

oneTesla SD Interrupter Kit

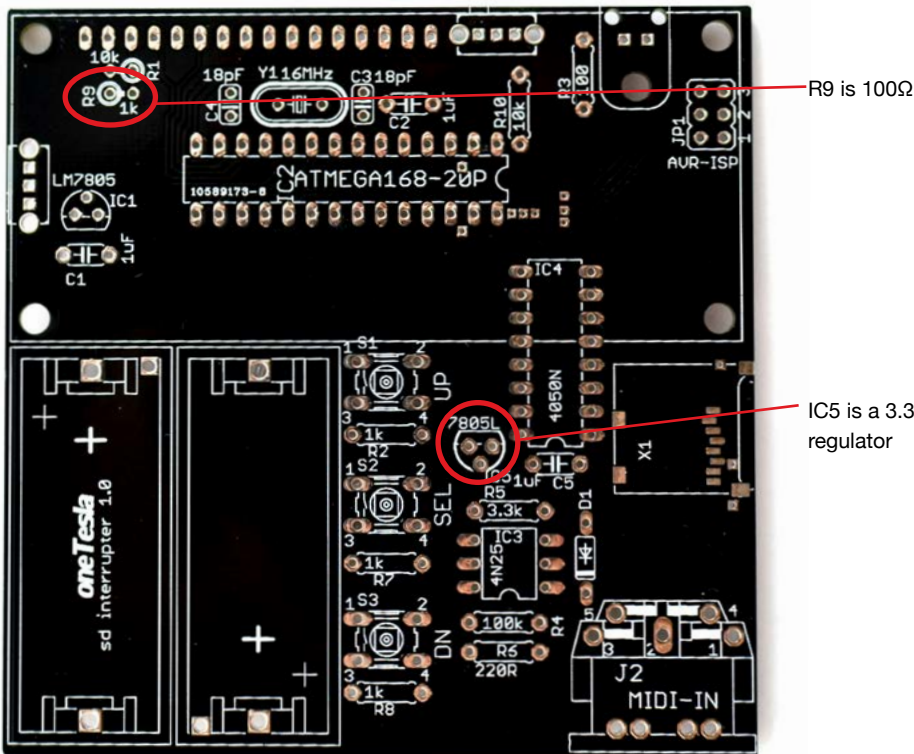
User Manual v1.0

STEP 1: Assemble the SD Interrupter

Heat up your iron! Let's start soldering. We'll begin with the SD card interrupter because we need it working to test the Tesla coil's electronics later on.

- A. Install resistors R1 through R10. **Note that in early boards, R9 is mislabeled as 1kΩ and should be 100Ω (see image)!**
- B. Install capacitors C1 through C5.
- C. Install sockets for IC2, IC3, and IC4. Align the notch on the socket to the notch pictured on the board.
- D. Install D1.
- E. Install the slide switches.
- F. Install the 16-pin female header for the LCD.
- G. Install IC1 (a 78L05 5V regulator) and IC5 (a **3.3 V regulator**). See image.
- H. 16MHz crystal Y1.
- I. Install the optical transmitter.
- J. Install the two CR123A battery holders. Ensure that the + mark on each socket aligns with the + mark on the board!
- K. Install the MIDI jack.
- L. Install the tall pushbutton switches S1, S2, and S3.
- M. Install the ICs in their sockets, taking care to orient them correctly.
- N. Solder the male header pins into the LCD module.
- O. Place the LCD module into the female header pins on the board. You don't need to install the standoffs yet, as you should confirm that the board works before finishing the mechanical assembly.
- P. Install the batteries, taking care to orient them correctly.

R1, R10	10kΩ (brown black orange)
R2, R7, R8	1kΩ (brown black red)
R3, R9	100 (brown black brown) (note that on early boards, R9 is mislabeled)
R4	100kΩ (brown black yellow)
R5	3.3kΩ (orange orange red)
R6	220Ω (red red brown)
C1, C2, C5	1uF (labeled 105)
C3, C4	18pF (labeled 180)
D1	1N4148
	2x Slide switch
	LCD headers
IC1	7805
IC2	ATMega328
IC3	4N25
IC4	74HC4050
IC5	3.3V regulator (note that early boards are mislabeled)
Y1	16MHz crystal
	Fiber optic transmitter
	2x CR123A battery holder
J2	MIDI jack
S1, S2, S3	Tall tactile switch



STEP 2: Test the SD Interrupter

Power on the interrupter. Depending on whether or not you have a micro SD card installed, you should be greeted with either “Fixed Mode” or “No SD card found” on the display. Press [Down] until you see “Fixed Mode”, then press [Select] to launch fixed mode. Look into the optical transmitter and verify that you see a blinking red light. If you do, hooray, your interrupter works! Proceed to step 3.

If no display is present...

- Make sure all ICs are correctly installed in their sockets.
- Measure the voltage between pins 7 and 8 of the ATmega328 and confirm that it is 5 volts. If it is not check for soldering errors around the 78L05 regulator and the pins of the ATmega328.
- Make sure R1 and R9 are not switched. Swapping R1 and R9 will cause extremely low contrast on the screen.
- Try switching on the backlight; in bright lighting conditions the screen may be hard to see without a backlight.

If no backlight is present...

Lack of a backlight indicates that the 5V rail is absent. Check for shorts on the board. Verify that the batteries are installed in the correct orientation.

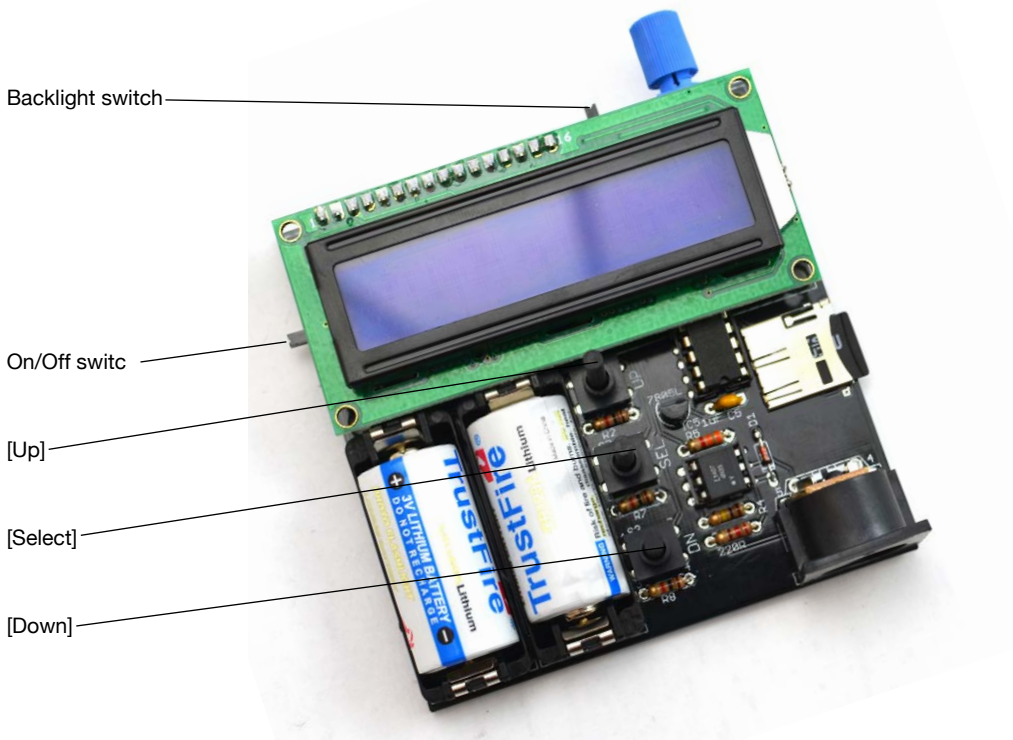
If the display is present but the LED does not light...

- Check the soldering of R3 and the fiber transmitter .
- Check the ATmega328, particularly pin 4.
- Confirm that the fiber transmitter is not mechanically damaged

If the buttons don't work...

Check the soldering of the buttons and the 1K resistors next to them. Be gentle with the buttons, as they are tall and too much sideways force will damage them.

Testing that the basic interrupter functionality works will let you test your coil. If you want to do more advanced troubleshooting go to step 17.



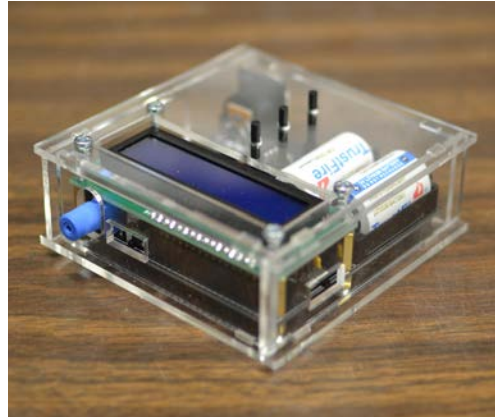
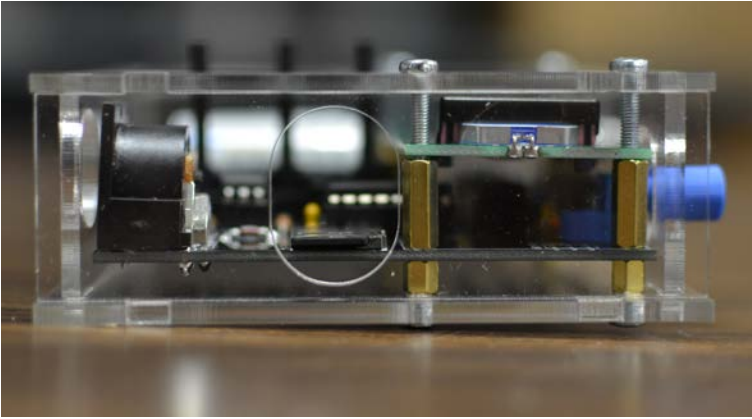
Need help?

If you encounter a problem that isn't covered here, take a look at our online help forum at onetesla.com/forum. Someone else may have had the same problem and figured out a solution.

Please post on the forum rather than emailing us for support, so that everyone can learn from how you resolved your problem!

STEP 3: Assemble the Interrupter Case

- A. Peel the protective paper off of the plastic parts
- B. Start by attaching the board to the bottom plate of the chassis. Use the short standoffs to space the board from the bottom plate. Use 6mm screws through the acrylic to hold the standoffs in place
- C. Screw the tall standoffs to the top of the short ones
- D. Place the LCD screen into its socket.
- E. Assemble the sides of the case by inserting the tabs into the holes in the base plate.
- F. Install the top plate. Note that the buttons are slightly off-centre, so if your top plate isn't fitting quite right, flip it around.
- G. Use 13mm screws to hold the case together. Don't over-tighten!
- H. Optionally, place the sticker with arrow icons next to the buttons.



STEP 4: Test advanced interrupter functions

You will need a Micro SD card of less than 2GB capacity and, if you wish to test live MIDI functionality, a MIDI source for this step.

- A.** The card must be formatted as FAT. Most small SD cards likely have this file system by default, but if you are unsure, right-click on the drive and click “Properties”; the “Filesystem” entry should read FAT, not FAT32 or NTFS. If it does not, right-click, “Format”, and select FAT from the drop-down box.
- B.** Copy one of the sample .OMD files from our site (onetesla.com/downloads) to the SD card.
- C.** Power on the interrupter. You should see “Fixed Mode” displayed on the screen. If the screen displays “No SD card found”, something is wrong.
- D.** Scroll down until the name of a .OMD file appears on the screen. Press [Select]. The LED inside the transmitter should light.
- E.** Press [Select] again to stop the song.

The most likely error you will receive in this case is the SD card not being detected. If so, check the following:

- Your SD card is formatted as FAT, and is less than 2GB in size.
- Your SD card works and is detected by a computer.
- The 4050 IC is installed in the correct direction, and is properly seated.
- The socket for the 4050 IC is correctly soldered.
- IC5 is not a 5V regulator (early revisions of the board have a typo on the board where this IC is marked as a 78L05).

It is very unlikely that the SD card is detected but songs do not play. In this case, check the MIDI files you converted from (which is why we suggest using one of our known-working sample files for the initial test)

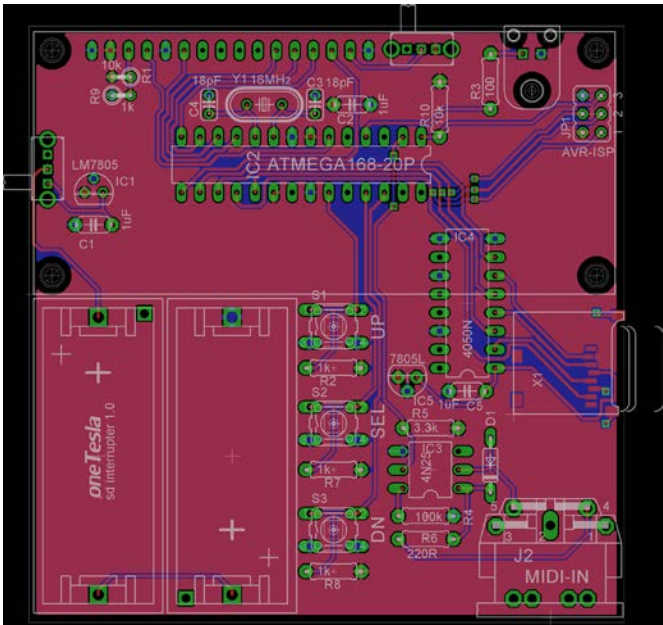
If you have a MIDI source, you can test MIDI functionality as well:

- A.** Set your MIDI source to output on its lowest channel (usually channel 0) and connect the output to the MIDI jack on the interrupter.
- B.** Power on the interrupter, scroll to “Live Mode”, and select it.
- C.** Set your MIDI source to output a middle C. You should see the LED in the transmitter light up. It should turn off when you release the note.

If live mode does not work, check the following:

- Confirm that your MIDI device is outputting on the correct channel.
- Check the soldering and direction of IC3.
- Check the soldering of R4, R5, and R6.
- Make sure D1 is installed in the correct orientation.
- Make sure the MIDI jack is correctly soldered.

APPENDIX: BOARD SCHEMATICS



SD interrupter