Kramer Electronics, Ltd.

USER MANUAL

Model:

VS-1616A

16x16 Balanced Stereo 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-1616A** *16x16 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-1616A** 16x16 Balanced Stereo Audio Matrix Switcher
- Power cord and "rack ears"
- Windows®-based Kramer control software
- 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[1]

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

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

3 Overview

The Kramer **VS-1616A** is a high-performance *16x16 Balanced Stereo Audio Matrix Switcher* for balanced audio stereo signals on detachable terminal block connectors.

The **VS-1616A** forms part of the series of 16x16 matrix switchers that includes the **VS-162V** (a 16x16 video matrix switcher).

In particular, the **VS-1616A** features:

- Balanced and unbalanced inputs and outputs
- True matrix operation, allowing the user to route any input to any or all outputs simultaneously
- Excellent audio performance, which ensures that it remains transparent in almost any audio application

In addition the **VS-1616A**:

- May be used as a single unit, or expanded to up to 96 x 96 inputs/outputs
- Can be configured into a Kramer multi-signal switcher system including digital and analog video, digital and analog audio, and RS-422 control switchers
- When integrated in a system, all units switch in true audio-follow-video mode
- Recalls up to 99 configuration setups via the non-volatile memory and provides for an unlimited quantity of setups when using the Kramer control software on your PC
- Includes a user-friendly LCD display (making operation even easier)
- With its FLASH memory, lets you upgrade to the latest Kramer firmware version via Internet download
- Comes with a choice of protocol format: hexadecimal or ASCII

Control the **VS-1616A**:

- Using the front panel buttons
- Remotely, by RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- Remotely, from the Kramer **RC-IR2** Infrared Remote Control Transmitter

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

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KRAMER: SIMPLE CREATIVE TECHNOLOGY
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- External IR receiver unit for controlling the machine via an IR remote controller
- Via external contact closure push buttons

To achieve the best performance:

- Use only good quality connection cables[1] 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-1616A** away from moisture, excessive sunlight and dust.

4 Your Balanced Stereo Audio Matrix Switcher

Figure 1 illustrates the front and rear panels of the **VS-1616A**. Table 1 and Table 2 define the front and rear panels of the **VS-1616A**, respectively.

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1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com
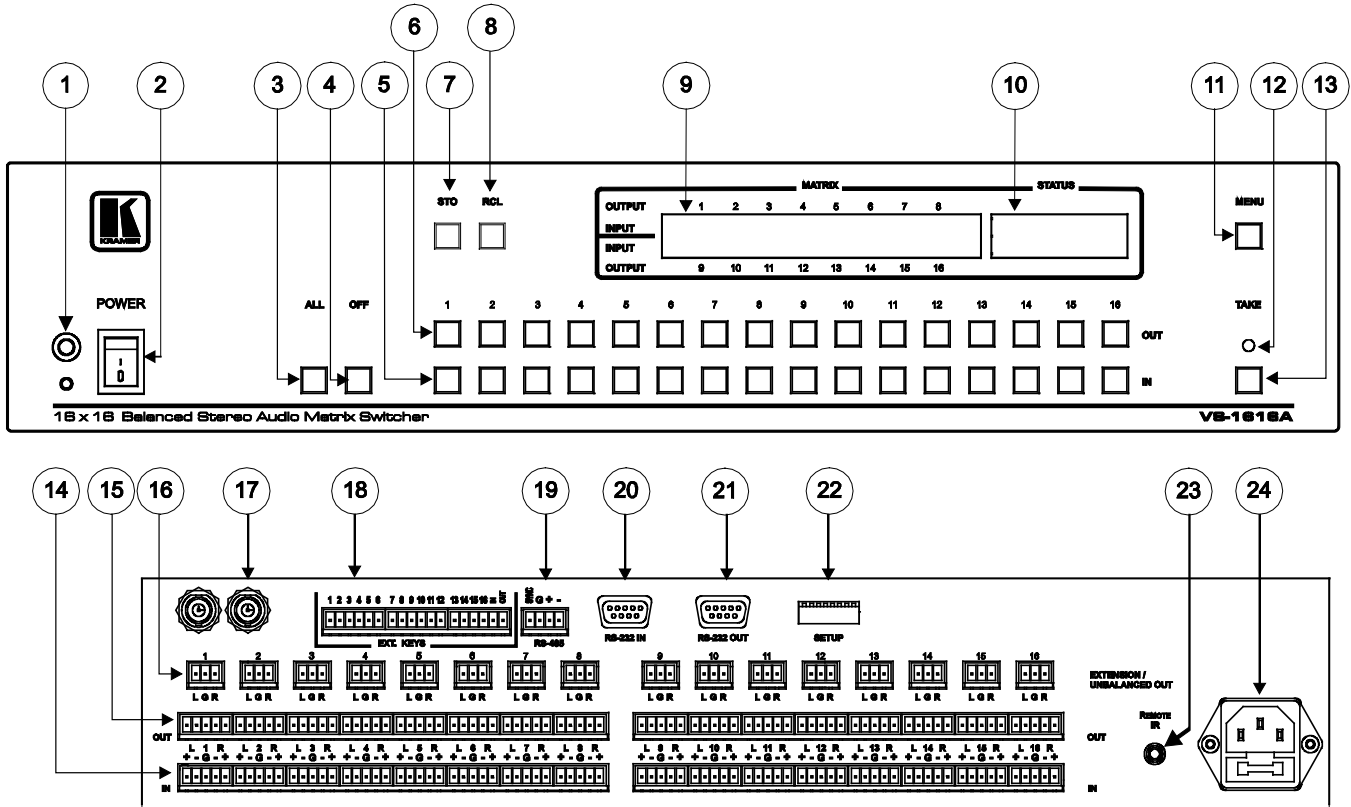
Figure 1: VS-1616A 16x16 Balanced Stereo Audio Matrix Switcher

Table 1: Front Panel VS-1616A Features

#	Feature	Function
1	IR Receiver	The red LED is illuminated when receiving signals from the Kramer Infra-red remote control transmitter
2	*Power* Switch	Illuminated switch supplying power to the unit
3	*ALL* Button	Pressing *ALL* followed by an *INPUT* button, connects that input to all outputs
4	*OFF* Button	An *OFF-OUT* combination disconnects that output from the inputs; an *OFF-ALL* combination disconnects all the outputs
5	*IN* Buttons	Select the input to switch to the output
6	*OUT* Buttons	Select the output to which the input is switched
7	*STO* Button	Stores the current setting in the non-volatile memory
8	*RCL* Button	Recalls a setup from the non-volatile memory
9	LCD *MATRIX* Display[1]	Displays the selected input(s) switched to the output(s) (above or below the corresponding *OUTPUT* label) and user interface messages
10	LCD *STATUS* Display[1]	Displays the matrix status
11	*MENU* Button	Selects the programming commands to setup the switcher
12	*TAKE* LED	Shows the current TAKE button mode aiding the completion of actions
13	*TAKE* Button	Used to confirm and complete setup and switching

Table 2: Rear Panel VS-1616A Features

#	Feature	Function
14	*IN* Terminal Block Connectors	Connect to the audio sources
15	*OUT* Terminal Block Connectors	Connect to the balanced audio acceptors
16	*EXTENSION / UNBALANCED OUT* Terminal Block Connectors	Connect to the *EXTENSION / UNBALANCED OUT* terminal block connectors on another unit, and/or to the unbalanced audio acceptors
17	*SYNC (IN and OUT)* BNC Connectors	Connect to daisy-chained video units for AFV setting
18	*EXT*. (extension) *KEYS* Terminal Block Connectors	Connects to an external keyboard (remote unit)
19	*RS-485* Terminal Block Port	Pins # 1 and # 2 are for vertical sync and Ground connection, and Pins # 3 and # 4 are for RS-485
20	*RS-232 IN* 9-pin D-sub (F) Port	Connects to the PC or the Remote Controller[2]
21	*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
22	*SETUP* DIP-switches	DIP-switches for setup of the unit
23	*REMOTE IR* 3.5mm Mini Jack	Connect to an external IR receiver unit for controlling the machine via an IR remote controller (instead of using the front panel IR receiver)[3]
24	Power Connector with Fuse	AC connector enabling power supply to the unit

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1 In sections 7.2.4 and 8, the word "Displays" refers to the LCD MATRIX and STATUS Displays

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 Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the VS-1616A (only if the internal IR connection cable has been installed)

5   **Installing** the VS-1616A **in a Rack**

This section describes how to install the **VS-1616A** in a rack.

Before Installing in a rack

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

Operating temperature range	+5° to +45° C (41° to 113° F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20° to +70° C (-4° to 158° 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.
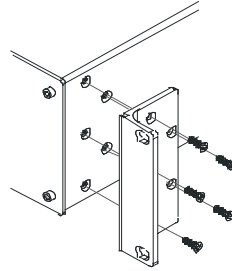
2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the five holes in the rack ears.

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 Installing the Balanced Stereo Audio Matrix Switcher

To install the **VS-1616A**, connect the following[1] to the rear panel, as required:

- Power cord
- Audio input and output cables
- Control Interface cables between switcher units, or PC (or other controller), as section 6.7 describes
- Set the DIP-switches, as section 6.6 describes
- Set the system variables using the MENU function, as section 8 describes

Using the **VS-1616A** unit and/or other 16x16 matrix switchers in the series[2], you can assemble the following kinds of systems:

- A stand alone switcher (see section 6.2)
- A multi-channel audio switcher (see section 6.3)
- An expanded matrix switcher (see section 6.4)
- A system of interconnected switchers (see section 6.5)

6.1 Connecting the Balanced/Unbalanced Stereo Audio Input/Output

This section illustrates how to connect:

- A balanced stereo audio input/output connection, see Figure 2
- An unbalanced stereo audio input connection, see Figure 3
- An unbalanced stereo audio output connection, see Figure 4
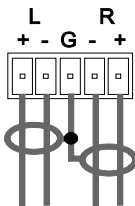
Figure 2: Connecting the Balanced Stereo Audio Input/Output
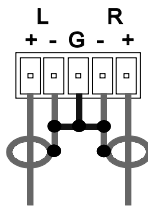
Figure 3: Connecting the Unbalanced Stereo Audio Input
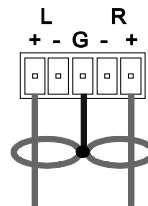
Figure 4: Connecting an Unbalanced Stereo Audio Output

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1 Switch OFF the power on each device before connecting it to your VS-1616A

2 Including the VS-162V (a 16x16 video matrix switcher)

6.2 Operating a Single Machine

By default, the **VS-1616A** is setup for use as a single machine. This means that it is a 16x16 balanced stereo audio matrix switcher. In particular, be sure that the DIP-switches are set as Figure 5 illustrates (see section 6.6 for further details). To operate a single machine, see Table 3.
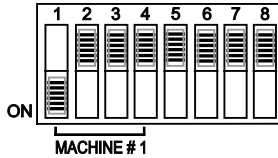
Figure 5: DIP-Switch Setup on a Single Machine

Table 3: Quick Reference Operating Guide for a Single Machine

To perform this command:	Press:
Connect an input with an output	OUT #; IN #
Reset a specific output	OUT #; OFF
Reset all outputs	ALL; OFF
Connect all outputs to a specific input	ALL; IN #
Store a setup	STO; OUT #; TAKE
Recall a setup	RCL; OUT #; TAKE
Lock front panel	MENU; TAKE
Unlock front panel	TAKE; TAKE
Change default setup	Press the Menu button several times until you reach the appropriate Menu setup command and follow the instructions

6.3 Assembling a Multi-channel Audio Switcher

Configure several **VS-1616A** units as a 16x16 expanded multi-channel audio switcher. In a multi-channel audio switcher configuration, only one unit is the Master (with DIP 6 OFF). The other units are Slaves (with DIP 6 ON).

The front panel of each Slave unit is always locked and the *MATRIX* and *STATUS* LCD Displays do not illuminate. The Slave units follow the Master. The Master unit operates in the regular way[1], leading the Slaves in the background.

To activate a multi-channel audio switcher so that each unit is in the same state from the outset, do not turn on the power on the Slave unit after the Master unit.

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1 The front panel is not locked and the MATRIX and STATUS LCD Displays illuminate

The example in Figure 6 illustrates a 4-channel 16x16 configuration consisting of 2 **VS-1616A** units. Broadcasting applications often use 4 channels, to broadcast stereo audio sound in 2 languages (say, English and French) or to produce surround sound (in which the sound is supplied to 4 speakers arranged in each corner of a room).
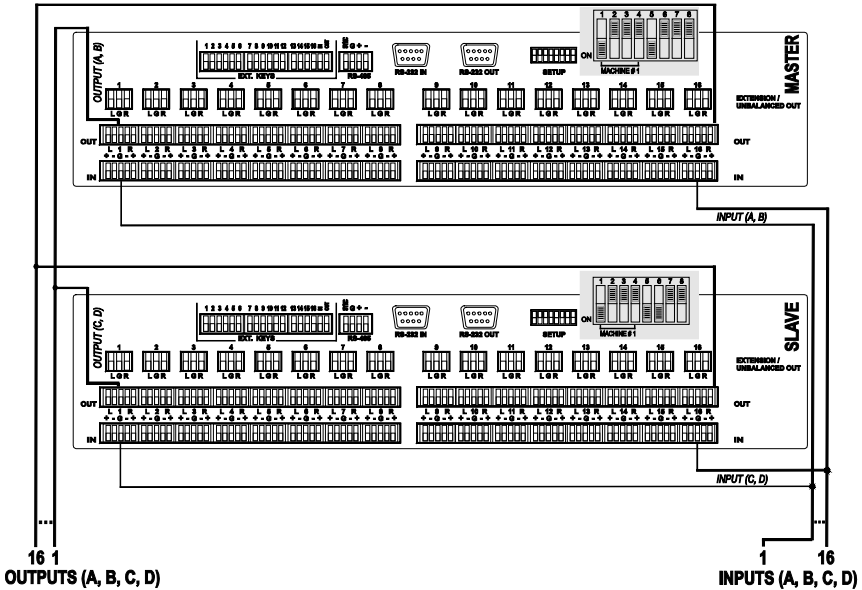
Figure 6: Configuring a 4 Channel 16x16 Switcher with Two VS-1616A Switchers

6.4 Assembling an Expanded Matrix Switcher

You can expand the number of inputs and outputs using several **VS-1616A** units[1]. Set the MACHINE ADDRESS # (see section 6.6.2) on each **VS-1616A** unit to define which inputs and outputs are configured to that particular unit when expanding, as the chart in Figure 7 illustrates.

For example, to connect a 48x64 switcher (48 inputs and 64 outputs), you would configure using MACHINE ADDRESS # 1, 2, 3, 4; 7, 8, 9, 10; 13, 14, 15 and 16. You can only choose a rectangular[2] configuration from the chart in Figure 7.

---

1 For example, a 32x32 switcher and a 32x16 switcher. In fact, you can connect up to 36 units to form a switcher with 96 inputs and 96 outputs

2 For example, like this: [diagram] but not like this: [diagram]

INPUTS 81-96	MACHINE ADDRESS # 31	MACHINE ADDRESS # 32	MACHINE ADDRESS # 33	MACHINE ADDRESS # 34	MACHINE ADDRESS # 35	MACHINE ADDRESS # 36
INPUTS 65-80	MACHINE ADDRESS # 25	MACHINE ADDRESS # 26	MACHINE ADDRESS # 27	MACHINE ADDRESS # 28	MACHINE ADDRESS # 29	MACHINE ADDRESS # 30
INPUTS 49-64	MACHINE ADDRESS # 19	MACHINE ADDRESS # 20	MACHINE ADDRESS # 21	MACHINE ADDRESS # 22	MACHINE ADDRESS # 23	MACHINE ADDRESS # 24
INPUTS 33-48	MACHINE ADDRESS # 13	MACHINE ADDRESS # 14	MACHINE ADDRESS # 15	MACHINE ADDRESS # 16	MACHINE ADDRESS # 17	MACHINE ADDRESS # 18
INPUTS 17-32	MACHINE ADDRESS # 7	MACHINE ADDRESS # 8	MACHINE ADDRESS # 9	MACHINE ADDRESS # 10	MACHINE ADDRESS # 11	MACHINE ADDRESS # 12
INPUTS 1-16	MACHINE ADDRESS # 1	MACHINE ADDRESS # 2	MACHINE ADDRESS # 3	MACHINE ADDRESS # 4	MACHINE ADDRESS # 5	MACHINE ADDRESS # 6
	OUTPUTS 1-16	OUTPUTS 17-32	OUTPUTS 33-48	OUTPUTS 49-64	OUTPUTS 65-80	OUTPUTS 81-96

Figure 7: MACHINE ADDRESS # Designation

Figure 8 illustrates the principle of assembling an expanded matrix switcher:
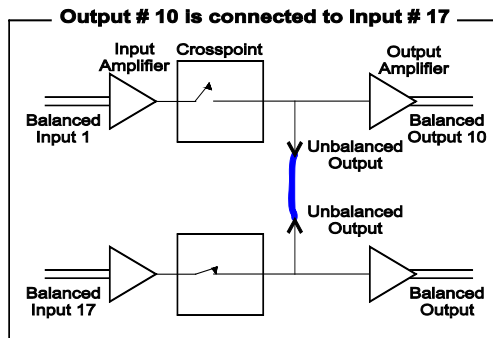
Figure 8: The Principle of Assembling an Expanded Matrix Switcher

6.4.1   Assembling a 32x16 Switcher

As can be seen in Figure 7, a 32x16 switcher consists of 2 **VS-1616A** units (MACHINE ADDRESS # 1 and MACHINE ADDRESS # 7). To assemble, as Figure 9 illustrates:

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1. Set the **same** MACHINE #[1] (see section [6.6.1](#)) on both **VS-1616A** units.

2. Set the MACHINE ADDRESS # on one **VS-1616A** unit to 1 and on the other **VS-1616A** unit to 7 (refer to *Figure 7*).

3. **Set DIP 6 OFF** on both **VS-1616A** units.

4. Interconnect each corresponding EXTENSION / UNBALANCED OUT connector between both **VS-1616A** units (1 to 1, 2 to 2, 3 to 3, up to and including 16 to 16).

5. Connect the balanced outputs 1 to 16 from the first **VS-1616A** unit (MACHINE ADDRESS # 7)[2].
    Alternatively, you could connect the balanced outputs from the second **VS-1616A** unit (MACHINE ADDRESS # 1)[3], or if required, you could connect the balanced outputs from both the first and second **VS-1616A** units**,** forming a 1:2 distribution amplifier.

6. The inputs on the MACHINE ADDRESS # 1 are system inputs 1 to 16, and the inputs on the MACHINE ADDRESS # 7 are system inputs 17 to 32. **The 2 VS-1616A units form a 32x16 switcher**.

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1 For a single group, this is usually set to # 1, as in the example in [Figure 9](#)

2 To the audio acceptors (not shown in [Figure 9](#))

3 However, connecting the balanced outputs from one unit suffices
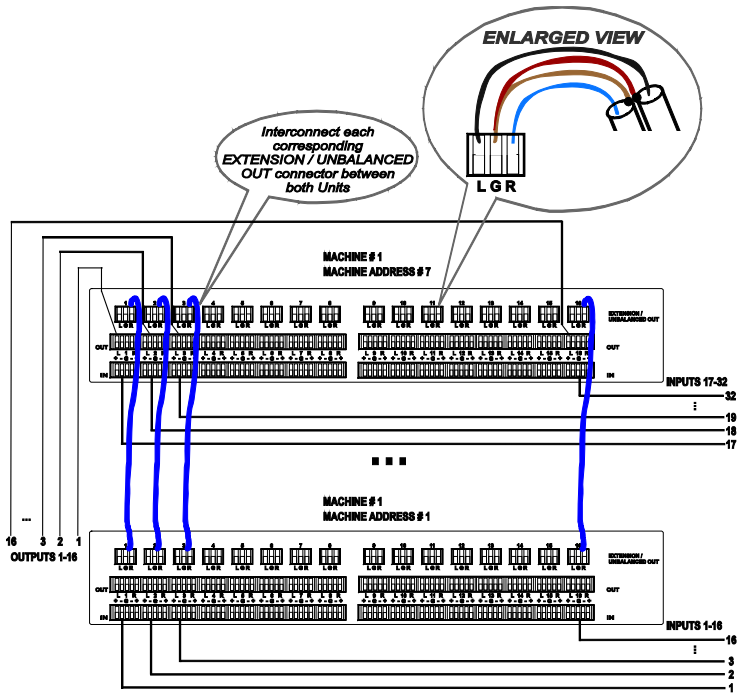
Figure 9: Connecting the 32x16 Switcher

6.4.2   Assembling a 32x32 Switcher

As can be seen in Figure 7, a 32x32 switcher consists of 4 **VS-1616A** units (MACHINE ADDRESS # 1, MACHINE ADDRESS # 2, MACHINE ADDRESS # 7 and MACHINE ADDRESS # 8). To assemble, as Figure 10 illustrates:

1. Set the **same** MACHINE #[1] on all the 4 **VS-1616A** units.

2. Set the MACHINE ADDRESS # to 1, 2, 7 and 8 on each of the 4 units, respectively (refer to Figure 7).

3. **Set DIP 6 OFF** on each of the 4 **VS-1616A** units.

4. Interconnect the corresponding EXTENSION / UNBALANCED OUT connectors between the same EXTENSION / UNBALANCED OUT connectors, as follows:

   • 1 to 1, 2 to 2, 3 to 3, up to and including 16 to 16, for MACHINE ADDRESS # 7 and MACHINE ADDRESS # 1

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1 Set to # 1 in most cases. In the example in Figure 10, the MACHINE # is set to # 2

- • 17 to 17, 18 to 18, 19 to 19, up to and including 32 to 32, for MACHINE ADDRESS # 8 and MACHINE ADDRESS # 2

5. Connect INPUTS 1 to 16 on the **VS-1616A** unit designated as MACHINE ADDRESS # 2 with INPUTS 1 to 16 on the **VS-1616A** unit designated as MACHINE ADDRESS # 1.
INPUTS 1 to 16 become the SYSTEM INPUTS 1 to 16.

6. Connect INPUTS 17 to 32 on the **VS-1616A** unit designated as MACHINE ADDRESS # 8 with INPUTS 17 to 32 on the **VS-1616A** unit designated as MACHINE ADDRESS # 7.
INPUTS 17 to 32 become the SYSTEM INPUTS 17 to 32.

7. Connect the balanced outputs 1 to 16 (OUTPUT 1 (1-16)) from the **VS-1616A** unit designated as (MACHINE ADDRESS # 7)[1] and also, if required, connect the balanced outputs 1 to 16 (OUTPUT 2 (1-16)) from the **VS-1616A** unit designated as (MACHINE ADDRESS # 1)[1].

8. Connect the balanced outputs 17 to 32 (OUTPUT 1 (17-32)) from the **VS-1616A** unit designated as (MACHINE ADDRESS # 8)[1] and also, if required, connect the balanced outputs 17 to 32 (OUTPUT 2 (17-32)) from the **VS-1616A** unit designated as (MACHINE ADDRESS # 2)[1].
OUTPUT 1 and OUTPUT 2 form a 1:2 distribution amplifier and the 4 VS-1616A units form a 32x32 switcher.

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1 To the audio acceptors (not shown in)
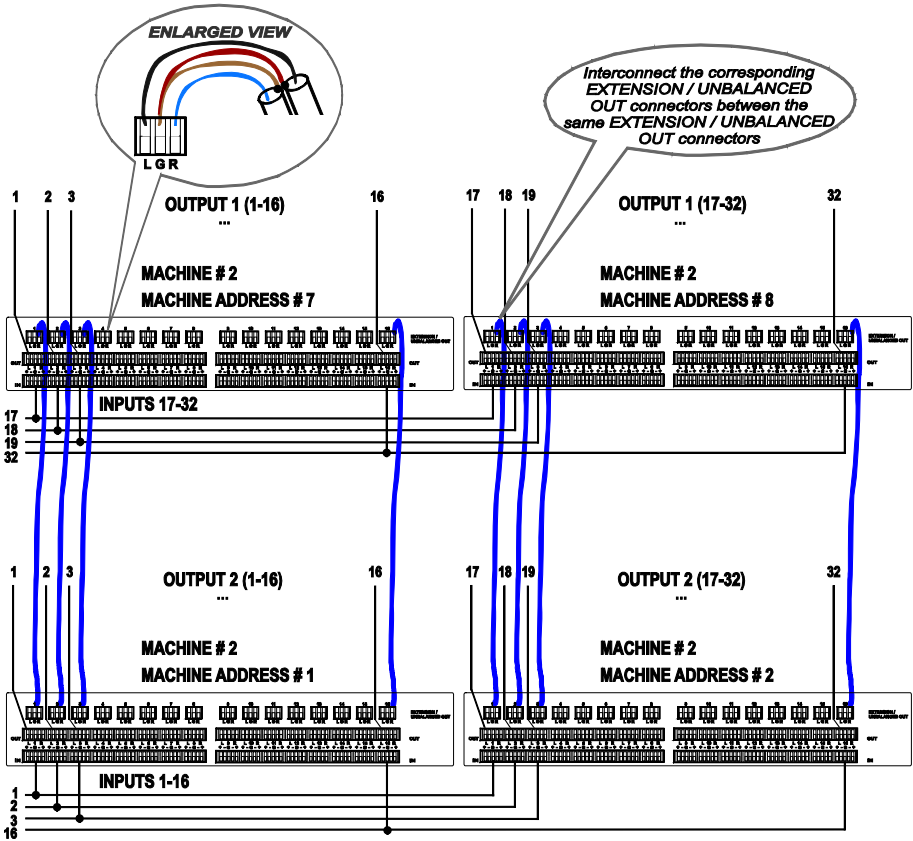
Figure 10: Connecting the 32x32 Switcher

6.5   Assembling a System of Interconnected Switchers

A major advantage of the **VS-1616A** is that it belongs to the series of 16x16 matrix switchers and, as such, can interconnect with other switchers in the series.

The block diagram in Figure 11 illustrates how to assemble an interconnected varied-format 16x16 series switcher that consists of a 32x32 composite video matrix switcher, a 32x16 digital video matrix switcher, a 32x32 balanced stereo audio matrix switcher, and a 16x16 digital audio matrix switcher.

Note that each group of switchers has a unique MACHINE # that is shared by all members of the group. In Figure 11, the 32x32 composite video matrix switcher is MACHINE # 1, the 32x16 digital video matrix switcher is MACHINE # 2 and so on. Control of the system is via the MACHINE #'s.

32x32 *Composite Video Matrix Switcher*

VS-162V Unit
MACHINE # 1
MACHINE ADDRESS # 7

VS-162V Unit
MACHINE # 1
MACHINE ADDRESS # 8

VS-162V Unit
MACHINE # 1
MACHINE ADDRESS # 1

VS-162V Unit
MACHINE # 1
MACHINE ADDRESS # 2

16x16 *Digital Video Matrix Switcher*

VS-162V Unit
MACHINE # 2

32x32 *Balanced Stereo Audio Matrix Switcher*

VS-1616A Unit
MACHINE # 3
MACHINE ADDRESS # 7

VS-1616A Unit
MACHINE # 3
MACHINE ADDRESS # 8

VS-1616A Unit
MACHINE # 3
MACHINE ADDRESS # 1

VS-1616A Unit
MACHINE # 3
MACHINE ADDRESS # 2

16x16 *Digital Audio Matrix Switcher*

VS-1616A Unit
MACHINE # 4
MACHINE ADDRESS # 1

RS-485 or RS-232 Control Interface

CONTROL

Figure 11: Assembling a System of Interconnected Switchers

Refer to section 6.6 for details of how to set the DIP-switches, and to section 6.7 for details of how to control this group of interconnected varied-format 16x16 series switchers, and other configurations.

6.6   Setting the DIP-switches

Configure the **VS-1616A** by setting the 8 DIP-switches as Figure 12 and Table 4 define:
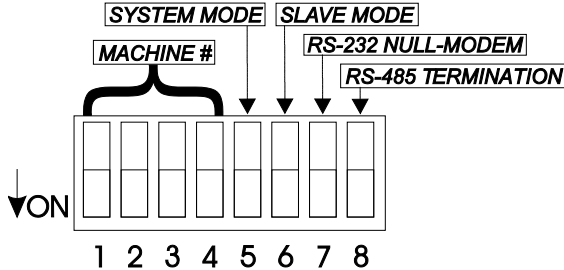
Figure 12: Rear Panel DIP-switches

Table 4: DIP-Switch Definitions

DIP-switch #	Function:
1-4	Set the MACHINE # (see Table 5 in section 6.6.1)
5	Enables (ON) or disables (OFF) the *Follow-SYSTEM* mode
6	Enables (ON) or disables (OFF) the *SLAVE* mode in a multi-channel configuration
7	Disables use of a null modem adapter[1] with RS-232 OFF = RS-232 connection via a null modem adapter ON = RS-232 connection without a null modem adapter
8	RS-485 termination for first and last machine = ON (RS-485 line terminates with 110Ω); for others = OFF (RS-485 line is open)

6.6.1   Setting the MACHINE

To control a unit via RS-232 or RS-485, each unit has to be identified via its unique MACHINE #. In an extended matrix configuration, in addition to the MACHINE #, each unit is identified via its MACHINE ADDRESS #.

Set the MACHINE #[2] on a **VS-1616A** unit according to Table 5.

A valid MACHINE # is from 1 to 15.

---

1 See section 6.7.1

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

Table 5: Machine # DIP-Switch Settings

MACHINE #	DIP-SWITCH			
	1	2	3	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
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

6.6.2 Setting the MACHINE ADDRESS

The MACHINE ADDRESS # is determined via the MACHINE ADDRESS Menu command, as section 8.3 describes. The MACHINE ADDRESS # defines which inputs and outputs are configured to that particular unit when expanding, as the chart in Figure 7 illustrates.

A valid MACHINE ADDRESS # is from 1 to 36.

6.6.3 Understanding the SYSTEM Mode

DIP 5 defines whether the **VS-1616A** unit communicates with other switchers via a common control line.

You can set **DIP 5 OFF** to disable the *Follow-SYSTEM* mode in the following applications:

- Stand alone switcher applications[1]
- A multi-channel audio switcher application[2]
- An expanded matrix switcher application[3]

You **must set DIP 5 ON** to enable the *Follow-SYSTEM* mode in an interconnected varied-format switcher application[1] and to allow control from a PC via RS-232 or RS-485 using the K-Router application.

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1 See section 6.2

2 See section 6.3

3 See section 6.4

Refer to section 8.2 for a description of the MENU's *Follow-SYSTEM* and *Breakaway-from- SYSTEM* modes.

6.6.4 Understanding the SLAVE Mode

The SLAVE mode is only used for the multi-channel audio switcher configuration[2], for example, when using 2 **VS-1616A** units to form a 4-channel 16x16 configuration, as Figure 6 illustrates.

One unit is used as the Master, and the other unit is a Slave. The Slave always follows the Master. In the example illustrated in Figure 6, the first **VS-1616A** unit is the Master (with DIP 6 set OFF disabling the Slave mode) and the second **VS-1616A** unit is a Slave (with DIP 6 set ON enabling the Slave mode).

On the Slave **VS-1616A** unit, the MATRIX and STATUS Displays do not illuminate and the STATUS Display shows the following message:

Keyboard LOCKED

However, the STATUS Display on the Slave **VS-1616A** unit dynamically shows[3] all changes made from the Master **VS-1616A** unit.

Front panel control is via the Master **VS-1616A** unit, on which the front panel buttons are unlocked and both the MATRIX and STATUS Displays illuminate.

6.7 Connecting a Control Interface

Connect a control interface (RS-232 or RS-485) unless operating a **VS-1616A** as a standalone unit without any control device (that is, with control from the front panel or IR port, and not via a remote controller or a PC). The control interface must be identical on each switcher in the series of 16x16 matrix switchers; either RS-232 or RS-485. One control interface suffices. Do not use both RS-232 and RS-485 control interfaces in the same configuration. For example, in an interconnected varied-format 16x16 switcher application[4], if the switcher that connects to the PC connects via the RS-232 control interface, each switcher must interconnect via the RS-232 control interface and not via the RS-485 control interface.

---

1 See section 6.5

2 See section 6.1

3 Albeit with an LCD Display that does not illuminate

4 See section 6.5

Choose the RS-232 control interface, for a range of about 25 meters used for a point-to-point connection.

Choose the RS-485 control interface, to operate the switcher from an extended distance of up to 1000 meters.

6.7.1 Connecting the RS-232 Control Interface

Connect several switchers (from the series of 16x16 matrix switchers) and the control unit in an RS-232 daisy chain arrangement, with or without using a null-modem adapter, as Figure 13 illustrates.

The RS-232 daisy chain switcher arrangement is transparent. This lets you arrange the switchers (from the series of 16x16 matrix switchers) according to your requirements, and not according to a fixed sequence dependent on the MACHINE # and/or MACHINE ADDRESS #.
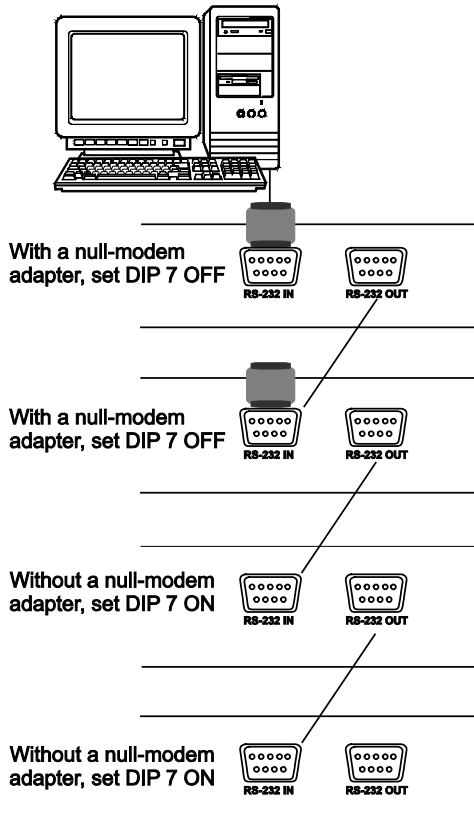
Figure 13: Connecting a PC to 4 VS-1616A Units

You can connect any of the following:

- 2 **VS-1616A** units, using a null-modem adapter (see section 6.7.1.1) or without using a null-modem adapter (see section 6.7.1.2)

- The PC's 9-pin D-sub COM port to a **VS-1616A** unit with a null-modem adapter (see section 6.7.1.3) or without a null-modem adapter (see section 6.7.1.4)

- The PC's 25-pin D-sub COM port to a **VS-1616A** unit with a null-modem adapter (see section 6.7.1.5) or without a null-modem adapter (see section 6.7.1.6)

6.7.1.1 Connecting Two VS-1616As with a Null-modem Adapter

To connect 2 **VS-1616A** units, using a null-modem adapter provided with the machine (default):

1. Connect a flat cable[1] between the RS-232 OUT 9-pin D-sub port on the first **VS-1616A** unit and the null-modem adapter that attaches to the RS-232 IN 9-pin D-sub port on the second **VS-1616A** unit.

2. On the second **VS-1616A** unit, set **DIP 7 OFF** (enabling null-modem adapter use).

6.7.1.2 Connecting Two VS-1616As without a Null-modem Adapter

To connect 2 **VS-1616A** units, without using a null-modem adapter:

1. Connect a flat cable1 between the RS-232 OUT 9-pin D-sub port on the first **VS-1616A** unit and the RS-232 IN 9-pin D-sub port on the second **VS-1616A** unit.

2. On the second **VS-1616A** unit, **set DIP 7 ON** (disabling null-modem adapter use[2]).

6.7.1.3 Connecting to a 9-pin D-sub COM Port with a Null-modem Adapter

To connect the PC's 9-pin D-sub COM port to a **VS-1616A** unit, using a null-modem adapter:

1. Connect a flat cable[1] between the PC's 9-pin D-sub COM port and the Null-modem adapter that attaches to the RS-232 IN 9-pin D-sub port on the **VS-1616A** unit.

---

1 Straight one-to-one uncrossed connections with at least the 3 wires pins # 2, # 3 and # 5

2 See section 6.6

　　　　　　　　　　KRAMER: SIMPLE CREATIVE TECHNOLOGY

2. **Set DIP 7 OFF** (enabling null-modem adapter use[2]) on the **VS-1616A** unit.

6.7.1.4 Connecting to a 9-pin D-sub COM Port without a Null-modem Adapter

To connect the PC's 9-pin D-sub COM port to a **VS-1616A** unit, without using a null-modem adapter:

1. Connect a flat cable[1] between the PC's 9-pin D-sub COM port and the RS-232 IN 9-pin D-sub port on the **VS-1616A** unit.

2. **Set DIP 7 ON** (disabling null-modem adapter use[2]) on the **VS-1616A** unit.

6.7.1.5 Connecting to a 25-pin D-sub COM Port with a Null-modem Adapter

To connect the PC's 25-pin D-sub COM port to a **VS-1616A** unit, using a null-modem adapter:

1. Connect a flat cable[1] between the PC's 25-pin D-sub COM port and the Null-modem adapter that attaches to the RS-232 IN 9-pin D-sub port on the first **VS-1616A** unit.

2. **Set DIP 7 OFF** (enabling null-modem adapter use[2]) on the **VS-1616A** unit.

6.7.1.6 Connecting to a 25-pin D-sub COM Port without a Null-modem Adapter

To connect the PC's 25-pin D-sub COM port to a **VS-1616A** unit, without using a null-modem adapter:

1. Connect the PC's 25-pin D-sub COM port to the RS-232 IN 9-pin D-sub port on the **VS-1616A** unit, as Figure 14 illustrates:

---

1 Straight one-to-one uncrossed connections with at least the 3 wires pins # 2, # 3 and # 5

2 See section 6.6
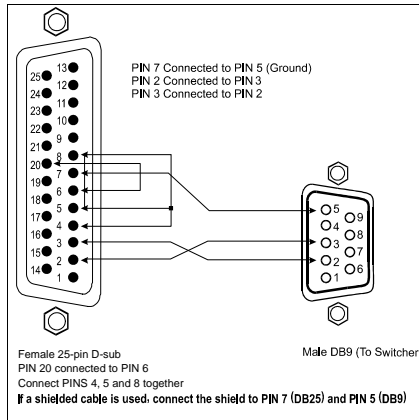
Figure 14: Connecting a PC (with a 25-pin connector) without a Null-modem Adapter

2. **Set DIP 7 ON** (disabling Null-modem adapter use[1]) on the **VS-1616A** unit.

6.7.2   Connecting the RS-485 Control Interface

Figure 15 defines the RS-485 connector PINOUT for external RS-485 control. The RS-485 connector is also used (if required) for vertical sync:
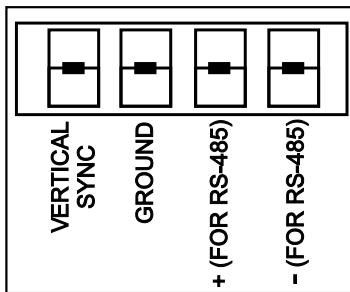
Figure 15: RS-485 Connector PINOUT

To connect an RS-485 connector on one **VS-1616A** unit to an RS-485 connector on one or more other switchers (from the series of 16x16 matrix switchers), as Figure 16 illustrates:

1. Connect the "+" PIN on the first **VS-1616A** unit to the "+" PIN on the second **VS-1616A** unit or other unit

---

1 See section 6.6

2. Connect the "-" PIN on the first **VS-1616A** unit to the "-" PIN on the second **VS-1616A** unit or other unit

3. If shielded cable is used for an RS-485 connection, connect the shield to the Ground PIN.

For details about how to configure the vertical sync (if required), refer to section 6.8 and Figure 21 in section 8.4.1.
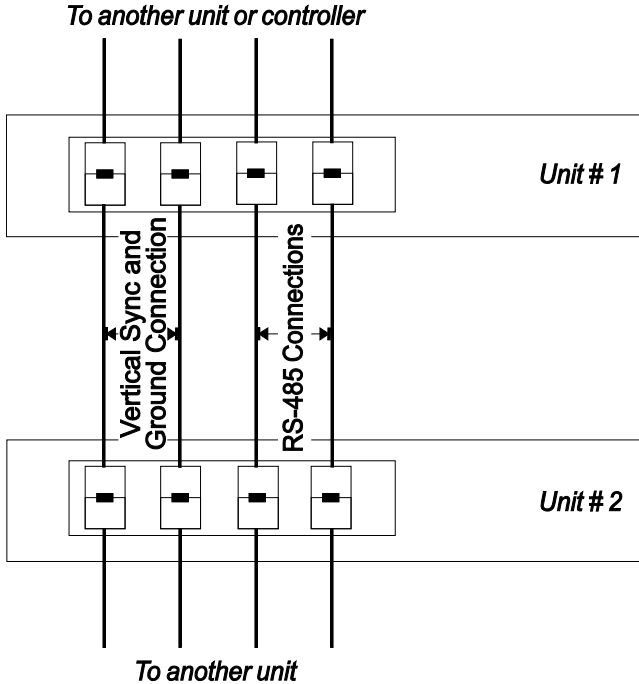
Figure 16: Connecting the RS-485 Connectors between 2 VS-1616A Units

Figure 17 illustrates the RS-485 line that connects:

*   Between each **VS-1616A** unit
*   To the PC via a Kramer Tools **VP-43xl** *Interface Converter* (connect the PC's 9-pin D-sub COM port to the "RS-232 in" 9-pin D-sub (F) port on the **VP-43xl**. Next, connect the RS-485 port on the **VP-43xl** to the RS-485 ports on the **VS-1616A** units)
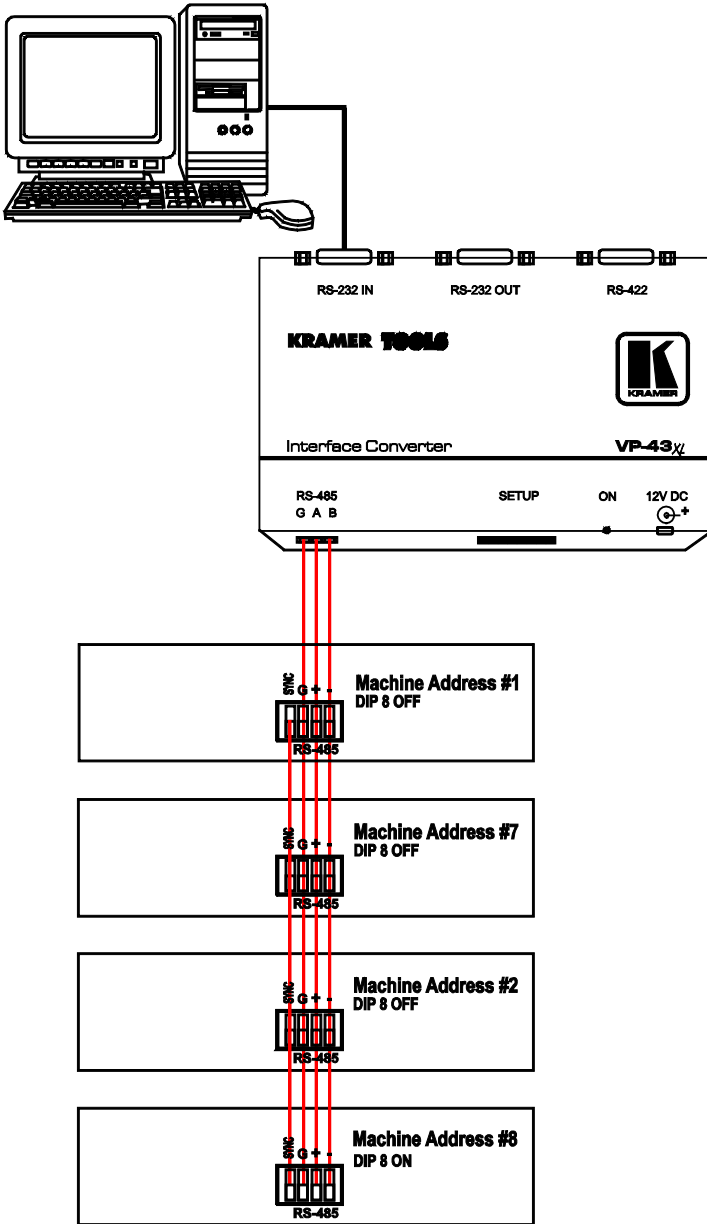
Figure 17: An RS-485 Control Interface Setup

6.8 Configuring the Sync

When using the **VS-1616A** without a video switcher (for example, a **VS-162V**), configure the sync via the SWITCHING METHOD Menu command setting[1]. When setting up multiple machines[2], you can select as the sync input, the MTX (Sync from Matrix) RS-485 Terminal Block connector. For example, a video-audio switcher (using **VS-162V** and **VS-1616A**), linking a common sync to all the machines may be necessary to facilitate simultaneous vertical interval switching.

Usually, the easiest method is to choose the sync source from any video machine, for example, the **VS-162V** switcher (as Figure 21 illustrates) and then connect all the terminal block connectors.

In this case, set the **VS-162V** switcher to select the sync source from the external sync connector or from the INPUT # 1 connector. This sync is now available to the other machines via the RS-485 terminal block connector, as Figure 15 and Figure 16 illustrate. Select the MTX sync on the **VS-1616A** switcher that receives that sync.

6.9 Connecting the KEYBOARD EXTENSION

Connecting dry contact-closure switches to the Keyboard Extension (*EXT. KEYS*) connector enables you to route an input to an output by remote control from a distance of up to 1000 meters. These IN and OUT keys are expandable[3]. Figure 18 illustrates how to connect the Keyboard Extension (*EXT. KEYS*):

---

1 Refer to section 8.4

2 Refer to section 8.4.1

3 Add an unlimited number of push buttons to the existing keys (in parallel) by attaching one end of the push button to the corresponding number and the other end to the IN or OUT
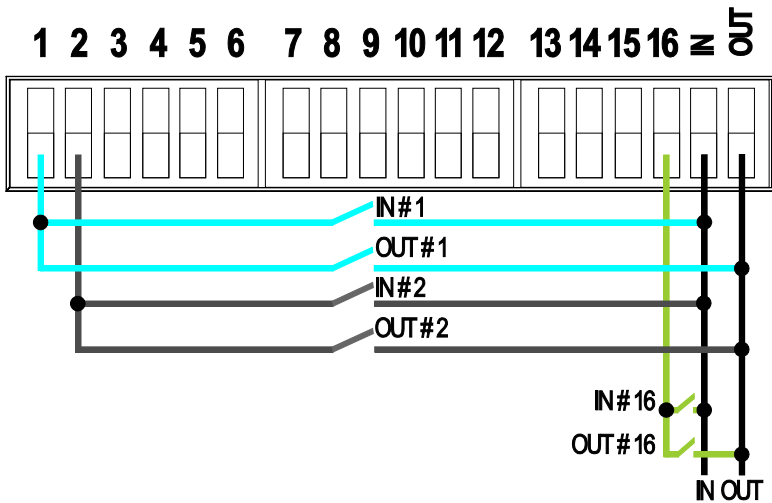
Figure 18: Keyboard Extension (EXT. KEYS) Connector

To use the Keyboard Extension, activate the extended KEYBOARD setting Menu command, as section 8.5 describes.

7 Operating Your Balanced Stereo Audio Matrix Switcher

Operate your **VS-1616A** via:

- The front panel buttons (as this section describes)
- RS-232 or RS-485 serial commands transmitted by a touch screen system, PC[1], or other serial controller
- The Kramer **RC-IR2** Infrared Remote Control Transmitter
- Dry contact-closure switches connected to the Keyboard Extension

7.1 Viewing the Startup Display

After switching on the power, the *MATRIX* and *STATUS*[2] displays show the following screens in sequence:

---

1 For instructions on using Kramer Windows®-based control software, refer to the separate user manual (included on the CD-ROM in .pdf format), *Kramer Control Software*

2 Version 1.5 is shown in the Status Display as an example; text in the Matrix Display may vary (according to machine settings)
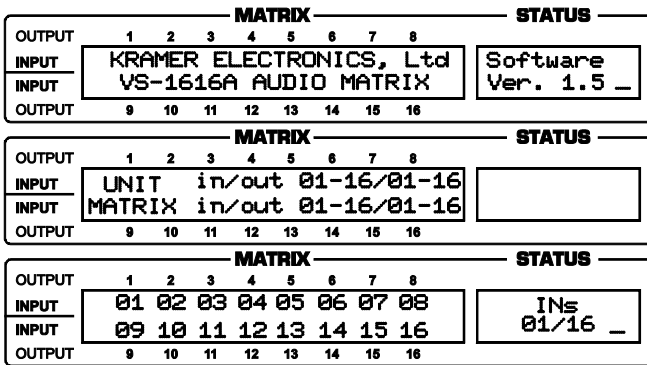
Figure 19: Default Startup Status Display Sequence

7.2 Using the Front Panel Buttons

You can switch (see section 7.2.2) and clear (see section 7.2.3):

- One input to one output
- Several inputs to several outputs
- One input to all outputs

7.2.1 Confirming the Settings

Choose to work in the *AT ONCE* mode or the *CONFIRM* mode:

In the *AT ONCE* (default[1]) mode:

- Actions require no user confirmation
- Execution is immediate
- No protection is offered against changing an action in error

In the *CONFIRM* mode[2]:

- You have an optional method to help avoid making a mistake
- Every action requires user confirmation
- Execution is delayed[3] until the user confirms the action
- Protection is offered to prevent erroneous switching
- You can key-in several actions and then confirm them by pressing the TAKE button once, to simultaneously switch several monitors

---

1 For all actions except storing/recalling setups

2 The CONFIRM mode is the default for storing/recalling setups (see section 8.6)

3 Failure to press the TAKE button within 30 seconds to one minute (the Timeout) will abort the action

7.2.1.1 Toggling between the AT ONCE and CONFIRM Modes

To toggle between the AT ONCE (default) mode and the CONFIRM mode, press the TAKE button.

In CONFIRM mode: Actions require user confirmation and the TAKE LED lights.

In AT ONCE mode: Actions do not require user confirmation and the TAKE LED does not light.

When the TAKE LED blinks:

- You cannot toggle between the AT ONCE and CONFIRM modes
- You can execute the previous action, by pressing the TAKE button
- You can cancel the previous action, by pressing a non-relevant button (for example, the MENU button)

7.2.2 Switching Inputs to Outputs

You can switch:

- One input to one output (see section 7.2.2.1)
- Several inputs to several outputs (see section 7.2.2.2)
- One input to all outputs (see section 7.2.2.3)

7.2.2.1 Switching One Input to One Output

Pressing an OUT-IN combination when your **VS-1616A** operates in the AT ONCE mode implements the switch immediately.

To switch one input to one output (AT ONCE mode):

1. Press the appropriate OUT button.
   The MATRIX Display shows the 2 blinking digits, representing the present input number connected to that specific output[1]. If the present output is clear, the 2 blinking digits *00* appear in the MATRIX Display. The STATUS Display shows the message:

   out # x

   Where x is the output number

2. Press the appropriate IN button.
   The output switches to the input and the MATRIX Display shows the

---

1 For example, pressing OUT button 9 shows the blinking digits 01 if input 1 was previously routed to OUT 9

Input # instead of the blinking digits.
The STATUS Display momentarily shows the message:

out # x
from in # y

Where x is the output number and y is the input number

Pressing an OUT-IN combination when your **VS-1616A** operates in the CONFIRM mode (and the TAKE LED is lit), requires user confirmation.

To switch one input to one output (CONFIRM mode):

1. Repeat step 1 above.

2. Press the appropriate IN button.
   The MATRIX Display shows the 2 blinking digits, representing the input number and the TAKE LED blinks.
   The STATUS Display shows[1] the message:

out # x
from in # y

Where x is the output number and y is the input number

3. Press the TAKE button to confirm the action.
   The output switches to the input and the TAKE LED lights.

7.2.2.2 Switching Several Inputs to Several Outputs

In the *AT ONCE* mode, you need to execute each OUT-IN combination separately (see section 7.2.2.1). When switching many inputs to many outputs it is recommended to toggle to 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 switch several inputs to several outputs in the CONFIRM mode (the TAKE LED is lit), do the following:

1. Press the appropriate OUT button.
   The MATRIX Display shows the 2 blinking digits, representing the previous input number for that specific output[2]. If the previous input is clear, the 2 blinking digits *00* appear in the MATRIX Display.
   The STATUS Display shows the message:

out # x

---

1 Continuously, within the limit of the timeout (approximately 30 seconds to one minute)

2 For example, pressing OUT button 9 shows the blinking digits 01 if input 1 was previously routed to OUT 9

Where x is the output number

2. Press the appropriate IN button.
   The MATRIX Display shows the 2 blinking digits, representing the input number and the TAKE LED blinks.
   The STATUS Display shows[1] the message:

   out # x
   from in # y

Where x is the output number and y is the input number

3. Press the second appropriate OUT button, repeating step 1 above.

4. Press the appropriate[2] IN button, repeating step 2 above.

5. Continue with this OUT-IN button sequence, pressing the appropriate OUT and IN buttons, as required. You can also combine an OUT-OFF or OFF-OUT combination with this sequence.

6. After completing the sequence, press the TAKE button to confirm the actions.
   The inputs switch to the respective outputs, as the MATRIX Display shows (no digits blink) and the TAKE LED lights.

7.2.2.3 Switching One Input to All Outputs

To switch one input to all the outputs (in the AT ONCE mode):

1. Press the ALL button.
   The MATRIX Display shows all the sets of 2 blinking digits (each representing the present input number for that respective output) blinking simultaneously.
   The STATUS Display shows the message:

   all OUTs

2. Press the appropriate IN button.
   This input switches to all the outputs and the MATRIX Display shows the identical non-blinking 2 digits (representing that input number).

To switch one input to all the outputs (in the CONFIRM mode, (the TAKE LED is lit)):

1. Repeat steps 1 and 2 above.
   The TAKE LED blinks.

2. Press the TAKE button to confirm the action.
   The selected input switches to all the outputs and the TAKE LED lights.

---

1 Continuously, within the limit of the timeout (approximately 30 seconds to one minute)

2 That corresponds with the second OUT button

The MATRIX Display shows the identical 2 non-blinking digits (representing that input number) for all outputs.

7.2.3 Clearing[1] Outputs

You can clear (delete):

- One output (see section 7.2.3.1)
- Several outputs (see section 7.2.3.2)
- All outputs (see section 7.2.3.3)

7.2.3.1 Clearing an Output

To clear an output (in the AT ONCE mode):

1. Press the appropriate OUT button.
   The MATRIX Display shows the 2 blinking digits, representing the present input number for that specific output[2]. If the present input is clear, the 2 blinking digits *00* appear in the MATRIX Display.
   The STATUS Display shows the message:

   out # x

Where x is the output number

2. Press the OFF button[3].
   The input is cleared and the MATRIX Display does not show any Input # in its place.
   The STATUS Display momentarily shows the message:

   out # x
   reset

Where x is the output number

To clear an output (in the CONFIRM mode (the TAKE LED is lit)):

1. Repeat step 1 above.

2. Press the OFF button[3].
   The MATRIX Display shows the 2 blinking digits *00* instead of the previous 2 blinking digits and the TAKE LED blinks.
   The STATUS Display shows[4] the message:

   out # x
   reset

---

1 "Clearing" means disconnecting the output from any of the inputs, and leaving it disconnected

2 For example, pressing OUT button 9 shows the blinking digits 01 if input 1 was previously routed to OUT 9

3 You can press the OFF button first, and then an OUT button (the order is irrelevant)

4 Continuously, within the limit of the timeout (approximately 30 seconds to one minute)

Where x is the output number

3.   Press the TAKE button to confirm the action.
     The input is cleared and the TAKE LED lights. The MATRIX Display
     does not show any Input # in its place.

7.2.3.2 Clearing Several Outputs

To clear several outputs (in the AT ONCE mode):

1.   Press the appropriate OUT button.
     The MATRIX Display shows the 2 blinking digits, representing the
     present input number for that specific output[1]. If the present output is
     clear, the 2 blinking digits *00* appear in the MATRIX Display.
     The STATUS Display shows the message:

out # x

where x is the output number.

2.   Press the OFF button.
     The output is cleared and the MATRIX Display does not show any Input
     # in its place.
     The STATUS Display momentarily shows the message:

out # x
reset

where x is the output number.

To clear several outputs (in the CONFIRM mode (the TAKE LED is lit)):

1.   Repeat step 1 above.

2.   Press the OFF button.
     The MATRIX Display shows the 2 blinking digits *00* instead of the
     previous 2 blinking digits and the TAKE LED blinks.
     The STATUS Display shows[1] the message:

out # x
reset

where x is the output number.

3.   Press the second appropriate OUT button, by repeating step 1 above.

4.   Repeat step 2 above.

5.   Continue with this OUT-OFF button sequence, pressing the appropriate
     OUT buttons and the OFF, as required.

---

1 For example, pressing OUT button 9 shows the blinking digits 01 if input 1 was previously routed to OUT 9

The MATRIX Display shows the sets of 2 blinking digits, representing the present input number for each specific output.

6. After completing the sequence, press the TAKE button to confirm the actions.
The inputs are cleared and the TAKE LED lights. The MATRIX Display does not show any Input # in its place.

7.2.3.3 Clearing All Outputs

To clear all outputs (in the AT ONCE mode):

1. Press the ALL button.
The MATRIX Display shows all the sets of 2 blinking digits (each representing the present input number connected to that respective output) blinking simultaneously.
The STATUS Display shows the message:

<div align="center">

all OUTs

</div>

2. Press the OFF button[1].
All the outputs are cleared and the MATRIX Display momentarily shows the message:

<div align="center">

Reset ALL connections
!!!!

</div>

To switch one input to all the outputs (in the CONFIRM mode (the TAKE LED is lit)):

1. Repeat step 1 above.

2. Press the OFF button[1].
The TAKE LED blinks and the MATRIX Display shows the message:

<div align="center">

Reset ALL ?
Press TAKE to execute

</div>

3. Press the TAKE button to confirm.
All the outputs are cleared and the TAKE LED lights.

7.2.4 Storing and Recalling Setups

You can store up to 99 settings in the non-volatile memory with the ability to recall each of those settings.

---

1 You can press the OFF button first, and then the ALL button (the order is irrelevant)

7.2.4.1 Storing Setups

To store a setting, do the following:

1. Press the STO button.
    The Displays show the messages:

    | **Enter SETUP number** | **Store** |
    | **use two digit # 01-99** | **# xy** |

Where xy are the OUT buttons.

2. Press two OUT buttons, using the OUTkeys # 1 to 9, and 10 (for 0).
    The OUTkeys function on a decimal-basis, and not on a positional-basis.
    For example, to enter the # 14, press # 1 followed by # 4 (not # 14). To
    enter the # 3, press # 10 followed by # 3[1].
    The TAKE LED blinks and the Displays show the messages:

    | **STORE this SETUP ?** | **Store** |
    | **YES -> TAKE** | **# xy** |

3. Press the *TAKE* button.
    The memory stores the setup and the MATRIX Display shows the
    message:

    Setup # xy stored

Note, saving a setup to an already allocated setup #, prompts the message
in the MATRIX Display:

    Setup already exists
    Press TAKE to overwrite

Pressing the TAKE button replaces the stored setup with the current
setup. Alternatively, press a different OUT button to change the setup #.

7.2.4.2 Recalling Setups

To recall a setting, do the following:

1. Press the *RCL* button.
    The Displays show the messages:

    | **Enter SETUP number** | **RECALL** |
    | **use two digit # 01-99** | **# xy** |

Where xy are the OUT buttons.

---

1 However, pressing # 3 followed by the TAKE button will also enter the # 3

2. Press the appropriate two OUT buttons, using the OUTkeys # 1 to 9, and 10 (for 0). The OUTkeys function on a decimal-basis, and not on a positional-basis. For example, to enter the # 14, press # 1 followed by # 4 (not # 14). To enter the # 3, press # 10 followed by # 3[1].
The memory recalls the setup. The MATRIX Display shows the blinking setup and the TAKE LED blinks. The STATUS Display shows the message:

SETUP # xy
Load ?

Where xy are the OUT buttons.

3. Preview the setup to decide whether to implement it. If not, you can scan the other setups, by pressing different OUT buttons. To stop previewing the setups, press a non-relevant button, for example, an IN button.

4. Press the TAKE button.
The specific setup is implemented.

If trying to recall an empty setup[2], the MATRIX Display would show a message saying that that particular setup is empty and would return you to step 1 above.

8   Viewing the MENU Commands Sequence

You can press the MENU button up to 12 times in straight sequence to scan the range of commands.

---

1 However, pressing # 3 followed by the TAKE button will also enter the # 3

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

LOCK front panel ?
yes -> TAKE, next -> MENU

Operational Control

Change the current state by pressing the TAKE button

Follow the SYSTEM
yes -> TAKE, next -> MENU

MACHINE ADDRESS setting
yes -> TAKE, next -> MENU

SWITCHING METHOD setting
yes -> TAKE, next -> MENU

extended KEYBOARD setting
yes -> TAKE, next -> MENU

STORE/RECALL setting
yes -> TAKE, next -> MENU

what to INDICATE
yes -> TAKE, next -> MENU

Setup Commands

Review the current setup by pressing the TAKE button several times (as required). Pressing the TAKE button lets you see how a command is setup without changing it

COMMUNICATION setting
yes -> TAKE, next -> MENU

IR REMOTE setting
yes -> TAKE, next -> MENU

AUTO store current SETUP
yes -> TAKE, next -> MENU

identify MACHINE
yes -> TAKE, next -> MENU

initial RESET
yes -> TAKE, next -> MENU

Figure 20: Sequence of MENU Commands

You can stop changing a setup at any time by pressing any IN button.

8.1 Locking and Unlocking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[1] your **VS-1616A**. Unlocking releases the protection mechanism.

To lock the **VS-1616A**:

1. Press the MENU button once.
   The MATRIX Display shows the message:

   > **LOCK front panel?**
   > **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
   The front panel locks and the Displays momentarily show the messages:

   > **Front panel LOCKED**   **Keyboard LOCKED**[3]
   > **to unlock- press MENU**[2]

Pressing a front panel button has no effect[4] but remote RS-232 and RS-485 commands function and show on the MATRIX Display.

To unlock the **VS-1616A**:

Either:

1. Press the MENU button.
   The MATRIX Display shows the message:

   > **to UNLOCK front panel**
   > **press TAKE**

The *TAKE* LED blinks.

2. Press the *TAKE* button.
   The front panel unlocks[5] and the MATRIX Display momentarily[2] shows the message:

   > **Front panel**
   > **UNLOCKED**

Or:

---

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

2 After a few seconds, the status of the unit replaces this message

3 This message appears continuously in the STATUS Display, until the front panel is unlocked

4 IR and Keyboard Extension (EXT. KEYS) commands are also blocked

5 Switching the power off and on again also unlocks the front panel

1. Press the *TAKE* button twice.
    The front panel unlocks and the same messages show as in steps 1 and 2 above.

8.2   Choosing the Follow-System or Breakaway-from-System Mode

The terms *audio-follow-video*[1] and *audio breakaway*[2] are well known. Sometimes signals other than audio signals need to switch simultaneously and at other times, need to switch independently. For example:

*   Non-linear editing systems, that sometimes combine video with analog audio and at other times combine video with digital audio

*   Duplication systems, that make Master tapes from programs with different formats: composite analog, component analog and component digital

When the **VS-1616A** functions in the:

*   *Follow-SYSTEM* mode, the **VS-1616A** switches with other 16x16 matrix switchers[3], implementing the same action simultaneously

*   *Breakaway-from-SYSTEM* mode, the **VS-1616A**[4] functions independently, implementing an action independently of the others

The **VS-1616A** unit will function[5] in the *Follow-SYSTEM* mode if at least one other **VS-1616A** unit[6] 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-1616A** unit to function in the *Follow-SYSTEM* mode:

1. Press the MENU button twice.
    The MATRIX Display shows the message:

    Follow the SYSTEM
    yes -> TAKE, next -> MENU

---

1 Video and the audio channels switch simultaneously in the same way

2 Audio channels switch independently from the video channels

3 16x16 matrix switchers in the same series, that include, for example, the VS-162V (16x16 video matrix switcher) units

4 Also applies to a VS-162V unit

5 The VS-1616A unit changes its status immediately and goes to the Follow-system mode

6 Or VS-162V (as well as other 16x16 matrix switchers in the same series)

2. Press the *TAKE* button.
    The Displays show the messages:

set FOLLOW SYSTEM?	**current:**
Press TAKE to execute	**breakaway**

3. Press the *TAKE* button again.
    The MATRIX Display momentarily shows this message, followed by the status of the switcher and in the STATUS Display the letter "S" is displayed behind the blinking cursor:

    the UNIT is set in mode
    FOLLOW system

4. If the status of the **VS-1616A** unit differs from that of the other unit(s), set the **VS-1616A** unit to the *Follow-SYSTEM* mode. The MATRIX Display blinks the new status of the switcher and the TAKE LED blinks. Pressing the *TAKE* button[1] implements all the changes to the same state as the rest of the system placing the switcher in the *Follow-SYSTEM* mode.

To set the **VS-1616A** unit to function in the *Breakaway-from-SYSTEM* mode:

1. Press the MENU button twice.
    The MATRIX Display shows the message:

    FOLLOW the system
    yes -> TAKE, next -> MENU

2. Press the *TAKE* button.
    The Displays show the messages:

Set BREAKAWAY from system?	**current:**
Press TAKE to execute	**follow SYS**

3. Press the *TAKE* button again.
    The MATRIX Display shows the message:

    the UNIT is set in mode
    BREAKAWAY from system

---

1 Pressing a different button cancels the operation and the switcher will remain in its previous state

8.3 Setting the MACHINE ADDRESS

Press the MENU button until you reach the Setting the MACHINE ADDRESS command. Choose the stand alone or the large matrix setting. You set the MACHINE ADDRESS using the OUTkeys # 1 to 9, and 10 (for 0). The OUTkeys function on a decimal-basis, and not on a positional-basis. For example, to enter the # 15, press # 1 followed by # 5 (not # 15).

You can change the MACHINE ADDRESS from:

- The stand alone setting to a large matrix setting (see section 8.3.1)
- A large matrix setting to the stand alone setting (see section 8.3.2)
- A large matrix setting to a large matrix setting with a different MACHINE ADDRESS (see section 8.3.3)

Plan your system according to the chart in Figure 7 before setting the MACHINE ADDRESS, because in a matrix configuration you need to enter the highest MACHINE ADDRESS as well as the MACHINE ADDRESS.

8.3.1 Changing the MACHINE ADDRESS from Standalone to a Large Matrix

To set the MACHINE ADDRESS:

1. Press the MENU button until you reach the MACHINE ADDRESS command.
   The MATRIX Display shows the message:

   > **MACHINE ADDRESS**
   > **setting yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
   The Displays show the messages:

OUTkey 1: Stand-Alone UNIT	**Current**
2: Large Matrix	**Alone**[1]

3. Press the *OUT* button *# 2*.
   The TAKE LED blinks and the Displays show the messages:

Change to the LARGE MATRIX?	**Current**
Press TAKE to confirm	**16x16**[2]

---

[1] Indicating that the machine is not set to the large matrix setting

[2] For example, if currently configured for stand alone

4. Press the *TAKE* button again.
    The Displays show the messages:

READY to set MACHINE ADDRESS	**Current #**
use OUTkey 1-9, 0	**1**

5. Enter the MACHINE ADDRESS by pressing an *OUT* button *# 1-9, 0*.
    The STATUS Display shows the message:

current:
x

Where x is the OUT button # pressed

6. Press the *TAKE* button again.
    The Displays show the messages:

READY to change MACH. ADDR.	**From # 01**
Press TAKE to confirm	**to # x**

At this stage, you can enter another MACHINE ADDRESS by pressing another OUT button.

7. Press the *TAKE* button again.
    The Displays show the messages:

MACHINE ADDRESS	**current #**
changed	**x**

After a few seconds, the Displays show the messages:

SET highest MACHINE ADDRESS	**current #**
use OUTkey 1-9, 0	**x**

8. Press an *OUT* button *# 1-9, 0*.
    The STATUS Display shows the message:

current #
x

Where x is the OUT button # pressed

At this stage, you can enter another highest MACHINE ADDRESS. The unit may suggest a highest MACHINE ADDRESS for your system. If so, it is recommended that you use that address.

9. Press the *TAKE* button again.
    The MATRIX Display shows the message:

Change highest MACH. ADDR. ?
Press TAKE to confirm

10. Press the *TAKE* button again.
    The MATRIX Display shows the message:

    HIGHEST MACHINE ADDRESS
    Changed

8.3.2 Changing the MACHINE ADDRESS from a Large Matrix to Standalone

To set the MACHINE ADDRESS:

1. Press the MENU button until you reach the MACHINE ADDRESS command.
   The MATRIX Display shows the message:

   MACHINE ADDRESS
   setting yes -> TAKE, next -> MENU

2. Press the *TAKE* button.
   The Displays show the messages:

   OUTkey 1: Stand-Alone UNIT   **Current**
   2: Large Matrix   **Matrix**[1]

3. Press the *OUT* button # 1.
   The Displays show the messages:

   STAND ALONE UNIT (Mach# 01)?   **Current**
   Press TAKE to confirm   **Matrix**

4. Press the *TAKE* button again.
   The MATRIX Display shows the message:

   MACHINE ADDRESS changed
   now STAND-ALONE

8.3.3 Changing the a Large Matrix Setting MACHINE ADDRESS

To set the MACHINE ADDRESS:

1. Press the MENU button until you reach the MACHINE ADDRESS command.
   The MATRIX Display shows the message:

   MACHINE ADDRESS setting
   yes -> TAKE, next -> MENU

---

1 Indicating that the machine is not set to stand alone

2. Press the *TAKE* button.
    The Displays show the messages:

OUTkey 1: Stand-Alone UNIT	**Current**
2: Large Matrix	**Matrix**

3. Press the *OUT* button *# 2*.
    The Displays show the messages:

set NEW matrix	**current:**
new -> TAKE leave old -> MENU	**16x32**

4. Press the *TAKE* button again.
    The Displays show the messages:

READY to set MACHINE ADDRESS	**current #**
use OUTkey 1-9, 0	**1**

5. Press an *OUT* button *# 1-9, 0*.
    The STATUS Display shows the message:

current: x

Where x is the OUT button # pressed

6. Press the *TAKE* button again.
    The *TAKE* LED blinks and the Displays show the messages:

READY to change MACH. ADDR.	**from # 01**
Press TAKE to confirm	**to #0x**

7. Press the *TAKE* button again.
    The Displays show the messages:

MACHINE ADDRESS	**current #**
changed	**x**

After a few seconds, the Displays show the messages:

SET highest MACHINE ADDRESS	**current #**
use OUTkey 1-9, 0	**x**

8. Press an *OUT* button *# 1-9, 0*.
    The STATUS Display shows the message:

current:
x

Where x is the OUT button # pressed

9. Press the *TAKE* button again.
    The MATRIX Display shows the message:

Change highest MACH. ADDR. ?
Press TAKE to confirm

10. Press the *TAKE* button again.
    The MATRIX Display shows the message:

    HIGHEST MACHINE ADDRESS
    Changed

8.4 Choosing the SWITCHING METHOD Setting

Section 8.4.1 describes the SWITCHING METHOD settings for
standalone units and large matrices. Section 8.4.2 describes how to
configure a SWITCHING METHOD.

8.4.1 Understanding the SWITCHING METHOD Settings

Setting the **VS-1616A** unit as a Stand-Alone UNIT[1] provides only one
SWITCHING METHOD setting, that is, immediate switching,
irrespective of how the sync is setup on the Menu. Switching occurs
immediately after completion of front panel or dry-contact operation or
immediately after receiving an RS-232 or RS-485 command, or an IR
command. The switching is independent of the video vertical reference.

Setting the **VS-1616A** unit as one unit in a system of interconnected
switchers (instead of as a Stand-Alone UNIT) provides a choice of 2
SWITCHING METHOD settings:

- **NoVIS**, (as described above)
- **MTX** (SYNC from Matrix) - the vertical interval of the video
  reference (selected on any video in a system of interconnected
  switchers) is present on the "SYNC" RS-485 terminal block
  connector[2]. This reference signal applies to all switchers in the
  multi-switcher system and facilitates switching all units
  simultaneously

To choose the MTX (SYNC from Matrix) setting[3] as the example in
Figure 21 illustrates:

- Connect the RS-485 terminal block connectors[4] between both
  switchers in the multi-switcher system
- Connect and set the video reference signal on the **VS-162V** unit
  to EXT (external sync) or INT# 1 (internal sync)
- Set the video reference on the **VS-1616A** unit to the MTX

---

1 Via the MACHINE ADDRESS setting (as section 6.6.1 describes)

2 Item 5 in Figure 1

3 This sets the matrix sync configuration from another (Master) machine

4 Via a straight connection of all four pins

(SYNC from Matrix) setting

Figure 21: Choosing the MTX (SYNC from Matrix) Setting

8.4.2 Configuring a SWITCHING METHOD

To choose a SWITCHING METHOD setting, do the following:

1. Press the MENU button until you reach the SWITCHING METHOD setting.
   The MATRIX Display shows the message:

   **SWITCHING METHOD setting
   yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
   The Displays show the messages:

   **Use OUTkey to configure   Current
   1: Immediate 4: Video SYNC   Immediate**[1]

3. Press *OUT* button *1* or *4*. For example, *OUT* button # 4 to set the MATRIX sync configuration.
   The *TAKE* LED blinks and the MATRIX Display shows the message:

   **Press TAKE to configure
   from MATRIX**

4. Press the *TAKE* button.
   The Displays show the messages:

   **SWITCHING METHOD   current:
   changed   From MATRIX**

---

1 Indicating that the machine is currently set to the immediate switching method setting

8.5 Choosing the Extended Keyboard Setting

Section 6.9 describes how to connect a remote unit. Activate or deactivate it by setting the extended Keyboard setting ON or OFF.

To set the extended KEYBOARD mode, do the following:

1. Press the MENU button until reaching the extended Keyboard setting.
   The MATRIX Display shows the message:

   > **extended KEYBOARD setting**
   > **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
   The Displays show the messages:

   > **Outkey 1: External keys OFF**   **current:**
   > **2: External keys ON**   **X-key ON**[1]

3. Press the *OUT* button *1* to deactivate the External keys.
   The TAKE LED blinks and the Displays show the messages:

   > **Turn OFF external keys?**   **current:**
   > **Press TAKE to execute**   **X-key ON**

4. Press the *TAKE* button.
   The Displays show the messages:

   > **External Keyboard mode**   **current:**
   > **changed**   **X-key OFF**

8.6 Setting the STORE/RECALL KEYBOARD Mode

Choose one of these STORE/RECALL KEYBOARD modes:

- At ONCE mode in which setups are stored/recalled immediately without the need for user confirmation
- CONFIRM mode in which storing/recalling setups require user confirmation. The CONFIRM mode is the default[2] for storing/recalling setups and is recommended to prevent erroneously storing/recalling of setups

To set the STORE/RECALL KEYBOARD mode to the AT ONCE mode, instead of the CONFIRM (default) mode, do the following:

1. Press the MENU button until reaching the STORE/RECALL setting.
   The MATRIX Display shows the message:

---

1 Indicating that the external keys are currently activated

2 The AT ONCE mode is the default for all actions except storing/recalling setups

---

> **STORE/RECALL setting**
> **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button and choose the appropriate Outkey 1 for the AT
    ONCE mode (Outkey 2 is for the CONFIRM mode).
    The Displays show the messages:

> **STO/RCL mode**   **current:**
> **changed**   **At once**

8.7 Choosing What to INDICATE

Choose what is displayed during regular operation: between scrolling the
switcher setup as <u>Figure 22</u> illustrates, and showing the IN/OUT range[1].

Figure 22: Choosing what to INDICATE

To scroll the switcher setup (instead of showing the IN/OUT range), do
the following:

1. Press the MENU button until you reach the what to INDICATE
    command.
    The MATRIX Display shows the message:

> **what to INDICATE**
> **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
    The Displays show the messages:

> **Use OUTkey to configure**   **Current:**
> **1: scroll SETUP   2: OUTs/INs**   **OUTs/INs**

---

1 Useful in an expanded matrix configuration

3. Press the *OUT* button *1*.
   The TAKE LED blinks and the Displays show the messages:

Scroll switcher setup?	**Current:**
Press TAKE to execute	**OUTs/INs**

4. Press the *TAKE* button.
   The Displays show the messages:

display mode	**Current:**
changed	**SETUP**

8.8 Choosing the COMMUNICATION Setting

Choose the response option (reply or no reply).

To choose the No Reply response option, for example, do the following:

1. Press the MENU button until you reach the COMMUNICATION
   setting.
   The MATRIX Display shows the message:

   > **COMMUNICATION setting**
   > **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
   The MATRIX Display shows the message:

   > **Use OUTkey to configure**
   > **1: REPLY   2: No Reply**

3. Press the *OUT* button *2*.
   The TAKE LED blinks and the Displays show the messages:

Set serial port No reply	**Current:**
Press TAKE to execute	**Reply**

4. Press the *TAKE* button again.
   The Displays show the messages:

SWITCHER RESPONSE	**Current:**
changed	**No reply**

8.9 Setting the IR REMOTE Control

Set the IR REMOTE control to enable remote control of the **VS-1616A**
16x16 Balanced Stereo Audio Matrix Switcher, using the Kramer RC-IR2

Infrared Remote Control Device[1]. Refer to the RC-IR2 *Infrared Remote Control Device* user manual[2], for full details.

Table 6 and Table 7 summarize the setup and operational commands.

Table 6: Summary of Basic RC-IR2 Setups

To execute this command:	Press the following keys in this sequence:
Allocate the **VS-1616A** to Group 12	SHIFT + GROUP + 12
Set the MACHINE #	UNIT + # key[3] (according to the **VS-1616A** DIP-switch settings)

To enable IR REMOTE control (when set OFF), do the following:

1. Press the MENU button until reaching the IR REMOTE setting.
    The MATRIX Display shows the message:

    IR REMOTE setting
    yes -> TAKE, next -> MENU

2. Press the *TAKE* button.
    The Displays show the messages:

    Outkey 1: InfraredREMOTE OFF   current:
    **   2: InfraredREMOTE ON   remote OFF**

3. Press the *OUT* button *2*.
    The TAKE LED blinks and the Displays show the messages:

    Turn ON infrared REMOTE ?   Current:
    **   Press TAKE to execute   remote OFF**

4. Press the *TAKE* button again.
    The Displays show the messages:

    Infrared REMOTE mode   Current:
    **   changed   remote ON**

Table 7: Summary of Basic RC-IR2 Operations

To execute this command:	Press the following keys in this sequence:
Switch an Input to an Output	# key (for the output) + # key (for the input)[4]
Store/Recall a setup	SHIFT + STO/RCL + # key (for the setup)

---

1 After enabling the IR REMOTE control command, remotely control the VS-1616A via the RC-IR2 remote control transmitter pointed at the remote receiver on the front panel of the VS-1616A (item 1 in Figure 1)

2 You can download it from the Internet www.kramerelectronics.com

3 For example, press UNIT + # 1 if the VS-1616A is set as MACHINE # 1

4 For example, press # 6 followed by # 2 to switch input 2 to output 6

8.10 Choosing the AUTO STORE Current SETUP

Choose whether or not to save the current setup automatically, that is, whether to save the machine's status on power down, so that it returns to the same status after cycling power.

To save the current setup automatically (when set OFF), do the following:

1. Press the MENU button until you reach the AUTO Store Current SETUP command.
    The MATRIX Display shows the message:

    > **AUTO store current SETUP**
    > **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
    The Displays show the messages:

    > **OUTkey 1: no AutoSave**   **current:**
    > **2: AutoSave CURRENT setup**   **NO save**

3. Press the *OUT* button *2*.
    The TAKE LED blinks and the Displays show the messages:

    > **Auto store CURRENT setup ?**   **Current:**
    > **Press TAKE to execute**   **NO save**

4. Press the *TAKE* button again.
    The Displays show the messages:

    > **AUTOSAVE mode**   **Current:**
    > **changed**   **AutoSave**

8.11 Identifying the MACHINE

Display essential information (the product name and version number) to identify your machine, for example, for technical support purposes.

To identify your machine, do the following:

1. Press the MENU button until you reach the Identifying the MACHINE command.
    The MATRIX Display shows the message:

    > **identify MACHINE**
    > **yes -> TAKE, next -> MENU**

2. Press the *TAKE* button.
    The MATRIX Display (as Figure 23 illustrates) shows the message:

```
┌──────────── MATRIX ──────────┐ ┌─ STATUS ─┐
│OUTPUT    1   2   3   4   5   6   7   8 │
│INPUT   KRAMER ELECTRONICS, Ltd │ │Software  │
│INPUT   VS-1616A AUDIO MATRIX  │ │Ver. 1.5 _│
│OUTPUT    9  10  11  12  13  14  15  16 │
└──────────────────────────────┘ └──────────┘
```

Figure 23: Machine Identification

8.12   Choosing the Initial RESET

Choose to reset the machine[1] to the:

- Current status[2] (reloads the current setup)
- Factory default (resets to the pre-installed factory default state[3])

To reset the machine, do the following:

1. Press the MENU button until you reach the initial RESET command.
   The MATRIX Display shows the message:

   initial RESET
   yes -> TAKE, next -> MENU

2. Press the *TAKE* button.
   The MATRIX Display shows the message:

   Outkey 1: Current status
   2: Factory default

3. Press the *OUT* button *2*, for example, to reset to the factory default.
   The TAKE LED blinks and the Displays show the messages:

   Reset to factory default   WARNING
   Press TAKE to execute   !!!!!

4. Press the *TAKE* button again.
   The Displays show the messages:

   Reset to factory default   WARNING !!!!!
   confirm by pressing OUT # 7

5. Press the *OUT # 7*.
   The machine resets to the factory default and the Displays show the first
   messages of the reloading progress (as <u>Figure 23</u> illustrates).

---

1 Without having to switch the power off and on

2 Sometimes called a "soft reset"

3 Each VS-1616A unit ships in its factory default state that is a 16x16 balanced stereo audio matrix, with all setups empty and each input connected to its corresponding output (for example, 1-to-1)

9   Upgrading the Flash Memory

The main part of the **VS-1616A** firmware is located in FLASH[1] memory, which lets you upgrade to the latest Kramer firmware version in minutes!

Download the up-to-date file from the Internet or obtain it from your dealer. The following example shows how to install a file named (for example) "1616-15.hex" to the FLASH memory[2].

The current **VS-1616A** software version shows in the *STATUS* display as Figure 19 illustrates in section 7.1.

9.1   Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **VS-1616A** unit, connect:

- The COM port on your PC to the RS-232 IN port on the **VS-1616A** unit

When simultaneously upgrading the firmware on several **VS-1616A** units:

- Connect the COM port on your PC to the RS-232 IN port on the first **VS-1616A** unit
- Connect the RS-232 OUT port on the first **VS-1616A** unit to the RS-232 IN port on the second **VS-1616A** unit or another 16x16 unit
- Connect All 16x16 units that you want to upgrade, in this way, linking them in a daisy chain connection
- Set DIP 7 according to whether or not a null-modem is being used[3]

9.2   Upgrading the Firmware

1. Install and run the *K-Sender* program on your PC.

2. Open the *K-Sender* program.
   The File COM Port Sender window opens.

---

1 Electrically programmable and erasable

2 The number "15" in the file name indicates the version number "1.5". Be sure you receive the latest version, and that it is a ".hex" file

3 Refer to section 6.6 for full details

---

3. Choose the appropriate COM port.
    Be sure that "9600 Baud rate" is chosen.
    Click the *File* button.

4. Locate the file "1616-15.hex" and click the *Open* button.
    The filename appears in the lower part of the window (in bold script).

5. Press and **hold** the *TAKE* button while simultaneously turning on the
    POWER switch on the **VS-1616A**.
    After a few seconds, following the initial machine identification message,
    the MATRIX Display shows the following message:

    **Please,
    release key TAKE**

6. Release the *TAKE* button.
    The TAKE LED blinks and the MATRIX Display shows the following
    message:

    **Update program?
    Please confirm < TAKE >**

7. Press the *TAKE* button.
    The MATRIX Display shows the following message:

    **YOU will lose current SETUP[1]
    Confirm < TAKE >**

8. Press the *TAKE* button again.
    The MATRIX Display shows the following message:

    **Are you ABSOLUTELY sure?
    Press TAKE to execute**

    At this stage, and at any time previously, you can cancel the operation by
    pressing any button, other than the TAKE button.

9. Press the *TAKE* button once again.
    The program starts working and the TAKE LED turns off.
    The MATRIX Display shows the following message:

    **ERASE flash MEMORY
    Please, wait…**

10. After a few seconds the FLASH memory is erased and the MATRIX
    Display shows the following message:

    **Ready for receiving
    Start transmission from PC**

---

1 Upgrading firmware resets your VS-1616A unit to the factory default. This includes erasing all setups

Note: If upgrading the firmware on more than one VS-1616A unit, be sure to perform the above steps, 5 to 9, on each VS-1616A unit before continuing.

11. From your PC's *K-Sender* program, click the *Send* button.
   The color of the *Send* button changes to red and numbers appear dynamically inside the blue line. The Displays on the **VS-1616A** show the messages:

   > **Transfer may take minutes** Σ=080756[1]
   > **Please, wait…**

12. Observe the PC monitor and the **VS-1616A** *MATRIX* and *STATUS* Displays. After about 30 seconds, the program installation completes, the color of the *Send* button ceases to be red and the numbers inside the blue line disappear. The Displays on the **VS-1616A** show the messages:

   > **Program replaced** Σ=16608D
   > **successfully!**   16608D

13. After about 3 seconds, the Displays show the messages:

   > **Turn unit OFF, reconnect** Σ=16608D
   > **cables and turn ON**   16608D

14. **Verify that the checksum (for example, Σ=16608D) is the same on both lines**.
   If not, repeat the firmware upgrade process from the beginning.

15. You have successfully replaced the previous program and upgraded to the latest Kramer firmware version.

   - Turn the **VS-1616A** *POWER* switch OFF.
   - Reconnect the RS-232 IN and RS-232 OUT rear panel port connections (as applicable).
   - Turn the **VS-1616A** *POWER* switch ON.
   - Observe the new version number that shows in the *STATUS* display.
   - Go to the Menu and restore your specific settings. Prepare and store all necessary setups.

---

1 Shows the dynamic progress upgrade of the checksum

10   Technical Specifications

Table 8 includes the technical specifications:

Table 8: Technical Specifications of the VS-1616A Video Matrix Switcher

INPUT:	16 balanced audio stereo, +4dBu/10kΩ on detachable terminal blocks
OUTPUTS:	16 balanced audio stereo, +4dBu/50Ω on detachable terminal blocks
MAX. OUTPUT LEVEL:	20Vpp
BANDWIDTH (-3dB):	100kHz
S/N RATIO:	82.2dB unweighted
CROSSTALK:	-80dB @1kHz
CONTROL:	Front panel, RS-232, RS-485, contact closure, & IR remote (included)
COUPLING:	AC
AUDIO THD + NOISE:	0.04%
AUDIO 2nd HARMONIC:	0.002% @1kHz
POWER SOURCE:	115/230V AC, 50/60Hz, 23VA
DIMENSIONS:	19" x 7" x 2U W, D, H, rack mountable
WEIGHT:	3.5kg (7.8lbs) approx.
ACCESSORIES:	Power cord, rack "ears", Windows®-based Kramer control software, null-modem adapter

11   Communication Protocol

Table 9 includes 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 9: Hex Table for the VS-1616A Video Matrix Switcher

	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

12   ASCII Protocol

12.1   Entering the ASCII Protocol

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:

1.   Press the MENU button until you get to "set communication protocol".

2.   Choose the ASCII protocol.
This is saved in the non-volatile memory, so the machine remains in ASCII even after turning OFF and ON.

3.   To check that the protocol has been selected, and to confirm that the communication is OK, send the string ****!!** to the **VS-1616A**.
It should reply by sending the string **OK!!**

12.2   ASCII Command Description

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

"Y" command: MAKE A CROSSPOINT CONNECTION**.**

Format:

**   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).

Example:

**Y3,4!! connects input 4 to output 3.

**Y9,6!! connects input 6 to output 9.

**Y2,17,Y43,12,Y7,6!! connects input 17 to output 2, input 12 to output 43, and input 6 to output 7.

The buffer allows up to 63 characters. Thus, a single string can include about 10 cross-point connections.

Also:

**Y0,5!! connects input 5 to all outputs.

**Y3,0!! disconnects output 3.

"T" command: RECALL A SETUP**.**

Format:

** T s# !!
where s# is the setup number (1 to 99) to recall.

Example:

**T13!! recalls setup number 13.

 "P" command: STORE A SETUP.

Format:

** P s# !!
where s# is the setup number (up to 99) that stores the present status of the machine.

Example:

**P13!! stores in setup number 13

The reply for all commands is:

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)

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

Caution