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## Instruction Manual

**T**hank you for purchasing an 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.

# OMX-SW8x8BAL

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## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Getting Started</b>	<b>1</b>
<b>3</b>	<b>Overview</b>	<b>1</b>
<b>4</b>	<b>Your OMX-SW8x8BAL 8x8 Video / Balanced Audio Matrix Switcher</b>	<b>2</b>
<b>5</b>	<b>Installing on a Rack</b>	<b>5</b>
5.1	Before Installing on a Rack	5
5.1.1	 CAUTION!!	5
5.2	Instructions for Rack-Mounting	5
<b>6</b>	<b>Connecting the OMX-SW8x8BAL</b>	<b>6</b>
6.1	Setting the Dipswitches	7
6.1.1	Self Address Dipswitches	7
6.1.2	Setting Connection Dipswitches	8
6.2	Controlling via RS-232 (for example, using a PC)	9
6.3	Controlling via RS-232 and RS-485	10
<b>7</b>	<b>Operating OMX-SW8x8BAL Matrix Switchers</b>	<b>12</b>
7.1	Displaying Unit Characteristics	12
7.2	Selecting and Connecting an Output and/or Input	12
7.3	Choosing the Audio-Follow-Video or Breakaway Option	13
7.3.1	Setting the Audio-Follow-Video Option	13
7.3.2	Setting the Breakaway Option	13
7.4	Confirming Settings	13
7.4.1	Toggling between the At Once and Confirm Modes	14
7.4.2	Confirming a Switching Action	14
7.5	Storing/Recalling Input/Output Configurations	14
7.5.1	Storing an Input/Output Configuration	15
7.5.2	Recalling an Input/Output Configuration	15
7.5.3	Deleting an Input/Output Configuration	15
7.6	Resetting the Machine	15
<b>8</b>	<b>Technical Specifications</b>	<b>16</b>

## Figures

Figure 1:	OMX-SW8x8BAL Video Matrix Switcher	3
Figure 2:	Connecting the Video Sources and Acceptors to the Rear Panel	6
Figure 3:	OMX-SW8x8BAL Dipswitch Configuration	7
Figure 4:	Connecting a PC without using a Null-modem Adapter	9
Figure 5:	RS-232 and RS-485 Operation	11

## Tables

Table 1: OMX-SW8x8BAL Front Panel Features	4
Table 2: OMX-SW8x8BAL Rear Panel Features	4
Table 3: Recommended Ambient Temperature and Humidity Range	5
Table 4: Dipswitch Settings	7
Table 5: Self Address Dipswitch Settings	7
Table 6: Technical Specifications of the OMX-SW8x8BAL	16

## 1 Introduction

Congratulations on purchasing your **OMX-SW8x8BAL** *8x8 Video / Balanced Audio Matrix Switcher*, which is ideal for the following typical applications:

- Any professional system requiring outstanding value in an 8x8 matrix
- Production and duplication facilities, rental and staging
- Security, CCTV, and home theater systems
- Production studio vertical interval routing between Genlocked sources

## 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 **OMX-SW8x8BAL** is a high performance matrix switcher for composite video and balanced stereo audio signals. Switching during the vertical interval ensures glitch-free switching with genlocked sources.

The **OMX-SW8x8BAL** includes:

- A video bandwidth of 200MHz that ensures transparency even in the most critical applications
- Eight input and eight output selector buttons
- An audio-follow-video or audio breakaway option (to switch audio independently from video)
- A TAKE button for executing multiple switches all at once
- Memory locations for storing multiple switches as presets to be recalled and executed when needed
- Vertical interval switching
- Switching synchronization for synchronizing either to an external reference or to the incoming video
- Selectable sync signal termination

Control the **OMX-SW8x8BAL** using the front panel buttons, or remotely via RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller.

The **OMX-SW8x8BAL** is dependable, rugged and fits into two vertical spaces (2U) of a standard 19" rack.

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 and position your **OMX-SW8x8BAL** away from moisture, excessive sunlight and dust

## 4 Your OMX-SW8x8BAL 8x8 Video / Balanced Audio Matrix Switcher

Figure 1, Table 1 and Table 2 define the **OMX-SW8x8BAL**:

Your OMX-SW8x8BAL 8x8 Video / Balanced Audio Matrix Switcher

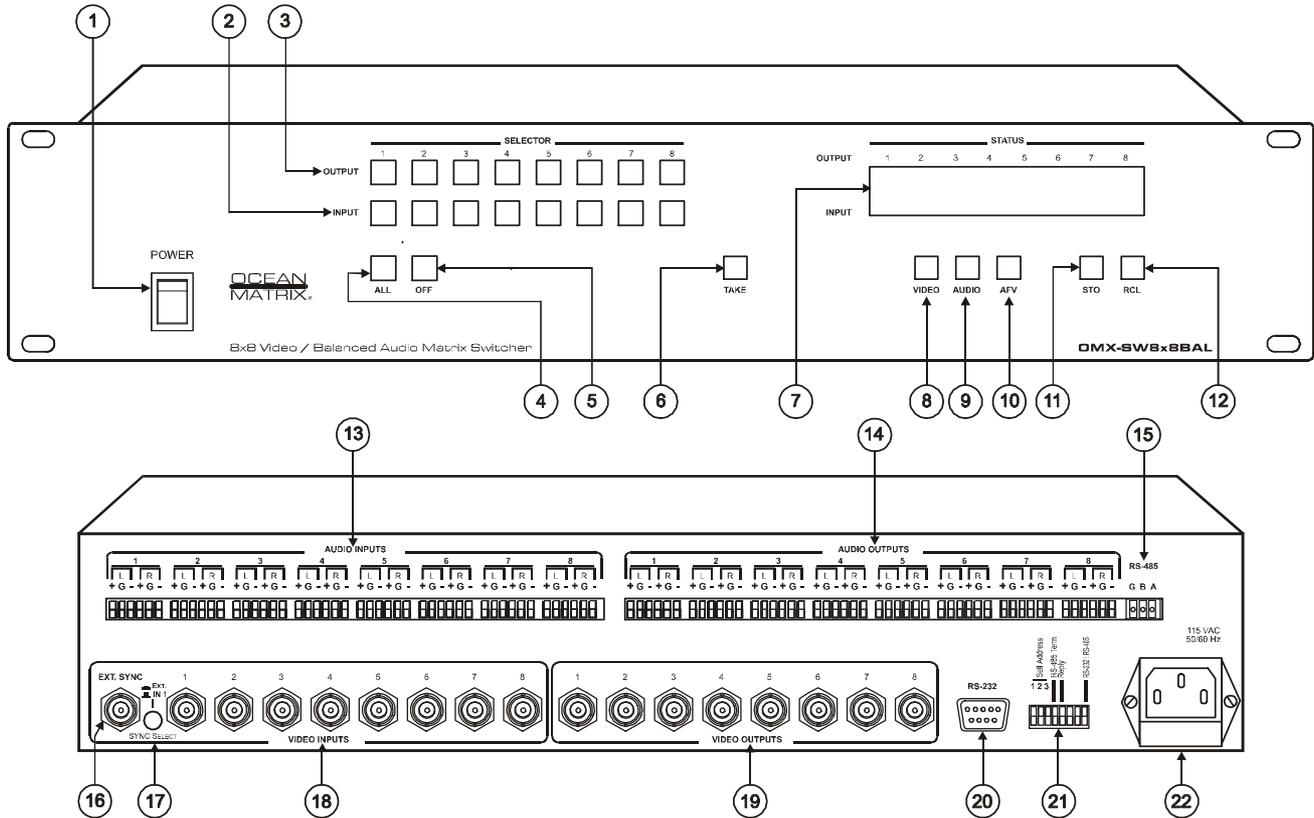


Figure 1: OMX-SW8x8BAL Video Matrix Switcher

Table 1: OMX-SW8x8BAL Front Panel Features

#	Feature	Function
1	POWER Switch	Illuminated switch for turning the unit ON or OFF
2	INPUT Buttons	Select the input to switch to the output
3	OUTPUT Buttons	Select the output to which the input is switched
4	ALL Button	Pressing ALL followed by an INPUT button, connects that input to all outputs <sup>1</sup>
5	OFF Button	An OFF-OUT combination disconnects that output from the inputs; an OFF-ALL combination disconnects all the outputs
6	TAKE Button	Pressing TAKE toggles the mode between the Confirm mode <sup>2</sup> and the At Once mode (user confirmation per action is unnecessary)
7	7-segment Display	Displays the selected audio <sup>3</sup> or video <sup>4</sup> input switched to the output (marked above each input)
8	VIDEO Button	When pressed, button is illuminated and all actions relate to video
9	AUDIO Button	When pressed, button is illuminated and all actions relate to audio
10	AFV Button	When pressed, button is illuminated and all actions relate to video and audio channels. Audio channels follow the video channels
11	STO (STORE) Button	Pressing STO followed by an output button stores the current setting <sup>5</sup>
12	RCL (RECALL) Button	Pressing the RCL button and the corresponding OUTPUT button recalls a setup from the non-volatile memory. The stored status blinks. Pressing a different OUTPUT button lets you view <sup>6</sup> another setup. After making your choice, pressing the RCL button again implements the new status

Table 2: OMX-SW8x8BAL Rear Panel Features

#	Feature	Function
13	AUDIO INPUTS Terminal Block Connectors	Connect to the audio sources
14	AUDIO OUTPUTS Terminal Block Connectors	Connect to the audio acceptors
15	RS-485 Connector	RS-485 port on detachable terminal block
16	EXT. SYNC BNC Connector	Connects to the external SYNC source
17	SYNC Source Selector Button	Pushing in selects the (EXT) external sync source on the SYNC connector; releasing selects the (IN 1) internal sync on the VIDEO INPUT 1 connector
18	VIDEO INPUTS BNC Connectors	Connect to the video sources (from 1 to 8)
19	VIDEO OUTPUTS BNC Connectors <sup>7</sup>	Connect to the video acceptors (from 1 to 8)
20	RS-232 DB 9F Connector	Connects to the PC or other Serial Controller
21	Setup Dipswitches	DIP 1, 2, and 3 for machine Self Address #; DIP 4 for RS-485 termination, DIP 5 for reply from switcher to PC, DIP 8 for RS-232 / RS-485 communication
22	Power Connector with Fuse	AC connector enabling power supply to the unit

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

2 When in the CONFIRM mode, the TAKE button illuminates

3 When the Audio button illuminates, that is, when the audio breakaway mode is selected

4 When the Video button illuminates, that is, when the video breakaway mode is selected

5 For example, press STO and then the Output button # 3 to store in Setup # 3

6 Only view, nothing is implemented at this stage

7 For RGBS applications, one of the sync channels (H or V) may be used for the S channel

## 5 Installing on a Rack

This section describes what to do before installing on a rack (see section 5.1) and how to install on a rack (see section 5.2).

### 5.1 Before Installing on a Rack

Before installing the machine in a 19" rack, be sure that the environment is within the recommended range:

*Table 3: Recommended Ambient Temperature and Humidity Range*

Operating temperature range	+5 to +45 Deg. Centigrade
Operating humidity range	5 to 65 % RHL, non-condensing
Storage temperature range	-20 to +70 Deg. Centigrade
Storage humidity range	5 to 95% RHL, non-condensing

#### 5.1.1 CAUTION!!

When installing the **OMX-SW8x8BAL** in a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi-unit rack assembly may exceed the room ambient temperature.
2. Once rack-mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to supply connections other than direct connections to the branch circuit (for example, the use of power strips), and that you use only the power cord that is supplied with the machine.

### 5.2 Instructions for Rack-Mounting

To install the **OMX-SW8x8BAL** in a 19" rack, place the ears of the machine against the rack rails, and insert the screws through each of the four holes in the rack ears<sup>1</sup>.

<sup>1</sup> Always mount the machine in the rack before you attach any cables or connect the machine to the power

## 6 Connecting the OMX-SW8x8BAL

To connect a single<sup>1</sup> OMX-SW8x8BAL switcher, do the following<sup>2</sup>:

1. Connect to the rear panel, the:
  - Video sources and acceptors, as illustrated in Figure 2
  - Appropriate audio sources and acceptors
  - Power cord
2. Set the dipswitches (see section 6.1).
3. Connect to a PC or other controller if required via RS-232 (see section 6.2) or RS-232 and RS-485 (see section 6.3).

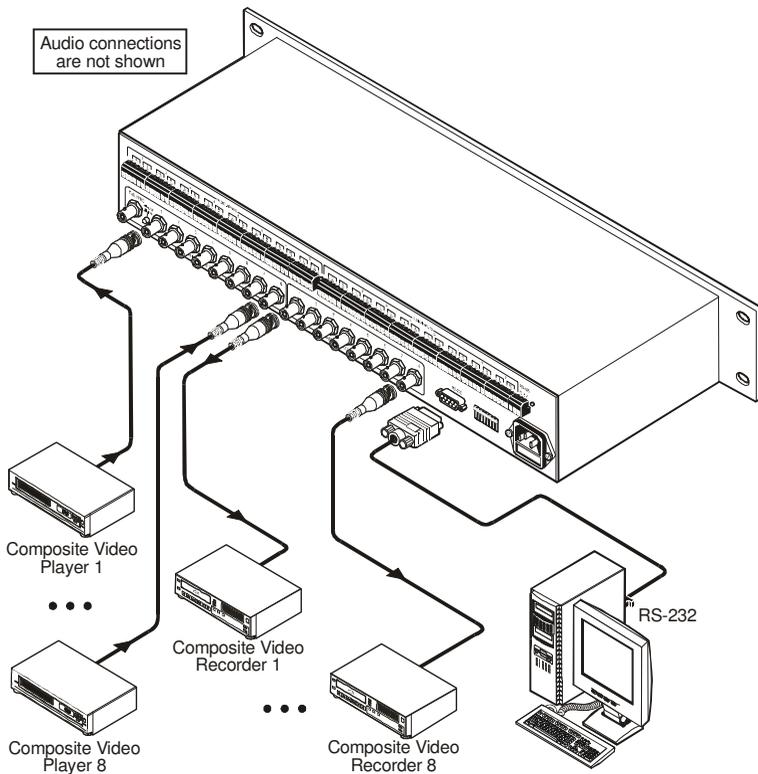


Figure 2: Connecting the Video Sources and Acceptors to the Rear Panel

<sup>1</sup> Note that you can connect up to 8 OMX-SW8x8BAL units to a PC or other RS-232 or RS-485 controller

<sup>2</sup> Switch OFF the power on each device before connecting it to your OMX-SW8x8BAL. After connecting your OMX-SW8x8BAL, switch on its power and then switch on the power on each device

## 6.1 Setting the Dipswitches

This section describes the machine set-up and dipswitch selection. Figure 3 and Table 4 define the **OMX-SW8x8BAL** dipswitches.

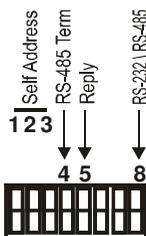


Figure 3: OMX-SW8x8BAL Dipswitch Configuration

Table 4: Dipswitch Settings

DIPS	Function	Description
1, 2, 3	Self Address	Determines the machine number
4	RS-485 Term	ON for RS-485 Line Termination OFF for no RS-485 Line Termination
5	Reply	ON enables reply from the switcher to PC OFF disables reply from the switcher to PC
6, 7	Reserved	OFF
8	RS-232\RS-485	ON enables RS-232 communication between the switcher and PC OFF enables RS-485 communication between the switcher and PC

To set the dipswitches, use a small flathead screwdriver to move the dipswitches to the ON or OFF position, as described in the following sections.

### 6.1.1 Self Address Dipswitches

The Self Address dipswitch determines the position of an **OMX-SW8x8BAL** unit in the sequence, specifying which **OMX-SW8x8BAL** unit is being controlled, when several **OMX-SW8x8BAL** units are controlled by a PC or serial controller. Set the Self Address on an **OMX-SW8x8BAL** unit via dipswitches 1, 2, and 3, according to Table 5.

Table 5: Self Address Dipswitch Settings

Self Address	DIPS		
	3	2	1
1 Master	ON	ON	ON
2	ON	ON	OFF
3	ON	OFF	ON
4	ON	OFF	OFF
5	OFF	ON	ON
6	OFF	ON	OFF
7	OFF	OFF	ON
8	OFF	OFF	OFF

Up to 8 machines may be cascaded for control via a single port by configuring one machine as the Master (Self Address = 1)<sup>1</sup>, while all the others are assigned as Slaves or with an ID other than "1".

### **6.1.2 Setting Connection Dipswitches**

When connecting a PC via the RS-232, set dipswitch # 8 to ON. When connecting a PC via the RS-485, set dipswitch # 8 to OFF.

Dipswitch # 5 enables or disables Reply from the Matrix Switcher to the PC. In some applications, it may be desirable for some machines not to reply to instructions received on the RS-232 and RS-485 ports. If so, set the Reply dipswitch to OFF.

In the case of interconnection between more than two RS-485 receivers-transmitters (including PC), the termination resistor must be disconnected on all the devices, except for the first (usually the PC) and last units on the communication line. Dipswitch # 4 connects or disconnects the termination resistor.

---

<sup>1</sup> The default is for Master (Self Address=1) and this is the recommended setting for a single machine



### 6.3 Controlling via RS-232 and RS-485

You can control up to eight single **OMX-SW8x8BAL** units with control from a PC via RS-232 (see section 6.2) and RS-485 as illustrated in Figure 5.

To control via RS-232 and RS-485, do the following:

1. Connect the video sources and acceptors, the appropriate audio sources and acceptors, and the power cord to each **OMX-SW8x8BAL** unit.
2. On each **OMX-SW8x8BAL** unit, set the Self Address dipswitches, as required<sup>1</sup> (see Table 5).
3. Connect the RS-232 port on the first unit to the PC<sup>2</sup>.
4. Interconnect the RS-485 ports on all the **OMX-SW8x8BAL** units: from the RS-485 port on the first **OMX-SW8x8BAL** unit, to the RS-485 port on the second **OMX-SW8x8BAL** unit, and so on – up to the RS-485 port on the last unit.
5. Terminate the RS-485 line as described in section 6.1.2.

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<sup>1</sup> The first unit (the master) will be set to Self Address = 1

<sup>2</sup> As in section 6.2

Connecting the OMX-SW8x8BAL

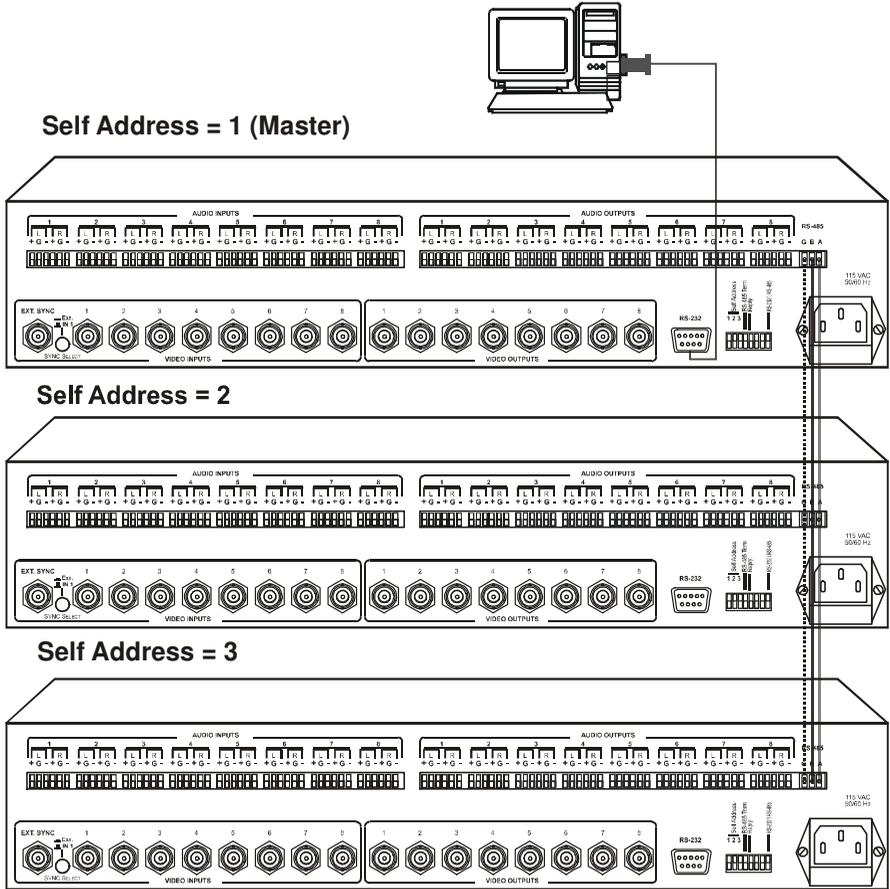


Figure 5: RS-232 and RS-485 Operation

## 7 Operating OMX-SW8x8BAL Matrix Switchers

Operate your **OMX-SW8x8BAL** via:

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

### 7.1 Displaying Unit Characteristics

The **OMX-SW8x8BAL** 7-segment display shows the selected audio<sup>1</sup> or video<sup>2</sup> input switched to the marked output.

The unit characteristics<sup>3</sup> are displayed in the following circumstances:

- Immediately (and automatically) after switching on the power; and
- When simultaneously pressing and holding for 3 seconds the “IN” buttons 1, 2 and 3

### 7.2 Selecting and Connecting an Output and/or Input

To select an output or input, press the designated button on the front panel. These buttons correspond to the output connections marked on the rear panel.

- To connect a video / audio input to a specific output, press the desired output button, followed by the desired input button
- To disconnect a video / audio input from a specific output, press the desired output button followed by the OFF button. To disconnect all the outputs, press the ALL button, followed by the OFF button
- To connect a video / audio input to all outputs, press the ALL button followed by the INPUT button corresponding to the input which is to be routed to all the outputs

---

<sup>1</sup> When the Audio button illuminates, that is, when the audio breakaway mode is selected

<sup>2</sup> When the Video button illuminates, that is, when the video breakaway mode is selected

<sup>3</sup> Machine model and software version

## 7.3 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of two 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

### 7.3.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option, press the AFV button:

- If the AUDIO and VIDEO configurations are the same, then the AFV button illuminates. The audio will follow the video
- If the AUDIO differs from the VIDEO, the AUDIO and TAKE buttons blink, indicating that the audio configuration is about to change. Also, the audio outputs, that need to be changed, will blink<sup>1</sup> in the INPUT STATUS 7-segment display. Press the TAKE button to confirm actions. The audio will follow the video

### 7.3.2 Setting the Breakaway Option

To set the Breakaway option, press either the AUDIO (for audio control only) or the VIDEO (for video control only) button.

- If the AUDIO button illuminates, switching operations relate to audio
- If the VIDEO button illuminates, switching operations relate to video

## 7.4 Confirming Settings

Choose to work in the At Once or the Confirm mode, as section 7.4.1 describes. When the **OMX-SW8x8BAL** operates in the At Once mode, pressing an OUTPUT-INPUT combination implements the switch immediately. In the Confirm mode, the TAKE button must be pressed to authorize the switch.

In the At Once mode, you save time as execution is immediate and actions require no user confirmation. However, no protection is offered against changing an action in error.

In the Confirm mode:

- You can key-in several actions and then confirm them by pressing the TAKE button, to simultaneously activate the multiple switches
- Every action requires user confirmation, to protect against erroneous switching
- Execution is delayed<sup>2</sup> until the user confirms the action

---

<sup>1</sup> Warning that you are about to modify the audio configuration for AFV operation

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

### 7.4.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the TAKE button to toggle from the At Once mode<sup>1</sup> to the Confirm mode<sup>2</sup>.  
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.

### 7.4.2 Confirming a Switching Action

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

1. Press an OUTPUT-INPUT combination.  
The corresponding input number that is displayed in the INPUT STATUS 7-segment display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm the action.  
The corresponding input number that is displayed in the INPUT STATUS 7-segment display no longer blinks. The TAKE button illuminates.

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

1. Press each OUTPUT-INPUT combination in sequence.  
The corresponding input numbers that are displayed in the INPUT STATUS 7-segment display blink. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm all the actions.  
The corresponding input numbers that are displayed in the INPUT STATUS 7-segment display no longer blink. The TAKE button illuminates.

## 7.5 Storing/Recalling Input/Output Configurations

You can store and recall up to 8 input/output configurations (or setups) in non-volatile memory, using the INPUT SELECTOR buttons 1 to 8. The 8 input/output configurations also include the relevant audio-follow-video / breakaway option definition, the video configurations and the audio configurations.

---

<sup>1</sup> The TAKE button does not illuminate

<sup>2</sup> The TAKE button illuminates

### 7.5.1 Storing an Input/Output Configuration

To store the current status in non-volatile memory, do the following:

1. Press the STO button.  
The STO button blinks.
2. Press one of the INPUT SELECTOR buttons from 1 to 8. This will be the setup # in which the current status is stored.  
The memory stores the data at that reference.

### 7.5.2 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 (the INPUT SELECTOR button # corresponding to the setup #). The memory recalls the stored data from that reference.

### 7.5.3 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<sup>1</sup>.

## 7.6 Resetting the Machine

To reset the machine, press INPUT buttons 1, 2 and 3 simultaneously. The machine resets itself and a 7-segment self-test is performed automatically.

---

<sup>1</sup> Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

## 8 Technical Specifications

Table 6 details the **OMX-SW8x8BAL** technical specifications<sup>1</sup>.

*Table 6: Technical Specifications of the OMX-SW8x8BAL*

INPUTS:	8 composite video, 1Vpp/75Ω on BNC connectors 1 Sync/Video Genlock 1Vpp/75Ω with sync select switch 8 balanced audio stereo, + 4dBm/33 KΩ on detachable terminal blocks
OUTPUTS:	8 composite video, 1Vpp/75Ω on BNC connectors 8 balanced audio stereo, + 4dBm/50Ω (24 Vpp max.) on detachable terminal blocks
MAXIMAL AUDIO:	24Vpp (> 20dBm)
VIDEO BANDWIDTH (-3dB):	200MHz
AUDIO BANDWIDTH (-3dB):	100kHz
NON LINEARITY:	0.1%
DIFF. GAIN:	0.05%.
DIFF. PHASE:	0.03 Deg.
K-FACTOR:	0.05%
VIDEO S/N:	74dB
AUDIO S/N:	84dB. Unweighted (1Vpp)
VIDEO CROSSTALK:	-50dB @5MHz
CONTROL:	Manual, RS-232 or RS- 485
AUDIO THD:	0.025% (1V, 1kHz)
2nd HARMONIC:	0.013%
SWITCHING:	Vertical interval
POWER SOURCE:	115 VAC, 50/60Hz, 14 VA
DIMENSIONS:	19 inch (W), 7 inch (D) 2U (H) rack mountable
WEIGHT:	3.5 kg (7.8 lbs.) approx.
ACCESSORIES:	Power cord, Windows® - based control software, Null modem adapter

<sup>1</sup> Specifications are subject to change without notice