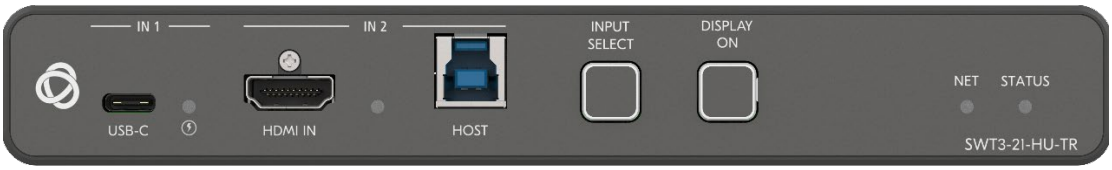
# USER MANUAL

## MODEL:

## SWT3-21-HU-TR
## 2x1 4K60 USB C/HDMI Switcher Extender




# Contents

# Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

## Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment.
- Review the contents of this user manual.

Go to http://www.kramerav.com/downloads/SWT3-21-HU-TR to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

### Achieving Best Performance

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Do not secure the cables in tight bundles or roll the slack into tight coils.
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.
- Position your Kramer **SWT3-21-HU-TR** away from moisture, excessive sunlight and dust.

### Safety Instructions

**Caution:**

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

**Warning:**

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which is located on the bottom of the unit.

## Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at www.kramerav.com/il/quality/environment.

# Overview

Congratulations on purchasing your Kramer **SWT3-21-HU-TR 2x1 4K60 USB C/HDMI** Switcher Extender. **SWT3−21−HU−TR** is a high−performance auto−switcher with one USB−C and one HDMI/USB input, HDMI output and long−range HDBaseT 3.0. The HDBaseT 3.0 port is configurable as either a transmitter (output) or a receiver (input). The unit extends a 4K60Hz (4:4:4) HDMI, USB 2.0, RS−232, IR and I/O signal over a 40 meter twisted pair cable. Local and remote connected USB peripherals – such as a room camera and microphone – can be switched to the active USB host, allowing smooth operation in hybrid meetings and supporting both in-room and online participants. The unit may be deployed at either the presentation source or at the display end.

**SWT3-21-HU-TR** provides exceptional quality, advanced and user-friendly operation, and flexible control.

## Exceptional Quality

- Hybrid-meeting Collaborative Switching – Controllable coupled–signals switching of both AV and USB host inputs, for concurrent connection with AV output and USB devices, allows collaborative hybrid meeting where meeting participants are switched to share their content with both room and online meeting participants.
- HDMI Signal Switching – HDCP 2.3 compliant, supporting deep color, x.v.Color™, CEC, HDMI uncompressed audio channels, Dolby TrueHD, DTS–HD, 2K, 4K, and 3D as specified in HDMI 2.0b.
- Flexible USB Switching and Extension – An active USB 3.2 host is connected to the switcher extender on either the transmitter or receiver sides. USB 2.0 signals are extended between the switcher extender transmitter and receiver sides, enabling connection and switching of the active USB host to both local USB 3.1 and remote USB 2.0 devices, such as camera and audio devices, or HID (Human Interface Devices) mouse or keyboard devices.
- HDMI Mirroring – On switcher transmitter side, active USB–C or HDMI input signal is transmitted on HDBT output, and in parallel mirrored to HDMI output port for connecting a local monitor or adding an additional unit in a daisy chain.
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling and processing that ensures Plug and Play operation.
- Multi–channel Audio Transmission – Up to 32 channels of digital stereo uncompressed signals for supporting studio–grade surround sound.

- Configurable HDBT port – operates as a 2-input switcher in transmitter mode, or a 3-input switcher in receiver mode.

## Advanced and User-friendly Operation

- BYOD Ease and Convenience – BYOD Ease and Convenience – Connect any DP–Alt–Mode–capable USB–C device as an AV source using a single USB-C cable. The connection also provides USB and Ethernet access, and (if PD–2.0–capable) up to 60 watts of charging power.
- Auto Switcher Ease of Use – Automatically switches to and plays the signal the connected display, according to user−configured preferences. Auto-switching of paired Kramer-recommended transmitter and receiver devices, for simple control-less applications.
- Display Power On/Off Control with Ease: Simply press the DISPLAY ON button to toggle on / off the power of the connected CEC-enabled display. The button's LED indicator shows you whether the display is currently powered on / off.
- Simple Control – Remote IP−controller connection, browser operation webpage, local panel buttons, or remotely connected contact−closure buttons, for easy and fully-flexible user port selection, signal routing, and switcher control.
- Comprehensive Management – Local panel indication LEDs to facilitate easy local maintenance and troubleshooting. Remote IP–driven firmware upgrade and management via user–friendly embedded web pages and an optional site-wide management system, ensure lasting and field-proven deployment.

## Flexible Connectivity

- High Performance Standard Extender – Professional HDBaseT 3.0 extender for providing long–reach signals over twisted–pair copper infrastructures. SWT3–21–HU–TR is a standard extender that can be connected to any market–available HDBaseT–compliant extension product. For optimum extension reach and performance, use recommended Kramer cables.
- Easy Online Meeting System Integrated Connectivity – Built–in flexible auto–disconnection operation of USB devices, such as room cameras and soundbars, enable detection of BYOD presenter disconnection by online meeting systems for their auto–activation, convenient integration, and ease of end–user operation according to space changing hybrid session’s needs.
- Built-in Intelligent Control Gateway - Remote IP–driven intelligent control of connected AV, USB and sensor devices via CEC, RS–232, IR or I/O. Eliminating the need for an external control gateway, this feature reduces installation complexity and costs, to enable easy integration with control systems, such as Kramer Control.
- Secured Network Connection – Standard IT-grade 802.1x authentication for secured IT LAN connectivity.
- Audio De-embedding – The digital audio signal passing to the output, is de–embedded, converted to an analog signal and sent to the stereo balanced analog audio output. This enables playing the audio on a locally connected professional audio system (such as DSP) and speakers, in parallel to playing it on the speakers connected to the AV acceptor device (such as TVs with speakers).
- Ethernet Extension – Ethernet interface data flows in both directions, allowing extension of up

to 1 Gbps Ethernet connectivity for LAN communication and device control.

- Bidirectional RS–232 Extension – Serial interface data flows in both directions, allowing data transmission and device control.
- Bidirectional Infrared Extension – IR interface data flows in both directions, allowing remote control of peripheral devices located at either end of the extended line.
- Easy and Elegant Installation – A sleek and small sized unit that has a configurable role. It can be field programmed as either a transmitter (at the desk side) or a receiver (at the display side) to save valuable installation time.

# Typical Applications

**SWT3-21-HU-TR** is ideal for the following typical applications:

- Enterprise and education hybrid meeting rooms and classrooms.
- Hybrid user connection element in advanced hybrid meeting solutions.

## Controlling your SWT3-21-HU-TR

Control your **SWT3-21-HU-TR** directly via the front panel push buttons, or:

- Via the IP commands transmitted by a controller and touch screen system, or a browser using built-in user-friendly Web pages.
- By RS-232 serial commands transmitted by a touch screen system, PC, or a serial controller.

# Defining SWT3-21-HU-TR 2x1 4K60 USB C/HDMI Switcher Extender

- Configuring the device as transmitter (Tx) or receiver (Rx, default) is done via the embedded webpages settings. (see Setting Device Extension Operation Mode on page 32).
- Set to transmitter (Tx) mode by default.

This section defines **SWT3-21-HU-TR**.

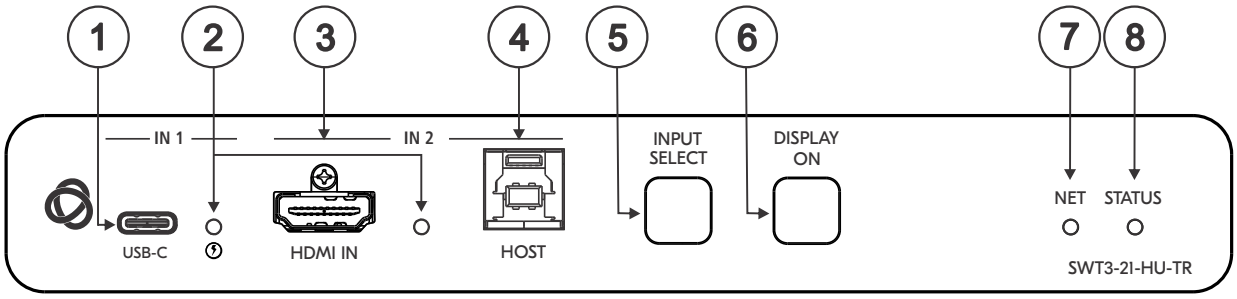



Figure 1: SWT3-21-HU-TR 2x1 4K60 USB C/HDMI Switcher Extender Front Panel

| # | Feature | Function | |
|---|---|---|---|
| 1 | USB-C IN 1 Port | Connect to a USB-C host (AV + USB + LAN):<br>• that supports DisplayPort Alternate Mode, (for example, a laptop) to share content.<br>• to communicate with the USB devices (for example, a PTZ camera) that are connected to the unit,<br>• to connect to the LAN<br>• to charge the connected sources (that supports USB Power Delivery 2.0).<br>⚠ Make sure to disconnect the USB-C cable from your host device before modifying the USB type, or before performing a factory reset.<br>After modifying the USB device type via the web, power cycle the unit after the webpage indicates that the process is complete.<br>While charging, the charging icon (to the right of the connector) becomes visible and lights orange. | |
| 2 | IN 1 / IN 2 Status LED (per input port) | **LED Status** | **Indicates** |
| | | Lights blue | The input is selected and connected to an active AV or AV+USB source. |
| | | Flashes blue | The input is selected and has no active AV signal. |
| | | Lights magenta | The input is selected and connected to an active USB host only (no AV). |
| 3 | HDMI IN | Connect to an HDMI source. | |

| # | Feature | | Function | |
|---|---|---|---|---|
| 4 | IN 2 Ports | HOST USB B 3.2 Connector | Connect to a USB host (for example, a room PC) to communicate with the USB devices (for example, a PTZ camera) connected to this device. | |
| 5 | INPUT SELECT Button | | Press to select an input. Each press switches to the next input, cycling through all the available inputs.<br>ⓘ 2 inputs for Tx mode, 3 inputs for Rx mode. | |
| 6 | DISPLAY ON Button | | Press to turn the display On/Off.<br>Button LED lights on after sending Display On message.<br>Button LED turns off after sending Display Off message. | |
| 7 | NET LED | | **LED Status** | **Indicates** |
| | | | Not lit | No IP address acquired. |
| | | | Flashes red/yellow | IP mode is set to DHCP, but the unit fails to obtain an IP address through a DHCP server and is assigned a default IP address. |
| | | | Lights green | A valid IP address has been acquired. |
| | | | Flashes green for 60 seconds | A means to identify the device in a system, using the #IDV command or the webpage “FLAG ME” button. |
| 8 | STATUS LED | | **LED Status** | **Indicates** |
| | | | Not lit | No power detected |
| | | | Lights blue | Power is on and a source is connected. |
| | | | Lights green | Power is on, and a source and an acceptor are connected. |

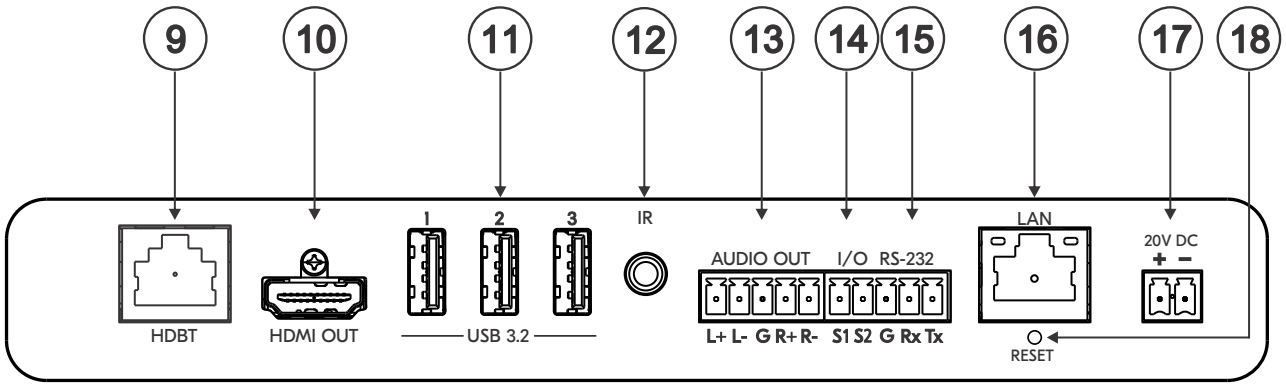



Figure 2: SWT3-21-HU-TR 2x1 4K60 USB C/HDMI Switcher Extender Rear Panel

| # | Feature | Function |
|---|---|---|
| 9 | HDBT RJ-45 Connector | Tx Mode: Connect to the HDBT RJ-45 connector on a paired receiver. |
| | | Rx Mode: Connect to the HDBT RJ-45 connector on a paired transmitter. |
| 10 | HDMI OUT Connector | Connect to an HDMI acceptor. |
| 11 | USB 3.2 Port (1 to 3) | Connect to the USB local devices (for example, a USB camera, a soundbar, microphone and so on). |
| 12 | IR 3.5mm Mini Jack | Connect to an IR emitter or sensor cable for IR extension over HDBT, or IR emitter for IR signal output per command from a LAN-connected controller (for example, from **KC-VB1/5**). |
| 13 | AUDIO OUT 5-pin Terminal Block Connector | Connect to a balanced stereo analog audio acceptor. |
| 14 | I/O 3-pin Terminal Block (S1 to S2) (GND is common for I/O and RS-232). | Connect to:<br>• Input-triggering devices (for example, remote buttons or sensors), **OR**<br>• Output-triggered devices (for example, remote alarm LED indication).<br>Each of these GPIO ports may be configured as a digital input, digital output, or an analog input port. |

| # | Feature | Function |
|---|---|---|
| 15 | RS-232 3-pin Terminal Block | • Connect and control the SWT3-21-HU-TR unit (default), OR<br>• Connect to an RS-232 controlled device (for example, a PTZ USB camera) for control via an IP-connected controller (for example, KC-VB1/5). |
| 16 | 1G LAN RJ-45 Connector | Connect to LAN.<br>⚠ **Make sure to connect only one HDBaseT endpoint (transmitter or receiver) to the network equipment (switch or router)! Connecting both endpoints to the network can cause network loops and signal issues.** |
| 17 | 20V DC Power Connector | Use the included +20V 6A power supply for powering the unit and charging the source connected to the USB-C port. |
| 18 | RESET Recessed Button | For restoring factory default settings, press the RESET button and connect power to the device (keep pressing longer than 6 seconds after power connection). |

# Mounting SWT3-21-HU-TR

This section provides instructions for mounting **SWT3-21-HU-TR**. Before installing, verify that the environment is within the recommended range:

- Operation temperature – 0° to 40°C (32 to 104°F).
- Storage temperature – -40° to +70°C (-40 to +158°F).
- Humidity – 10% to 90%, RHL non-condensing.

**Caution:**

- Mount **SWT3-21-HU-TR** before connecting any cables or power.

**Warning:**

- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device is 2 meters.

Install SWT3-21-HU-TR on a surface using one of the following methods:

- Mount device with its recommended mounting accessory to the underside of the table and secure.
- Mount the unit in a rack using the recommended rack adapter (see https://www.kramerav.com/SWT3-21-HU-TR).
- Mount the unit in a rack using the recommended rack adapter

# Connecting SWT3-21-HU-TR

- Configuring the unit as a transmitter (Tx) or a receiver (Rx) mode is done via the embedded webpages. (see Setting Device Extension Operation Mode on page 32).
- Set to receiver mode by default.

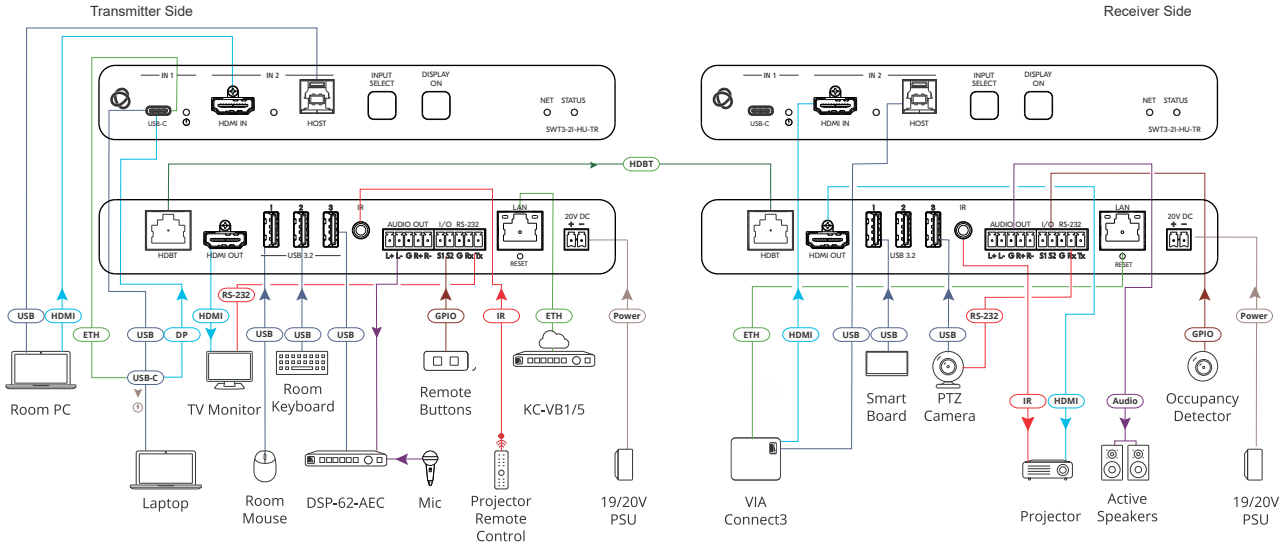



Figure 3: Connecting to the SWT3-21-HU-TR and paired receiver rear panels

**To connect SWT3-21-HU-TR as illustrated in the example in Figure 3:**

1. Set one **SWT3-21-HU-TR** to Tx mode and the other to Rx mode (see Setting Device Extension Operation Mode on page 32).
2. Connect the HDBT port (10) on the **SWT3-21-HU-TR** (Tx) to the HDBT port on the **SWT3-21-HU-TR** (Rx) side.
3. On the **SWT3-21-HU-TR (Tx)** side, connect:
   - A USB-C source (for example, a laptop that supports Display Port Alternate Mode) to the USB-C IN connector (1).
   - A source (for example, a room PC) to the IN 2 HDMI and USB Host (3) connectors.
4. On the **SWT3-21-HU-TR** Rx side, connect:
   - A source (for example, **VIA Connect3**) to the IN HDMI and USB Host connectors.
5. On the **SWT3-21-HU-TR (Tx)** side, connect USB DEVICE ports:

   USB devices that consume power greater than the power supplied by connected port (see Technical Specifications), should be powered by an external power supply.

   - Connect the room mouse to the USB 1 port (12) on the rear panel.
   - Connect the room keyboard to the USB 2 port (12) on the rear panel.
   - Connect a sound system (for example Kramer **DSP-62-AEC**) to the USB 3 port (12) on the rear panel.
6. On the **SWT3-21-HU-TR (Rx)** side, connect USB DEVICE ports:
   - Connect the smartboard to the USB 2 port on the rear panel.

- Connect the PTZ camera to the USB 3 port on the rear panel.

7. On the **SWT3-21-HU-TR (Tx)** side, connect the HDMI OUT port (11) to an HDMI acceptor (for example, a TV monitor).
8. On the **SWT3-21-HU-TR (Rx)** side, connect the HDMI OUT port to an HDMI acceptor (for example, a projector).
9. On the **SWT3-21-HU-TR (Rx)** side, to control the projector via IR, connect IR OUT 3.5mm mini jack to an IR emitter cable and attach the cable emitter side to the IR sensor of the touch projector.
10. On the **SWT3-21-HU-TR (Tx)** side, to control the TV monitor, connect the RS-232 3-pin terminal block connector (16) to the TV monitor.
11. On the **SWT3-21-HU-TR (Rx)** side, to control the PTZ camera, connect the RS-232 3-pin terminal block connector to the PTZ camera.
12. Connect a room controller (for example, the Kramer **KC-VB1**) via LAN to the LAN Ethernet RJ-45 port (17).

Make sure to connect only one HDBaseT endpoint (transmitter or receiver) to the network equipment (switch or router). Connecting both endpoints to the network can cause network loops and signal issues.

Send from the room controller via LAN:

- IR commands via the room controller to control the Projector.
- Serial commands to control the TV Monitor and PTZ camera.

13. On the **SWT3-21-HU-TR (Tx)** side, connect the AUDIO OUT 5-pin terminal block connector (14) to a sound source (for example Kramer **DSP-62-AEC).**

- Connect a Mic to a sound source (for example Kramer **DSP-62-AEC).**

14. On the **SWT3-21-HU-TR (Rx)** side, connect the AUDIO OUT 5-pin terminal block connector to a balanced stereo audio acceptor (for example, Kramer **Tavor 5-O** speakers).

The connected sound system (for example Kramer **DSP-62-AEC)** controls all aspects of sound, including output (speakers) and Input (microphone) peripherals.

15. On the **SWT3-21-HU-TR (Tx)** side, connect the IO 2-pin terminal block (15):

- To the Selector button.

16. On the **SWT3-21-HU-TR (Rx)** side, connect the IO 2-pin terminal block:

- To the Occupancy Detector.

17. On the **SWT3-21-HU-TR (Tx)** side, connect the RELAY 2-pin terminal block:

- To the Projector screen.

KC controls both devices and all connected controllable peripherals.

18. Connect LAN connector (17) to IT switch for LAN connection and optional powering. Optionally, connect the power adapter to **SWT3-21-HU-TR** (18) and to the mains electricity.

To charge the device that is connected to the USB-C port, you need to connect the included power adapter (purchased separately) for powering the **SWT3-21-HU-TR** switcher.

## Connecting the Output to a Balanced/Unbalanced Stereo Audio Acceptor

The following are the pinouts for connecting the output to a balanced or unbalanced stereo audio acceptor:

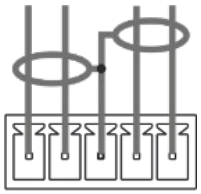



Figure 4: Connecting to a Balanced Stereo Audio Acceptor

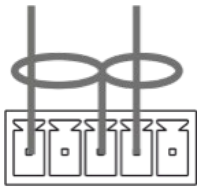



Figure 5: Connecting to an Unbalanced Stereo Audio Acceptor

## Connecting to SWT3-21-HU-TR via RS-232

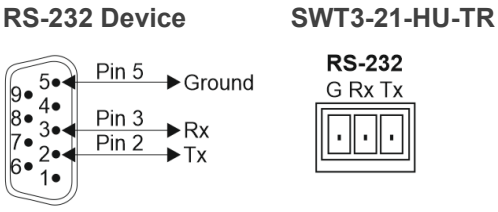
You can connect to **SWT3-21-HU-TR** via an RS-232 connection (13) using, for example, a PC.

**SWT3-21-HU-TR** features an RS-232 3-pin terminal block connector allowing the RS-232 to control **SWT3-21-HU-TR**.

Connect the RS-232 terminal block on the rear panel of **SWT3-21-HU-TR** to a PC/controller, as follows:

From the RS-232 9-pin D-sub serial port connect:

- Pin 2 to the TX pin on the **SWT3-21-HU-TR** RS-232 terminal block
- Pin 3 to the RX pin on the **SWT3-21-HU-TR** RS-232 terminal block
- Pin 5 to the G pin on the **SWT3-21-HU-TR** RS-232 terminal block



# Operating and Controlling SWT3-21-HU-TR

## Principles of Operation

This section covers the following topics:



### Auto USB Host/Device Pairing

Paired **SWT3-21-HU-TR** devices, one set as a transmitter (Tx mode) and the other set as a receiver (Rx mode), feature a default synchronizing operation for the local USB host and the extended USB devices. No additional control system is needed to pair them. This pairing operation provides a cost-effective solution for standard rooms with flexible support for both Room-Based Meeting (RBM) or Bring Your Own Meeting (BYOM) hybrid meeting scenarios, as follows:

**RBM scenario:**

- Rx-connected room PC/NUC is running the room-based meeting app, such as Zoom Room.
- The room PC/NUC is auto-connected to all room USB devices, both the Tx-connected and Rx-connected USB devices.
- Room-located participants use the Tx-connected room USB devices for collaborating and sharing content via the room PC/NUC.

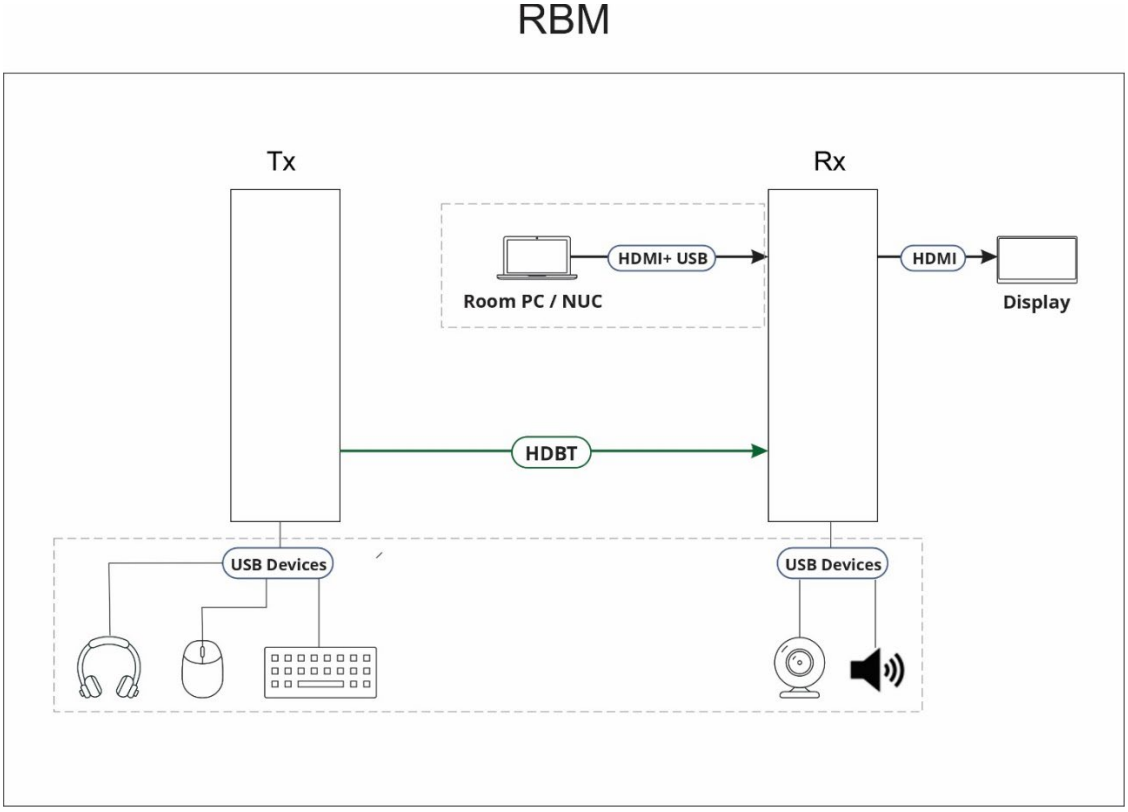



Figure 6: RBM Scenario

**BYOM scenario:**

- Room-located hybrid meeting participants bring their portable laptops running their own meeting app, such as Microsoft Teams.
- When the laptop connects to Tx, the laptop is auto-connected to all room USB devices, both the Tx-connected and Rx-connected USB devices.
- Room-located participants use the Tx-connected room USB devices for collaborating and sharing content via the laptop.

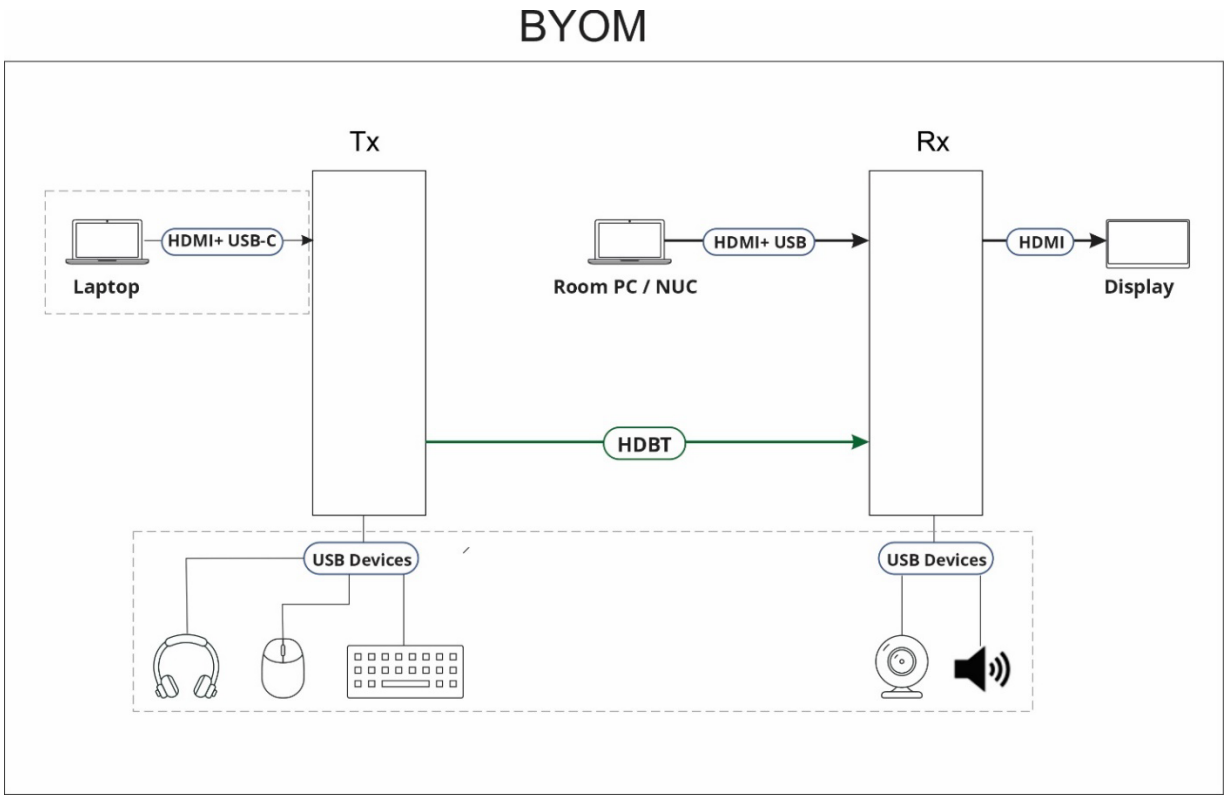



Figure 7: BYOM Scenario

The pairing operation applies also to mixed pairs of any Tx and Rx devices, providing that each device supports the pair-synchronizing operation feature

## Single Device Operates as Either Tx or Rx

Using the embedded webpage, the **SWT3-21-HU-TR** can be easily set to operate either as a transmitter (Tx) or receiver (Rx).

On Tx mode, switched AV signal is output on HDBT port and mirrored on HDMI output too.

On Rx mode, HDBT port AV and USB signals are switchable as 3rd input and switched AV signal is output on HDMI output port.

See Setting Device Extension Operation Mode on page 32.

## Coupled or Individual AV+USB Switching

**SWT3-21-HU-TR** multi-signal input switching to the AV output and to the connected (local and remote) USB devices, is configurable in one of the following modes:

- USB follows AV coupled routing ( ) – Selecting an AV input, routes the AV signal to the AV output and connects, in parallel, the input-associated USB host to the connected USB devices.
- USB signal individual routing ( ) – Selecting an AV input, routes the AV signal to the AV output only. The USB host can be independently selected to connect to the connected USB devices (see Individual USB Host Routing.

See Routing AV and USB Host Signals on page 26.

This is very useful in hybrid sessions, for convenient switching between multiple presenters using either their BYOD laptops and/or connected room PC devices

Routing cross-point grid for Tx and Rx operation modes (see Routing an Input to an Output on page 25), enable either coupled or independent AV and USB signals routing, as follows:

USB local and remote devices are always connected to the active Host.

| Extender Operation Mode | AV Routing | USB Host Routing |
|---|---|---|
| Tx | Inputs: 1xUSB-C + 1xHDMI | Input Hosts: 1xUSB-C + 1xUSB-B (local). |
| | Outputs: 1xHDBT, Mirrored 1xHDMI | Devices: 3xUSB-A (local) + Rx USB devices (remote) |
| Rx | Inputs: 1xUSB-C + 1xHDMI, 1xHDBT | Input Hosts: 1xUSB-C + 1xUSB-B (local) + 1xHDBT (remote Tx) |
| | Outputs: 1xHDMI | Devices: 3xUSB-A (local) + Tx USB devices (remote HDBT) |
| Active Host connects to all local and remote devices. | | |

## Flexible SWT3-21-HU-TR Auto Switching Policy

Set the switching policy to:

- Manual – Select an input manually. Switching occurs regardless of whether a live signal is present on the input or not.
- Auto– Input switching is performed automatically, according to either the Last Connected policy or the Priority policy.

In Last Connected policy:

- If, in this mode, a new signal is plugged in, SWT3-21-HU-TR will switch to it.
- If the signal on the current input is lost, SWT3-21-HU-TR automatically reverts to the previously connected input.

In Priority policy:

- If, in this mode, a signal with a higher priority than the currently selected one is plugged in, SWT3-21-HU-TR will switch to it.
- When the input source is lost, the input with a live signal and the next highest priority is selected automatically.

In both Last Connected and Priority modes, manually selecting an input (using the front panel, remote or web UI input select button) overrides automatic selection

See Setting the Auto-Switching Policy on page 27.

## USB-C Video and Host Options

USBC video and host capability can be set to either one of:

- USB 3.0 data rate with up to 4K@30/4K@60 4:2:0 resolution, or
- Up to 4K60 4:4:4 AV resolution and USB 2.0 data rate

See Setting USB-C Host Port Signal Convergence on Page 36.

## Online Meeting Systems Integration

USB device ports can be set to auto-disconnect following presenter disconnection, to allow smooth integration and auto-activation of connected online meeting room systems.

See Auto-disconnecting a USB Device on Inactive Host on page 37.

## Routing IP-Driven Control Signals via Built-in Control Gateway

Using the LAN, remote IP connected clients can send and receive CEC, RS-232, I/O and IR commands via SWT3-22-HU-WP-T's built-in control gateway, to control devices connected to these control ports. The built-in control gateway sends the control commands (converted from the client received IP messages) to the connected controlled devices, and distributes the responses received from the connected controlled devices to all connected clients.

## Flexible Remote Buttons Control

Remote contact-closure buttons can be connected to the I/O ports, for easy end-user control of device functions. The unit supports flexible configuration of button press/release actions and latching (default) or momentary operation, offering simple and custom control according to user needs.

See Configuring Remote Buttons on page 49.

# Using Front and Rear Panel Buttons

**SWT3-21-HU-TR** front and rear panel buttons enable the following actions:

- Selecting an INPUT.
- Turning the remote display on or off via the DISPLAY ON or sending on or off commands that are configured via the UI (see Defining and Testing Commands via Action Editor on page 48).
- Resetting the device to its factory settings (for additional instructions on resetting and resetting device (see Resetting and Restarting Device on page 33).

# Operating via Ethernet

You can connect to the **SWT3-21-HU-TR** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Connecting Ethernet Port Directly to a PC on page 18).
- Via a network switch or router, using a straight-through cable (see Connecting Ethernet Port via a Network Switch on page 20).

If you want to connect via a router and your IT system is based on IPv6, speak to your IT department for specific installation instructions.

## Connecting Ethernet Port Directly to a PC

You can connect the Ethernet port of **SWT3-21-HU-TR** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

This type of connection is recommended for identifying **SWT3-21-HU-TR** with the factory configured default IP address.

After connecting **SWT3-21-HU-TR** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.
2. Click **Change Adapter Settings**.

3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter appears as shown in Figure 8.

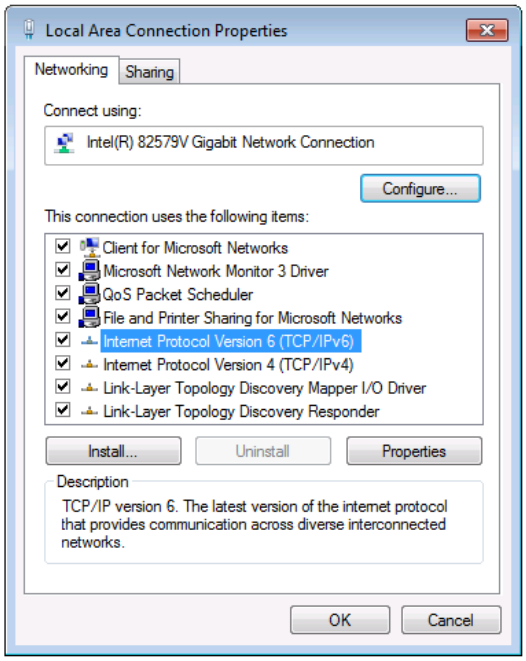



Figure 8: Local Area Connection Properties Window

4. Highlight either **Internet Protocol Version 6 (TCP/IPv6)** or **Internet Protocol Version 4 (TCP/IPv4)** depending on the requirements of your IT system.
5. Click **Properties**.
   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 9 or Figure 10.

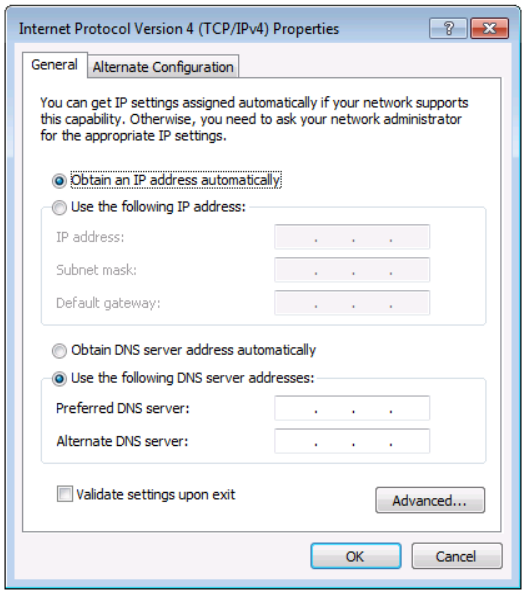



Figure 9: Internet Protocol Version 4 Properties Window

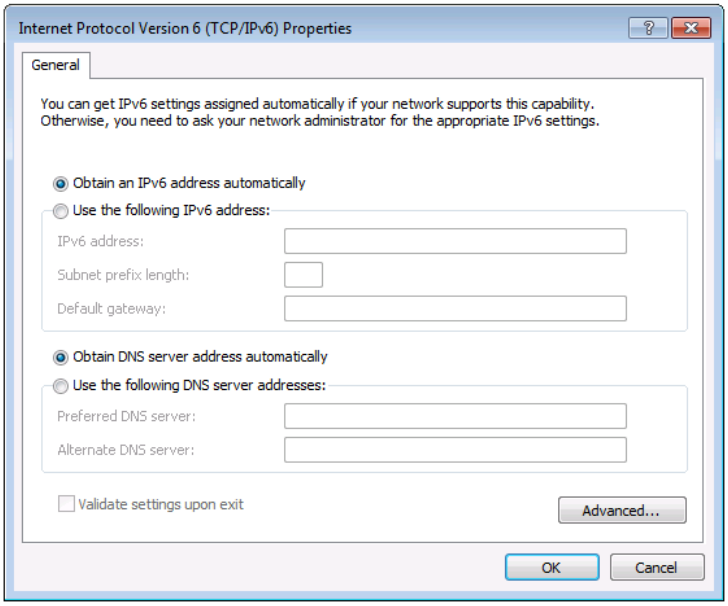



Figure 10: Internet Protocol Version 6 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 11.
   For TCP/IPv4 you can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding default 192.168.1.39 fallback address) that is provided by your IT department.

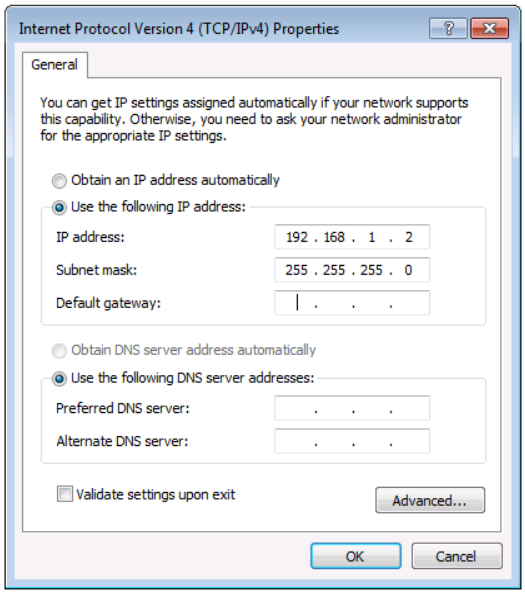



Figure 11: Internet Protocol Properties Window

7. Click **OK**.
8. Click **Close**.

## Connecting Ethernet Port via a Network Switch

You can connect the Ethernet port of **SWT3-21-HU-TR** to the Ethernet port on a network switch or router using a straight-through cable with RJ-45 connectors.

## Configuring the Ethernet Port

You can set the Ethernet parameters via the embedded Web pages.

## Discovering and acquiring an IP address

**SWT3-21-HU-TR** includes IP address auto acquiring policy via LAN-connected DHCP server by default. When no DHCP server is detected, a fallback static IP address of 192.168.1.39, and 255.255.255.0 subnet mask (class C), is assigned until an IP address is acquired via the DHCP server.

For more information, refer to Product Page Technical Note in http://www.kramerav.com/product/SWT3-21-HU-TR.

# Using Embedded Web Pages

**SWT3-21-HU-TR** enables you to configure settings via Ethernet using built-in, user-friendly web pages. The Web pages are accessed using a Web browser and an Ethernet connection.

You can also configure **SWT3-21-HU-TR** via Protocol 3000 commands (see Protocol 3000 Commands on page 63).

Before attempting to connect:

- Perform the procedure in (see Operating via Ethernet on page 18).
- Ensure that your browser is supported.

The following operating systems and Web browsers are supported:

| Operating Systems | Browser |
|---|---|
| Windows 10 and higher | Edge |
| | Chrome |
| Mac | Safari |
| iOS | Safari |
| Android | N/A |

If a web page does not update correctly, clear your Web browser's cache.

Check that Security/firewalls are not blocking HTTP traffic between the device and the user PC.

**To access the web pages:**

1. Enter the IP address of the device in the address bar of your internet browser (default = 192.168.1.39).

   If security is enabled, the Login window appears.

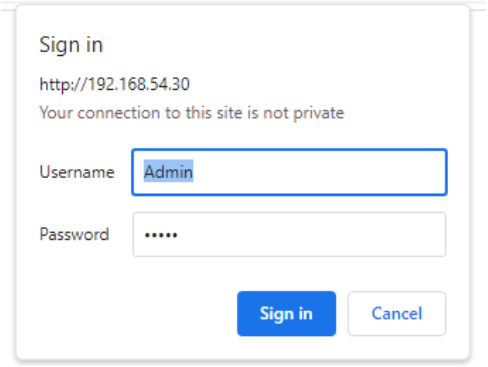



Figure 12: Embedded Web Pages Login Window

2. Enter the Username (default = Admin) and Password (default = Admin) and click **Sign in**. The default web page appears.

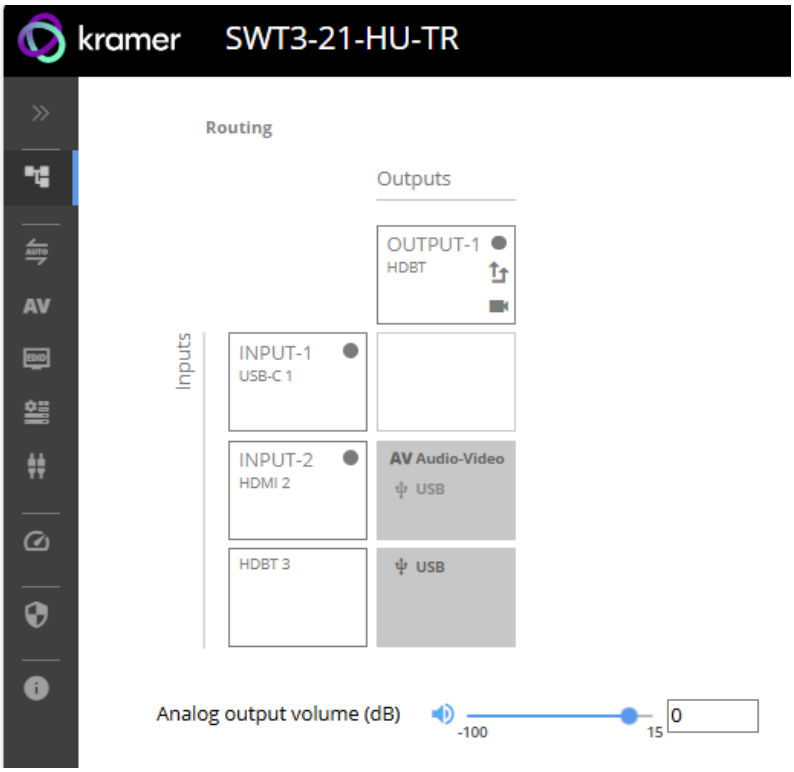



Figure 13: AV Settings Page

3. Click the arrow at the top of the navigation list to view the menu items in detail.

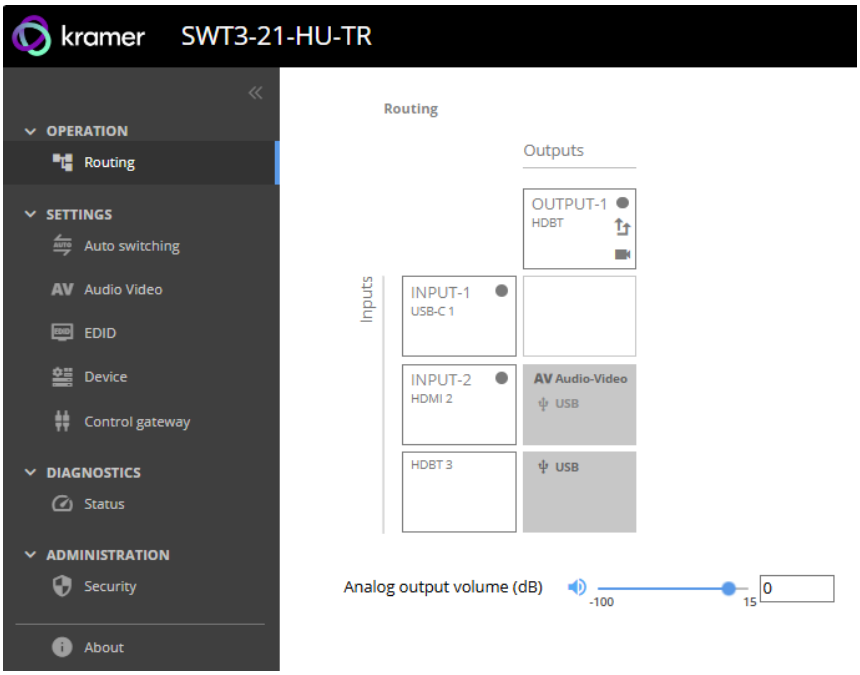



Figure 14: Navigation pane in Detail

4. Click the Navigation Pane on the left side of the screen to access the relevant web page.

Using the embedded webpage, the **SWT3-21-HU-TR** can be easily set to operate either as a transmitter (Tx) mode or receiver (Rx) mode**.** See Setting Device Extension Operation Mode on page 32.

**SWT3-21-HU-TR** web pages enable performing the following actions:

- Routing Operations on page 25.
- Setting AV Properties on page 27.
- Setting Device Properties on page 31.
- Setting Control Gateway Properties on page 39.
- Viewing Device Status on page 54.
- Setting Security Properties on page 54.

# Routing Operations

This section details the following actions:



## Routing an Input to an Output

Route any of the inputs to the output. Inputs can be configured to route the AV the USB signal together (USB follows video) or to route each signal independently.

For further detail, see Routing AV and USB Host Signals on page 26.

**To route the video inputs to the outputs:**

1. Go to the Routing Settings page.

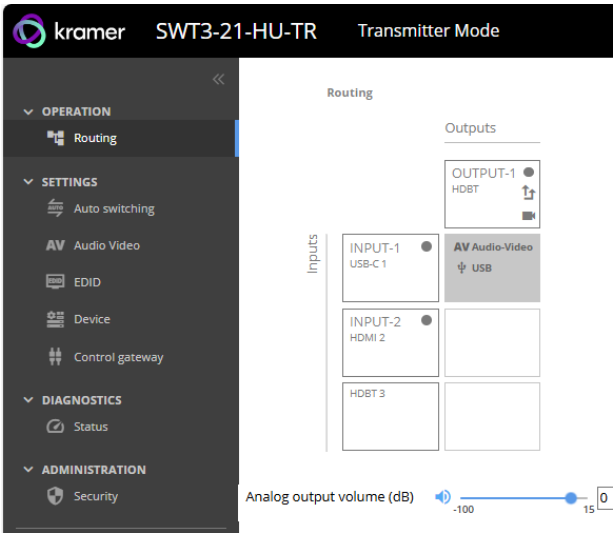



Figure 15: Tx Mode Routing Page

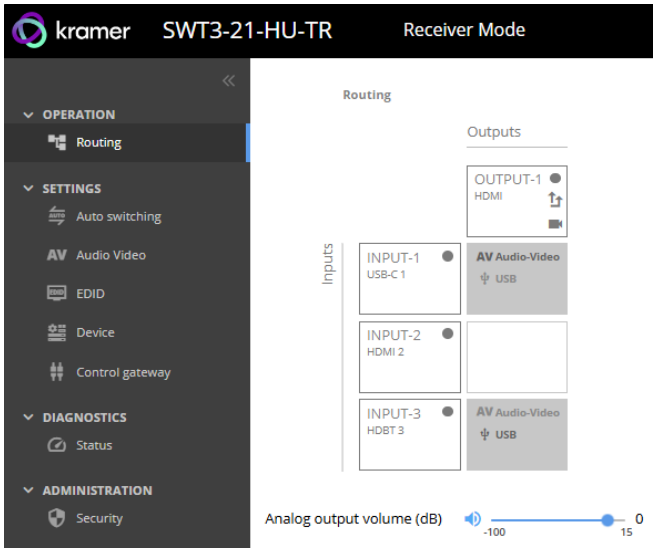



Figure 16: Rx Mode Routing Page

2. Perform the following functions:
   - Click an Input/Output cross-point (see Routing AV and USB Host Signals on page 26).

     A green light on a button indicates a connected source/acceptor.

   - Click to activate USB following video coupled routing.
   - Click to stop/play the video.

An input is routed to the output.

### Routing AV and USB Host Signals

**SWT3-21-HU-TR** enables switching any of the inputs to the output in one of the following operation modes:

- USB follows AV coupled routing ( ) – Selecting an input, routes the HDMI signal to the output and associates the USB devices to that selected USB host.
- USB signal individual routing ( ) – Selecting an input, routes the HDMI signal to the output. The USB host can be selected separately from any of the other inputs.

#### Individual USB Host Routing

In the following example, USB routing does not follow video. The AV signal on input 2 is selected and the USB signal is from input 1. This means that the HDMI input 2 AV signal is routed to the output while the USB devices are associated with the USB-C host (Input 1).

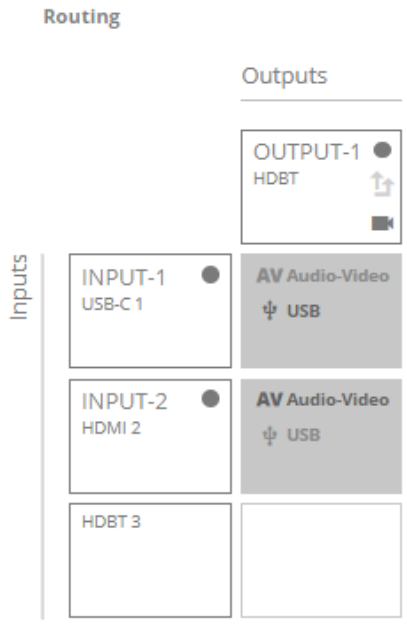



Figure 17: Individual routing of USB Host and AV Signal

## Setting the Analog Audio Output Level

**To set the audio output level:**

1. Go to the Routing Settings page.
2. Next to Analog output volume (dB) click .
3. Set the audio volume level:
   - using the slider next to Analog output volume (dB, from -80 to 20), or
   - enter the audio output volume in the text box.

Audio level is set.

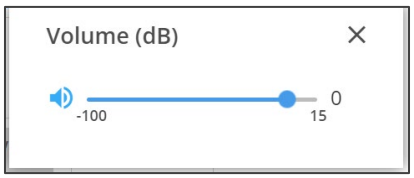



Figure 18: Setting Audio Output Level

Video inputs are routed to the outputs.

# Setting AV Properties

This section details the following actions:

- Setting the Auto-Switching Policy on page 27.
- Configuring AV Settings on page 29.
- Managing EDID on page 30.

## Setting the Auto-Switching Policy

**To set the auto-switching policy:**

1. Go to the Auto switching page.
2. Next to the Selection Mode drop-down box, select the auto switching policy: **Manual**, **Last Connected** or **Priority**.

Switching policy is set.

**To change input priorities:**

For Rx mode, HDBT should be IN 3.

1. Go to the Auto switching page.
2. Next to the Selection Mode drop-down box, select **Priority**.
3. Click and drag an input between high and low to change the priorities.

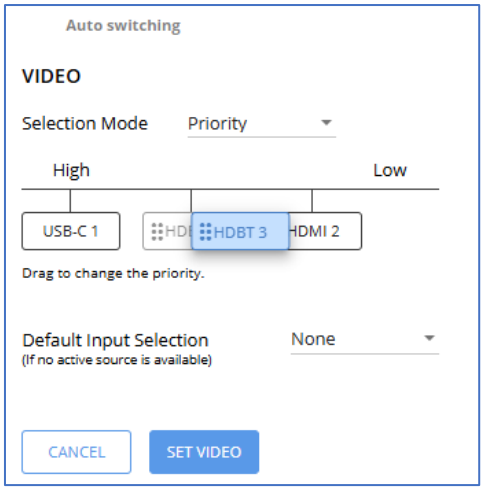



Figure 19: Changing Input Priorities

4. Click **SET VIDEO**.

Input priorities are set.

**To select default input selection:**

1. Next to the Default Input Selection drop-down box, select the desired input to be selected if no active source is available.

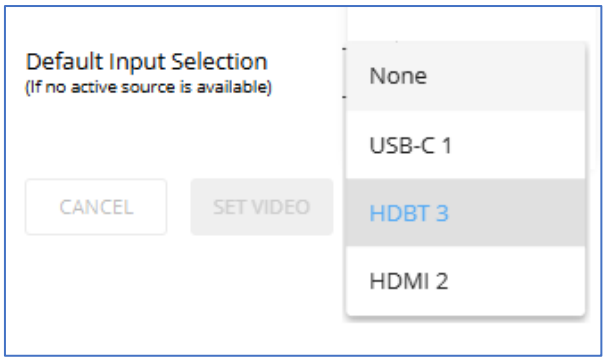



Figure 20: Selecting Default Input Source

2. Click **SET VIDEO**.

Default input is selected when no sources is available.

# Configuring AV Settings

**SWT3-21-HU-TR** enables configuring the device audio and video settings.

**To configure the audio and video settings:**

1. Go to the Audio Video Settings page. The Audio Video Settings page appears.

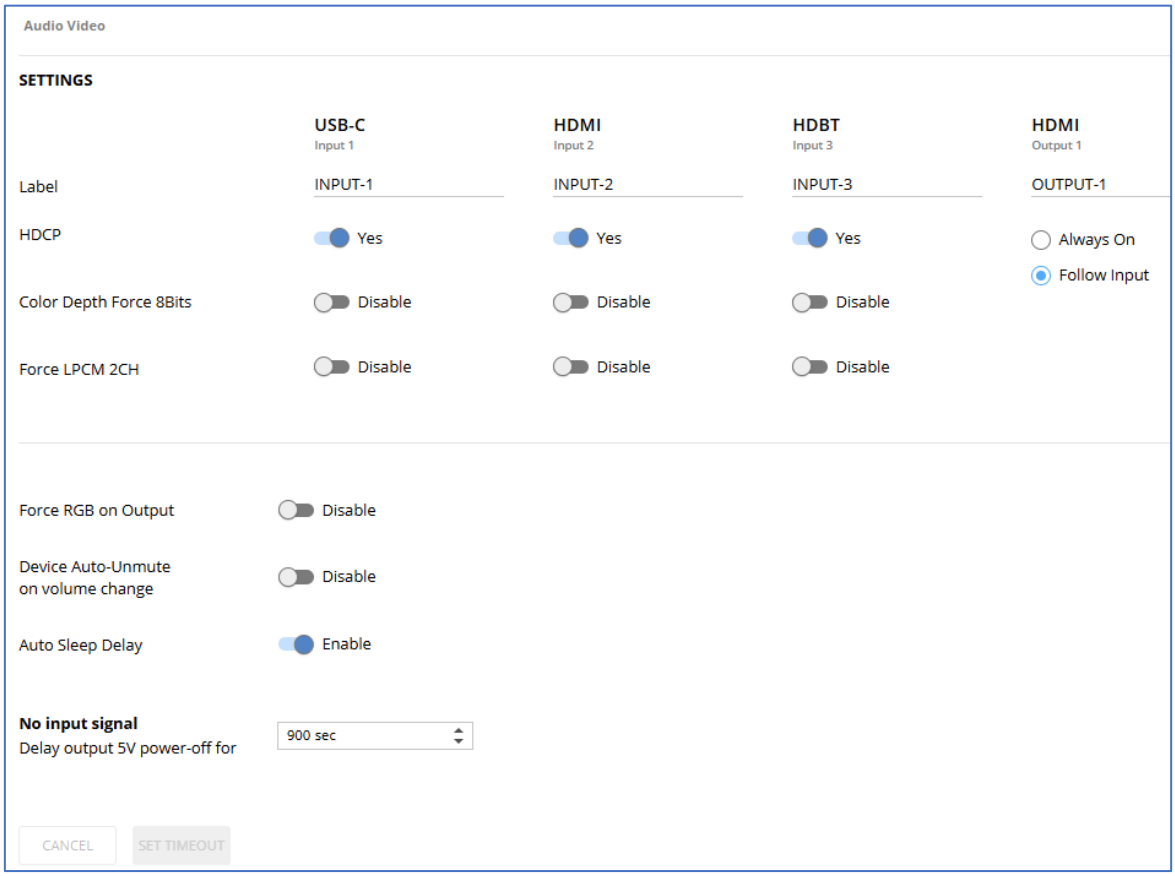



Figure 21: Audio Video Settings

2. Perform the following actions:

- Label – Change the name of an input or the output as it appears on the Routing page and EDID management page.
- HDCP – For the inputs, select the **Yes** (default) **/No** switch to enable/disable HDCP on that input. For the output, select **Always On** to keep HDCP enabled at all times, or **Follow Input** (default) to define the output HDCP setting according to the HDCP setting on the active input.
- Color Depth Force 8Bits – **Enable** or **Disable** (default) on each input.
- Force LPCM 2CH – **Enable** or **Disable** (default) on each input.
- Force RGB on Output – **Enable** or **Disable** (default).
- Device Auto-Unmute on volume change – When enabled changing the volume will auto- unmute the audio output.
- Auto Sleep Delay – When enabled, if no input signal is detected, the display automatically goes into sleep mode, and the output is set to off. The time before entering sleep mode is specified in the **TIMEOUT** setting (see below).

- No input signal (active when Auto Sleep Delay is enabled) – Set the number of seconds (30 to 60,000 seconds; default = 900 seconds) after signal loss before the display goes to sleep. Click SET TIMEOUT after defining this setting.

Audio and video settings are configured.

# Managing EDID

**SWT3-21-HU-TR** enables you to copy an EDID from one of several different sources to the inputs.

**To copy the EDID to the inputs:**

1. Go to the EDID Management page.

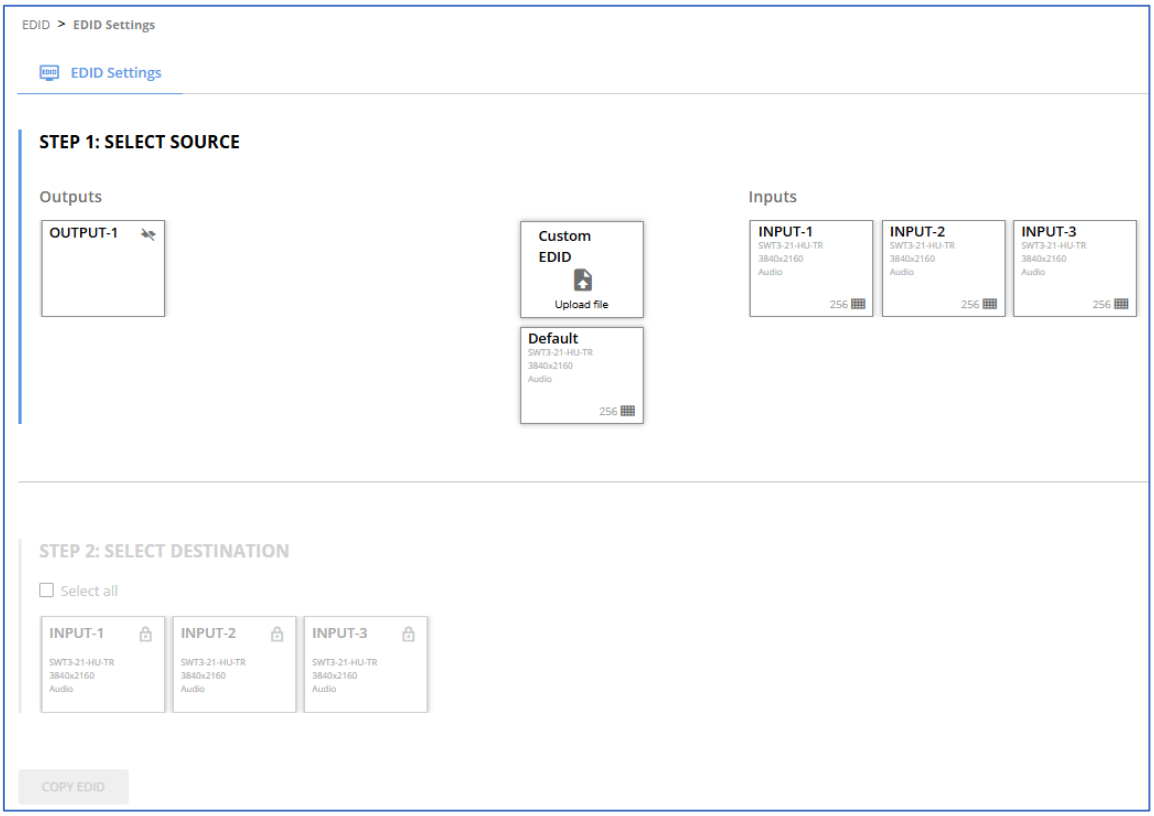



Figure 22: EDID Management Page

2. Under Step 1, select the EDID source (the output, any of the inputs, default or custom EDID.
3. Under Step 2, select one or more inputs as the destination for copying the EDID.
4. Click **COPY EDID**.

The EDID is copied.

- Lock sign: when opened, upon a connection to a new monitor, the unit will automatically copy the EDID of this monitor to the input.
- In order to keep the EDID of the input, click the lock sign to lock it.

# Setting Device Properties

This section details the following actions:



## Device Profile and Maintenance

### Changing Device Name

**SWT3-21-HU-TR** enables you to change the DNS name of the device.

**To change the device name:**

1. Go to the Device > General page.

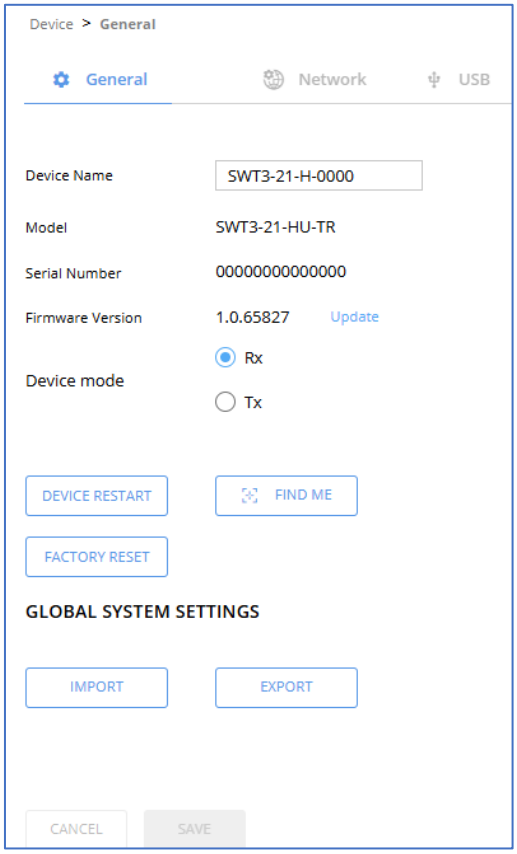



Figure 23: Device > General Page

2. Under General Preferences, change the device name and click **SAVE**.

The device name is changed.

### Setting Device Extension Operation Mode

This section applies to both Tx (transmitter) and Rx (receiver) modes unless otherwise noted.

#### To switch between Tx or Rx modes

1. Go to the Device>General tab.
2. Select either Rx or Tx.

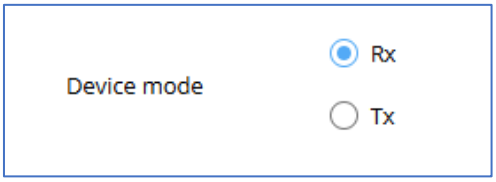



Figure 24: Device Tab: Switching Rx / Tx Operation Mode

3. Click **Save**. A device Reset message appears.

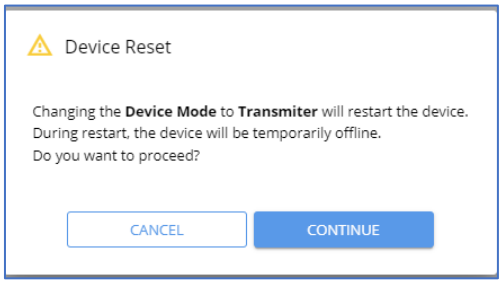



Figure 25: Device Reset Warning Message

4. Click CONTINUE. The device is switching extension operation modes.

Changing the Device extension mode can take up to 60 seconds!

5. The device extension device mode indication, at the top bar, shows the newly selected extension mode.

### Upgrading Firmware

#### To upgrade the device firmware:

1. Go to the **Device** > **General** page (Figure 23).
2. Under General, click **Update**, open the relevant firmware file, and follow the instructions. The upgrade takes approximately 30-60 seconds.

- During FW upgrade, the device continues to operate, but the device UI and protocol 3000 communication are inactive. When device restarts, the status LED is lit, and HDMI output signal is disconnected until restart completes.

Firmware is updated.

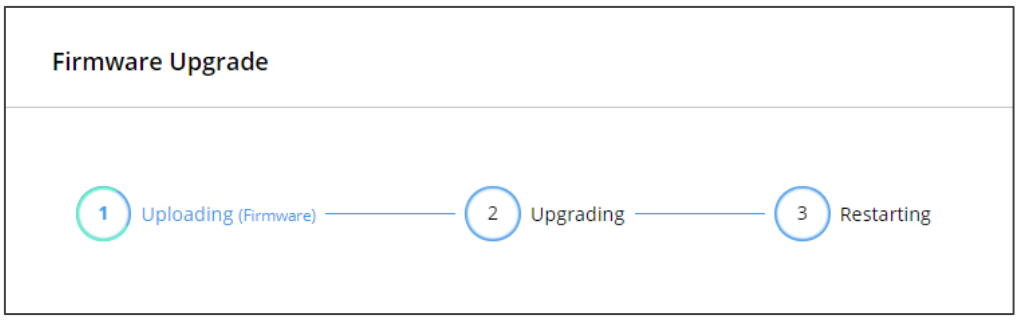



Figure 26:Firmware Upgrade Process

### Resetting and Restarting Device

Two types of resets can be performed:

- Restart – Reboots your device and keeps all your device settings, including the IP address and password.
- Reset – Reboots your device and restores all factory settings including input/output definitions, switching configuration, IP address and password (a DHCP-acquired IP address is retained).

**To restart the device:**

- Click **DEVICE RESTART** on the **Device** > **General** page (Figure 23).

**To perform a factory reset on the device, use one of the following actions:**

- Click **FACTORY RESET** on the **Device** > **General** page (Figure 23).
- Using protocol 3000 commands, send FACTORY command then RESET commands.
- On the rear panel, press and hold the RESET button for several seconds while connecting the power.

### Exporting and Importing a Configuration File

**SWT3-21-HU-TR** enables you to export and store (in the storage of the connected browsing PC) a configuration file that records all the current device settings (excluding the routing operation setup). The stored file can then be imported to the same or different **SWT3-21-HU-TR** device to load the recorded settings, for configuration backup and/or solution-replication purposes.

#### Exporting a Configuration File

**To export a configuration file of the current device settings:**

1. Go to the **Device** > **General** page (Figure 23).
2. Under Global System Settings, click **EXPORT**.
3. Select the storage location on your computer to save the configuration file and click **SAVE**.

The configuration file is exported and saved.

### Importing a Configuration File

**To import a configuration file of the current device settings:**

1. Go to the **Device** > **General** page (Figure 23).
2. Under Global System Settings, click **IMPORT**.
3. Select the relevant configuration file from your computer storage and click **SAVE**.

The configuration file is imported and the device restarts with the settings from the configuration file.

### Identifying Your Device

**To identify the device:**

1. Go to the **Device** > **General** page (Figure 23).
2. Under Global System Settings, click **FLAG ME**. NET LED flashes.

FLAG ME indication turns off after 60 seconds.

## Settings Networking Properties

By default, DHCP is set to on. The IP address shows the actual IP address acquired from the DHCP server, or the auto-acquired fallback IP address when there is no DHCP server detection.

**To configure network settings:**

1. Go to the **Device** > **General** page (Figure 23).
2. Select the **Network** tab.

The network page appears.

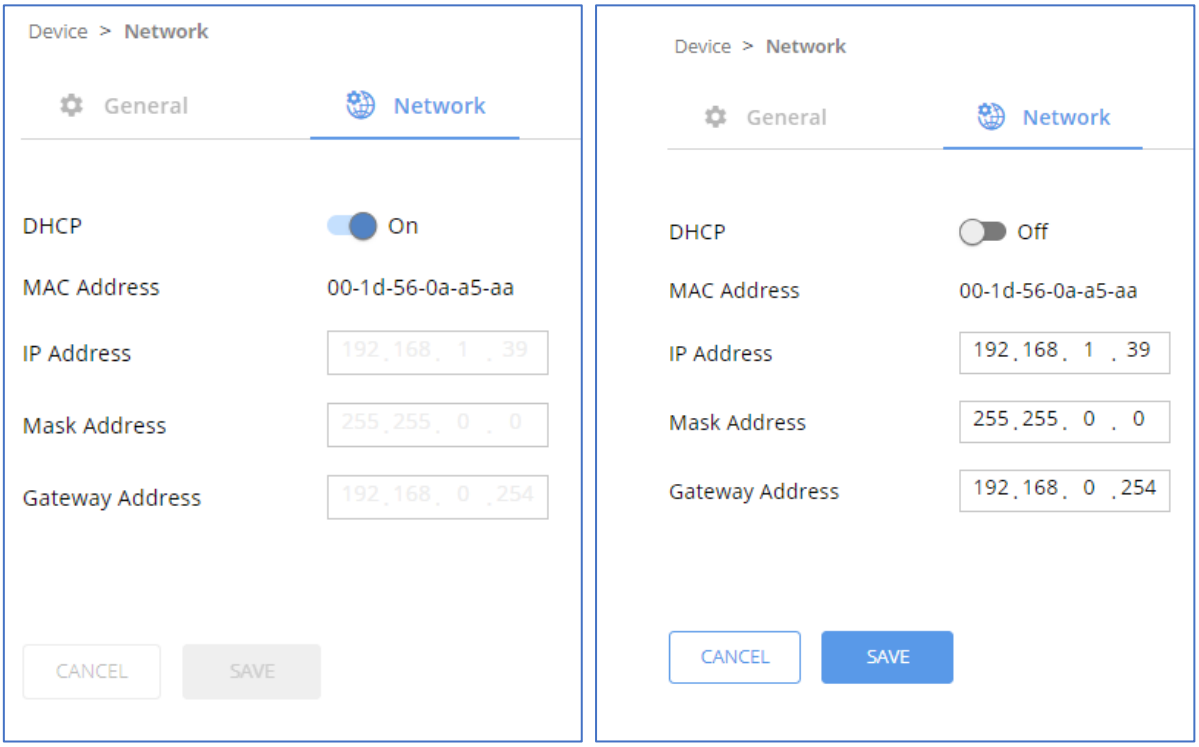



Figure 27: Device Settings > Network Page (DHCP On/DHCP Off)

3. Change settings as needed.

   If required, Set to **DHCP** (default) or static IP address resolution modes.
4. When in Static IP mode, perform the following actions:
   - Change the IP address.
   - Change the Mask address.
   - Change the Gateway address.

Network settings are defined.

### Setting USB-C Host Port Signal Convergence

In USB-C, AV and USB data share the same link using a converged signal, which impacts their respective data rates. SWT3-21-HU-TR allows flexible configuration of the USB data rate and the AV resolution for optimum performance.

To apply the USB-C type change, you must perform a power cycle.

USB-C ethernet connection is disabled by default and is enabled only by a serial command. (see Protocol 3000 Commands on page 63) .

**To configure the USB-C host port signal handling:**

1. Go to the **Device** > **General** page (Figure 23).
2. Select the USB tab.
3. Disconnect the USB-C cable from the device.

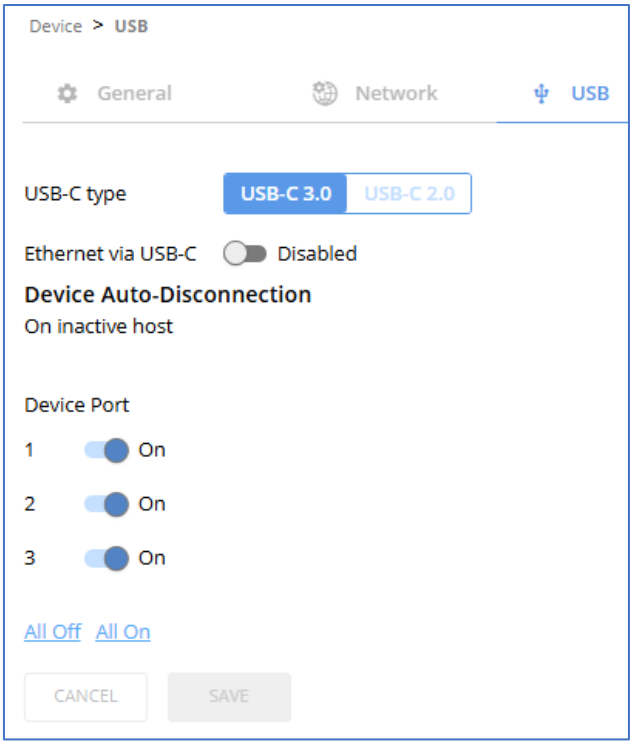



Figure 28: USB Page – USB-C/B Host Port Data Range Level Selection

4. Next to USB-C/B type, select one of the following:
   - **USB-C 3.0** - High USB 10Gbps data rate and lower 4K60 4:2:0 AV resolution mix.
   - **USB-C 2.0** - High 4K60 4:4:4 AV resolution and lower USB 480Mbps data rate mix.
5. Before you click SAVE, disconnect the USB-C cable from the unit. Click **SAVE** and wait
6. Power cycle the device, while the **USB-C is still disconnected** from the device.
7. After the unit has powered up, verify that the new USB setup took place (USB2 or USB3). At that stage you can connect the USB-C cable to the device.

### Enabling/Disabling Ethernet Connection via USB-C

You can enable (disabled by default) the ethernet connection.

**To enable the ethernet connection:**

1. Go to the **Device** > **General** page (Figure 23).
2. Select the USB tab.

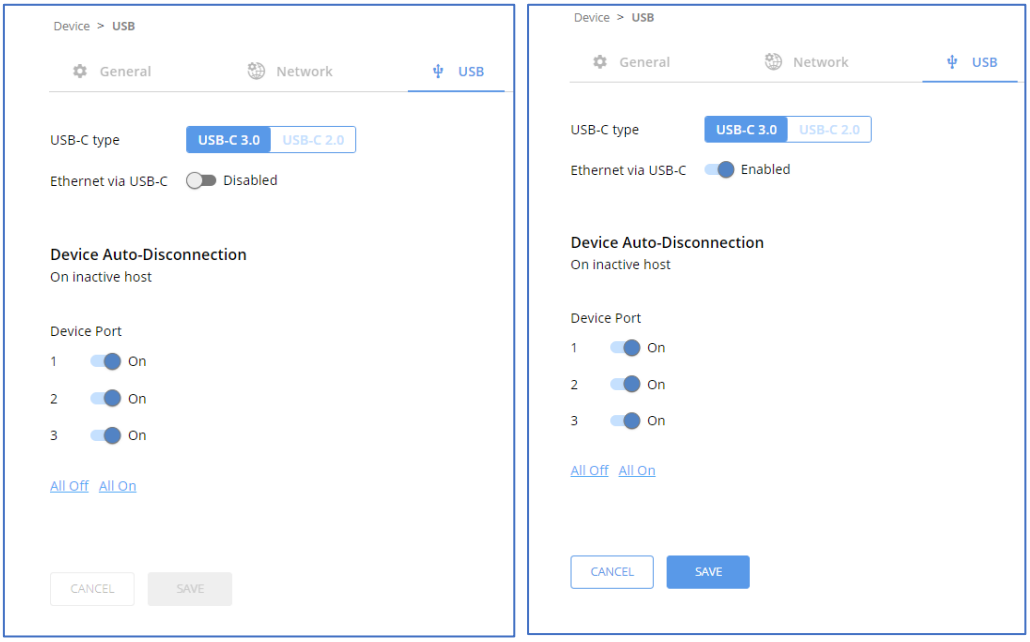



Figure 29: USB Page – USB-C Disabled/Enabled via USB-C

3. Next to **Ethernet via USB-C**, click:
   - **Enabled** to enable ethernet connection via USB-C
3. Click **SAVE**.

Ethernet via USB-C is enabled (this includes also the USB-B connection to the eth port).

### Auto-disconnecting a USB Device on Inactive Host

When a host becomes inactive, you can automatically disconnect one or multiple USB devices.

**To define auto-disconnection:**

1. Go to the **Device** > **General** page (Figure 23).
2. Select the USB tab.

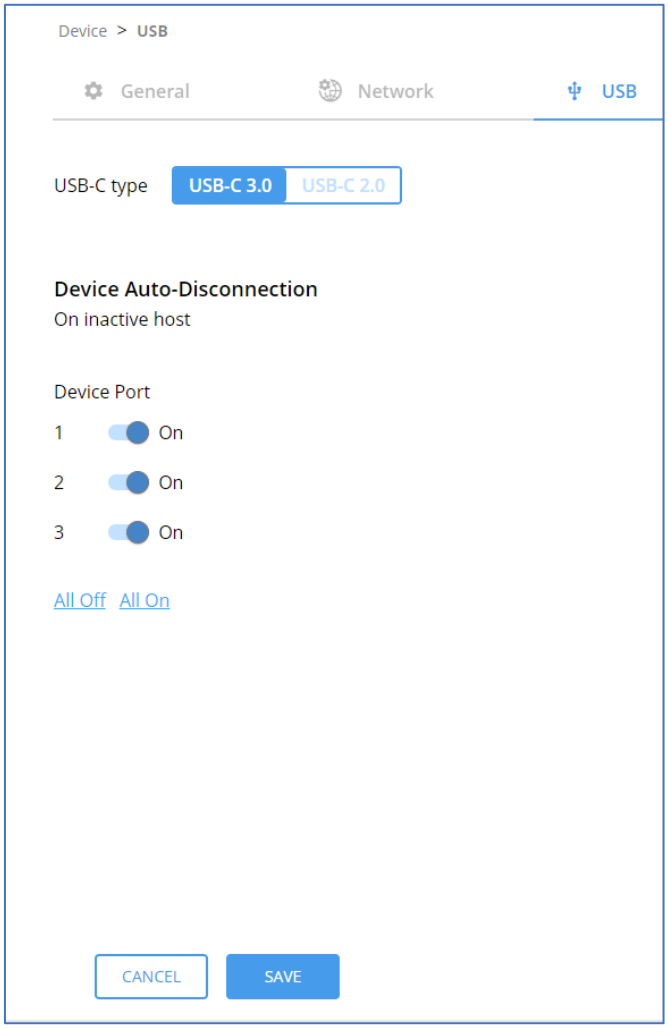



Figure 30: USB Page – USB Device Auto-Disconnection

3. For each USB Device Port, set the auto disconnection status to **On** or **Off**. You can also Select **All Off** or **All On** to set all device ports to off or on, respectively.
4. Click **SAVE**.

USB devices are set.

# Setting Control Gateway Properties

This section details the following actions:



## Setting Serial Port Properties

The serial ports can be configured for:

- RS-232 extension – From the panel RS-232 port, via the HDBT RS-232 channel, to control a peripheral connected to the HDBT paired unit RS-232 port.
- External peripheral IP control – Remote IP control of a port-connected peripheral, via the built-in control gateway.
- SWT3-21-HU-TR management and control – Service and control of the unit using P3000 commands.

**SWT3-21-HU-TR** enables configuring the RS-232 port in one of the following ways:



### Extending the RS-232 via the SWT3-21-HU-TR

#### Setting the HDBT Extension Mode:

Set the HDBT for RS-232 local port extension to control the remote peripheral device.

**To set the HDBT extension mode:**

1. Go to the Control Gateway page. The Serial Ports tab appears.

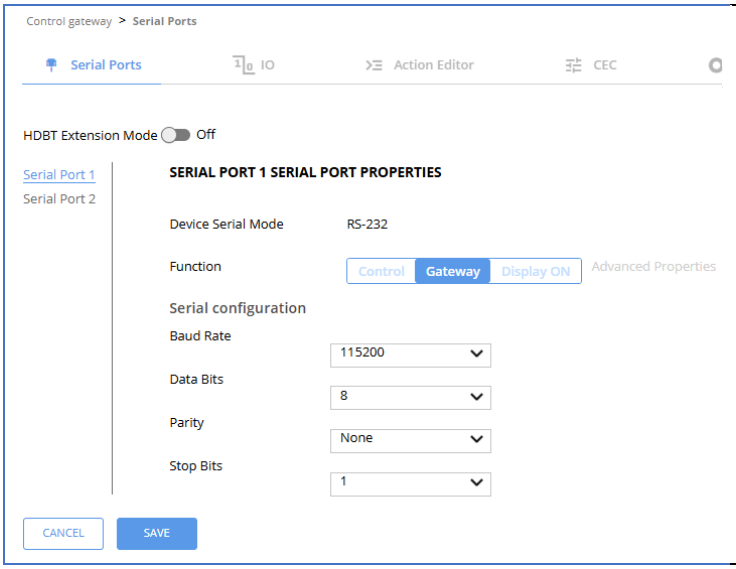



Figure 31: RS-232 Device Control

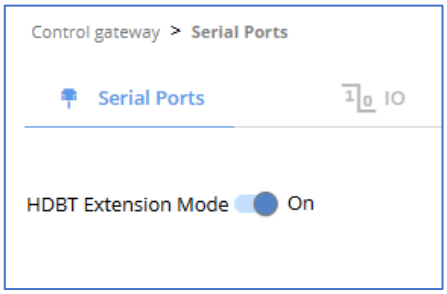



Figure 32: HDBT Extension Mode

2. Enable the **HDBT Extension Mode** to ON (OFF is default mode).
   - **SWT3-21-HU-TR** is set to operate as an RS-232 extender, with end-to-end extension between RS-232 panel port and HDBT RS-232 channel.

In extension mode, no configuration of port properties and functions are available (Figure 33).

## Controlling the SWT3-21-HU-TR

### To set the RS-232 port to control the device:

1. Go to the Control Gateway page. The Serial Ports tab appears.

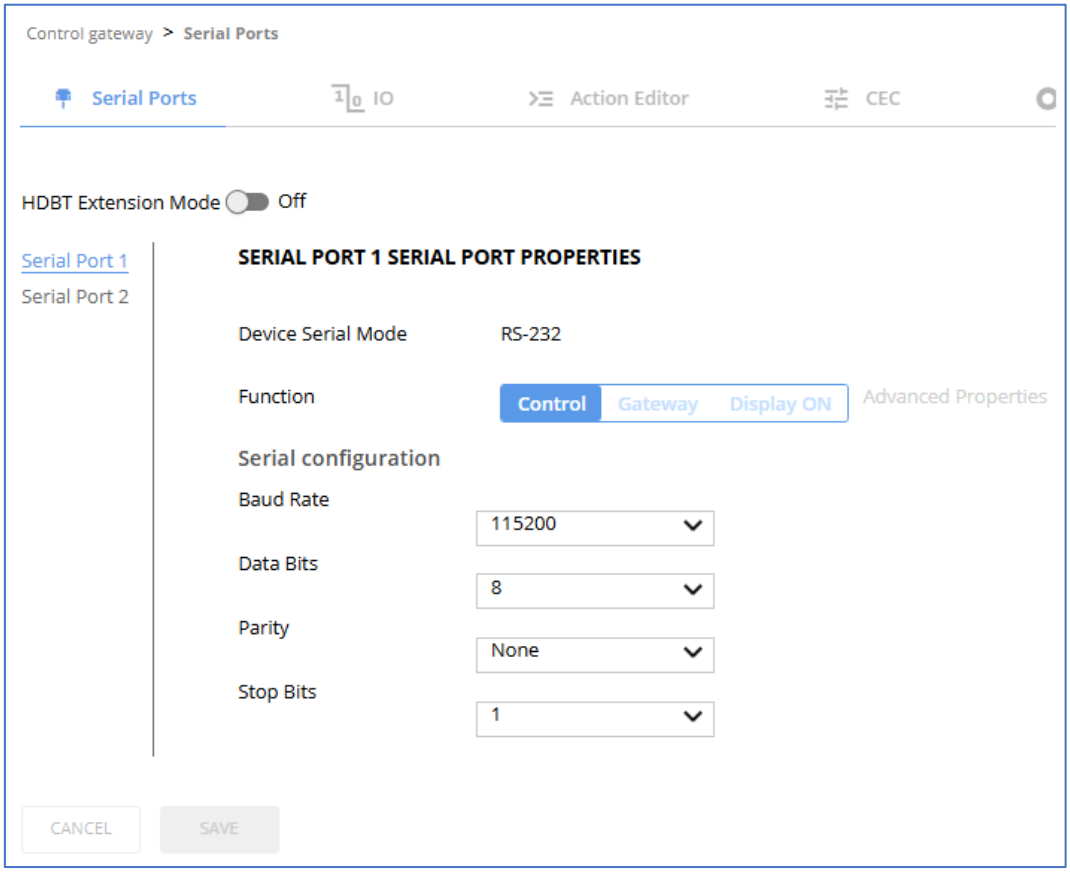



Figure 33: RS-232 Device Control

2. Next to Function, select **Control**.
3. Click **SAVE**.

RS-232 port controls the **SWT3-21-HU-TR**.

The control can be applied only on Serial Port1.

## Controlling an External Device

Control an external device via an IP-connected Controller (for example **SL-240C** that is connected via LAN)

### To set the RS-232 port to control an external device:

1. Go to the Control Gateway page. The Serial Ports tab appears.
2. Next to Function, select **Gateway**.

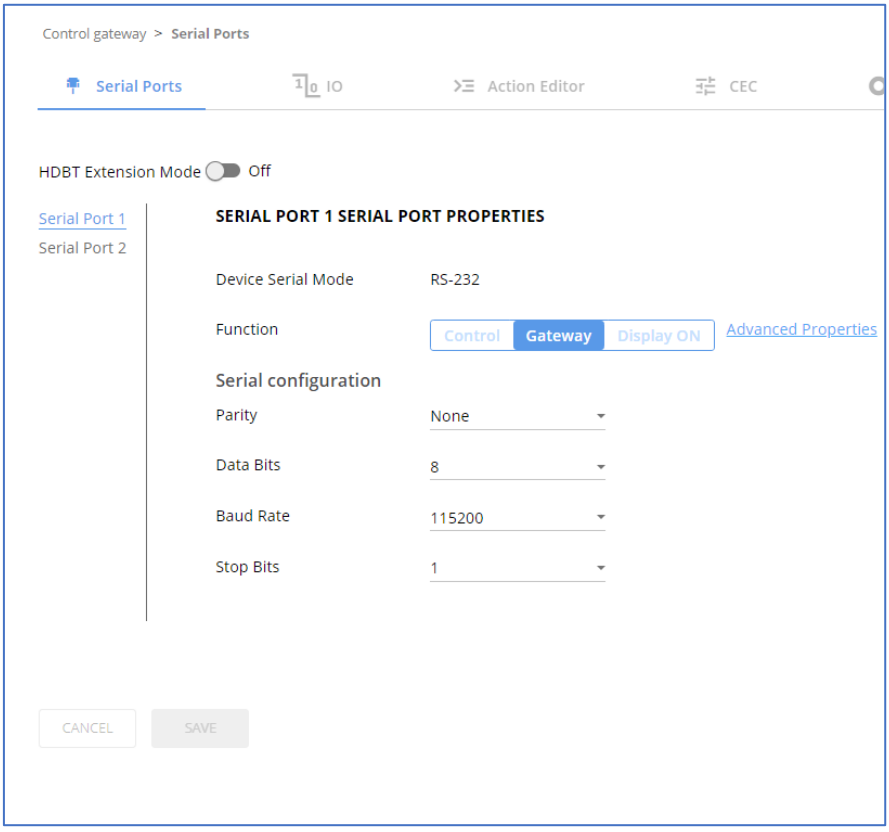



Figure 34: RS-232 as Gateway

3. Define the external device RS-232 settings (Parity, Data Bits, Baud Rate and Stop Bits).
4. Click **SAVE**.

The TUNNELING ADVANCED PROPERTIES screen appears.

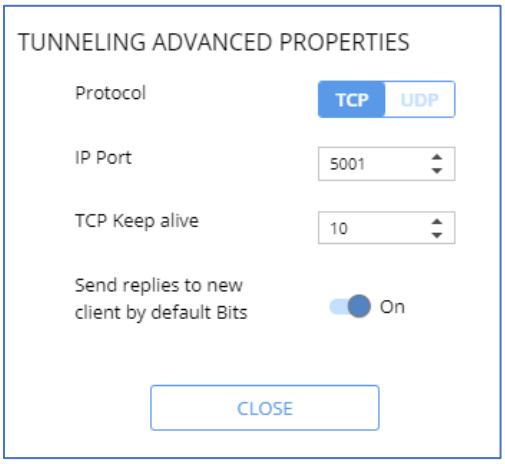



Figure 35: Setting Advanced Tunneling Properties

5. Select either TCP or UDP port.
6. Click the up/down arrows to select the IP Port for sending commands to RS-232.
7. Click the up/down arrows to select the time (in seconds) to keep TCP alive.
8. Press to toggle ON Send replies to new clients by default Bits.
9. Click **CLOSE**.
10. Click **SAVE**.

RS-232 port controls an external device.

### Controlling SWT3-21-HU-TR Connected Display

Control the display (an external device), connected to **SWT3-21-HU-TR**, either remotely via HDBT output (on Tx mode) or locally via HDMI output (on Rx mode).

The **SWT3-21-HU-TR** sends serial, CEC or IR commands, defined by the user in the Action Editor (see Defining and Testing Commands via Action Editor on page 48) and then linked to the DISPLAY ON button (see Associating Commands to DISPLAY ON/OFF on page 50).

**To set the RS-232 port to control the connected display:**

1. Go to the Control Gateway page. The Serial Ports tab appears.
2. Next to Tunneling, select **Display ON**.

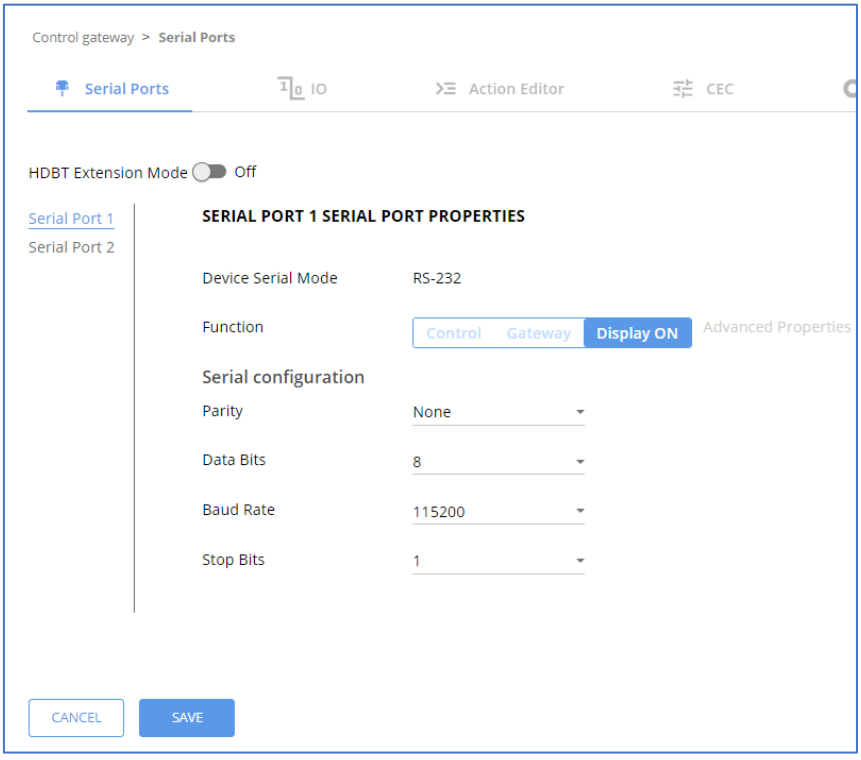



Figure 36: RS-232 Control for Display on/off

3. Define the display RS-232 settings (Parity, Data Bits, Baud Rate and Stop Bits).
4. Click SAVE.

**RS-232 Port Controls the DISPLAY ON/OFF.**

**To set RS232 pass through over the HDBT:**

1. Click S**erial Port 2**.
2. Enter the various parameters for RS-232.
3. Set the **HDBT Extension Mode** to **ON**.

The RS-232 port will be used to send RS-232 commands from the local Tx port over the HDBT to the Rx side to control a device connected to the Rx local RS-232 port.

## Configuring I/O (GPIO) Ports

The 2 I/O ports can be configured via webpages to control devices such as sensors, door locks, remote contact-closure buttons, audio volume and lighting control devices.

To enable I/O operations, Remote Button must be set to Off.

**To configure an I/O port:**

1. In the Navigation pane, click **Control Gateway**. The Serial Ports tab in the Device Settings page appears.
2. Select the IO tab. The IO tab appears.

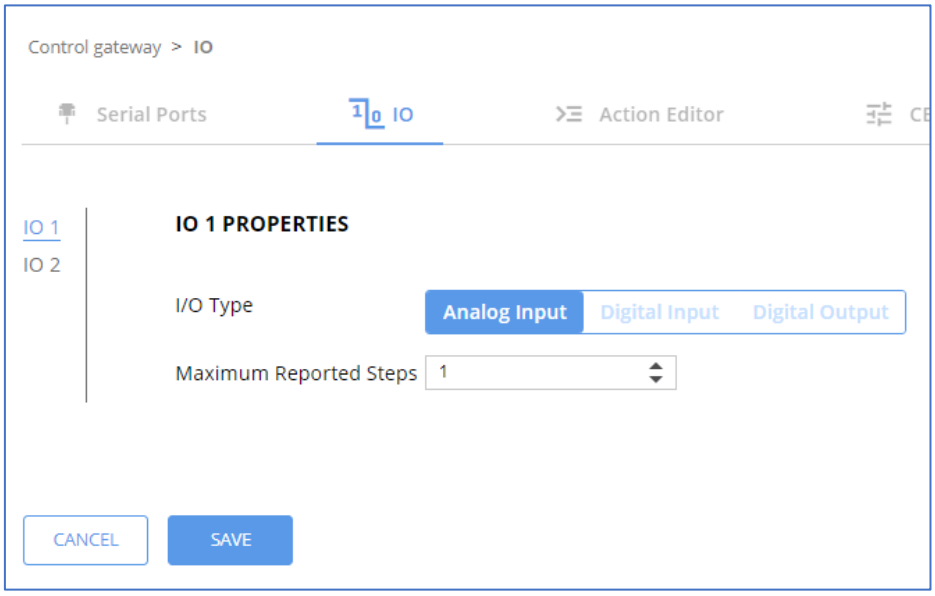



Figure 37: I/O Ports Settings Page

3. Select the I/O port to be configured (IO 1 or IO 2).
4. Select one of the following I/O types:
   - **Digital Input (default setting)** (see Configuring a Digital Input I/O Type on page 45).
   - **Digital Output** (see Configuring a Digital Output I/O Type on page 45).
   - **Analog Input** (see Configuring an Analog Input I/O Type on page 47).

The settings available on the page change depending on which trigger type is selected.

5. Click **SAVE** after setting the selected I/O type.

### Configuring a Digital Input I/O Type

The Digital Input trigger mode reads the digital input of an external sensor device that is connected to the I/O port. It detects High (upon passing the High threshold from a Low state) or Low (upon passing the Low threshold from a High state) states according to the user defined threshold levels.

**To configure a digital input I/O type:**

1. On the GPIO page, select **Digital Input** next to I/O Type.
   The Digital Input options appear (Figure 38).
2. Select one of the following for the Pull-up resistor setting:
   - **Disabled** – When the pull-up resistor is disabled, the port state must be triggered (pulled high or low) by the externally connected sensor. This is suitable, for example, for a high temperature alarm with logic levels according to the defined voltage thresholds. For example, the externally connected alarm sensor may be in a low state under normal conditions, and when the temperature rises above a certain level, it goes to a high state (or visa-versa)..
   - **Enabled** – When the pull-up resistor is enabled, the port detects an open circuit as High, and a short to ground as Low. This is suitable for example, for a pushbutton switch (connecting one terminal of the switch to ground, and the other to the input) or for an alarm closing a relay.
3. Set the Threshold VDC Low and High Range (threshold voltage at which the port changes state).
4. Click **Read** to refresh port status information.
5. Click **SAVE**.

Digital input I/O type is configured.

### Configuring a Digital Output I/O Type

**To configure a digital output I/O type:**

1. On the GPIO page, select Digital Output next to I/O type.
   A warning message appears.

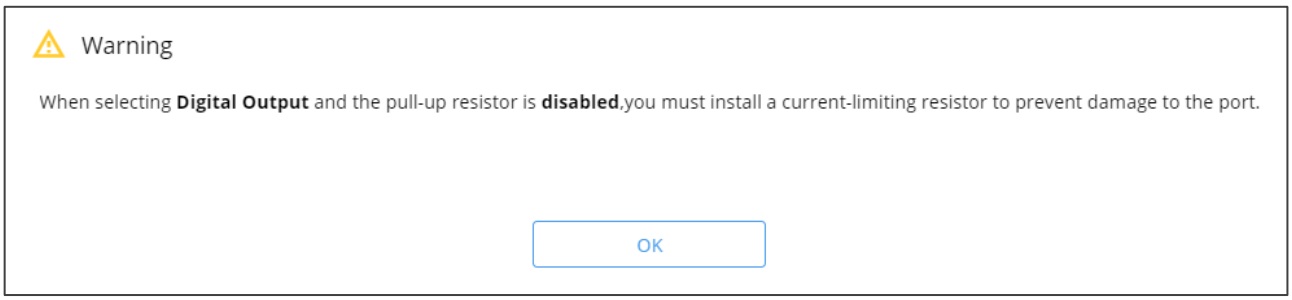



Figure 38: Digital Output Warning

2. Make sure to follow the instructions in this warning.

3. Click **OK**. The Digital Output options appear.

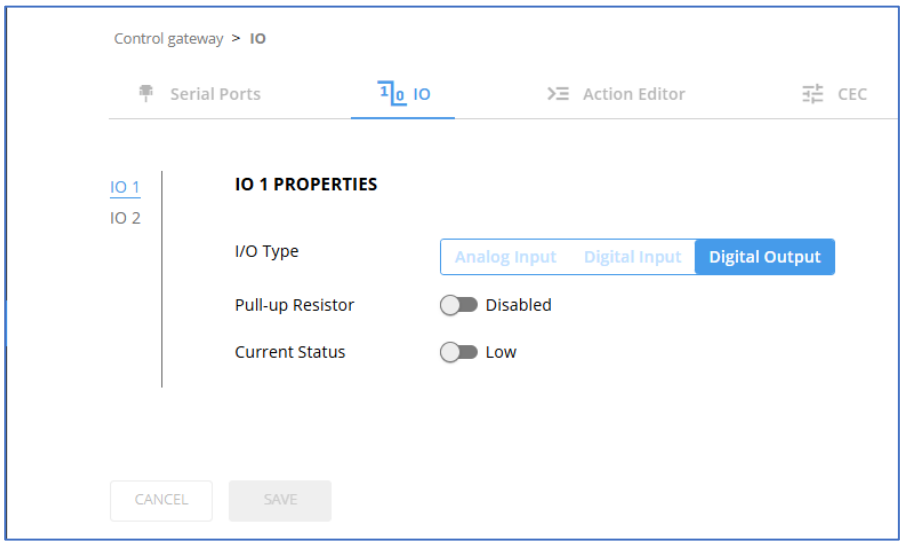



Figure 39: GPIO Settings Page – Digital Output I/O Type

4. Select one of the following for the Pull-up resistor setting:
   - Pullup resistor set to **Enabled**:
     The port can be used for controlling devices that accept a TTL signal such as for powering LEDs. The voltage output is TTL positive logic: high: >2.4V; low: < 0.5V.
   - Pullup resistor **Disabled**:
     The port is used for controlling external devices such as room or light switches. The external source device determines the voltage output; the maximum voltage is 30V DC and the maximum current is 100mA.

Make sure that the current in this configuration does not exceed 100mA.

5. The Current Status switch may be used to manually change the GPIO output state.
6. Click **SAVE**.

Digital Output I/O type is configured.

### Configuring an Analog Input I/O Type

When selectin the Analog Input I/O type, the port is triggered by an external analog device, such as a volume control device. The trigger is activated once when the detected voltage is within the 0 to 30V DC voltage range.

**To configure an analog input I/O type:**

1. On the GPIO page, select Analog Input next to I/O type.

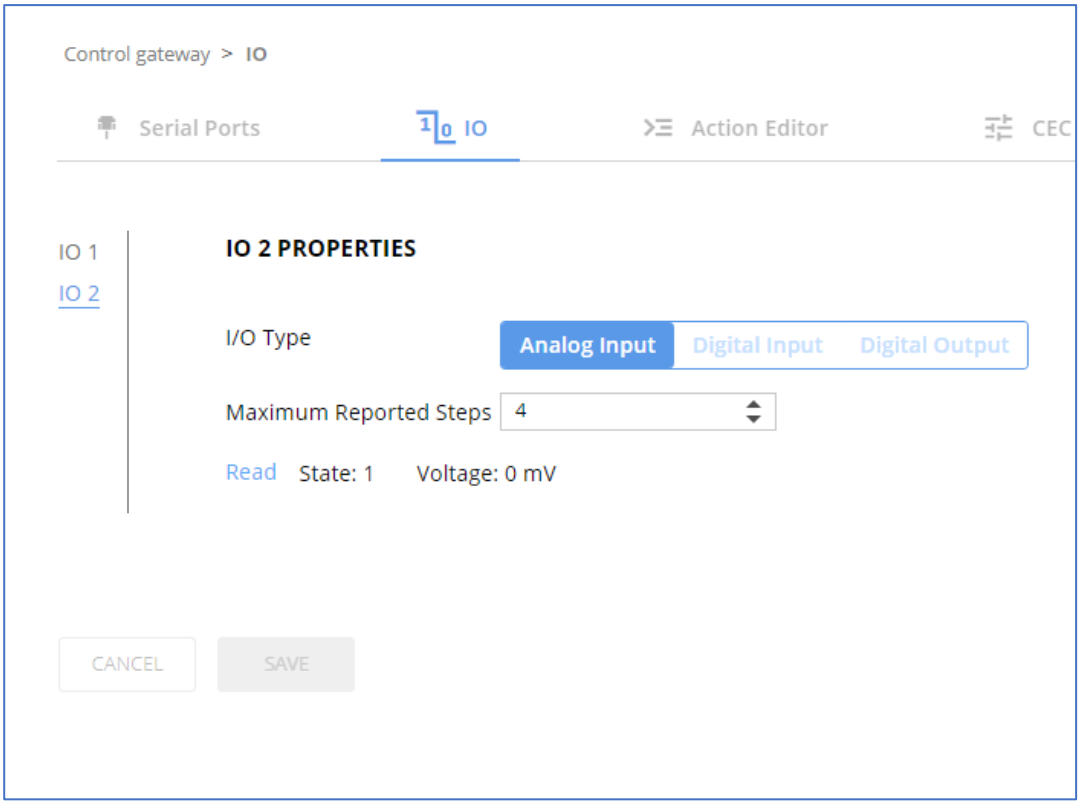



Figure 40: GPIO Port Settings Page Analog Input

2. Enter or use the arrows to scroll to a value (1–100) for the Maximum reported steps. This value is the number of steps that the analog input signal is divided into. To calculate the voltage of each step, use the following formula:
   Voltage of one step = 30V / number of steps.
3. Click **SAVE**.

Analog input I/O type is configured.

# Defining and Testing Commands via Action Editor

Use action editor to create and test control commands via CEC, UART or IR control interfaces. You can create up to 5 commands.

**To add an action:**

1. In the navigation pane, select **Control Gateway**. The Serial Ports tab opens.
2. Select the **Action Editor** tab. The Action Editor appears.

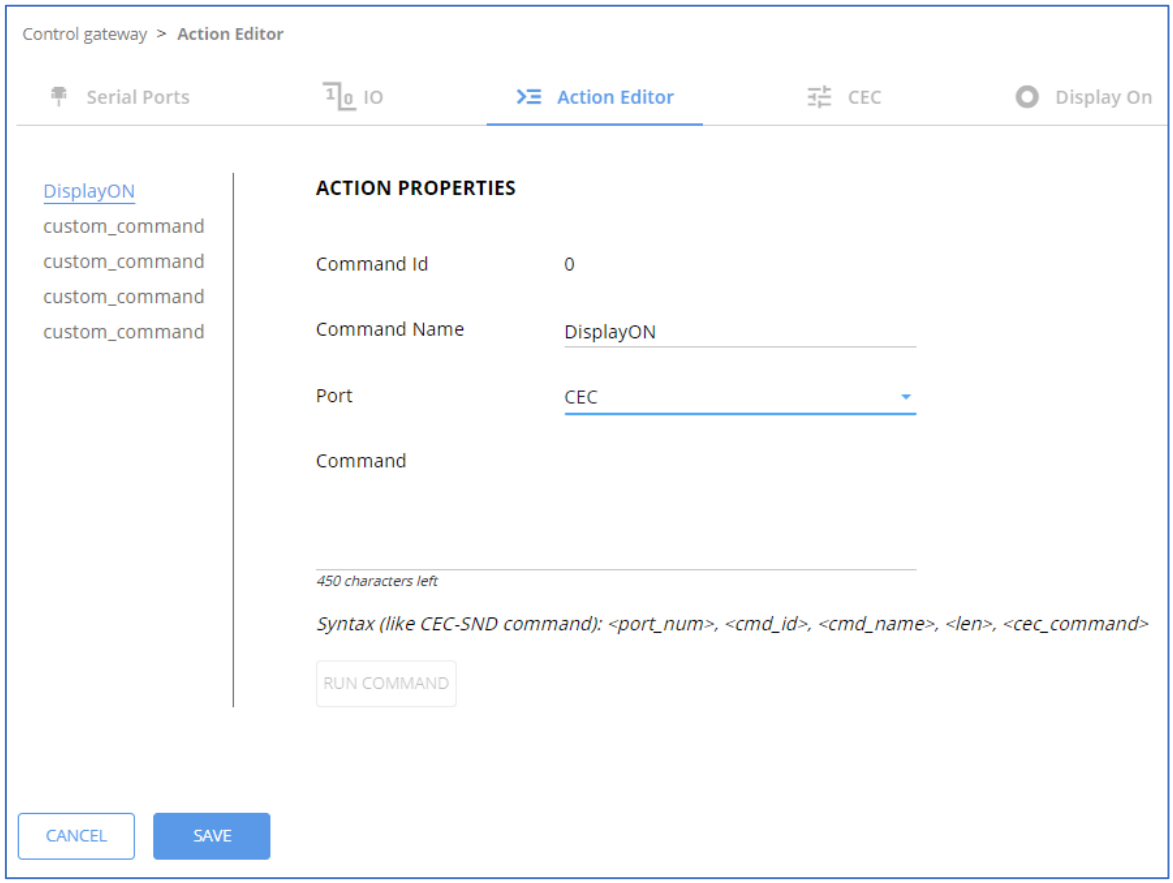



Figure 41: Action Editor Tab

3. Select a command name on the left side of the window.
4. Change the command name, if required.
5. Select the port (CEC, UART or IR).

For Tx: via HDBT output

For Rx: via HDMI output

6. Enter the appropriate command line, such as one of the following Display On sample commands:
   - For CEC - 1,1,tv-on,2,E004

     The command to power on a TV can vary depending on the specific TV model and manufacturer. However, above is a common example of a standard command to power on a TV.
   - For RS232 - PON

- For IR - 1,1,TVON,1,1,1,0000,006f,0022,0002,014d,00a6,0015,0015,0014,0015,0013,0014,0015,0015,0014,0014,0014,0014,0015,0015,0014,003e,0016,003d,0014,003f,0014,003e,0015,003f,0013,003f,0014,003e,0015,003f,0013,0016,0013,0015,0014,0015,0013,0016,0013,003f,0013,003e,0015,0015,0013,003e,0015,003f,0013,003f,0013,003e,0015,003e,0015,0015,0014,0015,0013,003f,0014,0015,0013,0014,0015,05c9,014d,0053,0015,0e0a

7. Click **SAVE**.
8. Click **RUN COMMAND** to run the command test.

An action is entered and can be run.

## Configuring Remote Buttons

You can connect remote buttons to the GPIO ports and define the actions to be performed when the GPI is triggered. See Defining and Testing Commands via Action Editor on page 48.

### To Configure Remote Buttons:

1. In the Navigation pane, click **Control Gateway**. The Serial Ports tab in the Device Settings page appears.
2. Select the IO tab. The IO tab appears.
3. Press to toggle **Remote Button** to On.
4. Configure defined control actions, for button on/off states, using the **State ON**, **State OFF** drop-down boxes.
   - Button default operation mode is latching. For momentary mode, check the Momentary checkbox.

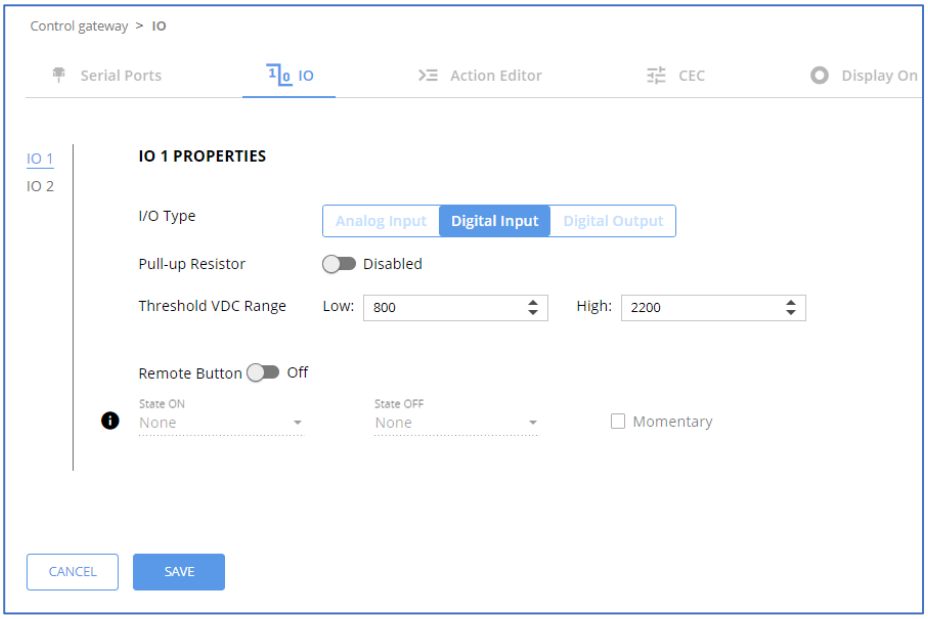



Figure 42: I/O ports settings tab – Configuring Remote Buttons

5. Click **SAVE**.

A control actions remote button can now be remotely operated.

# Defining CEC Gateway Settings

SWT3-21-HU-TR built-in CEC gateway enables IP control, via CEC messages, on the HDMI port. The Members address list shows the logical addresses of connected CEC-enabled devices.

- Rx: CEC gateway is disabled by default, Tx CEC gateway enabled by default.
- Tx via HDBT, Rx to local HDMI

**To disable the CEC gateway feature:**

1. In the navigation pane, select **Control Gateway**. The Serial Ports tab opens.
2. Select the **CEC** tab. The CEC Gateway page appears.
3. Click CEC gateway **OFF**.

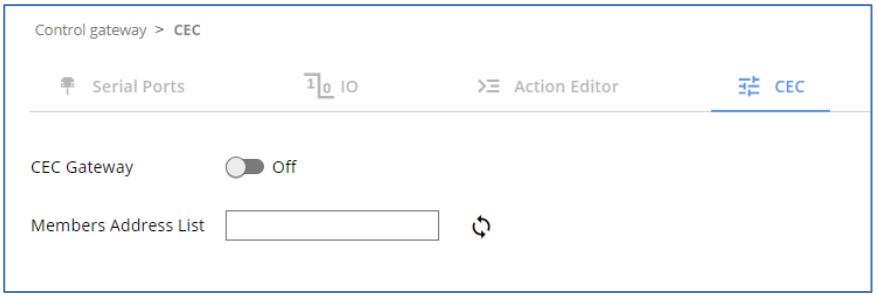



Figure 43: CEC Gateway Enable/Disable Tab

CEC gateway is disabled.

- You can view the logical addresses of CEC-enabled devices connected to the HDMI port on SWT3-21-HU-TR.
- Click **Refresh** to refresh the list.

# Associating CEC Commands to DISPLAY ON/OFF

Configure CEC commands to send via the DISPLAY ON button.

**To add an action:**

1. In the navigation pane, select **Control Gateway**. The Serial Ports tab opens.
2. Select the **Display On** tab. The Display ON settings appears.

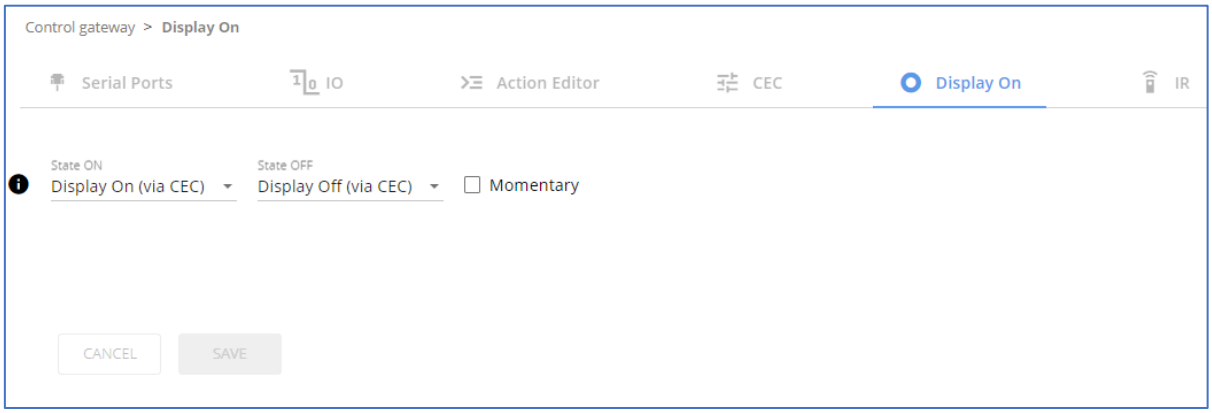



Figure 44: Action Editor Tab

3. Define the State On and State Off commands.
4. Check **Momentary** for the button to send a command on the press of a button.
5. Click **SAVE**.

DISPLAY ON button is configured.

# Setting IR Port Properties

**SWT3-21-HU-TR** has two IR ports:

- IR 1 – Panel IR port
- IR 2– HDBT IR channel

The IR ports can be configured for one of the following:

- IR extension (HDBT IR) – From panel IR port or Internal Gateway, via HDBT IR channel, to control a peripheral connected to the HDBT paired device IR port. IR signals sending method is transparent pass-thru of received IR signal only.
- IR Local (Panel IR) – From HDBT extension or Internal Gateway to Local (Panel) IR port. IR signals sending methods are as follows:
  - Pass-thru – Transparent pass-through of received IR signal (default).
  - Modulation – IR signal extension with 38kHz modulated IR signal output.

IR routing cross-point grid for Tx and Rx extension operation modes (see Figure 46), enable IR signals routing, as follows:

| Tx Selected IR Port | Rx Selected IR Port | IR Routing Description |
|---|---|---|
| IR 1 (Panel IR) | IR 2 (HDBT IR) | Received IR signal from panel IR port is extended, via HDBT IR channel, to output on remote HDBT-connected IR port |
| IR 2 (HDBT IR) | IR 1 (Panel IR) | Received IR-extended signal via HDBT IR channel is output on local IR panel port |
| GATEWAY 3 | IR 1 (Panel IR) | IR control gateway outputs IR-generated signal to IR panel port (to IR-control locally-connected peripheral) |
| GATEWAY 3 | IR 2 (HDBT IR) | IR control gateway outputs IR-generated signal to HDBT IR channel (to IR-control remotely-connected peripheral) |

**SWT3-21-HU-TR** enables concurrent control gateway signals output on both, IR panel port and HDBT channel.

### Routing IR Signals

1. In the navigation pane, select **Control Gateway**.
2. Select the **IR** tab. The IR tab opens (see Figure 46).
3. Select Tx and Rx IR routing cross-points by clicking on their IR icons. Selected IR routing indication appears.

4. If needed, select modulation method by pressing **M** on Rx IR 1 cell (see (Figure 47).
5. Click **SAVE**.

IR signals routing is set.

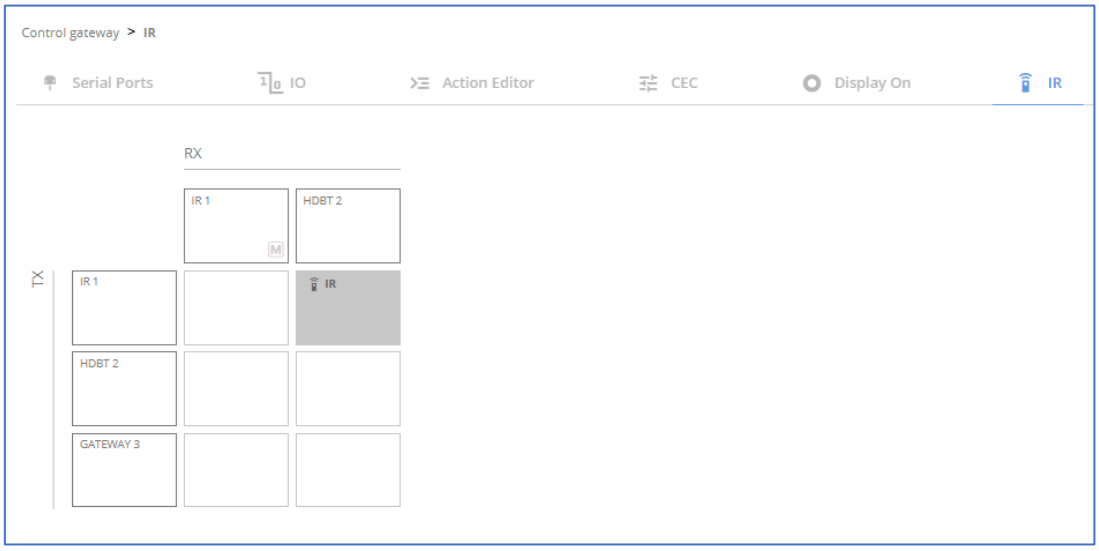



Figure 45: IR Tab Signals Routing


Figure 46: IR Modulation Method Setting

# Viewing Device Status

View the device status.

**To view the device status:**

1. In the navigation pane, select **Status**.
2. Select the **Devices** tab. The Devices Status appears.

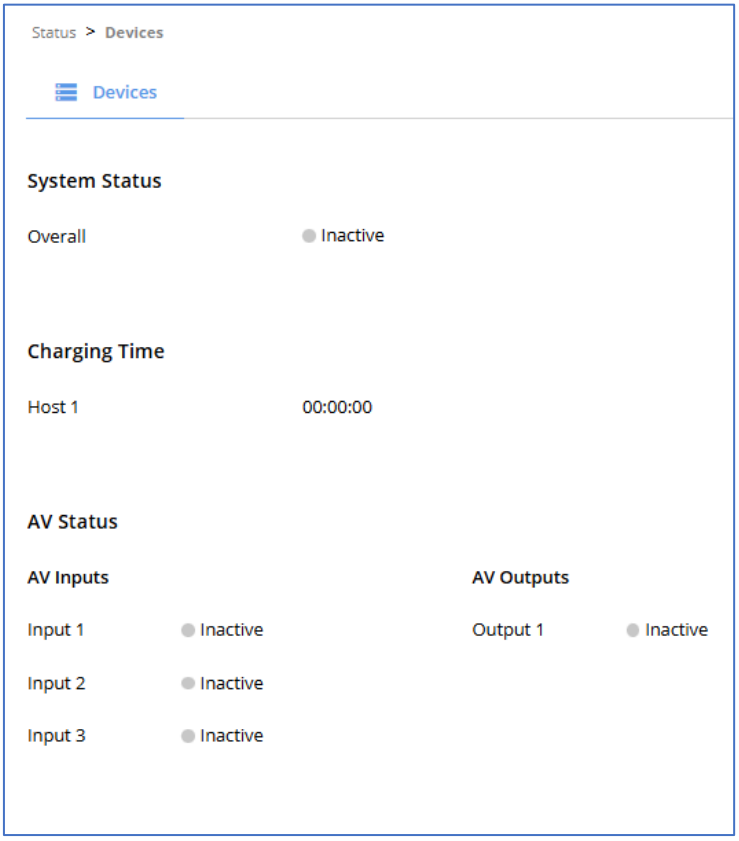



Figure 47: Device Status Page

3. View device status.

Device status can be viewed.

# Setting Security Properties

This section details the following actions:

- Changing Security Status on page 55.
- Defining 802.1X Authentication on page 57.

# Changing Security Status

By default, security status is set to On.

## Setting Security Status to Off

### To set security status to Off:

1. Go to the Security page (Figure 49).
2. Select the Security tab. The Security settings appears.

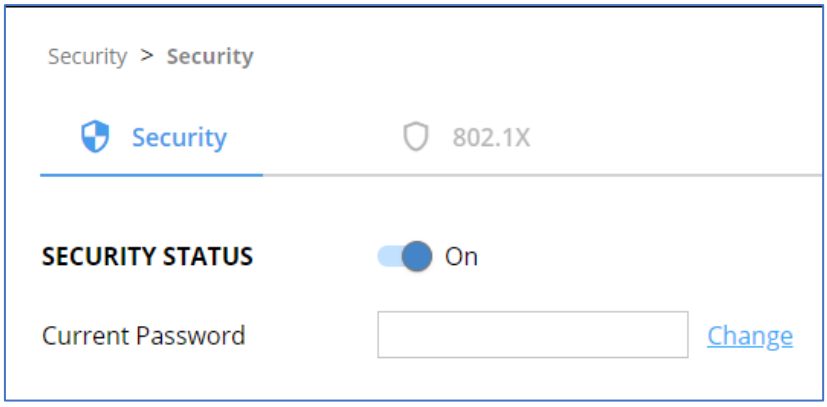



Figure 48: Security – Security Tab

3. Set **SECURITY STATUS** to **Off**. The Security Status window appears.

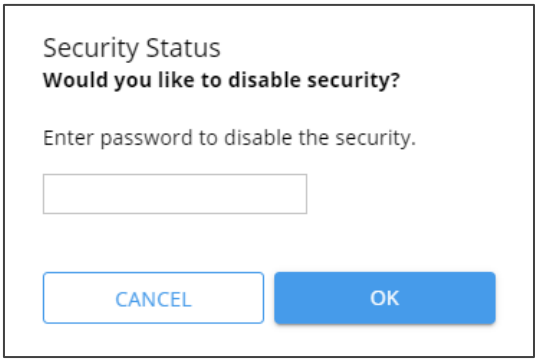



Figure 49: Security Status Message

4. Enter the current password.
5. Click **OK**.

Security status is set to Off.

## Setting Security Status to On

### To set security status to on:

1. Go to the Security > Security (Figure 49).
2. Set SECURITY STATUS to **On**.

Security status is set to On.

### Changing Web Pages Access Password

**To change the password for accessing the embedded web pages:**

1. Go to the Security page (Figure 23).
2. Select the Security Tab. The Security settings appear (Figure 51).
3. Enter the Current Password and click **Change**. The new password settings appear.

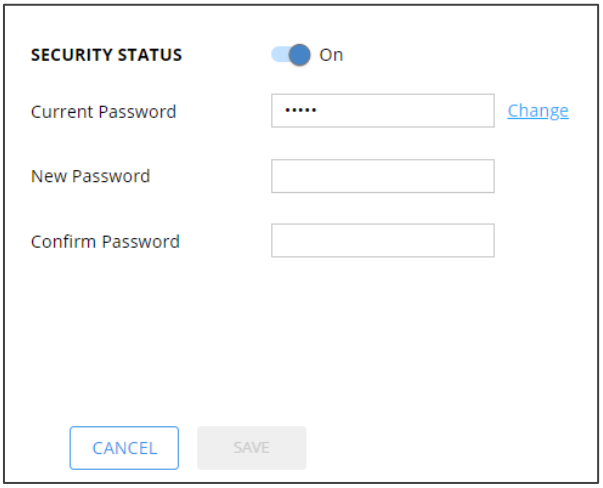



Figure 50: Device Settings – Changing the Password

4. Enter the new password and confirmation password and click **SAVE**.

The password is changed.

# Defining 802.1X Authentication

802.1x security standard supports IT networking authentication based on LAN port and MAC address.

**To configure security:**

1. In the Navigation pane, click **Security**. The Security settings tab in the Security page appears.
2. Select **802.1X** tab. The 802.1X settings tab appears (see Figure 52).

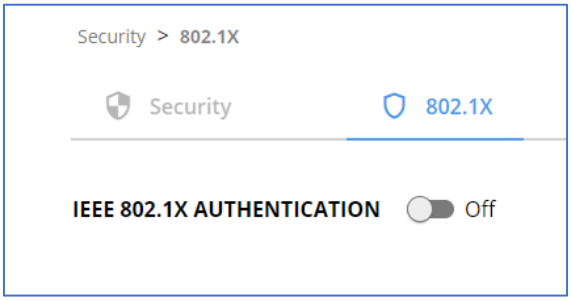



Figure 51: 802.1X Tab

3. For 802.1x authentication, click **ON** to enable 802.1x authentication service. 802.1x supports authentication based on port and MAC address.
4. When set to ON check one standard authentication method to set its security attributes.
   - **EAP-MSCHAP V2** – Enter:
     - Username - up to 24 alphanumeric characters, including "_" and "-" characters within the username, and
     - Password - up to 24 ASCII characters

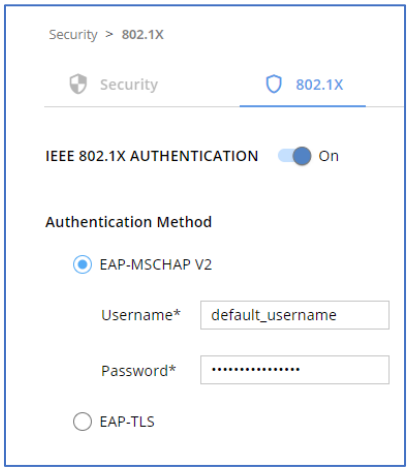



Figure 52: EAP-MSCHAP V2 Authentication Method

- **EAP-TLS** – To submit certificate from the server for authentication:
  - Enter Username,
  - Click to upload the certificates and keys.

  File format must be pem.

- Enter the private key password (assigned by IT administrator),
- Set Server Certificate **On**

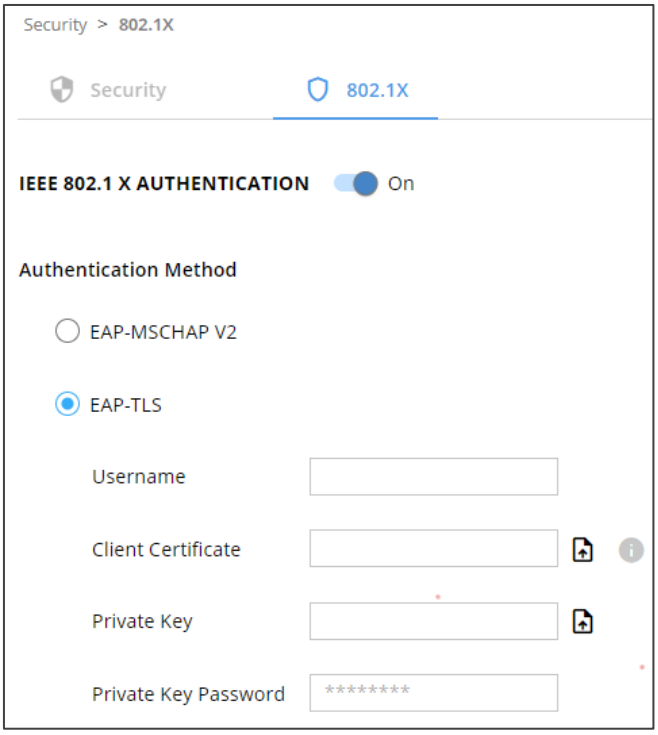



Figure 53: EAP-TLS – Certificates and Password

5. Click **APPLY**.

802.1x authentication security is configured.

# Upgrading Firmware

Use the Kramer **K-UPLOAD** software to upgrade the firmware via ethernet or the RS-232 port, allowing RS-232 to control/program the device). The device continues to operate and once FW upload complete, you are asked to Restart no or later.

The latest version of **K-UPLOAD** and installation instructions can be downloaded from our website at: www.kramerav.com/support/product_downloads.asp.

Note that in order to use the micro USB port, you need to install the Kramer USB driver, available at: www.kramerav.com/support/product_downloads.asp.

# Technical Specifications

| | | |
|---|---|---|
| Inputs | 1 HDMI | On an HDMI female connector |
| | 1 DP Alt Mode & PD 3.0 USB-C | On a USB type–C female connector |
| | 1 HDBT 2-way | On an RJ−45 female connector |
| Outputs | 1 HDMI (transmitter side) | On an HDMI female connector |
| | 1 Balanced Stereo Line Level | On a 5-pin terminal block connector |
| | 1 HDBT 2-way | On an RJ−45 female connector |
| Configurable Input/Output | 1 HDBT | On an RJ−45 female connector |
| Ports | 2 USB 3.2 Hosts | On a USB–C and a USB−B female connector |
| | 3 USB 3.2 Devices | On USB type–A female connectors |
| | 1 1000BaseT Ethernet | On an RJ–45 female connector for LAN connection & extension |
| | 1 RS–232 | On a 3–pin terminal block |
| | 1 IR | On a 3.5mm mini jack for IR extension |
| | 2 GPIO | On a 2–pin terminal block |
| Extension | Reach | Up to 40m (131ft), using Kramer HDBaseT cables |
| | Standards Compliance | HDBaseT 3.0 |
| USB Features | USB 3.2 Data Rate | Up to 10Gbps |
| | Integrated USB Hubs | 1 |
| | Standards Compliance | USB 3.2 GEN 2, 2.0 and 1.1 |
| Extended USB | USB 2.0 Data Rate | Up to 480Mbps |
| | Transmitted Data Bandwidth | Up to 300Mbps |
| | Standards Compliance | USB 2.0 and 1.1 |
| Extended Ethernet | Max Data Rate | 1 Gbps |
| Extended RS-232 | Baud Rate | 300 to 115200 |
| Video | Max Data Rate | 18Gbps bandwidth (6Gbps per graphic channel) |
| | Max Resolution | 4K@60Hz (4:4:4) resolution |
| | Content Protection | HDCP 2.3 |
| | HDMI Support | Deep Color, 3D, HDR as specified in HDMI 2.0b |
| Analog Audio | Max Output Signal Level | 15dBu |
| | Impedance | 500Ω |
| | Bandwidth | 20Hz to 20kHz |
| | THD + N: | 0.002% @1kHz at nominal level |
| | S/N Ratio | −93dB, 20Hz — 20kHz |
| | Coupling | DC |
| Power | Power Adapter | 20VDC |
| | | Max. Consumption: 6A |
| | | Max. Power: 120W |
| | USB Charging | Max. Power: 60W |
| | | Compliance: PD 3.0 |
| | USB Device Charging | Max. Total Current: 2A |
| Environmental Conditions | Operating Temperature | 0° to +40°C (32° to 104°F) |
| | Storage Temperature | -40° to +70°C (-40° to 158°F) |
| | Humidity | 10% to 90%, RHL non-condensing |
| | Safety | CE, UL |

| | | |
|---|---|---|
| Regulatory Compliance | Environmental | RoHs, WEEE |
| Enclosure | Size | Mega Tool |
| | Cooling | Fan Ventilation |
| General | Net Dimensions (W, D, H) | 19 x 11.6 x 2.7 cm (7.4”X 4.5”X 1”) |
| | Shipping Dimensions (W, D, H) | 35.1 x 21.2 x7.2 cm (13.8”X 8.3”X 2.83”) |
| | Net Weight | 0.9kg (1.9lbs) approx. |
| | Shipping Weight | 1.7kg (3.7lbs) |
| Accessories | Included | 20 VDC Power adaptor |
| Specifications are subject to change without notice at www.kramerav.com | | |

# Default Communication Parameters

| RS-232 | |
|---|---|
| Baud Rate: | 115,200 |
| Data Bits: | 8 |
| Stop Bits: | 1 |
| Parity: | None |
| Command Format: | ASCII |
| Example (Route video input 2 to the output): | #ROUTE␣1,1,2<CR> |

| Ethernet | |
|---|---|
| To reset the IP settings to the factory reset values go to: Menu->Setup -> Factory Reset-> press Enter to confirm | |
| Fallback IP Address: | 192.168.1.39 |
| Fallback Subnet mask: | 255.255.255.0 |
| Fallback gateway: | 192.168.0.1 |
| Default username: | Admin |
| Default password: | Admin |

| Full Factory Reset | |
|---|---|
| P3K | “#FACTORY” command.<br><br>After receiving "FACTORY OK" perform one of the following to restart the device and complete the procedure:<br>• Power cycle<br>• Send command "#RESET" |
| Embedded webpages | Go to: Device>General and click FACTORY RESET |

# Protocol 3000

Kramer devices can be operated using Kramer Protocol 3000 commands sent via serial or Ethernet ports.

## Understanding Protocol 3000

Protocol 3000 commands are a sequence of ASCII letters, structured according to the following.

- **Command format**:

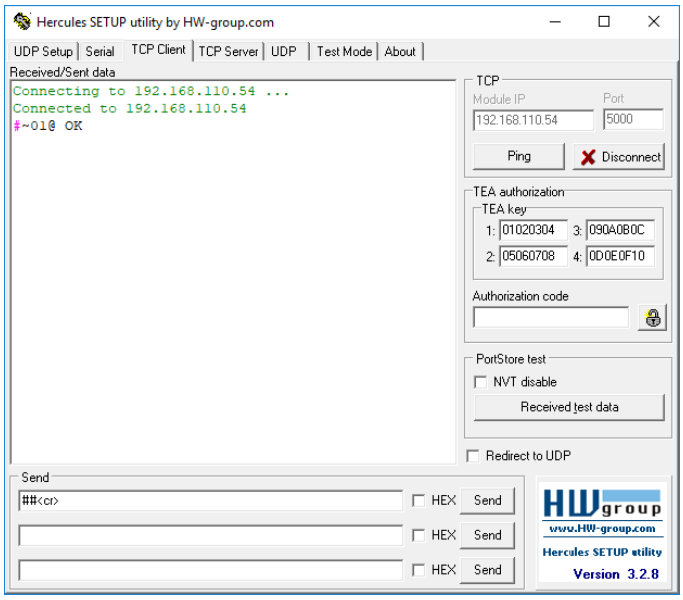
| Prefix | Command Name | Constant (Space) | Parameter(s) | Suffix |
|---|---|---|---|---|
| # | Command | ␣ | Parameter | <CR> |

- **Feedback format**:

| Prefix | Device ID | Constant | Command Name | Parameter(s) | Suffix |
|---|---|---|---|---|---|
| ~ | nn | @ | Command | Parameter | <CR><LF> |

- **Command parameters** – Multiple parameters must be separated by a comma (,). In addition, multiple parameters can be grouped as a single parameter using brackets ([ and ]).
- **Command chain separator character** – Multiple commands can be chained in the same string. Each command is delimited by a pipe character (|).
- **Parameters attributes** – Parameters may contain multiple attributes. Attributes are indicated with pointy brackets (<…>) and must be separated by a period (.).

The command framing varies according to how you interface with **SWT3-21-HU-TR**. The following figure displays how the # command is framed using terminal communication software (such as Hercules):



# Protocol 3000 Commands

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| # | Protocol handshaking.<br>Validates the Protocol 3000 connection and gets the machine number.<br>Step-in master products use this command to identify the availability of a device. | COMMAND<br>#<CR><br>FEEDBACK<br>~nn@ ok<CR><LF> | | #<CR> |
| AUD-LVL | Set volume level. | COMMAND<br>#AUD-LVL io_mode,io_index,vol_level<CR><br>FEEDBACK<br>~nn@AUD-LVL io_mode,io_index,vol_level<CR><LF> | io_mode –<br>1– Output<br>io_index – 1<br>vol_level – Volume level -100db to 15dB;<br>++ (increase current value by 1dB);<br>-- (decrease current value by 1dB) | Set AUDIO OUT level to -50.0dB:<br>#AUD-LVL 1,1,-50.0<CR> |
| AUD-LVL? | Get volume level. | COMMAND<br>#AUD-LVL? io_mode,io_index<CR><br>FEEDBACK<br>~nn@AUD-LVL io_mode,io_index,vol_level<CR><LF> | io_mode –<br>1– Output<br>io_index – 1<br>vol_level – Volume level -100db to 15dB; | Get AUDIO OUT level:<br>#AUD-LVL? 1,1<CR> |
| AUD-LVL-RANGE? | Get volume level min and max range. | COMMAND<br>#AUD-LVL-RANGE? io_mode,io_index<CR><br>FEEDBACK<br>~nn@AUD-LVL-RANGE io_mode,io_index,min_val,max_val<CR><LF> | io_mode –<br>1– Output<br>io_index – 1<br>min_val – -100db<br>max_val – 15dB | Get AUDIO OUT level range:<br>#AUD-LVL-RANGE? 1,1<CR> |
| AUD-MUTE | Set audio mute. | COMMAND<br>#AUD-MUTE out_index,mute_mode<CR><br>FEEDBACK<br>~nn@AUD-MUTE out_index,mute_mode<CR><LF> | out_index –1<br>mute_mode – On/Off<br>0– Off<br>1– On | Set Output 1 to mute:<br>#AUD-MUTE 1,1<CR> |
| AUD-MUTE? | Set audio mute. | COMMAND<br>#AUD-MUTE out_index<CR><br>FEEDBACK<br>~nn@AUD-MUTE out_index,mute_mode<CR><LF> | out_index –1<br>mute_mode – On/Off<br>0– Off<br>1– On | Get Output 1 to mute:<br>#AUD-MUTE 1,1<CR> |
| AUD-MUTE-PERSIST | Set the auto audio unmute status upon volume change. | COMMAND<br>#AUD-MUTE-PERSIST unmute_status<CR><br>FEEDBACK<br>~nn@AUD-MUTE-PERSIST unmute_status<CR><LF> | unmute_status –<br>0– Mute state is not persistent and changes upon volume change<br>1– Mute state is persistent upon volume change | Set mute mode to be persistent and not change upon volume change:<br>#AUD-MUTE-PERSIST 1<CR> |
| AUD-MUTE-PERSIST? | Get the auto audio unmute status. | COMMAND<br>#AUD-MUTE-PERSIST?<CR><br>FEEDBACK<br>~nn@AUD-MUTE-PERSIST unmute_status<CR><LF> | unmute_status –<br>0– Mute state is not persistent and changes upon volume change<br>1– Mute state is persistent upon volume change | Get auto unmute status upon volume change:<br>#AUD-MUTE-PERSIST?<CR> |
| AUTH-802-1X-ENABLE | Set authentication 802.1X feature for the specific interface. | COMMAND<br>#AUTH-802-1X-OP-STAT? interface ID<CR><br>FEEDBACK<br>~nn@AUTH-802-1X-ENABLE interface,enable_status<CR><LF> | interface – Interface ID – 0<br>enable_status –<br>0– Off<br>1– On | Get the authentication 802.1X operation status:<br>#AUTH-802-1X-OP-STAT 0<CR> |
| AUTH-802-1X-ENABLE? | Get authentication 802.1X feature for the specific interface. | COMMAND<br>#AUTH-802-1X-ENABLE? interface<CR><br>FEEDBACK<br>~nn@AUTH-802-1X-ENABLE interface,enable_status<CR><LF> | interface – Interface ID – 0<br>enable_status –<br>0– Off<br>1– On | Get the authentication 802.1X feature status:<br>#AUTH-802-1X-ENABLE? 0<CR> |
| AUTH-802-1X-OP-STAT? | Get authentication 802.1X operational status. | COMMAND<br>#AUTH-802-1X-OP-STAT interface ID<CR><br>FEEDBACK<br>~nn@AUTH-802-1X-OP-STAT interface ID_status<CR><LF> | interface – Interface ID – 0<br>Status– Status<br>0– Not authenticated<br>1–Authenticated | Get the authentication 802.1X operation status:<br>#AUTH-802-1X-OP-STAT? 0<CR> |
| AV-SW-MODE | Set input auto switch mode (per output). | COMMAND<br>#AV-SW-MODE layer_type,out_index,connection_mode<CR><br>FEEDBACK<br>~nn@AV-SW-MODE layer_type,out_index,connection_mode<CR><LF> | layer_type – Number that indicates the signal type:<br>1– Video<br>2– Audio<br>out_index – 1<br>connection_mode – Connection mode<br>0– manual<br>1– priority switch<br>2– last connected switch | Set the input audio switch mode to Manual for HDMI OUT:<br>#AV-SW-MODE 1,1,0<CR> |
| AV-SW-MODE? | Get input auto switch mode (per output). | COMMAND<br>#AV-SW-MODE? layer_type,out_index<CR><br>FEEDBACK<br>~nn@AV-SW-MODE layer_type,out_index,connection_mode<CR><LF> | layer_type – Number that indicates the signal type:<br>1– Video<br>2– Audio<br>out_index – 1<br>connection_mode – Connection mode<br>0– manual<br>1– priority switch<br>2– last connected switch | Get the input audio switch mode for HDMI OUT:<br>#AV-SW-MODE? 1,1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| AV-SW-TIMEOUT | Set auto switching timeout. | COMMAND<br>#AV-SW-TIMEOUT␣switching_mode,time_out<CR><br>FEEDBACK<br>~nn@AV-SW-TIMEOUT␣switching_mode,time_out<CR><LF> | switching_mode – Switching mode<br>0 – Video signal lost<br>1 – New video signal detected<br>4 – Disable 5V on video output if no input signal detected<br>5 – Video cable unplugged<br>7 – Video signal lost for signal routed as a result of a manual override action<br>time_out – Timeout in seconds<br>0 - 60000 | Set the auto switching timeout to 5 seconds in the event of 5V disable when no input signal is detected:<br>#AV-SW-TIMEOUT␣4,5<CR> |
| AV-SW-TIMEOUT? | Set auto switching timeout. | COMMAND<br>#AV-SW-TIMEOUT?␣switching_mode<CR><br>FEEDBACK<br>~nn@AV-SW-TIMEOUT␣switching_mode,time_out<CR><LF> | switching_mode – Switching mode<br>0 – Video signal lost<br>1 – New video signal detected<br>4 – Disable 5V on video output if no input signal detected<br>5 – Video cable unplugged<br>7 – Video signal lost for signal routed as a result of a manual override action<br>time_out – Timeout in seconds<br>0 - 60000 | Get the auto switching timeout in the event of 5V disable when no input signal is detected:<br>#AV-SW-TIMEOUT?␣4<CR> |
| BEACON-INFO? | Get beacon information, including IP address, UDP control port, TCP control port, MAC address, model, name. | COMMAND<br>#BEACON-INFO?␣<CR><br>FEEDBACK<br>~nn@BEACON-INFO␣port_id,ip_string,udp_port,tcp_port,mac_address,model,name<CR><LF> | port_id – ID of the Ethernet port<br>ip_string – Dot-separated representation of the IP address<br>udp_port – UDP control port<br>tcp_port – TCP control port<br>mac_address – Dash-separated mac address<br>model – Device model<br>name – Device name | Get beacon information:<br>#BEACON-INFO?␣<CR> |
| BUILD-DATE? | Get device build date. | COMMAND<br>#BUILD-DATE?␣<CR><br>FEEDBACK<br>~nn@BUILD-DATE␣date,time<CR><LF> | date – Format: YYYY/MM/DD where<br>YYYY = Year<br>MM = Month<br>DD = Day<br>time – Format: hh:mm:ss where<br>hh = hours<br>mm = minutes<br>ss = seconds | Get the device build date:<br>#BUILD-DATE?<CR> |
| CEC-GW-PORT-ACTIVE | Set the CEC activation state. | COMMAND<br>#CEC-GW-PORT-ACTIVE␣direction_type,port_format,port_index,state<CR><br>FEEDBACK<br>~nn@CEC-GW-PORT-ACTIVE␣direction_type,port_format,port_index,state<CR><LF>' | direction_type – Direction of the port: out<br>port_format – Type of signal on the port: hdbt<br>port_index – The port number: 1<br>state – Global gateway activation state:<br>○ 0 – as a passthrough<br>○ 1 – as a gateway | Activate CEC for the HDBaseT port as a passthrough:<br>#CEC-GW-PORT-ACTIVE␣in,hdmi,1,0<CR> |
| CEC-GW-PORT-ACTIVE? | Get the CEC activation state. | COMMAND<br>#CEC-GW-PORT-ACTIVE?␣direction_type,port_format,port_index<CR><br>FEEDBACK<br>~nn@CEC-GW-PORT-ACTIVE␣direction_type,port_format,port_index,state<CR><LF>' | direction_type – Direction of the port: out<br>port_format – Type of signal on the port: hdbt<br>port_index – The port number: 1<br>state – Global gateway activation state:<br>○ 0 – as a passthrough<br>○ 1 – as a gateway | Get the Activate CEC status for the HDBaseT port as a passthrough:<br>#CEC-GW-PORT-ACTIVE␣in,hdmi,1<CR> |
| CEC-MEMBERS? | Get list of CEC logical addresses. | COMMAND<br>#CEC-MEMBERS?␣port_index<CR><br>FEEDBACK<br>~nn@CEC-MEMBERS␣port_index,<la1>,<la2>...<CR><LF> | Port_index – 1<br>la – 1 to 15 | Set gateway members:<br>#CEC-MEMBERS?␣1<CR> |
| CEC-NTFY-ACTIVE | Set CEC notification activity (valid until the next power up). | COMMAND<br>#CEC-NTFY-ACTIVE␣cec_ntf<CR><br>FEEDBACK<br>~nn@CEC-NTFY-ACTIVE␣cec_ntf<CR><LF> | cec_ntf –<br>0 – Inactive<br>1 – Active | Enable CEC notification:<br>#CEC-NTFY-ACTIVE␣1<CR> |
| CEC-NTFY-ACTIVE? | Get CEC notification activity status. | COMMAND<br>#CEC-NTFY-ACTIVE?␣<CR><br>FEEDBACK<br>~nn@CEC-NTFY-ACTIVE␣cec_ntf<CR><LF> | cec_ntf –<br>0 – Inactive<br>1 – Active | Get CEC notification activity status::<br>#CEC-NTFY-ACTIVE?␣<CR> |
| CEC-SND | Send CEC command to port. | COMMAND<br>#CEC-SND␣port_index,sn_id,cmd_name,cec_len,cec_command<CR><br>FEEDBACK<br>~nn@CEC-SND␣port_index,sn_id,cmd_name,cec_mode<CR><LF> | port_index – CEC port transmitting the command: 1<br>sn_id – 1<br>cmd_name – command name<br>cec_len – 1–16<br>cec_command – CEC format command (in HEX format, no leading zeros, no '0x' prefix)<br>cec_mode – CEC mode<br>0 – Sent<br>1 – Gateway disabled<br>2 – Inactive CEC-Master<br>3 – Busy<br>4 – Illegal Message Parameter<br>5 – Illegal CEC Address Parameter<br>6 – Illegal CEC Command<br>7 – Timeout<br>8 – Error | Send TV-OFF CEC command to the HDBaseT port:<br>#CEC-SND␣1,1,TV-OFF,2,e004<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| COM-ROUTE? | Get tunneling port routing.<br>ⓘ This command sets tunneling port routing. Every com port can send or receive data from the ETH port.<br>Set command can edit an existing configuration. | COMMAND<br>#COM-ROUTE? com_id<CR><br>FEEDBACK<br>~nn@COM-ROUTE com_id,port_type,port_id,eth_rep_en,ping_val<CR><LF> | com_id – Machine dependent, * (get all route tunnels)<br>port_type – TCP/UDP<br>0 – TCP<br>1 – UDP<br>port_id – TCP/UDP port number<br>eth_rep_en – Ethernet Reply<br>0 – COM port does not send replies to new clients<br>1 – COM port sends replies to new clients.<br>ping_val – Send an empty string to TCP client every 0 to 3600 seconds. 0 - 3600 | Get tunneling port routing for all route tunnels:<br>#COM-ROUTE? *<CR> |
| COM-ROUTE-MODE | Set the communication at certain USRT port<br>ⓘ Indexes not continuous because of bitwise operation (this is Mask values) | COMMAND<br>#COM-ROUTE-MODE uart_port,COM-MODE<CR><br>FEEDBACK<br>~nn@COM-ROUTE-MODE uart_port,COM-MODE<CR><LF> | USRT Port –<br>1 – Control (p3k)<br>2 – Gateway (tunneling)<br>4 – Remote button<br>Uart_port – Uart Port<br>1-N<br>COM-MODE – communication mode that UART port is set to<br>1-Control<br>2- Gateway<br>4-Remote button )mask values and not continuous) | Change com-mode to Gateway (tunneling)<br>#COM-ROUTE-MODE 1,2<CR> |
| COM-ROUTE-MODE? | Get the communication at certain USRT port<br>ⓘ Indexes not continuous because of bitwise operation (this is Mask values) | COMMAND<br>#COM-ROUTE-MODE? uart_port,COM-MODE<CR><br>FEEDBACK<br>~nn@COM-ROUTE-MODE uart_port,COM-MODE<CR><LF> | USRT Port –<br>1 – Control (p3k)<br>2 – Gateway (tunneling)<br>4 – Remote button<br>Uart_port – Uart Port<br>1-N<br>COM-MODE – communication mode that UART port is set to<br>1-Control<br>2- Gateway<br>4-Remote button) mask values and not continuous) | **Get the communication mode of certain UART port.**<br>#COM-ROUTE-MODE? 1<CR> |
| CONF-EXPORT | Export configuration file | COMMAND<br>#CONF-EXPORT <CR><br>FEEDBACK<br>~nn@CONF-EXPORT filename<CR><LF> | file_name - the name of the file we want to upload for the export. | Export configuration file:<br>#CONF-EXPORT <CR> |
| CONF-IMPORT | Export configuration file | COMMAND<br>#CONF-IMPORT file_name<CR><br>FEEDBACK<br>~nn@CONF-IMPORT file_name<CR><LF> | file_name - the name of the file we want to upload for the import. | Import configuration file:<br>#CONF-IMPORT EXT3-31-HU-TR-conf<CR> |
| COUNTER? | Get the sent or received CEC messages count. | COMMAND<br>#COUNTER? category_id,sub_category_id<CR><br>FEEDBACK<br>~nn@COUNTER category_id,sub_category_id,count<CR><LF> | category_id – CEC messages: 0<br>Sub_category_id – Type of message:<br>0 – Sent message<br>1 – Received message<br>count – Number range: 0-65535 | Get the number of sent messages:<br>#COUNTER? 0,0<CR> |
| COUNTER-CLR | Clear CEC messages. | COMMAND<br>#COUNTER-CLR? category_id,sub_category_clr<CR><br>FEEDBACK<br>~nn@COUNTER-CLR category_id,sub_category_id,count<CR><LF> | category_id – CEC messages: 0<br>Sub_category_clr – Type of message to clear:<br>0 – Clear sent messages<br>1 – Clear received messages<br>* – Clear all CEC messages | Clear all CEC messages:<br>#COUNTER-CLR? 0,*<CR> |
| CPEDID | Copy EDID data from the output to the input EEPROM.<br>ⓘ Destination bitmap size depends on device properties (for 64 inputs it is a 64-bit word).<br>Example: bitmap 0x0013 means inputs 1,2 and 5 are loaded with the new EDID.<br>In certain products Safe_mode is an optional parameter. See the HELP command for its availability. | COMMAND<br>#CPEDID edid_io,src_id,edid_io,dest_bitmap<CR><br>or<br>#CPEDID edid_io,src_id,edid_io,dest_bitmap,safe_mode<CR><br>FEEDBACK<br>~nn@CPEDID edid_io,src_id,edid_io,dest_bitmap<CR><LF><br>~nn@CPEDID edid_io,src_id,edid_io,dest_bitmap,safe_mode<CR><LF> | edid_io – *EDID* source type (usually output)<br>0 – Input<br>1 – Output<br>2 – Default EDID<br>3 – Custom EDID<br>src_id – Number of chosen source stage<br>0 – Default EDID source<br>1 – HDBaseT OUT or USB-C IN<br>2 – HDMI IN<br>edid_io – *EDID destination* type<br>0 – Input<br>dest_bitmap – Bitmap representing destination IDs. Format: XXXX…X, where X is hex digit. The binary form of every hex digit represents corresponding destinations.<br>0 – indicates that EDID data is not copied to this destination.<br>1 – indicates that EDID data is copied to this destination.<br>safe_mode – Safe mode (optional parameter)<br>0 – device accepts the EDID as is without trying to adjust (default value if no parameter is sent)<br>1 – device tries to adjust the EDID | Copy the EDID data from the HDBaseT Output to the HDMI Input:<br>#CPEDID 1,1,0,0x1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| CS-CONVERT | Set the "force RGB color space" convert mode. | COMMAND<br>#CS-CONVERT␣out_index,cs_mode<CR><br>FEEDBACK<br>~nn@CS-CONVERT␣out_index,cs_mode<CR><LF>' | out_index – The port number: 1<br>cs_mode – color space mode:<br>o 0 – Color space pass (default)<br>o 1 – Enable "force RGB color space" convert mode | Enable force RGB color space:<br>#CS-CONVERT␣1,1<CR> |
| CS-CONVERT? | Get the "force RGB color space" convert mode. | COMMAND<br>#CS-CONVERT?␣out_index<CR><br>FEEDBACK<br>~nn@CS-CONVERT␣out_index,cs_mode<CR><LF>' | out_index – The port number: 1<br>cs_mode – color space mode:<br>o 0 – Color space pass (default)<br>o 1 – Enable "force RGB color space" convert mode | Get force RGB color space mode:<br>#CS-CONVERT?␣1<CR> |
| DEV-STATE? | Get the device state. | COMMAND<br>#DEV-STATE?␣<CR><br>FEEDBACK<br>~nn@DEV-STATE␣dev_state<CR><LF>' | dev_state – device state<br>0 – Active<br>1 – Power-on and no connected AV I/O ports (detecting cable connection faults)<br>2 – Power-on and standby (low power; cables are either connected or not) | Get device status:<br>#DEV-STATE?␣<CR> |
| DISPLAY? | Get output HPD status. | COMMAND<br>#DISPLAY?␣out_index<CR><br>FEEDBACK<br>~nn@DISPLAY␣out_index,status<CR><LF> | out_index – Number that indicates the specific output:<br>1<br>status – HPD status according to signal validation<br>0 – Signal or sink is not valid<br>1 – Signal or sink is valid<br>2 – Sink and EDID is valid | Get the output HPD status of Output 1:<br>#DISPLAY?␣1<CR> |
| EDID-AUDIO | Set audio capabilities for EDID. | COMMAND<br>#EDID-AUDIO␣<direction_type>.<port_format>.<port_index>.<signal_type>.<index>,audio_format<CR><br>FEEDBACK<br>~nn@EDID-AUDIO␣<direction_type>.<port_format>.<port_index>.<signal_type>.<index>,audio_format<CR><LF> | The following attributes comprise the signal ID:<br>▪ <direction_type> – Direction of the port:<br>o IN – Input<br>o OUT – Output<br>▪ <port_format> – Type of signal on the port:<br>o HDMI<br>o ANALOG_AUDIO<br>o USB_C<br>▪ <port_index> – The port number as printed on the front or rear panel<br>▪ <signal_type> – Signal ID attribute:<br>o AUDIO<br>▪ <index> – Indicates a specific channel number when there are multiple channels of the same type<br>audio_format – Audio block added to EDID:<br>0 – Auto<br>1 – LPCM 2CH<br>2 – LPCM 6CH<br>3 – LPCM 8CH<br>4 – Bitstream<br>5 – HD | Set HDMI IN 2 audio capabilities for EDID (LPCM 6CH):<br>#EDID-AUDIO␣in.hdmi.2.audio.1,2<CR> |
| EDID-AUDIO? | Get audio capabilities for EDID. | COMMAND<br>#EDID-AUDIO?␣<direction_type>.<port_format>.<port_index>.<signal_type>.<index><CR><br>FEEDBACK<br>~nn@EDID-AUDIO␣audio_format<CR><LF> | The following attributes comprise the signal ID:<br>▪ <direction_type> – Direction of the port:<br>o IN – Input<br>o OUT – Output<br>▪ <port_format> – Type of signal on the port:<br>o HDMI<br>o ANALOG_AUDIO<br>o USB_C<br>▪ <port_index> – The port number as printed on the front or rear panel<br>▪ <signal_type> – Signal ID attribute:<br>o AUDIO<br>▪ <index> – Indicates a specific channel number when there are multiple channels of the same type<br>audio_format – Audio block added to EDID:<br>0 – Auto<br>1 – LPCM 2CH<br>2 – LPCM 6CH<br>3 – LPCM 8CH<br>4 – Bitstream<br>5 – HD | Get HDMI IN 2 audio capabilities for EDID:<br>#EDID-AUDIO?␣in.hdmi.2.audio.1,2<CR> |
| EDID-DC | Force removal of deep color on EDID or leaving it as in the original EDID. | COMMAND<br>#EDID-DC␣in_index,deep_color_state<CR><br>FEEDBACK<br>~nn@EDID-DC␣in_index,deep_color_state<CR><LF> | in_index – Number that indicates the specific input:<br>1 – Input 1<br>2 – Input 2<br>deep_color_state –<br>0 – Don't change<br>1 – Remove deep color | Remove deep color on EDID for input 1.<br>#EDID-DC␣1,1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| EDID-DC? | Get deep color status on EDID. | COMMAND<br>#EDID-DC?␣in_index <CR><br>FEEDBACK<br>~nn@EDID-DC␣in_index,deep_color_state<CR><LF> | in_index – Number that indicates the specific input:<br>1 – Input 1<br>2 – Input 2<br>deep_color_state –<br>0 – Don't change<br>1 – Remove deep color | Get deep color state on EDID for input 2.<br>#EDID-DC?␣2<CR> |
| ETH-PORT | Set Ethernet port protocol.<br>ⓘ If the port number you enter is already in use, an error is returned.<br>The port number must be within the following range: 0-(2^16-1). | COMMAND<br>#ETH-PORT␣port_type,port_id<CR><br>FEEDBACK<br>~nn@ETH-PORT␣port_type,port_id<CR><LF> | port_type – TCP/UDP<br>port_id – TCP/UDP port number (0 – 65535) | Set the Ethernet port protocol for TCP to 12457:<br>#ETH-PORT␣TCP,12457<CR> |
| ETH-PORT? | Get Ethernet port protocol.<br>ⓘ If the port number you enter is already in use, an error is returned.<br>The port number must be within the following range: 0-(2^16-1). | COMMAND<br>#ETH-PORT?␣port_type<CR><br>FEEDBACK<br>~nn@ETH-PORT␣port_type,port_id<CR><LF> | port_type – TCP/UDP<br>port_id – TCP/UDP port number (0 – 65535) | Get the Ethernet port protocol for UDP:<br>#ETH-PORT?␣UDP<CR> |
| ETH-TUNNEL? | Get an open tunnel parameters. | COMMAND<br>#ETH-TUNNEL?␣tunnel_id<CR><br>FEEDBACK<br>~nn@ETH-TUNNEL␣tunnel_id,cmd_name,port_type,port_id,eth_ip,remote_port_id,eth_rep_en,connection_type<CR><LF> | tunnel_id – Tunnel ID number, * (get all open tunnels)<br>cmd_name – UART number<br>port_type – TCP/UDP<br>0 – TCP<br>1 – UDP<br>port_id – TCP/UDP port number<br>eth_ip – Client IP address<br>remote_port_id – Remote port number<br>eth_rep_en – Ethernet Reply<br>0 – COM port does not send replies to new clients<br>1 – COM port sends replies to new clients<br>connection_type – Connection type<br>0 – not wired connection<br>1 – wired connection | Set baud rate to 9600, 8 data bits, parity to none and stop bit to 1:<br>#ETH-TUNNEL?␣*<CR> |
| FACTORY | Reset device to factory default configuration.<br>ⓘ This command deletes all user data from the device. The deletion can take some time.<br>Your device may require powering off and powering on for the changes to take effect. | COMMAND<br>#FACTORY<CR><br>FEEDBACK<br>~nn@FACTORY␣ok<CR><LF> | | Reset the device to factory default configuration:<br>#FACTORY<CR> |
| FW-TYPE? | Get the current FW type status.<br>Used by Kramer Network and KUpload to identify recovery process. | COMMAND<br>#FW-TYPE?␣<CR><br>FEEDBACK<br>~nn@FEATURE-LIST␣fw_type<CR><LF> | Fw_type –<br>0 – Application<br>1 – Safe mode (kboot) | Get the current FW type status:<br>#FW-TYPE?␣<CR> |
| GLOBAL-GW-ACTIVE | Set global gateway to active / inactive. | COMMAND<br>#GLOBAL-GW-ACTIVE␣status<CR><br>FEEDBACK<br>~nn@GLOBAL-GW-ACTIVE␣status<CR><LF> | status – On/Off<br>ON – Active<br>Off – Inactive | Set global gateway off:<br>#AUDIO-BYPASS␣OFF<CR> |
| GLOBAL-GW-ACTIVE? | Set global gateway to active / inactive. | COMMAND<br>#GLOBAL-GW-ACTIVE?<CR><br>FEEDBACK<br>~nn@GLOBAL-GW-ACTIVE␣status<CR><LF> | status – On/Off<br>ON – Active<br>Off – Inactive | Get global gateway off:<br>#AUDIO-BYPASS?<CR> |
| GPIO-CFG | Set HW GPIO configuration. | COMMAND<br>#GPIO-CFG␣gpio_id,gpio_type,gpio_dir,pullup<CR><br>FEEDBACK<br>~nn@GPIO-CFG␣gpio_id,gpio_type,gpio_dir<CR><LF> | gpio_id – Hardware GPIO number (1-2)<br>gpio_type – Hardware GPIO type<br>0 – analog<br>1 – digital<br>gpio_dir – Hardware GPIO direction<br>0 – input<br>1 – output<br>pullup – Enable/Disable pull-up<br>0 – disable<br>1 – enable | Set HW GPIO 1 configuration:<br>#GPIO-CFG␣1,1,1,1<CR> |
| GPIO-CFG? | Get HW GPIO configuration. | COMMAND<br>#GPIO-CFG?␣gpio_id<CR><br>FEEDBACK<br>~nn@GPIO-CFG␣gpio_id,gpio_type,gpio_dir<CR><LF> | gpio_id – Hardware GPIO number (1-2)<br>gpio_type – Hardware GPIO type<br>0 – analog<br>1 – digital<br>gpio_dir – Hardware GPIO direction<br>0 – input<br>1 – output<br>pullup – Enable/Disable pull-up<br>0 – disable<br>1 – enable | Get HW GPIO configuration:<br>#GPIO-CFG?␣1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **GPIO-STATE** | Set HW GPIO state.<br>ⓘ GPIO-STATE? can only be set in digital out mode and the answer is 0=Low, 1=High. In all other modes an error message is sent.<br>The device uses this command to notify the user of any change regarding the step and voltage in:<br>In digital mode the answer is 0 (low), 1 (high).<br>In analog mode the answer is 0 to 100. | **COMMAND**<br>#GPIO-STATE␣gpio_id,gpio_mode<CR><br>**FEEDBACK**<br>~nn@GPIO-STATE␣gpio_id,gpio_mode<CR><LF> | **gpio_id** – Hardware GPIO number (1-2)<br>**gpio_mode** – Hardware GPIO state<br>0 – Low<br>1 – High | Set GPIO 2 to High:<br>#GPIO-STATE␣2,1<CR> |
| **GPIO-STATE?** | Get HW GPIO state.<br>ⓘ GPIO-STATE? can only be set in digital out mode and the answer is 0=Low, 1=High. In all other modes an error message is sent.<br>The device uses this command to notify the user of any change regarding the step and voltage in:<br>In digital mode the answer is 0 (low), 1 (high).<br>In analog mode the answer is 0 to 100. | **COMMAND**<br>#GPIO-STATE?␣gpio_id<CR><br>**FEEDBACK**<br>~nn@GPIO-STATE␣gpio_id,gpio_mode<CR><LF> | **gpio_id** – Hardware GPIO number (1-2)<br>**gpio_mode** – Hardware GPIO state<br>0 – Low<br>1 – High | Get GPIO 2 state:<br>#GPIO-STATE?␣2<CR> |
| **GPIO-STEP** | Set HW GPIO step.<br>ⓘ In digital mode the response is 2.<br>In analog mode the response is 1 to 100.<br>In other modes an error is returned. | **COMMAND**<br>#GPIO-STEP␣gpio_id,step_id<CR><br>**FEEDBACK**<br>~nn@GPIO-STEP␣gpio_id,step_id,currentstep<CR><LF> | **gpio_id** – HW GPIO number (1-2)<br>**step_id** – The configuration step – See note in description.<br>**currentstep** – The actual step depending on the measured voltage | Set GPIO 2 (set to Analog In) configuration step to 38mV:<br>#GPIO-STEP␣2,38<CR> |
| **GPIO-STEP?** | Get HW GPIO step.<br>ⓘ In digital mode the response is 2.<br>In analog mode the response is 1 to 100.<br>In other modes an error is returned. | **COMMAND**<br>#GPIO-STEP?␣gpio_id<CR><br>**FEEDBACK**<br>~nn@GPIO-STEP␣gpio_id,step_id,currentstep<CR><LF> | **gpio_id** – HW GPIO number (1-2)<br>**step_id** – The configuration step – See note in description.<br>**currentstep** – The actual step depending on the measured voltage | Get GPIO 2configuration:<br>#GPIO-STEP?␣2<CR> |
| **GPIO-THR** | Set HW GPIO voltage levels. | **COMMAND**<br>#GPIO-THR␣gpio_id,low_level,high_level<CR><br>**FEEDBACK**<br>~nn@GPIO-THR␣gpio_id,low_level,high_level<CR><LF> | **gpio_id** – Hardware GPIO number (1-2)<br>**low_level** – Voltage 500 to 28000 millivolts<br>**high_level** – Voltage 2000 to 30000 millivolts | Set GPIO 2 to a low level of 800mV and a high level of 2200mV:<br>#GPIO-THR␣2,800,2200<CR> |
| **GPIO-THR?** | Get HW GPIO voltage levels that were set. | **COMMAND**<br>#GPIO-THR?␣gpio_id<CR><br>**FEEDBACK**<br>~nn@GPIO-THR␣gpio_id,low_level,high_level<CR><LF> | **gpio_id** – Hardware GPIO number (1-2)<br>**low_level** – Voltage 500 to 28000 millivolts<br>**high_level** – Voltage 2000 to 30000 millivolts | Get GPIO 2:<br>#GPIO-THR?␣2<CR> |
| **GPIO-VOLT?** | Get active voltage levels of HW GPIO.<br>ⓘ This command is not available in digital out mode. | **COMMAND**<br>GPIO-VOLT?␣gpio_id<CR><br>**FEEDBACK**<br>~nn@GPIO-VOLT␣gpio_id,voltage<CR><LF> | **gpio_id** – Hardware GPIO number (1-2)<br>**voltage** – Voltage 0 to 30000 millivolts | Get GPIO 1 voltage:<br>#GPIO-VOLT?␣1<CR> |
| **HDCP-MOD** | Set HDCP mode.<br>ⓘ Get HDCP working mode on the device input:<br>HDCP supported – HDCP ON [default].<br>HDCP not supported - HDCP OFF.<br>HDCP support changes following detected sink - MIRROR OUTPUT. | **COMMAND**<br>#HDCP-MOD␣in_index,mode<CR><br>**FEEDBACK**<br>~nn@HDCP-MOD␣in_index,mode<CR><LF> | **in_index** – Number that indicates the specific input:<br>1 – USB-C IN<br>2 – HDMI IN<br>**mode** – HDCP mode:<br>0 – HDCP Off<br>1 – HDCP On<br>2 – Follow Input<br>3 – HDCP defined according to the connected output | Set the input HDCP-MODE of HDMI IN to off:<br>#HDCP-MOD␣2,0<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **HDCP-MOD?** | Get HDCP mode.<br>ⓘ Get HDCP working mode on the device input:<br>HDCP supported – HDCP ON [default].<br>HDCP not supported - HDCP OFF.<br>HDCP support changes following detected sink - MIRROR OUTPUT. | **COMMAND**<br>**#HDCP-MOD?**␣in_index**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-MOD**␣in_index,mode**<CR><LF>** | **in_index** – Number that indicates the specific input:<br>1 – USB-C IN<br>2 – HDMI IN<br>**mode** – HDCP mode:<br>0 – HDCP Off<br>1 – HDCP On<br>2 – Follow Input<br>3 – HDCP defined according to the connected output | Get the input HDCP-MODE of HDMI IN :<br>**#HDCP-MOD?**␣2**<CR>** |
| **HDCP-OUT** | Set output port HDCP mode.<br>HDCP supported – HDCP ON [default].<br>HDCP not supported - HDCP OFF.<br>HDCP support changes following detected sink - MIRROR OUTPUT. | **COMMAND**<br>**#HDCP-OUT**␣port number,mode**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-OUT**␣port number,mode**<CR><LF>** | **Port number** – output port number:<br>1 – N<br>**mode** – HDCP mode:<br>0 – Follow Input<br>1 – Follow Output | Set the output port 1 HDCP follow output:<br>**#HDCP-OUT**␣1,1**<CR>** |
| **HDCP-OUT?** | Get output HDCP mode.<br>ⓘ Get HDCP working mode on the device input:<br>HDCP supported – HDCP ON [default].<br>HDCP not supported - HDCP OFF.<br>HDCP support changes following detected sink - MIRROR OUTPUT. | **COMMAND**<br>**#HDCP-OUT?**␣port number,mode**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-OUT**␣port number**<CR><LF>** | **Port number** – output port number:<br>1 – N | Get HDCP mode for output port 1:<br>**#HDCP-OUT?**␣1**<CR>** |
| **HDCP-STAT?** | Get HDCP signal status of a connected device.<br>ⓘ io_mode =1 – get the HDCP signal status of the sink device connected to the specified output.<br>io_mode =0 – get the HDCP signal status of the source device connected to the specified input. | **COMMAND**<br>**#HDCP-STAT?**␣io_mode,in_index**<CR>**<br>**FEEDBACK**<br>**~nn@HDCP-STAT**␣io_mode,in_index,status**<CR><LF>** | **io_mode** – Input/Output<br>0 – Input<br>1 – Output<br>**io_index** – Number that indicates the specific number of inputs or outputs (based on io_mode):<br>1 – HDBaseT OUT or USB-C IN<br>2 – HDMI IN<br>**status** – Signal encryption status - valid values On/Off:<br>0 – HDCP Off<br>1 – HDCP On | Get the HDCP status of the source device connected to USB-C IN:<br>**#HDCP-STAT?**␣0,1**<CR>** |
| **HELP** | Get command list or help for specific command. | **COMMAND**<br>**#HELP<CR>**<br>**#HELP**␣cmd_name**<CR>**<br>**FEEDBACK**<br>1. Multi-line:<br>**~nn@Device**␣cmd_name,␣cmd_name…**<CR><LF>**<br>To get help for command use: HELP (COMMAND_NAME)<CR><LF><br>**~nn@HELP**␣cmd_name:**<CR><LF>**<br>**description<CR><LF>**<br>**USAGE:usage<CR><LF>** | **cmd_name** – Name of a specific command | Get the command list:<br>**#HELP<CR>**<br>To get help for AV-SW-TIMEOUT:<br>HELP␣**av-sw-timeout**<CR> |
| **IDV** | Set visual indication from device.<br>ⓘ Using this command, some devices can light a sequence of buttons or LEDs to allow identification of a specific device from similar devices. | **COMMAND**<br>**#IDV<CR>**<br>**FEEDBACK**<br>**~nn@IDV**␣ok**<CR><LF>** | | **#IDV<CR>** |
| **IR-MOD** | Set the IR modulation | **COMMAND**<br>**#IR-MOD?**␣port modulation**<CR>**<br>**FEEDBACK**<br>**~nn@IR-MOD**␣**<CR><LF>** | **Port** – port number<br>1<br>**Modulation** –<br>0 – no modulation<br>1 – 38K | Set IR modulation to 38k:<br>#IR-MOD␣**1,1**<CR> |
| **IR-MOD?** | Get the IR modulation | **COMMAND**<br>**#IR-MOD**␣port**<CR>**<br>**FEEDBACK**<br>**~nn@IR-MOD**␣**<CR><LF>** | **Port** – port number<br>1<br>**Modulation** –<br>0 – no modulation<br>1 – 38K | Get the IR modulation:<br>#IR-MOD?␣1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **IR-SND** | Send IR command to port. | **COMMAND**<br>**#IR-SND**␣ir_index,sn_id,cmd_name,repeat_amount,total_packages,package_id,<pronto command…>**<CR>**<br>**FEEDBACK**<br>**~nn@IR-SND**␣ir_index,sn_id,cmd_name,ir_status**<CR><LF>** | **ir_index** – Number that indicates the specific ir port:<br>1-N (N= the total number of inputs)<br>* - broadcasts to all ports<br>**sn_id** – Serial number of command for flow control and response commands from device<br>**cmd_name** – Command name (length limit 15 chars)<br>**repeat_amount** – Of times the IR command is transmitted (limited to 50; repeats > 50 are truncated to 50), default = 1<br>**total_packages** – Number of messages the original command was divided into, default = 1<br>**package_id** – Chunk serial number (only valid when *Total_packages* >1)<br>**pronto_command** – Pronto format command (in HEX format, no leading zeros, no '0x' prefix)<br>**ir_status** – IR Status<br>0 – Sent (no error)<br>1 – Stop<br>2 – Done<br>3 – Busy<br>4 – Wrong Parameter<br>5 – Nothing to Stop<br>6 – Start<br>7 – Timeout<br>8 – Error | Send IR command to port:<br>**#IR-SND**␣1,1,1,1,1,1**<CR>** |
| **IR-STOP** | Send IR stop command to port. | **COMMAND**<br>**#IR-STOP**␣ir_index,sn_id,cmd_name**<CR>**<br>**FEEDBACK**<br>**~nn@IR-STOP**␣ir_index,sn_id,cmd_name,ir_status**<CR><LF>** | **ir_index** – Number that indicates the specific ir port:<br>1-N (N= the total number of inputs)<br>* - broadcasts to all ports<br>**sn_id** – Serial number of command for flow control and response commands from device<br>**cmd_name** – String: IR command name limited to 15 chars. Controlling device must send the correct name (white space or commas forbidden)<br>**ir_status** – IR Status<br>0 – Sent (no error)<br>1 – Stop<br>2 – Done<br>3 – Busy<br>4 – Wrong Parameter<br>5 – Nothing to Stop<br>6 – Start<br>7 – Timeout<br>8 – Error | Send IR stop command to IR Port 2:<br>**#IR-STOP**␣**2,1,power<CR>** |
| **LABEL** | Set input/output label | **COMMAND**<br>**#LABEL**␣io_mode,io_index,switch,label_txt**<CR>**<br>**FEEDBACK**<br>**~nn@LABEL**␣io_mode,io_index,switch,label_txt**<CR><LF>** | **io_ mode** – Number that indicates the specific input:<br>0 – Input<br>1 – Output<br>**io_index** – Number that indicates the specific input:<br>**For inputs –**<br>1 – USB-C IN 1<br>2 – HDMI IN 2<br>**For output**<br>1 – HDMI output<br>**switch** – 0<br>**label_txt** – Custom label string between 1 and 32 (at least one character and not bigger than 32). | Set the HDMI input label on:<br>**#LABEL**␣0,2,0,hdmi**<CR>** |
| **LABEL?** | Get input/output label | **COMMAND**<br>**#LABEL?**␣io_mode,io_index,switch,label_txt**<CR>**<br>**FEEDBACK**<br>**~nn@LABEL**␣io_mode,io_index,switch,label_txt**<CR><LF>** | **io_mode** – Number that indicates the specific input:<br>0 – Input<br>1 – Output<br>**io_index** – Number that indicates the specific input:<br>**For inputs –**<br>1 – USB-C IN 1<br>2 – HDMI IN 2<br>**For output**<br>1 – HDMI output<br>**switch** – 0<br>**label_txt** – Custom label string between 1 and 32 (at least one character and not bigger than 32).<br>label string | Get the HDMI input label:<br>**#LABEL?**␣0,2,0,hdmi**<CR>** |
| **LOCK-EDID** | Lock last read EDID. | **COMMAND**<br>**#LOCK-EDID**␣in_index,lock_mode**<CR>**<br>**FEEDBACK**<br>**~nn@LOCK-EDID**␣in_index,lock_mode**<CR><LF>** | **in_index** – Number that indicates the specific input:<br>1 – USB-C IN<br>2 – HDMI IN<br>**lock_mode** – On/Off<br>0 – Off unlocks EDID<br>1 – On locks EDID | Lock the last read EDID from input 2:<br>**#LOCK-EDID**␣2,1**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| LOCK-EDID? | Get EDID Lock status. | COMMAND<br>#LOCK-EDID? in_index <CR><br>FEEDBACK<br>~nn@LOCK-EDID in_index,lock_mode<CR><LF> | in_index – Number that indicates the specific input:<br>1 – USB-C IN<br>2 – HDMI IN<br>lock_mode – On/Off<br>0 – Off unlocks EDID<br>1 – On locks EDID | Get input 2 Lock EDID status:<br>#LOCK-EDID? 2<CR> |
| LOG-TAIL? | Get the list of the N last events. | COMMAND<br>#LOG-TAIL? last_event<CR><br>FEEDBACK<br>~nn@LOG-TAIL last_event,ok,<list><CR><LF> | last_event – the number of last events to view <N = 1,2,3…> | Get the protocol permission level to Admin:<br>#LOG-TAIL? 8<CR> |
| LOGIN | Set protocol permission.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command.<br>LOGIN allows the user to run commands with an End User or Administrator permission level.<br>When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level<br>When set, login must be performed upon each connection<br>It is not mandatory to enable the permission system in order to use the device<br>In each device, some connections allow logging in to different levels. Some do not work with security at all.<br>Connection may logout after timeout. | COMMAND<br>#LOGIN login_level,password<CR><br>FEEDBACK<br>~nn@LOGIN login_level,password ok<CR><LF><br>or<br>~nn@LOGIN err 004<CR><LF><br>(if bad password entered) | login_level – Level of permissions required (User or Admin)<br>password – Predefined password (by PASS command). Default password is an empty string | Set the protocol permission level to Admin (when the password defined in the PASS command is 33333):<br>#LOGIN admin,33333<CR> |
| LOGIN? | Get protocol permission state.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command.<br>LOGIN allows the user to run commands with an End User or Administrator permission level.<br>When the permission system is enabled, LOGIN enables running commands with the User or Administrator permission level<br>When set, login must be performed upon each connection<br>It is not mandatory to enable the permission system in order to use the device<br>In each device, some connections allow logging in to different levels. Some do not work with security at all.<br>Connection may logout after timeout. | COMMAND<br>#LOGIN login_level <CR><br>FEEDBACK<br>~nn@LOGIN login_level,password ok<CR><LF><br>or<br>~nn@LOGIN err 004<CR><LF><br>(if bad password entered) | login_level – Level of permissions required (User or Admin)<br>password – Predefined password (by PASS command). Default password is an empty string<br>or NO SECURE if authentication is removed. | Get the protocol permission level to Admin:<br>#LOGIN? admin<CR> |
| LOGOUT | Cancel current permission level.<br>ⓘ Logs out from End User or Administrator permission levels to Not Secure. | COMMAND<br>#LOGOUT<CR><br>FEEDBACK<br>~nn@LOGOUT ok<CR><LF> | | #LOGOUT<CR> |
| MODEL? | Get device model. | COMMAND<br>#MODEL? <CR><br>FEEDBACK<br>~nn@MODEL model_name<CR><LF> | model_name – String of up to 19 printable ASCII chars | Get the device model:<br>#MODEL? <CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **NAME** | Set machine (DNS) name.<br>ⓘ The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on). | **COMMAND**<br>**#NAME** machine_name<CR><br>**FEEDBACK**<br>~nn@NAME machine_name<CR><LF> | **machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end) | Set the DNS name of the device to room-442:<br>**#NAME** room-442<CR> |
| **NAME?** | Get machine (DNS) name.<br>ⓘ The machine name is not the same as the model name. The machine name is used to identify a specific machine or a network in use (with DNS feature on). | **COMMAND**<br>**#NAME?** <CR><br>**FEEDBACK**<br>~nn@NAME machine_name<CR><LF> | **machine_name** – String of up to 15 alpha-numeric chars (can include hyphen, not at the beginning or end) | Get the DNS name of the device:<br>**#NAME?** <CR> |
| **NAME-RST** | Reset machine (DNS) name to factory default.<br>ⓘ Factory default of machine (DNS) name is "KRAMER_" + 4 last digits of device serial number. | **COMMAND**<br>**#NAME-RST**<CR><br>**FEEDBACK**<br>~nn@NAME-RST ok<CR><LF> | | Reset the machine name (S/N last digits are 0102):<br>**#NAME-RST** kramer_0102<CR> |
| **NET-CONFIG** | Set a network configuration.<br>ⓘ Parameters **[DNS1]** and **[DNS2]** are optional.<br>ⓘ For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.<br>ⓘ If the gateway address is not compliant to the subnet mask used for the host IP, the command will return an error. Subnet and gateway compliancy specified by RFC950. | **COMMAND**<br>**#NET-CONFIG** netw_id,net_ip,net_mask,gateway,[dns1],[dns2]<CR><br>**FEEDBACK**<br>~nn@NET-CONFIG netw_id,net_ip,net_mask,gateway<CR><LF> | **netw_id** – 0<br>**net_ip** – Network IP<br>**net_mask** – Network mask<br>**gateway** – Network gateway | Set the device network parameters to IP address 192.168.113.10, net mask 255.255.0.0, and gateway 192.168.0.1:<br>**#NET-CONFIG** 0,192.168.113.10,255.255.0.0,192.168.0.1<CR> |
| **NET-CONFIG?** | Get a network configuration.<br>ⓘ Parameters **[DNS1]** and **[DNS2]** are optional.<br>ⓘ For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port.<br>ⓘ If the gateway address is not compliant to the subnet mask used for the host IP, the command will return an error. Subnet and gateway compliancy specified by RFC950. | **COMMAND**<br>**#NET-CONFIG** netw_id,net_ip,net_mask,gateway,[dns1],[dns2]<CR><br>**FEEDBACK**<br>~nn@NET-CONFIG netw_id,net_ip,net_mask,gateway<CR><LF> | **netw_id** – 0<br>**net_ip** – Network IP<br>**net_mask** – Network mask<br>**gateway** – Network gateway | Get the device network parameters:<br>**#NET-CONFIG?** 0<CR> |
| **NET-DHCP?** | Get DHCP mode.<br>ⓘ For Backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port. | **COMMAND**<br>**#NET-DHCP?** netw_id<CR><br>**FEEDBACK**<br>~nn@NET-DHCP netw_id,dhcp_state<CR><LF> | **netw_id** – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….<br>**dhcp_state** –<br>0 – Do not use DHCP. Use the IP set by the factory or using the **net-ip** or **net-config** command.<br>1 – Try to use DHCP. If unavailable, use the IP set by the factory or using the **net-ip** or **net-config** command. | Get DHCP mode for port 1:<br>**#NET-DHCP?** 1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **NET-GATE** | Set gateway IP.<br>ⓘ A network gateway connects the device via another network and maybe over the Internet. Be careful of security issues. For proper settings consult your network administrator. | **COMMAND**<br>**#NET-GATE** ip_address **<CR>**<br>**FEEDBACK**<br>**~nn@NET-GATE** ip_address **<CR><LF>** | **ip_address** – Format: xxx.xxx.xxx.xxx | Set the gateway IP address to 192.168.0.1:<br>**#NET-GATE** 192.168.000.001 **<CR>** |
| **NET-GATE?** | Get gateway IP.<br>ⓘ A network gateway connects the device via another network and maybe over the Internet. Be aware of security problems. | **COMMAND**<br>**#NET-GATE?** **<CR>**<br>**FEEDBACK**<br>**~nn@NET-GATE** ip_address **<CR><LF>** | **ip_address** – Format: xxx.xxx.xxx.xxx | Get the gateway IP address:<br>#NET-GATE? <CR> |
| **NET-IP** | Set IP address.<br>ⓘ For proper settings consult your network administrator. | **COMMAND**<br>**#NET-IP** ip_address **<CR>**<br>**FEEDBACK**<br>**~nn@NET-IP** ip_address **<CR><LF>** | **ip_address** – Format: xxx.xxx.xxx.xxx | Set the IP address to 192.168.1.39:<br>**#NET-IP** 192.168.001.039 **<CR>** |
| **NET-IP?** | Get IP address. | **COMMAND**<br>**#NET-IP?** **<CR>**<br>**FEEDBACK**<br>**~nn@NET-IP** ip_address **<CR><LF>** | **ip_address** – Format: xxx.xxx.xxx.xxx | Get the IP address:<br>#NET-IP? <CR> |
| **NET-MAC?** | Get MAC address.<br>ⓘ For backward compatibility, the **id** parameter can be omitted. In this case, the Network ID, by default, is 0, which is the Ethernet control port. | **COMMAND**<br>**#NET-MAC?** id **<CR>**<br>**FEEDBACK**<br>**~nn@NET-MAC** id,mac_address **<CR><LF>** | **id** – Network ID–the device network interface (if there are more than one). Counting is 0 based, meaning the control port is '0', additional ports are 1,2,3….<br>**mac_address** – Unique MAC address. Format: XX-XX-XX-XX-XX-XX where X is hex digit | **#NET-MAC?** id **<CR>** |
| **NET-MASK** | Set subnet mask.<br>ⓘ For proper settings consult your network administrator. | **COMMAND**<br>**#NET-MASK** net_mask **<CR>**<br>**FEEDBACK**<br>**~nn@NET-MASK** net_mask **<CR><LF>** | **net_mask** – Format: xxx.xxx.xxx.xxx | Set the subnet mask to 255.255.0.0:<br>**#NET-MASK** 255.255.000.000 **<CR>** |
| **NET-MASK?** | Get subnet mask. | **COMMAND**<br>**#NET-MASK?** **<CR>**<br>**FEEDBACK**<br>**~nn@NET-MASK** net_mask **<CR><LF>** | **net_mask** – Format: xxx.xxx.xxx.xxx | Get the subnet mask:<br>#NET-MASK?<CR> |
| **PASS** | Set password for login level.<br>ⓘ The default password is an empty string. | **COMMAND**<br>**#PASS** login_level,password **<CR>**<br>**FEEDBACK**<br>**~nn@PASS** login_level,password **<CR><LF>** | **login_level** – Level of login to set (End User or Administrator).<br>**password** – Password for the *login_level*. Up to 15 printable ASCII chars | Set the password for the Admin protocol permission level to 33333:<br>**#PASS** admin,33333 **<CR>** |
| **PASS?** | Get password for login level.<br>ⓘ The default password is an empty string. | **COMMAND**<br>**#PASS** login_level **<CR>**<br>**FEEDBACK**<br>**~nn@PASS** login_level,password **<CR><LF>** | **login_level** – Level of login to set (End User or Administrator).<br>**password** – Password for the *login_level*. Up to 15 printable ASCII chars | Get the password for the Admin protocol permission:<br>#PASS? **admin**<CR> |
| **PORTS-LIST?** | Get the port list of this machine.<br>ⓘ The response is returned in one line and terminated with<CR><LF>.<br>The response format lists port IDs separated by commas.<br>This is an Extended Protocol 3000 command. | **COMMAND**<br>**#PORTS-LIST?** **<CR>**<br>**FEEDBACK**<br>**~nn@PORTS-LIST** [<direction_type>.<port_format>.<port_index>,..,] **<CR><LF>** | The following attributes comprise the port ID:<br>▪ **<direction_type>** – Direction of the port:<br>○ IN<br>○ OUT<br>▪ **<port_format>** – Type of signal on the port:<br>○ HDMI<br>○ USB_C<br>▪ **<port_index>** – The port number as printed on the front or rear panel | Get the ports list:<br>**#PORTS-LIST?** **<CR>** |
| **PRG-ACTION** | Add new user command.<br>ⓘ Programs matrix action as a response for external event (programmable button pressed). | **COMMAND**<br>**#PRG-ACTION** commandNum,type,name,command **<CR>**<br>**FEEDBACK**<br>**~nn@PRG-ACTION** commandNum,type,name,command **<CR><LF>** | **commandNum** – Command number 0 to 4<br>**type** – External programmable button<br>0 – CEC<br>1 – UART<br>2 – IR<br>**name** – Bitmap representing<br>**command** – External programmable button ID | Add a new user command:<br>**#PRG-ACTION** 1,3,1,0 **<CR>** |
| **PRG-ACTION?** | Add new user command.<br>ⓘ Programs matrix action as a response for external event (programmable button pressed). | **COMMAND**<br>**#PRG-ACTION?** commandNum **<CR>**<br>**FEEDBACK**<br>**~nn@PRG-ACTION** commandNum,type,name,command **<CR><LF>** | **commandNum** – Command number<br>0 – Input<br>1 – Output<br>**type** – External programmable button ID<br>**name** – Bitmap representing<br>**command** – External programmable button ID | Add a new user command:<br>**#PRG-ACTION?** 0,3,1,0 **<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **PRG-BTN-ACTION** | Set device's programable button, link to commands On &Off, and set command to momentary or not momentary. | **COMMAND**<br>**#PROG-BTN-MOD**␣btnNum,mode,actionOn,actionOff,btnBehavior**<CR>**<br>**FEEDBACK**<br>**~nn@PROG-BTN-MOD**␣btnNum,mode,actionOn,actionOff,btnBehavior**<CR><LF>** | **btnNum** – Button number 0 to 4<br>1 and 2 are enabled when remote button is (**mode**) On<br>1 – IO 1 button<br>2 – IO 2 button<br>3 – Display On button<br>**mode** – Remote button state<br>0 – Off<br>1 – On<br>**actionOn** –<br>100 – None<br>101 – Switch Input<br>102 – Display On (via CEC)<br>103 – Display Off (via CEC)<br>104 – Mute<br>105 – Unmute<br>106 – Volume ++<br>107 – Volume - -<br>0 – Command_01<br>1 – Command_02<br>2 – Command_03<br>3 – Command_04<br>4 – Custom 5<br>**actionOff** – Button_mode<br>100 – None<br>101 – Switch Input<br>102 – Display On (via CEC)<br>103 – Display Off (via CEC)<br>104 – Mute<br>105 – Unmute<br>106 – Volume ++<br>107 – Volume - -<br>0 – Command_01<br>1 – Command_02<br>2 – Command_03<br>3 – Command_04<br>4 – Custom 5<br>**btnBehavior** – Button_mode<br>0 – Momentary mode disabled<br>1 – Momentary mode enabled | Set the DISPLAY ON button to mute/unmute with the press of a button:<br>**#PROG-BTN-MOD**␣3,1,104,105,0**<CR>** |
| **PROG-BTN-MOD?** | Get device's programable button, link to commands On &Off, and set command to momentary or not momentary. | **COMMAND**<br>**#PROG-BTN-MOD?<CR>**<br>**FEEDBACK**<br>**~nn@PROG-BTN-MOD**␣button_mode**<CR><LF>** | **btnNum** – Button number 0 to 4<br>1 and 2 are enabled when remote button is (**mode**) On<br>1 – IO 1 button<br>2 – IO 2 button<br>3 – Display On button<br>**mode** – Remote button state<br>0 – Off<br>1 – On<br>**actionOn** –<br>100 – None<br>101 – Switch Input<br>102 – Display On (via CEC)<br>103 – Display Off (via CEC)<br>104 – Mute<br>105 – Unmute<br>106 – Volume ++<br>107 – Volume - -<br>0 – Command_01<br>1 – Command_02<br>2 – Command_03<br>3 – Command_04<br>4 – Custom 5<br>**actionOff** – Button_mode<br>100 – None<br>101 – Switch Input<br>102 – Display On (via CEC)<br>103 – Display Off (via CEC)<br>104 – Mute<br>105 – Unmute<br>106 – Volume ++<br>107 – Volume - -<br>0 – Command_01<br>1 – Command_02<br>2 – Command_03<br>3 – Command_04<br>4 – Custom 5<br>**btnBehavior** – Button_mode<br>0 – Momentary mode disabled<br>1 – Momentary mode enabled | Get the mode of button 3:<br>**#PROG-BTN-MOD?**␣3**<CR>** |
| **PRIORITY** | Set input priority. | **COMMAND**<br>**#PRIORITY**␣layer_type,priority_1,priority_2,priority_3**<CR>**<br>**FEEDBACK**<br>**~nn@PRIORITY**␣layer_type,priority_1,priority_2,priority_3**<CR><LF>** | **layer_type** – Layer Enumeration<br>1 – Video<br>**priority** – Priority of inputs (1-2)<br>1 – USB-C 1<br>2 – HDMI 2 | Set the priority to first HDMI 2, USB-C 1 secondrd:<br>**#PRIORITY**␣1,2,1**<CR>** |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| PRIORITY? | Set input priority. | COMMAND<br>#PRIORITY?␣layer_type<CR><br>FEEDBACK<br>~nn@PRIORITY␣layer_type,priority_1,priority_2,priority_3<CR><LF> | layer_type – Layer Enumeration<br>1 – Video<br>priority – Priority of inputs (1-2)<br>1 – USB-C 1<br>2 – HDMI 2 | Get the input priority:<br>#PRIORITY?␣1<CR> |
| PROT-VER? | Get device protocol version. | COMMAND<br>#PROT-VER?␣<CR><br>FEEDBACK<br>~nn@PROT-VER␣3000:version<CR><LF> | version – XX.XX where X is a decimal digit | Get the device protocol version:<br>#PROT-VER?␣<CR> |
| RESET | Reset device.<br>ⓘ To avoid locking the port due to a USB bug in Windows, disconnect USB connections immediately after running this command. If the port was locked, disconnect, and reconnect the cable to reopen the port. | COMMAND<br>#RESET<CR><br>FEEDBACK<br>~nn@RESET␣ok<CR><LF> | | Reset the device:<br>#RESET<CR> |
| ROUTE | Set layer routing.<br>ⓘ This command replaces all other routing commands. | COMMAND<br>#ROUTE␣layer_type,out_index,in_index<CR><br>FEEDBACK<br>~nn@ROUTE␣layer_type,out_index,in_index<CR><LF> | layer_type Layer Enumeration<br>1 – Video<br>5 – USB<br>out_index<br>1 – Output<br>in_index –<br>Source id for Video:<br>1 – USB-C 1<br>2 – HDMI IN 2 | Route video input 2 to the output:<br>#ROUTE␣1,1,2<CR> |
| ROUTE? | Get layer routing state.<br>ⓘ This command replaces all other routing commands. | COMMAND<br>#ROUTE?␣layer_type,out_index<CR><br>FEEDBACK<br>~nn@ROUTE␣layer_type,out_index,in_index <CR><LF> | layer_type Layer Enumeration<br>1 – Video<br>5 – USB<br>out_index<br>1 – Output<br>in_index –<br>Source id for Video:<br>1 – USB-C 1<br>2 – HDMI IN 2 | Get video routing output:<br>#ROUTE?␣1,1<CR> |
| SECUR | Start/stop security.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command. | COMMAND<br>#SECUR␣security_state<CR><br>FEEDBACK<br>~nn@SECUR␣security_state<CR><LF> | security_state – Security state<br>0 – OFF (disables security)<br>1 – ON (enables security) | Enable the permission system:<br>#SECUR␣1<CR> |
| SECUR? | Get security state.<br>ⓘ The permission system works only if security is enabled with the "SECUR" command. | COMMAND<br>#SECUR?␣security_state<CR><br>FEEDBACK<br>~nn@SECUR␣security_state<CR><LF> | security_state – Security state<br>0 – OFF (disables security)<br>1 – ON (enables security) | Enable the permission system:<br>#SECUR?␣<CR> |
| SIGNAL? | Get input signal status. | COMMAND<br>#SIGNAL?␣in_index<CR><br>FEEDBACK<br>~nn@SIGNAL␣in_index,status<CR><LF> | in_index – Number that indicates the specific input:<br>1 – USB-C IN 1<br>2 – HDMI IN 2<br>hdmistatus – Signal status according to signal validation:<br>0 – Off<br>1 – On | Get the input signal lock status of IN 1:<br>#SIGNAL?␣1<CR> |
| SN? | Get device serial number. | COMMAND<br>#SN?␣<CR><br>FEEDBACK<br>~nn@SN␣serial_num<CR><LF> | serial_num – 14 decimal digits, factory assigned | Get the device serial number:<br>#SN?␣<CR> |
| TIME | Set device time and date.<br>ⓘ The year must be 4 digits.<br>The device does not validate the day of week from the date.<br>Time format - 24 hours.<br>Date format - Day, Month, Year. | COMMAND<br>#TIME␣day_of_week,date,data<CR><br>FEEDBACK<br>~nn@TIME␣day_of_week,date,data<CR><LF> | day_of_week – One of {SUN,MON,TUE,WED,THU,FRI,SAT}<br>date – Format: DD-MM-YYYY.<br>data – Format: hh:mm:ss where<br>hh = hours<br>mm = minutes<br>ss = seconds | Set device time and date to December 5, 2020 at 2:30pm:<br>#TIME␣mon␣05-12-2020,14:30:00<CR> |
| TIME? | Get device time and date.<br>ⓘ The year must be 4 digits.<br>The device does not validate the day of week from the date.<br>Time format - 24 hours.<br>Date format - Day, Month, Year. | COMMAND<br>#TIME?␣<CR><br>FEEDBACK<br>~nn@TIME␣day_of_week,date,data<CR><LF> | day_of_week – One of {SUN,MON,TUE,WED,THU,FRI,SAT}<br>date – Format: YYYY/MM/DD where<br>YYYY = Year<br>MM = Month<br>DD = Day<br>data – Format: hh:mm:ss where<br>hh = hours<br>mm = minutes<br>ss = seconds | Get device time and date:<br>#TIME?<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| **TIME-LOC** | Set local time offset from UTC/GMT.<br>ⓘ If the time server is configured, device time calculates by adding UTC_off to UTC time (that it got from the time server) + 1 hour if daylight savings time is in effect.<br>TIME command sets the device time without considering these settings. | **COMMAND**<br>**#TIME-LOC** utc_off,dst_state<CR><br>**FEEDBACK**<br>**~nn@TIME-LOC** utc_off,dst_state<CR><LF> | **utc_off** – Offset of device time from UTC/GMT (without daylight time correction)<br>**dst_state** – Daylight saving time state<br>0 – no daylight saving time<br>1 – daylight saving time | Set local time offset to 3 with no daylight-saving time:<br>**#TIME-LOC** 3,0<CR> |
| **TIME-LOC?** | Get local time offset from UTC/GMT.<br>ⓘ If the time server is configured, device time calculates by adding UTC_off to UTC time (that it got from the time server) + 1 hour if daylight savings time is in effect.<br>TIME command sets the device time without considering these settings. | **COMMAND**<br>**#TIME-LOC?** <CR><br>**FEEDBACK**<br>**~nn@TIME-LOC** utc_off,dst_state<CR><LF> | **utc_off** – Offset of device time from UTC/GMT (without daylight time correction)<br>**dst_state** – Daylight saving time state<br>0 – no daylight saving time<br>1 – daylight saving time | Get local time offset from UTC/GMT:<br>**#TIME-LOC?**<CR> |
| **TIME-SRV** | Set time server.<br>ⓘ This command is needed for setting UDP timeout for the current client list. | **COMMAND**<br>**#TIME-SRV** mode,time_server_ip,sync_hour<CR><br>**FEEDBACK**<br>**~nn@TIME-SRV** mode,time_server_ip,sync_hour,server_status<CR><LF> | **mode** – On/Off<br>0 – Off<br>1 – On<br>**time_server_ip** – Time server IP address<br>**sync_hour** – Hour in day for time server sync<br>**server_status** – On/Off | Set time server with IP address of 128.138.140.44 to ON:<br>**#TIME-SRV** 1,128.138.140.44,0,1<CR> |
| **TIME-SRV?** | Get time server.<br>ⓘ This command is needed for setting UDP timeout for the current client list. | **COMMAND**<br>**#TIME-SRV?** <CR><br>**FEEDBACK**<br>**~nn@TIME-SRV** mode,time_server_ip,sync_hour,server_status<CR><LF> | **mode** – On/Off<br>0 – Off<br>1 – On<br>**time_server_ip** – Time server IP address<br>**sync_hour** – Hour in day for time server sync<br>**server_status** – On/Off | Get time server:<br>**#TIME-SRV?**<CR> |
| **TXRX-MODE** | Set tx/rx mode.<br>ⓘ This command will reset the device and restore factory defaults. | **COMMAND**<br>**#TXRX-MODE** hdbt_port_id,hdbt_mode<CR><br>**FEEDBACK**<br>**~nn@TXRX-MODE** hdbt_port_id,hdbt_mode<CR><LF> | **Hdbt_port_id:** HDBT port number<br>**hdbt_mode:** HDBT mode<br>0-Transmitter<br>1-Receiver | Set device in Transmitter mode<br>#TXRX-MODE 1,0<CR> |
| **UART** | Set com port configuration.<br>ⓘ In the FC-2x the serial port is selectable to RS-232 or RS-485 (usually serial port 1).<br>If Serial is configured when RS-485 is selected, the RS-485 UART port automatically changes.<br>The command is backward compatible, meaning that if the extra parameters do not exist, FW goes to.<br>RS-232.<br>Stop_bits 1.5 is only relevant for 5 data_bits. | **COMMAND**<br>**#UART** com_id,baud_rate,data_bits,parity,stop_bits_mode,serial_type,485_term<CR><br>**FEEDBACK**<br>**~nn@UART** com_id,baud_rate,data_bits,parity,stop_bits_mode,serial_type,485_term<CR><LF> | **com_id** – 1 to n (machine dependent)<br>**baud_rate** – 9600 - 115200<br>**data_bits** – 5-8<br>**parity** – Parity Type<br>0 – No<br>1 – Odd<br>2 – Even<br>3 – Mark<br>4 – Space<br>**stop_bits_mode** – 1/1.5/2<br>**serial_type** – 232/485<br>0 – 232<br>1 – 485<br>**485_term** – 485 termination state<br>0 – disable<br>1 – enable<br>(optional - this exists only when *serial_type* is 485) | Set baud rate to 9600, 8 data bits, parity to none and stop bit to 1:<br>**#UART 9600,8,node,1**<CR> |
| **UART?** | Get com port configuration.<br>The commad is backward compatible, meaning that if the extra parameters do not exist, FW goes to.<br>RS-232.<br>Stop_bits 1.5 is only relevant for 5 data_bits. | **COMMAND**<br>**#UART?** com_id<CR><br>**FEEDBACK**<br>**~nn@UART** com_id,baud_rate,data_bits,parity,stop_bits_mode,serial_type,485_term<CR><LF> | **com_id** – 1 to n (machine dependent)<br>**baud_rate** – 9600 - 115200<br>**data_bits** – 5-8<br>**parity** – Parity Type<br>0 – No<br>1 – Odd<br>2 – Even<br>3 – Mark<br>4 – Space<br>**stop_bits_mode** – 1/1.5/2<br>**serial_type** – 232/485<br>0 – 232<br>1 – 485<br>**485_term** – 485 termination state<br>0 – disable<br>1 – enable<br>(optional - this exists only when *serial_type* is 485) | Set baud rate to 9600, 8 data bits, parity to none and stop bit to 1:<br>**#UART** 1,9600,8,node,1<CR> |

| Function | Description | Syntax | Parameters/Attributes | Example |
|---|---|---|---|---|
| UART-SWITCH | | COMMAND<br>#UART-SWITCH␣<CR><br>FEEDBACK<br>~nn@UART-SWITCH<CR><LF> | | |
| UART-SWITCH? | | COMMAND<br>#UART-SWITCH?␣<CR><br>FEEDBACK<br>~nn@UART-SWITCH<CR><LF> | | |
| USBC-ETH | Set USBC to Ethernet connection. | COMMAND<br>#USBC-ETH␣state<CR><br>FEEDBACK<br>~nn@USBC-ETH␣state<CR><LF> | state – On/Off<br>0 – Off<br>1 – On | Set USBC to Ethernet connection state to ON:<br>#USBC-ETH␣1<CR> |
| USB-FV | Set USB autos-witching mode. | COMMAND<br>#USB-FV␣mode<CR><br>FEEDBACK<br>~nn@USB-FV␣mode<CR><LF> | mode – On/Off<br>0 – Off<br>1 – On | Set auto-switching mode to ON:<br>#USB-FV␣1<CR> |
| USB-FV? | Get USB auto-switching mode. | COMMAND<br>#USB-FV?␣mode<CR><br>FEEDBACK<br>~nn@USB-FV␣mode<CR><LF> | mode – On/Off<br>0 – Off<br>1 – On | Set auto-switching mode to ON:<br>#USB-FV␣1<CR> |
| USBA-DISCONNECT-MODE | Set USB device auto-disconnection mode.. | COMMAND<br>#USBA-DISCONNECT-MODE␣USBDevice,mode<CR><br>FEEDBACK<br>~nn@USBA-DISCONNECT-MODE␣mode<CR><LF> | USBDevice – USB device number<br>1 – USB Device 1<br>2 – USB Device 2<br>3 – USB Device 3<br>4 – USB Device 4<br>mode – On/Off<br>0 – Off<br>1 – On | Set USB Device 1 polycom mode to ON:<br>#USBA-DISCONNECT-MODE␣1,1<CR> |
| USBA-DISCONNECT-MODE? | Get USB device auto-disconnection mode.. | COMMAND<br>#USBA-DISCONNECT-MODE?␣USBDevice<CR><br>FEEDBACK<br>~nn@USBA-DISCONNECT-MODE␣mode<CR><LF> | USBDevice – USB device number<br>1 – USB Device 1<br>2 – USB Device 2<br>3 – USB Device 3<br>4 – USB Device 4<br>mode – On/Off<br>0 – Off<br>1 – On | Get USB Device 1 polycom mode:<br>#USBA-DISCONNECT-MODE?␣1<CR> |
| VERSION? | Get firmware version number. | COMMAND<br>#VERSION?␣<CR><br>FEEDBACK<br>~nn@VERSION␣firmware_version<CR><LF> | firmware_version – XX.XX.XXXX where the digit groups are: major.minor.build version | Get the device firmware version number:<br>#VERSION?␣<CR> |
| VMUTE | Set enable/disable video on output.<br>(i) Video mute parameter 2 (blank picture) is not supported. | COMMAND<br>#VMUTE␣out_index,flag<CR><br>FEEDBACK<br>~nn@VMUTE␣out_index,flag<CR><LF> | out_index – Number that indicates the specific output – 1<br>flag – Video Mute<br>0 – Video enabled<br>1 – Video disabled<br>2 – Blank picture | Disable the video output on output:<br>#VMUTE␣1,0<CR> |
| VMUTE? | Get video on output status.<br>(i) Video mute parameter 2 (blank picture) is not supported. | COMMAND<br>#VMUTE?␣out_index<CR><br>FEEDBACK<br>~nn@VMUTE␣out_index,flag<CR><LF> | out_index – Number that indicates the specific output – 1<br>flag – Video Mute<br>0 – Video enabled<br>1 – Video disabled<br>2 – Blank picture | Get video on output status:<br>#VMUTE?␣1<CR> |

# Result and Error Codes

## Syntax

In case of an error, the device responds with an error message. The error message syntax:

- **~NN@ERR XXX<CR><LF>** – when general error, no specific command
- **~NN@CMD ERR XXX<CR><LF>** – for specific command
- **NN** – machine number of device, default = 01
- **XXX** – error code

## Error Codes

| Error Name | Error Code | Description |
|---|---|---|
| P3K_NO_ERROR | 0 | No error |
| ERR_PROTOCOL_SYNTAX | 1 | Protocol syntax |
| ERR_COMMAND_NOT_AVAILABLE | 2 | Command not available |
| ERR_PARAMETER_OUT_OF_RANGE | 3 | Parameter out of range |
| ERR_UNAUTHORIZED_ACCESS | 4 | Unauthorized access |
| ERR_INTERNAL_FW_ERROR | 5 | Internal FW error |
| ERR_BUSY | 6 | Protocol busy |
| ERR_WRONG_CRC | 7 | Wrong CRC |
| ERR_TIMEDOUT | 8 | Timeout |
| ERR_RESERVED | 9 | (Reserved) |
| ERR_FW_NOT_ENOUGH_SPACE | 10 | Not enough space for data (firmware, FPGA…) |
| ERR_FS_NOT_ENOUGH_SPACE | 11 | Not enough space – file system |
| ERR_FS_FILE_NOT_EXISTS | 12 | File does not exist |
| ERR_FS_FILE_CANT_CREATED | 13 | File can’t be created |
| ERR_FS_FILE_CANT_OPEN | 14 | File can’t open |
| ERR_FEATURE_NOT_SUPPORTED | 15 | Feature is not supported |
| ERR_RESERVED_2 | 16 | (Reserved) |
| ERR_RESERVED_3 | 17 | (Reserved) |
| ERR_RESERVED_4 | 18 | (Reserved) |
| ERR_RESERVED_5 | 19 | (Reserved) |
| ERR_RESERVED_6 | 20 | (Reserved) |
| ERR_PACKET_CRC | 21 | Packet CRC error |
| ERR_PACKET_MISSED | 22 | Packet number isn't expected (missing packet) |
| ERR_PACKET_SIZE | 23 | Packet size is wrong |
| ERR_RESERVED_7 | 24 | (Reserved) |
| ERR_RESERVED_8 | 25 | (Reserved) |
| ERR_RESERVED_9 | 26 | (Reserved) |
| ERR_RESERVED_10 | 27 | (Reserved) |
| ERR_RESERVED_11 | 28 | (Reserved) |
| ERR_RESERVED_12 | 29 | (Reserved) |
| ERR_EDID_CORRUPTED | 30 | EDID corrupted |
| ERR_NON_LISTED | 31 | Device specific errors |
| ERR_SAME_CRC | 32 | File has the same CRC – not changed |
| ERR_WRONG_MODE | 33 | Wrong operation mode |
| ERR_NOT_CONFIGURED | 34 | Device/chip was not initialized |

P/N: 2900-301873 Rev: 1

SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

For the latest information on our products and a list of Kramer distributors, visit our website where updates to this user manual may be found.

We welcome your questions, comments, and feedback.



www.kramerav.com
info@kramerav.com