital signals from 270 Mbs through 4.25 Gbps .
SDI, HD-SDI, or 3G-SDI inputs and outputs - With SDI/HD-SDI I/O boards, the switchers input and output SDI and HD-SDI signals on BNC connectors. The SDI/HD-SDI I/O boards support multi-rate SDI at rates up to 2.97 Gbps , and comply with SMPTE $259 \mathrm{M}-\mathrm{C}, 292 \mathrm{M}, 424 \mathrm{M}$, and ITU digital video standards.

## Cross-format compatibility -

- An input on an SDI/HD-SDI I/O board can be tied to an output on a fiber optic I/O board.
- An input on a fiber optic I/O board can be tied to an output on an SDI/HD-SDI I/O board.
Switching flexibility - The switcher provides individually buffered, independent matrix switched outputs.
- Tie any input to any or all outputs.
- Quick multiple tie - Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.
Input link detection - In critical environments or unmanned, remote locations, it may be vital to know that sources are active and switching. The switcher confirms that input sources are active by detecting light. Link detection provides instantaneous feedback via the switchers' serial ports or LAN port. The input information can be displayed on any control system or in a Windows-based control program on a local-area network (LAN) or Internet (IP) connection.

Rooming - The switcher can be programmed to group multiple outputs to specific "rooms", allowing them to have their own presets.
Operational reliability - The Fiber Matrix 6400 can support round-the-clock operation in mission-critical applications, using a combination of hot-swappable components and redundant power supplies.

- Field upgradable, hot-swappable modular design - The architecture of the Fiber Matrix 6400 allows you to repair, upgrade, reconfigure, or expand the matrix by simply installing a new I/O board or replacing a board of one type with one of another. Hot-swappable components let you replace any I/O board at any time - without powering down the switcher.
- Primary and redundant, hot-swappable power supplies - The hotswappable, externally mounted redundant power supply is configured to automatically take over the load from the primary supply in the case of a failure.

The complete power circuit, from the plug, through the power supply, to the power's insertion onto the power distribution plane, is separate and redundant (figure 1-2). If the installation includes uninterruptible or completely separate power sources, the switcher will remain powered up through any power interruption short of a simultaneous loss of power on both power sources.


Figure 1-2 — Redundant power supply backs up primary

The hot-swappable redundant power supply means zero downtime for the switcher and no loss of functionality should one power supply fail. Should a primary power supply fail, the redundant power supply immediately assumes the load of the failed primary supply. A failed power supply is easily replaceable from the rear at any time-without powering down the matrix, and with no tools required.
Operational flexibility - Operations such as input/output selection and setting of presets can be performed on the front panel or via the Ethernet or either serial port link. The serial ports allow remote control via a PC or a control system. The Ethernet link allows multiple remote links with two levels of password protection.

- Front Panel Controller
- Windows-based control/configuration program
- Simple Instruction Set (SIS ${ }^{\text {TM }}$ )
- Remote control panels and keypads

Upgradeable firmware - The firmware that controls all switcher operation can be upgraded in the field via RS-232/RS-422 or Ethernet, without taking the switcher out of service. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and can be installed using the Windows-based control/configuration program or the built-in HTML pages.

Labeling - Extron's included button label software lets you create labels to place in the front panel I/O buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother ${ }^{\text {TM }} \mathrm{P}$-Touch ${ }^{\text {TM }}$ or comparable labeler.

## Global memory presets

Rack mountability
Front panel security lockout modes (Executive mode) - If a matrix switcher is installed in an open area, where operation by unauthorized personnel may be a problem, a security lockout mode can be implemented. When the front panel is locked, a special button combination or SIS command is required to unlock the front panel controller and make the front panel fully operational.

## I/O grouping

Two AC power inputs

Fiber Matrix 6400 Switcher

# Chapter Two 

## Installation

Setup/Installation Checklist
Mounting the Switcher
Rear Panel Cabling and Features
Front Panel Configuration Port

## Setup/Installation Checklist

Get ready
Familiarize yourself with the Fiber Matrix switchers. Obtain IP setting information for the Fiber Matrix from the local network administrator. Read Appendix A, "Ethernet Connection".

## Configure the Fiber Matrix

$\square$ Install the desired I/O boards (page 7-4).

## Perform physical installation

If desired, create (page 5-24) and replace button labels (page 7-6). If desired, install the switcher in a rack (below).
Cable input and output devices to the I/O ports (page 2-5).
If desired, connect computers or control systems to the serial ports and/or LAN port (page 2-6, page 2-8, and page 2-9.
Connect power (page 2-8).
Test the switcher by creating a tie (page 3-9).

## Ancillary operations

$\square$ Install the Windows-based control/configuration program (page 5-2).

## Mounting the Switcher

## UL guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the Fiber Matrix into a rack.

1. Elevated operating ambient temperature - If the equipment installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the Fiber Matrix in an environment compatible with the maximum ambient temperature ( $\mathrm{Tma}=+122^{\circ} \mathrm{F},+50^{\circ} \mathrm{C}$ ) specified by Extron.
2. Reduced air flow - Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. Mechanical loading - Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. Circuit overloading - Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. Reliable earthing (grounding) - Maintain reliable grounding of rackmounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

## Mounting instructions

The Fiber Matrix 6400 matrix switcher is housed in a rack-mountable, 7U high metal enclosure with mounting flanges for standard 19" racks. If desired, rack mount the switcher as follows:

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

## Rear Panel Cabling and Features

WARNING The Fiber Matrix 6400 fiber optic I/O boards output continuous invisible light, which may be harmful and dangerous to the eyes; use with caution.

- Do not look into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.


Figure 2-1 - Fiber Matrix 6400 fiber optic matrix switcher rear panel
CAUTION Use electrostatic discharge (ESD) precautions (be electrically grounded) when making connections. Electrostatic discharge can damage equipment, even if you cannot feel, see, or hear it.

CAUTION Remove system power before making all connections.
(1) Fiber optic connectors and LEDs - See page 2-5.
(2) SDI/HDI-SDI connectors and LEDs - See page 2-5.
(3) Reset button - See page 2-6.
(4) Ethernet connection (LAN connector) - See page 2-6.
(5) Remote port - See page 2-8.
(6) Power connectors - See page 2-8.
(7) Power indicator LEDs - See page 2-8.

## Installation, cont'd

## I/O boards

See figure 2-2. Each I/O board is identified by the input and output numbers supported by the board position (1-8,9-16, and so on). The transceiver modules on fiber optic I/ O boards and the BNC connectors on SDI/HD-SDI boards are identified as A through H .


Figure 2-2 - Arrangement of inputs and outputs on the I/O boards
Locations A through H correspond to the input and output numbers identified by the board position numbers. (For example, the input and output numbers supported by the I/O board in location 17-24 are as follows: $\mathrm{A}=17, \mathrm{~B}=18, \mathrm{C}=19$, $\mathrm{D}=20, \mathrm{E}=21, \mathrm{~F}=22, \mathrm{G}=23$, and $\mathrm{H}=24$.)

On the fiber optic I/O boards, locations A through H correspond to the transceiver modules, each of which includes an input and an output. Therefore, locations A through H are numbered from left to right.
On the SDI/HD-SDI I/O boards, inputs and outputs are grouped separately, with inputs A through H on the left and outputs A through H on the right.

## (1) Fiber optic connectors and LEDs -

WARNING This unit outputs continuous invisible light, which may be harmful and dangerous to the eyes; use with caution. For additional safety, plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.

NOTE Ensure that you use the proper fiber cable for your I/O board. Typically, singlemode fiber has a yellow jacket and multimode cable has an orange jacket.

NOTE Unlike the FOX 500 transmitters and receivers, which output an optical stream on one connector in a block and receive a return optical stream on the second connector in the same block, the Fiber Matrix 6400 uses one connector on the block as an input and the second connector on the same block as a separate output.
(1a) Input connector - For all oneway video, audio, and/or serial communications output by a transmitter, connect a fiber optic cable to the Input LC connector.

Connect the free end of this fiber optic cable to the Optical 1 LC connector on a FOX 500 Tx transmitter or to any other compatible Extron FOX 500 device.
NOTE Or, for the FOX 500 serial return, (receiver-to-transmitter) function, connect the free end to the Optical 2 connector on a FOX 500 Rx receiver.

Input LED - When lit, the link is active (light is received).
(1b) Output connector - For all oneway video, audio, and/or serial communications output to a receiver, connect a fiber optic cable to the Output LC connector.

Connect the free end of this fiber optic cable to the Optical 1 LC connector on a FOX 500 Rx receiver or to any other compatible Extron FOX 500 device.

NOTE Or, for the FOX 500 serial return, (receiver-to-transmitter) function, connect the free end to the Optical 2 connector on a FOX 500 Tx transmitter.


Output LED — Light is always
Figure 2-3 - Optical connections output, even when no input is tied to the output. This LED is always lit.

## (2) BNC connectors -

(2a) Multi-rate SDI Input connectors - Connect HD-SDI, SDI, or 3G-SDI video inputs to these BNC connectors.
(2b) Multi-rate SDI Output connectors - Connect digital displays to these BNC connectors.

## Reset button and LED

(3) Reset button - The Reset button initiates four levels of reset of the matrix switcher. For four different reset levels, press and hold the button while the switcher is running or while you power up the switcher.

See "Rear Panel Operations" in chapter 3, "Operation", for details.

- Events (mode 3) reset - Hold Reset for 3 seconds, then release it and push it again to toggle events monitoring on and off.
- IP settings (mode 4 ) reset - Hold Reset for 6 seconds, then release it and push it again to reset the switcher's IP functions.
NOTE The IP settings reset does not replace any user-installed firmware.
- Absolute (mode 5) reset - Hold Reset for 9 seconds, then release it and push it 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 Factory loaded firmware is active until it is replaced or the power is cycled.
NOTE Hard reset does not clear the current configuration.


## Ethernet connection

(4) LAN port - If desired, for IP control of the system, connect the matrix
 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 running Extron's Windows-based control/configuration program or has downloaded HTML pages from the switcher.
Link LED indicator - The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily.
Act LED indicator - The Act LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

## Cabling

It is vital that your Ethernet cables be the correct cable type 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 $328^{\prime}$ ( 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.
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.


## RJ-45 connector wiring

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

- Crossover cable - Direct connection between the computer and the Fiber Matrix switcher
- Patch (straight) cable - Connection of the Fiber Matrix switcher to an Ethernet LAN


Figure 2-4 - RJ-45 connector and pinout tables

## Remote port

(5) Remote RS-232/RS-422 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 (figure 2-5).


Figure 2-5 — Remote RS-232/RS-422 connector

See chapter 4, "Programmer's Guide", 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/ configuration software.
NOTE The switcher can support either the RS-232 or RS-422 serial communication protocol, and can operate at 9600, 19200, 38400, or 115200 baud rates. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27, 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 RS-232/RS-422 connector. Refer to the MKP 2000 Remote Control Panel User's Manual or the MKP 3000 User's Manual for details.

## Power

(6) Primary and Redundant AC power connectors - Plug standard IEC power cords into these connector to connect the switcher to 100 VAC to 240 VAC, 50 or 60 Hz power sources.

NOTE For the most reliable power, connect the Redundant power cord to either an uninterruptible power source or to a power source that is completely independent from the primary power source.

## (7) Primary and Redundant power supply indicator LEDs -

Green - Indicates that the associated power supply is operating within normal tolerances.
Red - Indicates that the associated power supply is operating outside the normal tolerances or has failed. See chapter 7, "Maintenance and Modifications" to replace the power supply.

## Front Panel Configuration Port



Figure 2-6 - Front panel configuration port
(1) Configuration port - This 2.5 mm mini stereo jack serves the same serial communications function as the rear panel Remote port, but it is easier to access than the rear port after the matrix switcher has been installed and cabled. The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part \#70-335-01 (figure 2-7), can be used for this connection.


Figure 2-7 - Optional 9-pin TRS RS-232 cable

NOTE This port is independent of the rear panel Remote port and is not affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed under SIS command control only. See the Command/Response table for IP-specific SIS commands, in chapter 4, "Programmer's Guide", to configure all ports under SIS control.

NOTE A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.

## Installation, cont'd

This port is RS-232 only, with its default protocols as follows:

- 9600 baud - no parity - 8 data bits
- 1 stop bit
- no flow control

NOTE The maximum distances from the matrix switcher to the controlling device can vary up to 200 feet ( 61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the switcher and the controlling device) all affect transmission distance. Distances of about 50 feet ( 15 m ) are typically not a problem. In some cases the matrix switcher may be capable of serial communications via RS-232 up to 250 feet ( 76 m) away.

Fiber Matrix 6400 Switcher

# Chapter Three 

## Operation

Front Panel Controls and Indicators

Rear Panel Power Indicators
Front Panel Operations
Rear Panel Operations Troubleshooting

## Operation

## Front Panel Controls and Indicators

The front panel controls (figure 3-1) are grouped into two sets. The input and output buttons are grouped on the left side of the control panel. The control buttons are grouped on the right side of the panel.


Figure 3-1 - Front panel, Fiber Matrix 6400 matrix switcher
The large, illuminated pushbuttons can be labeled with text and/or graphics. The buttons can be set to provide amber background illumination all the time or the background illumination can be turned off (see "Background illumination", on page 3-26. The buttons blink or are lit at full intensity (depending on the operation) when selected.
(1) Input buttons - See page 3-3.
(2) Output buttons - See page 3-4.
(3) Enter button - See page 3-4.
(4) Preset button - See page 3-5.
(5) View button - See page 3-5.
(6) Esc button - See page 3-6.

## Input and output buttons


(1)

Input buttons - The input buttons have two primary functions $(\bullet)$ and three secondary functions ( $\square$ ):

- Select an input.
- Identify the selected input.
- (Input 1 only) With the Output 1 button, select I/O Group mode. See "I/O grouping" on page 3-17.
- Select a preset. See "Using presets" on page 3-21.
- (Input 1 and Input 2 only) Toggle background illumination of the buttons on and off. See "Background illumination" on page 3-26.


## Operation, cont'd

(2) Output buttons - The output buttons have two primary functions (•) and four secondary functions ( $\square$ ):

- Select output(s).
- Identify the selected output(s).
- (Output 1 only) With the Input 1 button, select I/O Group mode. See "I/O grouping" on page 3-17.
- Select a preset. See "Using presets" on page 3-21.
- Mute the output. See "Muting and unmuting outputs" on page 3-23.
$\square$ Output 63 - Select the RS-232 protocol for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- Output 64 - Select the RS-422 protocol for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.


## Control buttons

| Primary functions <br> Action: |  | Save changes | Select Preset mode | Select View mode | Cancel/escape |  |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | Indication: | Blink: save needed | Blink: Save preset <br> Lit: Recall preset | View mode selected | Flashes once |  |
|  |  | ENTER |  | PRESET |  | VIEW |

(3) Enter button - The Enter button has three primary functions (•) and four secondary functions ( $\square$ ):

- Save changes that you make on the front panel. To create a simple configuration:
- Press the desired input button (1).
- Press the desired output button(s) (2).
- Press the Enter button.
- Indicate that a potential tie has been created but not saved.
- Indicate that a global preset has been selected to be saved or recalled but that the preset action has not been accomplished.
- In the I/O Group mode, select group 1 and indicate its selection. See "I/O grouping" on page 3-17.
- With the Preset, View, and Esc buttons, select Serial Port Selection and Configuration mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- Select 9600 baud for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- With the Esc button, toggles the front panel lock on and off. See "Locking out the front panel (Executive mode)" on page 3-25.
(4) Preset button - The Preset button has two primary functions (•) and four secondary functions ( $\square$ ):
- Activates Save Preset mode to save a configuration as a preset and Recall Preset mode to activate a previously-defined preset.
- Blinks when Save Preset mode is active and lights steadily when Recall Preset mode is active.
- In the I/O Group mode, select group 2 and indicate its selection See "I/O grouping" on page 3-17.
- With the Enter, View, and Esc buttons, select Serial Port Selection and Configuration mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- Select 19200 baud for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- With the View button, indicate that the front panel lock has been toggled on or off. See "Locking out the front panel (Executive mode)" on page 3-25.
(5) View button - The View button has two primary functions ( $\bullet$ ) and four secondary functions ( $\square$ ):
- Select View-only mode that displays the current configuration.

NOTE View-only mode also provides a way to mute and unmute the outputs. See "Muting and unmuting outputs" on page 3-23.

- Indicate that View-only mode is active.
- In the I/O Group mode, select group 3 and indicate its selection. See "I/O grouping" on page 3-17.
- With the Enter, Preset, and Esc buttons, select Serial Port Selection and Configuration mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- Select 38400 baud for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- With the Preset button, indicate that the front panel lock has been toggled on or off. See "Locking out the front panel (Executive mode)" on page 3-25.

Esc button - The Esc button has two primary functions $(\bullet)$ and four secondary functions ( $\square$ ):

- Cancel 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 the I/O Group mode, select group 4 and indicate its selection. See "I/O grouping" on page 3-17.
- With the Enter, Preset, and View buttons, select Serial Port Selection and Configuration mode. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- Select 115200 baud for the RS-232/RS-422 port in Serial Port Selection and Configuration mode and indicate its selection. See "Selecting the rear panel Remote port protocol and baud rate" on page 3-27.
- With the Enter button, toggles the front panel lock on and off. See "Locking out the front panel (Executive mode)" on page 3-25.


## Power indicators

(7) Primary and Redundant Power Supply LEDs -

Green - Indicates that the associated power supply is operating within normal tolerances.

Red - Indicates that the associated power supply is operating outside the normal tolerances or has failed. See chapter 7, "Maintenance and Modifications", to replace the power supply.

## Button labels

The numbered translucent covers on the input and output pushbuttons can be removed and replaced to insert labels behind them.
Input and output labels can be created easily with Extron's Button-Label Generator software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (figure 3-2). See chapter 5, "Matrix Software", for details on using the labeling software. See chapter 7, "Maintenance and Modifications", for blank labels and a procedure for removing and replacing the translucent covers.


Figure 3-2 - Sample button labels and icons

## Rear Panel Power Indicators

The two power supply modules (primary power supply and redundant power supply, figure 3-3) each have a 2-color LED.


Figure 3-3 - Rear panel power supply indicators

## (1) Primary and Redundant Power Supply LEDs -

Green - Indicates that the associated power supply is operating within normal tolerances.

Red - Indicates that the associated power supply has failed. See chapter 7, "Maintenance and Modifications", to replace the power supply.

## Front Panel Operations

The following paragraphs detail the power-up process and then provide sample procedures for the following actions:

- Creating ties, sets of ties, and configurations
- Changing a configuration
- Viewing ties, sets of ties, and configurations
- Creating I/O groups
- Saving a preset
- Recalling a preset
- Muting and unmuting outputs
- Locking and unlocking the front panel
- Performing front panel resets
- Reading and setting the RS-232/RS-422 Remote port settings


## Operation, cont'd

## 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 64 global memory presets can be stored in memory. When a preset is retrieved from memory, it becomes the current configuration. Presets can be saved and recalled from the front panel and any of the serial or LAN ports. For front panel operations, preset locations are assigned to the input buttons.
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 64 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.

## Power

Apply power by connecting one or both power cords (Primary and Redundant) to the AC source(s). The switcher performs a self-test that flashes the front panel button indicators red, green, red, and amber and then turns them either off or to background illumination. An error-free power up self-test sequence leaves all control buttons either unlit or showing background illumination.

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 switcher locks up. If your switcher locks up on power-up, call the Extron $\mathrm{S}^{3}$ Sales \& Technical Support Hotline. See the rear cover of this manual for the phone number in your region of the world.

## Creating a configuration

The current configuration can be changed using the front panel buttons. Change the current configuration as follows:

1. Press the Esc button to clear any front panel button indications that may be lit.
2. Select the desired input and output(s) by pressing the input and output buttons. Input buttons and output buttons light or blink green to indicate ties.

- To indicate potential ties, output buttons blink when an input is selected.
- To indicate current ties, output buttons light steadily when an input is selected.
- To clear unwanted outputs, press and release the associated lit output buttons. To indicate potential unties, output buttons blink when an output is deselected but not untied from the input.

3. Press and release the Enter button to accept the tie.
4. Repeat steps $\mathbf{1}$ through $\mathbf{3}$ to create or delete additional ties until the desired configuration is complete.
NOTE - Only one input can be tied to an output.

- If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.
- If an input with no tie is selected, only that input's button lights.
- As each input and output is selected, the associated output button blinks to indicate a tentative tie. Buttons for output(s) that were already tied to the input light steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
- If you press the input button for an I/O grouped input and then try to select an output in a different group, you cannot select the associated output button. The associated input button remains lit.
- An optical input can be tied to optical and/or SDI/HD-SDI outputs, and an SDI/HD-SDI input can be tied to SDI/HD-SDI and/or optical outputs.


## 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. Clear all selections: Press and release the Esc button.

Press the Esc button to clear all selections.

2. Select an input: Press and release the input 5 button.

3. Select the outputs: Press and release the output 3 , output 4 , and output 8 buttons.


NOTE You can cancel the entire set of ties at this point by pressing and releasing the Esc button. The Esc button flashes once.
4. Confirm the change: Press and release the Enter button.


The Enter button returns to unlit or background illumination.

The current configuration is now input 5 tied to output 3 , output 4 , and output 8.


## Example 2: Adding a tie to a set of ties

In the following example, a new tie is added to the current configuration. The steps show the front panel indications that result from your action.
NOTE This example assumes that you have performed example 1.

1. Clear all selections: Press and release the Esc button.

Press the Esc button to clear all selections.

2. Select an input: Press and release the input 5 button.

3. Select the output: Press and release the output 1 button.

Press and release the Output 1 button.
The button blinks green to indicate that the
selected input will be tied to this output.

4. Confirm the change: Press and release the Enter button.

Press the Enter button to confirm the configuration change.


The Enter button returns to
unlit or background
illumination.
The current configuration is now input 5 tied to output 1, output 3, output 4, and output 8.


## 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 example 1 and example 2.

1. Clear all selections: Press and release the Esc button.

2. Select an input: Press and release the input 5 button.

3. Select the output: Press and release the output 4 button.



The Enter button blinks green to indicate the need to confirm the change.
4. Confirm the change: Press and release the Enter button.

## Operation, cont'd

Press the Enter button to
confirm the configuration change.


The Enter button returns to unlit or background illumination.

The current configuration is now input 5 tied to output 1, output 3 , and output 8 .

| Input 5 video tied <br> to outputs 1, 3, and 8 |  |  |
| :---: | :---: | :---: |
| Input |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## Viewing a 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 video and audio outputs (see "Muting and unmuting outputs" on page 3-23).
View the current configuration as follows:

1. Press the Esc button to clear any front panel button indications that may be on.
2. Press and release the View button. All of the buttons light for outputs that are not tied
3. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.
NOTE - When you enter View-only mode, the output buttons light for all outputs without ties. Likewise, when you press an output button for which there are no ties, the output buttons light for all outputs without ties.

- To see all ties of the current configuration, press and release each input and output button, one at a time.
- After 30 seconds of front panel inactivity, View-only mode automatically ends.


## Example 4: Viewing ties

In the following example, the ties in the current configuration are viewed. The steps show the front panel indications that result from your action.

NOTE This example assumes that you have performed example 1, example 2, and example 3.

1. Clear all selections: Press and release the Esc button.

2. Select View-only mode: Press and release the View button to enter View-only mode. The View button lights amber.

3. Select an input: Press and release the input 5 button.


The output buttons for outputs that are not tied to Input 5 are either unlit or background illuminated.

NOTE You can also view a set of ties by selecting a tied output. For example, note the number of a lit output button, and then press and release the output button for an untied (unlit or background illumination) 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 (input 5), and the output buttons light for all of the outputs that are tied to the input.
4. Exit View-only mode: Press and release the View button to exit View-only mode.

Press the View button
to exit View-Only mode.


The View button returns to unlit or background illumination.

## I/O grouping

I/O grouping is a matrix switcher feature that allows you to subdivide the front panel controls of the matrix into up to four smaller functional sub-switchers (figure 3-4) 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.


Figure 3-4 - I/O grouping of incompatible video formats

When you are creating ties on the front panel, inputs and outputs that are assigned to a group can be tied only to other outputs and inputs within the same group. For example, a front panel operator 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 (an input in group 1 tied to an output in group 2) can be created under RS-232/RS-422 or Ethernet control.

## Operation, cont'd

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
- Segregating input and output devices that are in separate rooms
- Segregating incompatible fiber signals, such as those from an FOX 500 system and a FOX HD-SDI system
- Isolating video from being displayed on specific output devices for operational security reasons
The I/O groups can be set up on the front panel or by using either serial port and / or the LAN port and either the SIS or the Windows control program (see chapter 4, "Programmer's Guide", and chapter 5, "Matrix Software").
Create I/O groups on the front panel as follows:

1. Press the Esc button to clear any front panel button indications that may be lit.
2. To enter I/O Group mode, press and hold the Input 1 and Output 1 buttons until the input and output buttons light to display the ungrouped inputs and outputs.
3. Press and release one of the Control buttons to select a group:

- 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.

4. Select the desired input(s) and output(s) to assign to the group by pressing the input and output buttons.
5. Allow the I/O Group mode to time out after approximately 30 seconds.

NOTE - Ties between groups (an input in group 1 tied to an output in group 2) can be created under either serial port or Ethernet control.

- Ties that were created before I/O groups were created remain valid, even if they include inputs and outputs in different groups.
- Presets can be created under serial port or Ethernet control that 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 discarded in favor of the new grouping.
- For I/O groups to have any function, at least two groups must be created.


## Example 5: Grouping inputs and outputs

In the following example, several switcher inputs and outputs are assigned to groups. The steps show the front panel indications that result from your action.

1. Clear all selections: Press and release the Esc button.

Press the Esc button to clear all selections.

2. Select I/O Group mode: Press and hold the Input 1 and Output 1 buttons for approximately 2 seconds and then release the buttons.

3. Select an I/O group: Press and release the Enter button to select group 1.

Press and release the Enter button to select group 1.
The button lights amber to indicate the selection.

4. Assign inputs and outputs: Press and release the input 1 through 4 and output 1 through 4 buttons.


Press and release the Output 1 through Output 4 buttons.
The selected buttons light.

5. Select an I/O group: Press and release the Preset button to select group 2.

Press and release the Preset button to select group 2.
The button lights amber to indicate the selection.

6. Assign inputs and outputs: Press and release the input 5 through 8 and output 5 through 8 buttons.

7. Do nothing for approximately 30 seconds. The switcher exits I/O Group mode.

- Group 1 consists of inputs 1 through 4 and outputs 1 through 4.
- Group 2 consists of inputs 5 through 8 and outputs 5 through 8 .


## Using presets

The current configuration (configuration 0 ) can be saved as a preset in any one of 64 preset memory addresses. Presets can be saved and recalled from the front panel. The preset locations are assigned to input buttons 1 through 64. When a preset is retrieved from memory, it becomes the current configuration.
NOTE - Presets cannot be viewed from the front panel unless recalled as the current configuration. Presets can be viewed using Extron's Windows-based control program. See chapter 5, "Matrix Software", for more details.

- The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still 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 the preset configuration ties.


## Example 6: Saving a preset

In the following example, the current configuration is saved as a preset. The steps show the front panel indications that result from your action.

1. Clear all selections: Press and release the Esc button.

Press the Esc button to clear all selections.

2. Select Save Preset mode: Press and hold the Preset button for approximately 2 seconds until it blinks.

3. Select the preset: Press and release the input button for the desired preset.

4. Confirm the change: Press and release the Enter button. The current configuration is now stored in the selected memory location.


## Example 7: Recalling a preset

In the following example, a preset is recalled to become the current configuration. The steps show the front panel indications that result from your action.

1. Clear all selections: Press and release the Esc button.

2. Select Recall Preset mode: Press and release the Preset button.

3. Select the preset: Press and release the input button for the desired preset.

4. Confirm the change: Press and release the Enter button. The configuration stored in the selected memory location is now the current configuration and can be viewed in the View-only mode (see example 4).


## Muting and unmuting outputs

Individual outputs can be muted or unmuted as follows:

1. Press the Esc button to clear any front panel button indications that may be on.
2. Press and release the View button.
3. One at a time, press and hold the button(s) for the desired output(s) for approximately 2 seconds. The output button(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
4. Press and release the View button to return to normal switcher operation.

NOTE - When you enter View-only mode, the output buttons light for all outputs without ties.

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


## Example 9: Muting and unmuting an output

In the following example, several switcher outputs are muted and unmuted. The steps show the front panel indications that result from your action.

1. Clear all selections: Press and release the Esc button.

2. Select View-only mode: Press and release the View button to enter View-only mode. The View button lights red.

3. Mute the outputs: One at a time, press and hold the Output 3 button and then the Output 4 button for approximately 2 seconds until each button begins to blink. The output 3 and output 4 signals are muted.

## Mute outputs one at a time.


4. Unmute the outputs: One at a time, press and hold the Output 3 button and then the Output 4 buttons for approximately 2 seconds until each button lights steadily. The output 3 and output 4 signals are unmuted.

Unmute outputs one at a time.

5. Exit View-only mode: Press and release the View button to exit View-only mode.

## Press the View button

to exit View-Only mode.


All input buttons and output buttons return to unlit or background illumination

The View button returns to unlit or background illumination.

## Locking out the front panel (Executive mode)

The front panel security lockout limits the operation of the switcher 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" on page 3-14. Other than in View-Only mode, if the user pushes a front panel button when the switcher is locked, the View and Preset buttons flash twice and return to their previous state.
To toggle the lock on and off, press and hold the Enter button and the Esc button for approximately two seconds.


## Performing a system reset from the front panel

The front panel reset is identical to the EscZZXXX $\leftarrow$ SIS command (see chapter 4, "Programmer's Guide"). A system reset clears all ties and presets, all output mutes, and resets all I/O grouping.

Reset the switcher to the factory default settings by pressing and holding the View button and Esc button while you apply AC power to the switcher.
NOTE You must apply power from an unpowered state. Applying the redundant power $\begin{aligned} & \text { with primary power already applied does not reset the switcher. }\end{aligned}$
NOTE System reset does not reset the Internet protocol (IP) settings or replace userinstalled firmware.


## Background illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off. To toggle the background illumination on or off, press and hold the Input 1 and Input 2 buttons simultaneously for approximately 2 seconds.


After approximately 2 seconds, release the Input 1 and Input 2 buttons.

## Selecting the rear panel Remote port protocol and baud rate

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

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

1. Select Serial Port Selection and Configuration mode: Simultaneously press and hold all Control buttons (Enter, Preset, View, and Esc).


The flashing Control button indicates the baud rate as follows:
Enter - $9600 \quad$ Preset - 19200
View - $38400 \quad$ Esc - 115200
The flashing output button indicates the protocol as follows: Output 63 - RS-232 Output 64 - RS-422/RS-485
In this example, the port is set to RS-232 at 9600 baud.
2. Release the Control buttons.
3. Change a value: Press and release the button that relates to the desired value.

Press and release the button(s) to configure the port as
follows:
Baud rate:
Enter - 9600
Preset - 19200
View - 38400
Esc - 115200
Serial protocol
Ouput 63 - RS-232
Output 64 — RS-422/RS-485
The selected buttons blink and the others remain lit.
In this example, the port is set to RS-422 at 38400 baud.

4. Exit Serial Port Selection and Configuration mode: Press and release an output button.


## Rear Panel Operations

The rear panel has a Reset button that initiates four levels of resets (numbered 1,3, 4 , and 5 for the sake of comparison with an Extron IPL product). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or Extron Tweeker to access it.

See the following table for a summary of the modes.
CAUTION Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a controller reboot.

NOTE The reset modes listed below close all open IP and Telnet connections and close all sockets. Also, the following modes are separate functions, not a continuation from Mode 1 to Mode 5.

| Reset Mode Comparison/Summary |  |  |  |
| :---: | :---: | :---: | :---: |
| Mode | Activation | Result | Purpose/Notes |
| 1 | Hold down the recessed Reset button while applying power to the switcher. <br> NOTE After a mode 1 reset is performed, update the switcher's firmware to the latest version. Do not operate the switcher firmware version that results from the mode 1 reset. If you want to use the factory default firmware, you must upload that version again. See chapter 5 , "Matrix Software", for details on uploading firmware. | The switcher reverts to the factory default firmware. Event scripting will not start if the switcher is powered on in this mode. All user files and settings, such as IP settings, are maintained. <br> NOTE If you do not want to update firmware, or you performed a mode 1 reset by mistake, cycle power to the switcher to return to the firmware version that was running before the mode 1 reset. Use the 0 Q SIS command to confirm that the factory default firmware is no longer running (look for the asterisk [*] following the version number. | Use mode 1 to revert to the factory default firmware version if incompatibility issues arise with user-loaded firmware. |
| 3 | Hold down the Reset button for about 3 seconds, until the Reset LED blinks once, then press Reset momentarily ( $<1$ second) within 1 second. | Mode 3 turns events on or off. During resetting, the Reset LED flashes 2 times if events are starting, 3 times if events are stopping. | Mode 3 is useful for troubleshooting. |
| 4 | Hold down the Reset button for about 6 seconds, until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds). Then press Reset momentarily ( $<1$ second) within 1 second. | Mode 4: <br> - Enables ARP capability. <br> - Sets the IP address to the factory default. <br> - Sets the subnet address to the factory default. <br> - Sets the gateway address to the factory default. <br> - Sets port mapping to the factory default. <br> - Turns DHCP off. <br> - Turn events off. <br> The Reset LED flashes four times in quick succession during the reset. | Mode 4 enables you to set IP address information using ARP and the MAC address. |
| 5 | Hold down the Reset button for about 9 seconds, until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and then again at 9 seconds). Then press Reset momentarily ( $<1$ second) within 1 second. | Mode 5 performs a complete reset to factory defaults (with the exception of the firmware): <br> - Does everything mode 4 does. <br> - Resets most settings including: clears all ties and presets clears all output mutes clears all I/O grouping <br> - Resets all IP options. <br> - Removes/clears all files for the switcher. The reset LED flashes four times in quick succession during the reset. | Mode 5 is useful if you want to start over with configuration and uploading or to replace events. <br> Same as Escl ZXXX $\leftarrow$ SIS command, see chapter 4, "Programmer's Guide". |

For different reset levels, press and hold the button while the switcher is running or press and hold the button while you apply power to the switcher.

## Performing soft system resets (resets 3, 4, and 5)

Perform a soft reset of the switcher as follows:

1. Use an Extron Tweeker or other small screwdriver to press and hold the rear panel Reset button until the rear panel Reset LED and the front panel View and Esc buttons blink once (events reset), twice (system reset), or three times (absolute reset).

2. Release the Reset button and then immediately press and release the Reset button again. Nothing happens if the second momentary press does not occur within 1 second.

## Operation, cont'd

## Performing a hard reset (reset 1)

The hard reset function restores the switcher to the base firmware that it was shipped with. After a hard reset, events do not automatically start, but user settings and files are restored. Perform a hard reset as follows:

NOTE The hard reset restores the factory-installed firmware. The switcher reverts to that factory 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 the Reset button on the rear panel while you apply AC power to the switcher.


The switcher flashes the front panel button indicators green, red, and amber, and then turns them off.


Continue to hold the Reset button until all input and output buttons are either unlit or return to background illumination.


Release the Reset button.


## 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 $S^{3}$ Sales \& Technical Support Hotline if necessary.

## Operation, cont'd

## Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-39 and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio.

NOTE All of the equipment in the following examples is connected through the appropriate fiber optic transmitter or receiver.

## Worksheet example 1: System equipment

Figure 3-5 shows a worksheet for a 48 -input by 32 -output Fiber Matrix in a fictional organization with the system hardware annotated. Inputs $10,11,25,30,35,40$, and 45 through 48 have no connections in this organization, so they have been crossed out on the worksheet. Inputs 49 through 64 do not exist on this model, so they are crossed out. Similarly, outputs $7,14,15,16$, and 33 through 64 are crossed out on the worksheet.

Inputs include PCs, an audio CD player, cameras, and an Extron VTG 300. Output devices include monitors, front and rear projectors, a stereo, and a VCR for recording presentations.

The VTG 450 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. An audio test tape or CD could be used in a similar manner to check the audio components.


Preset \#
Fill in the preset number and use colors, or dashes, etc. to make connecting lines. Indicate if the configuration is for Video, Audio, or both.
Figure 3-5 - Worksheet example 1: System equipment

## Operation, cont'd

## Worksheet example 2: Daily configuration

Figure 3-6 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1 . Solid lines shows video ties and dashed lines show the audio ties.

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 )
- Tied to the VCR (output 6)
- The presenter has a presentation on her laptop computer (input 4) that is:
- Displayed in the main hall (output 2)
- Displayed locally on the podium (output 3)
- The audio from the presenter's microphone (input 3) is:
- Played in the hall (output 1)
- Played in the conference room (output 4)
- Sent to the VCR (output 6)
- Music from the CD player (input 5) is:
- Played in the background in the main hall on sound system \#2 (output 5)
- Played in the lobby (output 8 )


[^0]Figure 3-6 - Worksheet example 2: Daily configuration

## Operation, cont'd

## Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-7 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, 8, $9,10,11$, and 12) and to the various wall boxes. Sound checks are run from the CD player (input 5) to all audio systems (outputs $1,2,3,4,5$, and 8 ).

Preset \# ___ Title:___
Figure 3-7 — Worksheet example 3: Test configuration

## Operation, cont'd


Preset \# $\quad$ Fill in the preset number and use colors, or dashes, etc to make connecting lines. Indicate if the configuration is for Video, Audio, or both
Blank configuration worksheet

## Operation, cont'd

Fiber Matrix 6400 Switcher

# Chapter Four 

## Programmer's Guide

Serial Ports
Ethernet Port
Host-to-Switcher Instructions
Switcher-Initiated Messages
Switcher Error Responses
Using the Command/Response Tables
Command/Response Table for SIS Commands Command/Response Table for IP-Specific SIS Commands

## Programmer's Guide

## Serial Ports

The switcher has two serial ports that can be connected to a host device such as a computer running the HyperTerminal utility, an RS-232 capable PDA, or a control system. These ports make serial control of the switcher possible. The serial ports are:

- The rear panel Remote (RS-232 or RS-422) port, a 9-pin D female connector
- The front panel Configuration (RS-232) port, a 2.5 mm mini stereo jack

The default protocol for both ports is as follows:

- 9600 baud
- no parity
- 8 data bits
- 1 stop bit
- no flow control

The ports can be configured to operate at the $9600,19200,38400$, or 115200 baud rate.

NOTE These two ports are independent of one another. A front panel Configuration port connection and a rear panel Remote port connection can both be active at the same time.

NOTE The switcher can operate at 9600, 19200, 38400, or 115200 baud rates, but Extron recommends leaving these ports at 9600 baud only.

Rear panel Remote port


Remote connector pin assignments

## Front panel Configuration port

NOTE This port is hardwired for RS-232 only.
NOTE This port is independent of the rear panel Remote port and is not affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed via an SIS command only. See the Command/Response table for IP-Specific SIS commands, later in this chapter, to configure both ports using an SIS command.
The optional 9-pin D to 2.5 mm mini jack TRS RS-232 cable, part \#70-335-01 can be used for connection to the Configuration port.


Optional 9-pin TRS RS-232 cable

## Ethernet (LAN) Port

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. Communications between the switcher and the controlling device is via telnet (a TCP socket using port 23). The TCP port can be changed if necessary, via SIS. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN. The SIS commands and the actions of the switcher are identical to the commands and actions the switcher has when communicating with it via RS-232.

## 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 4-1).

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


Figure 4-1 - RJ-45 Ethernet connector pin assignments

## Default IP addresses

To access the Fiber Matrix switcher via the LAN 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, you can determine the actual numeric IP address 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 - DHCP: off


## Establishing a connection

Establish a network connection to a Fiber Matrix switcher as follows:

1. Open a TCP socket to port 23 using the switcher's IP address.

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.

The switcher responds with a copyright message including the date, the name of the product, firmware version, part number, and the current date/time.
NOTE If the switcher is not password-protected, the device is ready to accept SIS commands immediately after it sends the copyright message.

NOTE If the switcher is password-protected, a password prompt appears below the copyright message.
2. If the switcher is password protected, enter the appropriate administrator or user password.
If the password is accepted, the switcher responds with Login User or Login Administrator.
If the password is not accepted, the Password prompt reappears.

## Connection Timeouts

The Ethernet link times out after a designated period of time of no communications. By default, this timeout value is set to 5 minutes but the value can be changed. See the Configure port timout SIS commands on page 4-19.

NOTE Extron recommends leaving the default timeout at 5 minutes and periodically issuing the Query (Q) command to keep the connection active. If there are long idle periods, Extron recommends disconnecting the socket and reopening the connection when another command must be sent.

## Number of connections

A Fiber Matrix switcher can have up to 200 simultaneous TCP connections, including all HTTP sockets and telnet connections. When the connection limit is reached, the switcher accepts no new connections until some have been closed. No error message or indication is given that the connection limit has been reached. To maximize performance of an IP Link device, the number of connections should stay low and unnecessary open sockets should be closed.

## Using Verbose Mode

Telnet connections to a Fiber Matrix switcher can be used to monitor for changes that occur on the switcher, such as front panel operations and SIS commands from other telnet sockets or a serial port. For a telnet session to receive change notices from the switcher, the telnet session must be in verbose mode 3. See the Verbose Mode SIS command on page 4-19. In verbose mode 3, the telnet socket reports changes in messages that resemble SIS command responses.

## Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through either serial port and the LAN port. 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 $(C R / L F=\longleftarrow)$, 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).
(c) Copyright 2007, Extron Electronics, Fiber Matrix 6400, V $x . x x, 60-878-01$ \{day, date, time $]$

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

NOTE \{Day, date, time\} are only reported if the connection is via the LAN port.
ןPassword:
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. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

```
_Login Administrator_\
_LLogin 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_1

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

## Sprnne_

The switcher initiates the Spr message when a memory preset has been saved from the front panel. $n n$ is the preset number.

## Rprnn-

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel. $n n$ is the preset number.

## Vmtnn $x_{4}$ -

The switcher initiates the Vmt message when a channel output mute is toggled on or off from the front panel. $n n$ is the output number and $x$ is the mute status: $1=$ on, $0=$ off.

## Exen«-

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 switcher 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
E12 - Invalid output number (too large)
E13 - Invalid value (out of range)
E14 - Illegal command for this configuration
E17 - Timeout (caused only by direct write of global presets)
E21 - Invalid room number
E24 - Privilege violation (Ethernet, Extron software only)

## Using the Command/Response Tables

The command/response tables begin on page 4-9. Lower-case letters are acceptable in the command field except where indicated for the gain and attenuation commands. 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 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| spaee 20 | ! 21 | 22 | \# 23 | \$ 24 | \% 25 | \& 26 | 27 |
| ( 28 | ) 29 | 2 A | $+2 B$ | 2 C | 2D | 2 E | / 2F |
| $\emptyset 30$ | 131 | 232 | 333 | 434 | $5 \quad 35$ | 636 | $7 \quad 37$ |
| 838 | $9 \quad 39$ | 3A | 3B | < 3C | 3D | > 3E | ? 3F |
| @ 40 | A 41 | B 42 | C 43 | D 44 | E 45 | F 46 | G 47 |
| H 48 | 49 | J 4A | K 4B | L 4C | M 4D | N 4E | O 4F |
| P 50 | 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 |
| 60 | a 61 | b 62 | C 63 | d 64 | e 65 | 66 | g 67 |
| h 68 | 69 | j 6A | k 6B | 6C | m 6D | n 6E | - 6F |
| p 70 | q 71 | r 72 | s 73 | t 74 | u 75 | v 76 | w 77 |
| ¢ 78 | y 79 | z 7A | \{ 7B | 7C | \} 7D | ~ 7E | Del7F |

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

## Programmer＇s Guide，cont＇d

## Symbol definitions

$\longleftarrow=C R / L F$（carriage return／line feed）（hex 0D 0A）
$\leftarrow=$ Carriage return（no line feed，hex 0D）
－＝Space character
Esc＝Escape key（hex 1B））
X1＝Input number
01－64
X2＝Input number（for tie）
00－64（00＝untied）
区3 $=$ Output number
01－64
X4 $=$ Mute
$0=$ not muted， $1=$ muted
区5＝Output re－clocking rate
$00=$ auto（default）
$01=$ bypass
区6＝Group \＃（for I／O grouping）
1 through 4 groups（ $0=$ no group）
区7 $=$ Global preset\＃
$00-64$ maximum（ $0=$ current configuration）
X8＝Room \＃（for room presets）
10 max．（each can have up to 10 presets（ $\mathbf{\boxed { } 9}$ ）assigned）
NOTE A Room is a subset of operator－selected outputs that relate to each other．The Fiber Matrix switcher supports up to 10 rooms，each of which can consist of from 1 to 16 outputs．
区9＝Room preset \＃ 10 maximum（ $0=$ current configuration for 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．
X10＝Name
12 characters maximum for input names，output names，global preset
names，and room preset names
11 characters maximum for room names
Upper－and lower－case alphanumeric characters and
＿／and spaces are valid．
NOTE The following characters are invalid in the name：\｛space\} ~, @ = ' $[ \}\}<>$＇＂；：। \and ？
X11 $=$ Connection status
$0=$ no input connected
1 ＝input connected
X12 $=$ Output rate：
nпnn $=$ actual rate（in MHz）
$0000=$ no connection or rate mismatch
－－－－＝bypass mode
X13＝Lock mode，power supply
$0=$ unlocked $/$ not OK
1 ＝locked／OK
X14 $=$ Number（quantity）of inputs
$8,16,24,32,40,48,56$ ，or 64
X15 $=$ Number（quantity）of outputs
$8,16,24,32,40,48,56$ ，or 64
X16 $=$ Board installed
$0=$ No board installed
$1=8 \times 8$ multimode board
$2=8 \times 8$ singlemode board
3 ＝SDI／HD－SDI board
$x=$ Unknown board or mix of transceivers installed
X17＝I／O board slot number
1－8
X18＝Fiber optic transceiver module installed

X19＝Part number
$0=$ No module installed
1 ＝Multimode module
2 ＝Singlemode module
3 ＝SDI－HD－SDI board（all I／Os on board）

X20＝Firmware version number to second decimal place（ $x . x x$ ）
X21＝Verbose firmware version－description－upload date／time．
See the Query firmware version（verbose）command on page 4－16．

X22 $=$ Voltage
Positive or negative voltage and magnitude
X23 $=$ Temperature
X24＝Fan speed（in RPM）

Command／response table for SIS ${ }^{\text {TM }}$ commands

| Command | ASCII command （host to switcher） | Response （switcher to host） | Additional description |
| :---: | :---: | :---: | :---: |
| NOTE • Commands can be entered back－to－back in a string，with no spaces．For example： $1^{*} 1!02^{*} 02 \mathcal{E} 003^{*} 003 \% 4^{*} 8 \$$ ． <br> －The quick multiple tie and tie input to all output commands activate all I／O switches simultaneously． <br> －The matrix switchers support $1-, 2-$ ，and 3 －digit numeric entries（ $1^{*} 1,02^{*} 02$ ，or $001^{*} 001$ ）． <br> －The ！tie command，\＆tie command，and \％tie command can be used interchangeably． <br> －The ！tie all command，\＆tie all command，and $\%$ tie all command can be used interchangeably． |  |  |  |
| Tie input 区2 to output 区3 Example： | $\begin{aligned} & \boxed{\times 2 *} \times \times 3! \\ & 1 * 3! \end{aligned}$ | Out $\times 3 \cdot \operatorname{In}$ 区2 $\bullet$ All Out03•In01•All ${ }^{-}$ | Tie input 区2 to output 区3． <br> Tie input 1 to output 3 ． |
| Tie input X2 to output 区3 Example（see Note，above）： | $\begin{aligned} & \text { X2 } 2 \times \times 3 \mid \& \\ & 10 * 4 \& \end{aligned}$ |  | Tie input 10 to output 4. |
| Tie input X2 to output X3 <br> Example（see Note，above）： | $\begin{aligned} & \text { X2**区3\% } \\ & 7 * 5 \% \end{aligned}$ |  | Tie input 7 to output 5. |
| Quick multiple tie Example： |  <br> Esc + Q3＊ $4!3 * 5 \% 3^{*} 6!\leftarrow$ | $\begin{aligned} & \text { Qik } \\ & \text { Qik } \end{aligned}$ | Tie input 3 to output 4， tie input 3 to output 5 ，and tie input 3 to output 6 ． |
| Tie input to all outputs Example： | $\begin{aligned} & X 2 *! \\ & 5 *! \\ & \hline \end{aligned}$ |  | Tie input 5 to all outputs． |
| Tie input to all outputs <br> Example（see Note，above）： | X2＊\＆ <br> 8＊\＆ | In X2•RGB In $08 \cdot{ }^{\circ}$ RGB - | Tie input 8 to all outputs． |
| Tie input to all outputs <br> Example（see Note，above）： | $\begin{aligned} & \text { X2*\% } \\ & 10 * \% \end{aligned}$ | $\begin{aligned} & \text { In } \times 2 \bullet^{\bullet} \operatorname{Vid}-1 \\ & \text { In } 10^{\bullet} \operatorname{Vid} \longleftarrow- \end{aligned}$ | Tie input 10 to all outputs． |
| Read ties <br> NOTE The ！read tie command and \＆read tie command for RGB and the \％read tie command for video can be used interchangeably． |  |  |  |
| Read RGB output tie | 区3！ | X2 | Input X2 is tied to output X3． |
| Read RGB output tie | X3\＆ | X2］ | Input $\times 2$ is tied to output $\times 3$ ． |
| Read video output tie | 区3\％ | 区2］ | Input 区2 is tied to output $\times 3$ ． |
| Channel mute commands |  |  |  |
| Channel mute | 区3＊${ }^{1}$ B | Vmt 4 区3＊1 | Mute output X3 （no signal is output，but the light output remains active）． |
| Channel unmute | Х3＊＊ 0 B | Vmt $\triangle$ ¢ ${ }^{*} 0$－ | Unmute output X3 （signal is output）． |
| Read channel mute | 区3 ${ }^{\text {B }}$ | X4－ | 1 ＝mute on， $0=$ mute off． |
| Global channel mute | 1＊B | Vmt1 | Mute all output channels． |
| Global channel unmute | $0^{*} \mathrm{~B}$ | Vmt0 | Unmute all output channels． |

NOTE

[^1]\[

$$
\begin{aligned}
& 00-64(00=\text { untied }) \\
& 01-64 \\
& 0=\text { off (unmuted) } \\
& 1=\text { on (muted) }
\end{aligned}
$$
\]

## Programmer's Guide, cont'd

Command/response table for SIS commands (continued)


## NOTE

$\boxed{\times 3}=$ Output number
$\times 5=$ Output re-clocking rate
X6 = Group \# (for I/O grouping)

01-64
$00=$ auto (default)
$01=$ bypass
1 through 4 groups ( $0=$ no group )

## Command/response table for SIS commands (continued)



NOTE
X7 = Global preset \#
X8 = Room \# (for room presets)
x9 = Room preset \#
X2 $=$ Input number
X3 $=$ Output number
$00-32$ ( $00=$ current configuration)
10 max. (Each can have up to 10 presets ( 区9) assigned.)
$00-10$ ( $00=$ current configuration for room)
$00-64(00=$ untied $)$
01-64

## Programmer's Guide, cont'd

Command/response table for SIS commands (continued)

| Command | ASCII command (host to switcher) | Response (switcher to host) | Additional description |
| :---: | :---: | :---: | :---: |
| Save, recall, and directly write presets (continued) |  |  |  |
| Read room outputs Example: | $\begin{aligned} & \text { Esc\|X8 } \mathrm{MR} \leftarrow \\ & \text { Esc } 3 \mathrm{MR} \leftarrow \end{aligned}$ |  <br> Class 1,01,02,08,09 لـ | Outputs $1,2,8$ and 9 are assigned to room 3 , which named "Class 1". |
| Recall room preset | 区8** $\times$ 9. | $\mathrm{Rmm} \times 8{ }^{\bullet} \mathrm{Rpr}$ 区9 | Command character is a period. |
| Directly write a room preset <br> Example: |  $\text { Esc }+7 * 3 P 12 * 7 \& 11 * 5 \& 4^{*}$ |  <br> $\operatorname{Rmm} \times 8{ }^{\bullet}$ Spr $\mathbf{x} 9$ - <br> $\mathrm{Rmm}^{2}{ }^{\bullet} \mathrm{Spr03}-$ | Enter as many ties as are valid for this configuration. The ! tie command, \& tie, and \% tie commands are all valid and equivalent. <br> Brackets are shown to separate ties for clarity only. Create preset 3 for room 7, which ties input 12 to output 7 , input 11 to output 5, input 4 to output 5, and input 6 to output 6 . |
| View ties, mutes, and presets |  |  |  |
| View output tie | X3 \& | X2 |  |
| Example: |  | 27- | Input 27 is tied to output 15. |
| View output tie Example: | $\frac{\times 3 \%}{70}$ | X2] <br> 024 | Input 2 is tied to output 7 . |
| View output mutes | Escl $\mathrm{VM} \leftarrow$ | X4 ${ }^{1}$, \44 ${ }^{2}, \ldots$ X4 ${ }^{n}$ | Each X4 response is the mute status of an output, starting from output $1 . n$ is the highest-numbered output. |

X8 = Room \# (for room presets)
X10 = Name
X3 $=$ Output number
X9 = Room preset \#
X2 $=$ Input number
X4 $=$ Mute

10 max. (Each can have up to 10 presets (X9) assigned.)
12 characters maximum for input and output names
01-64
$00-10$ (00 = current configuration for room)
$00-64$ ( $00=$ untied)
$0=$ not muted, $1=$ muted

## Command/response table for SIS commands (continued)



NOTE
X7 = Global preset \#
X3 $=$ Output number
X2 $=$ Input number
X8 = Room \# (for room presets)
区9 = Room preset \#
X11 = Connection status
X12 = Output rate:
$00-32$ ( $00=$ current configuration)
01-64
$00-64$ (00 = untied)
10 max. (Each can have up to 10 presets ( $\mathbf{X} 9 \mathrm{~s}$ ) assigned.)
$00-10$ ( $00=$ current configuration for room)
$0=$ no input connected
1 = input connected
пппп $=$ actual rate (in megabits per second)
$0000=$ no connection or rate mismatch
-- - = bypass mode

Programmer＇s Guide，cont＇d

Command／response table for SIS commands（continued）

| Command | ASCII command （host to switcher） | Response （switcher to host） | Additional description |
| :---: | :---: | :---: | :---: |
| Names |  |  |  |
| Write global preset name Example： | Esc｜X7，区10 NG $\leftarrow$ <br> Escl1，Security 1NG $\leftarrow$ | Nmg 区7，区 $\times 10$－ <br> Nmg01，Security 1 $\downarrow$ | Name global preset 1 ＂Security 1＂． |
| Read global preset name Example： | Esc｜X7］NG $\leftarrow$ Esc $2 N G \leftarrow$ | X10 <br> Security 2 - | Global preset 2 is named ＂Security 2＂． |
| Write room name Example： | Esc X8，X10 NR $\leftarrow$ <br> Escl1，Classrm 1NR $\leftarrow$ | $\mathrm{Nmr} \times 8, \times 10$－ <br> Nmr01，Classrm 1 $\downarrow$ | Name room 1 ＂Classrm 1＂． |
| Read room name | Esc｜X8 ${ }^{\text {NR }} \leftarrow$ | $\times 10$ |  |
| Write room preset name Example： | Esc｜ $\mathbf{x 8} * \times 9, \boxed{\times 10} \mathrm{NP} \leftarrow$ <br> Escl $1 * 3$ ，Podium＿DVDNP $\leftarrow$ | $\mathrm{Nmp} \times 8 \times \times 9, \boxed{\times 10}$ <br> Nmp01＊3，Podium＿DVD | Name room1，preset 3 ＂Podium＿DVD＂． |
| Read room preset name <br> NOTE－Do not use le <br> －If a preset is u <br> －If a global pres <br> －If a room prest | Esc｜X8，X9 $\mathrm{NP} \leftarrow$ <br> $g$ spaces in preset names． signed，the $\mathbf{X 1 0}$ displays［unassig is saved，but not yet named，the def saved，but not yet named，the defa | X10 <br> d］． <br> It name is Preset $\mathbf{~} 7$ ． <br> Iname is $\mathrm{Rm} \times 8$ Prs $\times 9$ ． |  |
| Write input name Example： | Esc $\mathbf{X 1}, \boxed{\times 10} \mathrm{NI} \leftarrow$ <br> Esc 1，Podium camNI $\leftarrow$ | Nm ，区1，，区10 <br> Nmi01，Podium cam $\downarrow$ | Name input 1 ＂Podium cam＂． |
| Read input name | Esc｜$\times 1 \mathrm{NI}$ | －10 |  |
| Write output name Example： | Esc $\times 3$ ，区10 $\mathrm{NO} \leftarrow$ <br> Esc 1，Main PJ1NO $\leftarrow$ | $\mathrm{Nmo} \mathrm{X3}, \mathrm{X10}$ ， <br> Nmo01，Main PJ1 ـ | Name output 1 ＂Main PJ1＂． |
| Read output name | Esc］X3］ $\mathrm{NO} \leftarrow$ | －10 |  |
| Front panel lockout（Executive mode） |  |  |  |
| Lock front panel | 1X | Exe1－ | Enable executive mode． |
| Unlock front panel | 0X | Exe0 ${ }^{\text {－}}$ | Disable executive mode． |
| View lock status | X | －13 |  |

NOTE


[^2]
## Command／response table for SIS commands（continued）

| Command | ASCII command （host to switcher） | Response （switcher to host） | Additional description |
| :---: | :---: | :---: | :---: |
| Resets |  |  |  |
| Reset global presets and names | EsçZG $\leftarrow$ | Zpg | Clear all global presets and their names． |
| Reset one global preset | Esc｜$\times 77 \mathrm{ZG} \leftarrow$ | Zpg $\times 7$－ | Clear global preset $\times 7$ ． |
| Reset all mutes | Escl $\mathrm{ZZ} \leftarrow$ | Zpz | Unmute all outputs． |
| Reset room map | Escl $\mathrm{ZR} \leftarrow$ | Zpr ${ }^{\text {－}}$ | Clear all room definitions． |
| Reset individual room | Esc｜ $\mathrm{X8} 8 \mathrm{ZR} \leftarrow$ | Zpr $\times$ 8 | Delete room 区8． |
| Reset individual room preset | Esc｜$\times 8 \times \times \times \mathrm{X} \times \mathrm{ZP} \leftarrow$ | Zpp $\times 8 \times \times$＋ | Clear an individual room preset and name． |
| Reset flash | Escl ZFFF $\leftarrow$ | $\mathrm{Zpf} \downarrow$ | Reset flash memory（erase all user－supplied files）． |
| Reset whole switcher （Mode 5 reset） | Escl $\mathrm{ZXXX} \leftarrow$ | Zpx | Clear all ties and presets． |
| Absolute reset | EsclZQQQ $\leftarrow$ | Zpq | Similar to Reset whole switcher，plus clear the IP address to 192．168．254．254 and subnet mask to 255．255．000．000． |
| Erase user－supplied Web pages／files | Escffilename $\mathrm{EF} \leftarrow$ | Delfilename |  |
| Information requests |  |  |  |
| Information request | I | $V \widehat{x 14} \times \boxed{X 15} \cdot A \boxed{X 14} \times 区$ | 6： X16 $^{2} \ldots$ ．．．$^{\text {X16 }}{ }^{8}$－ <br> V Х14 $X$ Х15 shows the number of available inputs and outputs for this configuration． <br> A X14 $\times 15$ has no meaning for this product． <br> S Х16 Х16 ${ }^{2}$ ．．．Х16 ${ }^{\text {² }}$ shows the board type installed in each slot． |
| Slot／plane／LC information | $0^{*} \times 17$ |  | 18，区18］ |
| Request part number | N | 60－878－01 | See appendix A for part numbers． |
| NOTE There are up to three separate sets of Extron firmware on which the switcher can report：the 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． |  |  |  |
| Query firmware version | Q | －20 |  |
| Example： |  | 1．23 | The factory－installed controller firmware version is 1.23 （sample value only）． |

X7＝Global preset \＃
X8 $=$ Room \＃（for room presets）
X 9 ＝Room preset \＃
$\times 14=$ Number（quatity）of inputs
X15＝Number（quatity）of outputs
X16＝Board installed
$00-32$（ $00=$ current configuration $)$
10 max．（Each can have up to 10 presets（ $\backslash 9 \mathrm{~s}_{\mathrm{s}}$ ）assigned．）
$00-10(00=$ current configuration for room）
$8,16,24,32,40,48,56$ ，or 64
$8,16,24,32,40,48,56$ ，or 64
$0=$ No board installed， $1=8 \times 8$ multimode board，
$2=8 \times 8$ singlemode board， $3=$ SDI／HD－SDI board，
$\mathrm{x}=$ unknown board or mix of transceivers installed
1－8
X17 $=$ I／O board slot number
$0=$ no module installed， $1=$ multimode， $2=$ singlemode
$\begin{array}{lll}\boxed{X 18} & =\text { Fiber optic transceiver module installed } & 0=\text { no mo } \\ X 19 & =\text { Part number } & 68-878-01\end{array}$
X20＝Firmware version number to second decimal place（x．xx）

## Programmer's Guide, cont'd

## Command/response table for SIS commands (continued)



NOTE X20 = Firmware version number to second decimal place (x.xx)
X21 = Verbose firmware version-description-upload date/time.
$\mathbf{X 2 2}=$ Voltage Positive or negative voltage and magnitude
X23 = Temperature
X24 = Fan speed (in RPM)

Degrees Fahrenheit

## Command/Response Table for IP-Specific SIS Commands

## Symbol definitions

| X30 = Matrix name | (Up to 240 alphanumeric characters) |
| :---: | :---: |
|  |  |
| X31 = Default name | Fiber-Matrix-64-+ last 3 pairs of MAC address |
| X32 $=$ Time and date (for set) | In the format: MM/DD/YY $\cdot \mathrm{HH}: \mathrm{MM}: S S$ where: $\mathrm{MM}=$ month: 01 (January) through 12 (December) <br> DD = day: 01 through 31 <br> $\mathrm{YY}=$ year: 00 through 99 <br> HH = hour: 00 through 23 <br> $\mathrm{MM}=$ minutes: 00 through 59 <br> SS = seconds: 00 through 59 |
| X33 $=$ Time and date (for read) | In the format: Day $, \bullet \mathrm{DD} \bullet \mathrm{Mmm} \bullet \mathrm{YYYY} \bullet \mathrm{HH}: \mathrm{MM}: \mathrm{SS}$ where: <br> Day = weekday: Mon through Sun <br> DD = date: 01 through 31 <br> $\mathrm{Mmm}=$ month: Jan through Dec <br> YYYY = year: 2000 through 2099 <br> HH = hour: 00 through 24 <br> $\mathrm{MM}=$ minutes: 00 through 59 <br> SS = seconds: 00 through 59 |
| X34 $=$ GMT offset | -12.0 through +14.0. Hours and minutes removed from GMT |
| X35 = Daylight Saving Time | $\begin{aligned} & 0=\text { Daylight Saving Time off/ignore } \\ & 1=\text { Daylight Saving Time on (northern hemisphere) } \\ & 2=\text { Daylight Saving Time on (Europe) } \\ & 3=\text { Daylight Saving Time on (Brazil) } \end{aligned}$ |
| X36 $=$ IP address | \#\#\#.\#\#\#.\#\#\#.\#\#\# |
| X37 = Hardware (MAC) address | \#\#-\#\#-\#\#-\#\#-\#\#-\#\# |
| X38 $=$ Number of open connections | 0-255 |
| X39 = Password | 12 alphanumeric characters |
| NOTE The following characters are invalid in passwords: $\{$ space $\}+\sim, 0=`[]\{ \}<>{ }^{\prime} \times: \mid \backslash$ and ? |  |
| X40 = Domain name | Standard domain name rules apply (for example: $x x x$.com) |

NOTE The following characters are invalid in a domain name: $\{$ space $\}+\sim,=`[]\{ \}<\rangle^{\prime} ;: \mid \backslash$ and $?$. The @ character is acceptable only as the lead-in to the domain name (such as @extron.com).
X41 $=$ E-mail account
65-72. $65=$ e-mail recipient $1,66=2,67=3, \ldots 72=$ recipient 8
X42 $=$ E-mail address
X43 $=$ Notification selections, part 1
Typical e-mail address format (for example: пnпn@xxx.com)

X44 $=$ Notification selections, part 2
If X43 $=\mathrm{I}$, then
$\mathrm{F}=\mathrm{fans}$
$\mathrm{P}=$ power supply

$$
\text { If } X 43=F \text {, then }
$$

If X43 = P, then
$I=$ inputs $\quad F=$ fans $\quad P=$ power supply

X44 $=00$ (all inputs), or 01 through 64 (input 1 through input 64)
$\mathbf{X 4 4}=00$ (both fans), 01 (fan 1), or 02 (fan 2)
X44 = 00 (both power supplies [PSs]), 01 (primary PS), or 02 (redundant PS)
X45 = Notify when?
$0=$ no response $\quad 1=$ fail $/ \mathrm{missing} \quad 2=$ fixed $/$ restored
$3=$ both $1 \& 2 \quad 4=$ suspend
X46 $=$ DHCP
0 =off, 1 = on
X47 = Port \#
00 (all ports), 01 (rear panel), 02 (front panel), 03 - 99
X48 = Baud rate
9600, 19200, 38400, 115200
X49 = Parity
odd, $\underline{\text { even, }}$ none, $\underline{\text { mark }}$, space (Only the first letter required.)
X50 $=$ Data bits
7, 8
$\times 51=$ Stop bits
1, 2
X52 $=$ Port type
$0=$ RS-232, 1 = RS-422, 2 = RS-485
X53 $=$ Verbose mode
$0=$ clear/none (default for Telnet connection)
$1=$ verbose mode (default for RS-232/RS-422 connection)
$2=$ tagged responses for queries
3 = verbose mode and tagged for queries
NOTE If tagged responses is enabled, all read commands return the constant string and the value as the set command does (for example, the read matrix name command $\operatorname{Esc} C N \leftarrow$, returns Ipn $\bullet \times 30 \checkmark$ ).
$\mathbf{X 5 4}=$ Port timeout interval (in 10-sec. increments) 1 ( $=10$ seconds) -65000 (default is $30=300$ seconds $=5$ minutes)

## Programmer＇s Guide，cont＇d

Command／response table for IP－Specific SIS commands

| Command | ASCII command （host to switcher） | Response （switcher to host） | Additional description |
| :---: | :---: | :---: | :---: |
| IP setup commands |  |  |  |
| Set matrix name | Esco $\times 30 \mathrm{CN} \leftarrow$ | Ipn $\times$＜30 |  |
| Read matrix name | Escl $\mathrm{CN} \leftarrow$ | X30 |  |
| Reset matrix name to factory default | Esce $\cdot \mathrm{CN} \leftarrow$ | Ipn $\times$＜ | ＂Fiber－Matrix－64－＂plus the last 3 pairs of the MAC address． |
| Set time and date | Escl $\times 32 \mathrm{CT} \leftarrow$ | Ipt $\times 32$ |  |
| Read time and date | EsclCT $\leftarrow$ | －33 |  |
| Set GMT offset | Escs $\times 34 \mathrm{CZ} \leftarrow$ | $\mathrm{Ipz} \times 34$ | In the command，the divider between hours and minutes can be either a colon or a period．In the response，the divider is a colon． |
| Example： | Escl $8.0 \mathrm{CZ} \leftarrow$ | Ipz＋08：00 |  |
| Set Daylight Saving Time | Esc［ $\times 35$ ］ $\mathrm{CX} \leftarrow$ | － 35 － |  |
| Read Daylight Saving Time | EsclCX $\leftarrow$ | X35－1 |  |
| Set IP address | Esc）$\times 36 \mathrm{Cl} \leftarrow$ | Ip；$\times$ 36 |  |
| Read IP address | Escl $\mathrm{CI} \leftarrow$ | －36 |  |
| Read hardware address | Escc $\mathrm{CH} \leftarrow$ | X37 |  |
| Read \＃of open connections | Esc］CC $\leftarrow$ | －384 |  |
| Set subnet mask | Esc｜$\times 36] \mathrm{CS} \leftarrow$ | Ips $\times 36$ |  |
| Read subnet mask | EsclCS $\leftarrow$ | －36 |  |
| Set gateway IP address | Esc｜$\times 36$ CG $\leftarrow$ | Ipg $\times 36$ |  |
| Read gateway IP address | Escl CG $\leftarrow$ | X36 |  |
| Set administrator password | Esc $\times$ X39 $\mathrm{CA} \leftarrow$ | Ipa－＜$\times$－ |  |
| Read administrator password | Esc］ $\mathrm{CA} \leftarrow$ | －$\times 1$ |  |
| Reset（clear）administrator password | Esc $\cdot \mathrm{CA} \leftarrow$ | $\mathrm{Ipa} \cdot ⿶$ |  |
| Set user password | Esc｜X39］CU $\leftarrow$ | Ipu ${ }^{\times 39}$ |  |
| Read user password | Escl CU $\leftarrow$ | －39 |  |
| Reset（clear）user password | Esc］$\cdot \mathrm{CU} \leftarrow$ | $\mathrm{Ipu}{ }^{\bullet}$ |  |
| Set mail server，domain name | Esc｜ 36 ，区40，区39 $\mathrm{CM} \leftarrow$ | Ipm $\times 36, \times 40, \times 39$ |  |
| Read mail server，domain name | Escl $\mathrm{CM} \leftarrow$ | \36，X40，X39］ |  |
| Set e－mail recipient | Esc］X41，\42］ $\mathrm{CR} \leftarrow$ | $\mathrm{Ipr} \times 41, \times 42$, ， | This command sets the recipient．To receive e－mail notifications，you must then set the events that the switcher reports， using one or more separate Set e－mail events（EM） commands（see next page）． |
| Example： | Esc］72，Jsmith＠folklore．netCR $\leftarrow$ |  |  |
|  |  | Ipr72，Jsmith＠folklore |  |
| Read e－mail recipient | Esc \ X41 $C R \leftarrow$ | X42，－－ |  |

## Command/response table for IP-Specific SIS commands (continued)



## Special Characters

The HTML language reserves certain characters for specific functions. The switcher does 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 are ok for names) $\}+\sim$, @ =' [ ] \{ \} < > '" semicolon (;) colon (:) | \ and?.

## Programmer's Guide, cont'd

Fiber Matrix 6400 Switcher

# Chapter Five 

# Matrix Software 

Matrix Switchers Control Program
Button Label Generator Program

## Matrix Software

## Matrix Switchers Control Program

The Windows-based Extron Matrix Switchers Control Program communicates with the switcher via the Ethernet LAN port or either serial port to provide an easy way to set up ties and sets of ties. The program is compatible with Windows 2000 and Windows XP. Updates to these programs can be downloaded from the Extron Web site (www.extron.com).

## Installing the software

The program is contained on the Extron Software Products CD-ROM. Install the software as follows:

NOTE For full functionality, install both of the following programs:

- The Matrix Switchers Control Program
- The Firmware Loader

1. Insert the CD-ROM into the drive. The installation program should start automatically. If it does not self-start, run Launch.exe from the CD.
The Extron software CD window appears (figure 5-1).


Figure 5-1 - Software CD window
2. Click the Software tab (figure 5-1).
3. Scroll to the desired program and click Install (figure 5-2).
• Matrix Switchers
RS-232 Windows
Control Program.
CRelease Notes
Figure 5-2 - Software installation
4. Follow the on-screen instructions. By default, the installation of the Matrix Switchers Control Program creates a C: \Program Files \Extron\Matrix_ Switchers directory, and it places the following four icons into a group folder named "Extron Electronics $\backslash$ Matrix Switchers":

- MATRIX Switcher+ Control Program
- MATRIX Switcher+ Help
- Check for Matrix Updates
- Uninstall MATRIX Switcher

NOTE Besides the LAN port, the Fiber Matrix switcher can support remote control via either the rear panel Remote RS-232/RS-422 Remote port or the front panel Configuration port.

Remote RS-232/RS-422 port — The port can be configured for either the RS-232 or RS-422 serial communication protocol and operate at the 9600, 19200, 38400, or 115200 baud rate.

Configuration port - The port supports RS-232 serial communication protocol only. The port can operate at the 9600, 19200, 38400, or 115200 baud rate, but Extron recommends leaving this port at the 9600 baud rate.
See the Serial port parameters commands on page 4-19 to configure either port using an SIS command.

## Software operation via Ethernet

When a matrix switcher is connected to an Ethernet WAN or LAN, up to 200 users can operate it, locally or remotely, using the Matrix Switchers Control Program. See "Ethernet connection" in chapter 2, "Installation", for installation details.

Connection to the switcher via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all 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 log on with administrator privileges. Fields and functions that exceed user privileges are not selectable in the Matrix Switchers Control Program when the operator is logged on as a user.
The IP Settings/Options window (figure 5-7 on page 5-8) provides a location for viewing and, if connected via the RS-232 link or if 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 Matrix Switcher Control software

Many items found in the Matrix Switchers Control Program are also accessible via front panel controls (see chapter 3, "Operation") and under SIS control (see chapter 4, "Programmer's Guide"). The Matrix Switcher Help Program provides information on settings and on how to use the control program, itself.

1. To run the Matrix Switchers Control Program, click Start > Programs > Extron Electronics > Matrix Switchers > MATRIX Switcher + Control Pgm.

The Comm Port Selection window (figure 5-3) appears.

MTRX<br>진․․<br>MATRIX Switcher+ Control Pgm



Figure 5-3 - Comm port selection window
2. Choose either the comm port that is connected to one of the switcher's serial ports, 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 on the Baud button and double-click on the desired baud rate.


Available rates are 9600, 19200, 38400 , and 115200. The default is 9600 .

Click 0K. The Extron Matrix Switchers Control Program window (figure 5-5 and figure 5-6) appears, displaying the current configuration of the attached matrix. Proceed to step 4.

- If you selected IP [LAN], click OK and proceed to step 3.
- If you selected Emulate, click OK and see "Using emulation mode" on page 5-24.

3. If you selected IP [LAN] in step 2, the IP Connection window appears (figure 5-4).


Figure 5-4 — Address and password entry
a. Examine the Matrix 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 $(\bullet)$ and select from among the recently used addresses. Proceed to step 3b.
NOTE If the local system administrators have not changed the value, the factoryspecified default, 192.168.254.254, is the correct value for this field.
b. If the switcher is password protected, click in the Password field and enter the enter the appropriate administrator or user password.
c. Click Connect.

If you logged on using the administrator password, the program connects you to the matrix switcher with all of the administrator rights and privileges. The Extron Matrix Switchers Control Program window (figure 5-5 and figure 5-6) appears, displaying the current configuration of the attached matrix. Proceed to step 4.

If you logged on using the user password, the program connects you to the matrix switcher with only user capabilities.
If an incorrect password was entered, the program beeps and returns to the password entry display.


Figure 5-5 - Extron Matrix Switchers Control Program window (blank)


Figure 5-6 - Sample program window (complete)
4. - To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.

- To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.
- For quick display of information on a specific input or output device, position the pointer tool over that device in the control program window. The program opens a window that details the connections to that device and the status of the optical link (present or missing) input from or output to that device. See the inset box in figure 5-6.

[^3]
## IP Settings/Options window

The IP Settings/Options window (figure 5-7), accessible via the Tools menu, provides a location for viewing and, if connected via either serial port or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See appendix A, "Ethernet Connection", for basic information about IP addresses. None of the fields on this screen can be edited while you are logged on as a user.


Figure 5-7 — Control program IP Setting/Options window
NOTE Editing variables in the IP Settings/Options window while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using the RS-232 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 switcher via the RS-232 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.

## Matrix IP Address field

The Matrix IP Address field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.
Standard IP protocol consists of addresses comprised of four 1-, 2-, or 3-digit numeric subfields, properly called octets, 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.
NOTE The Matrix IP Address field is grayed out and uneditable when DHCP is selected.

NOTE Editing the Extron IP address while connected via the Ethernet port can immediately disconnect the user from the matrix switcher. Extron recommends editing this field using the RS-232/RS-422 link and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.
Edit this field as follows:

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

## Extron Name/Descriptor field

The Extron Name/Descriptor field contains the name used as the "from" information when the matrix switcher e-mails notification of its failed or repaired status. This descriptor can be changed to any valid name, up to 24 alphanumeric characters.

NOTE The following characters are invalid in the Extron Name/Descriptor field: \{space\} $+\sim$, @ =' [ ] \{ \} < > '" ; : | \and ?
Edit this field as follows:

1. Click in the Extron Name/Descriptor field. The pointer tool 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 on the Take button to make the name change take effect.

## Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the matrix switcher and the mail server are not on the same subnet. Standard IP protocol rules apply to the Gateway IP address.
Edit this field as follows:

1. Click in the Gateway IP Address field. The pointer tool becomes a text cursor.
2. Edit the address as desired.
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.

## Subnet Mask field

The Subnet Mask field is used to determine whether the matrix switcher is on the same subnet as the controlling PC or the mail server when you are subnetting. 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 pointer tool becomes a text cursor.
2. Edit the mask as desired.
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 mask take effect.

## Hardware Address field

The hardware (MAC) address is hardcoded in the matrix switcher and cannot be changed.

## Use DHCP checkbox

The Use DHCP checkbox directs the matrix 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). Contact the local system administrator to determine whether to use DHCP.

## Date field

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

1. Click in the Date field. A Set Date field appears with

Date: $1 / 28 / 2007$ the date in the format (M)M/(D)D/YYYY. Leading zeroes are not used. The pointer tool becomes a text cursor in the Set Date field.
2. Edit the field as desired to set the proper date. Leading zeroes 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.

## Time (local) field

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

1. Click in the Time field. A Set Time field
 appears with the date in the format HH:MM:SS (00:00:00 to 23:59:59). The pointer tool becomes a text cursor.
2. Edit the field as desired to set the proper time. Remember to use 24-hour time. Leading zeroes are optional.
3. Press the Tab key on the keyboard 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.

## GMT (offset) field

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. A GMT Offset field appears with the offset in the format $\pm \mathrm{HH}: \mathrm{MM}(-12: 00$ to $+14: 00)$. The pointer tool GMT | $-8: 00$ |
| :---: | becomes a text cursor.
2. Edit the field as desired to set the proper offset. Leading zeroes are optional. Some time zones are on the half-hour ( 30 minutes).
3. Press the Tab key on the keyboard or click in another field to exit the GMT Offset field.
4. Click the Take button to make the offset change take effect.

## Use Daylight Savings checkbox

Click in the Use Daylight Savings checkbox. When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.

## Administrator Password and User Password fields

The Administrator Password field displays the password required to $\log$ on to the matrix switcher via the Ethernet port with all of the administrator's rights and privileges. The User Password field displays the password required to $\log$ on to the matrix switcher via the Ethernet port as a user, without all of the administrator's rights and privileges. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

While you are logged on as a user, both password fields are masked with asterisks (************) as a security measure.
NOTE Editing the Administrator Password field while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing this field using either serial port and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.
NOTE An administrator password must be created before a user password can be created.

NOTE The following characters are invalid in passwords: \{space\} $+\sim$, @ =' [ ] \{ \} < > '" ; : | \and ?
Edit either password field as follows:

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

## Mail Server IP Address field

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 matrix switcher is installed. Standard IP protocol rules apply to the Mail Server IP address.
Edit this field as follows:

1. Click in the mail server IP address field. The pointer tool becomes a text cursor.
2. Edit the IP address as desired.
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.

## Mail Server Domain Name field

The Mail Server Domain Name field displays the domain name that the matrix switcher uses to log on to the e-mail server. Standard domain conventions (such as $x x x$.com) apply.
NOTE The following characters are invalid in a domain name:
\{space\} $+\sim$, =' [ ] \{ \}<>'" ; : | \and ?. The @ character is only acceptable 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 pointer tool 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.

## E-mail Addressee fields

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

```
Miles Standish
From: Fiber-Matrix-64-FF-FF-09@folklore.net
Sent: Wednesday, December 19, 2007 11:22 AM
To:
Subject: Fiber-Matrix-64-FF-FF-09 - Fan #1 is now running
Wed, 19 Dec 2007 11:21:48
Unit Name = Fiber-Matrix-64-FF-FF-09
Unit IP Address = 192-168-254-254
```

The radio buttons and check boxes associated with each address field permit the administrator to specify e-mail requirements for each recipient.
Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The pointer tool becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions apply (for example: nnnnn@xxx.com).
3. Press the Tab key on the keyboard or click in another field to exit the e-mail addressee field.
4. In the square check boxes associated with each addressee, select the options about which the addressee is to be e-mailed: missing input(s), fans, and /or power supply. In the floating box that contains the input numbers, select the inputs to be monitored.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of 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 on travel or vacation.
6. If desired, click on the Send test E-mail button to test the e-mail function.
7. Click on the Take button to make the e-mail address changes take effect.

## Matrix Software, cont'd

## Updating firmware

The firmware upgrade utility provides a way to replace the firmware that is coded on the switcher's control board without taking the switcher out of service.

Update the switcher firmware as follows:

1. Visit the Extron Web site, www.extron.com, click the Download tab, and then click the Firmware link (figure 5-8).


128/1212/168/1616 VGA A CP300

84/88/816/124/128/1212/168/1616 series and MVX
$28 / 1212 / 168 / 1616$ VGA A
K Release Notes

Download Center
Download CP300_FW1x04.exe
Please provide the following information.
Title: Planter
* E-mail: Jsmith@folklore.net
(3)


Figure 5-9 - Downloading firmware upgrade files
7. Connect a Windows-based computer to either switcher serial port or the switcher LAN port. See chapter 2, "Installation", for more details.
8. Start the Matrix Switchers Control Program and connect to the matrix switcher. See "Using the Matrix Switcher Control software" in this chapter, steps 1 through 4, starting on page 5-4.
9. Click Tools $>$ Update firmware.

If you are connected via the LAN port, the Select Files window appears (figure 5-10). See "Ethernet-connected firmware upload", below.

If you are connected via either serial port, the Extron Firmware Loader appears (figure 5-11). See "Serial-port-connected firmware upload", on the next page.

## Ethernet-connected firmware upload



Figure 5-10 - Select files window
10. Navigate to the folder where you saved the firmware upgrade file. Select the file.

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 Fiber Matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.
11. Click the Open button. The software advises you that you are about to reprogram the switcher's firmware. Click OK to continue.
A status window, which shows the progress of the upload, appears. The firmware upload to the Fiber Matrix switcher may take a few minutes.

## Serial-port-connected firmware upload



Figure 5-11 - Firmware loading
10. Click Browse. The open file window appears.
11. Navigate to the folder where you saved the firmware upgrade file. Select the file and click Open. The Firmware Loader window returns to the top.

NOTE Valid firmware files must have the file extension ".S19". Any other file extension is not a firmware upgrade for your matrix switcher.
12. Click Upload. The File Loader advises you that using the Ethernet (LAN) port is preferred over using either serial port (figure 5-12).
To quit the firmware upload and start over using the LAN port, click the Cancel button and return to step 3. Use the LAN port connection in step 3.
To continue the firmware upload using either serial port connection, click the OK button. The program prompts you to identify the serial port to which you are connected. Continue to step 13.


Figure 5-12 - Confirm window
13. If necessary, change the port number in the device port field:

- Rear panel RS-232/RS-422 port, enter 1.
- Front panel Configuration port, enter 2.

Click the $\mathbf{0 K}$ button. The Firmware Loader reports, "This process could take several minutes. Please wait...", then displays a status bar that shows the progress of the upload. When the upload is complete, the Firmware Loader reports "Unit resetting, this can take some time, please wait. ...", and then "Transfer complete!".
NOTE Firmware upgrades using either serial port can take several minutes.
14. When the Firmware Loader reports, "Transfer complete!", click the Exit button on the Firmware Loader and then again on the port configuration window. The Firmware Loader and the Matrix Switchers Control Program close.

## Uploading HTML files

You can create customized HTML pages for the switcher to display. The HTML Files List window (figure 5-13), accessible via the Tools menu, provides a way to view the contents of the switcher's file system and 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 "Updating firmware" in this chapter to replace the firmware.
NOTE The following characters are invalid in file names: \{space $\}+\sim$, @ = ' [ ] \{ \} < > " ; : | \and ?

1. Connect the PC to the matrix switcher via the switcher's RS-232/RS-422 port or Ethernet port.
2. Start the Matrix Switchers Control Program and connect to the Fiber Matrix switcher. See "Using the Matrix Switcher Control software" in this chapter, steps 1 through 4, starting on page 5-4.
3. Click on Tools $>$ HTML File Manager.
4. Click the Pick File(s) to Load to Server button. An open file window appears.
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 select 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 Fiber Matrix switcher automatically looks for that file name when you first connect to it using an Internet browser.
6. Click the Open button. The file(s) upload to the Fiber Matrix switcher 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, drop boxes, and trash can

The buttons, drop boxes, and trash can on the right side of the Matrix Switchers Control Program window perform the following functions:

Power - Unavailable for Fiber Matrix switchers, because the switcher power cannot be controlled via software.
Executive Mode - Allows you to lock out front panel operations,


Rooms menu - Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.
NOTE A Room is a subset of outputs that are logically related to each other, as determined by the operator. The Fiber Matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.


Save as ... - Allows the current set of ties to be saved as a preset. Enter the preset number when prompted to do so.
Delete - Allows the current preset to be deleted.
Changes - Take - Allows you to save to file any changes made to the displayed configuration.

Changes - 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 erase all ties associated with that input or output.

## Windows menus

## File menu

Save Matrix settings as ... - Saves a complete set of up to 64 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 setting file.


Save This-Session's settings - Saves the current assigned icons and icon captions.
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 to disk the last time you exited the program, the ties from that session are also loaded.

Select printer - Selects the target printer.
Print tie map - Prints the tie set that is displayed on the screen.
Exit - Closes the Matrix Switchers Control Program.

## Tools menu

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-Outputs settings - Displays the Mute Adjust screen, from which you can mute each output.
HD/SDI Reclocker settings - Displays the Channel Mute and Rate Settings screen, from which you can select between the automatic re-clocking rate or bypass reclocking for SDI/HD-SDI inputs only.

View Input Frequencies - Displays the Input Detection screen, which shows the data rates for SDI/HD/SDI

| Tools Preferences Master-Reset |
| :--- |
| Assign Device Icons |
| Edit Device Palette |
| RGB Delay settings |
| Audio-Input Gain settings |
| Audio-Output Volume settings |
| Mute-Output settings |
| HD/SDI Re-clocker settings |
| View Input Frequencies |
| Update Firmware ... |
| IP Options |
| HTML File Manager |
| Hardware Status |
| Physical Switcher Layout |
| Name Presets |
| Show RS-232 Strings |
| I/O Group settings |
| Room configuration |
| Initialize ... | inputs only.

Update Firmware - Allows you to replace the firmware that is coded on the switcher's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip set. See "Updating firmware" on page 5-14.

IP options - Allows you to set IP options. See "IP Settings/Options window" on page 5-8.
Hardware status - Provides an overall view of the status of the matrix switcher, including the power supply voltages, the temperature status, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (figure 5-14).


Figure 5-14 - Status window

Physical Switcher Layout - Calls the Fiber Matrix 6400 Physical Configuration window (figure 5-15), which displays the I/O board type installed in each slot. The Channels field can be helpful in identifying a specific input or output. In figure 5-15, for example, input 49 is identified as slot 7, input transceiver 1 (7i01).


Figure 5-15 - Physical Configuration window

Name presets - Allows you to assign a name to each of the 64 memory presets.
NOTE Preset names are limited to 12 upper-and lower-case 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.
I/O group settings - Allows you to establish I/O groups.
Room configuration - Allows you to assign outputs to rooms or delete outputs from rooms.

NOTE A Room is a subset of outputs that are logically related to each other, as determined by the operator. The Fiber Matrix switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.
Initialize - Initializes and clears any or all of the following: ties, presets, preset names, icon names, and icons.

## Preferences menu

Immediate Changes - Causes configuration changes to take effect immediately.
Hold/verify Changes - Delays implementation of configuration changes until the Changes - Take button is pressed.

Ties as Lines - Displays ties as lines (below).


$|$| Preferences Master-Reset |
| :--- |
| $\quad$ Immediate Changes |
| $\checkmark$ Hold/Verify Changes |
| $\checkmark$ Ties as Lines |
| Ties as Crosspoints |
| Link-detection options |
| $\checkmark$ Limit ties to same Group |
| $\checkmark$ Icons in I/O Boxes |
| Numbers in I/O Boxes |
| $\checkmark$ Catch FPC/other's Changes |

Ties as Crosspoints - Displays ties as a matrix of inputs and outputs (figure 5-16). Ties that have been made are indicated as amber or green boxes. Ties that will take effect when you click the Take button are indicated by + . Ties that will be broken when you click the Take button are indicated by -.


Figure 5-16 - Ties shown as crosspoints
Link-detection options - Allows you to set the link detection feature as follows:

- To automatically refresh the display every 10 seconds.
- To update the display whenever you refresh the screen.
- To never sample and display the link status

Icons in I/O Boxes - Erases any numbers in the I/O boxes in the Control Program window (figure 5-6). You can place icons in the boxes.
Numbers in I/O Boxes - Erases any icons in the I/O boxes in the Control Program window and fills each box with the associated
 input or output number.

## Master-Reset selection

Master reset clears all ties and presets, all output mutes, and resets 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. To use Emulation mode, do the following:

1. Double-click the Matrix Switchers Control Program icon in the Extron Electronics group or folder.
2. Choose Emulate, and click OK.
3. Choose an emulation file to open, and click OK. The file DEMO.MTX provides a sample of a completed matrix setup. Selecting the file NEW.INI or clicking Cancel provides a blank setup to get you started.
4. Enter the file name under which you want to save any changes to the file, and click OK.
5. Select the number of video boards, audio boards, and matrix model for which you are preparing a configuration, and click $\mathbf{O K}$.
6. Continue using the program as described on page 5-7.

## Using the help system

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

- From the Extron Electronics program folder or group, doubleclick on the MATRIX Switcher Help icon (shown at right).
- From within the Matrix Switchers Control Program, click on the Help menu on the main screen.
- From within the Matrix Switchers Control Program, press the F1 key.


## Button-Label Generator Program

The Button Label Generator software creates labels that you can place in the translucent covers above and below the input and output pushbuttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection. See chapter 7, "Maintenance and Modifications", for the procedure for removing and replacing the translucent covers.

## Installing the Button-Label Generator software

The Extron Button Label Generator is available on the Extron Web site, www.extron.com, under the Download tab. Click the Software link (figure 5-17), and download and install the program.

| Products | Applications | Technologies | Company |
| :--- | :--- | :--- | :--- |

Figure 5-17 - Location of software on the web site

NOTE The Button Label Generator software is also included on the Extron Software Products CD-ROM that accompanied the switcher.
By default, the Windows installation creates a
$C: \backslash$ Program Files $\backslash$ Extron $\backslash$ ButtonLabelGenerator directory and places the Button Label Generator icon into a group or folder named "Extron Electronics".

## Using the Button-Label Generator software

1. To run the Button-Label Generator program, click Start $>$ Programs $>$ Extron Electronics $>$ Button Label Generator $>$ Button Label Generator. The Button-Label Generator window appears (figure 5-18).


Figure 5-18 - Extron's Button-Label Generator window
2. In the Systems selection box, choose the Matrix Switchers 6464 option to match the button label size and quantities for your Fiber Matrix switcher.
3. Using standard Windows controls, you can create and print labels that can be placed in the clear button caps on the front panel of the switcher.
4. Click the Clear All Buttons button and create new labels as many times as necessary to make all of the button labels that you need.

To access the help program, click the Help menu.

## Matrix Software, cont'd

Fiber Matrix 6400 Switcher

## Chapter Six

## HTML Operation

System Settings Page

File Management Page
Special Characters

The switcher can be controlled and operated through its LAN port, connected via a LAN or WAN, using a web browser such as Microsoft ${ }^{\circledR}$ Internet Explorer ${ }^{\circledR}$. The browser's display of the switcher's status or operation has the appearance of web pages. This chapter describes the factory-installed HTML 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. In Internet Explore, click Tools > Internet Options $>$ Connections $>$ LAN Settings, uncheck the Use a proxy server... box, and then click OK.

## Opening the Switcher's Embedded Web Pages

Access the switcher using HTML pages as follows:

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

NOTE If the local system administrators have not changed the value, the factoryspecified 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 file name to open.
NOTE The browser's Address field should display the address in the following format: $x x x . x x x . x x x . x x x /\{$ optional_file_name.html\}
NOTE The following characters are invalid in file names: \{space\} $+\sim$, @ =' [ ] \{ \} < > '" ; : | \and ?
5. Press the keyboard Enter key. The switcher checks to see if it is password protected.

If the switcher is not password protected, it checks and downloads the HTML pages (proceed to step 7).
If the switcher is password protected, the switcher downloads the Enter Network Password page (figure 6-1).


Figure 6-1 - Enter Network Password page

NOTE A User name entry is not required.
6. Click in the Password field and type in the appropriate administrator or user password. Click the OK button.
7. The switcher checks several possibilities, in the following order, and then responds accordingly:
a. 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.
b. Is there a file in the switcher's memory that is named "index.html"? If so, the switcher downloads "index.html" as the default startup page.
c. 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 the 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 periodically updates itself to reflect the latest status of the switcher components. If a variable changes, the display shows the change the next time it updates.

## Input Link page

You can view the status of each I/O board slot on the Input Link page (figure 6-3). Click the Input Link link to the left of the Status page to download the Input Link page. The Input Link page automatically updates itself every 30 seconds to show the latest status of installed boards, LC connector installation, and input signal presence.


Figure 6-3 - Input Link page

## System Settings Page

The Fiber Matrix switcher downloads 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. You can access the Email Settings and Passwords pages by clicking the appropriate link. See appendix A, "Ethernet Connection", for basic information about IP addresses and subnetting.


Figure 6-4 - System Settings 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, set output mutes, and view all settings with the exception of passwords.

## 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 page.

## Unit Name field

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

NOTE The following characters are invalid in the matrix name:

$$
+\sim \text {, @ =' [ ] \{ \}<>'"; : | \ and?. }
$$

## 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 if DHCP is appropriate.

## IP Address field

The IP Address field contains the IP address of the connected switcher. This value is encoded in the switcher's flash memory.
Standard IP protocol consists of addresses comprised of four 1-, 2-, or 3-digit numeric subfields, properly called octets, 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 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. Standard IP protocol rules apply to the Gateway 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 hardcoded in the switcher and cannot be changed.

## Firmware field

The Firmware field identifies the installed firmware version. This field is hardcoded in the switcher and cannot be changed.

## Model field

The Model field identifies the number of video and audio inputs and outputs. This field is hardcoded in the switcher and cannot be changed.

## Part Number field

The Part Number field identifies the part number of your switcher. This field is hardcoded 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 year drop box is selected in figure 6-5).
2. Click and drag the slider or click the scroll up $\Delta$ button or the scroll down button until the desired variable is visible.
3. Click 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 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 $\mathbf{1}$ through $\mathbf{3}$ for other variables that need to be changed.
5. If appropriate, select the appropriate Daylight Saving radio button to turn on the daylight savings time feature for your region or nation.

NOTE When Daylight Saving Time is turned on, the switcher automatically updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the country or region selected. When Daylight Saving Time is turned off, the switcher does not adjust its time reference.
6. Click the Submit button.

## HTML Operation, cont'd

## Passwords page

Access the Passwords page (figure 6-6) by clicking the Passwords link on the 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-case and lower-case alphanumeric characters. Each password must be entered twice; once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks $\left({ }^{* * * * *}\right)$. If you do not want to password protect an access level, leave the Password field and the Re-Enter password field blank. After entering the desired password in both fields, click the Submit button.
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, clear any existing password, enter a single space character in the Password and Re-enter Password fields, and click the Submit button.

## Email Settings page

Reach the Email Settings page (figure 6-7) by clicking the Email Settings link on the System Settings page. The Email Settings page has fields for setting up the switcher's e-mail notification capabilities. For the e-mail settings and for each row of the e-mail notification settings, click the Edit button to make the fields available for editing. The button changes to Save. After editing the associated settings with, click the Save button.


Figure 6-7 - Email Settings page

## Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the e-mail server for the facility in which the Fiber Matrix switcher is installed. Standard IP protocol rules apply to the Mail IP address

## Domain Name field

The Domain Name field displays the domain name that the Fiber Matrix switcher uses to log on to the e-mail server. Standard domain name conventions (for example: $x x x . c o m$ ) apply.

NOTE The following characters are invalid in a domain name: \{space\} @ + ~ , =' [ ] \{ \} < > '" ; : | \and ?

## Email Address fields

The eight Email Address fields identify the e-mail addresses of the personnel to whom the Fiber Matrix 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 permit the operator to specify specific criteria under which the switcher will e-mail recipients. In the associated Missing Input drop boxes, select the inputs to monitor for presence or absence of a signal. Check the Fans and Power boxes to monitor the cooling and power supplies. In the associated Email 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. The Suspend option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation. Deleting an e-mail addressee and clicking the Submit 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 switcher's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip. Access the Firmware Upgrade page (figure 6-8) by clicking the Firmware Upgrade link on the System Settings page.


Figure 6-8 - Firmware Upgrade page

Update the switcher firmware as follows:
NOTE The Firmware Upgrade page is only for replacing the firmware that controls all switcher operation. To insert your own custom HTML pages, see "File Management Page", on page 6-12.

1. Visit the Extron Web site, www.extron.com, select the Fiber Matrix 6400 product category, select the latest firmware installation package (*.exe file) for the switcher, and download the file. Note the folder to which you save the firmware file.
2. Run the executable ( ${ }^{*}$.exe) file to decompress the firmware file.
3. Connect the PC to the Fiber Matrix switcher via the switcher's LAN port.
4. Access the Fiber Matrix switcher using HTML pages.
5. Click the Configuration tab.
6. Click the Firmware Upgrade link (figure 6-9).


Figure 6-9 - Firmware upgrade
7. Click the Browse button. A Choose File window appears.
8. Navigate to the folder where you saved the firmware upgrade file. Select the file.

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 Fiber Matrix switcher. If the attempted firmware upload fails for any reason, the switcher automatically reverts to the factory-installed firmware.
9. Click the Open button.
10. Click the Upload button. The firmware upload to the Fiber Matrix switcher may take a few minutes.

## 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 downloads the File Management HTML page (figure 6-10).


Figure 6-10 - File Management page

NOTE The files listed in figure 6-10 are shown for example only and may not be present on your switcher.

To delete a file, click the Delete button associated with a file.
Upload your own files as follows:
NOTE The following characters are invalid in file names: \{space $\}+\sim$, @ = ' [ ] \{ \}<>'" ; : | \and ?

1. Click the Browse button.
2. Browse through your system and select the desired file(s).

NOTE If you want one of the pages that you create and upload to be the default startup page, name that file "index.html".
3. Click the Upload File button. The file(s) that you selected appear(s) in the list.

## Special Characters

The HTML language reserves certain characters for specific functions. The switcher does 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 $\}+\sim$, @ = $[1]\}<>$ '" semicolon (;) colon (:) | \ and ?.

Fiber Matrix 6400 Switcher

## Chapter Seven

# Maintenance and Modifications 

Removing and Installing the I/O Board or Blank Panel
Removing and Installing the Power Supply Module
Removing and Installing Button Labels

## Maintenance and Modifications

## Removing and Installing the I/O Board or Blank Panel <br> WARNING <br> The Fiber Matrix 6400 fiber optic I/O boards output continuous invisible light, which may be harmful and dangerous to the eyes; use with caution.

- Do not look into the rear panel fiber optic cable connectors or into the fiber optic cables themselves.
- Plug the attached dust caps into the optical transceivers when the fiber optic cable is unplugged.
NOTE As factory configured, the fiber optic I/O boards are configured as either 100 percent singlemode or 100 percent multimode, but you can remove a fiber optic transceiver module (one input and one output) of one transmission mode and replace it with a block of the other transmission mode.
You can mix transmission mode transceiver modules on a fiber optic I/O board, provided that you ensure that each fiber cable and connected devices are the appropriate transmission mode for the transceiver module.

Typically, singlemode fiber has a yellow jacket and multimode cable has an orange jacket.
NOTE Unlike the FOX 500 transmitters and receivers, which output an optical stream on one connector in a block and receive a return optical stream on the second connector in the same block, the fiber optic I/O board uses one connector on the block as an input and the second connector on the same block as a separate output.
NOTE For proper cooling and air flow, boards and/or blank panels should be installed in all locations during normal switcher operations.

Circuit boards can be replaced for fault correction or to accommodate SDI/HD-SDI (electric) signals. They can be added or removed to increase or decrease the I/O configuration (size) of the Fiber Matrix.
See figure 7-1. Each I/O board is identified by the input and output numbers supported by the board position (1-8,9-16, and so on) The transceiver modules on fiber optic I/O boards and the BNC connectors on SDI/HD-SDI boards are identified as A through H.


Figure 7-1 - Arrangement of inputs and outputs on the I/O boards
Locations A through H correspond to the input and output numbers identified by the board position numbers. (For example, the input and output numbers supported by the I/O board in location 17-24 are as follows: $\mathrm{A}=17, \mathrm{~B}=18, \mathrm{C}=19$, $\mathrm{D}=20, \mathrm{E}=21, \mathrm{~F}=22, \mathrm{G}=23$, and $\mathrm{H}=24$.)
On the fiber optic I/O boards, locations A through H correspond to the transceiver modules, each of which includes an input and an output. Therefore, locations A through H are numbered from left to right.

On the SDI/HD-SDI I/O boards, inputs and outputs are grouped separately, with inputs A through H on the left and outputs A through H on the right.

## Removing the I/O board or blank panel

Remove an I/O board or blank panel as follows:
NOTE The I/O boards are hot-swappable. You do not need to power down the switcher to remove an I/O board.

1. For an I/O board, disconnect any connected cables.
2. Rotate the left and right knurled knobs to completely loosen the captive screws.
3. Gently pull on the knurled knobs/captive screws to loosen the board or panel from the backplane.
4. Slide the board or panel out of the chassis (figure 7-2).

CAUTION Do not touch the electronic components or the connectors on the backplane or on the circuit boards without being electrically grounded. Handle circuit boards by their edges only. ESD can damage circuits, even if you cannot feel, see, or hear it.
5. Place the removed board on an anti-static surface or in an anti-static container.


Figure 7-2 - I/O board replacement

## Installing the I/O board or blank panel

NOTE The I/O boards are hot-swappable. You do not need to power down the switcher to install an I/O board.

Install an I/O board or blank panel as follows:
CAUTION Do not touch the electronic components or the connectors on the backplane or on the circuit boards without being electrically grounded. Handle circuit boards by their edges only. ESD can damage circuits, even if you cannot feel, see, or hear it.

1. For an I/O board, orient the board to be installed so that transceiver module A (fiber board) or input BNC A (SDI/HD-SDI board) is on the left and transceiver module or output BNC H is on the right
2. For an I/O board, align the board with the left and right chassis guides (figure 7-2).
3. Gently slide the board or blank panel into the enclosure. For an I/O board, slide the board toward the front panel until it meets resistance.
4. Gently seat the board or panel in the backplane.
5. Tighten the left and right knurled knobs/captive screws to lock the board or panel in place.
NOTE If necessary, use a screwdriver to tighten the knurled knobs/captive screws.

## Removing and Installing the Power Supply Module Removing the power supply module

The two power supply modules (primary power supply and redundant power supply) are identical and hot-swappable. Each power supply module has a 2-color LED, visible on the rear panel, that indicates the status of the power supply outputs. If the LED is lit green, the power supply is operating normally. If the LED is lit red, the supply has failed and should be replaced at the earliest opportunity.
NOTE The power supply modules are hot-swappable. Either power supply can be removed without powering down the switcher.

Remove a power supply module as follows:

1. Rotate the left and right knurled knobs to completely loosen the captive screws.
2. Gently pull on the handle to loosen the power supply from the backplane (figure 7-3).
3. Slide the power supply out of the chassis.


Figure 7-3 - Power supply replacement

## Installing the power supply module

NOTE The power supply modules are hot-swappable. You do not need to power down the switcher to install a power supply.
Install a power supply module as follows:

1. Orient the power supply module to be installed with the LED to the right.
2. Align the flanges on the power supply module with the left and right power supply guides (figure 7-3).
3. Gently slide the power supply module into the enclosure until the power supply meets resistance.
4. Gently seat the power supply in the backplane.
5. Tighten the left and right knurled knobs/captive screws to lock the power supply in place.
NOTE If necessary, use a screwdriver to tighten the knurled knobs/captive screws.

## Removing and Installing Button Labels

Page 7-7 provides strips of blank button labels. If desired, copy them or cut them out, 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").

## Installing labels in the matrix switcher's buttons

Install new labels in the matrix switcher's front panel buttons as follows:

1. Remove the button from the Fiber Matrix; use a small, flat bladed screwdriver such as an Extron Tweeker to gently pry a button out from the front panel (figure 7-4).


Figure 7-4 - Illuminated button label replacement
2. Locate the notch in the corner of one side of the clear button cap lens.
3. Separate the white backing (diffuser) from the clear button cap (lens); insert the blade of the small screwdriver into the corner notch and gently twist the blade.
4. Save the translucent, white diffuser, but remove the text/label insert from the transparent button cap lens.
5. Insert the replacement button label into the button cap. Check for correct label orientation.
6. Align the white diffuser plate with the cap (lens). The bumps on the diffuser plate should be aligned (top and bottom) with the notches on the clear button cap. Firmly snap it into place.
7. Align the tabs on the Fiber Matrix's base with the notches on the diffuser plate. Gently, but firmly, press the reassembled button into place in the switcher's front panel.
8. Repeat steps 1 to 7 as needed to relabel other buttons.

$\square$



Fiber Matrix 6400 Switcher

## Appendix A

# Ethernet Connection 

Ethernet Link
Subnetting - A Primer

## Ethernet Connection

## Ethernet Link

The rear panel Ethernet connector on the Fiber Matrix 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 Fiber Matrix switcher
- Patch (straight-through) cable - Connection of the Fiber Matrix 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 |


| Side 1 <br> Pin |  | Side 2 <br> 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 IP address

To access the Fiber Matrix switcher via the LAN port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address 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 Fiber Matrix switcher.

## Pinging to determine Extron IP address

The Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and the Fiber Matrix 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. On the Windows task bar, click on Start $>$ Run.
2. At the Open prompt, type command.
3. Click the OK button.
4. At the DOS prompt, type ping \{IP address\} and then press Enter. The computer returns a display similar to as shown below.
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 = Oms, Maximum = Oms, Average = 0ms
```


## Pinging 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, type ping - a \{IP address\} and then press Enter. The computer's return display is similar to the Ping response shown in the figure above, except that when you specify the - $a$ modifier, the line Pinging mail... reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

## Connecting as a Telnet client

The Microsoft Telnet utility is available from the DOS prompt. Telnet allows you to input SIS commands to the Fiber Matrix switcher from the PC via the Ethernet link and the LAN.

Access the DOS prompt and start Telnet as follows:

1. On the Windows task bar, click on Start $>$ Run.
2. At the Open prompt, type command.
3. Click the OK button.

## Ethernet Connection, cont'd

4. At the DOS prompt, type $t e 7 n e t$ and then press Enter. The computer returns a display similar to as shown below.
```
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>
```


## 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 Fiber Matrix switcher via Telnet.

## Open

Connect to the Fiber Matrix switcher using the Open command. Once you are 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 Fiber Matrix switcher as follows:

1. At the Telnet prompt, type open \{IP address\} and then press Enter.

If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to the Fiber Matrix.

If the switcher is password protected, Telnet displays the password prompt.
2. If necessary, at the password prompt, type $\{$ password $\}$ and then press Enter.

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 Fiber Matrix switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set RGB and audio mutes, select a blue screen, and view all settings with the exception of passwords. By default, the Fiber Matrix switcher ships 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 break or disconnect the connection to the Fiber Matrix 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 Escape key.
The Telnet Escape character is a key combination, the ctrl key and the $\square \square$ key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to the Fiber Matrix switcher intact.
The Escape key is the Esc key on the computer keyboard.

## Local echo

Once connected to the Fiber Matrix switcher, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blindly and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type set local_echo and then press Enter 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. For example: $\mathbf{1}^{*} \mathbf{1}$ !In 1 Out1 All, where $\mathbf{1}^{*} \mathbf{1}$ ! is the SIS command and In1 Out1 All is the response.
With local echo turned on, 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 $\mathbf{a}^{*} \mathbf{d}^{*} \mathbf{m}^{*} \mathbf{i}^{*} \mathbf{n}^{*}$, where admin is the keyed in password and ${ }^{* * * * *}$ is the masked response.
You can turn off local echo by typing unset 70cal_echo and then pressing [Enter] at the Telnet prompt. If you are connected to the Fiber Matrix switcher and need to access the Telnet prompt to turn local echo off, type the Escape character $(\mathrm{ctrl}+\square])$.

## Set 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, but if crlf is set, the SIS link with the switcher does not function properly.

## Close

To close the link to the switcher, access the Telnet prompt by typing the Escape character $(\overline{C t r l}+\square)$. At the Telnet prompt, type close, and then press Enter.

## Help

For Telnet command definitions, at the Telnet prompt, type ? and then press [Enter].

## Quit

Exit the Telnet utility by typing quit and then pressing [Enter] at the Telnet prompt. If you are connected to the Fiber Matrix switcher, access the Telnet prompt by typing the Escape character $\left(\left[\begin{array}{crrr|} \\ +\square\end{array}\right)\right.$.

## Ethernet Connection, cont'd

## Subnetting - A Primer

It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a subset of a network - a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of the Fiber Matrix switcher and the mail server gateway. To understand subnetting at the level required to install and operate the Fiber Matrix switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

## Gateways

The Fiber Matrix switcher can communicate with the e-mail server that the switcher 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 Fiber Matrix (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, separated by dots (periods) as shown below. Each octet can be numbered from 000 through 255 . Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: $\underbrace{192.258 .254}_{\text {Octets }}$

## Subnet masks and octets

The subnet mask (shown below) 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 zeroes, up to three 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.
255 indicates that this octet will be
compared between two IP addresses.
Typical Subnet Mask: $\underbrace{255,255.0 .0}_{\text {Octets }}$

## 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 (below). Each address's octets are compared or not compared, 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 the figure below).
- 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 $\boldsymbol{X}$ in the figure below).
If the unmasked octets of the two IP addresses match (indicated by $=$ in the figure below) (example 1), the two addresses are on the same subnet.
If the two unmasked fields do not match (indicated by $\neq$ in the figure below) (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?: | $\begin{aligned} \hline== & \text { (Same subnet) } \end{aligned}$ | $\neq . \neq . X . X$ - No match <br> (Different subnet) | =. $\neq . X . X$ - No match <br> (Different subnet) |

Fiber Matrix 6400 Switcher

## Appendix B

# Specifications, Part Numbers, Accessories 

## Specifications

Part Numbers and Accessories

## Specifications, Part Numbers, Accessories

## Specifications

NOTE The Fiber Matrix 6400 fiber optic I/O boards are class 1 laser products. They meet the safety regulations of IEC-60825, FDA 21, CFR 1040.10, and FDA 21 CFR 1040.11.

## Optical specifications

Number/type $\qquad$ 8 single mode or 8 multimode fiber optic inputs and outputs per I/O card

NOTE Only one fiber is required to transmit video, audio, and unidirectional data. A second fiber is required to transmit return data for bidirectional control/communication.
Connectors $\qquad$ 8 LC connectors per I/O card
Operating distance $\qquad$ 30 km ( 18.75 miles) with singlemode (SM) cables with a FOX 500 DA6 SM or FOX 500 TX/RX SM
$0.15 \mathrm{~km}\left(492^{\prime}\right)$ with multimode (MM) cables with a FOX 500 DA6 MM or FOX 500 TX/RX MM

NOTE Operating distance is approximate. These are typical distances. The maximum distance may be greater than these typical numbers depending on factors such as fiber type, fiber bandwidth, connector splicing, losses, modal or chromatic dispersion, environmental factors, and kinks.
Nominal peak wavelength........... 850 nm for multimode (MM), 1310 nm for single mode (SM)
Transmission power
Singlemode.
-5 dBm , typical
Multimode.
-5 dBm , typical
Maximum receiver sensitivity
Singlemode.
-18 dBm , typical
Multimode.
-12 dBm , typical
Optical loss budget
Singlemode........................ 13 dB , maximum
Multimode.......................... 7 dB , maximum
Maximum channel data rate........ 4.25 Gbps

## Video

Routing $\qquad$ $8 \times 8$ up to $64 \times 64$ unidirectional (TX) matrix or $4 \times 4$ up to $32 \times 32$ bidirectional (TX/RX) matrix
Gain Unity
Pixel data bit depth 8 bits per channel, 3 channels ( $\mathrm{R}, \mathrm{G}, \mathrm{B}$ )
Maximum resolution $1600 \times 1200 @ 60 \mathrm{~Hz}$, digitized pixel for pixel; higher resolutions up to 2048x1120, undersampled

## Video/audio input

Number/signal type.
8 to 64 fiber optic signals
Connectors 8 LC connectors per I/O card

NOTE Input comes from an Extron FOX 500 TX transmitter, FOX 500 DA6, or FOX 500 DVI transmitter.

## Video/audio output

Number/signal type.
8 to 64 fiber optic signals
Connectors $\qquad$ 8 LC connectors per I/O card

NOTE Output connects to an Extron FOX 500 RX receiver or FOX 500 DVI receiver.

## B-2 Fiber Matrix 6400 Switcher • Specifications, Part Numbers, Accessories



NOTE The transmission distance varies depending on the signal resolution and on the type of cable, graphic card, and display used in the system.

| Digital video output - 3G HD-SDI I/O board (multi-rate SDI) |  |
| :---: | :---: |
| Number/signal type.... | 8 single link SDI, HD-SDI, or 3Gbps HD-SDI |
| Connectors ................. | 8 female BNC |
| Nominal level ............. | $0.80 \mathrm{Vp-p} \pm 10 \%$ |
| Return loss.................. | <-15 dB @ 1 HHz to 1.5 GHz |
| DC offset..................... | $\pm 0.5 \mathrm{~V}$ with input at 0 offset |
| Re-clocking........ | Automatic, or use available bypass mode for nonstandard rates |
| Jitter ............. | <0.2 VI |
| Rise/fall time (20-80\%) |  |
| SDI.................... | $700 \mathrm{ps} \pm 100 \mathrm{ps}$ |
| HD-SDI ............. | $250 \mathrm{ps} \pm 100 \mathrm{ps}$ |

## Control/remote - switcher

Serial control port. $\qquad$ 1 bidirectional RS-232 or RS-422, 9-pin female D connector (rear panel) 1 bidirectional RS-232, 2.5 mm mini stereo jack (front panel )
Baud rate and protocol $\qquad$ 9600 to 115200 baud, 9600 baud (default), 8 data bits, 1 stop bit, no parity
Serial control pin configurations
9-pin female D connector. RS-232: $2=\mathrm{TX}, 3=\mathrm{RX}, 5=\mathrm{GND}$
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, UDP, Telnet, HTTP, SMTP

## Specifications, Part Numbers, Accessories, cont'd

| Default settings............................ | ```Link speed and duplex level = autodetected IP address = 192.168.254.254 Subnet mask \(=255.255 .0 .0\) Gateway = 0.0.0.0 DHCP = off``` |
| :---: | :---: |
| Web server................................. | Up to 200 simultaneous sessions 3 MB nonvolatile user memory |
| Program control......................... | Extron's control/configuration program for Windows ${ }^{\circledR}$ Extron's Simple Instruction Set (SIS ${ }^{\text {TM }}$ ) <br> Microsoft ${ }^{\circledR}$ Internet Explorer ver. 6 or higher, Telnet |
| General |  |
| Power* | 2 (positive-negative), 100 VAC to $240 \mathrm{VAC}, 50 / 60 \mathrm{~Hz}$; internal Enclosure without cards: 35 watts at 115 VAC, 60 Hz <br> Enclosure fully loaded with 8 cards: 115 watts at 115 VAC, 60 Hz Each module card: 10 watts at 115 VAC, 60 Hz *A redundant power supply is standard. |
| Temperature/humidity ............... | Storage: -40 to $+158{ }^{\circ} \mathrm{F}\left(-40\right.$ to $\left.+70^{\circ} \mathrm{C}\right) / 10 \%$ to $90 \%$, noncondensing Operating: +32 to $+122{ }^{\circ} \mathrm{F}\left(0\right.$ to $\left.+50^{\circ} \mathrm{C}\right) / 10 \%$ to $90 \%$, noncondensing |
| Cooling ..................................... | Fan, right to left (as viewed from front panel) |
| Rack mount ................................ | Yes |
| Enclosure type ............................ | Metal |
| Enclosure dimensions................. | $12.25^{\prime \prime} \mathrm{H} \times 17.0^{\prime \prime} \mathrm{W} \times 12.25^{\prime \prime} \mathrm{D}$ (7U high, full rack wide) <br> ( $31.1 \mathrm{~cm} \mathrm{H} \times 43.1 \mathrm{~cm} \mathrm{~W} \times 31.1 \mathrm{~cm}$ D) <br> (Depth excludes connectors and front handles. Width excludes rack ears.) |
| Product weight (fully loaded) ..... | 35.8 lbs ( 16.2 kg ) |
| Shipping weight ......................... | $43 \mathrm{lbs}(20 \mathrm{~kg})$ |
| DIM weight |  |
| USA/Canada ................... | $146 \mathrm{lbs}(63 \mathrm{~kg})$ |
| International..................... | $171 \mathrm{lbs}(78 \mathrm{~kg})$ |
| Vibration. | ISTA 1A in carton (International Safe Transit Association) |
| Regulatory compliance |  |
| Safety.............................. | CE, CUL, UL |
| EMI/EMC ....................... | CE, C-tick, FCC Class A, ICES, VCCI |
| MTBF......................................... | 30,000 hours |
| Warranty .................................... | 3 years parts and labor |

NOTE All nominal levels are at $\pm 10 \%$.
NOTE Specifications are subject to change without notice.

## Part Numbers and Accessories

## Fiber Matrix switcher part numbers

The Fiber Matrix is custom-built to your requirements. You will need to specify the the number, type, and transmission mode (for fiber optic boards) of I/O boards desired when you order a unit. The following part numbers apply:

| Matrix switcher part numbers | Part number |
| :--- | :---: |
| Fiber Matrix enclosure | $60-878-01$ |
| Singlemode fiber optic 8x8 I/O board | $70-649-02$ |
| Multimode fiber optic 8x8 I/O board | $70-649-01$ |
| SDI/HD-SDI 8x8 I/O board | $70-650-01$ |

## Included parts

These items are included in each order for a Fiber Matrix switcher:

| Included parts | Part number |
| :--- | :---: |
| IEC power cords (2) |  |
| Rubber feet |  |
| Fiber Matrix User's Manual |  |
| Extron Software Products CD <br> (Matrix Switchers Control Program and <br> Button-Label Generator) |  |

## Replacement/configuration change parts

The following parts can be ordered to change the size of the matrix or to replace components:

| Part | Part number |
| :--- | :---: |
| Singlemode fiber optic 8x8 I/O board | $70-649-02$ |
| Multimode fiber optic 8x8 I/O board | $70-649-01$ |
| SDI/HD-SDI 8x8 I/O board | $70-650-01$ |
| Blank panel, 1 I/O board space | $70-651-01$ |
| Blank panel, 2 I/O board space | $70-652-01$ |
| Power supply module | $70-648-01$ |
| Button cap and diffuser kit (set of 3 button cap assemblies) | $70-352-01$ |

## Specifications, Part Numbers, Accessories, cont'd

## Accessories

These items can be ordered separately:

| Accessory | Part number |
| :--- | :---: |
| MKP 1000 remote keypad |  |
| Black | $60-239-02$ |
| White | $60-239-03$ |
| RAL9010 white | $60-239-05$ |
| WT (water-tight), black | $60-239-52$ |
| WT (water-tight), white | $60-239-53$ |
| MCP 1000M (master) | $60-298-01$ |
| MKP 2000 X-X remote control panel | $60-682-02$ |
| Black | $60-682-03$ |
| White | $60-682-05$ |
| RAL9010 white |  |
| MKP 3000 | $60-708-02$ |
| Black | $60-708-03$ |
| White | $60-708-05$ |
| RAL9010 white |  |

## 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, <br> and Central America: | Europe, Africa, and the Middle East: |
| :--- | :--- |
|  | Extron Electronics, Europe |
| Extron Electronics | Beeldschermweg 6C |
| 1001 East Ball Road | 3821 AH Amersfoort |
| Anaheim, CA 92805, USA | The Netherlands |
| Asia: | Japan: |
| Extron Electronics, Asia | Extron Electronics, Japan |
| 135 Joo Seng Road, \#04-01 | Kyodo Building |
| PM Industrial Bldg. | 16 Ichibancho |
| Singapore 368363 | 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.

| $\underbrace{s_{0} c^{c^{E}} A N^{n}}_{v_{0<U T}}$ <br> www.extron.com | Extron Electronics, USA <br> 1230 South Lewis Street <br> Anaheim, CA 92805 <br> 800.633.9876 714.491.1500 <br> FAX 714.491.1517 | Extron Electronics, Europe <br> Beeldschermweg 6C <br> 3821 AH Amersfoort, The Netherlands $\begin{aligned} & +800.3987 .6673+31.33 .453 .4040 \\ & \text { FAX }+31.33 .453 .4050 \end{aligned}$ | Extron Electronics, Asia <br> 135 Joo Seng Rd. \#04-01 <br> PM Industrial Bldg., Singapore 368363 $+800.7339 .8766+65.6383 .4400$ <br> FAX +65.6383 .4664 | Extron Electronics, Japan <br> Kyodo Building, 16 Ichibancho <br> Chiyoda-ku, Tokyo 102-0082 <br> Japan <br> +81.3.3511.7655 FAX +81.3.3511.765 |
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[^0]:    Fill in the preset number and use colors, or dashes, etc. to make connecting lines. Indicate if the configuration is for Video, Audio, or both.

[^1]:    X2 $=$ Input number
    X3 $=$ Output number
    （4）＝Mute

[^2]:    $00-32$（ $00=$ current configuration）
    12 characters maximum for global and room preset names 11 characters maximum for room names
    10 max．（Each can have up to 10 presets（ $\mathbf{X 9}$ ）assigned．）
    00－10（00＝current configuration for room）
    01－64
    01－64
    $0=$ unlocked
    1 ＝locked

[^3]:    HINT You can print a map of the current configuration by clicking File $>$ Print Tie Map.

