Extron Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Manual

System 5cr

System Switcher

Precautions

Safety Instructions • English

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

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

Caution

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

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

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

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

Consignes de Sécurité • Français

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

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

Attention

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

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

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

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

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

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.

Precaucion

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

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

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

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

Warning

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

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

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

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

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

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

Avertissement

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

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

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

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

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

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

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 Netzkabel 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. Im Inneren des Gerätes sind keine Teile enthalten, die vom Benutzer gewartet werden können. Zur Vermeidung eines elektrischen Schocks 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 die gleiche 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 puentearia ni eliminaria.

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

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

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

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

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

QUICK START FOR SYSTEM 5CR SWITCHER

Connections

1. **Rear Panel Inputs PC2 and PC3** – Connect RGBS/ RGBHV sources, such as from Computer-Video Interfaces. Connect Audio if available.

2. **Rear Panel Inputs VID1 & VID2** – Connect Composite Video or S-video sources and Audio, if available. (Use Setup and then procedure "b" below to select Composite or S-video.)

3. **Outputs** – Connect RGBS/RGBHV, S-video and Composite Video to the Display Device (Projector), as required. Connect Audio Preamp output to the input of a sound system or Amplified Out directly to Speakers.

4. **Other** – Connect RS-232 Host, SCP 100(s), Power Sensor, Room/Relay control and IR Emitter or Broadcaster.

5. **Front Panel Input PC1** – Connect a VGA and Audio source (Laptop) to this input at any time.

6. **Power** – Apply power to the System 5cr and other devices.

7. **Setup** – Follow the procedures below to clear or set up Audio levels, VID1 & VID2 input formats and IR learning (Projector control, etc.)

Rear panel labels: PC2 Input (RGBHV), PC2 Audio, S-video, Audio, Composite, RGBHV Output, Relay contacts for Room button, IR Emitter, or Optional IR Broadcaster, External control port, PC3 Input (RGBHV), PC3 Audio, Composite, Audio, S-video, S-video Output, Composite Video Output, Audio Output, Optional SCP 100 Remote Keypads, Optional Power Sensor, Stereo Speakers

Front panel labels: Commands **learned** from Display IR remote, Composite or S-video (use Setup Mode), PC1 Input - Audio & VGA (Laptop), IR Transmit & Setup LEDs, Room controls RELAY connector (rear), RGB inputs, Master Volume control (after input Setup), IR Sensor & Learning Port

Setup Mode procedures

Enter Setup Mode, and then continue to procedure a, b, or c.

Use Setup Mode for each of the following procedures. To enter Setup Mode, press and **hold all 3 Display buttons** (Power/Mute/Mode) on the front panel for 2 seconds. The **Config** LED lights. Continue to Clear, or to procedure a, b or c. Once in Setup Mode (Config LED still On), you may move from one procedure to another without returning to Normal operation. To **Exit** Setup Mode, hold the **same 3 Display buttons** for 2 sec., or wait for 20 second time-out (3 LEDs blink during the last 5 seconds).

Enter Setup Mode — Normal Mode → Press all three for 2 seconds → Config LED On → go to procedure: a - Audio attenuation, b - VID1/VID2 format, c - IR learning. Time out if no activity. TX / Config / Retry — All three LEDs flash 5 seconds.
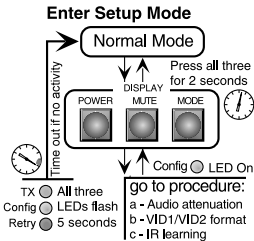
To Clear existing configuration(s) (to factory default)
From Setup Mode, double-click the Room button. The Room LED blinks for 8 seconds. During that time, do one of the following:
Clear One – press the desired button to clear **only** its **IR** configuration.
**Clear ALL** (IR & other settings) – press **all 3 Display buttons** 2 seconds. To **Exit Clear**, press the **Room** button.

a - Preset Attenuation for Audio Inputs – Audio must be present on each input, playing a loud passage from each source, then use the following procedure to set each input.
1a. Double-click (press twice) the button for the Input to be adjusted. Its LED will **blink** continuously.
2a. Adjust **Volume** knob **up** (cw) until **Clip** LED is On or blinking frequently with sound level.
3a. Adjust **Volume** knob **down** (ccw) just until **Clip** LED is Off or blinks occasionally as the level peaks.
4a. Press the **Input** button again to **save** the setting.
5a. Repeat steps 1a through 4a for each audio input.
6a. While still in **Setup** mode, you may move directly to another procedure, or exit to normal mode.
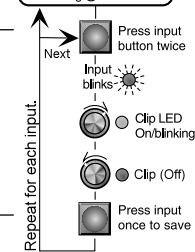
b - Select input format for VID1 & VID2 (default = comp. video) In Setup Mode, do the following:
1b. Press & **hold** the **Room** button until finished with this operation. After 2 seconds, one of the VID1 LEDs lights. (During this operation, the appropriate LED lights to indicate the selected format.)
2b. Press **VID1** input button to toggle between VID (Comp. Video) and Y/C (S-video) formats.
3b. **Repeat** step 2b to select the format for **VID2** input.
4b. Release the **Room** button to return to **Setup** mode.
5b. While still in **Setup** mode, you may move directly to another procedure, or exit to normal mode.
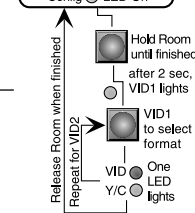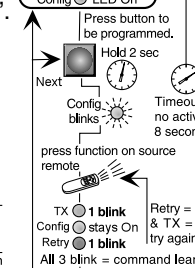
c - Learn Infrared Signals from other devices' remotes. In Setup Mode, do the following:
1c. Press the System 5 button to be programmed for 2 seconds. **Config** LED **blinks** to indicate "ready".
2c. Point the IR source remote control **directly** at the System 5 IR Remote window and press the button for the signal to be "learned". **Config** remains **On** while **TX** & **Retry** LEDs **blink** to indicate that the operation is complete. (If Retry = On and TX - Off, repeat this step.)
Note: The Display Power button can learn 2 functions. See LED codes below for other responses.
3c. **Repeat** steps 1c and 2c to program the next button.
4c. While still in **Setup** mode, you may move directly to another procedure, or exit.

Side panels

a - Preset Attenuation for Audio Inputs — Setup Mode Config LED On. Next → Press input button twice → Input blinks → Clip LED On/blinking → Clip (Off) → Press input once to save. Repeat for each input.

b - VID/S-VID Format — Setup Mode Config LED On. Hold Room until finished, after 2 sec, VID1 lights. VID1 to select format. VID — One LED lights. Y/C. Release Room when finished. Repeat for VID2.

c - Infrared Learning — Setup Mode Config LED On. Press button to be programmed. Hold 2 sec. Next → Config blinks. Timeout if no activity 8 seconds. press function on source remote. TX 1 blink, Config stays On, Retry 1 blink. Retry = blink & TX = Off, try again. All 3 blink = command learned.

LED Display codes

	Setup Mode	Ready to learn IR	Learned Ok	Try again	Ready to learn power off	No IR Subcarrier	Timeout Exit
TX	Off	Off	Blink Once	Off	Off	Off	Blink 10 times
Config	On	Blinking	On	On	Blinking	On	Blink 10 times
Retry	Off	Off	Blink Once	Blink Once	Blinking	Blinking	Blink 10 times
	Ready for any type of configuration	Press button for function on source remote	Continue with setup or exit.	Press same source remote button again.	Double-click Display Power button on System 5 panel and press power button on source remote.	Press same System 5 button again & repeat IR source command.	Press any button to stay in Setup Mode.

System 5cr Switcher
User's Manual

Chapter One
Introduction to System 5cr

What is the System 5cr ?

Control of the Entire A/V System

Infrared Learning

Features & Options

Specifications

What is a System 5*cr* Switcher?

Throughout this manual, the terms System 5 and System 5*cr* are both used to refer to the same product.

The System 5 provides central control for small audio/video installations. The five inputs accept video formats from composite, S-video and computer-video sources, together with line-level audio. In addition to being a video/audio switcher, the System 5 combines the functions of several devices, including projector control for LCD, DLP and Plasma Displays. A "room" function allows control of such things as lighting or a display screen and infrared "learning" adds control for one of many different projectors.
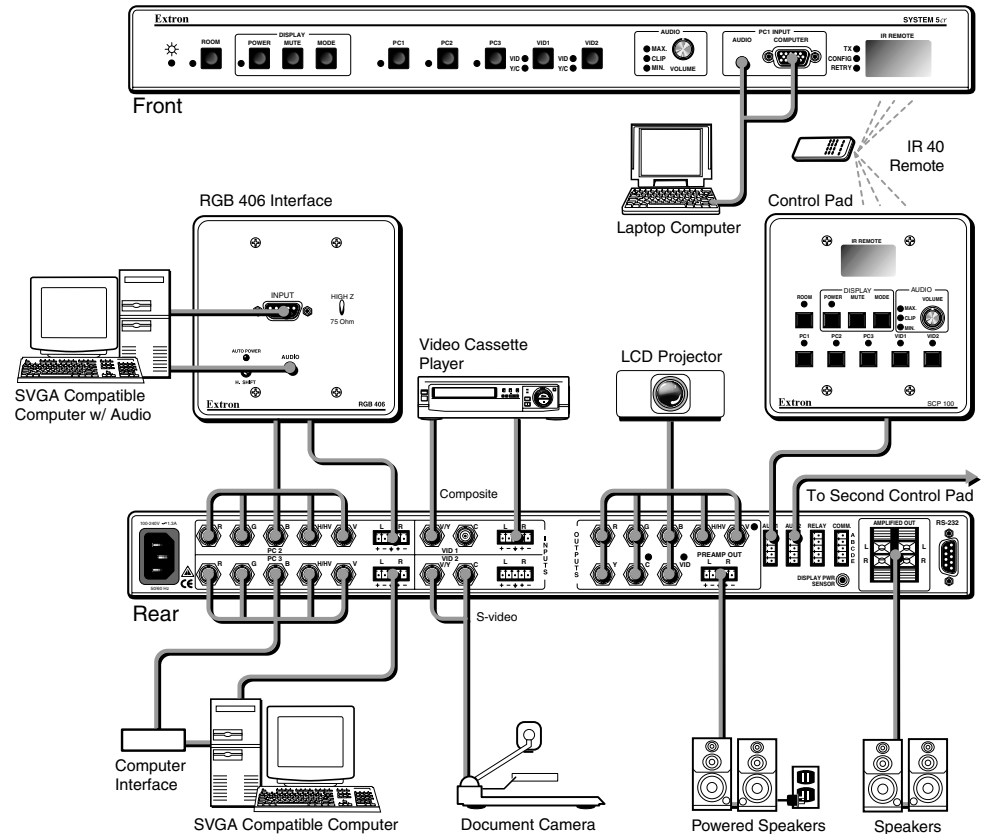

Figure 1-1. Example of a System 5 as part of a video/audio system.

Controlling the System

The System 5 functions as a switcher as it comes out of the box. However, to have projector control, it must be programmed. This can be done by learning projector IR commands or by loading a set of commands from Extron's IR library into its memory. The IR library, as well as the latest control software is available at www.extron.com. Control of the System 5 and other devices can be done in several ways:

• *The front panel*
• *Windows® control software from a PC*
• *Through RS-232 port by a PC, a touch screen panel, or any other device capable of sending and receiving the serial port protocol.*
• *Optional control pads (SCP 100) can be mounted in a wall, or podium, and hard-wired to the System 5. Each SCP 100 replicates the front panel functions and can receive IR signals, and pass them to the System 5.*
• *The IR 40 remote control has each of the System 5 front panel functions.*

Infrared Learning for System Control

The IR receiver window on the front panel also serves as a learning port to add IR signals from other sources to the System 5 panel functions. Then, when a panel function is selected, the learned IR signal is transmitted into the room through the hard-wired IR emitter, or the optional IR Broadcaster, to be received by the projector. IR commands for the projector can be associated with each of the Display buttons (Power, Mute and Mode) on the front panel as well as with each of the five input buttons. Thus the System 5 switcher can control the projector. Stored commands (learned or uploaded) in the System 5 memory are also effective when using the IR 40, SCP 100 or RS-232 controls.

As an example, IR commands for the projector shown in Figure 1-1 can be stored in the System 5 memory such that when the VID1 input is selected, the projector will switch to its composite video mode. Selecting VID2 input could send a command to tell the projector to switch to S-video mode.

Standard Features

- *250 MHz bandwidth (-3 dB)*
- *Audio preamp with 2-channel stereo outputs*
- *Audio breakaway (switch audio and video separately, with RS-232)*
- *Audio input levels may be preset individually and then adjusted by the master volume control.*
- *Five Inputs - computer video, RGBS, RGBHV, composite video or S-video*
- *Internal audio amplifier - 12 watt/channel, with adjustable output*
- *Room control - relay control of lights, window shades, display screen, etc.*
- *Projector control - display power, mute, mode (learned IR commands)*
- *Learns IR remote commands - from a library or through the front panel*
- *Memory stores IR commands that are learned, or uploaded through a PC. (Procedure in Chapter 4.)*
- *RS-232 programming, with Simple Instruction Set (SIS)*
- *Triple-action switching (blank screen while switching between inputs)*
- *Special mounting brackets allow the System 5 to be mounted on a wall or under a table, plus standard brackets are included for rack-mounting.*

Inputs

The four rear panel inputs described here include a 5-pole, captive screw connector for 2-channel stereo audio, balanced or unbalanced signals.

- *Computer video input is provided on the front panel through a VGA (female HD 15 pin) connector (PC1). This allows for quick connection of a laptop computer without having to access the rear panel of the switcher.*
- *Computer video may also be connected through BNC connectors to the PC2 and PC3 inputs, through an interface, such as an RGB 406, as shown in Figure 1-1.*
- *The VID1 and VID2 inputs can be either composite or S-video signals, both through BNC connectors.*

Outputs

- *The System 5 provides video outputs for RGBS, RGBHV, Composite and S-video formats. One output is active at any one time.*
- *Audio preamp output for either balanced or unbalanced audio signals is available through a 5-pole, captive screw connector.*
- *An internal, 12 watt/channel audio amplifier drives non-powered speakers.*
- *Stored IR commands output through emitter or broadcaster.*

www.camboard.de Tel. 07131 911201   ce-info@camboard.de *1-2*
Fax 07131 911203

Options and Accessories

The System 5 is more than just a system switcher. Standard and optional features make it the control center for a small A/V system by adding control of other things in the room as part of the system design. Two of these standard features include:

- *Room control allows for relay control of lights, window coverings, display screen, or most anything the system designer wants to use it for.*
- *An IR transmitter distributes all incoming IR signals, together with the learned commands in the immediate area.*

Optional equipment includes:

- *Current sensor (detects when projector power is on)*
- *Optional remote keypad, SCP 100 (1 or 2)*
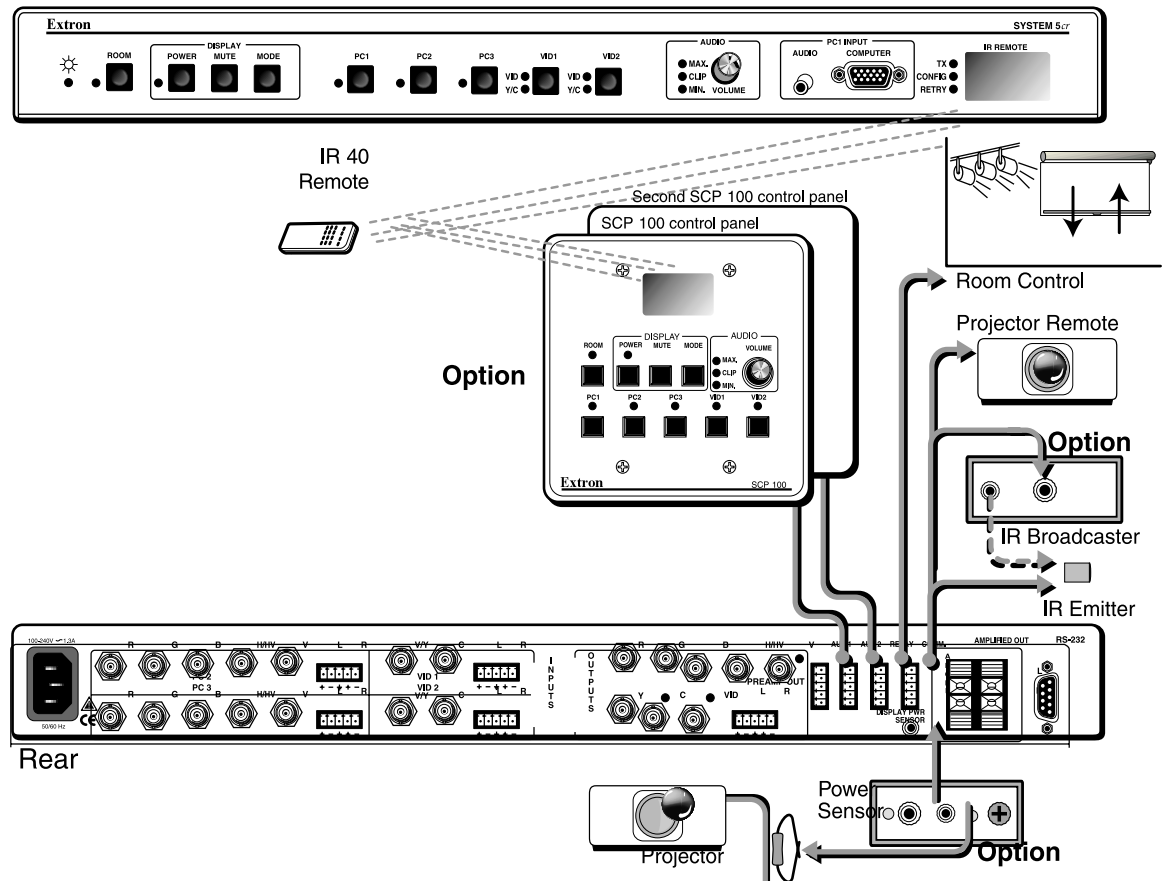- *IR broadcast device (transmits IR signals over a wide area)*

Figure 1-2. System 5 with accessories and options

The System 5 combines switching, room control and projector control, each of which is controlled at the front panel, by hard-wired control pad (SCP 100) and by IR remote control (IR 40). The switcher can be used to control video and audio input settings, display functions such as power, mute and video modes, and room controls, such as lowering or raising a display screen or powering lights on or off.

Specifications

Video input

Number/type _	3 RGBHV/RGBS/RGsB computer video
_	2 S-video or composite video
Connectors _	1 15-pin HD female (RGB computer video)
_	2 x 5 BNC female (RGB computer video)
_	2 x 2 BNC female (S-video or composite video)
Nominal level(s) _	Analog — 0.3 to 1.45V p-p
Maximum level(s) _	Analog — 2.0V p-p
Impedance _	75 ohms
Horizontal frequency _	15 kHz to 150 kHz
Vertical frequency _	30 Hz to 150 Hz
Return loss _	-45dB @ 5 MHz
Maximum DC offset _	1.5V

Video throughput

Gain _	Unity
Bandwidth _	250 MHz (-3dB)
Frequency response _	< ± 0.1dB to 30 MHz
Differential phase error _	0.01º, 0 to 10 MHz
Differential gain error _	0.01%, 0 to 10 MHz
Crosstalk _	-50dB @ 5 MHz
Isolation _	+50dB @ 5 MHz

Video output

Number/type/format _	1 RGBHV/RGBS/RGsB, or
_	1 S-video, or
_	1 composite video (NTSC/PAL)
Connectors _	1 x 5 BNC female
_	(RGBHV/RGBS/RGsB computer video)
_	1 x 2 BNC female (S-video)
_	1 x 1 BNC female (composite video)
Nominal level _	1V p-p
Impedance _	75 ohms
Return loss _	-38dB @ 5 MHz
DC offset _	±5 mV maximum
Switching type _	Triple action (for RGB signals only)

Sync

Input type _	RGBHV, RGBS, RGsB
Output type _	RGBHV, RGBS, RGsB
Standards _	TTL (RGB computer), NTSC and PAL
_	(S-video and composite video)
Input level _	0.5V to 5.0V p-p
Output level _	0.5V to 5.0V p-p
Input impedance _	75 ohms
Output impedance _	75 ohms
Max input voltage _	5.0V p-p
Input sensitivity _	5.0V p-p
Max. propagation delay _	20 nS
Polarity _	Positive or negative (follows input)

Audio input

Number/type _	5 stereo, balanced/unbalanced
Connectors _	1 3.5 mm mini jack, stereo, PC1
_	4 3.5 mm captive screw terminals, 5 conductor
Impedance _	25 k ohms, balanced; 50 k ohms, unbalanced
Minimum level _	-10dBu for full power out
Maximum level _	+20dBu, (balanced or unbalanced)
_	@ stated %THD+N

Audio throughput

Gain _	-78dB to +40dB
Frequency response _	±0.05dB @ 20 Hz to 20 kHz
THD + Noise _	< 0.1% @ 1 kHz, at rated maximum output
S/N _	>95dB, 21dBu output
Adjacent input crosstalk _	>80dB @ 1 kHz
Stereo channel separation _	>90dB @ 1 kHz
Total harmonic distortion _	0.03%, worse case, @ 1 kHz at rated preamp drive
CMRR _	>75dB @ 20 Hz to 20 kHz

Audio output — preamp

Number/type _	1 stereo, balanced/unbalanced
Connectors _	1 3.5 mm captive screw terminal, 5 conductor
Impedance _	50 ohms unbalanced, 100 ohms balanced
Drive (HI-Z) _	> +21dBu, balanced/unbalanced at stated %THD+N
Drive (600 ohm) _	> +15dBm, balanced/unbalanced at stated %THD+N

Audio output — power amp

Number/Type _	1 stereo, 12 watts/channel
Connectors _	2 captive terminals, L/R +/-, spring loaded
Protection _	Thermal, short circuit, open circuit, overload
Drive (full power out) _	12 watts per channel, 8 ohm load

Control/Remote — switcher

Serial control port _	RS-232, 9-pin female D connector
Baud rate and Protocol _	9600, 8-bit, 1 stop bit, no parity
Pin configuration _	Pin 2 = TX (RS-232), 3 = RX (RS-232), 5 = GND
Extron remote key pad control _	2 5 mm captive screw connectors,
_	5 conductor (auxiliary ports)
IR controller module _	30 kHz to 60 kHz input frequency compatibility
Program control _	Extron's Windows® control program
_	Extron's Simple Instruction Set - SIS

Control — room relay

Number/type _	1 momentary or latching
Connector _	1 3.5 mm captive screw connector, 5 conductor
Contact rating _	24V, 1 amp

Control — projector

Projector control port _	1 3.5mm captive screw connector, 5 conductor

General

Power _	100VAC to 240VAC, 50/60 Hz, 70 Watts,
_	internal, auto-switchable
Temperature/humidity _	Storage -40° to +158°F
_	(-40° to +70°C) / 10% to 90%, non-condensing
_	Operating +32° to +122°F (0° to +50°C) /
_	10% to 90%, non-condensing
Rack mount _	Yes, with included brackets
Enclosure type _	Metal
Enclosure dimensions _	1.75" H x 17" W x 10.1" D
_	4.4 cm H x 43.2 cm W x 25.7 cm D
Shipping weight _	10 lbs (4.5 kg)
Vibration _	NSTA 1A in carton
_	(National Safe Transit Association)
Approvals _	UL, CUL, CE, FCC Class A
MTBF _	30,000 hours
Warranty _	2 years parts and labor

Specifications are subject to change without notice.

_____ The AUX 1 & 2 ports of the System 5cr provide a total of 500mA. This is split between the two ports offering 250mA for each port. A 12VDC, 500mA output is provided on the Comm. (IR Emitter) port.

System 5cr Switcher
User's Manual

Chapter Two
Rear Panel Connections

Installation in a Rack, on a Wall or Under a Table

The System 5*cr* comes with two sets of mounting brackets. One set is for mounting under a table or on a wall and the second set is for rack mounting. Either set is attached to the System 5 by four #8 screws.

When mounted under a table on a wall, the bracket will extend approximately 1/4 inch above the top surface of the System 5 enclosure, as shown in Figure 2-1. This is designed to have an air space between the System 5 enclosure and the surface it is mounted on.

A second set of brackets (top example) has slotted holes that face forward to accommodate rack-mounting hardware. When attached to the System 5 enclosure, the forward-facing holes will align with the holes in a standard rack.

Included parts:

2 – brackets for rack mounting
2 – brackets for table/wall mounting
9 – 5-pole, captive screw connectors
1 – IR emitter, with connector cable
1 – phono-style audio connector
1 – IEC power cord
1 – IR 40 remote, with batteries
1 – Floppy disk with control software
4 – rubber feet
1 – Extron tweaker

Mounting Screws (2 Plcs)
Each Side

Rack-mount Brackets

or

Table/wall-mount Brackets
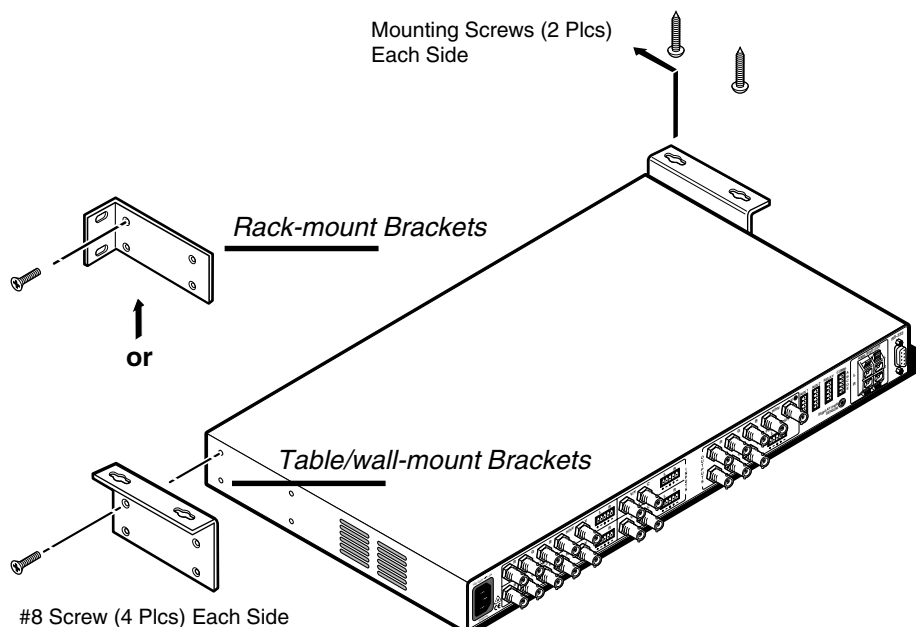
#8 Screw (4 Plcs) Each Side

Figure 2-1. System 5 can be mounted under a table or to a wall or in a rack.

Panel Connections

This section covers the types of input and output connections on the System 5. With the exception of input PC1 on the front panel, all other inputs are on the left side of the rear panel.

Video Input Connections

(8) **IEC Power connector –** for connecting the AC power cord.

(9) **PC2** and **PC3** inputs accommodate video formats, through a computer-video interface, as well as stereo audio from a computer. The video can be RGBS (composite sync) or RGBHV (separate horizontal and vertical sync), using BNC connectors. Connect balanced or unbalanced, 2-channel audio to the connector marked L R, using a 5-pole, 3.5 mm captive screw connector. (Audio connectors are discussed later in this chapter.)

(10) **VID1** and **VID2** each have two BNCs and a 5-pole, 3.5 mm audio connector. The BNC connectors accept composite video or S-video. The formats are configured through the front panel, or through RS-232 programming. Connect composite video to the left BNC, marked V/Y. If using S-video, connect the luma (Y) signal to the left BNC (V/Y) and the chroma signal (C) to the right BNC connector marked C.

VID Input sources could be VCRs DVDs document cameras, or anything that outputs either composite video or S-video.
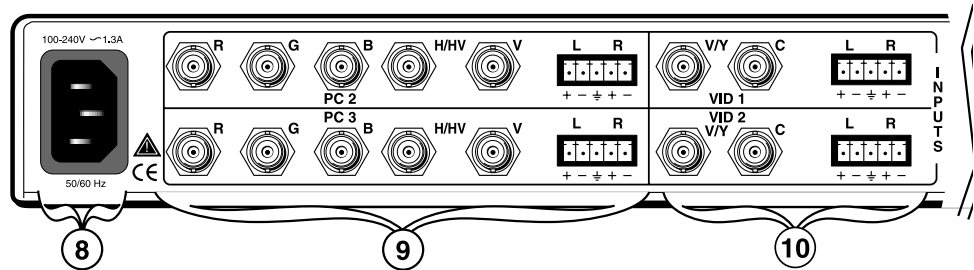
Figure 2-2a. The left side of the rear panel has four of the five inputs.

⑥ **PC1** input is on the Front Panel and accepts laptop video through a VGA connector as well as 2-channel audio through a 3.5 mm jack, as shown in Figure 2-2. With a buffered output, VGA signals can be driven up to 50 feet without additional amplification.
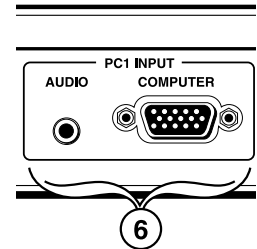

Figure 2-3. PC1 Input is on the Front Panel.

Audio Input Connections

Connect balanced or unbalanced, 2-channel audio to the input connectors marked L and R, using a captive screw connector. Possible connections are shown in Figure 2-4b. Connectors are included with each System 5, however, cables are the responsibility of the installer.
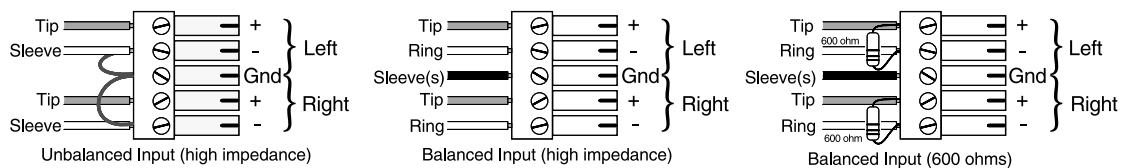
Figure 2-4a. Audio Input can be connected three different ways with the captive screw connectors.

Strip about 0.25" of insulation from each wire and insert it into the appropriate connector hole. Do not solder the wires. Turn the screw counterclockwise to allow the opening to accommodate the wire. Turn the screw clockwise to secure the wire in place. Repeat for each wire.
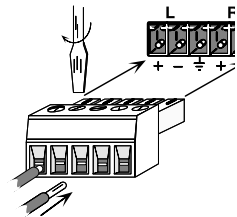

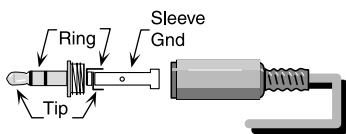*Figure 2-4b. Connecting audio wires in a captive screw connector.*

The PC1 audio input uses a 3.5 mm, round stereo connector, as shown in Figure 2-4c. Unscrew the barrel of the connector to expose the inside connections. Slide the barrel over the cable, as shown here. Cut and strip a wire to an appropriate length for each of the ring, tip and sleeve solder points. Insert each wire into its respective hole and solder it in place.

Figure 2-4c. Audio Input for PC1.

Video Output Connections

The System 5 has BNC output connectors for three video formats (RGBHV, Composite, and S-video). Which output connectors are active depends upon the format of the selected input. The green LED to the right of each connector, or set of connectors, lights to show which output is active. Only one output is active at any one time.

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> *Although all three outputs may be connected at the same time, only one can be active at one time, as determined by the input format. In a typical installation, an LCD projector may have inputs for all three formats. In such cases, each of the three System 5 outputs would be connected to the same projector.*

⑪ **R, G, B, H/HV, V** BNC connectors, for RGBS or RGBHV output. The green LED indicates when the selected input is RGB format (PC1, PC2 or PC3) and this output is active.

⑫ **Y** and **C** BNCs for S-video output. A BNC-Din adapter may be required. The green LED indicates when the selected input is S-video format (VID1 or VID2, if set up for S-video format) and this output is active.
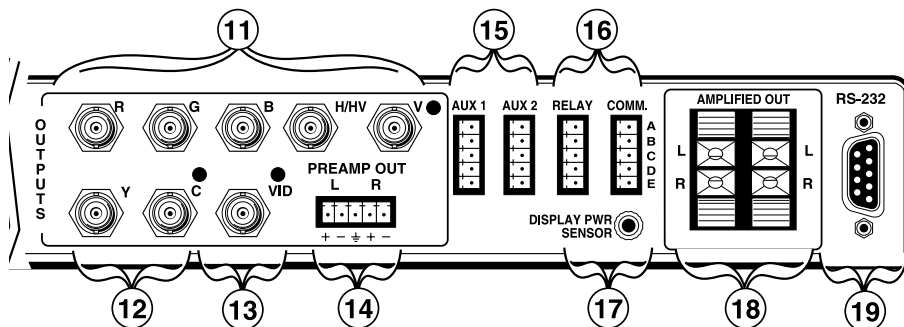

Figure 2-5. The right side of the rear panel has three video outputs, plus audio and options.

⑬ **VID** is for Composite video output. The green LED indicates when the selected input is composite video format (VID1 or VID2, if set up for VID format) and this output is active.

⑭ Audio **PreAmp Out** – This output has the audio signal from the selected input and should be connected to a stereo audio amplifier. The signal is the same as item 18, at a low level. Both audio outputs are affected by the volume control. See detailed section on audio connectors.

> *Audio breakaway is available if programmed through RS-232. If so, the selected audio input may be different from the selected video input.*

⑮ **Aux1** and **Aux2** each can accommodate a connection to an optional external control panel (SCP 100). See the SCP 100 User's manual and "Connecting Accessories" later in this chapter. See specifications

> *The AUX 1 & 2 ports of the System 5cr provide a total of 500mA. This is split between the two ports offering 250mA for each port.*

⑯ **Relay** Contacts (one normally open pair and one normally closed pair) are controlled by the "Room" button on the front panel to control external functions, such as lighting, display screen up/down, etc. See "Connecting Accessories" later in this chapter.

Comm – This is the connection for the IR emitter or the optional remote IR Broadcaster. Both of these devices transmit only learned IR signals from the System 5 to the projector, IR 40 commands are **not** included. The optional Broadcaster covers a much wider area than the emitter.

> *A 12VDC, 500mA output is provided on the Comm. (IR Emitter) port.*

⑰ Optional **Display Power Sensor** Input – Detects projector power on.

⑱ **Amplified Output** – connect directly to audio speakers.

⑲ **RS-232** Control Port – connect a host, such as a touch panel, a PC, etc.

Audio Preamp Out Connection

Connect balanced or unbalanced, 2-channel audio to the Preamp Out connector marked L (Left) and R (Right), using a captive screw connector. Possible connections are shown in Figure 2-6. Connectors are included with each System 5, however, cables are the responsibility of the installer. Use the same procedure as for the audio input captive screw connectors.
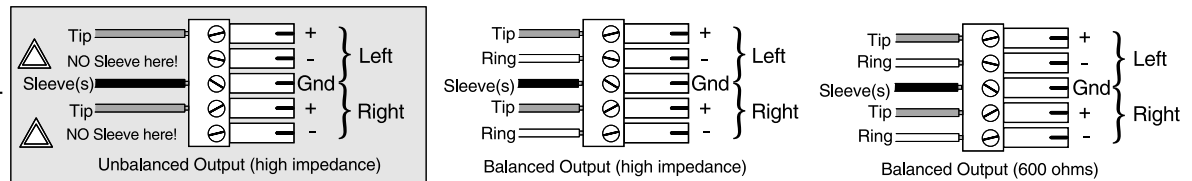

Figure 2-6. Audio Preamp Output can be connected three different ways.

Connecting Accessories

The System 5 can have several options and accessories that use connectors in the rear panel. Figure 2-7 shows four of the captive screw connectors for the Room Relay, IR Emitter or IR Broadcaster and the two SCP 100 remote panels. There is also one round connector for an optional Display power Sensor. Each accessory product has its own user's manual and is also summarized in Appendix B of this manual.
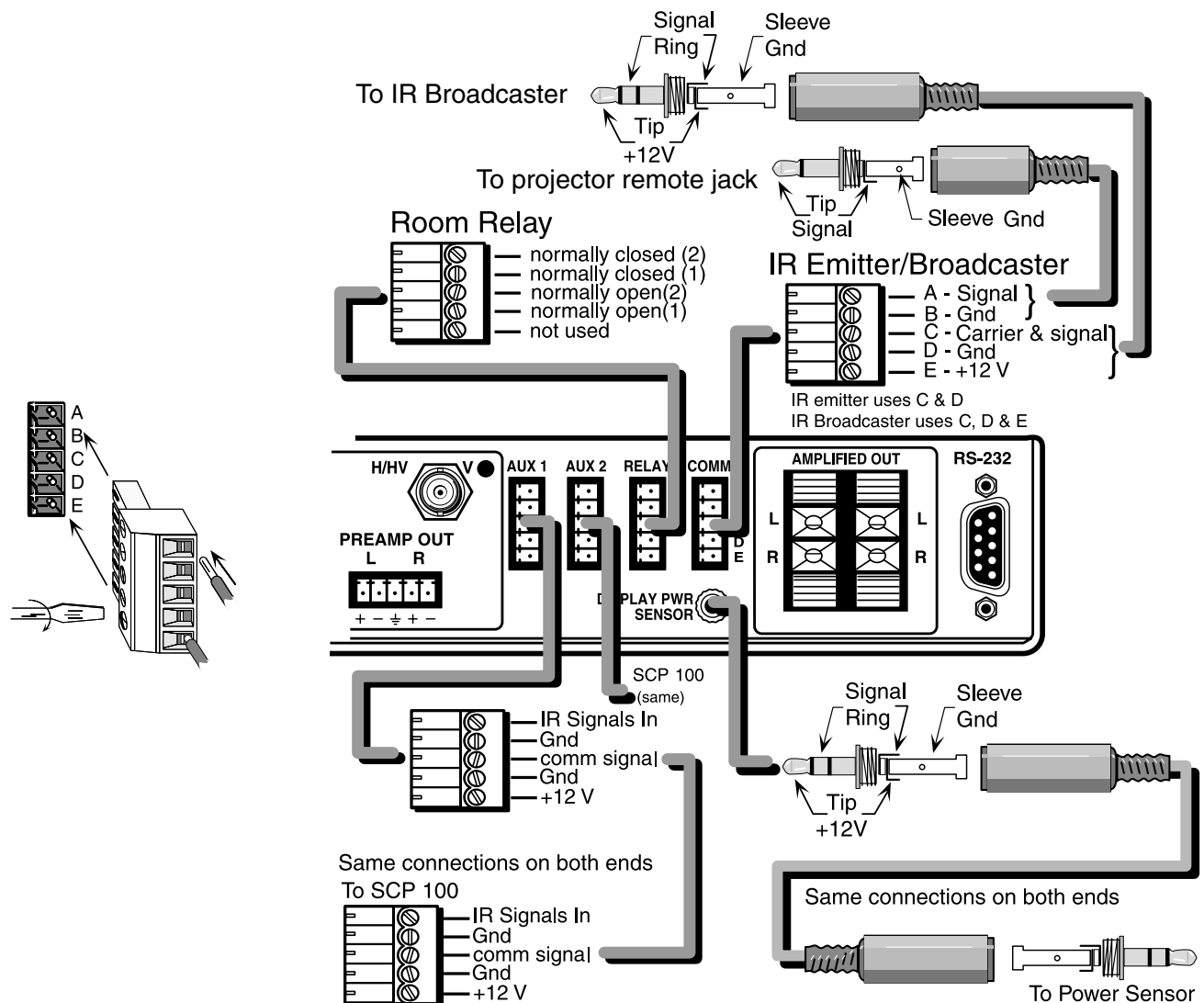

Figure 2-7. System 5 accessory and option connections.

3.5 mm, 5-pole captive screw connectors are used for the audio inputs and one output, as well as for accessories. These include:

- *Aux1 & Aux2 – SCP 100 remote panels (2 optional)*
- *Relay – Room/relay custom control (standard feature)*
- *Comm – projector control through the standard IR Emitter or the optional IR Broadcaster.*

One three-contact stereo phono-type of connector is provided for the optional Display Power Sensor. This device detects when the projector power is on.

All connectors are provided. Cables are the responsibility of the installer. The two standard accessories described in this section are the Infrared Emitter and the Room/Relay custom control. Figures 2-7, 8 and 9 show accessory connections. Optional devices (SCP 100, the IR Broadcaster and the Power Sensor) are also covered in their separate user's guides and are summarized in Appendix B of this manual.

Comm Connector and Infrared Emitter

This connector is for projector control, and can be used in different ways:

1a. Connect the IR Emitter (included) to transmit all of the "learned" IR commands to the projector. The IR Emitter includes a black cable with two wires, one has a white stripe. Insert the wire with the white stripe into the carrier/signal pin (C) and the solid black wire to either ground contact (B or D).

1b. If a wired remote can be plugged into the projector, that cable will use pins A (signal) and B, as shown in Figure 2-7.

IR Emitter

A - reserved
B - Gnd
C - carrier signal
D - Gnd
E - +12 V

uses C for signal and B or D for ground

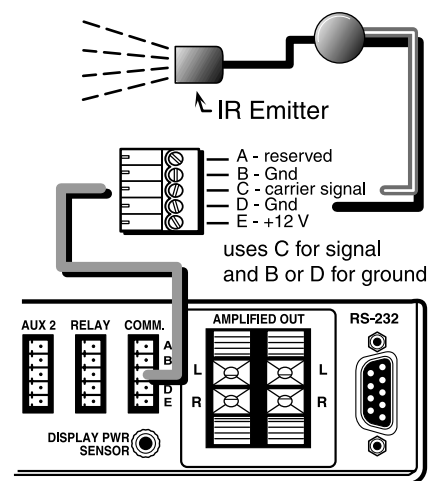AUX 2 RELAY COMM. AMPLIFIED OUT RS-232

DISPLAY PWR SENSOR

Figure 2-8. The IR Emitter can be used from the Comm connector or through an IR Broadcaster.

2. To install and use the optional IR Broadcaster, and to use emitter with the IR Broadcaster, see user's guide 68-392-02. For some projectors, the IR Emitter **must** be used with the broadcaster.

The standard IR Emitter transmits infrared signals over a short, narrow range, while the IR Broadcaster covers a wider, longer area. Both of these devices transmit only the IR commands that have been stored in the System 5, either through "learning" or by uploading from Extron's IR library. If the broadcaster is installed, the emitter may not be needed.

Room/Relay Connector

The Room Relay contacts are shown in Figure 2-9. One relay has two sets of contacts – one set is normally closed and the other is normally open. When the Room function is active, the normally closed contacts are open and the normally open contacts are closed.

normally closed

RELAY

normally open

to Room control equipment
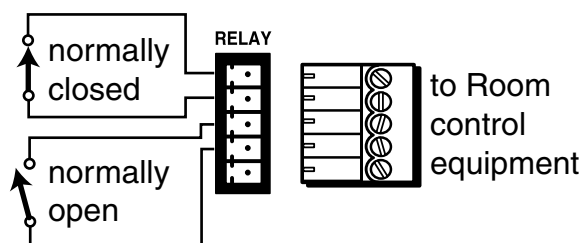
The contacts can be programmed to operate either of two ways: latched (press-on, press-off) and momentary or timed (press-on, time-out-off, default = 1/8 second). Timing can only be set through Windows® control software, through a PC.

The system designer can use these contacts any way he/she desires as long as the contact specifications of 24 volts at 1 ampere are not exceeded.

Figure 2-9. The Room Relay has two sets of contacts.

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3

Chapter Three
Using the System 5cr

Front Panel Controls & Indicators

Configuration:
Audio Preset, VID Formats & IR Learning

Using the System 5*cr*

⚠ _____ *In addition to the basic function of each of the panel buttons described here, there are also setup procedures that use many of the same buttons and controls. Each of the Input and Display buttons is capable of "learning" an IR command. The Display Power button must learn both power on and power off for the projector. The setup procedures are described later in this section.*

Front Panel Controls and Indicators

On power up, all of the LEDs light and then go off, except for the Power LED and the LED for the input last selected. On the rear panel, the LED for the selected input format will be lit.

① **Power and Room**

Power LED – Indicates when the System 5 has power.

Room Button and LED – These work with the relay contact connections provided on the rear panel of the System 5. The button can activate/ deactivate a room condition, such as turn lights on/off and raise/lower a viewing screen. The LED indicates that the condition is active. Exactly how the feature is used depends upon the user-defined application and what is connected to the "Relay" connector on the rear panel.
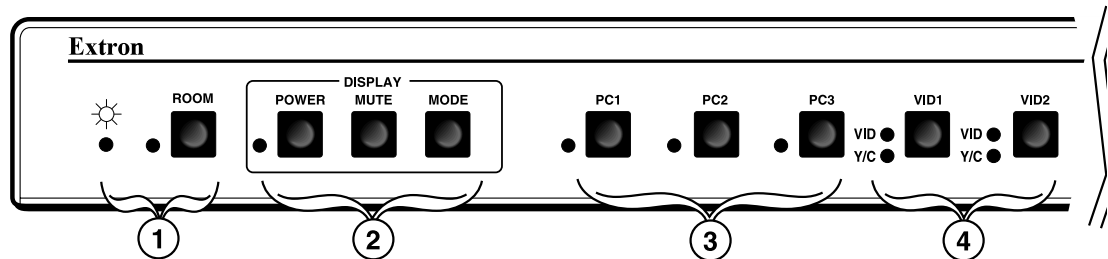

Figure 3-1a. Front Panel Buttons and Indicators

The Room button can be set to operate in either of two ways: latching (press on, press off) or momentary (press on, off after time-out). The time-out value can **only** be set through the Windows® Control Program.

✍ _____ *For example, pressing the Room button once could lower a screen and turn room lights off and the LED will remain lit. Press the button again to turn the room lights on, raise the viewing screen and the LED goes out.*

② **Display –** (customized for the projector being used)

⚠ _____ *These buttons only function after being programmed, either by "learning", or by loading the projector's commands from Extron's IR library. Learning is described in the Setup Mode procedures later in this chapter.*

Power – After this button has been programmed for the projector's IR remote commands, it will toggle power to the display device on or off. Because there is a warm up delay and a cool down delay for many projectors, the Display Power LED will blink fast during projector power up and will blink slowly during projector power down. The blinking time is generated within the System 5; it does **not** come from the projector. Its duration can be programmed through RS-232.

Mute – After this button has been programmed for the projector's video mute signal, it will function as the Display Mute on/off switch.

Mode – Effective on display devices that do not automatically detect the type of video signal, this button can be programmed to change the mode of the display device between computer-video, composite video and S-video. This can duplicate the single-button (step) mode function found on some projector remote controls.

⚠ _____ *As stated earlier, each input button can be programmed to "learn" an associated IR command. For example, selecting the PC1 input could also send a signal to the projector to switch to its computer input mode, and selecting VID1 could cause the projector to switch to S-video mode, etc.*

③ **PC Input Selection Buttons and Indicators:**

- **PC1** – *Input select button for computer video and audio. This selects the input from the VGA and Audio connectors on the System 5 front panel.*
- **PC2** – *Input select button for an RGBS or RGBHV source (and audio) from the PC2 section of the rear panel. This could be from a computer, through a computer-video interface.*
- **PC3** – *Same as PC2 but input is from the PC3 section of the rear panel.*

④ Composite or S-video inputs (VCR, DVD, etc.):

VID1 – 1st input select button for Composite Video or S-video with audio.

VID2 – 2nd input select button for Composite Video or S-video with audio.

⑤ Audio Gain (Volume) Control knob for amplified output.

Max LED (red) – lights when the audio output level control has reached its maximum point. This does not indicate the audio level.

Clip LED – lights when the output level is beginning to overdrive (peak). This indicator is used to set the audio attenuation for the inputs.

Min LED – lights when the output level control has reached its minimum point. This does not indicate the audio level.

📝 _____ *When all audio inputs are at the same level coming into the System 5cr, the Volume knob functions as the master volume control for both audio outputs. (See Setup Mode procedures later in this chapter.)*

⑥ **PC1** Input connectors – Audio and Computer VGA connectors selected by the PC1 button. Connect a VGA cable to the 15-pin HD connector. Plug the computer's audio output to the audio jack.

📝 _____ *Each of the controls described above are duplicated on the IR 40 remote control, on the optional SCP 100 panels, and on the Windows® control software. The operation is the same, including associated IR commands.*
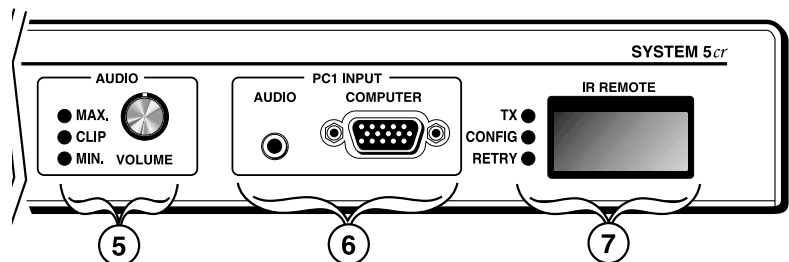

Figure 3-1b. Front panel controls and indicators

⑦ IR Function LEDs and Infrared Receiver/Learner Port – In addition to each LED having its function, in combinations they indicate other things.

TX LED (green) – lights when System 5 is transmitting infrared signals. Flashes with Config and Retry LEDs to indicate a time-out condition for the configuration mode.

Config LED (amber) –　　When steady on the System 5 is in setup mode and is ready to be configured. See the Setup Mode procedures for ways in which this indicator is used in combination with other LEDs.

Retry LED (red) – Indicates the System 5 has failed to recognize a command in the infrared learning process.

IR Remote – window receives signals from the IR 40 for normal operation, as well as from other remote control sources when learning commands.

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Configuration Setup from the Front Panel

For the System 5 switcher to control other equipment in the A/V system, it must be configured from the front panel, or through an RS-232 device. This cannot be done from an IR 40 or SCP 100. See Chapter 4 for Windows® Control program and Appendix A for RS-232 instructions.

Infrared Programs and Libraries

Extron provides a library of drivers for most projectors. To download a driver from the library, see the procedures located in Chapter 4. A typical projector driver assigns projector IR commands to the System 5 panel functions such that the Display Power, Mute and Mode functions can control the projector. Also, once programmed, selecting PC1, PC2 or PC3 inputs can set the projector to RGB format, while VID1 and VID2 can set the projector to either S-video or Composite Video. Selection can be from the front panel or by remote. To configure the System 5 from the front panel, use the following procedures.

Enter Setup (Config) Mode

Each of the procedures in this section is done from Setup (or Config) Mode. Once in Setup Mode (Config LED = On), you may go from one procedure to another without returning to Normal Mode.

To enter Setup Mode, press and **hold all 3 Display buttons** (Power/Mute/Mode) for 2 seconds. The **Config** LED lights. Go to the appropriate procedure. Pressing the same 3 buttons will also exit Setup (Config) mode.
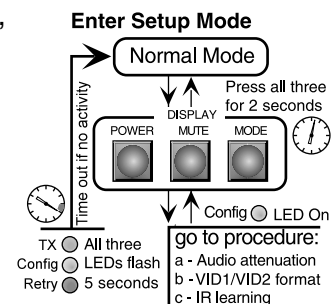

Figure 3-2a. Enter Setup Mode from the Front Panel.

Clear Configuration(s)

To Clear existing configuration(s) to the factory default, from Setup Mode, double-click the Room button. The Room LED blinks for 8 seconds. During that time, do one of the following:

Clear One – press the desired button to clear **only** its IR configuration.

Clear ALL – press all 3 Display buttons (Power/Mute/Mode) at the same time for 2 seconds to reset all IR and other settings to factory defaults.
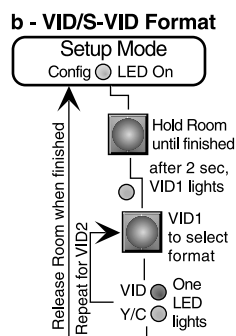
Preset Audio Input Attenuation Levels

For the Audio Volume control to act as a "master" control for all inputs, all audio inputs must be set for same level. With audio input signals connected and active, enter Setup Mode and do the following:
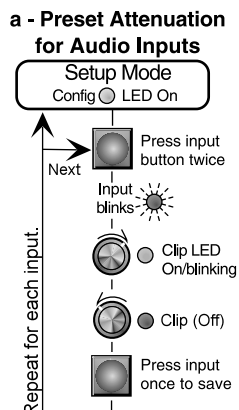
1a. Press the input button twice (double-click) for the audio input to be adjusted. The input LED **blinks**.

2a. Slowly adjust the **Volume** knob **up** (cw) until Clip LED is On or blinking frequently with changes in sound level.

3a. Adjust **Volume down** (ccw) just until Clip LED is Off or blinks occasionally as the level peaks.

4a. Press the **input** button again to **save** the setting.

5a. Repeat steps 1a through 4a for each audio input.

6a. While still in **Config** mode, you may go directly to another procedure, wait for 20 second time-out or press and hold **all 3 Display buttons** for 2 seconds to force a return to normal operation.

Figure 3-2b. Set the audio input attenuation to the same levels.

Select format for VID1 and/or VID2.

b - VID/S-VID Format

Setup Mode
Config ◯ LED On

Release Room when finished

Repeat for VID2

Hold Room until finished

after 2 sec, VID1 lights

VID1 to select format

VID ◯ One LED
Y/C ◯ lights

To set these two inputs for either Composite or S-video, in Config Mode, do the following:

1b. Press and **hold** the **Room** button until finished with this operation. After 2 seconds, one of the VID1 LEDs lights.

2b. Press **VID1** to toggle between VID (Video) and Y/C (S-video) formats.

3b. Repeat step 2b to select the format to set the format for the **VID2** input.

4b. Release the **Room** button to go back to **Config** mode.

5b. While in **Config** mode, you may go directly to another procedure, wait for 20 second time-out or press **all 3 Display buttons** for 2 seconds to exit.

Figure 3-2c. Select input format for VID1 and VID2.

Learn Infrared Signals from other devices' remote controls

c - Infrared Learning

Setup Mode
Config ◯ LED On

Press button to be programmed.

Hold 2 sec

Next

Config blinks

Timeout if no activity 8 seconds

press function on source remote

TX ◯ 1 blink
Config ◯ stays On
Retry ◯ 1 blink

Retry = blink & TX = Off, try again.

All 3 blink = command learned

This procedure is only necessary if the IR driver is not available for the system projector, or is not complete. A flow chart of the learning procedure is shown in Figure 3-2d and a table of LED codes is shown in Figure 3-2e. In Setup Mode, do this:

1c. Press the panel button to be programmed and hold it for 2 seconds. The **Config** LED **blinks**.

2c. Point the IR remote source at the System 5 IR Remote window and press the button **briefly**, but **firmly**, for the signal to be "learned".
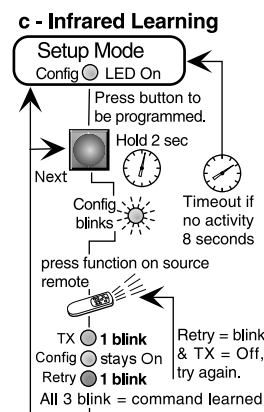
Figure 3-2d. Learn infrared signals from other remotes.

It may be necessary to hold remote as near as 1/2 inch and point it directly into the IR window. It may also help to block out ambient light, such as from fluorescent sources.

The Config LED remains On while TX & Retry LEDs flash to indicate that the operation is complete. (If Retry blinks once and TX - Off, repeat this step). See LED codes in Figure 3-2e below.

The Display Power button learns 2 signals. After learning the 1st signal (e.g. Power On), the Config and Retry LEDs blink to indicate that it is ready to learn the second signal (Power Off). Double-click the Power button and repeat step 2c to learn the second signal.

3c. **Repeat** steps 1c and 2c to program the next button.

4c. While in **Config** mode, you may go directly to another procedure, wait for 20 second time-out or hold **all 3 Display buttons** for 2 seconds to exit.

Once the display device (projector) has been programmed to operate from the System 5cr, those same control functions should not be done from the projector because the System 5 has no way of knowing what was done at the projector. That is, if the projector was turned on at the System 5 and turned off from the projector panel, the System 5 thinks the projector is still on.

LED Display codes

Condition	Setup Mode	Ready to learn IR	Learned Ok	Try again	Ready to learn power off	No IR Subcarrier	Timeout Exit
TX ◯	Off	Off	Blink Once	Off	Off	Off	Blink 5 seconds
Config ◯	On	Blinking	On	On	Blinking	On	Blink 5 seconds
Retry ◯	Off	Off	Blink Once	Blink Once	Blinking	Blinking	Blink 5 seconds
Recommended Action	Ready for any type of configuration	Press button for function on source remote	Continue with setup or exit.	Press same source remote button again.	Double-click Display Power button on System 5 panel and press power button on source remote.	Press same System 5 button again & repeat IR source command.	Press any button to stay in Setup Mode.

Figure 3-2e. LED response codes

Remote Operation

⚠ ————

See inset (top, right) to install batteries.

The System 5 includes one infrared remote control (IR 40) and can have one or two optional remote control panels (SCP 100). Each of these devices replicate the front panel controls for normal operation. Learning and other things done in Setup Mode cannot be done from these remote devices. The IR 40, shown in Figure 3-3, uses + and - buttons for Volume up and down.

The Function and Enter buttons on the IR 40 do not affect the System 5 operation.
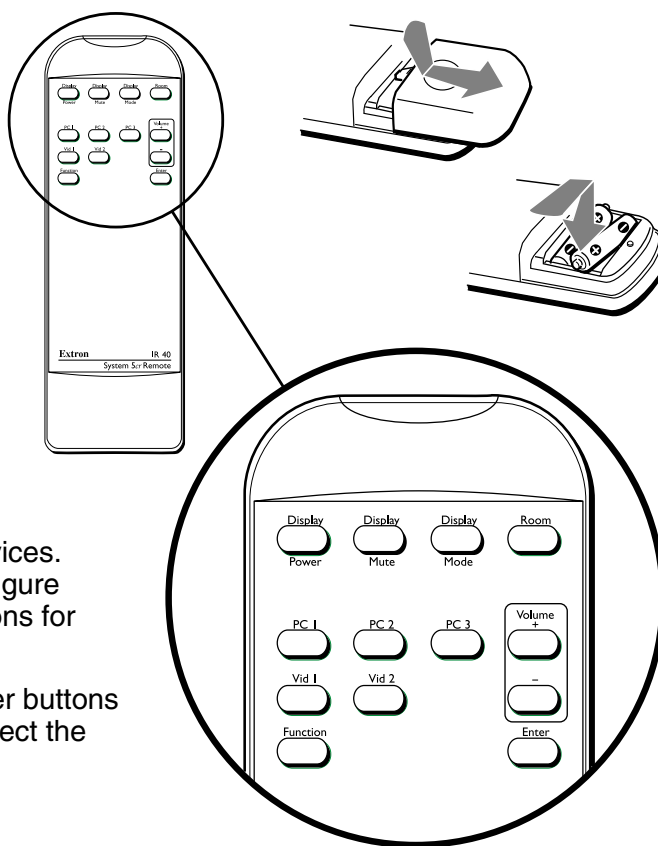
Figure 3-3. The IR 40 has the same controls as the front panel.

The optional SCP 100 panels can be mounted in a wall or piece of furniture, such as a desk or podium. In addition to duplicating front panel controls, they also receive IR 40 signals and pass them to the System 5. Infrared signals from other devices are blocked at the System 5, and do not pass on to the IR emitter or broadcaster.
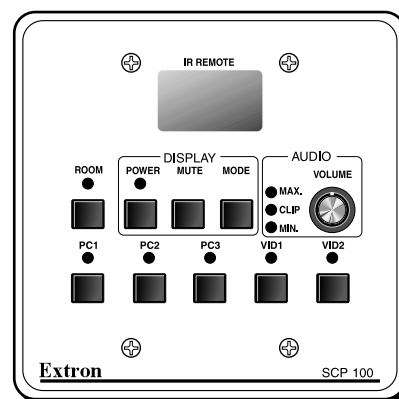
Figure 3-4. The optional SCP 100 also passes IR 40 signals to the System 5.

Other ways to control the System 5 include using the RS-232 serial port. This can be through a host, such as a touch-screen panel or a PC, using the Windows® operating system. RS-232 programming is covered in Appendix A of this manual.

Certain operations can be done only through Extron's System 5*cr* Control Program, these include:

• *Room Relay Mode (Latched/Momentary)*

• *(projector) Power Up/Down Delay times*

• *Auto Set Attenuators (set all audio input to the same level).*

The use of Extron's Windows® Control Program is covered in Chapter 4 and RS-232 programming is in Appendix A.
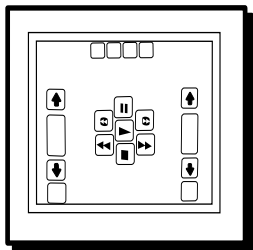
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Chapter Four
Windows® Control Software

Installing the Windows Control Software

Program Help

Program Operation

Downloading IR Projector Drivers

im Vertrieb von

Installing Windows® Control Software

This control program communicates with the System 5 Switcher through the RS-232 port on the rear panel of the System 5. Extron supplies this software that runs in the Windows® operating system, version NT, 95, or later. The program presents most of the same functions found on the unit's front-panel, but through an interactive graphical interface. There are some additional features/settings that are only available through the Configure Unit Screen of this program.

1. Connect the PC's Comm port to the RS-232 port on the System 5, as shown in Figure 4-1.

2. Power up the System 5 and the PC with the Windows operating system.

3. To install the software, run Setup.exe from the floppy disk #1. (just like any other Windows application.) Insert disk #2 when prompted to do so.
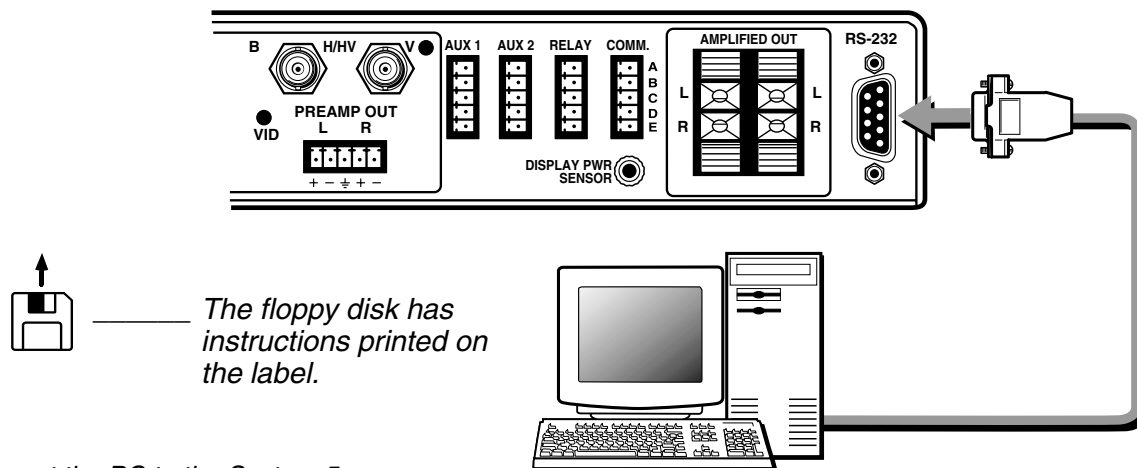

The floppy disk has instructions printed on the label.

Figure 4-1. Connect the PC to the System 5.

Follow the prompts to set up the program. To run the control software do:
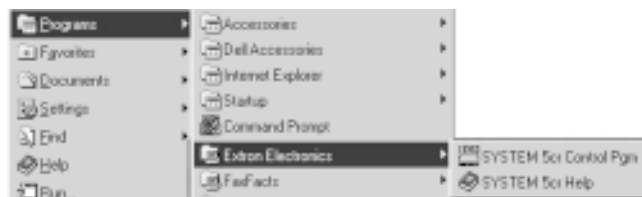Start | Programs | Extron Electronics | System 5cr Control Pgm

*Figure 4-2. System 5 Program*

Program Help

To learn how to use Help, press F1 from the program, or open it from the start button.

Start | Programs | Extron Electronics | System 5cr Help

This brings up a picture of the System 5cr Main Screen. For Help on specific buttons and controls, click the appropriate item above. [Use the Mouse or the TAB/ENTER keys to get details about the selected area of the screen]. For Help on specific screens and buttons, click the appropriate item link at the bottom of the screen, as follows:

Buttons & Controls of the System 5cr Configure Unit Screen (graphically)
Buttons & Controls of the System 5cr Executive Mode Screen (graphically)

Press F1 from within the program to get context-sensitive Help.
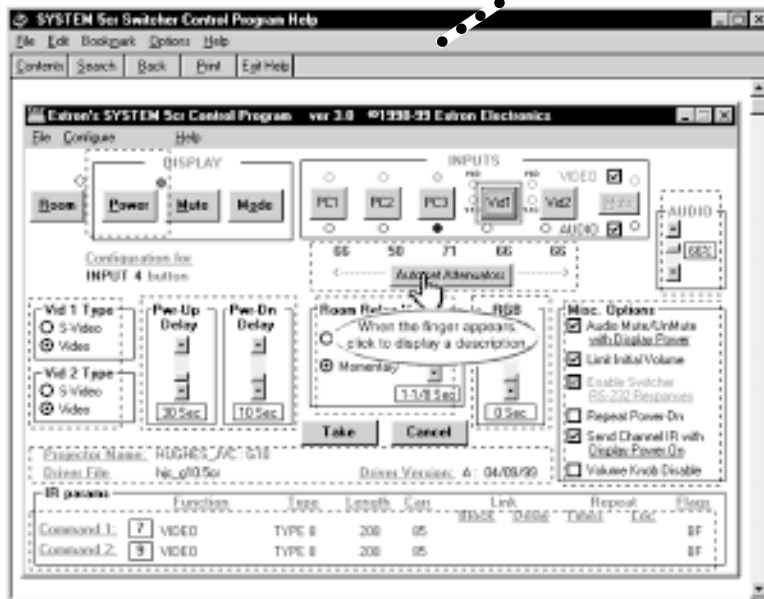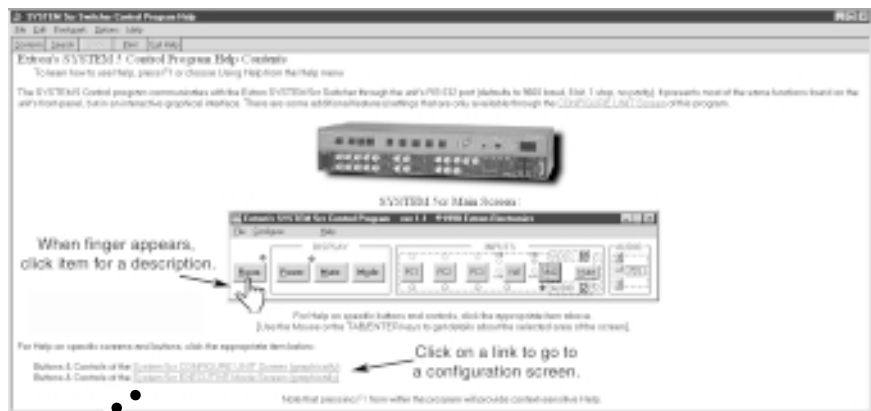
This is the help screen that appears when you click the Configure Unit link. Use the cursor (pointing finger) to display a description of that section. The operational version of this screen is used to set/view various system parameters and to view the IR command (if any have been learned or loaded) associated with the various front panel buttons. Not all of these functions are available through the unit's front-panel; some require the Windows Control Program. Click the Close button to return to the normal Main screen mode.

The **IR params** box at the bottom of the screen shows the command(s) associated with the selected panel button (top of screen) for the projector being used.

Figure 4-3. Example of two Help screens for the System 5.

Program Operation

Extron's System 5*cr* Control Program replicates a front panel on screen, including some information and functions that are not on the physical front panel. There are two different panel screens:

- *Executive Mode panel, shown here is a minimum version, which allows input selection only.*
- *Configure Unit (next page) includes all front panel, plus other configuration capabilities. Some operations can be done **only** through this Windows program.*
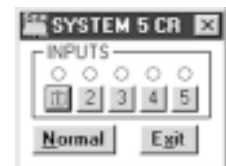

Figure 4-4. Example of Executive mode screen for the System 5.

The "Normal" operation panel is like the one shown in the Help screen in Figure 4-3. Some of the panel controls are explained on the following page. Some functions can only be done through this panel.

The System 5 comes with factory defaults and no "learned" IR commands stored in memory. Learning IR codes from the projector's remote control is covered on page 3-4. Panel settings made using this software, together with stored IR codes (learned or loaded) may be saved as a system file (page 4-4) and restored at another time.

Power Up/Down Delay times

① Many projectors (LCD, DLP, etc.) have a warm-up and cool-down cycle. During these times, the projector may not accept commands. The times for each projector may be different. The System 5 has timers that can be adjusted to represent these delay times, thereby warning the operator not to send commands while the Power LED is blinking. Slide the scroll bar for Pwr-Up Delay and/or for Pwr-Dn Delay to match the times required by the projector being used with the System 5. These settings determine how long the Display Power LED on the front panel blinks during power up and power down of the projector. These settings do not control the projector times; they simulate it. Settings are from 10 to 300 seconds (5 minutes), in 10 second steps. The factory default is 30 seconds.

Auto Set Attenuators (set all audio input to the same level)

② With the audio input sources active, click this button to automatically preset each input to its "Clip" level. Once this is done, the Volume control (from the front panel, a host or remote SCP 100) will operate as the master Volume control.

Room Relay Mode (Latched/Momentary)

③ This allows the selection of two modes for customizing the operation of the Room control function. Depending upon what the designer wants the function to control, it can operate in either of two ways.

• *Latched – click this button to make the Room button operate as follows: press to activate the relay and press again to deactivate (unlatch) it.*

• *Momentary – click this button to make the Room button operate as follows: press the Room button to activate; deactivation takes place after a prescribed time, as set by sliding the scroll button up or down. The time value is displayed from 1/8 to 2 seconds, in 1/8 second steps.*

⚠ *The Windows® Control Program is the only way to adjust the time duration for this mode.*
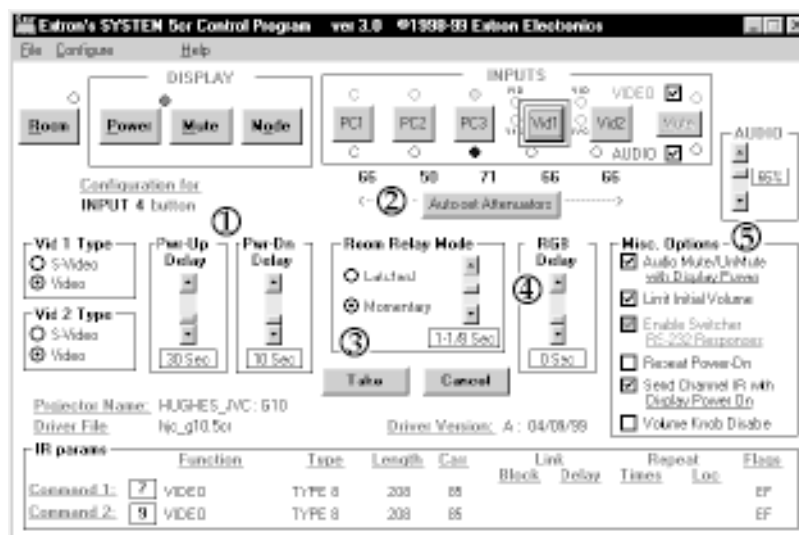

Figure 4-5. Example of the System 5 operational screen.

In the System 5 Control program, select one of the Room Relay Mode buttons. If Momentary is selected, move the scroll bar and observe the time duration displayed in the box below the scroll bar. Settings are from 1/8 to 2 seconds, in 1/8 second steps. Factory default is for Momentary Mode at 1/8 second. Thus, when the Room button is pressed, the relay is active for 0.125 seconds and then becomes inactive.

RGB Delay Times

(4) The RGB delay time switches the video off before switching the sync off. It then switches the sync for the new input before switching the video on. This assures a stable image on the screen. RGB Delay can be set from this Windows panel. Slide the scroll bar to select from 0 seconds to 5 seconds, in 0.5 second steps.

Miscellaneous Options

(5) These options may not be the same on all systems. Each one is explained in the Help screen by clicking on the panel option. Repeat Power Down is for projectors that require a second power down command as confirmation. Click the check box to activate the desired option.

Downloading from Extron's IR Projector Library

From Extron's website (www.extron.com), select **Download** and then **Projector Drivers**. A table of projector names, models and drivers will display. Locate the manufacturer and model and click on the File Name (hyperlink). Here is an example on one projector:

Manufacturer	Model	File Name	Rev. #	Rev. Date
Hughes/JVC	G10	**HJC_G10.5CR**	A	11/13/98

After selecting the software to download, you will be asked where to save it. From the File Download window, select **Save this file to a disk**. From the **Save as** window direct it to the path:

(drive):\system5\drivers\

Click the OK button.

Note that projector drivers have the extension .5cr.

Figure 4-6. Saving the downloaded file.

To activate a projector driver from the Control Software, drop down the File menu and select Restore Configuration from... and direct it to the **drivers** folder (under the System 5 folder) and select the driver file name.

To download the latest version of the System 5 Windows® Control software, select Download, Control Software, and then System 5cr.

Saving a Configuration to a File

Once a System 5 has been configured, whether it be from downloading, IR learning, front panel settings, or a combination of these, the current configuration can be saved as a file (*.sy5) and loaded again later. Any number of configuration files may be saved and restored. This eliminates having to set up the system for each application again and again. Saving and restoring system configuration files is done from the File menu, as shown in the example to the left.
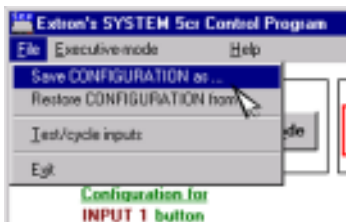
Figure 4-7. Save and restore a System 5 configuration.

△ *The operations described here are subject to change without notice and are intended as an overview. This includes the System 5 operation as well as the Extron web site. Use the Help screens for the latest functions and descriptions.*

Loading Projector Drivers

A sub-folder under the System 5 folder is used to store the user's library of projector drivers.

To view which commands are in a particular driver, without loading it, launch the System 5 control software in Emulation Mode (instead of selecting a Comm port). You will be asked to select from a list of drivers. Double-click the Drivers folder to open it and select a projector. Each driver (.5cr) loads the IR commands for that projector into the System 5 memory. During normal operation, certain System 5 functions will send out associated IR signals to the projector.

Figure 4-8. Example of the Drivers Folder containing Projector drivers, with IR codes.

Another example for using this folder would be to load the driver for a different projector. This could be the user's own driver library. Downloading from Extron's web library is explained on page 4-4.

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Appendix A
Programming the System 5cr

Remote Control Port (RS-232)

Host-to-Switcher Instructions

Command/Response Table

CAMBOARD Electronics

Remote Control Port (RS-232)

Figure A-1 shows the RS-232 port connector. This is used to connect to a host, or external controlling device, such as a computer or control panel that can generate the proper command codes and recognize the System 5 responses.
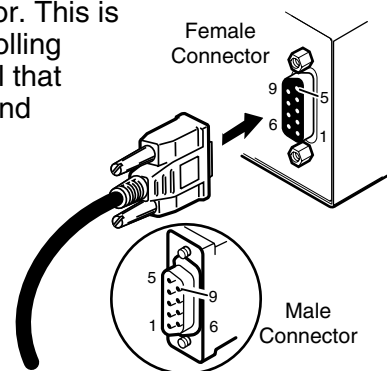
.

Figure A-1. The Serial Port Connector is wired for RS-232

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

Pin	RS-232	Usage
1	n/u	
2	Tx	RS-232 Transmit Data
3	Rx	RS-232 Receive Data
4	n/u	
5	Gnd	Signal Ground (both)
6	n/u	
7	n/u	
8	n/u	
9	n/u	

Commands and responses for programming the System 5 Switcher from a Host system connected to the RS-232 port are listed on the next page.

The RS-232 protocol is 9600 baud, 8-bit, 1 stop bit with no parity and no flow control.
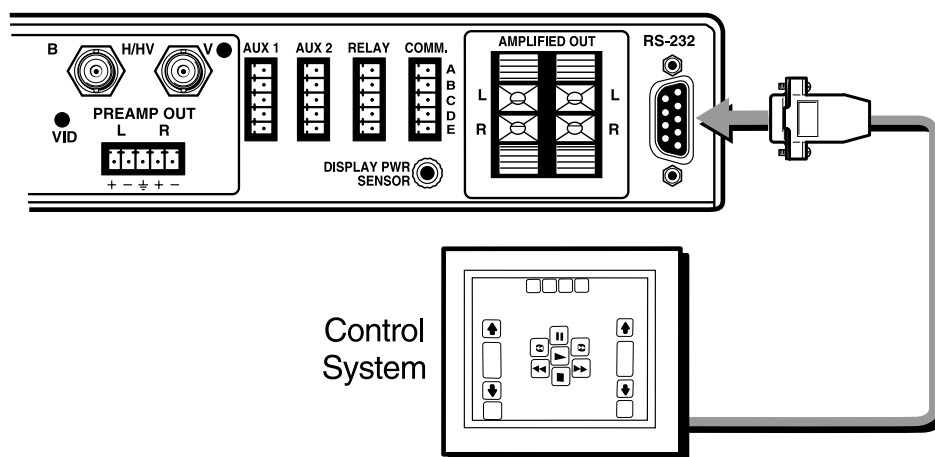

Figure A-2. Example of a touch panel connected to the RS-232 port.

Host-to-System 5*cr* Instructions

The System 5 will recognize certain ASCII characters as instructions. It then responds to those characters with appropriate information. Unrecognizable codes will get an error code as the response.

Simple Instruction Set – Command codes

Extron's Simple Instruction Set (SIS) minimizes the code required.

Initial power up	Unit response
	©COPYRIGHT 1999, EXTRON ELECTRONICS System 5cr, V1.04

Command Name/Description	ASCII	Hex	Unit response
Input Selection – Select one of five inputs to be connected to the output video and/or audio device(s). Send the input number, followed by the specific character ($, &, !) to define whether to switch audio, video, or both.			
Audio only	X1 $	30+ X1 24	A X1↵
Video only	X1 &	30+ X1 26	V X1↵
Both Video and audio	X1 !	30+ X1 21	C X1↵
Room – Switch between two states of the relay which operates room functions, such as lights, display screen, etc.			
On	O	4F	Rly X2↵
Off	o	6F	Rly X2↵
Display Power – Turn the display device (projector) On or Off.			
On (discrete)	[	5B	Pwr X8↵
Off (discrete)	]	5D	Pwr X8↵
Display Mute – Either S or s will toggle the video output Mute state.			
Toggle	S/s	53/73	Mut↵
Display Mode –			
Toggle	J	4A	Mde↵
Audio Gain – (0 = affect master volume output, 1 = affect current input attenuator)			
Set gain (amp output)	0* X3 G	30 2A X3 47	Aud X3↵
Set attenuation (input)	1* X3 G	30 2A X3 47	Aud X3↵
Increment up (amp output)	{ G	7B 47	Aud X3↵
Increment down (amp output)	} G	7D 47	Aud X3↵
Read Attenuators	*A	2A 41	X3 · X3 · X3 · X3 · X3 ↵
Video Configuration, Set video type	X5 * X4 \		X5 * X4 5C Vid/Svo↵
Query Software Version	Q/q	51/71	Ver X6 · X6 ↵
Request Part Number	N/n	4E/6E	Nxx-xxx-xx↵
Request Information	I/i	49/69	V X1 ·A X1 ·T X4 ·Pwr X8 ·Rly X2 ·Clp X2 ·Mut X2 ·Aud X3 ↵
Error Response codes			
Invalid input number	E01		The specified input number is something other than 1 - 5.
Invalid command	E10		The System 5 received a character that is not a command.
Invalid Value (out of range)	E13		The value parameter is not within the allowed range.

Definitions and Abbreviations:

↵ = CR/LF (hex 0D 0A)

X1 = Input #1 through 5, or 0 = no connection

X2 = 0 or 1 (0 = off, 1 = on)

X3 = 0 – 100 (steps of audio attenuation)

X4 = Video type (0 = RGB, 1 = composite video, 2 = S-Vid)

X5 = 4 or 5 (Configurable video inputs)

X6 = Controller firmware version, followed by IR firmware version

X7 = 0 or 1 (0 = Off, 1 = On)

X8 = 3, 2, 1, or 0 (3 = display is busy powering up, 2 = display is busy powering down, 1 = display power is on, 0 = display power is off)

· = space (If indicated, the space must be there.)

CAMBOARD Electronics

Advanced Instructions – Reserved for Windows program

IR Block	ASCII	Hex	Unit response
Read (Upload)	n/a	80 83	8k bytes of data
Write (Download)	n/a	80 82 [8k bytes]	Dnl ↵
Flag Block	**ASCII**	**Hex**	**Unit response**
Read (Upload)	n/a	80 85	15 bytes of data
Write (Download)	n/a	[Byte0]*[Byte1]91	Dnl ↵
	n/a	[Byte2]*[Byte3]93	Dnl ↵
	n/a	[Byte6]*[Byte7]97	Dnl ↵
	n/a	[Byte8]* 30 99	Dnl ↵
Unit Reset	**ASCII**	**Hex**	**Unit response**
Reset Unit	n/a	80 81	Upd ↵

Flag Block: Consists of fifteen bytes (0-14) that will used for handling special functions for current and future operation.

Byte 0 – Power on delay

Byte 1 – Power off delay

Byte 2 – Triple action switching delay (.5 second * value)

Byte 3 – Relay control

Byte 4 – n/u

Byte 5 – n/u

Byte 6 – n/u

Byte 7 – Mute control & misc. flags

    (msb)   Bit 7 - True = Mute audio upon display-power down.

                         Bit 6 - True = Limit System volume upon switcher power up.

                         Bit 5 - True = Send responses to RS-232 commands.

                         Bit 4 - True = Send channel IR command upon display-power up.

                         Bit 3 - True = Enable front panel volume

                         Bit 2 - reserved

                         Bit 1 - reserved

    (lsb)   Bit 0 - reserved

                         Note: Factory default = all bits on (hex FF).

Byte 8 – Video type (composite video or S-video)

Byte 14 - Checksum

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Projector Power Sensor

Infrared Broadcaster

SCP 100 Remote Pads

Glossary of Terms

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www.camboard.de   Tel. 07131 911201   ce-info@camboard.de
                         Fax 07131 911203

System 5*cr* Options

Figure B-1 illustrates the options and accessories that operate with the System 5. The standard accessories installation is covered in Chapter 2 and each option has its own User's Guide. This section summarizes the three options: SCP 100, IR Broadcaster and Display Power Sensor.
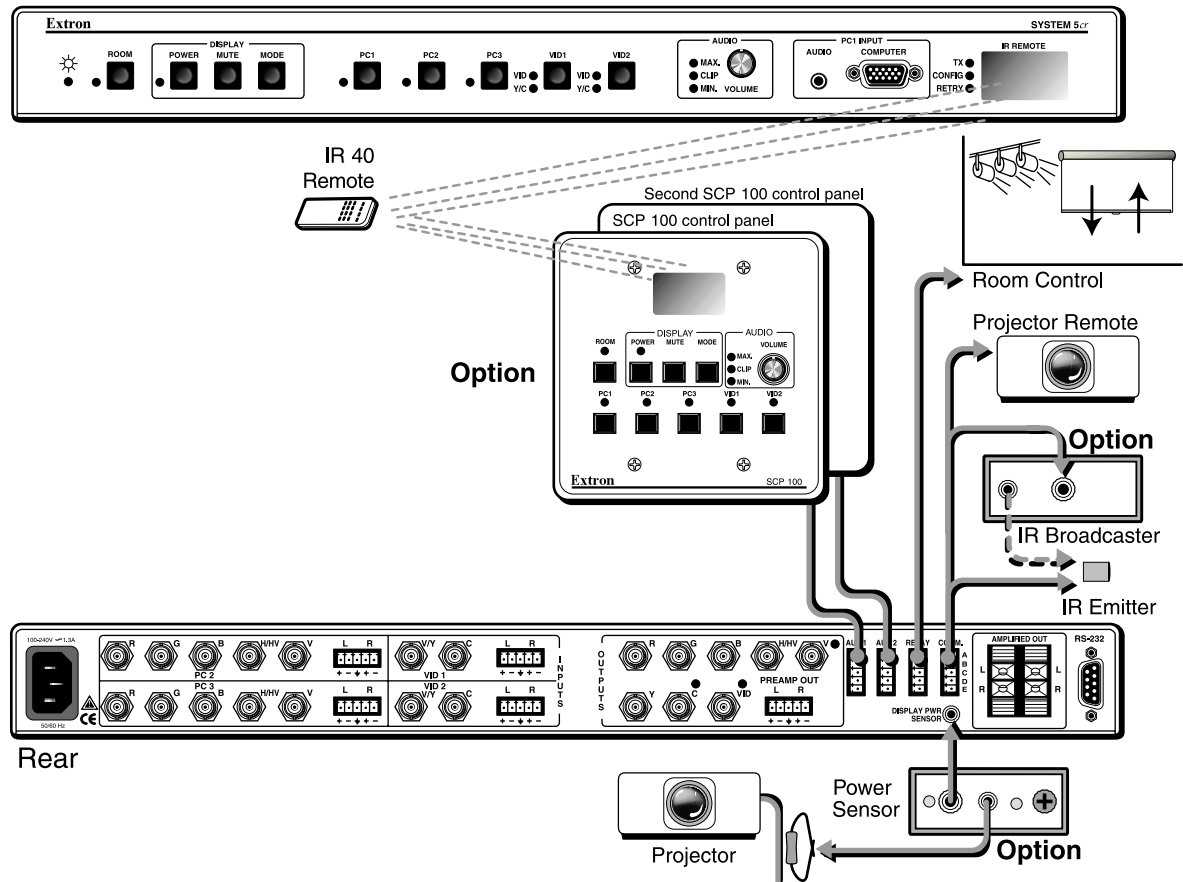
Figure B-1. The options connectors are located to the right side of the rear panel.

All of the necessary connectors are provided with the products, but cables must be custom made according to the requirements of the installation.

The Display Power Sensor is also shown in Figure B-1. Its cable is one-to-one, ring = signal, tip = +12 volts and sleeve = ground. The optional IR Broadcaster uses the same contact assignments.

⚠ ———— *When connecting a Power Sensor or IR Broadcaster, remember that the System 5 supplies the +12 volts to the tip of the connector. Therefore the cable should be plugged into the option device before connecting it to the System 5 rear panel, where the voltage source is.*

⚠ ———— *Do not plug any other devices into the rear panel connectors, except those described here.*

For detailed instructions, see appropriate document.

- *SCP 100 Control Pad, P/N 68-390-01*
- *Display Power Sensor, P/N 68-391-01*
- *IR Broadcaster, P/N 68-392-01*
- *IR Broadcaster with Emitter connector, P/N 68-392-02*

Notes: The IR Broadcaster requires a 3-wire cable to connect:
+12 V from tip to contact E, signal from Ring to contact C and Ground from Sleeve to either contact B or D.

If using the IR Broadcaster that has an emitter connector (60-272-02), use pin A from the System 5 for signal without carrier. The carrier will then be generated by the IR Broadcaster, for a specific frequency range.
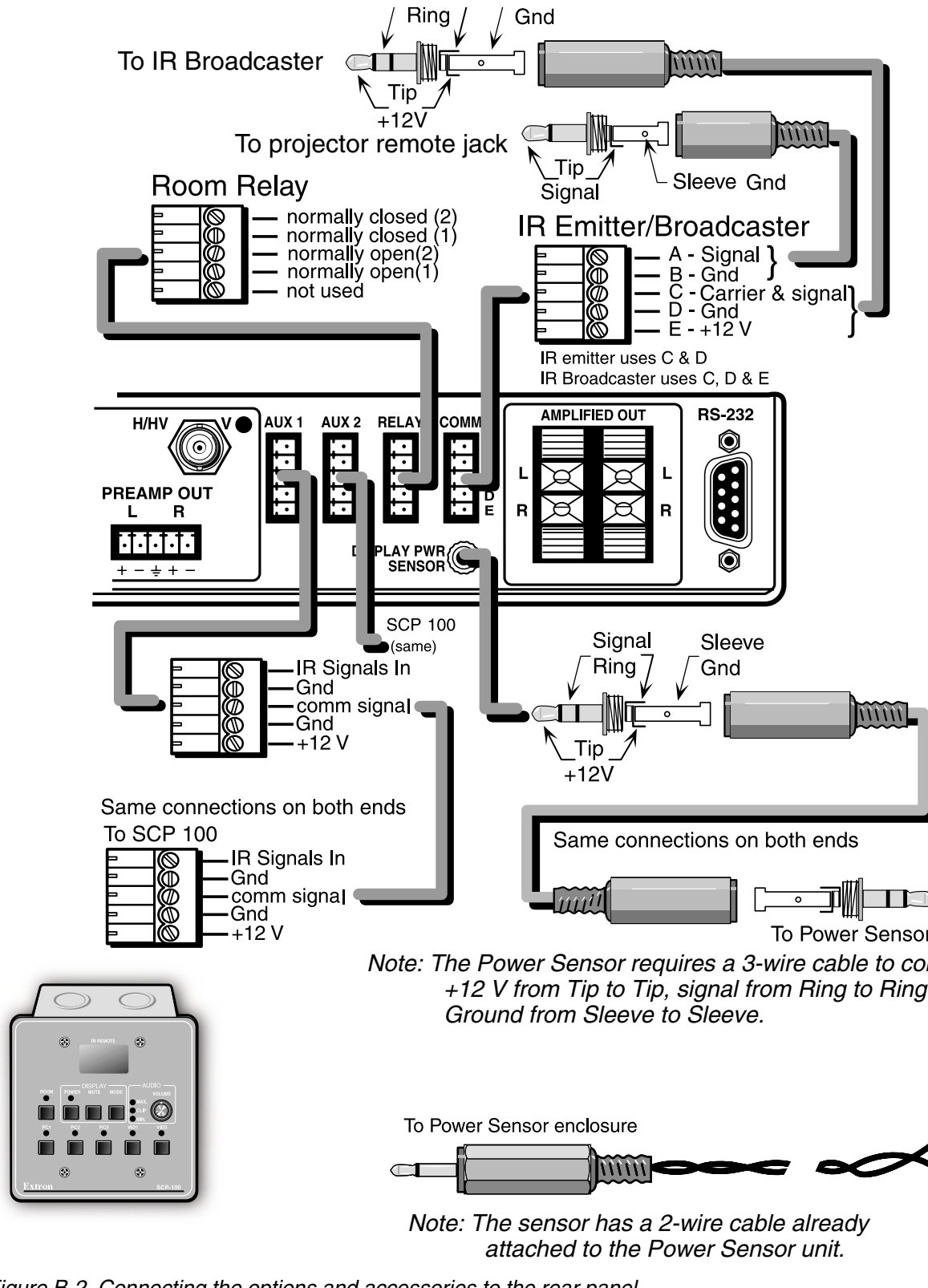
Ring   Gnd

To IR Broadcaster

Tip
+12V

To projector remote jack

Tip
Signal   Sleeve Gnd

Room Relay

— normally closed (2)
— normally closed (1)
— normally open(2)
— normally open(1)
— not used

IR Emitter/Broadcaster

— A - Signal
— B - Gnd
— C - Carrier & signal
— D - Gnd
— E - +12 V

IR emitter uses C & D
IR Broadcaster uses C, D & E

H/HV   V   AUX 1   AUX 2   RELAY   COMM   AMPLIFIED OUT   RS-232

PREAMP OUT
L   R   L   L
                                                  R   R
+ − ÷ + −   D
                                                  E

DISPLAY PWR
SENSOR

SCP 100
(same)

— IR Signals In
— Gnd
— comm signal
— Gnd
— +12 V

Signal   Sleeve
Ring   Gnd

Tip
+12V

Same connections on both ends
To SCP 100

— IR Signals In
— Gnd
— comm signal
— Gnd
— +12 V

Same connections on both ends

To Power Sensor

Note: The Power Sensor requires a 3-wire cable to connect:
+12 V from Tip to Tip, signal from Ring to Ring and Ground from Sleeve to Sleeve.

To Power Sensor enclosure

current sensor

Power-Cable

Note: The sensor has a 2-wire cable already attached to the Power Sensor unit.

Figure B-2. Connecting the options and accessories to the rear panel.

Glossary of terms

Following is a list of terms taken from Extron's Glossary.

AC Reset – Refers to status that changes when power is removed from a device. Many electronic devices have live power inside, even after "Power off" has been initiated from a panel or remote control device. This is not the same as "AC Reset", when power is removed at the AC cord.

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 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.

Breakaway – The ability to separate 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. The opposite of the term "follow".

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.

Chroma – The color information (hue and saturation), independent of luma intensity. Black, gray, and white objects do not have chroma characteristics.

Chroma Signal – Part of a television signal containing the color information. Abbreviated as "C".

Clip, Clipping – The level at which a signal excursion begins to exceed limits of the circuit and flattens out, distorting the signal. When setting audio attenuation, the clip level can be defined as a level short of the distortion point, thus allowing "headroom" and maintaining the signal's fidelity.

Composite Sync – A signal consisting of horizontal sync pulses, vertical sync pulses, and equalizing pulses only, with no signal reference level. Also referred to as RGBS.

Composite Video – A combined signal which includes luma black and white, chroma (color), blanking

Differential Audio – See Balanced Audio.

DLP – Digital Light Processing – Also DMD (Digital Micro-mirror Device). Uses an array of mirrors that move independently, reflecting light to compose the picture.

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

Headroom – The margin between a nominal operating signal level and peak clipping (distortion) level. See Clipping.

High Impedance (Hi Z/High Z) – This is typically 10k ohms or greater. In video, when the signal is not terminated locally, there may be a switch for Hi Z or some termination value (75 ohms). Hi Z is used if termination is provided by another device.

IR Learning – The ability of a device to receive and store infrared commands for other devices, such as the projector. With Extron's System 5, each command is assigned to a system operation (such as selecting an input). When an operation is executed,

the associated (learned) command is then transmitted through an IR emitter or broadcaster to the projector, where it is executed. For example, if input #3 is S-video, selecting that input also sends a signal to the projector to switch to S-video mode. See IR library.

IR Library –

A library of infrared commands for video projectors that can be used with Extron's System 5 switcher. Each library file has a set of commands for a specific projector, or series of projectors. The files are available at Extron's web site and for uploading to the System 5 memory. Once installed, appropriate IR commands are assigned to operational functions, which are transmitted when that function is activated, allowing the System to control the projector. See IR learning.

Latching –

For a device that has two states, such as a relay or a switch, latching means that once put into the active state, the condition remains until it is taken out of that state by some action. Often the same action latches and unlatches alternately. In the System 5, the Room relay can operate in two modes: latching or momentary.

LCD –

Liquid crystal display – A panel that utilizes two transparent sheets of polarizing material with a liquid containing rod-shaped crystals between. When a current is applied to specific pixel-like areas, those crystals align to create dark images. The dark areas are combined with light areas to create text and images on the panel. LCD panels do not emit light but are often backlit or side-lit for better viewing.

LCD panel –

A device used to project video images through a liquid crystal display and an overhead projector onto a large screen. The panel is placed over the stage of an overhead projector, projecting the computer display onto a screen.

LCD projector –

Utilizing the LCD technique, these projectors separate the red, green and blue information to three different LCD panels. Since LCD panels do not produce color, the appropriate colored light is then passed through each panel and combined to exit through the projector lens and onto a viewing screen.

Level (audio) –

A term used with signal voltage, power, strength or volume. Audio level can be expressed as attenuation (less than the original) or gain (more than original).

Library –

See IR Library.

Luma –

This is the signal that represents brightness in a video picture. Luma is any value between black and white. In mathematical equations, luma is abbreviated as "Y".

Relay –

In the System 5, a "room" function controlled from the front panel or by a remote device, which provides normally open and normally closed contacts to a connector, allowing the user to control other electrical devices.

RGB Delay –

When switching between video inputs, for a brief time, the signal out of the switcher may be unstable while locking in on the new sync. RGB delay turns the video on after the sync has stabilized, providing seamless switching.

Room (control) –

The "room" function controlled from the System 5 front panel or by a remote device provides relay contacts to a connector, allowing the user to control other devices electrically. Examples include window blinds, lighting, projection screen.

RS-232 –

A method of communicating between two devices using two lines: Tx to transmit and Rx to receive. Tx on one end becomes Rx on the other. This standard does not specify balanced control lines.

Serial Port –

A connection that allows communication with other devices over a single pair of wires. The serial port is most often used with RS-232 protocol.

S-video –

The composite video signal is separated into the Luma (Y) and the Chroma (C).

Y –

In video, "Y" is an abbreviation for Luma.

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www.camboard.de Tel. 07131 911201 ce-info@camboard.de
Fax 07131 911203

FCC Class A Notice

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

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

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of 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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www.camboard.de   Tel. 07131 911201   ce-info@camboard.de
                         Fax 07131 911203