

User's Manual



CrossPoint 450 Plus Series

MAV Plus series

Large Scale Matrix Switchers

Precautions

Safety Instructions • English



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



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

Caution

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

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

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

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

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.

Conservier 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.

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 de 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 Erdanschluß, 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 cable 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。不要使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。

Quick Start — CrossPoint 450 Plus and MAV Plus Switchers

Installation of multiple BME system

Rack mount the switcher BMEs.

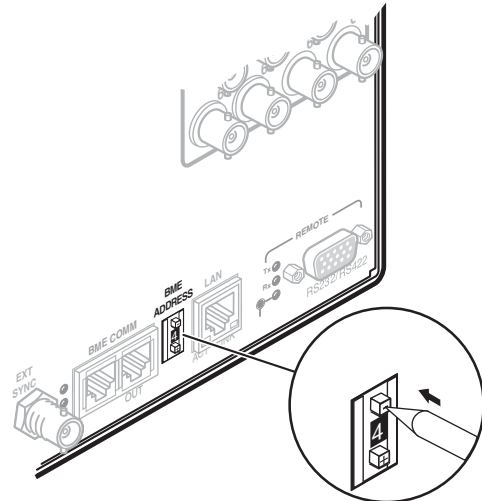
Step 1 — Numbering the BMEs

Each BME must be set to a unique address of 0 through 5.

BME address switch — To set the BME address, press the + and - buttons on the BME Address switch on the rear panel of the switcher BMEs, as shown at right.

NOTE Addresses 6 through 9 are invalid. The addresses used in the system must be sequential with no skipped numbers. Sync BMEs cannot be set to address 0

NOTE BME 0 is the controlling unit. All control communications and front panel operations should be made through BME 0 only.



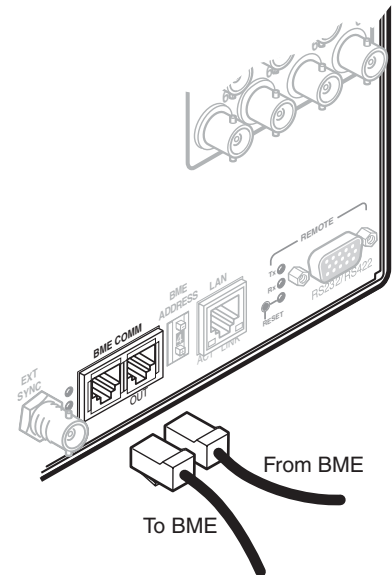
Step 2 — Daisy chaining the BMEs

If the matrix switcher system consists of more than one BME, the BMEs must be connected together in a daisy chain using Extron-supplied RJ-45 cables.

BME COMM interconnect ports — Connect the first daisy chain from BME 0's BME Comm Out connector to the nearest BME's BME Comm In connector as shown at right. In a rack whose BMEs are arranged so that their physical location matches the BME address numbering, this would be BME 1. But since not all systems are configured alike, call this module BME *n*.

Connect the next RJ-45 cable from BME *n*'s BME Comm Out connector to the nearest unconnected BME's (BME *n*+1's) BME Comm In connector.

Continue connecting RJ-45 cables from each daisy-chained module's BME Comm Out connector to the next module's BME Comm In connector until all modules are included in the chain. When all of the BMEs are connected, each of the BMEs in the system is connected to at least one other BME via the BME Comm connectors.



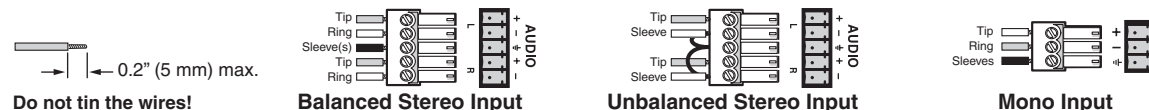
I/O Connections

Step 3 — Inputs

a. **Video and sync BMEs** — Connect a single plane of video or sync, as appropriate to the BME, to the BNC connectors on the video and sync BMEs for each input.

NOTE Each BME supports *one* video or sync plane only. See figure 1-1 in chapter 1 for an example configuration.

b. **Audio BME** — Connect balanced or unbalanced stereo or mono audio inputs, as appropriate to the BME type, to the 5-pole (stereo) or 3-pole (mono) captive screw connectors.



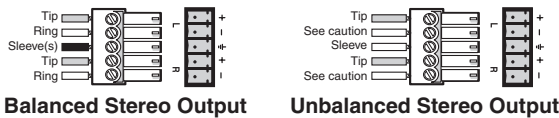
Quick Start — CrossPoint 450 Plus and MAV Plus Switchers, cont'd

Step 4 — Outputs

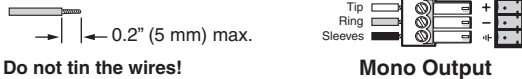
- a. **Video and sync BMEs** — Connect a single plane of video or sync, as appropriate to the BME, to the BNC connectors on the video and sync BMEs for each output.

NOTE Each BME supports **one** video or sync plane only. See figure 1-1 in chapter 1 for an example configuration.

- b. **Audio BME** — Connect balanced or unbalanced stereo audio or mono audio devices, as appropriate to the BME type, to the captive screw connectors.



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



Step 4 — RS-232/RS-422

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

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

Step 5 — Ethernet

If desired, connect a network WAN or LAN hub, a control system, or computer to the Ethernet RJ-45 port. See chapter 2, *Installation*, for details.

- **Network connection** — Wire as a patch (straight) cable.
- **Computer or control system connection** — Wire the interface cable as a crossover cable.

Step 6 — Power

Plug the switcher into a grounded AC source.

Front Panel Controls

Input and output buttons select inputs and outputs. Output buttons light **amber** to indicate video and audio ties. The buttons light **green** to indicate video-only ties. The buttons light **red** to indicate audio-only ties. Input and output buttons also select presets.

The output buttons also display the selected input's audio level.

The input buttons also display the selected output's volume level.

Enter button saves changes.

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

View button selects a view-only mode that prevents inadvertent configuration changes. In systems with audio BMEs, View decrements the level and volume.

Esc button cancels selections in progress and resets the front panel button indications. The Esc button does **not** reset: the current configuration, the RGBHV and audio selection, any presets, or any audio level or volume settings. In systems with audio BMEs, Esc increments the level and volume.

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

Create a tie

1. Press and release the RGBHV and/or Audio I/O button(s) to select or deselect video and/or audio as desired. **Green = selected. Red = selected. Off = deselected. Off = deselected.**
2. Press and release the desired input button. The button lights to indicate the selection.
3. Press and release the desired output button(s).

Amber indicates RGBHV/video and audio tie.
Green indicates RGBHV/video only tie.
Red indicates audio only tie.



Green indicates the need to confirm the change.

4. Press and release the Enter button.

Table of Contents

Chapter One • Introduction	1-1
About this Manual	1-2
About the Matrix Switchers	1-2
Definitions	1-5
Features	1-5
Chapter Two • Installation	2-1
Mounting the Switcher	2-2
Rear Panel Views	2-2
Video or sync input and output (systems with video and sync BMEs)	2-3
Sync termination switches (systems with sync BMEs)	2-4
Audio input and output (systems with audio BMEs).....	2-4
BME connection and selection	2-6
RS-232/RS-422	2-8
Ethernet.....	2-8
Cabling and RJ-45 connector wiring	2-9
Reset button	2-10
External sync (systems with MAV Plus Video BMEs)	2-10
Power	2-11
Front Panel Configuration Port	2-12
Chapter Three • Operation	3-1
Front Panel Controls and Indicators	3-2
Definitions.....	3-3
Input and output buttons.....	3-3
Control buttons.....	3-4
I/O controls.....	3-7
Power indicators.....	3-8
Button icons.....	3-8
QS-FPC Front Panel Operations	3-9
Power	3-9
Creating a configuration	3-9
Example 1: Creating a set of video and audio ties.....	3-10
Example 2: Adding a tie to a set of video and audio ties.....	3-12
Example 3: Removing a tie from a set of video and audio ties.....	3-14
Viewing a configuration	3-16
Example 4: Viewing video and audio, audio only, and video only ties.....	3-17
I/O grouping.....	3-20
Example 5: Grouping inputs and outputs.....	3-22
Setting RGB delay (systems with wideband BMEs)	3-24
Example 6: Setting the RGB delay for an output	3-24
Using presets.....	3-26
Example 7: Saving a preset	3-26
Example 8: Recalling a preset	3-28

Table of Contents, cont'd

Muting and unmuting video and/or audio outputs	3-29
Example 9: Muting and unmuting an output.....	3-30
Viewing and adjusting the input audio level (systems with audio BMEs).....	3-32
Example 10: Viewing and adjusting an input audio level	3-33
Viewing and adjusting the output volume (systems with audio BMEs)	3-35
Reading the displayed volume	3-36
Example 11: Viewing and adjusting an output volume level.....	3-38
Locking out the front panel (Executive mode)	3-40
Performing a system reset from the front panel.....	3-40
Background illumination	3-41
Selecting the rear panel Remote port protocol and baud rate	3-42
Rear Panel Controls	3-43
Performing soft system resets	3-43
Performing a hard reset.....	3-45
Optimizing the Audio (Systems with Audio BMEs)	3-45
Troubleshooting	3-46
General checks.....	3-46
Plasma display S-video problem (CrossPoint 450 Plus wideband BMEs only)	3-46
Configuration Worksheets	3-46
Worksheet example 1: System equipment.....	3-46
Worksheet example 2: Daily configuration.....	3-48
Worksheet example 3: Test configuration	3-50
Blank configuration worksheet	3-51
Chapter Four • SIS Programming and Control	4-1
RS-232 and RS-422 Links	4-2
Rear panel Remote port.....	4-2
Front panel Configuration port	4-3
Ethernet Link	4-4
Ethernet connection	4-4
Host-to-Switcher Instructions	4-5
Switcher-Initiated Messages	4-5
Switcher Error Responses	4-6
Using the Command/Response Tables	4-6
Symbol definitions	4-7
Command/response table for SIS commands.....	4-8
Command/response table for IP SIS commands.....	4-19
Symbol definitions.....	4-19
Special Characters	4-22

Chapter Five • Matrix Software	5-1
Matrix Switchers Control Program	5-2
Installing the software	5-2
Software operation via Ethernet	5-2
Ethernet protocol settings	5-3
Using the software	5-3
IP Settings/Options window	5-7
Matrix IP Address field	5-8
Extron Name/Descriptor field	5-8
Gateway IP address field	5-9
Subnet Mask field	5-9
Hardware Address field	5-9
Use DHCP checkbox	5-9
Date field	5-9
Time (local) field	5-10
Sync Time to PC button	5-10
GMT (offset) field	5-10
Use Daylight Savings checkbox	5-10
Administrator Password field	5-11
User Password field	5-11
Mail Server IP Address field	5-12
Mail Server Domain Name field	5-12
E-mail Addressee fields	5-13
Update firmware	5-14
Upload HTML files	5-15
Windows buttons, drop boxes, and trash	5-16
Windows menus	5-16
File menu	5-16
Tools menu	5-17
Preferences menu	5-18
Master-Reset selection	5-19
Using emulation mode	5-20
Using the help system	5-20
Special Characters	5-20
Button-Label Generator	5-20

Table of Contents, cont'd

Chapter 6 • HTML Operation	6-1
Download the Startup Page	6-2
System Status Page	6-3
DSVP page (systems with a sync BME only).....	6-4
System Configuration Page	6-5
IP Settings fields	6-6
Unit Name field	6-6
DHCP radio buttons.....	6-6
IP Address field	6-6
Gateway IP Address field	6-6
Subnet Mask field.....	6-6
MAC Address field	6-6
Date/Time Settings fields	6-7
Passwords page	6-8
Email Settings page	6-9
Mail IP Address field.....	6-9
Domain Name field	6-9
Email address fields	6-10
Firmware Upgrade page	6-10
File Management Page	6-12
Set and View Ties Page	6-13
Create a tie.....	6-14
RGBHV and Audio Settings page.....	6-14
Change the input gain and attenuation (systems with audio BMEs).....	6-15
Mute and unmute one or all outputs	6-16
Change the RGB delay (systems with CrossPoint 450 Plus sync BMEs)	6-17
Change the output volume level (systems with audio BMEs).....	6-18
Global Presets page	6-20
Save a preset.....	6-20
Recall a preset.....	6-20
Special Characters	6-21

Appendix A • Ethernet Connection	A-1
Ethernet Link	A-2
Ethernet connection	A-2
Default address	A-2
Pinging to determine Extron IP address.....	A-3
Pinging to determine Web IP address.....	A-3
Connecting as a Telnet client	A-4
Telnet tips.....	A-4
Open	A-4
Escape character and Esc key	A-5
Local echo.....	A-5
Set carriage return-line feed.....	A-5
Close	A-5
Help	A-5
Quit.....	A-5
Subnetting — A Primer	A-6
Gateways.....	A-6
Local and remote devices.....	A-6
IP addresses and octets.....	A-6
Subnet masks and octets.....	A-6
Determining whether devices are on the same subnet	A-7
Appendix B • Reference Information	B-1
CrossPoint 450 Plus Specifications	B-2
MAV Plus Specifications	B-4
Part Numbers and Accessories	B-7
CrossPoint 450 Plus system part numbers.....	B-7
MAV Plus system part numbers.....	B-8
BME part numbers	B-9
CrossPoint 450 Plus wideband video BMEs.....	B-10
CrossPoint 450 Plus sync BMEs.....	B-10
MAV Plus video BMEs.....	B-10
MAV Plus stereo audio BMEs	B-11
MAV Plus mono audio BMEs.....	B-11
Included parts	B-11
Replacement parts.....	B-11
Optional accessories	B-12
Cables.....	B-12
Bulk cable.....	B-12
Terminated cable assemblies	B-13
Button Labels	B-14
Installing labels in the matrix switcher’s buttons.....	B-14
Button label blanks.....	B-15

Table of Contents, cont'd

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CrossPoint 450 Plus and MAV Plus Switchers

1 Chapter One

Introduction

About this Manual

About the Matrix Switchers

Definitions

Features

Installation

About this Manual

This manual contains installation, configuration, and operating information for the Extron family of full-function, very large CrossPoint 450 Plus ultra-wideband and MAV Plus 3248 through 6464 video and audio matrix switchers.

About the Matrix Switchers

Matrix switchers distribute any input to any combination of outputs. The matrix switchers can route multiple input/output configurations simultaneously.

The Extron very large CrossPoint 450 Plus and MAV Plus matrix switchers are a family of matrix switcher basic module enclosures (BMEs) that allow you to create a video and/or audio matrix switching system with up to 64 inputs and 64 outputs specifically tailored to meet your requirements. All BMEs are rack mountable. All video and sync BMEs are 6U in height; audio BMEs are 7U in height. This family of matrix switcher BMEs includes the following models:

- **CrossPoint 450 Plus Wideband video switcher BME** — A switcher that routes one video plane (red [R], green [G], and blue [B]) from any input to any one or more outputs. This BME has a video bandwidth of 450 MHz (–3 dB), fully loaded, to support video resolutions of 1600 x 1200 and above.
- **CrossPoint 450 Plus Sync switcher BME** — A switcher that routes one sync plane (horizontal [H], vertical [V], or composite sync [S]) from any input to any one or more outputs..
- **MAV Plus Video switcher BME** — A switcher that routes one plane of low resolution (NTSC/PAL/SECAM) component video (Y, R-Y, or B-Y), S-video (Y or C), and composite video from any input to any one or more outputs. This BME has a video bandwidth of 150 MHz (–3 dB), fully loaded, to support all video resolutions.
- **MAV Plus Stereo Audio switcher BME** — A switcher that routes balanced or unbalanced stereo audio (two audio planes) from any input to any one or more outputs.
- **MAV Plus Mono Audio switcher BME** — A switcher that routes mono audio (one audio plane) from any input to any one or more outputs.

Each BME model is available in the following matrix sizes:

- 3248 (32 inputs by 48 outputs)
- 3264 (32 inputs by 64 outputs)
- 4832 (48 inputs by 32 outputs)
- 4848 (48 inputs by 48 outputs)
- 4864 (48 inputs by 64 outputs)
- 6432 (64 inputs by 32 outputs)
- 6448 (64 inputs by 48 outputs)
- 6464 (64 inputs by 64 outputs)

Some BMEs are equipped with an integrated QuickSwitch-Front Panel Controller (QS-FPC™):

- The CrossPoint 450 Plus Video BME is available **with or without** a QS-FPC.
- The MAV Plus video BME is **always** equipped with a QS-FPC.
- The CrossPoint 450 Plus Sync BME is **not available** with a QS-FPC.
- The MAV Plus audio BME (stereo or mono) is **not available** with a QS-FPC.
- BMEs without a QS-FPC are equipped with a blank front panel.

A wideband (RGBHV or RGBS) video matrix switcher system requires a CrossPoint 450 Plus Wideband BME for each video plane (red, green, and blue) and a CrossPoint 450 Plus Sync BME for each sync plane (H and V [two planes] or composite sync [one plane]). To add audio to the system requires a MAV Plus Stereo or Mono BME (figure 1-1).

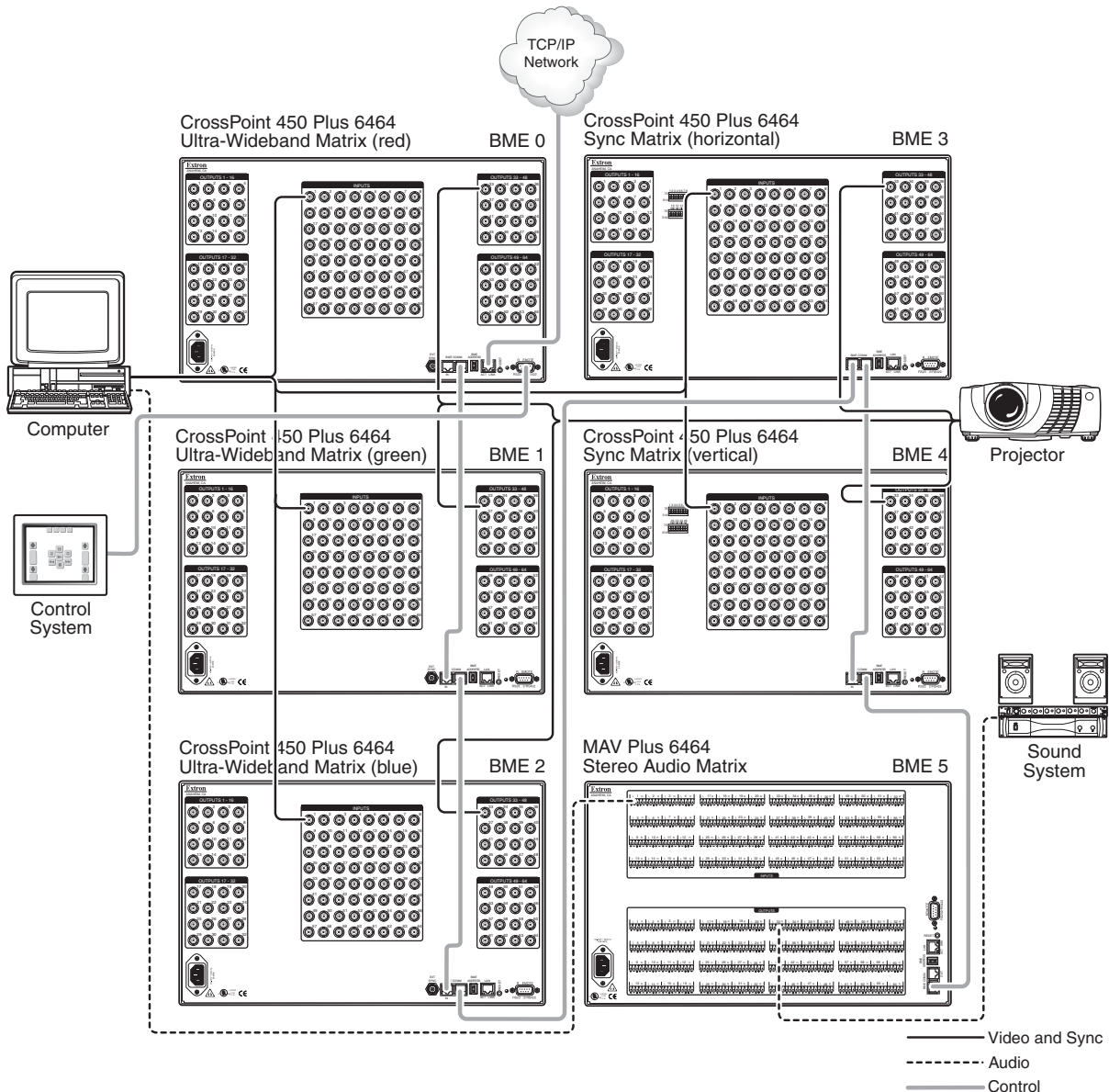


Figure 1-1 — CrossPoint 450 Plus / MAV Plus application

Introduction, cont'd

A low resolution video matrix switcher system requires a MAV Plus Video BME for each video plane (three BMEs for component video, two BMEs for S-video, or one BME for composite video). To add audio to the system requires a MAV Plus Stereo or Mono Audio BME.

NOTE *Multiple QS-FPCs are unnecessary and potentially confusing. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See Locking out the front panel (Executive mode) on page 3-40.*

The matrix switchers are solutions to complex wideband or low resolution video and/or audio routing applications. Each input and output is individually isolated and buffered, and any input(s) can be switched to any one or all outputs with virtually no crosstalk or signal noise between channels.

The audio BMEs input and output audio on 3.5 mm, 5-pole (stereo BME) or 3-pole (mono BME) captive screw terminals.

For matrix switcher systems with video and audio BMEs, the audio switching can either be linked with the video (audio follow) or independent of the video (audio breakaway). Adjustable input audio gain and attenuation compensates for level differences between audio inputs.

The matrix switcher system can be remotely controlled via its local area network (LAN) Ethernet port and/or RS-232/RS-422 port on the rear of the primary BME (BME 0). The matrix switchers are programmed with Extron's Simple Instruction Set™ (SIS™), a set of basic ASCII code commands that provide simple control through a control system or PC without programming long, obscure strings of code. SIS commands can be entered via either the Ethernet link or the RS-232/RS-422 link.

The LAN port can be connected through a LAN or wide area network (WAN).

The switchers feature e-mail notification of maintenance or other concerned personnel concerning the status of the power supplies and the loss or resumption of sync on individual inputs.

The RS-232/RS-422 port can be connected to a control system, a PC, or any of the Extron remote control panels, such as the MKP 2000 or MKP 3000.

The matrix switchers are housed in rack-mountable, metal enclosures with 19" rack ears. Each video and sync BME model is housed in a 6U enclosure. The MAV Plus audio BMEs are housed in a 7U enclosure. The appropriate rack mounting kit is included with each switcher.

Each model has two, primary and redundant, internal 100 VAC to 240 VAC, 50/60 Hz auto switchable power supplies that provide worldwide power compatibility and redundant dependability. The power supply wattages are as follows:

- **195 watts** — All MAV Plus audio BMEs
- **110 watts** — CrossPoint 450 Plus 64-input and 48-input video BMEs and all MAV Plus video BMEs
- **65 watts** — All CrossPoint 450 Plus sync BMEs
- **50 watts** — CrossPoint 450 Plus 32-input BMEs

Definitions

The following terms, which apply to Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection.

Set of ties — An input **typed** to two or more outputs. (An output can never be tied to more than one input.)

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

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

Global memory preset — A **configuration** that has been stored. Up to 64 **global memory presets** can be stored in memory. Preset locations are assigned to the input buttons and (where necessary) output buttons. All presets can be selected from the front panel for either saving or retrieving. When a **preset** is retrieved from memory, it becomes the **current configuration**. All presets are also accessible under RS-232/RS-422 or Ethernet control.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration**. The switchers support up to 10 presets per room.

Features

Video (video BMEs) — All switchers input and output video on BNC connectors.

CrossPoint 450 Plus Wideband Video — These switcher BMEs input and output wideband RGBHV or RGBS video. They can also switch RGsB, RsGsBs, component/HDTV, S-video, or composite video.

MAV Plus Low Resolution Video — These switcher BMEs input and output NTSC 3.58, NTSC 4.43, PAL, or SECAM video or HDTV video inputs. Depending on the video format of the switcher system, these switchers can distribute low resolution RGsB, RsGsGs, component/HDTV, S-video, or composite video.

Bandwidth —

CrossPoint 450 Plus Wideband Video — The wideband switcher BMEs provide a minimum of 450 MHz (-3 dB) video bandwidth, fully loaded.

MAV Plus Low Resolution Video — The low resolution switcher BMEs provide a minimum of 150 MHz (-3 dB) video bandwidth, fully loaded.

Audio inputs (audio BMEs only) —

Stereo audio BME — Input and output balanced or unbalanced stereo audio on 3.5 mm, 5-pole captive screw terminals.

Mono audio BME — Input and output mono audio on 3.5 mm, 3-pole captive screw terminals.

Audio input gain/attenuation (audio BMEs only) — Individual input audio levels can be adjusted so there are no noticeable volume differences between sources. Users can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the Ethernet link, RS-232/RS-422 link, or the front panel.

Introduction, cont'd

Audio output volume (systems with audio BMEs) — The audio volume of each output can be displayed and adjusted through a range of full output to completely silent, from the front panel or under RS-232/RS-422 or Ethernet control.

Digital Sync Validation Processing (DSVP™) (CrossPoint 450 Plus Sync BMEs) — In critical environments or unmanned, remote locations, it may be vital to know that sources are active and switching. Extron's DSVP confirms that input sources are active by scanning all sync inputs for active signals. DSVP provides instantaneous frequency feedback for composite sync or separate horizontal and vertical sync signals via the switcher's RS-232/RS-422 or Ethernet port. The frequency information can be displayed on any control system or in a Windows®-based control program on a local-area network (LAN) or Internet (IP) connection (figure 1-2).

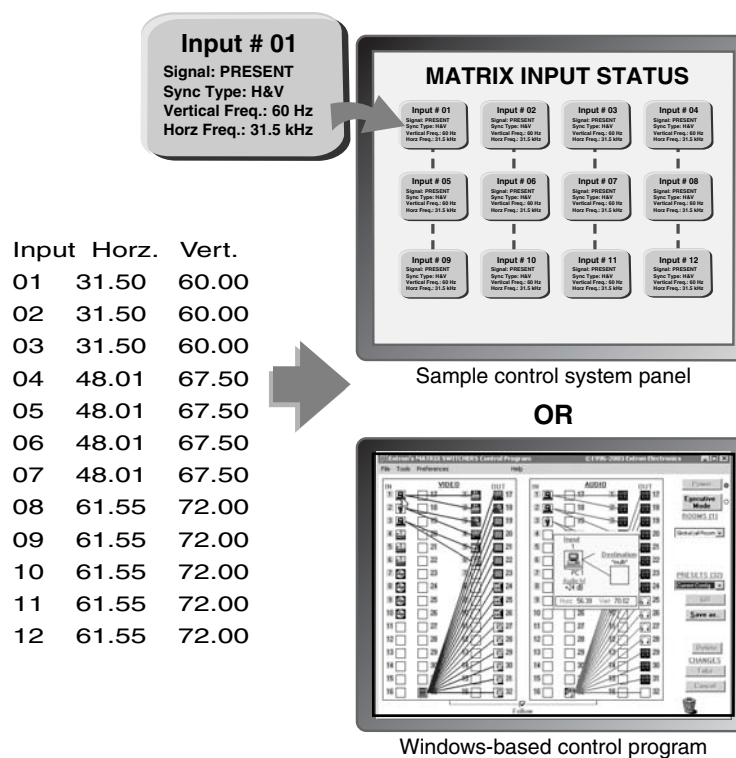


Figure 1-2 — DSVP data display

RGB Delay (CrossPoint 450 Plus Sync BMEs) — A switcher that includes a CrossPoint 450 Plus Sync BME can briefly blank the RGB (video) output while it switches to the new input's sync source, and then switches the RGB signals. This allows a brief delay for the display to adjust to the selected input's sync timing before displaying the new picture, which will appear without glitches. RGB delay, also known as Triple-Action Switching™ or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

Rooming — Each switcher can be programmed to group multiple outputs to specific "rooms", allowing them to have their own presets.

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

- **Tie any input to any or all outputs**
- **Quick multiple tie** — Multiple inputs can be switched to multiple outputs simultaneously. This allows all displays (outputs) to change from source to source at the same time.
- **Audio follow** — Audio can be switched with its corresponding video input via front panel control or under Ethernet or RS-232/RS-422 remote control.
- **Audio breakaway** — Audio can be broken away from its corresponding video signal. This feature allows any audio signal to be selected with any video signal simultaneously to one or all outputs in any combination. Audio breakaway switching can be done via front panel control or under Ethernet or RS-232/RS-422 remote control.

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

- **QuickSwitch-Front Panel Controller (QS-FPC)** — The optional front panel controller supports input and output selection, I/O grouping, preset creation and selection, RGB delay, and audio gain and attenuation, and volume control (systems with audio BMEs). The front panel features illuminated pushbuttons that can be labeled with text or graphics.

NOTE *The front panel controller is standard, not optional, on MAV Plus video BMEs. In systems with multiple BMEs, all are operational, but there may be a delay in reporting configuration. To prevent confusion, Extron recommend locking the front panels of all BMEs with the exception of BME 0.*

A front panel controller cannot be installed on a sync or audio BME. See Locking out the front panel (Executive mode) on page 3-40.

- **Windows-based control program** — For RS-232/RS-422 remote control from a PC, the Extron Windows-based control software provides a graphical interface and drag-and-drop/point-and-click operation. The Windows-based control program also has an emulation mode that lets you create a switcher configuration file at the home office and then download it for use by the switcher on site.
- **Simple Instruction Set (SIS™)** — The remote control protocol uses Extron's SIS for easy programming and operation.
- **Remote control panels and keypads** — The matrix switchers are remote controllable, using the optional MKP 2000 and MKP 3000 remote control panels. The remote control devices are easy to use and provide tactile buttons for quick selection. Each MKP can be used for input-to-output switching, one-touch switching for a particular output. The MKP 3000 also can be used for selection of global presets.

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

Introduction, cont'd

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

Global memory presets — 64 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.

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

Front panel security lockout (*Executive mode*) — If a matrix switcher BME with a QS-FPC 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 or SIS command is required to unlock the front panel controller before it can be operated.

I/O grouping — Allows the matrix to be virtually divided into smaller sub-switchers, making installation and control easier. I/O grouping allows specific inputs and outputs, such as those designated for a specific purpose, to be grouped together. I/O grouping limits the selection of inputs and outputs to members of the same group.

Primary and redundant power supplies — Includes two internal 100 VAC to 240 VAC, 50/60 Hz, auto-switchable power supplies, which provide worldwide power compatibility.

The power supply circuitry is configured to automatically switch over from the primary supply to the hot redundant supply in the case of a failure.

The hot redundant power supply means high reliability for the system and no loss of functionality should the primary supply fail; the redundant power supply immediately assumes the load.

Power supply status LEDs — Front panel LEDs indicate the status of the primary and redundant power supplies.



CrossPoint 450 Plus and MAV Plus Switchers

2 Chapter Two

Installation

Mounting the Switcher

Rear Panel Views

Front Panel Configuration Port

Installation

Mounting the Switcher

The matrix switcher BMEs are housed in rack-mountable, 6U (sync and video BMEs) or 7U (audio BMEs) high metal enclosures with 19" rack ears. If desired, rack mount the switcher BME as follows:

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

Rear Panel Views

All connectors for all switcher BMEs are on the rear panel. Figure 2-1 shows a CrossPoint 450 Plus 6464 Sync BME, which has a feature set similar to all of the features of all of the video and sync switcher BMEs with the following exceptions:

- The Sync Termination DIP switches (③) are found on the sync BME *only*.
- The External Sync BNC connection (⑪) is found on the MAV Plus and CrossPoint 450 Plus video BMEs *only*.

Figure 2-2 shows a MAV Plus 6464 Stereo Audio BME.

CAUTION Use electrostatic discharge precautions (be electrically grounded) when making connections. Electrostatic discharge (ESD) can damage equipment, even if you cannot feel, see, or hear it.

CAUTION Remove system power before making all connections.

NOTE The 3248, 3264, 4832, 4848, 4864, 6432, 6448 matrix sizes are housed in the same enclosure, but have fewer input and output connectors to accommodate their smaller matrix sizes.

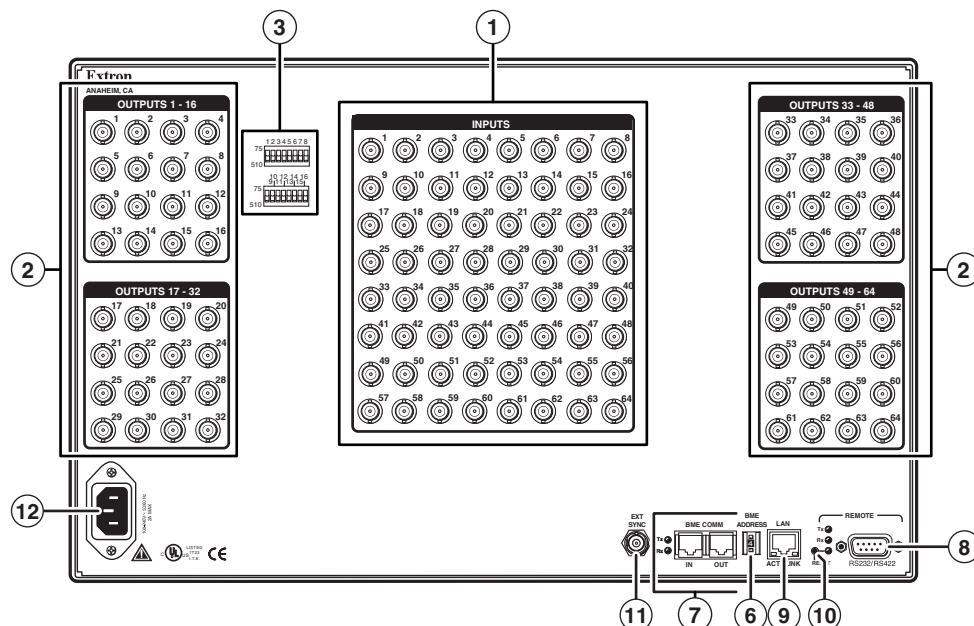


Figure 2-1 — CrossPoint 450 Plus / MAV Plus 6464 sync or video matrix switcher BME

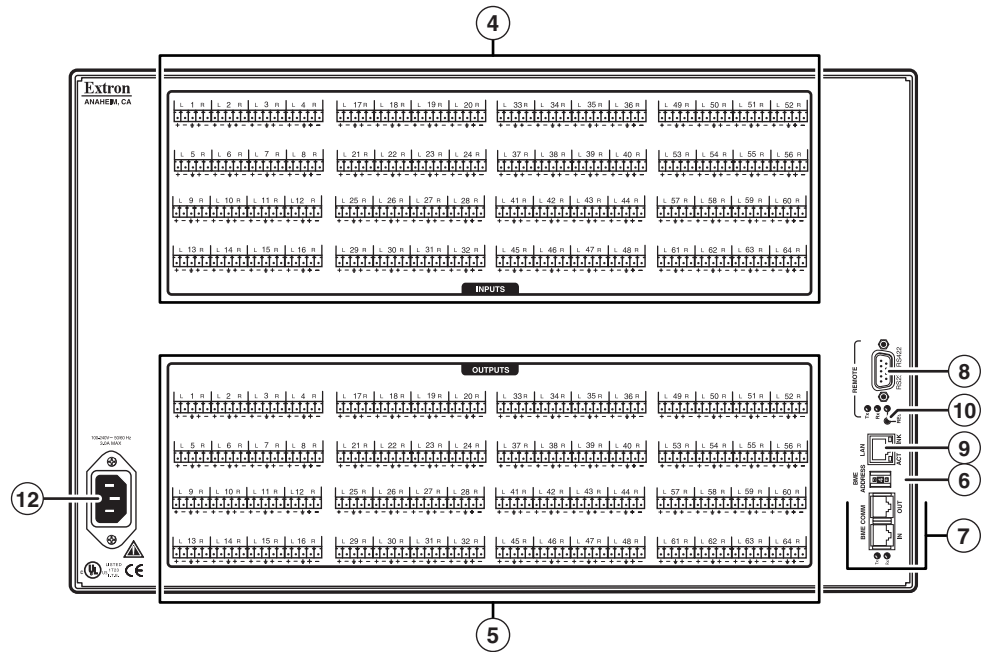


Figure 2-2 — MAV Plus 6464 Stereo Audio BME

Video or sync input and output (video and sync BMEs)

NOTE The switchers do not alter the input video or sync signal in any way. The signal output by the BME is in the same format as the input.

The switcher can connect to up to as many as 64 video sources, depending on the model. The switcher can output to as many as 64 video devices, depending on the model.

NOTE Each video plane (such as red, green, or blue) or sync plane (such as horizontal sync and vertical sync) requires its own BME of the appropriate type:

Red, green, and blue video planes — Connect these planes to **CrossPoint 450 Plus Wideband video BMEs**.

Horizontal sync, vertical sync, and composite sync — Connect these planes to **CrossPoint 450 Plus Sync BMEs**.

Y, R-Y, B-Y [component video], Y, C [S-video], or video [composite video] — Connect these planes to **MAV Plus Low Resolution video BMEs**.

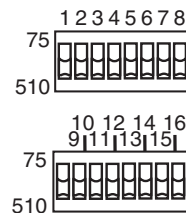
- ① **Video or sync inputs** — Connect a single plane of video or sync, as appropriate to the BME type, to these BNC connectors for each input.
- ② **Video or sync outputs** — Connect a single plane of video or sync, as appropriate to the BME type to these BNC connectors for each output.

Installation, cont'd

Sync termination switches (systems with sync BMEs)

- ③ **Sync termination switches** — The CrossPoint 450 Plus Sync matrix switcher BMEs have sync termination switches on the rear panel for inputs 1 through 16. The switches provide a way to condition non-TTL sync levels greater than 5 V_{p-p}, enabling the sync to be properly passed from input to selected output(s).

Each switch provides the option of selecting either 510 ohms or 75 ohms. The 75 ohms position is required only for an input with non-TTL sync, greater than 5 V_{p-p}. The normal position is 510 ohms.



NOTE An input that produces an out of sync display, a display that is rolling vertically and/or tearing horizontally, could indicate a non-TTL sync input. A device that is known to output non-TTL sync levels (greater than 5V p-p) should be connected to one of the inputs with sync termination switches, and the switches for that input should be set to the 75 ohm position. If you are not sure, check the specifications in the user's manual for the input device.

Audio input and output (systems with audio BMEs)

NOTE Figure 2-2 shows a MAV Plus 6464 Stereo audio BME. The mono audio BME looks similar, but with 3-pole captive screw connectors rather than the 5-pole connectors shown.

By default, the audio ties follow the video ties. Audio breakaway, which can be activated via the optional front panel or under Ethernet or RS-232/RS-422 control, allows you to select from any one of the audio input sources and route it separately from its corresponding video source. See chapter 3, *Operation*, chapter 4, *SIS Programming and Control*, chapter 5, *Matrix Software*, and chapter 6, *HTML Operation* for details.

- ④ **Connections for balanced and unbalanced audio inputs** — Each input has a 3.5 mm, 5-pole (stereo audio BME) or 3-pole (mono audio BME) captive screw connector for balanced or unbalanced stereo or mono (depending on the BME) audio input. Connectors are included with each switcher, but you must supply the audio cable.

See figure 2-3 to wire a connector on a stereo audio BME for the appropriate input type and impedance level.

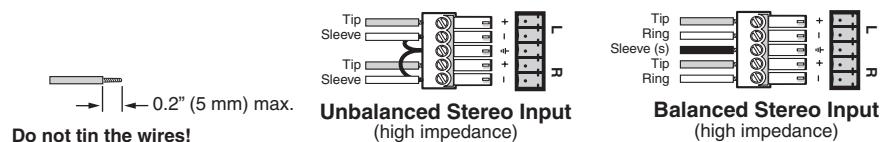


Figure 2-3 — Captive screw connector wiring for stereo audio inputs

CAUTION On stereo audio BMEs, the captive screw audio connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio circuits. Ensure that the connector is plugged fully and only into the desired input or output.

See figure 2-4 to wire a connector on a mono audio BME.

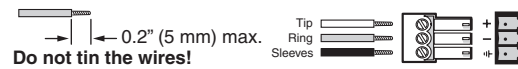


Figure 2-4 — Captive screw connector wiring for mono audio inputs

NOTE The length of exposed wires is critical. The ideal length is 0.2" (5 mm).

- If the stripped section of wire is longer than 0.2", the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 0.2", wires can be easily pulled out even if tightly fastened by the captive screws.

NOTE See figure 2-5 to identify the tip, ring, and sleeve when you are making connections for the switcher from existing audio cables. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. The ring, tip, and sleeve wires are also shown on the captive screw audio connector diagrams, figure 2-3, figure 2-4, figure 2-6, and figure 2-7.

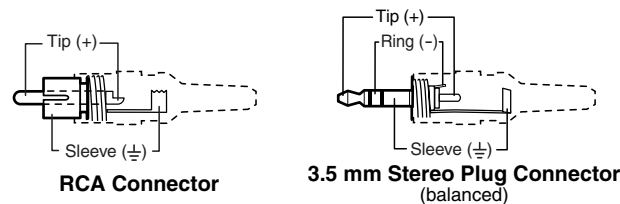


Figure 2-5 — Typical audio connectors

The audio level for each input can be individually set via the front panel or Ethernet or RS-232/RS-422 control to ensure that the level on the output does not vary from input to input. See chapter 3, *Operation*, chapter 4, *SIS Programming and Control*, chapter 5, *Matrix Software*, and chapter 6, *HTML Operation* for details.

- ⑤ **Connections for balanced and unbalanced audio outputs** — These 3.5 mm, 5-pole (stereo audio BMEs) or 3-pole (mono audio BMEs) captive screw connectors output the selected unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers.

See figure 2-6 to properly wire an output connector for the stereo audio BME.

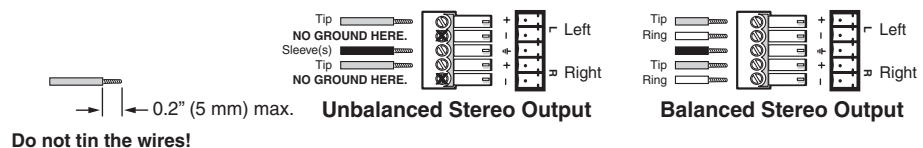


Figure 2-6 — Captive screw connector wiring for stereo audio output

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

Installation, cont'd

See figure 2-7 to properly wire an output connector for the mono audio BME.

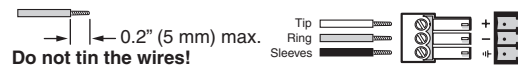


Figure 2-7 — Captive screw connector wiring for mono audio output

NOTE The length of exposed wires is critical. The ideal length is 0.2" (5 mm).

- If the stripped section of wire is longer than 0.2", the exposed wires may touch, causing a short circuit between them.
- If the stripped section of wire is shorter than 0.2", wires can be easily pulled out even if tightly fastened by the captive screws.

The volume level for each output can be individually set via the front panel or Ether net or RS-232/RS-422 control. See chapter 3, *Operation*, chapter 4, *SIS Programming and Control*, chapter 5, *Matrix Software*, and chapter 6, *HTML Operation* for details.

BME connection and selection

NOTE BME 0 should house the front panel controller and be the BME used for system control and monitoring via the serial ports and Ethernet LAN link.

- ⑥ **BME address switch** — Each BME must be set to a unique address of 0 through 5.

Addresses 6 through 9 are invalid.

The addresses used in the system must be sequential with no skipped numbers.

Sync BMEs cannot be set to address 0.

To set the BME address, press the + and - buttons on the BME Address switch on the rear panel of the switcher (figure 2-8).

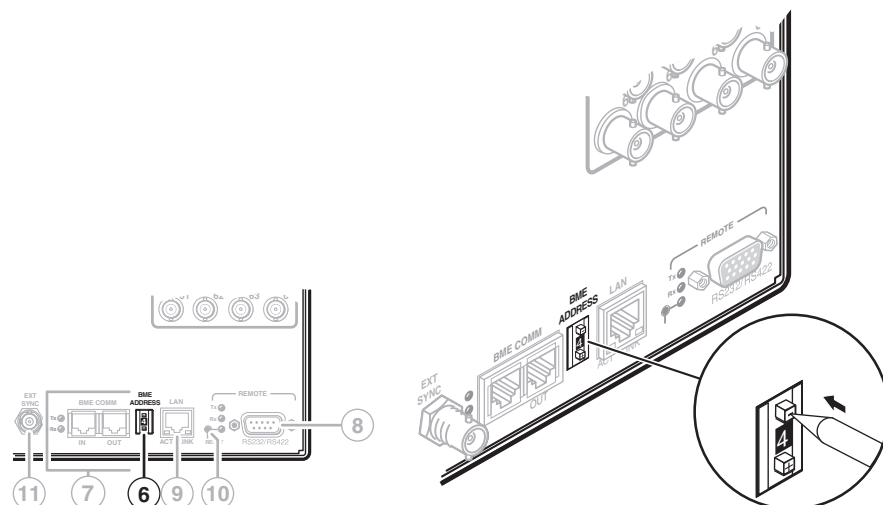


Figure 2-8 — Setting a BME address (video BME shown)

- ⑦ **BME COMM interconnect ports** — If the matrix switcher system consists of more than one BME, the BMEs must be connected together in a daisy chain using Extron-supplied RJ-45 cables.

Connect the first daisy chain from BME 0's BME Comm Out connector to the nearest BME's BME Comm In connector (figure 2-9). In a rack where BMEs are arranged so that their physical location matches the BME address numbering, this would be BME 1. But since not all systems are configured alike, call this module BME *n*.

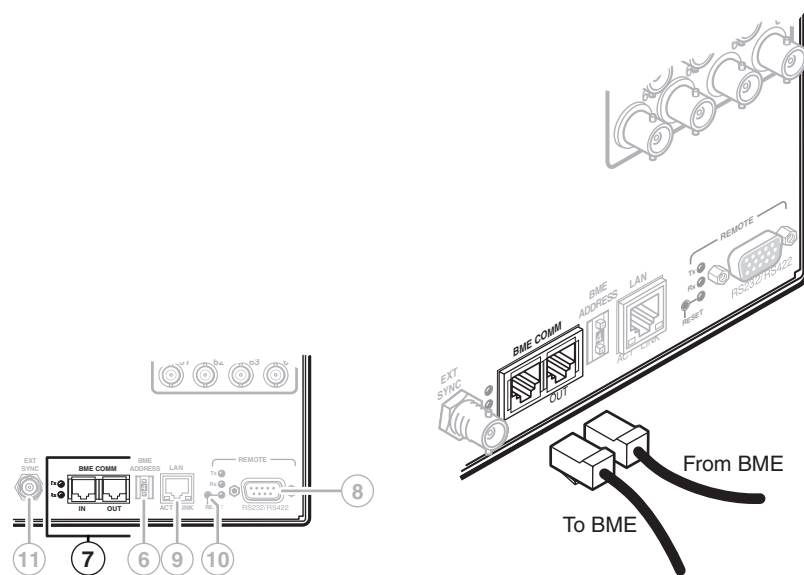


Figure 2-9 — Daisy-chaining BMEs (video BME shown)

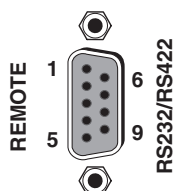
Connect the next RJ-45 cable from BME *n*'s BME Comm Out connector to the nearest unconnected BME's (BME *n*+1's) BME Comm In connector.

Continue connecting RJ-45 cables from each daisy-chained module's BME Comm Out connector to the next module's BME Comm In connector until all modules are included in the chain. When all of the BMEs are connected, each of the BMEs in the system is connected to at least one other BME via the BME Comm connectors.

Installation, cont'd

RS-232/RS-422

- ⑧ **RS-232/RS-422 connector** — Connect a host device, such as a computer, touch panel control, or RS-232 capable PDA to the switcher via this 9-pin D connector **on BME 0 only** for serial RS-232/RS-422 control (figure 2-10).



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

Figure 2-10 — RS-232/RS-422 connector

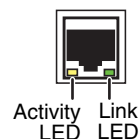
See chapter 4, *SIS Programming and Control*, for definitions of the SIS commands (serial commands to control the switcher via this connector) and chapter 5, *Matrix Software* for details on how to install and use the control software.

NOTE *The switcher can support either the RS-232 or RS-422 serial communication protocol, and operate at 9600, 19200, 38400, or 115200 baud rates. See Selecting the rear panel Remote port protocol and baud rate in chapter 3, Operation, to configure the RS-232/RS-422 port from the front panel.*

If desired, connect an MKP 2000 or MKP 3000 remote control panel to the switcher's RS-232/RS-422 connector. Refer to the *MKP 2000 Remote Control Panel User's Manual* or the *MKP 3000 Remote Control Panel User's Manual* for details.

Ethernet

- ⑨ **Ethernet port** — If desired, for IP control of the system, connect the matrix switcher to a PC or to an Ethernet LAN, via this RJ-45 connector **on BME 0 only**. You can use a PC to control the networked switcher with SIS commands from anywhere in the world. You can also control the switcher from a PC that is either running Extron's windows-based control program or that has downloaded HTML pages from the switcher.



Ethernet connection indicators — The Link and Act LEDs indicate the status of the Ethernet connection. The Link LED indicates that the switcher is properly connected to an Ethernet LAN. This LED should light steadily. The Act LED indicates transmission of data packets on the RJ-45 connector. This LED should flicker as the switcher communicates.

Cabling and RJ-45 connector wiring

It is vital that your Ethernet cables be the correct cables, and that they be properly terminated with the correct pinout. Fast Ethernet links use Category (CAT) 5e or CAT 6, unshielded twisted pair (UTP) or shielded twisted pair (STP) cables, terminated with RJ-45 connectors. Ethernet cables are limited to a length 328' (100 m).

NOTE Do not use standard telephone cables. Telephone cables will not support Ethernet or Fast Ethernet.

Do not stretch or bend cables. Transmission errors can occur.

The cable used depends on your network speed. The switcher supports both 10 Mbps (10Base-T — Ethernet) and 100 Mbps (100Base-T — Fast Ethernet), half-duplex and full-duplex, Ethernet connections.

- 10Base-T Ethernet requires CAT 3 UTP or STP cable at minimum.
- 100Base-T Fast Ethernet requires CAT 5e UTP or STP cable at minimum.

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 2-11).

- **Crossover cable** — Direct connection between the computer and the matrix switcher BME 0.
- **Patch (straight) cable** — Connection of the matrix switcher BME 0 to an Ethernet LAN.

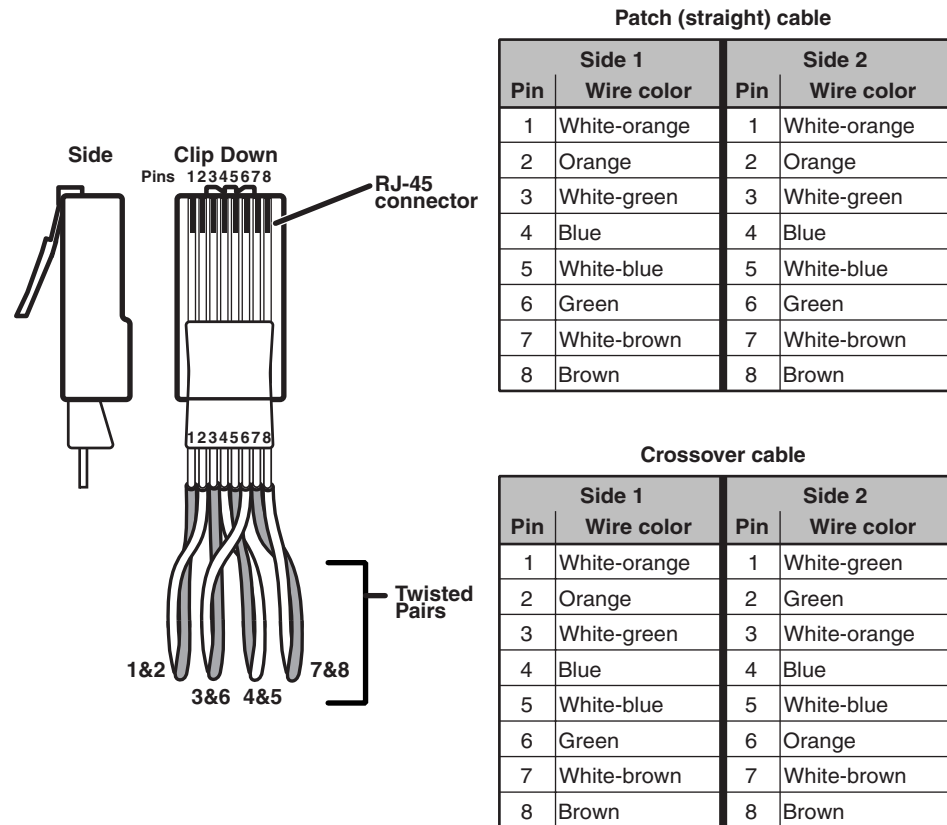


Figure 2-11 — RJ-45 connector and pinout tables

Reset button

- ⑩ **Reset button** — The Reset button initiates four levels of reset to the matrix switcher. Press and hold the button while the switcher is running or while you power up the switcher for different reset levels.



See *Performing soft system resets* in chapter 3, *Operation*, for details.

- **Events (mode 3) reset** — Hold Reset for 3 seconds then release and push again to toggle events monitoring on and off.
- **IP settings (mode 4) reset** — Hold Reset for 6 seconds then release and push again to reset the switcher's IP functions.

NOTE *IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset** — Hold Reset for 9 seconds then release and push again to restore the switcher to the default factory settings.
- **Hard reset** — Hold Reset while powering up the switcher to restore the switcher to the default base firmware, user settings, and files.

NOTE *Hard reset does not clear the current configuration.*

External sync (systems with MAV Plus Video BMEs)

The MAV Plus Video switcher BME switches between inputs during the vertical interval period, resulting in glitch-free video switching. The MAV switcher can use an external signal to synchronize switching during the vertical interval. Without the external sync locking feature, switching between inputs can result in a brief rolling (sync loss) or a brief change in the picture size.

- ⑪ **Ext(ernal) Sync connector** — Connect an external sync signal to this BNC connection on BNC 0 for genlocking the video signal in broadcast or other sync-critical applications.

NOTE *In systems with multiple low resolution video BMEs (such as component video and S-video systems), only the External Sync connector on the luminance (Y) video plane's BME needs to be connected to the black burst generator. This BME should be BME 0*

Figure 2-12 shows a basic external sync configuration. The Ext Sync connector receives the timing signal. A tee connector on the connector allows the signal to be passed on to another video device, if required. Terminate the tee connector if desired.

Figure 2-13 shows another configuration, in which the timing source passes through three video cameras and a video scan converter before connecting to the switcher. This type of video camera can synchronize with the external timing source for video editing applications.

If no external sync timing source is connected to the switcher, switching occurs immediately.

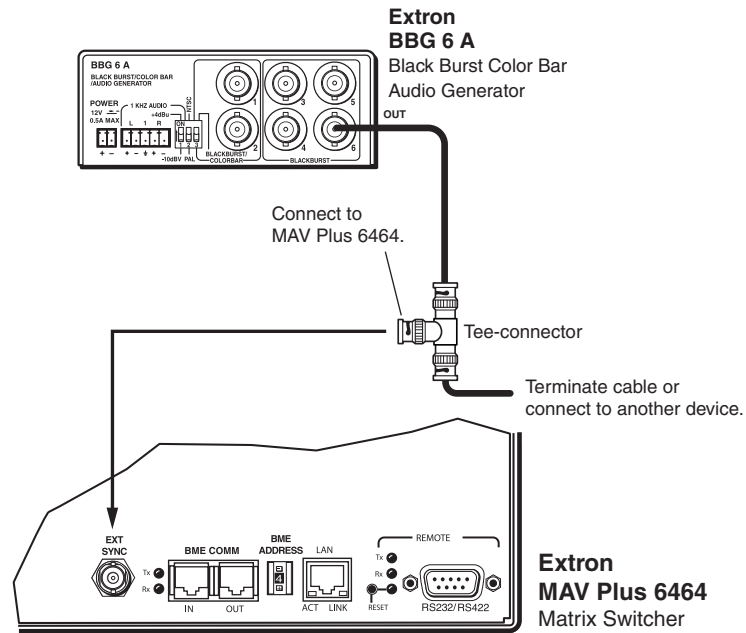


Figure 2-12 — Simple external sync connection example

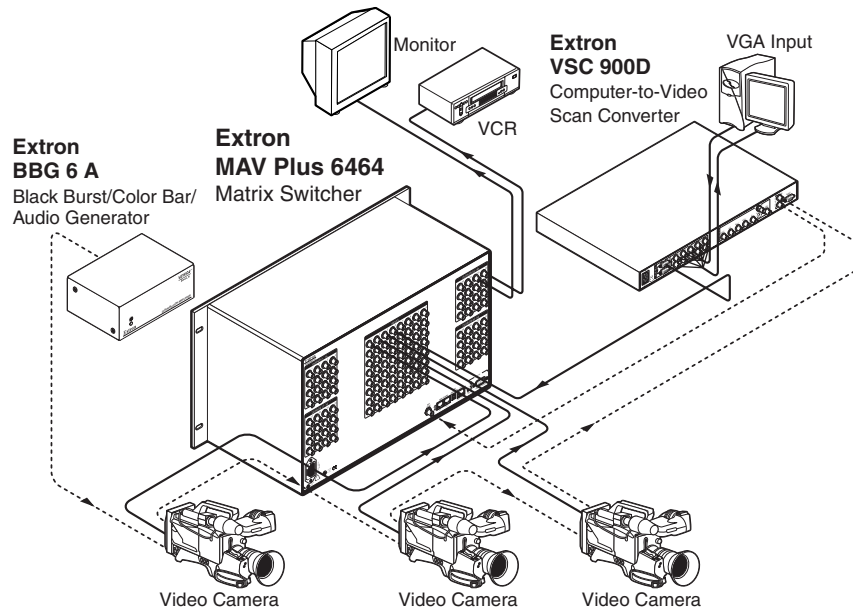


Figure 2-13 — Multiple device external sync connection example

Power

- ⑫ **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.

Installation, cont'd

Front Panel Configuration Port

- ⑬ **Configuration port** — This 2.5 mm mini stereo jack (figure 2-14) serves the same serial communications function as the rear panel Remote port, but it may be easier to access. The optional 9-pin D to 2.5 mm stereo mini TRS RS-232 cable, part #70-335-01 (figure 2-15) can be used for this connection.

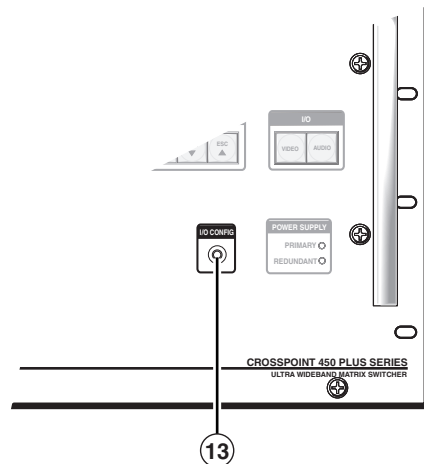


Figure 2-14 — Front panel configuration port

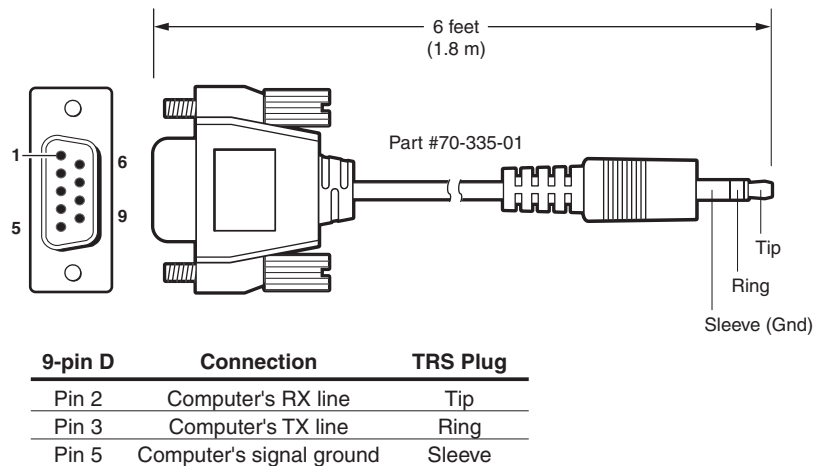


Figure 2-15 — Optional 9-pin TRS RS-232 cable

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

NOTE This port is completely separate from the rear panel Remote port and is **not** affected by changes to the rear panel port's protocol. This front panel port's protocol can be changed, under SIS command control only.

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

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



CrossPoint 450 Plus and MAV Plus Switchers

Chapter Three

Operation

Front Panel Controls and Indicators

QS-FPC Front Panel Operations

Rear Panel Controls

Optimizing the Audio (Systems with Audio BMEs)

Troubleshooting

Configuration Worksheets

Operation

NOTE The operation of the CrossPoint 450 Plus switcher BMEs and MAV Plus switcher BMEs is very similar. There are two exceptions:

- The video selection button is labeled “RGBHV” on the CrossPoint 450 Plus switcher BMEs and “Video” on the MAV Plus switcher BMEs. Throughout this manual, the terms “RGBHV button” and “Video button” can be used interchangeably.
- The MAV Plus switcher BMEs do not offer RGB delay switching.

NOTE Some models are equipped with an integrated Quick Switch-Front Panel Controller (QS-FPC™):

- The CrossPoint 450 Plus Video BME is available **with or without** a QS-FPC.
- The MAV Plus video BME is **always** equipped with a QS-FPC.
- The CrossPoint 450 Plus Sync BME is **not available** with a QS-FPC.
- The MAV Plus audio BME (stereo or mono) is **not available** with a QS-FPC.
- BMEs without a QS-FPC are equipped with a blank front panel.

NOTE The BME with the operational front panel controller should be BME 0.

NOTE Multiple QS-FPCs are unnecessary and potentially confusing. An S-video or component video system has multiple QS-FPCs by default. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See Locking out the front panel (Executive mode) on page 3-40.

Front Panel Controls and Indicators

The QS-FPC front panel controls (figure 3-1) are grouped into two sets. The input and output buttons are grouped on the left side of the panel. The control buttons and video/audio (I/O) selection buttons are grouped on the right side of the panel.

NOTE While the number of inputs and outputs varies depending on the size of the matrix, all of the switchers in this family have the same 64 input buttons by 64 output buttons front panel arrangement (figure 3-1).

On switchers with a smaller matrix size, the higher-numbered buttons do not select inputs and outputs, although they are used to select and indicate preset numbers, indicate the input audio level, and indicate the output audio volume.

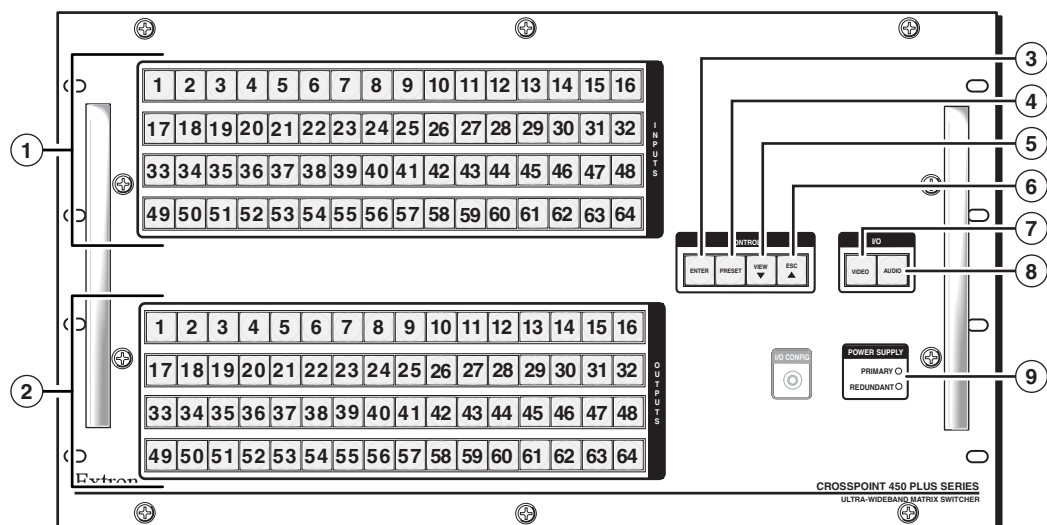


Figure 3-1 — CrossPoint 450 Plus 6464 series with integrated QS-FPC

The large, illuminated push buttons can be labeled with text and/or graphics. The buttons can be set to provide amber background illumination all the time or the background illumination can be turned off (see *Background illumination*, on page 3-41). The buttons blink or are lit at full intensity (depending on the operation) when selected.

Definitions

The following terms, which apply to Extron matrix switchers, are used throughout this manual:

Tie — An input-to-output connection.

Set of ties — An input **typed** to two or more outputs. (An output can never be tied to more than one input.)

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

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

Global memory preset — A **configuration** that has been stored. Up to 64 **global memory presets** can be stored in memory. Preset locations are assigned to the input buttons and (where necessary) output buttons. All presets can be selected from the front panel for either saving or retrieving. When a **preset** is retrieved from memory, it becomes the **current configuration**. All presets are also accessible under RS-232/RS-422 or Ethernet control.

Room — A subset of outputs that are logically related to each other, as determined by the operator. The switchers support up to 10 **rooms**, each of which can consist of from 1 to 16 outputs.

Room memory preset — A **configuration** consisting of outputs in a single **room** that has been stored. When a **room preset** is retrieved from memory, it becomes the **current configuration**. The switchers support up to 10 presets per room.

Input and output buttons

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

① **Input buttons** — The input buttons have two primary functions (•) and five secondary (□) functions:

- Select an input.
- Identify the selected input.
- **(Input 1 only)** With the Output 1 button, select *I/O Group* mode. See *I/O grouping* on page 3-20.
- Select a preset. See *Using presets* on page 3-26.
- **(Systems with CrossPoint 450 Plus Wideband switcher BMEs, Input 1 through 10 only)** Display the RGB delay. See *Setting RGB delay (systems with wideband BMEs)* on page 3-24.
- **(Systems with audio BMEs)** Display the output volume level. See *Viewing and adjusting the output volume (systems with audio BMEs)* on page 3-35.
- **(Input 1 and Input 2 only)** Toggle background illumination of the buttons on and off. See *Background illumination* on page 3-41.

Operation, cont'd

- ② **Output buttons** — The output buttons have two primary functions (•) and three secondary (◻) functions:
 - Select output(s).
 - Identify the selected output(s).
 - ◻ **(Output 1 only)** With the Input 1 button, select *I/O Group* mode. See *I/O grouping* on page 3-20.
 - ◻ Mute the output. See *Muting and unmuting video and/or audio outputs* on page 3-29.
 - ◻ **(Systems with audio BMEs)** Display the audio level of the selected input. See *Viewing and adjusting the input audio level (systems with audio BMEs)* on page 3-32.

Control buttons

- ③ **Enter button** — The Enter button has three primary functions (•) and five secondary (◻) functions:
 - Save changes that you make on the front panel. To create a simple configuration:
 - Specify RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus switchers), Audio, or both (see *I/O selection buttons* [⑦] and [⑧])
 - Press the desired input button (①)
 - Press the desired output button(s) (②)
 - Press the Enter button.
 - Indicate that a potential tie has been created but not saved.
 - Indicate that a global preset has been selected to be saved or recalled but that the preset action has not been accomplished.
 - ◻ In the *I/O Group* mode, select group 1. See *I/O grouping* on page 3-20.
 - ◻ In the *I/O Group* mode, indicate that group 1 is selected. See *I/O grouping* on page 3-20.
 - ◻ With the Preset, View, and Esc buttons, select *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - ◻ Select 9600 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - ◻ Indicate that the RS-232/RS-422 port is set to 9600 baud in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.

-
- ④ **Preset button** — The Preset button has two primary functions (•) and five secondary (□) functions:
- Activates *Save Preset* mode to save a configuration as a preset and *Recall Preset* mode to activate a previously-defined preset.
 - Blinks when *Save Preset* mode is active and lights steadily when *Recall Preset* mode is active.
 - In the *I/O Group* mode, select group 2. See *I/O grouping* on page 3-20.
 - In the *I/O Group* mode, indicate that group 2 is selected. See *I/O grouping* on page 3-20.
 - With the Enter, View, and Esc buttons, select *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - Select 19200 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - Indicate that the RS-232/RS-422 port is set to 19200 baud in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.

- ⑤ **View (▼) button** — The View (▼) button has two primary functions (•) and eight secondary (□) functions:

- Select *View-Only* mode that displays the current configuration.

NOTE *View-only mode also provides a way to mute and unmute the outputs. See Muting and unmuting video and/or audio outputs on page 3-29.*

- Indicate that *View-Only* mode is active.
- In the *I/O Group* mode, select group 3. See *I/O grouping* on page 3-20.
- In the *I/O Group* mode, indicate that group 3 is selected. See *I/O grouping* on page 3-20.
- **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Decrease the RGB delay of switches to the selected output. See *Setting RGB delay (systems with wideband BMEs)* on page 3-24.
- **(Systems with audio BMEs)** Decrease the audio level of the selected input. See *Viewing and adjusting the input audio level (systems with audio BMEs)* on page 3-32.
- **(Systems with audio BMEs)** Decrease the volume of the selected output. See *Viewing and adjusting the output volume (systems with audio BMEs)* on page 3-35.
- With the Enter, Preset, and Esc buttons, select *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
- Select 38400 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
- Indicate that the RS-232/RS-422 port is set to 38400 baud in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.

Operation, cont'd

- ⑥ **Esc (▲) button** — The Esc (▲) button has two primary functions (●) and eight secondary (□) functions:

- Cancel operations or selections in progress and reset the front panel button indicators.

NOTE *The Esc (▲) button does **not** reset the current configuration, the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and Audio selection button, any presets, or any audio gain or attenuation or volume settings.*

- Flashes once to indicate that the escape function has been activated.
- In the *I/O Group* mode, select group 4. See *I/O grouping* on page 3-20.
- In the *I/O Group* mode, indicate that group 4 is selected. See *I/O grouping* on page 3-20.
- **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Increase the RGB delay of switches to the selected output. See *Setting RGB delay (systems with wideband BMEs)* on page 3-24.
- **(Systems with audio BMEs)** Increase the audio level of the selected input. See *Viewing and adjusting the input audio level (systems with audio BMEs)* on page 3-32.
- **(Systems with audio BMEs)** Increase the volume of the selected output. See *Viewing and adjusting the output volume (systems with audio BMEs)* on page 3-35.
- With the Enter, Preset, and View buttons, select *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
- Select 115200 baud for the RS-232/RS-422 port in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
- Indicate that the RS-232/RS-422 port is set to 115200 baud in *Serial Port Configuration* mode. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.

I/O controls

You must specify video, audio, or both when you are creating or viewing a configuration. This is done with the RGBHV button (CrossPoint 450 Plus switchers) or Video button (MAV Plus switchers) (7) and Audio (8) buttons.

NOTE Throughout this manual, the terms “RGBHV button” and “Video button” can be used interchangeably.

- ⑦ **RGBHV (CrossPoint 450 Plus) button or Video (MAV Plus) button** — The RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button has two primary functions (•) and five secondary (☐) functions:
- Selects and deselects video for a configuration that is being created or viewed.
 - Lights green to indicate that video is available for configuring or for viewing.
 - ☐ With the Audio button, toggles the front panel lock on or off. See *Locking out the front panel (Executive mode)* on page 3-40.
 - ☐ With the Audio button, commands the front panel system reset. See *Performing a system reset from the front panel* on page 3-40.
 - ☐ **(Systems with CrossPoint 450 Plus Wideband switcher BMEs)** Selects the *RGB delay mode*, in which you can set the RGB delay. See *Setting RGB delay (systems with wideband BMEs)* on page 3-24.
 - ☐ Select the RS-232 protocol for the RS-232/RS-422 port in *Serial Port Configuration mode*. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - ☐ Indicate that the RS-232/RS-422 port is set to the RS-232 protocol in *Serial Port Configuration mode*. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
- ⑧ **Audio button** — The Audio button has two primary functions (•) and three secondary (☐) functions
- **(Systems with audio BMEs)** Selects and deselects audio for a configuration that is being created or viewed.
 - **(Systems with audio BMEs)** Lights to indicate that audio is available for configuration or viewing.
 - ☐ **(Systems with audio BMEs)** Selects the *Audio mode*, in which you can adjust the input audio level and the output audio volume. See *Viewing and adjusting the input audio level (systems with audio BMEs)* on page 3-32 and *Viewing and adjusting the output volume (systems with audio BMEs)* on page 3-35.
 - ☐ With the RGBHV/Video button, toggles the front panel lock on or off. See *Locking out the front panel (Executive mode)* on page 3-40.
 - ☐ With the RGBHV/Video button, commands the front panel system reset. See *Performing a system reset from the front panel* on page 3-40.
 - ☐ Select the RS-422 protocol for the RS-232/RS-422 port in *Serial Port Configuration mode*. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.
 - ☐ Indicate that the RS-232/RS-422 port is set to the RS-422 protocol in *Serial Port Configuration mode*. See *Selecting the rear panel Remote port protocol and baud rate* on page 3-42.

Operation, cont'd

Power indicators

All front panels have power indicators, regardless whether they have an integrated QS-FPC or not (figure 3-2).

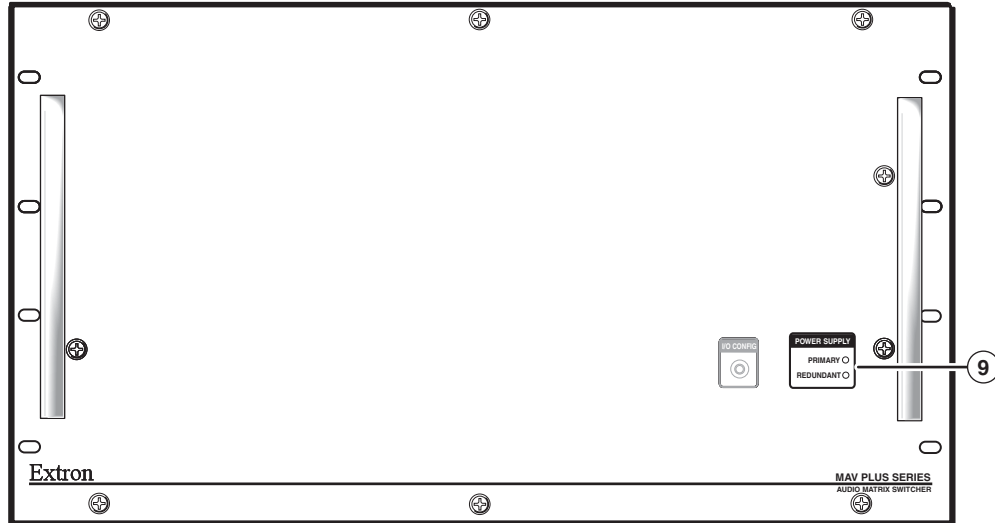


Figure 3-2 — Front panel without an integrated QS-FPC

⑨ Primary and Redundant Power Supply LEDs —

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

Red — Indicates that the associated power supply is operating outside the normal tolerances or has failed.

Button icons

The numbered translucent covers on the input and output pushbuttons can be removed and replaced to insert labels behind the covers.

Input and output labels can be created easily with Extron's Button-Label Generator software, which ships with every Extron matrix switcher. Each input and output can be labeled with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection (figure 3-3). See chapter 5, *Matrix Software*, for details on using the labeling software. See Appendix B, *Reference Information*, for blank labels and a procedure for removing and replacing the translucent covers.

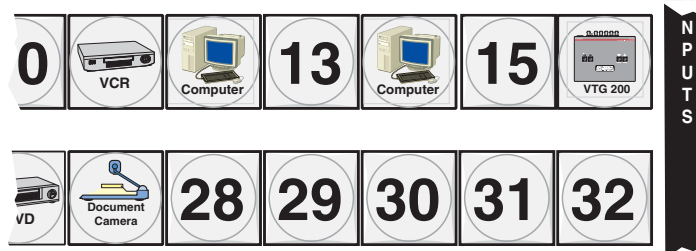


Figure 3-3 — Sample button icons

QS-FPC Front Panel Operations

The following paragraphs detail the power-up process and then provide sample procedures for creating ties; changing a configuration; viewing configurations; saving and recalling a preset; muting and unmuting outputs, viewing and adjusting the audio level; viewing and adjusting the output volume; locking out the front panel; performing one of several resets; toggling background illumination on and off; and reading and setting the rear panel RS-232/RS-422 Remote port settings.

Power

Apply power by connecting the power cord to an AC source. The switcher performs a self-test that flashes the front panel button indicators (if so equipped) green, red, and amber and then turns them off. An error-free power up self-test sequence leaves all I/O and control buttons either unlit or showing background illumination. The lit/unlit status RGBHV or Video button and the Audio button is defined by the system configuration.

- **Systems with audio** — RGBHV/Video and Audio both lit
- **Systems without audio** — RGBHV/Video lit and Audio unlit

The current configuration and all presets are saved in non-volatile memory. When power is applied, the most recent configuration is retrieved. The previous presets remain intact. BME 0, upon power up, issues a map refresh command to all slave BMEs to restore the current configuration.

NOTE *Because BME 0 maps the slave BMEs upon power up, either all BMEs should be powered up simultaneously or BME 0 should be the last BME turned on. Also, if any slave BME loses power, you need to issue any front panel command or simply cycle BME 0's power to restore the current configuration.*

If an error occurs during the self-test, the switcher locks up and does not operate. Call the Extron S³ Sales & Technical Support Hotline.

Creating a configuration

Change the current configuration using the front panel buttons as follows:

1. Press the Esc button to clear any input button indicators, output button indicators, or control button indicators that may be lit.
2. Select to configure video, audio, or both by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and/or Audio button.
3. Select the desired input and output(s) by pressing the input and output buttons.
 - Input buttons and output buttons light or blink **amber** to indicate video and audio ties, **green** to indicate video only ties, and **red** to indicate audio only ties.
 - To indicate **potential ties**, output buttons **blink** the appropriate color when an input is selected.
 - To indicate **current ties**, output buttons **light steadily** the appropriate color when an input is selected.
 - To clear unwanted outputs, press and release the associated lit output buttons. To indicate **potential unties**, output buttons **blink** the appropriate color when an output is deselected but not untied from the input.
4. Press and release the Enter button to accept the tie.
5. Repeat steps 1 through 4 to create additional ties.

Operation, cont'd

- 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.
 - If an input with no tie is selected, only that input's button lights.
 - When the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and Audio button are lit, if an input with an audio tie but no video tie is selected, the input's button lights amber and the output button lights the appropriate color (amber, green, or red).
 - As each input and output is selected, the associated output button blinks the appropriate color to indicate a tentative tie. Buttons for output(s) that were already tied to the input light the appropriate color steadily. Outputs that are already tied can be left on, along with new blinking selections, or toggled off by pressing the associated output button.
 - If you press the input button for an I/O grouped input and then try to select an output in a different group, the associated output button cannot be selected. The associated input button remains lit.

Example 1: Creating a set of video and audio ties

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

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

1. Press and release the Esc button (figure 3-4).

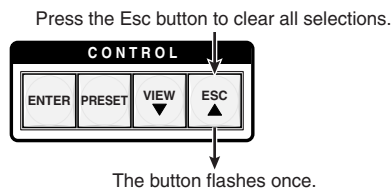
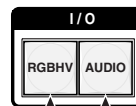


Figure 3-4 — Clear all selections

2. To select video and audio for the tie, if necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button until the buttons light (figure 3-5).



Press the RGBHV/Video button to toggle on and off. The button lights **green** when selected.

Press the Audio button to toggle on and off. The button lights **red** when selected.

Figure 3-5 — Select RGBHV or video and audio

3. Press and release the input 5 button (figure 3-6).

Press and release the Input 5 button.
The button lights **amber** to indicate that **RGBHV**
and **audio** outputs can be tied to this input.

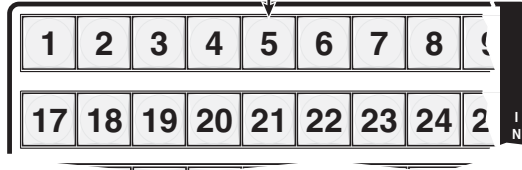
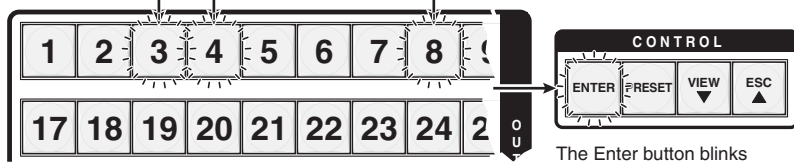


Figure 3-6 — Select an input

4. Press and release the output 3, output 4, and output 8 buttons (figure 3-7).

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

Press and release the Output 3, Output 4, and Output 8 buttons.
The buttons blink **amber** to indicate that the selected **RGBHV** or **video** and **audio**
input will be tied to these outputs.



The Enter button blinks **green** to indicate the need to confirm the change.

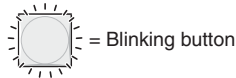
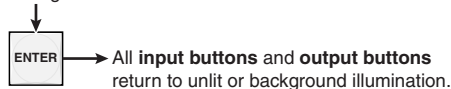


Figure 3-7 — Select the outputs

5. Press and release the Enter button (figure 3-8).

Press the Enter button to
confirm the configuration
change.



The Enter button returns to
unlit or background
illumination.

Figure 3-8 — Press the Enter button

The current configuration (figure 3-9) is now:

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

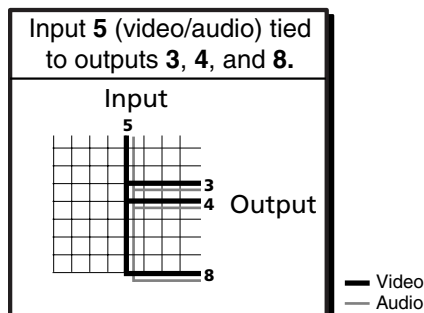


Figure 3-9 — Example 1, final configuration

Operation, cont'd

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

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

NOTE This example assumes that you have performed example 1.

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

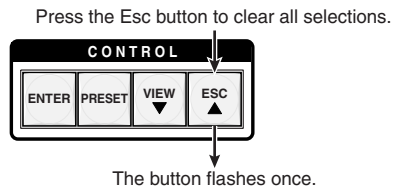
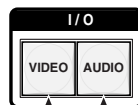


Figure 3-10 — Clear all selections

2. To select video only for the tie, if necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button (figure 3-11).



Press the RGBHV/Video button to toggle on and off. Press the Audio button to toggle on and off. The button lights **green** when selected. The button is **unlit** or **background illuminated** when deselected.

Figure 3-11 — Select RGBHV or video only

3. Press and release the input 5 button (figure 3-12).

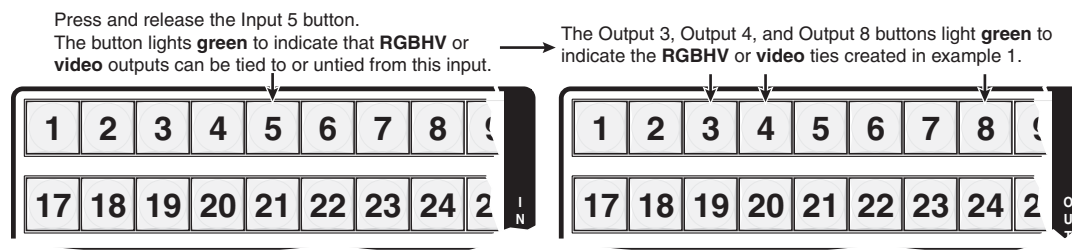
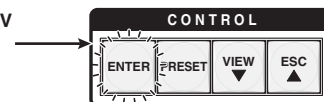
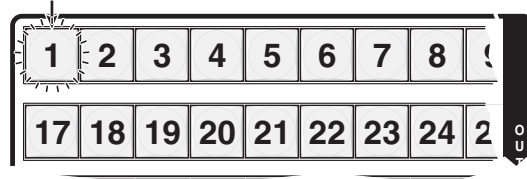


Figure 3-12 — Select an input

4. Press and release the output 1 button (figure 3-13).

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



The Enter button blinks **green** to indicate the need to confirm the change.

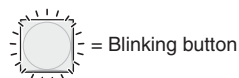
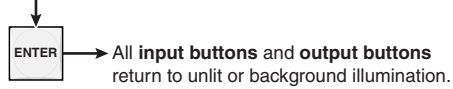


Figure 3-13 — Select the output

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

Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

Figure 3-14 — Press the Enter button

The current configuration (figure 3-15) is now:

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

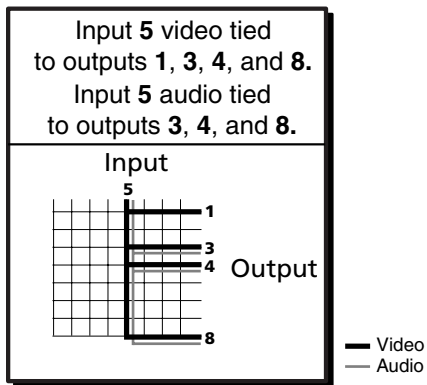


Figure 3-15 — Example 2, final configuration

Operation, cont'd

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

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

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

1. Press and release the Esc button (figure 3-16).

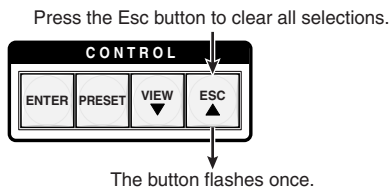


Figure 3-16 — Clear all selections

2. To select audio only for the tie, if necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button (figure 3-17).

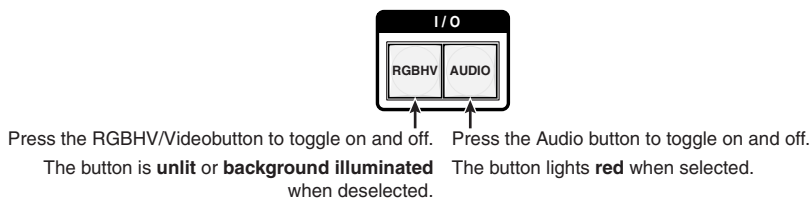


Figure 3-17 — Select audio only

3. Press and release the input 5 button (figure 3-18).

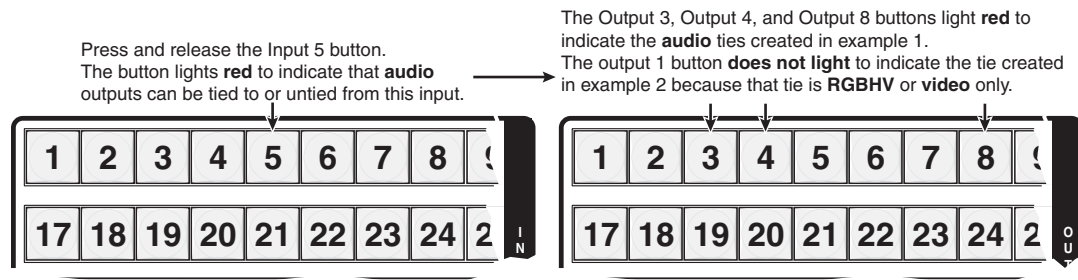
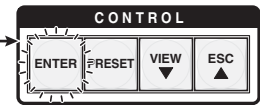
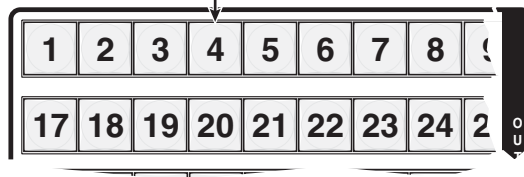


Figure 3-18 — Select an input

4. Press and release the output 4 button (figure 3-19).

Press and release the Output 4 button.

The button blinks **red** to indicate the pending change: **audio** input will be untied.



The Enter button blinks **green** to indicate the need to confirm the change.

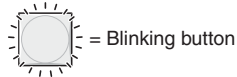
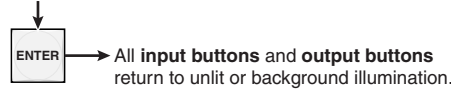


Figure 3-19 — Deselect the output

5. Press and release the Enter button (figure 3-20).

Press the Enter button to confirm the configuration change.



The Enter button returns to unlit or background illumination.

Figure 3-20 — Press the Enter button

The current configuration (figure 3-21) is now:

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

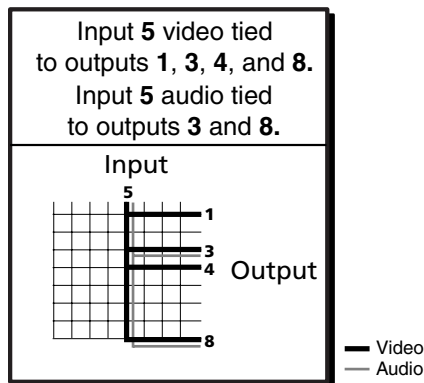


Figure 3-21 — Example 3, final configuration, audio switcher

Viewing a configuration

The current configuration can be viewed using the front panel buttons. The *View-Only* mode prevents inadvertent changes to the current configuration. *View-Only* mode also provides a way to mute video and audio outputs (see *Muting and unmuting video and/or audio outputs* on page 3-29).

View the current configuration as follows:

1. Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
2. Press and release the View button. All of the buttons for outputs that are **not** tied light:
 - **Amber:** No tied video or audio input
 - **Green:** No tied video input
 - **Red:** No tied audio input
3. Select video, audio, or both to view by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and/or the Audio button.
4. Select the desired input or output(s) whose ties you wish to view by pressing the input and output buttons.
5. Press and release the View button to exit *View-Only* mode:

- NOTE**
- *When you enter View-Only mode, the output buttons light for all outputs without ties.*
 - *If you are viewing tied inputs and outputs and an output button for which there are no ties is pushed, the output buttons turn on for all outputs without ties.*
 - *To see all ties of the current configuration, press and release each input and output button, one at a time, with the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button lit.*
 - *In View-Only mode, you can view video and audio, video-only, or audio-only ties. Pressing and releasing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button toggles each on and off.*
 - *When you view video and audio ties, the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button is lit green and the Audio button is lit red. After you select an input or output, the output buttons light different colors to show where video and audio ties are not the same (audio is broken away).*
 - **Amber** — video and audio
 - **Green** — video only
 - **Red** — audio only
 - *After 30 seconds of front panel inactivity, View-Only mode automatically deselects.*

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

The following example shows the viewing of the video and audio, audio-only, and video-only ties in the current configuration. The steps show the front panel indications that result from your action.

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

1. Press and release the Esc button (figure 3-22).

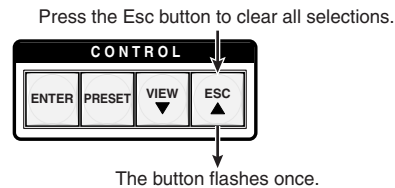


Figure 3-22 — Clear all selections

2. Press and release the View button to enter *View-Only* mode. The View button lights red.
3. To select both video and audio for viewing, if necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button (figure 3-23).

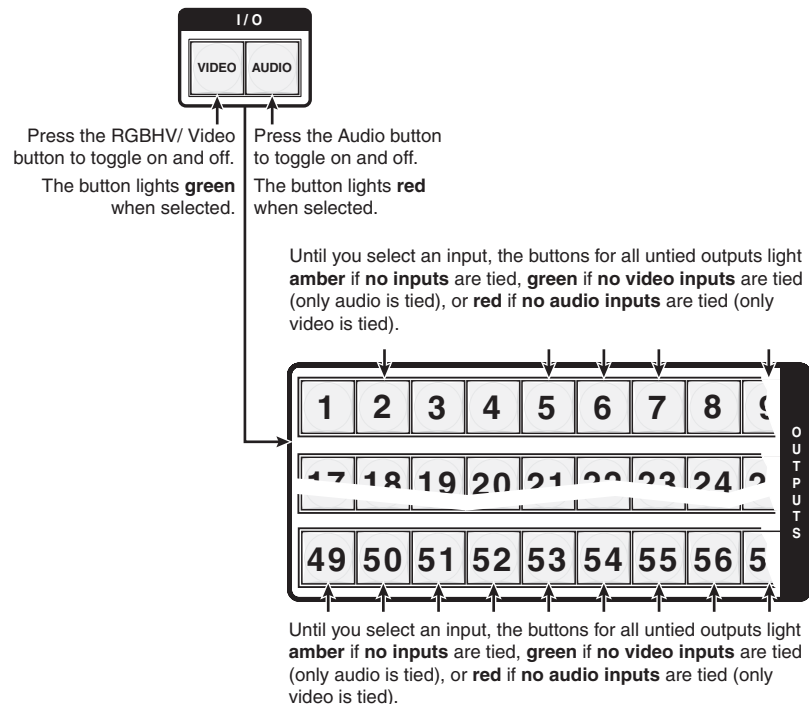
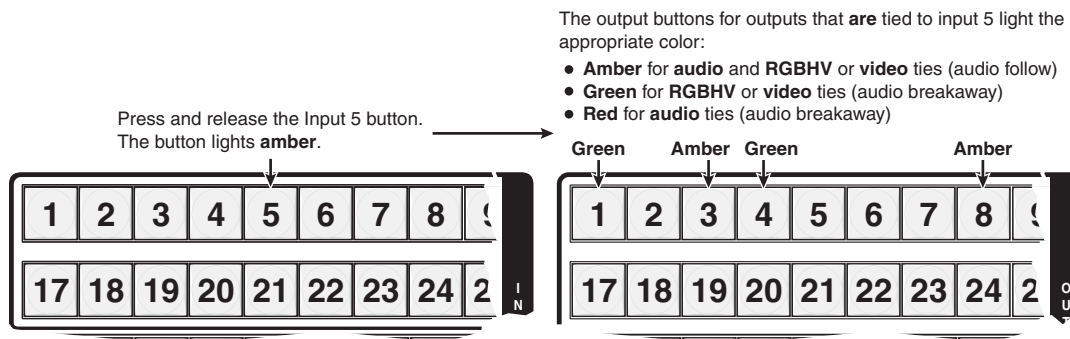


Figure 3-23 — Select RGBHV or video and audio

Operation, cont'd

- Press and release the input 5 button (figure 3-24).

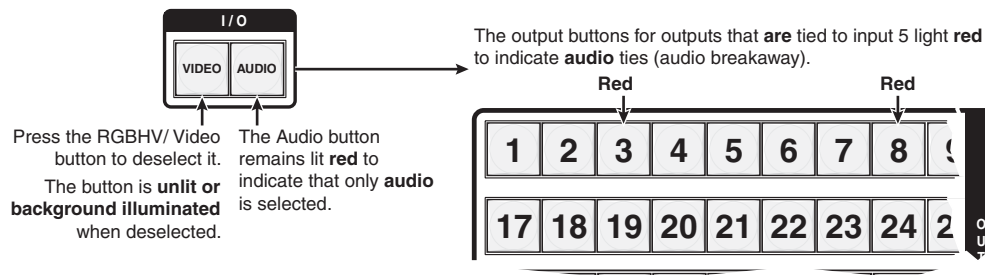


The output buttons for outputs that are **not** tied to input 5 are either unlit or background illuminated.

Figure 3-24 — Select an input

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

- Press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button to deselect RGBHV or video (figure 3-25).



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

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

- Press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button to toggle the RGBHV or Video button on green and the Audio button either unlit or providing background illumination (figure 3-26).

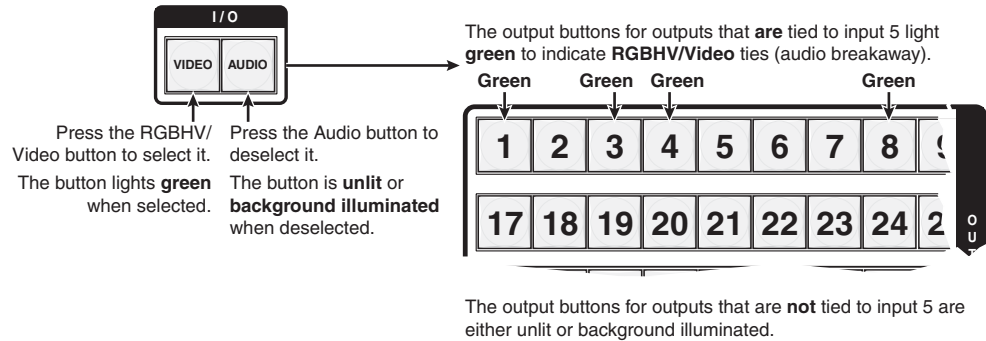


Figure 3-26 — Deselect audio and select RGBHV or video to view RGBHV or video only

If video ties are established for input 5, the output buttons for all video outputs tied to input 5 light green. If no ties are established for input 5, all output buttons return to either unlit or to background illumination.

- Press and release the View button to exit *View-Only* mode (figure 3-27).

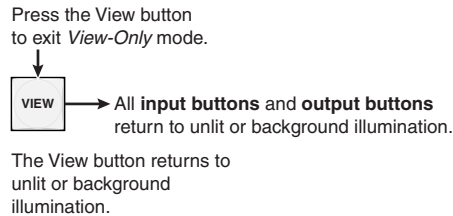


Figure 3-27 — Press the View button to exit View-Only mode

Operation, cont'd

I/O grouping

I/O grouping is a matrix switcher feature that allows you to subdivide the front panel control of the matrix into four smaller functional sub-switchers and limit tie creation **from the front panel only**. Inputs and outputs can be assigned to one of four groups or not assigned to any group.

Inputs and outputs that are assigned to a group can only be tied to other outputs and inputs within the same group when you are creating ties on the front panel. For example, a front panel operator cannot tie an input that is assigned to group 1 to an output that is assigned to group 2. Ungrouped inputs and outputs can be switched to outputs and inputs in any group. Ties between groups (an input in group 1 tied to an output in group 2) **can** be created under RS-232/RS-422 or Ethernet control.

Suggested applications for the I/O grouping feature include:

- Segregating specific video formats to prevent an input in one video format from being inadvertently applied to an output device that supports another video format (figure 3-28).
- Segregating input and output devices that are in separate rooms.
- Isolating video from being displayed on specific output devices for operational security reasons.

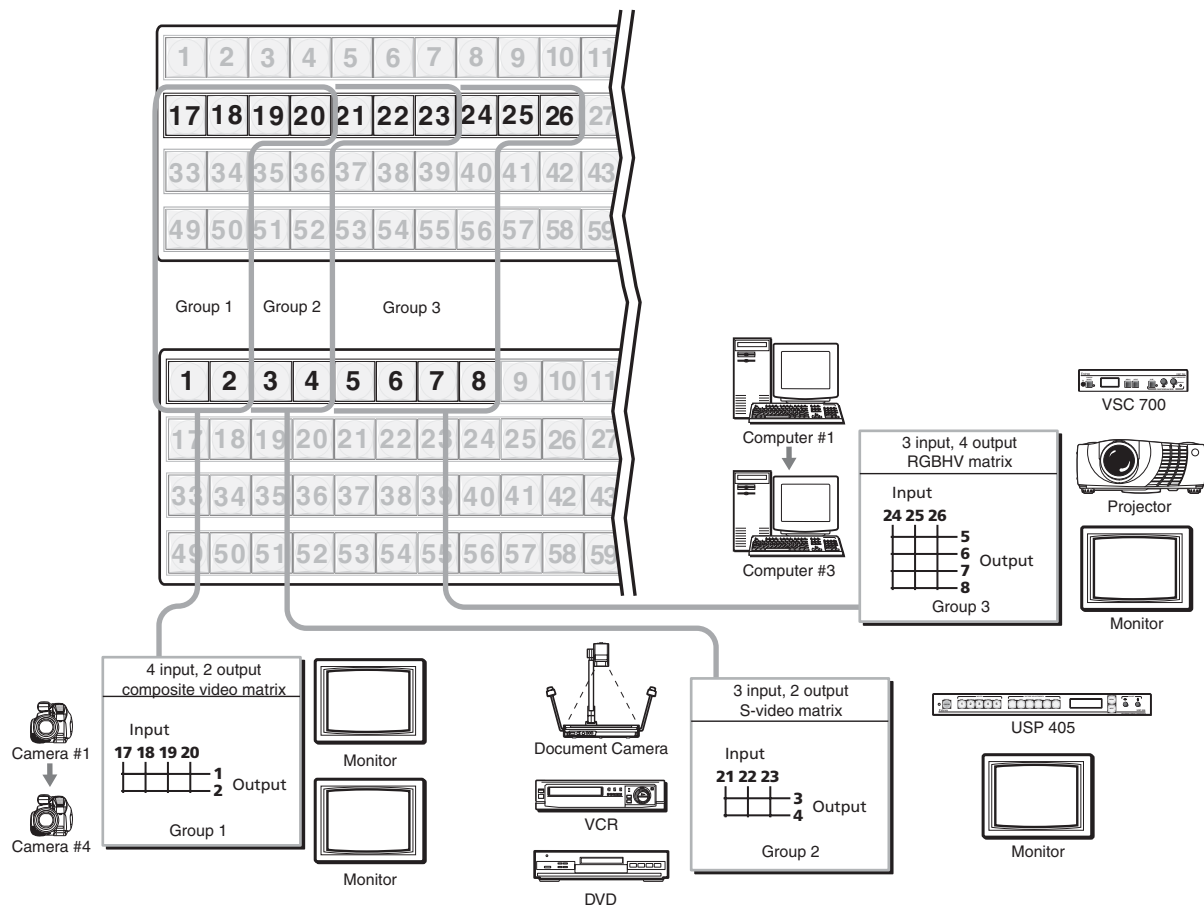


Figure 3-28 — I/O grouping of incompatible video formats

The I/O groups can be set up on the front panel or by using RS-232/RS-422 and Ethernet ports and either the SIS or the Windows control program (see chapter 4, *SIS Programming and Control*, and chapter 5, *Matrix Software*). Create I/O groups on the front panel as follows:

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *I/O Group* mode, press and **hold** the Input 1 and Output 1 buttons until the input and output buttons light to display the ungrouped inputs and outputs.
3. Press and release one of the Control buttons to select a group:
 - Press the Enter button to select group 1.
 - Press the Preset button to select group 2.
 - Press the View button to select group 3.
 - Press the Esc button to select group 4.
4. Select the desired input(s) and output(s) to assign to the group by pressing the input and output buttons.
5. Press and release the RGBHV/Video and Audio button to exit the *I/O Group* mode, or allow the mode to time out after approximately 30 seconds.

NOTE

- *Ties between groups (an input in group 1 tied to an output in group 2) can be created under RS-232/RS-422 or Ethernet control.*
- *Presets can be created under RS-232/RS-422 or Ethernet control that tie inputs and outputs across group boundaries. These presets **are** selectable from the front panel.*
- *An input or output can be assigned to only one group. If you assign an input or output to a group and that input or output is already assigned to a different group, the older grouping is discarded in favor of the new grouping.*
- *Audio **can** be broken away from the video for a given input or output (assigned to different groups) by isolating only video or only audio using the front panel RGBHV (CrossPoint 450 Plus)/Video (MAV Plus) and/or Audio buttons after you select I/O Group mode (between steps 2 and 3).*

*Audio breakaway across different groups **can be** confusing when operating the front panel; **is not displayed** by the Matrix Switchers Control Program, HTML pages, or SIS commands; and is **not** recommended.*
- *For I/O groups to have any function, at least two groups must be created.*

Operation, cont'd

Example 5: Grouping inputs and outputs

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

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

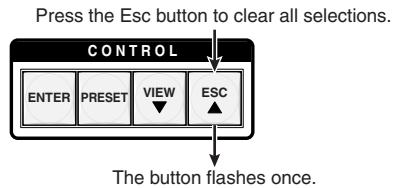


Figure 3-29 — Clear all selections

2. To enter *I/O Group* mode, press and **hold** the Input 1 and Output 1 buttons (figure 3-30).

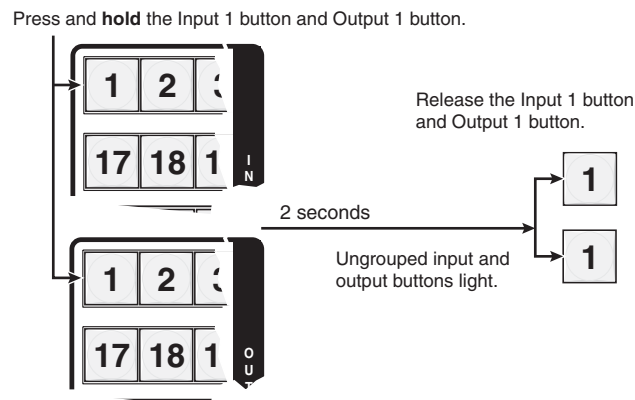


Figure 3-30 — Select I/O Group mode

3. Press and release the Enter button to select group 1 (figure 3-31).

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

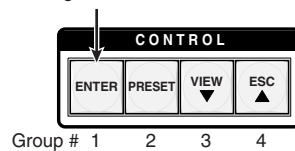
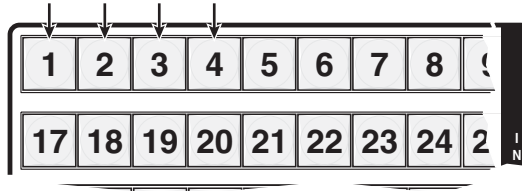


Figure 3-31 — Select an I/O group

- Press and release the input 1 through 4 and output 1 through 4 buttons (figure 3-32).

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



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

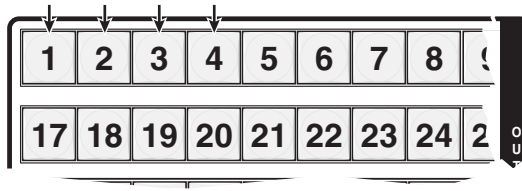


Figure 3-32 — Assign inputs and outputs

- Press and release the Preset button to select group 2 (figure 3-33).

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

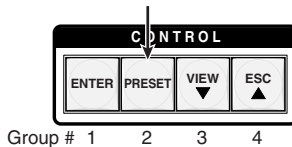
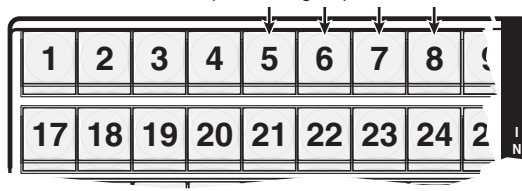


Figure 3-33 — Select an I/O group

- Press and release the input 5 through 8 and output 5 through 8 buttons (figure 3-34).

Press and release the Input 5 through Input 8 buttons. The selected buttons light.



Press and release the Output 5 through Output 8 buttons. The selected buttons light.

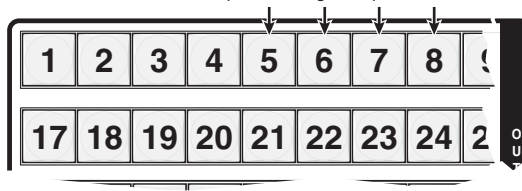


Figure 3-34 — Assign inputs and outputs

- Do nothing for approximately 30 seconds. The front panel times out and the switcher exits I/O Group mode.
 - Group 1 consists of inputs 1 through 4 and outputs 1 through 4.
 - Group 2 consists of inputs 5 through 8 and outputs 5 through 8.

Setting RGB delay (systems with wideband BMEs)

A switcher that includes a CrossPoint 450 Plus Sync BME can briefly blank the RGB (video) output while it switches to the new input's sync source, and then switches the RGB signals. This allows a brief delay for the display to adjust to the selected input's sync timing before displaying the new picture, which will appear without glitches. RGB delay, also known as Triple-Action Switching™ or video mute switching, is user selectable from 0 to 5 seconds, in half-second increments.

The RGB delay interval can be set on the front panel or by using RS-232/RS-422 and Ethernet ports and either the SIS, Windows control program, or HTML pages (see chapter 4, *SIS Programming and Control*, chapter 5, *Matrix Software*, and chapter 6, *HTML operation*). Specify the RGB delay interval for a specific output on the front panel as follows:

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *RGB Delay* mode, press and **hold** the RGBHV button until the button begins to blink green, then release the button.
3. Press and release an output button to select an output.

Each lit input button, from Input 1 through Input 10, indicates a half second of RGB delay interval for the selected output.

4. Press and release the Esc (▲) and View (▼) buttons to increase and decrease the interval.
5. Press and release the RGBHV button to exit the *RGB Delay* mode. The RGBHV button stops blinking.

- NOTE**
- Pressing the Enter or Preset button also exits *RGB Delay* mode. Pressing the Preset button changes to Recall Preset mode.
 - The RGB interval for each output is stored in non-volatile memory. When power is removed and restored, the delay settings are retained.
 - Exiting *RGB Delay* mode by pressing the RGBHV button always returns the I/O configuration to audio only selected for configuration.

Example 6: Setting the RGB delay for an output

In the following example, the RGB delay is increased for output 17. The steps show the front panel indications that result from your action.

1. Press and release the Esc button (figure 3-35).

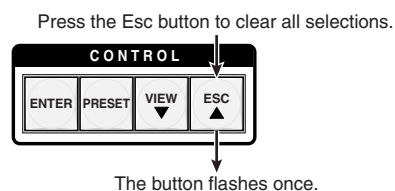


Figure 3-35 — Clear all selections

- Press and **hold** the RGBHV button for approximately 2 seconds (figure 3-36).

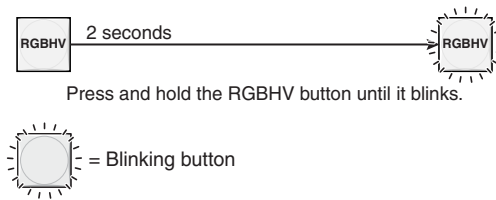


Figure 3-36 — Select RGB Delay mode

- Press and release the output 17 button (figure 3-37).

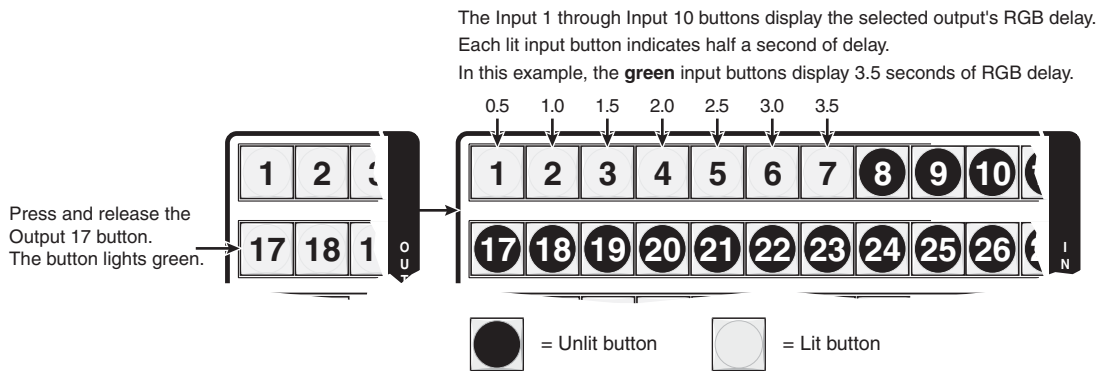


Figure 3-37 — Select an output

- Press and release the Esc (▲) button once (figure 3-38) to increase the RGB delay by a half second.

Press and release the Esc (▲) button twice more to increase the RGB delay by a whole second. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

Figure 3-38 show the result of pressing the Esc (▲) button a total of 3 times.

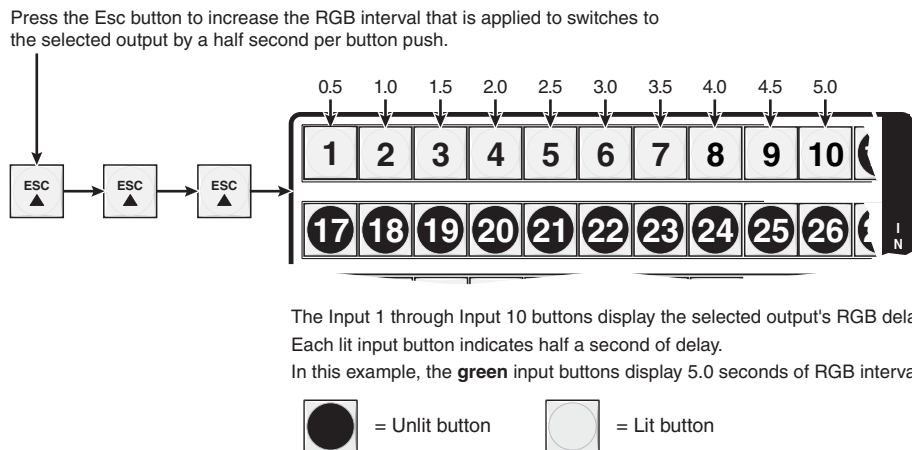


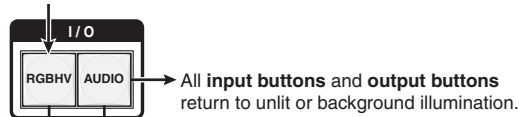
Figure 3-38 — Adjust the RGB delay interval

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the delay up or down to the high or low limit.

Operation, cont'd

5. Press and release the RGBHV button (figure 3-39).

Press the RGBHV button to exit RGB delay mode.



The RGBHV button stops blinking and goes out or becomes background illuminated.
The Audio button lights red.

Figure 3-39 — Deselect RGB Delay mode

Using presets

The current configuration (configuration 0) can be saved as a preset in any one of 64 preset memory addresses. Preset locations are assigned to the input buttons. Presets can be selected from the front panel to be either saved or retrieved. When a **preset** is retrieved from memory, it becomes the **current configuration**.

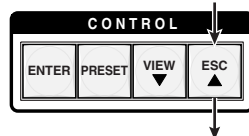
- NOTE**
- All switchers have 64 presets, selectable from the front panel, regardless of the matrix size.
 - Only the audio and video ties are stored and recalled; audio gain settings are not saved, and they do not change when a preset is recalled.
 - Presets **cannot** be viewed from the front panel unless recalled as the current configuration. Presets **can** be viewed using Extron's Windows-based control program. See Chapter 5, Matrix Software, for more details.
 - The current configuration and all presets are stored in non-volatile memory. When power is removed and restored, the current configuration is still active and all presets are retained.
 - When a preset is recalled, it replaces the current configuration, which is lost unless it is also stored as a preset. The recalled preset overwrites all of the current configuration ties in favor of the preset configuration ties.

Example 7: Saving a preset

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

1. Press and release the Esc button (figure 3-40).

Press the Esc button to clear all selections.



The button flashes once.

Figure 3-40 — Clear all selections

- Press and **hold** the Preset button for approximately 2 seconds until it blinks (figure 3-41).

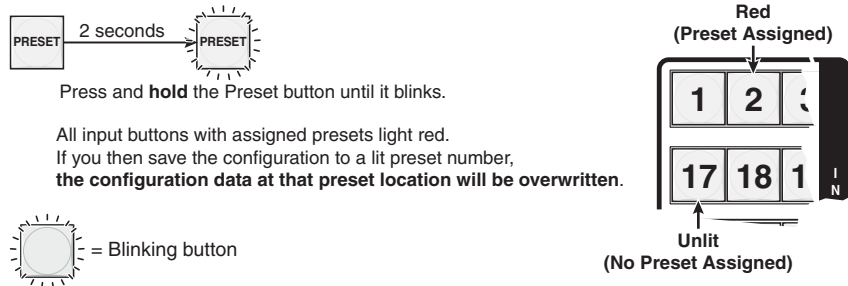


Figure 3-41 — Enter Save Preset mode

- Press and release the input or output button for the desired preset (figure 3-42).

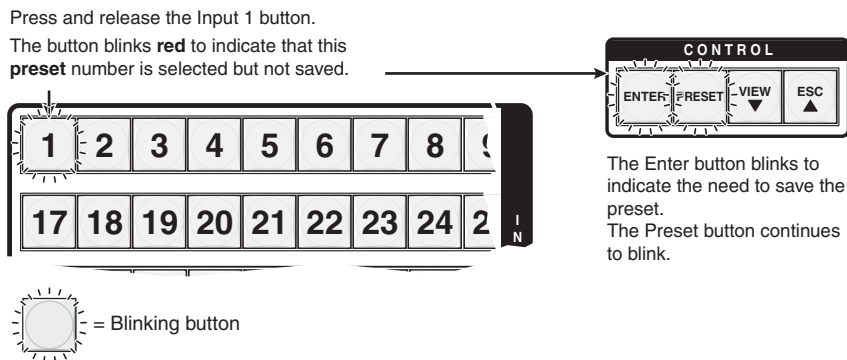


Figure 3-42 — Select the preset

- Press and release the Enter button (figure 3-43). The current configuration is now stored in the selected memory location.

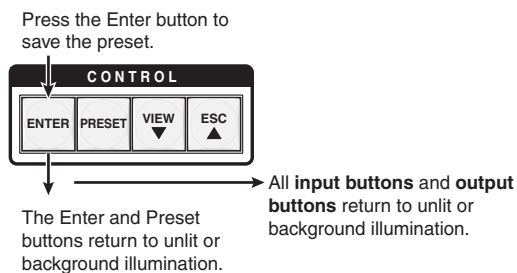


Figure 3-43 — Press the Enter button

Operation, cont'd

Example 8: Recalling a preset

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

1. Press and release the Esc button (figure 3-44).

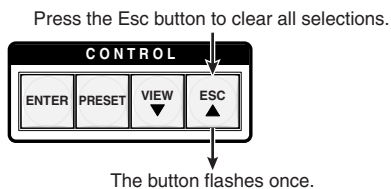


Figure 3-44 — Clear all selections

2. Press and release the Preset button (figure 3-45).

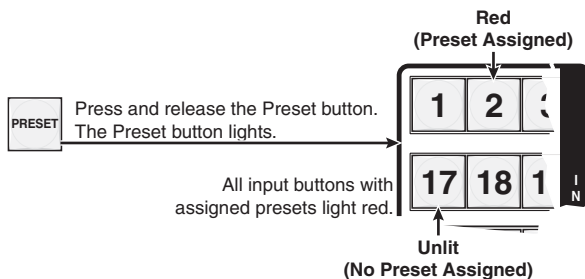


Figure 3-45 — Enter Recall Preset mode

3. Press and release the input or output button for the desired preset (figure 3-46).

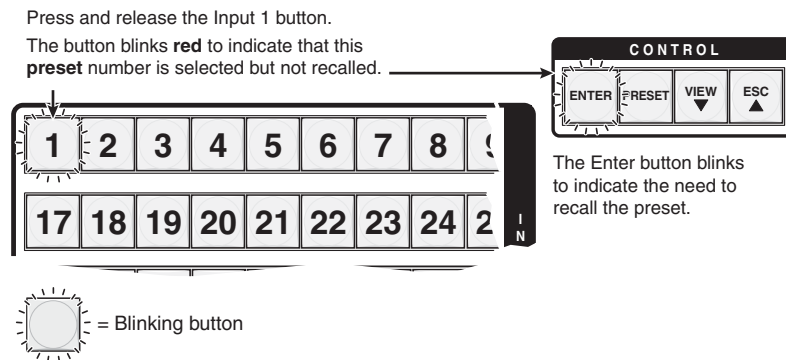


Figure 3-46 — Select the preset

- Press and release the Enter button (figure 3-47). The configuration stored in selected memory location is now the current configuration and can be viewed in the *View-Only* mode (see example 4).

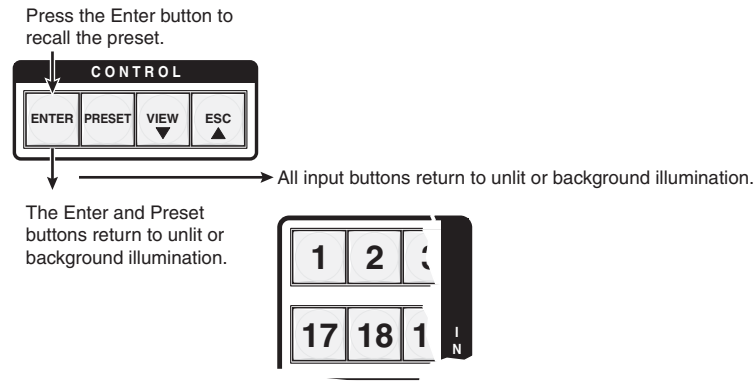


Figure 3-47 — Press the Enter button

Muting and unmuting video and/or audio outputs

Individual outputs can be muted or unmuted as follows:

- Press the Esc button to clear any input button indications, output button indications, or control button indications that may be on.
- Press and release the View button.
- Select video, audio, or both to mute or unmute by pressing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and/or the Audio button.
- One at a time, press and **hold** the output button(s) for the desired output(s) for approximately 2 seconds. The output LED(s) for the selected output(s) blink to indicate the mute or return to their previous state to indicate the unmute.
- Press and release the View button to return to normal switcher operation.

- NOTE**
- You can mute video and audio, video-only, or audio-only outputs. Pressing and releasing the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button toggles each selection on and off.
 - When you enter View-Only mode, the output LEDs turn **on** for all outputs **without** ties.
 - On CrossPoint 450 Plus switchers, the video mute function mutes the wideband video switching BMEs (the R, G, and B planes) only; the sync switching BMEs (the H and V planes) are still active. On MAV Plus low resolution video switching BMEs, the video mute function mutes all video planes.
 - Mutes are saved to non-volatile memory. When power is removed and restored, the mute settings are retained.

Operation, cont'd

Example 9: Muting and unmuting an output

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

1. Press and release the Esc button (figure 3-48).

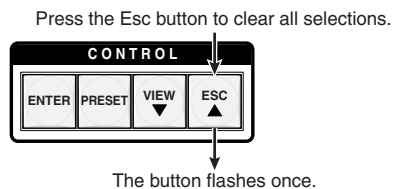


Figure 3-48 — Clear all selections

2. Press and release the View button to enter *View-Only* mode. The View button lights red.
3. To select both video and audio for viewing and muting, if necessary, press and release the RGBHV (CrossPoint 450 Plus switchers) or Video (MAV Plus video switchers) button and the Audio button (figure 3-49).

NOTE This example shows the front panel indications if example 1, example 2, and example 3 have been completed.

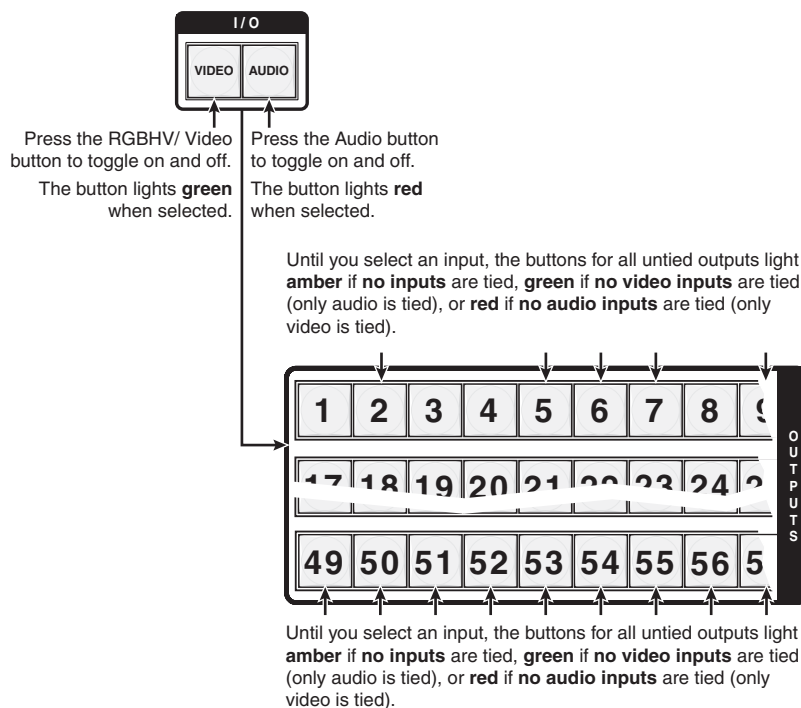


Figure 3-49 — Select RGBHV or video and audio

4. **One at a time**, press and **hold** the Output 3 and then the Output 4 buttons (figure 3-50) for approximately 2 seconds until the buttons begin to blink. The output 3 and output 4 video and audio signals are muted.

Mute outputs one at a time.

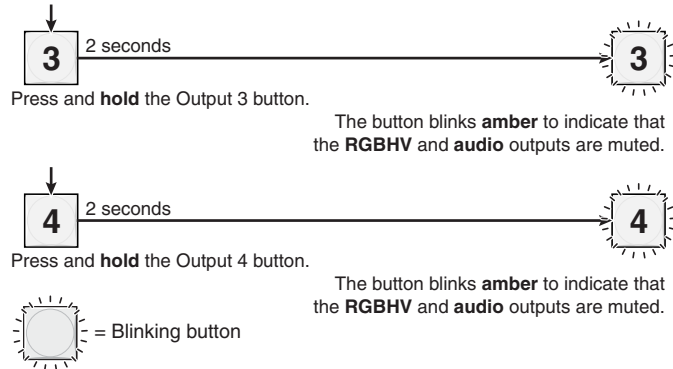


Figure 3-50 — Mute the outputs

NOTE If both RGBHV/video and audio are selected, the mute action toggles both the video and audio outputs. If either the video output or the audio output is already muted, the unmuted output is muted and the muted output is unmuted.

NOTE If both RGBHV/video and audio are selected and only video is muted, the output button flashes between green and amber. If only audio is selected, the output button flashes between red and amber.

5. **One at a time**, press and **hold** the Output 3 and then the Output 4 buttons (figure 3-51) for approximately 2 seconds until the buttons lights steadily. The output 3 and output 4 video and audio signals are unmuted.

Mute outputs one at a time.

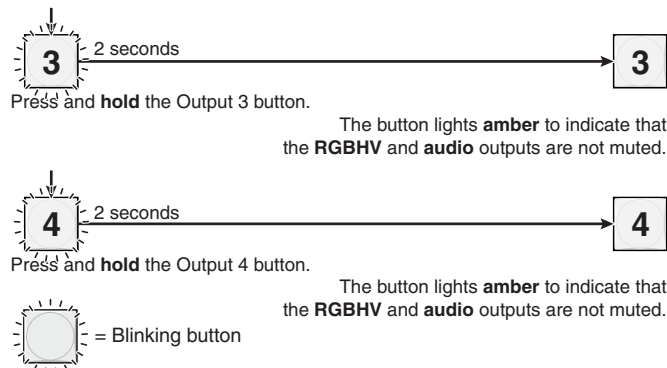


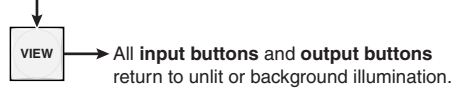
Figure 3-51 — Unmute the outputs

NOTE If both RGBHV/video and audio are selected, the unmute action toggles both the video and audio outputs. If either the video output or the audio output is already unmuted, the muted output is unmuted and the unmuted output is muted.

Operation, cont'd

- Press and release the View button to exit *View-Only* mode (figure 3-52).

Press the View button
to exit *View-Only* mode.



The View button returns to
unlit or background
illumination.

Figure 3-52 — Press the View button to exit View-Only mode

Viewing and adjusting the input audio level (systems with audio BMEs)

In systems that include a MAV Plus audio BME, the audio level of each input can be displayed and adjusted through a range of -18 dB to +24 dB to ensure that there is no noticeable volume difference among sources (figure 3-53). The audio level can be adjusted from the front panel incorporated in BME 0 or under RS-232/RS-422 or Ethernet control.

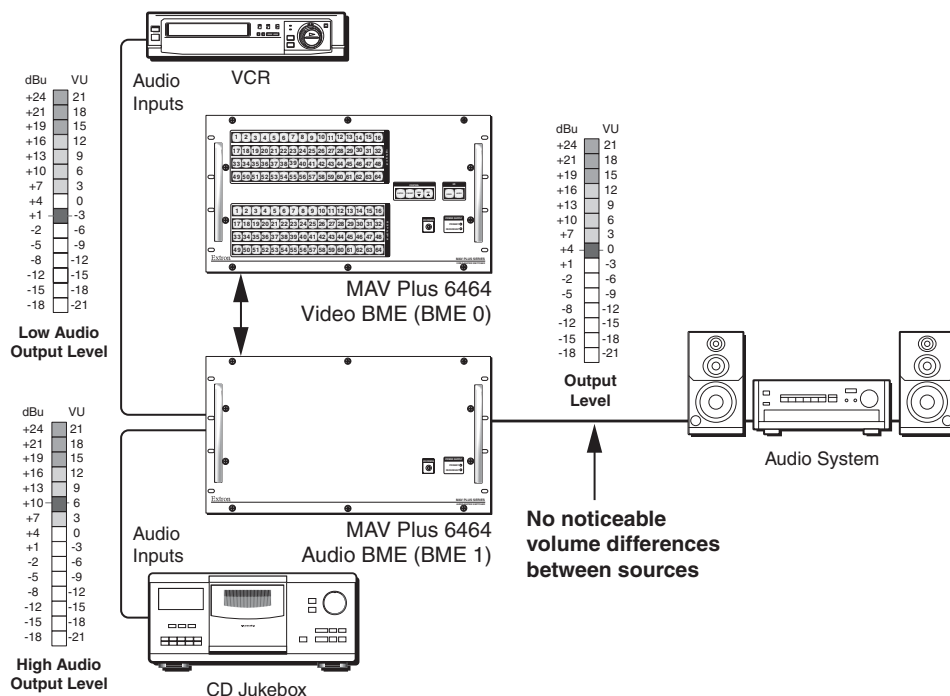


Figure 3-53 — Audio gain and attenuation

- Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
- To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
- Press and release an input button to select an input. The output buttons display audio level and polarity (+ or -) for the selected input. Each lit output button indicates 1 dB of gain or attenuation. Green output buttons indicate a gain (+) audio level and red buttons indicate an attenuation (-) level.
- Press and release the Esc (▲) and View (▼) buttons to increase and decrease the audio level by 0.5 dB per push of the button.

- Press and release the Audio button to exit the *Audio* mode. The Audio button stops blinking.

- NOTE**
- Pressing the Enter or Preset button also exits *Audio* mode. Pressing the Preset button changes to Recall Preset mode.
 - There is one audio level setting per input. The audio level setting is shared by the left and right audio inputs.
 - The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
 - Exiting *Audio* mode by pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red (video and audio selected for configuration).

Example 10: Viewing and adjusting an input audio level

In the following example, an audio level is viewed and adjusted. The steps show the front panel indications that result from your action.

The output buttons display the audio gain and attenuation by each indicating 1 dB when lit. Output buttons lit green indicate gain; output buttons lit red indicate attenuation.

- Press and release the Esc button (figure 3-54).

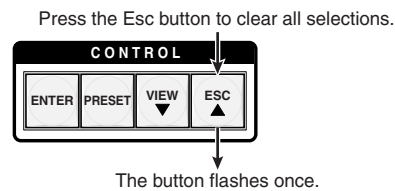


Figure 3-54 — Clear all selections

- Press and **hold** the Audio button for approximately 2 seconds (figure 3-55).

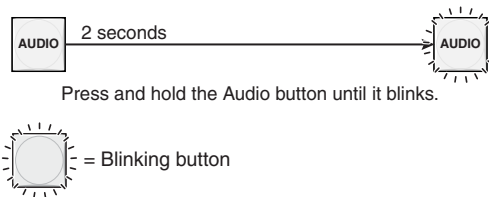
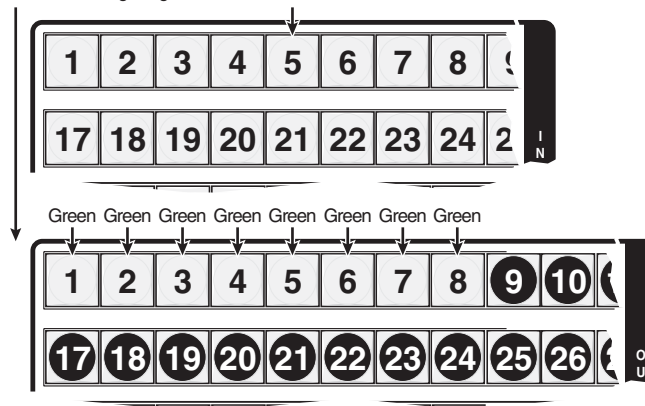


Figure 3-55 — Select Audio mode

Operation, cont'd

- Press and release the input 5 button (figure 3-56).

Press and release the Input 5 button.
The button lights green.



The output buttons display the selected input's audio level and polarity (gain or attenuation). Each output button indicates 0.5 dB when flashing and 1 dB when lit steadily. When the buttons are lit **green**, they indicate a **gain (+)** audio level. When the output buttons are lit **red**, they indicate an **attenuation (-)** level. In this example, the output buttons display an audio gain level of +8 dB.

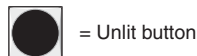


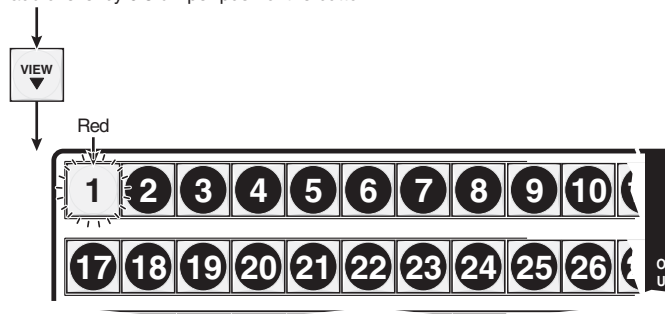
Figure 3-56 — Select an input

- Press and release the View (▼) button once (figure 3-57) to decrease the input audio level by 0.5 dB.

Press and release the View (▼) button several more times (figure 3-57) to decrease the input audio level by 0.5 dB per push. Note the output button indication changes that occur each time the View (▼) button is pressed.

Figure 3-57 shows the result of pressing the View (▼) button a total of 17 times. Note that the level is now displayed in red to indicate a negative level.

Press the View button to decrease the input audio level by 0.5 dB per push of the button.



The output buttons display the selected input's audio level and polarity (gain or attenuation). Each output button indicates 0.5 dB when flashing and 1 dB when lit steadily. When the buttons are lit **green**, they indicate a **gain (+)** audio level. When the output buttons are lit **red**, they indicate an **attenuation (-)** level. In this example, the output buttons display an audio attenuation level of -0.5 dB.



Figure 3-57 — Adjust the input audio level

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.

5. Press and release the Audio button (figure 3-58).

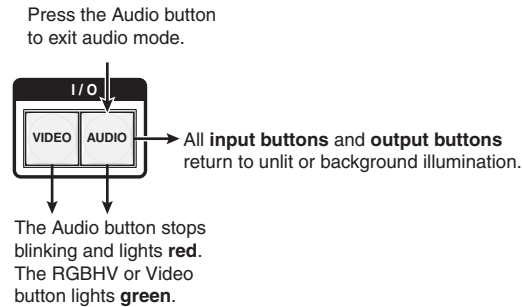


Figure 3-58 — Deselect Audio mode

Viewing and adjusting the output volume (systems with audio BMEs)

On MAV Plus audio BMEs, the audio level of each output can be displayed and adjusted through a range of 100% (no attenuation) to 0% (maximum [98 dB] attenuation). The audio level can be adjusted from the front panel or under RS-232/RS-422 or Ethernet control.

1. Press the Esc button to clear any input buttons, output buttons, or control buttons that may be lit.
2. To enter *Audio* mode, press and **hold** the Audio button until the button begins to blink red, then release the button.
3. Press and release an output button to select an output. The input buttons display the volume level for the selected output. The switcher indicates the volume; the more buttons that are lit, the higher the volume. The fewer buttons that are lit, the lower the volume.

For a more detailed analysis of decoding the displayed value, see *Reading the displayed volume* on the next page.

4. Press and release the Esc (▲) and View (▲) buttons to increase and decrease the audio volume.
5. Press and release the Audio button to save the audio settings and exit the *Audio* mode. The Audio button stops blinking.

- NOTE**
- There is one audio volume level setting per output. The audio level setting is shared by the left and right audio inputs.
 - The audio volume levels are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.
 - Exiting *Audio* mode by pressing the Audio button always returns the I/O buttons to Video lit green and Audio lit red (video and audio selected for configuration).
 - Pressing the Enter or Preset button also exits *Audio* mode. Pressing the Preset button changes to Recall Preset mode.

Operation, cont'd

Reading the displayed volume

NOTE *This section is a detailed look at reading the output volume display on the switcher's front panel. If you do not need to read the exact value of the volume setting, skip this section.*

There are a maximum of 98 dB of volume attenuation available, that is adjustable in steps of 0.5 dB, except for the first step from full attenuation, which is 34.5 dB. At maximum attenuation, no input buttons are lit, 98 dB of attenuation is applied, and the audio output is effectively muted. At no attenuation, all input buttons are lit and the output volume is equal to the input signal plus any gain or attenuation that is applied to that specific input using the input audio level adjustment. See *Viewing and adjusting the input audio level (systems with audio BMEs)*. See the table on the next page to read the volume display for each display scheme.

The input buttons light sequentially to indicate the approximate volume of the selected output. Volume is defined as a percentage of the input audio signal that is applied to the output. From 0% of volume, the first Esc (▲) button push applies 4.75% of the input audio signal and the Input 1 button flashes. From 4.75% on, each push of the Esc (▲) button applies 0.75% more of the input audio signal to the output and the number of output buttons flashing or lit increases:

- **Push Esc (▲) button** — $4.75\% + 0.75\% = 5.5\%$ volume, indicated by the Input 1 button lit steadily.
- **Push Esc (▲) button three more times** — $5.5\% + 0.75\% + 0.75\% + 0.75\% = 7.75\%$ volume, indicated by the Input 1 and Input 2 buttons lit steadily and the Input 3 button flashing.
- **Push Esc (▲) button nineteen more times** — $7.75\% + (19 \cdot 0.75\%) = 22\%$ volume, indicated by the Input 1 through Input 12 buttons lit steadily.

















































































































When all input buttons are lit, the audio output is 100% of the audio input level.

Another way to view the volume level is to think in terms of the attenuation that is applied to the output. Attenuation reduction is indicated by the lit or blinking input buttons: when fewer input buttons are lit, attenuation is greater (and the volume is quieter).

- At minimum volume, all input buttons are unlit or background illuminated and 98 dB of attenuation is applied to the output. The audio output is effectively muted.
- The first step of volume increase causes the Input 1 button to flash. Attenuation is reduced by 34.5 dB (63.5 dB of attenuation is applied to the output).
- The second step of volume increase reduces the attenuation by an additional 0.5 dB (62.5 dB of attenuation is applied to the output). (The Input 1 button lights steadily.)
- Successive steps of volume increase cause consecutive buttons to flash and then light. Each consecutive **lit** button indicates a full 1 dB of **attenuation reduction**.
- The buttons' volume indications are additive. **For example:** Input 1 lit ([34.5 dB + 0.5 dB] of **attenuation reduction**) and Input 2 lit [0.5 dB + 0.5 dB] of **attenuation reduction**) indicate that the output **attenuation has been reduced** by a total of 36 dB:
($34.5\text{ dB} + 0.5\text{ dB} + 0.5\text{ dB} + 0.5\text{ dB} = 36\text{ dB}$).
- At full volume, no attenuation is applied to the output and all input buttons are lit steadily.

See the table on the next page to read the volume display.

Audio volume adjustment settings

Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume	Highest # input button lit	dB of attenuation	Output volume
None	98	0%									
 1	63.5	4.75%	 17	47.5	28.75%	 33	31.5	52.75%	 49	15.5	76.75%
1	63	5.5%	 17	47	29.5%	 33	31	53.5%	 49	15	77.5%
 2	62.5	6.25%	 18	46.5	30.25%	 34	30.5	54.25%	 50	14.5	78.25%
2	62	7%	 18	46	31%	 34	30	55%	 50	14	79%
 3	61.5	7.75%	 19	45.5	31.75%	 35	29.5	55.75%	 51	13.5	79.75%
3	61	8.5%	 19	45	32.5%	 35	29	56.5%	 51	13	80.5%
 4	60.5	9.25%	 20	44.5	33.25%	 36	28.5	57.25%	 52	12.5	81.25%
4	60	10%	 20	44	34%	 36	28	58%	 52	12	82%
 5	59.5	10.75%	 21	43.5	34.75%	 37	27.5	58.75%	 53	11.5	82.75%
5	59	11.5%	 21	43	35.5%	 37	27	59.5%	 53	11	83.5%
 6	58.5	12.25%	 22	42.5	36.25%	 38	26.5	60.25%	 54	10.5	84.25%
6	58	13%	 22	42	37%	 38	26	61%	 54	10	85%
 7	57.5	13.75%	 23	41.5	37.75%	 39	25.5	61.75%	 55	9.5	85.75%
7	57	14.5%	 23	41	38.5%	 39	25	62.5%	 55	9	86.5%
 8	56.5	15.25%	 24	40.5	39.25%	 40	24.5	63.25%	 56	8.5	87.25%
8	56	16%	 24	40	40%	 40	24	64%	 56	8	88%
 9	55.5	16.75%	 25	39.5	40.75%	 41	23.5	64.75%	 57	7.5	88.75%
9	55	17.5%	 25	39	41.5%	 41	23	65.5%	 57	7	89.5%
 10	54.5	18.25%	 26	38.5	42.25%	 42	22.5	66.25%	 58	6.5	90.25%
10	54	19%	 26	38	43%	 42	22	67%	 58	6	91%
 11	53.5	19.75%	 27	37.5	43.75%	 43	21.5	67.75%	 59	5.5	91.75%
11	53	20.5%	 27	37	44.5%	 43	21	68.5%	 59	5	92.5%
 12	52.5	21.25%	 28	36.5	45.25%	 44	20.5	69.25%	 60	4.5	93.25%
12	52	22%	 28	36	46%	 44	20	70%	 60	4	94%
 13	51.5	22.75%	 29	35.5	46.75%	 45	19.5	70.75%	 61	3.5	94.75%
13	51	23.5%	 29	35	47.5%	 45	19	71.5%	 61	3	95.5%
 14	50.5	24.25%	 30	34.5	48.25%	 46	18.5	72.25%	 62	2.5	96.25%
14	50	25%	 30	34	49%	 46	18	73%	 62	2	97%
 15	49.5	25.75%	 31	33.5	49.75%	 47	17.5	73.75%	 63	1.5	97.75%
15	49	26.5%	 31	33	50.5%	 47	17	74.5%	 63	1	98.5%
 16	48.5	27.25%	 32	32.5	51.25%	 48	16.5	75.25%	 64	0.5	99.25%
16	48	28%	 32	32	52%	 48	16	76%	 64	0	100%

 = blinking LED

Operation, cont'd

Example 11: Viewing and adjusting an output volume level

In the following example, the audio output volume is viewed and adjusted. The steps show the front panel indications that result from your action. See the table on page 3-37 to read the displayed audio output volume.

1. Press and release the Esc button (figure 3-59).

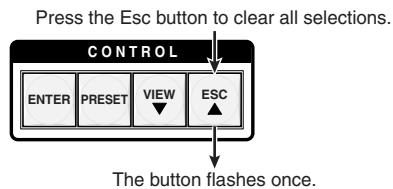


Figure 3-59 — Clear all selections

2. Press and **hold** the Audio button for approximately 2 seconds (figure 3-60).

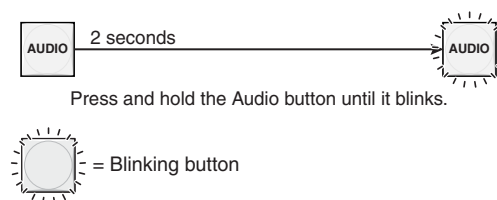


Figure 3-60 — Select Audio mode

3. Press and release the output 17 button (figure 3-61).

The input buttons display the selected output's audio volume level.

Each lit input button beyond input 1 indicates 1.5 percent of the total input volume is applied to the output.

In this example, the **green** input buttons indicate 41.5 percent of the applied audio input. The **unlit** input buttons indicate an audio volume **attenuation** of 39 dB.

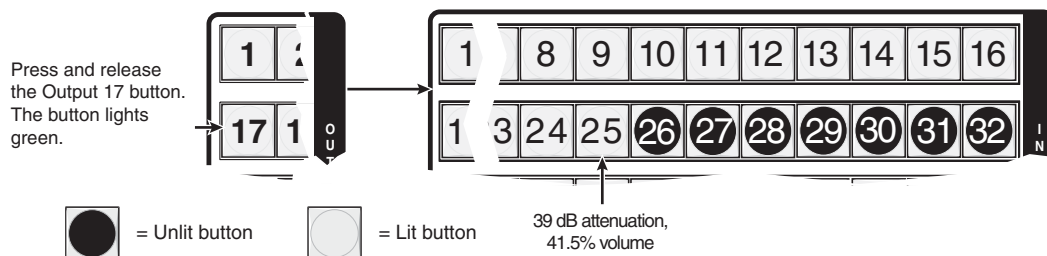


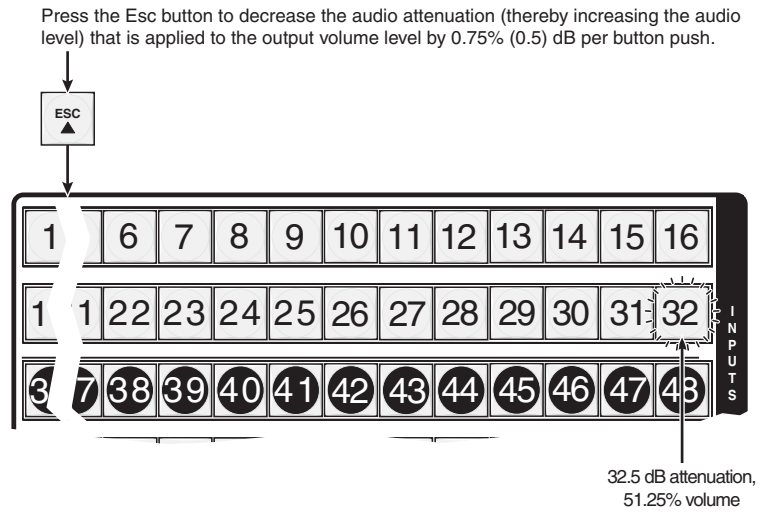
Figure 3-61 — Select output 17

4. Press and release the Esc (▲) button once (figure 3-62) to increase the volume by 0.75%.

Press and release the Esc (▲) button several more times (figure 3-62) to increase the volume by 0.75% (0.5 dB) per button push. Note the input button indication changes that occur each time the Esc (▲) button is pressed and released.

NOTE You can press and **hold** the Esc (▲) or View (▼) button to ramp the level up or down by 3 dB per second to the high or low limit.

Figure 3-62 show the result of pressing the Esc (▲) button a total of 13 times.



The input buttons display the selected output's audio volume level.

Each lit input button beyond input 1 indicates 1.5 percent of the total input volume is applied to the output.

In this example, the lit and flashing input buttons display 51.25 percent of the applied audio input. The flashing and unlit input buttons indicate an audio volume **attenuation** of 32.5 dB.

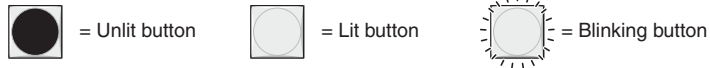


Figure 3-62 — Adjust the output audio volume

5. Press and release the Audio button (figure 3-63).

Press the Audio button to exit audio mode.

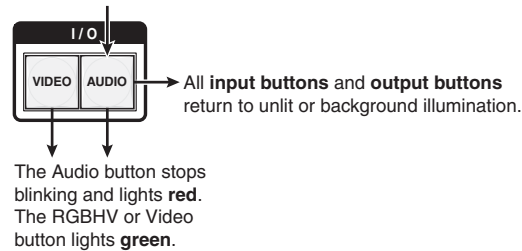


Figure 3-63 — Deselect Audio mode

Locking out the front panel (*Executive mode*)

NOTE In a system with multiple front panel controllers, Extron recommends locking the front panel of BMEs other than BME 0 to prevent confusion.

The front panel security lockout limits the operation of the switcher system from the front panel controller. When the switcher is locked, all of the front panel functions are disabled except for the *View-Only* mode functions. See *Viewing a configuration* on page 3-16. Other than in *View-Only* mode, if the user pushes a front panel button when the switcher is locked, the RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) and Audio buttons flash twice and return to their previous state.

To toggle the lock on and off, press and hold the RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) button and the Audio button for approximately two seconds (figure 3-64).

Press and **hold** the RGBHV /Video and Audio buttons simultaneously to toggle executive mode on or off.

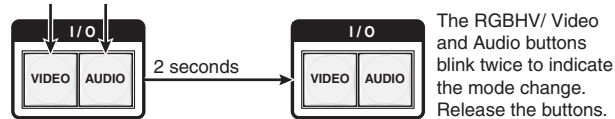


Figure 3-64 — Toggle front panel lock on or off

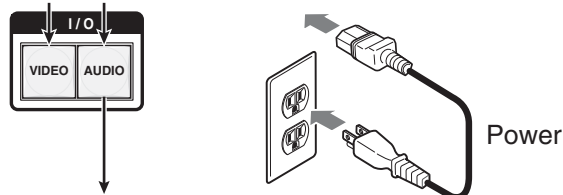
Performing a system reset from the front panel

The front panel reset is identical to the `Esc/ZXXX← SIS` command (see chapter 4, *SIS Programming and Control*). A system reset clears all ties and presets, all video and audio mutes, resets all I/O grouping, sets all input audio levels to unity gain (+0 dB), and sets all output volume levels to 100% (0 dB of attenuation).

Reset the switcher to the factory default settings by pressing and **holding** the RGBHV (CrossPoint 450 Plus) or Video (MAV Plus) button and Audio button **while** you apply AC power to the switcher (figure 3-65).

NOTE System reset does not reset the Internet protocol (IP) settings or replace user-installed firmware.

Press and **hold** the RGBHV/Video and Audio buttons while you apply power to the switcher.



The switcher flashes the button indicators **green, red, and amber** and then turns them off. Continue to hold the RGBHV/Video and Audio buttons until all input and output buttons return to either unlit or to background illumination and the RGBHV or Video and Audio buttons turn on.

Release the RGBHV/Video and Audio buttons.

Figure 3-65 — System reset

Background illumination

The buttons on the front panel can be set to provide amber background illumination at all times or the background illumination can be turned off. To toggle the background illumination on or off, press and hold the Input 1 and Input 2 buttons for approximately two seconds (figure 3-66).

Press and **hold** the Input 1 and Input 2 buttons simultaneously to toggle background illumination mode on or off.

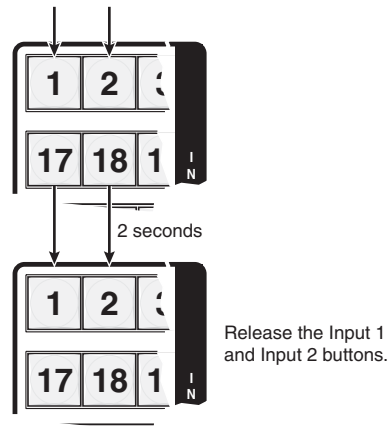


Figure 3-66 — Toggle background illumination on or off

Operation, cont'd

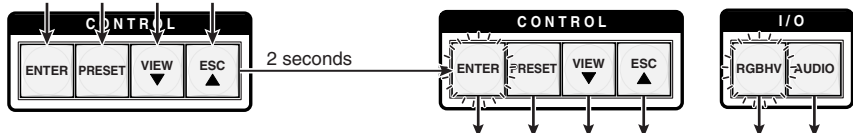
Selecting the rear panel Remote port protocol and baud rate

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

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

1. To enter *Serial Port Configuration* mode, simultaneously press and hold all Control buttons (Enter, Preset, View, and Esc) (figure 3-67).

Press and hold the Enter, Preset, View, and Esc buttons.



All Control buttons light with one flashing.
Both I/O buttons light with one flashing.
The flashing Control button indicates the **baud rate** as follows:
Enter — 9600 Preset — 19200
View — 38400 Esc — 115200
The flashing I/O button indicates the **protocol** as follows:
RGBHV/Video — RS-232 Audio — RS-422/RS-485
In this example, the port is set to RS-232 at 9600 baud.

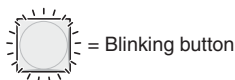


Figure 3-67 — RS-232/RS-422 and baud rate display

2. Release the Control buttons.
3. To change a value, press and release the button that relates to the desired value (figure 3-68).

Press and release the button(s) to configure the port as follows:

Baud rate:

Enter — 9600 Preset — 19200
View — 38400 Esc — 115200

Serial protocol:

RGBHV/Video — RS-232 Audio — RS-422/RS-485

The selected buttons blink and the others remain lit.

In this example, the port is set to RS-422 at 38400 baud.

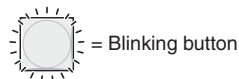
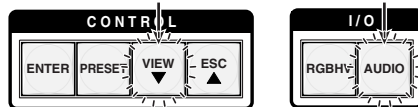


Figure 3-68 — RS-232/RS-422 and baud rate selection

4. Press and release an input or output button to exit the *Serial Port Configuration* mode (figure 3-69).

Press and release an input or output button.

All Control and I/O buttons return to unlit or background illumination.

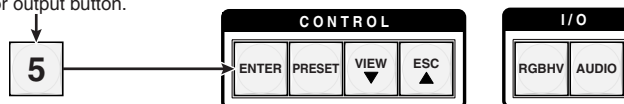


Figure 3-69 — Exit Serial Port Configuration mode

Rear Panel Controls

The rear panel has a Reset button that initiates four levels of matrix switcher resets. Press and hold the button while the switcher is running or while you apply power to the switcher for different reset levels.

Performing soft system resets

The CrossPoint 450 Plus and MAV Plus switchers have three soft resets available that restore various tiers of switcher settings to their default settings.

- **Events (mode 3) reset** — This function toggles the monitoring of events on or off (if events monitoring was on, this function turns it off; if it was off, it is turned on).
- **IP settings (mode 4) reset** — The IP settings reset performs the following functions:
 - Enables Arp program capability
 - Resets the IP address to the factory default (192.168.254.254)
 - Resets the subnet mask to the factory default (255.255.0.0)
 - Resets the gateway address to its factory default (0.0.0.0)
 - Resets port mapping to the factory default:
 - Rear port = primary
 - Front port = secondary
 - Both ports = 9600 baud, 8 data bits, 1 stop bit, no parity
 - Turn DHCP off
 - Turn events off

NOTE *IP settings reset does not replace any user-installed firmware.*

- **Absolute (mode 5) reset** — Absolute reset restores the switcher to the default factory conditions, including the IP settings. This function is identical to the `[Esc]ZQQQ←` SIS command, see chapter 4, *SIS Programming and Control*.

Operation, cont'd

Perform a soft reset of the switcher as follows:

1. Press and **hold** the Reset button until the Reset LED blinks once (events reset), twice (system reset), or three times (absolute reset) (figure 3-70).

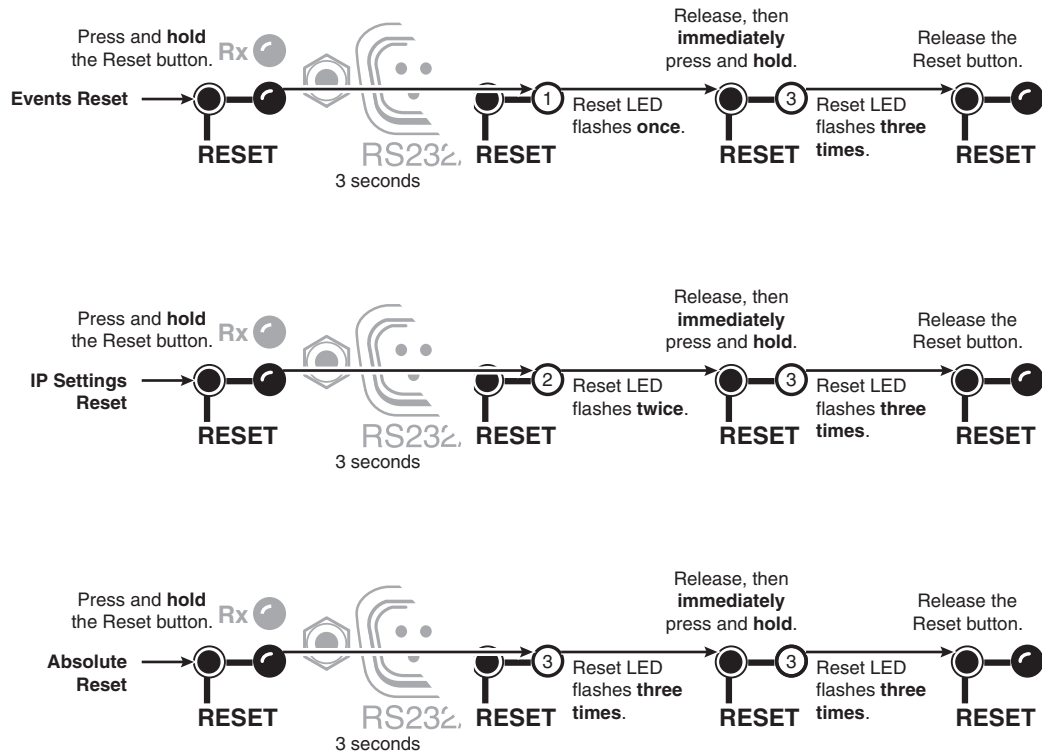


Figure 3-70 — Whole switcher and absolute resets

2. Release the Reset button and then immediately press and **hold** the button until the LED flashes three times. Release the Reset button. Nothing happens if the second momentary press does not occur within 1 second.

Performing a hard reset

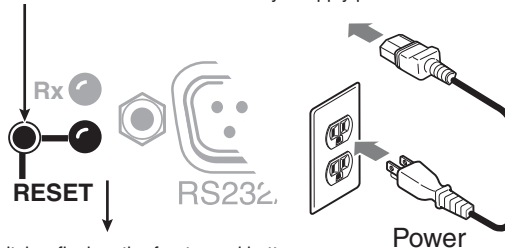
The hard reset function restores the switcher to the base firmware that it shipped with. After a hard reset, events do not automatically start, but user settings and files are restored. Perform a hard reset as follows:

NOTE The hard reset restores the factory-installed firmware. The switcher reverts to that factory firmware the next time power is cycled off and on unless a firmware update is performed before the power cycle.

NOTE Hard reset does *not* clear the current configuration.

1. If necessary, turn off power to the switcher.
2. Press and **hold** the Reset button on the rear panel **while** you apply AC power to the switcher (figure 3-71).

Press and **hold** the Reset button while you apply power to the switcher.



The switcher flashes the front panel button indicators **green**, **red**, and **amber** and then turns them off. Continue to hold the Reset button until all input and output buttons return to either unlit or to background illumination and the RGBHV or Video and Audio buttons turn on.

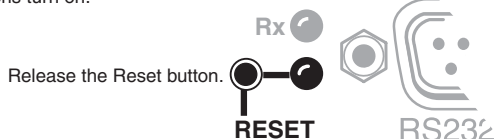


Figure 3-71 — Hard reset

Optimizing the Audio (Systems with Audio BMEs)

Each individual input audio level can be adjusted within a range of -18 dB to +24 dB, so there are no noticeable volume differences between sources and for the best headroom and signal-to-noise ratio. Adjust the audio gain and attenuation as follows:

1. Connect audio sources to all desired inputs and connect the audio outputs to output devices such as audio players. See *Audio input and output (systems with audio BMEs)*, in chapter 2, *Installation*. For best results, wire all of the inputs and the outputs balanced.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see *Creating a configuration*, in this chapter), listening to the audio with a critical ear or measuring the output audio level with test equipment, such as a VU meter.
4. As necessary, adjust the input audio level of each input (see *Viewing and adjusting the input audio level (systems with audio BMEs)*, in this chapter) so that the approximate output level is the same for all selected inputs.
5. As necessary, adjust the output audio level of each input (see *Viewing and adjusting the output volume (systems with audio BMEs)*, in this chapter).

Troubleshooting

This section gives recommendations on what to do if you have problems operating the CrossPoint 450 Plus or MAV Plus switcher, and it describes an actual image problem that Extron has encountered.

General checks

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if one of the front panel Power Supply LEDs is lit green.
2. Check to see if one or more outputs are muted.
3. Ensure an active input is selected for output on the switcher.
4. Ensure that the proper signal format is supplied.
5. Check the cabling and make corrections as necessary.
6. Call the Extron S³ Sales & Technical Support Hotline if necessary.

Plasma display S-video problem (CrossPoint 450 Plus wideband BMEs only)

Extron has encountered a problem when a CrossPoint 450 Plus wideband switcher BME routes S-video that is output by some video conference codecs. Some codecs change the DC offset on the chrominance (C) so that it is very different from the level on the luminance (Y). This can cause a plasma display to come up in the wrong size mode.

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

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

Configuration Worksheets

Rather than trying to remember the configuration for each preset, use worksheets to record this information. Make copies of the blank worksheet on page 3-51 and use one for each preset configuration. The worksheet accommodates all of the matrix sizes available with the CrossPoint 450 Plus and MAV Plus models documented in this manual. Cross out all unused or inactive inputs and outputs. Use different colors for video and audio.

Worksheet example 1: System equipment

Figure 3-72 shows a worksheet for a 48-input by 32-output system in a fictional organization with the system hardware annotated. Inputs 10, 11, 25, 30, 35, 40, and 45 through 48 have no connections in this organization, so they have been crossed out on the worksheet. Inputs 49 through 64 do not exist on this model, so they are crossed out. Similarly, outputs 7, 14, 15, 16, and 33 through 64 are crossed out.

Inputs include PCs, an audio CD player, cameras, and an Extron VTG 450. Output devices include monitors, front and rear projectors, a stereo, and a VCR for recording presentations.

The Extron VTG 450 video test generator connected to input 12 enables a video test pattern to be sent to one, several, or all output devices for problem isolation or adjustment purposes. An audio test tape or CD could be used in a similar manner to check out the audio components.

Input sources															
Camera main podium	Camera #2	Podium mic	Laptop RGB 201	Audio CD	Classrm #1 VCR DVS 406	Classrm #2 VCR DVS 406	PC1 R6B 201	Rack DVD (DVS)	X	X	VT6 450	Floorbox #1-1	Floorbox #1-2	Floorbox #1-3	Floorbox #1-4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Floorbox #2-1	Floorbox #2-2	Floorbox #2-3	Floorbox #2-4	Demo rk #1 USP 405	Demo rk #2 USP 405	Demo rk #3 USP 405	Demo rk #4 USP 405	X	Floorbox #3-1	Floorbox #3-2	Floorbox #3-3	Floorbox #3-4	X	Floorbox #4-1	Floorbox #4-2
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Floorbox #4-3	Floorbox #4-4	X	Floorbox #5-1	Floorbox #5-2	Floorbox #5-3	Floorbox #5-4	X	Demo rk #5 USP 405	Demo rk #6 USP 405	Demo rk #7 USP 405	Demo rk #8 USP 405	X	X	X	X
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Main hall PJ#1	Main hall PJ#2	Podium monitor	Conf. room	Sound system #2	VCR (USP 405)	X	Lobby monitor	Class room #1 monitor	Class room #2 monitor	Demo room PJ#1	Demo rack monitor	Demo rack switcher	X	X	X
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Demo wallbox #1-1	Demo wallbox #1-2	Demo wallbox #2-1	Demo wallbox #2-2	Demo wallbox #3-1	Demo wallbox #3-2	Demo wallbox #4-1	Demo wallbox #4-2	Demo wallbox #5-1	Demo wallbox #5-2	Demo wallbox #6-1	Demo wallbox #6-2	Demo wallbox #7-1	Demo wallbox #7-2	Demo wallbox #8-1	Demo wallbox #8-2
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Output destinations

Preset # _____ Title: _____

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

Figure 3-72 — Worksheet example 1: System equipment

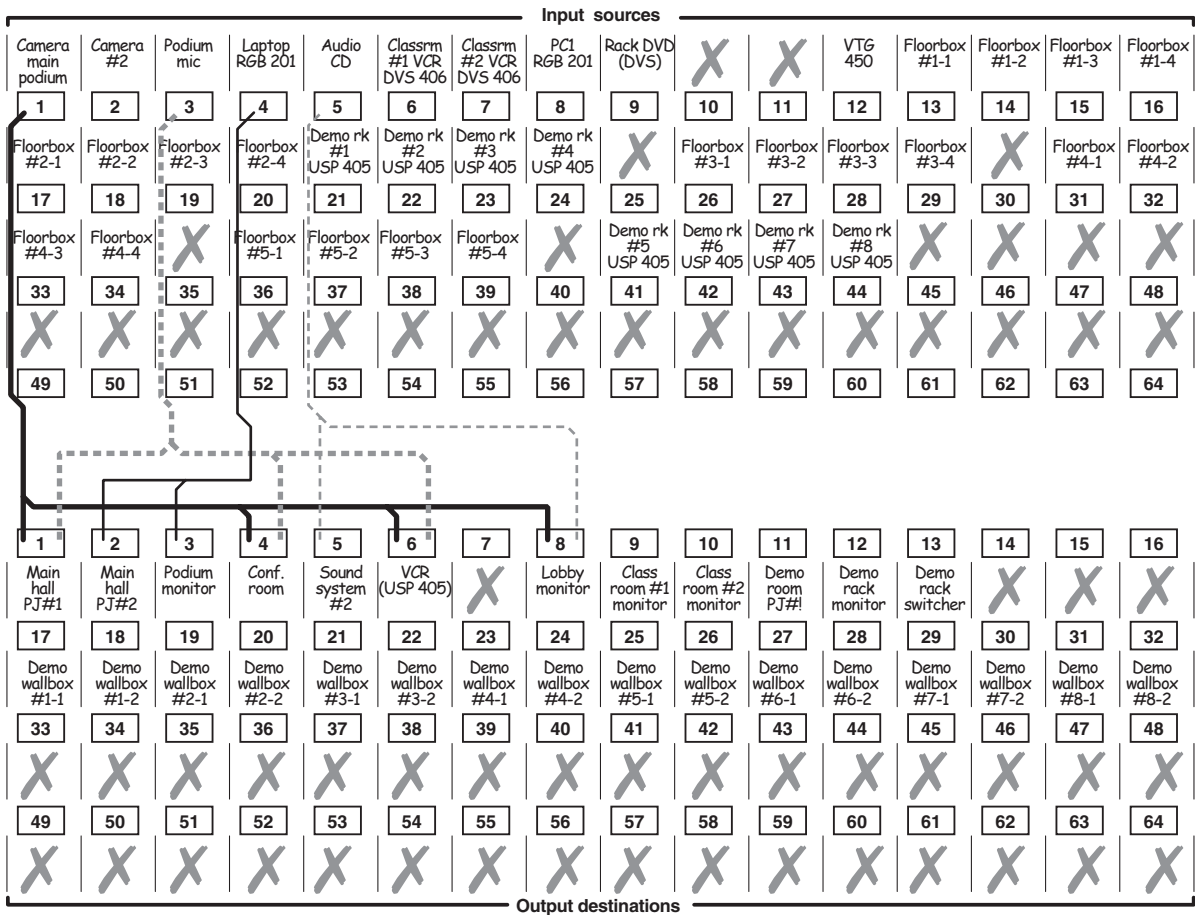
Worksheet example 2: Daily configuration

Figure 3-73 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.

NOTE *Large matrix sizes can become very complex. Extron suggests using various colors of ink and/or pencil and careful routing of drawn lines for ease of tracking connection lines.*

In this example:

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



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

Figure 3-73 — Worksheet example 2: Daily configuration

Operation, cont'd

Worksheet example 3: Test configuration

The A/V system in our fictional organization needs to be fine tuned on a regular basis. Figure 3-74 shows a typical test configuration, with an Extron video test generator (input 12) generating a test pattern to all connected outputs. Sound checks are run from the CD player (input 5) to all output devices that accept audio (outputs 1, 2, 4, 5, and 8).

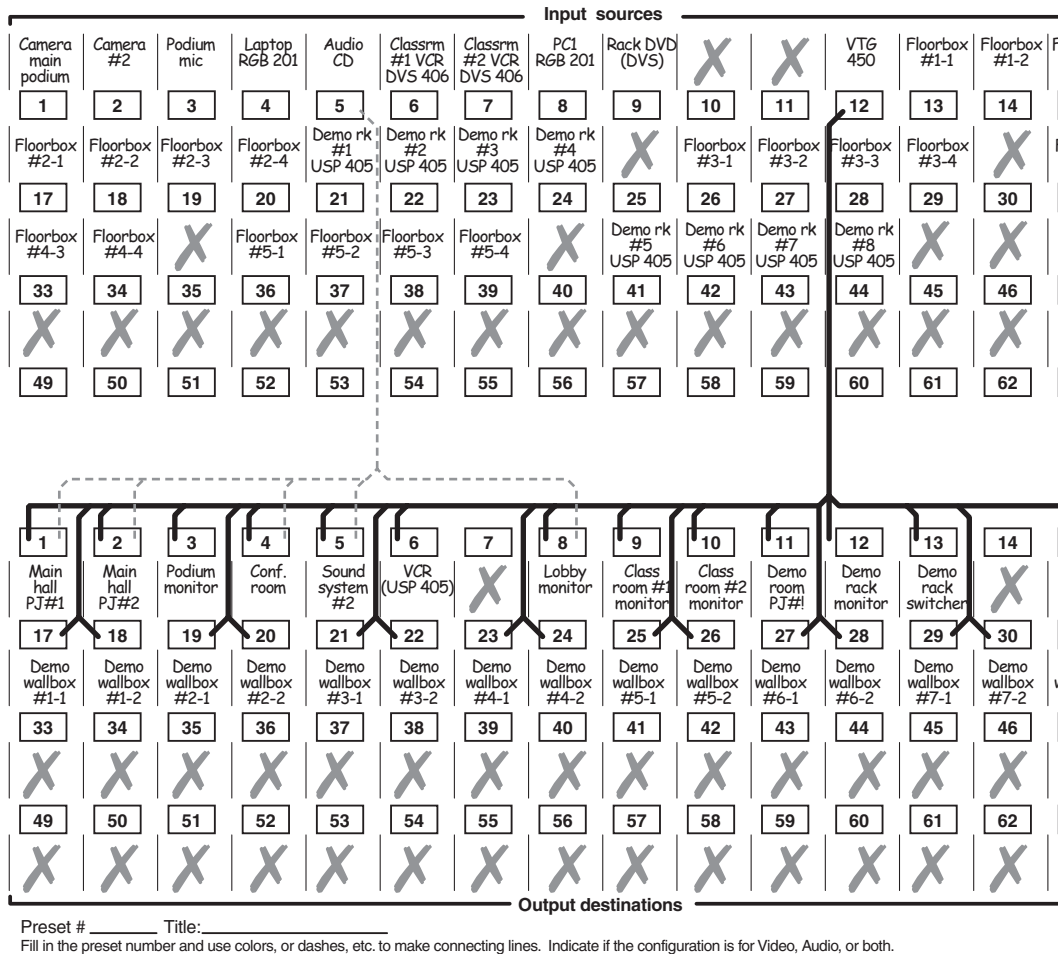
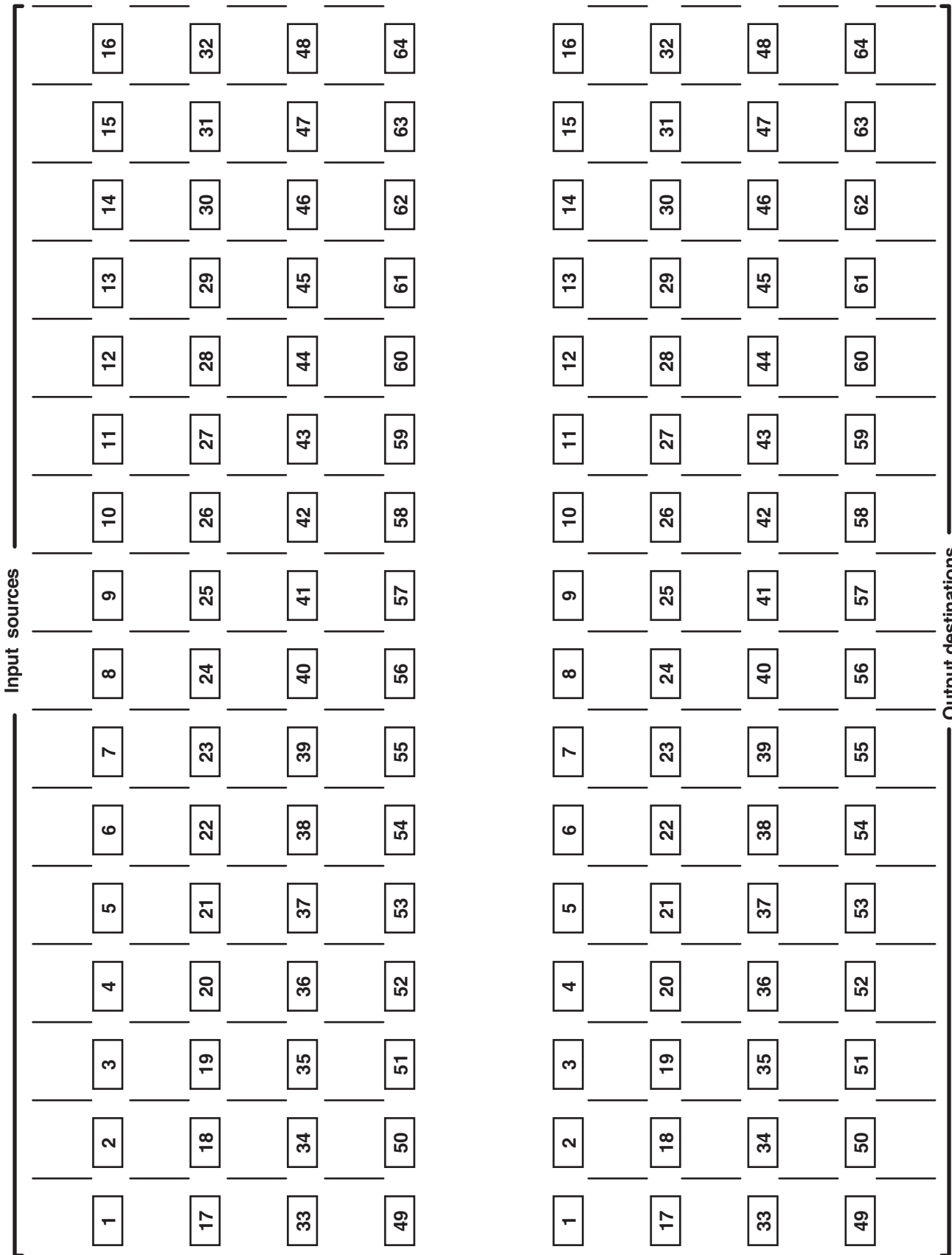


Figure 3-74 — Worksheet example 3: Test configuration



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

Blank configuration worksheet

Operation, cont'd



CrossPoint 450 Plus and MAV Plus Switchers

4 Chapter Four

SIS Programming and Control

RS-232 and RS-422 Links

Ethernet Link

Host-to-Switcher Instructions

Switcher-Initiated Messages

Switcher Error Responses

Using the Command/Response Tables

Command/Response Table for SIS Commands

Command Response Table for IP SIS Commands

Special Characters

SIS™ Programming and Control

RS-232 and RS-422 Links

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

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

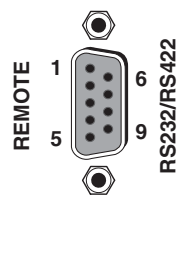
The default protocol for both ports is as follows:

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

Rear panel Remote port

The rear panel Remote RS-232/RS-422 port (figure 4-1) can be configured for either RS-232 or RS-422. The port can operate at the 9600, 19200, 38400, or 115200 baud rate.

NOTE *The rear panel Remote RS-232/RS-422 port can be configured from the front panel or using Simple Instruction Set (SIS) commands. See Selecting the rear panel Remote port protocol and baud rate in chapter 3, Operation, to configure the port from the front panel. See the Set serial port parameters command on page 4-21 to configure the port using an SIS command.*



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

Figure 4-1 — Remote connector pin assignments

Front panel Configuration port

The front panel Configuration port is hard configured as RS-232 only. The port can operate at the 9600, 19200, 38400, or 115200 baud rate, *but Extron recommends leaving this port at 9600 baud only.*

NOTE *The front panel Configuration port can be configured using SIS commands only. See the Set serial port parameters command on page 4-21 to configure the port using an SIS command.*

The optional 9-pin D to 2.5 mm stereo mini TRS RS-232 cable, part #70-335-01 (figure 4-2) can be used for connection to the Configuration port.

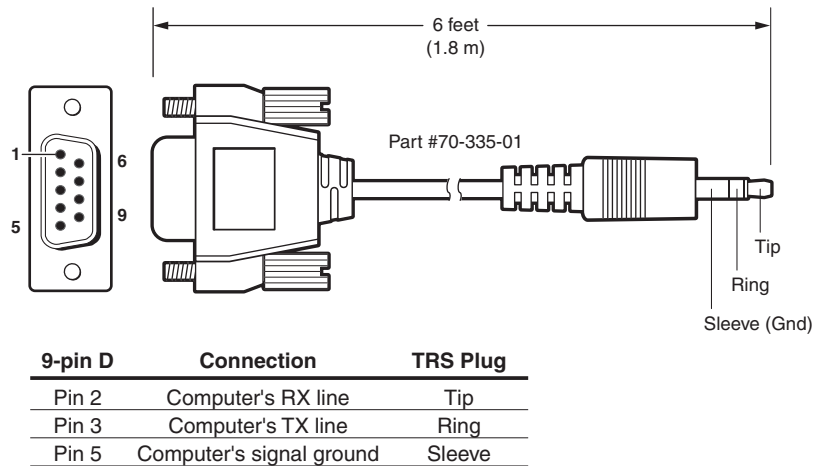


Figure 4-2 — Optional 9-pin TRS RS-232 cable

Ethernet Link

The rear panel Ethernet connector on the switcher can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN or WAN.

Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure 4-3).

- **Crossover cable** — Direct connection between the computer and the CrossPoint 450 Plus or MAV Plus switcher.
- **Patch (straight) cable** — Connection of the CrossPoint 450 Plus or MAV Plus switcher to an Ethernet LAN.

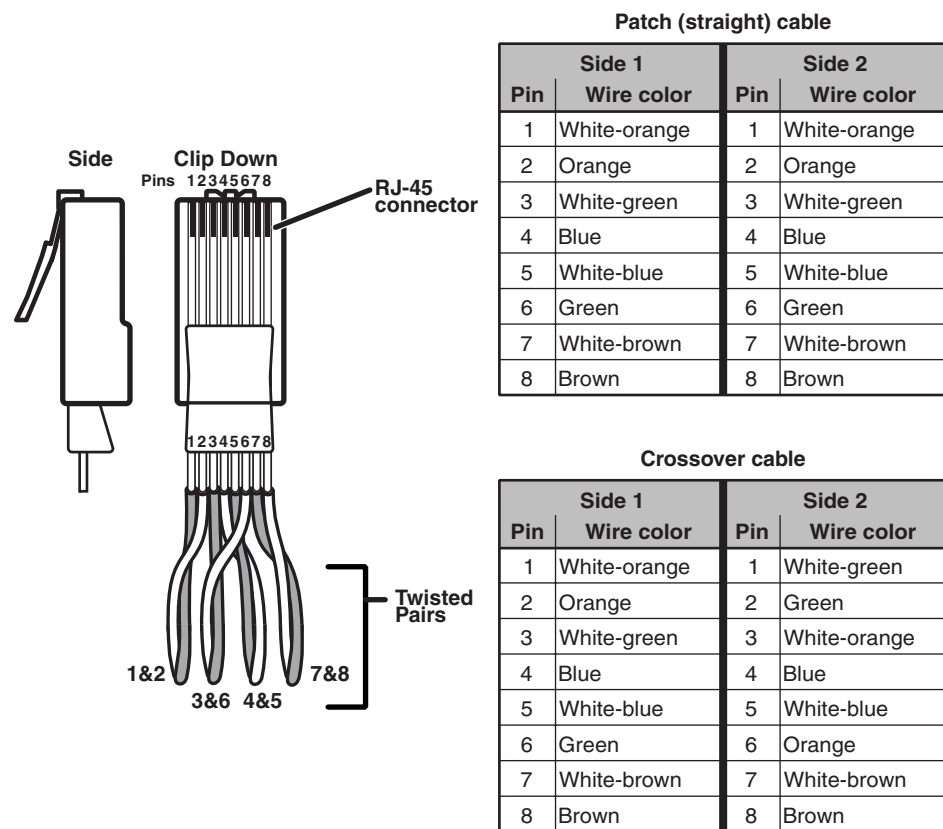


Figure 4-3 — RJ-45 Ethernet connector pin assignments

Default IP addresses

To access the CrossPoint 450 Plus or MAV Plus switcher via the Ethernet port, you will need the Extron IP address, and may need the subnet mask and the gateway address. If the IP address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the ping (ICMP) utility (see appendix A, *Ethernet Connection*, for more details). If the addresses have not been changed, the factory-specified defaults are:

- IP address 192.168.254.254
- Subnet mask 255.255.0.0
- Gateway address 0.0.0.0

Host-to-Switcher Instructions

The switcher accepts SIS commands through the RS-232/RS-422 port and Ethernet port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each switcher response to an SIS command ends with a carriage return and a line feed (CR/LF = **↵**), which signals the end of the response character string. A string is one or more characters.

Switcher-Initiated Messages

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

(C) Copyright 2006, Extron Electronics CP 450 MAV Plus, Vx.xx, nn-*nnn*-nn, date/time**↵**

The switcher initiates the copyright message when it is first powered on or when connection via Internet protocol (IP) is established. "Vx.xx" is the firmware version number. "nn-*nnn*-nn" is the BME's part number. "date/time" is the date and time of the connection and is only reported when the connection is made via the IP port.

↵Password:

The switcher initiates the password message immediately after the copyright message when the controlling system is connected using TCP/IP or Telnet and the switcher is password protected. This message means that the switcher requires an administrator or user level password before it will perform the commands entered via this link. The switcher repeats the password message response for every entry other than a valid password until a valid password is entered.

↵Login Administrator**↵**

↵Login User**↵**

The switcher initiates the login message when a correct administrator or user password has been entered. If the user and administrator passwords are the same, the switcher defaults to administrator privileges.

Qik**↵**

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

Sprnn**↵**

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

Rprnn**↵**

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

Innn Audxx**↵**

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

Outnn Volxx**↵**

The switcher initiates the Vol message when a front panel output audio volume change has occurred. "nn" is the output number and "xx" is the volume level.

SIS™ Programming and Control, cont'd

Vmtm•x←**↓**

The switcher initiates the Vmt message when a video output mute is toggled on or off from the front panel. "nm" is the output number, • is a space, and "x" is the mute status: 1 = on, 0 = off.

Amtm•x←**↓**

The switcher initiates the Amt message when an audio output mute is toggled on or off from the front panel. "nm" is the output number, • is a space, and "x" is the mute status: 1 = on, 0 = off.

Exen←**↓**

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

Switcher Error Responses

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

- E01 — Invalid input channel number (too large)
- E10 — Invalid command
- E11 — Invalid preset number
- E12 — Invalid output number (too large)
- E13 — Invalid value (out of range)
- E14 — Illegal command for this configuration
- E17 — Timeout (caused only by direct write of global presets)
- E21 — Invalid room number
- E24 — Privilege violation (Ethernet, Extron software only)

Using the Command/Response Tables

The command/response tables begin on page 4-8. Lower case letters are acceptable in the command field except where indicated for the gain and attenuation commands. The table below shows the hexadecimal equivalent of each ASCII character used in the command/response table.

ASCII to HEX Conversion Table										Esc 1B	CR 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

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

Symbol definitions

↵	= CR/LF (carriage return/line feed) (hex 0D 0A)	
←	= Carriage return (no line feed, hex 0D)	
•	= Space character	
Esc	= Escape key (hex 1B)	
X1	= Input number	01 – (maximum number of inputs for your model)
X2	= Input number (for tie)	00 – (maximum number of inputs for your model) (00 = untied)
X3	= Output number	01 – (maximum number of outputs for your model)
X4	= Numeric dB value	–18 to +24 (45 steps of gain or attenuation)
X5	= Audio gain	0 – 24 (1 dB/step)
X6	= Audio attenuation	1 – 18 (1 dB/step)
X7	= Volume adjustment range	0 – 64 (1 dB/step except for 0-to-1, which is 34.5 dB) (see the table on page 4-11)
X8	= Room # (for room presets)	10 max. (each can have up to 10 presets (X12 s) assigned)
NOTE	<i>A Room is a subset of operator-selected outputs that relate to each other. The switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.</i>	
X9	= Mute, executive mode, power supply	(0 = off/not OK, 1 = on/OK)
X10	= Group # (for I/O grouping)	1 through 4 groups (0 = no group)
X11	= Global preset #	64 maximum (0 = current configuration)
X12	= Room preset #	10 maximum (0 = current configuration for room)
NOTE	<i>A Room preset is a stored configuration with all of the outputs assigned to a single room. When a room preset is retrieved from memory, it becomes the current configuration.</i>	
X13	= RGB delay interval	Delay in ½ second increments (10 maximum)
X14	= Video/audio mute:	0 = no mutes 1 = video mute 2 = audio mute 3 = video and audio mute
X15	= Sync frequency	xxx.xx (frequency in Hz (V) or kHz (H))
X16	= Signal detection	0 = no input detected, 1 = input detected
X17	= Firmware version number to second decimal place (x.xx)	
X18	= BME type	1 = wideband video 2 = low resolution video 3 = Sync 4 = stereo audio 5 = Mono audio
X19	= # of connected BMEs in the system	1 through 6
X20	= Verbose firmware version-description-upload date/time.	See page 4-18.
X21	= Name	12 characters maximum for global, room preset, input, and output names 11 characters maximum for room names Upper- and lower-case alphanumeric characters and _ : = / and spaces are valid.
NOTE	<i>The following characters are invalid in the name: {space} ~ , @ = ' [ ] { } < > ' " ; : | \ and ?.</i>	
X22	= Voltage	Positive or negative voltage and magnitude
X23	= Temperature	Degrees Fahrenheit
X24	= Fan speed	RPM

SIS™ Programming and Control, cont'd

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*22&023*064%4*8\$. • 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 003*003). 			
Tie input X2 to output X3 , video (V) and audio (A) <i>Example:</i>	X2 * X3 ! 1*3!	Out X3 •In X2 •All← Out03•In01•All←	Tie input X2 's video and audio to output X3 . Tie input 1 video and audio to output 3.
Tie input X2 to output X3 , RGBHV only <i>Example (see Note):</i>	X2 * X3 & 10*4&	Out X3 •In X2 •RGB← Out04•In10•RGB←	Video breakaway. Tie input 10 RGB to output 4.
Tie input X2 to output X3 , video only <i>Example (see Note):</i>	X2 * X3 % 7*5%	Out X3 •In X2 •Vid← Out05•In07•Vid←	Video breakaway. Tie input 7 video to output 5.
NOTE The & tie command for RGB and the % tie command for video can be used interchangeably on the matrix switchers.			
Tie input X2 to output X3 , audio only <i>Example:</i>	X2 * X3 \$ 12*4\$	Out X3 •In X2 •Aud← Out04•In12•Aud←	Audio breakaway. Tie input 12 audio to output 4.
Quick multiple tie <i>Example:</i>	Esc +Q X2 * X3 !... X2 * X3 \$← Esc +Q3*4!3*5%3*6\$←	Qik← Qik←	Tie input 3 video and audio to output 4, tie input 3 video to output 5, and tie input 3 audio to output 6.
Tie input to all outputs, V & A <i>Example:</i>	X2 *! 5*!	In X2 •All← In05•All←	Tie input 5 video and audio to all outputs.
Tie input to all outputs, RGBHV only <i>Example (see Note):</i>	X2 *& 8*&	In X2 •RGB← In08•RGB←	Video breakaway. Tie input 8 video to all outputs.
Tie input to all outputs, video only <i>Example (see Note):</i>	X2 *% 10*%	In X2 •Vid← In10•Vid←	Video breakaway. Tie input 10 video to all outputs.
NOTE The & tie all command for RGB and the % tie all command for video can be used interchangeably on the matrix switchers.			
Tie input to all outputs, audio only	X2 *\$	In X2 •Aud←	Audio breakaway.
Read ties			
Read RGB output tie	X3 &	X2 ←	RGBHV input X2 tied to output X3 .
Read video output tie	X3 %	X2 ←	Video input X2 tied to output X3 .
NOTE The & read tie command for RGB and the % read tie command for video can be used interchangeably on the matrix switchers.			
Read audio output tie	X3 \$	X2 ←	Audio input X2 tied to output X3 .

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Digital Sync Validation Processing (DSVP)			
Individual sync frequency	$\boxed{X1}$ LS	$\boxed{X15}$, $\boxed{X15}$ ↵	Listed as horizontal frequency, vertical frequency.
<i>Example:</i>	2LS	031.5,060.00↵	Input 2 frequency is 31.5 kHz (horizontal) and 60 Hz (vertical).
NOTE The matrix switcher returns 000.00,000.00 if there is no connection or sync frequencies are not applicable.			
List input signal status for all inputs	0LS	$\boxed{X16}^1$, $\boxed{X16}^2$, $\boxed{X16}^3$, ... , $\boxed{X16}^n$ ↵	Each $\boxed{X16}$ value is an input. <i>n</i> is the highest-numbered input for this model.
RGB / Video mute			
RGB/video mute	$\boxed{X3}$ *1B	Vmt $\boxed{X3}$ *1↵	Mute RGB or video, output $\boxed{X3}$ (video off).
RGB/video unmute	$\boxed{X3}$ *0B	Vmt $\boxed{X3}$ *0↵	Unmute RGB or video, output $\boxed{X3}$ (video on).
Read RGB/video mute	$\boxed{X3}$ B	$\boxed{X9}$ ↵	1 = mute on, 0 = mute off.
Global RGB/video mute	1*B	Vmt1↵	Mute all RGB or video outputs.
Global RGB/video unmute	0*B	Vmt0↵	Unmute all RGB or video outputs.
RGB delay			
Set RGB delay	\boxed{Esc} $\boxed{X3}$ * $\boxed{X13}$ D↵	Out $\boxed{X3}$ •Dly $\boxed{X13}$ ↵	Set the RGB interval for switches to output 43 to 3.5 seconds (7 x 0.5).
<i>Example:</i>	\boxed{Esc} 43*7D↵	Out43•Dly07↵	
Read RGB delay	\boxed{Esc} $\boxed{X3}$ D↵	$\boxed{X13}$ ↵	Output 54 switching interval is 2.5 seconds (5 x 0.5).
<i>Example:</i>	\boxed{Esc} 54D↵	05↵	
Audio input gain and attenuation			
NOTE The set gain (G) and attenuation (g) commands are case sensitive.			
You can set the input level to whole dB values only , using the $\boxed{X1}$ * $\boxed{X5}$ G command. The increment and decrement level ($\boxed{X1}$ +G and $\boxed{X1}$ -G) commands increase and decrease the level in steps of 0.5 dB only . The $\boxed{X4}$ values for all audio gain and attenuation commands are reported in whole dB levels only; the reported $\boxed{X4}$ value is rounded up to the next higher magnitude value (for example, 1.5 dB is reported as 2 dB and -3.5 dB is reported as -4 dB).			
Set input audio gain to + dB value	$\boxed{X1}$ * $\boxed{X5}$ G	In $\boxed{X1}$ •Aud $\boxed{X4}$ ↵	Set input 1 audio gain to +2 dB.
<i>Example:</i>	1*2G	In01•Aud+02↵	
Set input audio attenuation to - dB value	$\boxed{X1}$ * $\boxed{X6}$ g	In $\boxed{X1}$ •Aud $\boxed{X4}$ ↵	Increase audio level by 0.5 dB.
<i>Example:</i>	55+G	In55•Aud+03↵	
Increment level	$\boxed{X1}$ +G	In $\boxed{X1}$ •Aud $\boxed{X4}$ ↵	Increment audio input 55 level from +2 dB to +2.5 dB.
<i>Example:</i>	55+G	In55•Aud+03↵	
Decrement level	$\boxed{X1}$ -G	In $\boxed{X1}$ •Aud $\boxed{X4}$ ↵	Decrease audio level by 0.5 dB.
<i>Example:</i>	7-G	In07•-09↵	
Read input gain	$\boxed{X1}$ G	$\boxed{X4}$ ↵	Decrement audio input 7 level from -08 dB to -8.5 dB.

SIS™ Programming and Control, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Audio output volume			
NOTE The table on the next page defines the value of each audio volume step.			
NOTE You can set the output volume to whole dB values <i>only</i> , using the <code>[X3][X7]V</code> command. The increment and decrement level (<code>[X3]+V</code> and <code>[X3]-V</code>) commands increase and decrease the volume in steps of 0.5 dB <i>only</i> . The <code>[X7]</code> values for all audio output volume commands are reported in whole dB levels only; the reported <code>[X7]</code> value is rounded up to the next higher magnitude value (for example, 3.5 dB is reported as 4 dB).			
Set audio volume to a specific value <i>Example:</i>	<code>[X3]*[X7]V</code> 1*50v	Out[X3]•Vol[X7]← Out01•Vol50←	Set output 1 volume to 79%.
Increment value <i>Example:</i>	<code>[X3]+V</code> 1+V	Out[X3]•Vol[X7]← Out01•Vol51←	Increase volume by 0.5 dB. Increment audio volume 0.5 dB, from 79% to 80.5%.
Decrement volume	<code>[X3]-V</code>	Out[X3]•Vol[X7]←	Decrease volume by 0.5 dB.
Read output volume	<code>[X3]V</code>	<code>[X7]←</code>	
Audio mute			
Audio mute	<code>[X3]*1Z</code>	Amt[X3]*1←	Mute audio output [X3] (audio off).
Audio unmute	<code>[X3]*0Z</code>	Amt[X3]*0←	Unmute audio output [X3] (audio on).
Read audio mute	<code>[X3]Z</code>	<code>[X9]←</code>	1 = mute on, 0 = mute off.
Global audio mute	1*Z	Amt1←	Mute all audio outputs.
Global audio unmute	0*Z	Amt0←	Unmute all audio outputs.
Names			
Write global preset name <i>Example:</i>	<code>[Esc][X11][X21]NG←</code> <code>[Esc]1,Security 1NG←</code>	Nmg[X11][X21]← Nmg01,Security 1←	Name global preset 1 "Security 1".
Read global preset name <i>Example:</i>	<code>[Esc][X11]NG←</code> <code>[Esc]2NG←</code>	<code>[X21]←</code> Security 2←	
Write room name <i>Example:</i>	<code>[Esc][X8][X21]NR←</code> <code>[Esc]1,Classrm 1NR←</code>	Nmr[X8][X21]← Nmr01,Classrm 1←	Name room 1 "Classrm 1".
Read room name	<code>[Esc][X8]NR←</code>	<code>[X21]←</code>	
Write room preset name <i>Example:</i>	<code>[Esc][X8]*[X12][X21]NP←</code> <code>[Esc]1*2,Podium_DVDNP←</code>	Nmp[X8]*[X12][X21]← Nmp01*03,Podium_DVD←	Name room 1, preset 3 "Podium_DVD".
Read room preset name	<code>[Esc][X8]*[X21]NP←</code>	<code>[X21]←</code>	
NOTE			
• If a preset is unassigned, then <code>[X21]</code> displays [unassigned].			
• If a global preset is saved, but not yet named, the default name is Preset•[X11].			
• If a room preset is saved, but not yet named, the default name is RM[X8]•Prst[X12].			
Write input name <i>Example:</i>	<code>[Esc][X1][X21]NI←</code> <code>[Esc]1,Podium cam1NI←</code>	Nmi[X1][X21]← Nmi01,Podium cam←	Name input 1 "Podium cam".
Read input name	<code>[Esc][X1]NI←</code>	<code>[X21]←</code>	
Write output name <i>Example:</i>	<code>[Esc][X3][X21]NO←</code> <code>[Esc]1,Main PJ1NO←</code>	Nmo[X3][X21]← Nmo01,Main PJ1←	Name output 1 "Main PJ1".
Read output name	<code>[Esc][X3]NO←</code>	<code>[X21]←</code>	

Audio output volume settings table

X7 value	dB of attenuation	Output volume	X7 value	dB of attenuation	Output volume	X7 value	dB of attenuation	Output volume
00	98	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

SIS™ Programming and Control, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
I/O grouping			
Write input grouping	<code>Esc</code> <code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ <code>I</code> ←	<code>Gri</code> <code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ ←	Each <code>X10</code> entry is the group number assigned to an input position, starting from input 1. <i>n</i> is the highest numbered input for this model.
<p>NOTE If verbose mode is off (see the Verbose mode SIS command), the Gri preface is omitted in the response.</p> <p>Example for MAV Plus 3264:</p> <pre> Esc40 ... 33I ← See below Input 1 in group 4 Input 2 not grouped Response #s = group: Gri 4 0 1 3 3 0 0 0 0 4 4 4 4 1 1 2 2 1 2 2 3 3 3 2 1 2 2 3 3 3 3 Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 </pre>			
Write output grouping	<code>Esc</code> <code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ <code>O</code> ←	<code>Gro</code> <code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ ←	Each <code>X10</code> entry is the group number assigned to an output position, starting from output 1. <i>n</i> is the highest number output for this model.
<p>NOTE If verbose mode is off (see the Verbose mode SIS command), the Gro preface is omitted in the response.</p>			
Read input grouping	<code>Esc</code> <code>I</code> ←	<code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ ←	One <code>X10</code> entry for each input, starting from input 1. <i>n</i> is the highest numbered input for this model.
<p>Example for CrossPoint Plus 4848:</p> <pre> EscI ← See below Input 1 in group 1 Input 9 not grouped Response = group: 1 1 1 3 3 0 0 0 0 4 4 4 4 1 1 1 1 1 1 2 2 3 3 3 3 2 1 2 2 3 3 3 3 Input: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 </pre>			
Read output grouping	<code>Esc</code> <code>O</code> ←	<code>X10</code> <code>X10</code> <code>X10</code> ³ ... <code>X10</code> ⁿ ←	One <code>X10</code> entry for each output, starting from output 1. <i>n</i> is the highest numbered output for this model.
<p>NOTE For all of the above I/O grouping commands, the group that is assigned (<code>X10</code>) must be 1, 2, 3, 4, or 0. 0 = (not grouped).</p>			

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, recall, and directly write presets			
<p>NOTE</p> <ul style="list-style-type: none"> • If the user tries to recall a preset that is not saved, the matrix switcher responds with the error code E11. • If the room is nonexistent, the matrix switcher responds with the error code E21. • The following characters are invalid in preset names: + ~ , @ = ' [ ] { } < > ' " ; : | \ and ?. 			
Save current the current configuration as a global preset	[X11]	Spr[X11]↵	Command character is a comma.
Example:	9,	Spr09↵	Save current ties as preset 9.
Direct write process —			
<p>NOTE The direct write of a global preset command should always be preceded by a clear global preset command of that same preset number, as shown below. In a directly-written preset, each output position's tied input (or no tied output) remains unchanged unless overwritten or cleared.</p> <p>If you do not clear a global preset number before you directly write a global preset to that number, ties that are part of the previous version of the specified preset can unexpectedly become part of the newly-created preset.</p>			
Clear a global preset	[Esc]+[X11]P0*!←	Spr[X11]↵	Clear all ties in preset [X11].
Directly write a global preset	[Esc]+[X11]P[X2]*[X3]|[X2]*[X3]*[X2]*[X3]*[X2]*[X3]\$... [X2]*[X3]&←	Spr[X11]↵	Enter as many ties as are valid for this model. The tie all (!), tie RGBHV (&), tie video (%), and tie audio (\$) commands are all valid.
Example:	[Esc]+27P0*!← [Esc]+27P22*5,15*29%13*26\$3*8&←	Spr27↵ Spr27↵	Brackets are shown to separate ties for clarity only. Create global preset 27, which ties video and audio input 22 to output 5, RGBHV input 15 to output 29, video input 13 to output 26, and audio input 3 to output 8.
Recall a global preset	[X11].	Rpr[X11]↵	Command character is a period.
Example:	5.	Rpr[X11]↵	Recall preset 5, which becomes the current configuration.
Write room outputs	[Esc][X8][Y1][Y2][Y3], ..., [Yn]MR←	Mpr[X8][Y1][Y2][Y3], ..., [Yn]↵	See notes.
<p>NOTE</p> <ul style="list-style-type: none"> • Each [Y#] is an output. • A room can contain a maximum of 16 outputs ([Y#]s). • An output can belong to one room only. • The maximum number of rooms ([X8]) is 10. • If no room name is assigned, the default name is "Room #[X8]•[Y1]•[Y2]•[Y3]". 			
Example:	[Esc]8,3,04,5,6MR←	Mpr8,03,04,05,06↵	Outputs 3, 4, 5, and 6 are assigned to room 8.
Read room outputs	[Esc][X8]MR←	[X21][Y1][Y2][Y3], ..., [Yn]↵	
Example:	[Esc]3MR←	Class 1,01,02,08,09↵	Outputs 1, 2, 8, and 9 are assigned to room 3, which is named "Class 1".
Save current configuration as a room preset	[X8]*[X12],	Rmm[X8]•Spr[X12]↵	Command character is a comma.
Example:	3*9,	Rmm03•Spr09↵	Save the current configuration as preset 9 for room 3.

SIS™ Programming and Control, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Save, recall, and directly write presets (continued)			
Directly write a room preset	<code>[Esc]+[X8]*[X12]P[X2]*[X3][X2]*[X3]%[X2]*[X3]\$... [X2]*[X3]& ←</code>	<code>Rmm[X8]•Spr[X12] ←</code>	Enter as many ties as are valid for this model. The tie all (!), tie RGBHV (&), tie video (%), and tie audio (\$) commands are all valid. <u>Brackets are shown to separate ties for clarity only.</u> Create preset 3 for room 7, which ties audio input 12 to output 7, video input 13 to output 35, RGBHV input 4 to output 26, and video and audio input 6 to output 6.
<i>Example:</i>	<code>[Esc]+7*3P12*7&13*35\$4*26%6*6! ←</code>	<code>Rmm07•Spr03]</code>	
Recall a room preset	<code>[X8]*[X12].</code>	<code>Rmm[X8]•Rpr[X12] ←</code>	
Front panel security lockout (Executive mode)			
Lock front panel	1X	Exe1 ←	Enable <i>Executive</i> mode.
Unlock front panel	0X	Exe0 ←	Disable <i>Executive</i> mode.
View front panel lock	X	[X9] ←	
Resets			
Reset global presets and names	<code>[Esc]ZG ←</code>	Zpg ←	Clear all global presets and their names.
Reset and individual global preset	<code>[Esc][X11]ZG ←</code>	Zpg[X11] ←	Clear global preset [X11].
Reset RGB delays	<code>[Esc]ZD ←</code>	Zpd ←	Reset all RGB delays to 0.0 seconds.
Reset audio input levels	<code>[Esc]ZA ←</code>	Zpa ←	Reset all audio input levels (gain and attenuation) to 0 dB.
Reset audio output levels	<code>[Esc]ZV ←</code>	Zpv ←	Reset all audio output levels (volume) to 100% (no attenuation).
Reset all mutes	<code>[Esc]ZZ ←</code>	Zpz ←	Reset all video and audio mute.
Reset room map	<code>[Esc]ZR ←</code>	Zpr ←	Clear all room presets
Reset individual room	<code>[Esc][X8]ZR ←</code>	Zpr[X8] ←	Clear all presets for room [X8].
Reset individual room preset	<code>[Esc][X8]*[X12]ZP ←</code>	Zpp[X8]*[X12] ←	Reset individual room preset and name.
Reset flash	<code>[Esc]ZFFF ←</code>	Zpf ←	Reset flash memory (erase user-supplied files).
Reset whole switcher	<code>[Esc]ZXXX ←</code>	Zpx ←	Clear all ties and presets, resets all audio gains to 0 dB, and resets the volume to 100%.
Absolute reset	<code>[Esc]ZQQQ ←</code>	Zpq ←	Similar to Reset whole switcher , plus sets the IP address to 192.168.254.254 and the subnet mask to 255.255.0.0.

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, and DSVP			
View RGBHV output tie <i>Example:</i>	X3 & 25&	X2 ← 37←	Input 37 RGBHV tied to output 25.
View video output tie <i>Example:</i>	X3 % 7%	X2 ← 02←	Input 2 video tied to output 7.
View audio output tie <i>Example:</i>	X3 \$ 3\$	X2 ← 06←	Input 6 audio tied to output 3.
View input gain <i>Example:</i>	X2 G 4G	X4 ← -02←	Gain for input 4 is -2 dB.
View output volume <i>Example:</i>	X2 V 7V	X7 ← 55←	Volume for output 7 is attenuated by 9 dB (86.5%).
View output mutes <i>Example:</i> (CrossPoint 450 Plus 6432)	Esc VM← Esc VM←	X14 ⁿ | X14 ⁿ⁺¹ | X14 ⁿ⁺² ... X14 ⁿ ← 00001000000230000000000000000000←	Each X14 response is the mute status of an output, starting from output 1. <i>n</i> is the highest numbered output for this model. Output 5 video is muted, output 12 audio is muted, and output 13 video and audio are muted. All other outputs are unmuted.
View video global preset configuration <i>Command description:</i> <i>Response description:</i> <i>Example:</i>	Esc X11 * X3 *1VC← Esc 4*17*1VC←	X2 ⁿ • X2 ⁿ⁺¹ • X2 ⁿ⁺² • ... • X2 ⁿ⁺¹⁵ • Vid← input 34 tied to output 19 no tied input input 8 tied to output 29 Response = tied input: 08•08•34•08•08•49•49•00•08•01•01•01•08•08•08•Vid← Output: 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32	Show preset X11 's video configuration. Show the video input tied to 16 sequential outputs, starting from output X3 .
<p>Each position show in the response is an output: left = starting, right = starting output+15. The number in each position is the input tied to that output.</p> <p>Video — Input 1 is tied to outputs 26 through 28; input 8 to outputs 17, 18, 20, 21, 25, and 29 through 32; input 34 to output 19; and input 49 to outputs 22 and 23. No input is tied to output 24.</p> <p>NOTE EscX11*X3*1VC← where X11 = 0 returns the switcher's current video configuration.</p>			

SIS™ Programming and Control, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, and DSVP (continued)			
View audio global preset configuration	<code>[Esc][X11]*[X3]*2VC←</code>	<code>[X2]ⁿ•[X2]ⁿ⁺¹•[X2]ⁿ⁺²•...•[X2]ⁿ⁺¹⁵•Aud←</code>	Show preset <code>[X11]</code> 's audio configuration. Show the audio input tied to 16 sequential outputs, starting from output <code>[X3]</code> .
<i>Command description:</i>	Preset# * starting output# (StO#) * 2(=audio) VC		
<i>Response description:</i>	Input# (I#) tied to StO#•I# tied to StO#+1•StO#+2•StO#+3•...•StO#+15•Aud←		
<i>Example:</i>	<code>[Esc]4*17*2VC←</code>		
		input 1 tied to output 3 no tied input input 58 tied to output 15	
		Response = tied input: 01•01•01•01•02•22•22•00•03•03•03•03•60•60•58•58•Aud←	
		Output: 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16	
Each position show in the response is an output: left = starting, right = starting output+15. The number in each position is the input tied to that output.			
Audio — Input 1 is tied to outputs 1 through 4, input 2 is tied to output 5, input 3 is tied to outputs 9 through 12, and input 22 is tied to outputs 6 and 7, input 58 is tied to outputs 15 and 16, input 60 is tied to outputs 13 and 14, and no input is tied to output 8.			
NOTE	<code>[Esc][X11]*[X3]*2VC←</code> where <code>[X11] = 0</code> returns the switcher's current audio configuration.		
View video room preset configuration	<code>[Esc][X8]*[X12]*1*1VC←</code>	<code>[X2]ⁿ•[X2]ⁿ⁺¹•[X2]ⁿ⁺²•...•[X2]ⁿ⁺¹⁵•Vid←</code>	Show room <code>[X8]</code> , preset <code>[X12]</code> 's video configuration. Show the video input tied to up to 16 outputs assigned to room <code>[X8]</code> .
<i>Command description:</i>	Room#* room preset#* starting output# (recommended value = 1) * 1(=video) VC		
NOTE	<ul style="list-style-type: none"> • The matrix switcher responds to the View video room preset configuration command with a series of responses, each reporting the inputs tied to 16 outputs. • These responses should then be compared to a list of the outputs assigned to the specified room to determine the ties in the room preset. • For ease of understanding the starting output number should always be "1". 		
<i>Response description:</i>	Input# (I#) tied to O#1•I# tied to O#2•O#3•O#4•...•O#16•Vid← Input# (I#) tied to O#17•I# tied to O#18•O#19•O#20•...•O#32•Vid← Input# (I#) tied to O#33•I# tied to O#34•O#35•O#36•...•O#48•Vid← Input# (I#) tied to O#49•I# tied to O#50•O#51•O#52•...•O#64•Vid←		

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
View ties, gain, volume, mutes, presets, and DSVP (continued)			
View audio room preset configuration	<code>[Esc][X8][X12]*1*2VC ←</code>	<code>[X2]ⁿ•[X2]ⁿ⁺¹•[X2]ⁿ⁺²• ... •[X2]ⁿ⁺¹⁵•Aud ←</code>	Show room <code>[X8]</code> , preset <code>[X12]</code> 's audio configuration. Show the audio input tied to up to 16 outputs assigned to room <code>[X8]</code> .
<i>Command description:</i>	Room#* room preset#* starting output# (recommended value = 1) * 2 (=audio) VC		
NOTE	<ul style="list-style-type: none"> • The matrix switcher responds to the View audio room preset configuration command with a series of responses, each reporting the inputs tied to 16 outputs. • These responses should then be compared to a list of the outputs assigned to the specified room to determine the ties in the room preset. • For ease of understanding the starting output number should always be "1". 		
<i>Response description:</i>	Input# (I#) tied to O#1•I# tied to O#2•O#3•O#4• ... •O#16•Aud ← Input# (I#) tied to O#17•I# tied to O#18•O#19•O#20• ... •O#32•Aud ← Input# (I#) tied to O#33•I# tied to O#34•O#35•O#36• ... •O#48•Aud ← Input# (I#) tied to O#49•I# tied to O#50•O#51•O#52• ... •O#64•Aud ←		
NOTE	The response to the View file directory command differs, depending on whether the command is sent via an RS-232/RS-422 or Telnet connection or sent via a Web browser connection.		
View file directory RS-232/RS-422 and Telnet	<code>[Esc]DF ←</code>	<code>filename1,date/time,length ←</code> <code>filename2,date/time,length ←</code> <code>filename3,date/time,length ←</code> • • • • <code>filenamex,date/time,length ←</code> <code>space_remaining Bytes •left ←</code>	List user-supplied files.
View file directory Web browser	<code>[Esc]DF ←</code>	Var file = new array (); File [1] = 'filename1,date1,filesize1', File [2] = 'filename2,date3,filesize2', File [3] = 'filename3,date3,filesize3', • • • • File [n] = 'filenamex,datemx,filesize', File [n+1] = space_remaining Bytes •Left	List user-supplied files.
Erase user-supplied Web pages/files	<code>[Esc]filenameEF ←</code>	<code>Delfilename ←</code>	
View DSVP (individual sync frequency) <i>Example:</i>	<code>[X1]LS</code> 2LS	<code>[X15][X15] ←</code> 031.5,060.00 ←	Listed as horizontal frequency, vertical frequency. Input 2 frequency is 31.5 kHz (horizontal) and 60 Hz (vertical).
NOTE	The matrix switcher returns 000.00,000.00 if there is no connection or sync frequencies are not applicable.		

SIS™ Programming and Control, cont'd

Command/response table for SIS commands (continued)

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description									
Information requests												
Information request	I	V[X2]X[X3]•A[X2]X[X3]T[X18]U[X19]←	V[X2]X[X3] = video size, A[X2]X[X3] = audio size T[X18] = BME type U[X19] = number of BMEs in system.									
<i>Example:</i> (MAV 450 Plus 6448 with a connected audio BME)	I	V64X48•A64X48•T2•U2←	This low resolution matrix switcher (T2) has 64 video and 64 audio inputs by 48 video and 48 audio inputs. This is a two BME system (a video and and audio BME).									
Request part number	N	nn-nnn-nn	See appendix A for numbers.									
<i>Example:</i>	N	60-768-41	CrossPoint 450 Plus 6464 with front panel controller.									
NOTE There are up to three separate sets of Extron firmware that the switcher can report on: the CrossPoint/MAV Plus controller firmware, which is the overall control firmware; the Ethernet protocol firmware, which handles the Ethernet interface; and the latest optional Extron firmware update, which is available at www.Extron.com .												
Query controller firmware version	Q	[X17]←										
<i>Example:</i>	Q	1.23←	The factory-installed CrossPoint Plus / MAV Plus controller firmware version is 1.23 (sample value only).									
Query software version (verbose)	0Q	[X17]-[X20]-[X20]←	Provide a detailed status of the Ethernet protocol firmware, the CrossPoint 450 Plus / MAV Plus controller firmware, and any firmware upgrade. The firmware that is running is marked by an asterisk (*). A caret (^) indicates that the firmware has a bad checksum or an invalid load. ??? indicates that the firmware is not loaded.									
<i>Response description:</i> Ethernet protocol firmware version - controller firmware version - updated firmware version←												
<i>Example:</i>	0Q											
<table style="width:100%; border:none;"> <tr> <td style="width:33%;"></td> <td style="width:33%; text-align:center;">* indicates the version running</td> <td style="width:33%; text-align:right;">Upload date and time</td> </tr> <tr> <td>Response: 1.23-0.14(0.20-64x64 Series</td> <td style="text-align:center;">-Wed, 22 Feb 2006 00:00:00 GMT)-0.25*(0.24-64x64 Series</td> <td style="text-align:right;">-Thu, 16 Mar 2006 16:39:21 GMT)←</td> </tr> <tr> <td>Ethernet protocol firmware</td> <td style="text-align:center;">CrossPoint/MAV firmware version</td> <td style="text-align:right;">Updated firmware version</td> </tr> </table>					* indicates the version running	Upload date and time	Response: 1.23-0.14(0.20-64x64 Series	-Wed, 22 Feb 2006 00:00:00 GMT)-0.25*(0.24-64x64 Series	-Thu, 16 Mar 2006 16:39:21 GMT)←	Ethernet protocol firmware	CrossPoint/MAV firmware version	Updated firmware version
	* indicates the version running	Upload date and time										
Response: 1.23-0.14(0.20-64x64 Series	-Wed, 22 Feb 2006 00:00:00 GMT)-0.25*(0.24-64x64 Series	-Thu, 16 Mar 2006 16:39:21 GMT)←										
Ethernet protocol firmware	CrossPoint/MAV firmware version	Updated firmware version										
Request system status	S	[X22]•[X22]•[X22]•[X22]•[X22]•[X22]•[X22]•[X23]•[X24]•[X24]•[X9]•[X9]←										
<i>Response description:</i> +5V•+3.3V•+2.5V•Fan voltage•-5V•-12V•+12V•Temp•Fan1 RPM•Fan2 RPM•Primary PS•Secondary PS←												
<i>Example:</i>	S		Fans receiving 11.52 V Secondary power supply is on and Ok 4.98•3.30•2.55•11.52•-5.21•-12.35•11.65•78.80•753•774•1•1← 5V power system at 4.98V Fan 1 rotating at 753 RPM									
NOTE If one of the variables is not applicable to a BME (such as fans for a video BME), the response for that variable is "--".												

Command/Response table for IP SIS commands

Symbol definitions

X30	= Matrix name	(Up to 240 characters)
NOTE	<i>The following characters are invalid in the name: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ?.</i>	
X31	= Default name	Factory default name (model name + last 3 pairs of MAC address)
X32	= Time and date (set)	In the format: MM/DD/YY•HH:MM:SS <i>where</i> : MM = month: 01 (January) through 12 (December) DD = day: 01 through 31 YY = year: 00 through 99 HH = hour: 00 through 24 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X33	= Time and date (read)	In the format: Day,•DD•Mmm•YYYY•HH:MM:SS <i>where</i> Day = weekday: Mon through Sun DD = day: 01 through 31 Mmm = month: Jan through Dec YYYY = year: 2000 through 2099 HH = hour: 00 through 24 MM = minutes: 00 through 59 SS = seconds: 00 through 59
X34	= GMT offset	-12.0 through +14.0 (hours and minutes removed from GMT)
X35	= Daylight Savings Time	0 = Daylight Savings Time off/ignore 1 = Daylight Savings Time on (northern hemisphere) 2 = Daylight Savings Time on (Europe) 3 = Daylight Savings Time on (Brazil)
X36	= IP address	###-###-###-###
X37	= Hardware (MAC) address	##-##-##-##-##-##
X38	= Number of open connections	0 - 255
X39	= Password	12 alphanumeric characters
NOTE	<i>The following characters are invalid in passwords: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ?.</i>	
X40	= Domain name	Standard domain name conventions apply (for example, xxx.com)
NOTE	<i>The following characters are invalid in passwords: {space} ~ , @ = ` [ ] { } < > ' " ; : \ | and ? The @ character is only acceptable as the lead-in to the domain name (such as @extron.com).</i>	
X41	= E-mail account	65 - 72. 65 = e-mail recipient #1, 66 = 2, 67 = 3, ... , 72 = recipient #8.
X42	= E-mail address	Typical e-mail address format (for example: nmmn@xxx.com)
X43	= Notify when?	0 = No response, 1 = fail/missing, 2 = fixed/restored, 3 = both 1 and 2
X44	= Notification selections	01 through 64 = input numbers 98 = power supplies 99 = fans
X45	= Notify status (for read)	66-digit number. For each digit: 0 = do not notify, 1 = notify.
X46	= DHCP	0 = off, 1 = on
X47	= Port #	01 = rear panel Remote port 02 = front panel Configuration port)
X48	= Baud rate	9600, 19200, 38400, 115200
X49	= Parity	Odd, even, none, mark, space (only first letter required)
X50	= Data bits	7, 8
X51	= Stop bits	1, 2
X52	= Port type	0 = RS-232, 1 = RS-422, 2 = RS-485
X53	= Verbose mode	0 = Clear/none (default for Telnet connection) 1 = Verbose mode (default for RS-232 / RS-422 connection) 2 = Tagged responses for queries 3 = Verbose mode and tagged for queries
NOTE	<i>If tagged responses is enabled, all read commands return the constant string and the value as the set command does (for example, the read matrix name command, EscCN←, returns IPN•X30←).</i>	

SIS™ Programming and Control, cont'd

X54 = Security level

00 = Anonymous

10 = Extended security levels 1 through 10

11 = User

12 = Administrator

X55 = RAM status

0 = RAM dirty (needs saving to flash)

1 = RAM has been saved (ok to power off / reset)

Command/response table for SIS commands (continued)

Command/response table for IP SIS commands

Command	ASCII command (host to switcher)	Response (switcher to host)	Additional description
Set matrix name (location)	Esc X30CN ←	Ipn•X30 ←	
Read matrix name (location)	Esc CN ←	X30 ←	
Reset matrix name to factory default	Esc •CN ←	Ipn•X31 ←	
Set time and date	Esc X32CT ←	IptX32 ←	
Read time and date	Esc CT ←	X33 ←	
Set GMT offset	Esc X34CZ ←	IpzX34 ←	The divider between hours and minutes is a period.
Read GMT offset	Esc CZ ←	X34 ←	
Set Daylight Savings Time	Esc X35CX ←	IpxX35 ←	Set the switcher to display the local time as Daylight Savings Time (+1 hour) in summer months.
Read Daylight Savings Time	Esc CX ←	X35 ←	
Set IP address	Esc X36CI ←	IpiX36 ←	
Read IP address	Esc CI ←	X36 ←	
Read hardware address	Esc CH ←	X37 ←	
Read # of open connections	Esc CC ←	X38 ←	
Set subnet mask	Esc X36CS ←	IpsX36 ←	
Read subnet mask	Esc CS ←	X36 ←	
Set gateway IP address	Esc X36CG ←	IpgX36 ←	
Read gateway IP address	Esc CG ←	X36 ←	
Set administrator password	Esc X39CA ←	Ipa•X39 ←	
Read administrator password	Esc CA ←	X39 ←	
Reset (clear) administrator password	Esc •CA ←	Ipa•X39 ←	
Set user password	Esc X39CU ←	Ipu•X39 ←	
Read user password	Esc CU ←	X39 ←	
Reset (clear) user password	Esc •CU ←	Ipu•X39 ←	
Set e-mail server, domainname	Esc X36,X40,X39CM ←	IpmX36,X40,X39 ←	
Read e-mail server, domainname	Esc CM ←	X36,X40,X39 ←	



CrossPoint 450 Plus and MAV Plus Switchers

5 Chapter Five

Matrix Software

Matrix Switchers Control Program

Special Characters

Button-Label Generator

Matrix Software

Two software programs accompany the matrix switcher BMEs:

- The Extron Matrix Switcher Control Program, which communicates with the switcher BME 0 via the RS-232/RS-422 port and the Ethernet port, provides an easy way to set up ties and sets of ties.
- The Extron Button-Label Generator, which allows you to design and print labels for the buttons on the optional front panel.

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

Matrix Switchers Control Program

Installing the software

The program is contained on a CD-ROM and is also available on the Extron Web site, www.extron.com. Load and run the program from the hard drive.

To install the program from the CD-ROM to the hard drive, load the CD and it should install automatically. If it does not self install, run Launch.exe from the CD and follow the instructions that appear on the screen. The program occupies approximately 1 MB (megabyte) of hard-drive space.

By default, the installation program creates the folder C:\Program Files\Extron\Matrix_Switcher directory and creates two icons: Matrix Switcher Control Program and Matrix Switcher Help.

NOTE *The program controls most Extron matrix switchers, but its operation is limited to the features and configuration of your switcher.*

NOTE *The CrossPoint 450 Plus or MAV Plus switcher BME can support either the front panel Configuration port or the rear panel Remote RS-232/RS-422 port.*

Remote RS-232/RS-422 port — *The port can be configured for either the RS-232 or RS-422 serial communication protocol and operate at the 9600, 19200, 38400, or 115200 baud rate. See Selecting the rear panel Remote port protocol and baud rate in chapter 3, Operation, to configure the rear panel port from the front panel.*

Configuration port — *The port supports RS-232 serial communication protocol only. The port can operate at the 9600, 19200, 38400, or 115200 baud rate, but Extron recommends leaving this port at the 9600 baud rate. See the Set serial parameters command on page 4-21 to configure the port using an SIS command.*

Software operation via Ethernet

When a matrix switcher BME is connected to an Ethernet WAN or LAN, any number of users can operate it, locally or remotely, using the Matrix Switcher Control Program. See *Ethernet connection* in chapter 2, *Installation*, for installation details.

Connection to the switcher BME via the Ethernet is password protected. There are two levels of password protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can select inputs and outputs, set and recall presets, and view all settings with the exception of passwords. If the same password or no password is required for logging on, all personnel log on with administrator privileges. Fields and functions that exceed user privileges are grayed out in the Matrix Switcher Control Program when the operator is logged on as a user.

Ethernet protocol settings

The IP Settings/Options window (figure 5-5 on page 5-7) provides a location for viewing and, if connected via the RS-232 link or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See *IP Settings/Options window* later in this chapter for more details.

Using the software

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

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



The Comm Port Selection window (figure 5-1) appears.

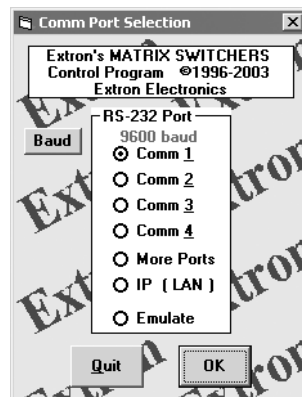


Figure 5-1 — Comm port selection window

2. Choose either the comm port that is connected to the matrix switcher BME 0's RS-232/RS-422 port, *IP [LAN]*, or *Emulate*.
 - **If you selected a comm port**, check the baud rate displayed in the comm port selection window. If you need to change the baud rate, click on the Baud button and double-click on the desired baud rate.
Available rates are 9600, 19200, 38400, and 115200. The default is 9600.
Click OK and proceed to step 4.
 - **If you selected *IP [LAN]***, click OK and proceed to step 3.
 - **If you selected *Emulate***, click OK and see *Using emulation mode* on page 5-20.

Matrix Software, cont'd

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

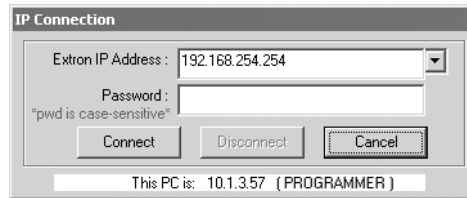


Figure 5-2 — Address and password entry

- a. Examine the Extron IP Address field in the IP Connection window. The field displays the last Extron IP address entered.

If the IP address is correct: Proceed to step 3b.

If the address is not correct: Either click in the Extron IP Address field and enter the IP address or click on the scroll down button (▼) and select from among the recently used addresses. Proceed to step 3b.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

- b. If the switcher is password protected, click in the Password field and enter the appropriate administrator or user password.
- c. Click *Connect*.

If you logged on using the administrator password, the Windows program connects you to the matrix switcher BME 0 with all of the administrator rights and privileges.

If you logged on using the user password, the Windows program connects you to the matrix switcher BME 0 with only user capabilities.

If an incorrect password was entered, the program beeps and returns to the password entry display.

- The Extron Matrix Switcher Control Program window (figure 5-3 and figure 5-4) appears. The window displays the current configuration of the attached matrix.

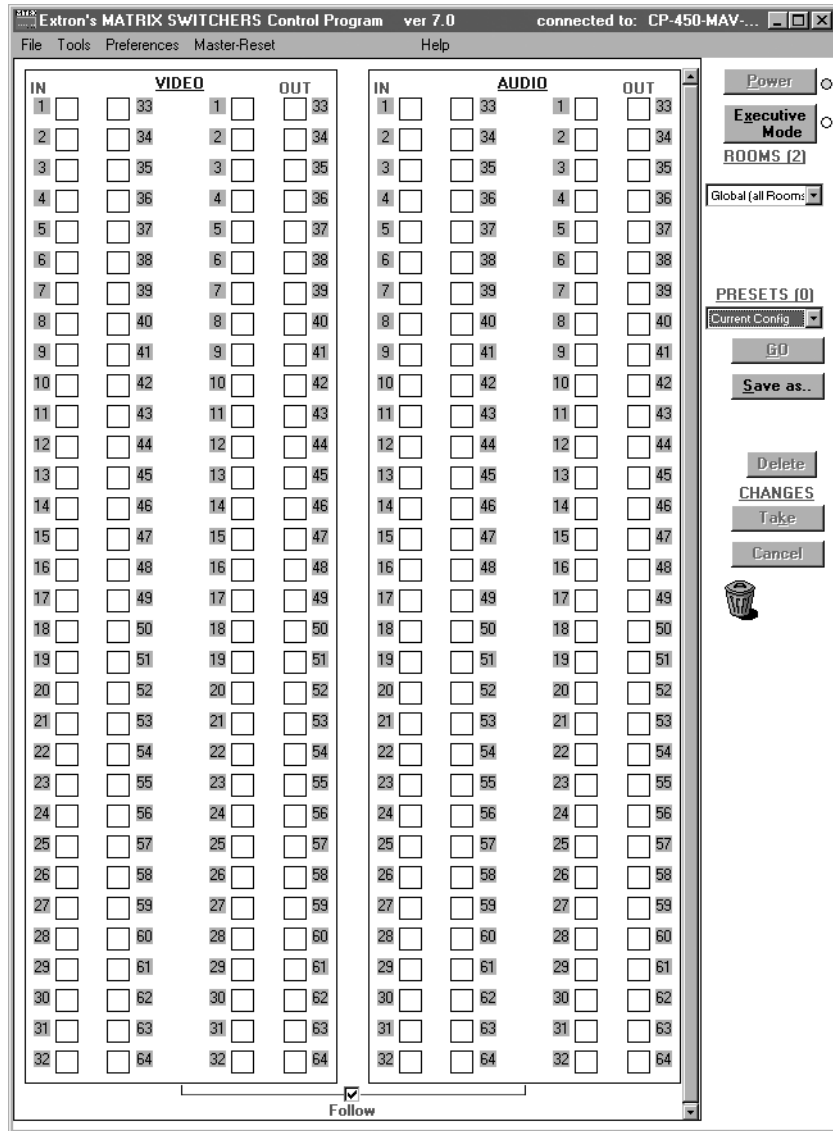


Figure 5-3 — Matrix Switcher Control Program window (no ties or icons)

- To set up audio in follow mode (audio and video have the same tie configuration), select the Follow box at the bottom of the window. To set up audio in breakaway mode (audio and video have different tie configurations), deselect the Follow box.
- 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.
- To create a tie, drag an input box to one or more output boxes. To remove a tie, drag the output box to its tied input box or to the trash can.

Matrix Software, cont'd

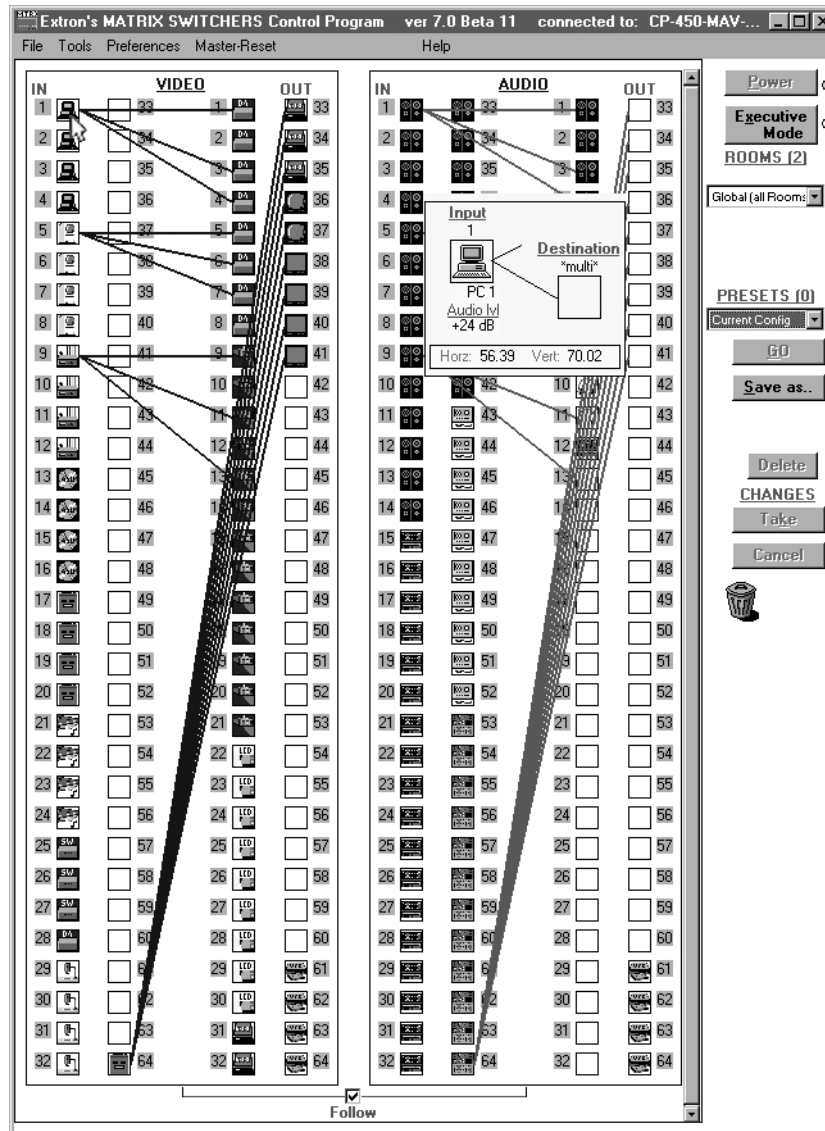


Figure 5-4 — Matrix Switcher Control Program window (ties and icons assigned)

- For quick display of information on a specific input or output device, position the cursor over that device in the control program window. The program opens a window that details the connections to that device, the audio level, and, for systems with CrossPoint 450 Plus switcher BMEs only, the switching interval (RGB delay) and the frequency of the video signal input from or output to that device. See the inset box in figure 5-4.
- If desired, on the task bar, click *Tools > IP Options* to set the switcher's IP parameters in the IP Settings/Options window (figure 5-5).

IP Settings/Options window

The IP Settings/Options window (figure 5-5), accessible via the Tools menu, provides a location for viewing and, if connected via the RS-232/RS-422 link or if logged on via the Ethernet port as an administrator, editing settings unique to the Ethernet interface. See appendix A, *Ethernet Connection*, for basic information about IP addresses. None of the fields on this screen can be edited while you are logged on as a user.

E-mail Addressee	None	Fail	Fixed	Both	Missing Input(s)	Fans	Power Supply
1 JSmith@folklore.net	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2 Pocahontas@folklore.net	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4 MStandish@folklore.net	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 5-5 — Control program IP settings/options window

NOTE *Editing variables on the IP Settings/Options screen while connected via the Ethernet port can immediately disconnect the user from the switcher. Extron recommends editing the settings on this screen using the RS-232 link and protecting the Ethernet access to this screen by assigning an administrator's password to qualified and knowledgeable personnel only.*

NOTE *When the control program is connected to the switcher via the RS-232 link, the Administrator and User Password fields are not masked. If a password has been inadvertently changed to an unknown value, you can look up and, if desired, change a password in this window without knowing the current password.*

Matrix Software, cont'd

Matrix IP Address field

The Matrix IP Address field contains the IP address of the connected matrix switcher. This value is encoded in the flash memory in the switcher.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE *The Matrix IP Address field is grayed out and uneditable when DHCP is selected.*

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

Edit this field as follows:

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

Extron Name/Descriptor field

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

NOTE *The following characters are invalid in the Extron Name/Descriptor field: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

Edit this field as follows:

1. Click in the Extron name/descriptor field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Extron Name/Descriptor field.
4. Click on the *Take* button to make the name change take effect.

Gateway IP address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the matrix switcher BME 0 and the mail server are not on the same subnet.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

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

Subnet Mask field

The Subnet Mask field is used to determine whether the matrix switcher BME 0 is on the same subnet as the controlling PC or the mail server when you are subnetting. For more information, see *Subnetting — A Primer*, in Appendix A, *Ethernet Connection*.

Edit this field as follows:

1. Click in the Subnet Mask field. The graphic cursor becomes a text cursor.
2. Edit the mask as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Subnet Mask field.
4. Click the *Take* button to make the mask take affect.

Hardware Address field

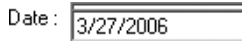
The hardware address is hardcoded in the matrix switcher BME 0 and cannot be changed.

Use DHCP checkbox

The Use DHCP checkbox directs the matrix switcher BME 0 to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). Contact the local system administrator.

Date field

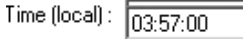
The Date field displays the current date in the Greenwich Mean Time (GMT) zone. If necessary, adjust the date as follows:

1. Click in the Date field. A set date field appears with the date in the format (M)M/(D)D/YYYY. Leading zeroes are not used. The graphic cursor becomes a text cursor in the set date field. 
2. Edit the field as desired to set the proper date. Leading zeroes are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set date field.
4. Click the *Take* button to make the date change take affect.

Matrix Software, cont'd

Time (local) field

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

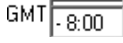
1. Click in the time field. A set time field appears with the date in the format HH:MM:SS (00:00:00 to 23:59:59). The graphic cursor becomes a text cursor in the set time field.  Time (local) : 03:57:00
2. Edit the field as desired to set the proper time. Remember to use 24-hour time. Leading zeroes are optional.
3. Press the Tab key on the keyboard or click in another field to exit the set time field.
4. Click the *Take* button to make the time change take affect.

Sync Time to PC button

Clicking the mouse on the Sync Time to PC button causes the computer you are operating to send its internal time to the switcher in a set time command.

GMT (offset) field

The GMT field displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference. If necessary, adjust the offset as follows:

1. Click in the GMT field. A set offset field appears with the offset in the format ±HH:MM (-12:00 to +14:00). The graphic cursor becomes a text cursor in the set offset field.  GMT -8:00
2. Edit the field as desired to set the proper offset. Leading zeroes are optional. Some time zones are on the half-hour (30 minutes).
3. Press the Tab key on the keyboard or click in another field to exit the Set Offset field.
4. Click the *Take* button to make the offset change take affect.

Use Daylight Savings checkbox

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

Administrator Password field

The Administrator Password field displays the password required to log on to the matrix switcher BME 0 via the Ethernet port with all of the administrator's rights and privileges. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

While you are logged on as a user, this field is masked with asterisks (*****) as a security measure.

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

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

Edit this field as follows:

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

User Password field

The User Password field displays the password required to log on to the matrix switcher BME 0 via the Ethernet port as a user, without all of the administrator's rights and privileges. Passwords are case sensitive and are limited to 12 upper-case and lower-case alphanumeric characters.

While you are logged on as a user, this field is masked with asterisks (*****) as a security measure.

NOTE *An administrator password must be created before a user password can be created.*

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

Edit this field as follows:

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

Matrix Software, cont'd

Mail Server IP Address field

The Mail Server IP Address field displays the IP address of the mail server that handles the e-mail for the facility in which the matrix switcher is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Edit this field as follows:

1. Click in the mail server IP address field. The graphic cursor becomes a text cursor.
2. Edit the IP address as desired.
3. Press the Tab key on the keyboard or click in another field to exit the mail server IP address field.
4. Click the *Take* button to make the address change take affect.

Mail Server Domain Name field

The Mail Server Domain Name field displays the domain name that the matrix switcher BME 0 uses to log on to the e-mail server. Standard domain conventions (such as *nnnnn@xxx.com*) apply.

NOTE *The following characters are invalid in a domain name: {space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is only acceptable as the lead-in to the domain name (such as @folklore.net).*

Edit this field as follows:

1. Click in the Mail Server Domain Name field. The graphic cursor becomes a text cursor.
2. Edit the name as desired.
3. Press the Tab key on the keyboard or click in another field to exit the Mail Server Domain Name field.
4. Click the *Take* button to make the name change take affect.

E-mail Addressee fields

The eight E-mail Addressee fields permit the administrator to identify the e-mail addresses of the personnel to whom the matrix switcher BME e-mails notification of its failure and repair status. Figure 5-6 shows a typical e-mail from the switcher.

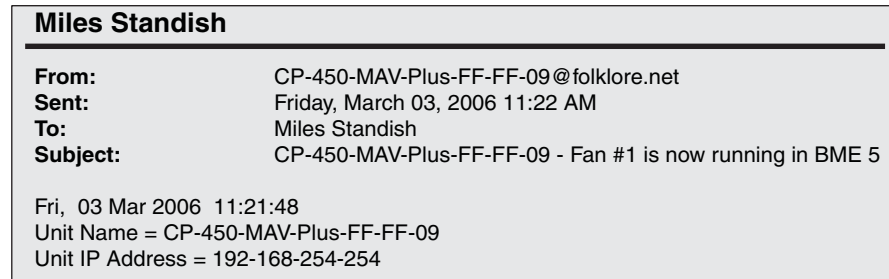


Figure 5-6— Typical CrossPoint 450 Plus e-mail

The radio buttons and check boxes associated with each address field permit the administrator to specify specific e-mail requirements for each recipient.

Edit these fields and controls as follows:

1. Click in the desired E-mail Addressee field. The graphic cursor becomes a text cursor.
2. Edit the e-mail address as desired. Standard e-mail address conventions (for example: *nnnnn@xxx.com*) apply.
3. Press the Tab key on the keyboard or click in another field to exit the e-mail addressee field.
4. In the square check boxes associated with each addressee, select the options about which the addressee is to be e-mailed: missing input(s), fans, and/or power supply. In the floating box that contains the input numbers, select the inputs that need monitoring.
5. In the round radio buttons associated with each addressee, select whether the addressee is to be e-mailed of failures, fixes, both, or not be notified. The None radio button is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation.
6. If desired, click on the *Send test E-mail* button to test the e-mail function.
7. Click on the *Take* button to make the e-mail address changes take affect.

Matrix Software, cont'd

Update firmware

The firmware upgrade utility, accessible via the Tools menu, provides a way to replace the firmware that is coded on the switcher BME 0's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip.

Update the switcher firmware as follows:

NOTE *The update firmware utility is for replacing the firmware that controls all switcher operation. This is **not** the window to insert your own HTML pages. See Upload HTML files to insert custom HTML pages.*

NOTE *To prevent operational problems, when a firmware update is planned, update the firmware in all BMEs.*

1. Visit the Extron web site, www.extron.com, select the CrossPoint/MAV Plus product category, and select the latest firmware install package (*.exe file) for download. Note the folder to which you save the firmware file.
2. Run the executable (*.exe) file to decompress the firmware file.
3. Start the Matrix Switcher Control Program
4. Connect to the matrix switcher BME to be updated. See *Using the software* in this chapter, steps 1 through 4, starting on page 5-3.

NOTE *The Ethernet connection is much faster than the RS-232/RS-422 connection. Extron recommends using the Ethernet connection rather than the serial port for firmware uploads.*

NOTE *If the computer that you are using to update the firmware is connected to the BME via an Ethernet network, each BME must have a unique IP address.*

5. Click *Tools > Update firmware*. The open file window appears (figure 5-7).



Figure 5-7 — Open window

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

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

NOTE *The original factory-installed firmware is permanently available on each matrix switcher BME. If the attempted firmware upload fails for any reason, the switcher reverts to the factory-installed firmware.*

7. Click on the *Open* button. A status window appears that shows the progress of the upload. The firmware upload may take a few minutes.
8. Shift the Ethernet cable (recommended) or serial cable to the next BME and repeat steps 4 through 7 for each BME.

Upload HTML files

You can create customized HTML pages for the switcher to display. The HTML Files List window (figure 5-8), accessible via the Tools menu, provides a way to view the contents of the switcher's file system and upload custom HTML pages to the switcher.

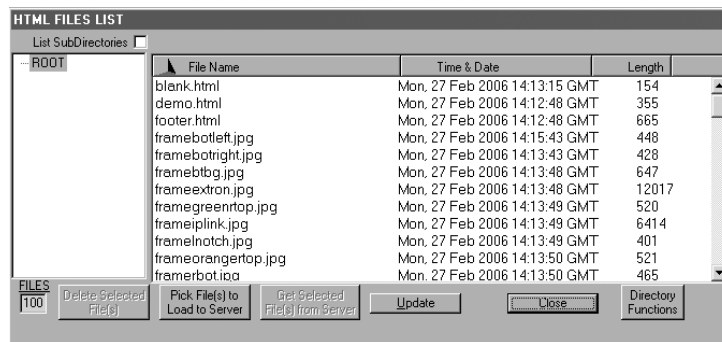


Figure 5-8 — HTML Files List window

Upload HTML pages as follows:

NOTE The files listed in figure 5-8 are shown for example only and may not be present on your switcher.

NOTE The HTML Files List window is for inserting your own HTML pages. This is *not* the window to replace the firmware that controls all switcher operation. See *Update firmware* in this chapter to replace the firmware.

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

1. Connect the PC to the matrix switcher BME 0 via the switcher's RS-232/RS-422 port or Ethernet port.
2. Start the Matrix Switcher Control Program and connect to the CrossPoint 450 Plus or MAV Plus switcher. See *Using the software* in this chapter, steps 1 through 4, starting on page 5-3.
3. Click on *Tools > HTML File Manager*.
4. Click on the *Pick File(s) to Load to Server* button. An open file window appears.
5. Navigate to the folder where you saved the HTML file(s). Select the file(s).

NOTE To select multiple files, hold the *Ctrl* key while you select the desired files.

NOTE If you want one of the HTML files that you created to be the default start-up page, name the file "index.html". The CrossPoint 450 Plus or MAV Plus switcher automatically looks for that file name when you first connect to it using an Internet browser.

6. Click on the *Open* button. The file(s) upload to the CrossPoint 450 Plus or MAV Plus switcher may take a few minutes.
7. Click on the *Update* button to confirm the upload.
8. Click on the *Close* button to exit the HTML Files List window.

Matrix Software, cont'd

Windows buttons, drop boxes, and trash

The buttons, drop boxes, and trash can on the right side of the program window perform the following functions:

Power — Unavailable for CrossPoint 450 Plus and MAV Plus switchers, because the switcher power cannot be controlled via software.

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

Room menu — Displays a list of up to 10 rooms. You can select a room from the list to display it in the window.

NOTE *A Room is a subset of outputs that are logically related to each other, as determined by the operator. The CrossPoint 450 Plus or MAV Plus switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.*

Presets menu — Displays a list of up to 64 global presets and up to 100 room presets (10 rooms x 10 presets per room). You can select a preset from the list to display it in the window and either activate it (Go) or delete it (Delete).

Go — Activates the selected preset as the current configuration.

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

Changes - Take — Allows you to save to file any changes made to the displayed configuration.

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

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 164 presets (64 global presets + 100 room presets), plus the last active setting (preset #0), to a file. Saved settings include audio gain settings (if specified), assigned icons, and icon captions to a specified file.

Restore matrix settings from — Loads and activates a previously saved setting file.

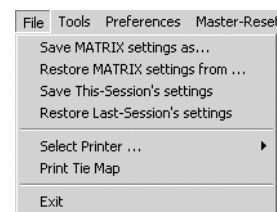
Save this-session's settings — Same as **Save matrix settings as**, but without specifying a file name.

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

Select printer — Selects the target printer.

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

Exit — Closes the Matrix Switcher 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 switching interval setting for each input and allows you to change them.

Audio-Input gain settings — Displays the audio gain level setting for a single input or for all inputs and allows you to change it. The level is expressed as the magnitude (number of decibels) and polarity (positive, gain or negative, attenuation) of the audio adjustment.

Audio-Output volume settings — Displays the audio output level setting for a single input or for all inputs and allows you to change it. The level is expressed as a percentage of the input audio volume that is applied to the output; 0% is full attenuation (audio is silent), 100% is full volume.

Mute-Output settings — Displays the RGB Delay, Volume, and Mute Adjust screen, which allows you to mute and unmute individual or all video and audio outputs.

View input frequencies — (DSVP) Displays the input horizontal and vertical frequencies for each input.

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 *Update firmware* on page 5-14.

IP options — Allows you to set IP options. See *IP Settings/Options window* on page 5-7.

HTML file manager — Displays a list of HTML files installed on the switcher and allows you to upload custom files from a connected PC to the switcher. See *Upload HTML files* on page 5-15.

Hardware status — Provides an overall view of the status of the matrix switcher, including the primary and secondary power supply status and the individual voltages, the fan and temperature status, the Remote RS-232/RS-422 port configuration, and the installed and updated firmware status (figure 5-9).

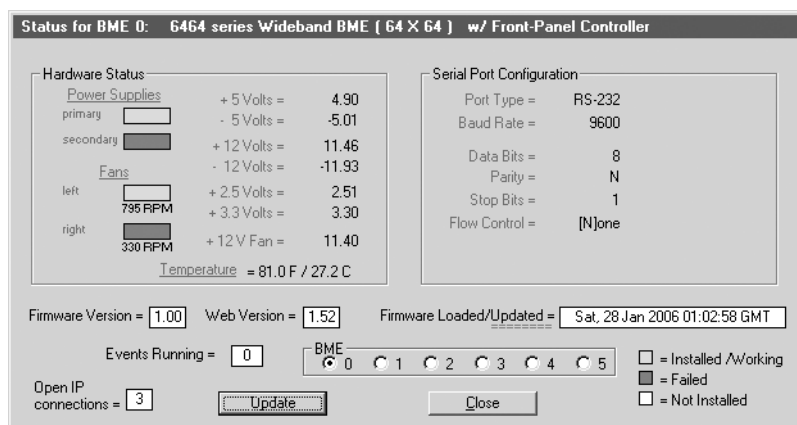


Figure 5-9 — Status window

Matrix Software, cont'd

- = Installed /Working **Green** — Proper operation.
- = Failed **Red** — Component has failed.
- = Not Installed **White** — Components are not installed.

NOTE *The CrossPoint 450 Plus and MAV Plus switcher BMEs are not available in custom configurations. Each model has all available monitored components, such as power supplies and fans, installed. Only the MAV Plus audio BMEs require fans, so the white “not installed” indication is normal for fans for all sync and video BMEs. If you see the white “not installed” indication for audio BMEs, the “not installed” component probably became disconnected during shipment or rough handling.*

Name presets — Allows you to assign a name to each of the 64 global presets and 100 room presets.

NOTE *Preset names are limited to 12 upper- and lower-case alphanumeric characters, space, and the _ : = and / characters.*

NOTE *The following characters are invalid in preset names:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

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

I/O group settings — Allows you to establish and clear I/O groups.

Room configuration — Allows you to assign outputs to rooms or delete outputs from rooms.

NOTE *A Room is a subset of outputs that are logically related to each other, as determined by the operator. The CrossPoint 450 Plus or MAV Plus switcher supports up to 10 rooms, each of which can consist of from 1 to 16 outputs.*

Initialize — Initializes and clears any or all of the following: current ties, presets, groups, RGB delay, audio configuration, preset names, input and output names, and icons.

Preferences menu

Immediate changes — Causes configuration changes to take effect immediately.

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

Ties as lines — Displays ties as lines (figure 5-10).

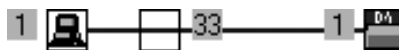
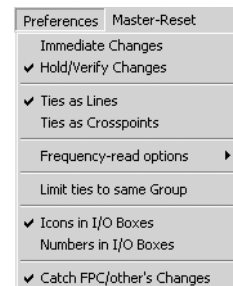


Figure 5-10 — Ties shown as lines

Ties as crosspoints — Displays ties as a matrix of inputs and outputs (figure 5-11). Ties that have been made are indicated as **amber** (video and audio), **green** (video only), and **red** (audio only) boxes. Ties that will take effect when you click on the *Take* button are indicated by +. Ties that will be broken when you click on the *Take* button are indicated by –.



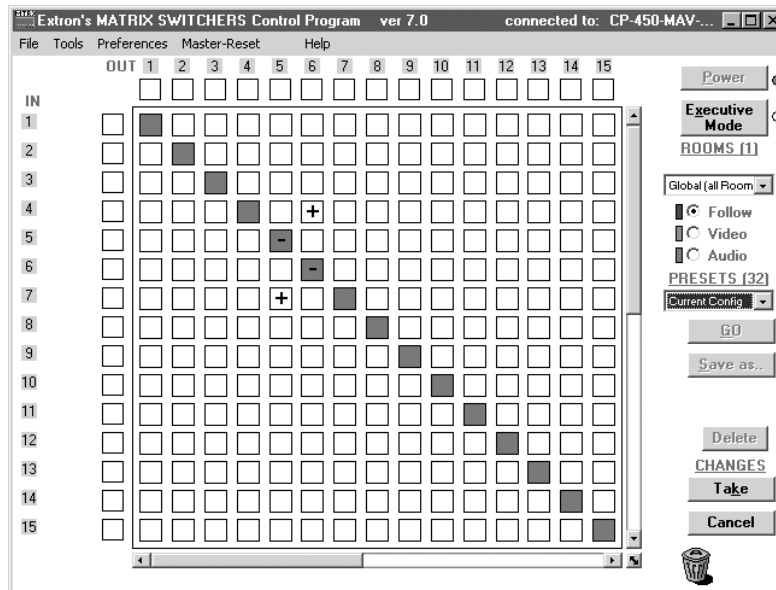


Figure 5-11 — Ties shown as crosspoints

Frequency read options (systems with a CrossPoint 450 Plus sync BME only) — Allows you to set the input signal detection (DSVP) feature as follows:

- To never sample and display the sync or no sync status (set this option to **None**)
- To automatically refresh the display (set this option to **Automatically every 10 seconds**)
- To sample the sync and update the display whenever you make a configuration change (set this option to **On demand or by refresh**).

Limit ties to same group — Allows you to limit the creation of ties using the program to inputs and outputs that are in the same group (similar to front panel operation).

Icons in I/O boxes — Erases any numbers in the I/O boxes in the Control Program window (figure 5-4). You can place icons in the boxes.



Numbers in I/O boxes — Erases any icons in the I/O boxes in the Control Program window and fills each box with the associated input or output number.



Catch FPC/others changes — When checked, sets the switcher to report all configuration and setting changes to the Remote RS-232/RS-422 or Ethernet connection that turned this selection on. These reports allow the Matrix Switcher Control Program to track the changes that occur in the switcher's configuration and settings, whether commanded via the front panel, the RS-232/RS-422 port, or the Ethernet port.

Master-Reset selection

Master reset clears all ties and presets, all video and audio mutes, resets all I/O grouping, sets all input audio levels to unity gain (+0 dB), and sets all output volume levels to 100% (0 dB of attenuation).

NOTE *Master reset does not reset the Internet protocol (IP) settings.*

Matrix Software, cont'd

Using emulation mode

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

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

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.



Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space (spaces are ok for names)} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:)| \ and ?.

Button-Label Generator

The Button Label Generator software creates labels that you can place in the translucent covers of the input and output pushbuttons. You can create labels with names, alphanumeric characters, or even color bitmaps for easy and intuitive input and output selection. See appendix B, *Reference Information*, for blank labels and procedures for removing and replacing the button labels.

The program is contained on the same CD-ROM as the Matrix Switcher+ Control Program and is also available on the Extron Web site, www.extron.com.



CrossPoint 450 Plus and MAV Plus Switchers

6

Chapter 6

HTML Operation

Download the Startup Page

System Status Page

System Configuration Page

File Management Page

Set and View Ties Page

Special Characters

HTML Operation

The switcher can be controlled and operated through BME 0's Ethernet port, connected via a LAN or WAN, using a web browser such as Microsoft's Internet Explorer. The browser's display of the switcher's status or operation has the appearance of web pages. This chapter describes the factory-installed HTML pages, which are always available and cannot be erased or overwritten.

NOTE *If your Ethernet connection to the matrix switcher is unstable, try turning off the proxy server in your Web browser. In Microsoft's Internet Explore, click Tools > Internet Options > Connections > LAN Settings, uncheck the "Use a proxy server..." box, and then click OK.*

Download the Startup Page

Access the switcher using HTML pages as follows:

1. Start the Web browser program.
2. Click in the browser's Address field.
3. Enter BME 0's Matrix IP address in the browser's Address field.

NOTE *If the local system administrators have not changed the value, the factory-specified default, 192.168.254.254, is the correct value for this field.*

4. If you want the browser to display a page other than the default page (such as a custom page that you have uploaded), enter a slash (/) and the file name to open.

NOTE *The browser's Address field should display the address in the following format: xxx.xxx.xxx.xxx/{optional_file_name.html}*

NOTE *The following characters are invalid in file names: {space} + ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

5. Press the keyboard Enter key. The switcher BME checks to see if it is password protected.

If the switcher is not password protected, proceed to step 7.

If the switcher is password protected, the switcher downloads the Enter Network Password page (figure 6-1).



Figure 6-1 — Enter Network Password page

NOTE *A User Name entry is not required.*

6. Click in the Password field and type in the appropriate administrator or user password. Click the OK button.

7. The switcher checks several possibilities, in the following order, and then responds accordingly:
 - a. Does the address include a specific file name, such as 10.13.156.10/file_name.html? **If so**, the switcher BME downloads that HTML page.
 - b. Is there a file in the switcher BME's memory that is named "index.html"? **If so**, the switcher downloads "index.html" as the default startup page.
 - c. **If neither of the above conditions is true**, the switcher BME downloads the factory-installed default startup page, "nortxe_index.html" (figure 6-2), also known as the System Status page.

System Status Page

The System Status page (figure 6-2) provides a status report for all BMEs in the matrix switcher system, including the primary and secondary power supply status, the individual voltages, the fan status (if applicable), and the operating temperature. The System Status page is the default page that the switcher downloads when you connect to the switcher. Access the System Status page from other pages by clicking the *Status* tab.

The screenshot shows the Extron Electronics System Status page. The browser address bar shows 'http://10.13.2.236'. The page has a navigation menu with 'Status', 'Configuration', 'File Management', and 'Control'. The 'System Status' page displays the following information:

Unit Name: CP-450-MAV-Plus-00-68-F6
 Model: CP 450 MAV Plus
 Part Number: 60-768-41 Firmware Version: 1.00
 Date: 3/06/2006 Number of BME(s): 6
 Time: 09:11 AM # of Connections: 002

Operational Status	BME 0	BME 1	BME 2	BME 3	BME 4	BME 5
Primary Power Supply	On	On	On	On	On	On
Redundant Power Supply	On	On	On	On	On	On
+2 Volts	4.93 V	4.96 V	4.93 V	4.96 V	4.96 V	5.04 V
+3.3 Volts	3.29 V	3.29 V	3.27 V	3.27 V	3.29 V	3.27 V
+5 Volts	5.01 V	5.04 V	5.04 V	4.93 V	4.96 V	5.04 V
+12 Volts	-----	-----	-----	-----	-----	11.67 V
-5 Volts	-5.01 V	-4.95 V	-4.92 V	-4.97 V	-5.01 V	-----
-12 Volts	-----	-----	-----	-----	-----	-11.76 V
+12 Volts	-----	-----	-----	-----	-----	12.05 V
Fan 1	-----	-----	-----	-----	-----	803 RPM
Fan 2	-----	-----	-----	-----	-----	795 RPM
Temperature	107.60 F	98.60 F	105.80 F	100.40 F	93.20 F	105.80 F

Figure 6-2 — System Status page

The status web page automatically updates itself every thirty seconds to reflect the latest status of the switcher components.

If a component fails or becomes disconnected, the display shows the change in status the next time it updates.

HTML Operation, cont'd

DSVP page (systems with a sync BME only)

You can view a snapshot-in-time of the input frequencies of connected inputs on the Digital Sync Validation Processing (DSVP) page (figure 6-3). Click the DSVP link to the left of the Status page to download the DSVP page.

Select System Status Refresh

Input	Horizontal (kHz)	Vertical (Hz)	Name
001	037.87	060.30	
005	037.86	060.29	Input #05
009	037.86	060.29	Input #09
013	037.87	060.30	Input #13
017	037.86	060.30	Input #17

Figure 6-3 — DSVP page

The DSVP page automatically updates itself every 30 seconds to show the latest input frequencies changes or if an input has been disconnected.

System Configuration Page

The matrix switcher BME 0 downloads the System Configuration page (figure 6-4) when you click the *Configuration* tab. The screen consists of fields in which you can view and edit IP administration and system settings. The Email Settings and Passwords pages can be accessed by clicking the appropriate link. See appendix A, *Ethernet Connection*, for basic information about IP addresses and subnetting.

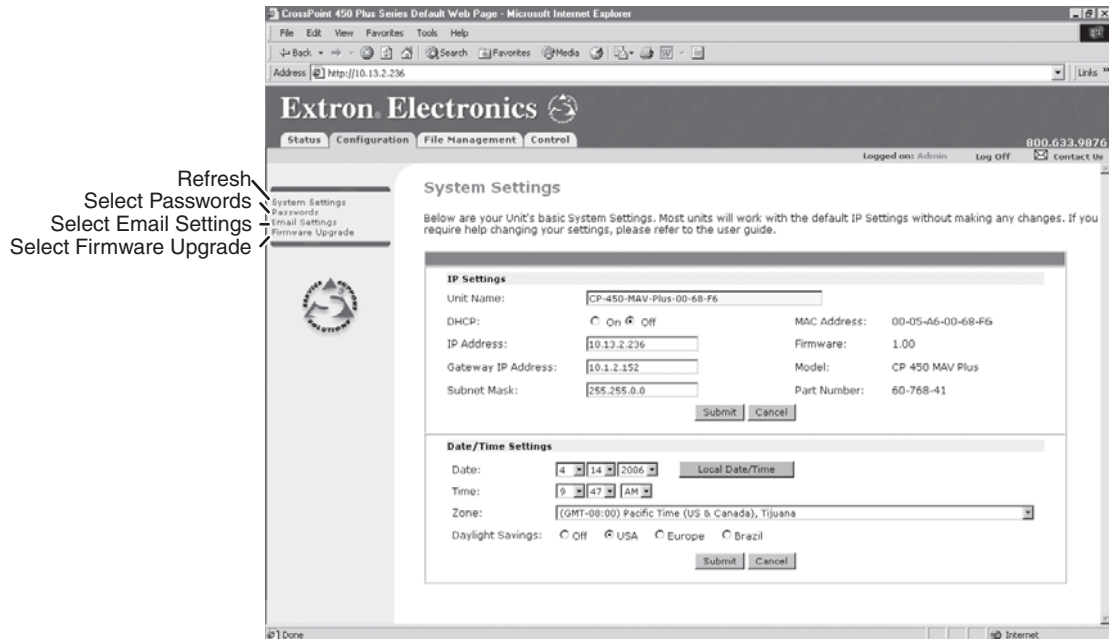


Figure 6-4 — System Configuration page

On password-protected connections, there are two levels of protection: administrator and user. Administrators have full access to all switching capabilities and editing functions. Users can create ties, save and recall presets, and set RGB/video and audio mutes.

- Ethernet connection to the switcher, either entering SIS commands (see chapter 4, *SIS Programming and Control*) or using the Extron Matrix Switcher+ Control Program (see chapter 5, *Matrix Software*) is password protected.
- Connection via the RS-232/RS-422 port is **not** password protected.

HTML Operation, cont'd

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the *Submit* button at the bottom of the page.

Unit Name field

The Unit Name field contains the name used as the “from” information when the switcher BME 0 e-mails notification of its failed or repaired status. This name field can be changed to any valid name, up to 24 alphanumeric characters.

NOTE *The following characters are invalid in the matrix name:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.*

DHCP radio buttons

The DHCP On radio button directs the switcher BME 0 to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable). The DHCP Off radio button turns DHCP off. Contact the local system administrator for guidance on the use of DHCP.

IP Address field

The IP Address field contains the IP address of the connected switcher BME. This value is encoded in the switcher BME's flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

The factory-installed default address is 192.168.254.254, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE *IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.*

Gateway IP Address field

The Gateway IP Address field identifies the address of the gateway to the mail server to be used if the switcher BME 0 and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The Subnet Mask field is used to determine whether the switcher BME 0 is on the same subnet as the mail server when you are subnetting. For more information, see *Subnetting — A Primer*, in Appendix A, *Ethernet Connection*.

MAC Address field

The Media Access Control (MAC) Address is hardcoded in the switcher BME and cannot be changed.

Date/Time Settings fields

The Date/Time Settings fields (figure 6-5) provide a location for viewing the time functions and two methods for setting the time.

Figure 6-5 — Date/Time Settings fields

To sync the BME's clock to the connected PC, simply click the *Local Date/Time* button and then click the *Submit* button.

NOTE Use of the *Local Date/Time* button has no effect on the *Zone* and *Daylight Savings Time* functions.

For more complete control of the date and time settings, change the settings as follows:

1. Click the desired variable's drop box. The adjustable variables are month, day, year, hours, minutes, AM/PM, and (time) zone. A drop down scroll box appears (the year drop box is selected in figure 6-5).
2. Click and drag the slider or click the scroll up ▲ button or scroll down ▼ button until the desired variable is visible.
3. Click the desired variable.

NOTE If setting the time, set the local time. The *Zone* variable allows you to then enter the offset from *Greenwich Mean Time (GMT)*.

NOTE The *Zone* field identifies the standard time zone selected and displays the amount of time, in hours and minutes, that the local time varies from the *GMT* international time reference.

4. Repeat steps 1 through 3 for other variables that need to be changed.
5. If appropriate, click the *Daylight Savings* radio button to turn on the daylight savings time feature.

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

6. Click the *Submit* button.

HTML Operation, cont'd

Passwords page

Access the Passwords page (figure 6-6) by clicking the Passwords link on the System Settings page.

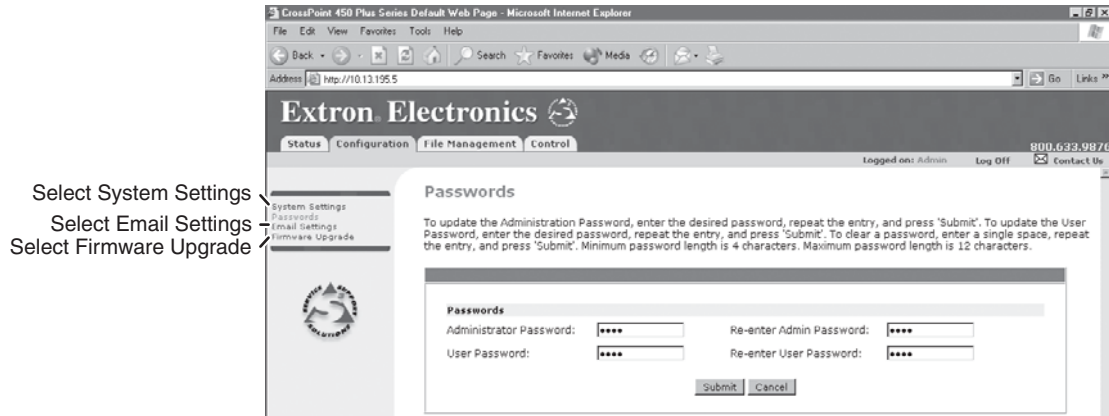


Figure 6-6 — Passwords page

The fields on the Passwords page are for entering and verifying administrator and user passwords. Passwords are case sensitive and are limited to 12 upper case and lower case alphanumeric characters. Each password must be entered twice; once in the Password field and then again in the Re-enter Password field. Characters in these fields are masked by asterisks (*****). If you do not want to password protect an access level, leave the Password field and the Re-Enter password field blank. After entering the desired password in both fields, click the *Submit* button.

NOTE *An administrator password must be created before a user password can be created.*

To clear an existing password so that no password is required, enter a space in the Password and Re-enter Password fields and click the *Submit* button.

Email Settings page

Reach the Email Settings page (figure 6-7) by clicking the Email Settings link on the System Configuration page. The Email Settings page has fields for setting up the switcher BME 0's e-mail notification capabilities. For the e-mail settings and for each row of the e-mail notification settings, click the *Edit* button to make the fields available for editing. The button changes to *Save*. After editing the settings associated with the *Edit/Save* button, click the *Save* button.

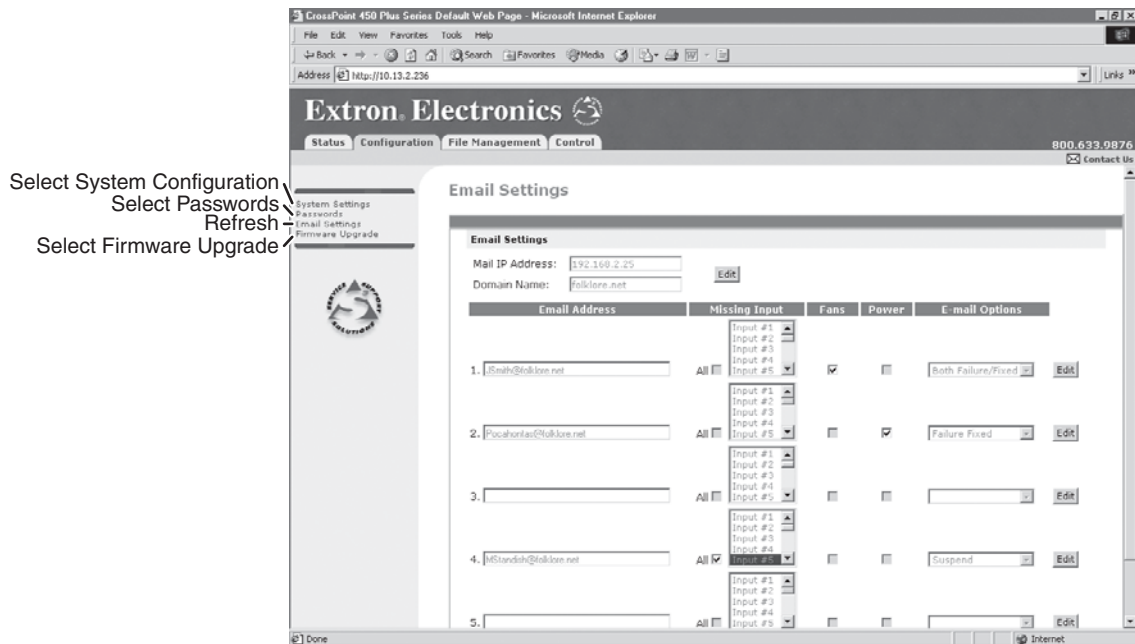


Figure 6-7 — Email Settings page

Mail IP Address field

The Mail IP Address field displays the IP address and the domain name of the mail server that handles the e-mail for the facility in which the matrix switcher BME 0 is installed.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from 000 through 255. Leading zeroes, up to 3 digits total per field, are optional. Values of 256 and above are invalid.

Domain Name field

The Domain Name field displays the domain name that the matrix switcher BME 0 uses to log on to the e-mail server. Standard domain name conventions (for example: *nnnnn@xxx.com*) apply.

NOTE *The following characters are invalid in a domain name: {space} + ~ , = ' [] { } < > ' " ; : | \ and ?. The @ character is only acceptable as the lead-in to the domain name (such as @folklore.net).*

HTML Operation, cont'd

Email address fields

The eight Email address fields identify the e-mail addresses of the personnel to whom the matrix switcher BME 0 e-mails notification of its failure and repair status. Standard e-mail address conventions (*nnnnn@xxx.com*) apply.

The check boxes and drop boxes associated with each address field permit the operator to assign specific criteria under which the BME will e-mail recipients. In the associated Missing Input drop boxes, select the inputs to monitor for presence or absence of a signal. Check the Fans and Power boxes to monitor the cooling and power supplies. In the associated E-Mail Options drop box, select whether the recipient is to be e-mailed of failures, fixes, both, not notified, or to be removed from the e-mail list. The Suspend option is useful for temporarily removing personnel from the e-mail list when they are unavailable, such as on travel or vacation. Deleting an e-mail addressee and clicking the submit button removes the recipient from e-mail notification completely.

Firmware Upgrade page

The Firmware Upgrade page provides a way to replace the firmware that is coded on the switcher BME 0's control board without taking the switcher out of service, opening the switcher enclosure, and replacing the firmware chip. Access the Firmware Upgrade page (figure 6-8) by clicking the Firmware Upgrade link on the System Configuration page.

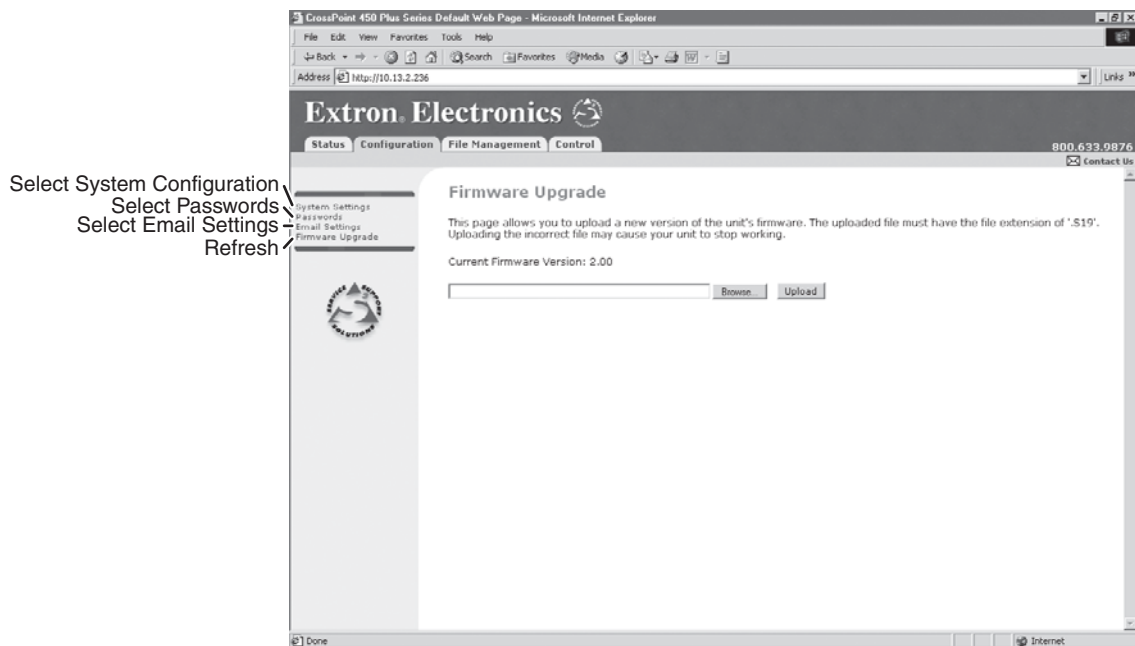


Figure 6-8 — Firmware Upgrade page

Update the switcher BME 0 firmware as follows:

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

NOTE *To prevent operational problems, when a firmware update is planned, update the firmware in all BMEs.*

1. Visit the Extron web site, www.extron.com, select the CrossPoint/MAV Plus product category, and select the latest firmware installation package (*.exe file) for the switcher and download it. Note the folder to which you save the firmware file.
2. Run the executable (*.exe) file to decompress the firmware file.
3. Connect the PC to the matrix switcher BME 0 via the switcher's Ethernet port.

NOTE *If the computer that you are using to update the firmware is connected to the BME via an Ethernet network, each BME must have a unique IP address.*

4. Access the matrix switcher BME using HTML pages.
5. Click the Configuration tab.
6. Click the Firmware Upgrade link.
7. Click the *Browse* button. An open file window appears.
8. Navigate to the folder where you saved the firmware upgrade file. Select the file.

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

NOTE *The original factory-installed firmware is permanently available on the matrix switcher BME. If the attempted firmware upload fails for any reason, the BME automatically reverts to the factory-installed firmware.*

9. Click the *Open* button.
10. Click the *Upload* button. The firmware upload to the switcher BME may take a few minutes.
11. Shift the Ethernet cable to the next BME and repeat steps 4 through 10 for each BME.

HTML Operation, cont'd

File Management Page

To delete files such as HTML pages from the connected switcher BME or to upload your own files to the switcher, click the File Management tab. The switcher BME downloads the file management HTML page (figure 6-9).

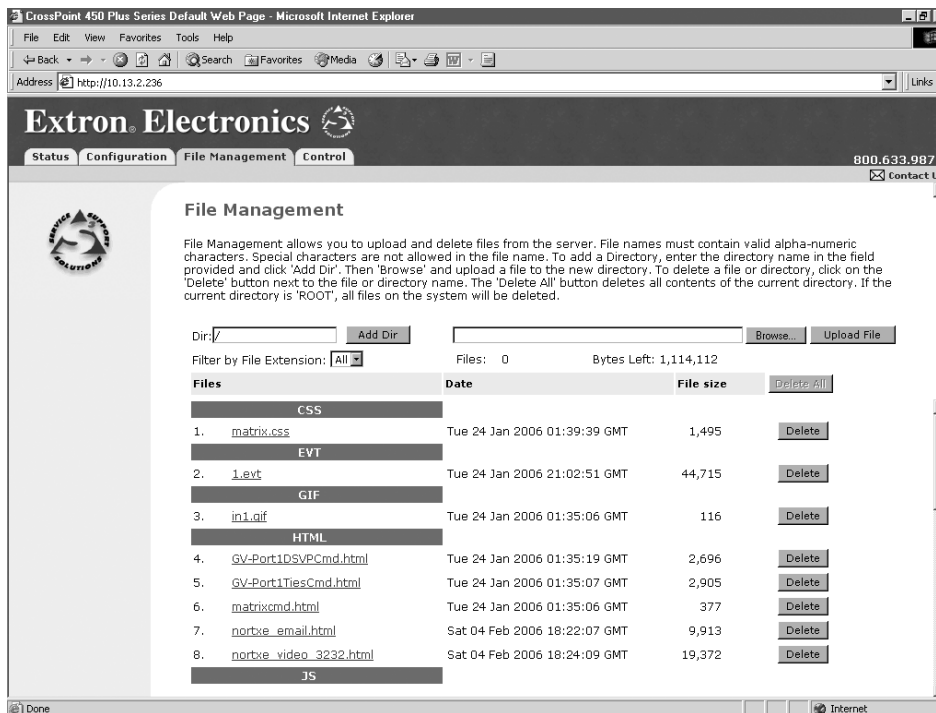


Figure 6-9 — File Management page

NOTE The files listed in figure 6-9 are shown for example only and may not be present on your switcher.

To delete a file, check the associated delete check box and click the *Delete Files* button.

Upload your own files as follows:

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

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

NOTE If you want one of the pages that you create and upload to be the default startup page, name that file "index.html".

3. Click the *Upload File* button. The file(s) that you selected appear in the list.

Set and View Ties Page

You can create ties on the Set and View Ties page (figure 6-10). Access the Set and View Ties page by clicking the *Control* tab.

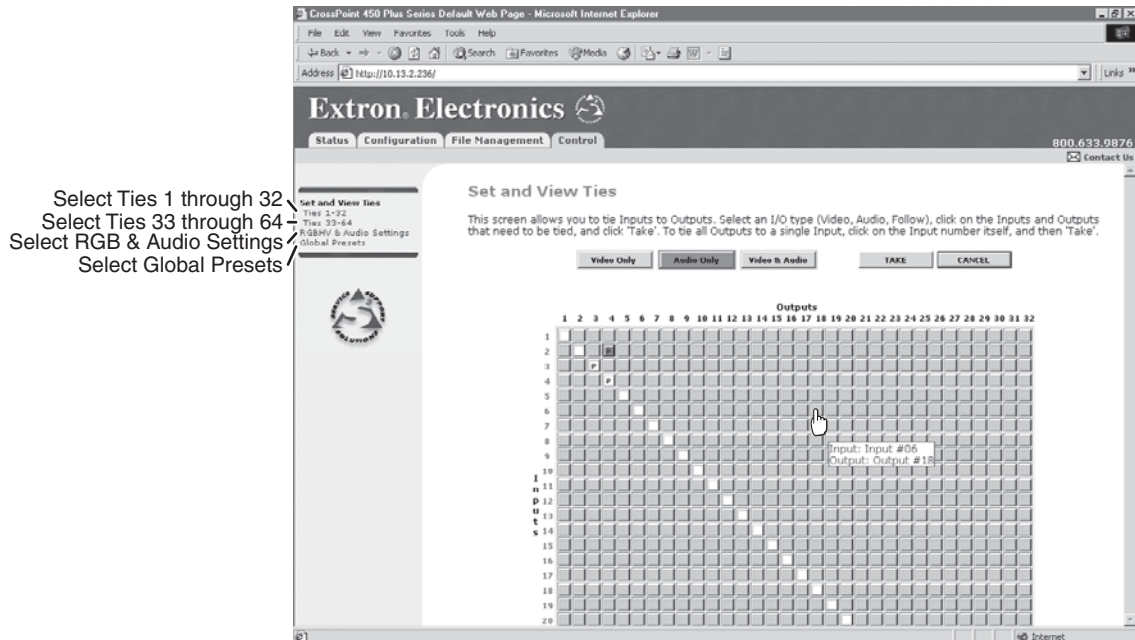


Figure 6-10 — Set and View Ties page

The page consists of a matrix of input (rows) and output (columns) selection buttons of four different colors:

- The **amber** buttons indicate **video and audio ties**.
- The **green** buttons indicate **video only ties**.
- The **red** buttons indicate **audio only ties**.
- The **gray** buttons indicate **no ties**.

NOTE *If you lose track of the input and output associated with a specific button, let the mouse pointer rest over a button for a moment. As shown on figure 6-10, a field pops up that identifies the input and output for that button.*

HTML Operation, cont'd

Create a tie

Select and switch an input as follows:

1. Click the *Video Only*, *Audio Only*, or *Video & Audio* button to select video, audio, or both for switching (audio follow or audio breakaway). Each mouse click on a button toggles the other two buttons off.
2. Move the mouse over the matrix of input and output selection buttons. Click a button to create a preliminary tie (if not tied) or preliminary untie (if tied) of the input and output associated with that button. A "P" (for preliminary) appears in the button.

NOTE *If you lose track of the input and output associated with a specific button, let the mouse rest over one of the tie buttons for a moment. A field pops up (as shown on figure 6-10) that identifies the input and output for that button.*

NOTE *To tie an input to all outputs, click that input's input number.*

3. Click the *Take* button to make the configuration changes or *Cancel* button to abandon the configuration changes.

RGBHV and Audio Settings page

The RGBHV and Audio Settings page provides a way to set the input audio gain and attenuation, set the output volume, mute and unmute all video and audio outputs, and (for systems with CrossPoint 450 Plus sync BMEs only) set the RGB delay (switching interval). Access the RGBHV and Audio Settings page (figure 6-11) by clicking the RGBHV & Audio Settings link on the Control page.

NOTE *The control options on this page vary, depending on the configuration of the matrix switcher system.*

Select Ties 1 through 32
Select Ties 33 through 64
Refresh
Select Global Presets

Figure 6-11 — RGB and Audio Settings page

Change the input gain and attenuation (systems with audio BMEs)

Users can set each input's level of audio gain or attenuation (-18 dB to +24 dB) from the RGBHV and Audio Settings page. Audio levels can be adjusted so there are no noticeable volume differences between sources.

Change an input's audio level setting as follows:

1. Click the Input drop box. A drop down scroll box appears (figure 6-12).

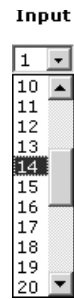


Figure 6-12 — Input selection drop box

2. Click and drag the slider or click the scroll up ▲ button or scroll down ▼ button until the desired input is visible.
3. Click the desired input.
4. Click the Input Audio Level (dB) drop box. A drop down scroll box appears (figure 6-13).

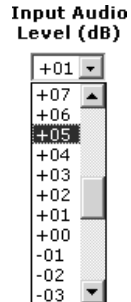


Figure 6-13 — Input Audio Level drop box

5. Click and drag the slider or click the scroll up ▲ button or scroll down ▼ button until the desired input is visible.
6. Click the desired gain or attenuation value.

HTML Operation, cont'd

Mute and unmute one or all outputs

Mute one or all outputs as follows:

1. To select an individual output to mute or unmute, click the Output drop box. A drop down scroll box appears (figure 6-14).

Output

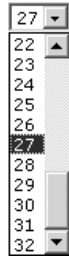




Figure 6-14 — Output selection drop box

2. Click and drag the slider or click the scroll up  button or scroll down  button until the desired output is visible.
3. Click the desired output.
4. Click the *Video*, *Audio*, or *Follow* button to select video, audio, or both for muting. Each mouse click on a button toggles the other two buttons off.
5. Click the *Mute* or *UnMute* button to mute or unmute the selected output. Click the *Mute All* or *UnMute All* button to mute or unmute all of the outputs. Observe the Mute status indications on the page (figure 6-15). Unmuted is displayed in green and muted is displayed in red.

Mute Status

RGB	Audio
UnMuted	Muted

Figure 6-15 — Mute status indications

Change the RGB delay (systems with CrossPoint 450 Plus sync BMEs)

The RGB delay interval defines how long the screen is blanked when switching to a new input for the selected output. This value can be set from 00 to 5 seconds in 0.5-second increments.

Change the RGB delay as follows:

1. Click the Output drop box. A drop down scroll box appears (figure 6-16).

Output



Figure 6-16 — Output selection drop box

2. Click and drag the slider or click the scroll up ▲ button or scroll down ▼ button until the desired output is visible.
3. Click the desired output.
4. Click the RGB delay drop box. A drop down scroll box appears (figure 6-17).

**RGB Delay
(Seconds)**

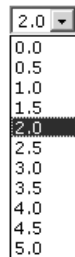


Figure 6-17 — RGB delay drop box

5. Click the desired RGB delay.

HTML Operation, cont'd

Change the output volume level (systems with audio BMEs)

Users can set each output's volume level through a range of zero steps of attenuation (full attenuation, minimum volume) to 64 steps of attenuation (no attenuation, full volume) from the RGB and Audio Settings page.

Change an output's audio level setting as follows:

1. Click the output drop box. A drop down scroll box appears (figure 6-18).

Output

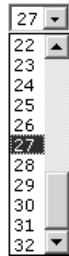




Figure 6-18 — Output selection drop box

2. Click and drag the slider or click the scroll up  button or scroll down  button until the desired output is visible.
3. Click the desired output.
4. Click the Volume Steps (64 Max) drop box. A drop down scroll box appears (figure 6-19).

Volume Steps (64 Max)

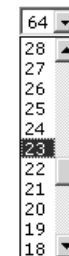


Figure 6-19 — Volume drop box

5. Click the desired output volume step value.

NOTE *The table on the next page defines the value of each audio volume step.*

Audio volume adjustment settings

Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume	Number of steps	dB of attenuation	Output volume
00	98	0%						
01	63	5.5%	23	41	38.5%	45	19	71.5%
02	62	7%	24	40	40%	46	18	73%
03	61	8.5%	25	39	41.5%	47	17	74.5%
04	60	10%	26	38	43%	48	16	76%
05	59	11.5%	27	37	44.5%	49	15	77.5%
06	58	13%	28	36	46%	50	14	79%
07	57	14.5%	29	35	47.5%	51	13	80.5%
08	56	16%	30	34	49%	52	12	82%
09	55	17.5%	31	33	50.5%	53	11	83.5%
10	54	19%	32	32	52%	54	10	85%
11	53	20.5%	33	31	53.5%	55	9	86.5%
12	52	22%	34	30	55%	56	8	88%
13	51	23.5%	35	29	56.5%	57	7	89.5%
14	50	25%	36	28	58%	58	6	91%
15	49	26.5%	37	27	59.5%	59	5	92.5%
16	48	28%	38	26	61%	60	4	94%
17	47	29.5%	39	25	62.5%	61	3	95.5%
18	46	31%	40	24	64%	62	2	97%
19	45	32.5%	41	23	65.5%	63	1	98.5%
20	44	34%	42	22	67%	64	0	100%
21	43	35.5%	43	21	68.5%			
22	42	37%	44	20	70%			

HTML Operation, cont'd

Global Presets page

You can save and recall global presets from the Global presets page (figure 6-20). Access the Global presets page by clicking the *Global Presets* link on the left of the Control page.

Select Ties 1 through 32
Select Ties 33 through 64
Select RGB & Audio Settings
Refresh

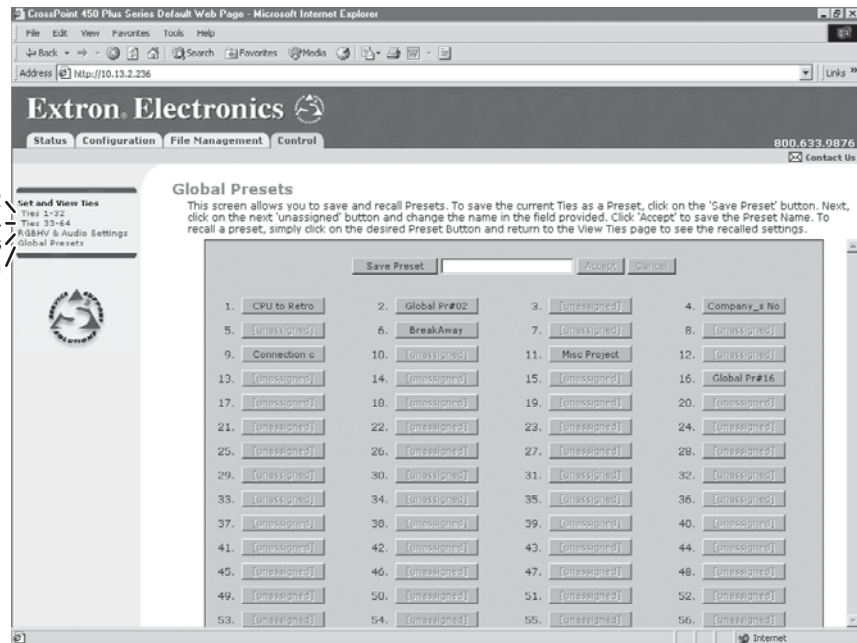


Figure 6-20 — Global Presets page

Save a preset

Save the current configuration (configuration 0) as a preset as follows:

1. Click the *Save Preset* button.
2. Select the desired preset by clicking on one of the presets listed. To create a new preset, click one of the *[unassigned]* buttons. Overwrite an existing preset by clicking an already existing preset.
3. If desired, type over the current name in the box adjacent to the *Save Preset* button.

NOTE Preset names are limited to 12 upper and lower case alphanumeric characters and the {space} _ : = and / characters.

NOTE The following characters are invalid in preset names:
+ ~ , @ = ' [] { } < > ' " ; : | \ and ?.

If you do not rename an unassigned button, the matrix switcher BME automatically names the preset as Preset {next available number}.

If you do not rename an existing preset when it is overwritten, the matrix switcher BME retains the same name.

4. Click the *Accept* button.

Recall a preset

To recall a global preset to be the current configuration, click the button associated with the desired preset.

Special Characters

The HTML language reserves certain characters for specific functions. The switcher will not accept these characters as part of preset names, the switcher's name, passwords, or locally created file names.

The switcher rejects the following characters:

{space} + ~ , @ = ' [] { } < > ' " semicolon (;) colon (:) | \ and ?.

HTML Operation, cont'd



CrossPoint 450 Plus and MAV Plus Switchers

Appendix A

Ethernet Connection

Ethernet Link

Subnetting — A Primer

Ethernet Connection

Ethernet Link

The rear panel Ethernet connector on the CrossPoint 450 Plus and MAV Plus switcher BMEs can be connected to an Ethernet LAN or WAN. This connection makes SIS control of the switcher possible using a computer connected to the same LAN. Although for normal system control, the connection is to BME 0, you can connect to and communicate with any BME (for example, you connect to other BMEs to perform a firmware upgrade).



Ethernet connection

The Ethernet cable can be terminated as a straight-through cable or a crossover cable and must be properly terminated for your application (figure A-1).

- **Crossover cable** — Direct connection between the computer and switcher BME (usually BME 0)
- **Patch (straight-through) cable** — Connection of a switcher BME (usually BME 0) to an Ethernet LAN.

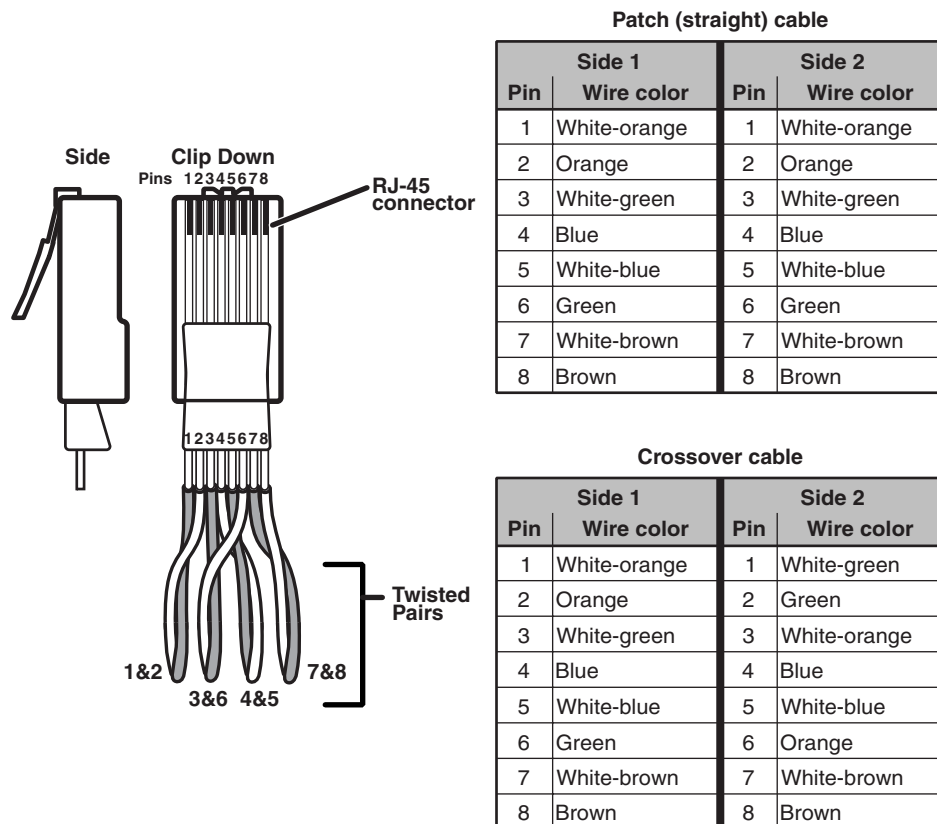


Figure A-1 — RJ-45 connector pinout tables

Default address

To access BME 0 via the Ethernet port, you need the switcher's IP address. If the address has been changed to an address comprised of words and characters (an alias), you can determine the actual numeric IP address using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to any CrossPoint 450 Plus or MAV Plus switcher BME.

Pinging to determine Extron IP address

The Microsoft Ping utility is available at the DOS prompt. Ping tests the Ethernet interface between the computer and a switcher BME (usually BME 0). Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the switcher as follows:

1. On the Windows task bar, click on *Start > Run*.
2. At the Open prompt, type *command*.
3. Click the *OK* button.
4. At the DOS prompt, type *ping {IP address}* and then press [Enter]. The computer returns a display similar to figure A-2.

The line **Pinging ...** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:

Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure A-2 — Ping response

Pinging to determine Web IP address

The Ping utility has a modifier, *-a*, that directs the command to return the Web address rather than the numeric IP address.

At the DOS prompt, type *ping -a {IP address}* and then press [Enter]. The computer's return display is similar to the Ping response shown in figure A-2, except that when you specify the *-a* modifier, the line **Pinging mail...** reports the web IP address rather than the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Ethernet Connection, cont'd

Connecting as a Telnet client

The Microsoft Telnet utility is available from the DOS prompt. Telnet allows you to input SIS commands to BME 0 from the PC via the Ethernet link and the LAN.

Access the DOS prompt and start Telnet as follows:

1. On the Windows task bar, click on *Start > Run*.
2. At the Open prompt, type *command*.
3. Click the OK button.
4. At the DOS prompt, type *telnet* and then press [Enter]. The computer returns a display similar to figure A-3.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure A-3 — Telnet screen

Telnet tips

It is not the intention of this manual to detail all of the operations and functionality of Telnet; however, some basic level of understanding is necessary for operating the switcher via Telnet.

Open

Connect to BME 0 using the Open command. Once you are connected to the switcher, you can enter the SIS commands the same as you would if you were using the RS-232 link.

Connect to BME 0 as follows:

1. At the Telnet prompt, type *open {IP address}* and then press [Enter].
If the switcher is not password protected, no further prompts are displayed until you break or disconnect the connection to BME 0.
If the switcher is password protected, Telnet displays the password prompt.
2. If necessary, at the password prompt, type *{password}* and then press [Enter].

Connection to the switcher via the Ethernet can be password protected. There are two levels of password protection: administrator and user. A person logged on as an administrator has full access to all CrossPoint and/or MAV switching capabilities and editing functions. Users can select video and/or audio for output, select test patterns, set RGB and audio mutes, select a blue screen, and view all settings with the exception of passwords. By default, all BMEs ship with both passwords set to {carriage return}.

Once you are logged in, the BME returns either **Login Administrator** or **Login User**. No further prompts are displayed until you break or disconnect the connection to BME 0.

Escape character and Esc key

When Telnet is first started, the utility advises that the **Escape character is 'Ctrl+]**. Many SIS commands include the keyboard **[Esc]** key. Consequently, some confusion may exist between the Escape character and the Escape key.

The Telnet Escape character is a key combination, the **[Ctrl]** key and the **[I]** key pressed simultaneously, that returns you to the Telnet prompt while leaving the connection to BME 0 intact.

The Escape key is the **[Esc]** key on the computer keyboard.

Local echo

Once connected to BME 0, by default, Telnet does not display your keystrokes on the screen. SIS commands are typed in blind and only the SIS responses are displayed on the screen. To command Telnet to show keystrokes, at the Telnet prompt, type *set local_echo* and then press **[Enter]** before you open the connection to the switcher.

With local echo turned on, keystrokes and the switcher's responses are displayed on the same line. For example: **1*1!In1 Out1 All**, where **1*1!** is the SIS command and **In1 Out1 All** is the response.

With local echo turned on, all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the keyed in password and ********* is the masked response.

You can turn off local echo by typing *unset local_echo* and then pressing **[Enter]** at the Telnet prompt. If you are connected to BME 0 and need to access the Telnet prompt to turn local echo off, type the Escape character (**[Ctrl+I]**).

Set carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected switcher when you press the **[Enter]** key. This is the correct setting for SIS communication with the switcher. The Telnet *set crlf* command forces Telnet to transmit carriage return and line feed characters when **[Enter]** is pressed, but if *crlf* is set, the SIS link with the switcher does not function properly.

Close

To close the link to the BME, access the Telnet prompt by typing the Escape character (**[Ctrl+I]**). At the Telnet prompt, type *close* and then press **[Enter]**.

Help

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

Quit

Exit the Telnet utility by typing *quit* and then pressing **[Enter]** at the Telnet prompt. If you are connected to BME 0, access the Telnet prompt by typing the Escape character (**[Ctrl+I]**).

Ethernet Connection, cont'd

Subnetting — A Primer

It is not the purpose of this manual to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting (a subnet is a **subset** of a **network** — a set of IP devices that have portions of their IP addresses in common) is necessary in order to understand the interaction of BME 0 and the mail server gateway. To understand subnetting at the level required to install and operate the switcher, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

BME 0 can communicate with the e-mail server that the switcher uses for e-mail notification directly (if they are on the same subnet) or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this manual, subnetting is an issue when you are using the controlling PC to set TCP/IP and e-mail values in BME 0 (see *IP Settings/Options window* in chapter 5, *Matrix Software*, and *Email Settings page* in chapter 6, *HTML Operation*). When you are setting up the variables for e-mail notification, which may include subnetting, the matrix switcher is the local device and the e-mail server is the remote device.

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields, properly called octets, separated by dots (periods) (figure A-4). Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: 192,168,254,254
Octets

Figure A-4 — IP address and octets

Subnet masks and octets

The subnet mask (figure A-5) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeroes, up to three digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

255 indicates that this octet will be compared between two IP addresses. 0 indicates that this octet will **not** be compared between two IP addresses.

Typical Subnet Mask: 255,255,0,0
Octets

Figure A-5 — Subnet mask and octets

Determining whether devices are on the same subnet

To determine the subnet, the local device's IP address is **compared** to the remote device's IP address (figure A-6). Each address's octets are **compared** or **not compared**, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device's address and the remote device's IP address are unmasked.

Unmasked octets are compared (indicated by ? in figure A-6).

- If the subnet mask octet contains the value 0, the related octets of the local device's and remote device's IP addresses are masked.

Masked octets are not compared (indicated by X in figure A-6).

If the unmasked octets of the two IP addresses **match** (indicated by = in figure A-6) (example 1), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by ≠ in figure A-6) (example 2 and example 3), the addresses **are not on the same subnet**.

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (??.X.X)	255.255.0.0 (??.X.X)	255.255.0.0 (??.X.X)
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	<u>==.X.X — Match</u> (Same subnet)	<u>≠.X.X — No match</u> (Different subnet)	<u>≠.X.X — No match</u> (Different subnet)

Figure A-6 — Comparing the IP addresses

Ethernet Connection, cont'd



CrossPoint 450 Plus and MAV Plus Switchers

Appendix B

Reference Information

CrossPoint 450 Plus Specifications

MAV Plus Specifications

Part Numbers and Accessories

Button Labels

Reference Information

CrossPoint 450 Plus Specifications

Video

Routing	64 x 64, 64 x 48, 64 x 32, 48 x 64, 48 x 48, 48 x 32, 32 x 48, or 32 x 64 matrix
Gain	Unity
Bandwidth.....	450 MHz (-3 dB), fully loaded 0 - 10 MHz: no more than +0.1 dB to -0.1 dB 0 - 130 MHz: no more than +1.0 dB to -1.0 dB
Crosstalk.....	-80 dB @ 1 MHz, -62 dB @ 10 MHz, -52 dB @ 30 MHz
Switching speed	200 ns (max.)

Video input

Number/signal type.....	32, 48, or 64 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video
Connectors	32, 48, or 64 BNC female
Nominal level	1 Vp-p for Y of component video 0.7 Vp-p for RGB 0.3 Vp-p for R-Y and B-Y of component video and C of S-video
Minimum/maximum levels.....	Analog: 0.5 V to 2.0 Vp-p with no offset
Impedance.....	75 ohms
Horizontal frequency.....	15 kHz to 150 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss.....	-30 dB @ 5 MHz
DC offset (max. allowable).....	1.5 V

Video output

Number/signal type.....	32, 48, or 64 RGBHV, RGBS, RGsB, RsGsBs, HDTV, component video
Connectors	32, 48, or 64 BNC female
Nominal level	1 Vp-p for Y of component video 0.7 Vp-p for RGB 0.3 Vp-p for R-Y and B-Y of component video and C of S-video
Minimum/maximum levels.....	0 V to 2.0 Vp-p (follows input)
Impedance.....	75 ohms
Return loss.....	<-30 dB @ 5 MHz
DC offset.....	±5 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)
Input level	0.5 V to 5.0 Vp-p, 4.0 Vp-p normal
Output level	AGC to TTL: 4.0 V to 5.0 Vp-p, unterminated
Input impedance	Inputs 1 to 16: 75 or 510 ohms, switchable Inputs 17 to 32, 48, or 64: 510 ohms
Output impedance	75 ohms
Max. propagation delay	30 ns
Max. rise/fall time	4 ns
Polarity.....	Positive or negative (follows input)

Audio — See *MAV Plus Specifications* (page B-4)

Audio input — See *MAV Plus Specifications* (page B-4)

Audio output — See *MAV Plus Specifications* (page B-4)

Control/remote — switcher

Serial control port.....	1 RS-232 or RS-422, 9-pin female D connector (rear panel) 1 RS-232-only 2.5 mm phone jack (front panel)
Baud rate and protocol	
9-pin D connector.....	9600 (default), 19200, 38400, 115200 baud (adjustable); 8 data bits, 1 stop bit, no parity
2.5 mm phone jack	9600 baud; 8 data bits, 1 stop bit, no parity
Serial control pin configurations	
9-pin D connector.....	RS-232: 2 = TX, 3 = RX, 5 = GND RS-422: 2 = TX-, 3 = RX-, 5 = GND, 7 = RX+, 8 = Tx+
2.5 mm phone jack	Tip = TX, ring = Rx, sleeve = GND
Ethernet control port.....	1 RJ-45 female connector
Ethernet data rate.....	10/100Base-T, half/full duplex with autodetect
Ethernet protocol.....	ARP, DHCP, ICMP (ping), TCP/IP, Telnet, HTTP
Program control.....	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

General

Power	100 VAC to 240 VAC, 50/60 Hz, internal, autoswitchable, primary and redundant (64 or 48) x (32, 48, or 64) wideband: 110 watts at 115 VAC, 60 Hz 32 x (48 or 64) wideband: 50 watts at 115 VAC, 60 Hz (64 x 64) sync: 65 watts at 115 VAC, 60 Hz
-------------	---

NOTE *A redundant power supply is standard.*

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 included parts
Enclosure type	Metal
Enclosure dimensions.....	10.5" H x 17.0" W x 14.1" D (6U high, full rack wide) 26.7 cm H x 43.2 cm W x 35.8 cm D
Product weight per BME	
32 x 48 through 64 x 64 Series wideband video BMEs	18.0 lbs (8.2 kg)
32 x 48 through 64 x 64 Series sync BMEs	17.0 lbs (7.7 kg)
Shipping weight per BME	
32 x 48 through 64 x 64 Series wideband video BMEs	30 lbs (14 kg)
32 x 48 through 64 x 64 Series sync BMEs	29 lbs (13 kg)
DIM weight, international, per BME	44 lbs (20 kg)

NOTE *An RGBHV system will be shipped as 5 BMEs in 5 cartons.*

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.*

Reference Information, cont'd

MAV Plus Specifications

Video

Routing	64 x 64, 64 x 48, 64 x 32, 48 x 64, 48 x 48, 48 x 32, 32 x 48, or 32 x 64 matrix
Gain	Unity
Bandwidth.....	150 MHz (-3 dB), fully loaded 0 - 10 MHz: no more than +0.1 dB to -0.1 dB 0 - 80 MHz: no more than +1.0 dB to -1.0 dB
Crosstalk.....	-80 dB @ 1 MHz, -62 dB @ 10 MHz, -52 dB @ 30 MHz
Switching speed	200 ns (max.)

Video input

Number/signal type.....	32, 48, or 64 S-video, composite video
Connectors	32, 48, or 64 BNC female
Nominal level	1 Vp-p for Y of S-video, and for composite video 0.3 Vp-p for C of S-video
Minimum/maximum levels.....	Analog: 0.5 V to 2.0 Vp-p with no offset
Impedance.....	75 ohms
Horizontal frequency.....	15 kHz to 150 kHz
Vertical frequency.....	30 Hz to 150 Hz
Return loss.....	-30 dB @ 5 MHz
DC offset (max. allowable).....	1.5 V

Video output

Number/signal type.....	32, 48, or 64 S-video, composite video
Connectors	32, 48, or 64 BNC female
Nominal level	1 Vp-p for Y of S-video, and for composite video 0.3 Vp-p for C of S-video
Minimum/maximum levels.....	0 V to 2.0 Vp-p (follows input)
Impedance.....	75 ohms
Return loss.....	<-30 dB @ 5 MHz
DC offset.....	±5 mV with input at 0 offset
Switching type.....	Vertical interval

Sync

Genlock connectors.....	1 BNC female
Standards.....	NTSC 3.58, NTSC 4.43, PAL, SECAM

Audio — audio BMEs

Routing	(32, 48, or 64) x (32, 48, or 64) stereo or mono matrix
---------------	---

NOTE Both stereo (2 channel) and mono (1 channel) audio models are available.

Gain	Unbalanced output: -6 dB; balanced output 0 dB
Frequency response	20 Hz to 20 kHz, ±0.05 dB
THD + Noise.....	0.03% @ 1 kHz at nominal level
S/N.....	>90 dB, balanced, at maximum output (21 dBu), unweighted
Crosstalk.....	<-80 dB @ 1 kHz, fully loaded
Stereo channel separation	>80 dB @ 1 kHz
CMRR.....	>75 dB @ 20 Hz to 20 kHz

Audio input — audio BMEs

Number/signal type.....	32, 48, or 64 stereo balanced/unbalanced <i>or</i> 32, 48, or 64 mono balanced/unbalanced
Connectors	
Stereo models.....	(32, 48, or 64) 3.5 mm captive screw connectors, 5 pole
Mono models	(32, 48, or 64) 3.5 mm captive screw connectors, 3 pole
Impedance.....	>10k ohm, balanced/unbalanced, DC coupled
Nominal level	-10 dBV (316 mVrms)
Maximum level.....	+19.5 dBu, (balanced or unbalanced) at 1% THD+N
Input gain adjustment	-18 dB to +24 dB, adjustable per input by RS-232/422, Ethernet, or front panel

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

Audio output — audio BMEs

Number/signal type.....	32, 48, or 64 stereo balanced/unbalanced <i>or</i> 32, 48, or 64 mono balanced/unbalanced
Connectors	
Stereo models.....	(32, 48, or 64) 3.5 mm captive screw connectors, 5 pole
Mono models	(32, 48, or 64) 3.5 mm captive screw connectors, 3 pole
Impedance.....	50 ohms unbalanced, 100 ohms balanced
Gain error	± 0.1 dB channel to channel
Maximum level (Hi-Z)	$>+21$ dBu, balanced or unbalanced at 0.1% THD+N
Maximum level (600 ohm).....	$>+15$ dBm, balanced or unbalanced at 0.1% THD+N
Output volume range.....	0 to 64 (-98 dB to 0 dB) in 0.5 dB increments from steps 1 to 64, 35 dB increment from step 0 to 1

Control/remote — switcher

Serial control port.....	1 RS-232 or RS-422, 9-pin female D connector
Baud rate and protocol.....	9600 (default), 19200, 38400, 115200 baud (adjustable); 8 data bits, 1 stop bit, no parity
Serial control pin configurations.	RS-232: 2 = TX, 3 = RX, 5 = GND RS-422: 2 = TX-, 3 = RX-, 5 = GND, 7 = RX+, 8 = Tx+
Ethernet control port.....	1 RJ-45 female connector
Ethernet data rate.....	10/100Base-T, half/full duplex with autodetect
Ethernet protocol.....	ARP, DHCP, ICMP (ping), TCP/IP, Telnet, HTTP
Program control.....	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™) Microsoft® Internet Explorer, Telnet

Reference Information, cont'd

General

Power 100 VAC to 240 VAC, 50/60 Hz, internal, autoswitchable,
primary and redundant
Video models: 110 watts at 115 VAC, 60 Hz
All audio models: 195 watts at 115 VAC, 60 Hz

NOTE *A redundant power supply is standard.*

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 included parts

Enclosure type Metal

Enclosure dimensions

Video BMEs 10.5" H x 17.0" W x 14.1" D (6U high, full rack wide)
26.7 cm H x 43.2 cm W x 35.8 cm D

Audio BMEs 12.25" H x 17.0" W x 14.1" D (7U high, full rack wide)
31.1 cm H x 43.2 cm W x 35.8 cm D

Product weight per BME

32 x 48 through 64 x 64 Series video BMEs
17.0 lbs (7.7 kg)

32 x 48 through 64 x 64 Series stereo audio BMEs
19.0 lbs (8.6 kg)

32 x 48 through 64 x 64 Series mono audio BMEs
18.5 lbs (8.4 kg)

Shipping weight per BME

32 x 48 through 64 x 64 Series video BMEs
29 lbs (13 kg)

32 x 48 through 64 x 64 Series stereo audio BMEs
31 lbs (14 kg)

32 x 48 through 64 x 64 Series mono audio BMEs
30 lbs (14 kg)

DIM weight, international, per BME

44 lbs (20 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

CrossPoint 450 Plus system part numbers

NOTE *The part numbers below are for complete RGBHV (five BMEs) systems with or without stereo audio (a sixth, stereo audio BME) only.*

A front panel controller is incorporated into one of the BMEs in the system.

For custom systems, such as RGBS video, mono audio, or no front panel controller, see BME part numbers to order individual BMEs.

Model	Part number
CrossPoint 450 Plus 3248 HV video switcher	42-078-40
CrossPoint 450 Plus 3248 HVA video and audio switcher	42-078-45
CrossPoint 450 Plus 3264 HV video switcher	42-079-40
CrossPoint 450 Plus 3264 HVA video and audio switcher	42-079-45
CrossPoint 450 Plus 4832 HV video switcher	42-080-40
CrossPoint 450 Plus 4832 HVA video and audio switcher	42-080-45
CrossPoint 450 Plus 4848 HV video switcher	42-081-40
CrossPoint 450 Plus 4848 HVA video and audio switcher	42-081-45
CrossPoint 450 Plus 4864 HV video switcher	42-082-40
CrossPoint 450 Plus 4864 HVA video and audio switcher	42-082-45
CrossPoint 450 Plus 6432 HV video switcher	42-083-40
CrossPoint 450 Plus 6432 HVA video and audio switcher	42-083-45
CrossPoint 450 Plus 6448 HV video switcher	42-084-40
CrossPoint 450 Plus 6448 HVA video and audio switcher	42-084-45
CrossPoint 450 Plus 6464 HV video switcher	42-085-40
CrossPoint 450 Plus 6464 HVA video and audio switcher	42-085-45

Reference Information, cont'd

MAV Plus system part numbers

NOTE *The part numbers below are for composite video (one BME) switchers with or without stereo audio (a second, stereo audio BME) only.*

A front panel controller is incorporated into the video BME.

For S-video and component video systems, systems with mono audio, or audio only switchers, see BME part numbers to order individual BMEs.

Model	Part number
MAV Plus 3248 V video switcher	60-761-31
MAV Plus 3248 AV video and audio switcher	42-078-15
MAV Plus 3264 V video switcher	60-762-31
MAV Plus 3264 AV video and audio switcher	42-079-15
MAV Plus 4832 V video switcher	60-763-31
MAV Plus 4832 AV video and audio switcher	42-080-15
MAV Plus 4848 V video switcher	60-764-31
MAV Plus 4848 AV video and audio switcher	42-081-15
MAV Plus 4864 V video switcher	60-765-31
MAV Plus 4864 AV video and audio switcher	42-082-15
MAV Plus 6432 V video switcher	60-766-31
MAV Plus 6432 AV video and audio switcher	42-083-15
MAV Plus 6448 V video switcher	60-767-31
MAV Plus 6448 AV video and audio switcher	42-084-15
MAV Plus 6464 V video switcher	60-768-31
MAV Plus 6464 AV video and audio switcher	42-085-15

BME part numbers

NOTE The complete system part numbers listed on the preceding pages are for either:

- RGBHV (three wideband video and two sync BMEs) systems
- Composite video (one video BME) switchers

Any of the above matrix switchers is available as a complete system with or without stereo audio (an extra, stereo audio BME).

For custom systems, such as RGBS video, S-video, component video, or systems with mono audio, see the part numbers below and order the required BMEs for your system.

- One CrossPoint 450 Plus wideband video BME for each high resolution video plane (typically three required)
- One CrossPoint 450 Plus sync BME for each sync plane
- One MAV Plus video BME for each low resolution video plane:
 - Three BMEs for component video
 - Two BMEs for S-video
 - One BME for composite video
- If desired, one MAV Plus audio (stereo or mono) BME

Order all BMEs of the same matrix size, such as 6464.

If desired, order one wideband video BME with an optional QuickSwitch-Front Panel Controller (QS-FPC™).

- A system should include only one operational QS-FPC.
- The QS-FPC is standard, not optional, on MAV Plus video BMEs. In systems with multiple BMEs, only one QS-FPC is operational.
 - Multiple QS-FPCs are potentially confusing. An S-video or component video system has multiple QS-FPCs by default. To avoid confusion, Extron recommends that you lock the redundant QS-FPCs. See Locking out the front panel (Executive mode) on page 3-40.
- A front panel controller cannot be installed on a sync or audio BME.

Connect the BMEs as detailed in chapter 2, Installation.

Reference Information, cont'd

CrossPoint 450 Plus wideband video BMEs

BME	Part number
CrossPoint 450 Plus 3248 WB	60-761-40
CrossPoint 450 Plus 3248 WB FPC	60-761-41
CrossPoint 450 Plus 3264 WB	60-762-40
CrossPoint 450 Plus 3264 WB FPC	60-762-41
CrossPoint 450 Plus 4832 WB	60-763-40
CrossPoint 450 Plus 4832 WB FPC	60-763-41
CrossPoint 450 Plus 4848 WB	60-764-40
CrossPoint 450 Plus 4848 WB FPC	60-764-41
CrossPoint 450 Plus 4864 WB	60-765-40
CrossPoint 450 Plus 4864 WB FPC	60-765-41
CrossPoint 450 Plus 6432 WB	60-766-40
CrossPoint 450 Plus 6432 WB FPC	60-766-41
CrossPoint 450 Plus 6448 WB	60-767-40
CrossPoint 450 Plus 6448 WB FPC	60-767-41
CrossPoint 450 Plus 6464 WB	60-768-40
CrossPoint 450 Plus 6464 WB FPC	60-768-41

CrossPoint 450 Plus sync BMEs

NOTE Only one sync BME matrix size is available for separate purchase. Use the 6464 matrix size sync BME for all custom matrix switcher configurations of all matrix sizes 3248 and larger.

BME	Part number
CrossPoint 450 Plus 6464 sync	60-768-20

MAV Plus video BMEs

BME	Part number
MAV Plus 3248 video FPC	60-761-31
MAV Plus 3264 video FPC	60-762-31
MAV Plus 4832 video FPC	60-763-31
MAV Plus 4848 video FPC	60-764-31
MAV Plus 4864 video FPC	60-765-31
MAV Plus 6432 video FPC	60-766-31
MAV Plus 6448 video FPC	60-767-31
MAV Plus 6464 video FPC	60-768-31

MAV Plus stereo audio BMEs

BME	Part number
MAV Plus 3248 stereo audio	60-761-15
MAV Plus 3264 stereo audio	60-762-15
MAV Plus 4832 stereo audio	60-763-15
MAV Plus 4848 stereo audio	60-764-15
MAV Plus 4864 stereo audio	60-765-15
MAV Plus 6432 stereo audio	60-766-15
MAV Plus 6448 stereo audio	60-767-15
MAV Plus 6464 stereo audio	60-768-15

MAV Plus mono audio BMEs

BME	Part number
MAV Plus 3248 mono audio	60-761-10
MAV Plus 3264 mono audio	60-762-10
MAV Plus 4832 mono audio	60-763-10
MAV Plus 4848 mono audio	60-764-10
MAV Plus 4864 mono audio	60-765-10
MAV Plus 6432 mono audio	60-766-10
MAV Plus 6448 mono audio	60-767-10
MAV Plus 6464 mono audio	60-768-10

Included parts

Part	Part number
5-pole captive screw audio connectors (with stereo audio BMEs only)	10-703-12LF
3-pole captive screw audio connectors (with mono audio BMEs only)	10-703-11LF
Matrix Switchers Control Program and Button Label Generator <i>CrossPoint 450 Plus/MAV Matrix Plus Switcher User's Manual</i>	
BNC extraction tool (with video and sync BMEs)	100-096-01

Replacement parts

Part	Part number
Button cap and diffuser kit (set of 3 button cap assemblies)	70-352-01

Reference Information, cont'd

Optional accessories

These items can be ordered separately:

Adapters, power supplies, labels	Part number
MKP 1000 remote keypad	
Black	60-239-02
White	60-239-03
RAL9010 white	60-239-05
WT (water-tight) (gray)	60-239-51
MCP 1000M (master)	60-298-01
MKP 2000 matrix switcher 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
Button cap and diffuser kit (set of 3 button cap assemblies)	70-352-01

Cables

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

Bulk cable

RG6 super high resolution cable	Part number
RG6-5/500, non-plenum 5-conductor 500'/150 m spool	22-100-02
RG6-1/1000, non-plenum 1-conductor 1000'/300 m spool	22-098-03
RG6-1/500, non-plenum 1-conductor 500'/150 m spool	22-098-02
RG6P/1000, plenum 1-conductor 1000'/300 m spool	22-164-03
RG6P/500, plenum 1-conductor 500'/150 m spool	22-164-02
BNC male SHR crimp connectors, qty. 500	100-260-02
BNC male SHR crimp connectors, qty. 50	100-260-01

RG59 high resolution cable	Part number
RG59/1000 non-plenum 1-conductor 1000'/300 m spool	22-145-03
RG59/500 non-plenum 1-conductor 500'/150 m spool	22-145-02
RG59P/1000 plenum 1-conductor 1000'/300 m spool	22-146-03
RG59P/500 plenum 1-conductor 500'/150 m spool	22-146-02
BNC male RG59/HR crimp connectors, qty. 500	100-257-02
BNC male RG59/HR crimp connectors, qty. 50	100-257-01

MHR mini high resolution cable	Part number
MHRHF-5/300 m halogen-free 1000'/300 m spool	22-126-03
MHRHF-5/150 m halogen-free 500'/150 m spool	22-126-02
MHR-5/1000 non-plenum 5-conductor 1000'/300 m spool	22-020-03
MHR-5/500 non-plenum 1-conductor 500'/150 m spool	22-020-02
MHR-5P/1000 plenum 5-conductor 1000'/300 m spool	22-103-03
MHR-5P/500 plenum 1-conductor 500'/150 m spool	22-103-02
BNC male mini HR crimp connectors, qty. 50	100-250-01

Terminated cable assemblies

RG6 super high resolution cable	Part number
RG6-5/25 non-plenum 5-conductor 25'/7.6 m	26-369-04
RG6-5/35 non-plenum 5-conductor 35'/10.6 m	26-369-12
RG6-5/50 non-plenum 5-conductor 50'/15.2 m	26-369-05
RG6-5/75 non-plenum 5-conductor 75'/22.8 m	26-369-06
RG6-5/100 non-plenum 5-conductor 100'/30.4 m	26-369-07
RG6-1/25 non-plenum 1-conductor 25'/7.6 m	26-383-04
RG6-1/35 non-plenum 1-conductor 35'/10.6 m	26-383-12
RG6-1/50 non-plenum 1-conductor 50'/15.2 m	26-383-05
RG6-1/75 non-plenum 1-conductor 75'/22.8 m	26-383-06
RG6-1/100 non-plenum 1-conductor 100'/30.4 m	26-383-07

MHR mini high resolution cable	Part number
MHR-5/25 non-plenum 5-conductor 25'/7.6 m	26-260-03
MHR-5/35 non-plenum 5-conductor 35'/10.6 m	26-260-17
MHR-5/50 non-plenum 5-conductor 50'/15.2 m	26-260-04
MHR-5/75 non-plenum 5-conductor 75'/22.8 m	26-260-16
MHR-5/100 non-plenum 5-conductor 100'/30.4 m	26-260-05
MHR-5P/25 plenum 5-conductor 25'/7.6 m	26-378-04
MHR-5P/35 plenum 5-conductor 35'/10.6 m	26-378-12
MHR-5P/50 plenum 5-conductor 50'/15.2 m	26-378-05
MHR-5P/75 plenum 5-conductor 75'/22.8 m	26-378-06
MHR-5P/100 plenum 5-conductor 100'/30.4 m	26-378-07

Reference Information, cont'd

Button Labels

Page B-15 provides strips of blank button labels. If desired, photocopy them or cut them out of the manual, write button information in each button area as desired, and put them in the switcher's input or output buttons' windows. You can also create labels using the Button-Label Generator software (see chapter 5, *Matrix Software*).

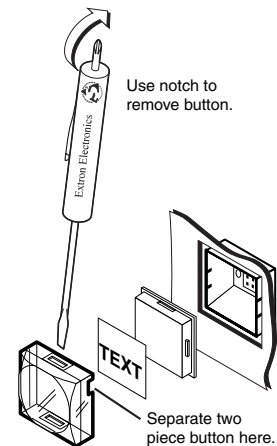
Installing labels in the matrix switcher's buttons

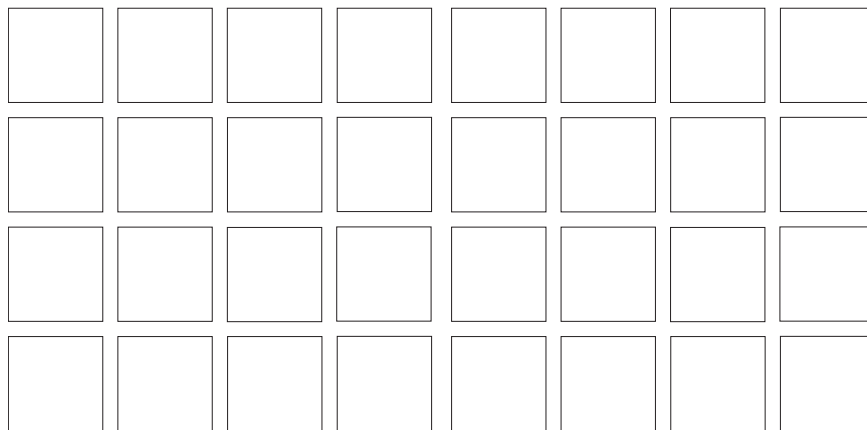
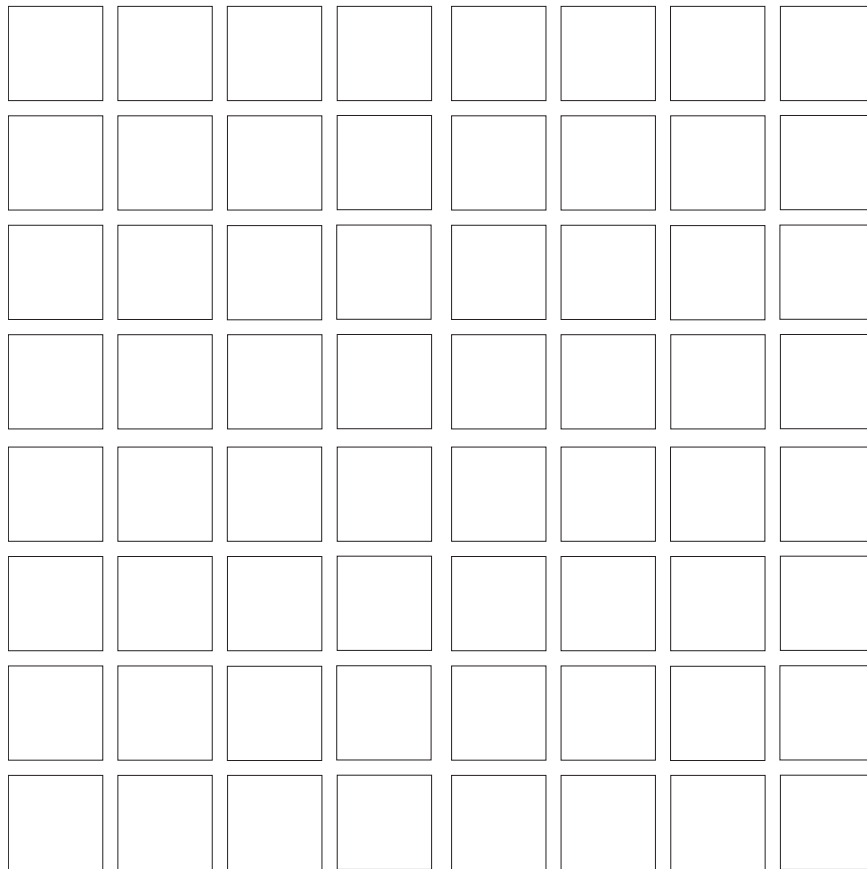
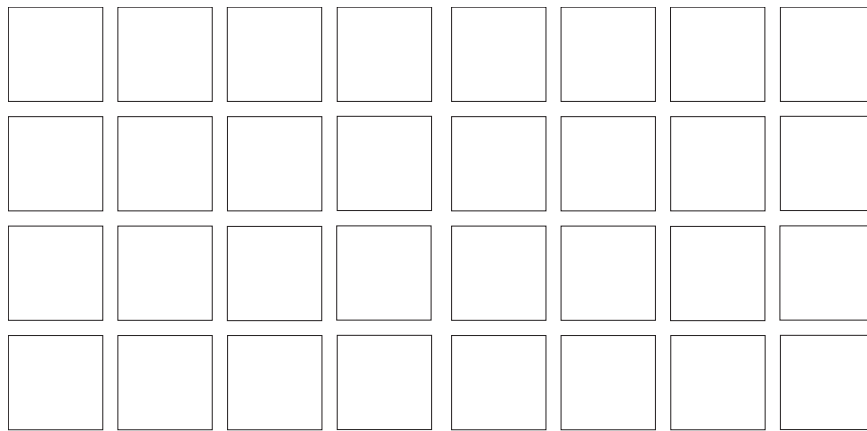
Use the following procedure to install new labels in the matrix switcher's front panel buttons.

1. Make new labels using either the blanks on page B-15 or the Button-Label Generator software. Cut them out.
2. Remove the button from the switcher by grasping the button firmly and pulling it away from the front panel.

NOTE *There are different button models available. Your buttons **may** appear different.*

3. Use a small screwdriver or Extron Tweezer to gently lever the button cap off of the white backing plate.
4. Insert a button label into the cap and gently but firmly press the cap onto the white backing plate.
5. Press the button into place in the matrix switcher





Button label blanks

Reference Information, cont'd

FCC Class A Notice

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

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

Extron's Warranty

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

**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.

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