

The Power

Four International Manufacturers—Honda, Ford, Mercedes-Benz and Toyota—Have C

Honda took just three years to win CART's Manufacturers Championship, evolving from the cast-iron block HRX in 1994 to the aluminum block HRH which scored a first win in '95 and then dominated competition in '96, winning 11 races, 12 poles and the PPG Cup, not to mention leading 58 percent of the total race laps. For the '97 season, Honda has produced an all-new engine, called the HRR.

"It's a clean-sheet-of-paper design," said Robert Clarke, general manager of Honda Performance Development in California. "It's smaller, lighter, the packaging is cleaner. We're combining a lot of fasteners and castings, so that they incorporate multiple functions. That way we're losing weight, and the engine is becoming simpler, easier and quicker to build.

"Power is better than last year's engine, if you ran it at this year's (40in.) boost," noted Clarke, "and the driveability's better. We're starting the season at the same rpm where we were at the end of last year. We're just inching up on it to see how far we can take it. Our number one objective—as it always has been—is quality and a high level of performance. So until we're completely assured that the durability is there, we're not going to push the rpm."

1997 Honda lineup: Target/Chip Ganassi Racing, Walker Racing, Tasman Motorsports Group, Team KOOL Green.



Honda



Mercedes-Benz

Mercedes-Benz, remarkably, did not win a PPG Cup race in 1996, although the IC108C engines did lead 454 laps, take seven second places and two poles. By refining, rather than redesigning the product, Mercedes-Benz hopes to rectify that situation in '97 with the IC108D.

"Last year's engine represented a fairly dramatic change from its predecessor," commented Paul Ray, vice president of Ilmor Engineering, the race-engine building arm of Mercedes-Benz. "We revised the entire bottom end of the engine, including the block, crankshaft, connecting rods and pistons—90 percent of the engine.

"This year," Ray continued, "the changes from the C to the D are much smaller and mostly limited to carrying the changes slightly further than we did on the C. But we also had to contend with the rule changes (reduced boost and fuel tank capacity, more restrictive fuel mileage) implemented by CART.

"The decrease in boost levels became an exercise in re-optimizing air flow through the engine which led us to design a new cylinder head," he added. "Lower peak cylinder and intake pressures meant there were some small gains in piston design.

"We also produced a simpler valve train with fewer moving parts. RPM is no different than last year," concluded Ray, "but that's likely to change during the year."

1997 Mercedes-Benz lineup: Marlboro Team Penske, PacWest Racing Group, Player's Ltd./Forsythe Racing, Hogan Racing LLC, Bettenhausen Motorsports.

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Gen the PPG CART World Series to Showcase Their Engine Technology by **GORDON KIRBY**

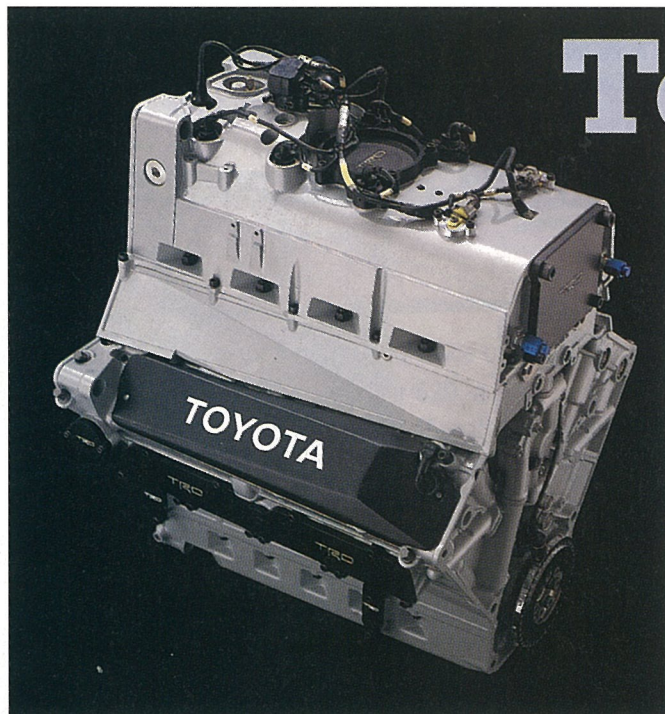
Ford Cosworth-powered cars won the 1993 and '95 PPG Cup titles with Nigel Mansell and Jacques Villeneuve. In 1996, Ford won five races and finished second in the championship, all with Michael Andretti. Ford's Cosworth XD engine continues to be CART's most popular, powering 11 cars this year. The 1997 XD features a new block and cylinder heads and new electronics.

"The new electronic system is aimed at saving weight and improving reliability," noted Cosworth's chief CART engineer Steve Miller. Reliability of both electronic and mechanical components has been a bone of contention the past two years, and winter track testing appeared to confirm that these issues have been resolved for the '97 season.

"The engine is running 500rpm quicker than at the end of last year, but running very reliably," declared Miller. "We have more power than (we had) at 45in. (of boost) a year ago. We're still trying to pull rabbits out of hats."

Ford's engineers insist the company's PPG Cup program is not about simply supplying teams with engines but about "technical partnerships." In fact, Bobby Rahal said this is the main reason his team has switched to Ford. "Because we have access to Ford's wind tunnel, vehicle dynamics and testing procedures," noted Rahal, "it really is a genuine technical partnership."

1997 Ford Cosworth lineup: Newman/Haas Racing, Team Rahal, Brahma Sports Team, Payton/Coyne Racing, Davis Racing, Della Penna Motorsports and Project Indy.



Toyota entered the CART arena last year with Dan Gurney and Arciero-Wells. According to Dave Wilson, vice president of Toyota Racing Development (TRD), "We took an extremely aggressive approach last year. Packaging was our guiding design criteria." The 1996 RV8A was a small, light unit; but changes in CART's aerodynamic rules opened up the area beneath the engine, making the smaller package less valuable.

"This year," said Wilson, "we believe we have an engine with much greater potential to make power, with packaging a secondary consideration. Although, because we went back to the drawing board, we're a little behind schedule to start the season."

Toyota continued developing the RV8A over the winter and started the year with both the RV8A and all-new RV8B. When the RV8A is retired depends entirely on how quickly the RV8B becomes competitive. "It's also a function of the availability of engines," said Wilson. "We're supporting four cars all season; and going into the year, the supply of engines and parts is a serious consideration."

"Our goal this year is to be competitive," said John Koenig, TRD's president and CEO and vice president of motorsports for Toyota Motor Sales. "I think early in the year that's going to be difficult; but I think, later in the year, we'll be very competitive."

1997 Toyota lineup: Arciero-Wells Racing and All American Racers.