# PUV-1250PL-TX

**Multi-format 4K HDBaseT™ Transmitter with HDMI, USB-C, DisplayPort & VGA Inputs plus USB-C charging**

/// **OPERATION MANUAL**

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Version 1.1

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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 |
|---|---|---|
| v1.00 | 30/04/2020 | First release |
| | | |

# CONTENTS

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# 1. INTRODUCTION

This 4x1 Multi-Format to HDBaseT Switch is a 4K@60Hz (4:4:4) switcher featuring HDMI, DisplayPort, USB Type-C, and VGA with stereo inputs which are automatically converted to the standard HDBaseT format for use with a compatible receiver. The HDMI, DisplayPort and USB-C inputs support resolutions up to 4K@60Hz (4:4:4, 8-bit) and the VGA input supports resolutions up to WUXGA (RB). With the use of the 3.5mm audio input, stereo audio can be embedded with the VGA source as well. Despite HDBaseT's 10.2Gbps bandwidth limitation, high bandwidth 4K UHD HDMI video sources, up to and including 4K@60Hz (4:4:4, 8-bit), can be supported and will be automatically converted to 1080p when necessary.

Signal management features such as automatic switching based on input signal and hot plug detection enable convenient hands-free operation. Additional functionality such as EDID management, HDCP management and basic signal event automation (which can send customised CEC commands to the display automatically) is also available. The USB Type-C input can provide power (up to 60W) to any connected device and the HDBaseT output provides PoH (Power over HDBaseT) to power compatible receivers, providing greater flexibility in installations. Control is provided via a front panel button, WebGUI, Telnet, and RS-232.

# 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

▰ 1×HDMI/DisplayPort/VGA/USB Type-C to HDBaseT Switcher

▰ 1×24V/3.75A DC Power Adapter

▰ 1×Power Cord

▰ 1×3.5mm to IR Blaster Cable

▰ 1×3-pin Terminal Block

▰ 1×Operation Manual

# 4. SYSTEM REQUIREMENTS

▰ Source equipment such as media players, video game consoles, PCs, or set-top boxes.

▰ A compatible HDBaseT receiver with PoH (PD) support is recommended.

▰ The use of Premium High Speed HDMI cables, and industry standard Cat.6, Cat.6a or Cat.7, is highly recommended.

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## 5. FEATURES

▰ HDMI 2.0, DisplayPort 1.4, and DVI 1.0 compliant

▰ HDCP 1.x and 2.2 compliant

▰ Switchable HDMI, DisplayPort, VGA with analogue audio, and USB Type-C inputs

▰ 1 HDBaseT output

▰ Digital inputs support up to 4K UHD (18Gbps, 4K@60Hz 4:4:4, 8-bit)

▰ VGA input supports resolutions up to WUXGA (RB)

▰ Analogue stereo audio is automatically embedded with the video from the VGA input

▰ HDBaseT output supports resolutions up to 4K@60Hz (4:2:0, 8-bit) or 4K@30Hz (4:4:4, 8-bit). 4K@50/60Hz (4:4:4, 8-bit) or 4K@any (10/12-bit) sources will be automatically converted to 1080p.

▰ Supported HDBaseT feature set: HD Video & Audio, PoH, and Control Extension (Bi-directional IR/RS-232)

▰ HDBaseT output transmits video, audio and data over a single Cat.5e/6/7 cable and can reach distances up to 40m/131ft at 4K when using Cat.6a/7

▰ Supports pass-through of many audio formats including 8 channel LPCM, Bitstream, and HD Bitstream

▰ Supports standard PoH from the unit to connected HDBaseT Receivers (compatible Receivers only)

▰ Supports manual input selection or automatic input selection with hot plug detection and "Last Memory" feature

▰ Basic signal event automation using CEC commands

▰ Comprehensive EDID management

▰ USB Type-C port provides up to 60W to power or charge the connected device

▰ Controllable via a front panel button, WebGUI, Telnet, and RS-232

# 6. OPERATION CONTROLS AND FUNCTIONS

## 6.1 Front Panel
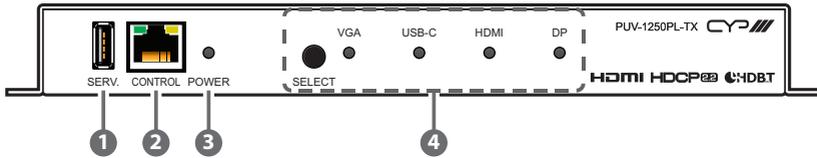


**1** **SERV. Port:** This port is reserved for firmware update use only.

**2** **CONTROL Port:** Connect directly, or through a network switch, to your PC/laptop to control the unit via Telnet/WebGUI.

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

**4** **SELECT Button & VGA/USB-C/HDMI/DP LEDs:** Press the Select button to sequentially switch through the available inputs. The currently selected input's LED will illuminate green. The LEDs will illuminate red to indicate inputs that have live sources but are not currently selected.

## 6.2 Rear Panel
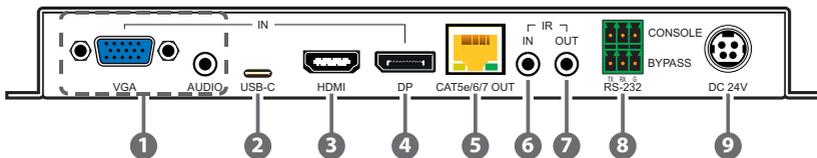


**1** **VGA IN Port:** Connect to VGA source equipment such as a PC or laptop.

**AUDIO IN Port:** Connect to the stereo analogue output of the device connected to the VGA input port.

**2** **USB-C IN Port:** Connect to USB Type-C video source equipment such as a PC or laptop.

*Note: Not all devices with USB Type-C ports can support video output. Please verify that the device supports video output from the USB Type-C port before connecting it.*

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

**4 DP IN Port:** Connect to DisplayPort source equipment such as a PC or laptop.

**5 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. PoH will also be supplied to a connected compatible PD Receiver.

**6 IR EXTENDER Port:** Connect to an IR Extender to receive IR control signals and extend them to devices connected to the other end of the HDBaseT connection. Ensure that the remote being used is within direct line-of-sight of the IR Extender.

**7 IR BLASTER Port:** Connect to the provided IR Blaster to transmit IR signals from the other end of the HDBaseT connection to devices within direct line-of-sight of the IR Blaster.

**8 RS-232 CONSOLE Port:** Connect directly to a PC, laptop, or other serial control device with a 3-pin adapter cable to send RS-232 commands to control the unit.

**RS-232 BYPASS Port:** Connect to a PC, laptop, or other serial control device with a 3-pin adapter cable for the extension of RS-232 signals to the Receiver.

**9 DC 24V Port:** Plug the 24V DC power adapter into this port and connect it to an AC wall outlet for power.

## 6.3 IR Cable Pinouts

**IR Blaster Cable**

| | |
|---|---|
| ① | Power |
| ② | Infrared |
| ③ | Not Used |

**IR Extender Cable**

| | |
|---|---|
| ① | Infrared |
| ② | Power |
| ③ | Ground |
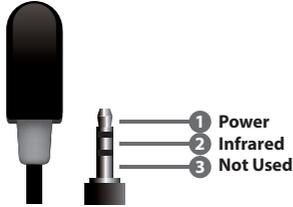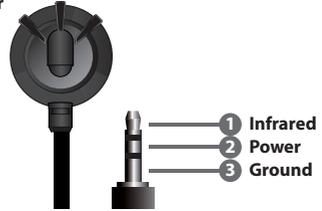
## 6.4 RS-232 Pinout and Defaults

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

### Console

**3-pin Terminal Block**

| | |
|---|---|
| ① | GND |
| ② | RxD |
| ③ | TxD |
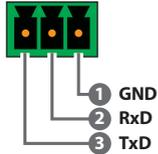
### Bypass

**3-pin Terminal Block**

| | |
|---|---|
| ① | GND |
| ② | RxD |
| ③ | TxD |
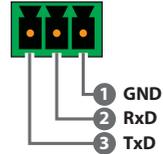
## 6.5 WebGUI Control

**Device Discovery**

Please obtain the "Device Discovery" software from your authorised dealer and save it in a directory where you can easily find it.

Connect the unit and your PC/Laptop to the same active network and execute the "Device Discovery" software. Click on "Find Devices on Network" and a list of devices connected to the local network will show up indicating their current IP address.

*Note: The unit's default IP address is 192.168.1.50.*

| | Find Devices on Network | | |
|---|---|---|---|
| Product Name | Description | IP Address | MAC Address |
| | | | |

By clicking on one of the listed devices you will be presented with the network details of that particular device.

| | |
|---|---|
| Product ID | |
| Product Name | |
| MAC Address | 00:00:00:00:00:00 |
| IP Address | |
| Subnet Mask | |
| Gateway IP | |
| DNS | |
| IP Mode | Static |
| | Static |
| Web GUI Port | DHCP |
| Telnet Port | 0 |
| S / N | |
| Firmware Version | |
| Hardware Version | |
| Description | |
| Web GUI | Web GUI |
| Save | Reboot |

1) **IP Mode:** If you choose, you can alter the static IP network settings for the device, or switch the unit into DHCP mode to automatically obtain proper network settings from a local DHCP server. To switch to DHCP mode, please select DHCP from the IP mode drop-down, then click "Save" followed by "Reboot".

2) **WebGUI Hotkey:** Once you are satisfied with the network settings, you may use them to connect via Telnet or WebGUI. The network information window provides a convenient link to launch the WebGUI directly.

**WebGUI Overview**

After connecting to the WebGUI's address in a web browser, the login screen will appear. Please enter the appropriate user name and password then click "Submit" to log in.

*Note: The default user name and password is "admin".*



On the left side of the browser you will see the following menu tabs where all primary functions of the unit are controllable via the built in WebGUI. The individual functions will be introduced in the following sections.



Clicking the red "Logout" tab will automatically log the currently connected user out of the WebGUI and return to login page.

### 6.5.1 Switch Tab

This tab provides A/V routing control, HDCP management, auto switch control, A/V mask, and I/O renaming options.

To assign a new A/V route, please click the Output button on the left and then click on the button of the preferred input port on the right. As each button is selected they will become highlighted. The new route will become active immediately and the routing information displayed on the buttons will change accordingly.
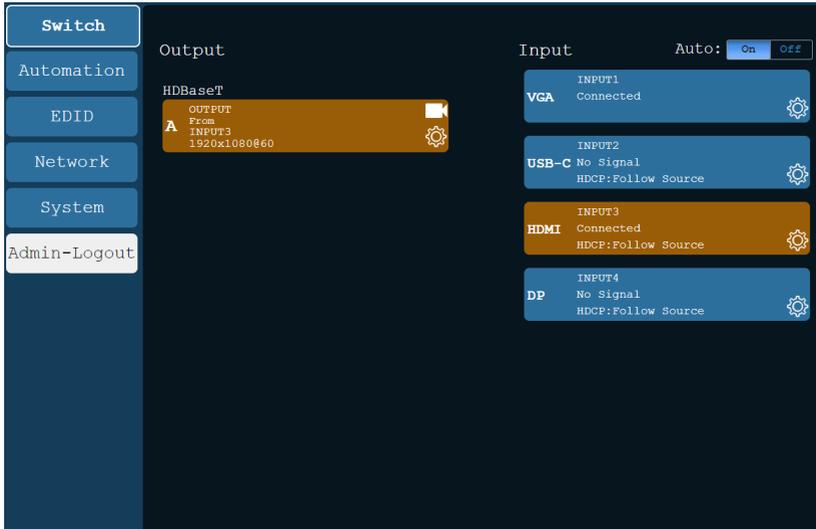


1) **Output:** This button selects the output to route A/V Inputs to. Details about the output name and currently selected Input are also displayed here. Clicking on the "Edit" icon (⚙) opens up the Output Edit window. Clicking on the "A/V Mask" icon (▣) will mute or unmute the audio and video output.

2) **Auto:** Auto switching may be enabled or disabled by clicking on the On/Off slider to toggle the setting.

3) **Input VGA/USB-C/HDMI/DP:** Buttons for selecting the input (VGA, USB Type-C, HDMI, or DisplayPort) to route to the output. Details about the input names and current sync/HDCP status are also displayed here. Clicking on the "Edit" icon (⚙) opens up the Input Edit window.
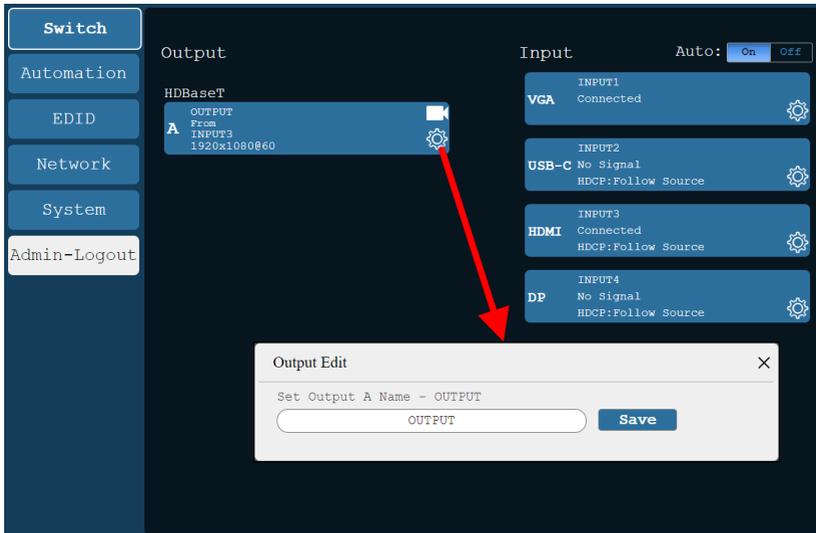
**4) Output Edit:** Provides control over the name of the output.

■ **Set Output Name:** To rename the output, type the new name in the space provided in the Edit window. The name can be up to 8 characters long. Click the "Save Change" button to confirm the change.
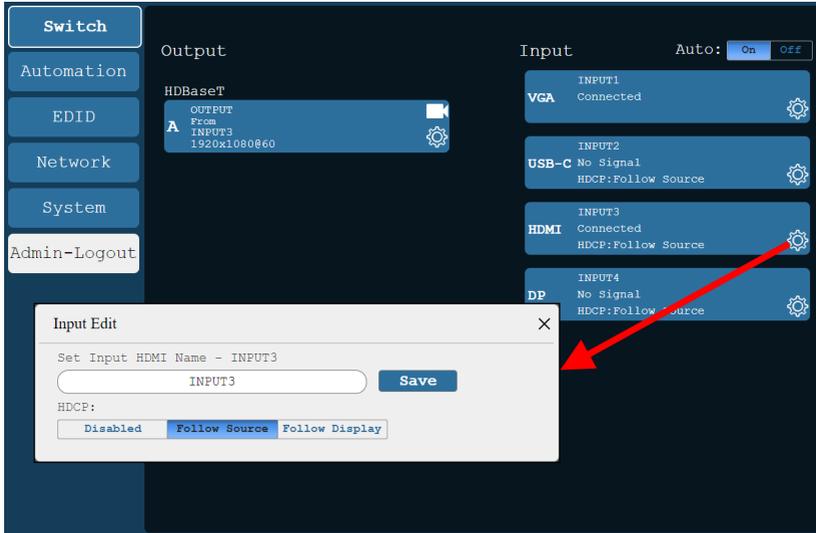
5) **Input Edit:** Provides Individual control over the name of each input and the behavior of HDCP on that input.

- **Set Input Name:** To rename an input, type the new name in the space provided in the Edit window. The name can be up to 8 characters long. Click the "Save Change" button to confirm the change.

- **HDCP:** The HDCP mode of each input can be set to "Follow Source", "Follow Display", or "Disabled". Changes made to this setting occur immediately.

  *Note: The VGA input cannot support HDCP.*

### 6.5.2 Automation Tab

The Automation tab provides control over the unit's automatic control command broadcast behavior when any of the specified Automation Events occur. Automation commands are sent to the connected display device via standard CEC.



1) **Event:** Use the dropdown to select the Automation Event to configure. Available Automation Events are:

   – **Power On:** This unit is powered on.

   – **Out A Source Active:** The currently selected input changes from inactive to active.

   – **Out A Source Lost:** The currently selected input changes from active to inactive.

   ■ **CEC:** Enable or disable sending a CEC command when the currently selected Automation Event is activated.

   *Note: CEC support must also be enabled on the connected HDMI display device.*

   ■ **Delay:** Set the length of time, in seconds, that the specified Automation Event must continue to be true before sending the defined command.

- **Wait:** Set the length of time, in seconds, to wait after this Automation Event has been activated before ANY new Automation Event can be detected.

- **CEC Command:** Shows the CEC command, in ASCII hex pairs, that will be sent when the specified Automation Event is activated. Click the "Edit" button to modify the command. Click the "Test" button to send the command immediately.

### 6.5.3 EDID Tab

This tab provides the option of six standard EDIDs, four customer uploaded User EDIDs, and one sink sourced EDID that can be assigned to any or all of the applicable input ports. The contents of any of these EDIDs may also be downloaded from here.



1) **User EDID**

- **Upload:** To upload a User EDID, select the User EDID slot to upload into from the dropdown list and then click the "Upload" button. An EDID Upload window will appear, allowing you to locate and upload the preferred EDID file (*.bin format) from a local PC. Once the correct file has been selected, please click the "Upload" button in the window, and the file will be transferred to the unit.

- **Download:** To save an existing User EDID to your local PC, select the User EDID slot from the dropdown list and then press the "Download" button. Depending on your browser settings you will either be asked where to save the downloaded file, or the file will be transferred to the default download location on your PC.

- **Edit Name:** Click the "Edit Name" button to open a window that allows changing the name of the User EDID. Click the "Save Change" button within the window to confirm the change.

**2) Output EDID**

- **Download:** To save an EDID provided by the connected HDBaseT Receiver to your local PC, select the output from the dropdown list then press the "Download" button. Depending on your browser settings you will either be asked where to save the downloaded file, or the file will be transferred to the default download location on your PC.

**3) Input EDID**

- **Appoint/All:** The Input EDID section allows for the assignment of an EDID to each individual input port, or to all inputs at once. Click the selection bar to toggle between "Appoint" (individual assignment), or "All" inputs.

- **EDID Selection:** Click on one or more input buttons to open the EDID Table List window. Select the new EDID source to use, from the choices on the right, and the change will occur immediately across all selected Inputs.

This unit provides the following 6 default EDIDs:

| EDID NAME | EDID CONTENT |
|---|---|
| **1080P@60/PCM/2CH** | 1920×1080p@60Hz (148MHz), 8-bit Colour, LPCM 2.0 |
| **1080P@60/PCM/Bitstream/ MCH** | 1920×1080p@60Hz (148MHz), 8-bit Colour, LPCM 7.1 & Bitstream |
| **4K@30/PCM/2CH** | 3840×2160p@30Hz (297MHz), Deep Colour (8/10/12-bit), LPCM 2.0 |
| **4K@30/PCM/Bitstream/MCH** | 3840×2160p@30Hz (297MHz), Deep Colour (8/10/12-bit), LPCM 7.1 & Bitstream |
| **4K@60/PCM/MCH** | 3840×2160p@60Hz (594MHz), Deep Colour (8/10/12-bit), LPCM 2.0 |
| **4K@60/PCM/Bitstream/MCH** | 3840×2160p@60Hz (594MHz), Deep Colour (8/10/12-bit), LPCM 7.1 & Bitstream |

*Note: In most cases, assigning a new EDID to an input will cause the affected input to briefly blink out while the source adapts to the new information.*

## 6.5.4 Network Tab

This tab provides network configuration options including changing the IP mode, viewing/setting the IP configuration, changing the admin login password, and changing the Web Login timeout.



1) **IP Configuration:** IP Mode may be switched between Static IP or DHCP. In Static IP Mode the IP, netmask and gateway addresses may be manually set. When in DHCP Mode, the unit will attempt to connect to a local DHCP server and obtain IP, netmask and gateway addresses automatically. Please press "Save" after making any changes to the IP configuration or mode.

   *Note: If the IP address is changed then the IP address required for WebGUI/Telnet access will also change accordingly.*

2) **Web Login Account:** The WebGUI admin password can be changed here. Please press "Save" after entering the old and new passwords to enact the change.

   *Note: The default password is "admin".*

3) **Web Login Timeout:** Select the length of time to wait before logging the user out of the WebGUI due to inactivity. Available range is from 0 to 35970 minutes. Setting it to 0 will disable the timeout function.

### 6.5.5 System Tab

This tab provides serial number information, system configuration backup/restore/reset, system reboot, and firmware update functions.
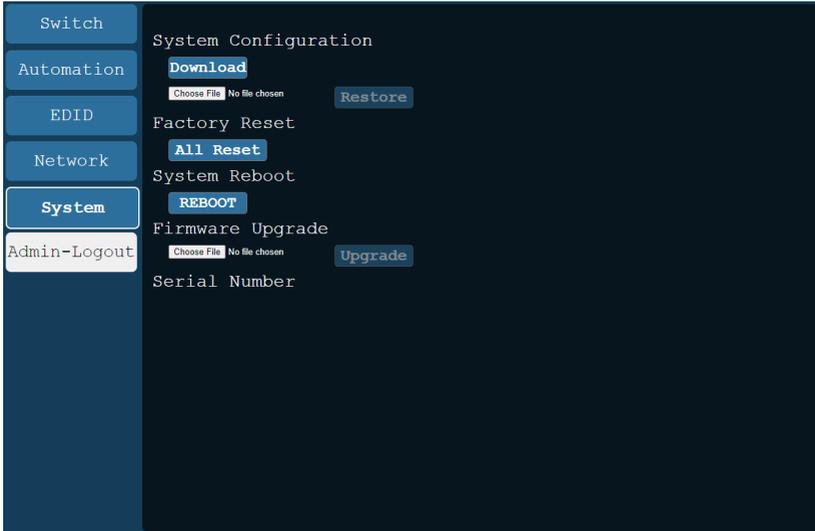


1) **System Configuration**

   ■ **Download:** The current system configuration, including routing and settings, may be saved as an XML file to a PC. Click the "Download" button to save the current system configuration to your local PC.

   ■ **Restore:** Previously saved system configurations may be restored from a saved XML file. Click the "Choose File" button to locate the saved XML file, then click the "Restore" button to upload and activate the selected configuration.

2) **Factory Reset:** Press the "ALL Reset" button to reset the unit to its factory default state. After the reset is complete, the unit will reboot automatically.

3) **System Reboot:** Click this button to reboot the unit.

4) **Firmware Upgrade:** To update the unit's firmware, click the "Choose File" button to open the file selection window and then select the firmware update file (*.bin format) located on your local PC. After selecting the file, click the "Upgrade" button to begin the firmware update process. After the upgrade is complete, the unit will reboot automatically.

5) **Serial Number:** Displays the unit's serial number.

## 6.6 Telnet Control

Before attempting to use Telnet control, please ensure that both the unit and the PC are connected to the same active networks.

| To Access the Command Line Interface (CLI) | |
|---|---|
| Windows 7 | Click **Start**, type "cmd" in the search field, and press **Enter**. |
| Windows XP | Click **Start** > **Run**, type "cmd", and press **Enter**. |
| Mac OS X | Click **Go** > **Applications** > **Utilities** > **Terminal**. |

Once in the Command Line Interface (CLI) type "**telnet**" followed by the IP address of the unit (and the port number if it is non-standard) and then hit "**Enter**". This will connect us to the unit we wish to control.

```
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Adminstrator\telnet 192.168.1.50 23
```

*Note 1: If the IP address is changed then the IP address required for Telnet access will also change accordingly.*

*Note 2: The default IP address is 192.168.1.50.*

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## 6.7 RS-232 and Telnet Commands

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **?** | Show the full command list. |
| **help** | Show the full command list. |
| **set factory default** | Reset the unit to the factory defaults. |
| **set system reboot** | Reboot the unit. |
| **get fw ver** | Show the unit's current firmware version. |
| **set in N1 name N2** | Set the name of the specified input. <br><br>**N1** = 1 ~ 4     [Input port] <br><br>**N2** = {Name}     [8 characters max] |
| **get in N1 name** | Show the current name of the specified input. <br><br>**N1** = 1 ~ 4     [Input port] |
| **get in name list** | List the names of all inputs on the unit. |
| **set out A name N1** | Set the name of the output. <br><br>**N1** = {Name}     [8 characters max] |
| **get out A name** | Show the current name of the output. |
| **set out A route N1** | Route the specified input to the output. <br><br>**N1** = 1 ~ 4     [Input port] |
| **get out A route** | Show the current input routed to the output. |
| **set out A mask N1** | Enable or disable the A/V Mask setting on the output. <br><br>Available values for **N1**: <br><br>ON     [Output muted] <br><br>OFF     [Normal output] |

| COMMAND | DESCRIPTION AND PARAMETERS | |
|---|---|---|
| **get out A mask** | Display the current A/V Mask setting for the output. | |
| **set in N1 hdcp mode N2** | Set the HDCP behavior of the specified input. | |
| | **N1** = 1~4 | [Input port] |
| | Available values for **N2**: | |
| | 0 | [Disabled] |
| | 1 | [Follow source] |
| | 2 | [Follow display] |
| **get in N1 hdcp mode** | Show the current HDCP behavior used by the specified input. | |
| | **N1** = 1~4 | [Input port] |
| **set all in edid mode N1** | Select the EDID management mode to use (All or Appoint) for all inputs. | |
| | Available values for **N1**: | |
| | ON | [All mode] |
| | OFF | [Appoint mode] |
| **get all in edid mode** | Show the current EDID management mode used by all inputs. | |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **set all in edid N1** | Set the EDID to use when the "All" EDID mode is active. |
| | Available values for **N1**: |
| | 1                        [1080P, 2CH] |
| | 2                        [1080P, MCH] |
| | 3                        [4K@30, 2CH] |
| | 4                        [4K@30, MCH] |
| | 5                        [4K@60, 2CH] |
| | 6                        [4K@60, MCH] |
| | 7                        [User EDID 1] |
| | 8                        [User EDID 2] |
| | 9                        [User EDID 3] |
| | 10                      [User EDID 4] |
| | 11                      [Sink EDID] |
| **get all in edid** | Show the current EDID used by the "All" EDID mode. |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---------|----------------------------|
| **set in N1 edid N2** | Set the EDID to use on the specified input. |
| | **N1** = 1~4          [Input port] |
| | Available values for **N2**: |
| | 1          [1080P, 2CH] |
| | 2          [1080P, MCH] |
| | 3          [4K@30, 2CH] |
| | 4          [4K@30, MCH] |
| | 5          [4K@60, 2CH] |
| | 6          [4K@60, MCH] |
| | 7          [User EDID 1] |
| | 8          [User EDID 2] |
| | 9          [User EDID 3] |
| | 10          [User EDID 4] |
| | 11          [Sink EDID] |
| **get in N1 edid** | Show the EDID currently being used on the specified input. |
| | **N1** = 1~4          [Input port] |
| **get in edid list** | List all available EDID selections. |

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| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **set edid N1 name N2** | Set the name for the specified EDID. |
| | Available values for **N1**: |
| | 7                        [User EDID 1] |
| | 8                        [User EDID 2] |
| | 9                        [User EDID 3] |
| | 10                      [User EDID 4] |
| | **N2** = {Name}     [16 characters max] |
| | *Note: Only User EDIDs may be renamed* |
| **get edid N1 name** | Show the current name of the specified EDID. |
| | Available values for **N1**: |
| | 7                        [User EDID 1] |
| | 8                        [User EDID 2] |
| | 9                        [User EDID 3] |
| | 10                      [User EDID 4] |
| **set user N1 edid data N2** | Upload a new EDID (in HEX format) for use as the specified User EDID. |
| | **N1** = 1 ~ 4       [User EDID] |
| | **N2** = {EDID data}    [Comma delimited hex pairs] |
| **get user N1 edid data** | Show the current contents of the specified User EDID as HEX data. |
| | **N1** = 1 ~ 4       [User EDID] |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **set out auto mode N1** | Set the auto switching behavior of the unit. |
| | Available values for **N1**: |
| | 0                   [Disabled] |
| | 1                   [Auto switch] |
| **get out auto mode** | Show the current auto switching mode of the unit. |
| **get ipconfig** | Show the unit's current IP configuration information. |
| **set ip mode N1** | Set the IP address assignment mode. |
| | Available values for **N1**: |
| | 0                   [Static IP mode] |
| | 1                   [DHCP mode] |
| **get ip mode** | Show the current IP address assignment mode. |
| **set ipaddr N1** | Set the unit's static IP address. |
| | **N1** = X.X.X.X       [X = 0 ~ 255] |
| **get ipaddr** | Show the unit's current IP address. |
| **set netmask N1** | Set the unit's static netmask. |
| | **N1** = X.X.X.X       [X = 0 ~ 255] |
| **get netmask** | Show the unit's current netmask. |
| **set gateway N1** | Set the unit's static gateway address. |
| | **N1** = X.X.X.X       [X = 0 ~ 255] |
| **get gateway** | Show the unit's current gateway address. |
| **set webgui password N1** | Set the WebGUI login password. |
| | **N1** = {Password}     [16 characters max] |
| **get webgui password** | Show the current WebGUI login password. |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **set webgui login timeout N1** | Set the WebGUI inactivity timeout value. |
| | Available values for **N1**: |
| | 0            [No timeout] |
| | 1 ~ 35970      [Timeout in minutes] |
| **get webgui login timeout** | Show the current WebGUI inactivity timeout value. |
| **set webgui port N1** | Set the unit's WebGUI access port. |
| | **N1** = 1 ~ 65535     [TCP port] |
| **get webgui port** | Show the unit's current WebGUI access port. |
| **set telnet port N1** | Set the unit's Telnet access port. |
| | **N1** = 1 ~ 65535     [TCP port] |
| **get telnet port** | Show the unit's current Telnet access port. |
| **set automation event N1 cec A N2** | Enable or disable the specified Automation Event's CEC response. |
| | Available values for **N1**: |
| | 1            [Power on] |
| | 2            [Out A source active] |
| | 3            [Out A source lost] |
| | Available values for **N2**: |
| | ON          [Event enabled] |
| | OFF         [Event disabled] |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **get automation event N1 cec A** | Show the current state of the specified Automation Event's CEC response.<br><br>Available values for **N1**:<br><br>1 [Power on]<br><br>2 [Out A source active]<br><br>3 [Out A source lost] |
| **set automation event N1 cec A delay N2** | Set the delay time that the specified Automation Event must continue to be true before sending the defined CEC command.<br><br>Available values for **N1**:<br><br>1 [Power on]<br><br>2 [Out A source active]<br><br>3 [Out A source lost]<br><br>**N2** = 0 ~ 240 [Delay time in seconds] |
| **get automation event N1 cec A delay** | Show the delay time for the specified Automation Event's CEC response.<br><br>Available values for **N1**:<br><br>1 [Power on]<br><br>2 [Out A source active]<br><br>3 [Out A source lost] |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **set automation event N1 cec A wait N2** | Set the length of time to wait after an Automation Event's CEC response has been activated before ANY other Automation Event can be detected. |
| | Available values for **N1**: |
| | 1 [Power on] |
| | 2 [Out A source active] |
| | 3 [Out A source lost] |
| | **N2** = 0 ~ 240 [Wait time in seconds] |
| **get automation event N1 cec A wait** | Show the wait time for the specified Automation Event's CEC response. |
| | Available values for **N1**: |
| | 1 [Power on] |
| | 2 [Out A source active] |
| | 3 [Out A source lost] |
| **set automation event N1 cec A command N2** | Set the CEC command to send when the specified Automation Event is activated. |
| | Available values for **N1**: |
| | 1 [Power on] |
| | 2 [Out A source active] |
| | 3 [Out A source lost] |
| | **N2** = {CEC data} [Comma delimited hex pairs] |

| COMMAND | DESCRIPTION AND PARAMETERS |
|---|---|
| **get automation event N1 cec A command** | Show the CEC command to be sent when the specified Automation Event is activated. |
| | Available values for **N1**: |
| | 1          [Power on] |
| | 2          [Out A source active] |
| | 3          [Out A source lost] |

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

# 7. CONNECTION DIAGRAM



Media Player

HDMI Input

1.5m
60°

3m   7m   3m
60°

Laptop

USB-C Input

IR Input & Output

Serial Equipped Laptop

DisplayPort Input

Tower PC

RS-232

Stereo Input

LAN

Network Switch

VGA Input

TX

Power Supply

Cat.5e/6/7 Cable

RX

IR Input & Output

RS-232

60°
3m   7m   3m

HDMI Output

60°
1.5m

Serial Controlled Device

UHDTV
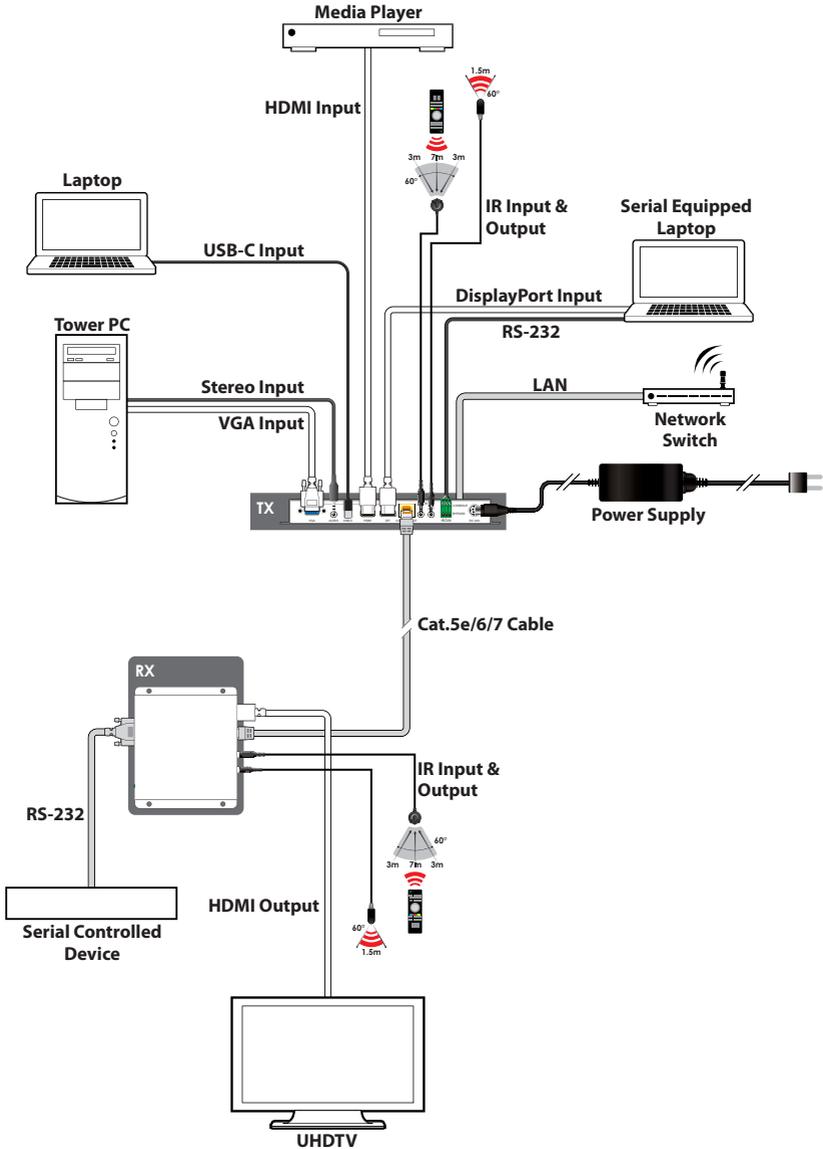
# 8. SPECIFICATIONS

## 8.1 Technical Specifications

| | |
|---|---|
| **HDMI/DisplayPort/ USB-C Bandwidth** | 18Gbps |
| **VGA Bandwidth** | 153MHz |
| **HDBaseT Bandwidth** | 10.2Gbps |
| **Input Ports** | 1×HDMI (Type-A) |
| | 1×DisplayPort |
| | 1×USB (Type-C) |
| | 1×VGA (HD-15) |
| | 1×Stereo Audio (3.5mm) |
| **Output Port** | 1×HDBaseT (RJ-45) |
| **Pass-through Ports** | 1×IR Extender (3.5mm) |
| | 1×IR Blaster (3.5mm) |
| | 1×RS-232 (3-pin Terminal Block) |
| **Control Ports** | 1×RS-232 (3-pin Terminal Block) |
| | 1×Ethernet (RJ-45) |
| **Service Port** | 1×USB 2.0 (Type A) |
| **IR Frequency** | 30 – 50kHz |
| | (30 – 60kHz under ideal conditions) |
| **Baud Rate** | Up to 115200 |
| **Power Supply** | 24V/3.75A DC |
| | (US/EU standards, CE/FCC/UL certified) |
| **ESD Protection (HBM)** | ±8kV (Air Discharge) |
| | ±4kV (Contact Discharge) |
| **Dimensions (W×H×D)** | 231.5mm×25mm×108mm [Case Only] |
| | 231.5mm×25mm×116mm [All Inclusive] |
| **Weight** | 657g |
| **Chassis Material** | Metal (Steel) |

| | |
|---|---|
| **Chassis Colour** | 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** | 82W |

## 8.2 Video Specifications

| Supported Resolutions (Hz) | In | | | | Out |
|---|---|---|---|---|---|
| | HDMI | DP | USBC | VGA | HDBT |
| **720×400p@70/85** | ✓ | ✓ | ✗ | 70 | ✓ |
| **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** | ✓ | ✓ | ✓ | 60 | ✓ |
| **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** | ✓ | ✓ | ✓ | ✗ | ✓ |

| Supported Resolutions (Hz) | In | | | | Out |
|---|---|---|---|---|---|
| | HDMI | DP | USBC | VGA | HDBT |
| 1920×1080p@50/60 | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1920×1200p@60RB | ✓ | ✕ | ✕ | ✓ | ✓ |
| 2048×1080p@24/25/30 | ✓ | ✕ | ✕ | ✕ | ✓ |
| 2048×1080p@50/60 | ✓ | ✕ | ✕ | ✕ | ✓ |
| 2560×1440p@60RB | ✓ | ✕ | ✕ | ✕ | ✕ |
| 2560×1600p@60RB | ✓ | ✕ | ✕ | ✕ | ✕ |
| 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 | ✓ | ✓ | ✓ | ✕ | ✕ |

*Note: Supported input resolutions with data rates higher than 10.2Gbps will be automatically scaled down to 1080p at the same refresh rate to fit within the 10.2Gbps transmission limit of HDBaseT.*

## 8.3 Audio Specifications

### 8.3.1 Digital Audio

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

| HDBaseT 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 |

### 8.3.2 Analogue Audio

| Analogue Input | |
|---|---|
| **Max Audio Level** | 2Vrms |
| **Impedance** | 36.9kΩ |
| **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 |
| **DisplayPort Cable** | | | | |
| **DisplayPort Input** | 15m | 10m | 2m | 2m |
| **USB-C Cable** | | | | |
| **USB-C Input** | 2m | | | |
| **VGA Cable** | | | | |
| **VGA Input** | 2m | | ✕ | |
| **Ethernet Cable** | | | | |
| **Cat.5e/6** | 60m | | 35m | |
| **Cat.6a/7** | 70m | | 40m | |

**Bandwidth Category Examples:**

**1080p (FHD Video)**
- Up to 1080p@60Hz, 12-bit Colour
- 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 Colour
- 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), conversion to 1080p will be performed when output over HDBaseT
- 4K@50/60Hz (4:2:0, 10-bit HDR), conversion to 1080p will be performed when output over HDBaseT
- Data rates higher than 10.2Gbps

## 8.5 HDBaseT Features

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

# 9. ACRONYMS

| ACRONYM | COMPLETE TERM |
|---------|---------------|
| ADC | Analogue-to-Digital Converter |
| ASCII | American Standard Code for Information Interchange |
| AV | Audio/Video |
| 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 |
| DP | DisplayPort |
| DVI | Digital Visual Interface |
| EDID | Extended Display Identification Data |
| GUI | Graphical User Interface |
| 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 |
| LAN | Local Area Network |
| LED | Light-Emitting Diode |

| ACRONYM | COMPLETE TERM |
|---|---|
| **LPCM** | Linear Pulse-Code Modulation |
| **MAC** | Media Access Control |
| **PC** | Personal Computer |
| **PD** | Powered Device |
| **PoH** | Power over HDBaseT |
| **PSE** | Power Sourcing Equipment |
| **SNR** | Signal-to-Noise Ratio |
| **TCP** | Transmission Control Protocol |
| **UHD** | Ultra-High-Definition |
| **UHD+** | Ultra-High-Definition Plus |
| **USB** | Universal Serial Bus |
| **VGA** | Video Graphics Array |
| **WUXGA (RB)** | Widescreen Ultra Extended Graphics Array (Reduced Blanking) |
| **XGA** | Extended Graphics Array |