

Fiero Mill & Drill

How to Change Your 4-Cyl. Fiero to V-6

By Ted Hamm

This article was written by one of our many members who wanted to change his four cylinder Fiero into a V-6. First thing that he did was to make lots of phone calls and receive lots of advice, not to attempt the change. He was told this conversion was not worth the effort, save his time, and in general advised to "not do it". He decided that he would do the work himself and make a carefully documented effort to preserve his steps so that what he knew and what he learned could be shared with other Fiero owners who want to change their own Fiero. Ted Hamm has now joined in a small but growing club of unsung Fiero heroes. We want to thank him for his time, his efforts and especially his unselfishness and willingness to share with others. I am sure this article will become a wonderful gift to the Fiero owners who have all wondered how to make this transformation on their own Fieros. This is especially a timely article because many of the cars need some major recycling, changing and upgrading. This too will prevent many Fieros from becoming throw away's. As we mentioned in the past we would grade the tips and we think this is not a project for a beginner. The skills required are more moderate to advanced.

Before You Start

This 4 cylinder to V-6 conversion that I did involved a 1984 Fiero SE car with air conditioning and a manual transmission. The V-6 engine and ECM that went into the 1984 car was from a 1986 Fiero with an automatic transmission. As there are many variables involved, like cruise control, no air conditioning, and converting a 1984 automatic transmission car to a V-6. I am not familiar with what would have to be done. I do however think that this conversion would work with a 1984 car that didn't have A/C, and was a stick shift. If

you do use a V-6 from a car that had an automatic trans., just cover up the TCC plug and the large flat plug that plugged into the automatic transmission gear selector switch, as these will not be used in a stick shift application. I would suggest not to use a 1988 V-6 engine or ECM, as I was told there were electrical changes made in that year, but I just don't know for sure. If you are taking this project on, it would be wise to buy the HELM service manuals for the 1984 Fiero, and the 1986 Fiero. This way you can turn to the pages I list and reference what I am talking about. Also, in these manuals, it is explained how to access the ECM, remove and install the engine, remove and install the accelerator cable, drop the gas tank, and all the wire connector locations. It is an invaluable tool, but the wiring diagrams listed in the book leave little to be desired.

When I talk about cutting wires I mean this. You have a wire in the car that exits out the rear firewall. When told to cut that wire in half, you will have two ends. The end that does NOT exit the firewall is called the CAR end, meaning it is part of a bundle of wires that stays inside the car.

In the Beginning

This 1984 4 cyl Fiero to a V-6 conversion that I undertook was a result of my determination to try to make a replica of a 1988 yellow Fiero formula that I once owned, but couldn't keep. I knew I could get the 1984 car as close to the 1988 as I could, except for the suspension. But on congested roads, what does suspension do for you anyway? What I wanted out of this 1984 transformation was a V-6, stick shift, A/C, sunroof, sound system, rear spoiler, and of course, the 1988 Talbot yellow paint job GM used on my old formula. That's just what I got. Except for the spoiler. That's next on the list. This 1984 Fiero I bought for

\$100.00 was an SE model. The car had 54,000 original miles on it. I hate when they say "original", I mean, what other kind of miles are there? If the odometer had turned over it would have been like 1,054,000 miles. It does have 6 segments for miles and the 7th segment for tenths of a mile. Have you seen a 1984 Fiero worth over a million miles on it? Not me. Anyway, the 1984 car had such a mint interior in it that it just cried out for more horsepower. The body was in such fine shape, except it was white. Not acceptable. I did manage to find a rear fascia from a GT model that I put on this car, but the front fascia stayed. It seems the formula front fascia was still kind of pointed, but didn't have the black rubber bumper pads on it. One day I will get the right front end. When I started asking around about what it takes to do a V-6 conversion, the majority of the replies were: "Not worth it", "too much electrical work involved", "too hard to do", but the best one I heard that I just didn't want to believe was "you have to change the entire cars wiring harness". That one just blew my mind. I would have to change the entire wiring harness in the car, the one that powers the radio, the dash, dome lights, door locks, and everything else! What for?

That's when I compared both the 1984 and 1986 Fiero wiring schematics and said to my self, "these people are wrong". So I am writing these steps on how to convert your 84 Fiero stickshift to a V-6 car the way I did it, but I can't stress enough that the person who takes on this project be somewhat mechanically inclined and have a theory of electricity. Also, I really recommend that the HELM Pontiac Fiero service manuals be used.

Anyone who has done this conversion or needs further help can write to me at my e-mail address of: PAHIAUAHI@AOL.com

Adapting The 1984 C-203 Car Wiring To The V6 C-203 Connector

Once you have found the original 1984 C-203 connector by the ECM, unplug it. You will be cutting the wires off the plug that is wired to the CARS wiring, NOT the plug that eventually goes through the rear firewall. If you look at the C-203 plug that's wired to the cars wiring, you will see the wires have letters assigned to them. The wires are to be cut one at a time, then spliced to the V-6 C-203 plug that you should have gotten before. Here is the list of where the wires are supposed to be spliced together, see chart below.

Additional Notes:

The two wires you ran previously from the fuse block labeled TBI 1 and TBI 2 get connected to wires J and K of the V-6 C-203 connector. It doesn't matter which wire goes where.

You will have to find the yellow and purple wires that are in the C-500 bundle next to the ECM. These are the wires that come from the VSS, or vehicle speed sensor mounted in the transmission. The HELM manual labels these wires as follows:

- C-500 connector, B1 pin of connector is the yellow wire, and C1 pin of connector is the purple wire. Find these two wires in the bundle of wires next to the ECM, that exit out the rear firewall. Cut these two wires, and run the CAR ends of these two wires to V-6 C-203 connector. This means connect the yellow wire to the G pin of the V-6 C-203 connector and connect the purple wire to the R pin of the V-6 C-203 plug.

- Once done, the signal from the VSS passes through the new V-6 main engine harness, through the firewall, through C-203, and right up to the dash. On the 1984 Fiero, the signal started at the VSS, went through C-500, through the firewall, and right up to the dash, bypassing the old C-203. The new V-6 engine harness has a connector built into it that plugs into your VSS.

- The L pin of the new C-203 connector has to be spliced to the tan/white wire that goes to the fuel pump. You can find this tan/white wire located next to the C-500 plug in the engine compartment. It's a single pull apart wire the HELM manual lists as C-503. Follow it from the engine compartment through the firewall, and once found cut it. Splice the firewall side of the wire to pin L of the V-6 C-203. This is the wire that supplies voltage to the fuel pump via the fuel pump relay that's now part of the V-6 engine wire harness.

- The 1984 4 cyl stick shift had a shift indicator light. This will not be used with a V-6, as the V-6 ECM I used was from an auto trans. The oil pressure idiot light will glow dim and bright as engine rpm changes if you use a V-6 engine that came from a car that had an oil pressure gauge. This is because the resistance of the sender is changing when pressure changes. Take bulb out of the idiot light if it bothers you. Also, the V-6 ECM doesn't need a "crank" fuse, so just safely cap off wire R of the 1984 C-203 connector.

Splicing 1984 C-500 Into V6 C-500

The name of the wire connection that connects the engine electrical components

to the car is called C-500. On the 1984 Fiero, it's the big square plug located in the engine compartment in the middle of the fire wall. It connects components like the starter, tachometer, engine temp sensor, and cooling fan controls to the car wiring harness. On the 1985 and later Fiero, C-500 is located on the passenger side wall next to the battery in the engine compartment. It pretty much ties the V-6 engine components into the cars wiring. What you need to do is take the male end of the C-500 connector that you saved from the 1984 ENGINE, and splice it up to the female end of C-500 you got from a junk V-6 Fiero. On the 1984 Fiero, the C-500 connection on the middle firewall has actually two square plugs to it. The top plug is for the cars rear lights and should not be disturbed. The bottom plug is the one we will be tampering with. When you take the C-500 female end out of a junk V-6 Fiero, remember to leave 3 feet of wire attached to the plug, when you make your cut. After you make this splice, plug the male end of the C-500 1984 plug into your socket on the middle of the 1984 car firewall. Then run the wire around the back of the battery, and secure the female end of the V-6 C-500 connector to the passenger side of the car, inside the engine compartment, next to the battery. You have to do it this way because when you go to put the V-6 motor in the 1984 car, the wiring harness that's of the V-6 will only reach as far as the battery. Ok, here is the layout of the splices needed.

- C-500 Male Plug From 1984 Fiero
- E3-light pink, run this to E3 on V-6 C-500 female plug (coil voltage)
- E4-red, run this wire directly to + on battery.
- B3-brown, run this to B3 on V-6 C-500 female plug (alternator light)
- A4-heavy purple, run this wire directly to "S" terminal on starter solenoid.
- C3-blk/wht, run to C3 on V-6 C-500 female plug (tachometer)
- A5-red/wht, run this wire directly to + on battery
- D3-dk green, run to C2 of V-6 C-500 female plug (temp sender to gauge)
- C2-tan, run to D3 of V-6 C-500 female plug (temp sender to overheat light)
- A2-blk, run to ground
- D1-grn/wht, run to D1 of V-6 C-500 female plug (coolant sensor to fan relay)

From 1984 C-203 Car Wires . . . GOES TO . . . V-6 C-203 Car Plug

A Shift light	A keep vacant
B Fuel pump fuse	B Fuel pump relay
C Check eng light	C Check eng light
D A/C cycling switch	D Compressor to cycle switch
E Oil pressure light	E Oil pressure sender
F ECM fuse	F ECM power
G Vacant	G Speed sensor-See note
H From speed sensor buffer	H To ECM, from buffer
J Vacant	J TBI 1 (See Note)
K Don't use, cap off wire	K TBI 2 (See Note)
L Vacant	L Fuel pump (See Note)
M From speed buffer	M Ground
N Htr/AC fuse	N Compressor control relay
P Vacant	P Not used, cap off wire
R From crank fuse, cap off wire	R Speed sensor (See Note)

NOTES

The Fiero I converted had a two speed radiator fan. When you wire up the D1 to D1 connection, it lets the fan run at high speed when engine temp reaches 221 degrees. It will shut the fan off when the temp goes down to 212 degrees. In the 1985 and on Fiero, there was a one speed fan at the radiator, and a fan that blew into the engine compartment.

When you make this splice, be sure to seal it up good, and secure the wires in a bundle to the firewall tightly. When the V-6 engine gets put into the car, you will see how close the exhaust manifold is to where this wire goes, so the wire must not touch the engine.

Instead of running a lot of positive wires to the positive post on the battery, I tied all the positive little wires together, and ran a thick 8 gauge wire to the battery.

Any wires remaining that were not spliced or connected must be capped off, so they don't touch each other or ground.

Electrical Changes Needed On The 1984 Fiero

The only additional wiring you will need to add what wasn't in the 1984 Fiero car wiring harness is two fused (5 amp) circuits that will power injector bank 1 and 2 on the V-6 motor. If you look at the main fuse block you will see two blank spaces for fuses labeled TBI 1 and TBI 2, but upon inspection of these slots, you will see there are no wires attached to these slots. What is needed is to tap into the thick solid red wire going to the stop/hazard fuse. Now you will need two inline fuse holders with 5 amp fuses in them. Splice one end from each fuse holder together and join them into the thick red wire going to the stop/hazard fuse. You can tuck these fuse holders on top of the fuse block when you snap it back up. Now the other ends of the fuse holders will have to have a wire attached to them and run through the shift console back to the ECM. It's better to use two different colors, as this is TBI 1 and TBI 2 circuit. Leave them there for now.

Changes Needed To Fuel System

The V-6 engine fuel injectors need to run at a pressure around 40-45 psi. The fuel pump in the 1984 Fiero only supplies around 9 psi. What is needed is to change

the fuel pump. The fuel tank must be disconnected and taken down from the car. You basically need to have the car high enough to get under it to the tank. There are 4 or 5 lines going to the tank. One is the main fill hose, one is the pump output, one is fuel return, and one is vapor to the charcoal canister. When taking these lines off the tank, be sure to put them back in the right place. They don't give you much room to work near the disconnection point of the lines, but you can do it.

Once the tank is lowered, remove the old fuel pump and sender unit as one. If you found a used fuel pump/sender unit from another V6 Fiero to use like I did, your gas gauge might read quarter full, but your out of gas. I guess because GM put a bigger fuel tank in the later model Fieros, but it sure will fool the car thief. Just make sure to connect the three wires in the same place going to the fuel pump/sender. You will see them when you drop the tank.

Engine compartment gets hot, so make sure the rubber fuel line is secured away from hot stuff like the exhaust manifolds. Also, make sure in the engine compartment, the fuel feed and return line from the 1984 Fiero is routed on the drivers side. Take a pipe cutter and cut both of these lines after the fuel filter. Leave the filter connected to the line, but have about a foot of metal fuel pipe continuing past the filter. The filter is connected to the feed line and the other line running next to the feed line is the fuel return line. After these lines are cut with the pipe cutter, get some double wall 3/8 id rubber fuel line. I used a good quality marine fuel line that's Coast Guard rated for use in confined spaces. Also because I own a marine dealership.

Be sure to use two metal worm type hose clamps on each end of the rubber fuel line. Slip enough fuel hose onto the metal lines to extend them over to where fuel will enter the V-6 engine. On the V-6 engine I also cut off the threaded fittings that were on the metal lines coming from the intake manifold. When you connect the rubber fuel hose to these lines at the engine, use two clamps per hose also. Remember, the fuel coming from the tank now is under higher pressure, and that nothing can rub through these new rubber fuel lines.

Modifications You May Need

The only real structural modifications I can think of that you would have to do to

the 1984 Fiero would be to cut the drivers side lower metal radiator pipe 5 inches shorter. You would also have to install a bracket to the cradle that would secure the small shock absorber strut from a V-6 engine, if the V-6 you used had a lower strut. I welded a piece of 1/4 inch thick flatbar (flat piece of metal) with a hole drilled in it to my cradle to accept the bolt that secures this small lower strut to the frame. *Do the welding or fastening after you have put the V-6 into the cradle*, so you know exactly where this lower strut lies in relation to the cradle. Another thing you may have to do is find another place to secure the exhaust hanger clamps that support the exhaust tips to the frame. And on last, but major thing I had to do was to cut a relief area in the 1984 clutch slave cylinder bracket. This has to be done because the crossover pipe from the newly installed V6 is partially in the way of this bracket. I used a cutting torch to "notch" the area I had to cut out of the slave cylinder bracket. It did not weaken my bracket, because I didn't go too radical with the cut.

Parts Needed For The V6 Conversion

1. One V-6 throttle cable
2. One complete V-6 engine with complete V6 engine wiring harness attached to it, also must have proper flywheel for manual trans and front metal engine mounting bracket
3. One V6 ECM, can be from either automatic or manual transmission
4. One set of C-203 connector ends with 6" of wire on them, taken from a V-6 Fiero. These must be the CAR ends, located next to the ECM.
5. One V-6 Fiero fuel pump assembly
6. One V-6 complete air cleaner assembly
7. One set of V-6 air cond lines that go from compressor to where Schrader valve is just below rear deck lid, if your car has A/C in it.
8. One V-6 Fiero C-500 female end with 3 feet of wire on it. This is the big square type connector located next to the battery on the passenger side engine compartment wall in a V-6 Fiero. Unbolt the connector from the junk car and make sure you get about 3 feet of wire with it. You will have to cut it from the junk V-6 car you take it from.
9. One complete V-6 exhaust system, crossover pipe, O2 sensor, and EGR valve.

10. One V-6 upper strut, sometimes called "Dogbone".
 11. One V-6 lower engine radiator hose. Get the flex hose, as it has two different diameter ends on it. This hose goes from the water pump to the lower metal pipe on the passenger side that goes up to the radiator.
 12. One long length of 1" inch inside diameter hose. This hose will go from the thermostat neck on the engine to the driver side lower metal pipe that goes up front to the radiator. I used a good quality marine water/exhaust hose re-inforced with wire. This hose is about 5 feet long, and is under pressure and heat from the hot engine water. Run it from the thermostat neck, curve it tight next to the battery, then come back with it under the dogbone, secure it to the trunk wall where the fuel canister vapor lines are, then route it down on top of the transmission, watch out for the shift linkages, and onto the pipe you will have to cut 5 or so inches off. You will see what I'm talking about when you want to connect this hose up to the driver side lower metal radiator pipe. Secure tightly with a good quality worm type hose clamp. Remember, keep this line from rubbing on any moving parts.
 13. One C-500 male end that was part of the 1984 4 cyl engine harness, with a foot or so of wire attached to it. This is the big square plug that you had to unbolt from the middle of the firewall in the engine compartment when you removed the 4 cyl. It should be attached to the 4 cyl engine. Cut all the wires off of the engine, as we will be splicing this connector up to the C-500 plug and wire you got from a V-6 Fiero.
 14. If the car your doing has A/C, you will need a rear compressor mounting bracket from a V-6 compressor, as the 4 cyl rear bracket is different. This is why you have to change out the A/C lines too. Also make sure the V-6 engine has a front compressor bracket attached to it.
- Remove center console, radio enclosure, armrest, and ECM
 - Run new wires from fuse block to ECM area for TBI 1 and TBI 2
 - Remove old accelerator cable and install new V-6 cable
 - Splice in V-6 C-203 ends to existing 4 cyl C-203 wires.
 - Push plugs that came out of ECM through firewall, so you have an open hole
 - Remove rear deck lid
 - Remove 7mm bolt holding C-500 together
 - Remove shift cables from transmission
 - Remove clutch slave cylinder from transmission and let hang
 - Disconnect fuel lines, vacuum lines, any additional wires
 - Remove 4 cylinder engine and cradle together as one from car, see HELM book
 - Remove 4 cyl from transmission and cradle
 - Remove entire exhaust system from cradle
 - Install V-6 exhaust onto cradle, remembering how 4 cyl exhaust was attached
 - Install V-6 into transmission and onto cradle and secure
 - Connect up complete V-6 exhaust
 - Make A/C compressor attachment to engine if using A/C
 - Connect positive battery cable to starter now and drape over top of engine
 - Connect 8 gauge wire to "S" term on starter solenoid and drape over top
 - Go to workbench and splice up the C-500 connection cable
 - Install C-500 spliced cable
 - Change out A/C lines in engine compartment, if you have A/C
 - Cut about 5 inches off of drivers side lower metal pipe that goes to radiator
 - Drop fuel tank, and change out fuel pump, then re-install tank
 - Start installing engine and cradle as one unit, but as you are installing, if you have A/C, connect the lines to the compressor, as there is virtually no room to do this when the cradle is bolted in, and connect the lower engine radiator hose from the water pump to the passenger side lower metal pipe that goes up to the radiator.
 - Finish bolting up the cradle, shift cables, modified slave cyl bracket
 - Cut metal fuel lines, extend over to engine with rubber lines.
 - Route V-6 ECM wire harness, this includes the engine side C-203 connectors through the existing hole in firewall that the old 4 cyl engine harness was taken out of. It's a tight fit.
 - Plug in the V-6 C-500 male engine side connector into the newly located
 - C-500 female end next to the battery.
 - Attach the V-6 accelerator cable to the throttle body on the V-6
 - Connect the wire you ran from the "s" term on the starter solenoid, that should be draped over the motor, to the A 4, heavy purple wire, that you have stubbed out of the freshly spliced C-500 cable.
 - Connect the vacuum lines up to the charcoal canister and the vacuum line up for the power brakes. Look in HELM manual for vacuum line routing.
 - Connect up heater water hoses, you will have to extend them with hose barb fittings and extra heater hose.
 - Connect up water neck 1 1/4 inch ID long hose to drivers side lower metal radiator pipe that you cut 5 inches off of.
 - Make sure ALL fuel lines and water lines are away from hot or moving engine parts.
 - Install V6 air cleaner onto driver side wall in engine compartment
 - Plug in MAT sensor plug into air cleaner where MAT sensor is
 - Install top dogbone strut
 - Install V6 ECM, and plug in newly spliced C-203 connectors
 - Install negative wire from battery to engine block
 - Install positive wire you had draped over engine from starter to battery
 - Connect any remaining positive and negative wires to battery
 - Fill coolant
 - Don't worry about A/C system now if you have A/C
 - Try to start car now, if it starts, watch gauges, inspect engine
 - If it doesn't start, and you can't fix it, gather as much information about the problem you can, and E-mail me.
 - If car starts and runs fine, you will have to get the A/C system charged
 - If you have A/C for it to work. There's a pressure switch that won't let the compressor come on if there's no freon in the system.
 - Replace armrest and such

Steps In Converting 1984 4cyl To A V6

- Disconnect battery
- Drain coolant
- Safely have A/C system drained

BE SURE ALL WIRES AND HOSES ARE OUT OF THE WAY OF EXHAUST PIPES