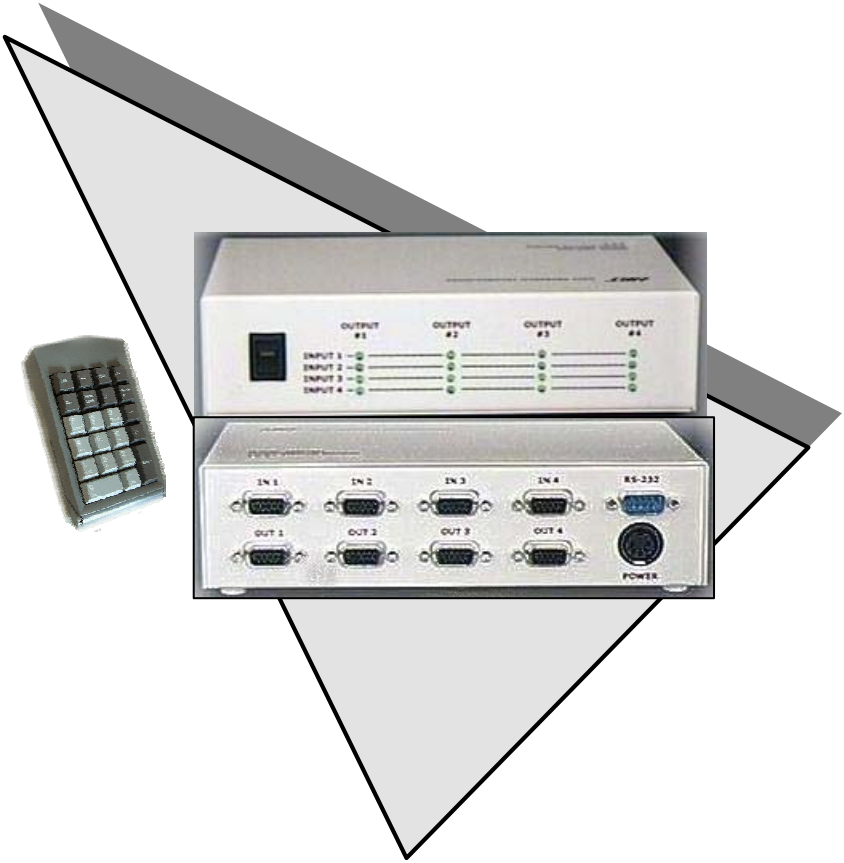
Hall Research Technologies, Inc.

4 x 4 VGA Matrix Switch

Model VSM-404
User's Manual
With Serial Keypad



CUSTOMER SUPPORT INFORMATION

Order **toll-free** in the U.S. **800-959-6439**
FREE technical support, Call **714-641-6607** or fax **714-641-6698**
Mail order: **Hall Research Technologies**, 1163 Warner Ave. Tustin, CA 92780
Web site: **www.hallresearch.com** • E-mail: **info@ hallresearch.com**

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Federal Communications Commission Statement

This equipment generates, uses and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. This equipment has been tested and found to comply with the limits for a Class A computing device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference, in which case the user, at there own expense, will be required to take whatever measures are necessary to correct the interference.

European Union Declaration of Conformity

This product has been tested and shown to comply with the requirements of the European EMC directive 89/336/EEC. CE

Contents

1. Introduction

The Model VSM-404 is a 4 in x 4 out video switch matrix that provides four independent outputs each capable of displaying any of the 4 inputs (or blanked out). The inputs can be RGBHV (e.g. VGA from a PC), RGBS, or RGsB with resolutions to 1600x1200 pixels, all inputs are terminated and buffered using 250 MHz DC-coupled video amplifiers for a sharp and perfect reproduction at each output. The VSM-404 outputs can drive cables in excess of 150 feet.
An RS232 "Serial Port" is provided on the unit to control the selection for the outputs. A Serial Keypad is supplied with each unit. The VSM-404 requires an external power supply for operation, which is also furnished (The keypad does not require a separate power supply and is powered by the base unit)
The VSM-404 employs HDD15 female connectors for all video inputs and outputs (with standard SVGA pinout). All cable connections are located on the rear of the unit. The front panel provides the on/off power switch and individual indication of the channels selected for each output.

The Switch's features include:

- With its large bandwidth, it can handle even very high resolutions and refresh rates, up to 1600 x 1280 pixels at up to 85 Hz.
- It includes a serial keypad, so it's ready to do manual switching right out of the box
- Comes with a universal power supply
- It's primarily designed to carry VGA/XGA video, but it ca n handle separate horizontal and vertical sync, composite sync, and sync on green, so with the right kinds of cables or adapters it can accept all sorts of video from all sorts of devices.
- All of its input and output signals are buffered, so you'll get the sharpest possible images.
- It can drive video signals as far as 150 ft. end-to-end, so it's ideal for use in auditoriums, conference halls, and similar spaces.
- Its front-panel LEDs show you right away which video inputs are going to which outputs.

2. Installation and Configuration

To set up your VSM-404 Video Matrix Switch system, take these steps:

1. Making sure that the Switch is powered off, find its input ports. (These are the top row of HD15 connectors on its rear panel. Run cabling from these ports to the video-output ports of the PC CPUs or other devices that will be providing the Switch's video input. If all of these input devices are transmitting VGA/SVGA/XGA-type video signals on HD15 female connectors, you can use standard VGA video extension cables such as our product CVGX-*xx*-MM. Keep in mind that the length of any of these cables plus the length of any of your monitor/output cables (see step 2) should not be more than 150 ft. If any of your input devices transmit some other type of video signal and/or use some other type of video connector, you might need special cables or adapters; call HRT Technical Support.

Figure 2-1. The Switch's rear-panel components.

2. The Switch's output ports are the bottom row HD15 female connectors on the rear panel. If all of your output devices are standard VGA or multisync monitors with HD15 male connectors on their video cables, you can plug them directly into these ports (if they'll be placed nearby) or run video-extension cables to them such as our product CVGX-*xx*-MF (if they'll be some distance away). Keep in mind that the length of any of these cables plus the length of any of your CPU/input cables (see step 1) should not be more than 150 ft. If either of your output devices are designed to receive a non-VGA video signal and/or use a different type of video connector, you might need special cables or adapters; call HRT Technical Support.

3. Connect the included keypad to the DB9 male connector labeled "RS-232" on the Switch's rear panel.

4. Plug the output cord of the Switch's power supply into the Switch's 5-pin DIN female power inlet. Plug one end of the power supply's input cord into the transformer's IEC 320 male inlet; plug the other end of the input cord into a working AC outlet. Your Video Matrix Switch system is now fully installed, as shown in Figure 3-2 below.

5. Now you can turn on all attached devices. The system should power up in its last state, with each of the Switch's outputs displaying its last selected input. If it does, the system should be ready for continuous operation. If it doesn't, check the front-panel LEDs to make sure the Switch is ON; check your devices and make sure they're ON; and check you're cabling and make sure it's all properly connected. If everything seems like it should work but the system still doesn't, call HRT Technical Support.

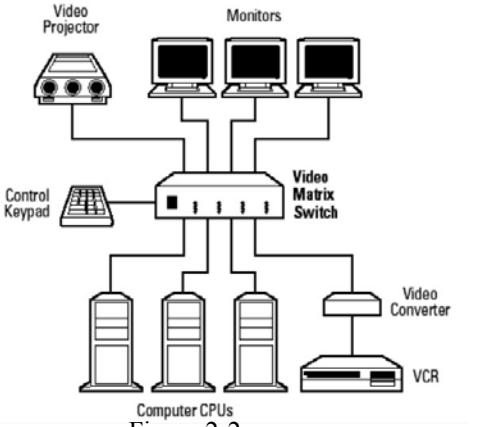


Figure 2-2

3. Operation

3.1 The Switch's LEDs

The LEDs on the 4 x 4 Video Matrix Switch's front panel indicate which of the Switch's outputs are displaying the video from which inputs.

3.2 Switching with the Keypad

To switch a given output to display a given input (or to blank an output), press "[out][.][in][Enter]" on the Switch's keypad, where:

- [out] is the number of the output channel (1 through 4, or "*" for all outputs);
- [.] is the keypad's decimal-point/Delete key;
- [in] is the number of the input channel (1 through 4, or 0 to blank the output); and
- [Enter] is the keypad's Enter key.

For example, to display input #1 on output #3, press [3][.][1][Enter]. To blank output #2 so that it doesn't display anything, press [2][.][0][Enter]. To send input #4's video to all outputs, press [*][.][4][Enter]. Remember that any number of outputs can be switched to display the same input, but no output can be switched to display more than one input at the same time.

After you press each key, you have five seconds to press the next one; if you wait longer than that, the switching command is aborted. If at any time you press an invalid key or a key that the Switch isn't expecting, the command is also aborted. For example, if you press [4], and then [.], but then press [5], or [.] again, or any unused key, the command in progress is discarded and the Switch resets itself.

3.3 Keypad Shortcut

After switching to a channel using the [output].[input][enter] format, you can then switch the input of the last output you changed quickly by just entering [input][enter]. For example:
Select Output 3 from Input 2 by pressing [3][.][2] [enter]
Then you can change the input for Output 3 by simply pressing [1] [enter] to show input 1 or [2][enter] for input 2 etc.

3.4 Blanking the Video Output

Pressing 0 for input will blank the output. For example if you press [3][.][0][Enter]. Then the output #3 will be blanked.

3.5 Switching all outputs to the same input

Pressing * for output will affect all the outputs. For example if you press [*][.][1][Enter]. Then all the outputs will show input #1.

3.6 Auto Scan Mode

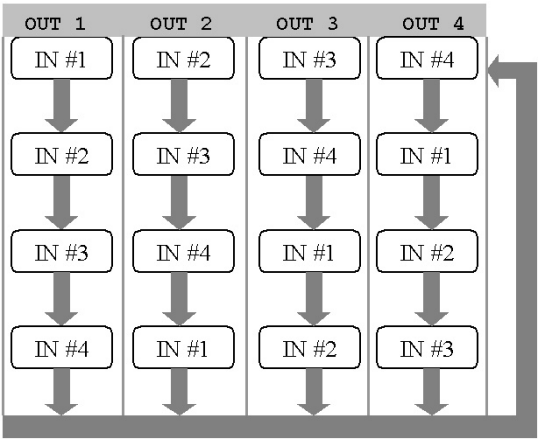
The VSM-404 has a “Scan Mode” whereby each output of the switch automatically cycles through all inputs at a rate of every 1 minute or customer specified period.

3.6.1 How to Activate Scan Mode

There are 2 types of scan modes: individual scan and all scan. Both scan modes will adhere to the scan cycle as described above. To enter individual scan mode, a simple key sequence is entered on the keypad
[Output Channel that you want to scan]. [/][Enter]

For example to scan output #1 press: [1].[/][enter
]
This will begin scanning output 1 at input 1 and cycle through the inputs. Any time an output is put into individual scan mode, it starts with input 1. Each of the 4 output channels can be scanning independently of one another. This means you can start scanning on one channel and then at some time later, start scanning on another channel. Both channels will now be scanning independent of one another. All scanning channels will scan at the same rate.

To enter the all scan mode, use the key sequence:
[*].[/] [Enter]
This will start with output 1 on input 1, output 2 on input 2, output 3 on input 3 and output 4 on input 4 (as shown in the diagram below):



3.6.2 How to Exit Scan Mode

To exit the scan mode hit the Esc key on the keypad and this will cancel all scanning whether it be individual scan mode or all scan mode. If the all scan command has been issued, then scanning can be canceled by selecting any input from any output via the keypad or by selecting an individual scan. When individual scan mode is running on a channel, the way to cancel that specific channel's scan mode is to select an input for that channel from the keypad.

3.6.3 How to change the Scan Timing

The time between transitions in scan mode is user definable (factory default is 10 seconds). Connect the ACL0404A to a PC using a crossover DB9 serial cable. Start up Hyper Terminal with the settings 1200, 8, none, 1, none. To program the scan time, press PPP followed by the A through G corresponding to periods shown below.

A	5 seconds	**B**	10 seconds	**C**	1 minute	**D**	2 minutes
E	3 minutes	**F**	4 minutes	**G**	5 minutes		

3.6.4 Compatibility with MatrixMon Software

The scan mode is compatible with MatrixMon software (available free at HRT's web site), however once you enter the scan mode you can use the MatrixMon to only monitor the status of the inputs and will not be able to control the switch through it as in normal mode until you exit the scan mode.

3.7 Control from Serial Devices (RS-232 Command Protocol)

To control the Video Matrix Switch through an attached PC or other serial device, the serial device has to be able to communicate with the Switch. (You'll need to set the device to 1200 bps, 8 data bits, and no parity; the number of stop bits is irrelevant.).

To tie the unit to a PC, use a DB9 F/F cross-over cable (Null Modem: 2<>3, 4<>6, 7<>8, 5=5).

The serial device will have to mimic the Switch's keypad commands. When you press a button on the keypad, a "make" code is sent to the Switch; when you release a button, a "break" code is sent to the Switch. Here are the values you need to send to the Switch to get it to change channels, listed as both ASCII characters and hexadecimal values:

Keypad Button	Make Code		Break Code	
	ASCII	(HEX)	ASCII	(HEX)
1	`	(60)	@	(40)
2	a	(61)	A	(41)
3	b	(62)	B	(42)
4	c	(63)	C	(43)
5	d	(64)	D	(44)
6	e	(65)	E	(45)
7	f	(66)	F	(46)
8	g	(67)	G	(47)
9	h	(68)	H	(48)
0	o	(6F)	O	(4F)
+	m	(6D)	M	(4D)
-	l	(6C)	L	(4C)
.	n	(6E)	N	(4E)
*	k	(6B)	K	(4B)
/	j	(6A)	J	(4A)
Esc	i	(69)	I	(49)
Enter	t	(74)	T	(54)
NumLock	y	(79)	Y	(59)
LEFT	z	(7A)	Z	(5A)
TAB	{	(7B)	[	(5B)
SHIFT	|	(7C)	\	(5C)
Fn	}	(7D)	]	(5D)

3.7.1 Status and Special Commands

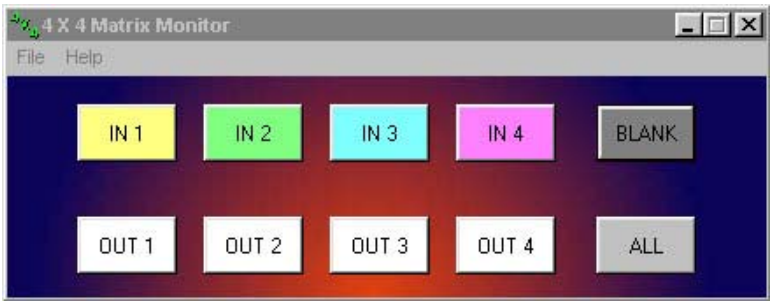
There is a special set of codes that can be sent by (or through) the serial device that will cause the Switch to respond with status values; these can be very useful in automated systems:

• Send the Switch an ASCII “0” (zero, 30 hex) to have it return the revision level of its firmware: an ASCII “1” (31 hex), for instance, for firmware version 1.

• Send the Switch an ASCII “1”, “2”, “3”, or “4” (31 hex through 34 hex respectively) to have it return the status of the corresponding output channel: It will reply with ASCII “1”, “2”, “3”, or “4” (31 hex through 34 hex) to indicate that that output is switched to input #1, 2, 3, or 4 respectively, or it will reply with ASCII “0” (zero, 30 hex) to indicate that that output is blanked.

3.8 Free Control Software for Windows® PC

The "Matrix Monitor" software available from www.hallresearch.com allows point-and-click control and monitoring of the VSM-404 from a PC with Windows OS.



4. Troubleshooting

Make sure that all your connections are solid, and check the state of the LED's on the front of the unit. Do not open or try to repair the unit yourself. There is no customer repairable items in the unit and you will void your warranty.

Contact HRT Support at 714-641-6607 or via email or web. If you need to ship your converter for repair, make sure to get a Return Material Authorization (RMA) number first.

5. Specifications

Standards:	VGA, SVGA, XGA, or XGA-2 video
Compliance:	CE; FCC Part 15 Subpart B Class A
Video Types:	RGBHV (VGA, SVGA, XGA, or XGA-2), RGBS, ,RGsB ("sync on green"), or YPbPr (component)
Resolution and Refresh Rate:	Up to 1600 x 1280 non-interlaced at up to 85 Hz
Bandwidth:	DC to 265 MHz
Temperature	Operating: 0 to 50°C; Storage: –40 to +85°C
Humidity:	Up to 95% noncondensing
Enclosure:	Steel
MTBF:	100,000 hours (estimate)
Power:	From utility-power (mains) outlet, through included detachable output cord and external universal power supply: Input: 100 to 240 VAC at 50 to 60 Hz (autosensing); Output: +5 VDC at 1 A, +12 VDC at 0.5 A, and –12 VDC at 0.5 A; Consumption: 5 VA (5 watts) maximum
Size:	2.3"H x 8.3"W x 5.3"D
Weight:	Base: 2.2 lbs, Keypad: 1 lbs , Power Supply: 1.2 lbs

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