



Flashing Side Marker Lamps

Most 1968 and newer (and all 1970 and newer) vehicles first sold in the USA or Canada are equipped with amber front and red rear side marker lights. These are intended to show the presence, position, and direction of travel of the vehicle after dark. They do that job very effectively.

But there's no requirement in North American lighting regulations for side-on visibility of vehicle turn signals. Some vehicles have turn signal repeaters mounted on the front fenders or side view mirrors as required in most countries outside North America. Adding repeaters to a vehicle not originally equipped requires drilling holes and adding new wires, which presents issues with vehicle body rust and body shop costs.

The front side markers are *allowed* to flash with the turn signals, but it's not required. There's **good quality research** on the subject from UMTRI (the University of Michigan Transportation Research Institute, one of the world's top centres for vehicle lighting safety performance research) on the subject; take a look at the "Results" section on page 7. The abstract of that paper states, correctly, that **"the turn signals of a vehicle that is minimally compliant with U.S. regulations are not visible to a driver of a nearby vehicle in an adjacent lane"**. That hazard is not confined only to drivers of nearby vehicles, though; it also endangers pedestrians and bicyclists. The situation illustrated and described in **this 1975 AAA Foundation film** still exists throughout North America today.

Having the front side markers flash is an easy, non-invasive way to expand the visibility angle of your turn signals so your intent to turn or change lanes is visible to drivers alongside your car who can't see your front or rear indicators—as well as to pedestrians, bicyclists, and others who have a personal interest in not trying to occupy the same space at the same time as your vehicle.

There is more than one method for adding turn signal flashing functionality to the side marker lights. First, let's look at a method which works on any vehicle, no matter what kind of side marker lights or circuitry it might have.

Module method: Works on any vehicle

Fetch a **PLUM-4 module** (\$129) from me (**Send me an email to order one**). This durable, dependable, compact, American-made logic module works perfectly to add turn signal flashing to the front side markers while retaining their original function as side markers.

One module does the whole job, there's no underhood clicking or excessive parts count as with homebrew methods with a pile of relays, no tedious and risky ground isolation needed, and it works with *any* kind of side marker light. One-wire, two-wire, filament bulb, LED; controlled by traditional switches or by the vehicle's body control module; doesn't matter, it'll work regardless.

If you do it this way, the side markers will always flash in synchronous phase with the front and rear turn signals, whether the parking or headlamps are on or off. They will not flash in opposite phase when the parking or headlamps are lit, as occurs with the other methods described below. Either in-phase or opposite-phase flashing of the side marker with the turn signal is acceptable in North America.

Most countries outside North America do not allow side markers to flash in opposite phase, so the PLUM-4 module is the solution when importing an American-specification vehicle to a country that uses the international European auto safety standards; this will in many cases satisfy the requirement (which does not exist in North America) for side turn signal repeater functionality, without giving up the side marker functionality.

The obverse is also true: if you're bringing a European-, Japanese-, Australian-, or other-spec vehicle into North America and have to have a front side marker function, this method lets you add it via the existing repeaters (if they're acceptably close to the front of the vehicle) without giving up the side repeater function.

Even in North America, where opposite-phase flashing is allowed, there are some situations in which it should not be implemented even when the vehicle and lamps are electrically compatible. On a vehicle with 2-wire side markers that wrap round to the front of the and serve as the vehicle's front position ("parking") lights, opposite-phase flashing will create a confusing—and at least arguably illegal—wig-wag appearance. This isn't a good idea; reducing the clarity of the front turn signal can only increase the likelihood of a collision, and who wants to go catching the attention of a police officer? On vehicles configured like this, use the PLUM-4 module (**Send me an email to order one**) and make sure the combination side marker/parking lights emit amber light, not white (pick amber bulbs carefully; some are inappropriate—advice on request). That way all functions (parking lights, side markers, and side turn signal repeaters) will be effective, legal, and safe.

To hook up the PLUM-4 module as a side marker controller, connect its wires as follows:

- **Blue:** Tap into the vehicle's parking lamp feed wire
- **Black:** To ground
- **Yellow:** To +12v via a 10A fuse
- **Red:** Tap into the vehicle's right front turn signal feed wire
- **Brown:** Not used in this application of the module; tape it off.
- **Pink:** Tap into the vehicle's left front turn signal feed wire
- **Violet:** Not used in this application of the module; tape it off.
- **White:** Cut the feed wire to the left front side marker light, and connect the module's white wire to the downstream (lamp) end of the cut wire. Tape off the upstream (vehicle) end of the cut wire.
- **Green:** Cut the feed wire to the right front side marker light, and connect the module's green wire to the downstream (lamp) end of the cut wire. Tape off the upstream (vehicle) end of the cut wire.

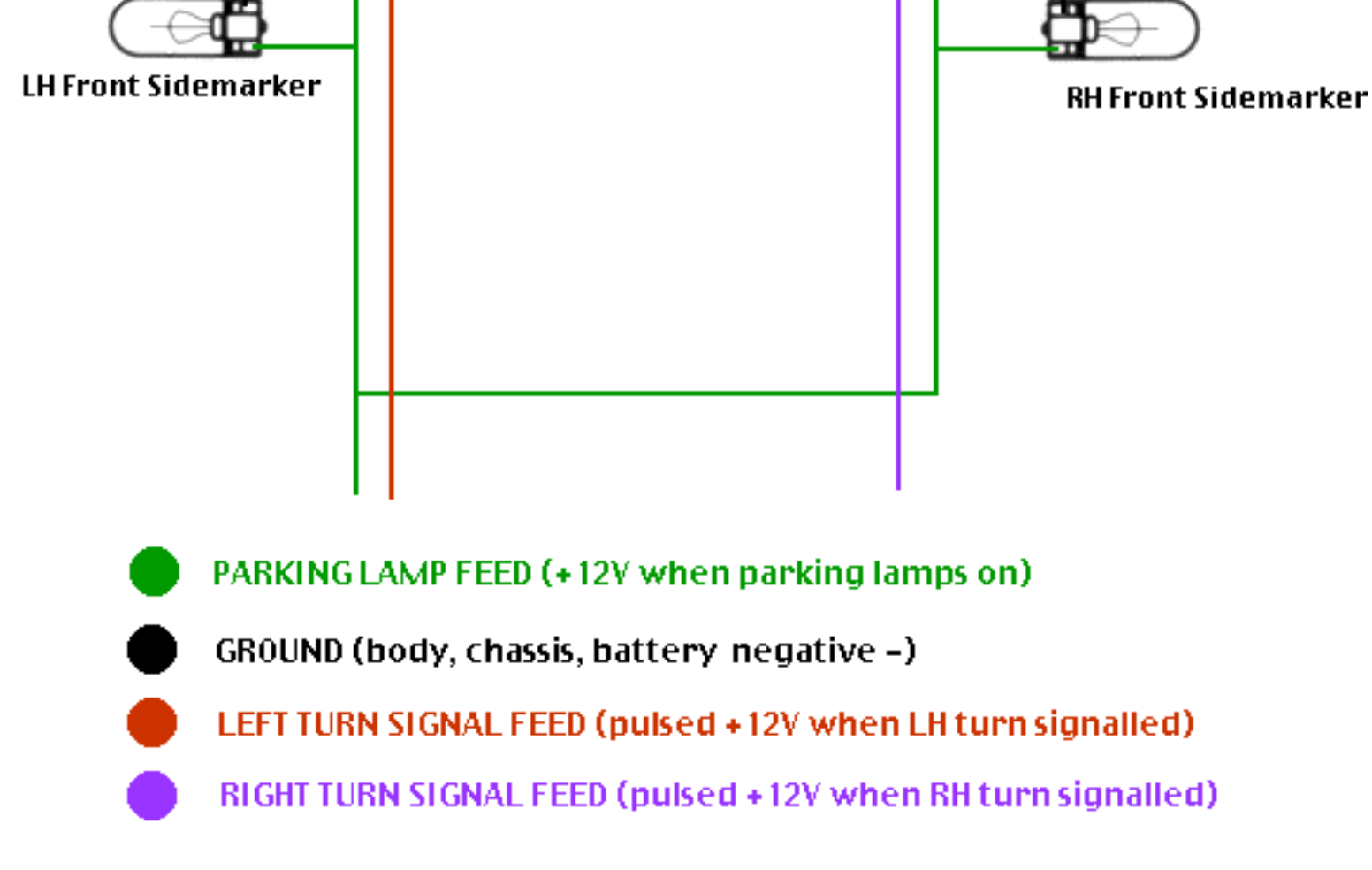
(The module wires not used in this application are for **adding daytime running lights** to a vehicle not originally equipped; a single PLUM-4 module can add either function, or both, to a vehicle)

For tapping into existing circuits in a good and durable manner, use Posi-Tap connectors as reviewed **here**, available **from the manufacturer** and increasingly available locally. It is best to avoid the fold-over-and-crunch ("Scotchlok", etc) type taps; they tend to cause problems.

Crossfeed method

Vehicles with 2-wire, bulb-type side markers have been manufactured with the side markers wired in two different ways: with the front side marker bulbs wired across parking lamp feed and turn signal feed, which provides a flashing side marker, or wired across parking lamp feed and ground, which results in a non-flashing side marker. There's no consistency or pattern to which vehicles have what; front side markers *may* flash with the turn signals, but they're not required to, so it's a matter of automaker whim. The Jeep Wrangler, for example, had flashing front side markers until 2004, and non-flashing ones starting in 2005. Same vehicle, same side marker lights (same cost to the automaker), just a different decision. It's pretty random and arbitrary. If your vehicle has filament bulbs in the front turn signals, and two-wire front side markers with filament bulbs in them, and the markers don't flash with the turn signals, you can make them do so by moving one wire.

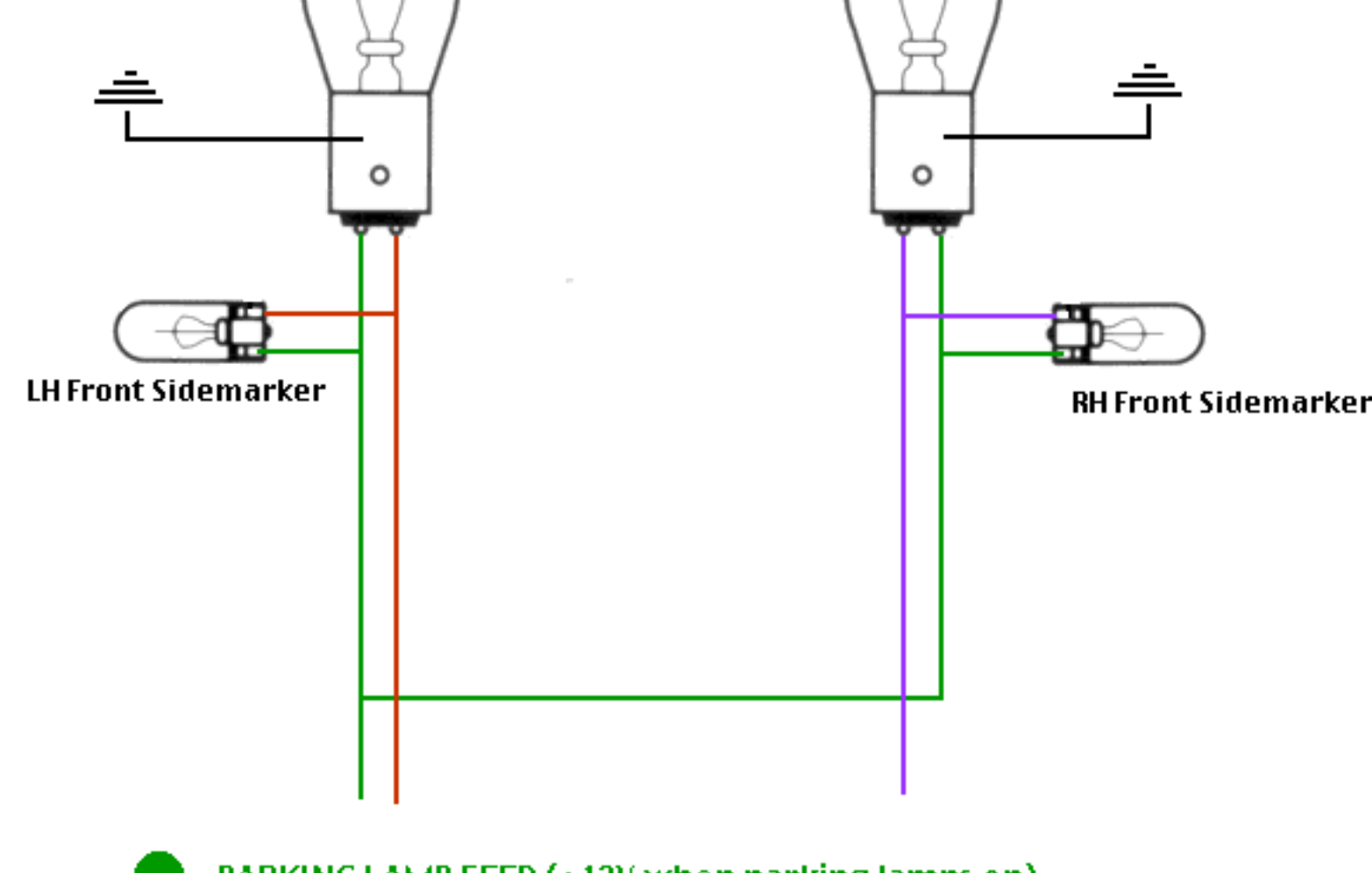
Here's how the front parking, turn signal and side marker lights are wired so the side markers **do not** flash:



This diagram shows combination park/turn bulbs, with a bright turn signal filament and a dim parking lamp filament in the one bulb. Each filament has its own feed terminal on the bulb base. The wiring is the same in systems that have separate bulbs for the parking lamp and the turn signal; the only difference is that the park lamp feed and the turn signal feed wires go to separate bulbs.

With this hookup, the side marker lamps are wired exactly like the parking lamps. They are always grounded, and they receive +12V whenever the parking lamps are on. Therefore, they illuminate steadily whenever the parking lamps are on, and never flash.

Here's how the system is wired to make the front side markers do double duty as side turn signal repeaters:

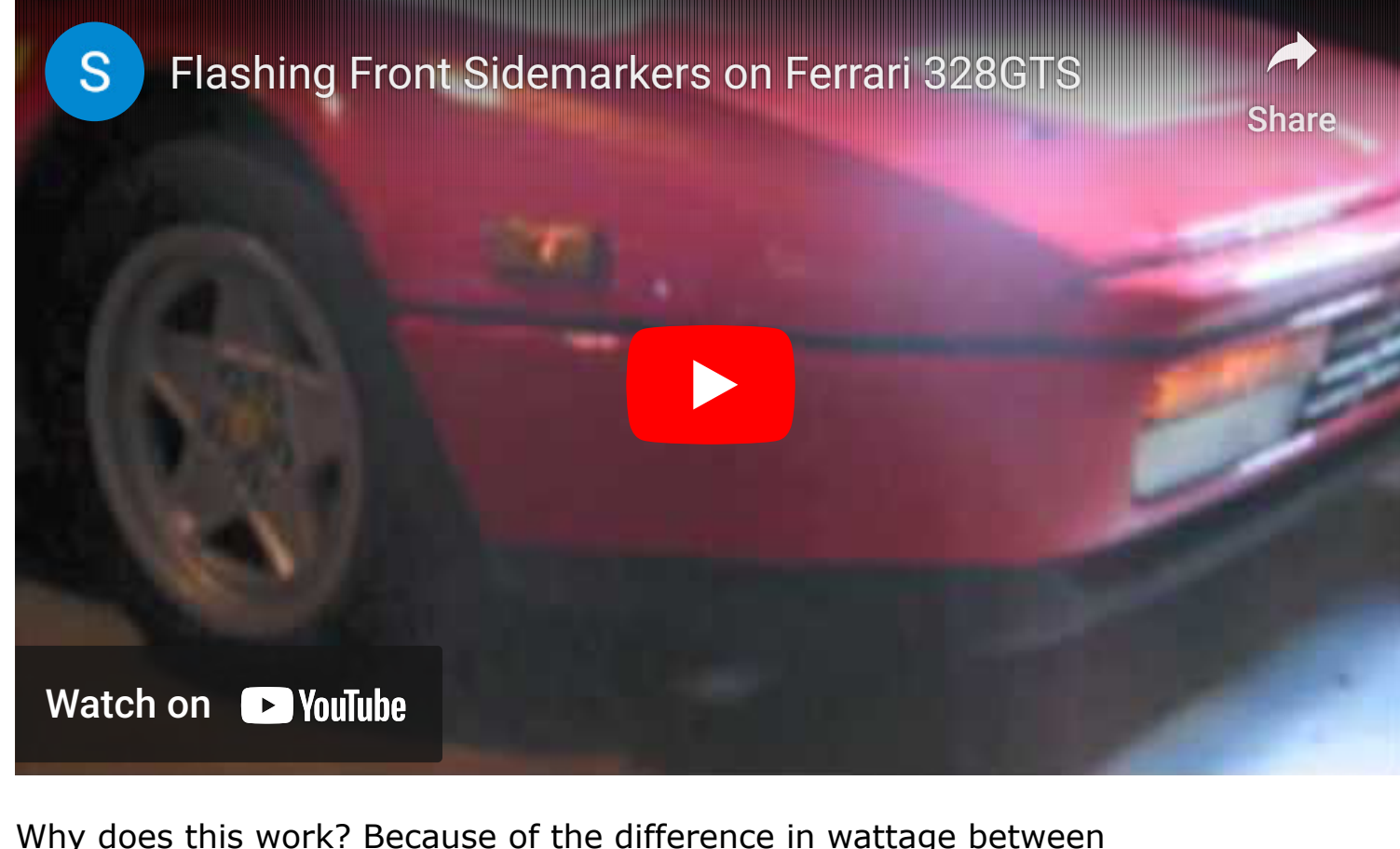


There's only one difference between this setup and the non-flashing side markers: Instead of the side markers being wired across parking lamp feed and ground, they're wired across parking lamp feed and *turn signal feed*.

The side marker bulb socket is isolated from ground, and one bulb lead goes to the running lamp positive circuit. The other lead is tied into the turn signal positive lead.

When the parking lights are on and the turn signal off, it grounds through the turn signal filament and illuminates the marker lamp. When the turn signal flashes, it interrupts the ground and the marker will flash. When the running lights are off, the process is reversed, with the ground being through the filaments of the running light circuit, and the marker will flash in sync with the turn signal instead of alternately.

Here is a video showing the results of this modification on a Ferrari 328GTS. First with the parking lamps off, then with them on:



Why does this work? Because of the difference in wattage between the side marker filament (3 to 6 watts) and the turn signal filament (21 to 29 watts). There are at least two turn signal filaments—at least one front, at least one rear—through which for the single side marker filament to ground when the turn signals aren't lit. As far as the low-wattage side marker filament is concerned, the high-wattage turn signal filaments look like a low-resistance path to ground; the low-wattage side marker doesn't send enough current through the turn signal filaments to light them up.

1-wire and LED side markers

It's easiest and safest to use a PLUM-4 module (**Send me an email to order one**). The move-one-wire crossfeed method won't work if your front turn signals and/or front side markers use LEDs rather than filament bulbs, nor if each front side marker has only one wire and gets its ground through the mounting of the lamp housing to the body sheetmetal rather than via an actual ground wire.

If you have single-wire, body-grounded filament-or-bulb side markers, you can use the crossfeed method if you go to considerable extra work: you must well and thoroughly isolate and insulate the side marker housing from ground, then attach a ground wire and proceed as described above. Materials and supplies useful in isolating and insulating body-ground side markers may include nylon mounting hardware rather than metal, rubber gasket material, liquid electrical tape (in the brush-top can), and the "Plasti-Dip" material available at hardware stores for creating insulating flexible plastic handles on bare metal tools. But take a careful look at your side markers and how they mount to make *absolutely sure* you can achieve a good and durable insulation from ground. If your insulation job fails, you'll have a short circuit which will blow the fuse and kill the lights (or cause worse damage if you're less fortunate). It's easier and safer to use the PLUM module method.

Likewise, the crossfeed method will not work with front turn signals and/or side markers that use an LED light source rather than a filament bulb. That's because it functions only if the lights will operate regardless of which direction current flows through them. That's true of a filament, but not of a light-emitting diode (LED).

With single-wire/body-ground or LED side markers, A workable alternate method is to put a relay in the feed wire to each front side marker. Parts count is higher to do it this way—two relays, each with its associated fuse, fuse holder, terminals, relay mounting block, etc. And the resultant relay clicking under the hood or dashboard can be creepy and irritating. Nevertheless, if you are bound and determined to do it this way, wire a normally-open ("NO" or "SPST") relay in on each side of the car as follows:

Relay terminal **85**: to vehicle end of cut side marker feed wire

Relay terminal **86**: to vehicle end of turn signal feed wire via splice

(with Posi-Tap connector as linked above)

Relay terminal **30**: to always-hot +12v via a fuse

Relay terminal **87**: to side marker light end of cut side marker feed wire.

It's really just easier, safer, and more reliable to use the purpose-built PLUM module.

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