



**MSA**

**Firmware Version 2.0**

**User Manual**

Updated 2008-01-31

Additional documentation available at:

<http://highlyliquid.com/support/>

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### 1.0 Overview

The MSA can activate its outputs in response to incoming MIDI note, controller ("CC"), program change, or start/stop/continue messages.

By default, MSA behavior is user-specified via "**Note Range Configuration**": each MSA output is mapped to a single MIDI note number within a range specified by DIP switch SW1 positions 5-8.

For a customized MIDI response, "**SysEx Configuration**" is used: the user sends a MIDI SysEx command to the MSA which independently configures each output.

In both "Note Range Configuration" and "SysEx Configuration," the MSA responds to the MIDI channel specified by DIP switch SW1 positions 1-4.

### 2.0 Note Range Configuration

By default, the MSA responds to a range of eight MIDI notes specified by SW1 positions 5-8. See Table 2-1.

SW1 settings become active upon power-up. The MSA must be power-cycled for changes to take effect.

Table 2-1: Note Range Selection

MIDI Note Range	SW1 Setting			
	5	6	7	8
<b>0-7</b>	off	off	off	off
<b>8-15</b>	off	off	off	<b>on</b>
<b>16-23</b>	off	off	<b>on</b>	off
<b>24-31</b>	off	off	<b>on</b>	<b>on</b>
<b>32-39</b>	off	<b>on</b>	off	off
<b>40-47</b>	off	<b>on</b>	off	<b>on</b>
<b>48-55</b>	off	<b>on</b>	<b>on</b>	off
<b>56-63</b>	off	<b>on</b>	<b>on</b>	<b>on</b>
<b>64-71</b>	<b>on</b>	off	off	off
<b>72-79</b>	<b>on</b>	off	off	<b>on</b>
<b>80-87</b>	<b>on</b>	off	<b>on</b>	off
<b>88-95</b>	<b>on</b>	off	<b>on</b>	<b>on</b>
<b>96-103</b>	<b>on</b>	<b>on</b>	off	off
<b>104-111</b>	<b>on</b>	<b>on</b>	off	<b>on</b>
<b>112-119</b>	<b>on</b>	<b>on</b>	<b>on</b>	off
<b>120-127</b>	<b>on</b>	<b>on</b>	<b>on</b>	<b>on</b>

### 3.0 SysEx Configuration

A MIDI System Exclusive (SysEx) message can be used to independently configure each of the MSA outputs.

- A single SysEx message configures the entire MSA.
- Settings are retained when the MSA is disconnected from a power supply.
- When the MSA is configured via SysEx message, the settings of SW1 positions 5-8 are ignored.
- Upon receipt of a properly formatted configuration message, the Activity LED (LED2) blinks 3 times. Any additional MIDI data is discarded during this period (approximately 1.5 seconds).

Figure 3-1 shows the message format for the SysEx configuration message. Each hex value *mm* specifies the output mode for the corresponding MSA output. The meaning of each hex value *ss* depends on the value of the corresponding *mm*.

Table 3-1 shows the possible values for *mm* and the corresponding meaning of *ss*.

After the use of a SysEx configuration message, the default “Note Range Configuration” method can be restored by using the message shown in Figure 3-2.

Example 3-1 and Example 3-2 show configurations which use MIDI events other than notes.

All SysEx values are shown in hexadecimal (hex) format.

**Figure 3-1: SysEx Configuration Message Format (Hex)**

Header (6 bytes)	Output Configuration								Footer (1 byte)
	0	1	2	3	4	5	6	7	
F0 00 01 5D 02 01	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	<i>mm ss</i>	F7

**Figure 3-2: SysEx Message for Note Range Configuration**

SysEx Message (Hex)
F0 00 01 5D 02 00 F7

**Example 3-1: Output State by Program Number**

SysEx Message (Hex)									
F0 00 01 5D 02 01	04 00	05 00	06 00	07 00	08 00	09 00	0A 00	00 00	F7

**Example 3-2: CC as On/Off Control**

SysEx Message (Hex)									
F0 00 01 5D 02 01	12 00	12 01	12 02	12 03	12 04	12 05	12 06	12 07	F7

**Table 3-1: Output Modes**

<i>mm</i> (Hex)	Mode Description	<i>ss</i>
00	<b>Disabled</b> Output is off.	Ignored
01	<b>Note Trigger</b> Output is on for the duration of a corresponding MIDI note, and off otherwise.	Note number (hex)
02	<b>Inverted Note Trigger</b> Output is off for the duration of a corresponding MIDI note, and on otherwise.	Note number (hex)
03	<b>Note Toggle</b> Output state is toggled & latched upon receipt of a corresponding Note On message.	Note number (hex)
04	<b>Program Change Bit 0</b> Output state corresponds to bit 0 of the current program number.	Ignored
05	<b>Program Change Bit 1</b> Output state corresponds to bit 1 of the current program number.	Ignored
06	<b>Program Change Bit 2</b> Output state corresponds to bit 2 of the current program number.	Ignored
07	<b>Program Change Bit 3</b> Output state corresponds to bit 3 of the current program number.	Ignored
08	<b>Program Change Bit 4</b> Output state corresponds to bit 4 of the current program number.	Ignored
09	<b>Program Change Bit 5</b> Output state corresponds to bit 5 of the current program number.	Ignored
0A	<b>Program Change Bit 6</b> Output state corresponds to bit 6 of the current program number.	Ignored
0B	<b>Sync: Run</b> MIDI Start and Continue messages latch output on. MIDI Stop message latches output off.	Ignored
0C	<b>Controller (CC) Bit 0</b> Output state corresponds to bit 0 of the controller position.	Controller number (hex)
0D	<b>Controller (CC) Bit 1</b> Output state corresponds to bit 1 of the controller position.	Controller number (hex)
0E	<b>Controller (CC) Bit 2</b> Output state corresponds to bit 2 of the controller position.	Controller number (hex)
0F	<b>Controller (CC) Bit 3</b> Output state corresponds to bit 3 of the controller position.	Controller number (hex)
10	<b>Controller (CC) Bit 4</b> Output state corresponds to bit 4 of the controller position.	Controller number (hex)
11	<b>Controller (CC) Bit 5</b> Output state corresponds to bit 5 of the controller position.	Controller number (hex)
12	<b>Controller (CC) Bit 6</b> Output state corresponds to bit 6 of the controller position.	Controller number (hex)

## 4.0 Channel Setting

The MSA will respond to MIDI events only on the MIDI channel specified by positions 1-4 of DIP switch SW1. See Table 4-1.

SW1 settings become active upon power-up. The MSA must be power-cycled for changes to take effect.

**Table 4-1: MIDI Channel Selection**

MIDI Channel	SW1 Setting			
	1	2	3	4
1	off	off	off	off
2	off	off	off	<b>on</b>
3	off	off	<b>on</b>	off
4	off	off	<b>on</b>	<b>on</b>
5	off	<b>on</b>	off	off
6	off	<b>on</b>	off	<b>on</b>
7	off	<b>on</b>	<b>on</b>	off
8	off	<b>on</b>	<b>on</b>	<b>on</b>
9	<b>on</b>	off	off	off
10	<b>on</b>	off	off	<b>on</b>
11	<b>on</b>	off	<b>on</b>	off
12	<b>on</b>	off	<b>on</b>	<b>on</b>
13	<b>on</b>	<b>on</b>	off	off
14	<b>on</b>	<b>on</b>	off	<b>on</b>
15	<b>on</b>	<b>on</b>	<b>on</b>	off
16	<b>on</b>	<b>on</b>	<b>on</b>	<b>on</b>