Marshall Electronics

Model No. VSW-2000

4x1 3G/HD/SD-SDI Switcher
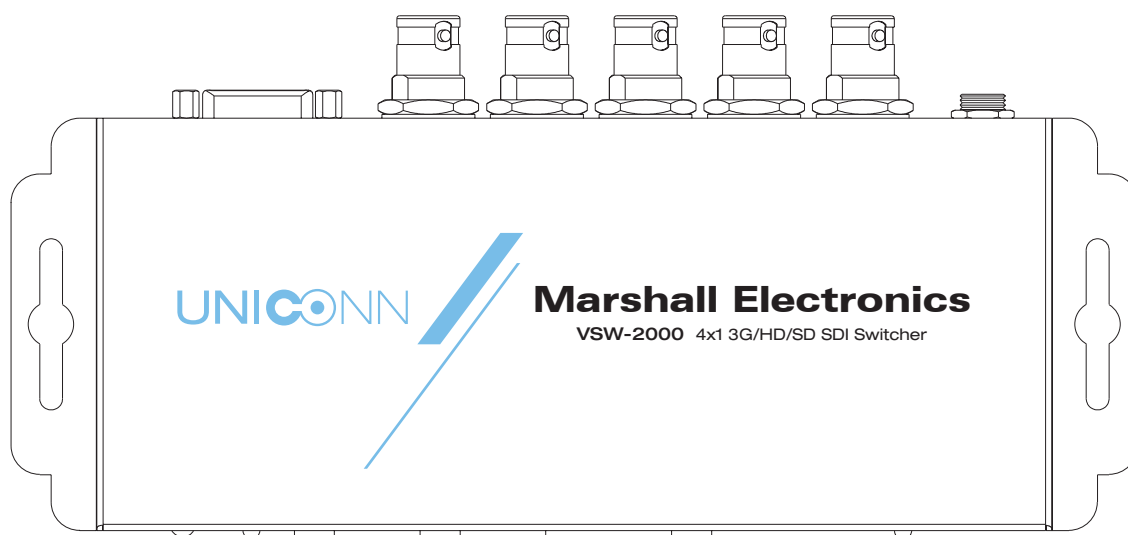
Operating Instructions

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IMPORTANT SAFETY INSTRUCTIONS:

The VSW-2000 4x1 3G/HD/SD-SDI Switch has been tested for conformance to safety regulations and requirements, and has been certified for international use. However, like all electronic equipments, the VSW-2000 should be used with care. Please read and follow the safety instructions to protect yourself from possible injury and to minimize the risk of damage to the unit.

- Follow all instructions and warnings marked on this unit.
- Do not attempt to service this unit yourself, except where explained in this manual.
- Provide proper ventilation and air circulation and do not use near water.
- Keep objects that might damage the device and assure that the placement of this unit is on a stable surface.
- Use only the power adapter and power cords and connection cables designed for this unit.
- Do not use liquid or aerosol cleaners to clean this unit.
  Always unplug the power to the device before cleaning.

1. Introduction

The **VSW-2000** 4x1 3G/HD/SD-SDI Switch receives, equalizes, and re-clocks up to 4 SDI inputs and switches the desired input to SDI equipped monitors or receivers. The switch supports all 3G/HD/SD-SDI bit rates. Flexible control is provided through RS-232, IR remote, or front panel push buttons. VSW-2000 provides a convenient and cost effective solution in systems where simple operation plus high signal integrity is required.
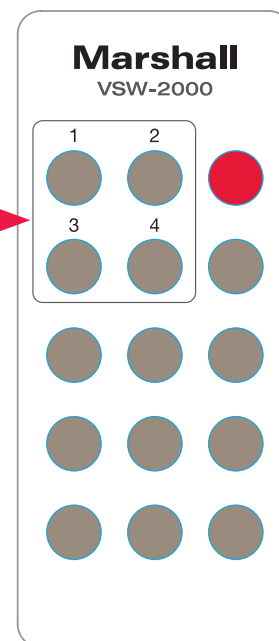
2. Features

- Supports 3G/HD/SD-SDI video formats
- Auto switching between SD, HD, and 3G SDI signal
- Cable equalization and signal retiming
- Up to four inputs & one re-clocking SDI output
- Provides the equalized and reclocked* transmission path up to 300m (1000ft) at SD-SDI, 150m (500ft) at HD-SDI or 90m (300ft) at 3G HD-SDI
- Multiple controls by RS-232, IR remote, and push button
- Locking type power connector

3. Package Contents

- 1x VSW-2000
- 1x IR controller
- 1x 5V 4A power adapter

4. IR Remote Control
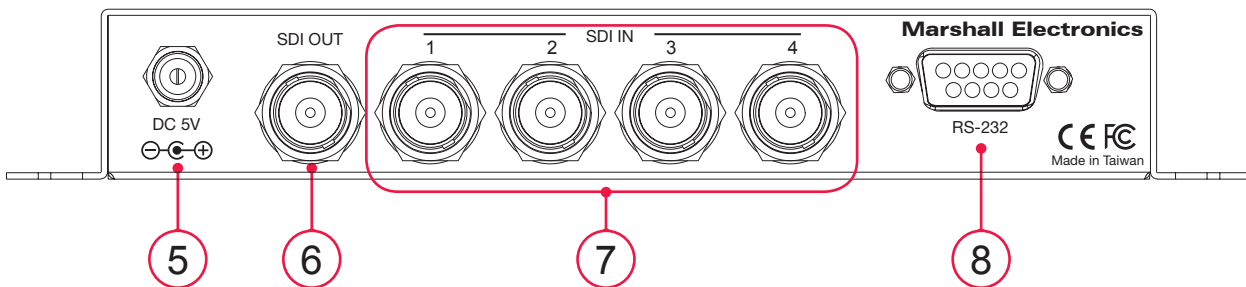
Input Selection Buttons →

5. Specifications

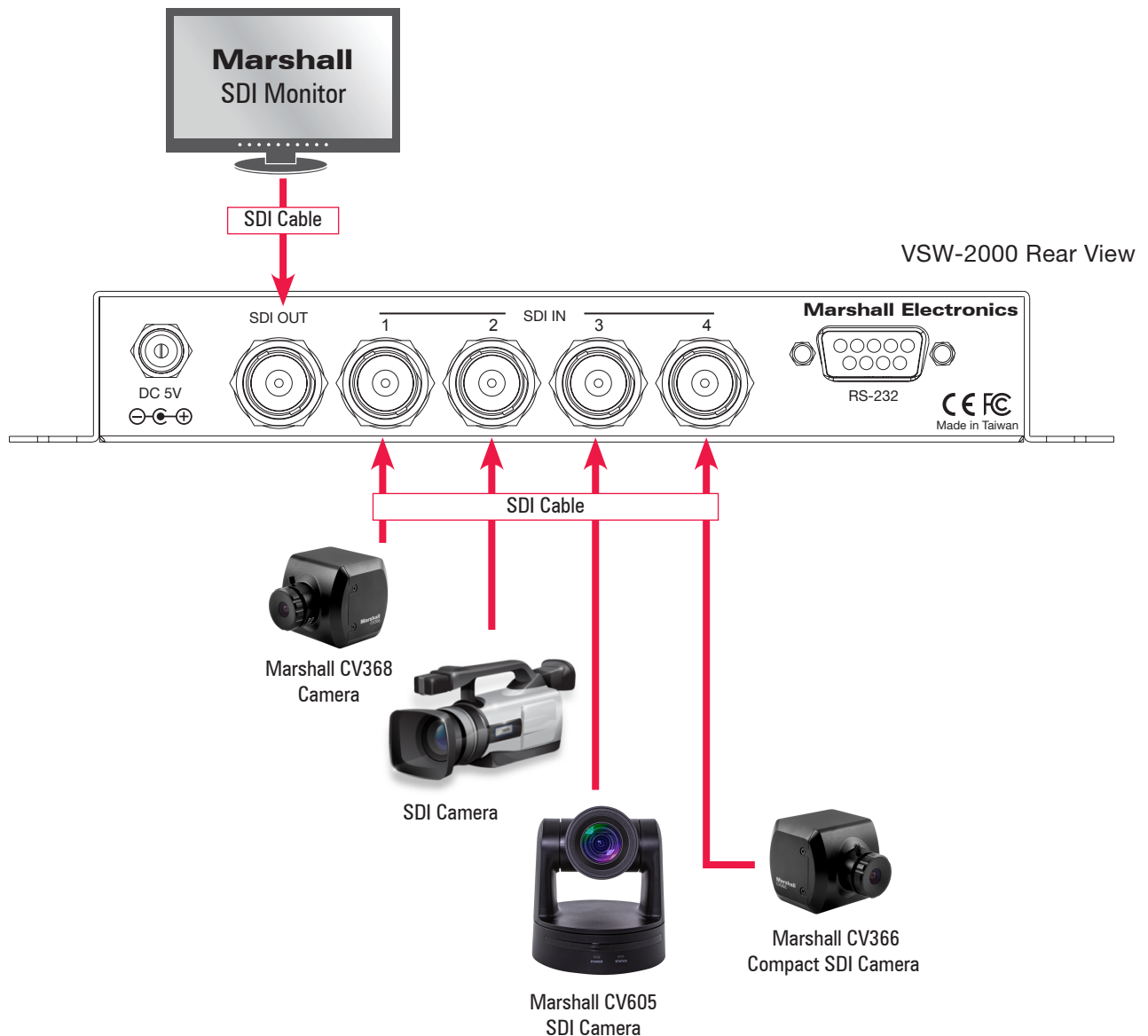|	
Model Name	VSW-2000 Video Switcher
SDI Inputs / Output	3G/HD/SD-SDI
Auto 3G/HD/SD detection	Yes
Supported protocols	DVB-ASI at 270Mbps, SMPTE-259M, SMPTE-292M, SMPTE-424M, SMPTE-425M
Video bandwidth	2.97Gpbs & 2.97/1.001Gbps
Re-clocking function	Yes
Cable equalization	[3G] up to 90m (300ft) / [HD] up to 150m (500ft) / [SD] up to 300m (1000ft)
Audio support	Yes
RP-198 pathological patterns	Immune
Input	4x BNC [SDI]
Output	1x BNC [SDI]
Eye pattern characteristics [HD]	Amplitude: Within 800mV (<10%) Rise overshoot: Less than 2% (<10%) Fall overshoot: Less than 2% (<10%) — Long time jitter: 0.195 UI (<1.0 UI) Timing jitter: 0.8 UI (<1.0 UI) Alignment jitter: 0.13 UI (<0.2 UI)
Mechanical	
Housing	Metal enclosure
Dimensions [L x W x H]	Model: 165 x 71 x 26mm [6.5" x 2.8" x 1"] Package: 264 x 170 x 77mm[10.3" x 6.7" x 3"]
Weight	Model: 1413g [14.5 oz] Package: 933g [2 lbs]
Fixedness	Inter-locked power supply
Power supply	5V 4A DC
Power consumption	5 Watts [max]
Operation Temperature	0~40°C [32~104°F]
Storage Temperature	-20~60°C [-4~140°F]
Relative Humidity	20~90% RH [no condensation]

6. Panel Descriptions

Front Panel
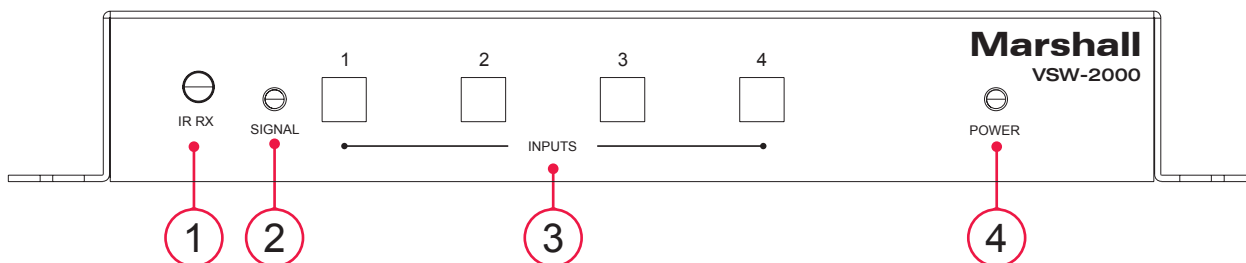
Rear Panel

1. **IR:** Remote Sensor
2. **LED:** Signal indicator
3. **INPUT SELECTION BUTTON:** Input source selection
4. **LED:** Power indicator
5. **Power:** +5V DC latch-locking power connector
6. **OUTPUT:** 3G/HD/SD-SDI output
7. **INPUT:** 3G/HD/SD-SDI input 1-4
8. **RS-232:** Serial channel control / FW update

7. Hardware Installation

1. Connect display, recorder, etc. to SDI Output of VSW-2000
2. Connect the SDI input sources to the inputs of VSW-2000.
3. Screw on the 5V power supply unit to the locking power jack.
4. Use IR remote, RS-232, or front panel push button to switch between input channels.

8. Connection Diagram

Marshall SDI Monitor

SDI Cable

VSW-2000 Rear View

SDI OUT | 1 | 2 | SDI IN | 3 | 4 | Marshall Electronics
DC 5V | RS-232 | Made in Taiwan

SDI Cable

Marshall CV368 Camera

SDI Camera

Marshall CV605 SDI Camera

Marshall CV366 Compact SDI Camera

VSW-2000 Remote Protocols

Document Purpose

This document is intended for use by engineers and coders using the Marshall VSW-2000 SDI 4x1 quick switch in a remote control environment.

The VSW-2000 is controllable via RS-232 serial commands or IR (infra-red optical remote).

Commands are shown here with both hexadecimal values (HEX) and ASCII text. They produce the same results. Choose HEX or ASCII depending on what your control system requires.

If the control system requires codes formatted like 0x49 or 0x0D, simply put 0x in front of the HEX value shown in the tables below

RS-232 Control

Key Points

The RS-232 connector is of the standard 9-pin DSub type.
"Crossover" or "Null Modem" cables are not required. Extension cables should be "straight-through".
Only pins 2, 3 and 5 need to be connected.
If you have made your own cable and communication does not work, try swapping the connections to pins 2 & 3.
Baud rate must be 9600, other rates will not work.

Here are the recommended serial port settings.

Baud Rate	Data	Stop	Parity	Flow Control
9600	8-bits	1-bit	None	None

Command Format

The protocol is extremely simple. There is no length byte or checksum byte.
The ASCII versions are provided as they are human-readable.
For example, the ASCII command for "Switch to Input 1" is:

IN01 followed by a Carriage Return as in "IN zero one". No space characters.
When using ASCII commands, they must have Capital Letters. "in01" will not work.

All commands should be followed by a Carriage Return (HEX 0D), ASCII CR
Responses from the VSW-2000 (in most cases) are followed by Carriage Return (0D) and Line Feed (0A)

List of Commands and Responses

Switch Individual Input Commands

Commands are shown with Carriage Return at end. This may not be required if your system implicitly applies a CR at the end of a command. In other words, there may be a global setting that always ends a command with Carriage Return and it would not be necessary to program that command.   It may only be necessary to send IN01 or 49 4E 30 31 to switch to Input 1.

	Command		Response	
	ASCII	HEX	ASCII	HEX
Input 1	IN01 CR	49 4E 30 31 0D	SW01	53 57 30 31 0D 0A
Input 2	IN02 CR	49 4E 30 32 0D	SW02	53 57 30 32 0D 0A
Input 3	IN03 CR	49 4E 30 33 0D	SW03	53 57 30 33 0D 0A
Input 4	IN04 CR	49 4E 30 34 0D	SW04	53 57 30 34 0D 0A

Status of Current Selected Input

The ST (ASCII) command (HEX 53 54) will trigger a response from the VSW-2000 as shown in the table below.   This may be useful to confirm that a switch command was acted upon.

Command			Response	
ASCII	HEX		ASCII	HEX
ST (cr)	53 54 0D	Input 1 Active	Null Null	00 00
		Input 2 Active	Space Null	20 00
		Input 3 Active	Null STX	00 02
		Input 4 Active	Null Space	00 20

Full Status or "Status All" request command
Note: This command will cause the video output to go to black for a brief moment!
Therefore it is not recommended to use this during normal operation.

This command may be useful when initializing a control system at the start of a day or start of a session.
It will return information on whether an SDI signal is present and whether the signal is Standard Definition, High Definition or 3G Full HD.

The command itself is simply the ASCII word STALL or the equivalent HEX values followed by Carriage Return. (HEX 0D)
STALL (cr)
53 54 41 4C 4C 0D

Response is an ASCII string showing which inputs have active sources and the SDI source type.

Example 1: With no sources connected, the response will be:

1:non2:non3:non4:non (cr)

Example 2: With a variety of sources connected such as,
3G SDI connected to Input 1
HD SDI connected to Input 2
SD SDI connected to Input 3
Nothing connected to Input 4

the response will be:

1:3G2:HD3:SD4:non (cr)

Version Number request command
The firmware version number is available via:

VR (cr)   ASCII
56 52 0D   HEX

The response will be:

SDI 4:1 SWITCH
FW:0.01

IR Control

The VSW-2000 quick switch is supplied with a small IR remote control.
The IR commands can also be supplied from controllers such as Crestron using an IR emitter.

There are just four commands shown in the table below   Note that the series of codes has a jump between Input 2 and 3.

COMMAND	HEX
Input 1	86 6B 01 FE
Input 2	86 6B 02 FD
Input 3	86 6B 04 FB
Input 4	86 6B 05 FA

10. Warranty

Marshall Electronics warranties to the first consumer that this VSW-2000, Video Switcher will, under normal use, be free from defects in workmanship and materials, when received in its original container, for a period of one year from the purchase date. This warranty is extended to the first consumer only, and proof of purchase is necessary to honor the warranty. If there is no proof of purchase provided with a warranty claim, Marshall Electronics reserves the right not to honor the warranty set forth above. Therefore, labor and parts may be charged to the consumer. This warranty does not apply to the product exterior or cosmetics. Misuse, abnormal handling, alterations or modifications in design or construction void this warranty.

No sales personnel of the seller or any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties on behalf of Marshall Electronics, beyond the time period described above.

Note:

Due to constant effort to improve products and product features, specifications may change without prior notice.

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