

PedalSync™

NODE 4-Loop MIDI Audio Switcher KIT

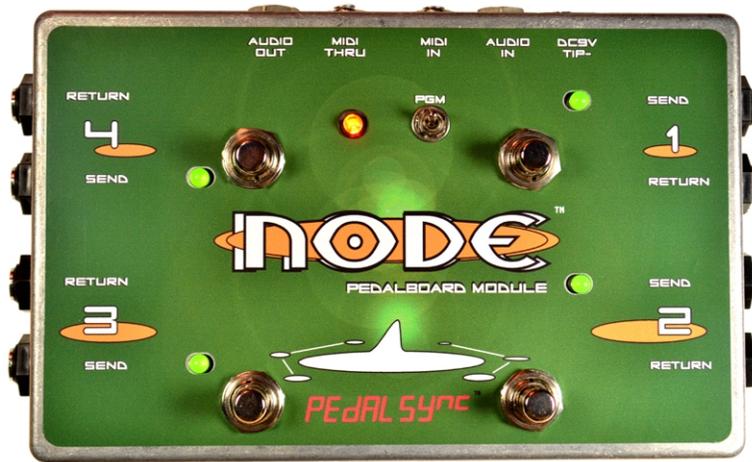
Assembly Instructions



Key Features

- 4-Loop Relay Bypass, MIDI-controlled switching module for robust, scalable pedalboard designs
- Proprietary *ReMute™* circuit virtually eliminates switching noise *without sacrificing audio quality*
- MV-57 module with jacks simplifies scalable pedalboard switching designs.
- Power-on light show
- Stores and recalls bypass status of 4 isolated audio loops
- Robust, 128 program storage
- Simple, intuitive user interface
- MIDI-Compatible
- MIDI Thru repeater for boosting the MIDI signal and re-transmitting it downstream
- Scalable - combine NODEs like building blocks to make elaborate designs with an unlimited number of switches
- Tough, road-ready construction
- Simple to program - toggle a switch!
- PedalSync design allows remote, synchronized self-programming
- True-bypass loops allow use of vintage pedals while leaving them all-original
- Easy to see pedal status at a glance with the bright LED display
- Compact design assists discrete modular pedalboard construction
- Compatible with all major MIDI controllers, including Voodoo Lab Ground Control and Behringer FCB1010

Following are the assembly instructions for the PedalSync NODE KIT.



NODE is a MIDI-controlled audio switching module designed for use on musician pedalboards.

NODE features four (4) switchable isolated audio loops, 128-program storage, and the PedalSync MV-57 *ReMute*™ Relay Bypass system ensuring extremely quiet operation.

Building the NODE KIT is difficult and is NOT recommended for beginners.

Things you will need:

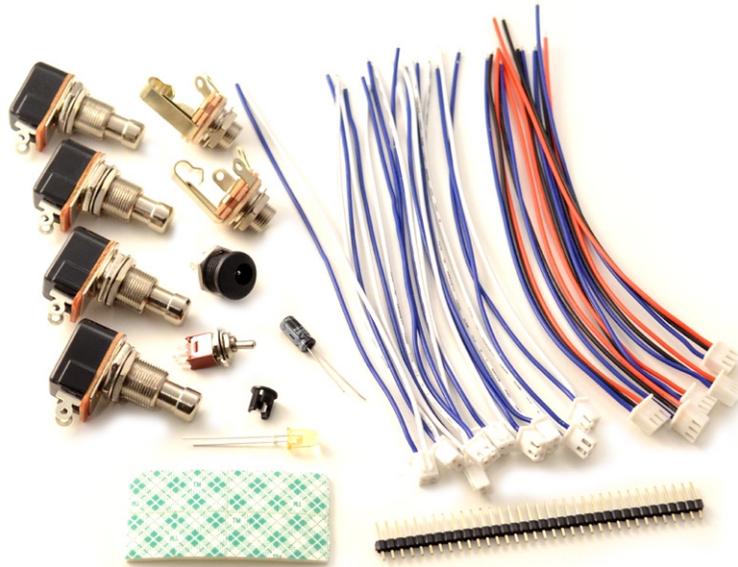
- Eye Protection
- Solder
- Soldering Iron
- Wire Cutters
- Wire Strippers
- Jumper wire (about 2 feet)
- Epoxy
- 1/4" wrench or nut driver
- Philips Screwdrivers for enclosure and PCB screws
- 10mm wrench for Potentiometer
- 14mm wrench for DC jack
- 15mm wrench for Footswitches
- Needlenose Pliers
- A happy state of mind!

Assembly Instructions:

- 1) Remove the screws holding on the back of the enclosure and remove the parts from the Enclosure

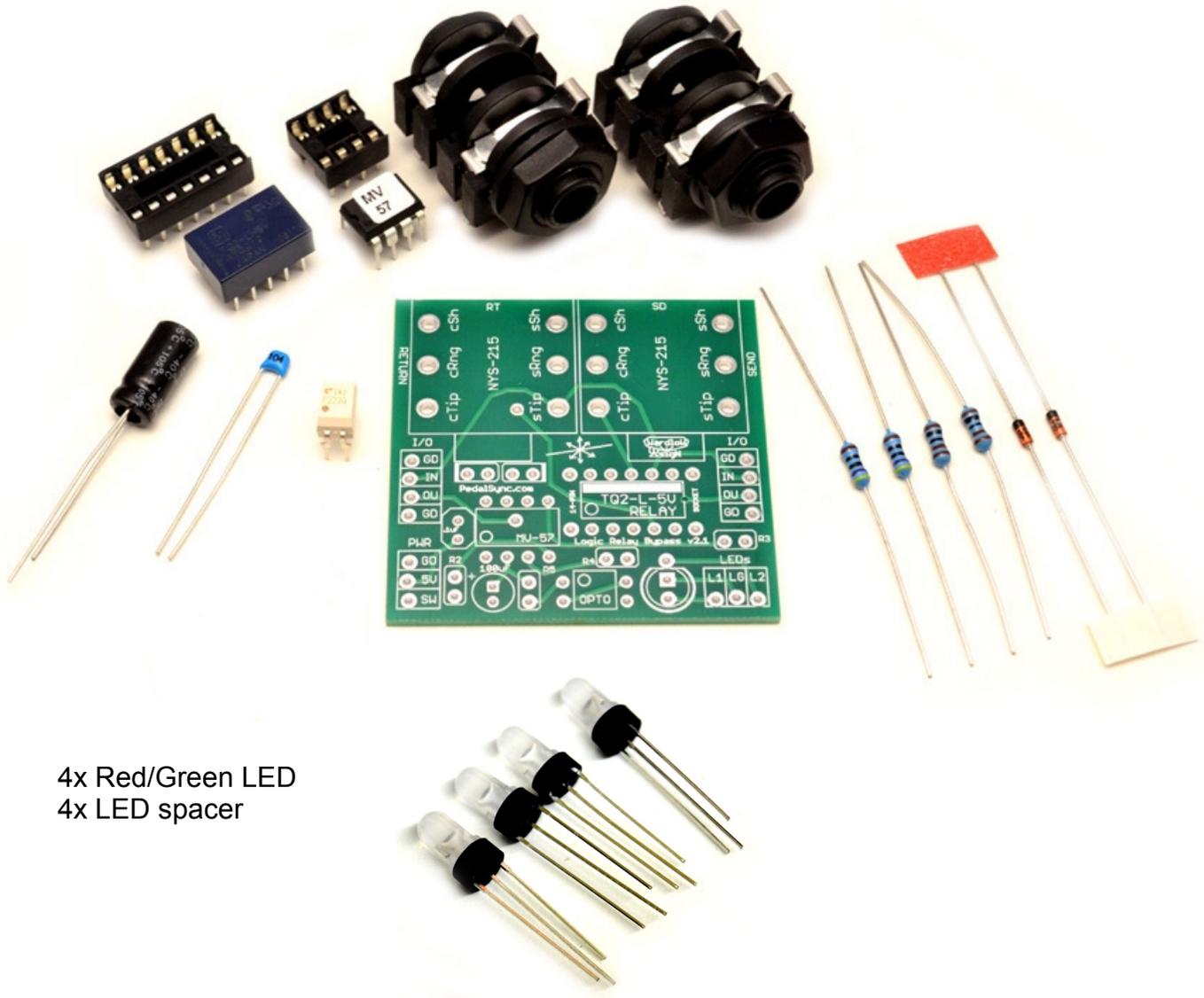
Kit parts:

- 2x MIDI Jack - panel mount, pre-attached to enclosure
- 2x Audio Jack (panel mount, shunted)
- 2x Lock Washers (for audio jacks)
- 1x DC Jack - panel mount
- 4x SPST Momentary Footswitches
- 1x Machined Enclosure
- 1x Write Switch (SPDT micro toggle switch)
- 1x LED Bezel
- 1x Molten Red Status LED
- 10x 2-pin wired connector
- 5x 3-pin wired connector
- 8x Two-Sided Tape Squares
- 1x 35-Pin Header Strip (0.1")
- 1x 10uF Electrolytic Capacitor



4x MV-57 Kits, containing:

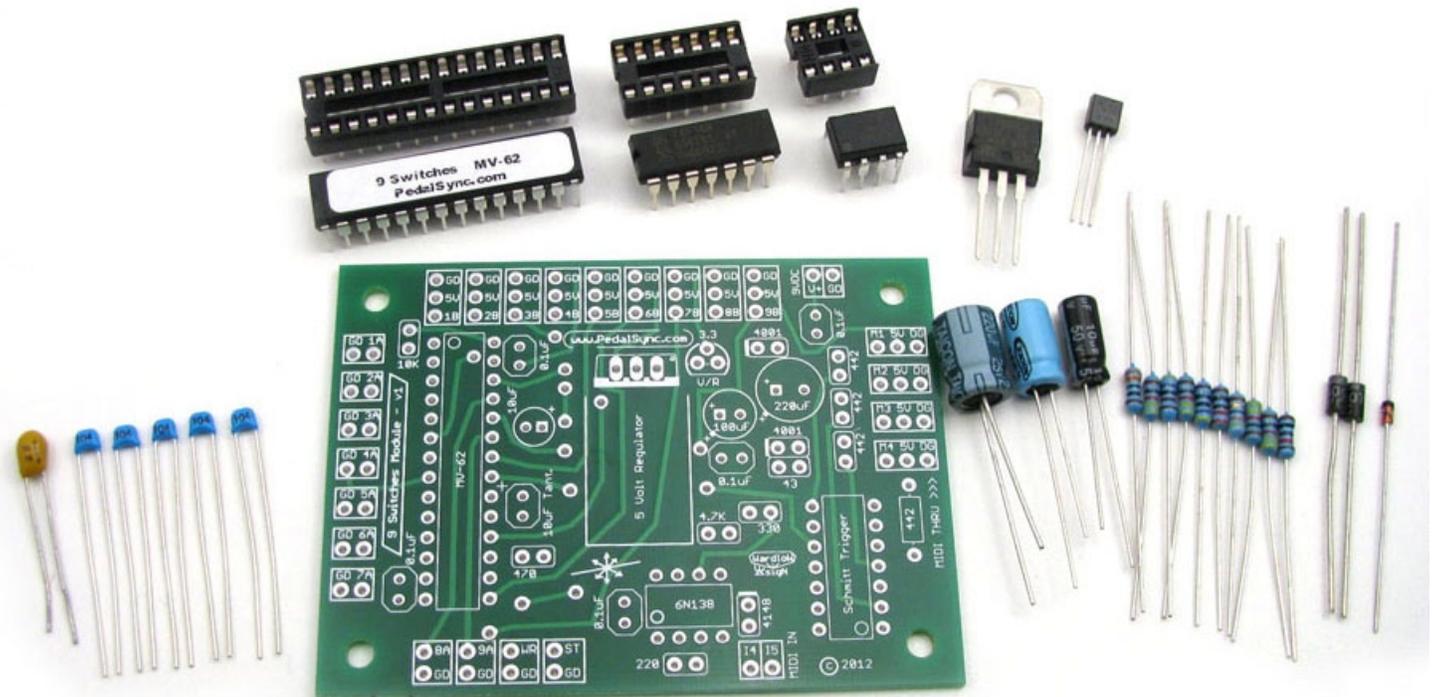
- 8x 1K (brown, black, black, brown, brown)
- 8x 470 (yellow, purple, black, black, brown)
- 4x Ceramic 0.1uF (104) non-polarized capacitor with .1" lead spacing
- 4x 100uF polarized Electrolytic Capacitor
- 8x 5.1v Zener diodes - align polarity band with PCB
- 4x Opto-MOSFET Solid State Relay, e.g. Toshiba TLP222G - dot represents pin 1
- 8x 1/4" PCB-mount Audio Jacks
- 4x PedalSync MV-57 Logic-Controlled Relay Bypass chip
- 4x 14-Pin socket for use with the relay
- 4x 10-pin Panasonic Relay - orient the text on the Relay the same way as the text on the PCB.



- 4x Red/Green LED
- 4x LED spacer

MV-62N Kit, containing:

- 1x MV-62N Chip (with 28-pin socket)
- 1x 6N138 Optocoupler (with 8-pin socket)
- 1x 74x14 Hex Schmitt Trigger (with 14-pin socket)
- 5x 0.1uF 50v Ceramic Capacitor (104)
- 1x 10uF Tantalum Capacitor (yellow - note polarity)
- 1x 10uF 25v Electrolytic Capacitor
- 1x 100uF 25v Electrolytic Capacitor
- 1x 220uF 25v Electrolytic Capacitor
- 2x 1N4001-7 rectifier diode
- 1x 1N4148 signal diode (smaller orange one)
- 1x 43 ohm resistor (yellow, orange, black, gold, brown)
- 1x 220 ohm resistor (red, red, black, black, brown)
- 1x 330 ohm resistor (orange, orange, black, black, brown)
- 1x 442 ohm resistor (yellow, yellow, red, black, brown)
- 1x 470 ohm resistor (yellow, purple, black, black, brown)
- 1x 4.7K resistor (yellow, purple, black, brown, brown)
- 1x 10K resistor (brown, black, black, red, brown)
- 2x 3.3-volt regulator TO-92
- 1x 5-volt regulator TO-220



The MV-57 Logic-Controlled Relay Bypass Module with Jacks is designed to allow the following connections:

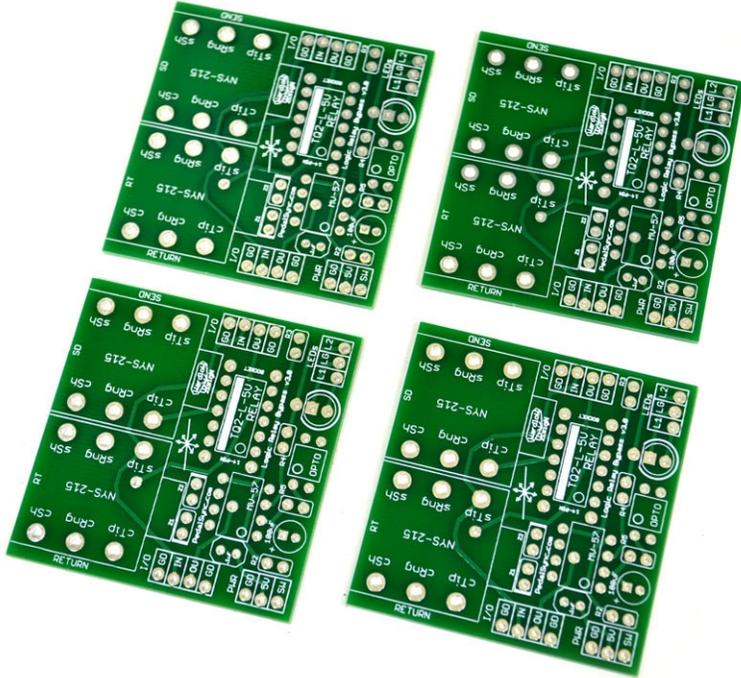
Pin	Connection
IN	Audio Input
OU	Audio Output
GD	Power ground connection
5V	Connection for regulated 5-volt power input
SW	Switching signal from 5-volt logic source - 1B-9B connections from PedalSync 9 Switches Modules

The MV-57 Logic-Controlled Relay Bypass Module with Jacks has the following components:

PCB	Component
R2, R5	1K (brown, black, black, brown, brown)
R3, R4	470 (yellow, purple, black, black, brown)
.1uF	Ceramic 0.1uF (104) non-polarized capacitor with .1" lead spacing
100uF	100uF polarized Electrolytic Capacitor
Z1, Z2	5.1v Zener diodes - align polarity band with PCB
OPTO	Opto-MOSFET Solid State Relay, e.g. Toshiba TLP222G - dot represents pin 1
NYS-215	1/4" PCB-mount Audio Jacks
MV-57	PedalSync MV-57 Logic-Controlled Relay Bypass chip
14-PIN SOCKET	Optional 14-Pin socket for use with the relay
TQ2-L-5V	10-pin Panasonic Relay - orient the text on the Relay the same way as the text on the PCB. Center the Relay in the middle 10 pins of the 14-pin socket

How to Build the MV-57 Modules

Find the four Relay Bypass circuit boards (PCBs).



Solder the 8-pin and 14-pin sockets into place. Align the notch on the sockets with the art on the circuit board - the notches should be at the same end as the small white circles.

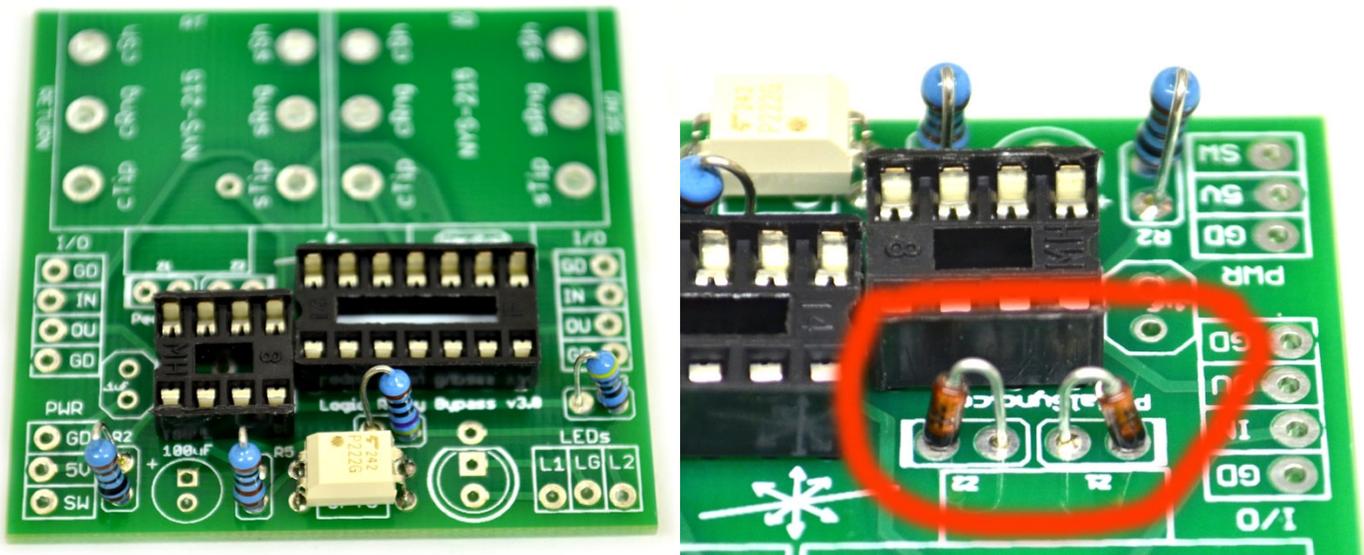


Solder the opto-coupler in place. **Be certain that the dot is on the upper left as shown in the photo:**

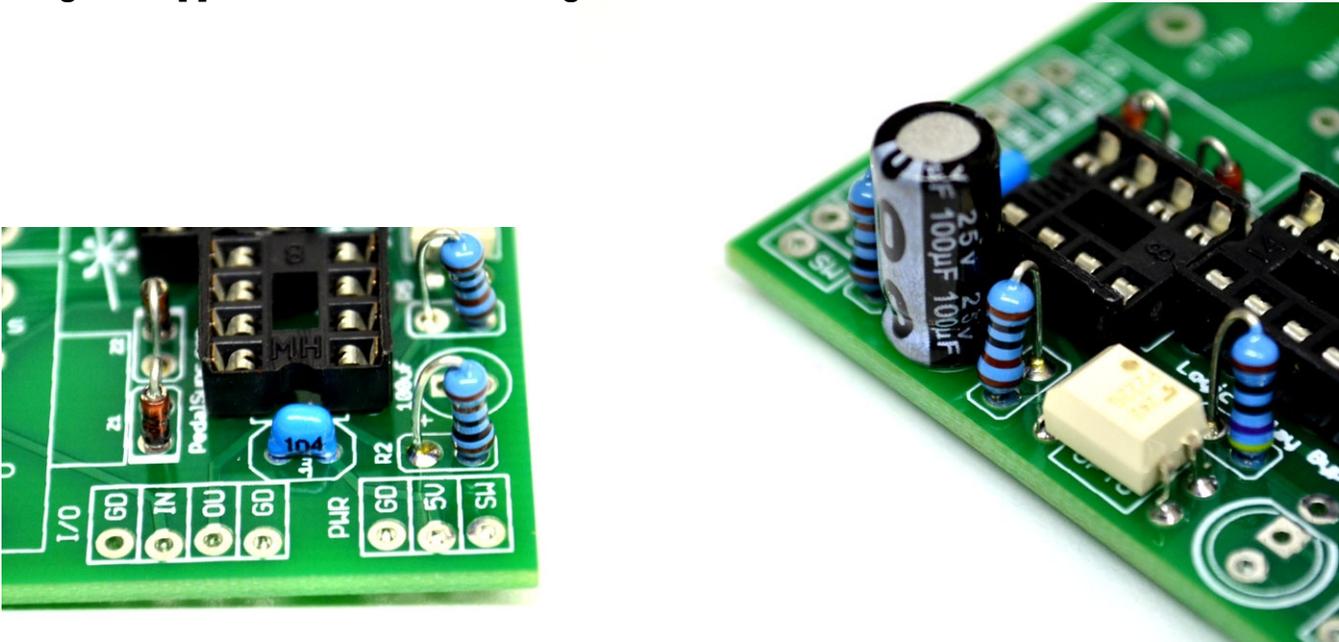


Solder the resistors and zener diodes in place. Note that they are mounted vertically.

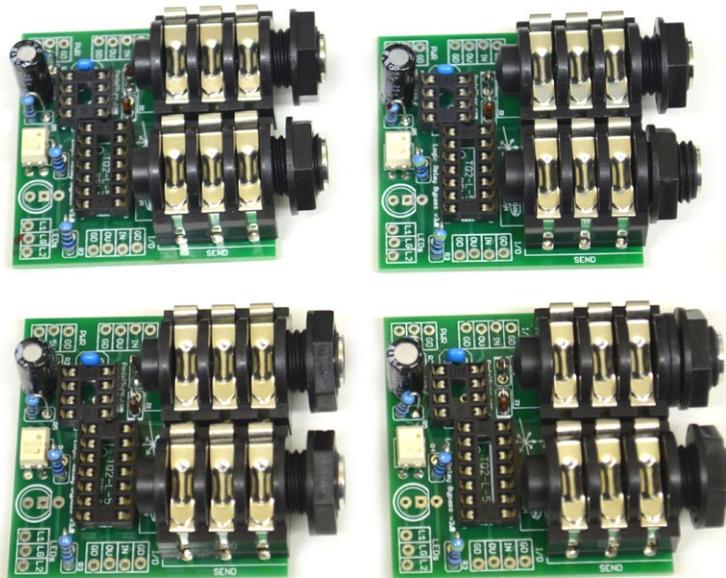
Note: The 5.1v Zener diodes MUST be oriented with the dark band facing out, as shown in the second photo:



Solder the 0.1uF (104) and 100uF capacitors in place. Note the polarity of the 100uF capacitor, the ground [-] side is closer to the edge of the PCB:

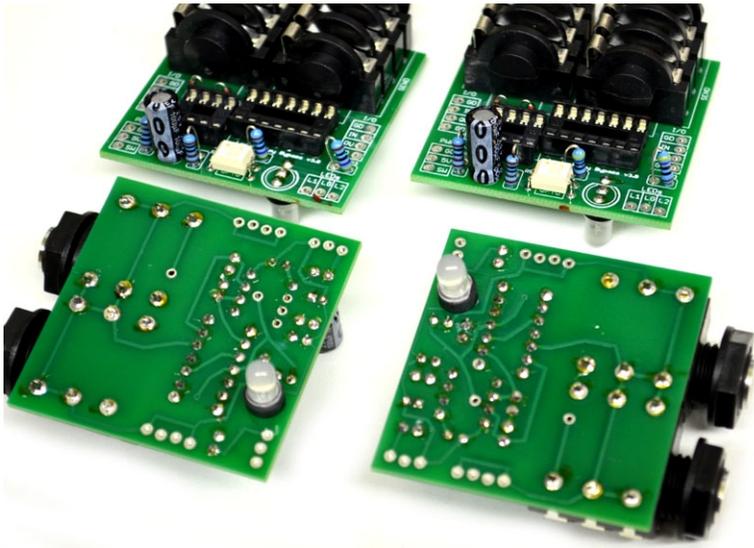


Solder the audio jacks in place.



Put the spacers on the LEDs and mount them to the back side of the PCB with the flat side of the LED facing inward.

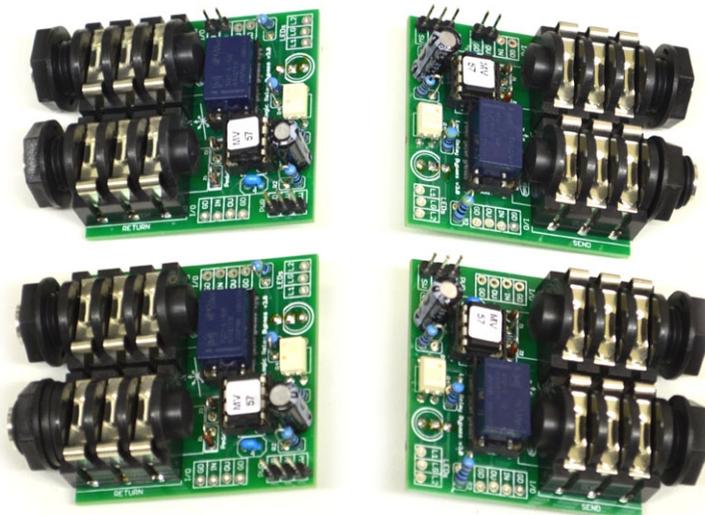
Get the LEDs snug up against the PCB. Solder the center pin first, then adjust the LED depth and angle before soldering the 2 outside pins. The LED should be perpendicular if properly mounted.



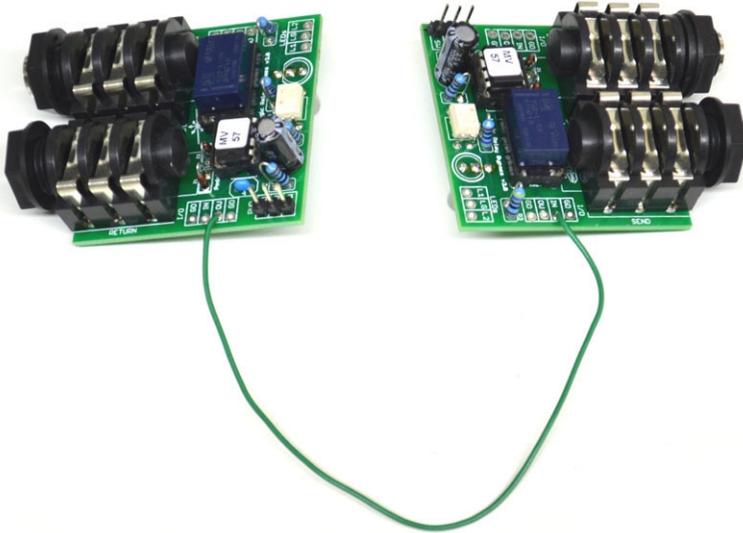
Insert the MV-57 chip in the socket, lining up the notch on the chip with the notch in the socket. Center the Relay in the middle 10 pins of the 14-pin socket with the writing to the bottom of the PCB.

Cut 2x 2-pin and 4x 3-pin header pins off the 40-pin strip. Mount the 3-pin headers to the PCB switch inputs as shown in the photo.

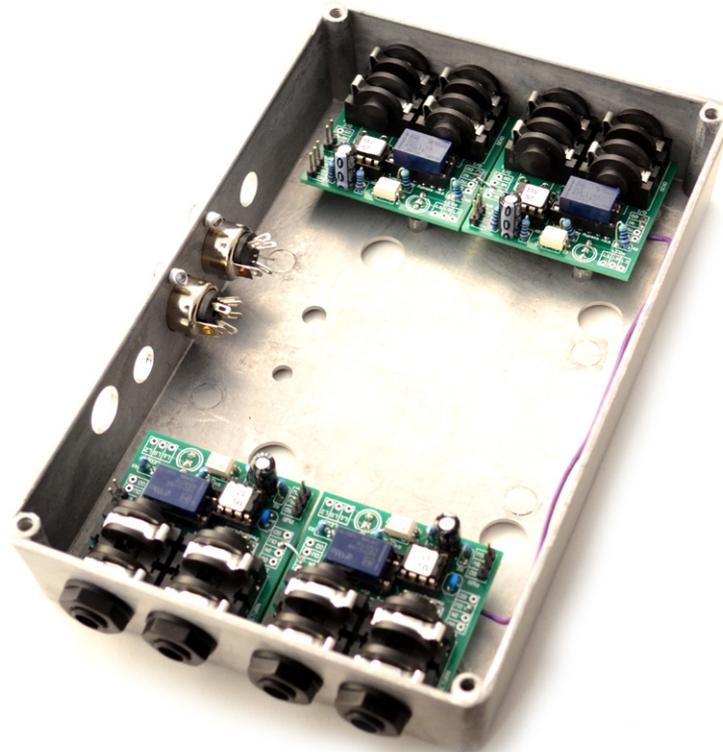
Mount a 2-pin header on the Audio Input (pins GD and IN), and a 2-pin header to the top right on the Audio Output (pins GD and OU).



Connect a 6" jumper wire between the bottom left audio output (OU pin) to the bottom right audio input (IN pin).

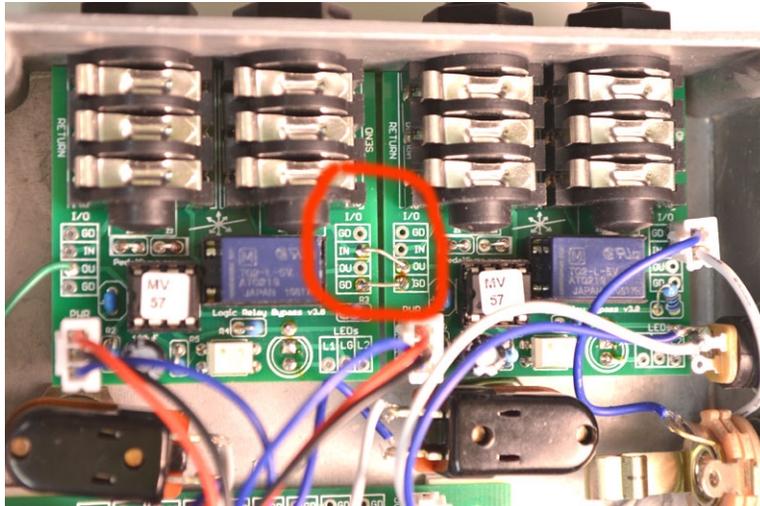


Attach the 4 modules to the enclosure. If an LED does not easily go through the hole, heat up 2 pins at a time and gently adjust as needed.



The audio from each module needs to be connected to the adjacent module. Connections for Audio Input and Output are on both sides of each module. Use a solid jumper wire to make the connection. The wire can be a leftover lead from a component.

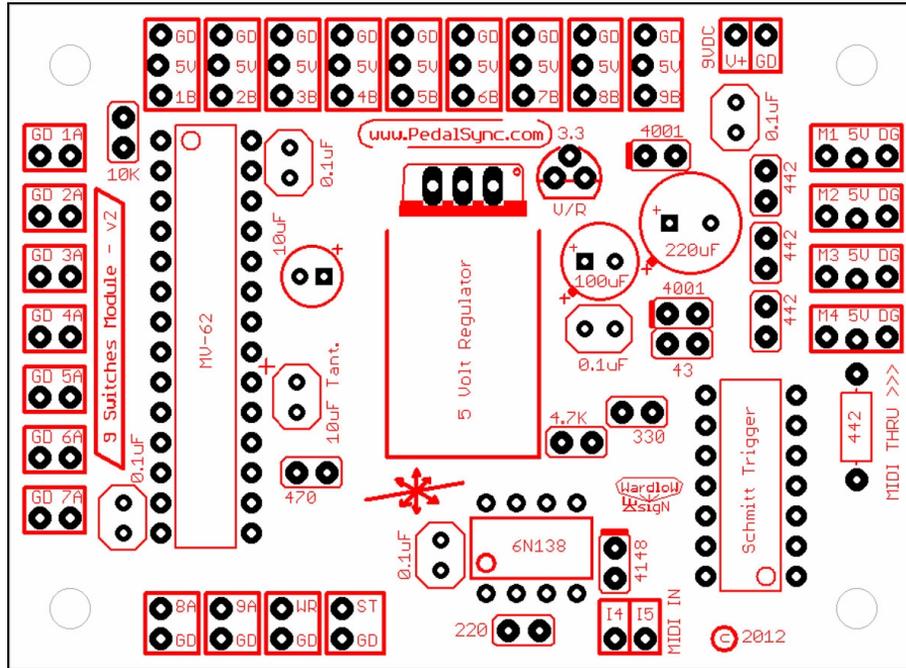
Connect the OU (audio output) of the top left module to the IN (audio input) of the bottom left module. Also connect the GD ground pins from the two modules together.



Connect the OU (audio output) of the bottom right module to the IN (audio input) of the top right module. Also connect the GD ground pins from the two modules together.



3) Build the 9 Switches Module



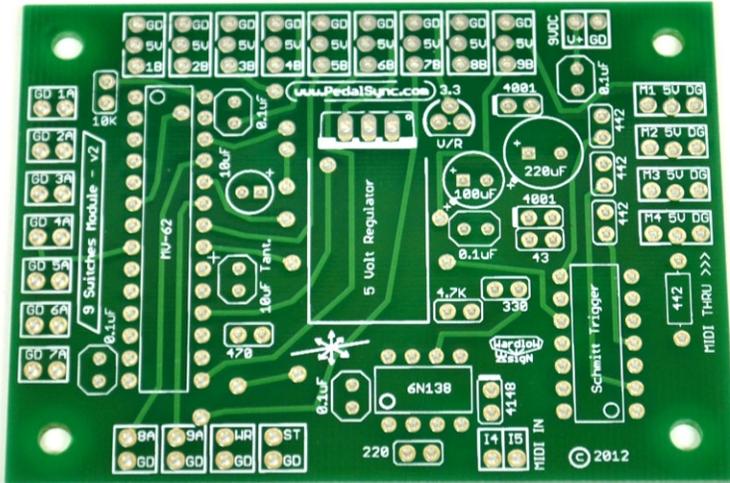
The 9 Switches Module has the following parts:

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**

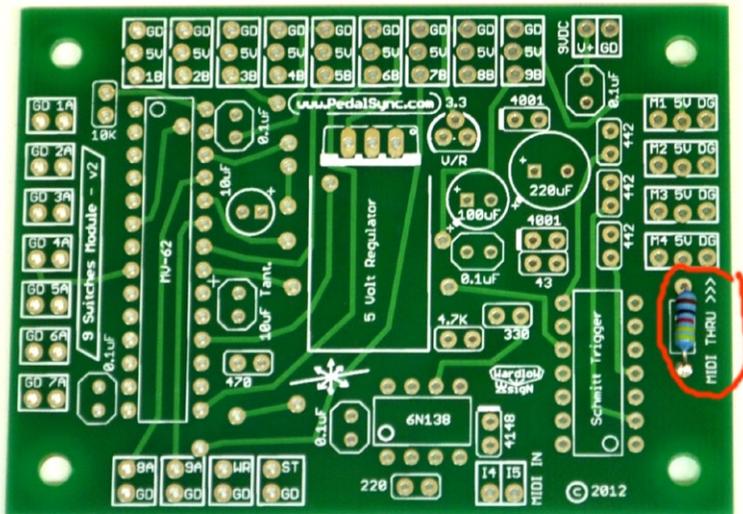
** Note the polarity of these parts

How to Build the 9 Switches Module

Find the 9 Switches circuit board (PCB).

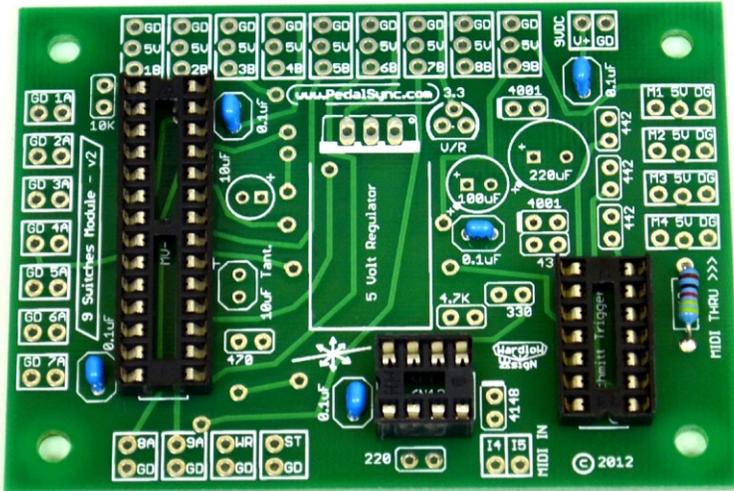


Solder the 442 ohm resistor in the spot right above the “MIDI THRU >>>” indication on the PCB. This will connect it with the M4 MIDI Out header.

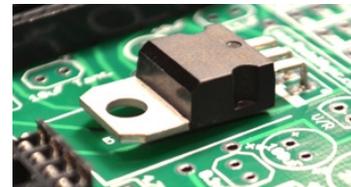


Solder the five (5) 0.1uF capacitors (104) in place.

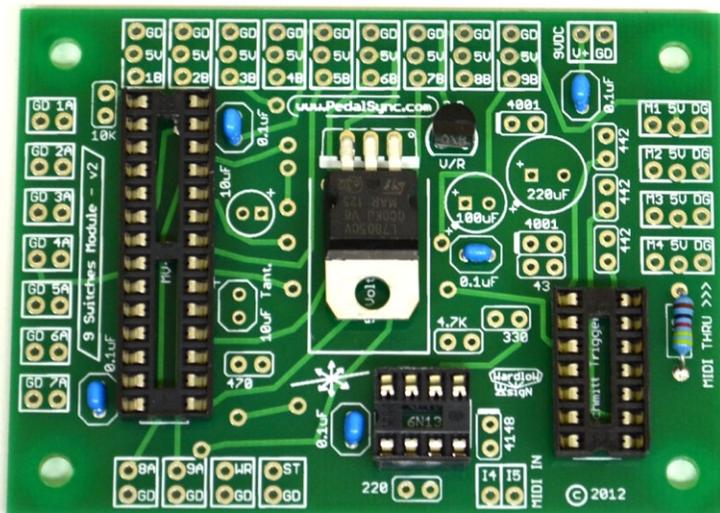
Solder the three sockets (8-pin, 14-pin, and 28-pin) in place. Align the notch on the sockets with the art on the circuit board - the notches should be at the same end as the small white circles.



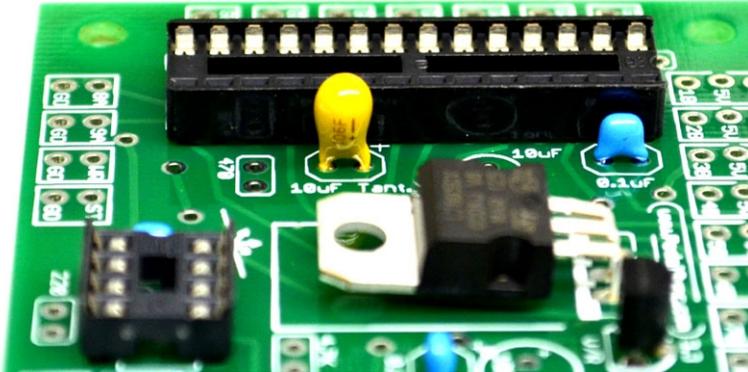
Bend the leads on the 5-volt regulator to a 90 degrees where they become narrow, then solder in place so that the regulator is just above the circuit board without touching it. This is most easily done by first soldering in the chip sockets, then bending and inserting the voltage regulator and flipping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



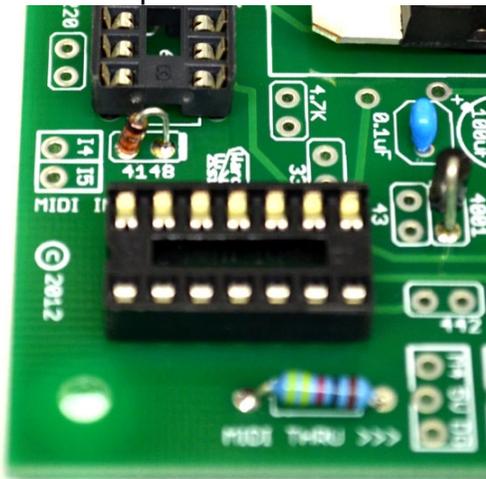
Solder the 3.3-volt regulator in place as well, noting its orientation.



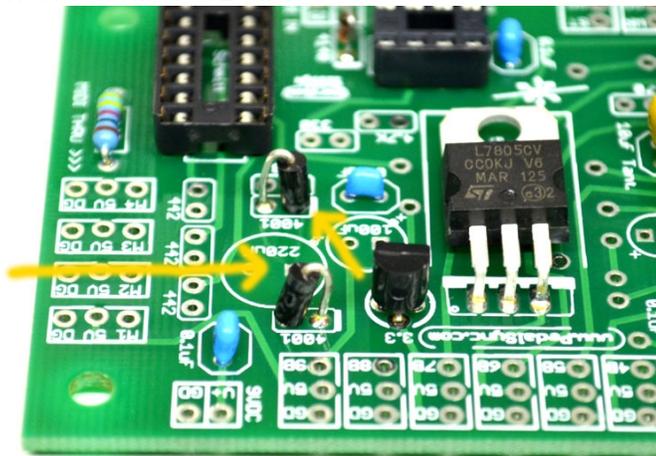
Solder the 10uF Tantalum Capacitor in place. Note the polarity - the writing is visible if the capacitor is properly inserted - see *photo*.



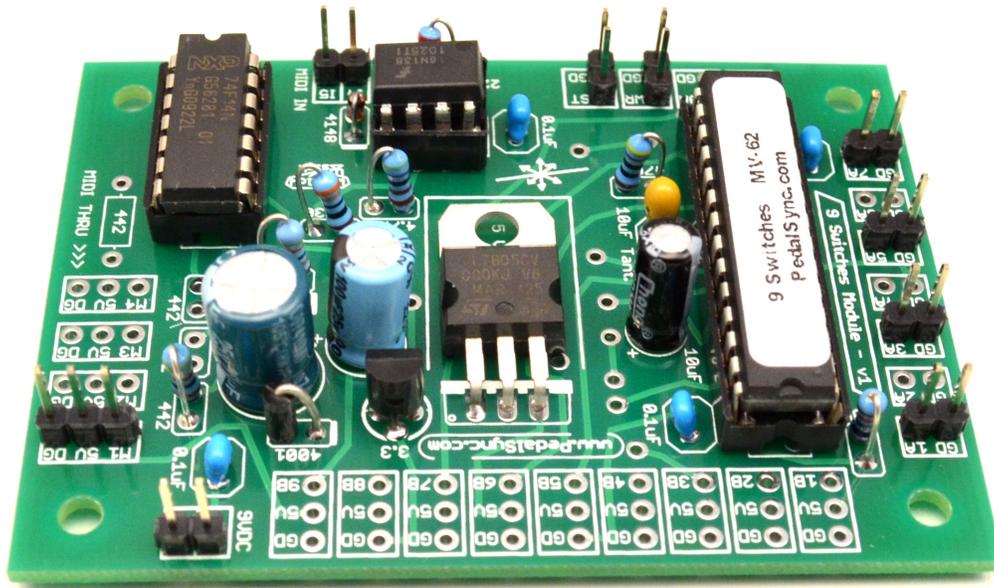
Solder the 4148 diode in place, noting its polarity. The thicker line on the diode PCB art indicates the side of the diode band stripe.



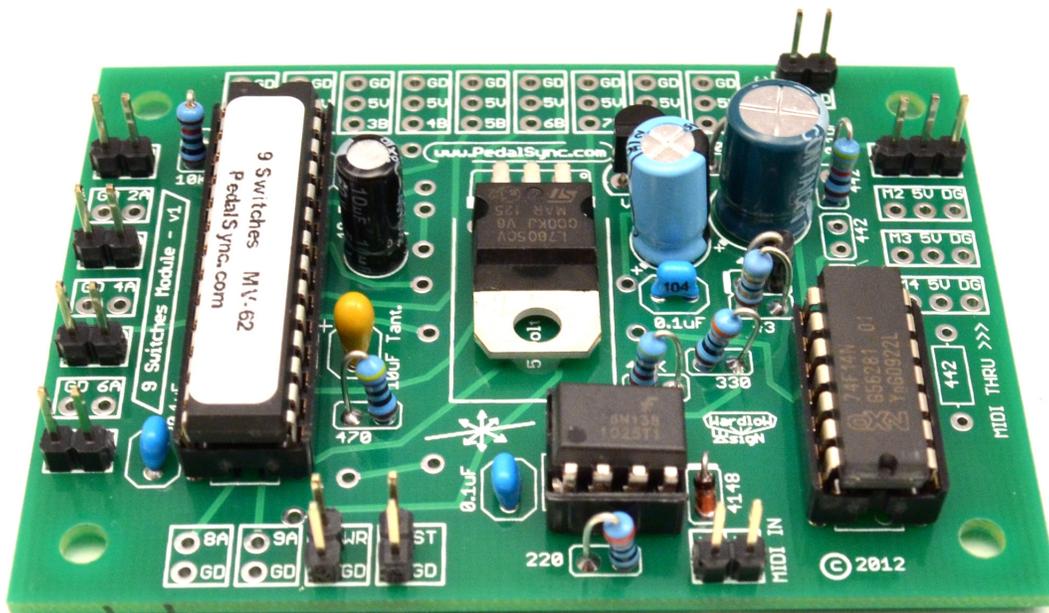
Solder the 2x 4001 (or 4007) diodes in place, again making sure the silver band is on the correct side, indicated by the thicker line on the diode PCB art.



Cut header pins 1x 3-pin and 8x 2-pin header strips. Attach 3-pin MIDI Out header to the same MIDI Out that is connected to the 442 resistor.



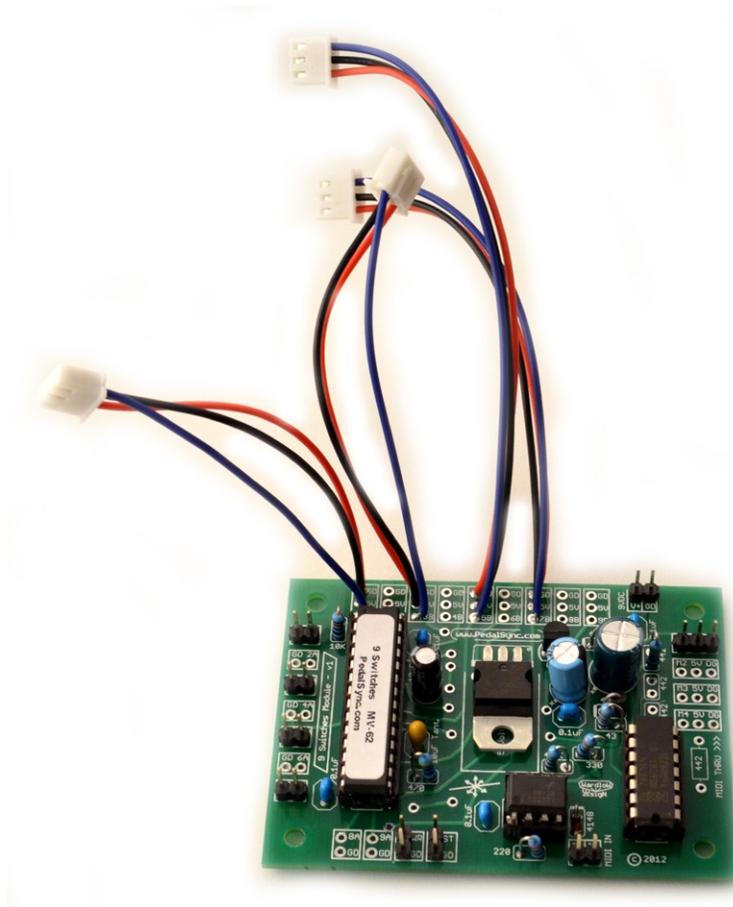
Attach the 2-pin headers to the 1, 3, 5, and 7 switch inputs, the 9VDC power input, the MIDI IN, the WR/GD- write switch input, and the ST/GD - status LED output.

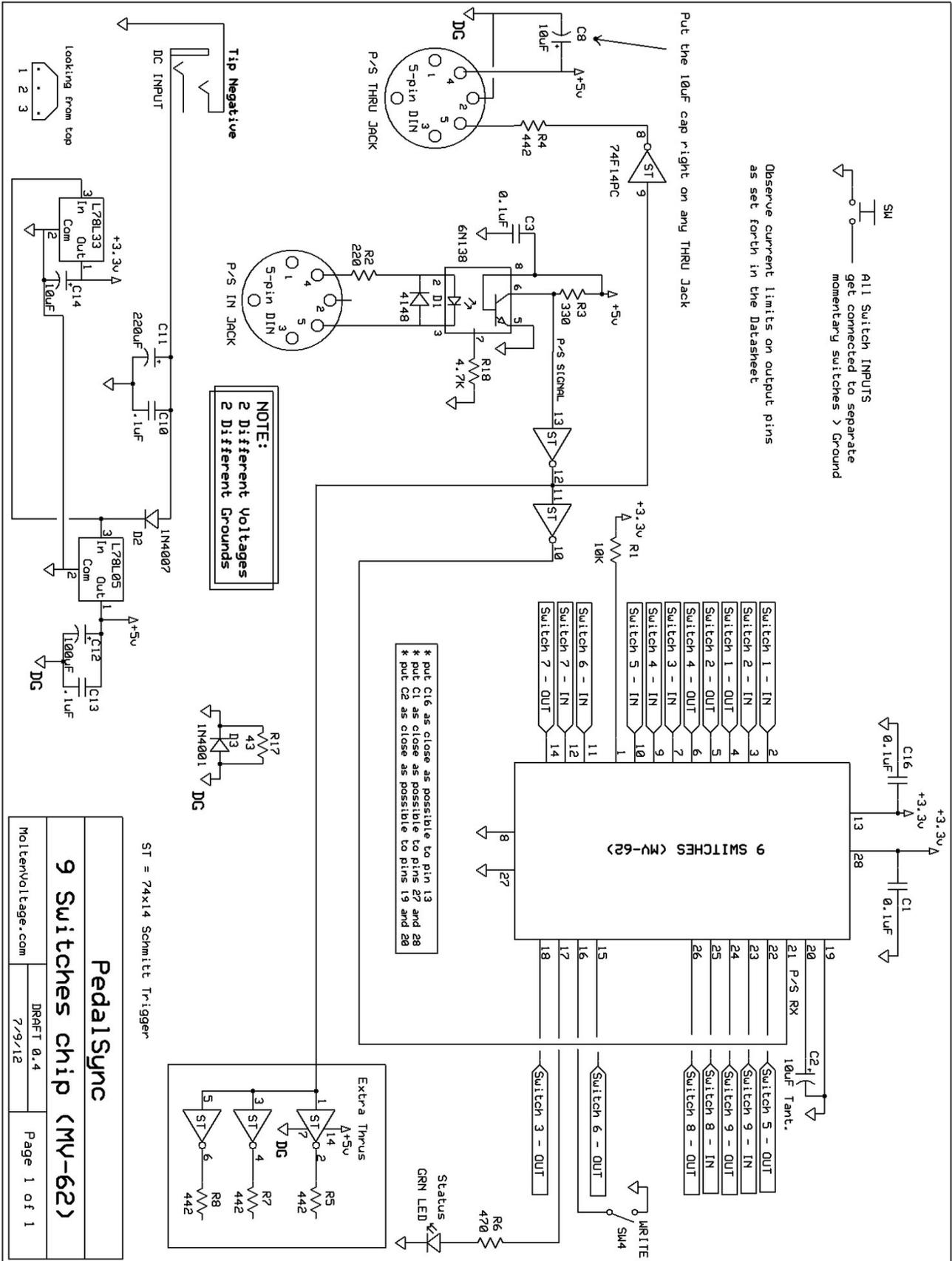


Cut and trim 3-pin wired header connectors and connect as follows:

Red = GD
Black (center) = 5V
Blue = 1B, 3B, 5B, and 7B

Output 1B to bottom left (#2) Relay module	3.5"
Output 3B to top left (#1) Relay module	4.0"
Output 5B to top right (#4) Relay module	full length
Output 7B to bottom right (#3) Relay module	4.5"





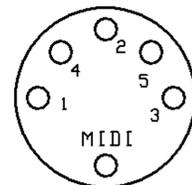
4) Wire the Off-Board Components

Cut and trim the leads on a 2-pin connector to 4.5 inches, then cut and bend the legs to the STATUS LED and solder in place.



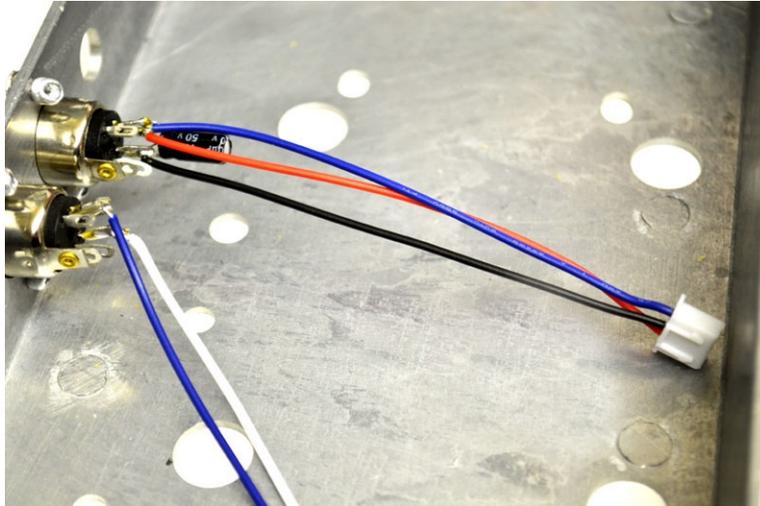
Cut a 2-pin wired header connector to 4.5" and solder it to pins 4 and 5 of the MIDI IN Jack (on the left when looking into the enclosure).

Position the 10uF capacitor on the MIDI THRU Jack (on the right when looking into enclosure), with the positive (longer lead) on pin 4, and the negative (shorter lead) on pin 2 (center pin).



MIDI JACK
Looking from outside

Cut a 3-pin wired header connector to 4.0". Solder the Black - center header wire to MIDI Pin 4 of the MIDI THRU Jack, which is on the right when looking into enclosure. It will connect to the 5V output on the PCB.



Solder the Red outside wire to MIDI Pin 2 (center pin). It will connect to the digital ground DG on the PCB.

Solder the Blue outside wire to MIDI Pin 5. It will connect to the M4 MIDI THRU output



Cut and trim the leads on 2-pin wired header connectors as follows:

Audio IN and OUT Jacks 3.5"

Note: if not already done, bend the audio jack lugs inward until they are perpendicular to the frame. Connect the wires to the center and tip lugs (the two outside lugs)

Micro Toggle Switch 4.5"

Connect to the center and one outside lug.

Bottom left switch - connects to Input 1 3.5"

Top left switch - connects to Input 3 4.5"

Bottom right switch - connects to Input 7 3.5"

Top right switch - connects to Input 5 4.5"



Use of a hobby vise is recommended.

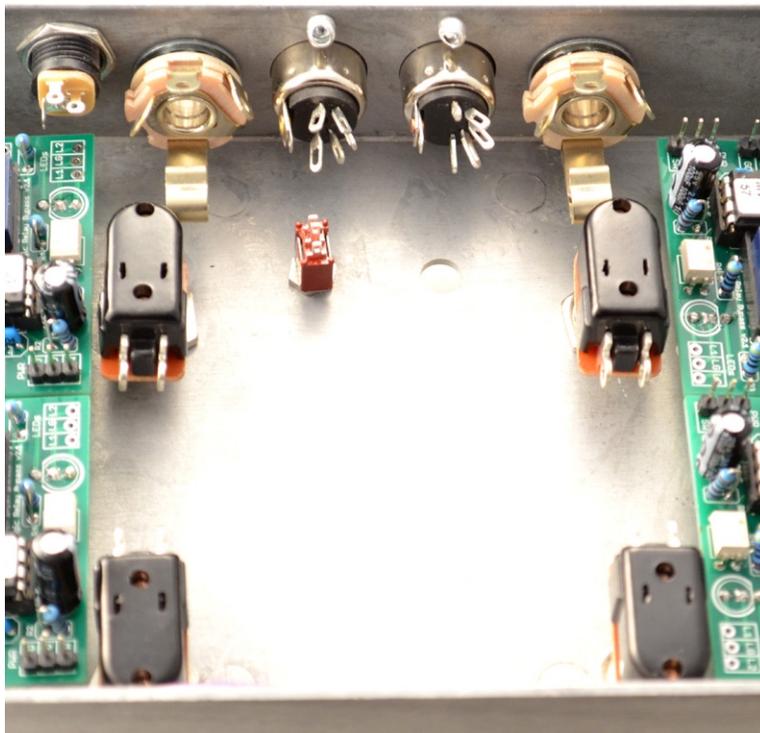
Cut and trim the leads on a 2-pin connector to 4 inches, then solder to the two outside lugs of the DC Jack.



Attaching Off-Board Components

Secure the DC Jack with a 14mm wrench.

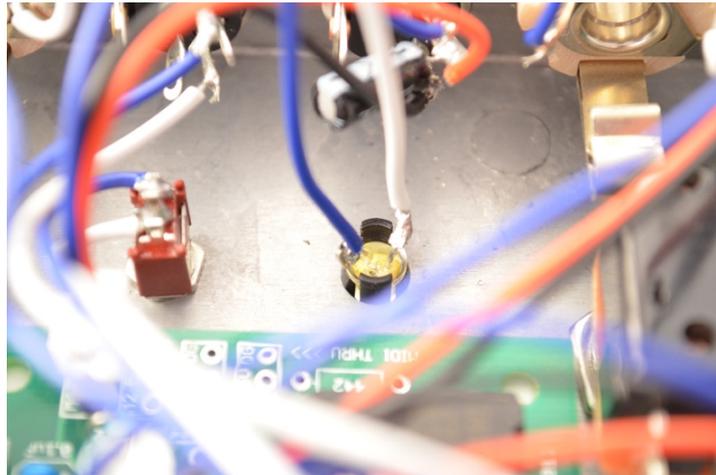
Put a lock washer on each Audio Jack and secure with a 1/2" wrench with the long end down.



Set the height of each switch with the lower nut by placing it about halfway up the switch. Put each switch through its proper hole, put a switch washer on the outside, then attach the other nut and tighten with a 15mm wrench.

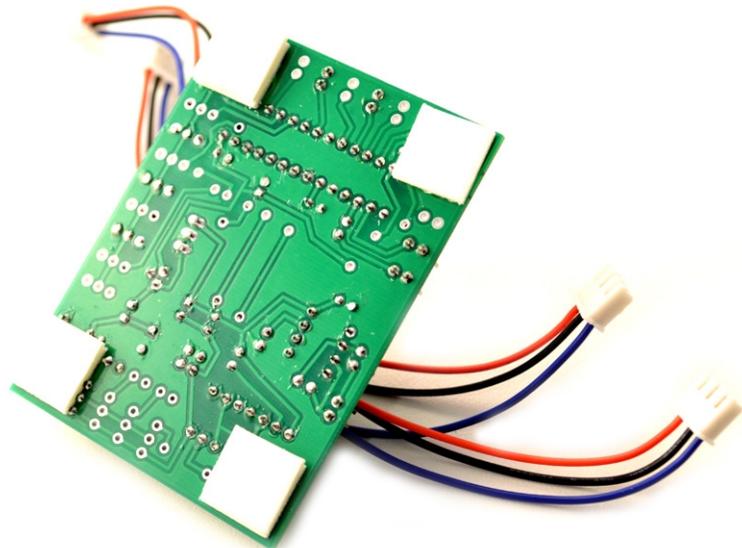
Insert the micro-toggle switch so that the 2 leads are nearest the top of the enclosure then secure it with a 7mm wrench.

Insert the LED bezel through the enclosure, then insert the LED until clicks into place. ***Be certain the LED leads do not touch!***



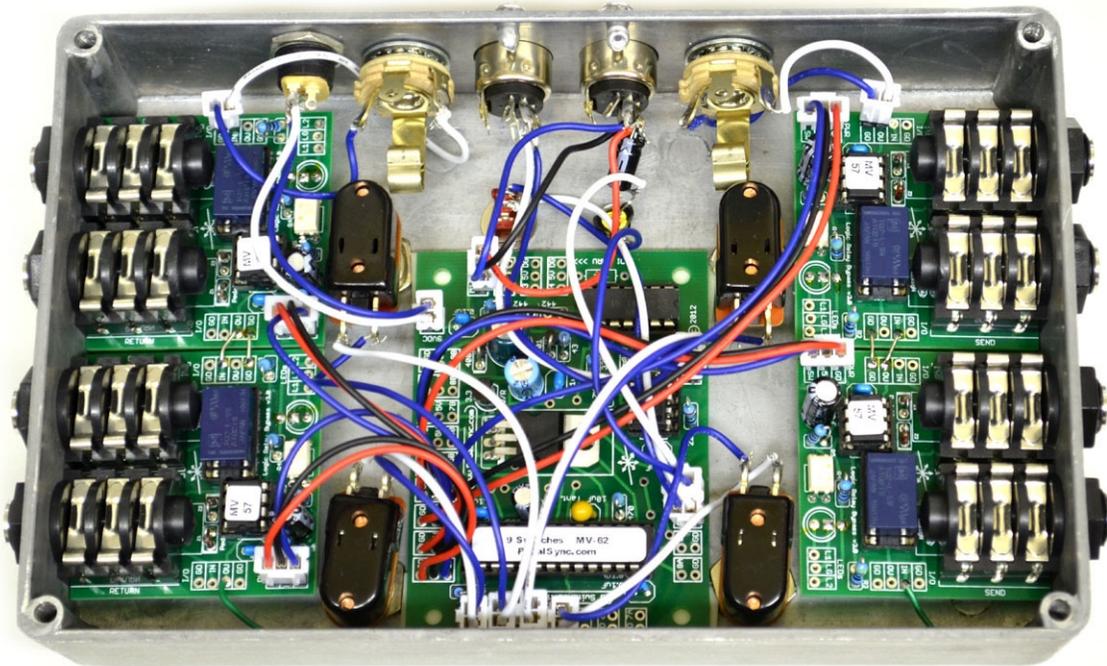
Connecting Off-Board Components

Stack and attach two (2) adhesive squares to each corner of the MV-62 module.



Note: Failure to use 2 squares on each corner will cause a short circuit!

Center the module in the enclosure between the switches with the MIDI output at the top, and as close to the bottom wall as possible.



Connect MV-62 output 1 to the lower left Relay module.

Connect MV-62 output 3 to the upper left Relay module.

Connect MV-62 output 5 to the upper right Relay module.

Connect MV-62 output 7 to the lower right Relay module.

Be sure each top GD connection on the MV-62 module connects to the top GD connection on the corresponding Relay module.

Connect the lower left switch to the switch 1 input header (GD/1A).

Connect the upper left switch to the switch 3 input header (GD/3A).

Connect the upper right switch to the switch 5 input header (GD/5A).

Connect the lower right switch to the switch 7 input header (GD/7A).

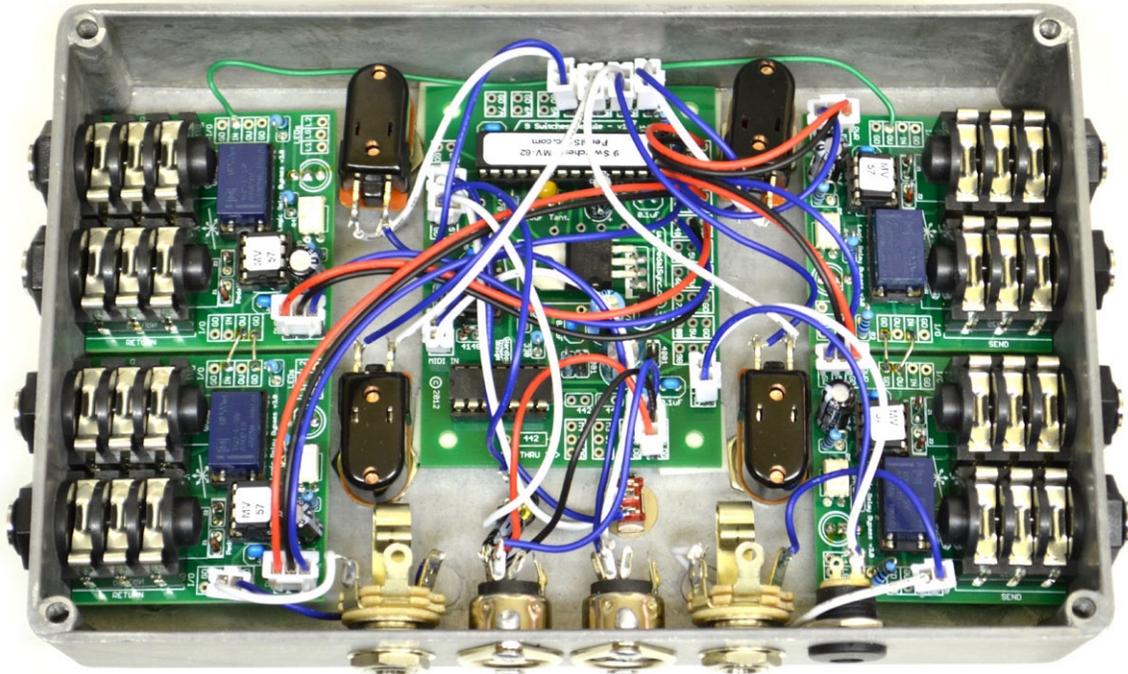
Connect the DC jack to the 9VDC header on the MV-62 PCB - the bent center lug attaches to the outer GD (ground) pin.

Connect the Write switch to the WR/GD header.

Connect the STATUS LED to the ST/GD header, with the flat side of the LED connected to the GD pin.

Connect the MIDI IN Jack to the corresponding MIDI IN header pins, I4 and I5.

Connect the MIDI THRU Jack to the corresponding MIDI THRU header pins that are connected to the 442 ohm resistor.



IMPORTANT REVISIONS:

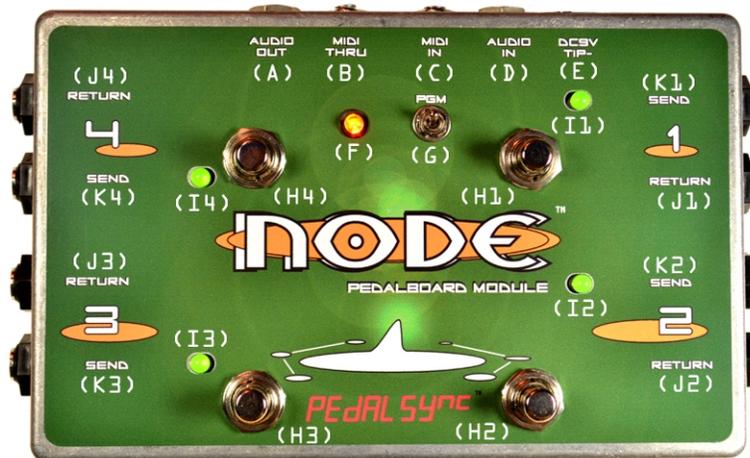
- 1) On the 9 Switches Modules, solder a jumper wire between an unused DG and an unused GD header hole.
- 2) Solder a 2.2K ohm resistor between the Ground lug of the DC Power Jack and the Ground lug of the Audio Input Jack



Using NODE

Note: In order to achieve electrical isolation of the audio and digital signals,

NODE MUST HAVE A SEPARATE OR ISOLATED POWER SUPPLY, DISTINCT FROM ALL AUDIO DEVICES



A) AUDIO OUT

1/4" output for the audio signal. Connected directly to AUDIO IN if all loops are bypassed.

B) MIDI THRU

5-pin DIN connection for repeating MIDI output. Repeats all MIDI data received that the MIDI IN jack. Connects to MIDI IN on another device.

C) MIDI IN

5-pin DIN connection for receiving MIDI data. Connect to MIDI OUT or MIDI THRU of another device.

D) AUDIO IN

1/4" input for the audio signal. Connected directly to AUDIO OUT if all loops are bypassed.

E) DC9V TIP-

9-volt DC, tip-negative 2.1mm center power connection. **Power supply must deliver 200mA minimum.**

F) STATUS LED

Flashes to indicate a program has been successfully written to memory.

G) PGM Switch

Toggle the switch down, then up again to write the current settings to the currently selected program. If the switch is in the down position, you will need to go up, down, then up again.

H1-4) Loop Bypass Footswitches

Pressing a momentary switch toggles the corresponding loop output bypass state.

I1-4) Loop Bypass LED Indicators

When red, the corresponding loop is bypassed. When green, the loop is engaged.

J1-4) RETURN Jacks

Receives the audio signal from the connected effect unit. Connects to the OUTPUT on the effect.

Note: In order to mute a loop, insert a 1/4" connector into the RETURN jack only. When that module is engaged, the audio signal will be muted.

K1-4) SEND Jacks

Sends the audio signal to the connected effect unit. Connects to the INPUT on the effect.

Program Storage

NODE stores 128 programs. Programs are stored by toggling the Write Switch or upon a command from the PedalSync Master Controller or PedalSync TEMPEST, the MIDI Clock Injector.

Program Recall

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

On power up, NODE always loads program 1.

Program Default

The program default for each of the 128 programs is all four loops bypassed.

MIDI Compatibility

NODE responds to standard MIDI Program Change messages on channels 1 and 15 only. MIDI Program Change messages sent on any other channel will be ignored by the chip.

Related Products

- PedalSync Master Control (MV-58 and MV-58B)
- PedalSync MV-59 and MV-59B 4 Presets Chips and Modules
- PedalSync MIDI Splitty - MIDI Pedalboard Repeater

Many more compatible chips and devices available soon!

PedalSync MIDI PedalBoard Devices

Sturdy
Scalable
Simple™

streamline your sound™

Support

info@PedalSync.com



DISCLAIMER

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. **MOLTEN VOLTAGE MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WHETHER EXPRESS OR IMPLIED, WRITTEN OR ORAL, STATUTORY OR OTHERWISE, RELATED TO THE INFORMATION, INCLUDING BUT NOT LIMITED TO ITS CONDITION, QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR PURPOSE.** Molten Voltage disclaims all liability arising from this information and its use. No licenses are conveyed, implicitly or otherwise, under any Molten Voltage intellectual property rights.

Voodoo Lab, Ground Control, and Behringer are trademarks of their respective companies and are unrelated to Molten Voltage.

PedalSync, Tru-Foot, Molten Voltage, Visionary Effects, ReMute, “Sturdy Scalable Simple”, “streamline your sound”, “Design simple Design sublime”, and “the future just showed up” are all trademarks of Molten Voltage.

Legal@MoltenVoltage.com