VOPEX® Series

VOPEX-C64K18GB-4V2

4K 18Gbps HDMI Splitter/Extender via CAT6/6a/7: 4-Port

Installation and Operation Manual

**VOPEX-C64K18GB-4V2 Local Unit (Back) and
Four Remote Units (Included)**

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CHANGES

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INTRODUCTION

The VOPEX® 4K 18 Gbps HDMI Splitter/Extender simultaneously distributes uncompressed Ultra-HD 4Kx2K@60Hz 4:4:4 HDMI video, multi-channel audio, RS232, and IR from one video source to up to four displays and speakers, each located up to 394 feet away via CAT6/6a/7 cable.

The VOPEX-C64K18GB-4V2 system consists of a 4K HDMI broadcast unit, which connects to the HDMI source and also supplies video to a local display via the HDMI loop output; and four included receivers for each remote 4K HDMI display and speakers. The units are interconnected by CAT6/6a/7 cable.

- Transmits an uncompressed HDMI signal over one CAT6/6a/7 cable to multiple display locations.
    - o Extend Ultra-HD 4Kx2K@60Hz 4:4:4 to 394 feet (120 meters).
    - o Extend 1080p and 1920x1200 to 443 feet (135 meters).
    - o Zero latency.
- Supports Ultra-HD 4Kx2K resolutions (4096x2160 and 3840x2160@30/60Hz YUV 4:4:4), HDTV resolutions to 1080p, and up to 1920x1200 (WUXGA).
- HDMI features supported:
    - o HDMI 2.0 compliant.
    - o Up to 36-bit Deep Color
    - o LPCM, Dolby Digital, Dolby TrueHD, DTS-HD, and DTS
    - o RGB, YCbCr 4:4:4, YCbCr 4:2:2, and YCbCr 4:2:0
    - o Bandwidth up to 18 Gbps
    - o 3D
    - o HDR10
- HDCP 2.2/1.4 compliant.
- Supports the DDC2B protocol.
- Includes four receivers.
    - o No power supply required for the receivers
- Full Infrared Remote (IR) control of HDMI source or display. IR transport channel can be forward or backward per the installation.
- RS232 for configuration and control, pass-through, and firmware updates.
    - o Supports RS232 pass-through from transmitter to receiver or from receiver to transmitter.
    - o Baud rate: 115200 bps
- Built-in EDID table.
- Cascade units together to send video simultaneously to many receivers.
- Mounting brackets included for easy surface/wall mounting.
- Ideal for digital signage, tradeshows, or classrooms where high quality video on multiple displays is needed.

MATERIALS INCLUDED

Materials supplied with this kit:

1x 4-port Splitter

4x Receivers

5x IR emitters

5x IR receivers

5x 3-pin terminal connectors for RS232

1x 5-pin terminal connector for audio

1x 100 - 240VAC@50/60Hz; 24V/2.7A DC Locking Power Adapter (The Transmitter powers all Receivers)

URL Slip with path to this manual

Cables available (not supplied):

Interface cables between the video source/display and the transmitter/receiver are required for proper operation.

Supports cable lengths to 20 feet for 4K resolutions and lengths to 50 feet for 1080p@60Hz using passive HDMI cables.

Use HD-xx-MM cable to connect an HDMI source or display.

Use HD-ACT-xx-MM 4K HDMI Active Cables to connect a 4K@60Hz HDMI source and/or display up to 50 feet.

Use USB3C-HD4K-xx-MM to connect a 4K@60Hz computer with USB Type C connector up to 10 feet.

Use DVI-HD-xM-MM to connect a DVI computer up to 5 meters.

Supports resolutions to 1080p.

Use CAT6/6a/7 solid or stranded straight through cable for TIA/EIA-568B wiring terminated with standard RJ45 connectors.

Cables not included.

where:
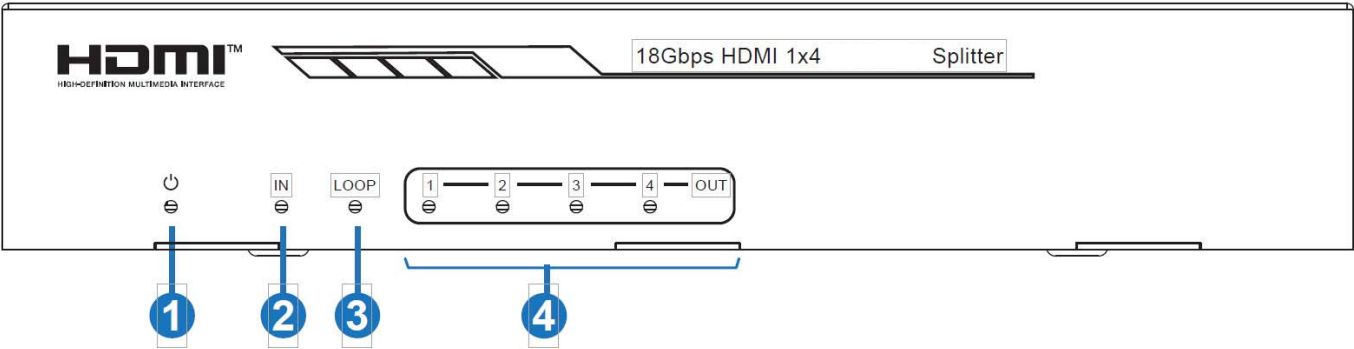
xx is the length of the cable in feet

MM indicates male-to-male connectors

Cables can be purchased from Network Technologies Inc by calling **(800) 742-8324** *(800-RGB-TECH) in the US and Canada or* **(330) 562-7070** *(worldwide).*

FEATURES AND FUNCTIONS

Transmitter (Front View)

#	LABEL	CONNECTOR/LED	DESCRIPTION
1	**POWER (SYMBOL)**	LED	When the device is powered on, the red power LED will be illuminated.
2	**IN**	LED	When the HDMI IN port connects an active source device, the green LED will be illuminated.
3	**LOOP**	LED	When the HDMI LOOP OUT port connects an active display device, the green LED will be illuminated.
4	**OUT 1-4**	LEDs	When the OUTPUT port connects a Receiver, the corresponding green OUT LED will be illuminated.

Transmitter (Rear View)
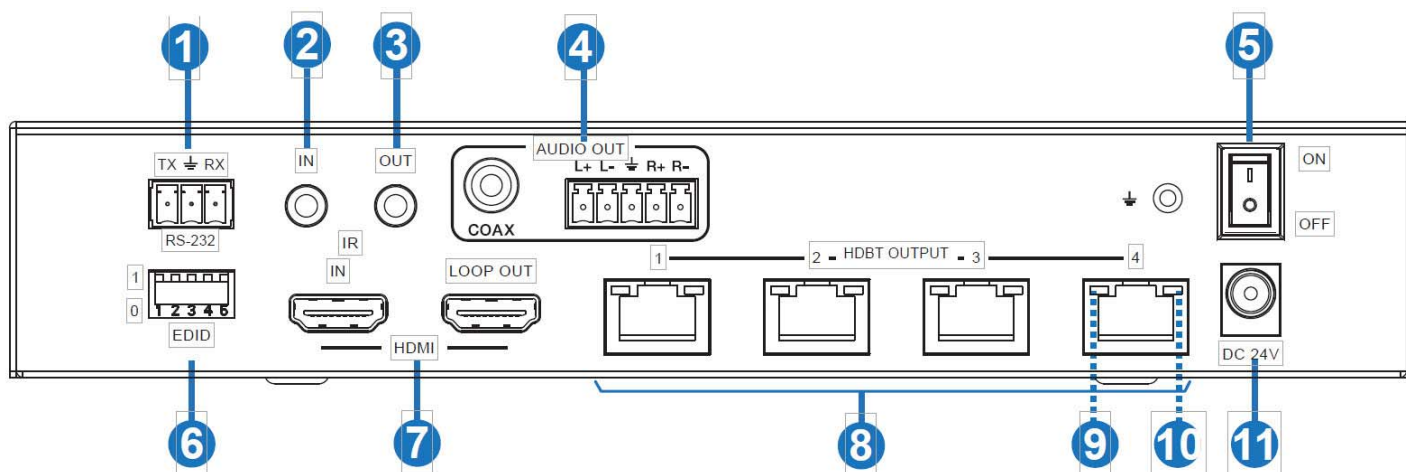
| #	LABEL	CONNECTOR/LED	DESCRIPTION
1	RS232	3-Terminal Block	Connect screw terminals to a PC or control system via a 3-terminal block for three functions: 1- Firmware update; 2- Control the Splitter via RS-232 commands; 3- RS-232 signal pass-through (from transmitter to receiver or from receiver to transmitter).
2	IN	3.5mm Jack	Connect to IR receiver cable, the IR receive signal will emit to "IR OUT" port of the Receiver.
3	OUT	3.5mm Jack	Connect to IR blaster cable, the IR emit signal is from "IR IN" port of the Receiver.
4	AUDIO OUT COAX + L/R	Terminal block & BNC Female	Coaxial/balanced digital audio output port, connect to amplifier or speaker.
5	On/Off	LED	Press this switch to power ON/OFF the device.
6	EDID	DIP Switch	Used to set EDID mode. Please refer to Section "6. EDID Mode" for details.
7	HDMI	HDMI Female	IN: connect to HDMI source device such as DVD or set-top box with an HDMI cable.
			LOOP OUT: connect to the HDMI display device such as TV or Monitor with an HDMI cable
8	OUTPUT 1~4	LEDs	Connect to the HDBT IN port of the Receiver with a CAT6/6a/7 cable.
9	NONE	Green LED	Illuminated solid: Transmitter and Receiver are in good connection status. Flashing: Transmitter and Receiver are in poor connection status. Dark: Transmitter and Receiver are not connected
10	NONE	Amber LED	Illuminated: HDMI Signal with HDCP Flashing: HDMI Signal without HDCP Dark: No HDMI Signal
11	DC24V	Power Jack	Plug the DC 24V power supply into the unit and connect the adaptor to an AC outlet. (**Note:** The transmitter powers all of the receivers via CAT6/6a/7 cables.)

Receiver (Front and Rear View)
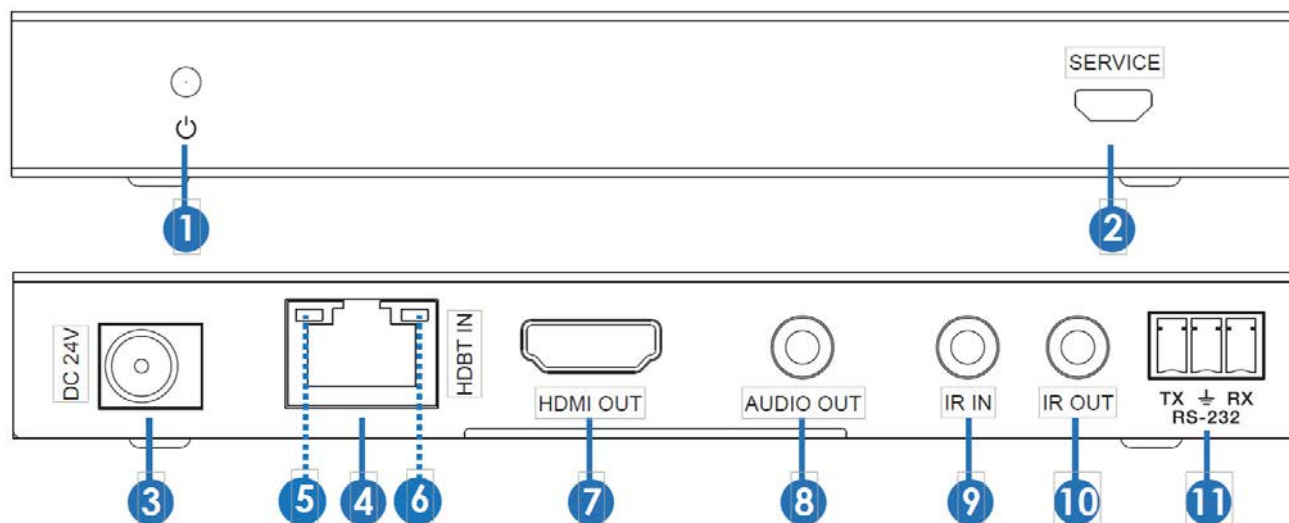
#	LABEL	CONNECTOR/LED	DESCRIPTION
1	POWER (SYMBOL)	LED	Illuminates ON when power is ON
2	SERVICE	USB Micro Type B	Used for firmware update (none available at this time)
3	DC24V	Power Jack	The Receiver is powered by the transmitter via a CAT6/6a/7 cable. This jack is not used in this application.
4	HDBT IN	RJ45 Female	Connect to an HDBT OUTPUT port (1~4) on the transmitter with a CAT6/6a/7 cable.
5	NONE	Green LED	Illuminated: Transmitter and Receiver are in good connection status. Flashing: Transmitter and Receiver are in poor connection status. Dark: Transmitter and Receiver are not connected
6	NONE	Amber LED	Illuminated: HDMI Signal with HDCP Flashing: HDMI Signal without HDCP Dark: No HDMI Signal
7	HDMI OUT	HDMI Female	HDMI output port, connect to HDMI display device such as TV or Projector with an HDMI cable.
8	AUDIO OUT	3.5mm Jack	Audio output port, connect to amplifier or speaker.
9	IR IN	3.5mm Jack	Connect to the IR Receiver cable. The IR signal will send to the IR OUT port of the transmitter.
10	IR OUT	3.5mm Jack	Connect to the IR blaster cable, the IR signal is from IR IN port of the transmitter.
11	RS232	3-Terminal Block	Screw terminals for RS232 command transmission RS-232 signal will pass-through (from transmitter to receiver or from receiver to transmitter).

APPLICATION EXAMPLE
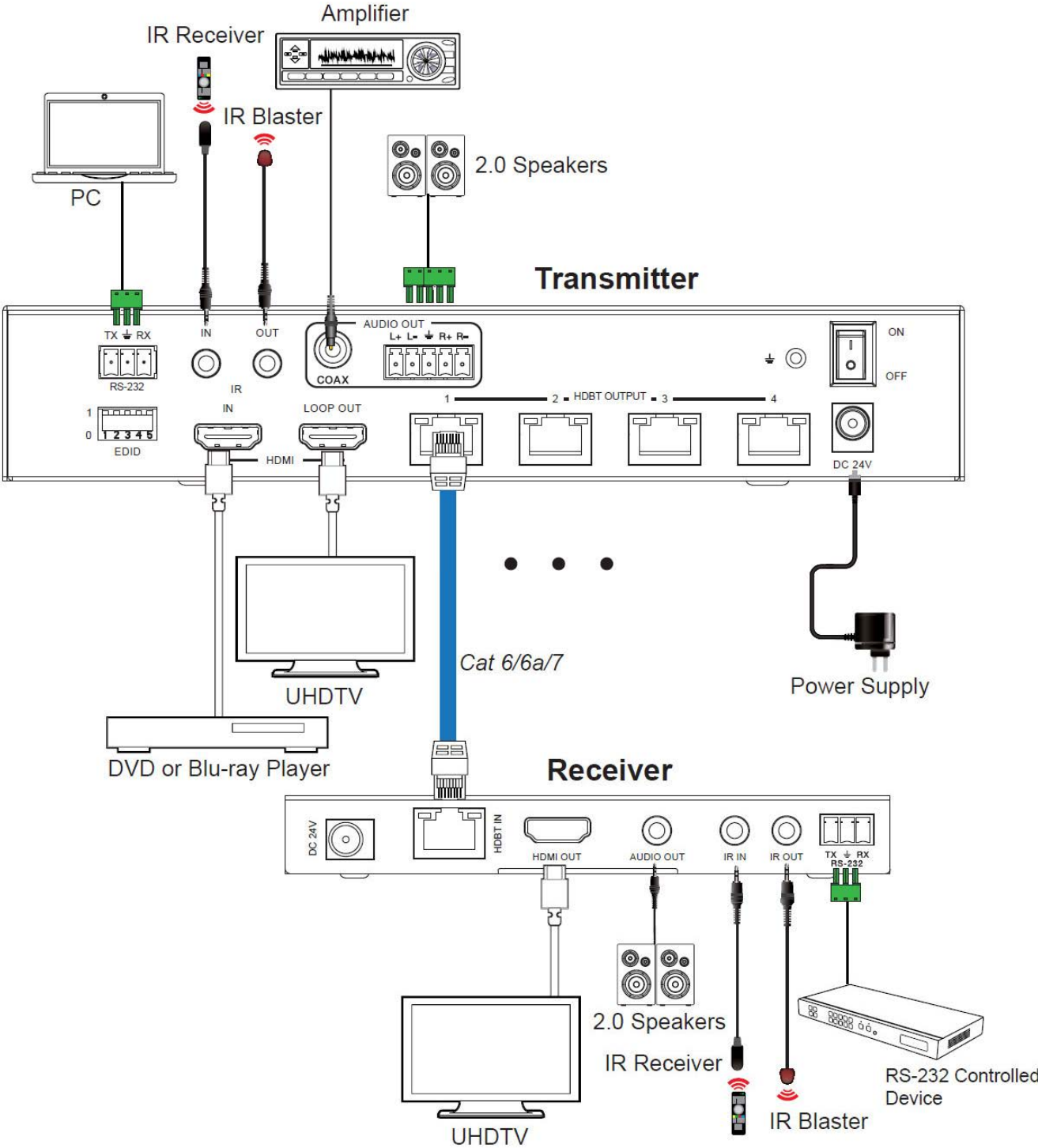
Cascaded VOPEXs

For an application where more displays need to be viewed, the VOPEX can be cascaded for connection to more Receivers with zero latency.

IR PIN DEFINITIONS

IR Receiver   IR Blaster

IR Blaster
1. IR Blaster Signal
2. Power
3. NC

IR Receiver
1. IR Signal
2. Power
3. Grounding
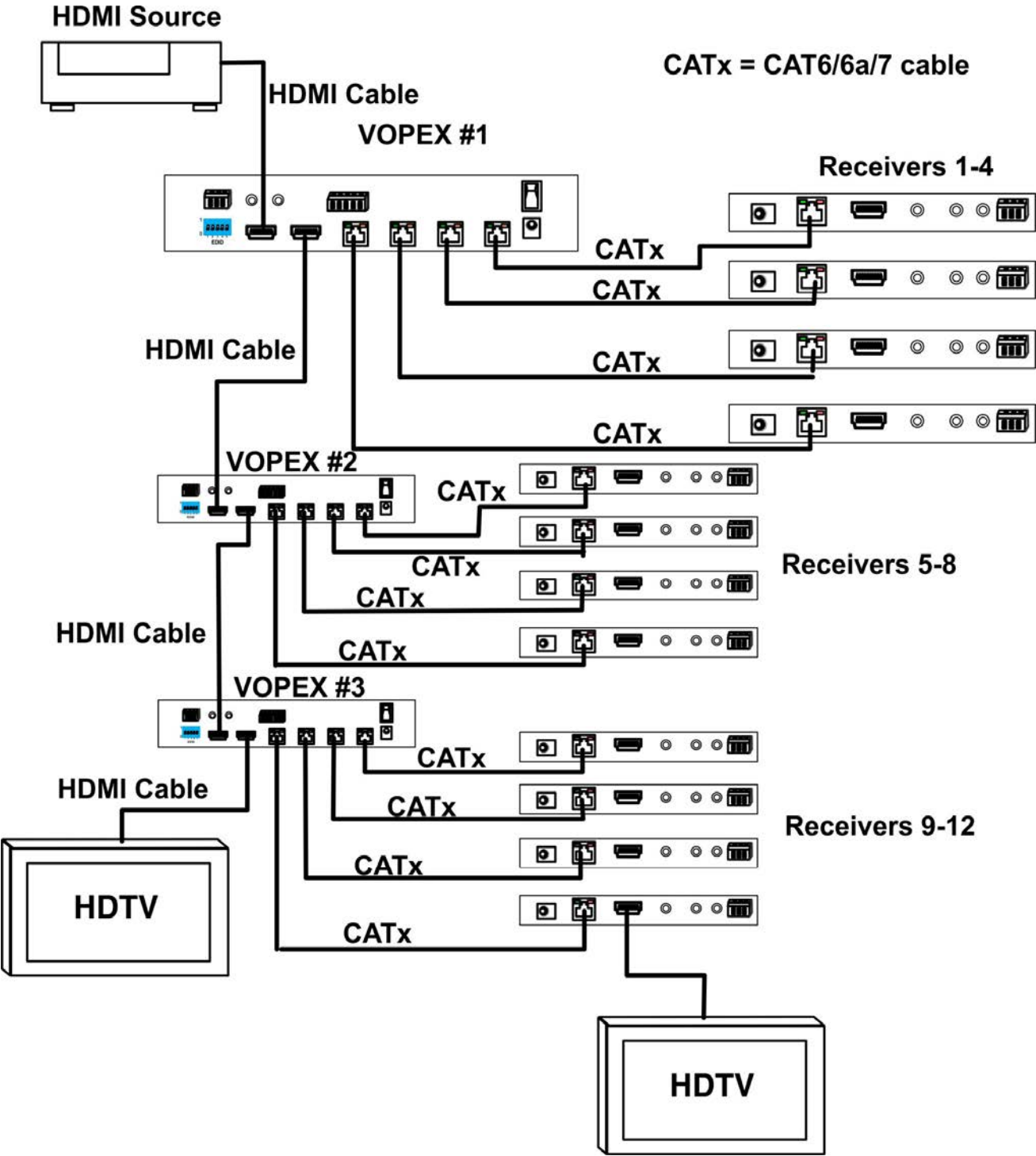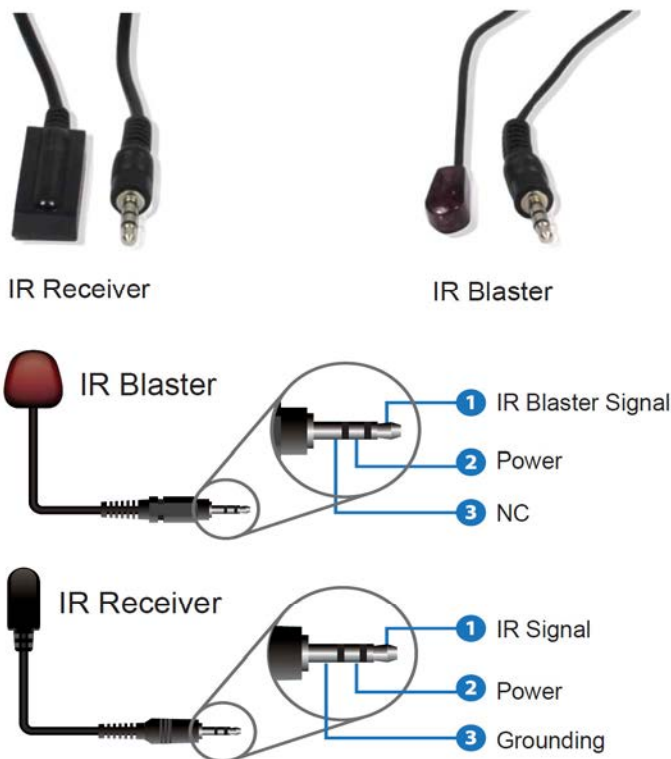
Note: When the angle between the IR receiver and the remote control is ± 45 °, the transmission distance is 0-5 meters; when the angle between the IR receiver and the remote control is ± 90 °, the transmission distance is 0-8 meters.

EDID MODES

The EDID Modes are determined by the DIP Switch settings and are defined in the chart below.

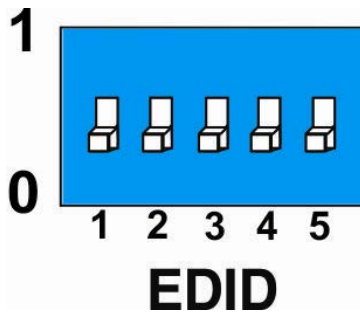| EDID Mode	EDID Description
11111	1080P, Stereo Audio 2.0
11110	1080P, Dolby/DTS 5.1
11101	1080P, HD Audio 7.1
11100	1080I, Stereo Audio 2.0
11011	1080I, Dolby/DTS 5.1
11010	1080I, HD Audio 7.1
11001	1080P 3D, Stereo Audio 2.0
11000	1080P 3D, Dolby/DTS 5.1
10111	1080P 3D, HD Audio 7.1
10110	4K2K30Hz_444, Stereo Audio 2.0
10101	4K2K30Hz_444, Dolby/DTS 5.1
10100	4K2K30Hz_444, HD Audio 7.1
10011	4K2K60Hz_420, Stereo Audio 2.0
10010	4K2K60Hz_420, Dolby/DTS 5.1
10001	4K2K60Hz_420, HD Audio 7.1
10000	4K2K60Hz_444, Stereo Audio 2.0
01111	4K2K60Hz_444, Dolby/DTS 5.1
01110	4K2K60Hz_444, HD Audio 7.1
01101	4K2K60Hz_444, Stereo Audio 2.0 HDR
01100	4K2K60Hz_444, Dolby/DTS 5.1 HDR
01011	4K2K60Hz_444, HD Audio 7.1HDR
01010	COPY_FROM_LOOP OUT
01001	COPY_FROM_HDBT OUT1
01000	COPY_FROM_HDBT OUT2
00111	COPY_FROM_HDBT OUT3
00110	COPY_FROM_HDBT OUT4
00101	1080P, Stereo Audio 2.0
00100	1080P, Stereo Audio 2.0
00011	1080P, Stereo Audio 2.0
00010	1080P, Stereo Audio 2.0
00001	1080P, Stereo Audio 2.0
00000	PC control mode

ASCII COMMANDS

The VOPEX also supports ASCII command control. Connect the RS232 port to a computer with a 3-wire cable.   Then open a serial program (i.e. HyperTerminal) on the computer to send ASCII commands to control the VOPEX.   A list of ASCII commands are below.

ASCII Commands				
Serial port protocol. Baud rate: 115200, Data bits: 8bit, Stop bits:1, Check bit: 0				
x - Parameter 1 y - Parameter 2 ! - Delimiter				
Command Code	**Function Description**	**Example**	**Feedback**	**Default Setting**
Power				
s power z!	Power on/off the device,z=0~1 (z=0 power off, z=1 power on)	s power 1!	Power on System Initializing... Initialization Finished! FW version x.xx.xx	power on
r power!	Get current power state	r power!	power on/power off	
s reboot!	Reboot the device	s reboot!	Reboot… System Initializing... Initialization Finished! FW version x.xx.xx	
System Setup				
help!	List all commands	help!		
r status!	Get device current status	r status!	Get the unit all status: power, in/out connection, edid mode	
r fw version!	Get Firmware version	r fw version!	MCU BOOT: Vx.xx.xx MCU APP: Vx.xx.xx	
r link in!	Get the connection status of the input port	r link in!	HDMI IN: connect	
r link out y!	Get the connection status of the y output port, y=0~5(0=all, 1~4=HDBT 1~4, 5 = loop out)	r link out 1!	hdmi loop out: connect hdbt output 1: connect	
s reset!	Reset to factory defaults	s reset!	Reset to factory defaults System Initializing... Initialization Finished! FW version x.xx.xx	

ASCII Commands Continued

Command Code	Function Description	Example	Feedback	Default Setting
Output Setting				
s hdmi stream z!	Set hdmi loop output stream on/off z=0~1(0:disable,1:enable)	s hdmi stream 1 !	Enable hdmi loop out stream Disable hdmi loop out stream	enable
s hdmi hdcp z!	Set hdmi loop output hdcp on/off z=0~1(0:disable,1:enable)	s hdmi hdcp 1!	Enable hdmi loop out hdcp Disable hdmi loop out hdcp	enable
s hdbt y hdcp z!	Set hdbt output y hdcp on/off, y=0~4(0=all) z=0~1(0:disable, 1:enable)	s hdbt 1 hdcp 1 ! s hdbt 0 hdcp 1 !	Enable hdbt output 1 hdcp Disable hdbt output 1 hdcp Enable hdbt all outputs hdcp Disable hdbt all outputs hdcp	enable
s hdbt y stream z!	Set hdbt output y stream on/off, y=0~4(0=all) z=0~1 (0:disable,1:enable)	s hdbt 1 stream 1 ! s hdbt 0 stream 1 !	Enable hdbt output 1 stream Disable hdbt output 1 stream Enable hdbt all outputs stream Disable hdbt all outputs stream	enable
r hdmi stream!	Get hdmi loop out stream status	r hdmi stream!	Enable hdmi output stream	
r hdmi hdcp!	Get hdmi loop out hdcp status	r hdmi hdcp!	Enable hdmi output hdcp	
r hdbt y hdcp!	Get hdbt output y hdcp status, y=0~4(0=all)	r hdbt 1 hdcp!	Enable hdbt output 1 hdcp	
r hdbt stream!	Get hdbt output y stream status, y=0~4(0=all)	r hdbt 1 stream!	Enable hdbt output 1 stream	

ASCII Commands Continued

Command Code	Function Description	Example	Feedback	Default Setting
EDID Setting				

s edid in from z!	Set input EDID from default EDID z, z=1~27
	1, 1080p,Stereo Audio 2.0
	2, 1080p,Dolby/DTS 5.1
	3, 1080p,HD Audio 7.1
	4, 1080i,Stereo Audio 2.0
	5, 1080i,Dolby/DTS 5.1
	6, 1080i,HD Audio 7.1
	7, 3D,Stereo Audio 2.0
	8, 3D,Dolby/DTS 5.1
	9, 3D,HD Audio 7.1
	10, 4K2K30_444,
	    Stereo Audio 2.0
	11, 4K2K30_444,Dolby/DTS 5.1
	12, 4K2K30_444,HD Audio 7.1
	13, 4K2K60_420,
	    Stereo Audio 2.0
	14, 4K2K60_420,
	    Dolby/DTS 5.1
	15, 4K2K60_420,HD Audio 7.1
	16, 4K2K60_444,
	    Stereo Audio 2.0
	17, 4K2K60_444,
	    Dolby/DTS 5.1
	18, 4K2K60_444,HD Audio 7.1
	19, 4K2K60_444,
	    Stereo Audio 2.0 HDR
	20, 4K2K60_444,
	    Dolby/DTS 5.1 HDR
	21, 4K2K60_444,
	    HD Audio 7.1 HDR
	22, copy from hdmi loop out
	23, copy from hdbt output 1
	24, copy from hdbt output 2
	25, copy from hdbt output 3
	26, copy from hdbt output 4
	27, use user1 EDID
		s edid in from 1!	input EDID:1080p, Stereo Audio 2.0
			
			Please toggle EDID dip switch to 00000!
				1080p,Stereo Audio 2.0

s edid user1 00 FF FF FF FF …!	Set user1 EDID data	s edid user1 00 ff ff ff ff …. !	user1 EDID data: 00 FF FF ….	
r edid user1!	Get user1 EDID data	r edid user1!	user1 EDID data : 00 FF FF FF FF FF FF 00 ………	
r edid in!	Get EDID status of the input	r edid in!	input EDID: 4K2K60_444,Stereo Audio 2.0	
r edid in data!	Get the EDID data of the hdmi input	r edid in data!	EDID data : 00 FF FF FF FF FF FF 00 ……	

ASCII Commands Continued

Command Code	Function Description	Example	Feedback	Default Setting
RS-232 BYPASS Setting				
s rs232 bypass hdbt y!	Set RS-232 port connect to HDBT out1 Receiver RS-232 port, y=0~5(0=all, 1~4= hdbt out 1~4 5=NC)	s rs232 bypass hdbt 1!	RS-232 connect to HDBT OUT1 RS-232 not connect to HDBT OUT	y=0
r rs232 bypass!	Get RS-232 port connect to HDBT out receiver RS-232 port	r rs232 bypass!	RS-232 connect to HDBT OUT1 RS-232 connect to all HDBT OUT RS-232 not connect to HDBT OUT	
s device baud w size x stop y parity z!	Set receiver control device COM port setting, w=2400, 4800,9600,19200,38400, 57600,115200, x=7,8 y=1,2, z=none, even,odd	s device baud 57600 size 8 stop 1 parity none!	receiver device COM port setting baudrate: 57600 data size :8, stop:1 parity: none	
s rs232 time x!	set send RS232 command wait time x=200~5000ms	s rs232 time 200!	send RS-232 command wait time 200ms	200ms

TECHNICAL SPECIFICATIONS

Local Unit	• Compatible with computers and UHD video sources (satellite receivers, Blu-Ray players, etc) with HDMI video.
	• One female HDMI connector for video source.
	• One female HDMI connector for local display or for cascading to another VOPEX-C64K18GB-4HDBT.
	   o Supports Ultra-HD 4Kx2K resolutions (4096x2160 and 3840x2160@30/60Hz YUV 4:4:4), HDTV resolutions to 1080p, and up to 1920x1200 (WUXGA).
	• Two female 3.5mm ports for connecting an IR emitter and receiver (included).
	• Screw terminal for RS232.
	   o Supports full duplex RS232 at 115200 baud.
	• One RCA jack for SPDIF digital audio output.
	• Screw terminal for analog stereo audio output.
	• Four female RJ45 HDBaseT connectors for sending/receiving ultra-high definition video, audio, IR, RS232, and DDC signals.

Remote Unit	• One female HDMI connector for display.
	   o Supports Ultra-HD 4Kx2K resolutions (4096x2160 and 3840x2160@30/60Hz YUV 4:4:4), HDTV resolutions to 1080p, and up to 1920x1200 (WUXGA).
	   o Supports embedded digital audio through HDMI compatible TVs or audio receivers.
	• Two female 3.5mm ports for connecting an IR emitter and receiver (included).
	• Screw terminal for RS232.
	   o Supports full-duplex RS232 at 115200 baud.
	• One female 3.5mm port for stereo audio output.
	• One female RJ45 HDBaseT connector for sending/receiving ultra-high definition video, audio, IR, RS232, and DDC signals.

HDMI Compliance	HDMI 2.0b
HDCP Compliance	HDCP 2.2/1.4
Video Bandwidth	594MHz/18Gbps
Color Depth	8-bit,10-bit,12-bit(1080p@60Hz) 8-bit (4K2K@60Hz YUV4:4:4) 8-bit,10-bit,12-bit(4K2K@60Hz YCbCr 4:2:2/4:2:0)
Coaxial Audio Formats	PCM2.0, Dolby Digital / Plus, DTS 2.0/5.1
Analog Audio Formats	PCM 2.0CH
ESD Protection	Human body model—±8kV (Air-gap discharge) & ±4kV (Contact discharge)
Color Space	RGB 4:4:4, YCbCr 4:4:4 / 4:2:2 / 4:2:0
HDR Support	HDR, HDR10+, HLG, Dolby vision
HDMI Audio Formats	LPCM 2.0/2.1/5.1/6.1/7.1, Dolby Digital, Dolby TrueHD, Dolby Digital Plus(DD+), DTS-ES, DTS HD Master, DTS HD-HRA, DTS-X

Power	Local unit:
	    Input: 100 to 240 VAC at 50 or 60 Hz via AC adapter.
	    Output: 24VDC, 2.7A
	    Power consumption: 30W max
	Remote units: powered by local unit

Dimensions	• Local unit WxDxH (in): 8.69x5.40x1.62 (221x137x41 mm) • Remote unit WxDxH (in): 5.53x2.69x0.76 (140x68x19 mm)
Operating Temperature	32 to 104°F (0 to 40°C)
Storage Temperature	-4 to 140°F (-20 to 60°C)
Operating relative humidity	20 to 90% non-condensing RH

Regulatory Approvals	CE, FCC, RoHS
Maximum Distance	394 feet (120 meters) for Ultra-HD 4Kx2K 60Hz 4:4:4 over CAT6/6a/7 cable.
	443 feet (135 meters) for 1080p and 1920x1200 over CAT6/6a/7 cable.

WARRANTY INFORMATION

The warranty period on this product (parts and labor) is two (2) years from the date of purchase. Please contact Network Technologies Inc at **(800) 742-8324** (800-RGB-TECH) or **(330) 562-7070** or visit our website at http://www.networktechinc.com for information regarding repairs and/or returns. A return authorization number is required for all repairs/returns.

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