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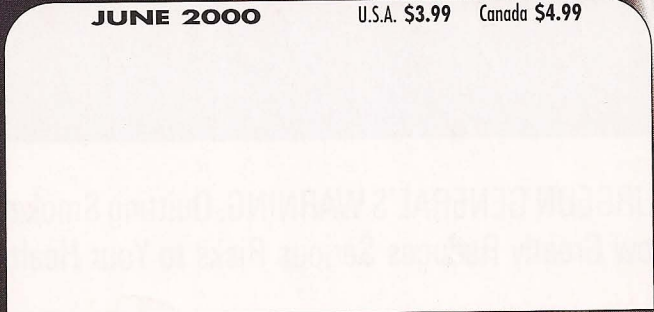
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# CUSTOM CARBURETION

## Part Two

By Donald Nosek

**I**N PART ONE, WE DISCUSSED STOCK VERSUS modified carburetion, track conditions and driveability, and attention to detail. Now we move into the final topics of our custom carburetion series. For anyone who missed the first installment, this must-read can be found in the May 2000 issue of CIRCLE TRACK.

### Size and Synchronicity

Talk to most amateur racers and weekend hobbyists about car engines and the overwhelming theme will usually be, size matters. Everyone will boast about the engine size, the stroke, the compression ratio, and most of all, horsepower. But without digressing into yet another diatribe on how torque is often more important than peak horsepower, let us just say that never have numbers been more confusing and misleading than when referring to a carburetor.

Sean Murphy of JET Performance Products explains, "Some customers will call and say, 'This carburetor I ran against beat you by 2 peak horsepower,' and we'll say, 'Yeah, but what's the average power?' And they'll go, 'Huh?'" We tell them to factor every rpm you run on the track and figure out how much the average power is and how much the average torque is on both carburetors. Then see what it does.

"They'll call back and go, 'Wow, you've got an average 14 more ft-lb of torque and an average 8 more horsepower than that carb does.'"

Murphy conceded that a JET carb may be getting beat at the peak. He also cautioned racers that when they have to drive that carburetor off the corner, it's not going to matter that at the end of the straight, at peak rpm, they have two more horsepower. "They're going to be mad that they didn't have 18 more ft-lb of torque coming off the corner," Murphy says.

As far as the size of a carburetor goes, all the custom tuners claimed they could do more with less than any racer could fathom. Sure, if you're looking for peak horsepower, bigger is usually better. But remember, we're talking about driveability

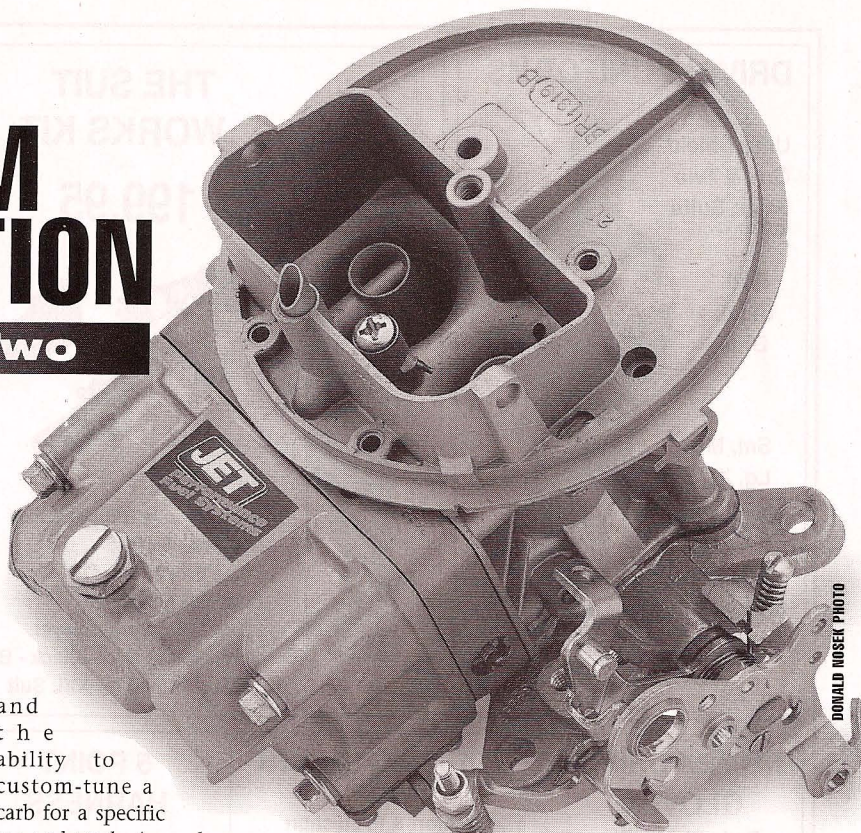
and the ability to custom-tune a carb for a specific car and track. A good example of racers making a lot of power with a smaller carburetor can be seen in NASCAR's Busch Series, where teams are restricted down to a 390-cfm carburetor yet they're still making more than 550hp.

So it's not the size of the carburetor, but rather its synchronicity with the rest of the car and how the entire setup works in unison. "The critical factor you have to maintain is to keep the air/fuel ratio correct," Murphy says. "As long as the motor is getting the correct air/fuel ratio, it will make a lot of power. But you can't just take an out-of-the-box 390-cfm carburetor, slap it on a motor, and expect it to make huge horsepower."

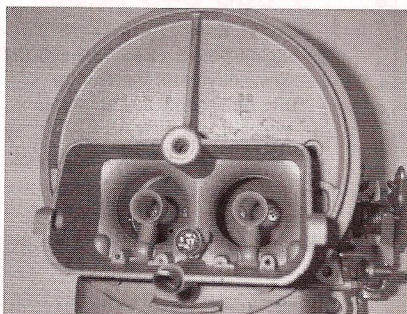
Carburetors are designed to work with the race car and its engine, not independently from it, so engine internals play a large part in proper tuning for maximum performance. For instance, if one engine is using a more efficient camshaft than another, that engine with the better

camshaft can run smaller jet sizes. The smaller jet sizes and upgraded camshaft will help emulsify fuel better because the improved valve timing will create a better burn in the combustion chamber. Conversely, on a sloppier cam, a carb tuner would have to compensate for that flaw by making the carburetor richer. That can be achieved in several ways, including modifying the jetting, emulsion circuit, main well sizes, booster sizes, and other variables.

A high compression ratio is another



DONALD NOSEK PHOTO



DONALD NOSEK PHOTO

This is where it all begins for the fuel system—straight down the venturi of this Holley 4412 carb.

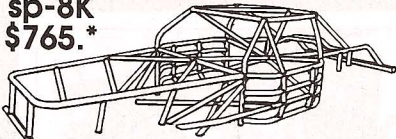
### CUSTOM CARB FACTS

- Custom carbs produce more power than box-stock counterparts.
- Custom carbs maximize driveability, especially off corners.
- You can tailor the carb to your specific race car.
- You can tailor the carb to specific track conditions.
- A custom carb is typically \$200-\$400 more than box-stock.
- Tuners will modify your existing carb to save money.
- Can buy same brand name, with custom tuning and pricing to fit your needs.
- Tuners will recommend changes if your class or track change.
- Tuners offer more personal, one-on-one service.

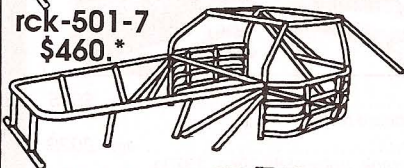


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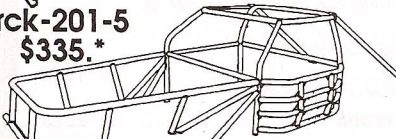
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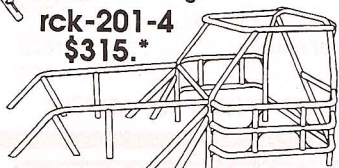
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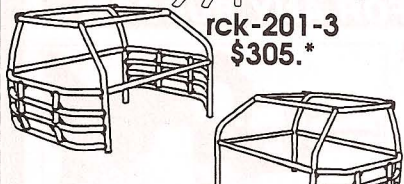
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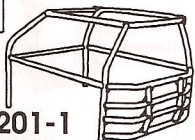
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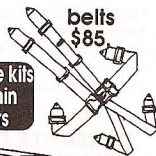
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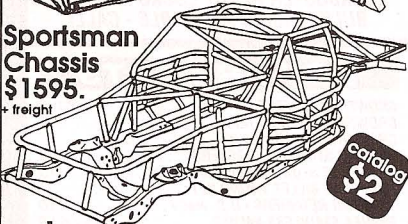
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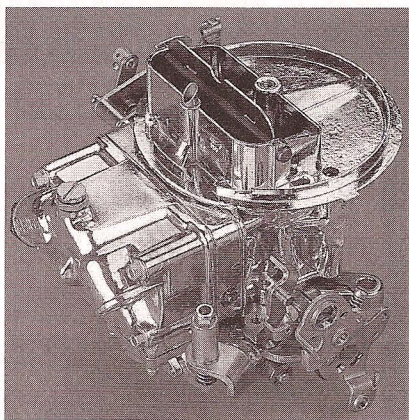
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## Feature Tech



DONALD NOSEK PHOTO

This is the box-stock Holley 4412 carburetor with chrome plating. Yes, it is a proven performer, but no, it won't hold up to a custom-tuned version on the track.

battle cry of uneducated weekend warriors trying to impress in the pits. While it helps produce more power, a high compression ratio is not necessary for building a race-worthy engine. Besides, in many local classes, and in Winston Cup as well, sanctioning bodies are mandating lower compression ratios to curb racing costs and keep speeds down. However, an experienced carburetor tuner can get an incredible amount of power from lower compression motors. "A motor that uses a really low compression ratio, like 9:1, which is a hot topic right now, can't burn highly atomized fuel nearly as well," Murphy says. As a result, JET and other carb tuners go to work on maximizing the efficiency of the fuel curve. Again, they go through every last millimeter of the unit to try to gain critical advantages that will ultimately translate to faster lap times. Also, racers benefit from running lower compression motors in many ways. Not only can you use less expensive gas (probably even pump gas) instead of expensive racing fuel, but it will save wear on the engine internals and extend their life. In addition, racers can avoid the costly expense of buying a

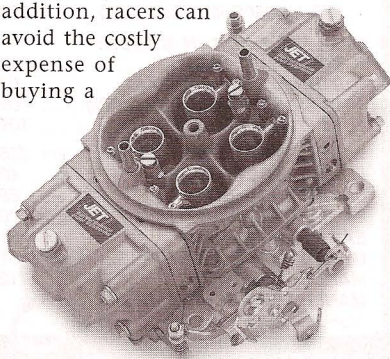


PHOTO COURTESY JET

Behold, the granddaddy of carburetors—the monstrous 950- to 1000-cfm Holley HP tuned to Stage 4 status by JET. If your engine can run it, and you have the money, this one is tough to beat.

sophisticated racing ignition system and many other high-priced components. And thanks to a properly tuned carb, racers can afford to sacrifice some compression ratio without giving up a lot on the track.

### Does the Dyno Lie?

Remember when you would get in trouble as a youngster; your mom would ask what happened, and you would try to withhold key details. She'd accuse you of lying, saying, "Not telling the whole truth is just as bad as lying." Well, a dyno is a lot like a youngster in trouble. It won't lie to you straight out, but it won't offer the full story either.

Dyno testing is important in any race car tuning, as well as a key element for custom-carb tuning. But it's also not the last word. "A dyno is a great tool, but a guy has to use it responsibly and not live and die by it, 'cause you will," says Bob Oliver of Competition Carburetion in Sparks, Nevada.

As we spoke with the tuners, they revealed many instances in which a dyno would fail to account for a particular

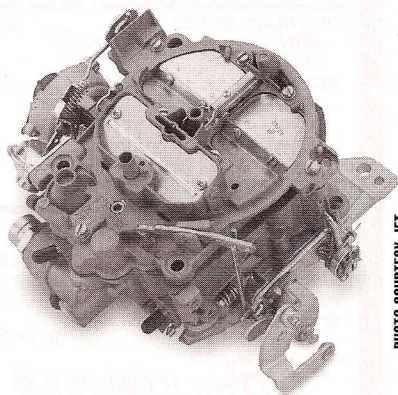


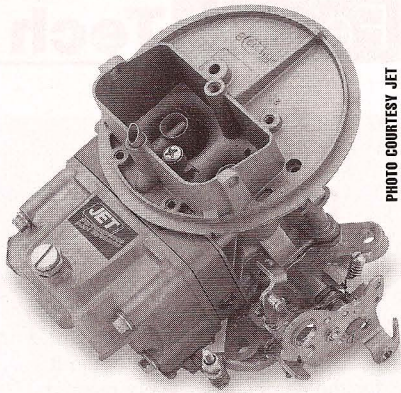
PHOTO COURTESY JET

Rochester's Quadrajet carburetor flows 750 cfm and can be tuned to three different stages from JET, then custom-tailored for your specific application.

aspect of the carb's tuning. Murphy explains, "What we find with two-barrel motors that people screw up on is that a racer or another carburetor builder tends to over-accelerator pump it, and that tends to make it lazy off the corner. That's something that won't show up on a dyno test because you go wide-open throttle then move it through rpm range. You don't look at how it reacts when you move the throttle under load."

It all comes back to how that particular car reacts on that particular track under those specific weather conditions. "Driveability is an extremely important fact in racing, especially in circle track racing," Murphy says. "We spend a lot of time at

PHOTO COURTESY JET



While its 350-cfm rating is less than the more popular 500 cfm 4412, Holley's 7448 remains a big seller. JET's Stage 2 version includes a 1.750 throttle bore (butterfly) instead of the stock 1.690. With its other Stage 1 mods, this is commonly known as "the cheater carb" because it passes any inspection as long as it is not removed from the manifold.

the track testing accelerator pumps and figuring out a lot of different things."

Before he got into the carb business professionally, Bob Oliver of Competition Carburetion was heavily involved in circle track racing, driving Late Models for many years in Southern California. He's still actively involved in racing Legends, among other things, in Nevada and says, "I realize what it's like to still drive. It's not just what a dyno says for numbers, but what the driveability is. I think I put more emphasis on that than a lot of places."

He went on to explain the pitfalls of carbs tuned solely on flow benches and dynos. "Some carbs run fantastically at 8,000 rpm but won't idle," Oliver says. "Plus, no matter where you race, you gotta restart somewhere. And if that thing doesn't have throttle response on the restart, you could lose some spots that you'll never regain in a race." In that respect, Oliver's driving experience and understanding of race conditions pays off. "I was on the other side, and I try not to forget what it's like," he says.

## Out of Sight Service

Of all the great services custom-carb tuners can offer, the most appealing to a circle track racer on a budget is that these companies will tune your existing carb—not just sell brand-new ones. By utilizing a used carburetor—as long as it is in decent shape—racers can save core costs between \$200 and \$500. In fact, tuning customers' used carbs constitutes the majority of Competition Carburetion's business. Sure, you can buy a new system from this company, but you don't have to. "You can't send a lot of companies a Holley 4779, 750 cfm, and ask them to convert it to alcohol and remove the choke tower," Oliver says. "They're not interested."

JET and Chuck Nuytten also custom-tune used carburetors from customers. But

## ACCELERATOR PUMP TUNING

OK, so you've got a specially tuned carb that's just perfect for your car, class, and local track. But what if you want to race at a regional event with a radically different layout than your home course? What if you regularly race at more than one track, and they each have quite distinct conditions? If you go to a custom-carb tuner and tell them this, you're in luck. Not only can they make recommendations for the different setups at each track, but they also know enough to factor in the implications of a critical component: the accelerator pump.

JET's Sean Murphy says when taking your carb to another track, in addition to other modifications, the accelerator pump might have to be changed. Many novice tuners overlook this element, but it is especially critical on a tight track. "On a tight-cornered track, the accelerator pump can make or break you," Murphy says. "If you've got a hard-cornered track where you're backing off the throttle completely, if you get too much pump shot when you stand back into it, the motor will accelerate, but it will seem lazy."

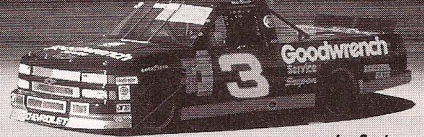
The accelerator pump's basic function is to inject fuel into the carburetor at a specific rate to match the incoming air. Of course, air is lighter than fuel, so when you open the throttle blade up, the air moves very quickly, but it's harder for the fuel to keep up. The accelerator pump compensates for that lag time in the fuel delivery. This explains why Bob Oliver of Competition Carburetion agrees. "At some tracks, you need a little more accelerator pump than others, depending on how it all works," he says.

Nuytten warns, "However, you still have a carburetor that will have a shorter life span, as it was previously used. And circle track racing will wear a carburetor out faster than any other type of motorsport."

By using a variety of information provided by the customer, these custom-carb tuners will tailor an existing carb to new class rules, whether it's a stocker, a two-barrel, or a big four-barrel carb.

"The more information they give us,

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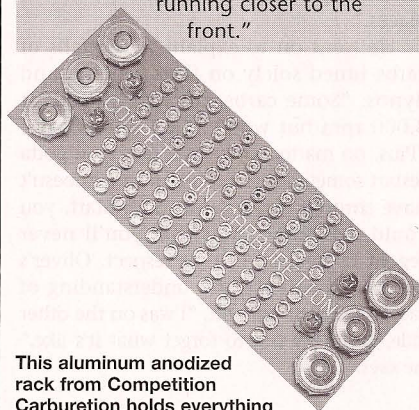
## Feature Tech

### A CARB FOR EVERY RACER

Many racers are probably thinking, *Nice article, but I'm not sure if I really need a custom tuned carb—it's just a hobby.* Hobby yes, but you're in it for the competition. Every racer at every level can benefit greatly from a custom-tuned carb.

"A prime example is a guy who's new to racing," Bob Oliver of Competition Carburetion says. "I just did one for a guy who runs a sprint car, alcohol, two-barrel in Northern California. He raced last year, just getting his feet wet, racing on gas, just seeing if he liked it. And he had a good time!

"So he called me up and said, 'I want to convert to alcohol, I want the 1¼-inch butterflies, I want everything the rules allow. How much is it?' So instead of going out and buying a whole new carburetor, we took the one he ran that was box-stock. And for \$400, he can start running closer to the front."



This aluminum anodized rack from Competition Carburetion holds everything a racer needs to tweak their carbs—44 pairs of jets, six power valves, and four discharge nozzles, all for \$24 (jets and valves not included).

the better. There's no such thing as too much information," Murphy says. But the same information exchange holds true the other way.

Oliver says, "We'll explain to customers, 'Well, you can run this carburetor and get a little better off the bottom and good in the middle. But this other one will be a little better on the bigger tracks and on the top.' Then let the customer decide."

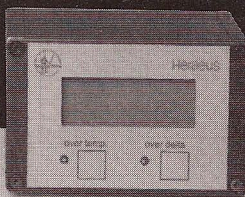
Competition Carburetion actually goes beyond the realm of most carb tuners, offering to fix damaged or worn parts and selling the customer small parts instead of

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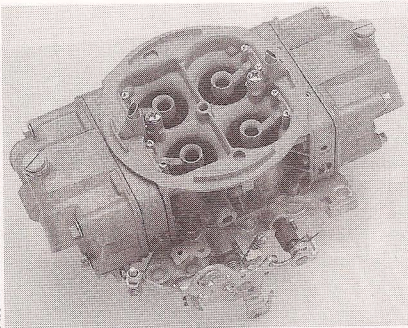
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## Next Month: INDY 500 PREVIEW

PHOTO COURTESY COMPETITION CARBURETION



A predecessor to the new HP Holley carbs, this Competition Carburetion 4150 four-barrel is still a viable choice for many circle track racers.

charging for their services. "If a customer gets a stripped bowl, for example, he shouldn't have to send that in to me. Just buy a bowl from me," Oliver says.

"I'll give him the bowl and gaskets, and he can put it together himself. There's no problem. There's no minimum order; there's none of that stuff.

"I own the company, I do all the machine work, the assembly work, and the engine testing myself. People help me with some cleaning and disassembly, but when it comes to a customer getting his carb built, flow checked, engine checked, and assembled, I do it myself. Everyone gets treated the same way. If a carburetor's for a Winston West car or for a mini stock that runs at El Cajon, I build every one the same way—good and consistent."

As a special service, all Competition Carburetion carbs come with a knurled idle control screw, which allows for easy idle-speed adjustment by hand—without the use of a screwdriver. The idle adjuster is so convenient, it has even been purchased by some of the Cup teams. "It's kinda nice," Oliver says. "You don't have to pull the air cleaner off and get a screwdriver every time you have to change the idle speed; you can just reach in there and grab it." **CT**

**SOURCES**

**Chuck Nuytten Carburetor Specialty Service**

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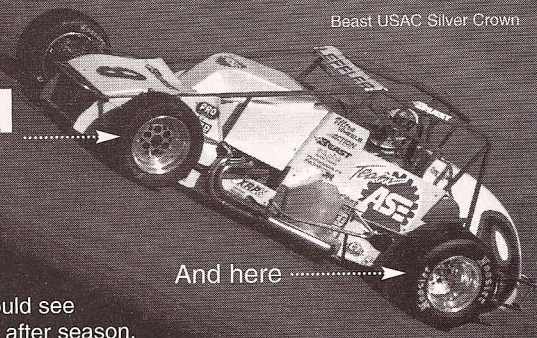
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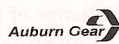
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# In the Next CIRCLE TRACK . . . Is it time for a quick change?