

# THE OCTAGON NEWS

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### MG Car Club Monthly Meeting

The Southwestern Ohio Center of the MG Car Club meets on the third Wednesday of every month at the Lithuanian Social Club, 922 Valley Street, Dayton, at 8:00 pm. The next meeting will be:

**January 17, 1996**

### Club Membership Information

Membership dues of the Southwestern Ohio Centre of the MG Car Club are eighteen (\$18.00) dollars per year, payable during September and October. On January 1st, the names of delinquent members are removed from the roster. See Karen Hill for further membership information.

January, 1996

## Upcoming Events

- January 17: **MGCC Meeting** at the Lithuanian Social Club, 8:00.
- February 21: **MGCC Meeting** at the Lithuanian Social Club, 8:00.
- June 27-30, 1996: **MG International**, Indianapolis, Indiana.
- August 3, 1996: **BCCD 96**, location TBD.

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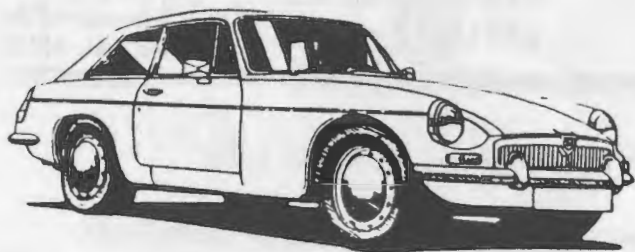
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## Happy New Year!

by  
Mark Dodd

The holidays have come and gone, and they were very busy ones around the Dodd household. Time to enjoy those gifts before the Visa bills get here! With all of the festivities as an excuse, I have not had time to write much in the way of new articles. Therefore, I have collected a couple of excellent articles from the BritCar mailing list I am on. Sorry Randy, you will have seen both of these...

With 1996 just starting, we need to start getting ready for the Event of the Year. And that Event is *Indy 96!* If you have not gotten your registration in yet (which includes me), do it soon. Last I heard, they were into the 600s and it will only be the first 1000 that get to lap the Brickyard. If you are planning to get those last few things done before the show, you still have time. In fact, if you do it early, you can enjoy your handiwork on a Spring rally if we get one planned. Put your thinking caps on for new ideas at the next meeting on January 17.



## Upgrading Your Lighting System

by  
Chris Kantarjiev

So, you say your headlamps aren't bright enough, and you want to do something about it? The very first thing you should do is aim them. It's amazing how much better even old tungsten sealed beams are when they're pointed where they're supposed to be! Best of all, it's free.

The next thing to do is check the electrical connections. Most importantly, make sure you have a good ground coming off each headlamp. The Lucas bullet connectors are usually pretty good, but the wire going into them isn't strain relieved and some strands may have broken over time. Check for corrosion on the spade lug connectors; if you have any doubts, replace them. Use a good crimping tool \*and\* solder - most "automotive" crimping tools won't make a gas-tight seal, and if gas can get in, moisture can get in, which leads to corrosion. Throw away the plastic collar on the connector (if you buy that kind) and make your own strain relief with multiple layers of heat shrink. This is another area where the economies of the automotive industry did not have long lifetimes in mind, and we can learn from the technology used by aircraft engineers.

OK, that's not bright enough? Time to start spending some money. The cheapest upgrade you can do is to replace your headlamps with new versions of what's in there. If you're in the US, that means buying new sealed beams with tungsten filaments - something like \$5/side. If you're anywhere else, replace the bulb unit - it can't cost much. (But keep reading before you head out to the store!)

Just for grins, check the aim again after you've made the swap. (Have you detected a theme here?) The theory is that you don't alter the alignment when changing bulbs, but manufacturing tolerances are not that tight.

The reason this can make a difference is that tungsten filaments get dimmer over time - while the lamp is on, a microscopic amount of the filament gets boiled off and deposited on the glass. This forms a barrier to the light, so the light gets dimmer! In a quartz halogen light,

the bulb globe is made of quartz (to withstand the higher temperature). The bulb itself is filled with one of the inert halogen gasses (iodine or bromine), which acts to redeposit the tungsten particles emitted from the filament at incandescence back onto it instead of on the inside of the globe, which causes the characteristic glass blackening - one of the reasons, along with corrosion resistance, that we in the US got saddled with sealed beams in the 1930s.

But if you're going to go to the effort of taking your headlamp apart, I suggest that you at least spend a bit more and move to slightly newer technology: buy a halogen sealed beam, or put in a halogen capsule that's rated at approximately the same wattage as your stock capsule (that probably means 60/55 watts instead of 45/40).

This gets you an improvement in light output with relatively low expense and doesn't run you afoul of any laws (in the US, the separate bulb/reflector units that I'm about to go into aren't legal, but no one pays much attention). You also won't toast your wiring.

Speaking of wiring, you may be able to get an improvement in light output by upgrading your wiring harness and continuing to use the stock headlamps. Most British cars run the headlamp circuit unfused, and use fairly thin leads in the wiring harness to the switch, if not out to the headlamps.

If you're running "classic" separate bulb units (like the Lucas PL700 "tripods" or Le Mans, or Marchal Equilux), you'll need to get a special bulb - you can't just go out and buy an H4 bulb and plug it in. PL700s take what's known as a P45 or type A base. Halogen capsules on a P45 base are commonly available (see vendors, below, or the Monster Vendors list). The Le Mans lamps are on a P36 base - also adaptable, but more rare these days; they need a different bulb and a special adaptor to fit the modern three prong lighting plug.

If you have British PreFocus headlamps, you may be out of luck. I've never run a car with BPF, so I have never tried to upgrade the lamps; I'd love to hear from someone who has. I believe that the solution for the Le Mans headlights is what's needed for BPF bulbs, but I'm not sure.

Now, if you want to go to the expense of getting better lamps than your car left the factory left with, it will take some work - read on.

### Get a Better Headlamp

Please note - I'm writing about 7" round headlight because they are what I know - all my cars are fitted with them. The same theories apply to smaller round or rectangular, but I have never dealt with them so I can't make specific recommendations. Call David at OJ Rallye and discuss your needs - he'll set you up right.

There is no reason to tolerate 1930's headlights in the 1990's, be it a fine vintage car or your modern sedan. Installed responsibly, today's quartz halogen lights provide efficient lighting to the driver and are inoffensive to opposing traffic. Several car manufacturers and tuners have now engineered through loopholes in the 1930 US lighting laws and provide QH lamps as standard equipment. Few communities enforce these old laws, and most of the lights aren't even that expensive. (Most H4 lamps seem to fail to meet the letter of the law only because they don't have aiming bumps.) I don't believe that there is any reason not to have these superior and safer lights.

Usually the term "quartz halogen" is used broadly to refer to any light system using a QH bulb, because lens, reflector and shielding all work hand in hand with the improved bulbs. Lenses, for instance, are lead crystal, the clearest glass man can make. Reflectors in the quality lights are precisely shaped stainless steel with highly polished, aluminized coating (even more reflective than chrome), not silvered plastic. Bulb location, shielding and lens fluting are all closely controlled dimensionally to give sharp upper cutoff for better vision in weather conditions and to keep from blinding oncoming traffic.

QH headlights are usually built to European (E-code) specs, which feature a distinct horizontal cutoff low beam that gives an amazing amount of light without blinding an approaching driver. High beam range is generally twice that supplied by US Federal sealed beam.

The best, bar none, 7" round headlights in the world right now are the Marchal H4 "flat face" lamps. Unfortunately, they are no longer



manufactured, and are getting rare and expensive (the only source I know is charging more than \$200 each).

What makes these lamps so very good is that they have a razor sharp low-beam cutoff; unless the fog is *\*very\** thick, you don't need any auxiliary lamps (assuming that you've aimed the headlights correctly, of course).

After that, I would choose a Cibie Z beam, and then a Cibie "E Code". These can be had in the US for about \$90/pair. These also have a great low-beam cutoff. Either of these lamps should get you through the worst weather without the need for an auxiliary lamp.

One thing to note is that H4 lamps are *\*not\** legal in the US; the ancient DOT laws against separate bulb headlamps apply, so H4 lamps are marked "for off road use only". Most jurisdictions don't care any more; maybe one day the law will get changed. If you care that much, use the sealed beam halogens and accept the results.

Hella has recently come on the market with an H4-derived lamp that they somehow claim is DOT legal. I don't have experience with these, either, but they might be worth checking out if you're in the habit of attracting cops who are looking for an excuse to write you a ticket.

Again, whatever lamp you choose, ***AIM IT PROPERLY!***

Now, back the H4 lamps. Upgrade the stock 60/55 bulb - for courteous street driving, I recommend a 100/55. If you're careful about aiming, trust your wiring and don't think you'll attract the attention of cops, go for the 100/80 or 130/90 or higher ... but don't come back to me when your stock wiring melts. Even if you install relays, the wiring out to the headlamps in our cars is woefully small. I ran 100/80s for a while and the resistance out to the buckets was high enough that they weren't appreciably brighter than the 60/55s. (Note that most European countries have declared lamps brighter than 60/55 illegal. If people would learn to aim their lamps properly, we wouldn't have such ridiculous laws on the books.)

## Upgrading Your Wiring Harness

If you make any of these upgrades, add relays, and fuses. The stock harness in most of our cars runs all the headlight current through that teeny-tiny headlamp switch, which often comes from the factory with 18 gauge leads! If the contacts don't burn, and the wires don't melt, you'll be getting a lot of voltage drop. Not to mention that the headlamp circuit is typically unfused - a ground fault/short here will cause serious harness damage. (If your switch isn't the weak point, someplace else will be - our Morris Minor has a great harness all the way out to the fenders, but the subharness that goes through the fenders to the lamp is made up of 18 gauge wire...)

At the very least, you want a relay and fuse on the high beam circuit. The best (and easiest!) way to do this is to buy a fused Marchal 514 relay. They're bulletproof, and can easily be spliced into the high beam circuit. Find some source of unswitched 12V (brown wire, you want a heavy one). Find the blue/white wire leaving the dip switch (usually there's a connector that connects the switch, the lead out to the lamps, and the indicator - this is a good spot). Connect the brown wire to the source terminal on the relay. Connect the U/W wire coming from the switch to the coil. Connect the U/W wire going to the headlamps to the load. Make a good coil ground. Voila! You now have brighter high beams, even if you didn't change the lamps. (If you're particularly anal, wire the new harness with appropriate colors - I would use blue/slate for the lead that splices from relay to the headlamp wire). Use heavy wire for the load connections - 14 gauge.

If you think about it for a little while, you can make up a neat two- or three-wire harness and mount the relay where it's out of the way but accessible (so you can change the fuse if it blows). In the GT6+, I mounted it on the firewall with all the other relays; there's a good source of hot at the overdrive relay, and it was easy to pass the two-wire harness through one of the existing grommets.

Now, if you're having fun, you can rig a parallel relay for the low beams. If you're going to do this, then consider not using two Marchal relays, but two unfused relays, sharing a single source, which you fuse. Lucas makes a very nice metal relay with a separable plastic base (it's

called a 28RA) - you can snap the bases together to make up a multi-unit block, and there is available a fuse holder that snaps to the end (holds a modern blade-style fuse). These are all available from British Wiring.

Sometimes this isn't good enough, because the harness out to the lamps is not up to the task. One fellow with a TR3 measured more than a volt voltage drop from the switch to the lamps. In this situation, you want to mount the relays out at the lamp end of the harness; there's usually a spot near the grille where one wire becomes two, and this is the place to splice in to minimize that sort of voltage drop.

### Auxiliary Lamps

Now we can go on to auxiliary lamps: there are two basic kinds, with variations on each.

Fog lamps have a short but wide beam with a very sharp cutoff to reduce light reflection off the fog into the driver's eyes; they're used to illuminate the road immediately in front of you without reflecting back off the fog or rain and blinding you. They should be mounted as low as possible, ideally below the bumper. They are also useful as cornering lights for racing because of their broad lateral pattern.

Driving lamps have a narrow but long beam, to light up the road beyond where your main beams reach ... several thousand feet ahead of the car. They have a broad beam that lets you see around curves far ahead. You want these when you're headed down your favorite straightaway at night at an illegal speed. They are best mounted above the bumper. Spot or pencil beams are an extreme variant of driving lamps, and do just what they sound like they do. They provide a tunnel of light over a mile ahead, but give no lateral vision. These are of little use alone (use them in conjunction with driving lamps) and are a waste of time unless you intend to drive over 100 mph. The old rallyist term of "follow the bouncing ball" of light is an earned reputation. Primary use is racing, high speed rallies, and off road. But then they would prove just the thing if you live 50 miles down a straight lonely road in Nevada!

All these lamps should be individually switched, but everything except fogs must be interlinked to the high beam dip switch so you can cut them all with one motion when meeting another car. (This is the law in most European countries - it may well be the law in some States. It's also a good idea.) Fog lights, aimed correctly, will help your vision and not harm your fellow motorist's vision at all. Wire fog lamps so you can turn them on with just the parking lamps, in case the weather is so bad that your well-aimed low beams still make the fog too bright to see what's going on. None should be used in heavy traffic situations.

Note that you don't have to fit these in pairs. A rallying acquaintance yearns for the days of running his Volvo 122 with one each of the Marchal 902 fog and driving lamps (switched individually, of course).

Use relays and fuses. If you're clever and careful, you can put it all together without cutting the original harness. My TR4A has a set of four relays and a Lucas two-fuse box in the driver's footwell: the low and high beams are on individual relay circuits, the driving lamps on another, and the fourth relay is a changeover - I can select just the high beams, just the driving lamps, or both together, when the dipswitch is in the "main" position. It took a weekend to figure out exactly how to splice into the original harness, but the result looks as if the factory intended it that way.

### Aiming Your Headlamps

If you haven't figured it out yet, I think that aiming is important. Your lights are dangerous and ineffective when improperly aimed. There are specialized machines that aim headlamps very accurately - but these tend to be in the hands of "official, certified" shops who will either call the light cops or charge you for aiming and even give you a certificate saying they're aimed, but not do anything. So it's best to just learn to aim them yourself.

The basic goal is to get the beams parallel to your direction of travel, low enough that they don't blind oncoming traffic, and the same height. You should see the low beam cutoff on the cars in front of you.

First, find a 2' level stretch of driveway that is adjacent to a wall or garage door (to act as the aiming screen). Prepare the car in normal travel trim (i.e., luggage, fuel and passenger load simulated). Roll the car up to the wall. Mark the headlight centers both vertically and horizontally with a heavy felt tip on the screen. (You might want to use a large piece of cardboard and save it to be re-used on the same car; these days I tend to stick a couple of Post-Its on the wall and be done with it.) Mark the center of any auxiliary light as well. Now, roll the car straight back, 25 feet. Scribe a straight line between the headlight centers (line B). Measure down 3" and draw another horizontal line (D). Do the same for your auxiliary lights. C1 and C2 are circles about the high intensity/highbeam spot at point blank range. One at a time, aim the lights as follows (turn off or cover the lights not being aimed):

*Low Beams* The correct visual aim for low beams is with the top edge of the beam at horizontal D. The point at which the cutoff begins to rise to the right should be located straight ahead of the lamp at the intersection of D and C.

*High Beams* The correct visual aim for high beams is with the center of the high intensity zone at horizontal, straight ahead of the lamp as indicated by circles C1 and C2. When aiming high beams on a four headlamp system, cover the adjacent headlights.

*Auxiliary Lamps* To aim your lamps, turn the lamp to be aimed on and cover or turn off all other lamps. Loosen the nuts on the mounting bolts and move the lamps until the light falls into the place recommended by the aiming diagram.

*Fog Lamps* Light should fall between lines B and D as indicated by shaded rectangles.

*Driving Lamps* Light should fall straight ahead of the lamps at the intersection of lines B and C1 and C2 as indicated by circles.

Tighten the nuts on the mounting bolts securely when aiming is completed.

## Future Technologies

The future promises new and wondrous lighting technologies. One, projector bulbs, is on the road already. This is a variant of the kind of bulbs you find in a slide or movie projector: a very small QH light capsule with a small but precise reflector attached to it. PIAA pioneered this in their line of compact auxiliary lamps, and a number of OEM manufacturers have adopted it for their cars. Porsche and BMW have gone so far as to package small projector units in a traditional-looking round headlamp. It provides a very tightly controlled beam, without much upward splash. It can also be put into a small package, which is good for modern cars that are concerned with front end aerodynamics to meet CAFE standards.

The other, ion discharge, may be here in a few years. It's unlikely that you'll be putting it on your British car - it's basically a small-scale carbon arc lamp, which requires a very high (400V) starting voltage and about 60V to keep the arc going. It promises very efficient, very white light, but requires a completely new kind of wiring harness.

And manufacturers are still talking about light pipes - a system where there is a single, very bright source of lighting (probably something like the ion discharge unit) and a collection of fiber optics that directs the light to the right place in the car. But no one has road tested such a system yet, as far as I know.

### ... and be Seen

Now that you can see what's in front of you, it's time to wonder if the people behind can see you! You can do many of the same things to check out your brake and tail lamps - clean up the wiring harness, polish the reflector, clean the lenses - but most of our cars have small bulbs and poorly designed reflectors, leaving them all but invisible from the rear. (I started worrying about this one night when I was driving behind my GT6+.)

QH technology comes to the rescue again, but with a catch. You can buy QH light capsules fitted to traditional bulb bases, but rated at higher wattages. They draw a bit more current, provide a lot more

light, a 2: put out a lot more heat. This latter is of concern to those of us whose cars have small taillights with plastic lenses, because these bulbs have been known to melt them. You can buy them from the usual suspects, but be careful; you might want to test them with a scrap lens first.

And if you've significantly increased your wattage with upgraded headlamps and QH taillamps, it's time to start wondering if your generator is up to the task of running all this stuff...

### Lighting Vendors

I have dealt with the following vendors for lighting and have been quite happy with their service; I recommend them to your attention.

OJ Rallye  
N 6808 Highway OJ  
Plymouth, WI 53073  
(414) 893-2531

For some time now, David Heupchen has been the sole importer of Marchal aftermarket headlamps. His rallye weapon of choice runs towards Volvos, but he knows lighting, both current and vintage. He's got flat face H4 lamps, and he knows what they're worth. But at least he has them! He also carries Cibie and other brands, as well as parts, spares, quality bulbs and accessories, and is fun to chat with on the phone.

Dave Bean Engineering, Inc.  
636 E. St. Charles Street, Star Route 3  
San Andreas, CA 95249-9564  
(209) 754-5802

These folks cater to Lotus, Jensen and British specials that use the Ford "Kent" engine - but that means that they have Lucas supplies, and care about performance lighting. They have variable stocks of Marchal gear, some of which is old stock and some of which is purchased from OJ Rallye and marked up.

Mini City, Ltd  
205 Summit Point Drive  
Henrietta, NY 14467  
(800) 933-MINI  
(716) 359-1400

The owners, Doug and Laurie Scribner, are dedicated Mini owner/enthusiasts, and also have very deep stocks of Morris Minor parts. More to the point of this article, they have Cibie Z beams in stock for around \$90/pair, which is the cheapest price I've seen.

<b>S T R I C T L Y</b>  <b>BRITISH</b> <b>RESTORATION &amp; PARTS</b>	<b>RANDY BALOGH</b>  226 Kirby Road Lebanon, Ohio 45036 (513) 933-0950
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Note: Randy has joined the information highway! You can contact him at [MGBay@AOL.COM](mailto:MGBay@AOL.COM)

## Upgrading Your Flexible Brake Lines

by  
**Berry Kercheval**

Before we begin this delicate operation let me state a few obvious points. First, the braking system may be the most important system on your car. 500 horsepower does no good if it cannot be stopped without a stone wall. Secondly, do not attempt this modification without being absolutely sure you know what you are doing. With all of that in mind, let me begin with how I changed the rear flexible brake lines on my TR6 over to Aeroquip/AN style racing hoses. (Editor's note, while this description is for a TR6, it would also apply to the flex lines on our MGs as well.)

Step one: survey your existing setup.

On the TR6, there are two flexible brake lines on either side of the car, where you'd expect them. They carry the braking circuit across where the trailing arms flex.

The right line is simple: it's a length of flexible hose with male threads on each end. The hose goes into two brackets, one on the frame and one on the trailing arm, and is fastened into place with a jam nut. The female bubble flare on the hard line then fastens to the end of the hose. The left line is less simple: the trailing arm end is just like the right side, but the frame end goes into a T fitting with a 3/8-24 thread and seals with a crush washer.

Step two: Plan the new setup.

For Sybil, the plan was pretty simple: The right line would be replaced by two AN-3 bulkhead fittings and a length of hose. Bulkhead fittings look like a steel tube about 2.5 inches long, with AN-3 threads one each end and a nut molded into the middle. You attach them to bulkheads or brackets with a jam nut and then attach your hydraulic lines to them. Luckily, the britcar bubble flare will seal at least once to a male AN-3, but probably not the other way around.

The left side was a little different. I planned for a 3/8-24 hose end, but

the place where I got the parts didn't have them, so I got a 3/8-24 crush to AN-3 male adapter instead, another bulkhead fitting for the left trailing arm and two more hose ends.

Step 3: buy the parts.

I'm lucky that there's a pretty good racing parts supplier less than ten minutes from my house. Mail order sources for parts are Aircraft Spruce and Pegasus Racing.

So, I bought:

- 4 feet of #3 stainless steel braid covered teflon brake hose  
(way too much...2 feet would have been plenty, but I'm going to do the fronts eventually)

- 4 AN-3 hose ends

- 3 AN-3/AN-3 bulkhead fittings

- 1 3/8-24/AN-3 adapter fitting

- Brake fluid

- 3/8-24 jam nuts and lock washers

- 2 crush washers (you can reuse copper ones if you anneal them, but they're cheap.)

- a 32-tooth hacksaw blade for cutting the hose

- some spiral plastic wire-wrap to cover the hose and prevent chafing

Step 4: disassemble existing lines.

I recommend doing one side at a time.

Jack the car up, install jack stands, and remove the rear wheels.

**Clean the brake lines and fittings!!!**

Disconnect the existing brake line and remove it from the car.

Step 5: Make and install new hoses

Install bulkhead fittings (or adapter into T fitting, according to which side you are working on)

Now, put an AN-3 hose end on the end of the hose. To do this:

a) Make sure the end of the hose is clean and neat. I cut off a



quarter inch to make sure. Make cuts by wrapping the hose tightly with electrical tape to prevent the braid from fraying and cut with the fine-tooth hacksaw. Clean grunge out of the hose, unwrap the tape and slightly trim the braid.

b) Take the hose end apart. You should have 3 pieces: a collar that threads onto the end, the end with a rotating nut and a little tail that fits into the hose, and a tiny oval goody called an "olive", because it looks sort of like a pitted olive, if you squint in a bad light.

c) Put the collar over the end of the hose.

d) Spread the braid a bit -- there's a tool for this but it costs \$50 -- and insert the olive. Make sure the olive goes OVER the inner teflon hose and UNDER the stainless steel braid. Make sure the inner hose bottoms out on the olive.

e) Insert a tapered punch to spread the hose and lock it into the inner serration of the olive. I used a Stanley scratch awl, actually.

f) Bring the collar up over the end of the hose. I found it useful to twist the collar to get the ends of the braid and tap on the end of the olive lightly.

g) Insert the end into the hose, pressing firmly to make sure it goes in all the way.

h) Put the collar in a vise and tighten the end down. This will take a great deal of torque but don't over do it. The catalog from Earl's Racing, the actual manufacturer of the fittings I used, says to tighten to a set spacing between the collar and the end; I broke two fittings trying to get to this (spec is about .020-.040, I couldn't get less than .055). It seems to hold pressure OK, though.

Now you are done. Take the hose out to the car, attach the new hose end lightly to one bulkhead fitting, decide how long the hose should be (allowing for the length of the hose end), and mark it. Bring it back into the garage, cut the hose and install the other hose end.

Put spiral plastic wire-holder stuff over the hose to protect the braid (and the car) from chafing. Blow any swarf out of the hose with compressed air, and take it back out to the car and install it. (I always wanted to use "swarf" in a sentence...)

Repeat for other side.

Step 6: Check connections and bleed brakes.

Check all the connections for tightness, and bleed the brakes. This is a good time to flush the old fluid from your car.

When you've bled the brakes, have a helper stomp on the pedal hard and check for leaks. I found a loose connection and tightened it.

Step 7: test drive

Put the wheels back on, and lower the car. In my case, this also involved new springs, new trailing arm brackets (one was cracked, I replaced all of them), new Nylatron bushings and all new grade-8 hardware.

Drive carefully down your street. I cautiously started and stopped several times with hard pedal pressure to make sure always shipshape and Coventry fashion. (Can't be Bristol Fashion in a Triumph, now can we? OOPS! Getting silly...)

Step 8: Enjoy Car

Drive your car. Have fun. Be content that your flexible brake lines are as good as they can get.