



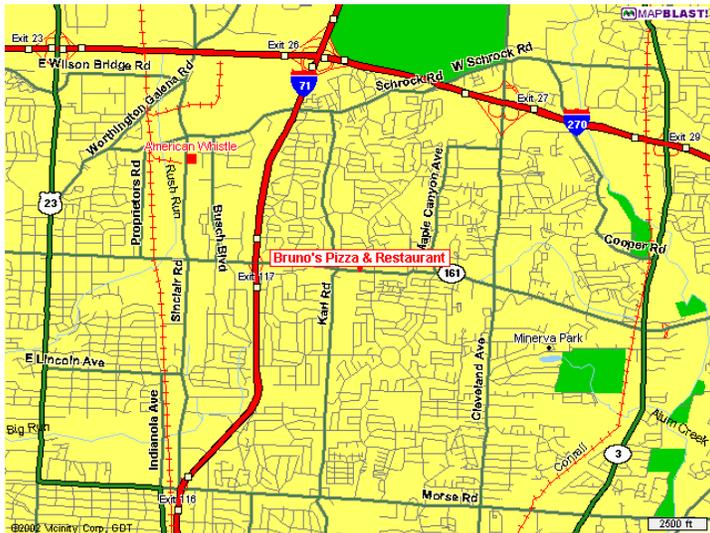
# Buckeye Triumphs Newsletter

Visit us at:  
<http://www.BuckeyeTriumphs.org>  
 (and get your newsletter in COLOR)

Please let me know of updates by calling Bruce or Ryan Miles 740-587-4179 or [bmiles@intinfo.com](mailto:bmiles@intinfo.com)

## April BT Business/Social Meeting

The April BT Business/Social Meeting will be held on Tuesday, April 2nd at Bruno's Pizza, 1774 East Dublin-Granville Road.



It will begin at **6:30 PM** and will be hosted by Murry and Jacqueline Mercier. If you have any questions, "ring them up" at 614-888-0838. Please attend and come prepared to be dazzled. (*Editor's note: I'm not sure that I have ever been "dazzled" before – this should be fun...*)

## April BT "Tech" Session

**Mike and Mary Henry are hosting a TR6 workshop on Saturday, April 6th at 10:00 AM.** The goal is to mount Mike's TR6 body tub onto his restored chassis. Currently, the body tub is suspended from a neat custom framework in the Henry garage. If we have enough muscle, it should be an easy job to carry the tub over the chassis, set it down

and bolt it in place. Mike states that Mary is looking forward to serving coffee and donuts to the hungry members (and lunch too, if it takes that long). Come and lend a hand (and a strong back).

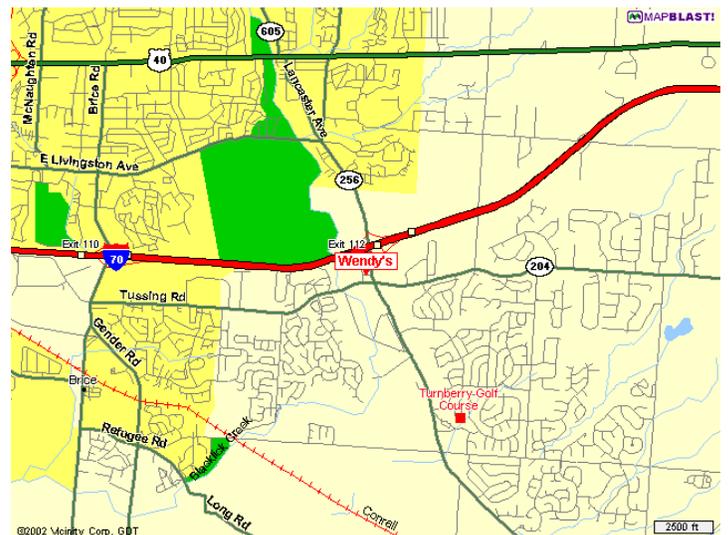
### Directions to the Henry's:

From I-270, go west to the Dublin/Marysville exit at US 33 and go west toward Marysville. Go north at the first exit, which is Avery Road/Muirfield Drive. Go north on Avery/Muirfield Drive about 2 miles until you come to the entrance to Muirfield, but turn right onto Brand Road. Go about 1 mile until you come to the entrance to the Brandon Subdivision. Turn left onto Brandonway Drive and follow it until you come to the fourth street on the left, which is Brandbury Place. Turn left. **7668 Brandury Place** is the next to the last house on the left. Phone number is 614-793-1453

## Member's Car Pictured in Hemming's Special Interest Auto

The March-April issue of Hemming's Special Interest Auto features a 2 page picture layout of the history of Triumphs over the years. Members LaMar and Karon Wyse have their 1976 TR6 pictured as an example of "Late" TR6's. I asked Murry to bring a copy to our meeting on the 2<sup>nd</sup>. Congratulations to LaMar and Karon!

## BT Driving Event – Saturday April 20th



The April BT event will begin at the Wendy's on route 256 just south of interstate 70 on Saturday, April the 20<sup>th</sup>. We will roll out at 10:30.

We hope your March Madness has been minimal and your Triumph will be ready and roaring to go. Jim Van Order and Bob Mains are looking forward to taking you on a drive through the winding roads and hilly countryside south of Buckeye Lake. Jim will lead and Bob will try to keep up from the 'rear of the pack' position. (Bob can't imagine why he was relegated to that most envied position in the line. Jim said something about helping him avoid the temptations u-turns on divided highways.) **Buckeye Lake** and the **Banbury Cross Tea Room** will be a fitting destination for Buckeye Triumphs

on April 20, 2002; British and Buckeye you just can't beat that combination.

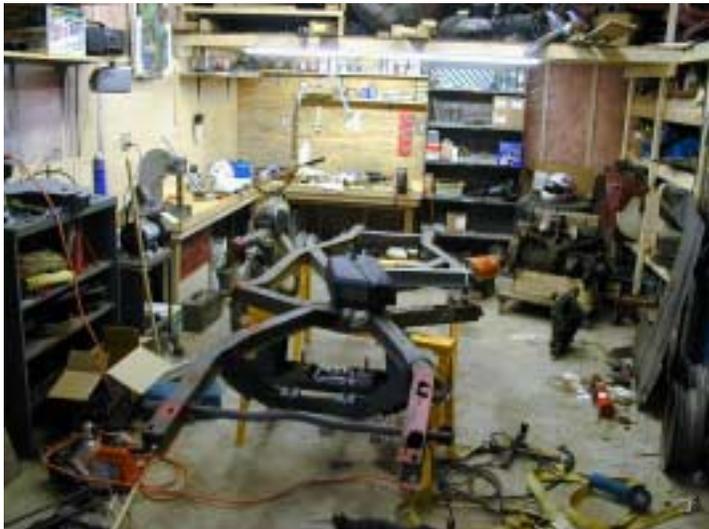
The Tea Room is as authentic as Lucas lights and much more dependable. You can count on a varied menu of Shepherd's Pie, Banger's and Mash, Cornish Pasty (*Editor's Note: A "Pasty" is a meat pie – I always thought they were something else ☺ ...*) or a Ploughman's Lunch. There is a Full English Breakfast for those who miss the eggs, banger, rasher of bacon and grilled tomato so typical in the British bed and breakfast inns. Of course the tea is imported and goes very nicely with the Bread Pudding and Devon cream or the scones and biscuits. Please be there and help us show our colors to Central Ohio.

We should arrive around 12:30. Anyone wishing to skip the drive and meet us for lunch can take 70 East to exit 129A Go South .9 Tenths of a mile. Look for a British Flag hanging out in front on the left side of the road.

### Editor's Corner

The weather is certainly not cooperating for Ryan's Spring Break this year. Snow on Monday, Ice on Tuesday and we lost power for most of the day on Tuesday.

I am taking a couple of days off this week but I'm afraid I can't offer many pearls of wisdom, as my welding skills are not very good. There are several things of note, though. I finally finished work on the Barn just in time for the 250 project to get going. Here is a picture:



I think I have created the perfect Triumph workshop. Ryan's bedroom has many boxes of Triumph parts. I am writing to you today from the Riedel workshop as Nelson and Ryan re-assemble Ryan's transmission and A-Type overdrive mentioned is last month's article.

Ryan has been busy "porting" the head for his 250 with the help and guidance of Sam Halkias. My thanks to Nelson and Sam for their guidance and experience in broadening his understanding of all things mechanical. I'm afraid that Ryan now has the racing bug and the 250 will be an autocross "machine" when completed.

Last November, our friend Marty Sukey had offered Ryan the following advice on the 6 Pack list:

*Ryan, don't go the Nylatron route. Go to the parts cars and find the oldest softest bushings you can and use them. As far as shocks, drain the oil out of the levers and drill holes in the front tube shock so that they are good and empty also. Run real low tire pressures also as that will help make the car stick. Remove two spark plug wires before you run. That's what gives my car it's rumble, HONEST! Oh yeah, and positive camber, lots of it! After seeing you run at the summer party I figure this is the only way I'll be able to keep ahead of you. Seriously IMHO, you can't go wrong with Richard's bushings and other parts also. Good Luck Marty Sukey.*

I laughed so hard when I read this, I can't wait to see the Sukey's this spring.

Oh yes – under the category of "more power" check out our air compressor setup in the workshop:



We are using our compressor and Nelson's old compressor to improve our "flow". So far it is working great. Our sandblast cabinet is on backorder from Harbor Freight and should arrive in early April. (I suppose that the moral to this story is to buy a bigger air compressor – but this should work fine)

Be sure to mark you calendar for the events that are coming our way in the next few months. The details are listed elsewhere in the newsletter. Our driving event for May is of special note. We will be touring the roads around Granville and ending up at Paul and Jill Griesse's "Pau Hana" Farm in Granville on Saturday, May 11<sup>th</sup> for a TRials "tune up". Paul and Jill will be hosting our Friday night event at their beautiful farm in September, and they invited us to pay them a visit in the Spring.

Also of note is Eric Jones's "River Run" event on May 25<sup>th</sup> – this is a hard day of driving and a great deal of fun.

On May 13<sup>th</sup> (a Monday evening) we have been invited to participate in an event sponsored by WOSU News 820 radio. They will have their annual auto "checkup" as part of their "open line" program in the evening. Any member that would like to participate should bring their car (after work, around

5:30 to 6:00) to the Fawcett Center on Olentangy River Road for a mini "car show". Tom Wiebell will host the radio show starting at 6:30. I will have more details in next month's newsletter.

**Just when you think that you have seen everything or How does the teenage mind work?**

The "boy's" were our working in the "yard" (as they refer to it) to remove a differential from the 250 that Ryan had affectionately named "Kermit". Since he had just got his Sawzall using his Christmas money, he thought that he could get to the differential through the trunk. Well.... When that didn't work out here is what I came home to one day last week:



When all else fails, turn the car upside down. In their defense, the body on this car was shot - the frame was also collapsed.

They even pulled the engine from the upside down position. They claimed it was "easier" to do it that way. Be sure to ask Ryan about this when you see him this month.

That's it for me this month - I look forward to seeing you folks in April.

**Bruce Miles** [bmiles@INTInfo.com](mailto:bmiles@INTInfo.com)

Next Newsletter Article Deadline – April 25th, 2002

## March Meeting Minutes

The meeting of Buckeye Triumphs was called to order on March 12th by Bob Mains. There were approximately 15 members in attendance at Terry and Charlie's home in Bexley. The next business meeting will be on April 2 at Bruno's on 161 at the regular time. There is also to be a tech session on April 6. See directions in this newsletter.

**Upcoming events:**

Our first drive of the season will be to Buckeye Lake. Lunch will be at the Banbury Cross Tea Room. A menu was passed around at the last meeting and the selection looks good with reasonable prices. There will be more about the drive elsewhere in this newsletter. We hope to see a large group for our first driving event!!

May 11th will be the cookout at the Griesse estate outside Granville. This is to be the site of one of the activities for the Trials in September. There will be more details later--plan to attend this event!!

May 19th will be the Easton show. This year we have decided that everyone should bring their own cooler instead of getting one of the big ones from McD's. We will still set up the awning, if possible.

June 12-14th is the TRA meet, in Wadsworth, Ohio. Call for hotel reservations now if you haven't already. Our club is co-sponsoring this event and we need a good turnout-- so please come and show your support!! One of our contributions will be to put together the registration packets. We will be doing that the weekend before the event. Look for further announcements.

In July is the Immke show. We will have our business meeting sometime that weekend. July 20 will be a trip to the Longaberger Homestead and perhaps the motorcycle museum (something for the "guys"!!) The Huddy's will plan this.

In August, of course, is The Roadster Factory (TRF) summer party!! Get your reservations soon as there are several hotels, but they fill up fast!!

There are blocks of rooms at many of the hotels. The Holiday Inn in Indiana (Penn) has a special rate, as do other hotels.

Other subjects discussed:

- We are still looking into insurance coverage for the club. It has been moved and seconded that coverage be obtained.
- Membership requirements for entering competition event judging was discussed. It was agreed that membership must be obtained in TRA, 6-Pack, etc., in order to enter "concourse" competitions. It remains to be decided if membership is necessary to enter "participants choice" competitions.

Please send in your dues and come one and all to the meetings. We look forward to seeing you!!

Respectfully submitted, Margo Washburn, Sec'y

## President's Corner

**April, 2002**

March Madness; the meaning of those words is usually tied to the sport of basketball. The ups and downs of national tournament play may have been maddening to most Buckeye fans this year but I submit that it is more appropriately tied to the Buckeye sports car scene and then likely to the sport of sailing. Purely a personal point of view I must admit; however some of you may agree. It is madness to think I can get both a car and a boat fully ready for Spring. The drive to Buckeye Lake and the Chesapeake Bay launch in April; there are too few days and nights in Mad March to do justice for both! I am trying; very trying according to Lisa. This weekend it was the boat; next weekend it will be the car's turn to get some TLC. I sure don't want to get my locations or vehicles mixed up in

April since both will be focused on a body of water and our first outing of the year.

The March social and business meeting was hosted again by Terry and Charlie; thanks for the great hospitality. We had a good time with ample opportunity to plan more of the events for 2002. John Huddy has That Calendar for our events and more folks are volunteering to Host and Help as we seek to make our events as creative and as rewarding as you want them to be. So, come on down, be an active member and make our events the best ever. The tech sessions and drives are all about your cars; let's roll for 2002.

Look for the newsletter details on the starting point for the drive; the Wendy's at the Pickering/ I-70 exit at 10am with a go time of 10:30am. The tech session in early April will be a great opportunity to see the mating of a Triumph body to its frame; be there for this up close and personal lesson in frame off restorations.

I again repeat, we need your membership and your dues to succeed. Please renew by sending your check to Jim VanOrder and plan to participate in more of our events.

Thanks for your continued support and participation. See ya at Bruno's on April 2<sup>nd</sup> !

Bob Mains [bob.mains@ode.state.oh.us](mailto:bob.mains@ode.state.oh.us)

## A Chronicle of Triumph: how I became addicted

I can't believe that it is spring break already, and there is snow on the ground! The only good thing about having the roads salted is that it ensures that I will stay inside and work instead of driving around. Work was my main goal for spring break, and I have managed to be fairly efficient. I received all my suspension pieces so I decided it was time to start working on my 250's frame. Last night I went to the barn with the grinder, the sawzall, and the welder. All the pieces from Triumph Works are perfect matches for the old stuff, so I was able to start removing some of the old parts with the grinder. One more evening and I should have the trailing arm cross members welded in place and possibly have the differential pieces reinforced.

Other projects for spring break are the engine and transmission. I have been spending one day every weekend at a BT member's garage learning how to port cylinder heads. I have developed decent skills manipulating the tools, and have made progress on two different heads (we had to scrap one after finding a crack). I will possibly publish a tech article on porting if I get good enough at it. I should have my head finished in two weeks or so, and the assembled block shouldn't be too long after that, as I have received all my bottom end parts, so its just a matter of getting the machine work finished (The block is having cylinders bored, and cam bearings installed right now).

The 250 has started moving again, I won't be surprised to see it on the road this summer sometime. Most of the parts are in, and so are most of my go fast goodies. I can't wait to

hit the autocross with my new car, but until its finished I will have to put my roll bar in the TR6 so I can have some fun!

Ryan [rjhmile@yahoo.com](mailto:rjhmile@yahoo.com)

### Officers and the Fine Print

The Buckeye Triumphs Newsletter is a publication of Buckeye Triumphs, and the content herein is not officially endorsed by the staff or members of Buckeye Triumphs, their families, or lawyers. If you decide to follow the advice of anything inside this newsletter, you do at your own risk. We are all adults here, so if you do something stupid, own up to it and don't sue the club. Heck, we don't have any money anyway...

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Web Site: <http://www.BuckeyeTriumphs.org>

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Affiliations: 6-Pack Chapter -- Center of Triumph Register of America -- VTR Zone Member

### Buckeye Triumph Upcoming Events

Date	Event/Location	Host
April 2	BT Business/Social Event Bruno's Pizza, 1774 E. Dublin-Granville Road	Murry and Jacqueline Mercier 888-0838
April 6	TR6 Body Workshop 7668 Brandbury Place, Dublin	Mike and Mary Henry 793-1453
April 20	BT Spring Drive	Bob Mains and Jim VanOrder 890-7767 or 740-967-2110
May 5	25th Annual British Swap Meet and Car Show. Holiday Inn Express, I-76 & Rt. 94, Wadsworth, OH.	The Northeast Ohio Austin Healey Club of America <a href="http://ahbugeye.com/neoahca/">http://ahbugeye.com/neoahca/</a>
May 11	BT drive and cookout at Paul and Jill Griesse's Pau Hana Farm in Granville, OH	Bruce Miles 740-587-4179

**Buckeye Triumph Upcoming Events**

Date	Event/Location	Host
May 17 – 19	Import/Replicar Nationals (and huge swap meet) Carlisle, Pennsylvania	<a href="http://www.carsatcarlisle.com/Import/import.htm">http://www.carsatcarlisle.com/Import/import.htm</a> For more information call (717) 243-7855
May 19	British Car Show Easton Towne Center	British Car Council
May 25 <sup>th</sup>	River Run is a 300+ mile, all-day driving tour using some of Ohio's most interesting and challenging roads.	Eric Jones (740) 363-2203
Last week of May 27 <sup>th</sup> through June 2 <sup>nd</sup>	Take your British Car to Work Week	<a href="http://users.arczip.com/zntech/britishcarweek.html">http://users.arczip.com/zntech/britishcarweek.html</a>
June 14-16	Sprint Vintage Grand Prix at Mid-Ohio Sports Car Course – Triumph is the Featured Marque!	<a href="http://www.midohio.com">www.midohio.com</a> 1-800-MID-OHIO. Special ticket pricing is being offered to Triumph owners ordered by June 13, 2002

*strip was attached with duct tape (everything needs at least one piece of duct tape) from the floor to the top of the pail where one end of the rod goes through the pail, to act as a walkway (this is so the victim can walk the plank from the floor up to the edge of the bucket). A couple inches of water, or antifreeze, is then put in the bottom of the pail.*

*I put this set-up in the shed when the TR was put to sleep last fall, and yesterday I saw the first two "testers" of the system. It worked flawlessly!*

*And, I'll be using Zerex anti-freeze in my cars, as both mice showed no signs of freezing, boil-over, or corrosion.*

My observation: The antifreeze in the bottom is of course used to drown the rodent. Water is ineffective in locations where it freezes. For you bleeding hearts, if you can't bear the thought of a mouse drowning in antifreeze, you might use a similar amount of whiskey, gin, rum or vodka. That of course has the risk that your brother-in-law might get his head caught in the pail.

**Zauberei Ausrücklagerset**

I recently purchased two ausrücklagers from Joachim Gunst Britische Automobile in Heidelberg (<http://www.gunst.de/>). If you go to the Website you'll see it's in German. One set of my grandparents immigrated from Leipzig so I can claim some German affiliation (the other set immigrated from West Virginia). However, in spite of the heritage, I'm not that impressed with some Germans. I was reminded of that when we on vacation a few weeks ago in Spain---a week in Majorca and a week in Tenerife. There were many Germans at the same hotels. The hotels provided full board buffets. To understand what the blitzkrieg must have been like, just get between the buffet and a couple 150-kilo panzerfraus. I know that's unfair to let the action of a few distort my view of the millions of fine Germans, but after being elbowed from both sides and walked on, one can develop a bit of a prejudice. I must add that the German men were very courteous and most stayed out of the way when the panzerfraus were at the trough.

I did grow up bilingual. Unfortunately, my second language is West Virginian, not German. So how did I read Gunst's Website? No problem, I copied the text and pasted it into one of the online translators. There used to be a really good one that unfortunately has ceased operation. I currently use <http://www.freetranslation.com/>. Sometimes the translation isn't 100% accurate. For example, a woman friend used these translators to write a letter in German to a friend. Apparently the friend had recently purchased a unusual camera case so she commented that she was really anxious to see his new camera case when he visited in a few weeks. Unfortunately, the software translated camera case to the German equivalent of scrotum. This caused a bit of confusion since he was still using the original and had no plans for a replacement. Obviously one should be a bit careful with interpreting the translator results.

Now, after that bit of confusion, ausrücklager is release bearing. It seems that Gunst does maintenance on British

**Notes from Nelson:**

**TRials WebPages**

We have turned on the part of the BT Website devoted to information about the 2002 6-PACK Trials. You can access these pages by clicking the link on the BT home page (<http://www.buckeyetriumphs.org>) or directly at <http://www.buckeyetriumphs.org/2002Trials/index.htm>.

**Please report any errors anyplace on the Website to the Webmaster by clicking the button on the left side.**

**A Better Mousetrap**

I try to include something from the Triumph or 6-PACK email lists every month. This month the nod goes to Kevin Thompson of Cape Cod, MA who posted the following on the 6-PACK email list the other day.

*Well, by following the advice of one of the list members I have succeeded in preventing mouse related problems from occurring in my TR6. This approach involves the 5 gallon sheetrock pail with a smooth rod inserted through the top from side to side. In the center of the rod I put a soup can with both lids intact and the rod going through the top and bottom lids, allowing it to spin freely in the center, at the top of the bucket. A thin strip of peanut butter was applied around the circumference of the can, then a thin wooden*

cars. After having several clutch replacements fail within a few thousand miles (some bearing failures and others sticky clutches), he found a very high quality substitute bearing. He uses this bearing on a custom made bronze sleeve and provides this stuff in kit called an Ausrücklagereset. I added the Zauberei, which is German for magic ----- **Magic Release Bearing Kit**. This of course is mocking the magic clutch kit that we know sometimes doesn't work very well because the application doesn't match the large Koyo release bearing characteristics.

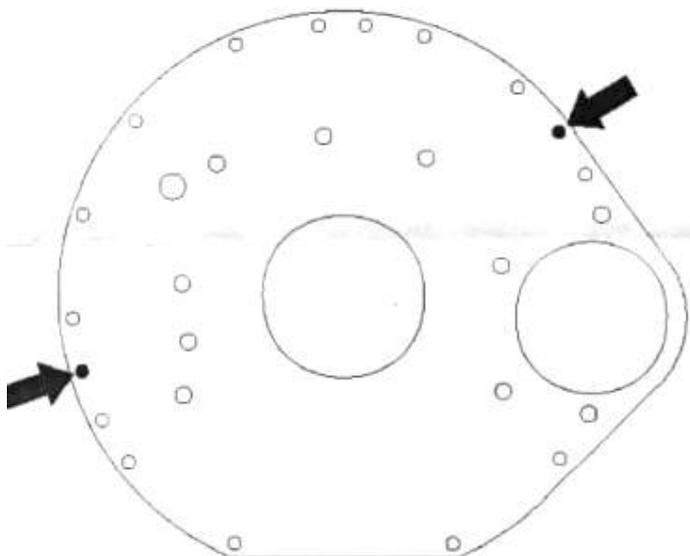
The next photo shows the kit with bearing already pressed on the sleeve, a spring, flat medal strap, two dowel pins, a bolt& nut, and a packet of grease. The kit also came with two instruction pages, in German. I used the translator program to convert to English with limited success. For example, the word for grease translated to fat in English. (A thought ---- the translator I'm using goes from German to English. Maybe I need to then pass it through an English to American translator.)

Wirad Pless from up in Canada originally steered me to Gunst's Website. He understands German (I believe he grew up in Germany) and was able to give me a good translation.



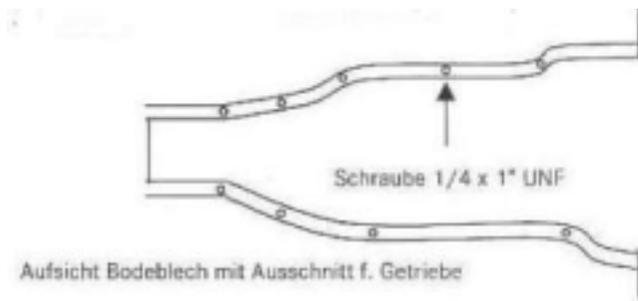
**Position der Passstifte:** Gunst made a big deal out of using the dowels (or Passstifte as he calls them) between the gearbox and the rear engine plate. (Look at that word; sss all in a row.) The dowels are positioned in the two holes shown on the next sketch. Just a few weeks before I

received the kits from Gunst I received an email from Casey Van den Dorpel out in British Columbia. Casey had been reading the clutch notes on the BT Website and wanted to pass on a suggestion to make sure 3/8 inch bolts are used in these same holes Gunst uses the dowels. For those of you that aren't aware, all except four of the bolts that hold the gearbox to the rear engine plate are 5/16". The exceptions are the two that hold the starter and the two flagged here. Casey said that his gearbox had originally used 5/16" bolts in those two positions and he figured the resulting misalignment caused part of his problem. He also measured the diameters of all the holes and found these two holes have a reduced clearance. He measured a 0.020" clearance for the 5/16" bolts; 0.040" clearance for the two 3/8" starter bolts and about 0.003" clearance for the 3/8" bolts in these two holes. Clearly these two holes are intended to align the gearbox and engine. Gunst says that if the gearbox and engine aren't aligned properly the clutch will be jerky (German for sticky?). The 3/8" bolts probably do a good job of aligning everything but the dowels are probably better. I understand that the TR3 uses dowels in these positions.



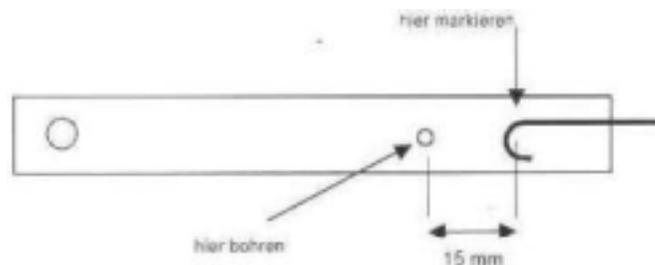
**Stopping the squeal:** You might recall I wrote something last fall about the sticky clutch in Murry Mercier's TR6. When we pulled the gearbox we found that the pressure plate spring fingers severely worn after less than 5K miles and will probably wear through in less than 20K miles. The clutch squealed when there was no pressure on the pedal; typical of the KOYO bearing many folks are using instead of the OEM RHP bearing. The RHP bearing turns fairly easily so the small spring in the slave cylinder provides sufficient preload to keep the bearing against the pressure plate and spinning when there is no pedal pressure. The KOYO bearing is much stiffer and the little spring provides insufficient preload so the bearing rubs against the pressure plate rather than spinning with it. This wears away the fingers and causes the squealing. A very slight pedal pressure stops the squeal as the bearing picks up speed and rotates with the pressure plate. Dick Taylor researched this issue and added a stiffer spring to increase the preload. It solved the problem. Several modern clutch systems I've investigated preload the

release bearing in a similar way to keep it spinning when the clutch is engaged.



The spring in the Gunst kit is used to provide a preload. In fact, it is nearly identical to a scheme Dick Taylor described to me last year. The end of the metal strap with the hole is fastened to one of the holes used to hold down the gearbox cover using the new bolt and nut provided in the kit. The specific hole used is shown in the previous sketch.

One end of the spring is hooked in the bottom hole of the clutch operating shaft arm and the other end is held against the strap and the spring is then drawn snug so that the release bearing is against the pressure plate. The position of the end of the spring is marked on the strap. A hole is then drilled 15 mm (~1/2") further away from the arm and the spring is then hooked in the hole. This provides about 15 pounds of force on the bearing when the clutch is engaged and keeps the bearing spinning.



**The Bearing:** The bearing Gunst uses is quite a bit smaller than the OEM RHP bearing as shown in the photo below. The Gunst bearing is slightly stiffer than the RHP bearing, seems smoother and in general of much higher quality. Recall that the KOYO bearing is even bigger than the RHP bearing. One of the problems with the KOYO bearing is that it is so big that it engages the release bearing spring fingers further from the center, so much so that it engages in the area of the bend of the fingers on the Borg & Beck pressure plate.



**Sleeve:** The Gunst sleeve is custom made of bronze. Recall that the sharp edges at the rear of the standard steel sleeve appears to be the cause of the sticky clutch. This is probably aggravated by the misalignment mentioned earlier. The bronze is softer than the steel sleeve and less prone to grabbing since bronze is frequently used for bushings and sleeve bearings. Dick Taylor said he smoothed the rear edge of this sleeve as a further precaution. Gunst says to use the special grease he sent in the kit between the sleeve and gearbox front cover and also to spread a little over the front of the bearing where it engages the pressure plate fingers.

**Results to date:** Dick Taylor has had his bearing in and running for a couple weeks and is happy with the results. I hope to get the second one under test shortly. Both Dick and I were concerned that the constant pressure on the release bearing, which is transferred to the crankshaft thrust bearing, could cause premature thrust bearing failure. I'm less concerned at the moment. The thrust bearing must bear the 250 to 400 pound force required to release the clutch every time the clutch pedal is pressed so the constant 15-pound force probably isn't a problem. Dick is keeping an eye on his crank end float. I'll do the same when I first install the bearing.

If they work as well as I expect, I'll probably order a dozen or two for some of the local guys. The first pair cost ~\$90 including shipping. This is about the same price as the KOYO bearing with sleeve. I can probably get a better price if I order a bunch. Let me know if you want some.

### TR250 & TR6 Brake Theory

Recall that we had a brake tech session last month. I dragged the brake parts of my 70TR6 project to the basement workshop in preparation for that session. As I got into the brakes I decide that brakes would make for a nice addition to our Website technical pages. The documentation is about 75% complete. As is typical, I'm discovering new and interesting things each day. The final product will have 11 parts and be over 100 pages if printed in the web format. I'll be putting an edited version here over the next few months as space permits. The part below is from the first section called "theory".

**Overview:** The same brake system with only a few minor changes was used from the first TR250 manufactured in 1968 through the last TR6 manufactured in 1976. The system is hydraulically operated using disk brakes in the front and drum brakes in the rear. Separate hydraulic plumbing is used for the front and rear so that a failure in either the front or rear should allow a measure of braking through the other half of the system. A single master cylinder with separate chambers and reservoirs for the front and rear is used. The master cylinder is designed such that under normal operation the front and rear have equal hydraulic pressure. The system is equipped with a Pressure Differential Warning Alarm (PDWA) device that senses a difference in pressure between the two parts that indicates a failure in half the system. The PDWA is equipped with an electrical switch that turns on the red **BRAKE** warning light on the dash when a failure is sensed. The master cylinder is equipped with a servo that amplifies the force applied to the pedal resulting in a reduced pedal force required to operate the brakes. The system also has a cable mechanical arrangement to operate the rear brakes for the handbrake function.

The variations to the system are:

**Front calipers:** The front caliper pistons were changed at CC29928 to accommodate a different style piston boot. The calipers were changed to use metric threads at CC81078 in 1972. The metric threads include the caliper end of the short pipe between the caliper and the front hoses and the bleed screws. The two bolts attaching the calipers to the caliper mounting plate were also changed to accommodate different size holes in the calipers. The pad retaining pins were also changed from 1/4" to 3/16" (not metric?).

**Rear wheel cylinders:** The rear wheel cylinders were changed from 0.70" diameter to 0.75" diameter either late in the '75 model year or early in the '76 model year.

**Handbrake:** The handbrake handle was changed in '76 with the addition of a switch to operate the **BRAKE** warning lamp when the handbrake is engaged.

**Servo:** Apparently there were minor variations in the seals & non-return valves. Repair of the servo is normally beyond the scope of the amateur mechanic. However, after I finally got one apart (without using saw, cutting torch or explosives), I decided to play with it too.

**Master Cylinder:** A plastic reservoir is attached to the top of the master cylinder casting as shown below. The reservoir has two sections, a small section at the front for the rear brakes and a larger section to the rear for the front brakes. The ports to the front and rear brake pipes are also shown. These ports use different size fittings to prevent connecting the system incorrectly. However, the ability of an amateur mechanic in this regard should not be underestimated.

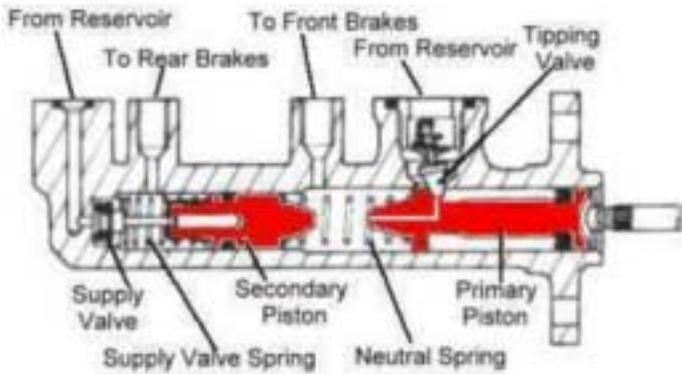


The master cylinder internal components are shown in the next photo. The system uses tandem pistons. Although it's not obvious from the picture, the primary piston is a little larger diameter than the secondary piston. The primary piston pushes the fluid to the front brakes as well as pushing fluid to drive the secondary piston that supplies the rear brakes; hence the primary piston does double duty. Aren't these parts filthy? They really clean up nice as seen later.



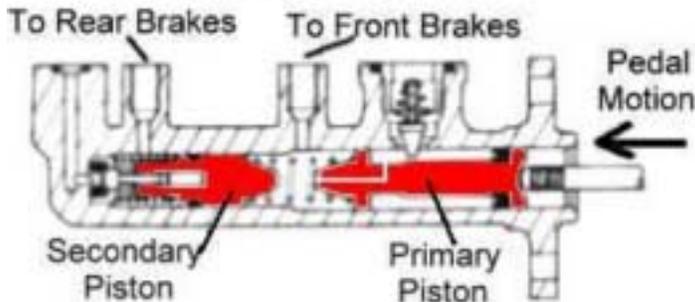
The sketch below shows the situation when the pedal is released. The supply valve spring pushes the secondary piston to the right, which also opens the supply valve allowing fluid from the (rear brake) reservoir to flow into the cylinder and on to the pipes to the rear brakes. The neutral spring pushes the primary piston to the right against the tipping valve. The tipping valve tips and opens allowing fluid to flow into the cylinder and via the holes in the side and end of the primary piston into the area between the pistons and on to the pipes to the front brakes. The tipping valve prevents further movement of the primary piston to the right.

**PEDAL RELEASED**



The next sketch shows the situation after pedal motion forces the primary piston to the left. The side force on the tipping valve is removed allowing it to straighten and close off the front brake reservoir from the cylinder. The primary piston pushes the fluid into the front brake calipers where the pistons move out and push the pads against the rotors. This same fluid pushes the secondary piston to the left which first closes the supply valve and then forces fluid into the rear brake cylinders where the pistons move out and push the shoes against the drums.

**Pedal Operated**



There is a subtle but interesting point relating to the two different piston sizes. A little further on we see that the front brakes have no springs to push the pistons back into the calipers whereas the rear brakes have springs that push the pistons back into the wheel cylinders. Also, the front caliper pistons are much larger than the rear wheel cylinder pistons. The net effect is that as the master cylinder primary piston is pushed by the pedal a small pressure develops in the front system that pushes the pistons against the pads and in turn, the pads against the rotors removing all slack from the front system. This pressure is probably too small to overcome the force of the rear shoe springs with the small rear cylinder pistons. Once the slack is out of the front brakes, pressure will build as required. It is at this point the secondary piston starts to move. The interesting point is that since the master cylinder secondary piston is slightly smaller than the primary piston, the secondary piston will move further than the primary piston once the slack is removed from the front brakes.

Nearly all the piston movement in the master cylinder and the calipers as well as the rear cylinders occurs under fairly low pressure. If there is no air in the system, additional force will cause little motion but instead cause the force of the pads against the rotors and the shoes against the drums to increase resulting in increased braking force.

Several things about the system are really neat. The secondary piston has the pressure of the front system on one side and the rear system on the other. This means that the front and rear systems operate at the same pressure; otherwise the secondary piston would move in the direction of the lower pressure until the pressures equalize. (This neglects the effect of the springs pushing on the secondary piston. However, the spring forces are small, nearly equal and oppose, so they essentially cancel.) This same feature allows the system to self adjust to differences in the fluid required to the two halves. For example, if the rear brakes are out of adjustment, the secondary piston will have to move further to provide sufficient fluid to move the shoes against the drums. The primary piston will also move further (more pedal to apply brakes), but the pressure in the two halves will still be the same.

Now what happens if part of the system fails? Lets first assume a rear brake line ruptures. When the pedal is pushed the same operation as described above will happen except that the secondary piston and hence the primary piston and the pedal will not encounter much resistance until the secondary piston runs into the back of the cylinder. After that point the secondary piston can't move any more and the pressure can then build between the two pistons and in the front system. On the other hand, if the front system ruptures, the pedal and primary piston will not encounter resistance until the primary piston physically runs into the secondary piston and then moves it to the point that the rear shoes are against the drums.

The failure of either half the system will significantly increase the brake pedal motion and will at best provide barely adequate emergency braking. **The car should not be driven until all brake problems are repaired.**

**Pressure Differential Warning Alarm (PDWA):** The PDWA is connected to the two master cylinder outputs by the short pipes shown in the photo on the right. The master cylinder is installed at an angle with the front pointing up. Recall that the front output of the master cylinder is for the rear brakes. These pipes cross so that the fluid for the front brakes gets to the front part of the PDWA and the fluid for the rear brakes gets to the back part of the PDWA.

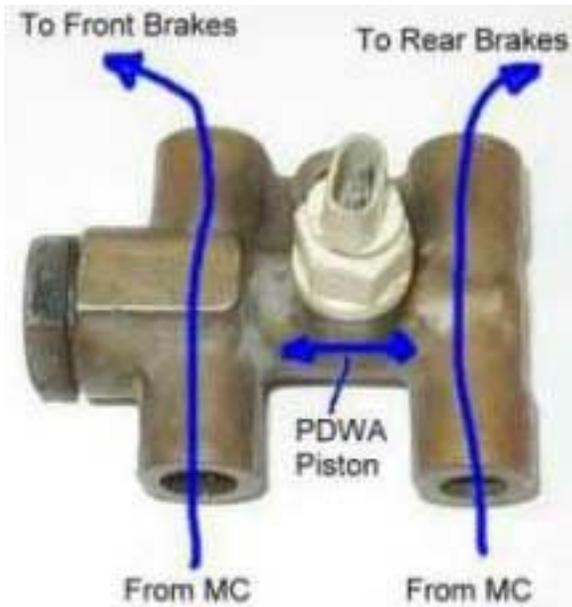


First I should point out that the PDWA is not a **brake-proportioning valve**. If it were, it'd be called a **brake-proportioning valve**. (A brake-proportioning valve is used to reduce the pressure in part of the brake hydraulic system.) The PDWA is a device to sense a Pressure Difference between the front and rear hydraulic lines and gives a Warning Alarm if a difference exists. We noted earlier that the floating secondary piston in the master cylinder would normally keep the pressure in both sides the system equal. A difference in pressure between the two sides indicates that one side will generate less than normal and possibly no braking forces, a serious fault. This can be caused by a rupture or an air pocket in one side of the system. Note that the PDWA will not sense the failure where both halves of the system lose pressure.

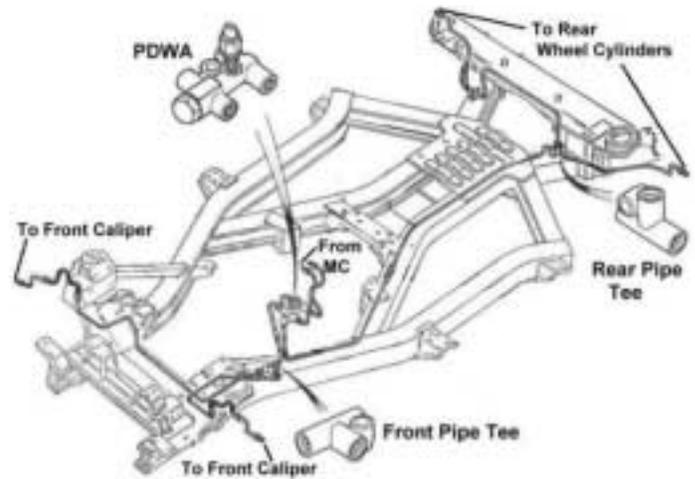
The PDWA is an H shaped pipefitting made of brass as shown in next photo. The front leg of the H provides the hydraulic path for the front brakes and the rear leg of the H provides the hydraulic path for the rear brakes. A small piston rides in the cross piece of the H and prevents fluid from flowing between the two sides. If the pressure is the same on each side of the H, the piston will not move. If the pressure is different between the two sides, the piston will move toward the lower pressure side.



**The pipes (plumbing):** The sketch below shows the brake pipes. (This sketch was copied from the TRF TR250 catalogue and then "processed".) The master cylinder and PDWA are both mounted to the body. The pipe for the front brakes goes through a short pipe from the PDWA to a tee mounted on the frame and then through separate pipes along the frame to each front suspension tower. A short hose connects the pipe on each tower to a pipe on each front caliper assembly and then via that short pipe to the caliper. The drawing is a little misleading in that the routing of the pipe is actually on the back side of the frame cross member rather than on the top as implied from the drawing. The pipe to the rear brakes is from the PDWA along the inside of the frame member under the top cruciform plate to a tee mounted on the top of the left frame member. A hose connects from the tee to a pipe on the left suspension arm that runs to the left wheel cylinder. A pipe runs from the tee across the front of the rear suspension cross member to a fixture on the top of the right main frame member and then to the hose to the pipe on the right suspension arm that connects to the right wheel cylinder.



The PDWA is equipped with an electrical switch that operates if the piston moves off center. The end of the switch and piston are shown in the photo below. The switch plunger normally rides in the narrow part on the center of the piston. If the piston moves off center, a larger diameter part of the piston comes under the switch and pushes the plunger into the switch, operating the switch in the process. The operated switch will then turn on the **BRAKE** warning lamp on the dash.



**Next Month:** I'll pick up with the front and then rear brakes followed by the servo next month.

Nelson Riedel -- [nelson@buckeyetriumphs.org](mailto:nelson@buckeyetriumphs.org)

## Late TR Guy



April 2002: By Bruce Clough ([clough@erinet.com](mailto:clough@erinet.com))

## You'd Think I'd Be Motivated To Do Something...The Sequel

What, you actually thought I'd have time to work on the cars? Please, I'm a professional. You think I have time? Well, actually I did, I took the time to take the wheels to Steve Miller at MG Automotive to have them sandblasted. He had as much of a problem as I did, but since he was doing it by the hour, he didn't lose patience, in fact, the dollar signs gave him the vim and vigor to press on. Clean wheels, cleaned wallet – win/win situation for all involved.

Anyway, at the time of writing, three of four are clean. I'm trying Dupicolor's wheel paint. Silver followed by clear. Since they are epoxy paints, this will take a week or so to do right (let the silver base dry a week before covering with the clear). I originally thought I might have them powder coated, but

- a) Lots of folks have had the powder coating come off. Lots.
- b) The new lawn mover sucked up all the cash that would have been used for the powder coating!



Painted Wheels All In A Row

The paint has covered good so far. The first can I tried had a faulty nozzle - \$5 a can and the bad nozzle is thrown in for free – but the next operated fine. I'm hoping Victoria British has new nuts and center pieces. I'm hoping to have the wheels on soon so I can go through the car before the Spring Tour. You are going, aren't you?

## This Month's Technical Tip

### Don't put sugar in your gas tank!

Just kidding – this month I'm lazy, so I'll swipe some more stuff from the Wedge email list. Ron Fowler loves this since he's already read it, but the rest of you haven't. But then again, most of you don't have wedges, so why should you care?

### Topic: What Not To Do To Your TR7 When Towing, And Why!

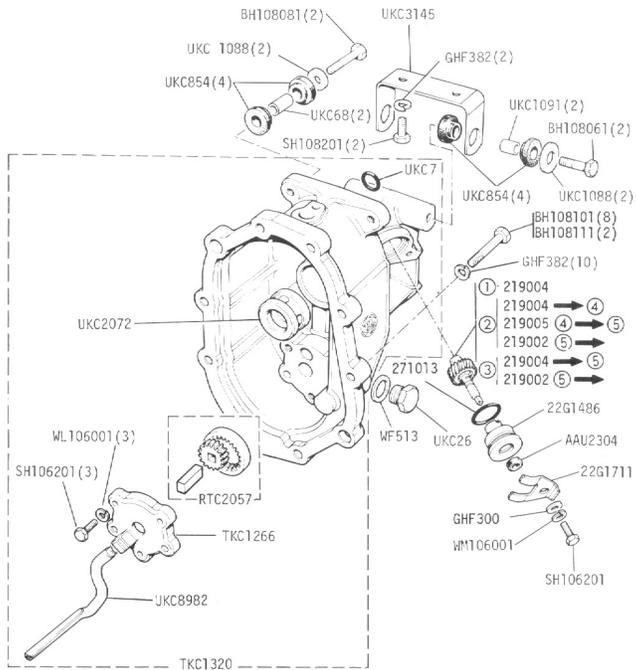
David wrote:

*Hi Guys,*

*My TR7 broke down, and I got my recovery company to recover my car 300 miles back to my house. They simply hooked it up to the back of a transporter, and towed it with the front wheels on the transporter, and the back wheels on the road.*

*I've just read in the manual that the propshaft should be disconnected before towing - does this mean my gearbox will be toast? If it has been damaged, which part of it would be affected?*

*Oh, woe is me!*



**Parts Picture From BL TR7 Parts Catalogue – Oil Pump Is In The Dashed Box**

To which Joe wrote:

*How about someone posting info on what the oil path from the pump is. I haven't found anything that defines what all the pump supplies lubrication to except the bearing in the tail. I have a transmission that the oil pump failed on while Bill Wood was on a trip. The rear seal is fried to a crisp but I haven't inspected all the bearings yet. I know he had to replace the transmission on the trip though.*

To which Dan wrote:

*The tranny oil pump on the 5 speed gearboxes supplies the oil to all the internal bearings and parts. The oil pressure goes into the mainshaft through a rope type thing directly above the pump that surrounds the mainshaft. Within the mainshaft is a passage that lets the oil go to the rear bearing, both mid bearings, all rotating gears on the mainshaft, through the front coupling bearing at the fourth gear, into the input shaft, and then through the front cover to both front bearings!*

*It lubes everything except the actual gear teeth which are directly immersed and the reverse shaft which is on the side wall and only used in limited duration so it doesn't even have an actual bearing.*

*If the pump is not going, the bearings are not getting pressure feed. This is terrible, but not super terrible as they are actual ball bearings and roll around the surfaces and are replaceable parts.*

*If the pump is not going, the mainshaft will spin due to wheels turning on the ground and all the gears will not be turning. Remember that the gears reside on the mainshaft and only engage at their sides through shifting. Those surfaces will be rubbing without oil and without any ball*

*bearings. This is super terrible because they are not designed to have replaceable parts of any cheap fashion.*

Dave explained it further thus:

*The gears on the main shaft are turned by the input shaft and the main shaft is connected to the propshaft. There are bronze bushes between the gears and the mainshaft. When a car is towed in this way the mainshaft turns in the bushes. The problem here is that the oil in the transmission only comes up to the gears on the layshaft in the bottom of the transmission. Normally the engine turning will turn the layshaft gears which will fling oil about in the transmission case lubricating everything,*

*Further, if you have a 5 speed box there is an oil pump that runs off of the layshaft to distribute oil.*

*With the engine off oil is not being circulated through the box and the only lub is the residual oil film from the previous run. Since you car was towed soon after breaking down there was a relatively fresh oil film which is better than a 6 month old film. If you box sustained damage it would likely be the bushes and possible the mainshaft. But changing these parts requires a pretty complete tear down.*

*One question: Didn't these guys know any better?*

Finally, John chipped in

*The towing problem only applies to the 5 speed transmission in the TR7/TR8. I towed mine 10,000 miles behind my RV before I had any indication that there was a problem. I was on I-80 approaching Reno from the East when I had to slow down for a construction zone. I opened the RV window while driving past all of the heavy equipment. After leaving the construction zone I noticed I could still hear all of the heavy equipment! When I got to Reno, the transmission did not like to shift and made a terrible racket when trying to drive the car.*

*I disconnected the driveshaft then and replaced the transmission after arriving in San Luis Obispo, CA. The local BMC repair shop recommended filling the tranny all the way up to the top with ATF. I never towed it again with the driveshaft connected except for short runs where the engine was left safely idling. Up until leaving the East Coast (about 7,000 miles of towing) there was never any hint of a tranny problem. I checked for quick-disconnects for the transmission or rear wheels, but could never find something that would fit. Up until then it was great to cruise around the U.S. in the RV then do local sightseeing in the TR7 with the top down.*

*I'm trying to envision John towing the car with the engine idling, and wondering why?.... Anyway, the jist of the above is don't tow you wedge by the rear wheels unless you disconnect the driveshaft!*

## Current Stereo Status

In order to stay ahead of the competition – to have the best garage stereo in the neighborhood – I managed to pick up an entire Sony sound system, receiver, cassette deck, turntable and speakers for \$35. This means that I could retire the Marantz gear to the basement (that's actually collector's stuff) and pump out serious sound. I added an old Denon CD

player I had sitting around so I could play modern media (no 8-tracks in this garage!) The neighborhood jams when I'm working away in the garage of speed. I challenge you, the reader, to make your Triumph time as musical as mine.



**Second-Hand Sony Stuff Sounding Super!**

During the sound check I scared away all the cars in the neighborhood, woke up Bridgett, and shook some loose paint of the wheels. Now I need to get it up off the workbench!

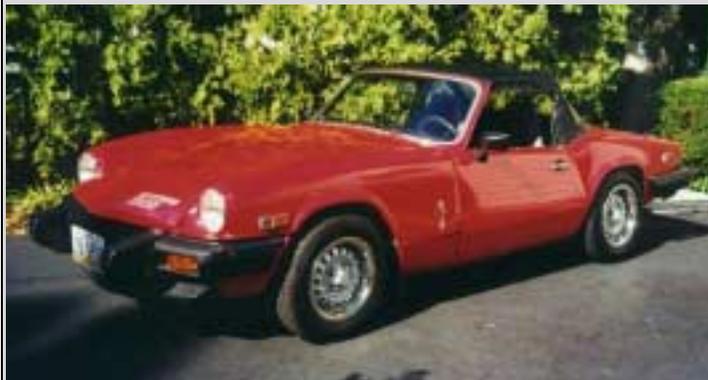
– Embroidered on your article

Select your favorite jacket, shirt or bag since the logo can be added to almost any cloth article at a cost of about \$10.00. Send or bring your articles to Bob Mains. Turn-around is usually about 2-4 weeks. (Names or lettering can be added for additional costs).

**Classifieds:**

These classifieds are free to BTC members, given, of course, that they relate to Triumphs, and are for private (not business) use. No, you cannot sell that old couch here! We'll run classified ads for two months, beyond that you'll have to ask for an extension.

FOR SALE:



1979 Triumph Spitfire 1500, #FM101136U – Red w/black interior/top; 4-speed; 83,500 miles; near original and good mechanical condition all around; a daily driver; rust on rear portion of wishbone frame. Asking price \$4,000. Contact John at 614-255-2261 or [jschilling@dgcolumnbus.com](mailto:jschilling@dgcolumnbus.com)

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