



KRAMER ELECTRONICS, Ltd.

USER MANUAL

VGA/XGA to RGBS Converters

Models:

VP-101

VP-102

**IMPORTANT: Before proceeding, please read paragraph entitled
"Unpacking and Contents"**

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1 INTRODUCTION

Congratulations on your purchase of this Kramer Electronics Converter. Since 1981 Kramer has been dedicated to the development and manufacture of high quality video/audio equipment. The Kramer line has become an integral part of many of the best production and presentation facilities around the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better. Kramer's line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to the Kramer line of high quality VGA products, such as the one you have just purchased, Kramer also offers a full line of high quality distribution amplifiers, switchers, processors, interfaces, controllers and computer-related products. This manual includes configuration, operation and accessory information for the following products from the Kramer VP line of presentation (VGA/XGA) products. The machines are similar in operation and features.

- **VP-101** - VGA to RGB Converter
- **VP-102** - VGA to RGB Converter

1.1 A Word on VGA/XGA Distribution Line Amplifiers/Converters

The VGA/XGA Amplifiers/Converters described in this manual are used to split VGA/Super-VGA/XGA graphics card outputs to remote monitors. VGA/XGA Amplifiers/Converters route signals to one or more selected users for recording or monitoring. They vary in looping capability, number of outputs, bandwidth and input/output coupling. Some of them allow control of signal level and cable equalization of each channel independently, as well as control of the horizontal and vertical sync delay on the outputs. A good quality VGA/XGA Amplifier/Converter pre-compensates the signal for potential losses (resulting from the use of long cables, noisy sources, etc.) and routes the signal to buffered and amplified outputs. The front panels of these Kramer Amplifiers/Converters are designed to be simple to operate.

1.2 Handling Graphics signals

A computer generated graphics signal is usually comprised of 5 signals: Red, Green, Blue - which are analog level signals - and Horizontal Sync and Vertical Sync signals - which are TTL (logic) level signals. (Digital graphics cards and monitors use a different signal format, and will not be discussed here, as they are not relevant to these machines).

Computer graphics resolution is measured in pixels and signal bandwidth. The more pixels (picture elements) on the screen, the more detailed the image. VGA, S-VGA, XGA, S-XGA and U-XGA are terms describing the graphics resolution and the color depth. Color depth represents the maximum number of simultaneously displayed colors on the screen and is measured in bits. 24 and 32-36 bits of color depth represent millions to billions of color shades available on the screen at any given moment. (It should be born in mind though that the human eye can resolve only a few thousands colors!) The more detailed the image (higher resolution) and higher the color depth, the more real the image looks. The highest resolution of standard VGA was 640x480 pixels with 4 bits of color (16 colors). VGA was able to use more colors (256) but at a lower resolution of around 320x200 pixels, which was very crude. Common resolutions used today for computer graphics vary from 1024x768 up to 2000x1600 pixels with "high color" (16 bits of color, representing 64,000 different colors) up to "true color" (24 bits or more, representing from 16.7 million colors up to several billion.) Displaying such a detailed and colorful image on the screen needs enormous graphics memory per frame, as well as very high speeds, for "writing" so many pixels on the screen in real time. The amplifiers that carry those signals must be able to handle those speeds and signal bandwidth.

The standard VGA, at 640x480 resolution, needed amplifiers with 20-30MHz bandwidth. At 1600x1200 or even at 1280x1024 (S-XGA), such amplifiers fail completely. In order to faithfully amplify and transmit modern high-resolution graphics, amplifiers with bandwidths of 300 MHz and more are needed. Those amplifiers, besides the enormous bandwidth they handle, need to be linear, to have very low distortion and to be stable. Stability of an amplifier is its ability to avoid bursting into uncontrolled oscillation, which is in adverse relationship to the speed it can handle.

The tendency to oscillate is further enhanced by the load impedance. The load impedance of a system is usually not just a resistor. A cable connected to an amplifier (leading to the receiver or monitor) may present a capacitive and/or an inductive load to the amplifier. This is the main cause for instability. The behavior of a load or cable may severely degrade the performance of the amplifier, its bandwidth, linearity and stability and, in general, its ability to faithfully reproduce the signal.

Cables affect image resolution. Longer cables can cause high frequency deterioration and hence image "smear" and loss of resolution. In computer graphics especially, this adverse effect is very much

accentuated. Amplifiers should therefore cope with the additional task of compensating for cable losses up to the maximum useful operation distance. High-resolution graphics systems must use very high quality cables for image transmission. The cables should be shielded to eliminate externally induced interference but, on the other hand, the shield may increase the capacitance of the cable, and therefore cause deterioration in the image's resolution and clarity. Standard (compound) cables should be only a few meters long. For longer distances, five individual coax cables should be used though this is a bulky and cumbersome solution. Even then, distance is limited to only several tens of meters.

The negative behavior of a cable may create other problems resulting from the failure to accurately match the system's required impedance. The result of this, especially at high frequencies, is "shadows" or "ghosts" on the image, resulting from standing waves and electronic reflections running back and forth between the transmitter and receiver. Another aspect to consider is the sync. As the signals are logic signals, which are not treated as analog signals, the receiver does not terminate the line, and therefore the line is not matched. A host of problems can occur when the signals are sent over long, unterminated, unmatched cables. The result can be image breakdown or distortion due to improper sync information. The amplifier that drives the analog section of the graphics data should also be able to buffer, recover and send the sync information in such a way that it is received properly at the receiving end.

1.3 Factors Affecting Quality of Results

There are many factors affecting the quality of results when signals are transmitted from a source to an acceptor:

- **Connection cables** - Low quality cables are susceptible to interference; they degrade signal quality due to poor matching and cause elevated noise levels. They should therefore be of the best quality.
- **Sockets and connectors of the sources and acceptors** - So often ignored, they should be of highest quality, since "Zero Ohm" connection resistance is the objective. Sockets and connectors must also match the required impedance (75ohm in video). Cheap, low quality connectors tend to rust, thus causing breaks in the signal path.
- **Amplifying circuitry** - Must have quality performance when the desired end result is high linearity, low distortion and low noise operation.
- **Distance between sources and acceptors** - Plays a major role in the final result. For long distances between sources and acceptors, special measures should be taken in order to avoid cable losses. These include using higher quality cables or adding line amplifiers.
- **Interference from neighboring electrical appliances** - These can have an adverse effect on signal quality. Balanced audio lines are less prone to interference, but unbalanced audio should be installed far from any mains power cables, electric motors, transmitters, etc., even when the cables are shielded.

2 SPECIFICATIONS

	VP-101	VP-102
Function	VGA/ XGA to RGBS	VGA/ XGA to RGBS
Input	1 VGA/XGA 0.7Vpp/75 ohm, H&V syncs TTL level on an HD15F connector	1 VGA/XGA 0.7Vpp/75 ohm, H&V syncs TTL level looping on HD15F connectors
Outputs	Analog RGB signals 0.7Vpp/75ohm; H&V syncs-TTL level (Hi-Z load) or analog Level (75ohm load) on BNCs.	Analog R, G (with or without composite sync), B signals 0.7Vpp/75ohm; H&V syncs-TTL level (Hi-Z load) or analog Level (75ohm load) on BNCs.
Controls	Composite sync or horizontal sync output selection.	Composite sync or horizontal sync output; Green or Green + sync selection
Output Coupling	AC inputs and outputs, with input protection circuitry	AC inputs and outputs, with input protection circuitry
Video Bandwidth	>300MHz	>315MHz
Differential Gain	0.04%	0.05%
Differential Phase	0.04Deg.	0.09Deg.
K-factor	<0.05 %	<0.05%
Non Linearity	<0.1%	<0.1%
Video S/N ratio	75dB	73dB
Dimensions (W, D, H)	16.5 x 12 x 4.5 (cm) 6.5" x 4.7" x 1.8"	24.5 x 18 x 4.5 (cm) 9.6" x 7" x 1.8"
Weight	0.6 kg. (1.3 lbs.) approx.	1.2 kg. (2.7 lbs.) approx.
Power Source	12VDC, 30mA.	230VAC, 50/60 Hz, (115 VAC, U.S.A.), 3.7VA.

3 HOW DO I GET STARTED?

The fastest way to get started is to take your time and do everything right the first time. Taking 15 minutes to read the manual may save you a few hours later. You don't even have to read the whole manual. If a section doesn't apply to you, you don't have to spend your time reading it.

4 UNPACKING AND CONTENTS

The items contained in your Kramer VP Amplifier/Converter package are listed below. Please save the original box and packaging materials for possible future shipment.

- Amplifier/Converter
- AC power cable (VP-102) or a 12V wall transformer (VP-101)
- User Manual
- Kramer concise product catalog
- 4 rubber feet

4.1 Optional Accessories

The following accessories, which are available from Kramer, can enhance implementation of your amplifier. For information regarding cables and additional accessories, contact your Kramer dealer.

- **Rack Adapter** - Used to install smaller machines in a standard 19" 1U rack. One or more machines may be installed on each adapter.
- **VP-61RS** - (6x1 VGA Switcher) can be serially inserted between up to 6 VGA sources and the Converters for signal switching. It is a full bandwidth switcher, designed for computer and workstation applications. The **VP-61RS** switches one of six VGA/Super-VGA/XGA graphics card outputs to one monitor or vice versa, with no discernible signal degradation. The **VP-61RS** also has RS-232 control. Input and output are direct coupled and conform to the highest standards.
- **VP-400** - (1:4 High Resolution VGA Distribution Amplifier) can be serially inserted between the Converter and the monitors, or between the VGA source and the Converter. It is a full bandwidth DA, designed for computer and workstations applications. The **VP-400** splits a VGA/Super-VGA/XGA graphics card output to 4 monitors, with no discernible signal degradation. State-of-the-art video amplifying circuitry and microchip technology make the **KRAMER VP-400** the first choice Graphics Component Distributor. Signal bandwidth of 345MHz allows the **VP-400** to be used with the highest quality graphics workstations.
- **VP-222** - (2x1 VGA switcher distributor) can be serially inserted between the 2 VGA sources and the Converter. It is a full bandwidth, 2x1 VGA switcher distributor designed for computer and presentation applications. The **VP-222** allows selection of one out of two VGA/XGA sources and distribution of the selected source to two independent outputs. Signal bandwidth of 365MHz ensures that the **VP-222** remains transparent even in the most critical applications. The **VP-222** is part of the Kramer TOOLS family of compact, high quality and cost effective solutions for a variety of applications.
- **VP-211** - (2x1 Automatic VGA/Audio Switcher) can be serially inserted between 2 VGA sources and the Converter. It is a full bandwidth switcher, designed for computer and presentation applications. The **VP-211** automatically detects the presence of a VGA/XGA signal on input no. 1 and routes it to the output. If the signal disappears, the machine switches to input no. 2 and routes it to the output. When the signal on input no. 1 re-appears, the **VP-211** reroutes input no. 1 to the output. The machine operates in audio-follow-video (VGA) mode and switches the stereo audio input appropriate to the VGA input. Signal bandwidth of 517MHz ensures that the **VP-211** remains transparent even in the most critical applications. The **VP-211** is part of the Kramer TOOLS family of compact, high quality and cost effective solutions for a variety of applications.

5 VGA/XGA LINE AMPLIFIERS/CONVERTERS

This section describes all the controls and connections of your converter. Understanding all of the controls and connections helps you realize the full power of your amplifier/converter.

5.1 Getting to Know Your VP-101 Converter

The KRAMER VP-101 is a full bandwidth VGA to RGBS converter designed for computer, workstation and presentation applications. The VP-101 converts a VGA/Super-VGA/XGA graphics card output to Red, Green, Blue, horizontal/composite sync and vertical sync. The signals are available on BNC connectors. Via a rear panel switch the VP-101 allows the user to select either a composite or horizontal sync output. The generated composite sync maintains the correct polarity (negative) at any polarity of Hs and Vs inputs. The input and outputs are AC coupled conforming to the highest standards. The original source bandwidth is retained to well over 300MHz thus allowing the VP-101 to be used with the highest quality graphics workstations. The VP-101 is fed from a 12VDC source, making it suitable for field work as well. Front/Rear panel features of the VP-101 are described in Figure 1 and Table 1.

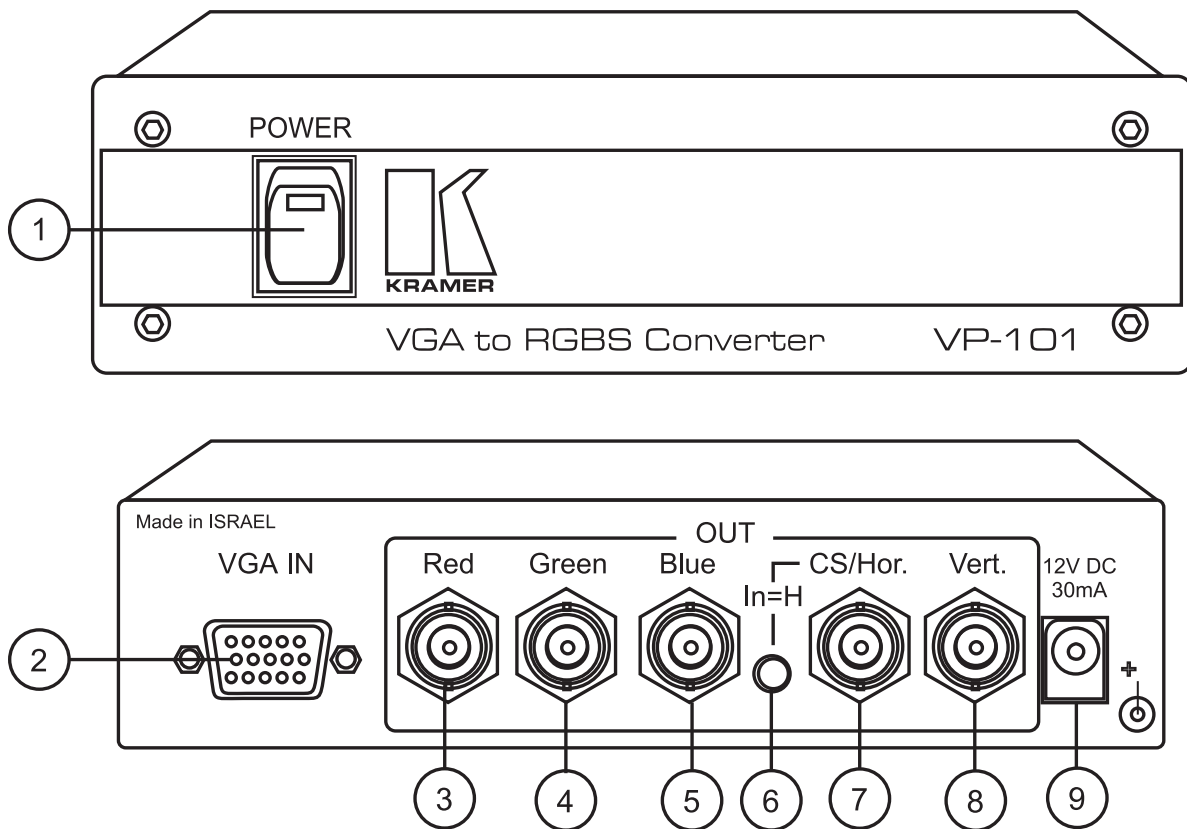


Figure 1: VP-101 Front/Rear Panel Features

Table 1: VP-101 Front/Rear Panel Features

No.	Feature	Function
1.	Power switch (on front panel)	Illuminated switch supplies power to the unit.
2.	VGA IN HD15F Connector	VGA/XGA input
3.	RED BNC connector	Amplified and buffered RED signal output.
4.	GREEN BNC connector	Amplified and buffered GREEN signal output.
5.	BLUE BNC connector	Amplified and buffered BLUE signal output.
6.	<u>In=H</u> pushbutton	Selects either composite sync or horizontal sync at the CS/Hor. BNC connector (pressed=horizontal).
7.	CS/Hor. BNC connector	Amplified and buffered composite sync (when <u>In =H</u> pushbutton is released) or horizontal sync (when <u>In=H</u> pushbutton is pressed).
8.	Vert BNC connector	Amplified and buffered vertical sync output.
9.	12VDC feed connector	A DC connector that allows power to be supplied to the unit.

5.2 Getting to Know Your VP-102 Converter

The KRAMER VP-102 is a full bandwidth VGA/RGBS converter especially designed for computer, workstation and presentation applications. The VP-102 converts a VGA/Super VGA/XGA graphics card output to Red, Green, Blue, horizontal/composite sync and vertical sync signals on BNC connectors. The VP-102 allows the user to select either a composite or horizontal sync output, and the Green output either includes composite sync or is blanked. The composite sync generated by the machine maintains the correct polarity (negative) for any polarity of Hs and Vs inputs. As the signal bandwidth is well over 315MHz, the VP-102 may be used with the highest quality graphics workstations. Front/Rear panel features of the VP-102 are shown in Figure 2 and Table 2.

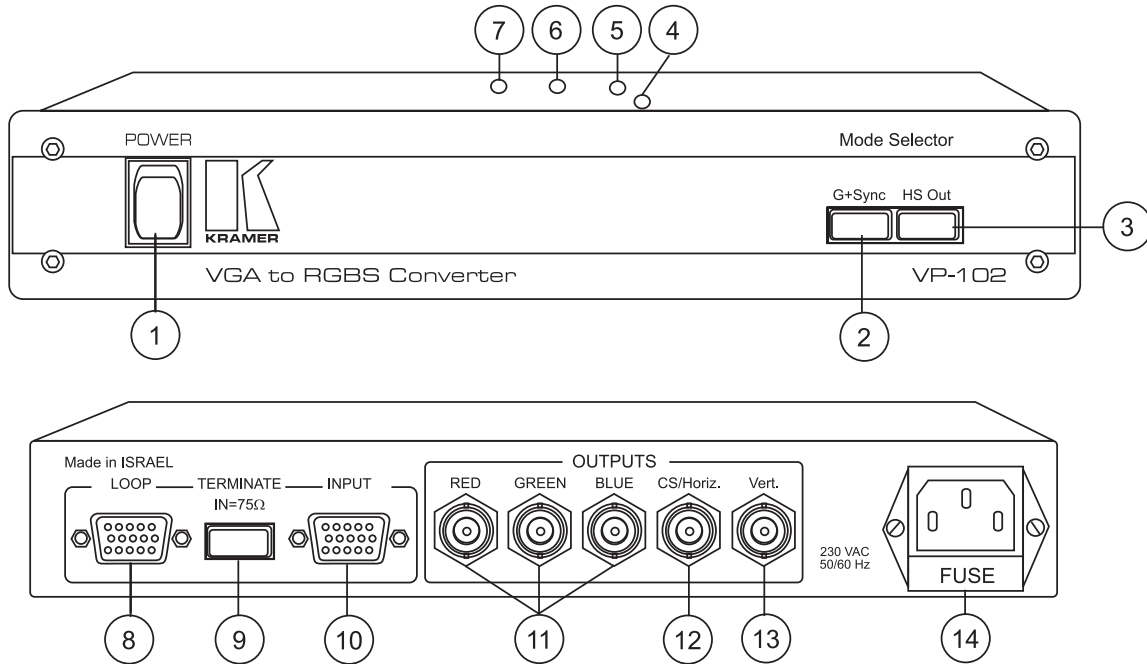


Figure 2: VP-102 Front/Rear Panel Features

Table 2: VP-102 Front Panel Features

No.	Feature	Function
1.	Power switch (on front panel)	Illuminated switch: Supplies power to the unit.
2.	G+Sync mode selector	Selects Green+sync at the GREEN BNC connector when pressed (blanked during sync period when released).
3.	HS Out mode selector	Selects horizontal sync at the CS/Horiz. BNC connector when pressed, or composite sync when released.
4.	Sync On Green trimmer	Controls Sync On Green level on the GREEN BNC connector (accessible from bottom).
5.	RED trimmer	Controls RED level (accessible from bottom).
6.	GREEN trimmer	Controls GREEN level (accessible from bottom).
7.	BLUE trimmer	Controls BLUE level (accessible from bottom).
8.	LOOP HD15F Connector	Provides VGA/XGA looping capability to increase number of outputs.
9.	TERMINATE pushbutton	Selects "75ohm" or "Hi-Z" impedance (IN=75ohm). For looping select "Hi-Z".
10.	INPUT HD15F Connector	VGA/XGA input
11.	RED, GREEN and BLUE BNC connectors	Amplified and buffered RED, GREEN and BLUE signal outputs.
12.	CS/Horiz. BNC connector	Amplified and buffered horizontal sync (HS Out mode selector is pressed), or composite sync (HS Out mode selector is released).
13.	Vert. BNC connector	Amplified and buffered vertical sync output.
14.	Power connector	A 3-prong AC connector allows power to be supplied to the unit. Directly underneath this connector, a fuse holder houses the appropriate fuse.

6 TYPICAL APPLICATIONS

6.1 Increasing the Number of Inputs

When it is necessary to handle more than one input, a VGA switcher such as the VP-31 can be used to select the required input to be switched to the outputs. The VP-31 is a full bandwidth, 3x1 VGA/XGA switcher designed for computer and workstation applications. The VP-31 switches one of three VGA/Super-VGA/XGA graphics card outputs to one acceptor or vice versa, with no discernible signal degradation. Input and output are directly coupled and conform to the highest standards. Signal bandwidth of over 450MHz allows the VP-31 to be used with the highest resolution graphics workstations. The VP-201 mechanical switcher can also be used for this purpose. The VP-201 switches two VGA/Super-VGA/XGA graphics card outputs to one monitor or vice versa, with no discernible signal degradation. State-of-the-art PCB layout and careful transmission-line design make the VP-201 the first choice mechanical graphics component switcher. Signal bandwidth of 320Mhz allows the VP-201 to be used with the highest quality graphics workstations. Figure 3 describes a typical switching configuration, where one of three VGA inputs is selected by a VP-31 and then outputted to a VP-200 input.

Perform the following steps:

- 1) Connect up to three VGA/XGA sources to the input of the VP-31.
- 2) Connect a VGA cable from the output of the VP-31 to the **VGA IN** connector of the VP-101.
- 3) Connect RGB acceptor to the BNC coax outputs of the VP-101.
- 4) Use front panel selectors of the VP-31 to select the required input to be switched to the outputs.
- 5) Operate the VP-31, VP-101, source and acceptors.

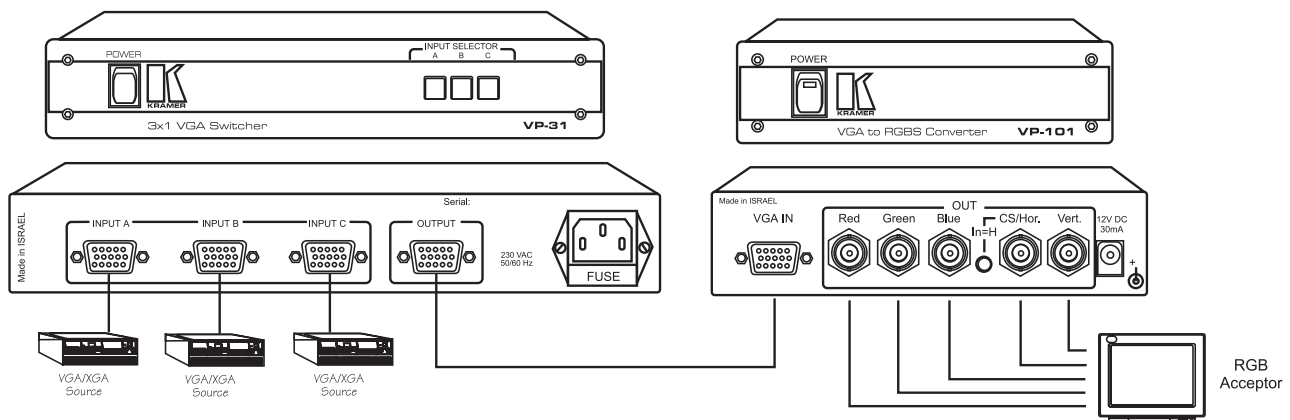


Figure 3: Increasing the Number of Inputs

6.2 Increasing the Number of Outputs

The VP-102 can be used to increase the number of outputs by setting up a looping configuration. The example shown in Figure 4 describes the principle of looping VGA distributors (1:4 configuration in this case).

Perform the following steps:

- 1) Connect VGA/XGA source to the input of the VP-102.
- 2) Connect three, four or five coax cables to the BNC sockets of the VP-102. If it is necessary to provide Composite sync to the acceptor, release the **HS Out** front panel pushbutton. If it is necessary to provide Sync On Green to the acceptor, press the **G+Sync** front panel pushbutton.
- 3) Connect a VGA cable from the **LOOP** socket of the VP-102 to the **INPUT** socket of the VP-400. Release the **TERMINATE** switch on the rear panel. If looping is not performed, the switch should be pushed in (**IN=75ohm**).
- 4) Connect up to four XGA/VGA acceptors to the outputs of the VP-400.
- 5) Operate the VP-102, VP-400, source and acceptors.

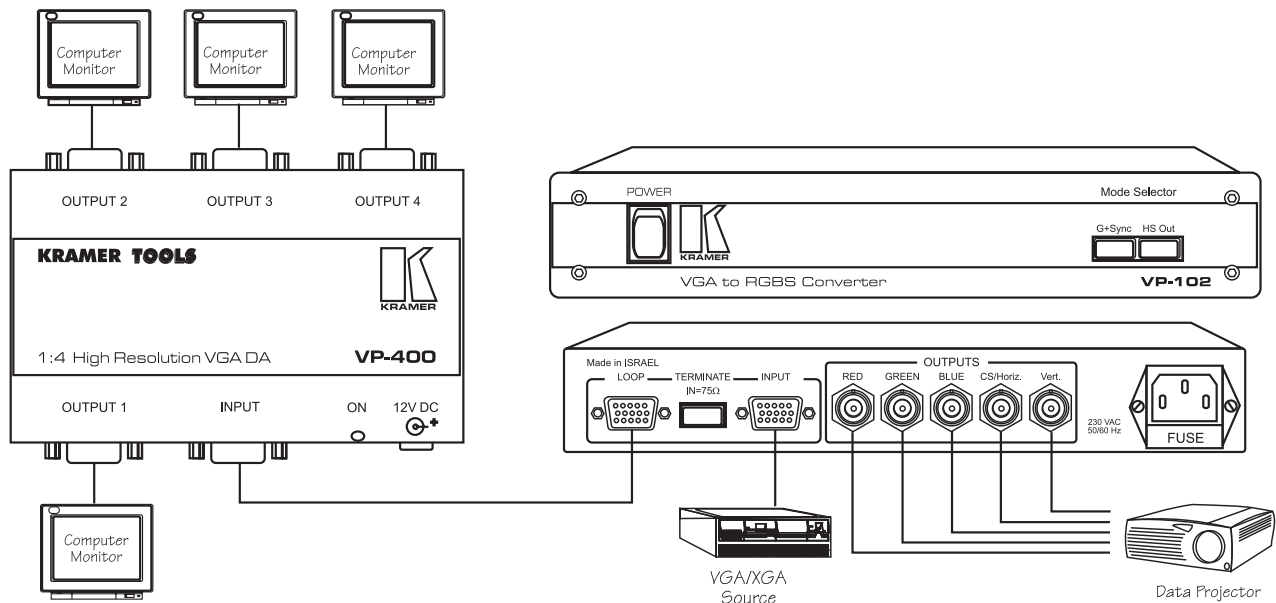


Figure 4: Increasing the Number of Outputs

7 INSTALLATION

7.1 Rack Mounting

The VP-101/VP-102 models can be table mounted using rubber feet, or rack mounted using a special adapter (see section 4.1). To rack mount any of the amplifiers & processors, simply place the unit against the rack rails and insert standard screws through each of the four corner holes in the rack ears. These devices do not require any specific spacing above or below the unit for ventilation.

8 USING THE CONVERTER

8.1 Turning on the Amplifier/Converter

NOTES

1. The Amplifier/Converter should only be turned on after all connections are completed and all source devices have been turned on. Do not attempt to connect or disconnect any signals to the Amplifier/Converter while it is turned on!
2. The socket-outlet should be near the equipment and should be easily accessible. To fully disconnect equipment, remove the power cord from its socket.

➤ For VP-102 model:

1. Press the toggle switch on the left of the front panel to the up position. The switch illuminates.
2. Operate the acceptors.

➤ For VP-101 model:

1. Connect the amplifier's DC socket to an appropriate DC source. Observe proper polarity!
2. Press the toggle switch on the far-left of the front panel to the up position. The toggle switch illuminates.
3. Operate the acceptors.

8.2 Output Level Control (VP-102 only)

The Level trimming function enables the operator to adjust the picture intensity level or compensate for losses. Under normal operation conditions, those trimmers should not be touched. *The machine was pre-adjusted at the factory for 1:1 transparent operation, and readjusting the trimmers will upset this transparency.* To correct the incoming signal, the operator adjusts the RGB trimmers until a satisfactory picture is achieved. Those trimmers should not be used instead of using a line amplifier with level and cable compensation controls (such as the Kramer VP-22), as they were not designed for continuous operation.

8.3 Looping (VP-102 only)

The looping function enables the operator to connect several machines to a VGA source. The operator must always switch the termination switch of the **first** and **middle** machines to "Hi-Z". The **last**

amplifier's termination switch should always be at "**75ohm**" to maintain well-matched lines (of 75ohm impedance) from the first to the last amplifier. Note that if the looping function is not used, the termination switch should be set to "**75 ohm**".

9 TAKING CARE OF YOUR CONVERTER

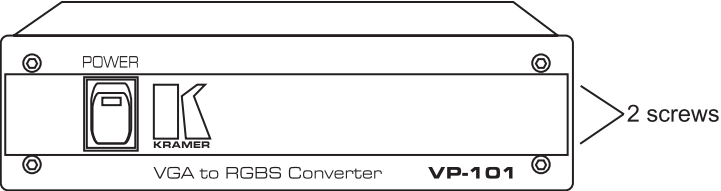
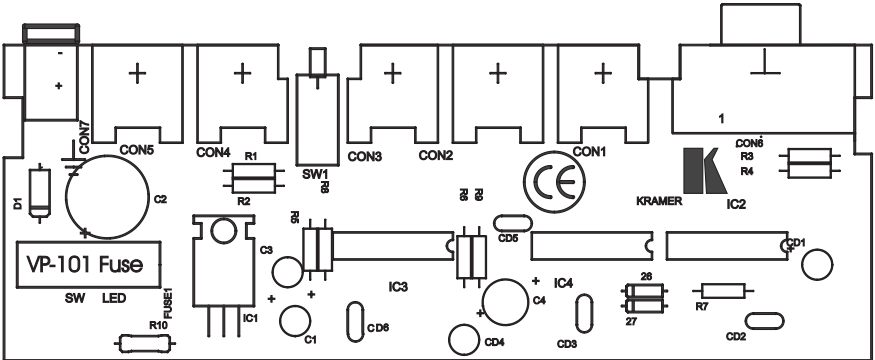
Do not locate your machine in an environment where it is susceptible to dust or moisture. Both of these may damage the electronics, and cause erratic operation or failure. Do not locate your machine where temperature and humidity may be excessive. Doing so may also damage the electronics, and cause erratic operation or failure of your machine. Do not clean your machine with abrasives or strong cleaners. Doing so may remove or damage the finish, or may allow moisture to build up. Take care not to allow dust or particles to build up inside unused or open connectors.

10 TROUBLESHOOTING

NOTES

- 1. Please note that if the output signal is disturbed or interrupted by very strong external electromagnetic interference, it should return and stabilize when such interference ends. If not, turn the power switch off and on again to reset the machine or disconnect power source (VP-101 only) from the machine and reconnect again.*
- 2. If the following recommended actions still do not result in satisfactory operation, please consult your KRAMER Dealer.*

10.1 Power and Indicators

Problem	Remedy
No power	<ul style="list-style-type: none"> ➤ For both models: Confirm that rocker switch is in “ON” position, and red LED is illuminated. ➤ For VP-102 model: <ol style="list-style-type: none"> 1. Confirm that power connections are secured at the amplifier/converter and at the receptacle. 2. Make sure the receptacle is active, outputting between 110 and 120VAC (USA) or 220VAC. 3. If there still is no power, remove power cord from AC outlet and use a flat head screwdriver to remove the fuse holder located directly below the power connector. Confirm that the fuse is good by looking for the wire connected between the ends of the fuse. If the wire is broken, replace fuse with another, with the same rating. ➤ For VP-101 model: <ol style="list-style-type: none"> 1. Confirm that power connections are secured at the amplifier/converter and at the receptacle. 2. Make sure the receptacle is active, outputting the appropriate voltage. 3. If there still is no power, then, using a Philips screwdriver, remove the screws on the sides of the machine and release panel. <div style="text-align: center;">  </div> 4. Locate the fuse holder located inside your converter. Confirm that the fuse is good by looking for the wire connected between the ends of the fuse. If this wire is broken, replace fuse with another, with the same rating. 5. Install the front panel by tightening the two screws on each side of the machine. <div style="text-align: center;">  </div>

10.2 Video Signal

Problem	Remedy
No picture at the output device	<ol style="list-style-type: none"> 1. Confirm that your source and output device are powered on and connected properly. 2. Confirm that your output device can work in the format produced by the source. 3. Confirm that any other units in the signal path have the proper input and/or output selected.

<p>Video level is too high or too dim.</p>	<ol style="list-style-type: none"> 1. Verify that the video line is well matched through 75ohm impedance, otherwise it results in a video level that is too high or too dim. 2. Confirm that the connecting cables are of high quality, properly built and that they are termination (75ohms.) 3. Check level controls located on your source input device or output display or recorder.
<p>Noise bars "roll" up or down in the output image or: Low Frequency Hum in the output signal</p>	<p>Hum bars (ground loop) are caused by a difference in the ground potential of any two or more devices connected to your signal path. This difference is compensated by passing that voltage difference through any available interconnection, including your video cables.</p> <p style="text-align: center;">WARNING!</p> <p style="text-align: center;"><i>DO NOT DISCONNECT THE GROUND FROM ANY PIECE OF VIDEO EQUIPMENT IN YOUR SIGNAL PATH!</i></p> <p>Check the following to remove hum bars:</p> <ol style="list-style-type: none"> 1. Confirm that all interconnected equipment is connected to the same phase of power, if possible. 2. Remove equipment connected to that phase that may introduce noise, such as motors, generators, etc. 3. Disconnect all interconnect cables and reconnect them one at a time until the ground loop reappears. Disconnect the affected cable and replace, or insert isolation transformers in the signal path.



LIMITED WARRANTY

Kramer Electronics (hereafter Kramer) warrants this product to be free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for three years from the date of the first customer purchase.

WHO IS PROTECTED

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

- 1) Any product which is not distributed by Kramer or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
- 2) Any product, on which the serial number has been defaced, modified or removed.
- 3) Damage, deterioration or malfunction resulting from:
 - a) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature.
 - b) Unauthorized product modification, or failure to follow instructions supplied with the product.
 - c) Repair or attempted repair by anyone not authorized by Kramer.
 - d) Any shipment of the product (claims must be presented to the carrier).
 - e) Removal or installation of the product.
 - f) Any other cause, which does not relate to a product defect.
 - g) Cartons, equipment enclosures, cables or accessories used in conjunction with the product.

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

- 1) Removal or installations charges.
- 2) Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
- 3) Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

- 1) To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
- 2) Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
- 3) For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

Kramer's liability for any defective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

- 1) Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or
- 2) Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

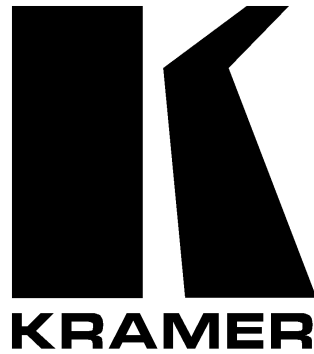
NOTICE

This equipment has been tested to determine compliance with the requirements of:

- EN-50081:** "Electromagnetic compatibility (EMC);
generic emission standard.
Part 1: Residential, commercial and light industry"
- EN-50082:** "Electromagnetic compatibility (EMC) generic immunity standard. Part 1:
Residential, commercial and light industry environment".
- CFR-47** FCC Rules and Regulations:
Part 15- "Radio frequency devices:
Subpart B- Unintentional radiators

CAUTION!

- ☒ Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- ☒ Use the supplied DC power supply to feed power to the machine.
- ☒ Please use recommended interconnection cables to connect the machine to other components.



The list of Kramer distributors appears on our web site:

www.kramerelectronics.com

From the web site it is also possible to e-mail factory headquarters.

We welcome your questions, comments and feedback.

KRAMER ELECTRONICS, LTD.

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