![HRT Logo] Hall Research Technologies, Inc. **VSM-802B**

8 x 2 Video Matrix Switch

With Serial Keypads and Long Cable Compensation

UMA1007 Reb B

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Contents

1. Introduction

The Model VSM-802B 8 in x 2 out Video Matrix Switch is an ideal tool for sharing and/or switching between the output of as many as eight video sources (such as PCs), in order to display or capture that output at two video destinations (such as monitors). Once you attach all your devices, you can hook the Switch to the included keypads for full switching control.

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 two serial keypads, so it's ready to do manual switching almost right out of the box (you *do* have to attach the keypad to the Switch first).
- Because it has a universal power supply, you can plug it in almost anywhere if you have the right input cord. (And it's small and light enough to take almost anywhere!)
- It's primarily designed to carry VGA/XGA video, but it can 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 300 ft. (90 m) 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.
- To top it off, it can be operated by pressing a single keypad button, so anybody can use it without having to be extensively trained.

The Switch comes with:
- (2) 10-button keypads
- (2) 6-ft. (1.8-m) DB9 male to DB9 female keypad cables
- Power supply
- This manual

2. Installation and Configuration

To set up your VSM-802B 8 x 2 Video Matrix Switch system, take these steps:

Making sure that the Switch is powered off, find its input ports. (These are the HD15 connectors on its front panel labeled "INPUT 1" through "INPUT 8.")

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 300 ft. (90 m). You'll configure the Switch for the length of your cables in step 3.

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.
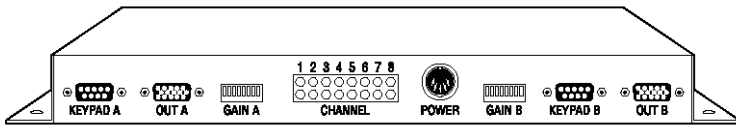

Figure 2-1. The Switch's rear-panel components.

The Switch's output ports are the two HD15 female connectors labeled "OUT A" and "OUT B" on the Switch's rear panel. If both 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 300 ft. (90 m). (You'll configure the Switch for the length of your cables in step 3.)

If either of your output devices is 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.

1. For each of the two outputs there is an 8-position DIP switch on the Video Matrix Switch's rear panel - labeled "GAIN A" for "OUT A" and "GAIN B" for "OUT B" - that you can use to control the gain applied to the corresponding input signals. For each of the eight inputs, calculate the total lengths of the video cables from the source to each of the two destinations (the devices attached to OUT A and OUT B). Then set the corresponding switch position ("1" for input 1 through "8" for input 8 on either GAIN A for OUT A or GAIN B for OUT B): Move it DOWN if the total length is 100 ft. (30 m) or less, or UP if the total length is over 100 ft. (30 m). (In the UP setting, extra compensation is added to the signal to make up for the high-frequency losses typical of longer cabling.)

2. Run the included 6-ft. (1.8-m) DB9 cable from the two included keypads to the DB9 female connectors labeled "KEYPAD A" and "KEYPAD B" on the Switch's rear panel. If you have either monitor placed father than 6-ft. (1.8 m) from the Switch, you can use DB9 male to DB9 female extension cable such as CDB9-*xx*-MF to run just as far to the keypad, up to the maximum of 300 ft. (90 m) .

3. 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 on the next page.

4. 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 rear-panel LEDs to make sure the Switch is ON; check your devices and make sure they're ON; and check the 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.
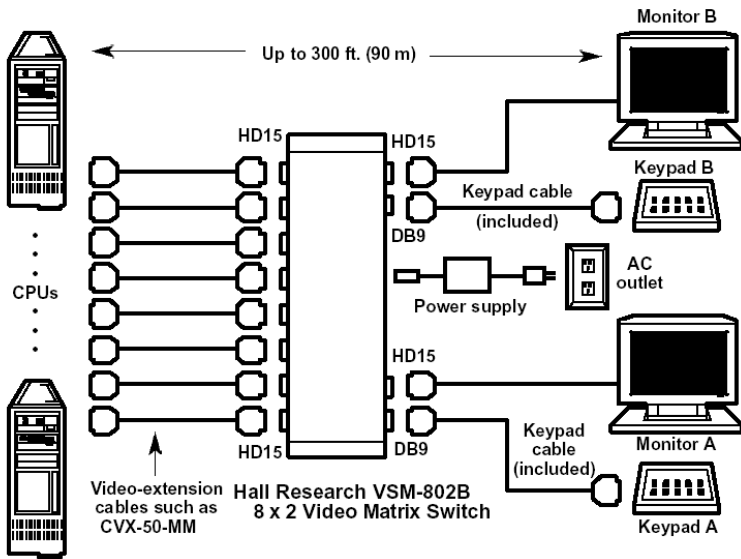
Figure 3-2. A fully installed Switch system.

High-Density 15-Pin VGA Connector	
PIN	Function
1	Red
2	Green
3	Blue
4	Not Used
5	Gnd
6	Red Return (Gnd)
7	Green Return (Gnd)
8	Blue Return (Gnd)
9	Key (Not Used)
10	Gnd
11	Gnd
12	SDA (plug-n-play)
13	Horizontal Sync
14	Vertical Sync
15	SCL (plug-n-play)

3. Operation

3.1 The Switch's LEDs

The LEDs on the 8 x 2 Video Matrix Switch's rear panel, shown in Figure 3-1 at the start of **Chapter 2**, indicate which of the Switch's outputs are displaying the video from which inputs, and which outputs have been blanked and aren't showing anything (see **Section 3.3**) .

There are two rows of eight LEDs, labeled "Channel" and "1" through "8." The top row shows which input is selected for "OUT A," while the bottom row shows which input is selected for "OUT B." If no LEDs are lit in an output port's row, the output has been blanked and the keypad is in test mode (see **Section 3.3**)

3.2 Switching with the Keypads

To switch your output port's monitor or other destination device to display a given input, press the number of that input on your keypad. For example, to display the video from a CPU attached to INPUT 8, press the "8" button. The LED next to that button will light (and will stay lit until a different port is selected). Buttons 9 and 10 on the keypad have no switching function; pressing them will have no effect unless you press both at the same time, which will blank the output and trigger the keypad's self-test function (see **Section 3.3**).

3.3 Blanking the Video Output and Keypad Self-Test

Pressing both the 9 and 10 buttons simultaneously on one of the Switch's keypads will blank the video output controlled by that keypad (the monitor will go dark). It will also cause that keypad to go into self-test mode and light all of its LEDs. If you see that any of the LEDs don't light while a keypad is in this mode, consider contacting HRT to arrange for the keypad to be repaired or returned. (A dark LED probably just means that the LED is defective, but there's a slim chance that something more serious might be wrong.) To exit test mode and restore video output of the previously selected channel, press any button (1 through 8).

4. Troubleshooting

4.1 Problem Solving FAQ

1)   Fuzzy, blurry, or ghosting image at remote location

If you have a stable but somewhat blurry image (object or character edges are not sharp), make sure that you have set the unit's compensation switches correctly. If you still have a fuzzy image, try reducing the refresh rate and/or resolution of the PC. You should also be sure to use multi-coaxial (double shielded) 75 ohm video extension cables for best results. A ghosting image is usually an indication of impedance mismatch of the cable.

2)   Image exhibits steady or rolling horizontal color "hum" bars

This is usually an indication of improper grounding either at the sending end, the receiving end, or both. Verify that the AC line is properly wired and that a protective ground (green) wire is established with NO potential difference between both the sender and receiver locations.

3)   The PC does not recognize a Plug-and-Play monitor

If the PC's Operating System is setup to detect a plug-and-play monitor (usually in Display Properties: Advanced Settings), it may have trouble finding a monitor if it is directly connected to the VSM-802B. If the PC does not produce an image due to this, disable the plug-and-play monitor detection in the PC's operating system.

4)   Substituting power supplies

The splitter relies on the AC power adapter that is supplied with it. Do not substitute any other power supplies.

4.2 Calling Hall Research Technologies

If you determine that your Switch is malfunctioning, do not attempt to repair the unit. Contact HRT Tech. Support at 714-641-6607.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

• The nature and duration of the problem

• The components involved in the problem—that is, what type of cable, makes and models of computers and monitors, etc.

• The results of any testing you've already done

4.3 Shipping and Packaging

If you need to transport or ship your splitter:

• Package it carefully. We recommend that you use the original container.

• Before you ship the unit back to HRT for repair or return, contact us to get a Return Material Authorization (RMA) number.

5. Specifications

Standards:	VGA, SVGA, XGA, or XGA-2 video
Interfaces:	Video: VGA; Keypads: EIA/TIA RS-232 Serial
Compliance:	CE (meets requirements); FCC Part 15 Subpart B Class A (meets specs),
Supported Video Types:	RGBHV (VGA, SVGA, XGA, or XGA-2), RGBS, or RGsB ("sync on green")
Resolution and Refresh Rate:	Up to 1600 x 1280 non-interlaced at up to 85 Hz
Bandwidth:	DC to 265 MHz
Video Level:	0.7 volts peak-to-peak
Video Gain:	1-to-1 (buffered); for distances over 100 ft. (30 m), can be set to proportionally apply higher gain to higher signal frequencies to compensate for losses in cable
Maximum Distance:	Up to 300 ft. (90 m) of total cable length from any attached CPU or other input device to any attached monitor or other output device
User Controls:	(2) 10-button switching keypads, (1) for each output; (2) Rear-mounted 8-position DIP switches—(1) for each output port—for distance compensation
Indicators:	(16) Rear-mounted LEDs, (2) for each video-source port; (10) LEDs on each keypad
Connectors:	Front-mounted: (8) HD15 female for video input; Rear-mounted: (2) HD15 female for video output (2) DB9 female for keypad input, (1) 5-pin DIN female power inlet
Max Altitude:	10,000 ft. (3048 m)
Temperature	Operating: 0 to 50°C; Storage: –40 to +85°C
Humidity:	Up to 95% noncondensing
Enclosure:	Steel
MTBF:	300,000 hours (calculated 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:	1.5"H x 12.1"W x 4.1"D (3.9 x 30.8 x 10.4 cm); mounting ears protrude an additional 0.9" (2.2 cm) wide on each side
Weight:	Net: Switch itself: 2.3 lb. (1 kg); Keypads: 1 lb. (0.5 kg) each; Power supply: 1.3 lb. (0.6 kg); Shipping: 6.7 lb. (3 kg)

6. Addendum

6.1 Switching with or through a Serial Device

The VSM-802B has two serial ports, one for each of the keypads. One or both of these ports can be used to control the switch from an external serial device.

The serial connectors are DB9-F. The following list shows pins used:

> Pin 1 (reserved) = Used by keypad (must be left open)
> Pin 2 (output) = TX from switch
> Pin 3 (input) = RX to switch
> Pin 4 (input) = DSR to switch (must be hi for switch to transmit)
> Pin 5 (Gnd) = Ground
> Pin 6 (output) = DTR from switch (hi indicates ready to receive)
> Pin 7 (n/u) = Not Used
> Pin 8 (n/u) = Not Used
> Pin 9 (reserved) = Used by keypad (must be left open)

Configure port for 9600 Baud, 8 bits, No Parity, 1 Stop bit

Serial Commands:
All commands are made up of ASCII characters followed by carriage return. x and y are input and output channel numbers respectively.

OyIx   Connects y output to x input. If x is 0, then y output is blanked. The switch will send out an identical string (i.e. OyIx) when the action is completed

Oy?   Returns status of y output in the form of OyIx

You can still have a keypad connected to one of the serial ports and control the switch simultaneously from an external serial device. If the output associated with the keypad that is connected is changed via the external serial device, then the keypad LEDs will reflect the new selection.

6.2 Configuring for Dual-head Display Devices

If you are using computers with dual-video outputs, you can configure the VSM-802B to display the video outputs from 4 PC's on to a single dual-head display.

Connect the left video output of all PCs to inputs #1 through #4, and the right video outputs to inputs #5 through #8 respectively. Then connect the "A" output from the switch to your left display device and the "B" output to the right one.

Connect a PC to either keypad port on the switch using a Straight-through DB9 M/F cable. Configure a terminal-emulator software, such as Windows HyperTerminal ™ per settings mentioned in the previous section.

Type the letter P and the following menu will appear on the screen:

> Select Switching Mode
> N = Normal
> T= Tandem (used for dual-head displays)

Press T on the keyboard; the switch will respond with "Tandem mode selected". The switch will permanently stay in this mode until you change it back to normal by performing the same procedure and selecting N.
Now you can use one of the keypads to select any of the PCs for display. The keypad must be plugged into "Keypad A" port of the switch. Buttons 1 through 4 are used to make the desired PC selection. Buttons 5 through 8 are inactive; however pressing buttons 9 and 10 together will still blank the outputs. When the switch is configured for tandem mode, you can still use an external serial device (either by itself or together with a keypad), to control the switch. The command string is simplified to: Ix (where x is 1 through 4).

6.3 Scan Mode

The VSM-802 now features a Scan Mode whereby each output can independently cycle through all 8 inputs at a customer specified period.

To enter the Scan Mode for a given output, press keys 9 and 10 at the same time on the corresponding keypad. To enter the scan mode from a serial device type: O1S↵or O2S↵which forces output 1 or 2 into scan mode respectively ("↵"denotes Enter).

To Exit Scan Mode, just press any key on the keypad. This will cause the output to switch to selected channel and quit scanning. This can also be done from a serial device by issuing a valid switch command such as: O2I5↵ (see Addendum on page 13 of the manual for details regarding controlling the switch through a serial device (or Windows® HyperTerminal™)

When you place an output into scan mode, the Model 802 will remember and remain in that state even after power off. So if you disconnect power and reconnect power, it will pick up and start scanning where it left off. In fact you don't even need a keypad plugged in for that output once power is restored!

Scan mode is not available in Tandem or Dual Head Switching mode (see Addendum on page 14 of the manual for details regarding "Dual-Head Switching".

6.4 Blanking the output

Pressing key 9 or key 10 on the keypad will cause the output to be blanked (all LED's on the keypad will be lit when the output is blanked). To come out of blank mode, just press any 1 through 8 keys on the keypad.

Either output can also be blanked from a serial device by issuing a switch command with 0 as input such as: O2I0↵

> ***NOTE: This is the only method
> of blanking the output.
> Please disregard
> paragraph 3.3 on page 8
> of the manual***

6.5 Programming the Scan Period for each output

You can specify a scan interval for each output from 1 second to 255 seconds. Once you program the scan interval, the model 802 will use the new period whenever you enter scan mode. The scan mode is set to 10 seconds for both outputs when the unit is shipped from the factory.

To program the scan interval, connect either keypad port of the VSM802 to a PC (you can use the keypad cable for this purpose). Configure a terminal emulator (such as HyperTerminal™ which comes with Windows®) for 9600 baud.

Press the letter "P" on the keyboard. You will see a dialog screen similar to the following:

P
Select Switching Mode
N = Normal
T =Tandem (used for dual-head displays)
N
Normal mode selected

Scan interval for output 1 (1 to 255 seconds)? *10*↵
Scan interval for output 2 (1 to 255 seconds)? *10*↵
*** END PROGRAM MODE. RESUMING NORMAL OPERATION ***

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