
User's Manual



RAC 104

Remote Volume and Tone Controller

68-782-01 **Rev. C**
12 08

Precautions

Safety Instructions • English



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



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

Caution

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

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

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

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

Consignes de Sécurité • Français



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



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

Attention

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

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

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

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



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

Achtung

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

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

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

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

Instrucciones de seguridad • Español



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



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

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. 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 le contourner ni de la désactiver.

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

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

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

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

Lithium Batterie • Il a danger d'explosion s'il y a un remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Vorsicht

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

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

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

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

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

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

Advertencia

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

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

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

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

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

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

安全须知 • 中文



这个符号提示用户该设备用户手册中的操作和维护说明。



这个符号警告用户该设备机壳内暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。
遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

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

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有后备或桌面电源的电源线，或任何接到市电系统电源线。

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

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

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

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

FCC Class A Notice

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.*

Quick Start Guide — RAC 104

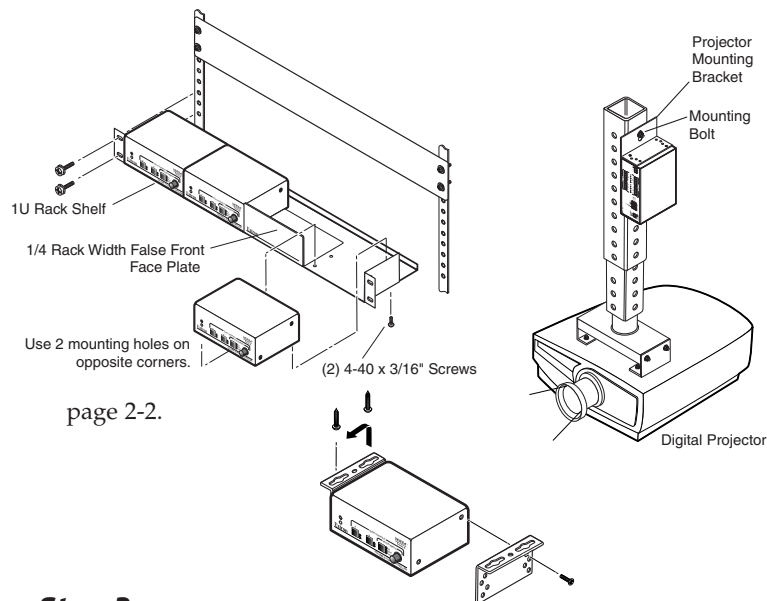
To install and set up the RAC 104 remote volume and tone controller, follow these steps and see the appropriate section of this manual for details:

Step 1

Turn all of the equipment off and **disconnect the power cords**.

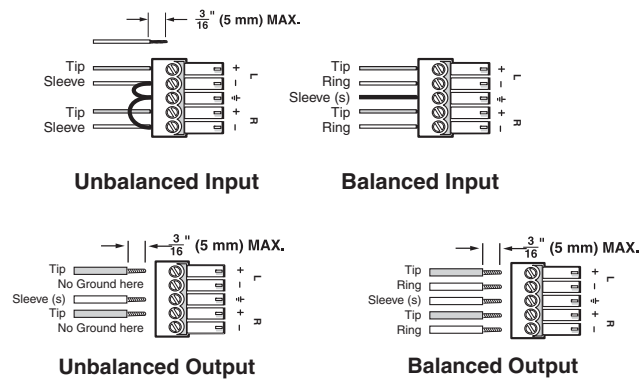
Step 2

Mount the RAC 104 (if applicable) or affix the rubber feet to the bottom of the unit for tabletop use. See



Step 3

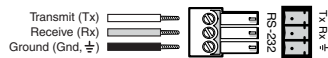
Attach the cables to the audio input and output devices. Wire the connectors as shown below.



Quick Start Guide — RAC 104, cont'd

Step 4

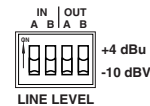
If the RAC 104 is to be connected to a computer or host controller for remote control, connect the host's RS-232 cable to the RAC 104's 3-pole captive screw RS-232 connector. Wire the connector as shown below. See chapter 3 for more information on remote control.



Pin	RS-232 function	Description
1	Tx	Transmit data
2	Rx	Receive data
3	Gnd	Signal ground

Step 5

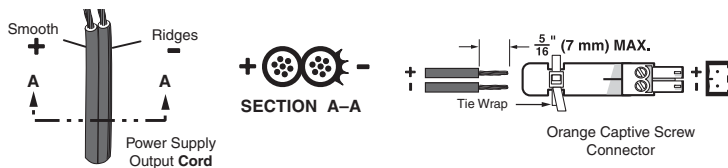
Set the line level selector DIP switches to -10 dBV (unbalanced, consumer line level) or +4 dBu (balanced, professional line level).



Step 6

Connect power cords. Wire the RAC 104's power connector as shown below.

CAUTION When connecting the power supply, voltage polarity is extremely important. Applying power with incorrect voltage polarity could damage the power supply and the RAC 104. Identify the power cord negative lead by the ridges on the side of the cord or a black heat shrink wrapping around it.



WARNING The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

Step 7

Turn all the equipment on.

Step 8

Set volume, bass, and treble levels using the front panel controls, Simple Instruction Set commands, or the Extron Audio Products Control Program. See chapters 2 and 3 for more information.

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12 08



RAC 104

1

Chapter One

Introduction

About the RAC 104

Features

Introduction

About the RAC 104

The Extron RAC 104 is a high-performance, four-channel remote audio controller that adjusts volume and tone for stereo or mono audio signals. Adjustments are made via the RAC 104's front panel controls or through a device connected to the unit's RS-232 connector.

The four channels on the RAC 104 can be used as four discrete mono channels or can be tied into pairs as stereo channels. All channels input and output balanced or unbalanced signals on 5-pole captive screw connectors.

The unit features smooth volume adjustment and three presets for each channel. An external 100-240 VAC power supply is included with the unit.

Features

Volume, bass, and treble controls — Adjust these three settings using the RAC 104's front panel controls or an RS-232 device. Set upper and lower limits for volume and tone using an RS-232 device.

Four discrete channels — Versatile input/output configuration can accommodate mono audio, stereo audio, or a combination of the two.

Speed-sensitive volume knob — Turn the knob quickly to make coarse adjustments or slowly to make fine adjustments.

Smooth volume adjustment — No audible "stairstepping" or jumps when volume is adjusted.

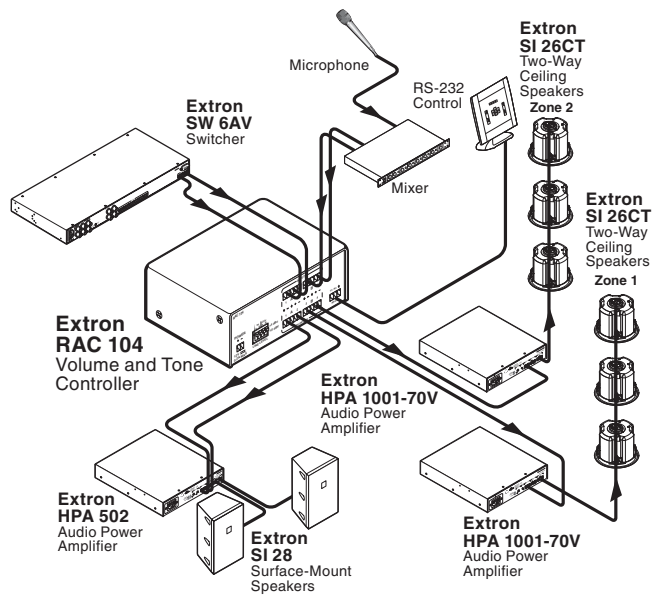
Input gain adjustment — Using an RS-232 device, adjust the input gain to reduce variations in volume between channels and set an upper volume limit for each channel.

Presets — Save and recall up to three presets for each channel via an RS-232 device. Each preset saves volume, bass, treble, and input gain settings.

Balanced/unbalanced inputs and outputs — The RAC 104 is compatible with both balanced and unbalanced audio, and can be used as a balanced-to-unbalanced audio converter.

Consumer and professional audio compatibility — Input and output line level can be set to consumer (-10 dBV) or professional (+4 dBu).

Rack, furniture, and projector mountability — The RAC 104 can be mounted on an optional VersaTools or Universal rack shelf. Alternatively, it can be mounted under a desk, podium, or other furniture, or secured to a projector mount with optional brackets.



Typical RAC 104 application

Introduction, cont'd



RAC 104

2 Chapter Two

Installation and Operation

Mounting the RAC 104

Rear Panel Features and Cabling

Front Panel Controls

Installation and Operation

Mounting the RAC 104

The RAC 104 can be set on a table or mounted on a rack shelf, under a desk or tabletop, or on a projector mount.

UL rack mounting guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the RAC 104 in a rack.

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the RAC 104 in an environment compatible with the maximum ambient temperature ($T_{ma} = +122\text{ }^{\circ}\text{F}, +50\text{ }^{\circ}\text{C}$) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

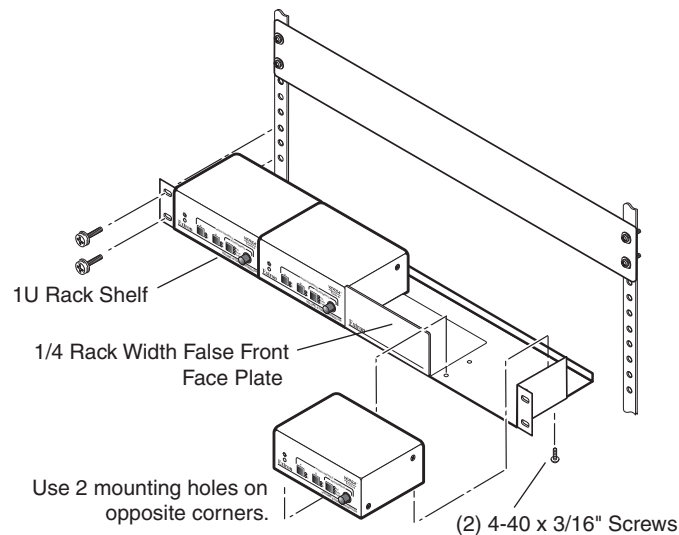
Tabletop use

Four self-adhesive rubber feet are included with the RAC 104. For tabletop use, attach one foot at each corner of the bottom side of the unit and place the unit in the desired location.

Rack mounting

For optional rack mounting, do not install the rubber feet. Mount the RAC 104 on an RSF 123 VersaTools™ 19" 1U rack shelf (Extron part #60-190-20) or a RSU 129 universal 1U rack shelf (Extron part #60-190-01). On the Universal rack shelf, the unit mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

1. Remove rubber feet if they were previously installed on the bottom of the RAC 104.
2. Mount the unit on the rack shelf, using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the unit to the shelf.
3. Install blank panel(s) or other unit(s) on the rack shelf.
4. Attach the rack shelf to the rack using the supplied bolts.



Mounting the RAC 104 on a VersaTools rack shelf

NOTE

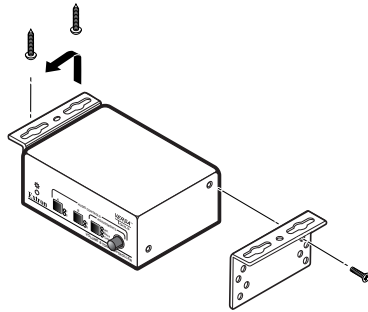
Only products in the VersaTools line can be mounted on a VersaTools shelf. Most 1U rack-mountable Extron products can be mounted on the standard shelf.

Installation and Operation, cont'd

Furniture mounting

Furniture mount the RAC 104 using the optional MBU 123 mounting kit (Extron part #70-212-01) as follows:

1. Remove rubber feet if they were previously installed on the bottom of the RAC 104.
2. Attach the furniture mounting brackets to the RAC 104 with the machine screws provided.
3. Hold the RAC 104 with the attached brackets against the underside of the table or other furniture. Mark the location of the screw holes of the bracket on the mounting surface.
4. Drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" of the screw protrudes.
6. Align the mounting screws with the slots in the brackets and place the RAC 104 against the surface, with the screws through the bracket slots. See the illustration below.
7. Slide the RAC 104 slightly forward or back, then tighten all four screws to secure the unit in place.

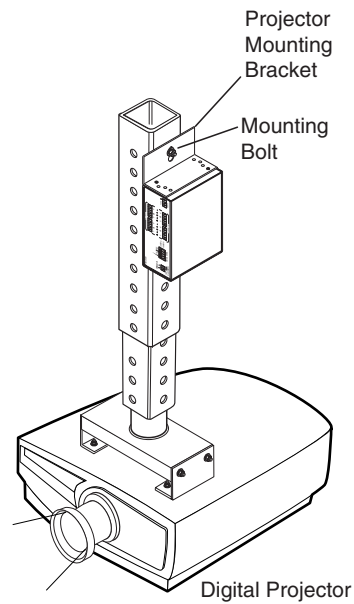


Mounting the RAC 104 under furniture

Projector mounting

Projector mount the RAC 104 using the optional PMK 100 pole mount kit (part #70-217-01) as follows:

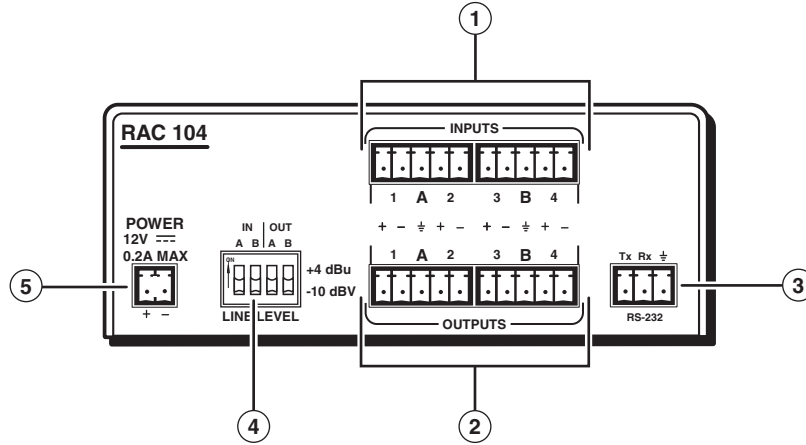
1. Remove rubber feet if they were previously installed on the bottom of the RAC 104.
2. Attach the projector mounting brackets to the RAC 104 with the machine screws provided.
3. Secure the RAC 104 to a projector mount or other surface by inserting the mounting bolt through the bracket's slotted hole, as shown below.



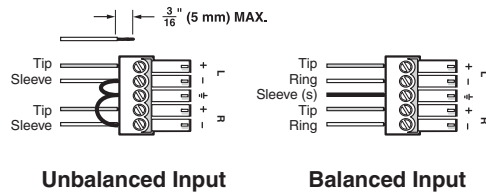
Mounting the RAC 104 on a projector mount

Installation and Operation, cont'd

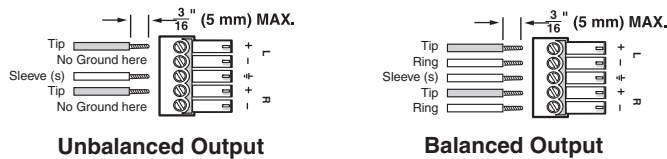
Rear Panel Features and Cabling



- ① **Input connectors** — Plug the audio input devices into these two 5-pole captive screw connectors. One stereo device or two mono devices can be connected to each captive screw connector. Wire the connectors as shown below.

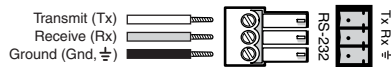


- ② **Output connectors** — Plug the audio output devices into these two 5-pole captive screw connectors. One stereo device or two mono devices can be connected to each captive screw connector. Wire the connectors as shown below.



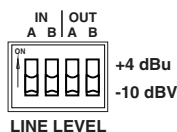
CAUTION Connect the sleeve to ground (⊕). Connecting the sleeve to a negative (-) terminal will damage the audio output circuits.

- ③ **RS-232 connector** — Plug an optional RS-232 device into this 3-pole captive screw connector. Wire the connector as shown below.

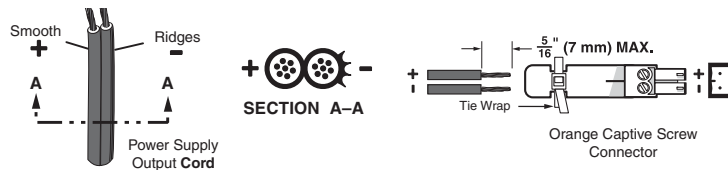


Pin	RS-232 function	Description
1	Tx	Transmit data
2	Rx	Receive data
3	Gnd	Signal ground

- ④ **Line level selector DIP switches** — Set these switches to -10 dBV (unbalanced, consumer line level) or +4 dBu (balanced, professional line level). There are four switches, one for each input group and output group.



- ⑤ **Power connector** — An external 12 V power supply is included with the unit. Plug it into this 2-pole captive screw connector. Wire the connector as shown below.



CAUTION

When connecting the power supply, voltage polarity is extremely important. Applying power with incorrect voltage polarity could damage the power supply and the RAC 104. Identify the power cord negative (ground) lead by the ridges on the side of the cord or a black heat shrink wrapping around it.

WARNING

The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

To verify the polarity before connection, check the no load power supply output with a voltmeter.

Installation and Operation, cont'd

NOTE *Your RAC 104 may have shipped with a blue captive screw connector. This blue connector can be plugged into either a blue or an orange power receptacle.*

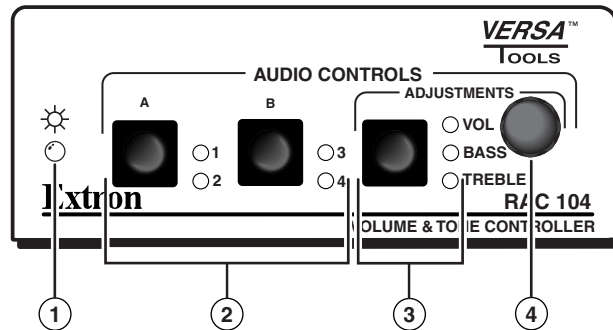
The ideal length of exposed (stripped) copper wire for the blue connector is 3/16" (5 mm).

The blue connector does not have the extended tail or the included tie-wrap.

NOTE *Do not tin the power supply leads before installing in the direct insertion connector. Tinned wires are not as secure in the connectors and could be pulled out.*

NOTE *After making any adjustments to the RAC 104, either via the front panel controls, SIS commands, or the Extron Audio Products Control Program, wait at least 10 seconds after making those changes **before** disconnecting power to the RAC 104. Failure to observe the 10-second timeout may result in those adjustments not being saved.*

Front Panel Controls



- ① **Power LED** — Lights to indicate that the RAC 104 is on.
- ② **Channel selector buttons and LEDs** — The RAC 104 has two channel selector buttons, one for channel group A (channels 1 and 2) and one for channel group B (channels 3 and 4). Press and release these buttons to select the channel(s) to adjust. When a channel is selected, the corresponding LED lights.

Pressing the buttons repeatedly cycles through four possible selections:

Both LEDs on — both channels selected (tied, for stereo audio)

NOTE *When both channels in a group are selected, they will be tied together once the user turns the adjustment knob. The RAC 104 automatically sets both channels to the same volume and tone levels and any future changes will affect both channels simultaneously. To cancel a tie, press and release the channel selector button again and then turn the adjustment knob. See “Channel ties” in this chapter for more information.*

LED 1 (or 3) on — mono channel 1 (or 3) or the left stereo channel selected

LED 2 (or 4) on — mono channel 2 (or 4) or the right stereo channel selected

Both LEDs off — no channel selected

NOTE *Groups A and B cannot be adjusted at the same time. Pressing the button for one group will cause the LEDs for the other group to turn off.*

Installation and Operation, cont'd

- ③ **Adjustment selector button and LEDs** — Press and release this button to select volume, bass, or treble adjustment. When an adjustment is selected, the corresponding LED lights. If after 10 seconds you do not make any other adjustments or selections on the front panel, this selector will default to volume.

NOTE *The adjustment selector button will not function unless you have first selected one or more channels (see ②, above).*

- ④ **Adjustment knob** — Turn this knob to adjust the volume, bass, or treble for the channel(s) you selected using the channel selector buttons. When you reach the upper or lower limit of the allowable adjustment range, the adjustment selector LED flashes three times. (See chapter 3, "Remote Control", for instructions on setting volume and tone limits.)

NOTE *The volume adjustment is speed sensitive. Turn the knob quickly to make coarse volume adjustments or slowly to make fine volume adjustments.*

Channel ties

The user can tie the two channels in a group together for stereo audio.

Creating a tie

To tie channels together:

1. Press the channel selector button until both LEDs are on.
2. Press the adjustment selector button to select either volume, bass, or treble and turn the adjustment knob in either direction.

The RAC 104 automatically sets both channels to the same volume or tone level using the following criteria:

For volume — The unit changes the volume setting for the channel with the highest volume to match that of the other channel.

For example, if the volume on channel 1 is set to 85 and the volume on channel 2 is set to 50, the unit will change channel 1's volume setting to 50 when the user ties them together.

	Channel 1	Channel 2
Volume before tie:	85	50
Volume after tie:	50	50

For bass and treble — The unit changes the tone setting for the channel with the tone setting farthest from 7 (0dB) to match that of the other channel.

For example, if the treble on channel 1 is set to 6 and the treble on channel 2 is set to 10, the unit will change channel 2's treble setting to 6 when the user ties them together.

	Channel 1	Channel 2
Treble before tie:	6	10
Treble after tie:	6	6

Volume, bass, treble, and mute adjustments can now be made to both channels simultaneously. The user can continue to adjust the gain settings independently using the SIS or the Windows-based control program via the RS-232 connector (see chapter 3 for more information).

Ties can also be made using the SIS or the Windows-based control program (see chapter 3 for more information).

Canceling a tie

To cancel a tie, press and release the channel selector button again so that only one channel selector LED is on, then turn the knob.

Ties can also be cancelled using the SIS or the Windows-based control program (see chapter 3 for more information).

Resetting the RAC 104

To return the RAC 104 to its default settings, press and hold the adjustment selector button for 10 seconds. All the LEDs will light and then turn off. The default settings are:

Volume	70 (-30 dB)
Gain	0 dB
Bass	7 (0 dB)
Treble	7 (0 dB)

Any volume and tone limits are cancelled (see chapter 3 for information on limits).

The unit can also be reset using the SIS or the Windows-based control program (see chapter 3 for more information).

Locking the front panel

To prevent accidental changes to the controller settings, the front panel controls can be locked using one of two executive modes. The user turns the executive modes on and off using either the SIS or the Windows-based control program via the RS-232 connector (see chapter 3 for more information).

If the user presses a front panel button that is locked, the LED corresponding to that button flashes three times.

Installation and Operation, cont'd



RAC 104

3

Chapter Three

Remote Control

Simple Instruction Set

Windows-Based Program Control

Front Panel Security Lock Out (Executive Modes)

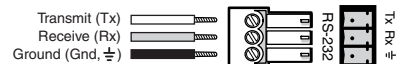
Presets

Mute

Remote Control

The RAC 104 can be controlled remotely via the RS-232 connector using the Extron Simple Instruction Set (SIS) or the Extron Windows-based control program.

The RS-232 connector on the RAC 104 is a 3-pole captive screw connector, with one pole for transmitting data, one for receiving data, and one for the ground. Wire the RS-232 connector as shown below.



RS-232 connector wiring

Pin	RS-232 function	Description
1	Tx	Transmit data
2	Rx	Receive data
3	Gnd	Signal ground

RS-232 pin assignment table

The RS-232 protocol for this connector is 9600 baud, 8-bit, 1 stop bit, no parity.

Simple Instruction Set

Host-to-controller instructions

The RAC 104 accepts SIS commands through the RS-232 port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each controller response to an SIS command ends with a carriage return and a line feed (CR/LF = ↵), which signals the end of the response character string. A string is one or more characters.

Controller-initiated messages

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

Boot V1.00,(c) 2003, ? to Enter

(c) Copyright 2003,Extron Electronics,RAC 104, Vx.xx↵

Controller error responses

When the RAC 104 receives an SIS command and determines that it is valid, it performs the command and sends a response to the host device. If the controller is unable to perform the command because the command is invalid or contains invalid parameters, the controller returns an error response to the host. The error response codes are:

- E01 — Invalid channel number (too large)
- E10 — Invalid command
- E13 — Invalid value (out of range)
- E14 — Invalid setting at this time (i.e., setting outside the upper or lower value limit)
- E23 — Firmware update failure

Using the command/response table

The command/response table begins on the next page. Upper and lower case letters can be used interchangeably in the command field except where noted. Symbols are used throughout the table to represent variables in the command/response fields. An ASCII-to-hexadecimal (HEX) conversion table and symbol definitions are provided below. Command and response examples are shown throughout the table.

ASCII to HEX Conversion Table								Esc 1B	CR 0D	LF 0A
(28) 29	! 21	" 22	# 23	\$ 24	% 25	& 26	' 27	/ 2F	
0 30	1 31	2 32	3 33	4 34	5 35	6 36	7 37	8 38	9 39	
@ 40	A 41	B 42	C 43	D 44	E 45	F 46	G 47	H 48	I 49	
P 50	Q 51	R 52	S 53	T 54	U 55	V 56	W 57	X 58	Y 59	
` 60	a 61	b 62	c 63	d 64	e 65	f 66	g 67	h 68	i 69	
p 70	q 71	r 72	s 73	t 74	u 75	v 76	w 77	x 78	y 79	
		z 7A	{ 7B	7C	} 7D	~ 7E	DEL 7F			

Symbol definitions

↵ = Carriage return/line feed

← = Carriage return (no line feed)

X1 = 0 through 100, output volume; attenuation (dB) = **X1**-100.
Default = 70 (-30 dB)

X2 = 1 through 4, channel numbers
1 = group A, channel 1
2 = group A, channel 2

Remote Control, cont'd

3 = group B, channel 3

4 = group B, channel 4

X3 = 0 or 1

0 = off

1 = on

X4 = 0 through 14, bass adjustment range

(+/-14 dB; 2 dB increment/decrement,

bass in dB = [bass number minus 7] times 2;

default = 7 [0 dB]).

X5 = 0 through 14, treble adjustment range

(+/-14 dB; 2 dB increment/decrement,

treble in dB = [treble number minus 7] times 2;

default = 7 [0 dB]).

X6 = Front panel executive modes

0 = off

1 = executive mode 1

2 = executive mode 2

X7 = Controller software version to second decimal place

X8 = A or B, group number

Group A = channels 1 and 2

Group B = channels 3 and 4

X9 = 1 through 3, preset number

X10 = -12 through +12 (audio gain or attenuation in dB)

X11 = 0 through 12 (audio gain in dB)

X12 = 1 through 12 (audio attenuation in dB)

X13 = 0 through 15, decimal number indicates settings for the four input and output line level DIP switches. DIP switch settings are shown in the table below.

		X13															
DIP Switch	Group	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Input A	Off	Off	Off	Off	Off	Off	Off	Off	On	On	On	On	On	On	On	On
2	Input B	Off	Off	Off	Off	On	On	On	On	Off	Off	Off	Off	On	On	On	On
3	Output A	Off	Off	On	On	Off	Off	On	On	Off	Off	On	On	Off	Off	On	On
4	Output B	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On	Off	On

Off = -10 dBV (unbalanced, consumer level)

On = +4 dBu (balanced, pro level)

Command/response table for SIS commands

Command	ASCII Command (host to RAC 104)	Response (RAC 104 to host)	Additional description
Audio input gain/attenuation			
Set gain (+dB) <i>Example:</i>	[X2]*[X1]G 3*8G	Chn[X2] Gain[X10] ↓ Chn3 Gain8	Set gain for channel [X2] to [X10]dB. Set gain for channel 3 to 8 dB.
Set attenuation (-dB)	[X2]*[X12]g	Chn[X2] Gain[X10] ↓	Set attenuation for channel [X2] to [X10]dB.
Gain increment	[X2]+G/g	Chn[X2] Gain[X10] ↓	Increment gain for channel [X2] by 1 dB.
Gain decrement	[X2]-G/g	Chn[X2] Gain[X10] ↓	Decrement gain for channel [X2] by 1 dB.
View gain/attenuation for input	V/v[X2]G/g	[X10] ↓	View input gain/attenuation for channel [X2].
Output Volume			
Specify volume level	[X2]*[X1]V/v	Vol[X2]*[X1]	Set volume for channel [X2] to [X1].
Increment volume	[X2]+V/v	Vol[X2]*[X1]	Increment volume for channel [X2] by 1 dB.
Decrement volume	[X2]-V/v	Vol[X2]*[X1]	Decrement volume for channel [X2] by 1 dB.
View volume	[X2]V/v	[X1] ↓	View output volume for channel [X2].
Mute			
Mute one channel	[X3]*1Z/z	Amt[X2]*[X3] ↓	Mute channel [X2].
Unmute one channel	[X3]*0Z/z	Amt[X2]*[X3] ↓	Unmute channel [X2].
View mute status of one channel	[X2]Z/z	[X3] ↓	View mute status of channel [X2].
Mute all channels	1*Z/z	Amt All*[X3] ↓	Mute all channels.
Unmute all channels	0*Z/z	Amt All*[X3] ↓	Unmute all channels.
View mute status of all channels <i>Example:</i>	Z/z Z	[X3]•[X3]•[X3]•[X3] ↓ 1 0 1 0 ↓	View mute status of all channels. Channels 1 & 3 muted, channels 2 & 4 not muted

Remote Control, cont'd

Command	ASCII Command (host to RAC 104)	Response (RAC 104 to host)	Additional description
Bass adjustment			
Specify bass level	[X2]*[X4]>	Bas[X4]↓	Set bass level for channel [X2] to [X4].
Increment bass level	[X2]+>	Bas[X4]↓	Increment bass level for channel [X2] by 2 dB.
Decrement bass level	[X2]->	Bas[X4]↓	Decrement bass level for channel [X2] by 2dB.
View bass level	[X2]>	[X4]↓	View bass level for channel [X2].
Treble adjustment			
Specify treble level	[X2]*[X5]<	Trb[X5]↓	Set treble level for channel [X2] to [X5].
Increment treble level	[X2]+<	Trb[X5]↓	Increment treble level for channel [X2] by 2 dB.
Decrement treble level	[X2]-<	Trb[X5]↓	Decrement treble level for channel [X2] by 2 dB.
View treble level	[X2]<	[X5]↓	View treble level for channel [X2].
Preset save and recall			
Save preset	[X2]*[X9] ,	Spr[X2]*[X9]↓	Save preset [X9] for channel [X2].
Recall preset	[X2]*[X9] .	Rpr[X2]*[X9]↓	Recall preset [X9] for channel [X2].
View preset status	[X2] .	[X3]•[X3]•[X3]↓	View preset status for channel [X2]; see note below.
<i>Example</i>	3.	0 1 1	For channel 3, preset 1 is empty, preset 2 is used, and preset 3 is used.
NOTE			
Each of the four channels has three presets. The View Preset command response tells the user which presets for a particular channel have been used to save settings and which are empty. The response consists of a sequence of three digits. The first, second, and third digits indicate the status of presets 1, 2, and 3, respectively. A 0 in the sequence indicates an empty preset, a 1 indicates a used preset.			

Command	ASCII Command (host to RAC 104)	Response (RAC 104 to host)	Additional description
View Preset Settings			
View input gain	X2 * X9 *5#	X10 ↵	
View output volume	X2 * X9 *6#	X1 ↵	
View bass setting	X2 * X9 *7#	X4 ↵	
View treble setting	X2 * X9 *8#	X5 ↵	
System reset			
Reset to factory defaults	Esc ZXXX↵	Zpx↵	Default settings: Input gain X10 = 0 Volume level X1 = 70 Bass level X4 = 7 Treble level X5 = 7.
Update firmware			
Upload firmware update	Esc Upload↵	Go↵	See note below.
Upload success		UPL↵	See note below.
<p>NOTE Firmware updates will periodically become available on the Extron Web site. To update the firmware, first download the update file from the site. Then open HyperTerminal and type the EscUpload↵ command. After receiving the Go↵ response, select Send Text File from the Transfer menu. In the Send Text File window, locate and select the file you downloaded and click Open. The controller will send the UPL↵ response once the update has been successfully completed. It will send the error code E23 if the update failed.</p>			

Remote Control, cont'd

Command	ASCII Command (host to RAC 104)	Response (RAC 104 to host)	Additional description
Front panel lock out (Executive modes)			
Set executive mode	X6 X/x	Exe X6 ↵	0 = off. 1 = mode 1 (all features except volume are locked). 2 = mode 2 (all features are locked).
View executive mode status	X/x	X6 ↵	0 = off. 1 = mode 1. 2 = mode 2.
Information requests			
Information request (DIP switch settings)			
Request for part number	I/i	X19 ↵	View DIP switch settings (see table on page 3-4).
Query software version	N/n	xx-xxx-xx ↵	60-561-01.
Tie channels together			
Tie channels together	X8 * X3 *4#	Tie Grp X8 * X3	Tie channels in group X8 together (0 = not tied, 1 = tied).
View ties of all groups	4#	GrpA* X3 GrpB* X3	Group A tied/not tied, group B tied/not tied.

NOTE

Commands can be made back-to-back with no spaces. Example 1*1102.103*031..
The RAC 104 supports the 2-digit numeric format (01*02).

Command	ASCII Command (host to RAC 104)	Response (RAC 104 to host)	Additional description
Volume, Bass, and Treble Range Limit Settings			
Set volume lower limit	[X2] * [X7] * 21 #	Vll [X2] * [X1] ↓	Set volume lower limit for channel [X2] to [X1].
Set volume upper limit	[X2] * [X7] * 22 #	Vul [X2] * [X1] ↓	Set volume upper limit for channel [X2] to [X1].
View volume lower limit	[X2] * 21 #	[X1] ↓	View volume lower limit setting for channel [X2].
View volume upper limit	[X2] * 22 #	[X1] ↓	View volume upper limit setting for channel [X2].
Set bass lower limit	[X2] * [X4] * 23 #	Bll [X2] * [X4] ↓	Set bass lower limit for channel [X2] to [X4].
Set bass upper limit	[X2] * [X4] * 24 #	Bul [X2] * [X4] ↓	Set bass upper limit for channel [X2] to [X4].
View bass lower limit	[X2] * 23 #	[X4] ↓	View bass lower limit setting for channel [X2].
View bass upper limit	[X2] * 24 #	[X4] ↓	View bass upper limit setting for channel [X2].
Set treble lower limit	[X2] * [X5] * 25 #	Tll [X2] * [X5] ↓	Set treble lower limit for channel [X2] to [X4].
Set treble upper limit	[X2] * [X5] * 26 #	Tul [X2] * [X5] ↓	Set treble upper limit for channel [X2] to [X4].
View treble lower limit	[X2] * 25 #	[X5] ↓	View treble lower limit setting for channel [X2].
View treble upper limit	[X2] * 26 #	[X5] ↓	View treble upper limit setting for channel [X2].

Remote Control, cont'd

Windows®-Based Program Control

The Windows-based Extron Audio Products Control Program is compatible with Windows 2000 and Windows XP and provides remote control of the volume, gain, and tone adjustment, and other RAC 104 features.

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

Installing the software

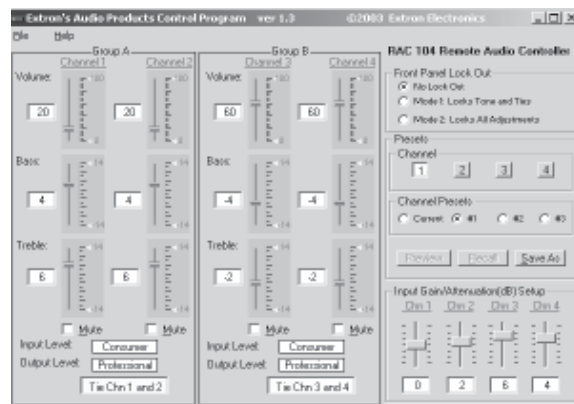
The program is contained on the Extron Software Products CD-ROM. To install the software:

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

Using the software

To run the software:

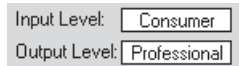
1. Double click the Audio Products Control Program icon in the Extron Electronics program group.
2. Click the comm port that is connected to the unit's remote connector.
3. Click OK. The Audio Products Control Program main window displays the current volume, tone, and gain/attenuation settings for each channel and allows the user to adjust them. The window also contains channel tie, channel mute, front panel lock out (executive modes), and preset controls.



Windows-based control program main window

Input/Output Level fields

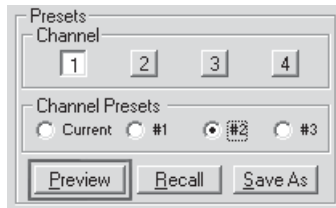
The Input Level and Output Level fields display the current settings for the line level selector DIP switches. See the chapter 2 section, “Rear Panel Features and Cabling”, for more information.



Input/Output Level fields

Preset Preview button

To view a preset before recalling it, select a channel and preset number, then click and hold the Preview button.

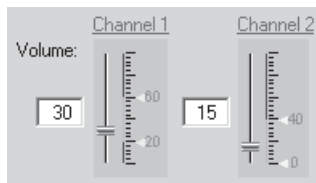


Preset Preview button

Setting volume and tone limits

Volume and tone limits allow you to specify the range of allowable volume, bass, and treble values. To set upper and lower volume and tone limits:

1. On the File menu, click Advanced Setup, then click Set Limits. A check mark appears next to Set Limits.
2. In the Volume and Tone adjustment area of the main window, click and drag the yellow arrows up or down to change the upper and lower limits. Limits for channels tied together will change simultaneously.



3. To lock the limits to the values you selected in step 2, click Advanced Setup on the File menu, then click Set Limits. The check mark next to Set Limits disappears.

Remote Control, cont'd

Using the help system

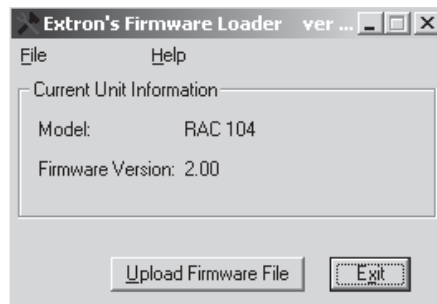
For information about program features, you can access the help program in any of the following ways:

- From the Extron Electronics program group, double-click the Audio Products Help icon.
- From within the Audio Products Control program, click Help on the task bar.
- From within the Audio Products Control program, press the F1 key.

Updating the firmware

Firmware updates will periodically become available on the Extron Web site. To load a firmware update:

1. Download the update file from the Extron Web site (www.extron.com).
2. Run the Audio Products Control Program.
3. On the File menu, click Update Firmware. The Firmware Loader window appears.



Firmware Loader window

4. Click the Upload Firmware File button.
5. Locate and select the update file you downloaded from the Web site and click Open. The Firmware Loader loads the update.

The RAC 104's front panel LEDs flash intermittently during the loading process. Once loading is complete, all the LEDs flash simultaneously for 10 seconds and then return to their default settings.

NOTE *The firmware update file must have an .s19 extension. If it does not have that extension it will not work properly.*

6. After the update has completed loading, click Exit.

Front Panel Security Lockout (Executive Modes)

To prevent accidental changes to the controller settings, the front panel controls can be locked using one of two executive modes. The user turns the executive modes on and off using either the SIS or the Windows-based control program via the RS-232 connector. While an executive mode is on, the locked controls can be adjusted through the RS-232 device only.

Executive mode 1 locks the tone controls and channel selector buttons only. The user can continue to change the volume via the front panel.

Executive mode 2 locks all the front panel controls.

Presets

The user can program up to three presets for each channel using the SIS or the Windows-based control program via the RS-232 connector. The presets allow the user to save the current input gain and output volume, bass, and treble settings for recall at a later time.

When two channels are tied together, selecting a preset for either channel will set the volume, bass, treble, and gain for both channels. Input gain for tied channels can be adjusted independently.

Mute

The user can mute each channel using the SIS or the Windows-based control program via the RS-232 connector.

- Volume and tone settings can still be adjusted while a channel is muted.
- When two channels are tied together, selecting mute or unmute for one channel will mute or unmute both.
- When the user ties a muted channel to a channel that is not muted, the RAC 104 unmutes the muted channel automatically.

Remote Control, cont'd



RAC 104

A

Appendix A

Specifications, Part Numbers, and Accessories

Specifications

Included Parts

Accessories

Specifications, Part Numbers, and Accessories

Specifications

Audio

Gain	Unbalanced output: -6 dB; balanced output: 0 dB when input gain is set to 0 dB, output volume is at 100, and the input and output are set to the same level via the Line Level DIP switch
Frequency response	20 Hz to 20 kHz, ± 0.05 dB
THD + Noise	0.03% @ 1 kHz at nominal level
S/N	>90 dB, balanced at maximum output (unweighted)
Crosstalk	<-120 dB @ 1 kHz
Stereo channel separation	>80 dB @ 1 kHz, >60 dB @ 20 kHz
CMRR	>75 dB @ 1 kHz
Volume control range	-100 dB to 0 dB (volume numbers 0 through 100) in 0.5 dB steps

NOTE *Attenuation = volume number minus 100. The default is -30 dB = volume number 70.*

Bass control range	± 14 dB, 100 Hz referenced to 1 kHz (0 through 14) in 2 dB steps
--------------------------	---

NOTE *Bass dB = (bass number minus 7) times 2. The default is 0 dB = bass number 7.*

Treble control range	± 14 dB, 10 kHz referenced to 1 kHz (0 through 14) in 2 dB steps
----------------------------	---

NOTE *Treble dB = (treble number minus 7) times 2. The default is 0 dB = treble number 7.*

Audio input

Number/signal type	4 channels, which can be mono or tied into stereo pairs, balanced/unbalanced
Connectors	(2) 3.5 mm captive screw connectors, 5 pole
Impedance	>18k ohms unbalanced/balanced, DC coupled
Nominal level	+4 dBu (1.23 V), -10 dBV (316 mV), switchable per group
Maximum level	+20 dBu (7.75 V), (balanced or unbalanced) at 1% THD+N

Input gain adjustment -12 dB to +12 dB

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

Audio output

Number/signal type 4 channels, which can be mono or tied into stereo pairs, balanced/unbalanced

Connectors (2) 3.5 mm captive screw connector, 5 pole

Impedance 50 ohms unbalanced, 100 ohms balanced

Nominal level +4 dBu (1.23 V), balanced; -10 dBV (316 mV), unbalanced; switchable per group

Maximum level (Hi-Z) >+20 dBu, balanced or unbalanced at 1% THD+N

Control/remote — remote volume/tone controller

Serial control port RS-232, 3.5 mm captive screw connector, 3 pole

Baud rate and protocol 9600 baud, 8 data bits, 1 stop bit, no parity

Serial control pin configurations 1 = TX, 2 = RX, 3 = GND

Program control Extron's control/configuration program for Windows®
Extron's Simple Instruction Set (SIS™)

General

External power supply 100 VAC to 240 VAC, 50/60 Hz, external to 12 VDC, 1 A, regulated

Power input requirements 12 VDC, 0.2 A

Temperature/humidity Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing
Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing

Mounting

 Rack mount Yes, with optional 1U, 9.5" deep rack shelf (RSU 129, #60-190-01; RSB 129, 60-604-01); 1U, 6" deep rack shelf (RSU 126, #60-190-10, RSB 126, 60-604-10); or VersaTools® 1U, 3.5" deep rack shelf (RSF 123, #60-190-20, RSB 123, 60-604-20)

 Furniture mount Yes, with optional brackets

Enclosure type Metal

Specifications, Part Numbers, Accessories, cont'd

Enclosure dimensions	1.7" H x 4.3" W x 3.0" D (1U high, quarter rack wide) 4.3 cm H x 10.9 cm W x 7.6 cm D (Depth excludes connectors and knob.)
Product weight	0.5 lbs (0.3 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliance	
Safety	CE, CUL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

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

NOTE Specifications are subject to change without notice.

Included Parts

These items are included in each order for an RAC 104:

Included parts	Replacement Part number
RAC 104	60-561-01
12 VDC, 1.0 A external power supply	70-055-01
3.5 mm, 5-pole captive screw connector (4)	10-319-10
3.5 mm, 3-pole captive screw connector (1)	10-265-03
Audio Products Control Program	
Tweezer (small screwdriver)	
User's Manual	

Accessories

These items can be ordered separately:

Accessories	Part number
RSU 129 1U universal rack shelf	60-190-01
RSF 123 VersaTools 1U rack shelf	60-190-20
MBU 123 under-desk mounting bracket	70-212-01
PMK 100 projector mounting bracket	70-217-01

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,
and Central America:**

Extron USA
1001 East Ball Road
Anaheim, CA 92805
U.S.A.

Japan:

Extron Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

Europe, Africa, and the Middle East:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

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

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

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

Extron USA - West Headquarters +800.633.9876 <small>Inside USA / Canada Only</small> +1.714.491.1500 +1.714.491.1517 FAX	Extron USA - East +800.633.9876 <small>Inside USA / Canada Only</small> +1.919.863.1794 +1.919.863.1797 FAX	Extron Europe +800.3987.6673 <small>Inside Europe Only</small> +31.33.453.4040 +31.33.453.4050 FAX	Extron Asia +800.7339.8766 <small>Inside Asia Only</small> +65.6383.4400 +65.6383.4664 FAX	Extron Japan +81.3.3511.7655 +81.3.3511.7656 FAX	Extron China +400.883.1568 <small>Inside China Only</small> +86.21.3760.1568 +86.21.3760.1566 FAX	Extron Middle East +971.4.2991800 +971.4.2991880 FAX
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