User Guide

Matrix Switchers

MVX 44 / 48 / 84 / 88 Series

VGA Matrix Switchers

Extron Electronics
INTERFACING, SWITCHING AND CONTROL

68-877-01 Rev. E
05 11

Safety Instructions • English

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

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

Caution

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

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

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

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

Warning

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

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

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

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

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

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

Consignes de Sécurité • Français

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

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

Attention

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

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

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

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

Avertissement

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

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

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

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

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

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

Sicherheitsanleitungen • Deutsch

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

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

Achtung

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

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

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

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

Vorsicht

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

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

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

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

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

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

Instrucciones de seguridad • Español

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

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

Precaucion

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

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

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

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

Advertencia

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

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

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

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

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

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

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

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

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

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

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

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

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

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:
This device may not cause harmful interference.

1. This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

For more information on safety guidelines, regulatory compliances, EMI/EMF compliance, accessibility, and related topics, **click here**.

Conventions Used in this Guide

In this user guide, the following are used:

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make working with the application easier.

CAUTION: A caution indicates a potential hazard to equipment or data.

WARNING: A warning warns of things or actions that might cause injury, death, or other severe consequences.

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X1 * X21 * X24 * X23 * X25 CE ←

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "O" represents the capital letter "o."

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Contents

Introduction

About this Guide

This guide contains installation, configuration, and operating information for the Extron® MVX VGA Matrix Switchers.

About the Switchers

The Extron MVX Series VGA matrix switchers (see **figure 1**) is a family of computer video matrix switchers that distribute any VGA or component/HDTV video (or other high resolution video) and audio input to any combination of outputs. The MVX Series switchers can route multiple input/output ties simultaneously. The switchers input and output high resolution video on 15-pin HD connectors. They input audio on 3.5 mm mini jacks and output audio on 3.5 mm captive screw connectors. There are four matrix sizes available:

- MVX 44 (four inputs by four outputs)
- MVX 48 (four inputs by eight outputs)
- MVX 84 (eight inputs by four outputs)
- MVX 88 (eight inputs by eight outputs)

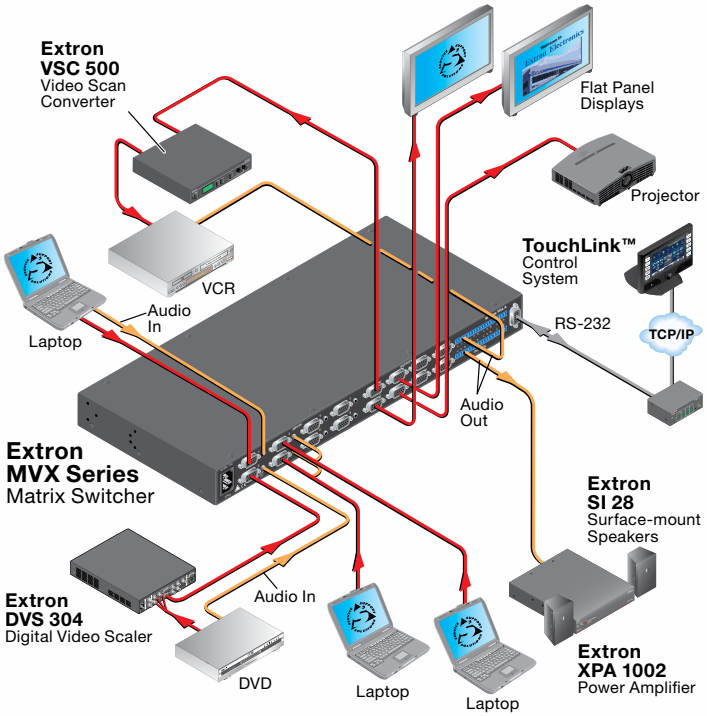


Figure 1. Typical MVX 88 VGA A Application

NOTE: The switchers can also distribute S-video and composite video with applicable adapters.

The MVX switcher can be locally controlled from the front panel or remotely controlled via its rear panel RS-232 serial port or an optional IR 501 Small Matrix Infrared (IR) Remote Control (part number **70-336-01**).

Features

Video — These switchers input and output VGA – UXGA RGBHV, RGBS, RGsB, RsGsBs video, or component/HDTV signals on 15-pin HD female connectors.

Bandwidth — Bandwidth is 300 MHz (–3 dB). This high bandwidth allows the switchers to switch high resolution video with no loss of signal quality.

Audio input — These switchers input unbalanced stereo audio signals on 3.5 mm mini jacks.

Audio output — These switchers output balanced or unbalanced stereo audio signals on 3.5 mm, 5-pole captive screw terminals.

Audio input gain/attenuation — You can set the input audio gain or attenuation (–18 dB to +10 dB) via the RS-232 port or from the front panel. Individual input audio levels can be adjusted so there are no noticeable volume differences between sources and allows for the best headroom and signal-to-noise ratio. This function also eliminates the need for separate preamps or attenuators when used with professional (higher line level) and consumer (lower line level) audio equipment.

Audio output level switch — The audio level of each output can be set to either –10 dBV (consumer level) or +4 dBu (pro level) via RS-232 control only.

Audio follow — Audio can be switched with the corresponding video input. Audio follow switching can be done via front panel control, optional IR 501 control, or the RS-232 port.

Audio breakaway — Audio can be broken away from its corresponding video input signal. Audio breakaway switching can be done via front panel control, optional IR 501 control, or the RS-232 port.

Switching flexibility — Provides individually buffered, independent matrix switched outputs with audio follow and audio breakaway for audio versions.

- **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.

Operational flexibility — Operations such as input/output selection and setting of presets can be performed on the front panel, via the RS-232 port, or using the optional IR 501 small matrix universal remote control. The RS-232 port allows remote control via a PC or control system.

- **Front panel controller** — The MVX series front panel controller feature supports touch-of-a-button input and output selection, preset creation and selection, and audio gain and attenuation control.
- **RS-232 control** — The RS-232 port of the switcher allows remote control via a PC or control system using the Extron Simple Instruction Set (SIS™) or the included Matrix Switchers Control Program.
- **Optional IR remote control** — The MVX switchers are remote controllable, using the optional IR 501 Small Matrix IR Remote Control.

Upgradeable firmware — The firmware that controls the operation of the switcher can be upgraded in the field via the RS-232 port, without taking the switcher out of service. Firmware upgrades are available for download on the Extron website, **www.extron.com**, and they can be installed using the Windows-based control program.

Global memory presets — Sixteen global memory presets are a time-saving feature that lets you set up and store input/output configurations in advance. You can then recall those configurations, when needed, with a few simple steps. On each model, there are as many presets available from the front panel as there are input and output buttons:

- MVX 44s have 8 presets available on the front panel
- MVX 48s and MVX 84s have 12 presets available on the front panel
- MVX 88s have 16 presets available on the front panel

On smaller MVXs, presets that are not available from the front panel are still available under RS-232 or optional IR 501 control.

Rack mountable — With the included rack mounting kit, the switchers can be mounted in any conventional 19-inch wide rack.

Under-desk mountable — With an optional desk mounting kit, the switchers can be mounted under a desk, podium, or other furniture.

Front panel security lockout (executive mode) — If an MVX Series switcher is installed in an open area where operation by unauthorized personnel may be a problem, a security lockout 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. Ties can still be viewed.

When the front panel is locked out, the switcher can still be operated via the RS-232 link.

Power supply — The internal 100 VAC to 240 VAC, 50/60 Hz 30 watts power supply provides worldwide power compatibility.

Installation

This sections details the installation of the MVX VGA Matrix Switchers, including:

- **Mounting the Switcher**
- **Cabling and Rear Panel Views**

Mounting the Switcher

CAUTION: Installation and service must be performed by authorized personnel only.

Detailed mounting instructions can be found in the "Reference Information" section at the end of this guide. The 1U high matrix switchers can be placed on a tabletop or **mounted on a rack shelf**. Use the included hardware for rack mounting.

Cabling and Rear Panel Views

All connectors are on the rear panel. Depending on the model, the switcher can have up to eight high resolution video and stereo audio inputs and eight video and audio outputs.

Figure 2 shows an MVX 88 VGA A video and audio switcher. Other switcher models are housed in the same 1U enclosures, but have fewer input connectors, output connectors, or both to accommodate the different matrix sizes that they provide.

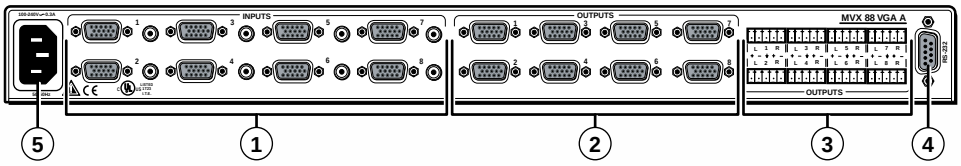


Figure 2. MVX 88 VGA A High Resolution Video Matrix Switcher

Video and Audio Input Connections

① **RGB video inputs** — Connect the analog computer-video sources to these 15-pin HD female connectors.

NOTE: Most laptop or notebook computers have an external video port, but they require special commands to output the video to that connector. Also, a laptop screen shuts off once that port is activated. See the user guide for the computer for details, or contact the Extron S3 Sales and Technical Support Hotline for a list of common laptop keyboard commands (see the **contact numbers** on the last page of this guide for the Extron office nearest you).

Audio inputs — Connect the unbalanced stereo audio sources to these 3.5 mm mini stereo jacks for unbalanced audio input. **Figure 3** shows how to wire the audio plug.

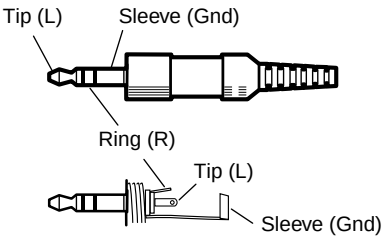


Figure 3. Audio Input Connector Wiring

Video and Audio Output Connections

② **RGB video output connectors** — Connect RGBHV video displays to these 15-pin HD female connectors for each output.

NOTES:
- The MVX switchers can also switch RGBS, RGsB, RsGsBs, or component/HDTV video.
- The MVX switchers do not alter the video signal in any way. The signal output by the switcher is in the same format as the input.

③ **Balanced or unbalanced audio output connectors** — 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 4** to properly wire an output connector. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

Figure 4. Captive Screw Connector Wiring for Audio Output

CAUTION: For unbalanced audio, connect the sleeves to the ground contact. ***DO NOT*** connect the sleeves to the negative (-) contacts.

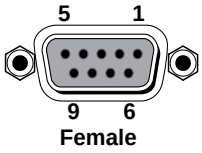
NOTES:
- The length of exposed wires is critical. The ideal length is 3/16 inch (5 mm).
  - If the stripped section of wire is longer than 3/16 inch, the exposed wires may touch, causing a short circuit.
  - If the stripped section of wire is shorter than 3/16 inch, wires can be easily pulled out even if tightly fastened by the captive screws.
- **Figure 4** on the preceding page identifies the tip, ring, and sleeve. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. If you are wiring a captive screw connector from an existing unbalanced audio cable, the white insulated wire is typically the left channel (tip) and the red insulated wire is typically the right channel (sleeve). There is no reliable standard for existing balanced audio cables.

The audio level for each input can be individually set, via the front panel or RS-232, to ensure that the level on the output does not vary from input to input. See the "**Operation**" section and the "**Remote Operation**" section.

By default, the audio follows the video switch. Audio breakaway, which is commanded via the front panel, via RS-232 control using SIS commands or the Windows-based control program, or via optional IR 501 control, allows you to select from any one of the audio input sources. See the "**Operation**" section, the "**Remote Operation**" section, and the *IR 501 Small Matrix IR Remote Control User Guide*.

Remote Connection

④ **RS-232 connector** — Connect a host device, such as a computer or control system, to the switcher via this 9-pin D connector (**figure 5**) for remote control of the switcher.



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

Figure 5. RS-232 Port Pin Assignment

NOTE: The cable used to connect the RS-232 port to a computer or control system may need to be modified by removing pins or cutting wires. If you encounter problems while operating under RS-232 control (the switcher may hang up), pins 1, 4, 6, 7, and 8 may need to be disconnected. Either cut the wire to pins 1, 4, and 6 through 8 in a hard-shelled connector or remove pins 1, 4, and 6 through 8 from a molded plug.

See the "Remote Operation" section for definitions of the **SIS commands** and details on how to install and use the **control software**.

Using the hardwired IR input on pin 9, you can use a control system with IR-learning capabilities to operate the switcher just as if you were using an IR 501 remote control. The control system must first "learn" the IR command from an IR 501, after which it sends the same commands to the MVX via pin 9.

Power Connection

⑤ **AC power connector** — Plug a standard IEC power cord into this connector to connect the switcher to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

Operation

This section describes the front panel operation of the MVX VGA Matrix Switcher, including:

- **Front Panel Controls and Indicators**
- **Operations**
- **Optimizing the Audio**
- **Troubleshooting**
- **Worksheets**

Front Panel Controls and Indicators

The number of input and output buttons and LEDs that each MVX Series VGA matrix switcher provides varies with the number of inputs and outputs.

Figure 6 shows the front panel of an 8-input, 8-output video and audio switcher. Other switcher models have fewer input and/or output buttons to accommodate the different matrix sizes that they provide.

Many of the buttons and LEDs on figure 6 have dual functions.

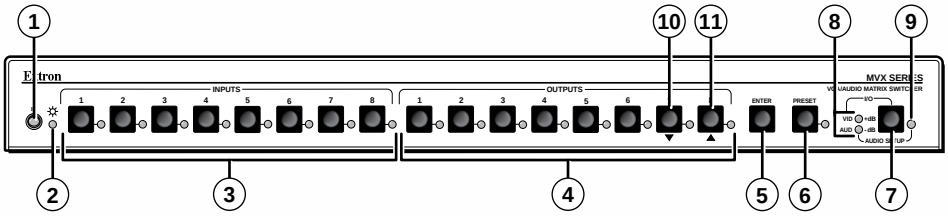


Figure 6. MVX 88 VGA A Front Panel

Infrared Sensor and Power/audio/data LED

① **Infrared remote sensor** — This sensor receives infrared (IR) signals from the optional IR 501 small matrix universal remote control. The IR remote control must be pointed within 30 degrees of this sensor for best results.

Operation of the IR 501 remote control is described in the *IR 501 Small Matrix IR Remote Control User Guide*.

> **NOTE:** Keep the switcher out of bright light to prevent interference with the IR signals from the IR 501 remote control.

② **Power/data/audio LED** —

- When lit, the Power LED indicates that power is applied to the matrix switcher.
- When blinking off and on, the Power LED indicates that an IR signal has been received.
- In Audio Setup mode, the Power LED also serves as an audio meter that is tied to output 1. The LED blinks frequently when the audio level of the selected input has been adjusted to the –10 dBV internal reference level. (In Audio Setup mode, the audio of the selected input is automatically tied to output 1.) See "**Adjusting Input Audio Gain and Attenuation**" on page 23 and "**Optimizing the Audio**" on page 31.

Input and Output Selection Controls and Indicators

> **NOTE:** If the switcher has fewer than eight inputs or outputs, it has fewer input or output buttons and LEDs.

③ **Input buttons and LEDs** — The input buttons and LEDs select and identify inputs.

Alternate preset selection function — The input buttons and LEDs also serve as preset selection buttons and indicators, allowing you to select presets to either save or recall. A more detailed explanation of the presets functions is included in "**Using Presets**", beginning on page 20.

④ **Output buttons and LEDs** — The output buttons and LEDs select and identify outputs.

Alternate preset selection function — The output buttons and LEDs also serve as preset selection buttons and indicators, allowing you to select presets to either save or recall. A more detailed explanation of the presets functions is included in "**Using Presets**", beginning on page 20.

Alternate audio indication function — The Output 1 through Output 3 LEDs also serve as the input audio level indicators, each indicating a range of 6 dB when lit:

- Output 1 LED off = 0 dB to 5 dB
- Output 1 LED lit = 6 dB to 11 dB
- Output 1 and 2 LED lit = 12 dB to 17 dB
- Output 1 through Output 3 LEDs lit = 18 dB

See "**Adjusting Input Audio Gain and Attenuation**" on page 23.

Alternate audio adjustment function — On 8-output switchers, the Output 7 and Output 8 buttons and LEDs also serve as the Down (▼) and Up (▲) controls and indicators. See **item** ⑩ and **item** ⑪.

Control Buttons and LEDs

⑤ **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 controls [**item** ⑦] and [**item** ⑧]).
- Press the desired input button (**item** ③).
- Press one or more desired output buttons (**item** ④).
- Press the Enter button.

⑥ **Preset button and LED** — The Preset button activates either Save Preset mode or Recall Preset mode. Save Preset mode saves a configuration as a preset. Recall Preset mode recalls and activates a previously-defined preset. The Preset button indicates Save Preset mode when it is blinking and Recall Preset mode when it lights steadily.

Alternate reset function — This button is also used to clear all ties and presets. See "**Clearing all Ties and Presets**" on page 29.

I/O Selection and Audio/video Controls and Indicators

⑦ **I/O and Audio Setup button** —

- **Press and release** — Pressing the I/O button cycles through video and audio, video only, or audio only for input and output selection. See the Video and Audio LEDs (**item** ⑧) for the sequence.
- **Press and hold** — The I/O button also serves as the Audio Setup mode selection button. To enable the Audio Setup mode, press and hold the Audio Setup button for about 2 seconds until the Audio Setup LED (**item** ⑨) lights. In Audio Setup mode, you can view and/or change the current audio level setting for each input (see "**Adjusting Input Audio Gain and Attenuation**" on page 23.

Audio Setup mode times out after approximately 30 seconds of inactivity.

Alternate reset function — This button is also used to perform a system reset (see "**Resetting the System to Factory Defaults**" on page 30.

⑧ **Video/+dB LED and Audio/–dB LED** —

- **I/O selection** — The Video and Audio LEDs indicate whether video and audio, video only, or audio only will be selected using the input buttons (**item** ③) and output buttons (**item** ④).

  Pressing the I/O button advances through a cycle of video and/or audio selections (see **figure 7**).

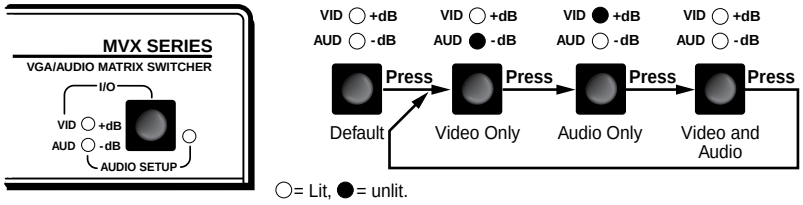


Figure 7. Video and/or Audio Selection Cycle

- **Audio Setup mode** — The –dB and +dB LEDs indicate the polarity of the audio level setting. See "**Adjusting Input Audio Gain and Attenuation**" on page 23. Both LEDs light to indicate unity gain (0 dB).

⑨ **Audio Setup LED** — The Audio Setup LED lights red to indicate that the switcher is in Audio Setup mode. See "**Adjusting Input Audio Gain and Attenuation**" on page 23.

Alternate IR error function — The Audio Setup LED also indicates errors when you use an IR 501 small matrix remote control. The LED lights for approximately 1 second when the switcher receives an unexpected or out-of-sequence IR command from the remote control. The switcher otherwise ignores the command.

⑩ **Down (▼) button and LED** — The ▼ button decreases the audio gain for a selected input. Press and release the button to decrease the gain by 1 dB or press and hold the button to decrease the gain by 3 dB per second until the button is released or the lower limit is reached.

NOTES:
- On 4-output switchers, this button and LED stand alone.
- On 8-output switchers, this button and LED are secondary functions of the Output 7 button and LED.

The ▼ LED flashes once in Audio Setup mode to indicate each 1 dB decrease in the input audio gain. See "**Adjusting Input Audio Gain and Attenuation**" on page 23.

The ▼ LED lights steadily in Audio Setup mode to indicate that the adjustment has reached the maximum attenuation (-18 dB).

⑪ **Up (▲) button and LED** — The ▲ button increases the gain for a selected input. Press and release the button to increase the audio level by 1 dB or press and hold the button to increase the audio level by 3 dB per second until the button is released or the upper limit is reached.

NOTES:
- On 4-output switchers, this button and LED stand alone.
- On 8-output switchers, this button and LED are secondary functions of the Output 8 button and LED.

The ▲ LED flashes once in Audio Setup mode to indicate each 1 dB increase in the input audio gain. See "**Adjusting Input Audio Gain and Attenuation**" on page 23.

The ▲ LED lights steadily in Audio Setup mode to indicate that the adjustment has reached the maximum gain (+10 dB).

Operations

The following paragraphs define matrix switcher terms and then 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; saving a preset; recalling a preset; viewing and adjusting the audio level; and selecting the front panel security lockout.

Definitions

The following Extron matrix switcher terms 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 — Consists of one or more ties or one or more sets of ties

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

Global memory preset — A configuration that has been stored. Sixteen global memory presets can be stored in memory. The input and output buttons select preset memory locations to load or retrieve. When a preset is retrieved from memory, it becomes the current configuration. On each model, there are as many presets available from the front panel as there are input and output buttons:

- The MVX 44 has 8 presets available on the front panel.
- The MVX 48 and MVX 84 have 12 presets available on the front panel.
- The MVX 88 has 16 presets available on the front panel.

  On smaller MVX models, presets that are not available from the front panel are still available under RS-232 or optional IR 501 control.

Powering up the Switcher

1. Plug in the switcher. On all switcher 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 and initialization that sequences the front panel LEDs on and off from left to right. A successful power up self-test and initialization leaves the power LED on, the Video and Audio LEDs on, and all other LEDs off.

   The current configuration, all presets, and all input audio levels are saved in non-volatile memory within 5 seconds of a change or exiting *Audio Setup* mode. When power is applied, the most recent configuration is retrieved. The previous presets remain intact.

   NOTE: Wait at least 5 seconds after changing any configuration, saving a preset, or exiting Audio Setup mode. Before 5 seconds have elapsed, changes that you have made may not have been saved.

   If an error occurs during the self-test, the switcher locks up and does not operate. If your switcher locks up on power-up, call the Extron S3 Sales and Technical Support Hotline. See the **last page** of this guide for the phone number in your region of the world.
2. Plug in all system components and turn on the input devices (such as computers or HDTV set-top boxes) and the output devices.
3. Set the input devices to output video using the operating instructions for each device.
4. Create a tie (see below). The selected input image should appear at the selected output. If no image appears, see "**Troubleshooting**" on page 31.

Creating a Set of Ties

You can create a set of ties, changing the current configuration, by using the front panel buttons. Change the current configuration as follows:

1. Select video, audio, or both to configure by pressing the I/O button as necessary.
2. Select the desired input and one or more outputs by pressing the input and output buttons.
3. Press and release the Enter button.
4. Repeat steps **1** through **3** to create additional ties until the desired configuration is complete.

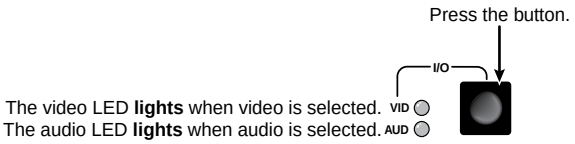
NOTES:
- Only one video input and one audio input can be tied to an output.
- If a tie is made between an input and an output, and the selected output was previously tied to another input, the older tie is broken in favor of the newer tie.
- Output LEDs light when an input is selected to indicate current ties. Press and release the associated output buttons to clear unwanted outputs.
- If, when you are configuring video and audio ties, the Audio LED blinks and the Video LED is on after you have selected 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.
- If an input with no tie is selected, only the LED for that input lights.
- As each output is selected, the associated output LED blinks to indicate a tentative tie until you press the Enter button or the 5-second timeout expires. LEDs for outputs that were already tied to the input light steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
- If you inadvertently press the wrong input or output button, wait approximately 5 seconds. The input and output button selections time out and are abandoned.

Example 1: Create a set of video and audio ties

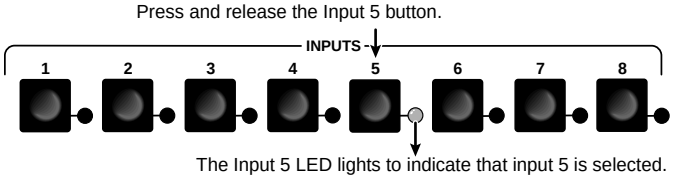
In the following example, input 5 is tied to outputs 3, 4, and 8. The example shows the front panel indications that result from your actions.

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

1. **Select video and audio for the tie**: If necessary, press and release the I/O button to cycle through the selections until the both LEDs light.

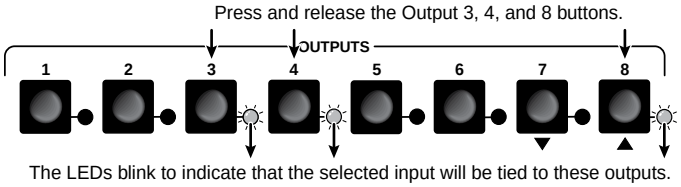


2. **Select an input**: Press and release the input 5 button.

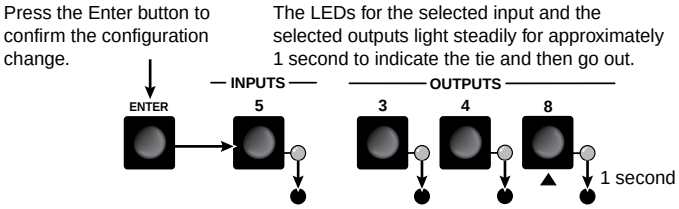


3. **Select the outputs**: Press and release the output 3, output 4, and output 8 buttons.

> **NOTE:** The entire set of ties can be canceled at this point by by waiting for the 5-second input/output button timeout to occur.



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



The current configuration is now input 5 video and audio tied to output 3, output 4, and output 8 (see **figure 8**).

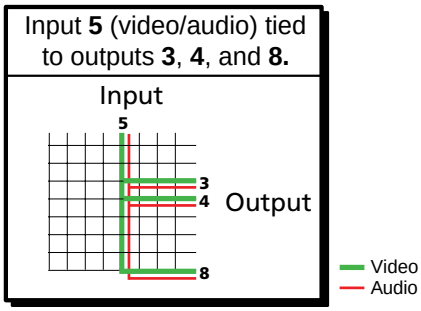


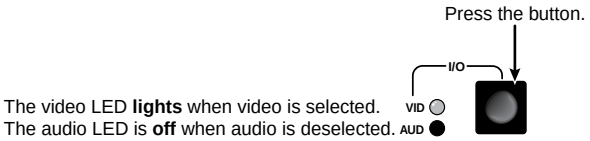
Figure 8. Example 1 Configuration

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

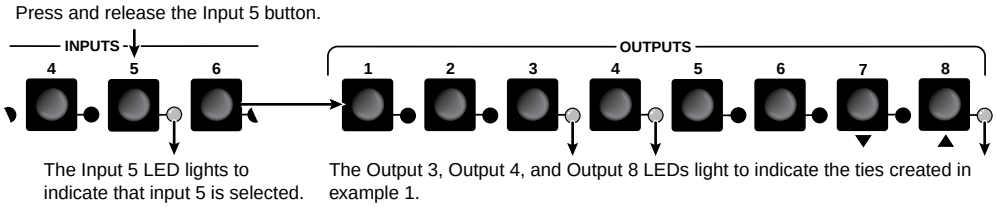
In the following example, a new video tie is added to the current configuration. The example shows the front panel indications that result from your actions.

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

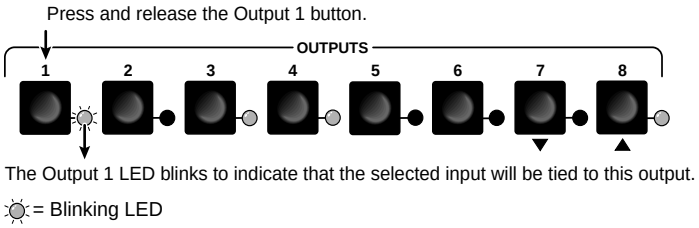
1. **Select video only for the tie**: If necessary, press and release the I/O button to cycle through the selections until the only the Video LED lights.



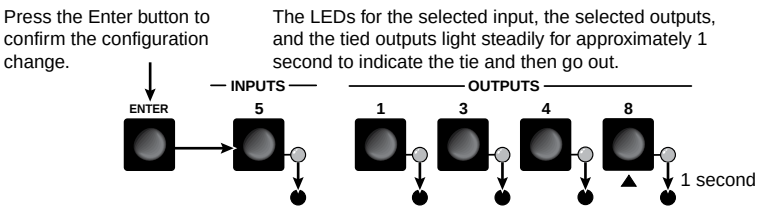
2. Select an input: Press and release the input 5 button.



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



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



The current configuration is now input 5 video tied to output 1, output 3, output 4, and output 8 (see **figure 9**).

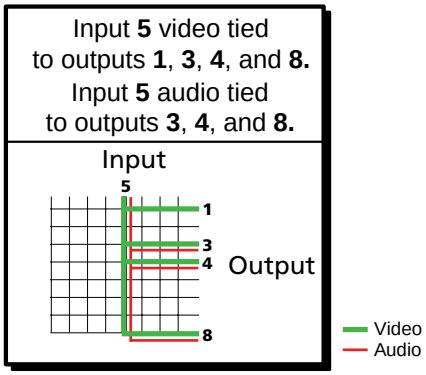


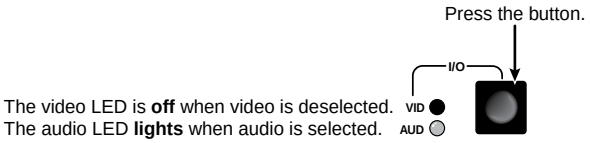
Figure 9. Example 2 Configuration

Example 3: Remove a tie from a set of ties

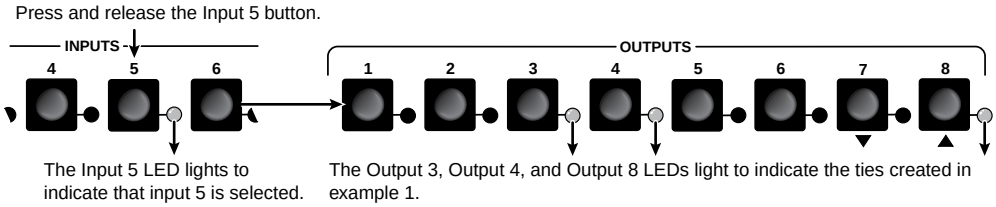
In the following example, an existing tie is removed from the current configuration. The example shows the front panel indications that result from your actions.

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

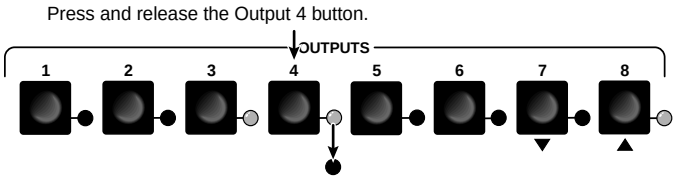
1. **Select audio only for the tie**: If necessary, press and release the I/O button to cycle through the selections until the only the Audio LED lights.



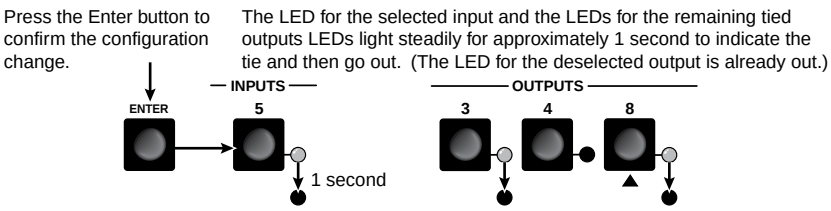
2. **Select an input**: Press and release the input 5 button.



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



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



The current configuration (see **figure 10**) is now:

- **Video** — Input 5 video tied to output 1, output 3, output 4, and output 8
- **Audio** — Input 5 audio tied to output 3 and output 8

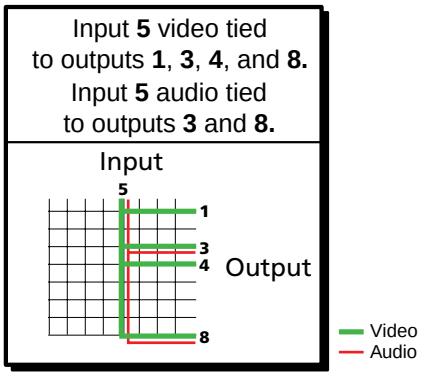


Figure 10. Example 3 Configuration

Viewing the Configuration

The current configuration (all active ties) can be viewed using the front panel buttons as follows:

1. Select video, audio, or both to view by pressing the I/O button.
2. Press and release an input or output button.
   a. **Press and release an input button** — All of the buttons for outputs that are tied to the selected input light. If the Audio LED is flashing, it indicates that there are audio-only ties (audio breakaway).

      NOTE: Allow the 5-second timeout to deselect the input buttons before you select an output button. If an input button is still selected, the indications will not be as described and you may inadvertently establish potential ties that could be created by pressing the Enter button.

   b. **Press and release an output button** — The button for the tied input and all of the buttons for outputs that are also tied to the same input light. If the Audio LED is flashing, it indicates that there are audio-only ties (audio breakaway).

      NOTE: To see all ties of the current configuration, press and release each input or output button, one at a time, with the Video LED and the Audio LED lit.

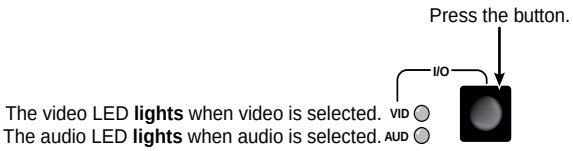
3. After approximately 5 seconds, the LEDs for the input and tied outputs go out.

NOTE: Examples 4 and 5 assume that you have performed **example 1**, **example 2**, and **example 3**.

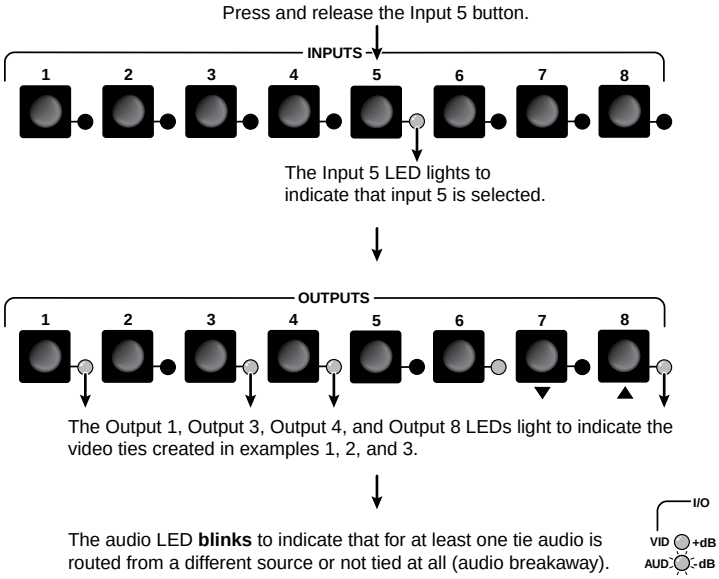
Example 4: View ties by selecting an input

In the following example, the video and audio, audio-only, and video-only ties in the current configuration are viewed by selecting an input. The example shows the front panel indications that result from your actions.

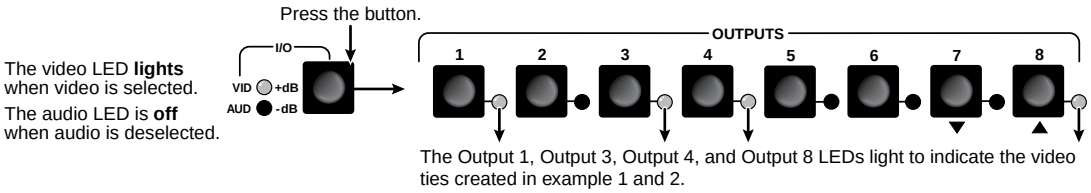
1. **Select video and audio for viewing**: If necessary, press and release the I/O button to cycle through the selections until the both LEDs light.



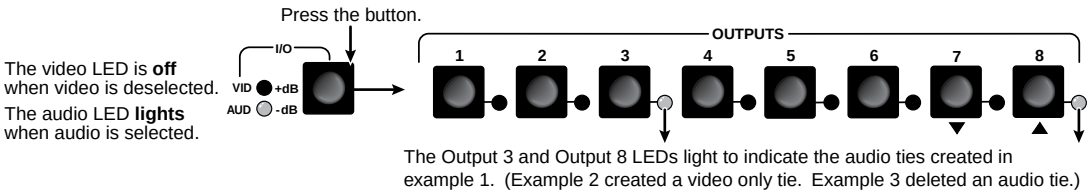
2. **Select an input**: Press and release the input 5 button.



3. **Deselect audio**: Press and release the I/O button.



4. **Deselect video and select audio**: Press and release the I/O button.

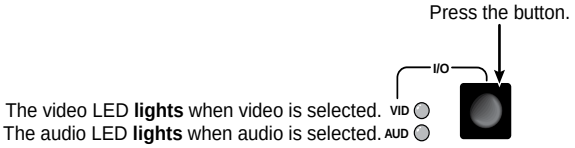


5. Allow the 5-second input and output button timeout to deselect the input.

Example 5: View ties by selecting outputs

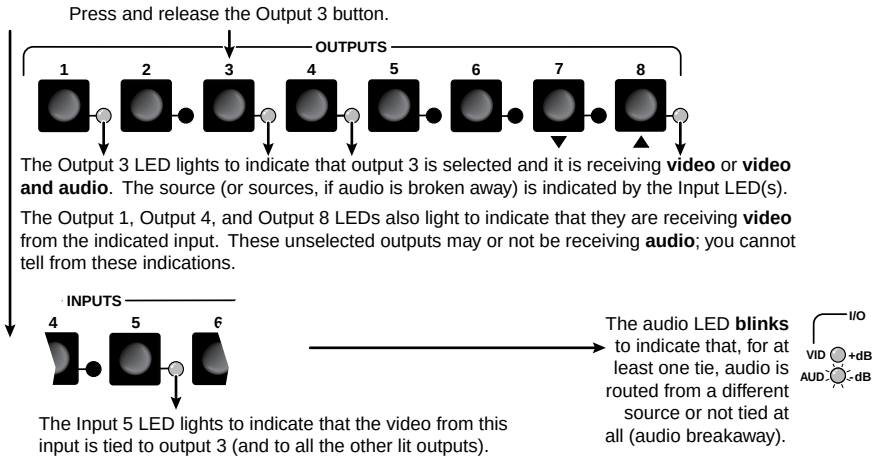
In the following example, the video and audio, audio-only, and video-only ties in the current configuration are viewed by selecting various outputs. The example shows the front panel indications that result from your actions.

1. **Select video and audio for viewing**: If necessary, press and release the I/O button to cycle through the selections until the both LEDs light.

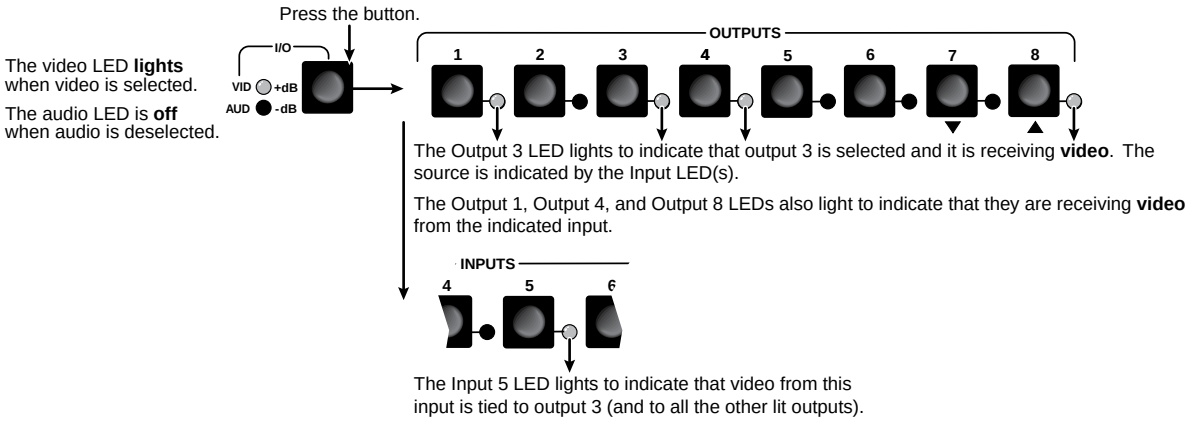


> **NOTE:** Allow the 5-second timeout to deselect the input buttons before you select an output button. If an input button is still selected, the indications will not be as described and you may inadvertently establish potential ties that could be created by pressing the Enter button.
> If you **do** inadvertently establish a potential tie by selecting an input and output button, **do not press the Enter button**. Allow the 5-second timeout to deselect all input and output buttons.

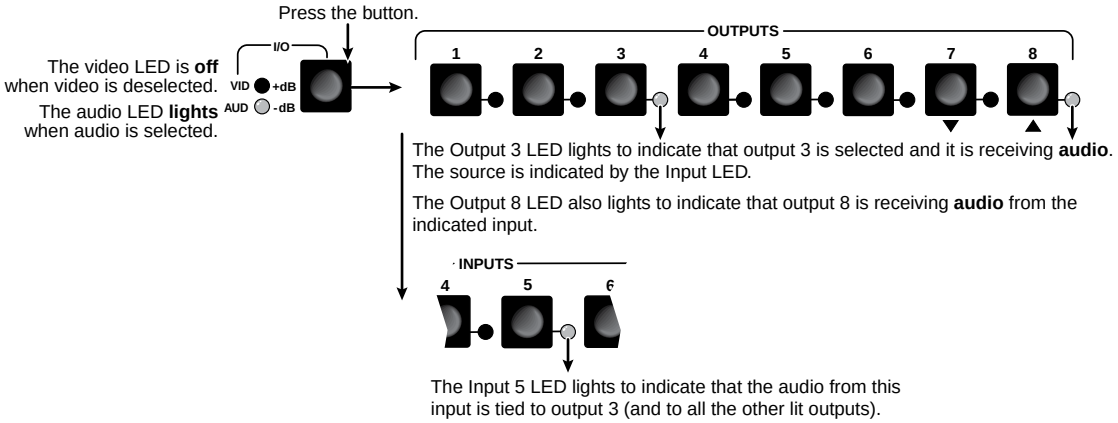
2. **Select an output**: Press and release the output 3 button.



3. **Deselect audio**: Press and release the I/O button.



4. **Deselect video and select audio**: Press and release the I/O button.



5. Allow the 5-second input and output button timeout to deselect the output.

Using Presets

The current configuration (configuration 0) can be saved as a preset in any one of 16 preset memory addresses. Each switcher has as many presets available from the front panel as it has input and output buttons. For example, the MVX 44 has 8 presets (4 input buttons and 4 output buttons) available from the front panel and the MVX 88 has 16 (8 input buttons and 8 output buttons). **Figure 11** on the next page identifies preset numbers available from the front panel for each matrix size; preset numbers above those listed are available under RS-232 or IR control only (see the "**Remote Operation**" section).

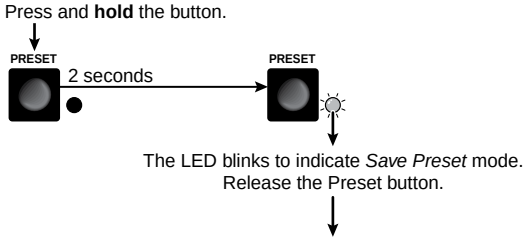
NOTES:
- Only the audio and video ties are stored and recalled; audio gain settings are not saved, and they do not change when a preset is recalled.
- Presets **cannot** be viewed from the front panel unless they are recalled as the current configuration. Presets **can** be viewed using the Extron Matrix Switchers Control Program (see the "**Remote Operation**" section).
- The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
- When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.
- All models have 16 presets; on models with fewer than 16 input and output buttons, preset numbers that are too high to be available from the front panel are still accessible under serial port or Ethernet control.

Figure 11. Preset Locations by Matrix Size

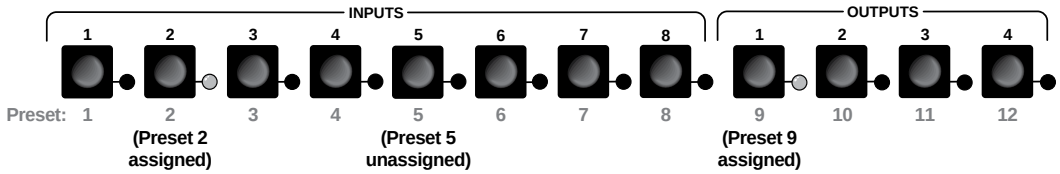
Example 6: Save a preset

In the following an example, the current configuration is saved as a preset. The example shows the front panel indications that result from your actions.

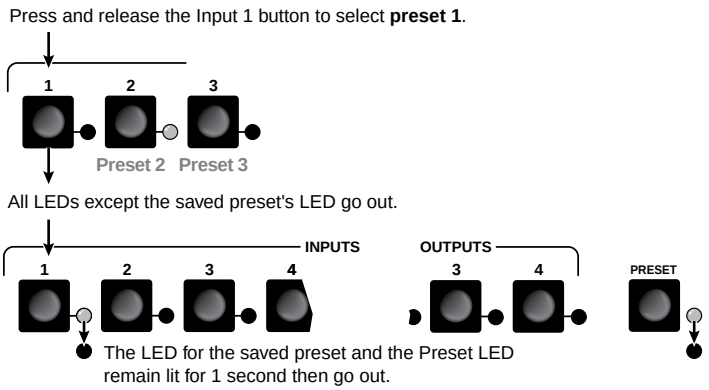
1. **Select *Save Preset* mode**: Press and hold the Preset button for approximately 2 seconds until the Preset LED begins blinking.



All input and output buttons with assigned presets light. If you then save the configuration to a lit preset number, **the configuration data at that preset location will be overwritten**.



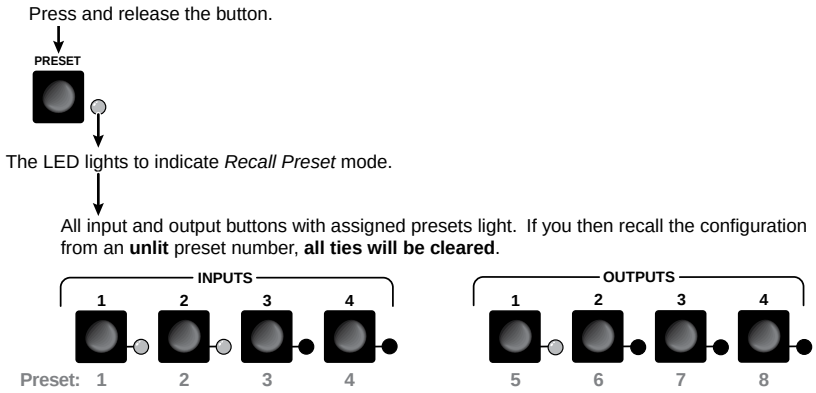
2. **Select the preset**: Press and release the input button or output button for the desired preset.



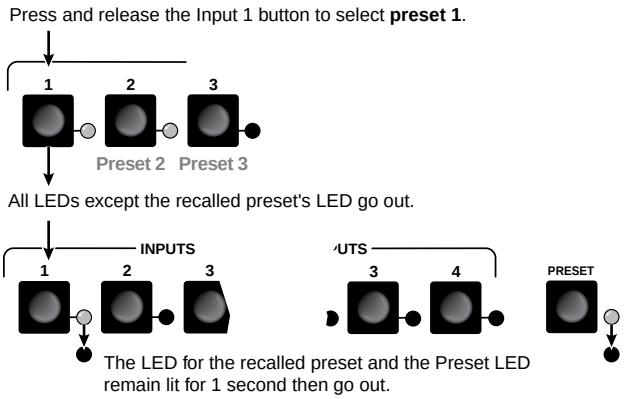
Example 7: Recall a preset

The following steps show an example in which a preset is recalled to become the current configuration. The example shows the front panel indications that result from your actions.

1. **Select *Recall Preset* mode**: Press and release the Preset button.



2. **Select the preset**: Press and release the input button or output button for the desired preset.



Adjusting Input Audio Gain and Attenuation

Switchers have input audio gain and attenuation adjustments. In *Audio Setup* mode, the audio level of each input can be adjusted through a range of –18 dB to +10 dB. This adjustment range ensures that there is no noticeable volume difference among sources. It also eliminates the need for separate preamps or attenuators when used with professional (higher line level) and consumer (lower line level) audio equipment (see **figure 12**).

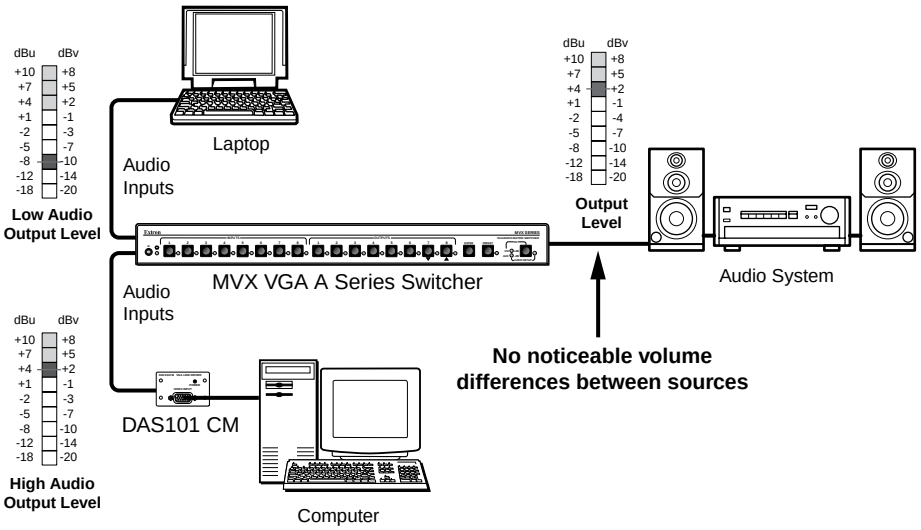


Figure 12. Audio Gain and Attenuation

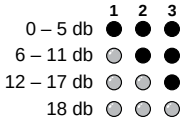
In *Audio Setup* mode, the input that is selected for adjustment is automatically tied to output 1. Connect a VU meter or an audio system to output 1 to measure or monitor the audio while you perform adjustments.

There are two ways to measure the audio level during audio setup:

- Monitor the input audio level indicator (Power LED) on the front panel.
- Connect a VU meter to output 1 and, if necessary, temporarily set the output 1 level to the consumer (-10 dBV) level (see the **Audio output level** SIS commands in the "Remote Operation" section).

The input audio gain or attenuation can be adjusted from the front panel or by using the Extron Matrix Switchers Control Program or the SIS.

1. Apply audio signals to all inputs to be adjusted.
2. Press and hold the Audio Setup (I/O) button until the Audio Setup LED lights. Release the Audio Setup button.
3. Press and release an input button to select an input. The selected input can be adjusted and is tied to output 1 for measurement or monitoring.
   a. The Output 1 through Output 3 LEDs display the approximate audio gain or attenuation for the selected input. The +dB and –dB LEDs display the polarity (+ [gain] or – [attenuation]).
      - Each Output 1 through Output 3 LED indicates a range of 6 dB when lit:
        - Output 1 LED off = 0 dB to 5 dB
        - Output 1 LED lit = 6 dB to 11 dB
        - Output 1 and 2 LED lit = 12 dB to 17 dB
        - Output 1 through Output 3 LEDs lit = 18 dB



      - The +dB LED on indicates a positive (gain) level. The –dB LED on indicates a negative (attenuation) level. Both LEDs on indicate 0 dB.

By noting the status of these LEDs and counting the number of 1 dB steps you increase or decrease the audio level (step **4** and example 8, step **2a**), you can determine the exact input gain or attenuation setting.

b. The Power LED blinks to indicate the adjusted audio level (compared to the internal level, -10 dBV):

- When the LED is lit most of the time, blinking off only occasionally, the level is too high.
- When the LED is off most of the time, blinking on (lit) only occasionally, the level is too low.
- When the LED blinks frequently, the level is in the proper range.

c. The ▼ LED lights steadily when the adjustment is at the minimum level (maximum attenuation, -18 dB). The ▲ LED lights steadily when the adjustment is at the maximum gain (+10 dB).

4. Press and release the ▼ and ▲ buttons to increase and decrease the audio level by 1 dB or press and **hold** the buttons to increase or decrease the level by 3 dB per second. The ▼ or ▲ LEDs flash to indicate each 1 dB level change.

> **NOTE:** Each time you press the ▼ or ▲ button, wait for the ▼ or ▲ LED to flash before pushing the button again. Pressing the button too rapidly may not increment or decrement the audio level.

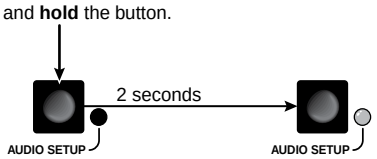
5. Press and release the Audio Setup button to save the level value in memory and to exit Audio Setup mode. The Audio Setup LED turns off.

> **NOTES:**
> - After approximately 30 seconds of front panel inactivity, the switcher saves the most recent input gain or attenuation levels and exits Audio Setup mode.
> - There is one audio gain or attenuation setting per input. The setting is shared by the left and right audio inputs.
> - The input audio gain or attenuation settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.

Example 8: Adjust the input audio gain

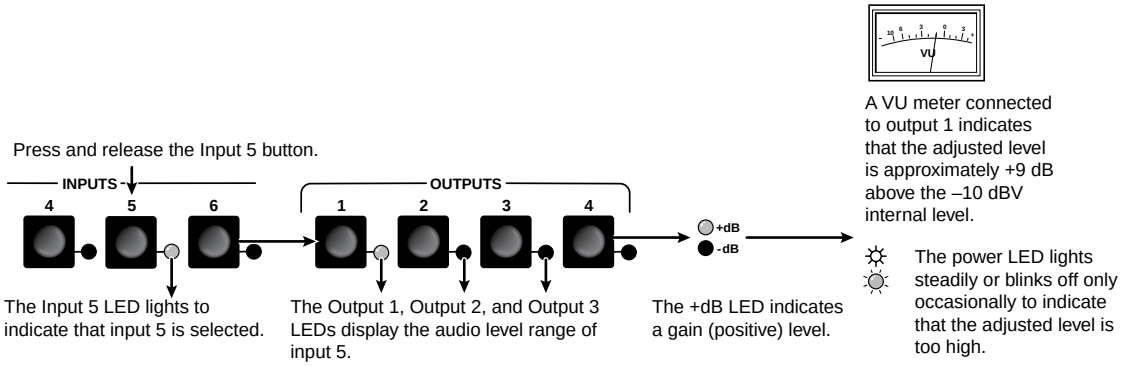
The following steps show an example in which an input audio level is viewed and adjusted. The example shows the front panel indications that result from your actions.

1. **Select *Audio Setup* mode**: Press and **hold** the Audio Setup (I/O) button for approximately 2 seconds.



The LED **lights** to indicate *Audio Setup* mode.
Release the Audio Setup button.

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



In this example, the LEDs indicate gain in the +6 dB to +10 dB range.

If the +dB and –dB LED are both lit they indicate an input gain of 0 dB. Otherwise, you can determine the exact gain or attenuation using the following procedure:

a. **If one or more output LEDs are lit AND the +dB LED is lit**, press and release the ▼ button repeatedly until the highest-numbered lit output LED goes out. Count the button presses. In example 8, assume a value of +8 dB. It will take three presses of the ▼ button for the Output 1 LED to go out.

If one or more output LEDs are lit AND the –dB LED is lit, press and release the ▲ button repeatedly until the highest-numbered lit output LED goes out. Count the button presses.

If the +dB LED is lit and NO output LEDs are lit, press and release the ▼ button repeatedly until the +dB and –dB LED are both lit, indicating 0 dB. Count the button presses.

If the –dB LED is lit and NO output LEDs are lit, press and release the ▲ button repeatedly until the +dB and –dB LED are both lit, indicating 0 dB. Count the button presses.

b. Return to the original audio gain setting by pressing and releasing the ▼ or ▲ button (the opposite of the button you pressed in step **a**) the same number of steps you pressed the opposite arrow button in step **1**. In example 8, this means pressing the ▲ button three times.

c. Add the dB value indicated by the highest-numbered lit output LED (no output LEDs lit and both dB LEDs lit = 0 dB) and either of the following:

- The number of button presses from 0 dB, or
- The number of button presses from when the highest-numbered output LED lit. In example 8:

  Output 1 LED: **6 dB**
  + 2 presses: **+2 dB**
  8 dB

The lit +dB or –dB LED indicates the gain (+) or attenuation (–).

3. **Decrease the audio level**: Press and release the ▼ button once. The ▼ LED flashes each time the button is pressed

   Press and release the ▼ button several more times to continue to decrease the audio level (see **figure 13**). Note the output LED, +dB LED, and –dB LED changes that occur each time the ▼ button is pressed and released.

   Figure 13 shows the result of pressing the ▼ button a total of 9 times to change the value to -1 dB. Note that the +dB LED has turned off and that the –dB LED is on to indicate a negative level.

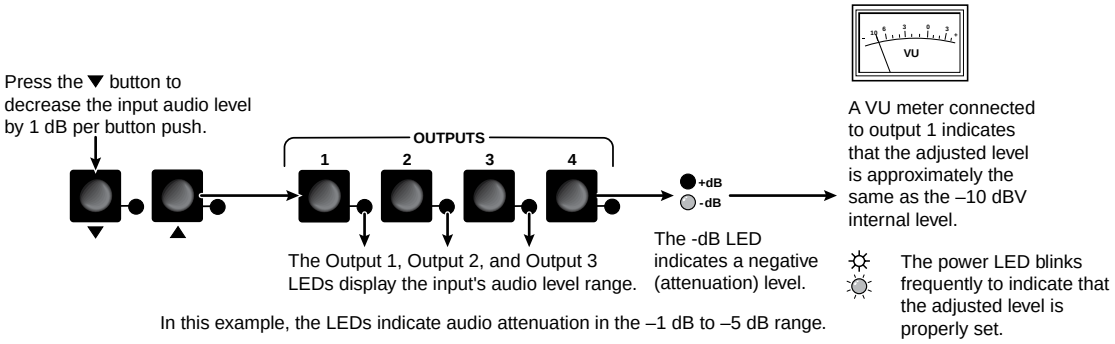
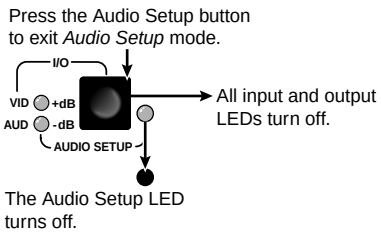


Figure 13. Adjust the Input Audio Level

> **NOTE:** If you press and release another input button, the switcher saves the gain value for the current input and displays the gain value for the newly selected input.

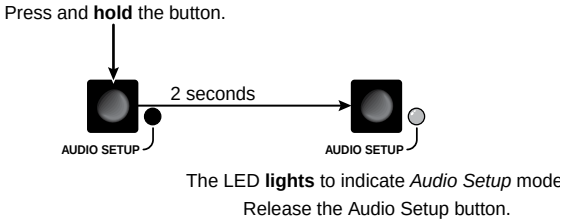
4. **Exit the *Audio Setup* mode**: Press and release the Audio Setup button. All audio changes are saved.



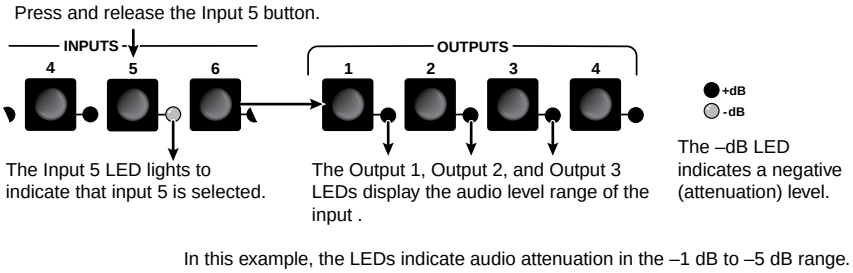
Example 9: Resetting audio gain — single input

Reset the audio gain or attenuation for a specified input to the factory default (0 dB) as follows:

1. **Select *Audio Setup* mode**: Press and **hold** the Audio Setup (I/O) button for approximately 2 seconds.

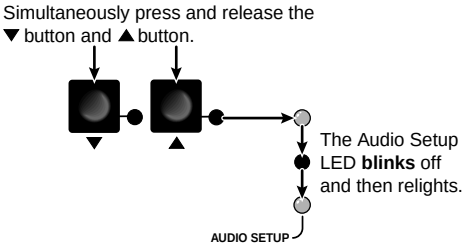


2. **Select an input**: Press and release the Input 5 button.



In this example, the LEDs indicate audio attenuation in the –1 dB to –5 dB range.

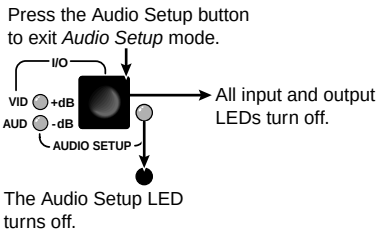
3. **Reset the input level**: Press and release the ▼ and ▲ buttons simultaneously.



4. If desired, reset the audio levels for other inputs by repeating steps **2** and **3**.

> **NOTE:** After approximately 30 seconds of front panel inactivity, the switcher saves the most recent input gain or attenuation levels and exits *Audio Setup* mode.

5. **Exit the *Audio Setup* mode**: Press and release the Audio Setup button. All audio changes are saved.



Example 10: Resetting audio gain — all inputs

To reset the input audio gain or attenuation to the factory default (0 dB) for all inputs, press and **hold** the Audio Setup (I/O) button for approximately 10 seconds (see **figure 14**).

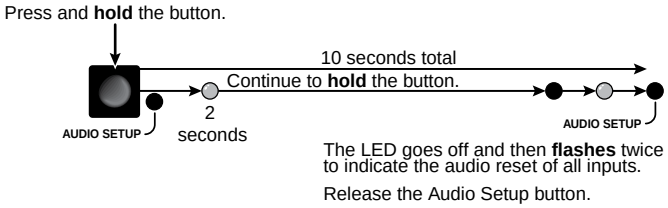


Figure 14. Reset all Audio Gains

Setting the Output Audio Level

The audio level for each output can be set only via the RS-232 port, using either SIS commands or the Matrix Switchers Control Program (see the "**Remote Operation**"section). The available settings are professional level (+4 dBu) and consumer level (–10 dBV). The default is professional level.

Front Panel Security Lockout (*Executive* Mode)

The MVX Series switchers have a front panel security lock feature (*Executive* mode) that limits the operation of the switcher from the front panel and optional IR remote control. When the switcher is locked, the Enter button, I/O button (video, audio, or video and audio selection), and all of the front panel audio gain and attenuation functions are disabled. The front panel input and output buttons continue to allow ties to be viewed, but ties cannot be created.

The front panel security lockout also disables the IR remote sensor to lock out remote control functions.

Toggle the front panel lockout on and off by pressing and ***holding*** the Enter and Preset buttons for approximately 2 seconds (see **figure 15**).

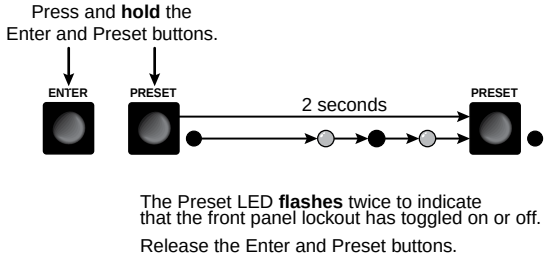


Figure 15. Toggle Front Panel Lock on or off

Clearing all Ties and Presets

To clear all ties and saved presets, press and **hold** the Preset button on the front panel while applying AC power (see **figure 16**). Continue to hold the Preset button until all LEDs light and then release the Preset button. The power up sequence completes:

- All LEDs turn off then turn on and off from left to right.
- The Video and Audio LEDs turn on.
- All other LEDs remain off.

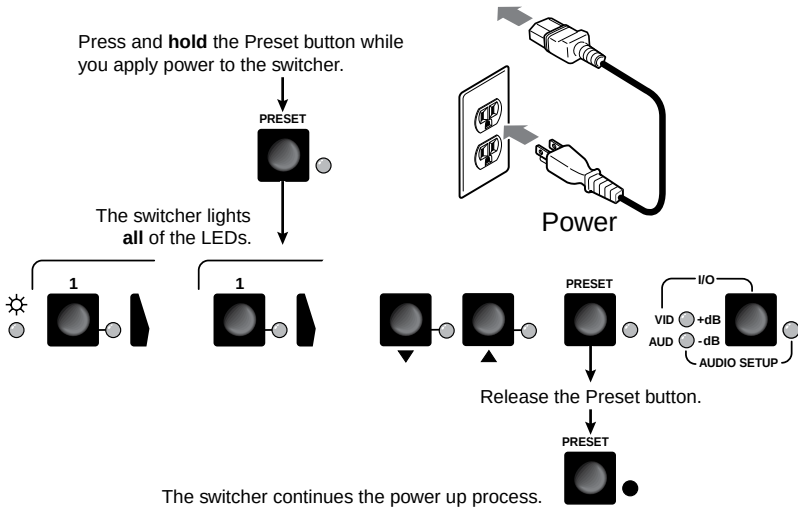


Figure 16. Clear all Ties and Presets

Resetting the System to Factory Defaults

To reset a switcher to the factory default settings, press and **hold** the I/O button on the front panel while applying AC power (see **figure 17**). Continue to hold the I/O button until all LEDs light and then release the I/O button. The power up sequence completes (all LEDs turn off then turn on and off from left to right, the Video and Audio LEDs turn on, and all other LEDs remain off). System reset does the following:

- Clears all ties and presets.
- Clears all video and audio mutes.
- Sets all input audio gain levels to their default (0 dB) values.
- Returns the output audio level to the professional (+4 dBu) level.

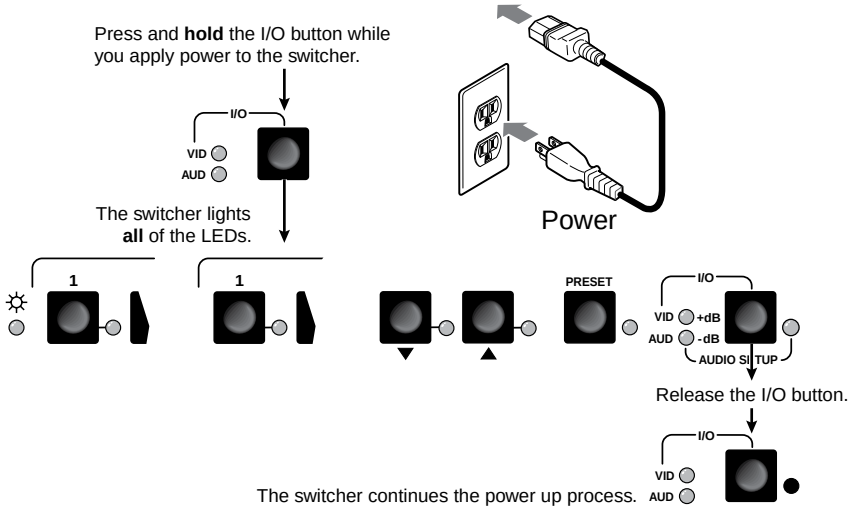


Figure 17. System Reset to Factory Defaults

Memory

The current configuration, all presets, and all input audio levels are saved in non-volatile memory within 5 seconds of a change or exiting *Audio Setup* mode. When power is applied, the last current configuration is retrieved. The previous presets remain intact.

NOTE: Wait at least 5 seconds after changing any configuration, saving a preset, or exiting Audio Setup mode. Before 5 seconds have elapsed, changes that you have made **may** not have been saved.

Optimizing the Audio

Each individual input audio gain can be adjusted within a range of -18 dB to +10 dB to eliminate noticeable volume differences between sources and to achieve the best headroom and signal-to-noise ratio. Adjust the audio level as follows:

1. Connect audio sources to all desired inputs and connect the audio outputs to output devices such as audio players. See "**Video and Audio Input Connections**" and "**Video and Audio Output Connections**" in the "Installation" section. For best results, wire all of the inputs and the outputs balanced when possible.
2. Power on the audio sources, the switcher, and the audio players.
3. Apply audio signals to all inputs to be optimized.
4. In Audio Setup mode (see "**Adjusting Input Audio Gain and Attenuation**," on page 23) select among the inputs while observing the front panel Power LED. The LED blinks at a rate that corresponds to the highs and lows of the audio signal.
5. As necessary, adjust the audio gain of each input so that the Power LED blinks frequently for all selected inputs. If the LED is lit most of the time, the level is probably too high; if the LED rarely flashes, the level is too low.

As an alternative:

- If necessary, temporarily set the output 1 level to the consumer (-10 dBV) level (see the **Audio output level** SIS commands in the "Remote Operation" section).
- Measure the output 1 audio level (in *Audio Setup* mode, the selected input is tied to output 1) with test equipment, such as a VU meter, or listen to the output 1 audio with a critical ear.

Troubleshooting

This section gives recommendations on what to do if you have problems operating the MVX Series switcher.

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if the power LED 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 and Technical Support Hotline if necessary. See the **last page** of this guide for the phone number in your region of the world.

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 35 and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. If applicable, use different colors for video and audio.

Worksheet Example 1: System Equipment

Figure 18 shows a worksheet for an MVX 88 in a fictional organization with the system hardware annotated. Input 6 has no connection in this organization, so it has been crossed out on the worksheet.

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

The VTG 300 video test generator connected to input 8 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.

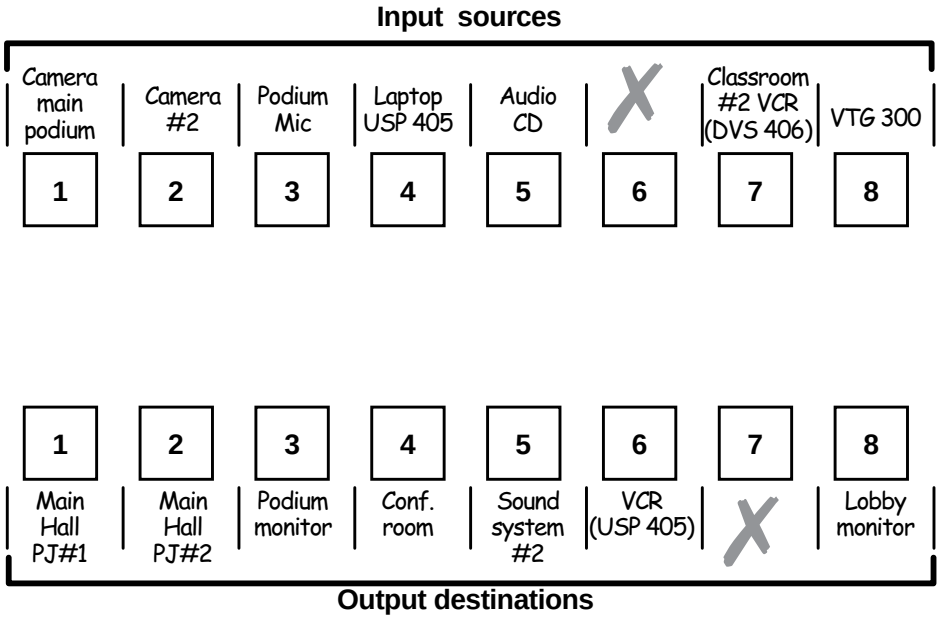


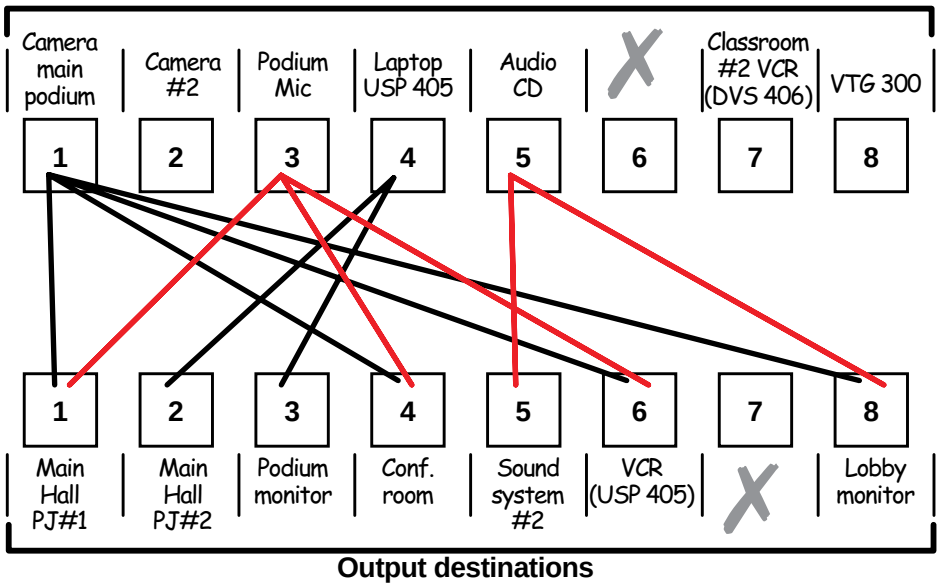
Figure 18. Worksheet Example 1: System Equipment

Worksheet Example 2: Daily Configuration

Figure 19 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1. A black line shows video ties and a red line shows the audio ties.

In this example:

- The image of the speaker, from the main podium camera (input 1), is:
  - Displayed in the main hall (output 1)
  - Displayed in the conference room (output 4) to the overflow crowd
  - Displayed in the lobby (output 8)
  - Tied to the VCR (output 6)
- The speaker has a presentation on her laptop computer (input 4) that is:
  - Displayed in the main hall (output 2)
  - Displayed locally on the podium (output 3).
- The audio from her microphone (input 3) is:
  - Played in the hall (output 1)
  - Played in the conference room (output 4)
  - Sent to the VCR
- Classical music from the CD player (input 5) is:
  - Played in the background in the main hall on sound system #2 (output 5)
  - Played in the lobby (output 8).



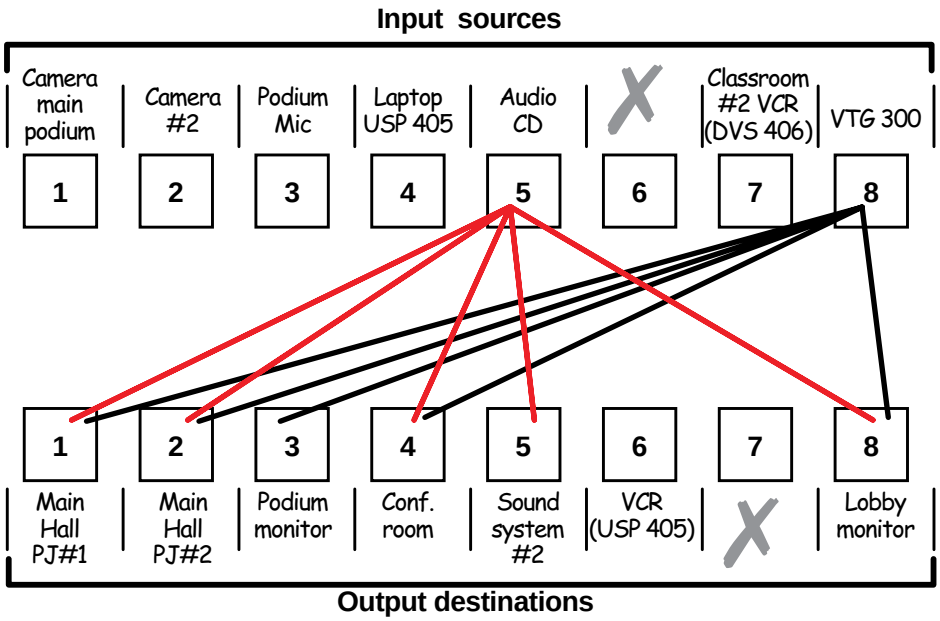
Preset # 1 Title: Worksheet Example Video: —— Audio: ——

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 19. Worksheet Example 2: Daily Configuration

Worksheet Example 3: Test Configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. **Figure 20** shows a typical test configuration, with an Extron video test generator (input 8) generating a test pattern to all monitors (outputs 1, 2, 3, 4, and 8). Sound checks are run from the CD player (input 5) to all audio systems (outputs 1, 2, 4, 5, and 8).

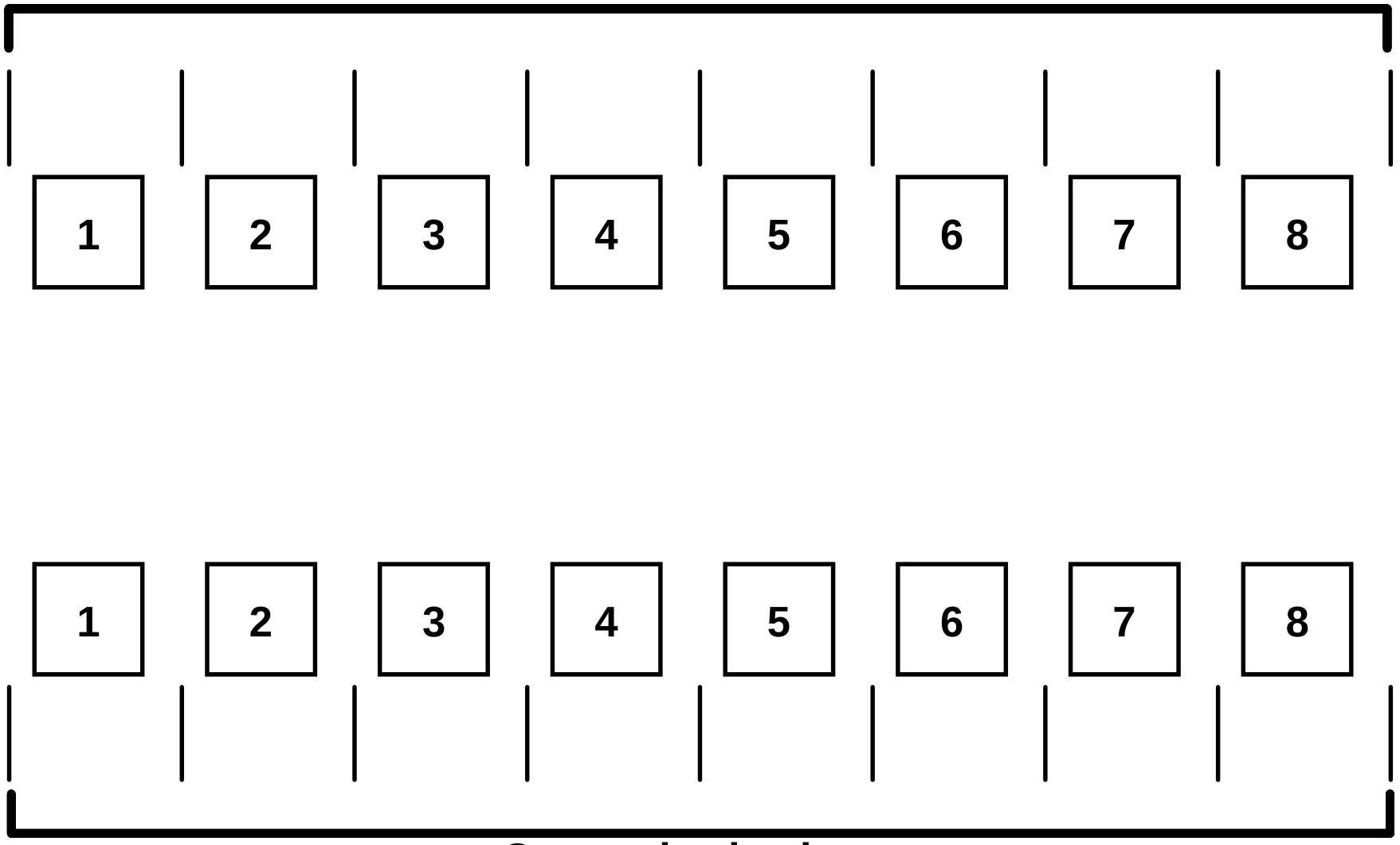


Preset # 1 Title: Worksheet Example Video: ——— Audio: ———

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 20. Worksheet Example 3: Test Configuration

Input sources



Output destinations

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.

Remote Operation

This section describes the operation of the MVX VGA Matrix Switcher, including:

- **IR Remote Control**
- **Simple Instruction Set Control**
- **Matrix Switchers Control Program**

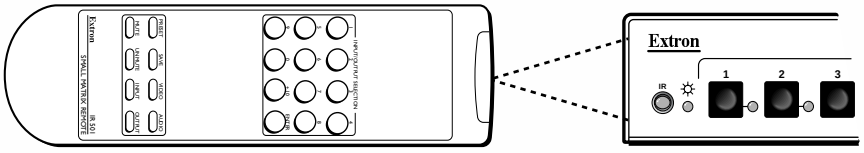
SIS commands and the Matrix Switchers Control Program require a connection to the rear panel RS-232 port by either a host device, such as a computer, or a control system (see **item ④** and "**Remote Connection**" on page 6). The serial port protocol is:

- 9600 baud
- 8-bit
- 1 stop bit
- No parity
- No flow control

NOTE: When using communications software such as HyperTerminal to control the MVX switcher, verify that the terminal emulation is set to Auto Detect or ANSI and set flow control to None. Other settings may cause errors.

IR Remote Control

Besides the RS-232 port, the MVX VGA Series switchers can be remotely controlled using an optional infrared Small Matrix Universal Remote Control (**figure 21**). Operation of the IR 501 remote control is described in the *IR 501 Small Matrix IR Remote Control User Guide*. Using the hardwired IR input on pin 9 of the RS-232 port, you can use a control system with IR-learning capabilities to operate the switcher just as if you were using an IR 501 remote control. The control system must first "learn" the IR command from an IR 501, after which, it sends the same commands to the MVX via pin 9.



Extron
IR 501 Remote, Part # 70-336-01

Figure 21. Small Matrix IR Remote Control

Simple Instruction Set Control

Host-to-Switcher Instructions

The switcher accepts SIS (Simple Instruction Set) commands through the RS-232 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 or an IR 501 command string occurs, the switcher responds by sending a message to the host. The switcher-initiated messages are listed below (underlined).

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

`(C) COPYRIGHT 20yy, EXTRON ELECTRONICS "MVX nn VGA/A Series", Vx.xx↵`

The copyright message is initiated by the switcher when it is first powered on. V*x.xx* is the firmware version number. "*nn*" is the matrix size (such as 88, eight inputs by eight outputs).

`Qik↵`

The switcher initiates the Qik message when a front panel or IR 501 tie creation has occurred.

`Sprnn↵`

The switcher initiates the Spr message when a memory preset has been saved from the front panel or under IR 501 control. "*nn*" is the preset number.

`Rprnn↵`

The switcher initiates the Rpr message when a memory preset has been recalled from the front panel or under IR 501 control. "*nn*" is the preset number.

`Inn Audxx↵`

The switcher initiates the Aud message when a front panel input audio level change has occurred. "*n*" is the input number and "*xx*" is the dB level.

`Zpa↵`

The switcher initiates the Zpa message when a reset of all audio input levels to 0 dB has been initiated from the front panel.

`Exen↵`

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

`Vmtn 1↵`

The switcher initiates the Vmt message when an IR 501 remote control output video mute command has occurred. "*n*" is the output number and "1" indicates the mute function is turned on (the output is muted).

`Amtn 1↵`

The switcher initiates the Amt message when an IR 501 remote control output audio mute command has occurred. "*n*" is the output number and "1" indicates the mute function is turned on (the output is muted).

Mut*n* 1↵

The switcher initiates the Mut message when an IR 501 remote control output video and audio mute command has occurred. "*n*" is the output number and "1" indicates the mute function is turned on (the output is muted).

Zpz↵

The switcher initiates the Zpz message when an IR 501 remote control output unmute command has occurred. All video and audio outputs are unmuted.

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 (out of range)
E10 — Invalid command
E11 — Invalid preset number (out of range)
E12 — Invalid output number (out of range)
E13 — Invalid value (out of range)
E14 — Invalid command for this configuration

Using the Command and Response Table

The command and response table begins on **page 39**. Symbols used in the table represent variables in the command and response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table below is for use with the command and response table.

ASCII to Hex Conversion Table

Space →	20	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	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	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	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

Esc 1B CR 0D LF 0A

NOTE: With the exception of the audio input gain and attenuation commands, the SIS commands are **not** case sensitive.

Symbol definitions

↵ = Carriage return/line feed
← = Carriage return (no line feed)
• = space
Esc = Escape key

X1	= Input number (for tie)	0 (untie) – maximum number of inputs
X2	= Output number	1 through 4 (MVX 44, MVX 84) or 1 through 8 (MVX 48, MVX 88)
X3	= Executive mode, mute	1 = on 0 = off
X4	= Input number	1 through 4 (MVX 44, MVX 48) or 1 through 8 (MVX 84, MVX 88)
X5	= Input audio gain	0 through 10 (1 dB per step)
X6	= Numeric dB value	–18 to +10 (29 steps [dB] of audio attenuation and gain)
X7	= Input audio attenuation	1 through 18 (1 dB per step)
X8	= Output gain	0 = consumer level (–10 dBV) 1 = pro level (+4 dBu)
X9	= Preset number	00 through 16 (00 = current configuration)
X10	= Video/audio mute	0 = no mutes 2 = audio mute 1 = video mute 3 = video and audio mute

X11 = RGB delay in ½ second increments (10 [5 seconds] maximum)
X12 = Controller firmware version number to second decimal place

Command and Response Table for SIS Commands

Command Function	ASCII Command (Host to Unit)	Response (Unit to Host)	Additional description
Create Ties			
NOTES: • The & tie command for RGB and the % tie command for video can be used interchangeably. • The & read tie command for RGB and the % read tie command for video can be used interchangeably. • Commands can be entered back-to-back in a string, with no spaces. For example: 1*1!02*02&003*003%4*4$. • The quick multiple tie and tie input to all output commands activate all I/O switches simultaneously. • The matrix switchers support 1-, 2-, and 3-digit numeric entries (1*1, 02*02, or 001*001).			
Tie input X1 to output X2, RGB video and audio	X1*X2!	Out X2 • In X1 • All ↵	Tie the input X1 video and audio to output X2.
Example:	1*3!	Out3•In1•All↵	Tie input 1 video and audio to output 3.
Tie input X1 to output X2, RGB (video) only	X1*X2&	Out X2 • In X1 • RGB ↵	Audio breakaway (video only) tie.
Example (see the 1st bulleted note, above):	7*5&	Out5•In7•RGB↵	Tie input 7 RGB to output 5.
Tie input X1 to output X2, video only	X1*X2%	Out X2 • In X1 • RGB ↵	Audio breakaway (video only) tie.
Tie input X1 to output X2, audio only	X1*X2$	Out X2 • In X1 • Aud ↵	Audio breakaway (audio only) tie.
Example:	3*8$	Out8•In3•Aud↵	Tie input 3 audio to output 8.
Quick multiple tie	Esc+Q X1*X2!...X1*X2$←	Qik↵	Make multiple ties.
Example:	Esc+Q3*4!3*5%3*6$←	Qik↵	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.
Tie input to all outputs, RGB video and audio	X1*!	In X1 • All ↵	
Example:	5*!	In05•All↵	Tie input 5 video and audio to all outputs.
Tie input to all outputs, RGB (video) only	X1*&	In X1 • RGB ↵	Audio breakaway (video only) tie.
Tie input to all outputs, video only	X1*%	In X1 • RGB ↵	Audio breakaway (video only) tie.
Tie input to all outputs, audio only	X1*$	In X1 • Aud ↵	Audio breakaway (audio only) tie.
Read RGB (video) output tie	X2&	X1↵	RGB input X1 is tied to output X2.
Read RGB (video) output tie	X2%	X1↵	RGB input X1 is tied to output X2.
Read audio output tie	X2$	X1↵	Audio input X1 is tied to output X2.

Command/Response Table for SIS Commands (continued)

Command Function	ASCII Command (Host to Unit)	Response (Unit to Host)	Additional description
RGB mute commands			
RGB mute	X2*1B	VmtX2*1↵	Mute output X2 RGB (video off).
RGB unmute	X2*ØB	VmtX2*Ø↵	Unmute output X2 RGB (video on).
Read RGB mute	X2B	X3↵	1 = mute on, 0 = mute off.
Global RGB mute	1*B	Vmt1↵	Mute all RGB outputs.
Global RGB unmute	Ø*B	VmtØ↵	Unmute all RGB outputs.
IR 501 mute command responses			
NOTE: An IR 501 user can mute video, audio, or both with a string of IR commands that cannot be duplicated by a computer or control system sending SIS commands. The switcher sends the following responses shown in the entries below.			
IR 501 RGB and audio mute	{none}	MutX2*1↵	The RGB and audio from output X2 are muted.
IR 501 RGB mute	{none}	VmtX2*1↵	The RGB from X2 output is muted.
IR 501 RGB and audio unmute	{none}	Zpz↵	The RGB and audio from output X2 are unmuted.
Audio input gain and attenuation			
NOTE: The set gain (G) and set attenuation (g) commands are case sensitive.			
Set audio input gain to +dB value	X4*X5G	InX4•AudX6↵	
Example:	1*2G	In1•Aud+Ø2↵	Set input 1 audio gain to +2 dB.
Set audio input attenuation to -dB value	X4*X7g	InX4•AudX6↵	
Increment gain	X4+G	InX4•AudX6↵	Increase gain by 1 dB.
Example:	5+G	In5•Aud+Ø3↵	Increase audio input 5 level from +2 dB to +3 dB.
Decrement gain	X4-G	InX4•AudX6↵	Decrease gain by 1 dB.
Example:	7-G	In7•Aud-Ø9↵	Decrease audio input 7 level from -8 dB to -9 dB.
Read input gain	X4G	X6↵	
Example:	3G	-Ø6↵	Audio input 3 level is at -6 dB.
Audio output level			
Set audio output to the consumer level (-10 dBV)	X2*Ø*4Ø#	OutX2•Lvl0↵	Set output X2 level to consumer (-10 dBV).
Set audio output to the professional level (+4 dBu)	X2*1*4Ø#	OutX2•Lvl1↵	Set output X2 level to pro (+4 dBu) (default).
Read output level	X2+4Ø#	X8↵	
Example:	3*4Ø#	1↵	Output 3 audio level is pro (+4 dBu).
Audio mute commands			
Audio mute	X2*1Z	AmtX2*1↵	Mute output X2 audio (audio off).
Audio unmute	X2*ØZ	AmtX2*Ø↵	Unmute output X2 audio (audio on).
Read audio mute	X2Z	X3↵	1 = mute on, 0 = mute off.
Global audio mute	1*Z	Amt1↵	Mute all audio outputs.
Global audio unmute	Ø*Z	AmtØ↵	Unmute all audio outputs.

NOTE:

X2 = Output number	1 through 4 (MVX 44, MVX 84) or 1 through 8 (MVX 48, MVX 88)	
X3 = Mute status	1 = on	0 = off
X4 = Input number	1 through 4 (MVX 44, MVX 48) or 1 through 8 (MVX 84, MVX 88)	
X5 = Input audio gain	0 through 10 (1 dB per step)	
X6 = Numeric dB value	–18 to +10 (29 steps [dB] of audio attenuation and gain)	
X7 = Input audio attenuation	1 through 18 (1 dB per step)	
X8 = Output gain	0 = consumer level (–10 dBV)	1 = pro level (+4 dBu)

Command/Response Table for SIS Commands (continued)

Command Function	ASCII Command (Host to Unit)	Response (Unit to Host)	Additional description
Save, recall, and directly write global presets			
Save current configuration as a global preset	X9,	SprX9↵	Command character is a comma.
Example:	8,	Spr08↵	Save current ties as preset 8.
Recall a global preset	X9.	RprX9↵	Command character is a period.
Example:	5.	Rpr05↵	Recall preset 5, which becomes the current configuration.
Directly write a global preset	Esc*X9PX1*X2!X1*X2%X1*X2$ ... X1*X2&← SprX9↵		Enter as many ties as are valid for this model. The tie all (!), both tie RGB (& and %), and the tie audio ($) commands are all valid.
Example:	Esc*16P08*5!07*04%3*6$3*8&← Spr16↵		Brackets are shown to separate ties for clarity only. Create global preset 16, which ties video and audio input 8 to output 5, RGBHV input 7 to output 4, audio input 3 to output 6, and RGBHV input 3 to output 8.
View global preset configuration	EscX9VC←	$X1^1$•$X1^2$•$X1^3$•...•$X1^n$•Vid•$X1^1$•$X1^2$•$X1^3$•...•$X1^n$•Aud↵	Show the video and audio configuration for preset X9. Show the video input tied to *n* sequential outputs and then the audio input tied to *n* sequential outputs. *n* is the highest output number for this model switcher.
Response description:	Video input # (I#) tied to output #1 (O#1)•I# tied to O#2•I# tied to O#3•I# tied to O#n•Vid• Audio input # (I#) tied to output #1 (O#1)•I# tied to O#2•I# tied to O#3•I# tied to O#n•Aud↵		
*Example (**MVX 88 VGA**):*	Esc4VC←		
		Input 5 video tied to output 2; No tied input; Audio input 8 tied to output 5 Response = tied input: 6•5•6•8•3•3•1•0•Vid•8•1•1•1•8•8•8•8•Aud↵ Output: 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8	
			Each position shown in the response is an output: left = output 1 , right = output 8. The number in each position is the input tied to that output. Video — Input 6 is tied to outputs 1 and 3; input 5 to output 2; input 8 to output 4; input 3 to outputs 5 and 6; and input 1 to output 7. No input is tied to output 8. Audio — Input 8 is tied to outputs 1 and outputs 5 through 8; input 1 to outputs 2 through 4.
*Example (**MVX 44 VGA**)*	Esc4VC←		
		Input 1 tied to output 2 Response = tied input: 1•1•0•2•Vid•1•1•0•1•Aud↵ Output: 1 2 3 4 1 2 3 4	

NOTE: Esc0VC← returns the current video and audio configuration of the switcher.

NOTE:

X1 = Input number (for tie)	0 (untie) – maximum number of inputs
X2 = Output number	1 through 4 (MVX 44, MVX 84) or 1 through 8 (MVX 48, MVX 88)
X9 = Preset number	00 through 16 (00 = current configuration)

Command/Response Table for SIS Commands (continued)

Command Function	ASCII Command (Host to Unit)	Response (Unit to Host)	Additional description
View ties, gains, mutes, and presets			
Read RGB (video) output tie	X2&	X1↵	RGB input X1 is tied to output X2.
Read RGB (video) output tie	X2%	X1↵	RGB input X1 is tied to output X2.
Read audio output tie	X2$	X1↵	Audio input X1 is tied to output X2.
View input gain	X4G	X6↵	
Example:	3G	-Ø6↵	Audio input 3 level is -6 dB.
View output mutes	EscVM←	X10¹X10² ... X10ⁿMut↵	Each X10 response is the mute status of an output: left = output 1, right = output *n*. *n* = the highest output number for this model.
*Example (**MVX 84 VGA**):*	EscVM←	Ø132Mut↵	Output 1 is unmuted, output 2 video is muted, output 3 video and audio are muted, and output 4 audio is muted. Outputs 5 through 8 are not present on this switcher.
View global preset configuration	EscX91VC←	X1¹•X1²•X1³•...•X1ⁿ•Vid•X1¹•X1²•X1³•...•X1ⁿ•Aud↵	Show the video and audio configuration for preset X9. Show the video input tied to *n* sequential outputs and then the audio input tied to *n* sequential outputs. *n* is the highest output number for this model switcher.
Response description:	Video input # (I#) tied to output #1 (O#1)•I# tied to O#2•I# tied to O#3•I# tied to O#n•Vid• Audio input # (I#) tied to output #1 (O#1)•I# tied to O#2•I# tied to O#3•I# tied to O#n•Aud↵		
*Example (**MVX 88 VGA**):*	Esc4VC←		

Input 5 video tied to output 2 | No tied input | Audio input 8 tied to output

Response = tied input: 6•5•6•8•3•3•1•Ø•Vid•8•1•1•1•8•8•8•8•Aud↵
Output: 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

Each position shown in the response is an output: left = output 1 , right = output 8. The number in each position is the input tied to that output.

Video — Input 6 is tied to outputs 1 and 3; input 5 to output 2; input 8 to output 4; input 3 to outputs 5 and 6; and input 1 to output 7. No input is tied to output 8.

Audio — Input 8 is tied to outputs 1 and outputs 5 through 8; input 1 to outputs 2 through 4.

NOTE: Esc0VC← returns the current video and audio configuration of the switcher.

RGB delay			
Set RGB delay	EscX2*X11D←	OutX2•DlyX11↵	
Example:	Esc5*7D←	Out5•DlyØ7↵	Set the RGB delay for a tie to output 5 to 3.5 sec (7 x 0.5 sec.).
Read RGB delay	EscX2D←	X11↵	
Example:	Esc6D←	Ø5↵	Output 6 delay is 2.5 sec (5 x 0.5 sec.).

NOTE:
- X1 = Input number (for tie) — 0 (untie) – maximum number of inputs
- X2 = Output number — 1 through 4 (MVX 44, MVX 84) or 1 through 8 (MVX 48, MVX 88)
- X4 = Input number — 1 through 4 (MVX 44, MVX 48) or 1 through 8 (MVX 84, MVX 88)
- X6 = Numeric dB value — –18 to +10 (29 steps [dB] of audio attenuation and gain
- X9 = Preset number — 00 through 16 (00 = current configuration)
- X10 = Video/audio mute — 0 = no mutes; 1 = video mute; 2 = audio mute; 3 = video and audio mute
- X11 = RGB delay in ½ second increments (10 [5 seconds] maximum)

Command/Response Table for SIS Commands (continued)

Command Function	ASCII Command (Host to Unit)	Response (Unit to Host)	Additional description
Front panel lockout (*Executive* mode)			
Lock front panel	1X	Exe1↵	Enable executive mode.
Unlock front panel	ØX	ExeØ↵	Disable executive mode.
View lock status	X	X3↵	
Resets			
Reset global presets	Esc ZG←	Zpg↵	Clear all global presets.
Reset **one** global preset	Esc X9 ZG←	Zpg X9↵	Clear global preset X9.
Reset audio input levels	Esc ZA←	Zpa↵	Reset all audio input levels such that the output is 0 dB.
Reset audio output levels	Esc ZV←	Zpv↵	Reset all audio output levels to the professional level.
Reset all mutes	Esc ZZ←	Zpz↵	Unmute all video and audio outputs.
Reset all RGB delay settings	Esc ZD←	Zpd↵	Reset all RGB delays to 0 seconds.
Reset whole switcher	Esc ZXXX←	Zpx↵	Clear all ties, global presets, and mutes and reset all audio gains to the factory default.
Firmware upload			
Upload firmware	Esc upload	See "**Loading Firmware Using an SIS Command**" on the next page.	
Information requests			
Information request	I	V X4 X X2 •A X4 X X2 ↵	V (video) matrix size• A (audio) matrix size
*Example (**MVX 84 VGA**):*	I	V8X4•A8X4↵	8 RGB and audio inputs and 4 RGB and audio outputs.
Request part number	N	*nn-nnn-nn*↵	See "**Part Numbers and Accessories**" in the "Reference Information" section.
*Example (**MVX 88 VGA A**):*	N	6Ø-638-21↵	MVX 88 VGA A part number is 60-638-21.
Query controller firmware version	Q	X12↵	
Example:	Q	1.23↵	The factory-installed controller firmware version is 1.23 (sample value only).

NOTE:
X2 = Output number — 1 through 4 (MVX 44, MVX 84) or 1 through 8 (MVX 48, MVX 88)
X3 = Executive mode — 1 = on 0 = off
X4 = Input number — 1 through 4 (MVX 44, MVX 48) or 1 through 8 (MVX 84, MVX 88)
X9 = Preset number — 00 through 16 (00 = current configuration)
X12 = Controller firmware version number to second decimal place

Loading Firmware Using an SIS Command

NOTE: Firmware can be uploaded two ways:

1. Using the Matrix Switchers Control Program.
2. Using the Esc upload SIS command entered via a communications utility such as HyperTerminal.

Extron recommends that you upload firmware using the Matrix Switchers Control Program (see "**Updating the firmware**" on page 49) and reserve this SIS procedure for correcting firmware that has been corrupted and unable to respond to the Matrix Switchers Control Program**.**

Firmware can be loaded using SIS commands as follows:

1. Obtain the latest firmware file for the matrix switcher (see steps **1** through **6** of "**Updating the firmware**" on page 49.
2. Start a communications utility such as HyperTerminal. Select the Comm port that is connected to the RS-232 port of the switcher. Use 9600 bits per second, 8 data bits, "none" parity, 1 stop bit, and "none" flow control.

NOTES:

- If you are performing this procedure to recover from corrupted firmware, the switcher will respond only to the "`n`", "`q`", and "Esc`upload`" SIS commands.
- The firmware upload can take several minutes. If the echo function of HyperTerminal is turned off, you will have no indication that the upload is progressing. If desired, turn on the echo function as follows (see **figure 22**): Click **`File`** > **`Properties`** > **`Settings`** > **`ASCII Setup`**..., check the **`Echo typed characters locally`** checkbox, and then click **`Ok`** twice.

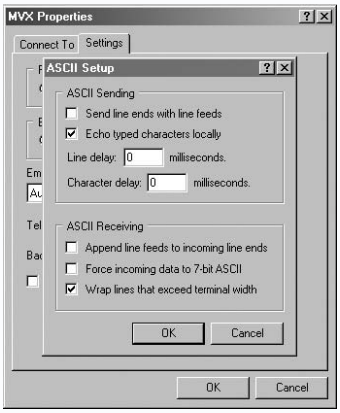


Figure 22. Turn on the Echo Function

3. Depress the <Esc> key on the keyboard and then type `upload`. The computer responds with the **`Go`** prompt.
4. Click **`Transfer`** > **`Send text file…`** .
5. Click the **`Files of type:`** drop box and select **`All files (*.*)`**.

6. Navigate to the folder where you saved the firmware upgrade file. Select the file (see **figure 23**).

> **NOTE:** Ensure that the firmware upgrade is for the MVX Series AV switcher. Valid firmware files must have the file extension ".s19". Any other file extension is **not** a firmware upgrade for your switcher.

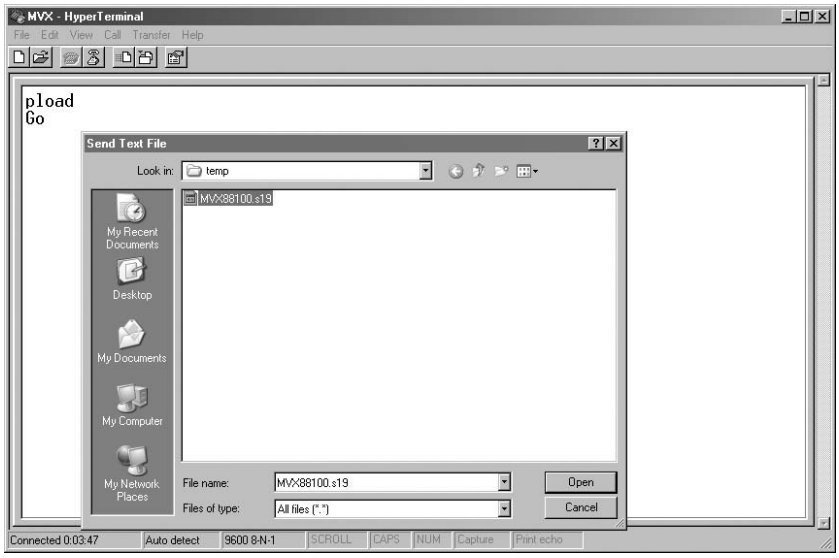


Figure 23. Select the Firmware Upgrade File

7. Click **Open**. The firmware upload begins. If you have the echo function of HyperTerminal turned on, HyperTerminal will display a scroll of the text of the firmware file as it uploads to the switcher (see **figure 24**).

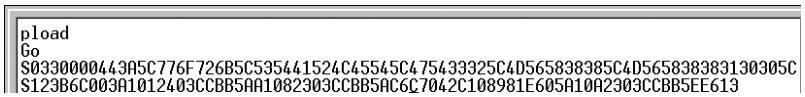


Figure 24. Upload Progress Display

8. After several minutes, the switcher reports the startup copyright message:

   (C) Copyright 20*yy*, Extron Electronics "MVX *nn* VGA/A Series", V*x.xx*↵

   This message indicates that the firmware upload is complete.

9. Exit HyperTerminal.

Matrix Switchers Control Program

The Matrix Switchers Control Program communicates with the switcher via the rear panel Remote RS-232 port to provide an easy way to set up ties and sets of ties. The program is compatible with Windows 2000, Windows XP, Windows 7, and newer operating systems. Updates to the program can be downloaded from the Extron website (**www.extron.com**).

Installing the Software

The program is contained on the Extron Software Products DVD. Install the software as follows:

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

- The Matrix Switchers Control Program
- The Firmware Loader

1. Insert the DVD into the drive. The Extron software DVD window should appear automatically (see **figure 25**).

Figure 25. Software DVD Window

NOTE: If the window does not self-open, run Launch.exe from the DVD.

2. Click the **Software** tab (see **figure 25**).

3. Scroll to the desired program and click **Install** (see **figure 26**).

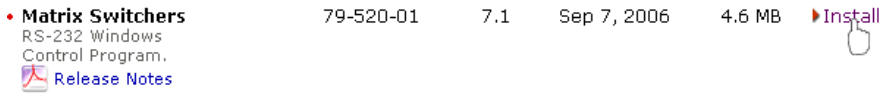


Figure 26. Software Installation

4. Follow the on-screen instructions. By default, the installation of the Matrix Switchers Control Program creates a `C:\Program Files\Extron\Matrix_Switchers` directory, and it places the following four icons into a group folder named "`Extron Electronics\Matrix Switchers`":

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

Starting the Software

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

   The Comm Port Selection window (**figure 27**) appears.

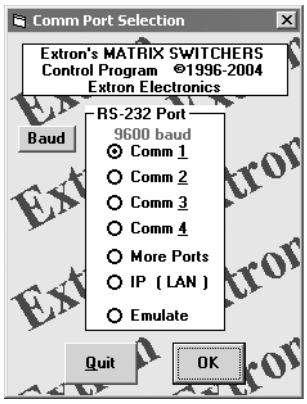


Figure 27. Comm Port Selection Window

2. Choose either the comm port that is connected to the RS-232 port of the MVX switcher, or **`Emulate`**.

   NOTE: Although **`IP [LAN]`** is available for selection, the switcher does not have an Ethernet port. Do not select **`IP [LAN]`**.

   a. **If you selected a comm port**, check that the baud rate displayed in the comm port selection window is the 9600 rate of the switcher. If you need to change the baud rate, click the Baud button and double-click on 9600.

      Click **`OK`**. The Extron Matrix Switchers Control Program window appear (see **figure 28** and **figure 29** on the next page), displaying the current configuration of the attached matrix. Proceed to step **3**.

   b. **If you selected Emulate**, click **`OK`** and see "**Using Emulation mode**" on page 56.

Using the Software

- To set up audio to follow video (audio and video have the same tie configuration), select the **`Follow`** checkbox at the bottom of the window.
  To set up audio to breakaway (audio and video have different tie configurations), deselect the **`Follow`** checkbox.
- For easier use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.

- To create a tie, drag an input box to one or more output boxes. If the **Take** button is available, click the **Take** button.
- To remove a single tie, drag the output box to its tied input box or to the trash can. To remove a set of ties, drag the input box to the trash can.

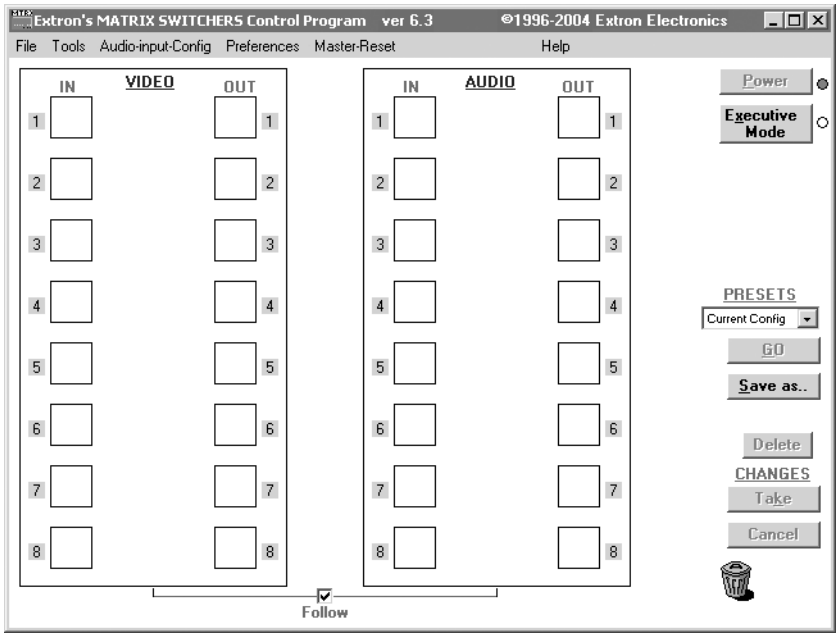


Figure 28. Matrix Switchers Control Program Window (no Ties)

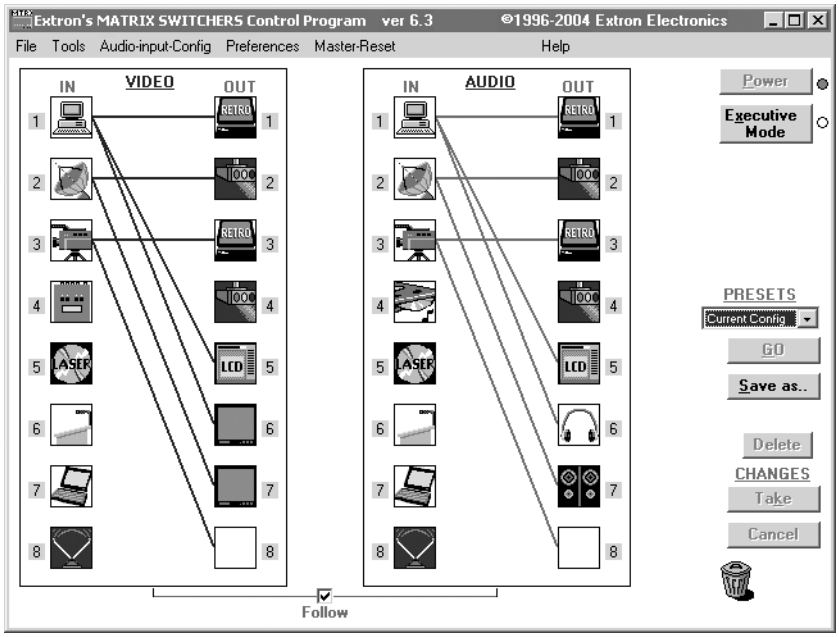


Figure 29. Sample Program Window (Ties Shown)

Updating the Firmware

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

NOTE: Upgrading the firmware does not overwrite the current configuration, presets, or the audio settings.

Update the switcher firmware as follows:

1. Visit the Extron website, **www.extron.com**, click the **Download** tab, and then click the **Firmware** link (see **figure 30**).

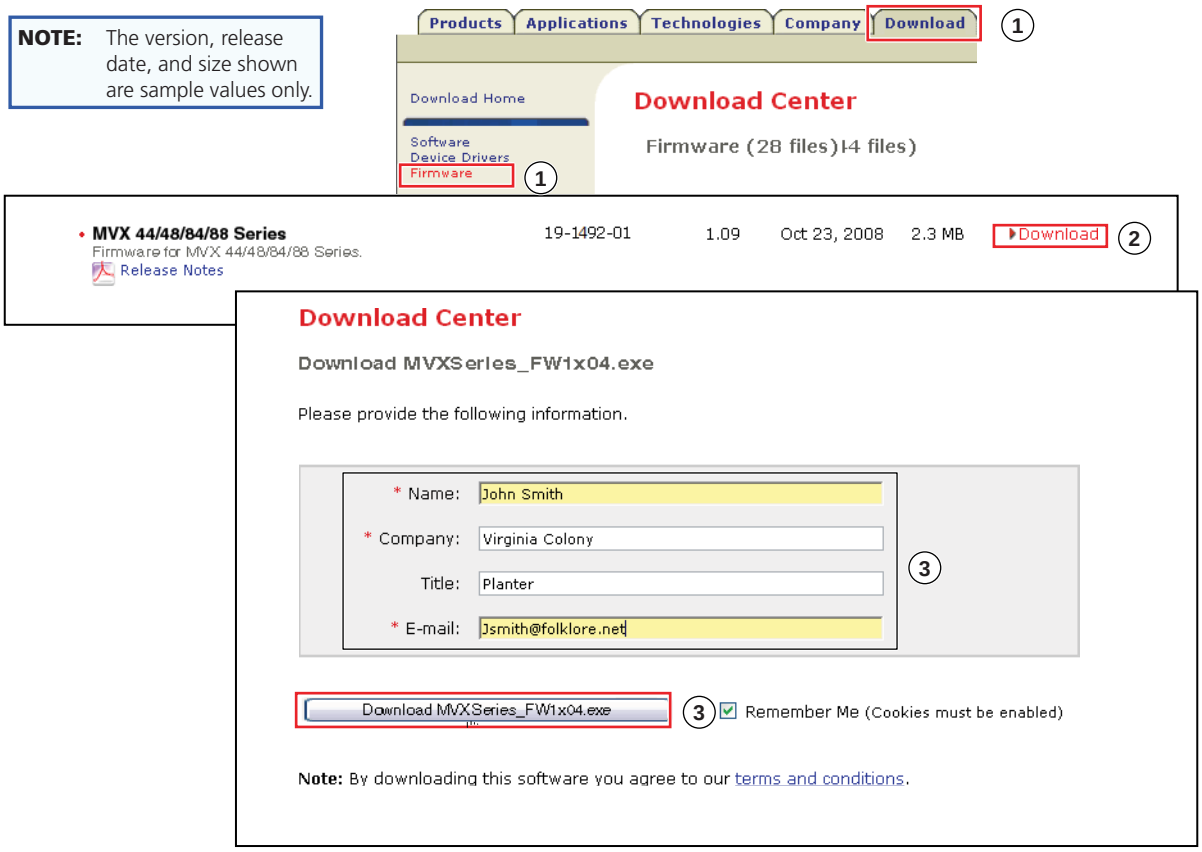
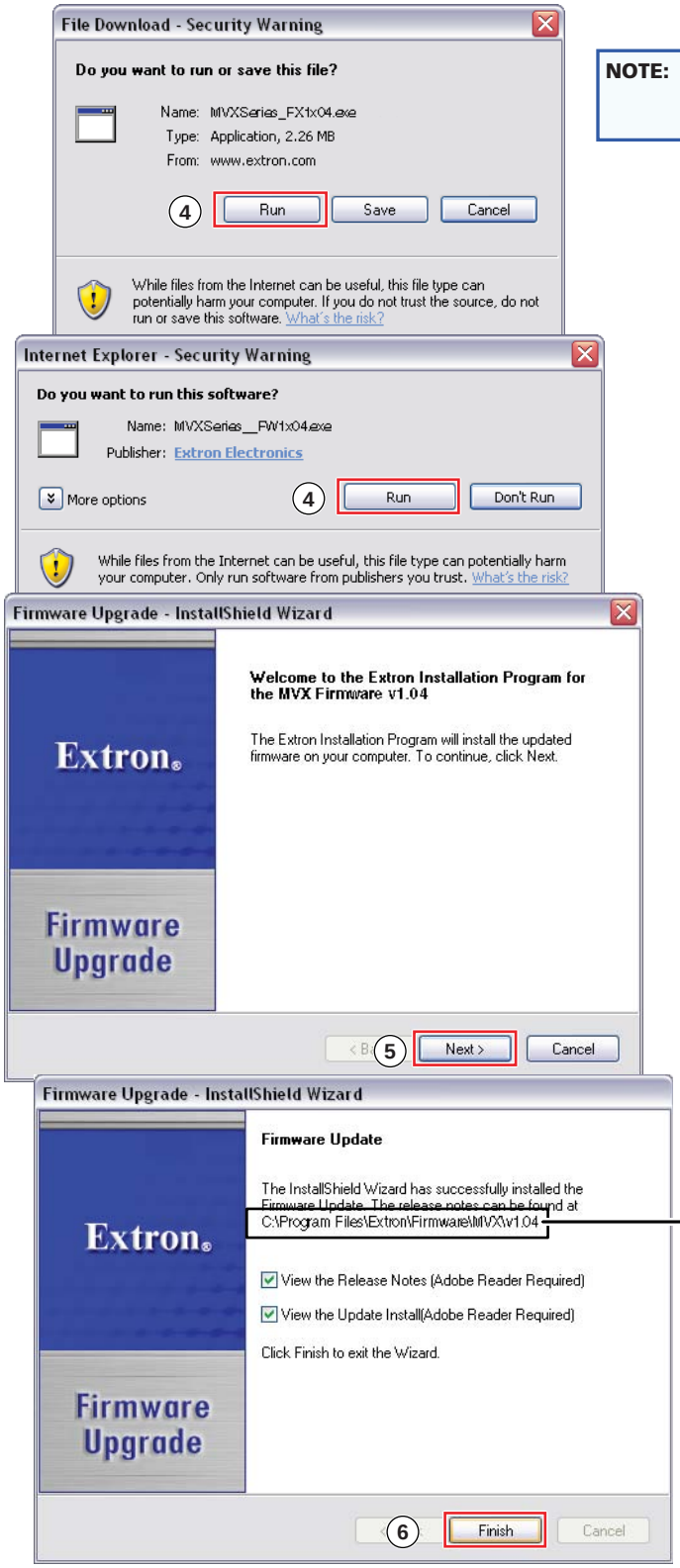


Figure 30. Location of Firmware Upgrade Files

2. Select the appropriate firmware file (MVX Series) to download and click **Download**.
3. Enter the requested personal information and then click **Download** to copy the firmware to your computer.
4. Click **Run** on the next two screens (see **figure 31** on the next page). The PC downloads the firmware update from the Extron website and starts the Extron Installation Program to extract the firmware file.
5. Click **Next**. The program extracts the firmware files and places them in a folder identified in the InstallShield Wizard window.

   NOTE: Note the folder to which the firmware file is saved.

6. Click **Finish** to exit the program.



NOTE: The version and file size shown are sample values only.

Figure 31. Downloading Firmware Upgrade Files

7. Connect a computer that runs the Windows operating system to the switcher serial port (see "**Installation**" for more details).
8. Start the Matrix Switchers Control Program and connect to the matrix switcher. See "**Starting the Software**," on page 47.
9. Click **Tools** > **Update** firmware. The Extron Firmware Loader appears (see **figure 32**).

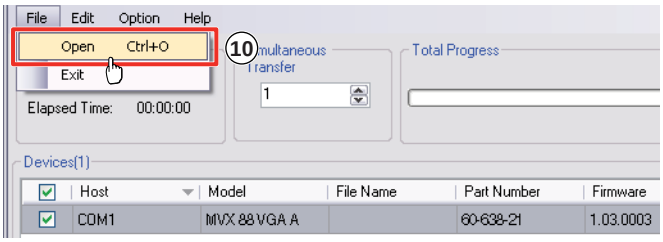


Figure 32. Extron Firmware Loader Window

10. Select the MVX matrix switcher and click **File** > **Open**. The `Choose Firmware File` screen appears (see **figure 33**).

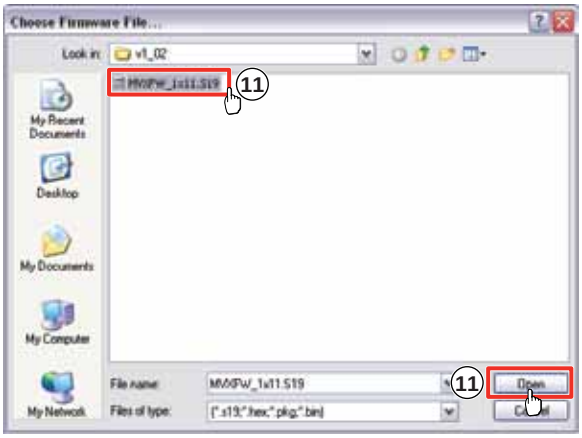


Figure 33. Choose Firmware File Window

11. Navigate to and select the new firmware file. Click **Open**. The Choose Firmware File window closes.

CAUTION: The firmware file must have an .s19 extension. Other file types can cause the switcher to stop functioning.

NOTES:
- When downloaded from the Extron website, the firmware is placed in a subfolder of `C:\Program Files\Extron\Firmware`.
- Valid firmware files must have the file extension .S19. A file with any other extension is not a firmware upgrade.
- The original factory-installed firmware is permanently available on the matrix switcher. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.

12. In the Firmware Loader window, click **Begin** (see **figure 34**).

The **Total Progress** and **Progress** status bars show the upload progress. The firmware upload may take several minutes. Once the status bars have progressed from **0%** to **100%**, and Status is listed as **Completed**, the firmware loader utility resets the switcher.

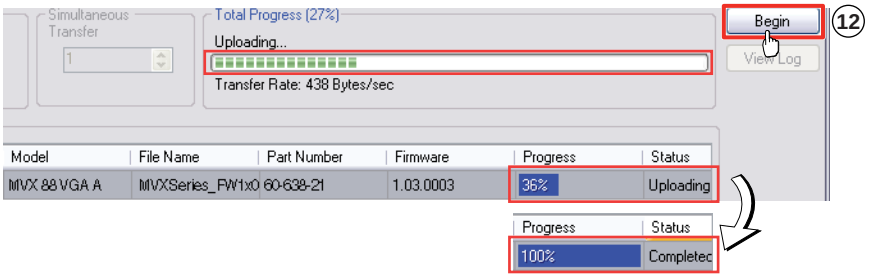


Figure 34. Firmware Loader Screen

13. Click **Exit** to close the Firmware Loader.

Windows Buttons, Drop Boxes, and Trash Can

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

Power — Unavailable for MVX switcher, because the switcher power cannot be controlled via software.

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

Presets menu — Displays a list of up to 16 presets. You can select a preset from the list to display it in the window or click **Take** to recall it.

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.

Delete — Allows you to delete a selected preset.

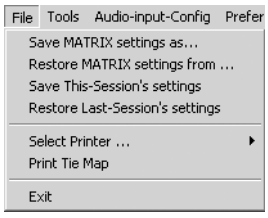
Changes – Take — Allows you to apply any changes made to the displayed configuration.

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

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

Windows menus

File menu



Save MATRIX settings as ... — Saves a complete set of up to 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 a complete set of up to 16 presets, plus the last active setting (preset #0), to overwrite the current file. Saved settings include audio gain settings (if specified), 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 changes of the previous session to disk the last time you exited the program, the ties from that session are also loaded.

Select Printer ... — Selects the target printer.

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

Exit — Closes the Extron Matrix Switchers Control Program.

Tools menu

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

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

RGB Delay settings — Displays the RGB Delay/Mute/Output-Volume Adjust window (see **figure 35**), which shows the RGB delay setting for each output and allows you to change it. This window also allows you to mute and unmute the video and audio output and displays the output volume level and allows you to change it.

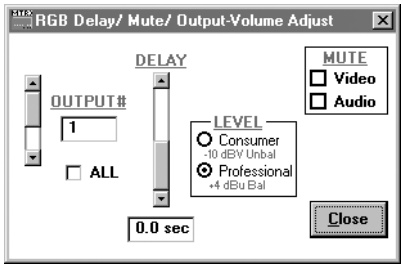


Figure 35. RGB Delay/Mute/Output-Volume Adjust Window

Audio-Input-Gain settings — Displays the Configure Audio Options window (see **figure 36**), which shows the audio gain level settings for each input and allows you to change them.

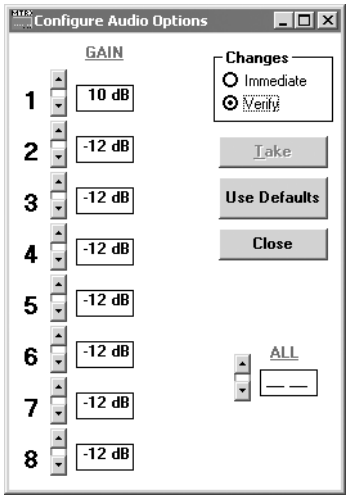


Figure 36. Configure Audio Options Window

Audio-Output Volume settings — Displays the RGB Delay/Mute/Output-Volume Adjust window (see **figure 35** on the preceding page), which displays the output volume level, consumer (-10 dBV) or professional (+4 dBu), for a single output or for all outputs and allows you to change it. This window also displays the RGB delay settings and allows you to change it and allows you to mute and unmute the video and audio output.

Mute-Output settings — Displays the RGB Delay/Mute/Output-Volume Adjust window (see **figure 35** on the preceding page), which allows you to mute and unmute the video and audio output for a single output or for all outputs. This window also displays the RGB delay and output volume level settings and allows you to change them.

Update Firmware ... — Allows you to replace the firmware that is coded on the control board of the switcher without taking the switcher out of service. See "**Updating the firmware**" on page 49.

Name Presets — Allows you to name 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, RGB delay, audio configuration, preset titles, icon names, and icons.

Audio Input Configuration selection

Displays the Configure Audio Options window (see **figure 36** on the preceding page), which shows 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 (see **figure 37**).

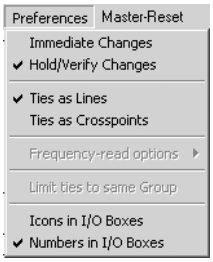


Figure 37. Ties Shown as Lines

Ties as Crosspoints — Displays ties as a grid of inputs and outputs (see **figure 38**). Current ties are indicated as orange (video and audio), green (video only), or red (audio only) boxes. New ties that will take effect when you click the **Take** button are indicated by +. Ties that will be broken when you click the **Take** button are indicated by –.

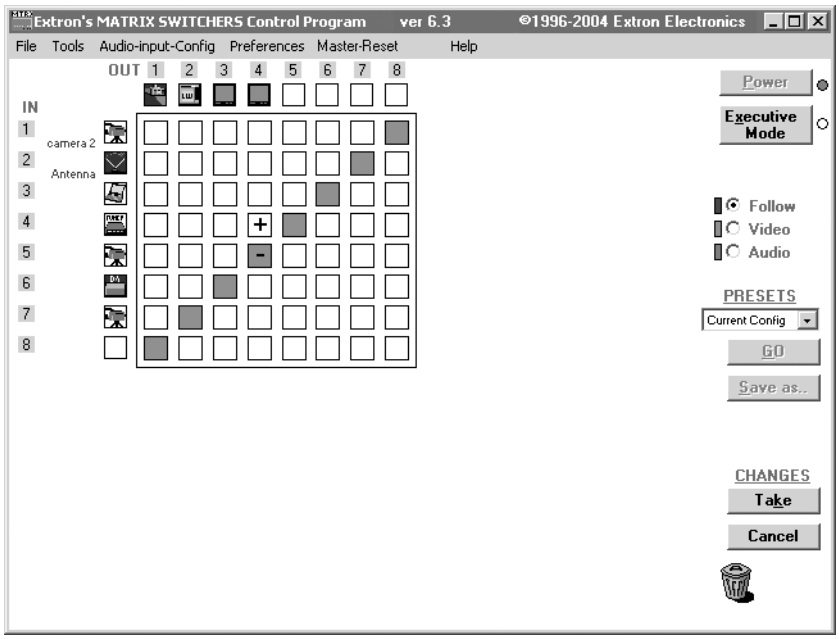
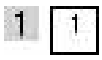


Figure 38. Ties Shown as Crosspoints

Icons in I/O Boxes — Erases any numbers in the I/O boxes in either the ties-as-lines window or the ties-as-boxes window. You can place icons in the boxes.

Numbers in I/O Boxes — Erases any icons in the I/O boxes in either the ties-as-lines window or the ties-as-boxes window, and fills each box with the associated input or output number.



Master-Reset selection

Master reset performs all of the following functions:

- Clears all ties
- Clears all presets
- Clears all video and audio mutes
- Sets all input audio levels to unity gain (0 dB)
- Sets all output volume levels to the factory default (professional level, +4 dBu)

Using Emulation Mode

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

1. Click **Start** > **Programs** > **Extron Electronics** > **Matrix Switchers** > **MATRIX Switcher + Control Pgm**.
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 **1, 2, or 3** as the number of video planes, **1 or 2** as the number of audio planes, the correct matrix size, and **MVX Series** as the matrix model for which you are preparing a configuration; and click **OK** (see **figure 39**).

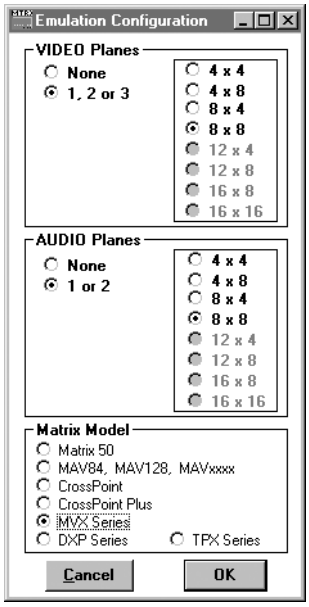


Figure 39. Emulation Mode Configuration

6. Continue using the program as described in the "**Using the Software**" section.

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 the MATRIX Switcher Help icon (shown at right).
- From within the Matrix Switcher Control Program, click **Help** > **Contents** on the menu bar.
- From within the Matrix Switcher Control Program, press the <F1> key.

Reference Information

This section discusses the specifications, part numbers, and accessories for the MVX Matrix Switchers. Topics that are covered include:

Specifications

Video

Routing

MVX 44 VGA A	4 x 4 matrix
MVX 48 VGA A	4 x 8 matrix
MVX 84 VGA A	8 x 4 matrix
MVX 88 VGA A	8 x 8 matrix
Gain	Unity
Bandwidth	350 MHz (-3 dB), fully loaded
0 - 10 MHz	No more than +0.14 dB to -0.1 dB
0 - 130 MHz	No more than +0.95 dB to -0.8 dB
Crosstalk	<-60 dB nominal @ 10 MHz, <-39 dB @ 100 MHz
Switching speed	20 ms (max.)

Video input

Number/signal type	VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video (bi-level and tri-level sync), S-video, composite video
44/48 models	4
84/88 models	8

Connectors

44/48 models	4 female 15-pin HD
84/88 models	8 female 15-pin HD
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels	Analog: 0.3 V to 2.0 Vp-p with no offset at unity gain
Impedance	75 ohms
Horizontal frequency	15 kHz to 145 kHz
Vertical frequency	30 Hz to 170 Hz
Return loss	<-40 dB @ 5 MHz
DC offset (max. allowable)	1.5 V

Video output

Number/signal type	VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video (bi-level and tri-level sync), S-video, composite video
44/84 models	4
48/88 models	8
Connectors	
44/84 models	4 female 15-pin HD
48/88 models	8 female 15-pin HD
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum/maximum levels	0.3 V to 2.0 Vp-p (follows input)
Impedance	75 ohms
Return loss	<-40 dB @ 5 MHz
DC offset (max. allowable)	<20 mV with input at 0 offset
Switching type	Triple-Action™

Sync

Input type	RGBHV, RGBS, RGsB, RsGsBs
Output type	RGBHV, RGBS, RGsB, RsGsBs (follows input)
Standards	Computer scan rates and also NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	0.5 V to 5.0 Vp-p
Output level	AGC to TTL: 4.0 V to 5.0 Vp-p, unterminated
Input impedance	510 ohms
Output impedance	75 ohms
Max. propagation delay	Horizontal: 90 ns nominal Vertical: 160 ns nominal
Max. rise/fall time	4 ns
Polarity	Positive or negative (follows input)

Audio

Routing	
MVX 44 VGA A	4 x 4 stereo matrix
MVX 48 VGA A	4 x 8 stereo matrix
MVX 84 VGA A	8 x 4 stereo matrix
MVX 88 VGA A	8 x 8 stereo matrix
Gain	Adjustable

NOTE: At default (when input gain is set to 0 dB and output level is set to "Pro"), overall gain is 12 dB for balanced output. The gain range is -6 dB to +22 dB for balanced output when the output level is set to "Pro".

Frequency response	20 Hz to 20 kHz, ±0.2 dB
THD + Noise	0.05% @ 1 kHz, 0.3 % @ 20 kHz at nominal level
S/N	>90 dB, balanced, at maximum output (unweighted)
Crosstalk	<-65 dB @ 20 kHz, <-80 dB @ 1 kHz (fully loaded) or below 60 Hz
Stereo channel separation	>80 dB @ 1 kHz, >55 dB @ 20 Hz to 20 kHz (average for range)
CMRR	>75 dB @ 20 Hz to 20 kHz

Audio input

Number/signal type
- 44/48 models ..... 4 stereo, unbalanced
- 84/88 models ..... 8 stereo, unbalanced

Connectors
- 44/48 models ..... 4 female 3.5 mm stereo mini jacks: tip (L), ring (R), sleeve (GND)
- 84/88 models ..... 8 female 3.5 mm stereo mini jacks: tip (L), ring (R), sleeve (GND)

Impedance ..... >18k ohms unbalanced, DC coupled

Nominal level ..... -10 dBV (316 mV) (default)
Also compatible with +4 dBu (1.23 V), 0 dBu (0.775V), -20 dBV (100 mV)

Maximum level ..... >+12 dBV (4 V), (unbalanced) at 1% THD+N

Input gain ..... -18 dB to +10 dB, default = 0 dB
Adjustable per input.

NOTE: This is referenced to the internal bus signal level. It can be verified by measuring the unbalanced output when the output level is set to "Consumer".

NOTE: 0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV ≈ 2 dBu

Audio output

Output gain ..... 0 dB unbalanced (consumer) or +12 dB balanced (pro), selectable
Default = +12 dB, balanced, when output level is set to "Pro"

Number/signal type
- 44/84 models ..... 4 stereo, balanced/unbalanced
- 48/88 models ..... 8 stereo, balanced/unbalanced

Connectors
- 44/84 models ..... (4) 3.5 mm captive screw connectors, 5 pole
- 48/88 models ..... (8) 3.5 mm captive screw connectors, 5 pole

Impedance ..... 50 ohms unbalanced, 100 ohms balanced

Gain error ..... ±0.1 dB channel to channel

Nominal level (output volume range)
+4 dBu (1.23 V) (default) balanced, or
-10 dBV (316 mV) unbalanced

Maximum level (Hi-Z) ..... >+22 dBu, balanced; >+14 dBV, unbalanced at 1% THD+N

Maximum level (600 ohm) ..... >+20 dBu, balanced; >+12 dBV unbalanced at 1% THD+N at default settings

Control/remote — switcher

Serial control port ..... 1 RS-232, 9-pin female D connector

Baud rate and protocol ..... 9600 baud, 8-bit, 1 stop bit, no parity

Control pin configurations ..... 2 = TX, 3 = RX, 5 = GND, 9 = hardwired IR input

IR controller module 44-88 models ..... IR 501 (optional)

Program control ..... Extron control/configuration program for Windows®
Extron Simple Instruction Set (SIS™)

General

Power	100 VAC to 240 VAC, 50-60 Hz, internal, 30 watts
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, vents on sides and top
Mounting	
Rack mount	Yes, with included mounting kit
Furniture mount	Yes, with optional under-desk mounting kit
Enclosure type	Metal
Enclosure dimensions	1.75" H x 17.4" W x 8.5" D (1U high, full rack wide) (4.4 cm H x 44.2 cm W x 21.6 cm D) (Depth excludes connectors and knobs. Width excludes rack ears.)
Product weight	7.0 lbs (3.2 kg)
Shipping weight	10 lbs (5 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTES:
- All nominal levels are at ±10%.
- Specifications are subject to change without notice.

Part Numbers and Accessories

MVX Part Numbers

Matrix switcher part numbers	Part Number
MVX 44 VGA A video and audio switcher	60-635-21
MVX 48 VGA A video and audio switcher	60-636-21
MVX 84 VGA A video and audio switcher	60-637-21
MVX 88 VGA A video and audio switcher	60-638-21

Included Parts

These items are included in each order for a MVX matrix switcher:

Included parts	Part Number
MBD 149 1U Through-desk and rack mounting kit	70-077-03
Tweeker (small screwdriver)	
MVX Series VGA Matrix Switcher Setup Guide	
5-pole captive screw audio connectors (7 or 14, depending on the model)	
Extron Software Products DVD (Matrix Switchers Control Program)	

Optional Accessories

These items can be ordered separately:

Remote control, adapters, mounting, controllers, connectors	Part Number
IR 501 small matrix universal remote control	70-336-01
MBU 149 under-desk mounting kit	70-222-01
3.5 mm mini stereo plug to (2) RCA female adapter	26-592-01
Captive screw to (2) RCA female connector	26-575-01
VGA male to 5 BNC female adapter, 0.5 foot (0.15 m)	26-531-01
VGA male to 5 BNC female adapter, 1.0 foot (0.35 m)	26-531-11
MKP 1000 remote keypad	
Black	60-239-02
White	60-239-03
WT (water-tight) black	60-239-52
WT (water-tight) white	60-239-53
MCP 1000M (matrix control panel)	60-298-01
MCP 1000S (secondary control panel)	60-298-02
MKP 2000 matrix switcher X-Y remote control panel, black	60-682-02
MKP 3000, black	60-708-02
5-pole captive screw audio connectors (qty. 10)	100-460-01
3-pole captive screw serial connectors (qty. 10)	100-459-01

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use high resolution cables to achieve maximum performance.

Bulk cable and termination tools

MHR mini high resolution cable	Part Number
MHRVGA/1000 non-plenum 5-conductor, 1000 feet (300 m)	22-024-03
MHR-2/500 non-plenum 2-conductor, 500 feet (150 m)	22-123-03
MHR-2P/500 plenum 2-conductor, 500 feet (150 m)	22-129-03

RG6 super high resolution cable	Part Number
RG6/500 non-plenum single-conductor, 500 feet (150 m)	22-098-02
RG6-1000 non-plenum single-conductor, 1000 feet (300 m)	22-098-03
RG6P/500 plenum single-conductor, 500 feet (150 m)	22-164-02
RG6P/1000 plenum single-conductor, 1000 feet (300 m)	22-164-03

Termination connectors	Part Number
15-pin HD connectors, (VGA style), qty. 10	100-070-51

Terminated cable assemblies

VGA male-to-male cables	Part Number
VGA M-M MD, 3 feet to 100 feet (0.9 m to 30.4 m) (molded)	26-238-*nn*
VGA M-M BK, 3 feet to 100 feet (0.9 m to 30.4 m) (backshell)	26-238-*nn*
VGAP M-M MD, 3 feet to 25 feet (0.9 m to 7.6 m) (molded)	26-439-*nn*
VGAP M-M BK, 35 feet to 100 feet (10.6 m to 30.4 m) (backshell)	26-439-*nn*

VGA male-to-male with audio cables	Part Number
VGA-A M-M MD, 3 feet to 50 feet (0.9 m to 15.2 m) (molded)	26-490-*nn*
VGA-A M-M BK, 3 feet to 50 feet (0.9 m to 15.2 m) (backshell)	26-490-*nn*
VGA-A 90° M-M BK/6, 6 feet (1.8 m) (molded)	26-510-02
VGA-A 90° Up M-M BK/3, 3 feet (0.9 m) (molded)	26-510-21
VGA-A 90° Up M-M BK/6, 6 feet (1.8 m) (molded)	26-510-22

VGA male-to-female cables	Part Number
VGA M-F MD, 3 feet to 100 feet (0.9 m to 30.4 m) (molded)	26-112-*nn*
VGA M-F BK, 3 feet to 100 feet (0.9 m to 30.4 m) (backshell)	26-112-*nn*
VGAP M-F MD, plenum 3 feet to 25 feet (0.9 m to 7.6 m) (molded)	26-438-*nn*
VGAP M-F BK, plenum 35 feet to 100 feet (10.6 m to 30.4 m) (backshell)	26-438 -*nn*

VGA male-to-female with audio cables	Part Number
VGA-A M-F MD, 3 feet to 50 feet (0.9 m to 15.2 m) (molded)	26-491-*nn*
VGA-A M-F BK, 3 feet to 50 feet (0.9 m to 15.2 m) (backshell)	26-491-*nn*
VGA-A 90° F-M BK/3, 3 feet (0.9 m) (backshell)	26-509-01
VGA-A 90° Up F-M MD, 3 feet to 6 feet (0.9 m to 1.8 m) (molded)	26-509-*nn*

Mounting the Switcher

The MVX switchers are housed in a rack-mountable, 1U high, metal enclosures. Included mounting hardware lets you install the switcher in any standard 19-inch rack or into furniture.

Tabletop Use

For tabletop use, affix one of the supplied self-adhesive rubber feet to each corner of the bottom of the switcher.

UL Rack-Mounting Guidelines

The following Underwriters Laboratories (UL) requirements pertain to the installation of the matrix switcher into a wall or furniture.

1. **Elevated operating ambient temperature —** If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °C) specified by Extron.
2. **Reduced air flow —** Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading —** Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading —** Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding) —** Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as use of power strips).

Mounting Instructions

If desired, mount the switcher in a rack or through furniture in accordance with the directions included with the mounting kit.

Extron® Warranty

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

USA, Canada, South America, and Central America:
Extron Electronics
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:
Extron Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Middle East:
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

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 if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: (714) 491-1500 **Europe**: +31.33.453.4040
Asia: +65.6383.4400 **Japan**: +81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West** Headquarters	Extron **USA - East**	Extron **Europe**	Extron **Asia**	Extron **Japan**	Extron **China**	Extron **Middle East**
+800.633.9876 Inside USA/Canada Only **+1.714.491.1500** **+1.714.491.1517** FAX	**+800.633.9876** Inside USA/Canada Only **+1.919.863.1794** **+1.919.863.1797** FAX	**+800.3987.6673** Inside Europe Only **+31.33.453.4040** **+31.33.453.4050** FAX	**+800.7339.8766** Inside Asia Only **+65.6383.4400** **+65.6383.4664** FAX	**+81.3.3511.7655** **+81.3.3511.7656** FAX	**+400.883.1568** Inside China Only **+86.21.3760.1568** **+86.21.3760.1566** FAX	**+971.4.2991800** **+971.4.2991880** FAX