

Kramer Electronics, Ltd.



USER MANUAL

Model:

VM-24HC

2 Input 1:4 HDMI Distributor

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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 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 groups¹ that are clearly defined by function.

Thank you for purchasing your Kramer **VM-24HC 2 Input 1:4 HDMI Distributor**² which is ideal for:

- Home theater, presentation and multimedia applications
- Rental and staging

The package includes the following items:

- **VM-24HC 2 Input 1:4 HDMI Distributor**
- Power adapter (5V DC output)
- **RC-IR3 Infrared Remote Control**
- This user manual³

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 Kramer high performance high resolution cables⁴

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

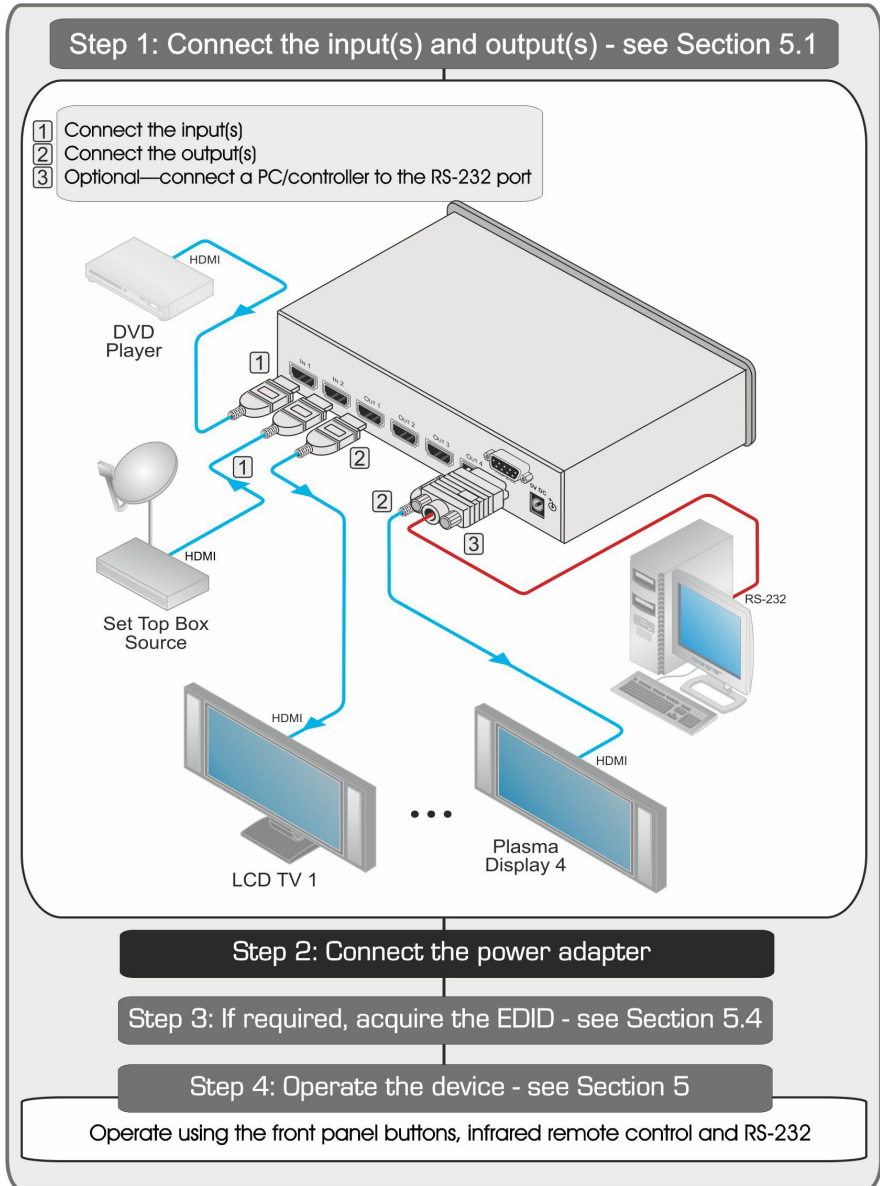
2 High-Definition Multimedia Interface

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

This quick start chart summarizes the basic setup and operation.



3 Overview

Each high quality **VM-24HC** accepts one of two HDMI inputs and distributes the selected signal to up to four outputs.

The **VM-24HC** features:

- Support for up to 2.25Gbps bandwidth per graphic channel¹
- I-EDIDPro™ Kramer Intelligent EDID Processing™ – Intelligent EDID handling & processing algorithm ensures Plug and Play operation for HDMI systems
- Supports 3D Pass-Thru
- Equalizes and reclocks the data
- The ability to use a default² EDID or acquire the EDID from one output or from all connected outputs (Auto-mix)
- Housing in desktop sized enclosure. Two devices can be rack mounted side-by-side with the optional **RK-1** adapter in a 1U rack space.

You can control the **VM-24HC** using:

- The front panel buttons
- Infrared Remote Control
- RS-232 serial commands transmitted by a touch screen system, PC or other serial controller

3.1 About HDMI

High-Definition Multimedia Interface (HDMI) is an uncompressed all-digital³ audio/video interface, widely supported in the entertainment and home cinema industry. It delivers the highest high-definition image and sound quality.

In particular, HDMI⁴:

- Provides a simple⁵ 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 lengthy⁶ cable

1 Suitable for resolutions up to UXGA at 60Hz, and for all HD resolutions

2 Lets you use the EDID default value when no display from which to read the EDID is connected

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

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

5 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

6 HDMI technology has been designed to use standard copper cable construction at up to 15m (49ft)

- Supports standard, enhanced, high-definition video, and multi-channel digital audio¹ 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 cable², and user-friendly connector
- Is backward-compatible with DVI (Digital Visual Interface)
- Supports two-way CEC 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 and 1080p, 2K and 4K), as well as standard definition formats such as NTSC or PAL

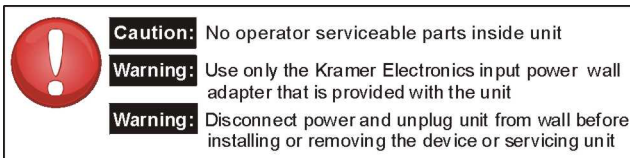
3.2 Defining the EDID

The Extended Display Identification Data (EDID³) is a data-structure, provided by a display, to describe its capabilities to an HDMI source. The EDID enables the **VM-24HC** to “know” what kind of monitor is connected to the output. The EDID includes the manufacturer’s name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

3.3 Recommendations for Best Performance

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances and position your **VM-24HC** away from moisture, excessive sunlight and dust



¹ 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

² HDMI provides the quality and functionality of a digital interface while also supporting uncompressed video formats in a simple, cost-effective manner

³ Defined by a standard published by the Video Electronics Standards Association (VESA)

4 Defining the VM-24HC 2 Input 1:4 HDMI Distributor

[Figure 1](#) and [Table 1](#) define the VM-24HC.

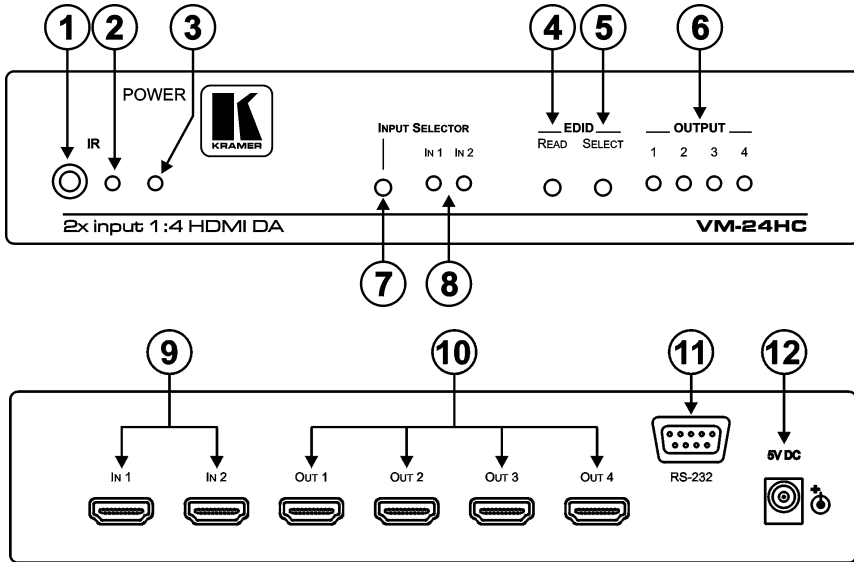


Figure 1: VM-24HC 2 Input 1:4 HDMI Distributor Rear Panel

Table 1: VM-24HC 2 Input 1:4 HDMI Distributor Front and Rear Panel Features

#	Feature	Function	
1	IR Receiver	IR signal sensor for the IR Remote Control	
2	IR LED	Lights yellow when the device receives an IR signal	
3	POWER LED	Lights green when the device receives power	
4	EDID Buttons	READ ¹	Press to acquire the EDID following selecting the EDID source. Press again to indicate the EDID status
5		SELECT	Press to select the EDID source (single output, Auto-Mix or default)
6	OUTPUT LEDs (1 to 4)	Lights green when an output is connected and active. LED flashes to indicate the source of the EDID acquired (see Section 5.4) or when connecting a non-HDCP display while providing HDCP content to the VM-24HC	
7	INPUT SELECTOR Button	Press to select Input 1 or 2 (see Section 5.2)	
8	IN 1 LED	Lights green when Input 1 is selected	
	IN 2 LED	Lights green when Input 2 is selected	
9	INPUT 1 and INPUT 2 HDMI Connectors	Connect to the HDMI sources 1 and 2	
10	OUTPUT 1 to OUTPUT 4 HDMI Connectors	Connect to the HDMI acceptors 1 to 4	
11	RS-232 9-pin D-sub Port	Connect to a PC/remote controller (see Section 5.2)	
12	5V DC Power Connector	Connect to the power adapter, center pin positive	

¹ Lights when configuring the EDID

5 Using the VM-24HC 2 Input 1:4 HDMI Distributor

This section describes:

- Connecting the VM-24HC (see [Section 5.1](#))
- Selecting an Active Input (see [Section 5.2](#))
- Connecting a PC/Controller via RS-232 (see [Section 5.3](#))
- Acquiring the EDID (see [Section 5.4](#))

5.1 Connecting the VM-24HC 2 Input 1:4 HDMI Distributor

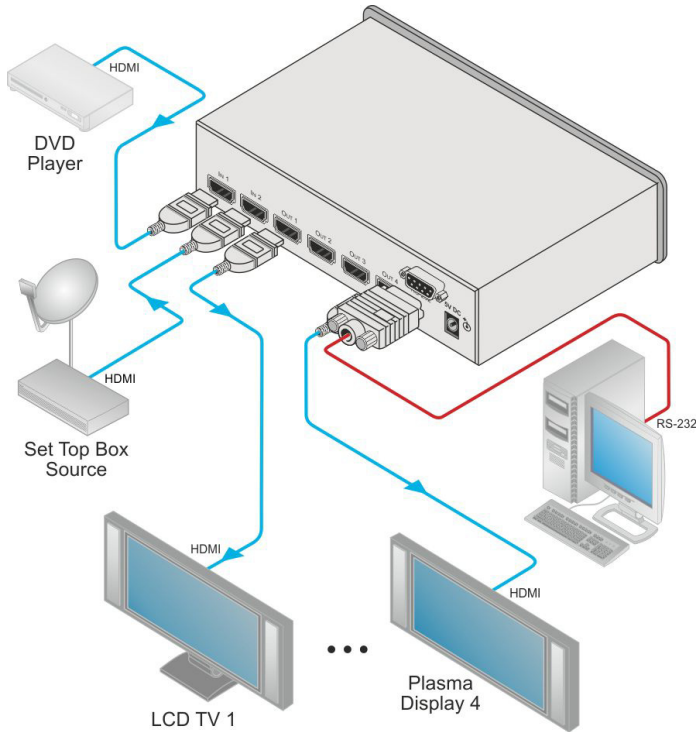


Figure 2: Connecting the VM-24HC 2 Input 1:4 HDMI Distributor

To connect¹ the VM-24HC as illustrated in the example in [Figure 2](#):

1. Connect² the two HDMI sources, for example, a DVD player and a set top box to the INPUT 1 and INPUT 2 connectors, respectively.

¹ Switch off the power on each device before connecting it to your VM-24HC. After connecting your VM-24HC, switch on its power and then switch on the power on each device

² Using for example, the Kramer C-HM/HM/PRO

2. Connect the HDMI OUTPUT connectors¹ to up to 4 HDMI acceptors using Kramer HDMI copper cables. In this example², connect:
 - OUTPUT 1 to display device 1 (for example, an LCD TV)
 - OUTPUT 2 to display device 2 (for example, an LCD TV)
 - OUTPUT 3 to display device 3 (for example, an LCD TV)
 - OUTPUT 4 to display device 4 (for example, a plasma display)
3. If required, connect a PC and/or controller to the RS-232 port (see [Section 5.2](#)).
4. Connect the power adapter to the device and to the mains electricity (not shown in [Figure 2](#)).
5. If required, acquire the EDID (see [Section 5.4](#)).

5.2 Selecting an Active Input

To select an active input:

- Press the INPUT SELECTOR button to toggle between inputs 1 and 2

5.3 Connecting a PC/Controller via RS-232

You can connect a PC or serial controller to the **VM-24HC** using the RS-232 connection. Note that a null-modem adapter/connection is not required.

To connect to the **VM-24HC** via RS-232:

- Connect the RS-232 9-pin D-sub rear panel port on the **VM-24HC** 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/controller

5.4 Acquiring the EDID

Initially³ the **VM-24HC** operates with the factory default EDID⁴ stored in the non-volatile memory. The source reads the EDID from the device when the device is plugged in or powered on.

¹ As required. Up to four outputs can be connected. Not all outputs need to be connected

² Only connections to the first and last acceptors are shown in [Figure 2](#)

³ This is usually done only once when the unit is being set up in an installation. Once acquired, the EDID is saved in non-volatile memory and further acquisition is not necessary

⁴ The VM-2DH reads the EDID, which is stored in the non-volatile memory

The EDID¹ can be acquired from:

- One output
- The default EDID
- Up to four connected outputs using the Auto-mix Mode²

Repeatedly pressing the EDID SELECT button cycles through the EDID sources in the following order³:

- Output 1 (Output 1 LED lights)
- Output 2 (Output 2 LED lights)
- Output 3 (Output 3 LED lights)
- Output 4 (Output 4 LED lights)
- Default EDID (all LEDs light)
- Auto-Mix EDID (the LEDs flash in a running sequence)

To store the selected EDID, press EDID READ as described in the following example⁴.

To select the EDID from Output 3:

1. Press the EDID SELECT button repeatedly until OUTPUT 3 LED lights.
2. Press the EDID READ button.

When the LED stops flashing the EDID from Output 3 is stored at the input.

Pressing the EDID SELECT button briefly once causes the relevant LEDs to indicate which EDID is stored at the input as follows:

- OUTPUT 1 LED flashes—the EDID from OUTPUT 1 was the last acquired
- OUTPUT 2 LED flashes—the EDID from OUTPUT 2 was the last acquired, and so on
- All OUTPUT LEDs light—the default EDID was the last acquired
- All OUTPUT LEDs flash sequentially—the Auto-Mix² EDID was the last acquired

1 This is usually done only once when the machine is being set up in an installation. Once acquired, the EDID is saved in non-volatile memory and further acquisition is not necessary

2 The EDID acquired is a weighted average of all the connected outputs. For example, if several displays with different resolutions are connected to the outputs, the acquired EDID supports all the resolutions, as well as other parameters included in the EDID

3 If you attempt to acquire the EDID from an output that is not connected the default EDID is acquired

4 To cancel the EDID modification wait for a few seconds without touching any button

6 Technical Specifications

[Table 2](#) includes the technical specifications¹ of the **VM-24HC 2 Input 1:4 HDMI Distributor**.

Table 2: VM-24HC Technical Specifications

INPUTS:	2 HDMI connectors
OUTPUTS:	4 HDMI connectors
BANDWIDTH:	Supports up to 2.25Gbps bandwidth per graphic channel
COMPLIANCE WITH HDMI STANDARD:	Supports HDMI and HDCP
CONTROLS:	EDID SELECT, EDID READ, IN 1, IN 2 buttons, RS-232, IR
INDICATOR LEDs:	POWER, IR, OUTPUT
POWER SOURCE:	5V DC, 1.1A
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)
STORAGE TEMPERATURE:	-45° to +72°C (-49° to 162°F)
HUMIDITY:	10% to 90%, RHL non-condensing
DIMENSIONS:	21.5cm x 16.3cm x 4.4cm (8.5" x 6.4" x 1.7") W, D, H
WEIGHT:	0.6kg (1.3lbs) approx.
ACCESSORIES:	Power supply
OPTIONS:	HDMI/HDMI male-to-male cables, Fiber Optic HDMI Cable (C-FOHM/FOHM), RK-1 19" Rack adapter kit

7 Default Communication Parameters

Table 3: Default Communication Parameters

EDID	
EDID data is passed between Output 1 and Input 1	
RS-232	
Protocol 2000	
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None
Command Format:	HEX
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81

¹ Specifications are subject to change without notice

8 Default EDID

```

Monitor
Model name..... VM24HC
Manufacturer..... KRM
Plug and Play ID..... KRM0023
Serial number..... 505-707455010
Manufacture date..... 2009, ISO week 10
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 (CEA-EXT)
-----
DDC/CI..... n/a

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

EIA/CEA-861 Information
Revision number..... 3
IT underscan..... Supported
Basic audio..... Supported
YCbCr 4:4:4..... Supported
YCbCr 4:2:2..... Supported
Native formats..... 1
Detailed timing #1..... 1920x1080p at 60Hz (16:10)
  Modeline..... "1920x1080" 148.500 1920 2008 2052 2200 1080 1084 1089 1125 +hsync +vsync
Detailed timing #2..... 1920x1080i at 60Hz (16:10)
  Modeline..... "1920x1080" 74.250 1920 2008 2052 2200 1080 1084 1094 1124 interlace +hsync +vsync
Detailed timing #3..... 1280x720p at 60Hz (16:10)
  Modeline..... "1280x720" 74.250 1280 1390 1430 1650 720 725 730 750 +hsync +vsync
Detailed timing #4..... 720x480p at 60Hz (16:10)
  Modeline..... "720x480" 27.000 720 736 798 858 480 489 495 525 -hsync -vsync

CE video identifiers (VICs) - timing/formats supported

```


9 Communication Protocol

The **VM-24HC** is compatible with Kramer's Protocol 2000 (version 0.50). This RS-232/RS-485 communication protocol uses four bytes of information as defined below. The default data rate is 9600 baud, no parity, 8 data bits and 1 stop bit.

Table 4: Protocol Definitions

MSB		INSTRUCTION						LSB
DESTINATION		N5	N4	N3	N2	N1	N0	
0	D							
7	6	5	4	3	2	1	0	
1st byte		INPUT						
1	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte		OUTPUT						
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte		MACHINE NUMBER						
1	OVR	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

1st BYTE: Bit 7 – Defined as 0.

D – “DESTINATION”: 0 - for sending information to the switchers (from the PC);

1 - for sending to the PC (from the switcher).

N5...N0 – “INSTRUCTION”

The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5...N0).

2nd BYTE: Bit 7 – Defined as 1.

I6...I0 – “INPUT”.

When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.

O6...O0 – “OUTPUT”.

When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.

Bit 5 – Don't care.

OVR – Machine number override.

M4...M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.

For a single machine controlled via the serial port, always set M4...M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Note: All values in the following table are decimal, unless otherwise stated.

Table 5: Instruction Codes for Protocol 2000

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2, 15
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version 5 - RS422 controller name 6 - RS422 controller version 7 - remote control name 8 - remote software version 9 - Protocol 2000 revision	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio 3 - for SDI 4 - for remote panel 5 - for RS-422 controller	14

NOTES on the above table:

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E 82 81 82 (ie. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

NOTE 15 - When the OVR bit (4th byte) is set, then the "video" commands have universal meaning. For example, instruction 1 (SWITCH VIDEO) will cause all units (including audio, data, etc.) to switch. Similarly, if a machine is in "FOLLOW" mode, it will perform any "video" instruction.

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.



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 your 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.



Caution

Safety Warning:

Disconnect the unit from the power supply before opening/servicing.



Kramer Electronics, Ltd.

Web site: www.kramerelectronics.com

E-mail: info@kramereel.com

P/N: 2900-000717 REV 1