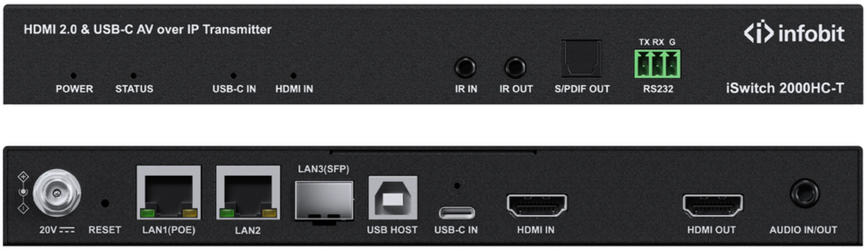
iSwitch 2000HC-T

4K HDMI and USB-C AV over IP TX/Encoder

Hardware User Manual V1.0



CONTENT

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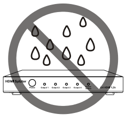
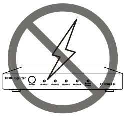
IMPORTANT SAFETY INSTRUCTIONS



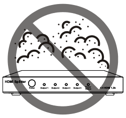
1. Do not expose this apparatus to rain, moisture, dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on the apparatus.

2. Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure the unit is well ventilated.

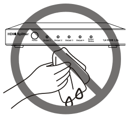


3. To prevent risk of electric shock or fire hazard due to overheating, do not obstruct the unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.

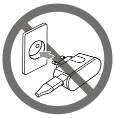
4. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.



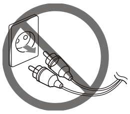
5. Do not place sources of naked flames, such as lighted candles, on the unit.



6. Clean this apparatus only with dry cloth.

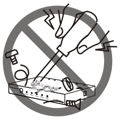


7. Unplug this apparatus during lightning storms or when unused for long periods of time.



8. Protect the power cord from being walked on or pinched particularly at plugs.

9. Only use attachments / accessories specified by the manufacturer.



10. Refer all servicing to qualified service personnel.

1. INTRODUCTION

1.1 OVERVIEW

The **iSwitch 2000HC-T** encoders work with the decoders **(iSwitch 2000H-TR/ iSwitch 2000U-TR/ iSwitch 2000HC-R)** to deliver AV signals over standard Gigabit Ethernet networks. They support UHD resolutions up to 3840 × 2160 @ 60 Hz, 4:4:4. They provide end-to-end AV over IP solutions, enabling flexible routing of audio, video, USB, RS-232, and IR signals across networked AV systems.

With Dante support, the encoders integrate with Dante-enabled audio systems for flexible audio distribution. Supporting low-latency transmission and scalable system deployment, they are suitable for a wide range of professional AV applications, including classrooms, conference rooms, auditoriums, and other commercial environments.

Note: *Dante license need to be purchased separately and activated. Dante is not activated by default.*

1.2 FEATURES

- Includes one **HDMI** input and one **USB-C** inputs, with support for Auto, Manual and Priority input switching modes.
- Features **three Ethernet ports**, any one of which can be used to transmit A/V streams, control data, and Dante audio streams.
- Supports input and output resolutions up to **3840 x 2160@60Hz 4:4:4**.
- Supports **HDR10** and **Dolby Vision**.
- Supports **CEC**.
- Supports **multi-channel audio** up to PCM 7.1, Dolby Atmos, DTS HD Master and DTS:X.
- Configurable audio input/output direction.
- HDMI **eARC** audio return.
- **HDCP 2.2/2.3** compliant.
- Flexible routing of **audio, video, USB, RS-232 and IR** signals independently or together throughout the matrix system.
- Extends **audio, video, USB, RS-232, IR, and power** signals up to **328 ft (100 m)** over a single Cat 5e (or higher) cable.
- Supports **bidirectional RS-232** communication.
- Supports **bidirectional IR** passthrough for controlling remote source and display devices between encoders and decoders.
- Supports IR generation, allowing IR codes to be sent through the API.
- Supports **point-to-point, point-to-multipoint, multipoint-to-point, multipoint-to-multipoint** applications.
- Supports **PoE**, allowing the device to be remotely powered by compatible power source equipment such as a PoE-enabled Ethernet switch, eliminating the need for a nearby power outlet.
- Supports **DHCP** by default, and falls back to Auto-IP if no DHCP server is available in the system.
- Supports control via **Telnet API** or an IP controller **(iSwitch 2000-CTL)**.
- Supports the **Telnet, SSH, HTTP, and HTTPS** protocols.

- Supports **2-channel Dante** transmit and 2-channel Dante receive audio streams when Dante is licensed **(default: Dante unlicensed).**

1.3 PACKAGE CONTENTS

- 1 x iSwitch 2000H-T Encoder Unit
- 1 x 20V DC 6A Power Adapter (US/EU/UK/AU)
- 1 x 3.5mm 3-pin Phoenix Male Connector
- 1 x IR Emitter (3.94ft/1.2m)
- 1 x Broadband IR Receiver (3.28ft/1.0m, 30–50kHz)
- 4 x Wall-Mount Brackets
- 4 x Screws

1.4 SPECIFICATIONS

Video	
Input Video Port	1 x USB-C; 1 x HDMI Type A (19 pins)
Input Video Type	HDMI 2.0, HDCP 2.2/2.3
Input Resolutions	3840 x 2160p@24/25/30/50/60Hz 4:4:4, 1920 x 1200@50/60Hz, 2400x1350p@60Hz, 1920 x 1080p@24/25/30/50/60/100/120Hz, 1920 x 1080i@50/60Hz, 1680 x 1050@60Hz, 1600 x 1200@60Hz, 1600 x 900@60Hz, 1400 x 1050@60Hz, 1440 x 900@60Hz, 1366 x 768@60Hz, 1360 x 768@60Hz, 1280 x 1024@60Hz, 1280 x 960@60Hz, 1280 x 800@60Hz, 1280 x 768@60Hz, 1280 x 720p@60/100/120Hz, 1024 x 768@60Hz, 800 x 600@60Hz, 720 x 576p@50Hz, 720 x 480p@60Hz, 640 x 480p@60Hz
Output Video Port	2 x RJ-45; 1 x Optical; 1 x HDMI Type A (19 pins)
Output Video Type	IP Stream; HDMI 2.0, HDCP 2.2/2.3
Output Resolutions	Up to 3840 x 2160p@60Hz 4:4:4
Average Encoding Data Rate	3840 x 2160@60Hz: 650Mbps (avg) / 900Mbps (max)
Input/Output Video Signal	0.5~1.2 V p-p
Input/Output DDC Signal	5 V p-p (TTL)
Video Impendence	100 Ω
Maximum Data Rate	18 Gbps (6 Gbps per color)
Maximum Pixel Clock	600 MHz

Audio	
Input Audio Port	1 x USB-C; 1 x HDMI Type-A; 1 x 3.5mm stereo jack (configurable)
Input Audio Signal	• HDMI/USB-C IN: Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio and DTS:X • AUDIO IN: Analog
Output Audio Port	2 x RJ-45; 1 x Optical; 1 x HDMI; 1 x S/PDIF Out; 1 x 3.5mm stereo jack (configurable)
Output Audio Signal	• LAN/HDMI: Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio and DTS:X • S/PDIF Out: Digital audio

Audio	
	• AUDIO OUT: Analog
Dante Audio Type	LPCM 2.0, 44.1/48/88.2/96 KHz

Audio	
Input Audio Port	1 x USB-C; 1 x HDMI Type-A; 1 x 3.5mm stereo jack (configurable)
Input Audio Signal	• HDMI/USB-C IN: Fully supports audio formats in HDMI 2.0 specification, including PCM 2.0/5.1/7.1, Dolby TrueHD, Dolby Atmos, DTS-HD Master Audio and DTS:X • AUDIO IN: Analog
Output Audio Port	2 x RJ-45; 1 x Optical; 1 x HDMI; 1 x 3.5mm stereo jack (configurable)
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Dante Audio Type	• LPCM 2.0, 44.1/48/88.2/96 KHz

Control	
Control Method	Telnet API, IP Controller **(iSwitch 2000-CTL)**

General	
Operating Temperature/ Humidity	32°F – 113°F (0°C – 45°C), 10% – 90%, non-condensing
Storage Temperature/ Humidity	-4°F – 158°F (-20°C – 70°C), 10% – 90%, non-condensing
ESD Protection	Human body model: ±8kV (air-gap discharge) / ±4kV (contact discharge)
Power Supply	20V DC 6A; PoE
Power Consumption	• No load: 6W • Typical: 9.8W (device only) • Max.:73W (with 60W USB-C PD output)
Device Dimension (W x H x D)	8.46" x 0.98" x 6.30" (215 mm x 25 mm x 160 mm)
Net Weight	2.22lbs (1.01kg)

2. PANEL OVERVIEW

2.1 FRONT PANEL

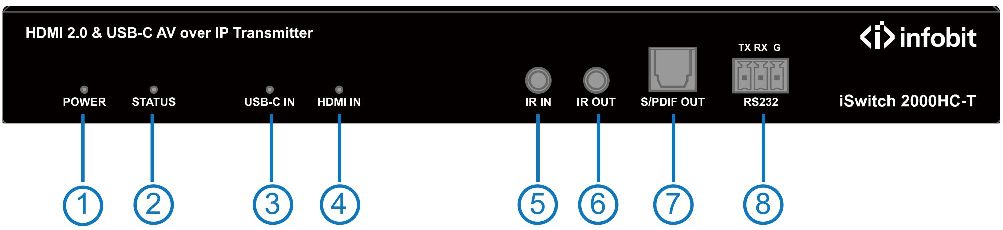

Figure 1: Front Panel

#	Name	Description
1	POWER LED	• **On**: The device is powered on. • **Blinking**: The device is booting. • **Off**: The device is powered off.
2	STATUS LED	• **On**: The device is working properly. • **Blinking**: The device is connected to the network but doesn't detect valid signal input. • **Blinking slowly**: The device is being upgraded. • **Blinking rapidly**: The Find me function is activated through the control API to help locate a specific device. For more information, refer to the API documentation. • **Off**: The device is not connected to the network.
3	USB-C IN LED	• **On**: The corresponding input channel is selected, and a valid A/V signal is detected. • **Blinking**: The corresponding input channel is selected, and there is a 5V signal input, but no valid A/V signal is detected. • **Off**: The corresponding input channel is not selected. / The corresponding input channel is selected but no 5V signal is detected.
4	HDMI LED	
5	IR IN	3.5mm TRS jack. Connect to an IR receiver for IR communication with an IR emitter at the decoder side on the network.
6	IR OUT	3.5mm TS jack. Connect to an IR emitter that is with 5V output for IR communication with an IR receiver at the decoder side on the network.
7	S/PDIF OUT	Optical S/PDIF connector. Connect to an audio receiver for digital audio output.
8	RS232	3-pin phoenix connector. Connect to an RS-232 device for directional RS-232 communication.

2.2 REAR PANEL

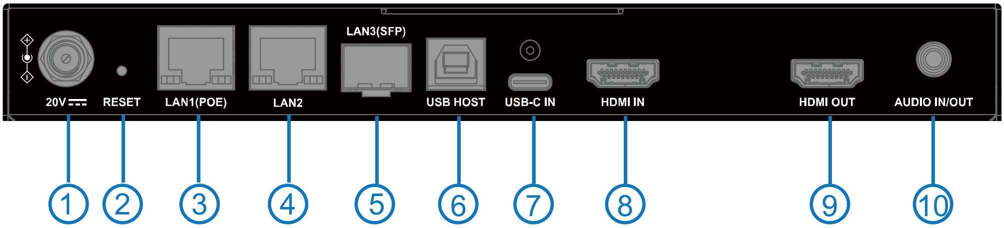

Figure 2: Rear Panel

#	Name	Description
1	20V	20V DC power connector. Connect to included power adapter for power input.
2	RESET	Press and hold the recessed button for at least five seconds, then release to restore the device to its factory default settings. **Note:** Restoring factory default settings erases all configurations and custom data. Back up any important settings before proceeding.
3	LAN1 (POE)	By default, use one of the following ports to connect the device to an Ethernet switch for transmission of A/V streams, Dante audio streams, and control data: LAN1 (POE), LAN2, or LAN3 (SFP). **LAN1 (POE)** - Supports PoE. **LAN2** - When configured as an independent Dante port, LAN2 is used for Dante audio transmission, while LAN1 (POE) or LAN3 (SFP) is used for A/V streams and control data.
4	LAN2	
5	LAN3 (SFP)	

#	Name	Description
		LAN3 (SFP) - Connect this optical port to a Gigabit Ethernet switch using a single-mode or multimode SFP module. - SFP module is not included. - The maximum transmission distance depends on the specifications of the installed SFP module. **IMPORTANT:** - By default, connect only one of the LAN1 (POE), LAN2, or LAN3 (SFP) ports to an Ethernet switch. - When LAN2 is configured as an independent Dante port, LAN2 can be connected to a dedicated Dante network, while either LAN1 (POE) or LAN3 (SFP) can be used for A/V streams and control data. Do not connect both LAN1 (POE) and LAN3 (SFP) simultaneously, as this may cause unexpected network behavior.
6	USB HOST	USB Type-B port. Connect to a PC for USB 2.0 extension.
7	USB-C IN	USB 3.0 Type-C port. Connect to a USB-C source. This port supports DP 1.3, HDMI 2.0, USB 2.0, and up to 60W PD (power delivery). **Note:** Charging the connected peripheral device is available only when the unit is powered by a DC power supply rather than PoE.
8	HDMI IN	19-pin HDMI Type-A port. Connect to an HDMI source. This port supports HDMI 2.0b, HDCP 2.3 and bandwidth up to 18Gbps.
9	HDMI OUT	19-pin HDMI Type-A port. Connect to an HDMI display.
10	AUDIO IN/OUT	3.5mm TRS port for unbalanced stereo input or output. This port can be configured as AUDIO IN or AUDIO OUT. • AUDIO IN: Connect to an audio source for audio input. • AUDIO OUT: Connect to an audio receiver for audio output. Default: AUDIO OUT

3. INSTALLATION

Note: Ensure the device is disconnected from the power supply before installation.

Installing Wall-Mount Brackets

1. Attach the two wall-mount brackets to the enclosure using the screws provided, as shown in the figure below.

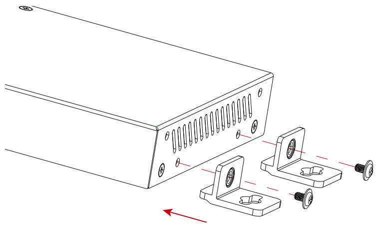

Figure 3: Wall-Mount Bracket Installation

2. Repeat the above step for the other side of the device.
3. Mount the brackets at the desired location using user-supplied screws (not included).

4. SYSTEM CONNECTION

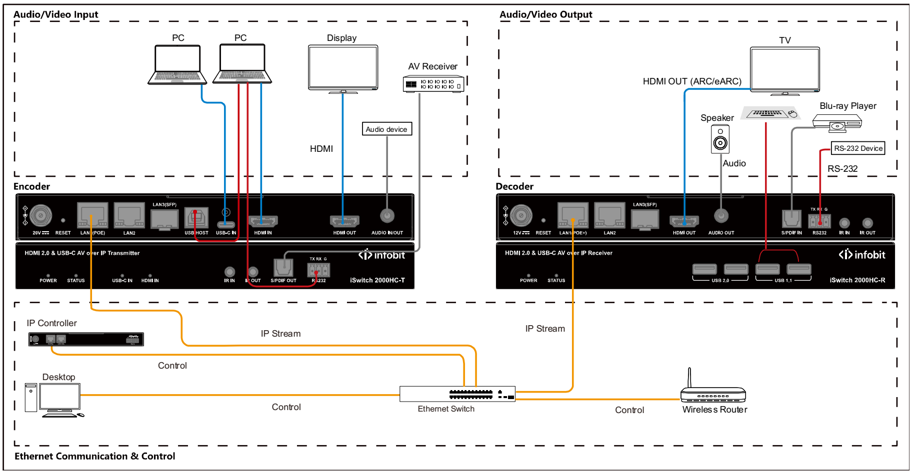

Figure 4: Basic System Connection

Notes

- If the Ethernet switch doesn't support PoE, connect each encoder and decoder to its corresponding power adapter.
- The **HDMI OUT** port on the decoder supports ARC/eARC for returning audio from a connected TV.
- The **AUDIO IN/OUT** port on TX can be configured as an audio input or output.
- The SPDIF ports support digital audio transmission between the encoder and decoder.

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5. TYPICAL APPLICATIONS

5.1 VIDEO WALL APPLICATION

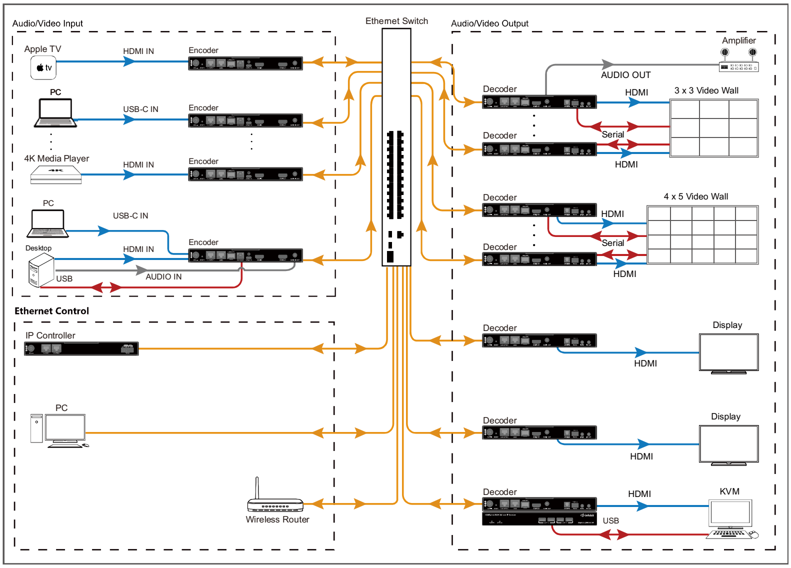

Figure 5: Video Wall Application

5.2 MULTI-ROOM AV DISTRIBUTION

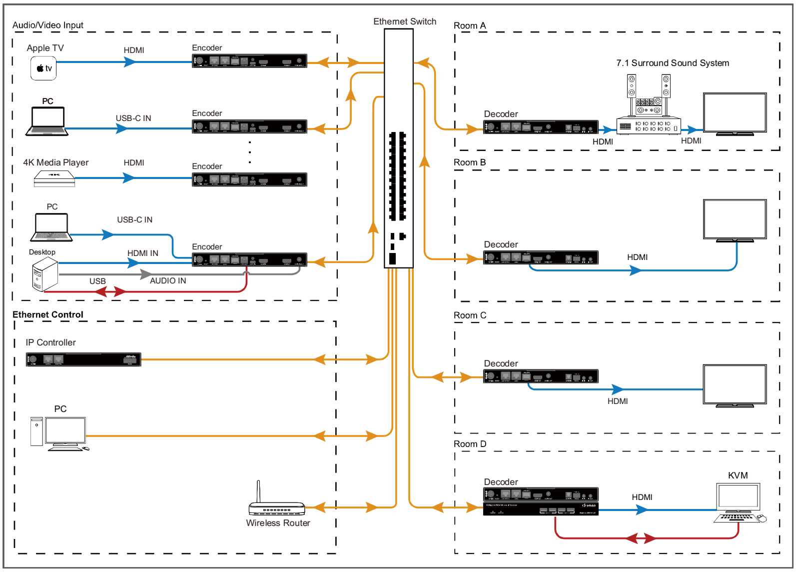

Figure 6: Multi-Room AV Distribution

5.3 DANTE AUDIO DISTRIBUTION

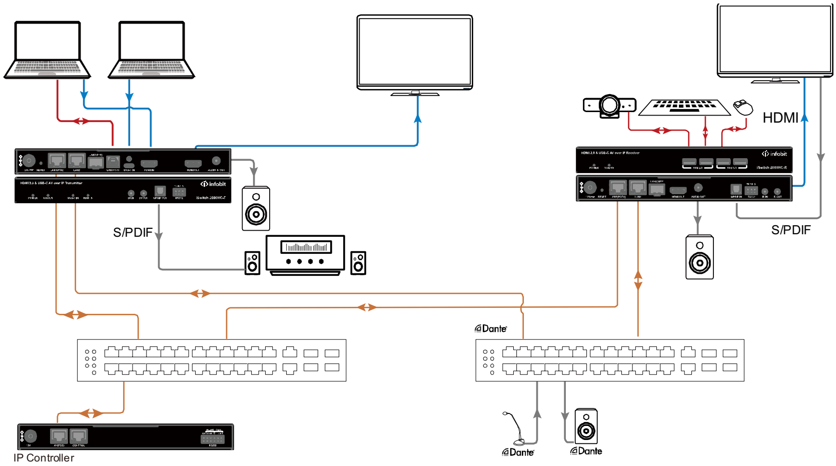

Figure 7: Dante Audio Distribution

Note: LAN 1 (PoE) / LAN 3 carries A/V and control data. LAN 2 carries Dante audio and connects to a dedicated Dante network. The Ethernet ports connect to separate networks.

6. IP ADDRESS IDENTIFICATION

Default IP setting for the device is **DHCP**. Ensure there's a DHCP server in the network so that the device can obtain a valid IP address when you deploy the system. If there's no available DHCP server, e.g. the device is connected to a laptop directly, the device gets a default IP address in the range of **169.254.X.Y.** The allocated IP address can be identified through API Commands.

7. INPUT SWITCHING MODE

The device provides three input switching modes for selecting between USB-C IN and HDMI IN: Auto, Manual and Priority.

- Auto
  - In Auto mode, input switching follows the Last In, First Out (LIFO) rule. The device automatically switches to the most recently input source. If the currently selected video source is removed, the device switches to the other source automatically.
  - If both input ports are connected to active video sources, when the device powers on, the device selects the source according to the default priority order (USB-C IN > HDMI IN).
    For example, if a USB-C source is connected to USB-C IN, it is selected as the input source. Ohterwise, the device switches to the HDMI source.
- Manual
  In Manual mode, the device switches to the user-selected input source. If the selected source is unavailable (for example, if the source device is in standby mode), no video is

output.

- Priority
  - In Priority mode, if both input ports are connected to active video sources when the device powers on, the source with the higher priority is selected automatically.
  - If the currently selected source is disconnected, the device automatically switches to the other available source.
  - The priority order of the two input ports can be configured through API commands.

Notes:
- The default input switching mode is Auto.
- The input switching mode can be configured through API commands. For details, refer to the separate API document.

8. DEVICE CONTROL OVERVIEW

The device can be controlled and configured through the IP controller (iSwitch 2000-CTL). Supported functions include USB signal routing and firmware upgrades. For details, refer to the **iSwitch 2000-CTL** Web Configuration Guide.

Figure 8: Scan to visit iSwitch 2000-CTL website