

# Cycle World MX Test

## DG YAMAHA 125 MX



Making the Monorocket suitable for pro racing is not cheap, but it's worth it.

**T**HERE IS AN AXIOM in racing that every serious competitor must follow in order to win. Very simply stated, you don't race a box stock machine. This is decidedly so in the rough and tumble 125cc motocross class. Once a breeding ground for young riders who lacked experience and the financial power to compete in the large categories, the one-two-five class has taken on a new look. It's now a high-powered racing class, where team racing is almost a requirement for winning.

Honda was essentially the first manufacturer to become seriously involved in 125 MX with the introduction of the Elsinore in 1973. Since then Suzuki and Yamaha have been developing and producing top notch machinery to compete with the CR series Honda. Competition is so fierce now that if new mods aren't incorporated into the design each year, the machine can be considered a loser on the race track. There can be no kidding when the green flag is dropped. He who has the best equipment and knows how to use it, wins. It's as simple as that.

But even with the computer-designed air forks, dyno-proven port timing and exotic metallurgy used in today's production motocrossers from Japan, a stocker will not win on National and local Expert levels. A top flight rider might win a couple of races in the Beginner and Intermediate classes at local events, but otherwise, no way. Trying to find the right combination can be tough. Ask the racer who wins what he has done to his motorcycle to make it go fast, and he will blandly respond, "Nothing."

*Outside appearance of the DG is much different from a stock YZ. Modifications include head, chamber, carburetor and Mototek CD ignition.*

We don't settle for that response. Instead, we went to DG Performance of Anaheim, California. DG is serious about the 125 class, serious enough to support two riders, Broc Glover and Dave Taylor. Broc rides a Honda, Dave a Yamaha. We were interested in the Yamaha, and how it stacks up against stock YZC and YZX Monoshockers.

The motorcycle we used for testing was Dave Taylor's practice bike, identical to his racer with the exception of the rear tire, a 4.60-18 Yokohama Super Digger.

Perhaps the major surprise was that there really is not too much changed from a stock YZC or YZX. The big secret, says Harry Clemm, who does the majority of research and development on the DG racers, is precise

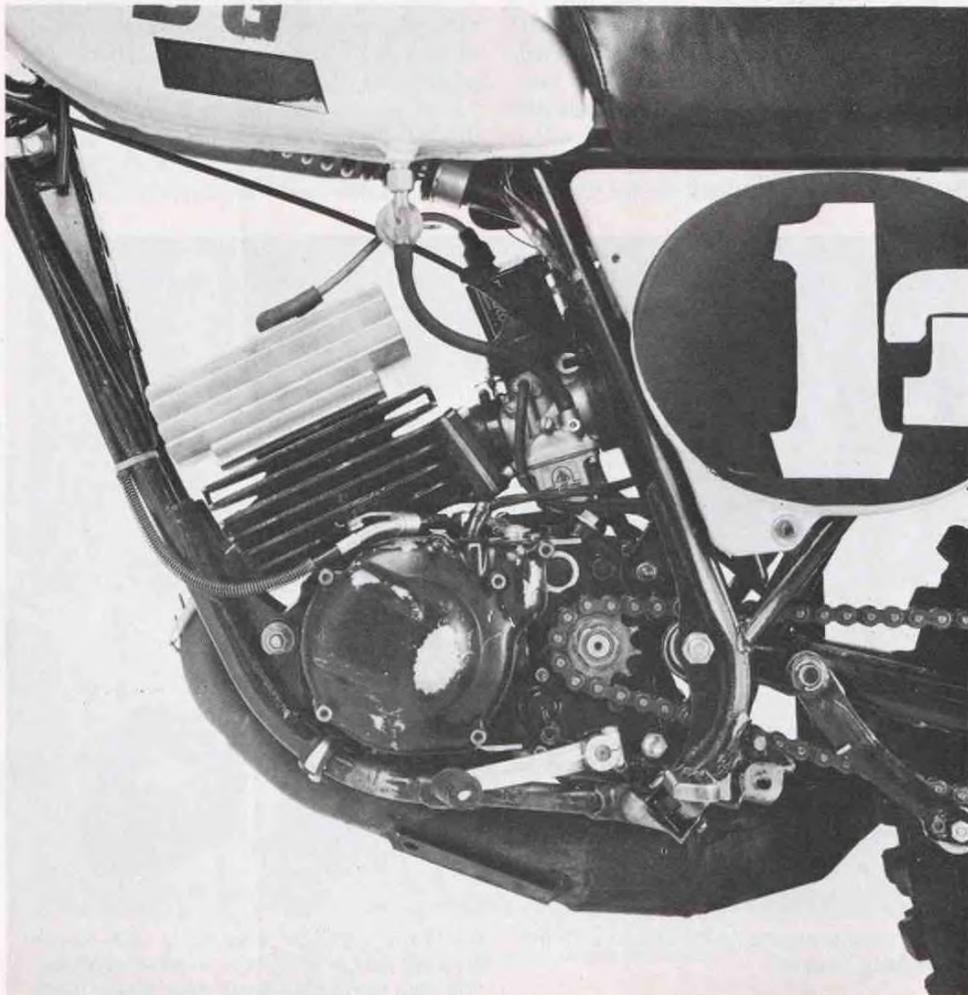
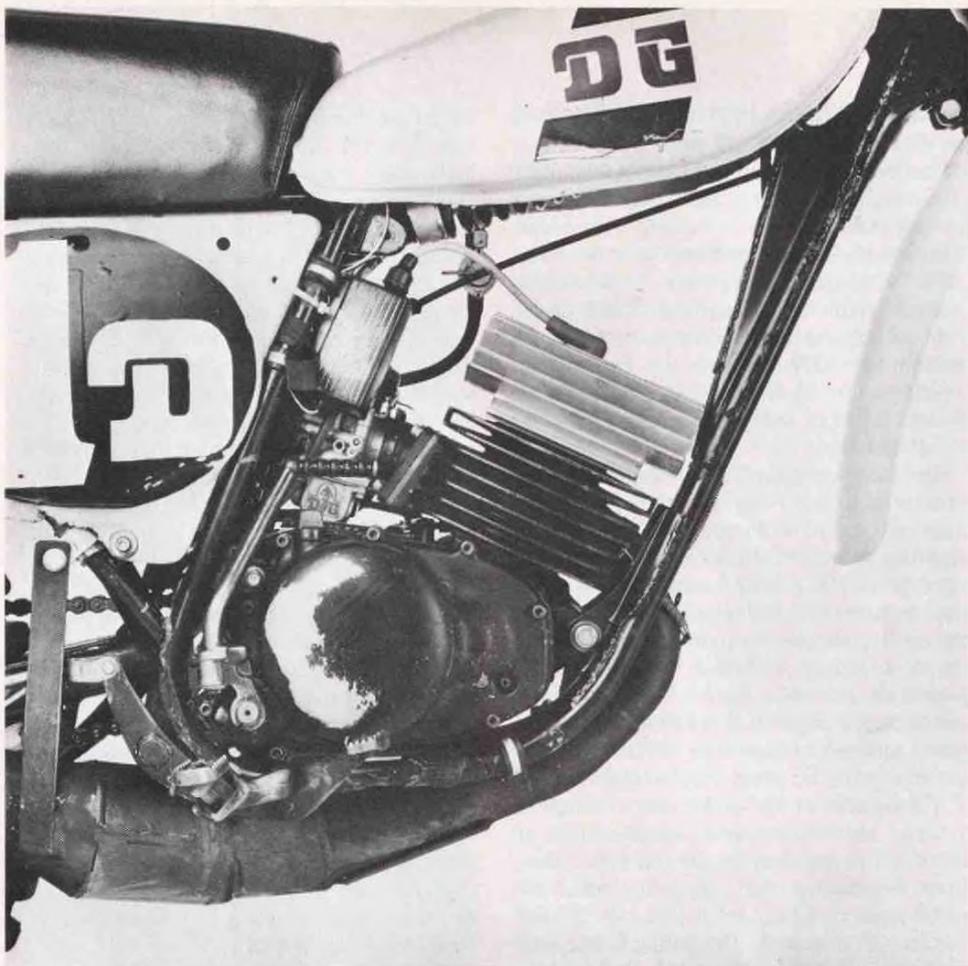


preparation. Everything must be done properly and methodically. No corners cut.

Sometimes a race can be won or lost at the starting line. The secret to winning there is horsepower. With that in mind, DG takes the entire motor apart and carefully blueprints each part for maximum efficiency. The piston retains its stock dimensions; no cutting the skirts for increased breathing. But for increased intake duration a hole is drilled in the piston, right in the middle of the rear skirt, matching up with the boost port that aims down into the crankcase. This hole/boost port combination allows an intake duration of 360 degrees, which is primarily usable because of the reed valve. When the piston is at BDC, the incoming fuel/air mixture continues through the hole in the piston. This aids in cooling the top end bearings and the piston crown. YZs are known to fade under high temperatures: this is a precaution to help eliminate that. DG has tried other methods to achieve this; one is cutting a slot about 2mm tall that runs the width of the intake port. Both methods work and will not weaken the piston. As a final modification to the piston, each of the four skirt corners is filed smooth. This is not a speed secret, but is a precautionary step to help maintain engine life. Pistons with unfiled skirt corners tend to carve grooves in the cylinder walls.

Other than matching the boost port to the piston and the transfer ports to the engine cases, there is no other port work done. The exhaust port is left untouched, except for cleaning and polishing of the walls and edges.

Exhaust port timing and configuration vary



between the YZX and YZC models, however, so DG did some R&D to find out which offers better power advantages. After much dyno and track testing, the C barrel seemed to suit their purposes. Yamaha raised and widened the exhaust port on the X model in an effort to gain more power. With it came a slightly narrower powerband. The X barrel can be brought back down to C specs by machining 0.030 in. from the base of the cylinder. Two head gaskets are called for to maintain proper compression and piston-to-head clearance.

Because operating temperature is very critical in a small engine, cooling is never overlooked. DG's aluminum radial head design has proven efficient in maintaining favorable operating temperature through a 45-minute moto. The 17-fin radial head increases the cooling surface by about 25 percent over the stock design. A shallow relief around the perimeter, known in the trade as the squish band, protects against detonation. As a safeguard against air leaks, head and base gaskets are changed after every race weekend.

Taking care of the intake side of things is a 32mm Mikuni carburetor, more suitable to the small motor than the 34mm that comes from the factory. All jetting and other internal parts have been track-tested by DG for use on all YZ models. The jetting is intended for a 20:1 mixture of Castrol R. Some riders prefer a 40:1 ratio of their favorite oil, but forget to change the main jets. A 40:1 mixture increases the amount of fuel delivered to the engine. This means the main jet size must be reduced in order to compensate for the richer fuel mixture.

The YZC comes with a 30mm Mikuni. DG sells an intake manifold needed to adapt

the larger 32mm carb to the engine. The YZX manifold will fit the 32mm body, as both carbs share the same body.

At the exhaust end of the motor, a special low pipe, with a triple-stage expanding header, is used. Working in unison with a header is a two-stage reverse cone. This design helps maintain high engine horsepower without sacrificing much low end. The large diameter exhaust flange incorporated into this system helps the tiny motor breathe better. A silencer is designed into the system in order to meet AMA noise requirements for racing.

Almost all of the popular 125 motocrossers have a built-in ignition retard at the end of the rpm range. This helps keep young, exuberant riders from over-revving the motor. This is a detriment for racing, as the retard begins to cut power at about 6000 rpm. Power for a competitive 125 motocross engine begins at 7500 and can continue up to 12,000. To get around the retard, DG installs a Mototek CDI ignition system. The Mototek CDI easily adapts to the stock wiring on the YZ. All the owner need do is match the color-coded terminals from the Mototek CDI to those of the motorcycle. The Mototek CDI eliminates the brainbox and ignition coil of the motorcycle, enabling the engine to have full spark at high rpm.

A common problem with YZ racers is shifting mechanisms becoming faulty in a race. Riders constantly complain about missed shifts. This is caused primarily by mechanical slop within the shift linkage. About the only way DG has found to correct this is to use a Yamaha rebuild kit. Available from just about any Yamaha dealer, the kit includes three important replacement parts:



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### SPECIFICATIONS

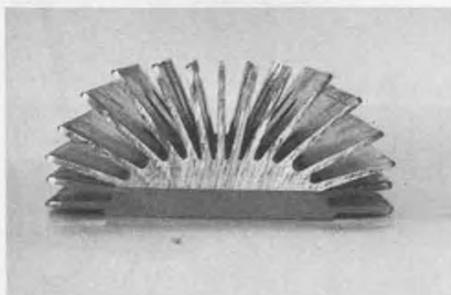
List price	.....	\$2000
Suspension, front	.....	telescopic fork
Suspension, rear	.....	DG swinging arm, Monoshock
Tire, front	.....	3.00-21 Metzeler
Tire, rear	.....	4.60-18 Yokohama
Engine, type	.....	two-stroke, reed-valve Single
Bore x stroke, in., mm	..	2.21 x 1.97; 56 x 50
Piston displacement, cu. in., cc	..	7.51; 123
Compression ratio	.....	7.5:1
Actual bhp @ rpm	..	23.93 @ 11,500
Actual torque @ rpm lb.-ft.	....	10.09 @ 10,500
Piston speed @ rpm ft./min.	...	3940 @ 12000
Carburetion	.....	32mm Mikuni
Ignition	.....	Mototek CDI
Oil system	.....	pre-mix
Oil capacity, pt.	.....	oil in fuel
Fuel capacity, U.S. gal.	.....	1.0
Recommended fuel	.....	premium
Starting system	.....	primary kick, folding crank
Air filtration	.....	oil-wetted foam

### POWER TRANSMISSION

Clutch	.....	wet, multi-disc
Primary drive	.....	helical gear
Final drive	...	#520 single-row chain
Gear ratios, overall:1		
6th	.....	13.078
5th	.....	14.292
4th	.....	16.269
3rd	.....	19.460
2nd	.....	24.191
1st	.....	31.763

### DIMENSIONS

Wheelbase, in.	.....	55.7
Seat height, in.	.....	33.8
Seat width, in.	.....	6.5
Handlebar width, in.	.....	33.5
Footpeg height, in.	.....	12.2
Ground clearance, in.	.....	10.5
Front fork rake angle, degrees	..	31.5
Trail, in.	.....	5.51
Curb weight (w/half-tank fuel), lb.	..	191
Weight bias, front/rear, percent	.....	46/54



To help reduce engine heat buildup, a 17-fin radial head is used.



For more efficient breathing, the larger exhaust flange at right is used in conjunction with the triple-staged downswept pipe.

the shift drum (part number 1G8-18140-00), the detent arm (1G8-18541), and the shift arm stopper (537-17000-09).

After the engine has received its face lift, the frame gets the once-over. Although Yamaha has one of the best production-based motocrossers, the bike does have faults. First area for improvement is the front forks, on both the C and X models.

The YZX comes with Kayaba air forks. Although air offers better preload adjustment, it does not compress evenly. Expert motocrossers generally don't like air forks for this reason. DG advises experts to discard X model forks in favor of the C forks, which have conventional springs. In order to equip the X model with the C forks, the triple clamp must also be replaced. The C forks measure 34mm in diameter, as compared to the larger 36mm X forks.

The C forks are modified to increase preload. This is done by removing the preload insert and replacing it with DG's preload springs. Two will generally be sufficient, but for heavier riders, or a severely bumpy track, three are inserted. Air fork caps are used in place of the C caps. By using air, the preload can be more precisely set. Air pressure should be set at 5-15 psi, again depending on prevailing track conditions.

The Monoshock concept has proven one of the best designs for motocrossing. Yamaha has spent many hours engineering the design, so it becomes a matter of making sure the part doesn't fail during the race. DG dismantles each Monoshock unit for inspection. Yamaha's rebuild kit is used, along with careful reassembly, for blueprinting. Yamaha fork and shock oil is used, because DG believes the Yamaha product is superior to any



#### PARTS PRICING

Porting and Polishing .....	\$90.00
DG Racer Pipe .....	49.95
17-Fin Radial Head .....	39.95
32mm Mikuni Carb (jetted) ....	36.95
YZC125 Jet Kit .....	21.50
YZC125 Manifold Adapter .....	14.95
Air Boot .....	5.95
Air Fork Adapter Kit .....	15.95
Booster Springs, Front Fork (per pair) .....	4.95
Plus 1 Chrome-Moly Swinging Arm .....	127.50
4.10-18 Yokohama Super Digger .....	31.95
Sprocket Kit with Chain .....	42.95
Aluminum Gas Cap .....	8.95
Air Box with Phase II Foam Filter .....	39.95
Clutch Springs (heavy duty) ....	6.95
DG GP Seat Kit .....	24.95
Polypropylene Fender .....	8.95
DG Racer YZC125 (complete)	2000.00

aftermarket oil for this application. Oddly enough, many dealers don't carry it, as most customers prefer their favorite aftermarket brand. Part number for the Yamaha fork oil is ACC-11001-28. Specify 20- or 30-weight.

To improve handling and reduce weight, DG builds a chrome-moly swinging arm the same length as the X model's, which is one inch longer than the C's swinging arm. The extra length helps when landing from jumps and at high speed through the rough stuff. The DG arm is two pounds lighter than the stock arm; and that's unsprung weight, so handling is helped a bit all the way around.

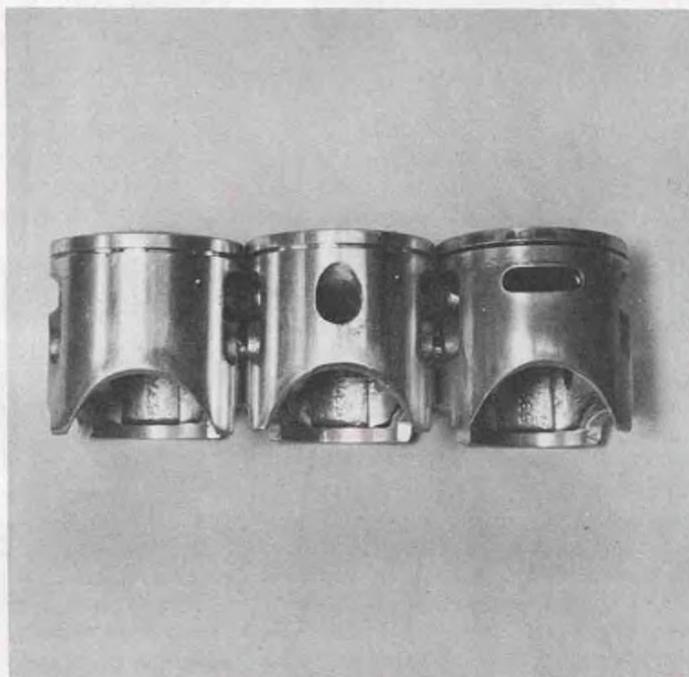
Because they are lightweight and very rugged, D.I.D. rims are retained on the team racer. The selection of tires differs from stock. A Metzeler 3.00-21 is standard up front. The rear is a matter of choice. Most DG bikes have a 4.10-18 Yokohama Super Digger. Our test bike had a 4.60-18 Super Digger that Dave Taylor seemed to prefer. The biggest question at the time was whether the engine could produce the power to pull such a large tire. It does. Pressure varies with each track, but 13-14 psi front and 15 psi rear is a good starting point.

YZ Yamahas are known for their reluctance to start until the rider masters the technique: Turn the piston to TDC, then kick down quick and hard. If everything is done right, it fires first time. Use of the Mototek CDI doesn't help starting either, as engine rpm has to be above 1000 before it works.

Once running, the motor seems tame . . . for a racer. Rolling the throttle slowly, the engine speed builds up without fear of loading up the plug. Off-the-line starts are something else. Following standard operating procedure with any 125, the engine must be brought to



These parts with a 32mm Mikuni and down-pipe will help any YZ125 become a potential threat in local motocross.



Piston on the left is stock. Middle and right pistons have the extra hole for added intake duration.

full power. The clutch is then released and rapid shifting up through the gears is begun. Any skilled rider can get the holeshoot at local motocrosses thanks to the machine's abundant top-end power.

Use of the Metzeler front tire enables the YZ to be pushed into a tight corner with very little trouble. The front end will wash out but not as badly as YZs fitted with the stock Dunlop tire.

When making a jump, the bike lands very gently. The extra preload on the front forks, the blueprinted Monoshock and the large 4.60-18 rear tire have much to do with this.

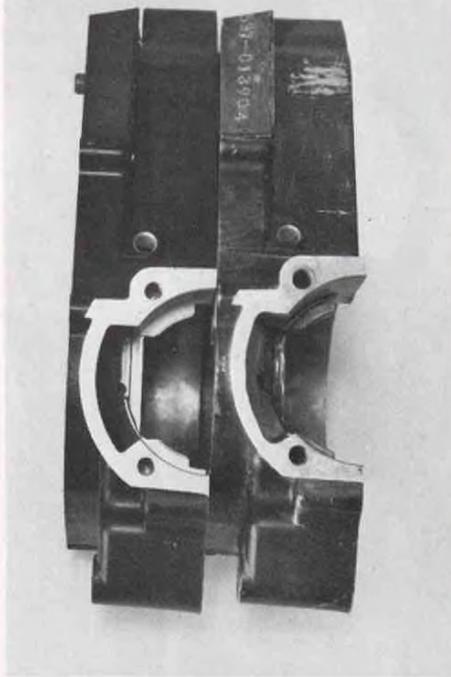
Even with the rebuilt rear shock absorber, however, damping eventually fades. Overheating is a common problem with many motocrossers; this bike is no exception. Rebuilding the rear shock only extends the length of time it stands up to the continuous beating of jumps and ruts.

We experienced no difficulties with the shifting. The modifications to the shift drum and arm were probably to thank. Our YZC test bike from a year ago didn't give us too much trouble either, however.

The DG Yamaha, then, is a bike on which an expert can win. The primary reason is the extra power extracted from the engine via

*The shifting arm stop on the right is included in the Yamaha shift kit. Roller bearings help prevent it from sticking.*

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*Matching up of transfer ports to the cases is a very critical step in helping the YZ engine breathe better.*

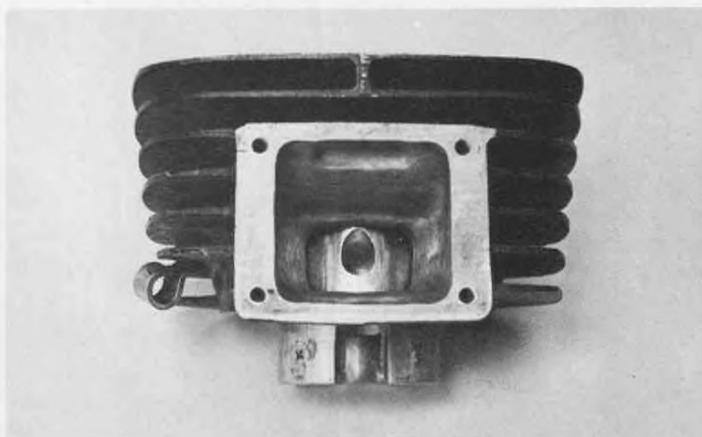
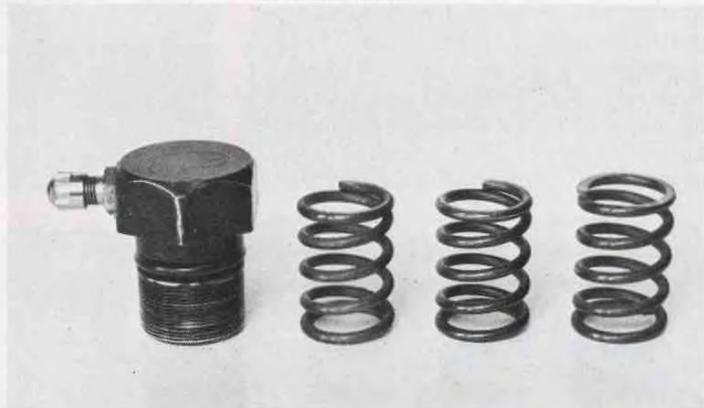
blueprinting and changing the ignition to eliminate spark retard at high rpm.

Handling is better than stock, but not radically different. The front tire and extra power do keep the front end from pushing as badly in tight turns. The reduction in swinging arm weight allows the Monoshock to control wheel movement more precisely and for a slightly longer period of time. In other words, in 20- or 30-minute motos, or on smooth tracks, the rider will have good control over whoop-de-dooos and braking bumps until the end. In a 45-minute moto, he'll have to fight the machine; because when damping goes, the rear end hops from side to side and once in a while you find yourself landing on the front wheel.

All the modifications listed here are available to the public. A racer can modify his machine in stages, beginning with a pipe and radial head and ending with port work and a carburetor. When he is ready to challenge the front runners, some of the suspension changes can be made.

For the impatient racer, a complete machine identical to our test bike can be purchased. Total price is an even \$2000. DG Performance is located at 5552 La Palma Ave. East, Anaheim, CA 92806. 

*These three preload springs and the air-fork cap enable the rider to adjust preload to suit track condition.*



*An inside look at the piston shows how the added hole enables the incoming fuel-air mixture to continue even with the piston at BDC.*