Installing a Trunk Mounted Painless Wiring Kit

Not long after purchasing a very nice Model A Tourer, Graeme Thomas, owner of Tractor Replacements, came to me with a wiring problem. It seems his indicators had suddenly decided to retire from their indicating duties, so we dived under the dashboard to take a look.

The sight we met was, sadly, a typical one. Here was a very nice looking Hot Rod that had been well engineered and assembled, only to be let down by a wiring system that was, to say the least, an untidy tangle of wires.

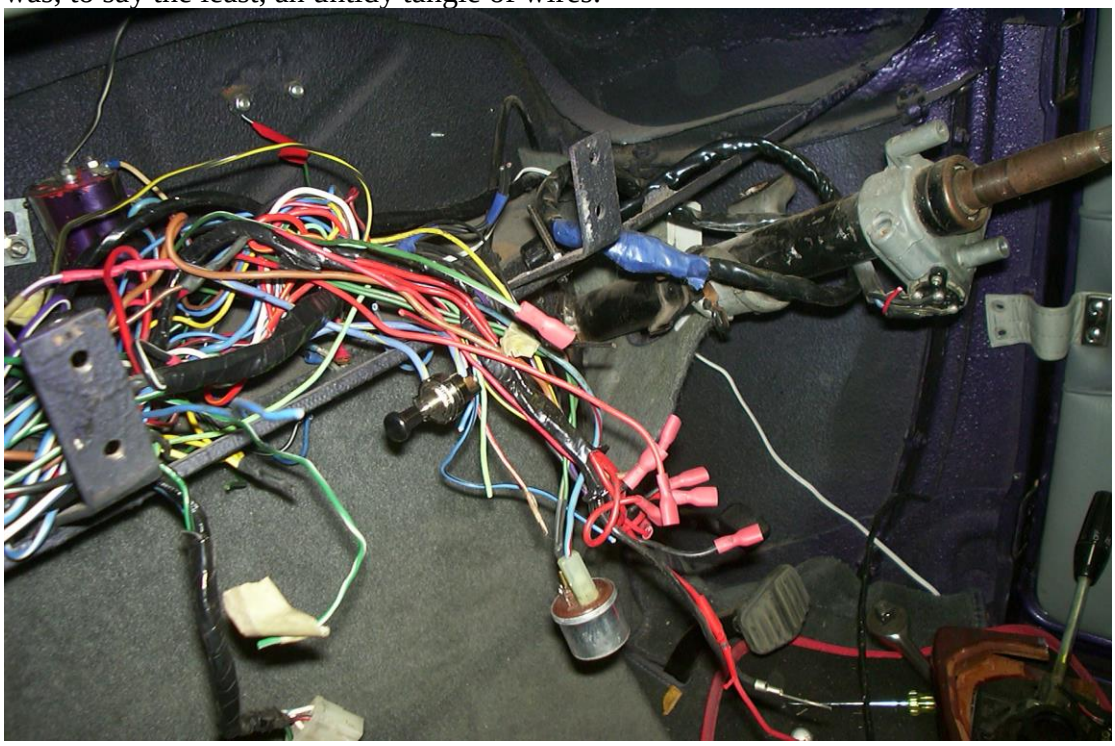


Figure 1 - Once the dash was removed, this is what we found - a rat's nest. Wires that change colour, wires that go nowhere, miles of electrical tape but wires left hanging with no support.

It was plain as the nose on your face that chasing down the indicator circuits was going to be very difficult, and would require the dismantling of the wiring. To make matters worse, while we were attempting to investigate the indicator stalk connections, the radio suddenly stopped working. Then the headlights would not come on.

It was getting worse!

It just so happened that I had a trunk mounted Painless Wiring kit in my garage, waiting to take its place in my 36 Plymouth Coupe. This, however, was an emergency, so we agreed to rewire the car as soon as possible.

Like NOW!

Painless? Yeah, right!

Painless Wiring kits are good. *Very* good. I've used them before, and, compared to a custom built system that you install wire by wire, nothing beats these kits. For the non-technical person, they are far and away the best alternative provided you READ THE FRIGGIN' MANUAL and TAKE YOUR TIME!

But – (now pay attention!) *the instruction manual assumes the installation is for a new hot rod project* or, at least, a major rebuild. Wiring up a car because the old

wiring system has failed presents a few problems that you won't face if your car is in primer, has no existing wiring, and has a "clean" firewall, no carpet and no established harness routings. There are no problems with drilling new holes, welding up old ones, making up brackets or shifting things around to accommodate your wiring. In reality, replacing an existing system means routing the wires where the old ones used to go – regardless of whether it could be done better. In addition, the fact that you have to replace the old system means that there are existing problems – and you have to fix them as you go along.
Painless? Yes. As painless as you are ever going to get, anyway.
Now I understand that there are some pretty good Australian kits out there, too, and some even advertise in this magazine. I haven't had the opportunity to check them out, but the truth is that I have used Painless kits before. So I have to work with what I know and what is at hand. Having said that, the descriptions and procedures that I'm outlining here will pretty much cover for any installation, so regardless of the kit you have chosen for your vehicle, what follows is a guide to doing it right the first time.

Preparation

Painless Wiring kits come pre-wired to the fuse panel, and they throw in some connectors and cable ties.

Figure 2 - Trunk Mounted Painless Wiring kit. They come with heaps of cable ties, crimps and grommets, but you need to supply a few things yourself.

However, you need to have several items to ensure your wiring job is a good one.

- **Crimping Tool.** You'll need a crimping tool, crimps, plugs and sockets.

Figure 3 - Crimping Tool. Only a good quality, ratchet type crimping tool will do. Also make sure you have a good supply of crimps. Also get some three, six and eight pin connectors from your local auto electrical store.

- **Wiring Diagrams.** Your steering column may have indicators, horn, windscreen wipers, light switch and emergency flashers. To sort the wires out, you are going to need a circuit diagram from the workshop manual for the donor car. Beg, steal or borrow the diagrams – not only do they list the wire colours, but they show where other circuits connect and interact. Also make sure you have the right info on other items, like electronic speedo, fuel pump, stereo, ratchet shifter (light, neutral safety switch and revering light switch), stop light switch, wipers, etc.
- **Relays**. If you are using a late model steering column, all the wiring inside it (lights, indicators, horn, windscreen wipers, etc) is control wiring. This narrow gauge, low current wire, is designed to operate relays, not carry the full load for the lights, horn, fuel pump, etc. Make sure you have the correct relays.
- **Convoluted Tubing**. Use plastic convoluted tubing to hold bunches of wires together and protect the wiring from chafing on body panels. You can get this from most parts outlets and swap meets. It also comes in various sizes and colours, but don't pay too much for it! A bag of 10mm x 5 metres of black tubing is about $12.00.

Our steering column is a Mitsubishi with all the lighting controls (indicators, emergency flashers, lights on/off, hi/lo beam), horn and windshield wipers on the column. Quite a common swap in a model A, or any hot rod, as it keeps the dash clean and ensures the controls are in easy reach. *It is in this area that your wiring job will create the biggest problems.* The Painless Wiring kits cater for GM/Holden/Ford/Mopar wiring circuits that use a separate, heavy duty light switch

and dimmer switch. If this is your set-up, you will have no problems. If not, read on….
With all that functionality and not much room, the cabling inside the column is narrow gauge, designed to control external relays to handle the high current drain of lighting circuits, horn, etc. What's more, the mechanical design is somewhat flimsy, and it was clear that this is where the original problem came from. Most of the wiring had been cut and joined to another plug, which had different coloured wires. The plastic indicator-cancelling ring was broken and the emergency flasher switch had been sheared off. So it was off to the wreckers for another steering column, which cost about $30 and included the plastic surround and ignition lock with key. The ignition switch is located further down the column than all the other switches, and it terminates into a six-connector plug which easily grafted into our wiring harness, as you'll see later. We also had a photocopied page of the wiring diagram, so that we could identify the wires in the steering column by their colours and see how they were connected to the donor vehicle's relays. Make sure you have access to a correct wiring diagram if you are using a similar set-up. To make your job even easier, try to get the lighting relay(s) from the donor car when you choose a steering column. You'll be glad you did!
We'll look at the wiring of our steering column later.

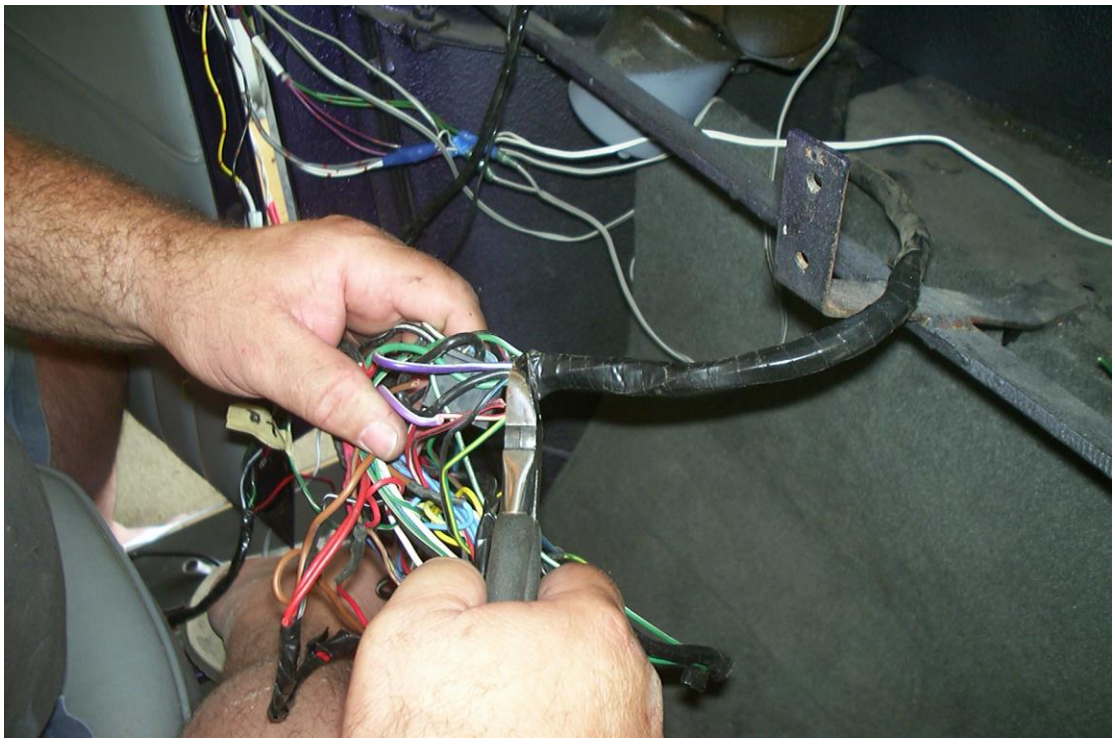


Figure 4 - Cut out the old wiring system. All of it!

Installation

The Painless Wiring kit featured here is a universal Hot Rod type, utilising GM plugs and colour codes. The instruction booklet supplied contains a lot of pertinent information for different makes. GM, Ford and Chrysler dominate, but you can get a Holden kit with the associated instructions. As I said before, read the instructions through carefully so you can identify the parts that are applicable to your job.
The wiring tables, while concise, are difficult to follow, at first, but once you start thinking in terms of circuit numbers, the fog will lift and it should all go together

“painlessly”. Of course, every wiring job is different, and the kits can’t be tailor made to every possible combination, so there will be a bit of customising along the way. *Use the instruction manual to record your changes/modifications/adaptations that are different to the text.*

The number one rule here is:
TAKE YOUR TIME!

Now there’s no need to go into too much detail as far as the installation process goes, because it’s already in the instructions. However, the following descriptions outline some of the twists and turns that take place which aren’t in the book.

Mounting the Fuse Panel

Decide where you are going to mount the fuse panel. Trunk mounted kits are great if there is little room under the dash, so in this installation we chose the area under the back seat where the battery is located. The only difference between the trunk mounted kit and the regular, under dash model, is the length of the wires.

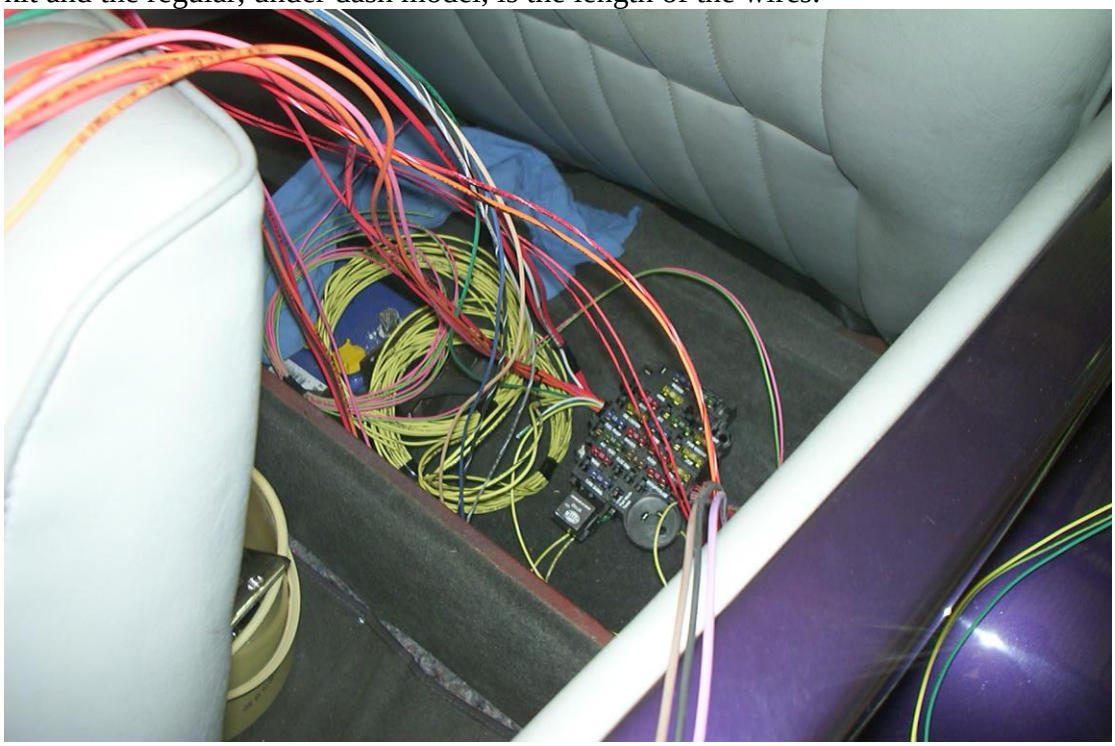


Figure 5 - Decide where to mount the fuse panel and lay out the wiring sections. Unused circuits can be wound up and stowed (in case you need them at a later date) or cut them off at the fuse panel, being careful to leave a few centimetres of wire free, "just in case”.

The wiring harness is divided into five groups:

- Headlights
- Engine
- Dash
- Tail lights
- Doors/Speakers

You need to plan where these groups will run. Look at the components you are connecting that are located differently from the factory locations of the donor cars, such as the electric fuel pump, the fuel tank sender, the brake light switch, the neutral

safety start switch, the thermo fan, the dimmer switch, etc. Remember: Proper Planning Prevents Piss Poor Performance.

Rough Installation

Before making any permanent connections, lay out the wiring harness and familiarise yourself with the groups. There are pages in the instruction manual that provide space for you to write notes and routing information for each wire group/section. Use this facility, as it will be your future reference should you have any problems later on. Check the group, section and circuit number of each wire as you progress. This information is printed on the wire, so double check with the book as you route them.

Route the rear tail section, including the door and speaker sections if applicable.

Figure 6 - Lay out the wire groups. Here, the tail light group wires have been identified and routed through to the rear parcel try, where the fuel tank is.

Next, route the engine and headlight wires, designated Engine Section, Engine Section A (the single thick Red wire #916), and Headlight Section A.

Note: Pay particular attention to the instructions for installing the Maxi Fuse. This is the protection device for the main supply line, and replaces the fusible link. It is easy to miss this important installation instruction in the manual, so be aware of it.

Install the Firewall grommet if necessary. Route engine and headlight group wires through the grommet and position the harness groups in the areas you decided upon earlier.

Figure 7 - The engine and headlight sections were passed along the floor under this panel. Then they passed through the grommet on the firewall.

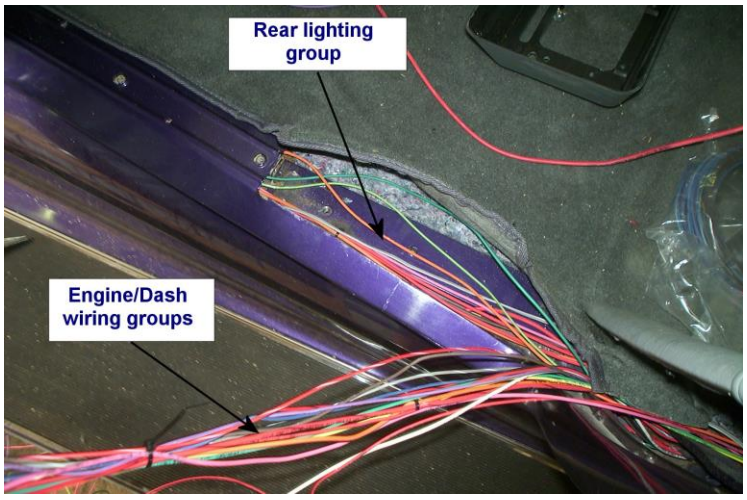


Figure 8 - Here, the rear lighting wiring has been routed and the engine/dash wiring has been bundled up on one side waiting for its turn to be routed. Remember, in this job, we used a trunk-mounted kit, so all the wires pass from the rear to the front. You will most likely need to make more room.

Route the dash group (accessories, accessory switches, headlight section, instrument panel section and radio section) upward to the rear of the dash and temporarily tie in place.

Routing the wires is a time consuming, tedious task. Don't rush it! A wiring job like this will take at least 2 weekends, more if you have to fix things like broken indicator switches.

Once the wiring groups are roughly in place, permanently mount the fuse panel. No permanent electrical connections are going to be made just yet; we are preparing to secure the harness.

Systematically go through the wiring groups smoothing out the bundles. Start from the fuse panel, removing any tangles and loosely securing the bundled wires to strong points along the way. Mould the wire groups to the floor pan, firewall, fender panels etc. Route the harness away from sharp edges, exhaust pipes, hinges, etc. Use the cable ties supplied – ***don't use electrical tape*** – and use convoluted tubing if you wish.

Figure 9 - Use convoluted tubing (available at most auto parts shops like Supercheaps and Auto Pro, as well as most swap meets) to group the wires and provide protection from chafing on body panels. Use clamps at strategic places to help stop the wiring from flopping around. Use cable ties wherever individual wires branch out from the group.

The dash wires should be routed out of the way of any under-dash obstacles, such as cowl vent, air conditioning, radio, etc.

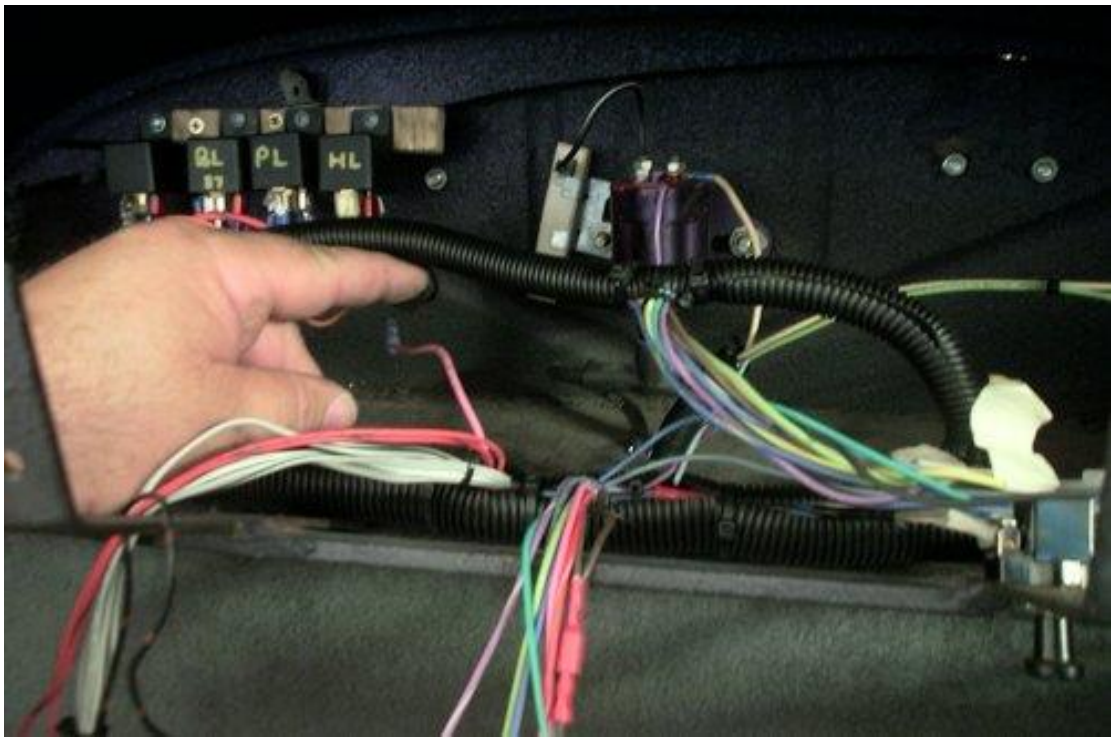


Figure 10 - The Ballast Resistor is mounted under the dash. Keep it away from the wires and other components, as it gets hot!

Do not tighten cable ties and mounting devices just yet. Make all harness attachments LOOSELY.

Neutral Safety Start Switch

Using a ratchet shifter like a B&M or Hurst means that the neutral safety start switch is on the shifter itself. The same applies to Lokar and Genie shifters. The Painless Wiring instructions describe factory GM and Ford neutral safety switches, so there's a pretty good chance your system is covered.

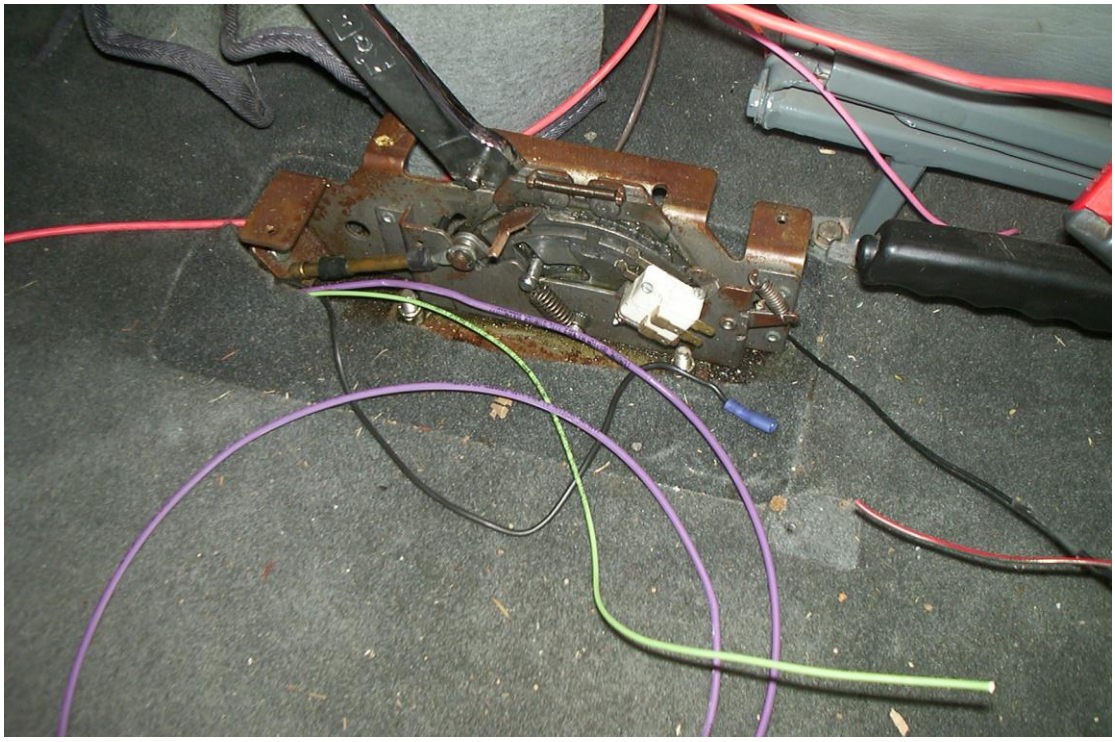


Figure 11 - On this B&M Shifter, there are two micro switches - one for the neutral safety switch and one for the backup lights. Be safe and correctly wire in the neutral safety switch between the starter solenoid and the ignition switch. The Painless Wiring instructions are not very clear on this point, so BE CAREFUL!

Lighting Relays

As we said before, if you have a GM type light switch in the dash board, a three pin dip switch on the floor and a GM/Ford steering column, the Painless kit will hook straight up. They even supply a couple of different style steering column plugs, and you can get different pigtails to suit.

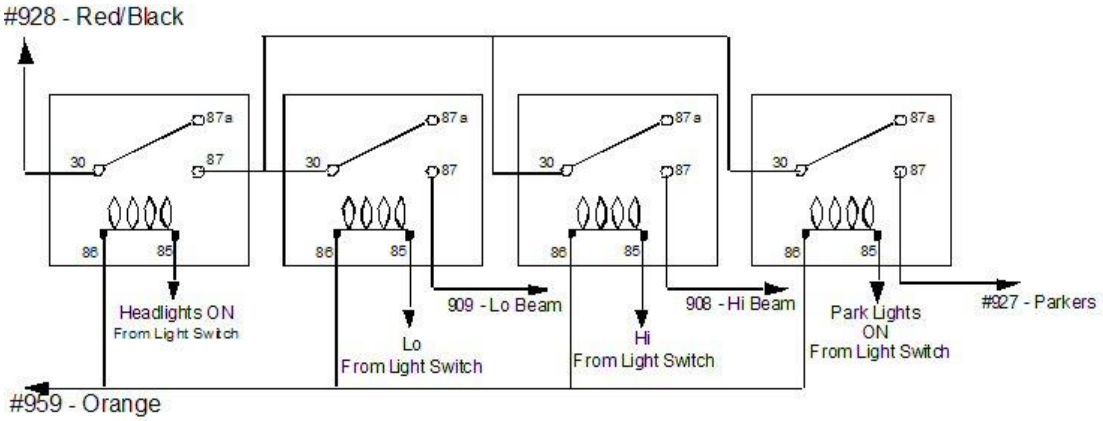
But we are using a late model column with all the controls on a single stalk. By describing the way we wired this up to our Model A tourer, you should be able to see how to do it for your application. This section describes how to wire in your headlight switch on the stalk – Lights On/Off, Hi Beam, Lo Beam.

We used 30Amp, good quality relays. It would have been easier to use a proper headlight relay (which is actually two relays in one) but we had all the parts on hand, so we did it this way.

The Painless kit supplies lighting power on one main circuit (#928, the thick red/black wire) and the auxiliary circuit, #959 (orange). The Auxiliary circuit is meant for instrument panel lights and taillights, but we also used this circuit for the trigger supply for the hold on coil of the relays. We could have used the #928 wire for this purpose, too, but keeping the low current circuits separate from the high current circuits made more sense. Both circuits are fused.

The rotary switch on the stalk supplied grounds for the hold on coil of the relay through four positions: Park lights, Headlights On, High Beam and Low Beam.

Tracing out the wires from the stalk, the following diagram is how it was all hooked up:



Alternator Exciter/Idiot Light

The Painless Wiring kits and the associated instructions cover many different alternator configurations, including those with external regulators, Ford, GM and Mopar. They even have instructions for a generator! There are several single wire alternator configurations mentioned, and not one of them illustrates how to hook up an alternator idiot light!

Most alternators require an *Excitation Voltage* to work. If you have a car with an idiot light, it's almost certain that this is part of the excitation circuit. The Painless kits reserve this for a white wire, circuit number 914 in the Engine Section. This will connect to the S terminal on the alternator. Provided that you have a satisfactory Voltage gauge, this will suffice, but if you want to run an idiot light, you can connect the light in series with this white wire. If your alternator has two other connections besides the main Batt connector (the thick red wire) then you can connect the white wire to the S terminal and the idiot light to the L terminal. These are the most common configurations, although some of the compact alternators from Nissan, Honda and Mitsubishi alternators have different markings. You'll have to consult a factory wiring diagram if the Painless kit and this article can't resolve your problem.

US Gauge Number	Diameter (Inches)	Diameter (mm)
10	0.1019	2.588
12	0.08081	2.053
14	0.06408	1.628
16	0.05082	1.291
18	0.04030	1.024