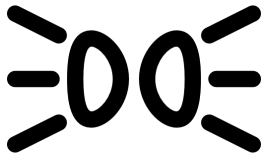

Hot Rod Blinkn' 2.1

Installation Instructions

This product is intended to be installed by a professional installer.
Attempts to install this product by a person other than a
Trained professional may result in severe damage to a vehicles
electrical system.

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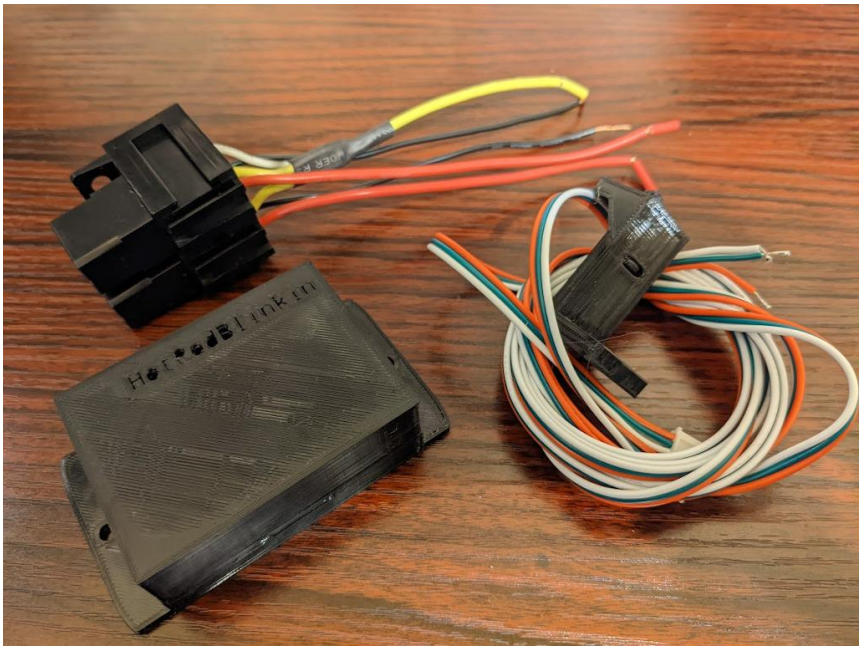


HotRodBlinkn' fills a need for us HotRod and Custom Vehicle enthusiasts. In particular, the Factory Five Roadster that I built which inspired the creation of this module. So often these builds use a simple generic steering column, with no provided mechanism to have a self-canceling turn signal.

Features

- Self Canceling by the position of your steering wheel, not a timer.
- Easy to Integrate into new or existing vehicle wiring.
- Solid-State switching logic supports LED turn lights.
- Audible Old-School (tick/tock) .
- Lane-Change Mode.
- Standard G8HL Automotive Relays for high reliability and easy replacement.
- Easy to Retrofit into existing wiring.
- Uninstallable Install with minimal destructive impact on existing wiring.

Parts Provided

- Main Hot Rod Blinkn' Module.
- Switch and Sensor Wiring Harness.
- Relay block with 2 G8HL relays. Pre-Wired for use with the main module.
- IR Sensor and Bracket pre-wired to harness.

How it Works

The IR-Sensor is the part of this self-canceling turn module that sets it apart. This sensor is what is used by the main module to detect the orientation of your steering wheel. If you observe how a typical OEM self-cancel mechanical mechanism works, it does not turn off the flashing until your steering wheel is brought back to center. The IR sensor provides the feedback to the main module allowing it to emulate this behavior.

The IR sensor is able to detect only 2 things. Either a black (non-reflective) surface, or a White/Silver (reflective) surface. The control module is programmed to assume the steering wheel is straight as long as the black non-reflective surface is in front of it. If a white/silver reflective surface is in view of the sensor, the module assumes the wheel is turned at some angle. The specific angle is not important, only that the wheel is not straight.

The IR sensor simply needs to be positioned to be able to see the steering shaft. Then, the part of the steering shaft that is in front of the sensor, needs to be colored accordingly. Black for straight and white/silver for turning. The colors of the 2 sections are important. A flat-black color is the best choice for the non-reflective section. The important property being that the color does not reflect Infrared light. White is ideal for the other color, but any decently reflective surface should do. The white or silver color needs simply be highly reflective to Infrared light.

When you initiate a turn with the SPDT switch, the main module watches the IR sensor for a specific sequence of events in order to detect when the turn is finished. Simply, the IR sensor must transition from reflective to non-reflective to cancel the turn. For example, typically the black section is in view to begin with. This indicates to the main module that the turn has not even started yet. As the wheel is turned, the IR sensor will begin to see the reflective surface. This now indicates that the turn is under way, and the flashing continues. As the steering wheel is straightened back to center, the non-reflective surface is visible to the IR sensor, indicating the turn is complete. The main module now cancels the flashing. Yes, it's just that simple.

The width of the non-reflective black stripe will depend on the diameter of the steering shaft on your vehicle. It might require a little trial-and-error to get it turned the way you want it. I suggest painting the steering shaft white (or leave it silver) and using a piece of black electricians tape of varying widths to find the width that best fits your car. Once you have the size you like, you can paint a permanent stripe.

In my car, the steering shaft is only about 1.25" in diameter. The width of the black stripe (about ¾") is sized so that each edge of the stripe is about 35 degrees from the center.

In an effort to reduce noise and false triggers, the IR sensor employs a feature called debounce. The firmware uses a ½ second debounce period. This means that the black and white/silver sections on the steering shaft must be in view for a minimum of ½ a second before that state is considered active. In other words, if during your turn the reflective surface comes into view for under ½ a second, the control module will not think that that a turn was executed. You will have

to cancel the turn yourself manually. I have found that the vast majority of turns have the steering wheel turned far longer than ½ a second.

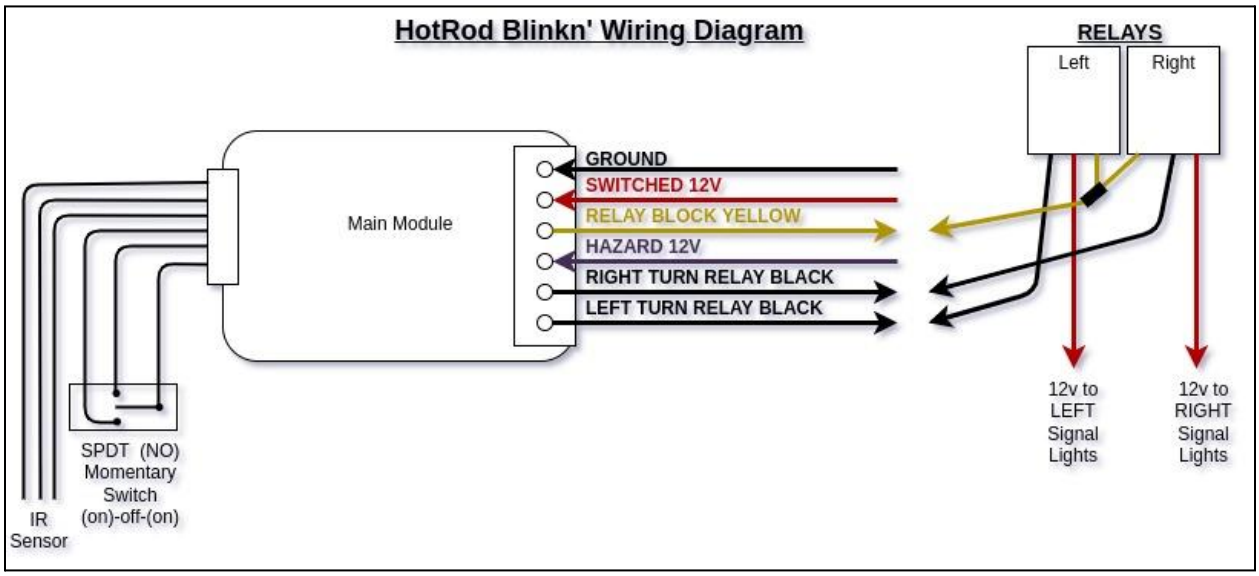
Final note about the IR sensor, it needs to be in a place that is not affected by LEDs, Interior Lights or sunlight. It should be under your dash in the dark. Sunlight and most LEDs will negatively affect its performance. In most cases, preventing it from operating as intended.

Operating Instructions

- Initiating a turn operation is as simple as touching one of the SPDT-RT or SPDT-LT wires to the SPDT-C wire. The momentary connection of the wires signals to the module to begin flashing the relay for the indicated side.
- Cancel a turn by momentarily connecting the opposite direction SPDT wire combination.
- Lane Change is initiated by Holding the wires connected for more than 1 second.

Power On	When power is first provided on the 12v switched input, or the 12v hazard input, the module will flash the turn signals quickly 2x. This simply indicates the module is started up and ready to go. On the main module, the **STS** LEd will do a short-flash every 1.5 seconds.
Start Turn Signal	Momentarily connect the SPDT-LT or SPDT-RT wires to the white SPDT-C wire to initiate a turn in the desired direction.
Manual Cancel Turn Signal	Momentarily connect the opposite SPDT wire to the white common wire to cancel a running turn signal.
Lane Change	Instead of momentarily connecting the SPDT-RT or LT wires to the SPDT-C wire, continue to hold it connected for over 1 second. As long as the connection is continued to be held, the flashing will continue to operate. As soon as you release the connection, the flashing will cancel.
Hazard	Provide 12v to the HZD terminal to start flashing all lights in hazard mode.

Wiring Diagram



Parts

- **IR Sensor** is the provided plastic **Z** shaped piece with the 2 small round IR LEDs. This should already be attached to 3 of the 6 wires from the small white JST plug.
- **SPDT** is any sort of momentary **S**ingle **P**ole **D**ual **T**hrow toggle switch. Often identified by (on)-off-(on). The specifics of this switch is left to you to determine.
- **Relays** is the provided output relay block that connects to the turn signal lights. Replacement Relays MUST include a fly-back diode. Failure to use a relay with a fly-back diode could permanently damage the main module.
- **Main Module** The Hot Rod Blinkn' Itself!

6-pin White JST Connector

IR Sensor (PIN 1,2,3)	5v - RED LG - GREEN SG -WHITE	Pre Connected to the wiring harness. Red provides 5v to the sensor. Green is the ground for the IR LED. White is the signal from the IR sensor.
SPDT-LT (PIN 4)	L - RED	Left-Turn Trigger. Starts the left turn sequence when touched to the whtie Trigger Common wire. If the connection is maintained for over 1 second, the sequence will continue in Lane Change mode.
SPDT-RT (PIN 5)	R - GREEN	Right-Turn Trigger. Starts the right turn sequence when touched to the whtie Common wire. If the connection is maintained for over 1 second, the sequence will continue in Lane Change mode.
SPDT-C (PIN 6)	C - WHITE	Turn Trigger Common

6-Position Black Screw Terminal Block

Ground	GND - BLACK	Ground to chassis. This is a low current ground. Under 1A
Switched 12v	12v+ - (RED)	Switched 12v power. Power only when the key is on. No more than a 10A fuse. Recommend a 5A or less if using LED lights. This wire feeds power to the bulbs.
12v Out	Y - YELLOW	Provides 12v output power to the relay block. This output comes from either the 12v switched, or 12v hazard. The 12v is provided to the combined yellow and white wires in the relay block.
Hazard 12v	HZD - (PURPLE)	Hazard input power from your hazard switch. Similar to the switched 12v power, no more than a 10A fuse.
Right Turn	RT - BLACK	Output signal to the relay block to trigger the right-turn relay. The relays are ground triggered. This means this terminal provides a ground to the relay to trigger it.
Left Turn	LT - BLACK	Output signal to the relay block to trigger the left-turn relay.

Installation Instructions

Notes:

- Maximum Hazard and Switched 12v Fuse (10A). If you are using LED turn bulbs, you should be able to easily use as small as a 5A or even 3A fuse.
- Please take great care to connect the correct wires to the correct terminals. The GND, 12v+, Y and HZD terminals are very resilient to accidental reverse wiring. The LT and RT terminals however will not survive a short circuit directly with a 12v source.
- The SPDT (red, green, white) wires will not survive a 12v source. A short circuit with 12v to these wires will destroy the module. These 3 wires however can handle any combination of themselves connected to each other.
- Existing Flasher Modules are usually wired before the switch they are connected to. They work by heat. When the switch connects the power to the light bulbs, the current heats up the internals of the flasher module. The temperature causes the flasher to open internally, curing power to the lights. As it is open, it cools down, and closes, reconnecting the power to the lights. This is the reason that LED bulbs often result in a very rapid "flashing". They do not demand enough current to warm up the flasher enough.

Installing into a new project

Installation of the main Hot Rod Blinkn' Module should be very straightforward for a new build/install. The above wiring diagrams should be sufficient to be able to integrate into your build. How exactly to perform this integration will be unique to each new install.

Retrofit into an existing Wiring Harness

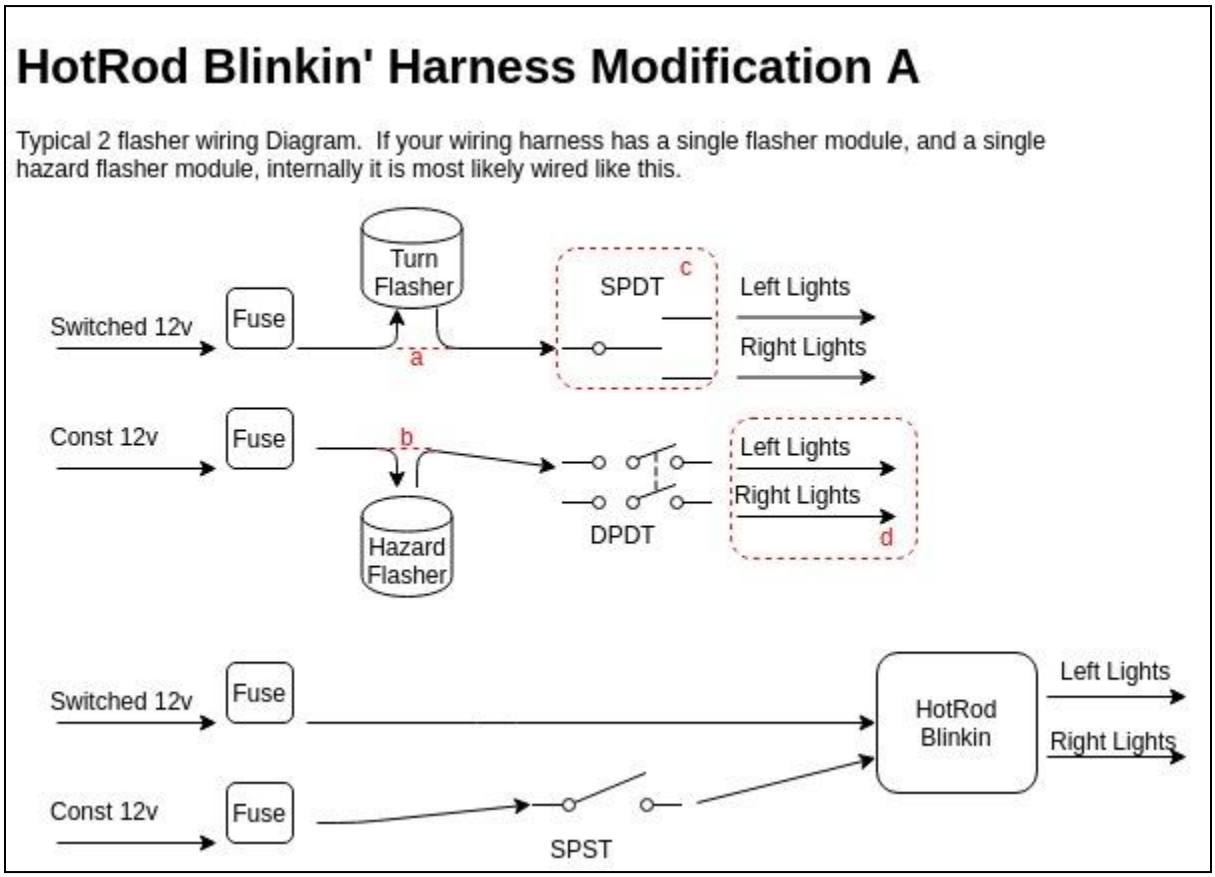
Retrofitting a Hot Rod Blinkn' is to effectively eliminate the turn and hazard switches and flashers and replace them totally with this module. It will be important to fully understand how your existing turn and hazard flashers currently operate. Depending on the particular wiring harness in your vehicle, there will be a few modifications needed. The key thing to determine is how your existing wiring harness is setup with flasher modules.

A typical harness uses a single 2-pin flasher module for the turn flashing, and a separate 2-pin flasher for the hazard flasher. If this is your wiring setup, you will be able to remove both flasher modules and simply connect the 2 wires together. You can cut and connect, or simply create some sort of simple wire shunt. This will effectively result in providing a constant 12v source to your turn lights for both the signal lights, and the hazards.

Reference the below harness modification diagram. In this typical 2 flasher module wiring diagram you can see the layout used to connect each flasher to the light outputs. The diagram

shows how to eliminate the existing flasher modules, and replace with the HotRodBlinkn' module.

1. Remove the Turn Flasher and connect the 2 wires together (red dotted line a)
2. Remove the Hazard Flasher and connect the 2 wires together (red dotted line b)
3. The existing turn-signal switch (red dotted box c) will need to be eliminated in favor of the momentary SPSD needed (see above main wiring diagram)
4. The output from the now bypassed turn flasher is then connected to the 12v switched input on the Hot Rod Blinkn' module.
5. The output from the now bypassed hazard flasher is directed through a simple (existing) SPST switch and connected to the HZD input on the Hot Rod Blinkn' module.
6. The (red dotted box d) is eliminated also. Usually these wires are simply connected directly to the outputs of the turn signal switch (red dotted box c) outputs.



IR Sensor Placement

See How It Works Above for more info

Wherever you install the IR sensor, do not put it in a location where it can be affected by sunlight, other interior lights, or LED lights. This sensor relies on IR (infrared) to do its job, stray light will hamper its functionality. Mount the IR sensor about ½" away from the surface of the steering shaft. This should be more than close enough for a good reading from the reflective and non-reflective black and silver colorings on the steering shaft.

You will need to color the steering shaft with 2 colors. White paint, white vinyl sticker, and even a sharpie should do the trick. I suggest you test it out (see below Try it Out Before Installing) section.

This is the sensor installed on my Factory Five Roadster. You can see the black paint on the section of steering shaft.

Try it out Before Installing

I highly recommend you try out the module on your workbench before installing. This will help understand how it operates, and aid you during install. You do not need a 12v light bulb to fully test out the module. You will be able to hear the relays clicking in operation. You'll need a 12v-50ma DC power supply of some sort. The 3 bare SPST wires are not high voltage. They are 5v low power (<1ma) wires. You will not feel anything.

Test 1

1. Plug in the 6 pin white jst harness.
2. Ensure the 3 bare wires are not touching (yet).
3. Connect the 12v switched terminal.
4. Connect the GRND terminal.
5. Touch the green SPDT-RT wire to the white SPDT-C wire.
6. One of the relays should start clicking. The RT LED on the module will flash also.
7. Touch the red SPDT-LT wire to the white SPDT-C wire to cancel.

Test 2

1. Plug in the 6 pin white jst harness.
2. Ensure the 3 bare wires are not touching (yet).
3. Connect the 12v switched terminal.
4. Connect the GRND terminal.
5. Ensure the IR sensor is not aimed at anything reflective.
6. Touch the green SPDT-RT wire to the white SPDT-C wire.
7. Place a white piece of paper in front of the IR sensor for 2 seconds or more.
8. Remove the piece of paper.
9. The signaling should now have automatically stopped.

Test 3

Using test 2 as a guideline, experiment with different materials you plan to use on your steering shaft for the reflective and non-reflective colorings. If you intend to use paint, I recommend you do a sample spray on something to test it out. If you intend to use some sort of sticker or tape, again I suggest you test out the materials ahead of time to be sure.