

UHD4K 101

Cable Equalizer



Extron Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions

Safety Instructions • English

WARNING: This symbol, , when used on the product, 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.

ATTENTION: This symbol, , when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide, part number 68-290-01, on the Extron website, www.extron.com.

Instructions de sécurité • Français

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ATTENTION : Ce pictogramme, , lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec le matériel.

Pour en savoir plus sur les règles de sécurité, la conformité à la réglementation, la compatibilité EMI/EMF, l'accessibilité, et autres sujets connexes, lisez les informations de sécurité et de conformité Extron, réf. 68-290-01, sur le site Extron, www.extron.com.

Sicherheitsanweisungen • Deutsch

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

Weitere Informationen über die Sicherheitsrichtlinien, Produkthandhabung, EMI/EMF-Kompatibilität, Zugänglichkeit und verwandte Themen finden Sie in den Extron-Richtlinien für Sicherheit und Handhabung (Artikelnummer 68-290-01) auf der Extron-Website, www.extron.com.

Instrucciones de seguridad • Español

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ATENCIÓN: Este símbolo, , cuando se utiliza en el producto, avisa al usuario de la presencia de importantes instrucciones de uso y mantenimiento recogidas en la documentación proporcionada con el equipo.

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Инструкция по технике безопасности • Русский

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Для получения информации о правилах техники безопасности, соблюдении нормативных требований, электромагнитной совместимости (ЭМП/ЭДС), возможности доступа и других вопросах см. руководство по безопасности и соблюдению нормативных требований Extron на сайте Extron: www.extron.com, номер по каталогу - 68-290-01.

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注意:  产品上的这个标志意在提示用户设备随附的用户手册中有重要的操作和维护(维修)说明。

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安全記事 • 繁體中文

警告:  若產品上使用此符號, 是為了提醒使用者, 產品機殼內存在著可能會導致觸電之風險的未絕緣危險電壓。

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安全上のご注意 • 日本語

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安全上のご注意、法令遵守、EMI/EMF適合性、その他の関連項目については、エクストロンのウェブサイト www.extron.com より『Extron Safety and Regulatory Compliance Guide』(P/N 68-290-01)をご覧ください。

안전 지침 • 한국어

경고: 이 기호  가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

주의: 이 기호  가 제품에 사용될 경우, 장비와 함께 제공된 책자에 나와 있는 주요 운영 및 유지보수(정비) 지침을 경고합니다.

안전 가이드라인, 규제 준수, EMI/EMF 호환성, 접근성, 그리고 관련 항목에 대한 자세한 내용은 Extron 웹 사이트(www.extron.com)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

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. The Class A limits 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 interference. This interference must be corrected at the expense of the user.

NOTE:

- This unit was tested with shielded I/O cables on the peripheral devices. Shielded cables must be used to ensure compliance with FCC emissions limits.
- For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the [Extron Safety and Regulatory Compliance Guide](#) on the Extron website.

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Conventions Used in this Guide

Notifications

In this user guide, the following are used:

WARNING: Potential risk of severe injury or death.

AVERTISSEMENT : Risque potentiel de blessure grave ou de mort.

CAUTION: Risk of minor personal injury.

ATTENTION : Risque de blessure mineure.

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

`^ARMerge Scene,,Op1 scene 1,1 ^B51 ^W^C`

`[ 01 ] R 0004 00300 00400 00800 00600 [ 02 ] 35 [ 17 ] [ 03 ]`

`[Esc] [X1] * [X17] * [X20] * [X23] * [X21] CE ←`

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character “0” is used for the number zero and “O” represents the capital letter “o”.

Computer responses and directory paths that do not have variables are written in the font shown here:

`Reply from 208.132.180.48: bytes=32 times=2ms TTL=32`

`C:\Program Files\Extron`

Variables are written in slanted form as shown here:

`ping xxx.xxx.xxx.xxx -t`

`SOH R Data STX Command ETB ETX`

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

Contents

Introduction.....	1
About the UHD4K 101.....	1
Features	2

Panel Features	3
UHD4K 101 Front Panel	3
HDMI Connector Wiring.....	3
Input Cable Lengths	4
Securing the HDMI Connector	4
UHD4K 101 Rear Panel.....	5
Powering Via the Input Source.....	7
Internal Settings.....	7
DDC Buffer	9
Equalization and Pre-emphasis.....	9
Connecting for Long Cable Runs.....	9

Mounting.....	10
Tabletop Mounting.....	10
Rack Mounting	10
Underwriters Laboratories Guidelines for	
Rack Mounting	10
Rack Mounting the UHD4K 101.....	10
Under Desk Mounting.....	10
Through Desk Mounting	10

Introduction

This guide describes the function, installation, and operation of the UHD4K 101 cable equalizer. Unless otherwise stated, the term “cable equalizer” refers to this product.

This section provides the following information:

- [About the UHD4K 101](#)
- [Features](#)

About the UHD4K 101

The UHD4K 101 is a cable equalizer that actively conditions incoming HDMI signals to compensate for signal loss when using long HDMI cables, low quality HDMI cables, or source devices with poor HDMI signal output. It extends Ultra High Definition (UHD) and 4K signals up to 50 feet (15 m).

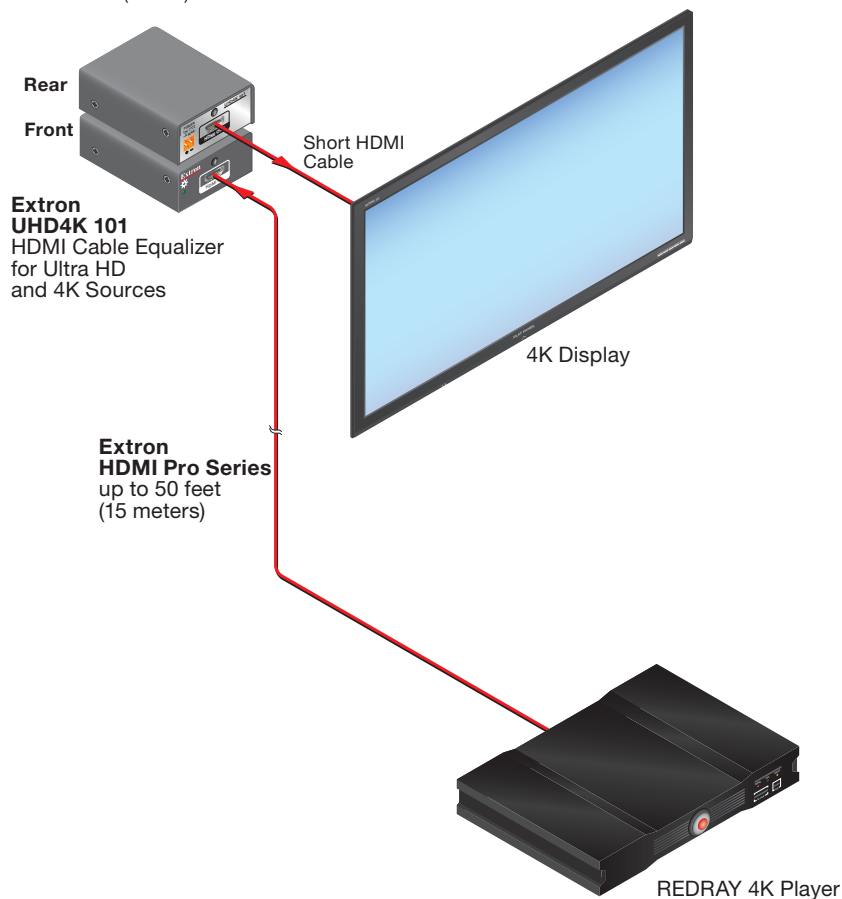


Figure 1. UHD4K 101 Application Diagram

The UHD4K 101 supports resolutions up to UHD (3840x2160 @60Hz) or 4K (4096x2160 @60Hz). It is also able to support a 225 MHz pixel clock rate with 1080p @60Hz (8, 10, or 12-bit) or 1920x1200 @60 Hz resolution.

The UHD4K 101 also passes Extended Display Identification Data (EDID) information and supports the long distance transmission of HDTV signals with High-bandwidth Digital Content Protection (HDCP) for copy protection of digital television broadcasts and high resolution digital video output from DVD, HD DVD, and Blu-rayDisc™ players.

With the appropriate adapters from Extron, the UHD4K 101 is fully compatible with all Extron HDMI and DVI products that support both 1080p @60 Hz and UHD and 4K @30 Hz resolutions.

Features

Supports UHD and 4K signals — The UHD4K 101 supports computer video resolutions up to 2560x1600, HDTV 1080p/60 Deep Color, UHD resolutions at 3840x2160 @60 Hz (4:2:0) and 4K resolutions up to 4096x 2160 @30 Hz (4:4:4).

Extends UHD and 4K video signals up to 50 feet (15 m) over HDMI cable.

Supports HDMI specifications — The UHD4K supports data rates up to 10.2 Gbps, Deep Color up to 12-bit, 4K, 3D, Lip Sync, HD lossless audio formats, and CEC.

Automatic input cable equalization — The UHD4K 101 actively conditions incoming HDMI signals to compensate for signal loss when using long HDMI cables, low quality HDMI cables, and source devices with poor HDMI signal output.

Facilitates EDID communication and HDCP key exchange between the display and source.

HDCP compliant.

Input — One HDMI connector.

Output — One HDMI connector.

Highly reliable, energy-efficient external universal power supply included — The power supply provides worldwide power compatibility, with high demonstrated reliability and low power consumption for reduced operating costs.

Can be powered directly from the HDMI source device — Attached source devices that provide +5 VDC on the HDMI output can power the UHD4K 101, eliminating the need for power supply installation.

LED indicator for source signal presence and power — Indicator illuminates amber when power is detected and green when a signal is present.

LockIt HDMI cable lacing brackets included.

Panel Features

This section describes

- [UHD4K 101 Front Panel](#)
- [UHD4K 101 Rear Panel](#)

UHD4K 101 Front Panel

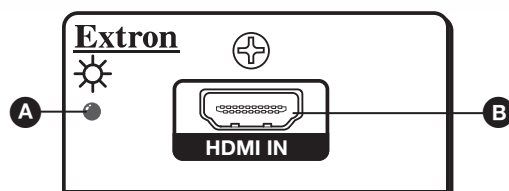


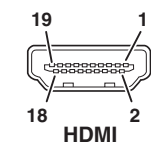
Figure 2. UHD4K 101 Front Panel

- A Status LED** — lights amber when the product is receiving power from either the 12 VDC connector or via Pin 18 of the HDMI input from a source device. The LED lights green when an HDMI signal is present, which is detected from TMDS Clock.
- B HDMI Input** — is a single Female HDMI Type A connector. The input equalizes the input cable signal at the highest support rate of 300 MHz (see the [Input Cable Lengths](#) table on the following page).

The input can also receive power from the video source, via pin 18 (+5 VDC) of the HDMI connector (see table below). If the source does not supply adequate power, an external power supply must be used.

HDMI Connector Wiring

The connector wiring follows the HDMI single link format (see the figure to the right and the table below).



HDMI
Type A Receptacle

Pin	Signal	Pin	Signal	Pin	Signal
1	TMDS data 2+	7	TMDS data 0+	13	CE control
2	TMDS data 2 shield	8	TMDS data 0 shield	14	Reserved (NC)
3	TMDS data 2-	9	TMDS data 0-	15	SCL
4	TMDS data 1+	10	TMDS clock+	16	SDA
5	TMDS data 1 shield	11	TMDS clock shield	17	DDC/CEC ground
6	TMDS data 1-	12	TMDS clock-	18	+5 VDC power
				19	Hot plug detect

Input Cable Lengths

Resolution	Refresh Rate (Hz)	Maximum distance
720p	24, 30, or 60	100 feet (30.5 m)
1080i	30 or 60	100 feet (30.5 m)
1080p	30	100 feet (30.5 m)
1080p (8, 10, or 12 bit)	60	75 feet (22.9 m)
3840x2160 (UHD)	30	50 feet (15.2 m)
3840x2160 (UHD)	60 (4:2:0)	50 feet (15.2 m)
4096x2160 (4k)	30	50 feet (15.2 m)
PC Rates		
1024x768	60	100 feet (30.5 m)
1280x1024	60	100 feet (30.5 m)
1600x1200	60	100 feet (30.5 m)
1920x1080	60	75 feet (22.9 m)
1920x1200	60	75 feet (22.9 m)
2560x1600	60	50 feet (15.2 m)

NOTES:

- Only certain display models can handle 4:2:0 color sampling.
- To extend signals the distances shown in the Input Cable Lengths table above, Extron recommends the use of HDMI Pro cables (see www.extron.com).

Securing the HDMI Connector

Use a HDMI cable to connect the input source to the female HDMI socket on the front panel of the UHD4K 101 (**figure 2, B**, on page 3).

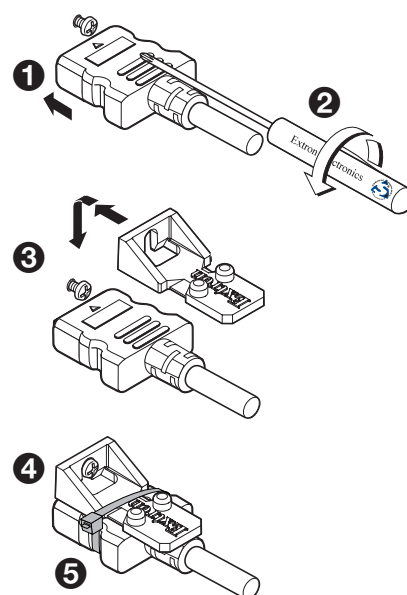
Use the provided LockIt HDMI lacing bracket to secure the HDMI connector:

1. Plug the HDMI cable into the panel connection.
2. Loosen the HDMI connection mounting screw from the panel enough to allow the LockIt lacing bracket to be placed over it. The screw does not have to be removed.
3. Place the LockIt lacing bracket on the screw and against the HDMI connector, then tighten the screw to secure the bracket.

ATTENTION:

- Do not overtighten the HDMI connection mounting screw. The shield it fastens to is very thin and can easily be stripped.
- Ne serrez pas trop la vis de montage du connecteur HDMI. Le blindage auquel elle est attachée est très fin et peut facilement être dénudé.

4. Loosely place the included tie wrap around the HDMI connector and the LockIt lacing bracket as shown.
5. While holding the connector securely against the lacing bracket, tighten the tie wrap, then remove any excess length.



UHD4K 101 Rear Panel

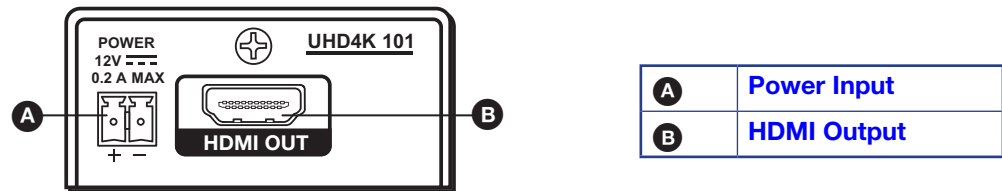


Figure 3. UHD4K 101 Rear Panel

- A Power Input** — connect the provided 12 VDC, 1.0 A power supply to this single female, two-pole, 3.5 mm, captive screw connector.

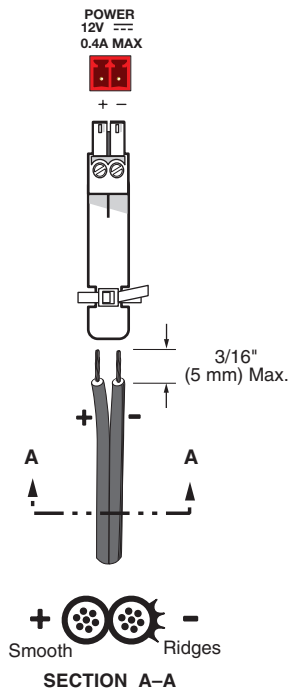
WARNING: The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

AVERTISSEMENT: Les deux cordons d'alimentation doivent être tenus à l'écart l'un de l'autre quand l'alimentation est branchée. Couper l'alimentation avant de faire l'installation électrique.

ATTENTION:

- Do not connect any external power supplies until you have read the Attention notifications on page 6.
- Ne branchez pas de sources d'alimentation externes avant d'avoir lu les mises en garde sur la page 6.

- Cut the DC output cord to the length needed.
- Strip the jacket to expose 3/16 inch (5 mm) of the conductor wire.



ATTENTION:

- The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inches (5 mm). Any longer and the exposed wires may touch, causing a short circuit between them. Any shorter and the wires can be easily pulled out even if tightly fastened by the captive screws.
- La longueur des câbles exposés est primordiale lorsque l'on entreprend de les dénuder. La longueur idéale est de 5 mm (3/16 inches). S'ils sont un peu plus longs, les câbles exposés pourraient se toucher et provoquer un court circuit. S'ils sont un peu plus courts, ils pourraient sortir, même s'ils sont attachés par les vis captives.

- Ensure the connections have the correct polarity as shown in the figure above.
- Slide the exposed end of the wire into the captive screw connector and secure by tightening the screw.
- Use the supplied tie wrap to strap the power cord to the extended tail of the connector.

ATTENTION:

- Always use a power supply provided by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que le produit final.
- These products are intended for use with a UL Listed power source marked "Class 2" or "LPS" and rated 12 VDC, minimum 1.0 A.
- Ces produits sont destinés à une utilisation avec une source d'alimentation listée UL avec l'appellation « Classe 2 » ou « LPS » et normée 12 Vcc, 1,0 A minimum.
- Extron power supplies are certified to UL/CSA 60950-1 and are classified as LPS (Limited Power Source). Use of a non-LPS or unlisted power supply will void all regulatory compliance certification.
- Les sources d'alimentation Extron sont qualifiées UL/CSA 60950-1 et sont classées LPS (Limited Power Source). L'utilisation d'une source d'alimentation non-listée ou non-listée LPS annulera toute certification de conformité réglementaire.
- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium, or desk.
- Sauf mention contraire, les adaptateurs AC/DC ne sont pas appropriés pour une utilisation dans les espaces d'aération ou dans les cavités murales. La source d'alimentation doit être située à proximité de l'équipement de traitement audiovisuel dans un endroit ordinaire, avec un degré 2 de pollution, fixé à un équipement de rack à l'intérieur d'un placard, d'une estrade, ou d'un bureau.
- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16.
- Cette installation doit toujours être en accord avec les mesures qui s'appliquent au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16.
- The power supply shall not be permanently fixed to building structure or similar structure.
- La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.
- Do not tin the wire leads before installing into the connector. Tinned wires are not as secure in the connector and could be pulled out. They may also break after being bent several times.
- Ne pas étamer les conducteurs avant de les insérer dans le connecteur. Les câbles étamés ne sont pas aussi bien fixés dans le connecteur et pourraient être retirés. Ils peuvent aussi se casser après avoir été pliés plusieurs fois.

- B HDMI Output** (see [figure 3](#) on page 5)— One female HDMI Type A connector used for HDMI output. The output supports a pixel clock up to 300 Mhz. The cable length connecting to the display device must be a maximum of 15 feet (5 m).

Use the provided LockIt HDMI lacing bracket to secure the HDMI connector (see [Securing the HDMI Connector](#) on page 4).

Powering Via the Input Source

The UHD4K 101 can receive power from the input device via the 5 VDC signal on pin 18 of the HDMI cable (see [HDMI Connector Wiring](#) on page 3). This eliminates the external power supply. However, for best unit performance, Extron recommends using the external supply.

NOTES:

- If the source does not adequately supply the +5 VDC power, an external power supply must be used.
- To verify if the source is providing power, connect a short HDMI cable from the input device to the input of the equalizer. If the UHD4K 101 front panel LED lights amber, the source is supplying power.

Internal Settings

Under most conditions, the UHD4K 101 works without adjustments. However, the quality of the image displayed may be affected by a combination of the source, display, and cable length. If so, the UHD4K 101 has three sets of jumper switches that are used to adjust DDC buffer, Equalization (EQ), and Pre-emphasis (see [figure 4](#) and [table 1](#) on the following page.)

Follow these instructions to get access to these jumper switches:

ATTENTION:

- Electrostatic discharge (ESD) can damage IC chips even though you cannot feel, see, or hear it. Use electrostatic discharge (ESD) precautions (be electrically grounded) when making connections.
- Les décharges électrostatiques peuvent endommager les puces de circuit même si vous ne pouvez pas les sentir, les voir ou les entendre. Prenez des précautions contre les décharges électrostatiques (soyez électriquement relié à la terre) lorsque vous effectuez des connexions.

1. Remove the screws holding the cover to the base. There is one screw on the front panel and two screws on each side. Set aside the cover and retain the screws.

NOTE: Do not remove the screw from the back panel. This secures the internal circuit board and does not attach the base to the cover.

2. Locate the three sets of jumper switches near the center of the circuit board.

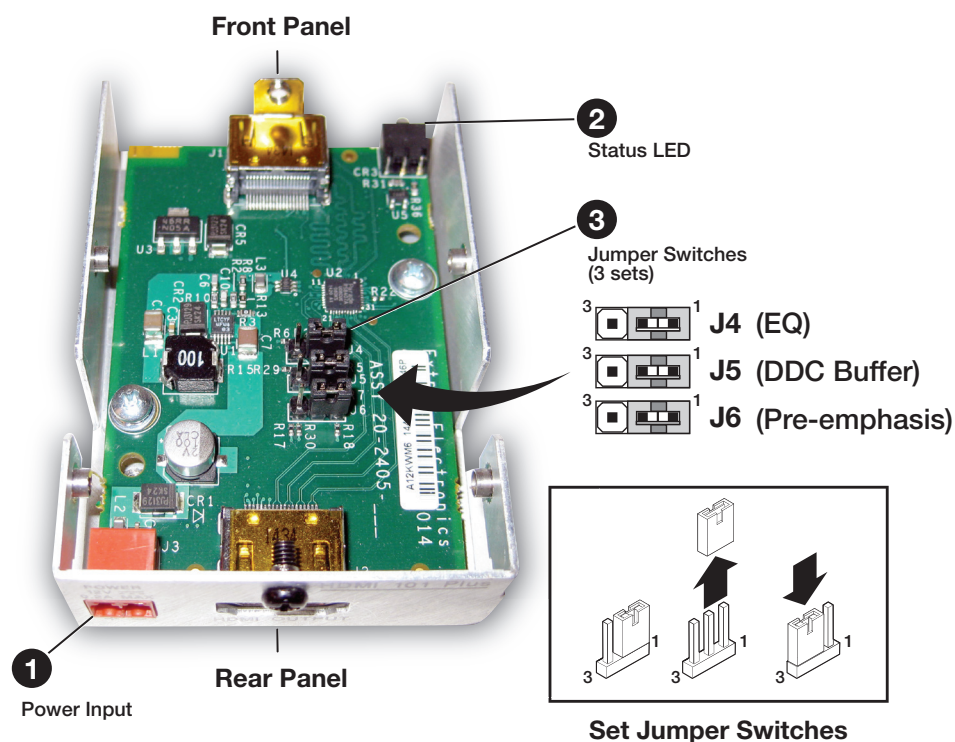


Figure 4. Locating the Jumper Switches

3. Set the jumper switches as required (see table 1 below).
4. Replace the cover, using the screws that were saved in step 1.

Table 1. Internal Jumper Settings

Jumper	Function	Jumper Pins 2 and 3	Jumper Pins 1 and 2	No Jumper
J4 (EQ)	Adjusting this jumper can improve the image for some applications with longer cable runs, image artifacts, or both.	 8.6 dB	 4.3 dB	 12.4 dB Default
J5 (DDC Buffer)	Some applications require that the DDC be buffered for proper operation. The Active setting for this jumper (connecting pins 1 and 2) is required for proper operation only for applications in which a source has a weak or no pull up resistor.	 Active, no pull up	 Active	 Pass-through Default
J6 (Pre-emphasis)	Adjusting this jumper can compensate for signal degradation in applications with higher data rate, higher resolution, or both. This adjustment is recommended for resolutions of 2560x1600 @ 60 Hz or higher.	 2.5 dB	 1.6 dB	 None Default

Connecting for Long Cable Runs

To use the UHD4K 101 effectively, follow the recommendations in figure 5 for cable lengths between the source device and UHD4K 101 and between the UHD4K 101 and the display device. Position the UHD4K 101 Plus at the end of the cable closest to the display.

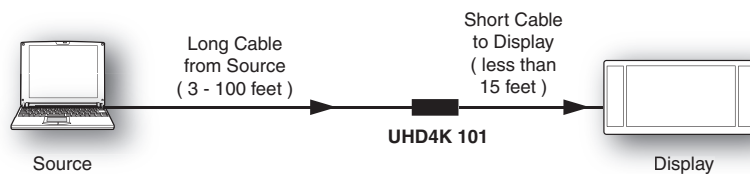


Figure 5. Optimum Cable Lengths between the Source, UHD4K 101, and Display

Mounting

This section outlines the UHD4K 101 mounting options:

Tabletop Mounting

Rack Mounting

Under Desk Mounting

Through Desk Mounting

Tabletop Mounting

Attach the four provided rubber feet to the bottom of the UHD4K 101 and place the unit in any convenient location.

Rack Mounting

Underwriters Laboratories Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines are relevant to the safe installation of these products in a rack:

Elevated operating ambient temperature — If the unit is 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 equipment in an environment compatible with the maximum ambient temperature (Tma: +122 °F, +45 °C) specified by Extron.

Reduced air flow — Install the equipment in the rack so that the equipment gets adequate air flow for safe operation.

Mechanical loading — Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.

Circuit overloading — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Give appropriate consideration to the equipment nameplate ratings when addressing this concern.

Reliable earthing (grounding) — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack Mounting the UHD4K 101

See the Extron website for a list of optional rack mounting kits that are suitable for the UHD4K 101. Follow the instructions provided with the kit.

Under Desk Mounting

See the Extron website to find the optional under desk mounting kit that is suitable for the UHD4K 101. Follow the instructions provided with the kit.

Through Desk Mounting

See the Extron website to find the optional through desk mounting kit that is suitable for the UHD4K 101. Follow the instructions provided with the kit.

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

Japan:

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

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Asia:

Extron Electronics Asia Pte. Ltd.
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
Dubai, United Arab Emirates

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 if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876
Asia: 65.6383.4400

Europe: 31.33.453.4040
Japan: 81.3.3511.7655

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 Headquarters +1.800.633.9876 (Inside USA/Canada Only) Extron USA - West +1.714.491.1500 +1.714.491.1517 FAX	Extron Europe +800.3987.6673 (Inside Europe Only) +31.33.453.4040 +31.33.453.4050 FAX	Extron Asia +65.6383.4400 +65.6383.4664 FAX	Extron Japan +81.3.3511.7655 +81.3.3511.7656 FAX	Extron China +86.21.3760.1568 +86.21.3760.1566 FAX	Extron Middle East +971.4.299.1800 +971.4.299.1880 FAX	Extron Korea +82.2.3444.1571 +82.2.3444.1575 FAX	Extron India 1800.3070.3777 (Inside India Only) +91.80.3055.3777 +91.80.3055.3737 FAX
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