

User's Manual



SEQ 100 15HD

Skew Equalizer for TP Transmission Systems

68-962-01 Rev. B
02 08



Extron Electronics, USA
1230 South Lewis Street
Anaheim, CA 92805
800.633.9876 714.491.1500
FAX 714.491.1517

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort, The Netherlands
+800.3987.6673 +31.33.453.4040
FAX +31.33.453.4050

Extron Electronics, Asia
135 Joo Seng Rd. #04-01
PM Industrial Bldg., Singapore 368363
+800.7339.8766 +65.6383.4400
FAX +65.6383.4664

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan
+81.3.3511.7655 FAX +81.3.3511.7656

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 présents dans la documentation utilisateur.

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

Sicherheitsanleitungen • Deutsch



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



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

Achtung

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

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

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

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

Instrucciones de seguridad • Español



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



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

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 la contourner ni de la désactiver.

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

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

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

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

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

Vorsicht

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

Extron's Warranty

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

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Asia:

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

Europe, Africa, and the Middle East:

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

Japan:

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

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

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (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.

安全须知 • 中文



这个符号提示用户该设备用户手册中有重要的操作和维护说明。



这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

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

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

电源线保护 • 妥善布线，避免被踩踏，或重物挤压。

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

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

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

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. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A 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 with FCC emissions limits.*

Introduction

The manufacturing process for network (CAT 5e) UTP cable leads to a condition called pair skew. The Extron SEQ 100 15HD Skew Equalizer corrects skew delay (misconvergence) problems commonly encountered when using Category (CAT) 5, 5e, or 6 twisted pair (TP) cables for RGB video transmission. The equalizer can also be used to correct for skew problems in component video transmission systems. The SEQ 100 15HD inputs and outputs video on 15-pin HD female connectors.

NOTE *An SEQ 100 skew equalizer should not be necessary when Extron Enhanced Skew-Free A/V UTP cable is used.*

Skew equalization

Skew exists between pairs when the physical length of one wire pair is different from another. As the transmission cable length increases, the amount of skew increases. Skew affects the displayed image when the differential length between wire pairs exceeds 2 feet, causing the timing of the red, green, and blue video signals to appear out of alignment (horizontal registration errors). The signals transmitted on the shortest pair are shifted to the left if using white lines on a black background. A white vertical line on a black field can appear as individual red, green, and blue lines that are close together; the signal transmitted on the shortest wire pair leads the other colors and appears to the left on the display.

The skew equalizer provides three separate time delay circuits, on the red, green, and blue video lines. Each time delay circuit can be independently adjusted, from 0 to 39 nanoseconds, to properly align the red, green, and blue video signals on the displayed image.

The SEQ 100, installed in a TP transmission system and correctly set, delays the video signal, red, green, or blue, on the shortest wire pair to properly converge the displayed video image. The skew equalizer can be connected between the TP transmitter and its video source or between the TP SEQ and its connected display device, whichever is more convenient. Figure 1 shows the SEQ 100 installed on the SEQ output, which is the typical configuration.

NOTE *You should not connect the SEQ between the TP transmitter and a source if you are also connecting a local monitor.*

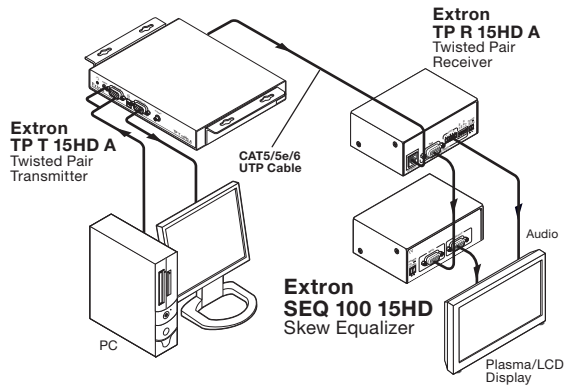


Figure 1 — Typical SEQ 100 BNC application

UTP cable test equipment measures and reports wire pair length. The report on the various pair lengths can be used to set the SEQ 100 to properly equalize pair skew.

If UTP cable test measurement cannot be done, pair skew can still be equalized by viewing a test pattern with a critical eye. Examine the test pattern for loss of horizontal registration and, through a process of trial and error, equalize any pair skew with the SEQ 100.

The SEQs are a part of the Extron VersaTools® line of basic distribution amplifiers, switchers, transmitters, SEQs, and associated video accessories. The rack- and furniture-mountable equalizer has an external power supply with worldwide compatibility.

Installation

The 1U high, quarter rack width, SEQ 100 can be placed on a tabletop, mounted on a rack shelf, mounted to a rack without a shelf, mounted under a desk or tabletop, or mounted on a projector bracket.

Tabletop placement

Affix the four included rubber feet to the bottom of the unit and place it in any convenient location.

Rack mounting

UL requirements

The following Underwriters Laboratories (UL) requirements pertain to the installation of the SEQ into or onto a rack.

1. **Elevated operating ambient** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the +122 °F (+50 °C) maximum ambient temperature (T_{ma}) specified by Extron.
2. **Reduced air flow** — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits 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)** — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack mounting instructions

For optional rack mounting, mount the SEQ on any of the following rack shelves:

- RSF 123 3.5" deep 1U VersaTools® rack shelf kit (part #60-190-20) (figure 2)
- RSB 123 3.5" deep 1U VersaTools rack shelf (part #60-604-20)
- RSU 126 6" deep 1U universal rack shelf kit (part #60-190-10)
- RSB 126 6" deep 1U basic rack shelf (part #60-604-10)
- RSU 129 9" deep 1U universal rack shelf kit (part #60-190-01) (figure 3)
- RSB 129 9" deep 1U basic rack shelf (part #60-604-01)
- MBB 100 VersaTools back of the rack mounting kit (part #70-367-01)

In-rack installation

On the non-VersaTools rack shelves, the SEQ can be mounted in the front or the rear of the rack (figure 3).

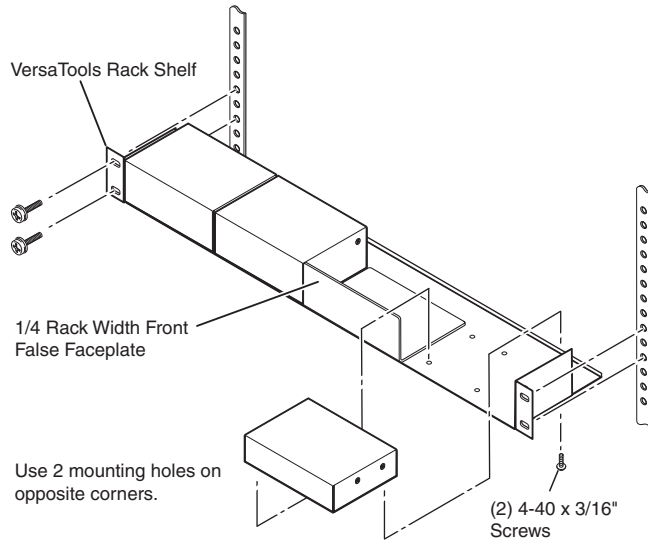


Figure 2 — Mounting the SEQ on a VersaTools rack shelf

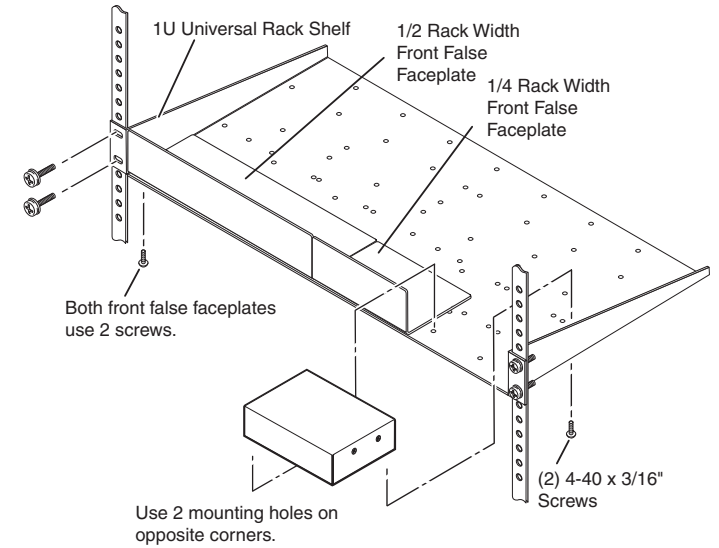


Figure 3 — Mounting the SEQ on a standard rack shelf

1. Remove the feet from the bottom of the SEQ, if they are installed.
2. Mount the SEQ using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the SEQ to the shelf.
3. Install false faceplate(s) or other unit(s) to the rack shelf.
4. Insert the shelf into the rack, aligning the holes in the shelf with those of the rack.

Back of the rack installation

The SEQ 100 can be mounted to the rear of a rack using the Extron MBB 100 VersaTools back of the rack mounting kit (part #70-367-01) (figure 4). The kit allows the product to be vertically mounted to the front or rear rack supports and facing either towards the front or the rear of the rack.

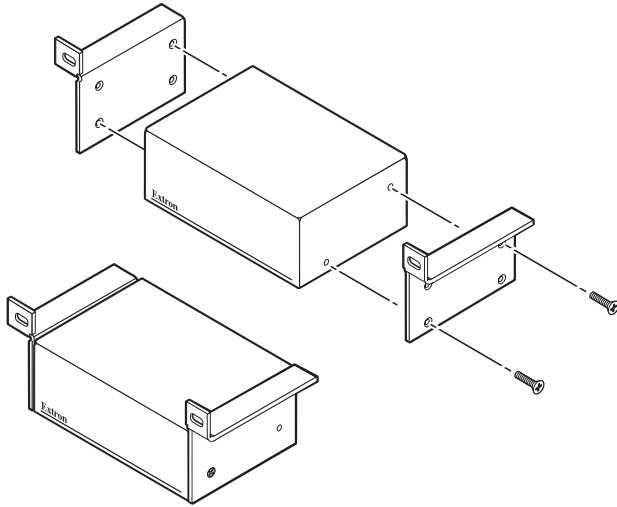


Figure 4 — Attaching the back of the rack kit

1. Remove feet from the bottom of the SEQ if installed.
2. Remove two screws from one side of the unit. Retain the screws for possible later reassembly without the bracket.
3. Attach one bracket to the side of the unit by using the longer screws included in the kit.
4. Repeat steps 2 and 3 on the other side of the unit.
5. Mount the unit to the rack using the two included rack screws (figure 5). The SEQ can be vertically mounted facing in either direction.

NOTE Only VersaTools products and most IP Link products can be mounted using the back of the rack mounting kit.

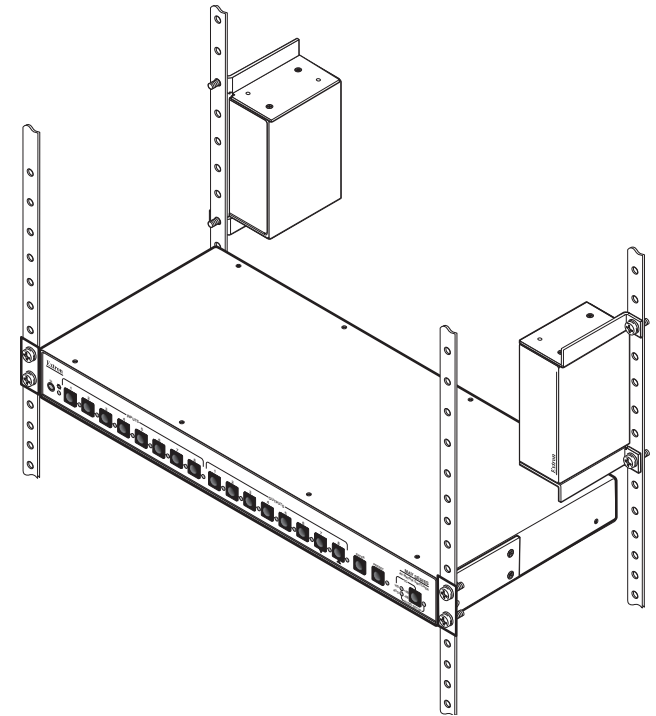


Figure 5 — Typical back of the rack installations

Furniture mounting

Furniture mount the SEQ using the optional MBU 123 VersaTools under desk mounting kit, part #70-212-01 (figure 6), as follows:

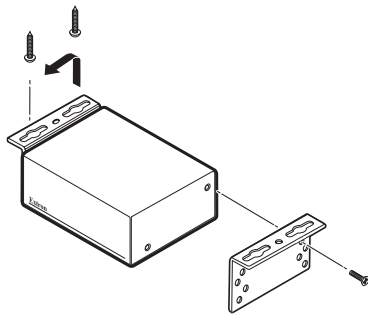


Figure 6 — Desk mounting the SEQ

1. Remove feet from the bottom of the SEQ if installed.
2. Remove two screws from one side of the unit. Retain the screws for possible later reassembly without the bracket.
3. Attach one bracket to the side of the unit using the longer screws included in the kit.
4. Repeat steps 2 and 3 on the other side of the unit.
5. Hold the SEQ 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.
6. Drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
7. 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.
8. Align the mounting screws with the slots in the brackets and place the SEQ against the surface, with the screws through the bracket slots.
9. Slide the SEQ slightly forward or back, then tighten all four screws to secure the SEQ in place.

Projector mounting

The SEQ can be mounted on a projector bracket using either of the following optional Extron projector mounting kits:

- PMK 100 projector mounting kit (part #70-217-01)
- PMK 300 projector mounting kit (part #70-374-01)
- PMK 350 low profile projector mounting kit (part #70-563-02 [black] or part #70-563-03 [white])

PMK 100 mounting

Projector mount the SEQ using an optional PMK 100 bracket (figure 7) as follows:

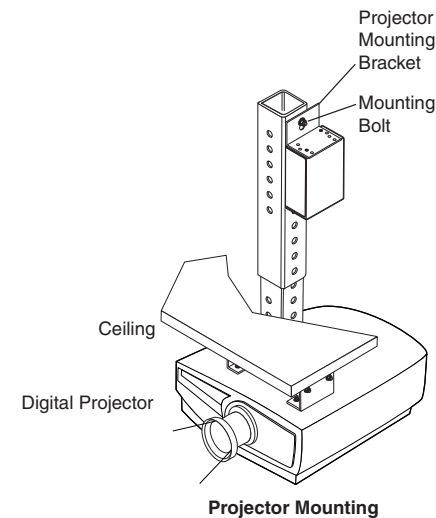


Figure 7 — Desk and projector mounting the SEQ

1. Remove feet from the bottom of the SEQ if installed.
2. Remove two screws from one side of the unit. Retain the screws for possible later reassembly without the bracket.
3. Attach one bracket to the side of the unit using the longer screws included in the kit.
4. Secure the SEQ to a projector mount or other surface by inserting the mounting bolt through the bracket's slotted hole.

PMK 300 mounting

Mount the SEQ to a PMK 300 bracket (figure 8) as follows:

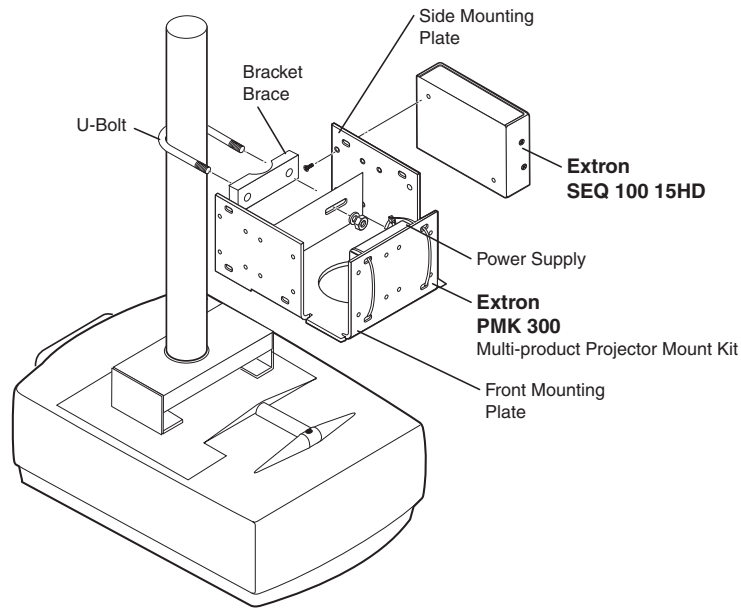


Figure 8 — PMK 300 projector mounting an SEQ

1. Remove feet from the bottom of the SEQ if installed.
2. Mount the SEQ to one of the bracket's three mounting plates using two of the supplied 4-40 x 3/16" screws in opposite (diagonal) corners to secure the device to the bracket. It can be vertically mounted facing either up or down (figure 8).

NOTE On the side mounting plates, the device is typically mounted on the outside of the bracket.
On the front mounting plate, the device is typically mounted on the inside of the bracket.

3. If the power supply is connected to the SEQ, use the two included tie wraps to strap the power supply to one of the brackets.

NOTE The PMK 300 has a hole in the bottom plate that allows the projector pole to be inserted through the center of the plate (figure 9), rather than outside of the plate (figure 8). To install the PMK 300 in this configuration, slide the bracket up from the bottom of the pole before the projector is installed on the pole.

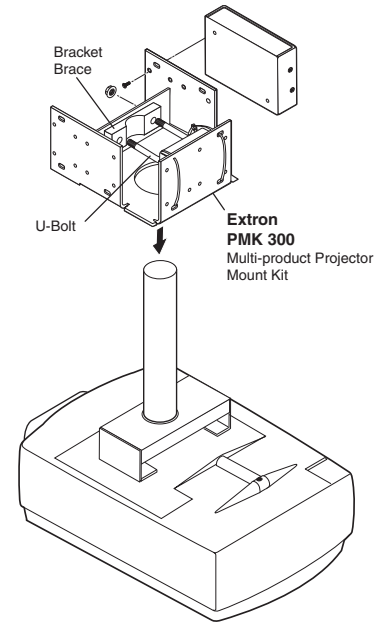


Figure 9 — Projector pole on the inside

4. Place the contoured bracket brace against the pole and opposite the back plate. The pole should fit snugly into the depression in the center of the bracket brace.
5. Place the U-bolt around the ceiling pole and insert the two legs of the U-bolt through the round holes on the contoured bracket brace and then through the slotted holes on the bracket's mounting plate.

NOTE The supplied U-bolt fits a typical (1.5" to 2.0" diameter) ceiling pole.

6. Secure the bracket to the U-bolt with the included hex nuts, washers, and lock washers. Tighten the hex nuts just enough that they can be loosened by hand.

PMK 350 mounting

Mount the SEQ to a PMK 350 bracket (figure 10) as follows:

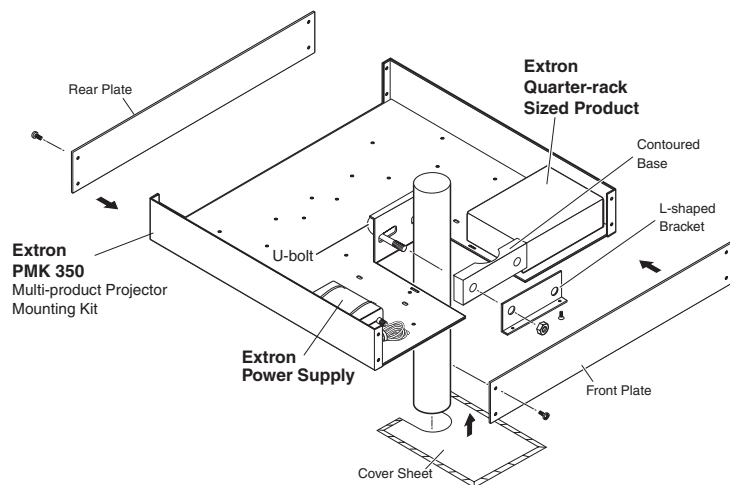


Figure 10 — PMK 350 projector mounting a SEQ

1. Remove the front and back plates from the PMK 350 (figure 10), using an Extron Tweeker or a #2 Philips screwdriver. Retain the screws to reattach the plates when you are finished.
 2. Remove feet from the bottom of the SEQ if installed.
 3. Secure the SEQ to one side of the mounting tray, using two of the supplied 4-40 x 3/16" screws in opposite (diagonal) corners.
 4. Use the two included tie wraps to strap the power supply to the bracket.
 5. Place the PMK 350 around the projector ceiling mounting pole (figure 10).
 6. Assemble the U-bolt and the following parts in the following order (figure 11):
 - a. Pass the legs of the U-bolt through the slotted holes on the mount plate flange.
 - b. Place the legs around the projector pole.
 - c. Pass the legs through the holes in the contour base.
- NOTE** *The pole fits snugly into the depression in the center of the contoured base.*
- d. Pass the legs through the holes in the L-shaped bracket.

NOTE

The supplied U-bolt fits a typical (1.5" to 2.0" diameter) ceiling pole.

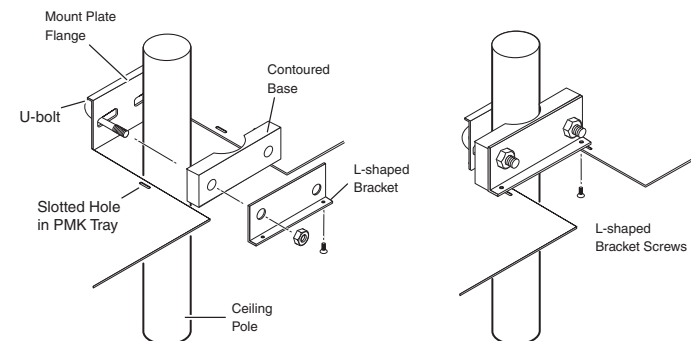


Figure 11 — Hanging the tray on the pole

7. Align the two slotted holes in the bottom of the L-shaped bracket with the two slotted holes in the base of the tray. Secure the L-bracket to the base by inserting two provided 6-32 x 5/16" screws through the aligned slots.
8. Move the PMK 350 up to the desired location on the ceiling pole, as close to the ceiling as desired.
9. Secure the L-shaped bracket to the U-bolt using the included hex nuts, washers, and lock washers. Tighten the hex nuts securely.

NOTE

Be sure to tighten the hex nuts securely enough that the PMK 350 does not slide down the ceiling pole. A socket wrench is recommended to tighten the hex nuts.

10. Secure the front panel to the mounting tray with four of the included #6 screws.
11. If desired, choose one of the provided four sizes of self-adhesive cover sheets, and apply it to the underside of the mounting tray.

Connections

Connect the input device, output device, and the power supply to the SEQ 100 Skew Equalizer (figure 12).

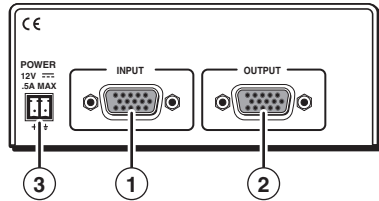


Figure 12 — SEQ 100 15HD rear panel features

- ① **Input connector (SEQ 100 15HD)** — Connect input VGA or RGB video to this female 15-pin HD connector.
- ② **Output connector (SEQ 100 15HD)** — Connect a VGA or RGB video device to this female 15-pin HD connector.
- ③ **Power connector** — Plug the included external 12 VDC power supply into this 2-pole captive screw connector. Figure 13 shows how to wire the power connector.

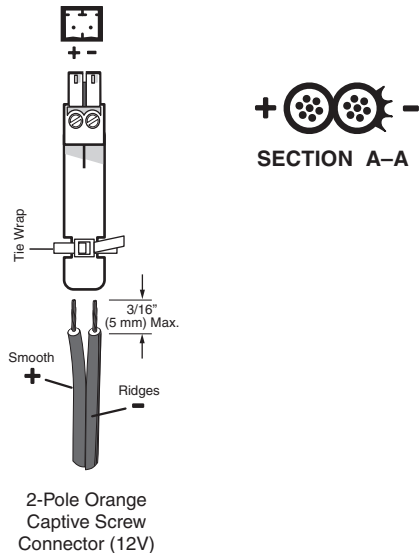


Figure 13 — Power connector wiring

CAUTION Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the SEQ. Identify the power cord negative lead by the ridges on the side of the cord (figure 13).

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

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

CAUTION The length of the exposed (stripped) copper wires is important. The ideal length is 3/16" (5 mm). Longer bare wires can short together. Shorter wires are not as secure in the connectors and could be pulled out.

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

Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

Alternatively, an optional Extron PS 123 Universal 12 VDC Power Supply, part #60-814-01, can power multiple Extron 12 VDC devices using only one AC power connector.

Controls and Indicator

- ① **Power LED** — This front panel LED (figure 14) lights to indicate that the SEQ 100 Skew Equalizer is receiving power.

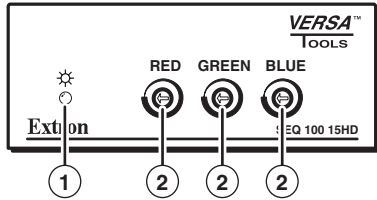


Figure 14 — SEQ 100 Skew Equalizer front panel

- ② **Red, Green, and Blue skew adjustment rotary switches** — These 16-position rotary switches delay the associated red, green, or blue video signals by approximately 3 nanoseconds per position, up to 39 nanoseconds. See the table below:

Position	Delay	Position	Delay	Position	Delay	Position	Delay
0 (⊖)	0 ns	4 (⬆)	10 ns	8 (⊖)	20 ns	12 (⬇)	30 ns
1 (⊖)	3 ns	5 (↻)	13 ns	9 (⊖)	23 ns	13 (⬇)	33 ns
2 (⊖)	6 ns	6 (↻)	16 ns	10 (⊖)	26 ns	14 (⬇)	36 ns
3 (⊖)	9 ns	7 (↻)	19 ns	11 (⬇)	29 ns	15 (⊖)	39 ns

Operation

When the video source, transmitter, SEQ 100, receiver, and display are powered up, the system is fully operational. Adjust the equalization as follows:

1. Rotate all three skew adjust rotary switches to the zero (⊖) position.
2. Use UTP cable test equipment or examine the displayed video image with a critical eye to determine which video signal, red, green, or blue, is most shifted to the left.

NOTE A crosshatch test pattern is ideal for determining pair skew.

3. Adjust the left-shifted video signal's rotary switch clockwise one step at a time while monitoring the display. Step the switch until the video signal is properly converged.

NOTE The SEQ 100 cannot shift the rightmost video image to the left.

4. If either of the other video signals is misconverged, repeat steps 2 and 3.

Specifications

Video

Gain Unity

Video input

Number/signal type..... 1 RGBHV, RGBS, RGsB, component video
 Connectors 1 female 15-pin HD
 Nominal level 1 Vp-p for Y of component video
 0.7 Vp-p for RGB and for R-Y and B-Y of component video
 Minimum/maximum levels..... Analog: 0.3 V to 1.45 Vp-p with no offset at unity gain
 Impedance 75 ohms
 Horizontal frequency..... 15 kHz to 130 kHz
 Vertical frequency..... 30 Hz to 150 Hz

Video output

Number/signal type..... 1 RGBHV, RGBS, RGsB, component video
 Connectors 1 female 15-pin HD
 Nominal level 1 Vp-p for Y of component video
 0.7 Vp-p for RGB and for R-Y and B-Y of component video
 Minimum/maximum levels..... 0.3 V to 1.45 Vp-p (follows input)
 Impedance 75 ohms

Sync (pass-through)

Input type RGBHV, RGBS, RGsB
 Output type..... RGBHV, RGBS, RGsB (follows input)
 Input/output level TTL: 5.0 Vp-p, unterminated
 Input impedance 75 ohms
 Output impedance 75 ohms
 Max input voltage 5.0 V p-p
 Polarity..... Positive or negative (follows input)

VersaTools® SEQ 100 Skew Equalizer, cont'd

General

External power supply	100 VAC to 240 VAC, 50/60 Hz, external; to 12 VDC, 2 A, regulated
Cooling	Convection, unvented
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
Rack mount	Yes, with optional 1U, 9.5" deep rack shelf, part #60-190-01 (RSU 129) or 60-604-01 (RSB 129); VersaTools® rack shelf, part #60-190-20 (RSF 123) or 60-604-20 (RSB 123); or VersaTools Back of the Rack Mounting Kit, part #70-367-01 (MBB 100) Furniture mountable with optional Mini Under-Desk Mounting Kit, part #70-212-01 (MBU 123) Projector mountable with optional Mini Projector Mounting Kit, part #70-217-01 (PMK 100)
Enclosure type	Metal
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.)
Product weight	0.6 lbs (0.3 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings.....	UL, CUL
Compliances.....	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF.....	30,000 hours
Warranty	3 years parts and labor

NOTE All nominal levels are at ±10%

NOTE Specifications are subject to change without notice.

Part Numbers

These items are included in each order for a SEQ 100 15HD:

Included parts	Part number
SEQ 100 15HD	60-676-01
12 VDC power supply and IEC power cord	70-055-01
Tweezer (small screwdriver)	
Four rubber feet	
User's guide	

Optional accessories

Accessories	Part number
RSU 129 9.5" 1U universal rack shelf kit	60-190-01
RSB 129 9.5" 1U basic rack shelf	60-604-01
RSU 126 6" deep 1U universal rack shelf kit	60-190-10
RSU 126 6" deep 1U universal rack shelf	60-604-10
RSF 123 3.5" deep 1U VersaTools® rack shelf kit	60-190-20
RSB 123 3.5" deep 1U VersaTools rack shelf	60-604-20
MBB 100 VersaTools back of the rack mounting kit	70-367-01
MBD 123 under-desk mounting kit	70-212-01
PMK 100 mini projector mounting kit	70-217-01
PMK 300 projector mounting kit	70-374-01
PMK 350 low profile projector mounting kit, black (white)	70-563-02 (03)
PS 123 universal 12 VDC power supply	60-814-01

Cable and adapters

Cable and adapters	Part number
VGA M-M MD/3, 3 '(0.9 meters)	26-238-14
Mac HV/VGA adapter	26-340-02
SY-VGA/XGA	26-173-01

