

User's Manual



MPS 112 and MPS 112CS

Media Presentation 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.

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

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

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 du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

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

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

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

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

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

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

Advertencia

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

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

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

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

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

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Descharrar 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。不要有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 — MPS Series

Installation

See chapter 2 for details.

Step 1

Turn off power to the MPS switcher and all other devices that will be connected.

Step 2

Select your mounting option and install the appropriate brackets. Mount the switcher.

Step 3

Attach up to four VGA, four S-video, and four Video (composite) input devices (up to four of each type) to the MPS switcher.

Step 4

Connect a VGA output, an S-video output, and a Video (composite) output from the switcher to a projector's inputs.

Step 5

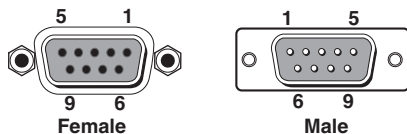
For stereo input, connect up to 12 audio sources to the audio inputs of the VGA, S-video, or Video (composite) groups (up to four audio sources for each group). See chapter two, "Installation", for wiring diagrams.

Step 6

For stereo audio output, connect an audio output device to each of the three output groups and one audio amplifier to the Program Audio output connectors. See chapter two, "Installation", for wiring diagrams.

Step 7

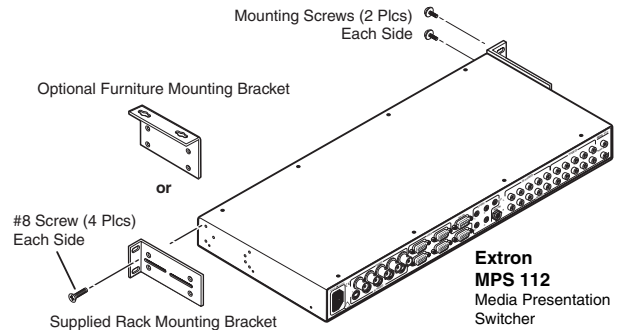
If the MPS switcher is to be connected to a computer or host controller for remote control, connect the host's RS-232 cable to the 9-pin female RS-232 remote connector of the switcher. For more information, see the "Remote Control Port (RS-232)" section in chapter five.



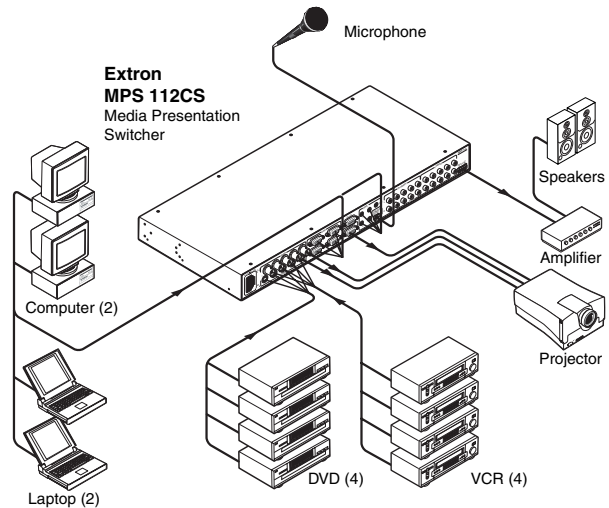
RS-232 remote connector

Step 8

Power up the input and output devices, then connect power to the switcher's rear AC connector.



Mounting options



Connecting the MPS switcher

Pin	RS-232 function	Description
1	—	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	—	No connection
5	Gnd	Signal ground
6, 7	—	No connection
8, 9	—	No connection

RS-232 remote connector pinout table

Quick Start — MPS Series, cont'd

Optimizing the audio

1. Finish installation and wiring as described on the previous page, turn on all equipment, and provide an input signal to the MPS switcher.
2. Reset program audio volume by pressing and holding the Mode button, then pressing and releasing the Prog Vol Reset button. Release the Mode button to return to normal operating mode.
3. Select an input with a signal present, and adjust the volume of the audio amplifier connected to the Prog Out audio connectors to achieve the desired sound level.
4. Turn on or off the microphone power (15V for MPS 112 and 48V phantom power for MPS 112CS).
 - a. Press and hold the Mode button for more than 2 seconds until the front panel LEDs change to view mode
 - b. Press and release the Mic Power On/Off button. On the MPS 112CS, the associated LED lights.
5. Turn on the microphone by pressing the Mix button (the associated LED lights).
6. Reset the microphone volume by pressing and holding the Mode button, then pressing and releasing the Mic Vol Reset button. Release the Mode button to return to normal operating mode.
7. Talk into the microphone in a normal voice and adjust the Mic Volume knob to the desired sound level.
8. Use the Program Volume and Mic Volume knobs on the MPS switcher to adjust the volume.

Setting the microphone talk-over threshold

1. Finish installation wiring and setup as described in the previous sections.
2. Turn on the microphone by pressing the Mix button (the associated LED lights).
3. Speak into the microphone in a normal voice; the main program audio level should drop moderately. If it does not, lower the threshold by pressing and holding the Mix button and turning the Mic Volume knob counter-clockwise. Release the Mix button to return to normal operating mode.
4. Stop speaking into the microphone; the main program audio should recover to the previous level after approximately four seconds. If not, increase the threshold by pressing and holding the Mix button and turning the Mic Volume knob clockwise. Release the Mix button to return to normal operating mode.

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MPS Series

Chapter One

Introduction

About the MPS Series

MPS Series Features

Introduction

About the MPS Series

The Extron MPS 112 and MPS 112CS are media presentation switchers featuring three A/V switchers and a program audio switcher with microphone pre-amplifier and mute controls in one product. The A/V switchers include a four input, one output VGA/audio switcher; a four input, one output S-video/audio switcher; and a four input, one output composite video/audio switcher. The MPS 112 and MPS 112CS accept microphone input and mix the microphone signal with the main audio in “talk-over” mode. Both models have an RS-232 control port. The MPS 112CS also features switchable 48 V phantom power for the microphone.

The MPS Series is a one box solution for small presentation systems.

Throughout this manual both models of this switcher are referred to as “MPS” or “MPS 112” if the instructions are not model-specific.

MPS Series Features

Multiple video inputs — Twelve inputs can include four VGA (or SVGA, UXGA, RGBHV, RGBS, RGsB, or RsGsBs) inputs on 15-pin HD female connectors, four S-video (NTSC, PAL, or SECAM) inputs on 4-pin mini DIN female connectors, and four composite video (NTSC, PAL, or SECAM) inputs on BNC female connectors.

Multiple video outputs — Three outputs for simultaneous (in Separate mode), or one at a time (in Single mode) display on VGA, S-video, or composite video devices.

Multiple audio inputs — Twelve inputs can include four in the VGA group on 3.5 mm female stereo mini jacks, four in the S-video group on pairs of female RCA connectors, and four in the Video group on pairs of female RCA connectors.

Multiple audio outputs — One output for each group (VGA, S-video, and Video), plus Program Out.

Program audio switcher — A three input, one output stereo audio switching system allows the audio input of any video group to be selected for program audio output, with volume and mute control. The MPS 112 features unbalanced program audio output on RCA connectors, while the MPS 112CS has balanced/unbalanced program audio output on a 5-pole captive screw connector.

Bandwidth — Bandwidth is 350 MHz (-3 dB), typical for VGA video, allowing this switcher to switch everything from NTSC video to high-resolution computer displays.

Microphone input — The built-in microphone amplifier is switchable with microphone power (MPS 112 – 15 V and MPS 112CS – 48 V phantom power). The MPS 112 features unbalanced microphone input on one 1/4" (6.3 mm) jack, while the MPS 112CS has balanced/unbalanced microphone input on a 3-pole captive screw connector. The switcher includes a Mix button for “talk-over,” with adjustable threshold control and mix volume control.

Front panel security lockout (Executive mode) — Locks out all front panel functions except input selection and program volume control to prevent unwanted setting changes.

RS-232 remote control — Allows remote control of the MPS switcher using Extron’s Simple Instruction Set (SIS™), Extron’s control software for Windows®, or a control system.

Rack-mountable — The 1U high, full rack width, metal enclosure is rack-mountable, with supplied rack mounting brackets.



MPS 112 Series

Chapter Two

Installation

Mounting the Switcher

Rear Panel Connectors

Connecting the MPS Switcher

Installation

Mounting the Switcher

The MPS 112 and MPS 112CS are housed in 1U high, 17.4" wide metal enclosures that are rack- or desk-mountable. The MBD 149 1U through-desk and rack mounting kit (#70-077-03) is included with the switchers. The switchers may also be surface-mounted under a table, desk, or podium, or on a wall, using the optional Extron MBU 149 1U under-desk mounting kit (#70-222-01).

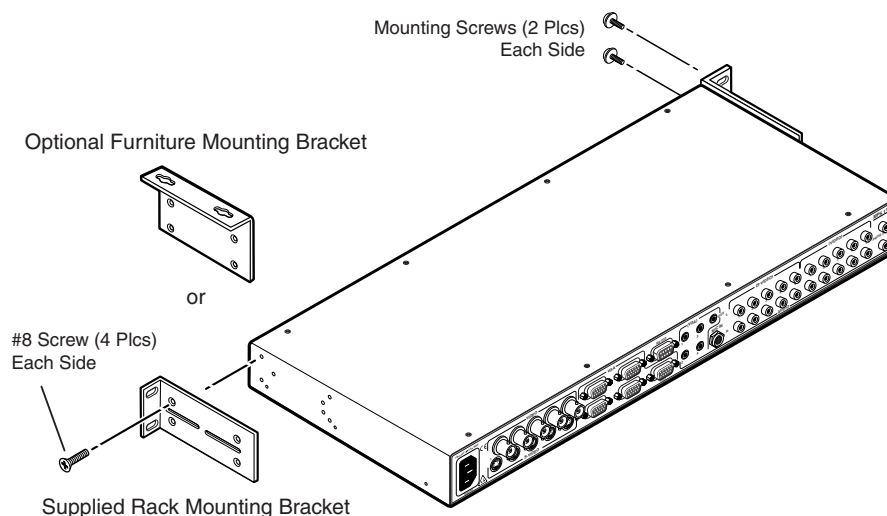


Figure 2-1 — Mounting the MPS switcher

Rack mounting

Rack mount the switcher as follows:

1. Attach the supplied rack mounting brackets to the switcher with the eight provided #8 machine screws (figure 2-1).
2. Insert the switcher into the rack, aligning the holes in the mounting bracket with those of the rack.
3. Secure the switcher to the rack using the supplied machine screws.

UL rack mounting requirements

The following Underwriters Laboratories (UL) requirements pertain to the safe installation of the MPS in a rack.

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

-
5. Reliable earthing (grounding) — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Table or wall mounting

The table/wall mounting brackets extend approximately 1/4" (6.4 mm) above the top surface of the switcher enclosure. This design allows for an air space between the enclosure and the surface to which it is mounted. Table or wall mount the switcher as follows:

1. Attach the table/wall mounting brackets to the switcher with the eight provided #8 machine screws (figure 2-1).
2. Hold the switcher with the attached brackets against the underside of the table or other furniture, or against the wall. Mark the location of the screw holes of the bracket on the mounting surface.
3. Drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.4 mm) deep in the mounting surface at the marked screw locations.
4. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw's head protrudes.
5. Align the mounting screws with the slots in the brackets and place the switcher against the surface, with the screws through the bracket slots.
6. Slide the switcher slightly forward or back, then tighten all four screws to secure the switcher in place.

Through-desk mounting

Mount the switcher through a desk or podium as follows:

1. Attach the supplied mounting brackets to the switcher with the machine screws provided (figure 2-1).
2. Cut the proper sized hole in the mounting surface.
3. Hold the switcher with the attached brackets against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.
4. Drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. Insert four #8 wood screws through the bracket and into the four pilot holes. Tighten all four screws to secure the switcher in place.

Installation, cont'd

Rear Panel Connectors

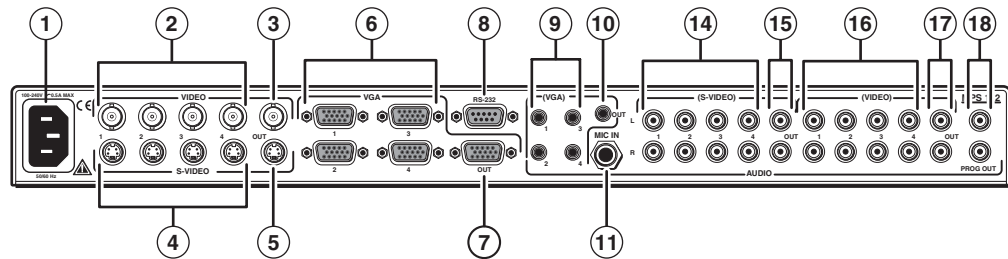


Figure 2-2 — Rear panel of MPS 112

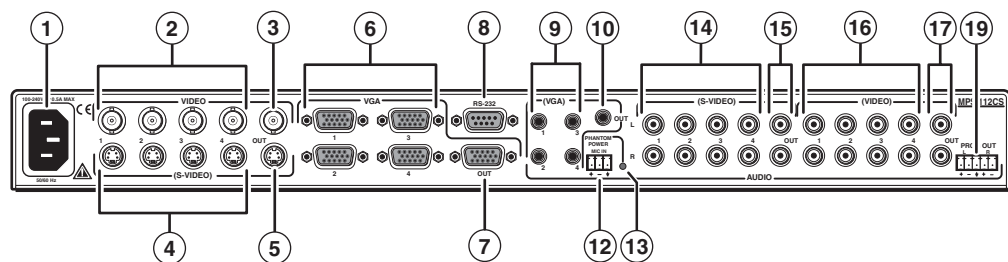


Figure 2-3 — Rear panel of MPS 112CS

- ① **AC power** — Standard AC power connector for a power source of 100 – 240 VAC, operating at 50/60 Hz
 - ② **Video input group** — Four female BNC connectors for composite video input (numbered 1 through 4)
 - ③ **Video output** — One female BNC connector for composite video output
 - ④ **S-video input group** — Four female 4-pin mini DIN connectors for S-video input (numbered 1 through 4)
 - ⑤ **S-video output** — One female 4-pin mini DIN for S-video output
 - ⑥ **VGA input group** — Four female 15-pin HD connectors for VGA input (numbered 1 through 4)
 - ⑦ **VGA output** — One female 15-pin HD connector for VGA output
 - ⑧ **RS-232 remote** — One female 9-pin D connector for a host computer or a controller using Extron's Simple Instruction Set (SIS) or Windows-based control software
 - ⑨ **(VGA) audio input group** — Four 3.5 mm, female, stereo mini jacks for audio input. See *Audio input and output* in this chapter.
- NOTE** *To reduce crosstalk, it is recommended that you either terminate all the VGA audio input jacks or avoid switching to a VGA audio input that has no device connected to it.*
- ⑩ **(VGA) audio output** — One 3.5 mm, female, stereo mini jack for audio output from the VGA group input. See *Audio input and output* in this chapter.
 - ⑪ **Microphone input (MPS 112)** — 6.3 mm mono microphone jack connection for an external microphone

-
- ⑫ **Microphone input (MPS 112CS)** — A 3-pole, 3.5 mm captive screw connector socket for an external microphone
 - ⑬ **Phantom Power LED (MPS 112CS)** — A green LED that indicates (when lit) that phantom power is on
 - ⑭ **(S-video) audio input group** — Eight female RCA connectors (four right and four left) for audio input (numbered 1 through 4)
 - ⑮ **(S-video) audio output** — Two female RCA connectors (one right and one left) for audio output from the S-video group inputs. See *Audio input and output* in this chapter.
 - ⑯ **(Composite Video) audio input group** — Eight female RCA connectors (four right and four left) for audio input (numbered 1 through 4)
 - ⑰ **(Composite Video) audio output** — Two female RCA connectors (one right and one left) for audio output from the Video group inputs. See *Audio input and output* in this chapter.
 - ⑱ **Program Audio output (MPS 112)** — Two female RCA (one right and one left) for program audio output (unbalanced)
 - ⑲ **Program Audio output (MPS 112CS)** — A 3.5 mm, 5-pole captive screw connector socket for balanced or unbalanced program audio output

Connecting the MPS Switcher

The MPS switcher can be connected to as many as 12 input devices simultaneously and can output to as many as three devices simultaneously, or one at a time. Follow the steps below and see the installation example in figure 2-4.

- 1 Turn off power to the MPS switcher and all other devices that will be connected.
- 2 If the MPS switcher is to be rack, table/wall, or through-desk mounted, position the brackets and insert the mounting screws. See the *Mounting the Switcher*, earlier in this chapter.
- 3 Attach up to four VGA, four S-video, and four video (composite) input devices to the MPS switcher.
- 4 Connect the switcher's VGA, S-video, and video (composite) outputs (up to three, one of each video format) to a projector's inputs.
- 5 For stereo audio input, connect up to 12 audio sources to the switcher's audio inputs of the VGA, S-video, or video (composite) groups (up to four for each group). See the following *Audio input and output* section for connections.
- 6 For stereo output, connect an audio output device to each of the three groups and one audio amplifier to the Program Audio connectors. Refer to *Audio input and output* for wiring diagrams.
- 7 If the MPS switcher is to be connected to a computer or host controller for remote control, connect the host's RS-232 cable to the 9-pin female RS-232 connector of the MPS unit. For an RS-232 pinout table, see *Remote connection* later in this chapter.

Installation, cont'd

- 8 Power up the input and output devices, then connect power to the rear AC connector of the MPS switcher.

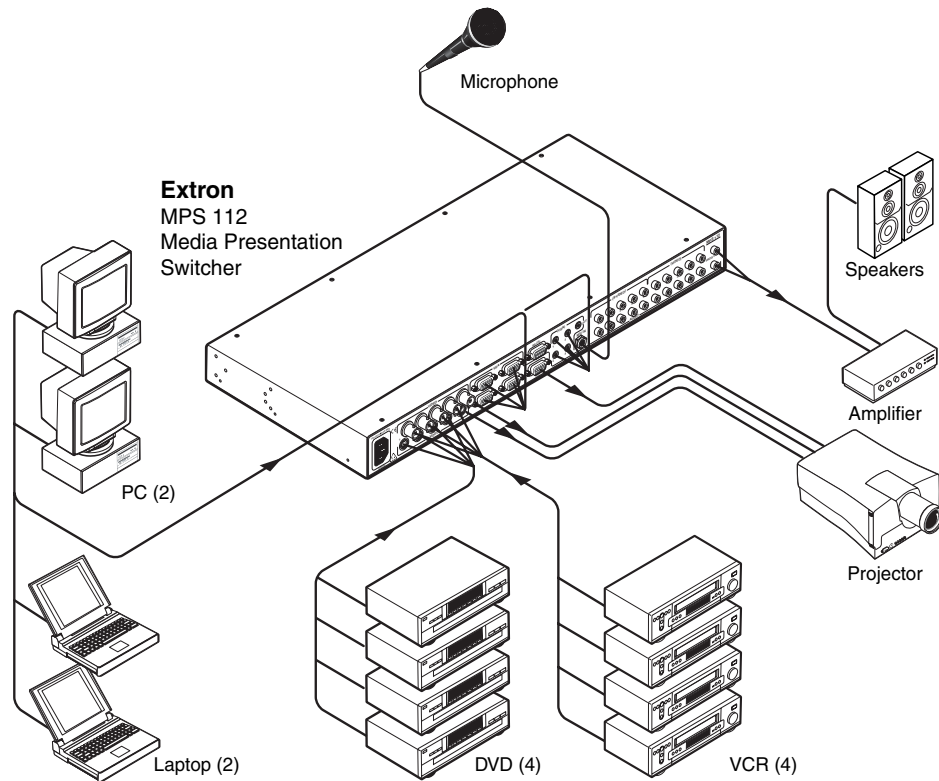


Figure 2-4 — MPS 112 installation example

Audio input and output

Connecting the RCA audio connectors

1. Use pre-made RCA audio cables, *or* cut bulk audio cable, terminate the RCA plugs on the cable as shown in figure 2-5.

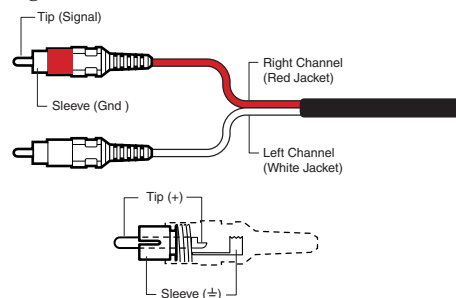
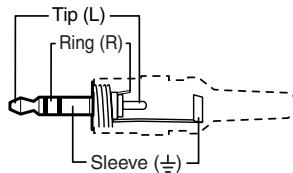


Figure 2-5 — RCA audio connector

2. Plug RCA connectors into the MPS switcher.

Connecting the 3.5 mm mini-plugs

1. Use pre-made Extron 3.5 mm audio cables,
or
cut bulk audio cable and solder the 3.5 mm mini-plug to the cable.



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

Figure 2-6 — 3.5 mm, mini-plug audio connector

2. Plug the 3.5 mm mini-plug connectors into the MPS 112.

Microphone input

Connecting the 1/4" (6.3 mm) microphone connector (MPS 112)

1. Use a pre-made 1/4" microphone cable,
or
cut bulk microphone cable and solder the 1/4" microphone connector to the cable.

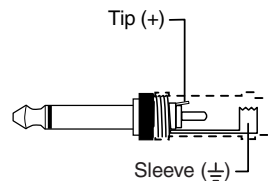


Figure 2-7 — 1/4" microphone connector

2. Plug the 1/4" microphone connector into the MPS 112.

Connecting the 3-pole captive screw microphone connector (MPS 112CS)

1. Use a pre-made 3-pole captive screw microphone cable,
or
cut bulk microphone cable, and attach the 3-pole captive screw connector to the cable.

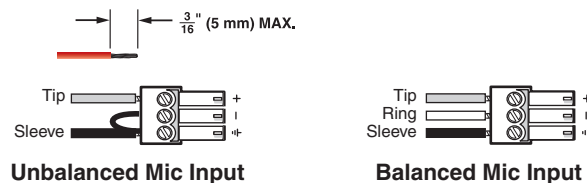


Figure 2-8— 3.5 mm, 3-pole captive screw microphone connector

NOTE Do not tin the mic leads before installing into the connector. Tinned wires are not as secure in the connector and could be pulled out.

2. Plug the 3-pole captive screw connector into the MPS 112CS.

Installation, cont'd

Program audio output (MPS 112CS)

Balanced or unbalanced program audio output is available on the MPS 112CS using a 3.5 mm, 5-pole captive screw connector. Refer to the following illustration for proper wiring.

CAUTION For unbalanced audio output, connect the sleeve(s) to the center ground pin. **DO NOT** connect the sleeve(s) to the negative (-) contacts.

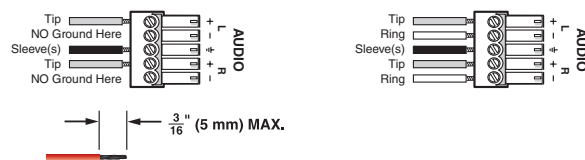


Figure 2-9 — 3.5 mm, 5-pole captive screw audio connectors

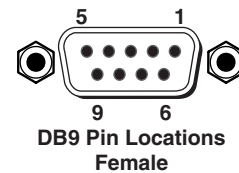
NOTE Do not tin the audio leads before installing into the connector. Tinned wires are not as secure in the connector and could be pulled out.

Remote connection

NOTE The cable used to connect the RS-232/Remote port to a computer or control system may need to be modified by removing pins or cutting wires. If unneeded pins are connected, the switcher may hang up.

For **RS-232 control**, use a control cable with only pins 2, 3, and 5 connected. Otherwise, either cut the wires to the other pins in hard-shelled connectors or remove the unneeded pins from molded plugs. See chapter 5, *Programmer's Guide*, for definitions of the SIS commands and details on how to install and use the control software.

The RS-232 connector is a 9-pin D female with the following pin designations:



Pin	RS-232 function	Description
1	–	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	–	No connection
5	Gnd	Signal ground
6, 7	–	No connection
8, 9	–	No connection

The **RS-232 protocol** is as follows:

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



MPS 112 Series

3

Chapter Three

Operation

Front Panel Features

Front Panel Operation

Operation

Front Panel Features

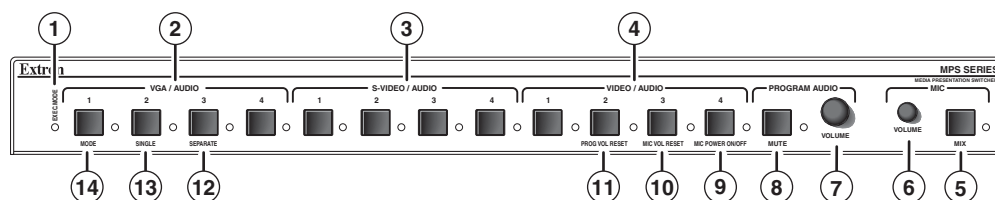


Figure 3-1 — Front panel details of the MPS switcher (MPS 112 shown)

- ① **Executive Mode indicator LED** — This red LED lights when Executive mode (front panel lockout) is turned on.

Video/audio group buttons

The controls for the three independent switchers are grouped by input type.

- ② **VGA/Audio group** — Buttons 1 through 4 select the input for the VGA/audio switcher sections of the MPS unit. The LEDs to the right of each button (when lit) indicate which input has been selected for output.
- ③ **S-video/Audio group** — Buttons 1 through 4 select the input for the S-video/audio switcher sections of the MPS unit. The LEDs to the right of each button (when lit) indicate which input has been selected for output.
- ④ **Video/Audio group** — Buttons 1 through 4 select the input for the composite video/audio switcher sections of the MPS unit. The LEDs to the right of each button (when lit) indicate which input has been selected for output.

Microphone and Program Audio controls

- ⑤ **Mic Mix button** — This button turns on the microphone mixer to provide microphone talk-over for the program audio. The LED (when lit) indicates that the microphone mixer is turned on.
- ⑥ **Mic Volume** — This adjustment knob controls the volume of the microphone.
- ⑦ **Program Audio Volume** — This adjustment knob controls the volume of the program audio output.
- ⑧ **Program Audio Mute** — This button mutes the program audio output. The LED (when lit) indicates that the program audio output is muted.

Secondary button functions

- ⑨ **Mic Power On/Off** — This is the secondary function of this button. Press and release this button while pressing and holding the Mode button (⑭) for more than 2 seconds to toggle the microphone power (MPS 112 – 15 V, MPS 112CS – 48 V) on or off. The associated LED indicates if the mic power is on (when lit) or off. When the Mode button is released, the LED resumes input indication.
- ⑩ **Mic Volume Reset** — This is the secondary function of this button. Press and release this button while pressing and holding the Mode button (⑭) to reset the mic volume to a preset level. See *Front Panel Operation* in this chapter for details. When the Mode button is released, the LED resumes input indication.
- ⑪ **Program Volume Reset** — This is the secondary function of this button. Press and release this button while pressing and holding the Mode button (⑭) to reset the Program Audio volume to a preset level. See *Front Panel Operation* in this chapter for details. When the Mode button is released, the LED resumes input indication.

Switcher Mode controls

- ⑫ **Separate Switcher mode** — This is the secondary function of this button. Press and release this button while pressing and holding the Mode button (⑭) to select the Separate Switcher mode. The associated LED indicates if the Separate Switcher mode is on (when lit) or off. When the Mode button is released, the LED resumes input indication.
- ⑬ **Single Switcher mode** — This is the secondary function of this button. Press and release this button while pressing and holding the Mode button (⑭) to select the Single Switcher mode. The associated LED indicates if the Single Switcher mode is on (when lit) or off. When the Mode button is released, the LED resumes input indication.
- ⑭ **Mode** — Press and hold this button for more than 2 seconds to view the switcher status. It also allows mode and setting changes when used in combination with other buttons, as previously indicated.

Front Panel Operation

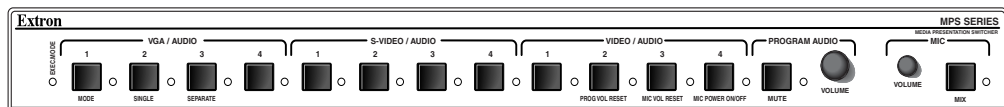


Figure 3-2 — MPS switcher front panel

The functions of the front panel controls are described in the following sections.

Input selection in Single Switcher mode

In Single Switcher mode the switcher emulates one switcher with 12 inputs. In this mode, when one of the inputs is selected, the input is routed to the outputs (video and audio) for that group, and the audio is sent to the program audio output as well. All of the other outputs are muted.

When you select and press an input button in Single Switcher mode, the green LED indicator to the right of the button lights steadily. All of the other LEDs turn off. To select a different input, press a different input button.

NOTE *The Extron IR 102 Universal Handheld Remote Control can be used with an MPS 112 switcher only when the switcher is in Single Switcher mode.*

NOTE *The MPS 112 must be in Single Switcher mode if it is to be slaved to an Extron MLC (Medialink™ Controller).*

Input selection in Separate Switcher mode

There are three input selection groups on the front panel: VGA/Audio, S-video/Audio, and Video/Audio. These groups correspond to the three independent A/V switchers (in Separate Switcher mode) available in the MPS 112.

Each of the input selection groups has four numbered input selection buttons (1 through 4), which allow you to choose from among the four separate input sources in that group that the switcher can output.

All outputs of the three groups are active, but the audio from only one group is routed to the program audio output. That group (input) is indicated by a flashing LED, while the other two groups are indicated by solid LEDs. See the *Program Audio* section in this chapter for more details.

Operation, cont'd

View mode

To view the switcher's current mode and microphone power settings, press and hold the Mode button for more than 2 seconds. The LEDs on the front panel change from input indication to setting indication.

To change a setting, continue to hold the Mode button, and press the button that corresponds to the setting you want to change. Figure 3-3 shows the front panel buttons and LEDs that are active during View mode. Release the Mode button and the front panel LEDs resume input indication.

NOTE Changes to the Single Switcher mode and Separate Switcher mode do not take effect until the Mode button is released.

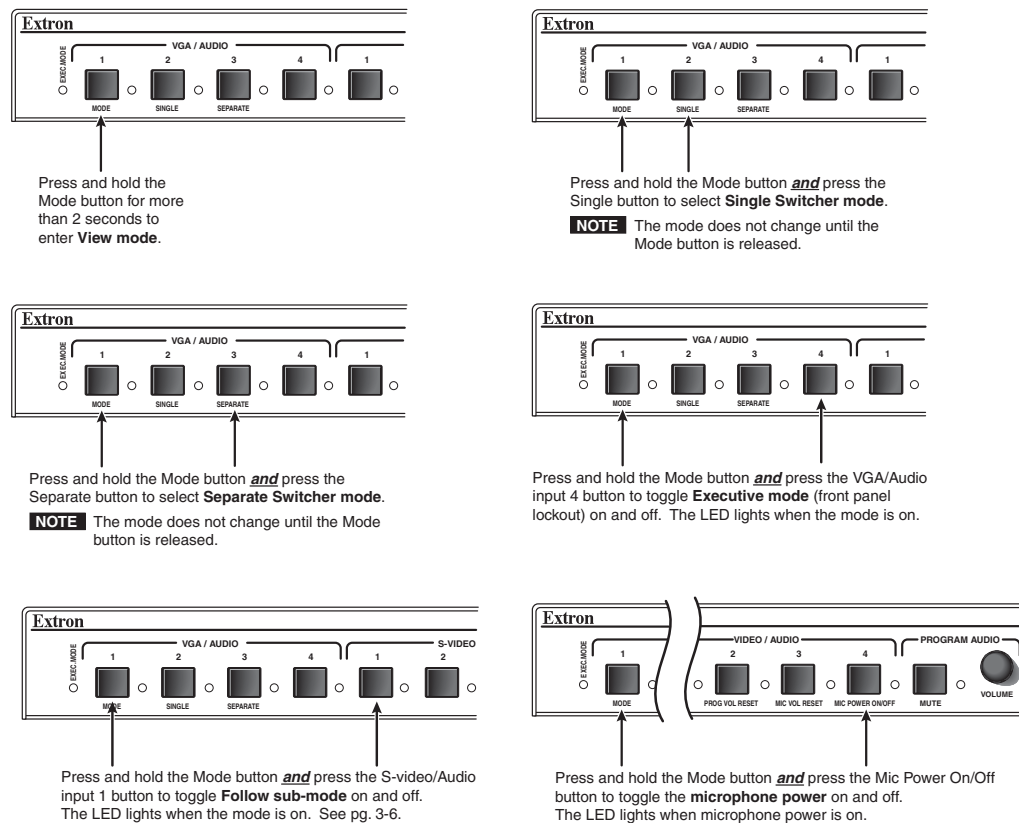


Figure 3-3 — Front panel button/LED functions during View mode

Determining and selecting the switcher mode

The current switcher mode is indicated by the input LEDs. If the unit is in Separate Switcher mode, up to four LEDs can be lit. In Single Switcher mode, only 1 LED is lit and the other 11 input LEDs are off.

To change modes, press and hold the Mode button for more than 2 seconds, then press either the Single (to enter the Single Switcher mode) or Separate (to enter the Separate Switcher mode) button. Release the Mode button when your selection has been made.

Front panel security lockout (Executive mode)

To prevent unauthorized changes, Executive mode locks all functions except input selection functions and Program Audio Volume control. To toggle the Executive mode on or off, press and hold the Mode button for more than 2 seconds until the front panel LEDs change to View mode, then press and release the fourth input button of the VGA / Audio group. The Exec Mode LED turns on to indicate that Executive mode is on, and it turns off to indicate Executive mode is off. Release the Mode button when your selection has been made.

Program audio

Single Switcher mode

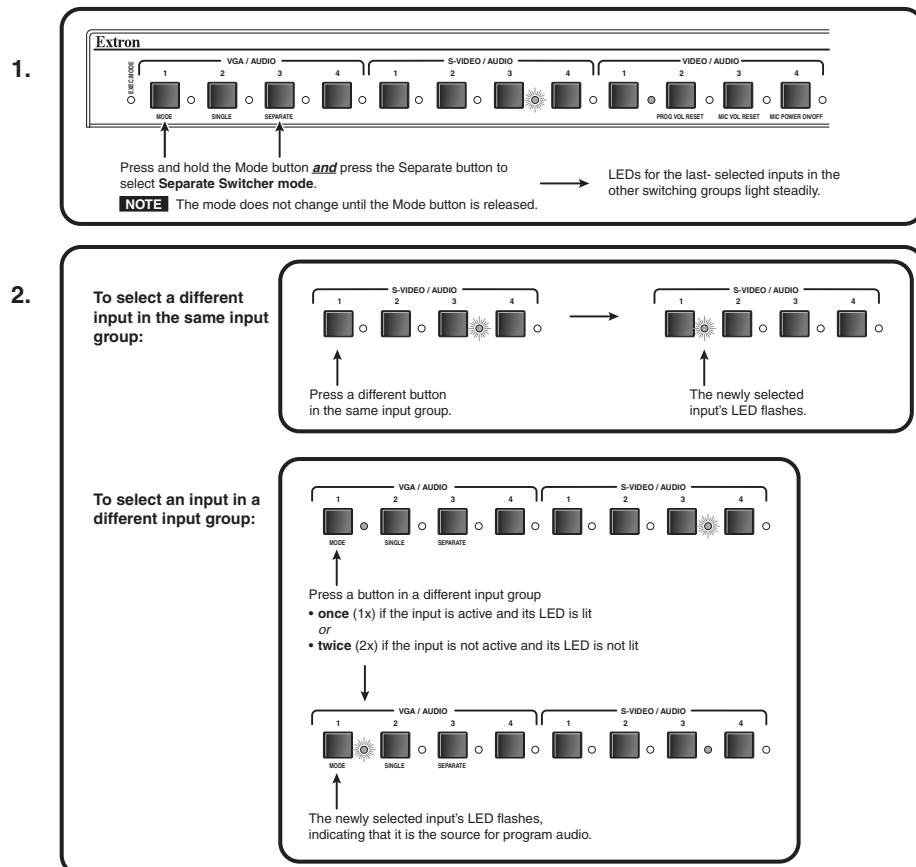
In Single Switcher mode, audio from the one selected input is routed to the program audio output.

Separate Switcher mode

In Separate Switcher mode, the selected audio input from one of the three input groups is routed to the program audio output. The selected input and group is indicated by a flashing input LED. The LEDs of the two remaining, unselected groups (inputs) are steadily lit.

To route a different audio input within the same input group to the program audio output, press one of the other input buttons within that group. The flashing LED moves to the new input. See the illustrations below.

To route an audio input from a different group to the program audio, press the input button once if the input is already active and its LED is steadily on, or twice if the input is not active and its LED is off. The flashing LED moves to the new input within the new group. See the illustrations below.



Operation, cont'd

Program audio breakaway

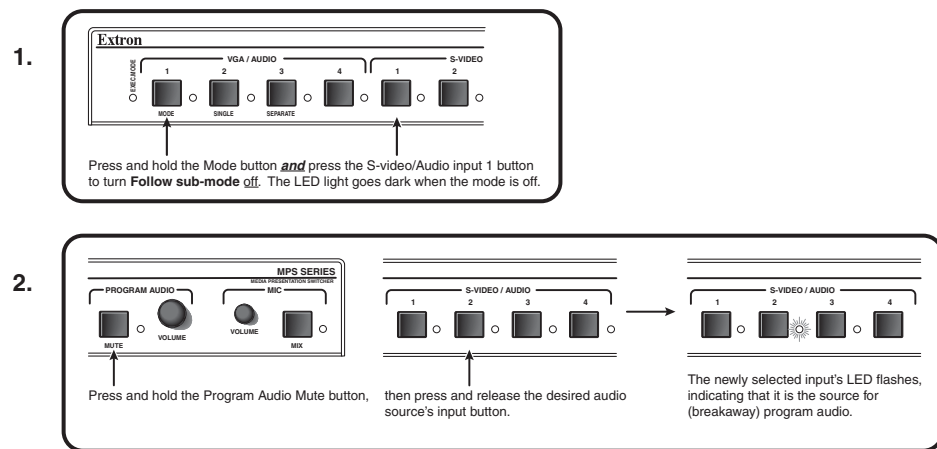
Separate Switcher mode provides audio breakaway by allowing you to route the audio signal from any input group to the program audio output, independently from the video signal.

For units with **firmware version 1.10 and above**:

To select an input for program audio breakaway, first set the Follow sub-mode off. (See the instructions under Follow sub-mode below.) Press and hold the Program Audio Mute button, then press and release the input button corresponding to the desired audio source. The LED of the input you just selected flashes to indicate that it is the input for program audio.

To select an input for audio breakaway:

NOTE This procedure for program audio breakaway is for MPS switchers with firmware version 1.10 or higher.



Follow sub-mode

Within the Separate Switcher mode there is a special sub-mode called Follow sub-mode. With the Follow sub-mode off (default), the switcher functions as described above. With the Follow sub-mode on, when any input button is pressed once, the input is routed to program audio.

To toggle the Follow sub-mode on or off, press and hold the Mode button for more than 2 seconds until the front panel LEDs change to view mode, then press and release the first button of the S-video / Audio group. S-video / Audio input #1 turns on to indicate that Follow sub-mode is toggled on, or it turns off to indicate that Follow sub-mode is off. Release the Mode button when your selection has been made (the LED resumes input indication).

Program audio volume

Use the Program Audio Volume control knob to adjust the volume of the program audio output. When the volume control knob is turned, the volume increases at a rate of 1 dB per step of the digital potentiometer. Program audio volume does not affect mic volume. Program audio volume has a range of 0 to 100.

Reset program audio volume

To reset the program audio volume to the default level (70), press and hold the Mode button, then press and release the second button (labeled Prog Vol. Reset) of the Video / Audio group within 2 seconds. Release the Mode button when the volume has been reset.

Program audio mute

To mute the program audio output, press the Program Audio Mute button. The indicator LED to the right of the button lights when the program audio is muted. Press the Program Audio Mute button again to unmute the output. Program audio mute does not mute the microphone.

Talk-over (program ducking)

When the MPS detects a voice (an audio signal at a level above the “talk-over” threshold) at the mic input, the MPS immediately lowers (“ducks”) the program audio volume. The default level (amount) of ducking is set to 6 dB. For MPS units with **firmware revision 1.10 and up**, the ducking level can be set between 0 dB and 30 dB via RS-232 control.

When voice input via the mic input stops for 5 seconds or longer, the MPS program volume slowly ramps up to the original volume over a period of about 1 second.

Microphone controls

Turn mic or phantom power on/off

To turn on the microphone power (15 V on the MPS 112, 48 V phantom power on the MPS 112CS), press and hold the Mode button for more than 2 seconds until the front panel LEDs change to view mode, then press and release the Mic Power On/Off button. On both switchers, while the Mode button is pressed, the fourth LED of the Video/Audio group is lit when the mic power is on. On the MPS 112CS, the Phantom Power LED on the rear panel is also lit when the phantom power is on. Release the Mode button when the power has been turned on or off (the LED resumes input indication).

Mic mix

To mix the microphone input with the program audio output (“talk-over” mode), press the Mic Mix button. The indicator LED to the right of the button lights when the Mic Mix is on. Press the Mic Mix button again to unmix the output.

Talk-over (program ducking)

When the MPS detects a voice (an audio signal at a level above the “talk-over” threshold) at the mic input, the MPS immediately lowers (“ducks”) the program audio volume. The default level (amount) of ducking is set to 6 dB. For MPS units with **firmware revision 1.10 and up**, the ducking level can be set between 0 dB and 30 dB via RS-232 control.

When voice input via the mic input stops for 5 seconds or longer, the MPS program volume slowly ramps up to the original volume over a period of about 1 second.

Mic volume

After turning on the mic mix, use the Mic Volume control knob to adjust the volume of the microphone output. When the volume control knob is turned, the volume increases at a rate of 1 dB per step of the digital potentiometer.

Reset mic volume

To reset the mic volume to the default level (0 dB), press and hold the Mode button, then press and release the third button (labeled Mic Vol. Reset) of the Video/Audio group within two seconds. Release the Mode button when the volume has been reset.

Setting mic “talk-over” threshold

1. Finish installation wiring and setup as described in the previous sections.
2. Turn on the microphone by pressing the Mix button.

Operation, cont'd

3. Speak into the microphone in a normal voice; the main program audio level should drop moderately. If not, lower the threshold by pressing and holding the Mix button and turning the Mic Volume knob counterclockwise.
4. Stop speaking into the microphone; the main program audio should recover to the previous level after approximately four seconds. If it does not, increase the threshold by pressing and holding the Mix button and turning the Mic Volume knob clockwise.



MPS Series

4 Chapter Four

Windows[®]-based Control Program

Installing the Windows-based Control Software

Using the Software

Uploading Firmware Updates

Windows®-based Control Program

The Windows-based Control Program (Extron part number 29-060-01) for controlling the MPS Series switchers via RS-232 requires Windows 95/98, NT, or later. It provides remote control of MPS switcher functions.

Installing the Windows-based Control Software

The program is contained on a CD, and it occupies approximately 2.5 MB (megabytes) of hard drive space. Run the program from the hard drive.

To install the software from the CD onto the hard drive, run SETUP.EXE from the CD, and follow the instructions that appear on the screen.

By default, the Windows installation creates a C:\MPS directory, and it places two icons into a group folder named “Extron Electronics”.

Using the Software

1. To run the MPS Control Program, double-click on the MPS Control Program icon in the Extron Electronics group or folder.



The Comm menu appears on the screen.

2. Select the radio button for the COM port that is connected to the MPS switcher’s RS-232 port, and click OK. The Extron MPS Control Program main screen appears, as shown below. The screen display includes controls for video inputs, audio inputs, picture adjustment controls, and a graphic representation of the window images.

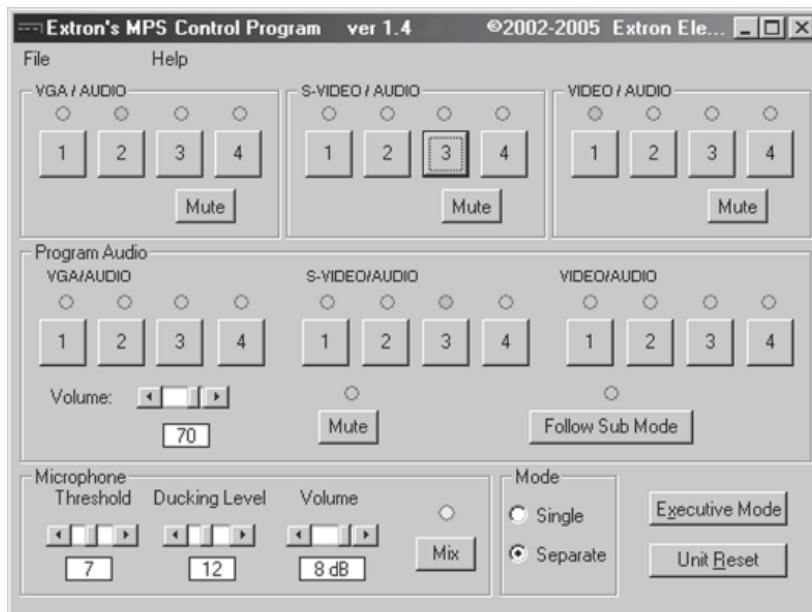


Figure 4-1 — MPS Control Program main screen

3. In Separate Switcher mode, a selected audio input from one of the three input groups can be routed to the program audio output. This selected input and its group are indicated by a flashing representation of the input LED. The LEDs of the two remaining, unselected groups (inputs) light steadily.

To route a different audio input within the same input group to the program audio output, click one of the other input buttons within that group. The LED/indicator for the new input flashes. To route an audio input from a different group to the program audio, click the input button once if the input is already active and its LED is steadily on, or click it twice if the input is not

active and its LED is off. The virtual LED for the new input within the new group flashes.

See pages 3-4 and 3-5 for information about program audio and microphone controls. The microphone threshold and ducking level can be adjusted after you click the Mix button to activate the audio mixing feature.

NOTE *Program audio ducking is available on MPS switchers that have firmware version 1.10 or higher. Earlier firmware versions do not support ducking.*

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

- From the Extron Electronics group folder, double-click on the MPS Help icon.
- From within the MPS Control Program, click on the Help menu on the main screen.
- From within the MPS Control Program, press the F1 key for context-sensitive help.



Uploading Firmware Updates

The following procedure is for the MPS Control Program software version 1.2 and higher only. If you have version 1.0 or 1.1, call Extron technical support for assistance.

1. Obtain a new firmware file from the Extron Web site (<http://www.extron.com>) or Extron technical support.
2. Save the file to a local drive with a known path.
3. Connect the MPS RS-232 connector to the serial port of a PC, then turn on the PC and the MPS switcher.
4. Run the MPS Control Program.
5. On the File menu, click Update Firmware. The Firmware Loader window appears.



Figure 4-2 — MPS Control Program File menu

6. In the Firmware Loader window, click the Upload Firmware File button.

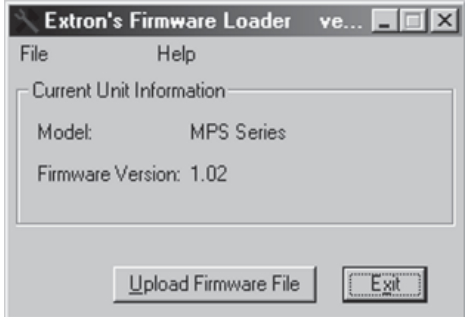


Figure 4-3 — Firmware Loader window

Windows®-based Control Program, cont'd

- Click OK to bring up the file selection window. Locate and select the file you saved in step 2 and click Open.

NOTE *Valid firmware update files have the file extension “.S19.” Files with other file extensions are not firmware update files.*

- After opening the file, click OK, then remove power from the unit. Power the unit back up to start uploading the firmware update. The upload process may take several minutes.

To ensure that the correct update file is listed, read the text in the window that appears. If the desired file is not listed, click Cancel to return to the Firmware Loader window.

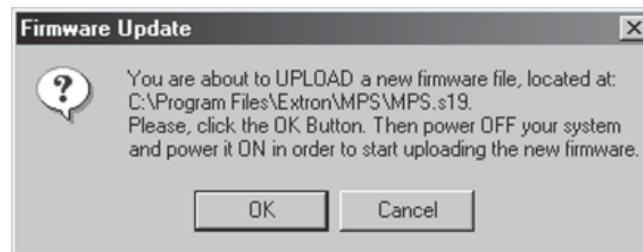


Figure 4-4 — Firmware update confirmation window

WARNING *The existing firmware in the unit will be erased once the power is removed. Ensure the update file is correct before clicking OK. Using the wrong update file will cause an error during firmware upload, and the unit may lock up. If the unit locks up, call the Extron S³ Sales and Technical Support Hotline for assistance.*

- After the upload is completed, click OK to return to the Firmware Loader window.

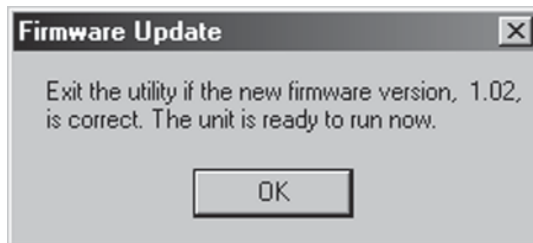


Figure 4-5 — Firmware update completed window

- Check the updated firmware version listed in the Firmware Loader window. If necessary, click Upload Firmware File to repeat the firmware update procedure. Otherwise, click Exit.



MPS Series

5 Chapter Five

Programmer's Guide

Remote Control Port (RS-232)

Host-to-MPS Communications

Command/Response Tables

Programmer's Guide

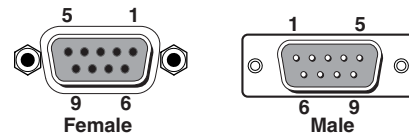
Remote Control Port (RS-232)

The MPS switcher RS-232 port connector is used to connect to a host or external controlling device, such as a computer or control system, which can generate the proper command codes and recognize the switcher's responses.

NOTE *The cable used to connect the RS-232 port to a computer or control system may need to be modified by removing pins or cutting wires. If unneeded pins are connected, the switcher may hang up. See chapter 2, Installation, for more information on wiring the connectors.*

The RS-232 connector is a 9-pin D female with the following pin designations:

Pin	RS-232 function	Description
1	–	No connection
2	Tx	Transmit data
3	Rx	Receive data
4	–	No connection
5	Gnd	Signal ground
6, 7	–	No connection
8, 9	–	No connection



RS-232 protocol:

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

Commands and responses for programming the MPS 112 from a host system connected to the RS-232 port are listed on the following pages.

Host-to-MPS Communications

The MPS switchers accept Simple Instruction Set (SIS™) commands through the RS-232 port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each 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.

MPS switcher-initiated messages

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

Boot-up messages

Boot v1.00, (c)2002, ? to Enter

(c) Copyright 2002, Extron Electronics, MPS 112, Vx.xx ↵

or

Boot v1.00, (c)2002, ? to Enter

(c) Copyright 2002, Extron Electronics, MPS 112CS, Vx.xx ↵

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

Status change messages

The switcher issues status change messages as a result of front panel operations (actual or software-simulated). The status change messages are the same as the switcher's responses to certain commands. See the last column of the table on pages 5-4 through 5-6.

MPS switcher error responses

When the MPS 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, it returns an error response to the host. The error response codes are as follows:

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

Command/Response Table

Using the command/response table

The command/response table is shown on the following pages. Lower case characters are acceptable in the command field only where indicated. Symbols are used throughout the table to represent variables in the command/response fields. Symbol definitions are shown below, and an ASCII-to-hexadecimal (HEX) conversion table is shown in figure 5-1. Command and response examples are shown throughout the command/response 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] = Group 1 through 3 (1 = VGA, 2 = S-video, 3 = composite video)
- [X2] = Inputs 0 through 4 for each group (Input 0 = off, which does not work in single switcher mode.)
- [X3] = 0 = off, 1 = on
- [X4] = 0 to 12
- [X5] = 1 to 66 (mic attenuation)
- [X6] = -66 to +12 (dB mic gain level)
- [X7] = 1 = Single Switcher mode, 2 = Separate Switcher mode
- [X8] = 0 through 15, default = 8 (mic talk-over threshold level)
- [X9] = 0 through 12 (input number in Simple address)
- [X10] = 0 - 100 (program volume adjustment range)
- [X11] = Inputs 0 through 12 for single input addressing, [X11] = ([X1] - 1) times 4 + [X2], 0 = mute
- [X12] = 0 to 30 (program audio ducking level in talk over mode, 0 = off)
- [X19] = Control software version to the second decimal place

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

Figure 5-1 — ASCII-to-hexadecimal conversion table

Programmer's Guide, cont'd

Command/response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description	Switcher- initiated messages
Input selection (in Separate Switcher mode only)				
Select video and audio input	$\overline{x1}*\overline{x2}!$	Chn $\overline{x1}*\overline{x2}$ ←	Group $\overline{x1}$ and input $\overline{x2}$ are selected. $\overline{x1}$ = Group 1 through 3 (1 = VGA, 2 = S-video, 3 = composite video). $\overline{x2}$ = Inputs 0 through 4 for each group (input 0 = off).	X
Input selection (in Single Switcher mode only)				
Select video and audio input	$\overline{x11}!$	Chn $\overline{x11}$ ←	Input $\overline{x11}$ is selected. $\overline{x11}$ = Inputs 0 through 12 for single input addressing, $\overline{x11}$ = $(\overline{x1} - 1)$ times 4 + $\overline{x2}$.	
Input selection for program audio output (in Separate Switcher mode only)				
Select program audio input	$\overline{x1}*\overline{x2}!$	Chn $\overline{x1}*\overline{x2}$ ←	Group $\overline{x1}$ and input $\overline{x2}$ are selected. $\overline{x1}$ = Group 1 through 3 (1 = VGA, 2 = S-video, 3 = composite video). $\overline{x2}$ = Inputs 0 through 4 for each group (input 0 = off).	
<p>NOTE <i>In Separate Switcher mode this command has the additional function of switching audio inputs to the program output when it is entered more than once.</i></p> <p><i>In Separate Switcher mode, selected audio input from one of the three input groups can be routed to the program audio output. This selected input and group is indicated by a flashing input LED. The LEDs of the two remaining, unselected groups (inputs) are steadily lit.</i></p> <p><i>To route a different audio input within the same input group to the program audio output, enter the command $\overline{x1}*\overline{x2}!$. The new input's LED flashes. To route an audio input from a different group to the program audio, enter the command once if the input is already active and its LED is steadily lit, or enter it twice if the input is not active and its LED is off. The LED for the new input within the new group flashes.</i></p>				
Volume level				
Specify volume/variable	$\overline{x10}$ V	Vol $\overline{x10}$ ←	Volume level is $\overline{x10}$. $\overline{x10}$ = 0 - 100 (program volume adjustment range).	X
Increment volume	+V	Vol $\overline{x10}$ ←	Volume level is $\overline{x10}$.	
Decrement volume	-V	Vol $\overline{x10}$ ←	Volume level is $\overline{x10}$.	
View volume	V	$\overline{x10}$ ←	Volume level is $\overline{x10}$.	
Audio mute on	1Z/z	Amt $\overline{x3}$ ←	Mute is on. $\overline{x3}$: 0 = off and 1 = on.	X
Audio mute off	0Z/z	Amt $\overline{x3}$ ←	Mute is off.	
View audio mute status	Z/z	$\overline{x3}$ ←	Mute status is (0=off, 1=on).	
View lock status	X/x	$\overline{x3}$ ←	Lock status is (0=off, 1=on).	
Query firmware version				
Query firmware version	Q/q	$\overline{x10}$ ←	This command displays the firmware version number. $\overline{x10}$ = Control software version to the second decimal place.	
Request part number				
Request part number	N/n	60-532-0X ←	Displays the part number of the MPS 112 or MPS 112CS.	

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher- initiated messages
Mic level				
Specify gain	16* x4 G	Aud x4 ↵	x4 = audio gain in dB = 0 to 12. This variable is a positive number.	X
Specify attenuation	16* x5 g	Aud x5 ↵	x5 = attenuation in dB = 1 to 66. This variable is a positive number.	
View mic volume	16G/g	x6 ↵	x6 = overall mic gain/attenuation between -66 dB and +12 dB. This response variable indicates attenuation as a negative number and gain as a positive number.	
Mic on/off				
Turn mic on/off	x3 M/m	Mix x3 ↵	Toggles mic on or off. x3 : 0 = off, 1 = on.	X
View mic status	M/m	x3 ↵	Mic status is (0=off, 1=on).	
Front panel security lockout (executive mode)				
Lock front panel access	2X/x	Exe 2 ↵	Locks volume, mic, input selection.	X
Lock front panel mic controls	1X/x	Exe 1 ↵	Locks mic controls.	X
Unlock front panel access	0X/x	Exe 0 ↵	Unlocks front panel.	X
System reset (to factory defaults)				
Reset switcher to factory defaults	Esc ZXXX ↵	Zpx ↵	Resets the system to the following factory defaults: Mode x7 = 1 Input x11 = 1 Main Volume x10 = 70 Mic Volume x4 = 0 Executive Mode x3 = 0 Mic threshold x8 = 8 Follow Sub Mode x3 = 0 Mic Power x3 = 0 Ducking Level x12 = 6	
Request information				
Request information	I/i	Mod x7 1G x2 2G x2 3G x2 4G= x1 G x2 ↵	Displays which input in each group is selected and which input is routed to program audio output. x7 1 = Single Switcher mode, 2 = Separate Switcher mode x1 = Group 1 through 3 (1 = VGA, 2 = S-video, 3 = composite video). x2 = Inputs 0 through 4 for each group (input 0 = off).	

Programmer's Guide, cont'd

Command	ASCII Command (host to switcher)	Response (switcher to host)	Description	Switcher- initiated messages
Special functions				
Switcher mode select				
Select switcher mode	[X7]*1#	Mod[X7] ↵	[X7] = switcher mode: 1 = Single mode (default). 2 = Separate switcher mode.	X
View switcher mode	1 #	[X7] ↵		
Mic talk-over threshold				
Display talk-over threshold	[X8]*2 #	Thr[X8] ↵	Shows the mic threshold number. [X8] = 0 through 15, default = 8.	X
Decrement threshold	-*2#	Thr[X8] ↵	Decrements mic threshold one step.	
Increment threshold	+%2#	Thr[X8] ↵	Increments mic threshold one step.	
View mic talk threshold	2 #	[X8] ↵		
<p>NOTE 2 = talk-over threshold [X8] = Value range: 0 - 15 (8 = midrange = default) + = increment 1 - = decrement 1</p>				
Follow sub mode*				
Turn the follow sub mode on/off	[X3]*4#	Fsm[X3] ↵	[X3]: 0 = off, 1 = on	X
View the follow sub mode status	4#	Fsm[X3] ↵	[X3]: 0 = off, 1 = on	
Mic (phantom) power*				
Turn mic power on/off	[X3]*57#	Mfp[X3] ↵	[X3]: 0 = off, 1 = on	X
View mic power status	57#	Mfp[X3] ↵	[X3]: 0 = off, 1 = on	
Program audio ducking level in talk over mode*				
Adjust audio ducking level	[X12]*58#	Adl[X12] ↵	Adjusts how much ([X12] = 0 to 30 dB) the program audio ducks (automatically decreases) while the MPS is in talk over mode. 0 = audio ducking is off.	
Increment audio ducking	+%58#	Adl[X12] ↵		
Decrement audio ducking	-*58#	Adl[X12] ↵		
View audio ducking level	58#	Adl[X12] ↵		
Program audio breakaway*				
Switch program audio	[X1]*[X2]\$	Pra[X1]*[X2] ↵	Selects any input from any group to be routed to the program audio output. [X1] = group 1 through 3 (1 = VGA, 2 = S-video, 3 = composite video). [X2] = inputs 0 through 4 for each group (input 0 = off).	X
<p>NOTE This command works only in Separate mode with Follow sub-mode turned off. If Follow sub-mode is turned on or if the switcher is in Single Switcher mode, the program audio breakaway command does not work, and the response is an E10 error code.</p>				

* These groups of commands are new for units using firmware version 1.10 or higher. Earlier firmware versions do not support these four command groups.

Uploading firmware to the MPS via an SIS command

There are two ways to upload firmware to the switcher:

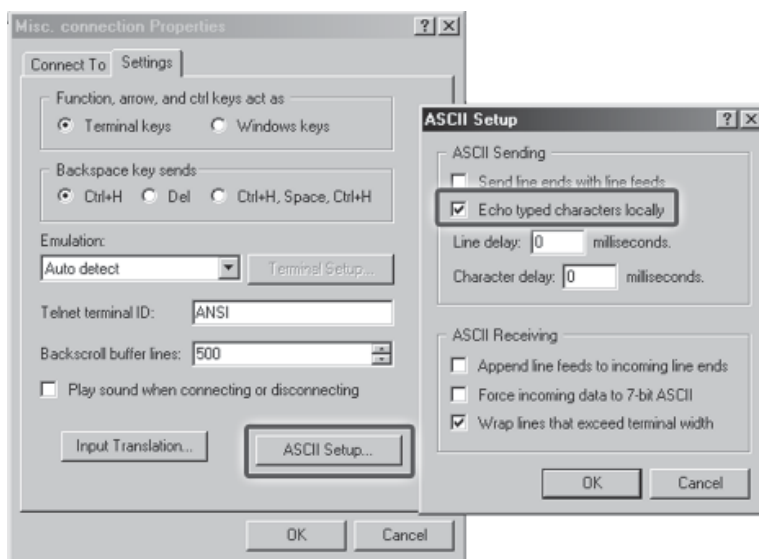
- Use the MPS Control Program
- Use SIS commands entered via a communication utility such as HyperTerminal.

Extron recommends that you use the MPS control Program to upload firmware (See *Uploading Firmware Updates* on page 4-3) and reserve this SIS procedure for correcting firmware that has been corrupted and is unable to respond to the MPS Control Program.

To load firmware using SIS commands, follow this procedure:

1. Obtain the new, correct firmware file.
 - a. Visit the Extron Web site, www.extron.com, and locate and select the product page for the MPS 112 or MPS 112CS.
 - b. In the MPS product page, locate the most recent firmware file, release notes, and firmware update instructions. Save these files on your computer's hard drive, and note the file path of the folder where the files have been saved.
2. Open a communications utility program such as HyperTerminal and select the COM port that is connected to the switcher's RS-232 port. Protocol for RS-232 communication with the MPS switcher is as follows:
 - 9600 baud
 - 8 data bits
 - 1 stop bit
 - no parity (none)
 - no flow control (none)

NOTE *The firmware upload process can take several minutes. If HyperTerminal's echo function is turned off, you have no indication that the upload is progressing. If desired, turn on the echo function as follows: Click File > Properties > Settings > ASCII Setup. Make sure that the echo feature is turned on (checked, as shown below), then click OK twice.*



Programmer's Guide, cont'd

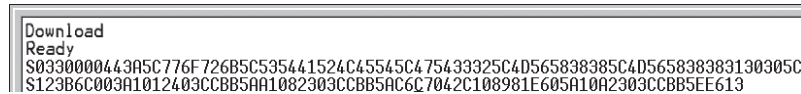
- Cycle power to the switcher: disconnect power for a few moments, reconnect power, and press the computer keyboard's ? (question mark) key.

NOTE *You have approximately 2 seconds or less to press the ? key. If that time lapses and the ? key has not been pressed, repeat step 3.*

- Press *D* on the keyboard, then type *Download*. This text is case-sensitive. The computer responds with a "Ready" prompt.
- Click *Transfer > Send text file...*
- Select *All files (*.*)* from the *Files of type:* drop-down box.
- Locate the folder where the firmware upgrade file is stored. Select that file.

NOTE *Ensure that the firmware is for the MPS 112 Series switchers. Valid firmware files have a file extension ".s19". Any other file extension is **not** a valid firmware upgrade for the switcher.*

- Click *Open*. Firmware uploading begins. If HyperTerminal's echo function is turned on, HyperTerminal displays the text of the firmware file scrolling (as in the screen excerpt below) as it is uploaded to the switcher.



```
Download
Ready
S0330000443A5C776F726B5C535441524C45545C475433325C4D565838385C4D565838383130305C
S123B6C003A1012403CCBB5AA1082303CCBB5AC6C7042C108981E605A10A2303CCBB5EE613
```

- After several minutes the firmware uploading is completed. Press the Enter key, and the switcher issues the startup copyright message:
(c) Copyright 2002, Extron Electronics, MPS 112, Vx.xx ↵
or
(c) Copyright 2002, Extron Electronics, MPS 112CS, Vx.xx ↵
- Exit HyperTerminal.



MPS Series

A

Appendix A

Reference Information

Specifications

Part Numbers

Reference Information

Specifications

Video

Gain	Unity
Bandwidth	
VGA signals	350 MHz (-3 dB)
S-video signals	250 MHz (-3 dB)
Composite video signals ..	300 MHz (-3 dB)
Differential phase error	1.0° at 3.58 MHz and 4.43 MHz
Differential gain error	1.0% at 3.58 MHz and 4.43 MHz
Crosstalk	
VGA signal group	-50 dB @ 10MHz, -30 dB @ 100MHz
Switching speed	
VGA group's sync	<5 ms (max.)
VGA/S-video/composite video	~100 ms

Video input

Number/signal type	
VGA inputs	4 VGA–UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
S-video inputs	4 NTSC/PAL/SECAM S-video
Composite video inputs ..	4 NTSC/PAL/SECAM composite video
Connectors	
VGA inputs	4 female 15-pin HD
S-video inputs	4 female 4-pin mini DIN
Composite video inputs ..	4 female BNC
Nominal level	
VGA inputs	0.7 Vp-p
S-video inputs	Y: 1 Vp-p (including sync), C: 0.3 Vp-p
Composite video inputs ..	1 Vp-p (including sync)
Minimum/maximum levels	
VGA inputs	Analog 0.3 V to 1.5 Vp-p with no offset
S-video inputs	Analog Y: 0.4 V to 2.0 Vp-p with no offset
Composite video inputs ..	Analog 0.4 V to 2.0 Vp-p with no offset
Impedance	75 ohms
Horizontal frequency	15 kHz to 145 kHz
Vertical frequency	30 Hz to 170 Hz
Return loss	
VGA inputs	<-40 dB @ 5 MHz
S-video inputs	<-25 dB, 0 to 10 MHz
Composite video inputs ..	<-40 dB, 0 to 10 MHz

Video output

Number/signal type	
VGA outputs	1VGA–UXGA RGBHV, RGBS, RGsB, RsGsBs, component video (Y, R-Y, B-Y)
S-video outputs	1 S-video
Composite video outputs	1 composite video

Connectors	
VGA outputs	1 female 15-pin HD
S-video outputs	1 female 4-pin mini DIN
Composite video outputs	1 BNC female
Nominal level	
VGA outputs	0.7 V _{p-p}
S-video outputs	Y: 1 V _{p-p} (including sync), C: 0.3 V _{p-p}
Composite video outputs	1.0 V _{p-p} (including sync)
Minimum/maximum levels	
VGA outputs	Analog, 0.3 V to 1.5 V _{p-p}
S-video outputs	Analog, Y: 0.4 V to 2.0 V _{p-p}
Composite video outputs	Analog, 0.4 V to 2.0 V _{p-p}
Impedance	75 ohms
Return loss (VGA output)	<-40 dB @ 5 MHz
DC offset (max. allowable, VGA output)	±5 mV with input at 0 offset

Sync

Input type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs
Output type (VGA group)	RGBHV, RGBS, RGsB, RsGsBs (follows input)
Standards (S-video & composite video groups)	NTSC 3.58, NTSC 4.43, PAL, SECAM
Input level	1.9 V to 5.0 V _{p-p}
Output level	TTL: 5.0 V _{p-p} (unterminated)
Input impedance	510 ohms
Output impedance	75 ohms
Max input voltage	5.0 V _{p-p}
Max. propagation delay	30 ns
Max. rise/fall time	4.2 ns
Polarity	Positive or negative (follows input)

Audio — individual audio groups (VGA, S-video, composite video)

Gain	Unity
Frequency response	20 Hz to 20 kHz, ±0.05 dB
THD + Noise	0.08% @ 1 kHz, 0.1% @ 20 kHz at nominal level
S/N	>90 dB at maximum output (unweighted)
Crosstalk	-105 dB @ 1 kHz, -91 dB @ 20 kHz (when all inputs are terminated) -93 dB @ 1 kHz, -70 dB @ 20 kHz (when all inputs are unterminated)
Stereo channel separation	>80 dB @ 20 Hz to 20 kHz
CMRR	>75 dB @ 20 Hz to 20 kHz

Audio input — individual audio groups (VGA, S-video, composite video)

Number/signal type	4 stereo, unbalanced, per each group
Connectors	
VGA input group	(4) 3.5 mm female stereo mini jacks; tip (L), ring (R), sleeve (GND)
S-video and composite video input groups	
	4 pairs of female RCA connectors per group
Impedance	>18k ohms unbalanced, AC coupled
Nominal level	-10 dBV (316 mV _{rms})
Maximum level	+9 dBV (2.82 V _{rms}), (unbalanced) at 1% THD+N

NOTE 0 dBu = 0.775 V_{rms}, 0 dBV = 1 V_{rms}, 0 dBV ≈ 2 dBu.

Reference Information, cont'd

Audio output — individual audio groups (VGA, S-video, composite video)

Number/signal type	1 stereo, unbalanced, per each group
Connectors	
VGA group	(1) 3.5 mm female stereo mini jack, tip (L), ring (R), sleeve (GND)
S-video and video groups	1 pair of female RCA connectors per each group
Impedance	50 ohms unbalanced
Gain error	±0.1 dB channel to channel
Nominal level	-10 dBV (316 mVrms)
Maximum level (Hi-Z)	+9 dBV (2.82 Vrms) at 1% THD+N

Audio — program audio

Gain	
When program volume is at default:	
MPS 112: 0 dB for unbalanced output	
MPS 112CS: 0 dB for unbalanced output, +12 dB for balanced output	
When program volume is at maximum:	
MPS 112: +12 dB for unbalanced output	
MPS 112CS: +12 dB for unbalanced output, +18 dB for balanced output	
Program volume range	0 to 100 (-70 dB to +12 dB)
Frequency response	20 Hz to 20 kHz, -0.1 dB to + 0.05 dB
THD + Noise	0.08% @ 1 kHz, 0.1% @ 20 kHz at nominal level
S/N	>90 dB at maximum output (unweighted)
Crosstalk	-105 dB @ 1 kHz, -91 dB @ 20 kHz (when all inputs are terminated) -93 dB @ 1 kHz, -70 dB @ 20 kHz (when all inputs are unterminated)
Stereo channel separation	100 dB @ 20 Hz, 80 dB @ 1 kHz, >55 dB @ 20 kHz
CMRR	>75 dB @ 20 Hz to 20 kHz

Audio output — program audio

Number/type	
MPS 112	1 stereo, unbalanced
MPS 112CS	1 stereo, balanced/unbalanced
Connectors	
MPS 112	(1) pair of RCA connectors
MPS 112CS	(1) 3.5 mm, 5-pole captive screw connector
Impedance	
MPS 112	50 ohms unbalanced
MPS 112CS	50 ohms unbalanced, 100 ohms balanced
Gain error	±0.1 dB channel to channel
Nominal level when the main volume is set to default	
MPS 112	-10 dBV (316 mVrms) unbalanced output
MPS 112CS	-2 dBu (632 mVrms) balanced output
Maximum level (Hi-Z)	+20 dBV (10 Vrms) at 1% THD+N
Talk-over (ducking) response time (typical)	
Attack time	Instant
Release delay	5 seconds
Release time	1 second
Ducking level	0 dB to 30 dB, adjustable; default = 6 dB

Microphone input

Number/type	
MPS 112	1 mono unbalanced
MPS 112CS	1 mono balanced/unbalanced
Connectors	
MPS 112	(1) 1/4" (6.3 mm) audio connector; tip (signal), sleeve (ground)
MPS 112CS	(1) 3.5 mm, 3-pole captive screw connector
Impedance	
MPS 112	>1k ohms unbalanced
MPS 112CS	>2.3k ohms unbalanced, >10k ohms balanced
Nominal level	-60 dBV (1 mV) when mic volume is set to 0 dB gain
Minimum level	-72 dBV (0.25 mVrms) when mic volume is set to +12 dB gain
Maximum level	-16 dBV (158 mVrms) at 1% THD+N when mic volume is set to -20 dB gain
Microphone volume range	-66 dB to +12 dB
Microphone DC power	
MPS 112	15 VDC, can be turned on or off
MPS 112CS	48 VDC phantom power, can be turned on or off

Control/remote — switcher

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

General

Power	100VAC to 240VAC, 50/60 Hz, 20 watts, internal, autoswitchable
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 brackets, part #70-077-03, or furniture mountable with an optional under-desk mounting bracket, part #70-222-01.
Enclosure type	Metal
Enclosure dimensions	1.75" H x 17.4" W x 8.5" D (1U high, full rack wide) 4.4 cm H x 43.2 cm W x 21.6 cm D (Depth excludes connectors and knobs. Width excludes rack ears.)
Product weight	7.0 lbs (3.2 kg)
Shipping weight	10 lbs (5 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE All nominal levels are at $\pm 10\%$.

NOTE Specifications are subject to change without notice.

Reference Information, cont'd

Part Numbers

Included parts

These items are included in each order for an MPS 112:

Included parts	Replacement part number
MPS 112	60-532-01
or MPS 112CS	60-532-02
Rack/desk mounting brackets	70-077-03
Tweezer (small screwdriver)	100-014-01
3.5 mm, 3-pole captive screw connector (MPS 112CS only)	10-265-03
3.5 mm, 5-pole captive screw connector (MPS 112CS only)	10-319-10
IEC power cord	
<i>MPS 112 and MPS 112CS User's Manual</i>	
Windows-based control program	
Rubber feet (self-adhesive) (4)	

Optional accessories

Part	Part number
RCAF-BNCM adapters (10)	100-229-01
SVHSM-BNCF adapter	26-353-01
SY VGA-RGBHVM cable	26-533-02
CSR 6 captive screw male to 2 RCA female adapter	26-575-01
MSR 6 3.5 mm mini stereo male to 2 RCA female adapter	26-592-01
Under-desk mounting bracket kit	70-222-01
IR 102 Universal Remote Control Kit	70-224-10

NOTE *The Extron IR 102 Universal Remote Control can be used with an MPS switcher only when the switcher is in Single Switcher mode.*

Cables and connectors

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

Bulk cable	Part number
MHR-2 (S-video)	22-123-03
MHR-5 (high resolution video)	22-020-02
MHR-5STP-2 (high resolution video with audio)	22-175-02
M59-3 (component video)	22-185-02
RG59	22-145-02
RG6-1	22-098-02
MHRVGA	22-024-01
STP22-2	22-160-03
STP20-2	22-161-03

Assorted connectors

Crimp connectors (qty. = 50)	Part number
Mini HR	100-250-01
M59	100-256-01
RG59	100-257-01
RG6	100-260-01

Solder connectors (qty. = 10)	Part number
RCA	100-333-01
S-video (mini DIN)	100-330-01
RCA HQ	100-334-01
1/4" audio plug	100-332-01
3.5 mm audio plug	100-331-01

BNC compression connectors (qty. = 50)	Part number
Mini HR	100-186-01
M59	100-187-01
RG59	100-189-01
RG6	100-188-01

RCA compression connectors (qty. = 50)	Part number
Mini HR	100-302-01
M59	100-303-01
RG59	100-304-01
RG6	100-305-01

Reference Information, cont'd

Pre-cut cables

VGA M-M with audio cable	Part number
3', 6', 12'	26-490-01, -02, -03
25', 50'	26-490-07, -08

VGA M to BNC M cable	Part number
3', 6', 12'	26-533-12, -02, -03
25', 50'	26-533-04, -05

S-video M-M cable	Part number
6', 12'	26-316-02, -03
20', 30'	26-316-01, -04

Audio cable	Part number
2', 4',..., 25'	26-571-01, -02,... , -07

NOTE Bulk cable spools of up to 5000 feet (1524 meter) lengths are available with or without connectors.

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.

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



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