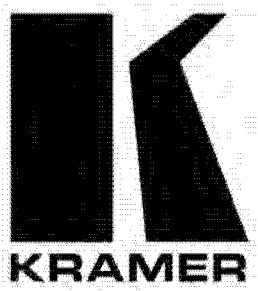
Kramer Electronics, Ltd.



USER MANUAL

Model:

VP-23C

Presentation Switcher

Contents

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1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 500-plus different models now appear in 8 Groups[1], which are clearly defined by function.

Congratulations on purchasing your Kramer **VP-23C** *Presentation Switcher*. This product is ideal for the following typical applications:

- Presentation and conference room systems
- Production studios, as well as rental and staging

The package includes the following items:

- **VP-23C** *Presentation Switcher*
- Power cord and Null-modem adapter
- Windows®-based Kramer control software[2]
- This user manual[3]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

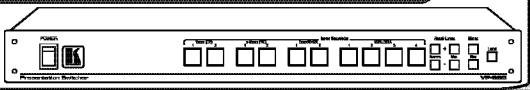
2 Downloadable from our Web site at http://www.kramerelectronics.com

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

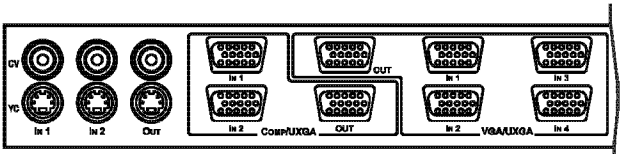
4 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside

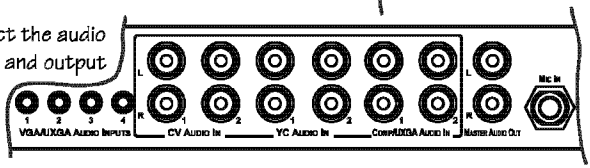


Step 2: Connect the inputs and outputs - see section 6



Connect the video inputs and outputs

Connect the audio inputs and output

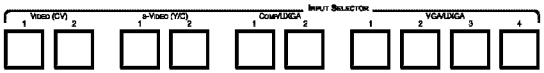


Step 3: Connect the control port - see section 6

Connect an RS-232 optional Control Port

Step 4: Turn the power ON

Step 5: Set the machine - see section 7

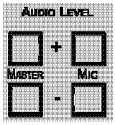


Press a button to select an input on each switcher group (CV, s-Video, COMP/UXGA and/or VGA/UXGA) to route to the appropriate output. Selected input buttons illuminate.

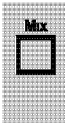
Press the Lock button to lock the front panel buttons.

Press the Mute button to disconnect the audio inputs from the Master output. This lets you output the microphone only.

Adjust MASTER Volume: Press + (increase) or - (decrease) buttons to adjust the audio signal Level.



Adjust MIC Volume: Press + (increase) or - (decrease) buttons to adjust the MIC signal Level.



Press the Mix button to mix the master audio output with the microphone signal.

Step 6: Operate the machine - see section 7

Operate via the front panel buttons and RS-232

3 Overview

The **VP-23C** is a high quality presentation switcher designed for a wide variety of presentation and multimedia applications. The **VP-23C** includes four switcher groups, that combine the functions of a 2x1 switcher for composite video, a 2x1 switcher for s-Video, a 2x1 switcher for component video/UXGA, and a 4x1 switcher for VGA/UXGA type signals. Each video input has its own unbalanced stereo audio input. There is also an independent unbalanced stereo master audio output, which can select a signal from any of the 10 audio inputs.

In addition the **VP-23C**:

- Includes 10 selector buttons, and front panel control buttons for the master audio output level and microphone level
- Is designed so that each switcher group can be controlled independently from the other sections
- Is controllable via the front panel buttons or by RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Lets you insert an additional microphone channel by mixing with the master output signal or by muting the master output signal
- Has a lock button to prevent unintentional tampering with the front panel buttons

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 Kramer **VP-23C** away from moisture, excessive sunlight and dust

4 Your VP-23C Presentation Switcher

Figure 1 illustrates the front and rear panels of the **VP-23C**. Tables 1 and 2 define the front and rear panels of the **VP-23C**, respectively.

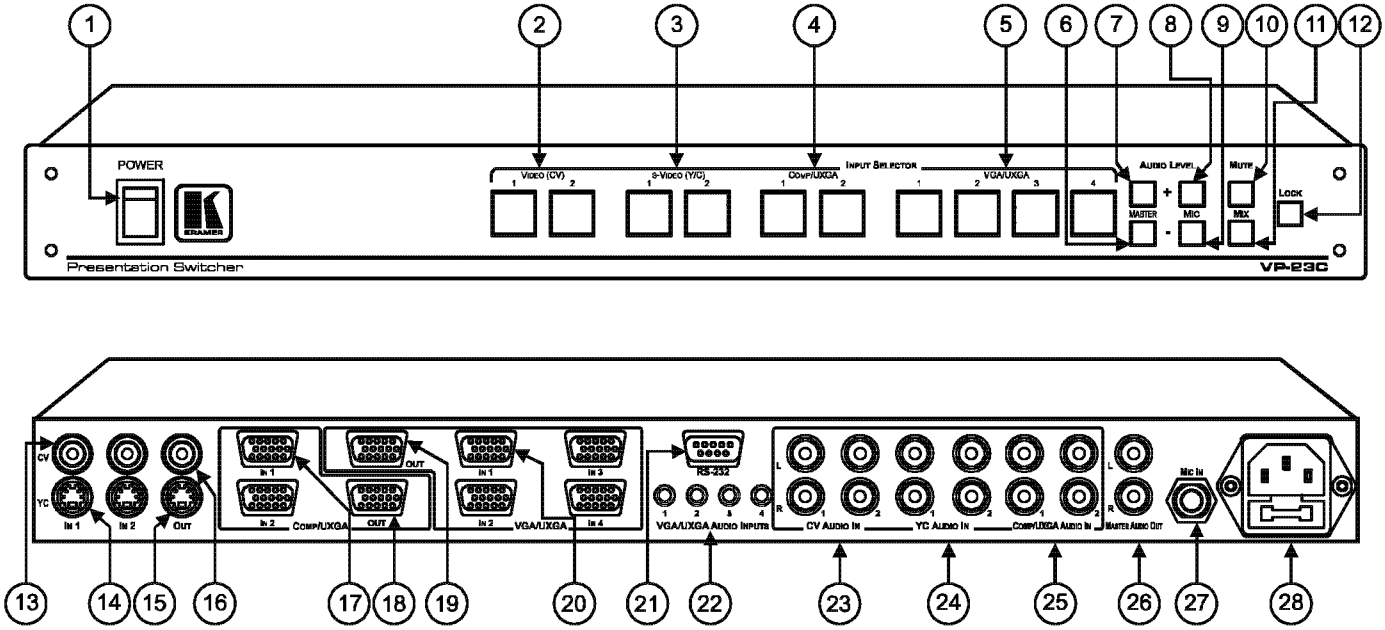


Figure 1: VP-23C Presentation Switcher – Front and Rear View

Table 1: Front Panel VP-23C Presentation Switcher Features

#	Feature			Function
1	*POWER* Switch			Illuminated switch for turning the unit ON or OFF
2	*INPUT SELECTOR*	*VIDEO (CV)* Buttons		Select the composite video / audio input (1 and 2)
3		*s-VIDEO (Y/C)* Buttons		Select the s-Video / audio input (1 and 2)
4		*COMP/UXGA* Buttons		Select the component[1] video / audio input (1 and 2)
5		*VGA/UXGA* Button		Select the VGA/XGA video / audio input (from 1 to 4)
6	*AUDIO LEVEL*	*MASTER*	- Button	Decrease the master audio signal level
7			+ Button	Increase the master audio signal level
8		*MIC*	+ Button	Increase the microphone audio signal level
9			- Button	Decrease the microphone audio signal level
10	*MUTE* Button			Press to disable/enable the Master Audio output[2]
11	*MIX* Button			Press to toggle. When on, will mix the microphone signal with the Master Audio output[3]
12	*LOCK* Button			Press and hold to lock/unlock the front panel buttons

Table 2: Rear Panel VP-23C Presentation Switcher Features

#	Feature	Function
13	*CV IN* RCA Connectors	Connect to the composite video sources (IN 1 and IN 2)
14	*YC IN* 4p Connectors	Connect to the s-Video sources (IN 1 and IN 2)
15	*YC OUT* 4p Connector	Connect to the s-Video acceptor
16	*CV OUT* RCA Connector	Connect to the composite video acceptor
17	*COMP/UXGA IN* HD15 Connectors	Connect to the component video or UXGA[4] sources (IN 1 and IN 2)
18	*COMP/UXGA OUT* HD15 Connector	Connect to the component video or UXGA[4] acceptor
19	*VGA/UXGA OUT* HD15 Connector	Connect to the VGA/UXGA video acceptor
20	*VGA/UXGA IN* HD15 Connectors	Connect to the VGA/UXGA video sources (from IN 1 to 4)
21	*RS-232* Connector	DB 9F connector connects to PC or Remote Controller
22	*VGA/UXGA AUDIO INPUTS* 3.5mm Mini Jack Connectors	Connect to the VGA/UXGA unbalanced stereo audio sources (from 1 to 4)
23	*CV AUDIO IN* RCA Connectors	Connect to the VGA/UXGA unbalanced stereo audio sources (1 and 2)
24	*YC AUDIO IN* RCA Connectors	Connect to the s-Video unbalanced stereo audio sources (1 and 2)
25	*COMP/UXGA AUDIO IN* RCA Connectors	Connect to the component video stereo audio sources (1 and 2)
26	*MASTER AUDIO OUT* RCA Connectors	Connect to the stereo audio acceptor[5]
27	*MIC IN* 6.3mm Phone Jack Connector	Connects to the microphone
28	Power Connector with Fuse	AC connector enabling power supply to the unit

1 Can also be used for UXGA inputs

2 Except for the microphone signal in the MIX mode

3 When the MUTE button and the MIX button are pressed, only the microphone signal is transferred to the output

4 When the HD15F connector is used for UXGA signals, the syncs are on PIN 13 and PIN 14

5 The input selector button last pressed transmits the audio input signal of the selected channel to the master audio output

Figure 2 and Table 3 describe the rear panel of the **VP-23C**:

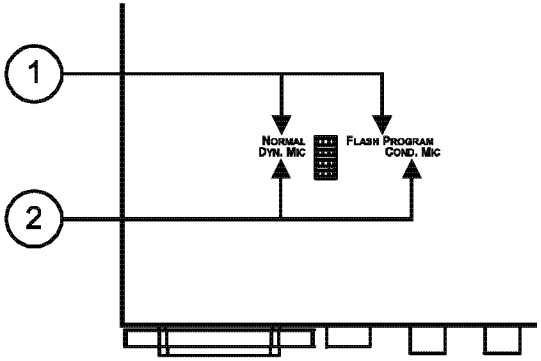


Figure 2: VP-23C Presentation Switcher – Underside View

Table 3: VP-23C Underside Panel Features

#	Feature	Function
1	*NORMAL / FLASH PROGRAM* Switch	Select between NORMAL for normal operation (the factory default), and FLASH PROGRAM to upgrade to the latest Kramer firmware (see section 8)
2	*COND. MIC / DYN. MIC* Switch	Select between a dynamic microphone and a condenser

5 Installing the VP-23C Presentation Switcher on a Rack

This section describes what to do before installing on a rack and how to rack mount.

Before Installing on a Rack

Before installing on a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65% RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!!

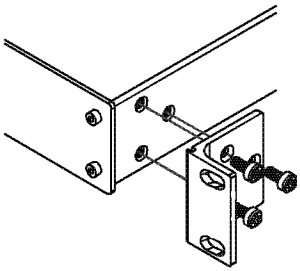
When installing on a 19" rack, avoid hazards by taking care that:

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

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 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 that:

- **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 (you can download it at: http://www.kramerelectronics.com)

6 Connecting the VP-23C Presentation Switcher

In Figure 3, the audio input connections are not shown, except for the microphone. In this example, all the outputs are connected to the same projector. Use the projector controller to switch between the **VP-23C** video outputs[1].

To connect[2] the **VP-23C**, as illustrated in the example in Figure 3, do the following[3]:

1. Connect the following video sources:
   - One[4] composite video source (for example, composite video player 1) to the CV IN 1 RCA connector
   - One[4] composite video source (for example, a composite video player 2) to the CV IN 2 RCA connector
   - One component video source (for example, component video player 1) to the COMP[5]/UXGA[6] IN 1 HD15F connector
   - One component video source (for example, a component video player 2) to the COMP[5]/UXGA[6] IN 2 HD15F connector
   - One[4] VGA/UXGA source (for example, a computer graphics source) to the VGA/UXGA IN 1 HD15F connector
2. Connect the acceptors to a projector[7] as follows:
   - The composite video CV OUT RCA connector to the composite video input of the projector
   - The COMP[5]/UXGA[6] OUT HD15F connector to the component video input of the projector
   - The VGA/UXGA OUT HD15F connector to the VGA/UXGA input of the projector
3. Connect the appropriate unbalanced stereo audio sources (not shown in Figure 3).

1 Or the projector inputs

2 You do not need to connect all the inputs

3 Switch OFF the power on each device before connecting it to your VP-23C. After connecting your VP-23C, switch on its power and then switch on the power on each device. Switching on the VP-23C, recalls the previous setup from the non-volatile memory

4 Although in this example not all the sources are connected (for example, the s-Video source), you can connect all of the inputs, that is, 10 in total

5 When connecting a component video input or output, connect Y to PIN 1, U to PIN 2 and V to PIN 3 on the HD15F connector

6 When the HD15F connector is used for UXGA signals, the syncs are on PIN 13 and PIN 14

7 In this example a projector is used, but you can also connect separate outputs such as displays, video recorders and so on

4. Connect the MASTER AUDIO OUT RCA connectors to an amplifier with speakers.
5. Connect a dynamic or a condenser microphone[1], if required, to the MIC IN 6.3 mm phone jack connector.
6. As an option, you can connect a PC and/or controller to the RS-232 port (see section 6.1).
7. Connect the power cord (not shown in Figure 3).

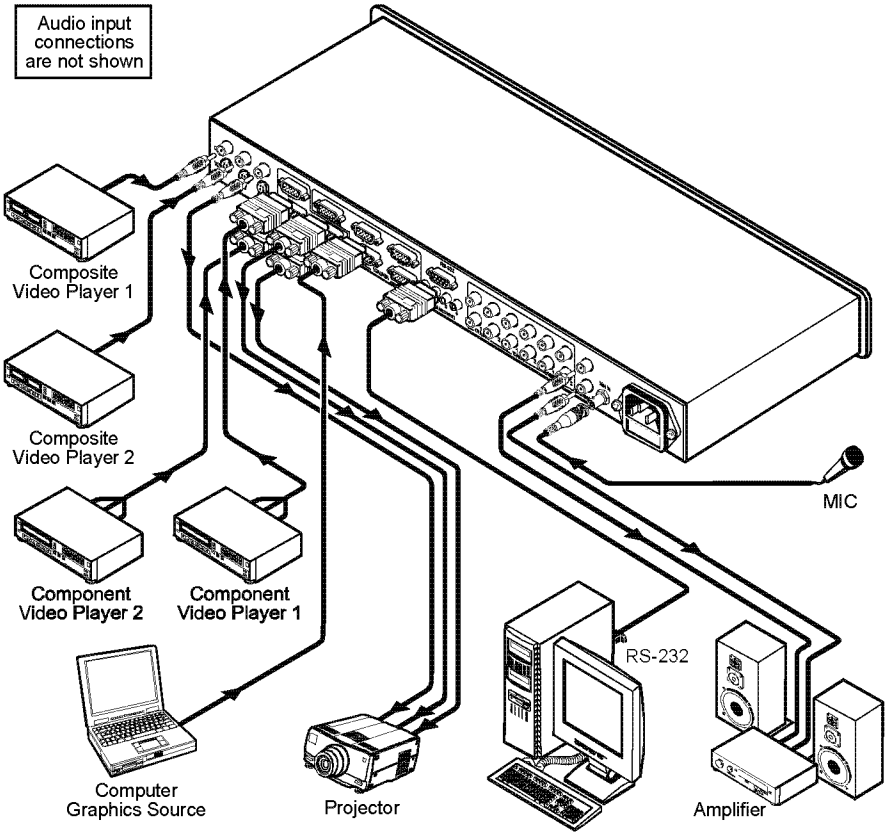


Figure 3: Connecting the VP-23C Presentation Switcher

1 Use the COND. MIC / DYN. MIC switch (refer to item 2 in Figure 2 and in Table 3) to select a dynamic microphone or a condenser

6.1 Connecting a PC

You can connect a PC (or other controller) to the **VP-23C** via the RS-232 port.

To connect using the Null-modem adapter provided with the machine (recommended method):

- Connect the RS-232 DB9 rear panel port on the **VP-23C** to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the **VP-23C**, as Figure 4 illustrates

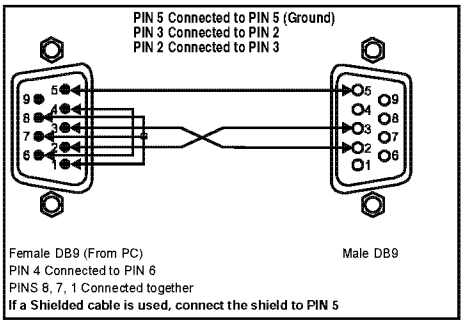


Figure 4: Connecting a PC without using a Null-modem Adapter

7 Operating the VP-23C Presentation Switcher

You can operate your **VP-23C** via:

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

The front panel buttons include the INPUT SELECTOR buttons, the MASTER and MIC AUDIO LEVEL BUTTONS, and the MUTE, LOCK and MIX buttons.

7.1 Operating your Switcher

You can select the video signals within each switcher group by pressing the relevant INPUT SELECTOR[1] buttons. You can switch:

- One[2] of the two composite video VIDEO (CV) inputs to the composite video output
- One of the two s-Video (Y/C) inputs to the s-Video output
- One of the two component video COMP/UXGA inputs to the component video output
- One of the four VGA/UXGA inputs to the VGA/UXGA output

The selected button in each group is illuminated in red[3].

The **VP-23C** operates in the audio-follow-video[4] (AFV) mode so that the audio signal follows the selected input signal.

The audio signal is routed to the MASTER AUDIO OUT output, therefore the last INPUT SELECTOR button selected (from any of the switcher groups) will route the audio signal of that input to the audio output.

The last selected button is illuminated in purple to indicate the source of the outputted audio signal

When setting the master audio gain to its minimum, the MUTE button illuminates.

When both the MUTE and MIX buttons are on, only the microphone signal is transferred to the master output.

The MUTE and MIX buttons can be turned ON or OFF via RS-232 control and their respective buttons on the front panel illuminate.

1 You can overlook a switcher group and choose not to select a button from it

2 You cannot select more than one button in a section

3 Pressing an illuminated button for more than 2 seconds will disconnect the output and the button will no longer illuminate

4 In which all operations relate to both the video and the audio channels

8 Flash Memory Upgrade

The **VP-23C** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 8.1)
- Connecting the PC to the RS-232 port (see section 8.2)
- Upgrading Firmware (see section 8.3)

8.1 Downloading from the Internet

You can download the up-to-date file[1] from the Internet. To do so:

1. Go to our Web site at http://www.kramerelectronics.com and download the file: "*FLIP_VP23C.zip*" from the Technical Support section.
2. Extract the file: "*FLIP_VP23C.zip*" to a folder (for example, C:\Program Files\Kramer Flash).
3. Create a shortcut on your desktop to the file: "*FLIP.EXE*".

8.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **VP-23C** unit, do the following:

1. Disconnect the power on the **VP-23C**.
2. Connect the RS-232 DB9 rear panel port on the **VP-23C** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 COM port on your PC (see section 6.1).
3. On the underside panel, switch to FLASH PROGRAM.
4. Connect the power on the **VP-23C** unit and switch it ON.

1 The files indicated in this section are given as an example only. These file names are liable to change from time to time

8.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the desktop icon: "*Shortcut to FLIP.EXE*".
   The Splash screen appears as follows:

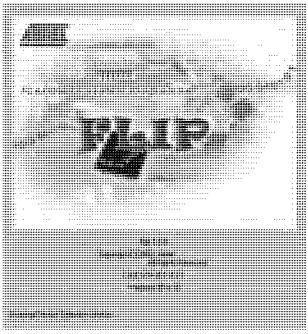


Figure 5: Splash Screen

2. After a few seconds, the Splash screen is replaced by the "*Atmel –Flip*" window:

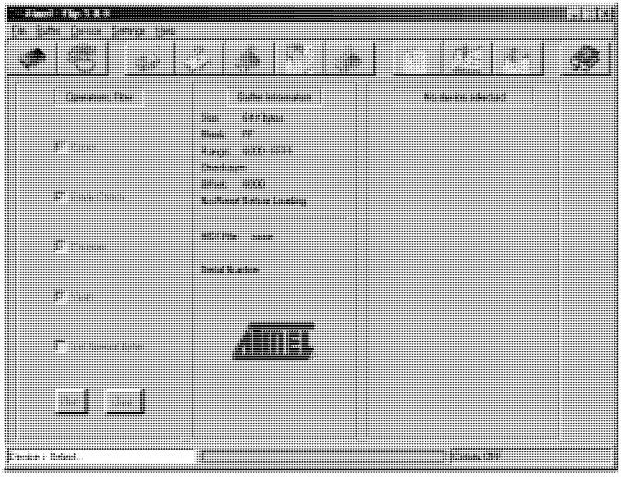


Figure 6: Atmel –Flip Window

3. Press the keyboard shortcut key *F2* (or select the "*Select*" command from the *Device* menu, or press the integrated circuit icon in the upper right corner of the window).
   The "*Device Selection*" window appears:

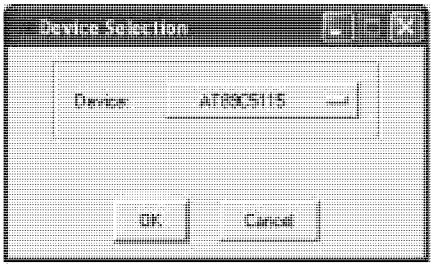


Figure 7: Device Selection Window

4. Click the button next to the name of the device and select from the list: AT89C51RD2:

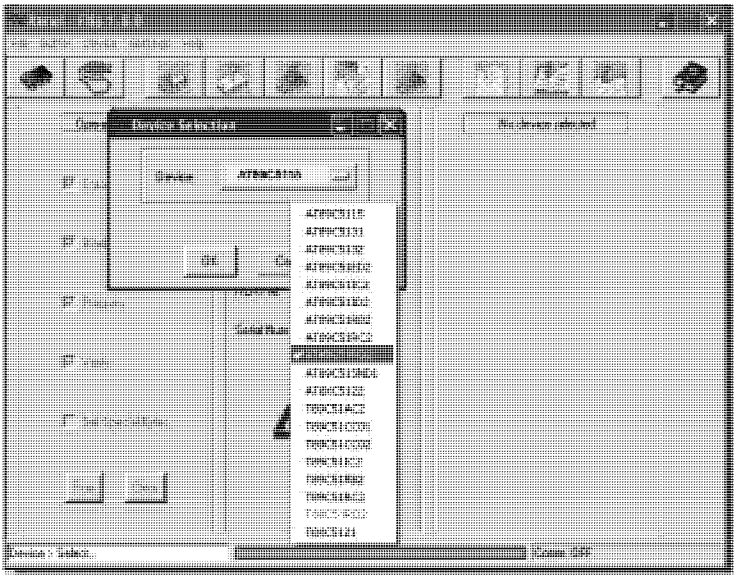


Figure 8: Selecting the Device from the Selection Window

5. Click OK and select "*Load Hex*" from the *File* menu.

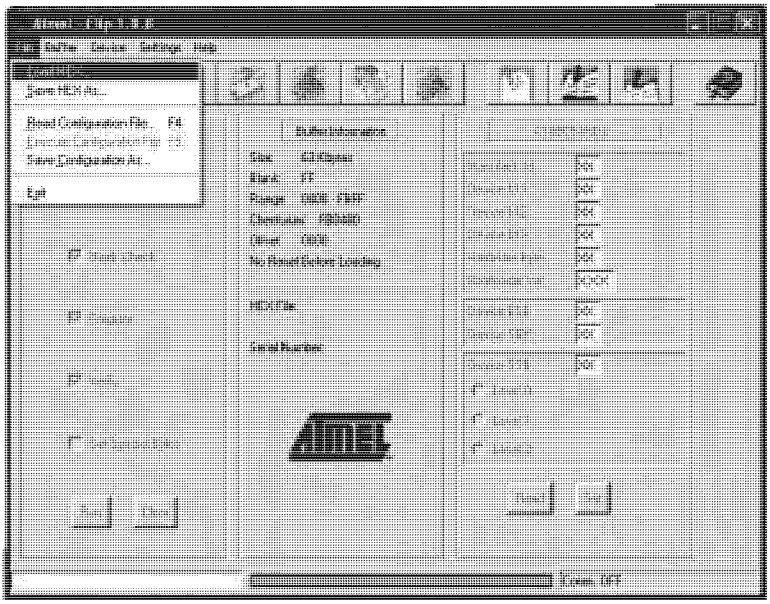


Figure 9: Loading the Hex

6. The Open File window opens. Select the correct HEX file that contains the updated version of the firmware for **VP-23C** (for example, ***23CM_V1p2.hex***) and click Open.
7. Press the keyboard shortcut key *F3* (or select the "*Communication / RS232*" command from the *Settings* menu, or press the keys: *Alt SCR*).
   The "*RS232*" window appears. Change the COM port according to the configuration of your computer and select the 9600 baud rate:

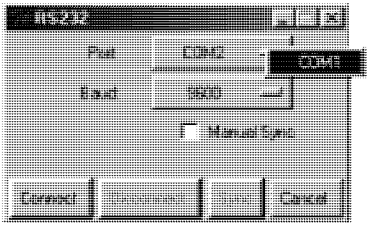


Figure 10: RS-232 Window

8. Click Connect.
   In the "*Atmel – Flip*" window, in the *Operations Flow* column, the *Run* button is active, and the name of the chip appears as the name of the third column: *AT89C51RD2*.

Verify that in the *Buffer Information* column, the "*HEX File: VP23C.hex*" appears.

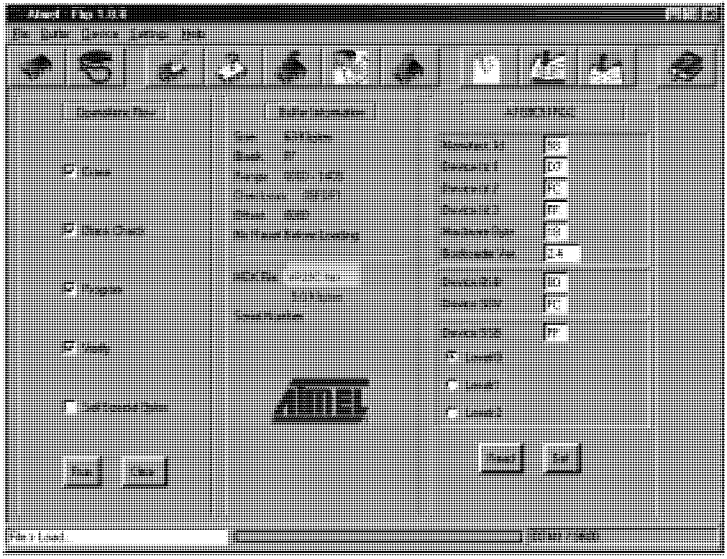


Figure 11: Atmel – Flip Window (Connected)

9. Click *Run*.
   After each stage of the operation is completed, the check-box for that stage becomes colored green[1].
   When the operation is completed, all 4 check-boxes will be colored green and the status bar message: *Memory Verify Pass* appears[2]:

1 See also the blue progress indicator on the status bar

2 If an error message: "Not Finished" shows, click Run again

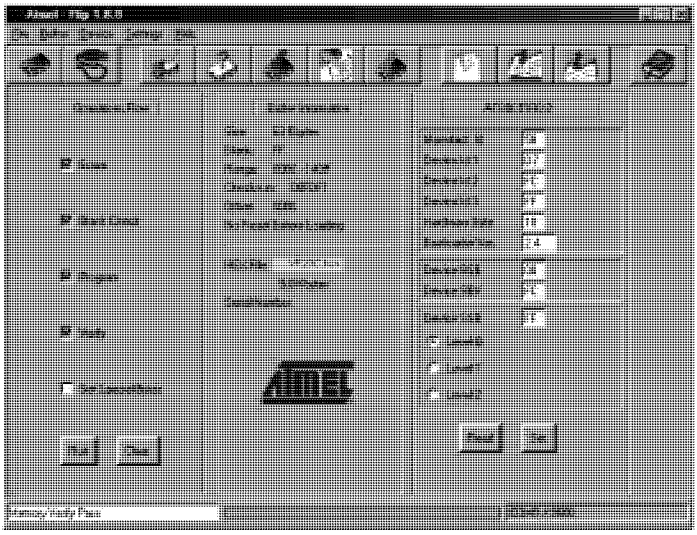


Figure 12: Atmel –Flip Window (Operation Completed)

10. Close the "*Atmel –Flip*" window.
11. Disconnect the power on the **VP-23C**.
12. Disconnect the RS-232 rear panel port on the **VP-23C** unit from the Null-modem adapter.
13. Switch to NORMAL on the machine underside.
14. Connect the power to the **VP-23C**.

9 Technical Specifications

Table 4 includes the technical specifications:

Table 4: Technical Specifications[1] of the VP-23C Presentation Switcher

INPUTS:	2 composite video (1Vpp/75Ω) on RCA connectors 2 s-Video 1 Vpp (Y), 0.3Vpp (C) / 75Ω on 4p connectors 2 component video/UXGA on HD15F connectors 4 VGA/UXGA on HD15F connectors 4 unbalanced stereo audio on 3.5mm jack connectors (for VGA/UXGA): +4dBm/10kΩ 6 unbalanced stereo audio channels: +4dBm / 10kΩ on RCA connectors (for CV, YC, COMP/UXGA) Mic: 3mV / 10kΩ condenser / dynamic on a 6.3mm Phone Jack connector	
OUTPUTS:	1 composite video (1Vpp/75Ω) on an RCA connector 1 s-Video 1Vpp (Y), 0.3Vpp (C) / 75Ω on a 4p connector 1 component video/UXGA on an HD15F connector 1 VGA/UXGA on an HD15F connector 1 unbalanced stereo master audio channel: +4dBm / 50Ω on RCA connectors	
MAX. OUTPUT LEVEL:	VIDEO: 2.1Vpp	AUDIO: 27Vpp
BANDWIDTH (-3dB):	VIDEO: VGA / UXGA: 400MHz; s-Video (Y): 310MHz; Composite/SDI video: 310MHz; Component video: 380MHz; HDTV compatible	AUDIO: 40kHz
DIFF. GAIN:	<0.07% all channels	
DIFF. PHASE:	<0.05 Deg. all channels	
S/N RATIO:	VIDEO: 75dB all channels	AUDIO: 75dB /1 Vpp all channels
CONTROLS:	10 selector buttons, master audio level, mic audio level, mix, lock, mute, RS-232	
POWER SOURCE:	100-240V AC, 50/60Hz, (115V AC, U.S.A.) 7VA	
DIMENSIONS:	19-inch (W), 7-inch (D) 1U (H) rack-mountable	
WEIGHT:	2.6kg (8lbs.) approx	
ACCESSORIES:	Power cord, Null modem adapter, Windows®-based Kramer control software	

1 Specifications are subject to change without notice

10 Hex Tables

Table 5 lists the Hex values (which the protocol in section 11 describes in more detail) for the **VP-23C** *Presentation Switcher*:

Table 5: VP-23C Hex Table

Inputs		Composite Video OUT	s-Video OUT	Component Video OUT	VGA/UXGA OUT
Group	#				
Composite Video	In 1	01 81 81 81			
	In 2	01 82 81 81			
s-Video	In 1		01 81 82 81		
	In 2		01 82 82 81		
Component Video	In 1			01 81 83 81	
	In 2			01 82 83 81	
VGA / UXGA	In 1				01 81 84 81
	In 2				01 82 84 81
	In 3				01 83 84 81
	In 4				01 84 84 81

Table 6: VP-23C Master Audio Selector Hex Table

Master Audio Selector	
Composite Video Group	02 81 81 81
s-Video Group	02 82 81 81
Component Video Group	02 83 81 81
VGA / UXGA Group	02 84 81 81
Microphone	02 85 81 81

10.1 Audio Gain Control Hex Tables

Table 7 and Table 8 describe the audio gain controls[1]:

Table 7: Set the Relative Audio Output[2]

Set Relative Audio Gain of Master Audio Out Gain	
16 81 80 81	Mute
⋮	
16 81 D3 81	-6dB
⋮	
16 81 DF 81	0dB
⋮	
16 81 EB 81	6dB
⋮	
16 81 FF 81	16dB

Table 8: Increase or Decrease the Audio Output Gain by One Step

	Master Out	Microphone
Increase	18 81 80 81	18 82 80 81
Decrease	18 81 81 81	18 82 81 81

1 When controlling the VP-23C via RS-232, read the note to command 42 in the communication protocol to

2 For the microphone gain control, the second byte equals 82

11 VP-23C Communication Protocol

The **VS-23C** is compatible with Kramer's Protocol 2000 (version 0.48) (below). This RS-232/RS-485 communication protocol uses four bytes of information as defined below. For RS-232, a null-modem connection between the machine and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

Table 9: Protocol Definitions

MSB							LSB
	DESTI-NATION	**INSTRUCTION**					
0	D	N5	N4	N3	N2	N1	N0
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.

Table 10: Instruction Codes

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION				NOTE
#	DESCRIPTION	INPUT		OUTPUT		
0	RESET MACHINE	0		0		1
1	SWITCH GROUPS	1-2		1-3*		2
		1-4		4*		
		Set equal to video and audio inputs to be switched for the relative group		Set equal to group to which output is to be switched		
2	SWITCH AUDIO OUTPUTS TO MASTER AUDIO OUT	1-4* Set equal to audio output to be switched to Master Audio out		1		2
5	REQUEST GROUP STATUS	0		1-4 Set equal to the group of which status is required		3
6	REQUEST STATUS OF MASTER AUDIO OUTPUT	0		1		3
11	REQUEST BREAKAWAY SETTING	0		0		3
16	ERROR	Don't care		0 – Invalid instruction 1 – Out of range		4
18	RESET MACHINE	0		0		1
22	SET AUDIO PARAMETER	Parameter	Value	Parameter	Value:	2, 7, 8, 9,
		Audio gain:	1 – Audio Master 2 –Microphone	Audio gain:	0-127	
		Mix microphone:	0	Mix microphone:	0 – mix OFF 1 – Mix ON	
24	INCREASE/DECREASE AUDIO PARAMETER	1 – audio master 2 – microphone		0 - increase output 1 - decrease output		8
25	REQUEST AUDIO PARAMETER	Equal to input / output number whose parameter is requested 1 – audio master 2 – microphone		0		9
30	LOCK FRONT PANEL	0 – Panel unlocked 1 – Panel locked		0		2
31	REQUEST WHETHER PANEL IS LOCKED	0		0		3
42	AUDIO PARAMETER SETTINGS FOR INSTRUCTIONS 22, 25	0		0 - Gain 4 - Mix mode		9
57	SET AUTO SAVE	1 – Autosave 2 – No save				5
61	IDENTIFY MACHINE	1 or 2 – Machine name 3 or 4 – Program version		0 – request first 4 digits 1 – request first suffix 10 – request first prefix		6
62	DEFINE MACHINE	1 – Number of inputs 2 – Number of outputs		1 – For video 2 – For audio		3

* 1 – for CV group, 2 – for SV group, 3 – for Comp video group, 4 – for VGA group

NOTE 1

When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

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:
0000 0001 Instruction "Switch Groups"
1000 0010 Input #2
1000 0001 in composite video group
1000 0001 Machine #1 (master)
Was sent from the PC, then the switcher (machine #1) will switch input 2 in composite video group to its output. If the user switched input 4 in the VGA group via the front panel keypad, then the switcher will send:
0100 0001
1000 0100
1000 0100
1000 0001 to the PC.
When the PC sends instruction #1 or #2 to the switcher, then, if the instruction is valid, the switcher replies by sending the same four bytes to the PC that were sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3

The reply to a "REQUEST" instruction is as follows: the same instruction and input codes as were sent are returned, and the OUTPUT is assigned to the value of the requested parameter. The reply to the instruction #5 (what is the status of the VGA group?):
0000 0101
1000 0000
1000 0011
1000 0001
Would be:
0100 0101
1000 0000
1000 0100
1000 0001

NOTE 4

An error code is returned to the PC if an invalid code was sent to the switcher (for example, when trying to switch an input or a group which is greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher will not be valid.

NOTE 5

Under normal conditions, the machine's present status is saved each time a change is made. The power-down save (the auto save) may be disabled using this code. Note that each time that the machine is turned ON, the auto save function is automatically set.

NOTE 6

This is a request to identify the switchers in a system. If the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and the OUTPUT. For example, the reply to the request to send the machine's name (for machine #001) will be:
0111 1101
1000 0000 (i.e. 128+0)
1001 0111 (i.e. 128+23)
1000 0001
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 following the decimal point. For example, for version 3.5 the reply will be:
0111 1101
1000 0011 (i.e. 128+3)
1000 0101 (i.e. 128+5)
1000 0001

NOTE 7

GAIN VALUE – Number from 0 to 127

NOTE 8

Answer = Current Audio Gain (0 –127)
If the Audio Gain = 0, the MUTE button is illuminated

NOTE 9

When changing parameters (mix or gain), further information needed in instructions 22 and 25 is sent using instruction 42 – which is sent prior to the instruction. For example, to request the audio gain value of the master audio output

2A 80 80 81

and then send HEX codes

19 81 80 81.

To set MIX mode, send hex codes
2A 81 84 81
and then send HEX codes

16 80 81 81

LIMITED WARRANTY

Kramer Electronics (hereafter ***Kramer***) warrants 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 Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

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

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

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

HOW YOU CAN GET WARRANTY SERVICE

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

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warrantics of merchantability and fitness for a particular purposc, 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.

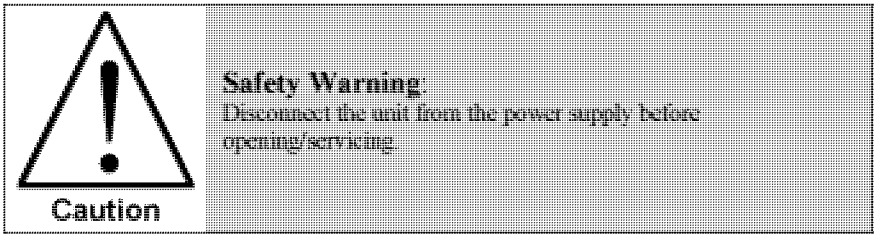
This equipment has been tested to determine compliance with the requirements of:

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.

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



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