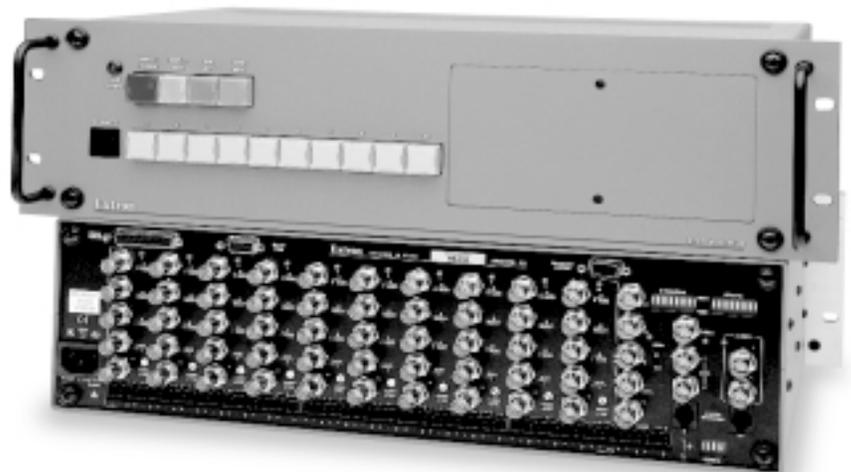


## User's Manual



# *System 8/10 Plus*

**System Switcher**

# Safety Guide

## 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: To prevent the risk of shock, do not remove the cover (or open the enclosure). There are no user-serviceable parts inside. Refer servicing to qualified service personnel.

### 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 instruction 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 : Afin d'éviter tout danger d'électrocution, ne pas enlever le couvercle (ni ouvrir le boîtier). Aucun des éléments internes ne peut être réparé par l'utilisateur. S'adresser à un technicien de maintenance qualifié.

### Attention

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

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

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

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

## Sicherheitsanleitungen • Deutsch



Dieses Symbol soll den Benutzer auf wichtige Anleitungen zur Bedienung und Wartung (Instandhaltung) in der Dokumentation hinweisen, die im Lieferumfang dieses Gerätes enthalten ist.



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: Zur Vermeidung eines elektrischen Schocks bitte nicht die Abdeckung entfernen (oder das Gehäuse öffnen). Im Inneren des Gerätes sind keine Teile enthalten, die vom Benutzer gewartet werden können. Eine Wartung sollte nur durch einen qualifizierten technischen Service durchgeführt werden.

### 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 Sicherheitsanleitungen sollten aufbewahrt werden, damit Sie später darauf zurückgreifen können.

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

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

## Instrucciones de seguridad • Español



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



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



Precaución: Para evitar riesgo de electrocución, no extraer la tapa (ni abrir la caja). En el interior no hay partes a las que el usuario deba acceder. Solicitar el servicio de personal técnico calificado.

### Precaución

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

**Conservar las instrucciones** • conservar las Instrucciones de Seguridad para futura consulta.

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

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

### Warning

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

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

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

**Servicing** • Refer all servicing to qualified service personnel. 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** • Danger of explosion if battery is incorrectly replaced. Replace 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. 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 un remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandée 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 Stift oder Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar und sollte nicht umgangen oder außer Betrieb gesetzt werden.

**Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabeln aus der Rückseite des Gerätes oder aus dem Desktop-Strommodul (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. Versuchen Sie in keinem Fall, dieses Gerät selbst zu warten, da beim Öffnen oder Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags 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 nur durch gleichartige oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgung der verbrauchten Batterien bitte gemäß den Herstelleranweisungen.

### Advertencia

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

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

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

**Reparaciones/mantenimiento** • solicitar siempre los servicios técnicos de personal calificado. 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 u orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Esta 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.

# System 8/10 Plus Switcher Series

## Getting Started.....



### ◀◀ Step 1 ▶▶

If the System 8/10 Plus is already configured for your model of projector, go to *Step 4*. If it is not set up correctly, it will be necessary to change switch settings on the System 8/10 Plus Main Controller Board. Continue with *Step 2* below to verify the correct configuration.

### ◀◀ Step 2 ▶▶

Use a small screwdriver to remove the access cover from the front panel of the System 8/10 Plus. Please refer to the illustration on page 3-3 of your User's Manual.

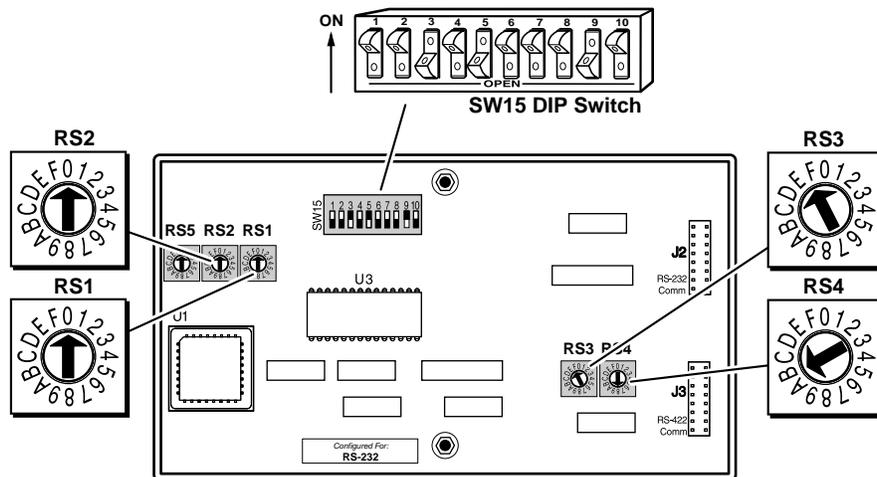


— Before changing anything, remove the AC power cord to the System 8/10 Plus and also turn the projector's power off.

### ◀◀ Step 3 ▶▶

Using the configuration information which came with your Communications Kit or is on the switcher's label, set the System 8/10 Plus switches. The following table and diagram are to be used only as an example of a typical configuration. Continue with *Step 4* below when your configuration is correct.

Config as	Model	Rotary Switches				Cable J2/J3	SW15 Settings										Comm Adapter
		RS1	RS2	RS3	RS4		1	2	3	4	5	6	7	8	9	10	
✓	Your Model	0	0	F	B	J2	↓	↓	↑	↓	↑	↓	↓	↓	↑	↓	26-467-01



### ◀◀ Step 4 ▶▶

Locate the Address DIP switches on the rear panel, lower right, of the switcher. Unless this is part of a master/slave system, set #3 and #5 to the up position and the others to the down position.

### ◀◀ Step 5 ▶▶

Please refer to the connection diagram and instructions for your projector (see your *System 8/10 Plus Projector Communications Kit* instructions). Using the appropriate Communications Adapter included in your Communications Kit, connect the Comm extension cable from the Projector Control port of the System 8/10 Plus to the Comm Adapter. Secure the Comm Adapter to the correct projector port. Connect all other required signal cables according to the connection diagram.



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## Legend of Icons



\_\_\_\_\_ *Important information – for example, an action or a step that must be done before proceeding.*



\_\_\_\_\_ *A Warning – possible dangerous voltage present.*



\_\_\_\_\_ *A Warning – possible damage could occur.*



\_\_\_\_\_ *A Note, a Hint, or a Tip that may be helpful.*



\_\_\_\_\_ *Possible Electrostatic Discharge (ESD) damage could result from touching electronic components.*



\_\_\_\_\_ *Indicates word definitions. Additional information may be referenced in another section, or in another document.*

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New format without projectors  
Printed in the USA*



# ***System 8/10 PLUS Switcher User's Manual***

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# **Chapter One**

## **Introduction to System 8/10 PLUS**

**Equipment Description**

**Configurations**

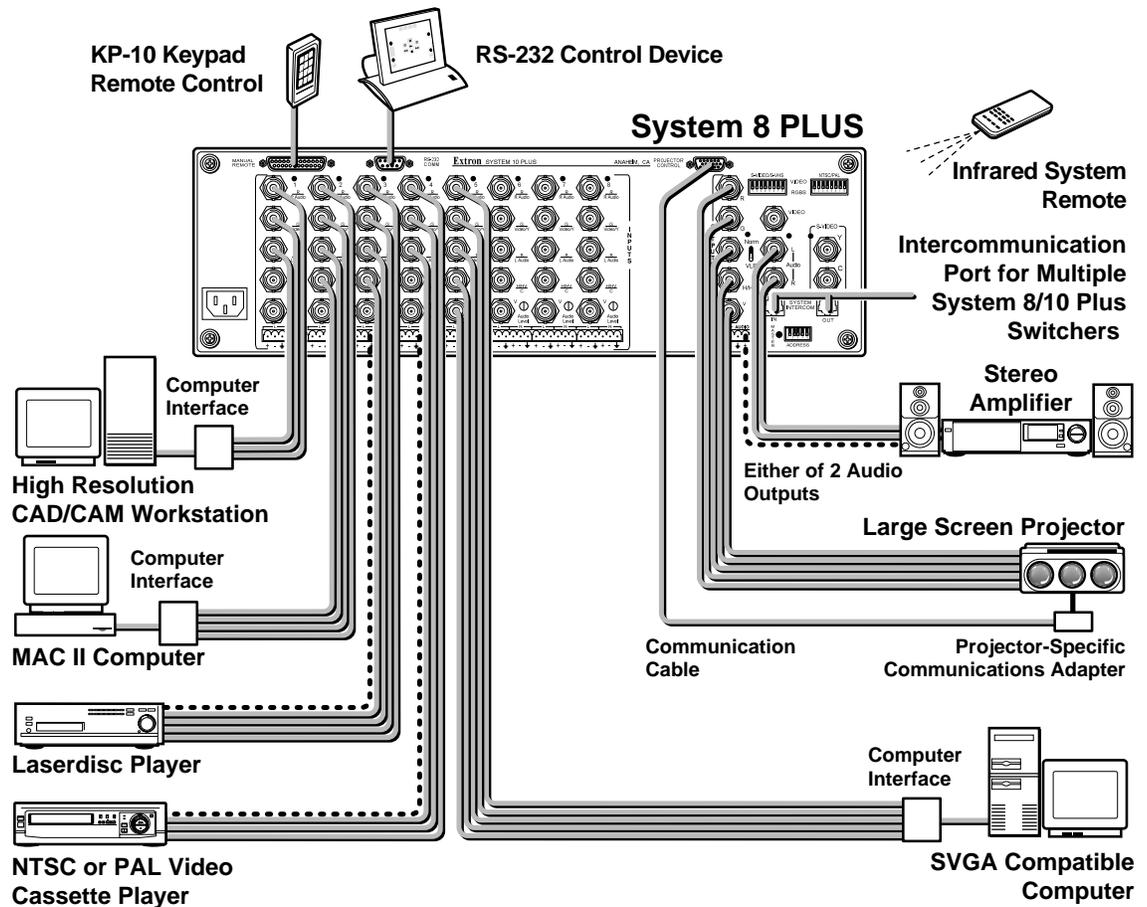
**Features**

**Specifications**

## Introduction

Although each EXTRON System 8/10 Plus switcher has been factory preset for the requested projector brand configuration, it can easily be changed to make your system switcher compatible with any projector brand you choose.

This manual has been carefully written in an effort to provide you with the detailed information that you need to connect your System 8/10 Plus switcher to most projectors available in today's market. It covers both the System 8 Plus and the System 10 Plus, however, since the only difference between these two switchers is the number of inputs, they will be referred to as "System 8/10 Plus".



## Equipment Description

The Extron System 8/10 Plus switchers are microprocessor controlled with BNC type input and output connectors for video. The built-in microprocessor provides for digital control of all major graphics projectors. Video formats supported are:

- *Composite Video (NTSC/PAL)*
- *S-Video/S-VHS (YC)*
- *RGBS (RGB w/separate composite sync)*
- *RGsB (RGB w/sync on green)*
- *RGBHV (RGB w/separate H & V sync)*

The switchers also feature stereo audio follow with an attenuation level control for any of the previously mentioned video input formats. Audio inputs can be attached through the Phoenix® brand captive screw terminal connectors or through BNC connectors when using Composite Video and S-Video only.

The system switcher can be controlled by the front panel switches, through its manual remote connector (using EXTRON or third-party remote control devices), or from a Host through an RS-232 connector. To address large installations with more than 10 inputs, the switchers can be looped for a total of up to 154 inputs (17 switchers). Features like Video Loop Back (VLB) make this switcher adaptable to most application requirements.

### Standard Features

- *Audio-follow switching*
- *Audio Breakaway (RS-232 only)*
- *Balanced audio inputs and outputs*
- *Audio Mute button*
- *Bandwidth of 300 MHz*
- *Eight (System 8) or ten (System 10) inputs (expandable when looped)*
- *Video inputs terminated at 75  $\Omega$  (when not selected)*
- *Dual microprocessor control*
- *Projector power button*
- *Projector video mute*
- *Switcher RGB mute*
- *Triple-Action Switching™ (RGB delay)*
- *Contact closure and Tally remote control*
- *RS-232 remote control*
- *Video Loop Back*
- *UL approved and CE compliant*
- *Universal inputs*
- *Universal projector control*

### Universal Projector Control

The System Switchers are compatible with many major brands of digital control projectors on the market including:

- *Ampro*
- *Barco*
- *Digital Projection*
- *Eiki*
- *Epson*
- *Electrohome*
- *Hughes/JVC*
- *InFocus*
- *Mitsubishi*
- *NEC/Runco*
- *Panasonic*
- *Sanyo*
- *Seleco*
- *Sharp*
- *Sony*
- *Toshiba*
- *Zenith*

If your projector manufacturer is not included in the above list, please contact your Extron representative.

The System 8/10 Plus switchers are factory preset for the projector brand of your choice, but can quickly and easily be reconfigured in the field for any other compatible brand. Projector control from the switcher includes video muting and turning projector power on/off. For some projectors, the projector's remote control device can be used to control the System 8/10 Plus switcher as well.

### Universal Inputs

All video and audio formats are supported with five BNC and 6-pin Phoenix® connectors per input channel.

## Description of Features

**Outputs** — Because switching is direct, the output will always have the same format as the selected input. Separate output connectors are provided for RGBS, Composite Video, S-Video, and Audio.

**Video Loop Back (VLB)** — This feature allows the switcher to integrate with either RGB decoders or scan doublers. With VLB, a Composite or S-Video output is routed from the switcher output through a decoder or scan doubler and then back into System 8/10 PLUS switcher. This means that one decoder or scan doubler can be used for all the video inputs instead of needing one unit for each video source.

**Triple-Action Switching™ (RGB delay)** — This prevents image scrambling during switching time. When an input is selected, Triple-Action Switching® will:

1. Drop the RGB signals.
2. Wait 150 ms and then switch to the new sync signal.
3. Wait for the time delay set by the user (0.0 - 7.5 seconds) and then switch to the new RGB signals. (During this time the projector is setting up to match the new sync.)

**300 MHz Bandwidth** — The wide bandwidth allows signals to be passed without loss of resolution. This is extremely important when using high resolution computer workstations.

**Switcher Control** — Each channel of the switcher can be controlled in any one of the following ways:

- *Front Panel Buttons.* Lighted push buttons can be labeled for each input source.
- *Remote Control Connector.* Contact closure remote control connector for hard-wired remote control with Tally indication.
- *RS-232 Control Connector.* Provides for computer control of switcher or use of third-party remote control system.
- *Projector Infrared Remote.* Projector IR remote can control the switcher via the projector. For some projectors, you may use the projector's remote to control Extron system switchers. Note: not all projector's have this capability.
- *IR-30 Infrared Remote Control.* The IR-30 upgrade will allow you control the System 8/10 PLUS through the switcher's IR receiver.

**Display Power Switch** — The Display Power switch controls projector power. This is essential for ceiling-mounted projectors.

**Video Mute Switch** — This switch blanks the video picture without turning off the projector power.

**Balanced or Unbalanced Audio** — All audio inputs and outputs use 5 mm Phoenix brand six-terminal connectors. This allows for connection of balanced or unbalanced line audio.

**Audio Breakaway (RS-232 control only)** — Audio and video may be selected from separate input channels.

**Easy System Expansion** — Up to 17 switchers can be looped (daisy chained) together to provide up to 154 inputs when using a combination of System 8 or System 10 switchers.

**Power** — The System 8/10 PLUS switchers have an internal, auto-switching (90 - 260 VAC) power supply. The System 8/10 PLUS switchers are UL approved.

**Rear Panel LED Indicators** — Rear panel LEDs indicate which input has been selected and which outputs are active.

**Rack Mount** — The 3U x 19" System 8/10 PLUS enclosure is ready for rack mounting.

## Specifications

**General**

Power ..... 90 - 260 VAC, 50/60 Hz, SMPS  
 Power consumption ..... 20 watts  
 Dimensions ..... 17" W, 10.5" D, 5.1" H  
 Shipping Weight ..... 18 lbs  
 Operating Temperature ..... 0° C - 50° C  
 Storage Temperature ..... -20° C - 70° C  
 MTBF (demonstrated) ..... 30,000 Hours  
 Approval ..... UL Listed  
 Warranty ..... 2 years parts and labor

**Wideband Video**

Connectors ..... BNC  
 Bandwidth, System 8 ..... 300 MHz (-3 dB)  
 Bandwidth, System 10 ..... 250 MHz (-3 dB)  
 Crosstalk at 10 MHz ..... -35 dB (typical) (note 1)  
 Isolation at 10 MHz ..... 55 dB (typical) (note 2)  
 Return Loss at 10 MHz ..... 25 dB  
 Input Impedance ..... 75  $\Omega$   
 Output Impedance ..... 75  $\Omega$   
 Termination Impedance ..... 75  $\Omega$   
 Gain ..... 0 dB

**Composite/S-Video**

Connectors ..... BNC  
 Termination impedance ..... 75  $\Omega$   
 Gain ..... 0 dB

**Sync**

Connectors ..... BNC  
 Termination impedance ..... 510  $\Omega$   
 Triple action switch delay ..... 0 - 7.5 seconds

**Audio**

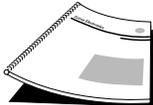
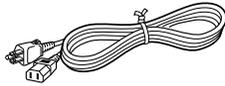
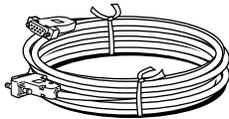
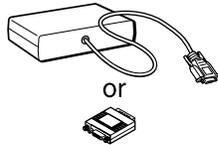
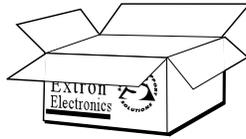
Input Impedance ..... High Z (>10k  $\Omega$ , typical)  
 Input Voltage Level ..... To 10 V p-p into 600  $\Omega$   
 Output Impedance ..... Low, capable of driving 600  $\Omega$   
 Crosstalk ..... -100 dB @ 1 kHz (note 1)  
 Signal-to-Noise Ratio ..... >95 dB  
 Single Output Level ..... Near zero to unity gain  
 Differential Output Level ..... Near zero to +6 dB gain  
 Bandwidth ..... 20 Hz - 20 kHz  
 Connectors ..... Phoenix® type with captive screws



1. The Crosstalk specification is the attenuation of all hostile signals relative to a given input-output connection.

2. The Isolation specification is the attenuation of an input signal relative to an unselected output when all inputs have the same signal applied simultaneously.

## Packing List



The following items are included with your System 8/10 PLUS switcher:

- *System 8 (or 10) PLUS switcher*
- *Communications Adapter*  
The Comm adapter allows the System 8/10 to be connected to the projector. This adapter is per customer order. Because each comm adapter is customized for the application, they appear different.
- *CC-50' Cable*  
Communications extension cable (50 feet)
- *Power Cord*  
Connects AC power to the System 8/10 PLUS
- *RJ11 Cable (telephone type)*  
This is only for use when looping System 8/10 PLUS switchers in a master/slave configuration.
- *Phoenix® Audio Connectors*  
There will be 9 with each System 8 PLUS or 11 with each System 10 PLUS.
- *System 8 (or 10) PLUS Switcher User's Manual (this manual)*
- *Extron tweaker*  
This is a small, combination screwdriver used for tightening connector screws and for making adjustments.

Appendix B has a list of other related part numbers if other adapters or cables are needed.

# ***System 8/10 PLUS Switcher User's Manual***

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## **Chapter Two**

### **Rear Panel Connections**

***input and Output Connections***

***Audio Connections***

***Configuring for RGBS***

***Configuring for Composite Video & S-Video***

***Video Loop Back (VLB)***

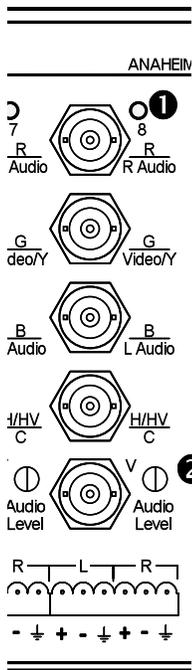
***Rack Mounting***

## Rear Panel Overview

This chapter covers the types of input and output connections, switches and indicators on the rear panel of the System 8/10 Plus.

### Rear Panel Controls and Indicators

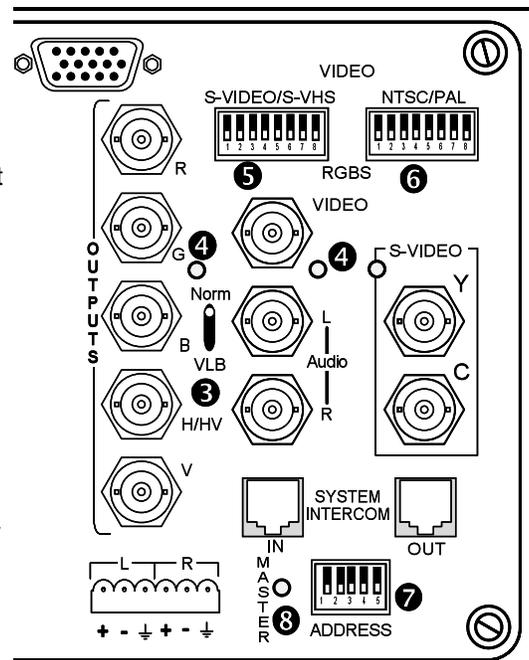
The following list refers to each input channel (left diagram):



1. **Input LEDs:** Green LED indicator (1-8 or 1-10) lights to indicate selected input.
2. **Audio Level:** An audio level attenuator is provided for each input channel (1-8 or 1-10) to normalize audio output levels. The attenuators can only decrease (not increase) audio levels.

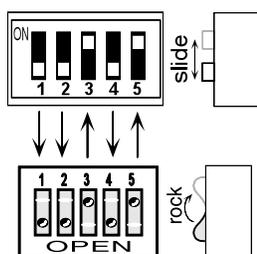
The following are in the output section (right diagram below):

3. **NORM/VLB Switch:** Set this switch to "VLB" to select Video Loop Back mode when using composite-to-RGB decoder or scan doubler (e.g., Extron Andora). Set switch to "Norm" for normal operation. Refer to the discussion of Video Loop Back mode later in this chapter.
4. **Output LEDs:** Green LED indicator (3 locations) lights to indicate which type of output is selected. (RGBHV, Composite, or S-Video).
5. **S-Video/S-VHS Switches:** Used only when setting up an input. (1-8 or 1-10) Separate switch for each input channel to select input/output type (RGBHV, Composite, or S-Video).
6. **NTSC/PAL Switches:** Used only when setting up an input. (1-8 or 1-10) Separate switch for each input channel to select input/output type (RGBHV, Composite, or S-Video).
7. **Address Switches:** Used only when setting up a master/slave configuration. Setting determines binary address of slave switcher. See Chapter 5 for looping two or more switchers.
8. **Master LED:** Lights when this switcher is configured as the Master in a loop, or when the switcher is operating in a stand-alone configuration.



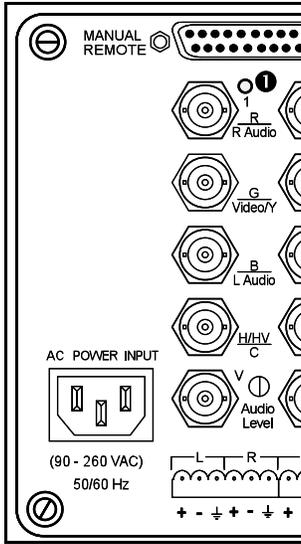
Details on the function of each panel section is described on the following pages.

### DIP Switch Types



There are different types of DIP switches, some "slide" and some "rock". Your System 8/10 Plus could have either type DIP switch. Although they operate differently and are labeled differently, they are simply **On** (switch closed) or **Off** (switch open). In the example diagram on the left, with the slide-type DIP switch, move the slide **up** to set the switch On (closed). With the rocker-type DIP switch shown in this example, press the **top** rocker **down** to set the switch On (closed). The two example switches shown here are set up for the same configuration. Throughout this manual, you may see either type of switch, however, the switch positions will be the same regardless of the switch type.

**Input Section**



Each input channel of the System 8/10 Plus has the following:

- A set of five BNC connectors mounted vertically.
- A six-pin audio connector located below each set of BNC connectors.
- A green LED indicator above each set of BNC connectors (1) lights to indicate that this input is selected. (Only one input can be selected at a time.)

With this combination of input connectors, the System 8/10 Plus can accept any type of video input format (NTSC/PAL, S-Video/S-VHS or RGBS). Also, each input can have stereo audio. The System 8/10 Plus handles signals according to how they are connected to the input, as well as how the configuration DIP switches are set. Each type of setup is explained in detail later in this chapter.

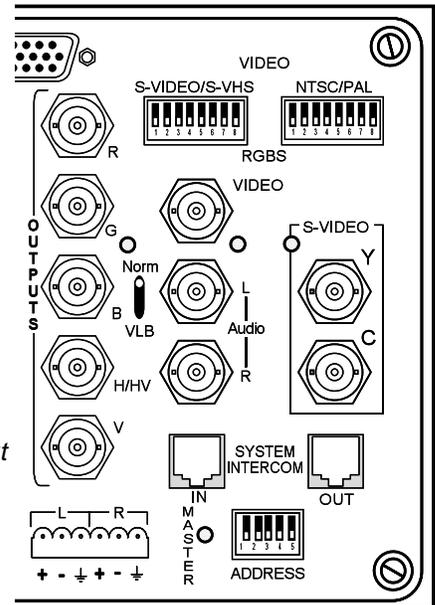
When the System 8/10 Plus is used to switch different types of signals, the output signal will have the same format as the selected input. That is, RGB and Sync (composite or separate H&V) will exit through the RGB and Sync output. Likewise, NTSC and PAL video signals go to the Composite Video output. Therefore, if multiple signal types are used in the same switcher, the same multiple outputs must be used by the projector or display monitor. Some displays receive all signals on the RGBHV port when under switcher control (see the appropriate connection diagram in Chapter 3 for your projector).

**Output Section**

The System 8/10 Plus has three sets of output connectors, one for each video format: RGBS, S-Video/S-VHS (Y/C) and NTSC/PAL (composite video). There is a green LED to identify which output is active, as determined by which type of input is selected. There is also a 6-pin audio output connector at the bottom, as well as left and right audio BNC outputs.



*If audio comes in on BNC connectors, it goes out the BNC connectors; if it comes in on the 9-pin Phoenix® connector, it goes out the 9-pin Phoenix connector.*



**Video Loop Back (VLB)**

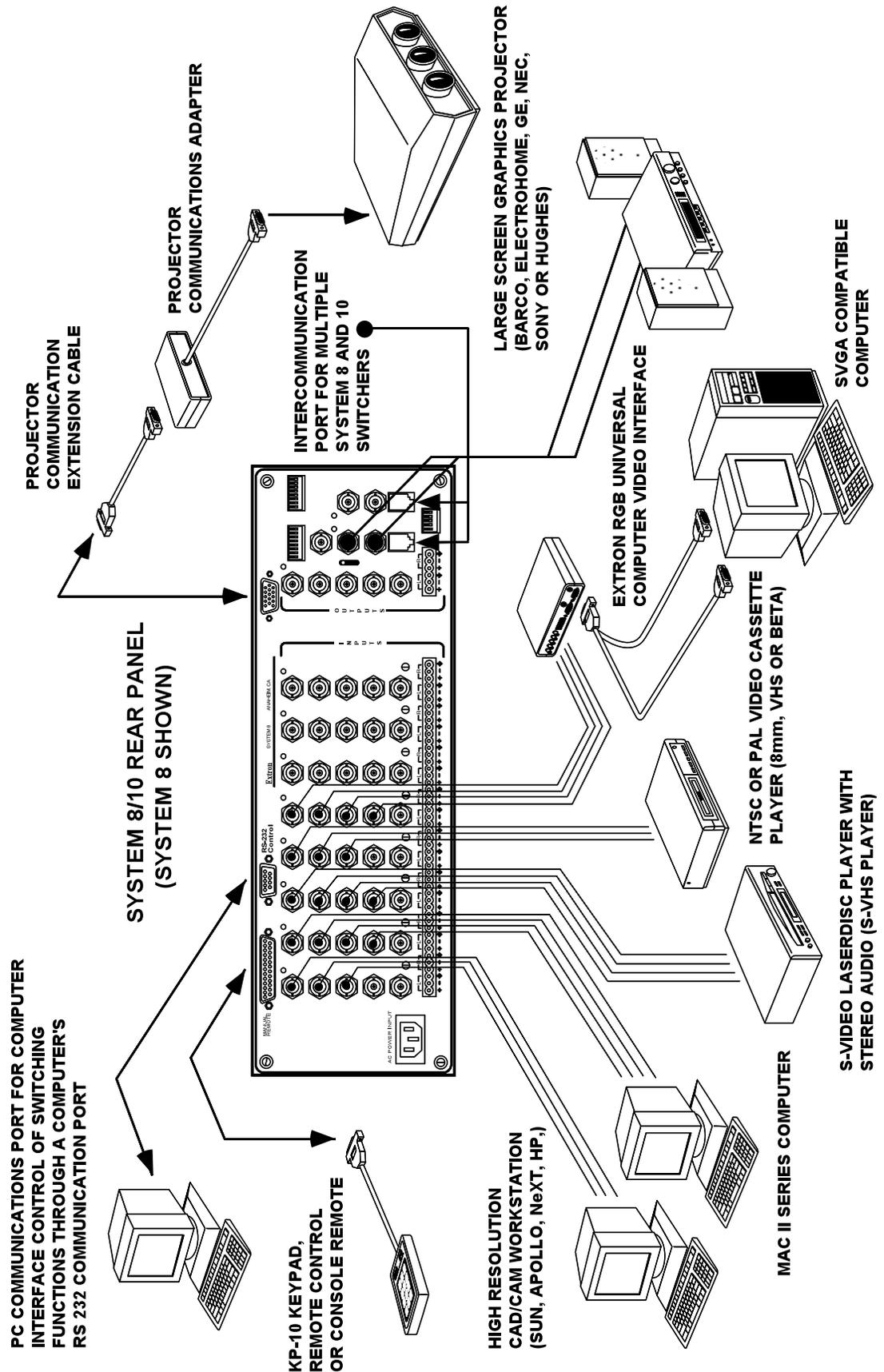
When using Extron's Sentosa, Lancia, a third-party scan converter or a Composite/S-Video-to-RGB decoder, the System 8/10 Plus allows the use of a single scan-doubler or decoder with multiple switcher inputs to be looped back through the System 8/10 Plus and then out again as RGB Sync together with all other RGB Sync inputs. These video configurations are described in detail later in this chapter.

**Power**

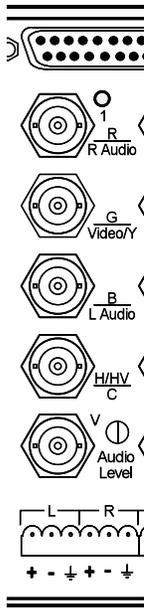
Although the power cord connector is on the back panel, the fuse is actually on the power supply inside the cabinet. System 8/10 Plus switchers have power supplies that accept 90-260 VAC, 50/60 Hz line power. No power configuration is required. The fuse rating is 250 VAC, 2 Amp fast-blow.

### Applications

The illustration shows examples of some of the equipment that can be connected to a System 8/10 Plus switcher.



### Input Configurations

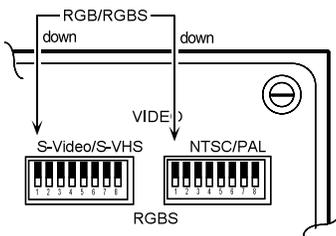


Each System 8/10 PLUS switcher input can be configured for any of the following RGB connections:

- **RGB** - Red, Green/sync, Blue (3 cables)
- **RGBS** - Red, Green, Blue, and Composite Sync (4 cables)
- **RGBHV** - Red, Green, Blue and Separate H & V Sync (5 cables)
- **Composite (NTSC/PAL)** - Using the G connector (1 cable)
- **S-Video/S-VHS** - Using the G connector for Y and H/HV connector for C (2 cables)

All video inputs to the System 8/10 PLUS use BNC connectors. Many types of video devices (VCR, laserdisc players, some computers, etc.) do not have BNC video output connectors. For this reason, an adapter may be required to connect the device output to the BNC input of the System 8/10 PLUS. (See parts list in Appendix B.) With the proper adapter, the RGBS signal can be connected directly to the R, G, B, H and V inputs of the switcher. If the RGB signal is carrying the sync on the green channel, connect the three RGB cables to the switcher without using the sync channels. Audio connections may be used with any of these video inputs.

### Input Switches and Output LEDs



When configuring an input, the video mode must be set up in the DIP switches located above the output connectors. There are two banks of eight (or ten) switches. The left bank is for S-Video and the right bank is for Composite (NTSC/PAL) video. One switch in each bank is assigned to an input channel number. For example, input #1 uses the leftmost switch at each bank. For the video mode shown on this page, DIP switch #1 of each switch bank must be in the RGBS position, which is in the down position.

The System 8/10 PLUS switchers are shipped with all DIP switches in the down position (RGBS inputs). For composite video input, change the NTSC/PAL DIP switch for that input channel to the up position. For S-Video or S-VHS input, change the S-Video/S-VHS DIP for that input channel to the up position.

There is an Output LED next to each set of output connectors. When an input is selected, the Output LED indicates the format for which that input has been configured. This also informs the user which output should be used.



These output LEDs also serve as a configuration check. Also, for displays which have all of their signals (including S-video and Video) on the RGBHV port, both the RGB LED and either the S-video or Video LED will light simultaneously.

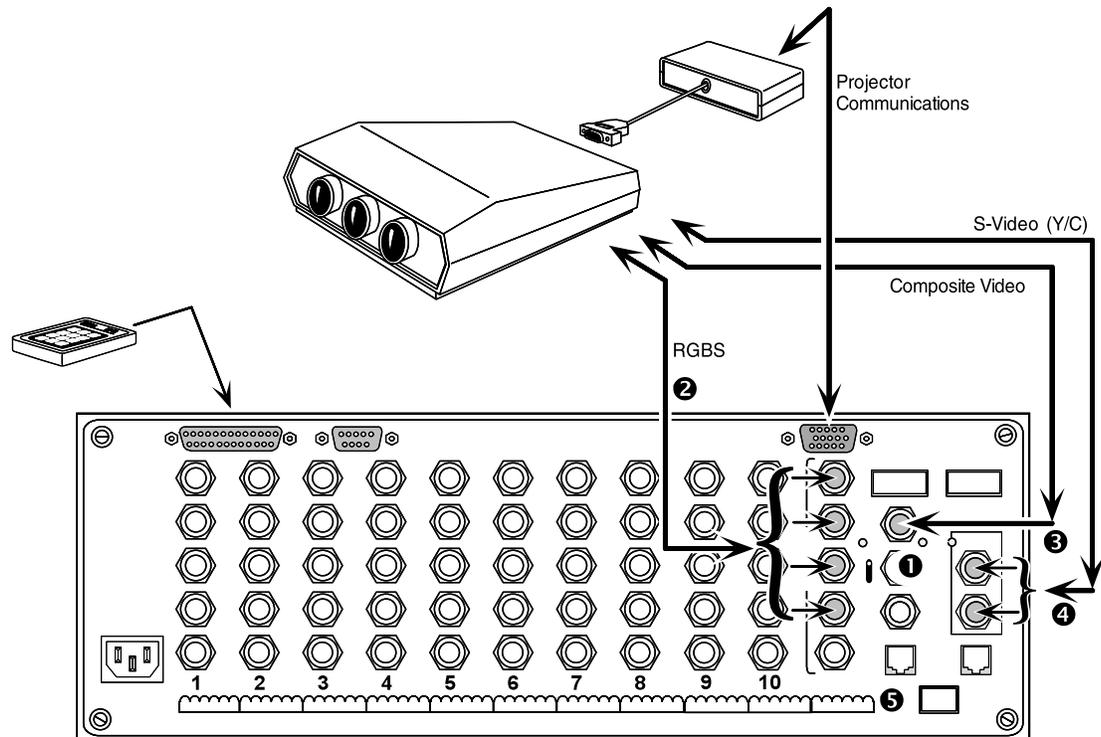
1. For example, if input #1 is using RGBS, and DIP switch #1 of the S-Video bank was accidentally switched "up", then the S-Video output LED will be lit, instead of the RGBS LED. This informs the user of an improper setting.
2. The only conditions for which two output LEDs can be lit at the same time is when the System 8/10 PLUS is used in the Video Loopback mode.
3. Under normal conditions, one of the output LEDs should be lit.
4. All three output LEDs should never be lit at the same time.
5. If no LEDs are lit, check for proper switch settings.

The following pages show examples of the three possible input configurations.

## Video Output Connections

The System 8/10 Plus has three sets of BNC output connectors (RGBHV, Composite, and S-Video). Which output connectors are active depends upon which type of input is selected. These connectors provide outputs from the System 8/10 Plus to the video projector or display monitor. When an input channel is selected, the corresponding LED lights to show the format of the selected video and which output is being used.

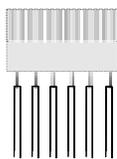
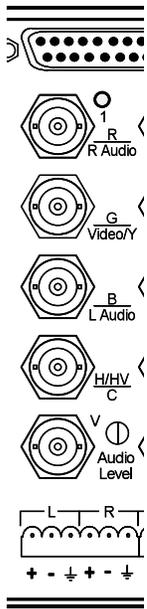
Only one output can be active at any given moment, unless the VLB (Video Loop Back) feature is being used.



All output signals have the same format as the selected input. They are switched to the output unaltered. That is: RGBHV input signals are RGBHV output signals, composite video input signals are composite output signals, and S-Video input signals are S-Video output signals. Thus, if multiple input signal types are used, such as audio on the R and B inputs, the same multiple output signals will be on the corresponding output to the projector or display monitor.

1. LED Output Indicators (See ❶ in figure above.)  
An LED lights to identify which of the three outputs is currently being used.
2. RGB Output Connections (❷)  
Attach BNC cables to outputs labeled "R", "G", "B", "H/HV", and "V".
3. Composite Video Output Connections (❸)  
Attach a single BNC cable to the output marked "Video".
4. S-Video Output Connections (❹)  
Attach the Y (luminance) cable to the BNC connector marked "Y" in the S-Video section and the C (chroma) cable to the BNC connector marked "C".
5. If the audio for the selected channel uses the Phoenix® input connector, then the audio output must use the Phoenix output connector (❺). See next page.

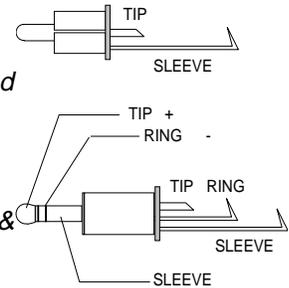
### Audio Connections



The System 8/10 PLUS can accept audio from two different sets of input connectors. Left and right audio can use the R and B BNC connectors shown to the left (labeled R Audio and L Audio). Audio can also use the 6-pin Phoenix® brand of captive screw connector shown at the bottom of each input and output.

Audio connections can be made using the Phoenix terminals in the following ways:

- Unbalanced High Impedance Stereo Tip, Ring, Ground (Left & Right)
- Balanced High Impedance Stereo Tip, Ring (Left & Right)
- Balanced 600 ohm Impedance Stereo Tip, Ring (Left & Right)



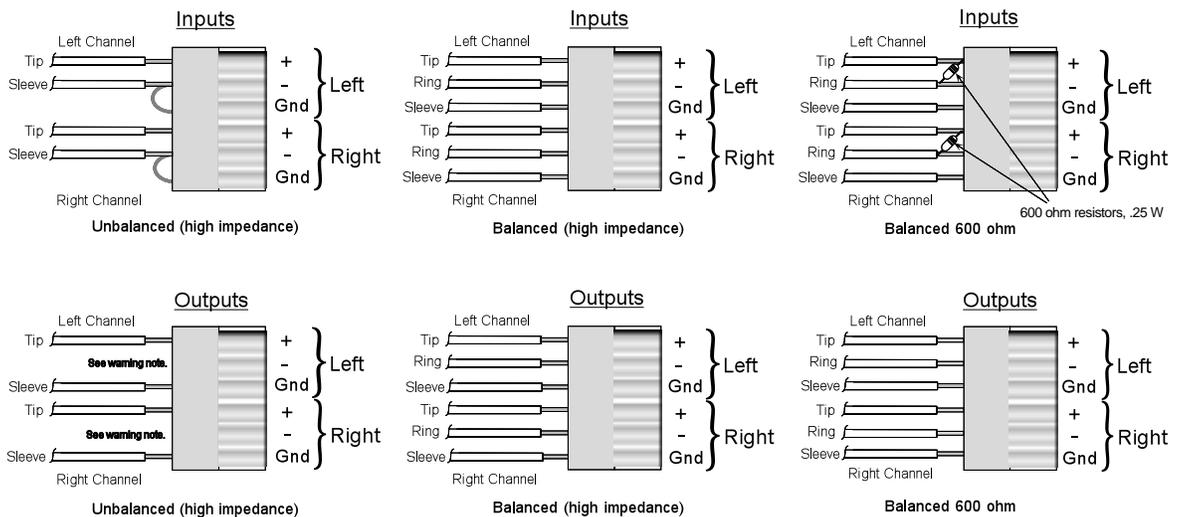
Right and left audio ports are available on both BNC connectors and on 6-terminal screw Phoenix connectors. BNC audio outputs are available only when using Composite Video or S-Video sources. When using the BNC input ports for audio, any unselected audio port will be terminated at 75 ohms. Verify that this termination will not damage the output.

An audio level attenuator is located to the right of each bottom BNC input channel connector. The attenuators are used to adjust only the audio levels going to the Phoenix connector output, and not those going to the BNC outputs. Because attenuators can only decrease (not increase) the audio levels, initial adjustments should be made with the attenuators set to the maximum (clockwise) position.

The captive connectors are located on the rear panel, just below the BNC connectors, and are labeled “R” (right) and “L” (left) for each channel. When wiring these Phoenix connectors and inserting them into the System 8/10 PLUS switcher, remember that the screw heads must face downward. Use the following diagrams to wire the connectors for your audio inputs and outputs.



*Because all switching is one-to-one, the audio output must use the same connector type(s) as the input (Phoenix to Phoenix or R/L Audio to R/L Audio).*



*Nine audio connectors are shipped with each System 8 PLUS and eleven with each System 10 PLUS. If more are needed, use Phoenix® audio connectors, Extron part number 10-163-01.*

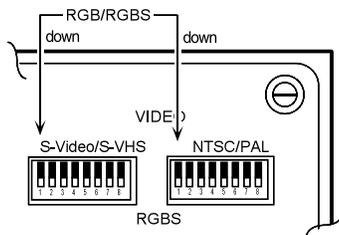
### RGB (Analog) Input Connections

Each switcher input can be configured for any of the following RGB connections:

- **RGB** - Red, Green/sync, Blue (3-cables)
- **RGBS** - Red, Green, Blue, and Composite Sync (4-cables)
- **RGBHV** - Red, Green, Blue, H & V Sync (5-cables)

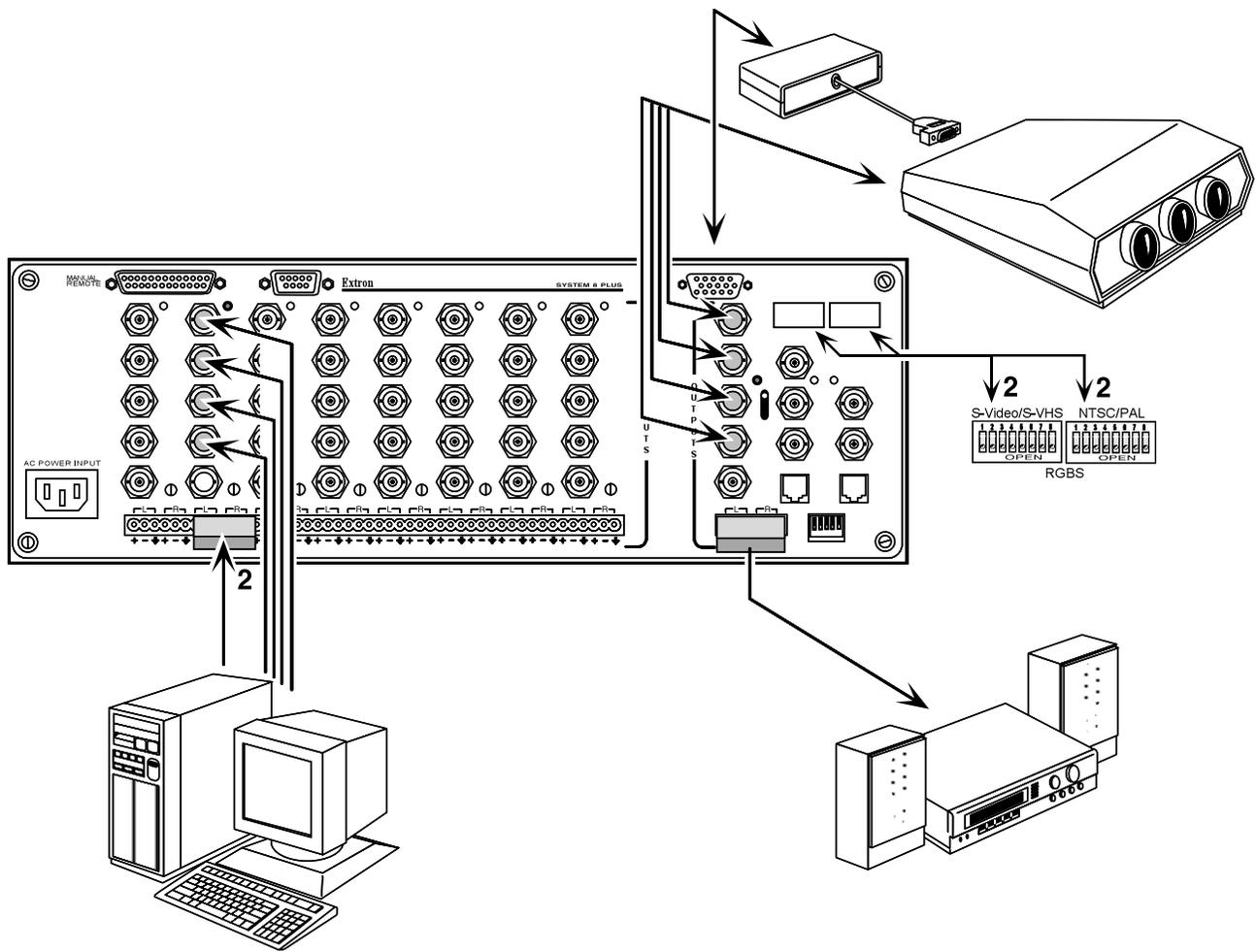
Any of these inputs may include audio follow, using the Phoenix® audio connectors. If the video source does not have audio, audio can be connected from another source.

### Input Selection Switches



To complete the RGB configuration, be sure that both of the DIP switches for that input channel are in the down position. Audio may be connected to the Phoenix connector at the bottom of that input section. See page 2-6 for details on audio connections.

When the System 8/10 Plus selects this input, the LED next to the output marked "RGBS" will light.

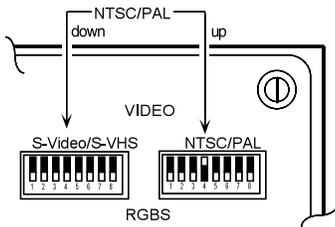


### Composite Video (NTSC/PAL) Input Connections

NTSC (National Television Standards Committee) and PAL (Phase Alternate Line) composite video signals use a single coax cable. They may or may not have separate audio.

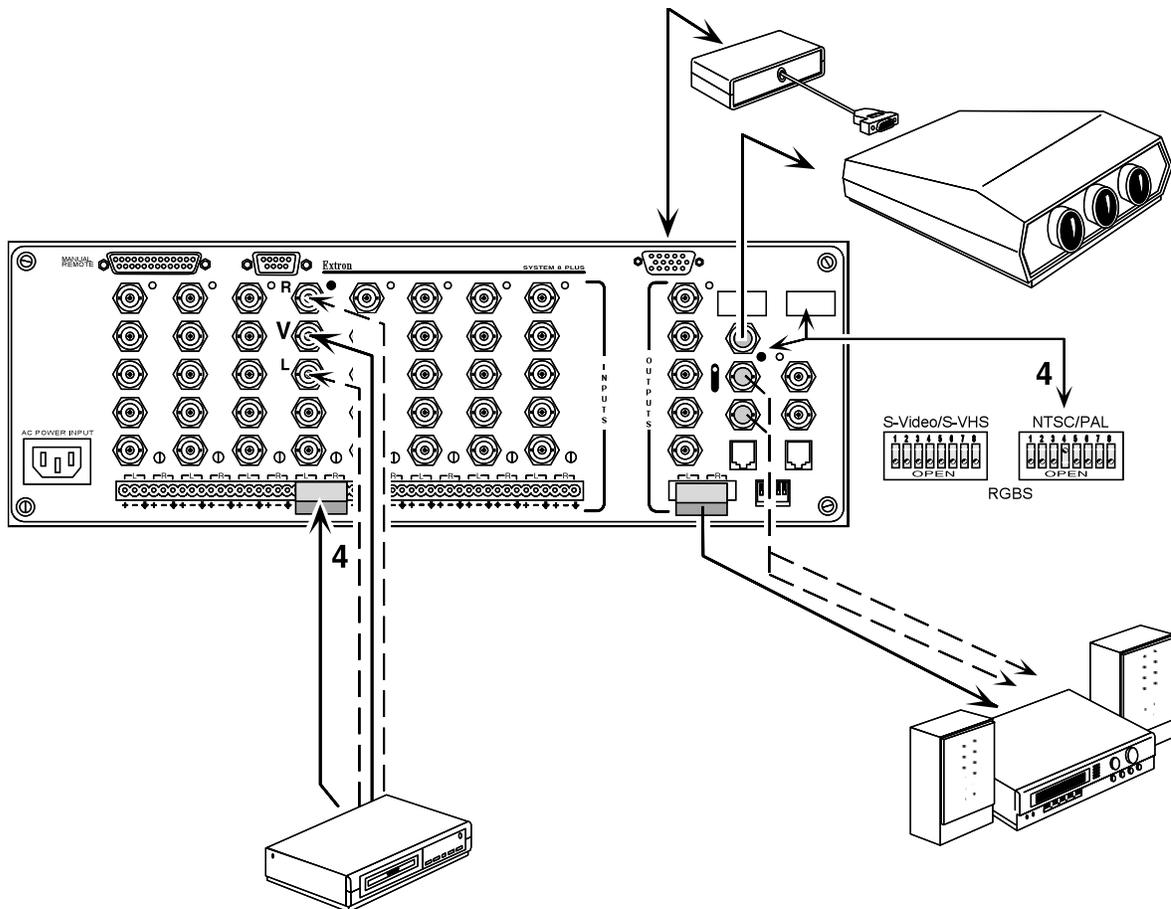
See the illustration below to connect a composite video source to the input of a System 8/10 Plus. If the source has stereo audio, it can be connected either of two ways. The solid line shows the use of a Phoenix® audio connector that has six (6) conductors. Details on audio connections are given on page 2-6. The second method of audio input connection is shown by dashed lines, and is also explained on page 2-6.

### Input Selection Switches



To complete the Composite Video configuration, the DIP switch for the input number being configured must be in the up position. These switches are on the right side of the rear panel. The switch for the example (input #4) is shown in the NTSC/PAL position. The S-Video switch for this channel (input #4) must be in the down position.

When the System 8/10 Plus selects this input, the LED next to the output marked "Video" will light. See arrow in illustration below.

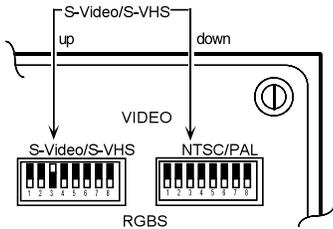


If audio input uses the Phoenix connector, the output must also use the Phoenix connector. If the input uses BNC connectors, the output must also use BNC connectors.

### S-Video Input Connections

S-Video or S-VHS is typically an output from the AV source on a 4-pin miniature DIN type connector which must be converted to 2 BNC type connectors – one for chrominance (C) and the other for luminance (Y) - [Extron adapter cable 26-353-01]. S-Video input to the System 8/10 PLUS is made by connecting the chroma (C) to the H/HV/C input connector and the luminance (Y) to the G/Video/Y input connector. Audio inputs from the AV source are made to either the R & L inputs of the System 8/10 PLUS or to the R/R-Audio and B/L-Audio BNC connectors.

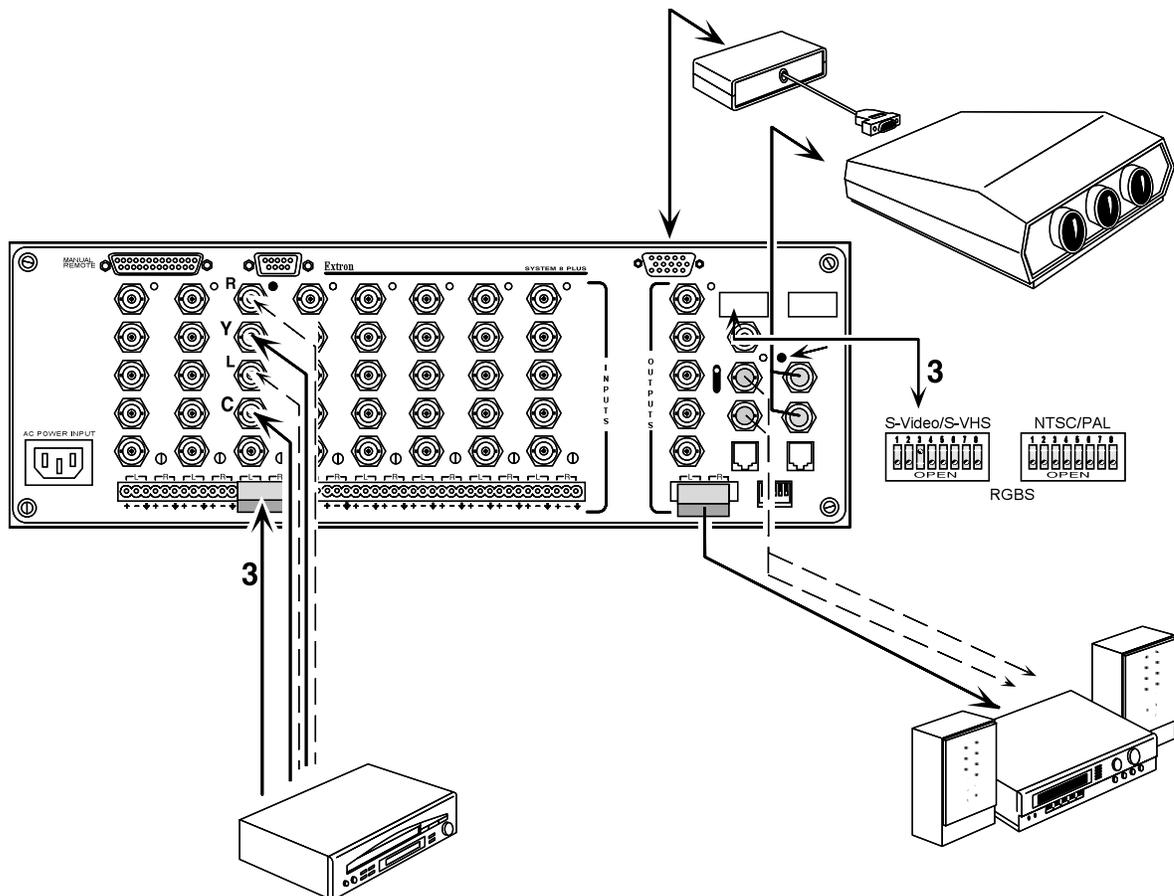
### Input Selection Switches



Each input must be configured. This is done by setting the DIP switches located above the output connectors. There are two banks of DIP switches, each having 8 (or 10) switches. Each input channel has two switches assigned to it, one in each bank. For example, input #3 uses the third switch at each bank. For the S-Video input shown below (S-Video signal connected to channel 3 input), the #3 DIP switch of S-Video/S-VHS bank should be in the up (Video) position and the #3 DIP switch of the NTSC/PAL should be in the down (RGBS) position.

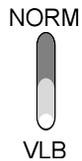
Place the S-Video/S-VHS switch for the input channel being configured in the Video (up) position. The NTSC/PAL switch for this channel (input 3, in this example) must be in the down position.

When the System 8/10 PLUS selects this input, the LED next to the output marked "S-Video" will light. See arrow in illustration below.



*If audio input uses the Phoenix connector, the output must also use the Phoenix connector. If the input uses BNC connectors, the output must also use BNC connectors.*

## Video Loop Back (VLB)



Video Loop Back (VLB) is a special feature which allows a scan doubler (also called “line-doubler”) or an RGB decoder to be used with the System 8/10 PLUS switcher. With VLB enabled, any input can use an RGB decoder or a scan doubler without recabling. This reduces the amount of equipment needed for a system that requires the use of either of these devices.

The VLB mode is turned on and off by a toggle switch located between output connectors on the right, rear panel of the System 8/10 PLUS. With the switch in the NORM (up) position, the VLB mode is disabled. In the VLB (down) position, Video Loop Back is enabled.

To configure the System 8/10 Switcher for Video Loop Back, connect the Composite video or S-video output(s) source to a System 8/10 PLUS input. Connect the output of the System 8/10 PLUS S-Video and/or Composite video to the input of the decoder or line doubler. Then connect the RGBS output of the decoder or scan doubler to the last input of the switcher. Only the last input can be used as VLB input. That is, input #8 of the System 8 PLUS, or input #10 of the System 10 PLUS.



When connected for Video Loop Back, the number of usable inputs is reduced by one because VLB uses the last input.

### Normal Mode

The VLB switch is set to NORM and no decoder or scan doubler is connected. When Composite and S-Video input signals are selected, they are routed directly to the projector (or display monitor) through the normal Composite and S-Video output connector set.

### VLB Mode

Set this switch to the “VLB” position when an external decoder or scan doubler is connected, as pictured on the following page. When a Composite or S-Video input signal is selected, it goes through the normal Composite or S-Video output connectors to an external (user provided) Composite-to-RGB decoder or scan doubler. The RGBS output of the decoder or scan doubler is “looped back” to the last input of the System 8/10 PLUS. The decoded (or scan doubled) RGBS signal is then routed directly to the projector (or display monitor) from the System 8/10 PLUS RGBS output connectors (see diagram on the following page).

Optional Extron Products that can be used with a System 8/10 Plus in Loop Back mode include:

- |   |              |
|---|--------------|
| • CD 400 – Quad Standard Decoder                  | 60-145-01/02 |
| • Lancia – NTSC & PAL Scan Doubler                | 60-213-01    |
| • Sentosa – High Resolution Video Line-Quadrupler | 60-229-01    |

### VLB Restrictions

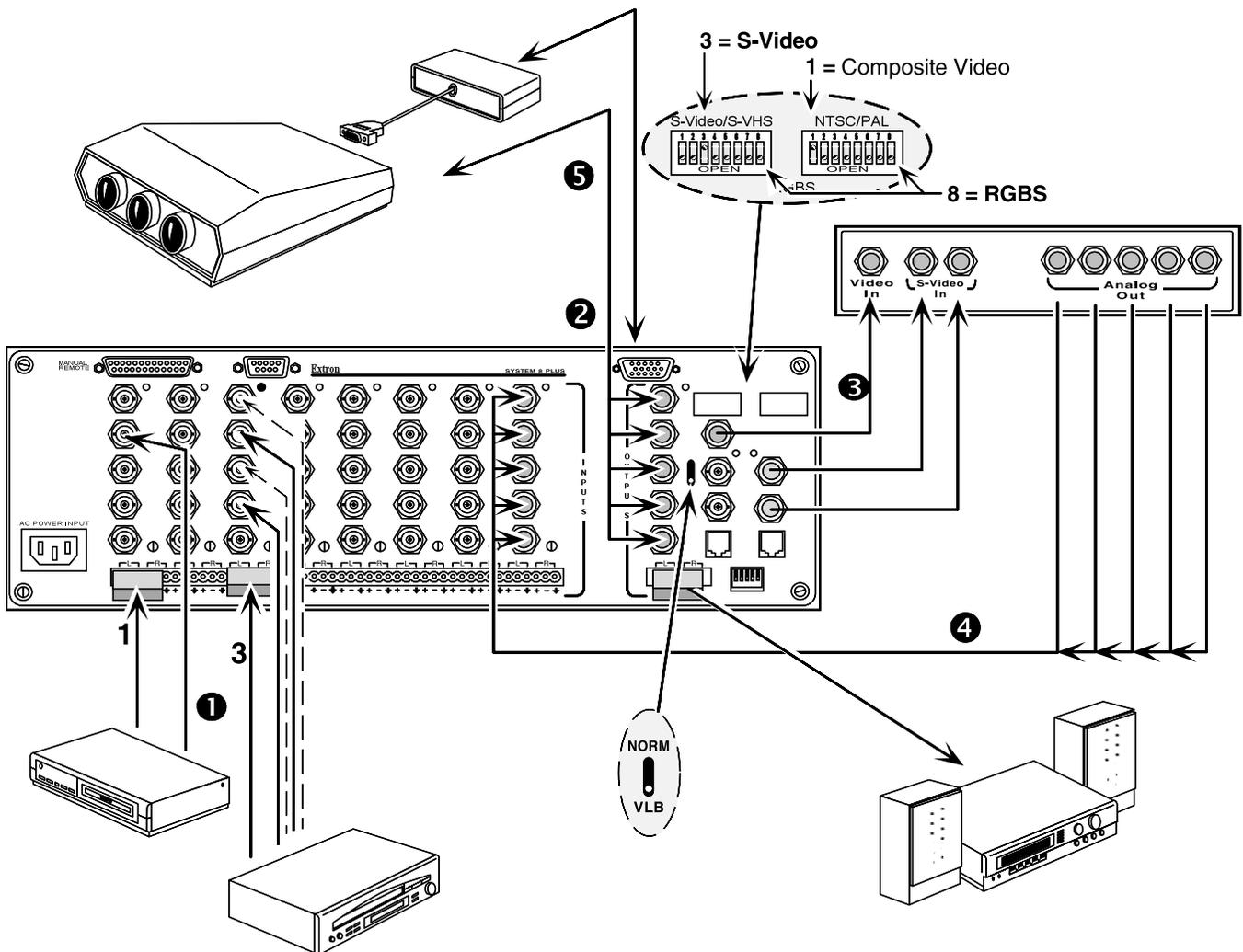
- When using the VLB mode with multiple switchers, always connect the switchers in a Star Configuration. The VLB mode cannot be used when switchers are connected in a Daisy-Chain configuration.
- Only the master switcher can use the VLB mode (slave switchers cannot).
- Refer to Chapter 5 for instructions on looping switchers in the Star Configuration.
- For projectors that accept S-video and Composite video signals on their RGBHV port, VLB can only be used when the System 8/10 PLUS is no longer in cable saver mode (see page 3-4 for SW settings).

VLB Operation

The illustration below is an example of a decoder being used in Video Loop Back, however, it could be any one of several types of decoders or line doublers. When VLB is active, the System 8/10 PLUS operates as follows:

1. Composite video and S-Video sources are connected to any of the System 8/10 PLUS inputs except the last one.
2. Standard RGB inputs exit the switcher through the normal RGB output.
3. Composite Video or S-Video signals exit the switcher through their normal Composite video or S-Video outputs and are routed to the external decoder or scan doubler.
4. The RGBS output of the decoder or scan doubler is then "looped back" to the last input (input #8 or #10) of the switcher, which is selected at the same time.
5. The RGBS output from the switcher goes to the projector.

This allows the System 8/10 PLUS to route only RGB signals to the display device.

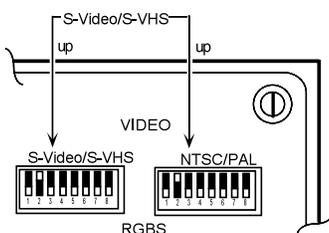


### Special Features

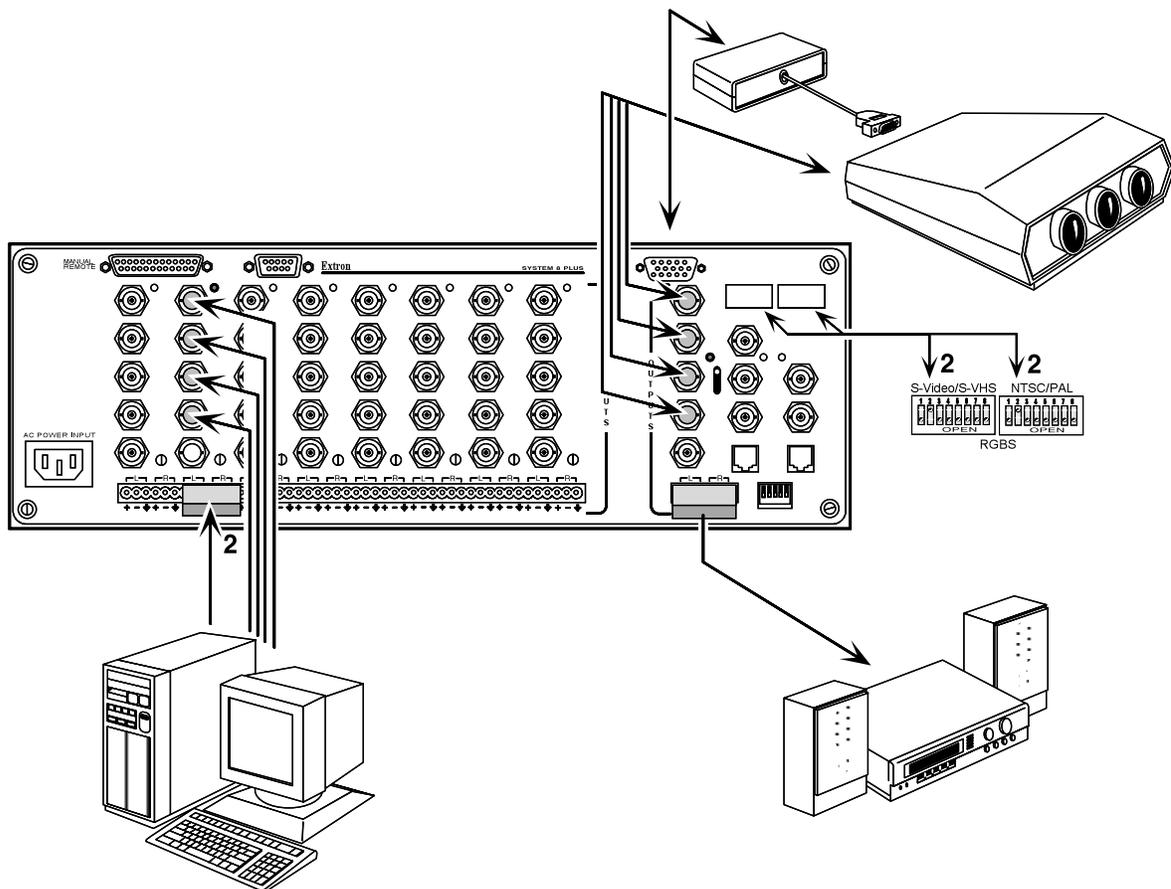
The System 8/10 PLUS has some special features, one of which is Auto Sync Detect. Auto Sync Detect determines what type of RGB sync is being input. Sometimes this feature must be disabled when connecting to certain projectors.

For example, if a Barco projector is powered up with no input yet present at the switcher, the projector will not detect any sync and will default to sync on Green. Later, if an RGB source with separate sync is connected to the System 8/10 PLUS, the Barco projector, which is still expecting sync on Green, may experience problems dealing with this conflicting situation. However, by setting both Input Selection DIP switches up (disabled), the switcher will disable Auto Sync Detect which will communicate to the projector that the RGB input has separate sync. Similarly, if Auto Sync Detect is enabled (both DIP switches down) for an RGB input, the switcher communicates to the projector that the RGB input has sync on Green.

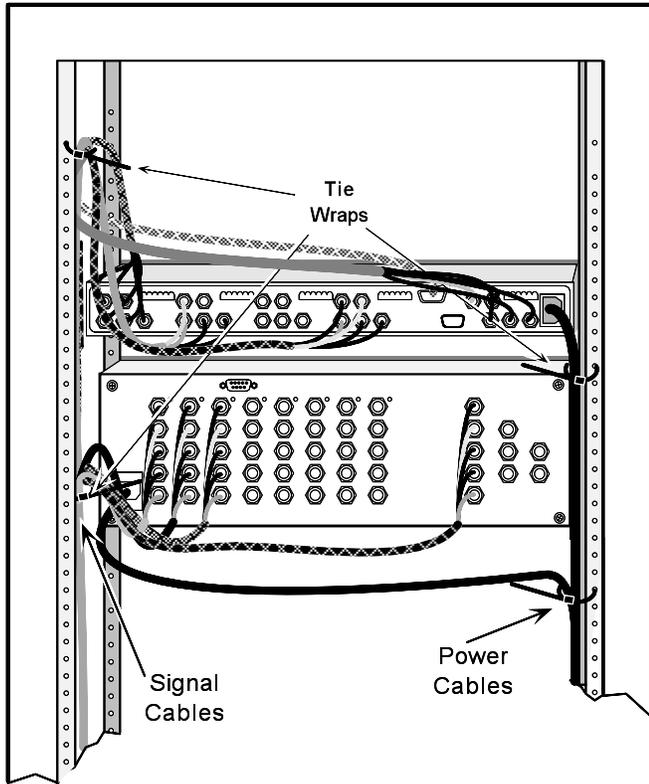
### Input Selection Switches



Each input must be configured. This is done by setting the DIP switches located above the output connectors. There are two banks of DIP switches, each having 8 (or 10) switches. Each input channel has two switches assigned to it, one in each bank. For example, input #2 uses the second switch at each bank. By setting input #2 up in both banks, the Auto Sync Detect feature will be disabled and the RGB sync will be defined as separate sync (as described above).



**Cabling a System 8/10 PLUS in a Rack**



When routing cables from one unit to another in a rack, do NOT allow the cables to pull down on the equipment. Use "Tie Wraps", "Rip-Ties" or other devices to secure the cables at some location in the rack that is above the rear panel connectors. Loosely hanging cables may be stepped on, resulting in damage to cables and equipment, as well as injury to personnel.

The illustration shows the rear view of a system rack. The example has the cables tied to the rack above the connections to the equipment. This allows a clear view of the back panels and prevents the cable weight from pulling down on the equipment.



The holes in the top and bottom of the System 8/10 PLUS enclosure are for cooling. Do NOT cover these holes. This could cause overheating of vital components.



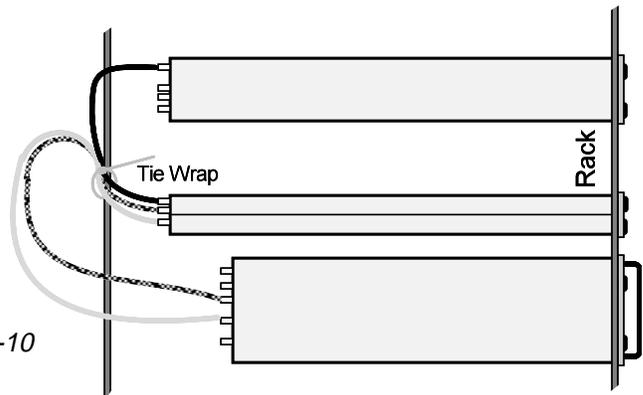
Maximum ambient operating temperature must not exceed 104° F (40° C).



The mounting rack and all equipment mounted in it must be grounded according to national and local electrical codes.



Keep power and signal cables separate (power cables on the right and signal cables on the left.)



**(French)**

Câbler un Système 8/10 PLUS sur un rack - page B-10

**(German)**

Verkabelung vom System 8/10 PLUS innerhalb eines Gestells - seite B-12

# ***System 8/10 PLUS Switcher User's Manual***

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## **Chapter Three**

### **Projector/Monitor Installation**

**Projector Control**

**Projector/Monitor Applications**

**Configuration**

## Projector/Monitor Installation

The System 8/10 Plus can be configured for many projectors. Among the projector manufacturers which Extron supports are:

- Ampro
- Barco
- Digital Projection
- Eiki
- Electrohome
- Epson
- Hughes/JVC
- InFocus
- Mitsubishi
- NEC/Runco
- Panasonic
- Sanyo
- Seleco
- Sharp
- Sony
- Toshiba
- Zenith

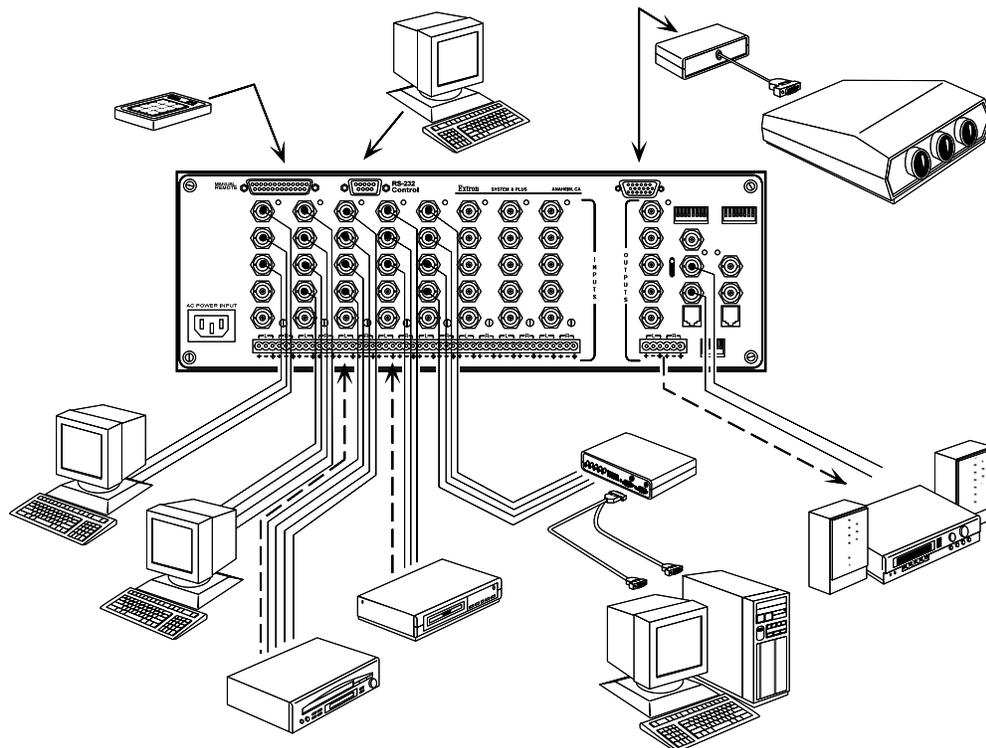


*If your projector manufacturer is not listed here, please consult with Extron.*

Extron System 8/10 PLUS switchers have bidirectional (i.e., "talk-listen"), user-programmable communications that communicates with the displays listed above. If projector input selection is made by the hard-wired or infrared remote control of the display\*, the System 8/10 PLUS switcher "listens" to the selection and switches to the proper input.

When an input selection is made at the switcher (by a front panel button, hard-wired remote control, RS-232 communications or IR-30), the System 8/10 PLUS switches the projector to RGBS, S-Video, or Composite (as required) and commands the projector to load the pre-programmed presets for that input.

*\* not applicable on some displays*

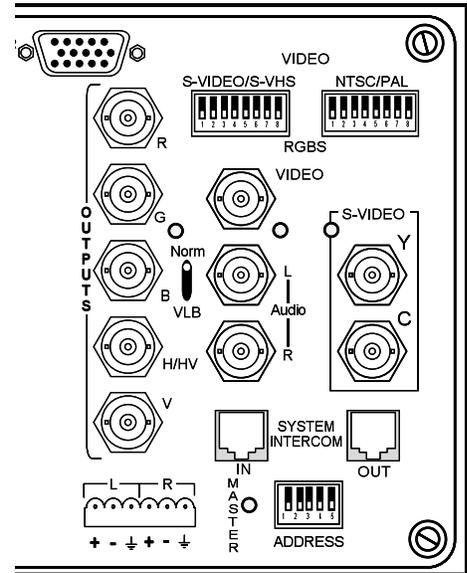


### Projector Control Port

The projector control port is a 15-pin HD connector located at the upper right hand corner of the rear panel.

A Communications Cable (CC) is used to connect the System 8/10 Plus to the projector, or to a suitable communications adapter. The cable is CL-2 rated and is available in three lengths, listed below.

Cable	Length	Extron Part Number
CC-50'	50 ft.	26-305-01
CC-100'	100 ft.	26-305-02
CC-200'	200 ft.	26-305-03



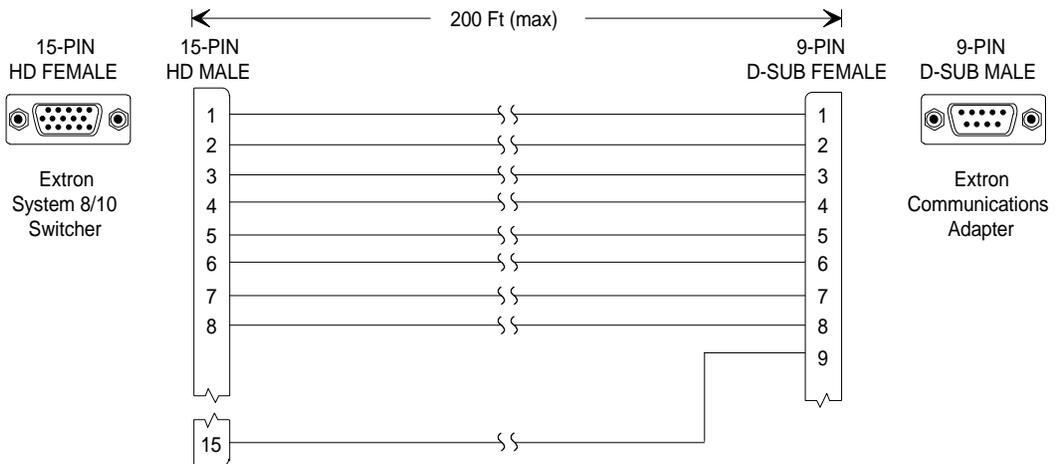
### User-Supplied Communications Cables

For custom installations, you may choose to make your own communications cables. If so, be sure to use approved installation practices, such as:

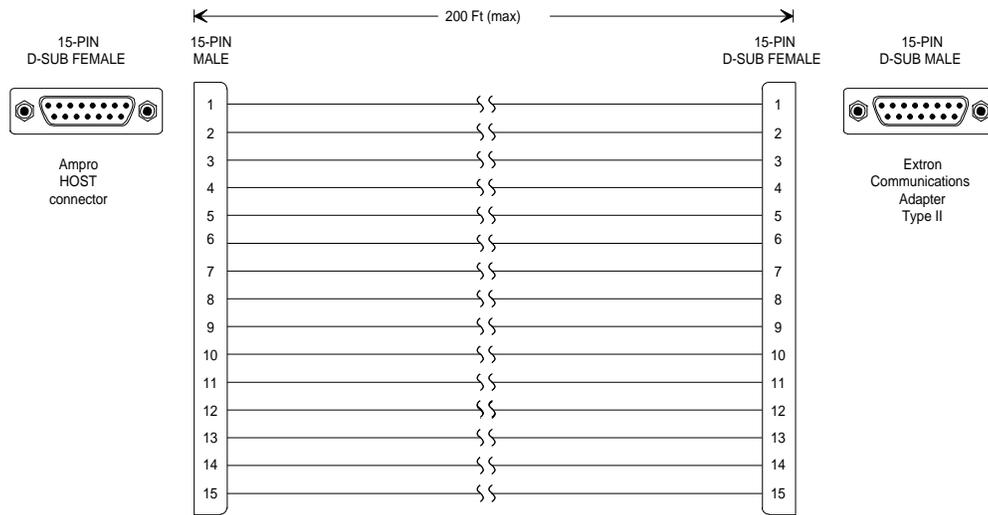
- Installation requires plenum rated cables
- Cables will be run through conduit

If you wish to make your own communications cables (up to 200 feet in length), using 26-AWG twisted pair cabling, follow the pin-to-pin wiring illustrated below.

The first illustration is for a Standard Communications cable with 15-pin male to 9-pin female connectors.



The second illustration is for a Type II Communications cable with 15-pin male to 15-pin female connectors. This cable is required for certain installations, for example, when using the Ampro Type II adapter, etc.



**Stand Alone Operation**

If you plan to use your System 8/10 PLUS in a system where it will not be connected to a projector, it must be configured for RS-232 mode. The switcher settings are shown on the following page.

**Address Switch Settings**

For installations with one switcher, configure the System 8/10 PLUS as a master switcher by setting the address switch on the rear panel. If multiple switchers are being used in a master/slave configuration, refer to Chapter 5.

**Configuration Setup**

System 8/10 PLUS switchers are shipped from the Extron factory configured for the projector brand specified by the user at the time of the order.

Labels are placed in three locations:

1. On the shipping container
2. On the rear panel
3. Inside the front panel access cover lower left (See picture on next page.)

Switcher configuration is done with switch settings behind the front access panel. Information is printed on a label inside the front panel access cover for setting up most applications. The label includes a place for the user to mark the configuration for which the System 8/10 PLUS is set.

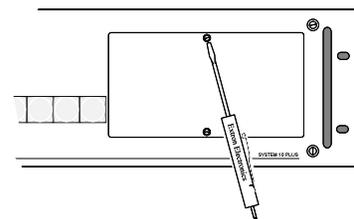
This chapter covers the setup and installation of the System 8/10 PLUS with specific projectors and displays. This includes instructions for changing the configuration switches. If your application includes connecting more than one switcher, you will also need to refer to Chapter 5.

**Removing the Access Cover**

If it is necessary to check or change any configuration switches, the Front Panel Access Cover must be removed. This is done with a small, flat-blade screwdriver.



*Do NOT touch the IC chips!*



### Extron Comm Adapters

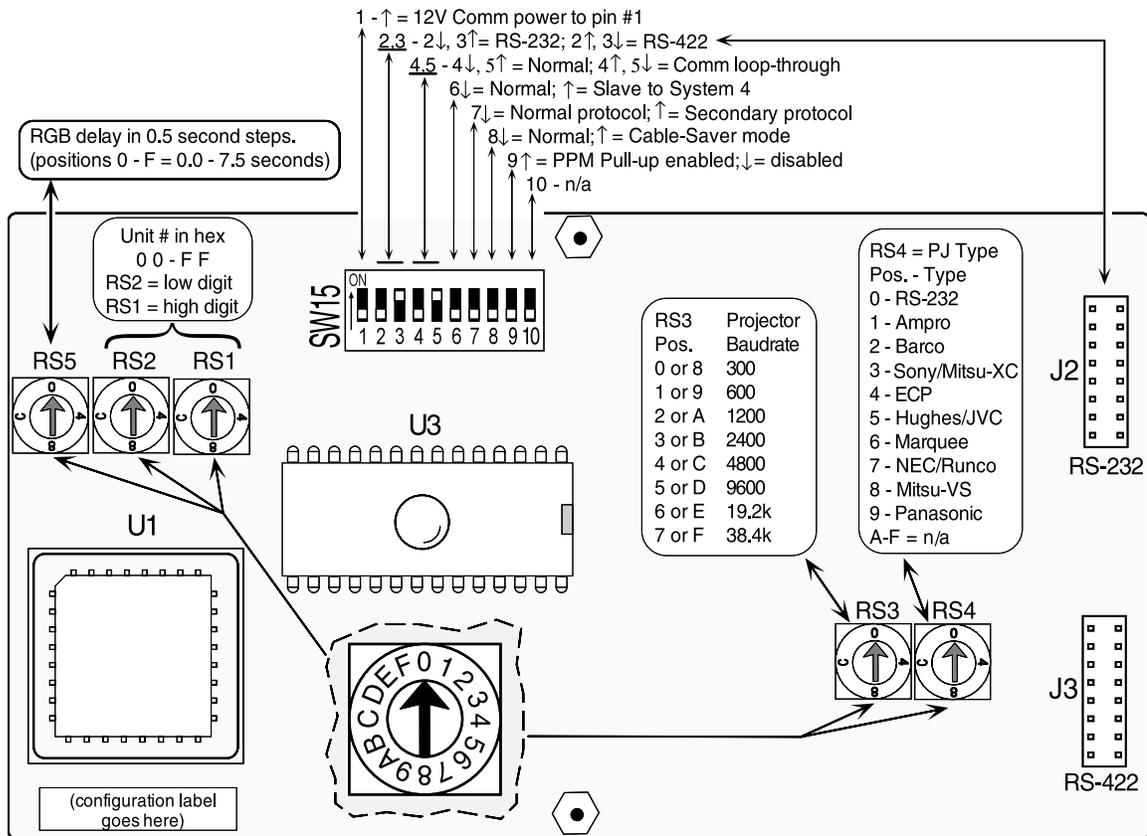
Extron communications adapters (Comm Adapters) provide the interface between the 9-pin connector of the communications cable and the display's switcher port. Extron manufactures a wide range of Comm Adapters to interface with virtually all projector makes and models. Your Extron representative will help you select the correct Extron Comm Adapter to meet your specific projector requirements.

### Setting the System 8/10 Plus for the Projector

Before each System 8/10 Plus ships, it is configured for the projector type as requested by the user. However, it can easily be reconfigured for any application. The picture below shows the function of each switch behind the access cover on the front panel of the System 8/10 Plus.



Do not change any switch settings without following the correct procedure in this chapter. Go to the appropriate procedure for your application.



### Triple-Action Switching™ (RGB Delay Switch - RS5)

When an input is selected, the sync switches immediately. However, the picture may be switched later (0.0 - 7.5 seconds) to prevent an unstable image while the projector is setting up for the new sync signal. RS5 is used to set this delay. Each position of the switch adds 0.5 seconds to the delay.



# ***System 8/10 PLus Switcher User's Manual***

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## **Chapter Four**

### **Rear Panel Connections**

*Remote Controls*

*Front Panel*

*Button Labels*

## Controlling the System 8/10 Plus Switchers

The System 8/10 Plus Switchers can be controlled four ways:

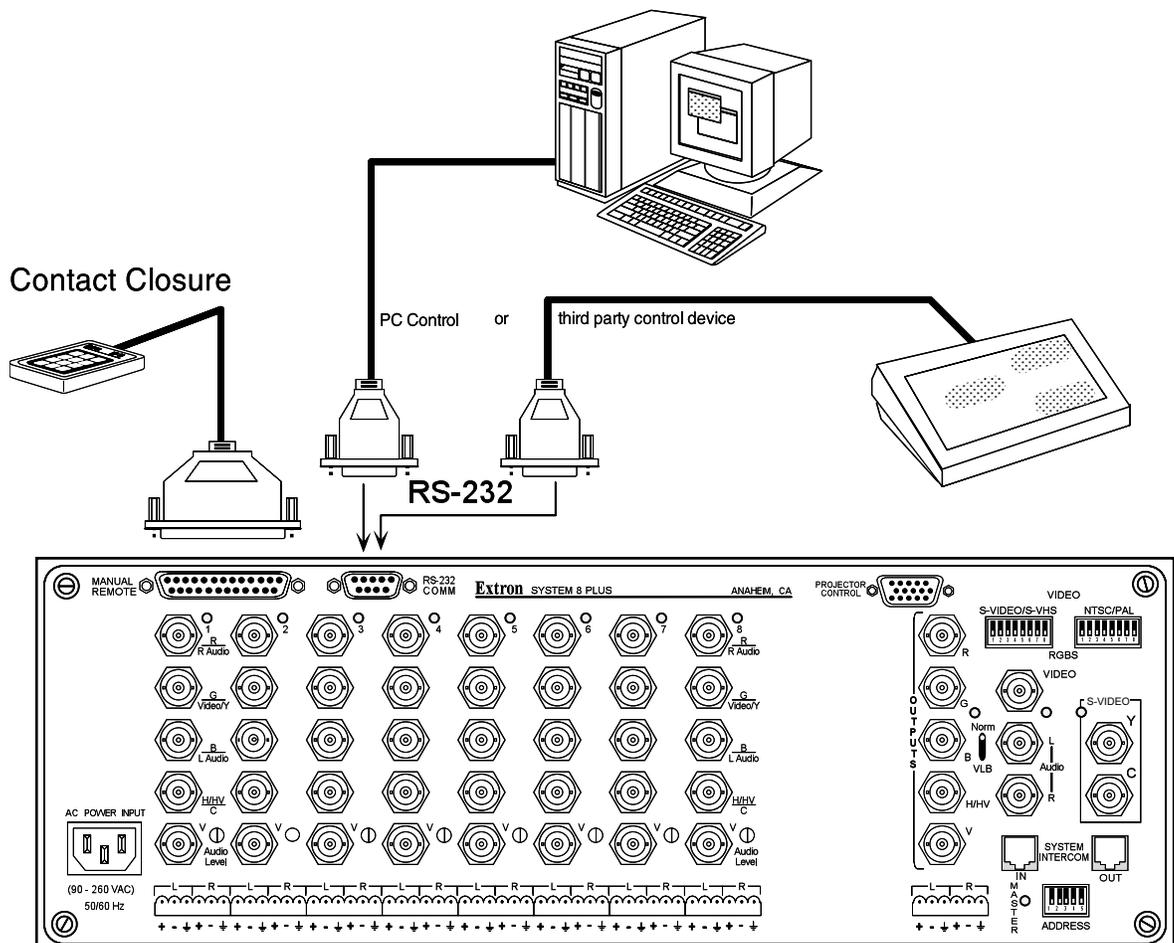
1. Manual front panel controls (See next page.)
2. Manual, (contact closure) wired remote control
3. Manual infrared remote control
4. RS-232 control (from a host system)

### Manual Remote Control

The Manual Remote connector can be used to select inputs by means of dry momentary contact closures and Tally outputs to drive (user provided) remote LEDs to indicate which of the inputs have been selected. This is described in detail on page B-1 of the appendix.

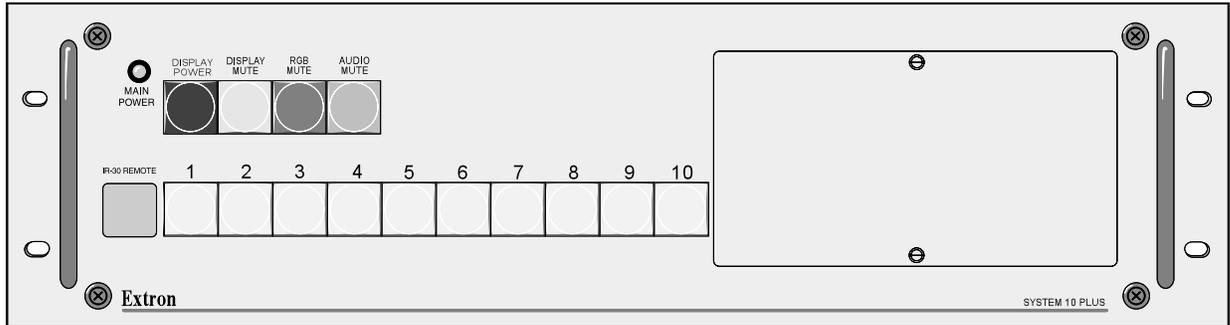
### RS-232 Control

The RS-232 Comm connector provides a serial interface for switching inputs by means of a host computer (such as a PC) or other third party control system, such as Crestron® or AMX®. For example, a control program in a PC could be written in a DOS or Windows® environment. RS-232 programming is described in Appendix A.



## Front Panel Buttons and Indicators

The following Front Panel Controls are used to operate the System 8/10 Plus.



**Power indicator** – Lights to indicate System 8/10 Plus switcher input power is On. This LED also blinks when the optional IR-30 remote receiver is detecting a signal from the transmitter.

**Display Power Button** – This button is used to turn the projector ON or OFF. To turn the projector ON, press this button down until it flashes on, then off, (approximately two seconds) and then release the button. Some projectors take a few seconds to initialize. For those projectors, the Display Power button will flash to prevent any communications during the initialization period. This flashing can last from 8 to 35 seconds. To turn OFF the projector, press and hold the button down until it flashes off, then on (approximately two seconds). This two second delay provides a safety factor so the projector is not turned off by accidentally touching this button.

**Display Mute Button** – The Video Mute button is similar to a “Projector Mute” or “Pause” button typically found on the projector remote control. This button mutes (blanks) the projector display, but does not actually turn the projector off. Press to mute the video display. The button lights to indicate Display Mute mode has been selected and the projector display is blanked. Press the button again to restore the video image.

**RGB Mute** – Pressing this button interrupts the picture (RGB) to the display device, but not the sync. Pressing the button again restores the picture without flicker.

**Audio Mute** – Press to mute the audio. The button lights to indicate audio mute mode has been selected. Press again to restore the audio. The button light then goes out.

**Input Select Buttons** – Press to select video input. (System 8 has buttons 1-8 and System 10 has 1-10.) Each button lights when its input is selected. Only one input can be selected at one time. These buttons flash to indicate that audio only is selected from that input (Breakaway).

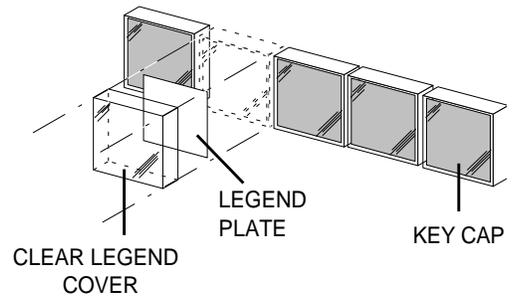
**Infrared Receiver** – The lower left corner of the front panel has the receiver lens for the infrared (IR System Remote) control. Although the lens is there, it will not operate if the option is not installed. See page B-5 for installation procedures and B-6 for IR operation.

**Infrared Remote Transmitter** – This remote control transmits commands to the Infrared Receiver described above.

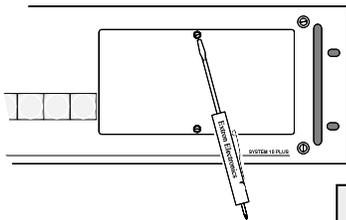
The right side of the front panel has a removable cover for accessing setup controls. This is explained in Chapter 3.

**Button Labels**

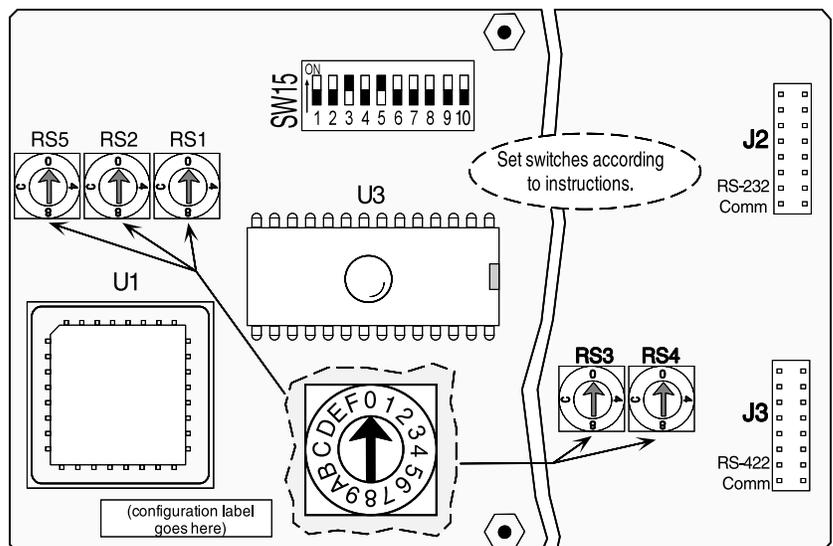
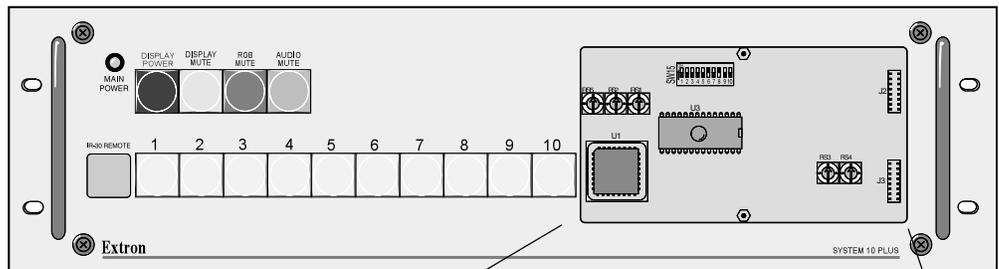
1. Remove the desired key cap from the switcher by grasping the top and bottom of the key cap and pulling it away from the switcher.
2. Dismantle the button by prying the clear legend cover from the key cap base.
3. Label the button by using rub-on letters on the white legend plate or by placing a small clear or white label between the white legend plate and the clear legend cover.
4. Reinsert the key cap back into place on the switcher.



**Front Panel Access Cover**



The Front Panel has a cover that can easily be removed for configuring the System 8/10 Plus for different applications. Use a small screwdriver to release the captive screws that hold the access cover on. Note that the cover has a label on the inside that shows how to configure the switches. Chapter 3 has detailed instructions for using this area.



# ***System 8/10 PLus Switcher User's Manual***

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## **Chapter Five**

### **Multiple Switcher Operation**

*Two Switcher Operation*

*Daisy Chain Connection*

*Star Connection*

*Looping with System 4<sup>x</sup>*

## Multiple Switcher Installation

This chapter shows how to connect multiple switchers in the following ways:

- Two Switcher Operation
- Daisy Chain Connections
- Star Connections
- Using System 8/10 PLUS as slave(s) to System 4

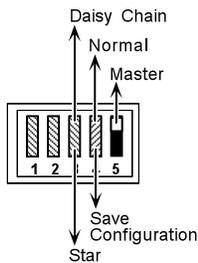
For large installations that require more inputs than one system switcher can handle, multiple switchers can be looped together. Up to 17 switchers can be looped together, providing a total of 154 inputs (using all System 10 PLUS switchers). System 8/10 PLUS switchers can be looped together in different combinations. Two connection schemes that are suitable for looping switchers are called Daisy Chain and Star configurations.

When switchers are connected to work together, only one can communicate with the projector and with the host system. This switcher is called the "Master". All other switchers provide input to the Master, and they are called "Slaves". Which switcher operates as the Master is determined by two things:

1. How the cables are connected
2. How the Address switches are set

After a multiple switcher configuration is complete, the information must be saved to the master switcher's memory.

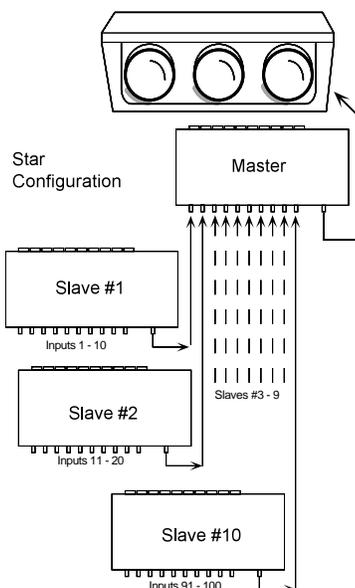
### Saving Configurations to Memory



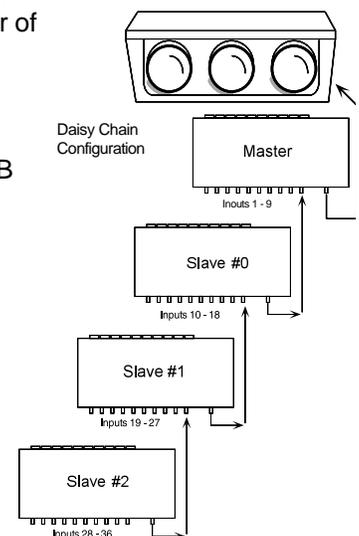
The System 8/10 PLUS has a memory to store the current connection scheme (configuration). To save the configuration to memory, switch #4 of the Address DIP switch, located on the rear panel of the Master Unit, must be set to the Configuration (Down) position and the system operated for a minimum of 10 seconds. This provides sufficient time to save the configuration in the memory of the Master Unit. After the configuration is saved, Address switch #4 is set to the Normal (Up) position. The configuration sequence does not have to be repeated until (or unless) the connection scheme is changed. This procedure will be included as a step in the procedures that follow.

### Master/Slave Configurations

The Star connection method (shown to the left) provides increased flexibility and higher video performance than the Daisy Chain connection method. The maximum number of inputs, however, is limited to 100 inputs when all switchers are System 10 (1 master unit plus 10 slave units). If using all System 8 switchers, the maximum number of inputs is 64 (1 master unit and 8 slaves).

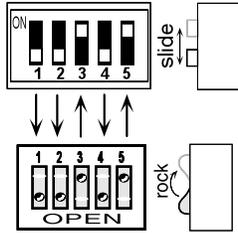


A simple example of the Daisy Chain method of connection is shown to the right. It is the most common looping method used for large analog RGB switching systems. This method offers the largest chaining configuration – 154 inputs when using all System 10 switchers (1 master unit plus 16 slave units). If using all System 8 switchers, the maximum number of inputs is 120.



For information on selecting slave channels with the optional IR remote, see page B-6.

### DIP Switch Types



Before going into the switch setups, let us first explain that there are different types of DIP switches, some "slide" and some "rock". Your System 8/10 PLUS could have either type DIP switch. Although they operate differently and are labeled differently, they are simply on/off (open/closed) switches. Regardless of the type of switch, we will show the positions as "up" or "down" and will use arrows to show the switch position. The illustration to the left shows two types of switches having the same configuration. Throughout this manual you may see either type of switch, however, the switch positions will be the same.

### Looping Two Switchers

A simple example of using multiple switchers is to use two System 8/10 PLUS switchers. As explained on the previous page, the switcher feeding the projector is the Master and the output of the Slave is one of the inputs to the Master.

1. See the figure below. Remove the power connections from both switchers and decide which unit will be the Master Unit and which the Slave.
2. Disconnect all communications devices from the Master Unit.



*The **only** communications device that a Slave switcher can have connected is a contact closure Manual Remote control (if required).*

3. On the Master Unit, locate the DIP switches labeled "Address" in the lower right corner of the rear panel. Set switches #3 and #5 up, and #1, #2 and #4 down. (Switch #4 must be set to the "down" position until Step 9.)

4. On the Slave Unit, locate the Address DIP switches and set switches #1, 2, 3 and 4 up, and set switch #5 down for Slave Mode.

5. Connect the video output of the Slave Unit to the last input of the Master Unit.

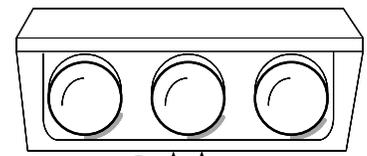
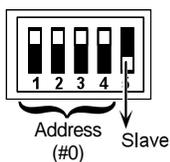
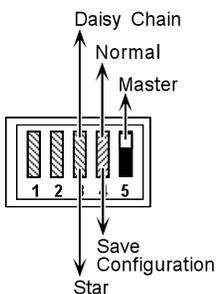
6. Connect an RJ11-to-RJ11 cable from the "System Intercom Out" connector of the Master to the "System Intercom In" connector of the Slave.

7. Connect the video outputs from the Master Unit to the video inputs of the projector. (Go to Chapter 3 for the detailed projector connections.)

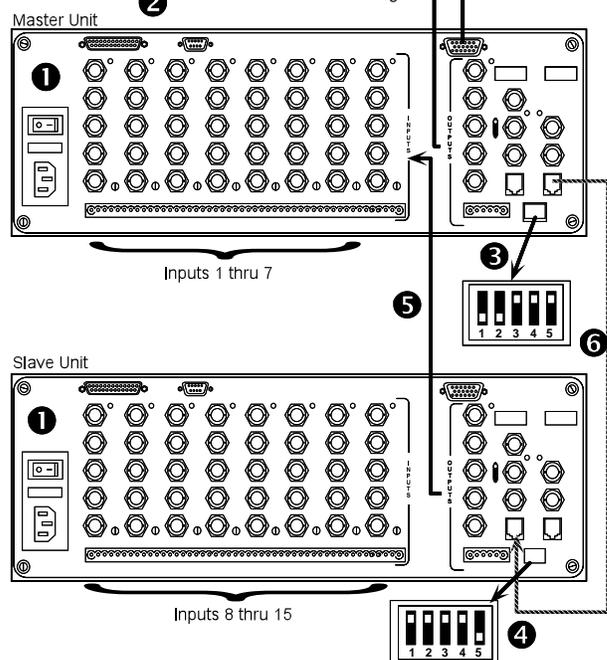
8. To save the configuration first turn the Slave On, and then turn the Master On. Wait at least 10 seconds for the Master Unit to save the configuration to memory.

9. On the Master Unit, set Address switch #4 to Normal, or "Up" position.

10. Make any necessary connections and put both switchers to normal operation.



**Two Switcher Loop (Daisy Chain)**



## Daisy Chain Connection

**Daisy Chain** configuration refers to routing the output of the first slave (#0) into the last input of the master switcher, and the output of the second slave (#1) into the last input of slave #0... etc. All other inputs are used for various video sources. The maximum number of inputs available in the daisy-chain configuration is 154 when using all System 10 PLUS switchers (120 when using all System 8 switchers). The Daisy Chain configuration is easy to configure, but results in decreased system bandwidth due to the cascading signal path through multiple switchers. As a further limitation of this connection scheme, it does not allow the use of composite-to-RGB converters or scan doublers.

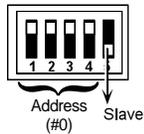
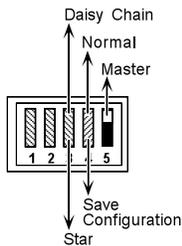
## Looping Instructions

See illustration on the facing page as you do the following:

1. Remove power from all switchers and decide which will become the Master Unit and which the Slave.
2. Disconnect all communications devices from the Master Unit.



*The Slave Units should never have any communications devices connected, except a contact closure remote control (if required).*



3. On the Master Unit, locate the DIP switches labeled "Address" in the lower right corner of the rear panel. Set switches #3 and #5 up, and #1, #2 and #4 down. (Switch #4 must be set to the "down" position until Step 9.)
4. On the first Slave Unit, locate the Address DIP switches and set switches #1, 2, 3 and 4 up (Slave # 0), and set switch #5 down, for Slave Mode.
5. Connect an RJ11 cable from the "System Intercom Out" connector of the Master to the "System Intercom In" connector of Slave #0. If more slave units are being connected, connect another RJ11 cable from Slave #0 "System Intercom Out" to Slave #1 "System Intercom In". Repeat this for each remaining slave unit in the daisy chain.
6. Connect the video output of Slave #0 to the last input of the Master Unit. Connect the output of Slave #1 to the last input of Slave #0. Repeat this for each remaining slave unit in the daisy chain.
7. Connect any communication devices (e.g., projector control cable, remote control, etc.) to the Master Unit.
8. Connect the video outputs from the Master Unit to the video inputs of the projector. Refer to Chapter 3 for detailed procedures.
9. To save the configuration first turn the Slave On, and then turn the Master On. Wait at least 10 seconds for the Master Unit to save the configuration to memory.
10. On the Master Unit, set Address switch #4 to the Normal, or "Up" position.
11. Make any necessary connections and put all switchers to normal operation.



*Video Loop Back (VLB) mode cannot be used when units are connected in this configuration.*

Daisy Chain Example

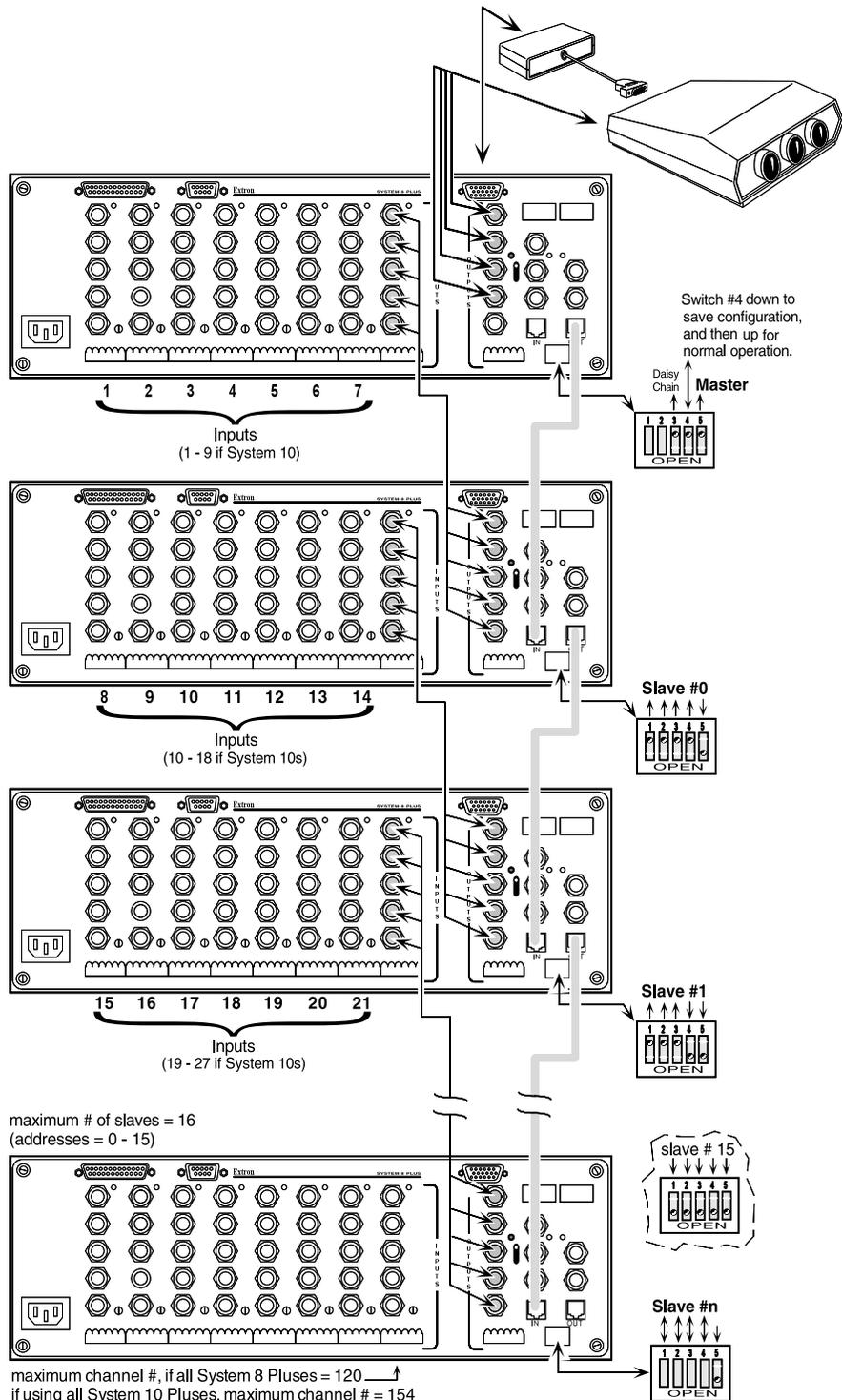
The illustration below shows how System 8/10 PLUS units would be connected in a Daisy Chain configuration. If System 10 PLUS units were used, the only difference would be the input channel numbers.



*Important audio information! If audio connections are made balanced, there will be +6 dB of gain. This gain must be offset with a pad, otherwise the maximum input audio level could be exceeded on the audio input. This would result in distortion. However, if audio connections are made unbalanced, there is no gain.*



*The audio attenuator(s) on the last input of the switcher(s) should be be set to 0 dB cut by turning the attenuator clockwise until it stops. This setting will prevent the looped input from affecting any gain acquired from preceding channels.*



## Star Connection

In a **Star** configuration, the output of each slave supplies an input to the master switcher. There is no slave #0 in a Star configuration. For example, slave #1 is connected to input #1 of the master switcher; slave #2 is connected to master input #2, etc. The output of the Master is connected to the projector or display monitor. The maximum number of inputs available in a Star configuration is 100 when using all System 10 switchers (80 when using all System 8 switchers). The Star connection scheme is somewhat more complicated to configure, but provides maximum video bandwidth since the video signal is only routed through two switchers. Another benefit of the Star configuration is the simple connection of composite-to-RGB converters and scan doublers.

## Looping Instructions

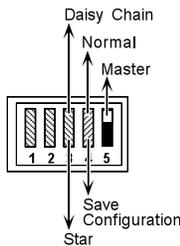
See illustration on the facing page as you do the following:

1. Remove power from all switchers and decide which will become the Master Unit and which the Slave.
2. Disconnect all communications devices from the Master Unit.

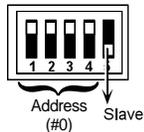


*The Slave Unit should never have any communications devices connected, except a contact closure remote control (if required).*

3. On the Master Unit, locate the DIP switches labeled “Address” in the lower right corner of the rear panel. Set switch #5 up, and #1, #2, #3 and #4 down. (Switch #4 must be set to the "down" position until Step 9.)



4. On the first Slave Unit, locate the Address DIP switches and set switches #1, 2 and 3 up, and switches #4 and #5 down (for Slave Mode, Slave #1).
5. Connect an RJ11 cable from the “System Intercom Out” connector of the Master to the “System Intercom In” connector of the Slave #0. If more slave units are being connected, connect another RJ11 cable from Slave #0 “System Intercom Out” to Slave #1 “System Intercom In”. Repeat this for each slave unit for the remaining system loop.



6. Connect the video output of Slave #1 to video input #1 of the Master Unit. Connect the output of Slave #2 to video input #2 of the Master Unit and so on until all slaves are connected (10 maximum for System 10; 8 maximum for System 8).



*If there are any inputs left over on the Master Switcher, their numbering will resume after the last input of the highest numbered slave switcher.*

7. Connect any communication devices (e.g., projector control cable, remote control, etc.) to the Master Unit.
8. Connect the video outputs from the Master Unit to the video inputs of the projector. Refer to Chapter 3 for details.
9. To save the configuration first turn the Slave On and then turn the Master On



*Wait at least 10 seconds for the Master Unit to save the configuration to memory.*

10. On the Master Unit, set Address switch #4 to Normal or “Up” position.
11. Make any necessary connections and return all switchers to normal operation.

Star Configuration Example

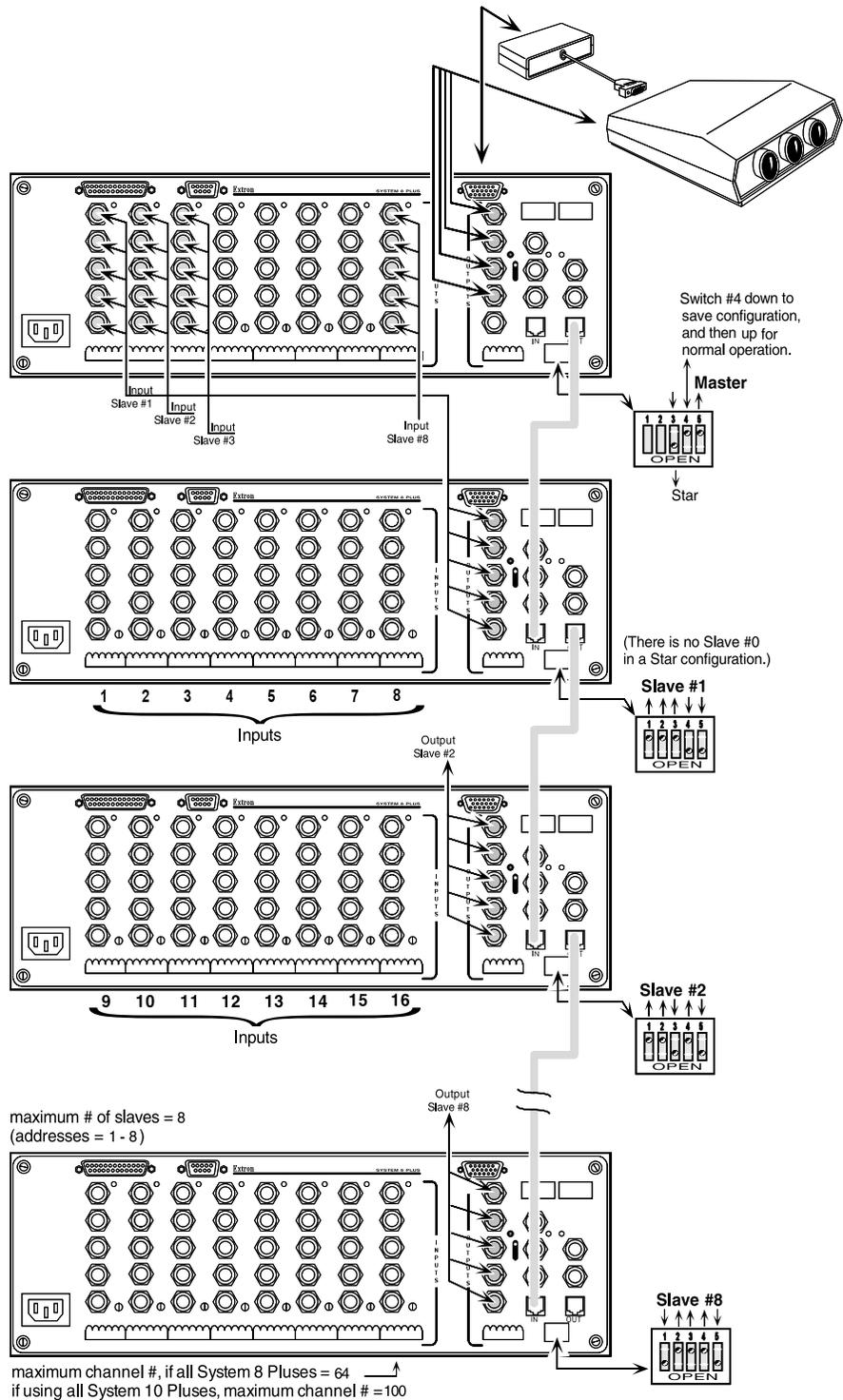
The illustration below shows how System 8/10 PLUS units would be connected in a Star configuration. If System 10 PLUS units were used, the only difference would be in the input channel numbers.



*Important audio information! If audio connections are made balanced, there will be +6 dB of gain. This gain must be offset with a pad, otherwise the maximum input audio level could be exceeded on the audio input. This would result in distortion. However, if audio connections are made unbalanced, there is no gain.*



*The audio attenuator(s) on the last input of the switcher(s) should be set to 0 dB cut by turning the attenuator clockwise until it stops. This setting will prevent the looped input from affecting any gain acquired from preceding channels.*



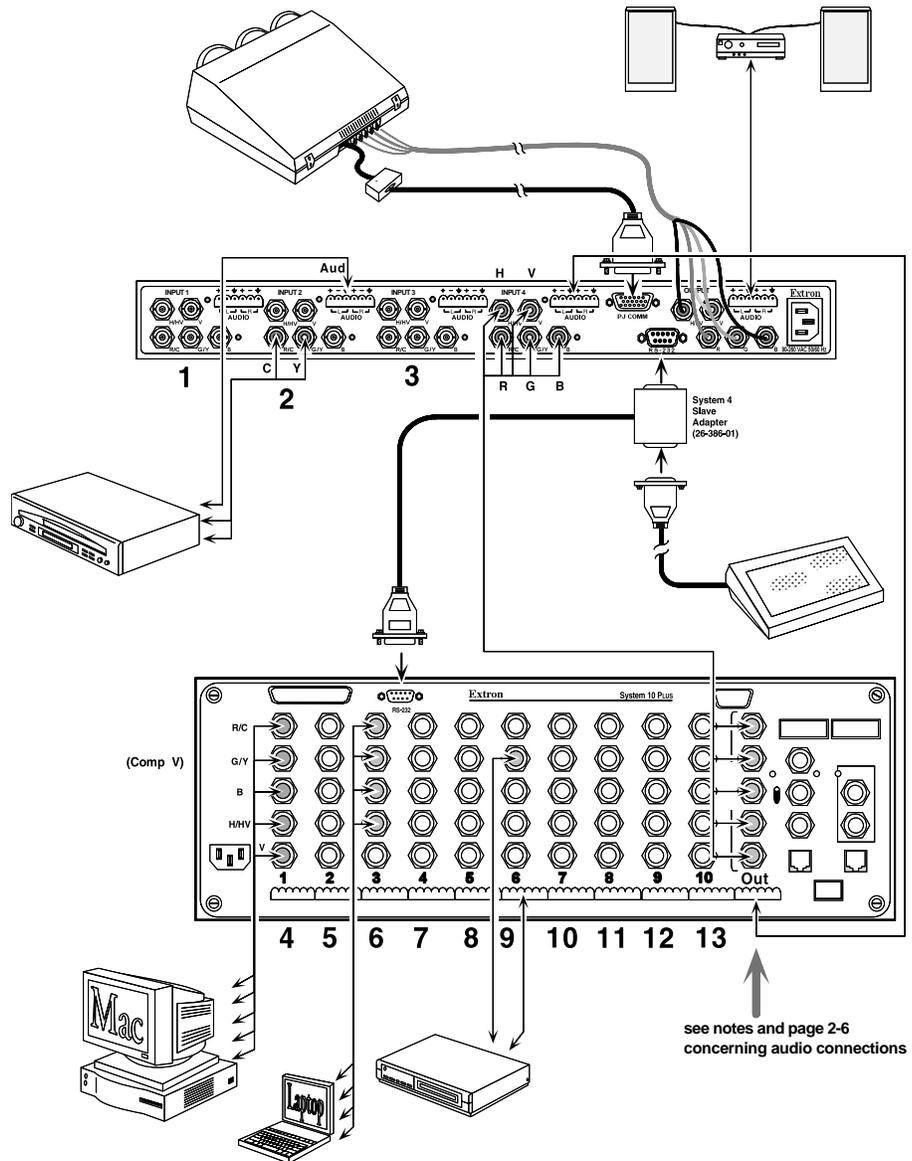
### System 4 with One System 8/10 Plus Switcher

The System 8/10 Plus must be configured as a System 4 Slave. Connect the RGBHV and Audio output of the System 8/10 switcher to the last (4th) input of the System 4. Use the figure below as an example.

The System 4 will control the System 8/10 Plus Switcher through the secondary RS-232 port, by way of a System 4 Slave Adapter described in the System 4 User's Manual.

 **Important audio information!** If balanced audio connections are made from the System 8/10 Plus audio output to the System 4 audio input, there will be +6 dB of gain. This gain can be offset with a 6 dB pad. If the level of gain does not exceed the System 4 maximum input level, the level can be offset with the System 4 audio gain/cut menu. However, if audio connections are made unbalanced, there is no gain.

 The audio attenuator(s) on the System 8/10 Plus audio inputs should be set to 0 dB cut by turning the attenuator clockwise until it stops. This will set all input audio levels on the System 4. Refer to the System 4 User Manual for audio setup.



 Nine audio connectors are shipped with each System 8 Plus and eleven with each System 10 Plus. If more are needed, use Phoenix® audio connectors, Extron part number 10-163-01.

See previous pages to set up the System 8/10 Plus DIP switches.

After making all the cable connections, go to page 4-7 of the System 4 User's Manual to configure the master/slave as a system.

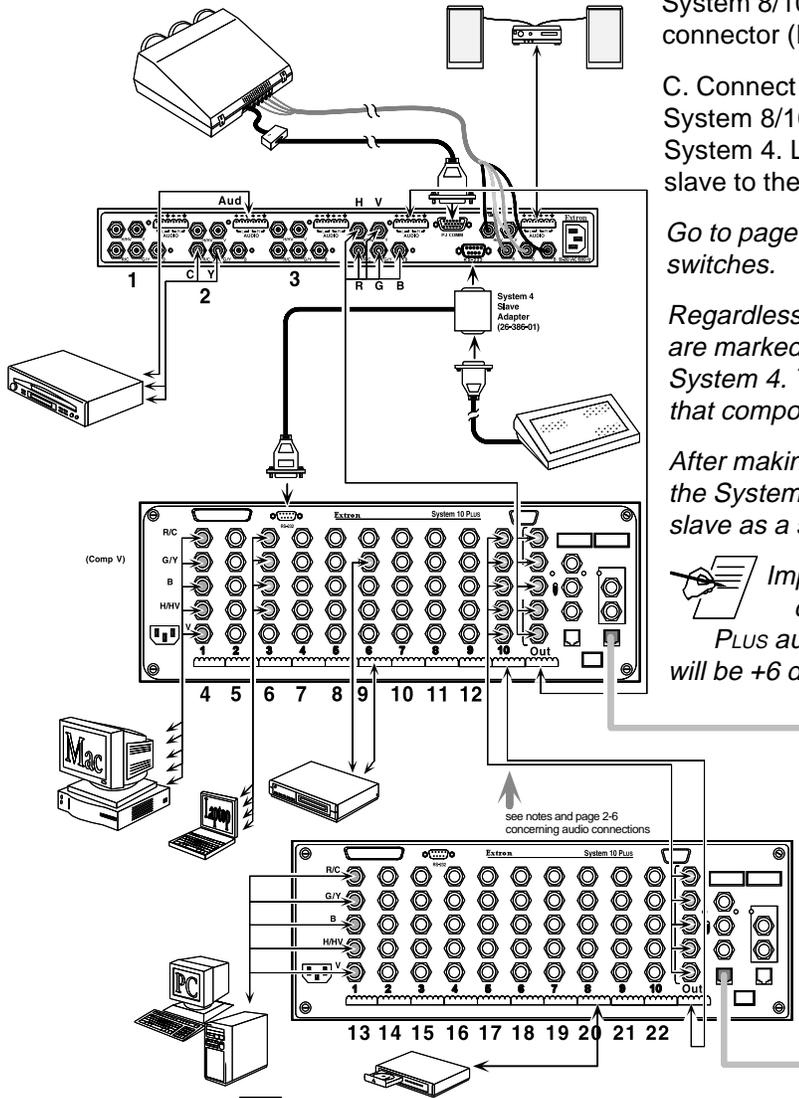
### System 4 with Multiple System 8/10 PLUS Switchers

This configuration will work only with System 8/10 PLUS switchers in a Daisy Chain configuration. The master of the System 8/10 PLUS chain must be configured in the "RS-232 only" projector communications mode. The System 4 will control the System 8/10 PLUS Switcher through the secondary RS-232 port by way of a System 4 Slave Adapter described on page 4-2 of the System 4 User's Manual. The System 4 communicates with the first System 8/10 PLUS which in turn communicates with the second System 8/10 PLUS.

A. Use the Slave Adapter described in the System 4 manual to connect the controlling device to the System 4 and to the first System 8/10 PLUS.

B. Connect one cable end from the Intercom Out connector (RJ11) on the first System 8/10 PLUS and the other end into the Intercom In connector (RJ11) of the second System 8/10 PLUS.

C. Connect the RGBHV and Audio outputs from the System 8/10 PLUS master to the last input of the System 4. Likewise, connect the output of the second slave to the last input of the first slave.



Go to page 5-9 to set up the System 8/10 PLUS DIP switches.

Regardless of how the slave switcher input connectors are marked, they must conform to the inputs of the System 4. They are: R/C, G/Y/Video, B, H/HV & V. Note that composite video uses the G/Y connector.

After making all the cable connections, go to page 4-7 of the System 4 User's Manual to configure the master/slave as a system.

*Important audio information!* If balanced audio connections are made from the System 8/10 PLUS audio output to the System 4 audio input, there will be +6 dB of gain. This gain can be offset with a 6 dB pad. If the level of gain does not exceed the System 4 maximum input level, the level can be offset with the System 4 audio gain/cut menu. However, if audio connections are made unbalanced, there is no gain.

The audio attenuator(s) on the System 8/10 PLUS audio inputs should be set to 0 dB cut by turning the attenuator clockwise until it stops. This will set all input audio levels on the System 4. Refer to the System 4 User Manual for audio setup.

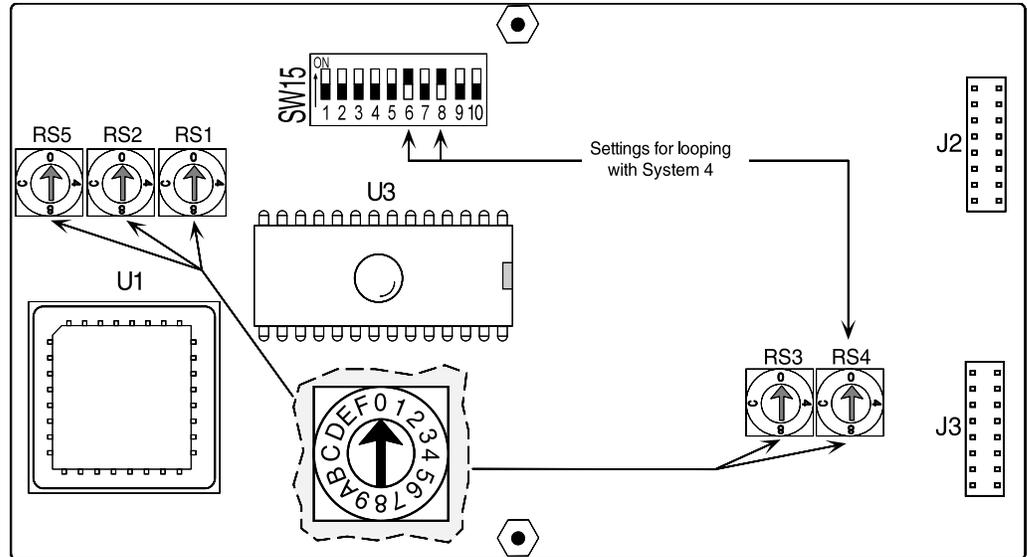
Nine audio connectors are shipped with each System 8 PLUS and eleven with each System 10 PLUS. If more are needed, use Phoenix® audio connectors, Extron part number 10-163-01.

### System 8/10 PLUS Switch Settings

From the front access panel on the System 8/10 PLUS, do the following:

1. On DIP switch block SW15, set switches #6 and #8 "up".
2. Set rotary switch RS4 to the "0" position (RS-232 mode).

On the rear panel of the System 8/10 PLUS, do the following:

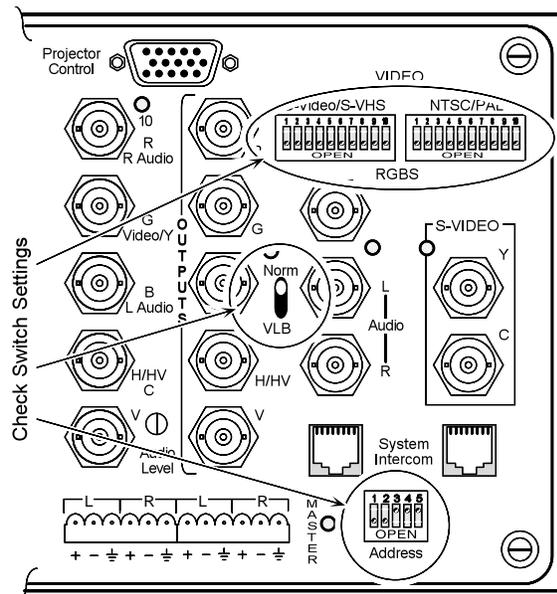


3. Set the Norm/VLB switch on the back of the 8/10 PLUS to "Norm".
4. Set the Address switches for "master". (If looping two 8/10 PLUS systems to the System 4, the second one must be set as a "slave".)
5. Set the Video/RGBS switches to match the type of video to be used by each input and do the configuration setup.

Go to page 4-7 of the System 4 User's Manual to configure the master/slave as a system.



Refer to the previous pages for other switch settings.



# ***System 8/10 PLUS Switcher User's Manual***

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## **Appendix A**

### **RS-232 Programming Guide**

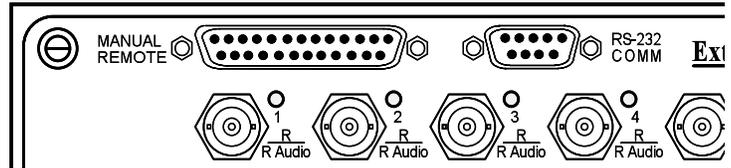
***RS-232 Protocol***

***Commands and Responses***

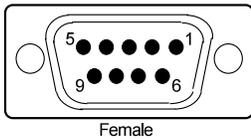
## Programming the System 8/10 PLUS

This section covers the commands for a host to set up and control the System 8/10 PLUS by way of the RS-232 port.

### RS-232 Connections



A standard RS-232 port is available on the back of the System 8/10 PLUS for use by a host. The connections are as follows:



#### RS-232 Pin Connections

Pin	Signal	Pin	Signal	Pin	Signal
1	—	4	—	7	—
2	Tx	5	Gnd	8	—
3	Rx	6	—	9	—

### RS-232 Protocol

The default protocol is 9600 baud, 8-bits, no parity and 1 stop bit. The baud rate can be changed by setting an internal rotary switch.



*If the Host baud rate needs to be changed, go to B-3 and B-4.*

### Program Instructions

The System 8/10 PLUS openly recognizes any character that comes in on the RS-232 port as a possible command. The characters shown in the Command/Response table on page A-4 are the only valid commands that are recognized by the System 8/10, any other character sent as a command will result in an error response to the Host.

### Simple Instruction Set

The Simple Instruction Set can be any ASCII character that is recognized by the System 8/10 PLUS as a command. For this set, there are no codes required to say that a command is coming or that a command has ended. Simple commands could be from a terminal or any other controlling device. The System 8/10 PLUS will execute the command and send a response back to the controlling device.

A simple command may be a single character typed on a keyboard and does not require any special characters before or after (i.e. It is not necessary to press "enter" from the keyboard.). However, some command characters may be followed by a "delimiter" character which defines a specific request. The System 8/10 PLUS looks at any character that comes in on the RS-232 port as a possible command.

## Related Terms

The following terms may be helpful in understanding information in the tables and examples that follow.

*Delimiter:*

*A delimiter character may specify audio and not video, the switcher and not the projector, etc. For commands that have more than one character, the delimiter is always the last character for that command string.*

*Carriage Return/Line Feed:*

*On most keyboards, pressing "enter" creates a carriage return (cr) and line feed (lf). The screen cursor moves down one line and to the left margin. This is not required for a command, but each response (as seen on a terminal display) will be followed by a cr/lf (shown as ↵).*

*Discrete Command:*

*A "discrete" command can do only one thing. For example, if projector power is already On, sending a "discrete power on" command does nothing.*

*Display, or Display Device:*

*"Display", refers to the video output device (projector, monitor, etc.)*

*Host:*

*Any device capable of talking to the switcher through an RS-232 port.*

*Switcher:*

*"Switcher" refers to the System 8/10 Plus or any slave inputs from other sources.*

*Terminal:*

*Any device that includes a keyboard and a display. This could be a "dumb" terminal, a "smart" terminal, a PC operating in "terminal" mode, etc.*

*Toggle:*

*A "toggle" command can do either of two things. It changes the state of the function, i.e. if the function was Off, the command turns it On; if the function was On, the command turns it Off. A toggle command character may be upper or lower case.*

*Zero:*

*In the examples that follow, the number zero is shown as 0 to distinguish it from the letter "O".*

## Selecting Inputs Using Delimiters

When selecting inputs to the projector and/or the System 8/10 Plus, audio and video can be switched together (follow) or separately (breakaway). An input is selected by its decimal number followed by a delimiter character. The delimiter ends the command and also determines which inputs are affected. The delimiters are used as follows:

- ! - Audio and video (Aud/Vid) for the switcher (Sw) and video for the projector (Dsp/Sw)*
- @ - Audio and video (Aud & Vid) for switcher only (Sw)*
- \$ - Audio only (Aud) for the switcher (Sw)*
- & - Video only (Vid) for both projector and switcher (Dsp/Sw)*

**Examples:**

- 5!** will select both audio and video from input channel #5.
- 132\$** will select audio (only) from input channel #132. This is "breakaway".
- 10&** will select video (only) from input channel #10. This is "breakaway".

## **Command/Response Table**

The Command/Response table lists commands, responses and data characters recognized by the System 8/10 PLUS. The Command string (string = one or more characters) in the left hand column of the table is defined in the right hand column (both in **Bold** print). The Command string is shown as ASCII characters and their hexadecimal (Hex) equivalent.

The Response string consists of one or more characters defining a function followed by one or more characters defining the status of that function. A carriage return followed by a line feed (↵ = CR/LF = 0Dh 0Ah) defines the end of the Response string. Possible error responses, E01 - E04 and E06, are shown at the bottom of the table.

In a basic configuration (no master/slave looping), the Channel Select command selects one of eight or ten inputs. However, in a more complex looping configuration, it is possible to have up to 154 inputs.

Example:

A Channel Select command string for Input 154 could be:

**154!**

The Response string will be:

↵**C154**↵

The following page shows a list of System 8/10 PLUS commands or command strings and their responses. Page A-5 shows a list of the same codes in numeric order.

Command/Response Table

Command String	Hex	Response String Switcher to Host	Command Description; etc.
x!	* 21	↵Cx↵ (x is the channel #, 1 - 154)	<b>Select Channel</b> (See page A-2)
x\$	* 24	↵Ax↵ (x is the audio channel #, 1 - 154)	Character following Command channel number is a delimiter. It defines end of Command string and further defines the Select Channel command.
x&	* 26	↵Vx↵ (x is the video channel #, 1 - 154)	
x@	* 40	↵Cx↵ (x is the channel #, 1 - 154)	
* a channel number of up to 3 digits			
<b>B</b>	42	↵Blk·1↵	<b>Turn Switcher RGB Mute ON</b>
<b>b</b>	62	↵Blk·0↵	<b>Turn Switcher RGB Mute OFF</b>
<b>c</b>	63	(Same command as C below)	<b>Request Projector Configuration</b>
<b>C</b>	43	↵CONFIGURED-FOR-AMPRO·(POWER-UP·....↵	
This is an example response and may vary depending on the internal setting for the projector type.			
<b>i</b>	69	(Same command as I below)	<b>Information Request</b>
<b>I</b>	49	↵Vx <sub>1</sub> ·Ax <sub>2</sub> ·Tx <sub>3</sub> ·Px <sub>4</sub> ·Sx <sub>5</sub> ·Zx <sub>6</sub> ·Rx <sub>7</sub> ·QSCx <sub>8</sub> ·x <sub>9</sub> x <sub>10</sub> ·QPCx <sub>11</sub> ·x <sub>12</sub> x <sub>13</sub> ·Mx <sub>14</sub> ↵ V - Video (x <sub>1</sub> = channel # 1 to 154; if 0 = Sys power is off) A - Audio (x <sub>2</sub> = channel # 1 to 154; if 0 = Sys power is off) T - Video Type. (x <sub>3</sub> = 1 if RGBS, 2 if RGsB, 3 if Composite video, 4 if S-Video) P - Display Power status. (x <sub>4</sub> = 0 power is off; 1 = on.) S - Display Mute status. (x <sub>5</sub> = 0 mute is off; 1 = on.) Z - Switcher Mute (x <sub>6</sub> = 0, mute is off; 1 = on.) R - Switcher RGB Mute status. (x <sub>7</sub> = 0, mute is off; 1 = on.) QSC - Switcher Comm software version # (3 digits x <sub>8</sub> ·x <sub>9</sub> ·x <sub>10</sub> ) QPC - Projector Comm software version # (3 digits x <sub>11</sub> ·x <sub>12</sub> ·x <sub>13</sub> ) M - Maximum channel available (x <sub>14</sub> = 8 - 154)	
An example of a response to the I/i command: ↵V3·A3·T2·P0·S0·Z1·R1·QSC1.10·QPC1.09·M8↵			
<b>n</b>	6E	(Same command as N below)	<b>Request Part Number</b>
<b>N</b>	4E	↵N60-107-01↵ (this is just an example response and may vary)	
<b>o</b>	6F	(Same command as O below)	<b>Toggle Display Power</b>
<b>O</b>	4F	↵PR·1↵ ↵PW·1↵ ↵PW·E↵ ↵PR·0↵	Display power is ON, was off Please wait, Initializing Please wait, End Display power is OFF, was on
<b>q</b>	71	(Same command as Q below)	<b>Query</b> (See QSC & QPC above.)
<b>Q</b>	51	↵QSCx.xx↵ As an example: ↵QSC1.10↵ ↵QPCy.yy↵ As an example: ↵QPC1.09↵	x.xx = Switcher Comm software version y.yy = Projector Comm software version
<b>r</b>	72	(Same command as R below)	<b>Toggle Switcher RGB Mute</b>
<b>R</b>	52	↵BLK·1↵ ↵BLK·0↵	Switcher RGB Mute ON, was off Switcher RGB Mute OFF, was on
<b>s</b>	73	(Same command as S below)	<b>Toggle Display Mute</b>
<b>S</b>	53	↵MUT·1↵ ↵MUT·0↵	Display Mute is ON, was OFF Display Mute is OFF, was ON
<b>x</b>	78	(Same command as X below)	<b>Toggle Executive Mode</b>
<b>X</b>	58	↵UNLOCKED-FRONT-PANEL↵ ↵LOCKED-OUT-FRONT-PANEL↵	If currently in Executive Mode If not in Executive Mode
<b>z</b>	7A	(Same command as Z below)	<b>Toggle Switcher Audio Mute</b>
<b>Z</b>	5A	↵AMUT·1↵ ↵AMUT·0↵	Switcher Audio Mute is ON, was off Switcher Audio Mute is OFF, was on
<b>[</b>	5B	↵PR·1↵ ↵PW·1↵ ↵PW·E↵	<b>Turn Display Power ON</b> Please wait, initializing Please wait, END
<b>]</b>	5D	↵PR·0↵	<b>Turn Display Power OFF</b>
<b>(</b>	28	↵MUT·1↵	<b>Turn display mute ON</b>
<b>)</b>	29	↵MUT·0↵	<b>Turn display mute OFF</b>
<b>+</b>	2B	↵AMUT·1↵	<b>Turn Switcher Audio Mute ON</b>
<b>-</b>	2D	↵AMUT·0↵	<b>Turn Switcher Audio Mute OFF</b>

Error Response Codes

↵E01↵	Invalid Channel Number
↵E02↵	Slave Communication Error
↵E03↵	Projector is Powered OFF
↵E04↵	Projector Communication Error

Below is a list of Commands/Responses listed in numeric order, together with a general description. The "Cmd/Rsp" column indicates how the character is used:  
 Cmd - indicates a host command (or part of a command) to the switcher.  
 Rsp - indicates a switcher response to the host.

Character	Cmd/Rsp	Dec	Hex	Function
LF	Rsp	10	0A	Line feed
CR	Rsp	13	0D	Carriage return
!	Cmd	33	21	Delimiter to specify video and audio selection
\$	Cmd	36	24	Delimiter to specify audio selection only
&	Cmd	38	26	Delimiter to specify video selection only
(	Cmd	40	28	Turn the Display mute On
)	Cmd	41	29	Turn the Display mute Off
+	Cmd	43	2B	Turn the Switcher Audio mute On
-	Cmd	45	2D	Turn the Switcher Audio mute Off
0	Cmd/Rsp	48	30	Numeric value of 0
1	Cmd/Rsp	49	31	Numeric value of 1
2	Cmd/Rsp	50	32	Numeric value of 2
3	Cmd/Rsp	51	33	Numeric value of 3
4	Cmd/Rsp	52	34	Numeric value of 4
5	Cmd/Rsp	53	35	Numeric value of 5
6	Cmd/Rsp	54	36	Numeric value of 6
7	Cmd/Rsp	55	37	Numeric value of 7
8	Cmd/Rsp	56	38	Numeric value of 8
9	Cmd/Rsp	57	39	Numeric value of 9
:	Cmd	58	3A	Turn Executive Mode On (discrete)
;	Cmd	59	3B	Turn Executive Mode Off (discrete)
@	Cmd	64	40	Delimiter to specify audio & video for the Switcher only
A	Rsp	65	41	An audio channel character follows
B	Cmd	66	42	Turn RGB mute On for Switcher only
C	Cmd	67	43	Request projector configuration
C	Rsp	67	43	A Channel character follows (audio & video)
E	Rsp	69	45	An Error code character follows
I	Cmd	73	49	Request for Information
M	Rsp	77	4D	Maximum number of inputs
N	Cmd	78	4E	Request part number
O	Cmd	79	4F	Toggle the Display power (On/Off)
P	Rsp	80	50	A character for power status of the Display device follows
Q	Cmd	81	51	Query Software Version - show PC & SC version numbers
R	Cmd	82	52	Toggle the RGB mute for Switcher only
S	Cmd	83	53	Toggle the Display mute (On/Off)
S	Rsp	83	53	A character for mute status of the Display device follows
T	Rsp	84	54	A character for video signal Type follows
V	Rsp	86	56	A character for the Video channel follows
X	Cmd	88	58	Toggle Executive Mode (On/Off)
Z	Cmd	90	5A	Toggle audio mute (On/Off)
[	Cmd	91	5B	Turn the Display power On
]	Cmd	93	5D	Turn the Display power Off
b	Cmd	98	62	Turn RGB mute Off for the Switcher only
c	Cmd	99	63	Request projector configuration
i	Cmd	105	69	Request for Information
n	Cmd	110	6E	Request part number
o	Cmd	111	6F	Toggle the Display power (On/Off)
q	Cmd	113	71	Query Software Version - show PC & SC version numbers
r	Cmd	114	72	Toggle the RGB mute for Switcher only
s	Cmd	115	73	Toggle the Display mute (On/Off)
x	Cmd	120	78	Toggle Executive Mode (On/Off)
z	Cmd	122	7A	Toggle audio mute (On/Off)

# ***System 8/10 PLus Switcher User's Manual***

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## **Appendix B**

### **Reference**

***Manual Remote (Tally)***

***Related Part Numbers***

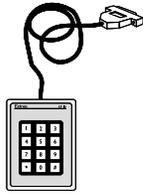
***Removing the Cover***

***Upgrading & Installing Options***

***Glossary of Terms***

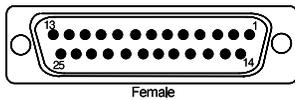
***Limited Warranty***

## Manual Remote Operation



The Manual Remote connector is a 25-pin D-Sub port used to remotely control the System 8/10 Plus switcher by dry contact closures to ground by using an Extron hard-wired remote (optional KP-10) or another manufacturer's remote control device. The connector also has a remote tally lamp capability to light remote incandescent lamps or LEDs to indicate which input has been selected. The following specifications are provided to allow the user to match other devices to these specifications.

### Connector Pin Assignments



**Display Power.** Pin 11 of the Manual Remote connector is used to switch projector power. By making a dry momentary contact closure for one second between pin 11 and ground (pin 25), the system switcher will command the projector to turn ON. A subsequent one second contact closure will command the projector to turn OFF.

**Display Mute.** Pin 24 of the Manual Remote connector is used to mute the projector video. By making a dry contact closure between pin 24 and ground (pin 25), the system switcher will command the projector video image to mute (blank). A subsequent momentary contact closure will restore the video image.

**Input Channel Selection.** Input channel selection is made by making a dry contact closure between the desired input (pin 1 thru 10) and ground (pin 25). Continuous dry contact closures can be made to select channels, but such continuous connections made at the Manual Remote port override all other means of input selection (i.e., takes precedence over front panel button selections and RS-232 inputs from a host controller).

### Tally Outputs

Remote Control Connector Pin Assignments:

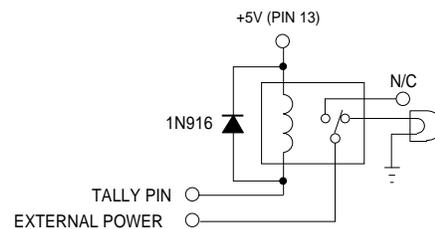
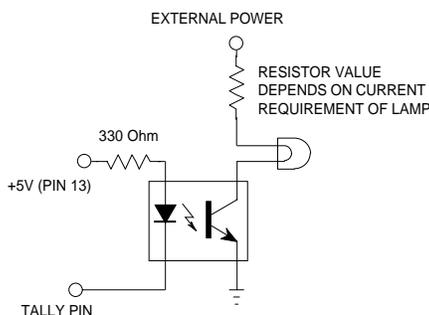
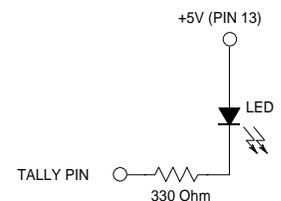
Pin#	Function
1	Input #1
2	Input #2
3	Input #3
4	Input #4
5	Input #5
6	Input #6
7	Input #7
8	Input #8
9	Input #9
10	Input #10
11	Display Power
12	(not used)
13	+5 V, 100 mA
14	Tally #1
15	Tally #2
16	Tally #3
17	Tally #4
18	Tally #5
19	Tally #6
20	Tally #7
21	Tally #8
22	Tally #9
23	Tally #10
24	Display Mute
25	Ground

Tally outputs (pins 14-23) offer means to poll a status from the System 8/10 to determine which input is presently selected. The tally outputs also have the ability to drive a remote front panel with lighted display. Tally outputs are normally high (5 volts) and drop to a low (0 volts) when selected.

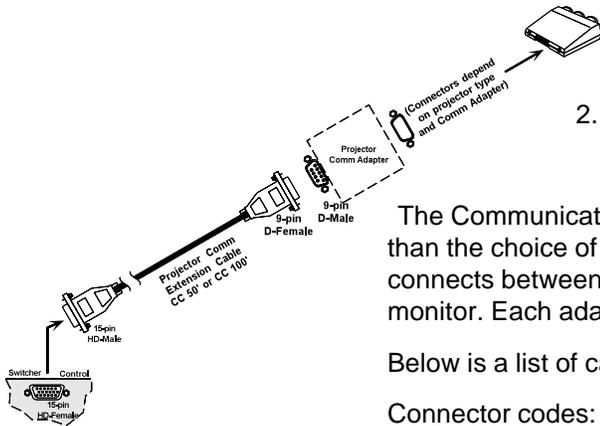
The tally outputs can be used to drive either remote LEDs (right) or remote incandescent lamps (left). Use one of the following schematics for each of the tally pins to power a remote display.

The following relays are recommended for use with tally outputs:

Manufacturer	General	Low Current
Aromat	DS2	TQ
ITT/Panasonic	R-Z-5C	A5W
Omron	G5Y	G6H



## Related Parts List



The System 8/10 Plus needs two additional parts to control a display device:

1. A Projector Communications Extension Cable (CC Cable)
2. A Communications Adapter (Comm Adapter)

The Communications Extension Cable is the same for most applications (other than the choice of length). In most applications the Projector Comm Adapter connects between the Communications Extension Cable and the projector or monitor. Each adapter is designed specifically for the display device being used.

Below is a list of cables and other related parts.

Connector codes: 9 = 9-pins; 15 = 15 pins; D = "D" sub connector  
M = male; F = female

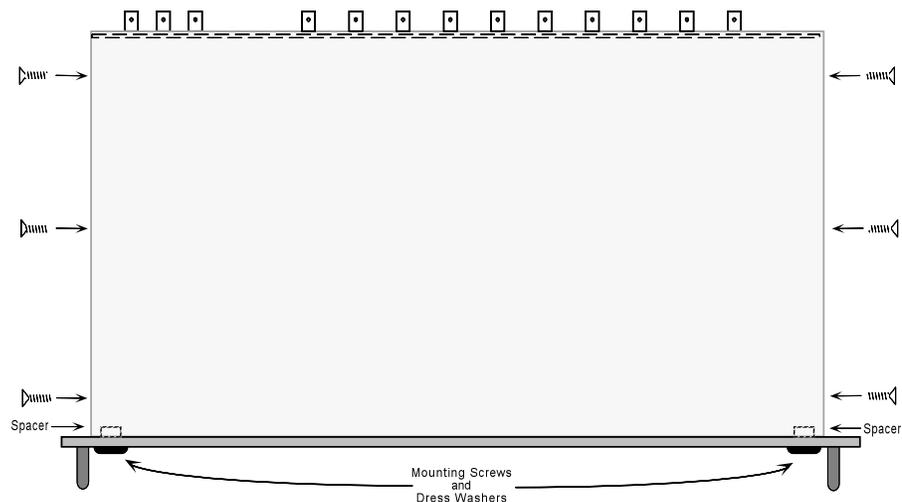
Projector Communication Extension Cables	Connectors	Part #
CC50' (50 ft.)	15/HD/M to 9/D/F	26-305-01
CC50' Type II (50 ft.)	15/D/M to 15/D/F	26-323-01
CC100' (100 ft.)	15/HD/M to 9/D/F	26-305-02
CC100' Type II (100 ft.)	15/D/M to 15/D/F	26-323-02
CC200' (200 ft.)	15/HD/M to 9/D/F	26-305-03
CC200' Type II (200 ft.)	15/D/M to 15/D/F	26-323-03
<b>S-Video Adapter Cables</b>		
S-VHS 6' (male-to-male, 6 feet)		26-316-02
S-VHS M20' (male-to-male, 20 feet)		26-316-01
S-VHS BNC (male-to-male, S-Video to BNC, 6")		26-353-01
<b>Connectors</b>		
Captive Screw Phoenix® Connectors (6-pin, Audio)		10-163-01
<b>Documentation</b>		
System 8/10 Plus User's Manual		68-078-01
<b>Extron Products that may be used with the System 8/10 Plus</b>		
CD 400 – Quad Standard Decoder		60-145-01/02
Andora – NTSC & PAL Scan Doubler		60-144-01
System 4C – Switcher with built in Quad Standard Decoder		60-183-01
System 4LD – Switcher with built in Line Doubler		60-155-01
<b>Upgrade/Options</b>		
Infrared (IR-30) Remote Control Option (includes IC chip and System Remote)		70-037-01

## Removing the System 8/10 PLUS Cover

There is rarely a need for the user to remove the System 8/10 PLUS cover. Three possible reasons would be:

- To change the Main Controller Board SW1 switch settings (switches 3 & 4 only)
- To change the Host baud rate from the factory setting of 9600 baud
- To upgrade the Main Controller Board Software chip

1. Unplug the AC power cord.
2. If rack-mounted, remove the System 8/10 PLUS from the mounting rack.
3. Remove all input and output cables.



4. Place the System 8/10 PLUS on a clean work space and remove the six (6) screws shown in the picture.
5. Go to the procedure for which you have opened the cover (see following pages). *Do NOT touch any switches or electronic components, other than those specified. This could seriously affect the operation of the system.*
6. When finished working inside the System 8/10 PLUS, use this procedure in reverse to replace the cover.



**(French)** Enlever le couvercle du Système 8/10 PLUS - page B-9

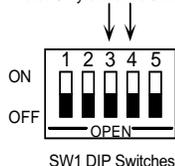
**(German)** Entfernung der System 8/10 PLUS Abdeckung - seite B-11

## Changing SW1 Switch Settings



The SW1 DIP switches, as illustrated below, should **ONLY** be changed when resetting switches 3 and 4! Switches 1, 2, and 5 must **NEVER** be reset! Failure to heed this warning could seriously affect the operation of the switcher.

Note: Only switches 3 and 4 may be reset!



Locate SW1 on the Main Controller board (see diagram on next page).

**Switch 3:** When set "ON" - if the connected projector is in 'Display Mute' mode, the front panel's Input Select button will not be illuminated.

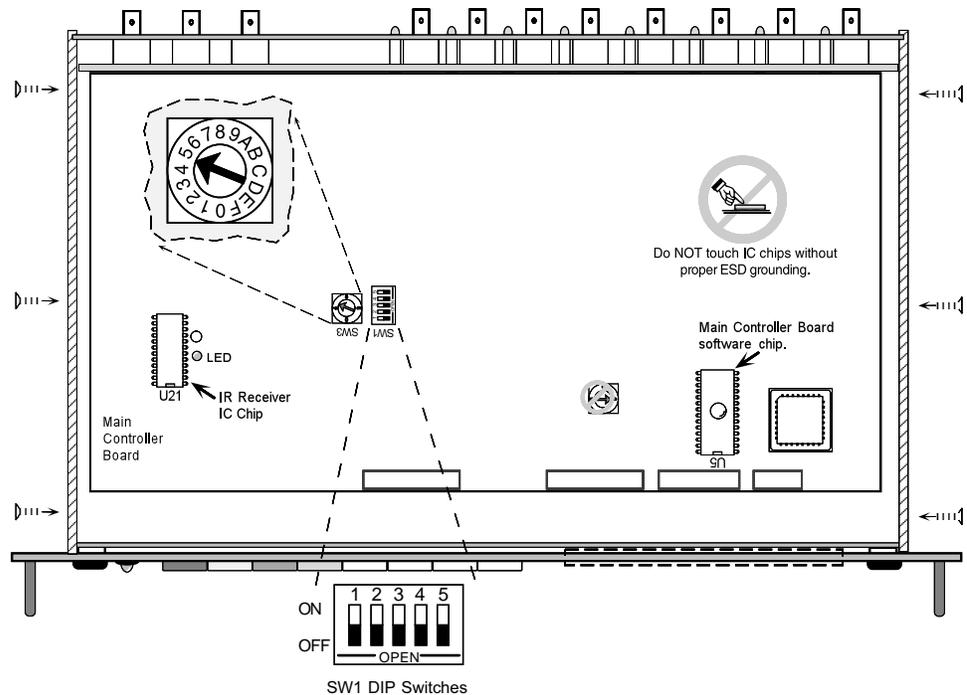
When set "OFF" - if the connected projector is in 'Display Mute' mode, the front panel's Input Select button will be illuminated.

**Switch 4:** When set "ON" - if the front panel's Display Power button is momentarily depressed, the connected projector will immediately power up/down without the default 2-second delay.

When set "OFF" - the front panel's Display Power button must be depressed for 2 seconds before the connected projector will power up/down.

### Changing the Host Baud Rate

Use the procedure on page B-3 to remove the System 8/10 PLUS cover.



1. With the cover removed, locate the Host Baud Rate switch SW3.



Do NOT touch any switches or electronic components, other than SW3 and switches 3 or 4 of SW1 - see previous page. This could seriously affect the operation of the switcher.

The factory setting for SW3 is 5 (9600 baud, 8-bit, no parity and 1 stop bit).

Other SW3 settings are listed below.

For 8-bit, no parity, 1 stop bit:	For 8-bit, odd parity, 1 stop bit:
Position 0 = 300 baud	Position 8 = 300 baud
Position 1 = 600 baud	Position 9 = 600 baud
Position 2 = 1200 baud	Position A = 1200 baud
Position 3 = 2400 baud	Position B = 2400 baud
Position 4 = 4800 baud	Position C = 4800 baud
Position 5 = 9600 baud	Position D = 9600 baud
Position 6 = 19200 baud	Position E = 19200 baud
Position 7 = 38400 baud	Position F = 38400 baud

2. Use a small screwdriver to rotate the switch to the position for the desired Host baud rate.
3. When finished, replace the System 8/10 PLUS cover (page B-3) and return the System 8/10 PLUS to normal operation.

## Installing the Infrared Remote IC Chip

Before starting this procedure, verify that power has been removed from the System 8/10 PLUS by removing the AC power cord.



Use ESD protection by grounding yourself with an approved wrist strap. An electrostatic discharge that is too small to be felt or seen is still capable of destroying or causing intermittent damage to IC circuits.

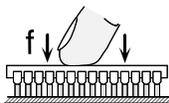
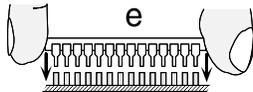
1. Prepare the switcher by first following the procedure "Removing the System 8/10 PLUS Cover" on page B-3.

2. With the switcher placed on a clean workspace, the power removed and the cover off, locate the vacant IC socket at U21 on the Main Controller Board. The picture below shows the left side of the switcher with the cover removed.

3. Using ESD protection, remove the IC chip from its packaging and examine it to verify that all pins ("legs") are straight and in perfect alignment.

4. Orient the chip with the socket, with the notch to the front of the switcher, as shown at U21 in the illustration.

5. Carefully align each pin on the chip to its corresponding female pin socket (see illustration "e" on the left).



6. With even pressure, press the chip into the socket (see illustration "f" on the left). If there is difficulty pressing it into the socket, see if any pins ("legs") are bent. If so, carefully remove the chip, straighten the leads and try again.

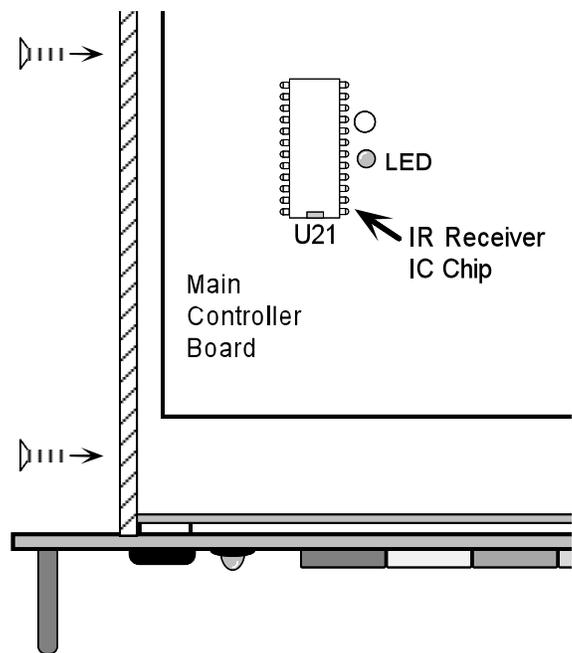
7. When the IC chip is installed, apply power to the System 8/10 PLUS by connecting the AC power cord.

8. Follow the steps on the next page to check for correct operation of the Infrared Remote system.

9. After checking the operation, replace the cover on the System 8/10 PLUS (page B-3). The switcher is now ready for normal operation.



The part number for this kit is 70-037-01.



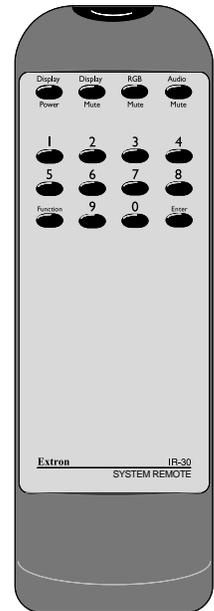
## Infrared Remote Control Operation



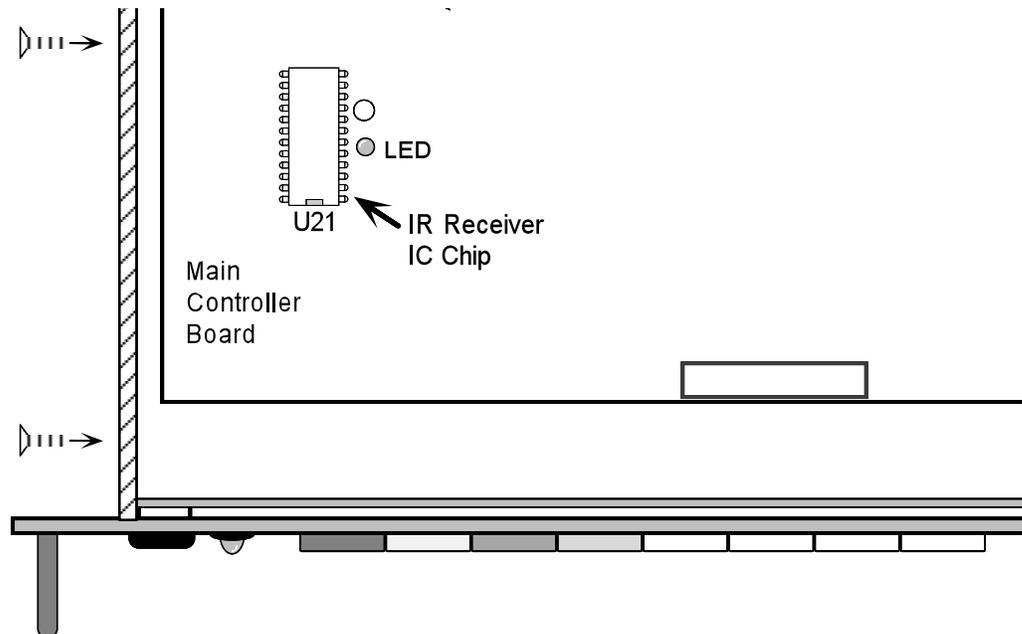
The IR-10 Remote control will also allow use of the Manual Remote 25-pin D-Sub port, whereas the IR-30 Remote will not.

Verify that batteries are installed in the IR-30 Remote Transmitter. Note that the buttons on the IR remote are in two groups.

- The four buttons across the top have the same names and functions as the four colored buttons on the System 8/10 PLUS front panel.
- The second group includes numbered buttons, as well as “Enter” and “Function” buttons. The numbered buttons are used to enter values, such as channel numbers. The “Enter” button is used to “send” the number to the switcher. The “Function” button is reserved for future use.



Whenever the System 8/10 PLUS is receiving an IR signal from the remote transmitter, the Main Power LED on the front panel blinks. The LED on the Main Controller board, next to the Infrared IC chip (U21), also blinks.



Check the IR-30 Remote operation as follows:

- Point the transmitter (remote control) in the direction of the left front of the System 8/10 PLUS and press each of the four top buttons, one at a time. For each button pressed on the transmitter, the corresponding switch on the front panel should light.
- To select an input channel, press the button(s) for the channel number followed by pressing **ENTER**. For example, to select input #3, press 3, **ENTER**. To select input #10, press 1, 0, **ENTER**.



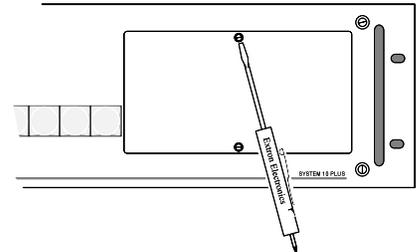
If the System 8/10 PLUS is looped, any available input channel is selected the same way. For example, if a System 10 has another switcher as a Slave input, selecting input channel #14 (1, 4, **ENTER**) will cause the System 10 PLUS Master to switch to the highest input (#10) and the Slave switcher will select its input #5.

## Changing the Projector Control Software Chip

Use this procedure when it is necessary to upgrade the Projector Control software. Before starting, verify that power has been removed from the System 8/10 PLUS by removing the AC power cord.



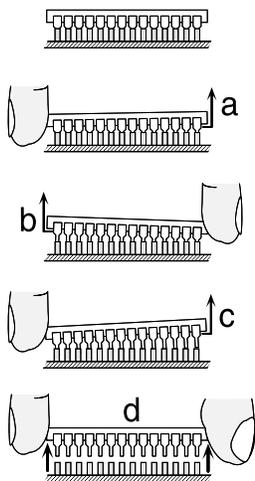
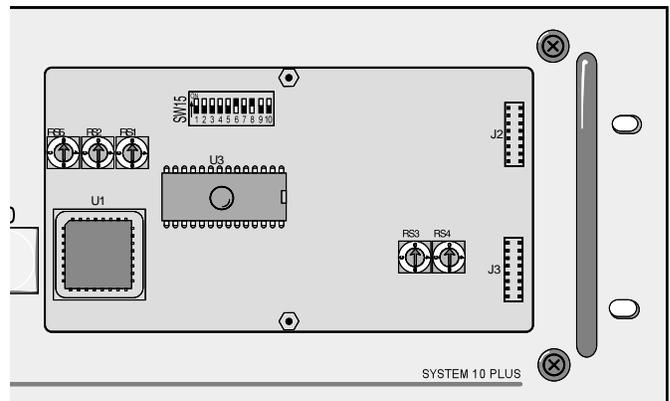
Use ESD protection by grounding yourself with an approved wrist strap. An electrostatic discharge that is too small to be felt or seen is still capable of destroying or causing intermittent damage to IC circuits.



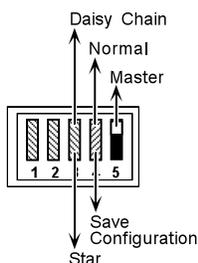
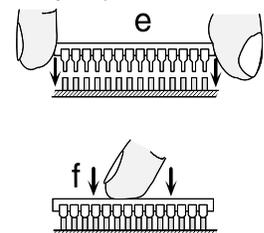
1. Use a small, flat-blade screwdriver to remove the Front Panel Access Cover.
2. Locate the software chip at U3 in the illustration below.
3. Use a chip puller or other appropriate tool to remove the software chip.



When placing the tool under the chip to begin pulling, be careful not to damage the circuit etches under the chip.



4. Ease the chip out in steps (see illustrations "a" to "d" on the left) by pulling up slightly on one end and then the other, as illustrated to the left. If you try to remove it too quickly, you may damage the chip and/or the circuit board.
5. With the chip out of its socket, check the area for circuit board damage.
6. Examine the new software chip to be sure that all pins ("legs") are straight and in perfect alignment.
7. Orient the new chip to the socket with the notch to the right, as shown at U3 in the illustration above.
8. Carefully align each pin on the chip to its corresponding female pin (see illustrations "e" and "f" on the right).
9. Using even pressure, press the chip into the socket. If there is difficulty pressing it into the socket, see if any pins ("legs") are bent. If so, carefully remove the chip (Step 4), straighten the leads and try again (Step 7).



10. On the rear panel of the System 8/10 PLUS, locate the Address Configuration DIP switches in the lower right corner. Set DIP switch #4 to the down position (see illustration to the left). This will reset the switcher.
11. When the software chip is installed, apply power to the System 8/10 PLUS by connecting the AC power cord. After power is ON for at least 15 seconds, set DIP switch #4 to the up position. The switcher has now been reset.
12. Replace the Access Cover and put the System 8/10 PLUS back in operation.

## Changing the Switcher Control Software Chip

Use this procedure when it is necessary to upgrade the Main Controller software. Before starting, verify that power has been removed from the System 8/10 PLUS by removing the AC power cord.

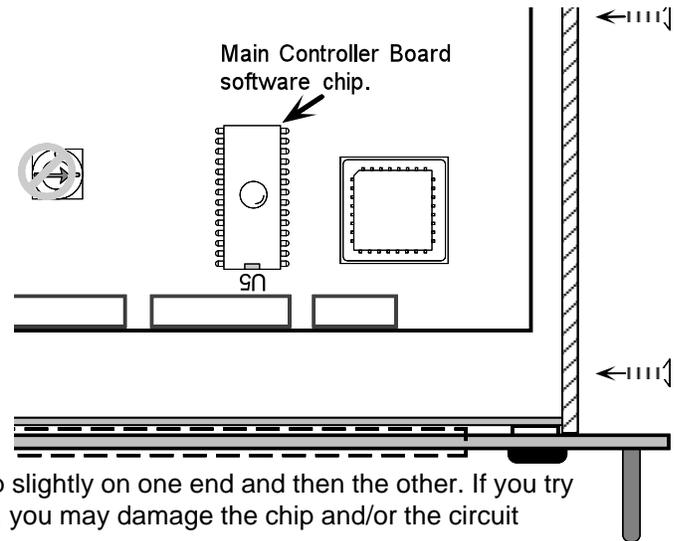


Use ESD protection by grounding yourself with an approved wrist strap. An electrostatic discharge that is too small to be felt or seen is still capable of destroying or causing intermittent damage to IC circuits.

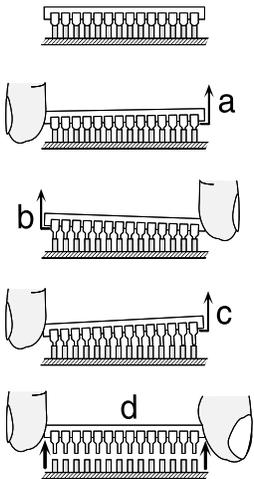
1. Prepare the switcher by first following the procedure "Removing the System 8/10 PLUS Cover" on page B-3.
2. With the switcher placed on a clean workspace, power removed and the cover off, locate the Software chip at U5 on the Main Controller Board. The picture below is the right, front corner of the switcher with the cover removed.
3. Use a chip puller or other appropriate tool to remove the software chip.



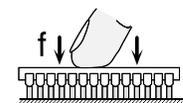
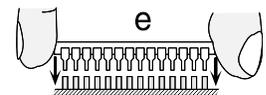
When placing the tool under the chip to begin pulling, be careful not to damage the circuit etches that run under the chip.



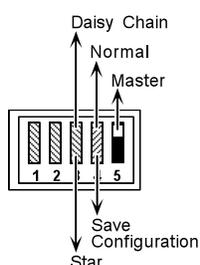
4. Ease the chip out in steps (see illustrations "a" to "d" on the left) by pulling up slightly on one end and then the other. If you try to remove it too quickly, you may damage the chip and/or the circuit board.
5. With the chip out of its socket, check the area for circuit board damage.
6. Examine the new software chip to be sure that all pins ("legs") are straight and in perfect alignment.
7. Orient the new chip with the socket with the notch to the front of the switcher, as shown at U5 in the illustration above.



8. Carefully align each pin on the chip to its corresponding female pin socket (see illustrations "e" and "f" on the right).
9. Using even pressure, press the chip into the socket. If there is difficulty pressing it into the socket, see if any pins ("legs") are bent. If so, carefully remove the chip (Step 4), straighten the leads and try again (Step 7).



10. On the rear panel of the System 8/10 PLUS, locate the Address Configuration DIP switches in the lower right corner. Set DIP switch #4 to the down position (see illustration to the left). This will reset the switcher.
11. When the software chip is installed, apply power to the System 8/10 PLUS by connecting the AC power cord. After power is ON for at least 15 seconds, set DIP switch #4 to the up position. The switcher has now been reset.
12. Replace the cover on the System 8/10 PLUS (page B-3). The switcher is now ready for normal operation.



## Enlever le couvercle du Système 8/10 Plus

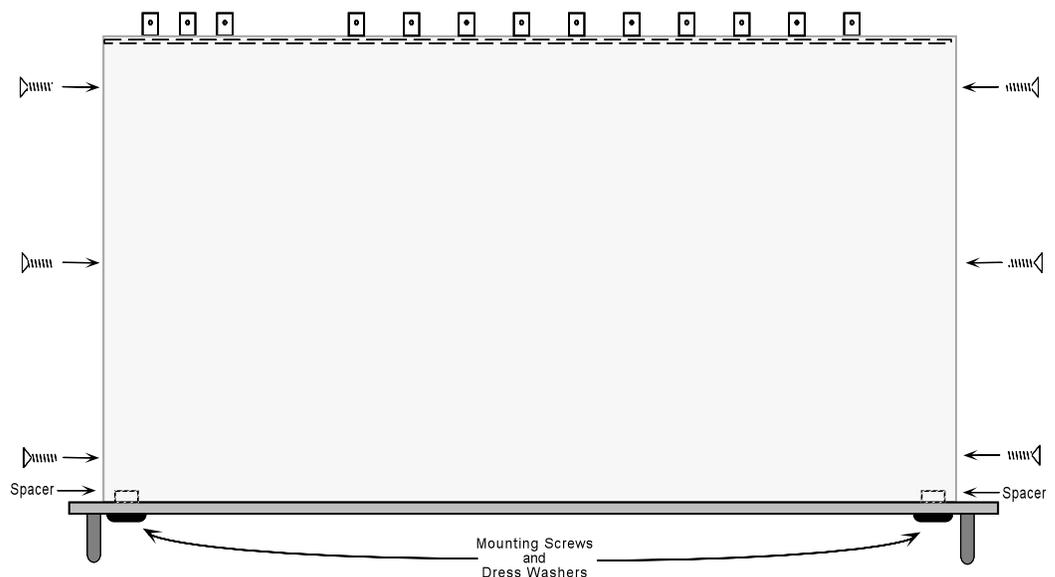
Si la configuration du Système 8/10 Plus doit être modifiée pour un différent projecteur, il est nécessaire d'accéder à la carte du Contrôleur Principal. De même, si le fusible de l'alimentation secteur doit être changé, on devra ouvrir l'appareil. Dans les deux cas, vous devez dans un premier temps enlever le couvercle supérieur du Système 8/10 Plus.

- 1/ Débrancher le cordon d'alimentation.
- 2/ Si le Système 8/10 Plus est monté en rack, détachez-le.
- 3/ Ôter les câbles d'entrée et de sortie.
- 4/ Mettre le Système 8/10 Plus sur une surface propre et enlever les 6 vis comme représenté sur la figure.
- 5/ Procéder à l'opération (configuration du système ou changement des fusibles).

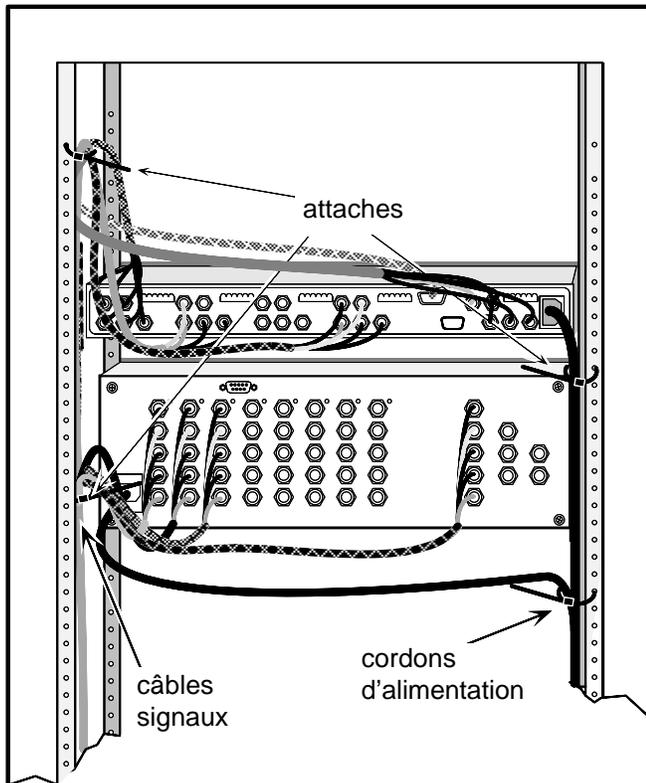


*NE PAS toucher les boutons ou les composants électroniques autres que ceux spécifiés. Cela pourrait sérieusement affecter l'opération du système.*

- 6/ Quand le travail à l'intérieur du Système 8/10 Plus est terminé, effectuer les opérations dans l'ordre inverse.



## Câbler un Système 8/10 Plus sur un rack



Quand vous fixez les câbles d'une unité à l'autre, veillez à ce que ces câbles ne soient pas "supportés" par le Système 8/10 Plus. Utilisez des attaches de manière à ce que les câbles soient fixés au dessus du panneau de branchement arrière. Tous les câbles non attachés peuvent provoquer des dommages aux utilisateurs, à l'équipement, et également aux câbles eux-mêmes.

L'illustration montre la vue arrière d'un système sur rack. Les câbles sur notre exemple sont fixés sur support au dessus des branchements de l'équipement. Cela permet une vue dégagée des panneaux arrière et évite que les câbles ne tombent sur l'équipement.



Assurez-vous qu'aucun poids sur l'arrière du Système 8/10 Plus ne dépasse 3.73 Kg. (10 lbs).



Les trous au-dessus et au-dessous du boîtier du Système 8/10 Plus sont destinés au refroidissement. NE PAS COUVRIR ces trous car cela pourrait endommager des composants vitaux.



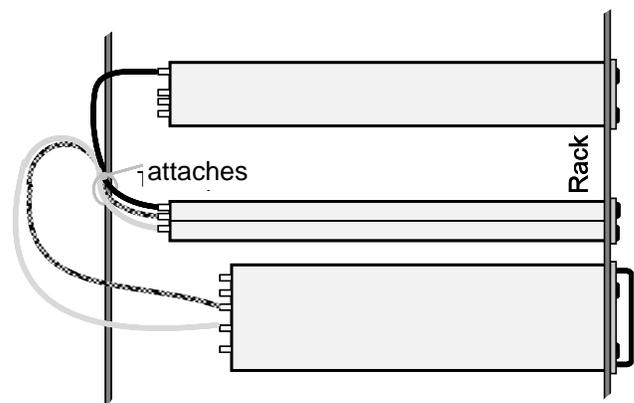
La température ambiante maximale ne doit pas dépasser 40°C.



Le rack et tout équipement monté sur ce support doivent être branchés selon les normes électriques en vigueur.



Si possible, essayer de séparer les cordons de secteur et les câbles signaux ( les cordons d'alimentation peuvent être mis sur la droite et les câbles signaux sur la gauche ).



## Entfernung der System 8/10 Plus Abdeckung

Die Abdeckung des *System 8/10 Plus* muß entfernt werden wenn für eine andere VDU eingerichtet, und dadurch Zugang zum Hauptcontroller benötigt wird, oder wenn die Hauptsicherung ausgetauscht wird.

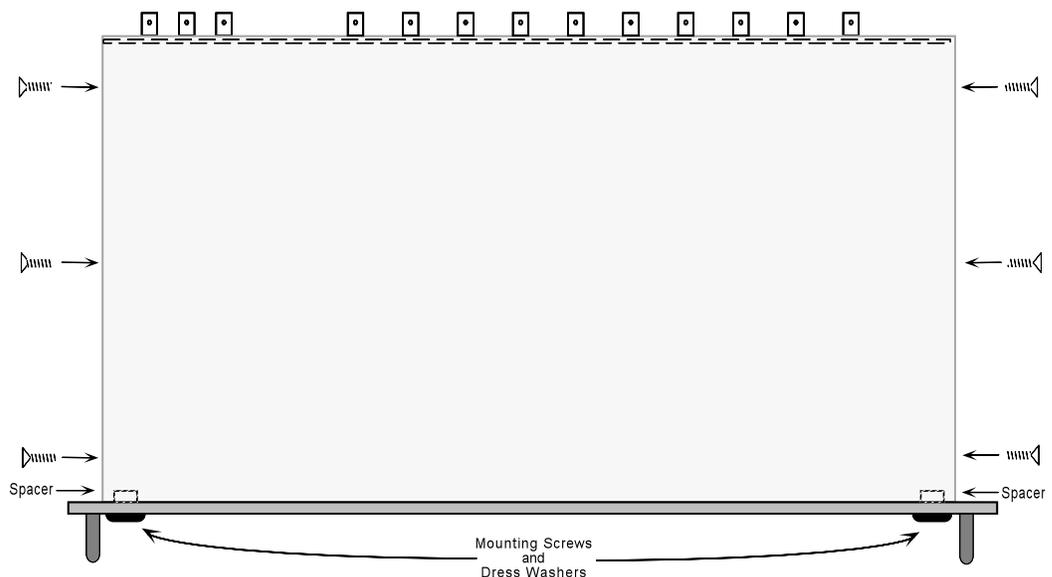
1. Ziehen Sie den Netzstecker.
2. Falls eingebaut, entfernen Sie *System 8/10 Plus* aus dem Gestell.
3. Eingangs- und Ausgangskabel entfernen.
4. Stellen Sie *System 8/10 Plus* auf einen sauberen Untergrund und entfernen Sie die sechs (6) Schrauben, siehe Abbildung.
5. Arbeiten erledigen.

(Entweder Projektor Konfigurieren oder Sicherung ersetzen.)

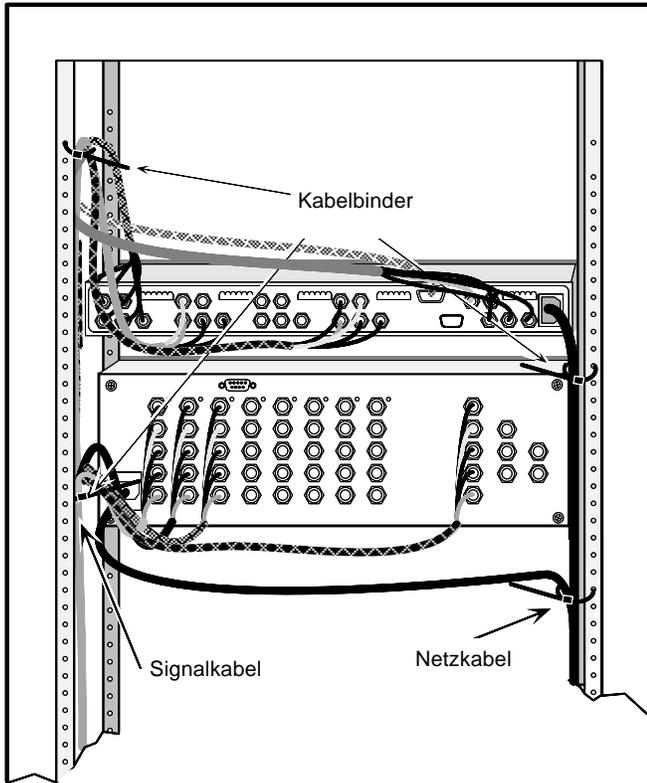


*Berühren Sie keine Schalter oder Bauteile außer die, die angegeben wurden. Es könnte sonst ernsthafte Auswirkungen auf das System haben.*

6. Wiederholen Sie die Schritte 1-5 in umgekehrter Reihenfolge um die Abdeckung wieder zu befestigen.



### Verkabelung vom System 8/10 PLUS innerhalb eines Gestells



Wenn Sie Kabel innerhalb eines Gestells von einem Gerät zum anderen verlegen, sollen diese Kabel nicht vom System 8/10 PLUS gehalten werden.

Verwenden Sie Kabelbinder oder ähnliches um die Kabel an einem Punkt zu befestigen der höher liegt als die Anschlüsse an der Rückseite des Gerätes.

Kabel die lose herabhängen stellen eine Gefahrenquelle für Mensch und Gerät dar.

Die Abbildung zeigt die Rückansicht eines Systemgestells.

Das Beispiel zeigt, daß die Kabel an einem Punkt befestigt sind, der höher liegt als die Anschlüsse an der Rückseite des Gerätes.

Dies ermöglicht eine freie Übersicht der Rückseite und verhindert, daß das Gewicht der Kabel das Gerät belastet.



Vermeiden Sie eine Belastung der System 8/10 PLUS Rückseite von mehr als 3,73 kg.



Die Löcher an der Ober- und Unterseite des System 8/10 PLUS dienen der Kühlung. Bedecken Sie diese Löcher nicht da eine Überhitzung der wichtigen Bauteile erfolgen kann.



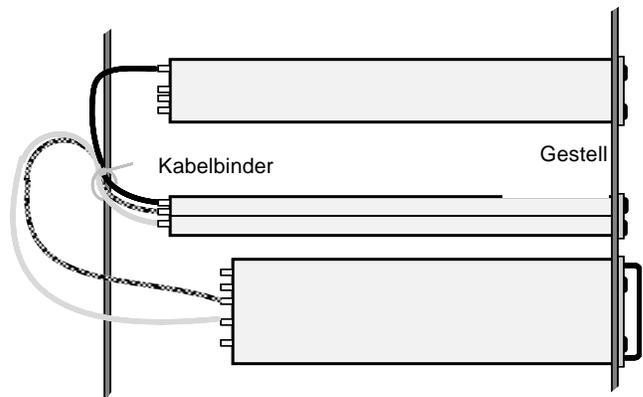
Die maximale Umgebungstemperatur beim Betrieb liegt bei 40 Grad °C.



Das Gestell, und die sich darin befindlichen Geräte müssen den landesüblichen Bestimmungen entsprechend geerdet werden.



Wenn möglich, verlegen Sie die Netz- und Signalkabel getrennt (Netzkabel an der rechten Seite und Signalkabel an der linken Seite).





**Glossary of Terms**

- AC** – Alternating Current –  
Flow of electrons that changes direction alternately.
- ADA** – Analog Distribution Amplifier – A device that takes in one signal and distributes it to several outputs without “tying” those outputs together (buffered).
- Adapter** – A linking device which allows two dissimilar devices to connect physically, and/or communicate electronically.
- AMPS** – (Amperes) A unit of measurement for current.
- Analog (Analogue)** – A continuous action, or movement that takes time to change from one position to another. Standard audio and video signals are analog. An analog signal has an infinite number of levels between its highest and lowest value. (Not like digital, where changes are by steps.)
- ANSI** – American National Standards Institute
- ASCII** – American Standard Code for Information Interchange. The standard code consisting of 7-bit coded characters (8 bits including parity check), utilized to exchange information between data processing systems, data communication systems, and associated equipment. The ASCII set contains control characters and graphic characters.
- Aspect Ratio** – The relationship of the horizontal dimension to the vertical dimension of a rectangle. In viewing screens, standard TV is 4:3, or 1.33:1; HDTV is 16:9, or 1.78:1. Sometimes the “:1” is implicit, making TV = 1.33 and HDTV = 1.78.
- Attenuation** – The decrease in magnitude (of a signal).
- Audio Follow** – A term used when audio is tied to other signals, such as video, and they are switched together. (The opposite of Breakaway)
- Balanced Audio** – A method that uses three conductors for one audio signal. They are plus (+), minus (-) and ground. The ground conductor is strictly for shielding, and does not carry any signal. Also called Differential Audio.
- Bandwidth** – A frequency range, or “band” of frequencies, within which a device operates. In audio and video, it is the band of frequencies that can pass through a device without significant loss or distortion. The higher the bandwidth, the sharper the picture; low bandwidth can cause a “fuzzy” picture.
- Black Level** – More commonly referred to as “brightness”, the Black Level is the level of light produced on a video screen.
- Blanking** – The turning off of the electron beam that scans the image onto the screen. When the beam completes a scan line it must return (retrace) back to the left. During this time, the beam must be turned off (horizontal blanking). Similarly, when the last line has been scanned at the bottom of the screen, the beam must return to the upper left. This requires vertical blanking.
- Blooming** – Most noticeable at the edges of images on a CRT, “blooming” is when the light hitting the screen phosphors is so intense that it overdrives them. The edges of an image seem to exceed its boundaries. Thin lines and sharp edges may look thick and fuzzy. This may be caused by the brightness being set too high, or by a high voltage problem.
- BNC** – It is a cylindrical Bayonet Connector which operates with a twist-locking motion. Two curved grooves in the collar of the male connector are aligned with two projections on the outside of the female collar. This allows the connector to be locked in place without the need of tools.
- Breakaway** – The ability to separate audio and video signals for the purpose of switching them independently. For example: an audio and video signal from the same source may be “broken away” and switched to different destinations. This is the opposite of the term “audio follow”.

- Brightness** – Usually refers to the amount, or intensity of video light produced on a screen. Sometimes called “black level”.
- Buffer** – Generally referred to as a unity gain amplifier used to isolate the signal source from the load. This is for both digital and analog signals.
- C**– In S-Video, “C” is an abbreviation for Chrominance, or the color information. (“Y” is for Luminance, or the brightness.)
- Cable Equalization** – The method of altering the frequency response of a video amplifier to compensate for high frequency losses in cables that it feeds. (See Peaking.)
- Capacitance** – The storing of an electrical charge. At high frequencies, capacitance that exists in cables also represents a form of impedance.
- Chroma** – The characteristics of color information, independent of luminance intensity. Hue and saturation are qualities of chroma. Black, gray, and white objects do not have chroma characteristics.
- Chrominance Signal** – Part of a television signal containing the color information. Abbreviated by “C”.
- Coaxial Cable** – A two-conductor wire in which one conductor completely wraps the other with the two separated by insulation. Constant impedance transmission cable.
- Color** – An Extron adjustment that is used to control color intensity.
- Component Video** – Our color television system starts with three channels of information; Red, Green, & Blue (RGB). In the process of translating these channels to a single composite video signal they are often first converted to Y, R-Y, and B-Y. Both 3-channel systems, RGB and Y, R -Y, B -Y are component video signals. They are the components that eventually make up the composite video signal. Much higher program production quality is possible if the elements are assembled in the component domain.
- Composite Sync** – A signal combining horizontal and vertical sync pulses, and equalizing pulses, with no picture information. Sometimes called “C”, “S” (as in RGBS) or “HV”.
- Composite Video** – An all-in-one video signal comprised of the luminance (black and white), chrominance (color), blanking pulses, sync pulses and color burst.
- Contrast** – The range of light and dark values in a picture, or the ratio between the maximum and the minimum brightness values. Low contrast is shown mainly as shades of gray, while high contrast is shown as blacks and whites with very little gray. It is also a TV monitor adjustment which increases or decreases the level of contrast of a displayed picture. Also called “white level”.
- Crosstalk** – Interference, usually from an adjacent channel, which adds an undesirable signal to the desired signal.
- Crosstalk Isolation** – Attenuation of an undesired signal introduced by crosstalk.
- CRT (Cathode Ray Tube)** – A vacuum tube that produces light on a screen when energized by the electron beam from inside the tube. A CRT has a heater element, cathode, and grids in the neck of the tube, making up the “gun”. An electron beam is produced by the gun and is accelerated toward the screen surface of the tube. The screen’s inside surface is coated with phosphors that light up when hit by the electron beam. The CRT is more commonly known as the picture tube. Some color CRTs have three guns – for red, green and blue colors.
- DAT (Digital Audio Tape)** – A method developed by Sony and Hewlett-Packard for recording large amounts of information in digital form on a small cassette tape. It uses a rotating helical read/write head, similar to the technique used on a VCR.
- dB (Decibel)** – The standard unit used to express gain or loss of power. It indicates the logarithmic ratio of output power divided by input power. A power loss of 3 dB is an attenuation of half of the original value. The term “3dB down” is used to describe the “half power point”.

**DC** – Direct Current – The flow of electrons in one direction.  
A connector with rounded corners and angled ends, taking on the shape of the letter “D”. Commonly used in computers and video.

**Decibel** – See dB.

**Decoder** – A device used to separate the RGBS (Red, Green, Blue and Sync) signals from a composite video signal. Also called NTSC Decoder.

**Detail** – An Extron Technologies adjustment that enhances/improves image sharpness.

**Differential Audio** – See Balanced Audio.

**Digital Audio Tape** – See DAT.

**DIN Connector** – An acronym for Deutsche Industrie Norm - a round connector with notches, or keyed that can be in several sizes: 4-pins, 5-pins, 8-pins, etc. A convenient way of combining all the signal lines in one connector, 4-pin DIN connectors are often used for S-Video.

**Display Device** – A projector or monitor.

**Distribution Amplifier (DA)** – A device that allows connection of one input source to multiple output sources such as monitors or projectors.

**DVD** – (Digital Versatile Disc or Digital Video Disc) An optical disc system about the size of a CD ROM, but capable of storing an entire movie. The technology uses MPEG-2 compression. Typical capacity for these discs is 4.5 GB, or about 133 minutes of digital video.

**FCC** – Federal Communications Commission –  
A unit of the U.S. Government that monitors and regulates communications.

**Field** – In interlaced video, it takes two scans on a screen to make a complete picture, or a “Frame”. Each scan is called a “Field”. Sometimes these are referred to as “field 1 and field 2”.

**Flicker** – Flicker occurs when the electron gun paints the screen too slowly, giving the phosphors on the screen time to fade.

**Frame** – In interlaced video, a Frame is one complete picture. A Frame is made up of two fields, or two sets of interlaced lines.

**Frequency Range** – Refers to the low-to-high limits of a device, such as a computer, projector or monitor. Also “bandwidth”.

**Gain** – A general term used to denote an increase in signal power or voltage produced by an amplifier in transmitting a signal from one point to another. Gain is usually expressed in decibels above a reference level. Opposite of Attenuation.

**Genlock** – A method of synchronizing video equipment by using a common, external sync, or “Genlock” signal.

**H or H/V** – Horizontal (H) sync, or Horizontal and Vertical sync combined (H/V). On connector panels, H identifies the connector for Horizontal Sync and H/V means it is also used for combined, or “composite” Horizontal and Vertical Sync.

**Hertz (Hz)** – A measure of frequency in cycles per second.

**High Impedance** – (Hi Z or High Z) – In video, when the signal is not terminated locally and is going to another destination where it will be terminated. In video, Hi Z is typically 10k ohms or greater.

**Horizontal Rate** – (Horizontal Frequency) The number of complete horizontal lines, including trace and retrace, scanned per second. Typically shown as a measure of kHz.

**Horizontal Resolution** – Smallest increment of a video picture in the horizontal plane is a scan line. The number of scan lines is dependent upon the video bandwidth and is measured in frequency. The number of lines it takes to scan an image onto the screen.

**Luminance** – This is the signal that represents brightness in a video picture. Luminance is any value between black and white. In mathematical equations, luminance is abbreviated as “Y”. (See Chrominance.)

**Matrix Switcher** – In audio/video, a means of selecting an input source and connecting it to one or more outputs. Like a Switcher, but with multiple inputs and multiple outputs.

**M (Mega)** – An abbreviation for one million. A megabyte is actually 1024K, or roughly a million bytes (1,048,076 to be exact [1024 x 1024]).

**MHz (as in 8 MHz)** – An abbreviation for megahertz. This is a unit of measurement and refers to a million cycles per second. Video bandwidth is measured in megahertz.

**Milli (m)** – Abbreviation for one thousandths. Example: 1 ms = 1/1000 second.

**Monitor** – A) A TV that receives a video signal directly from a VCR, camera or separate TV tuner for high quality picture reproduction. It does not include a tuner.  
B) A video display designed for use with closed circuit TV equipment.  
C) Device used to display computer text and graphics.

**Monochrome Signal** – A “single color” video signal— usually a black and white signal, or sometimes the luminance portion of a composite or component color signal.

**Motion** – In video, the term “motion” is used as opposed to “still” because there can be a difference in the way these two types of video are processed for the best viewing results, especially when the video is line-doubled or line-quadrupled. Motion video includes movies and TV programs, while still would include text and slide presentations. See Still.

**Non-Interlaced** – Also called progressive scan – a method by which all the video scan lines are presented on the screen in one sweep instead of two (also see Interlaced).

**NTSC** – National Television Standards Committee. Television standard for North America and parts of South America. 525 lines/60 Hz (60 Hz Refresh).

**NTSC Decoder** – See Decoder.

**Output** – The product of an operation by a device going to some external destination, such as another device, a video screen, image or hard copy.

**PAL ( Phase Alternate Line)** – The phase of the color carrier is alternated from line to line. It takes four full pictures for the color to horizontal phase relationship to return to the reference point. This alternation helps cancel out phase errors, the reason the hue control is not needed on PAL TV sets. PAL, in its many forms is used extensively in Western Europe.

**Peak-to-Peak** – (abbreviated p-p) The amplitude (voltage, for example) difference between the most positive and the most negative excursions (peaks) of a signal.

**Peaking** – A means of compensating for mid and high frequency RGB Video Bandwidth response in data monitors and projectors and for signal losses due to cable capacitance. When using the Peak enhancements, use the following guidelines for proper output settings: Use 50% with all computer frequencies between 15-125 kHz at any cable length. Use 100% with high frequency computers of 36 kHz or higher with cable lengths 75 feet or greater.

**Pinout** – An illustration or table that names signals, voltages, etc. that are on each pin of a connector or cable.

**Plenum Cable** – Cable having a covering that meets the UL specifications for resistance to fire.

**PLUGE** – (Picture Line Up Generation Equipment) – This is the name of a test pattern that assists in properly setting picture black level. PLUGE can be part of many test patterns. The phrase and origination of the test signal are both credited to the BBC.

**Power (Electrical)** – The dissipation of heat by passing a current through a resistance. Measured in Watts (W), it is expressed by Ohm's law from the two variables: Voltage (E) and Current (I). i.e.  $P = I^2 \times R$ , or,  $P = E^2/R$  or  $P = E \times I$

**Progressive Scan** – See non-interlaced.

**Resolution** – The density of lines or dots that make up an image. Resolution determines the detail and quality in the image. (units per distance or units per area)

**A)** A measure of the ability of a camera or video system to reproduce detail.

**B)** In video, generally called horizontal resolution. It can be evaluated by establishing the limit to which lines can be distinguished on a test pattern. A higher resolution value means a broader frequency band of the video signal.

**C)** A measure of the amount of detail that can be seen in an image. Often incorrectly expressed as a number of pixels; more correctly it is the bandwidth.

**RGB ( Red, Green, Blue)** – The basic components of the color television system. They are also the primary colors of light, not to be confused with Cyan, Magenta, and Yellow, the primary pigments. Also called the "Additive Color Process".

**RGB Video** – A form of color video signal (red, green, blue) distinctly different from the composite color video used in standard television sets. RGB can be displayed only on a color monitor that has a separate electron gun for each of these primary colors. Some color television sets use only one gun. RGB monitors are noted for their crisp, bright colors and high resolution. RGB Video can be three different ways: RGSB (sync is on the green signal), RGBS (sync is separate from the colors) and RGBHV (sync is separate from the colors and the horizontal and vertical are separate signals).

**RS-232** – An Electronic Industries Association (EIA) serial digital interface standard specifying the characteristics of the communication path between two devices using D-type connectors. This standard is used for relatively short range communications and does not specify balanced control lines.

**RS-422** – An EIA serial digital interface standard which specifies the electrical characteristics of balanced voltage digital interface circuits. This standard is usable over longer distances than RS-232. It is also used as the serial port standard for Macintosh computers. This signal governs the asynchronous transmission of computer data at speeds of up to 920,000 bits per second.

**Scan Converter** – Also called "video converter" or "TV converter", a scan converter is a device that changes the scan rate of a source video signal to fit the needs of a display device. Examples: computer-video to NTSC (TV), or NTSC to computer-video.

**SECAM** – (Sequential Couleur Avec Memoiré) – Translated as "Sequential Color with Memory". A composite color transmission system that potentially eliminates a need for both a color and hue control on the monitor. One of the color difference signals is transmitted on one line and the second is transmitted on the second line. Memory is required to obtain both color difference signals for color decoding. This system is used in France, Africa, Asia and many Eastern European countries.

**Serial Port** – An input/output connection on the computer that allows it to communicate with other devices in a serial fashion – data bits flowing on a single pair of wires. The serial port is most often used with RS-232 protocol.

**SMPTE** – (Society of Motion Picture and Television Engineers) – A global organization, based in the United States, that sets standards for baseband visual communications. This includes film as well as video standards.

**SMPTE Pattern** – The video test pattern made up of color, black and white bands.

**Still** – In video, the term "still" is used as opposed to "motion" because there can be a difference in the way these two types of video are processed for the best viewing results, especially when the video is line-doubled or line-quadrupled. Still video includes text and slide presentations, while motion would include movies and TV programs. See Motion.

- Strike** – In the Audio/Video business, this is the tearing down of an installation or show.
- Sync** – In video, a means of synchronizing signals with timing pulses to insure that each step in a process occurs at exactly the right time. For example: Horizontal Sync determines exactly when to begin each horizontal line (sweep) of the electron beam. Vertical Sync determines when to bring the electron beam to the top-left of the screen to start a new field. There are many other types of sync in a video system. (Also called Sync Signal or Sync Pulse.)
- S-VHS** – (Super-Video Home System) A high band video recording process for VHS that increases the picture quality and resolution capability. See S-Video.
- S-Video** – The video signal is separated into the Luminance (Y, black and white information) and the Chrominance (C, color information).
- Switcher** – In audio/video, a means of selecting an input source and connecting it to an output device or a system. Also see Matrix Switcher.
- System Switcher** – A switching device that communicates with other components in a system. For example, with communications between a switcher and a projector, the projector's remote control can command the switcher to change inputs. Also, the projector can be turned on/off by a command from the switcher.
- Terminal** – A device typically having a keyboard and display that is capable of sending text to and receiving text from another device, a network, etc.
- Termination** – A load, or impedance at the end of a cable or signal line used to match the impedance of the equipment that generated the signal. The impedance absorbs signal energy to prevent signal reflections from going back toward the source. In the video industry, termination impedance is typically 75 ohms.
- Tint** – See Hue.
- Touch Panel** – A control panel with a flat surface with areas (usually marked off) that act as switches, or controls. May also be called "Touch Screen".
- V** – Vertical (as in RGBHV), or the Vertical Sync connector on a panel. This is used when the sync is separated into Horizontal and Vertical components.
- Video Converter** – See Scan Converter.
- Vertical Interval** – The synchronizing information which is presented between fields, and then signals the picture monitor to return to the top of the screen to start another vertical scan.
- Y** – In S-Video, "Y" is an abbreviation for Luminance. ("C" is for chrominance.)
- Z** – A symbol for impedance.



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## Extron's Warranty

Extron Electronics warrants the product against defects in materials for a period of two years and defect in workmanship for a period of two 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:

Extron Electronics  
1230 South Lewis Street  
Anaheim, CA 92805, U.S.A.

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 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 that some provisions of this warranty may not apply to you.



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