

User's Manual



MVX 44 / 48 / 84 / 88 series

VGA Matrix Switcher

Precautions

Safety Instructions • English



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



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

Caution

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

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

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

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

Consignes de Sécurité • Français



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



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

Attention

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

Conservé 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.

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

Sicherheitsanleitungen • Deutsch



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



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

Achtung

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.

Instrucciones de seguridad • Español



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



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

Precaucion

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

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

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

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

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

Warning

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.

Avertissement

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

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

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

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

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

Lithium Batterie • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

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

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

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica 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 puentearla ni eliminarla.

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

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

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

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

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

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。按照生产厂家的建议处理废弃电池。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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

Quick Start — MVX Series VGA Matrix Switchers

Installation

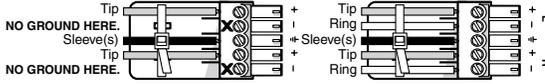
1 — Mount

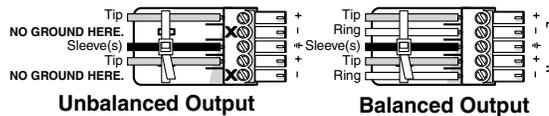
If desired, mount the switcher in a rack with the supplied rack ears or mount the switcher under a desk using an Extron MBU 149 1U enclosure under-desk mount kit, part #70-222-01.

2 — Inputs

- a** Connect up to 4 or 8 high resolution video inputs to the 15-pin HD input connectors. 
- b** Connect up to 4 or 8 unbalanced stereo audio inputs to the input 3.5 mm mini jack connectors. 

3 — Outputs

- a** Connect up to 4 or 8 high resolution video devices to the 15-pin HD output connectors. 
- b** Connect up to 4 or 8 balanced or unbalanced stereo audio devices to the output captive screw connectors. 



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

4 — RS-232

If desired, connect a control system or a computer to the RS-232 port. 

Pin	RS-232	Function
1	—	N/C
2	TX	Transmit data
3	RX	Receive data
4	—	N/C
5	Gnd	Signal ground
6	—	N/C
7	—	N/C
8	—	N/C
9	—	Hardwired IR

5 — Power

Connect the included IEC power cord into the rear panel connector and plug the switcher in to a 100 VAC to 240 VAC, 50 or 60 Hz power source.

Definitions

Tie — An input-to-output connection

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

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

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

Preset — A **configuration** that has been stored.

One **preset** can be assigned to each input and output button. 16 presets are available via RS-232 control. When a **preset** is retrieved from memory, it becomes the **current configuration**.

Front Panel Features

Power/data/audio LED — Indicates power is applied. This LED also has two secondary functions:

Serial communication function — The Power/data/audio LED blinks off and on to indicate that an IR signal has been received.

Audio level function — In *Audio Setup* mode, the Power/data/audio LED lights when the selected input audio signal is \geq the reference level and is unlit when the signal is below the reference level. Adjust the gain until the LED blinks frequently. If the LED is almost always on, but occasionally blinks off, the level is too high. If the LED is almost always off, but occasionally blinks on occasionally, the level is too low.

I/O button selects video and audio, video, or audio for input selection.

Video and Audio LEDs indicate whether video and audio, video, or audio is selected. The Audio LED blinks to indicate audio is broken away.

Input buttons select an input to tie to an output.

Input LEDs identify the input selected for the tie.

Output buttons select output(s) to tie to an input.

Output LEDs identify output(s) selected for the tie.

Enter button saves configuration changes.

Preset button selects *Save Preset* mode or *Recall Preset* mode, in which a configuration can be saved as a preset or recalled.

Audio Setup button and LED enable you to view and/or change the current audio level setting for each input. *Audio Setup* is a secondary function of the I/O button.

Down (▼) and Up (▲) buttons and LEDs decrease or increase the audio level for the selected input and indicate the decrease and increase. On 8-output switchers, ▼ and ▲ are secondary functions of the Output 7 and Output 8 buttons.

+dB/-dB LEDs indicate the polarity of the audio level setting (+dB = gain, -dB = attenuation). +dB and -dB are secondary functions of the Video and Audio LEDs.

Quick Start — MVX 44 / 48 / 84 / 88 VGA Matrix Switchers, continued

Each audio input gain and attenuation indicator indicates a range of 6 dB when lit. (Output 1 LED off = 0 dB to 5 dB, Output 1 lit = 6 dB to 11 dB, Output 1 and 2 lit = 12 dB to 17 dB, Output 1 through 3 lit = 18 dB.) *The level indicators are secondary functions of the Output 1 through Output 3 LEDs.*

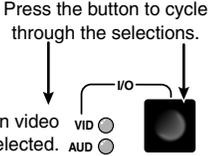
Operation

Powering up

Plug in the switcher to apply power. The switcher performs a self-test that sequences the front panel LEDs. After the self-test, video and audio are selected and the configuration and audio settings are the same as they were when power was removed.

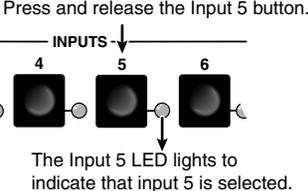
Creating a tie

1. Press and release the I/O button to select or deselect video and/or audio as desired. The LEDs light when video and/or audio is selected.



Press the button to cycle through the selections.

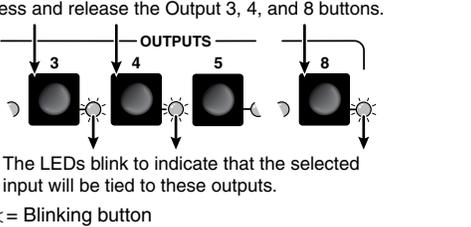
2. Press and release the desired input button*.



Press and release the Input 5 button.

The Input 5 LED lights to indicate that input 5 is selected.

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



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

The LEDs blink to indicate that the selected input will be tied to these outputs.

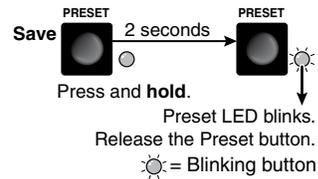
☼ = Blinking button

NOTE *You can cancel the entire set of ties at this point by waiting for the 5-second input/output button timeout to occur.

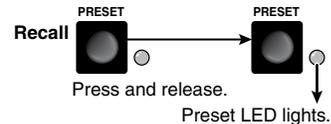
4. Press and release the Enter button. The LEDs for the selected input and the selected outputs light steadily for approximately 1 second to indicate the tie and then go out.

Saving or recalling a preset

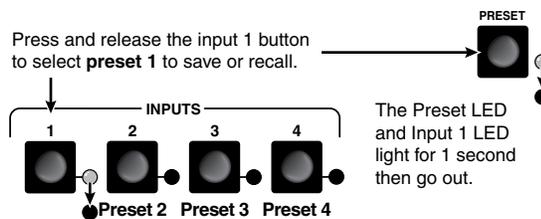
1. To save a preset: Press and hold the Preset button until the Preset LED starts blinking.



To recall a preset: Press and release the Preset button.



2. Press the desired input or output button.

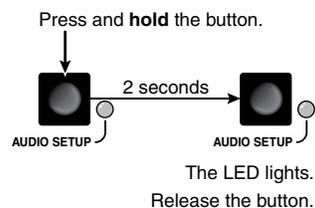


The selected input button and Preset button remain lit for 1 second to indicate the preset and then go out.

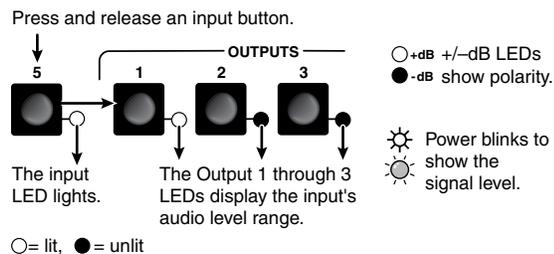
Viewing and adjusting the audio input gain

1. Apply audio signals to all inputs to be adjusted.

2. Press and hold the Audio Setup (I/O) button for 2 seconds until the Audio LED lights.



3. Press an input button. See chapter 3 to read the displayed value.



4. Increase and decrease the audio input gain by pressing the ▲ and ▼ buttons until the audio indicator (Power LED) blinks frequently.

5. For other inputs, repeat steps 3 and 4.

6. Press and release the Audio Setup button.

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MVX 44 / 48 / 84 / 88 VGA Matrix Switchers

1 Chapter One

Introduction

About the Switchers

Features

Introduction

About the Switchers

The Extron MVX Series VGA matrix switchers (figure 1-1) 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. The switchers 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)

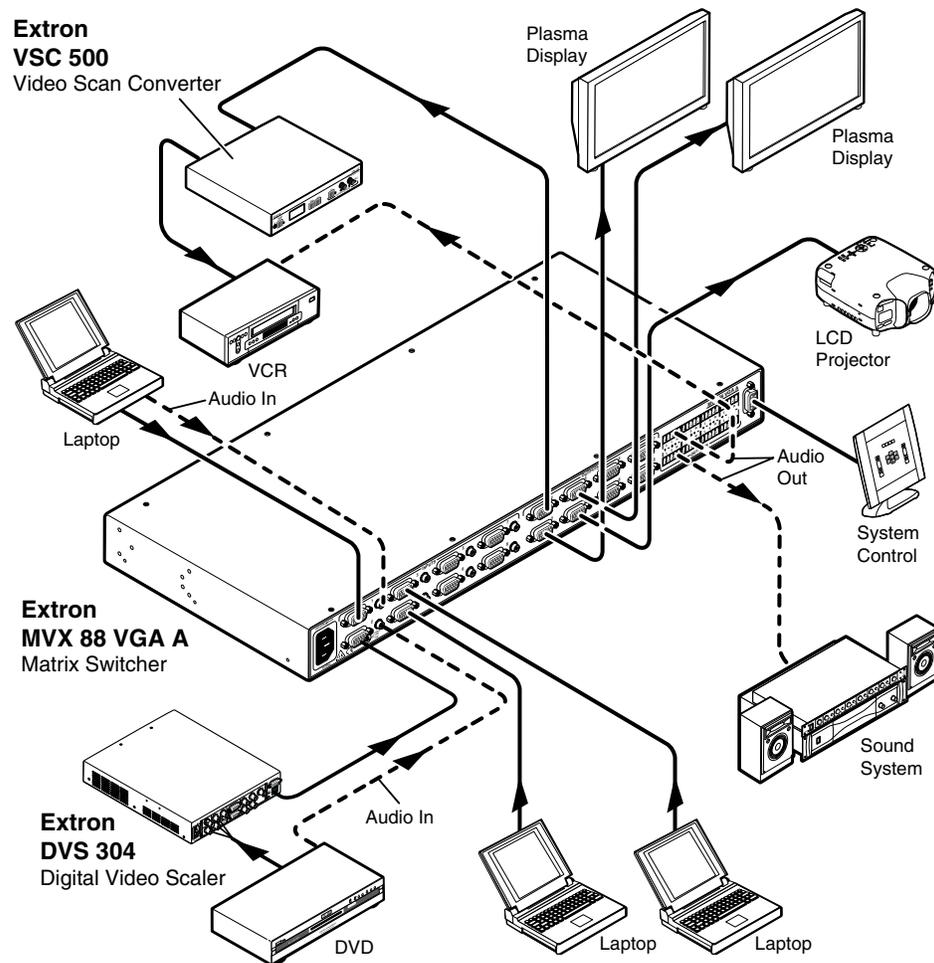


Figure 1-1 — Typical MVX 88 VGA A application

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 # 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 switcher's RS-232 port allows remote control via a PC or control system using Extron's Simple Instruction Set™ (SIS™) or the included Windows®-based 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 switcher's operation can be upgraded in the field via the RS-232 port, without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip. Firmware upgrades are available for download on the Extron Web site, www.extron.com, and they can be installed using the Windows-based control program.

Introduction, cont'd

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" 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 a 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 matrix switchers' internal 100 VAC to 240 VAC, 50/60 Hz, 30 watts power supply provides worldwide power capability.



MVX 44 / 48 / 84 / 88 VGA Matrix Switchers

2 Chapter Two

Installation

Mounting the Switcher

Cabling and Rear Panel Views

Installation

Mounting the Switcher

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

Tabletop use

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

Rack mounting the switcher

All of the MVX Series VGA switcher models are housed in rack-mountable, 1U high, full rack wide metal enclosures. The appropriate rack mounting kit is included with each switcher. Rack mount the switcher as follows:

UL guidelines

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

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

Mounting instructions

1. If feet were previously installed on the bottom of the switcher, remove them.
2. Attach the rack mount brackets to the switcher with the eight #8 machine screws provided (figure 2-1).
3. Insert the switcher into the rack, aligning the holes in the mounting bracket with those of the rack.
4. Secure the switcher to the rack using the supplied machine screws.

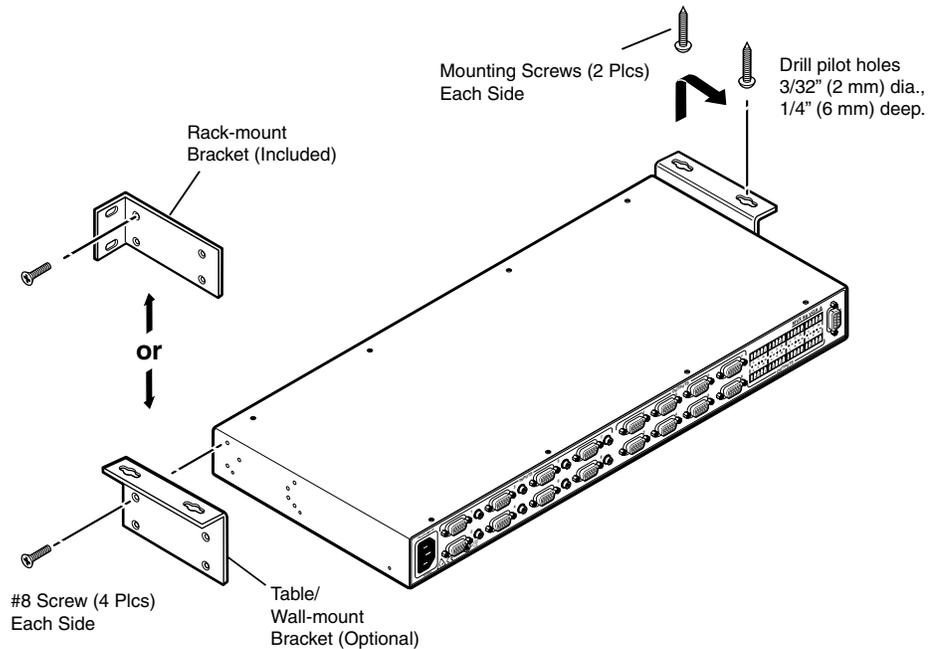


Figure 2-1 — Mounting the switcher

Furniture mounting the switcher

The MVX Series switchers can be mounted under a table or other horizontal surface with an optional Extron under-desk mounting kit (part #70-222-01).

1. Secure the two table/wall mounting brackets to the switcher with the eight machine screws provided in the kit (figure 2-1).
2. Hold the switcher with attached brackets against the underside of the desk or other furniture. Mark the location of holes for screws on the underside of the desk.
3. Drill 1/4" (6.4 mm) deep, 3/32" (2 mm) diameter pilot holes in the table or desk at the marked screw locations from the underside/inside (concealed side) of the furniture, where the switcher will be located.
4. Insert the four wood screws into the pilot holes. Fasten each screw into the installation surface until just less than 1/4" of the screw head protrudes.
5. Align the installed screws with the slots in the mounting brackets, and place the switcher against the surface, with the screws through the bracket slots.
6. Slide the switcher slightly forward or back, then tighten all four screws to fasten it in place.

Installation, cont'd

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

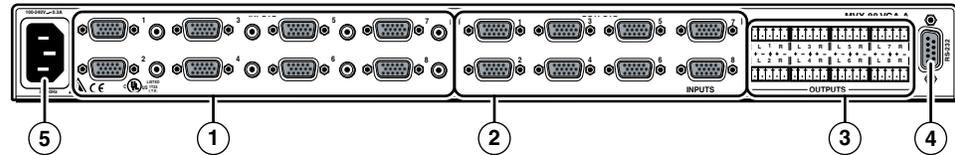


Figure 2-2 — MVX 88 VGA A high resolution video switcher

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's screen shuts off once that port is activated. See the computer's user's guide for details, or contact Extron for a list of common laptop keyboard commands.

Audio inputs — Connect the unbalanced stereo audio sources to these 3.5 mm mini stereo jacks for unbalanced audio input. Figure 2-3 shows how to wire the audio plug.

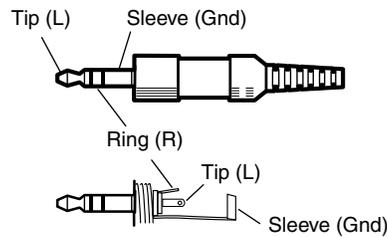


Figure 2-3 — Audio input connector wiring

Video and audio output connections

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



NOTE The MVX switchers can also switch RGBS, RGSB, RSGBs, or component/HDTV video.

NOTE 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.

Figure 2-4 shows how to wire the captive screw audio connector. The connector is included with the interface, but you must obtain the cable. Insert the wires into the appropriate openings in the captive screw connector. Tighten the screws on top to fasten the wires. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.

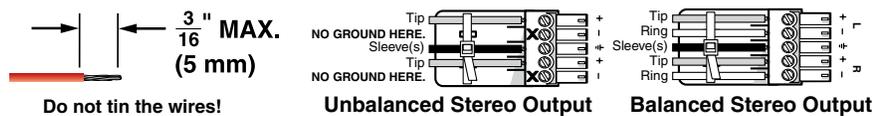


Figure 2-4 — Captive screw connector wiring for audio output

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

CAUTION The length of the exposed (stripped) portion of the copper wires is important. The ideal length is 3/16" (5 mm). Longer bare wires can short together. Shorter bare wires are not as secure in the direct insertion connectors and could be pulled out.

NOTE Figure 2-4 shows two methods of wiring the connectors for output. 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 chapter 3, "Operation", and chapter 4, "Remote Operation", for details.

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. For details, see chapter 3, "Operation", and chapter 4, "Remote Operation", and refer to the IR 501 User's Guide.

Installation, cont'd

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 2-5) for remote control of the switcher.

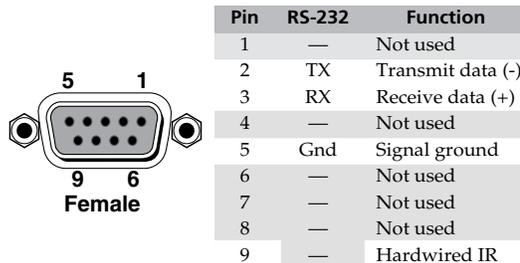


Figure 2-5 — RS-232 port pin assignment

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 chapter 4, “Remote Operation”, 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.



MVX 44 / 48 / 84 / 88 VGA Matrix Switchers

Chapter Three

Operation

Front Panel Controls and Indicators

Operations

Optimizing the Audio

Troubleshooting

Worksheets

Operation

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 3-1 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 3-1 have dual functions.

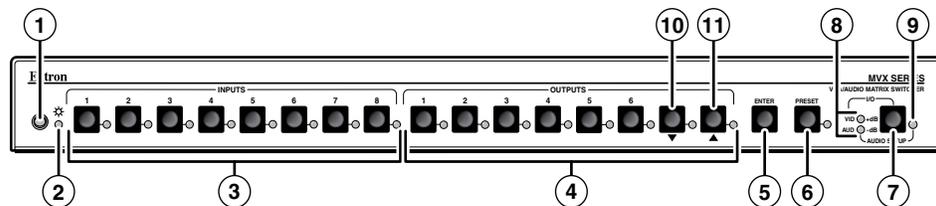


Figure 3-1 — MVX 88 VGA A front panel

Definitions

The following Extron matrix switcher terms are used throughout this manual:

Tie — An input-to-output connection

Set of ties — An input **typed** 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.

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's 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 selected input's audio level has been adjusted to the -10 dBV internal reference level. (In *Audio Setup* mode, the selected input's audio is automatically tied to output 1.) See "Adjusting input audio gain and attenuation" on page 3-18 and "Optimizing the Audio" on page 3-26.

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 3-16.

- 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 3-16.

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 3-18.

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 Ⓜ and Ⓨ.

Operation, cont'd

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 [⑦] and [⑧]).
 - Press the desired input button (③).
 - Press the desired output button(s) (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 3-24.

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 (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 (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 3-18.

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 3-25.

- 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 (③) and output buttons (④).

Pressing the I/O button advances through a cycle of video and/or audio selections as shown on figure 3-2.

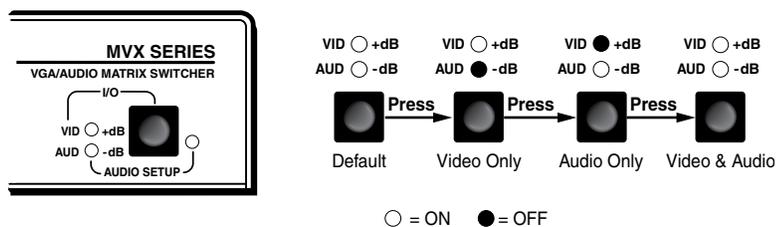


Figure 3-2 — Video and/or audio selection cycle

- **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 3-18. 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 3-18.

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.

NOTE *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 3-18.

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.

NOTE *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 3-18.

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

Operations

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

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 & Technical Support Hotline.

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 each device's own operating instructions.
4. Create a tie (see below). The selected input image should appear at the selected output. If no image appears, see "Troubleshooting" on page 3-26.

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 to configure video, audio, or both by pressing the I/O button as necessary.
2. Select the desired input and output(s) 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.

NOTE

- *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 that input's LED 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 output(s) that were already tied to the input light steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
- If you 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 (figure 3-3).

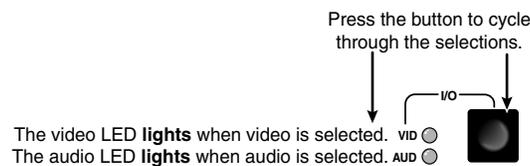


Figure 3-3 — Select video and audio

2. Press and release the Input 5 button (figure 3-4).

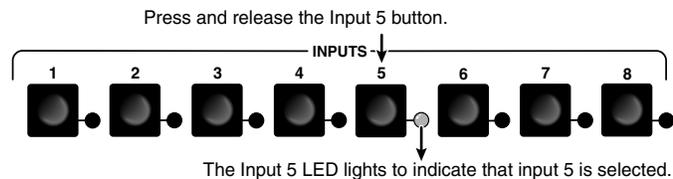


Figure 3-4 — Select an input

Operation, cont'd

- Press and release the Output 3, Output 4, and Output 8 buttons (figure 3-5).

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

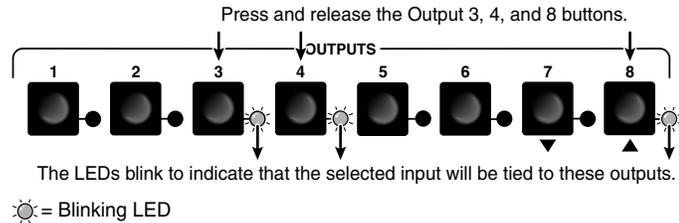


Figure 3-5 — Select the outputs

- Press and release the Enter button (figure 3-6).

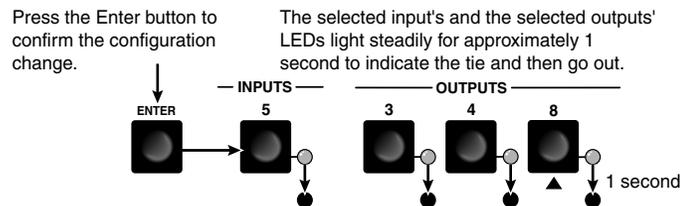


Figure 3-6 — Press the Enter button

The current configuration (figure 3-7) is now:

- Input 5 video and audio tied to output 3, output 4, and output 8

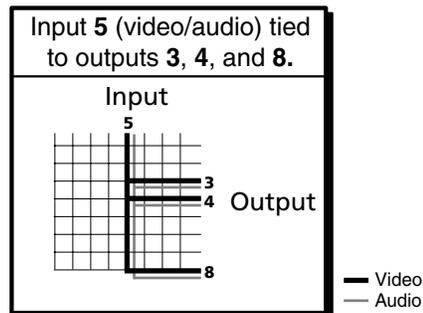


Figure 3-7 — Example 1 configuration

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 (figure 3-8).

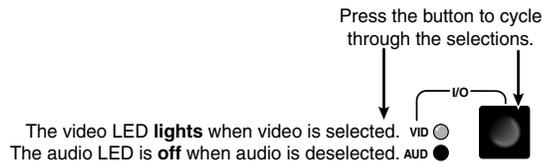


Figure 3-8 — Select video only

2. Press and release the Input 5 button (figure 3-9).

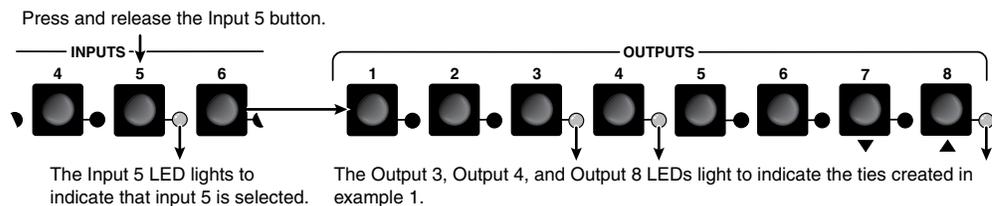


Figure 3-9 — Select an input

3. Press and release the Output 1 button (figure 3-10).

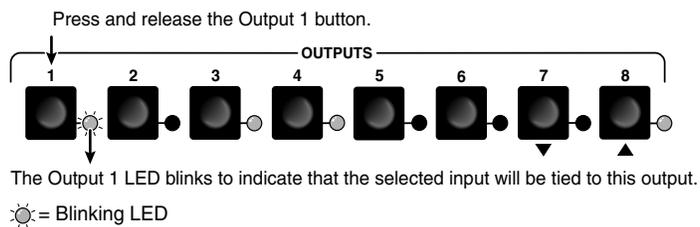


Figure 3-10 — Select the output

4. Press and release the Enter button (figure 3-11).

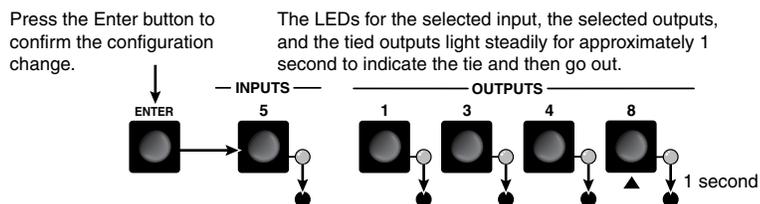


Figure 3-11 — Press the Enter button

Operation, cont'd

The current configuration (figure 3-12) is now:

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

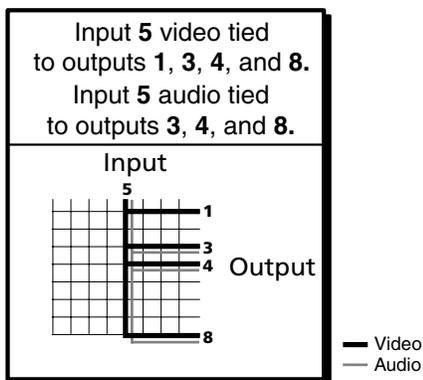


Figure 3-12 — Example 2 configuration

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 (figure 3-13).

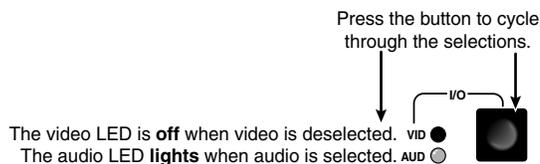


Figure 3-13 — Select audio only

2. Press and release the Input 5 button (figure 3-14).

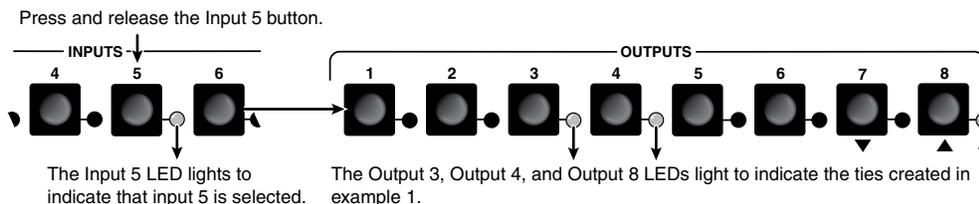
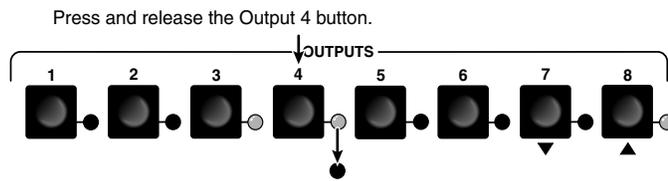


Figure 3-14 — Select an input

3. Press and release the Output 4 button (figure 3-15).



The Output 4 LED goes out to indicate that the selected input will be untied from this output.

Figure 3-15 — Deselect the output

4. Press and release the Enter button (figure 3-16).

Press the Enter button to confirm the configuration. The selected input's LED and the remaining tied outputs' LEDs light steadily for approximately 1 second to indicate the tie and then go out. (The deselected output's LED is already out.)

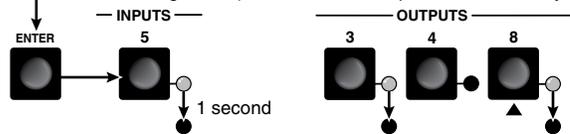


Figure 3-16 — Press the Enter button

The current configuration (figure 3-17) is now:

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

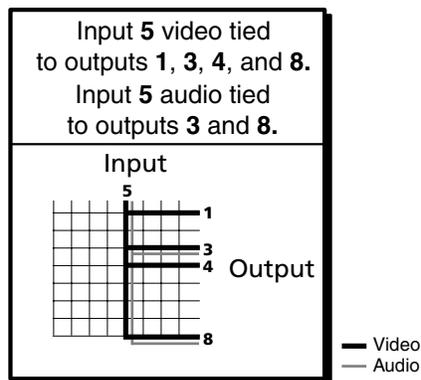


Figure 3-17 — Example 3 configuration

Operation, cont'd

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.

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.

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

1. Select both video and audio for viewing (figure 3-18).

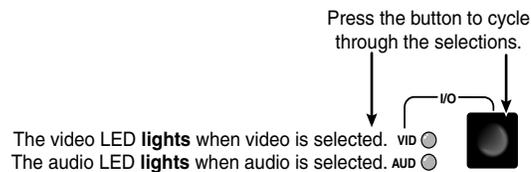


Figure 3-18 — Select video and audio

- Press and release the Input 5 button (figure 3-19).

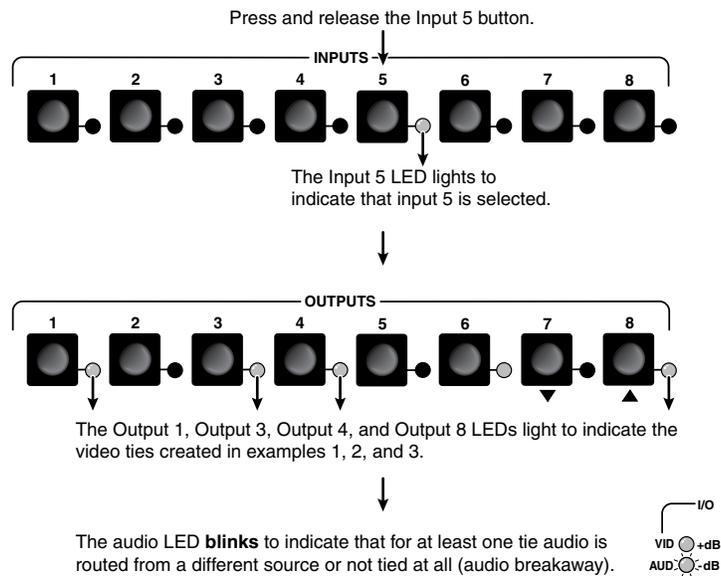


Figure 3-19 — Select an input

- Press and release the I/O button (figure 3-20).

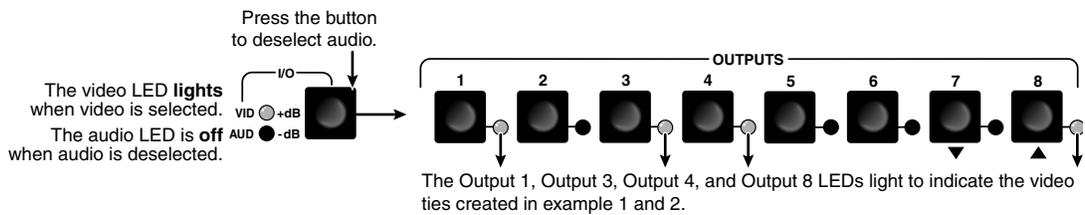


Figure 3-20 — Deselect audio to view video only

- Press and release the I/O button (figure 3-21).

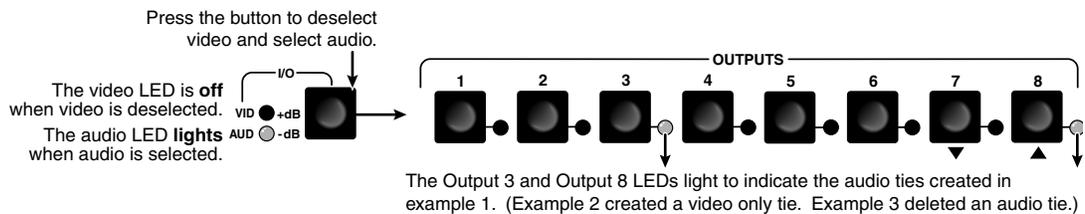


Figure 3-21 — Deselect video and select audio to view audio only

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

Operation, cont'd

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.

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

1. Select both video and audio for viewing (figure 3-22).

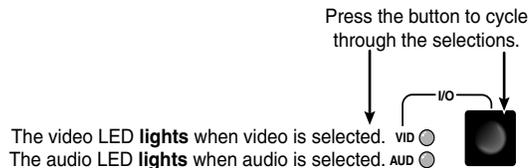


Figure 3-22 — Select video and audio

NOTE Ensure that no input button is selected before you select an output button. If an input button is 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. Press and release the Output 3 button (figure 3-23).

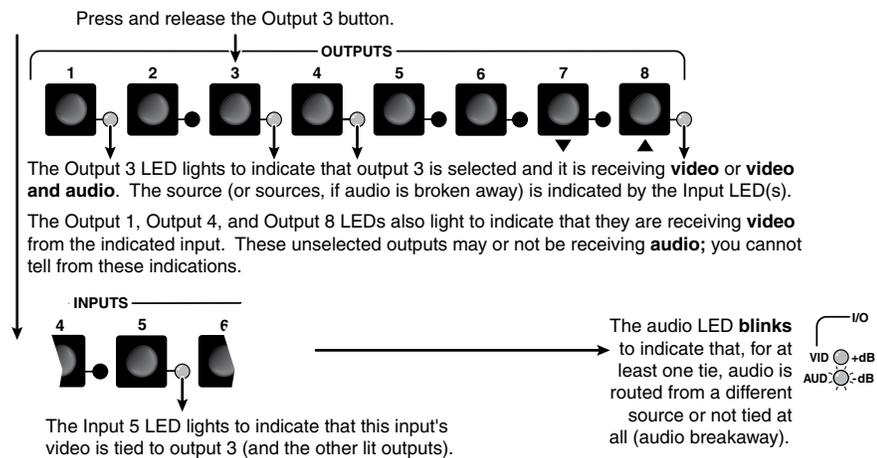


Figure 3-23 — Select an output

- Press and release the I/O button (figure 3-24).

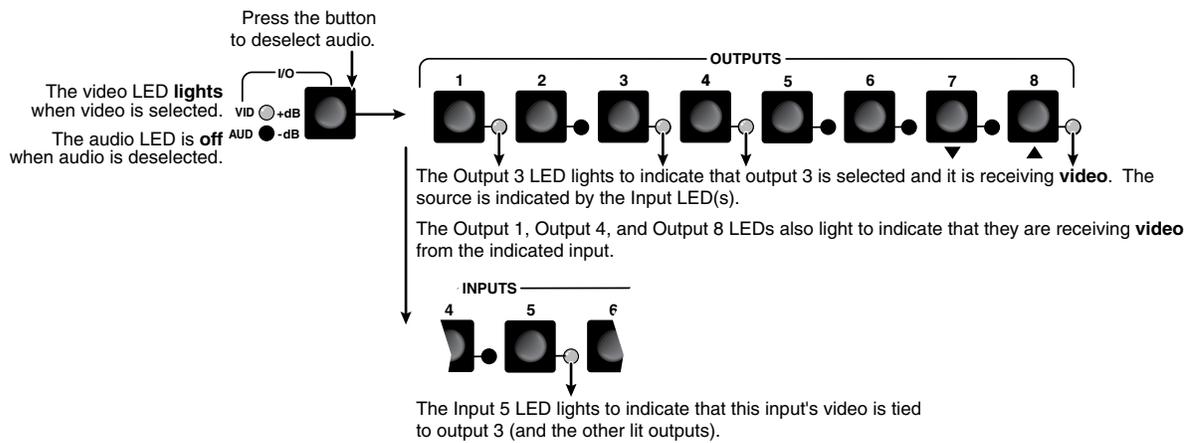


Figure 3-24 — Deselect audio to view video ties only

- Press and release the I/O button (figure 3-25).

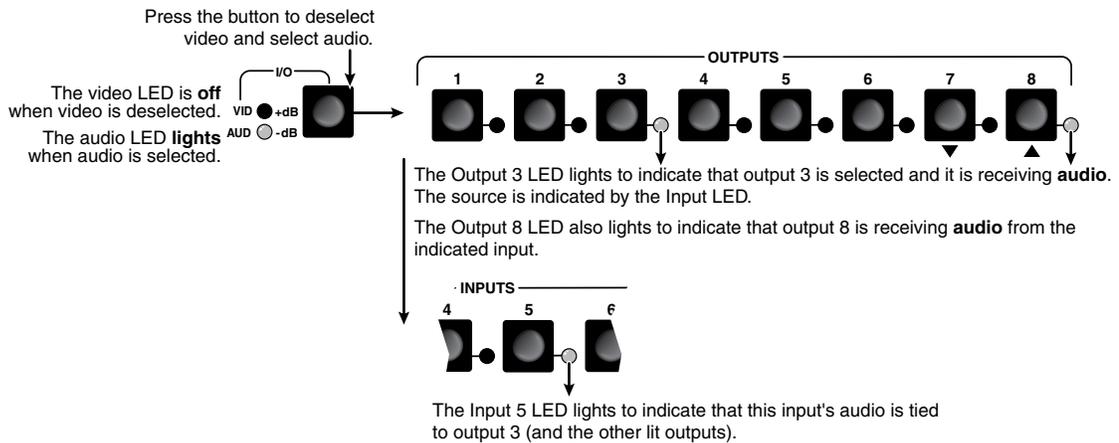


Figure 3-25 — Deselect video to view audio ties only

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

Operation, cont'd

Using presets

The current configuration (configuration 0) can be saved as a preset in any one of 16 preset memory addresses. Each switch 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). Preset numbers above those available from the front panel are available under RS-232 or IR control only. See chapter 4, "Remote Operation".

- NOTE**
- 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 Extron's Windows-based control program. See Chapter 4, "Remote Operation", for more details.
 - The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
 - When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.

Example 6: Save a preset

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

1. Press and **hold** the Preset button for approximately 2 seconds until the Preset LED begins blinking (figure 3-26).

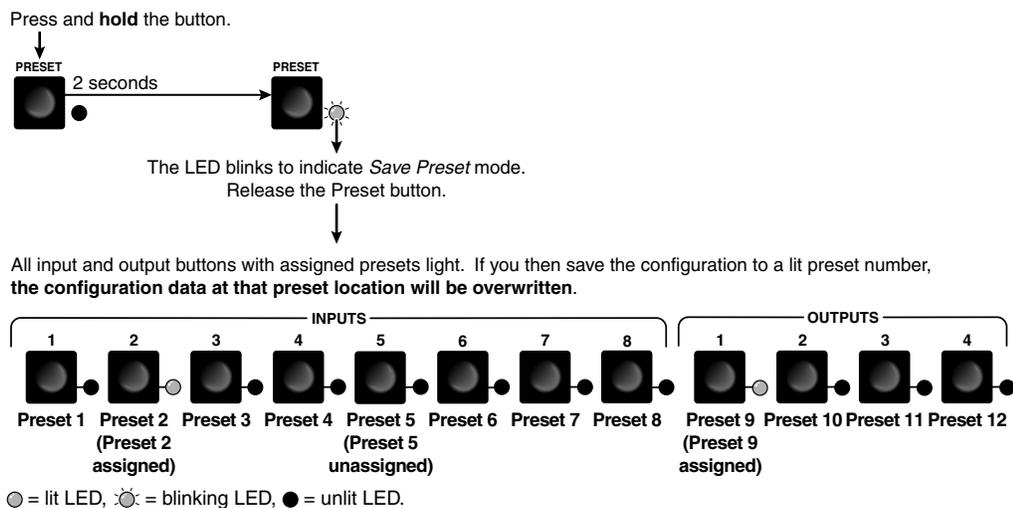


Figure 3-26 — Enter Save Preset mode, MVX 84

2. Press and release the Input 1 button (figure 3-27).

All LEDs except Input 1 and the Preset LED go out. The Input 1 LED and Preset LED remain lit for 1 second to indicate the saved preset number and then go out.

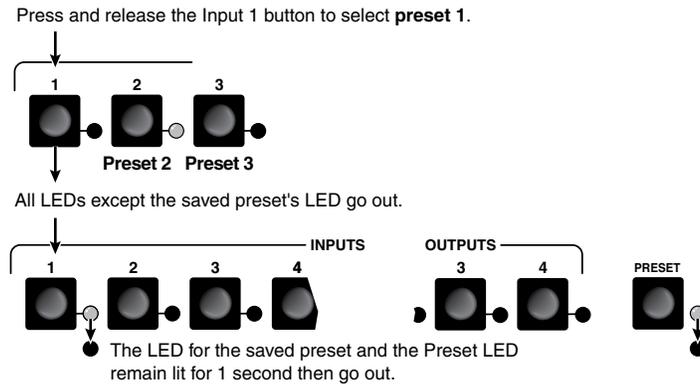


Figure 3-27 — Select the preset

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. Press and release the Preset button (figure 3-28).

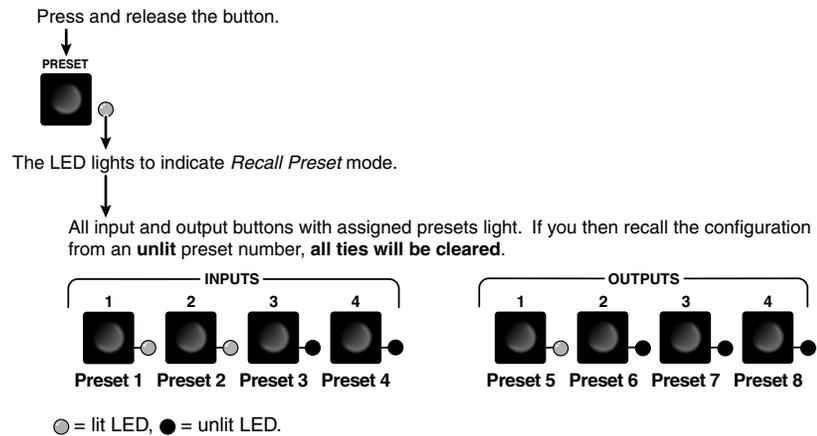


Figure 3-28 — Select Recall Preset mode, MVX 44

Operation, cont'd

2. Press and release the Input 1 button (figure 3-29).

All LEDs except Input 1 and the Preset LED go out. The Input 1 LED and Preset LED remain lit for 1 second to indicate the recalled preset number and then go out.

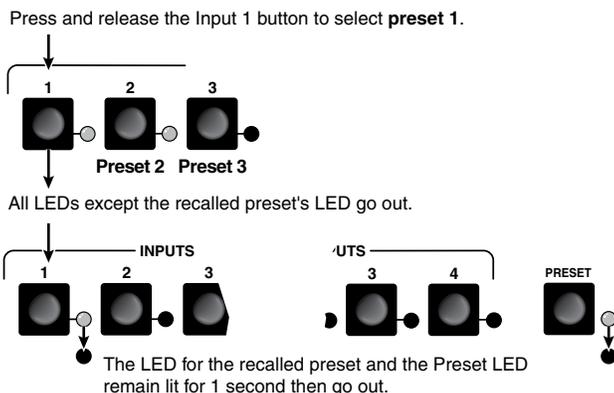


Figure 3-29 — Select the preset, MVX 48

Adjusting input audio gain and attenuation

Audio/video switchers have input audio gain and attenuation adjustments. In *Audio Setup* mode the audio gain or attenuation 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 (figure 3-30).

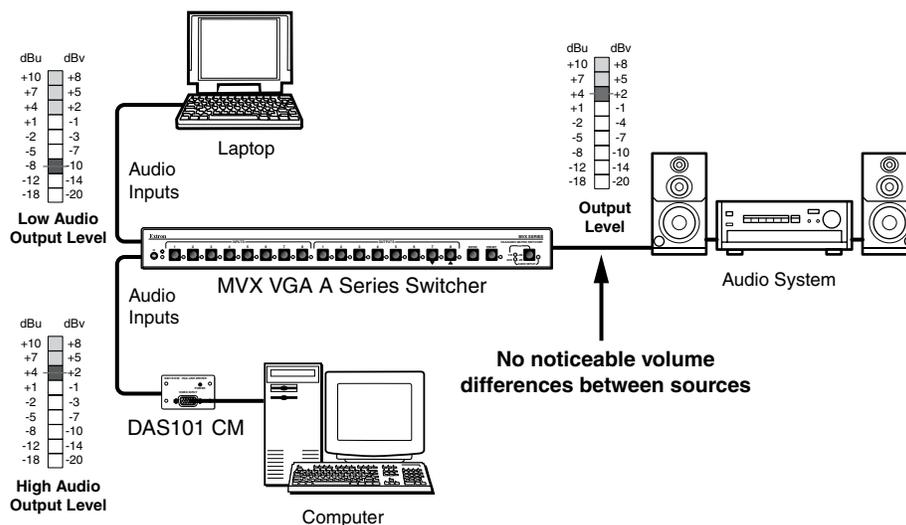


Figure 3-30 — Audio gain and attenuation

In *Audio Setup* mode, whichever input is selected for adjustment is automatically tied to output 1. You can 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 the Audio output level SIS commands in chapter 4, "Remote Operation").

The **input** audio gain or attenuation can be adjusted from the front panel or by using Extron's Windows-based 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 these LEDs' displays 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.*

Operation, cont'd

- 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.

- 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.
 - 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.

- Press and **hold** the Audio Setup (I/O) button for approximately 2 seconds (figure 3-31) until the Audio Setup LED lights.

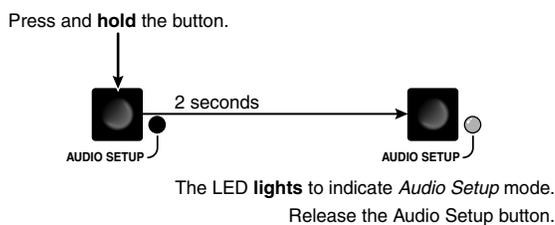


Figure 3-31 — Select Audio Setup mode

- Press and release the Input 5 button (figure 3-32).

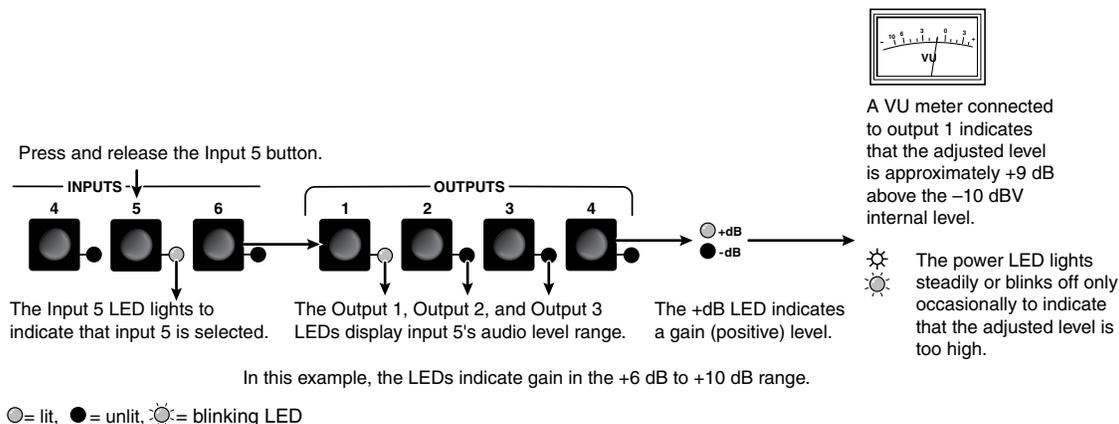


Figure 3-32 — Select an input

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:	<u>+2 dB</u>
	8 dB

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

3. Press and release the ▼ button once to decrease the audio level (figure 3-33). The ▼ LED flashes each time the button is pressed

Press and release the ▼ button several more times to continue to decrease the audio level (figure 3-33). Note the output LED, +dB LED, and -dB LED changes that occur each time the ▼ button is pressed and released.

Figure 3-33 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.

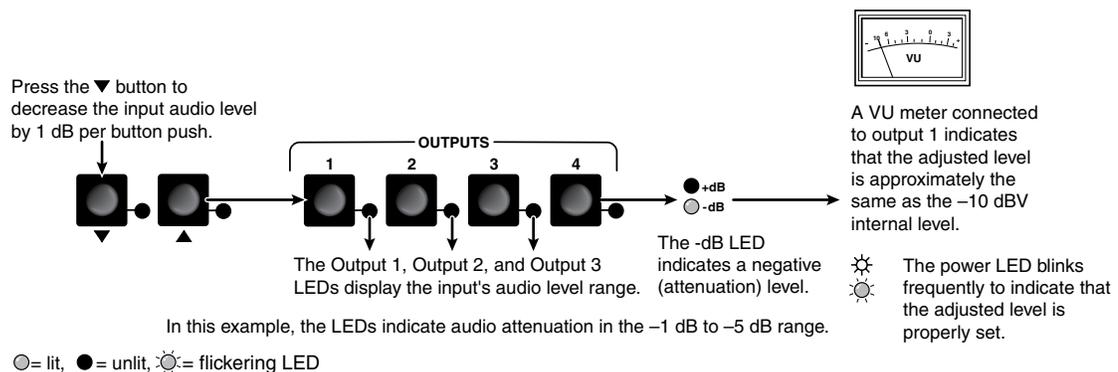


Figure 3-33 — Adjust the input audio level

Operation, cont'd

NOTE If another input button is pressed and released, the gain value for the current input is saved and the gain value for the newly selected input is displayed.

4. Press and release the Audio Setup button (figure 3-34). All audio changes are saved.

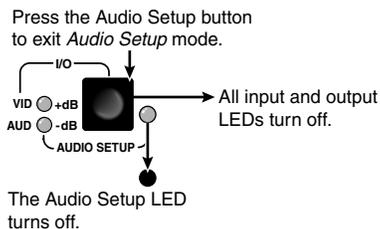


Figure 3-34 — Exit Audio Setup mode

Example 9: Resetting audio gain — single input

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

1. Press and **hold** the Audio Setup (I/O) button for approximately 2 seconds until the Audio Setup LED lights (figure 3-35).

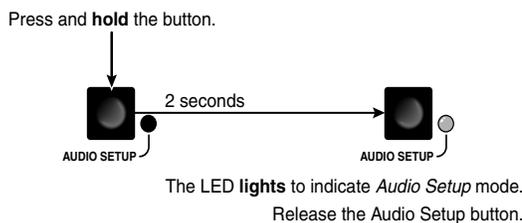


Figure 3-35 — Select Audio Setup mode

2. Press and release the Input 5 button (figure 3-36).

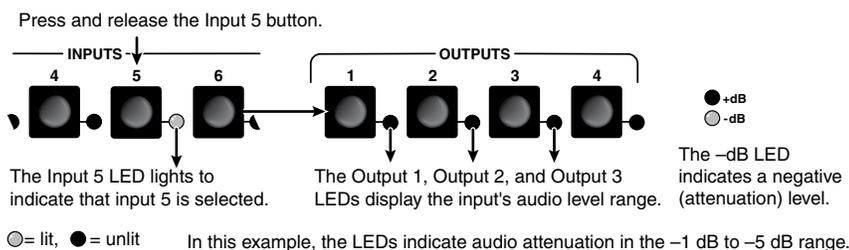


Figure 3-36 — Select an input

- Press and release the ▼ and ▲ buttons simultaneously (figure 3-37).

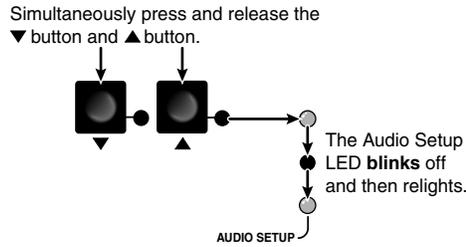


Figure 3-37 — Reset the selected input level

- If desired, reset other inputs' audio levels 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.

- Press and release the Audio Setup button (figure 3-38). All audio changes are saved.

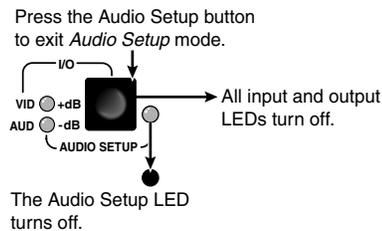


Figure 3-38 — Exit Audio Setup mode

Example 10: Resetting audio gain — all inputs

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

- Press and **hold** the Audio Setup (I/O) button for approximately 10 seconds (figure 3-39).

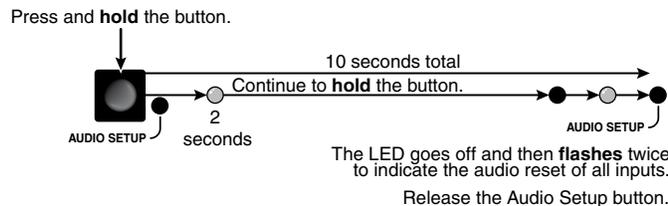


Figure 3-39 — Reset all input levels

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 Windows-based control program (see chapter 4, “Remote Operation”). The default 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 lockout 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 (figure 3-40).

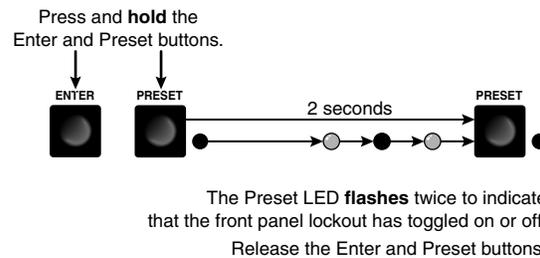


Figure 3-40 — Toggle front panel lockout on or off

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 (figure 3-41). 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 LED remain off.

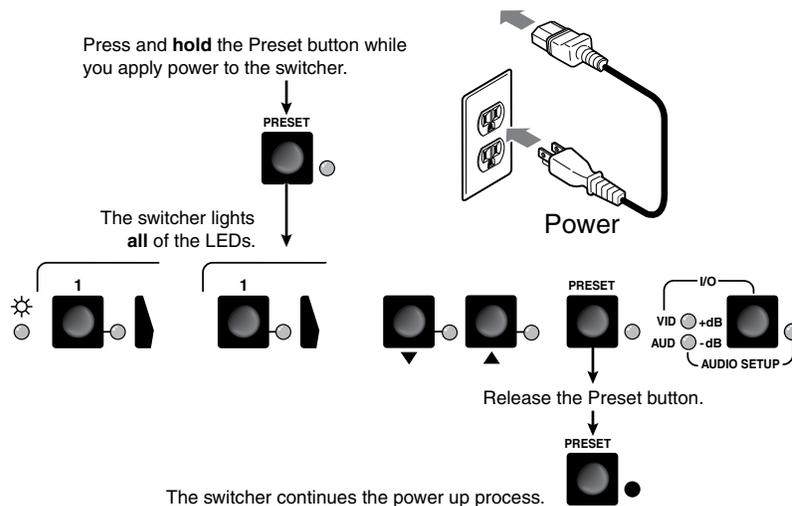


Figure 3-41 — Clear all ties and presets

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 (figure 3-42). 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 LED 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.

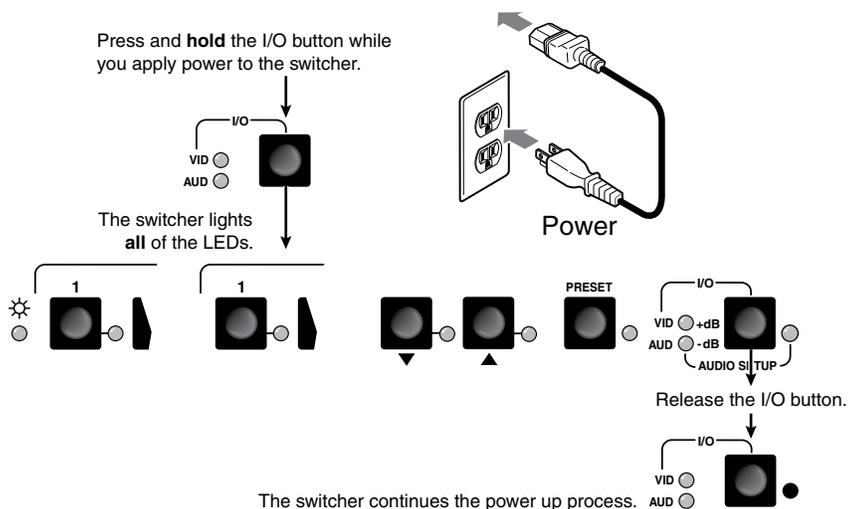


Figure 3-42 — System reset to factory defaults

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 chapter 2, "Installation". 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 3-18) 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 chapter 4, "Remote Operation").
- 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 & Technical Support Hotline if necessary.

Worksheets

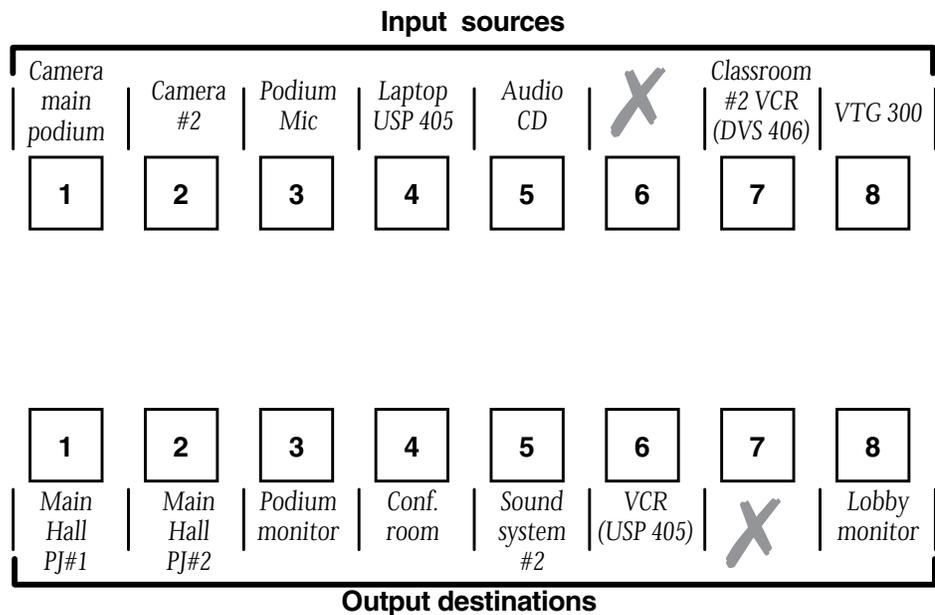
Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-31 and use one for each preset configuration. Cross out all unused or inactive inputs and outputs. If applicable, use different colors for video and audio.

Worksheet example 1: System equipment

Figure 3-43 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.



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 3-43 — Worksheet example 1: System equipment

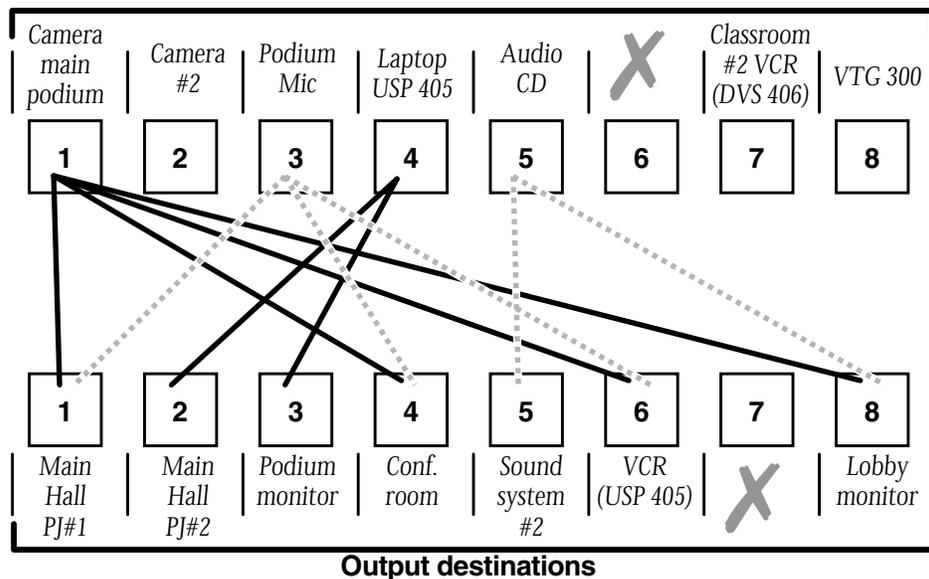
Operation, cont'd

Worksheet example 2: Daily configuration

Figure 3-44 continues from worksheet example 1 by showing the video and audio ties that make up the configuration of preset 1. A solid ink line shows video ties and a dashed pencil line shows the audio ties.

In this example:

- The image of the presenter, from the main podium camera (input 1), is:
 - Displayed in the main hall (output 1)
 - Displayed in the conference room (output 4) to the overflow crowd
 - Displayed in the lobby (output 8)
 - Tied to the VCR (output 6)
- The presenter has a presentation on her laptop computer (input 4) that is:
 - Displayed in the main hall (output 2)
 - Displayed locally on the podium (output 3).
- The audio from 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).



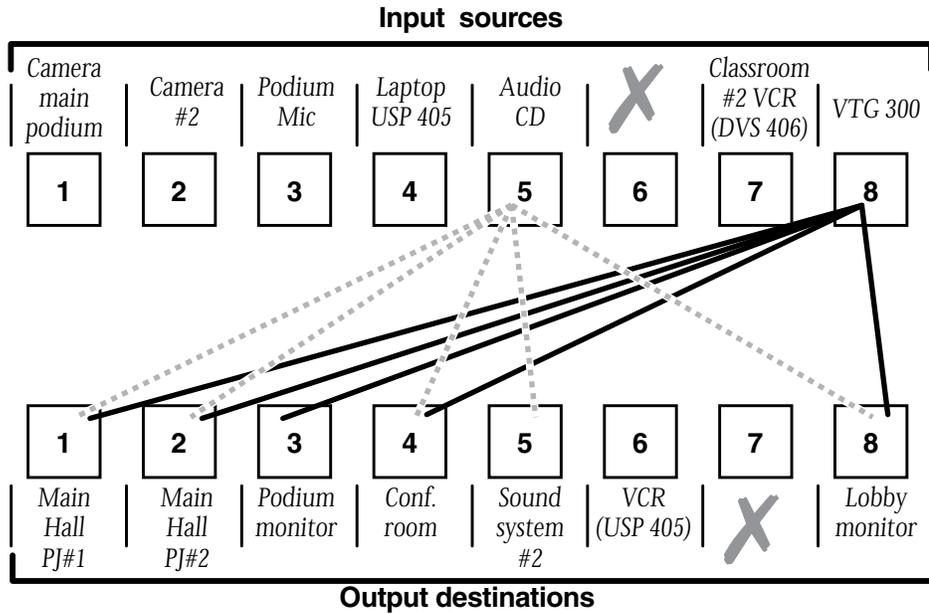
Preset # 1 Title: Worksheet Example Video: — Audio: --

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 3-44 — 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 3-45 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: --

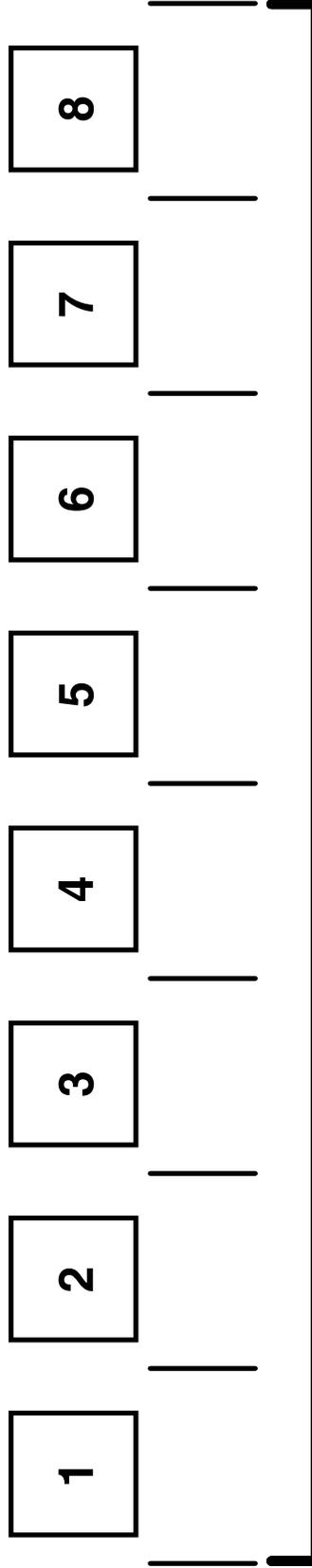
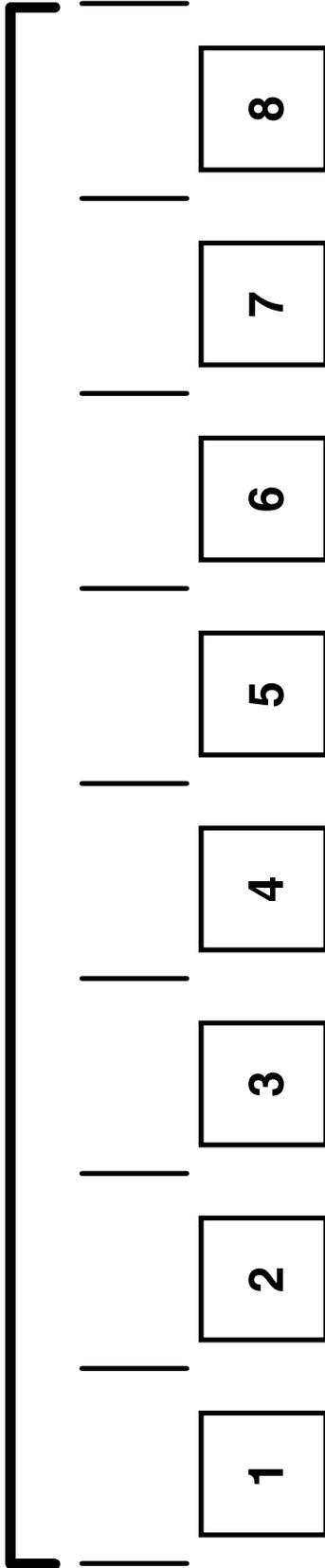
Fill in the preset number, use colors or dashes, etc. to make connecting lines. Indicate if the configuration is for Video, Audio, or both.

Figure 3-45 — Worksheet example 3: Test configuration

Operation, cont'd

Configuration worksheet

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.

Operation, cont'd



MVX 44 / 48 / 84 / 88 VGA Matrix Switchers

4 Chapter Four

Remote Operation

Simple Instruction Set Control

Matrix Switchers Control Program

Remote Operation

The MVX VGA Series switchers can be remotely controlled via the switcher's rear panel RS-232 connector (figure 4-1) or using an optional infrared Small Matrix Universal Remote Control (figure 4-2).

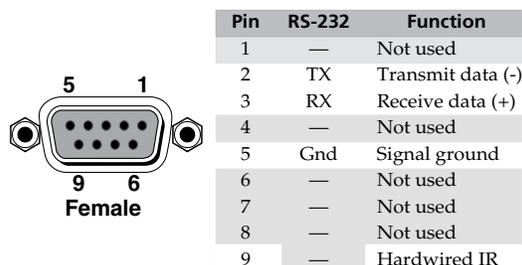


Figure 4-1 — Remote connector pinout

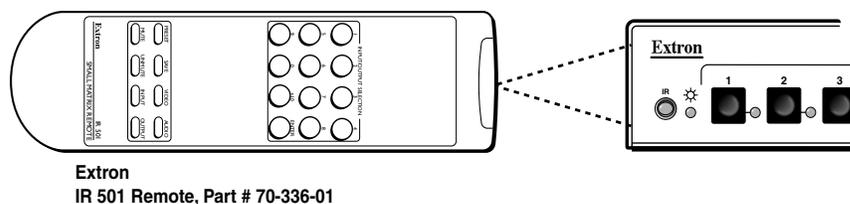


Figure 4-2 — Small matrix IR remote control

The RS-232 protocol is 9600 baud, 8-bit, 1 stop bit, no parity, and no flow control. RS-232 remote control devices can be either a host device, such as a computer or a control system.

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.

Two remote control methods are available: Extron's Simple Instruction Set and Extron's Windows®-based Matrix Switchers Control Program.

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

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.

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 2004, EXTRON ELECTRONICS "MVX *nm* VGA/A Series", Vx.xx

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

Vmt_n 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).

Amt_n 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.

Remote Operation, cont'd

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/response table

The command/response table begins on page 4-5. Symbols used in the table represent variables in the command/response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table below is for use with the command/response table.

ASCII to HEX Conversion Table										Esc 1B	CR 0D	LF 0A		
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

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)

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

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/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/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/response table for SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Create ties			
<p>NOTE</p> <ul style="list-style-type: none"> • 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). <p>NOTE The & tie command for RGB and the % tie command for RGB can be used interchangeably on the matrix switchers.</p>			
Tie input X1 to output X2 , RGB video and audio <i>Example:</i>	X1 * X2 ! 1*3!	Out X2 •In X1 •All← Out3•In1•All←	Tie input X1 's video and audio to output X2 . Tie input 1 video and audio to output 3.
Tie input X1 to output X2 , RGB (video) only <i>Example:</i>	X1 * X2 & 7*5&	Out X2 •In X1 •RGB← Out5•In7•RGB←	Audio breakaway (video only) tie. Tie input 7 RGB to output 5.
— or —			
Tie input X1 to output X2 , RGB (video) only	X1 * X2 %	Out X2 •In X1 •RGB←	Audio breakaway (video only) tie.
Tie input X1 to output X2 , audio only <i>Example:</i>	X1 * X2 \$ 3*8\$	Out X2 •In X1 •Aud← Out8•In3•Aud←	Audio breakaway (audio only) tie. Tie input 3 audio to output 8.
Quick multiple tie <i>Example:</i>	Esc +Q X1 * X2 !... X1 * X2 \$← Esc +Q3*4!3*5%3*6\$←	Qik← Qik←	Make multiple ties. 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 <i>Example:</i>	X1 *! 5*!	In X1 •All← In05•All←	Tie input 5 video and audio to all outputs.
Tie input to all outputs, RGB (video) only <i>Example:</i>	X1 *& 5*&	In X1 •RGB←	Audio breakaway (video only) tie.
— or —			
Tie input to all outputs, RGB (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 <i>Example:</i>	X2 & 3*&	X1 ←	RGB input X1 is tied to output X2 .
— or —			
Read RGB (video) output tie	X2 %	X1 ←	RGB input X1 is tied to output X2 .
NOTE The & read tie command for RGB and the % read tie command for RGB can be used interchangeably on the matrix switchers.			
Read audio output tie	X2 \$	X1 ←	Audio input X1 is tied to output X2 .

NOTE **X1** = Input number
X2 = Output number

0 – (maximum number of inputs for your model) (0 = untied)
1 – (maximum number of outputs for your model)

Remote Operation, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
RGB mute commands			
RGB mute	[X2]*1B	Vmt[X2]*1←	Mute output [X2] RGB (video off).
RGB unmute	[X2]*0B	Vmt[X2]*0←	Unmute output [X2] RGB (video on).
Read RGB mute	[X2]B	[X3]←	1 = mute on, 0 = mute off.
Global RGB mute	1*B	Vmt1←	Mute all RGB outputs.
Global RGB unmute	0*B	Vmt0←	Unmute all RGB outputs.
NOTE An IR 501 user can mute video and/or audio 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:			
IR 501 RGB and audio mute	{none}	Mut[X2]*1←	Output [X2]'s RGB and audio are muted.
IR 501 RGB mute	{none}	Vmt[X2]*1←	Output [X2]'s RGB is muted.
IR 501 RGB and audio unmute	{none}	Zpz←	Output [X2]'s RGB and audio are unmuted.
Audio input gain and attenuation			
NOTE The set gain (G) and set attenuation (g) commands <u>are</u> case sensitive.			
Set audio input gain to +dB value	[X4]*[X5]G	In[X4]•Aud[X6]←	
Example:	1*2G	In1•Aud+02←	Set input 1 audio gain to +2 dB.
Set audio input attenuation to -dB value	[X4]*[X7]g	In[X4]•Aud[X6]←	
Increment gain	[X4]+G	In[X4]•Aud[X6]←	Increase gain by 1 dB.
Example:	5+G	In5•Aud+03←	Increase audio input 5 level from +2 dB to +3 dB.
Decrement gain	[X4]-G	In[X4]•Aud[X6]←	Decrease gain by 1 dB.
Example:	7-G	In7•Aud-09←	Decrease audio input 7 level from -8 dB to -9 dB.
Read input gain	[X4]G	[X6]←	
Example:	3G	-06←	Audio input 3 level is at -6 dB.
Audio output level			
Set audio output to the consumer level (-10 dBV)	[X2]*0*40#	Out[X2]•Lvl0←	Set output [X2] level to consumer (-10 dBV).
Set audio output to the professional level (+4 dBu)	[X2]*1*40#	Out[X2]•Lvl1←	Set output [X2] level to pro (+4 dBu) (default).
Read output level	[X2]+40#	[X8]←	
Example:	3*40#	1←	Output 3 audio level is pro (+4 dBu).

NOTE [X2] = Output number
[X3] = Mute

[X4] = Input number
[X5] = Audio gain
[X6] = Numeric dB value
[X7] = Audio attenuation
[X8] = Output gain

1 – (maximum number of outputs for your model)
1 = on (muted)
0 = off (unmuted)
1 – (maximum number of inputs for your model)
0 – 24 (1 dB/step)
–18 to +24 (45 steps of gain or attenuation) (Default = 0 dB)
1 – 18 (1 dB/step)
0 = consumer level (-10 dBV)
1 = professional level (+4 dBu)

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio mute commands			
Audio mute	$\boxed{x2}^*1Z$	Amt $\boxed{x2}^*1\leftarrow$	Mute output $\boxed{x2}$ audio (audio off).
Audio unmute	$\boxed{x2}^*0Z$	Amt $\boxed{x2}^*0\leftarrow$	Unmute output $\boxed{x2}$ audio (audio on).
Read audio mute	$\boxed{x2}Z$	$\boxed{x3}\leftarrow$	1 = mute on, 0 = mute off.
Global audio mute	1*Z	Amt1 \leftarrow	Mute all audio outputs.
Global audio unmute	0*Z	Amt0 \leftarrow	Unmute all audio outputs.
NOTE	<i>An IR 501 user can mute audio and/or video 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:</i>		
IR 501 audio and RGB mute	{none}	Mut $\boxed{x2}^*1\leftarrow$	Output $\boxed{x2}$'s audio and RGB are muted.
IR 501 audio mute	{none}	Amt $\boxed{x2}^*1\leftarrow$	Output $\boxed{x2}$'s audio is muted.
IR 501 audio and RGB unmute	{none}	Zpz \leftarrow	Output $\boxed{x2}$'s audio and RGB are unmuted.

NOTE $\boxed{x2}$ = Output number
 $\boxed{x3}$ = Mute

1 – (maximum number of outputs for your model)
 1 = on (muted)
 0 = off (unmuted)

Remote Operation, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, recall, and directly write global presets			
Save current configuration as a global preset	[X9],	Spr[X9]←	Command character is a comma.
<i>Example:</i>	8,	Spr08←	Save current ties as preset 8.
Recall a global preset	[X9].	Rpr[X9]←	Command character is a period.
<i>Example:</i>	5.	Rpr05←	Recall preset 5, which becomes the current configuration.
Directly write a global preset	[Esc]*[X9]P[X1]*[X2][X1]*[X2]#[X1]*[X2]\$... [X1]*[X2]&←	Spr[X9]←	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.
<i>Example:</i>	[Esc]*16P08*5!07*04%3*6\$3*8&←	Spr16←	<u>Brackets are shown to separate ties for clarity only.</u> 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	[Esc][X9]!VC←	[X1]•[X1]•[X1]•...•[X1]•Vid•[X1]•[X1]•[X1]•...•[X1]•Aud←	Show preset [X9]'s video and audio configuration. Show the video input tied to <i>n</i> sequential outputs and then the audio input tied to <i>n</i> sequential outputs. <i>n</i> is the highest output number for this model switcher.
<i>Response description:</i>		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←	
<i>Example (MVX 88 VGA):</i>	[Esc]4VC←	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•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.
<i>Example (MVX 44 VGA):</i>	[Esc]4VC←	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	[Esc]0VC← returns the switcher's current video configuration.		

NOTE [X9] = Global preset #
[X1] = Input number
[X2] = Output number

00 - 16 (00 = current configuration)
0 - (maximum number of inputs for your model) (0 = untied)
1 - (maximum number of outputs for your model)

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 4-16) 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. Visit the Extron web site, www.extron.com, select the MVX switcher product category, select the latest firmware file for download, and copy it to your computer. Note the folder to which you save the firmware file.
2. Start a communications utility such as HyperTerminal. Select the Comm port that is connected to the switcher’s RS-232 port. Use 9600 bits per second, 8 data bits, “none” parity, 1 stop bit, and “none” flow control.

NOTE 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.

NOTE The firmware upload can take several minutes. If HyperTerminal’s echo function is turned off, you will have no indication that the upload is progressing. If desired, turn on the echo function as follows (figure 4-3): Click **File > Properties > Settings > ASCII Setup...**, check the **Echo typed characters locally** checkbox, and then click **Ok** twice.

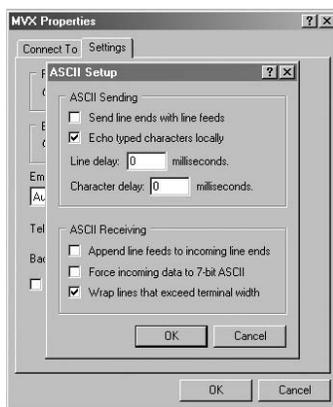


Figure 4-3 — Turn on the echo function

3. Depress the keyboard’s Esc key 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 (*.*)**.

Remote Operation, cont'd

- Navigate to the folder where you saved the firmware upgrade file. Select the file (figure 4-4).

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.

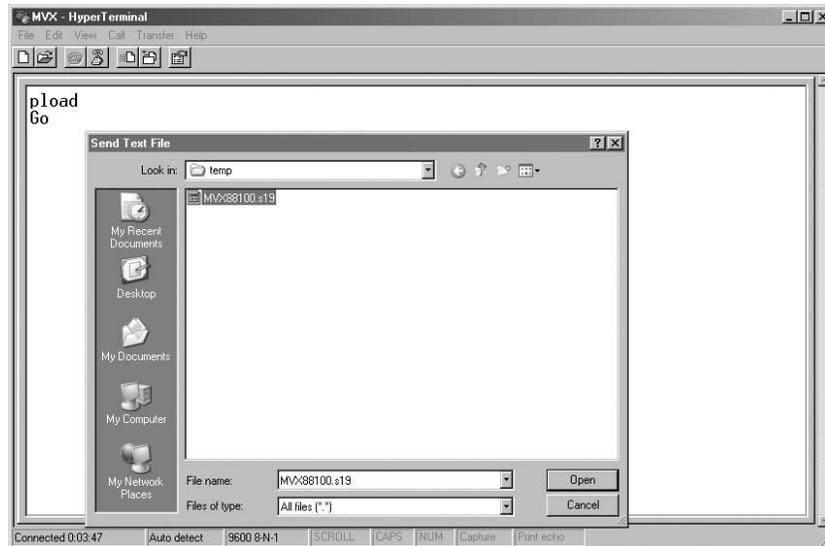


Figure 4-4— Select the firmware upgrade file

- Click **Open**. The firmware upload begins. If you have HyperTerminal’s echo function turned on, HyperTerminal will display a scroll of the text of the firmware file as it uploads to the switcher (figure 4-5).

```
pload
Go
S03300000443A5C776F726B5C535441524C45545C475433325C4D565838385C4D565838383130305C
S123B6C003A1012403CCBB5AA1082303CCBB5AC6C7042C108981E605A10A2303CCBB5EE613
```

Figure 4-5— Upload progress display

- After several minutes, the switcher reports the startup copyright message:
(C) COPYRIGHT 2004, EXTRON ELECTRONICS “MVX *nm* VGA/A Series”,
Vx.xx↵
This message indicates that the firmware upload is complete.
- Exit HyperTerminal.

Matrix Switchers Control Program

The Windows®-based Extron Matrix Switchers Control Program, which communicates with the switcher via the rear panel Remote RS-232 port provides an easy way to set up ties and sets of ties. The program is compatible with Windows 2000 and Windows XP.

Installing the software

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

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

- The Matrix Switchers Control Program
 - The Firmware Loader
1. Insert the CD-ROM into the drive. The installation program should start automatically. If it does not self-start, run Launch.exe from the CD.

The Extron software CD window appears (figure 4-6).



Figure 4-6 — Software CD window

2. Click the Software tab (figure 4-6).
3. Scroll to the desired program and click Install (figure 4-7).



Figure 4-7 — Software installation

Remote Operation, cont'd

- Follow the on-screen instructions. By default, the Windows installation of the Matrix Switchers Control Program creates a C:\Program Files\Extron\Matrix_Switcher directory, and it places three icons into a group folder named "Extron Electronics\Matrix Switchers." The three installed icons are:
 - MATRIX Switcher+ Control Program
 - MATRIX Switcher+ Help
 - Uninstall MATRIX Switcher

Using the software

Overview

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



The Comm Port Selection window (figure 4-8) appears.

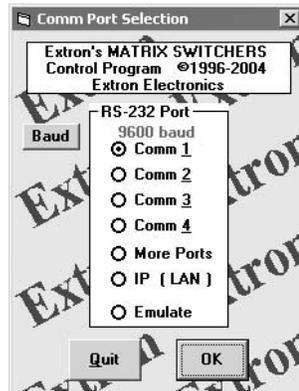
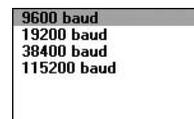


Figure 4-8 — Comm port selection window

- Choose either the comm port that is connected to the MVX switcher's RS-232 port, or *Emulate*.

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

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



Click OK and proceed to step 3.

- If you selected *Emulate*, click OK and see "Using emulation mode" on page 4-22.
- The Extron Matrix Switchers Control Program window (figure 4-9 and figure 4-10) displays the current configuration of the attached matrix.

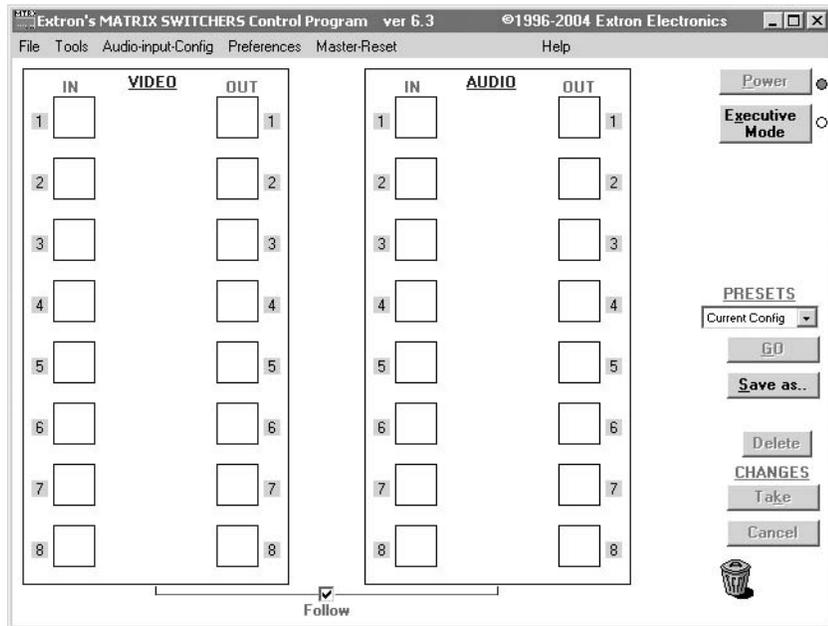


Figure 4-9 — Extron Matrix Switchers Control Program window (blank)

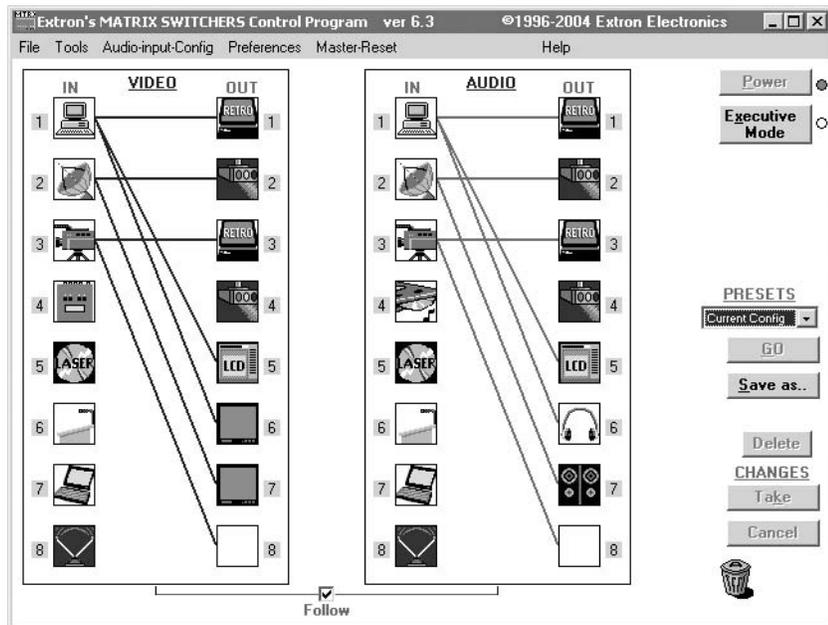


Figure 4-10 — Sample program window (complete)

4. 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.
5. To make the control program easier to use, assign a device icon to each input and output. Click on a box that represents an input or output, and drag the desired icon onto the box from the icon palette that appears.

Remote Operation, cont'd

6. To create a tie, drag an input box to one or more output boxes. If the Take button is not grayed out, click the Take button.
7. 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.

Updating the firmware

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

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 web site, www.extron.com, select the MVX switcher product category, select the latest firmware file for download, and copy it to your computer. Note the folder to which you save the firmware file.
2. Start the Matrix Switchers Control Program and connect to the MVX switcher. See "Using the software" in this chapter, steps 1 through 3, starting on page 4-14.
3. Click **Tools > Update firmware**. The Extron Firmware Loader appears (figure 4-11).
 - a. Click **Upload**. The Firmware Update window appears.
 - b. Click **OK**. The open file window appears.



Figure 4-11 — Open window

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

NOTE Ensure that the firmware upgrade is for the MVX Series VGA matrix switcher.

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

5. Click the **Open** button. A status bar, which shows the progress of the upload, appears in the Firmware Loader window (figure 4-12). The firmware upload to the switcher may take several minutes.

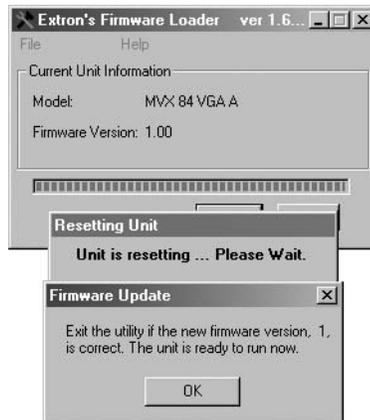


Figure 4-12 — Firmware Loader status indicator bar, switcher reset, and firmware update

Once the status bar has progressed fully from left to right across the indicator window, the firmware loader utility automatically resets the switcher (figure 4-10).

NOTE If the firmware loader utility exits before the status bar has progressed completely across the indicator window, try using a control cable with only pins 2, 3, and 5 connected. If necessary, modify the cable by removing pins or cutting wires.

NOTE If the firmware loader utility exits before the status bar has progressed completely across the indicator window, the firmware may be corrupted and may no longer respond to the Matrix Switchers Control Program. In this condition, the firmware upload can be accomplished only by using the SIS commands. See “Loading firmware using an SIS command” on page 4-11.

6. When prompted, confirm that the firmware version displayed in the firmware loader is correct. Click **Ok** in the Firmware Update prompt window to exit the firmware loader utility.

Remote Operation, cont'd

Windows buttons, drop boxes, and trash

The buttons on the right side of the 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.

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 unmake 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.

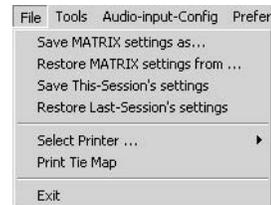
Save this-session's settings — Saves a complete set of up to 16 presets, plus the last active setting (preset #0), to overwrite the current file. Saved settings include audio gain settings (if specified), assigned icons, and icon captions.

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

Select printer — Selects the target printer.

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

Exit — Closes the 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 (figure 4-13), 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.

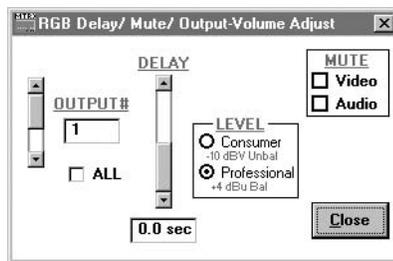
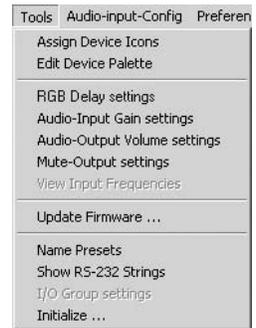


Figure 4-13 — RGB Delay/Mute/Output-Volume Adjust window

Audio-Input-Gain settings — Displays the Configure Audio Options window (figure 4-14), which shows the audio gain level settings for each input and allows you to change them.

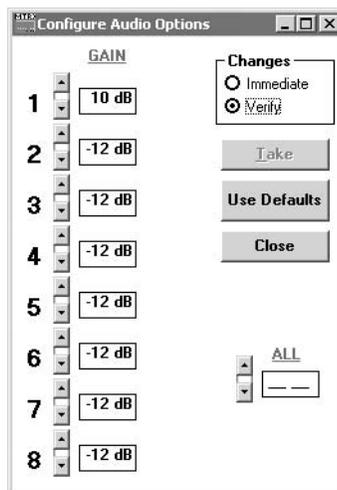


Figure 4-14 — Configure Audio Options window

Audio-Output volume settings — Displays the RGB Delay/Mute/Output-Volume Adjust window (figure 4-13), 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.

Remote Operation, cont'd

Mute-output settings — Displays the RGB Delay/Mute/Output-Volume Adjust window (figure 4-13), 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 switcher's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip set. See "Updating the firmware" on page 4-16.

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 (figure 4-14), which shows the audio gain level settings for each input and allows you to change them.

Preferences menu

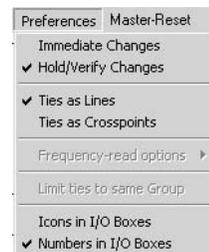
Immediate changes — Causes changes to take effect immediately.

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

Ties as lines — Displays ties as lines (figure 4-15).



Figure 4-15 — Ties shown as lines



Ties as crosspoints — Displays ties as a grid of inputs and outputs (figure 4-16). 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 -.

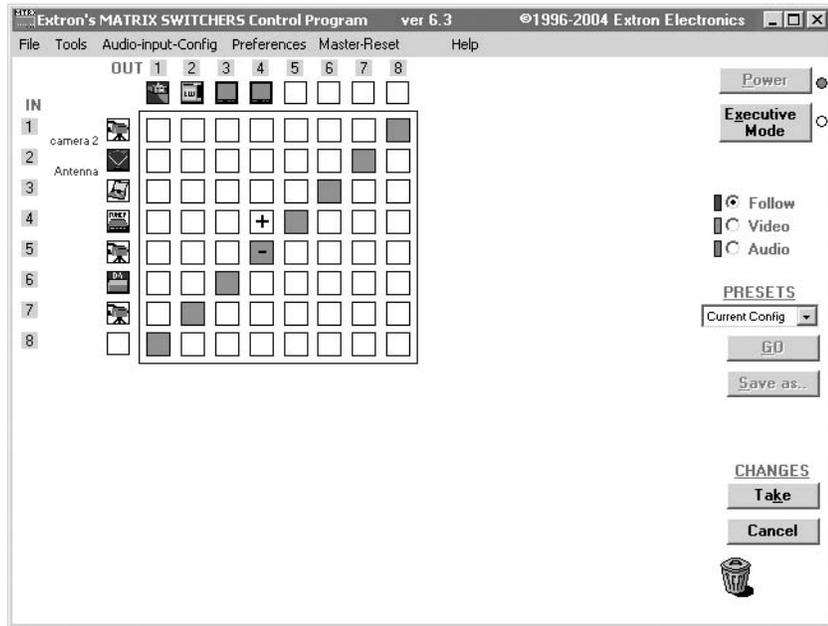


Figure 4-16 — Ties shown as crosspoints

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.



Remote Operation, cont'd

Master-Reset selection

Master-Reset

Master-Reset clears all ties and presets, clears all video and audio mutes, sets all input audio gain to unity gain (+0 dB), and sets all output 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 boards, **1 or 2** as the number of audio boards, and **MX Series** as the matrix model for which you are preparing a configuration; and click **OK** (figure 4-17).

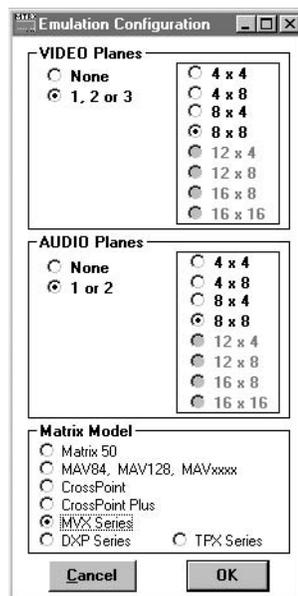


Figure 4-17 — Emulation mode configuration

6. Continue using the program as described in steps 3 through 7, beginning on page 4-14.

Using the help system

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

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



Remote Operation, cont'd



MVX 44 / 48 / 84 / 88 VGA Matrix Switchers

Appendix A

Specifications and Part Numbers

Specifications

Part Numbers and Accessories

Specifications and Part Numbers

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 300 MHz (-3 dB), fully loaded

Crosstalk..... <-60 dB nominal @ 10 MHz, <-39 dB @ 100 MHz

Switching speed 20 ms (max.)

Video input

Number/signal type

MVX 44/48 VGA A.....	4 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video
MVX 84/88 VGA A.....	8 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video

Connectors

MVX 44/48 VGA A..... 4 female 15-pin HD

MVX 84/88 VGA A..... 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

MVX 44/84 VGA A.....	4 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video
MVX 48/88 VGA A.....	8 VGA-UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (bi-level and tri-level sync), S-video, composite video

Connectors

MVX 44/84 VGA A..... 4 female 15-pin HD

MVX 48/88 VGA A..... 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 V _{p-p}
Output level	AGC to TTL: 4.0 V to 5.0 V _{p-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
Throughput gain	Adjustable. 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
CMRR.....	>75 dB @ 20 Hz to 20 kHz

Audio input

Number/signal type	
MVX 44/48 VGA A.....	4 stereo, unbalanced
MVX 84/88 VGA A.....	8 stereo, unbalanced
Connectors	
MVX 44/48 VGA A.....	4 female 3.5 mm stereo mini jacks: tip (L), ring (R), sleeve (GND)
MVX 84/88 VGA A.....	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), but also compatible with +4 dBu (1.23 V), 0 dBu (0.775 V), -20 dBV (100 mV)
Maximum level.....	>+12 dBV (4 V), (unbalanced) at 1% THD+N
Input gain.....	-18 dB to +10 dB, adjustable per input; default = 0 dB. (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 V_{rms}, 0 dBV = 1 V_{rms}, 0 dBV ≈ 2 dBu

Specifications and Part Numbers, cont'd

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	
MVX 44/84 VGA A.....	4 stereo, balanced/unbalanced
MVX 48/88 VGA A.....	8 stereo, balanced/unbalanced
Connectors	
MVX 44/84 VGA A.....	(4) 3.5 mm captive screw connectors, 5 pole
MVX 48/88 VGA A.....	(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 (pro), or -10 dBV (316 mV) unbalanced (consumer), selectable
Maximum level (Hi-Z)	>+22 dBu, balanced; >+14 dBV, unbalanced at 1% THD+N at default settings
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, 8-bit, 1 stop bit, no parity
Control pin configurations	2 = TX, 3 = RX, 5 = GND, 9 = hardwired IR input
IR controller module.....	IR 501 (optional remote control)
Program control.....	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™)

General

Power	100 VAC to 240 VAC, 50/60 Hz, 30 watts, internal
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, vented
Rack mount	Yes, with included full rack width rack and through-desk mounting kit, part #70-077-03 (MBD 149) Furniture mountable with optional under-desk mounting kit, part #70-222-01 (MBU 149)
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)
Listings.....	UL, CUL
Compliances.....	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF.....	30,000 hours
Warranty	3 years parts and labor

NOTE All nominal levels are at ±10%.

NOTE Specifications are subject to change without notice.

Part Numbers and Accessories

MVX matrix switcher part numbers

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

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
Tweezer (small screwdriver)	
<i>MVX series VGA Matrix Switcher User's Manual</i>	
5-pole captive screw audio connectors (7 or 14, depending on the model)	
Extron Software Products CD (Matrix Switchers Control Program)	

Specifications and Part Numbers, cont'd

Accessories

These items can be ordered separately:

Adapters, power supplies, labels	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' (0.15m)	26-531-01
VGA male to 5 BNC female adapter, 1.0' (0.35 m)	26-531-11
MKP 1000 remote keypad	
Black	60-239-02
White	60-239-03
RAL9010 white	60-239-05
WT (water-tight), black	60-239-52
WT (water-tight), white	60-239-53
MCP 1000M (master)	60-298-01
MKP 2000 X-Y remote control panel	
Black	60-682-02
White	60-682-03
RAL9010 white	60-682-05
MKP 3000	
Black	60-708-02
White	60-708-03
RAL9010 white	60-708-05

Cables

Bulk cable

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

Cable	Part number
14-conductor mini HR cable, 500' (152.4 m)	22-024-01
14-conductor mini HR cable, 1000' (304.8 m)	22-024-03
Plenum 14-conductor mini HR cable, 500' (152.4 m)	22-131-02
Plenum 14-conductor mini HR cable, 1000' (304.8 m)	22-131-03

Audio cable	Part number
STP22-2, 1000' (300 m)	22-160-03
STP22-2P, plenum, 1000' (300 m)	22-162-03

Cable assemblies

Male-to-male VGA cable with audio	Part number
VGA-A M-M MD, molded, 3' to 50' (0.9 m to 15.24 m)	26-490- <i>nn</i>
VGA-A M-M BK, backshell, 3' to 50' (0.9 m to 15.24 m)	26-490- <i>nn</i>
VGA-A 90M-M MD, 90°, molded, 3' to 12' (0.9 m to 3.6 m)	26-510- <i>nn</i>
VGA-A 90M-M BK, 90°, backshell, 3' to 12' (0.9 m to 3.6 m)	26-510- <i>nn</i>
VGA-A 90UM-M MD, 90° up, molded, 3' to 12' (0.9 m to 3.6 m)	26-510- <i>nn</i>
VGA-A 90UM-M BK, 90° up, backshell, 3' to 12' (0.9 m to 3.6 m)	26-510- <i>nn</i>
MVGA M-M, micro, 3' to 25' (0.9 m to 7.6 m)	26-566- <i>nn</i>

Male-to-male VGA cable	Part number
MVGA M-M, micro, 3' to 25' (0.9 m to 7.6 m)	26-567- <i>nn</i>
VGA M-M MD, molded, 3' to 100' (0.9 m to 30.4 m)	26-238- <i>nn</i>
VGA M-M BK, backshell, 3' to 100' (0.9 m to 30.4 m)	26-238- <i>nn</i>
VGAP M-M MD, molded, plenum, 3' to 25' (0.9 m to 7.6 m)	26-439- <i>nn</i>
VGAP M-M BK, backshell, plenum, 35' to 100' (10.6 m to 30.4 m)	26-439- <i>nn</i>

VGA to 5 BNC cables	Part number
SYM BNCM VGA male-to-male BNC, mini HR, 6" to 100' (15 cm to 30.4 m)	26-533- <i>nn</i>
SYF BNCF VGA male-to-female BNC, mini HR, 6" to 100' (15 cm to 30.4 m)	26-531- <i>nn</i>
SYM 90 BNCF VGA 90° male-to-female BNC, mini HR, 6" to 100' (15 cm to 30.4 m)	26-548- <i>nn</i>
SYM 90U BNCF VGA 90° up male-to-female BNC, mini HR, 6" to 100' (15 cm to 30.4 m)	26-549- <i>nn</i>

Install kit	Part number
SY IST male-to-BNC, 25' to 100' (7.6 m to 30.4 m)	26-511- <i>nn</i>
SY ISTP male-to-BNC, plenum, 25' to 100' (7.6 m to 30.4 m)	26-512- <i>nn</i>
VGA IST male-to-male, mini HR, 25' to 100' (7.6 m to 30.4 m)	26-515- <i>nn</i>
VGA ISTP male-to-male, mini HR, plenum, 25' to 100' (7.6 m to 30.4 m)	26-514- <i>nn</i>

Specifications and Part Numbers, cont'd

Extron's Warranty

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

**USA, Canada, South America,
and Central America:**

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Asia:

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

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Japan:

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

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

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

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

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

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+800.3987.6673
Inside Europe Only
+31.33.453.4040
+31.33.453.4050 FAX

Extron Asia

+800.7339.8766
Inside Asia Only
+65.6383.4400
+65.6383.4664 FAX

Extron Japan

+81.3.3511.7655
+81.3.3511.7656 FAX

Extron China

+400.883.1568
Inside China Only
+86.21.3760.1568
+86.21.3760.1566 FAX

Extron Middle East

+971.4.2991800
+971.4.2991880 FAX