OCEAN MATRIX®

Instruction Manual

OMX-4X4

4x4 Video & Stereo Audio Vertical Interval Matrix Switcher

Thank you for purchasing this Ocean Matrix component. This unit is designed to give you years of trouble free professional operation for your most demanding applications. It is our goal to develop long term partnerships with our customers through our commitment to exceed their expectations.

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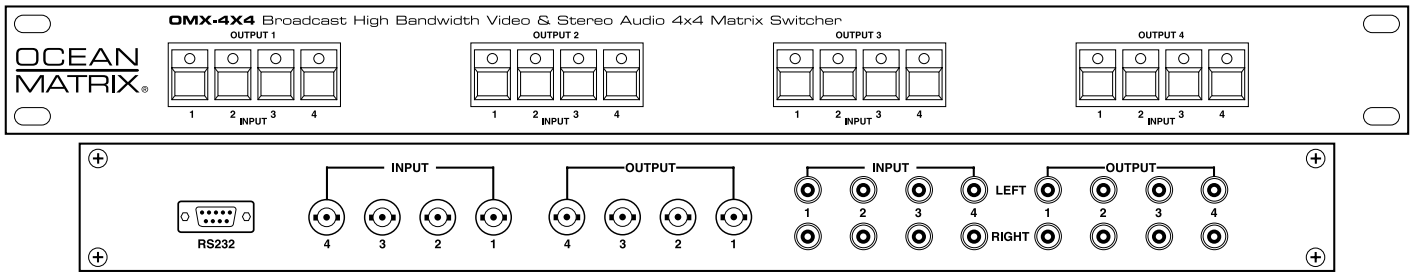

The OMX-4x4 Switchers are flawlessly designed 4 x 4 matrix routers for seamless routing between any one of four inputs to any or all of the four outputs. Since audio-follows-video, each switch selected controls both video and audio. As a true matrix switcher, you may send any input signal to any output.

Vertical Interval Switching provides glitch free transitions between synchronized sources.

The 4x4 models are controlled from the front panel using “output” assignment switches with LED confirm. Additionally, a 9-Pin Serial Control Port Located on the rear panel is provided to interface your PC with the switcher. **Included Software** is provided for switcher control from any standard PC.

SPECIFICATIONS

VIDEO

Inputs:	Composite Video Signals terminated into 75Ω; Inputs can be looped, Internal switches for termination,on BNC connectors
Outputs:	4 Composite video signals into 75Ω, BNC connectors
Video Performance:	Measured with a 40 IRE 3.58MHz sine wave a linear ramp 0-100 IRE 30MHz unity gain bandwidth
Differential Gain:	0.01%
Differential Phase:	0.05%
Tilt:	< 0.5%
S/N Ratio:	> 75dB, 5.0MHz, Low pass
Response:	DC -30MHz Baseband @ ±0.05dB
DC Offset:	0V @ 1Vp-p into 75Ω
Adj. Crosstalk:	-65dB tested @ 10MHz

AUDIO

Inputs:	4 Stereo inputs, Unbalanced, 150K bridging, 600Ω nominal 0.5Vp-p - 2.0Vp-p input signal, RCA connectors
Outputs:	4 Stereo outputs, Unbalanced, 600Ω, Unity gain set @ 1.2Vp-p, RCAs
Performance:	Measured with 1KHz 1.2Vp-p sine wave
Frequency Response:	10-30KHz ±0.1dB
S/N Ratio:	85dB, at specified tested center frequency for response
Crosstalk:	> 110dB isolation

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BASIC OPERATIONS

POWER UP

After unpacking the unit, plug in to 110 VAC power. The OMX-4X4 has no power switch. The front panel LEDs will light immediately. After a second the LEDs will go out. This indicates that POWER RESET has occurred and that the microprocessor is operational.

CONNECTIONS

Connect the composite video to input #1. THIS INPUT MUST BE USED AT ALL TIMES. Failure to use video input #1 will disable the switcher. Connect other video sources to inputs 2-4 as desired. The OMX-4X4 comes factory set for video 75Ω termination. If the OMX-4X4 is to be bridged with another device or another OMX-4X4, then the internal termination switches must be set to "off" as required. Open the top panel and set the 4 position DIP Switch located near the front, to the proper termination. OFF is open and ON is terminated. There is no need for audio termination.

Connect the outputs using the proper cables to the various destinations in your system. All output cables must be properly terminated if the devices being fed these signals provide a terminate option.

OPERATION

Once the unit is properly connected, simply select the input required to be switched for each output. The front panel switches are labeled "OUTPUT" on the top of the switch area and "INPUT" below the switches. To select input #1 to be fed to output #2: Simply push the #1 button for output #2 switch buss.

RS-232

RS-232 operation requires that you first write a program that outputs HEX code via the COM port of your PC. Review the section: SERIAL PROTOCOL in this manual for additional programming information.

You can control the OMX-4X4 with the PC software control provided with this unit. You can also order a more sophisticated software.
VERSION 1.0 is provided with this manual. Review the installation instructions later in this manual.

NOTE: The OMX-4X4 has been designed for simple use and reliable performance. The screening and layout work was carefully considered to provide an easy understanding of the product and its utilization. If you require any assistance in either application or operations, please call us at 845-247-0680 between 10 AM - 4 PM EST. We are happy to serve you with any assistance and tech support.

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OMX-4X4 SWITCHER SERIAL PROTOCOL SPECIFICATIONS

1.0 PROTOCOL DEFINITION

The serial protocol used by the OMX-4X4 switcher is an asynchronous byte oriented protocol at 9600 bits per second, no parity, 1 stop: commonly referred to as 9600, N, 8, 1.
There is no protocol encapsulation (e.g., HDLC,SLIP, etc.). Each valid code sent signifies an operation of the switcher. The switcher contains an 8 byte receive buffer therefore a programmer should be careful no to overflow the buffer, causing received bytes to be dropped. As a guideline, the host program (MAC or PC) should delay 5 milliseconds between send codes.

Table 1 shows the codes for connecting outputs to inputs for basic switching. Note that audio follows video.

TABLE 1.0: BASIC SWITCHING CODES

HEX VALUE	DESCRIPTION
0x80	Connect output 1 to input 1
0x90	Connect output 2 to input 1
0xA0	Connect output 3 to input 1
0xB0	Connect output 4 to input 1
0x81	Connect output 1 to input 2
0x91	Connect output 2 to input 2
0xA1	Connect output 3 to input 2
0xB1	Connect output 4 to input 2
0x82	Connect output 1 to input 3
0x92	Connect output 2 to input 3
0xA2	Connect output 3 to input 3
0xB2	Connect output 4 to input 3
0x83	Connect output 1 to input 4
0x93	Connect output 2 to input 4
0xA3	Connect output 3 to input 4
0xB3	Connect output 4 to input 4

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OMX-4X4 SWITCHER SERIAL PROTOCOL SPECIFICATIONS

2.0 GENERAL OVERVIEW

Note that on power up the unit has all outputs disabled. Simply connecting an output to an input does not produce the selected input at the selected output. The output must be enabled using the codes shown below in **Table 2.0.**

EXAMPLE 2.1: To produce input 3 video/audio at output 1 the following code must be sent by the host:

0x82 <5mS delay> 0x8C

The value 0x82 tells the switcher to connect output 1 to input 3
The value 0x8C tells the switcher to enable output 1

2.2 OUTPUT CONTROL

Outputs can be enabled or disabled. If the output is disabled, the switched connection remains intact. Thus, re-enabling the output restores the previously connected input.

For example, let's assume the steps in example 2.1 have occurred and input 3 is present at output 1. If the output is then disabled by sending code 0x8B and then a code 0x8C is sent, input 3 is present at output 1.

Ganged control of all outputs is possible using the DISABLE/ENABLE codes 0x8D and 0x8E

TABLE 2.0: SWITCHER CONTROL CODES

HEX VALUE	DESCRIPTION
0x8B	Disable output 1
0x9B	Disable output 2
0xAB	Disable output 3
0xBB	Disable output 4
0x8C	Enable output 1
0x9C	Enable output 2
0xAC	Enable output 3
0xBC	Enable output 4
0x8D	Disable all outputs
0x8E	Enable all outputs

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OMX-4X4 SERIAL CONTROL SOFTWARE VERSION 1.0

The OMX-4X4 is provided with a DOS bases RS232 control software. This software is provided on a 3.5" 1.44Mb floppy disc. This software allows the operator to run all switcher functions from a standard IBM compatible PC. The software can be run from the floppy disc or installed on a PC hard drive. Additionally, the software has control features not available via manual control.

TEST: This mode will instantly connect input #1 to all outputs. It can be used to feed Colorbars to all outputs for test purposes.

MUTE: This feature allows all outputs to be disabled or "muted" at once. Individual output channels may be muted as well.

INSTALLATION

Install the floppy disc in drive A of your PC. At the A: Prompt type: **Install** and hit return.
Type Y to answer YES for hardware installation. The software will create a sub-directory called 4X4232 on your hard drive and the copy the file AV.EXE into that directory.

RUNNING PROGRAM

From the directory 4X4232 type: **AV**
The operations menu will appear as shown below.

Select Output (1-4), T for Test, M to Toggle Mute or Q to Quit.

**********Current Switch Configuration**********

OUTPUT	CONNECTED OUTPUT
1	0
2	0
3	0
4	0

The top menu line offers these options: SELECT OUTPUT, TEST, MUTE & QUIT.
To enter the **TEST** mode type T and press enter. You will note that all the connected outputs change to "1". This indicates that all outputs are now connected to input #1. Follow the screen instructions for exiting the TEST mode.

The **MUTE** feature is a Toggle. This means it may turned on & off by pressing the ENTER key. Type M to engage this feature. You will note "MUTED" appears before each output line when the feature is engaged. To toggle back & forth, simply hit ENTER & "MUTED" goes on & off accordingly.

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RUNNING PROGRAM (cont...)

MATRIX ROUTING is accomplished by first entering the output bank required. The command line will ask for a selection of an input for that output. Enter the input you require and the next line will ask for an enable Y/N. Enter your choice and the route is executed. At the same time the CONNECTED OUTPUT register will show the connection. Repeat this operation for all four outputs.

At the command line, you can also enter MUTE mode. This will mute only the output selected. You may also QUIT the program from any of the prompt lines. Exiting the program leaves the switcher in the last controlled mode. Pressing the front panel switches or enabling the RS232 port again will change the settings.

PORT ASSIGNMENTS: The software is configured to boot on COM1. However, it can be assigned to andy COM PORT 1-4. To change a port assignment: At C:\4x4232 type AV [-p] where p is the new port number. Example: AV [-2] will boot the program on COM2.

SERIAL CABLE

To connect your PC to the OMX-4X4, a straight 9-Pin Female to 9-Pin Female cable can be used. The pinout is direct pin-to-pin. The cable can be up to 100' long. Ribbon cables can be used for cable lengths up to 30 feet. It is recommended that shielded cable is used for longer length runs.

CABLE PINOUT:

PIN#	FUNCTION
1	NC
2	TX
3	RX
4	DTR
5	GND
6	DSR
7	NC
8	DSR LOOP
9	NC

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Safety Precautions

1. To prevent fire or shock hazard, do not expose this equipment to the environment of Humidity and/or dust. Do not use this equipment in an unprotected outdoor installation or any area classified as a wet area.
2. The operating temperature of this product must be kept between -40°C and +95°C. Direct sunlight or an intense source of heat, direct or ambient, must not be introduced to the product either by induction or contact.
3. Always keep the product on a stable and secure base or enclosure. Do not drop the product or subject it to sudden heavy impact.
4. Provide adequate ventilation so that thermal characteristics do not cause an increase in product temperature to resulting in overheating.
5. Do not clean the unit by using electrically conductive or corrosive chemicals. Always be certain to unplug the unit from AC wall power before any major cleaning. Use a damp cloth only for cleaning.
6. Do not subject the product to electrical mains power over voltage: The product must be used at the rated supply voltages indicated on the product rear panel only.
7. Do not plug the product into an overloaded electrical outlet. This may result in fire or electrical shock.
8. Object Ingress and Liquid Entry: Never insert or push sharp metal objects into the product or use such devices for an attempt at opening or servicing the product. Servicing should be referred to a trained and qualified technician only. Do not allow liquid of any type to enter the unit. Do not allow the unit to be submersed in water as this may cause a shock hazard.
9. A trained qualified technician should perform all servicing of the unit. There are no serviceable components within the unit for user access.

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