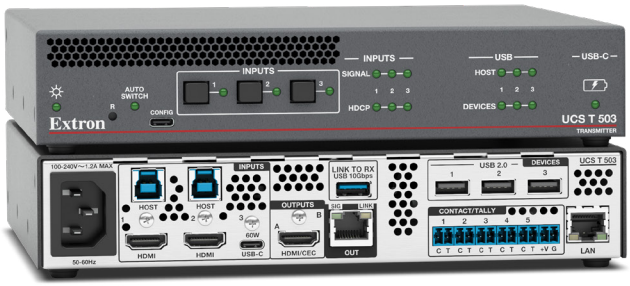
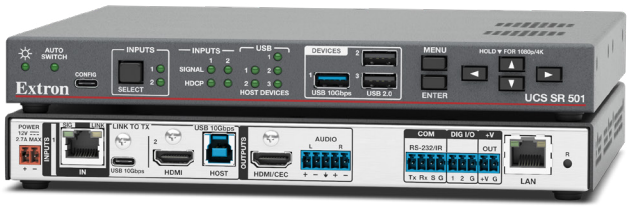
Extron

UCS 504:
UCS T 503 and UCS SR 501





User Guide
Collaboration Switchers

68-3502-01, Rev. D
04 26

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**.

تعليمات السلامة • العربية

تحذير: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم فيما يتعلق بوجود جهد كهربائي غير معزول على الغلاف الخارجي للمنتج وهو ما قد ينطوي على مخاطر حدوث صدمة كهربائية.

انتبه: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم بتعليمات التشغيل والصيانة الهامة (الخدمة) في المواد التي يتم توفيرها مع المعدات.

للحصول على المزيد من المعلومات حول إرشادات السلامة، والتوافقات التنظيمية، والتوافق الكهرومغناطيسي/المجال الكهرومغناطيسي، وإمكانية الوصول، والموضوعات ذات الصلة، يُرجى مراجعة دليل السلامة والتوافق التنظيمي الخاص بإكسترون، الجزء رقم 68-290-01، على موقع إكسترون، **www.extron.com**.

Sicherheitsanweisungen • Deutsch

WARUNG: Dieses Symbol ⚠ auf demProdukt soll den Benutzer darauf aufmerksam machen, dass im Inneren des Gehäuses dieses Produktes gefährliche Spannungen herrschen, die nicht isoliert sind und die einen elektrischen Schlag verursachen können.

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

ADVERTENCIA: Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de voltaje peligroso sin aislar dentro del producto, lo que puede representar un riesgo de descarga eléctrica.

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

Para obtener información sobre directrices de seguridad, cumplimiento de normativas, compatibilidad electromagnética, accesibilidad y temas relacionados, consulte la Guía de cumplimiento de normativas y seguridad de Extron, referencia 68-290-01, en el sitio Web de Extron, **www.extron.com**.

Instructions de sécurité • Français

AVERTISSEMENT : Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur la présence à l'intérieur du boîtier du produit d'une tension électrique dangereuse susceptible de provoquer un choc électrique.

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 l'équipement.

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**.

Istruzioni di sicurezza • Italiano

AVVERTENZA: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di tensione non isolata pericolosa all'interno del contenitore del prodotto che può costituire un rischio di scosse elettriche.

ATTENTZIONE: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di importanti istruzioni di funzionamento e manutenzione nella documentazione fornita con l'apparecchio.

Per informazioni su parametri di sicurezza, conformità alle normative, compatibilità EMI/EMF, accessibilità e argomenti simili, fare riferimento alla Guida alla conformità normativa e di sicurezza di Extron, cod. articolo 68-290-01, sul sito web di Extron, **www.extron.com**.

Instrukcje bezpieczeństwa • Polska

OSTRZEŻENIE: Ten symbol, ⚠, gdy używany na produkt, ma na celu poinformować użytkownika o obecności izolowanego i niebezpiecznego napięcia wewnątrz obudowy produktu, który może stanowić zagrożenie porażenia prądem elektrycznym.

UWAGI: Ten symbol, ⚠, gdy używany na produkt, jest przeznaczony do ostrzegania użytkownika ważne operacyjne oraz instrukcje konserwacji (obsługi) w literaturze, wyposażone w sprzęt.

Informacji na temat wytycznych w sprawie bezpieczeństwa, regulacji wzajemnej zgodności, zgodność EMI/EMF, dostępności i Tematy pokrewne, zobacz Extron bezpieczeństwa i regulacyjnego zgodności przewodnik, część numer 68-290-01, na stronie internetowej Extron, **www.extron.com**.

Инструкция по технике безопасности • Русский

ПРЕДУПРЕЖДЕНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии неизолированного опасного напряжения внутри корпуса продукта, которое может привести к поражению электрическим током.

ВНИМАНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии важных инструкций по эксплуатации и обслуживанию в руководстве, прилагаемом к данному оборудованию.

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.

安全说明 • 简体中文

警告: ⚠产品上的这个标志意在警告用户, 该产品机壳内有暴露的危险电压, 有触电危险。

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。

关于我们产品的安全指南、遵循的规范、EMI/EMF 的兼容性、无障碍使用的特性等相关内容，敬请访问 Extron 网站，**www.extron.com**，参见 Extron 安全规范指南，产品编号 68-290-01。

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，產品機殼內存在未隔離的危險電壓，可能會導致觸電之風險。

注意 若產品上使用此符號，是為了提醒使用者，設備隨附的用戶手冊中有重要的操作和維護（維修）說明。

有關安全性指導方針、法規遵守、EMI/EMF 相容性、存取範圍和相關主題的詳細資訊，請瀏覽 Extron 網站:**www.extron.com**，然後參閱《Extron 安全性與法規遵守手冊》，準則編號 68-290-01。

安全上のご注意 • 日本語

警告: この記号 が製品上に表示されている場合は、筐体内に絶縁されていない高電圧が流れ、感電の危険があることを示しています。

注意: この記号 が製品上に表示されている場合は、本機の取扱説明書に記載されている重要な操作と保守(整備)の指示についてユーザーの注意を喚起するものです。

安全上のご注意、法規厳守、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 기호가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

주의: 이 기호가 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.

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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: 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.

Battery Notice

This product contains a battery. **Do not open the unit to replace the battery**. If the battery needs replacing, return the entire unit to Extron (for the correct address, see the Extron Warranty section on the last page of this guide).

CAUTION: Risk of explosion. Do not replace the battery with an incorrect type. Dispose of used batteries according to the instructions.

ATTENTION : Risque d'explosion. Ne pas remplacer la pile par le mauvais type de pile. Débarrassez-vous des piles usagées selon le mode d'emploi.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

CAUTION: Risk of minor personal injury.
ATTENTION : Risque de blessure mineure.

ATTENTION: Risk of property damage.
ATTENTION: Risque de dommages matériels.

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene, 0p1 scene 1,1 ^B 51 ^W^C.0
[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 used in this guide, the character "0" is the number zero and "O" is 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 *italics* 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**.

Extron Glossary of Terms

A glossary of terms is available at **https://www.extron.com/technology/glossary.aspx**

Contents

Introduction

This section discusses the following topics:

About This Guide

This guide describes the function, installation, and operation of the UCS T 503 and UCS SR 501 transmitter and receiver pair. The transmitter and receiver pair is called the UCS 504

- The term “transmitter” refers to the UCS T 503.
- The term “receiver” refers to the UCS SR 501.

About the UCS 504 Series

The UCS 504 is a 4K collaboration switcher and receiver kit that combines AV and USB switching with twisted pair signal extension. The UCS 504 kit consists of the UCS T 503 switching transmitter and UCS SR 501 scaling receiver. The transmitter supports USB-C and dual HDMI with USB inputs for BYOM laptops. The scaling receiver provides an additional HDMI with USB input for a dedicated UC computer and an HDMI output to the room display.

The system supports auto-switching and automation capabilities including CEC, RS-232, or IR control to a display. The compact half-rack width transmitter can mount under a table while the 1 inch (2.5 cm) high receiver easily mounts behind a display. The UCS 504 makes it easy to integrate AV sources and USB cameras for Teams® and Zoom™ meetings into conference and collaboration spaces.

In addition, the receiver has integrated display control, making it an elegant and easy to use video and USB switching solution for a collaboration and huddle space environment. The receiver is also equipped with a 4k/60 4:4:4 video scaler, ensuring a common video resolution to the display.

The UCS 504 supports switching up to six USB room devices, one that supports rates up to USB 10 Gbps while providing 5 V, 900 mA power, and five that support rates up to High Speed (USB 2) while providing 5 V, 500 mA power per port. Integrating traditional AV display switching with USB peripheral device switching in one unit takes collaboration between local and remote users to a new level.

The UCS 504 offers USB breakaway switching, which enables flexibility in switching by allowing the DisplayPort Alt Mode video from the USB-C input and HDMI input video and audio to be switched to the display without the corresponding USB data bus. This enables USB peripherals to be switched independently of video and audio signals when needed.

The products are compatible with all HDMI and USB, and USB-C sources. The product is not compatible with Extron DTP, XTP, nor the USB Extender Plus family of products.

Features

- **Switches USB devices between USB-C and three HDMI inputs with extension to a remote display.**
- **Inputs**
  - **Transmitter** — Two HDMI type A with USB type B connectors and one USB-C connector
  - **Receiver** — One HDMI type A with USB type B connector
- **Outputs**
  - **Transmitter** — One female HDMI type A connector
  - **Receiver** — One female HDMI type A connector
- **Supports computer and video resolutions up to 4K/60 @ 4:4:4** — Resolutions up to 4096x2160/60 with 4:4:4 chroma sampling at 8 bits of color.
- **Provides USB device connections up to USB 10Gbps** — For use with USB cameras or microphones.
- **Provides up to 60 watts of power to a USB-C source** — Supports USB Power Delivery to charge a laptop or other USB-C connected device.
- **Auto-switching and automation capabilities** — Automatically switches to the highest-numbered input with an active video signal. Also turns on/off the display or other systems based on I/O signal connection.
- **Uses a single CATx cable to extend video and High Speed (USB 2) signals up to 330 feet (100 meters)** — The UCS 504 fully supports all compatible resolutions and USB data rates up to High Speed (USB 2) when used with CATx shielded twisted pair cable. Shielded twisted pair cabling with solid center conductor sizes of 22 AWG or better is recommended for optimal performance.
- **Display control options including RS-232, IR, and CEC over HDMI connection.**
- **Single connection for video, USB data, Ethernet, and power for USB-C source devices.**
- **Compatible with Show Me cables** — Show Me cables provide convenient connectivity and user input selection and control for collaboration systems.
- **Ethernet monitoring and control** — Enables control and proactive monitoring over a LAN or WAN.
- **Multiple control options including Ethernet, contact closure, front panel, and auto-input switching.**
- **Local Transmitter Output** — An HDMI output is available on the transmitter to send video to a local confidence monitor or display.
- **Scaling Receiver with Advanced Extron Vector 4K scaling technology** — Vector 4K scaling technology ensures critical-quality 4K imagery, with best-in-class image upscaling and downscaling, enhanced color accuracy, and picture detail for clear video content when switching inputs.
- **Aspect ratio control** — The aspect ratio of the scaling receiver video output can be controlled by selecting a **FILL** mode, which provides a full screen output, or a **FOLLOW** mode, which preserves the original aspect ratio of the input signal.
- **Display Screen Saver** — Automatically shuts down the HDMI output sync on the scaling receiver after a specified time if no input signal is present saving display energy and life.
- **Extron Pro Series Secure Control** — The UCS 504 is designed to work natively with Extron Pro Series control systems as a Secure Platform Device that provides encrypted communications at all times between an Extron Pro Series control processor and the UCS 504.
- **HDCP 2.3 compliant** — Ensures display of content-protected 4K video media and maintains interoperability with earlier versions of HDCP.
- **Supported HDMI 2.0b specification features include data rates up to 18 Gbps, HDR, Deep Color up to 12 bit, 3D, and HD lossless audio formats.**
- **Support for HDR – High Dynamic Range video** — Enables greater contrast range and wider color gamut by providing the necessary video bandwidth, color depth, and metadata interchange capability for HDR video.
- **EDID Minder automatically manages EDID communication between connected devices** — EDID Minder ensures that all sources power up properly and reliably output content for display.

- **User-selectable HDCP authorization** — Allows individual inputs to appear HDCP compliant or non HDCP compliant to the connected source, which is beneficial if the source automatically encrypts all content when connected to an HDCP-compliant device. Protected material is not passed in non HDCP mode.
- **HDCP Visual Confirmation provides a green signal when encrypted content is sent to a non-compliant display** — A full screen green signal is sent when HDCP encrypted content is transmitted to a non HDCP compliant display, providing immediate visual confirmation that protected content cannot be viewed on the display.
- **Automatic color bit depth management** — The switcher automatically adjusts color bit depth based on the display EDID, preventing color compatibility conflicts between source and display.
- **Front panel LED indicators for signal presence, HDCP, USB Device connectivity, Auto Switch mode, USB-C power, and unit power** — Provides visual indication of system status for real-time feedback and monitoring of key performance parameters.
- **Front panel input selection buttons and on-screen display controls** — Provides input selection buttons on the transmitter and receiver for local input selection as well as receiver on screen display controls for scaling receiver setup.
- **Front panel security lockout** — Prevents unauthorized use in non-secure environments. Set via front panel buttons or SIS commands.
- **Contact closure remote control with tally output** — Allows for automatic operation by an optional occupancy sensor or remote selection of an input channel by a button panel. +5 VDC is provided to light an LED to indicate the currently selected input.
- **Optional 65 foot (19.8 meter), 50 foot (15.2 meter), and 35 foot (10.7 meter) plenum-rated cable is available** — Extron USBA-C ProMax Plenum cable connects USB cameras or other devices at rates up to USB 10 Gbps between the transmitter and receiver.
- **Includes LockIt cable lacing brackets** — Securely fastens HDMI cables to a device, eliminating risk of disconnection.
- **Extron recommends the USBC Pro 8K Series cable for video applications or the USBC Pro Series for data applications.**
- **Extron recommends the USBC cable for video and data applications under 6 feet (1.8 meters).**
- **Compatible with Extron mounting solutions** — Easy mounting with Extron low-profile and under-desk mounts, under-table kits, and rack-shelf options.
- **1U (Transmitter) and 1 inch (2.5 cm) high (Receiver), half rack width metal enclosures** — Compact, low-profile enclosures allow discreet installation within furniture or behind a flat panel display.
- **Internal (Transmitter) and External (Receiver) Extron Everlast power supplies** — Provide worldwide power compatibility with high demonstrated reliability and low power consumption for reduced operating cost.
- **Extron Everlast Power Supplies are covered by a 7-year parts and labor warranty.**

USB System Architecture

A USB system architecture refers to the physical bus topology of USB devices connected to a host device. USB devices include USB hubs, USB peripheral devices, or compound devices (devices with a combination of USB hubs and USB peripheral devices built into them).

The system is organized in a tiered star topology to prevent multiple or circular attachments to the bus (see figure 1). Each tier represents a degree of separation from the host device. Per USB specifications, there are seven supported tiers, starting with the host device (or root hub) occupying the first tier.

NOTE: Do not connect more than five daisy-chained hubs to the root hub. The architecture does not support peripheral devices connected to USB hubs occupying the seventh tier.

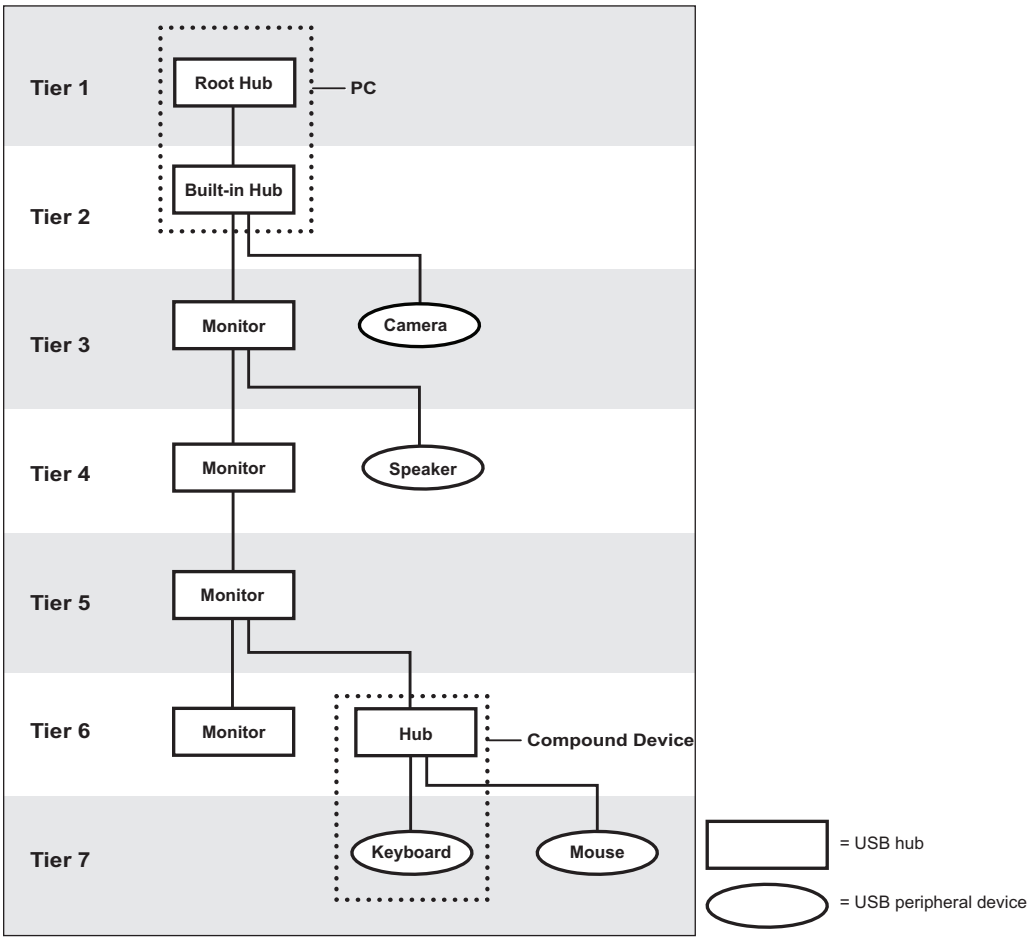


Figure 1. Tiered Star Topology Example for a Computer with Four Monitors

NOTE: Some computers include multiple hubs already connected to each other, occupying multiple tiers in the topology. For example, many computers with USB ports on the front and rear panels or computers with a built-in USB hub and a compound USB peripheral device (such as a touch display) occupy two tiers.

To review the USB system architecture, count all the cascading hubs (including USB hubs enclosed in computers and compound devices) between the host device and the last USB peripheral device.

NOTE: If the host device runs Windows® or macOS™ operating systems, use the following programs to view the hierarchical relationships between USB devices:

- Windows: Device Manager
- macOS: System Profiler or System Information

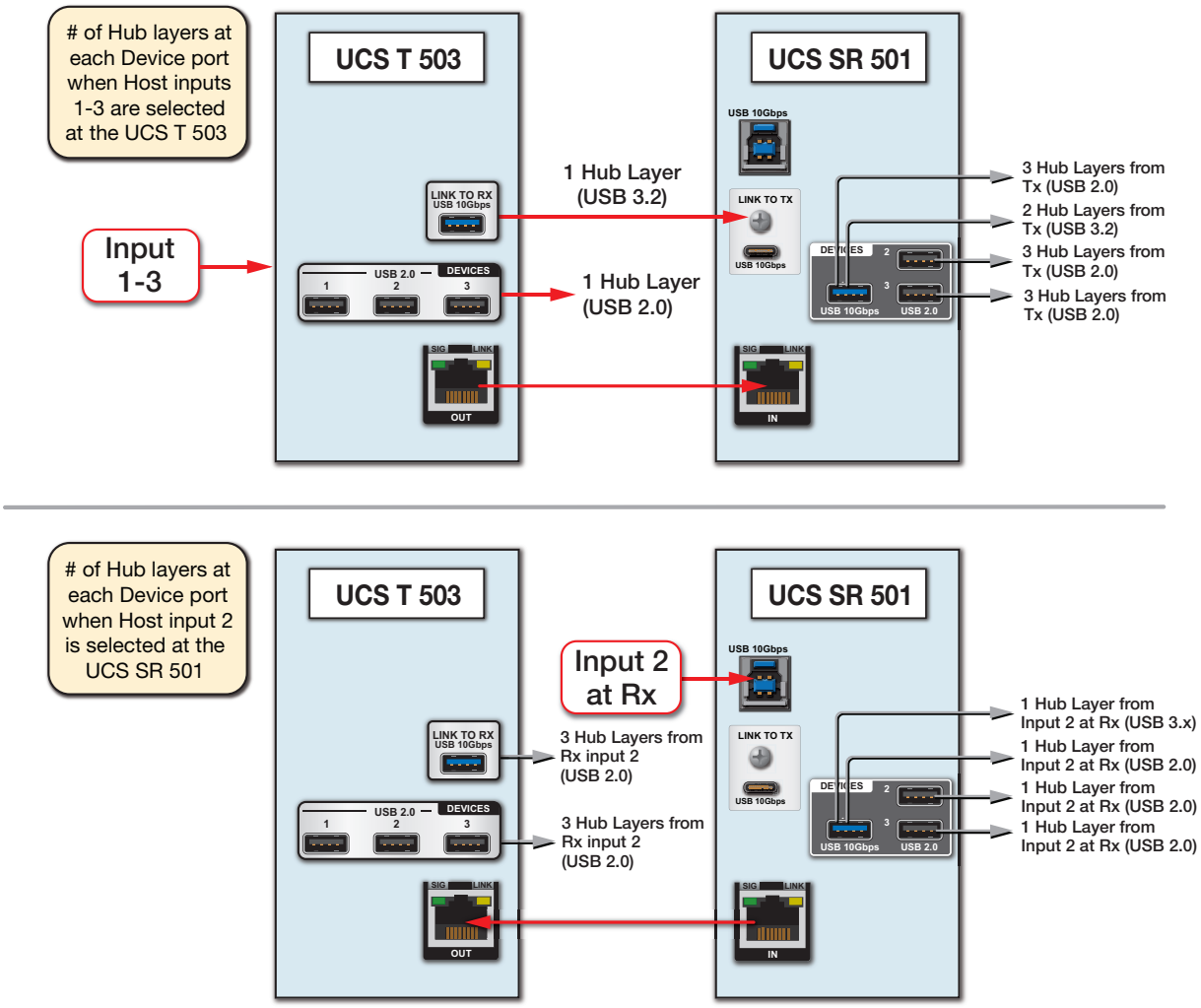


Figure 2. UCS 504 Hub Layers

Application Diagram

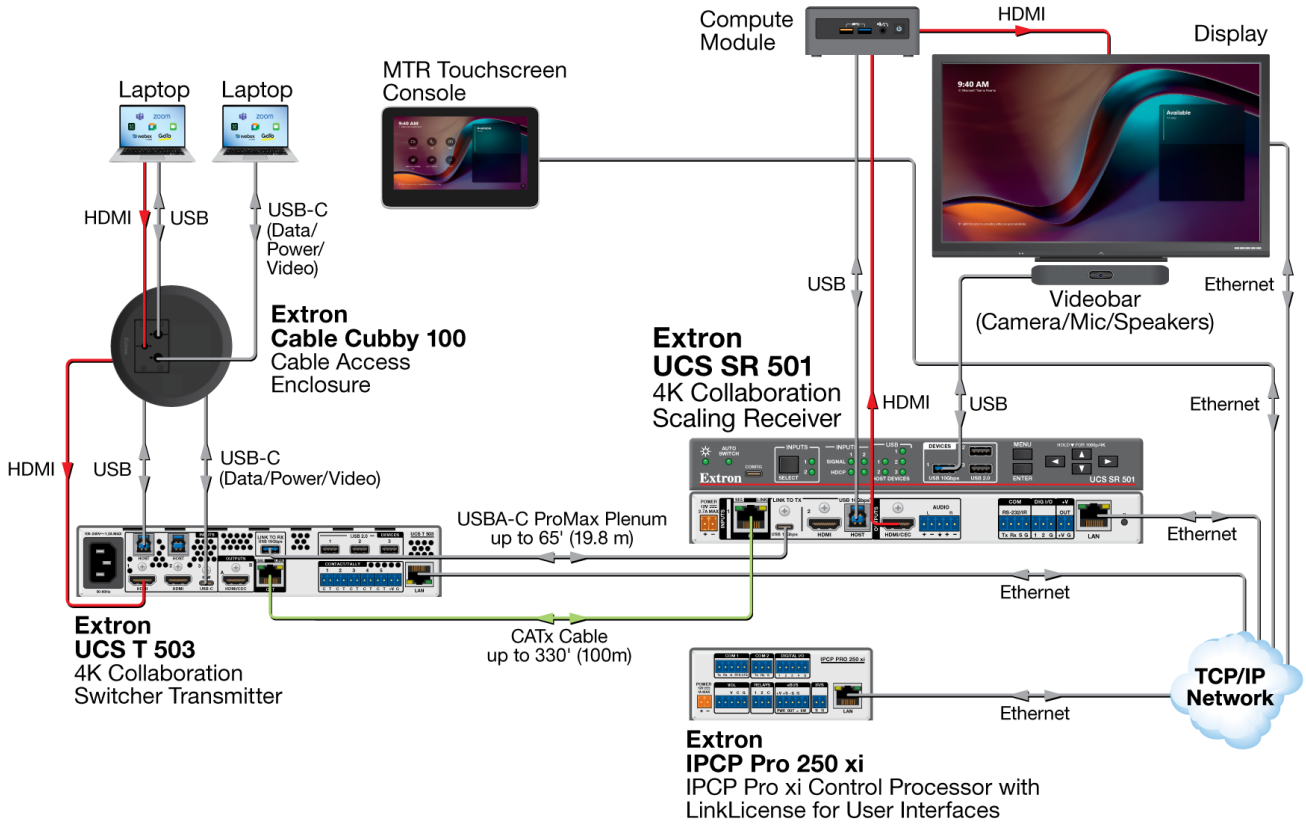


Figure 3. Application Diagram for UCS 504

Software Requirements

For a complete list of the requirements for running Global Configurator Plus and Professional (GCP), Toolbelt, and Product Control Software (PCS) see the Extron web page (**www.extron.com**) for that software.

Installation Overview

This section provides an overview of the installation process. Follow the links for a more detailed explanation of each step.

CAUTION: Remove power from the system before wiring.

ATTENTION : Coupez l'alimentation avant de faire l'installation électrique.

ATTENTION:

- Use electrostatic discharge precautions (be electrically grounded) when making connections. Electrostatic discharge (ESD) can damage equipment, although you may not feel, see, or hear it.
- Prenez des précautions contre les décharges électrostatiques (soyez électriquement relié à la terre) lorsque vous effectuez des connexions. Les décharges électrostatiques (ESD) peuvent endommager l'équipement, même si vous ne pouvez pas le sentir, le voir ou l'entendre.

Before You Start

1. Before starting to install the UCS T 503 and UCS SR 501, download and install the latest versions of the following software:
   - **Product Control Software** — For detecting and configuring the AV and USB settings for the transmitter-receiver pair, for configuring basic network settings, and for updating firmware.
   - **Toolbelt** — Provides device discovery, device information, firmware updates, and configuration of network settings, system utilities, user management, and firmware upgrades.
   - **Global Configurator Plus and Professional** — For setting up and configuring the control system.
   - **GUI Designer software** — For designing layouts for Extron TouchLink Pro touchpanels and third-party touch interfaces.
   - **IP Link Pro device drivers** — For use with GC, to make control of other AV devices possible.

   All are available from **www.extron.com**.
2. Before starting to install the UCS T 503 and UCS SR 501 models, obtain the following network information from your network administrator:
   - **Dynamic Host Configuration Protocol (DHCP) status** (on or off). If DHCP is off, you also require:
     - **IP address**
     - **Subnet mask**
     - **Gateway**
   - **User name** — This can be either `admin` or `user`.
   - **Password** — The factory configured passwords for all accounts on this device have been set to the device serial number. Passwords can be changed during configuration. Passwords are case sensitive.

     NOTE: If the device is reset to default settings, the password is the default password configuration. The default password is `extron` (for either `admin` or user `accounts`).
   - **MAC address** — Make a note of the UCS T 503 and UCS SR 501 MAC addresses, which can be found on the rear panel labels.
   - **SSL security certificates and IEEE 802.1X authentication** — Extron touchpanels come with a factory-installed Secure Sockets Layer (SSL) security certificate. IEEE 802.1X authentication is also supported once enabled. See **Secure Sockets Layer (SSL) Certificates** on page 74 or **IEEE 802.1X Certificates** on page 74 for more information.

Mount the Equipment

3. Turn off all equipment and disconnect the units from their power sources.
4. (Optional) Mount the transmitter and receiver on a rack shelf or furniture (see **Mounting** on page 71).

ATTENTION:

- All structural steps and electrical installation must be performed by qualified personnel in accordance with local and national building codes and electrical codes.
- Toute étape structurelle et installation électrique, doit être effectuée par un personnel qualifié, conformément aux codes du bâtiment, aux codes incendie et sécurité, et aux codes électriques, locaux et nationaux.

Cable All Devices

5. Connect AV sources to the input connectors (see **Rear Panel Features** on page 13).
6. Connect the transmitter to the receiver via the USB connectors (see **Transmitter-Receiver Interconnection** on page 18).
7. Connect AV output devices (display, projector, or other device, and an amplifier or powered speakers) to the output connectors (see **Rear Panel Features**).
8. If applicable, use Extron Show Me cables or connect a remote keypad to the Remote ports on the transmitter for controlling and indicating input selection (see **Rear Panel Features**).
9. Cable the control ports on the receiver as desired for controlling AV devices and for communicating with the system via LAN (see **Configuration and Control** on page 19).
10. Connect video sources and supporting host devices to HDMI and USB inputs.

NOTE: LockIt cable lacing brackets are provided to secure the HDMI cables to the ports to reduce stress on the HDMI connectors and prevent signal loss due to loose cable connections (see **LockIt Plus Lacing Bracket** on page 17).

11. Connect peripheral devices (for example, keyboard, mouse, or camera) to USB ports (see **Rear Panel Features**).

NOTE: These ports do not provide power if the connected device is getting power from an external power supply.

12. Connect a computer to one of the following UCS ports to configure and control the switcher via SIS commands or PCS:
    - USB-C CONFIG port — Connect a USB port on the computer to this USB-C connector via a USB-C cable. (see **figure 6**, **D** on page 13).
    - LAN port — Connect an Ethernet cable between the computer and the LAN port via a standard Ethernet cable to control and configure the UCS SR 501 (see **figure 6**, **F**) or the UCS SR 501 (see **figure 7**, **G** on page 13) via Ethernet.

Connect Power

13. Connect the power cords and power on all output devices.
14. Connect power to the 12 VDC input on the UCS SR 501 (see **figure 7**, K on page 13).

> **ATTENTION:**
> - Do not connect power to the UCS SR 501 until you have read the **ATTENTION** notifications (see page 14).
> - Ne branchez pas l'alimentation à l'UCS SR 501 avant d'avoir lu les **mise en garde** (voir page 14).

15. Connect the power to the IEC power connector port on UCS T 503 (see **figure 6**, A on page 13).
    a. The power LED (see **figure 4**, A on page 11) lights to amber immediately when power is connected.
    b. Once boot-up is complete, each of the input LEDs light one at a time, in order, for about 250 ms each.
    c. Afterwards, each of the signal status LEDs lights in the same manner.
    d. When boot is complete and after the LED sequences mentioned occur, normal operation begins.
16. Power on the source devices.

Configure Network Settings

17. Set up the UCS 504 for network communication. Network setup is essential before you configure control settings. You can configure basic network settings in one of the following ways:
    - Via front panel controls and the OSD menu (see **On-screen Display** on page 38) — a quick method to use whether or not you need to configure other settings. This requires connection to a display device.
    - Via PCS software (**Product Configuration Software** on page 44) — a method that provides basic network configuration and is convenient when you are ready to use PCS to configure AV settings. This requires a PC, software, and a LAN or USB connection.
    - Via Toolbelt software (see the *Toolbelt Help File*) — a method that allows you to configure additional connection settings and is convenient when you want to configure additional device, password, system, and control port settings. This requires a PC, software, and a LAN connection.

Configure AV and USB Settings

18. The AV and scaling settings for the system can be configured via a host connection through the LAN port or the USB-C front panel Config Port using PCS. You can also configure the scaler settings in the receiver using the on-screen display (OSD) menu system. See **On-screen Display** on page 38 and **Product Configuration Software** on page 44 for instructions.

Configure Control Settings

19. To use the COM, IR, or digital I/O ports on the receiver, you must configure an Extron IPL controller to control devices through those ports. The receiver is an IP Link Secure Platform Device and can extend secure control of endpoints attached to the IP Link Expansion Ports including RS-232, IR and Digital I/O, to control displays, projectors, and accessories. The UCS 504 comes with a basic configuration already installed, but you can modify the configuration if needed. CEC control of the output device can be customized during configuration with Global Configurator.

    NOTES:

    - See the *Toolbelt Help File*, *Global Configurator Help File*, and *GUI Designer Help File* as needed for step-by-step instructions and detailed information. The help file for GC includes an introduction to the software and how to start a project and configuration.
    - You must successfully complete Extron Control Professional Certification training to obtain GC Professional.

20. Using GC, create a new GC Pro or GC Plus project and configure the IPL Controller to securely control devices through the receiver control ports. The configuration tells the receiver:
    - How its control ports function
    - How to control other products
    - Which touchpanels or NBP button panels to interact with
    - What to monitor
    - When to do things
    - Whom to notify, how, and under what circumstances
21. Configure the control ports on the IPL controller.
    - Select device drivers and link them to each serial, IR, or Ethernet port.
    - Select settings (serial protocol or digital I/O settings) as needed.
    - Configure CEC controls, if desired.
22. Set up monitors, schedules, macros, and local variables.
23. Add any optional touchpanels or NBP button panels and set them up:
    - Create the GUI configuration for the touchpanels and add it to the project.
    - Configure functions, monitors, or schedules for the touchpanels or NBP button panels and their buttons.
24. Save and build the project.
25. Upload the system configuration to the IPL controller.

Test and Troubleshoot the System

26. Test the system. Make adjustments to wiring or configuration as needed.

NOTE: Frequently touched devices require regular cleaning to ensure their surfaces remain sanitary. Plastic surfaces and cosmetic finishes can be damaged by long term exposure to chemicals (see **Best Practices for Cleaning Your Extron Products** on page 73).

Operation

This section describes the front and rear panel features of the UCS T 503 and UCS SR 501:

- Front Panel Features
- Rear Panel Features
- LAN Connectors
- HDMI/CEC Ports
- Transmitter-Receiver Interconnection
- Contact/Tally Ports
- Audio Output
- +V Port
- Configuration and Control
- Front Panel Lock Mode (Executive Mode)
- IR
- RS-232
- Digital I/O
- Auto-switch
- Video Input Switching
- HDCP
- Color Bit Depth
- Reset Modes

Front Panel Features

Figure 4 shows the UCS T 503 front panel and figure 5 shows the UCS SR 501 front panel.

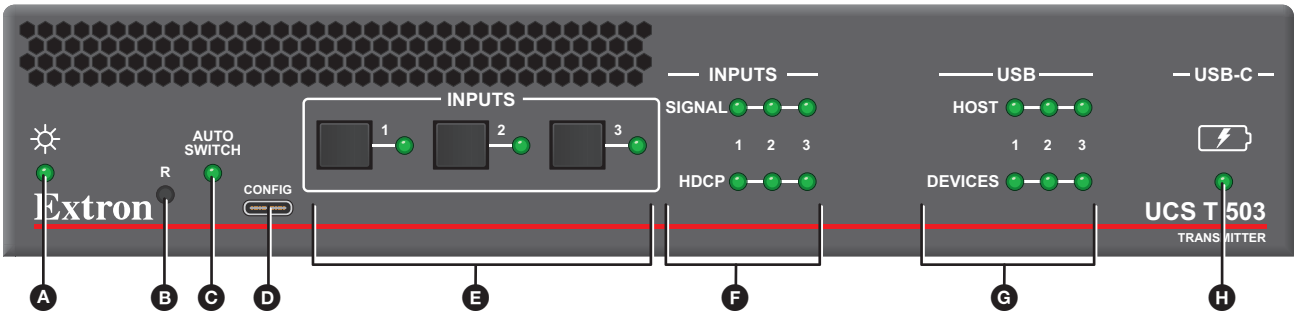


Figure 4. UCS T 503 Front Panel

- A Power LED
- B Reset button
- C AUTO SWITCH LED
- D CONFIG port
- E INPUT selection buttons
- F INPUT SIGNAL and HDCP LEDs
- G USB HOST and DEVICES LEDs
- H USB-C power LED

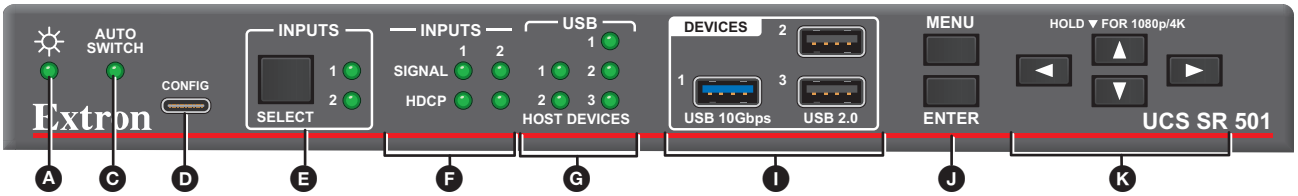


Figure 5. UCS SR 501 Front Panel

- A Power LED
- C AUTO SWITCH LED
- D CONFIG port
- E INPUT selection buttons
- F INPUT SIGNAL and HDCP LEDs
- G USB HOST and DEVICES LEDs
- I DEVICES USB ports
- J MENU and ENTER buttons
- K MENU navigation buttons

Ⓐ **Power LED** (see **figure 4** on page 11 or **figure 5 on** page 11) — Indicates the power status of the device.

Ⓑ **Reset button** — Recessed button for resetting the device.

Ⓒ **Auto-switch LED** — Indicates the Auto-switch mode status of the device.

Ⓓ **CONFIG port** — One female USB-C for configuring the device.

Ⓔ **INPUT selection buttons** —

UCS T 503 (see **figure 4**, Ⓔ) — Three buttons for selecting input 1, 2, or 3. Three LEDs, one for each input, indicate the currently selected input.

UCS SR 501 (see **figure 5**, Ⓔ) — One button to toggle between inputs 1 and 2. Two LEDs, one for each input, indicate the currently selected input.

Ⓕ **INPUT SIGNAL and HDCP LEDs** —

UCS T 503 (see **figure 4**, Ⓕ) — Three LEDs in the top row provide signal status for inputs 1, 2, and 3; three LEDs in the bottom row provide HDCP input status for inputs 1, 2, and 3.

UCS SR 501 (see **figure 5**, Ⓕ) — Two LEDs in the top row provide signal status for inputs 1 and 2. Two LEDs in the bottom row provide HDCP input status for inputs 1 and 2.

Ⓖ **USB HOST and DEVICES LEDs** —

UCS T 503 (see **figure 4**, Ⓖ) — Three LEDs in the top row provide USB Host signal status for inputs 1, 2, and 3. Three LEDs in the bottom row provide USB device signal input status for USB Hub ports 1, 2, and 3.

UCS SR 501 (see **figure 5**, Ⓖ) — One double stacked column of LEDs provide the USB HOST status; one triple stacked column of LEDs provide the USB Hub device ports status.

Ⓗ **USB-C power LED** — One LED provides status of USB-C charging for input 3.

Ⓘ **DEVICES USB ports** — One USB 3.2 type A female port (port 1) and two USB 2.0 type-A female ports (ports 2 and 3) for USB HUB.

Ⓙ **MENU and ENTER buttons** — Push buttons for menu and enter control within the On Screen Display (OSD).

Ⓚ **Menu navigation buttons** — Four push buttons for control of the direction or cursor in the OSD menu.

Rear Panel Features

Figure 6 shows the UCS T 503 rear panel and figure 7 shows the UCS SR 501 rear panel.

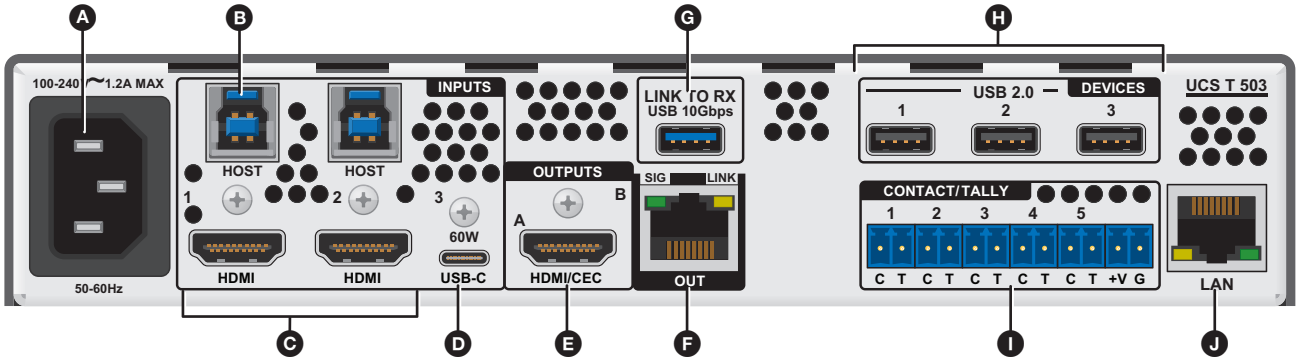


Figure 6. UCS T 503 Rear Panel

- A IEC Power input
- B HOST USB connectors
- C HDMI inputs
- D USB-C input port
- E HDMI/CEC output port
- F Output TP port
- G **USB LINK TO RX**
- H **USB 2.0 DEVICES ports**
- I **CONTACT/TALLY ports**
- J **Ethernet port**

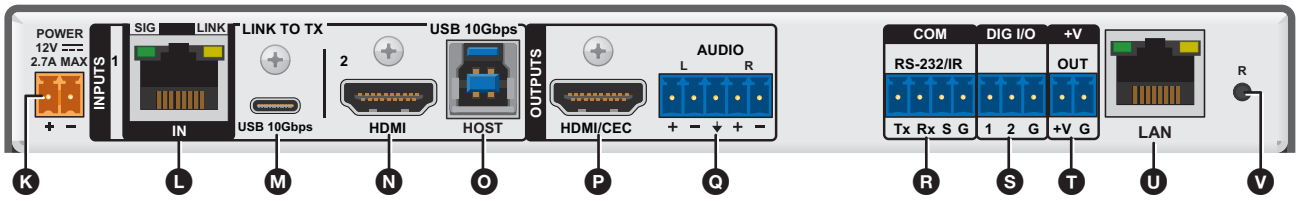


Figure 7. UCS SR 501 Rear Panel

- K **12 VDC power input**
- L **Input TP port**
- M **USB-C LINK TO TX port**
- N **HDMI port for Input 2**
- O **USB HOST port**
- P **HDMI/CEC OUTPUT port**
- Q **Analog AUDIO Output port**
- R **COM port**
- S **Digital I/O port**
- T **Voltage output**
- U **Ethernet port**
- V **Reset button**

A **IEC Power input** — One female IEC connector for connecting 100-240 V, 50-60 Hz power to the transmitter.

B **HOST USB connectors** — Two blue USB 3.2 type B female connector for inputs 1 and 2.

C **HDMI inputs** — Two female HDMI type A for inputs 1 and 2.

D **USB-C input port** — One USB type C for USB data, audio, video, and power delivery on input 3. The USB-C input port can provide up to 60 W of power delivery to the connected host input.

E **HDMI/CEC OUTPUT port** — One female HDMI type A for a local HDMI output. Connect an AV device to the HDMI/CEC output port on the transmitter. If the device (such as a CEC-compliant display) supports CEC control, the UCS 504 can automatically turn display power on or off based on whether an active signal is detected at the selected input. The video on the HDMI/CEC output is mirrored on the Output TP port.

F **OUTPUT TP port** — One RJ-45 jack for video and USB 2.0 extension via twisted pair. Up to 330 feet (100 m) of CAT6A cable is used between the transmitter and receiver. See **LAN Connectors** on page 15 for information about wiring.

G **USB LINK TO RX** (see **figure 6** on page 13) — Connect this USB port to the USB-C input port 1 labeled LINK TO TX on the receiver (**figure 7**, **M**, on page 13) using the Extron USBA-C ProMax Plenum extension cable (part number 26-758-*xx*) (see **Transmitter-Receiver Interconnection** on page 18). If the system does not need USB 3.2 extension, the USB A to C extension cable connecting the transmitter to the receiver does not need to be connected. This LINK TO RX port to the receiver is used to extend USB 3.2 data between the transmitter and receiver using Extron USBA-C ProMax optical extension cable.

H **USB 2.0 DEVICES ports** — Connect USB 2.0 or 1.x devices to these black USB Type A ports. USB 2.0 and 1.x signals from the inputs are routed to these ports. Each port provides 5 V and up to 500 mA.

I **CONTACT/TALLY ports** — Four 3.5 mm, 2-pole captive screw connectors for contact (C) and tally (T) connections. See **Contact/Tally Ports** on page 18 for information about wiring and use of these ports.

J **Ethernet port** — One female RJ-45 jack with integrated amber and green LEDs for Ethernet communications connectivity to the UCS T 503.

K **12 VDC power input** (see **figure 7** on page 13) — One 3.5 mm, 2-pole captive screw connector for connecting power to the receiver. The included 12 VDC external power supply must be connected to the receiver. It cannot be powered remotely from the transmitter.

ATTENTION:

- 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 conforme aux dispositions applicables du Code américain de l'électricité (National Electrical Code) ANSI/NFPA 70, article 725, et du Code canadien de l'électricité, 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 d'autres structures similaires.

- 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 length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inches (5 mm). If they are longer, the exposed wires may touch, causing a short circuit between them. If they are shorter, 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.

- 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.
- 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 tirés.

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.

- If not provided with a power supply, this product is intended to be supplied by a UL Listed power source rated output 12 VDC, minimum 2.8 A (receiver).
- Si le produit n'est pas fourni avec une source d'alimentation, il doit être alimenté par une source d'alimentation certifiée UL, avec une tension nominale 12 Vcc, 2,8 A minimum (récepteur).

L **Input TP port** (see **figure 7** on page 13) — One female RJ-45 jack with integrated amber and green LEDs for twisted pair input.

M **USB-C LINK TO TX port** — Connect this USB port to the corresponding port on the transmitter (**figure 6**, **G** on page 13). See **Transmitter-Receiver Interconnection** on page 18.

N **HDMI Input 2** — One female HDMI type A for HDMI input.

O **USB HOST port** — One female USB 3.2 blue type-B connector for USB input associated with HDMI Input 2.

P **HDMI/CEC OUTPUT port** — One female HDMI type A for a local HDMI output. Connect an AV device to the HDMI/CEC output port on the receiver. If the device (such as a CEC-compliant display) supports CEC control, the UCS 504 can automatically turn display power on or off based on whether an active signal is detected at the selected input (see **LAN Connectors** on page 15).

Q **Analog AUDIO Output port** — One blue 3.5 mm 5-pole captive screw connector for analog audio output (see **Audio Output** on page 19).

R **COM port** — One female blue 3.5 mm 4-pole captive screw connector for RS-232 and IR communications port. Control is accomplished using an Extron control system (see **RS-232** on page 21 and **IR** on page 20).

S **Digital I/O port** — One female blue 3.5 mm 3-pole captive screw connector for two Digital I/O ports. Control is accomplished using an Extron control system (see **Digital I/O** on page 21)

T **Voltage output** — One female blue 3.5 mm 2-pole captive screw connector for +V/G ports. Control is accomplished using an Extron control system (see **+V Port** on page 19).

U **Ethernet port** — One female RJ-45 jack with integrated amber and green LEDs for Ethernet communications connectivity to the UCS SR 501.

V **Reset button** — The UCS 504 series has five reset modes that are initiated by pressing the **RESET** button. An additional (sixth) mode toggles between enabling and disabling the DHCP client. For complete information about these reset modes, see **Reset Modes** on page 30.

LAN Connectors

Ethernet control enables configuration and control of the UCS 504 from a remote location using SIS commands (see **SIS Communication and Control** on page 57), PCS (see **Product Configuration Software** on page 44 and the *UCS 504 Help File*), or the embedded web pages (see **Default Web Pages** on page 50.

Default LAN settings:

- Rear panel LAN IP Address — 192.168.254.250
- Front panel USB-C port IP address — 203.0.113.22 @ port 22023
- Subnet mask — `255.255.255.0`
- Gateway — `0.0.0.0`
- DNS — `127.0.0.1`
- DHCP — Off
- User name — `admin`
- Password — The UCS 504 unit serial number

NOTE: The initial factory configured passwords for all accounts on this device have been set to the device serial number. Passwords are case sensitive. In the event of an absolute system reset, the passwords are reset to `extron`.

Protocols:

The following protocols are supported:

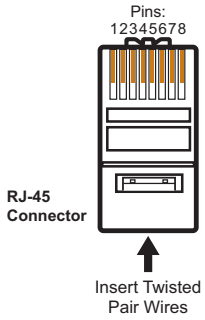
- HTTP (not secure)
- HTTPS
- DHCP
- DNS
- SSH
- ICMP
- SFTP
- SMTP
- SNMP
- NTP
- UDP/IP
- TCP/IP

ATTENTION:

- Do not connect this device to a telecommunications network.
- Ne connectez pas ces appareils à un réseau de télécommunications.

Wiring the LAN connector

- Use a straight-through cable for connection to a switch, hub, or router.
- Use a crossover cable or a straight-through cable for connection directly to a PC. Wire the connector as shown in **figure 10** on the next page.



Straight-through Cable
(for connection to a switch, hub, or router)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-orange
2	orange	2	orange
3	white-green	3	white-green
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	green
7	white-brown	7	white-brown
8	brown	8	brown

TIA/EIA-T568B T568B

Crossover Cable
(for direct connection to a PC)

End 1		End 2	
Pin	Wire Color	Pin	Wire Color
1	white-orange	1	white-green
2	orange	2	green
3	white-green	3	white-orange
4	blue	4	blue
5	white-blue	5	white-blue
6	green	6	orange
7	white-brown	7	white-brown
8	brown	8	brown

T568B T568A

Figure 8. Wiring for Ethernet Control

HDMI/CEC Ports

Connect an AV device to the HDMI/CEC output port (see **figure 6**, Ⓔ on page 13 for UCS T 503 or **figure 7**, Ⓟ on page 13 for the UCS SR 501). Secure the HDMI connector to the UCS with a LockIt Plus Lacing Bracket (see the section below).

If the device (such as a CEC-compliant display) supports CEC control, the UCS uses input signal detection to automatically control display power via CEC. If signal is present on the selected input, the UCS sends a CEC Power ON command to the connected display/sink device. If a signal is not present on the selected input, it sends a CEC Power OFF command. This CEC display functionality is available out of the box, but must be configured via PCS (see **Product Configuration Software** on page 44).

NOTE: It can take up to 2 minutes after powering up the UCS to initiate CEC display control.

TIPS:

- Some displays must be configured to enable CEC communication.
- If your display device does not support CEC commands or does not support a full implementation of them, use one of the other control options available in the UCS 504, such as RS-232, IR, or Ethernet control.
- If you need additional control options, use Global Configurator to fully customize the system to configure display control using Ethernet, RS-232 serial, CEC, or IR control, or by using an occupancy sensor.

LockIt Plus Lacing Bracket

The Extron LockIt Plus lacing bracket secures standard HDMI and USB-C connectors to most HDMI or USC-C devices.

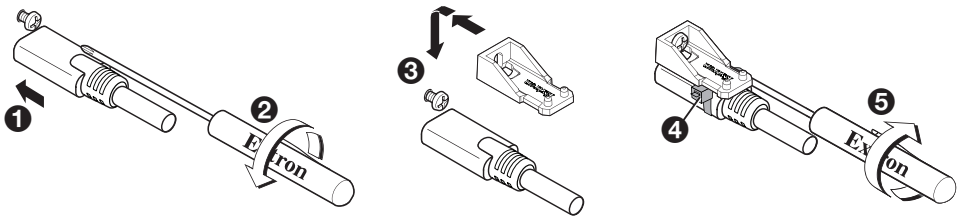


Figure 9. Securing a USB-C Connector to a Port, Using a Lockit Plus Lacing Bracket.

Figure 9 shows how to secure a USB-C connector to a device using the Lockit Plus Lacing Bracket. Use the same procedure to secure a HDMI connector to a device. Follow these instructions to secure the HDMI and USB-C connectors to the unit with the LockIt Plus lacing brackets provided:

NOTE: The HDMI or USB-C device must have a mounting screw for this bracket to be used.

1. **Plug in the cable** (see figure 9, ❶) – Connect the HDMI or USB-C cable to the port.
2. **Loosen the screw** (❷) – Slightly loosen the mounting screw (do not remove it).
3. **Attach the bracket** – Place the bracket over the screw (❸) and tighten it (❺). Do not overtighten the connector mounting screw.

   ATTENTION:

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

4. **Secure the cable** (❹) – Tighten the tie wrap around the connector and bracket, and cut off the extra length.

Transmitter-Receiver Interconnection

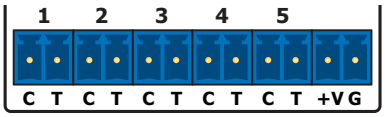
Connect the USB Link to the Rx port on the transmitter (see **figure 6**, G on page 13) to the `USB Link to Tx` port on the receiver (see **figure 7**, M on page 13), using an Extron USBA-C ProMax Extension cable. This LINK TO RX port to the receiver is used to extend USB 3.*2* data between the transmitter and receiver using Extron USBA-C ProMax optical extension cable.

If the system does not need USB 3.*2* extension, the USB A to C extension cable connecting the transmitter to the receiver does not need to be connected. If only USB 2.0 extension is needed, only the connection via Twisted Pair cable between the transmitter and receiver is required.

Depending on the selected input/host, the USB 3.*2* signal is routed automatically so that USB 3.*2* devices on both transmitter and receiver can be accessed by all hosts.

The twisted pair cable between the transmitter and receiver is always required to be connected. Use a CAT6A cable to connect the transmitter to the receiver. The Twisted Pair cable allows A/V and USB 2.0 to be extended between the units.

Contact/Tally Ports



Wire a push-button switch or other contact closure device to pin C (contact) and to the shared pin G (ground) of any of these 2-pole connectors. These ports are configured via PCS (see the *UCS 504 Help File*).

Wire a push-button switch or other contact closure device to pin C (contact) and to the shared pin G (ground) of any of these 2-pole connectors. These ports are configured via PCS (see the *UCS 504 Help File*).

To make input selections via contact closure, short the C pin of each port momentarily to the ground pin G. Input switching occurs immediately on contact, and not on the release.

The +V pin constantly outputs +5 VDC power with 200 mA total (shared between pins). Use this pin when power is needed for external Tally LEDs, such as those on the Extron CCB 30 contact closure remote.

Alternatively, wire a Show Me cable to the C and T pins.

1. Connect the red (contact) pigtail to the C pin corresponding to the input being used.
2. Connect the black (tally out) pigtail to the T pin.

NOTE: For a Show Me cable, the ground source needed to trigger the contact and the voltage to drive the tally indicator are supplied by HDMI source device. Therefore, it is not necessary to connect the cable to a G (ground) pin.

ATTENTION:

- The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inch (5 mm). If the exposed portion is longer, the wires may touch, causing a short circuit between them. If the exposed wires are shorter, they 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.

- Do not tin the wires. Tinned wires are not as secure in the captive screw terminals <connector> and could pull out.
- Ne pas étamer les câbles. Les câbles étamés ne sont pas aussi bien fixés dans les terminaisons des <connecteurs> à vis captives et pourraient sortir.

- 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 conforme aux dispositions applicables du Code américain de l'électricité (National Electrical Code) ANSI/NFPA 70, article 725, et du Code canadien de l'électricité, partie 1, section 16.

Audio Output

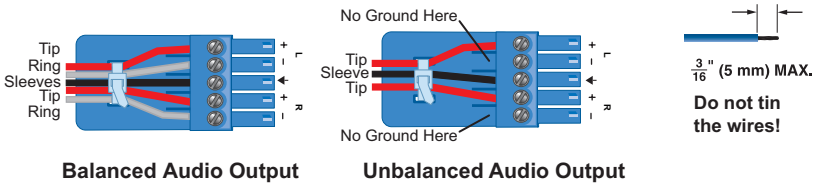
Digital Output

The following embedded HDMI audio formats are supported:

CEA Format	Stream Transport Standard	Supported Formats	Max Channel Count	Max Sample Freq.	HDMI Audio Packet Type
LPCM	IEC 60958-3	2-Ch LPCM	2.0	96 kHz	Audio Sample Packet (Layout 0)
		Multi-Ch LPCM	7.1	192 kHz	Audio Sample Packet (Layout 1)
AC-3	IEC 61937-3	Dolby Digital (DD)	5.1	48 kHz	Audio Sample Packet (Layout 0)
		DD Surround Ex	5.1		
DTS	IEC 61937-5	DTS	5.1	48 kHz	Audio Sample Packet (Layout 0)
		DTS-ES Matrix	5.1		
		DTS-ES Discrete	6.1		
		DTS 96/24	5.1	96 kHz	
E-AC-3	IEC 61937-3	Dolby Digital Plus	7.1	48 kHz	HBR Audio Stream Packet
		Dolby Atmos (DD+)	7.1		
MLP	IEC 61937-9	Dolby TrueHD	7.1	192 kHz	HBR Audio Stream Packet
		Dolby Atmos (TrueHD)	7.1		
DTS-HD	IEC 61937-5	DTS-HD (HRA)	7.1	192 kHz	HBR Audio Stream Packet
		DTS-HD Master Audio	7.1		
		DTS:X	7.1		

Analog Output

One analog audio output, via a 5-pole 3.5mm captive screw port, is available for de-embedding 2-CH LPCM audio.



Balanced Audio Output **Unbalanced Audio Output**

For analog audio output, connect an amplifier, powered speaker, mixer, or other audio device to the 3.5 mm, 5-pole captive screw connector. See the diagrams at right for the appropriate wiring for your application.

For unbalanced audio, connect the sleeves to the ground contact. Do not connect the sleeves to the negative (-) contacts.

NOTE: Embedded HDMI and analog audio output is fixed and cannot be adjusted.

+V Port

The +V port provides +VDC voltage to power accessory products such as Occupancy Sensors. The output can be configured to either +24 VDC up to 50 mA using an Extron control system. This supports the power requirements of a variety of occupancy sensors.

Configuration and Control

The **Digital I/O** (see page 21), **RS-232** (see page 21), and **IR** (see page 20) can all be used for device control. All of these ports must be used with an Extron IPL Pro Controller via IP Link expansion port control.

Front Panel Lock Mode (Executive Mode)

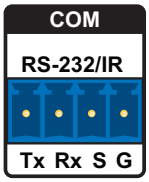
When the UCS 504 is in executive mode, all front panel functions are disabled, but SIS, USB, and Ethernet control are still available. This mode is accessible via SIS as well as front panel button presses on the transmitter and receiver.

On the transmitter, press and hold the **Input 1** and **Input 2** buttons for five seconds to toggle executive mode **on** or **off**.

On the receiver, press and hold the **MENU** and **down** navigational arrow for five seconds to toggle executive mode **on** or **off**.

The front panel LEDs blinks three times, simultaneously, to indicate that executive mode had been enabled or disabled. All LEDs blinks once simultaneously if a button is pressed while executive mode is enabled. When executive mode is enabled, it remains persistent even through a power cycle.

IR



The COM port (see the figure at right) is found on the UCS SR 501 rear panel (see figure 7, R on page 13). It has connections for IR and RS-232 control. Both share a Ground (G) connector.

The IR port is unidirectional and requires compatibility with the existing library of IPL IR drivers. This port is configured and controlled from an IPL Pro controller via IP Link expansion port control.

Wire the IR emitter with the positive lead connected to the S port and the negative lead of the emitter to the G port.

If you are using both the RS-232 and IR ports, use a 4-pole captive screw connector. Both outputs share the G connector.

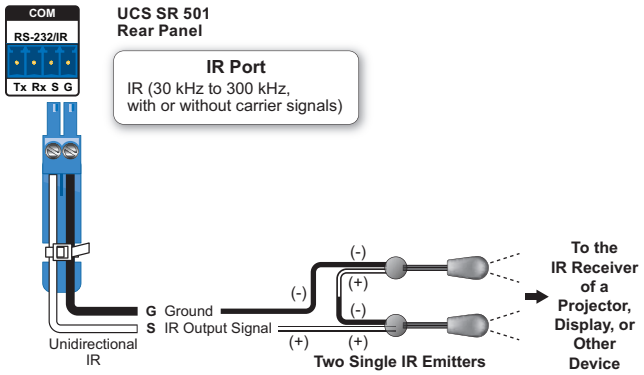


Figure 10. Wiring the IR Port

Typical wiring configurations are shown below:

Installing One Single Emitter

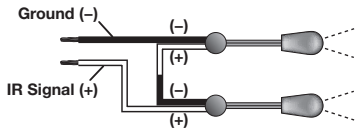
One Single IR Emitter

Installing One Dual Emitter

Dual IR Emitter

Installing Two Single Emitters

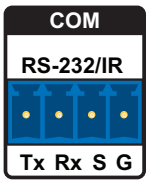
When installing only single emitters, tie them in series as shown below.



Two Single IR Emitters

Figure 11. Typical Wiring Configurations for IR Control

RS-232



The COM port (see the figure at right) is on the UCS SR 501 rear panel (see **figure 7**, Ⓡ on page 13). It has connections for IR and RS-232 control. If you are using both the RS-232 and IR ports, both outputs share the G connector.

Use the RS-232 COM port for serial control of a display or other device and to receive status messages from the connected device. This port is controlled from an IPL Pro controller via IP Link expansion ports.

Serial protocol:

- 300 to 115200 baud (9600 baud = default)
- 8 (default) or 7 data bits
- 1 (default) or 2 stop bits
- No parity (default), even, or odd parity
- Flow control support (default = none): software-only (XON, XOFF)

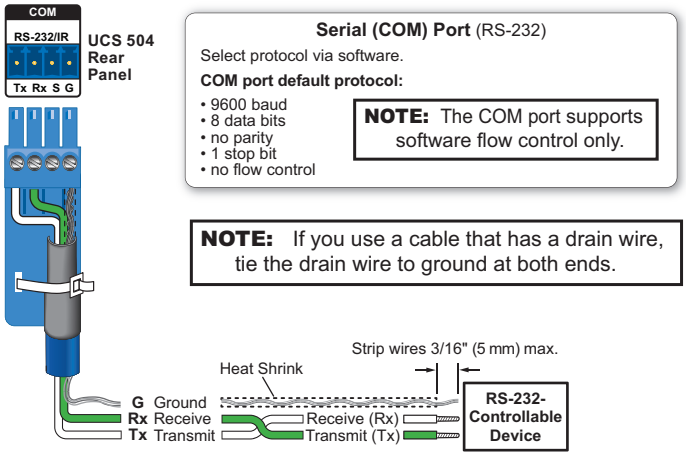


Figure 12. Wiring the RS-232 Connectors

For bidirectional serial communication, the transmit, ground, and receive pins must be wired at both the receiver and the other device. Each projector or other device may require different wiring. For details, see the manual for that equipment or read the Extron device driver communication sheet, which is included with the drivers.

NOTE: Maximum distances between the receiver and the device being controlled are generally up to 200 feet (61 meters) but may vary based on factors such as cable gauge, baud rates, environment, and output levels (from the UCS SR 501 and the device being controlled).

Digital I/O

Two digital I/O ports can be configured to operate in the following modes.

- Digital Input
- Digital Output

The I/O ports support the following executable actions:

- On
- Off
- Toggle
- Pulse

The I/O ports support the following thresholds:

- Lower threshold: +2.0 V
- Upper threshold: +2.8 V

These ports are configured and controlled from an IPL Pro controller via IP Link expansion ports.

Digital Input

Digital input allows the UCS 504 to monitor external devices that do not use RS-232 communication. Connect a switch, motion sensor, moisture sensor, tally feedback output, button pad, or a similar item to a digital I/O port and configure it for digital input. When configured as a digital input, the port is set to measure two states: high and low. The port accepts 0 to 25.3 VDC input.

Threshold voltages are not adjustable. The thresholds are:

- 2.0 VDC — port on, logic low
- 2.8 VDC — port off, logic high

There is also an internal, selectable, pull-up resistor connected to +5 VDC, which you can use if the connected device does not provide its own power.

Digital I/O digital input with pull-up disabled:

Digital input is triggered by an external switch or voltage between the digital input pin and ground.

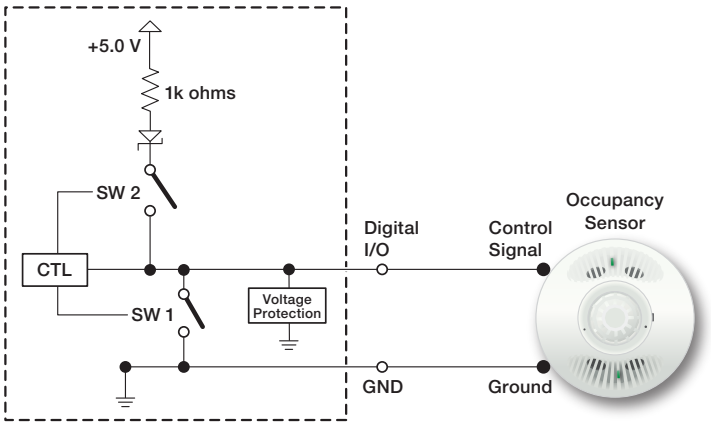


Figure 13. Example Application, Digital Input Without Pull-up: Occupancy Sensor Connection.

- Room occupied: logic high, switch 1 open.
- Room unoccupied: logic low, switch 1 closed.

NOTE: Occupancy sensors typically supply +24 VDC when occupancy is detected. After a set time with no occupancy, the sensor supplies 0 VDC.

Digital I/O digital input with pull-up enabled

- When the port is configured for pull-up, switch 2 is closed, activating the +5.0 VDC pull-up resistor.
- When an external switch closes (shorts to ground, logic low), the port is on.
- When the external switch opens (logic high), the port is off.

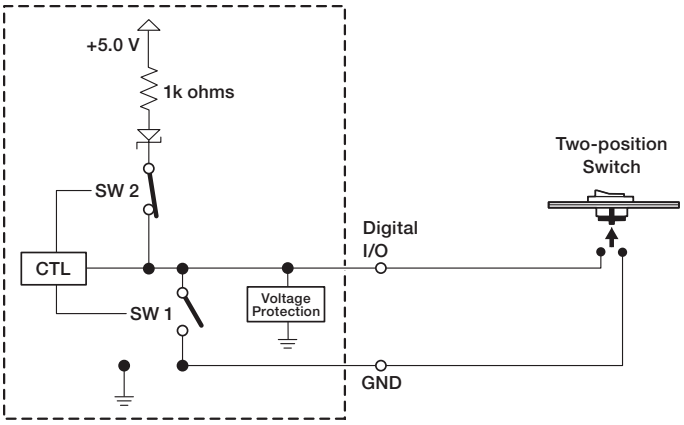


Figure 14. Example Application, Digital Input With Pull-up: Two-position Switch Connection.

- Two-position switch is open: logic high.
- Two-position switch is closed: logic low.

Digital Output

To activate LEDs, lights, or other devices that accept a TTL signal, or to provide contact closure control for projector lifts, motorized screens, room or light switches via an Extron IPA T RLY4 or similar device, you can use one or more of these ports as a digital output. When a port is configured for digital output, it offers two output states: **on** and **off**.

- When the port is set to an **on** state, (the switch 1 circuit is closed), the I/O pin is connected to ground. Output voltage is less than 0.5 volts.
- When the port is set to the off state (the switch 1 circuit is open), the output pin floats (is not connected).
- If the application calls for TTL compatibility, the digital output circuit can be set up to provide a 2K ohm pull-up resistor to +5 VDC, which you can use if the connected device does not provide its own power.
  - If the pull-up resistor is disabled, voltage output is determined by an external source device.
  - If the pull-up resistor is enabled, switch 2 is closed, voltage output is 4.3 VDC.

NOTE: Each I/O port is capable of accepting 250 mA, maximum.

Digital I/O digital output with pull-up disabled

- When switch 1 closes, the port is **on**.
- When switch 1 opens, the port is **off**.

This example application, shows digital output without pull-up: connecting an LED and an external +5 VDC power source.

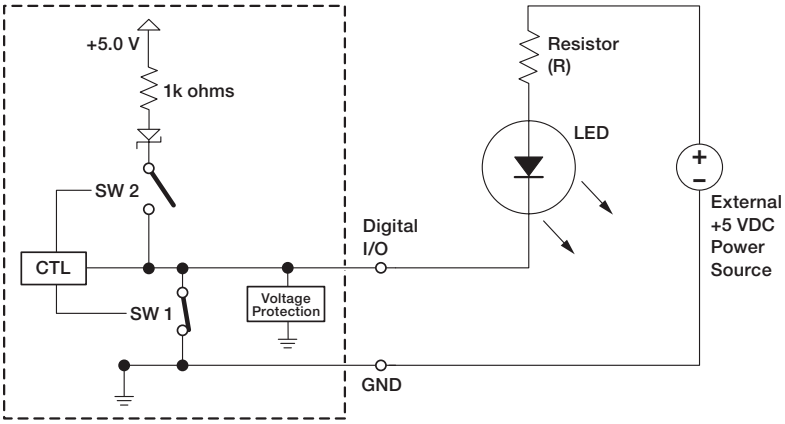


Figure 15. Digital I/O Digital Output Application: LED and External +5 VDC Power Source Without Pull-up

This application often requires a current-limiting resistor, as shown. Many button switches that contain LEDs have a resistor built in. See the guide for the lighted switch or stand-alone LED for details.

NOTE: Each digital I/O pin is capable of sinking a maximum of 250 mA.

- The connected LED is off when the port and switch 1 are open.
- The connected LED is on when the port and switch 1 are closed.

To determine the value of the current limiting resistor in the circuit shown above, you need to know the values of three variables:

`i` = LED forward current in amps (found in the data sheet for the LED)

`Vf` = LED forward voltage drop in volts (found in the data sheet for the LED)

`Vs` = supply voltage of the external voltage source

Insert those values into the following equation to determine the resistor value: $R = \frac{V_s - V_f}{i}$

Example calculation:

- i = 5 mA (0.005 A)
- Vf = 2 V
- Vs = 5 V

$$R = \frac{V_s - V_f}{i} = \frac{5\text{ V} - 2\text{ V}}{0.005\text{ A}} = 600\text{ ohms}$$

NOTE: If the value calculated for the current limiting resistor is not a standard resistor value, you can round up the number to the next highest common resistance value.

Digital I/O digital output with pull-up enabled

- When the port is configured for pull-up, switch 2 is closed, activating the +5.0 VDC pull-up resistor.
- When switch 1 closes, the port is **on**.
- When switch 1 opens, the port is **`off`**.

This example application shows digital output with pull-up controlling another device via its contact closure input port.

Connect the digital I/O port to the contact input port of another device. When activated, the digital I/O digital output port momentarily shorts pin 1 to ground (pulsed contact for 0.5 seconds), closes switch 1, which selects the input on the connected device.

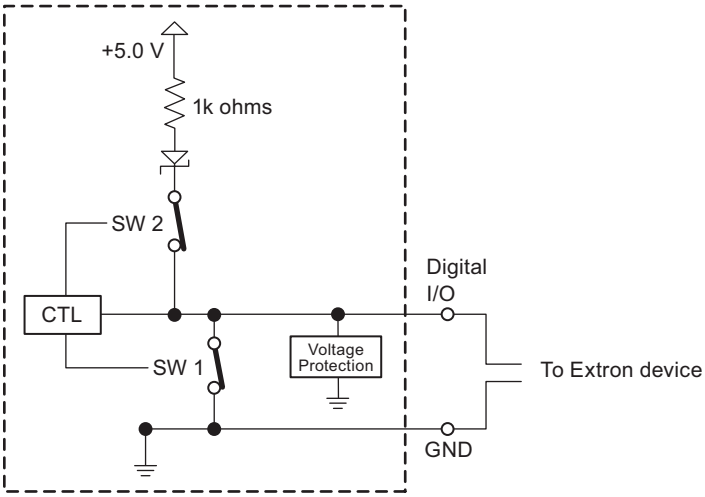


Figure 16. Digital I/O Digital Output Application With Pull-up: Contact Closure Input Selection on a Connected Device

Auto-switch

The Auto-switch feature allows the switcher to automatically switch to an input when active TMDS clock (HDMI input) or AUX channel (USB-C inputs) signal is detected. Auto-switch can be configured via SIS on both the transmitter and receiver. It can also be configured using PCS (see the *UCS 504 Help File*).

Auto-switch is disabled by default on both the transmitter and receiver. The user must select inputs manually on the transmitter or receiver via front panel or SIS. A manual input selection performed via SIS, PCS, or front panel button press overrides the automatically switched input, but does not disable Auto-switch.

User Priority Active input selection Mode 1

By default, the switcher automatically switches to the input in the order of input 1, 2, 3 based on whether the input has an active input signal. Inputs that do not have an active video input are skipped and the next input with an active video input is selected.

The user can assign the priority of inputs in which the switcher will select in order, when Auto-switch mode is enabled via SIS. For example, if the user wishes to select input 2, then 1, then 3, or an SIS command is used to configure that order.

Active input selection Mode 2

When Auto-switch is enabled, the switcher automatically switches to the newly detected active input that is detected (the last source that is plugged into the device).

When the last input selected is disconnected, the switcher automatically selects and steps through the prioritized active input. This ensures that the switcher selects an active input.

Timeout Period

While in Auto-switch mode, a user can still manually select inputs via front panel buttons or SIS. It is possible for a user to select an input that does not have an active video input. Using SIS, the switcher can be configured to have a timeout period during which the switcher switches to the active prioritized input if the currently selected input does not have a video input detected. If a signal is detected, the timeout period resets and waits. If the video signal is lost, the timeout period restarts.

The timeout period can range from `0-500` seconds, with `10` seconds being the default timeout period. `0` seconds indicates that the timeout period is OFF/disabled. When the timeout period is `OFF`, the switcher remains on that manually selected input that does not have a video input, indefinitely, until the input is selected manually or if an active video source is plugged into another input on the switcher.

Auto-switch Type

The Auto-switch type feature allows users to select which signal is automatically switched. If front panel input buttons are pressed while Auto-switch is enabled, the signal switched follows the type that is set. Pressing a front panel button overrides the current selected input and switch all signals but does not disable Auto-switch mode and type.

Audio, Video, and USB

When Auto-switch is enabled audio, video, and USB signals switch all together. This type monitors active TMDS clock (HDMI input) or AUX channel (USB-C inputs) signal.

Audio and Video only

When Auto-switch is enabled audio and video signals only switches. USB stays enumerated with user selected host. This type monitors active TMDS clock (HDMI input) or AUX channel (USB-C inputs) signals.

Video Input Switching

Selecting Inputs 1–3 on transmitter

Selecting Inputs 1-3 on the transmitter by contact closure, front panel buttons, SIS, or plugging in an active source on the Transmitter selects input 1 on the receiver automatically. The transmitter and receiver must be configured for `Auto-switch Mode`, with switching set to select Input 1 as the priority input on the receiver. This allows any of the three video inputs on the transmitter to be shown on the output of the receiver without having to manually select an input on the receiver.

Application example: Laptop input selected at the transmitter

To use a laptop PC connect it to input 1 of the transmitter:

Set the transmitter to Auto-switch mode with switch type video only. The transmitter detects that an active input is present at input 1 and switches to that input (video only), sending the video signal to the receiver input 1.

Set the receiver to Auto-switch mode with switch type video only. The receiver detects that an active input is now detected at its input 1 and switches to that input,providing a video output to the display. The USB continues to be enumerated on the receiver host port 2.

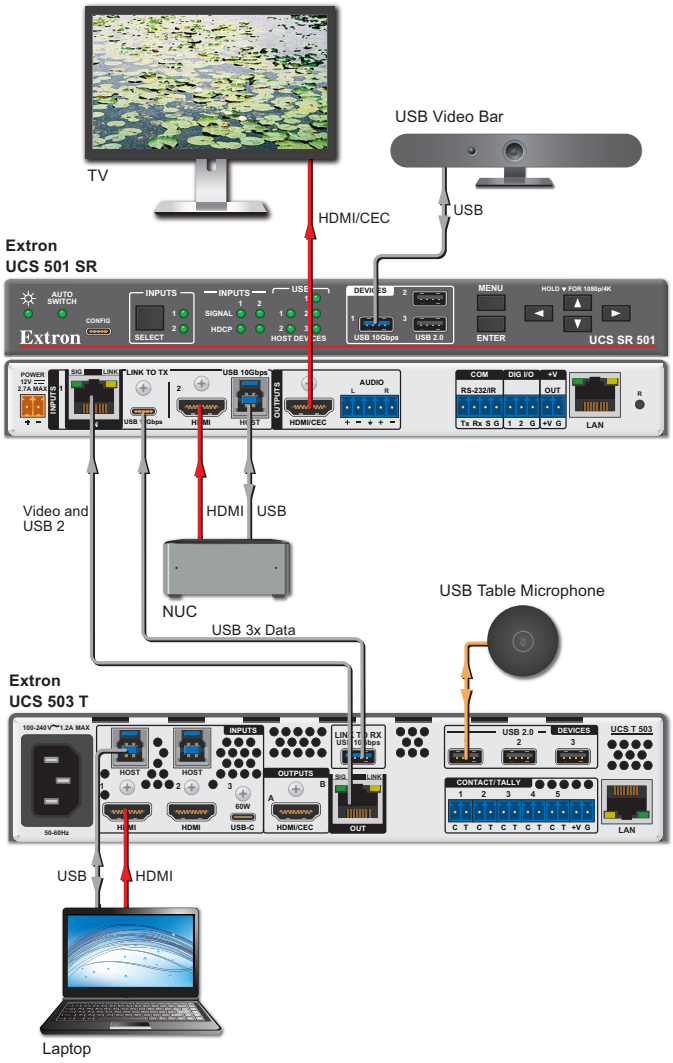


Figure 17. Laptop Input Selected at the Transmitter

Application example: Resident PC at the receiver is selected

To use a PC connected to input 2 of the receiver to run a soft codec conference meeting, disconnect their laptop from input 1 of the transmitter. No other inputs are connected to the transmitter.

The receiver, set to Auto-switch mode, no longer detects a signal at its input 1 and automatically selects input 2, where the resident PC is connected and video from the resident PC is output from the receiver to the display.

USB-C Input

The USB-C input is on the UCS T 503 rear panel (see **figure 6** Ⓓ, on page 13) supports USB data, audio, video, and USB power delivery.

The input is a USB 3.2 port that supports up to 10 Gbps and is backwards compatible with USB 2.0, 1.1, and 1.0.

DisplayPort Alt Mode

The USB-C input uses DisplayPort Alt Mode. The DP alt mode is required from the laptop USB-C output to the transmitter USB-C input. The DisplayPort signal is then converted to TMDS.

The USB-C input host controller can be configured to operate in one of two modes to support a combination of high resolution video and USB via SIS. The four data lanes used and shared by USB 3.2 data and DP alt mode are configured to operate in one of the two modes:

- **USB 3.2 + USB2.0 + 4K/30 Video** (Default) — The USB-C input host controller is configured such that two high speed data lanes operate in HBR2 mode (5.4 Gbps x 2 lanes = 10.8 Gbps). The two other high speed data lanes are used for USB 3.2 (5-10 Gbps) operation.
- **4K/60 video + USB 2.0 Only** — If the system requires just video and USB 2.0 (no USB 3.2 data), then 4K/60 can be supported on the USB-C input by configuring it to operate in a mode such that all four high-speed lanes for DisplayPort Alt Mode support HBR2 (5.4 Gbps x 4 lanes = 21.6 Gbps).

Power Delivery

The USB-C port provides up to 60 W of power to the connected source. If the connected USB-C host source requires more than 60 W, it is able to keep the source alive, but not charge. If the source is already connected to an external power supply, the UCS T 503 does not send power to the source.

USB Extension

- **USB 2.0 Extension** — All USB 2.0 data is extended through the twisted pair connection simultaneously with video/audio/control between the transmitter and receiver. If all peripherals and data used in the system are USB 2.0, only this twisted pair connection is needed.
- **USB 3.2 Extension** — USB 3.2 data is routed through the `LINK TO TX` and `LINK TO RX` connectors on the transmitter and receiver. An Extron active USB 3.2 Extension cable is required to be connected between the transmitter and receiver in order to extend USB 3.2. Depending on the selected input/host, the USB 3.2 signal is routed automatically so that USB 3.2 devices on both the transmitter and receiver can be accessed by all hosts.

USB Switching

- **Transmitter** — As inputs are switched, the currently selected input on the transmitter has access to all USB ports on the 3-port hub on the transmitter as well as the 3-port USB hub on the receiver.
- **Receiver** — When input 2 is selected on the receiver, the PC connected to input 2 on the receiver has communications and USB access to all USB ports on the 3-port hub on the transmitter as well as the 3-port USB hub on the receiver.

USB 2.0 Switching/Routing

The receiver triggers automatic routing of USB 2.0, which determines whether the transmitter or receiver is in USB host or device mode.

USB Device Port Status

This option allows the user to enable or disable USB downstream or device-facing ports (peripherals).

HDCP

Inputs

The HDMI input negotiates and authenticates HDCP with the source device if the source requires HDCP encryption. The authentication process is repeated whenever the stored EDID is changed or updated, which is indicated by pulling HPD low.

HDCP support can be disabled using using PCS or SIS commands (see **HDCP Authorized Device** on page 62). When the HDCP support is disabled, the input appears as a non-HDCP compliant device to a connected source.

Output

The output is pre-authenticated and encrypted, if required by the connect source. If the output requires encryption but the connected sink device cannot be authenticated, the output displays a green screen.

The following output encryption modes can be selected via SIS commands or PCS:

- **`Follow input`** — Output is always authenticated but only encrypted when required by input. HDMI authentication is continuous. DVI authentication occurs for a maximum of 10 seconds, then fails.
- **`Always encrypt output`** — Output is always authenticated and encrypted regardless of whether the input video is encrypted or not. HDMI authentication is continuous. DVI authentication occurs for a maximum of 10 seconds, then fails.

HDCP Authorized Setting

The HDCP Authorized setting, configurable via PCS or SIS commands, is for devices such as Mac computers, iPhones, iPads, and some Windows sources that always encrypt their output, if the downstream sink is HDCP compliant.

- **`HDCP Authorized On`** — The HDMI inputs indicate to the sources that they are capable of handling HDCP content. When an encrypted or unencrypted source is connected, the video is passed through the system.
- **`HDCP Authorized Off`** — The HDMI inputs indicate to the sources that they are not capable of handling HDCP content.

When a Macbook, or any of the other devices listed above, is connected, the output video is unencrypted.

When a source playing content that requires video encryption is connected, the source does not output video.

HDCP Encryption

The HDCP Encryption status can be viewed via SIS command and the front panel HDCP LED Indicators.

- **`Inputs`** — All inputs support content encrypted using HDCP 1.x or HDCP 2.3.
- **`Output`** — The output supports encrypting content using HDCP 1.x or HDCP 2.3.

HDCP Notification

HDCP notification provides an indication that encrypted content is trying to be displayed on a non-HDCP compliant sink device. The requirements for the notification can be configured for each output via SIS command (`N HDCP`).

- **`HDCP Notification Enabled`** — A green screen is displayed on the output when the input signal is encrypted and the display is not HDCP compliant.
- **`HDCP Notification Disabled`** — A black screen is displayed when the input signal is encrypted and the display is not HDCP compliant.

Color Bit Depth

Color bit depth is configurable via SIS command. The options are:

- **`Input color depth`** (transmitter and receiver) — All inputs on the transmitter and receiver support 8, 10, and 12 color bit depth signals.
- **`Force 8-bit color bit depth`** — The scaler outputs 8-bit color bit depth at all times.
- **`Color space conversion`** — The transmitter is capable of supporting YUV (4:4:4), YUV (4:2:2), YUV (4:2:0), and RGB color space signals for all inputs.

Reset Modes

The UCS 504 series has five reset modes that are initiated by pressing the **`RESET`** button. An additional (sixth) mode toggles between enabling and disabling the DHCP client:

- **Use Factory Firmware**
- **Reset IP Settings**
- **Full Factory Reset**
- **Toggle DHCP Client**

A recessed reset button on each device accesses various reset modes. The transmitter reset button is on the front panel (see **figure 4**, B on page 11). The receiver reset button is on the rear panel (see **figure 7**, V on page 13).

Use Factory Firmware

This mode is used to boot up the unit with factory-installed firmware for a single power cycle if a firmware update fails or incompatibility issues arise with user-loaded firmware.

Activation

To start the `Use Factory Firmware` reset mode and replace firmware:

1. Remove power from the device to be reset (either the transmitter or the receiver).
2. Hold down the recessed **`RESET`** button while re-applying power to the unit. When power is restored, the `Reset` LED lights. Hold the **`RESET`** button for a further 2 seconds before releasing it. The touchpanel enters factory firmware mode.
3. Upload new firmware to the unit as desired (see **Updating Firmware** on page 36).

   NOTE: Do not continue to operate the UCS 504 using the factory firmware version. If you want to use the factory default firmware, you must upload that version again (see **Updating Firmware**).

Result

The unit reverts to factory-installed firmware. IP settings are maintained.

NOTE: To return the unit to the firmware version that was running prior to the reset, cycle power to the unit.

Reset IP Settings

Activation

To reset all IP settings:

1. Hold down the **RESET** button for about 6 seconds until the Reset LED blinks twice (once at 3 seconds and again at 6 seconds).
2. Release and press **RESET** momentarily (for <1 second) within 1 second. Nothing happens if the momentary press does not occur within 1 second.

Result

Reset All IP settings mode:

- Sets port mapping back to factory default
- Sets all LAN IP settings back to factory default
  - Turns DHCP off.
  - Sets the IP address back to factory default.
  - Sets the subnet mask back to factory default.
  - Sets the gateway IP address back to factory default.
  - Sets all other IP settings, addresses, and domain and host names back to factory default.
  - User programs are stopped.

The Power LED blinks three times in quick succession following a successful reset.

For the receiver, the I/O port behavior following this reset mode mimics a product power cycle.

Full Factory Reset

This mode resets all IP settings and touchpanel settings, including passwords, to factory defaults and removes all configurations. It allows you to start over with configuration and uploading.

NOTES:

- The factory configured passwords for all accounts on this device have been set to the device serial number. Passwords can be changed during configuration. Passwords are case sensitive.
- If the device is reset using Full Factory Reset, the password is in the default password configuration. The default password is extron (for either admin or user accounts).

Activation

To reset the unit to all factory default settings:

1. Hold down the **RESET** button for about 9 seconds until the Reset LED blinks three times (once at 3 seconds, again at 6 seconds, and again at 9 seconds).
2. Release and press **RESET** momentarily (for <1 second) within 1 second. Nothing happens if the momentary press does not occur within 1 second.

Result

Reset to Factory Defaults mode performs a complete reset to factory defaults (except the firmware):

- Does everything Reset IP Settings mode does (see above).
- Deletes all user-loaded files, programming files, and configuration files.
- The product continues to run the soft loaded firmware.
- The Power LED blinks four times in quick succession following a successful reset.

Toggle DHCP Client

This mode toggles between DHCP enabled and DHCP disabled.

Activation

To enable or disable the DHCP client for the LAN port:

1. Press the **RESET** button five times (consecutively).
2. Release the button. Do not press the button within 3 seconds, following the fifth press.

Result

If DHCP was enabled, it is now disabled. The `Reset` LED blinks three times.

If DHCP was disabled, it is now enabled. The `Reset` LED blinks six times.

NOTES:

- DHCP toggle mode is supported on firmware version 3.0 or higher.
- By default DHCP is off and the unit uses a static IP address.
- When you disable DHCP, the unit reverts to using the previously-set static IP address.

Updating Software and Firmware

This section provides information about:

- **Updating Software**
- **Updating Firmware**

Updating Software

To use Extron software, download the latest version of the program from the Extron website and install it on a PC connected to the UCS, as described in the following sections. You can also download updates to the UCS software as they become available.

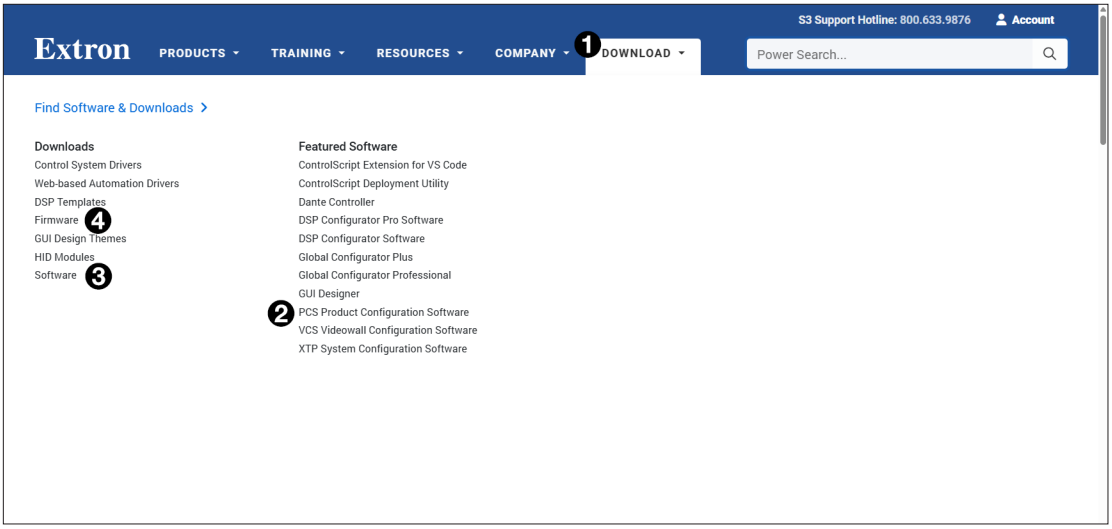


Figure 18. Download Center Page on the Extron Website

To access the software:

1. On the Extron website (**www.extron.com**), hover the pointer over the **DOWNLOAD** tab (see figure 18, ❶).
2. Do one of the following:
   - In figure 18, PCS is shown in the Featured Software list. Click on the link **PCS Product Configuration Software** link (❷), which takes you to the PCS product page (see **Downloading Software from the Product Page** on page 34).
   - If the software you are looking for is not shown in the Featured Software list, click the **Software** link (❸), which allows you to search for your software. Go to **Searching for Software to Download** on page 35.
   - If you wish to download firmware, click the **Firmware** link (❹), which allows you to search for firmware (see to **Updating Firmware** on page 36).

Downloading Software from the Product Page

When you click on a link in the `Featured Software` list, the product page for that software opens. Figure 19 shows the product page for PCS.

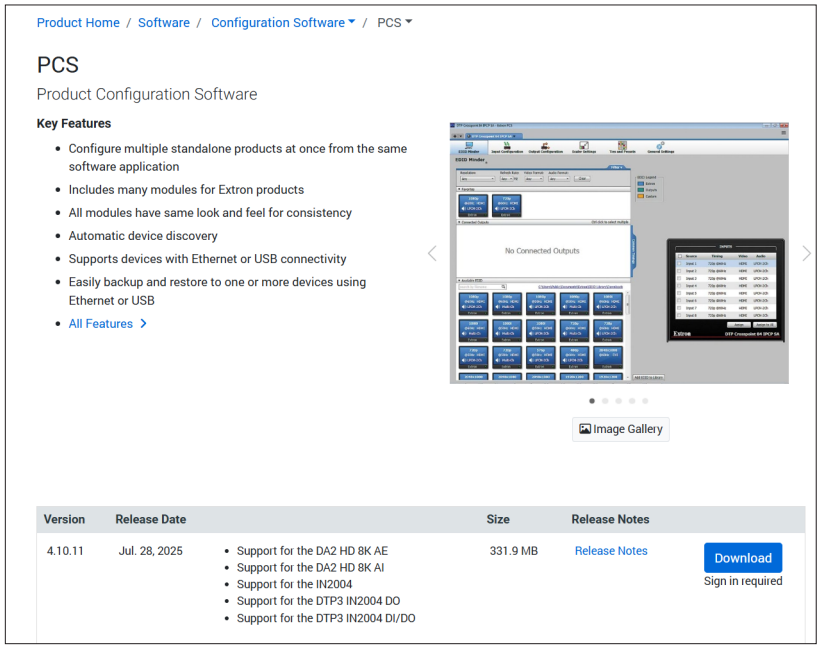


Figure 19. PCS Product Page

1. Click the **`Download`** button.

   If you have not already done so, you are required to sign in to your Extron Insider account. If you are not sure about this, contact your Extron representative.

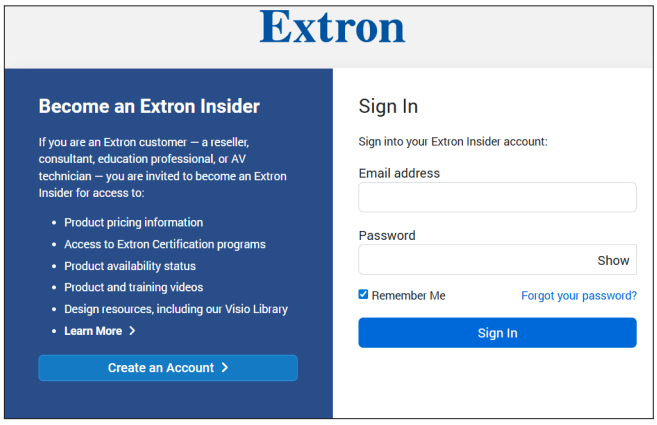


Figure 20. Extron Insider Account Sign In

2. Enter your `Email` address and `Password`.
3. Click **`Sign In`**.

The software downloads. The Download Center displays the message below and an executable file is saved in your Downloads folder.

If the download fails to start, click the **click here** link (see figure 21, ❶).

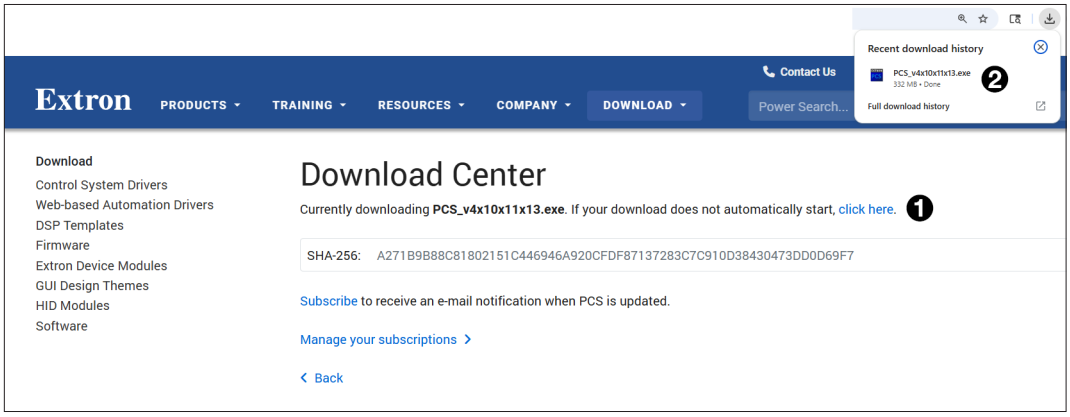


Figure 21. PCS Software Downloading

4. Click on the executable file in your **Downloads** folder (❷).
5. A pop-up asks Do you want to allow this app to make changes to your device. Click **Yes**.
6. The Installshield Wizard opens. Follow the instructions to complete the software program installation. By default, the configuration program files are stored on your computer at:

   C:\Program Files (x86)\Extron\Extron *software name*.

Searching for Software to Download

1. If the software does not appear in the Featured Software list (see **figure 18** on page 33), click the **Software** link (❸).

   The Download Center Software page opens:

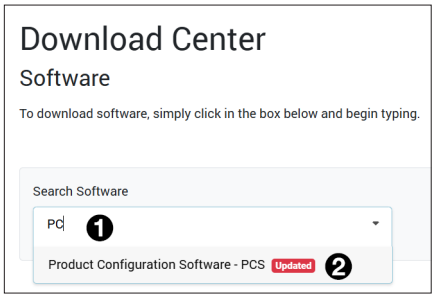


Figure 22. Download Center Software Page

2. Start typing the name of the software product in the text box (see figure 22, ❶).

   As you type, the names of software products that match the letters you have typed appear as links below the text box (❷).
3. Click on the link for the software product that you are looking for.

The page expands to provide informaton about the software. This includes the software version, the release date, and a summary of the new features offered with the latest version. For more information click **Release Notes**.

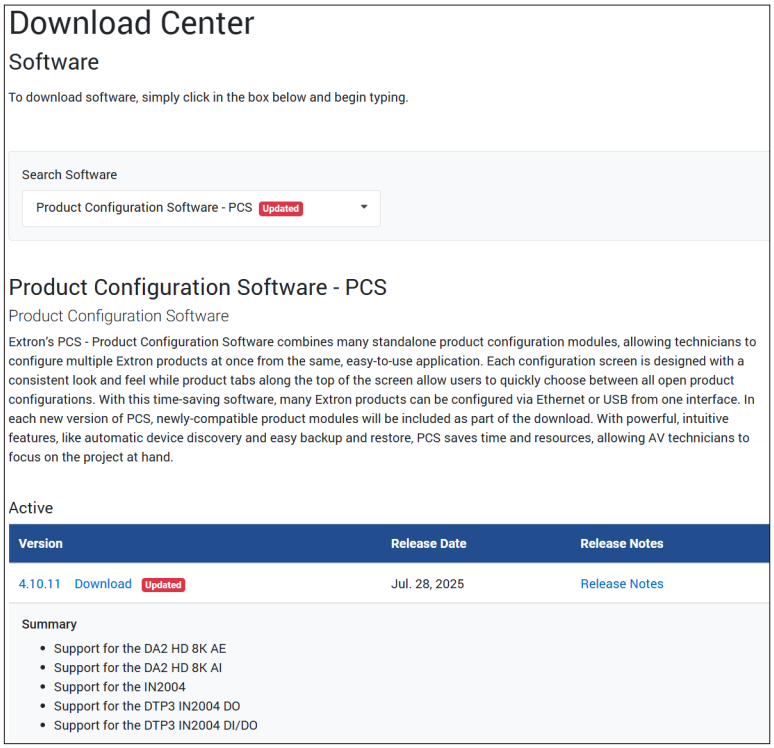


Figure 23. PCS Download Page

4. To download the software, click the **Download** link.
5. To sign in as an Extron insider, if required, and install PCS, follow the instructions, starting at **step 1** of the previous section on page 35.

Updating Firmware

Downloading Firmware

Extron periodically updates product firmware. Before updating any Extron product to the latest revision level, be sure to read the supplied release notes or contact Extron Technical Support to determine if your product requires a firmware update.

Before updating firmware, determine which version is on your device and whether a newer version is available.

You can check the firmware version that is currently installed using Toobelt (see the *Toolbelt Help File*) or PCS (see the *UCS 504 Help File*).

You can update firmware using PCS (see the *UCS 504 Help File*) the UCS 504 web pages (see **Default Web Pages** on page 50), or Toolbelt (see the *Toolbelt Help File*).

If you need to update the firmware, follow these instructions:

1. Click the **Firmware** link on the Download page (see **figure 18** on page 33).

   The Download Center Firmware page opens:

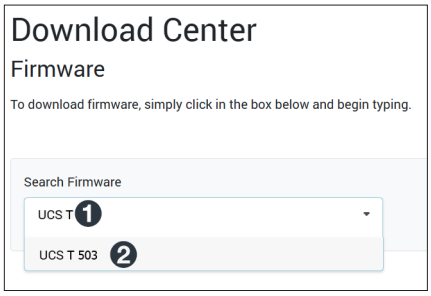


Figure 24. Locating Firmware

2. Start typing the name of the software product in the text box (see figure 24, ❶).

   As you type, the names of software products that match the letters you have typed appear as links below the text box (❷).

   NOTE: Your product appears only if a new version of the firmware has been released since the product was first introduced.

3. Click on the link for the software product that you are looking for.

   Information about the latest version of the firmware product is shown. This includes the software version, the release date, and a summary of the new features offered with the latest version. For more information click **Release Notes**.

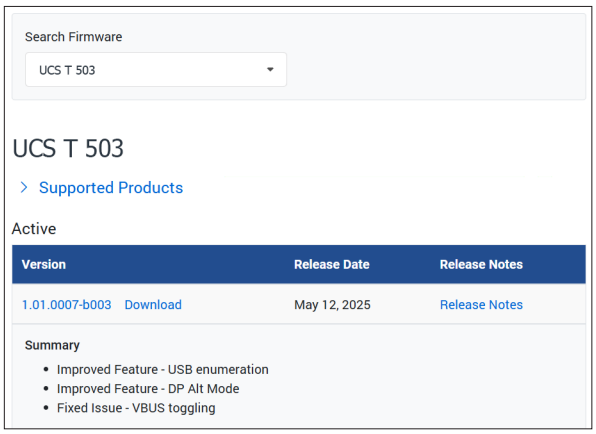


Figure 25. Download Firmware

4. To download the firmware, click the **Download** link.
5. If necessary, sign in as an Extron Insider (see **step 1** on page 34).
6. An executable file (.exe) is downloaded to your Downloads folder.
7. Open the Downloads folder and click on the file.
8. Click **Yes** to allow the app to run on your PC.
9. The InstallShield Wizard opens. Follow the prompts to save the firmware file on your PC.

   By default, the firmware file is saved in the C:\\Program Files (x86)\Extron\Firmware\UCS T 503 or C:\\Program Files (x86)\Extron\Firmware\UCS SR 501.

   Firmware files have a .eff extension.

10. Upload the firmware to the device using Toolbelt (see *Toolbelt Help File*), PCS (see the *UCS 504 Help File*), or the UCS 504 web pages (see **Default Web Pages** on page 50).

On-screen Display

The On-Screen Display (OSD) is used to configure video scaler settings, view the product device settings and details, and various other functions, including:

- **Device Information**
- **Quick Setup**
- **Picture Controls**
- **Input**
- **Output**
- **Advanced**
- **Communications**

To access the on-screen display:

1. Connect a monitor to the HDMI OUTPUT port for the USC SR 501 (see **figure 7**, P on page 13).
2. Press the **MENU** button (J) to activate the on-screen display.
3. Use the **MENU** and **ENTER** buttons (J) and the **arrow** buttons (K) to navigate and select options from the on-screen display menu.

Device Information

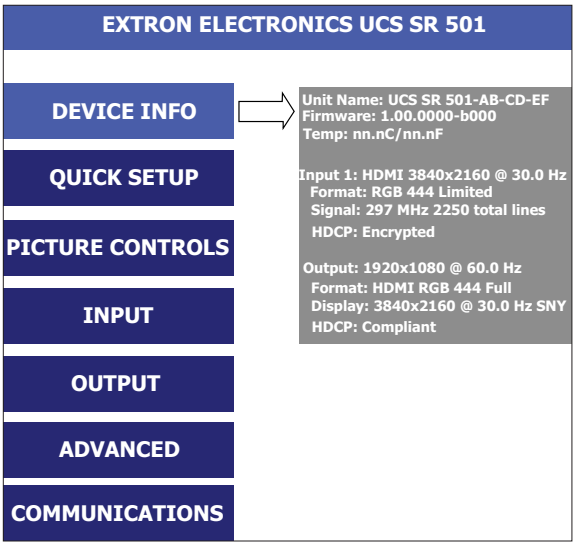


Figure 26. Device Info Screen

The Device Info screen is read-only and provides general information about the device, the input, and the output signals.

Quick Setup

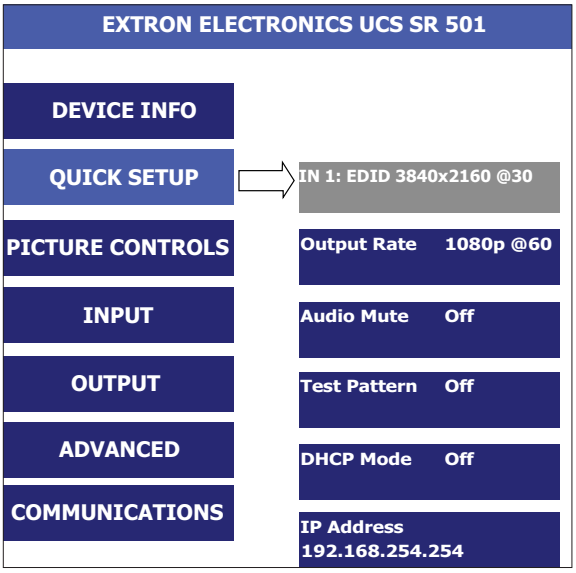


Figure 27. Quick Setup Screen

1. Use the **Up** and **Down** arrow keys to highlight the **QUICK SETUP** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Input EDID** — Set the EDID for the input signal. See **Scaler resolution / EDID emulation** on page 67 for a list of resolutions available.
   - **Output rate** — Set the output rate.
   - **Audio Mute** — Toggles between audio mute and unmute.
   - **Test Pattern** — Test patterns help to set up and troubleshoot the display. Available test patterns are crop, alternating pixel, 4x4 crosshatch, color bars, and 32-level grayscale at a resolution that matches the current output resolution. Test patterns are enabled and disabled using SIS or from the OSD.
   - **DHCP Mode** — DHCP mode can be toggled between enabled and disabled. If DHCP is enabled, all network communication settings are handled by the DHCP server. If DHCP is disabled, the network communication settings must be set by the user.
   - **IP Address** — If DHCP is enabled, this setting displays the IP address provided by the DHCP server. If DHCP is disabled, this setting allows the IP address to be configured.

Picture Controls

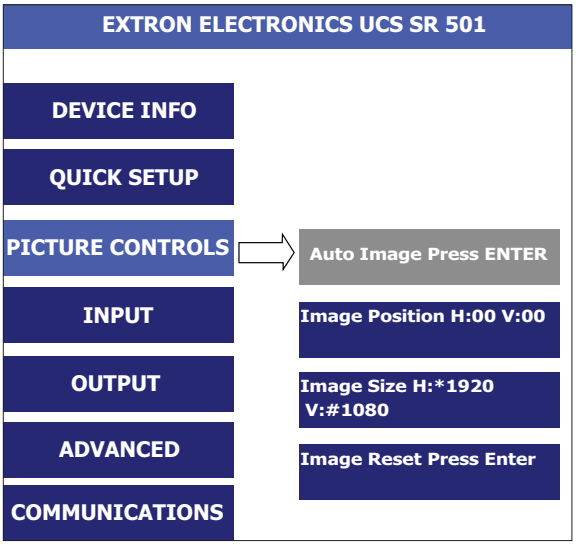


Figure 28. Picture Controls Screen

1. Use the **Up** and **Down** arrow keys to highlight the **PICTURE CONTROLS** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Auto Image** — Press the **ENTER** button to apply a one-time Auto Image on the current input. This function automatically sizes and centers the input to fill the screen.
   - **Image Position** — Set the Horizontal and Vertical postions of the first pixel in the top left corner (Horizontal = **-4096** to **+4096**, Vertical = **-2400** to **+2400**).
   - **Image Size** — Set the Horizontal and Vertical dimensions of the image. The range of possible values depends on the resolution of the output device.
   - **Image Reset** — Executes an Image Reset (following the aspect setting).

Input

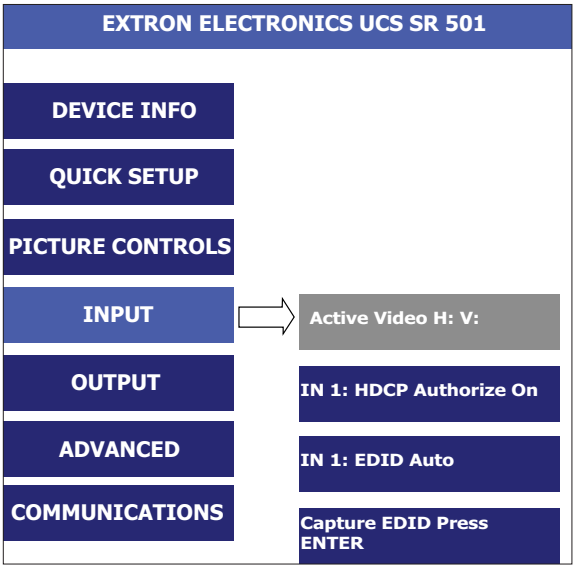


Figure 29. Input Screen

1. Use the **Up** and **Down** arrow keys to highlight the **INPUT** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Active Video** — Shows the number of active horizontal and vertical pixels.
   - **HDCP Authorization** — Toggles between HDCP Authorization **On** and **Off** (see **HDCP Authorized Setting** on page 29).
   - **EDID** — Shows the EDID for the selected input.
   - **Capture EDID** — Automatically populated with the sink EDID from the selected output.

Output

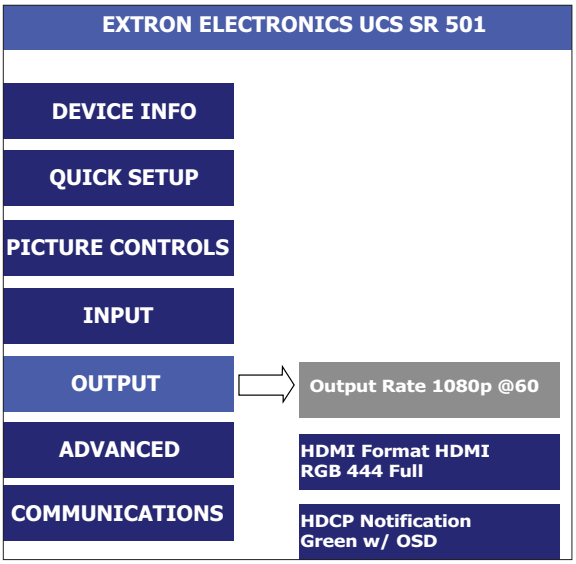


Figure 30. Output Screen

1. Use the **Up** and **Down** arrow keys to highlight the **OUTPUT** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Output rate** — Sets the output rate for the display.
   - **HDMI Format** — Sets the HDMI format for the display
   - **HDCP Notification** — Sets the HDCP setting for the output signal.

Advanced

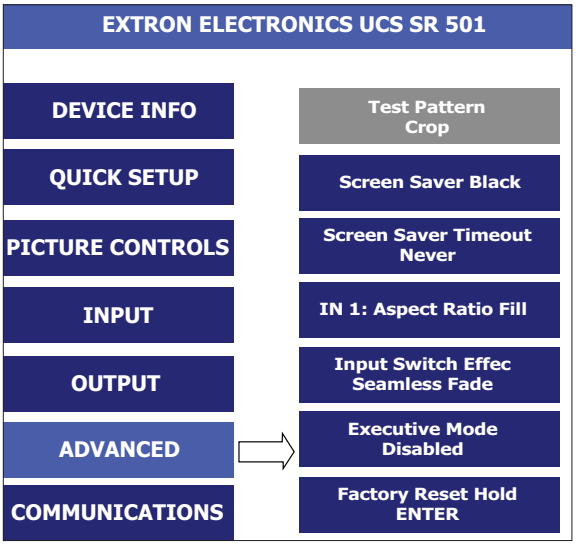


Figure 31. Advanced Screen

1. Use the **Up** and **Down** arrow keys to highlight the **ADVANCED** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Test Pattern** — Test patterns help to set up and troubleshoot the display. Available test patterns are crop, alternating pixel, 4x4 crosshatch, color bars, and 32-level grayscale at a resolution that matches the current output resolution. Test patterns are enabled and disabled using SIS or from the OSD.
   - **Screen Saver** — When the Screen Saver is enabled and there is no video input signal for a user defined period, the output shuts down by no longer transmitting TMDS data, allowing the display to go to sleep. When an input signal is reapplied to the receiver, the output is reactivated waking the display up.

     When the Screen Saver is enabled, although the output no longer transmits TMDS data, 5 V is present to read the sink device EDID or to attempt HDCP authentication.
   - **Screen Saver Timeout** — Adjusts the period of time without a video signal before the screen saver mode is activated.
   - **Aspect Ratio** — Sets the aspect ratio of the output video.
   - **Input Switch Effect** — Sets the effect shown as the output signal transitions from one input to another.
   - **Executive Mode** — Toggles between Front Panel Lock Mode **On** and **Off** (see **Front Panel Lock Mode (Executive Mode)** on page 20).
   - **Reset Mode** — Allows the various reset modes to be applied to the receiver (see **Reset Modes** on page 30).

Communications

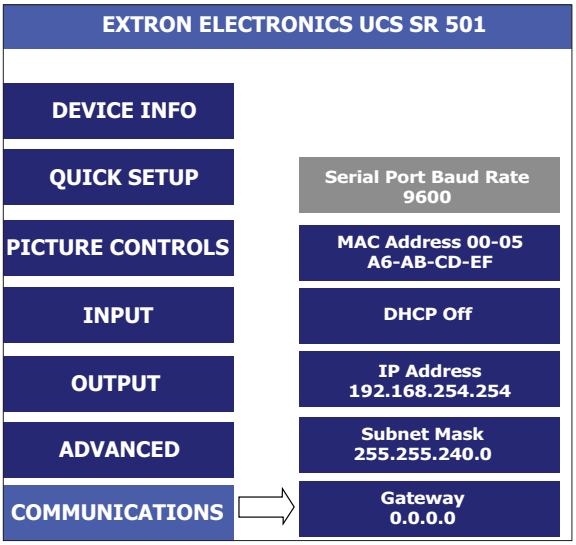


Figure 32. Communications Screen

1. Use the **Up** and **Down** arrow keys to highlight the **COMMUNICATIONS** option.
2. Click the **ENTER** or **right arrow** button to open the submenu.
3. Use the **Up** and **Down** arrows to select an option.
4. Click the **ENTER** or **right arrow** button to open the submenu option. The options are:
   - **Baud Rate**
   - **MAC Address** (read only)
   - **DHCP** (**on** or **off**).

     If DHCP is **on**, the other network settings are not available. If DHCP is **off**, you can set the **IP address**, **Subnet Mask**, and **Gateway** address.

Product Configuration Software

The Extron Product Configuration Software (PCS) offers another way to configure the UCS 504 via a USB-C connector in addition to the SIS commands.

The Extron PCS software program is a Windows-based program for the UCS that provides a convenient way to configure the input and output, audio, and image settings. It lets you perform nearly all the other functions that can be accomplished via the front panel controls or SIS commands.

This section provides an overview of PCS. For detailed information, see the *UCS 504 Help File*.

Using PCS

In order to use the PCS software, the UCS must be connected to your computer via the front panel USB-C port or the rear panel LAN port.

1. To start the configuration program, do either of the following:
   - From the desktop **Start** menu, select **Extron** > **Extron Product Configuration Software**.

     The Extron Product Configuration Software window opens.
   - Double-click on the **EAF.exe** file, located on your computer at C:\Program Files(x86)]\Extron\Extron PCS.

   The Application Licensing screen opens:

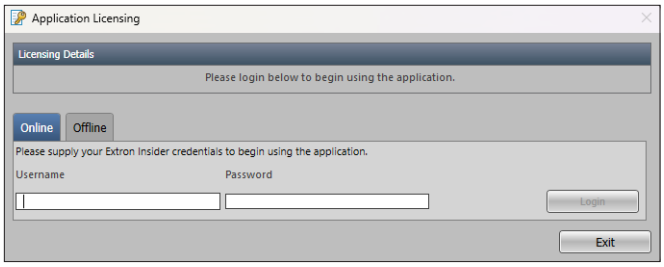


Figure 33. Application Licensing Screen

2. Enter your Extron Insider credentials (Username and Password) and click **Login**.

NOTE: The factory configured passwords for all accounts on this device have been set to the device serial number. Passwords are case sensitive. In the event of an absolute system reset, the passwords are set to extron.

3. Click **Check In**.

   PCS opens with the Device Discovery page:

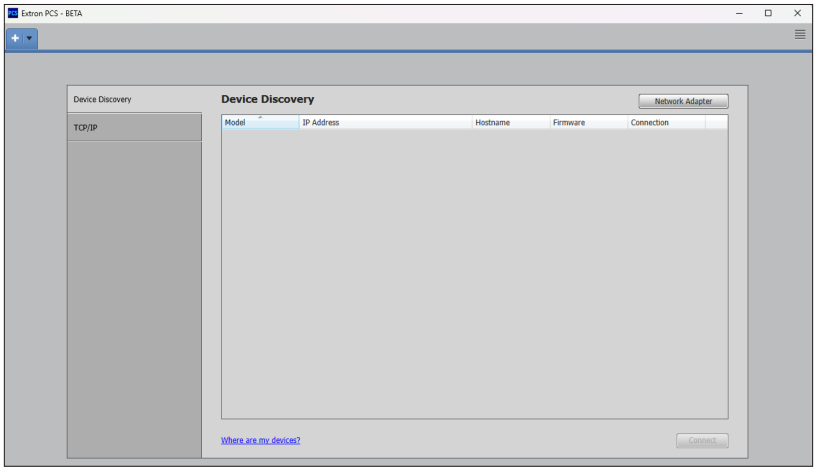


Figure 34. Device Discovery

4. If necessary, click **Network Adapter** and select the appropriate subnet.
5. If your device is listed in the Device Discovery panel, click on the name and then click **Connect**. Follow the instructions for the appropriate device.
6. If your device does not show up in the Device Discovery panel, click **TCP/IP**.

   NOTE: The UCS device must be connected to your computer via the front panel USB-C port or the rear panel LAN port (see **Default LAN settings:** on page 16 for the front panel config port IP address).

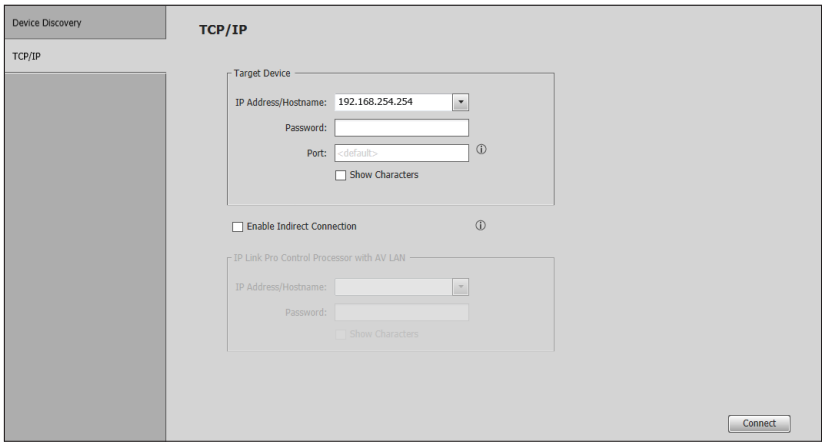


Figure 35. Connect by TCP/IP

7. Enter the device IP Address/Hostname and Password (if required).

   NOTE: The factory configured passwords for all accounts on this device have been set to the device serial number. Passwords are case sensitive. In the event of an absolute system reset, the passwords are set to extron.

8. Click **Connect**.
9. Follow the instructions for the appropriate device.
   - **PCS for UCS T 503**
   - **PCS for UCS SR 501**

PCS for UCS T 503

This section provides an overview of using the PCS program with the UCS T 503. For detailed information, see the *UCS 504 Help File*.

The PCS program opens with the **Input/Output Config** tab selected. This tab allows you to configure the input and output signals.

AV Controls

The AV Controls panel on the left of the screen allows you to select the input and mute audio, video, audio and video, or sync. This panel is available for all tabs (**Input/Output Config**, **EDID Minder**, **Control Config**, and **General Settings**).

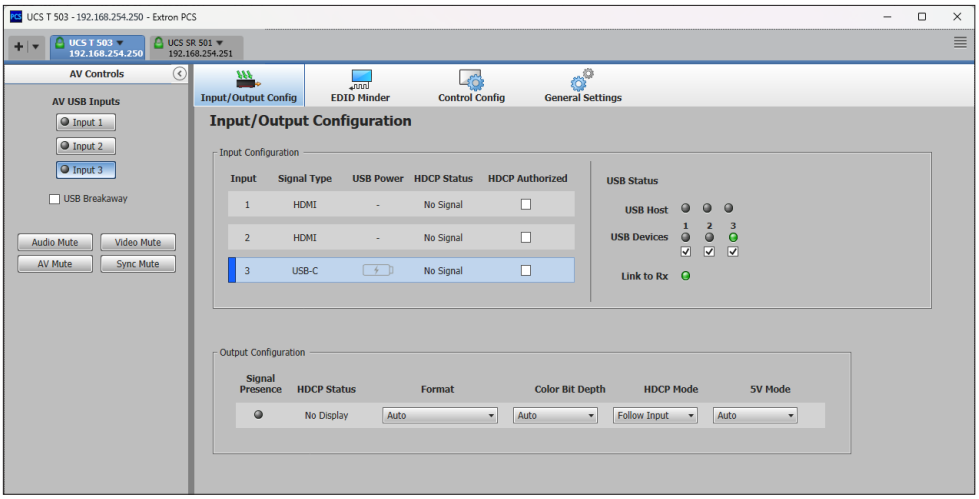


Figure 36. UCS T 503-specific PCS Input/Output Config Page

EDID Minder

Click the **EDID Minder** icon. This tab allows you to select the EDID applied to the input.

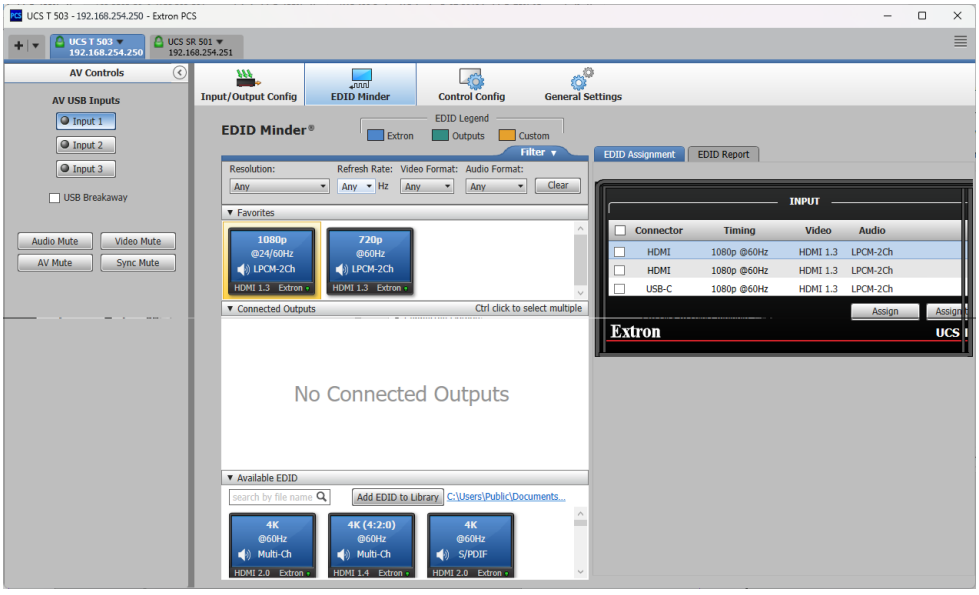


Figure 37. UCS T 503 PCS EDID Minder Page

Click the **Control Config** icon. This tab allows you to select the EDID applied to the input.

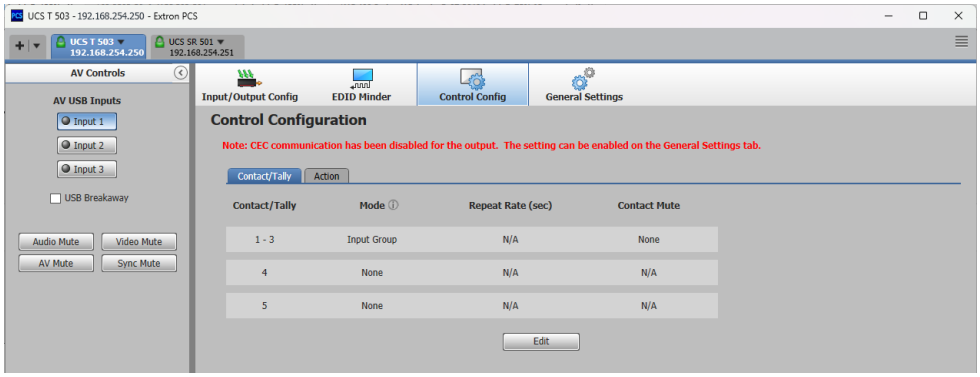


Figure 38. UCS T 503 PCS Control Config Page

Click the **General Settings** icon. On the General Settings tab, configure HDCP, Front Panel Lockout, Auto Switch, DisplayPort Alt Mode, and CEC Communication.

Click **RS-232 Insertion** to configure RS-232 signals.

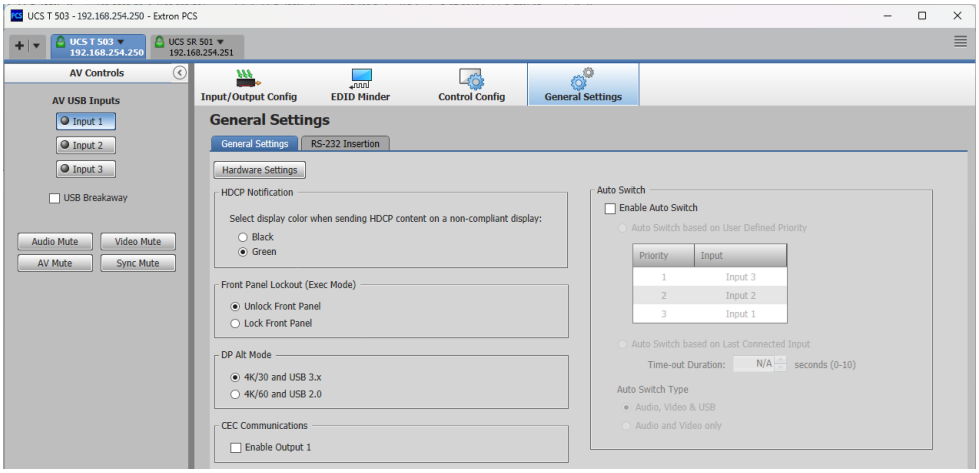


Figure 39. UCS T 503 PCS Control Config Page

PCS for UCS SR 501

This section provides an overview of using the PCS program with the UCS SR 501. For detailed information, see the *UCS 504 Help File*.

The PCS program opens with the **Input/Output Config** tab selected. This tab allows you to configure the input and output signals.

The AV Controls panel on the left of the screen allows you to select the input and mute audio, video, audio and video, or sync. This panel is available for all tabs (**Input/Output Config**, **EDID Minder**, **Scaler Settings**, and **General Settings**).

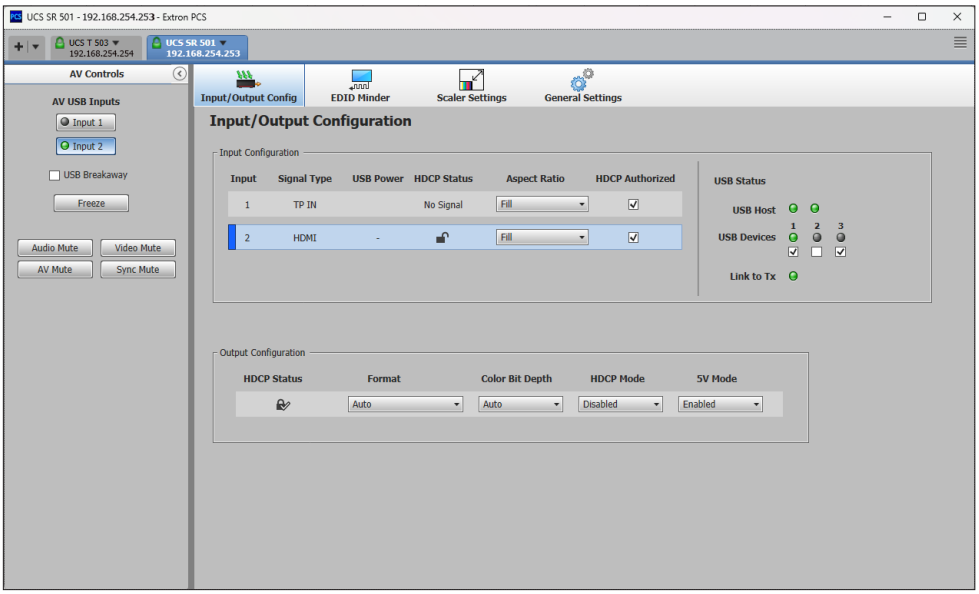


Figure 40. UCS SR 501 Input/Output Config PCS Page

Click the **EDID Minder** icon. This tab allows you to select the EDID applied to the input.

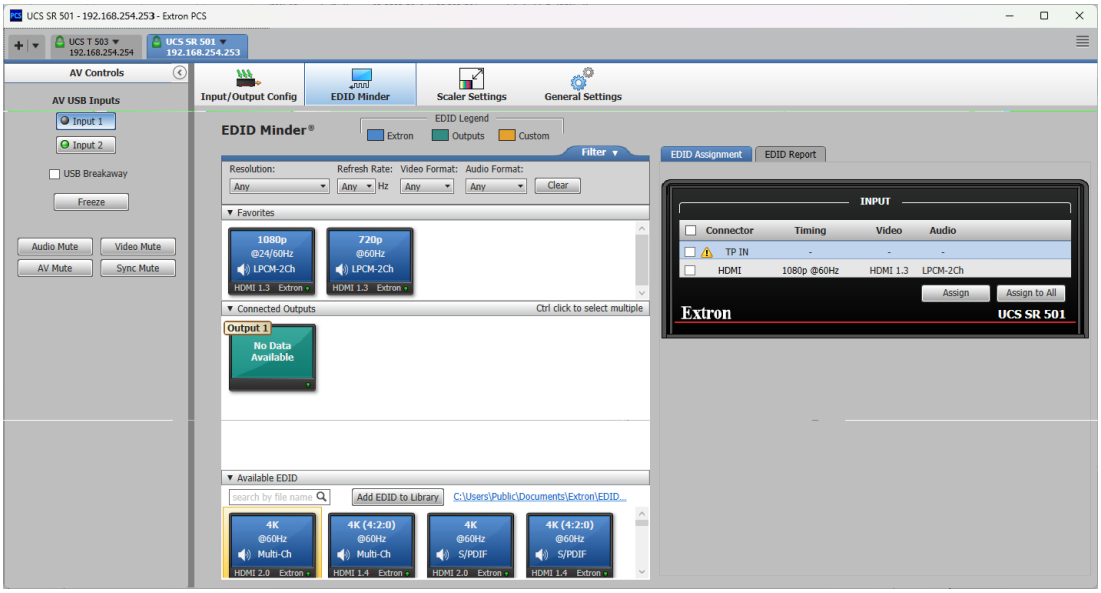


Figure 41. UCS SR 501 PCS EDID Minder Page

Click the **Scaler Settings** icon. This tab allows you to select the EDID applied to the input.

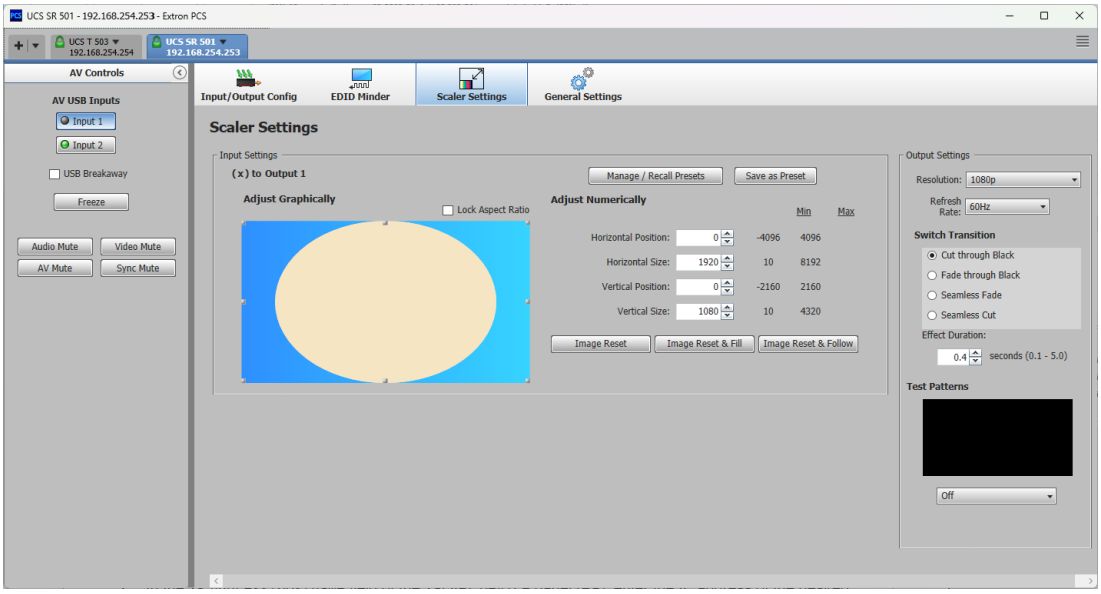


Figure 42. UCS SR 501 PCS Scaler Settings Page

Click the **General Settings** icon. On the `General Settings` tab, configure HDCP, Front Panel Lockout, Auto Switch, CEC Communication, and Screen Saver.

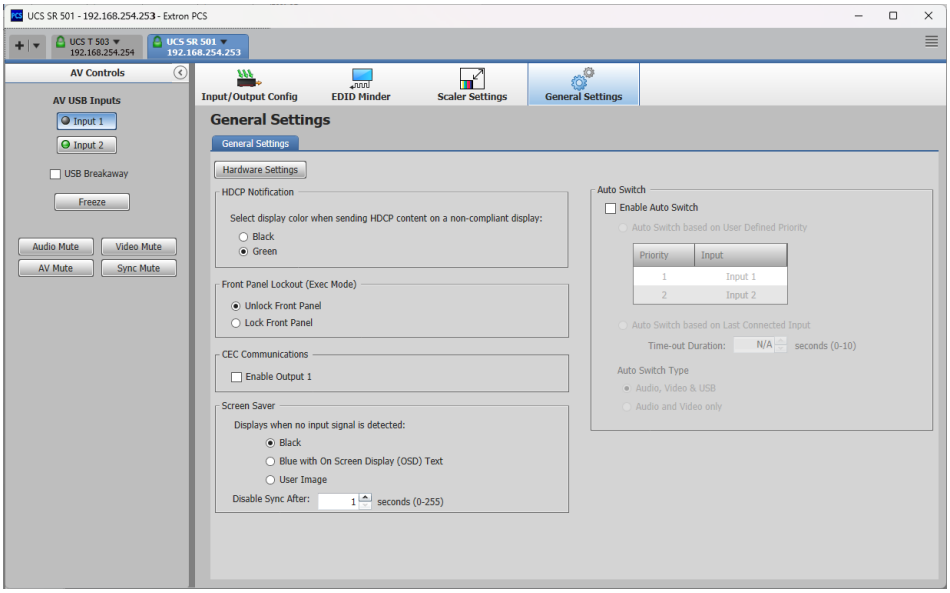


Figure 43. UCS SR 501 PCS General Settings Page

Default Web Pages

The UCS T 503 and UCS SR 501 have default web pages that can be used to configure the units. This section describes those web pages:

Opening the Default Web Pages

1. Open a browser and enter the IP address of the UCS T 503 or the UCS SR 501 in the title bar.

   The `Login` Page opens.

2. Enter the username and password.

   The `Device Utilities` Page opens. It is very similar for the UCS T 503 (see figure 44) and UCS SR 501 (see figure 45).

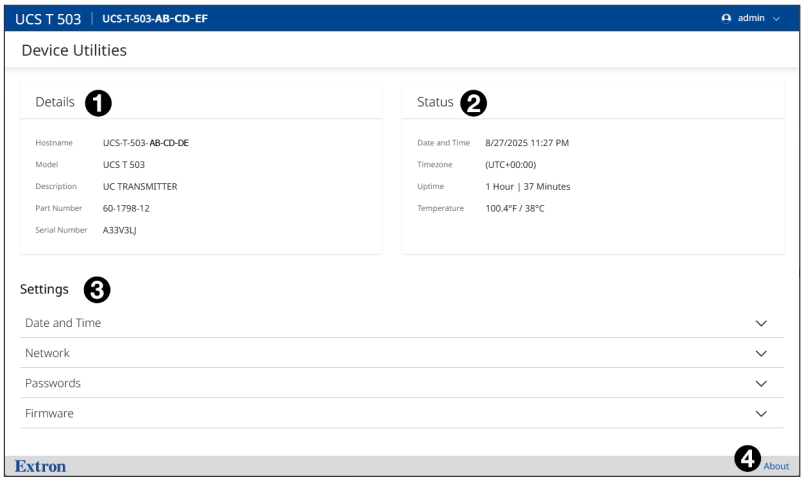


Figure 44. UCS T 503 Device Utilities Page

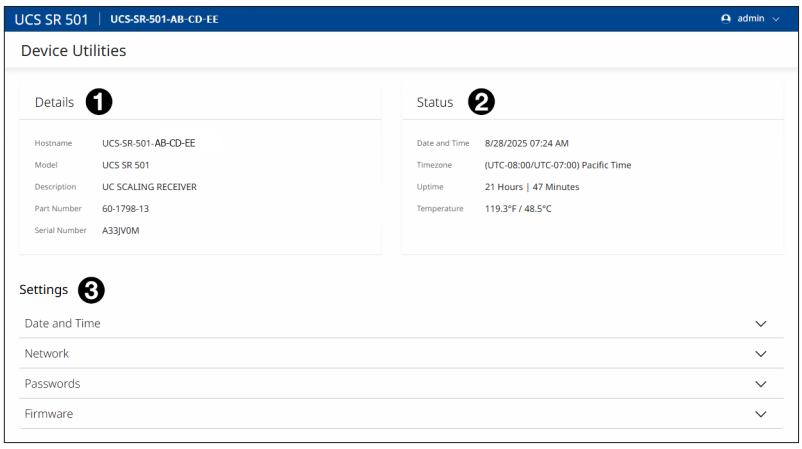


Figure 45. UCS SR 501 Device Utilities Page

There are three separate sections:

- `Details` (see **figure 44**, ❶, on page 50) is a read-only section that provides information about the device Hostname, the Model name, The device Description, the device Part Number, and the device Serial Number.
- `Status` (❷) is a read-only section that provides the current values for `Date and Time`, `Timezone`, `Uptime`, and device `Temperature`.
- `Settings` (❸) provides access to four further sections that can be used to configure the device. These are:
  - **Date and Time**
  - **Network**
  - **Passwords**
  - **Firmware**

  These sections are identical for both models and can be accessed by clicking on the links in the `Settings` section.

Click **About** (❹) page 50 for more detailed information about the UCS T 503 or UCS SR 501.

Date and Time

1. Click **`Date and Time`** (see **figure 44**).

   The accordion opens to show the current date and time and an **`EDIT`** button.

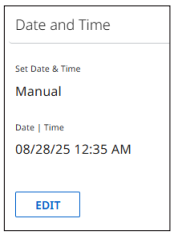


Figure 46. Date and Time Information

2. Click **`EDIT`**.

   The `Date and Time` accordion opens to show options for setting the date and time

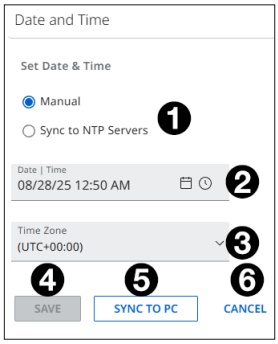


Figure 47. Setting Date and Time

Setting time manually

1. Select **Manual** (see **figure 47**, ❶, on page 51).
2. Click the **Calendar** (Datepicker) icon (❷).

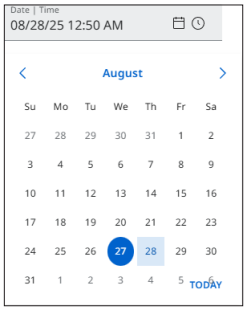


Figure 48. Setting the Date

3. Click **TODAY** to use the current date or select a date from the calendar. You can also change the month using the back and forward arrows (see figure 48 **<** and **>**).

   When you select a date, the calendar closes and returns to the screen shown in **figure 47**.
4. Click the **Clock** (Timepicker) icon (❷).

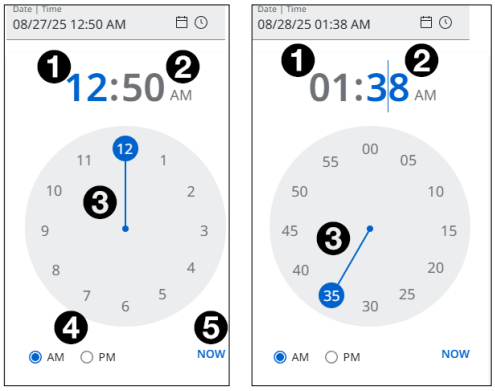


Figure 49. Date and Time Information

5. Click inside the `Hours` display (see figure 49, ❶).

   The hours value turns blue and the minutes value (❷) is gray.
6. Use the clock face (❸) to select the hours value.
7. Click inside the `Minutes` display (❷).

   The minutes value turns blue and the hour value is gray.
8. Use the clock face (❸) to select the minutes value.
   - You can only set the minutes to the nearest five minute interval if you use the clock face.
   - To set the minutes to the nearest minute, click and highlight the minutes value and enter the required value.
   - Alternatively, click **NOW** (❺). This syncs the UCS T 503 time to that of the PC.

     NOTE: If you click **NOW**, the date information also changes to the current time and date.
9. Select **AM** or **PM** (❹).
10. Select a **Time Zone** from the drop-down list (see **figure 47**, ❸).

11. Click **SAVE** (see **figure 47**, ❹ page 13).

    A **Success Toast** appears momentarily if the Date and Time change was successful.

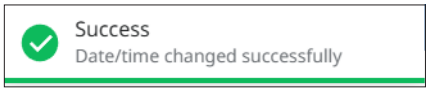


Figure 50. Success Toast

Sync to PC

Click **SYNC TO PC** (❺).

This syncs the UCS T 503 time to that of the PC.

Sync to NTP servers

1. Select the **Sync to NTP Servers** radio button (see figure 51, ❶).

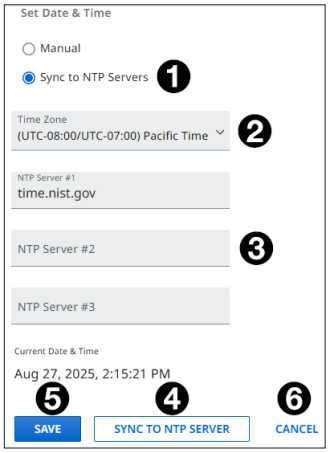


Figure 51. Sync to NTP Servers

2. Select a **Time Zone** from the drop-down list (❷).
3. Enter the IP address of an NTP server in one of the three slots (❸). Up to three servers can be saved.
4. Click **SYNC TO NTP SERVER** (❹).

   The button turns gray while a connection to the server is made. It may take a minute or so before the time is updated. When the time has been synced, the button returns to blue text on a white background.
5. Click **SAVE** (❺).

   A Success toast appears momentarily if the Date and Time change was successful (see figure 50).

Network

1. Click the **Network** (see **figure 44**, ❸, on page 50).

   The accordion opens to show the current Network settings. Figure 52 shows the Network settings for the UCS T 503. The settings for the UCS SR 501 are very similar.

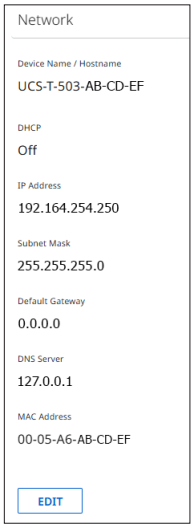


Figure 52. Network page

2. Click **EDIT**.

   The various settings on the Network page are now editable.

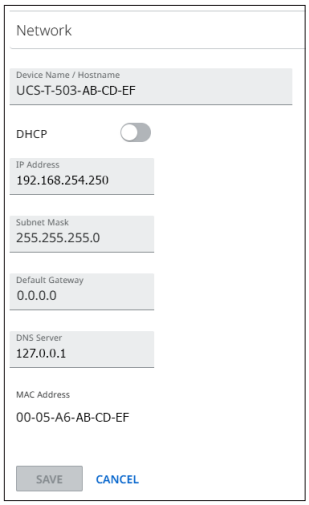


Figure 53. Editing Network Settings

3. If required, edit the **Device Name/Hostname**.
4. Set the DHCP switch **on** or **off**.

   If DHCP is set to on, none of the network addresses are available for editing.
5. If DHCP is set to off, edit the **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS Server**, as required.

   The MAC address cannot be edited.
6. Click **SAVE** to save the changes or **CANCEL** to exit the Network page without saving.

Passwords

1. Click the **Passwords** (see **figure 44**, ❸ on page 50).

   The accordion opens to show the current Passwords settings.

   If passwords have been set they are concealed by a row of asterisks. If passwords have not been set, the text Not Set is displayed (see figure 54, User Password).

Figure 54. Passwords page

2. Click **EDIT** to edit either the Admin Password or the User Password.

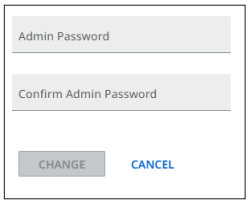


Figure 55. Edit Admin Password

   Figure 55 shows how to edit the Admin Password. The process to edit the User Password is the same.

3. Enter the new password in the Admin Password text box.
4. Enter the new password a second time in the Confirm Admin Password text box.
5. If both passwords match, the **CHANGE** button becomes active.
6. Click **CHANGE** to save the new passwords or **CANCEL** to close the Network page without making any changes.

Firmware

1. Click the **Firmware** (see **figure 44**, ❸, on page 50).

   The accordion opens to show the current Firmware information and the opportunity to update the firmware installed on the USC T 503.

   NOTE: Before using the Default Web Pages to install firmware, you must first have downloaded a suitable Firmware file (see **Updating Firmware** on page 36).

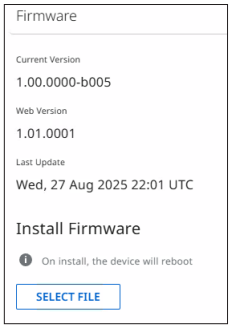


Figure 56. Firmware page

2. Click **SELECT FILE**.
3. Navigate to the previously downloaded firmware file and select it.
4. Click **Open**.

About

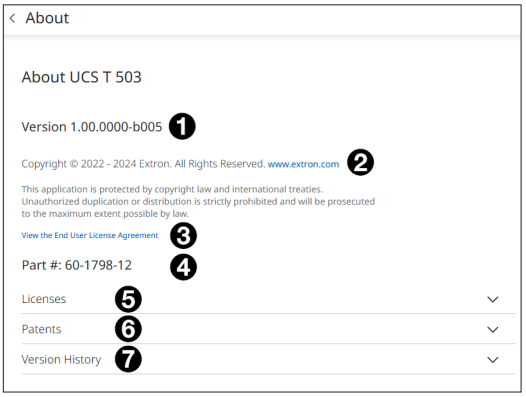


Figure 57. About Web Page

The About web page provides read-only information about the UCS T 503 or UCS SR 501:

❶ Firmware version number

❷ Copyright information

❸ A link that shows the End User License Agreement.

❹ The UCS T 503 or UCS SR 501 part number

❺ The **Licenses** accordion opens to show the licenses used by the UCS T 503. Click a letter of the alphabet to show all the licenses with names starting with that letter.

❻ The **Patents** accordion opens to show a link to the Patents page on the Extron website.

❼ The **Version History** accordion opens to show the versions of software and firmware currently used by the UCS T 503 or UCS SR 501.

SIS Communication and Control

This section describes remote operation of the UCS 504. Topics include:

Using the Simple Instruction Set Commands

The UCS T 503 and UCS SR 501 can be remotely set up and controlled via Extron SIS commands issued from a computer or control system via the rear panel LAN port (see **figure 5**, G on page 11) or the front panel USB-C CONFIG port (see **figure 11** on page 20).

Host-to-switcher Communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. You can enter these commands from your computer using a communication software program. When the switcher determines that a command is valid, it executes the command and sends a response to the host device. Responses from the UCS 504 to the host computer end 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.

Use one of the following methods to establish communication between the host and the UCS:

- **Ethernet** — Ensure the unit is connected to the host via the rear panel LAN port. To enter SIS commands, use a secure communication utility that supports Secure Shell (SSH). Enter the UCS 504 IP address where requested, and use 22023 as the port number.
- **IP over USB** — Connect the host to the front panel USB-C CONFIG port. To enter SIS commands, use a secure communication utility that supports Secure Shell (SSH). Enter 203.0.113.22 for the IP address where requested and 22023 as the port number.

Switcher-initiated Messages

When a local event such as a front panel selection or change in signal status takes place, the switcher responds by sending a message to the host, indicating what change has occurred. No response is required from the host.

The switcher sends the following message when it is first powered on:

© Copyright 20*nn*, Extron Electronics, UCS T 503, V*x.xx*, 60-1798-12↵

- V*x.xx* is the firmware version number.
- 60-1798-12 is the UCS T 503 part number.
- 60-1798-13 is the UCS SR 501 part number.

Error Responses

If the switcher is unable to execute a command it receives, it returns an error response to the host. The following error response codes can be sent:

E01 – Invalid Input Number

E06 – Invalid Channel Change (in auto-switch mode)

E10 – Invalid command

E13 – Invalid Parameter

E14 – Not valid for this configuration

E17 – Invalid command for signal type

Enabling and Disabling Telnet

By default, Telnet on port 23 is disabled. If it becomes necessary to enable Telnet communication, remap the Telnet port as described below. (The ↵ symbol shown here represents a carriage return with a line feed, in other words, pressing the <Enter> key.)

To enable Telnet:

1. Use a SecureShell (SSH) client (such as PuTTY) to connect to the switcher over port 22023.
2. Enter the following SIS command to remap the Telnet port to 00023:

   Esc Z23PMAP↵

To disable Telnet:

To disable Telnet communication in order to require the SSH secure communication protocol to transmit SIS commands, remap the Telnet port as follows:

1. Use an SSH client (such as PuTTY) to connect to the switcher using SSH over port 22023, or

   Use a Telnet client (such Extron DataViewer) to connect to the switcher over port 23.
2. Enter the following SIS command to remap the Telnet port to 00000.

   Esc Z0PMAP↵

   This disables Telnet at port 23.

Using the Command and Response Table

The **Command and Response Table for SIS Commands** on page 60 lists valid ASCII and hexadecimal command codes, the switcher responses to the host, and a description of the command function or the results of executing the command.

The conversion table in figure 58 is for use with the command and response table.

ASCII to HEX Conversion Table																Esc 1B	CR ØD	LF ØA
Space	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27			
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F			
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37			
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F			
@	4Ø	A	41	B	42	C	43	D	44	E	45	F	46	G	47			
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F			
P	5Ø	Q	51	R	52	S	53	T	54	U	55	V	56	W	57			
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F			
`	6Ø	a	61	b	62	c	63	d	64	e	65	f	66	g	67			
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F			
p	7Ø	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			

Figure 58. ASCII to Hex Conversion Table

Unsolicited Responses

`Sig`X3•X3•X3•*X3↵	Broadcast when signal status changes on any input or the output.
`HdcpI`X12•X12•X12↵	Broadcast when HDCP status changes on any input.
`HdcpO`X13↵	Broadcast when HDCP status changes on the output.
`In`X1•`All`↵	Broadcast when input selection changes via the front panel or auto-switch.
Sig`X53`●Res`X55`●HdcpO`X54`●Amt`X56`●LnkA`X53`●LnkB`X53`↵	Box Info.
`Hplg0`↵	Broadcast when Hot Plug occurs.
`Zpx`↵	Broadcast when the unit is reset from the front panel.
`Sts`X3*X2↵	Broadcast when there is physical contact (open or close) from contact/tally ports 1-6.

Symbol Definitions

↵ = CR/LF (carriage return with line feed) (hex 0D 0A)

← or | = Soft carriage return (no line feed)

• = Space

Esc or W = Escape

NOTE: Commands are not case-sensitive.

For symbol definitions for specific commands, see the command listing in the **Command and Response Table for SIS Commands** starting on the next page.

Command and Response Table for SIS Commands

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
USB Signal Host Status			
View input host status (Tx)	Esc IUSBC←	X2•X2•X2↵ UsbcIX2•X2•X2↵	Tx USB B ports + USBC Verbose mode 2/3
View input host status (Rx)	Esc IUSBC←	X2•X2↵ UsbcIX2•X2↵	Rx USB B ports Verbose mode 2/3
USB Signal Device Status			
View input device status (Tx)	Esc OUSBC←	X2•X2•X2•X2•X2↵ UsbcOX2•X2•X2•X2•X2↵	Tx USB A ports Verbose mode 2/3
View input device status (Rx)	Esc OUSBC←	X2•X2•X2↵ UsbcOX2•X2•X2↵	Rx USB A ports Verbose mode 2/3
DP Alt Mode Lane Config			
Set USB 2.0/3.x Mode	Esc F3*X25USBC←	UsbcF3*X25↵	
View 2.0/3.x Mode	Esc F3USBC←	X25↵ UsbcF3*X25↵	Verbose mode 2/3
USB Device Port status			
Enable/disable device port	Esc XX26*X2USBC←	UsbcXX26*X2↵	
Enable/disable all device ports	Esc XX2USBC←	UsbcXX2↵	
View all device ports status	Esc XUSBC←	X2•X2•X2↵ UsbcXX2•X2•X2↵	Verbose mode 2/3
CC Pin Toggle			
Enable/disable CC pin toggle	Esc K3*X2SWEF←	SWEFK3*X2↵	
View CC pin toggle status	Esc K3SWEF←	X2↵ SWEFK3*X2↵	Verbose mode 2/3
USB 3.2 Speed			
Set USB 3.2 speed	Esc SX1*X39USBC←	USBCSX1*X39↵	
View USB 3.2 speed per port	Esc SX1USBC←	X39↵ USBCSX1*X39↵	Verbose mode 2/3
Input Selection (unsolicited)			
Select Input	X1!	InX1•All↵	
View selected input	!	X1↵ InX1•All↵	Verbose mode 2/3
Select input (audio&video only)	X1%	InX1•Vid↵	Video and audio only
View selected input	%	X1↵ InX1•Vid↵	Verbose mode 2/3
Select input (USB only)	X1^	InX1•Usb↵	
View selected input	^	X1↵ InX1•Usb↵	Verbose mode 2/3
IP Setup Commands			
Set IP address	Esc X15CI←	Ipi•X15↵	
View IP address	Esc CI←	X15↵	
Set gateway address	Esc X15CG←	Ipg•X15↵	
View gateway address	Esc CG←	X15↵	
Set subnet address	Esc X15CS←	Ips•X15↵	
View subnet address	Esc CS←	X15↵	

KEY:

X1 = input 0-2 (Rx) or 0-4 (Tx) — 0 = de-select input (break tie) – result is output is disabled

X2 = 0 (off/disabled/not detected), 1 (on/enabled/detected)

X15 = IP address, gateway address, or subnet address (*xxx.xxx.xxx.xxx*)

X25 = DP Alt mode lane config — 1= USB 3.2 + 2.0 + 4K/30 video (default - 2 Lanes USB3 and 2 lanes of DisplayPort video); 2= USB 2.0 + 4K/60 video (4 lanes of DisplayPort video)

X26 = Device port number

X39 = USB 3.2 speed — 5 = 5 Gbps (default), 10 = 10 Gbps

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Autoswitch Mode			
Enable/Disable	Esc X3 AUSW←	Ausw X3 ↵	
View setting	Esc AUSW←		
Set priority switching order for Mode 1	Esc P X27 • X27 • … X27 AUSW←	AuswP X27 • X27 • X27 • X27 ↵	
View priority switching order for Mode 1	Esc PAUSW←	X27 • X27 • X27 • X27 ↵ AuswP X27 • X27 • X27 • X27 ↵	Verbose mode 2/3
View priority switching order for Mode 2	Esc OAUSW←	X27 • X27 • X27 • X27 ↵ AuswO X27 • X27 • X27 • X27 ↵	Verbose mode 2/3
Set timeout period during auto switch	Esc T X28 AUSW←	AuswT X28 ↵	Sets the time in which the switcher wills to the next active input if the currently selected input does not have a video input.
View timeout period	Esc TAUSW←	X28 ↵ AuswT X28 ↵	Verbose mode 2/3
Video Output Color Bit Depth			
Set video color bit depth mode	Esc X4 BITD←	BitdV X4 ↵	
Set video color bit depth on output	Esc V X4 BITD←	BitdV X4 ↵	HDMI output only on Tx and Rx
View Video color bit depth mode	Esc VBITD←	X4 ↵ BitdV X4 ↵	Verbose mode 2/3
Signal Status (unsolicited)			
Request all Signal Status	Esc 0LS←	Sig X2 ● X2 ● X2 * X2 ● X2 ↵ Sig X2 ● X2 * X2 ↵	Input1●Input2●Input3●HDMI Output●TP out (Tx) Input1●Input2●Output (Rx)
Front Panel Lockout			
Front Panel Executive Mode	X2 X	Exe X2 ↵	
Lockout Status	X/x	X2 ↵	
HDCP Status (unsolicited)			
View specific input HDCP status	Esc I X1 HDCP←	X5 ↵ HdcpI X1 * X5 ↵	Tx: X1= inputs 1-2 (HDMI), 3 (USBC) Rx: X1= inputs 1 (TP), 2 (HDMI) Verbose mode 2/3
View HDCP status for all HDMI inputs	Esc IHDCP←	X5 ● X5 ● X5 ↵ X5 ● X5 ↵ HdcpI X5 ● X5 ● X5 ↵	Input 1 status ● Input 2 status● Input 3 status (Tx) Input 1 status ● Input 2 status (Rx) Verbose mode 2/3
View output HDCP status	Esc OHDCP←	X6 ↵ HdcpO X6 ↵	Verbose mode 2/3

KEY:
X2 = 0 (off/disabled/not detected), 1 (on/enabled/detected)
X3 = Auto switch mode: 0 (disabled), 1 (enabled, user define - DEFAULT), 2 (enabled, newly active input)
X4 = Video color bit depth mode: 0 (auto based on sink EDID - default), 1 (force 8-bit)
X5 = Input HDCP status: 0 = No source detected, 1 = source detected with HDCP, 2 = source detected without HDCP
X6 = Output HDCP status: 0 = No source detected, 1 = source detected with HDCP, 2 = source detected without HDCP
X27 = Autoswitch priority: 1 = input 1, 2 = input 2, 3 = input 3, 4 = input 4
X28 = Auto Switch Timeout (Mode 2) = 0-500 seconds (in 1 second intervals), default= 3 seconds

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
HDCP Output Mode			
Set HDCP output mode single output	Esc S X40 * X23 HDCP ←	HdcpS X40 * X23 ↵	X23 = 0-2; 1 is default; Rx can only set input 2; only this command will work = Esc S X23 HDCP ← X40 = 1-2 (Tx), 1 (Rx)
Set HDCP output mode all outputs	Esc S X23 HDCP ←	HdcpS X23 ↵	
View HDCP output mode	Esc S HDCP ←	X23 • X23 ↵ HdcpS X23 • X23 ↵	Verbose mode 2/3
TMDS Output Format			
Set format	Esc X10 VTPO ←	Vtpo X10 ↵	X10 = 0, 0, default For Tx applies to HDMI output only For Rx applies to HDMI output
View setting	Esc VTPO ←	X10 ↵ Vtpo X10 ↵	Verbose mode 2/3
HDCP Authorized Device			
Set HDCP authorization per input	Esc E X1 * X2 HDCP ←	HdcpE X1 * X2 ↵	
Set HDCP authorization all inputs	Esc E X2 HDCP ←	HdcpE X2 ↵	
View HDCP authorization status	Esc E HDCP ←	Tx: X2 • X2 • X2 ↵ Rx: X2 ↵ Tx: HdcpE X2 • X2 • X2 ↵ Rx: HdcpE X2 ↵	Rx: only input 2. E13 for input 1. Verbose mode 2/3 Verbose mode 2/3
EDID Minder			
Upload file to unit	Esc +UFsize,*<filename>* ←	UPL ↵	Upload file from PC to *<filename>*, size = 128 or 256.
Import EDID (.bin) to input (store) slot	Esc I X11 ,*<filename>* EDID ←	EdidI X11 ↵	Import EDID from *<filename>* into specified input slot X11.
Export EDID (.bin) to PC	Esc E X11 ,*<filename>* EDID ←	EdidE X11 ↵	Export EDID from specified EDID table slot (X11) to *<filename>*.
Send file from unit to PC	Esc *<filename>* SF ←	file data (128/256 bytes)	Send *<filename>* from unit to PC.
View/Read EDID in Hex format	Esc R X1 EDID ←	X12 ↵	Read out HEX data (as text) from the EDID assigned/used on the specified input.
View Edid native resolution	Esc N X1 EDID ←	X13 ↵	

KEY:

X1 = input 0-3 (Tx) or 0-2 (Rx) 0 = de-select input (break tie) – result is output is disabled.

X2 = 0 (off/disabled/not detected), 1 (on/enabled/detected).

X10 = TMDS output format, 0 = Auto (default), pass through if HDMI sink, force DVI format if DVI sink.
1= DVI RGB 444 2= HDMI RGB "Full" 3= HDMI RGB "Limited"
4= HDMI YUV 444 "Limited" 5= HDMI YUV 422 "Limited"

X11 = slot on EDID lookup table (Tx: 1-4, Rx 2-3) (default: Tx = 1080p 60 Hz; Rx = 0).

X12 = 128 or 256 Byte EDID raw HEX (text form).

X13 = native resolution and refresh rate (in English) from selected EDID. For example: 1920x1200 @60Hz

X23 = HDCP output mode:
0 = Off; Disables all HDCP authentication and encryption attempts
1 = Default; Encrypt as required by input. Continuous trials for HDMI sinks, attempt for 10s on DVI sinks (then fail).
2 = Always encrypt; Continuous trials for HDMI sinks, attempt for 10 seconds on DVI sinks (then fail).

X40 = 1-2 (Tx), 1 (Rx)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Verbose Mode			
Set Verbose Mode	Esc X9 CV←	Vrb X9 ↵	
Read Verbose Mode	Esc CV←	X9 ↵ Vrb X9 ↵	 Verbose mode 2/3
NOTE: If tagged responses are enabled (modes 2 and 3), all read/query commands return the constant string and the value, as the set command does.			
Power Save Modes			
Set power save mode	Esc X32 PSAV←	Psav X32 ↵	
View power save mode	Esc PSAV←	X32 ↵ Psav X32 ↵	 Verbose mode 2/3
Device Name			
Set the unit name	Esc X7 CN←	Ipn●X7 ↵	Change the name to one of your choosing, consisting of up to 24 alphanumeric characters (including "-").
Set unit name to factory default	Esc●CN←	Ipn●UCS-T-503-*XX-XX-XX*↵ (transmitter) Ipn●UCS-SR-501-*XX-XX-XX*↵ (receiver)	Set name to default "UCS-T-503" plus the last three pairs of characters from MAC address or "UCS-SR-501" plus the last three pairs of characters from MAC address
View unit name	Esc CN←	X7 ↵	
View Information, Part Number, Firmware Version			
Information request	I or i	In X1 ●Vmt X21 ●X21 ●Amt X19 ●X19 ●Ausw X3 ↵ In X1 ●Vmt X21 ●Amt X19 ●Ausw X3 ↵	Tx Rx
Query Part Number	N or n	*<part number>*↵ Pno*<part number>*↵	 Verbose mode 2/3
Query Model Name	1I or 1i	UCS T 503↵ or UCS SR 501↵ Inf01*UCS T 503↵ or Inf01*UCS SR 501↵	 Verbose mode 2/3 Verbose mode 2/3
Query Model Description	2I or 2i	UC TRANSMITTER↵ or UC SCALING RECEIVER↵ Inf02*UC TRANSMITTER↵ or Inf02*UC SCALING RECEIVER↵	 Verbose mode 2/3 Verbose mode 2/3
Query Bootloader firmware version	Q or q	x.xx↵	Bootloader firmware version (to 2 decimal places). The bootloader firmware is not user-replaceable but this information may be needed for troubleshooting.

KEY:

X1 = Input 0-3 (Tx) or 0-2 (Rx) 0 = de-select input (break tie) – result is output is disabled.

X3 = Auto switch mode: 0 (disabled), 1 (enabled, user define - DEFAULT), 2 (enabled, newly active input)

X7 = The unit name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and minus sign/hyphen (-). No blank or space characters are permitted as part of a name. The first letter must a letter, and the last character must not be a minus sign/hyphen. The factory default is UCS T 503 or UCS SR 501.

X9 = Verbose mode: 0 (default, clear/none) 1 (verbose mode) 2 (tagged responses for queries) 3 (verbose mode and tagged responses for queries).

X19 = 0 unmute all output audio (default) 1 (mute HDMI embedded audio/unmute analog audio) 2 (mute analog audio – Rx Only), 3 (mute all output audio – Rx only)

X21 = 0 unmute video and sync (default) 1 mute video to black screen while sync on 2 mute video and sync

X32 = Power save modes
0 = full power (default)
1 = lowest power state; put into reset, no power delivery (Tx only). Input LEDs cycle at 500 ms interval;
2 = lower power mode; including Ethernet SSH to RS-232 insert communication (Rx only). Input LEDs cycle at 500 ms interval.

X40 = 1-2 (Tx) 1 (Rx)

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
View Information, Part Number, Firmware Version (Continued)			
Information request	I or i	In[X1]•Vmt[X21]•[X21]•Amt[X19]•[X19]•Ausw[X3]↵ In[X1]•Vmt[X21]•Amt[X19]•Ausw[X3]↵	Tx Rx
Query factory firmware version w/build	*Q or *q	x.xx.xxxx↵	Factory Firmware Version (with build verson). The factory installed firmware is not user-replaceable. This firmware is the version the device reverts to after a **Use Factory Firmware** reset (see page 30).
Query updated Firmware Version	0Q or 0q	x.xx.xxxx↵	Updated firmware version The updated firmware version shows the firmware version that has been uploaded to the device.
Video Mute			
Mute video only	1B or 1b	Vmt1↵	Mutes video
Mute sync and video	2B or 2b	Vmt2↵	Mutes video and sync
Unmute	0B or 0b	Vmt0↵	Unmute output
Enable/Disable video mute all outputs	[X21]B	Vmt[X21]↵	Mutes video and displays black video
View	B or b	[X21]↵ Vmt[X21]↵	View the mute status (verbose mode 2/3)
Video Output Format			
Set video output format	[Esc][X10]VTPO←	Vtpo[X10]↵	Sets video output format to [X10]
View	[Esc]VTPO←	Vtpo[X10]↵	View the current video output format setting
Audio Mute			
Mute	7Z	Amt7↵	Mutes all outputs
Mute Analog and HDMI	3Z or 3z	Amt3↵	Mutes analog and HDMI outputs
Mute Analog	2Z or 2z	Amt2↵	Mutes analog output
Mute Digital	1Z or 1z	Amt1↵	Mutes HDMI output
Unmute All	0Z or 0z	Amt0↵	Un-mutes all outputs
View	Z or z	Amt[X19]↵	View current mute setting

KEY: [X1] = input 0-3 (Tx) or 0-2 (Rx) 0 = de-select input (break tie) – result is output is disabled.
[X3] = Auto switch mode: 0 (disabled), 1 (enabled, user define - DEFAULT), 2 (enabled, newly active input)
[X10] = TMDS output format, 0 = Auto (default), pass through if HDMI sink, force DVI format if DVI sink.
1= DVI RGB 444; v2= HDMI RGB "Full"; 3= HDMI RGB "Limited"; 4= HDMI YUV 444 "Limited";
5= HDMI YUV 422 "Limited";
[X19] = 0 unmute all output audio (default); 1 (mute HDMI embedded audio/unmute analog audio)
2 (mute analog audio – Rx Only), 3 (mute all output audio – Rx only)
[X21] = 0 unmute video and sync (default); 1 mute video to black screen while sync on; 2 mute video and sync.

Color Bit Depth			
Color Bit Depth	[Esc]V[X18]BITD←	BitdV[X4]↵	[X4]: video color bit depth mode: 1 (auto based on sink EDID - default), 2 (force 8-bit)

KEY: [X1] = 0 (default); 1 (Advanced mode); 2 (1-4 are mutually exclusive; 5 and 6 are mutually exclusive);
3 (1-4 are mutually exclusive; 5 and 6 are single switch).
[X2] = 0 = Contact open; 1 = Contact closed.
[X3] = Contact ports 1-6.
[X18] = 0 (Auto); 1 (digital); 2 (analog). Additional information above just shows 0 and 1, and has different descriptions.

Receiver-only Command and Response Table

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Picture Adjustments: Image Reset			
Image Reset Execute	1*0A	Img1*0↵	Execute an Image Reset (follows aspect setting)
Execute and fill	1*1A	Img1*1↵	Image Reset and fill the output raster
Execute and follow	1*2A	Img1*2↵	Image Reset and follow the input aspect ratio
Picture Adjustments: Horizontal Shift			
Specific value	Esc I1*X20 HCTR←	HctrI1*X20↵	
Increment value	Esc I1+HCTR←	HctrI1*X20↵	Increments horizontal shift setting
Decrement value	Esc I1-HCTR←	HctrI1*X20↵	Decrements horizontal shift setting
View	Esc I1HCTR←	X20↵	View the current horizontal shift setting
Picture Adjustments: Vertical Shift			
Set vertical shift	Esc I1*X20 VCTR←	VctrI1*X20↵	Sets vertical shift to X20
Increment value	Esc I1+ VCTR←	VctrI1*X20↵	Increments vertical shift setting
Decrement value	Esc I1- VCTR←	VctrI1*X20↵	Decrements vertical shift setting
View	Esc I1VCTR←	X20↵	View the current vertical shift setting
Picture Adjustments: Horizontal Size (Image)			
Specific value	Esc I1*X35 HSIZ←	HsizI1*X35↵	Sets horizontal size to a specific value (X35)
Increase Size	Esc I1+HSIZ←	HsizI1*X35↵	Increments horizontal size setting
Decrease Size	Esc I1-HSIZ←	HsizI1*X35↵	Decrements horizontal size setting
View	Esc I1HSIZ←	X35↵	View the current horizontal size setting
Picture Adjustments: Vertical Size (Image)			
Specific value	Esc I1*X35 VSIZ←	VsizI1*X35↵	Sets vertical size to a specific value (X35)
Increase Size	Esc I1+VSIZ←	VsizI1*X35↵	Increments vertical size setting
Decrease Size	Esc I1-VSIZ←	VsizI1*X35↵	Decrements vertical size setting
View	Esc I1VSIZ←	X35↵	View the current vertical size setting
Test Pattern			
Set the test pattern	Esc 1*X33 TEST←	Test1*X33↵	
View	Esc 1TEST←	X33↵	
Video Switch Effect			
Set output switch effect	Esc O1*X34 SWEF←	SwefO1X34↵	Sets video switch effect to X34; 0=letter o
View	Esc O1SWEF←	X34↵ SwefO1X34↵	View the current switch effect setting Verbose 2/3
Output Scalar Rate			
Set output rate	Esc 1*X36 RATE←	Rate1*X36↵	Sets output rate to X36
View	Esc 1RATE←	X36↵	View the current output rate
Output Aspect Ratio			
Set output aspect ratio	Esc 1*X37 ASPR←	Aspr1*X37↵	Sets output aspect ratio to X37
View	Esc 1ASPR←	X37↵	View the current output aspect ratio
Freeze			
Set freeze	1*X2 F or 1*X2 f	Frz1*X2↵	Enables/disables freeze setting
View	1F or 1f	FrzX2↵	View the current freeze setting

KEY:

X2 = Enable/Disable freeze setting: 0 = disable (default), 1 = enable

X20 = Horizontal or vertical image position: Horizontal = -4096 to +4096;
Vertical = -2400 to +2400 Response is five digits with leading + or – and padded with zeros

X33 = Test pattern: 0 = Off (default); 1 = Crop; 2 = Alternating Pixels; 3 = Crosshatch; 4 = Color Bars; 5 = Grayscale,

X34 = Video switch: 0 = cut through black (default); 1 = fade through black and cut; 2 = seamless fade; 3 = seamless cut.

X35 = Horizontal and vertical size (depends on resolution). Response is five digits, padded with zeros.

X36 = Output scalar rate: 10-76 response is 2 digits padded with a zero; 201 = custom rate 1; 202 = custom rate 2; 203 = custom rate 3.

X37 = Output aspect ratio: 1 = fill (default); 2 = follow.

Command Function	SIS Command (Host to Device)	Response (Device to Host)	Additional Description
Screen Saver			
Set mode	Esc M X29 SSAV ←	SsavM X29 ↵	
View mode	Esc MSSAV ←	X29 ↵ SsavM X29 ↵	Verbose mode 2/3
Set time out duration	Esc T X30 SSAV ←	SsavT X30 ↵	
View time out duration	Esc TSSAV ←	X30 ↵ SsavT X30 ↵	Verbose mode 2/3
View screen saver status	Esc SSSAV ←	X31 ↵ SsavS x31 ↵	Verbose mode 2/3

KEY:
X29 = Screen saver mode: 1 = black output (default); 2 = blue output.
X30 = Output sync Timeout:
0 = OSD is never displayed, output sync is instantly disabled with no active input;
1-500 seconds (in 1 second intervals); 501 = output sync never times out.
X31 = Screen saver status: 0 = active input detected, timer not running; 1 = no active input, timer running, output sync enabled;
2 = no active input, timer expired, output sync disabled.

Scaler resolution / EDID emulation

x11 = (Three digit response – 0 padding)

Automatic: matches current output resolution of scaler (default input EDID)								0
Output - HDMI (EDID export and save only)								1
Resolution	**23.98 Hz**	**24 Hz**	**25 Hz**	**29.97 Hz**	**30 Hz**	**50 Hz**	**59.94 Hz**	**60 Hz**
640x480								10
800x600								11
1024x768								12
1280x768								13
1280x800								14
1280x1024								15
1360x768								16
1366x768								17
1440x900								18
1400x1050								19
1600x900								20
1680x1050								21
1600x1200								22
1920x1200								23
480p							24	25
576p						26		
720p			29	30	31	32	33	34
1080i						35	36	37
1080p	38	39	40	41	42	43	44	45*
2048x1080 (2K)	46	47	48	49	50	51	52	53
2048x1200								54
2048x1536								55
2560x1080								56
2560x1440								57
2560x1600								58
3840x2160	59	60	61	62	63	64	65	66
4096x2160**	69	70	71	72	73	74	75	76
Custom EDIDs/Output Rates								201 202 203

*Default output resolution

**4096x2160 rates are available only for output resolution and cannot be selected for input EDID.

Contact/Tally Modes (Unsolicited Responses)

Action		Unsolicited Response
Contact Ports		
Physical Contact (open or close)		Sts[X3]*[X2]↵
Query Individual Contact Port	[X3]S	[X2]↵
Query All Contact Ports	S or s	[X2][X2][X2][X2][X2][X2]↵
Tally Ports		
Set Individual Tally Port	[Esc][X3]*[X2]TALY←	Taly[X3]*[X2]↵
Query Individual Tally Port	[Esc][X3]TALY←	[X2]↵
Set All Tally Ports	[Esc][X2][X2][X2][X2][X2][X2]TALY←	Taly[X2][X2][X2][X2][X2][X2]↵
Query All Tally Ports	[Esc]TALY	[X2][X2][X2][X2][X2][X2]↵
Set Mode	[Esc][X1]MODE←	Mode[X1]↵
Query Mode	[Esc]MODE←	[X1]↵

Symbol Definitions for CEC Communications Commands

[X41] = CEC mode
- 0 = Disable CEC operations for this IO port (default)
- 2 = Enable insertion (unidirectional)
- 4 = Enable insertion and publish received CEC messages (bidirectional) (recommended mode)

[X42] = CEC status
- 0 = CEC mode 0 disabled
- 2 = CEC mode 2 enabled but no device detected (unidirectional)
- 3 = CEC mode 2 enabled and device detected (unidirectional)
- 4 = CEC mode 4 enabled but no device detected (bidirectional)
- 5 = CEC mode 4 enabled and device detected (bidirectional)

[X43] = Source logical address (our pseudo): 0 through 15 (-1 = not found or port not enabled)

[X44] = Destination logical address (theirs): 0 through 15 (-1 = not found or port not enabled)

CEC Logical Addresses			
Address	**Device**	**Address**	**Device**
0	TV	8	Playback Device 2
1	Recording Device 1	9	Recording Device 3
2	Recording Device 2	10	Tuner 4
3	Tuner 1	11	Playback Device 3
4	Playback Device 1	12	Reserved
5	Audio System	13	Reserved
6	Tuner 2	14	Free Use
7	Tuner 3	15	Unregistered (as initiator address) Broadcast (as destination address)

[X45] = CEC command: Predefined actions as strings within double quotes: "PwrOn", "PwrOff", or "ShowMe"

[X46] = Send result 0 = Failed (NAK) 2 = Unable to send
1 = Success (ACK) of entire message

[X47] = CEC physical address: four hexadecimal digits, Example: %10%00 for 1000

[X49] = CEC data: User selected elements (0 to 15) in the form of percent sign followed by two hex digits (Example: %2A%07%FF)

[X50] = CEC address byte: In the form of percent sign followed by two hex digits
Example: %E0 = Extron output (14) to TV (0)

NOTE: Unless otherwise indicated, commands are not case-sensitive.

Command and Response Table for CEC Communications SIS Commands

Command	ASCII Command (Host to Switcher)	Response (Switcher to Host)	Additional Description
CEC Enable/Disable			
Enable or disable the output CEC	Esc O1*X41 CCEC ←	CcecO1*X41 ↵	
View output CEC status	Esc O1CCEC ← Verbose mode 2/3	X42*X43*X44 ↵ CcecO1*X42*X43*X44 ↵	
Send CEC Commands			
Default Discovered Target Logical Address			
Send CEC data to Output (downstream sink)	Esc O1*X45 DCEC ← or Esc O1*X44 DCEC ←	DcecO1*X50 X45*X46 ↵	The response is always in a hex representation (X49), for example: %2A%07%FF.
Broadcast to All Devices			
Send CEC data to Output (downstream sink)	Esc O1*15*X45 DCEC ← or Esc O1*15*X49 DCEC ←	DcecO1*X50 X49*X46 ↵	

NOTE: Attempting to send a CEC command to an input or output that is disabled returns an E14 error.

KEY:

X41	=	CEC mode	0 = Disable CEC operation for this IO port (default) 2 = Enable insertion and break CEC connection input to output (unidirectional) 4 = Enable insertion and publish received CEC messages (bidirectional)
X42	=	CEC status	0 = CEC mode 0 disabled 2 = CEC mode 2 enabled but no device detected (unidirectional) 3 = CEC mode 2 enabled and device detected (unidirectional) 4 = CEC mode 4 enabled but no device detected (bidirectional) 5 = CEC mode 4 enabled and device detected (bidirectional)
X43	=	Source logical address (our pseudo)	0 through 15 (-1 = not found or port not enabled) s = Destination logical address (theirs): 0 through 15 (-1 = not found or port not enabled) (See **CEC Logical Addresses** on page 68.)
X45	=	CEC command	Predefined actions as strings within double quotes: "PwrOn", "PwrOff", or "ShowMe".
X46	=	Send result	0 = Failed (NAK) device not detected, 1 = Success (ACK) device detected, 2 = Unable to send
X49	=	CEC data	User selected elements (0 to 15) in the form of percent sign followed by two hex digits (Example: %2A%07%FF)
X50	=	CEC address byte	In the form of a percent sign (%) followed by two hex digits Example: %E0 = Extron output (14) to TV (0)

Command	ASCII Command (Host to Switcher)	Response (Switcher to Host)	Additional Description
CEC Usage Examples			
Unidirectional Mode — No CEC received data messages (including answers to queries) desired			
Set mode	Esc O0*2CCEC ←	CcecO0*2↵	Power on TV on output 1.
Send data	Esc O0*"PwrOn"DCEC ← or Esc O0*%04DCEC ←	DcecO0*%E0%04*1↵	
Bidirectional Mode — CEC received data messages desired			
Set mode	Esc O0*4CCEC ←	CcecO0*4↵	Switch TV on output 1 to our signal (HDMI 2 on TV).
Send data	Esc O0*"ShowMe"DCEC ← or Esc O0*15*%82%20%00DCEC ←	DcecO0*%EF%82%20%00*1↵	
Examples of possible unsolicited messages		Ceco0*%0F%32%65%6E%67*1↵	
			TV broadcast command to set the menu language to English (“eng”).
		Ceco0*%0E*1↵	TV pings us to confirm we are still there.

NOTE: Asynchronous received data messages from CEC in bidirectional mode (4) format: Ceci[X1]*[X49][X46]*[X45]↵
Ceco1*[X49][X46]*[X45]↵

Other CEC Commands			
Rediscover device on output	Esc O1QCEC ←	QcecO1*1↵ QcecO1*0*[X45]↵ ... QcecO1*13*[X45]↵	
Report physical address of output port	Esc O1PCEC ← Verbose mode 2/3 *Example*	[X46]↵ PcecO1*[X46]↵ %10%00	For 1000 (usually first HDMI input on TV).

KEY:

[X1]	= Input number	1 to 3
[X45]	= Send result	0 = Failed (NAK) device not detected 1 = Success (ACK) devices detected 2 = Unable to send
[X47]	= CEC physical address	Four hexadecimal digits in the form of *%xx%xx* (*Example:* %32%00)
[X50]	= CEC address byte	In the form of percent sign followed by two hex digits *Example*: %E0 = Extron output (14) to TV (0)

Mounting

Mounting the UCS T 503 and UCS SR 501

The UCS T 503 and UCS SR 501 can be set on a table or mounted on a rack shelf.

ATTENTION:

- All structural steps and electrical installation must be performed by qualified personnel in accordance with local and national building codes and electrical codes.
- Toute étape structurelle et installation électrique, doit être effectuée par un personnel qualifié, conformément aux codes du bâtiment, aux codes incendie et sécurité, et aux codes électriques, locaux et nationaux.

Tabletop Use

Attach the provided four self-adhesive rubber feet to the UCS T 503 and UCS SR 501 for tabletop use. Place the devices on a table or desk, as desired.

Mounting Kits

The UCS T 503 and UCS SR 501 can be mounted on a full- or half-rack shelf, or through or under furniture. Mounting kits are available at **www.extron.com**. For mounting procedures, see the instructions provided with the mounting option.

Rack Mounting

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the UCS T 503 and UCS SR 501 in a rack.

CAUTION:

- **Elevated operating ambient temperature** — If the equipment 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, +50 °C) specified by Extron.
- **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.
- **Mechanical loading** — When mounting the equipment in the rack, ensure that uneven mechanical loading does not cause a hazardous condition.
- **Circuit overloading** — When connecting the equipment to the supply circuit, consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider 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 (for example, use of power strips).

Consignes UL pour le montage en rack

Les consignes UL (« Underwriters Laboratories ») suivantes concernent l'installation en rack d'un boîtier UCS T 503 and UCS SR 501 :

ATTENTION : Risque de blessure mineure :

- **Température ambiante élevée** — En cas d'installation de l'équipement dans un rack fermé ou composé de plusieurs unités, la température du rack peut être supérieure à la température ambiante. Par conséquent, il est préférable d'installer l'équipement dans un environnement qui respecte la température ambiante maximale (Tma) spécifiée par Extron.
- **Réduction du flux d'air** — Si l'équipement est installé dans un rack, veillez à ce que le flux d'air nécessaire pour un fonctionnement sécurisé de l'équipement soit respecté.
- **Charge mécanique** — Installez l'équipement en rack de manière à éviter toute situation dangereuse causée par le déséquilibre de la charge mécanique.
- **Surcharge électrique** — Lorsque vous connectez l'équipement au circuit d'alimentation, observez la connexion de l'équipement et étudiez les effets possibles d'une surcharge du circuit sur les protections contre les surintensités et les conducteurs d'alimentation. Consultez à cet égard les indications de la plaque d'identification de l'équipement.
- **Mise à la terre** — Assurez-vous que l'équipement est correctement mis à la terre. Accordez une attention particulière aux connexions électriques autres que les connexions directes au circuit de dérivation (ex. : les multiprises).

Reference Material

This section describes:

- **Best Practices for Cleaning Your Extron Products**
- **Network Port Requirements and Licensed Third-Party Software Used by the UCS 504**
- **Secure Sockets Layer (SSL) Certificates**
- **IEEE 802.1X Certificates**
- **SNMP**

Best Practices for Cleaning Your Extron Products

Depending on the device, application, and location, there may be times when it becomes necessary to clean your Extron product. Frequently touched devices, such as touchscreens and button panels, require regular cleaning to ensure their surfaces remain sanitary. Plastic surfaces and cosmetic finishes can be damaged by long term exposure to chemicals. Therefore, Extron recommends the following guidelines when cleaning our products.

All Extron products can be safely cleaned with:

- 70% concentration or higher isopropyl alcohol
- Disinfectant cleaners that:
  - Are non-ammonium based (for example, contains no ammonium chloride)
  - Contain 2% or less sodium hypochlorite (for example, 2% bleach, 98% water)

Regardless of the device, it is important to follow these general guidelines when cleaning:

1. If possible, unplug the device.
2. Spray the cleaner on a lint-free cloth until the cloth is damp.
3. Do not spray the cleaner directly onto the product.
4. Gently clean the product surface using the cloth.

Your health and safety are our top priority. Keeping devices clean, especially those in high-traffic environments and high-use applications, is a crucial step in minimizing the spread of infections. Please contact us if you have any questions about the guidelines outlined in this section or if you have a question about cleaning a specific Extron product.

Network Port Requirements and Licensed Third-Party Software Used by the UCS 504

For information about network port requirements and licensed third-party software for the products described in this guide, please refer to the *DTP3 CrossPoint Series Network Ports, Protocols, and Licenses* , which is available at **www.extron.com**.

Secure Sockets Layer (SSL) Certificates

Extron TouchLink Pro control systems ship with factory-installed SSL certificates created by Extron. If you want or are required to use a different SSL certificate at your installation site, then you can use system utilities in the Toolbelt software to change the SSL certificate at any time. The *Toolbelt Help File* provides instructions on how to apply an SSL certificate to a controller.

NOTES:

- You must run Toolbelt as an administrator.
- Some certificates require a passphrase that is created when the certificate is created. If a passphrase is required, you must enter that passphrase before uploading and applying the certificate.

These devices support standard OpenSSL certificate encodings such as `.pem` (Privacy-enhanced Electronic Mail) and `.der` (Distinguished Encoding Rules) file types. `PEM` file types are ASCII encoded and are the required format for uploading to the Extron control product. `DER` file types are binary encoded and can typically have several file extension variations, such as .crt and .cer. There are many standard tools that can convert from `DER` to `PEM` file encodings if needed.

NOTE: A `DER` format file must be converted to `PEM` encoding before uploading it to the button panel, control processor, or collaboration receiver.

To properly create the certificate for uploading to Extron control devices, ensure that the certificate file meets the following requirements:

- contains X.509 certificate information
- contains public and private keys
- uses PEM encoding

NOTE: ITU-T standard X.509 covers aspects of public key encryption, digital cryptography, certificates, and validation.

Contact your IT administrator for more information on what tools and policies are required to obtain or create the SSL certificate and, if necessary, the corresponding passphrase.

IEEE 802.1X Certificates

IEEE 802.1X is a standard that enables port-based network access control via an authentication server. The protocol requires that all devices must be authenticated before gaining privileges to access the secure part of the network.

The Extron implementation of 802.1X supports PEAP - MSCHAPV2 and EAP - TLS methods of authentication. This section of the guide details the “Certificate File Requirements” and the “Private Key File Requirements” to be used in the system (see below).

Extron provides resources for learning about 802.1X implementation:

The *Extron 802.1X Technology Reference Guide*, available from **www.extron.com**, is the primary resource for background information, system planning, topology, and how to set up these systems.

The *Toolbelt Help file* provides detailed step-by-step information on using the software to set up 802.1X for IP Link Pro control systems and on troubleshooting.

The *802.1X Primer white paper*, also available from **www.extron.com**, provides a general overview of the protocol and its use within a control system.

NOTES:

- You must run Toolbelt as an administrator.
- Machine certificates require a private key file, which can be encrypted.

Certificate File Requirements

PEM (Privacy-enhanced Electronic Mail) file types are ASCII encoded, and they are the required format for 802.1X authentication for the TouchLink Pro control systems. DER (Distinguished Encoding Rules) file types are binary encoded and can typically have several file extension variations, such as .crt and .cer.

NOTE: DER encoded files (files with .der, .crt, or .cer extensions that are encoded in DER binary format) must be converted to a PEM encoded file type (.pem) before being used for authentication.

DER encoded certificates must be converted to PEM encoding using a third-party tool. Contact your IT administrator for more information on required tools.

To create the 802.1X security certificate for uploading to Extron TouchLink Pro control systems, ensure that the certificate file meets the following requirements:

- It contains X.509 certificate information.
- It contains a private key (for machine certificates only).
- It is PEM encoded.
- It has a file extension that is .crt or .pem
- Its file name consists of the following types of valid characters:
  - Alphanumerical (A-Z, a-z, 0-9) characters
  - Some special characters (colon [:], underscore [_], and hyphen [-])

    NOTE: Spaces are not permitted anywhere in the name.

Private Key File Requirements

Private key files are required only when employing machine certificates. Follow these requirements for creating a private key:

- Its file name consists of the following types of valid characters:
  - Alphanumerical (A-Z, a-z, 0-9) characters
  - Some special characters (colon [:], underscore [_], and hyphen [-])
- It has a file extension that is .key or .pem.
- It can have optional encryption (via password or passphrase).

SNMP

Extron control products support Simple Network Management Protocol (SNMP). SNMP facilitates the exchange of basic network management information between network devices. It helps in monitoring of operations and factors such as packet usage, memory usage, remote password resets, and collection of error information. An information technology administrator can use common IT tools to monitor those factors, as well as look up device location and the name of the contact person for the device.

The SNMP controls within Toolbelt provide a way to enable or disable SNMP. It also allows you to specify related information such as the name of a contact person, the physical location of the unit, and a community name. The text that is specified in these fields is seen by the network community when the unit is queried.

Extron control products support the following security levels:

- Management Information Base 2 (MIB-II)
- SNMPv2c.

Extron Warranty

Powered Product Warranty

Extron warrants its powered products against any defects in materials and workmanship for a period of three years from the date of invoice. In the event of a malfunction during the warranty period, Extron will repair or replace a product to its original operating condition.

To assure the highest level of service, a return authorization number must be obtained from Extron before products are returned for service. Products must be shipped to Extron, prepaid along with proof of purchase ONLY after obtaining a Return Authorization (RA) number from the Extron Customer Support department.

This statement of policy is in lieu of any other policy expressed or implied and no representative or person is authorized to assume any other liability or adopt any other policy for Extron Electronics without our written consent.

Powered Product Warranty Exceptions

Everlast™ Power Supplies — Extron warrants Everlast power supplies against any defects in materials and workmanship for a period of seven years from the date of invoice. In the event of a malfunction during the warranty period, Extron will repair or replace the power supply to its original operating condition. Extron engineers will examine the returned product and determine whether the Everlast Power Supply Warranty or Powered Product Warranty applies.

Speakers — Extron warrants Flat Field®, SoundField®, SpeedMount®, Column Array, and System *INTEGRATOR*® speakers against any defects in materials and workmanship for a period of five years from the date of invoice.

Touchscreens — Extron warrants touchscreen display and overlay components against any defects in materials and workmanship for a period of one year from the date of invoice.

Annotator 300 — Extron warrants the Annotator 300 against any defects in materials and workmanship for a period of five years from the date of invoice.

Non-Powered and Cable Products - Lifetime Limited Performance Warranty

Extron warrants that its non-powered products and cable products will be free from defects in material and workmanship for as long as you or your customer owns the product. All Extron non-powered products and cables are designed and engineered to meet and exceed performance specifications. If, at anytime, the product fails due to manufacturer defect, Extron will repair or replace the product to ensure that it meets original performance specifications. Reduced performance due to normal wear and tear, or damages caused by misuse or negligence will not be covered. Extron will test and evaluate all non-powered and cable products claimed defective.

To assure the highest level of service, a return authorization number must be obtained from Extron before products are returned for service. Products must be shipped to Extron, prepaid along with proof of purchase ONLY after obtaining a Return Authorization (RA) number from the Extron Customer Support department.

This statement of policy is in lieu of any other policy expressed or implied and no representative or person is authorized to assume any other liability or adopt any other policy for Extron Electronics without our written consent.

Non-Powered and Cable Product Warranty Exceptions

Cable Cubby, Hideaway Surface Access Enclosures and Retractors — Extron warrants Cable Cubby cable access enclosures, HSA Hideaway Surface Access enclosures, and Retractor cable retraction modules for a period of three years from the date of invoice.

Active Cables and Active Adapters — Extron warrants active cables and active adapter cables for a period of three years from the date of invoice.

Cable Termination Tools and Dies — Extron warrants cable termination tools for a period of three years from the date of invoice, excluding the die.

General

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. 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.

Return Information

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.

NOTE: To assure the highest level of service, a return authorization number must be obtained from Extron before products are returned for service. Products must be shipped to Extron, prepaid along with proof of purchase **only** after obtaining a Return Authorization (RA) number from the Extron Customer Support department.

Please contact Extron to receive an RA (Return Authorization) number:

USA:	714.491.1500 or 800.633.9876	**Asia**:	65.6383.4400
Europe:	31.33.453.4040 or 800.3987.6673	**Japan**:	81.3.3511.7655
Africa and Middle East:	971.4.299.1800	**China**:	4000.398766

Worldwide Headquarters: Extron USA West, 1025 E. Ball Road, Anaheim, CA 92805, 800.633.9876