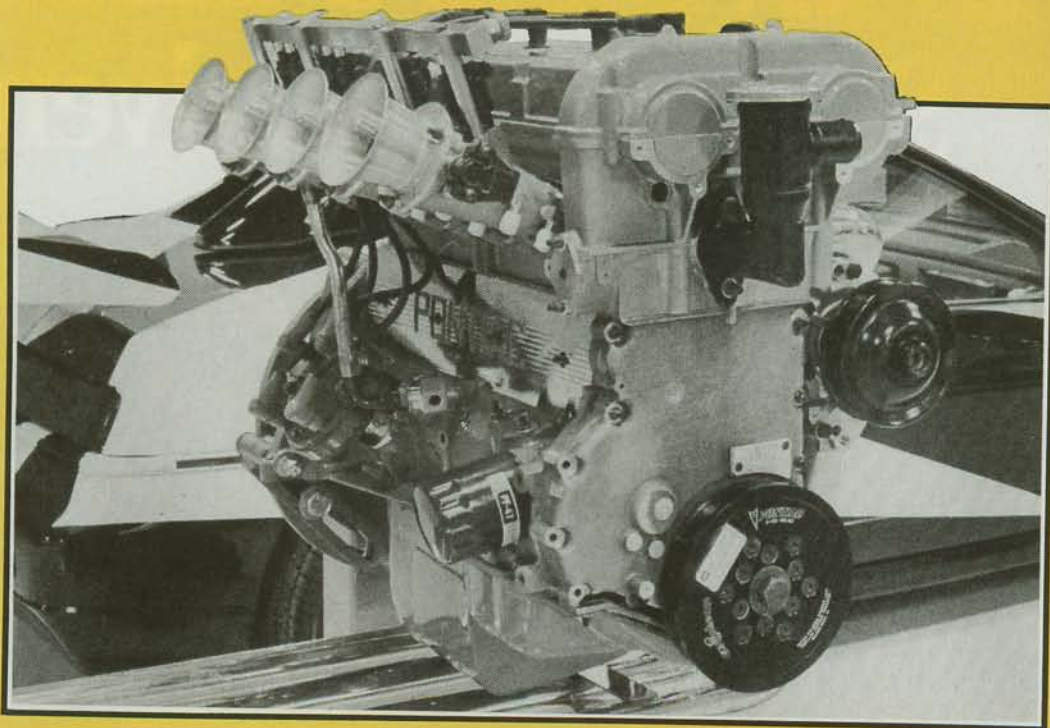


**TOP SECRET!**

# Formula Four Success

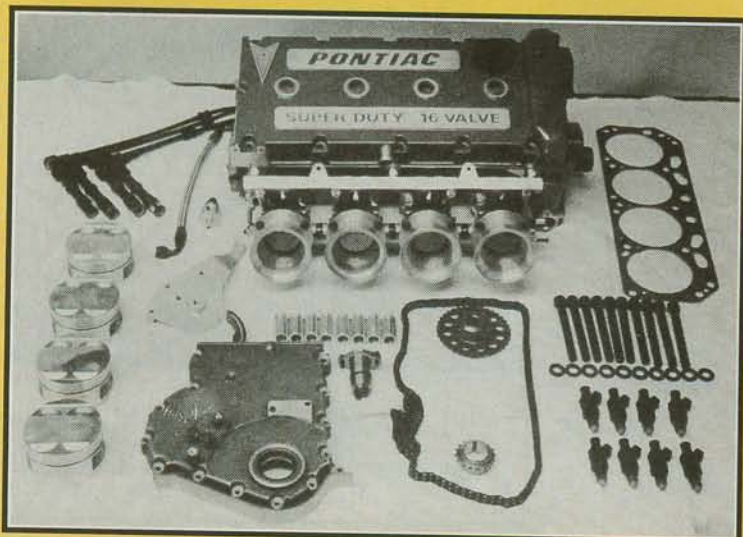
## PONTIAC'S HIGH-TECH, 16-VALVE HEAD FOR THE SUPER DUTY 4-CYLINDER ENGINE

By John Baechtcl



Pontiac's Super Duty 4-cylinder engine has established a formidable success record across a broad spectrum of motorsports competition. It has become the dominant powerplant in NASCAR's Charlotte/Daytona Dash series, IMSA's Camel Light GTP series, and is currently enjoying back-to-back national event wins in NHRA's tough Competition Eliminator. Super Duty engines hold records and/or national championships in IMSA GTU racing, hydroplane racing, midget racing, drag racing, and a variety of other motorsports activities.

*Pontiac's 16 valve Super Duty conversion kit can give your Fiero the kind of performance its styling implies. Kit includes all conversion hardware for existing Super Duty engines of the 2.7L and 3.0L variety.*



With this kind of success, it comes as no surprise that Pontiac would seek to maintain their position via an ongoing engine development program. According to John Callies, Pontiac's Manager of Motorsports for IMSA, NHRA, and engine development, current Super Duty oval track and road racing engines make about 330 hp, with as much as 350 hp on tap from a fresh powerplant that's been meticulously assembled. Drag racing engines don't have to meet long distance endurance requirements, so they can make 370-plus horsepower with more radical engine combinations. The

*The 16-valve Super Duty engine is a formidable-looking powerplant capable of producing 370-plus horsepower with unparalleled reliability.*

next obvious step in Pontiac's normally aspirated progression of power is their new Super Duty, 3.0L, 16-valve cylinder head conversion kit, an all-new cylinder head designed to give 370 reliable horsepower without having to build a radical engine combination.

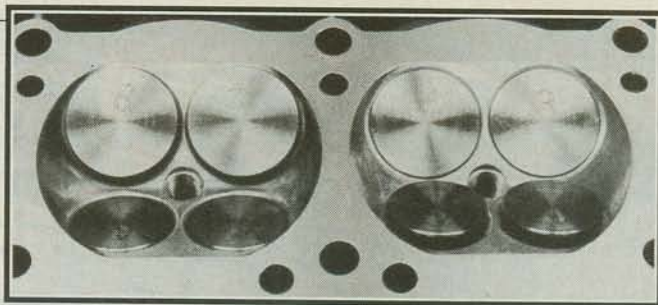
The new cylinder head was designed to combine the latest four-valve-per-cylinder technology with the bulletproof short-block assembly of the Super Duty engine. Pontiac's intent was to make it available in kit form so that racers and street machiners could purchase it and update their existing engines with a substantial horsepower increase. The head will come fully machined, but users will have to assemble the valves and cams along with the components that mate the head to the engine. These include a new, front chain-drive housing and cover—along with all the attendant sprockets and drive assemblies, new pistons with four-valve relief notches at the appropriate angles, the injector assembly, eight injectors, new head bolts, head gasket, and all the miscellaneous hardware required to complete the conversion. All components in the kit were designed for maximum durability in a high-rpm endurance environment.

The majority of dyno development work has been completed, and as we

## FORMULA FOUR SUCCESS

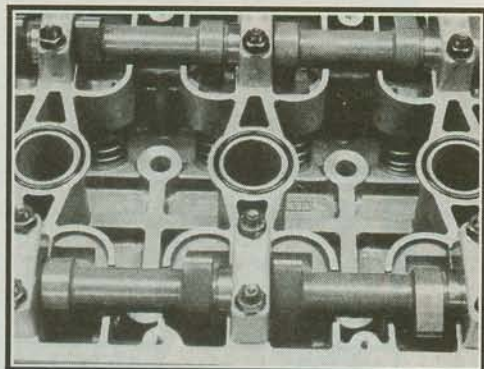
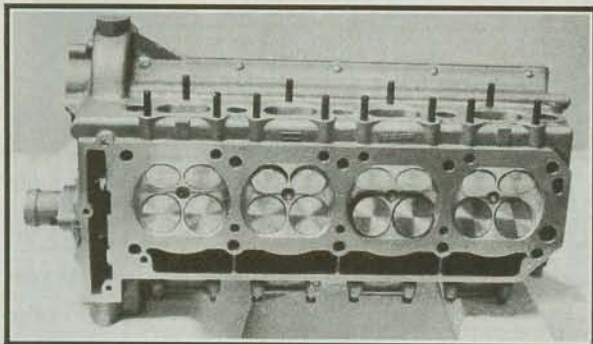
have shown in the accompanying article on Pontiac's Pro Street Fiero, the system has already proven its merit in a street and highway environment. Pending approval of various sanctioning bodies, the Pontiac cylinder head kit could very well see racing duty during the current season. With the same basic modifications, the head will fit stock Tech IV and Iron Duke 4-cylinder engines, but the power increase will make short-block durability questionable. New pistons would still be required, and it is likely that the increased power and rpm capability will exceed the limits of the stock crankshaft and connecting rods.

The Super Duty 16-valve conversion kit is yet another example of Pontiac's aggressive posture in today's high-per-

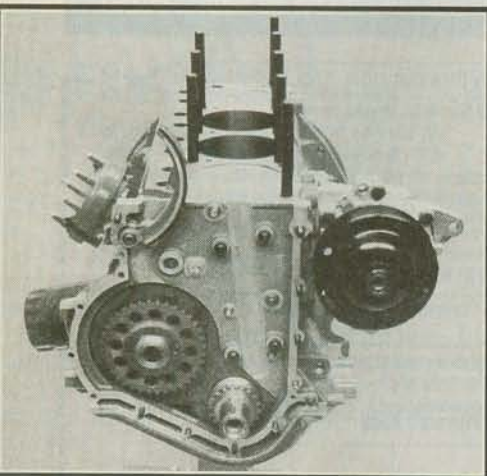


*Four-valve combustion chambers hold surprisingly large valves for a four-valve head. Intake valves measure 1.614 inches in diameter. This arrangement offers a 22-percent increase in intake valve area and a 35-percent increase in exhaust valve area over a standard Super Duty head equipped with 2.02-inch intake valves and 1.625 exhaust valves.*

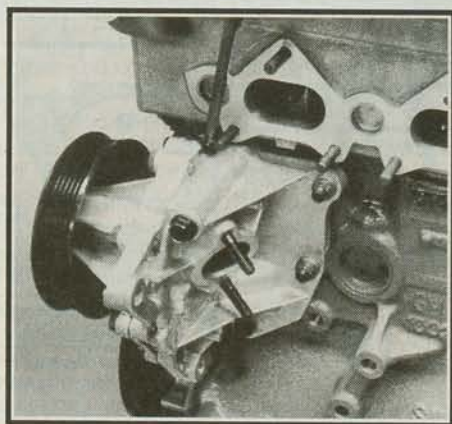
*New head requires minor modifications to the head gasket and cylinder block deck surface. Drilling for new water port at the rear of the block is necessary. Template dimensions are supplied with the kit.*



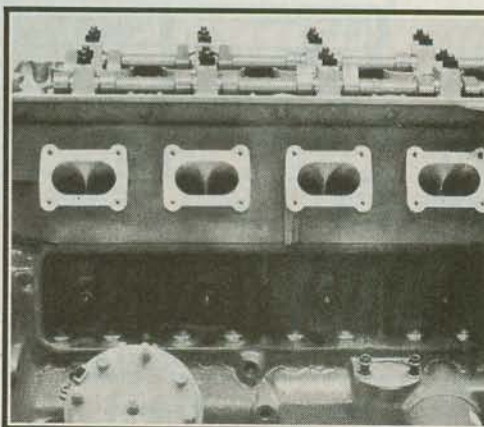
*Top view of the cylinder head with cam cover removed shows twin-cam arrangement and centrally located spark plug. Valve tappets ride in reinforced tappet housings.*



*Front view of engine with timing cover removed shows layout of sprockets for the chain-drive system. Kit includes special-length cylinder head studs, as shown.*

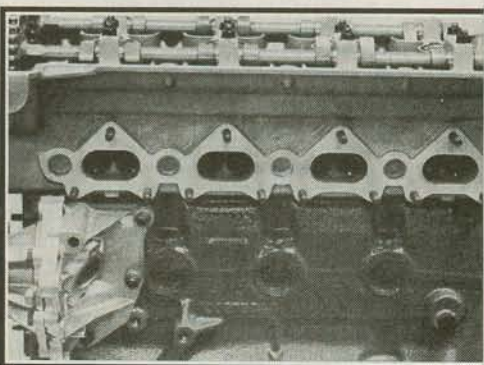
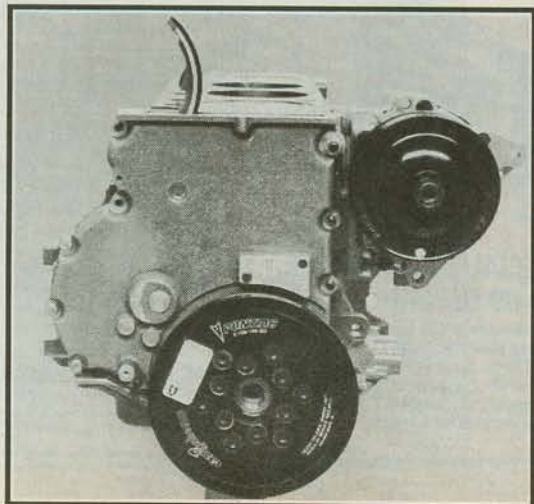


*Minor grinding on the Super Duty aluminum water pump is required to provide clearance for the front header flange and adapter cone.*



*Split and raised intake ports are equal length and flanged to accept the fuel-injection manifolds. Each throttle bore assembly is equipped with two injectors. The engine idles and runs at low speed on one injector per cylinder, with the second injector coming on line at higher engine speeds.*

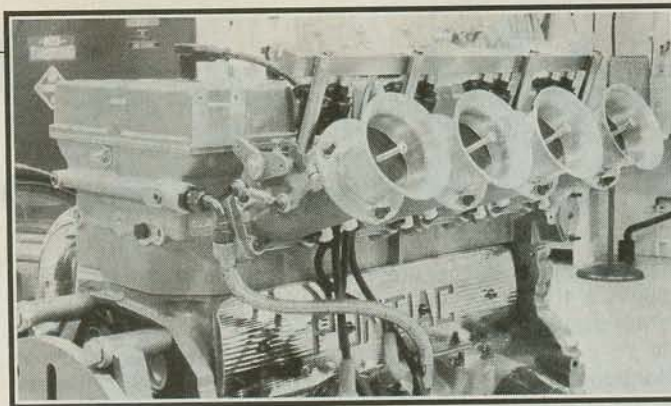
*With front cover in place, Fisher friction balancer with grooves for serpentine belt system is installed.*



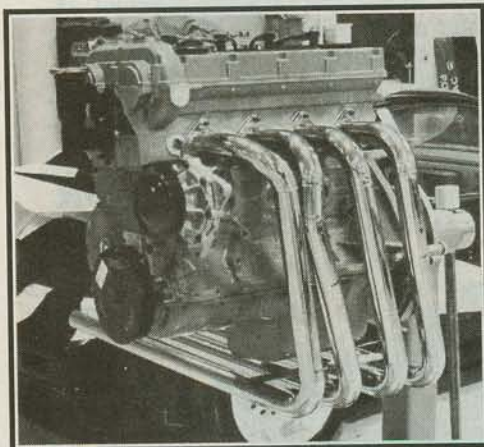
*Exhaust ports have a similar arrangement that requires special flange adapter cones.*

## FORMULA FOUR SUCCESS

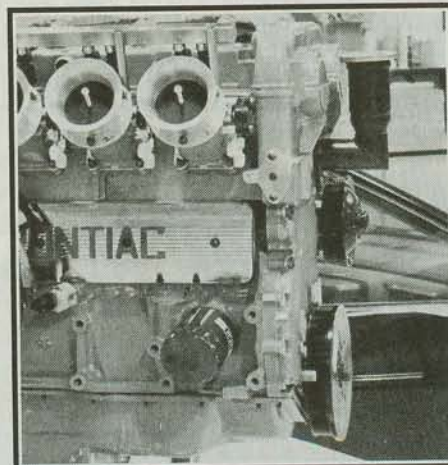
formance atmosphere. It makes the Super Duty engine one of the most powerful, normally aspirated 4-cylinder engines in the world, and it opens the door for current studies aimed at production applications. It also gives hot rodders a shot at some of the best-engineered hardware available. Capable of turning mild-mannered Fieros into 13-second street terrors, it strongly reinforces Pontiac's intent to provide contemporary racers and hot rodders with fully engineered performance parts for their cars. **HR**



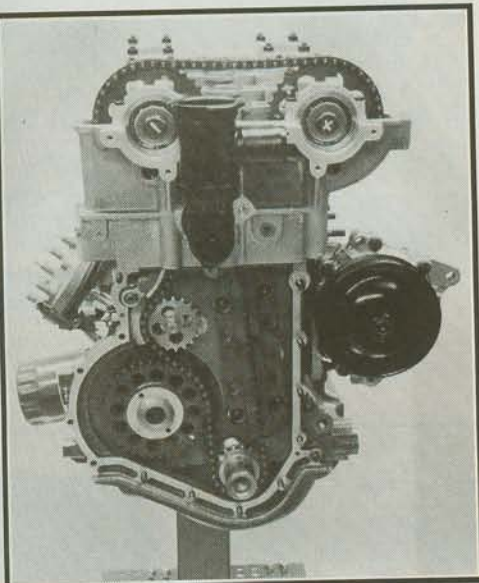
Rear view of assembled engine shows fuel-injector installation and routing of rear oil line for camshaft oiling.



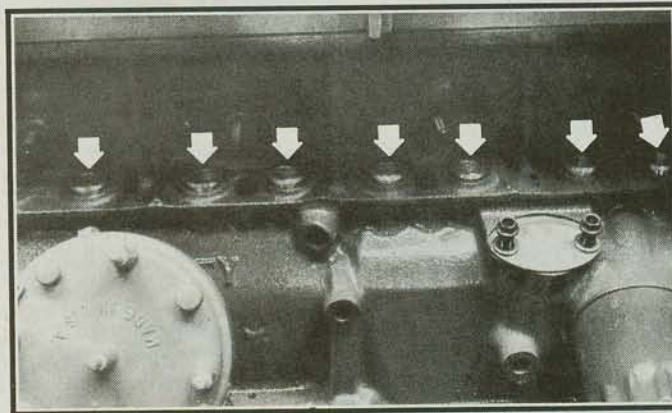
Exhaust side shows clean layout of header design. Production-style exhaust manifold would be relatively easy to package with this arrangement.



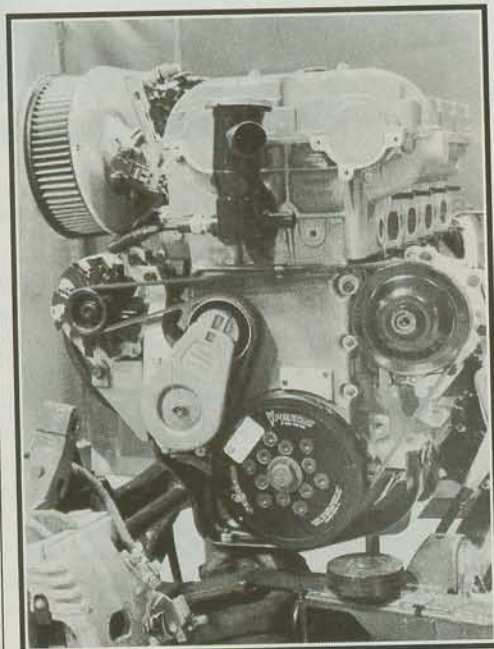
Side view shows how front timing cover assembly adds very little length to the engine.



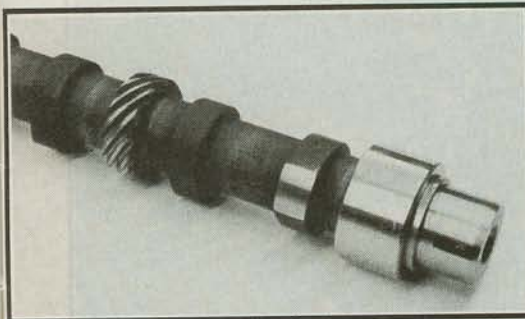
Complete head assembly installed on the short-block shows layout of sprockets and timing chain. Compact design is only slightly taller than current two-valve heads.



The kit provides eight special lifter bore inserts that are installed in the bores to seal the original camshaft oil gallery. The block is heated with a torch and inserts are installed while the lifter bores are expanded.



Sixteen-valve Super Duty engine installed on Fiero engine cradle for Pontiac's Pro Street technology demonstrator. Pontiac Motorsports fabricated various brackets to adapt serpentine belt system with belt tensioner.



A layshaft installed in the stock camshaft bore is required to drive the oil pump and the distributor. Note how lobes are ground off on this cam.

### PARTS LIST

PART NO.	COMPONENTS
KK0555	Cylinder head kit
KK0556	Carb/manifold kit (less carbs)
KK0557	Fuel-injection manifold kit

### SOURCE

Pontiac Motorsports  
(213) 534-1390