

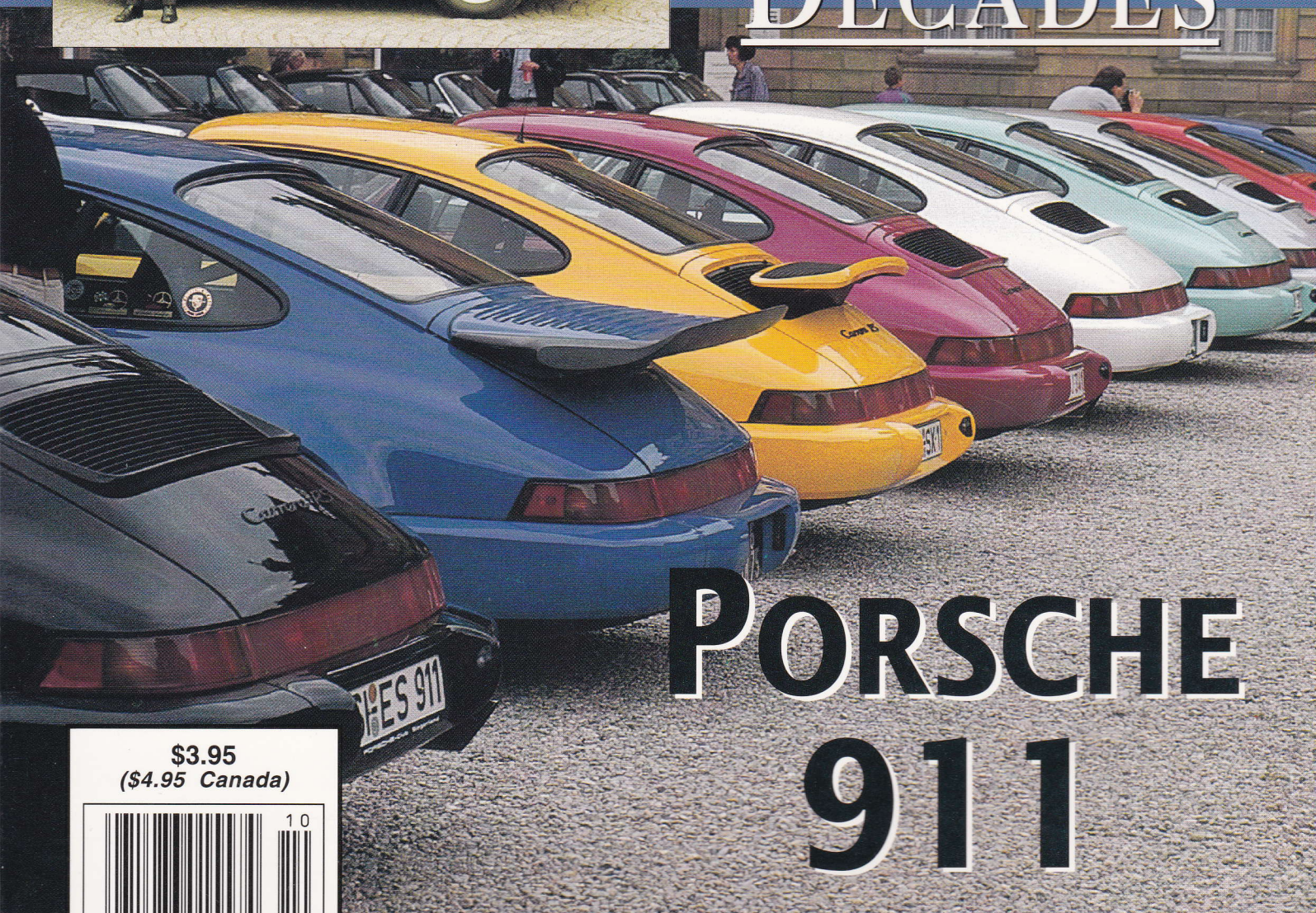
# Excellence

OCTOBER 1993

## A Magazine About Porsche Cars



## THREE AMAZING DECADES

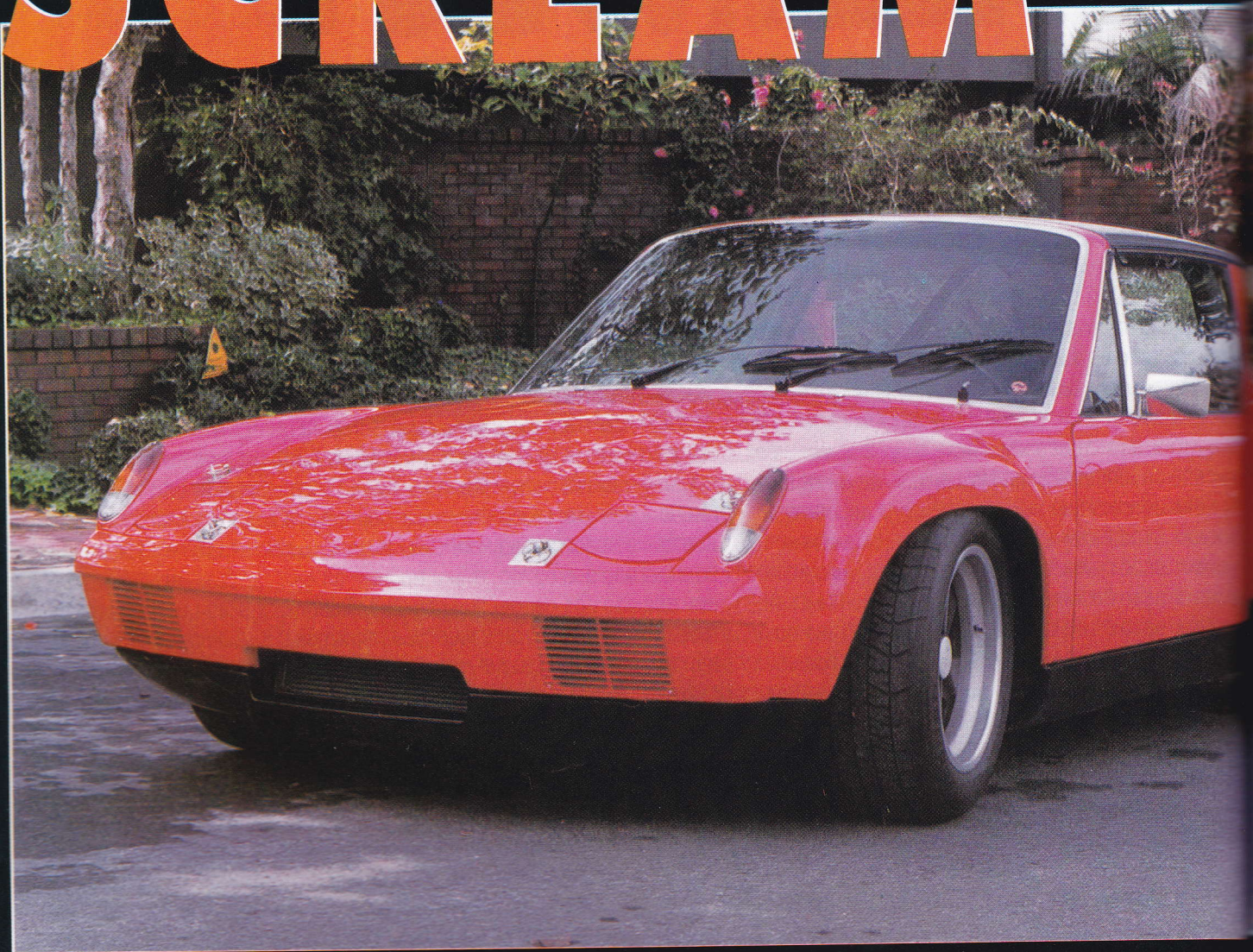


# PORSCHE 911

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# TANGERINE SCREAM



*by David Colman*

**B**ob Gagnon may be an anesthesiologist, but his 914-6 is no sleeper. When it comes to Porsche restoration, the difference between a perfectionist and a purist is often pronounced. A perfectionist seeks the best solution to

a problem while a purist seeks the most original.

When Gagnon decided to modify his stock 914-6, he drew inspiration from both camps. His stated goal was to build a club sport version of the 914-6 specifically tailored to time trials and autocrosses. Although the factory did build a limited number of 914-6

GTs, all the parts that went into them were also available through the spare parts list that Porsche published in March 1970. This catalogue enabled competitors to bring their 914-6s to GT specifications by ordering and installing the appropriate chassis, engine and body parts.

Gagnon, reasoning that these

*photos by author*



aftermarket GTs were in essence kit cars, resolved to "get as much of the kit as I could," and pretend "I was building a GT in 1970 for time trial and autocross." When opportunity arose, however, the perfectionist overcame the purist. Gagnon concedes that "I would do everything just as the factory did it unless I could think of a better way to

do it." Given that his project didn't begin in earnest until 1985, and ran to 1989, Gagnon and his expert crew had an armada of "improvements" to choose from that had been unavailable to the factory back in 1970.

If you like, you can think of this "GT" as the car Porsche would have built had the 914-6 stayed in production for 15 years. While Gagnon's car is rigorously original looking from the outside, it is brimful of technological innovations under the skin which distinguish it from being a mere GT replica.

Creating an imitation GT would have been an arduous but ultimately pedantic task for Gagnon. While he kept the original packaging intact, he ensured that the final product would be vastly better than the original from Porsche ever was. The 911 has enjoyed the luxury of 30 years of continuous development. What would the 914-6 be like today with that kind of breeding? Probably a lot like this tangerine screamer. Dr. Gagnon's clinical trial confirms that Porsche's stillborn infant would have matured brilliantly had it been nourished with the same lavish attention that was always doled out to the 911.

Early in 1980, Gagnon became the third owner of 914 043 0599, which was assembled at the Porsche works in February, 1970. It came to him with 45,000 miles on the clock and funky "ding doomer" guards glued to the doors. But more importantly, the six was rust-free, with original paint on all panels. Driven so infrequently that there was dust everywhere, the 914 immediately became a project car. Teardown number one entailed turning it into a typical autocrosser of the period. Out went the wimpy front sway bar and tippy 5.5 x 15" factory alloys. The front struts and rear coil-overs were replaced with Koni adjustable dampers, including hard-to-find double pumper Konis in the rear which could be tweaked for both jounce and rebound.

The competition portfolio included a 2.7 liter carbureted engine upgrade, a 916 gearbox conversion, GT brake rotors and calipers, and a Mazda RX-7 front oil cooler which received cooling air through existing holes in the trunk which Gagnon unplugged. While the upgrades made the tangerine toy more entertaining than ever, Gagnon had a more drastic conversion in mind. Through the early eighties, he had been collecting as many GT parts

as he could find in the classifieds. His aim was someday to convert his Porsche to full GT specifications.

Gradually, the parts began to accumulate. The garage bulged with lightweight, balsa-wood reinforced front and rear lids, oiling system lines

## **What would the 914-6 be like today with that kind of breeding?**

and fittings, pneumatic headlight actuators, and dozens of other parts Porsche had made available in March, 1970 through their special catalog — "Spare Parts List for 914-6 Competition Type" (Ersatzteilliste für Typ 914-6 Wettbewerbsausführung). Even in those days, the competition among collectors for such parts was fierce, as this vignette about securing a GT steering wheel (Part No. 914.347-.901.00) illustrates:

"No matter what time in the day I got *Panorama*, I'd read the ads instantly. When I saw a GT steering wheel for sale, with a thicker rim than standard, I called immediately, but some guy in Canada had already spoken for it. But I called every day for a week to see if the money had come in on it. Finally, the owner called to tell me he hadn't received payment, and it was mine for the original price plus \$50. I said how do you want your money... That thing came to me in a polyethelene bag that said Porsche on it. It had never even been used."

With most of the required merchandise on hand, Gagnon turned the car over to Don Araki, owner of Araki Engineering in San Diego, California. Araki had made a name for his talent by developing a four cylinder 2.5 liter 914 to the point that it had won several IMSA GTU class events in the hands of Wayne Baker. The ultralight flyer, which finished fourth in the GTU standings in 1981, and won the Sears Point round with ease, taught Araki how to reinforce the 914 chassis for maximum effect. He applied those lessons to the Gagnon car, effectively turning it into the GT that Porsche would have built — had they continued to develop the 914-6 over the years.

The process started where Porsche left off in 1970. At that time, the factory

solved the chassis flexing problem by offering a reinforcement kit for the rear fenderwells and trailing arms that allowed the 914 to manage the power and torque of a 906 specification 2.0 liter engine. But the 2.7 liter six already installed in Gagnon's car called for more drastic reinforcement, and Araki knew exactly how to proceed. As Gagnon says, "Araki knew how these cars break and flex, so it was his idea to put the tubes where they are."

The tubes are everywhere. Gussets reinforce the front suspension mounting points as well as the front stabilizer bar mounting bosses. A transverse reinforcement tube which houses the front sway bar not only adds to lateral stiffness, but also facilitates removal of the bar. Augmenting the factory stiffening kit in the rear is a tubular sub-chassis which extends from the transmission mounts in back to the fenderwells in front.

Longitudinal tubes run from the transmission mounts to the rear shock towers, through the engine compartment, and into the roll cage. Lateral tubes spanning the rear trunk and engine compartment anchor the longitudinal members.

In addition, the floor area under the pedal box is reinforced to withstand the imposition of loads from the added sub-chassis. Araki's tubular handiwork has made this 914 so stiff that the origi-

nal factory reinforcements to the rear fenderwells have become redundant.

Triangulation is critical to the car's resistance to deformation. A lattice-work of tubes connect the front and rear suspension points to the roll cage. For example, in the rear, the tubes originating at the transmission mounts pass through the floor of the rear trunk and connect to the rear shock towers. Gagnon explains the theory — "the engine is supported by two transmission mounts in back and one engine mount at the front of the firewall. So all the weight of the engine is pulling down across that span of sheetmetal in the trunk. By bringing those tubes from the transmission mount upward, you distribute that load directly to the shock towers."

The roll hoop design is as much a product of the owner's specifications and physical size as Araki's expertise. Gagnon requested that the entire structure be removable for maintenance and aesthetic reasons. Though Araki initially demurred, the two eventually compromised: the structure inside the passenger compartment would be removable, while the tubes in the rear trunk would not. In addition, the design of the interior hoop had to meet strict height requirements, since Gagnon's helmeted, six foot, 215 pound frame needed to fit beneath the bar, which in turn needed to fit

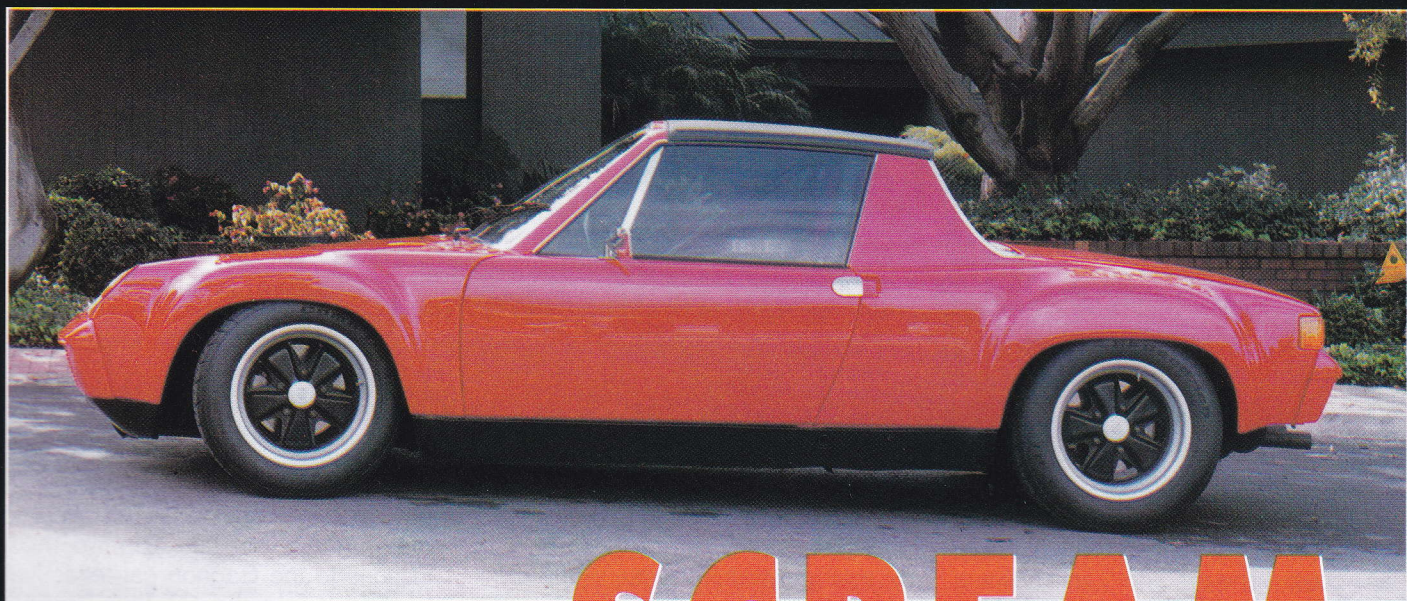
beneath the roof.

The end result is a marvel of intelligent packaging. The 21 pound top is still removable, and Gagnon regularly pulls it off for speed events to lighten the load. It even stows in the original position in the rear trunk, thanks to some trick fabrication work by Araki.

The roll cage's removable side braces allow the car to be used for street work without hindering cockpit access. For such street usage, the braces are absent, and the stub ends of the tubing are capped with orange plastic covers. When the GT goes racing, the braces can be installed in a matter of seconds, thanks to Araki's ingenious tongue and groove joinery. Milled joints enable the parts to mate with the precision of a rifle bolt sliding home. Engagement even makes the same "ker-chunk" noise typical of bolt action.

Though Gagnon regularly removes and installs the door beams, he has yet to dismantle the rest of the cage.

While the original plan called for nickel plating the entire structure inside the car, no plating tank could be found large enough to accommodate the roll hoop in one dip. So the apparatus was powder-coated black instead. The tongue and groove joints presented a special problem, since powder coating's thick finish would have ruined the careful fit. Masking



TANGERINE SCREAM

and painting took care of that problem, but Gagnon still misses the nickel plated structure he originally envisioned — “I liked the dull nickel appearance, plus plating would have solved the tongue and groove fit.” On the other hand, the satin black roll cage is more faithful to GT appearance standards.

The rigid platform allowed Araki to carry out suspension modifications that would have been unthinkable in a standard 914. For example, at the front, NMB monoball spheres replace the rubber bushings conventionally found at the upper ends of the struts. Similar monoballs hinge the rear trailing arms, and others serve as lower mounts for the double adjustable Koni rear shocks.

These monoballs are solid spherical units which replace the deformable rubber components used on the stock vehicle. Monoballs reduce suspension compliance and promote razor-sharp handling. But they do so at a cost, feeding loads into the chassis that may far exceed design specifications for the stock, spot-welded 914 platform. Araki's semi-space frame chassis, however, puts the monoballs to good use, allowing heavy duty front and rear suspension componentry to work without torquing the chassis unduly.

Koni struts anchor the front end. Using externally adjustable racing

shock inserts, these units are 19 mm shorter than stock, with their spindles raised 18 mm to compensate, a la 911 RSR. The steering arm has been corrected for bump steer, and a pair of 22 mm torsion bars complete the modifications. For fine tuning, Gagnon can change the settings on his 19 mm front sway bar, which features adjustable NMB rod end drop links. The rear suspension reflects similar fanatical attention to detail. Boxed and stiffened trailing arms leverage Koni shocks which are adjustable for jounce and rebound. The Konis also feature threaded collars to expedite height adjustments. Coil-over springs rated at 250 lbs./in. complete the picture at the rear.

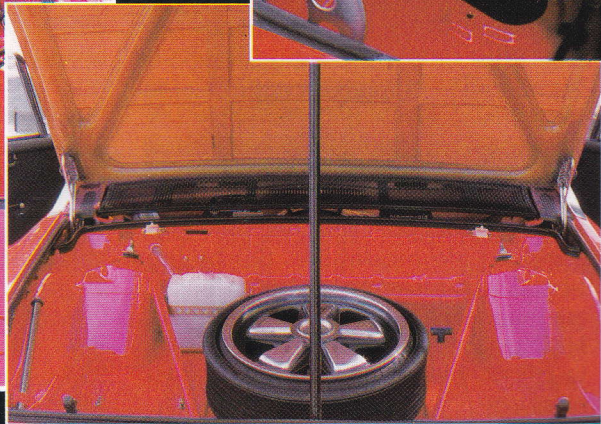
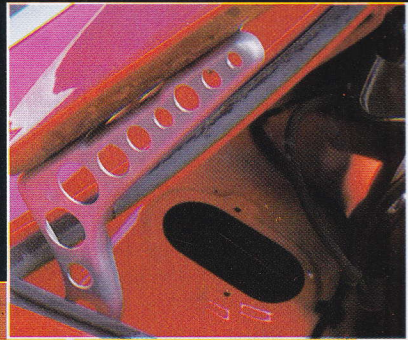
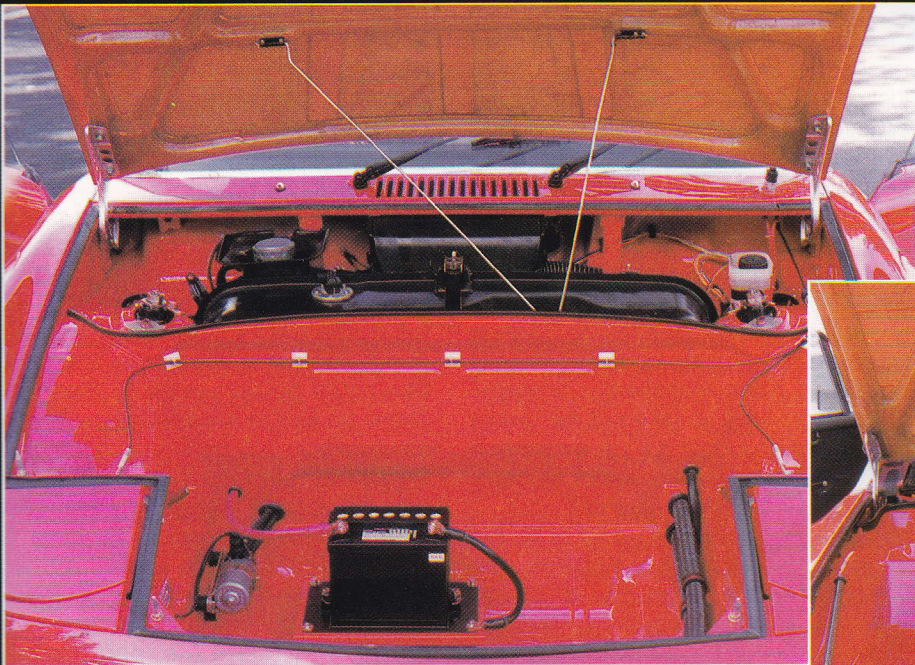
Up front, 72 mm wheel studs, 27 mm spacer plates and 8" x 15" Fuchs alloys increase track width by 118 mm, while 66 mm studs, 6 mm spacers and 9" x 15" alloys bump rear track 102 mm over stock. The front wheels mount BF Goodrich Comp T/A 225/50 x 15 rubber, the rears carry 245/50 x 15 tires. For racing purposes, Gagnon uses 7" and 8" x 15" rims with 23 x 8.0 x 15 Goodyear cantilever sidewall slicks up front, and 23 x 9 x 15 slicks in back. The race rubber took him to second place in the tough M2 Class at San Diego's 1992 Parade Speed Event. With some satisfaction, he points out that “the guy that beat me

trailed his car in. I drove mine over to the event.”

Between those tubes that delineate the engine compartment, throbs a highly evolved 2.681 liter engine. It uses 90 mm Mahle forged Nikasil racing pistons. By replacing the original 66 mm, 2.0 liter crank with the 70.4 mm unit introduced on the 2.4 liter engine, Gagnon boosted displacement to 2.7 liters and output to 240 horsepower. The owner built the engine himself, and endowed it with 40 IDA/3C Weber carbs, 39 mm venturis and 906 atomizer tubes. The Webers feed 46 mm intake valves, and combustion is controlled by a pair of 1967 911S 901/02 camshafts.

38 mm exhaust valves exhale into 37 mm ports which lead into a specially constructed exhaust built to Gagnon's specifications by Bill Schlossnagel. Gagnon “figured out the exact diameter and length for primaries, secondaries and collectors, then went out and got the tight radii bends for the bundle of snakes.” The system uses 16 gauge steel, and 1-5/8" tubing for the primary pipes.

The original plan called for using a factory rally exhaust which had been acquired in the parts hunt. This unit consisted of a pair of headers which bolted to megaphones which fed into a straight-through muffler. Gagnon was about to adapt the unit to his project



**The front and rear storage compartments are part 914-6 GT, part 914-fantasy. The balsa wood reinforced decklids are authentic. The drilled and lightened brackets are not.**

when John Daniels of SSI, Inc., pointed out that because the primary pipes varied tremendously in length, the factory system lost its effectiveness. Gagnon "went out and measured the pipes," found that Daniels was right, and decided that "the thing just wasn't worth fooling with." But he liked the unusual appearance of the system enough to commission a muffler which duplicated the look of the rally unit when viewed from the rear of the car. Thus a pair of healthy looking 2 3/4" exhaust stubs poke out the rear, just like the ones on the factory race unit.

To ensure the longevity of the engine, Gagnon performed a number of tricks when dressing out the case halves in his rebuild. For example, he shuffle-pinned the main bearing webs to add rigidity to the aluminum case assembly. He also reassembled the motor with dilavar studs, late-style oil pressure bypass, oil squirters for the pistons, and improved magnesium chain housings. An updated Carrera-type oil pump improves flow from a suction venturi pick-up, and a bowl design sump cover pan facilitates oil changes because it contains a drain plug.

Thanks to a lucky find by a European friend, Gagnon was able to install original GT ducting in the front trunk for the oil cooler. The only thing missing was the oil cooler itself. After virtually exhausting every avenue for this scarce part, Gagnon lucked out when he called Race Force. Everyone told me there was no way I could get the part, but it turned out to be the same as the 2.8 RSR oil cooler — except the RSR has two mounting ears on it, and the part number is two digits different. Race Force got the RSR part in less than a week! I had been calling all over the U.S., but the last place I thought to look was the factory."

What appears to be a typical GT twin plug ignition system may look original, but appearances can be deceiving. Gagnon explains the visual subterfuge — "The twin ignition uses a custom-built distributor with Marelli cap and rotor appearing the same as a GT, but with pointless magnetic triggering. Late model 911 CD boxes from Bosch resemble 914-6 units, but are magnetically triggered. A separate MSD system with programmable soft-touch rev limiter can be used alternatively for competition."

Gagnon, however, did more than just disguise new components with old

shrouds. He re-engineered the factory installation of the battery and fuel pump to improve performance and accessibility. The battery now resides in the front trunk rather than the engine compartment because the relocation avoids a number of complications typical of 914s: "It's easy to boil over a 914 battery, and all that acid drops down onto the suspension mounts. It's very hard to make sure that isn't happening. The extra heat from an increased displacement engine makes boil-over even more likely. I also feel the high mounted stock location doesn't help the car's balance, so I relocated it to as cool and low a spot as possible in the front trunk. It's also offset to counterbalance my weight."

For similar reasons of efficiency and safety, the fuel pump also perches in

***"Everyone told me there was no way I could get the part, but it turned out to be the same as the 2.8 RSR oil cooler..."***

the front compartment. In fact, the factory GTs used a pair of front-mounted fuel pumps, so the idea is not original, but as Gagnon says, the idea makes sense because "the standard plastic lines from the fuel tank to the engine are plastic, they deteriorate, and there are three of them passing through the passenger compartment. Now I have just one, it's Aeroquipped, and it's routed through the heater tube in the side of the chassis, along with the battery cable. Although the pressure line is longer, it has nice, direct suction, and since I used a large dash 6 line, there's almost no pressure drop." While some of the endurance racing GTs used 100 liter gas tanks, Gagnon was unable to locate one, and doubts he would have installed it anyway, since, "you have to take out the whole front bulkhead and it's an enormous project. Besides, who wants to carry 100 liters of fuel in a time trial?"

In keeping with the updates to the engine, fuel and oiling systems, the gearbox also reflects the direction Porsche would have gone had the 914-6 continued in production. After all, the most highly evolved form of 914 was the 916, a streetable 2.4 liter version of the GT6 engineered for pro-

duction in 1972, but never produced. The 916 was the only variant of the 914 to use the 915 - rather than the 901 - gearbox. The 915 unit, introduced for the 911 series to handle the increased torque of the 2.4 liter engine in 1972, was adapted to 914 usage only on the 916. Gagnon describes the modifications Porsche made to the 915 gearbox to make it work in the 916 — "When you look under a 915 gearbox, you notice there's a big flat plate held in place with four bolts. That plate covers the fork that holds the shifter selector. Originally, when they designed that gearbox, they also designed it for the 914, so they had a shift pod that bolts in where that plate went, and a shifter set going forward underneath the clutch and the engine." But don't call the gearbox in a 916 a "916 gearbox," because that designation refers to a 1968 5-speed transmission used in the 908/01 and 908/02 race cars. When Porsche decided against producing the 916, they were left with a number of 915 gearbox conversion parts no longer needed for the project. Those parts, which came onto the American market through Alan Johnson Racing, consisted of a specific case, shifter apparatus, and a unique rear cover plate. By carefully perusing Alan Johnson's mid-70s catalogue, Gagnon learned of the availability of these special parts, but by then Alan Johnson could no longer fill his order. Finally the supply line reopened, but it didn't last long — "I got the last set, and it wasn't even the whole set. It was the rear cover, the shift rails, the shifter pieces, and the console that goes underneath the gearbox. But they didn't actually have the case itself."

Gagnon located the missing part in Long Beach, but it was completely blank, with no studs and no bearing inserts. Yet it served as a valuable tool for comparison purposes. Curious about whether a late model 915 gearbox could be converted to the application he had in mind, Gagnon bought an aluminum 915 case from a wrecked '79 911SC, stripped it, then compared it to the bare magnesium 915 case already in his possession. He decided the 911SC/915 tranny could be modified to work — "in comparing the two, I realized that all the bosses were there on the aluminum case, and that you only had to do some millwork on the inside of the case to turn the differential around." Lest you forget, the

carbox is mounted ahead of the motor in the 911, behind the motor in the 914-6. If you mount a 911 tranny in the 914 without flipping over the differential, the 914 will have five speeds in reverse and one forward gear.

Gagnon explains that flipping the differential involved some rather simple techniques made easier by having an unused pattern case to consult for reference: "If you take the cover off a 911 differential, the first thing you see is the ring gear. Pull that off and you

resembles that of a 914-6 GT, it is not a duplicate. For example, Gagnon felt that certain aspects of the original could stand improvement, like the location of the headlight pull switch. On factory-built GTs, the switch is located beneath the dash, on the left side, near the stock position for the front decklid release lever. But Gagnon mounted his T-pull release on the dashboard, in the normal headlight switch position, because he felt that made more sense for a number of rea-

and steering wheel are factory GT parts. The seats took just as much effort to secure as the elusive steering wheel. A year of negotiation between Gagnon and Kremer 914-6 GT owner Harold Vonk finally brought the coveted but ratty buckets into Gagnon's possession. After a complete makeover, the pair of high-sided race seats took their place in the tangerine six, mounted on proper GT factory frame rails. An original competition-type GT fly-off handbrake nestles next



*914-6 GT steering wheel was most difficult to locate. Updated dash panel uses generic factory race warning lights.*



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Once Gagnon was assured that his 914 would be propelling him forward, he selected a tight grouping of ratios which compare as follows to the stock set found in the original 915 carbox used on the 916:

<b>1972 4-6/915 Conversion</b>	<b>916/915</b>
1ST: 11:35 (3.18)	3.18
2ND: 16:35 (2.19)	1.83
3RD: 20:32 (1.60)	1.26
4TH: 23:28 (1.22)	0.96
5TH: 25:26 (1.04)	0.76
6TH: 8:31 (3.875:1)	4.43:1

Although interior treatment closely

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sons: "I just figured since most of these cars were kit cars, it was up to the builder to decide how he wanted to do it. My placement in the dash makes it easier to use, and makes for a straighter shot than the location in the footwell." The bezel for the T-pull looks like a factory-designed part, and matches the mounting face of the starter button on the right side of the steering wheel. The unit is actually a 906 horn button, which the factory used as a starter button in 917s, 935s and 956s. Gagnon thought it an appropriate addition to his dash, along with a bevy of oversized warning lights in case of fan belt or oil system failure. Though the interior may vary in detail from GT configuration, the overall look and feel of this car bespeaks vintage Porsche racing, from the carpeted dash top to the open glove box. It helps that such important components as the seats

to the driver's seat, facilitating application in racing turns. Porsche described this part (No. 914.424.056.01) as a "Handbremschebel fur Sporteinatz," or "handbrake lever for sports employment."

Some would say that Gagnon's project misuses precious GT parts. That the dwindling supply of real parts should have been saved for more suitable, certified restoration candidates. The Porsche world is replete with dictums. You can't do this...you shouldn't do that. The forensic police are forever on patrol, zealously guarding the purity of the marque. Every now and again, though, an enthusiast who is unfettered by conventional wisdom comes along to stir up the pot. Bob Gagnon is just such a dreamer, and his tangerine screamer proves that with enough foresight, patience and money, you can go the factory one better at their own game.

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