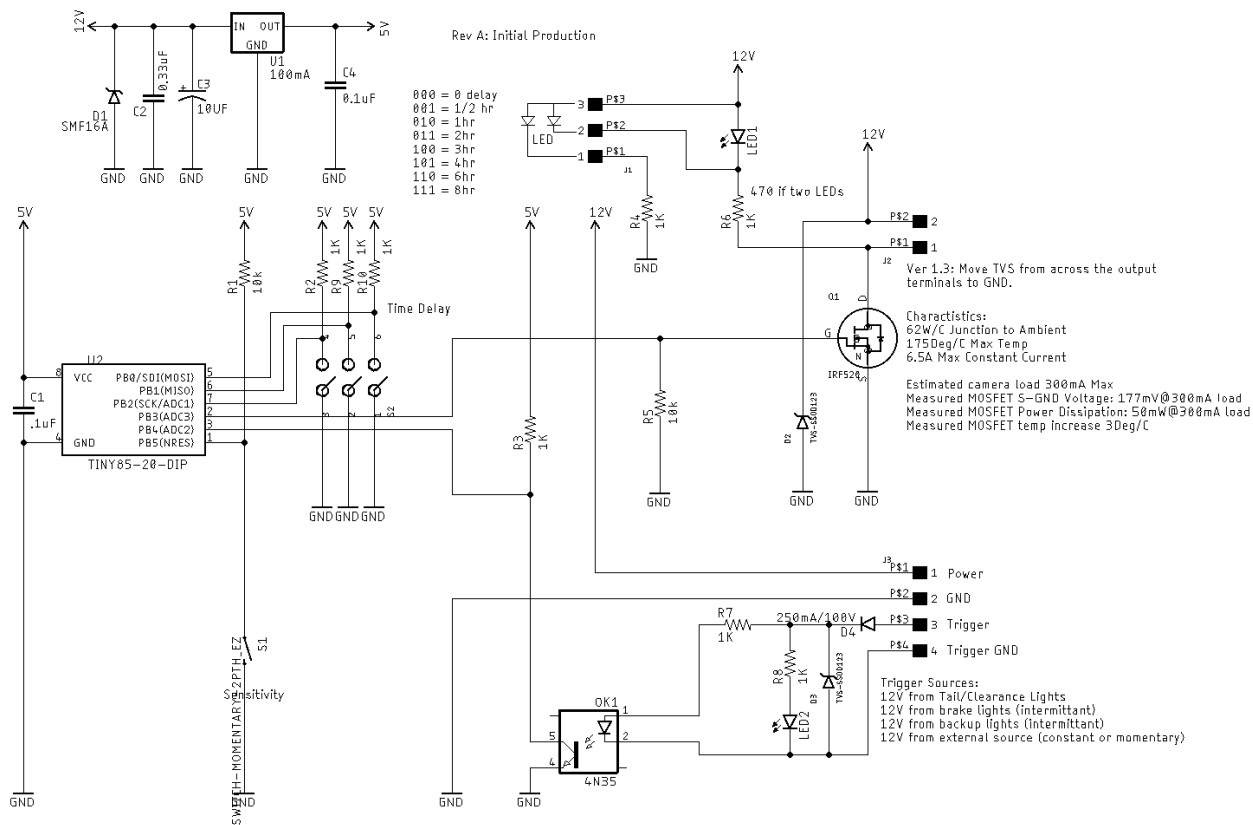


Building the Brake Light Switch



Consult www.RV-Project.Com for further information.

Build the brake light switch using normal construction procedures. Note that while SMD components are used (in order to get everything to fit), 1206 size components are used which are larger and therefore easier to solder.

Bill of Materials

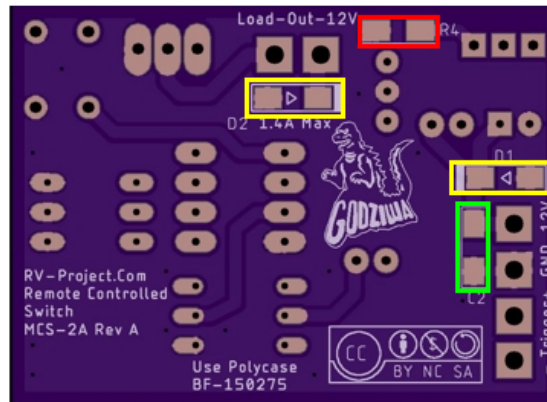
Item	Description	Part Number	Source
R1	10K SMD Resistor 1206	RMCF1206JT10K0	DigiKey.Com
R2	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R3	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R4	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R5	10K SMD Resistor 1206	RMCF1206JT10K0	DigiKey.Com
R6	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R7	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R8	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R9	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
R10	1K SMD Resistor 1206	RMCF1206JT1K00	DigiKey.Com
C1	0.1uF SMD Capacitor 1206	1276-3084-1	DigiKey.Com
C2	0.33uF SMD Capacitor 1206	1276-2860-1	DigiKey.Com
C3	10uF Electrolytic Capacitor	PIT-1996	Tayda.Com
C4	0.1uF SMD Capacitor 1206	1276-3084-1	DigiKey.Com
OK1	Optoisolator 4N35	A035	Tayda.Com
D1	TVS Diode 16V	SMF16A	DigiKey.Com
D2	TVS Diode 16V	SMF16A	DigiKey.Com
D3	TVS Diode 16V	SMF16A	DigiKey.Com
D4	1N4148 SMD	1N4148W-E3-18	DigiKey.Com
LED1	3mm RED LED	A705	Tayda.Com
LED2	3mm GREEN LED	A064	Tayda.Com
Q1	IRF520 N-Channel MOSFET	IRF520N	Tayda.Com
U1	78L05 Voltage Regulator	78L05ACZ	Tayda.Com
U2	ATMEL ATTiny85 Microcontroller	ATTiny85-20PU	Tayda.Com
S1	3 position DIP Switch	DIPT3G	Tayda.Com
J1	3 position 2.54 Wafer Connector	A-805	Tayda.Com
J2	4 position 3.96 Wafer Connector	A-778	Tayda.Com
J3	2 position 3.96 Wafer Connector	A-776	Tayda.Com
S1	Tactile SPST Momentary Switch	A-5145	Tayda.Com
Socket	DIP8 Socket	A-001	Tayda.Com
Box	PolyCase potting box	BF-150275	PolyCase.Com
Potting	Black potting compound	832HD-25ML	Amazon.Com

In addition to the above, you will need the mating connectors for the module above. As well, if you would like to replicate the configuration as shown in the project, you will need a switch, 2 additional LEDs, standoffs, and miscellaneous hardware. The parts list for those items is shown below:

Item	Description	Part Number	Source
J1	3-Pin Wafer Socket	A-827	Tayda.Com
Contacts	Connector pins for socket	A-837	Tayda.Com
J2	4-Pin Wafer Socket	A-796	Tayda.Com
Contacts	Connector pins for socket	A-803	Tayda.Com
J3	2-Pin Wafer Socket	A-794	Tayda.Com
Contacts	Connector pins for socket	A-803	Tayda.Com
Rocker Switch	Carling SPST Rocker	RA901-VB-B-9-V	Amazon.Com
Standoff	1.5In Aluminum #8-32	3497	DigiKey.Com
Red LED	3mm Panel Mount	67-1190	DigiKey.Com
Green LED	3mm Panel Mount	67-1191	DigiKey.Com

Note: Connector pins are sold qty 1. It is highly recommended to purchase extra pins.

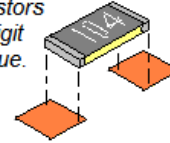
Board Bottom



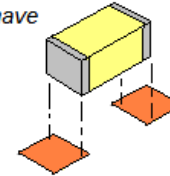
**Install the following Surface Mount Components
on the bottom side of the board.**

- ☐ R4 - 10K SMD 1206 Resistor (103) at location RED
- ☐ C2 - 0.33uF SMD 1206 Capacitor at location GREEN
- ☐ D1 - SMF16A TVS Diode 1206 at location YELLOW
- ☐ D2 - SMF16A TVS Diode 1206 at location YELLOW.

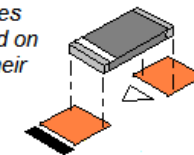
Surface mount resistors
typically have a 3 digit
number for their value.



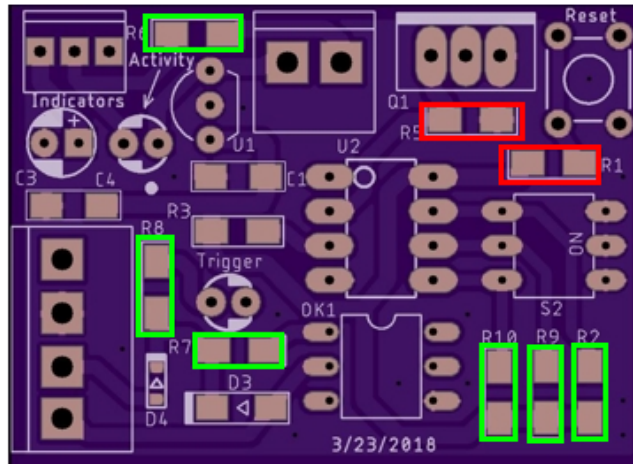
Surface mount capacitors
typically DO NOT have
any markings.



Surface mount Diodes
typically have a band on
one end indicating their
polarity.



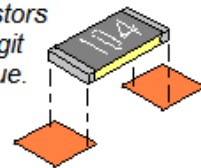
Board Top



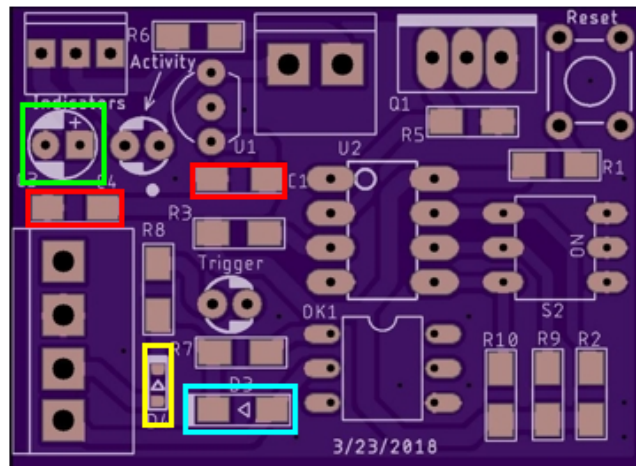
**Install the following Surface Mount Components
on the top side of the board.**

- ☐ R1 - 10K SMD Resistor 1206 (103) at location RED
- ☐ R2 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R3 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R5 - 10K SMD Resistor 1206 (103) at location RED
- ☐ R6 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R7 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R8 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R9 - 1K SMD Resistor 1206 (102) at location GREEN
- ☐ R10 - 1K SMD Resistor 1206 (102) at location GREEN

Surface mount resistors
typically have a 3 digit
number for their value.



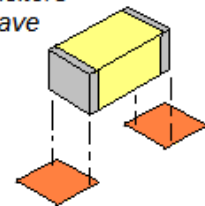
Board Top



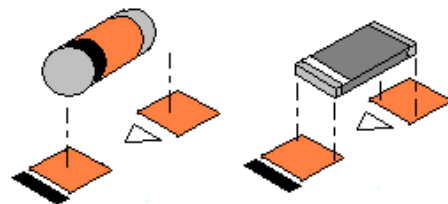
Insert the following components to the board as shown

- ☐ C1 - 0.1uF SMD 1206 Capacitor at location RED
- ☐ C3 - 10uF Electrolytic Capacitor at location GREEN
- ☐ C4 - 0.1uF SMD 1206 Capacitor at location RED
- ☐ D3 - SMF16A SMD 1206 TVS Diode at location BLUE
- ☐ D4 - 1N4148 SMD 1206 Diode at location YELLOW

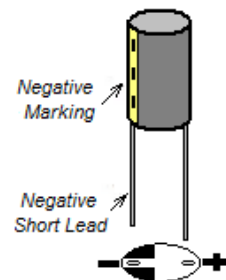
Surface mount capacitors typically DO NOT have any markings.



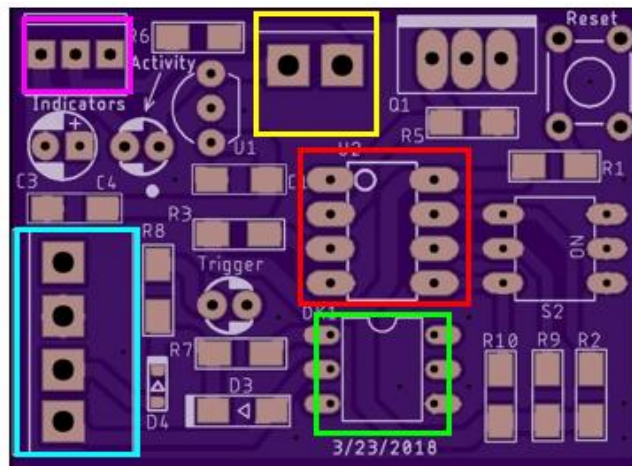
Surface mount Diodes typically have a band on one end indicating their polarity.



Note: Electrolytic Capacitors are polarity sensitive. Make sure the Negative Band on the side of the capacitor matches the Negative (-) symbol on the board.

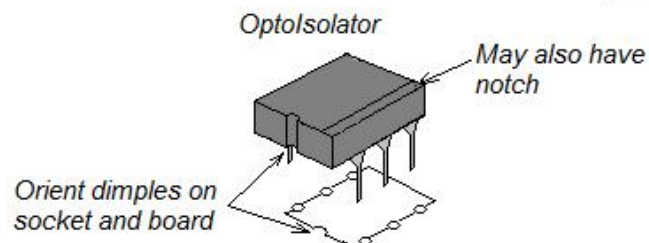
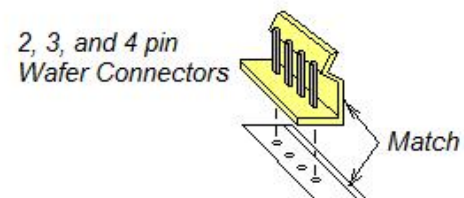
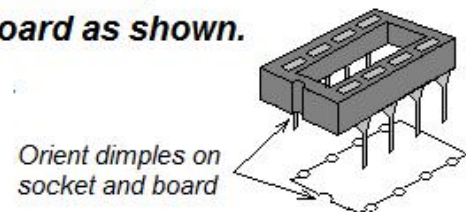


Board Top

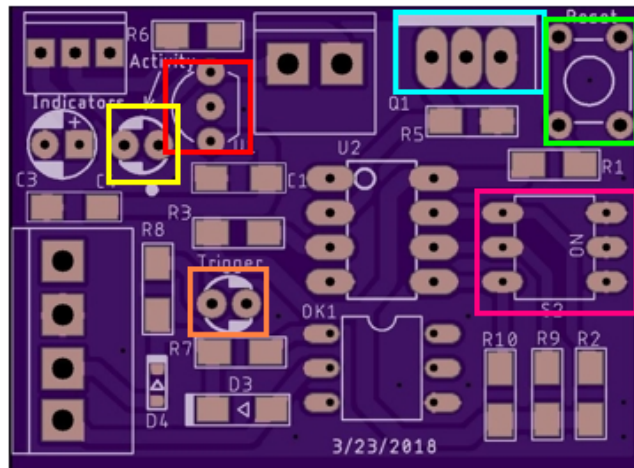


Insert the following components on the board as shown.

- ☐ DiP8 Socket as shown in Red.
- ☐ 4N35 Optoisolator as shown in Green
- ☐ Insert a 4-pin 3.96mm Wafer Connector as shown in Blue
- ☐ Insert a 2-pin 3.96mm Wafer Connector as shown in Yellow
- ☐ Insert a 3-pin 2.54mm Wafer Connector as shown in Violet



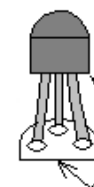
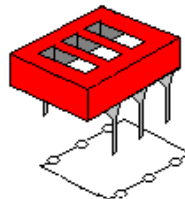
Board Top



Insert the following components as shown:

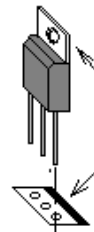
- ☐ Insert the Voltage Regulator as shown in Red.
- ☐ Insert the MOSFET as shown in Blue.
- ☐ Insert the Reset Switch as shown in Green
- ☐ Insert the RED LED as shown in Orange
- ☐ Insert the Green LED as shown in Yellow
- ☐ Insert the DiP Switch as shown in Violet

DiP Switch



Align the flat spot of the voltage regulator to the flat spot on the board.

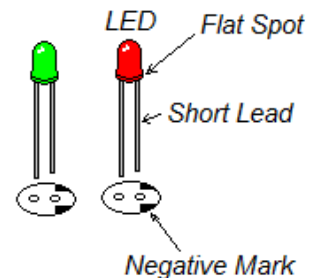
Flat Spot



Align the tab of the MOSFET to the mark on the board.



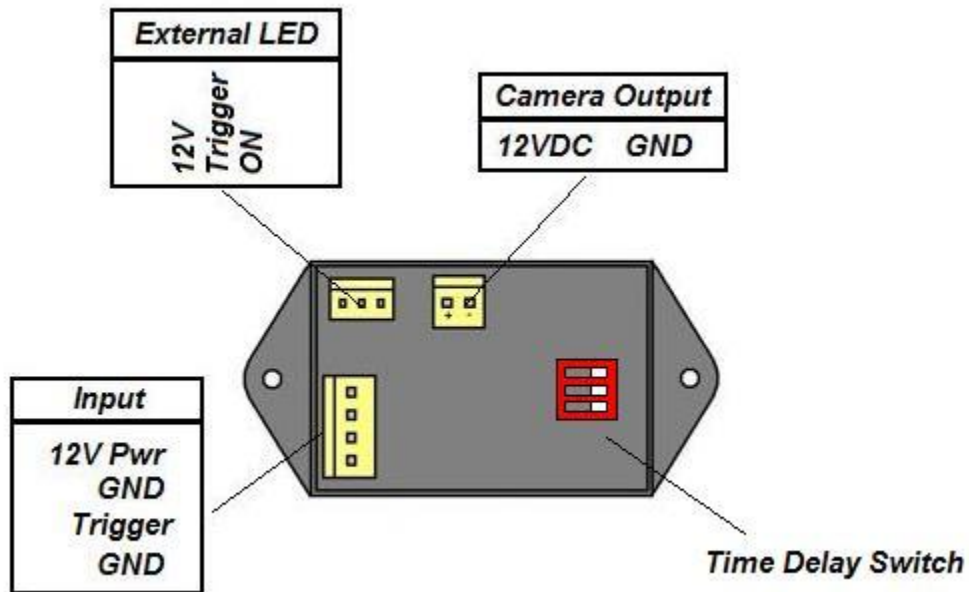
Reset Switch



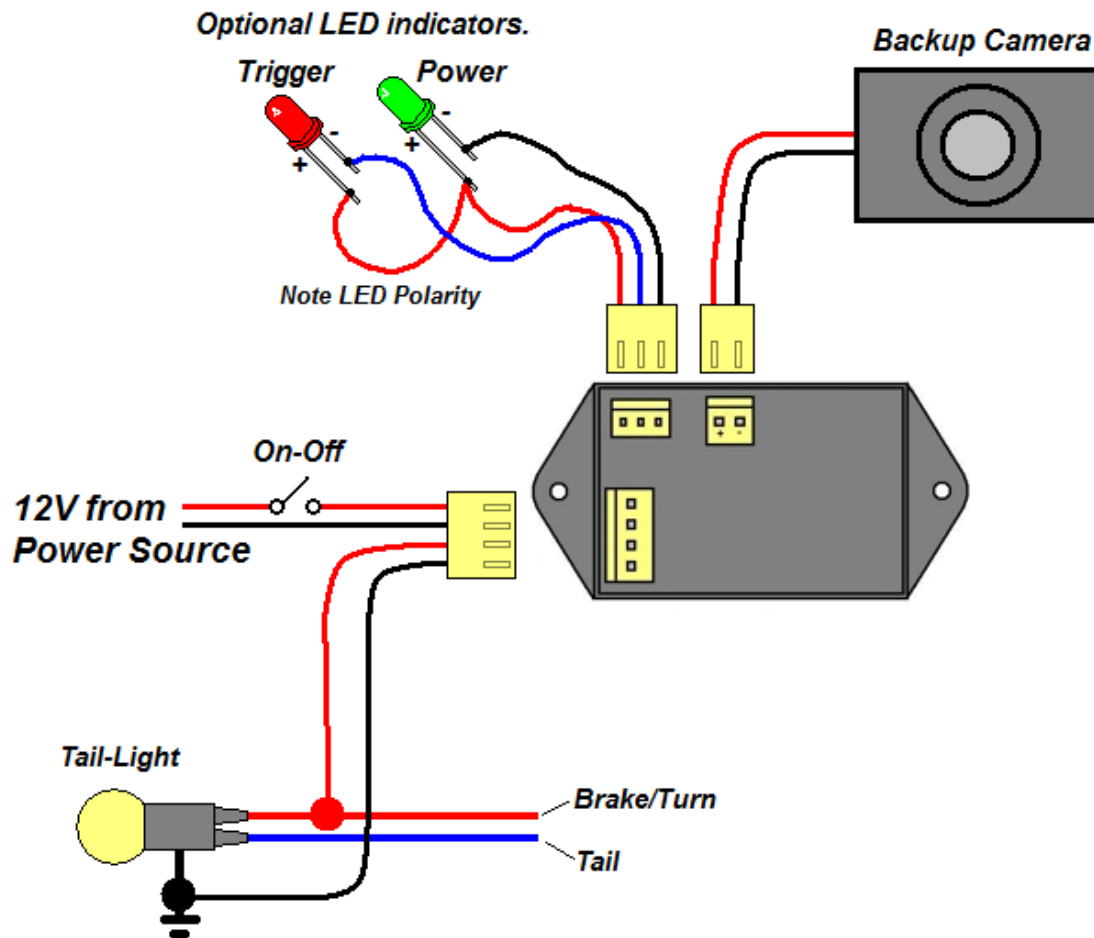
When you are done constructing the board, go to www.RV-Project.Com and download the latest Arduino Sketch, then load the sketch into the ATTiny85 microcontroller.

The board is now ready for testing. Connect 12VPwr and Ground, as well as a camera to the output.

Connect the Trigger to the brake light circuit, and ground to the brake ground if it is floating (otherwise a single ground is all that is needed).



Select the desired time delay with the switch. Apply 12V (if bench testing) or apply the brakes to turn the camera on.



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