

Tim's Pinball Mods

T.I.L.T. Mods Deluxe Board

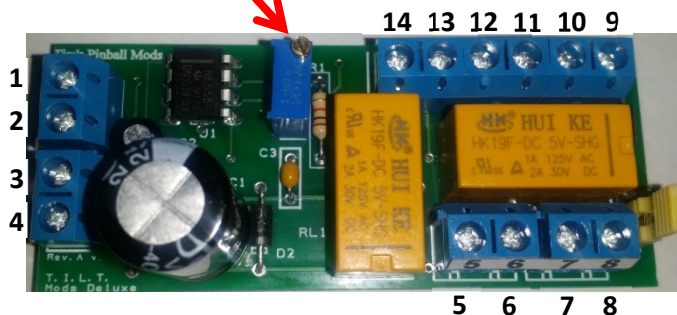
Tapping Illuminated Lamps to Trigger Mods

The T.I.L.T. Mods Deluxe Board was created with Pinball mod designers in mind. This board will generate several different outputs by connecting to one single lamp in the playfield or back box. Allow your creative juices to flow and not have to worry about how to tie your new mod into the game rules/modes. Whether your new mod is elaborate with motors, flashing, and steady lights or you just need to convert a pulsing lamp into a steady lamp, the T.I.L.T. Mods Deluxe is flexible enough to handle a variety of mod designs.

Features:

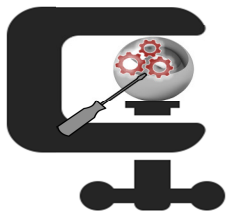
- Trigger mods using mode activated lamps.
- Convert a flashing 6VAC or 5VDC lamp to a steady 5VDC output.
- Convert a steady 6VAC or 5VDC lamp to a flashing 5VDC output.
- Dry contact outputs for added flexibility as well as controlling different voltage devices.
- Dry contacts can be switched from Latch Mode to Alternate Mode by moving a jumper.
- Rate of flashing outputs can be adjusted from once every 1.5 secs. to a strobe type effect.

Pulse Rate Adjustment Pot: Change the rate at which the voltage pulses. (1.5 sec. delay – Strobe)



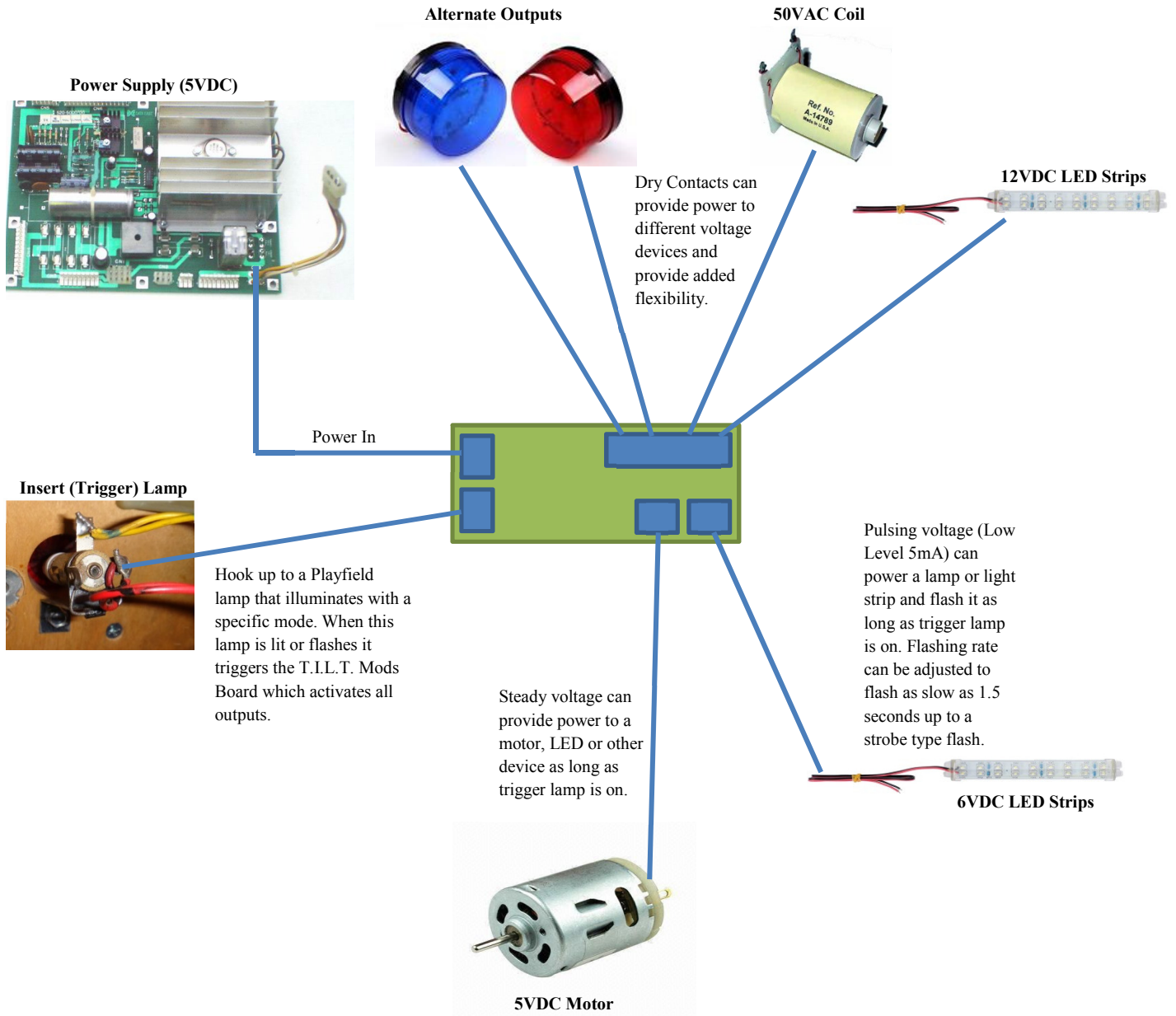
Dry Contact Output Jumper: Change Outputs to Latch Mode or Alternate Mode with jumper.

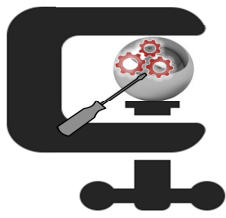
T.I.L.T. Mods Pin Out	
1.	Power In + 5-6 VDC DO NOT CONNECT AC
2.	Power In 5-6 VDC Ground
3.	Trigger In +5-6 Volts AC/DC (Flash or Steady)
4.	Trigger In Ground/-/AC
5.	Steady Out + 5VDC
6.	Steady Out 5VDC Ground
7.	Low Level Pulsing Out + 5VDC (Max Load 5 mA)
8.	Low Level Pulsing Out 5VDC Ground
9.	Dry Contact Out 1 (N.C.)
10.	Dry Contact Out 1 (C)
11.	Dry Contact Out 1 (N.O.)
12.	Dry Contact Out 2 (N.C.)
13.	Dry Contact Out 2 (C)
14.	Dry Contact Out 2 (N.O.)



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Application Example Diagram:



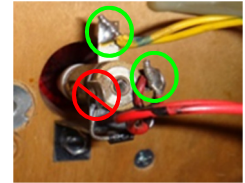


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Connection Descriptions:

Power In (Pins 1 & 2): The T.I.L.T. Mods board requires a steady power source from the 5VDC connection of the pinball machine. Typically there are test points on the power supply that you can tap into. Alternatively you can usually find several connectors that provide 5VDC. Refer to your machines schematics to determine where 5VDC is connected. Make sure to double check the voltage you are tapping into with a voltage meter before connecting. **DO NOT CONNECT AC VOLTAGE TO PINS 1 & 2!!! DOING SO WILL DAMAGE THE BOARD!!!**

Trigger Input (Pins 3 & 4): In order to activate or trigger the T.I.L.T. Mods board you will connect the input to a playfield or back box lamp. This connection can be made with alligator clips or by making a connector adapter. Refer to your machines schematics if using a connector adapter. The lamp can be a flashing or steady lamp. Typically you would connect to an insert lamp that is lit when a certain mode is active. Be mindful that most programmers also utilize insert lamps during attract mode and other light shows, so your mod may activate during these times. If you connect the trigger input to the GI (General Illumination) lamps your mod will be active any time the GI is on. Always check the lamps voltage with a voltage meter before making the connection. You should read anywhere between 5-6VAC or 5-6VDC. Both AC and DC voltage can act as the trigger. Most Pinball lamps have 3 terminals. 2 of them have wires connected while the third will have a diode connected. You will connect to the two terminals that have wires not to the one with the diode.



DO NOT CONNECT TRIGGER INPUT TO A FLASHER IF THE VOLTAGE EXCEEDS 5-6 VOLTS!!! DOING SO WILL DAMAGE THE BOARD!!!

Steady Output (Pins 5 & 6): When the T.I.L.T. Mods board is triggered; all of the outputs will activate and stay active as long as the trigger is present. The steady output will provide a steady 5VDC output that can be used to drive any 5VDC device (motor, lamp, light strip, etc.). Current draw is only limited by the power source, which in this case is the Power In.

Low Level Pulsing Output (Pins 7 & 8): When the T.I.L.T. Mods board is triggered; all of the outputs will activate and stay active as long as the trigger is present. The low level pulsing output will provide a pulsing 5VDC output that can be used to drive low current draw devices or signal voltage to another controller. The low level pulsing output has a maximum load of 5mA. It struggles to power some #555 and #47 type LEDs but does quite well with a Comet LED strip. <http://www.cometpinball.com/6-3-V-Plug-Play-Strips-Comet-Pinball-p/6.3vsmdstrips.htm> To power higher current draw devices you will use the dry contact outputs.

Dry Contact Outputs (Pins 9-14): When the T.I.L.T. Mods board is triggered; all of the outputs will activate and stay active as long as the trigger is present. The dry contact outputs can power higher voltage devices or devices that need more current.

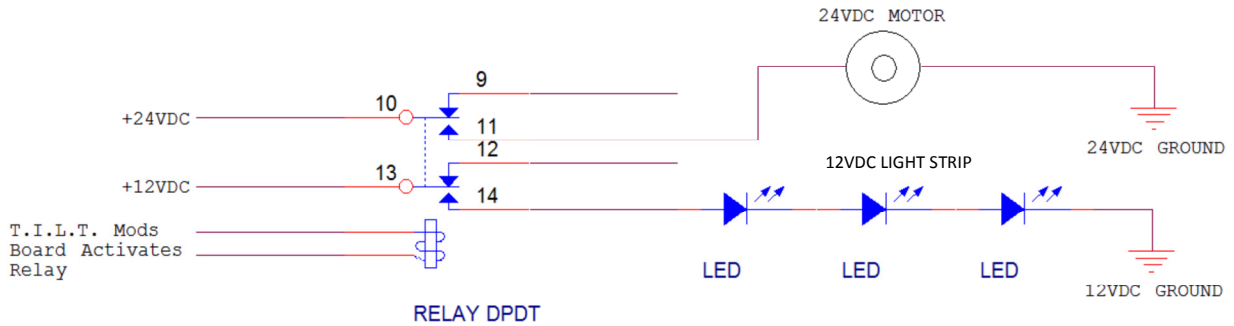
In Example A the dry contact relay is powering two different devices. The first set of contacts is powering a 24VDC motor every time the board is triggered. The second set of contacts is powering a 12VDC light strip every time the board is triggered.

In Example B the dry contact relay is powering a 50VAC solenoid every time the board is triggered. The second set of contacts is alternating a red and blue LED every time the board is triggered.

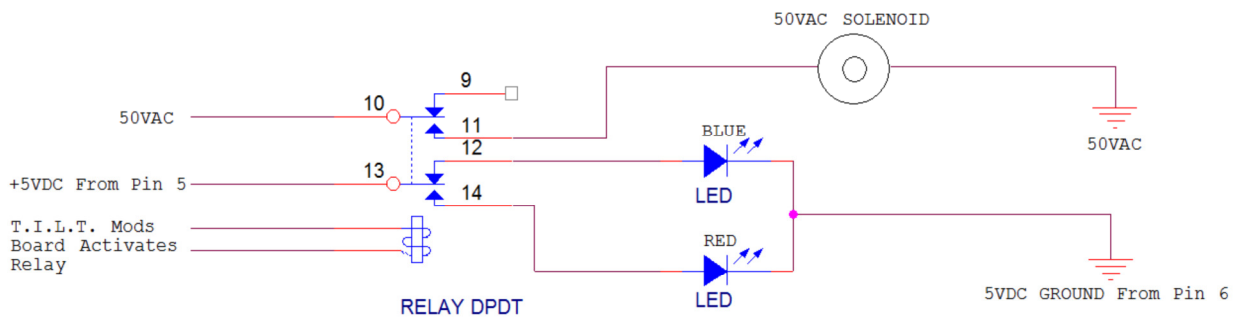


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Dry Contact Example A



Dry Contact Example B



Jumper Setting: The dry contacts can be set to Latch Mode, turning ON when the T.I.L.T. Mods board is triggered and turns off when the trigger input is removed. To do this you will place the yellow J6 jumper on pins 1 & 2 (closest to the edge of the board). The dry contacts can also be set to Alternate Mode, turning ON OFF ON OFF repeatedly until the trigger input is removed. To do this you will place the yellow J6 jumper on pins 2 & 3 (closest to the diode).

Pulse Rate Adjustment: The low level pulsing outputs and dry contacts (when set to alternate) pulse rate can be adjusted. Turning the potentiometer several turns clockwise will cause the pulse to slow down. Turning the potentiometer several turns counterclockwise will cause the pulse to speed up.