CH-2538STXWPUD
& CH-2527RX

4K UHD+ HDMI/VGA over HDBaseT Wall Plate Scaler Transmitter (PD) & Receiver (PSE)

Operation Manual

DISCLAIMERS

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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.

REVISION HISTORY

VERSION NO.	DATE	SUMMARY OF CHANGE
RDV1	2019/07/19	Preliminary release

CONTENTS

1. INTRODUCTION

Transmitter

This wall plate scaler is an HDMI/VGA switch with audio embedding and HDBaseT output. The wall plate is designed for use with US two-gang sized enclosures. This unit can send high definition uncompressed audio/video along with Ethernet over a single cable up to a distance of 100 meters at 1080p@60Hz.

The HDMI input supports resolutions up to 4K@60Hz (4:4:4, 8-bit). The VGA input supports resolutions up to WUXGA (RB) and with the use of the associated 3.5mm audio input, stereo audio may be embedded as well. Despite HDBaseT's 10.2Gbps bandwidth limitation, even 4K UHD+ HDMI video sources, up to and including 4K@60Hz (4:4:4, 8-bit), can be supported thanks to the built in scaling engine. A specific output resolution can be manually set, or to provide maximum compatibility with a wide range of display types, sources can be automatically scaled to match the preferred resolution and timing of the connected display (as reported by the display's EDID).

Signal management features, such as automatic source switching based on input signal detection, enable convenient hands-free operation. Additional functionality such as basic EDID management, HDCP management, and basic signal event automation (which can automatically send customized RS-232 commands to an external device) is also available for configuration via serial commands.

Additionally, the unit may be powered locally or via PoH (Power over HDBaseT) from a compatible HDBaseT receiver, which allows for greater flexibility in installations. Controllable via front panel buttons with OSD and RS-232 (with compatible receiver).

Receiver

This receiver is a great solution for extending uncompressed HD audio and video as well as Ethernet and control via a single run of Cat.5e/6/7 cable over distances of up to 100 meters. Multiple data and control interfaces are provided, including Ethernet, IR and RS-232 connections. This receiver complies with the advanced HDCP 2.2 and HDMI 2.0 standards, as well as supporting the legacy HDCP 1.x and HDMI 1.x standards. This receiver can provide PoH (Power over HDBaseT) to compatible transmitters allowing for greater flexibility within different installation scenarios.

2. APPLICATIONS

- Household entertainment sharing and control
- Lecture room display and control
- Showroom display and control
- Meeting room presentation and control
- Classroom display and control

3. PACKAGE CONTENTS

Transmitter

- 1× 4K UHD^{+} HDMI/VGA over HDBaseT Wall Plate Transmitter
- 1× Operation Manual

Receiver

- 1× 4K UHD HDMI over HDBaseT Receiver
- 1× 48V/0.83A DC Power Adapter
- 1× Power Cord
- 1× Operation Manual

4. SYSTEM REQUIREMENTS

- HDMI source equipment such as a media player, video game console or set-top box.
- VGA source equipment such as a PC, laptop or set-top box.
- HDMI receiving equipment such as an HDTV, monitor or audio amplifier.
- The use of Premium High Speed HDMI cables, and industry standard Cat.6, Cat.6a or Cat.7, is highly recommended.

5. FEATURES

Transmitter

- HDMI with 3D & 4K support, DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- 1 HDMI input
- 1 VGA input with 3.5mm mini-jack audio input
- HDMI input supports up to 4K UHD+ (18Gbps, 4K@50/60Hz 4:4:4, 8-bit) video
- VGA input supports up to 1080p60/WUXGA video
- Integrated scaler supports output resolutions from 640×480@60Hz up to 4096×2160@30Hz
- Automatic scaling of sources to match the native resolution of the HDMI display based on EDID
- HDBaseT output transmits video, audio and data over a single Cat.5e/6/7 cable and can reach distances up to 70m at 4K when using Cat.6a/7
- Supported HDBaseT feature set: HD Video & Audio, 100BaseT Ethernet, and PoH (PD)
- Supports 2 channel LPCM audio with volume control
- Supports CEC bypass
- Automatic input selection with hot plug detection enabling hands-free operation
- Basic signal event automation (via RS-232 with a compatible receiver)
- Unit may be powered locally or via PoH from a compatible HDBaseT receiver
- Wall plate is designed for US two-gang sized enclosures
- Front panel LEDs indicate input selection, power and link status
- Controllable via front panel buttons with OSD and RS-232 (via compatible receiver)

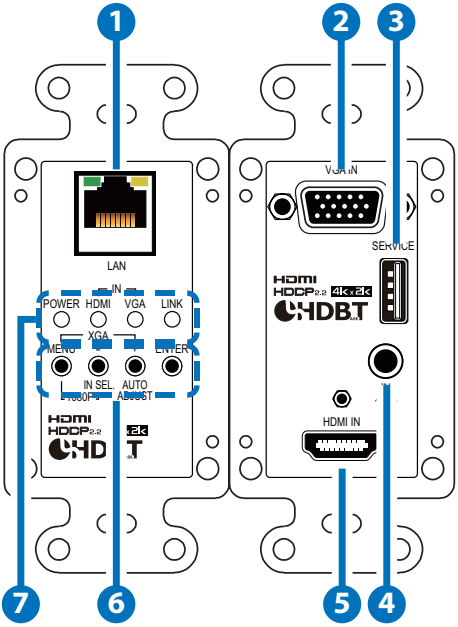
Receiver

- HDMI with 3D & 4K support, DVI 1.0 compatible
- HDCP 2.2 and HDCP 1.x compliant
- Supports up to 4K UHD (10.2Gbps, 4K@50/60Hz 4:2:0, 8-bit) video input and output
- HDBaseT input receives video, audio and data over a single Cat.5e/6/7 cable and can reach distances up to 70m at 4K when using Cat.6a/7
- Supported HDBaseT feature set: HD Video & Audio, 100BaseT Ethernet, PoH (PSE) and Control (Bi-directional IR/RS-232 pass-through)
- Supports pass-through of many audio formats including 8 channel LPCM, Bitstream, and HD Bitstream
- Supports CEC bypass
- Supports standard PoH from receiver (PSE) to transmitter (PD) (compatible transmitters only)

Note: The PoH function is designed for powering compatible transmitter units only. Non-PoH transmitters will need their own power supply. Transmitters from other brands may not be compatible.

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Transmitter Front Panel



1. **LAN Port:** Connect to an Ethernet supporting device or to your local network, as appropriate, to extend the network to both ends of the HDBaseT connection.
2. **VGA IN Port:** Connect to VGA source equipment such as a PC or laptop.
3. **SERVICE Port:** This port is reserved for firmware update use only.
4. **ANALOG AUDIO IN Port:** Connect to the analog stereo output of a device such as an audio player or PC.

   Note: By default, this audio will be embedded with the VGA source.
5. **HDMI IN Port:** Connect to HDMI source equipment such as a media player, game console, or set-top box.

6 CONTROL BUTTON BLOCK

MENU Button: Press to enter the OSD menu, or to back out from menu items.

Note: Pressing "MENU" and "+" together will reset the output resolution to XGA (1024×768@60Hz). Pressing "Menu" and "–" together will reset the output resolution to 1080p@60Hz.

MINUS (-)/IN SEL. Button: Press to move down or adjust selections within OSD menus. When not in a menu press this button to switch between the available inputs. The LEDs will illuminate to indicate which source is currently selected.

PLUS (+)/AUTO ADJUST Button: Press to move up or adjust selections within OSD menus. When not in a menu press this button to optimize the positioning of the picture (VGA sources only).

Note: The Auto Adjust function requires a VGA source with a bright, edge-to-edge, image to accurately judge the dimensions of the signal.

ENTER Button: Press to confirm a selection within the OSD or to go deeper to a menu item.

7 STATUS LED BLOCK

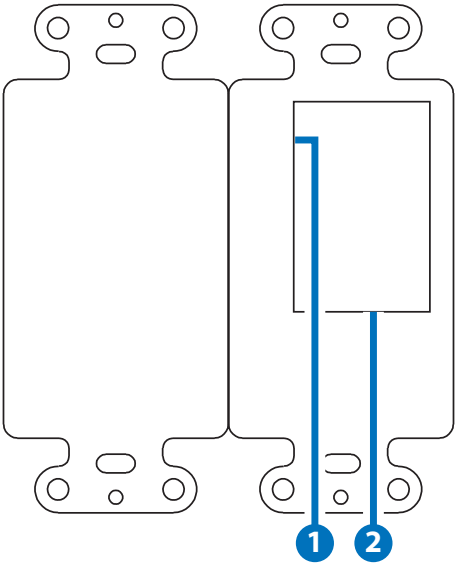
POWER LED: This LED will illuminate to indicate the unit is on and receiving power.

HDMI IN LED: The LED will illuminate when the HDMI input has been selected.

VGA IN LED: The LED will illuminate when the VGA input has been selected.

LINK LED: This LED will illuminate when both transmitter and receiver are connected and communicating with each other properly.

6.2 Transmitter's Rear Panel

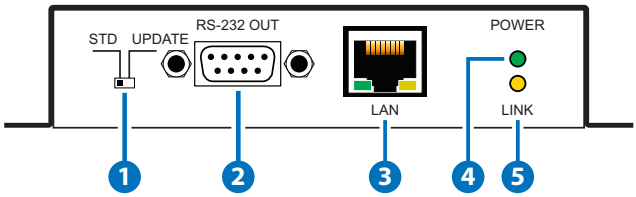


1. **DC 12V 2-pin Terminal Block:** Connect a 12V DC power adapter to these terminals and connect it to an AC wall outlet for power. (Optional)

   Note: This connection is not required if the unit is receiving PoH from a compatible PSE receiver.

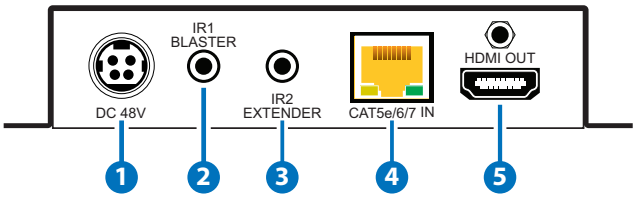
2. **CAT 5e/6/7 OUT Port:** Connect to a compatible HDBaseT receiver with a single Cat.5e/6/7 cable for transmission of all data signals. Power via PoH will also be supplied to this unit when connected to a compatible PSE Receiver.

6.3 Receiver Front Panel



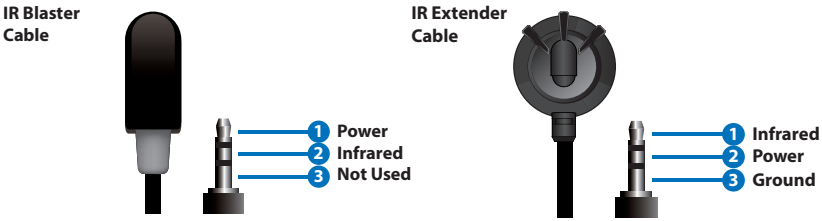
1. **STD/UPDATE Switch:**This switch is reserved for factory use only.
2. **RS-232 OUT Port:** Connect to a serial controllable device for the extension of RS-232 signals.
3. **LAN Port:** Connect to an Ethernet device or to your local network as appropriate.
4. **POWER LED:** This LED will illuminate to indicate the unit is on and receiving power.
5. **LINK LED:** This LED will illuminate solid when both Transmitter and Receiver are connected and communicating with each other properly.

6.4 Receiver Rear Panel



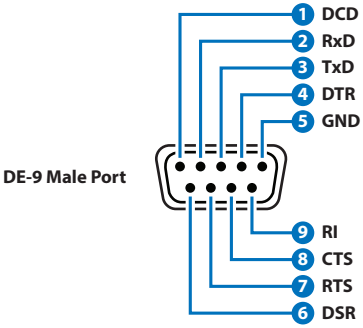
1. **DC 48V Port:** Plug the 48V DC power adapter into this port and connect it to an AC wall outlet for power.
2. **IR1 BLASTER Port:** Connect to the supplied IR Blaster cable for IR signal transmission. Place the IR Blaster in direct line-of-sight of the equipment to be controlled.
3. **IR2 EXTENDER Port:** Connect to the supplied IR Extender cable for IR signal reception. Ensure that remote being used is within the direct line-of-sight of the IR Extender.
4. **CAT5e/6/7 IN Port:** Connect to a compatible HDBaseT transmitter with a single Cat.5e/6/7 cable for reception of all data signals. PoH will also be supplied to a connected compatible PD transmitter.
5. **HDMI OUT Port:** Connect to an HDMI TV, monitor or amplifier for digital video and audio output.

6.5 IR Cable Pinouts



6.6 RS-232 Pinout and Defaults

Serial Port Default Settings	
Baud Rate	19200
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None



Note: Access to control the wall plate transmitter's settings is provided via the RS-232 port located on the connected receiver.

6.7 OSD Menu (Transmitter)

All functions of this unit can be controlled by using the OSD (On Screen Display) which is activated by pressing the MENU button on the front of the unit. Use the + (PLUS), – (MINUS), and ENTER buttons to navigate the OSD menu. Press the MENU button to back out from any menu item and then press it again to close the menu.

MAIN MENU
Video
Picture
Audio
OSD
EDID
RS232 Control
Reset
Information

The individual functions of the OSD will be introduced in the following section. Items marked in **BOLD** are the factory default settings.

VIDEO		
2ND LEVEL	**3RD LEVEL**	**4TH LEVEL**
Video	**HDMI**	
	PC	
Output	**NATIVE**	
	640×480@60	
	800×600@60	
	1024×768@60	
	1280×720@60	
	1280×768@60	
	1280×800@60	
	1280×1024@60	

VIDEO		
2ND LEVEL	3RD LEVEL	4TH LEVEL
Output	1360×768@60	
	1440×900@60	
	1400×1050@60	
	1600×1200@60	
	1680×1050@60	
	1920×1080@60	
	1920×1200@60RB	
	2048×1080@50	
	2048×1080@60	
	2560×1440@60RB	
	2560×1600@60RB	
	720×480p@60	
	720×576p@60	
	1280×720p@50	
	1280×720p@60	
	1920×1080p@24	
	1920×1080p@25	
	1920×1080p@30	
	1920×1080p@50	
	1920×1080p@60	
	2560×1080p@50	
	2560×1080p@60	
	3840×2160p@24	
	3840×2160p@25	
	3840×2160p@30	
	4096×2160p@24	
	4096×2160p@25	
	4096×2160p@30	

VIDEO		
2ND LEVEL	**3RD LEVEL**	**4TH LEVEL**
Aspect	**FULL**	
	Overscan	
	Follow In	
	Under 1	
	Under 2	
	Letterbox	
	Pan Scan	
	Best Fit	
HDMI HDCP	**REFER TO DISPLAY**	
	Refer to Source	
	Support Off	
No Signal Color	**BLACK**	
	Green	
	Red	
	Blue	
	White	
Blank	**OFF**	
	On	
Freeze	**OFF**	
	On	
Auto Setup	Auto Sync Off	**OFF**
		30s
		60s
		3min
		5min
		10min
	Auto Switch	**ON**
		Off

VIDEO		
2ND LEVEL	3RD LEVEL	4TH LEVEL
PC Setup	PC Auto Setup	[Current status]
	PC H Position	0 ~ 250
	PC V Position	0 ~ 250
	PC Phase	0 ~ 255
	PC Clock	0 ~ 250 **(125)**
	PC Mode	**1280×960@60**
		1600×900@60RB
	PC Reset	

1) **Video:** Selects the input source to display.
2) **Output:** Selects the output resolution to use. Selecting "Native" will make the unit automatically select an output resolution based on the detected EDID of the connected display.
3) **Aspect:** Selects the aspect ratio to use when outputting the source. "Full" stretches the source to fill the output resolution, regardless of the original aspect ratio, while "Best Fit" will always attempt to retain the original source's correct aspect ratio by adding black bars if necessary. "Follow In" centers the source on the screen, without any scaling (1:1 pixel reproduction).
4) **HDMI HDCP:** Selects the HDCP logic to use with the HDMI input. Setting this to "Support Off" will completely disable HDCP support.
5) **No Signal Color:** Selects the free run color to use when no live input source is detected.
6) **Blank:** Allows for the output video and audio to be blanked and muted.
7) **Freeze:** Allows for the output video to be frozen. While the output is frozen, audio output will also be muted.
8) **Auto Setup**
   - **Auto Sync Off:** Sets the amount of time to continue outputting sync with the free run color if there is no live source and no operations have been executed on the unit. Setting this to "OFF" forces the unit to always output sync.

- **Auto Switch:** Enable or disable automatically switching to any newly detected source.

9) **PC Setup:** These settings control the input specifications to use with the VGA input.
   - **PC H/V Position:** Manually set the horizontal and vertical posi tion of the VGA source.
   - **PC Phase/Clock:** Manually set the phase and clock of the VGA source.
   - **PC Auto Setup:** Activating this function forces the unit to at tempt to detect the correct image parameters of the con nected VGA source.

     Note: The "PC Auto Setup" function requires a VGA source with a bright, edge-to-edge, image to accurately judge the dimensions of the signal.
   - **PC Mode:** Select the PC resolution the unit should detect, be tween 1280x960@60Hz and 1600x900@60Hz (RB), due to the pixel clock of both resolutions being the same.
   - **PC Reset:** Reset all PC Setup settings to the factory defaults.

PICTURE	
2ND LEVEL	**3RD LEVEL**
Color Gain R	0 ~ 1023 **(512)**
Color Gain G	0 ~ 1023 **(512)**
Color Gain B	0 ~ 1023 **(512)**
Color Offset R	0 ~ 1023 **(512)**
Color Offset G	0 ~ 1023 **(512)**
Color Offset B	0 ~ 1023 **(512)**
Brightness	0 ~ 60 **(30)**
Contrast	0 ~ 60 **(30)**
Hue	0 ~ 60 **(30)**
Saturation	0 ~ 60 **(30)**
Sharpness	0 ~ 63 **(0)**

PICTURE	
2ND LEVEL	3RD LEVEL
NR	**OFF**
	Low
	Middle
	High
	Auto
Reset Picture	

1) **Color Gain (R/G/B):** These controls provide control over the red, green, and blue color gain level of the output.
2) **Color Offset (R/G/B):** These controls provide control over the red, green, and blue color offset level of the output.
3) **Brightness:** Provides control over the overall brightness of the output image.
4) **Contrast:** Provides control over the overall contrast of the output image.
5) **Hue:** Provides control over the hue shift of the output image.
6) **Saturation:** Provides control over the color saturation level of the output image.
7) **Sharpness:** Provides control over the amount of sharpness processing to apply to the output image.
8) **NR:** Provides control over the aggressiveness of the digital noise reduction processing when applied to the scaled output image. Selecting "Off" disables all noise reduction processing.
9) **Reset Picture:** Reset all picture settings back to their factory defaults.

AUDIO	
2ND LEVEL	**3RD LEVEL**
Audio	**FOLLOW VIDEO**
	Line In
Volume	0 ~ 100 **(80)**
Audio Mute	**OFF**
	On
Reset Audio	

1) **Audio:** Provides control over the analog audio routing in the unit. Selecting "Follow Video" pairs the HDMI source with its embedded digital audio and the VGA source with the analog audio input. Selecting "Line In" will force the analog audio to be output regardless of the selected video source.
2) **Volume:** Provides control over the HDBaseT output's volume level.
3) **Audio Mute:** Mutes or unmutes the HDBaseT output's audio.
4) **Reset Audio:** Reset all audio settings back to their factory defaults.

OSD	
2ND LEVEL	**3RD LEVEL**
H Position	0 ~ 60 **(30)**
V Position	0 ~ 60 **(30)**
Timer	**OFF**
	5s
	10s
	15s
	20s
	25s
	30s
	35s
	40s
	45s
	50s
	55s
	60s
Transparent	0 ~ 50 **(50)**
Display	Off
	On
	5s
	10S
Reset OSD	

1) **H/V Position:** Set the horizontal and vertical position of the OSD menu.
2) **Timer:** Set the length of time to wait before automatically turning off the OSD menu if there is no user interaction. The timer may also be disabled.
3) **Transparent:** Set the transparency level of the OSD menu. A setting of 50 is completely opaque.

4) **Display:** Enable or disable the information display and set the length of time for the information display to be visible after a source or resolution change.
5) **Reset OSD:** Reset all OSD settings back to their factory defaults.

EDID	
2ND LEVEL	3RD LEVEL
HDMI EDID	**OUTPUT**
	Int 1080p(2Ch)
	Int 4K2K(3G-2Ch)
	Int 4K2K(6G-2Ch)
EDID Status	[Current EDID]

1) **HDMI EDID:** Select the EDID to use with the HDMI input.
2) **EDID Status:** Displays the current EDID used by the HDMI.

RS232 CONTROL	
2ND LEVEL	3RD LEVEL
Control Baudrate	4800
	9600
	19200
	38400
	57600
	115200
Control Stop Bits	**1 BIT**
	2 Bit
Control Data Bits	5 Bit
	6 Bit
	7 Bit
	8 BIT
Control Parity	**NONE**
	Odd
	Even

1) **Control Baudrate:** Set the baud rate to accept from a connected receiver's RS-232 port.
2) **Control Stop Bits:** Set the number of stop bits for the RS-232 connection.
3) **Control Data Bits:** Set the number of data bits for the RS-232 connection.
4) **Control Parity:** Set the parity to use for the RS-232 connection.

RESET	
2ND LEVEL	3RD LEVEL
Reset All	

1) **Reset All:** Reset all of the unit's settings back to their factory defaults.

INFORMATION	
2ND LEVEL	3RD LEVEL
Video	[System Information Display]
Input	
Output	
Source HDCP	
Sink HDCP	
Version	

1) **Information Display:** This screen displays information about the unit's current state, input and output status, as well as the current firmware version.

6.8 Serial Commands (Transmitter)

COMMAND Description and Parameters
HELP↵ Show the full command list.
?↵ Show the full command list.
GET FW VER↵ Show the unit's firmware version.
GET MODEL NAME↵ Show the unit's model name.
SET OUT A ROUTE N1↵ Route the specified input to the HDBaseT output. Available values for **N1**: 1 [HDMI] 2 [VGA]
GET OUT A ROUTE↵ Show the current input routed to the HDBaseT output.
SET OUT AUTO MODE N1↵ Set the auto switching behavior of the unit. Available values for **N1**: 1 [Off] 2 [Auto Switch]
GET OUT AUTO MODE↵ Show the current auto switching mode of the unit.
GET OUT AUTO MODE LIST↵ List all available auto mode options..

COMMAND Description and Parameters
GET IN N1 TIMING↵ Show the current resolution detected on the specified input. Available values for **N1**: 1 [HDMI] 2 [VGA] *Note: Timing information can only be displayed for the currently selected input.*
GET IN TYPE LIST↵ List the port type of all inputs on the unit.
SET OUT A MASK N1↵ Enable or disable the a/v mask setting on the specified output. Available values for **N1**: ON [Blank video] OFF [Enable video]
GET OUT A MASK↵ Display the current a/v mask setting for the specified output.

COMMAND
Description and Parameters

SET OUT A TIMING N1↵

Set the output resolution to use for the HDBaseT output.

Available values for **N1**:

0	[Native]
1	[640×480@60]
2	[800×600@60]
3	[1024×768@60]
4	[1280×720@60]
5	[1280×768@60]
6	[1280×800@60]
7	[1280×1024@60]
8	[1360×768@60]
9	[1440×900@60]
10	[1400×1050@60]
11	[1600×1200@60]
12	[1680×1050@60]
13	[1920×1080@60]
14	[1920×1200@60RB]
15	[2048×1080@50]
16	[2048×1080@60]
17	[2560×1440@60RB]
18	[2560×1600@60RB]
19	[720×480p@60]
20	[720×576p@60]
21	[1280×720p@50]
22	[1280×720p@60]
23	[1920×1080p@24]
24	[1920×1080p@25]
25	[1920×1080p@30]
26	[1920×1080p@50]
27	[1920×1080p@60]
28	[2560×1080p@50]
29	[2560×1080p@60]
30	[3840×2160p@24]
31	[3840×2160p@25]
32	[3840×2160p@30]
33	[4096×2160p@24]
34	[4096×2160p@25]
35	[4096×2160p@30]

COMMAND Description and Parameters
GET OUT A TIMING↵ Show the current resolution used by the HDBaseT output.
GET OUT A SYNC STATUS↵ Show the current sync state of the HDBaseT output.
GET OUT TIMING LIST↵ List all available output resolutions with their local index numbers.
SET OUT A CONTRAST N1↵ Set the contrast level of the HDBaseT output. **N1** = 0 ~ 60 [Contrast]
GET OUT A CONTRAST↵ Show the current contrast level.
SET OUT A BRIGHTNESS N1↵ Set the brightness level of the HDBaseT output. **N1** = 0 ~ 60 [Brightness]
GET OUT A BRIGHTNESS↵ Show the current brightness level.
SET OUT A SATURATION N1↵ Set the saturation level of the HDBaseT output. **N1** = 0 ~ 60 [Saturation]
GET OUT A SATURATION↵ Show the current saturation level.
SET OUT A HUE N1↵ Set the hue value of the HDBaseT output. **N1** = 0 ~ 60 [Hue]
GET OUT A HUE↵ Show the current hue value.

COMMAND Description and Parameters
SET OUT A SHARPNESS N1↵ Set the sharpness level of the HDBaseT output. **N1** = 0 ~ 63 [Sharpness]
GET OUT A SHARPNESS↵ Show the current sharpness level.
SET OUT A NR N1↵ Set the amount of noise reduction to apply to the HDBaseT output's source. Available values for **N1**: 0 [Off] 1 [Low] 2 [Middle] 3 [High] 4 [Auto]
GET OUT A NR↵ Show the current amount of noise reduction applied to the HDBaseT output's source.
SET OUT A ASPECT RATIO N1↵ Set the aspect ratio of the video shown on the HDBaseT output. Available values for **N1**: 0 [Overscan] 1 [Full] 2 [Best Fit] 3 [Pan Scan] 4 [Letterbox] 5 [Under 2] 6 [Under 1] 7 [Follow In]
GET OUT A ASPECT RATIO↵ Show the currently set aspect ratio.
GET OUT ASPECT RATIO LIST↵ List all available aspect ratio options.

COMMAND Description and Parameters
SET OUT A AUTO SYNC OFF N1↵ Enable or disable the Auto Sync Off function on the HDBaseT output and set the timeout length. Available values for **N1**: 0 [Disabled] 1 [30 Seconds] 2 [60 Seconds] 3 [3 Minutes] 4 [5 Minutes] 5 [10 Minutes]
GET OUT A AUTO SYNC OFF↵ Show the current Auto Sync Off settings for the HDBaseT output.
SET OUT A R GAIN N1↵ Set the HDBaseT output's red gain level. **N1** = 0 ~ 1023 [Red Gain]
GET OUT A R GAIN↵ Show the current red gain level.
SET OUT A G GAIN N1↵ Set the HDBaseT output's green gain level. **N1** = 0 ~ 1023 [Green Gain]
GET OUT A G GAIN↵ Show the current green gain level.
SET OUT A B GAIN N1↵ Set the HDBaseT output's blue gain level. **N1** = 0 ~ 1023 [Blue Gain]
GET OUT A B GAIN↵ Show the current blue gain level.

COMMAND Description and Parameters
SET OUT A R OFFSET N1↵ Set the HDBaseT output's red gain level. **N1** = 0 ~ 1023 [Red Offset]
GET OUT A R OFFSET↵ Show the current red gain level.
SET OUT A G OFFSET N1↵ Set the HDBaseT output's green gain level. **N1** = 0 ~ 1023 [Green Offset]
GET OUT A G OFFSET↵ Show the current green gain level.
SET OUT A B OFFSET N1↵ Set the HDBaseT output's blue gain level. **N1** = 0 ~ 1023 [Blue Offset]
GET OUT A B OFFSET↵ Show the current blue gain level.
SET IN 2 PHASE N1↵ Set the PC phase value for the VGA input. **N1** = 0 ~ 255 [PC Phase]
GET IN 2 PHASE↵ Show the current PC phase value for the VGA input.
SET IN 2 CLOCK N1↵ Set the PC clock value for the VGA input. **N1** = 0 ~ 250 [PC Clock]
GET IN 2 CLOCK↵ Show the current PC clock value for the VGA input.

COMMAND Description and Parameters
SET IN 2 HPOSITION N1↵ Set the PC horizontal position for the VGA input. **N1** = 0 ~ 250 [PC H Position]
GET IN 2 HPOSITION↵ Show the current PC horizontal position for the VGA input.
SET IN 2 VPOSITION N1↵ Set the PC vertical position for the VGA input. **N1** = 0 ~ 250 [PC V Position]
GET IN 2 VPOSITION↵ Show the current PC vertical position for the VGA input.
SET PC MODE N1↵ Set the PC resolution to detect, between 1280x960@60Hz and 1600x900@60Hz (RB), when the pixel clock is the same. Available values for **N1**: 0 [1280x960@60Hz] 1 [1600x900@60Hz (RB)]
GET PC MODE↵ Show the current PC mode resolution setting.
SET AUDIO OUT A ROUTE N1↵ Set the audio routing behavior for the HDBaseT output. Available values for **N1**: 1 [Follow Video] 2 [Analog Audio]
GET AUDIO OUT A ROUTE↵ Show the currently selected audio routing behavior.
GET AUDIO IN TYPE LIST↵ List all available audio input sources.

COMMAND Description and Parameters
SET AUDIO OUT A MUTE N1↵ Enable or disable muting the audio output. Available values for **N1**: ON [Mute Enabled] OFF [Mute Disabled]
GET AUDIO OUT A MUTE↵ Show the current mute state of the HDBaseT output.
SET AUDIO OUT A VOLUME N1↵ Set the volume level of the HDBaseT output's audio. **N1** = 0 ~ 100 [Volume]
GET AUDIO OUT A VOLUME↵ Show the current volume level of the HDBaseT output's audio.
SET OUT A OSD TIMEOUT N1↵ Set the OSD's timeout value. Available values for **N1**: 0 [Off] 1 [5 Seconds] 2 [10 Seconds] 3 [15 Seconds] 4 [20 Seconds] 5 [25 Seconds] 6 [30 Seconds] 7 [35 Seconds] 8 [40 Seconds] 9 [45 Seconds] 10 [50 Seconds] 11 [55 Seconds] 12 [60 Seconds]
GET OUT A OSD TIMEOUT↵ Show the current OSD timeout value.

COMMAND	
Description and Parameters	
SET OUT A OSD INFO DISPLAY N1↵	
Enable, set the timeout value, or disable the info OSD.	
Available values for **N1**:	
0	[Always Off]
1	[Always On]
2	[5 Seconds]
3	[10 Seconds]
GET OUT A OSD INFO DISPLAY↵	
Show the current info OSD state for the specified output.	
SET OUT A OSD VPOSITION N1↵	
Set the vertical position of the OSD.	
N1 = 0 ~ 60	[V Position]
GET OUT A OSD VPOSITION↵	
Show the current vertical position of the OSD.	
SET OUT A OSD HPOSITION N1↵	
Set the horizontal position of the OSD.	
N1 = 0 ~ 60	[H Position]
GET OUT A OSD HPOSITION↵	
Show the current horizontal position of the OSD.	
SET OUT A OSD TRANSPARENCY N1↵	
Set the transparency level of the OSD.	
N1 = 0 ~ 50	[Transparency]
GET OUT A OSD TRANSPARENCY↵	
Show the current transparency level of the OSD.	

COMMAND Description and Parameters
SET IN 1 HDCP MODE N1↵ Set the HDCP behavior of the HDMI input. Available values for **N1**: 0 [Disable HDCP] 1 [Follow Source] 2 [Follow Display]
GET IN 1 HDCP MODE↵ Show the current HDCP behavior used by the HDMI input.
GET OUT A HDCP STATUS↵ Show the current HDCP status of the HDBaseT output.
SET UART 1 BAUDRATE N1↵ Set the baud rate to accept from a connected receiver's RS-232 port. Available values for **N1**: 0 [4800] 1 [9600] 2 [19200] 3 [38400] 4 [57600] 5 [115200]
GET UART 1 BAUDRATE↵ Show the current RS-232 baud rate setting.
SET UART 1 STOP BITS N1↵ Set the number of RS-232 stop bits. Available values for **N1**: 0 [1 Bit] 1 [2 Bits]
GET UART 1 STOP BITS↵ Show the current number of RS-232 stop bits.

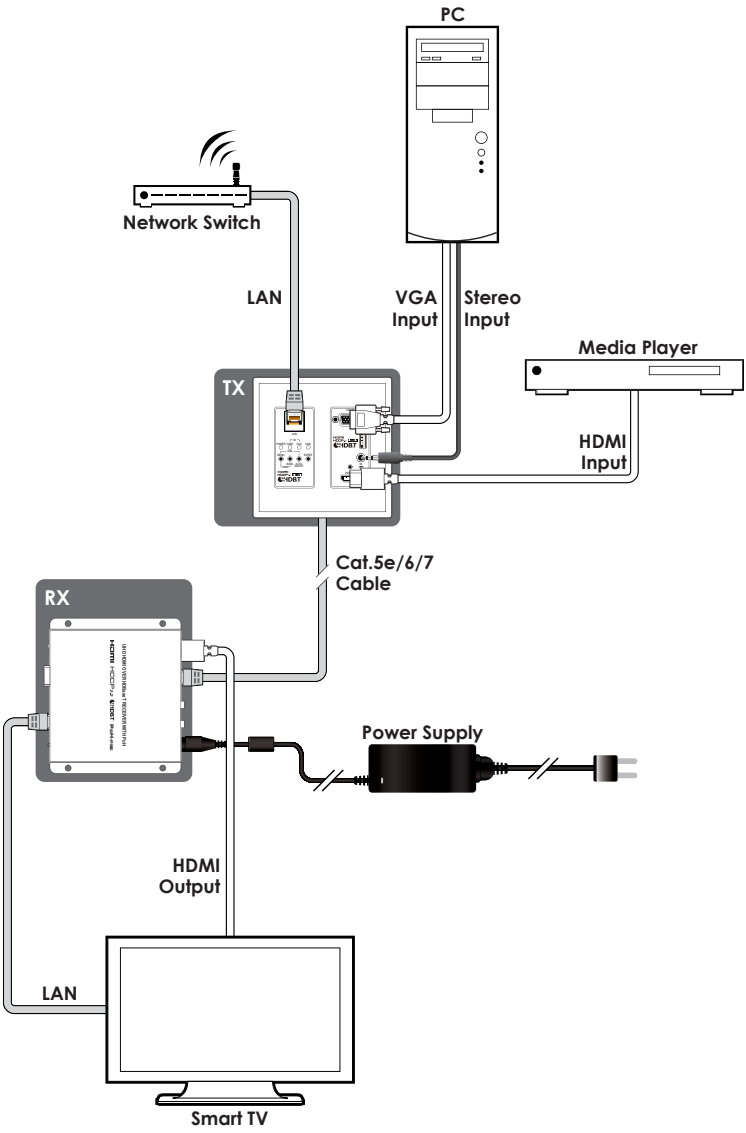
COMMAND Description and Parameters
SET UART 1 DATA BITS N1↵ Set the RS-232 data bits. Available values for **N1**: 0 [5 Bits] 1 [6 Bits] 2 [7 Bits] 3 [8 Bits]
GET UART 1 DATA BITS↵ Show the current number of RS-232 data bits.
SET UART 1 PARITY N1↵ Set the RS-232 parity. Available values for **N1**: 0 [None] 1 [Odd] 2 [Even]
GET UART 1 PARITY↵ Show the current RS-232 parity setting.
SET IN 1 EDID N1↵ Set the EDID to use on the HDMI input. Available values for **N1**: 1 [1080P, 2CH] 2 [4K (3G), 2CH] 3 [4K (6G), 2CH] 4 [Output's EDID]
GET IN 1 EDID↵ Show the EDID currently being used on the HDMI input.
GET IN EDID LIST↵ List all available EDID selections.
GET TRIGGER EVENT LIST↵ List all available Automation Events.

COMMAND	
Description and Parameters	
SET AUTOMATION EVENT N1 UART A COMMAND N2↵ Set the RS-232 command string to send when the specified Automation Event is activated.	
N1 = 1 ~ 3	[Automation Event Number]
N2 = {String}	[64 Chars Max]
GET AUTOMATION EVENT N1 UART A COMMAND↵ Show the RS-232 command string to be sent when the specified Automation Event is activated.	
N1 = 1 ~ 3	[Automation Event Number]
SET AUTOMATION EVENT N1 UART A N2↵ Enable or disable the specified Automation Event's RS-232 response.	
N1 = 1 ~ 3	[Automation Event Number]
Available values for **N2**:	
ON	[Enable]
OFF	[Disable]
GET AUTOMATION EVENT N1 UART A↵ Show the current state of the specified Automation Event's RS-232 response.	
N1 = 1 ~ 3	[Automation Event Number]
SET AUTOMATION EVENT N1 UART A DELAY N2 SCE↵ Set the delay time that the specified Automation Event must continue to be true before sending the defined RS-232 command.	
N1 = 1 ~ 3	[Automation Event Number]
N2 = 0 ~ 240	[Delay Seconds]
GET AUTOMATION EVENT N1 UART A DELAY↵ Show the delay time for the specified Automation Event's RS-232 response.	
N1 = 1 ~ 3	[Automation Event Number]

COMMAND	
Description and Parameters	
SET AUTOMATION EVENT N1 UART A WAIT N2 SCE↵	
Set the length of time to wait after an Automation Event's RS-232 response has been activated before ANY other Automation Event can be detected.	
N1 = 1 ~ 3	[Automation Event Number]
N2 = 0 ~ 240	[Delay Seconds]
GET AUTOMATION EVENT N1 UART A WAIT↵	
Show the wait time for the specified Automation Event's RS-232 response.	
N1 = 1 ~ 3	[Automation Event Number]

Note: Commands will not be executed unless followed by a carriage return. Commands are not case-sensitive.

7. CONNECTION DIAGRAM



8. SPECIFICATIONS

8.1 Technical Specifications (Transmitter)

HDMI Bandwidth	18Gbps
VGA Bandwidth	165MHz
HDBaseT Bandwidth	10.2Gbps
Input Ports	1×HDMI (Type-A)
	1×VGA (HD-15)
	1×Analog Audio (3.5mm)
Output Ports	1×HDBaseT (RJ-45)
Pass-through Ports	1xLAN (RJ-45)
Service Port	1×USB 2.0 (Type A)
Baud Rate	19200
Power Supply	PoH (from Rx)
	12V/3A DC (Optional)
	(US/EU standards, CE/FCC/UL certified)
ESD Protection (HBM)	±8kV (Air Discharge)
	±4kV (Contact Discharge)
Dimensions (W×H×D)	91.8mm×104mm×50mm[Case Only]
	91.8mm×104mm ×54mm[All Inclusive]
Weight	232g
Chassis Material	Metal (Aluminum)
Chassis Color	White
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	18.26 W

8.2 Technical Specifications (Receiver)

HDMI Bandwidth	18Gbps
HDBaseT Bandwidth	10.2Gbps
Input Ports	1×HDBaseT (RJ-45)
Output Ports	1×HDMI (Type-A)
Pass-through Ports	1×IR Extender (3.5mm)
	1×IR Blaster (3.5mm)
	1×RS-232 (DE-9)
	1×LAN (RJ-45)
IR Frequency	30 – 50kHz
	(30 – 60kHz under ideal conditions)
Baud Rate	Up to 115200
Power Supply	48V/0.83A DC
	(US/EU standards, CE/FCC/UL certified)
ESD Protection (HBM)	±8kV (Air Discharge)
	±4kV (Contact Discharge)
Dimensions (W×H×D)	128mm×25mm×108mm [Case Only]
	128mm×25mm×117mm [All Inclusive]
Weight	366g
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	8.74W

8.3 Video Specifications

8.3.1 Transmitter

Supported Resolutions (Hz)	Input		Output
	HDMI	VGA	HDBT
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	✓	✓	✓

Supported Resolutions (Hz)	Input		Output
	HDMI	VGA	HDBT
1920×1200p@60RB	✓	✓	✓
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	×	×	×

8.3.2 Receiver

Supported Resolutions (Hz)	Input	Output
	HDBT	HDMI
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	✓	✓

Supported Resolutions (Hz)	Input	Output
	HDBT	HDMI
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	✓	✓
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)	✓	✓

Supported Resolutions (Hz)	Input	Output
	HDBT	HDMI
4096×2160p@24, HDR10	×	×
4096×2160p@50/60 (4:2:0), HDR10	×	×
4096×2160p@50/60	×	×

8.4 Audio Specifications

8.4.1 Digital Audio (Transmitter)

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

HDBaseT Output	
LPCM	
Max Channels	2 Channels
Sampling Rate (kHz)	48
Bitstream	
Supported Formats	None

8.4.2 Analog Audio (Transmitter)

Analog Input	
Max Audio Level	2Vrms
Impedance	10kΩ
Type	Unbalanced

8.4.3 Digital Audio (Receiver)

HDBaseT Input & HDMI Output	
LPCM	
Max Channels	8 Channels
Sampling Rate (kHz)	32, 44.1, 48, 88.2, 96, 176.4, 192
Bitstream	
Supported Formats	Bitstream & HD Bitstream

8.5 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	×
VGA Cable				
VGA Input	2m		×	
Ethernet Cable				
Cat.5e/6	100m		90m	×
Cat.6A/7	100m		100m	×

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 (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 (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

8.6 HDBaseT Features

HDBaseT Feature Set	Transmitter
Video & Audio Extension	Supported
LAN Extension	Supported
Send power to Receiver	Unsupported
Accept power from Receiver	Supported (PoH)
IR Extension	Unsupported
RS-232 Extension	Unsupported
USB 2.0 Extension	Unsupported

HDBaseT Feature Set	Receiver
Video & Audio Extension	Supported
LAN Extension	Supported
Send power to Transmitter	Supported (PoH)
Accept power from Transmitter	Unsupported
IR Extension	Supported
RS-232 Extension	Supported
USB 2.0 Extension	Unsupported

9. ACRONYMS

ACRONYM	COMPLETE TERM
ADC	Analog-to-Digital Converter
ASCII	American Standard Code for Information Interchange
AVR	Audio/Video Receiver or Recorder
Cat.5e	Enhanced Category 5 cable
Cat.6	Category 6 cable
Cat.6A	Augmented Category 6 cable
Cat.7	Category 7 cable
CEC	Consumer Electronics Control
CLI	Command-Line Interface
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
Gbps	Gigabits per second
HD	High-Definition
HDBT	HDBaseT
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
IP	Internet Protocol
IR	Infrared
kHz	Kilohertz
LAN	Local Area Network
LED	Light-Emitting Diode
LPCM	Linear Pulse-Code Modulation
MHz	Megahertz
OSD	On-Screen Display

ACRONYM	COMPLETE TERM
PD	Powered Device
PoH	Power over HDBaseT
PSE	Power Sourcing Equipment
TCP	Transmission Control Protocol
UHD	Ultra-High-Definition (10.2Gbps)
UHD^{+}	Ultra-High-Definition Plus (18Gbps)
UHDTV	Ultra-High-Definition Television
USB	Universal Serial Bus
VGA	Video Graphics Array
WUXGA (RB)	Widescreen Ultra Extended Graphics Array (Reduced Blanking)
XGA	Extended Graphics Array
Ω	Ohm

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