KRAMER

USER MANUAL

MODEL:

VP-451
HDMI / USB-C Scaler

Contents

Introduction

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!

Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment.
- Review the contents of this user manual.

Go to www.kramerav.com/downloads/VP-451 to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

Achieving the Best Performance

- Use only good quality connection cables (we recommend Kramer high-performance, high-resolution cables) to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Do not secure the cables in tight bundles or roll the slack into tight coils.
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality.
- Position your Kramer **VP-451** away from moisture, excessive sunlight and dust.

Safety Instructions

Caution:

- This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.
- For products with relay terminals and GPI\O ports, please refer to the permitted rating for an external connection, located next to the terminal or in the User Manual.
- There are no operator serviceable parts inside the unit.

Warning:

- Use only the power cord that is supplied with the unit.
- To ensure continuous risk protection, replace fuses only according to the rating specified on the product label which located on the bottom of the unit.

Recycling Kramer Products

The Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC aims to reduce the amount of WEEE sent for disposal to landfill or incineration by requiring it to be collected

and recycled. To comply with the WEEE Directive, Kramer Electronics has made arrangements with the European Advanced Recycling Network (EARN) and will cover any costs of treatment, recycling and recovery of waste Kramer Electronics branded equipment on arrival at the EARN facility. For details of Kramer's recycling arrangements in your particular country go to our recycling pages at www.kramerav.com/support/recycling.

Overview

Congratulations on purchasing your Kramer **VP-451 HDMI / USB-C Scaler**.

VP-451 is a high-performance 18G 4K digital scaler for HDMI™ and USB-C signals. The unit up-scales, down-scales, and cross-scales to resolutions up to 4K@60 (4:4:4). The output resolution can be set to automatically follow the native resolution of the sink or set manually to a custom resolution.

VP-451 provides exceptional quality, advanced and user-friendly operation, and flexible connectivity.

Exceptional Quality

- High-Performance Professional Scaler – Supports HDR10 and HDCP 2.2/1.4, and features input auto–switching, constant sync on the output even if the input video signal is lost or interrupted, and a built-in ProcAmp for convenient signal adjustment.
- Automatic Display Control – Supports CEC that enables automatically turning the display on and off.
- HDMI Support – HDR, CEC, 4K@60, Deep Color / x.v.Color™, 7.1 PCM, Dolby TrueHD and DTS-HD as specified in HDMI 2.0.

Advanced and User-friendly Operation

- Fast, Smooth Manual and Auto Switching Between Sources – Select the USB Type-C or one of the HDMI inputs, or configure the device to automatically select the active source.
- Convenient Unit Control – Control the unit using an OSD (On-Screen Display) menu via front panel buttons and input selector, video freeze and resolution reset front panel buttons. Additionally, connect to the contact closure connector for remote switching of sources. All settings are saved in non-volatile memory.
- USB-C Powering – Provides up to 60W of power via the USB-C input, making it suitable for charging USB-C devices.
- User-Friendly Operation – LED indicator for each input and for power status. Local firmware upgrade via the USB type-A port ensures lasting, field-proven deployment.
- Easy Installation – Compact MegaTOOLS® fan-less enclosure for surface mounting or side-by-side mounting of 2 units in a 1U rack space with the recommended rack adapter.

Flexible Connectivity

- Flexible Analog Audio Embedding and Extraction (De-embedding) – The user can select the unbalanced analog audio input to embed into the HDMI output signal. On the output, the user can select to extract the audio signal and output it as balanced analog audio.

Typical Applications

VP-451 is ideal for the following typical applications:

- Meeting rooms and huddle spaces.
- Conversion between video formats.
- Charging USB-C devices.

Controlling your VP-451

Control your **VP-451** via the front panel buttons and via contact closure switches.

Defining VP-451 HDMI / USB-C Scaler

This section defines **VP-451**.

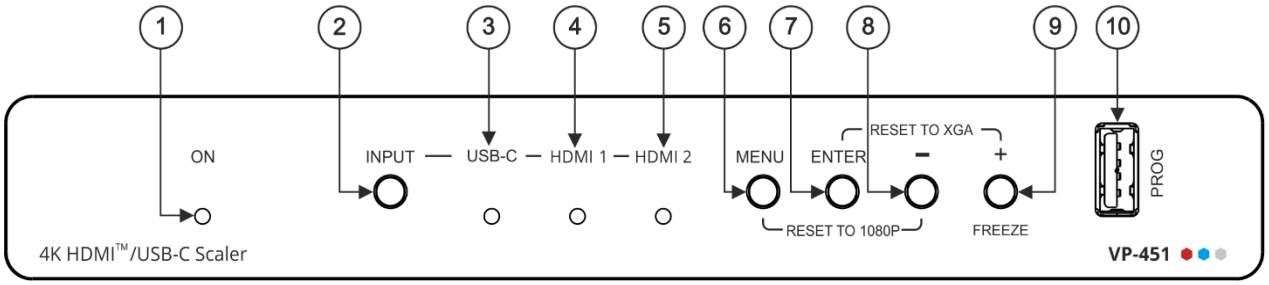


Figure 1: VP-451 HDMI / USB-C Scaler Front Panel

#	Feature	Function
1	ON LED	Lights green when the unit is powered.
2	INPUT Button	Press to cycle the input between USB-C, HDMI 1 and HDMI 2.
3	USB-C LED	Lights green when USB-C is selected.
4	HDMI 1 LED	Lights green when HDMI 1 is selected.
5	HDMI 2 LED	Lights green when HDMI 2 is selected.
6	MENU Button	Press to enter/escape the on-screen display (OSD) menu. When not in OSD, press together with the – button to reset to 1080p (RESET TO 1080P).
7	ENTER Button	In OSD, press to choose the highlighted menu item. When not in OSD, press together with the + button to reset to XGA (RESET TO XGA).
8	– Button	In OSD, press to move backward through the list or to decrement the parameter value.
9	+/FREEZE Button	In OSD, press to move forward through the list or to increment the parameter value. When not in OSD, press to freeze/unfreeze the display.
10	PROG USB Connector	Connect to a USB memory stick for upgrading the firmware (see Upgrading the Firmware on page 16) and uploading EDID from an external file (see Uploading EDID from an External File on page 14).

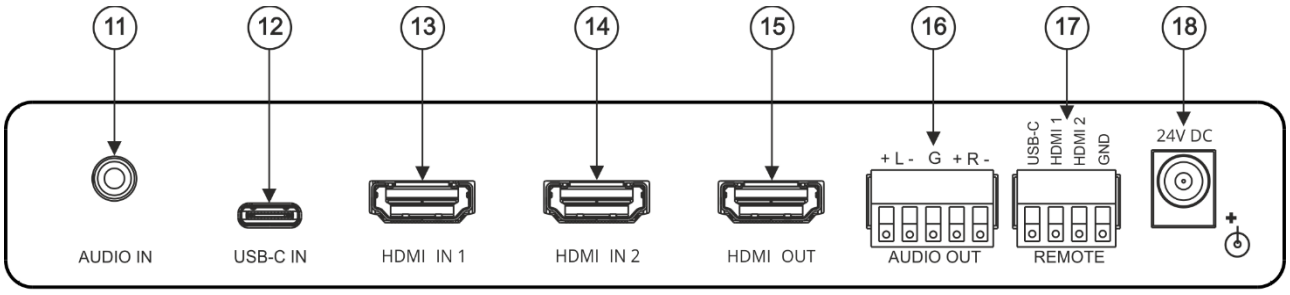


Figure 2: VP-451 HDMI / USB-C Scaler Rear Panel

#	Feature	Function
(11)	AUDIO IN 3.5mm Mini Jack	Connect to an unbalanced stereo audio PC source. Can also be selected as the audio input (instead of the HDMI and USB-C embedded audio inputs).
(12)	USB-C IN USB Type C Port	Connect to a USB type-C audio-video source.
(13)	HDMI IN 1 Connector	Connect to an HDMI source.
(14)	HDMI IN 2 Connector	Connect to an HDMI source.
(15)	HDMI OUT Connector	Connect to an HDMI acceptor.
(16)	AUDIO OUT Terminal Block Connector	Connect to a balanced stereo audio acceptor.
(17)	REMOTE 4-pin Terminal Block Connector	Connect to contact closure switches (by momentary contact between the desired pin and GND pin) to select an input (see Connecting the Remote Control Switches on page 8).
(18)	24V DC	24V DC connector for powering the unit.

Mounting VP-451

This section provides instructions for mounting **VP-451**. Before installing, verify that the environment is within the recommended range:

- Operation temperature – 0° to 40°C (32 to 104°F).
- Storage temperature – -40° to +70°C (-40 to +158°F).
- Humidity – 10% to 90%, RHL non-condensing.

Caution:

- Mount **VP-451** before connecting any cables or power.

Warning:

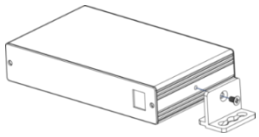
- Ensure that the environment (e.g., maximum ambient temperature & air flow) is compatible for the device.
- Avoid uneven mechanical loading.
- Appropriate consideration of equipment nameplate ratings should be used for avoiding overloading of the circuits.
- Reliable earthing of rack-mounted equipment should be maintained.
- Maximum mounting height for the device is 2 meters.

To mount the VP-451 on a rack

Mount the unit in a rack using the recommended rack adapter (see www.kramerav.com/product/VP-451).

To mount the VP-451 on a table or shelf

- Attach the rubber feet and place the unit on a flat surface.
- Fasten a bracket (included) on each side of the unit and attach it to a flat surface.



For more information go to www.kramerav.com/downloads/VP-451.

Connecting VP-451

Always switch off the power to each device before connecting it to your **VP-451**. After connecting your **VP-451**, connect its power and then switch on the power to each device.

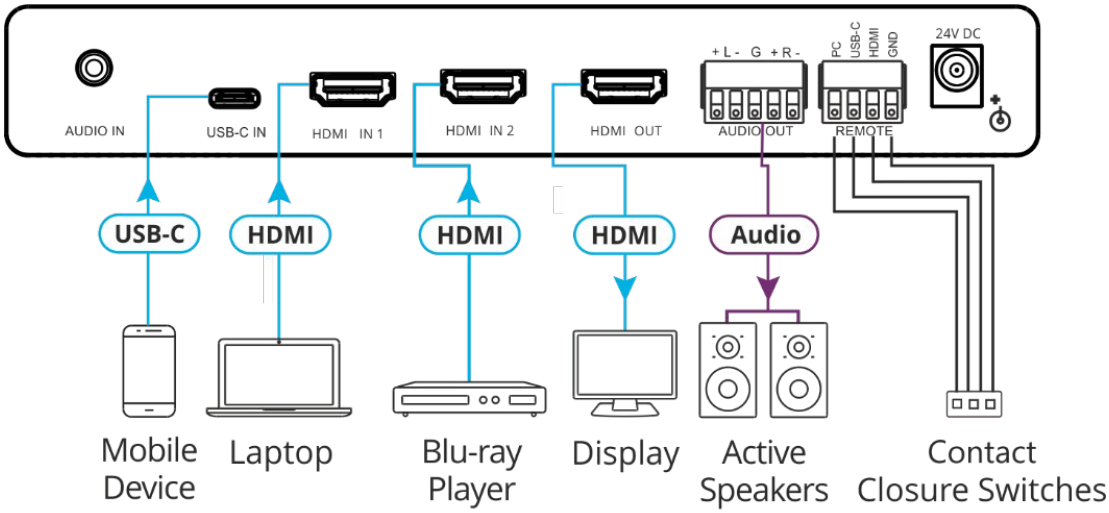


Figure 3: Connecting to the **VP-451** Rear Panel

To connect the VP-451 as illustrated in the example in Figure 3:

1. Connect a USB source (for example, a mobile device) to the USB-C IN connector (12).
2. Connect an HDMI source (for example, a laptop) to the HDMI IN 1 connector (13).
3. Connect an HDMI source (for example, a Blu-ray player) to the HDMI IN 2 connector (14).
4. Connect the HDMI OUT connector (15) to an HDMI acceptor (for example, a display).
5. Connect the AUDIO OUT 5-pin terminal block connector (16) to a balanced stereo audio acceptor (for example, active speakers).
6. Connect the REMOTE 4-pin terminal block connector (17) to contact closure switches (for example, Kramer **RC-21TB**).
7. Connect the power adapter to **VP-451** and to the mains electricity (not shown in Figure 3).

Connecting the Output to a Balanced/Unbalanced Stereo Audio Acceptor

The following are the pinouts for connecting the output to a balanced or unbalanced stereo audio acceptor:

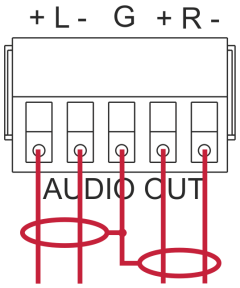


Figure 4: Connecting to a Balanced Stereo Audio Acceptor

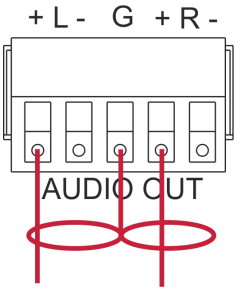
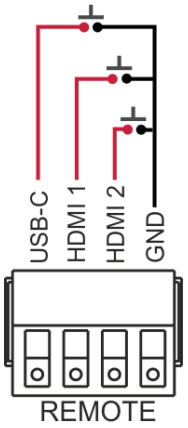


Figure 5: Connecting to an Unbalanced Stereo Audio Acceptor

Connecting the Remote Control Switches

Momentarily connect the desired pin to the GND pin to select an input:

Pin Name	Function
USB-C	Select the USB-C input.
HDMI 1	Select the HDMI 1 input.
HDMI 2	Select the HDMI 2 input.



Operating and Controlling VP-451

Operate and control **VP-451** via:

- Front panel buttons (see Using Front Panel Buttons on page 9).
- Remote control switches to select an input (see Connecting the Remote Control Switches on page 8).
- OSD menu (see Using the OSD Menu on page 9).

Using Front Panel Buttons

Press the **VP-451** front panel buttons to:

- Select the required INPUT (USB-C, HDMI IN or HDMI 2).
- Reset the resolution to XGA/1080p.
- Freeze the output.
- Control the device via the OSD menu, using the MENU, ENTER, and navigation buttons (see Using the OSD Menu on page 9).

Using the OSD Menu

Use the OSD buttons to control the **VP-451** via the OSD menu (for more information, see Navigating OSD Buttons on page 10).

The default OSD timeout is set to 10 seconds.

Use the OSD menu to perform the following operations:

- Setting Image Parameters on page 10.
- Selecting an Input Signal on page 10.
- Setting Output Parameters on page 11.
- Setting Audio Parameterson page 11.
- Setting OSD Parameters on page 12.
- Setting HDCP on page 12.
- Setting Sleep Mode on page 12.
- Setting Switching Mode on page 13.
- Setting FREEZE Mode Functionality on page 13.
- Managing EDID on page 14.
- Viewing Device Information on page 14.
- Performing Factory Reset on page 15.

Navigating OSD Buttons

To enter and use the OSD menu buttons:

1. Press MENU.
2. Press:
   - **ENTER** to accept changes and to change the menu settings.
   - **Arrow buttons** to move through the OSD menu, which is displayed on the video output.
   - **EXIT** to exit the menu.

Setting Image Parameters

To set the image parameters:

1. On the front panel press **MENU**. The menu appears.
2. Click **PICTURE** and define the image parameters according to the information in the following table:

Menu Item	Function	
CONTRAST	Set the contrast.	
BRIGHTNESS	Set the brightness.	
FINETUNE	Type-C/HDMI	HUE – set the color hue.
		SATURATION – set the color saturation.
		SHARPNESS – set the sharpness of the picture.
		NOISE REDUCTION – select the noise reduction filter: OFF (default), LOW, MIDDLE, HIGH or AUTO.
COLOR	Set the Red, Green and Blue shades.	

Selecting an Input Signal

To set the input source:

1. On the front panel press **MENU**. The menu appears.
2. Click **INPUT** and select the **SOURCE**:
   - HDMI 1(default).
   - HDMI 2.
   - Type C.

Setting Output Parameters

To set the output parameters:

1. On the front panel press **MENU**. The menu appears.
2. Click **OUTPUT** and define the output parameters according to the information in the following table:

Menu Item	Function			
Size	Set the size of the image: Full, OVER SCAN, FULL, BEST FIT (default), PAN SCAN, LETTERBOX, UNDER 2, UNDER 1, FOLLOW IN.			
Resolution	Select the output resolution (default, NATIVE HDMI):			
	Appears as	**Output Resolution**	**Appears as**	**Output Resolution**
	640x480 60	640x480 @60Hz	800x600 60	800x600 @60Hz
	1024x768 60	1024x768 @60Hz	1280x768 60	1280x768 @60Hz
	1280x800 60	1280x800 @60Hz	1280x1024 60	1280x1024 @60Hz
	1360x768 60	1360x768 @60Hz	1400x1050 60	1400x1050 @60Hz
	1440x900 60	1440x900 @60Hz	1600x1200 60	1600x1200 @60Hz
	1680x1050 60	1680x1050 @60Hz	1920x1200 60 RB	1920x1200 @60Hz RB
	2560x1600 60 RB	2560x1600 @60Hz RB	1920x1080 60	1920x1080 @60Hz
	1280x720 60	1280x720 @60Hz	2048x1080 50	2048x1080 @50
	2048x1080 60	2048x1080 @60Hz	2560x1440 60 RB	2560x1440 @60Hz RB
	720x480P 60	720x480P @60Hz	720x576P 50	720x576P @50Hz
	1280x720P 50	1280x720P @50Hz	1280x720P 60	1280x720P @60Hz
	1920x1080P 24	1920x1080P @24Hz	1920x1080P 25	1920x1080P @25Hz
	1920x1080P 30	1920x1080P @30Hz	1920x1080P 50	1920x1080P @50Hz
	1920x1080P 60	1920x1080P @60Hz	2560x1080P 50	2560x1080P @50Hz
	2560x1080P 60	2560x1080P @60Hz	3840x2160P 24	3840x2160P @24Hz
	3840x2160P 25	3840x2160P @25Hz	3840x2160P 30	3840x2160P @30Hz
	3840x2160P 50	3840x2160P @50Hz	3840x2160P 60	3840x2160P @60Hz
	3840x2160P 50(420)	4k2k @50Hz (4:2:0)	3840x2160P 60(420)	4k2k @60Hz (4:2:0)
BYPASS ENABLE	Yes (Bypass): Select to bypass the scaler (no video processing). No (Scaler): Select to scale the video signal.			

Setting Audio Parameters

To set the audio:

1. On the front panel press **MENU**. The menu appears.
2. Click **Audio** and define the audio parameters according to the information in the following table:

Menu Item	Function
DELAY	Set the audio delay time (lipsync) to 40ms (default),110ms or 150ms.
INPUT	Set each input audio source to AUTOMATIC (default, the embedded audio is used unless a DVI source is detected), or LINE IN (analog is used).
OUTPUT VOLUME	Set the AUDIO OUT output volume (default is 80 = 0dB).

Setting OSD Parameters

To set the OSD parameters:

1. On the front panel press **MENU**. The menu appears.
2. Click **OSD** and define the OSD parameters according to the information in the following table:

Menu Item	Function
H-POSITION	Set the horizontal position of the OSD.
V-POSITION	Set the vertical position of the OSD.
TIMER	Set the timeout period to Off or up to 60 seconds (default 10).
TRANSPARENCY	Set the OSD background between 100 (transparent) and 0 (opaque).
DISPLAY	Select the information displayed on-screen during operation: Info (default) – the information appears for 10 seconds. On – the information appears constantly. Off – the information does not appear.

Setting HDCP

To set the HDCP on the inputs and output:

1. On the front panel press **MENU**. The menu appears.
2. Click **Advanced** and define the HDCP parameters according to the information in the following table:

Menu Item	Function
HDCP On Input	Set HDCP support on HDMI 1 IN, HDMI 2 IN and TYPE C IN to ON (default) or OFF. Note that: 1. HDCP must be enabled (ON) in order to support HDCP encrypted sources. 2. Sources such as Mac computers always encrypt their outputs when detecting that the sink supports HDCP. If the content does not require HDCP, you can prevent these sources from encrypting by disabling (OFF) HDCP on the input.
HDCP On Output	Select Follow Output (default) or Follow Input on HDMI OUT. Select Follow Output (recommended) for the scaler to match its HDCP output to the HDCP setting of the acceptor to which it is connected. Select Follow Input to change its HDCP output setting according to the HDCP of the input (recommended when the output is connected to a splitter/switcher).

Setting Sleep Mode

VP-451 enables configuring if and when a connected display enters sleep mode using the Auto Sync Off feature. Auto Sync Off turns off the output after a period of not detecting a valid video signal on the input(s) until a valid input is again detected or any keypad is pressed.

To set Auto Sync Off:

1. On the front panel press **MENU**. The menu appears.
2. Click **ADVANCED** and select **Auto Sync Off**.

3. Define Auto Sync Off according to the information in the following table:

Menu Item	Function
DISABLE (default)	To leave outputs active at all times.
SLOW	To disable outputs after ~ 2 minutes of no input detection.
FAST	To disable outputs after ~ 10 seconds of no input detection.

Setting Switching Mode

VP-451 enables configuring for automatic switching of the input source upon signal loss or when a source is plugged in.

To set the switching mode:

1. On the front panel press **MENU**. The menu appears.
2. Click **ADVANCED** and select **AUTO SWITCH**.
3. Select the switching mode according to the information in the following table:

Menu Item	Function
OFF	For manual switching.
AUTO SCAN (default)	Scans for a valid input when no signal is found on the selected input.
LAST CONNECT	Automatically switches to the last connected input and reverts back to the last selected input after that input is lost.

Setting FREEZE Mode Functionality

To set the functionality of the FREEZE front panel button:

1. On the front panel press **MENU**. The menu appears.
2. Click **Advanced** and select **FREEZE**.
3. Set a panel lock mode according to the information in the following table:

Menu Item	Function
FREEZE + MUTE (default)	Freeze and mute the display.
ONLY FREEZE	Freeze the display.
ONLY MUTE	Mute the output audio.

Managing EDID

To manage the EDID:

1. On the front panel press **MENU**. The menu appears.
2. Click ADVANCED and select **EDID**.
3. For each input (HDMI IN 1, HDMI IN 2 and TYPE-C), select one of the EDID options according to the information in the following table:

EDID Selection	Operation
Def. 1080P	Select a built-in EDID from the list and press enter.
Def. 1080P(AUD)	
Def. 4K2K(3G)	
Def. 4K2K(3G-AUD)	
Def. 4K2K(6G)	
Def. 4K2K(6G-AUD)	
USER1	Select the EDID uploaded from an external file (see Uploading EDID from an External File on page 14).
USER2	
USER3	
OUTPUT	**To read the EDID from a connected output:** Make sure that the output is connected to an acceptor and then select OUTPUT.

Uploading EDID from an External File

To select the EDID from an external file:

1. Save the EDID file to a memory stick.
   The EDID file name should include USER1, USER2 or USER3.
   For example, use EDID_USER1.bin for USER 1, EDID_USER2 for USER 2 and EDID_USER3 for USER 3.
2. Plug the memory stick into the PROG USB port (10) on the device front panel.
3. On the front panel press **MENU**. The OSD menu appears.
4. Click **ADVANCED** and select **EDID UPLOAD**.
5. Select **USER EDID**. The external EDID file (EDID_USER1.bin, in this example) is stored to USER 1.

You can now read the uploaded EDID to an input by selecting USER 1 in a selected input in the ADVANCED>EDID menu.

Viewing Device Information

Device information includes the selected source, the input and output resolutions, and the software version.

To view the information:

1. On the front panel press **MENU**. The menu appears.
2. Click **INFO** and view the input resolution, output resolution and software version.

Performing Factory Reset

To perform factory reset:

1. On the front panel press **MENU**. The menu appears.
2. Click **FACTORY** and select **Reset**
3. Click **Yes**.
   Wait for completion of factory reset (resolution is set to Native).

Upgrading the Firmware

To upgrade the firmware:

1. Save the new firmware file to a memory stick.

   The memory stick should only include this file.

2. Power the device.
3. Verify that an 1080p input source and a display are connected to the device.
4. Plug the memory stick into the PROG USB port (10) on the device front panel.
5. Press and hold both the MENU button (6) and the ENTER button (7) until input LEDs flash and then release.
   During upgrade the LEDs flash and once complete, one of the INPUT LEDs turns on and a valid signal appears on the output.
6. Check that the OSD Info screen shows the latest FW version.

Technical Specifications

Inputs	2 HDMI	On female HDMI connectors
	1 DP Alt Mode (4-lane) USB-C	On a female USB-C connector
	Unbalanced Stereo Audio	On a 3.5mm mini jack
Outputs	HDMI	On a female HDMI connector
	Balanced Analog Stereo Audio	On a 5-pin terminal block connector
Ports	4 Contact Closure Switches	On a 4-pin terminal block
	USB	On a USB-A connector (for firmware upgrade)
Analog Audio Input	Max Input Level	2.14Vrms
	Impedance	20kΩ
Audio Output	Impedance	500Ω
	Frequency Response	20Hz to 20kHz @<+/-0.1dB
	S/N Ratio (A-weighted)	83dB, 20Hz to 20kHz @ 1.4Vrms input level
	THD+N	0.01%, 20Hz to 20kHz
Video	Max Bandwidth	18Gbps (6Gbps per graphic channel)
	Max Input Resolution	4K @60Hz (4:4:4) 24bpp resolution
	Compliance	HDMI, HDCP 2.2 and 1.4
Controls	Front Panel	Input selector, video freeze and resolution reset front panel buttons, OSD menu
Indication LEDs	Front Panel	Selected input
		Power on LED
Power	Maximum Consumption (supplying 60W over USB-C)	24V DC, 3.4A (when charging USB-C devices at 60W)
	Source	24V DC, 5A
	USB-C Charging	Up to 60W (PD 1.0)
Environmental Conditions	Operating Temperature	0° to +40°C (32° to 104°F)
	Storage Temperature	-40° to +70°C (-40° to 158°F)
	Humidity	10% to 90%, RHL non-condensing
Regulatory Compliance	Safety	CE, UL
	Environmental	RoHs, WEEE
	Size	Mega TOOL
	Type	Aluminum
	Cooling	Convection Ventilation
General	Net Dimensions (W, D, H)	18.8cm x 14.5cm x 2.5cm (7.4" x 5.7" x 1")
	Shipping Dimensions (W, D, H)	34.4cm x 20.9cm x 6.8cm (13.5" x 8.2" x 2.7")
	Net Weight	0.7kg (1.5lbs) approx.
	Shipping Weight	1.3kg (2.9lbs) approx.
Accessories	Included	Power cord and adapter
	Optional	For optimum range and performance use the recommended Kramer cables available at www.kramerav.com/product/VP-451
Specifications are subject to change without notice at www.kramerav.com		

Input Resolutions

Resolution/Refresh Rate	Type C	HDMI
480I/576I	√	√
480P/576P	√	√
720P@(60/50)	√	√
1080I@(60/50)	√	√
1080P@(60/50)	√	√
1080P@(24/25/30)	√	√
640x480@(60/67/72/75/85)	√	√
800x600@(56/60/72/75)	√	√
1024x768@(60/70/75)	√	√
1280x1024@(60/75)	√	√
1280X960@60	√	√
1280X720@60	√	√
1920X1080@60	√	√
1600X1200@60	√	√
1280x768@60	√	√
1280x800@60	√	√
1360x768@60	√	√
1366x768@60	√	√
1400x1050@60	√	√
1600X900@60 RB	√	√
1680x1050@60	√	√
1920x1200@60 RB	√	√
2048x1080@(24/25/30/50/60)	√	√
4K2K@(24/25/30/50/60)	√	√
4K2K(4:2:0)@(50/60)	√	√

Output Resolutions

Resolution/Refresh Rate	Resolution/Refresh Rate
640x480 60Hz	2560x1600 RB 60Hz
800x600 60Hz	1920x1080 60Hz
1024x768 60Hz	1280x720 60Hz
1280x768 60Hz	2048x1080 50/60Hz
1280x800 60Hz	2560x1440 RB 60Hz
1280x1024 60Hz	720x480P 60Hz
1360x768 60Hz	720x576P 50Hz
1400x1050 60Hz	1280x720P 50/60Hz
1440x900 60Hz	1920x1080P 24/25/30/50/60Hz
1600x1200 60Hz	2560x1080P 50/60Hz
1680x1050 60Hz	4K2K 24/25/30/50/60Hz
1920x1200 RB 60Hz	4K2K (4:2:0) 50/60Hz

Default EDID

Monitor
Model name..... VP-451
Manufacturer..... KMR
Plug and Play ID..... KMR060D
Serial number..... 49
Manufacture date..... 2018, ISO week 6
Filter driver..... None

EDID revision..... 1.3
Input signal type..... Digital
Color bit depth..... Undefined
Display type..... Monochrome/grayscale
Screen size..... 360 x 360 mm (20.0 in)
Power management..... Standby, Suspend
Extension blocs..... 1 (CEA-EXT)

DDC/CI..... Not supported

Color characteristics
Default color space..... Non-sRGB
Display gamma..... 2.40
Red chromaticity..... Rx 0.611 - Ry 0.329
Green chromaticity..... Gx 0.313 - Gy 0.559
Blue chromaticity..... Bx 0.148 - By 0.131
White point (default).... Wx 0.320 - Wy 0.336
Additional descriptors... None

Timing characteristics
Horizontal scan range.... 15-136kHz
Vertical scan range..... 23-61Hz
Video bandwidth..... 600MHz
CVT standard..... Not supported
GTF standard..... Not supported
Additional descriptors... None
Preferred timing..... Yes
Native/preferred timing.. 3840x2160p at 60Hz (16:9)
Modeline..... "3840x2160" 594.000 3840 4016 4104 4400 2160 2168 2178 2250 +hsync +vsync
Detailed timing #1..... 1920x1080p at 60Hz (16:9)
Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync

Standard timings supported
640 x 480p at 60Hz - IBM VGA
640 x 480p at 72Hz - VESA
640 x 480p at 75Hz - VESA
800 x 600p at 56Hz - VESA
800 x 600p at 60Hz - VESA
800 x 600p at 72Hz - VESA
800 x 600p at 75Hz - VESA
1024 x 768p at 60Hz - VESA
1024 x 768p at 70Hz - VESA
1024 x 768p at 75Hz - VESA
1280 x 1024p at 75Hz - VESA
1600 x 1200p at 60Hz - VESA STD
1280 x 1024p at 60Hz - VESA STD
1400 x 1050p at 60Hz - VESA STD
1920 x 1080p at 60Hz - VESA STD
640 x 480p at 85Hz - VESA STD
800 x 600p at 85Hz - VESA STD
1024 x 768p at 85Hz - VESA STD
1280 x 1024p at 85Hz - VESA STD

EIA/CEA-861 Information
Revision number..... 3
IT underscan..... Supported
Basic audio..... Supported
YCbCr 4:4:4..... Supported
YCbCr 4:2:2..... Supported
Native formats..... 0
Detailed timing #1..... 1440x900p at 60Hz (16:10)
Modeline..... "1440x900" 106.500 1440 1520 1672 1904 900 903 909 934 -hsync +vsync
Detailed timing #2..... 1366x768p at 60Hz (16:9)
Modeline..... "1366x768" 85.500 1366 1436 1579 1792 768 771 774 798 +hsync +vsync
Detailed timing #3..... 1920x1200p at 60Hz (16:10)
Modeline..... "1920x1200" 154.000 1920 1968 2000 2080 1200 1203 1209 1235 +hsync -vsync

CE video identifiers (VICs) - timing/formats supported
1920 x 1080p at 60Hz - HDTV (16:9, 1:1)
1920 x 1080p at 50Hz - HDTV (16:9, 1:1)
1280 x 720p at 60Hz - HDTV (16:9, 1:1)

1280 x 720p at 50Hz - HDTV (16:9, 1:1)
1920 x 1080i at 60Hz - HDTV (16:9, 1:1)
1920 x 1080i at 50Hz - HDTV (16:9, 1:1)
720 x 480p at 60Hz - EDTV (4:3, 8:9)
720 x 576p at 50Hz - EDTV (4:3, 16:15)
720 x 480i at 60Hz - Doublescan (4:3, 8:9)
720 x 576i at 50Hz - Doublescan (4:3, 16:15)
1920 x 1080p at 30Hz - HDTV (16:9, 1:1)
1920 x 1080p at 25Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
1920 x 1080p at 24Hz - HDTV (16:9, 1:1)
NB: NTSC refresh rate = (Hz*1000)/1001

CE audio data (formats supported)
LPCM 2-channel, 16/20/24 bit depths at 32/44/48 kHz

CE speaker allocation data
Channel configuration.... 2.0
Front left/right..... Yes
Front LFE..... No
Front center..... No
Rear left/right..... No
Rear center..... No
Front left/right center.. No
Rear left/right center... No
Rear LFE..... No

CE vendor specific data (VSDB)
IEEE registration number. 0x000C03
CEC physical address..... 1.0.0.0
Supports AI (ACP, ISRC).. No
Supports 48bpp..... Yes
Supports 36bpp..... Yes
Supports 30bpp..... Yes
Supports YCbCr 4:4:4..... Yes
Supports dual-link DVI... No
Maximum TMDS clock..... 300MHz
Audio/video latency (p).. n/a
Audio/video latency (i).. n/a
HDMI video capabilities.. Yes
EDID screen size..... No additional info
3D formats supported..... Not supported
Data payload..... 030C001000783C20008001020304

CE vendor specific data (VSDB)
IEEE registration number. 0xC45DD8
CEC physical address..... 0.1.7.8
Supports AI (ACP, ISRC).. Yes
Supports 48bpp..... No
Supports 36bpp..... No
Supports 30bpp..... No
Supports YCbCr 4:4:4..... No
Supports dual-link DVI... No
Maximum TMDS clock..... 35MHz

Reserved video related data
Data payload..... 0F000003

Report information
Date generated..... 3/24/2020
Software revision..... 2.70.0.989
Data source..... Real-time 0x0041
Operating system..... 6.1.7601.2.Service Pack 1

Raw data
00,FF,FF,FF,FF,FF,FF,00,2D,B2,0D,06,31,00,00,00,06,1C,01,03,80,24,24,8C,C2,90,20,9C,54,50,8F,26,
21,52,56,2F,CF,00,A9,40,81,80,90,40,D1,C0,31,59,45,59,61,59,81,99,08,E8,00,30,F2,70,5A,80,B0,58,
8A,00,BA,88,21,00,00,1E,02,3A,80,18,71,38,2D,40,58,2C,45,00,BA,88,21,00,00,1E,00,00,00,FC,00,56,
50,2D,34,35,31,0A,20,20,20,20,20,20,00,00,00,FD,00,17,3D,0F,88,3C,00,0A,20,20,20,20,20,20,01,2F,
02,03,3B,F0,52,10,1F,04,13,05,14,02,11,06,15,22,21,20,5D,5E,5F,60,61,23,09,07,07,83,01,00,00,6E,
03,0C,00,10,00,78,3C,20,00,80,01,02,03,04,67,D8,5D,C4,01,78,80,07,E4,0F,00,00,03,9A,29,A0,D0,51,
84,22,30,50,98,36,00,10,0A,00,00,00,1C,66,21,56,AA,51,00,1E,30,46,8F,33,00,10,09,00,00,00,1E,28,
3C,80,A0,70,B0,23,40,30,20,36,00,10,0A,00,00,00,1A,00,00,00,00,00,00,00,00,00,00,00,00,00,00,E0

KRAMER

P/N: 2900-301231 Rev: 5

SAFETY WARNING

Disconnect the unit from the power supply before opening and servicing

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We welcome your questions, comments, and feedback.

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