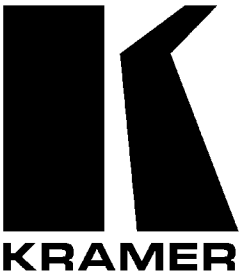
Kramer Electronics, Ltd.



USER MANUAL

Model:

VS-1604YC

16x4 s-Video / Balanced Audio Matrix

Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
3	**Overview**	**1**
4	**Your s-Video / Balanced Audio Matrix Switcher**	**2**
5	**Connecting an s-Video / Balanced Audio Matrix Switcher**	**5**
5.1	Controlling via RS-232 (for example, using a PC)	5
5.2	Controlling via RS-485	6
6	**Cascading s-Video / Balanced Audio Matrix Switchers**	**7**
6.1	Setting the Dipswitches	7
6.1.1	Setting the MACHINE #	7
6.1.2	Setting the MACHINE ADDRESS	8
6.2	Resetting to the Factory Default State	9
6.3	Displaying Unit Characteristics	9
6.4	Control Configuration via RS-232 and RS-485	9
6.5	Control Configuration via RS-485	12
7	**Operating Your Audio Matrix Switcher**	**14**
7.1	Choosing the Audio-Follow-Video or Breakaway Option	14
7.1.1	Setting the Audio-Follow-Video Option	14
7.1.2	Setting the Breakaway Option	14
7.2	Switching OUT-IN Combinations	15
7.3	Confirming Settings	15
7.3.1	Toggling between the AT ONCE and CONFIRM Modes	15
7.3.2	Confirming a Switching Action	16
7.4	Storing/Recalling Input/Output Configurations	16
7.4.1	Storing an Input/Output Configuration	16
7.4.2	Recalling an Input/Output Configuration	17
7.4.3	Deleting an Input/Output Configuration	17
8	**Technical Specifications**	**18**
9	**Table of Hex Codes for Serial Communication**	**18**
10	**Communication Protocol**	**20**

Figures

Figure 1: VS-1604YC 16x4 s-Video / Balanced Audio Matrix 3
Figure 2: Connecting a PC without using a Null-modem Adapter 5
Figure 3: Controlling via RS-485 (for example, using a VS-3000) 6
Figure 4: SETUP Set of 8 Dipswitches 7
Figure 5: VS-1604YC Unit Characteristics 9
Figure 6: Cascading in a Control Configuration via RS-232 and RS-485 11
Figure 7: Cascading in a Control Configuration via RS-485 13

Tables

Table 1: Front Panel VS-1604YC 16x4 s-Video / Balanced Audio Matrix Features 4
Table 2: Rear Panel VS-1604YC 16x4 s-Video / Balanced Audio Matrix Features 4
Table 3: Dipswitch Settings 7
Table 4: Machine # Dipswitch Settings 8
Table 5: Machine Address Dipswitch Settings 9
Table 6: Technical Specifications of the VS-1604YC 18
Table 7: VS-1604YC Hex Codes for Switching via RS-232/RS-485 19
Table 8: Protocol Definitions 20
Table 9: Instruction Codes 21

1 Introduction

Dedication by Kramer Electronics since 1981, to the development and manufacture of high quality video/audio equipment, makes the Kramer line an integral part of the finest production and presentation facilities in the world. In recent years, Kramer has redesigned and upgraded most of the line, making the best even better! The Kramer line of professional video/audio electronics is one of the most versatile and complete available, and is a true leader in terms of quality, workmanship, price/performance ratio and innovation. In addition to our high quality switchers and matrices, we also offer excellent distribution amplifiers, remote controllers, processors, interfaces and computer-related products. Congratulations on purchasing your Kramer **VS-1604YC** *16x4 s-Video / Balanced Audio Matrix.*

This product is ideal for the following typical applications:

- Any professional system requiring outstanding value in a 16x4 matrix
- Production and duplications facilities, rental and staging
- Security, CCTV, and home theater systems

The package includes the following items:

- **VS-1604YC** *16x4 s-Video / Balanced Audio Matrix*
- Power cord
- Latest Windows 95/98/NT™ Kramer control software
- Null-modem adapter
- This user manual
- Kramer concise product catalog/CD

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

3 Overview

The high performance **VS-1604YC** *16x4 s-Video / Balanced Audio Matrix* is a 16x4 vertical interval matrix switcher for s-Video and balanced stereo audio signals. It is a true matrix switcher - enabling the user to route any input to any or all outputs simultaneously.

In addition, the **VS-1604YC**:

- Includes 16 input and 4 output selector buttons
- Includes audio-follow-video or audio breakaway option (to switch audio independently from video)
- Produces glitch-free transitions, when sources share a common reference sync[1]
- Includes a "Take" button for precise switch control enabling the user to place multiple switches in a queue and then activate them with one touch of this button or a single serial command
- Is controllable via the front panel buttons, or remotely (by RS-485 or RS-232) via a touch screen system, PC, or other serial controller

To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality
- Position your Kramer **VS-1604YC** in a location free from moisture and away from excessive sunlight and dust

4 Your s-Video / Balanced Audio Matrix Switcher

Figure 1 illustrates the front and rear panels of the **VS-1604YC**. Tables 1 and 2 define the front and rear panels of the **VS-1604YC**, respectively.

1 As it switches during the vertical interval

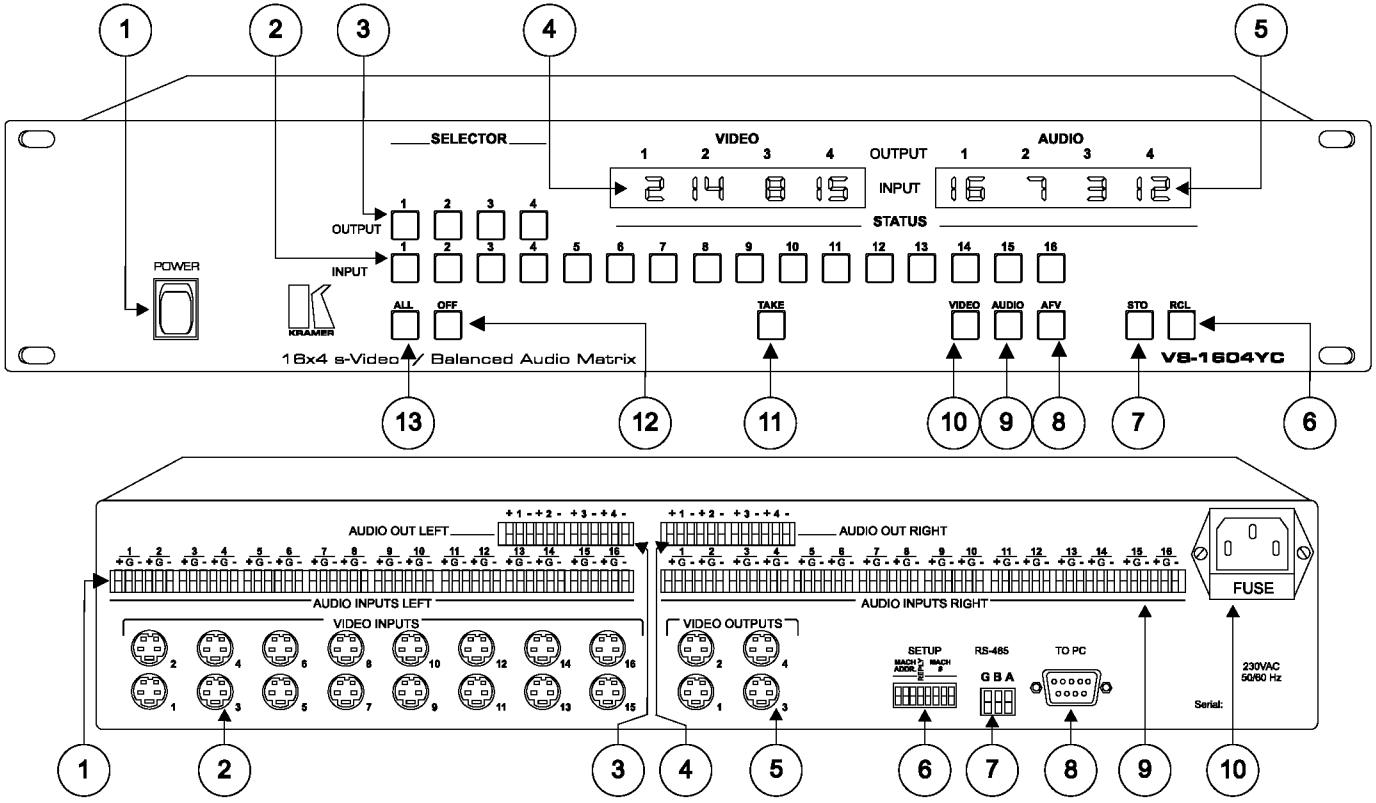


Figure 1: VS-1604YC 16x4 s-Video / Balanced Audio Matrix

Table 1: Front Panel VS-1604YC 16x4 s-Video / Balanced Audio Matrix Features

#	Feature	Function
1	*Power* Switch	Illuminated switch supplying power to the unit
2	*INPUT SELECTOR* Buttons[1]	Select the input to switch to the output (from 1 to 16)
3	*OUTPUT SELECTOR* Buttons	Select the output to which the input is switched (from 1 to 4)
4	*Video INPUT STATUS* 7-segment Display	Displays the selected video input switched to the output (marked above each input)[2]
5	*Audio INPUT STATUS* 7-segment Display	Displays the selected audio input switched to the output (marked above each input)[3]
6	*RCL* Button	Pressing the *RCL* (*RECALL*) button and the corresponding input button recalls a setup After pressing the button, the stored status blinks. Pressing a different input button lets you view[4] another setup. After making your choice, pressing the *RCL* button again implements the new status
7	*STO* Button	Pressing STO (STORE) followed by an input button stores the current setting
8	*AFV* Button	When pressed audio channels follow the video channels. The button is illuminated when the *AFV* mode is selected
9	*AUDIO* Button	When pressed actions relate to audio
10	*VIDEO* Button	When pressed actions relate to video
11	*TAKE* Button	Pressing *TAKE* toggles the mode between the *CONFIRM* mode[5] and the *AT ONCE* mode (user confirmation per action is unnecessary)
12	*OFF* Button	Pressing *OFF* after pressing an *OUTPUT* button disconnects that output from the inputs. To disconnect all the outputs, press the *ALL* button and then the *OFF* button
13	*ALL* Button	Pressing *ALL* followed by an *INPUT* button, connects that input to all outputs[6]

Table 2: Rear Panel VS-1604YC 16x4 s-Video / Balanced Audio Matrix Features

#	Feature	Function
1	*AUDIO INPUTS LEFT* Terminal Block Connectors	Connect to the audio sources (from 1 to 16)
2	*VIDEO INPUTS* 4p Connectors	Connect to the s-Video sources (from 1 to 16)
3	*AUDIO OUT LEFT* Terminal Block Connectors	Connect to the audio acceptors (from 1 to 4)
4	*AUDIO OUT RIGHT* Terminal Block Connectors	Connect to the audio acceptors (from 1 to 4)
5	*VIDEO OUTPUTS* 4p Connectors	Connect to the s-Video acceptors (1 to 4)
6	*SETUP*	Dipswitches for setup
7	*RS-485* Connector	RS-485 port on detachable terminal block
8	*TO PC* DB 9F *RS-232* Connector	Connects to the PC or other Serial Controller
9	*AUDIO INPUTS RIGHT* Terminal Block Connectors	Connect to the audio sources (from 1 to 16)
10	Power Connector with *Fuse*	AC connector enabling power supply to the unit

1 The INPUT SELECTOR buttons are also used to store/recall the input/output configurations (refer to section 7.4)

2 Also displays the number included in the product name, as section 6.3 describes

3 Also displays the MACHINE #, the MACHINE ADDRESS and the firmware version #, as section 6.3 describes

4 Only view, nothing is implemented at this stage

5 When in Confirm mode, the TAKE button illuminates

6 For example, press ALL and then INPUT button # 2 to connect input # 2 to all the outputs

5 Connecting an s-Video / Balanced Audio Matrix Switcher

To connect the **VS-1604YC**, connect the following[1] to the rear panel:

1. The s-Video sources and acceptors, as well as the appropriate audio sources and acceptors.
2. The power cord.

In addition, as section 6 describes, you can choose to connect up to 16 **VS-1604YC** units to a PC (when using the *Kramer Control software*, for example) or other RS-232 or RS-485 controller (refer to sections 5.1 and 5.2, respectively).

5.1 Controlling via RS-232 (for example, using a PC)

To connect a PC to the **VS-1604YC** unit, using the Null-modem adapter provided with the machine (recommended):

- Connect the "To PC" RS-232 DB9 rear panel port on the **VS-1604YC** unit to the Null-modem adapter and connect the Null-modem adapter with a 9 wire flat cable[2] to the RS-232 DB9 port on your PC

To connect a PC to the **VS-1604YC** unit, without using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the "To PC" RS-232 DB9 rear panel port on the **VS-1604YC** unit, as Figure 2 illustrates[2] (depending on whether the PC has a 9-pin or 25-pin connector)

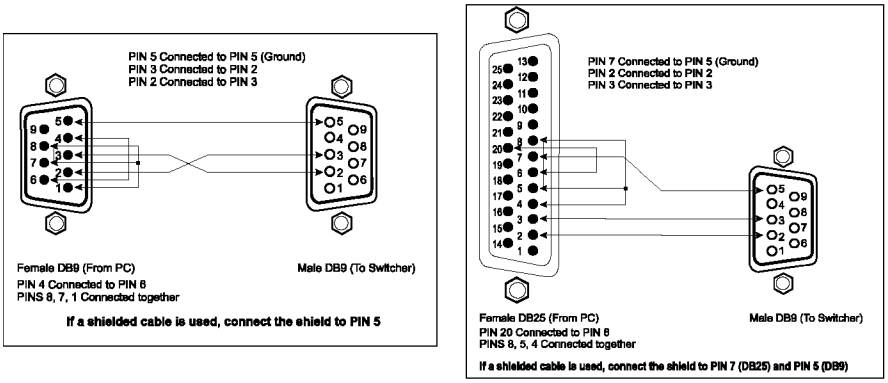


Figure 2: Connecting a PC without using a Null-modem Adapter

1 Switch OFF the power on each device before connecting it to your VS-1604YC Switcher. After connecting your VS-1604YC Switcher, switch on its power and then switch on the power on each device

2 Up to 50 feet of cabling may be used for the RS-232 connection

5.2 Controlling via RS-485

You can control a **VS-1604YC** unit via an RS-485 controller[1], for example, a PC (equipped with an RS-485 interface) or a Master Programmable Remote Control system such as the Kramer **VS-3000**.

To connect a **VS-3000** to a **VS-1604YC** unit (see Figure 3):

1. Connect the RS-485 terminal block port on the **VS-3000** to the RS-485 port on the **VS-1604YC** unit, as follows:

- Connect the "A" (+) PIN on the RS-485 rear panel port of the **VS-3000** to the "A" (+) PIN on the RS-485 rear panel port of the **VS-1604YC** unit
- Connect the "B" (-) PIN on the RS-485 rear panel port of the **VS-3000** to the "B" (-) PIN on the RS-485 rear panel port of the **VS-1604YC** unit
- If shielded twisted pair cable is used, the shield may be connected to the "G" (Ground) PIN on one of the units (for example, on the **VS-3000**)

2. Set the SETUP dipswitches on the **VS-1604YC** unit, as follows:

- DIPS 1, 2 and 3 OFF (*MACHINE* # 1, according to Table 4)
- DIPS 5, 6, 7 and 8 OFF (*MACHINE ADDRESS* 1, according to Table 5)
- DIP 4 ON (enabling the Reply option, according to Table 3)

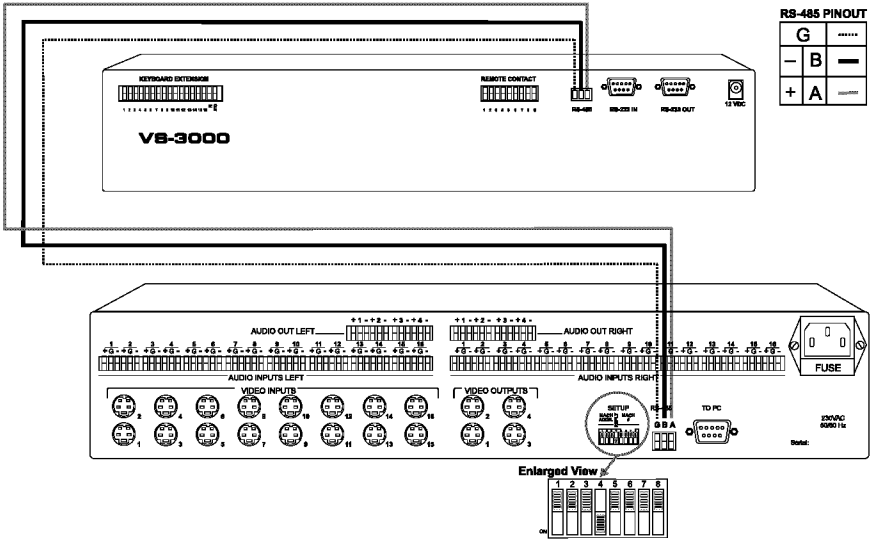


Figure 3: Controlling via RS-485 (for example, using a VS-3000)

1 RS-485 can be used for control even for distances exceeding 1km

6 Cascading s-Video / Balanced Audio Matrix Switchers

You can cascade up to 16 individual **VS-1604YC** units or sets[1] of **VS-1604YC** units, via RS-485 (or via RS-232 and RS-485), with control from a PC or serial controller[2]. To cascade several **VS-1604YC** units, you will need to set up the dipswitches as described later.

The **VS-1604YC** unit is shipped (its factory default state) with the dipswitches set up for a typical application using a single machine.

6.1 Setting the Dipswitches

Sections 6.1.1 and 6.1.2, respectively, describe how to use the *SETUP* dipswitches to set the *MACHINE #* and the *MACHINE ADDRESS*.

Figure 4 illustrates the factory default *SETUP* dipswitches:

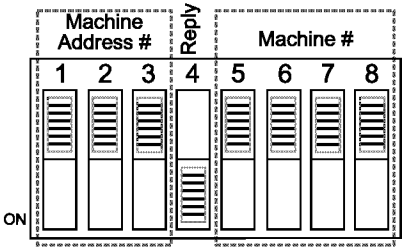


Figure 4: SETUP Set of 8 Dipswitches

Table 3: Dipswitch Settings

Function	DIPS	Description
Machine #	5, 6, 7, 8	Determines the position of a unit in the sequence (refer to section 6.1.1)
Machine Address	1, 2, 3	Determines the position in the extended switcher system, specifying which unit within the set is being controlled (refer to section 6.1.2)
Reply	4	Set ON to enable the Reply option in accordance with Protocol 2000 Set OFF to disable the Reply option in accordance with Protocol 2000

6.1.1 Setting the MACHINE

The *MACHINE #* determines the position of a **VS-1604YC** unit or a set of **VS-1604YC** units (with each **VS-1604YC** unit in the set having the same *MACHINE #*) in the sequence[3], specifying which **VS-1604YC** unit is being controlled when several **VS-1604YC** units connect to a PC or serial controller.

1 With up to 6 VS-1604YC units per set

2 Refer to section 6.1.2 for details of how to form an expanded input cascade

3 Set the MACHINE # on the first unit to one, on the second unit to 2, on the third unit to 3 and so on (up to MACHINE # 16 on the sixteenth unit)

Set the *MACHINE #* on a **VS-1604YC** unit via DIPS 5, 6, 7 and 8, according to Table 4.

When using a stand-alone **VS-1604YC** unit, set the *MACHINE #* to 1.

When connecting more than one **VS-1604YC** unit, set the first machine (the Master) that is closest to the PC, as *MACHINE #* 1.

Table 4: Machine # Dipswitch Settings

MACHINE #	DIPS			
	5	6	7	8
1 Master	OFF	OFF	OFF	OFF
2	OFF	OFF	OFF	ON
3	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON
5	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON
7	OFF	ON	ON	OFF
8	OFF	ON	ON	ON
9	ON	OFF	OFF	OFF
10	ON	OFF	OFF	ON
11	ON	OFF	ON	OFF
12	ON	OFF	ON	ON
13	ON	ON	OFF	OFF
14	ON	ON	OFF	ON
15	ON	ON	ON	OFF
16	ON	ON	ON	ON

6.1.2 Setting the MACHINE ADDRESS

Set the *MACHINE ADDRESS* on each **VS-1604YC** unit that is included in a set to define its position in the extended switcher system [1], specifying which **VS-1604YC** unit within the set is being controlled. You can combine a set of up to[2] 6 **VS-1604YC** units to form a 96x4 s-Video / balanced audio matrix switcher (with 96 inputs and 4 outputs).

Set the MACHINE ADDRESS via DIPS 1, 2, and 3, according to Table 5.

Set the *MACHINE ADDRESS* to 1 on an individual **VS-1604YC** unit, which does not form part of a set of **VS-1604YC** units.

1 An expanded input cascade with 120 Ohm termination on the RS-485 line at the first and last units in the set

2 Combine 2 units to form a 32x4 switcher (with 32 inputs and 4 outputs), 3 units to form a 48x4 switcher (with 48 inputs and 4 outputs), 4 units to form a 64x4 switcher (with 64 inputs and 4 outputs) or 5 units to form an 80x4 switcher (with 80 inputs and 4 outputs)

Table 5: Machine Address Dipswitch Settings

MACHINE ADDRESS	DIPSWITCH		
	1	2	3
1 Master	OFF	OFF	OFF
2	OFF	OFF	ON
3	OF	ON	OFF
4	OFF	ON	ON
5	ON	OFF	OFF
6	ON	OFF	ON

6.2 Resetting to the Factory Default State

Each **VS-1604YC** unit ships in its factory default state - that is, a 16x4 s-Video/ Balanced Audio Matrix switcher, with all setups cleared.

To reset a **VS-1604YC** unit to its factory default state, do the following:

- Press INPUT buttons 1, 2 and 3 simultaneously for 3 seconds

The **VS-1604YC** unit resets to its factory default state and displays [1] the unit characteristics, as section 6.3 describes

6.3 Displaying Unit Characteristics

Switching on the machine, displays the following momentarily on the front panel (as Figure 5 illustrates):

- The number included in the product name (for example, VS-**1604**YC)
- The *MACHINE #*
- The *MACHINE ADDRESS*
- The Firmware Version #

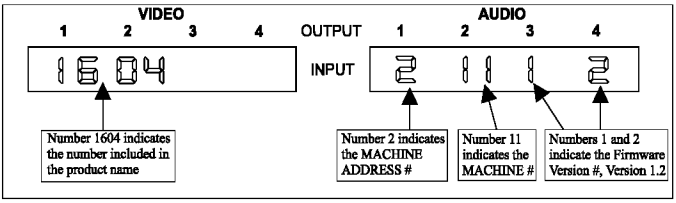


Figure 5: VS-1604YC Unit Characteristics

6.4 Control Configuration via RS-232 and RS-485

For example, to control 2 individual **VS-1604YC** units and a set of 2 **VS-1604YC** units, as Figure 6 illustrates, do the following:

1 In addition, the unit characteristics also appear immediately (and automatically) after switching on the power

1. On the first individual **VS-1604YC** unit (*Machine* # 1 = Master):

- Connect the "TO PC" RS-232 port to the PC using the Null-modem adapter provided with the machine (recommended), as section 5.1 describes
- Connect the s-Video sources and acceptors, as well as the appropriate audio sources and acceptors, as section 5 describes
- Connect the RS-485 terminal block port to the RS-485 terminal block port on the second **VS-1604YC** unit
- Set the SETUP dipswitches (*Machine* # 1; *Machine Address* 1 and the Reply option enabled (Dip 4 ON)), as section 6 describes

2. On the 32x4 switcher configuration that consists of a set of 2 **VS-1604YC** units (*Machine* # 2):

- On the first **VS-1604YC** unit in the set, connect the s-Video sources 1 to 16, as well as the appropriate audio sources 1 to 16, to the respective inputs 1 to 16. On the second **VS-1604YC** unit in the set, connect the s-Video sources 17 to 32, as well as the appropriate audio sources 17 to 32, to the respective inputs 1 to 16
- Connect the s-Video outputs 1 to 4 on the first **VS-1604YC** unit in the set to the s-Video outputs 1 to 4 on the second **VS-1604YC** unit in the set using "T" or "Y" type connectors. The s-Video outputs 1 to 4 become the s-Video system outputs 1 to 4
- Connect the appropriate audio outputs 1 to 4 on the first **VS-1604YC** unit in the set to the appropriate audio outputs 1 to 4 on the second **VS-1604YC** unit in the set using "T" or "Y" type connectors. The audio outputs 1 to 4 become the audio system outputs 1 to 4
- Connect the RS-485 terminal block port on the first **VS-1604YC** unit in the set to the RS-485 terminal block port on the first individual **VS-1604YC** unit. Connect the RS-485 terminal block port on the second **VS-1604YC** unit in the set to the RS-485 terminal block port on the last individual **VS-1604YC** unit
- Set the SETUP dipswitches on the first **VS-1604YC** unit in the set (*Machine* # 2; *Machine Address* 1 and the Reply option enabled (Dip 4 ON)), as section 6 describes
- Set the SETUP dipswitches on the second **VS-1604YC** unit in the set (*Machine* # 2; *Machine Address* 2 and the Reply option enabled (Dip 4 ON)), as section 6 describes

3. On the last individual **VS-1604YC** unit (*Machine* # 3):

- Connect the s-Video sources and acceptors, as well as the appropriate audio sources and acceptors, as section 5 describes
- Connect the RS-485 terminal block port to the RS-485 terminal block port on the second **VS-1604YC** unit in the 32x4 switcher configuration
- Set the SETUP dipswitches (*Machine* # 3; *Machine Address* 1 and the

Reply option enabled (Dip 4 ON)), as section 6 describes

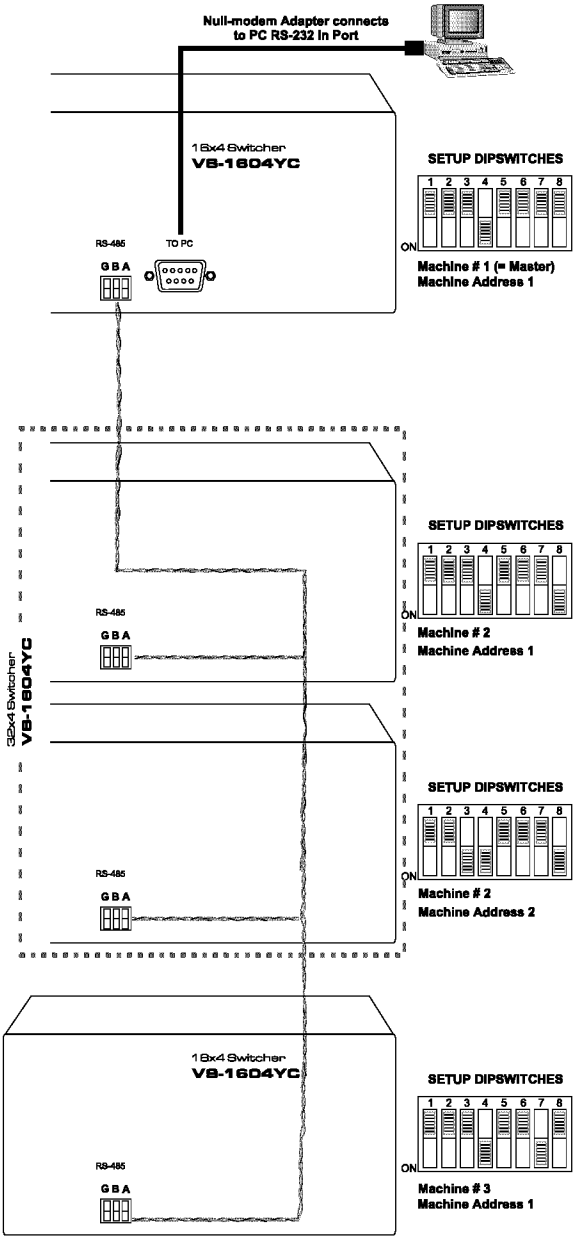


Figure 6: Cascading in a Control Configuration via RS-232 and RS-485

6.5 Control Configuration via RS-485

For example, to control 2 individual **VS-1604YC** units and a set of 2 **VS-1604YC** units, via RS-485 (with control via a Master Programmable Remote Control system such as the Kramer **VS-3000**), do the following:

1. Connect the "A" (+) and "B" (-) PINS on the RS-485 terminal block port of the **VS-3000** to the "A" (+) and "B" (-) PINS, respectively, on each of the following RS-485 terminal block ports[1]:

- To the first individual **VS-1604YC** unit
- To the first **VS-1604YC** unit in the 32x4 switcher configuration
- To the second **VS-1604YC** unit in the 32x4 switcher configuration
- To the last individual **VS-1604YC** unit

2. On the first individual **VS-1604YC** unit (*Machine* # 1 = Master):

- Connect the s-Video sources and acceptors, as well as the appropriate audio sources and acceptors, as section 5 describes
- Set the SETUP dipswitches (*Machine* # 1; *Machine Address* 1 and the Reply option enabled (Dip 4 ON)), as section 6 describes

3. On the 32x4 switcher configuration that consists of a set of 2 **VS-1604YC** units (*Machine* # 2):

- On the first **VS-1604YC** unit in the set, connect the s-Video sources 1 to 16, as well as the appropriate audio sources 1 to 16, to the respective inputs 1 to 16. On the second **VS-1604YC** unit in the set, connect the s-Video sources 17 to 32, as well as the appropriate audio sources 17 to 32, to the respective inputs 1 to 16
- Connect the s-Video outputs 1 to 4 on the first **VS-1604YC** unit in the set to the s-Video outputs 1 to 4 on the second **VS-1604YC** unit in the set using "T" or "Y" type connectors. The s-Video outputs 1 to 4 become the s-Video system outputs 1 to 4
- Connect the appropriate audio outputs 1 to 4 on the first **VS-1604YC** unit in the set to the appropriate audio outputs 1 to 4 on the second **VS-1604YC** unit in the set using "T" or "Y" type connectors. The audio outputs 1 to 4 become the audio system outputs 1 to 4
- Set the SETUP dipswitches on the first **VS-1604YC** unit in the set (*Machine* # 2; *Machine Address* 1 and the Reply option enabled (Dip 4 ON)), as section 6 describes
- Set the SETUP dipswitches on the second **VS-1604YC** unit in the set (*Machine* # 2; *Machine Address* 2 and the Reply option enabled (Dip 4 ON)),

1 If using shielded twisted pair cable, the shield is usually connected to the "G" (Ground) PIN of the first unit

as section 6 describes

4. On the last individual **VS-1604YC** unit (*Machine* # 3):

- Connect the s-Video sources and acceptors, as well as the appropriate audio sources and acceptors, as section 5 describes
- Set the SETUP dipswitches (*Machine* # 3; *Machine Address* 1 and the Reply option enabled (Dip 4 ON)), as section 6 describes

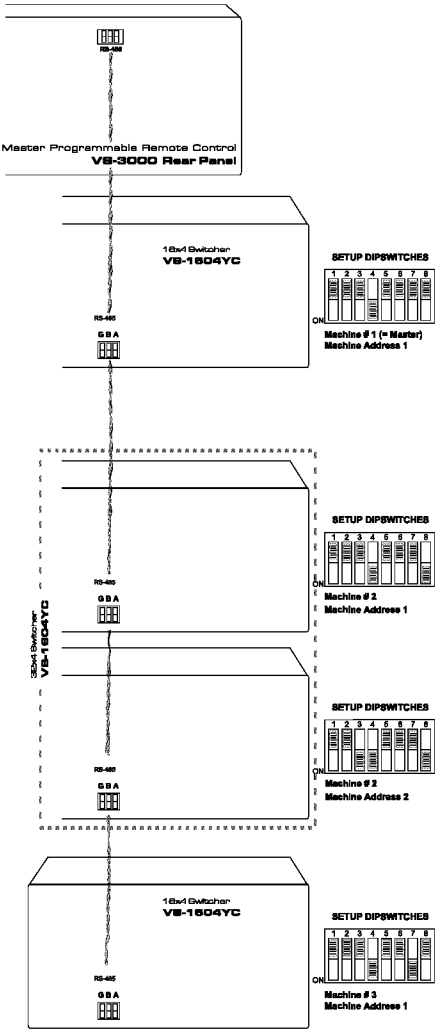


Figure 7: Cascading in a Control Configuration via RS-485

7 Operating Your Audio Matrix Switcher

Operate your **VS-1604YC** via:

- The front panel buttons
- RS-232 / RS-485 serial commands transmitted by a touch screen system, PC[1], or other serial controller

7.1 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of 2 ways, either:

- Audio-follow-video (AFV), in which all operations relate to both the video and the audio channels; or
- Breakaway, in which video and audio channels switch independently

7.1.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option, when the AUDIO and VIDEO configurations are the same:

- Press the AFV button

The AFV button illuminates. The audio will follow the video

To set the Audio-follow-video (AFV) option, when the AUDIO configuration differs from the VIDEO configuration:

- Press the AFV button

The TAKE and the AUDIO buttons flash[2], even when working in the *AT ONCE* mode

- Press the TAKE button to confirm the modification. The audio will follow the video

7.1.2 Setting the Breakaway Option

To set the Breakaway option:

1. Press either the AUDIO (for audio control only) or the VIDEO (for video control only) button.
2. If the AUDIO button illuminates, switching operations relate to Audio.
3. If the VIDEO button illuminates, switching operations relate to Video.

1 For instructions on using Kramer's Windows 95/98/NT ™ Control Software, refer to the separate user manual (included on the CD-ROM in .pdf format), *Kramer Control Software*

2 Warning that you are about to modify the audio configuration for AFV operation

7.2 Switching OUT-IN Combinations

To switch a video/audio input to a video/audio output, do the following:

1. Press an OUTPUT SELECTOR button.
   The corresponding Audio and[1]/or Video IN STATUS 7-segment displays blink.
2. Press an INPUT SELECTOR button.
   The selected input switches to the selected output.

For example, press the ALL button and then INPUT SELECTOR button # 2 to connect input # 2 to all the outputs

7.3 Confirming Settings

Choose to work in the AT ONCE or the CONFIRM mode, as section 7.3.1 describes.

Pressing an OUT-IN combination when your **VS-1604YC** operates in the AT ONCE mode implements the switch immediately. When the **VS-1604YC** operates in the CONFIRM mode, press the blinking TAKE button to authorize the switch.

In the AT ONCE mode:

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

In the CONFIRM mode:

- You have an optional method to help avoid making a mistake
- Every action requires user confirmation
- Execution is delayed[2] until the user confirms the action
- Protection is offered to prevent erroneous switch ing
- You can key-in several actions and then confirm them by pressing the TAKE button once, to simultaneously switch all monitors

7.3.1 Toggling between the AT ONCE and CONFIRM Modes

To toggle between the AT ONCE and CONFIRM modes, do the following:

1 When the audio-follow-video option is active

2 Failure to press the TAKE button within one minute (the Timeout) will abort the action

1. Press the dim TAKE button to toggle from the AT ONCE mode[1] to the CONFIRM mode[2].
   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.

7.3.2 Confirming a Switching Action

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

1. Press an OUT-IN combination.
   The corresponding Audio and Video IN STATUS 7-segment displays blink. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm the action.
   The corresponding Audio and Video IN STATUS 7-segment displays no longer blink. The TAKE button illuminates.

To confirm several actions (in CONFIRM mode), do the following:

1. Press each OUT-IN combination in sequence.
   The corresponding Audio and Video IN STATUS 7-segment display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm all the actions.
   The corresponding Audio and Video IN STATUS 7-segment displays no longer blink. The TAKE button illuminates.

7.4 Storing/Recalling Input/Output Configurations

You can store and recall[3] up to 8 input/output configurations using the INPUT SELECTOR buttons 1 to 15.

7.4.1 Storing an Input/Output Configuration

To store the current status in memory, do the following:

1. Press the STO button.
   The STO button blinks.

1 The TAKE button is dim

2 The TAKE button illuminates

3 The 8 input/output configurations (or setups) also include the relevant audio-follow-video / breakaway option definition

2. Press one of the INPUT SELECTOR buttons from 1 to 15. If in the CONFIRM mode, press the blinking TAKE button to confirm the action. The memory stores the data at that reference.

7.4.2 Recalling an Input/Output Configuration

To recall an input/output configuration, do the following:

1. Press the RCL button.
   The RCL button blinks.
2. Press the appropriate INPUT SELECTOR button. If in the CONFIRM mode, the setup will blink on the display and will only be implemented after pressing the TAKE button.
   The memory recalls the stored data from that reference.

If you cannot remember which of the 8 input/output configurations is the one that you want, set the **VS-1604YC** to the CONFIRM mode and manually scan all the input/output configurations until you locate it[1].

7.4.3 Deleting an Input/Output Configuration

To delete an input/output configuration, do the following:

1. Press the STO and RCL buttons simultaneously.
   Both the STO and RCL buttons blink.
2. Press the appropriate INPUT SELECTOR button.
   This erases that specific input/output configuration from the memory, leaving it empty and available[2].

1 Press RCL followed by an INPUT SELECTOR button to display a configuration. If this is the required configuration, press TAKE to select it. If not, repeat the above to display another configuration

2 Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

8 Technical Specifications

Table 6 includes the technical specifications:

Table 6: Technical Specifications of the VS-1604YC

Inputs:	16 s-Video, 1 Vpp (Y), 0.3Vpp (C) / 75 Ω on 4 pin connectors Each input is accompanied by the appropriate balanced stereo-audio channels: +4dBm / 50 kΩ on detachable terminal block connectors
Outputs:	4 s-Video, 1 Vpp (Y), 0.3Vpp (C) / 75 Ω on 4 pin connectors Each output is accompanied by the appropriate balanced stereo-audio channels: +4dBm / 50 Ω on detachable terminal block connectors
Video Bandwidth:	180 MHz -3dB
Video Crosstalk:	-69 dB
Video S/N Ratio:	78 dB
Diff. Gain:	0.01%
Diff. Phase:	0.01 Deg.
K-Factor:	<0.05%
Audio Bandwidth:	>100 kHz
Audio S/N Ratio:	82 dB unweighted
Audio THD + Noise:	0.021%
2nd Harmonic:	0.004%
Control:	RS-232, RS-485
Dimensions:	19-inch (W), 7-inch (D) 2U (H) rack-mountable
Power Source:	230 VAC, 50/60 Hz, (115VAC, U.S.A.) 17VA max
Weight:	3.4 kg (7.5 lbs.) approx
Accessories:	Power cord, Null modem adapter, Windows 95/98/NT TM Kramer control software

9 Table of Hex Codes for Serial Communication

Table 7 lists the Hex values for a single machine (*MACHINE* # 1):

Table 7: VS-1604YC Hex Codes for Switching via RS-232/RS-485

	Switching Video Channels				Switching Audio Channels			
	OUT 1	OUT 2	OUT 3	OUT 4	OUT 1	OUT 2	OUT 3	OUT 4
IN 1	01	01	01	01	02	02	02	02
	81	81	81	81	81	81	81	81
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 2	01	01	01	01	02	02	02	02
	82	82	82	82	82	82	82	82
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 3	01	01	01	01	02	02	02	02
	83	83	83	83	83	83	83	83
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 4	01	01	01	01	02	02	02	02
	84	84	84	84	84	84	84	84
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 5	01	01	01	01	02	02	02	02
	85	85	85	85	85	85	85	85
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 6	01	01	01	01	02	02	02	02
	86	86	86	86	86	86	86	86
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 7	01	01	01	01	02	02	02	02
	87	87	87	87	87	87	87	87
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 8	01	01	01	01	02	02	02	02
	88	88	88	88	88	88	88	88
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 9	01	01	01	01	02	02	02	02
	89	89	89	89	89	89	89	89
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 10	01	01	01	01	02	02	02	02
	8A	8A	8A	8A	8A	8A	8A	8A
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 11	01	01	01	01	02	02	02	02
	8B	8B	8B	8B	8B	8B	8B	8B
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 12	01	01	01	01	02	02	02	02
	8C	8C	8C	8C	8C	8C	8C	8C
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 13	01	01	01	01	02	02	02	02
	8D	8D	8D	8D	8D	8D	8D	8D
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 14	01	01	01	01	02	02	02	02
	8E	8E	8E	8E	8E	8E	8E	8E
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 15	01	01	01	01	02	02	02	02
	8F	8F	8F	8F	8F	8F	8F	8F
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81
IN 16	01	01	01	01	02	02	02	02
	90	90	90	90	90	90	90	90
	81	82	83	84	81	82	83	84
	81	81	81	81	81	81	81	81

10 Communication Protocol

The **VS-1604YC** is compatible with Kramer's Protocol 2000. The protocol for the unit is described below:

This protocol, which enables RS-232 communication between the **VS-1604YC** and the PC, uses 4 bytes of information, and data is at 9600 baud, no parity, 8 data bits and 1 stop bit.

Table 8: Protocol Definitions

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

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).
2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be s witched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.
3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.
4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.
Used to address machines in a system via their machine numbe rs. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the add ressed machine will reply.
For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 9: Instruction Codes

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2
2	SWITCH AUDIO	Set equal to audio input which is to be switched (0 = disconnect)	Set equal to audio output which is to be switched (0 = to all the outputs)	2
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP # 0	Equal to output number whose status is reqd	4, 3
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP # 0	Equal to output number whose status is reqd	4, 3
8	BREAKAWAY SETTING	0	0 - audio-follow-video 1 - audio breakaway	2
11	REQUEST BREAKAWAY SETTING	Set as SETUP # 0, or set to 126 or 127 to request if machine has this function	0 - Request audio breakaway setting	3, 4, 6
12	REQUEST VIDEO / AUDIO TYPE SETTING	Set as SETUP # 0, or set to 126 or 127 to request if machine has this function	0 - for video 1 - for audio	3, 4, 6
16	ERROR / BUSY	0	0 - error 1 - invalid instruction 2 - out of range	9
18	RESET AUDIO	0	0	1
30	LOCK FRONT PANEL	0 – Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
57	SET AUTO-SAVE	0 – no save 1 - auto-save	0	12, 2
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version	0	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio	14

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

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

01 85 88 83

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

41 81 87 83

to the PC.

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

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 to SETUP # 15 are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 80 85

would be

4B 80 81 85

NOTE 5 – For the OUTPUT byte set as 6, the VIS source is the input selected using the OUTPUT byte. Similarly, for the OUTPUT byte set as 7, the VIS source is the output selected using the OUTPUT byte. Note also, that on some machines the sync source is not software selectable, but is selected using switches, jumpers, etc!

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code), or will not reply.

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

4A FE 80 81 (ie. request VIS setting, with INPUT set as 126dec)

would be

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

NOTE 7 – Setting OUTPUT to 0 will return the VIS source setting as defined in instruction #7. Setting to 1 will return the input # or output # of the sync source (for the case where the VIS source is set as 6 or as 7 in instruction #7). Setting to 2 returns the vertical sync frequency (0 for no input sync, 50 for PAL, 60 for NTSC, 127 for error).

NOTE 8 - The reply to the "REQUEST WHETHER SETUP IS DEFINED" is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined; or 1 if it is defined.

NOTE 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than 15, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

NOTE 10 – This code is reserved for internal use.

NOTE 11 – For machines where the video and / or audio gain is programmable. The value of the gain is represented in twos complement form to allow for negative values (attenuation).

NOTE 12 - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, the auto-save function is set.

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

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

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

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

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

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

would be

7E 82 90 82

ie. 16 outputs

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

LIMITED WARRANTY

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 three years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

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

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

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

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

HOW YOU CAN GET WARRANTY SERVICE

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

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including 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 ou r 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.

The list of Kramer distributors appears on our web site:
www.kramerelectronics.com

We welcome your questions, comments and feedback.

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