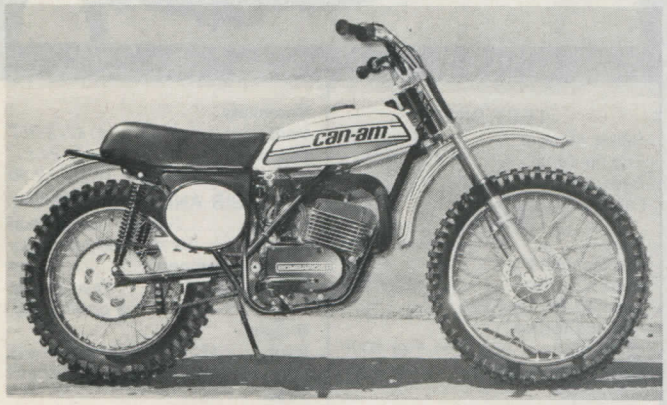
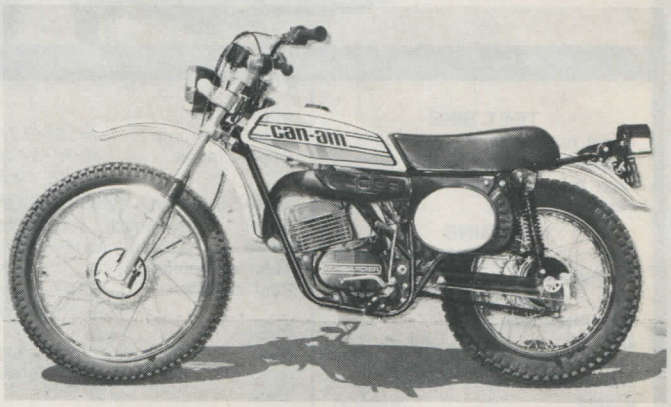
Preview:
Can-Am 125/175

Bombardier is introducing a brand new line of motorcycles . . . and they're right on target with these first four models!

By Tony Murphy

PHOTOGRAPHY BY ERIC RICKMAN





Every year the major manufacturers offer new models. On occasion a new name will pop up, generally powered by someone else's engine, and offering only an alternate chassis configuration. But, seldom does an all-new machine arrive on the scene from a manufacturer that had never before built motorcycles or motorcycle components. Such is the Can-Am, a two-stroke powered off-roader from Canada's Bombardier, the world's largest producer of snowmobiles and motorized snow equipment.

The very thought of a motorcycle from a snowmobile manufacturer might bring to mind a machine utilizing an existing engine surrounded by a conventional-type frame with the sole intent of capitalizing on the current boom in motorcycle sales. Nothing could be further from the truth. The Can-Am engine was designed from the ground up to power the Can-Am motorcycle. The frame that houses the compact six-speeder might at first be called conventional, but closer scrutiny reveals several innovative features that complement the equally innovative powerplant. The Can-Am is not a machine that can be visually evaluated with a quick walk around it. You have to get down on one knee, look under, over and around the more obvious components to appreciate the thought and development time that's been put into this, their first effort.

Since Bombardier is a big and successful company, they were well aware of the potential problems of such an undertaking. While they are proficient at building snowmobiles, this does not necessarily qualify them to design and build a good motorcycle. Therefore, their very first step was to round up some acknowledged experts in the field and charge them with the responsibility of the design.

Gary Robinson, best known for his work with Harmon and Collins camshafts during the early Sixties, was the first "outsider" to go on the payroll. His experience in both racing and manufacturing well qualify him to head such a project as an all-new machine. There are few racers or specialized component manufacturers with whom he's not on a first name basis.

Although he had the necessary confidence in his abilities, he quickly surrounded himself with equally talented individuals to both challenge his design decisions and test the finished product. He brought two-time World moto-cross champion, Jeff Smith, from England to assist chassis development. Several highly-skilled machinists and fabricators, whom Robison personally knew to be qualified, were brought from the US and soon the first of the prototypes took shape. As soon as it was completed, Smith entered in local moto-cross competition to test it under actual racing conditions. If the components could stand the punishment of both Smith and the terrain, the ideas that were incorporated would be suitable for a production machine.

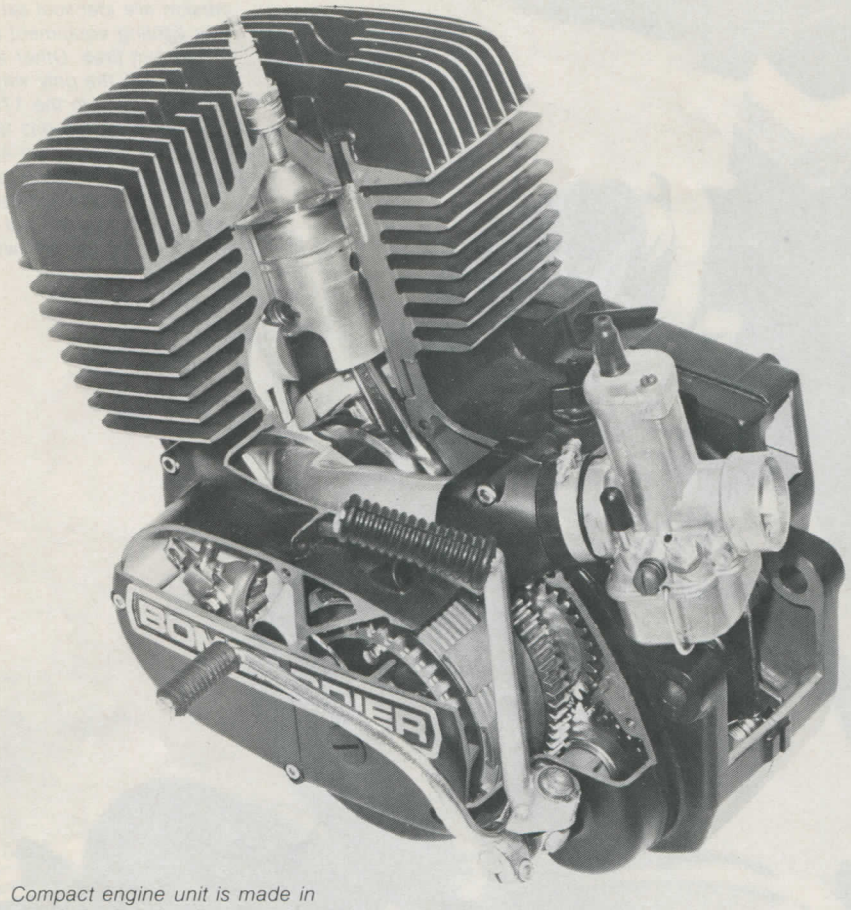
Meanwhile, in far off Austria, the Rotax engine plant, a wholly-owned subsidiary of Bombardier, was hard at work developing the initial powerplants, 125 and 175cc singles. Later on a 250 was planned but initial efforts were aimed at the smaller displacements. Most of the lessons learned could be valuable in the development of one or more larger powerplants, and by limiting the program to one basic engine with two displacement options, the time involved could be kept to a minimum.

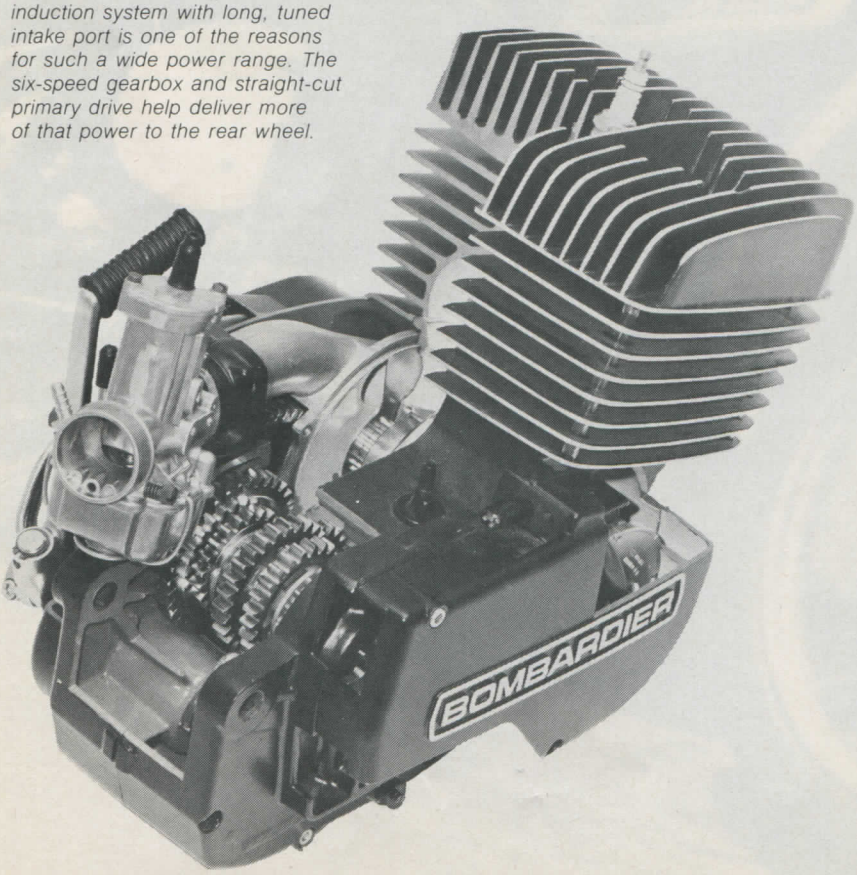
The two-stroke engine is no stranger to the engineers at Rotax. They've been building them for years for related uses such as snowmobiles, and had only to apply their knowledge to a unitized engine around the guidelines set down by the design staff in Canada. Those guidelines were quite simple: single cylinder, rotary valve, oil injection and a start-in-any-gear, six-speed transmission. That it should be compact and reliable was taken for granted since every engine Bombardier makes for snowmobiles is so compact that the actual displacement is usually deceiving.

The execution of those guidelines resulted in one of the nicest, most innovative little engines we've ever seen. The lower end is quite conventional, housing the forged crankshaft, flywheels and six-speed transmission in a common, vertically split crankcase, but great pains were taken to reduce the overall width to an absolute minimum. The use of a rotary valve induction system usually makes a narrow engine impossible since the carburetor must bolt to the side, rather than the rear, of the engine unit. This single fact is probably the reason that so few off-road machines are now built with the proven superior characteristics of the rotary valve.

To combine a narrow engine with a rotary valve, Rotax chose to mount the 32mm Bing carburetor behind the engine and supply the fuel mixture through a unique induction tract that runs fore and aft in the engine, making a gradual bend into the rotary valve cover. The long tract is said to be largely responsible for the remarkable low speed power of the engines as well as contributing to the very narrow ten inches overall width. The search for a slimline package even resulted in an extremely thin (about .030") rotary valve.

MX model on the left and enduro version are identical except for lighting equipment and different tires. Other than riding them, the only way to tell the 125 from the 175 is by the decal on the gas tank. Much credit for the Can-Am's all-around performance goes to rider, Jeff Smith. However, he's quick to point out the team effort that made it work.





Compact engine unit is made in Austria by Bombardier-owned Rotax, builders of Ski-doo snowmobile engines. Unique rotary valve induction system with long, tuned intake port is one of the reasons for such a wide power range. The six-speed gearbox and straight-cut primary drive help deliver more of that power to the rear wheel.

A fact that also minimizes it's effect on engine imbalance, a problem with some early high-rpm rotary valve engines.

As is common on rotary valve engines, the primary drive is taken off the same side as the valve. Straight-cut primary gears drive a seven-plate wet clutch with a smaller plastic gear driving the oil pump, which lubricates the main-bearings, rotary valve and cylinder wall. The left-side-mounted kick start lever shares a common shaft with the down-for-low shift lever, further simplifying the already uncluttered two-piece side cover.

The right end of the crankshaft spins a Bosch CDI ignition unit that is mounted "backwards" on the crankcases. Instead of the flywheel portion requiring removal for any examination, the inner unit attaches to the outer cover and can be removed in minutes for periodic inspection as the cover is removed. With that cover removed one can note another clever feature. Just forward of the drive sprocket there is a steel plate intended to stop a broken chain before it can damage the crankcase assembly. It's a small item but a very considerate one.

Both the big and little end of the connecting rod rides on needle bearings, the top half supporting a two-ring piston. The piston rides in a steel cylinder sleeve provided with a rear boost port and shrunk into a large, squared-off alloy cylinder. A plastic tube slips through holes drilled in the cylinder fins to cut down the ringing noise of resonating fins. A similarly-shaped cylinder head with a hemipherical combustion chamber and squish band tops off the compact package.

As we said, the engine's unique as well as an outstanding performer. The details of both the 125 and 175cc version are identical, but both bore and stroke dimensions differ. The 125 is square at 54mm x 54mm, while the 175 is oversquare with a 62mm bore and a 57.5mm stroke. Both sport a 13:1 compression ratio and have a claimed horsepower output of 20 @ 9500 rpm for the 125, and 25 @ 8500 for the 175.

The clever engineers in Austria don't have anything on the boys at Bombardier. The Canadians were responsible for the chassis and it offers a couple of interesting features which no other off-road machine can boast. While the Betor forks and Girling rear shock units have long since proven their efficiency for off-road use, the frame itself is Can-Am's own creation, aimed at ultra-light weight and extreme rigidity.

Aware of the multiple use that most off-roaders are put to, from true motocross to desert to muddy enduros, Robison insisted upon a means of easily altering steering geometry. Such systems exist on machines such as the Hatta-forked Kawasaki's, but the Can-Am de-

sign goes one better. Rather than just moving the axle fore or aft, the entire fork assembly can be moved at the frame steering head. Covering a six degree range, the fork angle can be changed in ½-degree increments from 25 to 31 degrees.

Such an adjustment is made possible by using eccentric alloy cups in the large diameter steering head and placing the needle bearings within the cups. By merely turning the eccentrics, which are pinned to the steering head to prevent misalignment, the rider can choose the proper fork angle for his particular style or riding conditions.

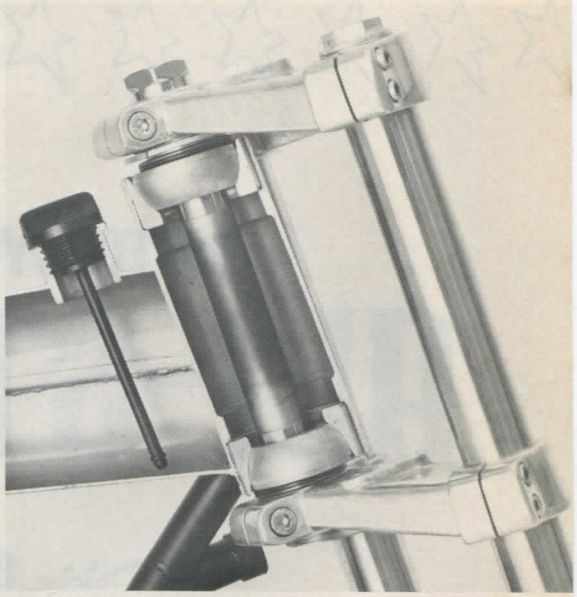
That large diameter steering head is party to another unique feature in that it attaches to a large tapered backbone that doubles as a 2½-quart oil tank for the oil injected engine. The oil filler projects from a recess just in front of the 1.9-gallon, high-density polyethylene gas tank. The convenience of the oil and gas caps right next to each other is further proof of the thought that went into the entire motorcycle.

The main frame tubes are of small diameter for weight saving and are obviously laid out to provide as rigid as possible a structure. Every effort has been made to make the swing arm pivot area strong and thereby keep the wheels in the same relationship all the time. It seems to be a case of making all the components fit the frame rather than the other way around. The swinging arm, which has proven to be the weak point of most chassis designs, is quite long to accomplish the desired wheelbase and weight distribution, but it has also undergone the strength treatment. Instead of pinching the ends of the tube together, a machined axle carrier is welded to the tube and the wheel is secured and adjusted by large snail-type adjusters. To keep it out of the way, the side stand is mounted to the swing arm and is hard to see, let alone contact any off-road obstacles.

If you aren't impressed so far, there's more. We found the Can-Am to be one of those machines that is 100% finished. Too many bikes now available offer a couple of neat features and then seem to fall short in other seemingly less important areas. Robison and the crew at Can-Am seem to have realized that and set out to avoid the all too common pitfall.

For one thing, both the moto-cross and enduro versions are whisper-quiet. Their well tucked-in exhaust systems terminate in a huge silencer that is reported to increase horsepower over an open pipe. The snowmobile manufacturers have been restricted for some time when it comes to noise levels and have therefore become very efficient in developing quiet but functional silencers. In fact, at the Bombardier facilities in Valcourt, Quebec, they have their own sound building designed strictly for exhaust system development. In spite of the size of the final silencer, it's well hidden behind a number plate and does not interfere with the rider's leg.

Other notable features include a one-piece molded seat, a full-floating rear backing plate and street-legal lighting on the enduro versions. Initially, there'll be four models, two 125's and two 175's. Each displacement category will be available as a no-nonsense moto-crosser and an enduro mount equipped with all the off-road essentials. We've ridden all four and can attest to the exceptional performance and handling from this, the first new American manufacturer able to compete with the giants. In the not-too-distant future there'll be a 250 joining the line and we'll be right there to wring it out in the pages of Motorcyclist. Till then, keep an eye out for a red, yellow and white machine with a black engine. You'll be seeing it shortly but unless you're aboard a rocketship you may not be able to see it very long. •



Steering geometry adjustments can be made at the steering head by rotating the eccentric bearing retainers. There's six degrees of change.

BOMBARDIER CAN-AM SPECIFICATIONS

	125 MX-1	175 MX-1	125 T'NT	175 T'NT
Engine Type	Rotary Valve/Two Cycle/Single Cylinder—All models			
Displacement/cc	123.7	173.6	123.7	173.6
Displacement/cu. in.	7.54	10.60	7.54	10.60
Bore and Stroke/mm	54x54	62x57.5	54x54	62x57.5
Bore and Stroke/in.	2.126x2.126	2.441x2.264	2.126x2.126	2.441x2.264
Compression Ratio (uncorrected)	13:1	13:1	13:1	13:1
True Rear Wheel Horsepower	20 @ 9500 rpm	25 @ 8500 rpm	20 @ 9500rpm	25 @ 8500 rpm
Lubrication	Twin Port Injection—All models			
Starter	Primary Drive/Kick/Folding Lever/In Gear Starting—All models			
Primary Drive	Straight Cut Gears (3.286:1)—All models			
Clutch	Multi-Plate/Oil Bath—All models			
Transmission	Constant Mesh, 6-Speed—All models			
Gear Ratios				
1st	3.40	3.40	3.40	3.40
2nd	2.31	2.31	2.31	2.31
3rd	1.68	1.68	1.68	1.68
4th	1.31	1.31	1.31	1.31
5th	1.09	1.09	1.09	1.09
6th	0.96	0.96	0.96	0.96
Final Drive	No. 520 Chain, ⅝"x¼"—All models			
Carburetor	Bing 32mm—All models			
Air Cleaner	Foam Air Filter—All models			
Electronic Ignition	30,000 volt, Bosch CDI—All models			
Frame	High Tensile Steel, Double Loop—All models			
Fork Angle Adjustment	6°	6°	6°	6°
Front Suspension	Betor Teledraulic, 6 in. Travel—All models			
Rear Suspension	Girling Hydraulic, 9-way Adjustable. 3 in. Travel—All models			
Brakes/Front and Rear	6" Drum, Single Leading Shoe—All models			
Front Tire	3.00 x 21 Knobby	3.00 x 21 Knobby	3.00 x 21 Trial	3.00 x 21 Trial
Rear Tire	4.00 x 18 Knobby	4.00 x 18 Knobby	4.00 x 18 Trial	4.00 x 18 Trial
Overall Length/inches	84	84	84	84
Overall Width/inches	34	34	34	34
Wheel Base/inches	54	54	54	54
Seat Height/inches	30	30	30	30
Ground Clearance/in.	9	9	9	9
Dry Weight	216 lbs.	216 lbs.	231 lbs.	233 lbs.
Wet Weight	233 lbs.	233 lbs.	248 lbs.	250 lbs.
Gas Tank Capacity	1.9 U.S. Gallons—All models			
Oil Tank Capacity	2.3 U.S. Quarts—All models			
Transmission Capacity	1.2 U.S. Quarts—All models			