Kramer Electronics, Ltd.

USER MANUAL

Model:

MV-6

3G HD-SDI Multiviewer

Contents

Figures

Tables

1   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! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer **MV-6** *3G HD-SDI Multiviewer* which is ideal for:

- Professional broadcasting and production studios
- Presentation applications

The package includes the following items:

- The **MV-6** *3G HD-SDI Multiviewer*
- Power cord[2]
- This user manual[3]

2   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
- Use only Kramer high performance, high resolution cables[4]

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1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems;

GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products;

GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity;

GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 We recommend that you use only the power cord supplied with this device

3 Download up-to-date Kramer user manuals from http://www.kramerelectronics.com

4 The complete list of Kramer cables is available from http://www.kramerelectronics.com

2.1 Quick Start

The following quick start chart summarizes the basic setup and operation.
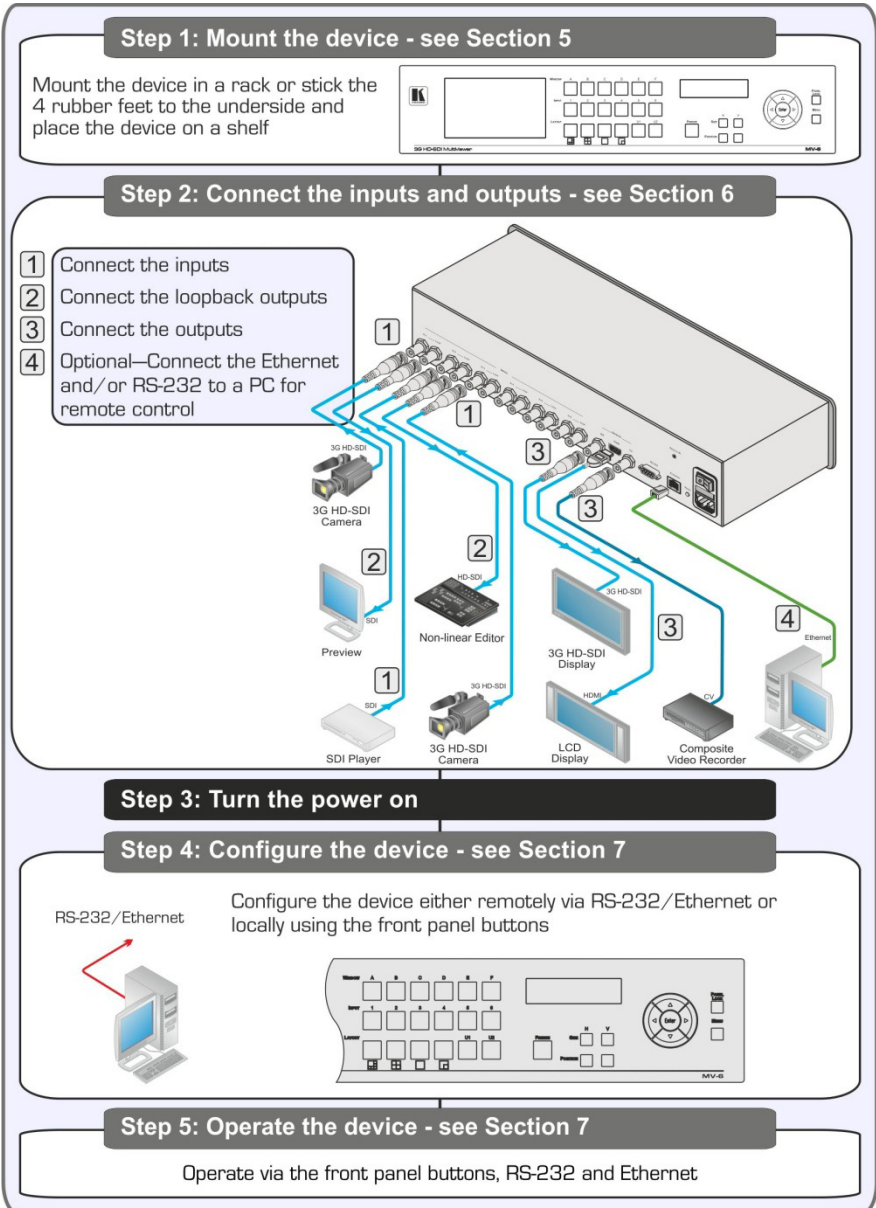
3 Overview

The **MV-6** is a versatile, high-performance video viewer for signals up to 3G HD-SDI. The device can window up to six sources in any layout and output the image in SDI, HDMI and CV formats. Both preprogrammed and customizable screen division is supported.

In particular, the **MV-6** features:

- Input bandwidth of up to 3Gbps which supports standard definition, high definition and 3G high definition serial digital video signals (SD/HD/3G HD-SDI)
- SMPTE 259M, 292M and 424M input compliance and support for data rates of 270Mbps, 1483.5Mbps, 1485Mbps, 2967Mbps and 2970Mbps
- Input cable equalization up to 350m (1150ft) for SD[1] signals, 140m for 1.5GHz HD[2] signals, and 120m (394ft) for 3GHz HD signals
- Multi-video output formats; HD-SDI (292M) and 3G HD-SDI (SMPTE 424M), HDMI and composite
- Front panel color LCD preview screen for real-time display of output
- Kramer re-Klocking™ and equalization on each input – rebuilds the digital signal to travel longer distances
- Flexible control options; front panel with menu LCD and on-screen displays, Ethernet, and RS-232
- Screen handling buttons; freeze, size, position, and four pre-programmed and two user-definable layouts

The **MV-6** is housed in a 2U height enclosure and is fed from a 100-240 VAC universal switching power supply. The device can be controlled via the front panel buttons and remotely via:

- RS-232 serial commands transmitted by a PC, touch-screen system or other serial controller
- Ethernet over a LAN

3.1 Recommendations for Best Performance

To achieve the best performance:

- Use only good quality connection cables[3] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise

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1 Standard Definition (SD) means an NTSC or PAL compatible video format consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video

2 High Definition (HD) means a video format consisting of 720 active lines of progressive video or 1080 lines of progressive or interlaced video

3 Available from Kramer Electronics on http://www.kramerelectronics.com

levels (often associated with low quality cables)

- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **MV-6** away from moisture, excessive sunlight and dust

3.2 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all digital[1] audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality. Note that Kramer Electronics Limited is an HDMI Adopter and an HDCP Licensee.

In particular, HDMI[2]:

- Provides a simple[3] interface between any audio/video source, such as a set-top box, DVD player, or A/V receiver and video monitor, such as a digital flat LCD / plasma television (DTV), over a single lengthy[4] cable
- Supports standard, enhanced, high-definition video, and multi-channel digital audio[5] on a single cable
- Transmits all ATSC HDTV standards and supports 8-channel digital audio, with bandwidth to spare to accommodate future enhancements and requirements
- Benefits consumers by providing superior, uncompressed digital video quality via a single cable[6], and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports CEC, two-way communication between the video source (such as a DVD player) and the digital television, enabling new functionality such as automatic configuration and one-button play
- Has the capacity to support existing high-definition video formats (720p, 1080i, 1080p, 2K and 4K)

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1 Ensuring an all-digital rendering of video without the losses associated with analog interfaces and their unnecessary digital-to-analog conversions

2 HDMI, the HDMI logo and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI licensing LLC

3 With video and multi-channel audio combined into a single cable, the cost, complexity, and confusion of multiple cables currently used in A/V systems is reduced

4 HDMI technology has been designed to use standard copper cable construction at up to 15m

5 HDMI supports multiple audio formats, from standard stereo to multi-channel surround-sound. HDMI has the capacity to support Dolby 5.1 audio and high-resolution audio formats

6 HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

4   Defining the MV-6 3G HD-SDI Multiviewer

Figure 1 and Table 1 define the front panel of the **MV-6** *3G HD-SDI Multiviewer*.
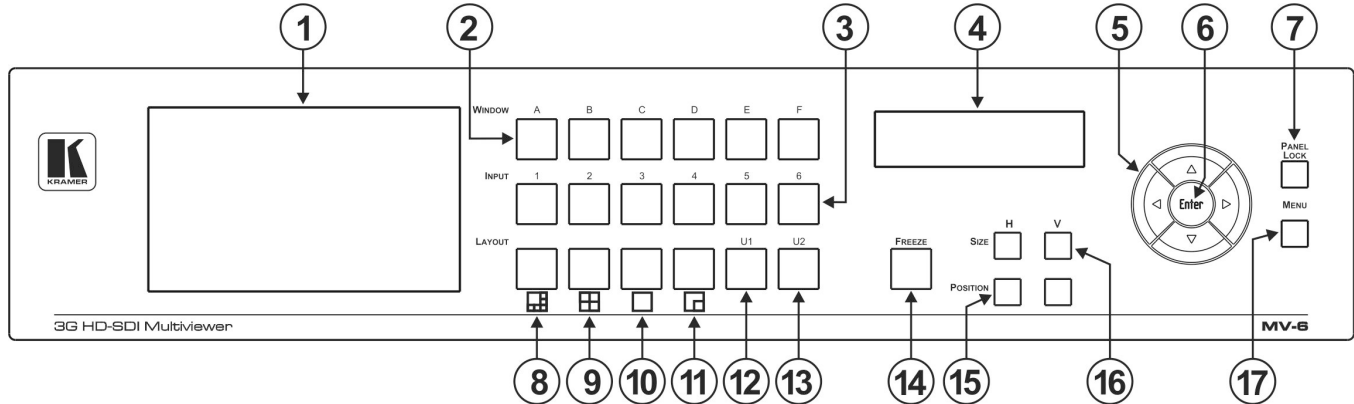
Figure 1: MV-6 3G HD-SDI Multiviewer Front Panel

Table 1: MV-6 3G HD-SDI Multiviewer Front Panel Features

#	Feature	Function
1	LCD Video Preview Screen	LCD screen to display the output signal
2	*WINDOW* Buttons (A to F)	Press to select one of the windows
3	*INPUT* Buttons (1 to 6)	Press to select the active input following selection of an active window (using the WINDOW buttons)
4	LCD Menu 2 Line x 16 Character Window/Input or Menu Display	During normal operation the Window/Input list is displayed. During menu operations, the Menu/parameter/values are displayed (see Section 7.9)

#	Feature		Function
5	Menu Navigation Buttons		Press the up (▲), down (▼), left (◄) and right (►) buttons to navigate the menu, parameters or values
6	*ENTER* Button		Press to enter the menu or accept the parameter/value
7	*PANEL LOCK* Button		Press and hold to lock the front panel buttons. Press and hold again to unlock the buttons (see Section 7.7)
8	Screen Layout Button (6 windows)		Press to display and output all six inputs as per the pattern
9	Screen Layout Button (4 windows)		Press to display and output four selected inputs in a quad pattern
10	Screen Layout Button (full screen)		Press to display and output one selected input as a full screen
11	Screen Layout Button (2 windows)		Press to display and output two selected inputs as per the pattern
12	*U1* Button		Press to select the first user-definable output window pattern (programmed using the menu, see Section 7.5)
13	*U2* Button		Press to select the second user-definable output window pattern (programmed using the menu, see Section 7.5)
14	*FREEZE* Button		Press to freeze the selected video window (see Section 7.6)
15	*POSITION* Buttons		Press either the horizontal (H) or vertical (V) button to change the position of the active window (see Section 7.3)
16	*SIZE* Buttons		Press either the width (H) or height (V) button to change the size of the active window (see Section 7.9)
17	*ESC* Button		Press to move back one level through the menu (see Section 7.9)

Figure 2 and Table 2 define the rear panel of the **MV-6** *3G HD-SDI Multiviewer*.
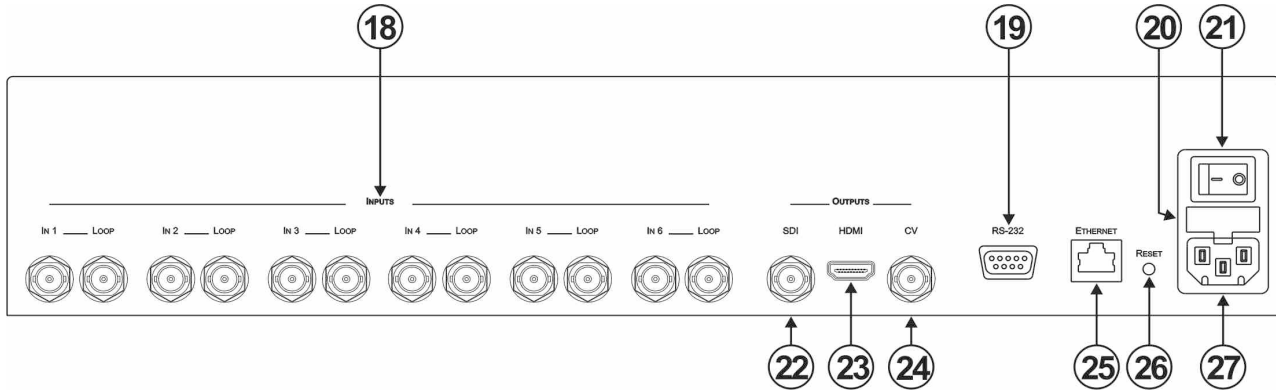
Figure 2: MV-6 3G HD-SDI Multiviewer Rear Panel

Table 2: MV-6 3G HD-SDI Multiviewer Rear Panel Features

#	Feature		Function
18	*INPUTS* (1 to 6) and Associated BNC *LOOP* Outputs (1 to 6)		Connect Inputs to video sources and Loop outputs to loop video acceptors (see Section 6)
19	*RS-232* 9-pin D-sub (F) Connector		Connect to the serial port on a PC or remote controller (see Section 6.1)
20	Mains Power Fuse		Fuse for protecting the device
21	Mains Power Switch		Switch for turning the device on or off
22		*SDI* BNC Connector	Connect to an SDI video acceptor (see Section 7.9)
23	*OUTPUTS*	*HDMI* Connector	Connect to an HDMI video acceptor
24		*CV* BNC Connector	Connect to a composite video acceptor
25	*ETHERNET* RJ-45 Connector		Connect to a PC via a LAN for remote control (see Section 6.2)
26	*RESET* Button		Press and hold while power cycling the device to reset to factory default configuration (see Section 7.8)
27	Mains Power Connector		Connect to the mains power

5 Installing the MV-6 3G HD-SDI Multiviewer in a Rack

This section provides instructions for rack mounting the device.

Before Installing in a Rack

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (5 on each side), and replace those screws through the ear brackets.
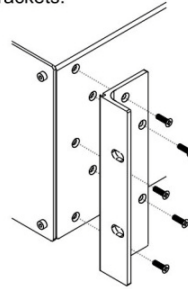
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:
- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from: http://www.kramerelectronics.com)

6   Connecting the MV-6 3G HD-SDI Multiviewer

The **MV-6** accepts up to six SD/HD/3G HD-SDI inputs. The device outputs a signal (which can be any combination of the inputs) to the SDI, HDMI and composite video connectors as shown in Figure 3.
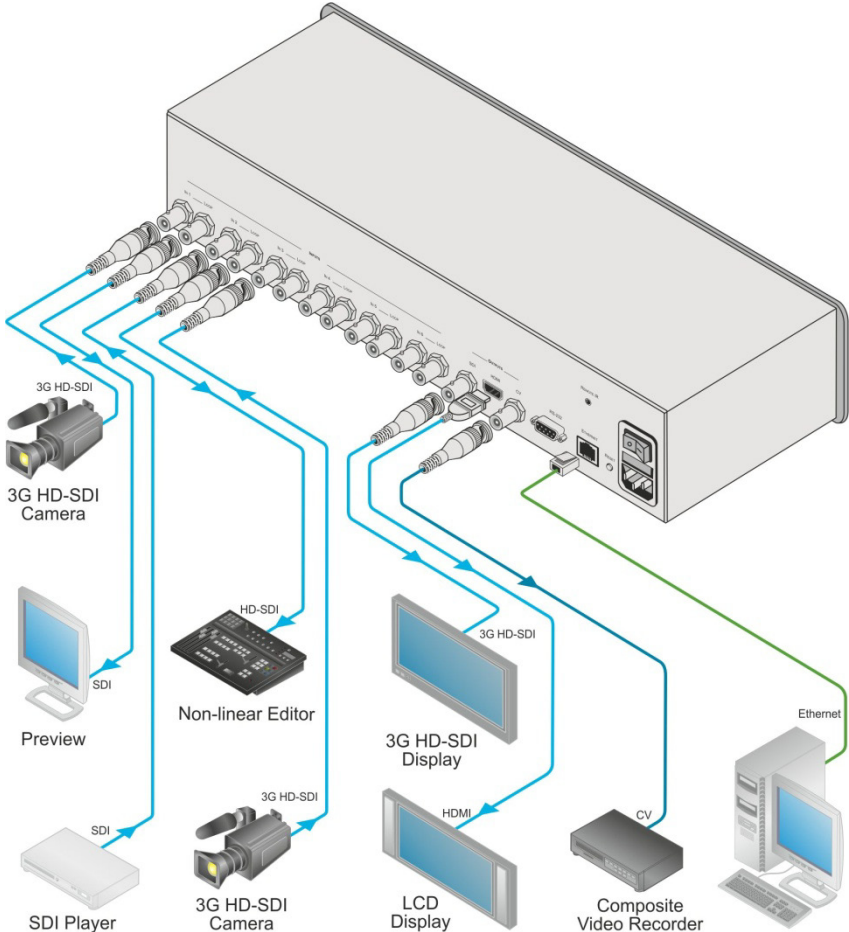
Figure 3: Connecting the MV-6 3G HD-SDI Multiviewer

Always switch off the power to each device before connecting it to your **MV-6**. After connecting your **MV-6**, connect its power and then switch on the power to each device.

To connect[1] the MV-6 *3G HD-SDI Multiviewer* as shown in <u>Figure 3</u>**:**

1. Connect up to six SDI sources (SD, HD or 3G HD-SDI) to the INPUT BNC connectors (for example, 3G HD-SDI cameras to IN 1 and IN 3, and an SDI player to IN 2).

2. Connect up to six SDI acceptors (SD, HD or 3G HD-SDI) to the INPUT LOOP BNC connectors (for example, a preview SDI display to IN 1—LOOP and a non-linear editor to IN 2—LOOP).

3. Connect up to three display acceptors to the OUTPUT connectors (for example, a 3G HD-SDI display to the OUTPUT SDI BNC connector, an LCD display to the HDMI connector, and a CV video recorder to the OUTPUT CV BNC connector).

4. Optional—Connect a PC and/or serial controller to the:
    - Ethernet connector (see <u>Section 6.2</u>)
      —and/or—
    - RS-232 port[2] (see <u>Section 6.1</u>)

5. Connect the power cord[2].

6.1 Connecting to the RS-232 Port

You can connect to the **MV-6** via an RS-232 connection using, for example, a PC. Note that a null-modem adapter/connection is not required.

To connect to the MV-6 via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **MV-6** via a 9-wire straight cable (only pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5 need to be connected) to the RS-232 9-pin D-sub port on your PC

6.2 Connecting to the Ethernet Port

You can connect the **MV-6** via the Ethernet port in either of the following ways:

- For direct connection to the PC, use a crossover cable (see <u>Section 6.2.1</u>)
- For connection via a network hub or network router, use a straight-through cable (see <u>Section 6.2.2</u>)

6.2.1 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **MV-6** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

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1 Switch off the power to each device before connecting it to your MV-6. After connecting your MV-6, switch on its power and then switch on the power to each device

2 Not shown in the illustration

> This type of connection is recommended for identification of the factory default IP address[1] of the **MV-6** during the initial configuration

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 4).
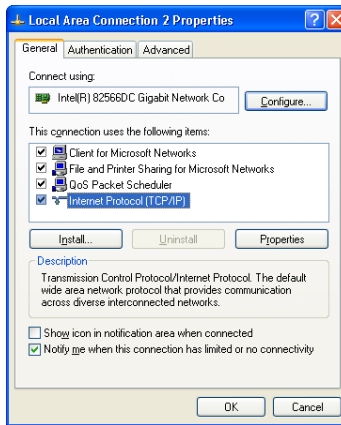
Figure 4: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 5.
7. Click **OK**.

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1 The default IP address is 192.168.1.39
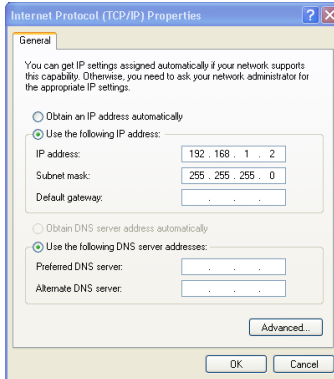
Figure 5: Internet Protocol (TCP/IP) Properties Window

6.2.2 Connecting the Ethernet Port via a Network Hub

You can connect the Ethernet port of the **MV-6** to the Ethernet port on a
network hub or network router, via a straight-through cable with RJ-45
connectors.

7 Operating the MV-6 3G HD-SDI Multiviewer Locally

The **MV-6** sports an LCD video preview screen on which the live video
output is shown. Changes made to the device configuration are reflected
immediately on the screen allowing you to monitor the output in real-time.

The **MV-6** is operated locally using the front panel buttons.

7.1 Display

When the **MV-6** is powered on, the following is displayed briefly:

```
MV6 Multiviewer
KRAMER
```

The device then performs a self test. If the test is successful the
Window/Input list is displayed, an example of which is shown below.

```
WIN A  B  C  D  E  F
INP 2  4  5  6  1  3
```

During operation, if there is no button activity for approximately 60 seconds
the display reverts to the Window/Input list.

7.2 Adjusting the Size of a Window

The horizontal and vertical size of each window can be modified.

To adjust the size of a window:

1. Select the required window by pressing one of the Window buttons. The relevant button lights.
2. Press either the H Size or V Size button to adjust the width or height of the selected window.
3. Use the left (◄) and right (►) buttons to adjust the window width, and use the up (▲) and down button (▼) to adjust the window height. The size changes in real-time.
4. Press Menu twice to exit the window size setting.

7.3 Adjusting the Position of a Window

The horizontal and vertical position of each window can be modified.

To adjust the position of a window:

1. Select the required window by pressing one of the Window buttons. The relevant button lights.
2. Press either the H Position or V Position button to move the window.
3. Use the left (◄) and right (►) buttons to move the window horizontally, and use the up (▲) and down button (▼) to move the window vertically. The position changes in real-time.
4. Press Menu twice to exit the window position setting.

7.4 Defining and Saving a Custom Window Layout

In addition to the four predefined window layouts, the **MV-6** can store two custom window layouts. Once you have defined a custom window layout you can save it for future recall.

To define and save a custom, user-defined window layout:

1. Using the Size and Position buttons, adjust all windows to the required configuration.
2. Press and hold either the U1 or U2 Layout button until the button flashes once. The window layout is stored in the respective memory.

7.5 Recalling a Window Layout

You can select any of the four predefined or two custom window layouts using the window layout buttons.

To select a window layout:

- Press one of the six screen layout buttons.

The button flashes quickly three times and the window layout is recalled from the memory

7.6 Freezing/Releasing a Video Output

To freeze/release a video output:
1. Select the required window to freeze.
2. Press the Freeze button (see FREEZE Button).
   The button lights and the output video freezes.
3. Press the Freeze button.
   The button no longer lights and the video is no longer frozen.

7.7 Locking the Front Panel

Lock the front panel buttons to prevent unwanted key presses from changing the current configuration.

To lock the front panel:
- Press and hold the Panel Lock button (see PANEL LOCK Button).
  The button lights and the front panel buttons are locked. Pressing any button causes the Locked message to display and the Lock button to flash

To unlock the front panel:
- Press and hold the Panel Lock button (see PANEL LOCK Button).
  The button no longer lights and the front panel buttons are unlocked

7.8 To Reset the Device to Factory Default Configuration

To reset the device to the factory default configuration:
1. Turn the device off.
2. Press and hold the Reset button on the rear panel of the device.
3. While holding the button depressed, turn the device on.
4. Hold the button depressed for 10 seconds and release the button.
   The configuration is reset to the factory default.

7.9 Using the Menu

The menu is displayed on the character display when the Enter button is pressed. After no button activity for about a minute, the window input list is displayed but the menu remains open in the background at the same position it was last left in.

Navigation through the menu is performed as follows:

Enter—display the menu or select a parameter/value

Up (▲)—scroll up through the parameter/value list

Down (▼)—scroll down through the parameter/value list

Left (◄)—move left in the current field

Right (►)—move right through the current field

Menu—Move up one level in the menu hierarchy

The main menu comprises six sections:

- Windows (see Section 7.9.1)
- Output (see Section 7.9.2)
- Status (see Section 7.9.3)
- Comm Settings (see Section 7.9.4)
- User Presets (see Section 7.9.5)
- System (see Section 7.9.6)

7.9.1 Windows Sub-menu

The parameters in the Windows sub-menu set the window inputs and characteristics.

Table 3: Windows Sub-menu Parameters and Descriptions

Parameter		Description	Values
Select window		Select the window to adjust	A, B, C, D, E, F Default—F
Visibility		Makes the selected window visible or non-visible	Visible, Non-Visible Default—Visible
Select layer		Select a source to display in the selected window	TOP, 2, 3, 4, 5, 6 Default—TOP
Input		Select an input	1, 2, 3, 4, 5, 6 Default—1
Size	Hor size(%)	Set the horizontal size for the selected window	1 to 100 Default— 66
	Ver size(%)	Set the vertical size for the selected window	1 to 100 Default— 66
Position	X origin(%)	Set the X origin for the selected window	0 to 99 Default— 0
	Y origin(%)	Set the Y origin for the selected window	0 to 99 Default— 0

Parameter	Description	Values
Freeze	Freezes or releases the video	ON, OFF Default—OFF

7.9.2 Output Sub-menu

The parameters in the Output sub-menu set the output and LCD preview screen characteristics.

Table 4: Output Sub-menu Parameters and Descriptions

Parameter	Description	Values
RESOLUTION	Sets the output resolution	720p59.94, 720p60, 720p50, 1080p59.94, 1080p60, 1080p50 Default— 720p59.94
GENLOCK MODE	Turns on and off and sets the source of the genlock signal	NO GENLOCK, INPUT 1, INPUT 2, INPUT 3, INPUT 4, INPUT 5, INPUT 6 Default—NO GENLOCK
BACKGROUND >	Sets the background color using R, G and B values	000 to 255 Default—R=1, G=101, B=53
WIN BORDER	Turns the window border on or off	ON, OFF Default—ON

7.9.3 Status Sub-menu

The parameters in the Status sub-menu display the input states.

Table 5: Status Sub-menu Parameters and Descriptions

Parameter	Description	Values
INPUTS >	Displays the input states	IN 1 unlocked, IN 2 unlocked, IN 3 unlocked, IN 4 unlocked, IN 5 unlocked, IN 6 unlocked
GENLOCK unlocked	Displays the Genlock state	

7.9.4 Comm Settings Sub-menu

The parameters in the Comm Settings sub-menu set the network IP and serial communications values.

Table 6: Comm Settings Parameters and Descriptions

Parameter		Description	Options
NETWORK	IP address	Sets the IP network address	All valid IP addresses Default—192.168.001.039
	IP mask	Sets the IP network mask	All valid subnets Default—255.255.000.000
	IP gateway	Sets the IP gateway address	All valid gateway addresses Default—000.000.000.000
	IP port	Sets the IP port number	All valid TCP ports Default—05000
RS-232	Baud	Displays the baud rate	115200
	Parity	Displays the parity setting	none

7.9.5 User Presets Sub-menu

The options in the User Presets sub-menu save and recall the preset configuration memories (see Section 7.4).

Table 7: User Presets Parameters and Descriptions

Parameter	Description	Options
SAVE	Saves the current screen layout as a user defined layout	USER PRESET 1, USER PRESET 2 Default—USER PRESET 1
LOAD	Loads the selected user defined screen layout	USER PRESET 1, USER PRESET 2 Default—USER PRESET 1

7.9.6 System Sub-menu

The parameters in the System sub-menu display the device versions and set the video screen characteristics.

Table 8: System Sub-menu Parameters and Descriptions

Parameter	Description		Options
FIRMWARE	The device firmware version		
FPGA VER	The device FPGA version		
S/N	The device serial number		
LCD	Back Light	AUTO, ON Default—AUTO	
	Brightness	0 to 999 Default—100	

8 Operating the MV-6 3G HD-SDI Multiviewer Remotely

The **MV-6** can be operated remotely using the Kramer **MV-6** Controller software[1] via the:

- RS-232 serial port (see Section 8.1)
- Ethernet port (see Section 8.2)

8.1 Operating the MV-6 via the RS-232 Serial Port

Kramer offers free control software that allows you to operate the **MV-6** remotely via a PC or serial controller using serial commands (see Section 11.1). This software can be downloaded from www.kramerelectronics.com.

8.2 MV-6 Controller Software

For details regarding connecting to the Ethernet port on the **MV-6**, see Section 6.2.

The Controller software requires the following:

- Windows™ XP, Vista or Windows™ 7
- Microsoft .Net Framework version 3.5

To install the Controller software, download the software and run the setup file. After installation, running the Controller software for the first time displays a window similar to that shown in Figure 6.

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1 The free MV-6 Control software can be downloaded from http://www.kramerelectronics.com

KRAMER: SIMPLE CREATIVE TECHNOLOGY
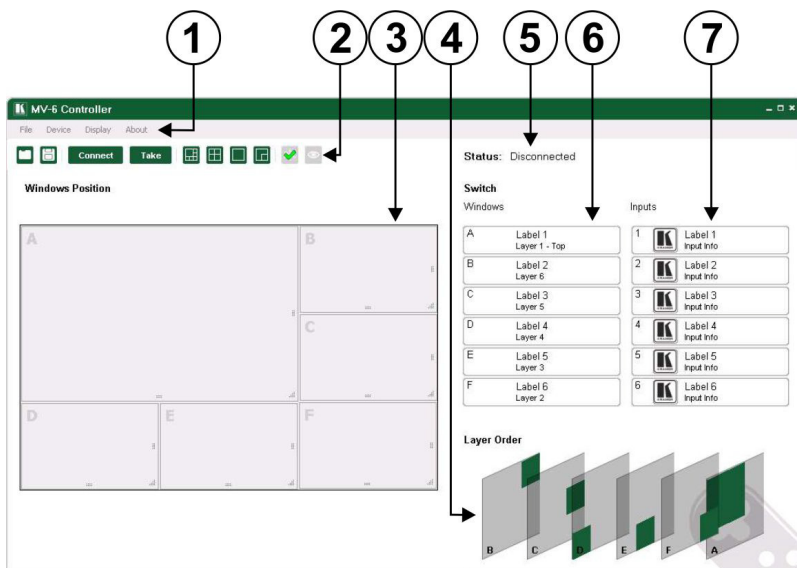
Figure 6: MV-6 Controller Software Main Window

Table 9: MV-6 Controller Software Features

#	Feature	Function
1	Menu Bar	Operate and configure the device using the Menu Bar options (see Section 8.2.1)
2	Quick Access Toolbar	Operate and configure the device using the quick access toolbar buttons (see Section 8.2.2)
3	*Windows Position*	Modify window size and position by dragging and dropping individual windows (see Section 8.2.4)
4	*Layer Order*	Click and drag individual layers to arrange the layer order (see Section 8.2.5)
5	*Status* Indicator	Indicates whether or not the Controller software is connected to the device (see Section 8.2.5)
6	*Switch Windows*	Press to select a window (see Section 8.2.5)
7	*Switch Inputs*	Press to select an inputs (see Section 8.2.5)

Note: Unless the device is in off-line mode (by pressing the **Take** button), when a change is made on the device (for example, a different output is selected), the change is reflected almost immediately in the main window of the Controller Software. Similarly, if a change is made in the Controller Software, the change is reflected almost immediately on the device.

8.2.1 The Menu Bar

The menu bar options are shown in Table 10.

Table 10: Menu Bar Options

Menu Bar Options	Sub Menu	Description
FILE	*Open*	Open an existing configuration
	Save	Save the current configuration
	Exit	Exit the MV-6 Controller software
DEVICE	*Connect/Disconnect*	Connect or disconnect to the device (see Section 8.2.3)
	Take/Update	Press Take to put the device in off-line mode. Press Update to implement waiting changes and return the device to on-line mode (see Section 8.2.5)
	Firmware Update	Update the device firmware (see Section 8.2.12)
	Device Details	Retrieve and display the device details, such as, model, unit name, version, and so on. (see Section 8.2.5)
DISPLAY	*Presets*	Set the screen to display one of the preconfigured configurations: 6-Split, Quad, Full, 2-Split
	Output Resolution	Set the output resolution: 720P 59.94Hz, 720P 50Hz, 1080P 60Hz, 720P 60Hz, 1080P 59.94Hz, 1080P 50Hz
	Genlock Control	Unlocks the genlock or sets the source for genlock control: Free Run (default), Input 1, Input 2, Input 3, Input 4, Input 5, Input 6
	Refresh	Retrieves full information from the device
ABOUT		Displays the Step-in Software and Kramer company details

Note: Any actions that you are not authorized to perform are grayed out.

8.2.2 The Quick Access Toolbar

The Quick Access Toolbar buttons are shown in Figure 7 and described in Table 10.

Figure 7: Quick Access Toolbar

Table 11: Quick Access Toolbar Options

Feature	Description
	Open an existing project
	Save the current project
	Connects to and disconnects from the device (see Section 8.2.3)

Feature	Description
Take **Update**	Press Take to enable multiple off-line changes to be made. Press Update to implement the changes (see Section 8.2.8)
	Set the screen to display the 6-window configuration
	Set the screen to display the 4-window configuration
	Set the screen to display the single-window configuration
	Set the screen to display the 2-window configuration
	Freezes the output video
	Sets the visibility of the active window

8.2.3 Connecting to the Device

To connect to the device:

1. Click the **Connect** button.
   The window shown in Figure 8 appears.
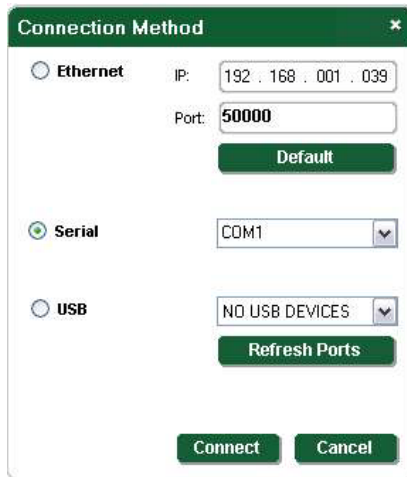
Figure 8: Connect Window

2. Select the required method of connection radio button:
- For Ethernet, enter the IP address and Port number of the device. To set the default IP address and Port number, press the **Default** button.

- For a serial connection, select the required Com port from the drop-down list.
3. Click **Connect**.
   If the connection is successful, the main window shown in <u>Figure 6</u> appears. If the connection is not successful, a Timeout error message appears.

8.2.4 Windows Position

The windows can be manually manipulated in size and position in the **Window Position** area.

Windows Position
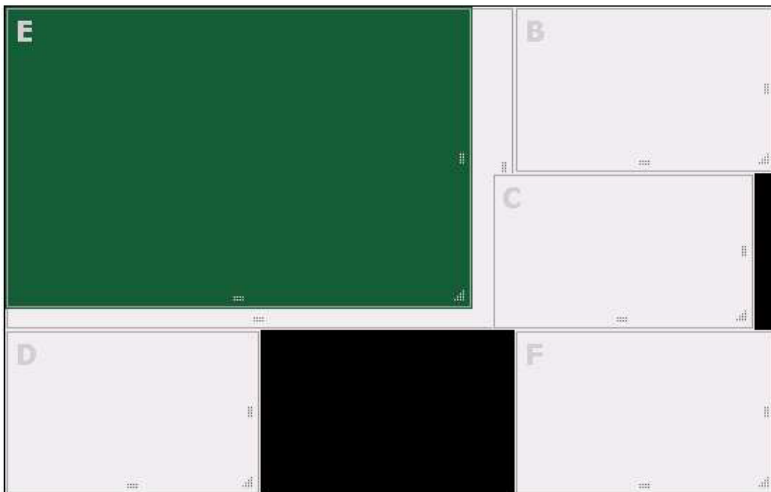
Figure 9: Windows Position

To change the size of a window:
- Click, hold and drag the required window handle

To change the position of a window:
- Click, hold and drag anywhere in the window

8.2.5 Switch Buttons

The switching configuration can be modified by clicking on the **Windows** and **Inputs** buttons.
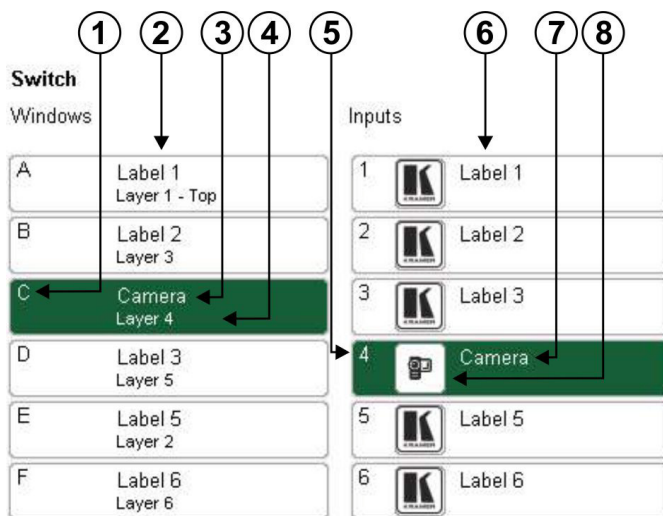
Figure 10: Switch Buttons

Table 12: Switch Button Characteristics

#		Description
1	*C* Window	Window identifier (A to F)
2	*Windows* Buttons (A to F)	Press to select a window to assign to an input (see Section 8.2.10)
3	*Camera*	The label of the input assigned to this window (see Section 8.2.10)
4	*Layer 4*	The layer (Top layer to 6) of this window (see Section 8.2.7)
5	*4*	Input number (1 to 6)
6	*Inputs* Buttons (1 to 6)	Press to select an input to assign to a window (see Section 8.2.10)
7	*Camera*	Input button label (see Section 8.2.10)
8	Input icon	User assigned icon for this input (see Section 8.2.10)

8.2.6 Connection Status

The connection status can be one of the following states:

- Online—the device is connected and being updated in real-time by the software
- Online, in take mode (not updating device)—the device is connected but changes are only implemented when the Update button is pressed
- Offline—in Take mode

8.2.7 Changing the Layer Order

You can modify the order in which the windows are arranged. The top layer is on the right and the bottom layer on the left. In <u>Figure 11</u> layer A is on top and layer F is at the bottom.
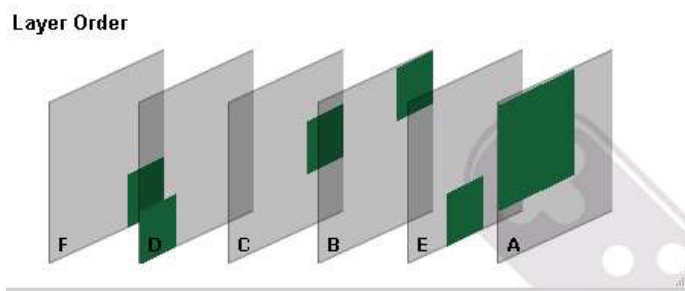
Figure 11: Layer Order

To change the window layer order:
1. Click and hold on the layer that you want to move.
2. Drag the layer to the right or left into the required position and release. The layer is placed in the required position.

8.2.8 Implementing Multiple Actions At Once

To implement multiple actions at once:
1. Press the **Take** button to put the device in off-line mode.
   The button changes to the **Update** button and the device is in off-line mode.
2. Perform the required actions, such as, switching and layer order changes.
3. Press the **Update** button.
   The button changes to the **Take** button and all changes are implemented.

8.2.9 Changing Input Button Icons and Labels

To change an input button icon and label:
1. Right-click on the relevant input button.
   The **Input Properties** window appears as shown in <u>Figure 12</u>.
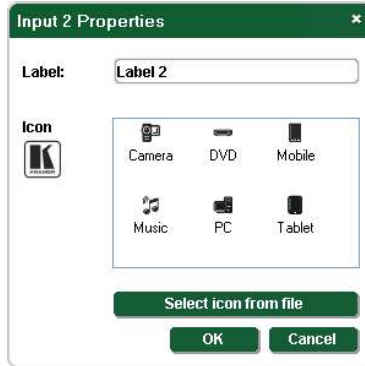
Figure 12: Input Button Properties Window

2. In the **Label** text box, enter the required button label.
3. Select the required icon from the list or click on the **Select icon from file** button and browse to the required file.
4. Click **Save**.
    The button characteristics are changed.

8.2.10 Switching an Input to a Window

To switch an input to a window:

1. Click on the required window button.
    The window is selected and the button changes to a solid color as shown in Figure 13.
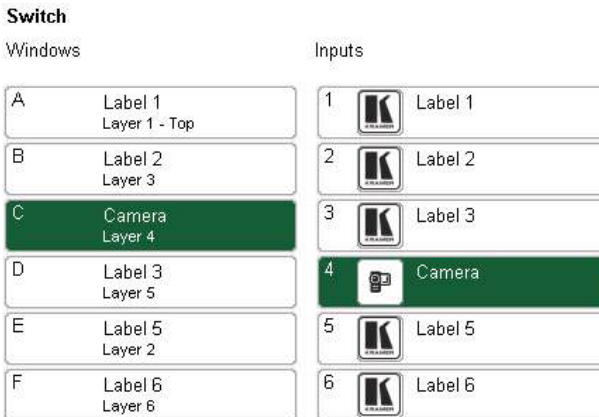
Figure 13: Switching an Input to a Window

2. Click on the required Inputs button.
    The input is assigned to the previously selected window and the button changes to a solid color.

8.2.11 Changing a Window Setup

To change a window setup:

1. Right-click on the relevant Windows button.
   The **Window Setup** window appears as shown in <u>Figure 14</u>.
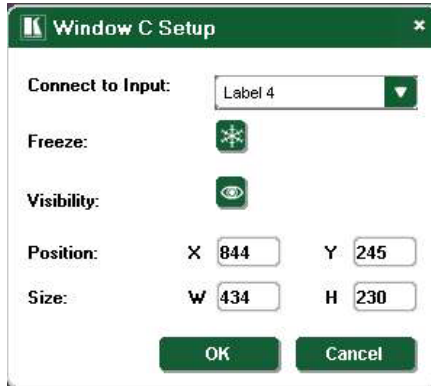
Figure 14: Windows Setup Window

2. From the **Connect to Input** drop-down list, select the required input.
3. Click the **Freeze** icon to freeze this window.
4. Click the **Visibility** icon to modify the visibility of this window.
5. In the **Position** fields, enter the x and y position for the window.
6. In the **Size** fields, enter the width and height for the window.
7. Click **OK**.
   The Window setup is changed.

8.2.12 Updating the Firmware

To update the firmware you must be logged in as Admin.

To update the firmware:

1. Download the latest firmware file from
   <u>http:www.kramerelectronics.com</u>.
2. Click **Unit** > **Firmware Update**.
3. Browse to the firmware file that you downloaded.
4. Click **Open**.
   The device firmware is loaded.

Note: Do not interrupt the uploading process or the device may be damaged.

5. When the process is complete, reset the device.

8.2.13 Setting the IP Network Parameters

To set the IP network parameters you must be logged in as Admin.

To set the IP network parameters:

1. Click **Unit** > **Device Details**.
2. Under **Connectivity**, edit the required parameter.
3. Click **Set Value**.
   A confirmation message appears.
4. Click **OK**.
   The parameter is set.
5. Reboot the device.

8.2.14 Displaying the MV-6 Software Version Number

To display the MV-6 Software version number:

1. From the Menu bar, click **About**.
   The **About MV6 Controller** window appears as shown in Figure 12.

Figure 15: About MV-6 Window

2. Click **OK** to close the window.

9   Technical Specifications

Table 13 lists the technical specifications of the **MV-6**.

Table 13: MV-6 Technical Specifications[1]

INPUTS:	6 SDI serial video, 75Ω on BNC connectors	SD	SMPTE-259M	SMPTE-125M	480i – 59.94
				ITU-R BT.656-5	576i – 50
		HD	SMPTE-292	SMPTE-296M	729p – 59.94/60/50
				SMPTE-274M	1080i – 59.94/60/50
					1080p – 29.97/30/25 23.98/24
					23.98sF/24sF
		3G	SMPTE-424M	SMPTE-296M	1080p – 59.94/60/50
	MAX. INPUT LEVEL:	800mVpp /75Ω			
OUTPUTS:	1 HDMI				
	1 CV on a BNC connector				
	1 SDI output, 75Ω on BNC connector	SMPTE-292	SMPTE-296M	729p – 59.94/60/50	
		SMPTE-424M	SMPTE-296M	1080p – 59.94/60/50	
	MAX. OUTPUT LEVEL:	800mVpp /75Ω			
	6 LOOP				
PREVIEW SCREEN:	4.3" TFT color LCD panel				
SERIAL BIT DATA RATE:	Up to 2.97Gbps				
CONTROLS:	Front-panel, RS-232, Ethernet				
POWER SOURCE:	Universal, 100-240V AC, 50/60Hz 35VA				
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)				
STORAGE TEMPERATURE:	-30° to +72°C (-22° to 162°F)				
HUMIDITY:	10% to 90%, RHL non-condensing				
DIMENSIONS:	19" x 7.4" x 2U (W, D, H) rack mountable				
WEIGHT:	3.1kg (6.83lbs) approx.				
ACCESSORIES:	Power cord, Rack "ears"				

---

1 Specifications are subject to change without notice

10 Default Communication Parameters

Table 14: Default Communication Parameters

EDID	
EDID data is passed between Output 1 and Input 1	
RS-232	
Protocol 3000	
Baud Rate:	115200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Example (Output 1 to Input 2):	#V 2>1 CR
Ethernet	
To reset the IP settings to the factory reset values, power cycle the device while holding in the Factory Reset button, located on the rear panel of the unit	
IP Address:	192.168.1.39
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1
TCP Port #: 5000	5000
UDP Port #: 50000	50000
Maximum UDP Ports:	10
Maximum TCP Ports:	4

11 Kramer Protocol 3000

The **MV-6** can be operated using serial commands from a PC, remote controller or touch screen using the Kramer Protocol 3000.

This section describes:

- Kramer Protocol 3000 syntax (see Section 11.1)
- Kramer Protocol 3000 commands (see Section 11.2)

11.1 Kramer Protocol 3000 Syntax

11.1.1 Host Message Format

Start	Address (optional)	Body	Delimiter
#	*Destination_id@*	**Message**	CR

11.1.1.1 Simple Command

Command string with only one command without addressing:

Start	Body	Delimiter
#	**Command** SP *Parameter_1,Parameter_2,…*	CR

11.1.1.2 Command String

Formal syntax with commands concatenation and addressing:

Start	Address	Body	Delimiter
#	*Destination_id@*	**Command_1** *Parameter1_1,Parameter1_2,…*| **Command_2** *Parameter2_1,Parameter2_2,…*| **Command_3** *Parameter3_1,Parameter3_2,…*|…	CR

11.1.2 Device Message Format

Start	Address (optional)	Body	delimiter
~	*Sender_id@*	**Message**	CR LF

11.1.2.1 Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**Command** SP *[Param1 ,Param2 …]* result	CR LF

CR = Carriage return (ASCII 13 = 0x0D)
LF = Line feed (ASCII 10 = 0x0A)
SP = Space (ASCII 32 = 0x20)

11.1.3 Command Terms

Command
A sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command and parameters must be separated by at least one space.

Parameters

A sequence of alphanumeric ASCII characters ('0'-'9','A'-'Z','a'-'z' and some special characters for specific commands). Parameters are separated by commas.

Message string

Every command entered as part of a message string begins with a **message starting character** and ends with a **message closing character**.

Note: A string can contain more than one command. Commands are separated by a pipe ('|') character.

Message starting character

'#' – For host command/query

'~' – For device response

Device address (Optional, for K-NET)

K-NET Device ID followed by '@'

Query sign

'?' follows some commands to define a query request.

Message closing character

CR – For host messages; carriage return (ASCII 13)

CRLF – For device messages; carriage return (ASCII 13) + line-feed (ASCII 10)

Command chain separator character

When a message string contains more than one command, a pipe ('|') character separates each command.

Spaces between parameters or command terms are ignored.

11.1.4 Entering Commands

You can directly enter all commands using a terminal with ASCII communications software, such as HyperTerminal, Hercules, etc. Connect the terminal to the serial or Ethernet port on the Kramer device. To enter CR press the Enter key.

(LF is also sent but is ignored by command parser).

For commands sent from some non-Kramer controllers like Crestron, some characters require special coding (such as, /X##). Refer to the controller manual.

11.1.5 Command Forms

Some commands have short name syntax in addition to long name syntax to allow faster typing. The response is always in long syntax.

11.1.6 Chaining Commands

Multiple commands can be chained in the same string. Each command is delimited by a pipe character ("|"). When chaining commands, enter the **message starting character** and the **message closing character** only once, at the beginning of the string and at the end.

Commands in the string do not execute until the closing character is entered.

A separate response is sent for every command in the chain.

11.1.7 Maximum String Length

64 characters

11.2 Kramer Protocol 3000 Commands

11.2.1 Common Commands

Command	Abbreviation	Description	Type	Permission
#		Protocol handshaking	Common-mandatory	End User
BUILD-DATE?		Read device build date	Common-mandatory	End User
FACTORY		Reset to factory default configuration		
HELP		List of commands	Common-mandatory	End User
LOCK-FP	LCK	Lock front panel	Common	Administrator
LOCK-FP?	LCK?	GET Lock front panel	Common	End User
MACH-NUM		Set Machine number	Common	Administrator
MODEL?		Read device model	Common-mandatory	End User
NAME		Set machine (DNS) name	Common	Administrator
NAME?		Query machine (DNS) name	Common	End User
NAME-RST		Reset machine name to factory default (DNS)	Common	Administrator
PROT-VER?		Read device protocol version	Common-mandatory	End User
RESET		Reset device	Common-mandatory	Administrator
SN?		Read device serial number	Common-mandatory	End User
UPGRADE		Execute firmware upgrade	Common	Administrator
VERSION?		Read device firmware version	Common-mandatory	End User

11.2.2 Network Setting Commands

Command	Abbreviation	Description	Type	Permission
ETH-PORT	ETHP	Change protocol Ethernet port	Ethernet	Administrator
ETH-PORT?	ETHP?	Query protocol Ethernet port	Ethernet	End User
NET-DHCP	NTDH	Set DHCP mode	Ethernet	Administrator
NET-DHCP?	NTDH?	Query DHCP mode	Ethernet	End User
NET-GATE	NTGT	Set Gateway	Ethernet	Administrator

Command	Abbreviation	Description	Type	Permission
NET-GATE?	NTGT?	Query Gateway	Ethernet	End User
NET-IP	NTIP	Set IP address	Ethernet	Administrator
NET-IP?	NTIP?	Query IP address	Ethernet	End User
NET-MAC?	NTMC?	Query MAC address	Ethernet	End User
NET-MASK	NTMSK	Set subnet mask	Ethernet	Administrator
NET-MASK?	NTMSK?	Query subnet mask	Ethernet	End User

11.2.3 Device Specific Commands

Command	Description	Syntax	Response
SRC-BLANK	Set window visibility	#SRC-BLANK win_num,enable<CR>	~SRC-BLANK win_num,enable [result]<CR>
SRC-BLNK?	Get window visibility	#SRC-BLANK? win_num<CR>	~SRC-BLANK? win_num, enable<CR>
SRC-VID	Set window input	#SRC-VID win_num,in_num<CR>	~SRC-VID win_num,in_num [result]<CR>
SRC-VID?	Get window input	# SRC-VID? win_num<CR>	~SRC-VID? win_num, in_num <CR>
WND-FRZ	Freeze window	#WND-FRZ win_num,freeze <CR>	~WND-FRZ win_num,freeze [result] <CR>
WND-FRZ?		#WND-FRZ? win_num<CR>	~WND-FRZ? win_num,freeze<CR>
WND-LR	Set window layer	#WND-LR win_num,layer <CR>	~WND-LR win_num,layer [result]<CR>
WND-LR?	Get window layer	#WND-LR? win_num<CR>	~WND-LR? win_num, layer<CR>
WIN	Set active window	#WIN win_num<CR>	~WIN win_num [result]<CR>
WIN?	Get active window	#WIN? >CR>	~WIN? win_num<CR>
CRDT	Set window size and position in %	#CRDT win_num,x0,y0,x1,y1<CR>	~CRDT win_num,x0,y0,x1,y1[result]<CR>
CRDT?	Get window size and position in %	#CRDT? win_num<CR>	~CRDT? win_num,x0,y0,x1,y1<CR>
VID-RES	Set output/input resolution	#VID-RES IN/OUT, id, HSIZE, VSIZE, "I"/"P", FramRate <CR>	~VID-RES IN/OUT, id, HSIZE, VSIZE, "I"/"P", FramRate [result] <CR>
VID-RES?	Get output/input resolution	#VID-RES? IN/OUT, id<CR>	~VID-RES? IN/OUT, id, HSIZE, VSIZE, "I"/"P", FramRate <CR>
BCKGRND	Set background color	#BCKGRND R, G, B<CR>	~BCKGRND R,G,B [result]<CR>
BCKGRND?	Get background color	#BCKGRND ?	~BCKGRND? R,G,B <CR>
GNLCK	Set genlcock	#GNLCK id <CR>	~GNLCK id [result]<CR>
GNLCK?	Get genlcock	#GNLCK? id<CR>	~GNLCK? id, state<CR>
VERSION?	Get firmware version		~VERSION <firmware version><CR>
FPGA-VER?	Get FPGA version	#FPGA-VER? <id><CR>	~FPGA-VER <id>,<expected ver>,<actual ver>
SN?	Get serial number		~SN <device serial number> <CR>
NTIP	Set IP address	#NTIP <ip address> <CR>	~NTIP <ip address> [result]<CR>
NTIP?	Get IP address	#NTIP?	~NTIP <ip address> <CR>
NTMSK	Set IP mask	#NTMSK <ip mask> <CR>	~NTMSK <ip mask> [result]<CR>

Command	Description	Syntax	Response
NTMSK?	Get IP address	#NTMSK?	~NTMSK <ip mask> <CR>
NTGT	Set gateway address	#NTGT <gateway> <CR>	~NTGT <gateway> [result]<CR>
NTGT?	Get gateway address	#NTGT?	~NTGT <gateway> <CR>
ETH-PORT	Set IP port	#ETH-PORT <protocol>,<port_num> <CR>	~ETH-PORT <protocol>, <port_num> [result] <CR>
ETH-PORT?	Get IP port	#ETH-PORT? <protocol>	~ETH-PORT <protocol>, <port_num> <CR>

LIMITED WARRANTY

We warrant this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven 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 us 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, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.

3. Damage, deterioration or malfunction resulting from:
    i)   Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
    ii) Product modification, or failure to follow instructions supplied with the product
    iii) Repair or attempted repair by anyone not authorized by Kramer
    iv) Any shipment of the product (claims must be presented to the carrier)
    v)   Removal or installation of the product
    vi) Any other cause, which does not relate to a product defect
    vii) 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

The liability of Kramer for any effective 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.

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.

    * FCC and CE approved using STP cable (for twisted pair products)

**For the latest information on our products and a list of
Kramer distributors visit** www.kramerelectronics.com
**where updates to this user manual may be found.
We welcome your questions, comments and feedback.**

 Safety Warning:
Disconnect the device from the power supply before
opening/servicing.

Caution

Kramer Electronics, Ltd.
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E-mail: info@kramerel.com
P/N: 2900-000737 REV 2