PU-444HBTE

4 x 8 HDMI / HDBaseT™ Matrix (4 x HDBaseT & 4 x HDMI Outputs, 5Play™ inc. PoE & Single LAN, up to 100m)

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
v1.00	14/04/2014	First release

CONTENTS

1. INTRODUCTION

The PU-444HBTE Matrix enables distribution of four HDMI sources to four HDBaseT™ outputs and four HDMI outputs. Each input is independently routed to any output for maximum source to screen flexibility within any AV system. The four HDBaseT outputs support the transmission of video (resolutions up to 1080p Full HD and 1920x1200@60Hz), multi-channel audio, single LAN serving, and control via 2-way IR, RS-232 or Web GUI/Telnet IP over a single CAT5e/6/7 cable (up to 100m) for each output. HDMI outputs support the same video resolutions and high definition audio via certified HDMI cables up to 15m.

The HDBaseT outputs are designed to be used with any compatible HDBaseT Receiver as follows: PU-507RX / PU-507RX-2H / PU-507RX-SCD / PU-507WPRX / PU-1109RX. These Receivers support Power over Ethernet (PoE) function so do not require a separate PSU for power.

Use the LAN serving capabilities of the matrix to add internet connectivity to every HDBaseT output zone. In addition, this matrix also features IP control allowing users to access and control the matrix remotely and also allow additional options for integration of third-party control systems.

2. APPLICATIONS

/// HDMI system controls

/// Video/TV wall display and control

/// Security surveillance and control

/// Commercial advertising, displaying and control

/// Lecture room display and control

3. PACKAGE CONTENTS

/// 1 x 4 by 8 Matrix

/// 8 x IR Extender

/// 8 x IR Blaster

/// x 24V/3.75A DC Power Supply

/// 1 x Remote Control

/// 1 x Operation Manual

4. SYSTEM REQUIREMENTS

/// Source equipment with HDMI connection cables

/// Certified CAT5e/6/7 cables

/// HDMI over CAT5e/6/7 receivers with Certified CAT5e/6/7 cables

/// Output displays or AV receivers with HDMI connection cables

5. FEATURES

/// HDMI, HDCP and DVI complaint

/// Common supported resolutions: HDTV: 480p, 576p, 720p, 1080i, 1080p, 1080p24; PC: VGA, SVGA, XGA, WXGA, SXGA, UXGA, WUXGA, 1920x1200@60Hz

/// High Definition Audio supported: Dolby TrueHD, Dolby Digital Plus and DTS-HD Master Audio plus LPCM (up to 192kHz)

/// Uncompressed data transfer over single CAT cable for HDBaseT outputs (100m - CAT6/7; 80m - CAT5e)

/// Supports HDMI input up to 15m 1080p 8bit or 10m 1080p 12bit.

/// Supports RS-232, 2-Way IR, Manual Selection Buttons, and Web GUI/ Telnet IP for control

/// HDBaseT outputs support Power over Ethernet (PoE) with compatible receiver units

/// Selectable EDID settings - TV (downstream) and STD (fixed)

/// Supports LAN serving to all connected HDBaseT zones

/// Supports 3D signals

6. OPERATION CONTROLS AND FUNCTIONS

6.1 Front Panel
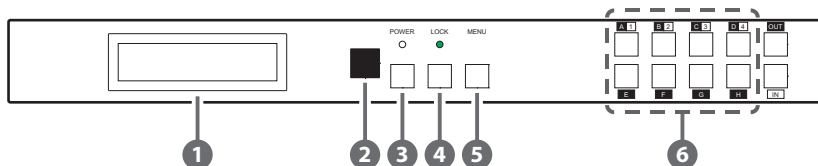
1 **LCM:** This monitor displays your setting information with each input and output selection.

2 **IR:** This IR window accepts the remote control signal of this device only.

3 **Power Button & LED:** Press this button to turn ON the device and the green LED will illuminate when the power is ON. When the LED illuminate in red it is in standby mode.

4 **LCOK:** Press this button to lock all the buttons on the panel and the LED will illuminate. To unlock, just press it again.

5 **Menu:** Press this button once to select EDID setting from STD(internal) 1 or TV(external) 2 then press it again to confirm the selection. Press this button every time to confirm the selection.

6 **1~4/A~H & OUT/IN button:** Press OUT/IN button first to select the output/input then press the number button to make the selection accordingly. For example, output A~B wish to select input 1 and C~E wish to select input 2. Press OUT→A→B→IN→1→Menu, and then press OUT→C→D→E→IN→2→Menu. If the menu button is not pressed the selection will not be changed.

6.2 Rear Panel
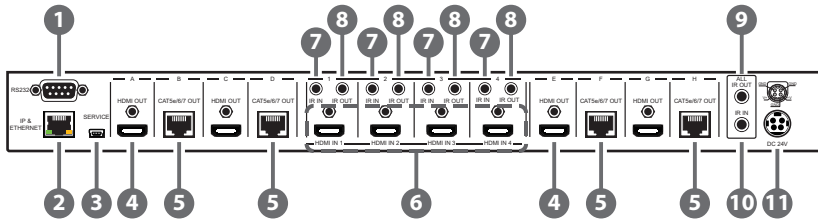
1 RS-232: This slot is to connect with D-Sub 9pin cable from the PC/Laptop device for RS-232 control.

Note: This RS-232 obtain routable function that is, from the Matrix it can send commands to all receivers or from receiver sides it can also send commands to control the Matrix. In order to allow the receivers to send command to control the Matrix, a null modern cable/adaptor is required. In order to allow the receivers to send command to control the Matrix, a null modern cable/adaptor is required.

2 IP & Ethernet: This port is for Telnet and Web GUI control. Connect and active network system with RJ45 terminated cable (for details, please refers to RS-232 & Telnet commands and Web GUI Control sections). Also, it allows Ethernet access when connecting to an active network source or when any of the CAT outputs has the Ethernet link.

Warning: Please do not connect this port directly to the PC/Laptop as the Telnet function will not work.

3 Service: This slot is to connect with mini USB B type cable for firmware update only.

4 HDMI OUT A/C/E/G: These slots are to connect with HD TV/display for instant display.

5 CAT5e/6/7 OUT B/D/F/H: These slots are to connect with HDMI over CAT5e/6/7 Receiver for signal extension up to 100m.

6 HDMI IN 1~4: These slots are to connect to input source equipment such as DVD player or Set-Top-Box with HDMI cable or DVI to HDMI converter cable for input signal sending.

7 IR IN 1~4: These slots are to connect with IR Extender included in the package for IR signal receiving.

8 IR OUT 1~4: These slots are to connect with IR Blaster included in the package for IR signal sending.

9 **ALL IR OUT:** This slot is to connect with the IR Blaster for IR signal received from receiver sides and send to the source side.

10 **ALL IR IN:** This slot is to connect with the IR extender for IR signal receiving and send out to receiver sides.

11 **DC24V:** This slot is to plug the power cord with adaptor included in the package and then connect them with AC wall outlet for power supply.

6.3 Side Panel
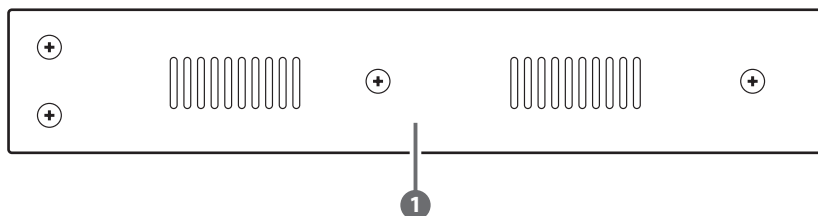
1 **Ventilator:** These are fan ventilator area, DO NOT block these area or cover it with any object.

6.4 Remote Control

1 **Power:** Press this button to switch ON the device or set it to standby mode.

2 **IN:** Input ports selection 1~4.

3 **OUT:** Output ports selection A~H.

6.5 IR Pin Assignment

IR Blaster

① Power 5 V
② IR Blaster Signal
③ NC

IR Extender

① IR Signal
② Power 5 V
③ Ground
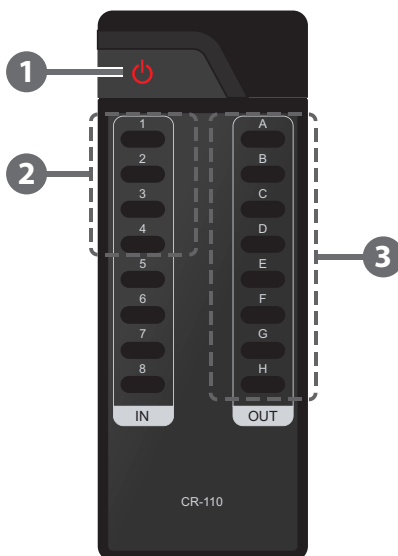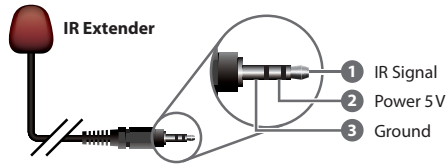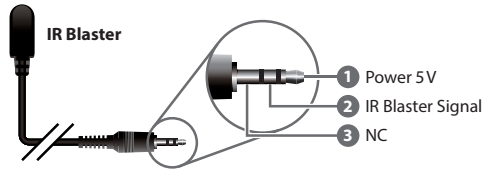
6.6 RS-232 Protocols

PU-444HBTE	
PIN	Assignment
1	NC
2	Tx
3	Rx
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

Remote Control Console	
PIN	Assignment
1	NC
2	Rx
3	Tx
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC

Baud Rate: 19,200bps

Data bit: 8 bits

Parity: None

Flow Control: None

Stop Bit: 1

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6.7 RS-232 & Telnet Commands

Command	Description
A1~A4	Switch output A to 1~4
B1~B4	Switch output B to 1~4
C1~C4	Switch output C to 1~4
D1~D4	Switch output D to 1~4
E1~E4	Switch output E to 1~4
F1~F4	Switch output F to 1~4
G1~G4	Switch output G to 1~4
H1~H4	Switch output H to 1~4
A0~H0	Switch output A to F mute
ABCD…1~ABCD…4	Switch output ABCD… to 1~4
ABCD….0	Mute output ABCD… at the same time
SETIP\<IP> \<SubNet> \<GW>	Setting IP. SubNet. GateWay (Static IP)
RSTIP	IP Configuration Was Reset to Factory Defaults \<DHCP>
IPCONFIG	Display the current IP configuration
P0	POWER OFF
P1	POWER ON
I1~I4	Switch all the output to 1~4
I0	Mute all the output
ST	Display the current matrix status and F/W version
RS	System Reset to A1, B1, C2, D2, E3, F3, G4, H4
EM	Setting EDID MODE. 1-STD 2-TV
?	Display all the available commands

UARTBAUD?	Display baud rate setting 1~6 1: 9600bps 2: 14400bps 3: 19200bps 4: 38400bps 5: 57600bps 6: 115200bps
UARTBAUD2	Set output B's baud rate from 1~6
UARTBAUD4	Set output D's baud rate from 1~6
UARTBAUD6	Set output H's baud rate from 1~6
UARTBAUD8	Set output H's baud rate from 1~6
UARTSW?	Display output's UART status Allowing Matrix to send commands to Receiver's connected device.
UARTSW0	Switch to MCU. Allowing Receivers to send commands to Matrix.
UARTSW2	Switch to output B and allow Matrix to send commands to Receiver's connected device.
UARTSW4	Switch to output D and allow Matrix to send commands to Receiver's connected device.
UARTSW6	Switch to output F and allow Matrix to send commands to Receiver's connected device.
UARTSW8	Switch to output H and allow Matrix to send commands to Receiver's connected device.
Quit	Exit (for telnet only)

Note: *Commands will be not executed unless followed by a carriage return. All commands are not case-sensitive. Commands are under RS-232 control only.*

6.8 Telnet Control

Before attempting to use the telnet control, please ensure that both the Matrix (via the 'CONTROL' port) and the PC/Laptop are connected to the active networks.

To access the telnet control in Windows 7, click on the 'Start' menu and type "cmd" in the Search field then press enter

Under Windows XP go to the 'Start' menu and click on "Run", type "cmd" with then press enter.

Under Mac OS X, go to Go→Applications→Utilities→Terminal See below for reference.
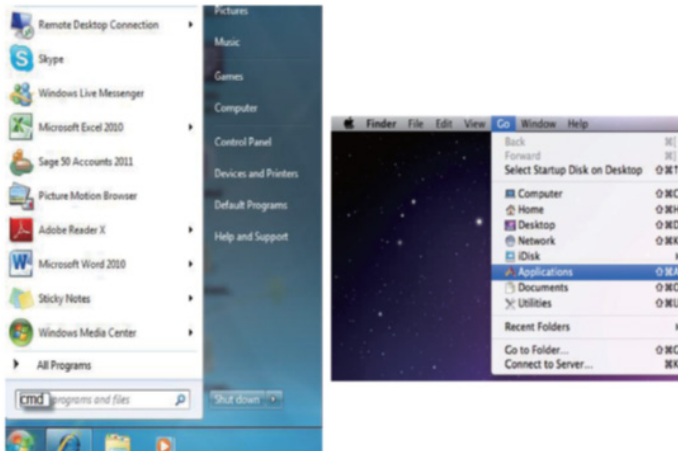
Once in the command line interface (CLI) type "telnet", then the IP address of the unit and "23", then hit enter.

Note: *The IP address of the Matrix can be displayed on the device's LCM monitor by pressing the Menu button twice.*
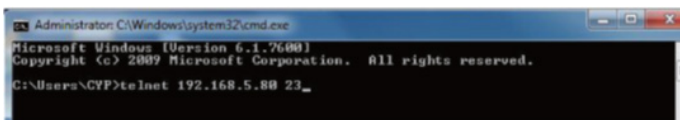
This will bring us into the device which we wish to control. Type "HELP" to list the available commands.

```
Telnet 192.168.5.77

Welcome to PU-444HBTE TELNET.

telnet-> help

   A1~A4     : Switch Output A to 1~4
   B1~B4     : Switch Output B to 1~4
   C1~C4     : Switch Output C to 1~4
   D1~D4     : Switch Output D to 1~4
   E1~E4     : Switch Output E to 1~4
   F1~F4     : Switch Output F to 1~4
   G1~G4     : Switch Output G to 1~4
   H1~H4     : Switch Output H to 1~4
   A0~H0     : Switch Output A to H mute
ABCD...1~ABCD...4 : Switch output ABCD... to 1~4 at the same time
ABCD...0: Mute output ABCD... at the same time
SETIP <IP> <SubNet> <GW> : Setting IP.SubNet.GateWay(Static IP)
       RSTIP : IP Configuration Was Reset To Factory Defaults(DHCP)
    IPCONFIG : Display the current IP config
         P0  : Power Off
         P1  : Power On
      I1~I4 : Switch all the output to 1~4
         I0  : Mute all the output
         ST  : Display the current matrix state and firmware version
         RS  : System Reset to A1,B2,C3,D4,E5,F6,G7,H8
         EM  : Setting EDID MODE. 1-STD 2-TV.
          ?  : Display all available commands
       QUIT  : Exit

telnet->
```

Type "IPCONFIG" To show all IP configurations. To reset the IP, type "RSTIP" and to use a set static IP, type "SETIP" (For a full list of commands, see Section 6.7).

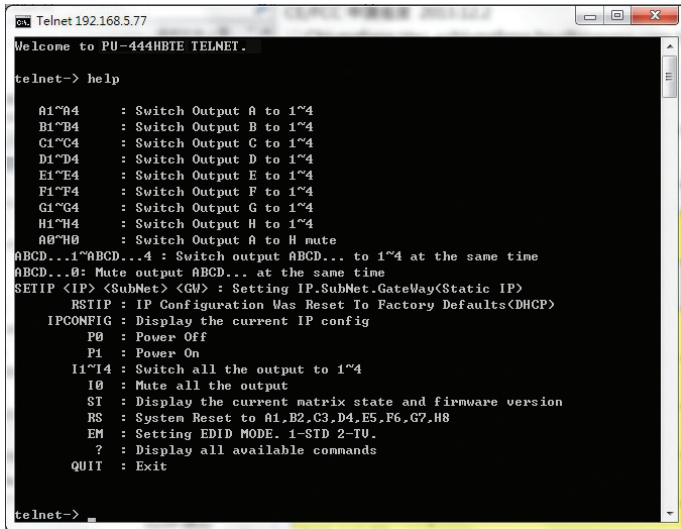**Note:** *All the commands will be not executed unless followed by a carriage return. Commands are case-insensitive. If the IP is changed then the IP Address required for Telnet access will also change accordingly.*

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6.9 Web GUI Control

On a PC/Laptop that is connected to the active network as the Matrix, open a web browser and type device's IP address on the web address entry bar. The browser will display the device's status, control and User setting pages.
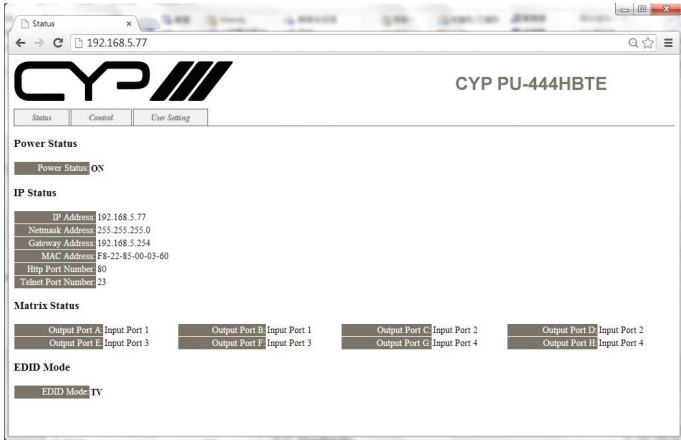
Click on the 'Control' tab to control power, input/output ports, EDID and reset mode.
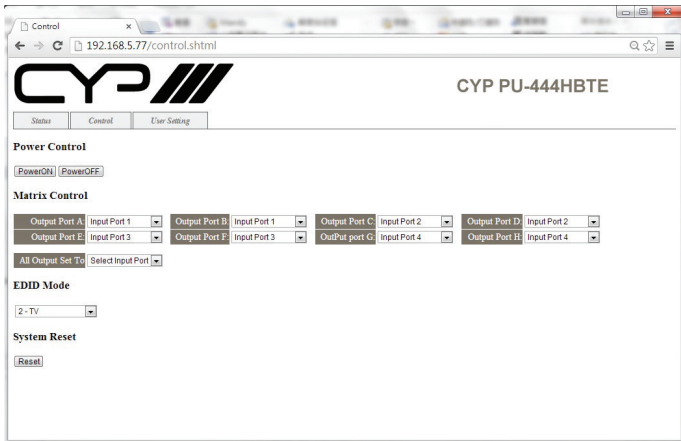
Clicking on the 'User Setting' tab allows you to reset the IP configuration. The system will ask for a reboot of the device every time any of the settings are changed. The IP address needed to access the Web GUI control will also need to be changed accordingly on the web address entry bar.

7. CONNECTION DIAGRAM

ZONE A

ZONE B

ZONE C

ZONE D

RX

RX

CAT5
Out

RS-232

B   D

A   C

HD
Out

RS-232 Equipped PC
or Control System

1   2

Network Router
with Ethernet

1.5m
60°
60°

3m   60°   3m
7m

IR BLASTER   IR EXTENDER

HDMI
Input

IR In/Out

HDMI
Input

IR In/O

Blu-ray Player

Media Server

ZONE **E**

ZONE **F**

ZONE **G**

ZONE **H**

RX

RX

Se/6/7
puts

F

H

DMI
tput

E

G

Power
Supply

2 **3** **4**

IR IN ALL

IR OUT
ALL

Out

**HDMI
Input**

IR In/Out

**HDMI
Input**

IR In/Out

Satellite Receiver

Set-top Box
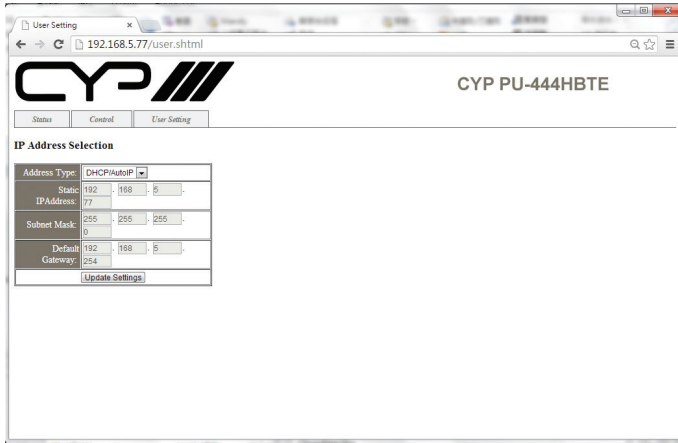
8. SPECIFICATIONS

8.1 Technical Specification

Video Bandwidth	225MHz/6.75Gbps
Input Ports	4 x HDMI, 5 x IR Extender, 1 x RS-232, 1 x LAN (Control only), 1 x RJ45 (Control Only), 1 x USB Mini-B (Service Only)
Output Ports	4 x HDMI, 4 x CAT5e/6/7, 5 x IR Blaster
Power Supply	24V / 3.75A DC (US/EU standards, CE/FCC/UL certified)
ESD Protection	Human Body model: ± 8kV (air-gap discharge) ± 4kV (contact discharge)
Dimensions (mm)	436(W) x 249(D) x 44(H) 436(W) x 255(D) x 48(H)/Including Jacks
Weight	3344g
Chassis Material	Metal
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 (no condensation)
Power Consumption	40W

8.2 CAT5e/6/7 Cable Specification

Cable Type	Range	Pixel clock rate	Video Data Rate	Supported Video
CAT5e/6/7	100 m	<=225 MHz	<=5.3 Gbps (HD Video)	Up to 1080p, 60 Hz, 36 bits, 3D (data rates lower than 5.3 Gbps or below 225 MHz TMDS clock).

8.3 Input Timing Support Chart

HDMI Supported Input Resolutions				
Resolution Timing	**Vertical Frequency(Hz)**	**Pixel Rate (MHz)**	**HDMI Support**	**Video Standard**
640x480@60	60.00	25.175	✓	VESA
640x480@72	72.00	31.500	✓	VESA
640x480@75	75.00	31.500	✓	VESA
640x480@85	85.00	36.000	✓	VESA
720x400@85	85.00	35.500	✓	VESA
800x600@56	56.00	36.000	✓	VESA
800x600@60	60.00	40.000	✓	VESA
800x600@72	72.00	50.000	✓	VESA
800x600@75	75.00	49.500	✓	VESA
800x600@85	85.00	56.250	✓	VESA
1024x768@60	60.00	65.000	✓	VESA
1024x768@70	70.00	75.000	✓	VESA
1024x768@75	75.00	78.750	✓	VESA
1024x768@85	85.00	94.500	✓	VESA
1152x864@75	75.00	108.000	✓	VESA
1280x720@60	60.00	74.250	✓	VESA
1280x768@60	60.00	79.500	✓	VESA
1280x768@75	75.00	102.250	✓	VESA
1280x768@85	85.00	117.500	✓	VESA
1280x800@60RB	60.00	71.000	—	VESA
1280x800@60	60.00	83.500	—	VESA
1280x960@60	60.00	108.000	✓	VESA
1280x1024@60	60.00	108.000	✓	VESA
1360x768@60	60.00	85.500	✓	VESA
1366x768@60	60.00	85.500	—	VESA
1400x1050@60RB	60.00	101.000	✓	VESA
1400x1050@60	60.00	121.750	✓	VESA
1440x900@60RB	60.00	88.750	—	VESA
1440x900@60	60.00	106.500	—	VESA
1600x900@60	60.00	108.000	—	VESA
1600x1200@60	60.00	162.000	—	VESA
1680x1050@60RB	60.00	119.000	—	VESA
1680x1050@60	60.00	146.250	—	VESA
1920x1080@60	60.00	148.500	✓	VESA
1920x1200@60RB	60.00	154.000	✓	VESA

HDMI Supported Input Resolutions				
Resolution Timing	**Vertical Frequency(Hz)**	**Pixel Rate (MHz)**	**HDMI Support**	**Video Standrad**
1440x576i@50	50.00	27.000	✓	CEA
1440x480i@59.94	59.94	27.000	✓	CEA
1440x480i@60	60.00	27.028	✓	CEA
720x480p@59.94	59.94	27.000	✓	CEA
720x480p@60	60.00	27.027	✓	CEA
720x576p@50	50.00	54.000	✓	CEA
1280x720p@50	50.00	74.250	✓	CEA
1280x720p@59.94	59.94	74.176	✓	CEA
1280x720p@60	60.00	74.250	✓	CEA
1920x1080i@50	50.00	74.250	✓	CEA
1920x1080i@59.94	59.94	74.176	✓	CEA
1920x1080i@60	60.00	74.250	✓	CEA
1920x1080p@50	50.00	148.500	✓	CEA
1920x1080p@59.94	59.94	148.352	✓	CEA
1920x1080p@60	60.00	148.500	✓	CEA
1920x1080p@23.97	23.97	74.176	✓	CEA
1920x1080p@24	24.00	74.250	✓	CEA
1920x1080p@25	25.00	74.250	✓	CEA
1920x1080p@29.97	29.97	74.176	✓	CEA
1920x1080p@30	30.00	74.250	✓	CEA