KRAMER ELECTRONICS LTD.

# USER MANUAL

MODEL:

MV-5
5 Channel Multiviewer

MV-5 5 Channel Multiviewer Quick Start Guide

This guide helps you install and use your product for the first time. For more detailed information, go to http://www.kramerelectronics.com/support/product_downloads.asp to download the latest manual or scan the QR code on the left.

Step 1: Check what's in the box

☑ **MV-5** 5 Channel Multiviewer
☑ Power cord
☑ 4 Rubber feet

☑ 1 Quick Start Guide
☑ 2 Rack "ears"
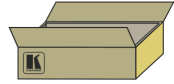
Save the original box and packaging materials in case your Kramer product needs to be returned to the factory for service.

Step 2: Install the MV-5

Mount the device in a rack (using the supplied rack "ears") or attach the rubber feet and place it on a shelf.

Step 3: Connect the inputs and outputs

Switch off the power to all devices before connecting them to your **MV-5**.
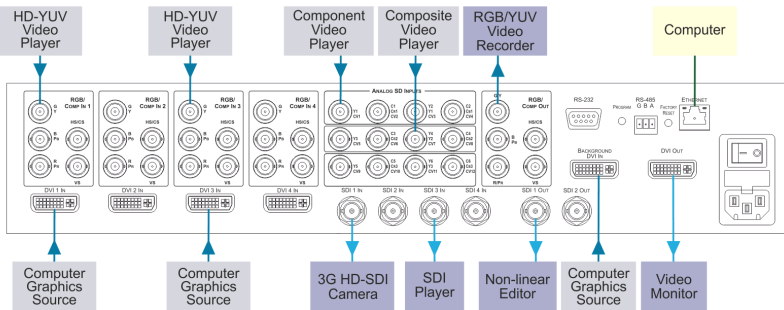
When connecting AV equipment to the **MV-5** we recommend that you use Kramer high-performance cable for best results.
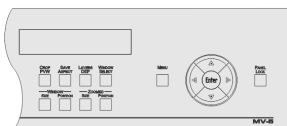
Step 4: Connect the power

Connect the **MV-5** to the mains supply using the supplied power cord.

Step 5: Configure the MV-5

RS-232/Ethernet

Configure the device either locally using the front panel buttons, or remotely using RS-232, RS-485 and Ethernet.

Step 6: Operate the MV-5

Operate the device using the front panel controls, RS-232, RS-485 and Ethernet.

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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 video, audio, presentation, and broadcasting professionals 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 that are clearly defined by function: GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; 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 and GROUP 11: Sierra Video Products.

Congratulations on purchasing your Kramer **MV-5** *5 Channel Multiviewer* which is ideal for:

- Professional broadcasting and production studios
- Presentation applications
- Post production

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

Go to http://www.kramerelectronics.com/support/product_downloads.asp to check for up-to-date user manuals, application programs, and to check if firmware upgrades are available (where appropriate).

2.1 Achieving the Best Performance

To achieve 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 **MV-5** away from moisture, excessive sunlight and dust

This equipment is to be used only inside a building. It may only be connected to other equipment that is installed inside a building.

2.2 Safety Instructions

Caution: There are no operator serviceable parts inside the unit

Warning: Use only the power cord that is supplied with the unit

Warning: Do not open the unit. High voltages can cause electrical shock! Servicing by qualified personnel only

Warning: Disconnect the power and unplug the unit from the wall before installing

2.3 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 *http://www.kramerelectronics.com/support/recycling/*.

2.4 Accessory to Medical Equipment (IEC 60601-1)

In the modern medical environment remote access is essential, for example, to transfer clinical data between doctors and to train to medical students. The **MV-5** is certified according to the IEC 60601-1-2, Clause 2.1.3, Medical Electrical Equipment, Part 1: General Requirements for EMC standard which is required when accessory devices are used at locations where medical personnel and patients are present.

The **MV-5** constitutes an optional component that can be considered necessary and suitable as part of medical equipment or for use as part of a medical system to provide real time simultaneous video feeds to those present at the local medical environment and at remote locations. In this environment, the **MV-5** can be added to the system ONLY if the connecting equipment has been evaluated and meets the IEC 60601-1-2 EMC standards. Note, that when attaching accessory devices to a digital or analog interface, they must comply with the IEC standard for which they are used: EMC Standard (IEC 60601-1-2), Information Technology equipment (IEC 60950-1 (2ed)).

3   Overview

The **MV-5** is a versatile, high-performance video and graphic multi-viewer for DVI signals, SD and HD analog signals up to 1920x1200@60Hz, and SDI signals up to 3G HD-SDI. The device can window up to four sources (plus a background) in any layout and output the image as SDI, DVI, component and composite video signals. Both preprogrammed and customizable screen division is supported.

In particular, the **MV-5** has:

- 16 inputs with rapid selection and switching

- An input bandwidth of up to 3Gbps which supports standard definition, high definition and 3G high definition serial digital video signals

- SMPTE 259M, 292M and 424M input compliance and support for data rates of 270Mbps, 1.4835Gbps, 1.485Gbps, 2.967Gbps and 2.97Gbps

- Input-cable equalization up to 350m (1150ft) for SD signals, 140m (459ft) for 1.5GHz HD signals, and 120m (394ft) for 3GHz HD signals
  SD means an NTSC or PAL compatible video format, consisting of 480 (for NTSC) or 576 (for PAL) lines of interlaced video. HD means a video format consisting of 720 active lines of progressive video or 1080 lines of progressive or interlaced video

- Any format to any format cross-conversion

- Any Standard to any standard cross-conversion

- HDCP support on DVI inputs/outputs

- Four independent chroma-key engines for each image layer

- Window and image scaling, zooming (up to 1000%), and aspect ratio control

- Independent layer transparency control

- Brightness, contrast, color and sharpness control

- Window or input label insertion

- Multi-video output formats; SD-SDI (259M), HD-SDI (292M) and 3G HD-SDI (SMPTE 424M), HDMI, HD, SD, analog and composite

- Kramer re-Klocking™ and equalization on each input—rebuilds the digital signal to travel longer distances

- Flexible control options; front panel with menu LCD, Ethernet and RS-232

- Screen handling buttons; freeze, size, position

- 16 user-definable screen layouts

- A front panel lock button

The **MV-5** is housed in a 19" 2U rack mountable enclosure and is fed from a 100-240 VAC universal switching power supply.

You can control the **MV-5** using the front panel buttons, or remotely via:

- RS-232/RS-485 serial commands transmitted by a serial controller (see Section 6.1 and Section 6.2)

- A PC connected to the Ethernet port on the device via a LAN using the control software (see Section 6.3)

4 Defining the MV-5 5 Channel Multiviewer

Figure 1 defines the front panel of the **MV-5**.
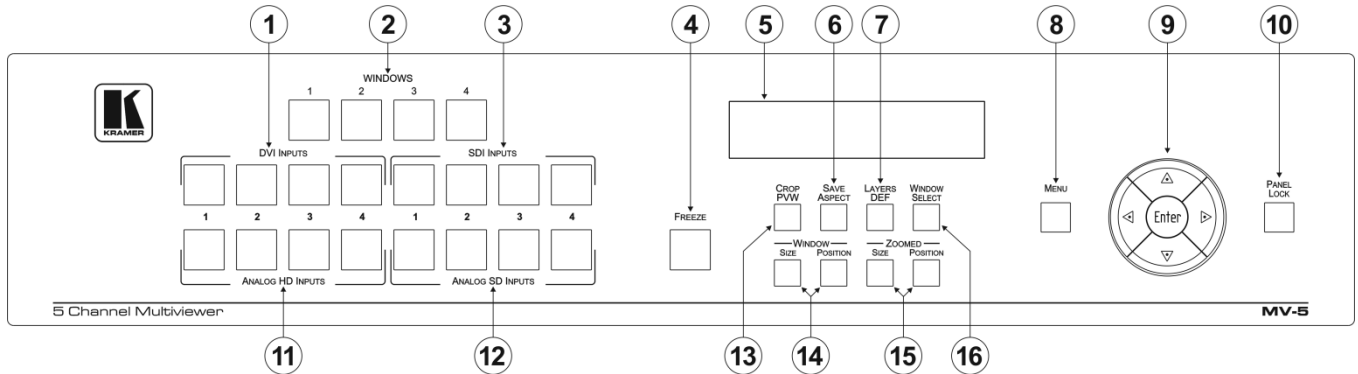
Figure 1: MV-5 5 Channel Multiviewer Front Panel

#	Feature	Function
1	*DVI INPUTS 1~4* Buttons	Press to select one of the DVI sources
2	*WINDOWS 1~4* Buttons	Press to make one of the windows the upper-most window (see Section 7.2.1). The order of the other windows is not changed
3	*SDI INPUTS 1~4* Buttons	Press to select one of the SDI sources
4	*FREEZE* Button	Press to freeze and release the selected window signal
5	LCD 2 Line x 20 Character Text Display	Displays the current configuration or menu
6	*SAVE ASPECT* Button	Press to turn on the Save Aspect mode whereby the window or image aspect is locked during size adjustments (see Section 7.2.1)

#	Feature		Function
7	*LAYERS DEF* Button		Press to set the order of priority of the window layers
8	*MENU* Button		Press to enter the configuration menu. When the menu is displayed, press to exit one level (see Section 7.1)
9	*ENTER* Navigation Pad		Press Enter to enter the sub-menu or accept a parameter value. Press and hold together with the arrow keys to scroll rapidly through parameter values (see Section 7.1)
10	*PANEL LOCK* Button		Press and hold to lock the front panel buttons. Press and hold again to unlock the front panel buttons (see Section 7.2.8)
11	*ANALOG HD INPUTS 1~4* Buttons		Press to select one of the analog HD sources
12	*ANALOG SD INPUTS 1~4* Buttons		Press to select one of the analog SD sources
13	*CROP PVW* Button		Press to display a full screen preview of the selected window image. Press when zooming to show the mask of the cropped image
14	*WINDOW* Buttons	*SIZE* Button	Press to adjust the size of the selected window (see Section 7.2.3)
		POSITION Button	Press to adjust the position of the selected window
15	*ZOOMED* Buttons	*SIZE* Button	Press to adjust the image size within the selected window, that is, the degree of zoom
		POSITION Button	Press to adjust the image position within the selected window, that is, the image panorama
16	*WINDOW SELECT* Button		Press to step through the windows to select an active window to adjust

Figure 2 defines the rear panel of the **MV-5**.
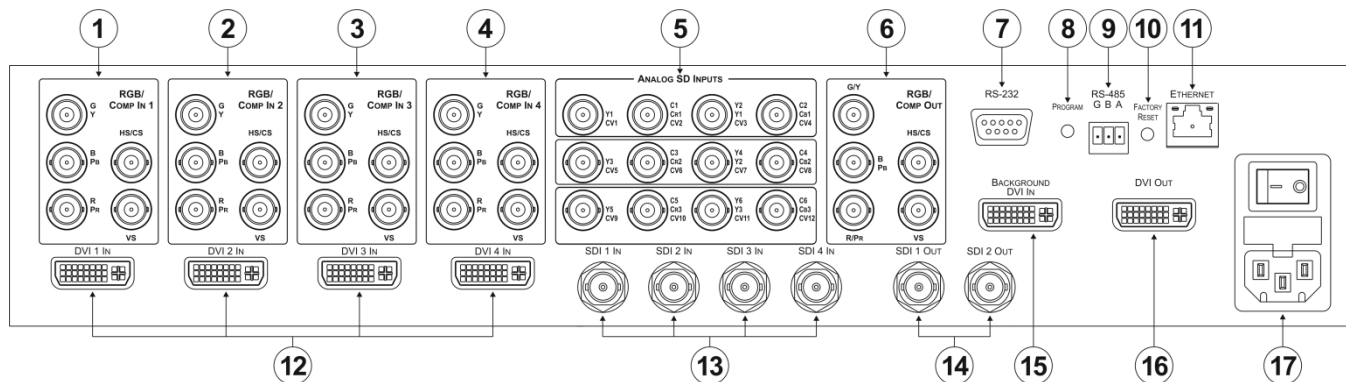
Figure 2: MV-5 5 Channel Multiviewer Rear Panel

#	Feature		Function
1	*RGB* BNC Connectors	*IN 1*	Connect to an analog HD video source
2		*IN 2*	Connect to an analog HD video source
3		*IN 3*	Connect to an analog HD video source
4		*IN 4*	Connect to an analog HD video source
5	*ANALOG SD INPUTS* BNC Connectors		Connect to up to 12 composite, 6 YC or 3 YUV sources
6	*RGB/COMP OUT* BNC Connectors		Connect to an analog HD or SD acceptor
7	*RS-232* 9-pin D-sub Serial Connector		Connect to a PC/serial controller (see Section 6.1)
8	*PROGRAM* Button		For the use of Kramer service personnel only
9	*RS-485* 3-pin Terminal Block		Connect to an RS-485 serial controller (see Section 6.2)
10	*FACTORY RESET* Button		Press while power cycling the device to reset to factory default values (see Section 7.2.9 and Section 11)
11	*ETHERNET* RJ-45 Connector		Connect to a PC via a LAN (see Section 6.3)

#	Feature	Function
12	*DVI IN 1 ~ 4* DVI Connectors	Connect to the DVI video sources (1 to 4)
13	*SDI IN 1 ~ 4* BNC Connectors	Connect to the SDI video sources (1 to 4)
14	*SDI OUT 1* and *2* BNC Connectors	Connect to the SDI video acceptors (1 and 2)
15	*BACKGROUND DVI IN* Connector	Connect to the DVI background video source (see Section 6)
16	*DVI OUT* DVI Connector	Connect to the DVI acceptor
17	Mains Power Connector, Fuse and Switch	Plug in the power cord, switch the device on and off

5   Installing in a Rack

This section provides instructions for rack mounting the unit.

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

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

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.

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.
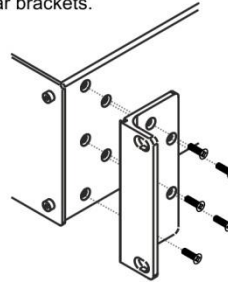
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

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 our Web site

6 Connecting the MV-5 5 Channel Multiviewer

You can use your **MV-5** to switch four of the 16 inputs (four HD, four SD, four DVI, and four SDI), to four outputs (two SDI, a DVI and an HD). The four inputs are combined in a customizable format and then combined with a user-selectable background.

> Always switch off the power to all devices before connecting them to your **MV-5**. After connecting your **MV-5**, connect its power and then switch on the power to each device.
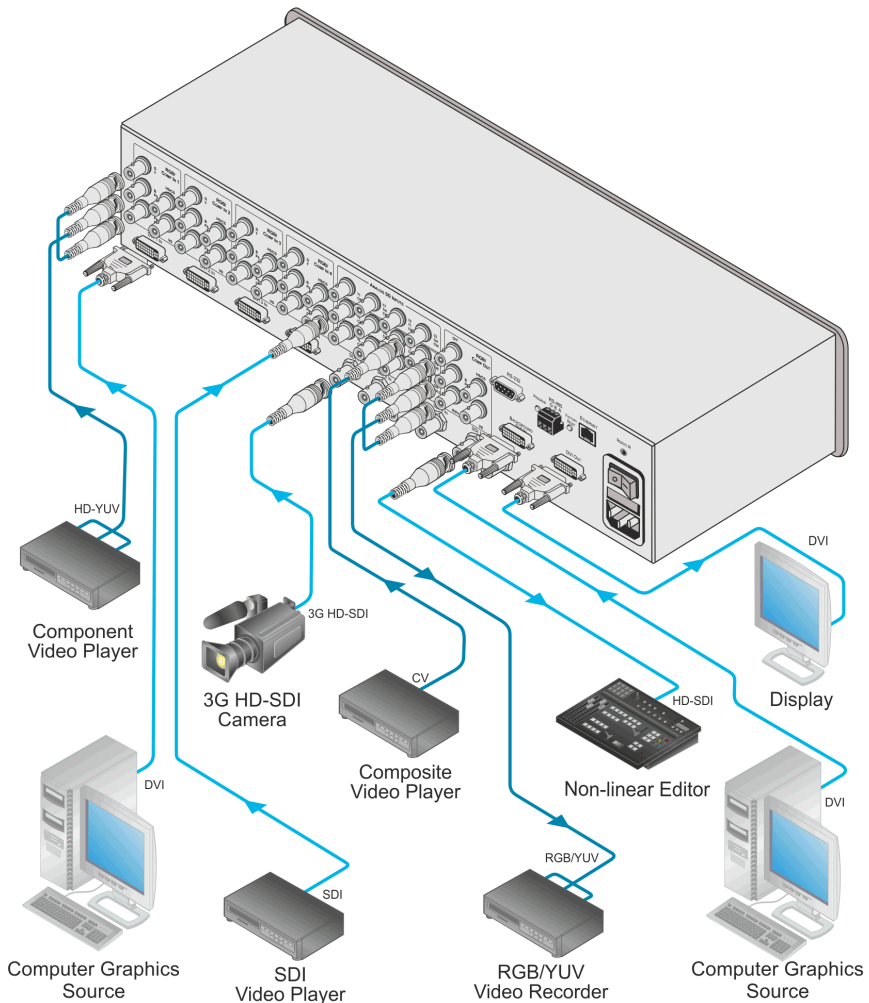
Figure 3: Connecting the MV-5 5 Channel Multiviewer

To connect the MV-5 5 Channel Multiviewer as illustrated in the example in
:

1. Connect up to four HD video sources, (for example, component video
    players) to the RGB IN BNC connectors.

2. Connect up to 12 composite, six YC or three YUV SD video sources, (for example, component and CV composite video players) to the Analog SD INPUTS BNC connectors.

3. Connect the RGB/Comp OUT BNC connectors to an analog HD or SD video acceptor, (for example, an RGB/YUV video recorder).

4. Connect up to four DVI sources, (for example, computer graphics sources) to the DVI In connectors.

5. Connect up to four SDI sources, (for example, a 3G HD-SDI camera and an SDI player) to the SDI In BNC connectors.

6. Connect the SDI Out BNC connectors to up to two SDI acceptors (for example, an HD-SDI non-linear editor).

7. Connect a DVI source, (for example, a computer graphics source) to the Background DVI In connector.

8. Connect the DVI Out connector to a DVI acceptor, (for example, a display).

9. If required, connect a controller to the:

    ▪   RS-232 port (see Section 6.1)

    ▪   RS-485 port (see Section 6.2)

    ▪   Ethernet connector (see Section 6.3)

10. Connect the power cord and power the device on.

6.1 Connecting to the MV-5 Using the RS-232 Connection

You can connect to the **MV-5** 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-5 via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **MV-5** unit 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 MV-5 Using the RS-485 Connection

6.2.1 Connecting via RS-485

You can operate the **MV-5** via the RS-485 port from a distance of up to 1200m (3900ft) using any device equipped with an RS-485 port (for example, a PC).

To connect a device with an RS-485 port to the MV-5:

- Connect the A (+) pin on the RS-485 port of the PC to the A (+) pin on the RS-485 port on the rear panel of the **MV-5**

- Connect the B (–) pin on the RS-485 port of the PC to the B (–) pin on the RS-485 port on the rear panel of the **MV-5**

- Connect the G pin on the RS-485 port of the PC to the G pin on the RS-485 port on the rear panel of the **MV-5**

- If you are using shielded cable, connect the shield only to the G pin of device 1

6.3 Connecting to the MV-5 Using Ethernet

You can connect to the **MV-5** via Ethernet using either of the following methods:

- Directly to the PC using a crossover cable (see Section 6.3.1)

- Via a network hub, switch, or router, using a straight-through cable (see Section 6.3.2)

6.3.1 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the **MV-5** directly to the Ethernet port on your PC using a crossover cable with RJ-45 connectors.

> This type of connection is recommended for identifying the **MV-5** with the factory configured default IP address.

After connecting the **MV-5** to the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel** > **Network and Sharing Center**.

2. Click **Change Adapter Settings**.

3. Highlight the network adapter you want to use to connect to the device and click **Change settings of this connection**.
   The Local Area Connection Properties window for the selected network adapter appears as shown in .
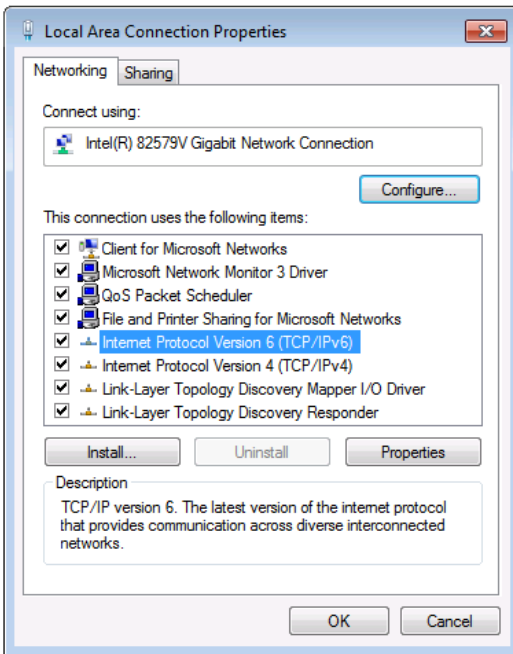
Figure 4: Local Area Connection Properties Window

4. Click on **Internet Protocol Version 4 (TCP/IPv4)** to highlight the selection.

5. Click **Properties**.

   The Internet Protocol Properties window relevant to your IT system appears as shown in Figure 5.
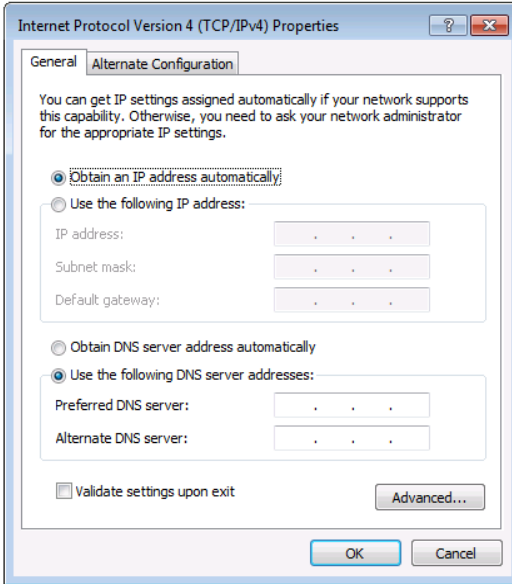
Figure 5: Internet Protocol Version 4 Properties Window

6. Select **Use the following IP Address** for static IP addressing and fill in the details as shown in Figure 6.

   You can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.
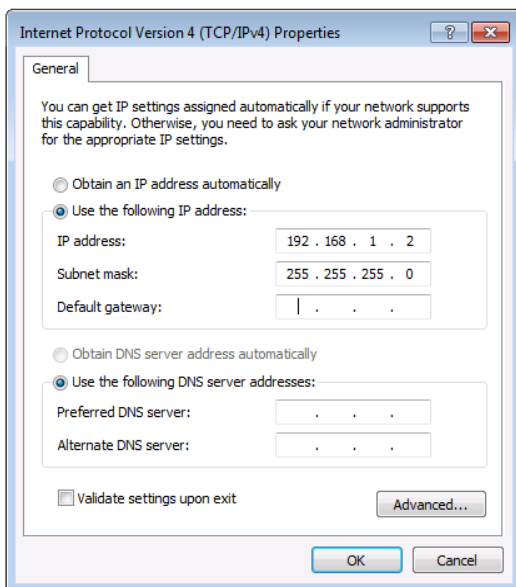
Figure 6: Internet Protocol Properties Window

7. Click **OK**.

8. Click **Close**.

6.3.2   Connecting the Ethernet Port via a Network Hub or Switch

You can connect the Ethernet port of the **MV-5** to the Ethernet port on a network hub or using a straight-through cable with RJ-45 connectors.

7   Configuring and Operating the MV-5 Locally

This section describes:

- Configuring the **MV-5** using the Menu (see Section 7.1)

- Operating the **MV-5** using the front panel buttons (see Section 7.2)

When the **MV-5** is powered on, the device performs a self test. If the test is successful, the Window/Input list is displayed, an example of which is shown below.

WIN1	WIN2	WIN3	WIN4
DVI1	SDI2	AnH3	SDI3

This initial state is the Main mode which is the default Window input configuration. You can control and adjust window and image geometry using the front panel buttons from the Main mode without entering the Menu. In the Main mode, pressing one of the four Windows buttons (the selected button lights yellow) gives this window the highest priority (1) and places this window of top of the other windows. All other widows retain their layer order but the priority of each drops by one.

In the Main mode, using the Inputs buttons, you can switch the input or freeze layer 1, not the other layers. Pressing the priority 1 layer Window button causes the layer to become invisible (subsequent layers all increase their priorities by 1) and the Window button no longer lights.

In the Main mode, layer priority is set by the order in which the Windows buttons are pressed.

In order to manage other layers without changing all layer priorities, you need to invoke the Adjustment mode.

Pressing any of the following buttons puts the device into the Adjustment mode:

- Layers Def
- Window Select
- Window Size or Position
- Zoomed Size or Position
- Menu

The device remains in Adjustment mode as long as one of these buttons is lit red.

Note: In the Adjustment mode, pressing Windows buttons does not affect layer priorities, but only selects a window to adjust, that is, it makes this window active. (If the selected window was initially invisible it remains invisible while it is being adjusted.)

It is possible to modify multiple parameters immediately following one another. For example, if the Window size is modified, you can press another button immediately in order to modify the Window position. It is also possible to modify the same parameter for another Window without returning to Main mode.

To return to the Main mode (that is, the default window input configuration), press any of the buttons listed above that light red. Following this, initial window priorities are restored and the initial Window button will again light only if the Window priorities were not specifically changed while in the Layer Def mode.

Using the Layer Def button, you can then set the priority of any layer (0 to make it invisible.

7.1 Configuring the MV-5 Using the Menu

The menu is displayed on the character display when the Menu button is pressed.

Navigation through the menu is performed as follows:

- Menu—Enter the Menu or move up one level in the menu hierarchy

- Enter—Enter the selected parameter or accept the displayed parameter/value

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

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

- Left (◄)—decrement the current value or move left through the options list

- Right (►)—increment the current value or move right through the options list

The main menu comprises the following sections:

- Load Setup Sub-menu (see Section 7.1.1)

- Save Current Setup Sub-menu (see Section 7.1.2)

- Input Configuration Sub-menu (see Section 7.1.3)

- Output Configuration Sub-menu (see Section 7.1.4)

- Window Configuration Sub-menu (see Section 7.1.5)

- Input Signal Status Sub-menu (see Section 7.1.6)

- System Parameters Sub-menu (see Section 7.1.7)

7.1.1 Load Setup Sub-menu

The Load Setup sub-menu allows you to load one of the 16 preset configurations.

To load a setup:

1. Press Menu.
   The Menu button lights and the current setup is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Load Setup sub-menu.

3. Use the left (◄) and right (►) buttons to select the required preset to load.

4. Press Enter.
   The selected preset is loaded and the display changes to indicate the current setup.

5. Press Menu to exit the setup.
   The display changes to show the default Window-Input configuration.

7.1.2 Save Current Setup Sub-menu

The Save Current Setup sub-menu allows you to save the current setup to one of the 16 presets.

To save the current configuration to a preset:

1. Press Menu.
   The last used sub-menu is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Save Current Setup sub-menu.

3. Use the left (◄) and right (►) buttons to select the required preset to which you want to save the current setup.

4. Press Enter.
   The current setup is saved and the display changes to indicate the current setup.

5. Press Menu to exit the setup.
   The display changes to show the default Window-Input configuration.

7.1.3 Input Configuration Sub-menu

The Input Configuration sub-menu allows you to assign SD input buttons to specified connectors, set analog HD input formats, and set the analog HD pixel phase.

Parameter	Description	Values
Assign Analog SD Button 1 (or 2, 3 or 4) to:	Assigns one of the four analog SD input buttons to the selected input format	CV1, CV2, CV3, CV4, CV5, CV6, CV7, CV8, CV9, CV10, CV11, CV12, YC1, YC2, YC3, YC4, YC5, YC6, YUV1, YUV2, YUV3 Default—CV1
Analog HD INP1 (or 2, 3 or 4) Format:	Assigns one of the four analog HD input buttons to the selected input format	RGBHV, RGBS, RGsB, YUV BiSync, YUV TriSync Default—RGBHV
Analog HD INP 1 (or 2, 3 or 4) Pixel Phase:	Assigns the position for sampling analog HD input signal	0 to 31 Default—0
Analog HD INP 1 (or 2, 3 or 4) Horiz Start:	Adjusts the horizontal start for an HD or graphic input signal	-100 to 100 Default—0
Analog HD INP 1 (or 2, 3 or 4) Vertical Start:	Adjusts the vertical start for an HD or graphic input signal	-50 to 50 Default—0
DVI INP 1 (or 2, 3, 4 or BackGround) HDCP capability)	Assigns HDCP capability for each DVI input individually	YES, NO Default—YES

To set an analog HD input to an input format (for example, Input 2 to format RGBS):

1. Press Menu.

   The last used sub-menu is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Input Configuration sub-menu.

3. Press Enter.

   The Assign Analog SD Button 1 format is displayed.

4. Use the up (▲) and down button (▼) to navigate to the HD Input 2 Format selection.

5. Use the left (◄) and right (►) buttons to select the RGBS format.

6. Press Menu.

   The current setup is saved and the display changes to the Input Configuration sub-menu.

7. Press Menu again to exit the setup.

   The display changes to show the default Window-Input configuration.

7.1.4 Output Configuration Sub-menu

The Output Configuration sub-menu allows you to set the output video characteristics, such as, output standard, background mode and HDCP support.

Parameter	Description	Values
Outp. Standard:	Sets the signal output format	480i/60, 576i/50, 720p/50, 720p/59, 720p/60, 1080i/50, 1080i/59, 1080i/60, 1080p/23, 1080p/24, 1080p/25, 1080p/29, 1080p/30, 1080p/50, 1080p/59, 1080p/60, 1080psf/23, 1080psf/24, 1080psf/25, 1080psf/29, 1080psf/30, 640x480/60, 640x480/72, 640x480/75, 640x480/85, 800x600/60, 800x600/72, 800x600/75, 800x600/85, 1024x768/60, 1024x768/70, 1024x768/75, 1024x768/85, 1152x864/75, 1280x768/60rducBL, 1280x768/60, 1280x768/75, 1280x768/85, 1280x960/60, 1280x768/85, 1280x1024/60, 1280x1024/75, 1360x768/60, 1366x768/60, 1400x1050/60rducBL, 1400x1050/60, 1400x1050/75, 1440x900/60rducBL, 1440x900/60, 1440x900/75, 1440x900/85, 1600x1200/60, 1680x1050/60rducBL, 1680x1050/60, 1920x1200/60rducBL Default—480i/60
OutpStand Mode:	Sets the output standard mode	Forced Standard, Auto byDVI BackGrnd Default—Forced Standard
Analog output Format:	Sets the analog output format	RGBHV, RGBS, RGsB, YUV BiSync, YUV TriSync Default—RGBHV
Analog SDTV Format:	Sets the analog SDT format	RGBHV or YUV, 3 CVBS, YC and CVBS, , YUV TriSync Default—RGBHV
BackGround Mode:	Sets the background mode	Colored Background, DVI Input BackGrnd Default—Colored Background
BackGround Color R-value:	Sets the background red color value	0 to 255 Default—0
BackGround Color G-value:	Sets the background green color value	0 to 255 Default—0
BackGround Color B-value:	Sets the background blue color value	0 to 255 Default—0
No Signal Handle Mode:	Sets the operation when no input signal is present	Black Screen, Blue Screen, Remove Window, Freeze Last Picture Default—Black Screen
RGB Analog Output Sync Mode	Sets Analog Output Sync Mode	CEA Standard, Inverse 1, Inverse 2 Default—CEA Standard
RGB Analog Output H Sync Position	Sets Analog Output H Sync Position (in pixels)	–75 to 75 Default—0

Parameter	Description	Values
RGB Analog Output V Sync Position	Sets Analog Output V Sync Position (in lines)	–1 to 7 Default—0
DVI Output HDCP mode	Assigns DVI Output HDCP mode	Follow Output, Follow Input, HDCP on Output: "ON", HDCP on Output: "OFF" Default—Follow Input

HDCP is the High-bandwidth Digital Content Protection system which is designed for protecting AV content from being copied. The DVI inputs (four for windows and one for the background) can accept HDCP protected signals. In order to meet all HDCP requirements and to support the multi-window features of the **MV-5**, there are various methods for handling different cases involving of input and output HDCP encrypted signals.

Using the Output Configuration Sub-menu, it is possible to select the following HDCP output modes:

1. **Follow Input**. If at least for one active window which carries an HDCP protected DVI input signal is selected, then on the DVI output HDCP encryption is turned on and simultaneously all others outputs (SDI and Analog) are forced to mute in order to meet HDCP license requirements. If a window with a DVI input with HDCP protection is selected, then in the case of the Main Mode of the **MV-5,** (that is, when the LCD shows WIN1, WIN2, WIN3, WIN4), then a small label appears to the left of WINx showing two vertically placed symbols **c** and **p,** (content protection). In order to indicate the same HDCP status for the background DVI input, a different label is used which looks like a triangle at the bottom left hand side of the LCD.

   If the DVI output of the **MV-5** is connected to a video acceptor that does not support HDCP, then all output formats that do not carry the HDCP protected input signal are available, but not those outputs which do carry the HDCP protected signal (for example, DVI, SDI and Analog). This output window is either black or entirely removed from the output image depending on the setting of the parameter NO SIGNAL HANDLE MODE in the Output Configuration Sub-menu.

   The Follow Input setting signifies that the output HDCP encryption is turned on (SDI and Analog are muted in this case) or off depending on the

presence or absence of HDCP on all active DVI inputs, and if the sink does not support HDCP, then this window is muted (removed) from the output image.

2. **Follow Output**. If the video acceptor (for example, a monitor) is HDCP capable, then independently of the presence or absence of an HDCP protected input signal, HDCP encryption on the DVI output is turned on (but in this case, the SDI and analog outputs are available only if HDCP is absent on all DVI inputs).

   If the video acceptor does not support HDCP, the HDCP encryption on the DVI output is turned off and simultaneously all DVI inputs become HDCP non-capable. In this case, the responsibility for content protection remains completely on the source, as it sees its video acceptor (that is, the **MV-5** DVI input) as not being HDCP capable. All other outputs (SDI and analog) are available.

3. **HDCP on output: ON**. The HDCP encryption on the DVI output is turned on, independently of the presence or absence of HDCP protected input signals. This mode can be used to protect content created on the **MV-5** from being copied on the DVI output.

4. **HDCP on output: OFF**. The HDCP encryption on the DVI output is turned off and simultaneously all five DVI inputs become HDCP non-capable. In this case, the responsibility for content protection remains completely on the source, as it sees its video acceptor (that is, the **MV-5** DVI input) as not being HDCP capable. All other outputs (SDI and analog) are available.

To select the RGsB format for Analog HD output:

1. Press Menu.
   The last used sub-menu is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Output Configuration sub-menu.

3. Press Enter.
   The Output Standard: message is displayed.

4. Use the up (▲) and down button (▼) to navigate to the Analog HD output FORMAT: option.

5. Use the left (◄) and right (►) buttons to select the RGsB option.

6. Press Enter.
   The current setup is saved.

7. Press Menu.
   The display changes to the Output Configuration sub-menu.

8. Press Menu again to exit the menu.
   The display changes to show the default Window-Input configuration.

To select the DVI input as the background signal:

1. Press Menu.
   The last used sub-menu is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Output Configuration sub-menu.

3. Press Enter.
   The Output Standard: message is displayed.

4. Use the up (▲) and down button (▼) to navigate to the BackGrnd MODE: option.

5. Use the left (◄) and right (►) buttons to select the DVI INPUT BACKGROUND option.

6. Press Enter.
   The current setup is saved.

7. Press Menu to exit the sub-menu.
   The display changes to the Output Configuration sub-menu.

8. Press Menu again to exit the menu.
   The display changes to show the default Window-Input configuration.

7.1.5 Window Configuration Sub-menu

The Window Configuration sub-menu allows you to set the window characteristics, such as, contrast and image transparency.

Parameter	Description	Values
Brightness:	Sets the brightness of the window	-50% to 50% in 1% increments Default—0
Contrast:	Sets the contrast of the window	50% to 150% Default—100
Color:	Sets the color of the window	50% to 150% Default—100
Sharpness:	Sets the contrast of the window	0% to 150% in 10% increments Default—0
Border Thickness:	Sets the border width of the window	0 to 20 Default—0
Border Color R-Value:	Sets the red value of the window	0 to 255 Default—0
Border Color G-Value:	Sets the green value of the window	0 to 255 Default—0
Border Color B-Value:	Sets the blue value of the window	0 to 255 Default—0
Keyer:	Controls the Keyer engine in the selected window	Disabled, Enabled Default—Disabled
Keyer Y Threshold Min:	Sets the minimum threshold for the Y value	0 to 255 Default—0
Keyer Y Threshold Max:	Sets the maximum threshold for the Y value	0 to 255 Default—0
Keyer U Threshold Min:	Sets the minimum threshold for the U value	0 to 255 Default—0
Keyer U Threshold Max:	Sets the maximum threshold for the U value	0 to 255 Default—0
Keyer V Threshold Min:	Sets the minimum threshold for the V value	0 to 255 Default—0
Keyer V Threshold Max:	Sets the maximum threshold for the V value	0 to 255 Default—0
Image Transparency:	Sets the image transparency for the selected Window	0 to 255 Default—0
Test	Sets the test signal for the selected window	No Test Signal, Color Bars 100%, Split Bars 100%, Ramp 100%
Label Mode:	Sets the label mode for the selected window	No Window Label, Black WND Label, White WND Label, Black Inp Label, White Inp Label, Default—No Window Label
Label Position:	Sets the label position for the selected window	Bottom Left, Bott Center, Bott Right, Top Left, Top Center, Top Right Default—Bottom Left

The keyer engine allows you to overlay one image on top of another. A keyed image is one image that is superimposed over another, such that portions of the top image are made transparent (keyed out) so that the background image can show through. The keyer settings allow you to vary the color(s) that are keyed out.

Window labeling allows you to turn on or off an identifying label that appears in the border of a window. For a label to be displayed, the border must be turned on and also must be of a contrasting color to the label text.

To set the Window Border Color Red value:

1. Press Menu.
   The last used sub-menu is displayed.

2. Use the up (▲) and down button (▼) to navigate to the Window Configuration sub-menu.

3. Press Enter.
   The Window Configuration Contrast option is displayed.

4. Using the Windows buttons, select the window to be modified.
   The selected window is displayed.

5. Use the up (▲) and down button (▼) to navigate to the Color R-Value option.

6. Use the left (◄) and right (►) buttons to select the red value.

7. Press Enter.
   The current setup is saved.

8. Press Menu to exit the sub-menu.
   The display changes to show the Window Configuration sub-menu.

9. Press Menu again to exit the menu.
   The display changes to show the default Window-Input configuration.

Note: Setting the Window border color green and blue values is performed in the same manner.

7.1.6 Input Signal Status Sub-menu

The Input Status sub-menu displays the input states and is read-only.

Parameter	Description
Window 1 (or 2, 3 or 4) Input: Signal:	Displays the input currently selected for each window and the signal detected
DVI Background Input: Signal:	Displays the signal currently detected on the DVI Background input

7.1.7 System Parameters Sub-menu

The System Parameters sub-menu allows you to view the current firmware version, serial number, serial port parameters, and to view and edit the Ethernet port parameters.

Parameter	Description	Values
MV-5 HW Revision FW Version	Hardware revision firmware number and version	X X.X..XXXX
MV-5 Serial Number		XXXXXXXXX
Serial Port Baud Rate		115200
Ethernet IP address	MV-5 device TCP/IP address	Default 192.168.1.39 Any valid address
Ethernet Subnet Mask	MV-5 device network mask	Default 255.255.0.0 Any valid mask
Ethernet IP Gateway	MV-5 network gateway	Default 0.0.0.0 Any valid gateway address
DHCP Enable	Enables and disables automatic IP addressing	OFF, ON Default: OFF
Ethernet UDP Port Number	Sets the TCP UDP port number. One item for three lowest significant digits; second item for 2 highest significant digits	Default: 50000
Ethernet TCP Port Number	Sets the TCP port number. One item for three lowest significant digits; second item for 2 highest significant digits	Default: 5000
LCD Sleep Mode Brightness:	Sets the LCD display sleep mode brightness	0% to 100% Default—100
LCD Operating Brightness:	Sets the LCD display brightness	0% to 100% Default—100
Machine Identification Number	Sets the device ID that determines the position of the MV-5 on the RS-485 bus	1 to 15 Default—1

7.2 Operating the MV-5 Using the Front Panel Buttons

This section describes:

- Assigning inputs to windows (see Section 7.2.1)
- Setting window layer priority (see Section 7.2.2)
- Changing the size and aspect ratio of a window (see Section 7.2.3)
- Adjusting the position of a window (see Section 7.2.4)
- Adjusting the image zooming degree inside a window (see Section 7.2.5)
- Adjusting the image panorama inside a window (see Section 7.2.6)
- Freezing and releasing the output (see Section 7.2.7)
- Locking and unlocking the front panel buttons (see Section 7.2.8)
- Resetting the device to factory defaults (see Section 7.2.9)

7.2.1 Assigning Inputs to Windows

To assign an input to the top-layer window when its button is lit, (for example, DVI Input 3 to Window 2):

- Press DVI Inputs button 3.
  The DVI Inputs button 3 lights and DVI Input 3 is assigned to Window 2

To assign an input to a non top-layer window when its button is not lit, (for example, SDI Input 1 to Window 4) without affecting the layer priorities:

1. Press Windows Select button.
   The Windows Select button lights red.

2. Press Windows button 4.
   The Windows button 4 lights.

3. Press SDI Inputs button 1.
   The SDI Inputs button 1 lights and SDI Input 1 is assigned to Window 4.

4. Press the Windows Select button.
   The Windows Select button no longer lights.

7.2.2 Setting Window Layer Priority

Each window can be assigned a layer priority.

To assign a window a layer priority (for example, Window 3 to priority 1):

1. Press the Layers Def button.
    The Layers Def button lights and a window and its current priority are
    displayed.

2. Press the Windows button 3.
    The Windows button 3 lights.

3. Use the left (◄) and right (►) arrow buttons to cycle through to priority 1.

4. Press the Layers Def button to save the changes.
    The button no longer lights, Window 3 is set to priority 1 and the display
    returns to the Window/Input selection.

7.2.3 Changing the Size and Aspect Ratio of a Window

You can change the size and aspect ratio of each window independently. Window
size can be adjusted from 10% to 100% (full screen) of the screen size.

There are two ways to change the windows size:

*   Adjusting the horizontal and vertical window size separately (thereby
    possibly altering the window aspect ratio).

*   Locking the aspect ratio and adjusting the horizontal and vertical sizes
    together.

When the window aspect ratio is locked, (for example, at 100%), then any change
to the window size leaves the output screen aspect ratio the same. This can be
used in a situation where for example, the output monitor connected to the **MV-5**
has a screen aspect ratio of 16:9, (that is, 1.77) and the window aspect ratio is set
to 75%. The resulting aspect ratio of this window will be 1.77 x 0.75 = 1.33 (that is,
4:3). If there is a need to correctly represent a 4:3 format, (for example, PAL) on a
16:9 screen, the window aspect ratio must be set to about 75%, and visa versa; to

represent HD video format (16:9) on an SDTV monitor (4:3), set the aspect ratio to about 133%.

The broad range of aspect ratio adjustment on the **MV-5** allows for a wide range of different PC graphic input and output resolutions.

In addition to adjusting the size of the window, it is also possible to adjust the size of the image within the window. If a window image is not zoomed and Save Image Aspect Ratio is not active (see Section 7.2.5), then changing the window size or aspect ratio results in the window image changing its size and aspect ratio to match the window changes.

If it is necessary to retain the window image size and aspect ratio independent of any change in size or aspect ratio of the window, then turn on Save Image Aspect Ratio.

The example shown in Figure 7 illustrates image position and scaling.
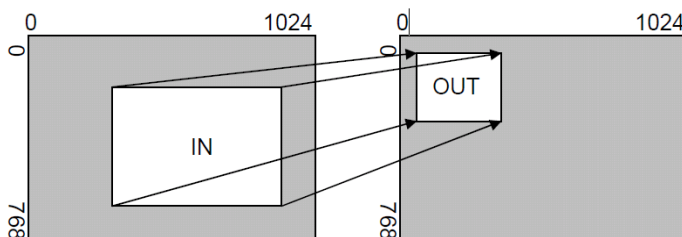
Figure 7: Image Position and Scaling Example

In the example in Figure 7, "In" has been set to 300,150 as its top-left source coordinate, with a size of 750,400. "Out" has been set to 50,50 (that is, close to the top left) with a size of 250,300. The **MV-5** ensures that the whole of the source (of size 750 by 400) is scaled to the required output (of size 250 x 300).

To adjust the horizontal and vertical size of a window separately:

1. Press the Window Size button.
    The Window Size button lights.

2. If the Save Aspect button is lit, press the button to turn it off.

3. Press the required Window button.
   The selected Window button lights.

4. 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.

5. Press the Window Size button.
   The button no longer lights.

To change the size of a window and aspect ratio of a window, (for example, Window 2, size 90% and aspect ratio 80%):

1. Press the Window Size button.
   The Window Size button lights.

2. Press the Save Aspect button.
   The Save Aspect button lights.

3. Press the Windows button 2.
   The Windows button 2 lights.

4. Use the left (◄) and right (►) arrow buttons to decrease or increase respectively the horizontal size until 90% is displayed.

5. Use the up (▲) and down (▼) arrow buttons to increase or decrease respectively the vertical size until 80% is displayed.

6. Press the Window Size button to save the changes.
   The button no longer lights, the window size is set and the display returns to the Window/Input selection.

7.2.4 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. Press the Window Position button.
   The Window Position button lights.

2. Select the required window by pressing one of the Windows buttons.
   The selected Windows button lights.

3. Use the left (◄) and right (►) arrow buttons to move the window
   horizontally, and the up (▲) and down (▼) arrow buttons to move the
   window vertically.
   The display changes in real-time.

4. Press the Window Position button.
   The button no longer lights.

7.2.5 Zooming into an Image in a Window

If an input image contains an area that is essential and must be displayed in the
output window while the rest of the image can be discarded, you can use Image
Zooming to accomplish this. Image Zooming provides adjustment of image size
relative to the Window size.

You can change the Image size and aspect ratio independently inside each
window relative to the window size and aspect ratio. The image size (that is, the
zooming) is adjustable between 100% (the Image just fits the Window) to 1000%
(10 times the original Image size). If the window size or aspect ratio changes then
the Image size changes in such a manner that the Image remains the same inside
within the window.

There are two ways to change the Image size and aspect ratio (Zoom):

- The horizontal and vertical Image sizes (Zoom) can be adjusted separately.
  In this mode, the Image aspect ratio conforms to the Window; changes to the
  Window cause the same changes to the Image.

- Locking the Image aspect ratio while zooming the Image. To engage this
  mode turn on Save Image Aspect Ratio by pressing the Zoomed Size button
  and then pressing the Save Aspect button (the button lights red). It is then
  possible to adjust the Image Size (simultaneously the horizontal and vertical
  zoom) using only one parameter (Image Size) and the aspect ratio remains
  constant but can be adjusted independently. If the Aspect Ratio (by default)
  is set to 100% and changes are made to the Image Size, the Image aspect
  ratio follows that of the input-signal aspect ratio.

Note: When using the locked Image aspect ratio mode, changing the Window aspect ratio can cause essential parts of the Image to be cropped.

You can use the Crop PVW button to provide easier and more precise zooming adjustment. If this button is pressed in Main mode (the button lights red), the top-layer window is adjusted to conform to the exact size of the output screen. Pressing any of the Window or Zoomed buttons causes the border mask of the cropped image to appear on the fitted image. It is then possible to adjust the Window or Zoomed Size and Position to see which part of the image will be visible in the window and which part will be discarded.

This function can be used only for the top-layer window. To adjust other windows in the Main mode, you must first select the required Window using the Windows buttons, that is, to move the required layer to the top.

In the event that something important suddenly appears in the image, the Crop PVW button can be used not only to see the cropping mask, but also to quickly revert to a full-screen in the window. The Crop PVW button must be pressed while the device is in Main mode. Pressing this button again returns the **MV-5** to the initial windows Sizes and Positions.

To adjust the horizontal and vertical Image size (Zoom) within a Window:

1. Press the Zoomed Size button.
   The Zoomed Size button lights.

2. If the Save Aspect button is lit, press it to turn it off.

3. Select the required Window by pressing the relevant Window button.
   The selected Window button lights.

4. Use the left (◄) and right (►) buttons to adjust the Image width, and the up (▲) and down buttons (▼) to adjust the Image height relative to the Window width and height respectively. If required, press the Crop PVW button to check the image cropping using the mask border.
   The size changes in real-time.

5. Press the lit Zoomed Size button.
   The button no longer lights.

To change the size and aspect ratio of the Image inside a window, (for example, Window 2, Image size 200% and aspect ratio 120%):

1. Press the Zoomed Size button.
   The Zoomed Size button lights.

2. Press the Save Aspect button.
   The Save Aspect button lights.

3. Press Windows button 2.
   The selected Windows button lights.

4. Use the left (◄) and right (►) arrow buttons to decrease or increase respectively the size until 200% is displayed.

5. Use the up (▲) and down (▼) arrow buttons to increase or decrease respectively the aspect ratio until 120% is displayed. If required, press the Crop PVW button to check the image cropping using the mask border.

6. Press the Zoomed Size button to save the changes.
   The button no longer lights, the Image size and aspect ratio are set and the display returns to the Window/Input selection.

7.2.6 Adjusting the Position of the Image Inside a Window – Panning

If an Image has been zoomed, (that is, horizontal or vertical values of the Image size are greater than 100%), then cropping takes place. You can pan the Image inside the Window in order to reveal the essential portion of the Image.

To adjust the position of the image inside a window (panning):

1. Press the Zoomed Position button.
   The Zoomed Position button lights.

2. Press the required Window button to select it.
   The Window button lights and the window is selected.

3. Use the left (◄) and right (►) buttons to move the Image horizontally, and use the up (▲) and down button (▼) to move the Image vertically. If required, press the Crop PVW button to check the image cropping using the mask border.
   The position changes in real-time.

4. Press the Zoomed Position button.
   The button no longer lights.

7.2.7 Freezing and Releasing the Output

To freeze and release an Image in a Window:

1. If you want to preserve the Window layer priority, press the Window Select Button.

2. Select the required Window to freeze.

3. Press the Freeze button.
   The Freeze button lights and the Image freezes.

4. Press the Freeze button again.
   The button no longer lights and the Image is no longer frozen.

5. If the Window Select button is lit, press the button to cancel the Window selection.

To freeze and release the background image:

1. Press the Menu button.
   The Menu button lights.

2. Press the Freeze button.
   The Freeze button lights and the background image freezes.

3. Press the Menu button.
   The Menu button no longer lights but the background image remains frozen.

4. To release the background image press the Menu button.
   The Menu button lights.

5. Press the lit Freeze button.

   The button no longer lights and the background image is released.

6. Press the Menu button.

   The Menu button no longer lights.

7.2.8 Locking and Unlocking the Front Panel Buttons

To lock and unlock the front panel buttons:

- Press and hold the unlit Panel Lock button.
  The LED lights and the front panel buttons are locked.

- Press and hold the lit Panel Lock button.
  The LED no longer lights and the front panel buttons are unlocked

Note: When the front panel is locked it is still possible to operation the device remotely.

7.2.9 Resetting 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 until the Window/Input is displayed.

5. Release the button.

   The configuration is reset to the factory default.

8 Configuring and Operating the MV-5 Remotely

This section describes:

- The Multiviewer main window (see Section 8.1)

- The Menu bar (see Section 8.2)

- The Quick Access Toolbar (see Section 8.3)

- Using the **MV-5** Multiviewer Software (see Section 8.4)

Kramer offers free control software that enables you to operate the **MV-5** remotely via a PC or serial controller using serial commands (see Section 13.1). This **MV-5** Multiviewer software can be downloaded from www.kramerelectronics.com.

The **MV-5** can be operated remotely using the Kramer **MV-5** Multiviewer software via the:

- RS-232 serial port (see Section 6.1)

- RS-485 serial port (see Section 6.2)

- Ethernet port (see Section 6.3)

The Multiviewer software requires the following:

- Windows™ XP, Vista or Windows™ 7

- Microsoft .Net Framework version 3.5

To install the Multiviewer software, download and then run the setup file. After installation, running the Controller software for the first time displays a window similar to that shown in Figure 8.

8.1   The Multiviewer Main Window
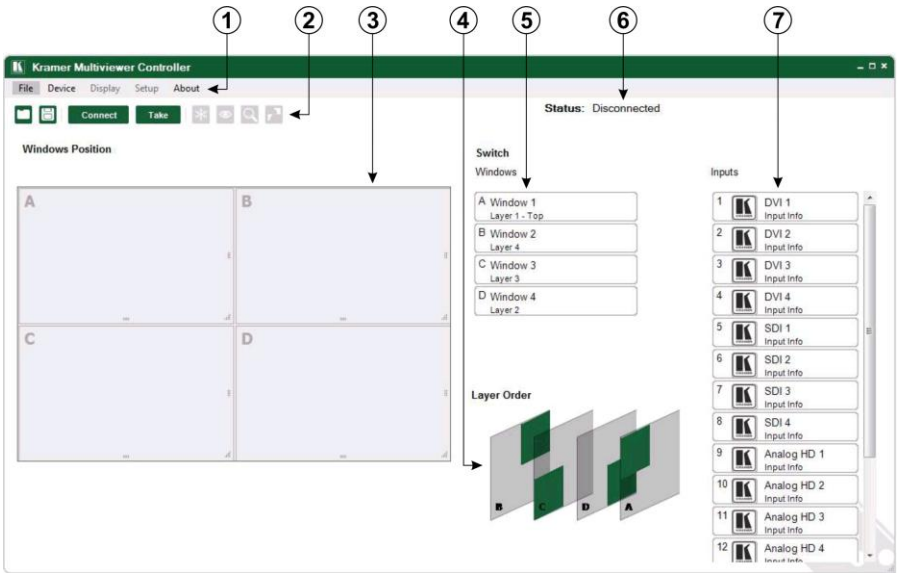
Figure 8: MV-5 Controller Software Main Window

#	Feature	Function
1	Menu Bar	Operate and configure the device using the Menu Bar options (see Section 8.2)
2	Quick Access Toolbar	Operate and configure the device using the quick access toolbar buttons (see Section 8.2.1)
3	*Windows Position*	Modify window size and position by dragging and dropping individual windows (see Section 8.4.1)
4	*Layer Order*	Click and drag layers to rearrange the order of visibility (see Section 8.4.2)
5	*Switch Windows* Buttons	Click on a button to select a window (see Section 8.4.2)
6	*Status: Disconnected/Connected*	Indicates whether the software is connected to or disconnected from the device (see Section 8.4.2)
7	*Switch Inputs* Buttons	Click on an input button to switch the input to the selected window (see Section 8.4.2)

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 The Menu Bar

The menu bar options are shown in the table below.

Note: Any actions that are not valid are grayed out.

Menu Bar Option	Sub Menu	Description
FILE	Open	Open an existing configuration
	Save	Save the current configuration
	Exit	Exit the MV-5 Controller software
DEVICE	Connect/Disconnect	Connect to or disconnect from the device (see Section 8.3.1)
	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 8.4.2)
	Firmware Upgrade	Update the device firmware (see Section 8.2.4)
	Device Details	Retrieve and display the device details, such as, model, unit name, version, and so on (see Section 8.4.2)
DISPLAY	Output Resolution	Set the output resolution
	Background Source	Set the background source: Colored, DVI Input
	Background Color	Set the background color (see Section 8.2.1)
	Background Freeze	Freezes and releases the background: Off, On
	Image Properties	Sets the image properties, such as, brightness, contrast and labeling (see Section 8.2.2)
	Advanced Properties	Sets the advanced image properties, such as, output standards and LCD brightness (see Section 8.2.3)
	Refresh	Retrieves full information from the device to update the screen
SETUP	Store	Stores the current configuration in a memory preset
	Recall	Recalls the configuration from a memory preset
ABOUT		Displays the Multiviewer Software and Kramer company details (see Section 8.2.6)

8.2.1 Setting the Background Color

You can assign a preset or custom color to the background.

To modify the background color:

1. From the Menu bar, click **Display** > **Background Color**.

   The **Color** window appears as shown in Figure 12.
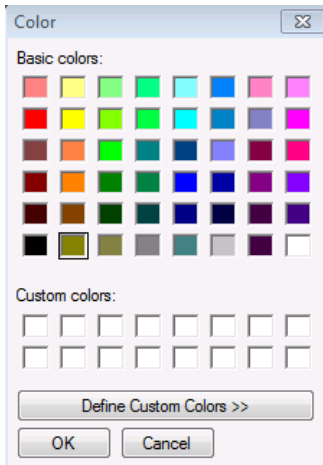
Figure 9: Background Color Window

2. Select either a predefined color or define a custom color.

3. Click **OK**.

    The background color is set.

8.2.2 Setting the Image Properties

You can set the image properties, such as, brightness, contrast and border color.

To modify the image properties:

1. From the Menu bar, click **Display** > **Image Properties**.

    The **Image Properties** window appears as shown in .
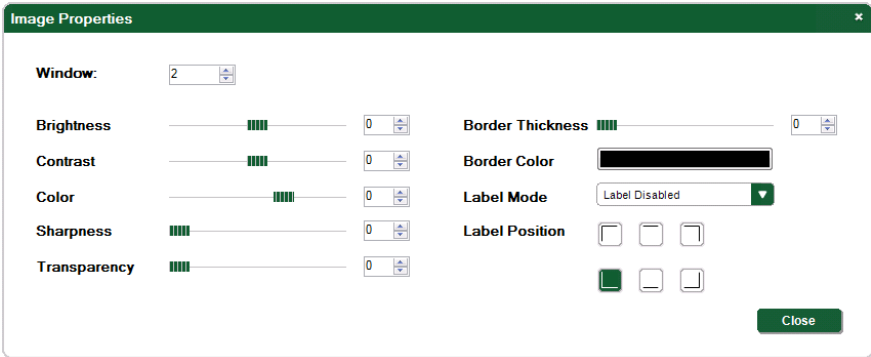
Figure 10: Image Properties Window

2. Select the required window to modify.

3. Modify the properties as required.

4. Click **Close**.

   The image properties for the selected window are set.

Field	Description
Window	Selects the window for which you want to change the properties
Brightness	Sets the brightness of the window
Contrast	Sets the Contrast of the window
Color	Sets the color of the window
Sharpness	Sets the sharpness of the window
Transparency	Sets the transparency of the window
Border Thickness	Sets the border width of the window
Border Color	Sets the border color of the window
Label Mode	Enables/disable the border label and adjusts the label properties, (Label Disabled, Black Window Label, White Window Label, Black Video Input Label, White Input Video Label)
Label Position	Sets the position of the label in the border, (Top left, top middle, top right, bottom left, bottom middle, bottom right)

8.2.3 Setting the Output Advanced Properties

You can set the output properties, such as, HD and SD formats, and output when there is no signal input.

To modify the image properties:

1. From the Menu bar, click **Display** > **Advanced Properties**.
   The **Advanced Properties** window appears as shown in Figure 11.
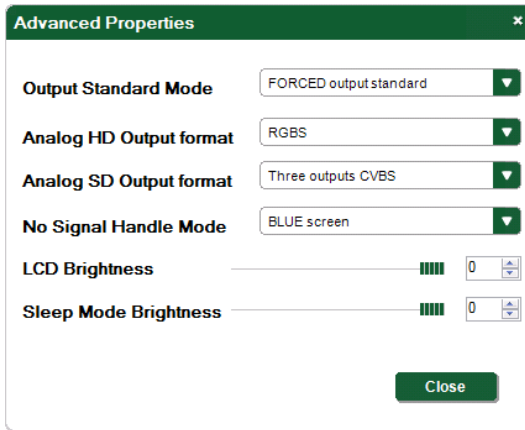
Figure 11: Advanced Properties Window

2. Modify the properties as required.

3. Click **Close**.
   The output properties are set.

Field	Description
Output Standard Mode	Selects the output between Forced Output Standard and Auto Defined by DVI Background Input
Analog HD Output Format	Sets analog HD output format, (RGBHV, RGBS, RGsB, YUV bi-sync, YUV tri-sync)
Analog SD Output Format	Sets the analog SD output format, (YUV SD, 3 outputs CVBS, YC and one CVBS)
No Signal Handle Mode	Sets the output when no input is present, (freeze last image, Blue screen, Black screen, Remove window)
LCD Brightness	Sets the brightness of the LCD backlighting
Sleep Mode Brightness	Sets the brightness of the LCD backlighting when the device is in sleep mode

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8.2.4 Updating the Firmware

To update the firmware:

1. Download the latest firmware file from http:www.kramerelectronics.com.

2. Click **Device** > **Firmware Upgrade**.

3. Browse to the firmware file that you downloaded.

4. Click **Upload**.
   The device firmware is loaded.

   > **Note**: Do not interrupt the uploading process or the device may be rendered inoperable.

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

8.2.5 Changing the Device Details

From this window you can change the device name and its IP communication parameters.

To change the device details:

1. From the Menu bar, click on **Device**.
   The **Device Details** window appears as shown in Figure 12.
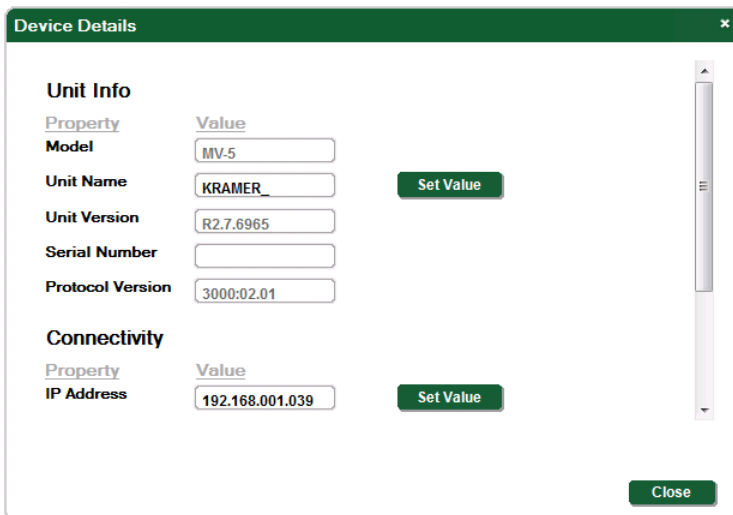
Figure 12: Device Details Window

2. Modify the parameters as required. For each modified parameter, click **Set Value**.

3. Click **Close**.

Note: If you modify any of the IP parameters you must reconnect to the device with the new parameters.

8.2.6   Displaying the MV-5 Software Version Number

To display the MV-5 Software version number:

1. From the Menu bar, click **About**.
   The **About MV-5 Multiviewer Controller** window appears as shown in Figure 13.

Figure 13: About MV-5 Window

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

8.3 The Quick Access Toolbar

The Quick Access Toolbar is shown in Figure 14 and described in the table below.

Figure 14: Quick Access Toolbar

Feature	Description
	Open an existing project
	Save the current project
Connect / Disconnect	Connects to and disconnects from the device (see Section 8.3.1)
Take / Update	Press Take to enable multiple off-line changes to be made. Press Update to implement the changes (see Section 8.4.5)
	Freezes and releases the top window
	Sets the visibility of the active window
	Sets the window zoom parameters
	Sets the chroma key properties

Figure 15: Quick Access Toolbar Icons

8.3.1   Connecting to the Device

To connect to the device:

1. Click the **Connect** button.

    The Connection Method window shown in Figure 16 appears.
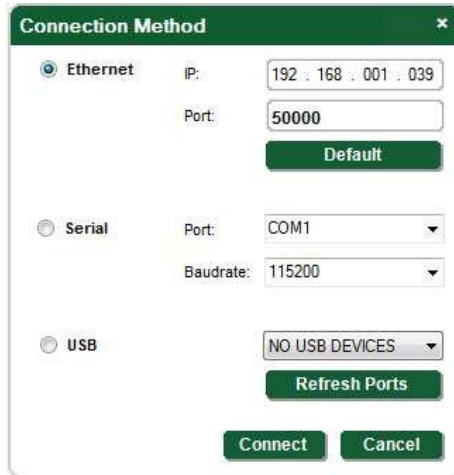
Figure 16: Connection Method Window

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 and baud rate
        from the drop-down lists

    ▪   For a USB connection, select the required USB connection from the
        drop-down list

3. Click **Connect**.

    If the connection is successful, the main window shown in Figure 8 appears.

    If the connection is not successful, a Timeout error message appears.

8.4 Using the MV-5 Multiviewer Software

8.4.1 Windows Position

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

Windows Position
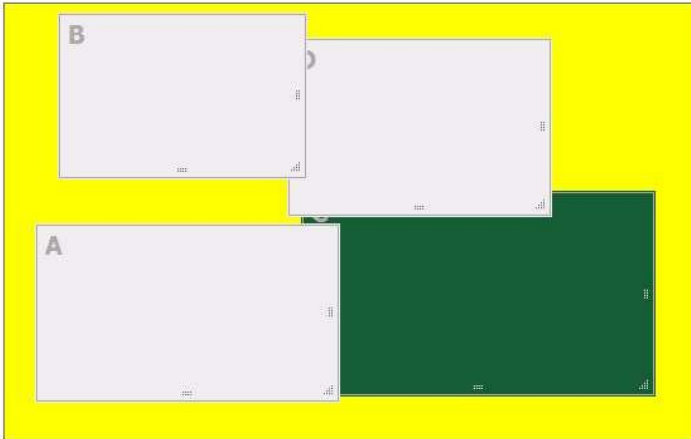
Figure 17: Windows Position

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

8.4.2 Window and Input Buttons

The switching configuration can be modified by clicking on the **Windows** and **Inputs** buttons.
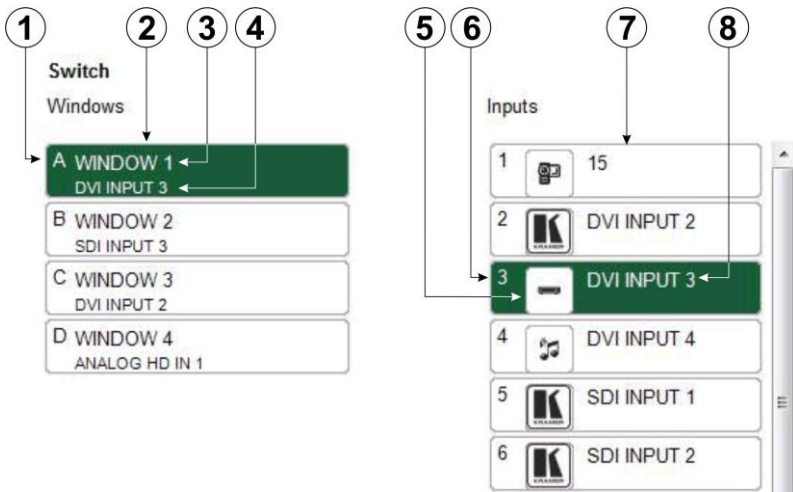
Figure 18: Switch Buttons

#	Feature	Function
1	*A*	Layer identifier (A to D)
2	*WINDOW* Buttons (A to D)	Click to select a window to assign to an input (see Section 8.4.6)
3	*1*	Input number (1 to 4)
4	*DVI INPUT 3*	Currently selected input for this window
5	DVD Icon	The input icon assigned to this window (see Section 8.4.8)
6	3	Input number
7	Input Button	Click to select one of the 16 inputs
8	*DVI INPUT 3*	The input label assigned to this button (see Section 8.4.4)

8.4.3   Device Status

The device status can be one of the following states:

- Online—the device is updated in real-time by the application, and changes to settings on the device are reflected almost immediately in the software

- Online in take mode—changes made in the application are only implemented on the device when the Update button is pressed

8.4.4 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 Figure 19 layer A is on top and layer C is at the bottom.
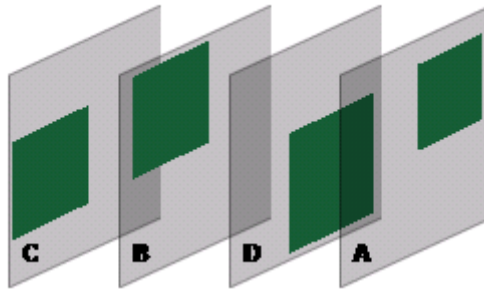
Figure 19: Layer Order

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.

8.4.5 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. Initiate the required actions, such as, switching and layer order changes.

3. Press the **Update** button.
   The button changes to the **Take** button and all actions are executed.

8.4.6 Switching an Input to a Window

To switch an input to a window:

1. Click on the required window button.
   The window is selected, promoted to the top layer (if it wasn't already) and
   the button changes to a solid color as shown in <u>Figure 20</u>.
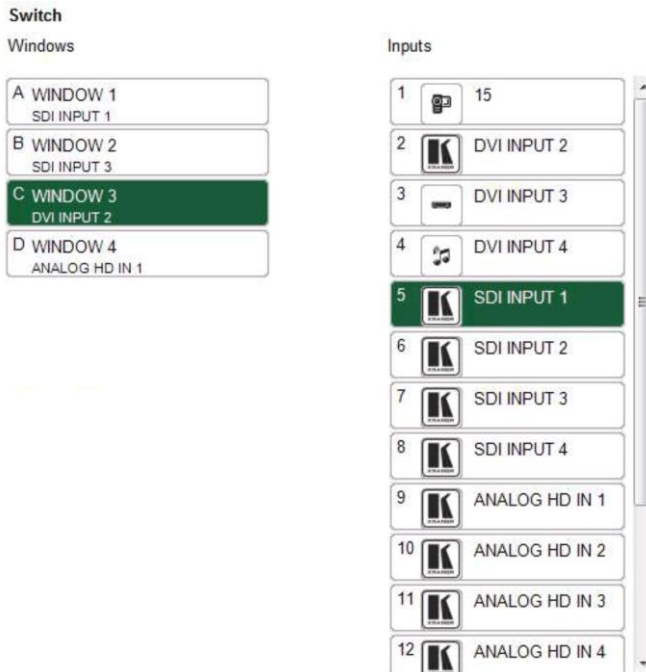
Figure 20: Switching an Input to a Window

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

8.4.7   Changing a Window Setup

To change a window setup:

1. Right-click on the relevant Windows button.

2. The **Window Setup** window appears as shown in <u>Figure 21</u>.
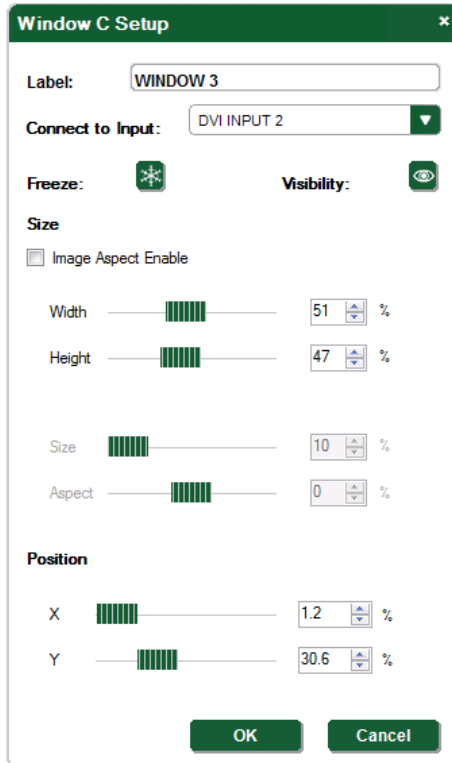
Figure 21: Windows Setup Window

3. From the **Connect to Input** drop-down list, select the required input.

4. Click the **Freeze** icon to freeze this window.

5. Click the **Visibility** icon to modify the visibility of this window.

6. In the **Size** fields, adjust the width and height percentage size of the window relative to the full image.
   This adjusts the size of this window.

Note: Checking the Image Aspect Enable box locks the width and height settings. With this box checked you can change only the size and aspect ratio of the image.

7. If the Image Aspect Enable box is checked, adjust the size and aspect ratio percentages of the image.

8. In the **Position** fields, enter the x and y position percentage for the window relative to the original position.
   This adjusts the position of this window.

9. Click **OK**.
   The Window setup is changed.

8.4.8 Changing Input Button Properties

To change the properties of an input button:

1. Right-click on the relevant input button.
   The **Input Properties** window appears as shown in <u>Figure 22</u>.
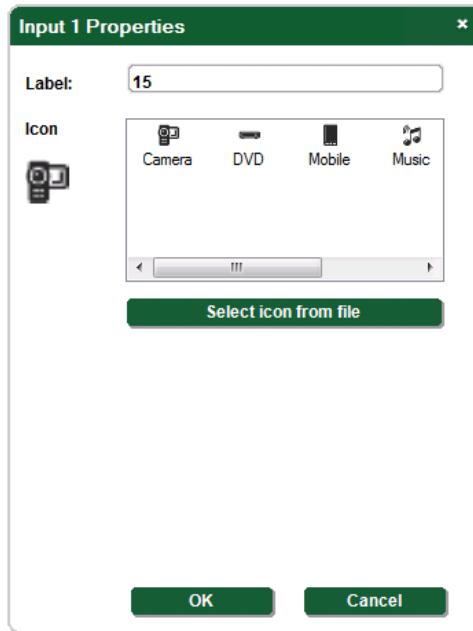
Figure 22: Input Button Properties Window

2. In the **Label** text box, enter the required button label.

   Note: The label is limited to 10 characters.

3. Select the required icon from the list or click on the **Select icon from file** button and browse to the required file. The icon image should be no larger than 32 x 32 pixels and one of the following formats: BMP, JPG, GIF, PNG, TIF, ICO.

4. Click **OK**.

   The input button characteristics are changed.

9   Upgrading the Firmware

The firmware can be uploaded either using the Web pages (see Section 8.2.4) or by using the **K-Upload Software**. The instructions for using the **K-Upload Software** can be found in the "*Upgrading the MV-5 Firmware Using the K-Upload Software*" document available for download from http://www.kramerelectronics.com .

10   Technical Specifications

INPUTS:	4 RGB/Component HD on 20 BNC connectors 12 Analog SD on BNC connectors (12CV / 6YC / 3YC$_B$C$_R$) 5 DVI-D (1 as a dedicated background) on 5 DVI-I Molex 24-pin (F) connectors 4 SDI on 4 BNC connectors
OUTPUTS:	1 RGB/Component HD on 5 BNC connectors 1 DVI-D on a DVI-I Molex 24-pin (F) connector 2 SDI on 2 BNC connectors
JITTER:	Better than 0.2UI
DATA RATE:	Up to 2.97Gbps
HDMI BANDWIDTH:	Up to 6.75Gbps data rate (2.25Gbps per graphic channel)
COMPLIANCE WITH HDMI STANDARD:	HDCP (DVI inputs/outputs)
SUPPORTED OUTPUT RESOLUTIONS:	480i/60, 576i/50, 720p/50, 720p/59, 720p/60, 1080i/50, 1080i/59, 1080i/60, 1080p/23, 1080p/24, 1080p/25, 1080p/29, 1080p/30, 1080p/50, 1080p/59, 1080p/60, 1080psf/23, 1080psf/24, 1080psf/25, 1080psf/29, 1080psf/30, 640x480/60, 640x480/72, 640x480/75, 640x480/85, 800x600/60, 800x600/72, 800x600/75, 800x600/85, 1024x768/60, 1024x768/70, 1024x768/75, 1024x768/85, 1152x864/75, 1280x768/60rducBL, 1280x768/60, 1280x768/75, 1280x768/85, 1280x960/60, 1280x768/85, 1280x1024/60, 1280x1024/75, 1360x768/60, 1366x768/60, 1400x1050/60rducBL, 1400x1050/60, 1400x1050/75, 1440x900/60rducBL, 1440x900/60, 1440x900/75, 1440x900/85, 1600x1200/60, 1680x1050/60rducBL, 1680x1050/60, 1920x1200/60rducBL
POWER CONSUMPTION:	100–240V AC, 50/60Hz, 57VA
CONTROLS:	Front panel buttons, RS-232, Ethernet
OPERATING TEMPERATURE:	0° to +40°C (32° to 104°F)
STORAGE TEMPERATURE:	–40°C to +70°C (–40° to 158°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	19" x 9.45" x 2U (W, D, H)
WEIGHT:	2.8kg (6.17lbs) approx.
INCLUDED ACCESSORIES:	Power cord, rack "ears"
Specifications are subject to change without notice at http://www.kramerelectronics.com	

11 Default Communication Parameters

RS-232	
Baud Rate:	115,200
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	ASCII
Protocol example (Output 1 to Input 1):	#AV 1>1<CR>
Ethernet	
IP Address:	192.168.1.39
TCP Port #:	5000
UDP Port #:	50000

12 Default EDID

The **MV-5** has a non-modifiable, preprogrammed EDID stored on each input.

```
Monitor
  Model name............... MV-5
  Manufacturer............. KMR
  Plug and Play ID......... KMR1200
  Serial number............ 505-708980100
  Manufacture date......... 2011, ISO week 255
  Filter driver............ None
  -----------------------
  EDID revision............ 1.3
  Input signal type........ Digital
  Color bit depth.......... Undefined
  Display type............. RGB color
  Screen size.............. 520 x 320 mm (24.0 in)
  Power management......... Standby, Suspend, Active off/sleep
  Extension blocs.......... 1 (Reserved - 0x00)
  -----------------------
  DDC/CI................... Not supported

Color characteristics
  Default color space...... Non-sRGB
  Display gamma............ 2.20
  Red chromaticity......... Rx 0.674 - Ry 0.319
  Green chromaticity....... Gx 0.188 - Gy 0.706
  Blue chromaticity........ Bx 0.148 - By 0.064
  White point (default).... Wx 0.313 - Wy 0.329
  Additional descriptors... None

Timing characteristics
  Horizontal scan range.... 30-83kHz
  Vertical scan range...... 56-76Hz
  Video bandwidth.......... 170MHz
  CVT standard............. Not supported
  GTF standard............. Not supported
  Additional descriptors... None
  Preferred timing......... Yes
  Native/preferred timing.. 1280x720p at 60Hz (16:10)
    Modeline............... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync

Standard timings supported
   720 x  400p at  70Hz - IBM VGA
   640 x  480p at  60Hz - IBM VGA
   640 x  480p at  75Hz - VESA
   800 x  600p at  60Hz - VESA
   800 x  600p at  75Hz - VESA
  1024 x  768p at  60Hz - VESA
  1024 x  768p at  75Hz - VESA
  1280 x 1024p at  75Hz - VESA
  1280 x 1024p at  60Hz - VESA STD
  1600 x 1200p at  60Hz - VESA STD
  1152 x  864p at  75Hz - VESA STD

Report information
  Date generated........... 14-Jul-14
  Software revision........ 2.60.0.972
  Data source.............. Real-time 0x0100
  Operating system......... 6.1.7601.2.Service Pack 1

Raw data
  00,FF,FF,FF,FF,FF,FF,00,2D,B2,00,12,01,01,01,01,FF,15,01,03,80,34,20,78,EA,B3,25,AC,51,30,B4,26,
  10,50,54,A5,4B,00,81,80,A9,40,71,4F,01,01,01,01,01,01,01,01,01,01,01,1D,00,72,51,D0,1E,20,6E,28,
  55,00,07,44,21,00,00,1E,00,00,00,FF,00,35,30,35,2D,37,30,38,39,38,30,31,30,30,00,00,00,FC,00,4D,
  56,2D,35,00,00,00,00,00,00,00,00,00,00,00,00,00,FD,00,38,4C,1E,53,11,00,0A,20,20,20,20,20,20,01,C2
```

13 Kramer Protocol 3000

The **MV-5** 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)
- Kramer Protocol 3000 commands (see)

13.1 Kramer Protocol 3000 Syntax

13.1.1 Host Message Format

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

13.1.2 Simple Command

Command string with only one command without addressing:

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

13.1.3 Command String

Formal syntax with commands concatenation and addressing:

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

13.1.4 Device Message Format

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

13.1.5   Device Long Response

Echoing command:

Start	Address (optional)	Body	Delimiter
~	*device_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)

13.1.6   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 ID (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.

13.1.7 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.

13.1.8 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.

13.1.9 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.

13.1.10 Maximum String Length

64 characters

13.2 Kramer Protocol 3000 Commands

13.2.1 Common Commands

Command	Description
#	Protocol handshaking
BUILD-DATE?	Read device build date
ETH-PORT	Change protocol Ethernet port
ETH-PORT?	Query protocol Ethernet port
FACTORY	Reset to factory default configuration
HELP	List of commands
LOCK-FP	Lock front panel
LOCK-FP?	GET Lock front panel
MACH-NUM	Set Machine number
MODEL?	Read device model
NAME	Set machine (DNS) name
NAME?	Query machine (DNS) name
NAME-RST	Reset machine name to factory default (DNS)
NET-DHCP	Set DHCP mode
NET-DHCP?	Query DHCP mode
NET-GATE	Set Gateway
NET-GATE?	Query Gateway
NET-IP	Set IP address
NET-IP?	Query IP address
NET-MAC?	Query MAC address
NET-MASK	Set subnet mask
NET-MASK?	Query subnet mask
PROT-VER?	Read device protocol version
PRST-RCL	Read saved preset list (see Note below)
RESET	Reset device
SN?	Read device serial number
UPGRADE	Execute firmware upgrade
VERSION?	Read device firmware version

13.2.2 Device Specific Commands

Set Command syntax

Y Control_Type=0, Function#, Param

For example:

#Y 0,212,1

Device response:

~id=01Y Control_Type=0,Function#,Param

For example:

~01@Y 0,212,1

Get Command syntax

Y Control_Type=1, Function

For example:

#Y 1,200

Device response:

~id=01Y Control_Type=1, Function, Param

For example:

~01@Y 1,200,3

The following table lists the **MV-5** "Y commands". If a parameter in the table is given as multidimensional vector (for example, IN_FRMT[4] - has the dimension = 4), this signifies that there are four different parameters each of which reflect a state of the same feature for different inputs or different windows. In order to address the required input or window, one more parameter must be added to the "Y command"- the fourth for "Set Command" and third for "Get Command". For example "#Y 0,103,25,2" signifies "Set Command, function = 103 (Pixel Latch Phase = PX_PHS[2]), Value = 25, only for Analog HD INPUT # 3 (as here additional parameter A = 2, this corresponds to INPUT # = A + 1). Another example: "#Y 0,303,-50,0" - signifies "Set Command, function = 303 (Window H size = HSZ_H[0]), Value = -50, only for WINDOW # 1 (as here additional parameter A = 0, this corresponds to WINDOW # = A + 1). The Notes column indicates whether the additional parameter is related to a window or to an input.

Description	Function #	Parameter	Value	Notes
Analog HD Input format	100	IN_FRMT[4]	0	RGBHV (additional parameter defines HD input
			1	RGBS
			2	RGsB
			3	YUV (bi-sync or tri-sync auto definition)

Description	Function #	Parameter	Value	Notes
Horizontal start pixel	101	H_STRT[4]	[-100:+100]	Additional parameter defines analog HD input
Vertical start line	102	V_STRT[4]	[-50:+50]	Additional parameter defines analog HD input
Pixel latch phase	103	PX_PHS[4]	[0:31]	Additional parameter defines analog HD input
SD button input assignment	104	SDBTN[4]	0	Analog CV1 input
			1	Analog CV2 input
			2	Analog CV3 input
			3	Analog CV4 input
			4	Analog CV5 input
			5	Analog CV6 input
			6	Analog CV7 input
			7	Analog CV8 input
			8	Analog CV9 input
			9	Analog CV10 input
			10	Analog CV11 input
			11	Analog CV12 input
			12	Analog YC1 input
			13	Analog YC2 input
			14	Analog YC3 input
			15	Analog YC4 input
			16	Analog YC5 input
			17	Analog YC6 input
			18	Analog YUV1 input
			19	Analog YUV2 input
			20	Analog YUV3 input
DVI inputs HDCP capability	105	HDCP_IN[5]	0	DVI input# is HDCP capable
			1	DVI input# is HDCP non-capable Additional parameter defines DVI Input. HDCP_IN[4] – for DVI background input
Output Video Resolution	200	OUT_RSL	0	480i/60
			1	576i/50
			2	720p/50
			3	720p/59
			4	720p/60
			5	1080i/50
			6	1080i/59
			7	1080i/60
			8	1080p/23
			9	1080p/24
			10	1080p/25
			11	1080p/29
			12	1080p/30
			13	1080p/50
			14	1080p/59
			15	1080p/60

Description	Function #	Parameter	Value	Notes
			16	1080sf/23
			17	1080sf/24
			18	1080sf/25
			19	1080sf/29
			20	1080sf/30
			21	640x480/60
			22	640x480/72
			23	640x480/75
			24	640x480/85
			25	800x600/60
			26	800x600/72
			27	800x600/75
			28	800x600/85
			29	1024x768/60
			30	1024x768/70
			31	1024x768/75
			32	1024x768/85
			33	1152x864/75
			34	1280x768/60 reduced blanking
			35	1280x768/60
			36	1280x768/75
			37	1280x768/85
			38	1280x960/60
			39	1280x960/85
			40	1280x1024/60
			41	1280x1024/75
			42	1360x768/60
			43	1366x768/60
			44	1400x1050/60 reduced blanking
			45	1400x1050/60
			46	1400x1050/75
			47	1440x900/60 reduced blanking
			48	1440x900/60 reduced blanking
			49	1440x900/75
			50	1440x900/85
			51	1600x1200/60
			52	1680x1050/60 reduced blanking
			53	1680x1050/60
			54	1920x1200/60 reduced blanking
Top Layer fit in the screen Cropping Preview	201	CROP_PVW	0	Normal windows size and position
			1	Top Layer window Image is fit in the screen
			2	The cropping border arises
Analog HD output format	202	OUT_HD_FR MT	0	RGBHV
			1	RGBS
			2	RGsB
			3	YUV bi-sync

Description	Function #	Parameter	Value	Notes
			4	YUV tri-sync
Analog SD output format	203	OUT_SD_FR MT	0	YUV SD
			1	Three outputs CVBS
			2	YC and one CVBS
Background image source	204	BG_MODE	0	Colored background field
			1	DVI background input
Background color RED	205	BG_RED	[0:255]	Active only if BG_MODE = 0
Background color GREEN	206	BG_GREEN	[0:255]	Active only if BG_MODE = 0
Background color BLUE	207	BG_BLUE	[0:255]	Active only if BG_MODE = 0
Background freeze	208	BG_FRZ	0	No freeze background
			1	Freeze background
Analog Output Sync mode Only For 720p, 1080i, 1080p in case of RGBHV Output Format	209	OUT_SNC_M ODE	0	Analog output sync meets the CEA Standard RGBHV format (H - pos, V - pos)
			1	INVERS1: H- neg, V - neg
			2	INVERS2: H- neg, V - neg, H advanced
RGB Out Hsync position	210	OUT_H_POS	[-75;75]	H sync position (for RGBHV, RGBS, RGsB)
RGB Out Vsync position	211	OUT_V_POS	[-1;7]	V sync position (for RGBHV, RGBS, RGsB)
DVI OUTPUT HDCP MODE	212	HDCP_OUT	0	DVI Output HDCP "FOLLOW INPUT"
			1	DVI Output HDCP "FOLLOW OUTPUT"
			2	HDCP on Output "ON"
			3	HDCP on Output "OFF"
DVI OUTPUT HDCP STATUS	213	OUT_STATUS	0	Output forced to non-encrypted (NO HDCP)
			1	MV-5 tries to set HDCP link, but acceptor don't support HDCP. Encryption turn OFF
			2	HDCP active (monitor supports HDCP)
			3	DVI output HDCP is ACTIVE, but SDI and Analog outputs are disabled
Window input source SELECT	300	WND_INP[4]	0	DVI1 input (additional parameter defines a window)
			1	DVI2 input
			2	DVI3 input
			3	DVI4 input

Description	Function #	Parameter	Value	Notes
			4	SDI1 input
			5	SDI2 input
			6	SDI3 input
			7	SDI4 input
			8	Analog HD1 input
			9	Analog HD2 input
			10	Analog HD3 input
			11	Analog HD4 input
			12	Analog SD1 button
			13	Analog SD2 button
			14	Analog SD3 button
			15	Analog SD4 button
Window Input Resolution (READ ONLY) INP_RES[0] - window 1 INP_RES[1] - window 2 INP_RES[2] - window 3 INP_RES[3] - window 4 INP_RES[4] - reflects background input status	301	INP_RSL[5]	0	480i/60 INP_RSL[4] - background
			1	576i/50
			2	720p/50
			3	720p/59
			4	720p/60
			5	1080i/50
			6	1080i/59
			7	1080i/60
			8	1080p/23
			9	1080p/24
			10	1080p/25
			11	1080p/29
			12	1080p/30
			13	1080p/50
			14	1080p/59
			15	1080p/60
			16	1080sf/23
			17	1080sf/24
			18	1080sf/25
			19	1080sf/29
			20	1080sf/30
			21	640x480/60
			22	640x480/72
			23	640x480/75
			24	640x480/85
			25	800x600/60
			26	800x600/72
			27	800x600/75
			28	800x600/85
			29	1024x768/60
			30	1024x768/70

Description	Function #	Parameter	Value	Notes
			31	1024x768/75
			32	1024x768/85
			33	1152x864/75
			34	1280x768/60 reduced blanking
			35	1280x768/60
			36	1280x768/75
			37	1280x768/85
			38	1280x960/60
			39	1280x960/85
			40	1280x1024/60
			41	1280x1024/75
			42	1360x768/60
			43	1366x768/60
			44	1400x1050/60 reduced blanking
			45	1400x1050/60
			46	1400x1050/75
			47	1440x900/60 reduced blanking
			48	1440x900/60 reduced blanking
			49	1440x900/75
			50	1440x900/85
			51	1600x1200/60
			52	1680x1050/60 reduced blanking
			53	1680x1050/60
			54	1920x1200/60 reduced blanking
			55	UNIDENTIFIED INPUT SIGNAL
			56	NO INPUT SIGNAL
Window priority definition	302	W_PRIO[4]	0	Window disappears
			1	Upper (top) layer window
			2	Window after upper layer
			3	Next window
			4	Lower layer window, can be overlapped by all others
Window H size	303	WSZ_H[4]	[-90:0]	If WSZ_H = 0 - window width fit in the screen 100%
				If WSZ_H = -90 - window width = 10% of screen
				width. Step = 1%
Window V size	304	WSZ_V[4]	[-90:0]	If WSZ_V = 0 - window height fit in the screen 100%;
				If WSZ_V = -90 - window height = 10% screen height.
				Step = 1%
Window aspect	305	W_ASP_EN[4]	0	H and V window sizes are defined independently
				by WSZ_H and WSZ_V
enable			1	Parameter WSZ_H affects simultaneously H and
				V window size, but the relation between H and V

Description	Function #	Parameter	Value	Notes
				sizes is defined by next parameter: WIN_ASP
Window Aspect ratio	306	WIN_ASP[4]	[-75:75]	If WIN_ASP = 0 - window aspect is equal to original screen aspect (100%), namely: Real window WIDTH(%) = WSZ_H + 100; HEIGHT(%) = WSZ_H + 100 If WIN_ASP > 0 then as above, window WIDTH(%) = WSZ_H + 100, but the height is reduced accordingly the formula : HEIGHT(%)= (WSZ_H+100) * 100 / / (WIN_ASP + 100) (window is like letterbox) If WIN_ASP < 0 then window HEIGHT(%) = WSZ_H + 100, but the width is reduced accordingly the formula :WIDTH(%) = (WSZ_H+100) * (100 + WIN_ASP) / 100 (window is like pillarbox)
Window H position	307	WPOS_H[4]	[0:1000]	Defines X coordinate of top left corner of window normalized relatively screen width (Step = 0.1%) represented in percent of screen width * 10
Window V position	308	WPOS_V[4]	[0:1000]	Defines Y coordinate of top left corner of window normalized relatively screen height. Step = 0.1% represented in percent of screen height * 10
Image H size	309	IMSZ_H[4]	[0:900]	Defines H size of image relatively window H size (i.e. H ZOOM) Step = 1% If IMSZ_H = 0 then image is exactly fits to window width. If IMSZ_H > 0 then real IM_WIDTH(%) = (IMSZ_H + 100) window WIDTH Image is cropped. If IMSZ_H = 900, then set maximal H ZOOM = 1000%
Image V size	310	IMSZ_V[4]	[0:900]	Defines V size of image relatively window V size (i.e. V ZOOM) Step = 1% If IMSZ_V = 0 then

Description	Function #	Parameter	Value	Notes
				image is exactly fits to window height. If IMSZ_V > 0 then real IM_HEIGHT(%)=(IMSZ_V + 100) In this case the image is cropped.
Image aspect enable	311	IM_ASP_EN[4]	0 1	H and V image sizes are defined independently by IMSZ_H and IMSZ_V Parameter IMSZ_H affects simultaneously H and V image size, but the relation between H and V sizes is defined by parameter: IM_ASP
Image Aspect ratio	312	IM_ASP[4]	[-50:100]	If IM_ASP = 0 - image aspect is equal to original input image aspect (100%) If IM_ASP = -50 then aspect= 0.5 of original If IM_ASP = +100 then aspect = 2.0 of original
Image position H relatively window (H panorama)	313	IMPOS_H[4]	[0:1000]	Defines shift of image to the left with cropping of image left side, measured in percent of original image width. Step = 0.1%. Allows image H panorama in case of ZOOM
Image position V relatively window (Vertical panorama)	314	IMPOS_V[4]	[0:1000]	Defines shift of image to the bottom with cropping of image bottom side, measured in percent of original image height. Step = 0.1%. Allows image V panorama in case of ZOOM
Window border thickness	315	BRD_THKN[4]	[0:20]	If BRD_THKN = 0 then border is OFF
Window border color R	316	BRD_RED[4]	[0:255]	
Window border color G	317	BRD_GREEN[4]	[0:255]	
Window border color B	318	BRD_BLUE[4]	[0:255]	
Window image brightness	319	BRIGHT[4]	[-50:50]	If BRIGHT = 0 then default brightness (100%)
Window image contrast	320	CONTRAST[4]	[-50:50]	If CONTRAST = 0 then default contrast (100%)
Window image color	321	COLOR[4]	[-100:50]	If COLOR = 0 then default color(100%). If SHARP = 0 - no sharpness,

Description	Function #	Parameter	Value	Notes
Window image sharpness	322	SHARP[4]	[0:15]	if = 15, then max sharpness 150% Step = 10%
Window freeze image	323	FREEZE[4]	0	No freeze window image
			1	Freeze window image
Window keyer enable	324	KEYER_EN[4]	0	Keyer disable
			1	Keyer enable
Window keyer threshold Y min	325	YKEY_MIN[4]	[0:255]	
Window keyer threshold Y max	326	YKEY_MAX[4]	[0:255]	
Window keyer threshold U min	327	UKEY_MIN[4]	[0:255]	
Window keyer threshold U max	328	UKEY_MAX[4]	[0:255]	
Window keyer threshold V min	329	VKEY_MIN[4]	[0:255]	
Window keyer threshold V max	330	VKEY_MAX[4]	[0:255]	
Window image transparency	331	W_TRNSP[4]	[0:255]	If W_TRNSP = 0 then window image is non-transparent. If W_TRNSP > 0 then the transparency increases and if it equal to 255 then image disappears
Window Label Mode	332	LBL_MODE[4]	0	Label Disabled
			1	BLACK Label attributed to specific window
			2	WHITE Label attributed to specific window
			3	BLACK Label corresponds to video input
			4	WHITE Label corresponds to video input
Label Position	333	LBL_POS[4]	0	Bottom left location of label
			1	Bottom center location
			2	Bottom right location
			3	Top left
			4	Top center
			5	Top right
TEST signal	334	TEST[4]	0	No TEST signal; Input signal is selected for window, if available
			1	COLOR BARS 100%
			2	Split COLOR BARS 100%
			3	Y RAMP 100 %

Description	Function #	Parameter	Value	Notes
Window input HDCP	335	WND_HDCP[5]	0	Source is not protected HDCP or this input
				is forced to be HDCP incompatible
STATUS (READ ONLY)			1	Input HDCP is active, but the window is removed
				or blanked due to HDCP mode settings
				Input HDCP is active and this window is
WND_HDCP[4] for background			2	present on output image (HDCP monitor only)
No input signal handle	400	NOSIG_HNDL	0	BLACK SCREEN
mode			1	BLUE SCREN
			2	Remove window
			3	Freeze last picture
LCD brightness	401	LCD_BRGHT	[-100:0]	LCD brightness while keyboard activated
				If LCD_BRGHT=0 - brightness = 100%
				LCD brightness in sleep mode (after 2 min
LCD brightness in sleep	402	LCD_SLEEP	[-100:0]	keyboard is non-activated)
Panel Lock	403	PLOCK	0	No Lock FP
			1	Lock Panel

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SAFETY WARNING
Disconnect the unit from the power supply before opening and servicing

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