YAMAHA STRIKE FORCE

- 650 Turbo
- 750 Maxim
- 550 Vision

These Three Bikes Lead the Assault in Yamaha's Bid for No. 1

In the last four years Yamaha has emerged as the most innovative motorcycle company in both marketing and technology. That's no small distinction when the competition includes Honda, Suzuki, and Kawasaki. Their success has to do with anticipating what people want, and then delivering it before anyone else . . . sometimes even before the people themselves know they want it.

The trend goes way back. Yamaha popularized automatic oil injection in two-strokes when no one was complaining about having to mix gas and oil. In 1978 they took an idea from Kawasaki—custom-styled street bikes—and built a whole line of Specials which made them a fortune, gave the industry a shot in the arm and are now available from every company in every displacement. Yamaha was the first to expand shaft drive beyond the touring market and the first Japanese manufacturer to build a V-twin, the 750 Virago.

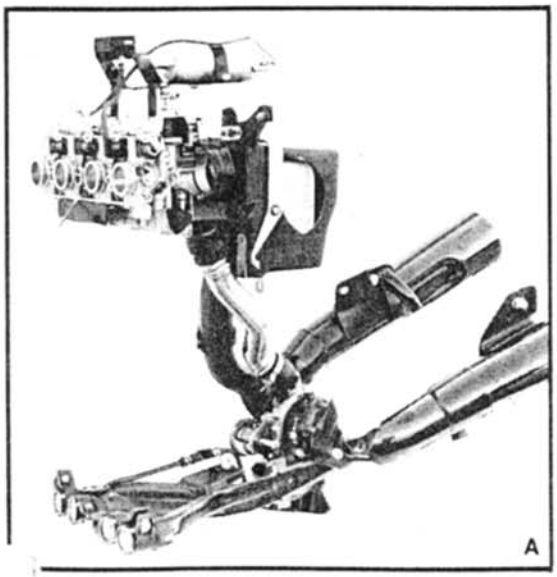
"We have a theory that the market must be stimulated every year to attract new blood," says Ed Burke, Yamaha's Product Planning Manager. To determine what stimulation will work best, Yamaha relies heavily on market research techniques that they have pioneered. "We go out to the public with all kinds of drawings," says Burke, "and we ask: 'Do you want a motorcycle like this, or this, or this?' Then we have plastic overlays that show their selection with different colors, accessories, or wheels, and we hone it down even further."

A big survey in 1979 revealed that 15 percent of the people polled wanted an air-cooled V-twin, so Yamaha built the Virago and it became a runaway best seller. Not many people requested a computer on their motorcycle, but Yamaha built one anyway. Their uncanny knack of anticipating needs proved right again.

HOT ROD visited Yamaha in Japan to ride the three most important models for '82 on the factory test track (impressions appear on the following pages). We learned first-hand how the market research is translated into hardware. Engineering teams, using American-made Computer Aided Design (CAD) equipment, hammer out the drawings with a "constant preoccupation of how it will look." Yamaha is the strongest believer that styling and appearance motivate buyers as much as performance. Consequently, Yamaha employs a sophisticated industrial design consultant to work with them on styling. The consultant, GK Associates of Tokyo, rhapsodizes over the art of design in their literature. GK says in fancy language what hot rodders have known for years: a careful blend of show and go is what makes a balanced, integrated machine. An owner cannot truly love his machine if it's great looking but slow, or if it's a banshee, but covered with bruises from the ugly stick.

"The dream invested in this year's models," say the GK design consultants, is to achieve the "Super Mechatronics Fantasy," which is styling so piercing that it projects the bike's latest technology with visual aesthetics; and to achieve "Man-Machine Symbiosis," which is styling so beckoning that it does not seem complete without a rider.

This kind of philosophy, with the technology and race wins to back it up, is why Yamaha is nipping at the heels of mighty Honda for the market share lead in America; why Yamaha Motor Company, founded only 27 years ago as a division of Nippon Gakki, a musical instrument maker, last year had worldwide sales of $2.3 billion, profits of $46 million and builds another bike every 3.4 seconds. Super Mechatronics Fantasy is what hot rodders have in place of white blood cells. Yamaha is seeking to touch this passion, opening the door with horsepower, double disc brakes, and 18-degree valve angles, then seducing the very psyche with Mechatronics and Man-Machine Symbiosis.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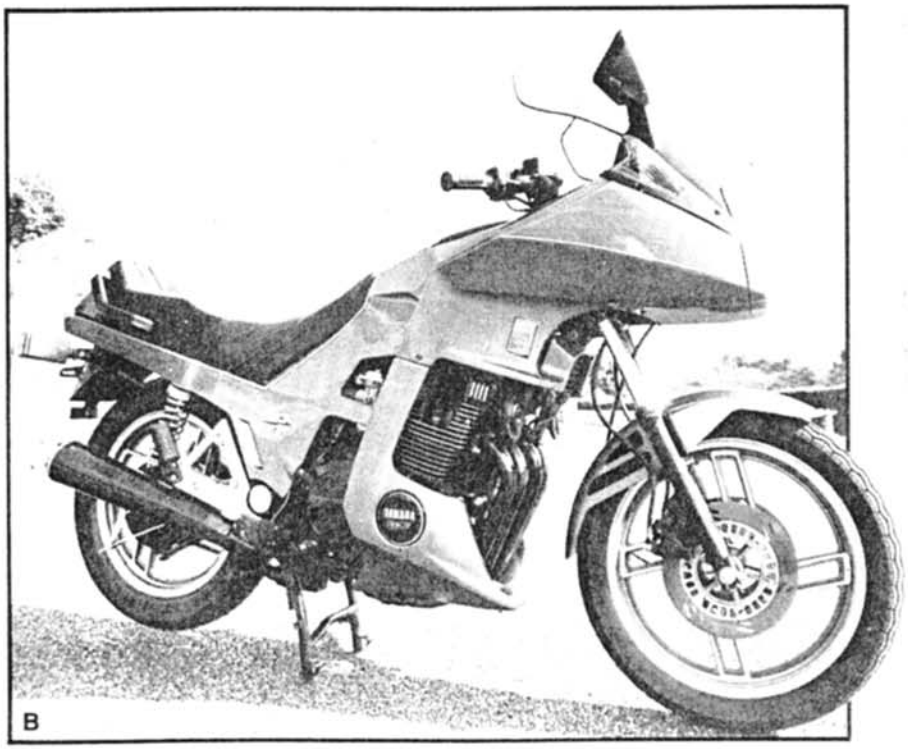
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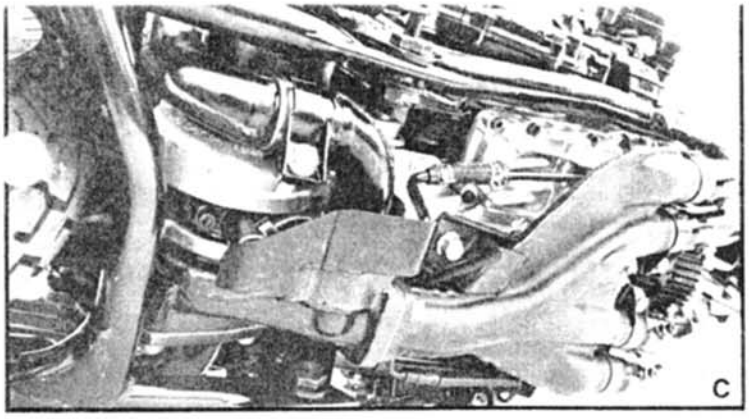
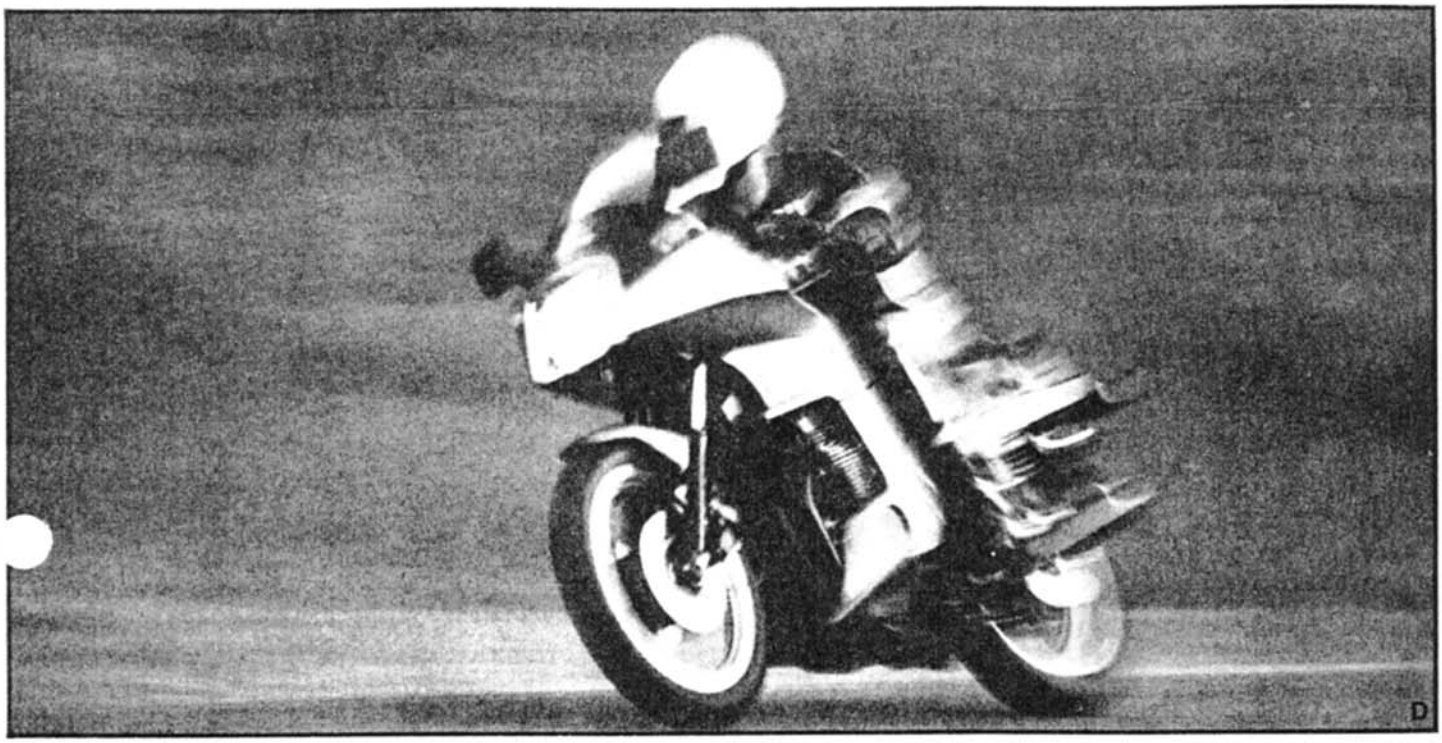
The world's smallest turbo (39mm) is nearly hidden by all its plumbing. The black pipe brings air from the air box to the turbo, which compresses it and routes it to a storage (surge) tank behind the carbs through the silver pipe. All this apparatus takes up the room normally used for monoshock suspension, which is why the Seca Turbo has dual shocks. The Mikuni CV carbs are 30mm; compression is 8.2:1.



C/D

The turbo nestles under the engine just in front of the rear tire. The four pipes siamese into a single nozzle aimed at the turbine blades. Hot exhaust gas (800 degrees C) spins them about 40,000 rpm at idle and up to 210,000 revs at full boost, which is a conservative 7 pounds. Excess boost pressure is shunted through a wastegate and out the rear pipe on the right side. We would guess the Seca Turbo will run about 11.6 seconds at 115 mph in the quarter-mile. For HOT ROD's tester (below) it zipped 130 mph on the Yamaha test track in Japan. The bike weighs about 535 pounds wet, has electronic ignition, five speeds, shaft drive, super-light cast wheels, dual front discs, and a sinister look that says "Don't mess."



650 Turbo

The era of the turbo is here. After years of thankless droning on airplane engines and diesel trucks, turbos are in the technology limelight as they generate massive amounts of extra horsepower for today's smog-choked cars and motorcycles. The word has a magic ring that connotes special powers. And the mechanism itself seemingly has them. The frantic spinning blades on the XJ650 transform the Yamaha into a screaming banshee that thinks it's an 1100. Thanks to some engineering breakthoughs, however, the bike doesn't lose a bit of its old personality and easy-going rideability until the boost gauge begins to stir at 5000 rpm. A thousand revs later, Reggie Jackson's bat hits you in the rear end. Your heart beats past redline. Your grip tightens and the only noise left is the wind.

The purpose of this bike is to bring that ·ling to a middleweight machine which re- s superior mileage, agility, braking, and aerodynamics. Who needs a turbo on an XS Eleven? But it would be nice to have that power on a 650.

The XJ650 has the best turbo installation yet on a motorcycle. Aftermarket kits have been around for ten years, but they're hard to tune and they rob rideability. The brilliantly engineered Honda CX500 Turbo we tested last October suffered from too much weight and too much turbo lag. The Yamaha is 40 pounds lighter and practically lag free.

The turbo hides in a cranny deep behind the engine, just a few centimeters in front of the rear tire. In this location the exhaust system which drives the turbo can be routed normally. No fat turbo pipes are necessary to hug the bike's midsection or to add heat to the engine, burn your leg, destroy aerodynamics, or replace the desirable and traditional look of four-into-two exhausts. Plus Yamaha wanted to retain four standard carburetors (rather than fit expensive fuel injection) so they needed the space behind them for an air box and surge tank. Once you concur with Yamaha's claim that the turbo isn't vulnerable so close to the rear wheel, and still works fine covered with mud or water, the location seems logical, especially since the system, and the bike, works so well.

Air compressed by the 39mm turbo (built to Yamaha specs by Mitsubishi) travels up a long pipe to a surge tank bolted to the carburetor intakes. At low revs, when the surge tank is not fully pressurized by the turbo, a reed valve between the surge tank and air cleaner opens, so the carbs draw all the oxygen they need for instant throttle response directly from the air box. This is how Yamaha rendered the lag problem inconsequential on the 650.

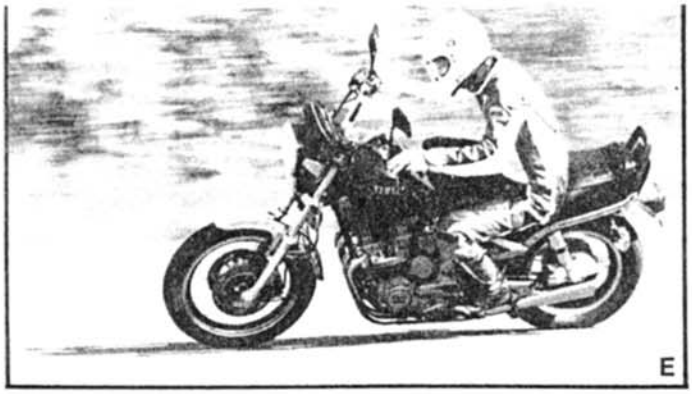
A computerized knock sensor on the front of the engine automatically retards timing should detonation occur as is common in turbo systems. A further safeguard is a poppet valve in the surge tank which acts as a back-up wastegate should maximum boost pressure of seven pounds be exceeded. Because the carburetors are sealed against outside atmosphere so turbo pressure can't escape, the 650 has a fuel pump driven by a cable off the camshaft. Finally, the entire engine has extra lubrication and beefier internals to handle the monstrous 85-hp rating with reliability.

Yamaha is especially proud of achieving impressive styling within the No. 1 priority of effective aerodynamics. The fairing cuts wind lift on the front wheel by 10 percent over a similar 650 without a fairing and delivered stable sailing for HOT ROD along the test track straight at an indicated 130 mph.

Naturally the turbo is expensive, $4999. That's due in part to the tiny turbo itself (this is the world's smallest). We have no price on the XJ turbo as a spare part, but an Audi car turbo lists for $1990. The 650 also sports the usual Seca features, including a computer monitor system.

Who will buy the turbo? Anyone who wants a fine-handling 650 and a pavement curling superbike, but only has room in the garage for one motorcycle.

STRIKE FORCE



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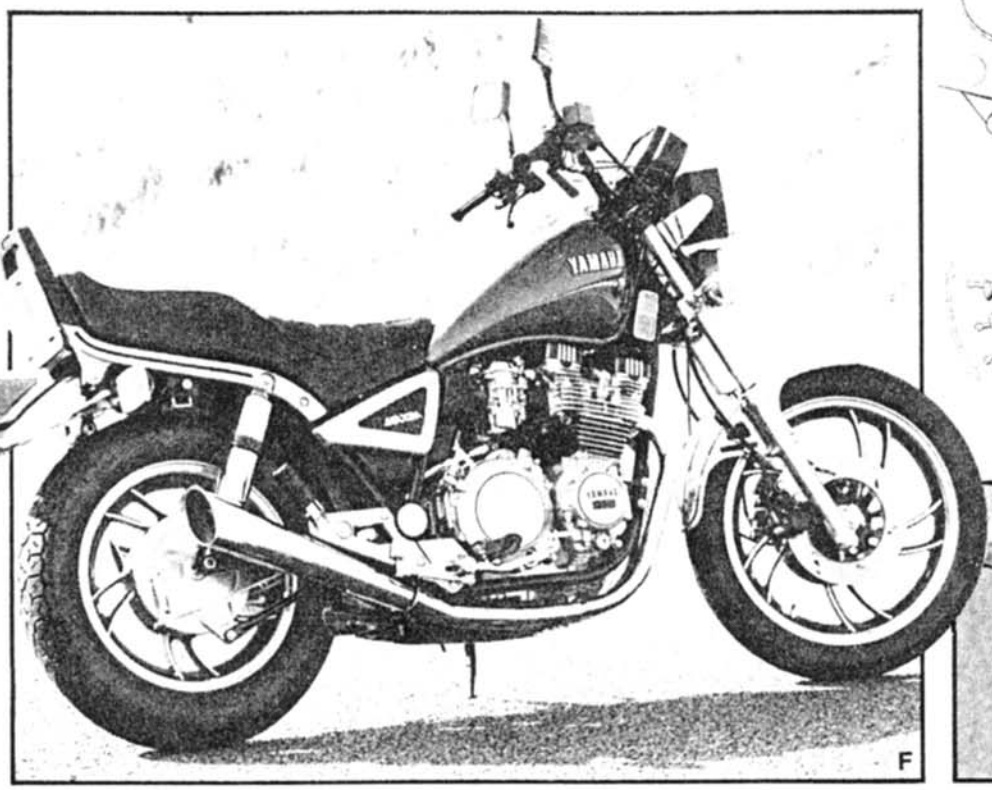
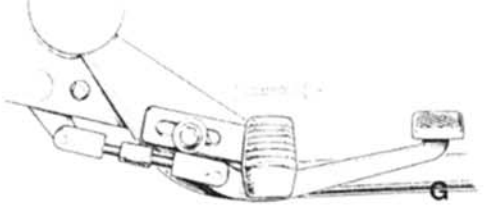
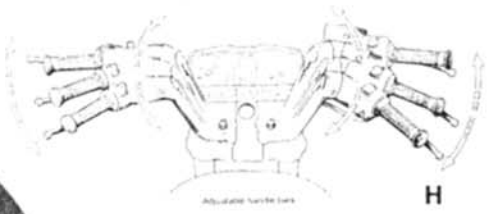
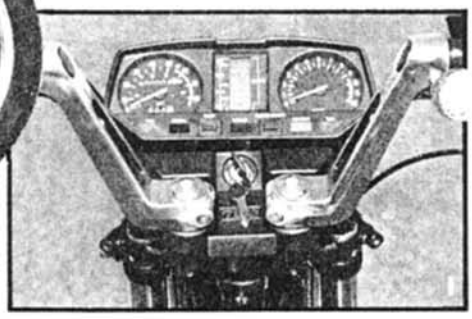
Like most Yamahas, the Maxim is a child of market research. Focus groups voted on scimitar wheels and teardrop tanks before Yamaha built them. Adjustability is a major new feature on the 750 Maxim. The footpegs move forward and back (below), and the bars can be made to fit anyone without marring the Maxim look. The engine has four 32mm Hitachi CV carbs, electronic ignition, double overhead chain-driven cams, and a forged crank. We estimate a 12.5-second quarter-mile at somewhere around 105 mph. Mileage should be 42-45 mph. The tank holds 4.5 gallons, the seat height is 30.7 inches, and we calculate the wet weight at approximately 520 pounds. High-speed cornering (left) proved the best yet for a Maxim-styled Yamaha.





Adjustable brake pedal





750 Maxim

This year all the original Yamaha Specials are gone. They've evolved into Maxims, a different name for the chopped look that has run away with motorcycle sales. The 750 is the newest and most advanced Maxim. It's especially important because it brings this type of styling closer to the performance and comfort levels of standard-type motorcycles.

Back in 1978 when the Specials were introduced, they achieved a quasi-chopped look with leading-axle forks, a fat rear tire, teardrop tank, shorty megaphones, a stepped seat, and pull-back bars. These changes put the rider in a cool slouch which was great for cruisin', but not so hot for canyon carving. Therein came most of the criticism, the riding position detracted from handling in the twisties and took its toll in comfort over the long haul. The main culprits were the buckhorn bars and forward-mounted footpegs.

On the 750, Yamaha has revived a once-popular British practice by making the handlebars and footpegs *adjustable*. This simple concept, well-executed, lets the owner custom fit the bars and pegs to his personal liking without disturbing the lines of macho styling. Some Special purists may prefer the smooth, flowing bends of a tubular bar to the forged struts of the 750 Maxim, but ask them which version they prefer after 100 miles in the saddle. Other subtle chassis changes join adjustability in making this Maxim the most comfortable and sporty Yamaha Special of all. You can even feel confident with sparks flying off the footpegs.

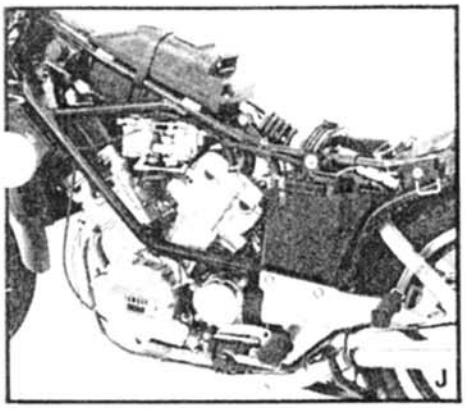
One of the chassis improvements is an air fork with an equalizer tube so both legs share a common air supply. This eliminates the hassle of filling the tubes individually and ensures a balanced pressure on both sides. Large, knurled knobs on top of each leg control the damping force adjustment so you can quickly dial in damping to suit road conditions or load. The rear shocks also have spring and damping adjustments and work well, but we prefer the machine-like looks of an exposed spring to Yamaha's tacky chrome cover.

This is the first Maxim to displace 750cc. It joins the original 650, a 550, an 1100, and a 400 that's also new this year. The engine is not simply a bored-out 650. It's got a different bore and stroke, its own crank, hotter cams, and a lot more punch. The factory claims a 12 horsepower increase, from 64 on the 650 to 76 on the 750. The power runs through a 5-speed tranny and shaft drive.

Yamaha is spending a ton of money on R&D to reduce the rise-and-squat effect of shaft drive on the rearend. They have isolated six elements that contribute to the problem: (1) length of the shaft, (2) ratio of the bevel gears, (3) angle of the swingarm, (4) location of the swingarm pivot, (5) position of the shock damper (at the transmission or in the rear hub), and (6) type of suspension, whether dual shocks at the rear wheel or monoshock under the tank. The right combination of these elements reduces shaft effect considerably. In this regard monoshock suspension is better than dual shocks, so the Maxim isn't as smooth as the single-shock 550 Vision, but it's far less intrusive than certain other shaft-drive bikes.

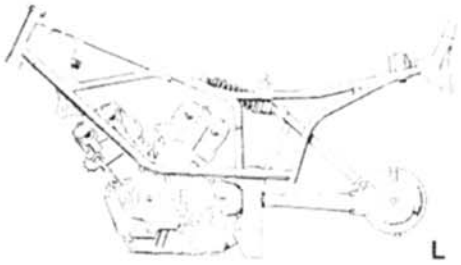
In addition to stylish looks, adjustability, and plenty of power, the Maxim has an onboard computer which monitors fluid levels, bulb condition, etc., with spacy LCD readouts on the instrument panel. All these features bring the price above the class average. No official figure has been set, but we estimate around $3350.

The Maxim rides in the toughest class there is: 750cc. Its brother, the 750 Seca, is formidable competition and probably more versatile. Others are faster, lighter, or less expensive, but they don't have the magic look of a Maxim.



J

J/N
The air box and two 36mm Mikuni down-draft carbs share tight quarters underneath the tank, which still manages to hold 4.5 gallons. Two Hy-Vo-type chains spin the double overhead cams, which activate four valves per cylinder. A gear on the crank drives the balancer (middle right). Water-cooling lets compression be a hefty 10.5:1, and, yes, regular gas is fine. Naturally there're electronic ignition and shaft drive. Our estimated quarter-mile: 12.85 sec. @ 100 mph.



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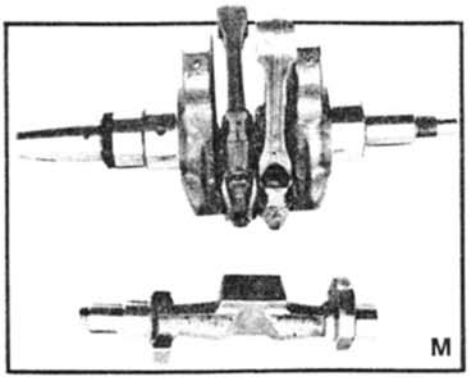

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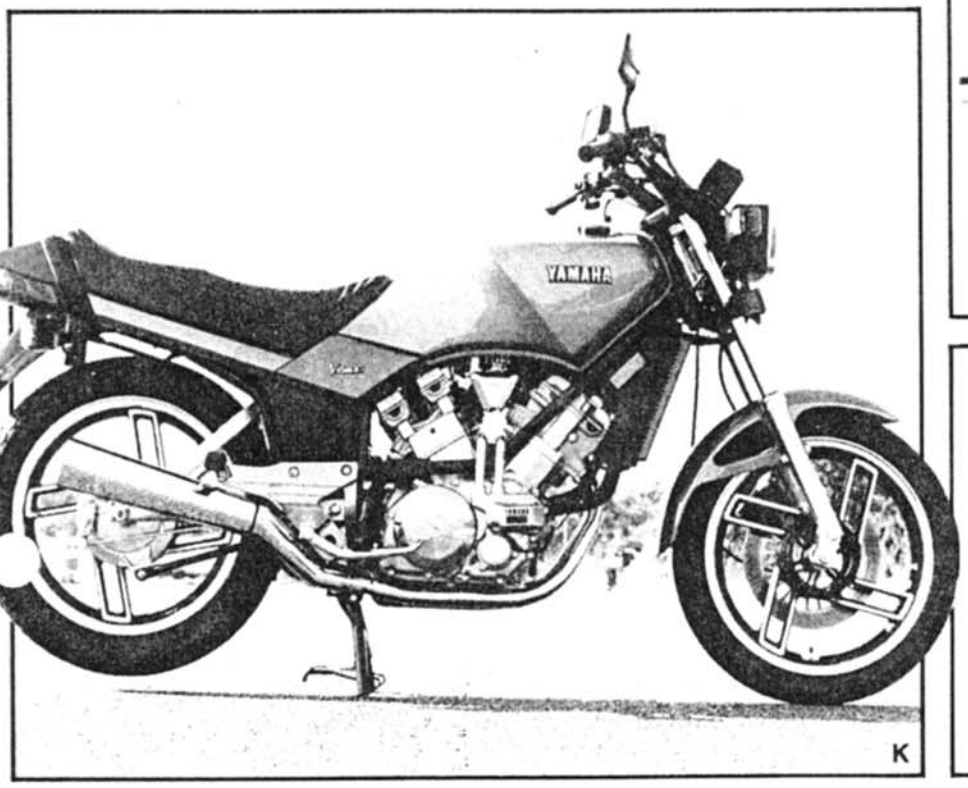

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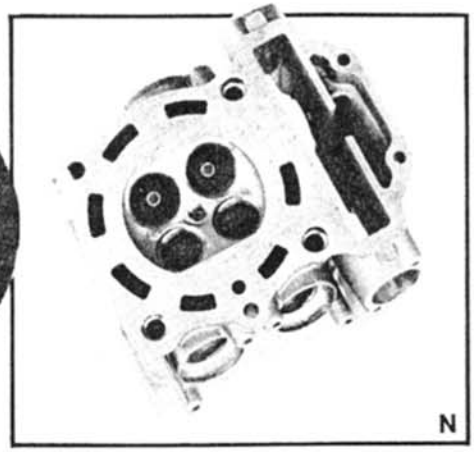

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550 Vision

No one knew exactly what to expect from the little 550 Vision. There's never been a water-cooled twin-cam four-valve V-twin on a motorcycle before. Or down-draft carburetors. Or a hang-support frame with monoshock suspension. Or these wild wheels and trailing-axle fork legs. It was intriguing on paper, but the tank looked a bit big and there were turbos to ride. The Vision was only a 550, and it would probably vibrate.

The Yamaha test track near corporate headquarters in Iwata, Japan, is 3.26 miles of fast bends and faster straightaways. A GP racer can kiss 180 past the timing tower and bang through the hairpin at 40 mph. A 550 could be timed with a sundial on this monument to horsepower. But that isn't the way it happened.

The Vision is an extraordinary motorcycle. Far better than we expected and a show stealer from the Maxim and perhaps even the Turbo. It taunted that test track, revving to 10,000 rpm on its straights, shrugging off its bumps, and taming its turns with any line it fancied. More importantly, the Vision seduced its rider with pure Man-Machine Symbiosis. You instantly feel at home. You instantly have confidence. And you're instantly in love with the engine.

Here are two pistons that measure 3 inches across and only move 2.1 inches in the bore. Yet they produce 64 horsepower and start pulling with authority at 2000 rpm. We actually clutched off the line from a dead stop in *fifth gear*. The horsepower curve is textbook perfect, a steady climb from 2000 revs to 9500, with a near-flat 35 ft.-lbs. of torque the whole way! You can *feel* the acceleration in any gear at any speed. It has that torquey V-twin pull and that mellow V-twin sound.

What's continually amazing is the Vision's rideability and versatility. Everything works as if it's well-lubricated, so it's effortless to zip through traffic using only one or two gears and sheer torque, or let her wind out and choose off a 650. If you were on a twisty road, you might win because the Vision handles very well—steady, precise, and light. There're gobs of ground clearance and a seating position that's both comfortable and confidence-inspiring. Super sporting riders will have three complaints: (1) the suspension is not adjustable except for the monoshock's spring preload, (2) the front tire should be a little wider for greater traction area, and (3) the front brake should be a double disc instead of a single. These compromises were made for two reasons: first, 90 percent of Vision buyers won't see a need for such luxuries, and second, the already high price of $3099 would soar to 750 levels. We would not hesitate to recommend the Vision exactly as it is.

The angle of the V is 70 degrees, so there is an uncancelled primary vibration. The rods are side-by-side so each power stroke tends to rock the engine to that side, a source of uncancelled secondary vibration. But the Vision has only a trace of the shakes. That's because bobweights on a counter-rotating balancer driven off the crankshaft smooth them out. At most speeds you have crystal clear vision in the rear view mirrors and no fatigue from vibration.

Where does all the power and torque come from? Part of the reason is down-draft carbs and 18-degree valve angles so the charge has a straight shot into the combustion chamber. That's why the tank is so big. Half the carbs and all of the air cleaner tuck underneath in a cavern wider than a Maxim rear tire. Yet the tank still holds 4.5 gallons, good for more than 200 miles of action at an estimated 45-50 mpg.

Who will buy a Vision? Most of the people who get to try one. It's a bike you'll love to ride, and love to own. We can't wait for a Siamese Vision—an 1100cc V4! **HR**