

## User's Manual



### MMX 32 VGA A Mini Matrix Switcher

68-789-01 Rev. D  
01 07



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# 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.

**Conserv**er les instructions • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

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

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

## Sicherheitsanleitungen • Deutsch



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



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

## Achtung

**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.

## Precaución

**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.

## 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 le 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 reut 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. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

**Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen 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.

**Litium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterytyp, 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 puede ser eliminada.

**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 abrirlo 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.

# FCC Class A Notice

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

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

# Extron's Warranty

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

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

Extron Electronics  
1230 South Lewis Street  
Anaheim, CA 92805, USA

### Asia:

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135 Joo Seng Road, #04-01  
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### 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), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.*

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

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.

## 安全须知 • 中文



这个符号提示用户该设备用户手册中的操作和维护说明。



这个符号警告用户该设备机壳内暴露的危险电压，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** • 不要使用该产厂商没有推荐的工具或追加设备，以避免危险。

### 警告

**电源** • 该设备只能使用产品上标明的电源。设备必用有地线供电系统供电。第三条线（地线）是安设施，不能不用或跳过。

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

**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。必须使与厂家推荐的相同或相近型号的电池。按照生产厂的议处理废弃电池。

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68-789-01 **Rev. D**  
01 07



**MMX 32 VGA A**



**Chapter One**

**Introduction**

About this Manual

About the MMX 32 VGA A

Features

# Introduction

## About this Manual

This manual discusses how to install and operate the Extron MMX 32 VGA A matrix switcher.

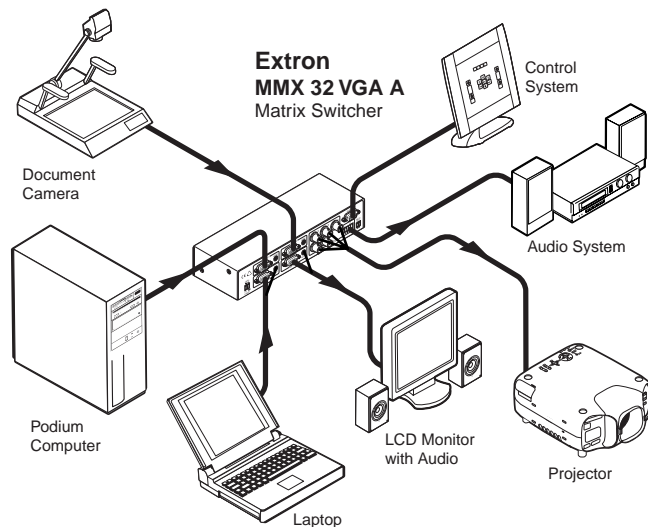
## About the MMX 32 VGA A

The Extron MMX 32 VGA A is a compact, three-input, two-output matrix switcher suitable for small installations or portable systems. The switcher routes computer video and both balanced and unbalanced audio signals, and features a bandwidth of 300 MHz to accommodate signals of all resolutions, from VGA to UXGA.

The MMX 32 VGA A has two outputs:

- Output 1 provides a video output on a female 15-pin HD connector and an audio output on a 3.5 mm stereo jack
- Output 2 provides a video output on five female BNC connectors and an audio output on a 5-pole 3.5 mm captive screw connector

The user controls the switcher via the front panel buttons or through remote contact closure or RS-232 controls.



**Figure 1-1 — Typical MMX 32 VGA A application**

## Features

**Inputs** — The MMX VGA A has three female 15-pin HD input connectors, each with a 3.5 mm stereo jack.

**Outputs** — The unit routes computer video and audio signals to two outputs: one female 15-pin HD connector with a 3.5 mm stereo jack and one set of five female BNC connectors with one 5-pole 3.5 mm captive screw connector.

**Stereo audio** — Unbalanced stereo audio can be output as either balanced or unbalanced stereo audio.

**Bandwidth** — The switcher features 300 MHz bandwidth to accommodate any signal resolution.

**Front panel control** — Each output has a set of input selector buttons and LEDs for easy input selection.

**Remote control** — Operate the switcher via optional contact closure and RS-232 remote controllers.

**Portability** — The switcher is light and compact, with rubber feet for tabletop operation.

**Rack and furniture mountability** — The MMX 32 VGA A can be mounted on a rack shelf or under a desk or podium.

**Power** — An external 12 VDC power connector is included with the switcher.



# Chapter Two

## Installation and Operation

Mounting the MMX 32 VGA A

Rear Panel Features and Cabling

Front Panel Features and Operation

# Installation and Operation

## Mounting the MMX 32 VGA A

The MMX 32 VGA A can be set on a table, mounted on a rack shelf, or mounted under a desk, podium, or tabletop.

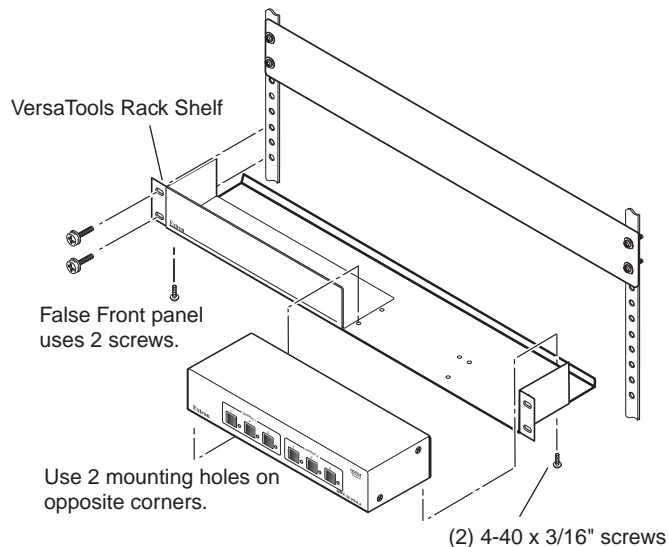
### Tabletop use

Four self-adhesive rubber feet are included with the switcher. For tabletop use, attach one foot at each corner of the bottom of the unit, and place the unit in the desired location.

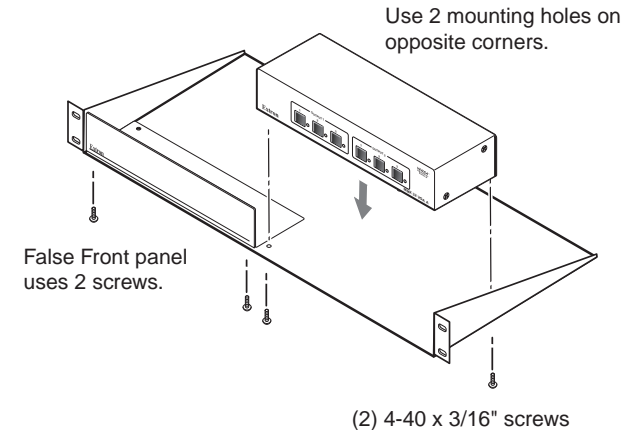
### Rack mounting

For optional rack mounting, mount the switcher on any of the following rack shelves:

- VersaTools® 19" 1U rack shelf kit (part #60-190-20) (figure 2-1)
- VersaTools 19" basic 1U rack shelf (part #60-604-20)
- 6" deep 1U rack shelf kit (part #60-190-10)
- 6" deep basic 1U rack shelf (part #60-604-10)
- Standard universal 1U rack shelf kit (part #60-190-01) (figure 2-2)
- Basic universal 1U rack shelf (part #60-604-01)



**Figure 2-1 — Mounting the MMX 32 VGA A on a VersaTools rack shelf**



**Figure 2-2 — Mounting the MMX 32 VGA A on a 1U Universal rack shelf**

### UL requirements

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

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



## Installation and Operation, cont'd

### Rack mounting instructions

On the standard rack shelf, the switcher mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

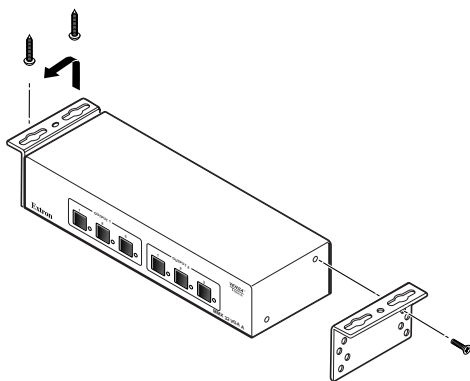
1. Remove rubber feet if they were previously installed on the bottom of the switcher.
2. Mount the switcher on the rack shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure it to the shelf.
3. Install blank panel(s) or other unit(s) on the rack shelf.
4. Attach the rack shelf to the rack using the supplied bolts.

**NOTE** Only products in the VersaTools line can be mounted on a VersaTools shelf. Most 1U rack-mountable Extron products can be mounted on the standard and basic shelves.

### Furniture mounting

Furniture mount the switcher using the optional mounting kit (part #70-212-01) as follows:

1. Remove rubber feet if they were previously installed on the bottom of the switcher.
2. Attach the furniture mounting brackets to the switcher with the provided machine screws (figure 2-3).

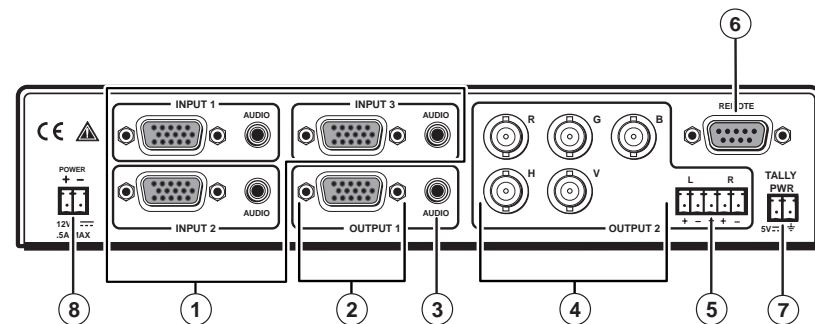


**Figure 2-3 — Mounting the MMX 32 VGA A under furniture**

3. Hold the switcher with the attached brackets against the underside of the table or other furniture. On the mounting surface, mark the location of the screw holes of the bracket.

4. Drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw protrudes.
6. Align the mounting screws with the slots in the brackets and place the switcher against the surface, with the screws through the bracket slots. See figure 2-3.
7. Slide the switcher slightly forward or back, then tighten all four screws to secure the unit in place.

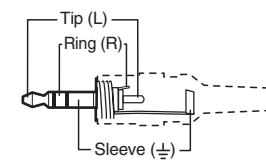
### Rear Panel Features and Cabling



**Figure 2-4 — MMX 32 VGA A rear panel features**

### Inputs

1. **Video and audio inputs** — Connect computer video sources to these female 15-pin HD connectors. Connect audio sources to these 3.5 mm stereo jacks. Wire the audio connectors as shown in figure 2-5.

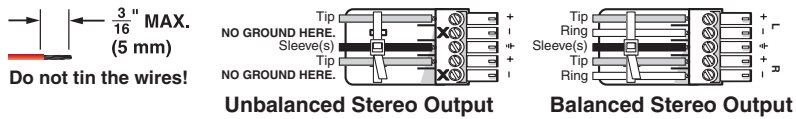


**3.5 mm Stereo Plug Connector (balanced)**

**Figure 2-5 — Audio input connection**

## Outputs

- ② **Video output 1** — Connect an output monitor or other VGA device to this female 15-pin HD connector.
- ③ **Audio output 1** — Connect speakers to this 3.5 mm stereo jack.
- ④ **Video output 2** — Connect a projector or other RGBHV video output device to these five BNC connectors.
- ⑤ **Audio output 2** — Connect speakers to this 5-pole 3.5 mm captive screw connector. Wire the captive screw connector for stereo output as shown in figure 2-6. Use the supplied tie-wrap to strap the audio cable to the extended tail of the connector.



**Figure 2-6 — Audio output connections**

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

**NOTE** The length of exposed (stripped) copper wires is critical. The ideal length is 3/16" (5 mm).

- If the stripped section of wire is longer than 3/16", the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 3/16", wires can be easily pulled out even if tightly fastened by the captive screws.

**NOTE** Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could be pulled out.

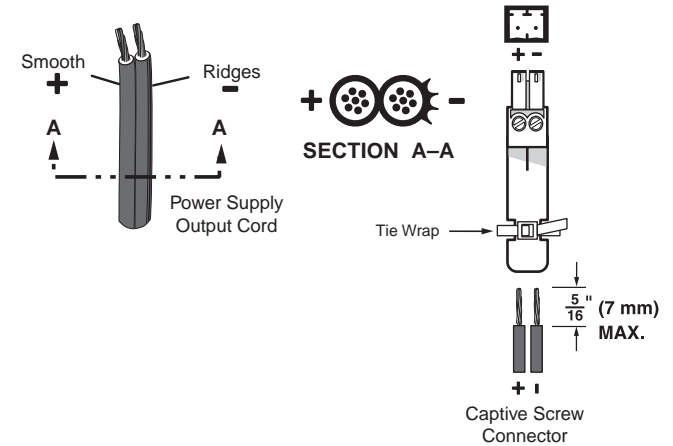
## Remote control connections

- ⑥ **Remote connector** — Connect a computer or RS-232 control module to this female 9-pin D connector to allow remote control using the Extron Simple Instruction Set™ (SIS™) or the Extron Universal Switcher Control Program. Alternatively, connect a contact closure device such as an Extron remote control Architectural Adapter Plate (AAP or MAAP). See chapter 3, "Remote Control", for more information.

- ⑦ **Tally Power connector** — This 2-pole captive screw connector provides power to light the LEDs on Extron MMX 32 AAP (part #70-277-01, -11, or -21) or MMX 32 MAAP (part #70-277-12, or -22) contact closure remote control panels. Connect the 5V and Gnd (-) 2-pole captive screw connector on the AAP or MAAP to this connector. See chapter 3, "Remote Control", for more information.

## Power connection

- ⑧ **Power connector** — An external 12V power supply is included with the unit. Plug it into this 2-pole 3.5 mm captive screw connector. Wire the connector as shown in figure 2-7. Use the supplied tie-wrap to strap the power cable to the extended tail of the connector.



**Figure 2-7 — Power connection wiring**

**CAUTION** Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the MMX. Identify the power cord negative lead by the ridges on the side of the cord (figure 2-7).

**NOTE** The length of exposed (stripped) copper wires is critical. The ideal length is 5/16" (7 mm).

- If the stripped section of wire is longer than 5/16", the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 5/16", wires can be easily pulled out even if tightly fastened by the captive screws.

**NOTE** Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could be pulled out.

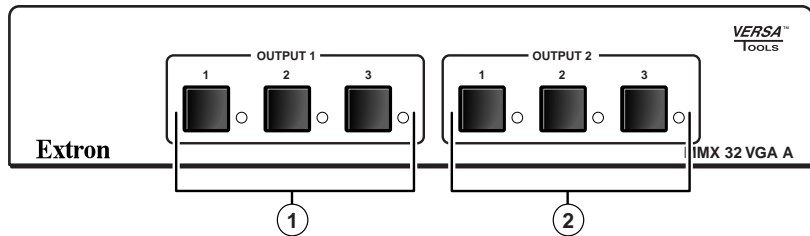
To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

**WARNING** The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

As an alternative, an Extron P/S 123 Universal 12 VDC Power Supply, part #60-814-01, can power multiple MMXs or other Extron 12 VDC devices, using only one AC power connector.

**CAUTION** Do not daisy chain power to this unit.

### Front Panel Features and Operation



**Figure 2-8 — Front panel features**

- ① **Input selector buttons and LEDs for output 1** — Press the button corresponding to the desired input. The Input LED for that input lights.
- ② **Input selector buttons and LEDs for output 2** — Press the button corresponding to the desired input. The Input LED for that input lights.

**NOTE** When power is applied, the LEDs light sequentially from left to right. Then the LEDs corresponding to the last valid input selections light. If audio is broken away via RS-232, the LED corresponding to the audio source flashes.

### Executive mode

Putting the switcher into executive mode locks the front panel. While the switcher is in executive mode, the user can select inputs only through a remote device.

To activate executive mode, press the following buttons simultaneously and hold for at least three seconds:

- Input 1 button for output 1
- Input 3 button for output 2

The front panel LEDs flash to indicate that executive mode is active.

Repeat this procedure to unlock the front panel.

### System reset

To clear all user settings and reset the switcher to its factory settings, press and hold the input 3 button for output 2 while you power up the switcher. Continue to hold the button while the switcher lights the front panel LEDs sequentially from left to right.

### Audio switching

When you select an input by pressing a front panel selector button, the audio and video signals from that input are routed together to the appropriate output.

The MMX 32 VGA A also features audio breakaway through the Extron Simple Instruction Set or the Extron Universal Switcher Control Program (see chapter 3, “Remote Control”, for details). When audio breakaway is active, the front panel LED corresponding to the audio source flashes, while the LED corresponding to the video source lights steadily.



# Chapter Three

## Remote Control

RS-232 Control

Contact Closure Control

# Remote Control

The switcher's rear panel Remote connector can be connected to the serial port output of a host device such as a computer or control system, or to a contact closure device such as the Extron MMX 32 AAP panel (part #70-277-01, -11, or -21) or MMX 32 MAAP panel (part #70-277-12 or -22).

## RS-232 Control

The RS-232 Remote connection makes software control of the switcher possible via the Extron Simple Instruction Set (SIS) or the Extron Windows®-based control program.

The Remote connector on the MMX 32 VGA A is a female 9-pin D connector (figure 3-1). Pins not used for RS-232 control are assigned to contact closure control as described later in this chapter. The Remote connector pin assignments are listed in the table below.

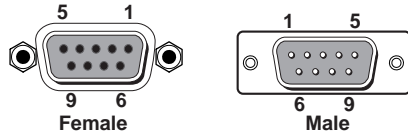


Figure 3-1 — Remote connector pin arrangement

**NOTE** For RS-232 use *only* pins 2, 3, and 5.

### Remote connector pin assignment table

Pin	RS-232	Contact closure	Function
1	—	In#1/Out#1	Tie input 1 to output 1
2	TX	—	Transmit data (-)
3	RX	—	Receive data (+)
4	—	In#2/Out#1	Tie input 2 to output 1
5	Gnd	Gnd	Signal ground
6	—	In#3/Out#1	Tie input 3 to output 1
7	—	In#1/Out#2	Tie input 1 to output 2
8	—	In#2/Out#2	Tie input 2 to output 2
9	—	In#3/Out#2	Tie input 3 to output 2

The RS-232 protocol for this connector is 9600 baud, 8-bit, 1 stop bit, no parity.

## Simple Instruction Set control

### Host-to-switcher instructions

The switcher accepts SIS commands through the remote connector. 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 message

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

(C) Copyright 2003, Extron Electronics, MMX 32 VGA A, Vx.xx ↵

### Switcher error responses

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

- E01 — Invalid input channel number (too large)
- E10 — Invalid command
- E12 — Invalid output number (too large)
- E13 — Invalid value (out of range)

## Using the command/response table

The SIS command/response table begins on the next page. Lower case letters are acceptable in the command field only where indicated. Symbols are used throughout the table to represent variables in the command/response fields. Symbol definitions and an ASCII-to-hexadecimal (HEX) conversion table are provided below. Command and response examples are shown throughout the table.

### Symbol definitions

↵ = Carriage return/line feed

← = Carriage return (no line feed)

[Esc] = W

[X1] = Input number 1 - 3

[X2] = Input number (for tie) 0 - 3  
0 = disconnected

[X3] = Output number1 or 2

[X9] = 0 or 1  
0 = off  
1 = on

[X19] = Controller software version number to second decimal place

[X20] = Mute  
0 = no mute  
1 = video mute  
2 = audio mute  
3 = video and audio mute

ASCII to HEX Conversion Table															
Space	20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B		7C	}	7D	~	7E	DEL	7F

## Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
<b>Create ties</b>			
Tie input [X2] to output [X3], A & V	[X2]*[X3]!	OUT[X3] IN[X2] ALL↵	Tie input 1 audio and video to output 2.
Example:	1*2!	OUT02 IN01 ALL↵	
Tie input to output, RGB	[X2]*[X3]%	OUT[X3] IN[X2] RGB↵	Tie input 3 RGB to output 1.
Example:	3*1%	OUT01 IN3 RGB↵	
Tie input [X2] to output [X3], audio	[X2]*[X3]\$	OUT[X3] IN[X2] AUD↵	Tie input 1 audio to output 2.
Example:	1*2\$	OUT02 IN1 AUD↵	
<b>RGB mute</b>			
RGB mute	[X3]*1B/b	VMT[X3]*1↵	Mute RGB output [X3].
RGB unmute	[X3]*0B/b	VMT[X3]*0↵	Unmute RGB output [X3].
Read RGB mute	[X3] B/b	[X9]↵	RGB mute [X9] (0 = off and 1 = on).
Global (where [X3] is not included, global RGB mute is activated)			
RGB mute all	1B/b	VMT1↵	Mute all RGB.
RGB unmute all	0B/b	VMT0↵	Unmute all RGB.
<b>Audio mute</b>			
Audio mute	[X3]*1Z/z	AMT[X3]*1↵	Mute audio output [X3].
Audio unmute	[X3]*0Z/z	AMT[X3]*0↵	Unmute audio output [X3].
Read audio mute	[X3] Z/z	[X9]↵	Audio mute [X9] (0 = off and 1 = on).
Global (where [X3] is not included, global Audio mute is activated)			
Audio mute all	1Z/z	AMT1↵	Mute all audio.
Audio unmute all	0Z/z	AMT0↵	Unmute all audio.

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
<b>Executive mode</b>			
Lock front panel	1 X/x	Exel↵	Enable executive mode.
Unlock front panel	0 X/x	Exe0↵	Disable executive mode.
Lock status	X/x	[X9]↵	Executive mode status (0 = off and 1 = on).
<b>Reset to factory defaults</b>			
System reset (factory default)	[Esc]ZXXX←	Zpx↵	Clear all ties and reset audio to 0dB.
Unmute RGB/Audio (all mutes)	[Esc]ZZ←	Zpz↵	Unmute all.
<b>View ties and output mute</b>			
View RGB output tie	[X3]%	[X2]↵	Output 2 video tied to input 3 video.
Example:	2%	3↵	
View audio output tie	[X3]\$	[X2]↵	Output 1 audio tied to input 2 audio.
Example:	1\$	2↵	Output mute [X20] (0 = no mute, 1 = video mute, 2 = audio mute, 3 = video and audio mute).
Output mute	[X3]VM	[X20]↵	
<b>Information requests</b>			
Information request	I/i	V1*[X2]•A1*[X2]•V2*[X2]•A2*[X2]•Vmt1*[X9]•Amt1*[X9]•Vmt2*[X9]•Amt2*[X9]↵	
Example:	i	V1*1•A1*1•V2*2•A2*2•Vmt1*0•Amt1*0•Vmt2*0•Amt2*0↵	
Request part number	N/n	xx-xxx-xx↵	60-565-01=MMX 32 VGA A switcher.
Query software version	Q/q	[X19]↵	Software version number.

**NOTE** Commands can be made back-to-back with no spaces. Example 1\*1102103\*03!...

**NOTE** The matrix switcher supports the 2-digit numeric format (01\*02).

**Loading firmware using an SIS command**

**NOTE** Firmware can be uploaded two ways:

1. Using the Universal Switcher Control Program.
2. Using the [Esc]upload SIS command entered via a communications utility such as HyperTerminal.

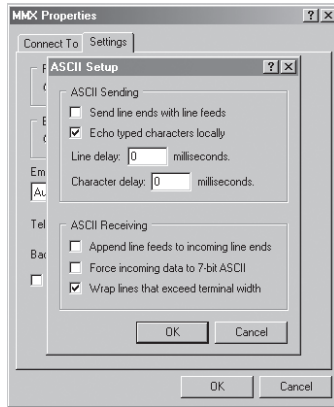
**Extron recommends that you upload firmware using the Universal Switcher Control Program (see Updating the firmware on page 3-12) and reserve this SIS procedure for correcting firmware that has been corrupted and is unable to respond to the Universal Switcher Control Program.**

Firmware can be loaded using SIS commands as follows:

1. Visit the Extron Web site, www.extron.com, select the MMX 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 responds 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 3-2): Click File > Properties > Settings > ASCII Setup... and then click the Ok button twice.*

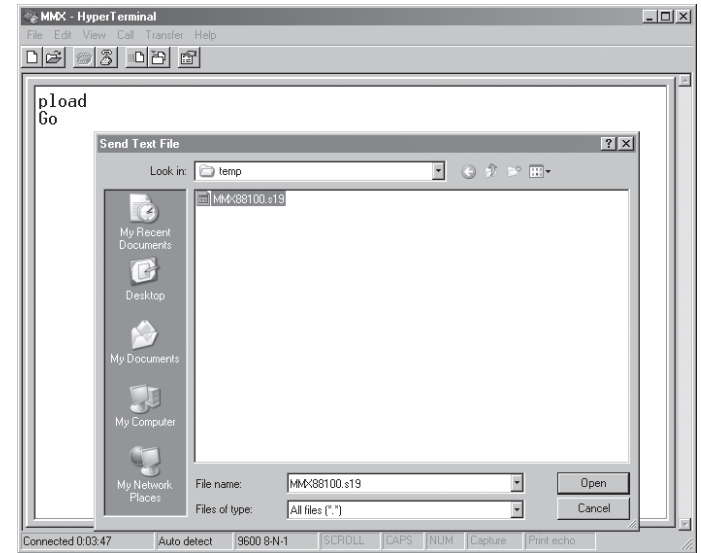


**Figure 3-2 — Turn on the echo function**

3. Press and release 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 (\*.\*)*.
6. Navigate to the folder where you saved the firmware upgrade file. Select the file (figure 3-3).

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

7. Click *Open*. The firmware upload begins. If you have HyperTerminal's echo function turned on, HyperTerminal displays a scroll of the text of the firmware file as it uploads to the switcher (figure 3-4).



**Figure 3-3 — Select the firmware upgrade file**

```

pload
Go
S0330000443A5C776F726B5C535441524C45545C475433325CC83130305C
S123B6C003A1012403CCBB5A1082303CCBB5AC6C7042C10893613
    
```

**Figure 3-4 — Upload progress display**

8. After several minutes, the switcher reports the startup copyright message:  
(C) Copyright 2003, Extron Electronics, MMX 32 VGA A,  
Vx.xx↵  
This message indicates that the firmware upload is complete.
9. Exit HyperTerminal.



### Windows-based control program

The Universal Switcher Control Program is compatible with Windows 3.1/3.11 and later. It provides remote control of the input selection for each output (including audio breakaway) and audio gain and attenuation adjustments.

Updates to this program can be downloaded from the Extron Web site (<http://www.extron.com>).

### Installing the software

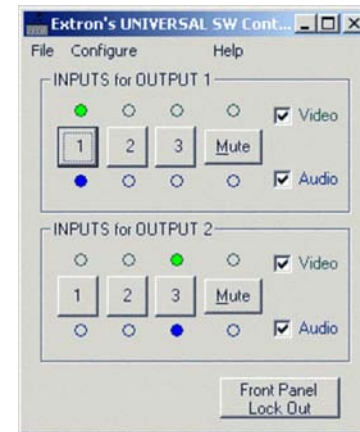
The program is contained on a single 3.5" diskette and can be run from the floppy drive, or it can be installed and run from the hard drive. To install the software on the hard drive, run SETUP.EXE from the floppy disk and follow the on-screen instructions.

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

### Using the software

To run the software:

1. Double-click the Universal Switcher Control Program icon in the Extron Electronics program group.
2. Click the comm port that is connected to the switcher's remote connector.
3. Click OK. The Extron Universal Switcher Control Program window displays the selected inputs for each output (figure 3-5).

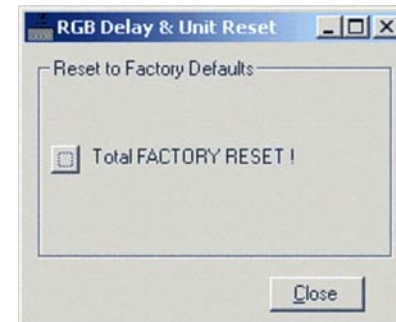


**Figure 3-5 — Universal Switcher Control Program window**

### Resetting the switcher

The RGB Delay & Unit Reset window allows you to clear all user settings and reset the switcher to its factory settings. To reset the switcher:

1. Click Unit Reset on the Configure menu. The RGB Delay & Unit Reset window appears (figure 3-6).



**Figure 3-6 — RGB Delay & Unit Reset window**

2. Click the Total FACTORY RESET! button.
3. Click Close.

### Updating the firmware

Firmware updates periodically become available on the Extron Web site. To load a firmware update:

1. Download the update file from the Extron Web site (www.extron.com).
2. Run the Universal Switcher Control Program.
3. On the File menu, click Update Firmware. The Firmware Loader window appears (figure 3-7).



**Figure 3-7 — Firmware Loader window**

4. Click the Upload Firmware File button.
5. Locate the update file you downloaded from the Web site and click Open. The Universal Switcher Control Program loads the update.

**NOTE** The firmware update file must have an .s19 extension. If it does not have that extension it will not work properly.

6. When the program is finished loading the update, click Exit. The Universal Switcher Control Program closes.

**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 Universal Switcher Control Program or the Firmware Loader utility. In this condition, the firmware upload can be accomplished only by using SIS commands. See Loading firmware using an SIS command on page 3-7.

### Using the help system

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

- From the Extron Electronics program group, double-click the Signal Enhancement Products Help icon.
- From within the Universal Switcher Control Program, click Help on the task bar.
- From within the Universal Switcher Control Program, press the F1 key.

### Contact Closure Control

The MMX 32 VGA A can be controlled remotely using the optional Extron MMX 32 AAP contact closure control panel (part #70-277-01, -11, or -21) or the MMX 32 MAAP contact closure panel (part #70-277-12 or -22). Each panel controls one output and has three input selector buttons and LEDs.

The contact closure system uses the pins on the Remote connector that are not assigned to RS-232 control (see the table below for pin assignments). Each contact closure pin corresponds to an input/output connection, or tie. A tie is made when one pin is connected to ground. Each pin returns a tally out signal to the remote control panel after a tie is made, lighting the control panel LED corresponding to the selected input.

**NOTE** For contact closure **do not** use pins 2 or 3.

Pin	RS-232	Contact closure	Function
1	—	In#1/Out#1	Tie input 1 to output 1
2	TX	—	Transmit data (-)
3	RX	—	Receive data (+)
4	—	In#2/Out#1	Tie input 2 to output 1
5	Gnd	Gnd	Signal ground
6	—	In#3/Out#1	Tie input 3 to output 1
7	—	In#1/Out#2	Tie input 1 to output 2
8	—	In#2/Out#2	Tie input 2 to output 2
9	—	In#3/Out#2	Tie input 3 to output 2

### Connecting an MMX 32 AAP or MMX 32 MAAP control panel

Each Extron MMX 32 AAP and MMX 32 MAAP contact closure remote control panel can control one output on the switcher. To connect a panel to the switcher, wire the captive screw connectors on the rear of the panel as follows.

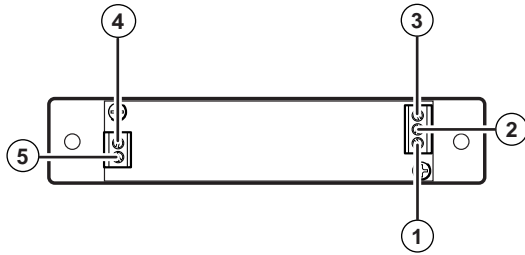


Figure 3-8 — MMX 32 AAP rear panel

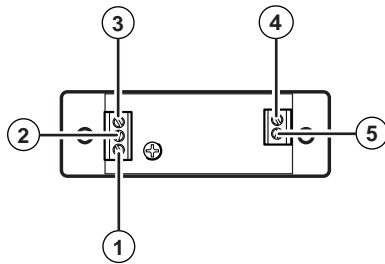


Figure 3-9 — MMX 32 MAAP rear panel

#### Input Selection connector

- ① **Input 1 pole** — Connect this pole of the captive screw connector to pin 1 (if the panel will control output 1) or pin 7 (if the panel will control output 2) of the MMX 32 VGA A's Remote connector.
- ② **Input 2 pole** — Connect this pole of the captive screw connector to pin 4 (output 1) or pin 8 (output 2) of the MMX 32 VGA A's Remote connector.
- ③ **Input 3 pole** — Connect this pole of the captive screw connector to pin 6 (output 1) or pin 9 (output 2) of the MMX 32 VGA A's Remote connector.

#### Tally Power connector

- ④ **5 VDC pole** — Connect this pole of the captive screw connector to the 5 VDC pole of the Tally Pwr connector on the MMX 32 VGA A.
- ⑤ **GND pole** — Connect this pole of the captive screw connector to the ground pole of the Tally Pwr connector on the MMX 32 VGA A.

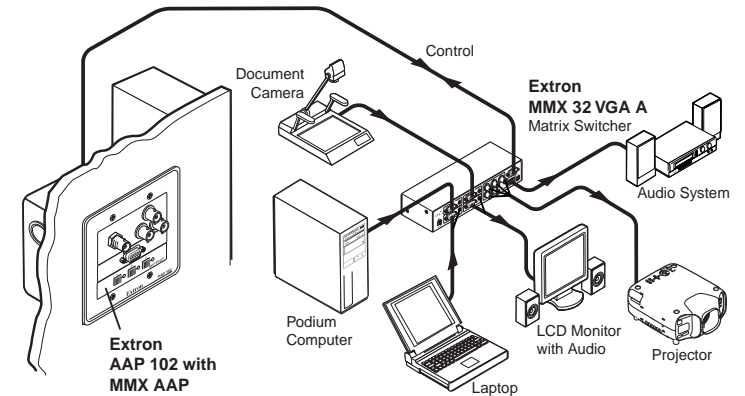


Figure 3-10 — Typical MMX 32 VGA A application using contact closure remote control

**NOTE** Only one MMX 32 AAP or MMX 32 MAAP control panel can be used to control each output.

**NOTE** Extron recommends shielded twisted pair cable, such as STP 22 dual plenum cable, part #22-162-03 (or equivalent). Unshielded cable can allow crosstalk and interference between the MMX and the control panel.



# A

## Appendix A

### Specifications, Part Numbers, and Accessories

Specifications

Included Parts

Optional Accessories

## Specifications, Parts, and Accessories

### Specifications

#### Video

Routing .....	3 x 2 matrix
Gain .....	Unity
Bandwidth .....	300 MHz (-3 dB), fully loaded
	0 – 10 MHz ..... no more than +0.1 dB to -0.1 dB
	0 – 130 MHz ..... no more than +2 dB to -0.1 dB
Crosstalk .....	-55 dB @ 10 MHz, -45 dB @ 30 MHz, -37 dB @ 100 MHz
Switching speed .....	200 ns (max.)

#### Video input

Number/signal type .....	3 RGBHV, RGBS, RGsB, RsGsBs
Connectors .....	(3) 15-pin HD female
Nominal level .....	0.7 Vp-p for RGB
Minimum/maximum levels .....	Analog: -0.5 V to 2.0 Vp-p with no offset at unity gain
Impedance .....	75 ohms
Horizontal frequency .....	15kHz to 145 kHz
Vertical frequency .....	30 Hz to 170 Hz
Return loss .....	<-42 dB @ 5 MHz
DC offset (max. allowable) .....	4.0 V

#### Video output

Number/signal type .....	2 analog RGBHV, RGBS, RGsB
Connectors .....	(1) 15-pin HD female 5 BNC female
Nominal level .....	0.7 Vp-p for RGB
Minimum/maximum levels .....	0.3 V to 2.0 Vp-p
Impedance .....	75 ohms
Return loss .....	<-30 dB @ 5 MHz
DC offset .....	±5 mV maximum with input at 0 offset

#### Sync

Input type .....	RGBHV, RGBS, RGsB, RsGsBs
Output type .....	RGBHV, RGBS, RGsB
Input level .....	TTL 2.5 V to 5.0 Vp-p, 4.0 Vp-p normal
Output level .....	TTL: 4 V to 5 Vp-p, unterminated
Input impedance .....	510 ohms

Output impedance .....	75 ohms
Max input voltage .....	5 Vp-p
Max. propagation delay .....	30 ns
Max. rise/fall time .....	4.2 ns
Polarity .....	Positive or negative (follows input)

#### Audio

Routing .....	3 x 2 stereo matrix
Gain .....	
Output 1 .....	Unbalanced output: 0 dB
Output 2 .....	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response .....	20 Hz to 20 kHz, ±0.05 dB
THD + Noise .....	0.03% @ 1 kHz, 0.3% @ 20 kHz nominal level
S/N .....	>90 dB at maximum output (unweighted)
Crosstalk .....	<-80 dB @ 1 kHz, fully loaded
Stereo channel separation .....	>-90 dB @ 1 kHz
CMRR .....	>-75 dB @ 20 Hz to 20 kHz

#### Audio input

Number/signal type .....	3 stereo, PC level, unbalanced
Connectors .....	(3) 3.5 mm mini stereo jacks
Impedance .....	25k ohms balanced/unbalanced, DC coupled
Nominal level .....	-10 dBV (316 mVrms)
Maximum level .....	+8.5 dBu, (unbalanced) at 1%THD+N

**NOTE**  $0 \text{ dBu} = 0.775 \text{ Vrms}$ ,  $0 \text{ dBV} = 1 \text{ Vrms}$ ,  $0 \text{ dBV} \approx 2 \text{ dBu}$

#### Audio output

Number/signal type .....	2 stereo, balanced/unbalanced
Connectors .....	(1) 3.5 mm mini stereo audio jack (unbalanced) (1) 3.5 mm captive screw connector, 5 pole
Impedance .....	50 ohms unbalanced, 100 ohms balanced
Gain error .....	±0.1 dB channel to channel
Maximum level (Hi-Z) .....	Program audio: >+21 dBu, balanced or unbalanced at 1% THD+N
Maximum level (600 ohm) .....	Program audio: >+14 dBm, balanced or unbalanced at 1% THD+N

## Specifications, Parts, and Accessories, cont'd

### Control/remote — switcher

Serial control port .....	RS-232, 9-pin female D connector
Baud rate and protocol .....	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configurations	2 = TX, 3 = RX, 5 = GND
Contact closure .....	9-pin female D connector (also used as the serial control port)
Contact closure pin configurations	Output 1: 1 = input 1, 4 = input 2, 6 = input 3, 5 = GND Output 2: 7 = input 1, 8 = input 2, 9 = input 3, 5 = GND
Program control .....	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™)

### General

External power supply .....	100 VAC to 240 VAC, 50/60 Hz, external, autoswitchable; to 12 VDC, 1 A, regulated
Power input requirements .....	12 VDC, 0.7 A
Temperature/humidity .....	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Rack mount .....	Yes, with optional 1U rack shelf, part #60-190-01 or 60-604-01; or VersaTools® rack shelf, part #60-190-20 or 60-604-20. Also furniture mountable with optional under-desk mounting kit #70-212-01.
Enclosure type .....	Metal
Enclosure dimensions .....	1.75" H x 8.75" W x 3.0" D (1U high, half rack wide) 4.4 cm H x 22.2 cm W x 7.6 cm D (Depth excludes connectors.)
Product weight .....	2.5 lbs (1.1 kg)
Shipping weight .....	5 lbs (2.3 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.

### Included Parts

These items are included in each order for an MMX 32 VGA A:

Included parts	Replacement part number
MMX 32 VGA A	60-565-01
12 VDC, 1.0 A external power supply	70-055-01
3.5 mm, 5-pole captive screw connector (1)	10-319-10
3.5 mm, 2-pole captive screw connector (1)	10-319-05
Universal Switcher Control Program	29-031-01
Tweaker (small screwdriver)	
MMX 32 VGA A User's Manual	

### Optional Accessories

These items can be ordered separately:

Accessories	Part number
19" 1U Universal Rack Shelf	60-190-01
19" 1U Basic Rack Shelf	60-604-01
6" deep 1U rack shelf	60-190-10
6" deep basic 1U rack shelf	60-604-10
VersaTools universal rack shelf	60-190-20
VersaTools basic rack shelf	60-604-20
Under-desk mounting kit (1U Versa Tools)	70-212-01
MMX 32 AAP panel (gray, black, white)	70-277-01, -11, -21
MMX 32 MAAP (black, white)	70-277-12, -22
P/S 123 Multiple output 12 V power supply	60-814-01