Extron® Electronics

INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

Matrix 50 Series

Matrix Audio/Video Switchers

Precautions

Safety Instructions • English

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

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

Caution

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

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

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

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

Warning

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

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

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

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

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

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

Consignes de Sécurité • Français

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

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

Attention

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

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

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

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

Avertissement

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

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

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

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

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

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

Sicherheitsanleitungen • Deutsch

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

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

Achtung

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

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

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

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

Vorsicht

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

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

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

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

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

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

Instrucciones de seguridad • Español

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

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

Precaucion

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

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

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

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

Advertencia

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

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

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

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

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento 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.

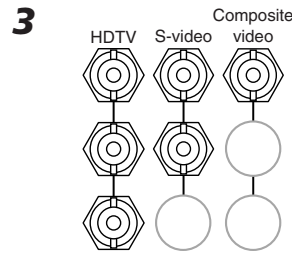# Quick Start — Matrix 50 Series Switchers

Installation

Step 1

Mount the switcher in a rack.

Step 2

Turn off power to the input and output devices, and remove the power cords from them.
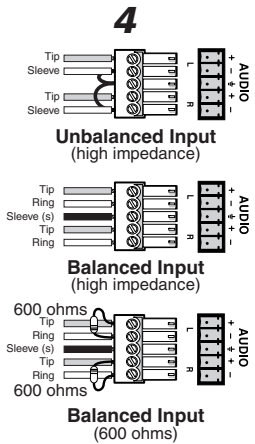
Step 3

Cable the switcher for RGsB, RsGsBs, HDTV/ component video, S-video, or composite video input and output *(3)*.
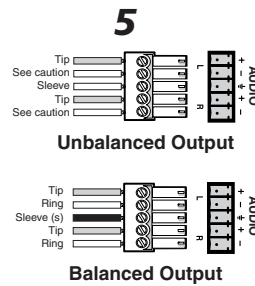
Step 4

Cable audio models for stereo audio input. Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo audio *(4)*. High impedance is generally over 800 ohms.

Step 5

Cable audio models for stereo audio output. Each output has a 3.5 mm, 5-pole captive screw connector that outputs the selected unamplified, line level audio. Connect an audio device, such as an audio amplifier or powered speakers *(5)*.
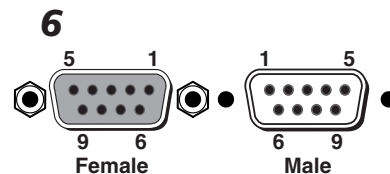
Step 6

If desired, connect a control system or computer to the Remote RS-232/RS-422 port (6).

Step 7

If desired, attach an external sync timing device to the external sync connectors *(7)*.

Step 8

Plug the switcher and input and output devices into a grounded AC source, and turn on the input and output devices.
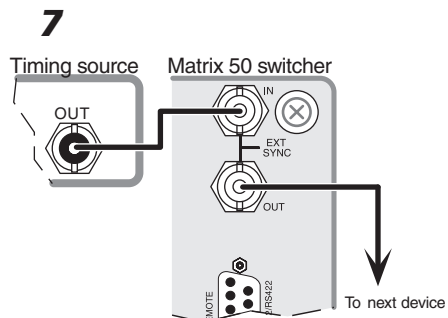
Definitions

Tie — An input-to-output connection.

Set of ties — An input **tied** to 2 or more outputs. (An output can never be tied to multiple inputs.)

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

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

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

3

HDTV S-video Composite video

4

Tip
Sleeve
Tip
Sleeve

Unbalanced Input
(high impedance)

Tip
Ring
Sleeve (s)
Tip
Ring

Balanced Input
(high impedance)

600 ohms
Tip
Ring
Sleeve (s)
Tip
Ring
600 ohms

Balanced Input
(600 ohms)

5

Tip
See caution
Sleeve
Tip
See caution

Unbalanced Output

CAUTION *Connect the sleeve to ground. Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

Tip
Ring
Sleeve (s)
Tip
Ring

Balanced Output

6

5   1   1   5

9   6   6   9

Female   **Male**

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

7

Timing source   Matrix 50 switcher

OUT   IN

EXT SYNC

OUT

REMOTE   RS422

To next device

Front Panel Controls

Input and output buttons and LEDs select and identify inputs and outputs. Input buttons also select presets. On audio models, the output LEDs also display the audio level of the selected input.

Enter button saves changes when you change the configuration.

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

View button selects a view-only mode that prevents inadvertent configuration changes. On audio models, the View button decrements the audio level of the selected input. The View LED indicates a negative (-) attenuation value.

Esc button cancels selections in progress and resets the front panel LEDs. The Esc button does **not** reset the current configuration, the Video and Audio LEDs, any presets, or any audio gain/ attenuation settings. On audio models, the Esc button increments the audio level of the selected input. The Esc LED indicates a positive (+) gain value.

Video and Audio buttons select/deselect video and/or audio. The Audio LED blinks to indicate audio breakaway. The Audio button also selects the audio level/adjust mode.

Input and output label windows hold labels that can be created easily with Extron's label software or with any Brother® P-Touch™ labeler.

LED key: ● = off, ☼ = on, ☼ = blinking,

Create a tie

A. Press and release the Video and/or Audio button(s) to select audio and/or video.

B. Press and release the desired input button.

C. Press and release the desired output button(s).
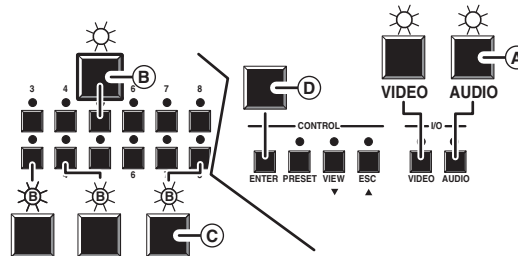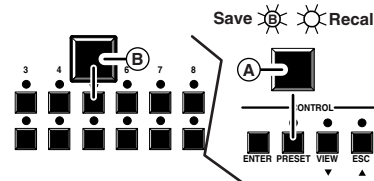
D. Press and release the Enter button.

View ties

A. Press and release the View button.

B. Press and release the Video and/or Audio button(s) to select audio and/or video.

C. Press and release the desired input button. The selected input and tied output LEDs light.
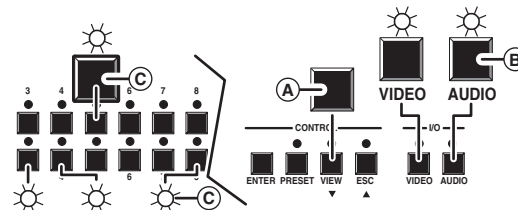
Save or recall a preset

A. To **save** a preset, press and **hold** the Preset button until the Preset LED begins to blink.

To **recall** a preset, press and release the Preset button. The Preset LED turns on steadily.

B. Press and release the input button associated with the desired preset number.

View and adjust audio level

A. Press and **hold** the Audio button until the Audio LED begins to blink.

B. Press and release the desired input button. The level is displayed by the output LEDs, (+) by the Esc LED, and (-) by the View LED.

C. Increment and decrement the level by pressing the Esc (▲) and View (▼) buttons.
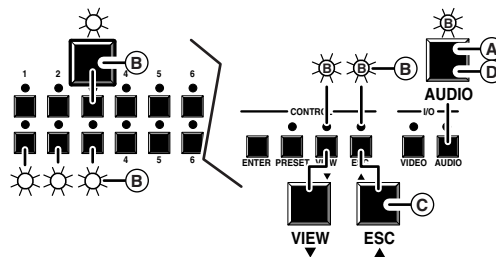
D. Press and release the Audio button to exit.

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Chapter One

Introduction

About the Matrix 50 Series Switchers

Features

Introduction

About the Matrix 50 Series Switchers

The Extron Matrix 50 Series Switchers are broadcast quality, upgradeable matrix switchers that distribute any video and/or audio input to any combination of outputs. The matrix switchers can route multiple input/output configurations simultaneously.

The modular Matrix 50 series are assembled from individual modules, each of which supports a discrete video or stereo audio plane, as follows:

- Composite video Matrix 50 switchers are assembled around one video module. The audio version of the composite video matrix requires a separate audio module.

- S-video Matrix 50 switchers are assembled around two video modules (one for the luma (Y) plane and one for the chroma (C) plane). The audio version of the S-video matrix requires a separate audio module.

  Matrix 50 switchers with two video modules can also be used to switch two planes of composite video. If used in this way, the two planes cannot be broken away; both inputs must be routed to the same outputs.

- Component video Matrix 50 switchers are assembled around three video modules (one for the luma (Y) plane, one for the red minus luma (R-Y) plane, and one for the blue minus luma (B-Y) plane. The audio version of the component video matrix requires a separate audio module.

  Component video Matrix 50 switchers can also route RGsB and RsGsBs video signals up to 150 MHz bandwidth. Switchers configured for component video can also route multiple composite video planes or S-video and composite video. If used in this way, the various planes cannot be broken away; all inputs must be routed to the same outputs.

- Audio only Matrix 50 switchers are assembled around one audio module for the stereo audio plane.

The video and audio modules are available with differing numbers of inputs and outputs to support four matrix sizes:

- Eight inputs by four outputs

- Eight inputs by eight outputs

- Twelve inputs by four outputs

- Twelve inputs by eight outputs

The audio switching can either be linked with the video (audio follow) or independent of the video (audio breakaway). Adjustable audio gain and attenuation compensates for level differences between audio inputs.

The Matrix 50 Series are expandable single box solutions to simple 150 MHz (-3dB) 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 switchers are housed in rack-mountable, 2U high, 19" wide metal enclosures. The appropriate rack mounting kit is included with each switcher. Each model has an internal 100VAC to 240VAC, 50/60 Hz, 30 watts, auto-switchable power supply that provides worldwide power compatibility.
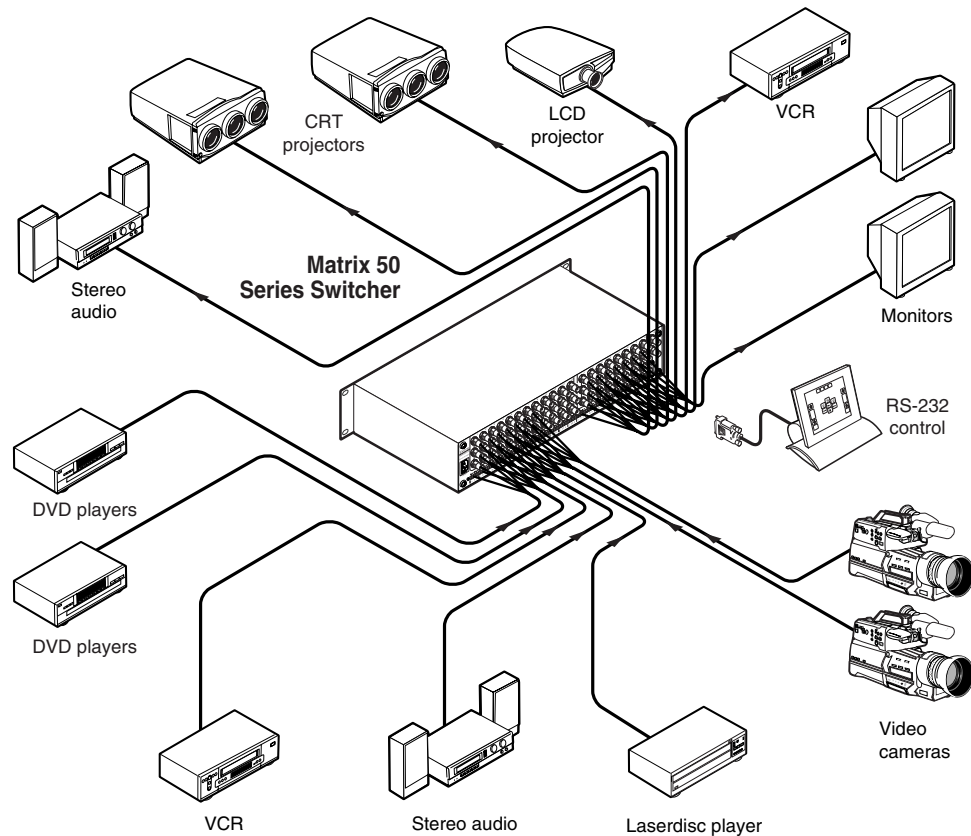
Figure 1- 1 — A typical Matrix 50 Series Switcher application

Features

Inputs — These switchers offer 8 or 12 RGBS, RGsB, RsGsBs, HDTV, component video, S-video, or composite video inputs on BNC connectors.

Stereo audio can be balanced or unbalanced, on 3.5 mm, 5-pole captive screw terminals (audio models).

Outputs — 4 or 8 RGBS, RGsB, RsGsBs, HDTV, component video, S-video, or composite video outputs are available on BNC connectors.

Stereo audio, balanced or unbalanced, on 3.5 mm, 5-pole captive screw terminals (audio models).

Bandwidth — Bandwidth is a minimum of 150 MHz (-3dB), fully loaded. This high bandwidth allows the Matrix 50 switchers to switch everything from NTSC video to HDTV.

Operational flexibility — Operations such as input/output selection, setting of presets, and adjustment of audio levels can be performed on the front panel or over the RS-232/RS-422 link. The RS-232/RS-422 link allows remote control via a PC or control system.

• **QuickSwitch Front Panel Controller (QS-FPC™)** — The Matrix 50 QS-FPC feature supports touch-of-a-button input and output selection, preset creation and selection, and audio gain and attenuation control.

• **Windows-based control program** — Extron's Windows-based control program provides a versatile range of operational options with its graphical interface and drag-and-drop/point-and-click operation. The Windows-based

control program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site.

- **Simple Instruction Set (SIS™)** — The remote control protocol uses Extron's SIS for easy programming and operation.

Audio gain/attenuation — Users can set the input level of audio gain or attenuation (-15dB to +9dB) via the RS-232/RS-422 link or from the front panel. Individual input audio levels can be adjusted so there are no noticeable volume differences between sources (figure 1-2).
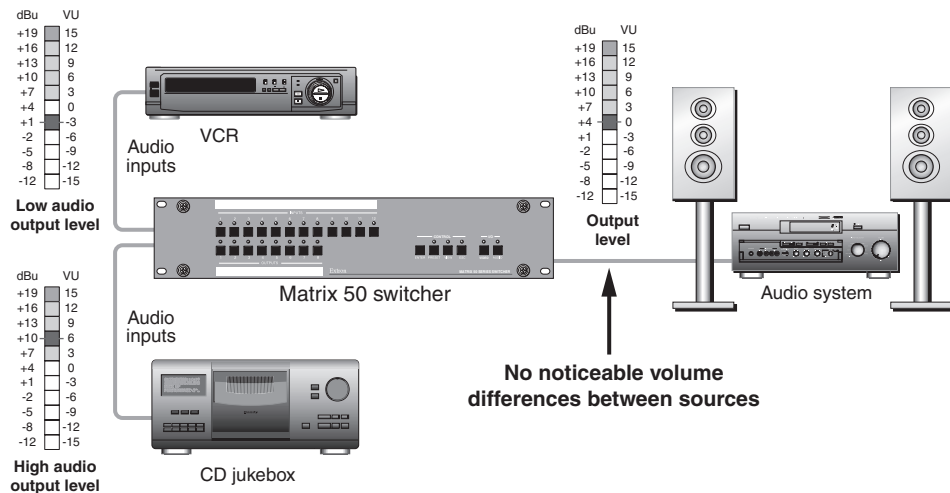
Figure 1-2 — Audio gain and attenuation

Global memory presets — 12 global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance and then recall those configurations when needed with a few simple steps.

Switching flexibility — Individually buffered, independent matrix switched video outputs with audio follow and audio breakaway for models with audio.

- **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.

- **Audio follow** — Audio can be switched with the corresponding video input. This feature allows any audio signal to be selected with any video signal simultaneously to one or all outputs in any combination. Audio follow switching can be done via front panel control or under RS-232/RS-422 remote control.

- **Audio breakaway** — Audio can be broken away from its corresponding video signal. Audio breakaway switching can be done via front panel control or under RS-232/RS-422 control.

Remote control — The Matrix 50 switchers are remote controllable, using the MKP 1000 primary control keypad and any combination of MCP 1000 secondary control panels and/or MKP 1000 secondary control keypads. The remote control devices are easy to use and provide tactile buttons for quick selection. Each MCP 1000 can be used for one-touch switching for a particular output and selecting global presets. Each MKP 1000 dedicated to an output can be used to select a different input for that output or to select a preset.

Labeling — Extron's label software ships with every Extron matrix switcher. You can create labels to place alongside the front panel input buttons and output buttons, with names, alphanumeric characters, or color bitmaps for easy and intuitive input and output selection. Alternatively, labels can be made with any Brother® P-Touch™ or comparable labeler.

Front panel security lockout — If a Matrix 50 Switcher is installed in an open area where operation by unauthorized personnel may be a problem, a security lock-out feature can be implemented. When the front panel is locked, a special button combination is required to unlock the front panel controller before it can be operated.

Rack mounting — The switchers are mountable in any conventional 19" wide rack.

Power — The internal 100VAC to 240VAC, 50/60 Hz, 30 watts, auto-switchable power supply of the Matrix 50 Series provides worldwide power compatibility.

Chapter Two

Installation

Rack Mounting the Switcher

Cabling and Rear Panel Views

Installation

Rack Mounting the Switcher

The Matrix 50 Series Switchers are housed in rack-mountable, 2U high, 19" wide metal enclosures. The appropriate rack mount kit is included with each switcher. Rack mount the switcher as follows:

1. Insert the switcher into the rack, align the holes in the mounting bracket with those of the rack.

2. Secure the switcher to the rack using the supplied machine screws.

Cabling and Rear Panel Views

All connectors are on the rear panel. Figure 2-1 shows a 12x8 Matrix 50 component video and audio switcher. Figure 2-2 shows a 12x8 Matrix 50 S-video switcher without an audio module. Figure 2-3 shows a 12x8 Matrix 50 composite video and audio switcher. Figure 2-4 shows a 12x8 Matrix 50 audio switcher. The 8x4, 8x8, and 12x4 matrixes are housed in the same 2U enclosure, but have fewer input and/or output connectors to accommodate the different matrix sizes each provides.
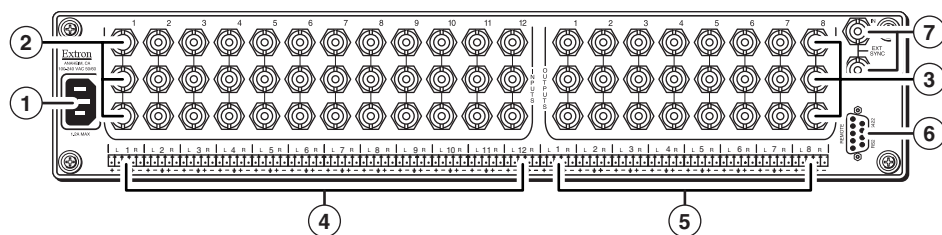

Figure 2-1 — Rear panel connectors, Matrix 50 component video and audio switcher
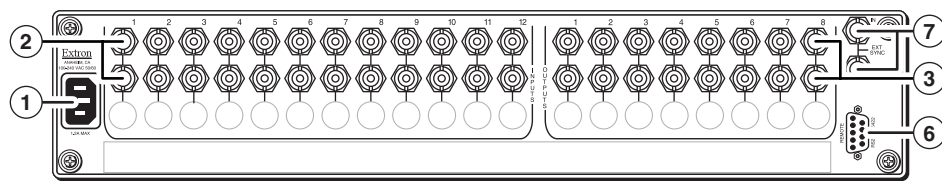

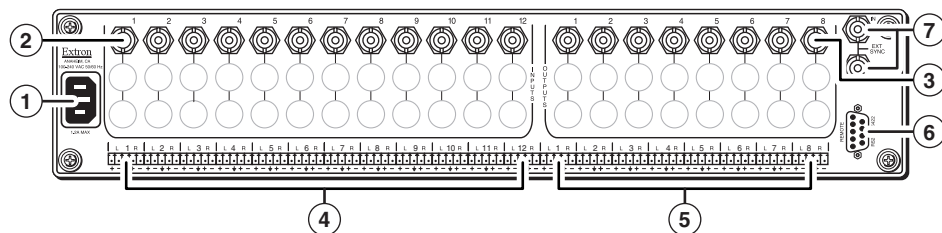*Figure 2-2 — Rear panel connectors, Matrix 50 S-video switcher*

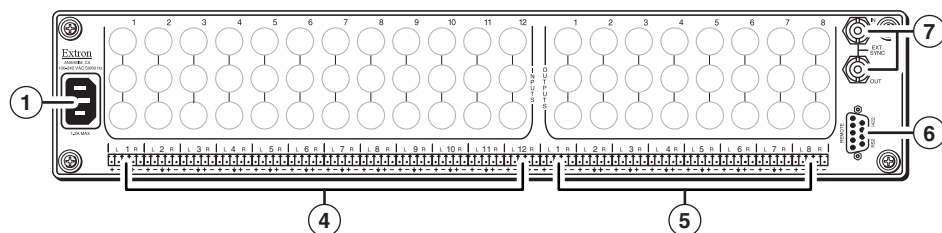*Figure 2-3 — Rear panel connectors, Matrix 50 composite video and audio switcher*

Figure 2-4 — Rear panel connectors, Matrix 50 audio switcher

Power connection

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

Video input and output connections (video models only)

NOTE *All video input and output connections to the Matrix 50 Series switchers are made with female BNC connectors. Some types of video output devices do not have BNC video output connectors. For these cases, a suitable cable or connector adapter is necessary between the device output connector and the BNC input connector of the switcher.*

RCA-to-BNC Connector

RCA Connector
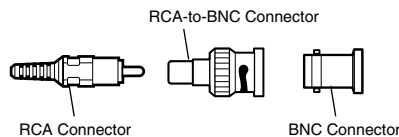
BNC Connector

(2) **HDTV/component video inputs (three video module models only)** — Connect HDTV, component video, RGsB, or RsGsBs video inputs to these BNC connectors for each input.

HDTV   S-video   Composite video

S-video inputs (two video module models only) — Connect S-video inputs to these BNC connectors for each input.

Composite video inputs (single video module models only) — Connect composite video inputs to these BNC connectors for each input.
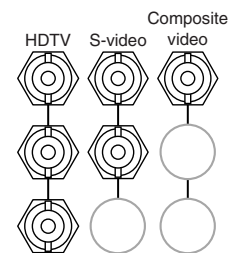
(3) **HDTV/component video outputs (three video module models only)** — Connect HDTV, component video, RGsB, or RsGsBs video outputs to these BNC connectors for each output.

S-video outputs (two video module models only) — Connect S-video outputs to these BNC connectors for each output.

Composite video outputs (single video module models only) — Connect composite video outputs to these BNC connectors for each output.

NOTE *The component video and S-video Matrix 50 Series switchers can also switch video lower on the video food chain by using only two or one BNC(s). If switching a different video format, ensure that the same video planes are used on the switcher output as on the input.*

NOTE *The Matrix 50 Series Switchers do not alter the video signal in any way. The signal output by the switcher is in the same format as the input.*

Audio input and output connections (audio models only)

WARNING *The captive screw connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio output circuits. Exercise care to ensure the captive screw connector is plugged into the desired input or output.*

(4) **Connections for balanced and unbalanced audio inputs** — Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo audio input. Connectors are included with each Matrix 50 Series switcher, but you must supply the audio cable. See figure 2-5 to wire a connector for the appropriate input type and impedance level. High impedance is generally over 800 ohms.
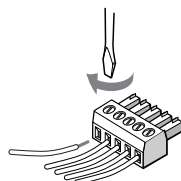
Installation, cont'd

NOTE *When making connections for the Matrix 50 Series Switcher from existing audio cables, see figure 2-6. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 2-5 and figure 2-7.*

Unbalanced Input (high impedance) **Balanced Input** (high impedance) **Balanced Input** (600 ohms)
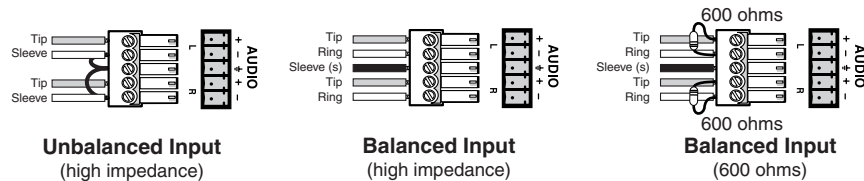
Figure 2-5 — Captive screw connector wiring for inputs

Unbalanced mono **Unbalanced stereo**
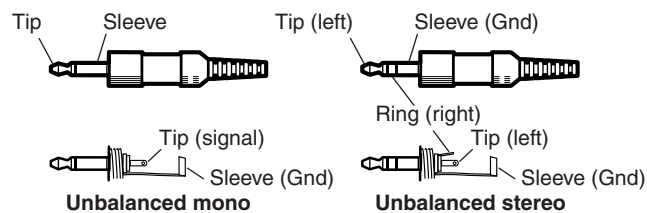
Figure 2-6 — Phono audio connectors

The audio level for each input can be individually set, via the front panel or RS-232/422, to ensure that the level on the output does not vary from input to input. See chapter 3, *Operation*, chapter 4, *Programmer's Guide*, and chapter 5, *Matrix Software* for details.

(5) **Connections for audio outputs** — These 3.5 mm, 5-pole captive screw connectors output the selected unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers. See figure 2-7 to properly wire an output connector.

Unbalanced Output **Balanced Output**
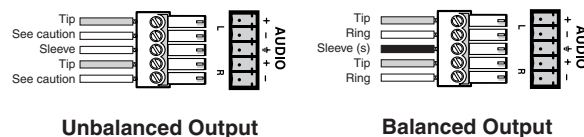
Figure 2-7 — Captive screw connector wiring for audio output

CAUTION *Connect the sleeve to ground (Gnd). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.*

By default, the audio output follows the video switch. Audio breakaway, commanded via the front panel, under RS-232/422 control, or Windows-based control program, allows you to select from any one of the audio input sources. See chapter 3, *Operation*, chapter 4, *Programmer's Guide*, and chapter 5, *Matrix Software* for details.

RS-232/422 connection

(6) **Remote/RS-232/RS-422 port** — Connect a host device, such as a computer or touch panel control, to the Matrix 50 via this 9-pin D connector for serial RS-232/RS-422 control.

Female **Male**
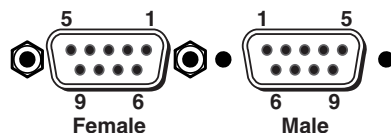
If desired, attach an MCP 1000 remote control panel primary unit to the switcher's RS-232/RS-422 connector.

You can also connect an MKP 1000 remote keypad or MCP 1000 secondary unit to the MCP 1000 primary unit. Refer to the *MCP 1000 Remote Control Panel User's Manual* and the *MKP 1000 User's Manual* for details.

See chapter 4, *Programmer's Guide*, for definitions of the SIS commands and chapter 5, *Matrix Software* for details on how to install and use the control software.

NOTE *The Matrix 50 Series Switchers are factory configured for RS-232 control. To use the switcher under RS-422 control, an internal cable must be moved. See appendix B for the procedure for shifting the cable.*

External sync connection

When the switching between inputs, the resulting image change should be seamless, or clean. The Matrix 50 Series switchers can use an external signal to synchronize switching during the vertical interval. Without the external sync locking feature, switching between inputs can result in a brief rolling (sync loss) or a brief change in the picture size.

⑦ **External Sync In connector —** Connect an external sync signal to this BNC connection for genlocking the video signal in broadcast or other sync-critical applications.

External Sync Out connector — Connect any downstream equipment that requires genlocking to this BNC connector to route the external sync signal throughout the system in broadcast or other sync-critical applications.

Figure 2-8 shows a basic external sync configuration. The Ext Sync In connector receives a timing signal. The Ext Sync Out connector allows the signal to be passed on to another video device, if required.

Figure 2-9 shows a configuration in which the timing source passes through three video cameras and a video scan converter before connecting to the switcher. This type of video camera is capable of synchronizing with the external timing source for video editing applications.

If no external sync timing source is connected to the switcher, switching occurs immediately.
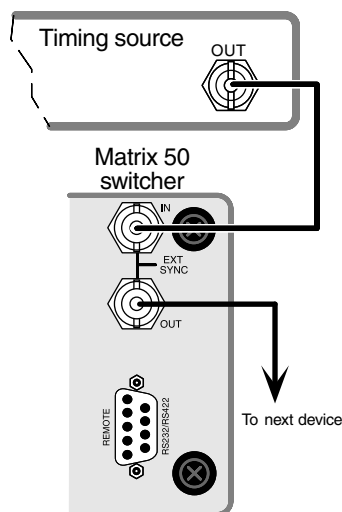
Figure 2-8 —Simple external sync connection example

Installation, cont'd
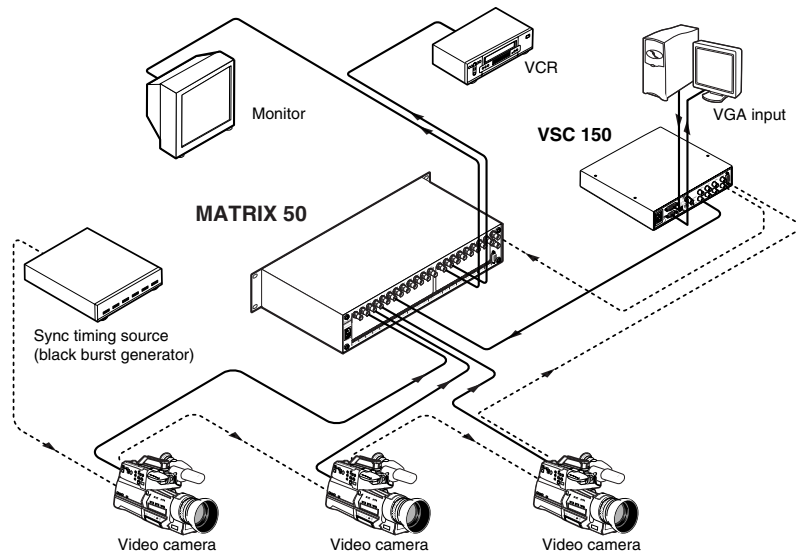
Figure 2-9 — Multiple device external sync connection example

Additional rear panel views

The following figures show the rear panels of an 8x4 Matrix 50 switcher, an 8x8 Matrix 50 switcher, and a 12x4 Matrix 50 switcher.
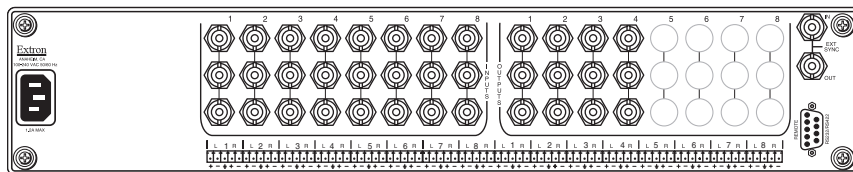
Figure 2-10 — Rear panel view, 8x4 component video and audio Matrix 50 Switcher
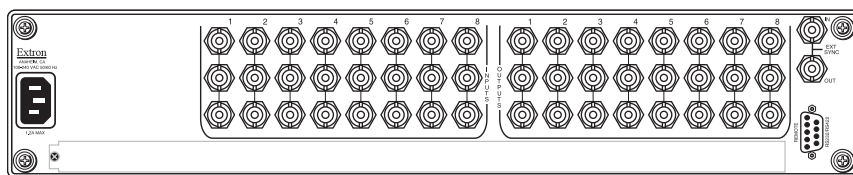
Figure 2-11 — Rear panel view, 8x8 component video Matrix 50 Switcher
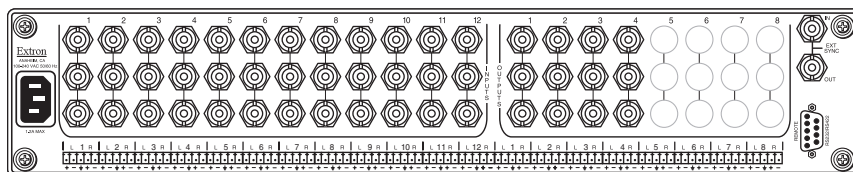
Figure 2-12 — Rear panel view, 12x4 component video and audio Matrix 50 Switcher

Chapter Three

Operation

Front Panel Controls and Indicators

Front Panel Operations

Troubleshooting

Worksheets

Operation

Front Panel Controls and Indicators

The front panel controls (figure 3-1) are grouped into two sets. The input and output buttons and LED indicators are grouped on the left side of the control panel. The control buttons and I/O selection buttons and indicators are grouped on the right side of the panel.
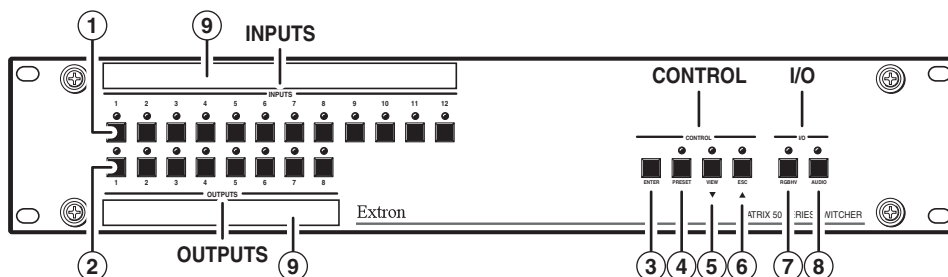
Figure 3-1 — Matrix 50 Series Switcher front panel

Definitions

The following terms apply to Extron Matrix Switchers, and 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 —** May consist of one **tie** or one or more **sets of ties**.
>
> **Current configuration —** The **configuration** that is currently being used (also called **configuration 0**).
>
> **Global memory preset —** A **configuration** that has been stored. Up to twelve **global memory presets** can be stored in memory. The input buttons select the desired **preset** memory location to load or retrieve a **preset**. When a **preset** is retrieved from memory, it becomes the **current configuration**. One **preset** can be assigned to each input button.

Input buttons, output buttons, and LEDs

NOTE   *If the switcher has fewer inputs and outputs than input and output buttons and LEDs, only the applicable buttons and LEDs perform the function of selecting and identifying an input or output.*

1   **Input 1 through 12 buttons and LEDs —** The input buttons have two independent functions: to select an input and to select a preset. The input LEDs identify selected inputs. A more detailed explanation of the two functions is included in *Front Panel Operations* beginning on page 3-4.

2   **Output 1 through 8 buttons and LEDs —** The output buttons and LEDs select and identify outputs. On audio models the output LEDs also display the user-adjustable audio level of the selected input. A more detailed explanation of the two functions is included in *Front Panel Operations* beginning on page 3-4.

Control buttons and LEDs

3   **Enter button —** The Enter button saves changes when you set up a new configuration. To create a simple configuration, specify video, audio, or both [see I/O selection buttons (⑦) and (⑧)], press the desired input button (①), press the desired output buttons (②), and press the Enter button.

④ **Preset button and LED —** The Preset button saves a configuration as a preset, or recalls and makes active a previously-defined preset. The Preset LED indicates save mode when it is blinking and recall mode when it lights steadily.

⑤ **View button and LED —** The View button selects a view-only mode that allows the display of the current configurations and provides a way to mute and unmute video and audio outputs. The view-only mode helps prevent changing configurations by accident. The View LED indicates that the switcher is in view-only mode.

In view-only mode, pressing any input button (①) or output (②) button lights the LEDs for the input and all outputs that are a part of that set of ties. Pressing the button for any unassigned output lights only the LEDs for all of the unassigned outputs. No input LED is lit.

As a secondary function on audio models, the View button decrements the audio level of the selected input. In audio adjustment mode, the View LED indicates a negative (-) attenuation value. A more detailed explanation of audio level adjustment is included in *Viewing and adjusting the audio level* on page 3-13.

⑥ **Esc button and LED —** The Esc button cancels operations or selections in progress and resets the front panel LEDs. The Esc button does **not** reset the current configuration, the Video and Audio LEDs, any presets, or any audio gain/attenuation settings. The Esc LED flashes once after the Esc button is pressed and released to indicate the escape function.

As a secondary function on audio models, the Esc button increments the audio level of the selected input. In audio adjustment mode, the Esc LED indicates a positive (+) gain value. A more detailed explanation of audio level adjustment is included in *Viewing and adjusting the audio level* on page 3-13.

I/O controls

When creating or viewing a configuration, you must specify whether the configuration applies to video, audio, or both. This is done with the Video (⑦) and Audio (⑧) buttons.

NOTE *Although present, the Audio button has no function on video only models.*

⑦ **Video button and LED —** The Video button selects and deselects video for a configuration that is being created or viewed. The Video LED lights to indicate that video is available for configuring or for viewing.

⑧ **Audio button and LED —** The Audio button selects and deselects audio for a configuration that is being created or viewed. The Audio LED lights to indicate that the audio configuration follows the video configuration. The Audio LED blinks to indicate that the audio configuration is broken away from the video configuration.

As a secondary function, the Audio button selects the audio level display/adjustment mode. Press and hold the Audio button until the Audio LED begins to blink. If the Video LED was lit, it turns off. Select an input. The current audio level setting for the selected input is displayed by the output LEDs. The audio level for the selected input can be increased and decreased by pressing the View (⑤) and Esc (⑥) buttons. A more detailed explanation of audio level adjustment is included in *Viewing and adjusting the audio level* on page 3-13.

Front panel I/O label windows

⑨ **Input and output label windows —** These translucent panels can be removed and replaced to insert labels behind the panels. To remove a panel, insert the Philips-head end of an Extron tweeker or small Philips-head screwdriver into the hole in one end of the panel, and gently slide the tab on the edge of the panel out of the recess in the switcher housing.

Input and output labels can be created easily with Extron's button label generator software, which ships with every Extron Matrix Switcher, or with any Brother P-Touch labeler. 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 for details on using the label software.
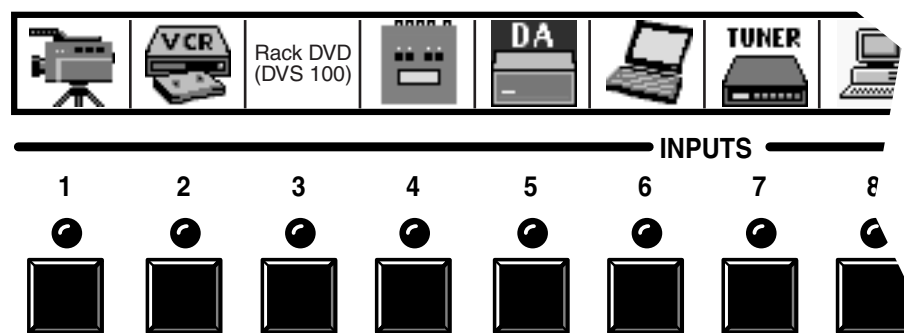
Figure 3-2 — Sample label

Front Panel Operations

The following paragraphs detail the power-up process and then provide sample procedures for creating ties, sets of ties, and configurations; changing a configuration; viewing ties, sets of ties, and configurations; muting and unmuting the video and audio; saving a preset; recalling a preset; and viewing and adjusting the audio level.

Power

On all models, power is automatically applied when the power cord is connected to an AC source. When AC power is applied, the switcher performs a self-test that blinks the front panel LEDs during the test. An error-free power up self-test sequence leaves the Video and/or the Audio LED(s) on, depending on the model, and all other LEDs off.

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

If an error occurs during the self-test, the switcher locks up and will not operate. If your switcher locks up on power-up, call the Extron S³ Sales & Technical Support Hotline.

Creating a configuration

The current configuration can be changed using the front panel buttons. To change the current configuration, do the following:

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

2. Select to configure video, audio, or both by pressing the Video and/or Audio buttons.

3. Select the desired input and output(s) by pressing the input and output buttons.

4. Press and release the Enter button.

5. Repeat steps 1 through 4 to create additional ties until the desired configuration is complete.

NOTE *1. Only one video input and one audio input can be tied to an output.*

2. 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.

3. To indicate current ties, output LEDs light when an input is selected. To clear unwanted outputs, press and release the associated output buttons.

4. If, when you configure video and audio ties, the Audio LED blinks and the Video LED is on after you select an input or output, the LEDs indicate audio breakaway, meaning that the audio ties are not the same as the video ties for that input.

5. If an input with no tie is selected, only that input's LED lights.

6. When the Video and Audio LEDs are on, if an input with an audio tie but no video tie is selected, the input's LED lights and the Audio LED blinks.

7. As each output is selected, the associated output LED blinks to indicate a tentative tie. LEDs 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.

Example 1: Creating a set of video and audio ties

See figure 3-3 and the following steps for an example in which input 5 is tied to outputs 3, 4, and 8 on a 12x8 Matrix 50 switcher with audio.

NOTE *This example assumes that there are no ties in the current configuration.*
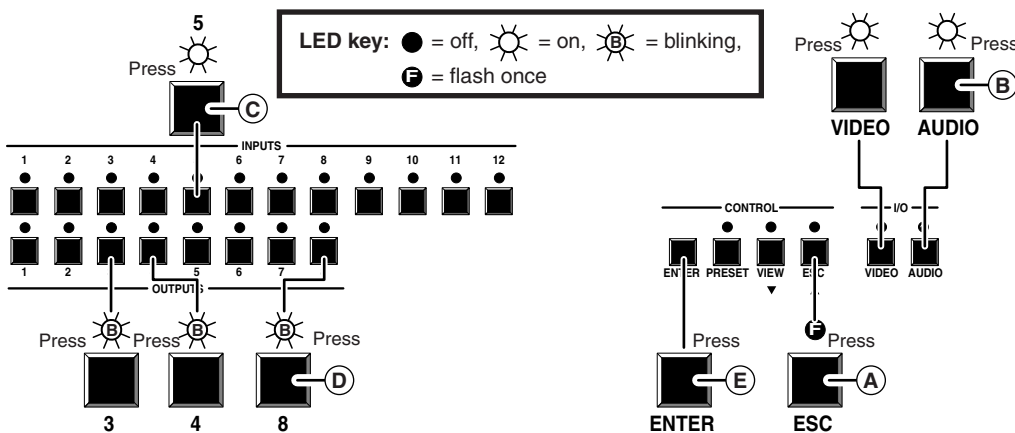
Figure 3-3 — Example 1: Creating a tie

(A) Press and release the Esc button. The Esc LED flashes once.

(B) To select video and audio for the tie, if necessary, press and release the Video and Audio buttons until the Video and Audio LEDs light.

(C) Press and release the input 5 button. The input 5 LED lights.

(D) Press and release the output 3, output 4, and output 8 buttons. The output 3, output 4, and output 8 LEDs blink to indicate a tentative tie.

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

(E) Press and release the Enter button. The input and output LEDs turn off. The current configuration is now defined as video and audio input 5 tied to video and audio output 3, output 4, and output 8.

Example 2: Adding a tie to a set of video and audio ties

See figure 3-4 and the following steps for an example in which a new video tie is added to the current configuration on a 12x8 Matrix 50 switcher with audio.
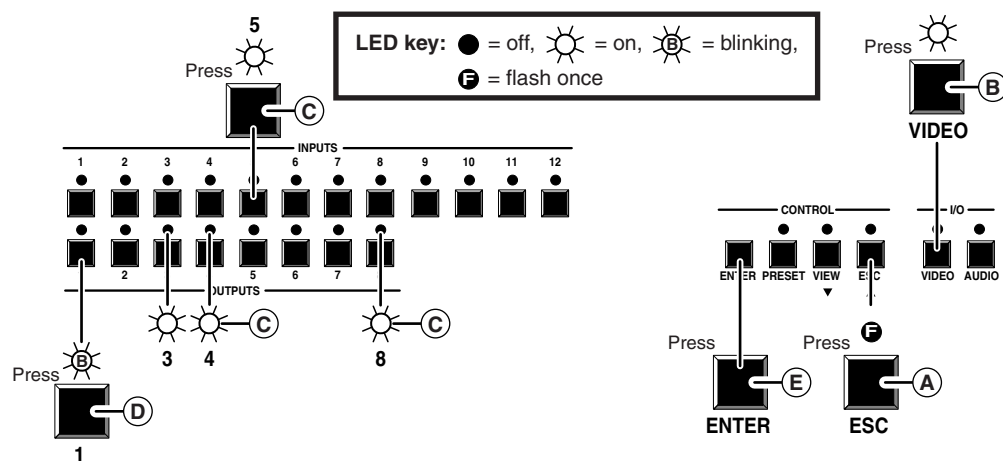
Figure 3-4 — Example 2: Adding a video tie

(A) Press and release the Esc button. The Esc LED flashes once.

(B) To select video only for the tie, if necessary, press and release the Video and Audio buttons until the Video LED lights and the Audio LED is off.

(C) Press and release the input 5 button. The input 5 LED lights. If the steps in Example 1 have been completed, the output 3, output 4, and output 8 LEDs light to indicate ties created in Example 1.

(D) Press and release the output 1 button. The output 1 LED blinks to indicate a tentative tie.

(E) Press and release the Enter button. The input and output LEDs turn off. The current configuration is now video input 5 tied to video output 1, output 3, output 4, and output 8; and audio input 5 tied to audio output 3, output 4, and output 8.

Example 3: Removing a tie from a set of video and audio ties

See figure 3-5 and figure 3-6 and the following steps for an example in which an existing audio tie is removed from the current configuration on a 12x8 Matrix 50 switcher with audio.

(A) Press and release the Esc button. The Esc LED flashes once.

(B) To select audio only for the tie, if necessary, press and release the Video and Audio buttons until the Video LED is off and the Audio LED lights.

Ⓒ Press and release the input 5 button. The input 5 LED lights. If the steps in Example 1 have been completed, the output 3, output 4, and output 8 LEDs light to indicate ties created in Example 1.

NOTE *The output 1 LED does not light, even if the steps in Example 2 have been completed, because Example 2 added a video tie only.*
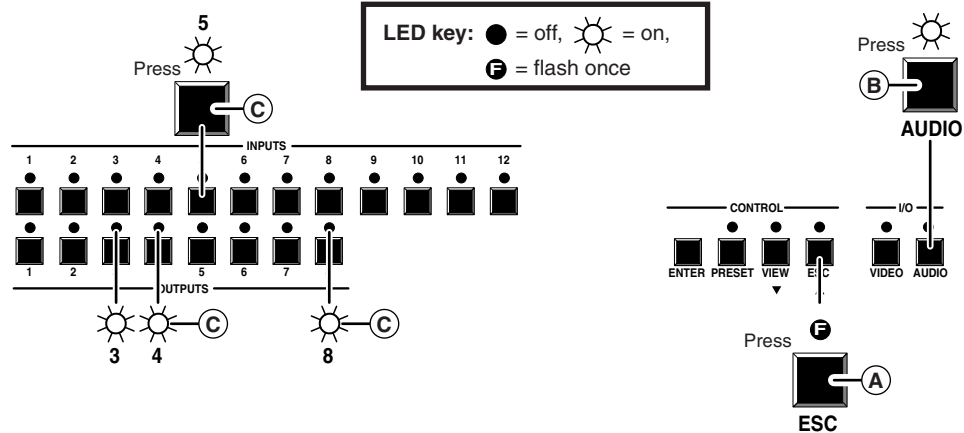
Figure 3-5 — Example 3: Selecting audio and selecting input 5

Ⓓ Press and release the output 4 button (figure 3-6). The output 4 LED turns off, while the output 3 and output 8 LEDs remain lit.
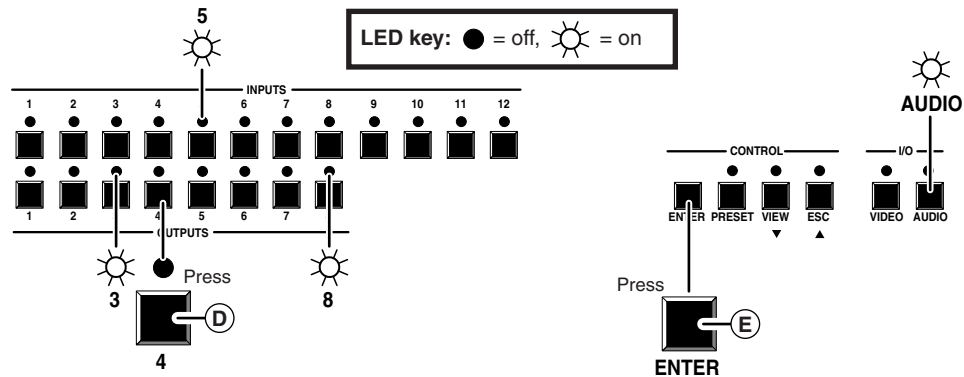
Figure 3-6 — Example 3d: Removing an audio tie

Ⓔ Press and release the Enter button. The input and output LEDs turn off. The current configuration is now video input 5 tied to video output 1, output 3, output 4, and output 8; and audio input 5 tied to audio output 3 and output 8.

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 on a 12x8 Matrix 50 switcher with audio. View-only mode also provides a way to mute video and audio outputs (see *Muting and unmuting video and/or audio* in this chapter.

To view the current configuration, do the following:

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

2. Press and release the View button.

3. Select video, audio, or both to view by pressing the Video and/or Audio buttons.

4. Select the desired input or output(s) for which ties need to be viewed by pressing the input and output buttons.

   NOTE *1. To see all ties of the current configuration, press and release each input and output button, one at a time, with the Video and Audio LEDs on.*

   2. In view-only mode, you can view video and audio, video-only, or audio-only ties. Pressing and releasing the Video and Audio buttons toggles each on and off.

   3. If, when you view video and audio ties, the Audio LED blinks and the Video LED is on after you select an input or output, the LEDs indicate that the audio ties are not the same as the video ties for that input (audio breakaway is active). Toggle the Video LED off by pressing and releasing the Video button.

   4. When you enter view-only mode, the output LEDs turn on for all outputs without ties. Likewise, when an output button for which there are no ties is pushed, the output LEDs turn on for all outputs without ties. The blinking Audio LED indicates audio breakaway for one or more of those outputs.

Example 4: Viewing video and audio, audio only, and video only ties

See figure 3-7, figure 3-8, figure 3-9, and figure 3-10 and the following steps for an example of viewing the video and audio, audio-only, and video-only ties in the current configuration on a 12x8 Matrix 50 switcher with audio.

NOTE *Example 4 shows the process of viewing the current configuration after the steps in Examples 1, 2, and 3 have been completed.*

Figure 3-7 — Example 4: Viewing the current configuration

(A) Press and release the Esc button. The Esc LED flashes once.

(B) Press and release the View button to enter view-only mode. The View LED lights.

(C) To select both video and audio for viewing, if necessary, press and release the Video and Audio buttons until the Video LED and Audio LED light. With no input LED selected, all output LEDs that have no established ties light.

(D) Press and release the input 5 button (figure 3-8). The input 5 LED lights.

If ties are established for input 5, all output LEDs toggle; outputs with no ties turn off and the LEDs associated with all outputs tied to input 5 (audio, video, or audio and video ties) light. If no ties are established for input 5, all output LEDs turn off.

If audio is broken away, the Audio LED blinks.
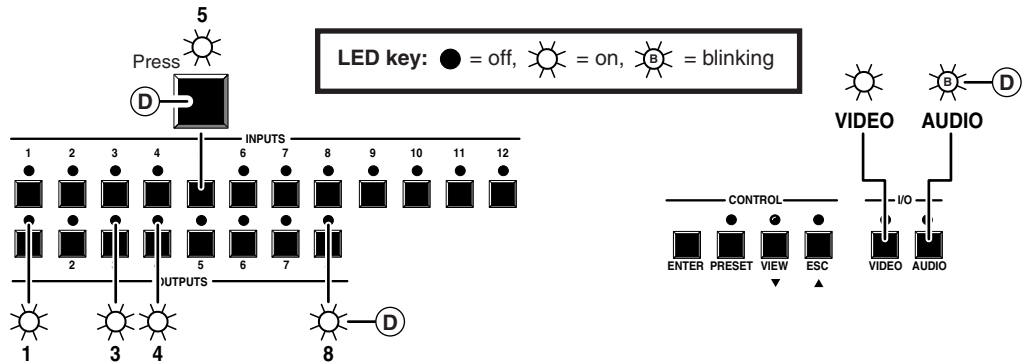
Figure 3-8 — Example 4d: Viewing the current configuration, video and audio

NOTE   *A set of ties can also be viewed by selecting a tied output. To demonstrate this, note the number of a lit output LED, and press and release the output button for an unlit (untied) output LED. Observe that all of the untied outputs light. Then press the output button for the output LED noted previously and observe that the selected output LED, the tied input LED (input 5), and the output LEDs light for all of the outputs that are tied to the input.*

(E) Press and release the Video button to toggle the Video LED off (figure 3-9). If audio is broken away, the Audio LED stops blinking and lights steadily.
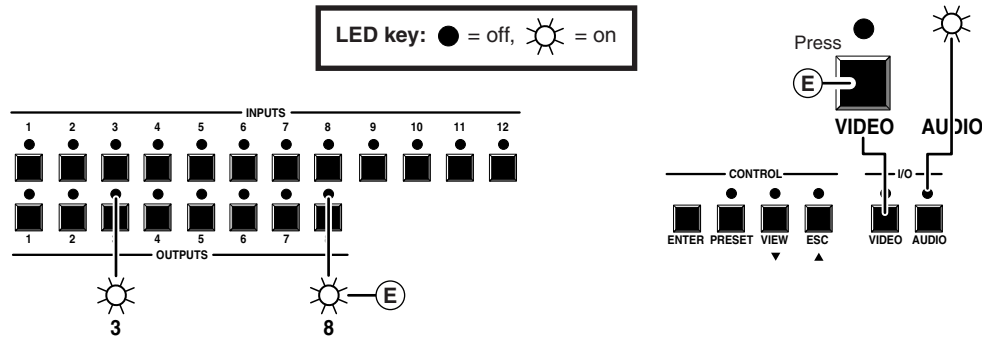
Figure 3-9 — Example 4e: Viewing the current configuration, audio only

If audio ties are established for input 5, the output LEDs for all audio outputs tied to input 5 light. If no ties are established for input 5, all output LEDs turn off.

(F) Press and release the Video and Audio buttons to toggle the Video LED on and the Audio LED off (figure 3-10).

If video ties are established for input 5, the output LEDs for all video outputs tied to input 5 light. If no ties are established for input 5, all output LEDs turn off.
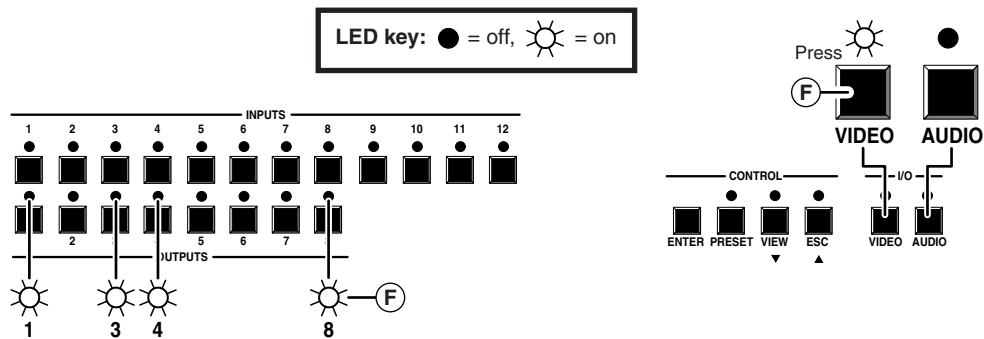
Figure 3-10 — Example 4f: Viewing the current configuration, video only

Muting and unmuting video and/or audio

Individual outputs can be muted or unmuted by doing the following:

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

2. Press and release the View button.

3. Select video, audio, or both to mute or unmute by pressing the Video and/or Audio buttons.

4. One at a time, press and **hold** the output button(s) for the desired output(s) for approximately 2 seconds. The output LED(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.

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

NOTE *1. You can mute video and audio, video-only, or audio-only outputs. Pressing and releasing the Video and Audio buttons toggles each selection on and off.*

*2. When you enter view-only mode, the output LEDs turn **on** for all outputs **without** ties.*

3. When you mute video, the mute command mutes all video planes.

*4. Mutes are **not** saved to non-volatile memory. When power is removed and restored, the mute settings are lost.*

Example 5: Muting and unmuting an output

See figure 3-7, on page 3-8, and figure 3-11 and the following steps for an example of muting and unmuting several 12x8 Matrix 50 switcher outputs.

NOTE *Figure 3-7 shows the process of viewing the current configuration after the steps in Examples 1, 2, and 3 have been completed.*
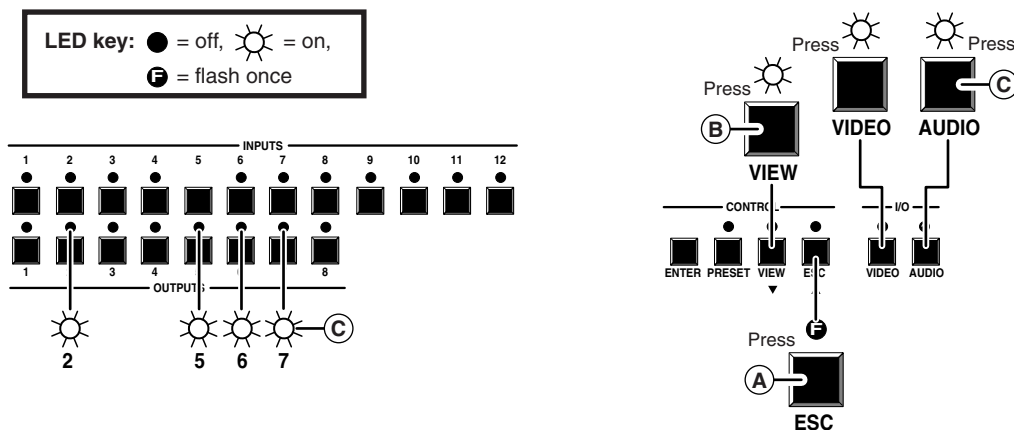
(A) Press and release the Esc button. The Esc LED flashes once.

(B) Press and release the View button to enter view-only mode. The View LED lights.

(C) To select both video and audio for viewing, if necessary, press and release the Video and Audio buttons until the Video LED and Audio LED light. With no input LED selected, all output LEDs that have no established ties light.

D **One at a time**, press an **hold** the Output 3 and Output 4 buttons (figure 3-11) for approximately 2 seconds until the associated output LED begins to blink. The output 3 and output 4 video and audio signals are muted.

NOTE *Figure 3-11 shows only the indications directly related to the mute operation. Indications from existing ties are not shown to avoid confusion.*
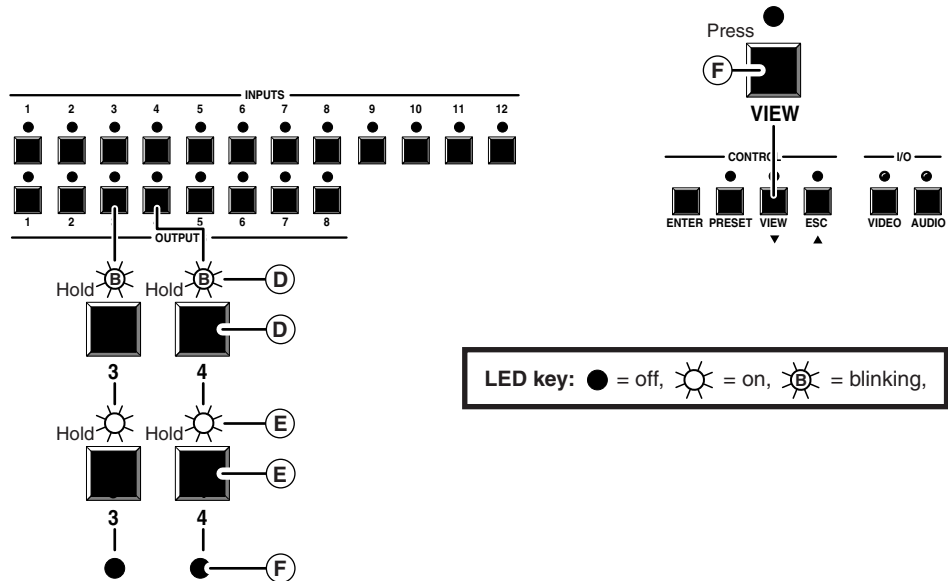
Figure 3-11 — Example 5, step d: Muting and unmuting outputs

E **One at a time**, press and **hold** the Output 3 and Output 4 LEDs for approximately 2 seconds until the associated output LED lights steadily. The output 3 and output 4 video and audio signals are unmuted.

F Press and release the View button to exit view-only mode. The View LED and all input and output LEDs go out.

Using global memory presets

The current configuration (configuration 0) can be saved as a preset in any one of 12 preset memory addresses.

NOTE
1. *Only the audio and video ties are stored and recalled; audio gain settings are not saved, and they do not change when a preset is recalled.*

2. *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 for more details.*

3. *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.*

4. *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

See figure 3-12 and the following steps for an example of saving the current configuration as a preset on a 12x8 Matrix 50 switcher with audio.
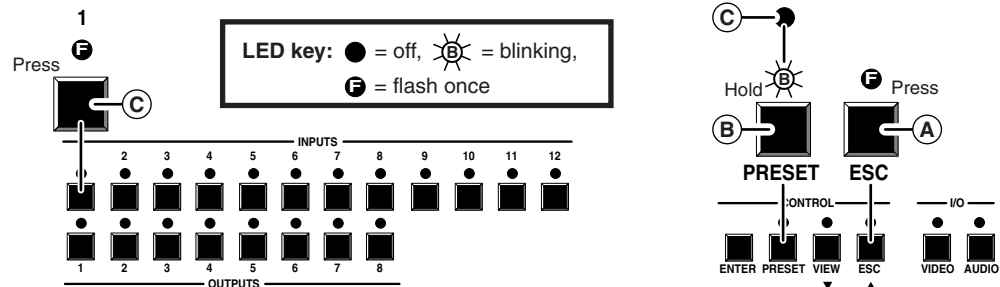
Figure 3-12 — Example 6: Saving the current configuration as preset 1

(A) Press and release the Esc button. The Esc LED flashes once.

(B) Press and **hold** the Preset button for approximately 2 seconds until the Preset LED begins to blink, then release the Preset button.

(C) Press and release the input 1 button. The input 1 LED lights flashes once. The Preset LED turns off.

Example 7: Recalling a preset

See figure 3-13 and the following steps for an example of recalling the current configuration as a preset on a 12x8 Matrix 50 switcher with audio.
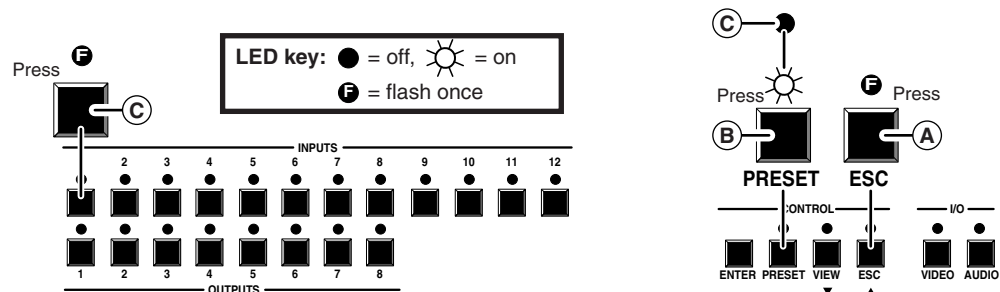
Figure 3-13 — Example 7: Recalling preset 1

(A) Press and release the Esc button. The Esc LED flashes once.

(B) Press and release the Preset button. The Preset LED lights.

(C) Press and release the input 1 button. The input 1 LED flashes once. The Preset LED turns off. The configuration stored in memory location 1 is now the current configuration and can be viewed in the view-only mode (Example 4).

Viewing and adjusting the audio level

The audio level of each input can be displayed and adjusted through a range of -15dB to +9dB to ensure that there is no noticeable volume difference among sources. The audio level can be adjusted from the front panel or by using Extron's Windows-based control program.

1. Press and **hold** the Audio button until the Audio LED begins to blink, then release the Audio button.

2. Press and release an input button to select an input. The audio level for the selected input is displayed by the output LEDs and the polarity (+ or -) is displayed by the view or Esc LEDs.

3. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level.

4. Press and release the Audio button to exit the audio display and adjustment mode. The Audio LED stops blinking and turns off.

NOTE

1. There is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.

2. The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.

Example 8: Viewing and adjusting an audio level

See figure 3-14 and figure 3-15 and the following steps for an example of viewing and adjusting the audio level on a 12x8 Matrix 50 switcher with audio.

Ⓐ Press and release the Esc button. The Esc LED flashes once.

Ⓑ Press and **hold** the Audio button for approximately 2 seconds until the Audio LED begins to blink, then release the Audio button.

Ⓒ Press and release the input 5 button. The input 5 LED lights. The audio level for the selected input is displayed by the output LEDs. The polarity is indicated by either the Esc (▲) or View (▼) LED blinking.

Each output LED indicates 1dB when blinking and 2dB when lit.

The blinking Esc (▲) LED indicates a positive (gain) level. The blinking View (▼) LED indicates a negative (attenuation) level.

Figure 3-14 — Example 8: Viewing the audio level

(D) Press and release the View (▼) button once to decrease the audio level displayed by the output LEDs by 1dB. Press and release the View (▼) button several more times to decrease the audio level displayed by the output LEDs by an additional 1dB per button push. Note the output LED, View LED, and Esc LED changes that occur each time the View (▼) button is pressed and released. Figure 3-15 shows the result of pressing the View (▼) button a total of 9 times. Note that the Esc (▲) LED has turned off and that the View (▼) LED is blinking to indicate a negative level.

NOTE *If another input button is pressed and released, the level value for the current input is saved and the level value for the newly selected input is displayed.*
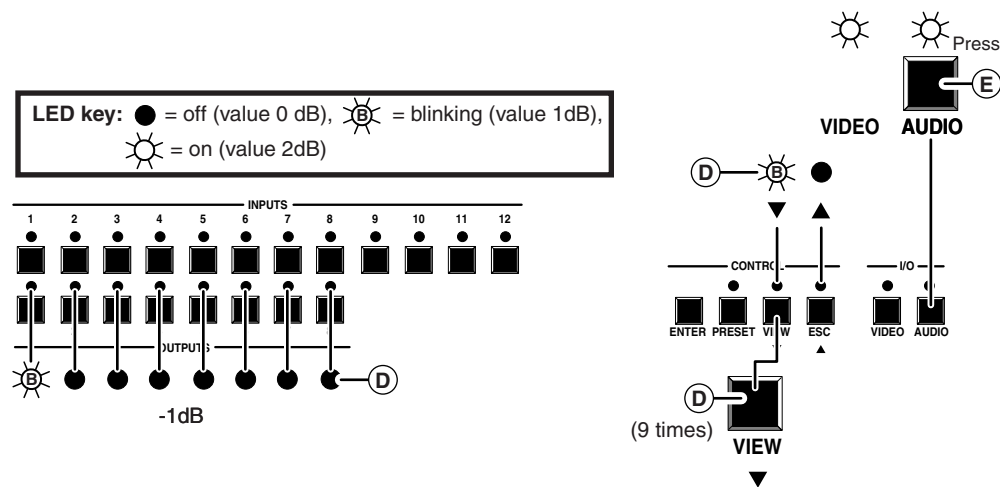
Figure 3-15 — Example 8d: Adjusting the audio level

(E) Press and release the Audio button. The Audio LED stops blinking and the View (▼) LED (if lit), the Esc (▲) LED (if lit), the selected input LED, and all output LEDs turn off.

NOTE *Both the Video and Audio LEDs light.*

Executive mode (front panel security lockout)

The executive mode limits the operation of the Matrix 50 switcher from the front panel. When the switcher is in executive mode, all of the front panel functions are disabled except for the view-only mode functions. See *Viewing a configuration*

on page 3-7. Other than in view-only mode, if the user pushes a front panel button when the switcher is in executive mode, that button's associated LED flashes twice and goes out.

To toggle executive mode on or off, press and hold the Video and Audio buttons for approximately two seconds. The Video and Audio LEDs blink twice to indicate the mode change. Release the Video and Audio buttons. To toggle the executive mode state again, press and hold the Video and Audio buttons again.

System reset to factory defaults

To reset the switcher to the factory default settings, press and hold the Esc button on the front panel while AC power is being applied. Continue to hold the Esc button until the power-up sequence is completed (all LEDs turn off, the Video and Audio LEDs turn on, and the Esc LED blinks). System reset clears all ties and presets, and sets all audio gain levels to unity gain (+0dB).

Troubleshooting

This paragraph gives recommendations on what to do if you have problems operating the Matrix 50, and it provides examples and descriptions for some image problems you may encounter.

General checks

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if one of the input LEDs is lit.

2. Ensure an active input is selected for output on the switcher.

3. Ensure that the proper signal format is supplied.

4. Check the cabling and make corrections as necessary.

5. Call the Extron S³ Sales & Technical Support Hotline if necessary.

Plasma display S-video problem

Extron has encountered a problem with the S-video output by some video conference codecs. Some codecs change the DC offset on the chrominance (C) so that it is very different from the level on the luminance (Y). This can cause a plasma display to come up in the wrong size mode.

With the matrix switcher taken out of the system, the plasma works fine. It looks like a Extron problem, but **it is not**. The matrix switcher boosts the bad codec output, which makes the plasma go to the wrong setting.

Solution: Try placing an Extron video DC block adapter, part **#26-495-01**, on the luminance (Y) input to the switcher from the codec.

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 3-19 and use one for each preset configuration. The forms accommodate all Matrix 50 Series switcher configurations. Cross off all unused or inactive inputs and outputs. Use different colors for video and audio.

Operation, cont'd

Worksheet example 1: System equipment

Figure 3-16 shows a worksheet for a 12x8 Matrix 50 switcher with audio in a
fictional organization with the system hardware annotated. Inputs 10 and 11
and output 7 have no connections in this organization, so they have been
crossed out on the worksheet.
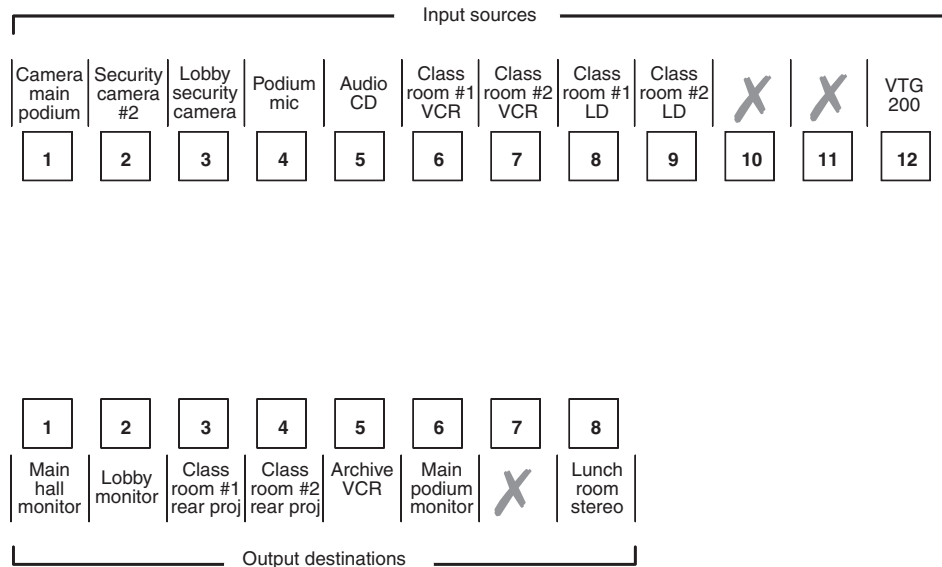
Figure 3-16 — Worksheet example 1: System equipment

Inputs include video cameras, audio tape and CD players, laser disc players,
VCRs, and a VTG 200 video test generator. Output devices include monitors,
front and rear projectors, a stereo, and a VCR. This example, labeled preset 3, is
used as the daily configuration. Choose your own method of notation.

The Extron VTG 200 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 out the audio components.

Worksheet example 2: Daily configuration

Figure 3-17 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 3, a solid ink line shows video ties, and a dashed pencil line shows the audio ties. In this example, the image of the presenter, from the main podium camera (input 1) is displayed on the main podium monitor (output 6) and taped on the VCR (output 5) for a tape archive. The audio from the presenter's microphone (input 4) is also routed to the podium monitor (output 6) and the VCR (output 5). Videotaped material from two VCRs (inputs 6 and 7) is displayed on two rear projection displays (outputs 3 and 4). Classical music from the CD player (input 5) is played on the lunch room stereo (output 8). Meanwhile security cameras (inputs 2 and 3) are routed to two local monitors (outputs 1 and 2).

Input sources

Camera main podium	Security camera #2	Lobby security camera	Podium mic	Audio CD	Class room #1 VCR	Class room #2 VCR	Class room #1 LD	Class room #2 LD	✗	✗	VTG 200
1	2	3	4	5	6	7	8	9	10	11	12

1	2	3	4	5	6	7	8
Main hall monitor	Lobby monitor	Class room #1 rear proj	Class room #2 rear proj	Archive VCR	Main podium monitor	✗	Lunch room stereo

Output destinations

Preset #   3   Title: Daily configuration   Video: ——   Audio: – –
Fill in the preset number, use colors or dashes, etc. to make connecting lines.
Indicate if the configuration is for Video, Audio, or both.

Figure 3-17 — Worksheet example 2: Daily configuration

Worksheet example 3: Test configuration

The A/V system in this fictional organization needs to be fine tuned on a regular basis. Figure 3-18 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all monitors (outputs 1, 2, 3, 4, and 6). Sound checks are run from the CD player (input 5) to all audio systems (outputs 3, 4, 6, and 8).
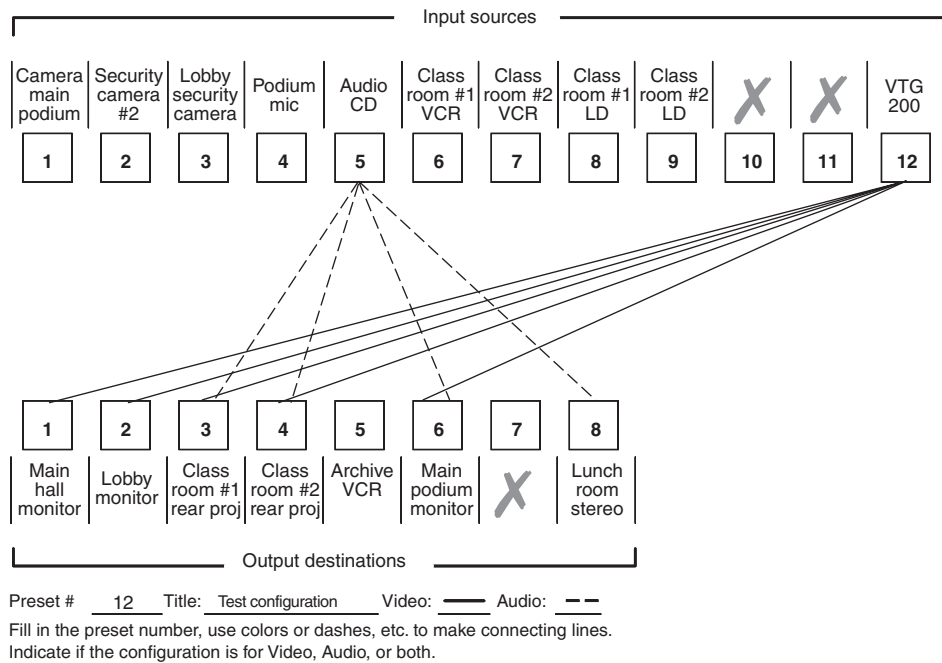
Figure 3-18 — Worksheet example 3: Test configuration

Input sources

1 2 3 4 5 6 7 8 9 10 11 12

Output destinations

1 2 3 4 5 6 7 8
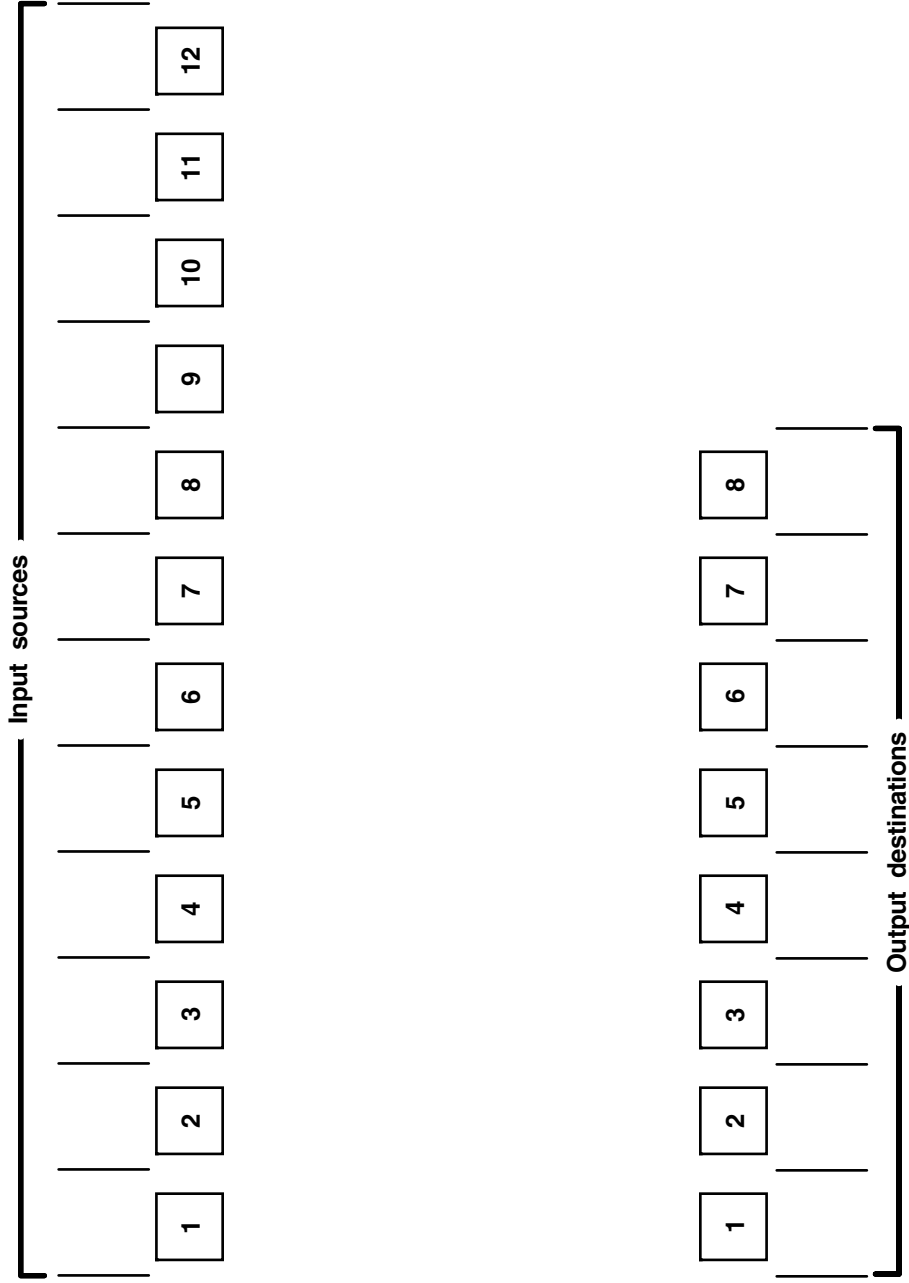
Preset # _____ Title: _____ Video: _____ Audio: _____
Fill in the preset number and use colors, or dashes, etc. to make connecting lines.
Indicate if the configuration is for video, audio, or both.

Configuration worksheet

Chapter Four

4

Programmer's Guide

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Table

Command/Response Table

Programmer's Guide

The switcher's rear panel RS-232/RS-422 connector (figure 4-1) can be connected to the serial port output of a host device such as a computer, RS-232 capable PDA, or control system. This connection makes software control of the switcher possible.

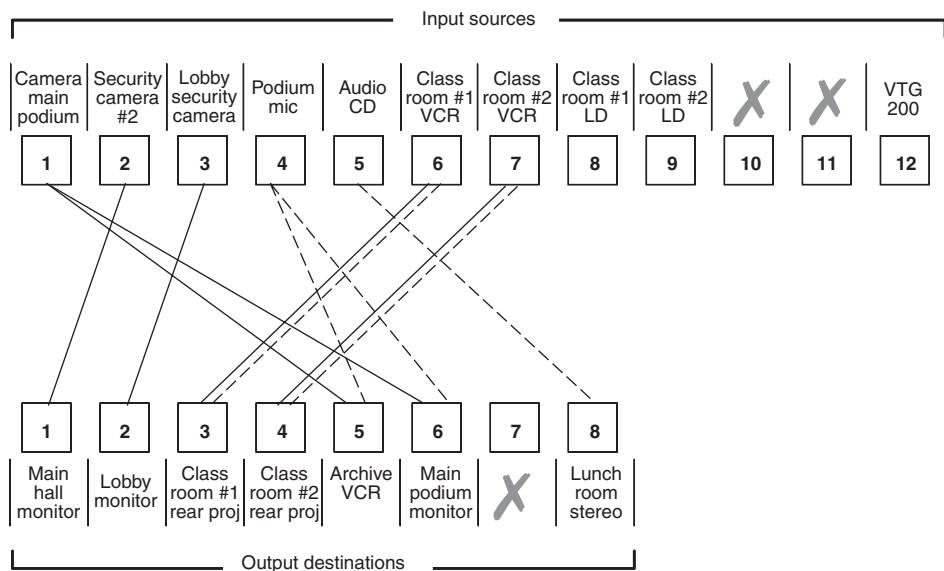| Pin	RS-232	Function	RS-422	Function
1	—	Not used	TX-	Transmit data (-)
2	TX	Transmit data	TX+	Transmit data (+)
3	RX	Receive data	RX+	Receive data (+)
4	—	Not used	RX-	Receive data (-)
5	Gnd	Signal ground	Gnd	Signal ground
6	—	Not used	—	Not used
7	—	Not used	—	Not used
8	—	Not used	—	Not used
9	—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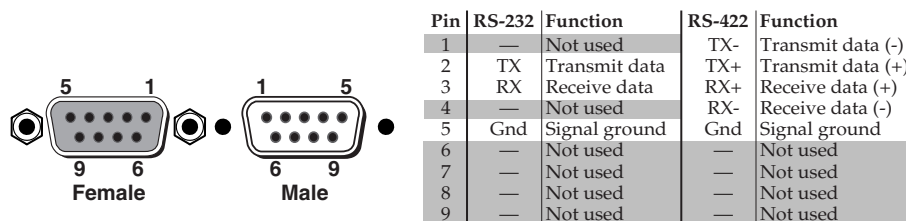
Figure 4-1 — RS-232/RS-422 connector pin arrangement

NOTE *The Matrix 50 Series switchers are factory configured for RS-232 control. To use the switcher under RS-422 control, an internal cable must be moved. See appendix B for the procedure for moving the cable.*

The RS-232/RS-422 connector on the Matrix 50 Series switcher is a 9-pin D female connector with pin assignments as shown in figure 4-1.

The protocol is 9600 baud, 8-bit, 1 stop bit, no parity, and no flow control.

Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through the RS-232/RS-422 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 (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

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

(C) Copyright 2002, Extron Electronics "CrossPoint/Mav/Matrix", Vx.xx ↵

The copyright message is initiated by the switcher when it is first powered on. Vx.xx is the firmware version number.

RECONFIG ↵

The reconfig message is initiated by the switcher when a front panel operation has occurred, an audio gain adjustment has been completed, or a memory preset has been recalled.

RAM Test Failed ↵
ROM Checksum Failed ↵
EEPROM Reset (Presets/Attenuators) ↵
Serial EEPROM Reset (Current Settings) ↵
Invalid Jumpers ↵

If an error occurs during power-up, the switcher initiates one or more of the messages listed above.

All Configuration Memory Cleared ↵

The memory cleared message is initiated by the switcher when a system reset has occurred. See *System reset to factory defaults* in chapter 3.

The switcher does not expect a response from the host, but, for example, the host program might request a new status.

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 (too large)
E12 — Invalid output number (too large)
E13 — Invalid value (out of range)
E14 — Illegal command for this configuration
E17 — Timeout (only caused by direct write of global presets)

Using the Command/Response Table

The command/response table begins on the next page. Lower case letters are acceptable in the command field only where indicated. Symbols are used throughout the table to represent variables in the command/response fields. Command and response examples are shown throughout the table.

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

Command/Response Table

Symbol Definitions:

↵ = Carriage return/line feed

← = Carriage return (no line feed)

• = space

X1 = Input number   1 – 12

X2 = Output number   1 – 8

X3 = Input number (for tie) 0 – maximum number of inputs (0=disconnected)

X4 = Audio gain   0 – 9 (1dB/step)

X5 = Audio attenuation   1 – 15 (1dB/step)

X6 = Numeric dB value   -15 to +09

X7 = Global preset number 0 – 12 (0 = current configuration)

X8 = Preset number   01 – 12

X9 = Mute status   0 = no mute, 1 = video mute, 2 = audio mute, 3 = V and A mute

X10 = Executive mode, mute 1 = on, 0 = off

X11 = Controller software version number to second decimal place

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

Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Create ties			
Tie input X3 **to output** X2**, A & V**	X3 * X2 !	OutX2•InX3•All↵	
Example:	1*3!	Out03•In01•All↵	Tie input 1 A & V to output 3.
Tie input to output, RGBHV only	X3 * X2 &	OutX2•InX3•RGB↵	Audio breakaway.
Example[1]:	10*4&	Out04•In10•RGB↵	Tie input 10 RGB to output 4.
Tie input X3 **to output** X2**, video only**	X3 * X2 %	OutX2•InX3•Vid↵	Audio breakaway.
Example[1]:	7*5%	Out05•In07•Vid↵	Tie input 7 video to output 5.
Tie input X3 **to output** X2**, audio only**	X3 * X2 $	OutX2•InX3•Aud↵	Audio breakaway.
Example:	12*8$	Out08•In12•Aud↵	Tie input 12 audio to output 8.
Quick multiple tie	Esc QX3*X2!…X3*X2!←	Out•Multi•In•Multi•All↵	
Example:	Esc Q3*4!3*5!3*6!←	Out•Multi•In•Multi•All↵	Tie input 3 to outputs 4, 5, and 6.
Tie input to all outputs	X3!	Out•Multi•InX3•All↵	
Example:	5!	Out•Multi•In05•All↵	Tie input 5 to all outputs.
Audio input gain and attenuation			
Set audio input gain to +dB value	X1 * X4 G	InX1•Aud=X6 ↵	
Example:	1*2G	In01•Aud=+02↵	Set input 1 audio gain to +2dB.
Set audio input attenuation to -dB value	X1 * X5 g	InX1•Aud=X6 ↵	
Increment gain up	X1{G	InX1•Aud=X6↵	
Example:	5 {G	In05•Aud=+03↵	Audio input 5 level incremented from +2dB to +3dB.
Decrement gain down	X1}G	InX1•Aud=X6 ↵	
Example:	7}G	In07•Aud=-09↵	Audio input 7 level decremented from -8dB to -9dB.
Global memory presets			
Save current configuration as preset	X8 ,	SprX8↵	Command character is a comma.
Example:	9,	Spr09↵	Save current ties as preset 9.

Command/response table for SIS commands (Cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Recall a preset	⟦X8⟧.	Rpr⟦X8⟧↵	Command character is a period.
Example:	5.	Rpr05↵	Recall preset 5, which becomes the current configuration.
Start direct write of global presets	Esc P ⟦X8⟧ ← {**Tie** commands}	Write Preset ⟦X8⟧ Ready ↵	Allows direct entry of presets. {Define ties for preset.}
End direct write of global presets	Esc p ←	End Write Preset ⟦X8⟧↵	Saves directly written presets.
Quick recall preset	Esc . ←	Rpr⟦X8⟧↵	Command character is a period.

NOTE

1. This sequence of commands forces the switcher to perform a complete backplane switch within 60 msecs of receipt of the Quick recall command.

2. The switcher ignores any invalid command or non-switching commands received between the Start and End commands.

3. If there is no activity for 5 seconds, the switcher returns the timeout (E17) error.

4. The switcher disables front panel switching during this sequence of commands.

5. The switcher returns the invalid command (E10) error if it receives the End command without the start command or the Quick recall command without a prior direct preset write.

6. The switcher must receive the Quick recall command within 100 msecs of the End command.

Example:

	Esc P10←	Write Preset 10 Ready ↵	Creates new preset 10 with:
	1*3!		A & V Input 1 tied to output 3.
	7*8%		Video input 7 tied to output 8[1].
	10*4&		RGB input 10 tied to output 4[1].
	12*4$		Audio input 12 tied to output 4.
	Esc p ←	End Write Preset 10 ↵	Stops entry, saves preset 10.
	Esc . ←	Rpr10↵	Recalls the preset.

Video mute commands

Command	ASCII Command	Response	Additional description
Video mute	⟦X2⟧*1B	Vmt⟦X2⟧*1↵	Mute output ⟦X2⟧ video (video off).
Video unmute	⟦X2⟧*0B	Vmt⟦X2⟧*0↵	Unmute output ⟦X2⟧ video (video on).
Read video mute	⟦X2⟧B	⟦X10⟧↵	1= mute on, 0 = mute off.
Global RGB mute	1*B	Vmt1↵	
Global RGB unmute	0*B	Vmt0↵	

Audio mute commands

Command	ASCII Command	Response	Additional description
Audio mute	⟦X2⟧*1Z	Amt⟦X2⟧*1↵	Mute output ⟦X2⟧ video (audio off).
Audio unmute	⟦X2⟧*0Z	Amt⟦X2⟧*0↵	Unmute output ⟦X2⟧ video (audio on).
Read audio mute	⟦X2⟧Z	⟦X10⟧↵	1= mute on, 0 = mute off.
Global audio mute	1*Z	Amt1↵	
Global audio unmute	0*Z	Amt0↵	

Executive mode

Command	ASCII Command	Response	Additional description
Lock front panel	X	Exe1↵	Enable executive mode.
Unlock front panel	x	Exe0↵	Disable executive mode.

Resets

Command	ASCII Command	Response	Additional description
Reset global presets	Esc zG	ZapG••↵	Clear all global presets.
Reset audio levels	Esc zA	ZapA••↵	Reset all audio levels to 0dB.
Reset whole switcher	Esc zXXX	ZapXXX↵	Clears all ties and global presets and resets all audio gains to 0dB.

Command/response table for SIS commands (Cont'd)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, and presets			
View video output tie	V/v [X2] %	Out[X2]•In[X3]•Vid↵	
Example:	v7%	Out07•In02•Vid↵	Output 7 video tied to input 2 video.
View audio output tie	V/v [X2] $	Out[X2]•In[X3]•Aud↵	
Example:	V3$	Out03•In06•Aud↵	Output 3 audio tied to input 6 audio.
View gain for input	V/v [X1] G	In[X1]•Aud=[X6]↵	
Example:	v4G	In04•Aud=-02↵	Gain for input 4 is -2dB.
View all output mutes	VM	[X9]•(up to 16)•Mut↵	Each position listed in the response is an output, left = output 1, right = *n* (*n* = the maximum number of outputs for this model).
Example[2] (12 x 8 model):	VM	0•1•0•2•0•3•0•0•Mut	
View preset configuration	V/v [X7] .	[X3]•(up to 8 total)•Vid•[X3]•(up to 8 total)•Aud↵	

> **NOTE** *Each position listed in the response is an output, left = output 1, right= output* n (n *is the maximum number of outputs). The number in each position is the input tied to the output represented by that position.*

Response description: Input# (I#) assigned to output# (O#)1•I# to O#2...I# to O#n•*Vid*•I# to O#1•I# to O#2...I# to O#n•*Aud*↵

Example[2] (12 x 8 model): V0.   Preset #0 is current configuration.

Video input 8 tied to output 2   Audio input 5 tied to output 2   No tied audio input

Response = tied input: 08•08•08•08•07•09•11•03•Vid•05•05•05•05•07•09•11•00•Aud↵
Output: 01 02 03 04 05 06 07 08   01 02 03 04 05 06 07 08

Video = Input (I) 8 is tied to outputs (O) 1–4; I7— O5; I9 — O6; I11 — O7; I3 — O8.

Audio = The same as video except that input 5 is tied to outputs 1–4 and no input is tied to output 8.

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Information requests			
Information request	I/i	V[X1]X[X2]•A[X1]X[X2]•Exe[X10]↵	V[X1]X[X2] = V size, A[X1]X[X2] = A Size.
Example:	i	V12X08•A12X08•Exe0↵	12 Video & Audio inputs and 8 Video & Audio outputs, front panel unlocked.
Request part number	N/n	N60-359-01↵	
Example:	N	N60-359-01↵	This is the only response for all configurations.
Query software version	Q/q	Ver[X11]↵	
Example:	Q	Ver2.00↵	Version shown is for example only.

[2] Video-only models do not display audio configuration or mutes, and the number of outputs shown varies with the number of video or audio outputs.

Chapter Five

Matrix Software

Matrix Switcher+ Control Program

Button-Label Generator

Matrix Software

Two software programs accompany the Matrix 50 Series switchers:

- The Extron Matrix Switchers Control Program (Extron part number 29-015-01), which communicates with the switcher via the RS-232/RS-422 port, provides an easy way for you to set up ties and sets of ties.

  NOTE *If your Matrix 50 Series switcher was previously set up for RS-232, and your computer comm port uses RS-422, you must change the switcher cabling to match the computer interface. See Appendix B,* Reference Information *for details.*

- The Extron Button-Label Generator allows you to design and print labels for the switcher's front panel buttons.

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

Matrix Switcher+ Control Program

Installing the software

The program is contained on a set of 3.5-inch diskettes, and you should load and run the program from the hard drive.

To install the program from the floppy disks to the hard drive, run SETUP.EXE from the floppy disk and follow the instructions that appear on the screen. The program occupies approximately 3 MB (megabyte) of hard-drive space.

By default, the Windows installation creates a C:\MTRX directory, and it places two icons (Matrix Switcher+ Control Program and Matrix Switcher+ Help) into a group or folder named "Extron Electronics".

NOTE *The program was designed to control most Extron matrix switchers, but its operation will be limited to the features and configuration of your Matrix 50 Series switcher.*

Using the software

Overview

This section is an overview of the Extron Matrix Switcher+ Control Program. The help function contains additional information. See *Using the help system* on page 5-5 for details.

1. To run the Matrix Switcher+ Control Program, double-click on the Matrix Switcher+ Control Program icon (shown at left) in the Extron Electronics group or folder.

    MTRX

    MATRIX Switcher+
    Control Pgm

2. Click on the comm port that is connected to the RS-232/RS-422 port of the switcher. To set up the software without attaching the switcher to the computer, see *Using emulation mode* on page 5-5.

    The Extron Matrix Switcher+ Control Program window (figure 5-1 and figure 5-2) displays the current configuration of the attached matrix.

3. To set up audio in follow mode (audio and video have the same tie configuration), select the Group box at the bottom of the window. To set up audio in breakaway mode (audio and video have different tie configurations), deselect the Group box.

4. To make the control program easier to use, you can 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.

5. 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.
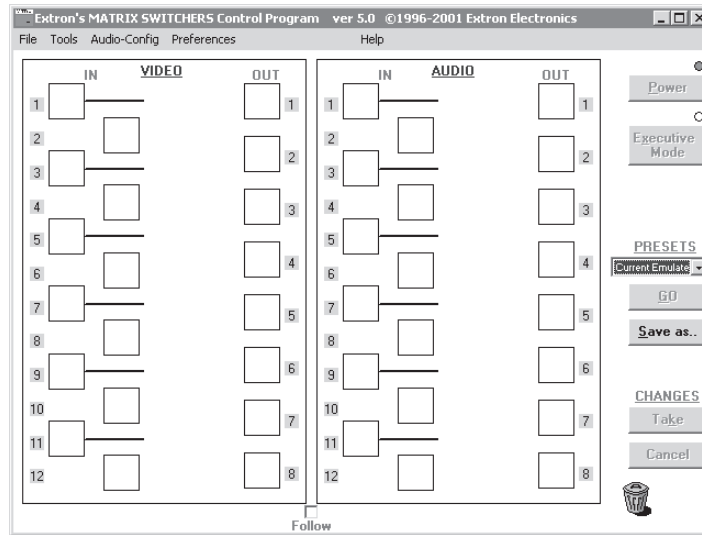
Figure 5-1 — Extron Matrix Switcher+ Control Program window (blank)
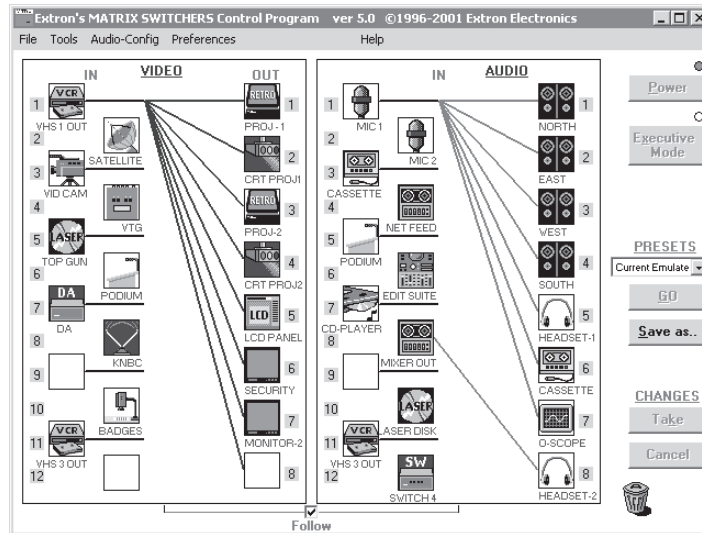
Figure 5-2 — Sample program window (complete)

Windows buttons

The buttons on the right side of the window perform the following functions:

Power — Unavailable for Matrix 50 switchers, because the switcher power cannot be controlled via software.

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

Presets menu — Displays a list of up to 12 presets. You can select a preset from the list to display it in the window.

Go — Activates the selected preset as the current configuration.

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

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.

Windows menus

File menu —

Save matrix settings as — Saves a complete set of up to 16 presets, plus the last active setting (preset #0), to a file. Saved settings include audio gain settings (if specified), 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 the 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 Extron Matrix 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.

Audio gain settings — Displays the audio gain level setting for a single input or for all inputs and allows you to change it.

Name presets — Allows you to assign a name to each of the 16 memory presets.

Show RS-232 strings — Displays the ASCII commands that are used by the current configuration. You can refer to these for RS-232 programming.

Initialize — Initializes and clears any or all of the following: ties, presets, audio configuration, preset titles, icon names, and icons.

Audio-config — Displays the audio gain level settings for each input and allows you to change them.

Preferences menu —

Immediate changes — Causes changes to take effect immediately.

Hold/verify changes — Delays implementation of changes until the Changes – Take button is pressed.

Ties as lines — Displays ties as lines.

Ties as crosspoints — Displays ties as a grid of inputs and outputs.

Using emulation mode

Emulation mode allows you to set up the software without attaching the switcher to a computer. To use emulation mode, do the following:

1. Double-click on the Matrix Switcher+ Control Program icon (shown at left) 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. The file NEW.INI 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 the matrix model for which you are preparing a configuration, and click OK.

6. Continue using the program as described in steps 3 through 5, starting on page 5-2.

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, double-click on the Matrix Switcher Help icon (shown at left).

MATRIX Switcher+
Help

• From within the Matrix Switcher Control Program, click on the Help menu on the main screen.

• From within the Matrix Switcher Control Program, press the F1 key.

Button-Label Generator

The program is contained on the same set of 3.5-inch diskettes as the Matrix Switcher+ Control Program and is installed automatically when you install that program.

By default, the Windows installation goes in the C:\BUTTONS directory, and the Button-Label Generator icon is placed in the "Extron Electronics" group or folder.

Using the software

1. To run the Button-Label Generator program, double-click on the Button-Label Generator icon (shown at left) in the Extron Electronics group or folder, and click OK when prompted. The Extron's Button-Label Generator window appears (figure 5-3).

Button-Label
Generator

2. Under System selection, choose Mtrx50/MAV/XPoint.

3. Using normal Windows controls, you can create and print labels that can be placed in the label windows on the front panel of the switcher.

For information about using the program, you can access the help program by clicking on the Help menu on the main screen and choosing Show Help.
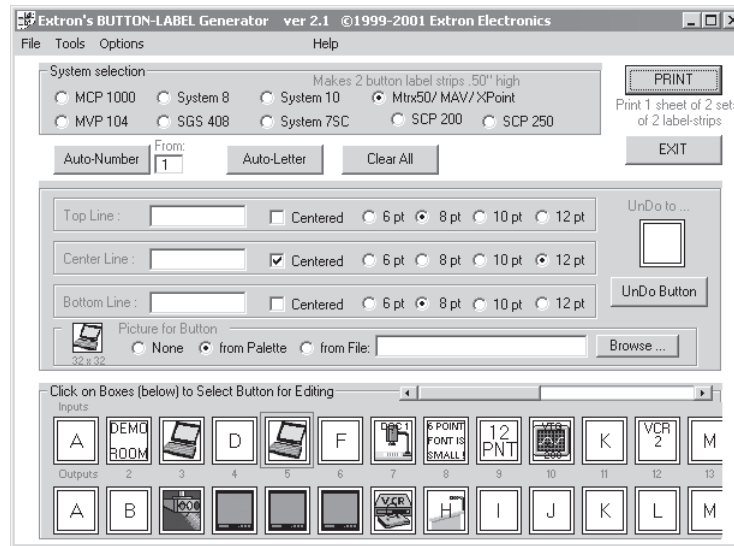
Matrix Software, cont'd

Figure 5-3 — Extron's Button-Label Generator window

You can also see an example of a completed Extron's Button-Label Generator window by clicking on the Help menu on the main screen, choosing Show Help, and clicking on the Load Demo button.

Appendix A

Specifications

Specifications

Part Numbers

Specifications

Video

Routing	8 x 4, 8 x 8, 12 x 4, or 12 x 8 matrix
Gain	Unity
Bandwidth	150 MHz (-3dB), fully loaded
	0 - 10 MHz .... no more than 0.1dB to -0.1dB
	0 - 130 MHz .... no more than 0.5dB to -0.5dB
Phase between I/Os	<1.28° at 3.58 MHz
Differential phase error	0.1%, 3.58 and 4.43 MHz
Differential gain error	0.1°, 3.58 and 4.43 MHz
Max. propagation of delay	5 ns typical (±1 ns)
Crosstalk	-50dB @ 5 MHz
Switching speed	200 ns (max.)

Video input

Number/signal type	8 or 12 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
Connectors	(8 or 12) x 1, 2, or 3 BNC female
Nominal levels	1V p-p for Y of component video and S-video, and for composite video
	0.7V p-p for RGB
	0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	Analog: 0.5V to 2V p-p with no offset
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
Maximum DC offset	1.5V
External sync (genlock)	0.3V to 0.4V p-p

Video output

Number/signal type	4 or 8 RGsB, RsGsBs, component video (Y, R-Y, B-Y), HDTV, S-video, composite video
Connectors	(4 or 8) x 1, 2, or 3 BNC female
Nominal levels	1V p-p for Y of component video and S-video, and for composite video
	0.7V p-p for RGB
	0.3V p-p for R-Y and B-Y of component video, and for C of S-video
Minimum/maximum levels	0.5V to 2.0V p-p
Impedance	75 ohms
Return loss	-30dB @ 5 MHz
DC offset	±5mV maximum with input at 0 offset
Switching type	Vertical interval

Sync

Input type	RGsB, RsGsBs
Output type	RGsB, RsGsBs
Genlock connectors	BNC female
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM

Audio

Routing	8 x 4, 8 x 8, 12 x 4, or 12 x 8 matrix
Gain	Unbalanced output: 0dB; balanced output: +6dB
Frequency response	20 Hz to 20 kHz, ±0.05dB
THD + Noise	0.03% @ 1 kHz at nominal level
S/N	>90dB, balanced, at rated maximum output (21dBu)

Crosstalk .... <-80dB @ 1 kHz, fully loaded
Stereo channel separation .... >80dB @ 1 kHz
THD .... 0.015%, worst case, @ 20 Hz to 20 kHz
CMRR .... >75dB @ 20 Hz to 20 kHz

Audio input

Number/signal type .... 8 or 12 balanced/unbalanced
Connectors .... (8 or 12) 3.5 mm captive screw connectors, 5 pole
Impedance .... >10 kohm, unbalanced/balanced, DC coupled
Nominal level .... -10dBV (316mV)
Maximum level .... +19.5dBu, (balanced or unbalanced) at 1%THD+N
Input gain adjustment .... −15dB to +9dB, adjustable per input via RS-232 or front panel

Audio output

Number/signal type .... 4 or 8 stereo, balanced/unbalanced
Connectors .... (4 or 8) 3.5 mm captive screw connectors, 5 pole
Impedance .... Unbalanced 50 ohms, balanced 100 ohms
Gain .... Unbalanced 0dBu, balanced +6dBu
Gain error .... ±0.1dB channel to channel
Maximum output (Hi-Z) .... >+21dBu, balanced at stated %THD+N
Maximum output (600 ohm) ...... >+15dBm, balanced at stated %THD+N

NOTE *0dBu = 0.775 volts (RMS).*

Control/remote

Serial control port .... RS-232 or RS-422, 9-pin female D connector
Baud rate and protocol .... 9600, 8-bit, 1 stop bit, no parity
Serial control pin configurations .... 2 = TX, 3 = RX, 5 = GND
Program control .... Extron's control program for Windows
Extron's Simple Instruction Set™ – SIS™

General

Power .... 100VAC to 240VAC, 50/60 Hz, 30 watts, internal, autoswitchable
Temperature/humidity .... Storage -40° to +158°F (-40° to +70°C) / 10% to 90%, non-condensing
Operating +32° to +104°F (0° to +40°C) / 10% to 90%, non-condensing
Rack mount .... Yes
Enclosure type .... Metal
Enclosure dimensions .... 3.5" H x 17.0" W x 9.5" D (2U high, full rack width)
8.9 cm H x 43.2 cm W x 24.1 cm D
(Depth excludes connectors. Width excludes rack ears.)
Product weight .... 8.6 lbs (3.9 kg)
Shipping weight .... 15 lbs (6.8 kg)
DIM weight 25
Vibration .... ISTA/NSTA 1A in carton (International Safe Transit Association)
Listings .... UL, CUL
Compliances .... CE, FCC Class A
MTBF .... 30,000 hours
Warranty .... 3 years parts and labor

NOTE *Specifications are subject to change without notice.*

Part Numbers

Matrix 50 Series switchers part numbers

Extron Part	Part #
12 x 8 HDTV/component video and audio switcher	60-359MV
12 x 8 HDTV/component video switcher	60-359MZ
12 x 4 HDTV/component video and audio switcher	60-359JW
12 x 4 HDTV/component video switcher	60-359JZ
8 x 8 HDTV/component video and audio switcher	60-359GX
8 x 8 HDTV/component video switcher	60-359GZ
8 x 4 HDTV/component video and audio switcher	60-359DY
8 x 4 HDTV/component video switcher	60-359DZ
12 x 8 S-video and audio switcher	60-359LV
12 x 8 S-video switcher	60-359LZ
12 x 4 S-video and audio switcher	60-359IW
12 x 4 S-video switcher	60-359IZ
8 x 8 S-video and audio switcher	60-359FX
8 x 8 S-video switcher	60-359FZ
8 x 4 S-video and audio switcher	60-359CY
8 x 4 S-video switcher	60-359CZ
12 x 8 composite video and audio switcher	60-359KV
12 x 8 composite video switcher	60-359KZ
12 x 4 composite video and audio switcher	60-359HW
12 x 4 composite video switcher	60-359HZ
8 x 8 composite video and audio switcher	60-359EX
8 x 8 composite video switcher	60-359EZ
8 x 4 composite video and audio switcher	60-359BY
8 x 4 composite video switcher	60-359BZ
12 x 8 stereo audio switcher	60-359AV
12 x 4 stereo audio switcher	60-359AW
8 x 8 stereo audio switcher	60-359AX
8 x 4 stereo audio switcher	60-359AY
Matrix Switchers+ Control Program and Button-Label Generator	29-015-01
Matrix 50 Series Switchers User's Manual	68-346-01

Matrix 50 Option Kits

Extron Part	Part #
12 x 8 video kit	70-165-04
12 x 4 video kit	70-165-03
8 x 8 video kit	70-165-02
8 x 4 video kit	70-165-01
12 x 8 audio kit	70-166-04
12 x 4 audio kit	70-166-03
8 x 8 audio kit	70-166-02
8 x 4 audio kit	70-166-01

Optional Accessories

Extron Part	Part #
Rack/desk mounting kit	70-077-03
Captive screw audio connector	10-319-10
SVHS - BNC adapter	26-353-01
RCA-to-BNC adapter	10-264-01
MKP 1000	
Gray	60-239-01
Black	60-239-02
White	60-239-03
MKP 1000M (primary)	60-298-01
MKP 1000S (secondary)	60-298-02

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution BNC cables to achieve maximum performance. Either BNC-4 Mini HR cable or BNC-5 Mini HR cable can be used for composite video.

Bulk cable

Extron Part	Part #
RG6 super high resolution cable	
RG6-1 bulk , 500'	22-098-02
RG6-1 bulk , 1000'	22-098-03
RG6-4 bulk , 500'	22-099-02
RG6-5 bulk , 500'	22-100-02
RG6 male crimp connectors, qty. 50	100-075-51
BNC-2 Mini HR Cable	
BNC-2 Mini HR bulk, 250'	22-123-02
BNC-2 Mini HR bulk, 500'	22-123-03
BNC-4 Mini HR Cable	
BNC-4 Mini HR bulk, 500'	22-032-02
BNC-4 Mini HR bulk, 1000'	22-032-03
BNC-5 Mini HR Cable	
BNC-5 Mini HR bulk, 500'	22-020-02
BNC-5 Mini HR bulk, 1000'	22-020-03
Plenum BNC-5 Mini HR Cable	
Plenum BNC-5 Mini HR bulk, 500'	22-103-02
Plenum BNC-5 Mini HR bulk, 1000'	22-103-03

Assorted connectors

Extron Part	Part #
BNC connectors	
BNC Mini HR crimp connectors, qty. 50	100-074-51
RG6 male crimp connectors, qty. 50	100-075-51
BNC bulkhead connectors, qty. 50	
(for custom wall plates)	100-076-51

Specifications, cont'd

Pre-cut cables

All Extron BNC cables have male connectors on both ends. A plenum version of the BNC-5 Mini HR cable is also available.

Extron Part	Part #
BNC-4 Mini HR Cable	
BNC-4-25'HR (25 feet/7.5 meters)	26-210-04
BNC-4-50'HR (50 feet/15.0 meters)	26-210-05
BNC-4-75'HR (75 feet/23.0 meters)	26-210-06
BNC-4-100'HR (100 feet/30.0 meters)	26-210-07
BNC-4-150'HR (150 feet/45.0 meters)	26-210-08
BNC-4-200'HR (200 feet/60.0 meters)	26-210-09
BNC-4-250'HR (250 feet/75.0 meters)	26-210-54
BNC-4-300'HR (300 feet/90.0 meters)	26-210-53
BNC-5 Mini HR Cable	
BNC-5-25'HR (25 feet/7.5 meters)	26-260-03
BNC-5-50'HR (50 feet/15.0 meters)	26-260-04
BNC-5-75'HR (75 feet/23.0 meters)	26-260-16
BNC-5-100'HR (100 feet/30.0 meters)	26-260-05
BNC-5-150'HR (150 feet/45.0 meters)	26-260-12
BNC-5-200'HR (200 feet/60.0 meters)	26-260-06
BNC-5-250'HR (250 feet/75.0 meters)	26-260-18
BNC-5-300'HR (300 feet/90.0 meters)	26-260-14
S-video Cable	
SVHS 6' (6 feet/1.8 meters)	26-316-02
SVHS 12' (12 feet/3.7 meters)	26-316-03
SVHS 20' (20 feet/6.1 meters)	26-316-01
SVHS 30' (30 feet/9.1 meters)	26-316-04
SVHS 50' (50 feet/15.2 meters)	26-316-05
SVHS 75' (75 feet/22.9 meters)	26-316-06
SVHS 100' (100 feet/30.4 meters)	26-316-07

NOTE *Bulk cable in lengths up to 5000' (1524 meter) rolls is available with or without connectors.*

B

Appendix B

Reference Information

Hardware Procedures

Button Labels

Reference Information

Hardware Procedures

This appendix contains procedures for performing hardware maintenance operations such as installing a Matrix 50 Option Kit, swapping the RS-232 and RS-422 ports, installing a new firmware update, and replacing the fuse.

Opening the switcher

Before you can perform any of the hardware upgrade procedures, you must open the switcher. To open the switcher, do the following:

1. Disconnect the power cord from the switcher.

2. If the switcher is rack mounted, remove the switcher from the rack and place it on a clean workspace.

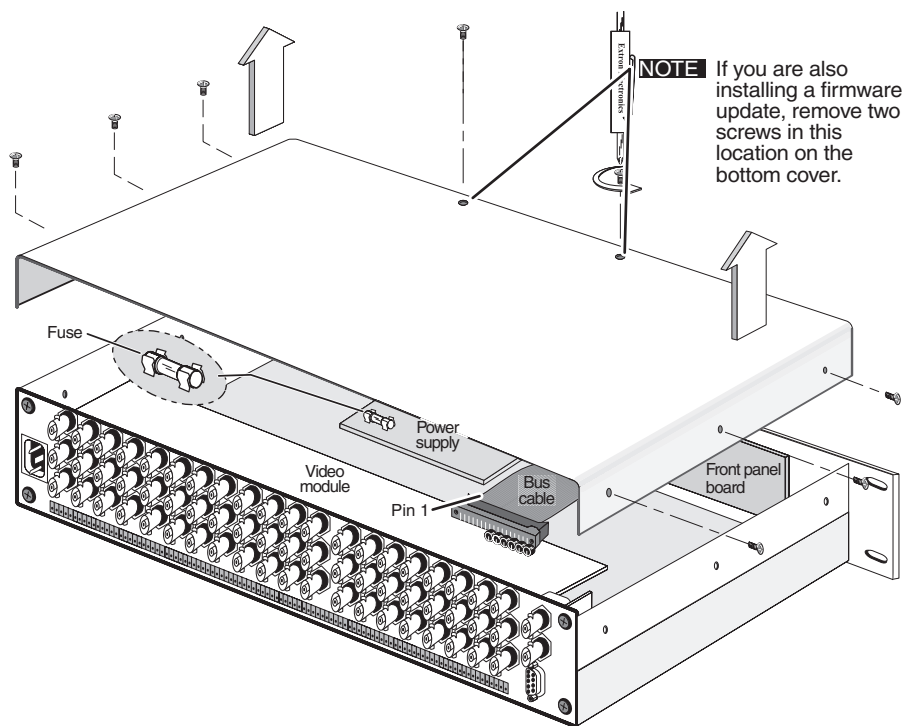3. Remove the eight screws that secure the switcher's top cover as shown in figure B-1.

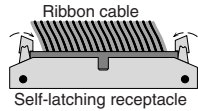*Figure B-1 — Removing the top cover screws*

4. Lift the top cover straight up. Lift the cover evenly to clear the grooves at the edge of the rear panel.

5. If you are updating the firmware, remove the two screws at the front edge of the bottom cover, and the four screws and washers securing front panel to the bottom cover. Three internal cables connected to the front panel can be damaged if strained. Carefully tilt the front panel away from the main body of the switcher.

6. If you are updating the firmware, remove the top cable by pressing the two receptacle tabs on the top cable outward, as shown at the left, and pulling back gently on the cable connector to remove it from the receptacle. Lay the front panel down in front of the switcher.
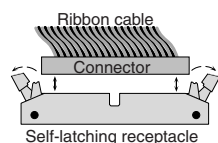
Closing the switcher

To close the switcher when you have finished performing a procedure in this chapter, do the following:

1. Reinstall any cables you removed. To connect a self-latching cable to a receptacle, align the holes in the connector with the pins in the receptacle, and press evenly until the receptacle tabs lock into place.

Ribbon cable

Self-latching receptacle

2. Place the top cover (and the front cover if a firmware upgrade was performed) in place and replace all the screws that were removed in *Opening the switcher* on page B-2.

Installing and removing video and audio modules

The Matrix 50 Series switchers are field upgradeable. The following procedures guide you through the process of:

- Upgrading from composite video (one video module) to S-video (two video modules) or HDTV/component video (three video modules)

- Upgrading from S-video (two video modules) to component video (three video modules)

- Downgrading from any of the above configurations

- Adding or removing audio capabilities

- Changing to a different switching matrix configuration (from an 8 x 4 configuration to a 12 x 8 configuration, for example)

> **NOTE**
> *1. Audio modules are always installed on the bottom of the switcher chassis (figure B-2). Removing or installing an audio board cannot be accomplished with video modules in the way. If changing the audio configuration of your switcher, remove all video modules first.*
>
> *2. Video planes in the Matrix 50 Series switcher are configured from the top down; if the switcher is configured for composite video, only the top video location is used; if configured for S-video, the top two locations are used.*
>
> *3. When adding video modules, the new module(s) must be of the same matrix configuration (8 x 4, 8 x 8, 12 x 4, or 12 x 8) as the existing module(s).*
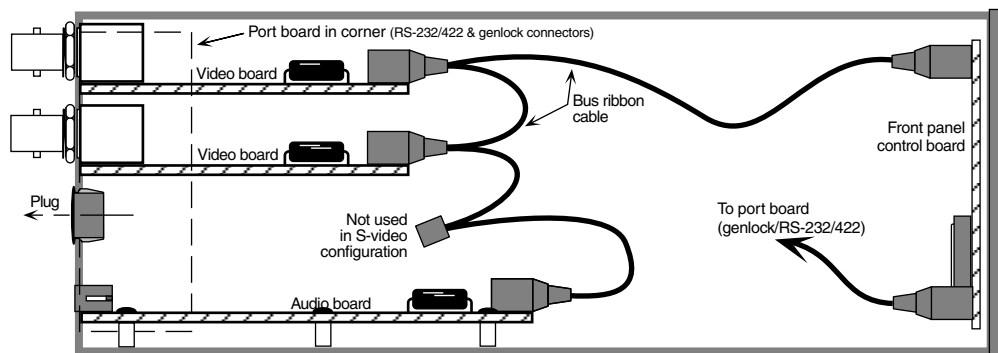

Figure B-2 — Side view, Matrix 50 S-video and audio switcher

Reference Information, cont'd
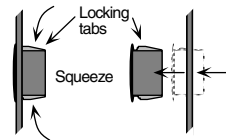
Installing a video module

1. Follow the instructions in *Opening the switcher* on page B-2 to remove the top cover.

2. Remove the bus ribbon cable that connects the video and audio modules to the front panel board by pressing the two receptacle tabs on the top cable outward, as shown at the left, and pulling back gently on the cable connector to remove it from the receptacle. Do this for each video or audio board connection and move the ribbon cable out of the way.
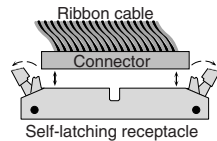
3. Follow the instructions in *Removing a video module* on page B-5 to remove any existing video modules and set them aside.

4. Remove any plastic plugs that are located where they will block the installation of video modules to be installed by squeezing the locking tabs together and pushing the plug out through the back of the chassis.

    NOTE *If you are also installing or removing an audio module, see* Installing an audio module, *step 3, on page B-6 or* Removing an audio module *on page B-7, before continuing to install the video modules. Return here when finished with the audio module procedure.*

5. Mount the new video module(s) and any module(s) removed in step 3, starting at the lowest required video module location. For example, if upgrading the switcher from composite video to S-video, mount a video module in the second location, and the next module in the top location, leaving the bottom video module location empty.

    a. Insert the video module into the Matrix 50 switcher chassis and position the module such that its BNC connectors protrude through the holes in the switcher's rear panel in the proper module location (figure B-3).
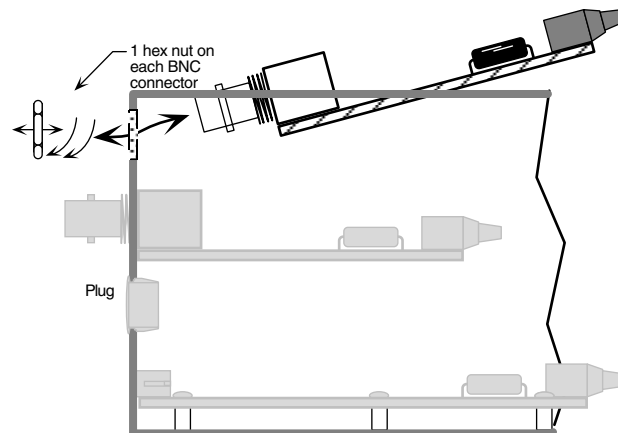
Figure B-3 — Installing a video module

    b. Using an Extron BNC extraction tool (part #100-096-01) or a 9/16", deep well socket with thin walls, secure the video module to the switcher's rear panel by installing a hex nut on each BNC connector on the video module.

6. When all of the video (and audio) modules are mounted, reconnect the bus ribbon cable to each board by aligning the holes in the connector with the pins in the bus connector on each board, and pressing evenly until the receptacle tabs lock into place. Ensure that the bus ribbon cable is not twisted and that the red line on the ribbon cable is toward the center of the video and audio boards.

Ribbon cable

Self-latching receptacle
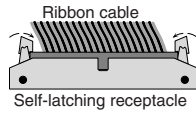
7. If the size of the video matrix was changed (8 x 4 configuration to 12 x 8 configuration, for example) or if video or audio capabilities were added or removed, see *Setting the front panel jumper*, on page B-10.

WARNING *Ensure that tools and hands are outside the switcher before powering up the switcher.*

8. Attach the power cord to the switcher and to the AC power source. Make sure the switcher is working properly. Unplug the AC power cord.

NOTE *If, on power-up, the switcher's Power LED blinks four times, pauses, and blinks four times again, there is a conflict in the jumper settings. Remove the power cable, recheck the jumper settings, and power the switcher up again.*

9. Reinstall the switcher's top cover. See *Closing the switcher* on page B-3.

10. If the switcher was removed from a rack, reinstall the switcher in the rack.

11. Reconnect the AC power, input, and output cables.
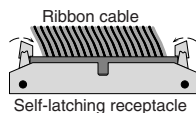
Removing a video module

1. Follow the instructions in *Opening the switcher* on page B-2 to remove the top cover.

2. Remove the bus ribbon cable that connects any video and audio modules to the front panel board by pressing the two receptacle tabs on the top cable outward as shown at the left, and pulling back gently on the cable connector to remove it from the receptacle. Do this for each video or audio board connection and move the ribbon cable out of the way.

Ribbon cable

Connector

Self-latching receptacle
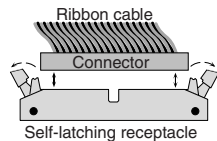
3. Using an Extron BNC extraction tool (part #100-096-01) or a 9/16", deep well socket with thin walls, remove all hex nuts securing the video module to be removed to the rear panel of the switcher. Gently pull the video module forward so the BNC connectors clear the holes in the rear panel of the switcher. Lift the video module out of the switcher.

4. If there are no further module installations or removals to be performed, reconnect the bus ribbon cable to each board by aligning the holes in the connector with the pins in the bus connector on each board, and pressing evenly until the receptacle tabs lock into place. Ensure that the bus ribbon cable is not twisted and that the red line on the ribbon cable is toward the center of the video and audio boards.

Ribbon cable

Self-latching receptacle

5. If the size of the matrix was changed (8 x 4 configuration to 12 x 8 configuration, for example) or if video or audio capabilities were added or removed, see *Setting the front panel jumper*, on page B-10.

WARNING *Ensure that tools and hands are outside the switcher before powering up the switcher.*

6. Attach the power cord to the switcher and to the AC power source. Make sure the switcher is working properly. Unplug the AC power cord.

Reference Information, cont'd

> **NOTE** *If, on power-up, the switcher's Power LED blinks four times, pauses, and blinks four times again, there is a conflict in the jumper settings. Remove the power cable, recheck the jumper settings, and power the switcher up again.*

7. Reinstall the switcher's top cover. See *Closing the switcher* on page B-3.

8. Push plastic plugs into all open BNC connector holes on the rear panel of the switcher.

9. If the switcher was removed from a rack, reinstall the switcher in the rack.

10. Reconnect the AC power, input, and output cables.

Installing an audio module

1. Remove the bus ribbon cable and all video modules in accordance with *Removing a video module* on page B-5.

2. If your Matrix 50 does not already have audio, there is a cover over the slot. Remove the screw on the left side of the cover (figure B-4), pull the audio cover away from the left, and then shift it to the left to free the tab from the slot on the right. Put the audio cover aside.
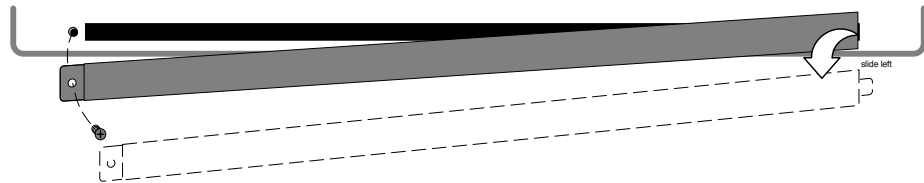

Figure B-4 — Removing the audio cover

3. Insert the audio module into the Matrix 50 chassis and position the board such that the input/output connector strip on the module protrudes through the audio slot in the rear panel of the switcher (figure B-5).
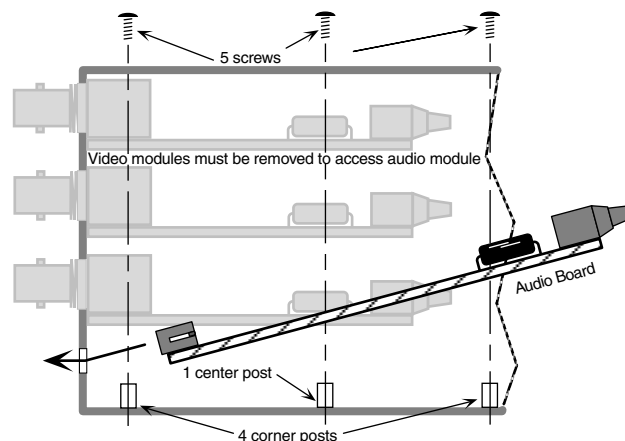

Figure B-5 — Installing the audio board

4. Secure the audio module to the five standoffs on the floor of the switcher (figure B-6).

5. Reinstall all video modules and the bus ribbon cable in accordance with *Installing a video module* on page B-4.

6. If the size of the matrix was changed (8 x 4 configuration to 12 x 8 configuration, for example) or if video or audio capabilities were added or removed, see *Setting the front panel jumper*, on page B-10.

Figure B-6 — Mounting the audio board

WARNING *Ensure that tools and hands are outside the switcher before powering up the switcher.*

7. If not already done, attach the power cord to the switcher and to the AC power source. Make sure the switcher is working properly. Unplug the AC power cord.

NOTE *If, on power up, the switcher's Power LED blinks four times, pauses, and blinks four times again, there is a conflict in the jumper settings. Remove the power cable, recheck the jumper settings, and power the switcher up again.*

8. If not already done, reinstall the switcher's top cover. See *Closing the switcher* on page B-3.

9. If not already done, and if the switcher was removed from a rack, reinstall the switcher in the rack.

10. If not already done, reconnect the AC power, input, and output cables.

Removing an audio module

1. Remove the bus ribbon cable and all video modules in accordance with *Removing a video module* on page B-5.

2. Remove the five screws securing the audio module to the floor of the switcher and lift the audio module out of the switcher.

3. Reinstall all video modules and the bus ribbon cable in accordance with *Installing a video module* on page B-4.

4. If the size of the matrix was changed (8 x 4 configuration to 12 x 8 configuration, for example) or if video or audio capabilities were added or removed, see *Setting the front panel jumper*, on page B-10.
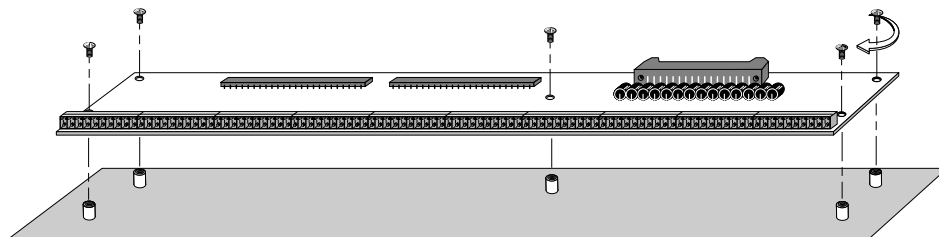
WARNING *Ensure that tools and hands are outside the switcher before powering up the switcher.*

5. If not already done, attach the power cord to the switcher and to the AC power source. Make sure the switcher is working properly. Unplug the AC power cord.

NOTE *If, on power-up, the switcher's Power LED blinks four times, pauses, and blinks four times again, there is a conflict in the jumper settings. Remove the power cable, recheck the jumper settings, and power the switcher up again.*

6. If not already done, reinstall the switcher's top cover. See *Closing the switcher* on page B-3.

7. If no replacement audio module was installed, reinstall the audio cover strip by inserting the slot on the cover strip into the tab on the right of the switcher and tightening the screw into the switcher on the left side of the cover strip.

8. If not already done, and if the switcher was removed from a rack, reinstall the switcher in the rack.

9. If not already done, reconnect the AC power, input, and output cables.

Swapping the serial ports

The Matrix 50 switchers are factory configured for RS-232 use. If you want to use RS-422 and the switcher is configured for RS-232, or if you want to use RS-232 and the switcher is configured for RS-422, do the following:

1. Follow the instructions in *Opening the switcher* on page B-2 to remove the top cover.

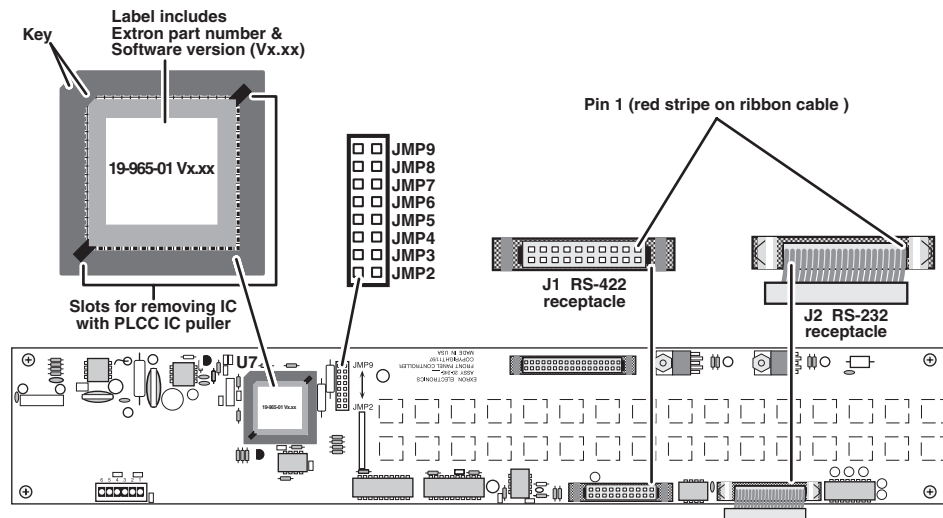2. Locate the switcher's front panel board (figure B-7).

Figure B-7 — Front panel board, Matrix 50 Series switcher

3. On the side of the front panel board that faces the rear of the switcher, locate the RS-232/RS-422 ribbon cable. The RS-422 ribbon cable receptacle, which is normally empty, is located to the left of the RS-232 ribbon cable receptacle.

4. Remove the RS-232/RS-422 ribbon cable by pressing the two RS-232/RS-422 receptacle tabs outward as shown at the left, and pull up evenly on the cable connector to remove it from the current receptacle.
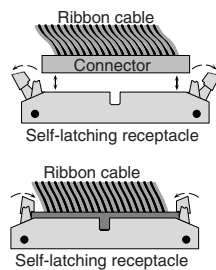
5. Plug the cable in to the desired receptacle by aligning the holes in the connector with the pins in the RS-232 or RS-422 receptacle, and pressing evenly until the receptacle tabs lock into place.

6. Reinstall the switcher's cover. See *Closing the switcher* on page B-3.

WARNING *If you choose to check for proper operation before putting the cover back on, ensure that tools and hands are outside the switcher, and then connect the power cord to the unit and to an AC source. The switcher should power up normally. Unplug the AC power cord, and reinstall the switcher.*

7. Attach the power cord to the switcher and to the AC power source. Ensure the switcher is working properly.

8. If the switcher was removed from a rack, remove its power cord, reattach the switcher to the rack, and reconnect the power cord.

9. Reconnect the input and output cables.

Installing a firmware update

NOTE   *The IC that contains the firmware for the matrix switcher also contains the memory in which presets and audio levels are saved. When you replace the IC, these settings will be lost. You may want to record the presets and audio levels before you replace the IC.*

To replace the firmware, do the following:

1.   Follow the instructions in *Opening the switcher* on page B-2 to gain access to the interior of your switcher, including the instructions to remove the front panel.

2.   Locate the RS-232/RS-422 ribbon cable that connects the front panel board to the rear panel RS-232/422 port (figure B-7). Note which receptacle on the front panel board that the cable plugs into, and remove the cable from its receptacle (see step 4 in *Swapping the serial ports*).

NOTE   *Do not touch the components inside the switcher without being electrically grounded. Electrostatic discharge (ESD) can damage ICs, even if you cannot feel, see, or hear it.*

3.   Unplug the power cable from the front panel board.

4.   Place the front panel board, button side down, on a suitable workspace.

5.   Locate IC U7 (figure B-7).

6.   Use the PLCC IC puller to remove the existing firmware IC. Squeeze the tool to align its hooks with the slots in opposite corners of socket U7. Insert the hooks, squeeze gently, and pull the IC straight out of the socket. Set the IC aside.

7.   Note the key (angled corner) of the new firmware IC and the dot on the underside that indicates pin 1 (figure B-8). Orient the IC to match the key and pin 1 (indicated by arrow) on the socket, and carefully press the IC in place.

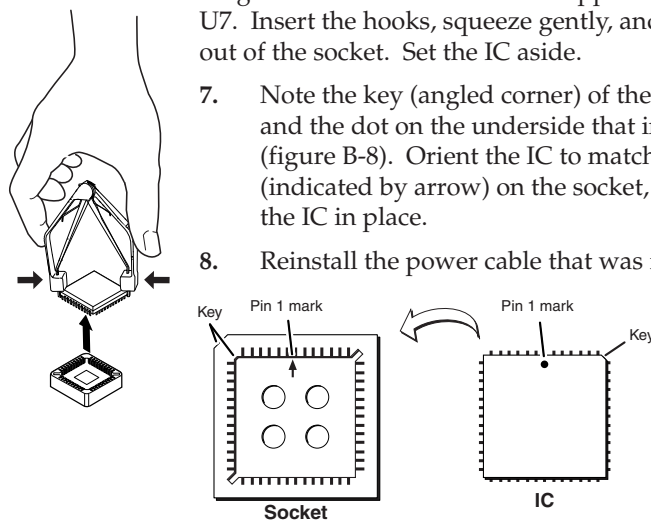8.   Reinstall the power cable that was removed in step 3.

Figure B-8 — Key and pin 1 mark

9.   Reinstall the RS-232/RS-422 cable removed in step 2. Ensure the RS-232/RS-422 ribbon cable is plugged back into the proper receptacle for the communications format desired (RS-232 or RS-422).

10.   Reinstall the switcher's front panel and cover. See *Closing the switcher* on page B-3.

WARNING   *If you choose to check for proper operation before putting the cover back on, ensure that tools and hands are outside the switcher and then perform step 11. After recognizing the new IC, the switcher should power up normally. Unplug the AC power cord, and reinstall the switcher.*

11.   Reinitialize the switcher to recognize the new IC as follows:

       a. Connect the power cord to the AC power source.

       b. Press and **hold** the Enter button while you connect the power cord to the switcher.

       c. Observe that the Input, Output, Preset, View, and Esc LEDs all flash.

       d. Release the Enter button.

12. Ensure that the switcher is working properly.

13. If the switcher was removed from a rack, remove its power cord, reattach the switcher to the rack, and reconnect the power cord.

14. Reconnect the input and output cables.

Replacing the AC fuse

The AC fuse on the power supply board is a user-replaceable component of the Matrix 50 Series switchers. To replace the AC fuse, do the following:

1. Follow the instructions in *Opening the switcher* on page B-2 to remove the top cover.

2. Locate the fuse on the power supply board (figure B-7), and remove it from its retaining clips.

3. If test equipment is available, you can check the fuse.

4. Place a new 2A/250V fast-blow fuse in the retaining clips.

**5.** Reinstall the switcher's cover. See *Closing the switcher* on page B-3.

> **WARNING** *If you choose to check the switcher for proper operation before putting the cover back on, ensure that tools and hands are outside the switcher, and then connect the power cord to the unit and to an AC source. The switcher should power up normally. Unplug the AC power cord, and reinstall the switcher.*

6. Attach the power cord to the switcher and to the AC power source. Make sure the switcher is working properly.

7. If the switcher was removed from a rack, remove its power cord, reattach the switcher to the rack, and reconnect the power cord.

8. Reconnect the input and output cables.

Setting the front panel jumper

If the front panel jumpers are set incorrectly (for example, if the matrix configuration was changed and the jumpers were not updated), when the switcher is powered up, it locks up and will not operate. If the switcher is connected to a PC or control system, it reports <u>Invalid Jumpers</u>↵ via the RS-232/422 link. Check the setting of the jumper as follows:

1. Follow the instructions in *Opening the switcher* on page B-2 to gain access to the interior of your switcher, including the instructions to remove the front panel.

2. Locate the front panel jumper (figure B-7).

3. Install the jumpers as appropriate to your Matrix 50 model (figure B-9).

JMP9 ☐☐ ☐☐ JMP5
JMP8 ☐☐ ☐☐ JMP4
JMP7 ☐☐ ☐☐ JMP3
JMP6 ☐☐ ☐☐ JMP2
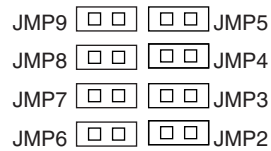
Switcher type	Matrix size	JMP2	JMP3	JMP4	JMP5	JMP6	JMP7	JMP8	JMP9
Video only	8 x 4	X	X	O	O	O	O	X	O
	8 x 8	O	X	X	O	O	O	X	O
	12 x 4	O	X	O	O	O	O	X	O
	12 x 8	X	O	X	O	O	O	X	O
Video & audio	8 x 4	O	O	X	X	O	O	X	O
	8 x 8	X	O	O	X	O	O	X	O
	12 x 4	X	X	O	X	O	O	X	O
	12 x 8	O	O	O	X	O	O	X	O
Audio only	8 x 4	O	X	O	O	X	O	X	O
	8 x 8	X	O	O	O	X	O	X	O
	12 x 4	O	O	O	O	X	O	X	O
	12 x 8	X	X	X	X	O	O	X	O

X = jumper installed, O = jumper removed

Figure B-9 — Jumper settings, Matrix 50 series switchers

WARNING *If you choose to check for proper operation before putting the cover back on, ensure that tools and hands are outside the switcher and then perform step 4. After recognizing the new configuration, the switcher should power up normally. Unplug the AC power cord, and reinstall the switcher.*

4. Reinitialize the switcher to recognize the new configuration as follows:

   a. Connect the power cord to the AC power source.

   b. Press and **hold** the Enter button while you connect the power cord to the switcher.

   c. Observe that the Input, Output, Preset, View, and Esc LEDs all flash.

   d. Release the Enter button.

5. Ensure that the switcher is working properly.

6. If the switcher was removed from a rack, remove its power cord, reattach the switcher to the rack, and reconnect the power cord.

7. Reconnect the input and output cables.

Button Labels

Figure B-10 provides blanks of a 12-button strip of button labels. Feel free to photocopy them or cut them out of the manual, write button information in each button area as desired, and put them in the switcher's label window. For 8-button strips and 4-button strips, use scissors to trim the blank to the appropriate length.
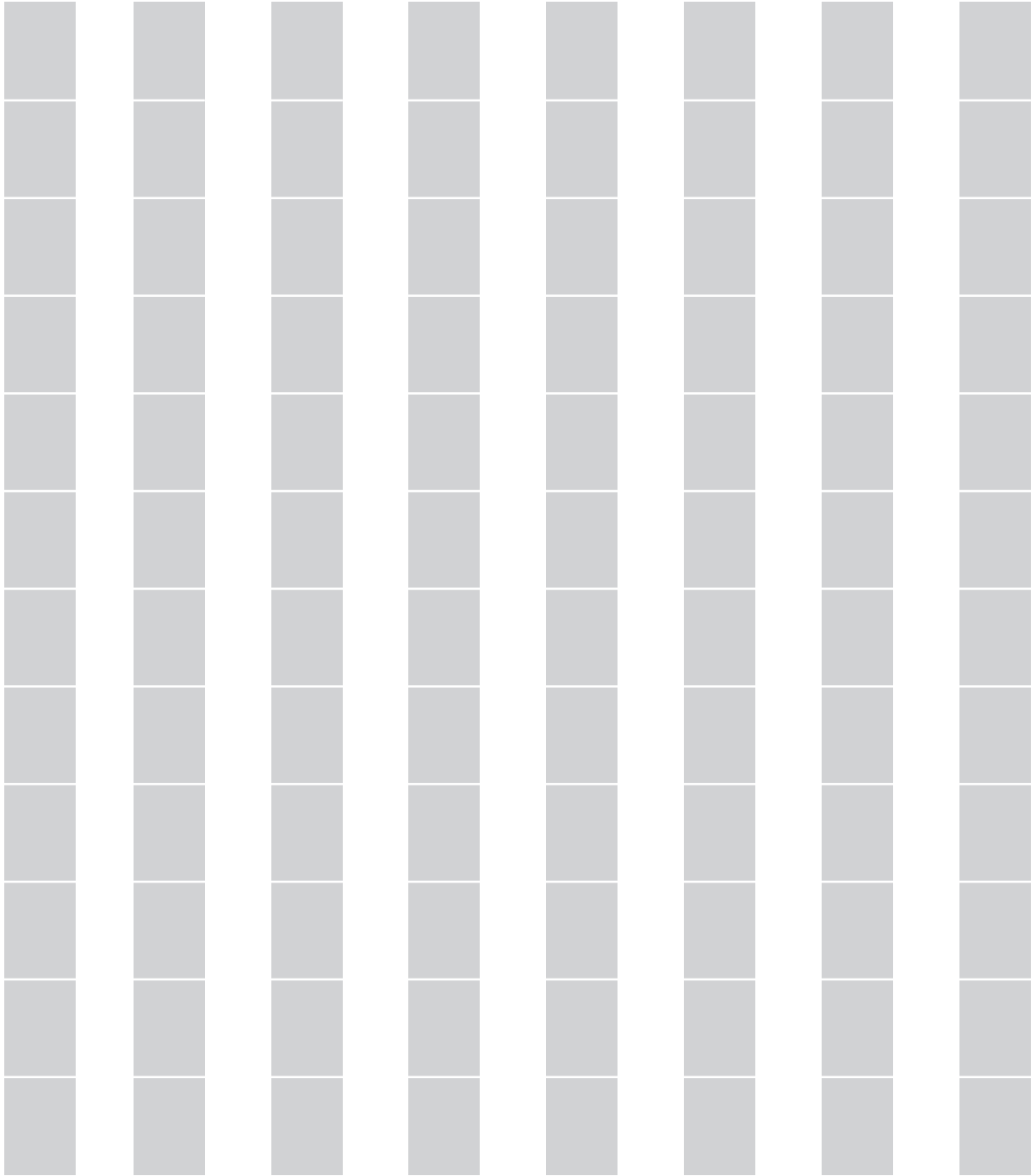
Blank

Figure B-10 — Button label blanks, 12-button strip

Reference Information, cont'd

FCC Class A Notice

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

Note: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance.

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

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Asia:	**Japan:**
Extron Electronics, Asia 135 Joo Seng Road, #04-01 PM Industrial Bldg. Singapore 368363	Extron Electronics, Japan Daisan DMJ Bldg. 6F, 3-9-1 Kudan Minami Chiyoda-ku, Tokyo 102-0074 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), 65.6383.4400 (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.

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