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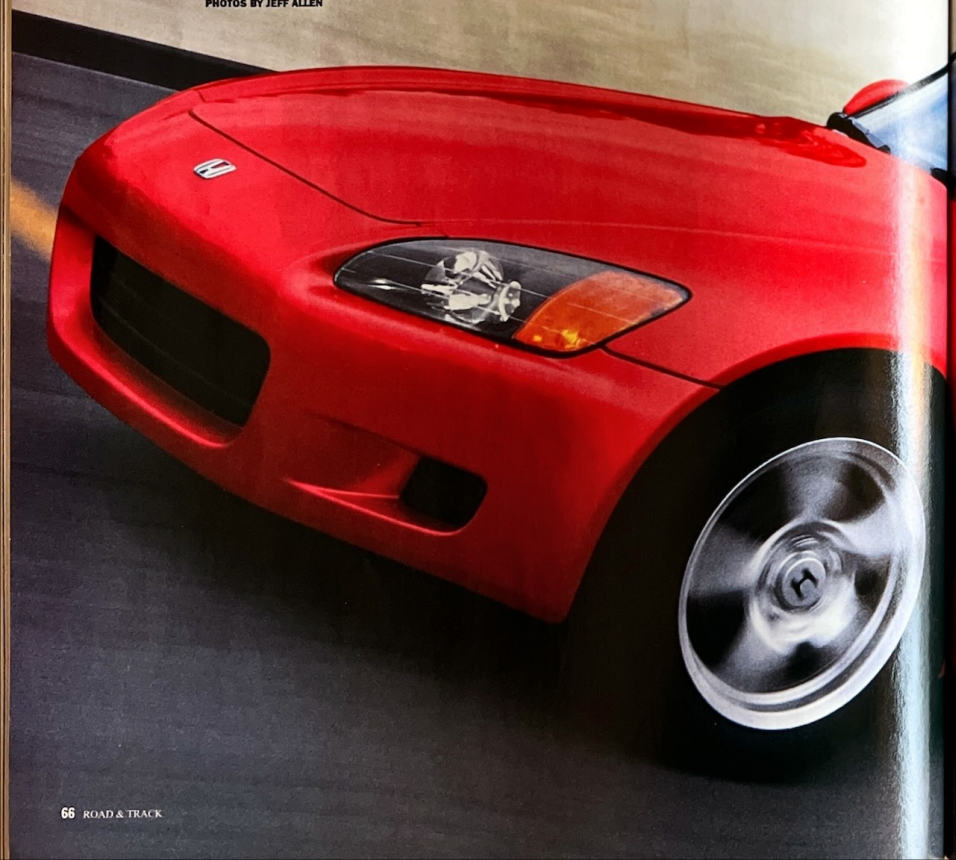
DRIVING & IMPRESSIONS & TECHNICAL ANALYSIS

Honda S2000

The world's newest sports car is a terrific driving machine

BY PAUL FRERE
PHOTOS BY JEFF ALLEN



With its S2000, a sensational rear-drive roadster built to commemorate the company's 50th anniversary, Honda has once again demonstrated its ability to surprise us. Honda is always different. And it pulled no punches when it came to creating a high-performance 2-seat convertible that does more than measure up with its European counterparts.

First appearing as a concept vehicle at the 1995 Tokyo motor show, the S2000—then called the SSM—wowed the automotive press with its daring styling and technical innovations. Fortunately, it has lost little of its excitement in its transition to small-volume production—Honda has earmarked 5000 units of the S2000's 12,000-a-year volume for the U.S.

Engine

Any manufacturer wanting to extract 240 bhp from a 2.0-liter engine (120 bhp per liter!) would not hesitate to add a turbocharger. But not Honda. That's the easy way, and anybody can do it. Back in 1992, the last year Honda officially competed in Formula 1, its atmospheric racing engine developed about twice that specific power, though admittedly it did not meet any emissions regulations or have the flexibility, driveability and tractability required for a road car. The engineers who developed the F1 engine are now exploiting their expertise for the benefit of production engines and they were sure that, even with a 4-cylinder engine, it could be done. The secret to achieving this is an improved version of VTEC (variable valve timing and opening duration, electronically controlled), used on both the intake and exhaust valves, just like on the Civic Vti and the Acura Integra Type R, plus the expertise gained in racing. The principle of the VTEC valve gear is unchanged, but roller rockers are now used to reduce friction.

Thanks to VTEC, excellent volumetric efficiency can be obtained up to very high crankshaft speeds without ill effects on midrange torque, and this has been exploited to further raise the redline to 9000 rpm. The engine produces peak power at 8600 rpm, a figure unheard of in a production powerplant. This in turn is possible—while retaining the reliability and durability expected from a production model—by using a carbon-fiber-reinforced aluminum cylinder block (a technique developed by Honda) and bearing materials used in

The Competition

	Honda S2000	BMW Z3 2.8	Mazda MX-5 Miata	Porsche Boxster
Current list price	est $35,000	$37,870	$20,220	$41,785
Engine	2.0-liter dohc 16V inline-4	2.8-liter dohc 24V inline-6	1.8-liter dohc 16V inline-4	2.5-liter dohc 24V flat-6
Horsepower	est 240 bhp @ 8600 rpm	193 bhp @ 5500 rpm	140 bhp @ 6500 rpm	201 bhp @ 6000 rpm
Torque	na	206 lb-ft @ 3500 rpm	119 lb-ft @ 5500 rpm	181 lb-ft @ 4500 rpm
Transmission	6-speed manual	5-speed manual	5-speed manual	5-speed manual
0–60 mph	est 5.5 sec	6.5 sec	8.0 sec	6.1 sec
Length	162.0 in.	158.5 in.	155.3 in.	169.9 in.
Width	69.0 in.	68.5 in.	66.0 in.	70.0 in.
Height	na	50.9 in.	48.3 in.	50.8 in.
Wheelbase	94.5 in.	96.3 in.	89.2 in.	95.1 in.
Track, f/r	59.0 in./59.0 in.	55.6 in./58.8 in.	55.7 in./56.7 in.	57.3 in./59.4 in.
Curb weight	est 2800 lb	2870 lb	2470 lb	2820 lb

the company's racing engines. To achieve such high crankshaft speeds, Honda has not had recourse to an exceptionally short stroke, the bore and stroke being approximately equal. Needless to say, the car meets all Euro 2000 emissions standards and is ranked as a Low Emissions Vehicle (LEV) in the U.S.

Honda obviously believes that the real sports-car enthusiast ultimately wants a car that feels as much as possible like a racing car. That is why a high-revving atmospheric engine was chosen, and that is why six gears are provided to exploit its enormous potential, and that is why rear-wheel drive is a must. The 6-speed gearbox, operated by a short lever, is new and has triple-cone synchromesh on the three lower gears for quicker and smoother engagement. Final drive is by a Torsen limited-slip differential. Nonetheless the car's tail can be stepped out to a significant degree.

It's surprising that the S2000, having been developed from the V-5-powered SSM concept car, has a 4-cylinder powerplant. The reason, according to Honda, is the more compact shape and lighter weight of the four.

■ **Nestled neatly against the firewall is Honda's 9000-rpm, 240-bhp 2.0-liter inline-4, its VTEC hardware evidently miniaturized to fit beneath the surprisingly narrow cam cover. The S2000's cockpit is comfortably snug, with a wide center console and high beltline. At far left, a push of the red button spins the starter.**

Body and chassis

ANOTHER SURPRISE OF THE S2000 IS that zinc-coated steel has been chosen for the body structure, rather than aluminum, which is used in the Acura NSX. (Incidentally, the chief engineer of the S2000, Shigeru Uehara, is also the creator of the NSX.) This may seem a retrograde step, but closer examination reveals that in this case the choice of steel is logical. The NSX is an expensive car, designed to meet the best from Ferrari and Porsche head-on. It was also originally designed as a coupe benefiting from the rigidity a fixed roof confers to the structure. The S2000 is a roadster designed to compete with the medium-priced open 2-seaters already on the market, ranging from the Mazda Miata to the Porsche Boxster, a group that also includes the BMW Z3 and the new Audi TT, whose roadster version will be in the showrooms next spring. With that sort of competition, the price of the S2000 had to be kept at a reasonable level. And steel is less expensive than aluminum and it is also less expensive to assemble and repair in the case of minor damage. The only large component of the S2000 made of aluminum is the hood, a completely unstressed part. Having a modulus of elasticity higher than that of aluminum, steel is more suitable to provide an open monocoque with adequate rigidity. And finally, it must be recognized that, as far as weight reduction is concerned, the aluminum construction of the NSX did not really pay off: Given comparable equipment, the all-steel Porsche 911 is marginally lighter than the NSX.

Much of the S2000's rigidity comes from its massive central backbone

through which the short driveshaft runs. This, combined with the large closed-section side members and the front and rear bulkheads, forms a very rigid structure. The front and rear suspensions are carried by subframes rigidly mounted to the body structure although they are designed to allow some fore/aft compliance. Front suspension is by double transverse wishbones, more expensive than MacPherson struts but allowing more freedom in the choice of the geometry. The rear suspension departs from current Honda practice by being a multilink system providing toe variations designed to stabilize the car when cornering or braking. Coil springs are used at the four corners and there are anti-roll bars front and rear. Brakes are discs all around, vented at the front, operated through a vacuum booster and benefiting from ABS. A novel electric speed-sensitive power steering pump (whose action is hardly noticeable at speed but is a definite plus in city traffic or on mountain roads) has been adopted for the S2000. It is entirely integrated in the rack housing and is concentric with the rack.

Even though the engine is located behind the front-wheel axis in the interest of 50/50 weight distribution, neutral handling and a low moment of inertia, the S2000 is a compact car, its wheelbase being only 94.5 in. and its overall length 162.0 in. Early prototypes were even shorter, but before the car was finalized, the rear overhang was slightly increased for the benefit of the luggage compartment and better visual balance. Overall width is 69.0 in., narrow enough to make the car fun to drive on winding secondary roads, but wide enough for a track of 59.0 in. With the outer sidewalls of the tires almost flush with the fender openings, the S2000 conveys an impression of great stability. There are no frills about the body design, which looks purposeful and owes its beauty to its obvious functionality. The front air intake is the shape of current Honda grilles, but there is no grille, just recessed wire mesh protecting the radiator. It is a pity that the stylists did not remember that in most countries a front number plate is required. As no provision is made for it, in most cases the smooth and well balanced front view will be spoiled when the plate is added.

Rollover structures are provided behind the seats and the soft top is operated electrically, which I deplore. Modern roadster soft tops are so easy to maneuver that—especially in a car designed for performance and the fun of driving—the weight of the electric power mechanism should have been saved, at least in the base version. The safety regulations regarding frontal, side and rear impacts, rollover deformations, airbags, etc., add so much weight that all high-performance roadsters, the S2000 and Porsche Boxster included, now weigh 2750 lb. or more, so why include a nonessential mechanism that adds more weight? Why not make the power top an option for the non-purists?

■ **The view through the fat 3-spoke wheel reveals a half-moon bar-graph tach, a large digital speedometer display and smaller horizontal readouts for coolant temperature and fuel level.**

Interior

THE WINDOW LIFTS ARE ELECTRIC too, but the seats thankfully are not, offering manual adjustments for fore/aft location and for seatback angle. There is no adjustment for height, however, and I personally would like to sit just a little higher. The seats themselves are wonderfully contoured Recaros that provide first-class lateral support. For a more open feel, the cockpit is not divided by a partition linking the cowl to the rear deck, as was the case in the SSM show car. Entirely finished in black, the cockpit is rather austere and so is the electronic instrument panel, whose analog tachometer and digital speedometer light up only if the ignition key is turned on. Esthetically, the system can't hold a candle to conventional round instruments, but there is no doubt that it represents the future. As several functions can be shown, as required, on a single display, it saves space and weight. And though disappointing to the eye, the instruments are very easy to read under all circumstances.

Driving impressions

ONCE COMFORTABLY INSTALLED IN your Recaro, you turn the ignition key...and apart from the instruments lighting up, nothing happens: In the best racing-car tradition, the starter motor responds to a push on a separate button and the engine instantly fires up, idling silently and regularly. There is nothing to remind you that up front is a tiger of an engine ready to acknowledge the shortest movement of your right foot by revving to a screaming 9000 rpm. In dense urban traffic, the engine is as tractable as any touring car's, the clutch works smoothly without requiring abnormal effort, and the high-geared steering is quite light. With the soft top up, the view to the rear three-quarter is not a strong point but otherwise it's excellent, the hood contours being well in view.

But wait until you come to the open road, especially to the S2000's favorite element, winding secondary roads, particularly in hilly surroundings. Here, the combination of a fabulously eager engine, a wonderful close-ratio 6-speed gearbox, pedals ideally suited to heel-and-toeing and one of the very best power steering systems I have ever used (it's electric, remember) makes the Honda a terrific driving machine. When using the engine as intended, that is, keeping it between 5000 and 9000 rpm, there is no question that it is noisy. But the continuous flow of power is a unique experience, and the engine is so eager that one feels almost frustrated to have to shift up when the 9000-rpm redline is reached! On the car I drove—a preproduction model—there was one minor fault: When briskly resuming acceleration after coasting for a short stretch, there was occasionally a brief hesitation before the engine picked up. I was told this was caused by the engine-management unit and would be attended to before production cars left the assembly line, which is right next to the NSX's in the Tochigi factory.

The chassis is fully up to the engine's performance and the structure is commendably rigid, with no cowl shake evident even on bumpy roads. A fairly hard suspension (which by sports-car standards is by no means uncomfortable) with strong anti-roll bars reduces roll to a minimum. With the help of the quick steering, excellent Bridgestone tires, superb brakes and the car's low polar moment of inertia, the S2000 exhibits neutral handling and great agility. The cornering attitude also responds well to lifting off the throttle, a welcome help whenever a quick line change is required.

For a 2.0-liter, the S2000 is a very fast car. Its top speed lies around 150 mph (which was reached on an appropriate road), and its stability was unaffected by high speeds. Sustained high speeds, however, are not really where the Honda feels best. The combined noises of the high-revving engine and the soft top reach a level that, on long journeys, could become tiring and tedious.

Of course not everyone wants to fully exploit the car's performance all the time. Though the Honda has been designed to be driven fast, it is nevertheless a practical car offering adequate luggage space for two and is quite happy to be driven leisurely, when driver and passenger can still enjoy its fine handling and nice steering. The tiger does not wake up until 6000 rpm is reached, and below that what you get is a well-engineered, efficient and well behaved 2.0-liter roadster with an engine developing torque adequate to its capacity, quite happy to be driven quietly. As usual with a Honda, workmanship is excellent and all accessories are of good quality, but a passenger grab handle and additional stowage would be welcome additions.

With its amazing engine, state-of-the-art chassis and purposeful styling, the Honda S2000 is a real connoisseur's car that will provide a high level of driver satisfaction and pride of ownership.

■ **Manually adjustable, amply bolstered Recaro seats offer proper sports-car support. Handy console storage bins augment the trunk, whose floor incorporates a surprisingly deep well.**

Styling Analysis

BY TOM KELLOGG

- A car that responds quickly and has a high level of engineering refinement, that's Honda's new S2000. And this is strongly conveyed the moment you see the car, with its classic design and proportions.
- The nose looks as if its shape was derived by a quick shove through heavy air. Beautiful organic engineering, as every line stretches from front to rear without disturbing the aerodynamics and stability.
- Considering the engine's potency and location, the car's proportions are well thought out and appropriate. The body lines are simple, without clutter, not trying to look trendy. This design will endure.

Design features of the rear have been channeled by the same forces that have acted on the front. From nose to tail, the S2000 is tastefully executed and will look great for years to come. It totally conveys performance!

SPORTS COUPE COMPARISON: BMW 330Ci vs. Acura CL Type S

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12 SPORTS CAR SHOOTOUT

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  911 Turbo vs. Boxster S
- **ACURA/HONDA**
  NSX vs. S2000
- **BMW**
  Z8 vs. M Roadster

Honda S2000 vs Acura NSX

The "fun car" holds its own with the dignified NSX

Honda S2000

AFTER A SHORT STINT IN THE WET ON the excellent Thunderhill Park track, an extremely challenging, smooth-surfaced circuit with a variety of high- and moderate-speed twists and turns, I returned to the pits to compliment the driver of the yellow Ferrari that I had been following. The driver, Dennis Simanaitis, went on to explain how easy it was to drive the 485-bhp Maranello in the wet. A few other editors, too, had been perfectly at ease with their cars in the rain.

This contrasts greatly with what I experienced in Honda's S2000.

HONDA S2000	
Price as tested	$32,477
Engine type	2.0-liter dohc 16V inline-4
Horsepower	240 bhp @ 8300 rpm
Torque	153 lb-ft @ 7500 rpm
Transmission	6-speed manual
Tires	Bridgestone Potenza S-02; 205/55R-16 89W f, 225/50R-16 92W r
0–60 mph	4.9 sec
Braking 60–0	134 ft
Lap time	2 minutes, 17.66 sec
Slalom	65.9 mph
Skidpad	0.90g

The Honda S2000 is definitely a "driver's" car. At speed on the track, rain or shine, the S2000 requires unwavering concentration. But do it right and you're rewarded with a tremendously satisfying driving experience.

At the front, no matter what the conditions are, the car just grips and grips. You're more likely to experience a bit of throttle-induced oversteer trying to get the power down coming out of corners before you would feel any front-end plowing going into a corner. In the wet, however, the rear of the car required constant monitoring. Let your guard down for but a moment and you may find yourself spinning off into the grass.

When it comes to high-performance driving, these are just the opinions of a hack. So I asked our hot-shoe Steve Millen for his take on driving Honda's little 240-bhp red rocket.

"Is the S2000 the most difficult car of the group to drive in the wet?" I asked. Steve pondered the question for a brief moment and affirmed my suspicions. I then added, "So, for a driver of your ability, this car is a lot of fun?" A wry smile appeared on his face. "Oh, a *lot* of fun," he replied.

The S2000's only weak point is its lack of low-end torque. There is virtually no power until the VTEC variable valve timing kicks in around 6000 rpm. You can either learn to accept the lack of grunt under normal street driving conditions (in the 2500–4000-rpm range), or place your order now for the set of hearing aids you'll need after spending an extended amount of time in the 9000-rpm neighborhood.

With the S2000, Honda has proven to the world that it is truly a leader when it comes to getting a lot of horsepower out of a small-displacement, high-revving, production car engine. A change in camshaft, the engine-management system, and a slightly reduced redline to produce more usable low-end power would make the S2000 experience even more memorable on both road and track.—*Jim Hall*

■ The S2000's high- and smooth-revving inline-4 gave Hall (far left) an agile go-kart feel around Thunderhill Park. However, Mitani (below) likes the more robust power output from the mid-mounted V-6 in the NSX, on both road and track.

Acura NSX

ONE WOULD NO DOUBT HESITATE TO sing the praises of a 10-year-old car among a formidable group of new up-and-comers such as these. Not only does a car's appearance become dated after a decade, its performance is eventually eclipsed by less expensive machines. This seems to be the case with the Acura NSX.

So what am I doing defending it? Simple: I feel it's the best all-rounder in this test. Many will point out that its "little" sister, the Honda S2000, is capable of faster acceleration times than the Acura at about half the cost; but most probably have never driven the compact roadster on a commute for more than two hours.

At speeds of more than 55 mph, the little Honda's cabin becomes a cacophony of engine, wind and road noise, all of which starts resembling a Limp Bizkit concert with Metallica and Kid Rock jamming in the background. Alternative rock fans may think this sounds good, but after about half an hour, you will be longing to pull their amplifier plugs.

The NSX, on the other hand, cruises to a more serene melody. The 3.0-liter VTEC V-6 stays relatively hushed during normal even-speed cruising, and only makes its presence heard when you mash the throttle pedal. Then, it rewards you with a growl as menacing as any race car, accompanied by a burst of head-snapping acceleration.

I must admit that the S2000 was more fun to drive around a racetrack than the NSX, thanks to its compact nature and go-kart-like reflexes. But to get the most out of the S, you'll need to keep the inline-4 spinning at 8000-plus rpm, a task that becomes tiresome after a half day of lapping. (Why is it that people named Jim Hall have an affinity for small, high-strung cars?)

Also, our test NSX seemed to have an alignment problem, resulting in numb steering feel and heavy understeer. Test driver Steve Millen agreed, "This car feels worse than the last NSX I drove," he commented. Still, the mid-engine Acura was able to click off faster lap times around Thunderhill than the S: a testament to the NSX's exceptional handling balance.

As for the others in this test; sure, there were faster and quieter examples, but none provided the overall diversity of the NSX: outstanding performance, optimal comfort, good fuel economy and a less-than-exotic price tag. With a more powerful V-8 engine (which is rumored to be coming in a few years)—not to mention a dramatic face lift and lower price—it won't be just the S2000 the NSX bullies around in tests like these. It'll be others…most likely those shown in the surrounding pages.—*Sam Mitani*

ACURA NSX	
Price as tested	$88,850
Engine type	3.2-liter dohc 24V V-6
Horsepower	290 bhp @ 7100 rpm
Torque	224 lb-ft @ 5500 rpm
Transmission	6-speed manual
Tires	Yokohama A-022; 215/45ZR-16 f, 245/40ZR-17 r
0–60 mph	4.9 sec
Braking 60–0	134 ft
Lap time	2 minutes, 14.15 sec
Slalom	62.1 mph
Skidpad	0.92g