



3.1L V6 SFI to 3.4L V6 SFI Engine Swap Guide

By: Ryan Pettersen (korbendallas68)

Version 2.0



Now if you're reading this, you probably own a Grand Am/Achieva/Skylark (or even Malibu's) equipped with the 3.1L V6, and you want to drop in a 3400. Ok, the first thing that you need is the car! Wow! No kidding. But wait! What's that you say? I have a 1992 or 1993 or a 1996 through 1998 model, and I want to this too? There *will* be parts that you need that I haven't listed here or mentioned, but that you have to figure out on your own. I'm not familiar enough with the 3.3L V6 (found in 92 through 93 models) or cars newer than 1995 to give you any help here. I assume the engine compartments are almost unchanged for all of the years. **Be sure to read the FAQ first!** If you want to do this no matter what, and your car does not have the 3.1L V6, keep in mind that this route may be more expensive than you will want it to be (except for the '96 through '98's). I really recommend that you buy a '94 or '95 instead if you have a '92 or '93 model. If you have a 4-cylinder, I wouldn't recommend this also. It will save you lots more cash for future upgrades to your car. Anyways, the people that I specifically wrote this for are the ones who own a **1994 or 1995 N-Body** car with the 3.1L V6 SFI. Some of you may also want to use this guide just to help you with some other project that you have. Who knows? It should be very helpful anyway you use it.

Some people always bring up: Why do this? Well, there are a couple of good reasons:

- 1: It's not the hardest thing to do. Hey, and you even have a guide to help you!
- 2: Drop in power. Instead of getting your car bored out to a 3.2, why not spend that money and replace it with a 3.4, which then you could bore to a 3.5? Remember, you can not bore a 3.1 to a 3.4 no matter how hard you want to. There just is not enough material in the block to make that happen. No ifs or buts about it.

- 3: Horse Power and Torque. Just putting this engine in will give a significant boost in those areas. You can't even get those kinds of numbers by moderately modifying your 3100. Think about it, the same modifying that you do your 3.1 will have a lot more impact on your 3.4.

Well there are a couple of reasons to do this. I'm sure there's more you can think of...

Disclaimer! :

I can not be held responsible for anything that goes wrong with your car as a result of you following this guide,

Or doing the 3400 swap!! So users beware!!

Here are some details about the car that I am going to use in the swap:

1995 Grand Am GT

2 Door Coupe

3.1L V6 SFI OHV (VIN M) (RPO Code: L82) (191ci)



Now some of these questions might come up (Be sure to read them before asking any questions!):

What if I have a SE or GT (or some other trim level)? Well, I will have to say, sure, it will work. The engines between these trims are the same exact thing. So go for it. I'm not doing an SE but you get the idea.

What if I have a 1994? No problem. The differences from a '94 to a '95 are basically cosmetic. You will have no problem with the ECU, or any mechanical things.

What if I have a 19XX with a 2.3L / 2.4L and I want to swap in the 3.4L, will I be able to do this?

This is a common question that I get asked. The answer that I give is a doubtful yes. As far as I know, the engine bays are the exact same thing between years and engine types/sizes. But there are also many things that are not the same between them. I wouldn't be able to tell you exactly what they all are. Also, in order for you to do the swap, you would have to have a '94 or '95 donor car with an intact 3.1L. See where I'm going here? You would have to have 2 cars in order for it to work. This already would put your budget too far over, since you would still have to buy a 3.4. So basically it would cost you more than you are going to want to spend in the first place. It's not recommended that you do it.

What if I have a 1996 or newer car, will it work? Again, I will say yes. But you may have to figure out some things on your own. This has been on '96 and newer cars before, and the swap has went pretty smoothly.

How much did your 3400 cost? Well keep reading to find out, but keep in mind that motors vary in price a lot. You can find a descent 3400 for under \$500 almost anywhere.

How long did it take you? For me it took some time to do, since I had to figure things out, buy new parts, and write this! But it really didn't take that long. It all depends on your skill level of being a mechanic. So it's up to you I guess.

What parts will I need? I listed almost every single part that you will need to this. Other than that, you're on your own.

Will an OBDII engine work in our OBDI cars? This gets brought up a lot. The answer is **YES**. OBDI and OBDII are types of software that cars use in their ECU's, NOT the kind of engine that it has. Motors do not care what runs them. So be sure to let that sink in. If you want more information, check out the net.

The 3400 is larger than the 3100, will it fit correctly? Yes. Like a glove.

My car doesn't run right, what's wrong? I don't know. I wrote this to help you through the swap. You're on your own for everything else (You can e-mail me if you have a question or problem though if you like, I am not guaranteeing that you get an answer that will help you though).

Is your car faster/more powerful now? Well, yes. Don't expect a *huge* jump in performance though. Not that you won't be able to tell, but I don't want to give people the wrong idea. You should see a big increase in power though.

Is there a manual transmission for the 3400? No, not really. Again, it is possible, but you are going to have to look that you on your own.

What transmission did you use? I used the 4T60-E that comes standard with all of the 3.1L V6 SFI's.

Will a 99+ transmission work in my 95 (or other year)? No. Too many differences between the two, besides, the 4T40-E and 4T45-E aren't really worth it.

Does it matter what car the 3400 comes from? Nah. Everything is about the same. Just get what you can find that is cheap and in good quality. Look below for a list of cars that come with the 3400 series motor.

Geez, I thought there would be a lot more power. What's up with that? Well, just dropping the newer bigger motor won't be all that's required. To get maximum performance, probably having the computer tuned to the new motor would be a good idea.

The Guide:

One thing to remember is that you will need a good amount of time to do this, and then when you do that, double it for a good measure. Be sure that you have the parts and fluids and/or tools ready and on hand or ordered in advance, this will speed-up the process greatly.

One of the first things that I had to get done was to get the original engine cleaned some how. If you don't want to do this that is perfectly ok, it will save you some time. The reason I suggest this is because it makes it a lot easier to see things and the mess will be less on your hands. This way you won't have to spend a lot of time cleaning up some of the pieces that you swap over. May be instead of getting it professionally steamed or whatever, you can just use some degreaser and spray out most of the grease with hot water.

I am removing the engine through the top of the car using a cherry-picker. This is going to be the way that, most likely, everyone is going to use. You can either take the transmission out or leave it in the car when swapping engines. I took mine out because the transmission was needed to be fixed anyways.

Be sure to give your self as room as possible underneath the car. It is very hard to work under there as it is.

Here is a checklist of the tools that you most likely will need. This list is just stuff that you probably already own, but it's just incase:

Tools:

Socket Wrenches 3/8's, 1/4's, 1/2's, all sizes.
Wrenches
Socket extensions
Spark Plug Wrench (if replacing sparkplugs)
Torque Wrench you *will* need one of these, so get a good one!
Deep-well Sockets/Oxygen Sensor Socket
Hex Keys
Flat Head, Philips
Star keyed Screwdrivers

Fuel Line Disconnect Tool
Jack Stands
Good Floor Jack, NOT the Spare Tire Jack, *it won't work, and is not safe!*
Engine Hoist
Engine Stand*
Containers for catching the oil, antifreeze, and any other fluids**
Funnels
Assortment of Pliers and Vise-Grips Clamps
Various Air Tools

** This is optional, I didn't use one. Instead my engine sat on a wood create that it came with.*

*** Make sure you have enough and one large container (for antifreeze) for the job. The most fluid will be the anti-freeze and engine oil (transmission fluid may not apply). Here's a tip: Put a large piece of plastic underneath the engine to catch the fluids that don't make it to the pans. Then when you are done taking out the old motor just throw away the plastic. This way you floor stays clean and dry. The antifreeze will be pain in the ass because it will fill up the lower radiator basin, and come out through every little hole that is in it (there are quite a few).*

Fluids/Other items:

5W-30 Engine Oil, (4.5 Quarts)
Dextron III Automatic Transmission Fluid – *If needed*
Green Antifreeze or Dex-Cool
Hydraulic Power Steering Fluid – *If needed*
New Oil Filter
New Air Filter – *If needed*
Delco Platinum Spark Plugs – *If needed*
PCV Valve – *If needed*

Now these are the things that I used on my car, you can buy whatever brand you wish, and change what ever you want. But I thought that I would start out with a fresh start to fresh motor. If something looks bad, worn, or broken, replace it! Don't risk all of your hard work because you did replace an Oil Filter!

You can change the spark plugs just for the sake of it being a lot simpler when the motor isn't in the engine bay.

You can use the Green Antifreeze if you want to. You *may* want to flush the engine to get out the Dex-Cool (orange colored anti-freeze) ~~because the two are not compatible~~, if you make that choice. I went with using Dex-Cool. If you do go with Dex-Cool, be sure to flush your cooling system first to get out most of the green stuff. Dex-Cool is rated to last 100,000 miles or 5 years, whichever comes first.

Note: Contrary to what some may say, you can indeed mix Dex-Cool and conventional coolant with no ill effects. However, if there is more than 10% of conventional coolant in the system this will reduce the

concentration of the Carboxylate such that conventional coolants change intervals must be followed. In other words, if you mix it, you can't leave it in for 100,000 miles or 5 years, but instead should treat a mix just like conventional coolant and change it every year until the concentration of Dex-Cool is over 90%.

Quoted from: DEX-COOL Extended Life Anti-Freeze/Coolant.

By: Scott Mueller



I am going to use the engine out of a 2000 Grand Am GT (VIN E) (RPO Code: LA1) (207ci). It's not 'New', but a lot newer than my 3.1 with 165,000 miles. It has about 23K miles on it, which is just fine. I paid about \$900 for the engine w/o shipping, and they come much, much cheaper than that. When you are looking for the engine that you want, you have to be sure to ask about what is included with the motor that you are buying. Make sure of this, because if you don't, you will be paying for something that should have been included with the motor. You can find this type of engine in more than a Grand Am, so keep an eye out if you're looking for one. Actually, your best bet is to find a 3400 from a minivan. This way you don't have to buy a new manifold for it.

My 3400 engine came with a 4T45-E (MN5) transmission, so I had to remove it. You, on the other hand may not have to (That is if your engine didn't come with the transmission). In this guide, I will have the transmission from the 1995 Grand Am installed in place of the new transmission. The transmission from the 94 and 95 Grand Am will bolt up exactly the same.

By using the 4T60-E you will not have to modify the drive axles anywhere. I'm not sure about the 4T65-E, but maybe it's worth looking into. But I assume that you have to have some custom axles made for the 4T65-E as well.

Some 3400's also come with some extra emissions crap on them. It's the AIR system. You can just remove all of that stuff and replace it with the normal parts.



You will not have to use the MAF anymore from the 3400.

And you don't need any of the mounts, alternator, computer, wiring harness, or stock air box from the 3.4.

3400 60° V6 Engines can be found in these Autos:

1999-2004 Pontiac Grand Am

1999-2004 Olds Alero

1999-2004 Chevy Venture

1999-2004 Pontiac Montana

2001-2004 Pontiac Aztek

1999-2004 Olds Silhouette

2002-2004 Buick Rendezvous

2000-2004 Monte Carlo

2000-2004 Impala

1996-1998 Olds Silhouette

1996-1998 Pontiac Trans Sport/Montana

1996-1998 Chevy Lumina APV/Venture

Engine Removal

Well the old engine removal is not that hard, but it can be messy and frustrating, especially when parts break from being so rusty or worn. One of the first things that I did was to read the Chilton's auto repair guide. Just follow the book's list. The things that I found that were hard to remove were the heater core tubing, transmission mount (this may not apply to you), and the exhaust (basically just the reach, I used an air ratchet to remove the bolts). Basically removing the engine is easy without the Chilton's at all, mostly common sense for most of it. Just be sure not to take out something that you didn't have to in the first place.

Despite the fact that you are certain that you've drained every last drop of every fluid out of the engine, the first tilting motion will dislodge gallons of every conceivable fluid (Most likely anti-freeze). Plan for this and either pull the engine in a place where you can tolerate the spills, not where you are going to

work under the car, or spread plastic sheeting under the car before actually pulling the engine. I kept the kitty litter close by to soak up any fluids that spilled. It works just as good as the expensive stuff.

Buy a package of Ziploc or plastic snack bags and a roll of masking tape or a small tablet. Group and label fasteners in the bags, and note any special features. For example, "Water pump fasteners - large bolt with stud goes in upper hole on driver's side". Put all the bags in a box to keep everything together. Label all wires and connectors. Make sketches or take Polaroid photos or videos during the disassembly process, then just stick the notes you made on paper into the baggie. In addition, having more than one of the same cars makes it very easy to figure out where something goes - you've got a full-scale model.

Parts To Save

There are a lot of parts to keep from the old 3.1L engine. These parts might replace some of the newer ones on the 3.4L engine. There may be some parts missing from your 3.4L, in that case, lots of the 3.1's parts will fit. I have made a list of what is needed to be kept from the 3.1L:

1. Motor Mounts (*Upper, Left Trans, Right Trans*)
2. Gas Lines
3. Engine Wiring Harness
4. Battery Wiring Harness
5. Engine Computer (ECU/PCM)
6. Transmission
7. Heating and Cooling Hoses
8. Alternator and Alternator Mounting Bracket
9. Timing Chain Cover/Water Pump **REVISED**
10. Belt
11. Harmonic Balancer (Crankshaft Pulley)
12. Knock Sensor/Oxygen Sensor
13. Crankshaft Position Sensor/Camshaft Position Sensor
14. Fuel Pump Switch/Oil Pressure Sender/Switch
15. Fuel Injection Harness/Fuel Injectors/Fuel Rail
16. Air Inlet Pipe, Filter Box, ect...
17. Oil Filter Adapter

I bought all new sensors from the dealership. This can be very expensive though. You don't have to but for to suppress any errors that might come-up; I would just have new ones installed.

I will go in order of the above list point out what to do with these parts below.

1. Motor Mounts

No motor mount fabrication is necessary with this swap at all. If you have mounts that came with the 3.4, just take them off and put away. Put the bolts back in the holes where you took them out of. Now is a good time to buy new mounts or aftermarket mounts if the ones you have are not going to make it. More information on how to attach them to the 3.4 will be below.

3.1L Eng, Engine Mount 22146738

3.1L Eng, Trans/Transaxle Mount 22175102

2. Gas Lines

You must remove the nylon gas lines from the 3.1. Now what I mean is the fuel lines that connect to the fuel rail on the engine. The ones from a 99+ Grand Am 3.4 are in the wrong position and will not connect to the steel gas lines mounted to the left strut tower. So you have to remove the upper intake plenum (Note: You will have to remove it anyways to change it for the EGR and the Fuel Injector Harness). With the plenum off, you will see two gas lines coming off of the fuel rail. One is the Inlet line and one is the Outlet line. The Outlet line has a round bulge in it and connects to the Fuel Pressure Regulator. Also the return line (Steel ones located on the left strut tower) is larger than the fuel feed line.

Remove the newer nylon fuel lines from the 3400 rails and set aside. Remove the old nylon fuel lines from the 3.1 and re-install them onto the 3400 rails. You will have to wriggle them through to have them in the right spot. They need to be tightened to 15 lbs ft for the both of them.



Be sure not to install them crooked/cross threaded! You could have a gas leak if you did no matter how tight you make them!

Some may not know how to remove the nylon fuel lines from the steel lines. You have to buy a Fuel Line Disconnect Tool in order to separate them from the steel lines. Just slip on and push out. Before you do this though, be sure to relive the pressure. To do this, locate the black plastic screw cover on the end of the back fuel rail. Take that off. Now there is a pin. Push that pin in, and be sure to have a towel underneath it too catch the spill. Now when you disconnect the nylon lines, gas IS going to come out no matter if you relived the fuel pressure or not. So be ready to catch it with old towels.

Here is a picture of the nylon fuel hoses installed on the 3400:

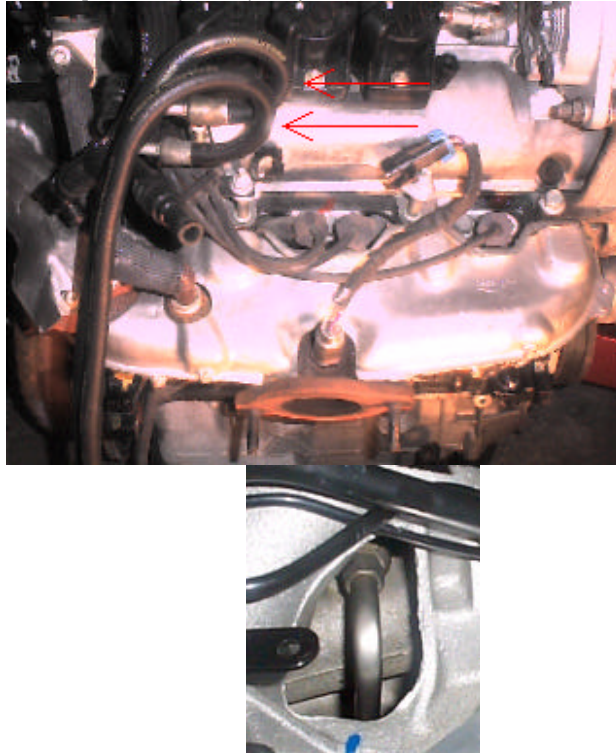


Figure 1: Inlet Pipe Location

Be sure not to forget to install the O-ring that goes onto the inlet pipe (towards the rear of the car on the fuel rail)! You will have a gas leak if you do! There is also a bracket that should be installed to hold the fuel lines in place.

3. Engine Wiring Harness

Do not remove the harness from the car. Just remove it from the old engine assembly. You may want to clean-up any dirty connectors. I found that the Oil Level Sensor was pretty bad on most cars. Other than that, don't touch it. I would remove the harness from the 3400 if it came with one. Be sure to remember how the harness was on the 3.1! Mark all of the sensor locations on the harness using masking tape. You should also note where exactly the harness runs in the engine bay.

4. Battery Harness

If you got the battery harness that came with the 3.4 you can't use it. It's just too short. So instead you have to use the old one. One problem though, the hole on the cables will be too small to connect to the 3400's starter bolt. So all that you have to do is find a carbide drill bit that is a little bigger than the holes on the harness and drill them out. I am not sure about the size that you need.

Negative Battery Cable: 12157155 - \$23.72

Positive Battery Cable: 12157410 - \$57.66

5. Engine Computer (ECU/PCM)

You will need this. **Not** a 3400 computer. This subject is very complicated so I can't go much into it. 94-95 ECU's are OBDI. Some say that some of the 1995½ + years maybe OBDII. I couldn't tell you more than that. I am not sure myself, but I doubt it.

Actually I am almost 100% sure that all 94 - 95's are OBDI. The '94 and '95's have a flash type chip, that's why they are considered OBDI½.



The 1994 to 1995 computer is on the left and the 99+ OBDII is in the middle, and the 96 – 98 V6's OBDII is on the left. The 1996 -1998 has the same connector as the 1999+; so from this I conclude that the 95's are going to be OBDI.

6. Transmission

The transmission is a big question that everyone has on their minds. It really isn't that complicated of a thing. I just used the 4T60-E that came with the 3.1. I don't know what other applications will work as easily as this.

Will it work? Yes it will. There is nothing that you have to modify on the transmission to get it to work with the 3400. Neither of the drive axles will have to be modified nor the mounts that hold the transmission. With the 4T45-E, the axles from the 95 will not work with it; the mounts will not fit without modification. So don't even try is my advise.

The 4T60-E has a ventilation hook-up that the 4T45-E does not, which would pose another problem if you were to use it. The pieces for this must also be saved. You also have to use the torque converter from the 3.1.



Figure 2: The Modulator Vacuum line on the 3.1.

Reinstalling the vent hoses is not hard and pretty self explanatory.

The Modulator Vacuum line will also have to be saved from the 3.1. Again, removal and installation of the part is very easy.

I'm guessing there will be a problem when installing a supercharger. The tubing will have to be moved to the rear of the Plenum. There is an extra outlet there. Then just switch the rubber cap around. More information on that installation may be followed up on in a later version.

The Transmission Cooler Lines will be kept also. Be sure to tighten each one to 16 lbs ft for each part they connect to. The lines are also a size 16mm.

Mounting the 4T60-E transmission is a piece of cake. Here are some brief instructions (I happened to take the engine and transmission out of the car at the same time, you shouldn't have to though): Remove the 4T45-E (If equipped); put it aside and out of the way. Be sure to keep every bolt from the 3.4, there are a total of 6 bolts to use. They're all a size 18mm. This picture below shows where the transmission case bolts are placed.

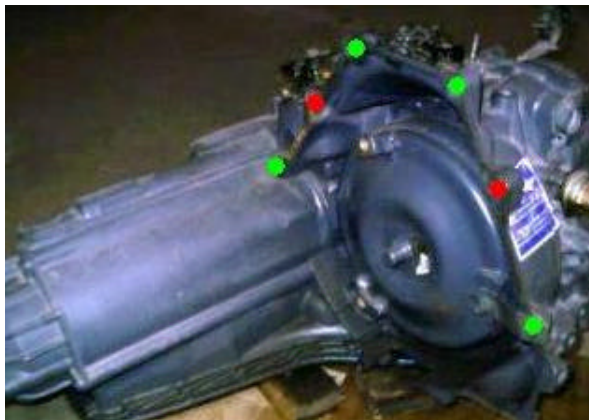


Figure 3: Transmission Bolt Placement.

Green: Normal Bolt 18mm Normal Size Socket

Red: Double Sided Bolt (Stud) (Used for ground cables from the harnesses.) 18mm Deep Well

Socket

NOTE: Most of these instructions are if you have the transmission out of the car, and are connecting it outside of the engine bay. You can probably just skip though this part.

Now the engine will have the flex plate and the torque converter on it. Remove the torque converter from the flex plate. Be sure to not lose those bolts, they're very short. Now remove the 4T60-E transmission from the 3.1. Then bring over to the 3400. Take the torque converter, and slide it onto the transmission (Use the torque converter from the 4T60-E transmission). You will have to turn it a bit to get it on to it. Remove the starter from the 3.4 (You can put this back on after you get the engine installed in the engine bay, very easy). Now begin to move the transmission over to the motor. Be sure to have the flex plate bolt holes and the torque converter holes lined up so you can get to them! You won't be able to turn the torque converter when the transmission is close to the engine. Now get the transmission to but up against the engine as close as you can. There should be almost no gap between the two. Then bolt up the flex plate and the converter.



Do not draw the torque converter to the flex plate, or you will damage the flywheel (flex plate) and torque converter.

Once the bolt is in and to torque, you have to turn the crankshaft pulley so you can see the other bolt spot. I recommend having a friend help with this (Will be very hard to turn). After that, put the correct bolts in the places and tighten to 55 ft lbs each. That's about it to connect the two.

7. Heating and Cooling

You need to use the 3.1 radiator hoses. There are a total of 6 hoses that you use. Two of them are large and connect directly to the radiator. The other ones connect the coolant surge tank to the engine and the last 2 are heater core hoses. It's pretty straight forward on how you hook them up.

The heater core hose pipes on the 3400 have moved up on the engine. So what you do is use one of the hoses from the 99+ Grand Am's and on from the 95 Grand Am. Getting the clamps on and off of the hoses is big challenge. The left side (Drivers side) is the *Outlet*, and the right side is the *Inlet* to the heater core. Don't try to disconnect the tubing from the firewall with the engine still in the compartment. It will be very hard if you do, and the tubing ends on the heater core are plastic and have a high risk of snapping off (Very, very bad if you do this!).

Just disconnect them from the motor, and remove if necessary later. The hard part will be the removal of them, but this depends on the condition of your car too. The pipes over time may, and most likely, will have begun to rust from the antifreeze, so this rust that has formed in the piping will bond the rubber hose to the metal pipe.

What you do is get a pair of pliers and twist the rubber hose around a few times to loosen it. Then pull off. Coolant will spill out.

One way to use the older coolant line pipes is to have the lower manifold taped so you can screw in the old pipe, since the newer one is the push on type. The size of the tap that you would need is 1/2 inch NPT. Just go about 3/4 of the way down into the hole.



Figure 4: 3400 Push-On Type

I just left it and installed my own type of tubing that I bought at an auto-parts store, which isn't that hard to install. If you go this way, you will have the pipe bent a bit in order to get the transmission dipstick to get by it. Do not bend the tube while it is in the manifold!! You will damage the manifold since its aluminum! Take out the pipe and bend it in a vise. You will also want to remove the plastic end connector on it to allow more room. You might also be able to cut-off some of the tubing to allow more room (Not really necessary though). Be sure to also make sure that the bolt that holds the pipe in place is secured very tightly! Or else the pressure from the coolant will push it out.

The other pipe, (The one that sits right in front of the front valve cover and goes into the water pump) on the other hand is easier to switch over. See picture below.



You may have to remove the side exhaust manifold to be able to get the pipe through. There are a couple of options that you have with this involving the heated throttle body that the 3400 comes with.

Option #1: 94-95 3.1's do not have heated throttle bodies. So what you will have to do is pull the rubber hoses off of the TB and just don't connect them. **Option #2:** 96-98 3.1's DO have a heated TB connection on the pipe (and are shaped the same as the 94 and 95's piping), thus allowing a heated TB. Either way is your call.

V6 THROTTLE BODY (1994 - 1995) (Non-Heated) - **17094010**

V6 THROTTLE BODY (1996 - 1998) (Heated) - **17096152**

V6 THROTTLE BODY (1999+) (Heated) - **17113543***

To sum it up, the heater core hoses are a pain in the ass. There are many things that you can do to make it work, so I won't go into detail on everything that you could do. You can just use a factory hose from a 99+ Grand Am, and it should work fine. Just watch out for the steering mechanism. Here is the part number for the coolant hose: **22659275**, there may be others that will work, but I haven't checked.

You may also want to install a lower temp thermostat (180°) while you have the motor out of the car and the coolant drained. You can get one from PFYC.com for about \$11. It's very easy to install.

Dex-cool Coolant GM Part Number: **12346290** (one gallon)

Mixture (coolant/water) Freeze Point Boil Point

50/50 -34 deg F 265 deg F

60/40 -62 deg F 270 deg F

70/30 -84 deg F 276 deg F

Another note on the heater core hoses: I found that instead of using the factory 'pinch' hose clamps that are provided, I used the screw driven Hose Clamps. These hold much better, and the most important part: are a much, much easier to remove or install.



Mixtures of less than 50% coolant or more than 70% coolant are not recommended.

Now for a finishing touch-up for your car, if you are using Dex-Cool, you can change the reservoir cap to one that has the Dex-Cool "Notice" sticker on it. Pretty Cool, huh? It might be recommended so a quick lube or anyone else for that matter won't put the other stuff in your car. The cap costs about \$4.

Reservoir Cap w/Dex-Cool Notice: **10285918**

Sticker Only: **10283878**

**Note: 3.4L V6; all others are the 3.1L V6.*

8. Alternator

You will not use the newer alternator from the 3.4. Installation of the old alternator to the 3400 is easy. There are four basic parts that are used: the alternator, alternator bracket, engine mount bracket, and the bolts. Be sure to get the bolts really tight since there's less support for the alternator.

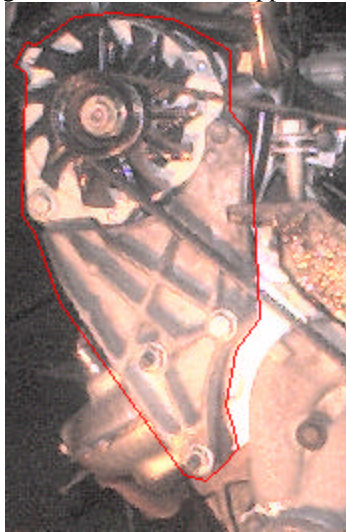
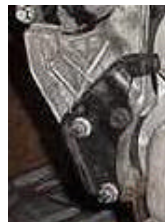


Figure 5: Alternator Bracket

There are a few parts that you will not use, two mounting brackets. They are tubular and black colored. These won't work with the upper plenum; there is no mounting hole for them any longer with the 3400 heads. There is one that could be installed if shortened I suppose, but it might not work if cut. Something to check for later...

Also when swapping over the alternator, you will have to switch over the engine lift bracket. The newer one will not fit with the '94 - '95 alternator bracket. I used medium sized grip pliers to grab onto the very inside of the black bolts (Closest to the motor) that hold the bracket. This way is a very simple way of removing those tricky bolts. Just do the same to install them. Not very professional, but it gets the job done.

In the picture I forgot an engine mount bracket that is attached to the alternator bracket.



This is the mount bracket that attaches to the alternator bracket.



Figure 6: For easier removal/installation, use large pliers on these two bolts.

Then just reconnect the cable and connector. Here's a picture of the alternator connector:



Figure 7: Alternator Harness Connector

9. Timing Chain Cover/Water Pump ***REVISED***

This part is little project on its own. It's not too hard though. ~~You can not use the timing chain cover from the 3400 because of its slightly modified design.~~ The 3400 cover itself is the exact same as the 3100, but with one difference. There is an extra 2 pulleys that the 3400 uses. This intern adds an extra knob to the cover. One way to over come the extra stud is to simply cut it off. *Read the information at the end of this section!*

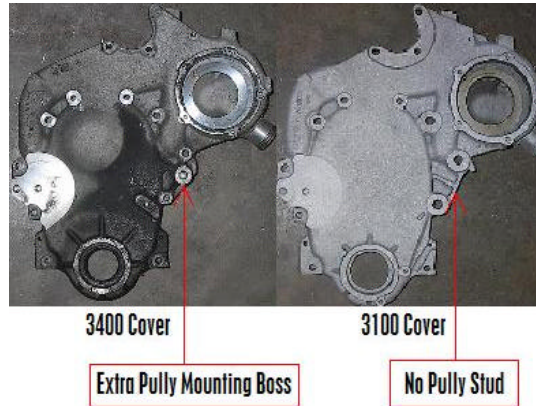


Figure 8: 3100 Timing Chain Cover w/Extra Knob Location Pointed Out

OPTIONAL INSTRUCTIONS (Do not do if you don't have to!):

To remove the cover is pretty easy. By this point your engine is already out of the car, so the alternator is removed and the belt too. Remove the belt tensioner. You do not have to remove the water pump pulley. Then the hardest part is removing the harmonic balancer (Crankshaft Balancer). You will need a three point puller large enough to handle the pulley. Remove the pulley and save.

Now you can remove the power steering pump. There are 3 bolts that hold on. Pull out and set aside. I would use the one that came with the 3400 if it's a GT model. The reason is so you can have Variable Effort Assist Power Steering (RPO code: NV7) on your car, even if it's a SE model. The GT's are the only ones to have this option. Now would be a good time to upgrade your SE. One way to check the power steering pump is to look for a place to plug-in a 2-prong connector (Red/Blue Connector if you have a 94 or 95 GT). I recommend using most of the newer parts form the 3400 just because they are newer.

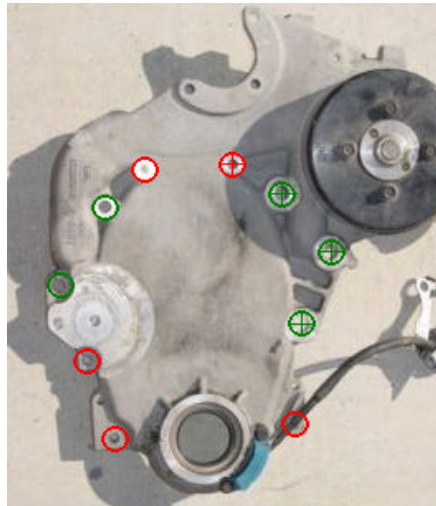
POWER STEERING PUMP*

V6, w/Variable Steering - 26046848 - \$368.98

V6, w/o Variable Steering - 26049350 - \$352.68

**These are from a 96 - 98 models, but it should not make a difference.*

Do the exact same for the 3400 cover removal, as you did for the 3.1 timing chain cover removal.



- | | |
|--|--|
|  Small Bolt |  Motor Mount bolt location. |
|  Large Bolt |  Motor Mount bolt location. |

Installation of the cover is basically just the opposite of what you just did to take off the cover. There are 5 small bolts and 5 larger bolts for the cover plate. Here are some notes about the proper torques for the bolts:

Tensioner bolt: 40 ft lbs


Harmonic Balancer: 76 ft lbs

Red Colored Circles: 15 ft lbs

Green Colored Circles: 35 ft lbs

Power Steering Pump : 25 ft lbs

Removal and installation of the Crankshaft Pulley will require a helper to hold the flywheel. You will need a new timing chain cover gasket. If you forgot you install the timing chain cover gasket, you are going to have a mess on your hands later down the road. Also, be very careful that you do not move the oil pan gasket when installing the cover. Oil will eventually be leaking out of the cover and it will be a very big mess. Also put silicon seal in the crankshaft pulley to prevent another oil leak.

 **RECOMMENDED INFO:** Also a possibility that I found out is to leave the 3400 cover on, and simply cut off the extruding stud. This way you will no messing around with gaskets and stuff. This also reduced the chance of creating an oil leak (very bad, very messy).

10. Belt

Save your old belt. Or buy a new one, which ever you like. No special size needed, just the regular 3.1 serpentine belt is all.

Belt - Serpentine Drive (AC Delco)

Part Number: 6K685

11. Harmonic Balancer (Crankshaft Pulley)

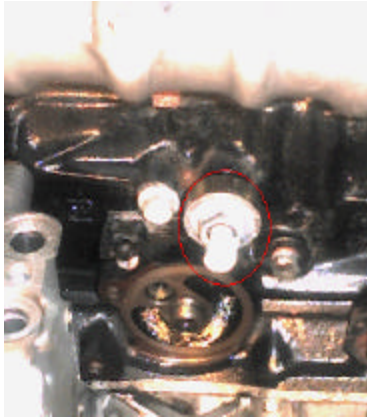
You can swap over the old harmonic balancer pulley or just use the newer one. I don't know if there's a difference. I used the 3.1's though, so I couldn't tell you if there is a difference between the two. Use a size 28mm air ratchet socket, do not use a regular chrome socket or else it will shatter on you! You should use an air racket to loosen and tighten the bolt, since the motor will want to crank on you when you use a bar. Be sure to also grease up the bolts on the pulley puller when you remove the pulley. Tighten it to 110 ft lbs

Balancer: #24504609 GM List Price: \$88.80

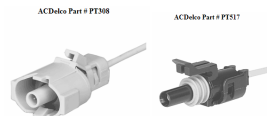


Do NOT to bend the interrupter ring on the inside of the pulley, or you can damage the sensor, and it will cause a rough idle or no start.

12. Knock Sensor/Oxygen Sensor



Just swap over the one from the 3.1, or replace it with a new one. Make sure that the threads are clean also. Tighten the sensor to 12-16 ft lbs. Note that there is a difference in connectors between the 3400 and the 3.1's:



The 3100 is on the Left and the 3400 is on the right.

You have to swap over the oxygen sensor because the connections are different between the two. Removal from the 3.1 will require an Oxygen Sensor Socket, but the removal/installation from/to the 3400 will only require a wrench. Tighten the sensor to 30 ft lbs.

A little note on the SES Code 43 (In case this comes up): Loss of ground at the ESC (Electronic Spark Control), failure or loss of the ESC signal to the ECM will all set code 43. Loss of the ESC signal will cause the ECM to constantly retard timing, resulting in sluggish performance. So if your car doesn't have any oomph, this may be your problem (or at least something to check first).



Do Not Over Tighten Either Of These Sensors!

13. Crankshaft Position Sensor/Camshaft Position Sensor

Again, same as above, just unscrew the 3400 sensors, and replace with 3.1 or new ones. As for the camshaft position sensor, it's just as easy to change.

24x Sensor: Bolted to the front side of the timing chain cover and is located partially behind the crankshaft pulley.



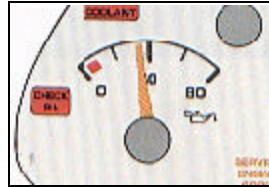
3x Sensor: Is located behind the engine, right below the exhaust manifold. Just unscrew the retaining bolt, pull out the 3400 one, and replace the sensor. If you have a new one, lubricate the O-Ring on first with motor oil. Then tight the bolt down to 71 inch lbs. This sensor runs directly to the distributor coils



Camshaft Position Sensor: You will have to remove the power steering pump in order to reach it. Take out the screw, and pull it out. It might be a little hard to get out at first because of the O-Ring. Then just clean up the area (Don't get anything into the hole!), and replace it with the other sensor (Part #24508215).

14. Fuel Pump Switch/Oil Pressure Sender/Switch

There are two kinds of Oil Pressure Switches that can be used. They both depend on the cluster that you have in your. The standard cluster (U2E) is usually used SE's but not on GT's. Now if you have a GT model Grand Am, you have a Sport Cluster (UB3). This has an Oil Pressure Gauge included that the 1996+ Grand Am's do not.



You can tell the difference between the two by how long they are. The one for the Sport Cluster is a bit longer than the Standard Cluster one. Here is picture of the two.



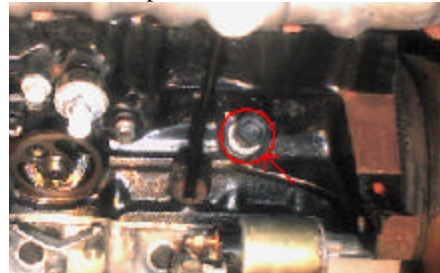
Figure 9: UB3 Cluster Left, U2E Cluster Right

ACDelco Part # PT121



Figure 10: Connector

The installation of the Oil Switch is not hard at all. All that you need is a crescent wrench to loosen it. Then finish by removing by hand. Here is a picture of the location of the part:

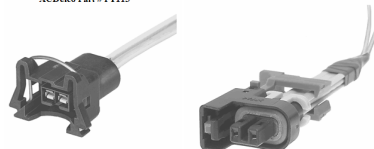


15. Fuel Injector Harness/Fuel Injectors/Fuel Rail

You will need the whole harness. The Fuel injectors on the 3400 have a different connector than the 3.1 so you have to switch them, or you could switch the injectors with the harness and not modify the harness.

ACDelco Part # PT113

ACDelco Part # PT1318



The 3.1 fuel injector connector is on the left and the 2000+ 3400 fuel injector is on the right. Since they are different, it much easier to swap in the 3400 fuel injector connector, than switch injectors (if you don't want to). Swapping over the 3.1's fuel rail and injectors will work too. This way you don't have to modify your harness that you may want to use later if you upgrade your injectors to 241b's. The 3400

manifold harness has the Engine Coolant Sensor, Map Sensor, Fuel Injectors, and the Camshaft Position Sensor on it. The 3.1 doesn't have the Camshaft Position Sensor in it. So it has total of 10 Bulkhead (Black Connector) wires and 2 other wires (ECT Sensor [White/Blue Connector]) for a total of 12. The 3400 harness has 14 wires. This gives the harness two extra wires and a different connector head, so that makes them incompatible. 3.1 is on the left and the 3400 is on the right:

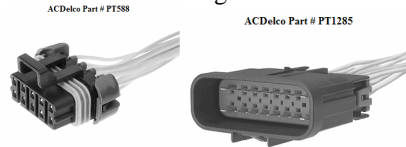


Figure 11: Fuel Injector Harness Bulkhead Connector

Here's what to do if you don't want to switch over the fuel rails or injectors: Cut off the 3.1 fuel injector connectors. Be sure to give your self the right amount of wire to be able to work with (about an inch or so will do). Then cut off the injector connectors from the 3400 harness. Re-attach the 3.4 injector connectors to the 3.1 harness. Just match-up the colors if you don't know which ones go where. You won't have to do anything to the coolant sensor connector.

16. Air Inlet Piping, Filter Box, ect...

Most of you will want to use a K&N filter or some other aftermarket filter, which will work just great. But if you want to use the stock air box, it will work exactly the same. You can also use the 3400 rubber intake tubing (it has a slightly larger diameter than the 3100's). The Air Temp Sensor (See Below for more info) is located on the opposite side, but that doesn't really matter. It is a little bit shorter than the 3100's, but it will reach just fine. It's just something to look into.



Figure 12: Stock Air Intake Will Work Perfectly

17. Oil Filter Adapter

You may notice when you try to switch over the adapter, that there is a screw for an oil filter that is in the way of getting the adapter installed.



Well this has a simple solution: all that you have to do is get a hex driver (can't remember the size) and stick it in the hole of the oil filter screw. Unscrew, and then the oil filter adapter will fit on it exactly like the 3.1. Be sure to spread a little bit of oil around the gasket of the adapter, just like you would on the oil filter itself. And don't forget to do it to the oil filter too. Be sure to get the bolt in there nice and tight.

Here is a list of the Oil filters that are the same as the Delco Oil Filter:

FRAM:

PH3354

PH3387A

Motorcraft:

FL321

Purolator:

L10111

WIX:

51040

Other Stuff:

Coolant Gauge

Upon further inspection of the 3400, you will notice that there is no place for one of the temperature sensors. This is the one with an only one dark green wire coming out of it. This sensor sends a signal to the dash to show what the temperature is. There are a couple of solutions for this problem.

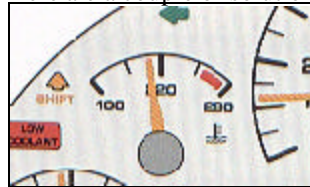


Figure 13: Dash Coolant Temp Sensor

ACDelco Part # PT517



Figure 14: Connector

ECT Sensor: 1 Blade Terminal #25036807 - GM List Price: \$21.76

AC Delco Part Number: 10232601

I suppose if you had the tools and skill, you could just tap out another spot on the 3400 heads for that sensor. The size of the hole that you have to make is a 1/2" -14, using a tapered pipe tap. Or just use the heads from the 3.1, but that really defeats the purpose of the 3400 swap (and would be a lot more involved). Well here is one solution to what to do (*Be warned! This may cause your car to not run correctly!*). You will be splicing into the other coolant sensor (ECT). The computer uses this sensor.

ECT Sensor: 2 Blade Terminal #12146312 – GM List Price: \$10.61

This is a diagram of what wire to use:

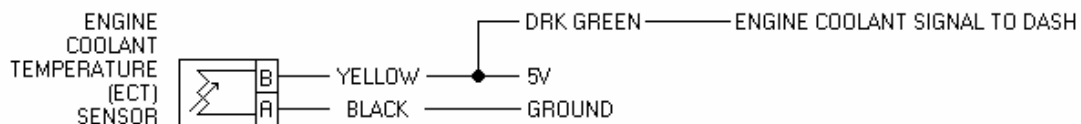


Figure 15: Sensor Location

Just cut off the connector end on the sensor so you can plug it into the harness with out cutting the harness itself. Then just find a little bit more wire to reach between the two and join the wires. The rest is self explanatory.

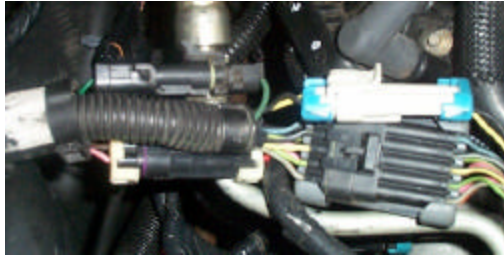


Figure 16: Fuel Injector Harness Assembly

As for the placement of the wire, I just ran it by the front of the fuel injector harness bulkhead, and use zip-ties to hold it. This way it keeps the wire out of the way, and prevents it from moving around.

Don't mistake the Low Coolant Sensor that is located on the coolant surge tank for the temperature sensor, because they have close colors to each other.

Now doing this, you will bring up the *SES* light on your dash. The computer will throw out a *Code 15: Low Coolant Temperature Indicated*. All that this means is that the sensor is not picking up enough voltage from the ECT sensor since it has been spliced into. But since this a temporary set-up, don't worry about it, the dash will work just fine, but remember your car will not run correctly for some reason because of this.

The very best thing to do is to buy the ECT sensor from a 97 Venture minivan (same car that you would get you upper intake manifold from). This sensor features a 3-wire set-up. It has the same color set up, so it's a matter of matching up the colored wires.

ECT Sensor: 3 Blade Terminal #10096181

Air Conditioning:

Well for A/C I just said, screw it, and loosened the top fittings a little bit to let the refrigerant leak out. I did this in my garage, but I opened the door and windows and left the garage for an hour or so. Just a warning though: your A/C has a lube in the lines, so when you are letting it out, you will get some of it on your car. No biggie though, just wipe off. Now the A/C obviously won't work until you bring it in to have recharged if you do it this way, so I recommend the route below:

You can keep the air conditioning system in your car also. Just swap over the old compressor from the 3.1. They will bolt-up exactly the same. The reason you can't use the compressor from the 3400 is because the hoses will not be able to connect to the compressor and the electrical connections are different. This won't affect the belt at all either (Both the 3100 and the 3400 compressors).

This is how to keep the refrigerant in your car's system: Remove the A/C compressor lower mounting bolts and remove the compressor from the mounting bracket and position aside. Do NOT disconnect the refrigerant lines from the compressor or allow the lines to support the weight of the compressor. Just use a long piece of wire to hold it.

If your compressor is shot, here is a price of a new one from the dealership (There might be a core charge, not sure though):

A/C Compressor #1135418 - GM List Price: \$559.87

The A/C Compressor from the 3400 will not work with the 95's system, so don't try. There a couple of problems that you will run into if you don't hook-up the A/C or disconnect it. One: The Computer will light-up the SES light on your dash. Two: The computer will think that the A/C pressure is too high, that intern will make the Engine Cooling Fan run all of the time, no matter what the temperature is outside, or how hot your engine is. This may be good for keeping your engine cool, but it's annoying.

The SES Code that your computer will throw out is: *70: A/C Pressure Sensor High*

EGR

Believe it or not, this is one of the little problems for this swap. Everyone has questions about it and here are a few answers.

You will, depending on the year of the engine used, have to find/buy another Upper Intake Manifold (UIM). The reason for this is so that you can use the Digital EGR (DEGR) with the 3.4. I believe that you have to use the manifold from a 1997 3400 engine. This type of engine will be found in a Pontiac Transport, Chevy Venture Minivan, or Oldsmobile Silhouette. The EGR will make the mounting to it a little easier. The plenum from a 99+ 3.4 will not work because the mounting plate for the EGR has changed to a vertical style. They switched the mounting style completely. The 97 manifold will bolt directly to the lower manifold.

You might want to retain the digital EGR so that the computer doesn't throw a code, and it can be modified to work with the 3400 just fine. It's for emissions and some fuel economy. (I did notice that my car was becoming a little bit of a gas hog, nothing to worry about though.). Now the big problem with keeping the 3400's EGR is the EGR solenoid, as the 3400 uses a linear type rather than digital. The EGR functions will have to be disabled in the PCM's code if you don't want the EGR to be used, otherwise the system will attempt to activate the valve at ~20 sec intervals during cruise speeds, and a surging condition will result. This valve test (activate/fail sequence) will occur even if the valve is mechanically blocked off and not hooked up electrically (Which I did). I found that the code comes one after you have been going above 60 or 65 mph (or give it WOT or close to it) and slow down or come to stop. It doesn't effect how the car runs at all.

So what I did as a temporary set-up, until I either disable the code or make a plate, was find a flat piece of aluminum (about 2mm thick), cut it (for a cleaner look), and drill holes for the two bolts, and use a high temp sealer (Found at any auto parts store) to mount it to the plenum, then plugged the exhaust hole on the manifold. One way to accomplish this is to take the old EGR exhaust tube that comes from that hole and cut off the top of it, leaving 2 inches left on the pipe. Then hammer down the pipe so it's nice and flat (Make sure that there's NO way any exhaust gases can escape. Then cut off the sharp ends. I just left the EGR connector off and tied off to the side. This may seem weird, but it works. It didn't seem to affect the engine very much. So basically you could do this with the vertical style EGR mounting also, but it would make using or making an adapter for the EGR later harder.

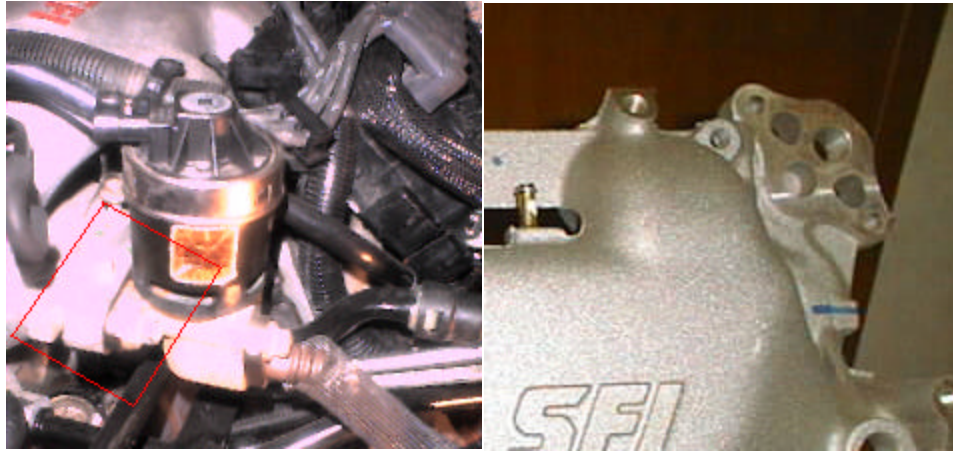


Figure 17: Blocking off the EGR port with a plate.

Another route that you can follow is to do nothing at all with the EGR. Just leave in on and do not touch it at all, and don't connect it to the harness (because you can't anyways). This seems to be a good way of dealing with the EGR, and recommended if you don't want more work than needed. But by doing this, you will have to have the code disabled or hope that the computer doesn't throw a code.

Having the EGR not working may be to your advantage. By not having the exhaust gases re-enter the intake, it will stay nice and clean and not clogged with exhaust gunk. This also will allow fresher, cooler air, possibly resulting in more power. But on the other hand, the EGR valve is there to cool down your engine. I'm going to go into detail on this but you can look it up on the internet some place to find out more information.

The newer 99+ style are on the left (Vertical Mounting), and the one that you need is on the right.



ACDelco Part # PT301

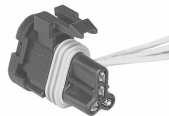


Figure 18: Digital EGR Connector

ACDelco Part # PT1332



Figure 19: Linear EGR Connector

As found on 60degreeV6.com, there is a link to making your own EGR adapter plate! But, the only thing is, like I said before, you must (unless you like to make things very, very complicated), switch the UIM over to the older 3400 EGR mounting style found on minivans. I won't list off what to do here, so you will have to check out the link:



Figure 20: EGR Adapter Plate.

<http://www.60degreev6.com/hlperf/index.php?p=pages&pid=8>

Thanks to the Beretta guys again for leading the way! You guys are always ahead of the game.

MAP Sensor: The MAP sensor is the same for the 3.1 and the 3.4 so the MAP sensor should not have to be changed, but they do have different part numbers. I changed mine after I had the car running, but it doesn't seem to make any difference of which one is connected. The mounting is the same also between the two.



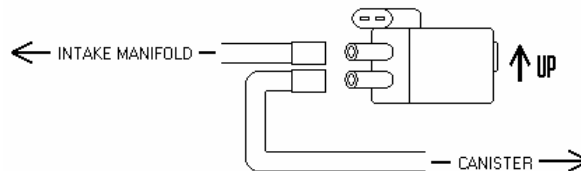
Figure 21: MAP Sensor Location

MAP Sensor - 16137039

MAP Sensor (3400) - 16254719

EVAP System: The EVAP Purge Solenoid Valve will have to be relocated to where it was originally on the 3.1. It will be a smooth change over. Be careful when handling the solenoid though, the hose connector tabs can break off very easily. Since there's no EVAP Solenoid Bracket on the lower Ignition Coil bolts, they put a washer in place to hold the coil packs up. So what I did was to just cut the washer off. This can be a pain in the ass since they like to spin (and are very strong), so I just put a vise-grip on them and used a carbide drill bit. You also could just swap over the old bolts, but that's a bigger pain in the ass, and takes more time. Either way is up to you.

The tube from the crankcase connects into the upper tab and the lower tab goes to the EVAP canister. See below for picture.



Accelerator and Cruise cables: I just used the 3400 intake instead of the 3.1, just because the 3.1 is a little smaller (56mm vs. 52mm). The cruise control cable will not be able to connect to the 3400 TB properly though if not modified. The accelerator pedal will work just fine with the 3400 TB. One way to solve the problem with the cruise is to swap the parts from each other (Described Below), or buy a 62mm TB and switch over the parts, which will be a better investment anyways. You also have to change over the bracket that holds the cables in place. The 3400 bracket has too big of a slot for the cable ends to sit in.



Figure 22: Cable slots are too large for the 95's

Throttle Bodies: You are going to want to keep the 3400's TB, but the cables won't connect, like I mentioned before. But changing over the parts is very easy and only takes a couple of minutes. Do these instructions at the same time to both of the TB's, except for the installation.



Figure 23: The TB Parts that are needed.

Step 1: Remove both TB's from engines.

Step 2: Remove the Throttle Position Sensor; it's the 3-wire connector if you're not sure. The screws are a size T-25 Torx bit.

Step 3: Remove the plate inside of the TB using a size T-15 Torx bit. The plate will then slide out.

Step 4: Using a hammer, lightly tap the end of the shaft that was inside of the TPS until you can pull the rod out by hand. Be careful though, the spring will recoil and it may snap your fingers when the shaft is moved.

Step 5: Clean the pieces that you removed, you don't want any loose stuff in your engine. I found that swab-type metal polisher works really well.

Step 6: Now its time to assemble the new TB. Place the old spring onto the shaft. Don't use the new spring, its shorter and I believe that it has too much tension.

Step 7: Place the shaft back into the man TB assembly.

Step 8: Put 3400 TB plate into the shaft. Make sure that the port can be fully closed by its self, do not force it. If it doesn't seem like it fits, then it's in wrong. After it's in correctly, put the smaller screws back into it.

Step 9: Place the 3100 TPS sensor and/or the IAT valve back onto the TB. (Not sure if it makes a difference if you don't switch over the 3100's, I didn't notice any change when I did)

Step 10: Make sure that the TB works correctly by using your hand to turn it. If everything is fine, then re-install it onto the engine.

Now you will be able to have cruise control, and a correctly mounted accelerator cable. The 3400 TB is 56mm vs. 52mm from the 3100. It's not that much more, but still larger than the 3100's, so you will get a slight increase in flow due to that. Increased air flow is a good thing.



Figure 24: Completed TB swap on your 3400

Exhaust Manifolds: If your 3400 didn't come with any exhaust manifolds, the 3100's should fit. I would use the 3400 ones though; they are larger than the 3.1's from what I've heard. When you use the 3400's manifolds, you will have to have the exhaust down pipe from a 3400 in order for you to be able to connect it to your 94 or 95's current exhaust system. The only way that you can connect the 3400 to the 94 or 95's exhaust system is to have it brought in to an exhaust shop. The 3400's exhaust sits farther to the right (passenger side firewall) than the 3100's. This means you have to have a custom pipe bent in order to have it work (Most likely not a at home project). There will be a tight squeeze between the firewall and the pipe, but it will fit. Basically all that the exhaust shop needs is the head of the down pipe. They won't be able to use 3100's down piping because it has a dual layer design (which is not worth even trying to make work, since it will be a lot cheaper to have a new pipe put in instead.).

On a side note, I have heard that the exhaust manifolds from the minivans are a little bit bigger, resulting in more power (about 5 Horsepower and 5 Torque). Of course, having aftermarket headers is recommended for a lot bigger performance.



Figure 25: Headers for the 3.4L V6

Starter: If your 3400 came with a starter that is very good. If not, the old will work with no modification. Even though I would stick the 3400 starter because of the smaller size and it's a little lighter, and more reliable from what I hear.

(99+ 3.4 V6) – 10465459

Fuel Injectors: The 3400 will run with the 3100 or the 3400 fuel injectors. The 3100 are recommended. This way there is no modifying of the fuel injector harness. From what I understand you are going to want to keep that fuel injection harness from the 3.1 anyways. For an improvement for ride, starting, and performance, 24# (lb) Mustang (?) fuel injectors are recommended. They should work with the 3100's harness with no modifications. And if the didn't come with new O-rings, you will need them. They may go for \$30 a piece at some locations, but you're better off going through eBay to find some injectors.

These are the specs on the Fuel Injectors (May not be entirely accurate):

94 - 95 3100's: 17#

Pre-00 3400's: 19#

00+ 3400's: 22.5#

I also recommend using an AFPR (Adjustable Fuel Pressure Regulator). You can get one from PFYC.com for about \$140; the kit is about \$190 (Includes Stainless Steel Hose, Fuel Line T Tap, and a Fuel Pressure Gauge). The fuel pressure adjustment range is from 42 to 48 psi. Factory fuel pressure is 40 psi. Higher fuel pressure increases fuel flow on the top end. A safe pressure is in the 42-46 PSI range. This is a good upgrade, especially if you plan on doing a future upgrades to your 3400.



Figure 26: Adjustable Fuel Pressure Regulator

Engine Oil Level Sensor: Should not have to be changed, since the part numbers match. Just make sure that the area is clean before plugging in. The spot can collect oil and dirt very easily.

(3.1L V6) - 24506885

(3.4L V6) - 24506885



Figure 27: Connector (Black w/Gray Weather Seal)

Fly Wheel (Flex Plate): This should not have to be changed, since the part numbers match up. Do not damage the teeth when changing in the motor.

(3.1L V6) – 24576876

(3.4L V6) – 24576876

Ignition Systems: I changed my ignition module over to the 3.1's after the swap was done. So the 3.4's coils and module will work regardless. It's up to you what you want to do.

Ignition Coil:

(3.1L V6) - 10472401

(3.4L V6) - 10472401

Ignition Module:

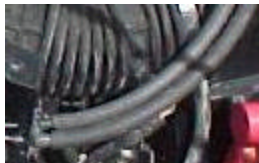
(3.1L V6) - 10489422

(3.4L V6) - 10489422

Air Temp Sensor: Don't change. The 3400's is a little shorter than the 3100's if you can't tell the difference.



Do not touch the inside of the sensor, you may damage it!



(3.1L, 3.4L V6) - 12160244

Other Notes

Now there are a lot of parts from the 1996+ 3100's that will work with the 3400 that you are swapping in. I have listed a few here, but defiantly not every thing. I will make a type of cross reference chart and another manual for them later. Some of them would be really helpful for keeping that 'from the factory' look, which I strive for on this swap. Some also may make the swap a tad easier.

Comparisons:

Some Base Weight Comparisons:

1995 Grand Am GT Coupe: 2981 lbs

1995 Grand Am SE Coupe: 2865 lbs

1995 Grand Am GT Sedan: 3030 lbs

1995 Grand Am SE Sedan: 2918 lbs

1999 Grand Am GT1 Coupe: 3129 lbs

1999 Grand Am SE2 Coupe: 3051 lbs

1999 Grand Am GT1 Sedan: 3210 lbs

1999 Grand Am SE2 Sedan: 3106 lbs

***Keep in mind that these may not be the most accurate, and they don't account for driver or passenger weight!*

Misc. 1995 Grand Am Specs:

Wheel Base: 103.4 inches

Length: 187.3 inches

Width: 68.7 inches

Transmission Specs:

4T60-E (M13):

Max. Engine Torque Rating:
280 lb-ft

Gear Ratios:

1st 2.921

2nd 1.568

3rd 1.000

4th 0.705

Rev 2.385

Axle Ratio 2.93

4T45-E (MN5):

Maximum Engine Torque:
215 lb (290 Nm)

Maximum Gearbox Torque:
380 lb (488 Nm)

Cont. ?

Gear Ratios:

1st 2.957

2nd 1.623

3rd 1.000

4th 0.683

Rev 2.143

4T65-E (M15, MN3, MN7, MD7):

Maximum Engine Torque:
280 lb (380 Nm)

Maximum Gearbox Torque:
400 lb (544 Nm)

Gear Ratios:

1st 2.921

2nd 1.568

3rd 1.000

4th 0.705

Rev 2.835



Note: I am not guaranteeing the absolute correctness of these specs.

Finishing Up

When installing the wheels back on, the wheel nut torque is 100 ft lbs.

Before starting-up the car for the first time, you will want to make sure that you have done every thing correctly. I have made a checklist before you start the car.

1. Check *every* electrical connection.
2. Before adding fluids, make sure that all hoses are properly connected and secured to there places tightly.
3. Make sure that all of the bolts are to the proper torque, and that none are missing, and do not use a weaker bolt in place of a stronger bolt.
4. Check all of the fluids for proper levels . This might not be possible until you get the engine running for some of them.
5. Make sure you have gas that hasn't sat too long.
6. Check the ground wires and/or clean the ground wire connections with a wire brush.
7. Make sure that no tools or rags are lying in the engine compartment.
8. Check the battery (if necessary).
9. Check all of the vacuum lines.
10. Check the EVAP system, and that all of the piping/tubing is connected.

Now time to give your car a test run. If you don't have any exhaust hooked up, it will be very loud! So beware! There may be white smoke from the motor sitting so long, but that's fine. When car is running, check for leaks (Vacuum or Fluid). If a no go, check everything again. Be sure to bleed the power steering system after the vehicle is running (If necessary). Then check the levels of the fluids again. Don't be rough or hard on the car for a while to make sure everything works fine. Don't accelerate hard, or rev it excessively. The car will run a little lean until you re-connect the exhaust so don't worry.

Problems:

I will cover a few things that might come up after the engine is in and running or lack of running right. Not every possible thing that can go wrong is listed here; this is just for some reference. More than likely, your problem will not be listed here, so you will have to do your own homework on that. **Not Complete**

Bad Idle:

IAC Valve: It's possible that the IAC valve has carbon on it and messing up the idle. If you want to clean up the intakes and valves and combustion chamber of the carbon, go here:
<http://www.60degreev6.com/index.php?p=pages&pid=76> If that doesn't help, I would take the IAC off (2 Torx bolts, size T25) and spray some carburetor spray inside there. Also spray the tip and get the carbon off of it. You can also try the Idle re-learn (Located below).

No Start / Runs Badly:

One possibility is the crankshaft position sensor. If the interrupter ring on the inside of the crankshaft pulley is bend or dented, even a little, it will cause some problems. Make sure that the sensor is plugged in, and it has the correct part number.

Like I mentioned above, check the vacuum lines. You may be able to hear a hissing nose or a high pitched whine if they are not hooked up. Not having the correct vacuum can cause the engine to run badly.

Idle Relearn:

By: sappyse107 (Ben Phelps)

There are a few methods floating around, but this is the one used by GM techs.

Reset ECM by pulling ECM fuse (under hood) for a few seconds.

With A/C turned off, start car and immediately put it in Drive with your foot on the brake. If the car does not start initially, keep trying WITHOUT putting your foot on the accelerator.

Let the car idle in gear for at least 5 and no more than 7 minutes.

Shut off the car for 10 seconds.

Start engine, place in drive and let idle for 5 minutes.

Shut off engine.

Idle is learned.

I am not really sure if you need to do this, but I added it in to do, sort of a FYI (This can be originally found at www.60degreeV6.com). I found that it did make my car run a smoother in idle. Then after that and every thing goes fine, put the hood back on with the help from a friend, bring her to a muffler shop and have them hook up the exhaust. You could use the down pipe from a 3400 or if you used the 3.1 exhaust manifolds, just hook it up your self. It will be cheap any way you do it.



Figure 28: Your New Engine Installed

Cost Estimates for the New Parts

Most of these prices that I got are from the GM dealership in my town. I am sure that you can find them cheaper at a discount auto store or even your own GM dealership parts store (Doubt it though). Now you do not have to buy new parts for the 3.4 if you don't want to. Like I mentioned before, I just want newer stuff used with the newly installed motor. This insures that these things will last longer, and may suppress some problems that could happen. Be careful to match-up the part numbers though, or else you will have problems. Some of the normal replacement parts are the same for the 3.1 and 3.4. There are a few parts on here that I had to replace on my car that I just named here for reference anyways.

Upper Intake Manifold 97 Pontiac Transport - 24508396 - \$103.46

Timing Chain Cover Gasket - 10189276 - \$6.93

Oil Pressure Switch - 12555492 - \$34.28

Camschaft Position Sensor - 24508215 - \$43.39

7x Crankshaft Position Sensor - 10456555 - \$26.36

24x Crankshaft Position Sensor - 12567648 - \$41.22

Knock Sensor - 10456208 - \$63.46

Heated Oxygen Sensor - 25312184 - \$68.15

Evap Purge Solenoid Valve - 1997201 - \$28.48

Evap Purge Solenoid Valve Bracket - 10223631 - \$4.18

Transmission Cooler Line (Lower) - 22651564 - \$17.54

Transmission Cooler Line (Upper) - 22651565 - \$17.54

AC/Delco Oil Filter - PF47 - \$5.95

AC/Delco Platinum Spark Plugs - 41-940 (0.060 inch Gap)

AC/Delco Fuel Filter - 25121293/AC Type GF-578 - \$14.96

PCV Valve - CV-892C - 25043843

Now some of those prices may seem like a lot, and they are. So, what I recommend is going to this web site: <http://www.gmpartdirect.com>. If you want to know how much they cost from there, just cut all of the parts prices in half, it will be very close to that amount. I recommend that you know the part number that you are looking for, or else you may not find it. When you get the new parts at your house, check the part numbers from the new parts with the ones on the old parts, just to be sure they match.

A few approximant fluid amounts for your information:

Dextron III Automatic Transmission Fluid – 6 or more quarts (Sometimes a little more is required)

Green Antifreeze - About 13 – 13.5 quarts

Power Steering Fluid - 2.25 pints (For complete system)

5W-30 Engine Oil - 4.5 quarts

Add more or less as needed.

Thanks to:

Brad Szopinski - (Bszopi)

Erich Dethloff - (Erich/ErichZ26)

Ben Phelps - (sappys107)

(For their input and help along the way, or any info that I quoted from them.)

Steve (Thanks for the extra muscle power!)

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Rose – For being so patient with me!

www.60degreev6.com

www.beretta.net

www.acdelco.com

www.gmpartsdirect.com

www.pfyc.com - Parts For Your Car

All of the Grand Am Sites/Forums

McGavin Auto Sports Web Page

UGAP - UsedGrandAmParts.com

Chilton's Repair Manual

Redline Used Auto Parts

Scott Mueller – For Some Text

Anyone's pictures and/or text that I used to make this manual,

And any one else that I forgot to give credit, or thanks to.

*I may have left out something and not realized it,
please let me know what it is I missed,
or if I gave out wrong, or misleading information. Thank you.*

-Ryan

Questions? Send me an e-mail!



E-Mail: korbendallas68@yahoo.com

Korbendallas68 is my user name on all of the Car-Related boards also.



***Hey! For all of you people that have done the swap or are thinking of doing it:
If you have completed this project on your car, please tell me about it!
I want to know who's done it to what cars.***

