YAMAHA XJ700 MAXIM

Don't whine to Yamaha about the march of technology trampling your pocketbook; the XJ700 is in vogue, ingenious, and incredibly inexpensive.

☐ In the afterglow of Yamaha's latest power thrust, it's easy to overlook the XJ700 Maxim. The XJ is not a breakthrough techno-bike, not especially fast, not emphatically gifted at any specific task; if you want hot-blooded hardware, look to the balance of Yamaha's lineup. There you'll find the five-valve Maxim-X, the FZ750 and the thunderous V-Max—three flaming comets in high-tech trajectories.

The XJ700 reflects an understanding of a different sort. Every manufacturer needs its image-makers, but performance machines, especially sport bikes, live an incendiary existence. They glow red-hot today and cool off tomorrow, superseded by more advanced machines that invite speed-jockeys to trade up or be shot down. In the midst of this tempest of performance and price escalation, the XJ700 responds to a public demand for competent, affordable alternatives.

Launched from a less-stellar elevation, the XJ700 is a surprise. Why? Given the average life span of the average Japanese motorcycle, the Maxim's drivetrain, at age five, is positively geriatric. With the new Maxim-X shoring up Yamaha's power-cruiser image in the 700cc class already, the company could have dropped the old two-valve Maxim altogether or simply squeezed a few more years out of the old girl by down-sizing last year's 750 to beat the tariff; either approach would make perfect sense.

But Yamaha, remember, is the company that finally pulled the plug on the XS650 Twin last spring after 15 years of production, the company that transformed the Venture's docile touring engine into the fire-spitting V-Max, and that designed eight different models around one air-cooled, two-valve, shaft-drive engine, the same engine now powering the XJ700. Face it; the Yamaha guys are pack-rats. They never pitch anything so long as it serves a useful purpose and it's paid for (and you can bet the XJ700 powerplant has paid for itself over the years). By yoking the new Maxim-X chassis and the enduring two-valve engine—destroked from last year's 56.4mm to 52.4mm to dodge the tariff—Yamaha has created a highly versatile, smooth,

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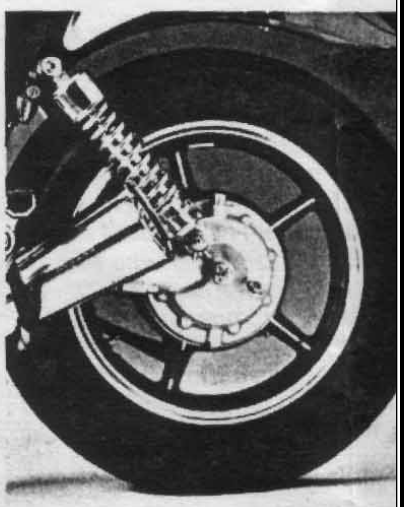
handsome, and surprisingly sporty machine that sells for—get this—$400 *less* than the 750 fetched *three* years ago.

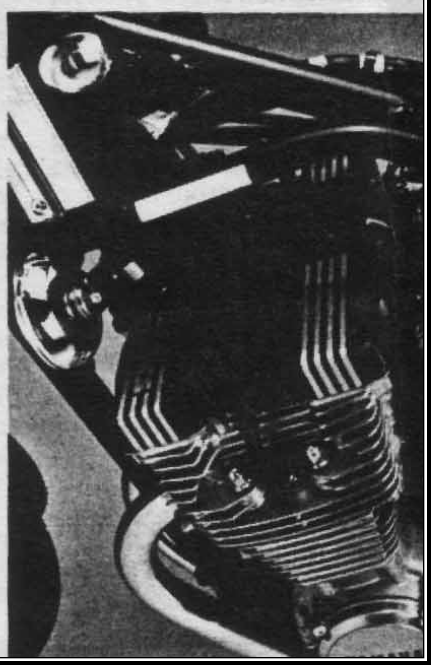
The Maxim plays an important role in Yamaha's lineup, conceived and built as a dollar-wise general-purpose bike to fill the gaps between specialized models. Its two-valve engine had proven itself a mechanical chameleon—having served as a 650, 750, and 900 in cruiser, sport-bike and even touring chassis. The engine could be made to work just fine one more time, but the old Maxim chassis had to go. Too uncomfortable. Too harsh. Too much of an uncompromising cruiser to become a general-purpose bike. But a lot of motorcyclists want their wide-spectrum motorcycling in a cruiser-style package. No problem. The Maxim-X chassis, with a rear-wheel swap and softer fork springs, would do just fine.

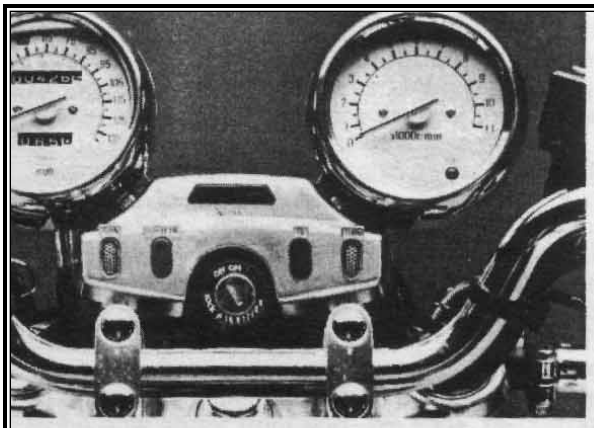
Yamaha's engineers are experts at mechanical crossbreeding. They began with a lightweight, compact engine block. By locating the alternator behind the cylinder block on the original Maxim, and driving the primary gears, camshafts and electrics from between the flywheels rather than the crank ends, they could hold overall engine width at a narrow 18 inches—providing ample cornering clearance even when stuffed into a low-slung chassis—yet still allow the wide bore centers needed by large pistons. By filling these cases with rugged, load-bearing components, Yamaha laid a solid foundation on which to build additional horsepower. The original 650 Maxim engine has whistled so many displacement tunes over the years that Yamaha arrived at a proper 700cc combination of bore and stroke simply by scrolling through the microfiche: 65mm pistons, cylinder block and cylinder head from the 750; 52.4mm stroke from the Maxim 650 crankshaft assembly. Result: 696cc, four under the ITC limit.

Yamaha also applied this design by transplantation to the XJ700's carburetion. Last year's 750 breathed through a quartet of 34mm Hitachis, the 650 Maxim through a set of 32s. The XJ700 needed something right in the middle, so Yamaha simply bored the 650's mixers to bring them up to 33mm and recal-

Though not as fancy as the X-model's two-tone slotted dish, the XJ's five-spoke cast wheel—salvaged from the parts bin—cuts cost and weight.

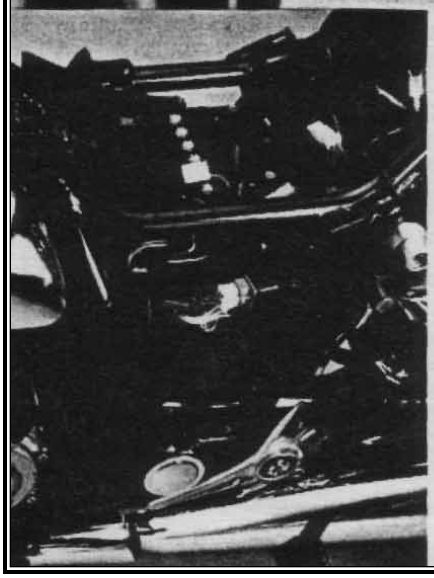






Good news for American mainstreamers: The XJ700 Maxim is a pro-function cruiser that's worth more than you'll have to pay.

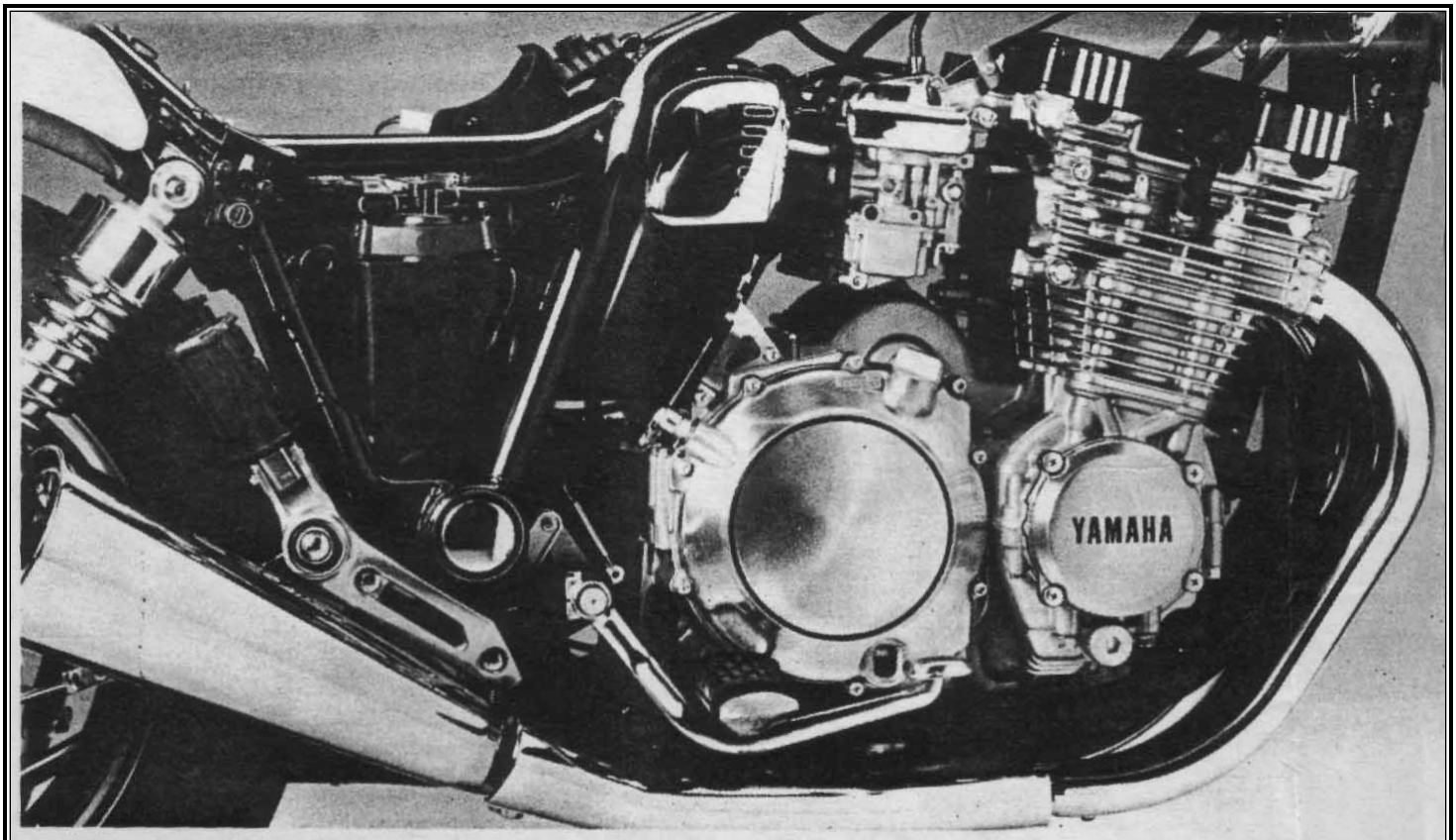
swap-and-save method of engineering. Grafting engine components from the 650 and 750 Maxims has left no scars on the XJ700. Driveline lash is noticeable in the lower gears but otherwise well controlled. The cable-operated clutch actuates smoothly and predictably, and few machines—V-four or inline—can match the remarkable vibration-free smoothness of the XJ's rubber-mounted engine, despite the absence of a counterbalancer. Until the tach drifts past 7000 rpm, you can't rely on vibration to tell you the engine is running. Even beyond seven grand, the tin-



ibrated the jetting circuits. Our Maxim required an extended warm-up period to clear its throats, but responded crisply and precisely thereafter from pilot circuits to main. At steady highway speeds, the Maxim exhibits none of the surging or hesitation which sometimes results from EPA-mandated leanness. No doubt, the Maxim is not starved for fuel—ridden hard it chug-a-lugs a gallon of fossils for every 26 miles. Steady highway droning only boosts that figure to 40. With a 4.2-gallon tank you'll be lucky to get 140 miles between pumps—not bad for a cruiser, but general-purpose bikes need more range.

Take a brief spin on the XJ700 and you'll return a believer in Yamaha's gle that passes through the handlebar is barely enough to blur the mirrors' images.

Chained to Kerker's dynamometer, the XJ posts more good news for cruiser riders. At the bottom end of its torque curve, the two-valve XJ is a match for the super-tech five-valve Maxim-X; from 4500 to 5500 it falls just shy of the X in torque and horsepower, then charges back to meet the X at 6000 rpm. From there, the X's superior breathing capabilities take hold and multiply a five-horsepower advantage at 7000 rpm to a decisive plus-16 at its 75.01-bhp, 10,000-rpm peak. The two-valver reaches its peaks 1000 rpm earlier at 59.02 bhp. Side by side, the Max-



The California-only XJ700 conceals its evaporative canister beneath the right side-panel where the tool kit used to be.

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ims offer a revealing look at where Yamaha engineering has been, and where it's going. Despite significant differences between the two- and five-valve engines, both designs result in wide power spreads. The two-valve Maxim trades peak power for a flat, surprisingly potent torque curve that extends well into the mid-range, while the five-valve X seems to sacrifice nothing.

Dyno numbers reflect not only the difference in power output, but the different approaches applied to making that power. The Maxim-X engine has very oversquare dimensions: its 68mm bore is large for a 700, its 48mm stroke one of the shortest of any street bike. The two-valve Maxim has a smaller, 65mm bore, longer 52.4mm stroke and the flat torque curve characteristic of longer-stroke engines. Short-stroke engines like the Maxim-X enjoy the benefits of both a lighter crankshaft assembly—less flywheel counterweight is needed for balance and thus less horsepower is expended accelerating the crankshaft assembly—and lower piston speeds, both of which enable the X to rev higher, quicker than the two-valver.

The X's valve train is also light, and the greater combined valve-circumference distance provided by five rather than two poppets allows greater flow through the head—especially when the valves are barely open—with shorter cam timing, less radical lift, less valve overlap. Because its shallow biconvex combustion chamber is free of obstructions, fuel charge is concentrated about the centrally located spark plug, and a high 11.2:1 compression ratio can be run without the threat of detonation.

The two-valve Maxim's combustion chamber is less efficient than the X's. With less valve perimeter and wider valve angles than the five-valve system, the two-valver must rely on more radical camshafts with greater overlap. Increased lift and valve angle means a deeper combustion chamber and a domed piston that must be relieved to provide the necessary valve clearance. This design creates obstructions within the combustion chamber which often lead to uneven burning of fuel.

Lacking the clean-burning characteristics of the five-valve combustion chamber, the two-valve XJ relies instead on YICS (Yamaha Induction Control System) to improve efficiency. YICS is a system of interconnected scavenging ports cast into the cylinder head and opening into each intake tract just above the valve heads. Residual fuel charge which accumulates in the inlet port when the valve slams shut is sucked at high velocity through the sub-ports and into the main air/fuel stream by the next intake cycle. This induces a swirl effect within the combustion chamber—especially effective during low-engine-speed, low-intake-velocity running—which enhances burning and improves combustion efficiency. Yet even with YICS, the two-valve Maxim must run a lower 9.5:1 compression ratio to avoid detonation's death rattle.

We suspect the Maxim's cam timing and YICS system are primarily responsible for its impressive low- and mid-range numbers. Away from the clinical habitat of the dyno, however, the slight power margin between the two Maxims expands to a chasm. With identical gearing and only a 12-pound weight difference (505 pounds wet for the two-valver, 517 for the X), the XJ is no match for the Maxim-X. In the crucible of quarter-mile and roll-on acceleration—0-60, 45-70, and quarter-mile—the Maxim-X is clearly faster and quicker than the XJ. Then again, the Maxim-X is the most potent 700 ever built, and you'll shell out an extra $500 for that distinction. Compared to its visual enemies—traditional cruisers, V-twin and otherwise—the two-valve Maxim offers smooth, impressive engine performance, though it lacks the decisive putt-putt cadence of V-twin iron.

In every measure of engine and chassis performance, the XJ neatly fills the gap between V-twin cruisers and high-performance sport bikes. By traditional cruiser standards, the XJ700 is remarkably comfortable and athletic—not surprising since it borrows its running gear from the X-model. The seat/peg/handlebar relationship, aided by a wide and deeply padded saddle, provides long-distance comfort and accommodating quarters for backroad work. Cornering clearance and tire adhesion are suitable even for those riders without a mortgage and 1.8 children. Where the Maxim's steering is neutral and light thanks to its geometry, many cruisers with stretched front ends rely on sweeping handlebars to make up for

ponderous steering characteristics, and such handlebars open up a can of ergonomic worms. Like many traditional cruisers, however, the Maxim does suffer from fork flex under braking and over bumps. And, like the X's, the XJ700's front brake requires a forceful hand at the lever, but it is also powerful and provides linear feedback.

As stated in our April 1985 Maxim-X test, the fork could do with further refinement, and the rear shocks, though more responsive than the old 650's, are still on the stiff side of plush. With a lighter wheel out back, the rear end feels even stiffer, out of balance with the now softer front end. We think Yamaha left the stiff rear dampers in place to control the pogo antics of the shaft drive, and while the XJ's shaft effect is suitably neutered, we would gladly trade a little up-and-down motion for more responsive rear springing. As is, the XJ sets up a rhythmic hobbyhorsing over freeway expansion joints which doesn't cease until you see 70 mph. Hitting the fork's air valves with a few extra pounds gets rid of the hobbyhorsing but also diminishes front-end response.

Cutting through traffic or trolling the boulevard is a breeze on the Maxim. Though its 30-inch saddle is high by Suzuki Intruder standards, you still sit low on the XJ, and planting both feet is no problem even for short riders. Since the XJ700 is air-cooled, its instrument panel lacks the X's water-temperature gauge; only the analog speedometer and electronically triggered tach (black digits on white dials!) and an unobtrusive assortment of idiot lights remain.

Despite its parts-shelf engineering, the Maxim feels integrated and polished. As a general-purpose bike for the '80s, the XJ700 is successful because it is versatile and comfortable yet cruiser stylish; because it has smooth, tractable, usable power; because its broad range bridges the chasm between cruiser and sport bike. Those who judge a motorcycle's worth by the newness of its components might argue that the Maxim is nothing more than a collection of familiar, used parts running on borrowed time. We disagree.

It needs more fuel range, yes, and some suspension refinement too. Nevertheless, Yamaha's XJ700 is a package of strong virtues, a contradiction of the theory that new always means better. Through careful orchestration of proven components, Yamaha has produced a machine that is no less appealing for being familiar—no more out of date than are sensibility, frugality and the quest for a righteous deal. ■

TEST SPECIFICATIONS

Make and model ..... Yamaha XJ700NC
Price, suggested retail (as of 5/30/85) $2999

Performance
Standing start ¼ mile ..... 12.43 sec. @ 106.82 mph
Acceleration, 0–60 mph ..... 3.68 sec.
45–70 mph, top gears ... (3) 3.28 sec., 275 ft.
(4) 4.48 sec., 380 ft.
(5) 6.24 sec., 539 ft.
Braking, 60–0 mph ..... 122 ft.
Engine rpm @ 60 mph, top gear 4473
Average fuel consumption rate ..... 33 mpg (53 km/l)
Cruising range (main/reserve) ..... 92/20 mi. (148/32 km)
Load capacity
(GVWR less curb weight) .... 531 lbs. (240 kg)
Maximum speed in gears
@ engine redline ..... (1) 43 (2) 64
(3) 81 (4) 101
(5) 116

Engine
Type ..... Four-stroke, transverse four; air-cooled with two chain-driven overhead camshafts; two valves per cylinder
Bore and stroke ..... 65.0 x 52.4mm (2.55 x 2.06 in.)
Piston displacement ..... 696cc (42.5 cu. in.)
Compression ratio 9.5:1
Carburetion ..... (4) Hitachi 33mm constant-vacuum
Exhaust system ..... Four-into-two
Ignition ..... Battery-powered, inductive, magnetically triggered
Air filtration ..... Paper element, disposable
Oil filtration ..... Paper element, disposable
Oil capacity ..... 3.7 qts. (3.5 l)
Bhp @ rpm ..... 59.02 @ 9000 rpm
Torque @ rpm ..... 36.82 @ 7000 rpm

Transmission
Type ..... Five-speed, constant-mesh, wet-clutch
Primary drive ..... Straight-cut gear; 97/58, 1.67
Final drive ..... Shaft and bevel gears; 19/18 x 32/11, 3.08
Gear ratios (transmission) ..... (1) 35/16, 2.19
(2) 30/20, 1.50 (3) 30/26, 1.15
(4) 28/30, 0.93 (5) 26/32, 0.81
Gear ratios (overall) ..... (1) 15.33 (2) 10.50
(3) 8.05 (4) 6.51 (5) 5.67

Chassis
Type ..... Double-downtube, full-cradle frame; tube/box-section steel swing arm
Suspension, front .. Leading-axle fork with 38mm tubes and 5.9 in. (150mm) of travel
rear .. (2) shock absorbers, adjustable for spring preload, producing 3.9 in. (99mm) of rear-wheel travel
Wheelbase ..... 59.8 in. (1520mm)
Rake/trail ..... 31.5°/4.7 in. (120mm)
Brake, front ..... Hydraulic, dual-disc with dual-piston calipers
rear ..... Rod-actuated, single-leading-shoe drum
Wheel, front ..... Cast, 2.15 x 19
rear ..... Cast, 3.00 x 16
Tire, front ..... 100/90-19 57H Bridgestone Exedra G525
rear ..... 130/90-16 67H Bridgestone Exedra G526
Seat height ..... 30.5 in. (775mm)
Ground clearance ..... 6.5 in. (165mm)
Fuel capacity (main/res.) ... 2.6/0.8 gal. (9.8/3.0 l)
Curb weight (full tank) ..... 505 lbs. (229 kg)
Test weight ..... 655 lbs. (297 kg)

Electrical
Power source ..... AC generator
Charge control .... Solid-state voltage regulator
Headlight beams (high/low) ..... 60/55 watts
Tail/stoplights ..... (2) 8/27 watts
Battery 12V 14AH

Instruments
Includes ..... Speedometer, odometer, tripmeter; tachometer with 9500-rpm redline; warning lights for low oil and fuel levels; indicators for high beam, turn signals, neutral
Speedometer error,
30 mph indicated, actual 28.25
60 mph indicated, actual 57.67

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