

6-BOLT MOTOR IN A 2G DSM

Story by Marlin Musial Photos courtesy of Automotorsports (AMS)

DSMs are a great bang for the buck, and with most of them becoming more affordable, many horsepower freaks are snatching them up for their good looks and power potential. DSM (Diamond Star Motors) are separated into two models, 1Gs (1st generation '89-'94) and 2Gs (2nd generation '95-'99). The strongest motors were the early turbo 6-bolt versions offered in the 1989 through mid-1992 model cars. From mid-1992 through 1999 all motors were 7-bolt, with the 2Gs introducing a crank angle sensor and eliminating the adjustable cam angle sensor (OBDII) later on.

CRANKWALK

The 1995-1997 2Gs are a prime candidate for

a 6-bolt swap because they are susceptible to a condition called crankwalk. Crankwalk occurs when the crank wears into the thrust bearing severely. Eventually the crank moves the trigger plate into the crank angle sensor breaking it and shutting the car down. Symptoms of crankwalk are a clutch pedal that will drop to the floor and having difficulty with clutch engagement. Another symptom is a 'ticking' noise from the crank pulley area in the engine bay, which is the trigger plate hitting the crank angle sensor. Crankwalk has also been seen in the early 7-bolt motors (mid 1992-1994) but not as frequently. The risk of crankwalk is greatly increased when clutches with very high pedal pressures are used. The cause of crankwalk

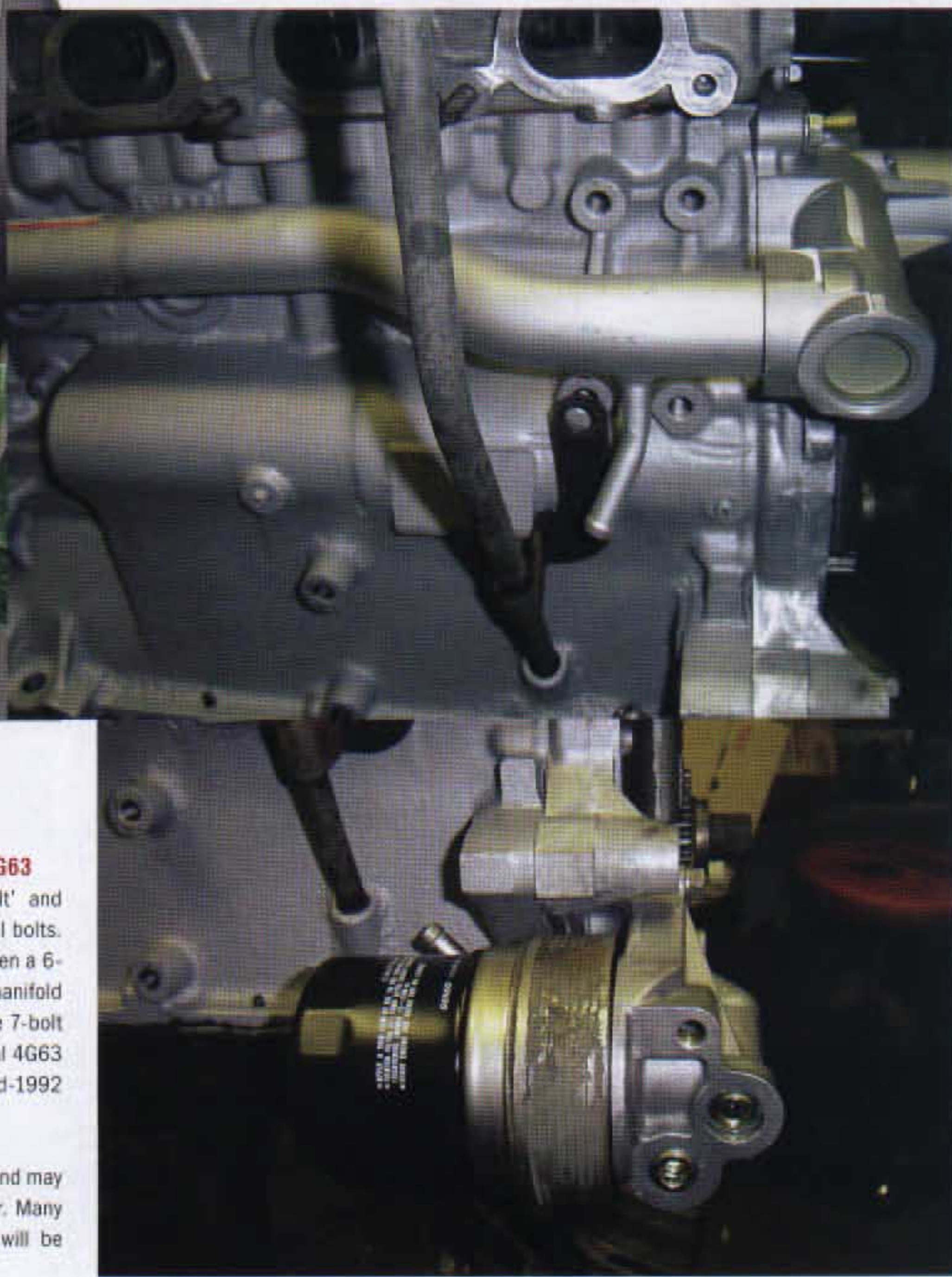
has not been found yet, but many theories are coming around that are pointing toward oiling problems to the thrust bearing.

AN IDEAL SWAP

The 6-bolt 4G63 is the ideal choice for the inevitable 2G motor swap. The 6-bolt motor has thicker and stronger connecting rods than the 2G 7-bolt motor, but more importantly it won't crankwalk. The 6-bolt also has a larger throttle body, intake manifold and intake runners. The cam angle sensor on the 1Gs is adjustable so with careful tuning you can add a little ignition advance on your 2G now. In a good state of tune, you will be able to extract over 450hp out of a stock internal motor with the correct bolt-

THE PARTS LIST

1G ISC AND THROTTLE BODY	Should come with donor motor
1G CAM ANGLE SENSOR (CAS)	Should come with donor motor
1G WATER PUMP	Use new pump
1G OIL PUMP AND FRONT CASE	Check condition of oil pump and replace if necessary
1G TIMING BELT KIT	Use new parts
1G TIMING BELT COVER	1990-1992 style timing cover
1G TENSIONER ARM	Should come with donor motor
1G FRONT WATER PIPE	Should come with donor motor
1G LOWER RADIATOR HOSE	
1G 6-BOLT FLYWHEEL	
1G THERMOSTATE HOUSING AND WATER NECK	Should come on donor motor
DIFFERENTIAL PRESSURE SENSOR ADAPTER	
'91-'94 STYLE COIL PACK	
10K POTENTIOMETER	



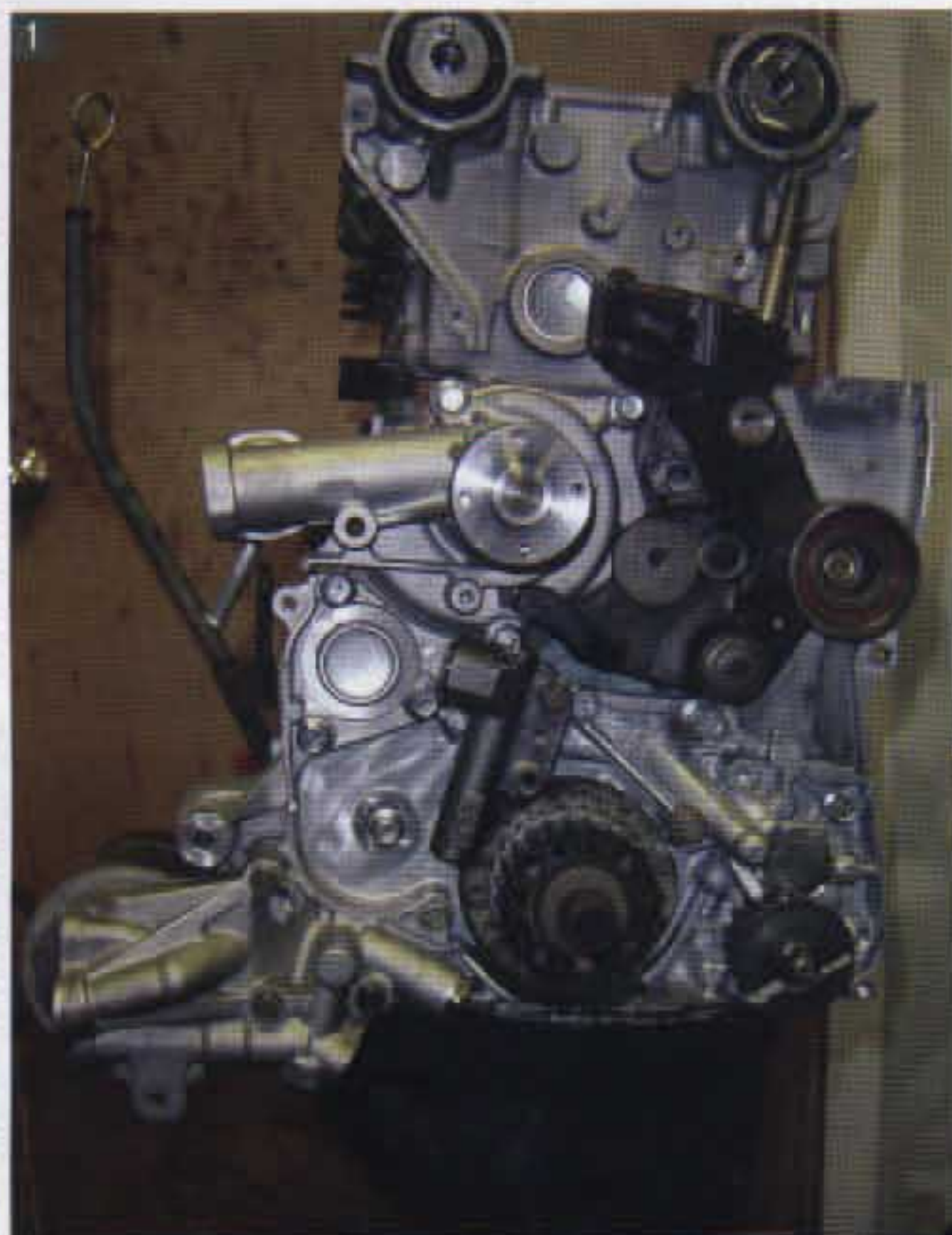
on parts and modifications.

WHAT TO LOOK FOR IN A 6-BOLT 4G63

For reference, the designation '6-bolt' and '7-bolt' refers to the number of flywheel bolts. Another way to tell the difference between a 6-bolt and 7-bolt is that all the exhaust manifold studs on a 6-bolt are 8mm while on the 7-bolt the outer two are 10mm studs. The ideal 4G63 we want is from a 1991 through mid-1992 DSM.

Some additional parts will be required and may or may not come with the donor motor. Many parts from the original 7-bolt motor will be needed so keep them handy.

SWAP PROCESS OVERVIEW

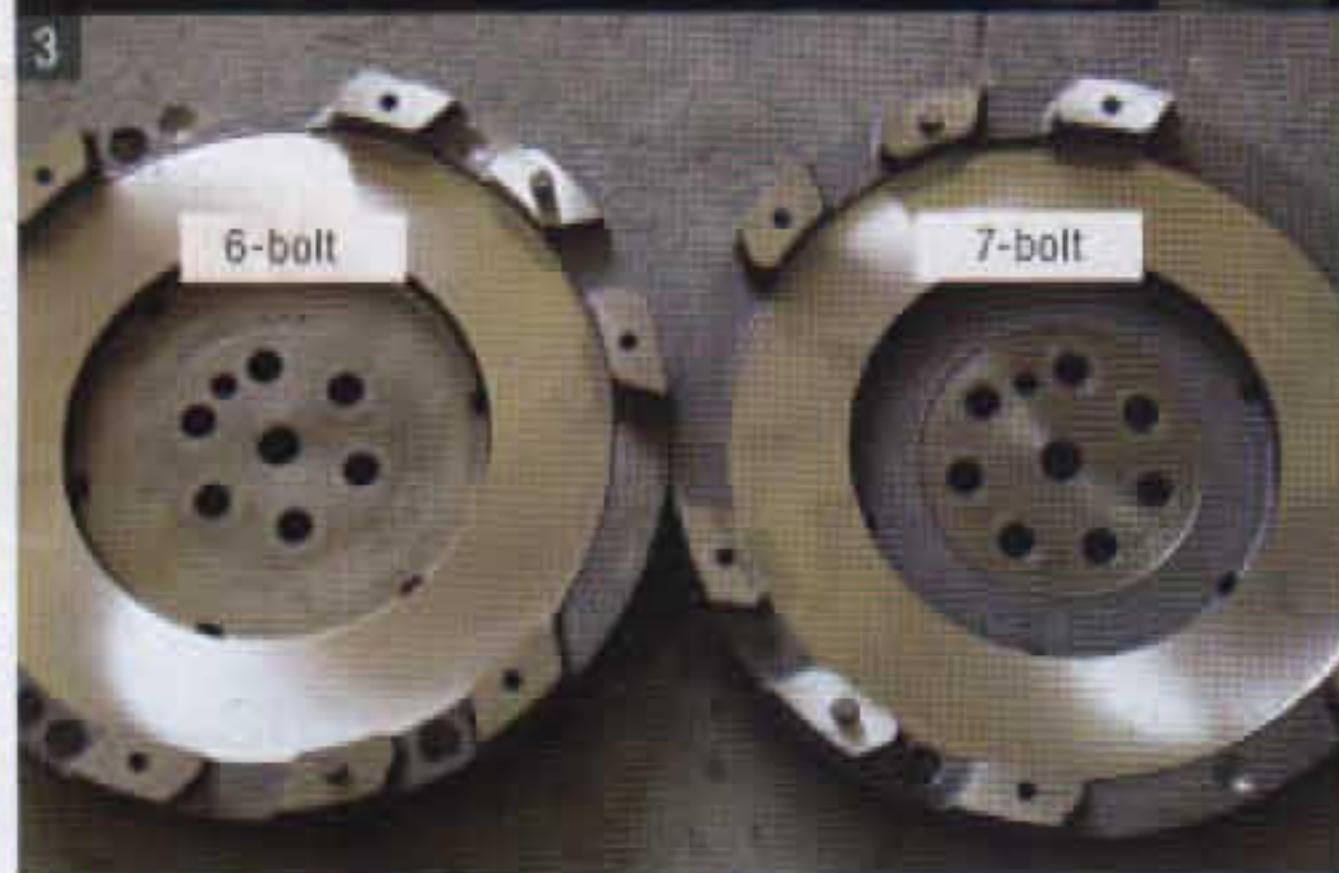


1. We remove the 2G motor and separate the trans away from the motor. As we will need many parts from the 2G motor, it's kept handy. The 6-bolt donor motor is prepped by stripping all the accessories. It's a good idea to check the oil pump gears and case for wear and replace if necessary. At this point, we replace all the timing components with new ones and change out the water pump for a new unit. A modified driver's side motor mount is used from the old 7-bolt motor and we bolt it to the block. The modification requires some trimming on the motor mount to clear a corner of the 1G water pump.

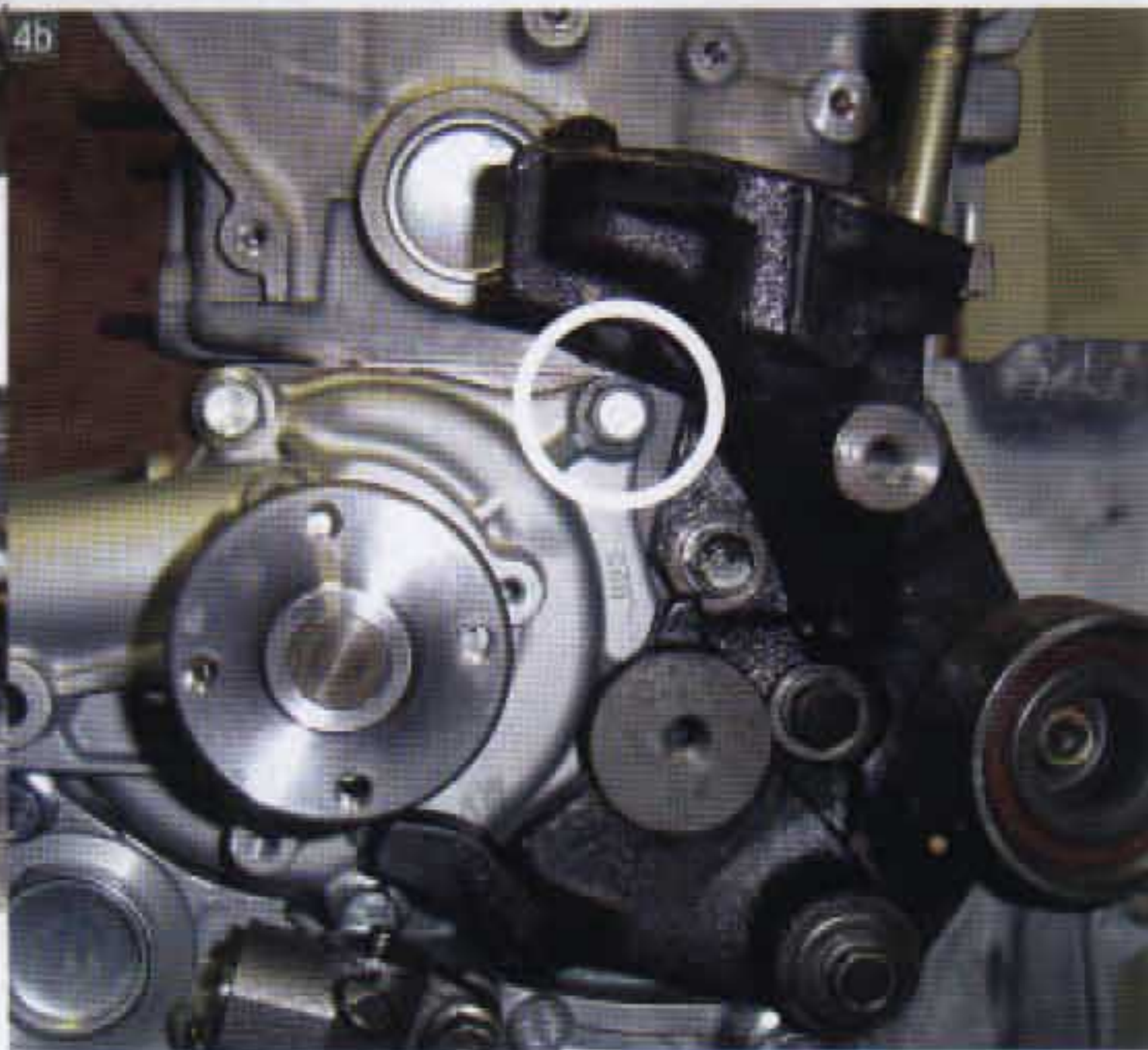
We use a '91-'92 style oil filter adapter and then transfer the sandwich style cooler over from the 7-bolt to the 6-bolt. The sandwich style cooler requires a '91-'92 style front water pipe that has the extra nipple near the oil cooler end to connect to one end of the sandwich style oil cooler. We'll also need a '91-'92 style water neck and corresponding water lines to connect to the other water port of the oil cooler.



2. Next we transfer all accessories (A/C, PS, Alternator) and motor mounts from the 7-bolt to the new motor. In order for the 1G timing cover to work it has to be trimmed to fit around the 2G driver's side motor mount.



3. We use the 6-bolt Intake manifold, coil pack and throttle body, and a '91-'94 style setup since anything earlier than that will require a TPS and Coil Pack rewire.



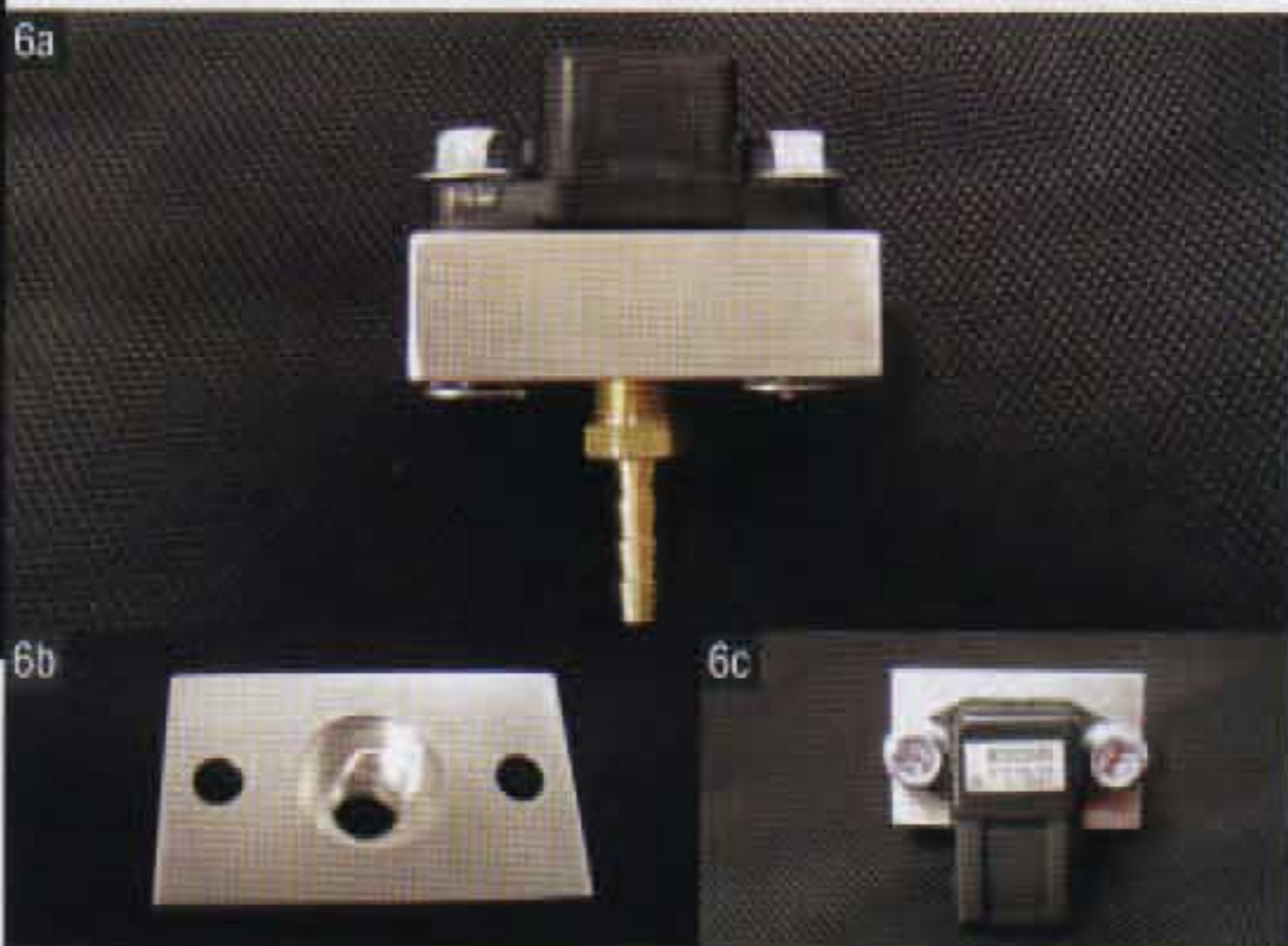
4. We must now use a 6-bolt flywheel and the plate that fits between the motor and trans must come off the 7-bolt motor.

SWAP PROCESS OVERVIEW



5. Wiring of the Cam angle sensor to the engine harness. The 1G cam angle sensor will now simulate both the crank angle sensor and the cam angle sensor that the 2G needs to see.

For a 1995-1996, the firing order of the two coil packs reverses. The firing order for the coil packs on the 1997-1999 cars stays the same.



6. We connect the Pressure Differential sensor to a vacuum source.

WRAP UP

We set the ignition timing and then read the timing (with a OBDII scanner or similar device) once the engine is at operating temperature and at a steady idle. Using a timing light and adjusting the cam angle sensor, we synch the ignition timing with what the ECU reads to what

we see at the crank.

Some cars might throw a check engine light for a random misfire code. A fix that usually works is to throw the barometric pressure sensor out of range to stop the ECU from looking for a misfire. This is done by wiring

a 10K potentiometer in the baro pressure circuit and reducing the signal. ■■■

Automotosports (AMS)
 T: 847-709-0530
 W: www.automotosports.com

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630.801.1417
 Hahn Racecraft
 1981 D Wiesbrook Dr. • Oswego, IL 60543
 fax: 253.830.7558
www.turbosystem.com
www.hahnracecraft.com