

SOLUTIONS FOR GROWTH



nT18BX04 CUSB-V605H UHD+ HDMI to USB Video Capture Recorder with PIP



Operation Manual

HDMI®
HIGH-DEFINITION MULTIMEDIA INTERFACE

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SAFETY PRECAUTIONS

Please read all instructions before attempting to unpack, install or operate this equipment and before connecting the power supply. Please keep the following in mind as you unpack and install this equipment:

- Always follow basic safety precautions to reduce the risk of fire, electrical shock and injury to persons.
- To prevent fire or shock hazard, do not expose the unit to rain, moisture or install this product near water.
- Never spill liquid of any kind on or into this product.
- Never push an object of any kind into this product through any openings or empty slots in the unit, as you may damage parts inside the unit.
- Do not attach the power supply cabling to building surfaces.
- Use only the supplied power supply unit (PSU). Do not use the PSU if it is damaged.
- Do not allow anything to rest on the power cabling or allow any weight to be placed upon it or any person walk on it.
- To protect the unit from overheating, do not block any vents or openings in the unit housing that provide ventilation and allow for sufficient space for air to circulate around the unit.
- Please completely disconnect the power when the unit is not in use to avoid wasting electricity.

VERSION HISTORY

REV.	DATE	SUMMARY OF CHANGE
RDV1	2020/12/22	Preliminary release



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1. INTRODUCTION

This HDMI to USB Video Capture Recorder with PIP can support resolutions up to 18Gbps 4K UHD⁺ with HDR (via input 1 and the bypass path) while simultaneously streaming a full screen or PiP/PoP audio/video signal at 1080p to a USB connected PC for capture or re-broadcast. HDMI sources up to 1080p60 are supported for capture without modification, while 4K sources from input 1 will be automatically scaled down to 1080p. The use of a special video timing stabilization feature helps to ensure that the USB capture stream won't lock up or drop, even if the HDMI input source is intermittent or becomes disconnected. Digital stereo audio from either HDMI (LPCM 2.0) or the 3.5mm analog audio input will be captured with the HDMI video source and is selectable within the configuration software.

USB capture is accomplished using the UAC (USB Audio Class) and UVC (USB Video Class) standards, allowing the unit to support most common video capture, chat, or streaming software, including support for the Free OBS (Open Broadcaster Software) streaming software which is available for Windows PC, macOS and Linux. The unit is powered directly by the USB 3.0 port so an external power supply is not required (A Y-cable is required when connected via USB 2.0 in order to deliver the necessary power). Availability and access to the controllable features of the unit depend on the capture software used.

2. APPLICATIONS

- Live video stream recording for broadcast
- Security camera recording
- Gameplay video archival

3. PACKAGE CONTENTS

- 1× UHD⁺ HDMI to USB Video Capture Recorder with PIP
- 1× USB 3.0 Type-A to Type-B Cable
- 1× Shockproof Feet (Set of 4)
- 1× Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI source equipment such as a media player, video game console or set-top box.
- HDMI receiving equipment such as an HDTV, monitor or audio amplifier.
- Personal computer (Windows or macOS) with a USB 3.0 port and plenty of available hard drive space.

5. FEATURES

- HDMI input 1 and HDMI output supports 4K@60Hz with HDR
 - Input 2 supports up to 1080p@60Hz
 - HDCP 2.2 and HDCP 1.x compliant
- Note: Video capture of sources using HDCP encryption is not supported.*
- Automatically scales 4K sources to 1080p for USB capture
 - Additional analog audio input via 3.5mm port
 - Supports capture of stereo audio from either HDMI input (LPCM 2.0) or the 3.5mm analog audio input (selectable via control software)
 - Integrated audio mixer provides a way to combine an analog audio source with HDMI audio
 - Mode Switch button allows easy switching between the Full, PoP, and PiP video layouts

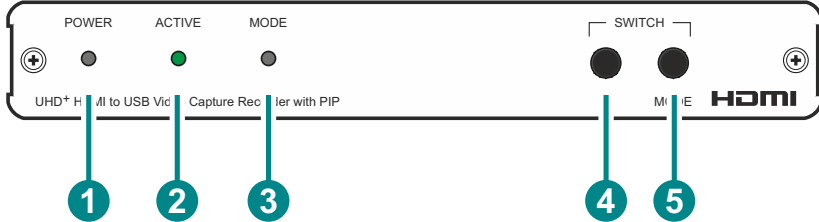
- Complies with the UAC (USB Audio Class) and UVC (USB Video Class) standards, allowing the unit to support most common capture and video streaming software

Note: Access to many of the software controllable features of the unit, beyond simple video capture, requires the use of the USB Video Capture Control software which is only available for Windows 10 or later PCs

- Supports video timing stabilization to help ensure a reliable and stable USB capture stream
- Capturing over USB 3.0 allows uncompressed video and audio data capture (up to 1080p, LPCM 2.0)
- Capturing over USB 2.0 requires the application of minimal MJPEG compression to the video and audio data (up to 1080p, LPCM 2.0)
- Unit may be powered directly via USB 3.0 (When using USB 2.0, a Y-cable is required to provide additional power)
- Supports the Free OBS (Open Broadcaster Software) streaming software which is available for Windows 10 (or later), macOS, and Linux.

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel



- 1 POWER LED:** This LED will illuminate red to indicate the unit is on and receiving power but does not yet have a live HDMI source. When a live HDMI source is detected, the LED will illuminate green.
- 2 ACTIVE LED:** When software on the connected PC is actively receiving video from the unit via USB, this LED will illuminate green.
- 3 MODE LED:** This LED indicates the current PiP/PoP state of the unit's USB output. When PiP is enabled, the LED will illuminate red. When PoP is enabled, the LED will illuminate green. When the output is full screen the LED will remain off.

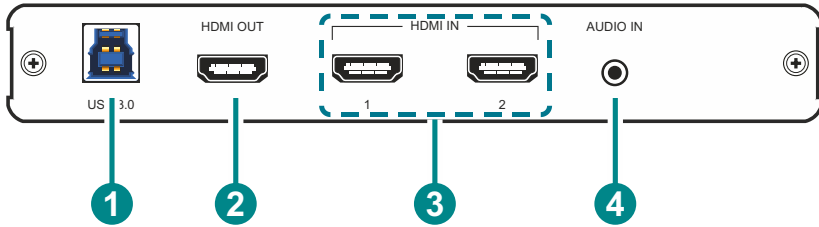
- 4 SWITCH IN Button:** Press this button to toggle the primary HDMI source for the USB output between the two HDMI inputs.

Note: This does not affect the video source for the HDMI output which is always a bypass output for input 1.

- 5 SWITCH MODE Button:** Press this button to sequentially switch between the available USB video output formats (Full screen, PoP, PiP).

Note: This does not affect the format of the video displayed by the HDMI output which is always a bypass output for input 1.

6.2 Rear Panel



- 1 USB 3.0 Port:** Connect directly to a PC's USB 3.0 port for control, video capture and power.

Note: Video capture of sources using HDCP encryption is not supported. If connected via USB 2.0, use of a Y-cable connected to 2 USB 2.0 ports is required in order to properly power the unit.

- 2 HDMI OUT Port:** Connect to an HDMI TV, monitor or amplifier for digital video and audio output.

Note: This port is always a direct bypass output from input 1.

- 3 HDMI IN 1~2 Ports:** Connect to HDMI source equipment such as a media player, game console or set-top box.

Note: Input 2 only supports video sources up to 1080p60Hz.

- 4 AUDIO IN Port:** Connect to the stereo analog output of a device such as an audio player or PC.

6.3 Configuration and Video Capture

6.3.1 USB Video Capture Control Software

The USB Video Capture Control software provides control over a selection of basic functions of the unit, including: primary HDMI source, audio source and control, picture mode (Full/PoP/PiP), PiP configuration, and video proc-amp settings. An option to return the unit to its factory defaults is also provided.

Note: Please obtain the “USB Video Capture Control” software from your authorized dealer and save it in a directory where you can easily find it. This software requires the .NET framework and only supports Windows 10 or later.

To use the software, connect the unit to your PC via the provided USB 3.0 cable and then execute the control application. A configuration window, similar to the screenshot below, will appear. All changes made to the video capture signal via this app will take effect immediately.



- 1) **Audio Source:** Switch the audio source type to record between embedded HDMI audio, analog line input, or the audio mixer.

Note: Only 2 channel LPC audio can be captured. Bitstream audio is not supported and will be automatically muted.

HDMI: Select this to capture audio from the currently selected HDMI audio source. Available options are: HDMI input 1, HDMI input 2, or “Follow Main Source” which will use the audio from whichever HDMI source is currently set as primary.

Audio-In: Select this to capture audio from the analog audio input.

Mixer: Select this to activate the audio mixer and capture audio from it. When the audio mixer is enabled, the currently selected HDMI audio source will be mixed with the analog audio input.

- 2) **Audio setting:** This section provides control over audio capture recording levels.

Volume (In): Adjust this slider to control the volume level of the analog audio input when the mixer function is enabled.

Volume (Out): Adjust this slider to control the overall volume level of captured audio.

MIC Mode: Click this button to enable or disable the microphone audio boost on the analog audio input.

Note: This should only be enabled when an unpowered microphone source is connected. Activating this when a line-level source is connected could result in heavily distorted audio.

Mute Audio: Click on this button to mute or unmute the audio being captured.

- 3) **Video Setting:** This section provides direct control over a variety of video settings that are applied when video capture is active.

Note: Changes to these settings have no impact on the HDMI bypass output signal.

Brightness: Provides control over the overall brightness of the captured video.

Contrast: Provides control over the overall contrast of the captured video.

Hue: Provides control over the hue shift of the captured video.

Saturation: Provides control over the color saturation level of the captured video.

Sharpness: Provides control over the amount of sharpness processing to apply to the captured video.

Reset Video Setting: Click this button to reset all video settings.

- 4) **Reset All to Default:** Click this button to reset the unit to its factory default state.

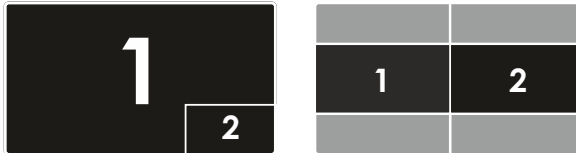
- 5) **Picture Mode:** This section provides a way to select the current video mode to use when capturing. Available modes are: Full, PoP, and PiP.

Full: The currently selected primary HDMI source will be displayed full screen.

PoP: Both HDMI sources will be displayed side by side with their proper aspect ratios maintained and black bars above and below the video.

PiP: Both HDMI sources will be displayed with the primary source full screen in the background and the other source displayed in a smaller PiP window that can be customized.

Configuration Examples:



- 6) **Main Video Source:** Use these buttons to select which HDMI input is currently set as the primary video source.

- 7) **PiP Settings:** This section provides control over the size, position and transparency of the PiP window when PiP mode is active.

Steps for size/position: Set the step size, in pixels, that is used when adjusting the size/position of the PiP window using the adjustment arrows. Setting a high number allows for faster adjustments, but small numbers are required when fine tuning.

Size: Click on the arrow buttons to adjust the horizontal and vertical size of the PiP window.

Position: Click on the arrow buttons to adjust the horizontal and vertical position of the PiP window.

Transparency: Use the slider to set the preferred transparency level for the PiP window.

- 8) **Mirror:** This section provides control over the horizontal and vertical mirror options for both windows in the multi-windowing modes.

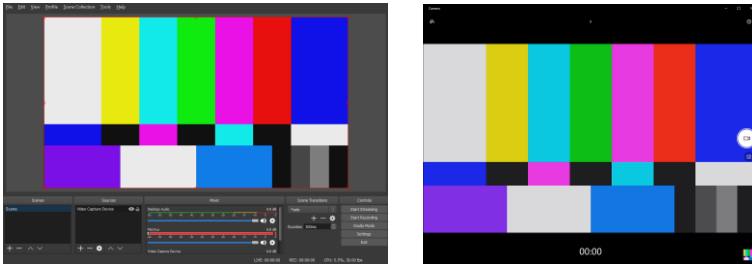
Main: Click on the appropriate button to select the preferred flip or mirroring effect to apply, if any, to the primary source window.

Sub: Click on the appropriate button to select the preferred flip or mirroring effect to apply, if any, to the secondary source window.

- 9) **FW Version/App Version:** Displays the unit's current firmware version and the USB Video Capture Control software's current version.

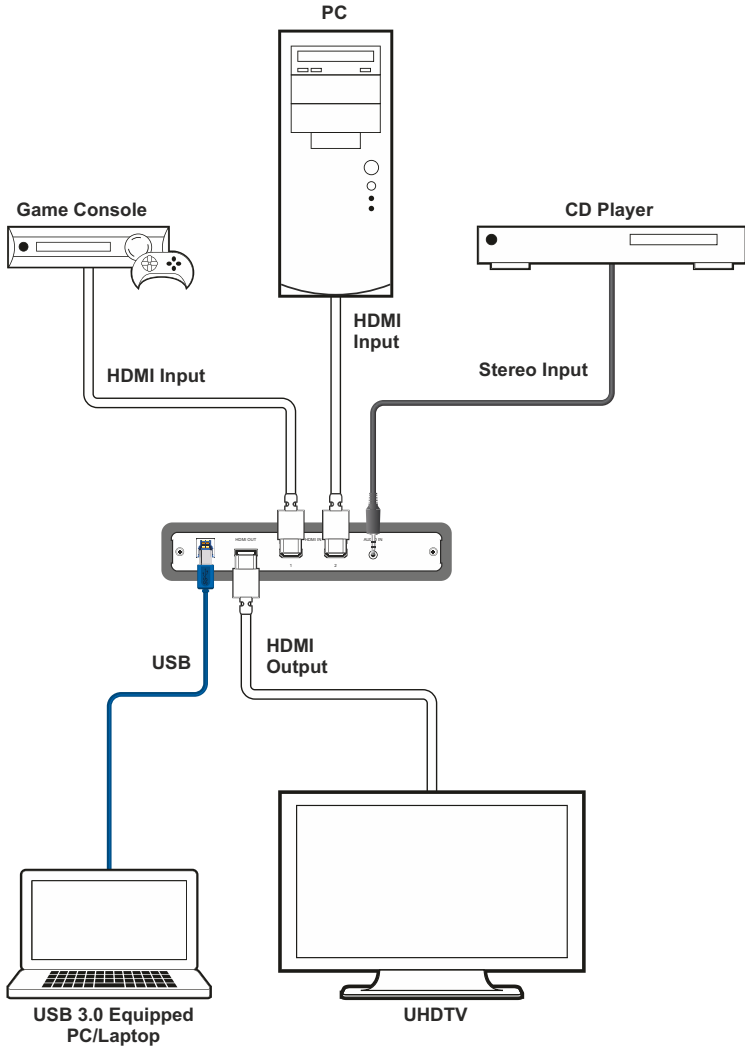
6.3.2 Video Capture

Video capture is accomplished using 3rd party software. The choice of video capture software is entirely up to the user. This unit adheres to the UAC (USB Audio Class) and UVC (USB Video Class) standards, allowing the unit to support most common video capture, chat, or streaming software, including support for the Free OBS (Open Broadcaster Software) streaming software, among many other choices. Availability and access to the controllable features of the unit (such as capture resolution, recording storage format, etc.) depends on which features the specific capture software package chooses to expose.



Note: Many sourced devices (such as most major video game consoles) force HDCP output by default, even when it is not required by the content currently being output. In order to enable video recording of the output of these devices, HDCP must be manually disabled using the game console's own system menu.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications

HDMI Bandwidth	18Gbps (Input 1 & Bypass Output) 2.98Gbps (Input 2)
Input Ports	2×HDMI (Type-A) 1×Analog Stereo (3.5mm)
Output Ports	1×HDMI (Type-A) 1×USB 3.0 (Type-B)
Power Supply	Provided via USB 3.0
ESD Protection (HBM)	±8kV (Air Discharge) ±4kV (Contact Discharge)
Dimensions (W×H×D)	180mm×25mm×108mm [Case Only] 180mm×25mm×111.6mm [All Inclusive]
Weight	359g
Chassis Material	Metal (Steel)
Chassis Color	Black
Operating Temperature	0°C – 40°C/32°F – 104°F
Storage Temperature	-20°C – 60°C/-4°F – 140°F
Relative Humidity	20 – 90% RH (Non-condensing)
Power Consumption	4.5W

8.2 Video Specifications

Supported Resolutions (Hz)	Input		Output
	HDMI 1	HDMI 2	HDMI Bypass
720×400p@70/85			
640×480p@60/72/75/85			
720×480i@60			
720×480p@60			
720×576i@50			
720×576p@50			
800×600p@56/60/72/75/85			
848×480p@60			
1024×768p@60/70/75/85			
1152×864p@75			
1280×720p@50/60			
1280×768p@60/75/85			
1280×800p@60/75/85			
1280×960p@60/85			
1280×1024p@60/75/85			
1360×768p@60			
1366×768p@60			
1400×1050p@60			
1440×900p@60/75			
1600×900p@60RB			
1600×1200p@60			
1680×1050p@60			
1920×1080i@50/60			
1920×1080p@24/25/30			
1920×1080p@50/60			
1920×1200p@60RB			

Supported Resolutions (Hz)	Input		Output
	HDMI 1	HDMI 2	HDMI Bypass
2560×1440p@60RB			
2560×1600p@60RB			
2048×1080p@24/25/30			
2048×1080p@50/60			
3840×2160p@24/25/30			
3840×2160p@50/60 (4:2:0)			
3840×2160p@24, HDR10			
3840×2160p@50/60 (4:2:0),HDR10			
3840×2160p@50/60			
4096×2160p@24/25/30			
4096×2160p@50/60 (4:2:0)			
4096×2160p@24, HDR10			
4096×2160p@50/60 (4:2:0),HDR10			
4096×2160p@50/60			

8.3 Audio Specifications

8.3.1 Digital Audio

HDMI Input / Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	Standard & High-Definition

USB Capture	
LPCM	
Max Channels	2 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	None

8.3.2 Analog Audio

Analog Input	
Max Audio Level	1Vrms
Impedance	10kΩ
Type	Unbalanced

8.4 Cable Specifications

Cable Length	1080p		4K30	4K60
	8-bit	12-bit	(4:4:4) 8-bit	(4:4:4) 8-bit
High Speed HDMI Cable				
HDMI Input	15m	10m	5m	3m
HDMI Output	15m	10m	5m	3m
USB Cable				
USB Output	2m			

Bandwidth Category Examples:

- **1080p (FHD Video)**
 - Up to 1080p@60Hz, 12-bit color
 - Data rates lower than 5.3Gbps or below 225MHz TMDS clock
- **4K30 (4K UHD Video)**
 - 4K@24/25/30Hz & 4K@50/60Hz (4:2:0), 8-bit color
 - Data rates higher than 5.3Gbps or above 225MHz TMDS clock but below 10.2Gbps
- **4K60 (4K UHD⁺ Video)**
 - 4K@50/60Hz (4:4:4, 8-bit)
 - 4K@50/60Hz (4:2:0, 10-bit HDR)
 - Data rates higher than 10.2Gbps

9. ACRONYMS

ACRONYM	COMPLETE TERM
ADC	Analog-to-Digital Converter
dB	Decibel
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
Gbps	Gigabits per second
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
kHz	Kilohertz
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
MHz	Megahertz
PiP	Picture in Picture
PoP	Picture outside of Picture
SNR	Signal-to-Noise Ratio
THD+N	Total Harmonic Distortion plus Noise
TMDs	Transition-Minimized Differential Signaling
UAC	USB Audio Class
4K UHD	4K Ultra-High-Definition (10.2Gbps max)
4K UHD⁺	4K Ultra-High-Definition (18Gbps max)
USB	Universal Serial Bus
UVC	USB Video Class
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array
Ω	Ohm



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