Extron

HC 400 Series • Setup Guide

HC 404 and HC 403 Systems

The Extron HC 404 and HC 403 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.

- 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. With the MBU 125 mounting brackets, the transmitter can easily be mounted under a desk and the receiver can be mounted to a wall. Both the transmitter and receiver feature half rack wide enclosures, and are also rack mountable.

- The **HC 403** features three AV inputs and one output. It consists of a two-input switching transmitter (HCT 102 D) 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 wall, furniture, or rack mountable.

Transmitters

The HCT 102 D transmitter switches between an analog video and one digital (HDMI) video input. It does not include input selection buttons and LEDs.

The HCT 103 transmitter switches between an analog video and two digital (HDMI) video inputs. It includes front panel input selection buttons and LED signal indicators.

For either transmitter, if the selected input is HDMI, the extended video signal can be HDCP-compliant.

HCT 102 D

HCT 103

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®.

HCR 102

This setup guide provides instructions for an experienced installer to install the HCT 103 or HCT 102 D and the HCR 102. The guide provides information needed to configure the most essential settings for the system and the receiver. It also describes basic operations using front panel controls and the on-screen display (OSD) menu system. Full details are available in the *HC 400 Series User Guide*.
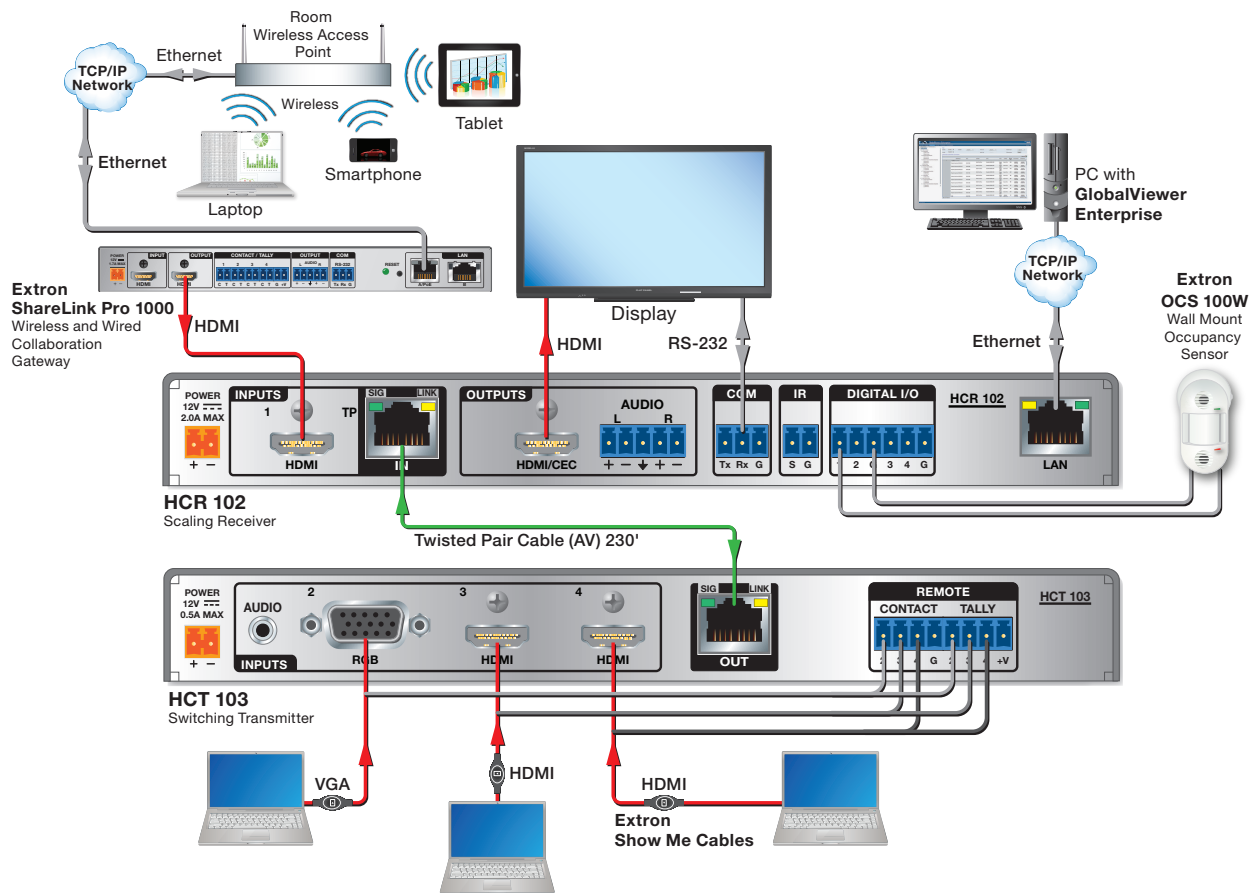
Figure 1. A Typical TeamWork HC 404 System Application
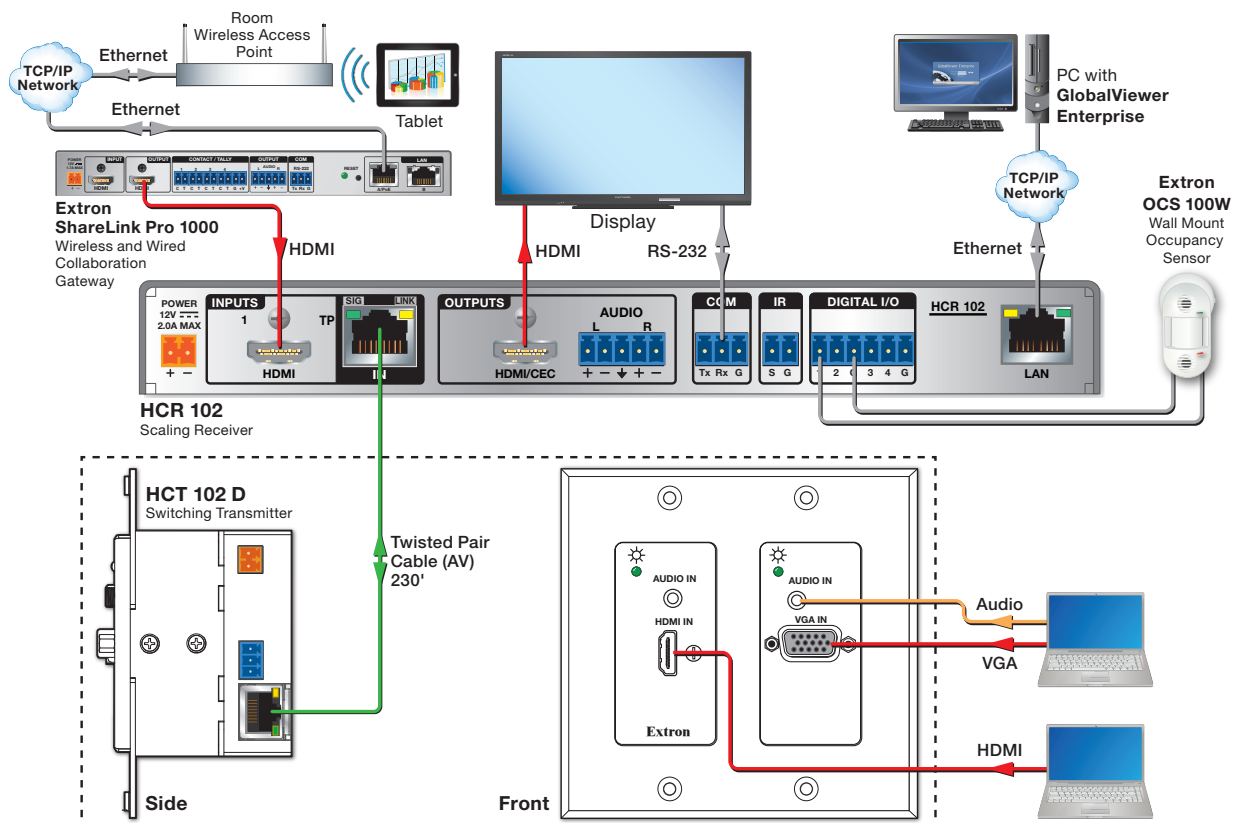
Figure 2. An HC 403 System Application

Panels and Features
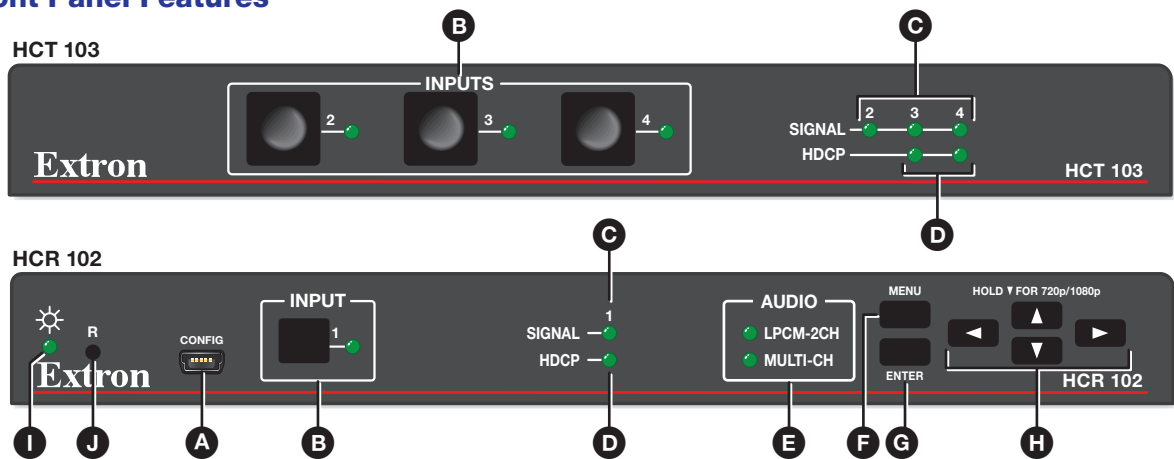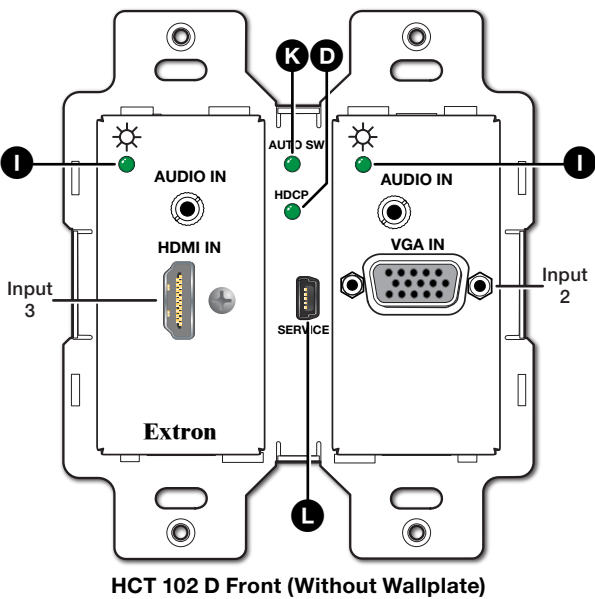
Front Panel Features

Figure 3. HCT 103 Front Panel (Top)
HCR 102 Front Panel (Middle),
HCT 102 D Front Panel Without Wallplate
(Bottom, Right)

A **Configuration** (Config) connector (USB mini-B), page 13

B **Input selection buttons** and **LEDs**, page 16

C **Input signal presence (Signal) LEDs**, page 16

D **HDCP status LEDs**, page 16

E **Audio input type LEDs** (LPCM-2Ch and Multi-Ch, page 16

F Menu button,

G Enter button, and

H Navigation (right ▶, left ◀, up ▲, and down ▼ arrow)
buttons (see **To configure the AV settings using the OSD and front panel buttons:** on page 9)

I Power LED (HCT 102 D), power and reset indicator LED
(HCR 102) (see below)

J **Reset button** (HCR 102) (see below and page 17)

K Auto Switch LED (see below)

L Service connector (for use by Extron support staff)

HCT 102 D Front (Without Wallplate)

NOTE: For AV connectors on the HCT 102 D, see
Rear and Side Panel Features on page 4.

J **Reset button** (HCR 102) — Pressing this recessed button causes various product settings to be reset to the factory defaults (see **Reset Modes: a Brief Summary** on page 17).

I **Reset and power LED** — This green LED indicates either the power status of the HCT 102 D transmitter or the HCR 102 receiver, or the reset mode of the receiver. LED indications are as follows:

HCT 102 D 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. **NOTE:** For full descriptions of reset modes, how to use the reset button to activate them, and details of LED indications of each mode, see the *HC 400 Series User Guide*.

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 the *HC 400 Series User Guide*.

Rear and Side Panel Features
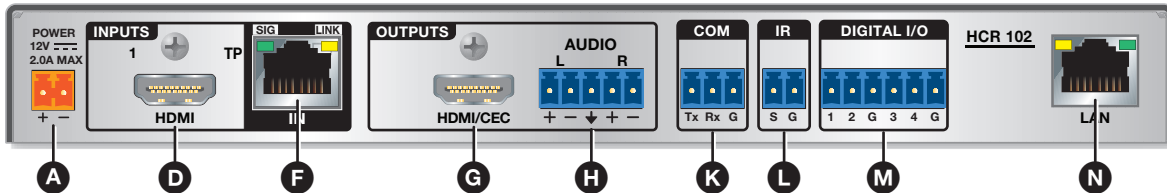
HCT 103 Rear

HCR 102 Rear

Figure 4. HCT 103 Rear Panel (Top) and HCR 102 Rear Panel (Bottom)

A **Power input** connectors, page 15

B **Audio input** connector, page 14

C **Analog RGB video input**, page 12

D **HDMI input** connectors, page 12

E **Transmitter output** RJ-45 connector (twisted pair interconnection), page 12

F **Receiver input** RJ-45 connector (twisted pair interconnection), page 12

G **HDMI/CEC output** connector, page 14

H **Analog audio output** connector, page 13

I Remote control **contact input** ports, page 13

J Remote control **tally output** ports, page 13

K **COM RS-232** control port, page 14

L **IR output** control port, page 14

M **Digital I/O** (digital input/output) control ports, page 14

N **LAN (Ethernet)** connector and LEDs, page 14

O **MAC address** (on side of receiver), page 14

P Reset button (HCT 102 D) — 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 this `Reset` button while applying power. You must then load new firmware via the HCR 102 receiver (see the *HC 400 Series User Guide* for instructions).
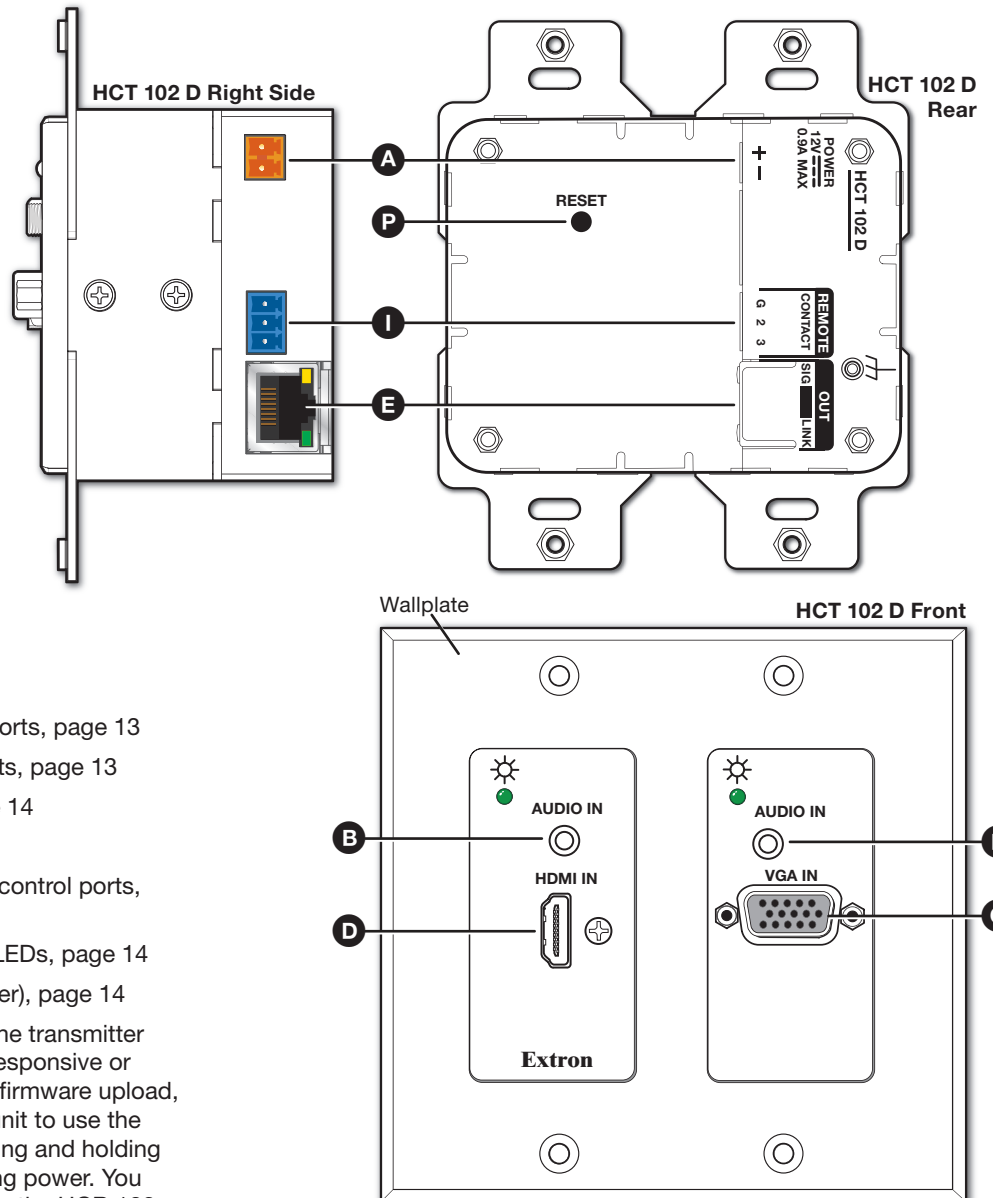

Figure 5. HCT 102 D Right Side Panel (Top Left), Rear Panel (Top Right), Front Panel (Bottom)

Installation and Configuration

> **ATTENTION:**
> - Installation and service must be performed by experienced personnel.
> - L'installation et l'entretien doivent être effectués par du personnel expérimenté.

Step 1 — Get Ready

1. Familiarize yourself with the features of the transmitter and receiver (see **Front Panel Features** and **Rear and Side Panel Features** on page 4).

2. 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
    - **Toolbelt software** — for discovering the HCR 102 receiver and other control products on the network, for managing core settings, and for upgrading firmware if the need arises
    - **Global Configurator® (GC) software** — for setting up and configuring the control system. GC Professional and GC Plus modes include a link to the **Toolbelt** software
    - **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 18).

3. Obtain network information for the unit from the network administrator. You will 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)
    - ☐ Subnet mask
    - ☐ Username
    - ☐ Device (HCR 102) LAN IP address
    - ☐ Gateway IP address
    - ☐ Passwords

4. Write down the MAC address of each HCR 102 (see **figure 4**, ⓞ on the previous page) or other IP Link Pro device to be used.

5. Obtain model names and setup information for devices the HCR 102 will control.

Step 2 — Mount the Half Rack Units, Prepare the Installation Site for the HCT 102 D

Turn off or disconnect all equipment power sources and mount the transmitter and receiver as required.

Mounting the HCT 103 and HCR 102

The HCT 103 transmitter and HCR 102 receiver ship with furniture mounting brackets attached for mounting to furniture or a wall.

> **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.
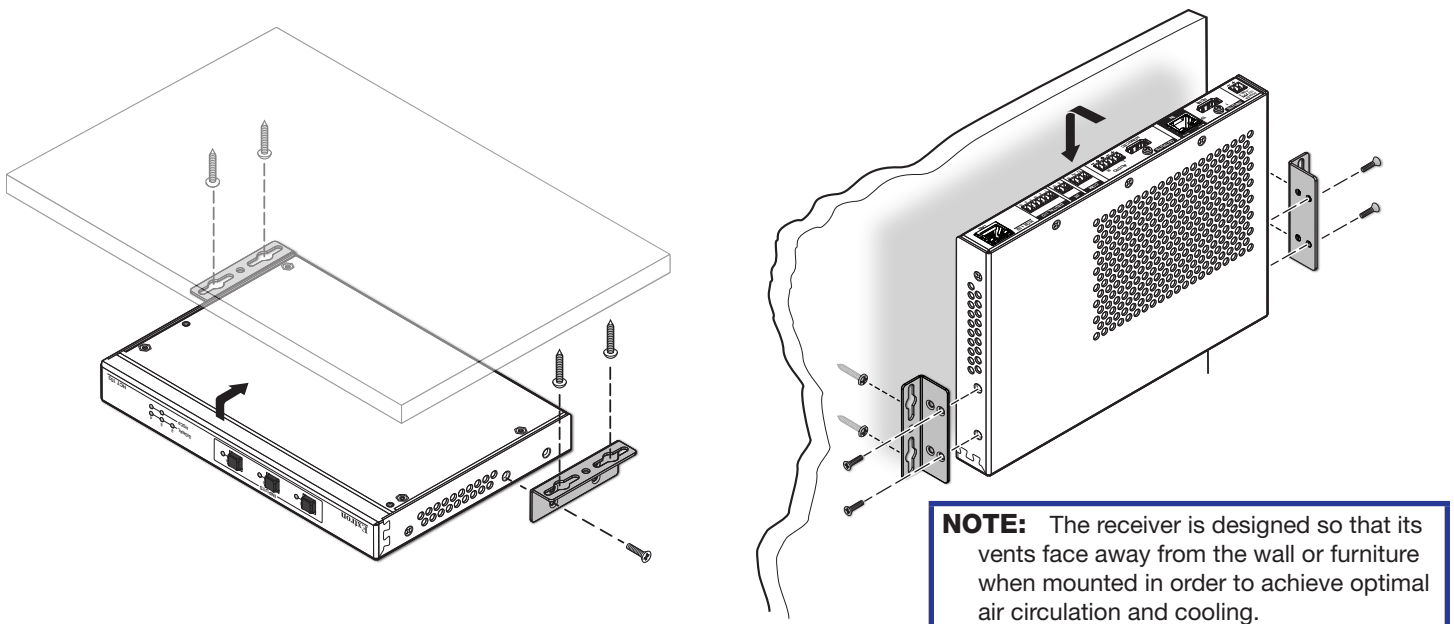
Figure 6. Mounting the Transmitter (Left) and the Receiver (Right)

Each transmitter or receiver is one inch high, one half rack wide, and can be rack mounted. The product page on **www.extron.com** includes links to recommended optional rack shelves or rack mounting kits. Alternatively, you can remove the pre-installed furniture mounting brackets and attach four rubber feet at the corners of each unit and place it on a table or desk.

Observe local and UL safety guidelines for mounting devices to equipment racks and see the *HC 400 Series User Guide* for UL rack mounting guidelines.

Prepare the Installation Site for the HCT 102 D

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 into a grounded, UL Listed electrical junction box.
• Extron recommande d'installer le HCT 102 D dans une boîte de dérivation électrique mise à la terre, certifiée UL.
• If the HCT 102 D will be installed into fine furniture, it is best to hire a licenced, 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 102 D 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 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 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.

Americans with Disabilities Act (ADA) compliance

When planning where to install the HC system, you may need to consider factors affecting accessibility of the units such as height from the floor, distance from obstructions, and how far a user must reach to press the buttons or insert a cable. 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

Mud rings, optional UL Listed junction boxes, external junction boxes, and surface mounting boxes are available for use with the HCT 102 D.

1. Read any installation instructions and UL guidelines that come with the mounting devices.

2. Protect the mounting surface to prevent damage.

3. For a junction box or mud ring, cut a hole in the wall or furniture just large enough to insert the box or mud ring. Cutout dimensions for the 2-gang mud ring are 4.06 inches W x 3.75 inches H (104 mm W x 95 mm H). The cutout for a junction box varies by model.

4. Install the box or mud ring in the opening at the installation site.

5. Run cables to the mounting location, leaving enough slack for device installation. Secure the cables with a clamp for strain relief so they do not slip back down into the wall or furniture.
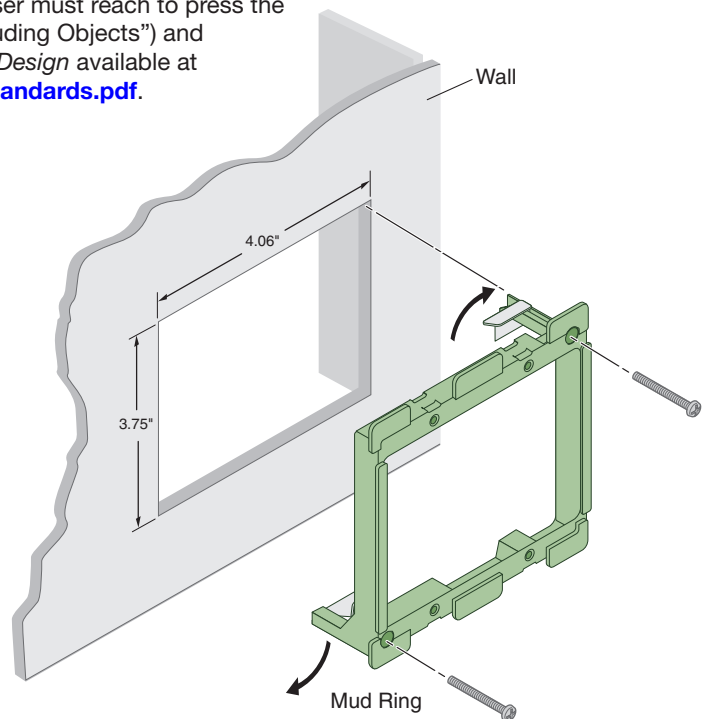

Figure 7. Installing a Mud Ring

Step 3 — Connect AV, Interconnection, and Control Cables

1. Connect AV sources to the input connectors (see **AV Inputs** on page 12).

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 12).

3. Connect AV output devices (display, projector, or other device, and an amplifier or powered speakers) to the output connectors (see **AV Outputs** on page 13).

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 instructions for the Remote connectors in **Control** on page 13).

5. Cable the control ports on the receiver as desired for controlling AV devices and for communicating with the system via LAN (see **Control** on page 13).

Step 4 — Connect Power

Connect the power supply or power supplies to the HC 400 Series system (see **Power** on page 15), connect power cords, 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

You can configure the basic network settings in one of the following ways:

- Via **front panel controls and the OSD menu** — a quick method you can use whether or not you need to configure other control settings (see **Using the OSD menu to configure the AV settings** on page 9). 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.

To configure network settings from the OSD menu:

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 **left ◀** or **right ▶** arrow button to move between octets. Press the **up ▲** and **down ▼** arrow buttons to change the value in the selected octet.
  Default: 192.168.254.250.

From the `Communication` menu:

> **NOTE:** Press and hold the `Enter` button for 10 seconds to edit settings in the `Communication` 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 **left ◀** or **right ▶** arrow button to move between and select octets. Press the **up ▲** and **down ▼** arrow buttons to change the value in the selected octet.
- Subnet mask — Select and enter the `Subnet Mask` submenu. Press the **left ◀** or **right ▶** arrow buttons to select an octet of the subnet mask address. Press the **up ▲** and **down ▼** arrow buttons to adjust the value of the selected octet.
  Default: 255.255.255.0.
- Gateway — Select and enter the `Gateway` submenu. Press the **left ◀** or **right ▶** arrow buttons to select an octet of the gateway address. Press the **up ▲** and **down ▼** arrow buttons to adjust the value of the selected octet.
  Default: 0.0.0.0.

To configure network settings using PCS:

1. Connect the PC and the LAN port of the HCR 102 receiver (see **LAN** on page 14) 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).
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 devices connected to the network as PCS detects them.
4. Using the MAC address, locate the desired device (HCR 102) in the list.

5. In the row for the HCR 102, click the **Edit** button in the `IP Address` column. The `Communication Settings` dialog box opens, displaying controls for network configuration.

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, 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 or front panel lockout.
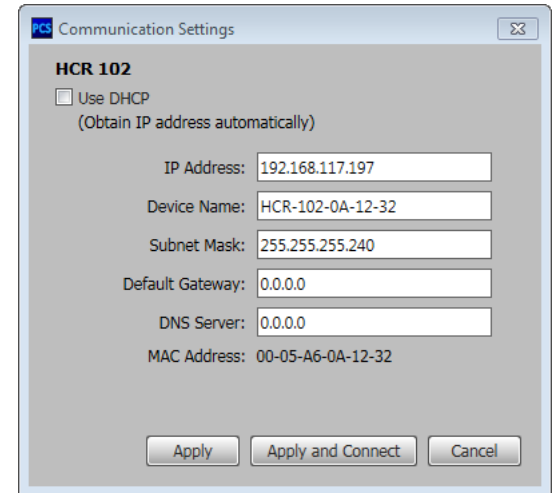
Figure 8. The PCS Communication Settings Dialog Box

To configure network settings using Toolbelt:

1. Connect the PC that you will use for setup and the HCR 102 receiver to the same network, and apply power to all devices. For details on the LAN connection, see **LAN** on page 14.

2. Start Toolbelt.

3. Start device discovery from within Toolbelt. Toolbelt displays a list of all Extron control devices connected to the network.

4. In Toolbelt, use the MAC address to locate the desired device (the HCR 102) in the list and select it.

5. Use the Set IP feature in Toolbelt or use the Toolbelt `Manage` > `Network Settings` tab feature to enter the IP address and subnet address, then configure other network settings as needed.

> **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`.

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

To configure the AV settings using PCS software:

1. Install Extron PCS Product Configuration Software on a PC and start the program.

2. Connect the PC to the receiver via the rear panel LAN port (see **figure 4**, **N** on page 4) or the front panel Config USB connector (see **figure 3**, **A** on page 3). USB connection requires a user-provided USB A to USB mini-B cable.

3. Use the PCS program to set the output resolution and rate, configure EDID Minder, adjust the video color bit depth, or monitor the signal and HDCP status, or other AV settings, as required. For details, see the *HC 400 Series User Guide*, or access the *PCS Help File* (press <F1> on the keyboard or click the **?** button in the software and select **Help File**).

To configure the AV settings using the OSD and front panel buttons:

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. Press the front panel **Menu** button on the HCR 102 (see **figure 3**, **F** on page 3, or the image at right). The OSD main menu appears on the display (see the example below, at right).
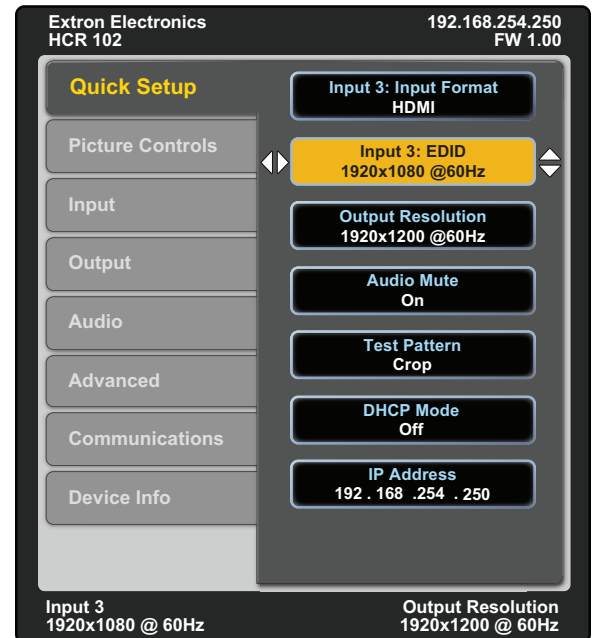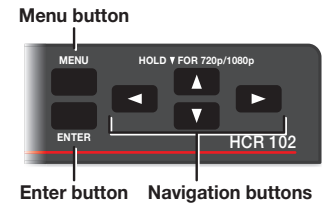
   The OSD menu system consists of the following menus:
   - `Quick Setup`
   - `Picture Controls`
   - `Input`
   - `Output`
   - `Audio`
   - `Advanced`
   - `Communication`

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

4. Navigate through the menus and make adjustments.
   a. Press the **up** ▲ and **down** ▼ arrow navigation buttons (see **H**) to navigate to and highlight the desired menu or submenu.

   b. Press the **Enter** button (see **G**) or **right** ▶ arrow button to access submenu items for the selected submenu (see "Using the OSD menu to configure the AV settings" below for information about the contents of each submenu).

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

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

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

Menu button

Enter button   Navigation buttons

Extron Electronics   192.168.254.250
HCR 102   FW 1.00

Quick Setup	Input 3: Input Format HDMI
Picture Controls	Input 3: EDID 1920x1080 @60Hz
Input	Output Resolution 1920x1200 @60Hz
Output	Audio Mute On
Audio	Test Pattern Crop
Advanced	DHCP Mode Off
Communications	IP Address 192 . 168 .254 . 250
Device Info	

Input 3   Output Resolution
1920x1080 @ 60Hz   1920x1200 @ 60Hz

Using the OSD menu to configure the AV settings

- Use the `Quick Setup` submenu to set input EDID settings, set output resolution, mute audio, activate video test patterns, enable or disable DHCP, and set the IP address.

- Use the `Picture Controls` submenu to view the image position and size.

- Use the `Input` submenu to set the input format for digital inputs, set horizontal and vertical start values, set the total pixels and phase, set HDCP authorization, and set the EDID for the current input.

- Use the `Output` submenu to set output resolution, HDMI output format, and HDCP notification.

- Use the `Audio` submenu to 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).

Audio Input Format	Details
None	Mutes all audio for selected input. Sets "No Audio" EDID.
Analog	Sets the selected input to analog (default for input 1). Sets "No Audio" EDID.
LPCM-2Ch	Sets the selected input to LPCM-2Ch digital audio (default for input 2). Sets 2Ch audio EDID.
Multi-Ch	Sets the selected input to Multi-Ch digital audio. Sets Multi-Ch audio EDID.
LPCM-2Ch auto	Sets the selected input to prioritize digital audio (default for inputs 3-4). Analog audio is passed when digital audio is not present. Sets 2Ch audio EDID.
Multi-Ch auto	Sets the selected input to prioritize digital audio. Analog audio is passed when digital audio is not present. Sets Multi-Ch audio EDID.

- Use the `Advanced` submenu to select a test pattern, set the screen saver, set the aspect ratio, configure auto switching, and reset the device to factory defaults.

- Use the `Communication` submenu to view the device MAC address, DHCP status, the current IP address and subnet mask, and gateway.

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

- Use the `Device Info` screen to view the device name, firmware build, temperature, input and output information, and detected display. This screen is read-only.

See the *HC 400 Series User Guide* for details about the menus and available settings, and for a list of output scaler rates.

Step 7 — Configure the Control Settings

To use the COM, IR, or digital I/O ports on the receiver, you must configure them. Also, CEC control of the output device can be customized during configuration with Global Configurator.

The basic steps are outlined below in the recommended order.

> **NOTE:** See the *Toolbelt Help File* or *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.

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 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, timers, and local variables.

    c. Add any optional touchpanels and set them up:
    - Create the GUI configuration for the touchpanels and add it to the project.
    - Program functions, monitors, or schedules to the touchpanels 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

1. Test the system. See the *HC 400 Series User Guide* for an outline of the system testing procedure.

2. Adjust wiring or configuration as needed.

Step 9 — Mount the HCT 102 D

1. Disconnect power at the source from all devices in the system.

2. 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 9 and 10, ❶).

3. Secure the transmitter to the junction box or mud ring as follows (see ❷):

    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.

4. 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 screws through the wallplate mounting holes (❸) and lightly tighten the screws until snug. Do not over-tighten.
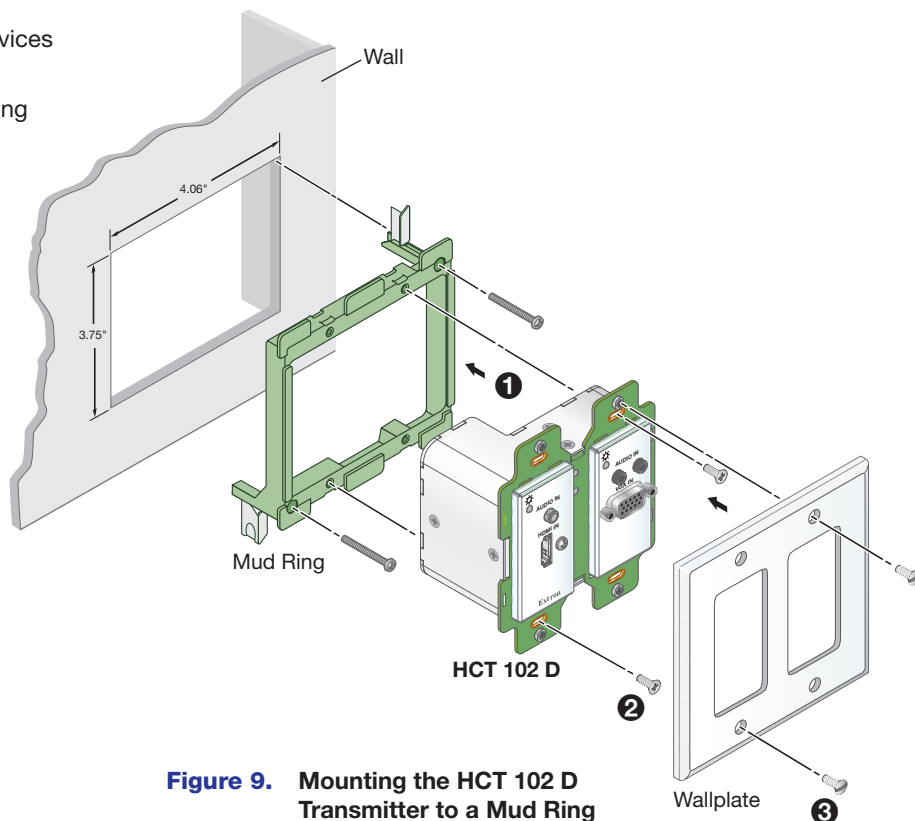
5. Reconnect power to all devices.

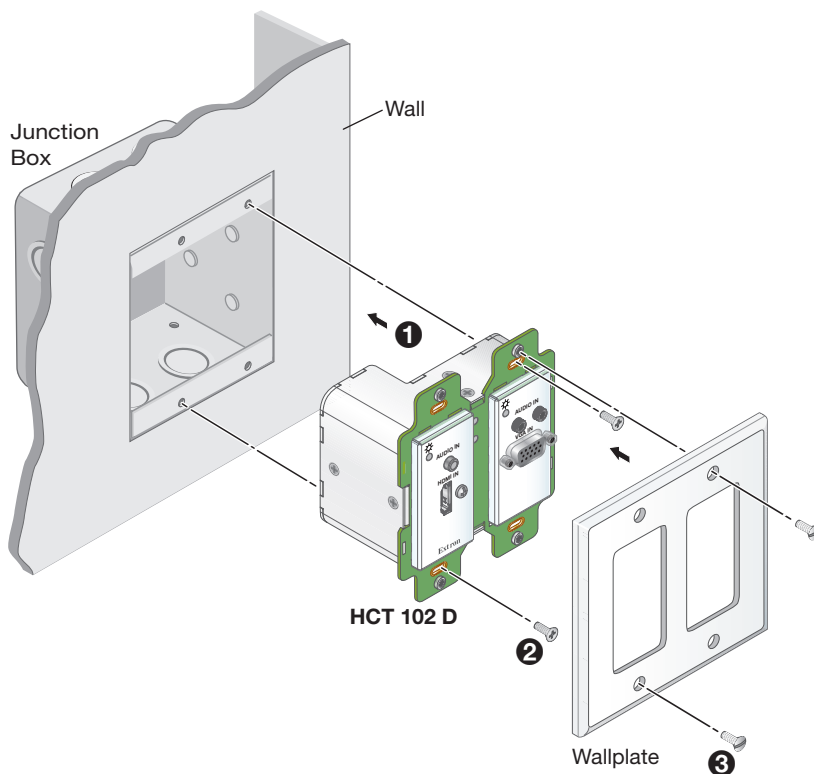**Figure 9.** **Mounting the HCT 102 D Transmitter to a Mud Ring**

**Figure 10.** **Mounting the HCT 102 D Transmitter to a Junction Box**

Cabling

Attach cables using the following wiring diagrams as a guide. Full details are available in the *HC 400 Series User Guide*.
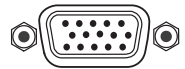
AV Inputs

Analog audio input

For analog audio sources, connect the source device to the audio input 3.5 mm tip-ring-sleeve (TRS) connector on the transmitter (see **figure 4** and **figure 5**, **B** on page 4 for connector location). Wire the connector as shown at right.

Tip (L)
Ring (R)
Sleeve (Gnd)

3.5 mm Stereo Plug
**(unbalanced input)**
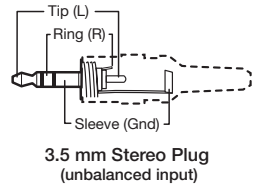
Analog video input

Connect an analog RGB video input source to the 15-pin HD RGB input connector (**C**) on the transmitter.

Digital AV input

For HDMI video and for digital audio embedded within HDMI signals:

1. Connect a digital video source device to any HDMI input connector on the transmitter or receiver (see **D** in **Rear and Side Panel Features** on page 4).

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.

    a. Plug the HDMI cable into the panel connection (see **a** at right).

    b. Loosen the HDMI connection mounting screw from the panel enough to allow the LockIt lacing bracket to be placed over it (**b**). The screw does not have to be removed.

    c. Place the LockIt lacing bracket on the screw and against the connector (**c**), then tighten the screw (**d**) to secure the bracket.

    d. Loosely place the included tie wrap around the connector and the LockIt lacing bracket as shown (**e**).

    e. While holding the connector securely against the lacing bracket, tighten the tie wrap, then remove any excess length.
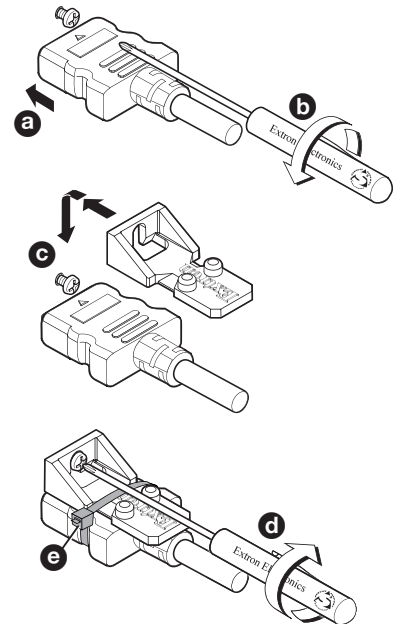
Complete details on LockIt installation are available in the *LockIt HDMI Cable Lacing Bracket Installation Guide*.

Transmitter-Receiver Interconnection

Connect the Out port of the transmitter (**figure 4**, **E**) to the In port of the receiver (**F**) using a shielded twisted pair CAT *x* cable of up to 230 feet (70 m), as shown in **figure 1** on page 2. Terminate the cable with shielded RJ-45 connectors using the TIA/EIA-T568B wiring standard at both ends, as shown at right.

> **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.
> *   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-4 d'Extron ou le câble STP201.

Pins:
12345678

Insert twisted
pair wires.

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

For optimal performance, Extron highly recommends the following:

*   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.
*   Use shielded RJ-45 plugs to terminate the cable.

*   Overall transmission distance capabilities vary depending on the number of patches used. If possible, limit the number of patches to 2 total.

*   If patches must be used in the system, Extron recommends shielded CAT 6 (or better) patch cables.

AV Outputs

1. Connect a display, projector, or other AV device to the Outputs HDMI/CEC connector (see **figure 4**, **G** on page 4) on the receiver rear panel for HDMI AV output.

2. Connect the cable and install the LockIt bracket (see step 2 within **Digital AV input** on the previous page) in the same method as for the HDMI inputs.

3. For analog audio output, connect an amplifier, powered speaker 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**
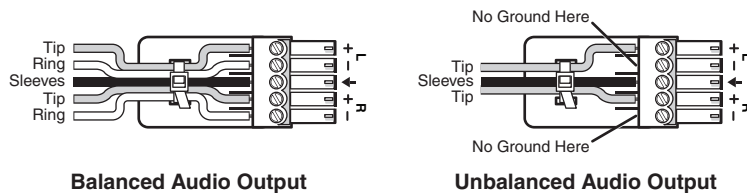
Control

USB connections

Connect a host computer to the USB mini-B port on the receiver (see **figure 3**, **A** on page 3) for AV configuration.

Transmitter connections for input selection and indication

The remote control contact input ports (see **figure 4**, **I**) and tally output ports (**J**) can be 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:**
> - 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 is equal in priority to input selection from the front panel or from software.
> - 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 (see below) or an external push button keypad (see the *HC 400 Series User Guide*), as appropriate.

Extron HDMI Show Me cable

For each Extron Show Me cable (part of a TeamWork system), 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 2 and see the diagram at right).

Extron Show Me Cable

Input
(To Source Device)

Share Button

Three-Conductor Pigtail for Contact Closure and Tally

Output
(To Transmitter or Receiver)

> **NOTES:**
> - For Show Me cables, the ground pin 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.
> Analog Show Me cables do not.
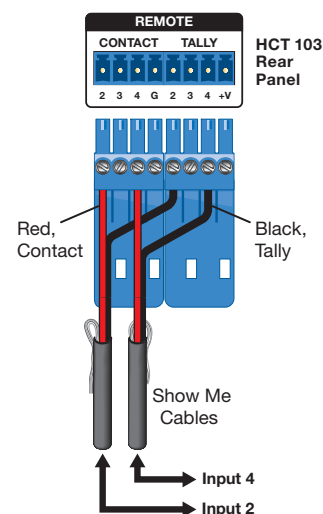
Receiver connections for display or device control

The serial, IR, digital I/O, LAN, and CEC ports can all be used for device control. All of these ports must be configured using Global Configurator.

Serial

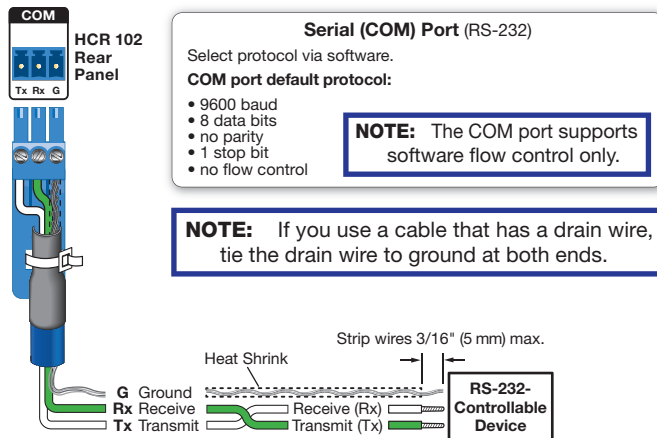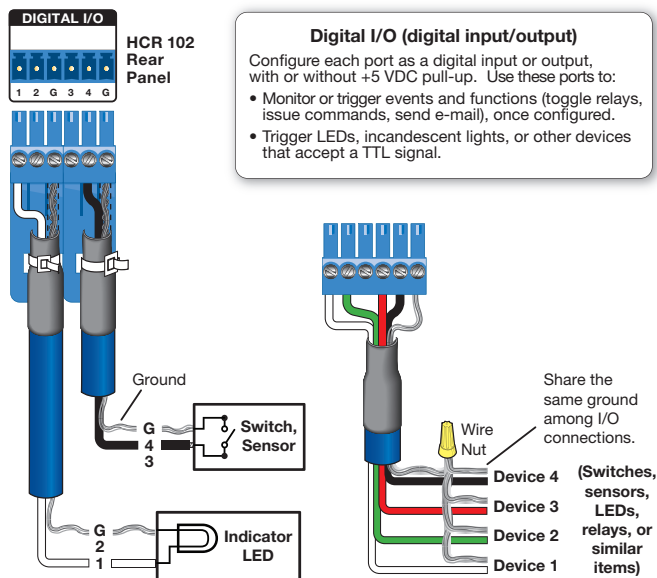For serial control using RS-232, connect the serial control port of the AV device to the COM port (see **figure 4**, **K** on page 4) of the HCR 102 receiver as shown below.

COM

HCR 102 Rear Panel

Tx Rx G

Serial (COM) Port (RS-232)

Select protocol via software.

COM port default protocol:
• 9600 baud
• 8 data bits
• no parity
• 1 stop bit
• no flow control

NOTE: The COM port supports software flow control only.

NOTE: If you use a cable that has a drain wire, tie the drain wire to ground at both ends.

Strip wires 3/16" (5 mm) max.

Heat Shrink

G Ground
Rx Receive — Receive (Rx)
Tx Transmit — Transmit (Tx)

RS-232-Controllable Device

Digital I/O

To use digital input or output to control other devices, provide feedback to the receiver, or trigger actions, connect devices to the digital I/O ports (**M**) as shown in the following diagram.

DIGITAL I/O

HCR 102 Rear Panel

1 2 G 3 4 G

Digital I/O (digital input/output)

Configure each port as a digital input or output, with or without +5 VDC pull-up. Use these ports to:
• Monitor or trigger events and functions (toggle relays, issue commands, send e-mail), once configured.
• Trigger LEDs, incandescent lights, or other devices that accept a TTL signal.

Ground

G 4 3 — **Switch, Sensor**

G 2 1 — **Indicator LED**

Wire Nut

Share the same ground among I/O connections.

Device 4
Device 3
Device 2
Device 1

(Switches, sensors, LEDs, relays, or similar items)

Infrared

For IR control of AV equipment, connect one or two IR emitters to the IR port (see **L**) of the HCR 102 receiver as shown below.

IR

HCR 102 Rear Panel

S G

IR Port
IR (30 kHz to 300 kHz, with or without carrier signals)

Unidirectional IR

G Ground
S IR Output Signal

(-)
(+)
(-)
(+)
(+)

Two Single IR Emitters

To the IR Receiver of a Projector, Display, or Other Device

LAN

Connect the receiver to a network via the LAN port (**N**) for remote monitoring and configuration of the system, for touchpanel control, or to allow the receiver to control an Ethernet-enabled product. You will need the MAC address (**O**) during device discovery and configuration.

Ethernet

TCP/IP Network

PC

AV Device

Insert Twisted Pair Wires

RJ-45 Connector

Pins: 8 7 6 5 4 3 2 1

Activity LED

Link LED

LAN

LAN

HCR 102 Rear Panel

NOTE: Initial units ship with the functions of these LEDs reversed. Subsequent units will ship with standard LED functions.

LAN (Ethernet)

Default protocol:
• IP address: 192.168.254.**250**
• Gateway IP address: 0.0.0.0
• Subnet mask: 255.255.255.0
• DNS address: 127.0.0.1
• DHCP: off
• Link speed and duplex level: autodetected
• Data rates: 10/100Base-T

Default login credentials:
• Username: **admin**
• Password: **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 (see **Reset Modes: a Brief Summary** on page 17) sets the password to extron.
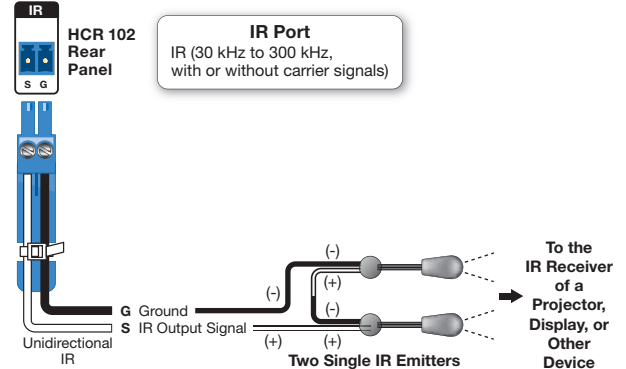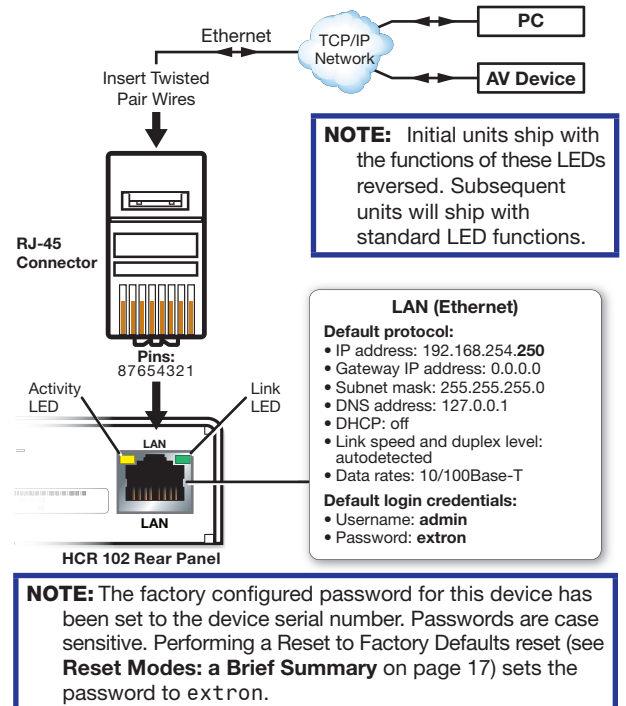
HDMI/CEC

Connect an AV device that supports CEC control to the HDMI/CEC output port on the receiver (**G**) to allow the HCR 102 to automatically turn display power on or off based on whether an active signal is detected at the selected input.

The HCR 102 sends CEC driver commands to the display for basic control functions. CEC control is pre-configured and works "out of the box" but it can be customized further using GC.

LINK

OUTPUTS

AUDIO L R

HDMI/CEC

HDMI

CEC

HCR 102 Rear Panel

CEC-Compliant Display

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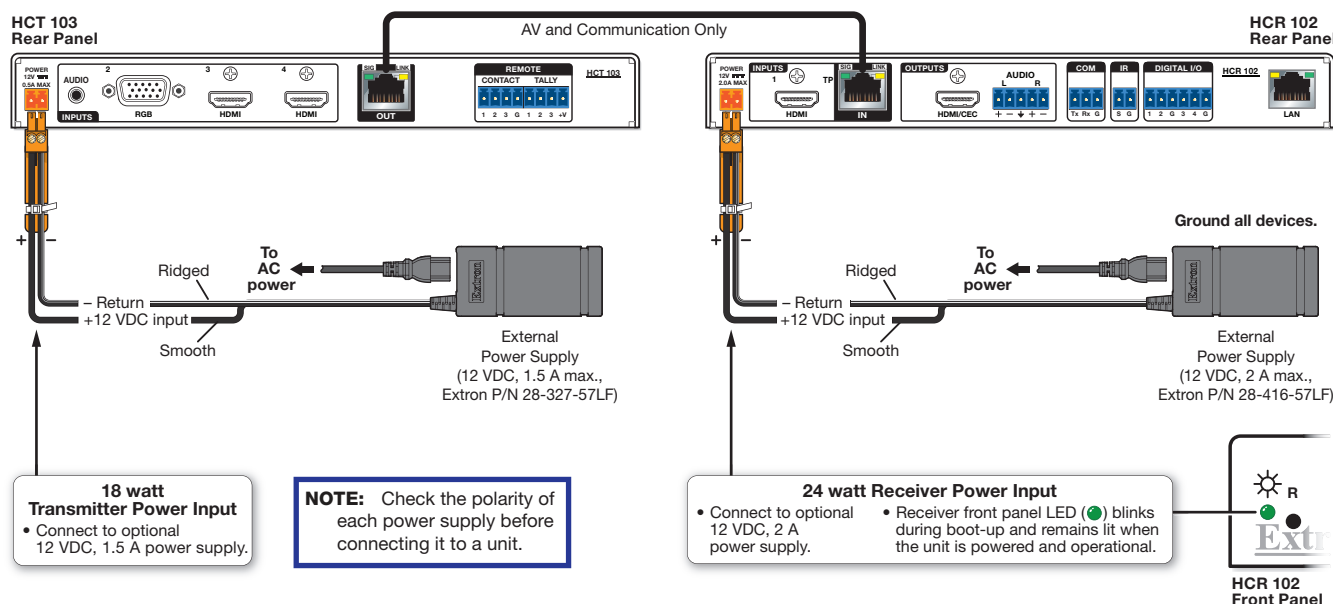
Power

For port locations, see **figure 4** and **figure 5**, **A** on page 4. You have two options for powering the system:

- Connect the **included** 12 VDC, 4.2 A power supply (Extron PS 1242) at the receiver to remotely power the transmitter.
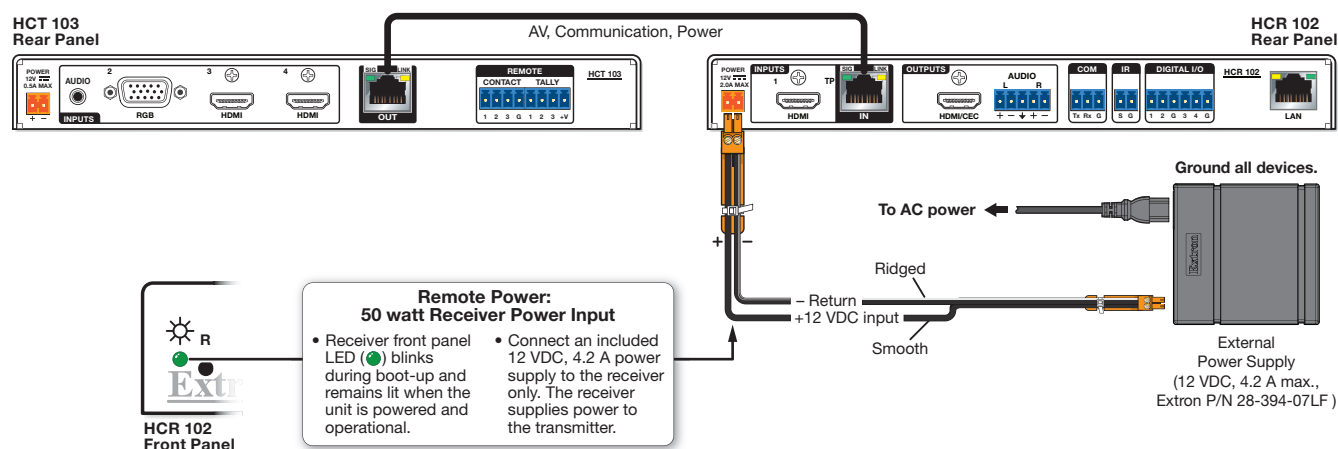
NOTE: The receiver can provide power remotely to the transmitter using a 50 watt power supply. Remote power mode requires at least 2.5 A. The transmitter can receive power from but cannot provide power to the receiver. The remote power feature is enabled by default but can be disabled by using a control in the PCS software.

- Alternatively, you can connect an **optional** 12 VDC, 1.5 A power supply (Extron PS 1215 C) or (for the HCT 103 only) a 12 VDC, 0.5 A power supply (Extron PS 1205 C) at the transmitter, and connect an **optional** 12 VDC, 2 A power supply (Extron PS 1220) at the receiver.

For both options, connect the external power supply or supplies to a 100 to 240 VAC power source.

Front Panel Operation and Indications

Input Selection and Indication

Input selection buttons and LEDs

- To select an input on the transmitter front panel, push one of the three input buttons (see **figure 3**, **B** on page 3 on the HCT 103) to select the corresponding input connected to the transmitter. Or push the button on a connected Show Me cable to select that input.

- To select an input from the receiver front panel, push the input 1 button (see **B** on the HCR 102) to select the input connected to the receiver input 1.

The corresponding LED lights to indicate that that input is selected (active). LEDs for deselected inputs are off (unlit).

Use the auto-switching feature, which is active by default. In the "last connected" auto switch mode, the system automatically switches to the input where an active AV source device was last connected. If that device is disconnected, the system switches to the last device connected before that, as long as it has an active signal.

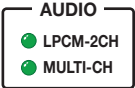#### Signal, HDCP, and Audio LEDs

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

HDCP LEDs —These LEDs (**D**) light to indicate the presence of an active signal with HDCP encryption at the corresponding input connector. Because input 2 on the transmitter 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.

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

	Audio Input LED State and Indication	
LED Type	**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.

OSD Use

See the section on page 9 of this guide about configuring the AV settings using the on-screen display and front panel buttons, and see the *HC 400 Series User Guide* for full details on the OSD and how to use it.

Locking the Front Panel (Executive Mode)

To prevent unauthorized access or accidental changes to device settings, you can lock the front panel controls, making control available only by software. (The default state is unlocked.)

- You can lock and unlock the front panel by using a control in the PCS software.

- Front panel lockout (Executive) mode 2 can also be enabled and disabled by pressing and holding the `Menu` and `Enter` buttons for 2 or more seconds.

Firmware Upgrades

The firmware can be upgraded via the HCR 102 embedded web page, or via Extron Toolbelt (available at **www.extron.com**).

Reset Modes: a Brief Summary

The HCR 102 receiver offers the following reset modes:

- **Use Factory Firmware**: Press and hold the receiver front panel `Reset` button (see **figure 3**, **J** on page 3 for location) while applying power to the unit. Keep holding the button down until the Power LED (**I**) blinks twice, or for 6 seconds, then release the button. The receiver enters factory firmware mode. Use this mode to revert to factory firmware in the event of a firmware failure.
  Do not continue to operate the control processor using the factory firmware version. If you want to use the factory default firmware version, you must upload that version again.

- **Project Recovery**: See the *HC 400 Series User Guide* for instructions. Use this mode to recover the project in the event of a lost username and password.

- **Run/Stop Program**: Hold down the `Reset` button for about 3 seconds, until the `Power` LED blinks once. 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 blinks 2 times if the program is starting. The LED blinks 3 times if the program is stopping. This mode allows you to restart any scripts or events stopped by an IP settings reset.

- **Toggle DHCP Client**: Press the `Reset` button five times (consecutively). Release the button. Do not press the button within 3 seconds following the fifth press. Use this mode to enable or disable the DHCP client for the LAN port.
  - The `Reset` LED blinks 6 times if the DHCP client is enabled.
  - The `Reset` LED blinks 3 times if the DHCP client is disabled.

  > **NOTES:**
  > - 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.
  > - When you disable the DHCP client by using this mode, the unit reverts to using the previously-set static IP address.

- **Reset All IP Settings**: Press and hold the HCR 102 front panel `Reset` button for 6 seconds. After the Power LED blinks twice, release and momentarily press the `Reset` button. Use this mode to reset all network settings to factory default values without affecting user-loaded files. This reset mode also stops any running programs.

- **Reset to Factory Defaults**: Press and hold the HCR 102 front panel `Reset` button for 9 seconds. After the Power LED blinks three times, release and momentarily press the `Reset` button within 1 second. Use this mode to return the receiver to factory default settings. This mode also deletes all user-loaded files and configurations from the HCR 102, and also 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.

For detailed information on each mode and its use, see the *HC 400 Series User Guide* at **www.extron.com**.

Resources

Obtaining Control Drivers

Extron provides an extensive selection of device drivers available on the Extron website. If the system requires a control driver that is not already available, you can request a new IR, serial (RS-232), or Ethernet driver from Extron.

Obtaining Instructions, Information, and Assistance

Basic setup steps are outlined in this guide. For additional information see the help files and the *HC 400 Series User Guide*, available at **www.extron.com**. If you have questions during installation and setup, call the **Extron Sales & Technical Support Hotline** or the Extron S3 Control Systems Support Hotline (1.800.633.9877).

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 **www.extron.com**.)
- Via links from search results

NOTES:

- For some software you have the option to click the `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.

  To obtain Extron control product software, you must have an Extron Insider account. 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.

- 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 IP Link (non-Pro) devices are not compatible.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the **Extron Safety and Regulatory Compliance Guide** on the Extron website.

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