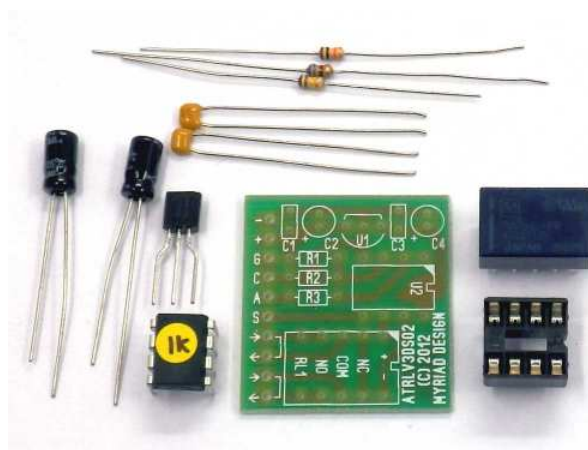


Myriad Design – True Bypass Relay – Construction & User Guide

V4 July 2017 – with firmware rev 1N

1. The package should include the following items. If any of the items are missing from the package, please contact sales@stomptville.co.uk :

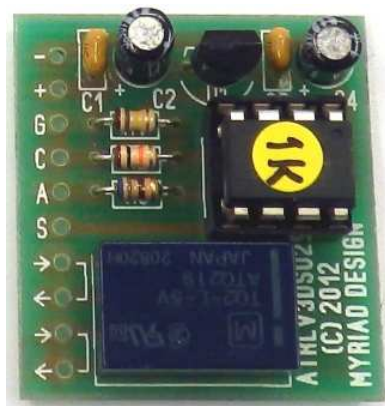
Designation	Description	Marking
R1	1/8W carbon film resistor 180k Ohm	brown-grey-yellow-gold
R2	1/8W carbon film resistor 10k Ohm	brown-black-orange-gold
R3	1/8W carbon film resistor 680 Ohm	blue-grey-brown-gold
C1, C3	ceramic capacitor 10nF (Qty 2)	10n or 103
C2, C4	electrolytic capacitor 1uF 50V (Qty 2)	1u 50V
U1	voltage regulator 5V - LP2950-5	KY5050 or 2950CZ-50
U2	microcontroller ATtiny13A	label with firmware revision marked
RL1	latching relay	TQ2-L-5V or EA2-5SNJ or FP2-D3043
-	DIL socket 8-pin	-
-	printed circuit board	ATRLV3



2. It is assumed that you have some experience of soldering and building of simple kits and are confident to build or modify effects pedals. If not, there are many informative tutorials and videos on the internet.

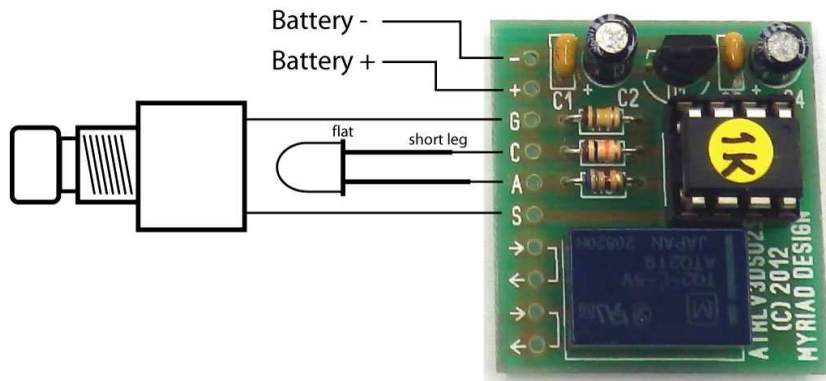
3. Note that U1 and U2 are electrostatic sensitive devices and should be handled with care. If you have an ESD protective wristband, use that. If not, wear clothes made of natural materials (e.g. cotton), regularly touch your finger to an earthed (grounded) metal object (such as a radiator) and do not handle the sensitive devices any more than you have to. In particular, don't remove them from the electrostatic protective foam until you are ready to fit them to the board.

4. Solder the items to the PCB according to the silk-screen legend, checking and ensuring that you insert each component in the correct orientation (R1, R2, R3, C1, C3 may be fitted either way):



5. Connect the board as follows:

- Connect a 9V battery clip to the + and – terminals, with Red+ and Black-.
- Connect an LED to the A and C terminals with A to anode and C to cathode.
- Connect a momentary-action switch to the S and G terminals. You can connect the switch either way, but the G-terminal is ground (battery -).



6. Generally, at the end of factory-testing, the microcontroller (U2) is set to bypass-on-power-up, but this may not be true in every case. We will assume it is true.

7. Connect a 9V battery to the battery clip. You should see the LED flash once and then go out. You may hear the relay click. The unit is in bypass (effect-off) mode.

8. Press and release the switch. The relay should click and the LED should come on. Press and release again and the relay/LED should go off.

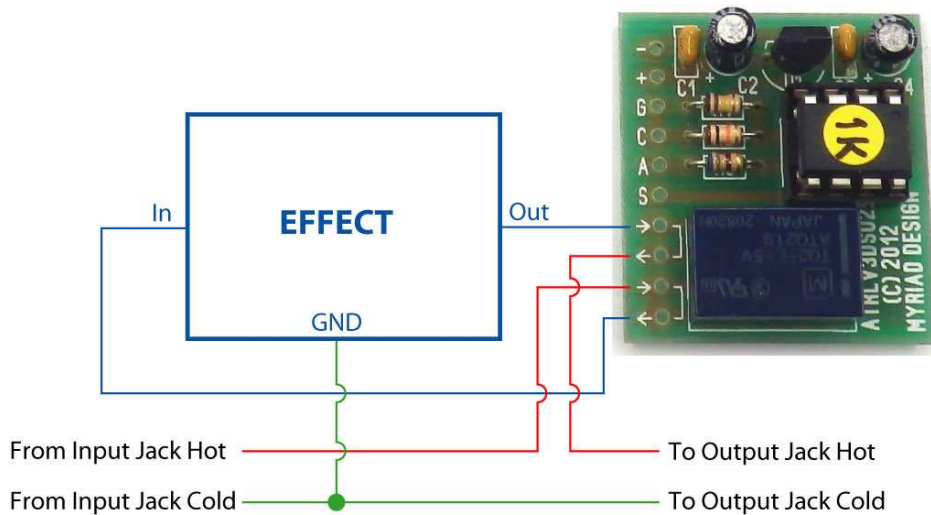
9. Disconnect the battery. Hold-down the switch and re-connect the battery whilst pressing the switch. This puts the unit into effect-on-at-power-up. Now the LED comes on and stays on when you power up. To revert to bypass-on-power-up, repeat the above procedure.

10. If the LED flashes ten times when you power up, this indicates that the battery voltage has fallen to about 7.3V (or less) and you should consider changing the battery soon. If you want to disable the low-battery function, omit R1 (but do still fit R2 or fit a shorting link in lieu of R2).

11. If you disconnect the battery from the circuit, then connect a shorting link between pin 2 and pin 8 of the microcontroller, then power up, then remove the shorting link, you will put the microcontroller into latching-switch mode. This is useful if you have a switch you want to try but it is not a momentary-action switch. Repeating the above changes the microcontroller back to momentary mode.

12. The maximum supply voltage is 20V d.c. Any voltage higher than this may damage the microcontroller (because the voltage at pin 3 will rise above 5V). If you omit R1 (and thereby lose low-battery indication), the maximum supply voltage rises to 30V d.c. Any voltage higher than this may damage the voltage regulator.

13. Now you have tested the unit, you can connect it to the effect board as follows (be sure to check which is the input and which the output socket on your pedal – you may be wiring it upside down and back to front!):



14. Troubleshooting. If the LED doesn't light at all:

- Check the battery isn't dead.
- Check the battery is connected the right way round.
- Check the LED is connected the right way round. (The cathode is the shorter leg and is adjacent to the flat on one side of the LED).
- Check the electrolytic capacitors are connected the right way round.
- Check the microcontroller is inserted the right way round.
- Check for any solder bridges on the under-side of the board.
- Check for any joints which have not been soldered.
- Check for dry joints.
- Check that there is 5V d.c. between pin 8 and pin 4 of the microcontroller.

15. If the LED is too bright, you need to increase the value of R3. Try 1k0, 1k2 or 1k5 (or keep going up to about 3k3). If the LED is too dim or you have a blue or white LED with a forward voltage of about 3.2V then you need to reduce the value of R3. For a white LED at about 5mA, R3 should be 330 Ohms. Don't go below about 150 Ohms.

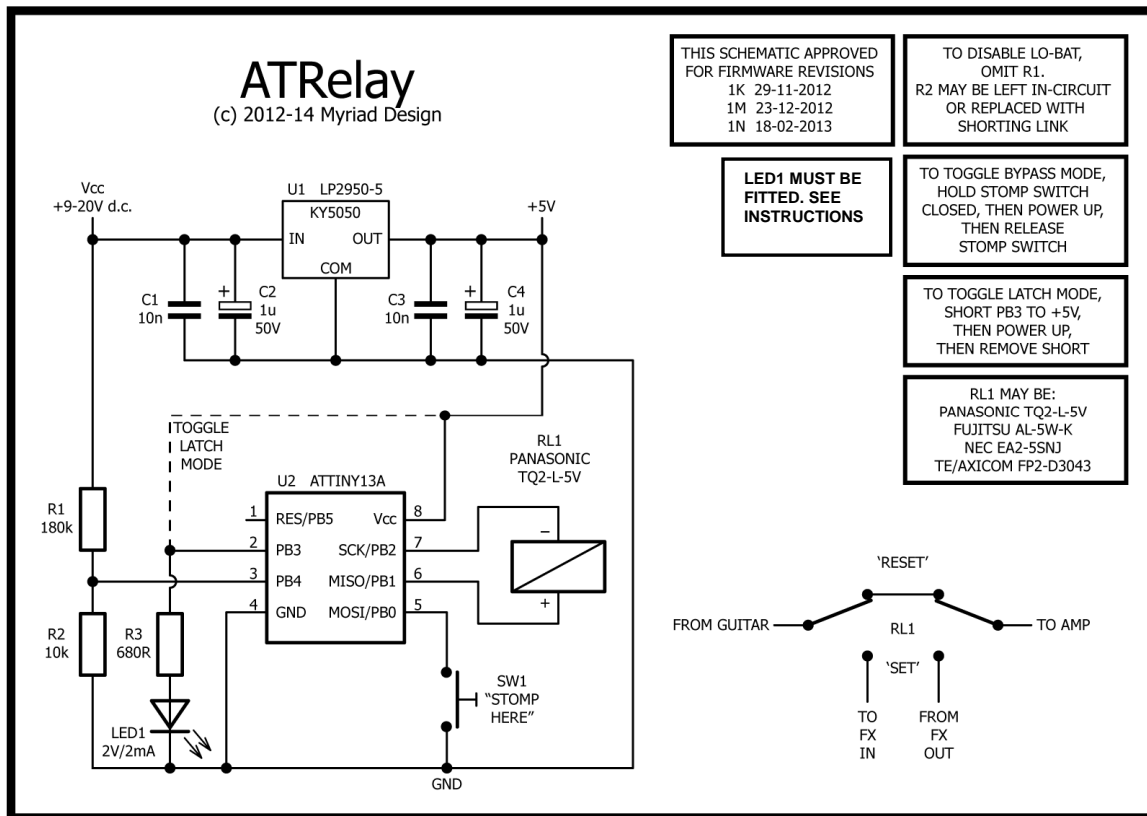
16. If the unit unexpectedly changes between latching and momentary mode this is because you don't have an LED fitted. You must do one of the following:

- Fit an LED between A and C.
- Fit a 10k resistor between A and C.
- Fit a 10k resistor in lieu of R3 and short A to C.
- Short A to C*.

* This will cause a 7mA current to flow when the unit is on which will drain your battery (not a problem if you are mains powering the unit).

Note that the software briefly sets the LED output to an input to check whether you shorted to 5V to change latching mode. If you didn't short to 5V and you didn't fit an LED (or resistor), then the input will be floating and the software will see a random 5V or GND and change the latching mode accordingly.

17. If you have any questions or comments which may be relevant to others, please consider posting on the Stompville blog. Alternatively, you can email smudgerd@stompville.co.uk.



Note: Omit R1 to disable low-battery warning. If R1 is omitted, maximum supply voltage rises to 30V d.c.

Note: LED1 (or a resistor in its place) must be fitted to avoid instability. See above (Clause 16).

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Myriad Design · United Kingdom
www.stompville.co.uk sales@stompville.co.uk