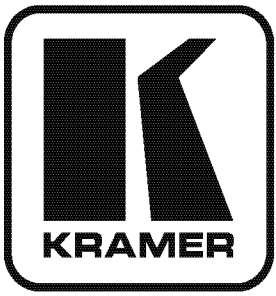
Kramer Electronics, Ltd.



USER MANUAL

Model:

VS-3232A

32x32 Audio Matrix Switcher

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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 groups[1] that are clearly defined by function.

Thank you for purchasing your Kramer **VS-3232A** *32x32 Balanced Stereo Audio Matrix Switcher.*

This product is ideal for the following typical applications:

- Professional display systems requiring audio signal routing
- Broadcast, presentation and production facilities
- Rental/staging applications
- Monitoring in large duplication systems

The package includes the following items:

- **VS-3232A** *32x32 Audio Matrix Switcher*
- Windows®-based Kramer control software
- Power cord and Null-modem adapter
- This user manual[2]

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[3]

2.1 Quick Start

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

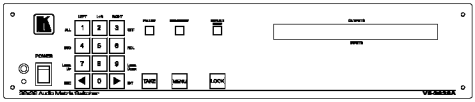
1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

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

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

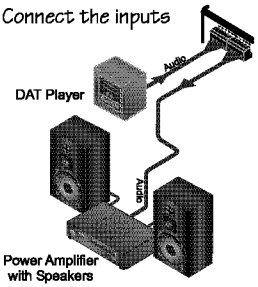
Step 1: Mount the machine - see section 5

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



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

Connect the inputs



Connect the outputs

Step 3: Connect the control port - see section 7

If required, connect an RS-232 Control Port, an RS-485 port and/or the ETHERNET Port

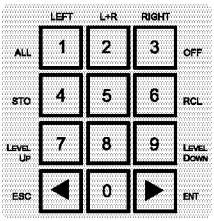
Step 4: Turn the power ON

Step 5: Operate the machine - see section 8

SWITCH AN INPUT TO AN OUTPUT

For example, to switch input 5 to output 24:
Press keys 2 and 4 (for output 24)
Press keys 0 and 5 (for input 5)

Press ESC to cancel an operation



SET THE AUDIO LEVEL

The volume level of the left and right channels for each input/output can be set separately or together using the LEVEL UP and LEVEL DOWN front panel buttons.

1. Select the input/output for which you want to adjust the volume.
2. Press button 1 (left), 2 (L+R) or 3 (right) to select the channels.
3. Use the Level Up and Level Down buttons to adjust the volume.
4. Press ENT to accept changes.

Step 6: Operate the machine - see section 8

Operate via the front panel buttons, IR remote control, RS-485, RS-232, and ETHERNET

3 Overview

The **VS-3232A** is a high-performance 32x32 matrix switcher (router) for analog balanced stereo audio signals. The unit can route any or all inputs to any or all outputs simultaneously.

The **VS-3232A** features:

- Clean switching (noise free)
- Level control for each input and output
- An S/N ratio of over 100dB at +20dBu/1kHz and a linearity better than 0.1dB from -25dBu to +20dBu
- THD and noise below 0.03%
- A flat frequency response from 20Hz to 20kHz (±0.1dB)
- The ability to operate as a standalone audio router or as a companion router to the **VP-3232V(xl)**
- The ability when connected to the **VP-3232V(xl)**, to operate in audio-follow-video or breakaway mode
- Flexible control options: front panel, remote control via RS-232 (K-Router™ Windows®-based software is included), RS-485, Ethernet and IR remote (included)
- A TAKE button for executing multiple switches all at once
- 60 memory locations to store the machine's full status such as presets to be recalled and executed when needed. One "Default" setup can be executed immediately by pressing the default button
- Front panel lockout
- Two optional communication protocols, the Kramer 2000 and Sierra ASCII protocols (partial)
- A worldwide power supply, 100-240V AC on a standard 19" rack mount size, with 2U Rack "ears" included

To achieve the best performance:

- Use only good quality connection cables to avoid 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 that may adversely influence signal quality and position your **VS-3232A** away from moisture, excessive sunlight and dust

4 Your Balanced Stereo Audio Matrix Switcher

Figure 1 and Table 1 define the front panel of the **VS-3232A**.

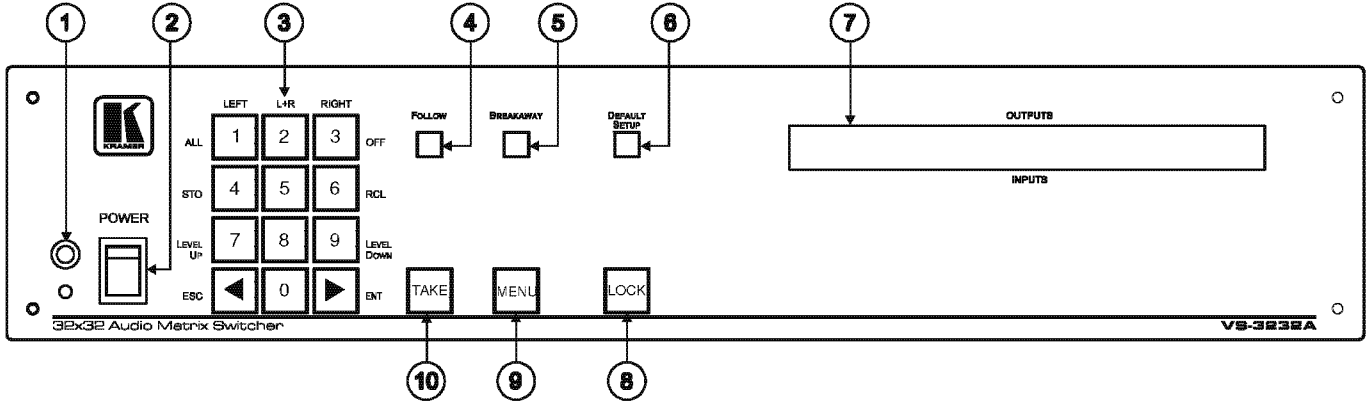


Figure 1: Front Panel VS-3232A 32x32 Audio Matrix Switcher

Table 1: Front Panel VS-3232A 32x32 Audio Matrix Switcher Features

#	Feature	Function
1	IR Receiver	The red LED is illuminated when receiving signals from the Kramer infrared remote control transmitter
2	*POWER* Switch	Illuminated switch for turning the unit ON or OFF
3	Keypad	See Figure 2 and Table 2
4	*FOLLOW* Button	Press to enter the Follow mode in the multi-switcher configuration
5	*BREAKAWAY* Button	Press to enter the Standalone mode in the multi-switcher configuration
6	*DEFAULT SETUP* Button	Press to recall the default setup (UNITY setting), see section 9.6
7	*INPUTS/OUTPUTS* LCD Display	Displays the outputs (in the upper row) switched to the selected inputs (in the lower row). Displays user interface messages and configuration menu items
8	*LOCK* Button	Toggle[1] to lock/unlock the front panel buttons
9	*MENU* Button	Press once to enable the ALL, OFF STO and RCL buttons Press twice to enter the audio input/output volume control menu Press three times to enter the configuration menu When in the configuration menu, press to browse through the menu items
10	*TAKE* Button	Used to confirm and complete setup and switching

1 Press and hold the LOCK button for about two seconds to toggle

The keypad selector buttons (illustrated in Figure 2 and Table 2) are used to select the outputs and the inputs when routing[1]. Use the ◄ keypad button to shift the display content to the left, and the ► keypad button to shift the display content to the right (as the LCD display is only large enough to show 13 cross-points out of a total of 32). Most keypad buttons have more than one function, as defined in Table 2.

Table 2: VS-3232A Keypad Selector Buttons Functions

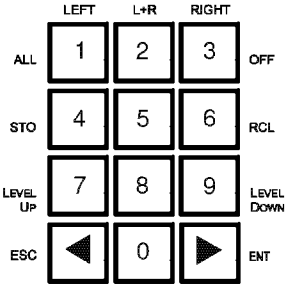


Figure 2: VS-3232A Keypad Selector Buttons

Keypad #	Function
1	*ALL*[2] – Press *ALL* followed by an input number to connect that input to all the outputs *LEFT* – Press to select the left channel of a selected input or output[3]
2	*L+R* (Left and Right) – Press to select both left and right channels of a selected input or output
3	*OFF*[2] – Press OFF followed by an output number to disconnect that output *RIGHT* – Press to select the right channel of a selected input or output
4	*STO*[2] – Press to store the current setting in the non-volatile memory
6	*RCL*[2] – Press to recall a setup from the non-volatile memory
7	*LEVEL UP* – Press to increase the audio output level of the selected input or output[4]
9	*LEVEL DOWN* – Press to decrease the audio level of the selected input or output[4]
◄ (Backward)	*ESC* – Press to exit the current operation
► (Forward)	*ENT* – Press to complete the input-output setup when using a one-digit number instead of two digits[5] Press to enter the options in a setup menu

Figure 3 and Table 3 define the rear panel of the **VS-3232A**.

1 See section 8.4

2 This button is enabled and illuminated after pressing the MENU button

3 For audio level adjustment

4 You can adjust the left, right or both channels of an input or an output

5 For example, to enter input 5, you can either press 0, 5 or 5, ENT

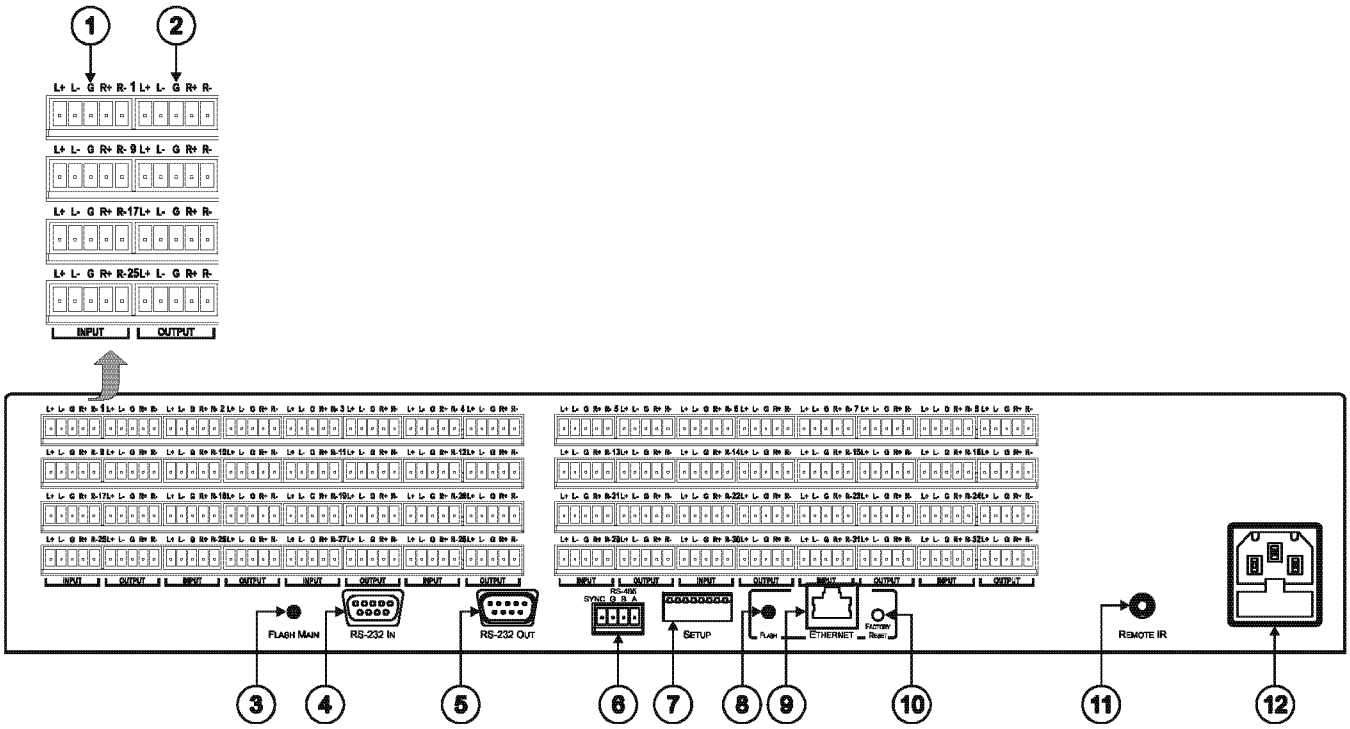


Figure 3: Rear Panel VS-3232A 32x32 Audio Matrix Switcher

Table 3: Rear Panel VS-3232A 32x32 Audio Matrix Switcher Features

#	Feature	Function
1	*INPUT* Terminal Block Connectors	Connect to the balanced stereo audio sources (from 1 to 32)
2	*OUTPUT* Terminal Block Connectors	Connect to the balanced stereo audio acceptors (from 1 to 32)
3	*FLASH MAIN* Button	Push in[1] to upgrade the switcher microcontroller to the latest Kramer firmware (see section 10.1), or release (the factory default) for normal operation
4	*RS-232 IN* 9-pin D-sub F Port	Connects to the PC or the Remote Controller[2]
5	*RS-232 OUT* 9-pin D-sub M Port	Connects to the RS-232 IN 9-pin D-sub F port of the next unit in the daisy-chain connection
6	*RS-485* Detachable Terminal Block Port	The A and B PINs are for RS-485, and the SYNC and the G PINs are for vertical sync and ground connection, respectively
7	*SETUP* DIP-switches	For setup of the unit (see section 7.5)
8	*FLASH* Button	Push in[1] to upgrade the ETH FLASH firmware version (see section 10.2), or release (the factory default) for normal operation
9	*ETHERNET* Connector	Connects to the PC or other Serial Controller through computer networking LAN
10	*FACTORY RESET* Button	Press to reset to factory default definitions[3]: IP Address: 192.168.1.39 Mask: 255.255.255.0 Gateway: 192.168.1.1
11	*REMOTE IR* 3.5mm Mini Jack	Connects to an external IR receiver unit[4] for controlling the machine via an IR remote controller (instead of using the front panel IR receiver)
12	Power Connector with Fuse	AC connector enabling power supply to the unit

4.1 Using the IR Transmitter

You can use the **RC-IR2** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver[5]. The external IR receiver can be located up to 15 meters away from the machine. This distance can be extended to up to 60 meters when used with three extension cables[6].

Connect the external IR receiver to the REMOTE IR 3.5mm connector.

1 Using a small screwdriver, if required

2 If the unit is not the first unit in the line, connects to the RS-232 OUT 9-pin D-sub F port of the previous unit in the line

3 Turn the machine OFF using the power switch and then turn it ON while pressing the ETH Factory Reset button. The unit will power up and load its memory with the factory default definitions

4 Can be used instead of the front panel (built-in) IR receiver to remotely control the machine

5 Model: C-A35M/IRR-50

6 Model: C-A35M/A35F-50

5 Installing the VS-3232A in a Rack

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

Before Installing in a rack

Before installing in a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5º to +45º C (41º to 113º F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20º to +70º C (-4º to 158º F)
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!!

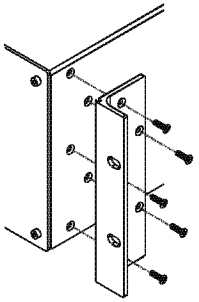
When installing on a 19" rack, avoid hazards by taking care that:

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 (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 five 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 a Single VS-3232A 32x32 Audio Matrix Switcher

To connect the **VS-3232A** as illustrated in the example in Figure 4, do the following[1]:

1. Connect up to 32 balanced audio sources[2].
2. Connect up to 32 balanced audio acceptors[2].
3. Set the DIP-switches (see section 7.5).
4. If required, connect a PC or controller to the RS-232 port (see section 7.6.1) or the RS-485 port (see section 7.6.2) or the ETHERNET port (see section 7.8).
5. Connect the power cord[3].

If necessary, review and set the system variables, using the MENU function, and the default setup (UNITY setting) as section 9 describes.

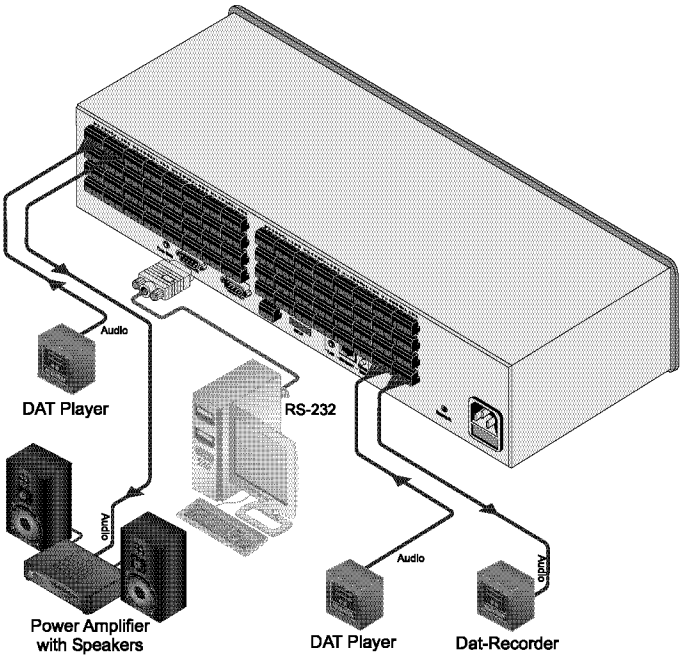


Figure 4: Connecting the VS-3232A Audio Matrix Switcher

1 Switch OFF the power on each device before connecting it to your VS-3232A

2 You do not have to connect all the inputs and the outputs. In this example only two inputs (two DAT players) and two outputs (a power amplifier with speakers and a DAT recorder) are connected

3 We recommend that you use only the power cord that is supplied with this machine

6.1 Connecting the Balanced/Unbalanced Stereo Audio Input/Output

This section illustrates how to wire:

- A balanced stereo audio input and output, see Figure 5
- An unbalanced stereo audio input, see Figure 6
- An unbalanced Stereo Audio Output, see Figure 7

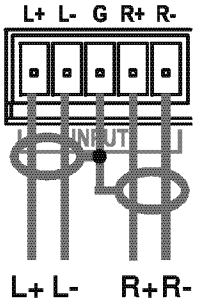


Figure 5: Connecting a Balanced VS-3232A Stereo Audio Input and Output

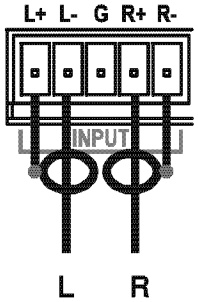


Figure 6: Connecting an Unbalanced VS-3232A Stereo Audio Input

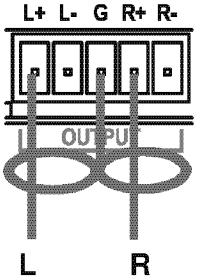


Figure 7: Connecting an Unbalanced VS-3232A Stereo Audio Output

7 VS-3232A 32x32 Audio Matrix Switcher Configurations

The **VS-3232A** belongs to a series of 32x32 matrix switchers, including the **VS-3232V** and the **VS-3232Vxl**, and as such, can interconnect with them. The following sections describe:

- The **VS-3232A** configuration setups (see section 7.1)
- Various matrix configurations (see sections 7.2, 7.3, and 7.4)
- The DIP-switch setup (see section 7.5)
- How to connect a control interface (see section 7.6)
- How to set the SYNC (see section 7.7)
- How to control via the Ethernet (see section 7.8)

7.1 The VS-3232A Configuration Setups

The **VS-3232A** includes two configuration setups: the Follow-System setup (see section 7.1.1) and the Master/Slave setup (see section 7.1.2).

7.1.1 The Follow-System Configuration Setup

The Follow-System configuration allows communication between the connected units via a common control line.

In the Follow-System configuration setup:

- Any type of signal can follow one or more signals within the setup at your choice
- Any unit can be turned ON or OFF at any time
- The LCD display on each unit shows the switching operations independently

Each unit within this configuration can be switched in the FOLLOW or BREAKAWAY state (via the FOLLOW or BREAKAWAY front panel buttons) at any time, depending on the current application requirements. When the:

- FOLLOW button is pressed, signals are switched simultaneously
- BREAKAWAY button is pressed, each machine in the configuration setup is switched independently

By default, the matrix switchers are set to the BREAKAWAY state (meaning that each machine switches independently from the other machines in the configuration setup).

Pressing the FOLLOW button on one machine and then on other machines, sets them searching for other machines, and they can follow each other without reference to the order in which they are connected. In this state,

switching an input to an output on one machine, switches the same input to the same output on the other machines in the FOLLOW state.

DIP 5 defines whether the **VS-3232A** unit can communicate with other switchers via a common control line. Set DIP 5 to:

- ON, to enable the Follow-System configuration setup
- OFF, to disable the Follow-System configuration setup

Set the machine number on each machine to a **different** value.

The example illustrated in Figure 8 shows three 32x32 matrix switchers: one composite video (CV) switcher (the **VS-3232Vxl**) and two **VS-3232A** audio switchers (A1 for the "English" language, and A2 for the "French" language). DIP 5 is set to ON and DIP 6 is set to OFF on all the switchers. Each unit within the system is set to a different machine number (see section 7.5.1).

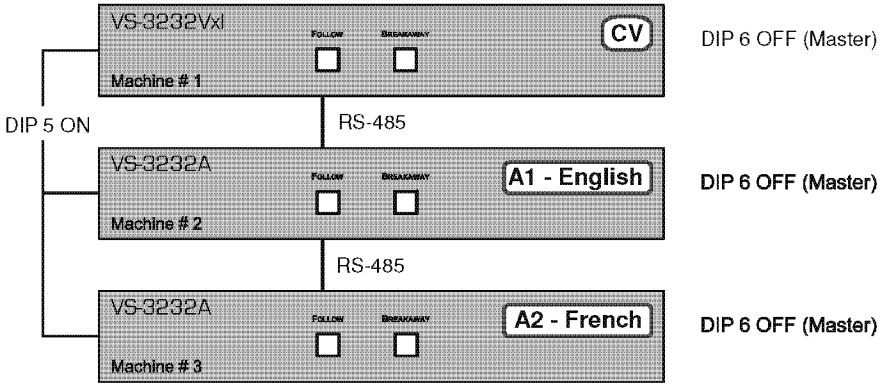


Figure 8: Connecting in the Follow-System Configuration Setup

The Follow-System configuration Setup lets you operate the system in the following way:

- Initially, all three units are set to the Breakaway state. This means that each unit operates independently, as a standalone unit
- Pressing the FOLLOW button on the two audio switchers, sets them searching for other machines they can follow within the communication line
  At this state, the video switcher still operates as a standalone unit, but the audio switchers follow each other: for example, switching input 1 to output 16 on the English language audio switcher, switches input 1 to input 16 on the French language audio switcher

- Pressing the FOLLOW button on the CV switcher too, sets it searching for the other machines in the FOLLOW state
  At this state, all three switchers follow each other: for example, switching input 1 to output 16 on the English language audio switcher, switches input 1 to output 16 on the French language audio switcher and on the CV switcher. Alternatively, you switch the CV switcher and have both audio switchers follow
- To return to independent switching, simply press the BREAKAWAY button on the switcher

7.1.2 The Master/Slave Configuration Setup

The Master/Slave configuration setup is only used for the multi-channel switchers configuration: one unit is set to be the Master and the other units are set to be the Slaves. The Slave units always follow the Master, they cannot be set to work as a standalone, unless you turn them off and change the DIP-switch settings.

In the Master/Slave configuration setup, the Slave unit initializing-sequence always follows the Master unit initialization-sequence, and the entire setup sequence is automatic (the Master–slave system automatically sets the master and the slave setup follows).

If several slave units are connected in a Master/Slave configuration, the initialization delay time for each of the Slave units (except for the first slave in the sequence) should be programmed via the menu, as described in section 9.7.

To change the initializing sequence delay time for a Slave unit via the menu, set DIP 6 to OFF and turn the unit ON separately in the Master mode.

On the Slave **VS-3232A** unit, the LCD display[1], shows the following message upon initialization[2]:

The unit set in SLAVE mode
Front panel completely LOCKED

However, during normal operation, the display on the Slave **VS-3232A** unit dynamically shows[3] all the changes that were made in the Master **VS-3232A** unit.

The front panel control is managed via the Master unit, on which the front panel buttons are unlocked and the LCD display illuminates.

1 At the time of powering the machines ON

2 Or when pressing any of the front panel buttons (by mistake)

3 Albeit with an LCD Display that does not illuminate

The BREAKAWAY and FOLLOW front panel buttons have no effect in the Master/Slave configuration setup since the connected machines act as one unit in one box.

DIP 6 determines the operation mode of each unit within the Master/Slave configuration setup. DIP 6 is set to:

- ON, for the Slave units in the configuration setup
- OFF, for the Master unit in the configuration setup

Set the machine number on all the machines to the **same** value.

The example illustrated in Figure 9 shows three 32x32 matrix switchers: one composite video switcher and two audio switchers. DIP 5 is set to OFF on all three switchers and DIP 6 is set to OFF on the CV **VS-3232Vxl** switcher (the Master) and to ON on the two **VS-3232A** audio switchers[1] (the Slaves). All the units have the same machine number (see section 7.5.1).

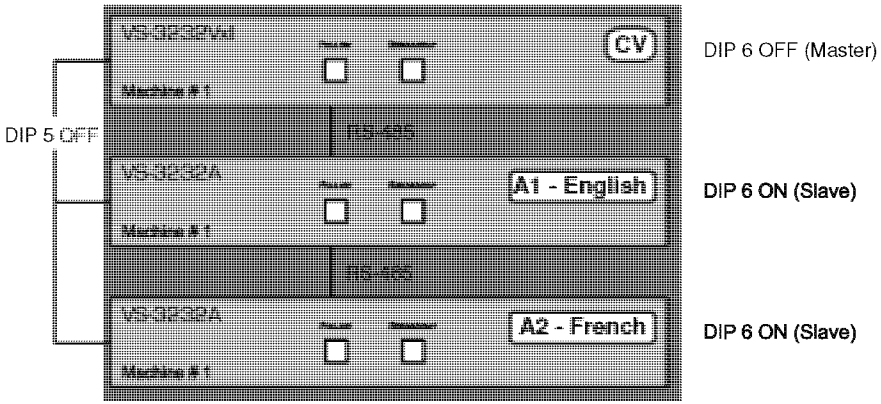


Figure 9: Connecting in the Master/Slave Configuration Setup

In this example, the Slaves always follow the Master, and both machines act as a single unit.

Switching input 1 to output 16 on the CV switcher, switches input 1 to output 16 on the English language audio switcher and on the French language audio switcher. In this state you cannot perform this switching operation on any of the audio switchers and have the CV switcher follow, or set any of the machines in this configuration to operate independently (as a standalone unit), unless you turn OFF the machines and change the DIP-switch settings.

1 A1 for the "English" language, and A2 for the "French" language

7.1.3 The Follow-System *versus the* Master/Slave Configuration Setups

The example illustrated in Figure 10 shows three 32x32 matrix switchers: one composite video switcher and two audio switchers. DIP 5 is set to ON on all the units. DIP 6 is set to OFF on the CV **VS-3232Vxl** switcher and on the A1 English language **VS-3232A** audio switcher. DIP 6 is set to ON on the A2 French language **VS-3232A** audio switcher.

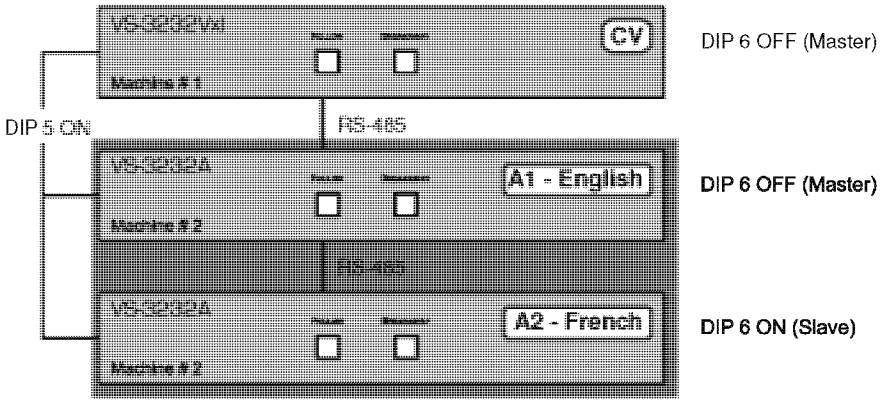


Figure 10: The Follow-System Combined with the Master/Slave Configuration Setup

In this example, the audio switchers are in the Master/Slave configuration setup (the French language switcher always follows the English language switcher). The CV switcher and the combined audio switcher unit are in the Follow-System configuration setup.

Table 4 summarizes the differences between the Follow-System configuration setup and the Master/Slave configuration setup:

Table 4: Follow-System versus the Master/Slave Configuration Setup

Follow-System Configuration Setup	Master/Slave Configuration Setup
Several units are connected in a common control line. The unit can be switched in the FOLLOW or BREAKAWAY state at any time (using the FOLLOW and BREAKAWAY front panel buttons), depending on the current application requirements.	One unit is set as the Master, the others as slaves. The Slaves always follow the Master. The machines cannot operate as standalone units without turning off and changing the DIP-switch settings. The FOLLOW/BREAKAWAY state is not applicable because the connected machines act as one unit.
Any unit can be turned on or off at any time.	The Slave unit can be turned ON only after full initialization of the Master unit.
Each machine has a different machine number value.	All the machines have the same machine number.

7.2 Assembling a Multi-channel Audio Switcher

The example in Figure 11 illustrates a 4-channel 32x32 configuration consisting of two **VS-3232A** units. Broadcasting applications often use four channels, to broadcast stereo audio sound in two languages (say, English and French) or to produce surround sound.

DIP 6 is set to OFF on the master unit and set to ON on the Slave unit.

The front panel of the Slave unit is always locked and the LCD display does not illuminate. The Slave unit follows the Master. The Master unit operates in the regular way, that is, its front panel is not locked and the LCD display illuminates, leading the Slaves in the background.

When turning the system ON, the Slave unit initialization sequence automatically follows the Master unit initialization sequence.

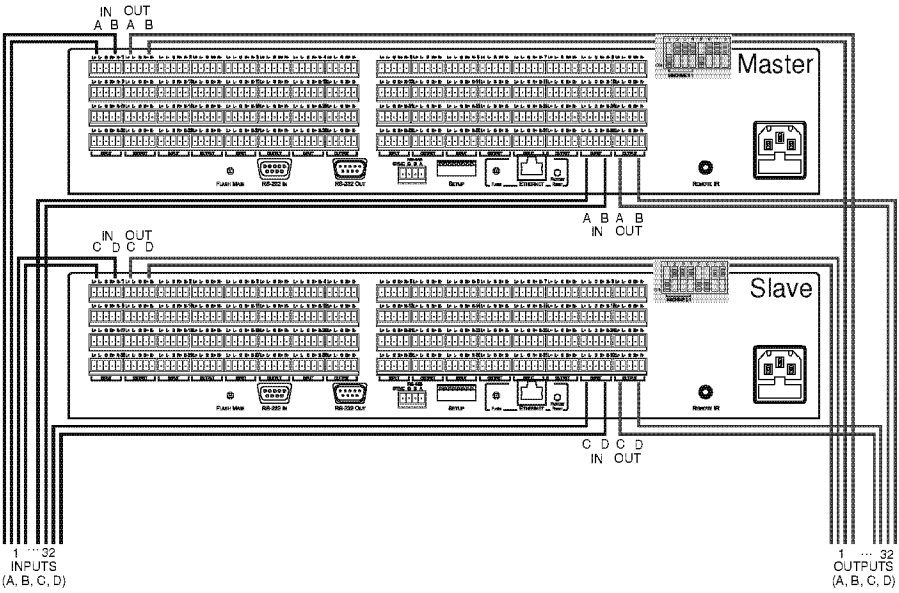


Figure 11: Configuring a 4-channel 32x32 Switcher with Two VS-3232A Switchers

7.3 Connecting the VS-3232A as a Companion to the VS-3232V(xl)

You can connect the **VS-3232A** as an analog audio companion to the **VS-3232Vxl** *32x32 Video Matrix Switcher*, as illustrated in the example in Figure 12.

To connect the **VS-3232A** as a companion to the **VS-3232Vxl**, do the following:

1. Connect the required inputs and outputs to the **VS-3232A** and the **VS-3232Vxl**.
2. Connect the two switchers via the RS-232 or RS-485 control interface (see section 7.6).
3. Set the DIP-switches according to the required configuration setup (see section 7.5).
4. Connect the power cord[1].
5. If necessary, review and set the system variables, using the MENU function, and the default setup (UNITY setting) as section 9 describes.

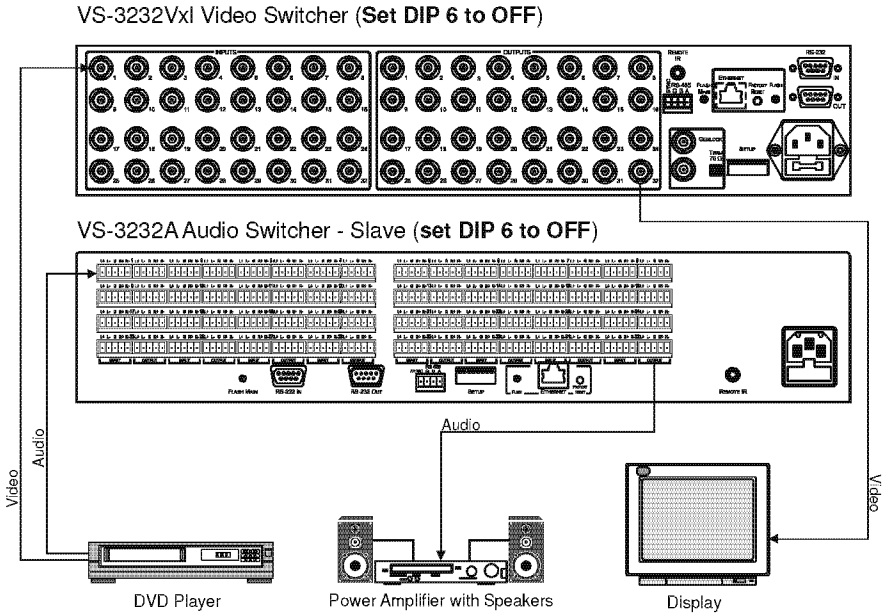


Figure 12: Connecting the VS-3232A as a Companion to the VS-3232Vxl

1 We recommend that you use only the power cord that is supplied with this machine

7.4 Connecting the VS-3232A as a Companion to a Multi-channel Video Switcher

You can connect the **VS-3232A** to a multi-channel system such as a switcher for YUV (RGB) by combining three **VS-3232Vxl** units[1].

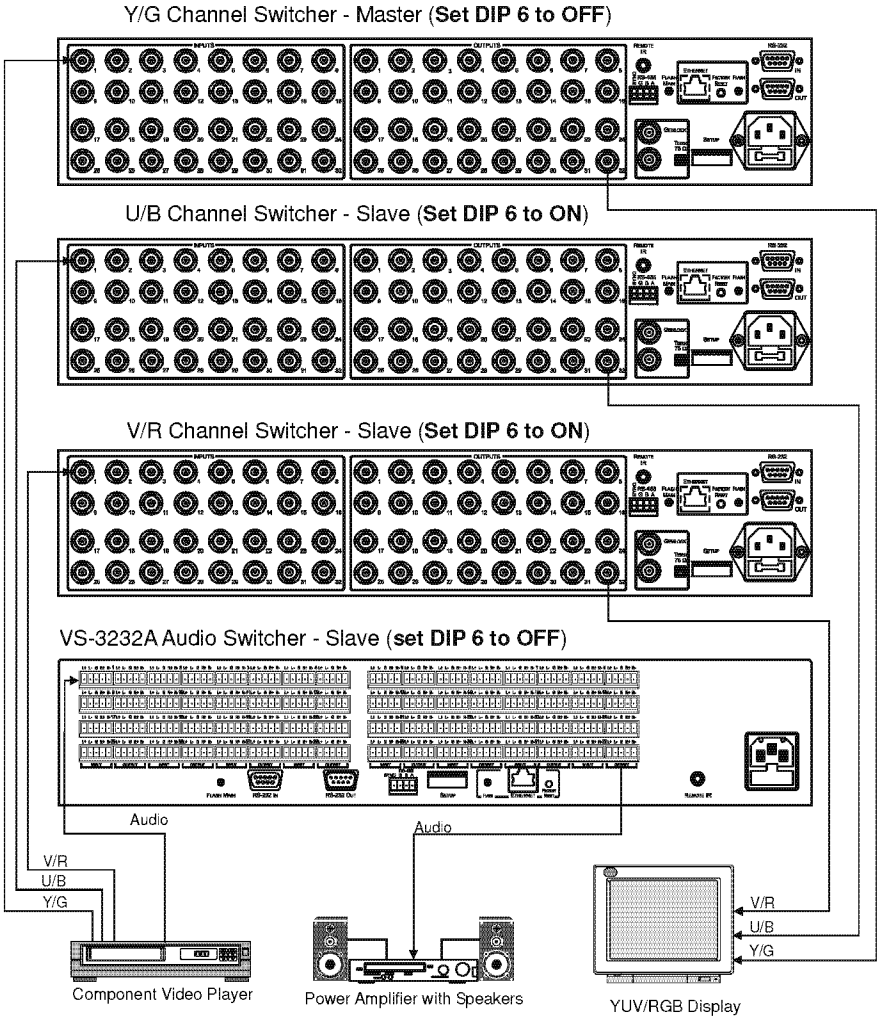


Figure 13: Connecting the VS-3232A as a Companion to a Multi-channel Switcher

1 You can also assemble an s-Video system (using two VS-3232Vxl units) or an RGBS system (using four VS-3232Vxl units)

Set the DIP-switches as follows:

Table 5: DIP-switch Settings for VS-3232A and VS-3232V(xl) Switchers

Machine Name		Machine #				Follow-System	Master/Slave
		1	2	3	4	5	6
VS-3232V(xl)	Y (G)	ON	OFF	OFF	OFF	ON	OFF
	U (B)	ON	OFF	OFF	OFF	ON	ON
	V (R)	ON	OFF	OFF	OFF	ON	ON
VS-3232A	Audio	OFF	ON	OFF	OFF	ON	OFF

Connect the communication line between the switchers via the RS-232 or RS-485 control interface as section 7.6 describes.

7.5 DIP-switch Settings

By default all the DIP-switches are set to OFF. Configure the **VS-3232A** by setting the eight DIP-switches as Figure 14 and Table 6 define:

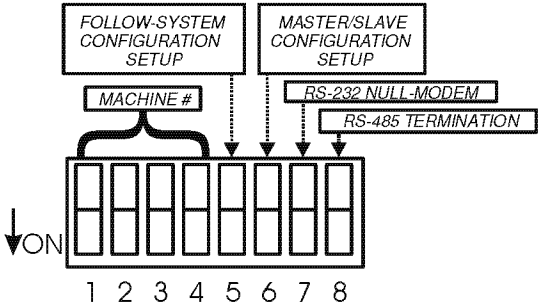


Figure 14: DIP-switches

Table 6: DIP-switch Definitions

DIP-switch #	Function:
1-4	Set the machine # (see Table 7 in section 7.5.1)
5	Enables (ON) or disables (OFF) the Follow-System configuration setup in a multi-switcher configuration
6	Enables (ON) or disables (OFF) the *Master/Slave* configuration setup in a multi-channel configuration
7	Disables the use of a null modem adapter[1] with RS-232 as follows: Set OFF for RS-232 input connection via a null modem adapter Set ON for RS-232 straight connection without a null modem adapter
8	Set ON for RS-485 termination for the first and the last machine (RS-485 line terminates with 110Ω); for others set OFF (RS-485 line is open)

1 See section 7.6.1

7.5.1 Setting the Machine

To control a unit remotely via RS-232, RS-485, IR or the Ethernet, each unit has to be identified via its unique Machine #. Set the Machine #[1] on a **VS-3232A** unit according to Table 7.

Table 7: Machine # DIP-switch Settings

Mach. #	DIP 1	DIP 2	DIP 3	DIP 4
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON

Mach. #	DIP 1	DIP 2	DIP 3	DIP 4
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

7.6 Connecting a Control Interface

You can connect a control interface (RS-232 or RS-485). It is recommended that the control interfaces are identical on each switcher in the series of 32x32 matrix switchers; either RS-232 or RS-485 (one control interface suffices). For example, in an interconnected varied-format 32x32 switcher application, if the switcher that connects to the PC connects via the RS-232 control interface, each switcher would interconnect via the RS-232 control interface and not via the RS-485 control interface.

You may transfer from one interface to another via the Kramer **VP-43xl** *Interface Converter*[2]. You can choose the RS-232 control interface, if the range is less than 25 meters for each point-to-point connection.

For greater ranges, you can choose the RS-485 control interface, and operate the switcher from an extended distance of up to 1000 meters.

7.6.1 Connecting the RS-232 Control Interface

You can connect several switchers (from the series of 32x32 or 16x16 matrix switchers) and the control unit in an RS-232 daisy chain arrangement, with or without using a Null-modem adapter, as Figure 15 illustrates.

The RS-232 daisy chain switcher arrangement is transparent. This lets you arrange the switchers (from the series of 32x32 or 16x16 matrix switchers) according to your requirements, and not according to a fixed sequence dependent on the Machine #.

1 When using a single unit, set the unit to MACHINE # 1

2 For more information on the VP-43xl, go to our Web site at http://www.kramerelectronics.com

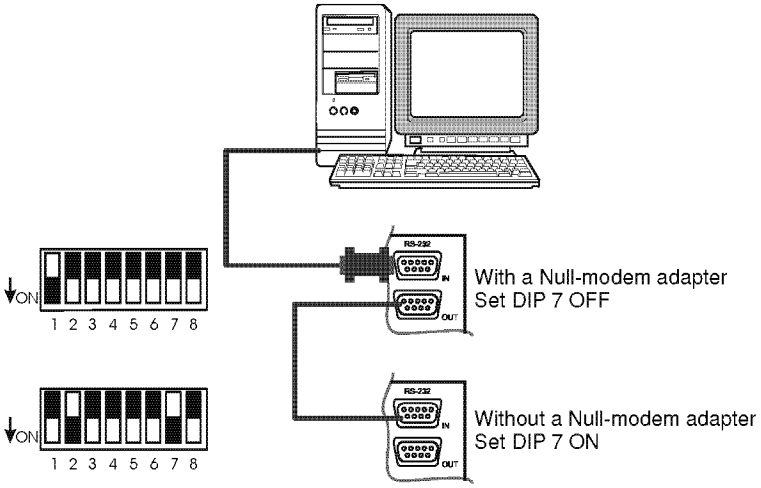


Figure 15: Connecting a PC to two VS-3232A Units

You can connect any of the following:

- The 9-pin D-sub COM port of the PC to a **VS-3232A** unit[1] (see section 7.6.1.1)
- Two **VS-3232A** units[1] or a **VS-3232Vxl** video matrix switcher[2] connected to a **VS-3232A** audio matrix switcher, (see section 7.6.1.2)

Note, turning OFF the power on a unit that is connected as part of an RS-232 daisy-chain will destroy the daisy-chain connection

7.6.1.1 Connecting a PC to a VS-3232A Unit via RS-232

To connect a PC to a **VS-3232A** unit, using the Null-modem adapter provided with the machine (the default):

1. Connect the RS-232 IN 9-pin D-sub rear panel port on the Master **VS-3232A** unit to the Null-modem adapter and connect the Null-modem adapter with a cable[3] to the RS-232 9-pin D-sub port on your PC.
2. Set DIP 7 OFF[4] (enabling Null-modem adapter use) on the **VS-3232A** unit.

1 With or without the Null-modem adapter

2 Or a multi-channel switch comprising of several VS-3232V(xl) units

3 The cable should consist of at least three straight-through wires for PINs 2, 3 and 5

4 See section 7.5

To connect a PC to the **VS-3232A** unit, without using a Null-modem adapter:

1. Connect the RS-232 9-pin D-sub port on your PC to the RS-232 IN 9-pin D-sub rear panel port on the Master **VS-3232A** with a 9-wire cable[1] to the RS-232 9-pin D-sub port on your PC.
2. Set DIP 7 ON[2] (disabling Null-modem adapter use) on the **VS-3232A** unit.

7.6.1.2 Connecting two VS-3232A Units via RS-232

To connect two **VS-3232A** units, using a Null-modem adapter provided with the machine (the default):

1. Connect a cable between the RS-232 OUT 9-pin D-sub port on the first **VS-3232A** unit and the Null-modem adapter that attaches to the RS-232 IN 9-pin D-sub port on the second **VS-3232A** unit.
2. On the second **VS-3232A** unit, set DIP 7 OFF[4] (enabling Null-modem adapter use).

To connect two **VS-3232A** units, without using a Null-modem adapter:

1. Connect a cable between the RS-232 OUT 9-pin D-sub port on the first **VS-3232A** unit and the RS-232 IN 9-pin D-sub port on the second **VS-3232A** unit.
2. On the second **VS-3232A** unit, set DIP 7 ON (disabling Null-modem adapter use).

7.6.2 Connecting the RS-485 Control Interface

Figure 16 defines the RS-485 connector PINOUT for external RS-485 control. The RS-485 connector is also used (if required) for vertical sync. The A and B PINs are for RS-485, and the SYNC and the G PINs are for vertical sync and ground connection, respectively

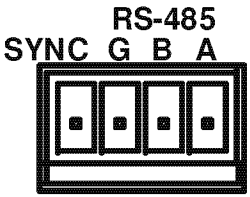


Figure 16: RS-485 Connector PINOUT

1 The cable should consist of at least three straight-through wires – PINs 2, 3 and 5 – and PINs 2 and 3 should be crossed

2 See section 7.5

To connect an RS-485 connector on one **VS-3232A** unit to an RS-485 connector on one or more video switchers (from the series of 32x32 or 16x16 matrix switchers), as Figure 17 illustrates:

1. Connect the "A" PIN on the first **VS-3232A** unit to the "A" PIN on the **VS-3232Vxl** unit and to all the other video units.
2. Connect the "B" PIN on the first **VS-3232A** unit to the "B" PIN on the **VS-3232Vxl** unit and to all the other video units.
3. If shielded twisted pair cable is used, the shield may be connected to the "G" (Ground) PIN

If necessary (for a video-audio combination only), connect the SYNC pins together. For details about how to configure the vertical sync (if required), refer to section 7.7 and section 9.2.

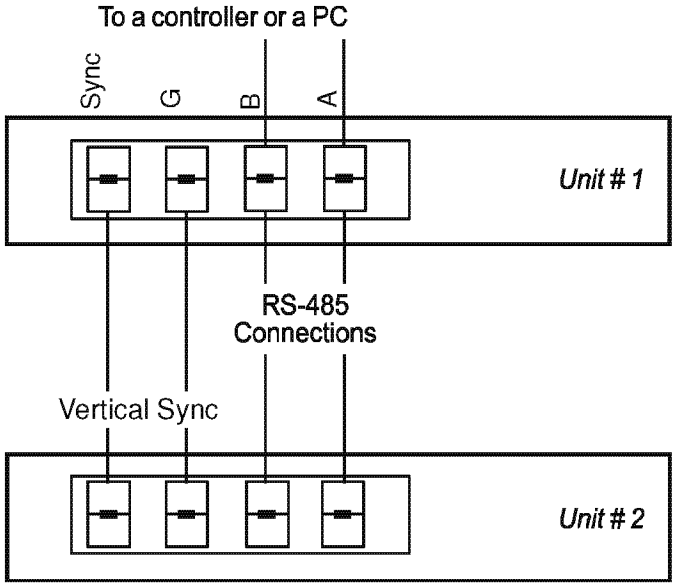


Figure 17: Connecting the RS-485 Connectors between VS-3232A/VS-3232V(xl) Units

Figure 18 illustrates the RS-485 line that connects:

- Between the **VS-3232Vxl** and **VS-3232A** unit
- To the PC via a Kramer TOOLS **VP-43xl** *Interface Converter* (connect the 9-pin D-sub COM port of the PC to the RS-232 IN 9-pin D-sub F port on the **VP-43xl** and then connect the RS-485 port on the **VP-43xl** to the RS-485 ports on the switcher units)

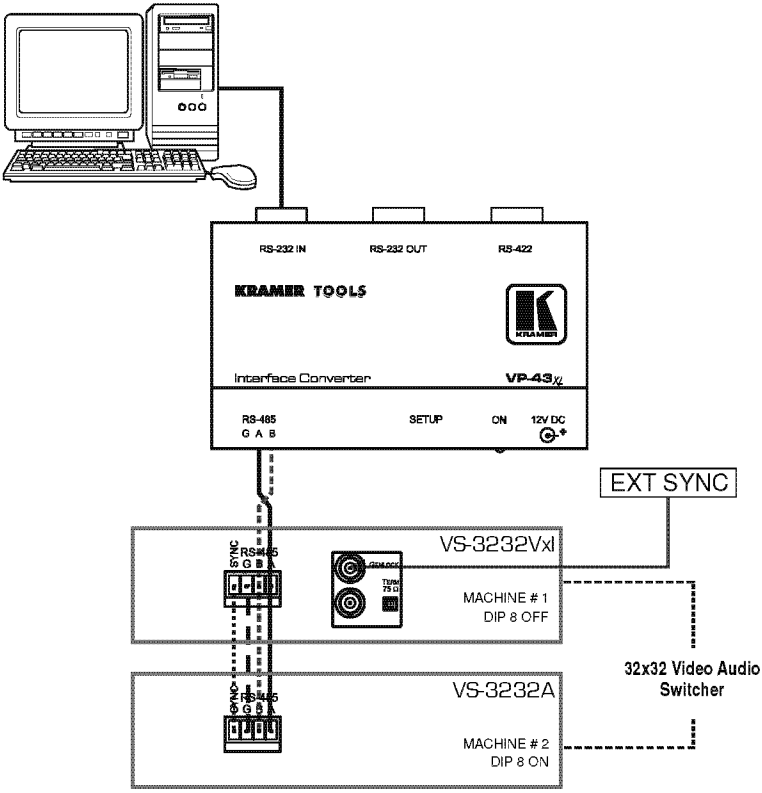


Figure 18: RS-485 Control Interface and SYNC Connections

7.7 Setting the Sync

You can set the **VS-3232A** to switch simultaneously with video (a sync derived from another 32x32 or 16x16 series switcher) via the RS-485 sync terminal block connector[1] or set the machine to the immediate switching mode, in which switching is executed immediately after receiving the command.

Configure the sync via the SYNC Configuration Menu command setting[2]. When setting up a 32x32 video and audio switcher, for example, it may be necessary to link a common sync to all the machines to facilitate simultaneous vertical interval switching.

1 When using multiple machines in one system

2 Refer to section 9.2

Usually the easiest method is to choose the sync source from the first video machine and then connect all the terminal block connectors, as Figure 18 illustrates. In this case, set the first machine to select the sync source from the external sync connector or from the INPUT # 1 connector[1]. This sync is now available to the other machines via the RS-485 terminal block connector, as the examples in Figure 16, Figure 17 and Figure 18 illustrate. Select the EXT-SYS SYNC[2] on the other machines that receive that sync.

7.8 Controlling via the ETHERNET

You can connect the **VS-3232A** via the Ethernet, using a crossover cable (see section 7.8.1) for direct connection to the PC or a straight through cable (see section 7.8.2) for connection via a network hub or network router[3].

7.8.1 Connecting the ETHERNET Port directly to a PC (Crossover Cable)

You can connect the Ethernet port of the **VS-3232A** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identification of the factory default IP Address of the **VS-3232A** during the initial configuration

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

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 19).

1 If the first machine is a VS-3232Vxl Video Matrix Switcher

2 You can also select the immediate switching mode (see section 9.1), in which the switching operation is executed immediately after receiving the command. This mode is not a glitch free transition

3 After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the "Ethernet Configuration (FC-11) guide.pdf" file in the technical support section on our Web site: http://www.kramerelectronics.com

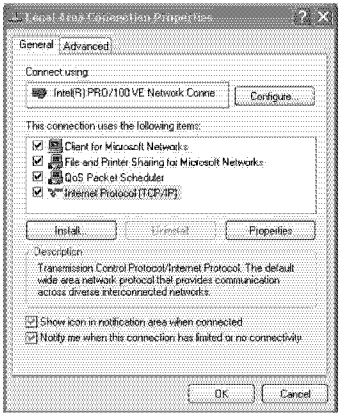


Figure 19: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 20.
7. Click **OK**.

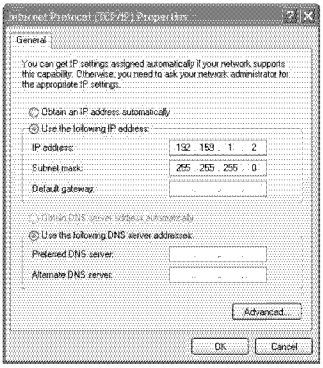


Figure 20: Internet Protocol (TCP/IP) Properties Window

7.8.2 Connecting the ETHERNET Port via a Network Hub (Straight-Through Cable)

You can connect the Ethernet port of the **VS-3232A** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

7.8.3 Control Configuration via the Ethernet Port

To control several units via the Ethernet, connect the Master unit (Machine # 1) via the Ethernet port to the LAN port of your PC. Use your PC initially to configure the settings (see section 7.8).

8 Operating Your Video Matrix Switcher

This section describes:

- The startup display (see section 8.1)
- How to use the selector buttons (see section 8.2)
- How to confirm actions (see section 8.3)
- The switching options (see section 8.4)
- How to store and recall setups (see section 8.5)
- The DEFAULT SETUP button (see section 8.6)
- How to Choose the FOLLOW or the BREAKAWAY modes (see section 8.7)
- How to Lock and unlock the front panel (see section 8.8)
- How to set the Input/Output volume (see section 8.9)

8.1 Startup Display

After switching on the power, the LCD display[1] shows the following screens in sequence:

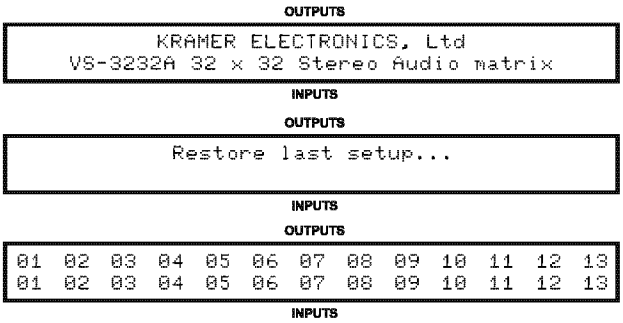


Figure 21: Default Startup Status Display Sequence

The front panel of the **VS-3232A** includes a numerical keyboard within the Keypad area[2]. This keypad includes the numbers from 0 to 9 and lets you enter both the output and input numbers.

1 The text in the LCD Display may vary (according to machine settings)

2 See Table 1

8.1.1 Viewing the Display

Figure 21 shows the output-input cross-points on the LCD display. The LCD display can only show 13 of the 32 input/output combinations.

To view the full contents of the display, shift the contents of the display to the right or to the left, via the ► or the ◄ buttons on the front panel, respectively.

This function is enabled when:

- The switcher is inbetween operations (waiting for its next operation while all previous operations are completed or cancelled)
- Viewing or recalling a setup using the ► or ◄ buttons prior to it execution

When entering an OUT IN combination, the contents of the LCD display automatically shift to indicate the current status of the selected output.

8.2 Using the Keypad Buttons

Since the **VS-3232A** has 32 inputs and outputs (and up to 59 setups that can be recalled), it can handle two digit numbers as well as one digit numbers (for numbers under 10). When entering a one-digit number (for example 5), you can either press 0 followed by 5 or 5 followed by ENT.

The number 00 (or 0, ENT) is relevant for the input only and is used to disconnect the currently entered output number from the input.

The ESC button is used to cancel an operation without affecting the current status of the switcher. For example, if a wrong number is entered, press the ESC button to cancel the operation. The ESC button can also be used for canceling a store/recall operation or to exit the setup menu at any stage.

8.3 Confirming Actions

You can choose to work in the At Once (the default[1]) or the Confirm mode.

In the At Once mode (the TAKE button is not illuminated):

- Pressing an OUT-IN combination implements the switch immediately
- You save time as execution is immediate and actions require no user confirmation
- No protection is offered to correct an erroneous action

1 For all actions except storing/recalling

In the Confirm mode (the TAKE button illuminates):

- You can key-in an action and then confirm it by pressing the TAKE button
- Every action requires user confirmation, protecting against erroneous switching
- Execution is delayed until the user confirms the action[1]

8.3.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the TAKE button[2] to toggle between the At Once mode (in which the TAKE button does not illuminate) and the Confirm mode (in which the TAKE button illuminates).
   Actions now require user confirmation and the TAKE button illuminates.
2. Press the illuminated TAKE button to toggle from the Confirm mode back to the At Once mode.
   Actions no longer require user confirmation and the TAKE button no longer illuminates.

You can toggle between the At Once and Confirm modes at any time, unless the TAKE button blinks.

8.3.2 Confirming a Switching Action

To confirm a switching action (in the Confirm mode), do the following:

1. Press an OUT-IN combination.
   The TAKE button blinks.
2. Press the blinking TAKE button to confirm the action.
   Once the action is executed, the TAKE button illuminates once again.

8.4 Switching Options

You can switch:

- One input to one output (see section 8.4.1)
- Several inputs to several outputs (see section 8.4.2)
- One input to all outputs (see section 8.4.3)

1 Failure to press the TAKE button within half minute (the Timeout) will abort the action

2 For about 2 seconds

8.4.1 Switching one Input to one Output

To switch one input to one output (in the At Once mode):

1. Press the appropriate digit buttons (for example, 06 representing output 6).
   The LCD display shows the following on the right side:

   In_ _ => Out 06

   The left-hand side of the display shows a segment of the input-output display, automatically shifting the content to show the 06 output.
2. Press the appropriate input number (for example, 27 representing input 27):
   - When in the At Once mode, the switching takes place immediately and the LCD display shows a segment of the input-output status, including the switched input and output (for example 06-27)

     When in the Confirm mode, the LCD display shows the following:

     In 27 => Out 06
   - Press the blinking TAKE button to switch the input to the output

8.4.2 Switching Several Inputs to Several Outputs

In the At Once mode, the **VS-3232A** will execute each OUT-IN combination separately (see section 8.4.1). If you want to switch several inputs to several outputs simultaneously, it is necessary to operate the machine in the Confirm mode.

In the Confirm mode you can key-in several actions and then confirm them by pressing the TAKE button once (simultaneously switching several inputs to several outputs).

To simultaneously switch several inputs to several outputs in the Confirm mode (the TAKE LED is illuminated), do the following:

1. Press the appropriate digit buttons for an out-in combination.
   The TAKE button blinks.
   Key-in additional output-input combinations.
   The LCD display can show up to five keyed-in actions, as follows[1]:

   09 => 06 05 => 07
2. After completing the output-input switching sequence, press the blinking TAKE button to carry out the switching operation.
   The inputs switch to the respective outputs, as shown on the LCD display and the TAKE LED no longer blinks and remains illuminated.

1 In this example, input 9 is set to switch to output 06 and input 5 is set to switch to output 7

8.4.3 Switching one Input to all Outputs

To switch one input to all the outputs (in the At Once mode):

1. Press the MENU button once.
   The Menu buttons[1] illuminate and are enabled.
2. Press the illuminated ALL button.
   The LCD display shows the message:

   In___ => ALL
3. Press the appropriate digit buttons (for example, 09 representing input 9).
   All the outputs switch to this input. The LCD display shows all the outputs switched to the input 9.

To switch all the outputs to one input in the Confirm mode (the TAKE LED is illuminated), repeat the steps above and then press the blinking TAKE button to confirm the action.

8.4.4 Clearing an Output[2]

To clear an output (in the At Once mode):

1. Press the MENU button once.
   The Menu buttons[1] illuminate and are enabled.
2. Press the illuminated OFF button.
   The LCD display shows the message:

   out___ => OFF
3. Press the appropriate digit buttons (for example, 25 representing output 25).
   This output is cleared (there is no input switched to this output).

To clear an output in the Confirm mode (the TAKE LED is illuminated), repeat the steps above and then press the blinking TAKE button to confirm the action.

Alternatively, you can perform a switching operation as described in section 8.4.1 and set the input to 00.

8.4.5 Clearing Several Outputs[2]

To clear several outputs in the Confirm mode (the TAKE LED is illuminated), repeat the switching actions described in section 8.4.2 but set all the inputs to 00:

8.4.6 Clearing all Outputs[2]

All the outputs can be cleared only through the configuration menu (see section 9).

1 The ALL, OFF, STO and RCL buttons

2 Turning OFF the output/s, that is no input is routed to the output/s

8.5 Storing and Recalling Setups

You can store up to 59 settings in the non-volatile memory with the ability to recall each of those settings.

A stored and recalled setup includes the cross-point connections as well as the audio level for all the 32 inputs and 32 outputs.

8.5.1 Storing Setups

To store a setting, do the following:

1. Press the MENU button once.
   The Menu buttons[1] illuminate and are enabled.
2. Press the illuminated STO button.
   The LCD display shows the message:

   STORE => __

3. Insert a digit from 01 to 59 (for example, press 1 twice for 11).
   In the At Once mode, the action is immediately executed and the LCD display briefly shows[1]:

   Setup STORED

   Memory 11 now stores the current setting.

Note that when saving a setup to an already allocated memory, the TAKE button blinks and the LCD display shows the message:

Setup NOT Empty

CONFIRM

You can either press the:

- TAKE button to overwrite the existing setup
- ESC button to save the setup to a different memory location
- ESC button twice to exit the storing operation

1 In the confirm mode, the TAKE blinks and you have to press the TAKE button to confirm the operation

8.5.2 Recalling Setups

To recall a setting, do the following:

1. Press the MENU button once.
   The Menu buttons[1] illuminate and are enabled.
2. Press the illuminated RCL button.
   The LCD display shows the message:

   RECALL <= ___
3. Insert the appropriate digits from 01 to 59[1] (for example, press 1 twice for 11).
   The LCD display shows the recalled setup.

When in the CONFIRM mode (the TAKE button is illuminated), repeat the steps above and then press the TAKE button to confirm the action.

After recalling a setup in the CONFIRM mode, while the TAKE button is blinking, you can review the content of the recalled setup using the ► or the ◄ buttons.

If the recalled setup is not the desired one, you can recall another setup by entering a different setup number, thus letting you review as many setups as needed before implementing the required setup.

When trying to recall an empty setup[2], the LCD display shows the message:

Setup Empty

another ## ?

followed by the message[3]:

RECALL <= ___

8.6 Using the DEFAULT SETUP Button (Unity Setting)

You can select a configuration that is used often and store it as the default setup (or the UNITY setting), which can be easily recalled by pressing the DEFAULT SETUP button. You can store the default setup via the menu commands and then recall it with the touch of a button.

The default setup stores a setup, which is defined via the DEFAULT SETUP configuration menu, and includes the switcher configuration, volume levels for each input and output, and the cross-points status.

1 When trying to recall a setup beyond 59, the LCD display shows the following message: No more than 59

2 That is, a setup # for which no setup is actually stored

3 The same as in step 2 above

If the machine is set to its default setup, the DEFAULT SETUP button illuminates. Otherwise it is off.

To set the machine to its default setup:

1. Press the DEFAULT SETUP button.
   The DEFAULT SETUP button LED blinks and the following message appears on the LCD display:

   Recall DEFAULT setup
   press FLASHING button to confirm

2. Press the DEFAULT SETUP button a second time to recall the default setup.
   The DEFAULT SETUP button stops blinking and no longer illuminates, the TAKE button blinks and the following message appears on the LCD display:

   all Setups and Connections change
   press TAKE to confirm

3. Press the TAKE button to confirm the action or press the ESC button to cancel the operation.
   If the DEFAULT SETUP was recalled, the DEFAULT SETUP button illuminates.

8.7 Choosing the FOLLOW or the BREAKAWAY Modes[1]

When the **VS-3232A** functions in the:

- FOLLOW-System mode, the **VS-3232A** switches with other 32x32 or 16x16 matrix switchers, implementing the same action simultaneously
- BREAKAWAY-from-System mode, the **VS-3232A** functions independently, implementing an action as a standalone unit that is independent of the other units connected

The **VS-3232A** unit will function in the FOLLOW-System mode if at least one other **VS-3232A** unit is set to the FOLLOW-System mode and these units interconnect via an RS-232 and/or RS-485 communication line.

To set the **VS-3232A** unit to function in the FOLLOW-System mode:

1. Make sure that DIP 5 is set to ON. If it is not set to ON, when pressing the FOLLOW button, the following message appears:

   Error: set DIP-5 to ON
   to allow FOLLOW SYSTEM mode

1 See section 7.1

2. Press the FOLLOW button.
   The FOLLOW button blinks and the LCD display shows the following message:

   Set the SYSTEM FOLLOW mode
   press FLASHING button to confirm

3. Press the FOLLOW button once again.
   If there are no switchers online in the FOLLOW-System mode or if one or more switchers that are in the FOLLOW-System mode are online but their cross-points status is exactly the same as that of the **VS-3232A**, the **VS-3232A** immediately moves to the FOLLOW System mode.
   The FOLLOW stops blinking and then illuminates, the BREAKAWAY button no longer illuminates and the LCD display restores its last content.

If the cross-points status of the **VS-3232A** is different from the other online switchers in the FOLLOW-System mode, the FOLLOW button stops blinking and the TAKE button blinks, and the LCD display shows the following message:

press TAKE to confirm
possible changing existing cross-points

4. Press the TAKE button.
   The **VS-3232A** moves to the FOLLOW-System mode. The FOLLOW button illuminates, the BREAKAWAY button no longer illuminates, the cross-points change according to the status in the system, and the LCD display shows the new cross point settings.

To set the **VS-3232A** unit to function in the BREAKAWAY-from-System mode:

1. Press the BREAKAWAY button.
   The BREAKAWAY button blinks and the LCD display shows the following message:

   Set the STAND ALONE mode
   press FLASHING button to confirm

2. Press the BREAKAWAY button once again.
   The switcher moves to the BREAKAWAY mode. The BREAKAWAY button illuminates, the FOLLOW button no longer illuminates and LCD display restores it last content

8.8 Using the LOCK Button

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[1] your **VS-3232A**. Unlocking releases the protection mechanism.

To toggle the status of the machine, press and hold the LOCK button for about 2 seconds. The LOCK button illuminates when in the Lock state.

8.9 Setting the Input/Output Volume

The volume of each input and output on the **VS-3232A** can be controlled individually. The volume level of the left and right channels for each input/output can be set separately or together using the LEVEL UP and LEVEL DOWN front panel buttons. In the following example, the volume is adjusted for input 11.

To set the input volume level, do the following:

1. Press the MENU button twice.
2. Press the ENT button.
3. Select 1 to adjust the Input Level[2].
4. Enter the input number for which you want to change the volume. For example, enter input number 11.
5. Press one of the following:
   - 1, to adjust the Left channel of the selected input
   - 2, to adjust both the Left and the Right (Both L&R) channels of the selected input simultaneously
   - 3, to adjust the Right channel of the selected input
6. When selecting 1 (Left), the following appears on the LCD display:

```
          Input 11
0.0dB <= =          -1.5dB
```

   When selecting 2 (Both L&R), the following appears on the LCD display

```
          Input 11
0.0dB <= =          = = >-1.5dB
```

1 Even though the front panel is locked you can still operate via the IR remote control, Ethernet, RS-232 or RS-485 serial (remote controller or PC)

2 Buttons 1 and 2 illuminate. To adjust an output level, press 2

When selecting 3 (Right), the following appears on the LCD display

```
Input 11
0.0dB                    = = >-1.5dB
```

7. Use the LEVEL UP and LEVEL DOWN buttons to adjust the volume level. The volume level changes by one step with each push of the button. Push and hold the buttons to increase / decrease the volume continuously.

   When adjusting the volume, you can change the Left, Both (L&R) and Right assignment by pressing the corresponding button 1, 2 or 3. For example, you can decrease the Left level by -0.5 dB, then raise Both levels by +2 dB, and then raise the Right level by +1 dB. This way you can adjust the volume as well as the stereo balance.

8. Press the ENT or ESC button to complete the level adjustment:
   - Press the ENT button to store the audio level values in non-volatile memory. The LCD displays the following:

```
Input 11
-1.0dB      VOLUME SET      -1.5dB
```

   - Press the ESC button to disregard changes, and load the channels with the last stored values. The LCD displays the following:

```
Input 11
-1.5dB  Restore initial value  -1.5dB
```

When adjusting the volume, you can monitor the audio level changes by using any audio measuring equipment. The audio level changes will be implemented only after pressing the ENT button. Pressing ESC will return the audio values to their previous settings.

9. Upon completion of the adjustment, the LCD displays the following:

```
Continue Volume Setup?
YES - ENT          ESC - NO
```

   If you want to adjust other input or output channels, press ENT.

Do the same to adjust any of the output levels (from 0dB to -100dB).

9 The MENU Commands

The menu lets you configure the **VS-3232A** to best suit your needs.

To enter the configuration menu, press the menu button three times. The MENU button illuminates. And the following message appears on the LCD display:

```
Start configuration menu
MENU to view setups ENT to change them
```

When browsing through the configuration menu, the enabled buttons are illuminated.

The ESC button is not illuminated, but is always enabled.

Use the configuration menu as follows:

1. Press the MENU button to scroll through the menu items[1].
2. Press the ENT button to enter the options in a desired setup.
3. After entering a setup, you can select between several options.
   Select a setup option by pressing one of the illuminated buttons in the Selector Buttons area.
   After selecting the desired option, a description of the desired change appears on the LCD display and the TAKE button blinks.
4. Press the blinking TAKE button to execute the change.
   A description of the current state appears on the LCD display for about a second and then the unit automatically switches to the next item in the menu.

In the example, illustrated in Figure 22, the SYNC configuration is changed through the configuration menu. You can scroll through the menu items by pressing the menu button, until you reach the desired item.

1 The LCD display shows the current status of the selected menu item

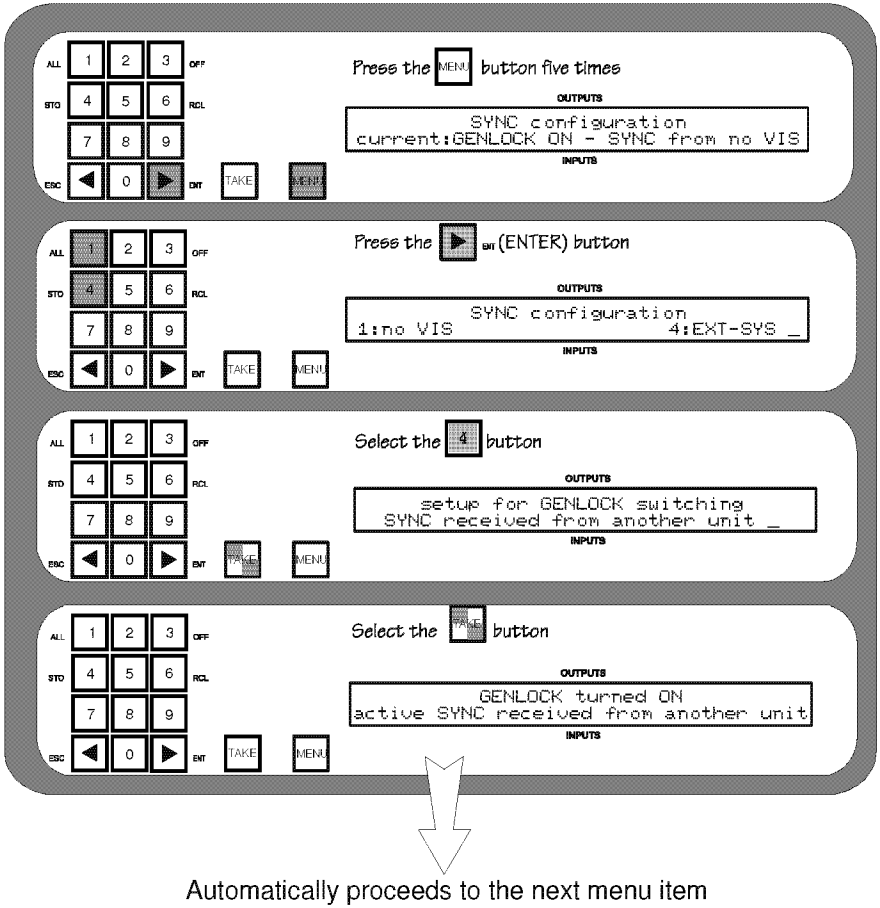


Figure 22: Setting the SYNC Configuration (an example)

The configuration menu includes the following items:

- Audio Switching Method (see section 9.1)
- SYNC configuration (see section 9.2)
- INTERFACE configuration (see section 9.3)
- Interface REPLY configuration (see section 9.4)
- PROTOCOL configuration (see section 9.5)
- Store DEFAULT setup (see section 9.6)
- Set the initializing sequence delay time (see section 9.7)
- Indication of the current Firmware version (see section 9.8)
- TOTAL RESET options (see section 9.9)

9.1 Selecting the Audio Switching Method

Table 8 summarizes the audio switching method configuration options:

Table 8: Audio Switching Method Configuration Menu

Press:	To select:	After the change, the LCD displays:
1	**FADE Out-In** (Clean switching)	Audio Switching set to FADE Out-In (Clean switching) (this mode is preferred for a standalone unit). The switching is delayed by about 0.1sec
2	**CUT** (immediate switching)	Audio Switching set to CUT (immediate switching) (this mode is preferred for Genlock switching at the same time as the video)

When selecting the FADE Out-In option, the current audio signal gradually decreases to the mute level (-100dBu), and the switching occurs after reaching the mute level. The newly switched audio level gradually rises to the set audio level. This way the switching is implemented silently.

When selecting the CUT option, the switching occurs immediately, and although the unit includes means to prevent "popping" and "clicking" noises, it cannot always be avoided. It is recommended to use the CUT mode only when the audio switcher follows a video switcher (for example, the **VS-3232V(xl)**).

9.2 Selecting the SYNC Configuration

Table 9 summarizes the SYNC configuration options:

Table 9: SYNC Configuration Menu

Press:	To select:	After the change, the LCD displays:
1	**No VIS**, for immediate switching	The unit is set for immediate switching
4	**EXT-SYS**, SYNC received from another unit	The unit is set to switch at the same time as the video unit

9.3 Selecting the INTERFACE Configuration

The INTERFACE configuration menu is a two-step menu:

1. Select the type of interface.
2. Turn the interface ON or OFF.

Note that the RS-232 interface is always ON.

Table 10 summarizes the INTERFACE configuration options.

Table 10: INTERFACE Configuration Menu

Press:	To select:	After the change, the LCD displays:
1	**RS485**	Interface RS-485 now active or, interface RS-485 now off
2	**IRremote**	IR remote now active or, IR remote now off
3	**Ethernet**	Network connection now active or network connection now off

9.4 Selecting the Interface REPLY Configuration

Table 11 summarizes the interface REPLY configuration options:

Table 11: Interface REPLY Configuration Menu

Press:	To select:	After the change:
1	**Turn reply ON**	All the interfaces that are set to ON accept and execute commands and also reply
2	**Never REPLY**	All the interfaces that are set to ON accept and execute commands but do not reply

9.5 Selecting the PROTOCOL Configuration

Table 12 summarizes the PROTOCOL configuration options:

Table 12: PROTOCOL Configuration Menu

Press:	To select:	After the change, the LCD displays:
1	**HEXadecimal**, for setting the protocol[1] to HEX KRAMER-2000	Communication protocol set to HEX KRAMER-2000
2	**ASCII**, for setting the protocol[1] to ASCII – SIERRA	Communication protocol set to ASCII – SIERRA

9.6 Selecting the Store DEFAULT Setup Configuration[2]

This option in the configuration menu lets you store the current setup to the default setup, so that by pressing the DEFAULT SETUP button on the front panel you can recall the default setup (so called UNITY setting).

After pressing the ENT button, the TAKE button blinks and the following message appears on the display:

```
current matrix stage is OKAY?
press TAKE to confirm
```

After pressing the blinking TAKE button, the display shows:

```
current matrix stage
stored as DEFAULT setup
```

1 See section 12 for a description of the protocols

2 See section 8.6

9.7 Selecting the Initialization Sequence Delay Time for a Slave Unit

When several **VS-3232A** units are used together, it is necessary to set up the delay time of each slave unit.

To configure the Initialization sequence delay time[1]:

1. Turn the machine OFF.
2. Set DIP 6 to OFF (Master unit).
3. Turn the machine ON.
   The unit is now set to the Master Mode.
4. Set the delay time according to Table 13, using the front-panel buttons and the LCD.
5. Turn the machine OFF.
6. Set DIP 6 to ON (Slave unit).
7. Turn the Machine ON.

Table 13 defines the initialization sequence delay time per unit in a Master/Slave configuration setup

Table 13: Initialization Sequence Delay Time

The Number of the Slave unit in the Sequence:	Required Turn-ON Time (sec)	Notes
1st	5	The delay time is set to 5 seconds automatically
2nd	10	Set via the Turn-ON menu
3rd	15	
4th	20	

9.8 The Main Firmware Version

The main firmware version menu shows information regarding the latest main and Ethernet firmware versions, for example:

```
Main Firmware Version: 1.00
Ethernet Version: Use Config. Manager
```

This information lets you decide whether a firmware upgrade is required.

It is recommended to upgrade the firmware only after consulting with the Kramer technical support staff

1 Turn-ON time

9.9 Selecting the TOTAL RESET Option

The TOTAL RESET options require you to press the blinking TAKE button twice for double confirmation. Table 14 summarizes the TOTAL RESET menu options:

Table 14: Total Reset Menu

Press:	To select:	After the change, the LCD displays:
1	**All outputs OFF**, to disconnect all the outputs	MATRIX erased – all outputs set to OFF
2	**Factory default**, to the factory default state	OUT 1 is connected to IN 1, OUT 2 is connected to IN 2 … OUT 31 is connected to IN 31 and OUT 32 is connected to IN 32

In both cases (above), the system status and the volume control stages are set as follows:

- The gain level of all the input and output channels is set to 0dB
- The audio switching method is set to fade out-in (clean switching)
- The SYNC configuration is set to GENLOCK OFF- immediate switching
- All the interfaces are set to ON
- The interface Reply is set to Reply
- The interface protocol is set to Hex Kramer 2000
- The default setup is set to the Factory default

10 Flash Memory Upgrade

The **VS-3232A** lets you upgrade both the:

- Switcher Microcontroller (see section 10.1)
- Ethernet Microcontroller (see section 10.2)

10.1 Switcher Flash Memory Upgrade

The **VS-3232A** firmware is located in FLASH memory, which can be upgraded to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 10.1.1)
- Connecting the PC to the RS-232 port (see section 10.1.2)
- Upgrading Firmware (see section 10.1.3)

10.1.1 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 www.kramerelectronics.com and download the file: "*FLIP_VS3232A.zip*" from the Technical Support section.
2. Extract the file: "*FLIP_VS3232A.zip*" to a folder (for example, C:\Program Files\Kramer Flash).
3. Create a shortcut on your desktop to the file: "*FLIP.EXE*".

10.1.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **VS-3232A** unit, do the following:

1. Turn the unit OFF.
2. Connect the RS-232 9-pin D-sub rear panel port according to section 7.6.1.
3. Push the rear panel FLASH MAIN button through the hole using a small screwdriver.
4. Switch the unit ON.

Note: this sequence is critical – first push the FLASH MAIN button and then turn on the unit

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

10.1.3 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:

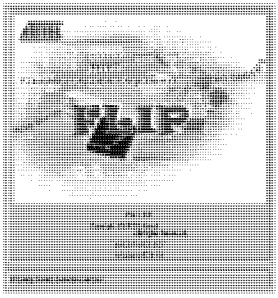


Figure 23: Splash Screen

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

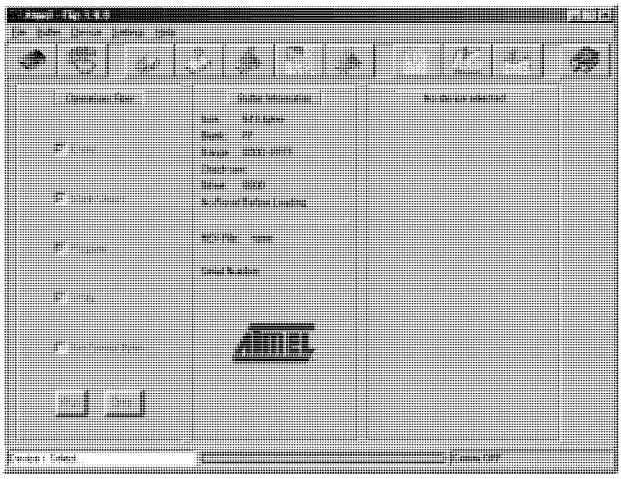


Figure 24: Atmel – Flip Window

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:

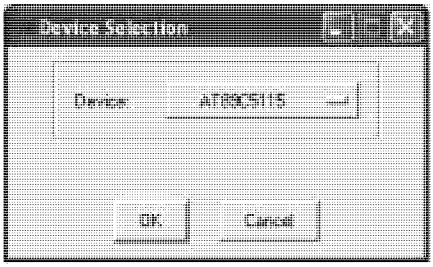


Figure 25: Device Selection Window

4. Click the button next to the name of the device and select from the list: AT89C51ED2:

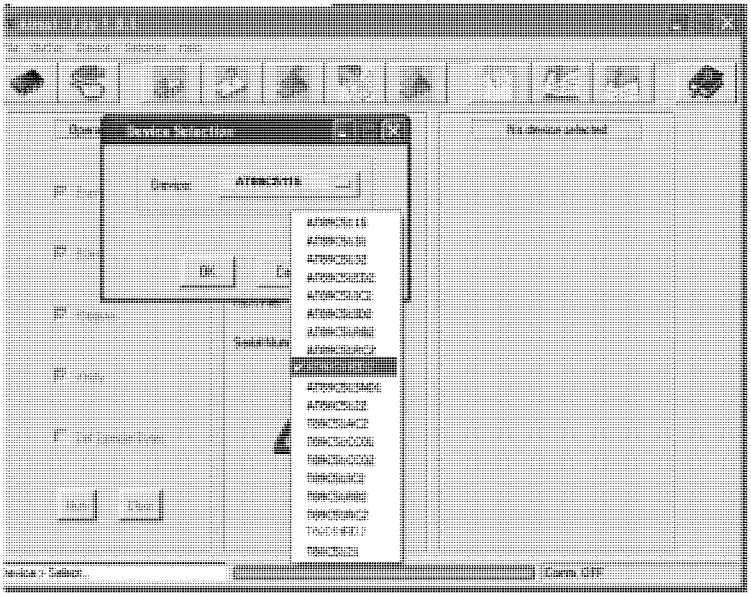


Figure 26: Device Selection window

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

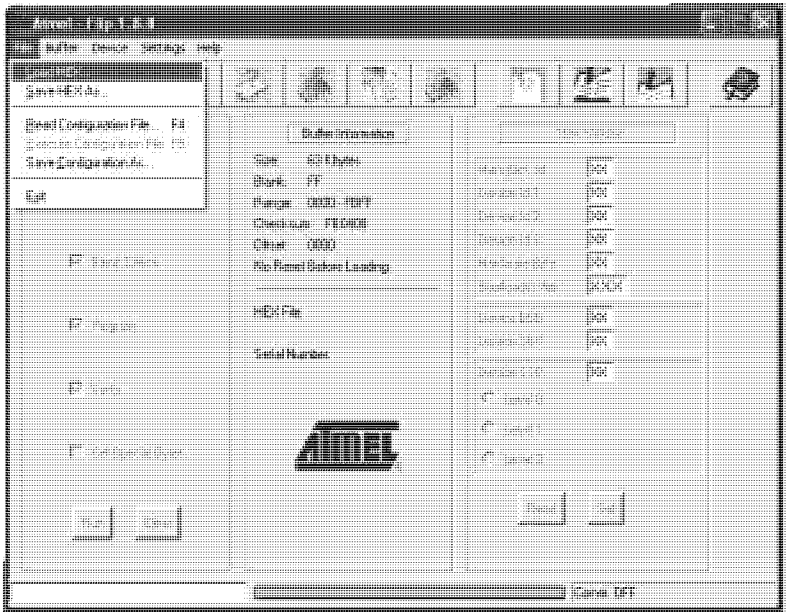


Figure 27: Loading the Hex

6. The Open File window opens. Select the correct HEX file that contains the updated version of the firmware for **VS-3232A** (for example ***32M_VIp2.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:

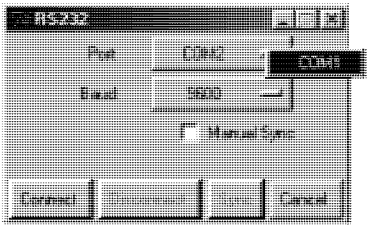


Figure 28: RS-232 Window

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: VS3232A.hex*" appears.

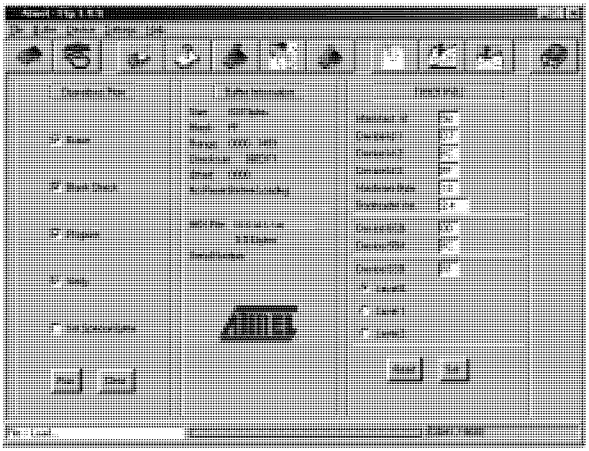


Figure 29: Atmel – Flip Window (Connected)

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]:

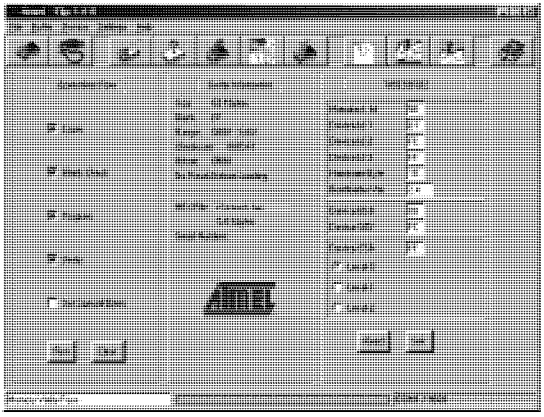


Figure 30: Atmel – Flip Window (Operation Completed)

1 See also the blue progress indicator on the status bar

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

10. Close the "*Atmel – Flip*" window.
11. Disconnect the power on the **VS-3232A**.
12. If required, disconnect the *RS-232* rear panel port on the **VS-3232A** unit from the Null-modem adapter.
13. Release the FLASH MAIN button on the rear panel.
14. Connect the power to the **VS-3232A**.
    Upon initialization, the new **VS-3232A** software version shows in the INPUT STATUS 7-segment Display.

10.2 Ethernet Flash Memory Upgrade

The **VS-3232A** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes!

The process involves:

- Downloading the upgrade package from the Internet
- Connecting the PC to the RS-232 port
- Upgrading the firmware

10.2.1 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: "*SetKFRETH11-xx.zip*" from the technical support section.
2. Extract the file "*SetKFRETH11-xx.zip*" package, which includes the KFR-Programmer application setup and the *.s19* firmware file, to a folder (for example, C:\Program Files\KFR Upgrade).
3. Install the KFR-Programmer Application.

10.2.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer Ethernet firmware version on the **VS-3232A**, do the following:

1. Connect the RS-232 IN 9-pin D-sub port (COM 1) on the **VS-3232A** to a Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 9-pin D-sub COM port on your PC.
2. Push the rear panel ETHERNET FLASH button to **Program** using a small screwdriver.
3. Connect the power on your machine.

1 File names are liable to change from time to time

10.2.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the KFR-Programmer desktop icon.
   The KFR-Programmer window appears (see Figure 31).

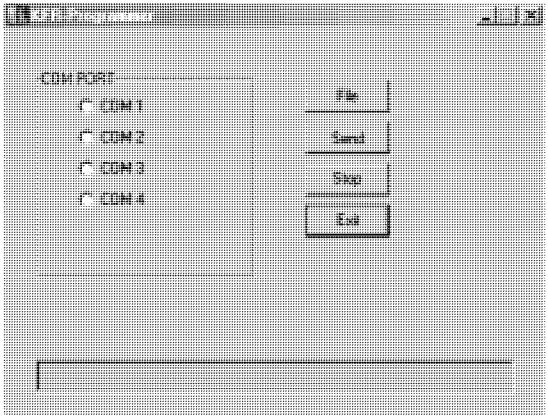


Figure 31: The KFR-Programmer Window

2. Select the required COM Port[1].
3. Press the File button to select the *.s19* firmware file included in the package.
4. Press the Send button to download the file. The Send button lights red.
5. Wait until downloading is completed and the red Send button turns off.
6. Disconnect the power on the **VS-3232A**.
7. Release the ETHERNET FLASH button on the rear panel.
8. Connect the power on your machine.

1 To which the VS-3232A is connected on your PC

11 Technical Specifications

Table 15 includes the technical specifications:

Table 15: Technical Specifications of the VS-3232A Video Matrix Switcher

INPUTS:	32 balanced stereo inputs on 5-pin detachable terminal block connectors
OUTPUTS:	32 balanced stereo outputs on 5-pin detachable terminal block connectors
INPUT IMPEDANCE:	>10kΩ (AC coupled)
NOMINAL INPUT LEVEL:	0dBu (775mV)
MAX. INPUT LEVEL:	21dBu @<0.05% THD+N at unity gain
OUTPUT IMPEDANCE:	50Ω unbalanced, 100Ω balanced
TOTAL INPUT-OUTPUT GAIN ERROR:	0.5dB channel to channel
MAX. OUTPUT LEVEL (600Ω LOAD):	>20dBu @0.02% THD+N at unity gain
MAX. OUTPUT LEVEL (Hi-Z LOAD):	21dBu @0.05% THD+N at unity gain
INPUT LEVEL ADJUSTMENT:	-20dB to 20dB (default 0dB)
OUTPUT LEVEL ADJUSTMENT:	0 to -100dBu at the following steps: 0.5dB steps from 0dBu to -40dBu; 1.0dB steps from -40dBu to -70dBu; 2.0dB steps from -70dB to -100dBu
FREQUENCY RESPONSE:	20Hz to 20kHz (±0.1dB)
THD + NOISE:	<0.03% @1kHz at nominal level "A" weighting
S/N RATIO:	>90dB at maximum output (21dBu), ("A" weighting)
CROSSTALK:	<80dB @1kHz, fully loaded
STEREO CHANNEL SEPARATION:	80dB @1kHz
CONTROLS:	18 selector switches; RS-232, RS-485, remote IR, Ethernet
POWER SOURCE:	100-240V AC 50/60Hz, 70VA max
DIMENSIONS:	19-inch (W), 7-inch (D) 2U (H) rack-mountable
WEIGHT:	3.5kg (7.8lbs) approx.
ACCESSORIES:	Power cord, Null modem adapter, Windows®-based Kramer control software, Windows®-based Ethernet Configuration Manager and Virtual Serial Port Manager, Infrared remote control transmitter
OPTIONS:	External remote IR receiver cable[1]; 15 meter extension cable[2]

1 P/N: C-A35M/IRR-50

2 P/N: C-A35M/A35F-50

11.1 Audio Performance Graphs

This section describes the audio performance of the left and right signals output from the **VS-3232A**[1,2,3]:

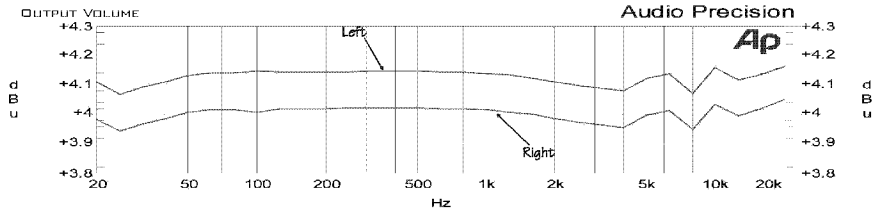


Figure 32: Frequency Response (Bandwidth) of the VS-3232A

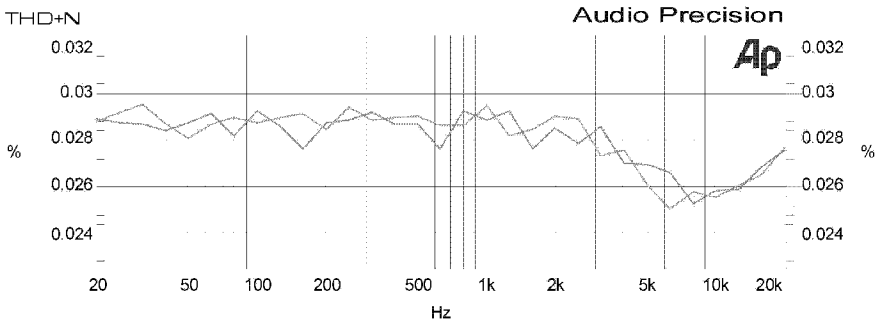


Figure 33: THD+N of the VS-3232A

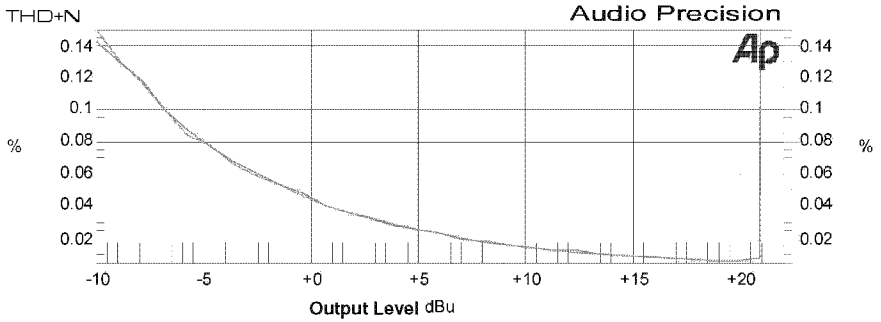


Figure 34: Maximum Input/Output Level at 1kHz

1 All the measurements for these graphs were taken while input 2 was switched to output 31

2 Both the input and output levels are set to 0dB

3 The input signal is +4dBu (where applicable) and the output load is 2.5kΩ

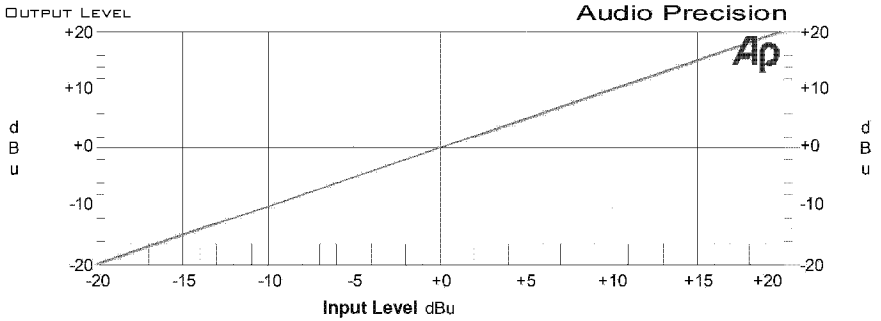


Figure 35: Linearity of the VS-3232A

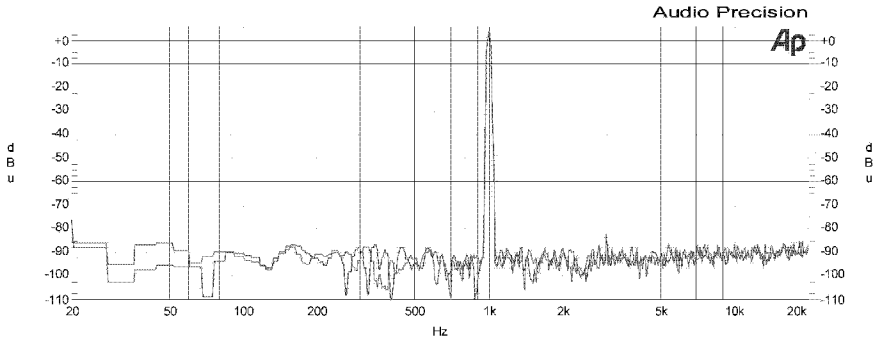


Figure 36: Spectrum Plot of the Output Signal for a 1kHz, 4dBu Input

12 Communication Protocols

Using the menu, you can select the:

- Kramer 2000 communication protocol (see section 12.1), or
- ASCII Protocol (see section 12.2)

12.1 The Kramer 2000 Communication Protocol

Table 16 and Table 17 include the Protocol 2000[1] hexadecimal codes[2]. The communication parameters are: 9600 baud, with no parity, 8 data bits and 1 stop bit.

1 Full details are available on our Web site: www.kramerelectronics.com

2 This example assumes MACHINE # 1, and node 0

Table 16: Hex Table (IN 1-32 to OUT 1-16)

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8	OUT 9	OUT 10	OUT 11	OUT 12	OUT 13	OUT 14	OUT 15	OUT 16
IN 1	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 2	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 3	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 4	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 5	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 6	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 7	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 8	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 9	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 10	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 11	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 12	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 13	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 14	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 15	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 16	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 17	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8	OUT 9	OUT 10	OUT 11	OUT 12	OUT 13	OUT 14	OUT 15	OUT 16
IN 18	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 19	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 20	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 21	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 22	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 23	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 24	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 25	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 26	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 27	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 28	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 29	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 30	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 31	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 32	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0
	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F	90
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81

Table 17: Hex Table (IN 1-32 to OUT 17-32)

	OUT 17	OUT 18	OUT 19	OUT 20	OUT 21	OUT 22	OUT 23	OUT 24	OUT 25	OUT 26	OUT 27	OUT 28	OUT 29	OUT 30	OUT 31	OUT 32
IN 1	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 2	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82	82
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 3	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83	83
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 4	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 5	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 6	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 7	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87	87
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 8	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88	88
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 9	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 10	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A	8A
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 11	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B	8B
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 12	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C	8C
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 13	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D	8D
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 14	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E	8E
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 15	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F	8F
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 16	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN 17	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91	91
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81

	OUT 17	OUT 18	OUT 19	OUT 20	OUT 21	OUT 22	OUT 23	OUT 24	OUT 25	OUT 26	OUT 27	OUT 28	OUT 29	OUT 30	OUT 31	OUT 32
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
18	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
19	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93	93
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
20	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
21	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95	95
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
22	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96	96
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
23	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97	97
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
24	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
25	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
26	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A	9A
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
27	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B	9B
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
28	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C	9C
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
29	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D	9D
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
30	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E	9E
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
31	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F	9F
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81
IN	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01	01
32	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0	A0
	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F	A0
	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81	81

12.2 ASCII Protocol: General

The ASCII protocol has three basic commands: **Y** *for connect*, **T** *for recall*, **P** *for store*. Before using the ASCII protocol, you need to select it from the machine's front panel. Press the MENU button until you get to "set communication protocol" and then choose the ASCII protocol. This is saved in the non-volatile memory, so the machine will remain as ASCII even after cycling power. To check that the protocol has been selected, and to confirm that the communication is OK, send the string **!! to the **VS-3232A**. It should reply by sending the string OK!!

12.2.1 ASCII Protocol: Description

The three basic commands are **Y**, **T**, and **P**.

"Y" command: MAKE A CROSSPOINT CONNECTION. The format is:

** **Y** **o#,** **i#** **!!** where i# is the input number, and o# is the output number.

Note: The string does not need a space (spaces are used here just to add clarity to the explanation).

For example:

**Y3,4!! would connect input 4 to output 3

**Y9,6!! would connect input 6 to output 9

**Y2,17,Y25,12,Y7,6!! would connect input 17 to output 2, input 12 to output 25, and input 6 to output 7.

The buffer allows up to 63 characters. Thus you could place up to about 10 crosspoint connections in a single string.

Also:

**Y0,5!! would connect input 5 to all outputs

**Y3,0!! would disconnect output 3

"T" command: RECALL A SETUP. The format is:

** **T** **s#** **!!** where s# is the setup number (1 to 59) which is to be recalled.

For example:

**T13!! would recall setup number 13

"P" command: STORE A SETUP. The format is:

** **P** **s#** **!!** where s# is the setup number (up to 59) where the machine's present status is to be stored.

For example:

**P13!! would store in setup number 13

The reply for all commands could be:

OK!! or ERROR!!

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, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

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

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

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

HOW YOU CAN GET WARRANTY SERVICE

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

LIMITATION OF IMPLIED WARRANTIES

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

EXCLUSION OF DAMAGES

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

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

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

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

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

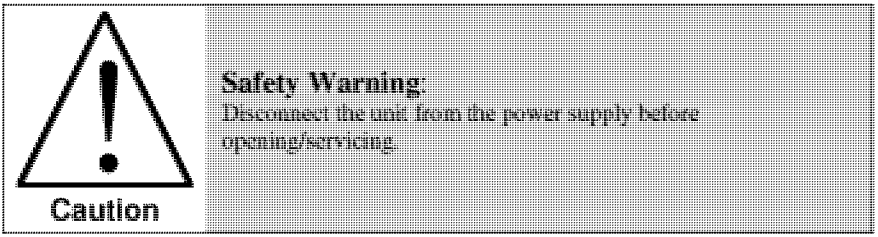
EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: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

CAUTION!

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

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

For the latest information on our products and a list of Kramer distributors, visit 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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