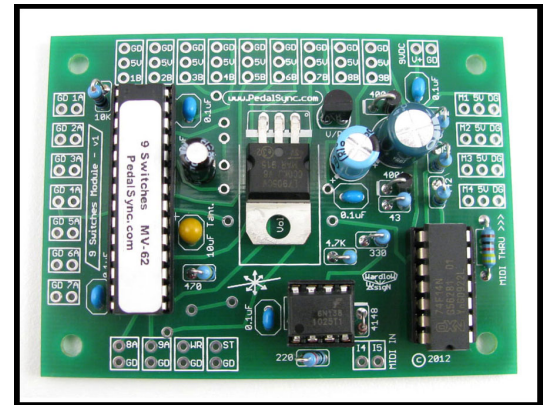
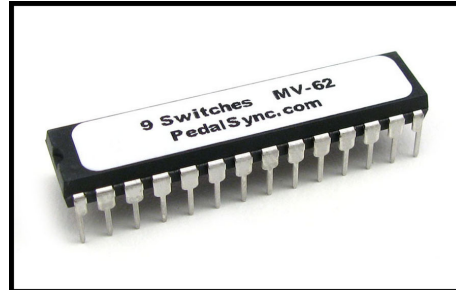


## PedalSync™

### 9 Switches MV-62



Chip

and

Module

**PedalSync 9 Switches chip MV-62** is designed for pedalboard switching controls using the extremely quiet PedalSync MV-57 *ReMute™* Relay Bypass system.

MV-62 works well with any other application where up to 9 separate momentary inputs control the logic state of 9 separate outputs, and the on/off states must be stored and recalled.

### Key Features

- Stores and recalls logic state of 9 separate outputs
- Works with Relay Bypass chip MV-57 for robust, scalable pedalboard designs that feature extremely quiet switching
- Robust, 128 program storage
- Simple, intuitive user interface
- Backwards-Compatible with MIDI
- Scalable - combine chips like building blocks to make elaborate designs with an unlimited number of switches
- Efficiently Designed to ensure Low part count
- Uses low-cost momentary switch inputs
- Thru-Hole or SMT
- Easy to create stand-alone pedals that can be used traditionally and tested in-store
- Use PedalSync™ trademark on your devices and in advertising

## User Interface

### Program Storage

The Pulse Output chip stores 128 programs. Programs are stored by toggling the Write Switch (*pin 16*) or upon a command from the PedalSync Master Controller.

### Program Recall

Programs are recalled using the PedalSync Master Controller, standard MIDI Program Change messages on Channel 15, or the PedalSync 4 Presets chip (MV-59).

On power up, the chip always loads program 1.

### Write switch

(*pin 16*)

Although it is possible to use a momentary pushbutton for the Write switch, a toggle switch is recommended to make it difficult for users to inadvertently program a setting.

Using a toggle switch, the user will switch down then up again to write the current settings to the currently selected program. If the switch is in the down position, the user will need to go up, down, then up again.

### Status LED

(*pin 17*)

The Status LED is normally on. When a program is written, the Status LED will blink.

### Switch Inputs buttons

(*pins 2, 3, 7, 9, 10, 11, 12, 23 & 25*)

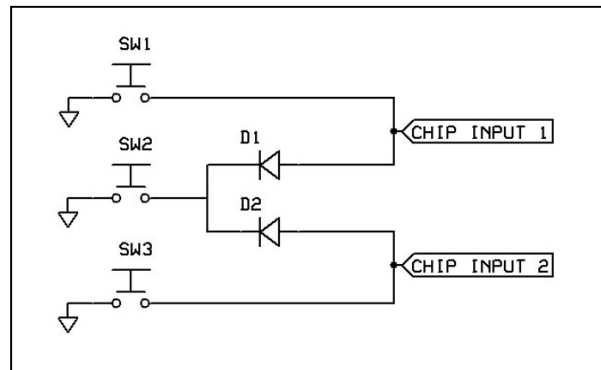
Pressing a momentary Bypass button toggles the corresponding output pin:

Switch	Input Pin	Output Pin
1	2	4
2	3	5
3	7	18
4	9	6
5	10	22
6	11	15
7	12	14
8	25	26
9	23	24

Connect the other lug of a given switch to the power ground.

*Note: a single SPST switch can pull down multiple inputs*

*Note: **if more than one SPST switch is connected to an input**, be sure to isolate each switch with a signal diode as shown below*



## Switch Outputs or LEDs

(pins 4, 5, 6, 14, 15, 18, 22, 24, & pin 26)

The switch output can be used to control the PedalSync Relay Bypass chip (MV-57) or its module. **The program default for the each switch is output low.** If using the Relay Bypass chip (MV-57) or module, this corresponds to having the device bypassed.

The outputs can alternately control other device features such as different signal paths.

*Note: a single output can drive two MV-57 modules for stereo applications, but use an additional 1.5K resistor in series with the control signal*

If more than one circuit is connected to an output, such as an additional LED, be sure to use a buffer.

*Tip: to create an “all bypass” mode, use a single relay to bypass the entire effect chain*

## Electrical Considerations

Place C16 as close as possible to Pin 13.

Place C2 as close as possible to Pin 20.

Place C1 as close as possible to Pins 27 and 28.

Connecting Pin 2 of any MIDI Thru jack to Digital Ground (DG) will reduce digital noise.

*Tip: MIDI schematics normally show 220 ohm resistors on either side of the MIDI Thru connection, but using 442 ohms on one side as shown in the 9 Switches chip schematic will have the same effect and reduce part count.*

The schematic, below, shows the necessary connections. Note that you can use different resistors for the LEDs depending on the type of LED used, but keep below the current limits of the chip.

If you require brighter LEDs, consider using buffers for the LEDs that connect directly to the chip, or use ultra-bright LEDs.

### Pin Voltage and Current Limits

Pin	Max Voltage	Max Current*
1	5	4
2	3.3	12
3	3.3	12
4	3.3	12
5	3.3	12
6	3.3	4
7	3.3	4
8	GND	
9	3.3	4
10	3.3	25
11	3.3	12
12	3.3	4
13	3.3	
14	5	12
15	5	12
16	5	4
17	5	12
18	5	12
19	GND	
20	N/A	
21	5	12
22	5	12
23	3.3	4
24	3.3	4
25	3.3	4
26	3.3	4
27	GND	
28	3.3	

\* 200 mA max current sink or source for the whole chip at any given time, except on the Module which is limited to ~50 mA. Keep your currents low to minimize noise.

The datasheet for the underlying dsPIC33FJ64GP202 chip can be found [here](http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en532310):  
<http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en532310>

## **Noise**

It is very important to properly filter your power supply as shown in the schematic.

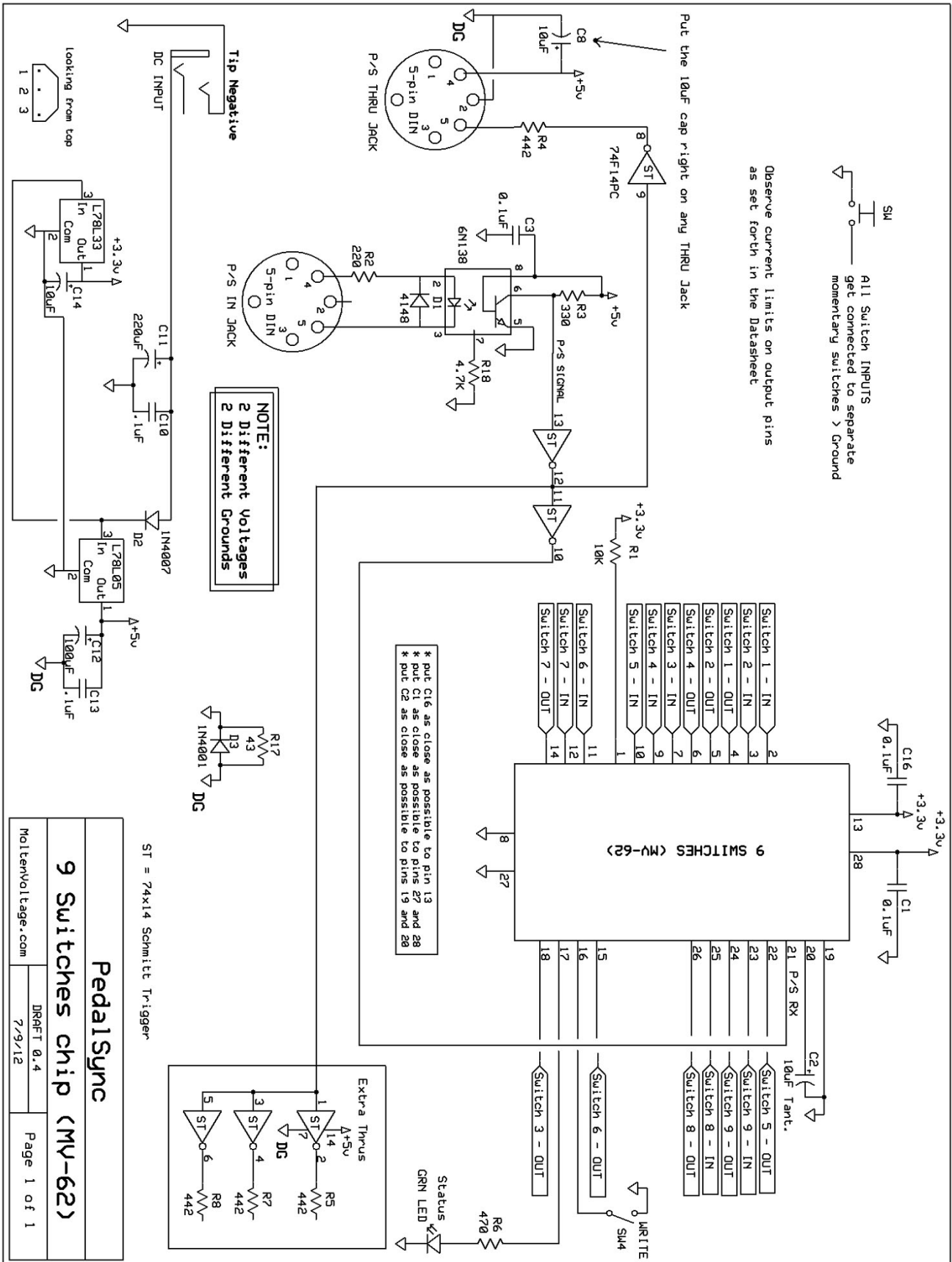
**Use of a separate or isolated power supply for devices containing the 9 Switches chip or module is strongly recommended to reduce ground noise crossover.**

To minimize digital noise bleeding into your audio circuit, be careful to run three separate grounds as indicated on the schematic.

Follow proper PCB layout design rules and isolate the digital and analog sections of your circuit as much as possible, connecting the grounds at a common point at the power supply.

## **MIDI - Backward Compatibility**

The 9 Switches chip uses MIDI Program Change messages. **The exclusive MIDI channel for the PedalSync system is MIDI Channel 15.** MIDI Program Change messages sent on any other channel will be ignored by the chip.

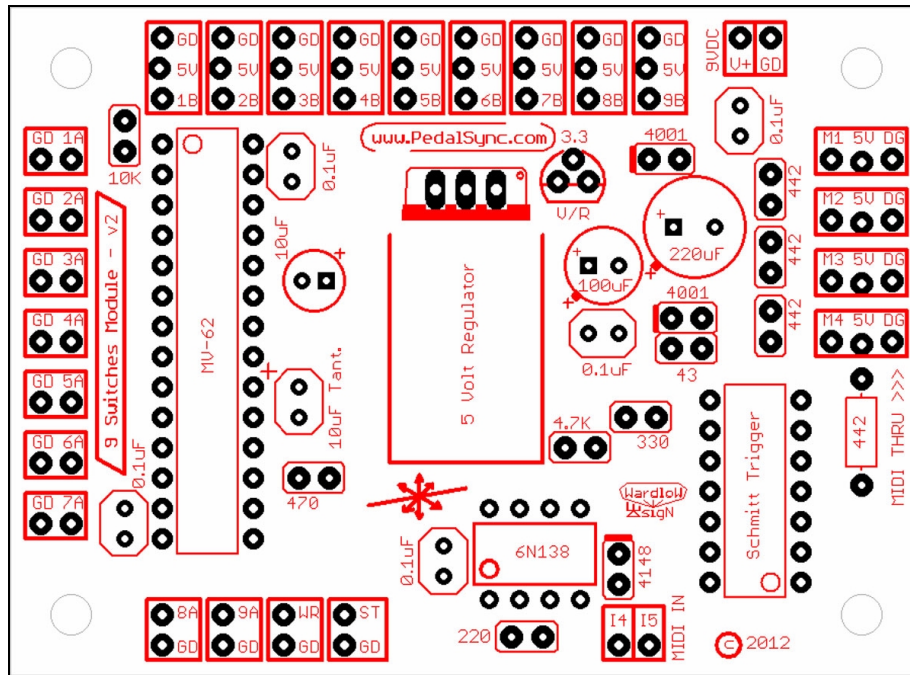


**PedalSync**

**9 Switches chip (MV-62)**

MoltenVoltage.com      DRAFT 0.4      Page 1 of 1  
 7/9/12

## 9 Switches Module

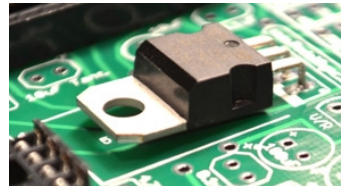
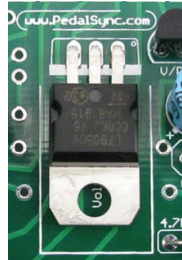


The 9 Switches Module has the following parts:

Label	Part
MV-62	MV-62 Chip (in 28-pin socket)**
6N138	6N138 Optocoupler (in 8-pin socket)**
Schmitt Trigger	74x14 Hex Schmitt Trigger (in 14-pin socket)**
0.1uF	0.1uF 50v Ceramic Capacitor (104)
10uf Tant.	10uF Tantalum Capacitor** (yellow - note polarity)
10uF	10uF 25v Electrolytic Capacitor**
100uF	100uF 25v Electrolytic Capacitor**
220uF	220uF 25v Electrolytic Capacitor**
4001	1N4001-7 rectifier diode**
4148	1N4148 signal diode** (smaller orange one)
43	43 ohm resistor (yellow, orange, black, gold, brown)
220	220 ohm resistor (red, red, black, black, brown)
330	330 ohm resistor (orange, orange, black, black, brown)
442	442 ohm resistor (yellow, yellow, red, black, brown)
470	470 ohm resistor (yellow, purple, black, black, brown)
4.7K	4.7K resistor (yellow, purple, black, brown, brown)
10K	10K resistor (brown, black, black, red, brown)
3.3 V/R	3.3-volt regulator TO-92**
5 Volt Regulator	5-volt regulator TO-220**

\*\* Note the polarity of these parts

The pins on the 5-volt regulator should be bent to 90 degrees where they become narrow, then soldered in place so that the regulator is just above the circuit board without touching it. This is most easily done by first soldering in the chip sockets, then bending and inserting the voltage regulator and flipping over the circuit board, whereafter the voltage regulator is positioned at the proper height.



The 9 Switches Module has the following header connections:

***Power Input [V+ and GD]***

Connect 9 volts DC to the V+ and GD header pads.

***Bypass Switch Inputs [1A-9A]***

Connect a momentary SPST switch to the input [1A-9A] and to the GD header pad.

***Bypass Switch Outputs [1B-9B]***

The header pads [1B-9B] carry the control signal. The 5V and GD pads carry the 5-volt and power ground connections.

Connect the control signal to the SW header pad on the MV-57 module.

Connect 5V and GD to the corresponding header pads on the MV-57 module.

***Write Switch Input [WR]***

Connect a momentary SPST switch to the WR and GD header pads.

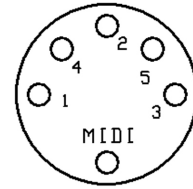
***Status LED Output [ST]***

Connect an LED to the ST and GD header pads. The 470 ohm resistor is in series with the LED output and can be changed to 220 ohms to increase brightness.



### **MIDI Input [I4 and I5]**

Connect header pins I4 and I5 to the corresponding pins on the MIDI Input Jack.



MIDI JACK

Looking from outside

### **MIDI Thru Outputs [M1-M4]**

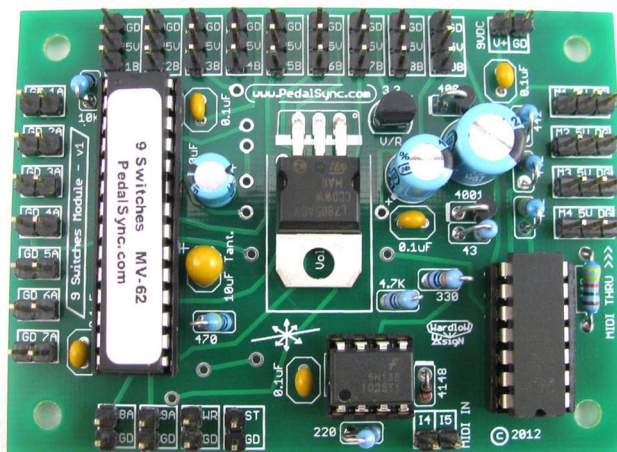
Each optional MIDI Thru Output has a series 442 ohm resistor. As such, the MIDI Thru Output data lines [M1-M4] are connected to Pin 5 of separate MIDI jacks.

Connect MIDI Thru Pin 4 to 5V

Connect MIDI Thru Pin 2 to DG

To minimize digital noise, place a 10uF Electrolytic capacitor right on the MIDI Thru jack with the positive side on Pin 4 and the Ground side on Pin 2.

It may also be convenient to utilize header pins for off-board connections as shown below:



### **Module Dimensions**

Circuit board: 3.0 x 2.2"

Header pins are all spaced 0.1" from adjacent pins

Mounting screw holes are 0.2" in from the corners and fit #4 screws

## Related Products

- NODE™ PedalBoard Module - 4-loop programmable pedalboard switch kit
- Use with PedalSync Relay Bypass chip MV-57 or module for silent true bypass pedalboard switching
- Use with the PedalSync Master Control Dev. Board to store and recall 128 programs
- Use with 4 Presets chip (MV-59) to make a stand-alone device that can store and recall four programs.

## Support

[info@PedalSync.com](mailto:info@PedalSync.com)

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