User Guide

Collaboration System

HC 400 Series

Transmitter and Receiver Systems

or

HC 402 EU or MK System

HC 402 System

HC 403 System

HC 404 System

Extron

68-3063-01 Rev. F
07 19

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.**

Sicherheitsanweisungen • Deutsch

WARNUNG: Dieses Symbol ⚠ auf dem Produkt 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 recogidas 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 le matériel.

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

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，產品機殼內存在著可能會導致觸電之風險的未絕緣危險電壓。

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

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

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

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference. This interference must be corrected at the expense of the user.

NOTE: 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.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

TIP: A tip provides a suggestion to make working with the application easier.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for 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 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
SOH R Data STX Command ETB ETX
```

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

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

Click the **OK** button.

Specifications Availability

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

Extron Glossary of Terms

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

Contents

Introduction

This section covers the following basic information you should know about this guide and the product before installation:

Before You Begin

What This Guide Covers

This user guide provides instructions for an experienced installer to install an Extron HC 404, HC 403, HC 402, HC 402 EU, or HC 402 MK Meeting Space Collaboration System. The guide provides detailed information and best practices recommendations about cabling, instructions for front panel operation, a brief overview of the configuration process, details on reset modes, and reference information.

This guide does not contain instructions on detailed software-related setup steps or details of configuration within the software: those are covered in the *Product Configuration Software Help File*, the *Global Configurator Help File* and help files for related programs, such as Toolbelt and GUI Designer. The software help files describe how to use each program to download drivers, add AV devices to a configuration, configure basic functions, and set up schedules, macros, e-mail alerts, touchpanel button configurations, and the like.

Conventions Used in This Guide

Throughout this guide each system is referred to as "the system" or by the system model name. The systems covered in this guide are as follows:

- The **HC 404 system** consists of the HCT 103 transmitter ("the transmitter") and the HCR 102 switching scaling receiver ("the receiver") connected by shielded twisted pair cable.
- The **HC 403 system** consists of the HCT 102 D transmitter ("the transmitter") and the HCR 102 switching scaling receiver ("the receiver") connected by shielded twisted pair cable.
- The **HC 402 system** consists of the HCT 101 D transmitter ("the transmitter") and the HCR 102 switching scaling receiver ("the receiver") connected by shielded twisted pair cable.
- The **HC 402 EU system** consists of the HCT 101 EU transmitter ("the transmitter") and the HCR 102 switching scaling receiver ("the receiver") connected by shielded twisted pair cable.
- The **HC 402 MK system** consists of the HCT 101 MK transmitter ("the transmitter") and the HCR 102 switching scaling receiver ("the receiver") connected by shielded twisted pair cable.

Additional terms used in this guide:

- Global Configurator software is referred to as “GC,” in Global Configurator Professional mode (“GC Professional”) or Global Configurator Plus mode (“GC Plus”).
- The GlobalViewer Enterprise application is sometimes referred to as “GVE.”
- Product Configuration Software is also referred to as “PCS.”

About the HC 400 Series

HC 400 Series Systems

The Extron HC 404, HC 403, HC 402, HC 402 EU, and HC 402 MK systems are AV presentation solutions. They incorporate a built-in control processor for display control via HDMI Consumer Electronics Control (CEC), RS-232, IR, or Ethernet. They also include digital I/O ports.

Each system is a dedicated transmitter-receiver pair that is factory-optimized to work together as if it were a single unit. Together each transmitter-receiver system extends video, audio, and control signals up to 230 feet (70 m) over a single CAT *x* cable.
An HC 404 TeamWork kit (which includes cables and other accessories) is also available.

Each system offers two auto-input switching modes, one of which automatically selects sources based on input signals and also allows manual source selection via buttons. Auto-switching modes can be enabled or disabled via Extron Product Configuration Software. The “last connected” auto-switching mode is enabled by default (see **Auto-Input Switching** on page 40).

- The **HC 404** features four AV inputs and one output. It consists of a three-input switching transmitter (HCT 103) and a scaling receiver (HCR 102) that has one HDMI input and one connection from the transmitter. Both the transmitter and receiver are rack mountable in half rack wide enclosures.
- The **HC 403** features three AV inputs and one output. The system consists of a two-input switching transmitter (HCT 102) and a scaling receiver (HCR 102) that has one HDMI input and one connection from the transmitter. The transmitter has a decorator-style wallplate and can be mounted into a standard US 2-gang junction box, and the receiver is rack mountable in a half rack wide enclosure.
- The **HC 402, HC 402 EU, and HC 402 MK** each feature two AV inputs and one output. Each system consists of a one-input switching transmitter (HCT 101 D, HCT 101 EU, or HCT 101 MK) and a scaling receiver (HCR 102) that has one HDMI input and one connection from the transmitter.
  - The HCT 101 D has a decorator-style wallplate and can be mounted into a standard US 1-gang junction box.
  - The HCT 101 EU has an EU-style frame and can be mounted into a standard 1-gang European EU junction box with a 55 mm opening or an Extron Flex55 mounting box.
  - The HCT 101 MK has an MK-style frame and can be mounted into a standard 1-gang European MK junction box with a 55 mm opening or an Extron Flex55 mounting box.
  - The receiver is rack mountable in a half rack wide enclosure.

Transmitters

Transmitter Model	Features					
	Analog Video Inputs	Digital HDMI Video Inputs	Analog Audio Inputs	Input Selection Buttons	Input Selection LEDs	Mounting Type
HCT 103	1	2	1	Yes	Yes	Rack mount (1 inch high, half rack wide)
HCT 102 D	1	1	2	No	Yes	2-gang US, decorator-style
HCT 101 D	0	1	1	No	No	1-gang US, decorator-style
HCT 101 EU	0	1	0	No	No	1-gang EU, 55 mm
HCT 101 MK	0	1	0	No	No	1-gang MK, 55 mm

For any of these transmitters, if the selected input is HDMI, the extended video signal can be HDCP-compliant.

Receiver

The HCR 102 receiver incorporates a high performance, HDCP compliant scaler that scales video to provide a consistent output resolution to a display. It accepts video with resolutions from 480i up to 1920x1200, 1080p, and 2K, and performs upscaling and downscaling with multiple output rates up to 1920x1200, including HDTV 1080p/60 and 2K. The receiver includes an on-screen display, test patterns, and EDID Minder.

Application Diagrams

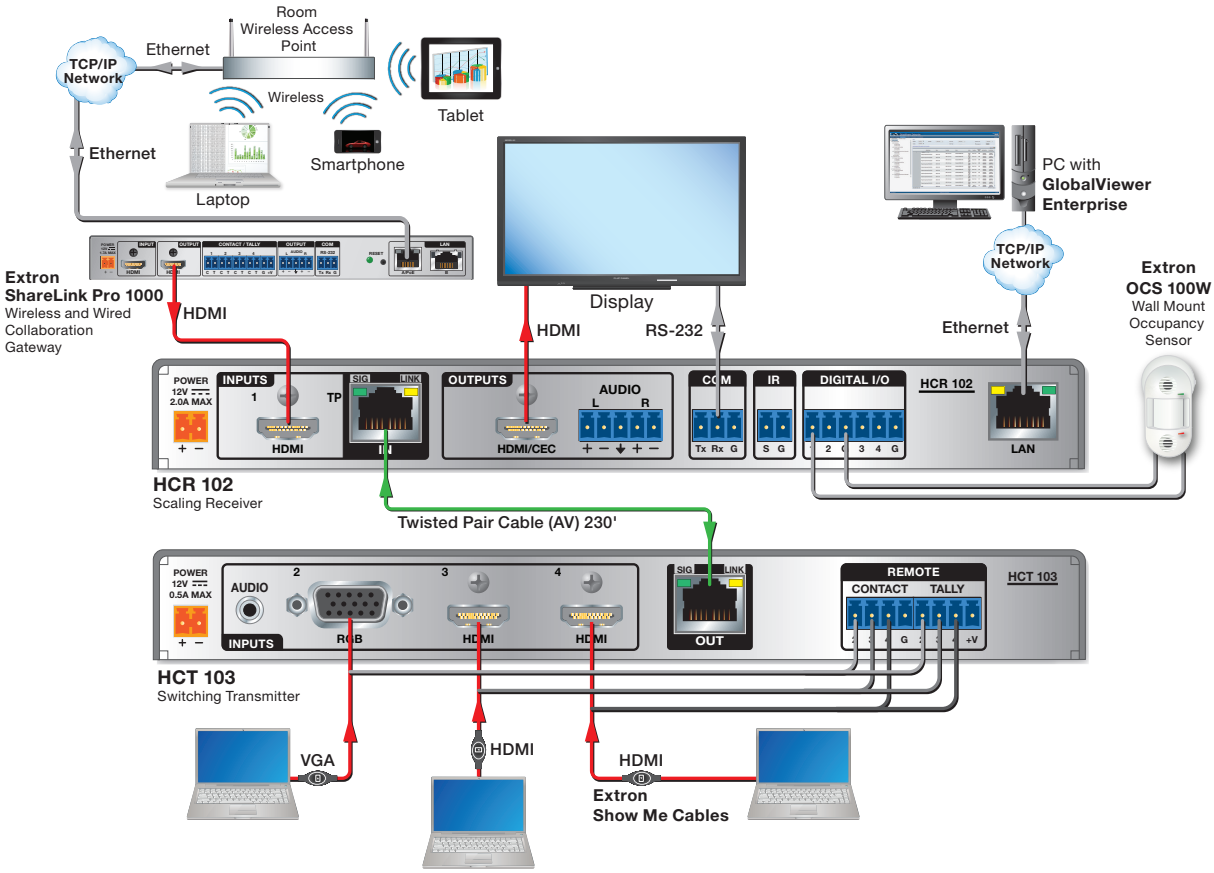


Figure 1. A Typical TeamWork HC 404 System Application

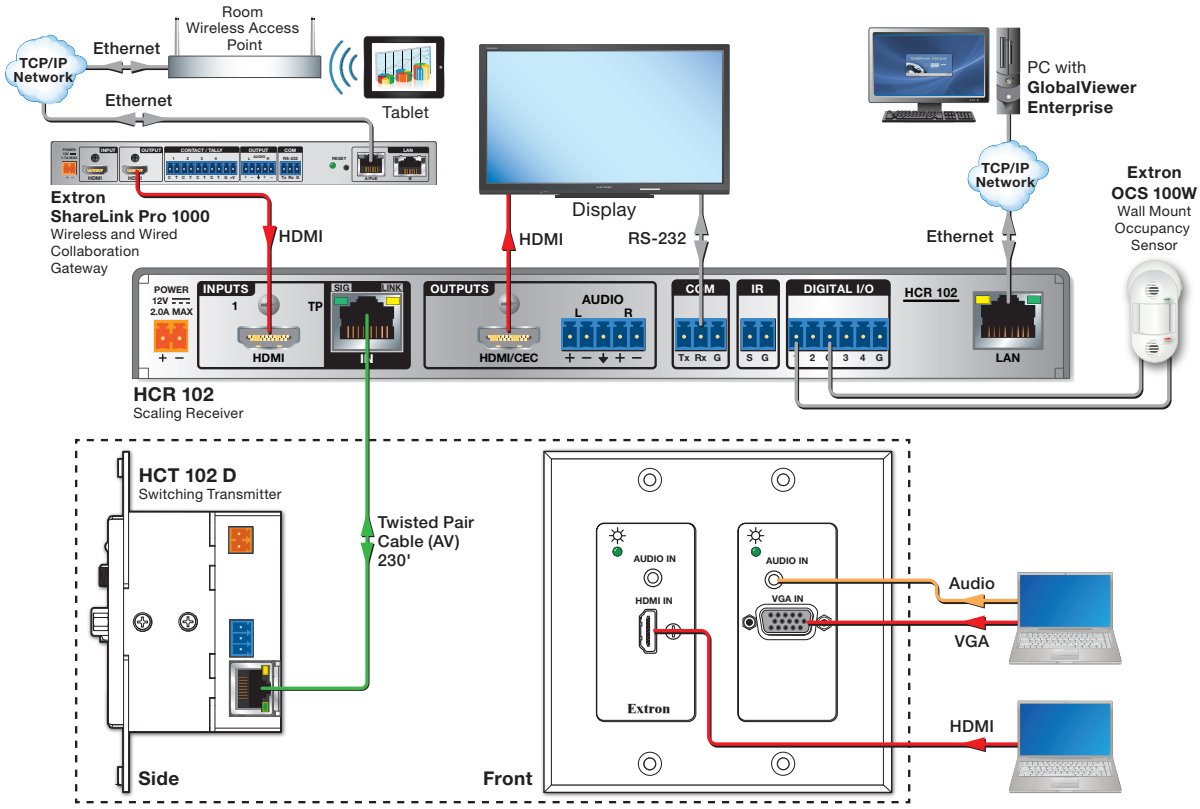


Figure 2. A Typical HC 403 System Application

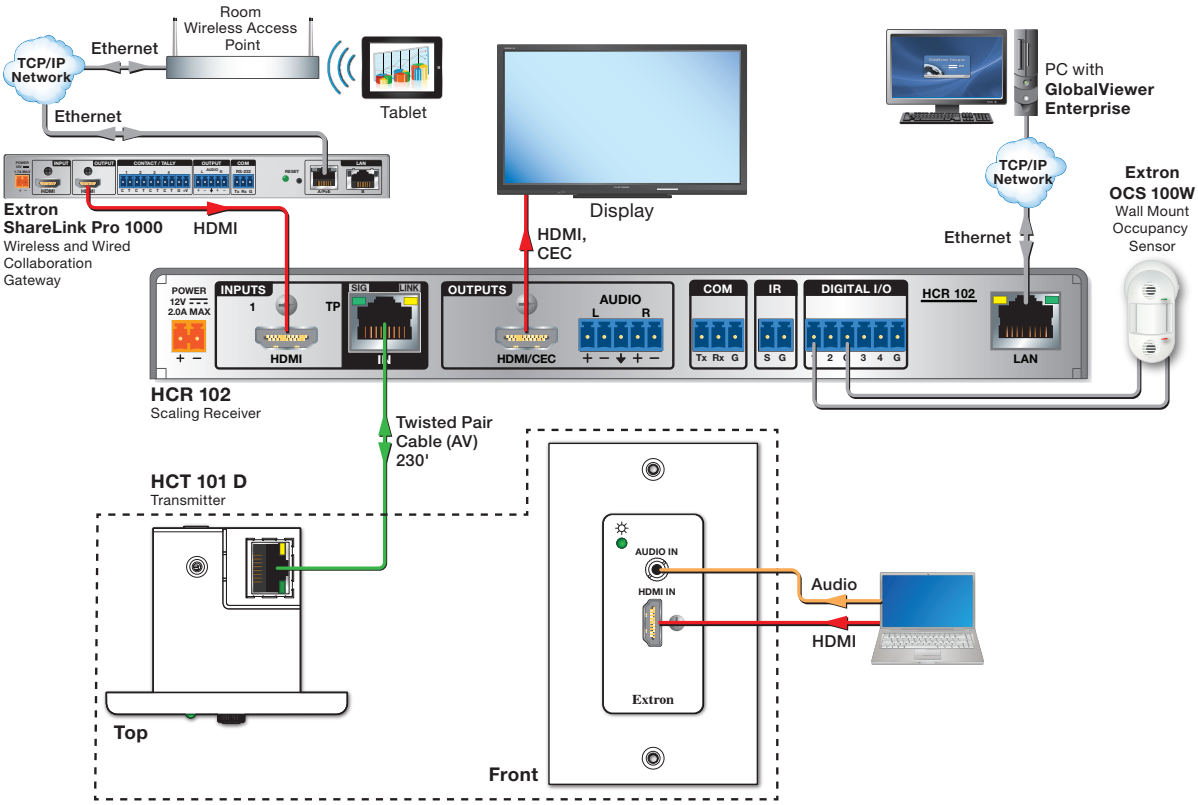


Figure 3. **A Typical HC 402 System Application**

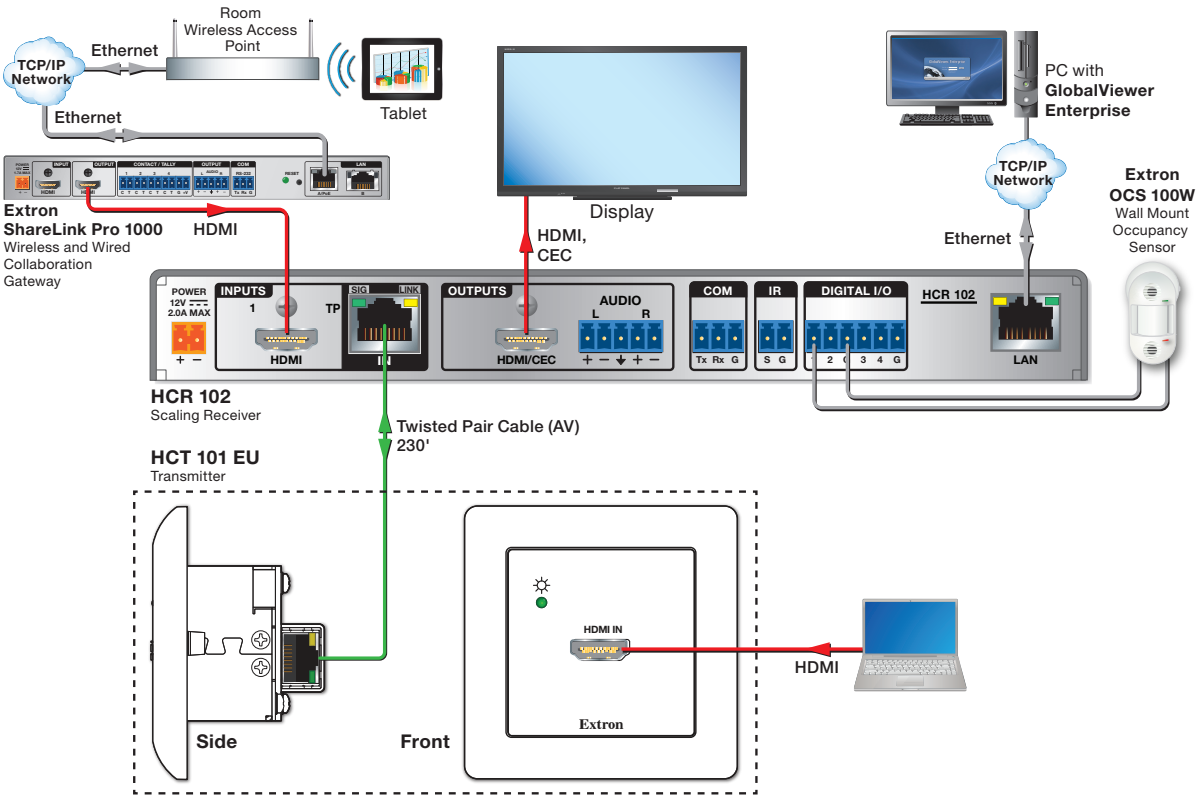


Figure 4. **A Typical HC 402 EU System**

Features

General features

Flexible options for device control — The systems offer RS-232 and infrared (IR) control, TCP/Ethernet control and monitoring, and digital I/O (digital input or digital output) controls. The transmitters offers contact input ports, as well. The HCT 103 also offers tally output ports.

Flexible mounting options —

- The HCT 103 transmitter and the HCR 102 receiver are each housed in a one inch high, half rack wide enclosure, so they can be discretely mounted under a table or near a display by using the included MBU 125 mounting kit. Alternatively, they can easily be rack mounted using an optional rack shelf, or set directly on a table top.
- The HCT 102 D transmitter fits into a standard US 2-gang junction box or mud ring and the HCT 101 D transmitter fits a standard US 1-gang junction box or mud ring for easy wall or furniture mounting.
- The HCT 101 EU fits an EU 1-gang junction box, the HCT 101 MK fits an MK 1-gang junction box, and either model fits into an Extron Flex55 mounting plate or junction box.

EDID Minder — An Extron proprietary process automatically manages the EDID information between a digital display device and one or more input sources. By maintaining continuous EDID communication with all sources, EDID Minder ensures that digital sources power up properly and maintain their video output, whether or not they are actively connected to the digital display device.

Two options for configuring AV settings — Configure the AV settings for transmitters and receiver using Extron Product Configuration Software (PCS). The scaler and EDID settings for the receiver can also be selected using the front panel controls and built-in on-screen display (OSD).

Output scaling — Set the receiver to scale video output to match the resolution and refresh rate required by the display. The HC 400 Series systems support a maximum resolution and rate of 1920x1200 including 1080p at 60 Hz and 2K.

Auto-input switching — The HC 400 Series systems offer an auto-switching mode (see **Auto-Input Switching** on page 40) that is useful in installations where the front panels are not easily accessible. Auto-switching modes can be enabled or disabled via configuration software or the on screen display (OSD) menu.

Support for optional TLP Pro touchpanels — The HC 400 Series systems each support one primary and one mirrored TouchLink Pro touchpanel over a standard Ethernet network. Touchpanels are an option that provides a convenient interface for controlling the HC 400 Series system, which, in turn, controls the other system components.

NOTE: GUI Designer software is used to design the user interface layout of any optional Extron TouchLink Pro touchpanel.

Support for optional NBP button panels — The HC 400 Series systems each support NBP button panels as an alternative interface for controlling the HC 400 Series system.

Universal power system compatibility — These products include a 12 VDC, 3 A external power supply that accepts 100-240 VAC, 50-60 Hz input.

Network and configuration features

- **Global compatibility** — The receiver uses industry standard Ethernet communication protocols, including DHCP, DNS, HTTP, HTTPS, ICMP, NTP, SFTP, SMTP, SNMP, SSH, TCP/IP, and UDP/IP.
- **Embedded web page** — The embedded web page includes online monitoring of basic features. More items can be monitored via this page if the unit is part of a Global Viewer Enterprise system.

- **Remote equipment management** — The IP Link Pro connection allows you to remotely manage, monitor, and control Ethernet-enabled products such as projectors, displays, video conferencing equipment, and other AV equipment. The HCR 102 provides support for the following:
  - TCP, UDP, and HTTP connections
  - Password protection using secure communication
  - Connection via IP address or host name
- **Multi-level password protection** — Allows security to be set based on user roles.
- **System asset management** — The configured system and receiver allow you to control, monitor, and schedule various functions of devices in the system.
- **E-mail notification** — The receiver can be set up to send e-mail notifications, such as a notice that a projector has been disconnected or the projector lamp has been used for a designated number of hours.

Device Control

The control features of the receiver integrate Ethernet connection into AV systems to allow users to remotely control, monitor, and troubleshoot AV equipment, including display devices, source devices, and other items such as lights, a projector lift, or a screen motor.

Use the Extron Toolbelt software to discover and manage the control features of the HCR 102 receiver and other Extron control products. Configure the receiver using Global Configurator Professional (GC Professional) or Global Configurator Plus (GC Plus). A basic configuration is preloaded at the factory. It can be customized as needed.

- An IR, RS-232, or Ethernet driver file can be downloaded from the Extron website (**www.extron.com/download/index.aspx**). The driver is saved to a folder and commands from the driver are incorporated into the GC configuration file for the HCR 102 and any touchpanels or button panels that will work with it. The configuration file is built and uploaded to the unit via GC.
- If a driver is not already available, RS-232 or Ethernet command strings can be entered directly from a host computer using Global Configurator. These can then be incorporated into controls within the GC project.

If touchpanels are part of the system, use GUI Designer software to design the graphic interface layout, then import the layout into the GC project.

Once you have set up how you want the system to work (set up IP addresses and functions, assigned drivers to ports, configured digital inputs or outputs), that information is saved to a GC project configuration file that is built and uploaded into the unit and to any optional TouchLink Pro touchpanels or NBP button panels.

See the *Global Configurator Help File* (which comes with the software) for basic details on setting up the HCR 102 (and other Extron control products) and for downloading and configuring device control commands.

About Global Configurator

Global Configurator (GC Professional or GC Plus) is the software tool for configuration of an HCR 102 receiver and the whole control system. Global Configurator:

- Loads device drivers for monitoring the status of and controlling devices within the AV system.
- Uploads GUI Designer interface layouts to touchpanels.
- Creates the configuration containing all the settings for the receiver and the products with which it interacts in the AV system.
- Generates a graphical user interface called GlobalViewer (GV) that is uploaded to the unit (a GlobalViewer host device) along with the completed configuration and can be accessed as a web page.

To obtain Global Configurator software, you must have an Extron Insider account and contact an Extron support representative. Extron provides training to our customers on how to use the software. Access to the full features of Global Configurator Professional is available to users who successfully complete Extron Control Professional Certification.

PC System Requirements

To find the minimum hardware and software requirements for the PC you use to configure the HC 400 Series system:

- Visit the `Download` page (**www.extron.com/download/index.aspx**) on the Extron website and navigate to the web page for the specific software package (such as Global Configurator Professional or Global Configurator Plus). Minimum PC hardware and software system requirements are listed in the description section. In some cases, minimum device firmware version requirements are also listed there.
- If system requirements are not listed on the software package web page, contact an Extron support representative.

Hardware Features and Installation

This section covers the following material:

- **Setup Checklist: How to Proceed With Installation**
- **Front Panel Features**
- **Rear and Side Panel Features and Connections**
- **Network Communication Setup**
- **Resetting the Unit Manually or Via Software**

Pay careful attention to the order and types of setup tasks. Follow the setup checklist in this guide or in the setup guide. It is helpful to keep it with you for reference throughout the installation and configuration process.

Setup Checklist: How to Proceed With Installation

Step 1 — Get Ready

☐ Familiarize yourself with the features of the system (see **Front Panel Features** on page 13 and **Rear and Side Panel Features and Connections** on page 16) and of any optional TouchLink Pro touchpanels or NBP button panels that are part of the system.

☐ Download and install the latest version of the following:

- **PCS product configuration software** — for detecting and configuring the AV settings for the transmitter-receiver pair, for configuring basic network settings, and for updating firmware
- **Toolbelt software** — for discovering the HCR 102 receiver and other control products on the network, for managing core settings, and for upgrading firmware
- **Global Configurator (GC) software** — for setting up and configuring the control system. GC Professional and GC Plus modes include an option to install **Toolbelt**.
- **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** (see **Locating Software, Firmware, and Driver Files on the Extron Website** on page 60).

☐ Obtain network information for the unit from the network administrator. You need the following details for each HCR 102 receiver and for any other Extron Pro control product that is part of the system:

- ☐ DHCP setting (on or off)
- ☐ Device (HCR 102, optional TLP Pro touchpanels, or NBP button panels) IP address
- ☐ Subnet mask
- ☐ Gateway IP address
- ☐ Username
- ☐ Passwords

- ☐ Write down the MAC address of each HCR 102 (see **figure 7**, ⓪ on page 16 for location) or other IP Link Pro device to be used.
- ☐ Obtain model names and setup information for devices the HCR 102 will control.

Step 2 — Mount the Receiver and HCT 103, Prepare the Installation Site for Other Transmitters

- ☐ Mount the HCT 103 (if applicable) and HCR 102 to furniture, a wall (see **Mounting the HCT 103 and HCR 102** on page 71) or a rack, or set them on a table top.
- ☐ Prepare the site (install a junction box or mud ring in furniture or a wall) for the HCT 102 D, or prepare an optional rack mounting kit for it. Do not mount the unit into the wall or furniture, however, until cabling and testing are completed.
- ☐ Prepare the site (install a junction box in furniture or a wall) for the HCT 101 EU or HCT 101 MK. Do not mount the unit into the wall or furniture, however, until cabling and testing are completed.
- ☐ Cable and mount any optional TLP Pro touchpanels or NBP button panels as needed (see the user guide for the TLP or the *NBP Series User Guide* for details).

Step 3 — Cable All Devices

- ☐ Ground the HCT 101 EU or HCT 101 MK transmitter (see **Grounding** on page 34).
- ☐ Cable devices to the transmitter and receiver (see **Rear and Side Panel Features and Connections** starting on page 16).
  1. Connect AV sources to the input connectors (see **AV Input Cabling** on page 18).
  2. Use a shielded twisted pair cable to connect the transmitter to the receiver via the output and input RJ-45 connectors (see **Transmitter-Receiver Interconnection** on page 19).
  3. Connect AV output devices (display, projector, or other device, and an amplifier or powered speakers) to the output connectors (see **AV Output Cabling** on page 20).
  4. 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 **Transmitter connections for input selection and indication** on page 21).
  5. Cable the control ports on the receiver as desired for controlling AV devices and for communicating with the system via LAN (see **Control Cabling** on page 21).

Step 4 — Connect Power

- ☐ Connect power cords (see **Power input connector** on page 32) and power on all the devices.

NOTE: The power supplies can be set on a tabletop, or mounted to a rack or furniture. Follow the mounting directions included with each power supply or see the power supply installation guides available on the **PS Series Power Supplies page** on the Extron website.

Step 5 — Configure Network Settings

Network setup is essential before you configure control settings. You can configure basic network settings in one of the following ways (see **Network Communication Setup** on page 34):

- Via **front panel controls and the OSD menu** — a quick method to use whether or not you need to configure other settings (also see **Communication submenu** on page 53). This requires connection to a display device.
- Via **PCS software** — 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** — 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.

Step 6 — Configure AV Settings

The AV and scaling settings for the system can be configured via a host connection through the LAN port or the USB port using Extron Product Configuration Software (PCS). You can also configure the scaler settings in the receiver using the on-screen display (OSD) menu system. See **Using the OSD Menu System** on page 41 and **AV Configuration Using PCS Software** starting on page 62 for instructions.

Step 7 — Configure Control Settings

To use the COM, IR, or digital I/O ports on the receiver, you must configure them. HC 400 Series systems come 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.

The basic steps are outlined below in the recommended order.

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.

1. Using GC, create a new GC Pro or GC Plus project and configure the receiver and other IP Link Pro devices. 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

   a. Configure the control ports on the receiver.
      - 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.

   b. Set up monitors, schedules, macros, and local variables.

c. 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.

2. Save and build the project.
3. Upload the system configuration to the HCR 102 receiver.

Step 8 — Test and Troubleshoot the System

☐ Test the system. See the **Troubleshooting** section starting on page 77 for an outline of items to check during system troubleshooting.

☐ Make adjustments to wiring or configuration as needed.

Step 9 — Mount the HCT 102 D, HCT 101 D, HCT 101 EU, or HCT 101 MK

☐ See **Mounting the HCT 102 D, HCT 101 D, HCT 101 EU, or HCT 101 MK** starting on page 72.

Front Panel Features

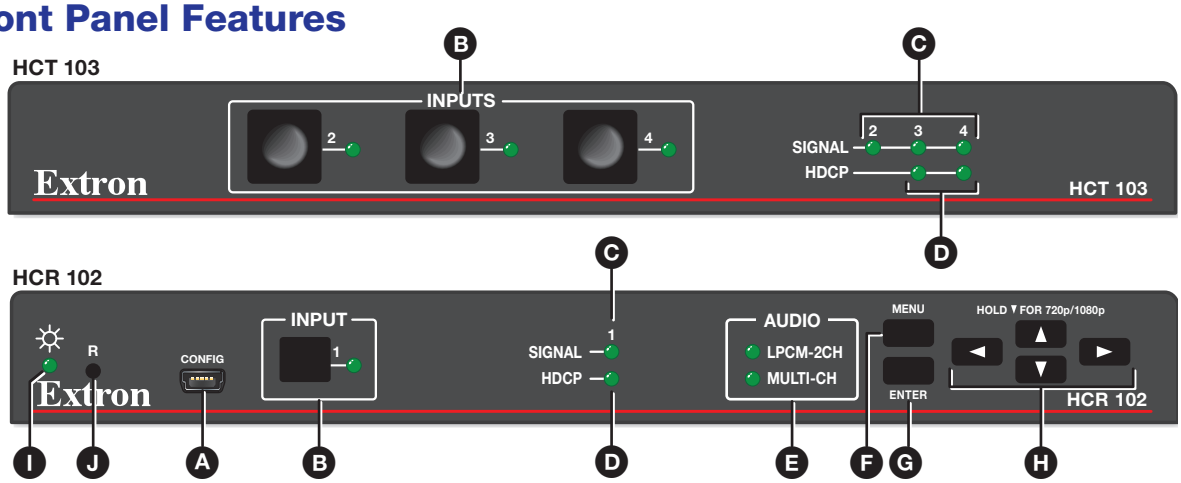
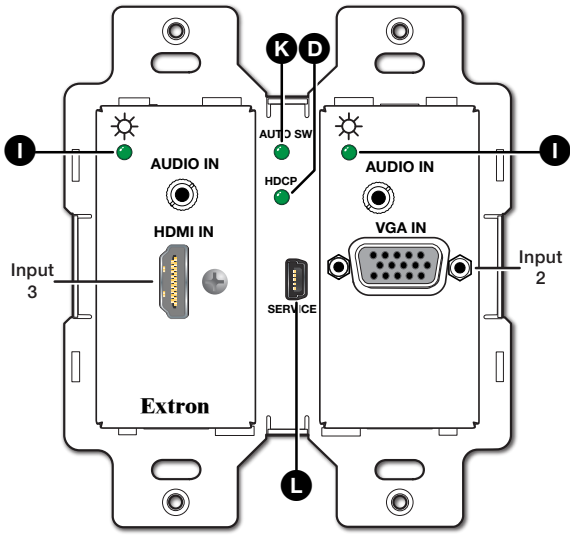
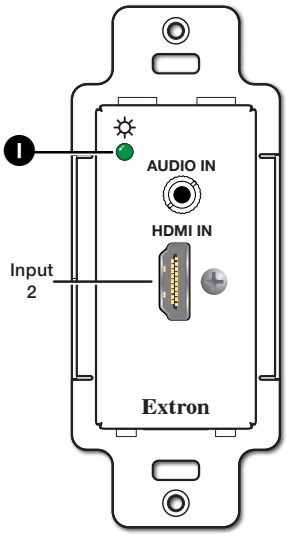


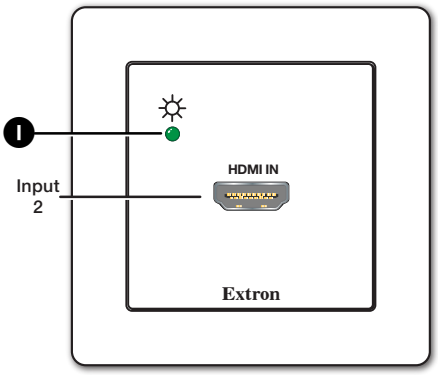
Figure 5. HCT 103 Front Panel (Top), HCR 102 Front Panel (Bottom)



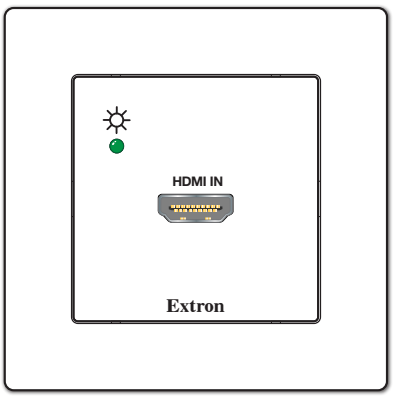
HCT 102 D Front (Without Wallplate)



HCT 101 D Front (Without Wallplate)



HCT 101 EU Front (With Frame)



HCT 101 MK Front (With Frame)

NOTE: For AV connectors on the HCT 102 D, HCT 101 D, and HCT 101 EU/MK, see **Rear and Side Panel Features and Connections** on page 16.

Figure 6. HCT 102 D Front Panel Without Wallplate (Above, Left), HCT 101 D (Above, Center), HCT 101 EU (Above, Right), HCT 101 MK (Right)

- **A** **Configuration (Config) connector**, page 14
- **B** **Input selection buttons and LEDs**, page 14
- **C** **Signal LEDs**, page 14
- **D** **HDCP LEDs**, page 14
- **E** **Audio input signal LEDs** (LPCM-2Ch and Multi-Ch), page 15
- **F** **Menu button**, page 15
- **G** **Enter button**, page 15
- **H** **Navigation buttons** (▶, ◀, ▲, and ▼arrow buttons), page 15
- **I** **Reset and power LED**, page 14
- **J** **Reset button** (HCR 102), page 14
- **K** **Auto Switch LED**, page 14
- **L** Service connector (for use only by Extron support staff)

Reset Features

J **Reset button** (HCR 102) — Pressing this recessed button (see **figure 5**, **J**, on the previous page) causes various product settings to be reset to the factory defaults.

I **Reset and power LED**— This green LED indicates either:

- The power status of the HCT 102 D, HCT 101 D, HCT 101 EU, or HCT 101 MK transmitter or the HCR 102 receiver, or
- The reset mode of the receiver.

LED indications are as follows:

HCT Transmitter	HCR 102 Receiver
• **Off** — The unit is not powered on. • **On, lit amber** — The unit is powered on but there is no active signal at that input. • **On, lit green** — The unit is powered on and there is an active signal at that input.	• **Off** — The unit is not powered on. • **On, lit steadily** — The unit is powered on. • **Blinking** — The unit is powering up or the HCR 102 is performing a reset. The blink pattern depends on the selected reset mode.

For full descriptions of reset modes, how to use the reset button to activate them, and details of LED indications of each mode, see **Resetting the Unit Manually or Via Software** on page 54 and the **reset modes table** on page 55.

Configuration Connection

A **Configuration (Config) connector** —For AV settings configuration using Extron PCS software, connect the USB port of a Windows-based PC or laptop to the HCR 102 via this USB mini-B connector using an USB A to USB mini-B cable. For details on using the PCS software, see **AV Configuration Using PCS Software** on page 62.

Input Selection and Indication Features

B **Input selection buttons and LEDs** — Press one of these buttons to select the corresponding input. The adjacent LED lights to indicate that the input is selected (active). LEDs for the other inputs are off (unlit).

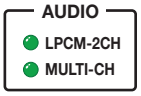
K **Auto Switch LED** — This LED on the HCT 102 D lights green if either of the auto-switching modes is enabled, and it turns off if both of the auto switch modes are disabled. For details on auto-switching modes, see **Auto-Input Switching** on page 40.

C **Signal LEDs** — These LEDs light to indicate the presence of an active signal at the corresponding input connector. If there is no active signal, the LED is unlit.

D **HDCP LEDs** —These LEDs light to indicate the presence of an active signal with HDCP encryption at the corresponding input connector. Because input 2 on the HCT 103 and HCT 102 D transmitters is analog video, it does not support HDCP, so there is no HDCP LED for transmitter input 2.

HDCP LED State and Indication	
On (Lit Steadily)	**Off (Unlit)**
An HDCP encrypted TMDS signal is detected at the corresponding input.	An unencrypted TMDS signal is detected at the corresponding input or no active TMDS signal is detected.

E **Audio input signal LEDs** (LPCM-2Ch and Multi-Ch)— These two LEDs on the receiver (see **figure 5**, **E**, on page 13) indicate the presence or absence of the specific types of audio signal on the selected (active) input.



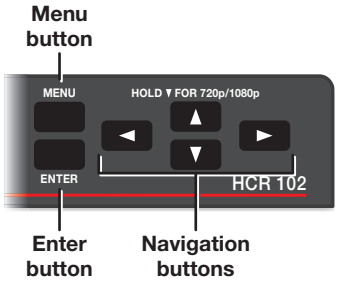
LED Type	Audio Input LED State and Indication	
	On (Lit Steadily)	**Off (Unlit)**
LPCM-2Ch	An embedded LPCM-2Ch audio signal is present on the selected HDMI TMDS input.	• There is no LPCM-2Ch audio signal in the selected TMDS input. • There is no TMDS signal on the selected input. • The audio embedded in the selected input is in Multi-Ch format.
Multi-Ch	Multi-Ch or bitstream (non-PCM) audio is present on the selected HDMI TMDS input.	• There is no Multi-Ch audio signal in the selected TMDS input. • There is no TMDS signal on the selected input. • The audio embedded in the selected input is in LPCM-2Ch format.

Configuration and Adjustment Buttons

For information on how to use these buttons with the on-screen display (OSD), see **OSD Menu Navigation** on page 42

F **Menu** and **G** **Enter** buttons — Press these buttons to access the OSD and make selections from the submenus.

H **Navigation buttons** (▶, ◀, ▲, and ▼ arrow buttons) — Press these buttons to navigate through the OSD submenus, lock the front panel, and reset the output rate (hold ▼ for 5 seconds).



Rear and Side Panel Features and Connections

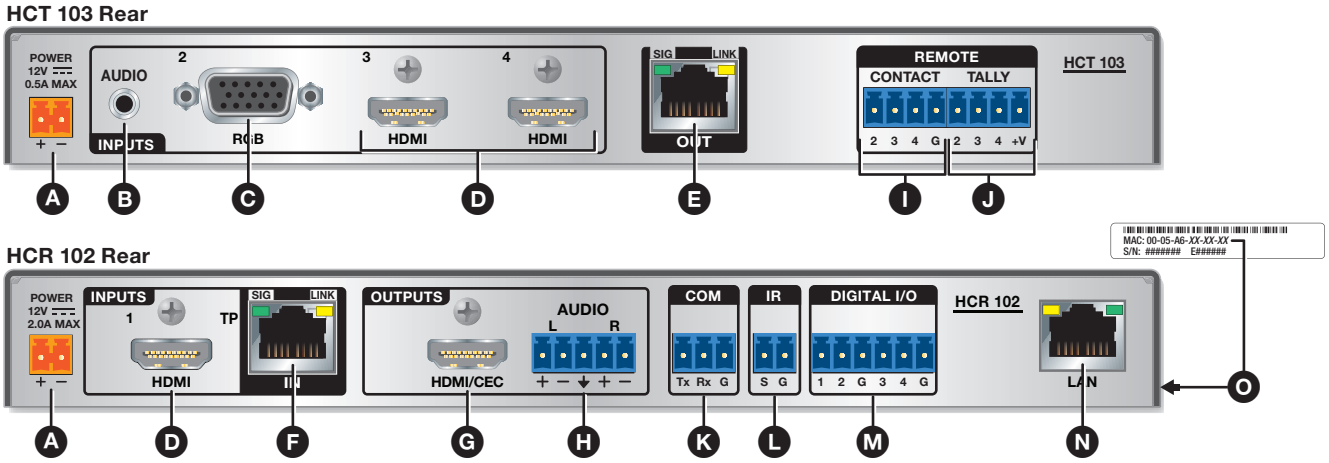
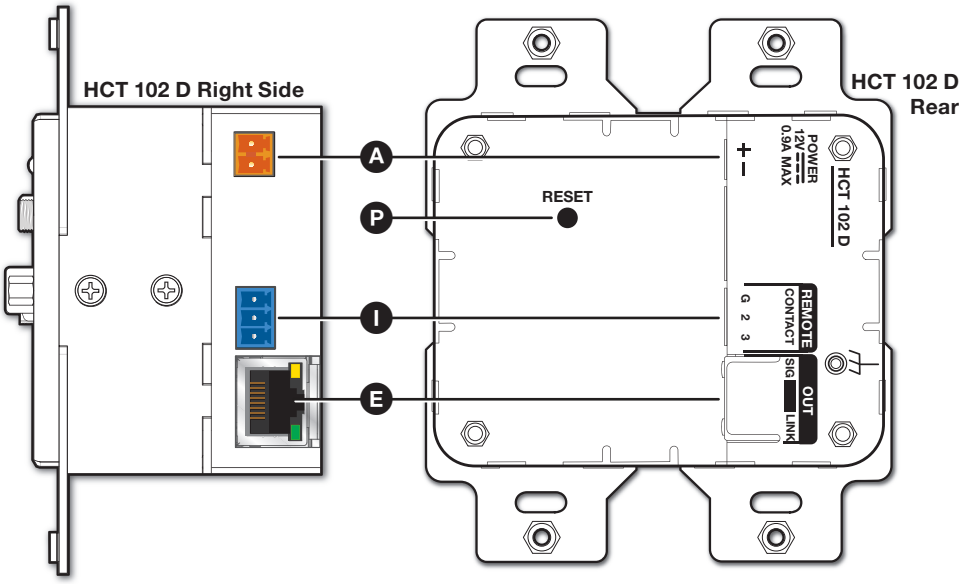


Figure 7. HCT 103 Rear Panel (Top) and HCR 102 Rear Panel (Bottom)



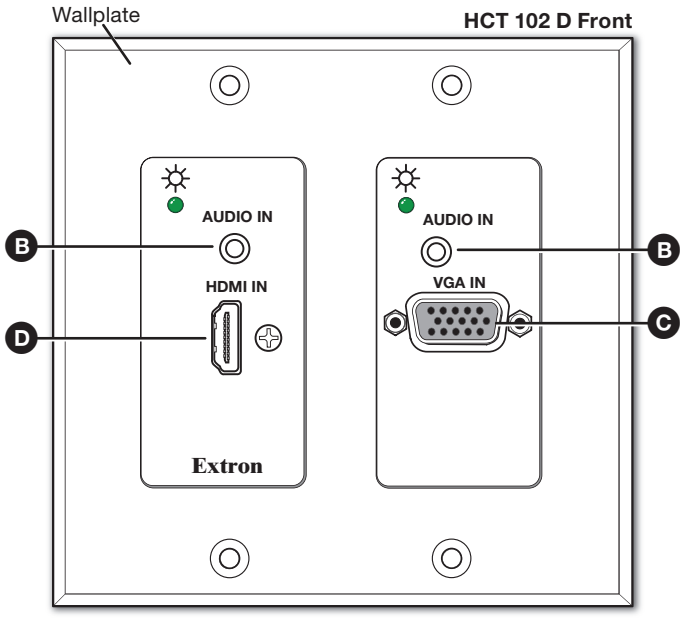
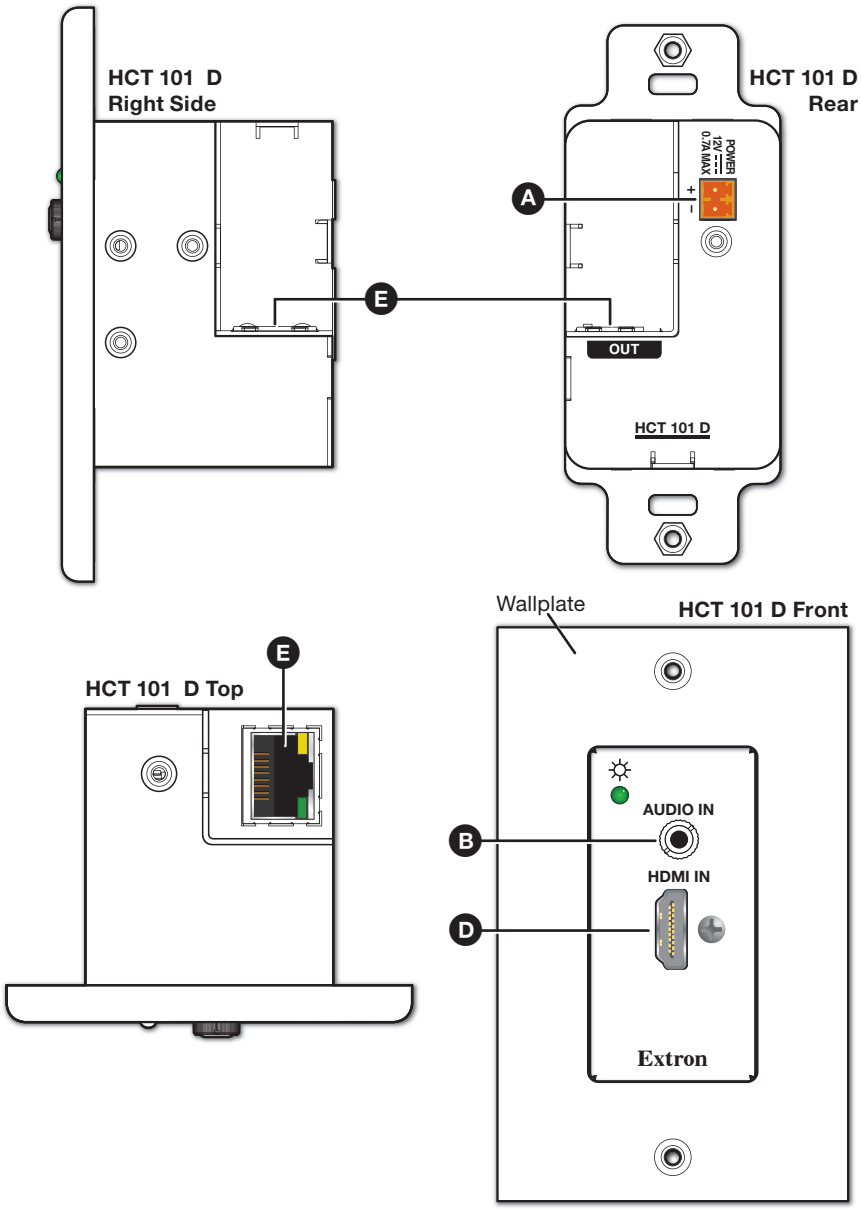
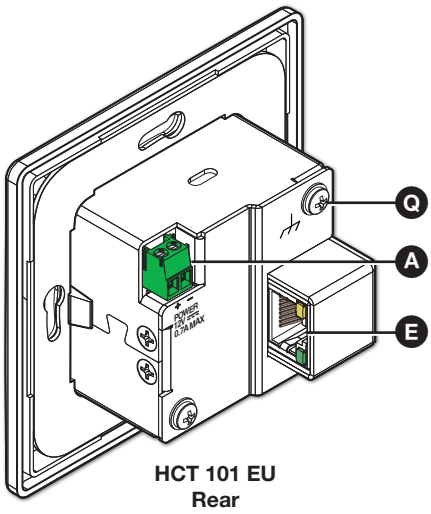


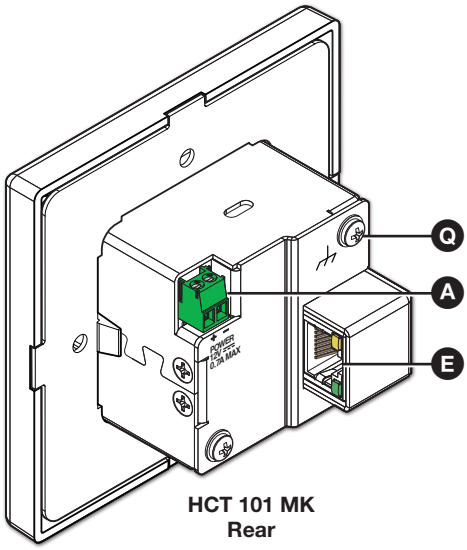
Figure 8. HCT 102 D Right Side Panel (Top Left), Rear Panel (Top Right), Front Panel (Bottom)

- **A** **Power input** connector, page 32
- **B** **Audio input** connector, page 18
- **C** **Analog RGB video input** (input 2), page 18
- **D** **HDMI input** connectors, page 18
- **E** **Transmitter output** RJ-45 connector (twisted pair interconnection), page 19
- **F** **Receiver input** RJ-45 connector (twisted pair interconnection), page 19
- **G** **HDMI/CEC output** connector, page 31
- **H** **Analog audio output** connector, page 20
- **I** Remote control **contact input** ports, page 21
- **J** Remote control **tally output** ports, page 21
- **K** **COM RS-232** control port, page 23
- **L** **IR output** control port, page 24
- **M** **Digital I/O** (digital input/output) control ports, page 25
- **N** **LAN (Ethernet)** connector and LEDs, page 30
- **O** **MAC address** (on side of receiver), page 30
- **P** **Reset button** (HCT 102 D), page 34

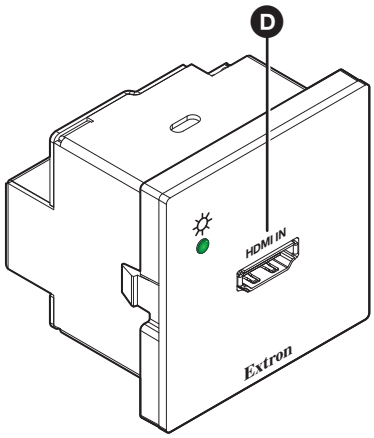




HCT 101 EU
Rear



HCT 101 MK
Rear



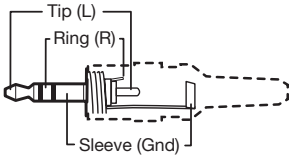
HCT 101 EU/MK
Device Module
Front

Figure 9. **HCT 101 D Right Side Panel (Top Left), Rear Panel (Top Right), Top Panel (Bottom Left), Front Panel (Bottom Right)**

Figure 10. **HCT 101 EU Rear Panel (Top), HCT 101 MK Rear Panel (Middle), HCT 101 EU and MK Module Front Panel (Bottom)**

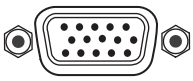
- A **Power input** connector, page 32
- B **Audio input** connector, page 18
- D **HDMI input** connectors, page 18
- E **Transmitter output** RJ-45 connector (twisted pair interconnection), page 19
- Q **Grounding screw** (HCT 101 EU and MK), page 34

AV Input Cabling



3.5 mm Stereo Plug
(unbalanced input)

Ⓑ **Analog audio input** (see **figure 7** and **figure 8** on page 16 and **figure 9** on page 17) — For analog audio sources, connect the source device to the audio input 3.5 mm tip-ring-sleeve (TRS) connector on the transmitter. Wire the connector as shown at right.



Ⓒ **Analog video input** — Connect an analog RGB video input source to the 15-pin HD RGB input connector (see **figure 7** and **figure 8** on page 16) on the transmitter.

Ⓓ **Digital AV (HDMI) input** (see **figure 7** and **figure 8** on page 16 and **figure 9** and **figure 10** on page 17) — For HDMI video and for digital audio embedded within HDMI signals (or single link DVI-D with the appropriate DVI-HDMI adapters):

1. Connect a digital video source device to any HDMI input connector on the transmitter or receiver.
2. To secure each cable to the unit, attach an Extron LockIt bracket to the unit and secure it to the cable with a zip tie as follows:
   a. Plug the HDMI cable into the panel connection (see figure 6, ⓐ).
   b. Loosen the HDMI connection mounting screw from the panel enough to allow the LockIt lacing bracket to be placed over it (ⓑ). The screw does not have to be removed.
   c. Place the LockIt lacing bracket on the screw and against the HDMI connector (ⓒ), then tighten the screw to secure the bracket (ⓓ).
   d. Loosely place the included tie wrap around the HDMI connector and the LockIt lacing bracket as shown (ⓔ).
   e. While holding the connector securely against the lacing bracket, tighten the tie wrap, then remove any excess length.

Complete details on LockIt installation are available in the *LockIt HDMI Cable Lacing Bracket Installation Guide*.

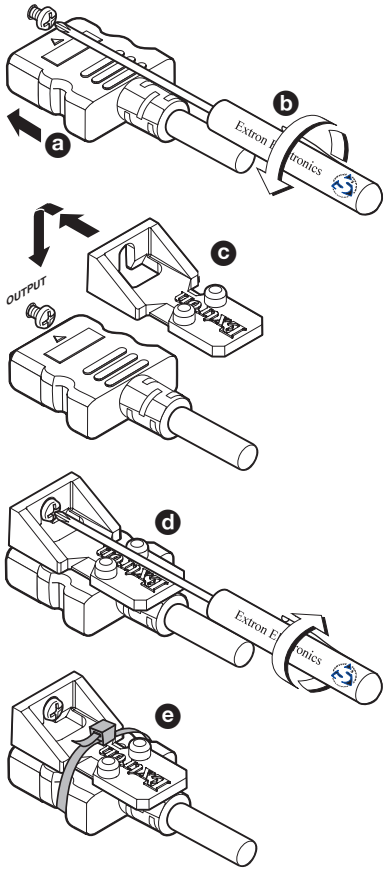
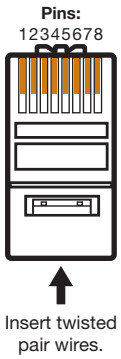


Figure 11. LockIt Bracket Installation Steps

Transmitter-Receiver Interconnection

Connect the Out port of the transmitter (E) (see **figure 7** and **figure 8** on page 16 and **figure 9** and **figure 10** on page 17) to the In port of the receiver (see **figure 7**, F on page 16) using a shielded twisted pair CAT *x* cable of up to 230 feet (70 m), as shown in **figure 1** on page 4. Terminate the cable with shielded RJ-45 connectors using the TIA/EIA-T568B wiring standard at both ends, as shown at right.



TIA/EIA-T568B	
Pin	Wire color
1	White-orange
2	Orange
3	White-green
4	Blue
5	White-blue
6	Green
7	White-brown
8	Brown

ATTENTION:

- Do not connect this port to a computer data network or a telecommunications network.
- Veuillez ne pas connecter ce port à un réseau de données informatiques ou à un réseau de télécommunications.

For optimal performance, Extron highly recommends the following:

- Extron XTP DTP 24 Series cable is recommended for best results
- Use the TIA/EIA-T568B wiring standard for terminating all STP cables with RJ-45 connectors.
- Use shielded twisted pair cable, 24 AWG solid conductor or better, with a minimum cable bandwidth of 400 MHz.

ATTENTION:

- Do not use Extron UTP23SF-4 Enhanced Skew-Free AV UTP cable or STP201 cable.
- N'utilisez pas le câble AV Skew-Free UTP version améliorée UTP23SF d'Extron ou le câble STP201.

- Use shielded RJ-45 plugs to terminate the cable.
- Overall transmission distance capabilities vary depending on the number of patches used. Use no more than two pass-through points, which may include patch points, punch down connectors, couplers, and power injectors. If these pass-through points are required, use shielded couplers and punch down connectors.
- If patches must be used in the system, Extron recommends shielded CAT 6 (or better) patch cables.

NOTE: When using shielded twisted pair cable in bundles or conduits, consider the following:

- Do not exceed 40% fill capacity in conduits.
- Do not comb the cable for the first 20 meters, where cables are straightened, aligned, and secured in tight bundles.
- Loosely place cables and limit the use of tie wraps or hook-and-loop fasteners.
- Separate twisted pair cables from AC power cables.

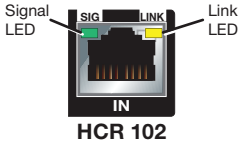
Once the transmitter and receiver are connected and powered on, the LEDs on these connectors light as follows:

- Signal LED (green) — Indicates the unit is receiving a signal on the selected input (2, 3, or 4) on the transmitter.

NOTE: The Signal LEDs do not light while input 1 on the receiver is selected or if there is no active signal when a transmitter input (2, 3, or 4) is selected.

- Link LED (amber) — Indicates a valid link is established between the units on the interconnection cable.

HCT 102, HCT 103

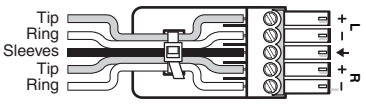


HCR 102

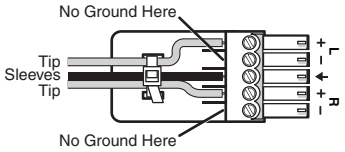
AV Output Cabling

1. Connect a display, projector, or other AV device to the Outputs HDMI/CEC connector (see **figure 7**, G on page 16) on the receiver rear panel for HDMI AV output.
   For more about the Consumer Electronics Control (CEC) connection and function, see **HDMI/CEC** on page 31
2. Connect the cable and install the LockIt bracket (see **figure 11** on page 18) in the same method as for the HDMI inputs.
3. 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 sleeve(s) to the ground contact. Do not connect the sleeve(s) to the negative (-) contacts.



Balanced Audio Output



Unbalanced Audio Output

NOTES:

- The output volume control in the PCS software and in the OSD menu applies to the analog audio output only. The output level for the HDMI embedded audio is fixed and cannot be adjusted.
- The HCR 102 can only de-embed digital 2Ch PCM audio to the analog audio output. It cannot de-embed multi-channel audio.

Control Cabling

USB connections

Connect a host computer to the USB mini-B port on the receiver (see **figure 7** and **figure 8**, Ⓐ on page 16) for device configuration with PCS software.

Transmitter connections for input selection and indication

The remote control contact input ports (see **figure 7** and **figure 8**, Ⓘ) and tally output ports (see Ⓙ) are typically used together. Momentarily short a contact input pin to ground to select the corresponding input. Connect a tally output pin and tally voltage pin to light an LED to indicate that the corresponding input is selected.

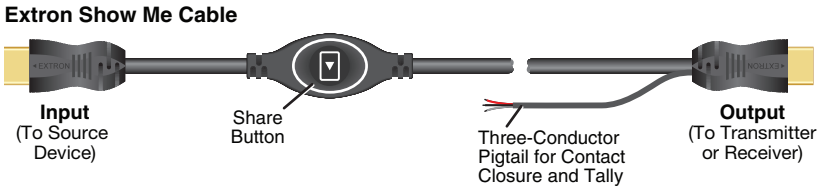
NOTES:

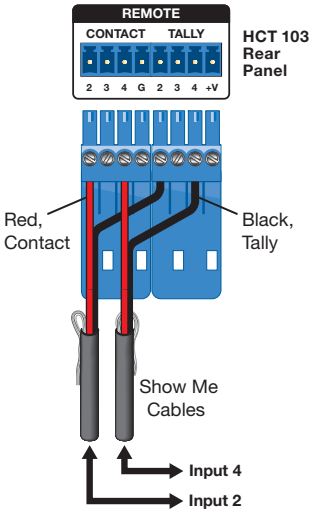
- Only the HCT 103 has tally output ports.
- Input selection and tally feedback behavior cannot be changed: the contact closure and tally ports cannot be configured using GC software.
- Input selection via contact closure has the same priority as input selection from the front panel.
- When an input is selected, the corresponding tally port is set to logic low, allowing voltage to pass through that tally output pin, providing power for an indicator LED. If the tally port is connected to an Extron Show Me cable, the LED in the cable lights.
- Show Me cables are available only as part of an Extron TeamWork kit.

Follow the wiring instructions for either an Extron HDMI Show Me cable or an external push-button keypad, as appropriate.

Extron HDMI Show Me cable

For each Extron Show Me cable, connect the red wire from the cable pigtail to the associated pin of the contact closure input connector on the HCT 103 transmitter and connect the black pigtail wire to the associated pin on the tally connector (see the system diagram in **figure 1** on page 4 and see the diagram at right).





NOTES:

- For Show Me cables, the ground pin (drain wire) connection is optional.
- Do not connect Show Me cables to the +V pin of the Tally port. The source device provides the +5 VDC supply voltage needed to illuminate the Share button. Some sources (such as mobile devices) do not provide sufficient voltage to light the button.
- Digital (HDMI) Show Me cables support embedded audio and CEC signals. Analog Show Me cables do not.

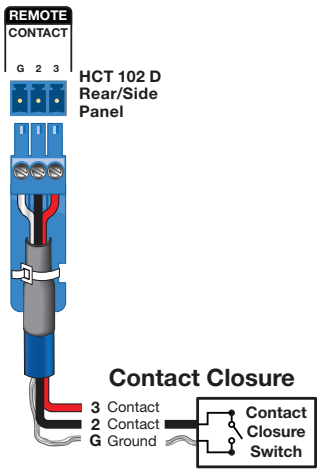
Push-button keypad

You can connect an external push-button keypad to these ports. Extron offers a variety of button panels such as the CCR Series products, but you can use any push-button switch or keypad of your choice.

NOTE: The Extron **CCR-4BLB AAP** contact closure remote requires only the contact closure connection and its own power connection. The tally connections are not needed. Other devices might use both contact and tally connections.

1. Make contact closure connections, as shown at right and lower right. Wire a male 4-pole captive screw connector as follows and plug it into the Contact connector:

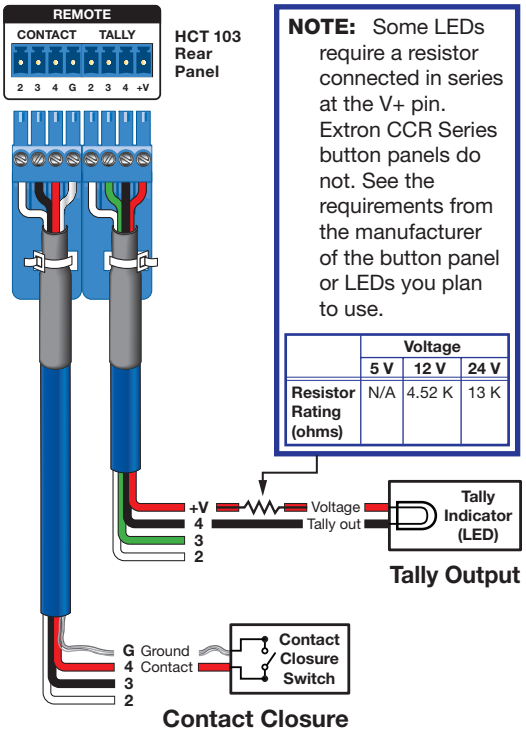
   - **Contact closure input (2, 3, or 4) pins** — Insert the contact connections to these pins as desired. Momentary closure of one of these pins to ground selects the corresponding input (2, 3, or 4). Selection is triggered at the closure (grounding) of the pin, not the opening.
   - **Ground (G)** — Insert ground wire to this pin.



2. Make tally output connections, as shown at right. To identify the currently selected input when the front panel buttons are not visible, connect a device such as an LED light to the Tally connector 2, 3, or 4 pin and the +V pin. When an input is selected (by keypad or front panel), the corresponding tally out pin is set to logic low, which completes a circuit and sends power (+5 VDC) to the connected LED.

   Wire a 4-pole captive screw connector as follows and plug it into the Tally connector:

   - **Tally output (2, 3, or 4)** — Insert connections to these pins as desired to control the LEDs for in the contact closure push-buttons. When an input is selected, the LED for that input is active.
   - **Voltage (V+)** — Insert the power wire for the contact indicator device into the opening for the +V pin. Some LEDs require a resistor connected in series at this pin, so see the documentation from the manufacturer to determine what to use for your device.



3. To test the connections, power on the system, then press the button on the keypad to switch the connected input to the output after the system is powered on. The input selection should change and the corresponding button should light.

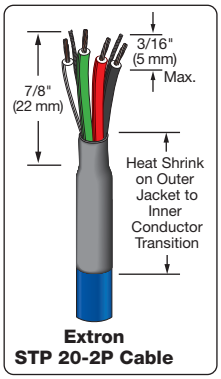
Receiver connections for display or device control

The serial, IR, digital I/O, CEC, and LAN ports can all be used for device control. All of these ports must be configured using Global Configurator. HC 400 Series systems come with a basic configuration installed, which you can customize.

Serial

K 3-pole COM port, RS-232 only

(see **figure 7** on page 16) — Use the COM port on the HCR 102 for serial control of a display or other device and to receive status messages from the connected device. This port can send commands from a driver file.



TIP: STP 20-2P cable, shown at left, is recommended for these connections. For best results, insulate the common or drain wires using heat shrink.

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)

Use the following diagram as a wiring guide to cable the HCR 102 to other devices.

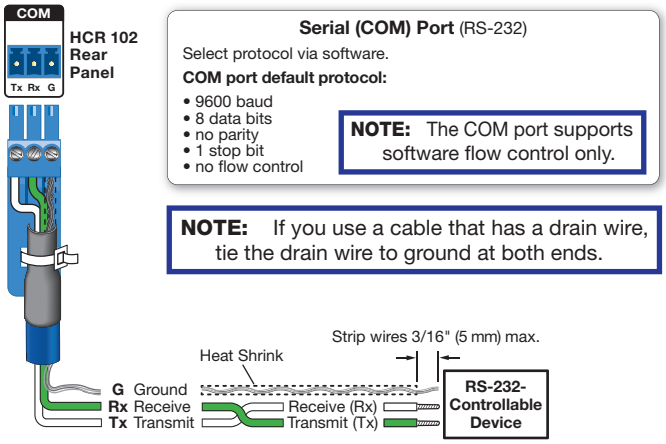


Figure 12. Wiring the COM Port for Serial Control

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 m) but may vary based on factors such as cable gauge, baud rates, environment, and output levels (from the HCR 102 and the device being controlled).

Infrared

L **IR output port** (see **figure 7** on page 16) — An HCR 102 can use infrared signals to control various devices (up to four) via this port. The figure below shows a wiring example.

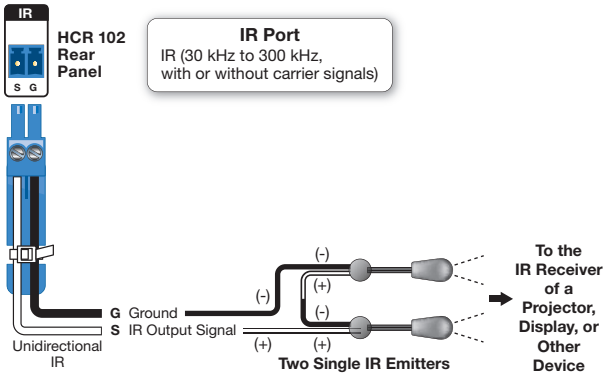
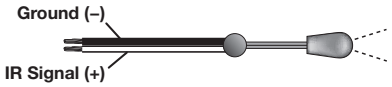


Figure 13. Wiring the IR Port

Connect the port directly to the wired IR port of another device. Or insert the wires from up to four IR Emitters into the IR port and place the heads of the emitters over or next to the IR signal pickup windows of the devices. For wiring, see the following diagrams or the *IR Emitter Installation Guide* (available on **www.extron.com**).

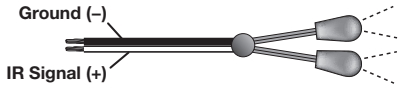
NOTE: Each emitter must be within 100 feet of the HCR 102 for best IR control results.

Installing One Single Emitter



One Single IR Emitter

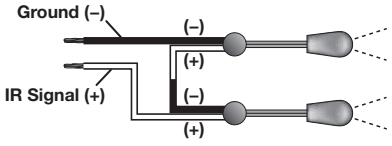
Installing One Dual Emitter



Dual IR Emitter

Installing Two Single Emitters

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



Two Single IR Emitters

Digital I/O

Ⓜ **Digital I/O (digital input/output) ports** (see **figure 7** on page 16) — To allow the HCR 102 receiver to monitor devices to trigger events, connect switches, sensors, LEDs, relays, or similar items to these ports, which can be configured as digital inputs or outputs, with or without +5 VDC pull-up. These ports can trigger events or functions (such as triggering relays, issuing commands, or sending an e-mail) that have been configured using Global Configurator Professional or Plus. By default these ports are set to digital input mode with pull-up disabled.

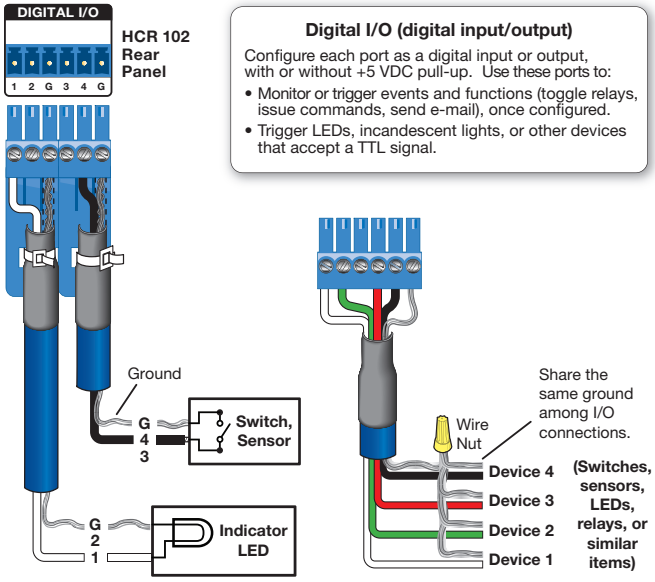


Figure 14. Digital I/O Port Wiring Examples

Digital input — To allow the HCR 102 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.
  - **Example application, digital input without pull-up:** occupancy sensor connection (shown below)

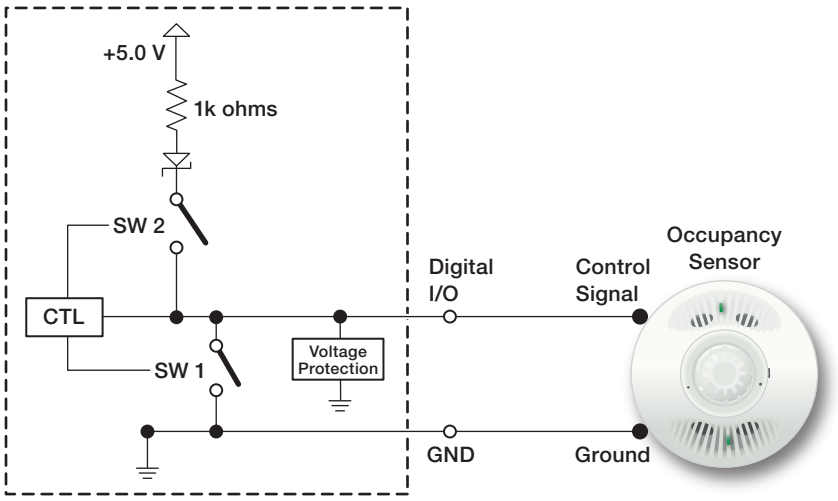


Figure 15. Digital I/O Digital Input Application: Occupancy Sensor, Without Pull-up

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.
  - **Example application, digital input with pull-up:** connecting a two-position switch

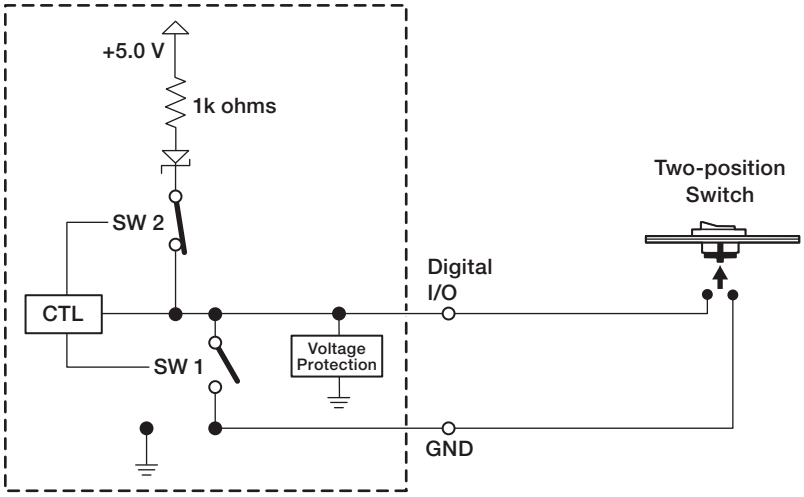


Figure 16. Digital I/O Digital Input Application: Two-position Switch With Pull-up

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

    This application often requires a current-limiting resistor, as shown in the diagram below. 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.

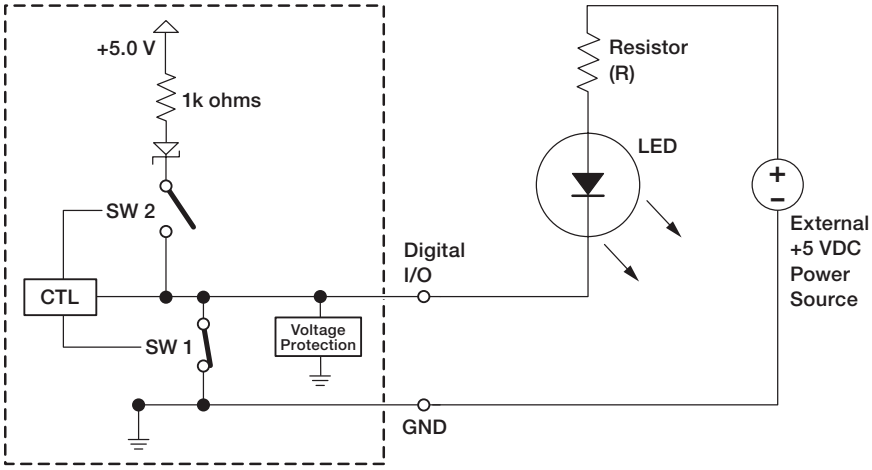


Figure 17. Digital I/O Digital Output Application: LED and External +5 VDC Power Source Without Pull-up

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

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

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

V_s = 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)
V_f = 2 V
V_s = 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.

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.

- 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.
  - **Example application, 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, such as an Extron HCT transmitter. 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.

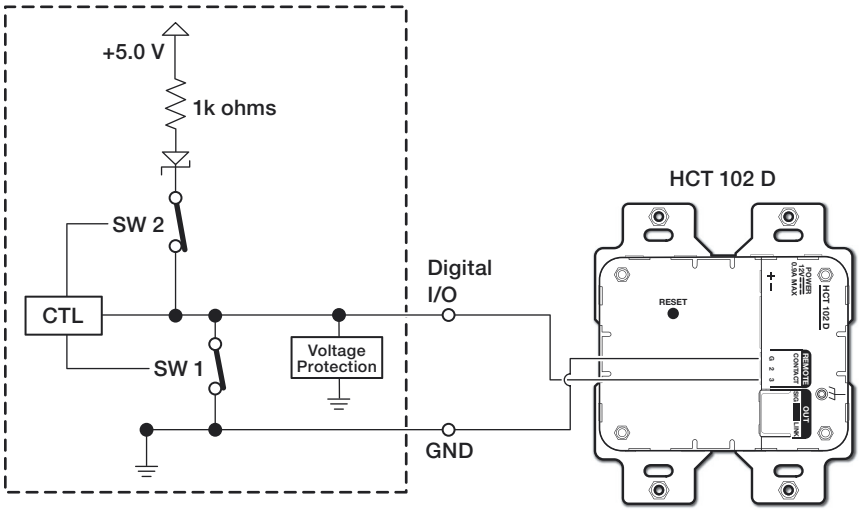


Figure 18. Digital I/O Digital Output Application With Pull-up: Contact Closure Input Selection on a Connected Device

LAN

N **LAN (IP) connector and LEDs** (see **figure 7** on page 16)— To connect the HCR 102 to an Ethernet network (so you can configure and control the HCR 102 and the devices connected to it, and for touchpanel or NBP button panel control), plug a cable into the LAN RJ-45 socket and connect the other end of the cable to a network switch, hub, router, or PC connected to a LAN or the Internet. For details of communication protocols, ports, and services used, see the *Pro Series Control Product Network Ports and Licenses Guide* at **www.extron.com**.

Cabling:

- For 10Base-T (10 Mbps) networks, use a CAT 3 or better cable.
- For 100Base-T (max. 155 Mbps) networks, use a CAT 5 or better cable.

You must configure this port before using it. Configure the settings via PCS, Toolbelt or Global Configurator. See the help files for each software package for basic information on configuration.

Activity LED — This yellow LED blinks to indicate network activity.

Link LED — This green LED lights to indicate a good network connection.

NOTE: Initial units ship with the functions of these LEDs reversed. Subsequent units will ship with the LED functions as noted at left.

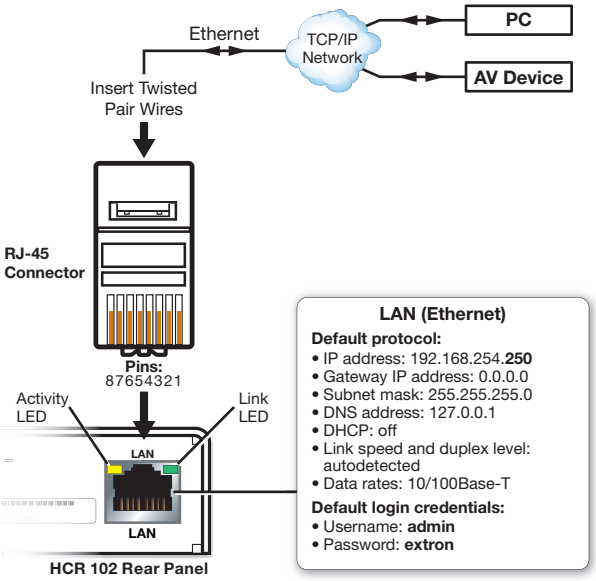
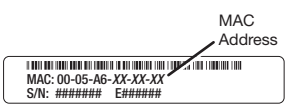


Figure 19. LAN Connector and LEDs

NOTES:

- The factory configured password for this device has been set to the device serial number. Passwords are case sensitive. Performing a Reset to Factory Defaults reset (see **Reset to Factory Defaults** reset mode on page 56) sets the password to `extron`.
- DHCP is off by default.

O **MAC address** — This is the unique user hardware ID number (Media Access Control [MAC] address) of the unit (for example, 00-05-A6-05-1C-A0).
You may need this address during device discovery and configuration.



HDMI/CEC

G **HDMI/CEC output connector** (see **figure 7** on page 16) — 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 HCR 102 can automatically turn display power on or off based on whether an active signal is detected at the selected input.

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

Via PCS, this port can be configured for DVI output or for one of several HDMI formats. You can select an HDCP output mode, and configure scaling settings to match video resolution and rate for the display device. To facilitate setup, the receiver can output a test pattern via this port, or it can display the on-screen menu options (see **Using the OSD Menu System** on page 41) for use during configuration.

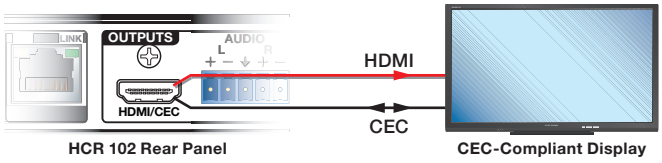


Figure 20. CEC Connection and Communication

About CEC control

Consumer Electronics Control (CEC) is an industry standard for control functions provided by HDMI. CEC control functions are incorporated into the HCR 102 and into GC software to control other equipment. HDMI CEC implementations vary by manufacturer and by their equipment.

Extron has tested a representative sample of equipment from other manufacturers to assure that power on and off commands work with most devices that conform to the HDMI CEC standard. However, CEC interoperation between the HCR 102 and equipment from other manufacturers cannot be guaranteed. Volume and audio mute commands may or may not be supported by any given display. See the manual for the device that you want the HCR 102 to control to determine the details of the HDMI CEC functions for that product, and see the release notes for the Extron Universal Display Driver - HDMI CEC.

TIPS:

- 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 HCR 102, such as RS-232, IR, or Ethernet control.
- Some displays must be configured to enable CEC communication.

Automatic display power control

The HCR 102 can automatically turn display power on or off based on whether an active signal is detected at any input. The system uses CEC driver commands sent to the display to automatically turn display power on or off based on whether or not an active signal is detected at any input.

- When an active signal is detected at any input, the receiver automatically sends the CEC power-on command out the HDMI/CEC port to the display or projector.
- If no signal is detected at all inputs, the receiver sends the CEC power-off command to the display or projector.

HC 400 Series systems ship with basic CEC control built into the default configuration. Basic CEC controls in that configuration work “out of the box”, but can be further customized using Global Configurator software.

The CEC port configuration can specify whether or when to send the power-off command, change the timeout period (from 0 to 500 seconds), and specify whether to send other CEC commands. See the *Global Configurator Help File* for more detailed information on the port and on macros.

NOTES:

- 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.
- The factory default control configuration (the GC configuration file that comes with the system), including CEC commands, is available within the `Downloads` section on the appropriate HC system product web page. If you perform a "Reset to Factory Defaults" reset (see page 56), you need to download this GC configuration file from the website and upload it to the HCR 102.

Supported CEC commands

CEC commands are derived from the CEC driver file, configured in Global Configurator or included in the factory-installed configuration, and then stored within the receiver. Actions configured in Global Configurator can tell the receiver to send CEC commands to the HDMI output. The HC 400 Series systems support the following CEC commands:

- power on
- power off
- connection status
- show as active source
- volume up
- volume down
- audio mute toggle
- user-defined command
- user-defined string

For additional details, see the release notes for the Extron Universal Display Driver for HDMI and CEC, available in the various HC product pages on the Extron website.

Power Connections

Ⓐ **Power input connector** (see **figure 7** and **figure 8** on page 16 and **figure 9** and **figure 10** on page 17)

ATTENTION:

- Always use a power supply supplied or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the unit.
- Utilisez toujours une source d'alimentation fournie ou recommandée par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute certification de conformité réglementaire et peut endommager la source d'alimentation et l'unité.

- If not provided with a power supply, this product is intended to be supplied by a UL Listed power source marked "Class 2" or "LPS" and rated output 12 VDC, minimum 0.5 A (transmitters) or minimum 2.0 A (receiver).
- Si le produit n'est pas fourni avec une source d'alimentation, il doit être alimenté par une source d'alimentation certifié UL de classe 2 ou LPS, avec une tension nominale 12 Vcc, 0,5 A minimum (émetteurs) ou 2 A minimum (récepteur).

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities.
- Sauf mention contraire, les adaptateurs CA/CC ne conviennent pas à une utilisation dans les espaces d'aération ou dans les cavités murales.

- 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. The power supply shall not be permanently fixed to building structure or similar structure.
- 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. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.

You have two options for powering the system:

NOTE: These examples show the HCT 103, but the connections are identical for the other HCT transmitters.

- Connect the included 12 VDC, 4.2 A power supply (Extron PS 1242) at the receiver.

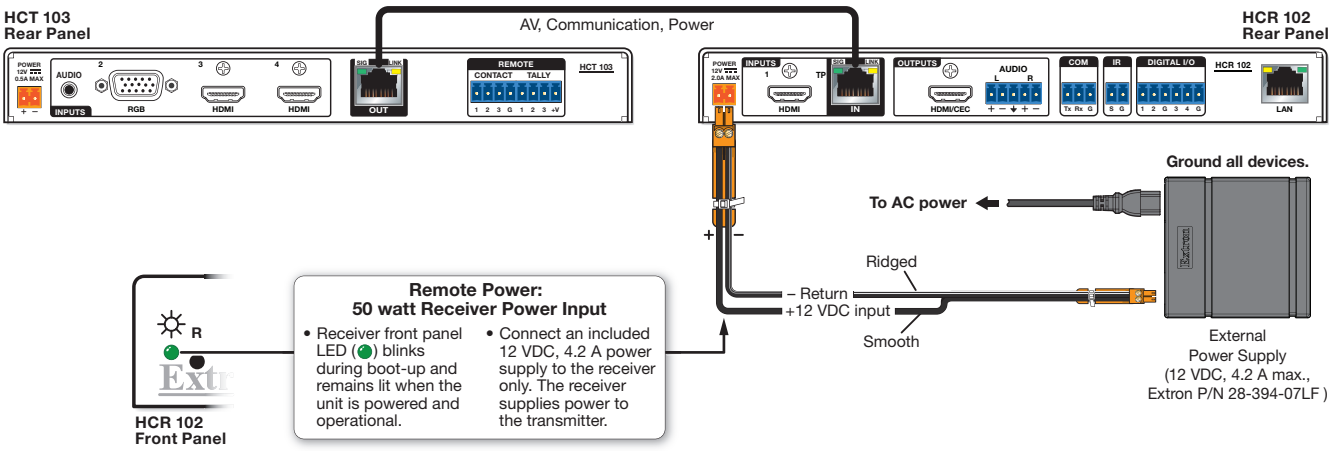


Figure 21. Connecting a 50 watt Power Supply for Remote Power

NOTE: The receiver can provide power remotely to the transmitter using a 50 watt power supply. Remote power mode requires at least 2.5 A. The transmitter can receive power from but cannot provide power to the receiver. The remote power feature is enabled by default but can be disabled by using a control in the PCS software.

- Alternatively, you can connect an optional 12 VDC, 1.5 A power supply (such as the Extron PS 1215 C) at the transmitter, and connect an optional 12 VDC, 2 A power supply (such as the Extron PS 1220) at the receiver.

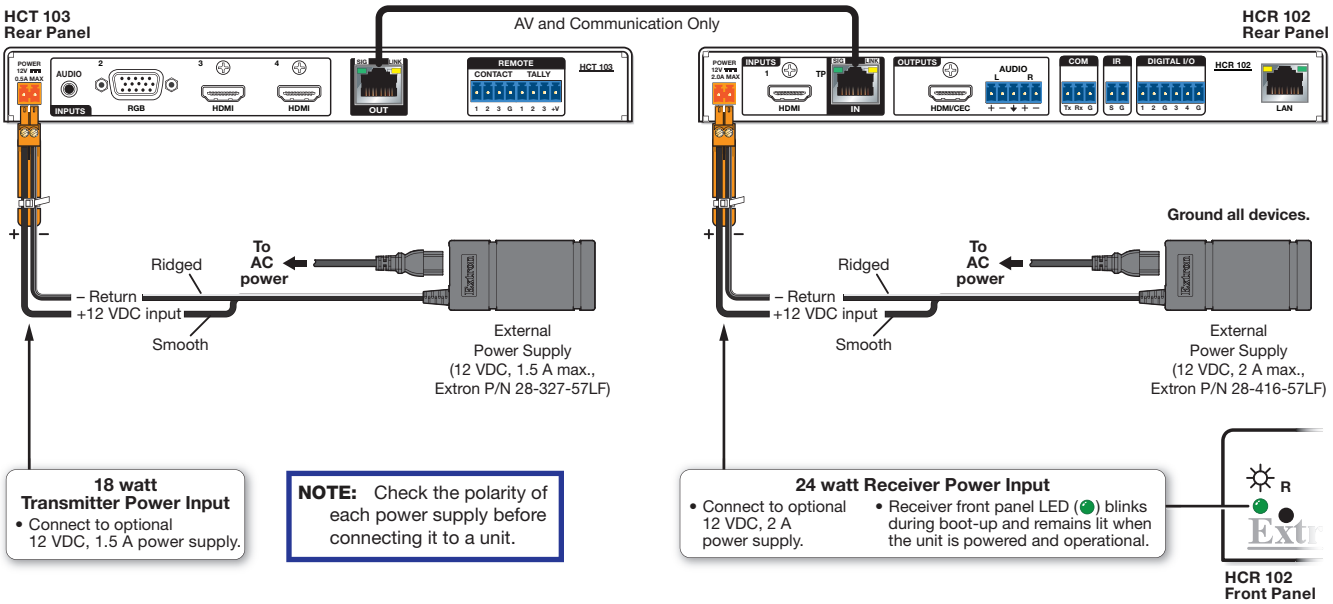


Figure 22. Connecting Each Unit to an External Power Supply

Connect the external power supply or supplies to a 100 to 240 VAC power source.

Reset Button (HCT 102 D)

P **Reset button** (see **figure 8** on page 16) — If the transmitter powers on but is otherwise unresponsive or uncommunicative after a failed firmware upload, you can manually boot up the unit to use the factory firmware code by pressing and holding the rear panel **Reset** button (HCT 102 D) while applying power. You must then load new firmware via the HCR 102 receiver (see **Firmware Updates** on page 80).

Grounding Screw (HCT 101 EU and MK)

Q **Grounding screw** (see **figure 10**, **Q**, on page 17)— If the HCT 101 EU or HCT 101 MK transmitter is not mounted to a grounded metal junction box, Extron recommends connecting the unit to an earth ground to protect the unit from electrostatic discharge.

Grounding

To ground the unit (see the figure at right):

1. Securely terminate a grounding cable with a ring terminal.
2. Remove the grounding screw in the upper right corner of the rear panel
3. Insert the screw through the ring terminal.
4. Replace and securely fasten the screw to the rear of the unit. Do not overtighten the screw. Maximum torque is 2 inch-pounds (0.2 Newton-meter).
5. Connect the other end of the grounding cable to an earth ground.

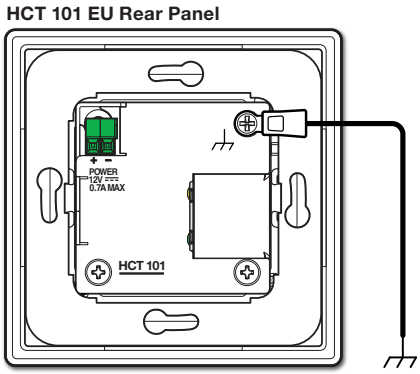


Figure 23. Connecting a Grounding Wire to the HCT 101 EU or HCT 101 MK

Network Communication Setup

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** — a quick method to use whether or not you need to configure other settings. This requires connection to a display device.
- Via **PCS software** — 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** — 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.

Network Configuration via OSD Menu

To configure network settings from the OSD menu:

1. Connect an HDMI display device to the HDMI/CEC output connector on the HCR 102.
2. Power on the receiver and the display device, if they are not already powered on.
3. On the front panel of the receiver, press the **Menu** button. The on-screen display should appear on the connected display or in the projected image.
4. Press the front panel **Menu** button on the HCR 102 (see **figure 5**, F on page 13 for button location). The OSD main menu appears on the display.

   NOTE: For details on the OSD menu system and its use, see **Using the OSD Menu System** starting on page 41.

5. Navigate through the menus and make adjustments. For the IP address, either set a static IP address (with DHCP off) or turn DHCP on to let the DHCP server select the IP address for the unit.

   a. Press the ▲ and ▼ arrow navigation buttons (H) to navigate to and highlight the desired menu or submenu. For network configuration, select the **Quick Setup** menu or the **Communication** menu.

   b. Press the **Enter** button (G) or ▶ arrow button to access submenu items for the selected submenu.

   c. Press the ▲ and ▼ arrow buttons to navigate to and highlight submenu items.

   d. Press the **Enter** or ▶ arrow button to adjust a submenu item.

   From the **Quick Setup** menu:

   - DHCP — Select and enter the **DHCP Mode** submenu and press the arrow buttons to turn DHCP on or off (default: off).
   - IP address — Select and enter the **IP Address** submenu. Press the ◀ or ▶ arrow button to move between octets. Press the ▲ and ▼ arrow buttons to change the value in the selected octet.
     Default: 192.168.254.250.

   From the **Communication** menu:

   NOTE: Hold the **Enter** button for 10 seconds to make changes in this submenu.

   - DHCP — Select and enter the **DHCP Mode** submenu and press the arrow buttons to turn DHCP on or off (default: off).
   - IP address — Select and enter the **IP Address** submenu. Press the ◀ or ▶ arrow button to move between and select octets. Press the ▲ and ▼ arrow buttons to change the value in the selected octet.
   - Subnet mask — Select and enter the **Subnet Mask** submenu. Press the ◀ or ▶ arrow buttons to select an octet of the subnet mask address. Press the ▲ and ▼ arrow buttons to adjust the value of the selected octet.
     Default: 255.255.255.0.
   - Gateway — Select and enter the **Gateway** submenu. Press the ◀ or ▶ arrow buttons to select an octet of the gateway address. Press the ▲ and ▼ arrow buttons to adjust the value of the selected octet.
     Default: 0.0.0.0.

Network Configuration via PCS Software

To configure network settings using PCS:

1. Connect the PC and the LAN port of the HCR 102 receiver (see **LAN (IP) connector and LEDs** on page 30) to the same network.

   Or

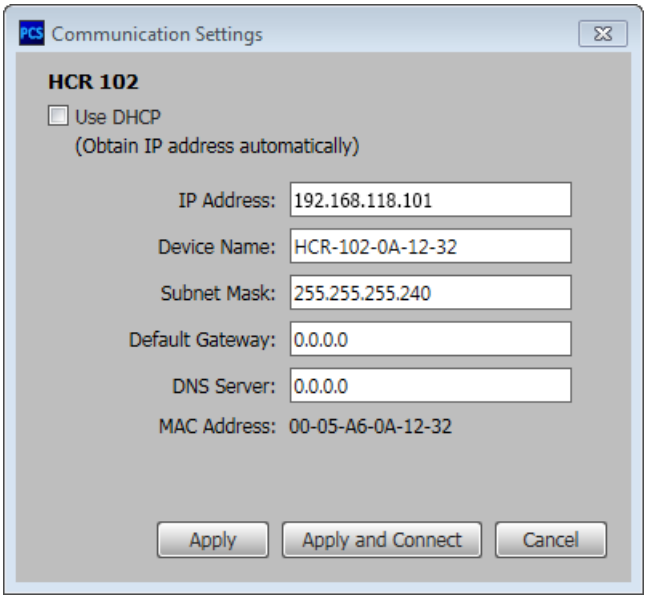
   Connect the PC to the front panel Config port of the HCR 102 receiver using a USB type A male to USB mini-B male cable (such as the Extron USB CFG cable).

   NOTE: If more than one device on a network shares the same default IP address, address conflicts can prevent TCP/IP connection. In most cases the MAC address is sufficient for PCS connection. Alternatively, try connecting the HCR 102 via USB.

2. Apply power to the PC and the HCR 102.
3. Open the PCS software. You might need to open the application as an administrator by right-clicking the PCS icon and selecting **`Run as administrator`**. PCS opens to the **`Device Discovery`** page. The Device Discovery process begins automatically. The page displays a list of all Extron control devices connected to the network via LAN or to the PC via USB as PCS detects them.

   TIP: If devices do not appear automatically in the list, click the **`Network Adapter`** button and select the appropriate option in the dialog box to ensure that PCS uses the correct network adapter for the connection to the HCR 102.

4. Using the MAC address, locate the desired device (HCR 102) in the list.
5. For a unit connected via TCP/IP, in the row for the HCR 102, the **`IP Address`** column click the **`Edit`** button. The **`Communication Settings`** dialog box opens, displaying controls for network configuration.



NOTE: If the unit is still set to the default IP address, all fields other than the **`IP Address`** field are grayed out and inaccessible.

Figure 24. The PCS Communication Settings Dialog Box (From Device Discovery)

For a unit connected via USB, double-click the row for the HCR 102 to open a connection to the unit. In the device-specific tab at the top of the window, click the Device Menu down-arrow then select **Settings** > **Communication Settings**. The **Communication Settings** dialog box opens, displaying controls for network configuration.

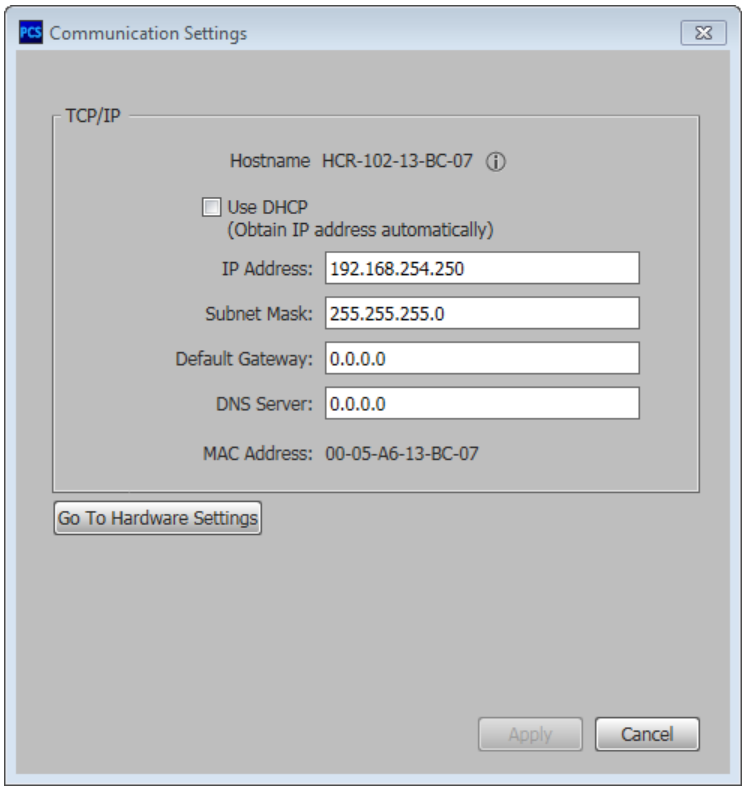


Figure 25. The PCS Communication Settings Dialog Box (From Device Menu)

6. Either select (enable) the **Use DHCP** checkbox to have the receiver obtain an IP address automatically from a DHCP server, or enter the static IP address for the unit in the **IP Address** field.

   NOTE: When setting up DHCP during network configuration or if using a host name instead of an IP address, the user must enter a qualified host name (*Username.HostName.Domain*). For example: `somename.extron.com`.

7. Configure the other items (device name, subnet mask, gateway address, DNS server address) as needed.
8. Click **Apply** to save the configuration changes. Alternatively, if you accessed this dialog box from the Device Discovery page, you can click **Apply and Connect** to save the configuration changes and then establish a connection from the PCS software to the receiver to configure AV settings.

Network Configuration via Toolbelt Software

To configure network settings using Toolbelt:

1. Connect the PC and the LAN port of the HCR 102 receiver to the same network. For details on the LAN connection, see **LAN (IP) connector and LEDs** on page 30.
2. Apply power to the PC and the HCR 102.
3. Open the Toolbelt software from within Global Configurator or open the stand-alone Toolbelt application. Extron recommends opening Toolbelt as an administrator by right-clicking the Toolbelt icon and selecting **Run as administrator**.

4. Start Device Discovery (click **Start Discovery** or **Discovery**, depending on the Toolbelt version). Toolbelt searches for and displays a list of all Extron control devices connected to the network as it detects them.

   NOTE: If your device does not appear in the Discovery list, navigate to the menu and select **Tools** > **Options...**. An Options dialog box opens. Verify that the selected network interface is either All or the specific network interface that connects to the LAN used by the HCR. Close the dialog box.

5. Using the MAC address, locate the desired device (HCR 102) in the list and select it.
6. Choose one of the following options (see the rightmost column of the device list):
   - Click the **Set IP** link or icon (if available). A Set Network Properties dialog box opens.
     a. Configure the IP address, subnet mask, and gateway address as needed.
     b. Click **Enter.** The system saves the settings and closes the dialog box.
   - Click the **Manage** link and then click the **Network Settings** tab in the right side of the window.
     a. Either select (enable) the **Use DHCP** checkbox to have the receiver obtain an IP address automatically from a DHCP server, or enter the static IP address for the unit in the **IP Address** field.

        NOTE: When setting up DHCP during network configuration or if using a host name instead of an IP address, the user must enter a qualified host name (*Username.Hostname.Domain*). For example: somename.extron.com.

     b. Configure the other items (device or host name, subnet mask, gateway address, DNS server address) as needed.
     c. Click **Apply** to save the configuration changes or click **Cancel** to discard changes.

Front Panel Configuration and Operation

This section covers how to use front panel controls for operation and configuration, including the following topics:

- **Input Selection: Manual and Auto-Input Switching**
- **Using Front Panel Buttons for Special Functions**
- **Front Panel Lockout (Executive Modes)**
- **Using the OSD Menu System**
- **Resetting the Unit Manually or Via Software**

See **Software-Based Configuration and Control** starting on page 59 for more advanced configuration options.

Input Selection: Manual and Auto-Input Switching

The HC 400 Series systems offer an auto-input switching (auto-switching) mode that automatically selects sources based on input signals and also allows manual source selection via buttons.

The auto-switching mode can be configured by using Product Configuration Software (PCS). It is useful in installations where the front panels are not easily accessible, or in the case of the HCT 102 D, HCT 101 D, HCT 101 EU, and HCT 101 MK, which have no buttons.

Manual Input Selection

If the system is set for manual switching mode (auto-switching mode is disabled), or if it is set for the "last connected" hybrid mode (a blend of auto-switching with manual override), there are four ways to select an input:

- Press the front panel input selection button (see **figure 5**, **B** on page 13) for the desired input.

- Press the **Share** button on an Extron Show Me cable connected to the desired input. For a diagram of the cable and how to wire it to the contact input and tally output connectors, see the **Show Me cable** on page 21.

  NOTE: Because the HCT 102 D and the HCT 101 models do not have tally output ports and because their rear panel contact input ports are within the wall or furniture, it is not practical to use Show Me cables with these transmitter models. Use auto-input switching, a button panel wired to the contact input port, or a touchpanel or NBP button panel to select inputs on these models.

- Momentarily short an input pin (for inputs 2, 3, or 4) to the ground pin on the transmitter contact input port (see **Transmitter connections for input selection and indication** on page 21 for wiring). The unit switches to the corresponding input, and the corresponding input LED lights on the front panel.

- Tap a button on a TLP Pro Series touchpanel or NBP button panel. This option is available only if the HCR 102 has been configured using Global Configurator to include the touchpanel or button panel and to configure its buttons.

The input switch occurs as soon as the button is released or the contact input connection is made (a Show Me cable button or similar device button is pressed), and the corresponding front panel LED for that input lights to indicate that the input is selected (active).

Auto-Input Switching

The HC 400 Series systems (the transmitter-receiver pairs) offer the following auto-switching modes, which can be selected using PCS software:

- **0: disabled** (manual switching only)
- **1: user-defined priority mode**

  When this mode is enabled, the transmitter-receiver system detects which of its inputs has an active signal and outputs the signal from the active input that has the highest specified priority level. You can set the priority level of each input by using the PCS software.

  NOTE: As shipped, and after a reset to factory default settings, the default priority order is: input 1, input 2, input 3, input 4.

- **2: last connected mode** (a hybrid of auto and manual switching) (default)

  Last connected (hybrid) auto-switching mode is a mode that blends connection priority and manual switching. For this mode, the HC 400 Series system assigns the highest priority to the most recently connected, active input, and assigns the lowest priority to the least recently connected input. Manual input selection overrides this priority.

  - When a new input source is connected, the system switches to the newly connected input.
  - When the currently selected input is disconnected, the system switches to the next highest priority input.
  - When an input is manually selected (using a front panel button, a Show Me cable Share button, contact closure, NBP button panel, or a touchpanel), the system switches to the manually selected input, and that input moves to the top of the priority list.

    If the system does not initially detect an active signal at the manually selected input, an auto-switching timeout period (from 0 to 500 seconds, set using PCS software) begins. The default period is 10 seconds. During the timeout period:

    - If no signal is detected at the manually selected input, the unit switches back to the previously selected input.
    - If an active signal is detected at the manually selected input, that input remains selected and system resets the timeout period. If the signal is lost, the timeout period begins again.

NOTE: The system (the transmitter-receiver pair) stores and remembers the current priority order, even if the units are powered off.

Using Front Panel Buttons for Special Functions

To enable or disable executive mode 2 (see "Front Panel Lockout (Executive Modes)" below for details): press and hold the **Menu** and **Enter** buttons for 2 or more seconds.

To reset the video output rate, hold the ▼ arrow button for 5 seconds.

In the event that the transmitter powers on but is otherwise unresponsive or uncommunicative after a failed firmware upload, you can manually boot up the unit to use the factory firmware code by pressing and holding the **Input 2** button while applying power.

Front Panel Lockout (Executive Modes)

The front panel controls (shown in (**figure 5**, Ⓕ, Ⓖ, Ⓗ, on page 13 and **OSD Menu Navigation** on page 42) can be disabled ("locked out") to prevent input selection and configuration changes. The front panel lockout options, known as "executive modes," are as follows:

Executive Modes			
Mode Number	**Input Switching Status**	**Status of Buttons**	**Enable and Disable Via:**
0 (default)	Unlocked (enabled)	Unlocked (enabled)	PCS software
1	Locked (disabled)	Locked (disabled)	PCS software
2	Unlocked (enabled)	Locked (disabled)	PCS software *or* Enable: Press and hold the **Menu** and **Enter** buttons for 2 seconds. Disable: Press and hold the **Menu** and **Enter** buttons for 2 seconds.

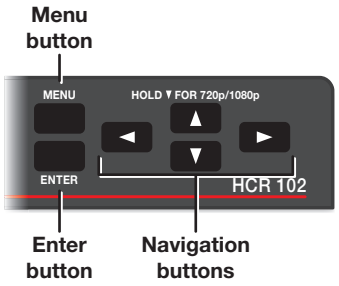
Using the OSD Menu System

The OSD menu is used primarily for the initial setup of the device (see **Software-Based Configuration and Control** starting on page 59 for advanced configuration options). The OSD menu presents configuration options on a local monitor. Selections and adjustments can be made with front panel controls.

NOTE: The OSD menu has a fixed time-out of 60 seconds.

OSD Menu Navigation

You can view and set many AV, communications, and system settings for the system using the on screen display and the receiver front panel buttons (shown at right).



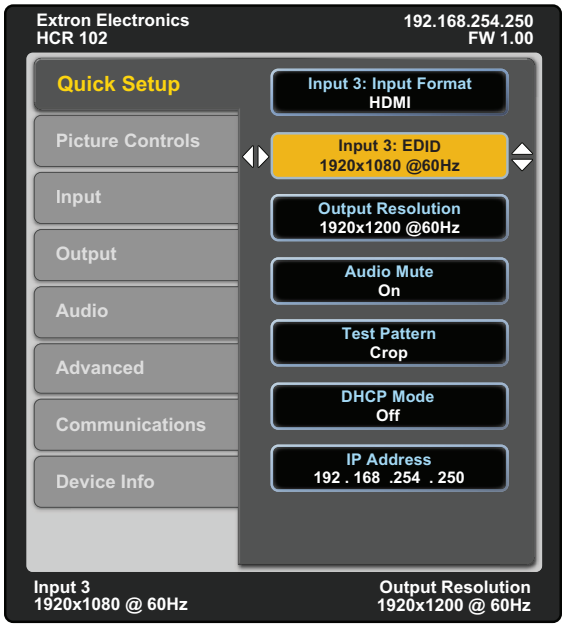
To open, navigate, and make selections in the OSD menu system, do the following:

1. Connect an HDMI display device to the HDMI/CEC output connector on the HCR 102.
2. Power on the HCR 102 receiver and the display device, if they are not already powered on. If you also want to configure the inputs or any settings that affect the transmitter, make sure the transmitter is also connected and powered on.
3. Press the front panel **Menu** button on the HCR 102. The OSD menu appears on the display (see the example at right).

   The OSD menu system consists of the following menus:

   - Quick Setup
   - Picture Controls
   - Input
   - Output
   - Audio
   - Advanced
   - Communication

   and one read-only information screen (Device Info).



4. Navigate through the menus and make adjustments.
   a. Press the ▲ and ▼ arrow navigation buttons to navigate to and highlight the desired menu or submenu items.
   b. Press the **Enter** button or ▶ arrow button to access submenu items for the selected submenu (see **Configuration: Using the OSD Submenus** on page 43 for information about the contents of each submenu). Press the ◀ arrow button to exit selected submenus or submenu items or press the **Menu** button to return to the list of submenus.

      NOTE: If needed, press any input selection button to change the selected input.

   c. Press the ▲ and ▼ arrow buttons to navigate to and highlight submenu items.
   d. Press the **Enter** or ▶ arrow button to adjust a submenu item.
   e. Press the **Enter** button to accept pending changes *or* press the **Menu** button to cancel any pending changes.
5. Allow the OSD menu to time out and turn off, or press and hold the **Menu** button for three seconds to exit the OSD menu.

   NOTE: The OSD times out and closes after one minute if no buttons are pressed.

OSD Menu Overview

In the OSD menu, the IP address and firmware version are displayed in the top border. The active input settings and output resolution are displayed in the bottom border.

The OSD menu contains eight submenus with various submenu items of adjustable settings or device information (see the table below). Use the **Menu**, **Enter**, and navigation buttons to navigate the menu.

Submenus	Submenu Items						
Quick Setup	Input Format	Input EDID	Output Resolution	Audio Mute	Test Pattern	DHCP Mode	IP Address
Picture Controls	Image Position	Image Size					
Input	Input Format	Horizontal/ Vertical Start	Total Pixels/ Phase	HDCP Authorization	Input EDID		
Output	Resolution	HDMI Format	HDCP Notification				
Audio	Audio Mute	Audio Format	Program Volume	Output Format			
Advanced	Test Pattern	Screen Saver/ Timeout	Aspect Ratio	Auto Switch	Factory Reset		
Communication	MAC Address	DHCP	IP Address	Subnet Mask	Gateway		
Device Info (Read Only)	Unit Name	Firmware Version	Temperature	Active Input Details	Output Details	Detected Display	

NOTE: The **Communication** submenu is normally locked. While the Communication page is open, press and hold the **Enter** button for 10 seconds to unlock the submenu items.

Configuration: Using the OSD Submenus

The AV, scaling, and basic IP settings for the system can be configured by using the on-screen display menu system. AV and scaling settings can also be configured via a host connection through the LAN port or the USB port using PCS software.

Use the information in this section as a guide to available settings as you configure the AV settings using the OSD and front panel buttons. For instructions on how to access and navigate through the OSD menu, see **OSD Menu Navigation** on page 42.

Quick Setup submenu

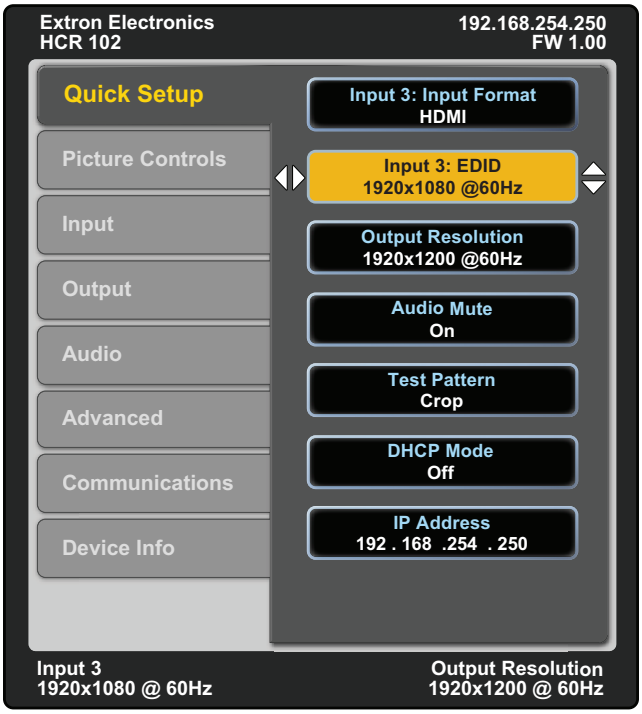


Figure 26. Quick Setup Submenu

The `Quick Setup` submenu provides quick access to common input, output, and communication settings. This submenu contains the following submenu items:

- **Input Format** — Press the navigation buttons to select the desired video input format (see **Input Format** on page 46). The current input is displayed in the title of the submenu.

  NOTE: Input 2 (RGB) is read-only.

- **Input EDID** — Press the navigation buttons to select a discrete EDID or match the output resolution (see **EDID** on page 47). The current input is displayed in the title of the submenu.
- **Output Resolution** — Press the navigation buttons to select from a list of output resolutions and refresh rates (see **Resolution** on page 48). The default setting is 1080p @ 60 Hz.
- **Audio Mute** — Press the navigation buttons to globally mute or unmute the audio.
- **Test Pattern** — Press the navigation buttons to select an available test pattern to display or to turn a test pattern off (see **Test Pattern** on page 51). The available test patterns are `Crop`, `Alternating Pixels`, `Color Bars`, `Grayscale`, `Blue Mode`, and `Audio Test Pattern` (pink noise). The default setting is `Off`.
- **DHCP Mode** — Press the navigation buttons to enable or disable DHCP mode.
- **IP Address** — Press the ▶ and ◀ buttons to change octets. Press the ▲ and ▼ buttons to change the value of a selected octet.

Picture Controls submenu

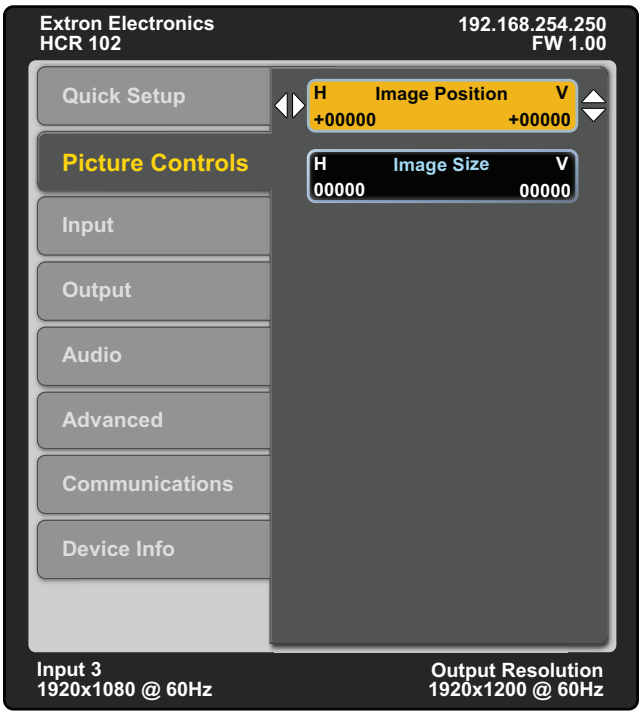


Figure 27. Picture Controls Submenu

The `Picture Controls` submenu displays picture settings. These settings are read-only.

- **Image Position** — This displays the horizontal (H) and vertical (V) positions of the image.
- **Image Size** — This displays the horizontal (H) and vertical (V) sizes of the image.

Input submenu

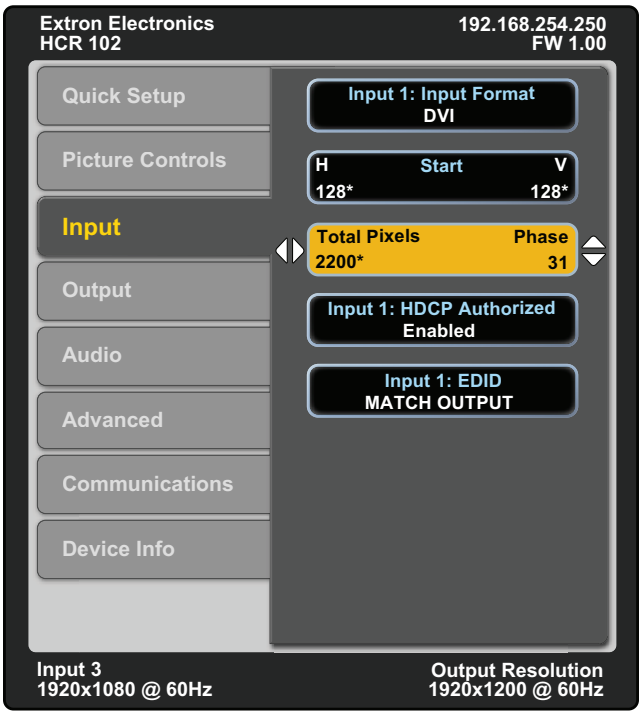


Figure 28. Input Submenu

The `Input` submenu adjusts the active input.

- **Input Format** — Press the navigation buttons to select a digital video input format. The table at right shows the available formats for each input.

  NOTE: Input 2 (RGB) for HC 404 and HC 403 systems is read-only.

	Input 1	Input 2	Input 3	Input 4
HC 404	HDMI (default)	RGB (default)	HDMI (default)	HDMI (default)
	DVI		DVI	DVI
HC 403	HDMI (default)	RGB (default)	HDMI (default)	
	DVI		DVI	
HC 402, HC 402 EU, HC 402 MK	HDMI (default)	HDMI (default)		
	DVI	DVI		

- **Start** — For analog input 2 (on an HCT 103 or HCT 102 D), press the ◀ and ▶ buttons to select the horizontal (H) or vertical (V) pixel start values, then press the ▲ and ▼ buttons to adjust the selected position. These values are read-only for the digital inputs.
- **Total Pixels and Phase** — For analog input 2, press the ◀ and ▶ buttons to select either `Total Pixels` or `Phase`, then press the ▲ and ▼ buttons to adjust the selected value. These values are read-only for the digital inputs.

- **HDCP Authorized** — Press the navigation buttons to enable or disable the HDCP Authorized feature for each digital input. This feature determines if a digital input will report as an HDCP authorized sink to a source.

  NOTES:

  - The HDCP Authorized feature does not apply to input 2 of an HC 404 or HC 403 system, as that is an analog input.
  - The HDCP Authorized feature also does not apply for input 2 of an HC 402 or HC 402 EU/MK system. The HCT 101 transmitters do not support configuration of HDCP authorization.

  Enable HDCP Authorized for source devices that require encryption. If HDCP Authorized is disabled for sources that require encryption (for example, a Blu-ray™ player), the output is muted or a warning message is displayed. By default this feature is enabled.

  Some source devices may encrypt their output even if the source material does not require HDCP encryption, preventing content from being displayed on a non-HDCP compliant display. Disable the HDCP Authorized feature to allow the output to remain unencrypted.

- **EDID** — Press the navigation buttons to select an EDID for the active input. Select a discrete EDID from a list of factory-supplied EDID or select **`Match Output`** to use the output resolution and refresh rate (see **Resolution** on page 48 for a full list of available resolutions and refresh rates).

  NOTE: The EDID feature does not apply for input 2 of an HC 402 or HC 402 EU/MK system. The HCT 101 transmitters do not support EDID configuration. The HCT 101 input EDID is fixed at 1080p, 60 Hz

Output submenu

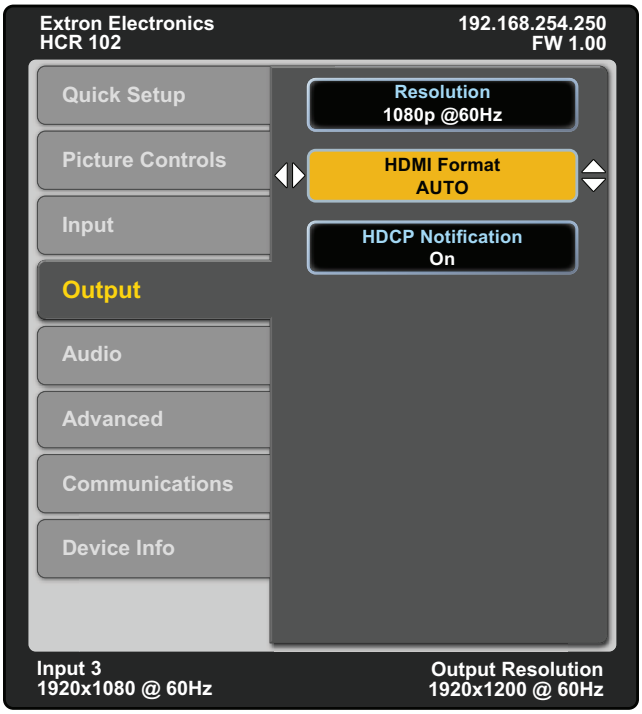


Figure 29. Output Submenu

The `Output` submenu configures the output resolution, refresh rate, HDMI format, and HDCP notification.

- **Resolution** — Press the navigation buttons to change the resolution and refresh rate from the select list. The following table shows the available resolution and refresh rates.

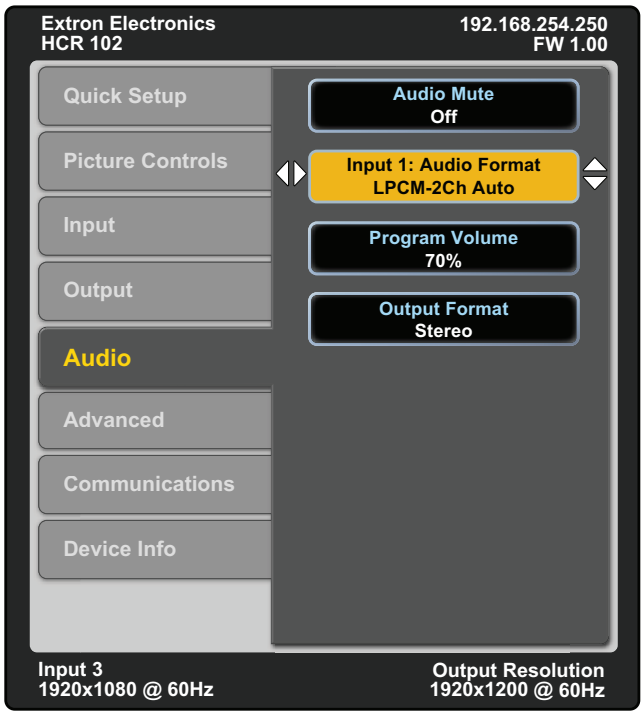
Output Resolution and Refresh Rate Combinations									
	Refresh Rate								
Resolution	23.98 Hz	24 Hz	25 Hz	29.97 Hz	30 Hz	50 Hz	59.94 Hz	60 Hz	75 Hz
640x480						X		X	X
800x600						X		X	X
852x480						X		X	X
1024x768						X		X	X
1024x852						X		X	X
1024x1024						X		X	X
1280x768						X		X	X
1280x800						X		X	X
1280x1024						X		X	X
1360x765						X		X	X
1360x768						X		X	X
1365x768						X		X	X
1366x768						X		X	X
1365x1024						X		X	X
1440x900						X		X	X
1400x1050						X		X	
1600x900						X		X	
1680x1050						X		X	
1600x1200						X		X	
1920x1200						X		X	
480p							X	X	
576p						X			
720p			X	X	X	X	X	X	
1080i						X	X	X	
1080p	X	X	X	X	X	X	X	**X***	
2K (2048x1080)	X	X	X	X	X	X	X	X	

* = Default output resolution (1080p @ 60 Hz)

- **HDMI Output Format** — Press the navigation buttons to set the output format. HDMI output format has three components:
  - **Video format** — DVI or HDMI
  - **Color space** — RGB 4:4:4, YUV 4:2:2, or YUV 4:4:4
  - **Quantization range** — full (0-255) or limited (16-235)

  The following formats are available:
  - Auto (based on display EDID)
  - DVI RGB 444
  - HDMI RGB 444 Full
  - HDMI RGB 444 Limited
  - HDMI YUV 444 Full
  - HDMI YUV 444 Limited
  - HDMI YUV 422 Full
  - HDMI YUV 422 Limited
- **HDCP Notification** — Press the navigation buttons to enable or disable an HDCP compliance notification for when an HDCP-encrypted input is sent to a non-compliant display. If HDCP notification is enabled, the output displays a moving message reading “HDCP Content” on a green screen. If HDCP notification is disabled, the output displays a black or muted screen. This feature is enabled by default.

Audio submenu



The `Audio` submenu allows users to adjust audio settings, mute audio, set the audio input format (see table below) for the selected input, set program audio volume, and set audio output format (stereo, mono). Extron recommends using the PCS for initial audio configuration (see the Audio Configuration topic within the *PCS - HC 404 Module Help File* for more audio configuration details and tips).

- **Audio Mute** — Press the navigation buttons to globally mute or unmute audio output.
- **Audio Format** — Press the navigation buttons to select the audio input format. For the HC 404 and HC 403 systems, analog input 2 can be set only to `Analog` or `None`. Inputs 3 and 4 can accept all audio input formats.

Audio Input Format	Details	Inputs (HC 404, HC 403)	Inputs (HC 402)	Inputs (HC 402 EU, HC 402 MK)
None	Mutes audio for the selected input. Sets “No Audio” EDID.	All	All	All
Analog	Sets the selected input to analog. Sets “No Audio” EDID.	2, 3, 4	2	See note below.
LPCM-2Ch	Sets the selected input to LPCM-2Ch (linear pulse code modulation, 2-channel) audio (default for input 1). Sets 2Ch audio EDID.	1, 3, 4	1, 2	1, 2
Multi-Ch	Sets the selected input to Multi-Ch (multi-channel) audio. Sets Multi-Ch audio EDID.	1, 3, 4	1, 2	1, 2
LPCM-2Ch Auto	Sets the selected input to prioritize digital audio (default for inputs 3 and 4). Analog audio is passed when digital is not present. Sets 2Ch audio EDID.	3, 4	2	2
Multi-Ch Auto	Sets the selected input to prioritize digital audio. Analog audio is passed when digital is not present. Sets Multi-Ch audio EDID.	3, 4	2	2

NOTES:

- Auto modes default to digital audio. If digital audio is not available, then the unit outputs analog audio.
- The OSD menu and PCS software provide an analog audio option for input 2 even though the HCT 101 EU/MK transmitters do not support analog audio input.
- Multi-channel audio does not include audio processing when it is sent to the output. It is also unaffected by volume control.

NOTES:

- HCR 102 can only de-embed digital 2Ch PCM audio to the analog audio output. It cannot de-embed multi-channel audio.
- Input 2 for an HC 402 EU/MK system can be set to LPCM-2Ch Auto or Multi-Ch Auto. However, EU and MK models use only digital audio because there is no analog audio input on the transmitter. That feature can be fully utilized by the HC 402.

- **Program Volume** — Press the navigation buttons to set the program volume (in percent).

NOTE: The output volume control in the PCS software and in the OSD menu applies to the analog audio output only. The output level for the HDMI embedded audio is fixed and cannot be adjusted.

- **Output Format** — Press the navigation buttons to set the audio output format (L + R program audio [mono], or stereo).

Advanced submenu

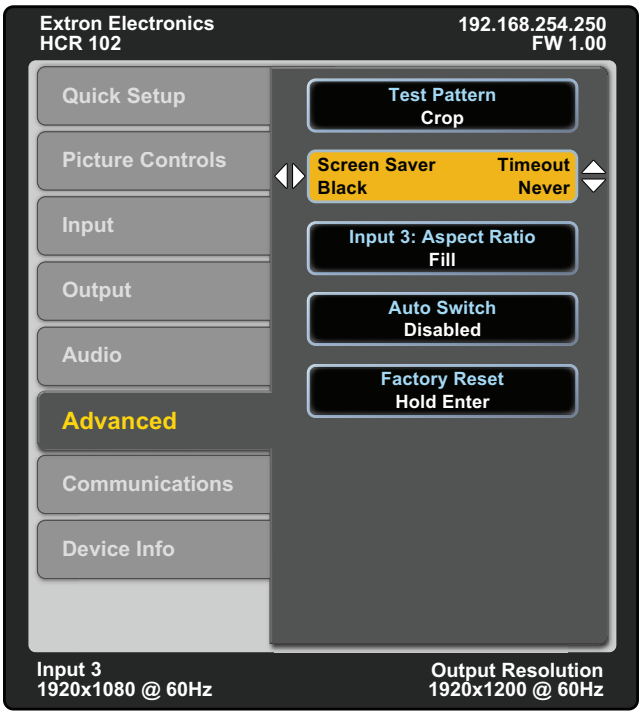


Figure 30. Advanced Submenu

The `Advanced` submenu allows you to select a test pattern, set the screen saver mode, set the aspect ratio, set auto-switching on or off, and reset the device to factory defaults.

- **Test Pattern** — Press the navigation buttons to select a test pattern to display or to turn off a test pattern. The available test patterns are `Crop`, `Alternating Pixels`, `Crosshatch`, `Color Bars`, `Grayscale`, and `Audio Test` (audio pink noise, with crop pattern). The default setting is `Off`.

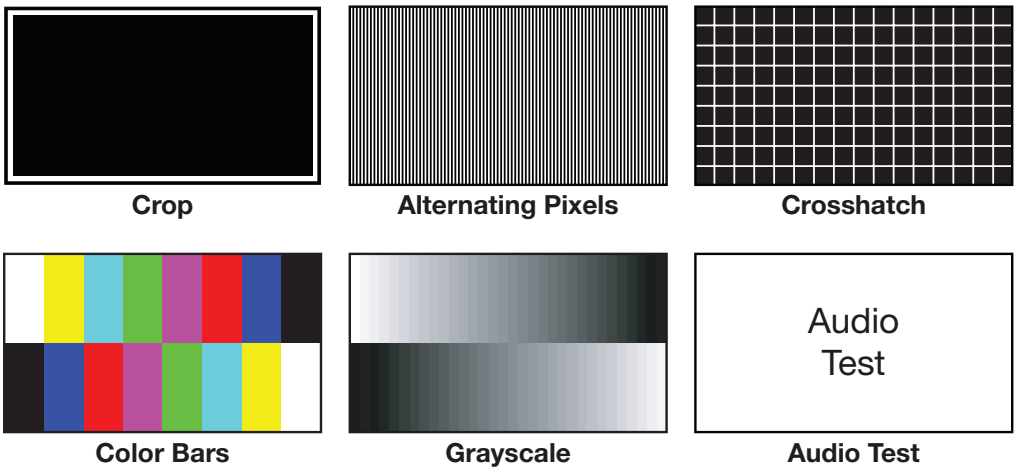


Figure 31. Available Test Patterns

NOTES:

- The audio test outputs pink noise on the embedded digital audio output (2-channel, 48 kHz, 16 bit) and displays a crop pattern on the video.
- All test patterns include a single pixel border.
- All test patterns remain enabled after a power cycle.

- **Screen Saver and Timeout** — Press the ◀ and ▶ buttons to select the screen saver setting or the duration the screen saver remains active before sync is disabled. Press the ▲ and ▼ buttons to either set the screen saver to a black screen (default), or to a blue screen with on-screen display, or to set the screen saver time-out duration to a specified number of seconds. These options can also be set by using PCS software.
  - When there is no active video on the selected input, the device can mute the video output to black (**`Black`**), or set it to blue with an on-screen display (**`Blue with OSD`**) for a set duration before disabling output sync. By default, the scaler outputs black video and sync (no sync timeout) when no active input is detected.
  - The screen saver timeout duration can be set to any duration from 0-500 seconds. The default timeout value is 501, which disables the timeout.
- **Aspect Ratio** — Press the navigation buttons to set the aspect ratio setting of the active input to Fill (default) or Follow.
  - Fill — In Fill mode, all input signals automatically fill the entire output. To adjust an aspect ratio for a single input rate, set the desired size and center in the `Picture Controls` submenu (see **Picture Controls submenu** on page 45).
  - Follow — In Follow mode, each input rate is displayed with its native aspect ratio mode with the correct letter box or pillar box settings visible.

  The scaler clears the previous size and position settings whenever the aspect ratio setting for an input is adjusted.
- **Auto Switch** — Press the navigation buttons to turn the auto-switching mode on or off, and to set the priority. The auto-switching setting allows for basic, unmanaged, automatic input switching based on the presence of active input signals. Auto-switching mode options are:
  - Disabled (off)
  - User-defined
  - Last connected

  Details about each mode are available in **Auto-Input Switching** on page 40.
- **Factory Reset** — Press and hold the **`Enter`** button to reset the device to factory defaults. The scaler retains the current firmware version, as well as communication and IP settings. For additional reset modes and options, see **Resetting the Unit Manually or Via Software** on page 54

Communication submenu

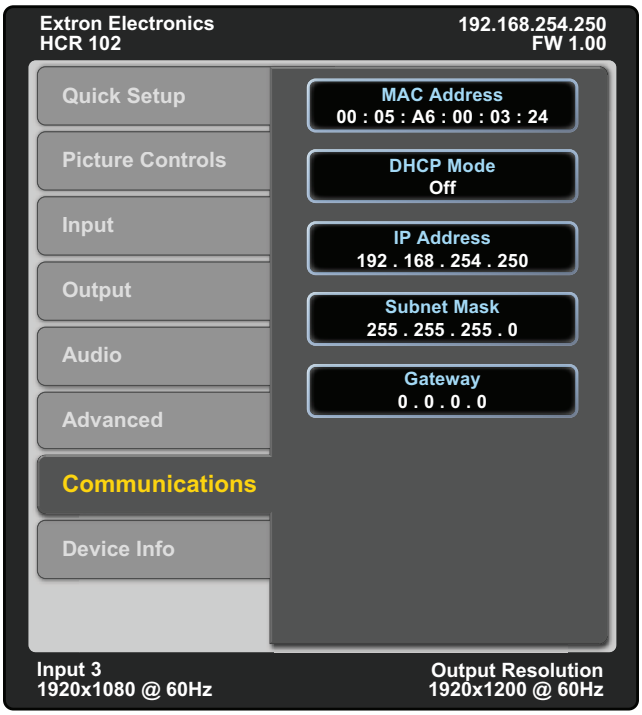


Figure 32. Communication Submenu

The `Communication` submenu displays the device MAC address, DHCP status, the current IP address and subnet mask, and the gateway IP address.

NOTE: Press and hold the **`Enter`** button for 10 seconds to edit settings in the `Communication` submenu.

- **MAC Address** — Displays the MAC address of the device (read only).
- **DHCP Mode** — Press the navigation buttons to turn the DHCP mode on or off. The default is `Off`. If you turn DHCP on, the IP address of the unit use an IP address that is dynamically assigned by a DHCP network server instead of a fixed address..
- **IP Address** — Press the ◀ and ▶ buttons to select an octet of the IP address. Press the **`Up`** and **`Down`** buttons to adjust the value of the selected octet. The default is `192.168.254.250`.
- **Subnet Mask** — Press the ◀ and ▶ buttons to select an octet of the subnet mask address. Press the ▲ and ▼ buttons to adjust the value of the selected octet. The default is `255.255.255.0`.
- **Gateway** — Press the ◀ and ▶ buttons to select an octet of the gateway address. Press the ▲ and ▼ buttons to adjust the value of the selected octet. The default is `0.0.0.0`.

Device Info submenu

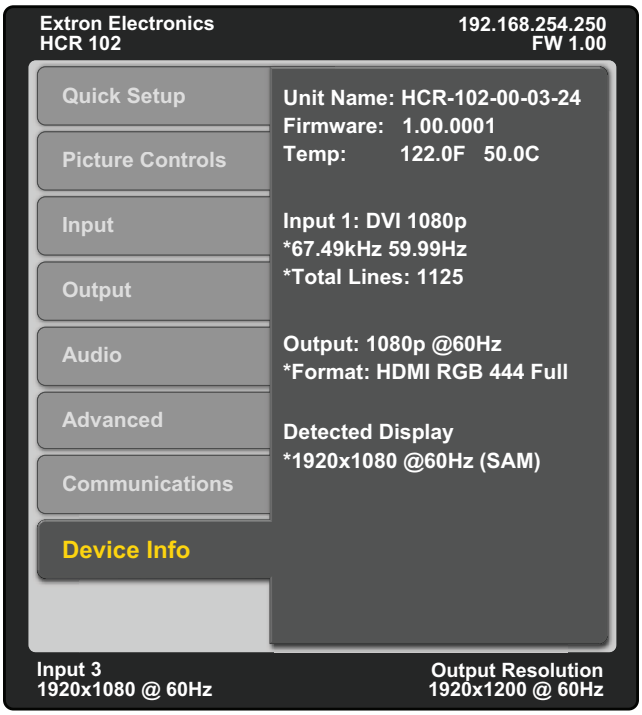


Figure 33. Device Info Submenu

The `Device Info` submenu displays device information including unit name, firmware version, internal temperature, input and output signal information, and detected display information. This submenu is read-only and does not contain any adjustable submenu items.

Resetting the Unit Manually or Via Software

A total of seven reset modes are available for the HC 400 Series systems. See the **reset modes table** starting on the next page for a summary of all of the modes.

- Five reset modes are available by pressing the **`Reset`** button on the front panel of the HCR 102. The **`Reset`** button is recessed, so use a pointed stylus, ballpoint pen, or Extron Tweeker to access it.
- Three reset modes (Reset Device Settings, Reset Device Settings and Delete Files, Reset All Settings and Delete Files) are available using PCS software, accessible by selecting **`Reset Device`** from the device menu, selecting the radio button for the desired reset mode, and clicking **`Reset`**.
- Some of the reset modes are accessible using Toolbelt software, and one is also available using the OSD menu and front panel buttons.

ATTENTION:

- Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a unit reboot.
- Analysez minutieusement les différents modes de réinitialisation. Appliquer le mauvais mode de réinitialisation peut causer une perte inattendue de la programmation de la mémoire flash, une reconfiguration des ports ou une réinitialisation de l'unité.

Manual Resets

NOTE: If you hold down the **Reset** button continuously, the LED blinks every 3 seconds, and the unit enters a different mode, from the Reset all IP Settings mode through the Reset to Factory Defaults mode. For Reset to Factory Defaults mode the LED blinks three times, the third blink indicating the last mode. The modes are separate functions, not a continuation from one mode to the next.

HCR 102 Reset Mode Summary — Front Panel-Based Resets

Mode	Use This Mode to...	Activation	Result
Use Factory Firmware	Temporarily boot up the unit with factory-installed firmware for a single power cycle in the event that a firmware update has failed or if incompatibility issues arise with user-loaded firmware	To start the Use Factory Firmware reset mode and replace firmware: 1. On the HCR 102, hold down the recessed **Reset** button while applying power to the unit. Keep holding the button down until the **Power** LED flashes twice, then release the button. The HCR 102 enters factory firmware mode, and the LED flashes quickly. 2. Upload new firmware to the unit as desired (see **Updating the Firmware** on page 81 for details). **NOTE: Do not** continue to operate the HCR 102 using the factory firmware version. If you want to use the factory default firmware version, you must upload that version again. See the *Global Configurator Help File* for firmware upload instructions.	**The unit reverts to the factory default firmware.** Event scripting does not start if the unit is powered on in this mode. All user files and settings such as drivers, adjustments, and IP settings are maintained. **NOTES:** • To return the unit to the firmware version that was running prior to the reset, cycle power to the unit. • This mode is available only **via front panel**.

Project Recovery	Recover project configuration and program files if passwords have been lost	To start the Project Recovery reset mode and recover a project:
		1. On the PC, open Global Configurator.
		2. Click the **Tools** menu and select **Project Recovery**. The **Recovery Mode** dialog box opens.
		3. Enter the IP address or host name of the target device for which you want to perform project recovery.
		4. Click **Recover**. The software allows indefinite time to establish a connection (until a connection is made or the user clicks **Cancel**).
		5. On the HCR 102, press the **Reset** button three times within one second. The HCR 102 enters project recovery mode for 30 seconds, during which time the **Power** LED blinks quickly.
		GC automatically connects to the HCR 102, then opens and retrieves the project from the unit.
		6. Cycle power to the HCR 102 to exit project recovery mode.
		7. Perform the **Reset to Factory Defaults** reset on the HCR 102 (see the next page).
		8. Open Toolbelt, start device discovery, select the desired HCR 102 from the list and click **Manage**.
		9. Click the **Network Settings** tab and set the IP address of the HCR 102.
		10. Click the **User Management** tab and change the password of the HCR 102.
		11. Close Toolbelt.
		12. In GC, add the new password to the recovered project.
		13. Save the project.
		14. Upload the project from GC to the HCR 102.
			Project Recovery mode stops regular operation and allows a connection to be made to the unit via GC software without requiring password entry so that project files can be retrieved and saved.
			• During project recovery mode, events are stopped, and so is communication with AV devices.
			• While the HCR 102 is in this mode, use GC software to recover project files.
			• If the software does not initiate project recovery within 30 seconds after the unit enters this mode, the unit exits recovery mode.
			• Upon exiting project recovery mode:
			  • The unit returns to its pre-recovery mode state and settings.
			  • The **Power** LED returns to being steadily lit.
			NOTE: This mode is available only **via front panel**.

HCR 102 Reset Mode Summary — Front Panel-Based Resets			
Mode	**Use This Mode to...**	**Activation**	**Result**
Run/Stop Program	Toggle stop/start program	To stop or start a program: 1. Hold down the **Reset** button for about 3 seconds, until the Power LED blinks once. 2. Release and press the **Reset** button momentarily (for <1 second) within 1 second*. *Nothing happens if the momentary press does not occur within 1 second.	The LED flashes 2 times if the program is starting. The LED flashes 3 times if the program is stopping. **NOTE:** This mode is available only **via front panel**.
Toggle DHCP	Enable or disable the DHCP client	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. **NOTES:** • The DHCP toggle mode is supported on firmware version 1.01 or higher. • By default DHCP is off and the unit uses a static IP address.	• The Reset LED blinks 6 times if the DHCP client is enabled. • The Reset LED blinks 3 times if the DHCP client is disabled. **NOTE:** When you disable the DHCP client, the unit reverts to using the previously-set static IP address.
Reset All IP Settings	Reset IP settings and port maps to factory defaults without affecting user-loaded files	To reset all IP settings: 1. Hold down the **Reset** button for about 6 seconds until the Power LED blinks twice (once at 3 seconds, again at 6 seconds). 2. Release and press the **Reset** button momentarily (for <1 second) within 1 second*. *Nothing happens if the momentary press does not occur within 1 second.	**Reset All IP Settings mode:** • Sets the LAN IP address back to factory default (192.168.254.250) • Sets the subnet back to factory default (255.255.255.0) • Sets the default gateway address to the factory default (0.0.0.0) • Sets domain and host names to factory default • Sets port mapping back to factory default • Turns DHCP off • Turns events (user-created schedules, macros) off. **NOTE:** This mode is available only **via front panel**.

Reset to Factory Defaults (Absolute System Reset)	Start over with configuration and uploading	To reset the unit to all factory default settings **via front panel**:
		1. Hold down the **Reset** button for about 9 seconds until the Power LED blinks three times (once at 3 seconds, again at 6 seconds, again at 9 seconds).
		2. Release and press the **Reset** button momentarily (for <1 second) within 1 second*.
		*Nothing happens if the momentary press does not occur within 1 second.
		NOTE: The factory configured password for this device has been set to the device serial number. Passwords are case sensitive. Performing a Reset to Factory Defaults reset sets the password to extron.
			Reset to Factory Defaults mode performs a complete reset to factory defaults (except the firmware).
			• Resets all AV settings.
			• Does everything Reset All IP Settings mode does
			• Removes (clears) all user-loaded files and configurations from the HCR 102:
			  • Clears driver-port associations (IR, serial, Ethernet) and port configurations
			  • Removes schedules, settings, macros
			  • Removes user-loaded digital certificates.
			• Removes the factory default GC configuration. The basic GC configuration project can be downloaded from the Extron website if you want to restore it to the unit after a reset.
			NOTE: This mode is available via **front panel, Toolbelt, and PCS**.
			The preferred methods for starting this reset are **front panel and Toolbelt**. In PCS this mode is called "Reset All Settings and Delete Files."
			This is also known as an absolute system reset.

NOTE: After performing a Reset All IP Settings or Reset to Factory Defaults reset, set the IP address again (by using the OSD menu, Toolbelt, or PCS) for use on your network.

Software- and OSD-Based Resets

HCR 102 Reset Mode Summary — Software- and OSD-Based Resets

Mode	Use This Mode to...	Activation	Result
Reset to Factory Defaults Except User Files, IP	Reset all device settings to factory default values, but retain user-created configuration files and IP settings.	**To use PCS** to reset the unit to factory default settings while retaining user-created configuration files and IP settings: 1. Open the Extron PCS software. 2. Locate and connect to the HCR 102 (see the *PCS Help File*). 3. Select **`Reset Device...`** from the device drop-down menu within the device tab for the HCR 102. The **`Reset Device`** dialog box opens. 4. Select (enable) the **`Reset Device Settings (Retains TCP/IP Settings)`** radio button. 5. Click the **`Reset`** button. The dialog box closes and the unit begins the reset process. **To use the OSD** to reset the unit to factory default settings while retaining the user-created configuration and IP settings: 1. Using the on-screen display and front panel buttons, navigate to the OSD **`Advanced`** submenu > **`Factory Reset`** (see **Factory Reset** on page 52). 2. Press and hold the front panel **`Enter`** button.	**This mode performs a reset to factory defaults (except IP-related settings, user-created configurations, and firmware).** • Resets all AV settings. **NOTES:** • This does not affect IP address, subnet mask, gateway address, unit name, DHCP, and related settings. • This mode is available **via PCS and OSD**. In PCS this mode is called "Reset Device Settings (Retains TCP/IP Settings)."
Reset to Factory Defaults Except IP	Reset all device settings to factory default values, delete user and configuration files, but retain IP settings.	**To use PCS** to reset the unit to factory default settings without affecting IP settings: 1. Open the PCS software. 2. Locate and connect to the HCR 102 (see the *PCS Help File* for instructions). 3. Select **`Reset Device...`** from the device drop-down menu within the device tab for the HCR 102. The **`Reset Device`** dialog box opens. 4. Select (enable) the **`Reset Device Settings and Delete Files (Retains TCP/IP Settings)`** radio button. 5. Click the **`Reset`** button. The dialog box closes and the unit begins the reset process.	**Reset to Factory Defaults Except IP mode performs a reset to factory defaults (except the IP-related settings and firmware).** • Resets all AV settings. • Removes all AV-related user-loaded files and configurations (such as EDID settings and backup files) from the HCR 102. • Removes the factory default GC configuration. The basic GC configuration project can be downloaded from the Extron website if you want to restore it to the unit after a reset. **NOTES:** • This does not affect IP address, subnet mask, gateway address, unit name, DHCP, and related settings. • This mode is available only **via PCS**.

Reset to Factory Defaults (Absolute System Reset)	Start over with configuration and uploading	To reset the unit to factory default settings **via Toolbelt software**:
		1. Start Toolbelt (run in Administrator mode). The Toolbelt window opens showing a blank list and no devices.
		2. Click the **`Start Discovery`** button (located top left) to enable device discovery. The button changes to **`Stop Discovery`** and the software searches for all available IP Link Pro devices (including the HCR 102) and associated TouchLink touchpanels or NBP button panels on the network, and displays them in the device list.
		3. Scroll through the device list and click on the **`IP Address`** link or the **`Manage`** link in the row for the desired HCR 102 to connect to the unit and open controls in the right side of the window.
		4. Click the **`System Utilities`** tab.
		5. In the **`System Commands`** section, click the **`Reset`** button. A confirmation dialog box opens.
		6. Click **`OK`**. The dialog box closes, the reset process begins.
		
		To reset the unit to factory default settings **via PCS software**:
		1. Open the Extron PCS software.
		2. Locate and connect to the HCR 102 (see the *PCS Help File*).
		3. Select **`Reset Device...`** from the device drop-down menu within the device tab for the HCR 102. The **`Reset Device`** dialog box opens.
		4. Select (enable) the **`Reset All Settings and Delete Files`** radio button.
		5. Click the **`Reset`** button. The dialog box closes, the unit begins the reset process. LAN connection to PCS is lost.
			Reset to Factory Defaults mode performs a complete reset to factory defaults (except the firmware).
			• Resets all AV settings.
			• Does everything Reset All IP Settings mode does.
			• Removes (clears) all user-loaded files and configurations from the HCR 102:
			  • Clears driver-port associations (IR, serial, Ethernet) and port configurations.
			  • Removes schedules, settings, macros.
			  • Removes user-loaded digital certificates.
			• Removes the factory default GC configuration. The basic GC configuration project can be downloaded from the Extron website if you want to restore it to the unit after a reset.
			
			NOTE: This mode is available via **front panel, Toolbelt, and PCS**.
			The preferred methods for starting this reset are **front panel and Toolbelt**. In PCS this mode is called "Reset All Settings and Delete Files."
			This is also known as an absolute system reset.

NOTES:

- After performing a Reset All IP Settings or Reset to Factory Defaults reset, set the IP address again (by using Toolbelt) for use on your network.
- The factory configured password for this device has been set to the device serial number. Passwords are case sensitive. Performing a Reset to Factory Defaults reset sets the password to `extron`.

Software-Based Configuration and Control

This section of the guide is divided into the following topics:

Configuration and Control: an Overview

AV Configuration

The AV and front panel lockout settings for the system can be configured:

- Via a host connection through the LAN port or the USB port on the receiver using PCS software (see **AV Configuration Using PCS Software** on page 62), or
- By using the on-screen display menu system (see **Using the OSD Menu System** on page 41). For cabling details see **LAN (IP) connector and LEDs** on page 30 and **USB connections** on page 21.

Many settings can be configured using either method (OSD or PCS). Some settings are available only in the PCS software.

Control Configuration

The control ports of the HCR 102 receiver must be configured before use in order to recognize and accept commands and pass them on to the controlled device. It can be configured and controlled via a host computer connected to the same network as the HCR 102 (see **LAN (IP) connector and LEDs** starting on page 30 for details about LAN port and cabling to connect the receiver to the network).

- Configure the receiver by using Toolbelt software and by using Global Configurator software (GC Professional or GC Plus) (see the Extron **website** for full system hardware and software requirements).
- The default web page embedded within the receiver provides a means to view general hardware information, network settings, and, if configured, project information. The embedded web page can also be used to update the firmware. However, you cannot configure either the AV settings of the system or the control features of the receiver via the embedded web page. To access the web page, enter the IP address of the HCR 102 receiver into the address field of a browser program and then log in.

Downloading the Software and Getting Started

Prior to configuration, download the configuration software (PCS, Toolbelt, Global Configurator) and the device driver files for products to be used in the installation. Those resources are available from the **Download** page on the Extron website (**www.extron.com/download/index.aspx**). When you locate the desired software or driver package, follow the on-screen directions to download and install it.

NOTES:

- Ethernet, serial, and infrared (IR) drivers (for controlling projectors, displays, DVD players, document cameras, and so forth) are available as individual files. If the system requires a driver that is not already available, you can request a new driver from Extron.
- You must use serial and Ethernet drivers developed specifically for the IP Link Pro platform. With the exception of IR device drivers, drivers used for the previous generation IP Link (non-Pro) control products are not compatible with the HCR 102.

Locating Software, Firmware, and Driver Files on the Extron Website

There are three main ways to find software, firmware, and device drivers within **www.extron.com**:

- Via links from the web page for the specific product
- Via the **Download Center** page (Click on the **Download** tab at the top of any page within the Extron website.)
- Via links from search results

NOTE: For some software you have the option to click the **Download** button to begin downloading the software file. For other software there is a link for contacting an Extron support representative who can provide you access to the latest version.

To obtain control product software, you must have an Extron Insider account and contact an Extron support representative. Extron provides training to our customers on how to use the software. For Global Configurator Professional, you must first attend Extron training, pass a proficiency test, and achieve Extron Control Professional Certification before being able to use all the features of that program.

Via links from the web page for the specific product

1. Navigate to the web page for the specific product model by performing one of the following:
   - Enter the model name into the search field in the upper right of any Extron web page and click the **magnifying glass** icon
     Or...
   - Selecting the model name from the **Product Shortcuts** drop-down list in the upper left of the Extron home page or **Products** page.
2. Click the **Downloads** tab in the middle of the product page. A list of available software, firmware, and documents for that model appears on screen.
3. Click on the name of the desired software or firmware to start downloading the file, or click on the link for device drivers to navigate to a page from which you can select either a driver package or specific drivers for individual devices.

Via the Download Center page

1. Click on the **Download** tab at the top of any page within the Extron website to access the **Download** page.

2. Click on the link for the desired software product category (such as PCS, Global Configurator Professional, firmware, or control system device drivers) in the center of the screen. A page opens that allows you to make more specific selections from within that category.
3. For **software**, click on the link for the specific software that you need. If needed, click on the alphabetical links to reach the desired part of the software list. A software product page opens that provides a description of the software package, a list of system requirements, a list of features, and access to the release notes, in addition to a download link.

   For **drivers**:

   a. Click on the **`Control System Drivers`** button.

   b. Select the name of the device from the drop-down list.

   c. Click the link directly below the search fields to download the current "Pro Series driver package" of all available drivers supported by the control device (the HCR). Alternatively, search for, locate, and select the device or devices for which you need a driver file.

   d. To download a single driver rather than the package, click on the appropriate link in the row for the product you want to control to download the driver or to download the "communication sheet." The communication sheet provides details that may be helpful for working with the product and its control driver.
4. For some software you can click the **`Download`** or **`Download Now`** button to begin downloading the software file. For other software there is a link for contacting an Extron support representative who can provide you access to the latest version.

   For **drivers**, navigate through the alphabetically arranged list to select and download a driver for a specific device.

Via links from search results

1. Type the specific name of the software package (such as Global Configurator or PCS) into the **`Search`** field in the upper right of the Extron web page and click the **`magnifying glass`** icon. A search results page appears.
2. Click on the name of the software package. A software product page opens that provides a description of the software package, a list of system requirements, a list of features, and access to the release notes, in addition to a download link.
3. For some software you can click the **`Download`** or **`Download Now`** button to begin downloading the software file. For other software there may be a link for contacting an Extron support representative who can provide you access to the latest version.

Installing Software

To install the software, do one of the following:

- Select "Run" as an option when you download the files and follow the on-screen instructions.
- Download the software, locate where it has been stored, open (double-click) the installer file, and follow the on-screen instructions.

AV Configuration Using PCS Software

To configure AV functions you must first establish a connection between the PCS software and the unit, then configure the settings.

Connecting to the HCR 102 in PCS

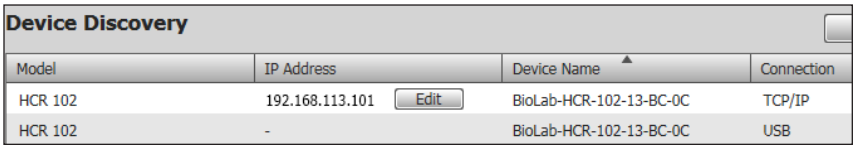
Prior to starting the software, connect the PC to the HCR 102 receiver via the rear panel LAN port (see **figure 7**, Ⓝ on page 16) or the front panel Config USB connector (see **figure 5**, Ⓐ on page 13). USB connection requires a user-provided USB A to USB mini-B cable.

To connect to the HCR 102 using PCS software:

1. Open the PCS software on a computer connected to the HCR 102 front panel Config port or to the same network as the HC 404 or HC 403 system (if connected by LAN). The software opens to the `Device Discovery` page. Device discovery begins and devices appear in the device list as they are detected on the network.
2. Connect to the unit in one of two ways:
   - In the `Device Discovery` page locate the desired HCR 102 in the device list and double-click on its row to connect to it (see the *PCS Help File* for detailed instructions).

     NOTES:

     - If multiple units that still have factory default IP address are connected to the same network, address conflicts can prevent a LAN connection. To ensure that you can connect to the unit, either:
       - Change the IP address of the unit before connecting to it within PCS (use the OSD menu and front panel controls), or
       - Make a direct USB connection from the unit to the computer and use the USB connection within PCS.
     - An HCR 102 can be connected to the PC via both LAN and USB at the same time. Choose one communication method for configuring the unit.

       Select the row that features the desired connection type (USB or TCP/IP LAN port).

   - Click the **`TCP/IP`** tab below `Device Discovery`, enter the IP address or host name of the unit into the **`IP Address/Hostname`** field, enter the password in the **`Password`** field, and click **`Connect`**.

     NOTE: The factory configured password for this device has been set to the device serial number. Passwords are case sensitive. Performing a Reset to Factory Defaults reset sets the password to `extron`.

3. If this is the first time you connect the HCR 102 to PCS, an **EDID Minder** library dialog box (shown in the figure below) opens to ask you to either locate an existing set of EDID settings or to create a new EDID library for the unit.

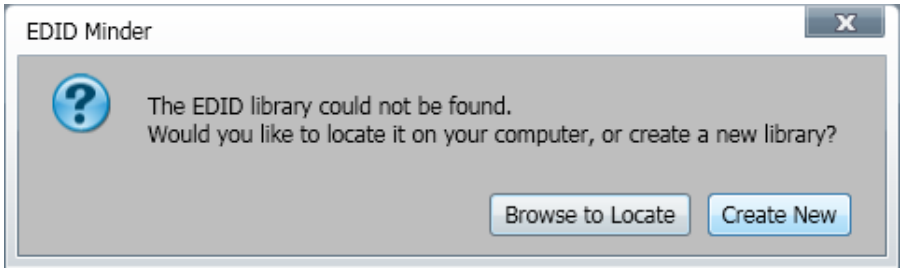


Figure 34. The EDID Minder Library Dialog Box

Either:

- Click **Browse to Locate**. A dialog box opens. Browse to and select an existing EDID file (.bin file type), then click the **Open** button.

  Or...

- Click the **Create New** button.

The **EDID Minder** dialog box closes.

An HCR 102-specific tab and **Input/Output Configuration** page open, showing the settings of the connected HCR 102 and its HCT 103 or HCT 102 D, if detected.

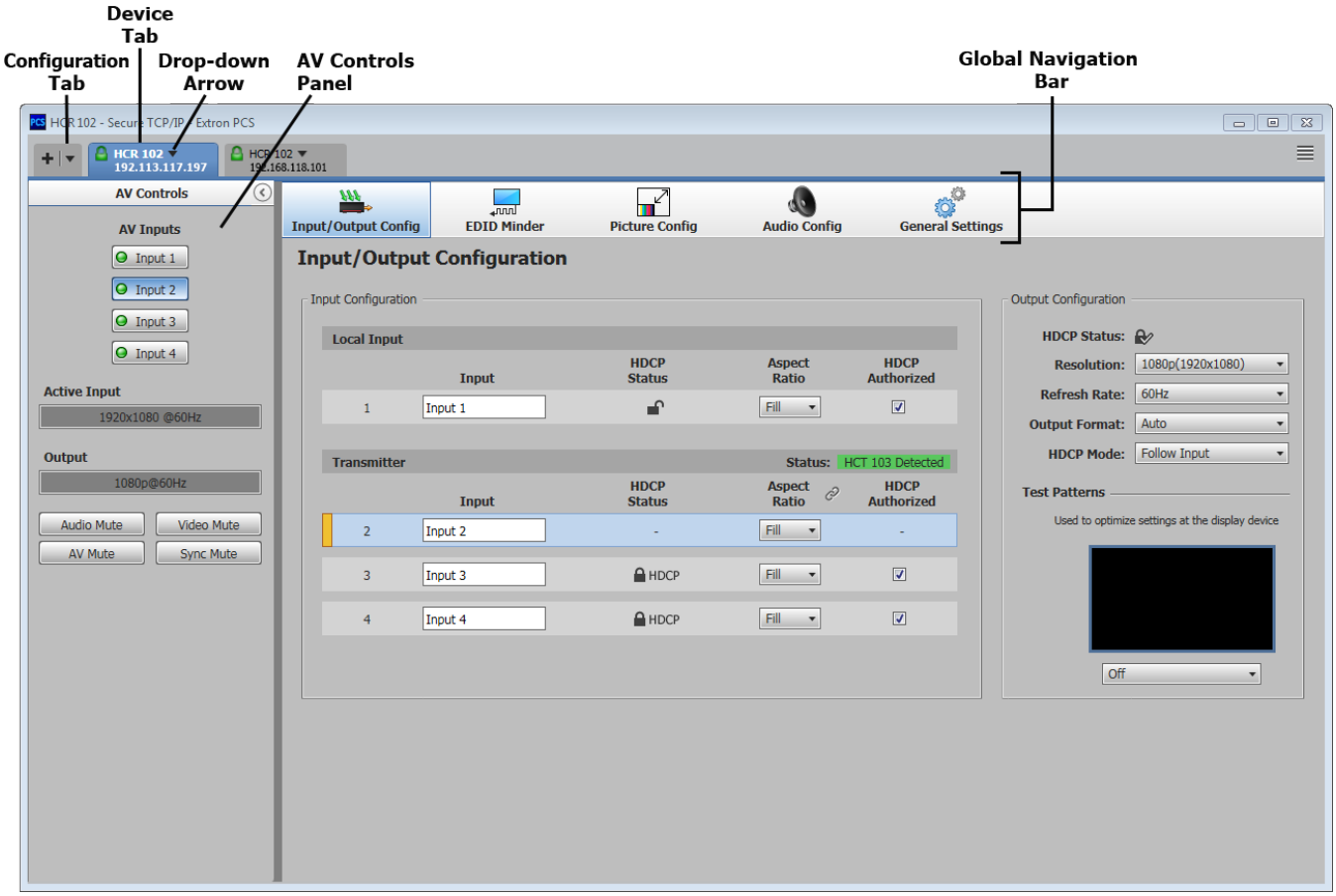


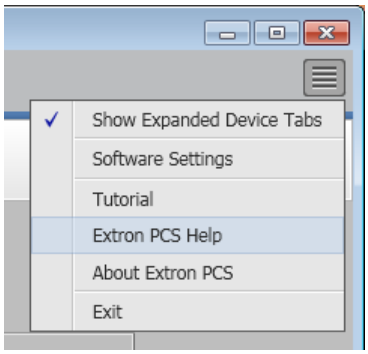
Figure 35. The HCR 102 Input/Output Configuration Page Within PCS Software

Configuring AV Settings in PCS

To configure the AV settings using PCS software:

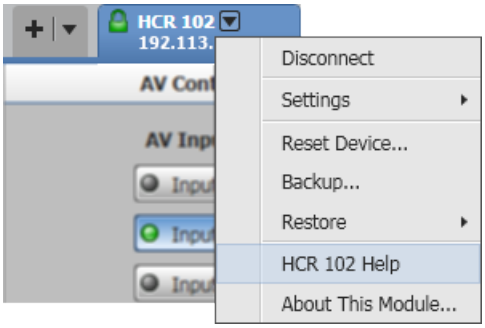
NOTES:

- Settings are saved as they are configured and the configuration is retained when power is recycled to the unit.
- For details on the PCS software on procedures for working within it, see:
  - The *PCS Help File* (select **`Extron PCS Help`** from the PCS software menu icon in the upper right of the window). This provides information on the general PCS software framework.



  - The *PCS - HC 404 Module Help File* (select **`HCR 102 Help`** from the device tab drop-down menu for the HCR 102). This provides unit-specific configuration details.

    The help file is named for the HC 404 system, but the material it covers applies to the other HC 400 Series systems, as well.



1. Open PCS and establish a connection to the HCR 102 (see **Connecting to the HCR 102 in PCS** on page 62).
2. Click on the **`Input/Output Configuration`** button in the global navigation bar (see **figure 35** on the previous page) to open the `Input/Output Configuration` page.
3. Configure the AV settings for each input (see "Input Video Configuration and Indication" in the Input/Output Configuration topic in the *PCS - HC 404 Module Help File*):
   - Input name (a software label)
   - Aspect ratio mode (fill or follow)
   - HDCP authorization (enabled or disabled)
4. Configure the output rate and resolution and output format signal type to match the requirements of the display device (see "Output Video Configuration" in the Input/Output Configuration topic in the *PCS - HC 404 Module Help File*).
5. For analog displays only, display the Alternating Pixels test pattern (see "Outputting and Using a Test Pattern" in the Input/Output Configuration topic in the *PCS - HC 404 Module Help File*). Then for input 2 adjust the total pixels (clocking) and pixel phase (fine sync) settings for optimal picture quality (see the Picture Configuration topic in the *PCS - HC 404 Module Help File*).
6. For any type of display, display the Crop test pattern (see "Outputting and Using a Test Pattern" in the Input/Output Configuration topic in the *PCS - HC 404 Module Help File*) and adjust the position settings of the display until all four sides of the crop pattern are visible, then disable the test pattern.

7. Click on the **EDID Minder** button in the global navigation bar to open the EDID Minder page.
8. Assign an EDID (see the EDID Minder topic in the *PCS - HC 404 Module Help File*), if required.
9. If needed, return to the Input/Output Configuration page and change the aspect ratio mode.
10. Click on the **Picture Config** button to open the Picture Configuration page.
11. Select input 2 in the AV Controls panel, then make any desired image adjustments, including adjusting horizontal and vertical start locations, total pixels, and pixel phase within the Signal Sampling pane (see the Picture Configuration topic in the *PCS - HC 404 Module Help File*).
12. Click on the **Audio Config** button to open the Audio Configuration page.
13. Configure the audio input format and the output volume and format (see the Audio Configuration topic in the *PCS - HC 404 Module Help File*).
14. Click on the **General Settings** button to open the General Settings page.
15. If needed, configure additional items:
    - Set the device name (see "Assigning a device name" in the General Settings topic in the *PCS - HC 404 Module Help File*).
    - Set administrator and user passwords. These passwords are used for logging into (controlling access to) the unit and its settings (see "Assigning and changing passwords" in the General Settings topic). You cannot set a user password unless an administrator password exists. By default, the admin password is "extron".

      NOTE: The factory configured password for this device has been set to the device serial number. Passwords are case sensitive. Performing a Reset to Factory Defaults reset sets the password to extron.

    - Set the executive mode for locking the front panel controls (see "Setting Front Panel Lockout (Exec Mode)" in the General Settings topic).

Basic Control Configuration

NOTE: GC projects can be created offline and uploaded to the hardware at a later date.

Follow the steps in **Setup Checklist: How to Proceed With Installation** starting on page 9. The overall process for setting up the control functions of the HCR 102 receiver is as follows:

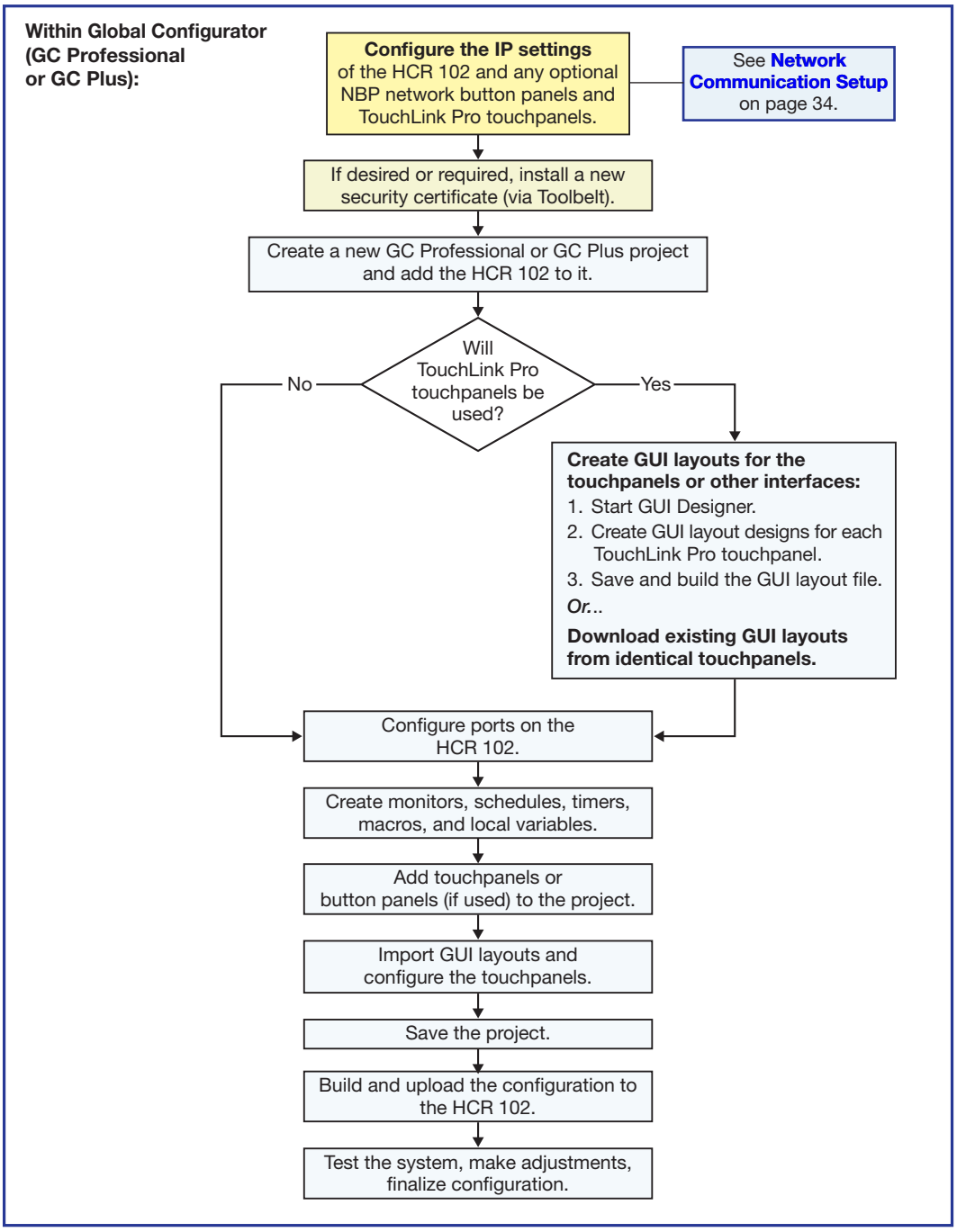


Figure 36. Overall Control Configuration Steps

Security Considerations: Ports, Certificates

The HC 400 Series system communicates using SSH protocol via port 4523 rather than Telnet on port 23. This provides for more secure access to the unit and reduces the likelihood of changes to configurations or operation. Port 23 is not supported by the HCR 102.

Security certificates allow greater privacy and security by allowing communications between the server and the device to be encrypted. You can use the default security certificate that is factory-installed on the HCR 102, or you can replace it with one provided by your organization (see **Secure Sockets Layer (SSL) Certificates** on page 70).

Things to Do After Installing GC and Before Starting a Project

- Read the *Global Configurator Help File* for details and step-by-step procedures on how to start a GC Professional or GC Plus project and perform basic setup tasks for a HCR 102 receiver. The help file provides a wealth of information on settings and how to use the software. It includes examples of how to use the features of GC and step by step instructions for typical configuration tasks.
- Obtain network addresses and related information from your network administrator.
- Set up the IP address for the HCR 102. See **Network Communication Setup** on page 34 for an overview of how to set up the network properties of the unit. For details, see the GC help file or Toolbelt help file, which contains instructions on how to set the IP address, gateway IP address, subnet mask, mail server IP address, domain name, web port, SMTP username, and SMTP password so that the HCR 102 is able to communicate with the network.

Using GC: Helpful Tips

Resources and Notes

- The setup guide, shipped with the unit, includes a quick reference to the front and rear panel features, and covers basic hardware installation.
- See **Front Panel Features** on page 13 and **Rear and Side Panel Features and Connections** on page 16 in the “Hardware Features and Installation” section of this guide for features and settings for the ports you are configuring.
- If you plan to configure the system at the installation site, Extron recommends downloading drivers for all the devices in the installation **before** you go out to the site
- The Global Configurator project file (`*.gcpro` or `*.gcplus`) contains configuration settings and it can be saved to a directory or folder for backup or for installation on another HCR 102. Saving a configuration is recommended before you perform a firmware upgrade.
- IP address, subnet mask, and gateway address are required during network setup of the unit.
- The unit name is any name (for example, Room730-HCR102 or ConfRmSystem) that you want to use to label a specific HCR 102 unit. The default is a combination of the product name and part of the hardware (MAC) address. This can be changed to your choice of alphanumeric characters and hyphens (-). The following rules apply:
  - Spaces are not permitted within the name of a unit or at the start or the end of a name.
  - Underscores (_) are not permitted.
  - Valid characters are A-Z, a-z, 0-9, and - (hyphen).

- The unit does not distinguish between upper and lower case letters.
- The name cannot start with a number or a hyphen, and it cannot end with a hyphen.
- Maximum name length is 63 characters.

Reference Information

This section includes the following reference items:

- **Network Port Requirements and Licensed Third-Party Software**
- **File Types: a Key to Extron-specific File Names**
- **Secure Sockets Layer (SSL) Certificates**
- **Mounting the HCT 103 and HCR 102**
- **Troubleshooting**

To read product specifications, visit the HC 404 system or HC 403 system product page at **www.extron.com**.

Network Port Requirements and Licensed Third-Party Software

Network administrators may find it useful to know which ports, protocols, and services are used by the HCR 102 and by IP Link Pro control processors, TouchLink Pro Touchpanels, NBP Network Button Panels, Global Configurator software, Toolbelt, and Extron Control (for IP Link Pro control systems). A list of protocols used for inbound and outbound communication for each type of device or software is available in the *Pro Series Control Product Network Ports and Licenses Guide*, part 68-2961-01, available at **www.extron.com**.

The HCR 102 uses various licensed third-party software packages during operation. To view details about third-party packages and associated licensing, click the **`License Information`** button in its internal web pages. A `License Information` window opens. To view a copy of a listed package license, in the `License Information` window, click the link in the License column for the relevant package. This opens a copy of the package license in a separate window. A list of licenses is also available in the *Pro Series Control Product Network Ports and Licenses Guide*.

File Types: a Key to Extron-specific File Names

A basic understanding of the types of files used by these devices is helpful in order to decide what (if anything) to do with them.

- **.eff** — This is an Extron firmware update file. See the **Firmware Updates** section starting on page 80 for details on firmware updates.
- **.eir** — These are IR driver files containing infrared commands. There is a separate `.eir` file for each device the receiver controls via infrared communication. Via Global Configurator, these files can be imported and associated with the IR port on an HCR 102.
- **.extz** — This is a backup configuration file that is saved from the HCR to a computer during the backup process using PCS software. This type of file can be used to restore a configuration to the unit after a reset.
- **.gcplus** — This is a Global Configurator Plus configuration file.
- **.gcpro** — This is a Global Configurator Professional configuration file.
- **.gdl** — This is a GUI Designer layout created for TouchLink Pro touchpanels.

- **.glta** — This is a GUI layout template.
- **.pkp** — This is for Ethernet, serial, and CEC drivers.

Secure Sockets Layer (SSL) Certificates

Extron control products 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 device such as the HCR or a control processor.

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.

IP Link Pro controllers and devices such as the HCR 102 support standard OpenSSL certificate encodings such as .pem (Privacy-enhanced Electronic Mail) and .der file types. PEM file types are ASCII encoded and are the required format for uploading to the HCR 102 receiver. DER (Distinguished Encoding Rules) 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 unit.

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.

Mounting

NOTE: Extron recommends taking safety precautions to avoid electrostatic discharge issues during installation.

Mounting the HCT 103 and HCR 102

Turn off or disconnect all equipment power sources before mounting the transmitter and receiver. The HCT 103 transmitter and HCR 102 receiver each ship with furniture mounting brackets attached. They can be easily mounted to a wall or furniture as shown in the following diagram:

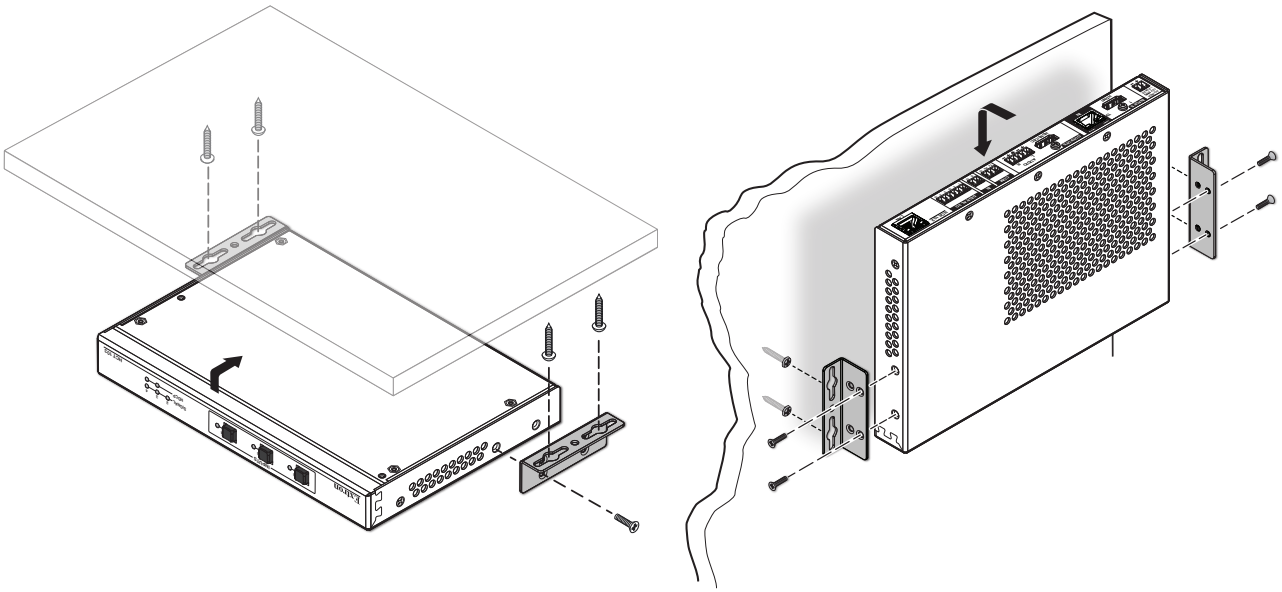


Figure 37. Mounting the HCT 103 Transmitter (Left) and the HCR 102 Receiver (Right)

NOTE: The receiver is designed so that its vents face away from the wall or furniture when mounted in order to achieve optimal air circulation and cooling.

Alternatively, you can remove the pre-installed furniture mounting brackets and mount these devices to a rack or set them on furniture.

- **Rack mounting** — The HC 404 and HC 403 product pages on **www.extron.com** include links to recommended optional 1U high rack shelves or rack mounting kits. An Extron support representative can recommend which kit to order for your installation.
  - See the installation guide for the mounting brackets or optional rack shelf for mounting diagrams and instructions.
  - Observe local and UL safety guidelines for mounting devices to equipment racks.
- **Desktop use** — Attach four rubber feet at the corners of each unit and place it on a table or desk.

UL Rack Mounting Guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the HCT 103 and HCR 102 in a rack.

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the units in an environment compatible with the maximum ambient temperature (Tma = +104 °F, +40 °C) specified by Extron.

2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as use of power strips).

Mounting the HCT 102 D, HCT 101 D, HCT 101 EU, or HCT 101 MK

- Select and prepare the site before cabling the transmitter.
- The end user or installer must furnish the wall (junction) box. It is not included with the unit.
- Read any installation instructions, UL guidelines, and other safety and regulatory guidelines that come with the wall box or other mounting device before installation.
- Protect the mounting surface to prevent damage during installation.
- Prior to mounting disconnect power at the source from all devices in the system.

Mounting Hardware

Decorator-style models

A mud ring is included with each decorator-style model. Extron recommends using a grounded, UL Listed junction box for the installation. Optional UL Listed junction boxes, external junction boxes, and surface mounting boxes are available.

- The HCT 102 D mounts to a standard two-gang electrical junction box or mud ring.
- The HCT 101 D mounts to a standard one-gang electrical junction box or mud ring.

European models

Extron recommends using a grounded junction box for the installation.

- The HCT 101 EU mounts to a standard one-gang European (EU) wall (junction) box.
- The HCT 101 MK mounts to a standard one-gang MK-type junction box or external wall box.
- Both models can be mounted in an external wall box with mounting holes that are 60 mm on center, or in an Extron Flex55 enclosure.

Prepare the Installation Site

ATTENTION:

- Installation and service must be performed by authorized personnel only.
- L'installation et l'entretien doivent être effectués uniquement par un technicien qualifié.

- Extron recommends installing the HCT 102 D or HCT 101 D into a grounded, UL Listed electrical junction box.
- Extron recommande d'installer le HCT 102 D ou HCT 101 D dans une boîte de dérivation électrique mise à la terre, certifiée UL.

ATTENTION:
• Extron recommends installing the HCT 101 EU or HCT 101 MK into a grounded electrical junction box. • Extron recommande d'installer le HCT 101 EU ou HCT 101 MK dans une boîte de dérivation électrique mise à la terre.
• If the HCT will be installed into fine furniture, it is best to hire a licensed, bonded craftsperson to cut the access hole and perform the physical installation so the surface will not be damaged. • S'il est prévu d'installer le HCT dans du beau mobilier, il est préférable de faire appel à un artisan autorisé et qualifié pour couper le trou d'accès et réaliser l'installation de telle façon que la surface ne soit pas endommagée.
• Follow all national and local building and electrical codes that apply to the installation site. • Respectez tous les codes électriques et du bâtiment, nationaux et locaux, qui s'appliquent au site de l'installation.
• For the installation to meet UL requirements and to comply with National Electrical Code (NEC), the HCT 102 D or HCT 101 D must be installed in a UL Listed junction box. The end user or installer must furnish the junction box. It is not included with the unit. • Pour que l'installation respecte les exigences UL et soit conforme au National Electrical Code (NEC) américain, le HCT 102 D ou HCT 101 D doit être installé dans une boîte de dérivation certifiée UL. Il incombe à l'utilisateur final ou à l'installateur de fournir la boîte de dérivation. Cet équipement n'est pas inclus avec l'unité.

Accessibility and Americans with Disabilities Act (ADA) compliance

When planning where to install the HC system, consider factors affecting accessibility of the unit such as height from the floor, distance from obstructions, and how far a user must reach to press buttons or connect cables. For guidelines, see sections 307 ("Protruding Objects") and 308 ("Reach Ranges") of the *2010 ADA Standards for Accessible Design* available at **http://www.ada.gov/regs2010/2010ADAStandards/2010ADAStandards.pdf**.

Site Preparation

To prepare the site:

1. **For installation into a wall or furniture:** Measure, mark, and carefully cut a hole in the mounting surface. Protect the surface prior to and during cutting so the surface is not damaged.
2. If using a mud ring for the HCT 102 D or HCT 101 D, install the mud ring.

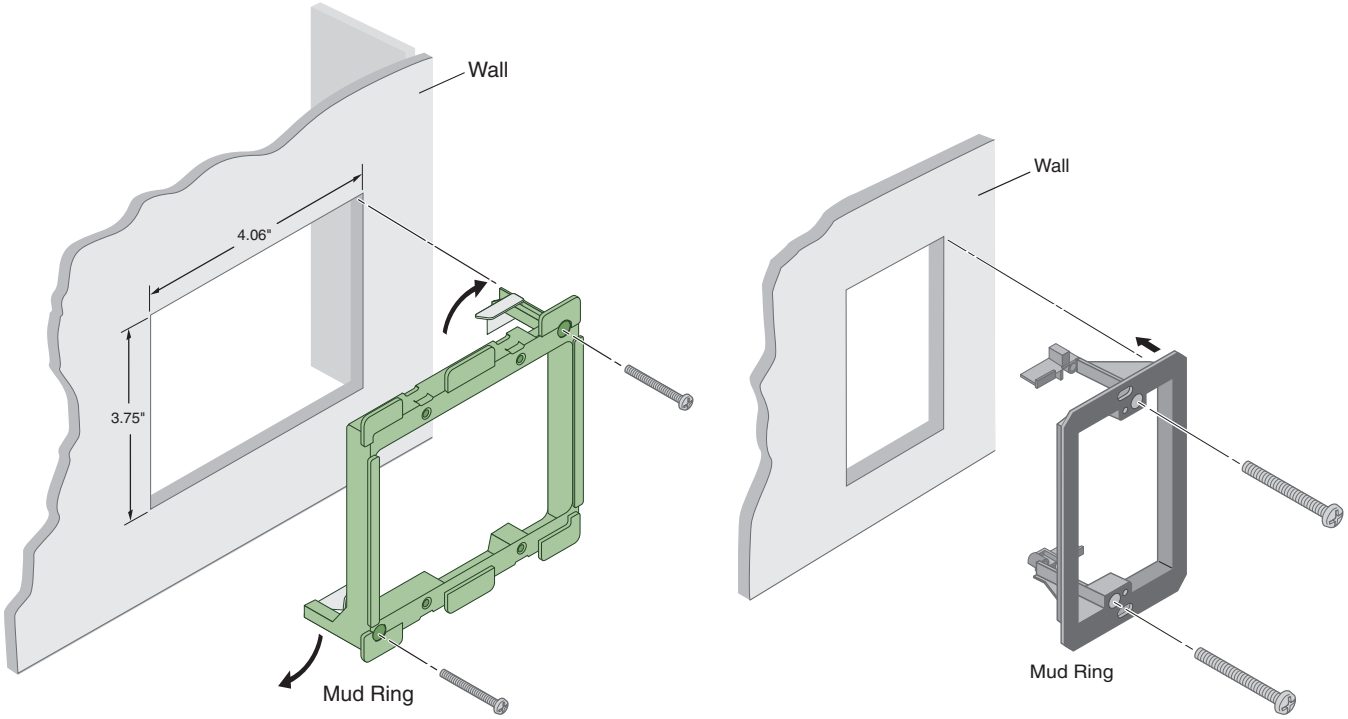


Figure 38. Installing a Mud Ring

3. **For all types of installations:** Run cables to the installation site. Leave enough slack for device installation.
4. Secure the cables with a clamp for strain relief and so they do not slip back down into the wall or furniture.
5. For installations that do not use a mud ring, secure the box to the raceway, stud, wall, or furniture.
6. **For EU and MK model wall mount installations,** attach the metal mounting bracket to the junction box or external wall box.
   For EU and MK model raceway installations, attach the metal mounting bracket to the junction box or external wall box and raceway.
   a. Hold the mounting plate and feed the cables through the mounting plate.
   b. Place the mounting bracket against the box, aligning the holes in the plate with the corresponding threaded holes on the edges of the box.
   c. Insert the provided screws into those holes, hold the metal mounting bracket to ensure it is aligned straight (visually level), and tighten the screws to secure the plate to the mounting surface.

Mount the HCT 102 D or HCT 101 D

1. Insert the cabled transmitter into the mud ring or junction box within the wall or furniture, aligning the mounting holes in the transmitter with those in box or mud ring (see figures 39 and 40, ❶, below).

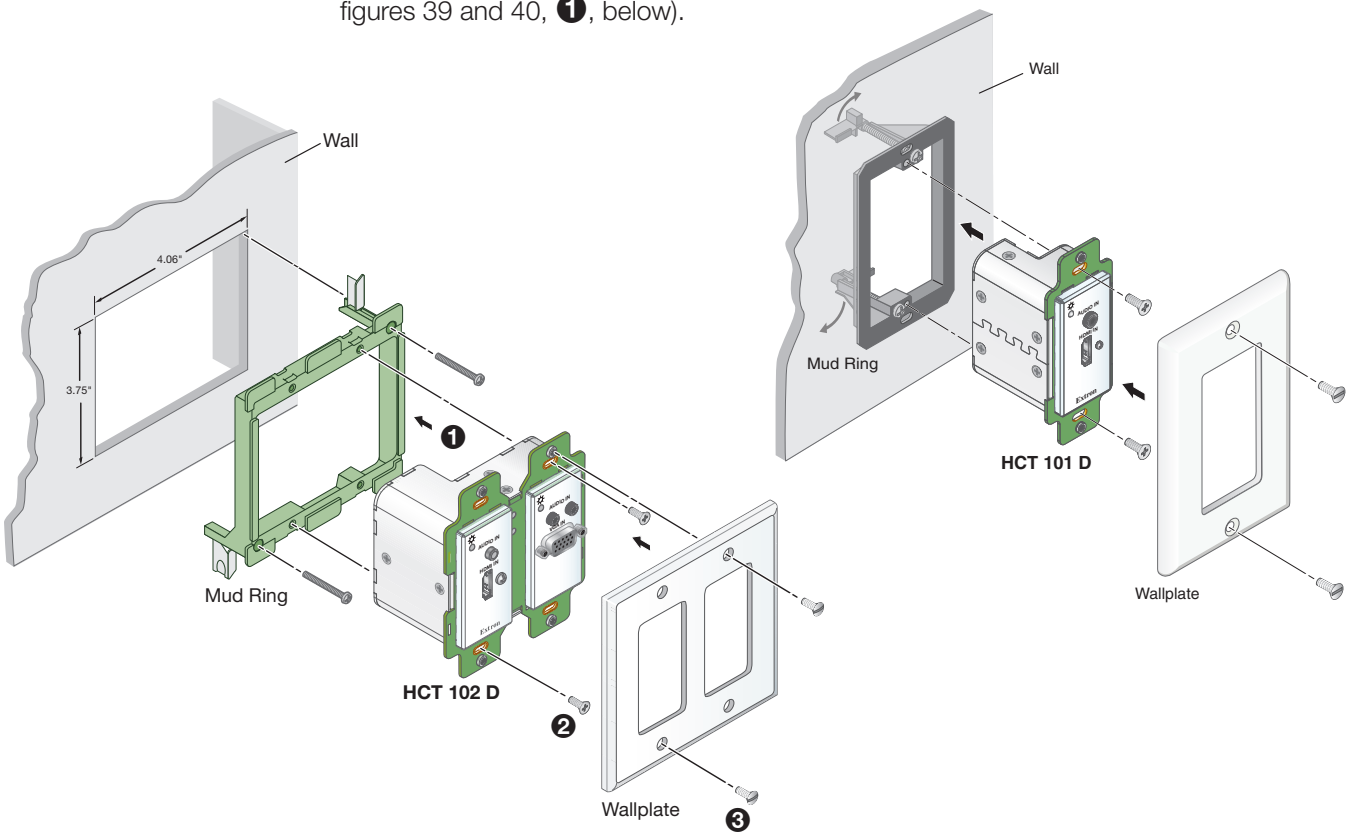


Figure 39. Mounting the HCT 102 D (Left) or HCT 101 D (Right) Transmitter to a Mud Ring

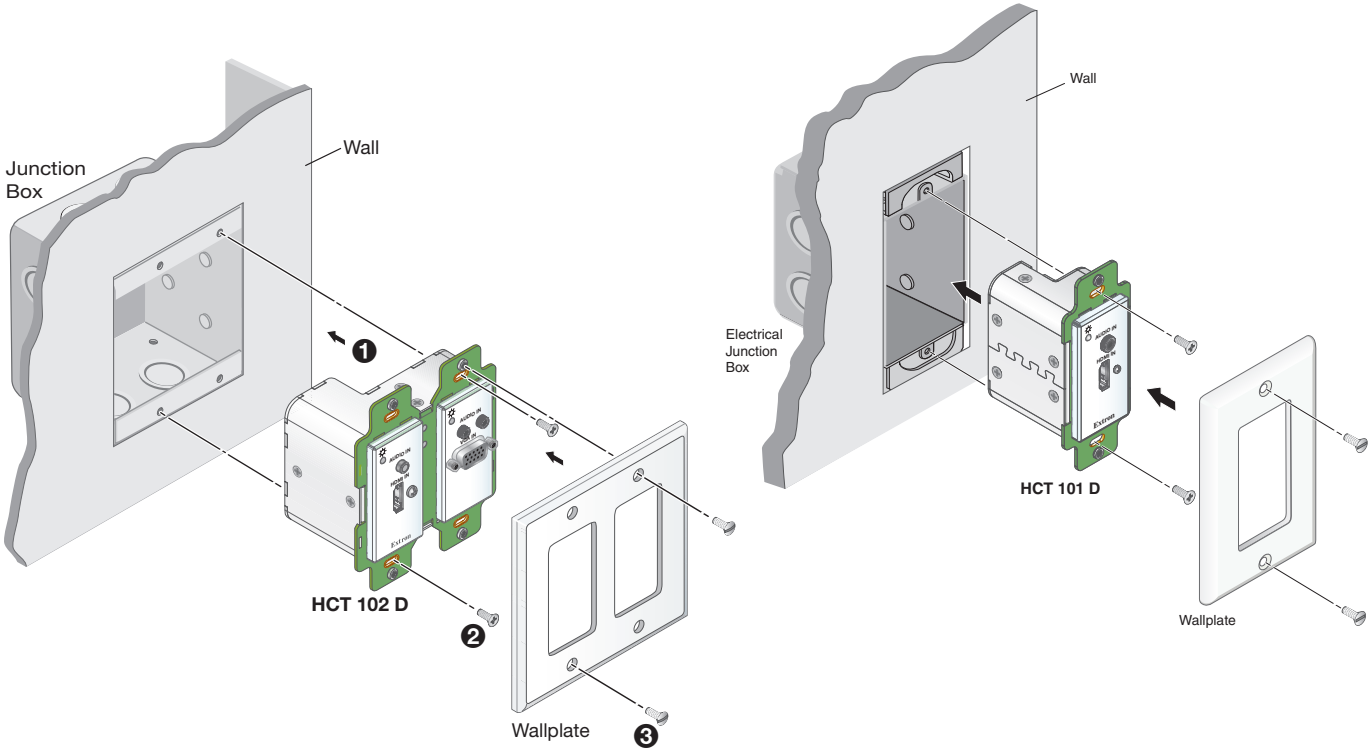


Figure 40. Mounting the HCT 102 D Transmitter to a Junction Box

2. Secure the transmitter to the junction box or mud ring as follows (see **figure 39** and figure 40, ❷ on the previous page):
   a. Insert the included screws through the oval mounting holes at the top and bottom of the transmitter and into the corresponding threaded holes in the box or mud ring.
   b. Using a Phillips screwdriver, lightly tighten the screws until snug.

   ATTENTION:
   - Do **not** overtighten the screws.
   - Veillez à **ne pas** trop serrer les vis.

3. Attach the wallplate to the transmitter:
   a. Align the wallplate openings with the faceplates of the transmitter, and place the wallplate against the unit.
   b. Insert the included screws through the circular mounting holes in the wallplate and the tabs on the transmitter (see ❸)
   c. Tighten the screws using a flat bladed screwdriver until snug.
4. Reconnect power to all devices.

Mount the HCT 101 EU or HCT 101 MK

Before mounting the transmitter, ensure that all device cables have been fed through the wall or furniture and mounting box.

To mount the transmitter (see figure 41 below):

1. Align the wallplate or frame with the metal mounting bracket. (The mounting bracket was attached to the wall box in **Site Preparation** on page 74.)

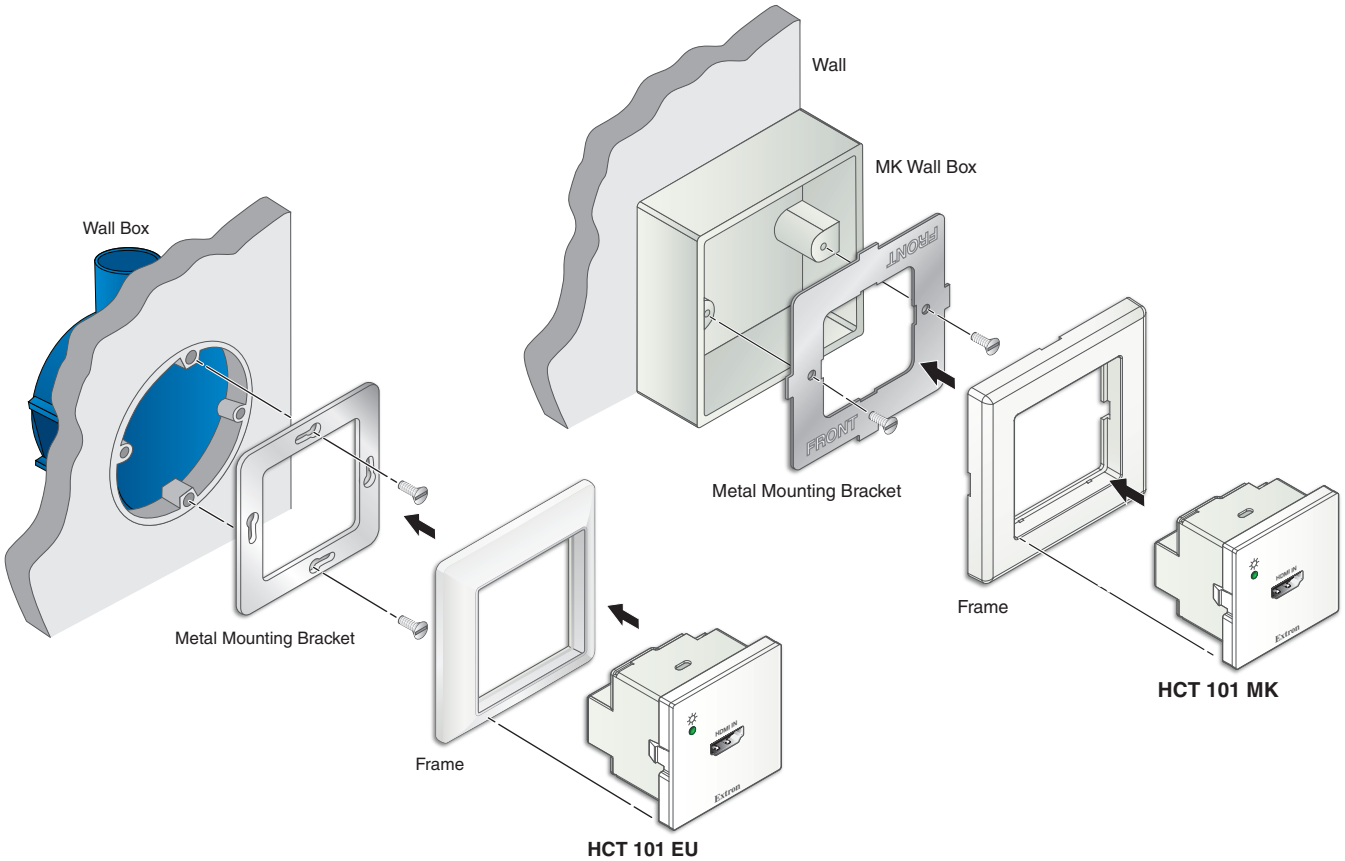


Figure 41. Mounting the HCT 101 EU to an EU Wall Box (Left) and the HCT 101 MK to an MK Wall Box (Right)

2. Ensure that the cables and grounding wire are connected to the rear panel (see **Grounding** on page 34).
3. Secure the transmitter to the mounting bracket: Insert the cabled HCT module through the opening in the frame and firmly press it into place so its side tabs snap into the mounting bracket.
4. Reconnect power to all devices.

Troubleshooting

Turn on the input devices (DVD players, Blu-ray players, PCs, and other sources), output device (display or projector), the HC 400 Series system, and the PC and TLP Pro touchpanel or Network Button Panels. Touch a configured button on the touchpanel or a button panel.

If an input or output AV device cannot be remotely controlled (does not respond as expected), if there is no picture or sound, or the output is not as expected, check the following:

- **Power Connections**
- **AV Connections and Configuration**
- **Data (Network) Connections**
- **Device Control Connections and Configuration**
- **Miscellaneous Troubleshooting Items**

Power Connections

- Ensure that all devices are plugged in.
- Make sure that each device is receiving power. The HCR 102 front panel power LED lights if the device is receiving power. The LED corresponding to the selected input lights. The Signal and HDCP LEDs light for inputs that have an active input signal and an HDCP compliant signal, respectively.
- If the system is in remote power mode (a 12 VDC, 50 watt power supply is connected to the HCR 102 receiver, which passes power through the twisted pair cable to the transmitter) ensure that the LED corresponding to each input lights when you press buttons on the transmitter.

AV Connections and Configuration

1. Check the input, unit interconnection, and output cabling connections and make adjustments as needed.
2. Ensure that only one input is selected at a time.
   - For the HC 404 and HC 403 systems, if an input on the transmitter is selected, the input 1 LED on the receiver should be off. If input 1 on the receiver is selected, the LEDs for inputs 2 through 4 (where applicable) on the transmitter should be off. The LED should light for the selected input. If not, there may be an interconnection cabling error, a lack of power at one of the units, or a firmware error.
   - For HC 402 systems, the LED on the HCT 101 lights green as long as an active source signal is detected at the transmitter and is passing to HCR. Therefore, if the input on the HCR is selected, the LED on the HCT 101 LED does not turn off. It remains lighted.
3. Ensure that the source and display devices are connected and powered on.

4. If input devices are not available or are malfunctioning, select a video or audio test pattern via the OSD menu (see **Test Pattern** on page 51 or see the discussion about test patterns on the Input/Output Configuration topic within the help file for the PCS HCR 102 module) to provide an output signal for testing.
5. Check the LEDs at the Out and In interconnection ports.
   - If the Signal LED for the Out port on the transmitter is not lit, the selected transmitter input (2, 3, or 4, as applicable) has no active signal.
   - If the Signal LED for the In port on the receiver is not lit, the receiver does not detect a valid signal coming from the selected input on the transmitter.
     - Ensure that the transmitter-receiver interconnection is wired correctly (see **Transmitter-Receiver Interconnection** on page 19).
     - Ensure that the transmitter has a valid AV signal at the selected input (see **Signal LEDs** on page 14, and check the connections and configurations of the input devices).
     - If firmware was recently updated, the unit may require a reset in order to re-establish communication between transmitter and receiver.
   - If the Link LED at the Out and In ports is not lit, the units do not have a valid interconnection link. Ensure that the interconnection cable is firmly connected at both ends and is correctly wired.
6. Verify that the EDID settings are correct. Use the EDID Minder feature within the PCS software to adjust the settings, if needed.

Data (Network) Connections

1. Check the cabling connections and make adjustments as needed. The Link LEDs on the HCR 102 receiver and on the PC should be lit green steadily if a network connection is detected. If these LEDs are not lit, the following items are possible causes:
   - The cable is faulty or not plugged in.
   - The wrong type of cable is being used (see **LAN (IP) connector and LEDs** on page 30).
2. Try to "ping" the unit by entering `ping 192.168.254.250` at the command prompt on the PC, or ping the IP or web address provided to you by your system administrator. If you get no response:
   - Make sure your unit is using the appropriate subnet mask (check with your system administrator).
   - Make sure your PC and network do not have a software firewall program that might block the IP address of the unit.
3. If contact is established with the unit, but the HCR 102 web pages cannot be accessed by your browser program, verify (via an Internet network options or preferences menu, or your IT department) that your browser is configured for direct network connection and is not set up to use a proxy server.

Device Control Connections and Configuration

- Verify that ports are wired correctly and that ground (earthing) wires are connected to the proper pins on the HCR 102 and, if applicable, on the controlled device.
- Ensure that each IR emitter head is placed adjacent to or directly over the IR pickup window on the controlled device.

- Verify that the appropriate drivers were used while creating the configuration file and that the correct commands and signal types (IR, RS-232, Ethernet) are associated with the appropriate ports on the HCR 102 and on the other devices.
- For digital input and output connections, verify whether the application requires the +5 VDC pull-up resistor within the unit for TTL circuits and use the software to check whether it is selected within the configuration.
- Verify that input current at any digital input or output port does not exceed 250 mA.

Miscellaneous Troubleshooting Items

Booting up with the factory-installed firmware

In the event that the transmitter powers on but is otherwise unresponsive or uncommunicative after a failed firmware upload, you can manually boot up the unit to use the factory firmware code by pressing and holding the **`Input 2`** button while applying power.

Timeout periods

There are three different timeout periods (listed below) that can be configured (specified or turned off) for the system. You might need to change or disable the timeout period to facilitate troubleshooting.

- Screen saver timeout — Set this via the `Advanced` submenu of the OSD, via the `General Settings` page of the HC 404 module in PCS software, or via Global Configurator.
- Auto-input switching timeout— Set this via the `General Settings` page of the HCR 102 device pages in PCS software.
- CEC output power-off timeout — Set this using GC.

If you still experience problems, call the **Extron S3 Sales & Technical Support Hotline** or the Extron S3 Control Systems Support Hotline (1.800.633.9877).

Firmware Updates

If the need arises, you can replace the firmware. This section covers the following aspects of how to do that:

- **Determining the Firmware Version**
- **Updating the Firmware**

Determining the Firmware Version

There are several ways to check which version of firmware the receiver (or receiver and transmitter) is using:

- View the device information in Toolbelt.
- View the general status information section of the embedded web page for the receiver.
- View the hardware unit information page within PCS.

Before using any of those methods, connect the receiver and the PC to the same network. Alternatively, for PCS, you can connect the receiver to the PC using a USB configuration cable. For details see the **Hardware Features and Installation** section starting on page 9, the **Software-Based Configuration and Control** section starting on page 59, and the setup guide that came with the unit.

Using Toolbelt Software

1. Open the Toolbelt software.
2. Either add the desired HCR 102 manually or start device discovery and select the desired unit from the list of discovered devices.
3. Click **Manage** in the row for the desired device and view the device information that appears in that section.

Using a Browser

The receiver comes with a set of factory default embedded web pages.

1. Start a browser program.
2. Enter the IP address of the HCR 102 receiver into the address field of the browser and log on to the internal web page.
3. Look for the general device or status information section.

Using PCS

1. Start the PCS software and connect to the HCR 102 (see **Connecting to the HCR 102 in PCS** on page 62).
2. From the device tab select **`Device Menu`** > **`Settings`** > **`Hardware Settings...`**. The `Hardware Settings` dialog box opens to the `Unit Information` page (a portion of which is shown in the following image), where you can view the firmware versions for both the receiver and transmitter.

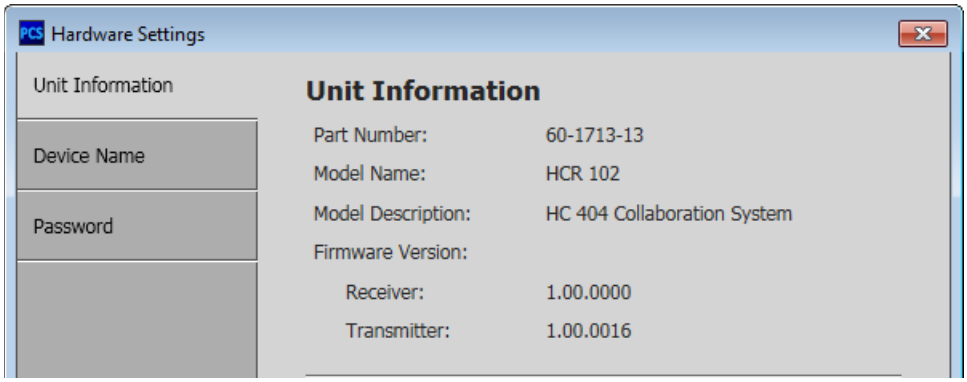


Figure 42. The PCS Hardware Settings Unit Information Page

Updating the Firmware

Before updating the firmware, connect the PC and the HCR 102 to an Ethernet network (if using Toolbelt, or the embedded web page) or to each other via a USB cable (if using PCS). The instructions for updating the firmware assume you have installed the appropriate software on your PC first.

NOTES:

- You should save the existing configuration to a file (see the *Global Configurator Help File* for instructions) before replacing the firmware. If the file is saved, the configuration can be restored to the unit later using GC.
- Check the Extron website for firmware-related documents, instructions, patch files, and new firmware files before loading new firmware into the unit. We recommend that you read the firmware release notes (available from **www.extron.com**) before beginning the firmware update.

Locating and Downloading the Firmware

1. Visit the Extron website to find the latest firmware file. The easiest way to locate files is through the **`Downloads`** tab on the web page for the specific model.
2. Download the executable installer file (`*.exe`) from the website and run the installer program. The program stores the firmware file on the PC in `C:\Program Files (x86)\Extron\Firmware` or `C:\Program Files\Extron\Firmware` within a folder specific to that version.
3. Write down the firmware filename and location for later use. The filename ends in *.eff* such as `49-###-5Ø-x.xx.xxxx-yyyy.eff` where `x.xx.xxxx` is the version number.

NOTE: The firmware update file must have a filename extension of `.eff`.

Installing Firmware

Firmware can be replaced by using one of the following:

- Toolbelt software

  NOTE: Toolbelt allows you to update multiple devices with the same firmware version simultaneously.

- The firmware uploader feature in the default embedded web page
- The `Update Firmware` option from the `Device Menu` in PCS software

These methods allow you to browse to find and select the appropriate `.eff` file on your PC and then click an **`Upload`** button to initiate the firmware upload to the device.

No matter which method you use, allow a few minutes for the firmware to finish uploading.

NOTE: After firmware is successfully updated for the receiver, you must wait an additional 3 to 4 minutes after receiving a success notification to allow the transmitter firmware to be updated.

At the end of the upload process, the unit partially reboots and loses its connection to the PC. After the update is complete, refresh the web page or reconnect in Toolbelt to re-establish the connection.

Loading firmware using Toolbelt

1. Open Toolbelt.
2. Click the **`Start Discovery`** or the **`Discovery`** button (depending on Toolbelt version) to start device discovery. Toolbelt populates the list of Extron control devices that it finds on the network.
3. Locate and select the desired HCR 102 in the list. You can filter the list by model, IP address range, or MAC address range to facilitate finding the device.
4. Either click the **`Update`** link or icon in the `Firmware Version` column *or* click **`Tools`** > **`Firmware Uploader`** at the top of the window. If needed, enter any requested credentials.
5. In the Toolbelt `Firmware Uploader` window, click the button in the `Selected Firmware` column. An `Open` dialog box appears.
6. Browse to and select the new firmware file.
7. Click the **`Open`** button. The dialog box closes, returning you to the `Firmware Uploader` window.
8. Click the **`Begin`** button. The firmware installation begins and the unit reboots. Remove all devices and click **`Close`** to exit and close the `Firmware Uploader` window. If desired, you can reconnect to (re-manage) the unit after it boots up.

Loading firmware using the embedded web page

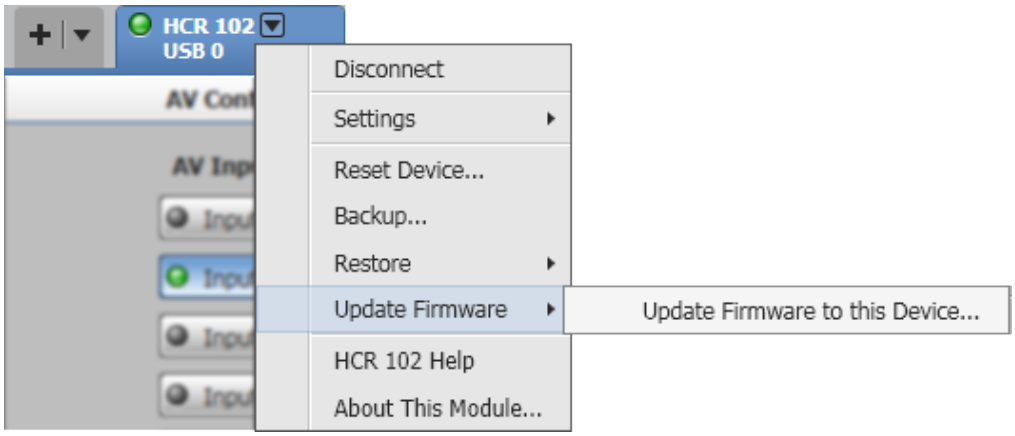
1. Open a browser program on the computer.
2. Enter the IP address of the HCR 102 in the address field of the browser and navigate to the embedded web page of the HCR 102.
3. In the `Firmware Uploader` pane (near the bottom of the page), click the **`Browse`** button. A dialog box opens.
4. Browse to and select the firmware file.
5. Click **`Open`**. The dialog box closes, and the file name appears in the `Firmware` field.

6. Click the **Upload** button. The firmware installation begins and the unit reboots and closes the connection to the browser.

NOTE: If the transmitter powers on but is otherwise unresponsive or uncommunicative after a failed firmware upload, you can manually boot up the unit to use the factory firmware code by pressing and holding the **Input 2** button (HCT 103) or the rear panel **Reset** button (HCT 102 D) while applying power.

Loading firmware using PCS

1. Open PCS. The **Device Discovery** page opens, displaying a list of detected devices.
2. In the device list locate the USB connection row for target HCR 102 unit.
3. Double-click that row to establish a USB connection to the unit.
4. In PCS, select **Update Firmware** and then **Update Firmware to This Device** from the drop-down **Device Menu** (see the *PCS - HC 404 Module Help File* for details about working with PCS).



An **Update Firmware** dialog box opens with a notice not to unplug the USB cable during the firmware update and reboot and asking whether to continue.

5. Click **Continue** to proceed with the firmware update. The **Update Firmware to this Device** dialog box opens.
6. Click **Open Firmware File...**. The **Firmware Files** window opens.
7. Browse to the folder where the firmware file is located and select the firmware file, which has an .eff extension.
8. Click **Open**. The **Firmware Files** window closes, returning to the **Update Firmware to this Device** dialog box, which lists the selected firmware file name.
9. Click **Update**. The firmware update proceeds and the dialog box displays progress messages. When the firmware has been uploaded, the unit reboots, disconnecting from PCS. PCS closes the device-specific page, returning to the **Device Discovery** page and displaying a dialog box that notes the success of the firmware update and reminding you to reconnect to the device.

Extron Warranty

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

USA, Canada, South America, and Central America:
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

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

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

Europe:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

Africa:
Extron South Africa
South Tower
160 Jan Smuts Avenue
Rosebank 2196, South Africa

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

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

USA:	714.491.1500 or 800.633.9876	**Asia**:	65.6383.4400
Europe:	31.33.453.4040 or 800.3987.6673	**Japan**:	81.3.3511.7655
Africa:	27.11.447.6162	**Middle East**:	971.4.299.1800

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

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

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