

# Avanti: Project Automatic Overdrive

By Bill Henderson, AOA! Pennsylvania Member, wfhenderson@yahoo.com

I hadn't owned my Avanti very long, when on an early summer morning drive on the Interstate to a club event my wife commented, "It doesn't seem happy." I could hardly argue with her. In fact, I was thinking the same thing. It was a hot day. Keeping up with traffic at 75 MPH the car ran smoothly but the engine was screaming like an over-revved sewing machine. The tachometer read 3300 RPM, and I kept wishing I had another gear to shift to. Further, by the time we had reached our destination more than an hour later, we were both drenched with sweat, as the footwells and console were radiating heat worthy of a smelting oven. The chrome shifter was so hot that it couldn't be touched without risking blisters. Even the air coming in the floor vents offered no relief as it was scalding hot, passing as it did through the oven-like cowl and past the firewall before reaching our feet. "That car needs air conditioning," said my wife with some annoyance as we joined the party, our backs soaked with perspiration. I frowned. Installing air conditioning on an R2 is a highly custom proposition, and I knew deep down that no auto air conditioner would be able to overcome *that* inferno. I realized the answer had to start with addressing the source of that heat. Further, just hearing that screaming engine was an assault to my ears; 3.73 rear gears couldn't have helped, and the 10 MPG I got on that trip was surely an additional result.

The pace on the road was surely slower in North Carolina where this car was sold new in 1963. There were few Interstates and more country roads, and likely this bright red Automatic Power-Shift equipped Avanti wasn't used to commute great distances in heavy traffic. But even at slower speeds, long trips in the southern climate would have been downright uncomfortable, though frankly, we expected less of our cars back then. The



combination of summer driving, today's faster highway speeds, the high rear gears, the ancient transmission and the fiberglass floor and firewall made me realize that I needed to address the issue if I was going to enjoy this car for years to come. Besides insulating the floor and firewall, I needed to reduce the engine speed on the road.

It was time to consider a modern automatic overdrive transmission swap.

## The Issue of Originality

This isn't the first time I have considered doing a transmission swap. Some years ago I converted my trusty V8 Hot Rod 1966 Mustang from a manual Ford four speed to a 5-speed Tremec overdrive, and I can attest that it has made a world of difference in my enjoyment of that car. When on the highway, I smile as I occasionally shift it from fifth back down into fourth just to hear it howl, reminding myself of the wise choice I made. But I had never attempted to swap automatic transmissions on a car before, and the thought of trying to make any modifications to

an all-Studebaker powertrain was a bit intimidating to me.

While I wouldn't likely change the engine in my Avanti to *brand X* (and I know some do), somehow it seemed completely OK to me to swap out the transmission; hidden beneath the floor and behind the engine as it is, who would know besides me? I'll admit that I am not a restoration purist, while I like to keep outward appearances stock-looking; I have made adaptations on all of my collector cars for safety. All have disc brakes, dual master cylinders, electronic ignitions and radial tires, and brighter brake lights, for example.

I have found that generally Studebaker people are much less bothered by modernization and adaptation of their cars than most other groups in the collector car hobby. Perhaps it is our need to adapt to survive, since unlike owners of Mustangs and Camaros, we cannot go through a catalog and order practically every part of our cars brand new. Or maybe we are just more fun. Anyway, the way I see it, old cars are meant to be driven, and anything one can do to make them more fun to drive, safer on the road and easier to maintain, the better.

### Transmission Choices

A major project like this one calls for some careful research. I spent more than six months researching and considering my alternatives, compiling as much data as I could from the Internet and print publications, both Studebaker-related and not, to see what success and failures others had found.

The two most documented choices for adapting an Automatic Overdrive (AOD) to the Studebaker 289 V8 are clearly the GM 700-4R and 200-4R. These are both pre-computer controlled AOD transmissions, meaning that they are easier to attach to the Avanti's pre-computer controlled engine than a newer AOD transmission. The only means of communication between engine and transmission is the Throttle Valve cable, which connects between the carburetor and the transmission. *(See sidebar near the end of this article)*

Both transmissions feature a lockup torque converter, which allows the engine to direct-connect to the driveshaft without any slippage. This usually

occurs only in 4<sup>th</sup> gear, and when it kicks in, RPMs drop by another 100 or so. It actually feels like a bonus 5<sup>th</sup> gear. Besides saving gas, this feature lessens the generation of heat by stopping slippage. Proper attachment of a 12V connection to the transmission engages lockup, and is essential for its long life.

	GM 700-4R	GM 200-4R
Description	4-speed automatic with lockup torque converter in overdrive, non-computer controlled, aggressive first gear with fast shift into second, Chevrolet bolt pattern. Can be "built" to handle extreme drag strip use. Avoid early 27-spline output shaft	4-speed automatic with lockup torque converter in overdrive, non-computer controlled, more evenly spaced gears, Universal GM bolt pattern. Pre 1986 units had reputation of being less durable, but rebuilt units generally have all upgrades made.
Original Application	Chevrolet 1982 to 1992	1982-1990 GM Cadillac, Pontiac, Buick, Olds, Chevrolet
Requires modification to Avanti floor and header pipes	Yes	No
Studebaker engine adapter plate available?	Yes	Yes
Gear ratios, 1 <sup>st</sup> through 4 <sup>th</sup>	3.06, 1.62, 1.00, .70	2.74, 1.57, 1.0, .67
Availability	Excellent	Good
Approximate Cost, with Torque converter	\$1365 plus freight "stage 1" remanufactured transmission	\$1465 plus freight "stage 1" remanufactured transmission
New driveshaft required?	Yes- shorter	Yes – longer
Reputation for strength and reliability	When properly built, both units are plenty durable for this job. If buying one used look for a later, 30-spline model.	When properly built, both units are plenty durable for this job. If buying one used look for a 1986 or later model

I decided that the 200 was the better choice for me. Besides the reason that the gears' spacing and ratios seem to have better owner reviews, the fact that the unit is supposed to fit in the Avanti without cutting

the floor or re-bending exhaust pipes was a major factor for me. I don't plan to thrash the car at the drag strip; however the fact that the 200 was the standard transmission for the Buick Regal V6 Turbo seemed to indicate that it wasn't a lightweight. Further, I planned to buy a remanufactured unit, so I would be assured that the internals were all updated, properly assembled and working well, and would carry a guarantee besides.

I chose to buy my transmission from Bowtie Overdrives in Hesperia, California, based on my research and the many positive comments I encountered during my search. Aiding my decision was the fact that they are clearly accustomed to dealing with a hobbyist-mechanic like me, one who knows his way around a shop and has good tools but who doesn't install transmissions for a living. Their online guides alone are a gold mine of reference information during the selection process. ([www.bowtieoverdrives.com](http://www.bowtieoverdrives.com))

Myers Studebaker Parts provided the various important items needed to mate the GM Transmissions with the Studebaker engine. Jon Myers' son Mike is the in-house expert on this swap, and he willingly helped me by telephone several times during the conversion when I was unsure of myself. The same adapter plate works with both transmissions. ([www.myersstudebaker.com](http://www.myersstudebaker.com))

### Do It Yourself Installation?

I would rate this job as one that only the most confident do-it-yourselfer would try at home. While no true "engineering" is required of the installer, and all special parts have already been made, (excepting the carburetor Throttle Valve cable lever) considering the logistics of removing an engine or transmission, this is not an easy job.

Several specialized tools are needed for this job, including an engine lift and/or a suitable transmission jack, and I wouldn't try to do it without a good set of ½" sockets, some in large sizes, and a torque wrench.

If deciding to have a shop do this work, you will need to find an agreeable and adventurous shop that will work on a time and materials basis. Giving them this article to read before asking would probably help

convince them that it is not that difficult. Expect to pay for two full days' of labor for a job that does not include completely removing the engine as I have done.

### Removing the old

Most will say that the far easier way to do this job is from underneath, removing only the transmission and torque converter while leaving the engine in place. I'd probably agree, as long as you have a way to raise the entire car at least 18 inches off the floor and have a suitable transmission jack. Regular floor jacks are not designed to balance an automatic



transmission, and many don't elevate high enough for the extraction. Harbor Freight ([www.harborfreight.com](http://www.harborfreight.com)) sells a reasonably priced transmission floor jack for this job. They also have an automatic transmission-supporting attachment that will work with some regular floor jacks. It looks like a



giant dustpan with a dowel on the bottom, designed to fit into the hole in the jack pad.

Here are a few tips that would apply to this project, regardless of the method you employ.

- You certainly should have both an Avanti shop manual and a body/chassis parts manual before you start a job of this scale.
- Drain the transmission as thoroughly as possible to avoid coating everything with a slick sea of its red fluid.
- Take lots of pictures of everything before you unbolt things, and then more as you go. You will be very glad you did when you try to remember the order that everything goes back together when you are at the reassembly stage.
- The transmission is not bolted to the large u-shaped frame brace that sits between the frame rails right between the engine and transmission. It is simply sitting on rubber pads attached to it. Unbolting this brace and removing it, pulling it out over the dropped exhaust pipes is recommended, as it allows the engine and transmission to be tipped enough to extract it.

If you are going to leave the engine in the car and remove the transmission from underneath, here are more hints:

- You will still need to unbolt the exhaust headers pipes from the manifolds so you can drop the pipes to remove the front transmission support/cross brace.
- You will probably still want to remove the radiator shroud and perhaps the radiator to avoid the risk of the fan doing damage as you change the tilt of the engine to get the transmission out.
- Tag wires and hoses with masking tape and a marker. It is so much better than trusting your memory and certainly easier than having to trace things using tiny diagrams in the shop manual later.

I chose to remove the entire engine and transmission as a single unit mainly because I had several other projects I wanted to do on the car at the same time, and these required the engine to be out of the way. It also allowed me to take better

pictures for you to see! But truthfully, since I had no step-by-step guide like this one to follow, I was not sure that everything would fit in place without cutting and fabricating. So, I unbolted everything that needed to come off and hoisted the engine and transmission out of the top. I won't cover the engine extraction here except to offer a few hints:

- Remove the radiator expansion tank completely from the engine before hoisting the engine up. The top of the tank is sure to crush against the top bar of the engine hoist when you've lifted the motor high enough to clear the car.
- You can use a simple three-holed lifting plate bolted to the carburetor mounting boss on the intake manifold; you do not need one of those special tools that allows you to turn a crank and tip the engine back and forth. The engine and transmission are nearly perfectly balanced with the hook placed in the center hole of the lifting plate.
- Remove the brake power booster and master cylinder as a single unit before attempting the lift. They are easily damaged if left in place.
- While during engine removal the oil pan will slip up past the center-mounted steering bellcrank, reinstallation is another story. It is very difficult to lower the engine into place with the bellcrank attached without damaging the oil pan. If I did it again I probably would have removed the steering bellcrank as well.

After extraction, I lowered the engine/transmission assembly onto two sturdy wooden dollies, one under the engine and one under the transmission, for the purpose of next separating the engine from the transmission.

## Step by Step

**Step 1:** Unbolt the engine from the transmission working around the bell housing, and remove the starter. Now, gently pry and work the transmission apart from the engine, being careful not to force or mar anything. The assembly is heavy, and even with the two parts mounted on wheels, their sheer weight makes them difficult to maneuver. Don't allow the weight of the engine to hang on the transmission's output shaft. The GM 200R is a couple of inches shorter than the original, and its integral tail shaft is shorter and thicker.

Hint: if you are careful removing the cooling lines from the old transmission, they can be reused on the new transmission if you simply cut the lines shorter and re-flare the transmission-side ends. The cost of the line flaring tool and tubing bender is easily made up by avoiding the cost (and hassle) of buying and bending new lines.

The old torque converter will remain with the engine as the transmission pulls free. Next remove the four stubby bolts that hold the torque converter to the flexplate (the flywheel- sized ring that has the teeth on it for engaging the starter gear). You will need to use a large socket and extension to turn the engine a quarter revolution at a time to bring each bolt into view. (Hint: remove spark plugs to reduce compression and make the engine easier to turn.)

**Step 2:** Unbolt the old flexplate from the crankshaft. Note the sorry condition of my old flexplate retaining ring. (*Top photo*) You can see that it is stress-fractured and torn nearly all the way around its circumference, and probably would have failed some dark night a hundred miles from home. While I am glad I discovered this problem in the making before its total failure, seeing things like this are unnerving and a reminder that our cars are a half-century old.

**Step 3:** Test fit the mounting adapter plate first to the engine, and then separately to the transmission. (*Center and bottom photos*) The adapter plate from Myers is a real engineering work of art and is the key piece that allows this swap to be done by a garage mechanic. I found that a couple of the holes had to be filed slightly larger to allow it to fit, and a dowel pin had to be removed.

Mounting the plate to the transmission, there is a single point of interference with an engine attaching bolt and small notch that must to be cut in one of the stiffening webs at the top of the transmission case. (*Next page, top photo*) I did this with a handheld grinder. The bottom two holes in the transmission (those at 8 o'clock and 4 o'clock when looking from the back of the transmission) needed to be elongated just a tiny bit to allow the bolt holes to align.



**Step 4:** Permanently mount the adapter plate on engine using the centering ring supplied by Myers. Torque all bolts to spec. Remove centering ring tool.

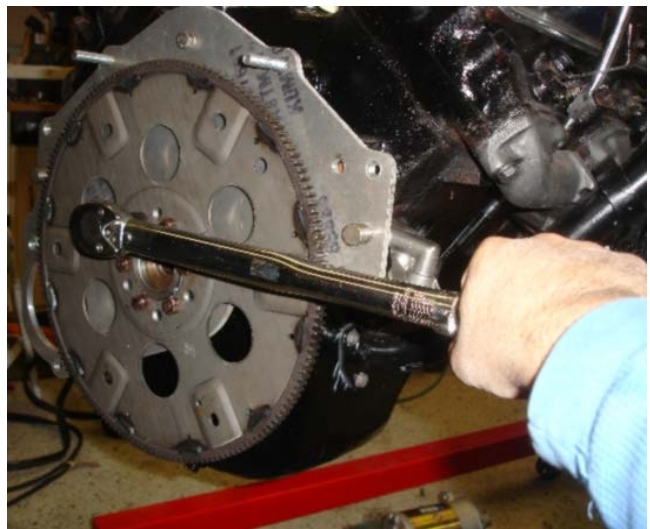
**Step 5:** Mount flexplate to engine's crankshaft hub, and carefully torque bolts in a star pattern. (*This page, center photo*) Adding a drop of red Loctite on each stud can't hurt. Just a tip, these are special bolts that have indexing marks that make them fit correctly in only one position. I found I needed to wedge cardboard behind them to keep them all in place while I slipped the tight-clearance flexplate over them. When tightened, the ends of the bolts should be perfectly even with the edges of the nuts. There is very little clearance here, and bolts that are too long can score and damage the torque converter.

**Step 6:** Install torque converter onto the transmission's output shaft. The shop manual recommends filling the torque converter with one quart of transmission fluid prior to installation so that it is not dry on initial startup, but use care. This makes it both heavier and slippery. There are two steps on the shaft over which the converter must slide to be fully seated. When in place it should spin easily.

**Step 7:** Mount the various accessories to the outside of the transmission case prior to mating the engine with the transmission. This is especially important if you are performing this swap with the engine left in the car. Making many of these attachments is much more difficult with the transmission already installed in the car. Mount the following six items:

- Cooling lines. The top hole is fluid IN, the bottom one is fluid OUT, and the oil filler/dipstick tube. (*This page, bottom photo*)
- Trans pressure gauge fitting and hose to the port just above the gear selector lever
- Speedometer cable
- TV Cable (*next page, top photo*)
- The shift detent lever and the shift rod (*next page, center photo*)

You may want to secure all the loose cables/rods/lines temporarily to the transmission with wire or packing string just to keep them all from getting in the way when lifting the transmission into place.



**Step 8:** Mate the engine and transmission. This is best done with two people, one working on each side of the transmission. Lift and slide it straight on. Ensure that there is no misalignment or interference. Do not simply get it started, and then rely on using the bellhousing mounting bolts to snug



it up tight. If there is misalignment, the torque converter can be easily crushed and damaged in this way. (This page, bottom photo)

**Step 9:** Reaching through the starter hole, you should be able to spin the torque converter easily. It should not wobble or rub, and clearances should be very close. Now, reaching into the starter hole and lining up the hole in the flexplate, bolt the flexplate to torque converter. You will then need to use a breaker bar on the crankshaft pulley to rotate the engine a quarter turn to get to each of the four special, fine thread bolts. Do not tighten them all down until all have been started. Use a torque wrench and a drop of red Locktite on each bolt.

If you have removed the entire engine and transmission as a unit, you can now lower it back into the car.

**Step 10:** Install the transmission mount. (Next page, top photo) The Myers unit is crafted for the longer 700, not the shorter 200. It will still work, but you will need to first clamp it into place, mark the location of the holes already in the frame and drill new holes in the mount. Installed, it will overlap the frame rails a bit. You can trim it down with a hacksaw if you want after you have drilled new holes and fit it properly.

**Step 11:** Slip the cross brace frame member back in place. Perhaps surprisingly it fits nearly perfectly. It will no longer be used to support the transmission, but it is a crucial frame strengthening member that should not be omitted. Clearances are tighter though, I also chose to add about 3/8" of clearance for safety's sake, and accomplished this by simply using a few washers between the bar and the frame with each of the eight bolts used to attach it. Fabricating a steel or aluminum spacer plate would be a more sanitary solution. I found that I still needed to cut a wedge-shaped notch in the plastic torque converter inspection cover to get it to fit.

**Step 12:** Once the transmission is in place, you will need to measure for the fabrication of a new, longer driveshaft which can be made by a local shop that specializes in this, usually for trucks. (Next page, center photo) The transmission side of the shaft should employ a new standard GM Turbo 350 30-



spline yoke. You can cut and reuse the differential side of the Studebaker driveshaft, but my shop didn't choose to do this, replacing it instead with a new yoke. Allow your shop to tell you how to take the measurement. Rather than trying to use a tape measure, I used an old broom handle, trimming it slightly over and over until it fit perfectly.

**Step 13:** After installing the new driveshaft, test for its clearance by jacking up the rear of the car and allowing the rear axle to hang to its lowest point. When I did, I found that the driveshaft barely touched the center of the frame X-member. I added 3/8" of shims under both transmission to cross-member mounting bolts to gain the required clearance, so that even at full extension the driveshaft could never rub against the frame.

**Step 14:** Attach the TV Cable to the carburetor: (*This page, bottom photo*) you will need to fabricate the bracket illustrated at the end of this article. I used two short Allen head screws and nuts to connect it



to the two existing holes in the throttle lever. The cable sheath's anchor attaches to the rear carb mounting bolt. There are very specific calibration instructions in the Bowtie Overdrives installers' guide, but for a starting point you are supposed to remove the transmission's pan, and adjust the cable so at idle the valve is just beginning to depress. (*see photos in sidebar, next page*)

**Step 15:** While you have the transmission pan removed, connect the shift lever threaded rod to the shifter. Using a helper sitting in the car, you will want to adjust the rod so that when the shifter is moved through all of its six detents, the selector cam lever inside the transmission clicks solidly into the center of each detent valley. The stock Avanti shifter will work just fine attached to the GM transmission, but the moving shifter indicator light will not illuminate the exact correct spots because we have added a gear. I suppose a GM quadrant lens could be adapted to fit the Avanti's shifter, but this will remain on my future "to do" list for now.

**Step 16:** You can now secure the transmission pan, torque the bolts carefully to spec. Avoid over-



tightening. Fill the transmission- it should require a total of 12 ½ quarts of Dextron ATF including the quart you already put in the converter.

**Step 17:** My recommendation—you really should add an external transmission oil cooler on your Avanti, one that is attached in series after the cooler that is built into the radiator. Heat is the biggest enemy of an automatic transmission. Running the fluid below 160 degrees is ideal, and sustained fluid



temperatures above 200 degrees can destroy the friction surfaces inside the transmission. Bowtie provides their transmissions with a threaded drain plug with an integral temperature sensor built in. By attaching a temperature gauge you can monitor the unit, at least for a while, and you can be confident that it is not overheating.

Since my water temperature gauge reads 180 degrees at most times, the basic laws of physics would indicate that it is unlikely that transmission fluid traveling through that same heat exchanger would emerge any cooler than that! In fact, I found that during testing, my transmission oil got as hot as 195 degrees. The techs agreed that I was right on the borderline of safety, and so I installed a medium sized, plate-style cooler in front of the radiator. It was inexpensive, easy to do and is cheap insurance for a rather expensive transmission. I drilled only two small holes in fiberglass panel next to the radiator for the cooler hoses to pass through. The plumbing is easy: disconnect the top cooling line from the radiator, steel line and all. I attached a short bung to the top of the radiator (included in the cooler kit) and then attached the hose to the external cooler. Finally run a hose from the bottom of the external cooler to the end of the detached coolant line that goes back to the transmission. To mount the radiator I used two 27" strips of aluminum scavenged from a discarded storm window. I mounted these to the radiator support frame using

## What does the Throttle Valve (TV) cable do?

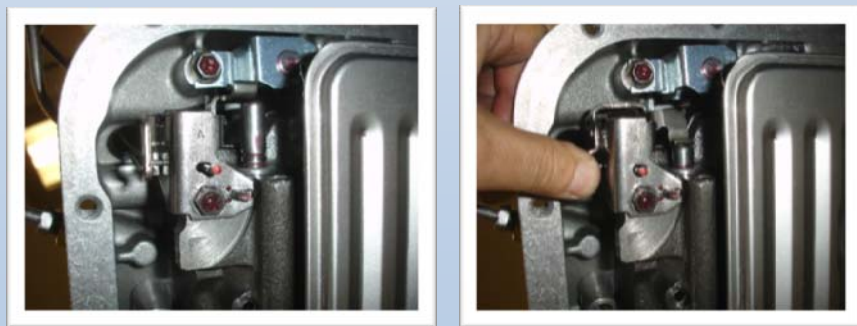
The function of the Throttle Valve, by its controlling cable, is central to the proper operation and the very survival of the transmission. As a newcomer to automatic transmissions, I found it very confusing to understand what this thing did. Let me try to explain it here in just a few words.

The transmission's throttle valve controls the pressure inside the transmission; pressure as it is applied to the clutch packs and that cause the car to shift gears and move forward. If the pressure is too low, too much clutch slippage will occur. Symptoms include mushy shifts, shifting into high gear (overdrive) far too early and requiring one to really mash the pedal to get it to manually up-shift.

The TV cable is connected to the throttle lever on the carburetor. The more the throttle is pushed open, the more the TV cable pulls open. IE—the greater the request for acceleration, the greater the pressure that is generated in the transmission regulated by how far open the valve is pulled.

Essentially, from fully shut to fully open, the valve's plunger moves 1.59 inches. (Photo 1 below shows the valve at idle, photo 2 shows it fully engaged.) Therefore, through the full motion of the throttle, the TV cable must pull out exactly that amount. My template for making a cable attachment bracket for the standard Avanti Carter carburetor is included at the end of this article.

The proper adjustment of the cable can only be truly determined by using a pressure gauge attached to the transmission. In fact, it is so important that Bowtie Overdrives will not warranty your installation without your use of one, which is included in their installers' kit.



Above, Throttle Valve shown with transmission pan removed. At left, fully closed at idle. At right, fully open at full throttle.

existing holes I found there, and then connected the cooler to the supports using thick wire ties. This method seemed best to me because it allows free air to travel around all surfaces of the cooler and does not obstruct the car's radiator at all.

The external cooler worked well, dropping the temperature of the transmission fluid from almost

200° Fahrenheit to 160°, and the difference in temperature between the top and bottom hoses is easily noticeable to the touch. The cooler is practically invisible as installed, and the wide open underneath location of the Avanti's grille makes it a snap to mount.

**Step 18:** Make electrical connections to the transmission: There are two things that need to be connected: the torque converter lockout relay, and the transmission temperature gauge. Device wiring diagrams are supplied with each.

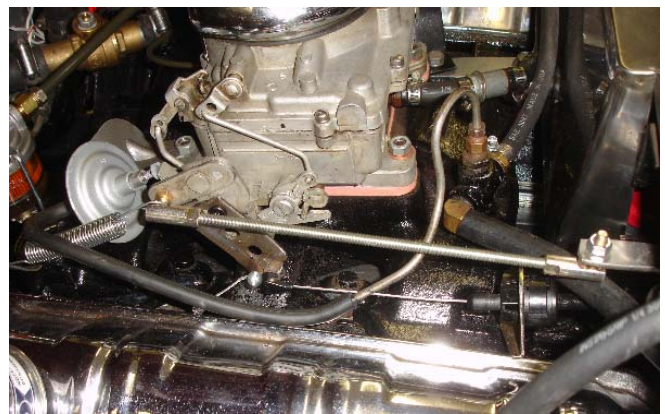
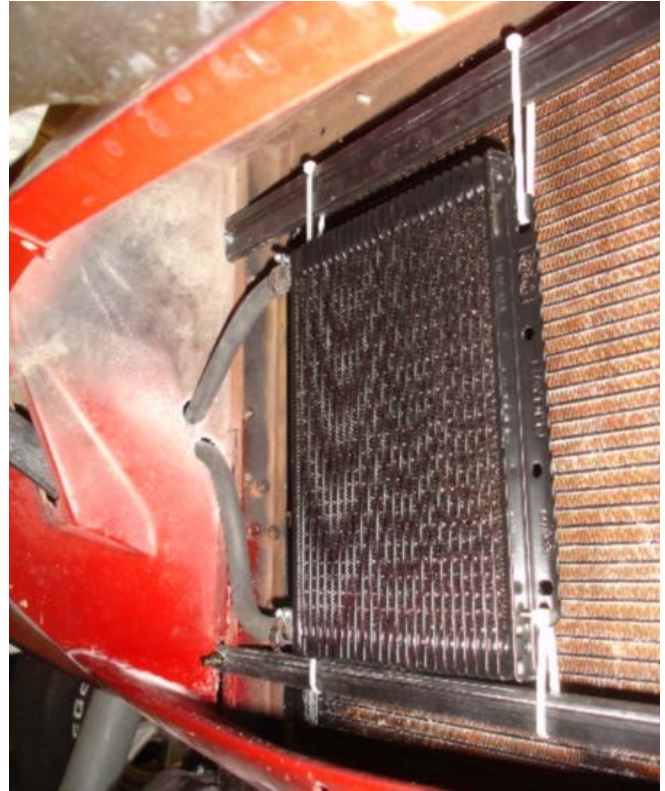
The lockout relay's job is to allow the torque converter to engage as soon as the engine has reached the proper RPM in 4<sup>th</sup> gear, and to disengage as soon as the brakes are applied. By splicing into the brake light wiring, the circuit is energized as soon as the brake lights go on, and then is allowed to re-engage as soon as the pedal is released and the brake lights go off.

**Step 19:** Road test! Bowtie Overdrives has a very comprehensive process that you need to go through for these tests, calling them to give readings and answer questions about your performance twice during the procedure. They want to verify that your pressures are correct under multiple conditions, and that your transmission is shifting properly, and that its operating temperature is within range.

### Finishing touches; final adjustments

You will want to carefully ensure that your throttle linkage is properly adjusted. The transmission depends on the full movement of the throttle lever on the carburetor as it moves through its travel. With the motor off, have a helper push the accelerator pedal to the floor. When properly adjusted, you should not be able to manually rotate the throttle open any further.

One more thing to check is whether or not your Avanti's stock, internally spring loaded under-hood throttle link is satisfactory for your application. (*This page, center photo*) While Mike Myers tells me that they use the stock Avanti linkage rod with no issues, I found that I needed to replace mine with a piece of solid threaded rod from throttle bellcrank to carburetor. The pressure required to pull the TV cable to full-open position was causing the stock



part's integral spring to stretch open, and therefore not provide full opening at full throttle.

Consider using Dynamat (or its Eastwood equivalent) to insulate the car's floor, firewall and the outside surface of the console while things are apart. This will further help deaden noise and reduce ambient heat.

Route and secure all new wires, especially in the transmission tunnel, so that they can't get caught in any mechanisms or become melted by touching something hot.

I mounted my new dipstick to the heater hose, using black wire zip ties. (Prior page, bottom photo) It looks clean and neat, and I detest drilling additional holes in my car's body anywhere, if I can avoid it.

### Conclusion and owner observations

I have discovered a new automobile! Starting in an honest first gear (as opposed to the Power-Shift's second-gear starts) was a real kick in the seat of the pants, literally. Satisfying second gear tire-chirps were easy to earn. But the real payoff came on the highway, exactly where I had hoped the difference would show. This swap turned my car from a noisy toy into a real mature performer. Note the RPM comparison table below.

	50 MPH	60 MPH	70 MPH	80 MPH	90 MPH
Studebaker Power-Shift	2300 RPM	2700 RPM	3100 RPM	3500 RPM	3900 RPM
GM TH200 4R	1700 RPM	2000 RPM	2300 RPM	2600 RPM	2900 RPM

As a hoped-for added benefit, interior temperatures became much more bearable. While still warm in the cockpit during mid-summer driving, it is no longer blast-furnace hot. This transmission runs much cooler than the old unit, apparent also by touching the chrome shifter handle which can be touched without causing a burn blister. The air coming in the floor vents is still too hot, which is understandable since the engine side of the cowl remains un-insulated, but is disappointing nonetheless.

After test-driving for a week, I noticed an unappealing characteristic, and I called the experts to inquire. What I noticed was that the transmission

would shift into fourth-gear overdrive, then a couple of seconds later the torque converter lockup would engage as it was supposed to, making it feel as if the transmission had actually shifted to an even higher, "fifth gear". Nice. The problem came when asking for more acceleration, especially if the vehicle had slowed considerably, say to below 40 MPH. On a new car, the computer would sense the request, note the speed and immediately unlock the converter allowing the car to speed up more rapidly. However, with this early, non-computer controlled gas-saving overdrive transmission this does not happen, and the car starts to lug in fourth with the converter locked up, until it both unlocks and downshifts to third with a lurch and a roar.

This tendency can be overcome by installing a *speed-sending overdrive lockup controller* as a recommended accessory. (B&M part number 70244) It attaches in-line with the speedometer cable, and has a control box with a dial that can be adjusted to keep the torque converter from locking up below a set speed. I found that setting the control to limit lockup only to speeds above 45 MPH provided a good compromise. I hid the control unit in the



ashtray, though I found that once I have it set I have really not had to touch it much. I could have mounted it hidden under the dash or in the glove box. Yes, a lower cost solution would have been to install a simple toggle switch in series with the brake light relay so that I could switch off torque converter lockup myself until I got on the highway. The problem with this is that a driver could forget to



switch it on, and cause the transmission to overheat. That idea was unappealing to me.

One comment is that using this accessory makes it advisable to install a new, pedal mounted brake light switch replacing the factory original hydraulically operated switch on the master cylinder. (See my article in a recent prior issue or at <http://www.studebaker-info.org/tech/Bhend/AvantiBSW.pdf> ) You will need to substitute switch AC Delco D850A, (around \$11), or equivalent, which has four contacts instead of the

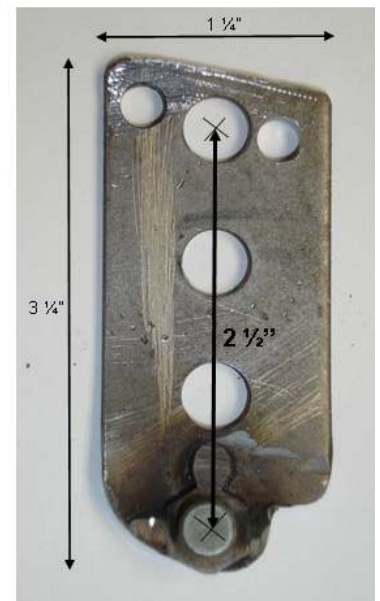
standard two. The extra set of contacts allows the convertor speed sensor to work in conjunction with the brake pedal switch activated unlocking as described before. I would advise this, because having overdrive lockup disengage as soon as the brake pedal is touched is a recommended safety feature. It provides some additional engine braking in a panic stop.

This ambitious project is one that I am glad to have undertaken, as it has deepened my enjoyment of my car.

## Parts List

<b>Part</b>	<b>Source</b>	<b>Part Number</b>	<b>Price</b>
GM 200 R4 Speed OD Transmission	Bowtie Overdrives	200R4 Level 1	\$ 1,195.00
Trans fill tube and dipstick	Bowtie Overdrives	Lokar 253011	\$ 69.95
Torque Converter	Bowtie Overdrives	PDQ-C24	\$ 269.00
Speedometer gears	Bowtie Overdrives		\$ 70.55
Lockup cutout relay and wiring*	Bowtie Overdrives		\$ 35.00
Trans temp gauge	Bowtie Overdrives		\$ 29.00
Trans pressure gauge	Bowtie Overdrives		\$ 31.25
New driveshaft	Locally sourced		\$ 350.00
Dextron ATF, 12 quarts	Local NAPA store		\$ 40.00
Speedometer cable	Myers Studebaker		\$ 25.00
Throttle Valve (TV) Cable	Myers Studebaker		\$ 30.00
Transmission Crossmember	Myers Studebaker		\$ 65.00
Rear transmission mount pad	Myers Studebaker		\$ 20.00
Mounting adapter, flex plate	Myers Studebaker		\$ 350.00
Ford 2.9 Starter	Myers Studebaker		\$ 100.00
torque converter inspection cover	Myers Studebaker		\$ 25.00
TV Cable mounting bracket, carb stud	Myers Studebaker		\$ 12.00
Shifter linkage rod	Myers Studebaker		\$ 40.00
Transmission Lever	Myers Studebaker		\$ 12.00
B&M Overdrive variable engagement control*	Summitracing .com	BMM-70244	\$ 165.95
Transmission oil cooler kit	Summitracing.com	HAD-678	\$ 55.95
			<b>\$ 2,955.65</b>

\* You really need only one or the other of these two items-- not both. I recommend the B&M control, so have removed the \$35 relay from the total.



Template for TV Cable bracket

Special thanks to both Jon and Mike Myers of Myers' Studebaker for their patient advice and help.