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**ULTRARARE
TRANS AM CONVERTIBLE**

HOW-TO:
CHEVY BRAKE & STEERING UPGRADE

JULY 2013

\$5.99



A SOURCE INTERLINK MEDIA PUBLICATION

ROAD-READY BISCAYNE

Part 2: Brakes and Steering

By Robert Genat

Braking and handling were never hallmarks of '60s cars. The only brakes available were self-energizing drums with a power option, but once into fade, all the power options in the world would still not stop the car. As for steering, the only power steering option Chevrolet offered was overly sensitive and gave no road feel. Yet without power steering, the ratio on the steering box meant that the driver had to have the dexterity of a Three-Card Monte dealer to make a decent turn. Therefore, it's brakes and steering for our Road Ready Biscayne.

Brakes

Summit Racing Equipment offers several disc brake kits from a number of manufacturers. We found Summit's own drum-to-disc power brake conversion kit to be reasonably priced while including everything we needed. Summit's power brake kit comes with an 8-inch booster, but we opted for the 7-inch model and the extra clearance it made for our 348's valve covers.

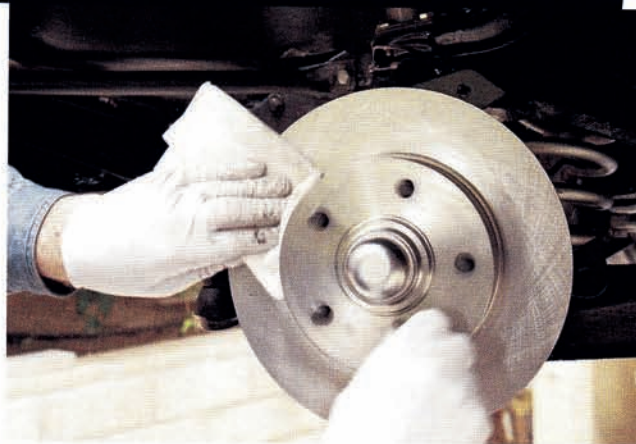
The kit included the booster, master cylinder, new rotors, single-piston calipers, powdercoated brackets, semimetallic pads, bearings, proportioning valve, seals, hoses, banjo fittings, and hardware needed for the conversion.

We started the swap by stripping off the old master cylinder, then hung the new booster in place using a bracket mounted to four firewall studs. Next came the new master cylinder (previously bench bled) and mounting the proportioning valve next to it on a line from the rear bail. From the proportioning valve this line goes to the rear brakes. It's an important component because it reduces the pressure to the rear brakes to establish braking balance. All the hard lines we fabricated were double-flared to ensure against leaks. Mild steel lines are easiest to form and flare. Stainless lines, while looking great, are the most difficult.

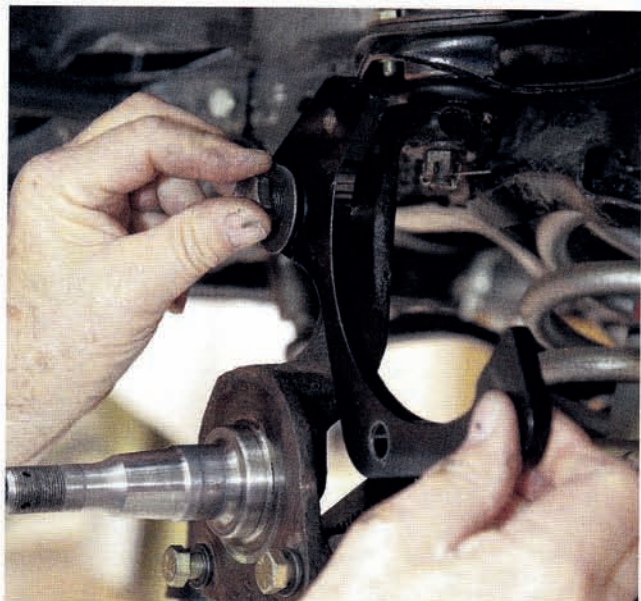
After stripping off the old front drum



1 After stripping off the old front drum brakes, we started the brake conversion by adding Summit's lower bracket. It bolts to the spindle using the steering arm attaching bolts. The small tubular spacer is used with the aft attaching bolt.



4 The spindle nut was added and adjusted to a torque spec of 17-25 lb-in, backed off, and the cotter pin added, locking the adjusting nut in place. A properly adjusted spindle locking nut will allow the rotor to turn freely. We again cleaned the face of the rotor with brake cleaner.



2 The larger upper bracket attaches to the spindle and lower bracket. Both of these sturdy brackets are water-jet cut and black powder-coated.



5 The caliper with the pads in place is slid over the rotor and the caliper mounting bolts added. Because the inboard half of the caliper slides on these bolts, we lubricated them with a silicone-based grease. Summit coats its cast iron calipers with a silver anodized finish that prevents rusting.



3 After packing and installing the inner bearings, the inner seal is added. It is tapped into place using a large wooden block to prevent damage. We used brake cleaner to clean the protective film off of the rotor.

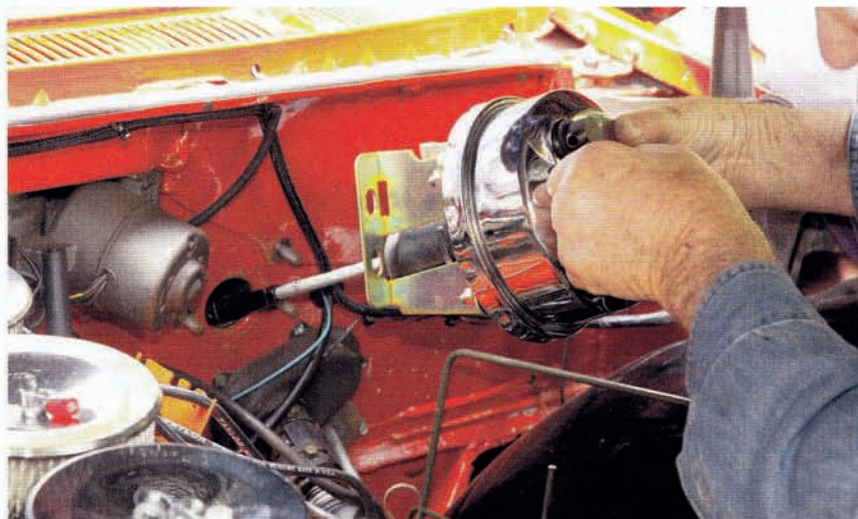


6 With the caliper in place, the tabs on the outer pad are bent over using a drift and a hammer, securing the outer pad to the caliper.

brakes, we cleaned and inspected the spindles. The lower caliper mounting bracket is attached using the steering arm attaching holes. The larger upper caliper mounting bracket is bolted to the large upper spindle

hole and to the new lower bracket. After sliding the rotor onto the spindle we adjusted the spindle locking nut to spec and added the cotter pin.

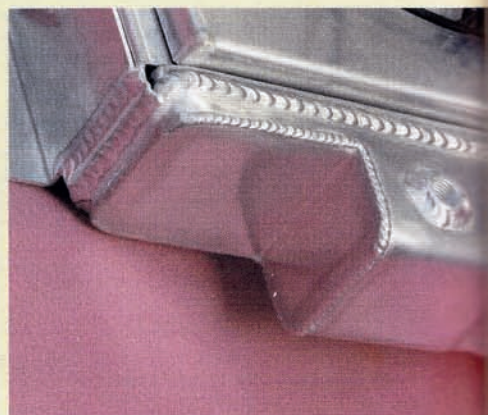
Before we installed the caliper, we



7 To mount the new booster, we found it easier to mount the brackets to the back of the booster and then attach the brackets to the studs on the firewall.



■ The backside of our new aluminum radiator shows the thin-line shroud that mounts twin 11-inch electric fans. They provide 1,620 cfm of airflow—plenty to keep our 348 cool through the desert as we run the A/C on our way to Michigan in August.



■ This is the notch in the lower tank. You have to admire the craftsmanship in the construction and welding of this radiator. I've never been able to run beads like these when I weld steel.

TANKS A LOT

Because CPP's 500 power steering box is slightly longer than the original, it interferes with the lower left corner of the radiator tank. We did a little research and found out that U.S. Radiator had a radiator with a notched tank.

The aluminum radiator is built with two rows of 1-inch tubing in the core. All of the components are die-stamped, and the construction is fully welded. Using aluminum instead of copper and brass (as the factory did) gives us a radiator that is almost as efficient at transferring

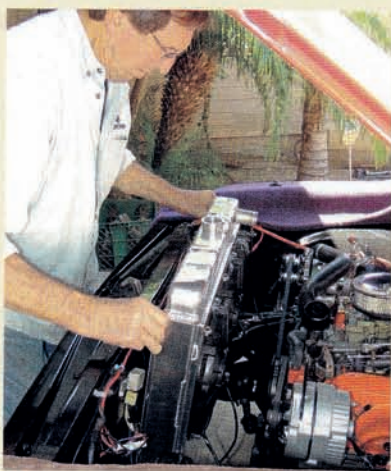
heat but weighs half as much. The matte finish complements our Biscayne's engine compartment.

To enhance the effectiveness of the new radiator, we added U.S. Radiator's thin-line shroud, which covers 100 percent of the core and is fitted with twin 11-inch fans. We wired the fans to a trinary switch in the A/C system and a thermostatic switch. The trinary switch starts the fans at a predetermined A/C head pressure, and the thermostatic switch starts the fans at a predetermined coolant temperature. This

greased the rubber O-rings and slider pins with silicone lubricant. Next we mounted a spring clip on the back of the inboard pad. We slid the caliper in place and added the mounting bolts. Flex hose was attached



8 Bench-bleeding the master cylinder is important to ensure that it is free of any trapped air. It's a simple operation done with the included small hoses, a little brake fluid, and a screwdriver.



■ Our new aluminum U.S. Radiator dropped in using the same attachment holes as the original radiator.

way the fans run only when needed.

Because we removed the original radiator for the steering gear swap, the new radiator dropped right into place and was retained by the same six bolts that held the original.

SOURCE

U.S. Radiator Corp.

323/826-0965

www.usradiator.com

to the caliper with a banjo bolt and to the hard brake line. Once the hoses are installed, turn the wheels lock-to-lock to make sure the hoses do not contact the tires or bind.

New disc brakes take a few miles of easy braking for the pads to seat. Once the pads were seated, we did a few test stops to adjust the proportioning valve. The goal was to have the front and rear brakes lock up

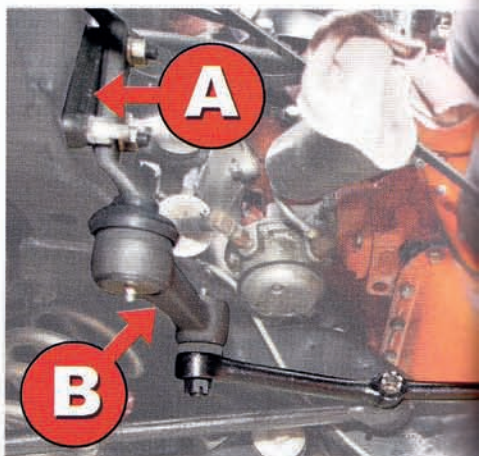
at the same time under hard braking. We again checked all of the lines and fittings for leaks.

Steering

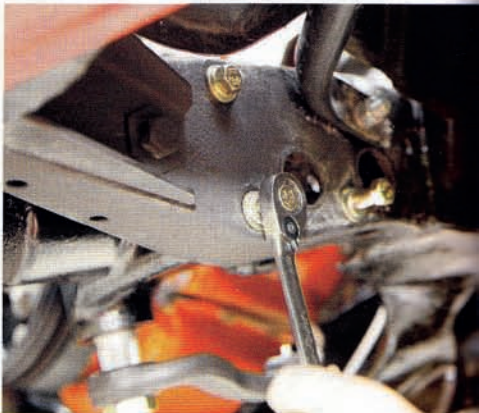
Classic Performance Products (CPP) realized that GM's original power steering, with its large, leaky cylinder and antiquated box, needed replacement. Or for those like us with manual steering, a simple sys-



9 An adjustable proportioning valve is included in the kit. It balances the braking across all four wheels by limiting the pressure to the rear brakes. We mounted it to the side of the master cylinder for easy access.



10 This is the schematic of the suspension portion of the CPP 500 steering upgrade. "A" is the idler arm bracket that bolts to the frame, "B" the idler arm, "C" the center link, "D" the pitman arm, and "E" the 500 steering box. With this system the power assist to the steering comes via the steering box, unlike the original GM system of having a hydraulic cylinder.



11 Mounting the new steering box was as easy as drilling out the three, 3/8-inch-diameter mounting bolt holes in the frame to 7/16 inch. CPP provided the Grade 8 bolts for attachment.

tem needed to be available as an upgrade. CPP's 500 kit provides everything to facilitate an easy power steering upgrade.

With the car on a hoist, we set the wheels in the straight-ahead position and removed the original steering gear. The new CPP 500 steering box mounts to the same location on the frame as the factory box. On the right-hand framerrail we attached the idler arm with the adaptor bracket CCP includes, again using the original mounting holes. The pitman arm slid onto the steering box's splined shaft and connected to the center link.

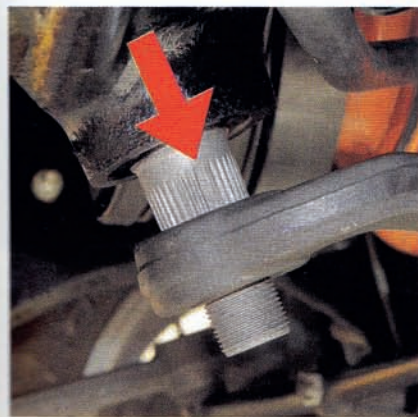
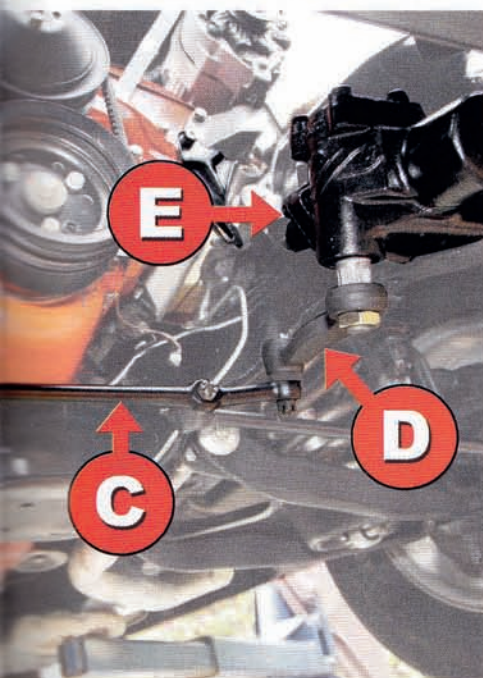
For our '60 Biscayne, the 500 steering box requires a new rag joint, which in turn requires a new steering shaft—both sup-

plied by CPP. The upper splined end of the shaft fits the factory steering column's splined collar. The lower end is a double-D that fits into the new rag joint's double-D female end.

The new power steering pump fit on the side of the engine using CPP's brackets. CPP also provides two pulleys for the pump with different offsets. We could have used the same belt as the alternator with

one of the pulleys, but we felt that the belt wrap around the pump pulley would be less than 90 degrees and thereby marginal. We chose the second pulley, which required a third pulley on the crank. This also meant that the alternator belt would run between the pump pulley and pump, but the clearance is sufficient to prevent the belt from contacting the pulley or pump.

After adding power steering fluid to

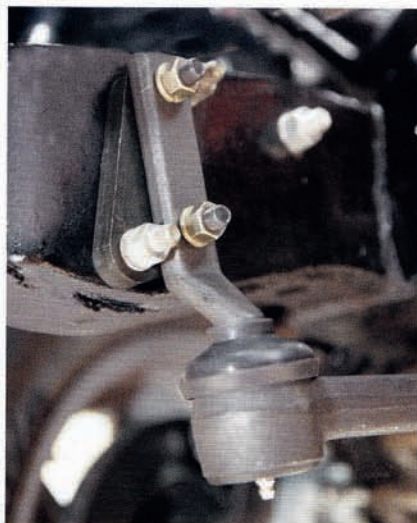


12 The pitman arm mounts onto the steering box with a splined shaft. CPP removed any chance of misalignment by adding one larger spline on the shaft (arrow) that matches the spline in the arm.

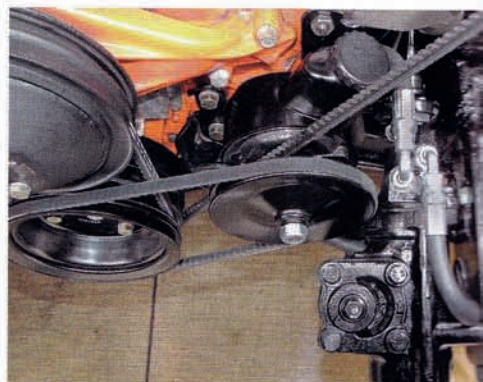
DRIVER TECH

the pump, we cranked the engine over a few times, which sucked the pump dry as it filled the system. We refilled the pump, started the engine, and then topped off the pump. The final test was to crank the wheel full lock in each direction and hold it against the stops. This produces the highest line pressure and is the ultimate test for system leaks, while clearing any trapped air in the system.

Once everything was properly connected, we tightened all of the fittings and added the required cotter pins. With no leaks, we hit the road for a test drive. Now our Biscayne turns and stops like a modern luxury car. Detroit here we come! **MCR**



13 CPP provides new idler arm mounts and an adaptor bracket that attaches to the original idler arm's mounting holes.

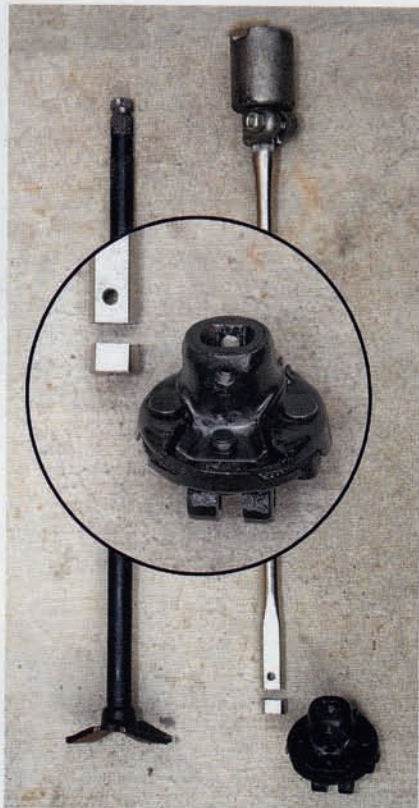


14 The power steering pump mounts on the lower left side of the block using existing holes. We added a third crankshaft pulley to drive the power steering pump. This was done because using the alternator belt would have given us insufficient belt wrap (less than 90 degrees). While the alternator belt passes between the power steering pump and its pulley, there is adequate space for it without any contact.



15 CPP provides the high-pressure line from the pump to the box and the low-pressure return line. It's impossible to mix them up because they have different fitting sizes. Both were attached using a flare nut wrench.

16 The new steering shaft is on the right, the old on the left. At the top of the new steering shaft is the original collar. At the bottom, a small portion must be cut off of the double-D end of the shaft. Then, as you can see in the larger view, a hole through the rag joint and shaft will be fitted with a roll pin or bolt.



17 The additions of the power steering components, dual master cylinder, and aluminum radiator (see sidebar), along with the previously added cruise control and A/C compressor (May '13), haven't compromised the look or integrity of our Biscayne's engine compartment. All of the lines have been routed neatly to reduce clutter. If anything, the new components add a touch of color and texture along with outstanding functionality.

SOURCES

Classic Performance Parts (CPP)

714/822-2000

www.classicperform.com

Summit Racing Equipment

800/230-3030

www.summitracing.com