Hello Paul,

The car I am designing is allowing for 4wd since it is the only way to cope with big power on the street since it isn't really appropriate to use 16" wide racing rear tires on the street. The easy/traditional approach is to do the 4 rotor longitudal with a transmission with a transfer box on it wether I do it rear engine or front engine (Nissan Skyline or Mckee Mk4 AWD Can-am). I think it is also worth noting that I want to make this engine a N/A engine with expected output around 500hp and with strength designed into it to allow for turbocharging that would take it to 1000hp.

The way I would really like to do it is to mount the engine transversely in a mid engine configuration. This would cause for an extreme offset transmission to bolt on to the back housing so what I would like to do it split the 4 rotor in half and have each half bolt to a trans flange that would be roughly the same width of an intermediate housing. This inserted flange will look like a winters quick change rear end without the bells bolted to the side. The shaft that would normally be the power intake shaft to the quick change gear set would be the shaft that would run toward the front of the car to the center diff and then the front diff. (See Figure 1) Picture a center diff mounted where the driveshaft yolk is. The shaft running to the center diff would be driven of a spiral or hypoid mounted on the rear diff since the rear diff will be run with a helical gear coming off the secondary shaft of the transmission.

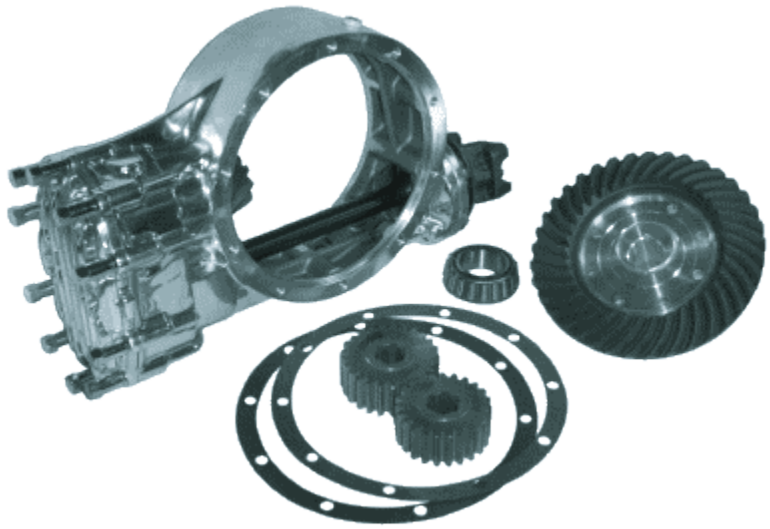


Figure 1

The thought is to couple the two shafts together with some mechanism (Granny setup, modifying e-shafts) that would also serve as the gear that will drive the clutch flywheel much like motorcycles do today with a gear teeth hobbed on a crankshaft counterweight that meshes with the flywheel that the clutch is connected to. Volvo is currently doing this with a transversely mounted 6 cylinder with fantastic packaging results. (See Figure 2) The thought was also to use this gear to drive a water and oil pump that will distribute the fluids from the center toward the ends. Additional things can be driven off of this gear if necessary or they can be done on the ends.

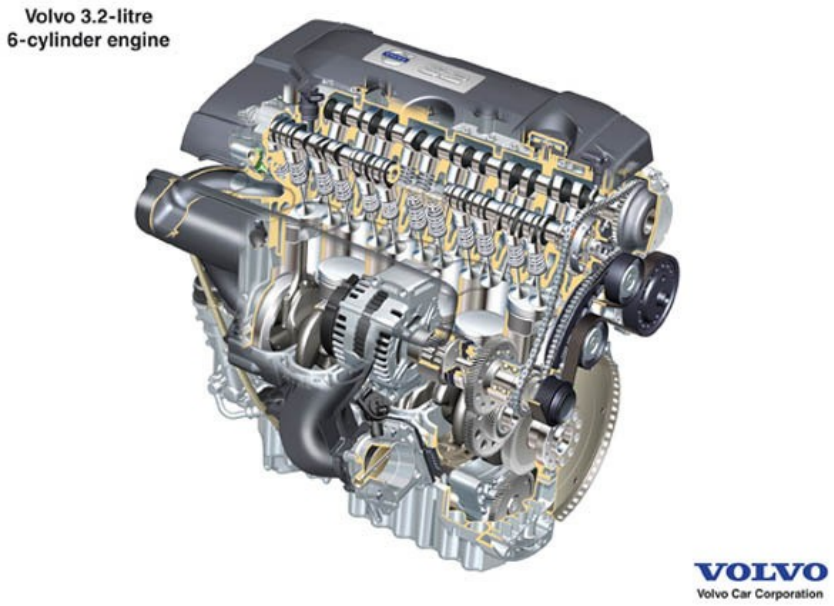


Figure 2

The concept for the engine is to use all RX-8 parts to do this with. I am assuming side ports are really needed for a streetable setup (i.e. idle) as much as p-port simplicity/superiority would be. This design would also require me to make my own "end" and "front" housings (two piece design ala you) to keep from having to add extra housings that only work on one side. The end and fronts would actually be very simple since I don't have to worry about attaching a front cover or bolting a transmission onto the back.

I am sure your eyebrows are raised at this point as you realize that the work this would require. This paper is basically a moment to put some brakes on if there isn't something that can't be technically handled with just hard work. I do plan on designing the transmission from the ground up but the work has already started on that. I have some pretty good manufacturing back up as well in terms of 3 axis machine centers and edms. I have a bunch more thought out but I felt like I should throw this at you first. My end goal is to make a powertrain module that can be used in my own chassis or be retro fitted into something else. I have a bunch of hand drawings but my scanner is broken at the moment. Once you respond I will start breaking down things into more detail. I do however have some initial question to ask of you.

1. Do you have a good cooling diagram for the RX-8 engine? I found some stuff online but it is crazy fuzzy.
2. Do you have a good oiling diagram for the RX-8 engine? I found some stuff online but it is crazy fuzzy.
3. How do these engines like the unsymmetrical side port design I so often see? Piston engines are crazy sensitive to inconsistencies from bore to bore and it makes manifolding an absolutely nightmare to engineer. With my new end housings my first thought was to make the porting symmetric the intermediate housing port design. I also wanted to do it this way because I would like to put all of the injectors at the housings in a row so as to have a single fuel rail instead of this crazy setup they come with. If you haven't noticed by now I am all about symmetry of design. I know this would result in less port capacity but it would simplify things and I could always turbo to make the difference up.
4. What is the thickness of the different housings for the RX-8? I am trying to determine a stack up thickness for the engine.
5. Is there anyone I could get junked parts for shipping cost so I have something to measure from?



Just to give you an idea of some of my work. Each caliper half machined on a horizontal machine center with 4 face tombstones. Two operations to make. Symmetrical design in SolidWorks allowed for these to be made as one part file with many configurations.