

STREET SWEEPER



MASTER PLAN

Next time you put your foot down, make sure your brakes do exactly what you want. CPP's new feature-laden master cylinder will make it happen.

A 40-year-old Chevelle with a 600-plus-horsepower big-block is a prime candidate for a brake upgrade, unless you happen to have a perverse death wish. And if that Chevelle is a project car, which had previously been converted to disc brakes without so much as a master cylinder upgrade or the addition of a proportioning valve, you'd have to be outright suicidal to let that condition persist. We have neither a death wish, nor are we suicidal, so action was called for.

And now, some background. Our '68 Chevelle project car was like a lot of hand-me-down, nine-owner muscle cars. A forensic investigation revealed that our Chevelle's mishmash of brake hardware consisted of a junkyard swap from stock drums to some questionable stock discs, which were relying on the original drum-brake master cylinder and no proportioning valve to speak of. Then, last month, we upgraded to Classic

Performance Part's (CPP) disc brake kit with 13-inch rotors and dual 52mm PBR calipers (\$799). (We already had late-model Ford truck drum brakes from our Currie Plus-9 rearend install.) During the CPP disc brake upgrade, we also added CPP's new aluminum master cylinder with a built-in proportioning valve (PN MCPV1, \$199), which is the subject of our story this month.

CPP's engineered brake system showed a huge improvement in instrumented testing. As we reported last month, our best stopping distance with the mismatched old system was 137 feet from 60 mph—and that was with the benefit of ultra-sticky Nitto NT01 R-compound tires. Moreover, fade was so bad that it wasn't long before stops were clocking in at 160 feet from 60 mph. After CPP's 13-inch system was installed with a new CPP master cylinder (and the brake bias dialed in), we were rewarded with a best stop of 120 feet, and a max distance



Classic Performance Parts' new master cylinder (PN MCPV1, \$199) comes in two flavors: 1-inch and 1 1/8-inch bore diameters. Being made out of chrome-plated cast aluminum, it's considerably lighter than most cast-iron master cylinders, and has a nice feature set, too. Key perks: built-in adjustable proportioning valve with adjustable max pressure, dual pressure ports for both circuits, a port for a hydraulic brake light switch, an extra reservoir lid for remote filling, and bottom-feeding ports for a cleaner appearance.



Our '68 Chevelle has 17-inch wheels, so it benefitted greatly from CPP's 13-inch Chevelle brake kit, which we installed concurrently with the MCPV1 master cylinder. The CPP front brake kit (\$799) also includes dual 52mm piston PBR calipers, caliper brackets, brake hoses, pads, hubs, bearings, seals, and hardware, which we covered last month.

(with fade) of just 126 feet. All we can say is "wow!"

The MCPV1 master cylinder is available in both 1-inch and 1 1/8-inch bore diameters, to handle a variety of applications from manual to power assist. CPP's Danny Nix recommends you call their tech line for a specific recommendation, but says that the larger bore version is generally recommended for larger boosters, and for OEM-style caliper pistons, which were (and still are) the largest in terms of needing to feed a large volume of fluid.

FEATURE COMPLEMENT

We also dig the fact that the CPP master has its fluid ports located on the bottom of the reservoir, instead of on the side. "The first thing you do when you install a master cylinder," says Nix, "is you bend the brake lines down. We figured, why not just design the ports to go straight down to start with? It cleans up the engine bay, and plumbs easier." You'll also note that CPP's master has dual ports for both front and rear circuits, a move they made to satisfy the custom and street rod market, which sometimes demands the extra plumbing to individual wheels for aesthetic reasons. In our installation, these auxiliary



Our '68 had manual brakes, and with a 496ci big-block making a meager 10 inches of engine vacuum on a good day, we wanted to stay away from vacuum-boosted brakes. CPP does offer brake booster kits and hydroboost systems, if you feel so inclined. Removal of the old master is straightforward: loosen the two fluid lines with a tubing wrench, and unbolt the two nuts holding the master on the firewall studs. Some cars may have a snap ring and a washer retaining the pushrod inside the master. If it does, you will have to remove the pin holding the pushrod fork to the brake pedal, and pull the pushrod out through the firewall when removing the old master.

Our stock '68 Chevelle pushrod. The end closest is the one that seats in the master cylinder. In some cars, there is a relief at the end where a snap ring and a washer hold the pushrod in the master cylinder. This



would need to be removed and swapped over to the new master. Note the fork where the pin holds the pushrod to the brake pedal.

ports remained plugged. At the bottom of the CPP unit, there is also a handy port for a hydraulic brake light switch. Since Chevelles all had pedal-mounted brake light switches, this is not applicable here, but the CPP unit is offered for other applications which do use this. As you might expect, the CPP master was designed for a variety of vehicles, from muscle cars and street rods, to customs and trucks. This is why the MCPV1 comes with two reservoir covers—a flat cover (the one we used) and a remote fill version with threaded ports for remote lines. For custom show cars, this is a nice alternative that allows mounting down on the frame, thus cleaning up the engine bay.

MAD PROPS

The coolest feature of the CPP master cylinder, however, is the built-in proportioning valve. We know that several other manufacturers now offer masters with built-in prop valves, but the

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A previous owner of our '68 converted to disc brakes and didn't use a prop valve, so all we did was bend the brake lines vertically to meet the bottom-feeding ports of the CPP master. If your Chevelle has a frame-mounted prop valve, you'll need to disconnect it, and run extension lines to the bottom of the CPP master. As we mentioned, the CPP master has a built-in adjustable prop valve, eliminating the need for the OE fixed-ratio prop valve.

The CPP master cylinder ports use a common parts' store brake line fitting, which is 3/8-24. If you're plumbing your brake system from scratch, you'll be happy to know that the



AutoZone will have plenty of these standard brake lines on the shelf. Nevertheless, if you want to reuse the old stock lines (which have 1/2-20 and 9/16-18 fittings, differentiating front from rear), this set of adapters (CPP PN MC-SF, \$15) will make it easy.

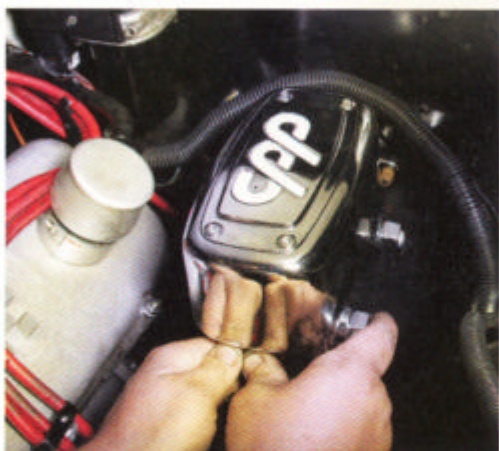
CPP unit ups the ante considerably. To understand why, we must first explain OEM prop valves. These perform two functions: to limit the max amount of brake pressure sent to the rear, and to deliver that brake pressure (up to that max threshold) at a predetermined ratio relative to the front brake pressure. But things get sticky with most aftermarket proportioning valves—which eliminate the max threshold and only perform a proportioning function. Imagine for a moment a max-effort car with really great brakes. Under hard braking, a much higher percent of the total braking is being done by the front brakes. In that scenario, a prop-only valve is going to let the rear pressure soar in proportion to the front pressure, which will result in rear lockup—unless the ratio is dialed back so severely that the rear brakes become nearly ineffective. What is needed is an additional threshold adjustment for the max rear pressure—so that an aggressive overall proportion ratio can be maintained for effective rear braking. The CPP master has both a max pressure adjustment (a small 1/8-inch Allen hex) inside the valve that houses the proportioning adjustment (a 1/4-inch Allen hex). These are concentric—one inside the other—for easy access.

"We figured, why not just design the ports to go straight down to start with? It cleans up the engine bay, and plumbs easier."

—CPP's Danny Nix



This view of the bottom of CPP's master cylinder shows a few things: bottom-fed ports, the adapter fittings installed in those ports, the redundant ports for front and rear (plugged), and the plugged port for the hydraulic brake light switch.



Installing the MCPV1 is simple: Guide the pushrod into the back of the master cylinder, and tighten the nuts onto the firewall studs.

Tighten the brake lines, remove the reservoir lid with an Allen wrench, and add some brake fluid. The MCPV1 will take almost a quart of fluid, and CPP recommends DOT 3 for anything but specialized race applications. Danny Nix



of CPP says that DOT 4 and DOT 5 have a higher boiling point, but must be completely flushed from the system yearly because they do not cope with water buildup as well as DOT 3.

DUAL-POT VERSUS SINGLE-POT

As some of you know, federal safety standards required OEs to begin building cars with dual-circuit brake systems starting in 1967. Prior to 1967, cars coming out of Detroit had single-pot master cylinders. Any hydraulic failure in the brake system—whether in the front or the rear—would cause a complete loss of braking. Dual-pot master cylinders came on the scene in 1967, and provided some measure of redundancy, allowing some limited brake power to be applied if one circuit failed. Since pre-'67 Chevelles—like most cars of that era—didn't have proportioning valves (or even the need for them), any upgrade to a dual-pot master in a pre-'67 car requires the addition of a prop valve. For those pre-'67 Chevelle owners out there, you'll appreciate CPP's built-in prop valve, because it greatly simplifies the plumbing operation.

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Bleeding the brakes with a fresh fill is a whole lot easier with a plastic syringe. Typically, pumping with your foot takes far longer, and results in more foaming. In their master cylinder kit, CPP gives detailed directions for bleeding with a syringe, but here are the basics: There are two small holes in each circuit well, a take-up port and a pressure port. The take-up port is the closest to the firewall in each well. Start by injecting fluid in the take-up port until it begins bubbling out of the pressure port. This will effectively clear the line of any air.



This is the adjustable proportioning valve in CPP's master cylinder. Note the concentric Allen screws—which separately control the max pressure to the rear circuit (innermost 1/8-inch Allen wrench), and the proportion of the rear circuit relative to the front circuit (1/4-inch Allen wrench). CPP provides detailed instructions with its master cylinder kit on maximizing your rear brake performance.

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