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Extron® Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual



SW RGBHV series

Wideband Video and Audio Switchers

68-648-01 **Rev. D**
07 08

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Precautions

Safety Instructions • English

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

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

Caution

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

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

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

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

Warning

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

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

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

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

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

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

Consignes de Sécurité • Français

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

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

Attention

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

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

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

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

Avertissement

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

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

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

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

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

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

Sicherheitsanleitungen • Deutsch

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

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

Achtung

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

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

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

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

Vorsicht

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

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

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

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

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

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

Instrucciones de seguridad • Español

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

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

Precaucion

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

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

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

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

Advertencia

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

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

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

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

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

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

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

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

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

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

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

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

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

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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.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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Quick Start — SW RGBHV Switchers

Installation

Step 1 — Remove power

Turn off power to the input and output devices, and remove the power cords from them.

Step 2 — Mounting

SW2 —

If desired, mount the switcher in a rack using an Extron 1U Universal Rack Shelf, part # **60-190-01** or **60-604-02**.

If desired, mount the switcher under a desk using an Extron Under-desk Mount Kit, part #**70-077-01**.

If desired, mount the switcher through a desk using an Extron Through-desk Mount Kit, part **#70-077-02**.

SW4 or SW6 —

If desired, mount the switcher in a rack with the supplied rack ears.

If desired, mount the switcher under a desk using an Extron 1U Under-desk Mount Kit, part #**70-222-01**.

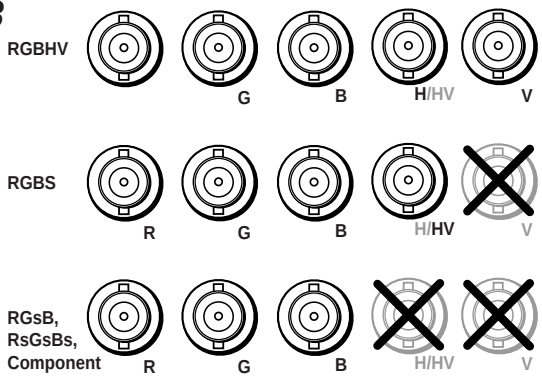
Step 3 — Video Inputs

Connect up to 2, 4 or 6 RGBHV, RGBS, RGsB, or RsGsBs video or component video inputs to the Input connectors (**3**).

Step 4 — Video Output

Connect an RGBHV, RGBS, RGsB, or RsGsBs video or component video display or other device to the Output connectors (**3**).

3



Step 5 — Audio Inputs

Cable audio models for stereo audio input (**5**). High impedance is generally over 10k ohms.

5



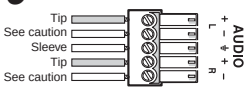
Unbalanced Input (high impedance)

Balanced Input (high impedance)

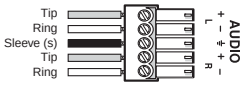
Step 6 — Audio Outputs

Cable audio models for stereo audio output (**6**).

6



Unbalanced Output



Balanced Output

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

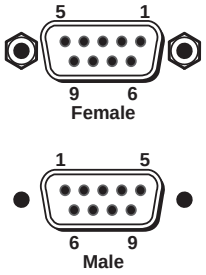
Step 7 — Remote Control

Connect a host device, such as a computer or touch panel control via RS-232, **OR** connect a remote contact closure device to the switcher via this 9-pin D connector (**7**) for remote control of the switcher.

To command a switch under contact closure control, momentarily short an input's pin on the remote connector to ground (the switcher must be in normal [manual] mode).

See chapter 4, "Remote Control", for definitions of the SIS commands and details on how to install and use the control software.

7



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

Step 8 — Connect power

Plug the switcher, input devices, and output devices into a grounded AC source, and turn on the input and output devices.

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Operation

Switch mode

Set the rear panel switch to Auto for autoswitch mode (the switcher automatically switches to the highest-numbered input with a sync signal present) or Normal for manual switch mode. The front panel Auto Switch Active LED lights when the switcher is in autoswitch mode.

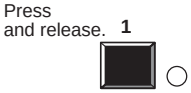


Switch inputs in normal switch mode

Press and release the desired input button.

Adjust audio level (SW2 RGBHV A / SW4 RGBHV A / SW6 RGBHV A only)

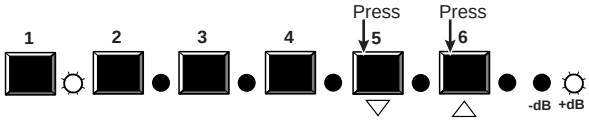
1. Press and release the desired input button.



2. Press and **hold** the Audio Conf. / Save button until the Audio Conf. / Save LED begins to blink. The approximate level is indicated by the input LEDs and the polarity by the ±dB LEDs. See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A)" in chapter 3, "Operation", to read the audio gain or attenuation level.



3. Press and release the ▲ and ▼ buttons to increase and decrease the audio level by 1 dB per push of the button, or press and **hold** the buttons to increase or decrease the level by 3 dB per second.



4. Press and release the Audio Conf. / Save button to exit. The Audio Conf. / Save LED goes out.



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Chapter One

Introduction

About the Switchers

Features

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Introduction

About the Switchers

The Extron SW RGBHV series (figure 1-1) is a family of six RGB video switchers, some with audio, in an array of input and output configurations. The models available are:

- **SW2 RGBHV** (two RGB video inputs)
- **SW2 RGBHV A** (two RGB inputs and two balanced or unbalanced stereo or mono audio inputs)
- **SW4 RGBHV** (four RGB video inputs)
- **SW4 RGBHV A** (four RGB inputs and four balanced or unbalanced stereo or mono audio inputs)
- **SW6 RGBHV** (six RGB video inputs)
- **SW6 RGBHV A** (six RGB inputs and six balanced or unbalanced stereo or mono audio inputs)

The switchers can switch wideband video (RGBHV, RGBs, RGsB, and RsGsBs), component video, S-video, and composite video.

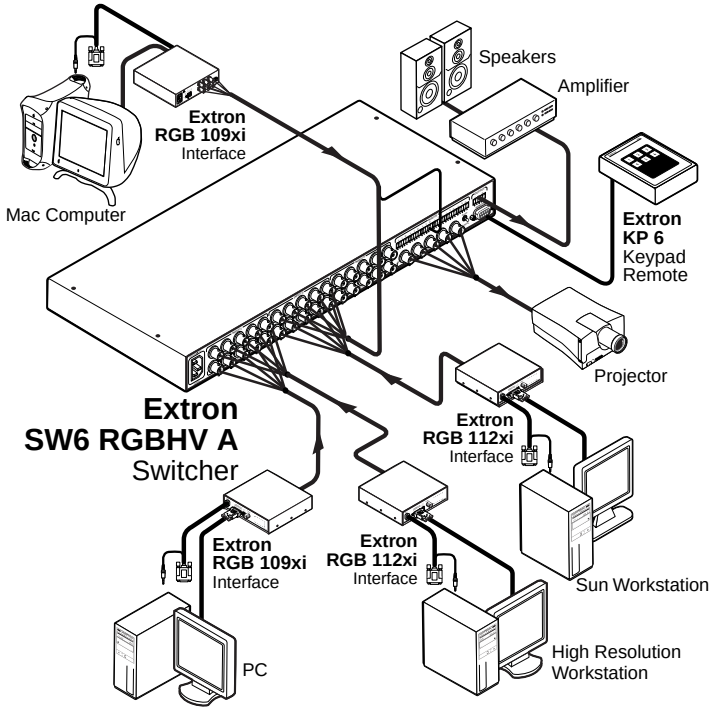


Figure 1-1 — Typical SW6 RGBHV A application

The switchers input video on female BNC connectors. Audio models input unbalanced or balanced stereo or mono audio on 5-pole captive screw connectors.

The 2-input models have 1U half-rack width enclosures. The remaining switchers have 1U full-rack width enclosures. All models can be mounted in a standard 19" rack; the 2-input models require an Extron 1U universal rack shelf.

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Features

Audio switching models

Inputs — These switchers input 2, 4, or 6 stereo audio signals, balanced or unbalanced, on 3.5 mm, 5-pole captive screw terminals.

Outputs — The selected audio input is buffered and output, balanced or unbalanced, on a 3.5 mm, 5-pole captive screw terminal.

Audio gain/attenuation — Users can set the input level of audio gain or attenuation (-18 dB to +24 dB) via the RS-232 link or from the front panel, to be compatible with a wide range of line level (from -20 dBV to +4 dBV). Individual input audio levels can be adjusted so there are no noticeable volume differences between sources (figure 1-2) and for the best headroom and signal-to-noise ratio. This function also eliminates the need for separate preamps or attenuators when the switcher is used with professional (higher line level) and consumer (lower line level) audio equipment.

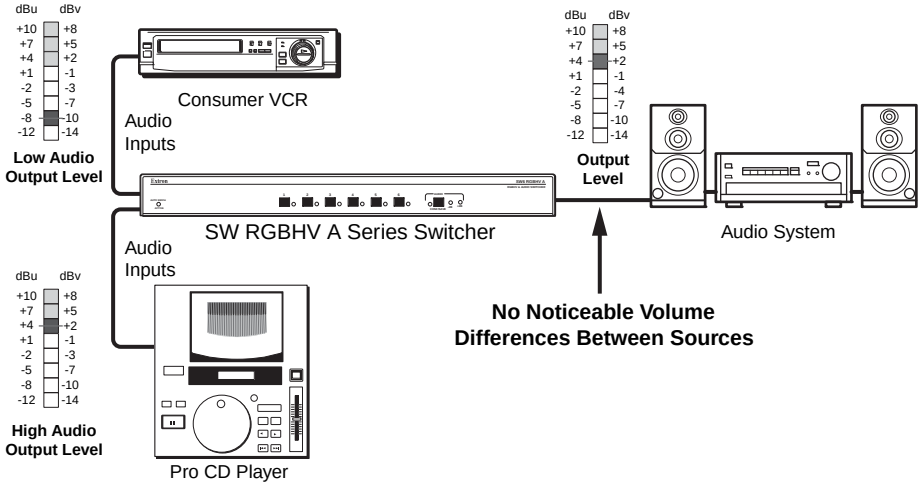


Figure 1-2 — Audio gain and attenuation

Audio follow — Audio can be switched with the corresponding video input. Audio follow switching can be done via front panel control or under RS-232 remote control.

Audio breakaway — Audio can be broken away from its corresponding video input signal. Audio breakaway switching can be commanded only under RS-232 remote control.

All switchers

Inputs — The video switchers input up to 2, 4, or 6 RGB video signals on five female BNC connectors.

Outputs — The selected RGB video input is output on five female BNC connectors.

Bandwidth — Bandwidth is 350 MHz (-3 dB). This high bandwidth allows the switchers to switch all of the high-resolution video signals with no loss of signal quality.

Input signal sensing — The switcher continuously monitors all inputs to sense when the input signal is active or inactive. The switcher reports changes in the status of each input (active to inactive or inactive to active) on the RS-232 port.

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Autoswitching mode — When autoswitching is enabled, the switcher continuously monitors all inputs and automatically switches to the highest-numbered input with video sync pulses present. If video is absent from all inputs, no input is selected.

Operational flexibility — The operator can select the input and set the audio gain and attenuation for each input using the front panel buttons or via the switcher's Remote port RS-232 link. The RS-232 link allows remote control via a PC or control system. You can select inputs via the switcher's contact closure link on the Remote port. You can also remotely control the switchers using a contact closure keypad connected to the Remote port or an Extron IR 102 Remote Control Kit (part #**70-224-01**) connected to the Remote port.

Rack mount — Rack mountable in any conventional 19" wide rack with the supplied rack ears. The two SW2 models require an optional RSU 129 or RSB 129 1U Universal Rack Mount Kit (part #**60-190-01** or **60-604-02**) for rack mounting.

Power supply — Includes an internal 100 VAC to 240 VAC, 50/60 Hz, 20 watts, auto-switchable power supply, which provides worldwide power compatibility.

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Chapter Two

Installation

Installation Overview

Mounting the Switcher

Cabling and Rear Panel Views

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Installation

Installation Overview

Install an SW RGBHV Series switcher as follows:

1. Turn off the input and output devices, and unplug their power cables.
2. If desired, mount the switcher in a rack, under furniture, or through furniture. See “Mounting the Switcher”, below.
3. Connect the input and output devices to the switcher (see “Cabling and Rear Panel Views”, on page 2-7).
4. If desired, connect a computer, RS-232 control system, or contact closure device to the Remote connector (see “Remote connection”, on page 2-9).
5. Plug the switcher and, if appropriate, the input devices and output devices into a grounded AC source.
6. Turn on the input and output devices.
7. The image from each input device should appear on the output devices, and you should be able to switch from one input device to another. If this does not happen, double check steps 3 through 5 and make adjustments as needed.

Mounting the Switcher

Rack mounting the switcher

The SW2 switcher models are housed in half-rack width 1U high metal enclosures that can be rack mounted with an optional RSU 129 or RSB 129 1U Universal Rack Mount Kit or 1U Basic Rack Shelf (part #**60-190-01** or **60-604-01**). The SW4 and SW6 switcher models are housed in rack-mountable, 1U high, 17" wide metal enclosures. The appropriate rack mount kit is included with the SW4 and SW6 switchers. Rack mount the switcher as follows:

UL guidelines

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

1. **Elevated operating ambient temperature** — If the equipment installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the switcher in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °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).

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SW2 models

1. If rubber feet were installed on the bottom of the switcher, remove them.
2. Place the switcher on one half of the optional RSU 129 or RSB 129 1U (one unit high, 19" wide) rack shelf (part #**60-190-01** or **60-604-02**). Align the front of the switcher with the front of the shelf, and align the threaded holes on the bottom of the switcher with the holes in the rack shelf (figure 2-1).

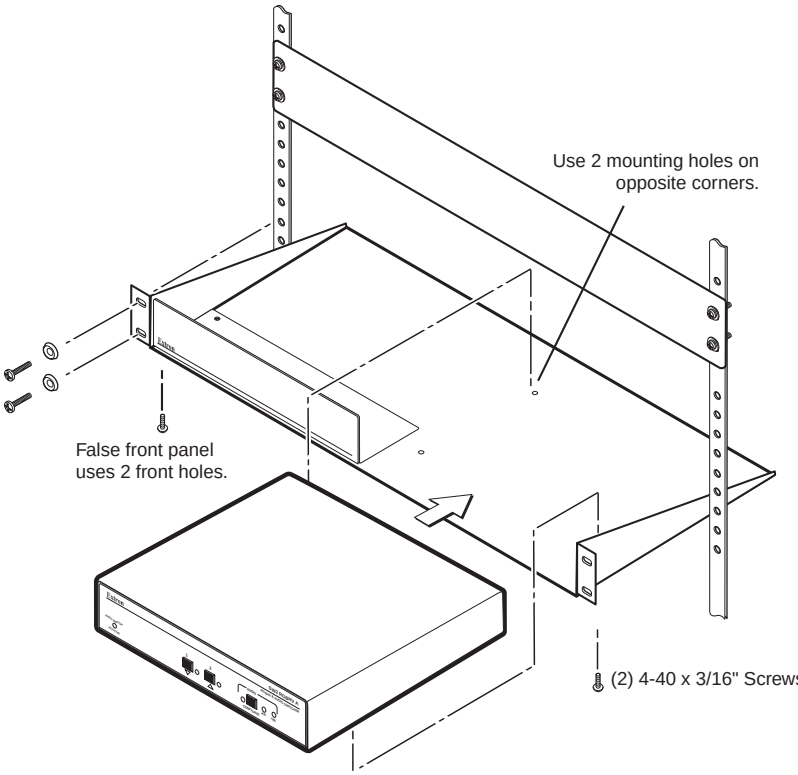


Figure 2-1 — Rack mounting an SW2 switcher

3. Secure the switcher to the rack shelf with the two provided 4-40 x 3/16" machine screws. Insert the screws from the underside of the shelf, and securely fasten them through diagonally opposite corners as shown in figure 2-1.
4. Fasten the false front panel (provided with the rack shelf) to the unoccupied side of the rack (as shown in figure 2-1), or install a second half-rack-width device in that side by repeating steps 1 through 3.
5. Secure the rack shelf to the rack using four 10-32 x ¾" bolts. Insert the bolts through the provided #10 beveled washers, then through the holes in the rack ears.

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SW4 and SW6 models

1. If rubber feet were installed on the bottom of the switcher, remove them.
2. Attach the rack mount brackets to the switcher with eight provided #8 machine screws, provided (figure 2-2).

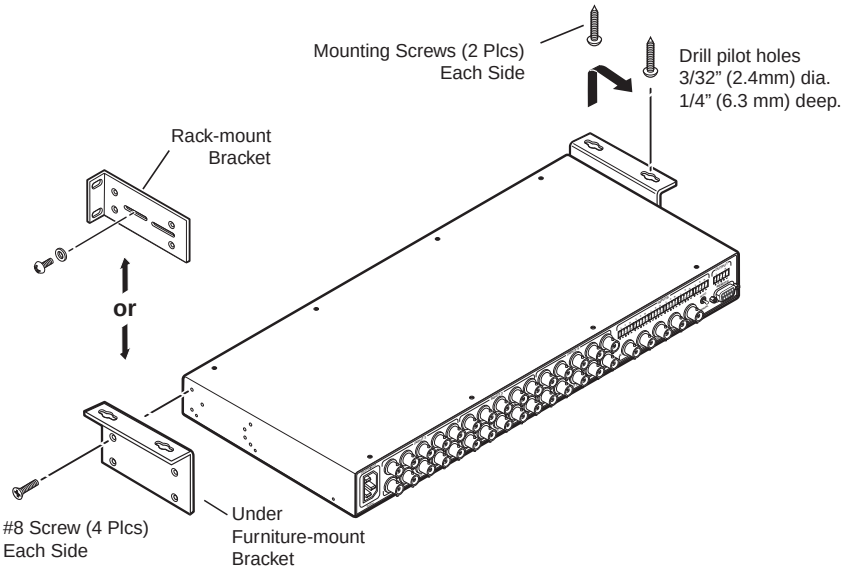


Figure 2-2 — Mounting an SW4 or SW6 switcher in a rack or under furniture

3. Insert the switcher into the rack, aligning the holes in the mounting bracket with those of the rack.
4. Secure the switcher to the rack using the supplied machine screws.

Under-furniture mounting the switcher

The SW2 switcher models can be mounted under a table or other horizontal surface with an optional Extron under-desk mounting kit (part #**70-077-01**). The SW4 and SW6 switcher models can be mounted under a table or other horizontal surface with an optional Extron 1U under-desk mounting kit (part #**70-222-01**).

SW2 models

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

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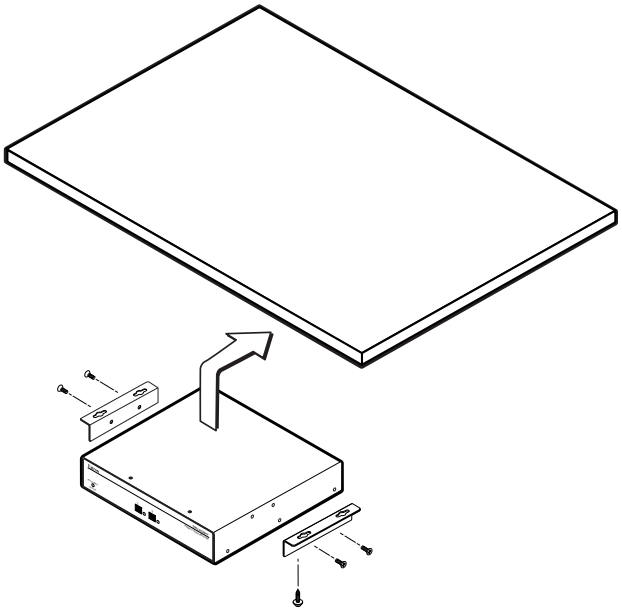


Figure 2-3 — Under-furniture mounting

SW4 and SW6 models

1. Secure the optional table / wall mounting brackets to the switcher with the eight #8 machine screws provided in the mounting kit (figure 2-2 on page 2-4).
2. Hold the switcher with attached brackets against the underside of the desk or other furniture. Mark the location of holes for screws on the underside of the desk.
3. Drill 1 / 4" (6.4 mm) deep, 3 / 32" (2 mm) diameter pilot holes in the table or desk at the marked screw locations from the underside / inside (concealed side) of the furniture, where the switcher will be located.
4. Insert the four wood screws into the pilot holes. Fasten each screw into the installation surface until just less than 1 / 4" of the screw head protrudes.
5. Align the installed screws with the slots in the mounting brackets, and place the switcher against the surface, with the screws through the bracket slots.
6. Slide the switcher slightly forward or back, then tighten all four screws to fasten it in place.

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Through-furniture mounting the switcher

The switchers can be mounted through a desk or other furniture. The SW2 models require an optional through-desk mounting kit, part #**70-077-02**. The SW4 and SW6 models require the included through-desk and rack mounting bracket. Mount the switcher as follows (figure 2-4):

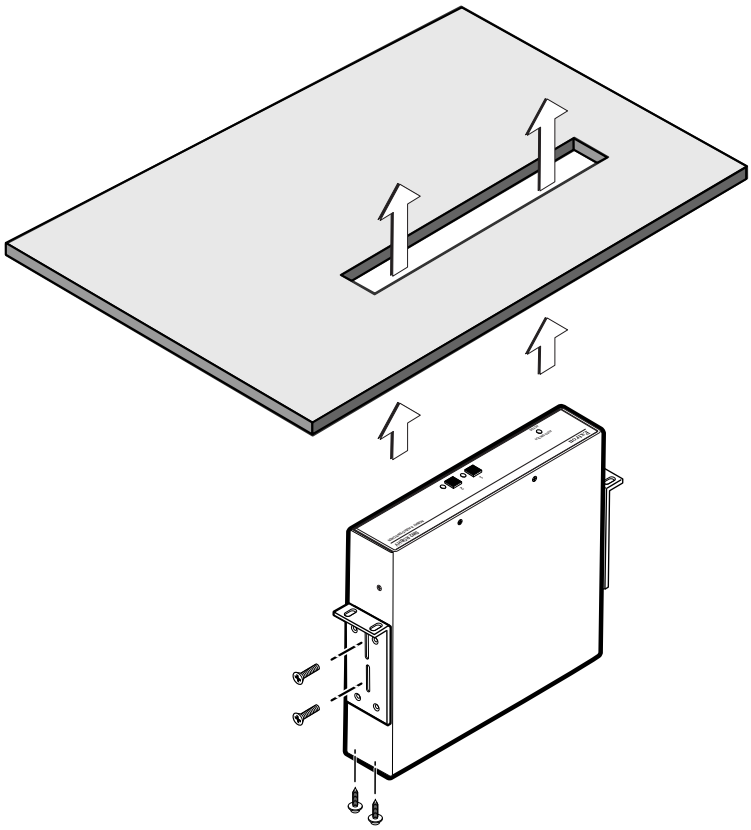


Figure 2-4 — Through-desk mounting

1. Loosely attach the mounting brackets to the switcher using the four supplied machine screws and washers. On the SW4 and SW 6 models, use two screws on each side, inserted through the slotted holes on the brackets (figure 2-2).
2. Hold the switcher underneath the surface where it will be mounted. Mark the cutout area and four screw holes on the underside of the surface.
3. Cut out the surface material that you marked in step **2**.
4. Insert the switcher into the hole to test the fit. If necessary, use a rasp to enlarge the cut-out.
5. Drill four pilot holes, 3/32" in diameter by 1/4" deep, at the screw marks.
6. Attach the brackets to the mounting surface with the four wood screws provided.
7. Slide the switcher up and down or back and forth in the mounting brackets until the face of the switcher is at the desired height. Tighten the screws that secure the bracket in place.

   If the screws are inaccessible to a screwdriver:

   a. Mark the location of the brackets relative to the screws.

   b. Remove the switcher from the underside of the surface.

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c. Tighten the screws.

d. Replace the switcher on the underside of the surface (step **6**).

Cabling and Rear Panel Views

All connectors are on the rear panel. The switcher can be connected to up to six RGBHV or component video devices and (audio models only) stereo audio devices, depending on the model. The video and / or audio output output is identical to the selected input; the switchers perform no sync or video format manipulation.

SW 2 models are in half-rack width enclosures and the rest of the models are in full-rack width enclosures. Figure 2-5 shows an SW2 RGBHV video switcher. Figure 2-6 shows an SW4 RGBHV A video and audio switcher. The two switchers shown have all of the connector configurations that are available in the SW RGBHV product family covered in this manual.

Switchers with video capabilities can switch video and audio separately (audio breakaway).

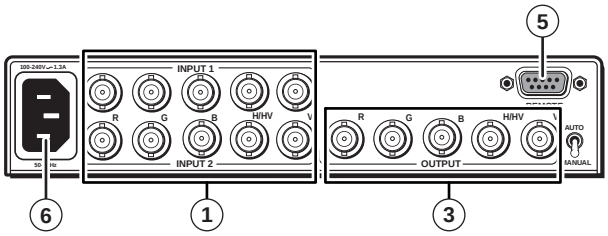


Figure 2-5 — SW2 RGBHV video switcher

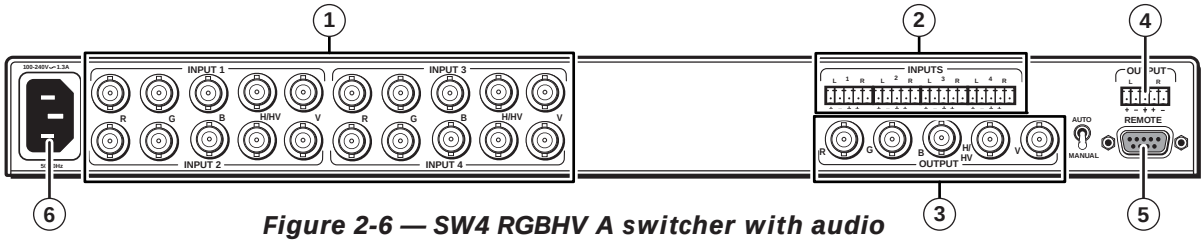


Figure 2-6 — SW4 RGBHV A switcher with audio

Inputs

(1) **RGB and component video inputs** — For each input, connect an RGBHV, RGBS, RGsB, RsGsBs, or component video source to these BNC connectors. Connect the cables as shown in figure 2-7.

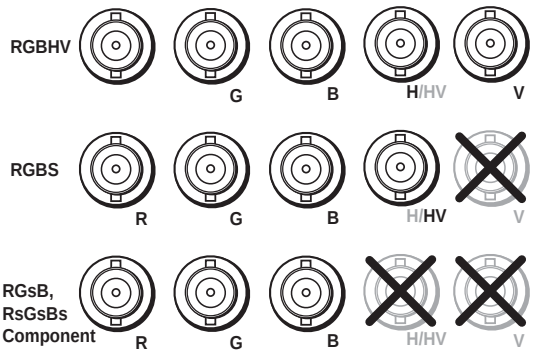
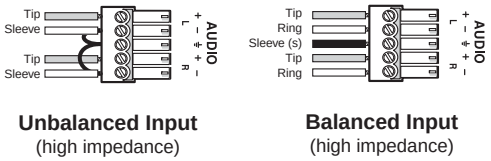


Figure 2-7 — Video input and output connections

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② **Balanced or unbalanced audio input connections (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)** — Each input has a 3.5 mm, 5-pole captive screw connector for balanced or unbalanced stereo audio input. Connectors are included with each SW RGBHV Series switcher, but you must supply the audio cable. See figure 2-8 to wire a connector for the appropriate input type and impedance level. High impedance is generally over 10k ohms.



Unbalanced Input (high impedance) **Balanced Input** (high impedance)

Figure 2-8 — Captive screw connector wiring for audio inputs

NOTE *Figure 2-8 shows three methods of wiring the captive screw audio connectors for input, and figure 2-9 shows two methods of wiring the connectors for output. A mono audio connector consists of the tip and sleeve. A stereo audio connector consists of the tip, ring and sleeve. If you are wiring a captive screw connector from an existing unbalanced audio cable, the white insulated wire is typically the left channel (tip) and the red insulated wire is typically the right channel (sleeve). There is no reliable standard for existing balanced audio cables.*

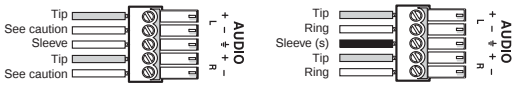
CAUTION *The captive screw connector can easily be inadvertently plugged partially into one receptacle and partially into an adjacent receptacle. This misconnection could damage the audio output circuits. Ensure that the captive screw connector is plugged into the desired input.*

The audio level for each input can be individually set, via the front panel or under RS-232 control, to ensure that the level on the output does not vary from input to input. See chapter 3, "Operation", and chapter 4, "Remote Control", for details.

Output

③ **RGB and component video outputs** — Connect an RGBHV, RGBS, RGsB, RsGsBs, or component video display or other device to these BNC connectors. Connect the cables as shown in figure 2-7.

④ **Balanced or unbalanced audio output connectors (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)** — These 3.5 mm, 5-pole captive screw connectors output the selected unamplified, line level audio. Connect audio devices, such as an audio amplifier or powered speakers, to these connectors. See figure 2-9 to properly wire an output connector.



Unbalanced Output **Balanced Output**

Figure 2-9 — Captive screw connector wiring for audio output

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

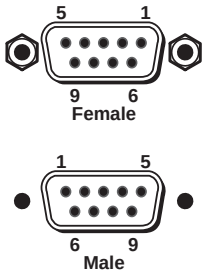
By default, the audio output follows the video switch. Audio breakaway, which can be commanded under RS-232 control via the SIS or Windows-based control program, allows you to select from any one of the audio input sources. See chapter 4, "Remote Control", for details.

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Remote connection

(5) **Remote connector —** Connect a host device, such as a computer or touch panel control, or a remote contact closure device to the switcher via this 9-pin D connector (figure 2-10) for remote control of the switcher.

See chapter 4, “Remote Control”, for definitions of the SIS commands, details on how to install and use the control software, and information on how to construct a remote contact closure device.



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

Figure 2-10 — Remote port connector and pinout

Power connection

(6) **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.

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Chapter Three

Operation

Controls and Indicators

Switcher Operations

Optimizing the Audio (SW2, SW4, and SW6 RGBHV A only)

Troubleshooting — If No Image Appears

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Operation

Controls and Indicators

The SW RGBHV family of switchers have 2, 4, or 6 input buttons and LEDs on the front panel. Audio models also have front panel configuration controls and LEDs. All models have an Auto / Manual mode selection switch on the rear panel.

Figure 3-1 shows the front panel of an SW2 RGBHV switcher. Figure 3-2 shows the front panel of an SW6 RGBHV A switcher. These two examples show all of the combinations of buttons and enclosure sizes that you may encounter with your particular switcher. Figure 3-3 shows the location of the Auto / Manual switch on the rear panel.

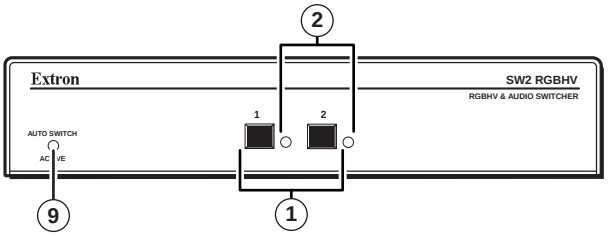


Figure 3-1 — SW2 RGBHV front panel

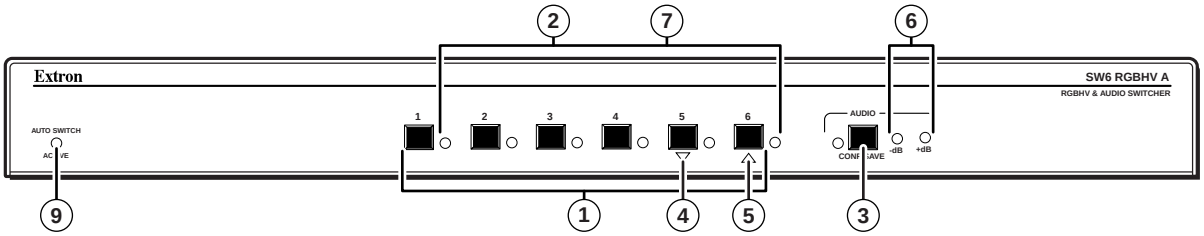


Figure 3-2 — SW6 RGBHV A front panel

In the following descriptions, you will find the following terms:

- **Video-only switcher** — Switches RGB video **only**. **No** audio switching.
- **Analog audio switcher** — Switches analog audio on captive screw connectors as well as RGB video.

On audio switchers, two of the input buttons and LEDs have dual functions. Double function controls on figure 3-1 and figure 3-2 have two callouts (ⓝ numbers), each indexed to a function in the following pages.

Input selection controls and indicators

① **Input buttons —** When pressed, each input button selects the associated input for output.

On some audio-switching models, the rightmost input buttons (Input 1 and Input 2 on SW2 models and Input 5 and Input 6 on SW6 models) are also used to decrease and increase the amount of audio gain for a selected input. See "Audio controls and indicators", items ④ and ⑤.

② **Input LEDs —** When lit, the input LEDs identify the selected input. If audio is broken away (available under RS-232 control only), the selected video input is indicated by a steadily lit input LED, and the selected audio input is indicated by a blinking input LED.

On the SW4 RGBHV A and SW6 RGBHV A, the input LEDs also indicate the audio level of the selected input. See "Audio controls and indicators", item ⑦.

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Audio controls and indicators

③ **Audio configuration/save button and LED —** The Audio button and LED enable the user to view and / or change the current audio level setting for each input. See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)", later in this chapter.

④ **Down (▼) button and LED —** The ▼ button is used to decrease the audio level for a selected input. The LED flashes each time the button is pressed to indicated a 1 dB decrease in the audio level. See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only", later in this chapter.

On the SW2 RGBHV A, this button and LED are secondary functions of the Input 1 button and LED. On the SW6 RGBHV A, this button and LED are secondary functions of the Input 5 button and LED.

⑤ **Up (▲) button and LED —** The ▲ button is used to increase the audio level for a selected input. The LED flashes each time the button is pressed to indicated a 1 dB increase in the audio level. See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)", later in this chapter.

On the SW2 RGBHV A, this button and LED are secondary functions of the Input 2 button and LED. On the SW6 RGBHV A, this button and LED are secondary functions of the Input 6 button and LED.

⑥ **–dB/+dB LEDs —** The –dB and +dB LEDs indicate the polarity of the audio level setting. See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)", later in this chapter.

⑦ **Audio level indicators (SW4 RGBHV A and SW6 RGBHV A only) —** The Input 1 through Input 4 LEDs indicate a range of 6 dB when lit (Input 1 LED off = 0 dB to 5 dB, Input 1 LED lit = 6 dB to 11 dB, Input 2 LED lit = 12 dB to 17 dB, and so on). See "Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)", later in this chapter.

Autoswitch mode control and indicator

When autoswitching is enabled, the switcher continuously monitors all inputs and automatically switches to the highest-numbered input with video sync pulses present. If video is absent from all inputs, no input is selected.

⑧ **Auto/Manual switch —** The rear panel Auto / Manual toggle switch (figure 3-3) selects autoswitching mode or manual switch mode.

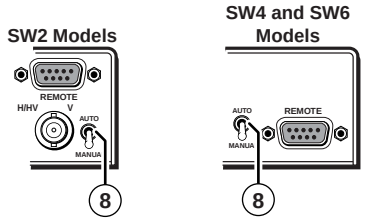


Figure 3-3 — Rear panel Auto/Manual switch

⑨ **Auto Switch Active LED —** When lit, the front panel Auto Switch Active LED indicates that the switcher is in autoswitch mode. When the LED is unlit, the switch is in normal (manual) mode.

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Switcher Operations

The following paragraphs detail the power up process and provide sample procedures for selecting an input and viewing and adjusting the audio level.

Powering on the switcher

1. Plug in the switcher.

   On all switcher models, power is automatically applied when the power cord is connected to an AC source. When AC power is applied, the switcher performs a self-test that blinks the front panel LEDs during the test. An error-free power up self-test sequence leaves the LED for the previously selected input lit and all other Input LEDs off.

NOTE *If an error occurs during the self-test, the switcher locks up and doesnot operate. If your switcher locks up on power-up, call the Extron S³ Sales & Technical Support Hotline. See the rear cover of this manual for the phone number in your region of the world.*

2. Plug in all system components and turn on the input devices (such as computers and scalers) and the output devices.
3. Set the input devices to output video using each device's own operating instructions.
4. Select an input. The image should appear on the screen.

   If no image appears, see "Troubleshooting — If No Image Appears", later in this chapter.

Switching inputs

A new input can be selected using the front panel buttons. Select a new input as follows:

1. Select the desired input by pressing the associated input button.
2. Observe that the LED for the selected input lights.

NOTE *The switcher must be in normal (manual) mode.*

An input can also be selected using an RS-232 device or a third party contact closure device. See chapter 4, "Remote Control". Separate video and audio inputs (audio breakaway) can be established under RS-232 control. If audio is broken away, the selected video input is indicated by a steadily lit input LED, and the selected audio input is indicated by a blinking input LED.

NOTE *Switching inputs on the front panel can only switch video and audio together (audio follow). Even if audio was previously broken away, audio follows the video on front panel input selection.*

Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)

Audio switchers have audio gain and attenuation adjustments. The audio level of each input can be adjusted through a range of –18 dB to +24 dB to ensure that there is no noticeable volume difference among sources and to eliminate the need for separate preamps or attenuators when the switcher is used with professional (higher line level) and consumer (lower line level) audio equipment.

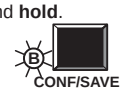
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The audio level can be adjusted from the front panel or by using Extron's Windows-based control program.

NOTE *The switcher must be in normal (manual) mode.*

1. Press and release an input button to select an input.
2. Press and **hold** the Audio Conf / Save button until the Conf / Save LED begins to blink, then release the Conf / Save button.

   Press and **hold**.

   Conf/Save blinks. Release the button.

   The +dB and –dB LEDs display the polarity (+ or –). The lit +dB LED indicates a positive (gain) level. The lit –dB LED indicates a negative (attenuation) level. Both LEDs lit indicate 0 dB.

   On the SW4 RGBHV A and SW6 RGBHV A only, the input 1 through 4 LEDs display the approximate audio level for the selected input. Each input LED indicates a range of 6 dB when lit (Input 1 LED off = 0 dB to 5 dB, Input 1 LED lit = 6 dB to 11 dB, Input 2 LED lit = 12 dB to 17 dB, and so on).
3. Press and release the ▼ and ▲ buttons to decrease and increase the audio level by 1 dB or press and **hold** the buttons to decrease and increase the level by 3 dB per second. The ▼ and ▲ LEDs flash to indicate each 1 dB level change.

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

4. Press and hold the Audio Conf / Save button until the Conf / Save LED turns off to save the gain value in memory and exit the audio display and adjustment mode.

NOTE

1. *There is one audio level setting per input. The setting is shared by the left and right audio inputs.*
2. *The audio level settings are stored in non-volatile memory. When power is removed and restored, the audio level settings are retained.*

Example — Adjusting the audio level

NOTE *The switcher must be in normal (manual) mode.*

1. Press and release an input button to select an input. The associated input LED lights.
2. Press and **hold** the Audio Conf / Save button until the Audio Conf / Save LED starts blinking.
3. **On the SW4 RGBHV A and SW 6 RGBHV A**, the input 1 through 4 LEDs display the gain or attenuation value. In figure 3-4, the LED readout shows a range of +6 dB to +11 dB.

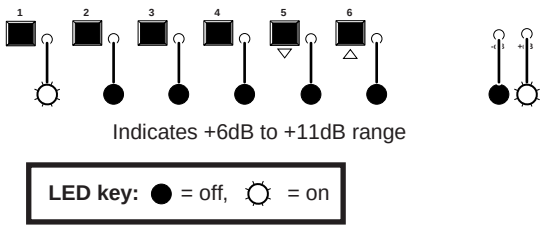


Figure 3-4 — Example: Viewing the audio level

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

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

If one or more input LEDs is/are lit AND the –dB LED is lit, press and release the ▲ button repeatedly until the .highest-numbered lit input LED goes out. Count the button presses, each of which represents a 1 dB increment.

If the +dB LED is lit and NO input LEDs are lit, press and release the ▼ button repeatedly until the +dB and –dB LED are both lit, indicating 0 dB. Count the button presses, each of which represents a 1 dB increment.

If the -dB LED is lit and NO input LEDs are lit, press and release the ▲ button repeatedly until the +dB and –dB LED are both lit, indicating 0 dB. Count the button presses, each of which represents a 1 dB increment.

b. Return to the original audio level setting by pressing and releasing the ▼ or ▲ button (the opposite of the button you pushed in step **3a**) the same number of steps you pushed the opposite arrow button in step **3a**. **In this example**, this means pushing the ▲ button three times.

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

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

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

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

4. Press and release the ▼ button several times to decrease the audio level displayed in the input LEDs by 1 dB per button push. The ▼ LED flashes each time the button is pressed. Note the input LED, +dB LED, and –dB LED changes that occur each time the ▼ button is pressed and released. Figure 3-5 shows the result of pressing the ▼ button a total of nine times to change the value to –1 dB. Note that the +dB LED has turned off and that the –dB LED is on to indicate a negative level.

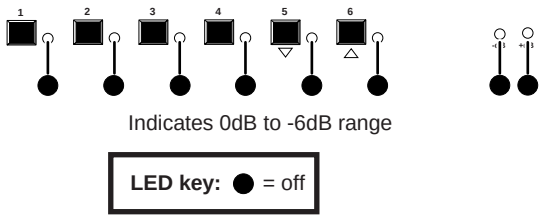


Figure 3-5 — Example, step D: Adjusting the audio level

5. Press and release the Audio Conf/Save button until the Audio LED goes off. The input LEDs stop displaying the audio level range, the +dB and –dB LEDs go off, and the selected input LED lights.



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Audio level reset — single input

Reset the audio level for an input to 0 dB as follows:

NOTE *The switcher must be in normal (manual) mode.*

1. Press and release an input button to select an input.
2. Press and **hold** the Audio Conf / Save button until the Conf / Save LED begins to blink, then release the Conf / Save button.
3. Press and release the ▼ and ▲ buttons. The ▼ and ▲ LEDs light and the Input LEDs go off.
4. Press and **hold** the Audio Conf / Save button until the Conf / Save LED goes off. The ▼ and ▲ LEDs go off, and the selected Input LED lights.

Audio level reset — all inputs

Reset the audio level to 0 dB for all inputs as follows:

1. Press and **hold** the Audio Conf / Save button for approximately 10 seconds until all Input LEDs light for approximately 1 second and then turn off. Release the Conf / Save button.
2. Press and **hold** the Audio Conf / Save button again until the Conf / Save LED turns off to save the reset level in memory and exit the audio display and adjustment mode.

Memory

Audio and switch mode settings are saved in nonvolatile memory. When the switcher is powered off, the settings are retained. When the switcher is powered on, the saved memory settings are active. The selected input is not a saved value; when the switcher is powered on it defaults to input 1.

NOTE *If the switcher is powered off in autoswitch mode, it automatically switches to the highest-numbered input with video sync pulses present when it is powered back on. If no input has video present, all input select LEDs are off.*

Optimizing the Audio (SW2, SW4, and SW6 RGBHV A only)

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 “Inputs” and “Output”, in chapter 2, “Installation”.
2. Power on the audio sources, the switcher, and the audio players.
3. Switch among the inputs (see “Switching inputs”, earlier 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 audio level of each input (see “Audio gain and attenuation (SW2 RGBHV A, SW4 RGBHV A, and SW6 RGBHV A only)”, earlier in this chapter) so that the approximate output level is the same for all selected inputs.

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Troubleshooting — If No Image Appears

1. Ensure that all devices are plugged in and powered on. The switcher is receiving power if the front panel Power LED (if equipped) is lit.
2. Ensure an active input is selected on the switcher or that the switcher is in autoswitch mode.
3. Ensure that the proper signal format is supplied.
4. Check the cabling and make corrections as necessary.
5. Call the Extron S³ Sales & Technical Support Hotline if necessary.

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Chapter Four

Remote Control

Simple Instruction Set

Windows®-Based Control Program

Contact Closure

Infrared Remote Control

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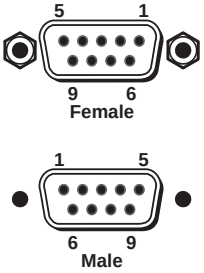
Remote Control

The SW RGBHV A Series switchers can be remotely controlled via the switcher's rear panel Remote connector (figure 4-1). Remote control devices can be:

- A host device (such as a computer or control system)
- An IR 102 Remote Control Kit
- A contact closure device such as an Extron KP 6 Keypad Control or a locally-constructed device.

Three remote control methods are available:

- Extron's Simple Instruction Set
- Extron's Windows®-based control program
- Contact closure



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

Figure 4-1 — Remote connector pinout

The RS-232 protocol of the rear panel RS-232/Remote connector is as follows:

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

NOTE *The cable used to connect the Remote port to a computer, control system, contact closure device, or IR control kit 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 and IR 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 "Simple Instruction Set", for definitions of the SIS commands and "Windows®-Based Control Program"for details on how to install and use the control software.

For contact closure, use a control cable with pins 2 and 3 **NOT** connected. Otherwise, either cut the wires to these pins in hard-shelled connectors or remove these pins from molded plugs. See "Contact Closure", for information on how to construct a remote contact closure device.

Simple Instruction Set

Host-to-switcher instructions

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command character sequence. When a command is valid, the switcher executes the command and sends a response to the host device. All responses, from the switcher to the host, end 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.

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Switcher-initiated (unsolicited) messages

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

(C) Copyright 2002, Extron Electronics, SW6 RGBHV {or appropriate model}, V*x.xx* ↵

The switcher issues the copyright message when it first powers on. V*x.xx* is the firmware version number.

In*n* • All ↵

The switcher issues the In*n* message when a front panel input selection operation occurs. *n* is the input number.

Reconfig ↵

The switcher initiates the Reconfig message when there is a change in an audio model's audio gain setting.

Sig • *n* • *n* • *n* • *n* • *n* • *n* ↵

The switcher initiates the Sig message when there is a change in the status of an input. *n* = 1 indicates a video signal is present, *n* = 0 indicates a video signal is not preset. There are as many *n*s in the switcher-initiated message as the maximum number of inputs for the models (2, 4, or 6). For example: Sig • 1 • 1 • 1 • 0 • 1 • 0 ↵, in which the input signal is present on inputs 1, 2, 3, and 5 and no signal is present on inputs 4 and 6.

Error responses

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

E01 ↵ - Invalid input channel number (out of range)

E06 ↵ - Invalid input channel change (autoswitch mode active)

E09 ↵ - Invalid function (mode) parameter

E10 ↵ - Invalid command

E13 ↵ - Invalid value (out of range)

Timeout

Pauses of 10 seconds or longer between command ASCII characters result in a timeout. The command operation is aborted with no other indication.

Using the Command/Response table

The Command / Response table starts on the next page. With the exception of the set audio gain and attenuation commands (**G** and **g**) , the SIS commands are **not** case sensitive. Symbols are used throughout the table to represent variables in the command / response fields. Command and response examples are shown throughout the table. The ASCII to HEX conversion table on the next page is for use with the command / response table.

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

Esc 1B | CR 0D | LF 0A

Symbol definitions

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

↵	=	CR/LF (carriage return/line feed) (0x0D 0A)	
←	=	CR (carriage return, no line feed)	
•	=	space	
X1	=	Input number	1 through the maximum number of inputs
X2	=	Input signal status	0 = no signal detected, 1 = signal detected
X3	=	On/off	0 = off, 1 = on
X4	=	Numeric value	-18 dB to +24 dB, each step = 1 dB
X5	=	Audio gain	0 through 24
X6	=	Audio attenuation	1 through 18
X7	=	Controller firmware	*x.xx*
X8	=	Switch mode	1 = normal switch mode, 2 = autoswitch mode

Command/Response table for SIS commands

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Input selection			
Select video and audio input	X1 !	In X1 • All ↵	Select input X1 video and audio.
Example (SW4 RGBHV A):	3!	In3 • All	Select input 3 video and audio.
Example (SW6 RGBHV):	5!	In5 • All	Select input 5 video.
Select video input only	X1 &	In X1 • Vid ↵	Select input X1 video only (audio breakaway).
Select audio input only (SW 2/4/6 RGBHV A only)	X1 $	In X1 • Aud ↵	Select input X1 audio only (audio breakaway).
Input signal sensing			
Request all inputs' status	0S	Sig • $X2^1$ • $X2^2$ • ... • $X2^n$ ↵	Each X2 response is the signal status of an input, starting from input 1; *n* is the maximum number of inputs for this model.
Example (SW6 RGBHV):	0S	Sig • 1 • 1 • 1 • 0 • 1 • 0 ↵	The input signal is present on inputs 1, 2, 3, and 5. No signal is present on inputs 4 and 6.
Request an individual input's status	X1S	X2 ↵	X1's signal status = X2.

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Command/Response table for SIS commands (continued)

Command	ASCII Command (host to switcher)	Response (switcher to host)	Additional description
Video mute			
Set video mute	1B	Vmt1↵	Video mute on (blank screen).
Clear video mute	0B	Vmt0↵	Video mute off.
Read video mute	B	X3↵	Mute status = X3.
Audio mute (audio switchers)			
Set audio mute	1Z	Amt1↵	Audio mute on (no sound output).
Clear audio mute	0Z	Amt0↵	Audio mute off.
Read audio mute	Z	X3↵	Mute status = X3.
Audio input gain and attenuation (audio switchers)			
Set gain (specified input)	X1*X5G	In X1 • Aud X5↵	Set gain for input X1 to X5 dB.
Example:	4*3G	In4 • Aud+03↵	Set gain for input 4 to 3 dB.
Set attenuation (specified input)	X1*X6g	In X1 • Aud X6↵	Set attenuation for input X1 to X6 dB.
Increment level (specified input)	X1+G	In X1 • Aud X4↵	Increase input X1 audio level by +1 dB.
Decrement level (specified input)	X1-G	In X1 • Aud X4↵	Decrease input X1 audio level by –1 dB.
View input level (specified input)	V X1G	X4↵	View input X1's audio level, X4 .
Set gain (current input)	X5G	In X1 • Aud X5↵	Set gain for the current input to X5 dB.
Set attenuation (current input)	X6g	In X1 • Aud X6↵	Set attenuation for the current input X6 dB.
Increment level (current input)	+G	In X1 • Aud X4↵	Increase input X1 audio level by +1 dB.
Decrement level (current input)	-G	In X1 • Aud X4↵	Decrease input X1 audio level by –1 dB.
View audio level (current input)	g	X4↵	View gain for input X1.
Example	G	In004 • Aud=-03↵	Attenuation for input 4 is set to –3 dB.
Reset			
Reset audio level to 0 dB	Esc ZA←	Zpa↵	Reset all audio levels to 0 dB.
View, information, part number, and firmware requests			
Information request	I	V X1 • A X1 • F X8 • Vmt X3 • Amt X3↵	
Example	I	V4 • A4 • F1 • Vmt0 • Amt 0↵	Video and input 4 selected; front panel (manual) switch mode; video and audio unmuted.
Request for part number	N	xx-xxx-xx↵	
Example	N	60-493-21↵	60-493-21 = SW6 RGBHV A.
Query firmware version	Q	X7↵	
Example	Q	1.23↵	Sample value only.

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Windows®-Based Control Program

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

- Input selection (including audio breakaway for models with video and audio)
- Audio gain and attenuation adjustments (audio models)

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

Installing the software

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

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

   The Extron software CD window appears (figure 4-2).



Figure 4-2 — Software CD window

2. Click the Software tab (figure 4-2).
3. Scroll to the Universal Switcher Control program and click Install (figure 4-3).



Figure 4-3 — Software installation

4. Follow the on-screen instructions. By default, the Windows installation of the Matrix Switchers Control Program creates a C:\UNIVSW folder and places two icons (Universal Switcher Control Program and Universal Switcher Help) into a group named "Extron Electronics".

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Using the software

1. Connect a serial cable between a PC and the switcher's Remote port. The cable's pin assignments are shown in figure 4-1 on page 4-2. Power up the PC and the switcher.

2. To run the software, click **Start**>**Programs**>**Extron Electronics**> **Universal Switcher Control Pgm**.



3. Click on the COM port that is connected to the switcher's RS-232 port.

4. The Extron Universal Switcher Control Program window (Figure 4-4) displays the input signal status for each input (signal present or not present), the selected input, and the audio gain for the selected input.



Figure 4-4 — Universal Switcher program window

● indicates that the input signal is present and is selected**.**

○ indicates that the input signal is present but not selected.

▣ indicates that the input signal is not present.

Click the  button to refresh the input signal status information.

Using the help system

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



- From the Extron Electronics program group, double-click on the Universal Switcher Control Program **Help** icon.
- From within the Windows-based switcher control program, click on the **Help** entry on the task bar.
- From within the Windows-based switcher control program, press the F1 key.

Contact Closure

The Remote connector also provides a way to select an input to the switcher by using a remote contact closure device, such an Extron KP 6 Keypad Remote Control or a locally-built device. Contact closure control uses pins on the Remote connector that are not used by the RS-232 interface. The contact closure pin assignments are shown in the table on page 4-2.

NOTE *Autoswitching models must be in normal (manual) mode.*

To select a different input number using a contact closure device, momentarily short the pin for the desired input number to logic ground (pin 5). To force one of the inputs to be always selected, leave the short to logic ground in place. The short overrides front panel input selections.

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Infrared Remote Control

The optional Extron IR 102 Remote Control Kit consists of the following components:

- IR 102 system remote (hand-held remote control)
- IR detector with 6' cable
- IR 102 receiver box with 3' cable
- External 12 VDC adapter power supply

Install and operate the remote control in accordance with *IR 102 User's Guide* (part #**68-663-01**), included with the remote control.

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Appendix A

Specifications and Part Numbers

Specifications

Part Numbers

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Specifications

Video

Gain	Unity.
Bandwidth	350 MHz (-3 dB)
Crosstalk	-70dB @ 10 MHz
Switching speed	5 ms (max.)

Video input

Number / signal type	
SW2 RGBHV / RGBHV A	2 RGBHV, RGBS, RGsB, RsGsBs, HDTV component video, S-video, composite video (or digital audio)
SW4 RGBHV / RGBHV A	4 RGBHV, RGBS, RGsB, RsGsBs, HDTV component video, S-video, composite video (or digital audio)
SW6 RGBHV / RGBHV A	6 RGBHV, RGBS, RGsB, RsGsBs, HDTV component video, S-video, composite video (or digital audio)
Connectors	
SW2 RGBHV / RGBHV A	2 x 5 female BNC
SW4 RGBHV / RGBHV A	4 x 5 female BNC
SW6 RGBHV / RGBHV A	6 x 5 female BNC
Nominal level	1.0 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum / maximum levels	Analog: 0.3 V to 1.5 Vp-p with no offset
Impedance	75 ohms
Return loss	<-30 dB @ 10 MHz
DC offset (max. allowable)	5.0V
Input coupling	DC

Video output

Number / signal type	1 RGBHV, RGBS, RGsB, RsGsBs, HDTV component video, S-video, composite video (or digital audio)
Connectors	5 BNC female
Nominal level	1.0 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB and for R-Y and B-Y of component video 0.3 Vp-p for C of S-video
Minimum / maximum levels	0.5 V to 1.5 Vp-p (follows input)
Impedance	75 ohms
Return loss	<-30 dB @ 10 MHz
DC offset	±5 mV maximum with input at 0 offset

Sync

Input type	RGBHV, RGBS, RGsB, RsGsBs, bi-level and tri-level sync
Output type	RGBHV, RGBS, RGsB, RsGsBs, bi-level and tri-level sync
Input level	Analog or TTL, 0.5 V to 5.0 Vp-p
Output level	5.0 Vp-p, unterminated, for V output; H output follows input.
Input impedance	510 ohms for V input and unselected H input; the selected H input impedance is determined by the device connected to the H output.
Output impedance	75 ohms for V output; the H output impedance is determined by the device connected to the selected H input.
Max input voltage	5.0 Vp-p
Max. propagation delay	35 ns
Max. rise / fall time	4 ns
Polarity	Positive or negative (follows input)

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Audio — SW 2/4/6 RGBHV A only

Gain	-18 to +24 dB, adjustable When audio gain is set to unity (0 dB), balanced output has a 0 dB gain; unbalanced output is attenuated by 6 dB.
Frequency response	20 Hz to 20 kHz, ±0.05 dB
THD + Noise	0.03% @ 1 kHz, 0.3% @ 20 kHz at nominal level
S/N	>90 dB at maximum output
Crosstalk	<-65 dB @ 20 kHz, <-80 dB @ 1 kHz or below 60 Hz
Stereo channel separation	>80 dB @ 20 Hz to 20 kHz
CMRR	>75 dB @ 20 Hz to 20 kHz

Digital audio — all models' H channel

Input type	Dolby Digital, DTS, AES/EBU
Output type	Dolby Digital, DTS, AES/EBU
Bandwidth	250 MHz (-3 dB)
Sampling rates	32, 44.1, 48, 96 kHz
Input level	0.5 V to 5.0 Vp-p
Output level	2.5 Vp-p (when terminated with 75 ohms)
Input impedance	510 ohms for unselected inputs; for the selected input, impedance is determined by the device connected to the output.
Output impedance	Determined by the device connected to the selected input
Max input voltage	5.0 Vp-p
Max. propagation delay	35 ns
Max. rise/fall time	4 ns

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

Audio input — SW 2/4/6 RGBHV A only

Number/signal type	2, 4, or 6 (depending on the model) stereo, balanced/unbalanced
Connectors	2, 4, or 6 (depending on the model) 3.5 mm captive screw connectors, 5 pole
Impedance	>10k ohms unbalanced, 20k ohms balanced, DC coupled
Nominal level	-20 dBV (100 mVrms), -10 dBV (316 mVrms), 0 dBu (0.775 Vrms), or +4 dBu (1.23 Vrms), configurable
Maximum level	+20 dBu, (balanced or unbalanced) at 1% THD+N
Input gain adjustment	-24 dB to +18 dB, adjustable per input
Input coupling	DC

Audio output — SW 2/4/6 RGBHV A only

Number/signal type	1 stereo, balanced/unbalanced
Connectors	(1) 3.5 mm captive screw connector, 5 pole
Impedance	50 ohms unbalanced, 50 ohms balanced
Nominal level	-10 dBV (316 mV) or +4 dBu (1.23 V), configurable
Maximum level (Hi-Z)	>26 dBu, balanced; >+20 dBu, unbalanced at 1% THD+N
Maximum level (600 ohm)	>+21 dBm, balanced; >+15 dBm, unbalanced at 1% THD+N

Control/remote — switcher

Serial control port	RS-232, 9-pin female D connector (same as the contact closure port)
Baud rate and protocol	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configurations	2 = TX, 3 = RX, 5 = GND
Contact closure	9-pin female D connector (same as the RS-232 port)

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Specifications, cont'd

Contact closure pin configurations	1 = input #1, 4 = input #2, 6 = input #3, 7 = input #4, 8 = input #5, 9 = input #6
Program control	Extron's control/configuration program for Windows® Extron's Simple Instruction Set (SIS™)

General

Power	100 VAC to 240 VAC, 50/60 Hz, 20 watts, internal
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, non-condensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, non-condensing
Cooling	Convection, no vents
Rack mount	
SW2 RGBHV, SW2 RGBHV A	Yes, with optional 1U, 9.5" deep rack shelf, part #**60-190-01** (RSU 129) or **60-604-02** (RSB 129). Also, furniture mountable with optional MBU 125 under-desk mounting kit (part #**70-077-01**).
All other models	Yes, with included mounting kit, part #**70-077-03** (MBD 149). Also, furniture mountable with optional MBU 149 1U under-desk mounting kit (part #**70-222-01**).
Enclosure type	Metal
Enclosure dimensions	
SW2 RGBHV, SW2 RGBHV A	1.75" H x 8.75" W x 9.5" D (1U high, half rack wide) (4.4 cm H x 22.2 cm W x 24.1 cm D) (Depth excludes connectors.)
All other models	1.75" H x 17.5" W x 8.5" D (1U high, full rack wide) (4.4 cm H x 44.5 cm W x 21.6 cm D) (Depth excludes connectors.)
Product weight	
SW2 RGBHV	2.4 lbs (1.1 kg)
SW2 RGBHV A	2.5 lbs (1.1 kg)
All other models	7.0 lbs (3.2 kg)
Shipping weight	
SW2 RGBHV, SW2 RGBHV A	5 lbs (3kg)
All other models	12 lbs (6 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Regulatory compliance	
Safety	CE, C-tick, CUL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
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.*

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Part Numbers

SW RGBHV switcher part numbers

Switcher	Part #
SW2 RGBHV video switcher	60-491-01
SW2 RGBHV A video and audio switcher	60-491-21
SW4 RGBHV video switcher	60-492-01
SW4 RGBHV A video and audio switcher	60-492-21
SW6 RGBHV video switcher	60-493-01
SW6 RGBHV A video and audio switcher	60-493-21

Supplied accessories

Switcher	Part #
SW RGBHV switcher User's Manual	
Universal Switcher Control Program	
MBD 149 1U through-desk and rack mounting kit (SW4 and SW6 models only)	70-077-03
3.5 mm 5-pole captive screw connectors; 2, 4, or 6 (audio models only)	10-319-10

Optional accessories

Extron Part SW2 models only	Part #
RSU 129 1U universal rack shelf kit	60-190-01
RSB 129 1U basic rack shelf	60-604-02
MBU 125 under-desk mount kit	70-077-01
MBD 129 through-desk mount kit	70-077-02
SW4 and 6 models only	
MBU 149 under desk mount kit	70-222-01
All models	
KP 6 keypad remote control	60-111-20
IR 102 infrared remote control kit	70-224-01
SVHSM-BNCF adapter	26-353-01

Cables

When using signals with a scanning frequency of 15-125 kHz and running distances of 100 feet or more, use RG6 or Mini HR BNC cables for best performance. Rental and staging (RC) cable is ideal for jobs with repeated installation and removal in high traffic areas.

Bulk cables

RG6 super high resolution cable	Part #
RG6-5 / 500, five conductor, non-plenum, 500' (150 m)	22-100-02
RG6 / 500, one conductor, non-plenum, 500' (150 m)	22-098-02
RG6 / 1000, one conductor, non-plenum, 1000' (300 m)'	22-098-03
RG6P / 500, one conductor, plenum, 500' (150 m)	22-164-02
RG6P / 1000, one conductor, plenum, 1000' (300 m)'	22-164-03

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MHR-5 mini high resolution cable	Part #
MHR-5 / 500, five conductor, non-plenum, 500' (150 m)	22-020-02
MHR-5 / 1000, five conductor, non-plenum, 1000' (300 m)'	22-020-03
MHR-5P / 500, one conductor, plenum, 500' (150 m)	22-103-02
MHR-5P / 1000, one conductor, plenum, 1000' (300 m)'	22-103-03
MHRHF-5 / 500, one conductor, halon free, 500' (150 m)	22-126-02
MHRHF-5 / 1000, one conductor, halon free, 1000' (300 m)'	22-126-03

M59-5 mini 59 flex cable	Part #
M59-5 / 500, 500' (150 m)	22-127-02

Crimp tools and assorted connectors

Tool or connectors	Part #
CTU 300 universal crimp tool	100-241-02
Hand wire stripper	100-242-01
RG6 universal crimp termination kit w / 100 BNC male connectors	100-267-02
MHR univeral crimp termination kit w / 100 BNC male connectors	100-266-02
Mini 59 universal crimp termination kit w / 100 male BNC connectors	100-269-02
BNC male RG6 male crimp connectors, qty. 50	100-260-01
BNC male MHR crimp connectors, qty. 50	100-250-01
Mini 59 crimp BNC male connectors, qty. 50	100-263-01
BNC bulkhead connectors, qty. 50	100-076-51

Pre-cut cables

All Extron BNC cables have male connectors on both ends.

Cable	Part #
RG6 BNC, one conductor, various lengths	26-383-*nn*
RG6-5 BNC, five conductor, various lengths	26-369-*nn*
MHR-5, five conductor, various lengths	26-260-*nn*
M59-5, five conductor, various lengths	26-499-*nn*

NOTE *Bulk cable in lengths up to 5000' (1524 meter) rolls is available with or without connectors.*

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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

Europe, Africa, and the Middle East:

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

Asia:

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

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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