



# USER MANUAL

## MODEL:

**860 Controller**

**Control Software for Signal Generator & Analyzer (Bench/Portable Version)**



# Contents

<b>Overview</b>	<b>1</b>
Disclaimers	1
COPYRIGHT NOTICE	1
<b>Introduction</b>	<b>2</b>
SYSTEM REQUIREMENTS	2
INSTALLATION	2
<b>CONNECTION</b>	<b>3</b>
Connect via Ethernet (Bench Version Only)	3
Connect via RS-232	4
<b>SOFTWARE OPERATION</b>	<b>6</b>
Operational Mode	6
EDID Management (Analyzer/Pattern)	7
Output Resolution (Analyzer/Pattern)	8
Test Pattern (Pattern Mode Only)	10
Control Panel (Analyzer/Pattern)	11
Real-time Monitoring (Analyzer/Pattern)	12
Cable Testing (Portable Version Only)	13
<b>ACRONYMS</b>	<b>14</b>

# Overview

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better!

---

## Disclaimers

The information in this manual has been carefully checked and is believed to be accurate. Kramer Technology assumes no responsibility for any infringements of patents or other rights of third parties which may result from its use.

Kramer Technology assumes no responsibility for any inaccuracies that may be contained in this document. Kramer also makes no commitment to update or to keep current the information contained in this document.

Kramer Technology reserves the right to make improvements to this document and/or product at any time and without notice.

---

## COPYRIGHT NOTICE

No part of this document may be reproduced, transmitted, transcribed, stored in a retrieval system, or any of its part translated into any language or computer file, in any form or by any means—electronic, mechanical, magnetic, optical, chemical, manual, or otherwise—without express written permission and consent from Kramer Technology.

© Copyright 2018 by Kramer Technology. All Rights Reserved.

# Introduction

**860 Controller** is fully featured control software for use with the 860 (Benchtop Version) and 861 (Portable Version) Signal Generator & Analyzer products. This software is designed for installation and operation on a standard Windows (7, 8, 8.1, 10) PC or Laptop. This software provides full control over the Signal Generator & Analyzer products using a flexible and automatically adaptive interface layout. The designated unit can be controlled via either Ethernet or RS-232 and a direct command input CLI is also provided for advanced users.

---

## SYSTEM REQUIREMENTS

A desktop PC or laptop running a standard Windows (7, 8, 8.1, 10) operating system is required.

---

## INSTALLATION

Before beginning the installation of the software, please remember to uninstall any previously installed versions of the software, to avoid potential conflicts, by using the Windows “Add or Remove Programs” function.

Next, please obtain the “**860 Controller**” software from your authorized dealer and save it in a directory where you can easily find it. Extract all files from the **860 Controller** \*.zip file, find the Setup.exe file and execute it to launch the Installation Wizard.

Follow the installation prompts and select your preferred installation location to complete the installation.

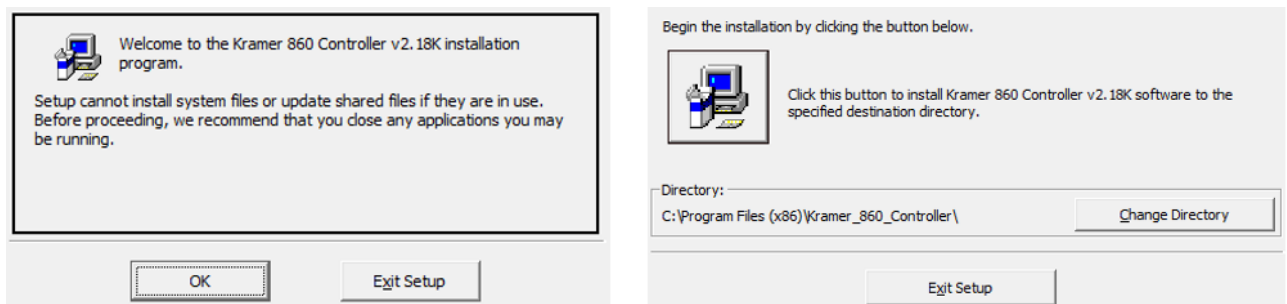
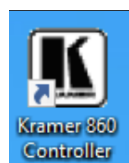


Figure 1: Installation Prompts

After the installation has completed, a copy of the **860 Controller** shortcut will be placed within your Start menu and it will have the same icon as seen below.



# CONNECTION

The **860 Controller** software can connect to the Bench Version of the Signal Generator & Analyzer via RS-232 or Ethernet or to the Portable Version via RS-232 (Using the Micro-USB port). Please follow the steps below to connect using the appropriate method for the device you wish to control.

---

## Connect via Ethernet (Bench Version Only)

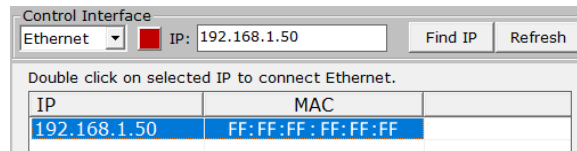
**Step 1:** Start the **860 Controller** software by clicking on it in the Start Menu. On some Windows 10 installations it might be necessary to start the software using the “Run as administrator” option.

**Step 2:** Select “Ethernet” as the control interface.



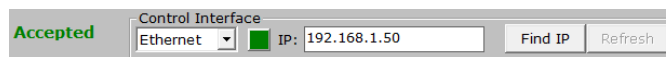
If you already know the IP address of the unit, you can skip Step 5 and enter in manually.

**Step 3:** If you do not know the IP address of the unit you wish to connect to, click on the “Find IP” button. This will open up a window listing all available units on the local network. Press the “Refresh” button to rescan the local network for available units, if necessary.



**Step 4:** Double click on the IP address of the unit you want to connect to or manually type it into the space provided.

**Step 5:** If the connection button is showing red (■), click it to initiate the connection. The “Not Linked” message should change to “Accepted” and the connection button will turn green (■).



---

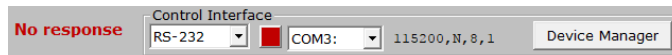
## Connect via RS-232

**Step 1:** To set the 861 to be controlled by RS-232 go to **Setup** → **USB Port** → **select RS-232**:



- Start the **860 Controller** software by clicking on it in the Start Menu.
- If you are attempting to connect to the Portable Version, remember to change the USB connection to “RS-232” in the unit’s “Setup” menu before connecting it to the PC’s USB port.

**Step 2:** Select “RS-232” as the control interface.



If you already know the COM port of the unit, you can skip to Step 4.

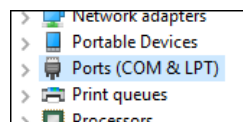


In case you can't control the unit but can connect to it, install the “XR21B1411” USB UART driver then try again.

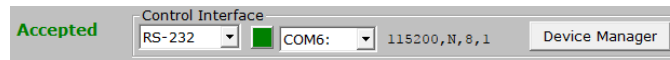
Search for the driver that is suitable for the PC type and model used:

<https://www.maxlinear.com/support/technical-documentation?partnumber=XR21B1411>

**Step 3:** If you do not know the COM port of the unit you wish to connect to, click on the “Device Manager” button which will open up the Windows Device Manager. Browse through the devices listed under “Ports (COM & LPT)” to find the correct COM port.



**Step 4:** Select the correct COM port of the unit from the dropdown in the **860 Controller** software and the software should automatically connect to the unit. If it is successful the connection button will turn green (■) and the “Not Linked” message will change to read “Accepted”.



**Step 5:** If the connection button is still showing red (■), double check that you have selected the correct COM port and that the cable is properly connected. Click the button to attempt to re-initiate the connection.

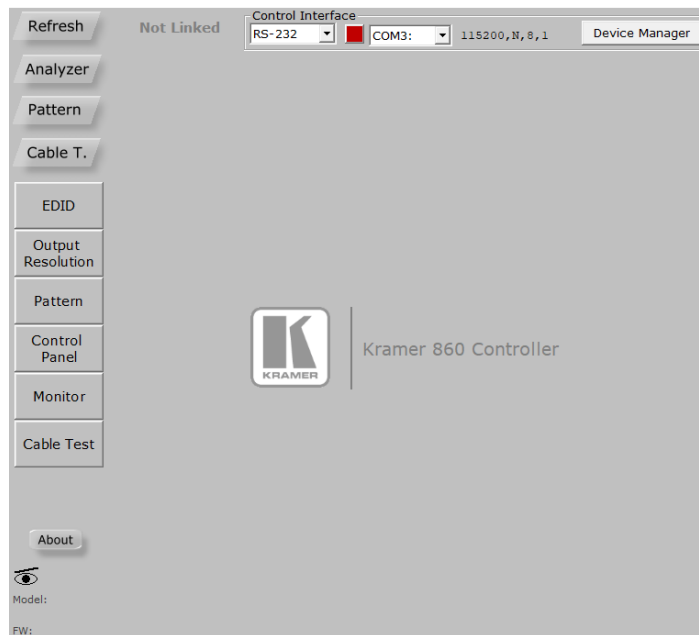
# SOFTWARE OPERATION

All major functions of the Signal Generator & Analyzer units are accessible from the tabs and buttons provided in the main window of the **860 Controller** software. These include operation mode selection, EDID management, output resolution selection, pattern selection, function control, sink/source monitoring, and cable testing (Portable Version only).

---

## Operational Mode

The Signal Generator & Analyzer units have 2 main operational modes, Analyzer Mode and Pattern Mode. The Portable Version has an additional 3rd mode, Cable Testing.



Select the preferred mode of operation by clicking the appropriate button in the Mode Selection area in the upper-left corner of the software. The unit will take a few seconds to change modes and refresh its data. Once the process has completed the button will be highlighted and normal control can resume.

You may now select one of the Main Function buttons on the left side of the interface. This will populate the interface with all appropriate controls and data relating to the selected function.



If at any time you feel that the currently displayed data is not correct or up to date (due to direct manual operation of the unit, for example) you may click on the Refresh button to force a re-download of the unit's data to the software.

```

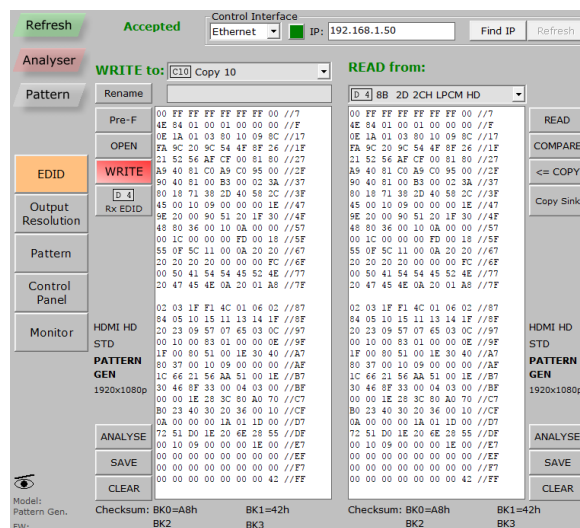
$source_detect? <CR><LF>
[Sv/cdd/tmds_format/sdct<CR>
/hdcp/hdcp_aksv/hdcp_bksv/hdcp_rxid<CR>
/data_rate/ha/hbp/hfp<CR>
/hsw/ht/hsp/hvs_offset<CR>
/hvs_offset2/pixel_clock/scan/timing<CR>
/timingx/tmds_clock/va/vbp<CR>
/vfp/vsw/vt/vsp<CR> /acr/acr_cts/acr_n/asp
<CR> /asp_ch/asp_fifo/asp_layout/asp_pll<CR>
/chs_code/chs_sr/chs_ss/chs_type<CR>
/hbr/aif/avi/dmi<CR>
/gcp/spd/vai/scdc_scr_enable<CR>
/scdc_scr_status/scdc_sink_ver/scdc_source_ver]
<CR><LF>
$task_mode [analyser/pattern]<CR><LF>
$task_mode<CR><LF>
$timing [1/2/3/...]<CR><LF>
$timing?<CR><LF>
$timingx?<CR><LF>
$tmnds_format [dvi/hdmi]<CR><LF>
$tmnds_format?<CR><LF>
$tmnds_sw [off/on]<CR><LF>
$tmnds_sw?<CR><LF>
$tx_sw [follow/on]<CR><LF>
$tx_sw?<CR><LF>
$update_fw<CR><LF>
$update_img480<CR><LF>
$update_img1080<CR><LF>
<EOT>

```

Clicking on the Command Monitor button ( ) will open a second window that displays all command responses from the connected unit. Individual Telnet commands may also be entered here to test command syntax or to control the unit directly.

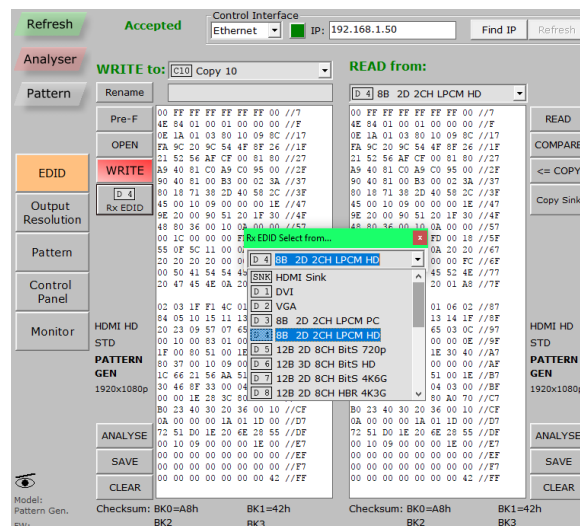
## EDID Management (Analyzer/Pattern)

This tab provides control over the unit's EDID Management including options to select, read, write, analyze and save any EDID available to the unit. While these functions are primarily used when in Analyzer Mode, they are also available in Pattern mode.



- RENAME:** Renames the currently selected "Write to:" EDID to the text typed into the entry box.
- PRE-F:** Opens a quick-access list of recently opened EDID files.
- OPEN:** Loads a previously saved EDID file (\*.bin format) from the local PC/Laptop and places it into the left window.

4. **WRITE:** Writes the EDID from the left window to the EDID destination selected in the “Write to:” dropdown menu.
5. **READ:** Reads the EDID from the currently selected source/sink listed in the “Read from:” dropdown menu and places it into the right window.
6. **COMPARE:** Compares the EDID in the left window with the EDID in the right window. Any data that is different between the EDIDs will be marked in red.
7. **<= COPY:** Copies the EDID in the right window to the left window.
8. **COPY SINK:** Allows directly copying the EDID from the current HDMI sink to any of the Copy EDID slots.
9. **ANALYZE:** Generates a short analysis report for the EDID (from the left or right window, depending on the button pressed) in a new window. The report may be saved to the local PC/Laptop if desired.
10. **SAVE:** Saves a copy of the EDID (from the left or right window, depending on the button pressed) to a file on the local PC/Laptop.
11. **CLEAR:** Clears the copy of the EDID (from the left or right window, depending on the button pressed) from memory.



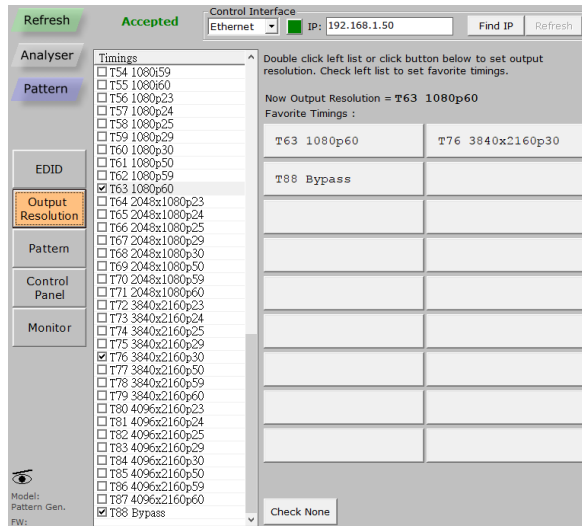
12. **Rx EDID:** Allows selection of any EDID stored in the unit, or copied from a connected sink. The selected EDID will be set as the EDID to be sent to any device connected to the HDMI input (Rx) of the unit.

## Output Resolution (Analyzer/Pattern)

This tab provides control over the unit’s Output Resolutions and allows setting “Favorite Timings” for quick selection. These functions are available for both Analyzer Mode and Pattern Mode.



The “Bypass” output resolution only works in Analyzer mode. The image below is from the Bench Version of the unit. The list of available resolutions for the Portable Version is more limited.

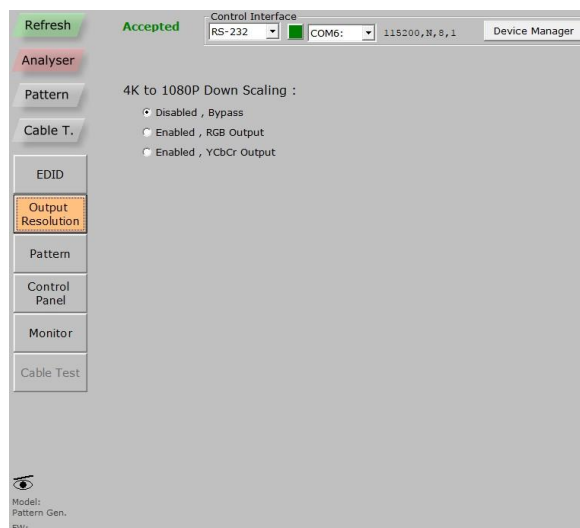


The output resolution that is currently in use is displayed near the top of the window. Selecting a new resolution for output can be done in one of two ways. Click on a resolution in the “Favorite Timings” list or find the resolution in the list on the left and double-click the resolution name.

To add a resolution to the “Favorite Timings” list, find it in the full list on the left and click its check box. To remove a resolution from the list, find it in the full list on the left and uncheck the checkbox. To remove all resolutions from the “Favorite Timings” list, click the “Check None” button.



Favorites are not permanently saved and will be reset to the defaults when the software is closed.



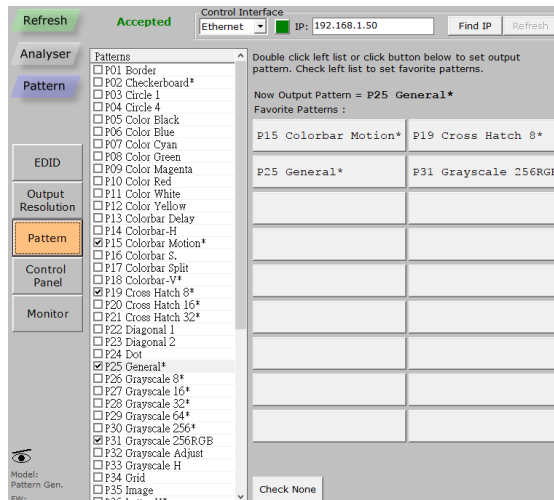
When connected to the Portable Version of the Signal Generator & Analyzer in Analyzer Mode the available Output Resolution choices are limited to 3 options: A pure Bypass mode, a mode that down-converts 4K sources to 1080p and outputs as RGB (same frame rate as the source), and a mode that down-converts 4K sources to 1080p and outputs as YCbCr (same frame rate as the source).

# Test Pattern (Pattern Mode Only)

This tab provides control over the unit's test patterns and allows setting "Favorite Patterns" for quick selection. This function is only available in Pattern Mode.



The image below is from the Bench Version of the unit. The list of available patterns for the Portable Version is more limited.



The pattern that is currently in use is displayed near the top of the window. Selecting a new pattern for output can be done in one of two ways. Click on a pattern in the "Favorite Patterns" list or find the pattern in the list on the left and double-click the resolution name. Patterns with multiple versions or

modes are marked with an asterisk (\*). The additional versions of the pattern are activated by re-selecting the pattern multiple times.

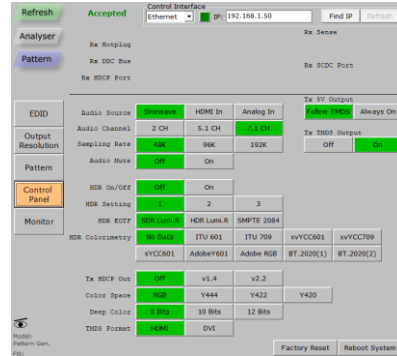
To add a pattern to the "Favorite Patterns" list, find it in the full list on the left and click its check box. To remove a pattern from the list, find it in the full list on the left and uncheck the checkbox. To remove all patterns from the "Favorite Patterns" list, click the "Check None" button.



When using Windows 10, by default, favorites will not be saved when the software is closed. To avoid this, please use the "Run as administrator" option to start the software.

# Control Panel (Analyzer/Pattern)

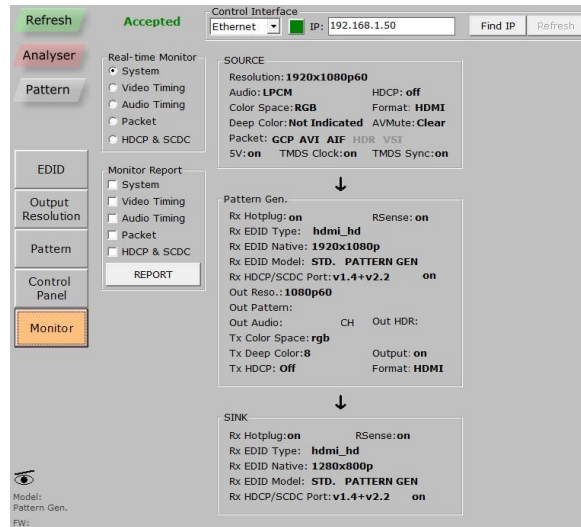
This tab provides control over the unit's additional features, functions and settings that are not covered by the other tabs. The available controls change depending on the unit's current operational mode (Analyzer or Pattern), and which functions are appropriate based on the unit's current output resolution and pattern selection.



The primary controls contained here are for HDCP, Color Space, Bit-depth, HDR, Audio, and Hot Plug/Voltage. Additionally, this tab provides controls for performing a Factory Reset or rebooting the unit.

# Real-time Monitoring (Analyzer/Pattern)

This tab provides access to a full suite of real-time monitoring and analysis functions covering a wide range of data from both the input and output.



The available Real-time Monitor categories are:

1. **SYSTEM:** Basic source, sink and unit signal information.
2. **VIDEO TIMING (Analyzer Mode only):** Detailed information about the source's video timing.
3. **AUDIO TIMING (Analyzer Mode only):** Detailed information about the source's audio format.
4. **PACKET (Analyzer Mode only):** Detailed information about the source's GCP, AVI, AIF, SPD, VSI, and DRMI packets.
5. **HDCP & SCDC (Analyzer Mode):** Detailed information about the source's HDCP and SCDC interaction with the unit.
6. **HDCP & SCDC (Pattern Mode):** Detailed information about the sink's HDCP and SCDC interaction with the unit.

Additionally, reports can be generated for each monitoring type, or any combination of multiple types. The report can be viewed directly in the window or saved to the local PC/Laptop as a text file.

# Cable Testing (Portable Version Only)

The Portable Version of the Signal Generator & Analyzer includes a cable testing function to help quantify the general feature support and error resistance capabilities of the cable being tested. The Cable Test tab contains the controls required to perform a cable test.



To perform a cable test:

**Step 1:** Connect the cable to be tested to both the HDMI input and HDMI output of the unit.

**Step 2:** Select the cable type being tested: "Copper" for standard HDMI cables, or "Optical" for AOC (Active Optical Cables).



The cable type selection controls which additional test options are available

**Step 3:** For copper cables, select the cable length (2~5M), testing level (strict, normal, or slim) and length of time to run the test (2 minutes up to "Infinite"). For optical cables only the Test Delay setting can be configured and in most cases this should be left in the "On" position.

**Step 4:** Click on the "Start" button and wait for the test process bar to complete.

**Step 5:** Each section tested will receive a "Pass" or "Fail" mark and an overall PASS/FAIL grade will be assigned to the cable itself.



A FAIL result does not necessarily mean that the cable cannot pass an 18Gbps signal under ideal circumstances, however it is an indication of a high number of detected data errors that could result in unreliable or unstable performance with high-bitrate signals in less than optimal conditions.

# ACRONYMS

ACRONYM	COMPLETE TERM
ARC	Audio Return Channel
ASCII	American Standard Code for Information Interchange
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
dB	Decibel
DHCP	Dynamic Host Configuration Protocol
DVI	Digital Visual Interface
EDID	Extended Display Identification Data
GbE	Gigabit Ethernet
Gbps	Gigabits per second
GUI	Graphical User Interface
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDR	High Dynamic Range
HDTV	High-Definition Television
HPD	Hot Plug Detection
IP	Internet Protocol
IR	Infrared
kHz	Kilohertz
LAN	Local Area Network
LPCM	Linear Pulse-Code Modulation
MAC	Media Access Control
MHz	Megahertz
SDTV	Standard-Definition Television
SNR	Signal-to-Noise Ratio
TCP	Transmission Control Protocol
THD+N	Total Harmonic Distortion plus Noise
TMDS	Transition-Minimized Differential Signaling
4K UHD	4K Ultra-High-Definition (10.2Gbps max)
4K UHD*	4K Ultra-High-Definition (18Gbps max)
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



