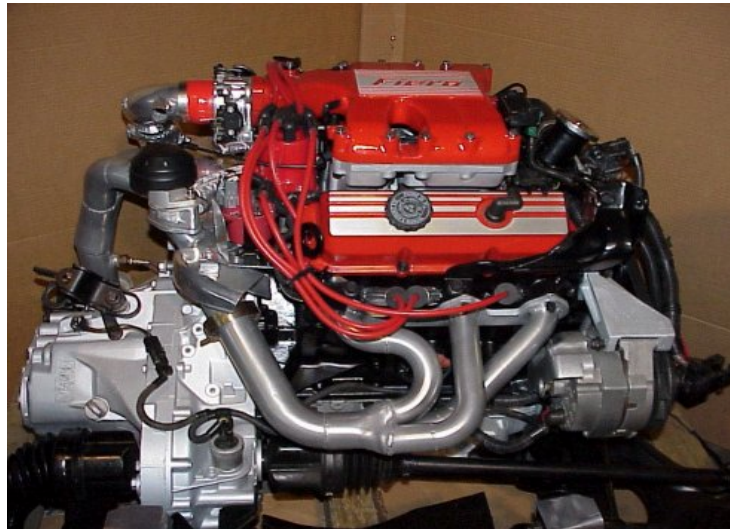




Home

Supercharger



## Engine Swap Details

*This swap utilizes a '96 Pontiac Transport van FWD 3400 engine short block with roller cam.*

*(Now Super-Charged - click **BUTTON** above)*

To retain the Fiero intake and fuel system, Fiero heads are used in place of the aluminium heads a 3400 engine would come with. Because of the larger combustion chambers in the Fiero's iron heads, you will have change to new pistons

The only roller cam available is the stock one, along with stock roller lifters and timing chain. No aftermarket is available for these items. GM didn't have an engine with the iron head/roller cam combination, so there are no proper length push rods - they are either too long or too short. Because of the taller height of the roller lifters, custom length push rods had to be ordered from Smith Brothers.

To gain better breathing, we went with Comp Cams 1.6 to 1 ratio roller-tip rockers to increase valve lift. The throttle body was bored, and intake manifolds gasket matched and ported. The heads were ported with most of the work being done in the valve pockets and exhaust side. Stainless steel valves were installed with SBC valve springs and retainers.











Headers are used instead of the stock exhaust manifolds, with a free-flow catalytic convertor and BORLA cat-back exhaust system. It sounds great and lets the engine breathe well.

Because this is a FWD block, the starter bolt holes are on the correct side. Just bolt on a stock Fiero starter and you're set. You will need a "zero balanced" flywheel, either a new one, or get your pre-88 flywheel rebalanced. The machine shop just machines off the weight to balance it out. There may be some sensor holes not required for the Fiero installation. These can be blocked off with appropriate plugs.

**NOTE** - there is a pressure bypass hole behind the water pump in the timing cover that has no corresponding hole in the 3400 block. This needs to be plugged, otherwise coolant will spill onto the ground when you fill engine. I drill a 1/8" hole in the edge of thermostat to perform this same function.

Most everything else is a normal rebuild procedure, with a careful selection of parts to upgrade all engine support systems. There's no point building a performance engine with an inadequate fuel system, poor ignition or plugged up exhaust system.

(Click thumbnails for larger image)

|   |  |
|---|--|
|    | <p>Engine's upperend components. Plenum and Valve Covers have been stripped and repainted. Bright red Taylor plug wires are a good replacement for the original red GM wires (no longer available). Bright red Holley coil and red distributor cap complement the engine parts. K&amp;N filter and new starter await installation.</p> <p>View websites for <a href="#">Holley coil</a>, <a href="#">K&amp;N Filters</a> and <a href="#">Taylor Wires</a>.</p> |
|    | <p>FOCOA headers and Y-pipe are ceramic coated. This has two purposes-<br/>         - it keeps the engine bay cooler as engine heat transfer is minimized.<br/>         -the coating has excellent corrosion resistance, so they'll last almost forever.<br/>         These are available from various sources. <a href="#">Race-Tech</a> in Canada has 'em.</p>   |
|    | <p>A Centerforce Dual Friction clutch/pressure plate kit will be installed. These have been reported to work very well in the Fiero powertrain. Although not shown, I'm also installing an aluminium flywheel. These are a perfect match, and should help "get the power to the ground". <a href="#">Centerforce website</a></p>   |
|    | <p>The stock fuel rail is shown with Holley Adjustable Fuel Pressure Regulator (AFPR) (located at the lower end in picture). I chose a Holley unit, because it has a large knurled wheel on top to adjust fuel pressure settings. Adjustment is easy without need of a wrench, although long thin fingers do help ;-)<br/> <a href="#">Holley AFPR</a></p>   |
|  | <p>Here's a closeup of the valley. You can see the roller lifters in their bores. The lifter bores are round, as is the lifter, but the upper third of the lifter has been machined flat on two sides. These are to prevent rotation of the lifter once the lifter anti-rotation retaining rails have been installed.</p>  |
|  | <p>Looking from the front of the block, you can see the plastic lifter anti-rotation rails installed. A raised edge needs to be ground off the inner side of the rails, as done on the left rail. The regular rail is on the right for comparison. This is required for clearance so that the Fiero lower intake manifold can be installed.</p>  |
|  | <p>A large photo shows the valley with both modified rails installed. The valley has more reinforcement webbing than 2.8 blocks as is readily apparent on closer inspection.</p>   |
|  | <p>Another modification is required in order for the stock Fiero lower intake to fit over the lifter anti-rotation rails. The oil splash shield on the bottom of the intake must be either bent or removed. I opted to bend them slightly, requiring several test fits to get it right. With this splash shield in place, hot oil splashing on the bottom of the intake is reduced.</p>  |
|  | <p>Because the stock cam is the <i>only</i> roller cam available for this engine, CompCams 1.6 to 1 ratio roller-tip rockers will be used to increase valve lift and improve breathing. The <a href="#">Comp Cams rockers</a> will fit under the stock valve lifters without any problems. <b>Custom 5.85" long pushrods</b> (stock diameter) were ordered from Smith Brother Manufacturing (541) 388-8188. Cost is under US\$100.</p>                         |
|  | <p>The 3400 engine has a strong, ribbed cast aluminium oil pan. No pan gasket is used, as RTV sealant is applied during installation to provide a leakproof seal. In addition to bolts attaching it the block, six bolts go through the side of the oil pan into the main bearing caps. A stock Fiero or 3.4L Camaro pan will not fit!! The stock 2.8L harmonic balancer is reused and new under-drive pulley and water pump is also installed.</p>            |
|   | <p>The engine is now installed on the cradle. More accessories had been installed, such as the oil filter,</p>   |



sensors, alternator and starter. The FOCOA headers are clearly visible. The BORLA cat-back exhaust system can also be seen here.



Here, the plenum and valve covers are test fitted. The heat shielding around the Y-pipe has been trimmed to fit the new one that came with the headers. The EGR valve and Holley coil are installed in their proper locations. Also visible, are the Torque Master spark plugs, which look like any other at this end.



Torque Master™ plugs have a radial ground/center electrode design. These came highly recommended from another Fiero owner with a high performance 3.4L engine. The tip design exposes the spark more directly in the combustion chamber for more power. Their alloy construction means *they should last the life of the engine*.



Engine looks right at home in the Fiero's engine bay. Fiero owners would spot the headers as being non-stock. Everything else looks pretty much as it did from the showroom floor.

Some people who've never seen a stock Fiero setup assume everything is "dress-up", while others believe everything is stock. I kinda have both of them fooled.



Here's a **cheap** dress-up item I came across some time *after* I took these pictures of the new engine. This is a GM EGR valve cover. It is now a discontinued item, but you'll find them in the wrecking yards on 80's Oldsmobile Ciera's with a fuel injected V6. They just snap on/off. They're very handy to cover up an old rusty EGR valve, or to keep a new EGR valve looking... well *new!!!*

## Engine

Custom PROM chip for 3.4L 5-speed - Wester's Garage, Tilley AB, [www.ecmprogrammer.com](http://www.ecmprogrammer.com)

'96 Pontiac Tranport van FWD 3400 V6 core - bored .020" over

3.4L DOHC pistons Federal Mogul H684CP (gives 9.7 CR) .020" oversize

- similar to Silvolite PN# 3409 [www.kb-silvolite.com/slvpg79.htm](http://www.kb-silvolite.com/slvpg79.htm)

Stock rods - polished, resized & shot-peened,

Stock 3.4L DOHC crankshaft - polished and balanced

Stock cast iron heads - ported w/new valves, valve guides & seals

Si SS valves - 1.72"/intake 1.42"/exhaust (Fiero Store) [www.fierostore.com](http://www.fierostore.com) (US)

Stock GM 3400 roller cam – no aftermarket available

Stock GM **roller lifters** – no aftermarket available

Stock GM timing chain and gear set (specific to roller cam) – no aftermarket available

Comp Cams 1.6 ratio **roller tip rockers** PN# 1414-12 [www.compcams.com](http://www.compcams.com)

Custom length **pushrods** 5.85" long - Smith Brothers Manufacturing [www.pushrods.net/](http://www.pushrods.net/)

Engine assembly computer balanced

New under-drive pulley (Fiero Store) [www.fierostore.com](http://www.fierostore.com) (US)

Fel-Pro 3.4L engine gasket kit

New EGR valve - GM PN# 17110831

180 thermostat - Motorad PN# 211-180

Engine "**long block**" painted (BLACK) - Mar-Hyde Universal Black 8560 [www.marhyde.com](http://www.marhyde.com)

New water pump - TRW/Carter PN# FP1843 [www.trwauto.com](http://www.trwauto.com)

## Intake/Fuel System

K&N air filter - PN# E-0890 [www.knfilters.com/airfiltr.htm](http://www.knfilters.com/airfiltr.htm)  
Bored throttle body (55mm) - RS Motorsports [webhome.idirect.com/~rsm1/main.htm](http://webhome.idirect.com/~rsm1/main.htm) (Canada)  
**Ported stock intake manifolds** – matched to bored throttle body and head gaskets  
Fel-Pro Fiero intake gasket set PN# MS 93020  
AC Delco V8 fuel pump - EP381 PN# 25163473 [www.acdelco.com](http://www.acdelco.com)  
AC Delco fuel pump strainer - TS-1 PN# 25055455  
AC Delco 3.4L DOHC injectors - PN# 17090849 (20% more flow than standard 3.4L injectors)  
**Holley adjustable fuel pressure regulator** - PN# 512-501 [www.weiand.com](http://www.weiand.com)

## Ignition

Stock distributor w/new pickup coil installed  
New dist/coil harness (Fiero Store) [www.fierostore.com](http://www.fierostore.com) (US)  
Wells Professional cap & rotor (RED) PN# DR-2012G  
Taylor Spiro-Pro spark plug wires (RED) PN# 74224 [www.taylorvertex.com](http://www.taylorvertex.com)  
Holley ignition coil (RED) PN# 820-214 [www.weiand.com](http://www.weiand.com)  
Torque Master **spark plugs** [www.extremespark.com](http://www.extremespark.com)

## Engine Electrical

New starter - Canadian Tire (5 yr warranty)  
New alternator (115amp) - Auto World, Calgary AB  
Some sensors and connectors replaced - AC Delco parts  
Engine harness cleaned up & re-loomed

## Exhaust System

**FOCOA headers** - Jet-Hot coated [www.thefieroshop.com](http://www.thefieroshop.com) (Canada)  
Fel-Pro exhaust header gaskets - PN# 1449  
Stainless Steel Super-Flow catalytic convertor - CarLine Muffler (Canada)  
**BORLA** Stainless Steel exhaust system w/tips <http://twinlakesfiero.tripod.com> (US)

## Transmission - Stock Getrag 5-speed

New 1st/2nd and 3rd/4th synchros and diff. bearings - GM  
Aluminium flywheel (zero balanced) [www.thefieroshop.com](http://www.thefieroshop.com) (Canada)  
(NOTE: Stock 2.8L flywheel can be resurfaced and zero balanced)  
New axle seal/bearings (Fiero Store) [www.fierostore.com](http://www.fierostore.com) (US)  
Center-Force Dual-Friction **clutch w/pressure plate** [www.centerforce.com](http://www.centerforce.com)  
New clutch release bearing - GM  
Synchromesh Transmission Fluid w/Limited Slip additive - GM

## Miscellaneous

Engine cradle is cleaned and repainted (BLACK) - Mar-Hyde Universal Black 8560  
**Plenum and valve covers** repainted (RED) - Dupli-Color Chrysler Industrial Red DE-1632  
**Intake manifolds** and aluminium heat shields painted Rust-oleum V2116 High Temperature Aluminium  
<http://www.rustoleum.com>  
All engine brackets repainted (BLACK) - Mar-Hyde Universal Black 8560  
New Prothane Poly cradle bushings PN# 7-502 [www.prothanesuspension.com](http://www.prothanesuspension.com)  
All new Goodyear radiator and moulded heater hoses [www.goodyearbeltsandhose.com](http://www.goodyearbeltsandhose.com)

## Sites where I found useful information on building up a 3.4L engine.

3.4L Fiero engine buildup (Freddy Clark) [www.angelfire.com/on/freddysplace/](http://www.angelfire.com/on/freddysplace/)  
3.4L S-15 engine buildup [www.s-series.org/html/windstorm/project-windstorm.htm](http://www.s-series.org/html/windstorm/project-windstorm.htm)  
What's involved using Camaro 3.4L [www.angelfire.com/on/fierofactory/start.html#34](http://www.angelfire.com/on/fierofactory/start.html#34)  
Intelligent mods - what to do, what to avoid [www.sdsefi.com/techmods.htm](http://www.sdsefi.com/techmods.htm)  
Rebuilding a 60 degree V6 - bores/displacements <http://users.spec.net/home/emxjc/block.html>  
GM Performance Parts on-line catalog [www.spoperformanceparts.com](http://www.spoperformanceparts.com)  
60 degree V6 performance parts listing [www.s-series.org/html/performance/60degree.php](http://www.s-series.org/html/performance/60degree.php)  
WhiteHorse performance engines [www.kitcar.com/whitehorse/](http://www.kitcar.com/whitehorse/)

