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VETTE

JANUARY 2015

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BAD ATTITUDE

 America's Favorite Corvette Magazine

JIMMY PHAM'S WICKED **900+HP** '06 Z06 **PAGE 20**



PROTOTYPE & CONCEPT RETROSPECTIVE—

- '59 STINGRAY RACER
- '60 XP-700 ■ '60 CERV I

**NCM SINKHOLE VETTES
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.200	148	113
.300	233	168
.400	296	212
.500	340	237
.600	375	249
.700	393	254

Tests conducted at 28" of water (pressure).
Bore size: 4.125"; exhaust with 2" pipe.

Some parts are not legal for use in California or other states with similar laws/regulations.
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We love to look back at the cool concept cars of the '50s and '60s – cars that possessed excessive style, super sexy lines, and a lot of scoops. The XP-700 was all that and then some. Check out Scott Teeters' third installment on experimental, prototype, concept, and show car Corvettes on page 56. Photo courtesy GM Archive.



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ON THE
COVER

*Jimmy Pham's '06 Z06 has the looks that appeal to just about any late-model Corvette enthusiast, and the fact that it packs a **900hp punch** to the tires makes it that much cooler. Check out the full feature starting on **page 20**. Photo by Justin Fivella.*

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Dwayne Gross' '60 restomod is one of those amazing cars that you just can't seem to get enough of, so here it is once more as this month's TOC image.
Photo by Tommy Lee Byrd



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IDLE CHATTER

NICK LICATA EDITOR

JUST STOPPING BY



Thanks to the good ol' Internet, the way in which we absorb our must-have pertinent information regarding the economy, entertainment, news, or finding out about the latest updates on the '15 C7 Corvette, comes to us in a much more timely manner than it did 15 years ago. And with ever-changing advancements in technology it only makes sense. Pre-Internet, us gearheads who were focused on the performance side of the automotive hobby ingested most of our information from books and magazines – they were good and there were plenty. Nowadays, the speed in which that same information is delivered has commonly become priority over accuracy, and in many cases, the “facts” can get quite cloudy. Blame it on the fact that any yahoo with a high-speed Internet connection and a “great idea” can spit out a plethora of unconfirmed news and information via Facebook, Twitter, Instagram, Google+, or any other form of social media for all the world to see.

But the Internet isn't all bad. Speedy, concise information is a great thing; only I'm one of those who like a balanced diet of the printed page combined with a digital feed via my smart phone or computer. And if I'm going to spend my money on something, I prefer it to be a tangible item. For example, I still buy my music on CDs. I just don't like

that hired me over 13 years ago.

Now, the reason I didn't say “I'm Nick Licata, the new editor of *Vette*” is because I'm just stopping by for one issue. No, it's nothing you said. Actually, once this issue is all buttoned up, the plan is for me to move on over to another one of our TEN Chevy-related publications: *Chevy High Performance*.

Speaking of this issue, you won't find any noticeable changes in this one from the previous few. What you have in your hands is the same *Vette* magazine you've come to know and love. You'll find the same talented and knowledgeable group of writers and photographers that *Vette* has always had. In fact, one of the things that caught my attention is the



IT WAS SOMETHING I LOOKED FORWARD TO – I STILL DO. TO THIS DAY, **MAGAZINES ARE MY PREFERRED METHOD** IN WHICH TO READ TECH ARTICLES AND TAKE IN GORGEOUS CAR FEATURES.”

the thought of purchasing a recording and having it stored on a “cloud” that I have no idea how to find or know for sure if it really exists.

I grew up in the late '60s and early '70s, a time when magazines were our major source of information regarding hot rods and muscle cars, so it's a little difficult to let go of something that we looked at as so credible. So what if I had to wait a month in between magazines hitting the newsstand or being delivered to my mailbox. It was worth it. It was something I looked forward to – I still do. To this day, magazines are my preferred method in which to read tech articles and take in gorgeous car features.

Sheesh, that was a whole lot of babbling before getting to the point of this editorial: introducing myself. So, I'll get to it. I'm Nick Licata, and I'll be your host for the January 2015 issue of *Vette* magazine. So, where did I come from? On my resume, you'll find that I was most recently Editor of *Camaro Performers* magazine, where I was at the helm for a little over seven years, and before that: Bartender. Although I haven't tended bar in about 15 years, I remember that being a pretty cool gig.

Unfortunately, *Camaro Performers* was cut from the roster of TEN's automotive enthusiast print publications a few months back. Was this due to the Internet's influential hand of pulling younger and potential new readers away from the printed page? Not sure, but I suddenly found myself without the vehicle in which I spent so many years bringing the latest news, tech articles, and features on Camaros – new and old. Although that magazine is gone, I'm lucky to still have an editorial gig at the same company

passion and how protective these guys are regarding the Corvette's history and its future.

Although my tenure at *Vette* was briefer than expected, I'm really looking forward to my new home at *Chevy High Performance*. No doubt we'll be covering some cool Corvette stuff in that magazine, so come on over and browse some pages.

Now, with that said, things can change around here at the flip of a nitrous switch, so if things don't pan out the way I just described, then I'll see you in the February issue ... maybe even March, too.

You in?

Email me at vette@sorc.com

CURRENTS

NICK LICATA WORDS

2015 CORVETTE Z06 PRICE ANNOUNCED



The '15 Chevrolet Corvette Z06—the most powerful and technologically advanced model in the iconic car's 62-year history—will be offered at a suggested retail price of \$78,995, while the convertible will start at \$83,995.

"The '15 Corvette Z06's performance and technical capabilities place it in the elite fraternity of supercars," said Harlan Charles, Corvette product and marketing manager. "Very few cars in the world deliver 650 horsepower, true aerodynamic downforce, carbon fiber, and performance technologies such as Magnetic Ride Control, Performance Traction Management, and an electronic limited-slip differential—and none gives the driver a transmission choice or the choice of a coupe with a removable roof panel or a full-power-top convertible."

Leveraging learnings from the Corvette Racing program, the \$2,995 Carbon Fiber Ground Effects package enables the Corvette Z06 to produce true aerodynamic downforce for increased stability at high speeds. The package adds a functional carbon-fiber front splitter, carbon-fiber rocker panels, and a larger rear spoiler.

For the ultimate performance, the Z07 Performance Package is available for \$7,995, adding Brembo carbon-ceramic-matrix brake rotors that improve braking performance and contribute to better handling through reduced unsprung weight. The Z07 package adds adjustable front and rear aerodynamic components to the Carbon Fiber Ground Effects package for unprecedented aerodynamic downforce and Michelin Pilot Super Sport Cup tires for enhanced grip.

Z06 models are offered in 1LZ, 2LZ, and 3LZ trims. A range of available features enables customers to tailor the look and feel of their Z06, including:

- Premium Package with leather-wrapped interior
- Aero-enhancing carbon-fiber ground effects package
 - Performance Data Recorder and navigation
 - Competition sport seats offered in leather or suede microfiber
 - Carbon-fiber interior trim and carbon-fiber convertible tonneau cover inserts
 - Visible carbon-fiber roof panel (Coupe)
 - Tintcoat exterior colors, several available wheel finishes, and several available brake caliper colors.



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TO SPONSOR NCM MOTORSPORTS PARK CONTROL TOWER

Holley Performance is proud to announce a new partnership with the NCM (National Corvette Museum) Motorsports Park, and is sponsoring the Park's Control Tower and Event Center in Bowling Green, Kentucky.

"It is only fitting that two great American motorsport brands like Corvette and Holley unite with our sponsorship of the NCM Motorsports Park," said Trevor Wiggins, Holley VP of Sales. "This track is going to secure Bowling Green's identity as a motorsports town, and we're proud to be a part of it."

The two-level Holley Control Tower and Event Center will feature 6,300 square feet on each level (12,600 total in building) including 1,800 square feet of meeting and classroom space, lobby/retail area, restrooms, catering kitchen, reception office, administrative offices, race control room, storage, and more. The second level will feature a 2,100-square-foot open-air viewing deck, available for private events. A Winners' Circle Podium is slated for the paddock side of the building, and the overall design of the Holley Control Tower and Event Center mimics that of the museum.

"We have been talking to Holley since we first announced that we were building a Motorsports Park and they were as excited as we were," said Mitch Wright, General Manager of the NCM Motorsports Park. "Those conversations grew into something bigger and we are thrilled to have them on board."

Construction on the Holley Control Tower and Event Center is planned for 2015.



VALET MODE WITH '15 CORVETTE

Owners of '15 Chevrolet Corvettes will feel better about handing over the keys to their car, thanks to the new Valet Mode with Performance Data Recorder.

The industry-exclusive system allows drivers to lock the interior storage; disable the infotainment system; and record video, audio, and vehicle data when the Valet Mode is active.

"Think of it as a baby monitor for your car," said Harlan Charles, Corvette product manager.

"Anyone who has felt apprehension about handing over their keys will appreciate the peace of mind of knowing exactly what happened while their baby was out of sight."

Introduced in 2014, the Corvette Valet Mode is turned on through the settings menu and activated by entering a unique four-digit code. A confirmation entry of the code simultaneously locks the storage bin behind the center stack display, the glovebox, and disables the radio and infotainment system.

With the introduction of the industry-first Performance Data Recorder for '15 models, Corvette drivers can also record HD video, in-car audio, and vehicle data – including speed, engine rpm, gear position, and g-force – when Valet Mode is active.

The video can be viewed instantly on the Corvette's 8-inch color touch screen when the car is parked, or downloaded to a computer.

The system includes three major components. First is a 720p, high-definition camera mounted within the windshield header trim, which records the driver's point-of-view through the windshield. Audio is recorded via a dedicated microphone in the cabin. Second is a self-contained telemetry recorder. The system utilizes a dedicated GPS receiver and is hardwired into the Stingray's Controller Area Network to access vehicle information. Finally, the system features a dedicated SD-card slot in the glovebox for recording and transferring video and vehicle data. An 8-gigabyte card can record approximately 200 minutes of driving time.

ALL-STAR MVP CHOOSES THE VETTE

The 2014 Ted Williams MLB All-Star Game Most Valuable Player, Mike Trout of the Los Angeles Angels of Anaheim, chose a Corvette Stingray during the MVP award ceremony presented by Chevrolet.

Chevrolet offered Trout his choice between the 2014 North American Car and Truck of the Year – the Stingray or the Silverado full-size pickup – for his being named the All-Star MVP.

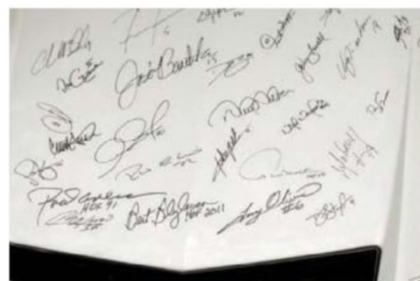
In addition, Chevrolet announced it would provide a second Stingray with a unique hood autographed by the game's All-Star players for auction at chevybaseball.com, a website powered by mlb.com, with proceeds to benefit charity.

"We honored the achievements of Mike Trout, the 2014 All-Star Game Most Valuable Player, while showcasing our own MVPs: the Corvette Stingray and Chevrolet Silverado," said Paul Edwards, U.S. vice president, Chevrolet Marketing.

The Stingray being auctioned features both an autographed display hood signed by the 2014 All-Star players and coaches and a factory original hood for driving. Bidding on the Corvette Stingray opened immediately following the MVP ceremony and continued until August 1.

In addition to the Stingray for auction on chevybaseball.com, Chevrolet will provide MLB and the Major League Baseball Players Association with a commemorative Corvette Stingray hood, also signed by 2014 All-Star players and coaches, for auction with proceeds to benefit MLB Charities and the Players Trust, the 501 (c)(3) charitable organization created and administered by active Major Leaguers.

Chevrolet supports the friendships, optimism, and spirit of teamwork built through the power of play. Currently in its ninth year, Chevy Youth Baseball has impacted the lives of approximately 3.8 million youth. Nearly 1,700 Chevrolet dealers support a youth league in communities across the country and have hosted more than 200 youth baseball clinics this year.



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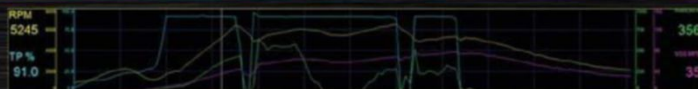
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FlashScan V2 also includes a hand-held controller that allows "black box" scanning, tuning and trouble code reset without using a PC.

FlashScan is backed by unequalled technical support, and can be used with most late model GM cars, pickups and SUVs. (So if you tow your Corvette to the track or to shows, you can also tune your tow vehicle.)



You can find out more about FlashScan, and even download a free copy of the software at www.efilive.com

PRODUCT PREVIEW

STAR-SPANGLED SPORTS CAR

Corvette books are plentiful these days, but that wasn't always the case. Back in 1973 the Corvette community was treated to what is arguably the first major hardback published on the Corvette's history: *Corvette – America's Star-Spangled Sports Car* by Karl Ludvigsen.

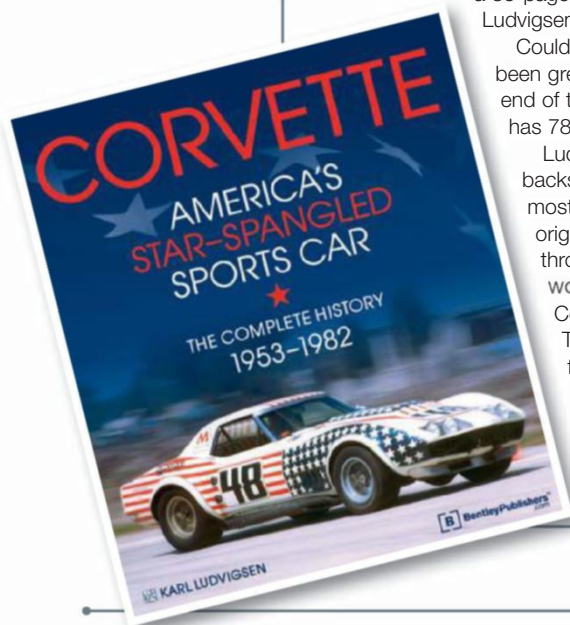
The book was like a day pass into the inner sanctum of Corvette R&D. Weighing in at 288 pages, 19 chapters, a 36-page color plate section, plus a genealogy chart and three pages of 1953 to 1973 statistics, Ludvigsen's book was a delicious meal for Corvette lovers.

Could it be better? Yes! Bentley Publishers has updated this classic. The 2014 version has been greatly expanded and covers the history of the Corvette from its inception in 1951 to the end of the C3, 1982 Corvette. And we mean EXPANDED! The revised and updated book now has 784 pages, 52 chapters, and 989 photos and illustrations.

Ludvigsen walks you through 30 model years with a technical review of each year, R&D backstories, plus stories of the legendary Corvette men that shaped what is arguably the most unlikely of all cars ever built by a major Detroit car manufacturer. And unlike the original that had a color plate section at the back of the book, the updated book is color throughout. Jam-packed with archival photos of prototypes, concept art, clay models, work-in-progress cars, experimentals, show cars, race cars, engines, production Corvettes, technical illustrations, statistics boxes, and more.

The first 30 years of Corvettes laid down the foundation to what is now General Motors' flagship automobile that is truly "world-class." To understand why the Corvette is the car it is today, you must understand its past. And it doesn't get any better than Karl Ludvigsen's expanded and updated, *Corvette – America's Star-Spangled Sports Car: The Complete History, 1953-1982*.

The book is available at bentleypublishers.com and amazon.com.



IMPROVED CUTOUTS

The original Doug's Headers has announced a new and improved version of their stainless steel construction electric exhaust cutouts in 2 1/2- and 3-inch diameters. The engineers at Doug's have taken their exhaust cutouts and dramatically decreased the size for more versatile installations while lowering the price as well. The cutouts feature a rugged gear reduction 12-volt DC motor and a rotating gate for a leak-proof seal every time the cutout is opened and closed. A pre-wired harness with an illuminated rocker switch is supplied for easy installation. Uncork your exhaust with the flip of a switch from your dash. Doug's cutouts are available in singles or pairs and in complete kits with Y-pipes for easy installation. Call Doug's Headers at 909.599.5955 or go to pertronix.com for more information.



FUELISH PLEASURE

Holley's new billet aluminum fuel rails make a great addition to any GM LS1, LS2, LS3, LS6, or L99 engine bay. They are direct bolt-on rails for OE-style intake manifolds and are machined from solid aluminum with the undersides relieved for ultimate weight savings. The aluminum is finished in a high-gloss anodizing making it both durable and good-looking. Fuel rail kits come with matching hand-polished fittings and a stainless braided hose. Both the fuel rail set and kit come with -6 to 3/4-16 O-ring adapters but are also machined to accept -8 O-ring fittings—available separately—to take full advantage of the 5/8-inch diameter fuel passage. For more information contact Holley at 270.781.9741 or visit them on the web at holley.com.



ROCKET LAUNCHER

McLeod is proud to reintroduce its world famous Line Launch system. With the McLeod Line Launch, you depress the clutch pedal to the desired position for release and then by activating a switch you lock the clutch in place. Simply let go of the switch to release the clutch and launch the car for a quicker reaction time. For cars equipped with an existing roll control device, McLeod's new two-stage button is available.

Using their two-stage button in conjunction with the Line Launch and your existing roll control device, you can release both the brake and clutch at the same time. "Products like the Line Launch give McLeod drag racing stick shift customers the competitive edge they need at the track," says Paul Lee, NHRA Funny Car driver and McLeod Racing owner. For more information visit mcleodracing.com or call 714.630.5129.



BOLT-ON HP

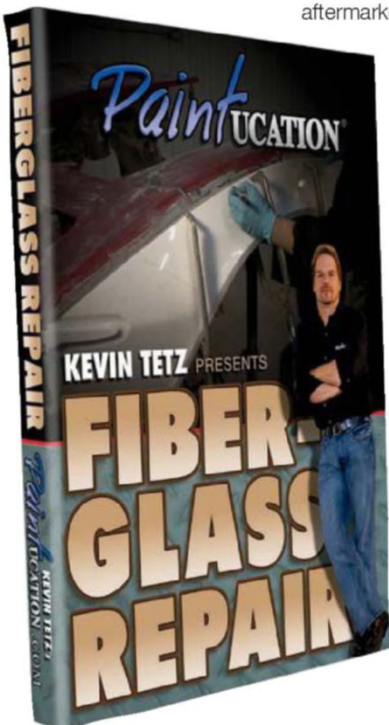
RHS Pro Elite 3.900-inch bore LS7 CNC-ported cylinder heads not only get the best LS rectangular port heads onto all GM LS 5.7L – 6.0L blocks, they also provide up to 100 bolt-on horsepower over stock and feature all the benefits of other RHS LS7 heads. These new Pro Elite cylinder heads fit all LS applications down to the 3.900-inch bore and utilize LS7 intake manifolds. Offered in CNC and P-Port (unfinished runner) versions, the heads' intake ports are raised 0.220 inches from the stock location for a straight line of sight into the cylinder, and utilize the LS six-bolt head design compatible with the RHS LS Race Block and GM LSX block. RHS Pro Elite 3.900-inch bore LS7 CNC-ported cylinder heads are designed to use eight standard LS1-style exhaust rockers and eight offset LS3-style intake rockers and stands. For more information go to racingheadservice.com or call 877.776.4323.



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FROM THE ARCHIVES

DREW HARDIN WORDS
TEN ARCHIVES PHOTOS

NOSE JOB



Corvettes appeared often in *Car Craft* magazine in the '50s and '60s, though rarely were they stock. Usually they were way-out customs or drag race cars. In the magazine's August 1962 issue, a damaged '56 or '57 model became fodder for what writer Bud Lang called a "simple and inexpensive swap" to a customized front end.

The early model Corvettes, Lang wrote, "pose a bit of a problem to most body men who are accustomed to the torch and lead paddle. Even some fiberglass men find anything more than patching a crack or hole a major chore and shun extensive restyling. Well, their worries are over to some extent if they would like to give one of these Vettes a glamorous face-lifting with a minimum of time and dollars spent."

A company called Fiberglass Auto Body in Hollywood, California, had developed a one-piece front body section for pre-'58 Corvettes that customized the car's looks while allowing the car owner to reuse his headlights, parking lights, hood, grille frame, and grille bars. The restyling "positions the grille assembly lower and a few inches ahead of the headlights," described Lang. "The Corvette bumperettes are discarded and the park lights are repositioned just aft of the grille. The main purpose behind this whole design is to give the Corvette a more graceful, streamlined silhouette instead of the rather blunt appearance it now possesses."

Lang's "Here's How" story ran two pages and contained 14 how-to photos. Here we've reproduced the "before" and "after" photos along with a few of the major steps. "If your Corvette is in good shape now, it's a simple matter to take a saber saw and detach the front end by cutting across the fender panels just above the wheel wells," Lang advised. "If you are one of the unfortunate ones who has wiped out the front end, you can follow the same procedure only you have less to remove. With patience you can do it yourself." **VETTE**

TOP: Ouch! The "before" shot and its "wiped out front end." Lang called this "the first step to a new custom car."

BOTTOM: The Fiberglass Auto Body nose piece attached to the car about two feet behind the headlights, right at the top of the wheelwells. A saber saw cut away the damaged nose.





LEFT: Lang said you may need a chisel to “break the nose loose from the inner panels.”

BELOW: Lang recommended the use of these “holding bars” to temporarily join the new custom parts with the body before glassing them together.



BOTTOM RIGHT: “Grind fender undersides then bond with fiberglass. Remove bars, repeat on top.” **LEFT:** An “extension strip” with the headlight buckets was screwed to an inner panel, then fresh fiberglass joined it to the rest of the nose. **BOTTOM LEFT:** With the bodywork done and a fresh coat of paint, the custom front end “is a real swinger when fitted with trim.”



TECHNICALLY SPEAKING

JAMES BERRY CORVETTE TECH GURU

UNDERSTANDING HOW **OXYGEN SENSORS** WORK TO HELP DIAGNOSE FAULT CODES

Q: Hi James. I keep having an oxygen sensor fault code for a lean exhaust with my '97 Corvette. I've taken the vehicle to the dealer several times but the problem keeps recurring. I would like to try and diagnose the problem myself instead of just paying for the dealer to guess. Also, when determined which sensor has the problem, the scan tool refers to Sensor 2 Bank 1 or Sensor 2 Bank 2. Which sensor are they referring to? Can I just remove the oxygen sensors and plug the holes?

Brian

A: Brian, don't remove any sensors from your vehicle. Your vehicle's onboard computer relies on an array of sensors to determine what you would like to happen next. These sensors, or inputs, send information to the vehicle computer microprocessor which processes the information, then the computer will determine what action should be taken and sends a signal to several output devices to change or control functions of the engine, transmission, ride, or any other operations.

HOW OXYGEN SENSORS WORK

Understanding how oxygen sensors work will help you diagnose problems without having to rely completely on a repair shop. Oxygen sensors act as low-voltage producers, such as how a microphone uses piezoelectric generation to produce an electrical voltage signal from mechanical vibration. An example of this is an oxygen sensor (O2), which acts like a miniature generator and produces its own voltage when it gets hot.

Now, let's discuss some history of oxygen sensors, how they work, and some common problems associated with them. The first oxygen sensor was used on a Volvo 240 in 1976. California vehicles started using oxygen sensors in 1980, and by 1981 federal emission laws made O2 sensors virtually mandatory on all cars and light trucks.

The O2 sensors are always located in the exhaust and monitor how much unburned oxygen is present in the exhaust. The O2 sensor used in most vehicles is a voltage generating sensor. The tip of the sensor, which is inserted into the exhaust, has a bulb that is coated with zirconium ceramic on the inside and a porous platinum on the outside. Inside the bulb are two strips of platinum that serve as electrodes, or contacts. The inside of the bulb is vented through the sensor housing to the outside atmosphere.

The O2 sensors are constantly measuring the oxygen content inside the exhaust flow and comparing it to the air outside of the exhaust. The engine controller then uses the sensor's voltage signal to alter the fuel mixture, creating a feedback loop that is constantly rebalancing the fuel mixture. Note: if the exterior of the sensor is covered with oil or debris, the sensor cannot breathe and will render a faulty reading.

When the bulb of the O2 sensor is exposed to hot exhaust, the difference in oxygen levels

across the bulb creates a low voltage somewhere between 0.1 and 0.9 volts. For this test you will need a scanner to read the oxygen sensor voltage. We will be using an affordable Actron scanner that can be purchased at any local parts store.

If the fuel mixture is burning rich, less oxygen will be present in the exhaust and the voltage will be above 0.45 volts, up to 0.9 volts.

If the fuel mixture is burning lean, more oxygen will be present in the exhaust and the voltage will be below 0.45 volts, and as low as 0.1 volts. When using the scanner to monitor the O2 voltages I always remember L = L (Low



voltage = Lean condition).

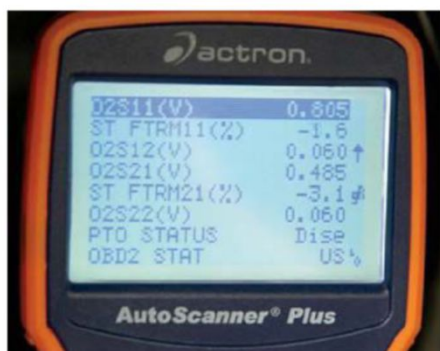
When the air/fuel ratio is perfect and the fuel mixture is 14.7:1 (stoichiometric), the sensor will generate approximately 0.45 volts. This is difficult for the engine controller to achieve. On a normal operating O2 sensor you should see the voltage bounce around quite a bit from rich to lean.

A simple test using the scanner to see if the O2 sensor is capable of reading correctly while monitoring the O2 voltage is to make the fuel mixture artificially rich by feeding propane into the intake manifold or tapping the accelerator several times quickly. You should see the O2 voltage go high, or rich.

When the engine is first started the computer is in what is called "open loop" and will ignore any signal from the O2 sensor. In the open loop mode the engine operations are controlled by a predetermined specification contained in the computer's memory. The fuel mixture is set to run rich and stays that way until the system goes into "closed loop" and starts using the O2 sensor signal to vary the fuel mixture.

Oxygen sensors containing three or more wires are called heated O2 sensors. They will warm up and reach operating temperature faster, which allows the engine controller to go into closed loop faster to help reduce emissions sooner. If you have a fault code for an O2 heater circuit failure on one of these multiple wire sensors, usually the sensor is defective.

If an O2 sensor failure occurs in the sensor or its wiring, it can prevent the system from going into closed loop causing a constant rich fuel condition. When diagnosing the system, if you are monitoring loop status using your scanner, remember only three things will keep a system from going into closed loop: a faulty O2 sensor, coolant temperature sensor, or engine controller or wiring.





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Like anything else, O2 sensors do wear out and require replacement around 75,000 to 100,000 miles as their performance will diminish with age. Contaminants will accumulate on the sensor tip and over time gradually reduce its ability to produce voltage. The sensor can become sluggish and take longer to react to oxygen changes in the exhaust, causing emissions and fuel consumption to rise. A sensor can become contaminated and destroyed by several outside elements that can accidentally be introduced into the exhaust system such as coolant from a leak, lead from the wrong kind of fuel, using the wrong type of RTV (Room Temperature Vulcanization) sealant, phosphorus from oil burning, etc. Also, remember a sluggish or slow-moving O2 sensor often will not set a fault code, so don't assume the O2 sensor is okay if there is no code.

Corvettes having four O2 sensors are using the two mounded post catalytic converter (downstream O2 sensors) to monitor catalytic converter efficiency. These O2 sensors operate just like the low-voltage O2 sensors mounted in or near the exhaust manifolds. Some Corvette owners complain that a fault code is always present after installing an aftermarket exhaust with high-flow catalytic converters. The fault code is caused because the exhaust is flowing faster and cooler than the factory O2 sensor is programmed for. A power programmer or chip can help eliminate this problem.

Another alternative to a power programmer or chip is to install a spark plug fowler in the post catalytic converter O2 sensor locations. This will require you to

drill the existing hole in the spark plug fowler large enough to accommodate the O2 sensor. Then install the original O2 sensor into the spark plug fowler. In some cases this will help eliminate the fault code, but this method should only be used for off road applications as it will not meet federal emissions requirements. Also, this method will not work on every application.

Brian, the questions I am asked most often about O2 sensors is how do you know what is Bank 1 or Bank 2, which O2 sensor is Sensor 1 or Sensor 2. Bank One is always the bank where cylinder number one is located. On the Corvette it will always be the driver side. Bank Two is the passenger side. Sensor 1 on Corvettes is always the sensor that is closest to the exhaust port of the engine. Bank Two is post catalytic converter.

- Bank 1 Sensor 1 - Driver side before converter (front)
- Bank 1 Sensor 2 - Driver side after converter (rear)
- Bank 2 Sensor 1 - Passenger side before converter (front)
- Bank 2 Sensor 2 - Passenger side after converter (rear)

Some of the symptoms of a bad oxygen sensor include a noticeable decrease in fuel economy along with a rich mixture. This does not automatically indicate that the sensor has failed. Be sure to check all vacuum hoses for leaks as well as the ignition system for any problems. Remember, the O2 sensor is only giving you a reading after the combustion process.

The oxygen sensor is an item in a vehicle that gets replaced due to the fault of another component. Just because a fault code indicates an oxygen sensor problem, don't just replace the O2 sensor. Use the following information to help diagnose the underlying problem.

FOR LEAN O2 SENSOR READINGS

A common mistake when reading O2 sensor voltage using your scanner is if the engine is running rough and has developed a misfire, the O2 sensor will read a low-voltage lean condition. Remember, an oxygen sensor reads oxygen not fuel. If an engine is misfiring there will be an abundance of unburned oxygen in the exhaust. The O2 sensor will think the engine is running lean and tell the engine controller, which in turn will add more fuel.

Another common reason to see a low-voltage or lean condition is when a fuel pump starts losing fuel pressure, a fuel filter becomes restricted, or a fuel pressure regulator is stuck open. All of these can cause a lower than normal volume of fuel causing a lean condition. If you think this could be your problem, check fuel pressure and fuel volume.

Clogged injectors can cause a false lean condition. Flushing the fuel injectors may repair this problem, however, replacement may be necessary.

Check the O2 sensor wire for a bare wire. A visual inspection of the wiring should indicate any

insulation missing from the wire or a pinched wire causing the wire to become grounded or cut. A grounded or cut wire will cause a false lean signal.

Check the mass airflow sensor (MAF) or the manifold absolute pressure sensor (MAP) for proper voltage output. The MAF sensor may need to be cleaned to achieve the proper reading.

Water contamination can cause a lean condition.

Exhaust leaks can cause oxygen sensor to send a false lean reading.

FOR RICH O2 SENSOR READINGS

Check the fuel pressure. High fuel pressure can cause a rich condition. Also check for a leaking fuel pressure regulator or leaking injectors. To test for a leaking fuel pressure regulator, remove the vacuum hose from the regulator and inspect for any fuel. None should be present.

A contaminated or malfunctioning canister purge system can put fuel into the intake manifold. To test this, disconnect the canister purge vapor hose and monitor the O2 voltage using your scanner. It is possible a canister purge fault may be set during this test and will need to be cleared.

Check vacuum to voltage readings at the MAF and MAP sensors using your scanner. Check the MAP sensor hose for cracks or a broken vacuum hose.

A high throttle position sensor (TPS) signal can cause a rich condition. The TPS is a potentiometer, so while monitoring the TPS voltage using your scanner, the voltage with the key on, the ignition off, and your foot off of the throttle should start below 1.0 volts, and as you slowly push on the accelerator pedal the voltage should steadily climb to approximately 4.5 volts.

USING SHORT TERM AND LONG TERM FUEL ADJUSTMENTS TO AID IN DIAGNOSTICS

Let's get a little technical and use short-term and long-term fuel adjustments to help pinpoint a rich or lean fuel condition. The engine controller will attempt to make adjustments to fuel flow by keeping the injector open longer or shorter to help maintain the correct air/fuel



ratio. The computer can do this by adjusting the pulse width of the injector using the Long Term Fuel Trim or Block Learn Multiplier.

The first step in diagnostics is to install a scan tool and go to the data stream page on your scanner. For all '96-and-newer Corvettes using OBD II you will need to monitor both Short Term Fuel Trim and Long Term Fuel Trim data.

The normal fuel trim value for both Short Term Fuel Trim and Long Term Fuel Trim is typically plus or minus 8 with 0 being ideal. To maintain the correct air/fuel ratio the engine controller continually adjusts the Short Term Fuel Trim and Long Term Fuel Trim.

If the numbers are plus 10 or higher for the Short Term Fuel Trim and Long Term Fuel Trim, the engine is running lean (the engine is not getting enough fuel). If the values for both the Short Term Fuel Trim and Long Term Fuel Trim are both minus 10 or more, the engine is running rich (the engine is getting too much fuel).

On the '82-'95 Corvette using OBD I you will need to monitor the Integrator and Block Learn Multiplier data. The Block Learn Multiplier is the long-term fuel adjustment that the engine controller uses to keep the air/fuel ratio within acceptable parameters. The Integrator is the same idea, only for short-term adjustments.

The Block Learn Multiplier value can range from 0 to 255 with a value of 128 being ideal, because it is the center point between 0 and 255. To maintain the correct air/fuel ratio, the engine controller continually adjusts the Integrator or Block Learn Multiplier.

If the numbers are 128 or higher for the Block Learn Multiplier, the engine is running lean (the engine is not getting enough fuel). If the numbers for the Block Learn Multiplier are lower than 128 the engine is running rich (the engine is getting too much fuel).

If the injectors are restricted and more fuel is needed, the computer will adjust the amount of fuel coming from the injectors by adding fuel using the long-term fuel trim function.

If the injectors are getting too much fuel or leaking fuel, the computer will adjust the amount of fuel coming from the injectors by subtracting fuel using the long-term fuel trim function.

Brian,

I hope I was able to make you feel confident in diagnosing your Corvette's oxygen sensor system. An oxygen sensor fault code is one of the most time-consuming fault codes to diagnose. So take your time and don't get discouraged. As you have found out, sometimes it is even hard for a seasoned automotive technician to pinpoint the problem.

→ QUESTIONS?

Got a burning tech question? Email us at vette@sorc.com with "Technically Speaking" in the subject line.

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There are plenty of clean cars and lots of fast ones, but seldom does someone dig deep enough to build one that checks both boxes. Jimmy Pham's '06 Corvette Z06 does so without question. It's flawless and it's fast. But what is its strongest attribute? Its brawn or its beauty? You be the judge. And while you ponder that for a moment, chew on this one as well. This Vette started as a stone stock black Z06 coupe and in a matter of months it received a color change, ZR1 attire, wicked wheels, and a engine combo good for 901 hp to the wheels on paltry 91-octane pump gas.

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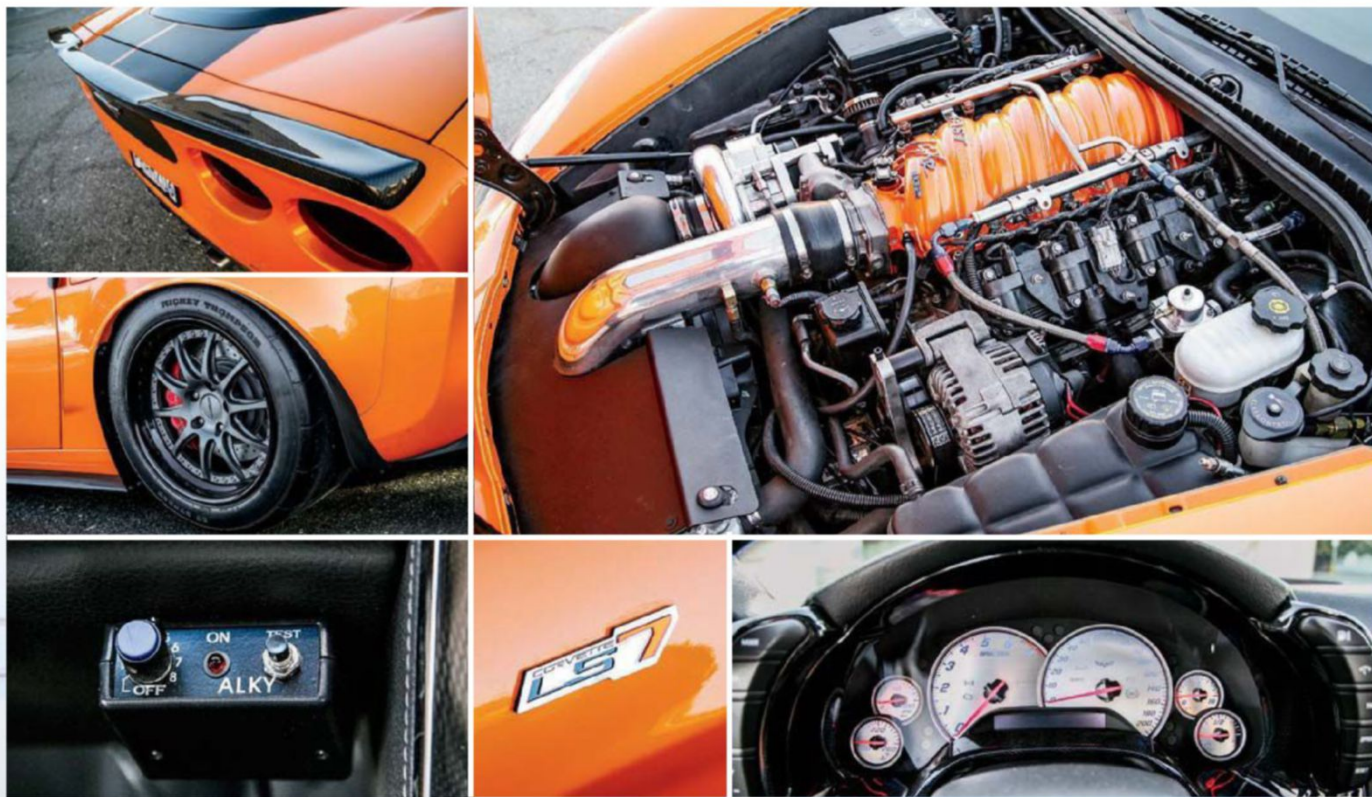
JUSTIN FIVELLA WORDS | PHOTOS



FAST



[FEATURE]
FLAWLESSLY FAST



"I'd always wanted a C6 Z06 but never thought I could afford one until I stumbled onto this one for a great deal, and once it was mine, the end goal was to have it dropped on 360 Forged wheels with a heads and cam package. That's it," said Pham.

As you can see, his Vette has progressed far beyond a simple heads and cam combo. But being an Oakland, California, native, it only made sense that he'd create a car of this caliber.

"Growing up in the East Bay you're surrounded by modified muscle cars. I guess I've always liked fast cars, and out here it gets in your blood early," he explained.

Being a car guy, Pham has owned his fair share of modified imports and Euros, but at his core he's a Chevy man.

"I've wanted a '69 Camaro since I was a kid but still haven't gotten one. I have owned a '67 Pontiac Firebird, two third-gen F-bodies, and a pair of fourth-gen F-bodies: one LT1 and one LS-powered," he said.

That LS-powered F-body was actually propelled by an LS2 with a ProCharger D1SC blower and a custom FMIC that made 650 rwhp, a whopping 645 lb-ft, and wore the same gorgeous House of Kolor Sunset Orange Pearl that blankets this Z06.

"I originally started with a matte-white vinyl

wrap on the Corvette but I wanted real paint, so a few months after the wrap I stepped up and had it painted by Eddie at Complete Automotive Reconditioning Service and continue to have it maintained by Marco at Pristine Detail," he explained.

"I added OEM ZR1 fenders, an aftermarket ZR1 hood along with C7 Carbon ZR1-style skirts, spoiler, splitter, and ZR1 Centennial Edition decal stripes," he explained.

Sexy lines are nothing without stance, and Pham knocked that down with stock leafs and QA1 double-adjustable shocks along with custom Forgeline wheels wrapped in Yokohama

front rubber and Mickey Thompson rear drag radials. The wheels measure 18x10.5 front and 18x13 rear, which allows him to run more rear rubber compared to the more common 19-inch rear rollers that require rubber-band tires with minimal sidewall.

Speaking of traction, there's not much of it thanks to 901 hp and 830 lb-ft of torque at the wheels on crappy California 91-octane.

"Torque is what moves you. There's no lag waiting for the power to hit. That's why with all of my supercharged builds I've kept torque in mind since I drive my cars on the street," Pham explained.





"I love the way it sounds. In fact, I can remember the days before the LS motors got popular, people swore big cams and boost didn't work. That was until they got brave enough to try them."

As a testament to his convictions, I can safely confirm that serious twist joins the party around 3,000 rpm—much lower than most centrifugal blown combos—and spinning it past 6,500 rpm is futile because you get the same drive even if you short shift it. Now, that's impressive on the street.

How impressive? Try high 9-sec e.t.'s at 145 mph at the dragstrip spinning tires through half-track. How'd he do it? And how'd he do it on 91-octane pump gas? With a carefully chosen combo, that's how.

Josh from JRG Motorsports helped him plan the build, pull the stock engine, assemble and install the rebuilt engine while Tony at T.O.E. Performance did the machine work. Rick at Synergy Motorsports tuned it.

Believe it or not, he's still using the stock LS7 block, and it's holding the 13 psi of boost just fine. Maybe that's because it's got a spot-on tune while the custom cam from JRG Motorsports correctly manages cylinder pressure and valve events on the 9.1:1-compression mill.

The cam specs out at 243/258-degree duration at 0.050, 0.623/0.623-inch lift, and a 115-degree LSA, while the bottom end consists of Katech gold-coated boost pistons, Calies H-beam rods, and the stock crank. Texas Speed & Performance ported LS7 heads with matching 0.675-inch EHT Double Springs, and a COMP Cams Retrofit Trunnion kit handle the valvetrain duties while a FAST 102 intake manifold with ported stock LS7 throttle body sit atop the simple, yet effective, combo.

A Vortech V-7 YSi supercharger kit from A&A with an upgraded FMIC and a Cartek Flip Drive kit ensure plenty of boost without the annoying belt slip. All that boost needs plenty

of fuel, so an A&A 1,200hp-capable twin pump fuel system brings the gas along with FIC 1,000cc injectors, a GP Tuning custom Flex-Fuel system, and an Alky Control twin nozzle methanol injection kit that utilizes massive -10AN lines.

Spent gasses are forced through a pair of Kooks 1 7/8-inch long-tubes and matching X-pipe and into a Corsa cat-back exhaust. The combo sounds wicked against the vented bypass valve for the blower and the rump and bump of the big cam.

"I love the way it sounds. In fact, I can





remember the days before the LS motors got popular, people swore big cams and boost didn't work. That was until they got brave enough to try them," Pham explained. Well, he was brave enough, as the first cam he tried was just too small, and when he added this big bumpstick, the naysayers swore he'd lose power. He didn't. He actually gained 70 hp to the tires. How's that for egg on their faces?

Power is nothing without control, so a burly RPS triple-disc clutch, C5 Z06 axles, and plenty of The Driveshaft Shop driveline components confidently turn the massive power into forward motion.

"About the only thing I haven't upgraded yet is the transmission and rearend. Once they go, I'm going to throw the book at it so I can drive the car without any worry," Pham said.

To the delight of everyone associated with the car, Pham actually drives it on a daily basis. Being that it's not a trailer queen might explain why so much attention was also spent on the ambiance of the interior.

"The stock interior was already nice so I focused on adding lots of small details like the Hydro Dipped trim pieces, the stainless steel gauge faces, and the AEM digital boost and air/fuel ratio gauges on the A-pillar," Pham said.

As if the blown 427 under the hood isn't enough music to his ears



SPECSHEET



2006 CORVETTE Z06

OWNER	Jimmy Pham
BLOCK	Stock, machined by T.O.E. Performance
COMPRESSION RATIO	9.1:1
HEADS	Texas Speed CNC machined LS7
CAM	Custom hydraulic roller, 243/258 duration at 0.050, 0.623/0.623-inch lift, 115 LSA, spec'd by JRG Motorsports
PISTONS	Katech gold-coated boost pistons
RODS	Callies 6.125-inch H-beam
INTAKE MANIFOLD	FAST 102R
THROTTLE BODY	Ported stock GM, 90mm
FUEL PUMP	A&A twin-pump kit with GP Tuning custom FlexFuel sensor and FAST fuel rails
POWER-ADDER	Vortech V-7 YSi kit from A&A with Cartek Flip Drive kit
BOOST	13 psi
EXHAUST SYSTEM	Kooks 1 7/8-inch long-tubes and 3-inch X-pipe with Corsa 3-inch cat-back
TRANSMISSION	Stock T-56
CLUTCH	RPS Triple Disc
FRONT SUSPENSION	Stock springs with QA1 double-adjustable shocks
REAR SUSPENSION	Stock springs with QA1 double-adjustable shocks
REAREND	Stock ZO6 centersection with The Driveshaft Shop halfshafts
BRAKES	Stock
FRONT WHEELS	Forgeline 18x10.5
REAR WHEELS	Forgeline 18x13
FRONT TIRES	Yokohama Advan Neova 295/35R18
REAR TIRES	Mickey Thompson ET Street Radial II 345/35R18
POWER/TORQUE	901 rwhp and 830 lb-ft
THANKS	My wife and family for the support, Tony at T.O.E. Performance, Josh at JRG Motorsports, Rick at Synergy Motorsports, Steve at Race Specialty Designs, Eddie at Complete Automotive Reconditioning Service, Marco at Pristine Detail, Joe at Chevrolet of Concord and Bobby at LG Motorsports

already, Pham added an Alpine double-DIN head unit with built-in navigation and backup camera along with a matching amp, a heap of JL Audio speakers, and a custom stealth box with a JL Audio 10W3 sub.

Since writing this story, Pham has also outfitted the interior with a Race Specialty Designs bolt-in Drag rollbar and plenty more OEM Centennial interior bits like a suede steering wheel and matching shift knob, boot, e-brake handle, and armrest. He also added two sets of rims since our photo shoot and tweaked some auxiliaries on the engine; we suppose the pursuit of perfection is an endless one.

"One day I'll be finished with it, but for now I'm going to keep adding small stuff and just enjoy driving it. I want to take it on some trips to the coast and to the mountains," he added. Yes folks, this is a 900hp street car that retains its air-conditioning system, runs down literbikes on the freeway, and can be driven across the States. If that isn't perfection, I don't know what is. **VETTE**

ROCK THE ROCK CRUSHER

GIVING A WORN-OUT MUNCIE FOUR-SPEED TRANSMISSION A QUICK REBUILD

STEVE BAUR WORDS | PHOTOS

One thing that can be problematic about cars, and classics in particular, is that they eventually wear out. Every part of them is subject to wear and tear, but unlike us humans, old cars and parts can be rebuilt quite easily and often inexpensively. The gearbox in our subject '72 Corvette was making an excessive amount of noise for an M22, and sometimes it would stick in Fourth gear. It was time to give the Muncie a rebuild.

The Muncie four-speed is as legendary as the cars that it was put into. The M20, M21, and Rock Crusher M22 models are each part of the hot rod vernacular. From the OEM factories to racetracks to the concours restorations, the Muncie four-speed remains a very desired transmission to have. It is also extremely reasonable to rebuild should yours not be shifting at its best.

In addition to the inexpensive rebuild cost, another great part about rebuilding a Muncie is that you really don't need any special tools. Sure, a hydraulic press is nice and so is a pair of snap ring pliers, but the job can be done without those if you choose—making it a great DIY project. Equipping your four-speed with fresh bearings and synchronizers will improve the driveability of the vehicle. And that will surely provide a better experience behind the wheel.

While we would have loved to show you each and every step in the rebuild process, there are just too many to show within the confines of this article, so we're going to cover the key parts and show you what to look for during disassembly and reassembly. There are a lot of great resources on the Muncie transmission, but we particularly liked Paul Cangialosi's *How To Build and Modify High-Performance Manual Transmissions* books from CarTech books. It covers the Muncie and T-10, as well as a number of other transmissions.

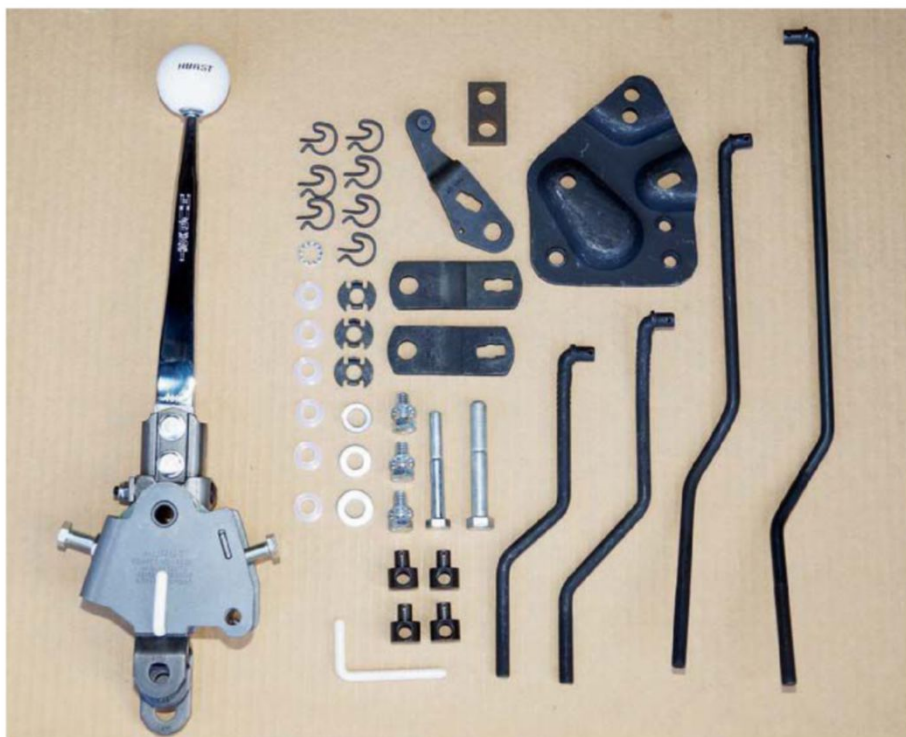
Aside from the obvious issues with our subject Muncie box, it was not the original transmission to the car, so a full inspection was warranted. After ordering a Motive Gear rebuild kit (PN T297RAHDMK), a new Hurst shifter



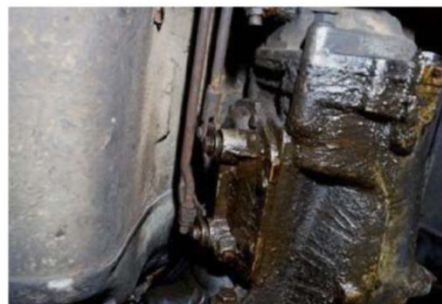
(PN 3917992), and a shifter installation kit (PN HUU-3738611), we brought the Vette to Anti-Venom in Seffner, Florida, where owner Greg Lovell performed a basic rebuild to get our classic sports car up and running quickly. Follow along to see what it takes to get your Muncie back in shape. **VETTE**



01 The Motive Gear rebuild kit (PN T297RAHDMK) retails for \$120 from Summit Racing and is an inclusive kit that provides you with everything necessary (short of gear oil) to rebuild your Muncie transmission.



02 To ensure smooth, precise, and short shifts, we upgraded from the stock shifter to this Hurst unit (PN 3917992) that sells for \$263 through Summit Racing. Pictured here is the optional (we recommend it) Hurst installation kit (PN HUU-3738611) that will add an additional \$162 to the package.



03 Removal of the Muncie transmission from the C3 Corvette begins by disconnecting the shifter rods from the case. That is followed by removing the driveshaft and draining the transmission fluid—it's greasy enough down here without getting a gear oil shower.



04 According to Greg Lovell of Anti-Venom, sometimes you can unbolt the shifter from the factory mount, unbolt the transmission, and then slide it back to get it out. In our case, we needed to disconnect the clutch linkage and unbolt the bellhousing to extract the transmission from the tunnel.



05 If your Muncie is anything like ours, a thorough cleaning is the first step in the rebuild process. Ours had years of accumulated oil and dirt. We recommend using some sort of Gunk product that will soak in, as our parts washer struggled to get the transmission clean.



06 Under the cover of slime, we found this marking on the tailshaft. We knew it to be an M22, and it would seem that someone noted it for storage or perhaps while it was for sale at a swap meet. You'll always want to run the numbers and check the components inside before believing anything that is written outside, though.



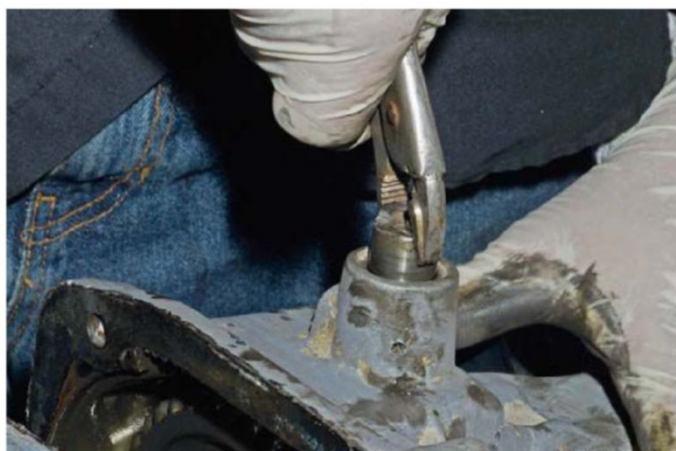
07 With the Muncie finally clean, Lovell begins the disassembly with the removal of the side cover. Along with the side cover will come the forward-gear shift forks.



08 The front bearing retainer is next. Be sure to inspect this part before reusing it or rebuilding the transmission, as you may need to order a new one.



09 The tailshaft housing is next. Remove the perimeter bolts that secure it to the main case. Before it will come off, though, you'll need to remove the reverse selector shaft.



10 To extract the reverse selector shaft, you'll need to drive out the roll pin that secures it to the tailshaft housing. From there, slide out the shaft and remove the tailshaft housing.



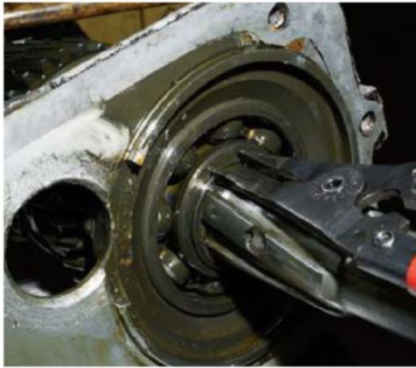
11 With the tailshaft off, remove the reverse idler gear, thrust washer, and countershaft from the back of the midplate. Now you can separate the midplate from the main case and then remove the output shaft and upper gearset.



12 Now that the main gearset is out of the way, empty the case of any remaining components. Here you can see the 1-inch-diameter countershaft, which was a later-model upgrade to the earlier 7/8-inch shafts.



13 As the front bearing retainer was removed earlier in the process, we now have access to the front bearing. Snap ring pliers or something similar makes removing the retaining spring much easier, but, in a pinch, you can do it with a pair of screwdrivers. With the snap ring out, you can tap the bearing out of the case. In some instances, it may just fall out.



14 At the midplate bearing there is another snap ring holding it in place. After removing this bearing, we found the bearing to be quite noisy and likely the cause of the excessive noise coming from the gearbox.



15 With the middle bearing snap ring released, you can remove the midplate and start to disassemble the main shaft. The Motive Gear kit includes new synchronizers as well as every snap ring to make sure everything goes back together nice and snug.



16 With the amount of debris found at the bottom of the case, there's no doubt this transmission was due for a rebuild. Be sure to clean the main case, midplate, tailshaft housing, and front bearing retainer if these components are to be reused. There are a number of companies that offer replacement options for these components, some of which are much stronger than the originals. Most of these are designed to work with your original Muncie components as well.



17 The likely source contributing to much of the debris in the case and some of the oil coating on the outside is this worn tailshaft bushing. Motive Gear includes a new bushing, as well as a new seal for the end.



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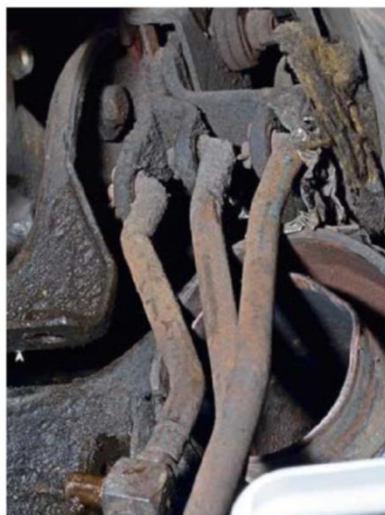
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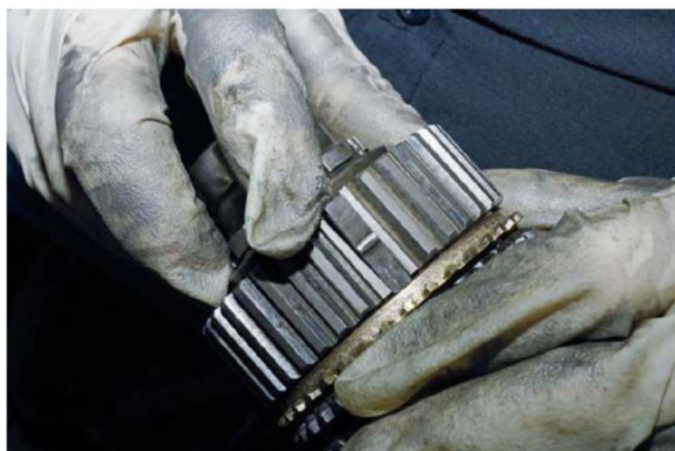
18 The factory shifter was the cause of our transmission sticking in Fourth gear. For the uninitiated, the shift rods fit into plastic bushings in the levers, and these bushings often wear out over time, causing a lack in solid shift engagement. This can lead to poor operation inside the transmission and subsequent damage if not remedied. We planned to solve this by installing a new Hurst shifter along with the recommended installation kit that includes new rods, levers, bushings, and clips.



19 As we mentioned earlier, the front bearing retainer should always be inspected for wear. Here you can see a groove has been worn into the retainer, and just on one side of it. We'll have to order a replacement, and stock ones are available for around \$50.



20 Once you have cleaned the cases free of grease and grime, you'll want to clean up the gasket mating surfaces and then give everything another quick cleaning. New gaskets are included in the Motive Gear kit.



21 An easy way to check out synchronizer wear is that the gear will sit down on the synchronizer if wear is an issue. You can more easily see the difference if you swap out the old and new ones, but don't bother reusing an old one just because it looks good. You're in it this far and the new ones are included in the kit. A shortcut here can lead to a long way back to another rebuild.



22 The front and main bearings in the Motive Gear kit are upgraded ones that feature additional bearings to better distribute the torque load your high-performance engine will put to it.



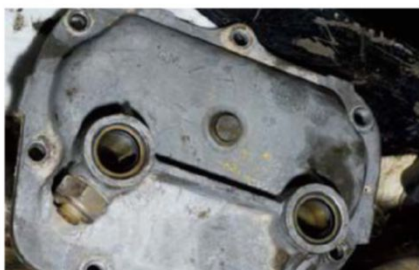
23 There are two sets of new needle bearings in the rebuild kit. The thicker ones are for the back of the input shaft and the thinner set is for the countershaft. Use a quality, high-temperature grease to hold them in place, and be sure to not leave any out.



24 New strut keys are included in the rebuild kit, and these here are being fitted to the 3-4 slider assembly. You can use a dab of grease to hold them in place or you can try your hand at holding them in place as you assemble the unit. Either way, don't forget them.



25 The front input shaft and bearing are held in place by a new snap ring. You can also see that the front bearing nut has been put on. You might think this nut goes on with the flange facing the bearing, but that would be incorrect. The flange faces the retainer and provides an airtight seal. Installing it backwards will lead to a leak and the nut will grind into the retainer.



26 As part of the effort to make this rebuilt transmission a leak-free unit, new external shifter shaft seals are included. If you detect excessive wear and/or movement between the shifter shafts and the cover, you may need to spring for a new side cover. These holes in the side cover can become elongated from wear over time, which can lead to poor shifting quality. Aftermarket covers that utilize needle bearings to support the shifter shafts are available and provide for a smooth and precise action.

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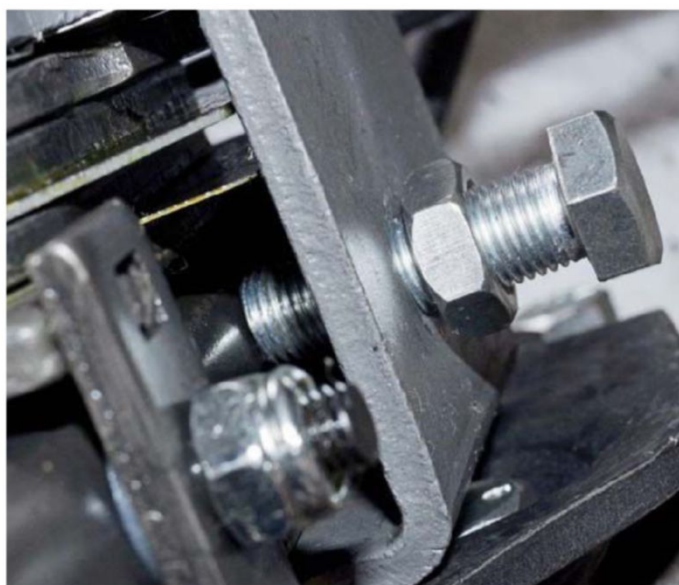
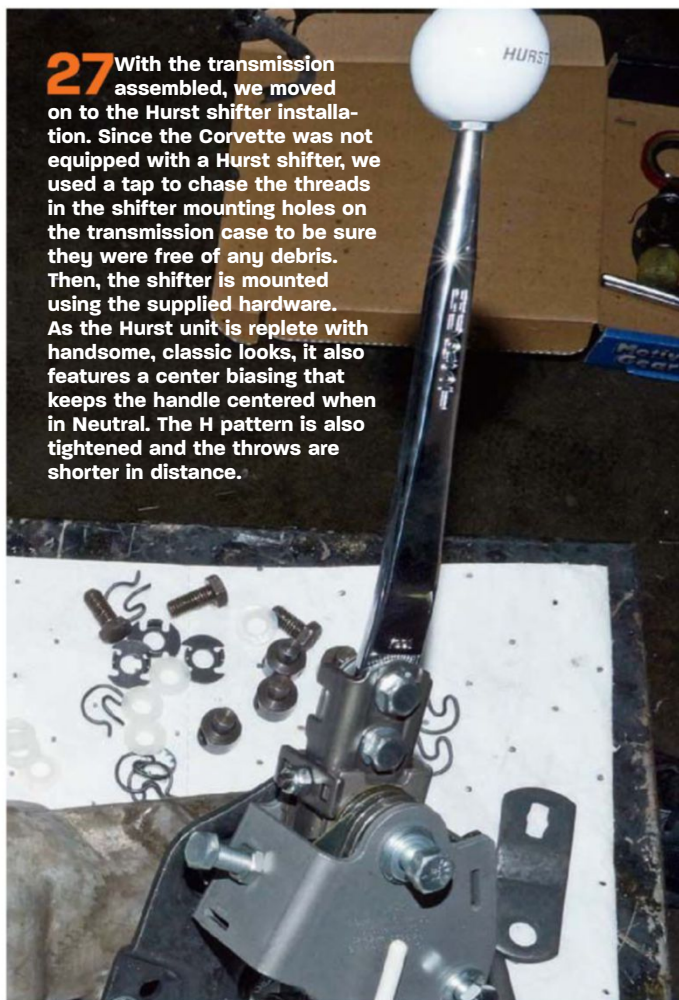
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27 With the transmission assembled, we moved on to the Hurst shifter installation. Since the Corvette was not equipped with a Hurst shifter, we used a tap to chase the threads in the shifter mounting holes on the transmission case to be sure they were free of any debris. Then, the shifter is mounted using the supplied hardware. As the Hurst unit is replete with handsome, classic looks, it also features a center biasing that keeps the handle centered when in Neutral. The H pattern is also tightened and the throws are shorter in distance.



29 Adjustment of the shifter stops is next and is fairly straightforward. Move the shifter into First gear and then turn the bolt in until it touches the handle. Then back the bolt off half a turn and tighten the nut. Do the same for the rear stop with the shifter in Second gear. Double-check that you have positive gear engagement in all gears and you're all set.

Sources

ANTIVENOM

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28 The Hurst installation kit is a no-brainer and ensures that the precise Hurst action works to the best of its ability. New rods, bushings, and clips are included for a trouble-free, bolt-in installation. Keep the white alignment pin in the shifter while you install and adjust the shift rods. Be sure you have the rod orientation correct for each gear, otherwise your First gear will be Second, and your Third could be Fourth. It's easy enough to switch them around under the car should you get them backwards, though.



30 The rebuilt Muncie M22 is ready to be put through the paces once more, this time with an improved shifting feel and effort. And the classic good looks of the Hurst shifter inside will garner looks at the car show in addition to giving you a better handle in the gear changes.



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This was the first peek at the 1.5-millionth Corvette after massive amounts of dirt were removed from its resting place. The attached cables were used to raise it from the bottom of the sinkhole.



The remnants of the badly damaged '09 convertible now rest in the NCM exhibit hall. Restoration of this iconic Corvette would be lengthy and expensive.



SINKHOLE CORVETTES -PART 3

EXPLORING THE HISTORY OF THE '84 AND '09 SINKHOLE CORVETTES

WALT THURN WORDS | PHOTOS ADDITIONAL PHOTOS BY NCM

BELOW: Employees at the Bowling Green assembly plant gather around the 1.5-millionth Corvette on May 28, 2009, before it exits the final assembly area. The fully optioned convertible was purchased by the National Corvette Museum.



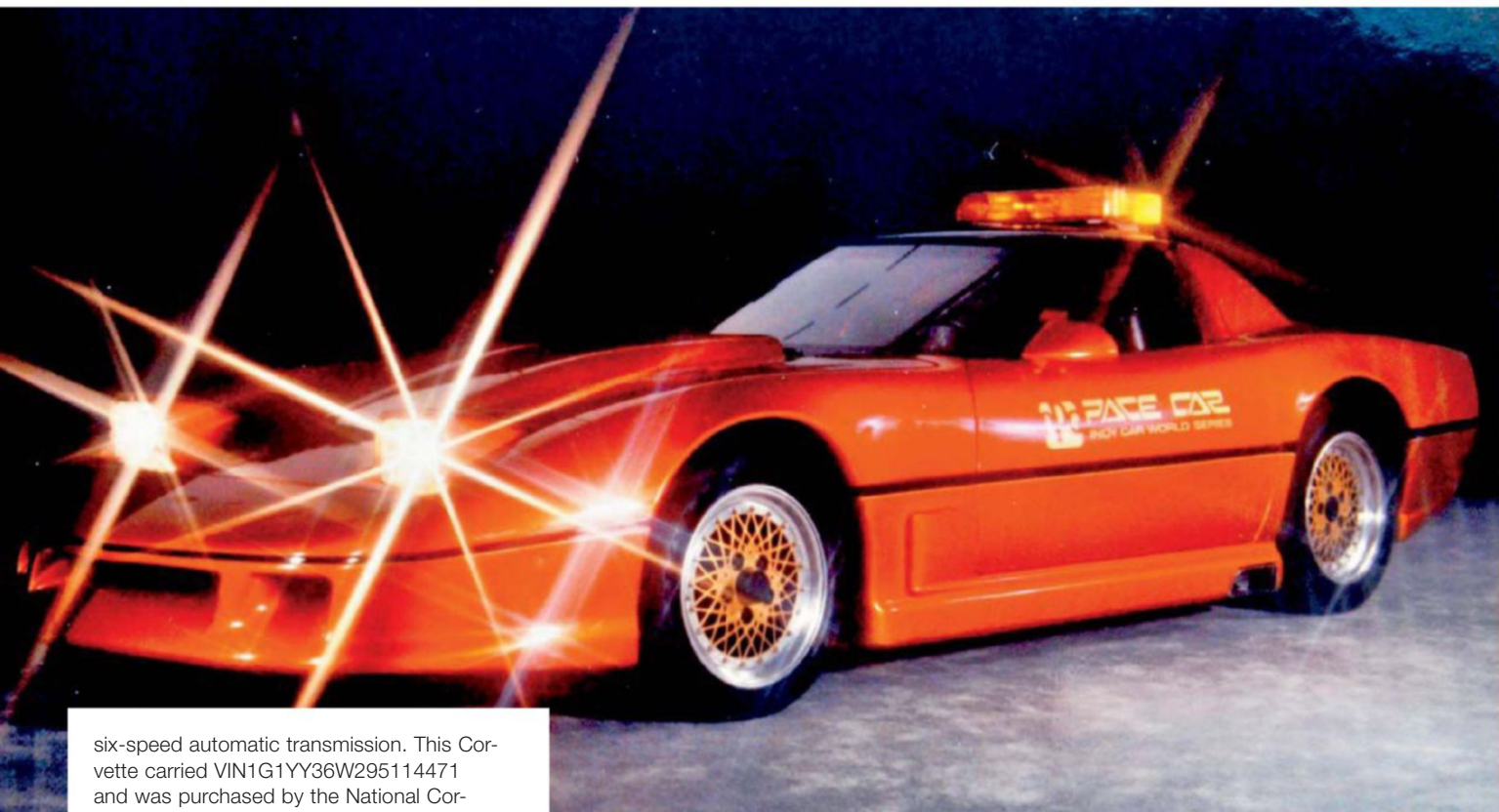
This is a continuation of our series about the Corvettes recovered from the February 12 NCM sinkhole. In Parts 1 and 2 we provided you with information about the ZR1, '62 convertible, '92 1-millionth, and '93 40th Anniversary coupe. These four cars were the least damaged of the eight that fell into the void. Part 3 covers the next two Corvettes, each receiving considerable damage and might not be repairable.

2009 1,500,000th Corvette

On May 28, 2009, a new Corvette convertible rolled off the Bowling Green assembly line. This Arctic White with red interior beauty was the 1.5 millionth example of this iconic American sports car. This fully loaded convertible included the 3LT package: AM/FM stereo, six-disc in-dash CD changer, Bose premium seven-speaker system, heads-up display, power telescoping steering wheel, universal home remote, heated seats, memory seat package, side impact airbags, driver/passenger power adjustable sport bucket seats with perforated leathers inserts, luggage shade, parcel net, Bluetooth, power convertible top, and leather-wrapped steering wheel. In addition, it was equipped with the Z51 Performance Package: larger cross-drilled brake rotors, performance-tuned tires, stabilizer bars, springs, and shocks. It rolled on forged chrome aluminum wheels and had DVD navigation, dual-mode performance exhaust and its 6.2L LS3 engine packed 436 hp (with the exhaust) that was coupled to a



In happier times the 1.5-millionth Corvette was displayed next to a '53 Corvette. The hood stripe was added after it arrived at the National Corvette Museum.



six-speed automatic transmission. This Corvette carried VIN1G1YY36W295114471 and was purchased by the National Corvette Museum Foundation to preserve its place in history. It followed two other production milestone models, the 500,000 white coupe built in 1977 at the St. Louis plant and the 1-millionth white convertible built at the Bowling Green assembly plant in 1992. This Corvette has served as a showpiece at the National Corvette Museum and usually could be found parked in a prominent location near the 1-millionth '92 Convertible inside the museum's Spire exhibit hall. That is until it tumbled into a 60-foot void on February 12 and was buried under tons of dirt and rocks. On April 3, 2014, after extensive digging by the Scott, Murphy & Daniel Construction crew, they located the Corvette. Its nose was exposed enough so the crew could wrap straps around its frame and control arms. The Corvette was slowly removed from the void. Damage was extensive and repairing it could prove very costly. Currently, it's being displayed with all of the other damaged sinkhole cars in the NCM exhibit hall.

1984 PPG Indy Pace Car

In 1994, this PPG Indy Pace Car was displayed when the National Corvette Museum opened its doors on September 2. It was donated by PPG to the museum in early August 1994 and became one of the NCM's permanent exhibits. This was one of a fleet of specially constructed PPG Pace Cars that were developed by different manufacturers to showcase their products. The pace cars were rotated so a different one would pace each race during the racing season. Chevrolet and PPG jointly designed this Corvette

This 1984 Corvette coupe was completely reskinned with panels from Diversified Glass Products and assembled by Triad Services. The completed body was finished in Deltron Acrylic Urethane Orange Glow Candy. It was part of the PPG Indy Car Pace Car fleet and donated to the museum in 1994.



The design of this one-of-a-kind pace car was a joint effort of the Chevrolet Division and PPG. It is powered by a Katech-developed 401ci engine that produced 450 hp and was coupled to a Warner T5 five-speed transmission. The coilover suspension was installed by race specialist George Follmer.

coupe, and it included many unique features that were not found on a production Corvette. It was equipped with coilover suspension for better handling. Power was bumped from 205 to 450 hp by Katech Engineering. Long-tube headers with outside side exhausts were covered by custom bodywork. The only stock body panels that remained were the doors and roof panel. All of the other panels were

removed and replaced with custom bodywork made by Diversified Glass Products. This unique Corvette held a place of honor among the various pace cars that were on exhibit at the museum until it fell into the void on February 12. Damage was extensive and the custom body panels will be expensive and difficult to replace. It is currently on exhibit with the other sinkhole survivors. **VETTE**



On March 5 Scott, Murphy & Daniel Construction crew attached straps to the front framrails and carefully lifted the Pace Car from its resting place.



The PPG Pace Car received extensive damage to its frame and body. Many of its parts were custom-fabricated and would be very expensive to duplicate. It is now on display in the NCM exhibit hall.

RACE-INTENDED C3 RESTORED TO BLOOMINGTON GOLD STANDARD

SCOTT ROSS WORDS BILL ERDMAN PHOTOS

ZORA'S LAST HU

In a model year (1971) when lower emissions and subcompact cars were emphasized, you could still buy a ready-to-race Corvette at your local Chevrolet dealer. Check either of the "ZR" option codes and you'd get a '71 Stingray that was loaded the way racers wanted them, with one of Chevrolet's highest-output engines teamed with a Muncie M22 "Rock Crusher" four-speed and other special/heavy-duty powertrain and chassis gear, but without items like a radio, air conditioning, or power steering. All you needed to do, once you got it home, was

add any required safety equipment, replace the OEM wheels and tires with race-ready rubber, put your number on it, then head to the track.

This particular ZR2, painted Brands Hatch Green at St. Louis, needed a bit more than pre-race preparation to get it into the condition seen here. "It was pretty much in disarray," says its current owner, Terry Michaelis. "It was restored by Kevin Mackay and Corvette Repair out of Long Island, who did quite the job."

That restoration, when finished, helped this Shark earn Gold certification at the 2014 Bloomington Gold meet. But it didn't earn a

perfect score, he notes. "In fact, when it went through the Gold judging, it only lost 245 points. It could have lost 410 points and still got a Gold." What caused it to lose points? "A lot of that was 'over-restoration,'" says Terry. "The air cleaner assembly they showed was in 'show chrome,' so that would be over-restoration. There wasn't any sloppy glue on the weatherstripping and no sealant on the firewall—all that stuff that judges want to see."

But what show judges look for may not be what those who pay to see show cars—and take them home—are interested in seeing. "I



URRAH

think what you have here is two worlds," says Terry. "You have the NCRS and Bloomington Gold judging world, who want the car to look the way they perceived it came from the factory: a lumpy old car. But, in the real world, if you look at what's been happening at the big-time car auctions (like Barrett-Jackson, Mecum, et al.), they don't want a lumpy old car. They want a beautiful car—and with a known history, it will command even more money."

"It's a well-documented car," says Terry. "It's also an export car, so it has the



[FEATURE]

ZORA'S LAST HURRAH

shipping data report when it was exported.” He adds, though, if he’d restored it himself he’d have done more research on it and its on-track history—and restored it back to its race configuration. But he credits Kevin Mackay and Corvette Repair for the top-quality work they did on this C3. “They did an unbelievable job on the restoration, and it’s also sorted,” says Terry, while noting the ZR2’s driveability. “This car isn’t all over the road. A lot of times, show cars are just done for show, and if you drive ‘em down the road, they’re awful.”

Driveability is one big difference the 454ci-powered ZR2s have over their predecessors: the ’66-’69 L88. “If you tried to use an L88 on the street back then, you couldn’t. And you still can’t today,” he says. “If that L88 engine’s built to factory specs, without a fan shroud, unless you’re moving, you’re going to overheat.”

Lack of a factory fan shroud is something that Corvette-savvy “carchaeologists” should keep an eye out for if they’re looking for any of the five factory-built ZR2s (of the 12 built) that have yet to be accounted for (nine coupes, three convertibles). What else should you keep an eye out for? Said Terry, “You’ve got to look for the heavy-duty J56 brakes, which have a special bracket on the back of the front calipers. Then, you have a special aluminum radiator. Also, there’s a transistorized ignition but no ignition shielding because there won’t be a radio (in it), and you won’t have an antenna hole or any of the (other) stuff that comes with a radio.”

He adds that used race cars, especially those that were crashed on the track, were prime candidates for parting out back in the day. “In the ’70s, these cars were worth more in parts than what they were complete,” says Terry. “The rougher it was, the more it became a candidate for disassembly and parting out.”

Terry adds that over the years the ZR2—and its LT-1-equipped sibling, the ZR1—may have been overlooked by the enthusiast press over the years. “Unfortunately, I don’t think these have been editorialized very much,” he says. “If you pay attention to what’s been written, it’s all L88, L88, L88. If you think about the ‘Z-cars’ (ZR1 and ZR2), this was Zora’s last effort.”

As Zora Arkus-Duntov, Corvette’s Chief Engineer, faced mandatory retirement in 1975, and as Chevrolet and GM turned their attention to meeting ever-stricter Federal safety and emission regulations starting in the early ’70s, the 53 Corvettes built with the ZR1 and ZR2 options from 1970-1972 were indeed the last factory-built race Vettes produced during his time with Chevrolet.

This particular example shows what you’d get for \$7,245 (plus taxes and fees), before you put safety equipment, racing tires, and numbers on it. And before you set out to own the A/Production class at your local track! **VETTE**



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Terry Branton came out for the car show and then decided to slap on some blue tape and a little have fun at the autocross in his C5 Z06. We're pretty sure he's hooked.

OBJECTS IN MOTION

VETTES PLAY HARD AT THE CHEVY HIGH PERFORMANCE NATIONALS

STEVEN RUPP WORDS | STEVEN RUPP, HENRY Z. DEKUYPER, HENRY DE LOS SANTOS, AND ROBERT MCGAFFIN PHOTOS

For the third year, the Chevy High Performance (CHP) Nationals presented by the NMCA came back to Atlanta Dragway in Commerce, Georgia. As always, there was a ton of drag racing action, but there was also a host of other events going on. For spectators, there was a huge midway where vendors showed off their latest and greatest go-fast gadgets and a show-and-shine full of super-clean cars. Another spectator favorite was the Jet-Hot-sponsored autocross where anyone registered for the event could take a shot at running around the cones. It's an event that had a little somethin' for everyone and, for the most part, the weather cooperated.

But as is the case at every NMCA-run event, the main action was on the dragstrip where hundreds of cars, and quite a few Corvettes, fought it out in various drag racing classes. All told, it was three days of all things Chevy that had enough action to keep even the most attention-deficit gearhead interested. **VETTE**



Tyler Powell's '63 Grand Sport replica killed it on the autocross course. His times kept getting better and better throughout the day, and he ended up with one of the quickest laps of the weekend.



There were more than a few sweet Corvettes at the car show, including Gerald Copeland's '63. This restomod had just enough custom touches to make it stand out from the crowd.



With a 427ci LS7 under the hood, making just over 700 hp, Peter Huff's '99 C5 is one fast ride. He worked his way through the ladders and eventually won the Proform LSX Rumble class by running a 10.518 against a 10.50 dial-in (0.017 reaction time) in the final round.

The CHP Nationals also included a car show that had everything from restored '50's Corvettes to brand-new '14 Camaros. The great weather on Saturday resulted in a large turnout.



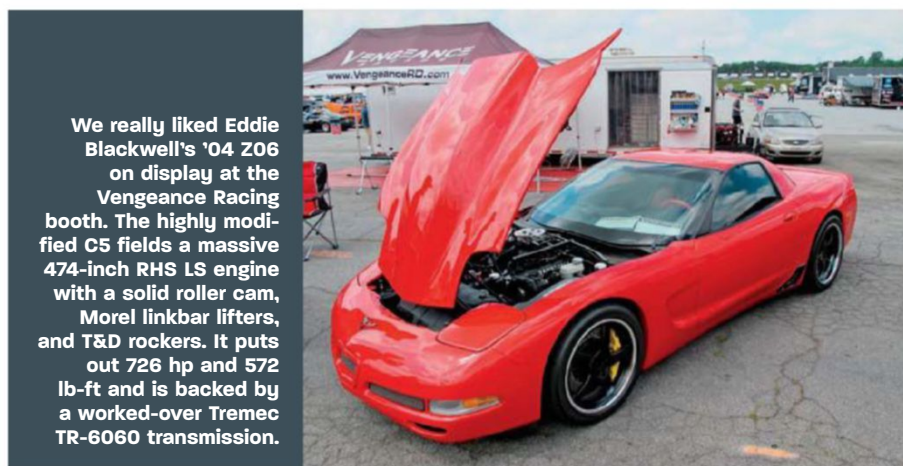
Scoggin-Dickey was on hand with a slew of cool Chevrolet Performance crate engines on display. The newest offering was this Gen 5 LT1. It displaces 6.2 liters and features direct injection, active fuel management, and variable valve timing. Output is rated at 460 hp and 465 lb-ft of torque.



Another Vette that we would have liked to take home was Scott Dunnington's meticulously restored '71. The combination of a drop-top and a 454 big-block is pretty hard to beat.



The swap meet was pretty crowded and filled with tons of stuff from hard-to-find parts to used engines.



We really liked Eddie Blackwell's '04 Z06 on display at the Vengeance Racing booth. The highly modified C5 fields a massive 474-inch RHS LS engine with a solid roller cam, Morel linkbar lifters, and T&D rockers. It puts out 726 hp and 572 lb-ft and is backed by a worked-over Tremec TR-6060 transmission.



There were even a few Corvettes looking for new homes, like this all-original L82 '79 for \$7,500.



Cody Puckett had a blast tossing his '04 C5 through the cones and laid down some solid times. His Vette is super clean and we dug the rear quarter-panel flairs.



There were a few new C7 Vettes at the dragstrip where they seemed to run in the low 12s, with one edging down into the 11s. That's pretty damn impressive for a stock (as far as we could tell) sports car.



Mark Carlyle took the top spot in the JE Pistons Drag Radial class with a blistering 5.18 e.t. at 156 mph (eighth-mile) pass.

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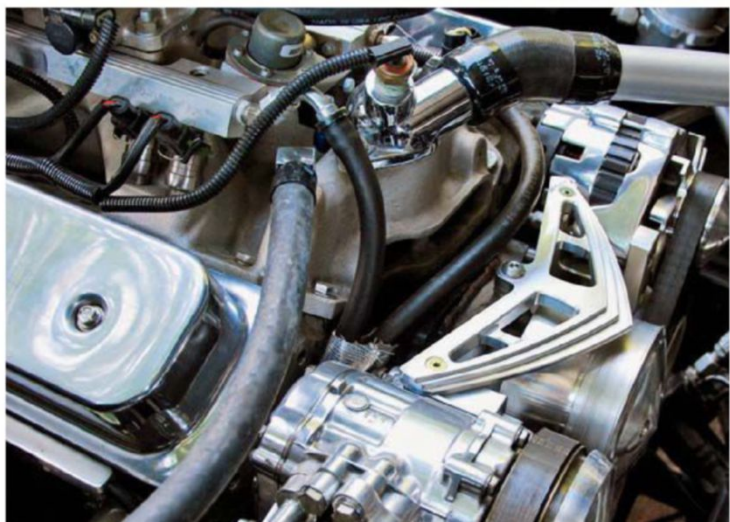
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[FEATURE]





TIME FOR CHANGE

COMBINING THE LOOKS OF AN EARLY VETTE WITH MODERN PERFORMANCE AND COMFORT

TOMMY LEE BYRD WORDS | PHOTOS

The term “restomod” gets thrown around quite a bit these days, and the basic definition is to make an old car perform like a new one without destroying the vintage style. That’s exactly what Maryville, Tennessee, resident Dwayne Gross accomplished with his ’60 Corvette, but he never intended on taking it this far when he purchased the car in 2001. He always loved the looks of first-generation Corvettes, dating back to the ’60s when his cousin sported a black ’58. Although he always longed for a Corvette, life simply got in the way and more practical decisions were made in place of the topless two-seater he wanted.

Fast forward a few decades and Dwayne’s desire for a Corvette still lingered. While tossing around the idea of buying a ’67 Oldsmobile project car, his wife, Charlene, offered a very encouraging statement: “Why don’t you get the Corvette that you’ve always wanted?” And that was all it took to push him over the edge. However, when he finally had the chance to buy one, he was rather disappointed in its performance. His dream car didn’t quite live up to the expectations.

One of Dwayne’s main concerns was the original engine and transmission. In 1960, Corvettes were only available with a 283ci small-block engine and Dwayne’s car had the standard, three-speed manual transmission. Dwayne didn’t want to go away from the old-school small-block design, so he opted for a GM Performance Parts ZZ4 crate engine, as it makes 355 horsepower without breaking a sweat. It was affordable, reliable, and offered just the right amount of power for this weekend cruiser. Atop the crate is an Edelbrock Pro-Flo EFI system to bring the small-block into the modern era. Other additions consist of a Mallory ignition, a March Ultra Drive serpentine accessory kit, and a Griffin aluminum radiator. Behind the simple and clean mill is a Tremec



FEATURE

TIME FOR CHANGE

five-speed manual transmission, which helps the Vette hit the road and achieve relatively decent fuel mileage.

Dwayne sought out a solution to the car's shortcomings, which included inadequate drum brakes, sloppy steering, and worn-out suspension. Solid axle Corvettes were never known for their handling and 40-some-odd years of abuse didn't make matters any better for this classic. The solution, in his case, was a brand-new rolling chassis from Street Shop that features a mandrel-bent steel frame and C4 independent front and rear suspension. QA1 coilovers on all four corners and an AGR power rack-and-pinion offer a comfortable ride and great performance.

Dwayne added a Master Power disc brake kit, featuring drilled and slotted rotors and a slick aluminum master cylinder to the new chassis. Dwayne's car received the new chassis and engine combination in 2004, but he decided on some big changes in 2012 after visiting the Corvette Expo in Knoxville, Tennessee.

That particular event introduced him to Larry Burchett, owner of B Rod or Custom as well as Strip Technologies. Larry has restored and modified a number of Corvettes through the years and had an incredible '64 Corvette coupe ("Classic Curves," Apr. '13) on display at the event. A deal was made and Dwayne's Corvette went to Strip

Technologies to be plastic mediablasted as the first of many steps. Larry then moved the car to the B Rod or Custom shop, where he perfected the fiberglass body and aligned the panels for a much better fit and finish than Chevrolet offered in 1960. Larry's son P.J. Burchett handled the paintwork, laying down several coats of DuPont black pigment, then sanding, buffing, and polishing the fresh finish. With a mirror-like finish, the effort certainly paid off. The slick paint is accented by refinished trim and emblems throughout.

To match the fresh, new look, Dwayne wanted a modern tire and wheel combination so he went with a set of Billet Specialties Flare wheels. Dwayne enhanced the car's



SPEC SHEET

1960 CORVETTE CONVERTIBLE

OWNER	Dwayne Gross
BLOCK	GM Crate
DISPLACEMENT	350 ci
COMPRESSION RATIO	10:1
HEADS	Aluminum, 165cc runners, 58cc chambers
VALVES	1.94 intake, 1.50 exhaust
CAMSHAFT	GM hydraulic roller, 208/221 duration, 0.474/0.510 lift
ROCKER ARMS	Stamped steel, 1.5:1
PISTONS	Stock
CRANKSHAFT	Stock, forged steel
RODS	Stock, powdered steel
INTAKE MANIFOLD	Edelbrock Pro-Flo EFI
FUEL SYSTEM	Electric pump
IGNITION	Mallory
EXHAUST SYSTEM	2.5-inch with Flowmaster mufflers
TRANSMISSION	Tremec five-speed
DRIVESHAFT	Custom length
FRONT SUSPENSION	C4 with QA1 coilovers
REAR SUSPENSION	C4 with QA1 coilovers
REAREND	C4 with 3.54 gears
FRONT BRAKES	C4 drilled and slotted rotors
REAR BRAKES	C4 drilled and slotted rotors
WHEELS	Billet Specialties Flare, 17x8, front; 18x9, rear
TIRES	Nitto 555 245/45-17, front; 255/45-18, rear
FUEL OCTANE	93

stance by staggering the sizing—17x8 up front and 18x9 out back. The wheels are complemented by a set of Nitto 555 245/45-17 and 255/45-18 tires.

Early Corvettes are known for their lack of real estate in the rear wheelwell area so B Rod or Custom widened the tubs but left enough room for all of the soft-top mechanisms. The 18x9s are tucked in nicely, offering the classic hot rod rake.

Inside, bright-red leather offers the perfect contrast to the deep-black exterior. Steve Holcomb of Pro Auto Custom Interiors handled the stitchwork, giving the original seats a rolled and pleated pattern, while the door panels received a two-tone

color scheme to match the original trim. The dash is all stock, but features a Vintage Air A/C system and a Sony CD player. A Ron Francis wiring harness ties all of the accessories into the main harness for a worry-free electrical system.

Dwayne's love for Corvettes led him to eventually buy a '65 convertible and an '11 Grand Sport convertible. He enjoys sliding behind the wheel of his modern Corvette, but admits the vintage cars are way more fun and get a lot more attention. Thanks to a number of changes, his '60 Corvette is on the road again, and it has the show-winning details to match the awesome performance. **VETTE**

HE ENJOYS SLIDING BEHIND THE WHEEL OF HIS MODERN CORVETTE, BUT ADMITS THE VINTAGE CARS ARE WAY MORE FUN, AND GET A LOT MORE ATTENTION.



C7+BOOST

ADDING BIG POWER TO A '14 STINGRAY IN LESS THAN A DAY

JUSTIN CESLER WORDS | PHOTOS



It's a pretty simple formula, really. Take any late-model GM V-8, add some boost, and go run a number. We've been doing it here in *Vette* for years, but with the new '14 C7 and its LT1 engine, the biggest question was, "will it still work?" Could the aftermarket boost the new direct injection V-8? And if so, would the high-compression engine respond like the old LS3 did? In short, the answer is yes. Yes, yes, yes! In fact, not only can the LT1 handle boost, it loves it. We're talking 580 rwhp and 553 lb-ft of torque on an almost bone-stock engine with a stock fuel system in less than a day! All from a 100-percent bolt-on supercharger kit that ships to your door and installs with simple hand tools. It really doesn't get much easier than that ... well, maybe until the Z06 comes out, but if you're looking for boosted C7 performance today, there are plenty of great choices.

For this test, we teamed up with the lunatics at Redline Motorsports in Pompano Beach, Florida, who had grown tired of their nitrous-injected 10-second quarter-mile missile C7 already and were looking to up the power full time. Howard Tanner, who runs Redline, uses his personal C7 as a testbed for new products, and when he heard that Doug Ring and the crew at East Coast Supercharging (ECS) were ready to ship a supercharger kit, he wasted no time getting a system in the mail. What Howard ordered is the same exact kit you can, which features a Novi 1500 self-contained supercharger head unit, a set of beautifully CNC-machined brackets, a large air-to-air intercooler, an eight-rib supercharger pulley system, and all of the pipes, couplers, bolts, and accessories you'll need to make everything work. Touted by ECS as a simple-to-install-at-home, 100-percent bolt-on

supercharger system, we wanted to see just how simple it was to make big power.

Spoiler alert: it's really easy.

Follow along as Redline drops the ECS kit in place, and make sure you check out the dyno numbers at the end of this story. If you're itching to make your C7 faster or you're waiting for the Z06 to drop prices on used Stingrays, you're going to want to pay attention to this formula. **VETTE**

Sources

EAST COAST SUPERCHARGING
609.752.0321
eastcoastsupercharging.com

REDLINE MOTORSPORTS
518.355.8460
redline-motorsports.net

AWESOME



01 For under \$5,500, East Coast Supercharging (ECS) will ship a complete bolt-on supercharger kit to your door that is capable of supporting upwards of 900 hp with the supplied Novi 1500-series supercharger. The dedicated eight-rib belt drive system, high-flow horizontal mount intercooler, and CNC'd mounting brackets are all top quality and the kit includes every nut and bolt you'll need for a complete installation.

02 Designed to be installed "from beginning to end in a day in your driveway and with no need for special tools or removal of the front fascia" this is truly a DIY kit. Of course, us magazine guys aren't lucky enough to afford a blow-off valve, let alone a C7, so we turned to the top-notch crew at Redline Motorsports in Pompano Beach, Florida, to show us how it's done.



03 Not wanting to waste any time, the Redline crew dug right into the installation (Hey, it said a day from start to finish, right?), which began with the removal of the factory air inlet scoop ...

04 ...and air intake tubing. If you're following along at home, note that you will not reuse these parts, but you will need the factory MAF sensor, so set that aside.



05 Underneath, Redline pulled the factory air dam out of the way, which allowed for ample room to work. This air dam will also

need to be modified/replaced to allow airflow to the horizontally mounted air-to-air intercooler once the supercharger system has been installed.



06 There is no need to remove the factory balancer to install the ECS supercharger system, as the factory piece

is already keyed and quite robust. That said, you will need to install the supplied eight-rib supercharger hub, which does require the removal of the stock balancer bolt.



07-08 Of course, to get to the bolt, you'll need to make some room. ECS recommends removing the factory steering rack to do this, but Redline found it was possible to remove the rack bolts and slide the rack out of the way to gain access to the balancer bolt.



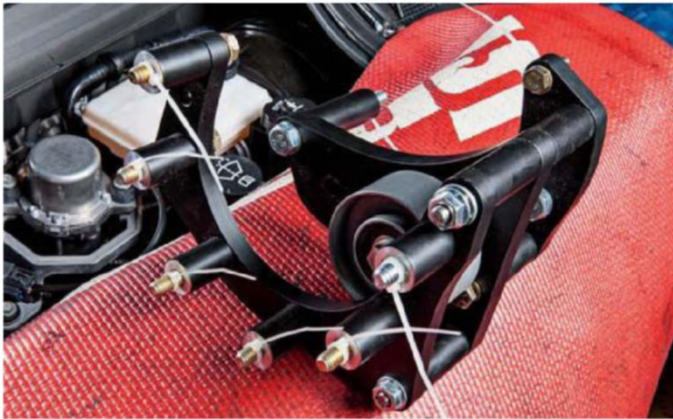
09 Once removed, you can slide the new eight-rib hub over the factory balancer, and using a new bolt, snug the system back to spec. Note, you will need a new balancer bolt for this job, as the stock bolt is "torque to yield" and cannot be reused.

10 The factory ABS block is big and it would get in the way of the supercharger head unit if it wasn't relocated. Luckily, ECS supplies a new bracket (on the left) with the kit that allows you to move the ABS block out of the way, and the installation is simple.



11 A single bolt holds the bracket in place.

12 Once installed, you can bolt the ABS block into its new location. OK, it's not quite that simple, as you will have to ever-so-slightly loosen the larger brake lines to "gently" bend them to fit. If you're careful, you won't have to bleed the brakes. Redline was able to bend and reposition without any issue.



13 Finally, it was supercharger time. Well, almost, but the all-black CNC-cut billet brackets were just as sexy as the supercharger itself, and you can see why ECS is a popular choice for Corvette installations. This bracket will bolt to the engine and hold the supercharger...



14...which is responsible for turning fresh air into compressed awesomeness. The Novi 1500, which ships with the base ECS supercharger system, is self-contained and capable of producing upwards of 900 horsepower. Need more power? ECS offers a Novi 2200R head unit that can support over 1,300 horsepower!



15 It's easiest to install the supercharger bracket system in pieces, and the cylinder head bracket was the first step for the Redline crew. As you would expect from a true bolt-on system, all of the hardware was supplied in the kit and, we're happy to report, all fit correctly without a trip to the bolt bin.



16 The supercharger drops in place next, although you'll want to install it and the belt as one unit, just to get everything situated properly. Note that there are no oil or water lines to run, as the self-contained Novi 1500 head unit needs no additional supply lines. That's a nice feature for a set-it-and-forget-it enthusiast.



17 ECS knows that proper belt tension (and width) is critical to making big boost, and the kit features a very well designed tensioner system. Shown here is the spring tensioner that keeps the belt tight as the engine accelerates and the belt stretches. There is also a manual tensioner built into the head unit bracket, which needs to be set to "tight."



18 With the boost maker in place, it was time to swap gears and get to work installing the boost cooler – also known as the intercooler. First up, you'll want to work on installing the mounting bracket, which can be bolted to the factory lower radiator support. Redline chose to install several "nutserts" here to allow for an easy installation of the supplied bracket.



19 And just like that, the intercooler slides into place. The horizontal design is quite ingenious, as it allows uncompromised airflow to the factory radiator/condenser, while still grabbing enough air to keep the supercharger air temperatures under control. If you've ever had an overheating C5 or C6 before, you'll appreciate this design.



20 The piping from the supercharger head unit to the intercooler literally slips into place, and the fit and finish was excellent. Redline had no trouble lining up the pipes, and the supplied silicone couplers tightened down easily with the stainless steel T-bolt clamps. Remember, you want a good tight fit on these pipes or you'll be wondering where your boost went after a session of spirited driving.



21 A quick bit of housekeeping here, as you'll need to cut and extend the factory radiator water line to make room for some of the supercharger's piping. A single cut and the supplied extension made for a simple splice job.



22 The ECS supercharger system is unique in that it A) uses a modified factory airbox and B) restricts airflow before the supercharger inlet to help regulate overall boost. This restrictor plate slides in place and keeps peak boost under control for factory engine configurations. If you want more airflow, well, you know what to do.



23 With the restrictor installed, you can bolt on the factory airbox and install the supercharger inlet tube. Of course, don't forget about the intercooler-to-throttle body piping, which will also include the factory MAF sensor. And with that, you can step back and admire your work. Or, in Redline's case, you can fire up the beast and head directly to the dyno!



24 With a little over 9 psi of boost, the C7 laid down 580 rwhp and 553 lb-ft of torque. Compared to the baseline run, the Redline C7 picked up 145 rwhp and 125 lb-ft of torque thanks to the ECS supercharger system! For an actual day's worth of work (with time for a long lunch), this is truly an excellent option for any C7 owner looking to lay down big numbers without any hassle.



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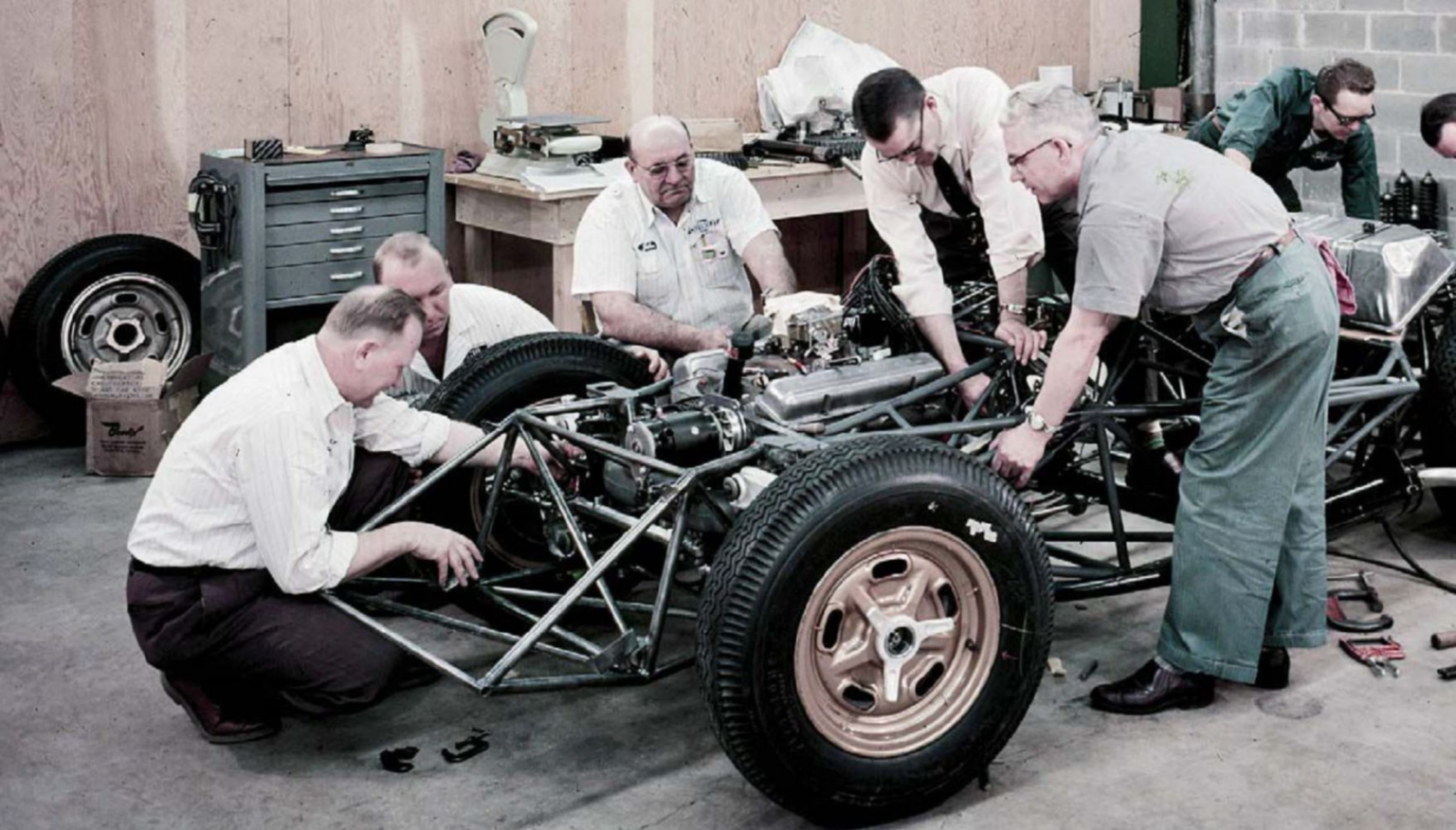
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TREND SETTING—PART 3

A LOOK BACK AT CHEVROLET'S EXPERIMENTAL, PROTOTYPE, CONCEPT, AND SHOW CAR CORVETTES.

SCOTT TEETERS WORDS | ILLUSTRATIONS **GENERAL MOTORS** PHOTOS

General Motors makes hundreds of kinds of cars and trucks. Some sell hundreds of thousands of units a year, which makes Chevrolet's Corvette a complete enigma. Given the small number of Corvettes sold every year, it is a modern American manufacturing miracle that the car survived for 61 years.

The Corvette was "officially" born on January 17, 1953 at the GM Motorama Show at the Waldorf Astoria Hotel, in New York. To understand the impact of Harley Earl's two-seater sports car concept, you have to look at typical cars of 1953. The car was low and sleek, and wasn't over festooned with styling gimmicks. Based on the response from attendees, Chevrolet rushed the car into production, and the rest is history.

Today, the Corvette is GM's flagship car. When Chevrolet unleashes a new Corvette, the automotive world stops to take notice. But things were not always this way. Up to the C4, there were many inside GM that wanted to see the Corvette go away. For the first 20-some years, the car suffered from an identity crisis. Inside GM there were always those that wanted the





Corvette to be something different; a light-weight sports car, a mid-engine car, a rear-engine car, a four-seater personal luxury car, powered by a boxer-type flat-six, Wankel rotary-powered, turbocharged small-displacement hemi-headed double-overhead cam powered, and even an all-aluminum car. Chevrolet kept the loyal faithful stoked with two or three experimental, prototype, show car Corvettes per year. From an enthusiast's perspective, this was endlessly fascinating.

This is part three of a chronological look back at Chevrolet's high-profile experimental, prototype, concept car, and show car Corvettes. Some of the cars had exotic names such as "Astro-I," "Astrovette," and "Geneve." Others had experimental prototype numbers such as "XP-700" and "XP-882." And some had sexy names such as "Nomad," "Mulsanne," "Snake Skinner," "Mako Shark," and "Tiger Shark." In retrospect, a few of the cars were the shape of things to come, but most were simply, "Here's an idea of something we're working on." Either way, it was all a ton of fun!

1959 Stingray Racer



In December 1958, Bill Mitchell was 46 years old and the head of GM's Styling Staff, and at the top of his career. Bill was a car guy with gasoline in his veins but had never raced. With a VP's salary and inside connections, Bill decided it was finally time to go racing and thus shaped the Corvette's history.

Mitchell bought the chassis of the '57 Corvette SS mule for just \$1, with the agreement that after he was finished racing, he would return it to GM. Under Mitchell's direction, stylist Larry Shinoda adapted the Q-Corvette body design by Pete Brock and Bob Verzyer, to the Corvette SS chassis. Shinoda made the Q-Corvette a roadster and gave it a tear-drop fairing around the rollbar and short wind-screens similar to the '56 SR-1 Corvette. When completed, it was an instant classic.

Though Mitchell raced his Stingray out of his own pocket, he had ample resources within Chevrolet. Just like the Corvette SS, brakes were a problem due to the car's complex double-booster setup. In the first season, a single Hydrovac power assist system was installed.

Disc brakes were ruled out due to cost. The Stingray's aerodynamics proved to be a nightmare. While the shape looked sleek, it's flat top and rounded bottom caused the car to dramatically lift at high speed, with the front end occasionally going airborne. This was corrected somewhat by raising the back end, thus raking the overall stance. The car's top speed was around 155 mph.

Using a fuel-injected 283 engine, Mitchell entered the Stingray in SCCA C-Class. During the two seasons, Bill had help from Zora Arkus-Duntov and Chevrolet mechanics Eddie Zalucki and Dean Bedford. Dick Thompson and John Fitch bravely handled the driving duties and won the SCCA C-Modified Championship in 1960. In 1961, the car reverted to a show car to tease the public as a possible '63 Corvette. Mitchell even drove the car on the street! In 2006, the Stingray Racer was given a top-level restoration and is still drop-dead gorgeous.

1960 XP-700

While GM's Styling V.P. Bill Mitchell was busy racing his '59 Stingray Racer, there was an accompanying custom Corvette that got a lot of attention. Mitchell had initiated a policy that all dream cars and show cars would be fully functional. No mockups or static shells. Since Bill liked to drive his designs, they should also have plenty of power under the hood. The XP-700 showed styling trends that would be used in the '61-64 Corvettes, and believe it or not – the '97 Corvette!

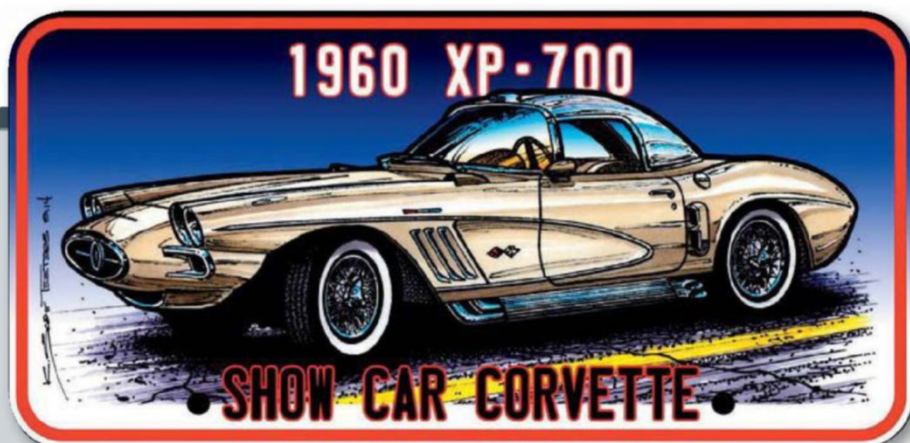
The XP-700 was built on a '58 fuelie Corvette. In '50s excess style, everything is “bigger and better.” The front was pure “custom car design” with an elongated, elliptical nose and a scoop under it. The headlights are moved forward and also had scoops under them. The recessed hood vents showed up on the '63 Corvette with fake grille inserts, and the '64 Corvette sans the grilles. The front fender scoops were shorter versions of the production '56-57 fender scoops. Mitchell loved loud side-pipes; consequently most of his Corvette show cars had them. Looking more like a custom car setup, the side pipes are interesting, but were a little too short, looking like add-ons, as do the scoops behind the doors. A “transparent roof” option wouldn't be available until '78 and the twin bubble-top roof

design arrived in '97 with the all-new C5.

At the back end of the car, a body crease leads off the tops of the wheel openings and wraps around the back. Below the back edge, the license plate was mounted deep in the center. Dual round taillights flank both sides of the license plate and vertical bumpers were at the corners. The basic shape, with horizontal bumpers, was put into production for '61 and '62, and set the design for the back end of the '63-67 Sting Ray. The interior had features that became standard in '61, such as the parking light warning light, dual sunvisors, windshield washers, and interior courtesy lights. Yes, early Corvettes had spartan interior amenities. Features that didn't go into production were the periscope rearview mirror (kind of a primitive version of modern rearview video monitors),

the experimental overdrive unit (tall highway cruising gears are now built into the basic transmission), and a dash-mounted chronometer (a basic feature that's now part of the Corvette's GPS and information system).

The XP-700 was the first of the street-worthy Corvette show cars. In retrospect, it's amazing how so many of those old “gee whiz” show car goodies gradually made their way into regular cars. Unlike today's show cars, Mitchell actually drove this car to work (nice perk!). I'll bet that modern Corvette chief of design Tom Peters would have loved using the '10 Stingray Concept (the *Transformers* car) as his daily driver. GM has always had a tight corporate structure, but sometimes executives got away with some amazing things that would never happen today.





1960 CERV I



At Riverside Raceway in 1960, Zora Arkus-Duntov unveiled one of the most unusual cars of his career.

CERV I's official reason for being was, "A research tool for Chevrolet's continuous investigations into automotive ride and handling phenomena under more realistic conditions (wink, wink)." But everyone knew better.

Duntov first got the idea of building a rear-engine racer in 1957 while working out the details on the Corvette SS. Since R&D work was also going on with the Corvair and its unique transaxle, a mid-engine V-8 wasn't outside of legitimate research. This alone may have been what got the project approved.

Duntov built the car to Indy dimensions, not to race at Indy but to have some relevance to all-out race cars. Wheelbase, length, and width were all at Indy specs. The car measured 172 inches in length, 52 inches in width, the wheelbase was 96 inches, and the front and rear tracks were 56 inches. The 283ci V-8 was too big for Indy, but it was perfect for the Pikes Peak Hill Climb. So in September 1960, Duntov took the CERV I to Colorado for "testing" and although not officially timed, the car performed below the record for his class.

Most interesting was the CERV I's all-aluminum SBC engine. Like the '69 ZL1, the engine used a high-silicon aluminum alloy for the block with no steel cylinder sleeves and forged aluminum Corvette pistons. Bolt-on aluminum parts included heads, water pump, starter-motor body, radiator, clutch pressure plate, and flywheel. The intake manifold and clutch housing were cast in magnesium and the radiator was aluminum. The complete engine weighed 175 pounds less than its cast-iron

stock version. The completed engine made 353 hp at 6,200 rpm. Too bad the '70-72 LT1 wasn't all-aluminum.

Brakes were similar to what was offered in the RPO 684 heavy-duty brake and suspension option. The rear brakes were inboard-mounted and the fronts were wheel-mounted. The rear suspension had upper and lower A-arms with coil springs and shocks. The front suspension also used A-arms with variable-rate coil springs over shocks. The front also has an 11/16-inch stabilizer bar and recirculating ball-type steering with 12:1 ratio. The truss-like frame was made from 7/8-inch and 5/8-inch chrome-moly tubing, and weighed just 125 pounds. Larry Shinoda and Tony Lapine (later designer of the Porsche 924, 944, and 928) designed the light-weight fiberglass body.

Zora had way too much fun with this car. Over the years, various setups were tried including; twin-turbocharged injected, GMC

Root-type supercharged, Hilborn injected, etc. A supercharged, injected version produced over 500 hp. Imagine that in a 1,800-pound car. Experiments with headers included Zoomy dragster-style, long equal-length headers, and large-collector header setups.

The CERV I was very fast for its day. Duntov lapped Daytona at 167 mph and hit 172 mph on the Sebring straight. Finally, in 1964, using a Hilborn injected 377 and a modified body, Zora drove the CERV I to a lap speed of 206 mph at GM's Milford test track. CERV I was a definite stretch for the Corvette R&D team. What it really did was keep racing in the life-blood of Corvettes. There's nothing quite like seeing a fast race car, knowing that the hardware in that machine is very much like your daily driver. Racing builds brand loyalty. The CERV I now resides in Mike Yeager's "MY Garage Museum," in Effingham, Illinois. **VETTE**



NO SWEAT-PART 2

INSTALLING THE UNDERDASH COMPONENTS OF VINTAGE AIR'S GEN IV SYSTEM

JEREMY D. CLOUGH WORDS | PHOTOS

In the last installment on Scarlett, our '72 coupe project car, we covered the first half of the Vintage Air install, which consisted of bolting in and plumbing up the compressor, condenser, and other underhood components that will actually cool the air headed back into the passenger compartment.

Now we'll talk about what it takes to get the cold air where you want it and when you want it, which consists of modifications to the dash, vents, and controls, as well as routing the hoses to the vents from the plenum on the evaporator. As with the other projects in this series, we're doing the work at Tray Walden's Street Shop in Athens, Alabama.

One of the features of Vintage Air's Gen IV system is that it uses the factory control panel, albeit with a few minor and reversible modifications. These are all straightforward, and the only difficult change was totally voluntary. Since much of our design language with Scarlett has been to follow the factory appearance with a slight twist, we decided to make the A/C controls white-faced to match the gauges and the radio, which we had already modified. The good news is that the normally black backplate and lens have to be removed anyway, as the factory lens must be replaced with the one supplied by Vintage Air. The bad news is that both parts are peened in place from the rear, so you'll be breaking some pot metal to get them out, and bending some to put them back in.

Rather than reuse our somewhat tired factory controls, we opted to use a new reproduction part, which was supplied by Paragon Corvette Reproductions. Since I was dead set on making it white-faced, I choked down my trepidation and unscrewed and pried it apart then sprayed the backplate with the correct color of white, then scanned the Vintage Air lens markings into Photoshop. Once I was sure the scan was right and legible, I polished the markings off the lens, then printed them onto a transparency in black. After cutting the transparency to the right size and shape, in it went between the now-featureless clear lens and the white backplate. Voila! White-faced (Full disclosure: it took months of fooling around with other options before I stumbled on that solution).



Once the parts under the hood are making the cold air, you've still got it into the car. Like everything else on Scarlett, we've decided to keep the factory look, with a twist.

Similarly, we also ordered new vent balls to go in our new dash panels, as the once-chrome originals had long since gone the dull yellow of scuffed nickel plating. While you probably can retain the factory on/off vent control system, Vintage Air supplies a simplified plate to mount the vent ball in the dash, and to which the ducting then mates. So in the interest of simplicity and maximum airflow, we went with the Vintage approach.

In the same vein, we also removed the rubber "flapper" that controls airflow through the upper center vent in dash above the smaller gauges. Like the vent balls, the upper console plate to which the center vent mounts was also in sorry shape, and those vents were so worn we couldn't even tell they had once been chrome. Unfortunately, the upper console is one of a precious few parts that are not reproduced for the '72 Corvette, so a refurb it was, and along with it the need to fill in the random hole some previous owner had chipped through it, which was large enough I'd once mounted a nitrous oxide toggle switch in it.

One safety note: even with rubber gloves, the gel I used to strip the factory paint is murder on your hands, so be careful and pause frequently to wash your hands. To make it all match, I even used the "correct" black paint to paint it, the sort of thing that evokes howls of laughter from anyone who knows what we've done to this car. **VETTE**

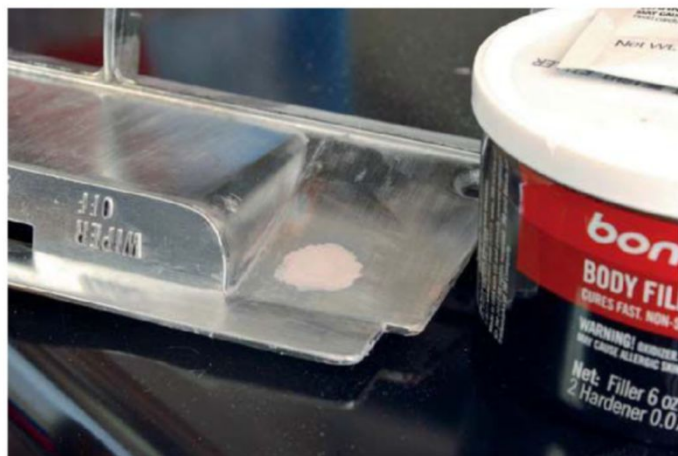
Sources

CORVETTE AMERICA
800.458.3475
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PARAGON CORVETTE REPRODUCTIONS
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STREET SHOP, INC.
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01 The well-worn wiper switch upper console plate is one of the few parts that isn't currently in production for '72 Vettes, so we stripped our original down for refurbishing using the noxious-but-effective Aircraft Paint Remover, whose directions say it is not for use on aircraft.

02 Since someone appeared to have gnawed a small, round hole in the upper console plate, we used some mesh backing and the much-maligned Bondo to fill the hole before repainting the plate in the "correct" black.



03 Since our center vents were looking a little shabby and the foam seals were long gone, we ordered replacements for both from Corvette America. The adhesive foam seals come in strips, which we carefully stuck in place around the pivoting vents.



04 Behind the upper console plate is the flapper assembly that determines when air comes through the two vents. Vintage Air suggests that you remove the flapper for maximum airflow, which we did, while leaving the now-non-functional switch in place so it doesn't look silly. It bolts into place on the rear of the upper console plate.



05 Once the wiper switch is installed, the refurbished upper console plate will be fully assembled and ready for installation.



06 We also had to modify the center defroster duct, which will sit behind the upper center vents. This starts with cutting it in half using the included template; once the bottom half is removed, another panel follows it into the trash barrel so the plenum supplied by Vintage Air can take its place.



07 Here's the completed defroster duct. While the Vintage Air-supplied part of the duct attaches to the modified factory piece with steel clips, we went ahead and sealed it up with a little black RTV.



08 Two sizes of ducting are supplied with the kit: 2- and 2 1/2-inch. Individual pieces will have to be cut to length, wrestled over their respective fittings, and then secured in place with a zip tie.



09 The defrost vent screwed into place on the bird-cage and with its hoses attached. Pay close attention to the instructions when routing the hoses. We inadvertently reversed the orientation of the two center vent hoses, so we got to do it twice.

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10 This is the seat where the vent balls will mount into the rear of the dashpad. Rather than reuse the tattered originals we replaced all of the dashpads with new ones provided by Corvette America.



11 Like the upper center vents, since our originals were in sad shape, we opted to replace the vent balls and their felt seals with new ones sourced from Corvette America.



12 Here's the original vent assembly after removal from the back of the dash-pad. You'll need to reuse the bracket (shown at the right) that the vent balls fit into, and against which it is sealed by the felt pads.



16 These new A/C controls were provided by Paragon Corvette Reproductions. To convert them, after removing some of the bracketry, the sliders from Vintage Air (they call them slide pots) need to be cut to length, then screwed in place so they're operated by the thumbwheel.



13 Since the Vintage Air system doesn't use a shutoff feature like the factory one, the vent ball is held in place with a simple backing plate. Note the stainless screw and washer to the upper right. This was used to hold the vent knob in place. While the knob is no longer functional, it's better than having a random hole in your dash.



14 The ducting slipped into place on the back of the ball vent. The driver side (shown here) uses a hard duct instead of flexible ducting: it also slips over the ball vent, and is then connected to the plenum by ducting.



15 The ducting all attached to the evaporator plenum and looks a bit like something from *The Matrix*. The center vent, which will slip over the rear of the upper console plate, is mocked up here with a clamp. Once the dash is installed, it and the duct ends will be slipped into place on their respective fittings.

Say hello to Justin Abbott, the "brain" of Zip-brand R&D. His office door says VP, but you're more likely to find him underhood or under the lift – improving a Corvette. In short, Justin lives performance. So much so, we're pretty sure high-test runs through his veins.

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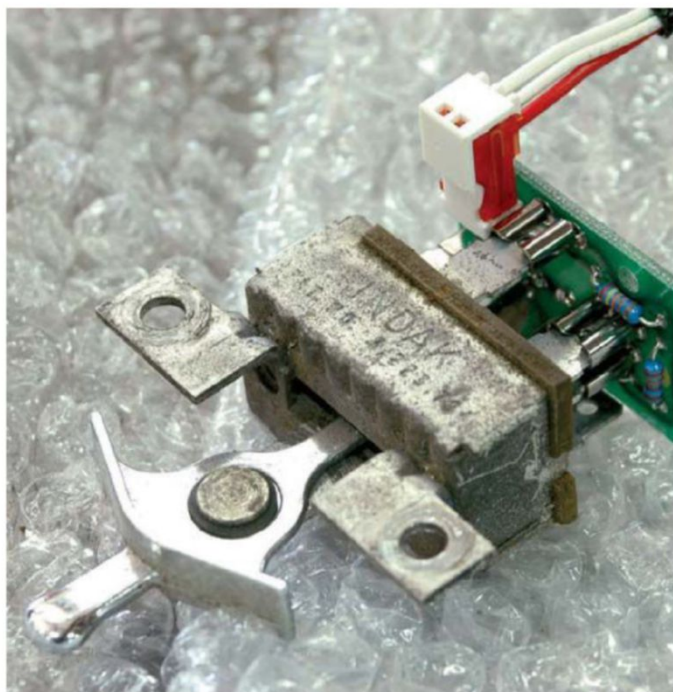


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17 In addition to the sliders that attach to the thumbwheels, the Vintage Air kit comes with a circuit board that will plug into the blower switch. You'll need to install the plug before you seat the board on the blower switch.



18 Once the sliders and the blower switch are in place on the control panel, the switch assembly can be plugged in with the wires zip-tied out of the way. It's now ready for installation in the console.



19 Here's the control panel converted and screwed into place in the center console. The white face, like the almost-right six-speed shift map is just one more indicator that Scarlett ain't exactly numbers-matching. Although we're using the original console for mockup purposes, we'll replace it with a new one prior to final install.



20 To connect the now-converted controls to the A/C system itself, it plugs into the evaporator box through the rectangular hole in the box's mounting bracket.

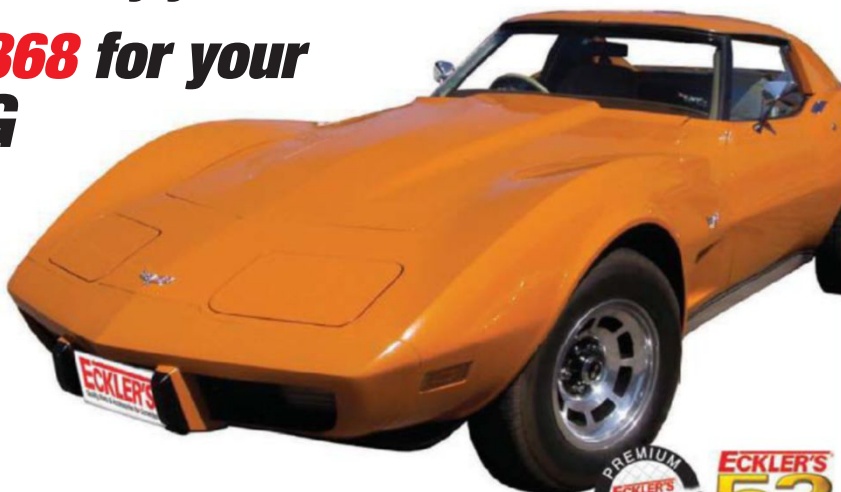


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[FEATURE]

BOND BU

A FATHER AND SON
BUILT A VERY
COOL CAR AND
A STRONGER
RELATIONSHIP IN
THE PROCESS



NICK LICATA WORDS
JOHN MACHAQUEIRO PHOTOS

Throughout the muscle car hobby, and especially in the Corvette world, it's not uncommon to hear stories about how a long-term father and son project has strengthened the bond between them. That was certainly the case when Jestin Allen and his father, Robert, started working on this '79 Vette together.

Jestin has fond memories of when he first laid eyes on the car. "It was Christmas 1988 when my mom bought my dad the car as a gift. It wasn't in the best shape, but she got it for a good deal, and it was a Corvette. My father's dream car. Although I was only 9 years old at the time, that was the turning point in my life that got me interested in cars."

Robert was appreciative of the Christmas present, but at

the same time he could tell the car needed a lot of work to get it up to par. He was excited to get started, as he saw plenty of potential in the somewhat rough C3. "It had a lot of things wrong with it that could not be seen by just looking at the exterior, while close inspection revealed the body had some flaws that would need to be addressed at some point as well," said Robert. "I started with the suspension and put on new shocks and brakes, along with a few other odds and ends. I worked on it off and on for the next nine years and was finally able to save enough money to rebuild the engine."

Through that time Jestin's attraction to hot rods began to grow stronger and he really started to express an interest in the car. In fact, auto body was his major in high school shop



class. Doing the bodywork on his dad's Corvette was his main goal.

"I continually asked my dad if I could paint the Corvette," recalls Jestin. "My dad kept telling me 'No, not until you turn 18.' Well, he finally caved when I talked him into letting me repair just the front bumper. I immediately repaired and painted it but scratched the front fender. Without asking, I began blocking and sanding the whole car in our garage."

Robert came out to check on Jestin's progress on the bumper and that's when he saw that he'd sanded the rest

of the car. "At first I was upset that he had gone beyond what I had allowed him to do, but at that point it was a done deal. Basically the whole car was sanded," remembers Robert. "Besides, at the time he had been working part time at an autobody shop, so I figured he had the knowledge and skills to finish the Vette."

Not long after, Jestin enrolled in college but continued working at the body shop. It was three straight months of late-night and weekend bodywork and paint sessions. "Those were the most exhausting months of my life,"

[FEATURE]

BOND BUILDING

Jestin recalls. "But seeing the progress we were making on the car also made it the most rewarding."

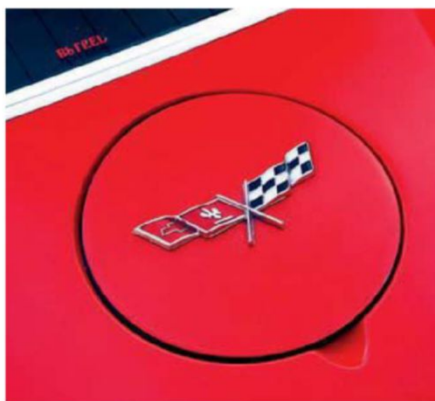
While driving the Corvette home after a long night working at the paint shop, the engine's oil sensor had come loose and completely backed out. Unfortunately, it went unnoticed by Jestin and the engine seized before he was able to make it home.

"I had to pick him and the car up from the side of the road," remembers Robert. "The engine was gone, but I figured since he had done all the bodywork and paint, he saved me a bunch of cash, so that money, which was originally put away for paint and body, ended up going into a new crate engine."

They loaded the '79 with a Chevrolet Performance 290hp, 350ci mill and rebuilt the stock trans. It's not the kind of engine that will light up the world, but this project isn't based on brute strength. It's more about finesse and staying within a budget. With that said, Gregg Barrett handled the engine's machining and assembly then perched a 750 Holley carburetor on top of a Holley polished intake manifold. A Holley Powercharger air cleaner sucks in atmosphere while ceramic-coated Hedman headers process spent fuel through a set of Flowmaster mufflers. Electric cutouts were included for those times when Jestin feels like announcing his presence and adding a little excitement to the situation.

With the suspension and brake system being rebuilt to stock specs, Jestin and Robert ramped up the overall look with Boyd Coddington five-spoke wheels on all four corners (18x8 up front and 18x10 out back), and wrapped the ensemble in Falken rubber (245/40-18 front, 275/40-18 rear).

With the body fully smoothed and prepped,





Jestin doused the Vette in '03 Dodge Viper Red. He accented the hood with a PPG Jet Black stripe for a little more attitude and race inspiration.

A.J. Rivera of Diverse Kreations took charge of the tunes and wired up an earth-shaking sound system featuring a custom sub box armed with an MTX 12-inch subwoofer. He then incorporated strategically placed mids and tweeters throughout. Not done, he built a one-off center console, which houses an 8-inch monitor. Jestin painted A.J.'s handiwork to match the car's exterior motif then continued the restoration process with OE-style carpet and upholstery.

Since the car's completion, Robert handed the keys over to Jestin as a reward for his overwhelming enthusiasm and interest in the project. With the number of hours of hard work he put into it, it was an easy decision. "Obviously Jestin was attached to this car," said Robert. "So I was more than happy to give it to him. He did an amazing job on the bodywork and paint, and everything else that needed fixing or replacing. He really made me proud. But the best part is the great experience we had working together."

Jestin gets the car out as much as possible and looks forward to the next cruise night or car show. In fact, he's piled up a nice collection of show-n-shine trophies in the process. "I'm very proud of what my father and I accomplished," said Jestin. "It's exciting for me to show people what a little hard work and elbow grease can do."

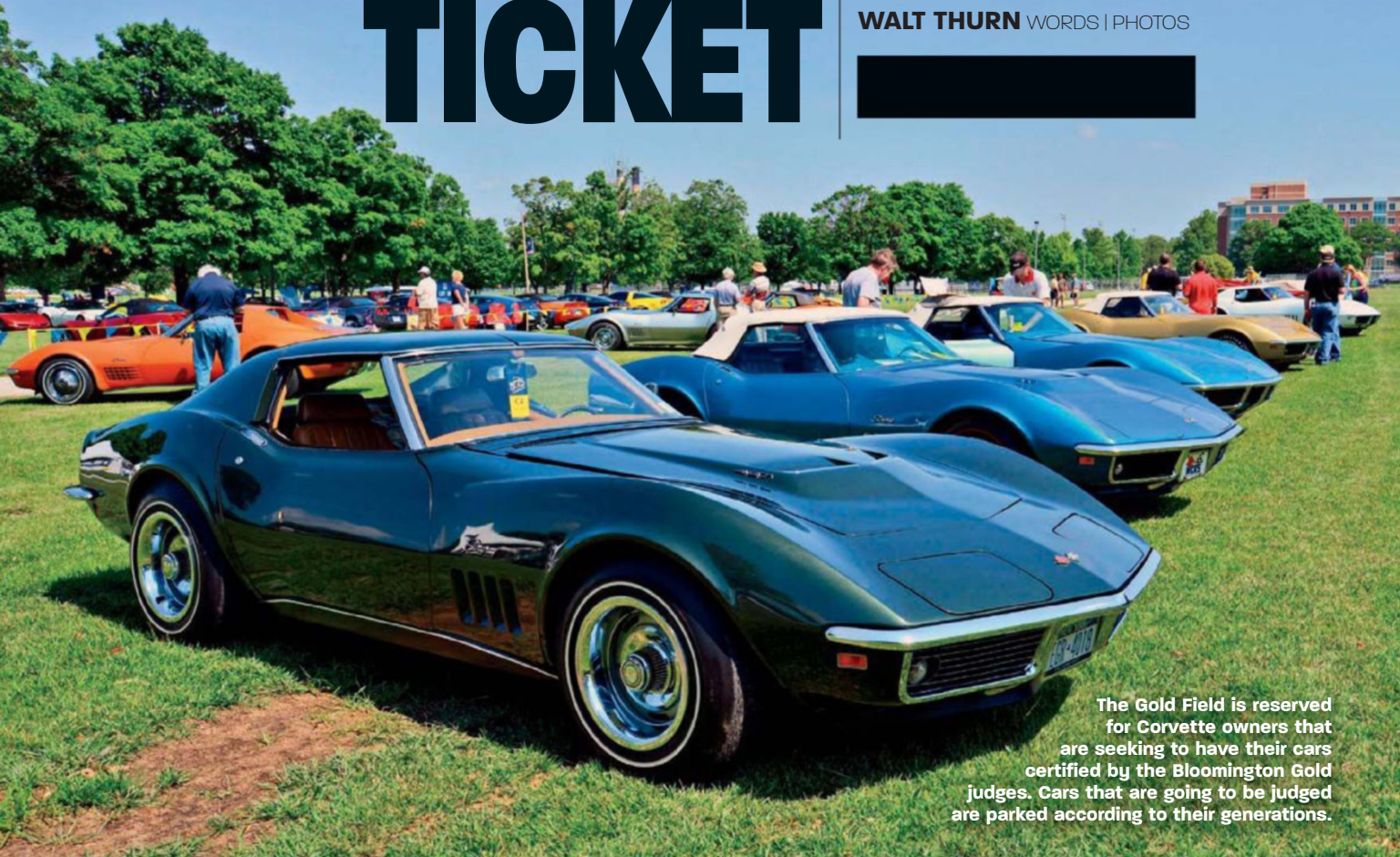
It was a 13-year project built on a tight budget and more frustration than the duo had planned to go through, but the hours of father/son bonding built a stronger relationship than any amount of money could. Oh yeah, and a really cool Corvette came out of it as well. **VETTE**



GOLDEN TICKET

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NEW LOCATION

WALT THURN WORDS | PHOTOS



The Gold Field is reserved for Corvette owners that are seeking to have their cars certified by the Bloomington Gold judges. Cars that are going to be judged are parked according to their generations.

The annual Bloomington Gold Corvettes USA show continues to offer a unique venue to the Corvette hobby. Each year an extensive cadre of Bloomington Gold trained judges inspect and determine if a Corvette qualifies for a Gold Certification. An area called the Gold Field is large enough to hold all of the Corvettes waiting to be judged for certification. This certification is coveted by owners and is a must for people looking to buy a factory-correct Corvette. If a Corvette is deemed to be 50 percent original, the owner can have it judged for a Survivor certificate. Besides passing the originality test, the Corvette must complete a 10-mile road test to merit this award. A Corvette that has been Gold and Survivor-certified qualifies to be judged for Benchmark status. Very few cars make it to this level of certification. Many owners took home Gold certifications, but some received the lower Silver certifications and left disappointed. They have a year to make corrections and return in 2015 for another try to get that coveted Gold certification.



The entrance to Bloomington's vendor area is called the Gold Market. It seemed to be a perfect place to park our '14 Velocity Yellow Z51 convertible. The Gold Market was a popular place to find that must-have special part for your Corvette.

Bloomington Gold began in 1972, and after going through a number of relocations seems to have found a successful spot in Champaign, Illinois. This year's show, for the second year in a row, was held at the University of Illinois Urbana-Champaign College. The city is filled with affordable restaurants and nearby lodging. Very few students attend the university this time of the year so there is plenty of room for Corvette parking and a host of other weekend activities. These include the Gold Market for vendors, big and small, who offer a wide variety of new and used Corvette parts or complete cars for sale. The Gold Year area provides exclusive parking for the 50th model year anniversary for Corvette. The featured model year were those from 1964, and a large number of these historic Corvettes were on display in this special area. The Gold School offered 12 seminars from leaders in the Corvette hobby. They started at 8:30 Friday morning and ended at 4:00 in the afternoon. The cost was \$100 for the day and one half of that fee was donated to the speaker's charity of choice.



Each year Bloomington celebrates Corvettes that are 50 years old. This year the Gold Year parking area featured a large group of '64 Corvettes, including this Grand Sport replica. Even after all these years, the Stingray body style is still very popular with Corvette enthusiasts.



Directly behind the Gold Year display is a large dealer "for sale" area and Chevrolet Display booth. One of the cars that caught our eye was this '99 FRC with over 195,000 miles on its clock that was available for \$8,888.



Todd Christensen, Marketing Manager Chevrolet Performance, was on hand to answer questions about the new Z06.



Chevrolet displayed this cutaway of the '15 Z06 that gave us a chance to inspect the awesome 650hp LT4. This compact engine packs a lot of punch. Notice the 625hp signs on the valve covers have not been updated.



Chevrolet set up a Ride and Drive area that gave people a chance to drive a variety of new Chevrolet products, including the C7. The staff stayed busy all through this popular event.

Todd Christensen, Marketing Manager Chevrolet Performance, and his team displayed four '15 Corvettes. This included an Atlantic Convertible, Pacific Coupe, Z06 coupe, and Z06 convertible. In addition, a cutaway Z06 was located under the Chevrolet display tent. This cutaway gave visitors a close look at the 650hp LT4 engine that powers this new Corvette. In addition, a Ride & Drive program was available all weekend that gave people a chance to try out new Chevrolet products, including the Camaro and Corvette.

Next to the show field was the I-Hotel where the seminars and the Great Hall were held on Friday. The Great Hall is designed to highlight 10 significant Corvettes and 10 people/events each year for five years that had a positive impact on the Corvette hobby. 2014 is the last year for people/events and cars to be selected. The 10 inductees in the people/event category were: Cypress Gardens Corvette event, Bob Gold Auctions, Collector Irwin Kroiz, writer Karl Ludvigsen, dealer Terry Michaelis, National Corvette Museum, GM engineer Vince Piggins, and Stingray designer Larry Shinoda. The 10 Car

inductees were: '55 prototype racer, Le Mans winning C6R #007, '63 coupe stuffed with a MK II mystery motor, '67 L88 DX racer, '68 Owens Corning racer, '69 L88 Rebel, '66 unrestored Survivor prototype coupe, '67 Bloomington Gold Certification prototype, the last C4 built, and VIN#001 C7 Stingray coupe. Each inductee was presented with a gold medal and certificate. The event producer, David Burroughs, is now working on a final conclusion to the Great Hall. That announcement as to its location and date will be released sometime in the near future.

On Saturday and Sunday a Bloomington Gold Autocross was held that accommodated up to 120 entries. On Saturday night the very popular Gold Tour was routed through miles of countryside that was filled with many switchbacks to let drivers exercise their Corvettes. A Party in the Park that featured food, entertainment, and outdoor movies was held immediately after the Gold Tour ended.

Be sure to mark your calendars and plan on attending Bloomington Gold on June 26-28, 2015. For details on next year's event go to bloomingtongold.com. **VETTE**



Mid-America Designs had a large display set up at the entrance of the Gold Market, including two C2 prototypes from Mike's Garage.



Al Knoch Interiors had a large staff on hand to install convertible tops and interiors. This pristine '60 fuelie is in the process of having a new black top installed.

DESTINATION BLOOMINGTON

CRUISING TO BLOOMINGTON IN A SEVEN-SPEED MANUAL CONVERTIBLE

The Bloomington Gold Corvette show always takes place in the middle of summer somewhere in the Midwest. For the second year the show was held in Champaign, Illinois. This area is filled with exciting two-lane country roads that take you through turn-of-the-century villages that make for a perfect Corvette road trip. Thanks to Chevrolet Communications and G. Schmitz & Associates, we picked up a Z51 convertible in Milwaukee for our Bloomington assignment. Earlier in the year we used a Lime Rock Green Z51 convertible for our Amelia Island story ("Drop-Top Dreamin'," Oct. '14). That car was an automatic (VIN#00616, MSRP \$73,525.00) and this was a seven-speed manual (VIN#00622, MSRP \$74,365.00). As you can see by the VIN numbers they are both early build Corvettes with similar equipment. Both had nearly the same mileage (6,800 miles) when we began our journeys. While each was equipped with different transmissions, they both showed amazing build quality after racking up some pretty hard media miles.

We drove this seven-speed manual for almost 1,000 miles, which gave us enough time to compare the differences between the automatic and manual transmission option. With so many manual gears to select from, a large shift indicator in the instrument panel (IP) was a huge help. The car is so quiet that it is sometimes hard to remember if you are in Fifth, Sixth, or Seventh gear when you are cruising down the highway. The shift indicator is an easy, quick reference.

The Wisconsin area is filled with rolling hills, and the manual would constantly shift out of the V-4 Economy Mode when it went up the slightest hill. We found it more comfortable to cruise in the Touring Mode and used Fifth or Sixth gear for most of our highway cruising. Fuel mileage hovered around 26-27 mpg, and this included some spirited backroad driving.

After driving both cars around 1,000 miles, it is only fair to give you our thoughts on transmission choices. If we lived in the city, the automatic would be our choice, hands-down. However, in a rural setting, the manual is delightful – you have total command of your engine revs, and powering through a corner in the right gear adds a lot of pleasure to your driving experience. However, the new eight-speed automatic could change our minds.

We will keep you posted.



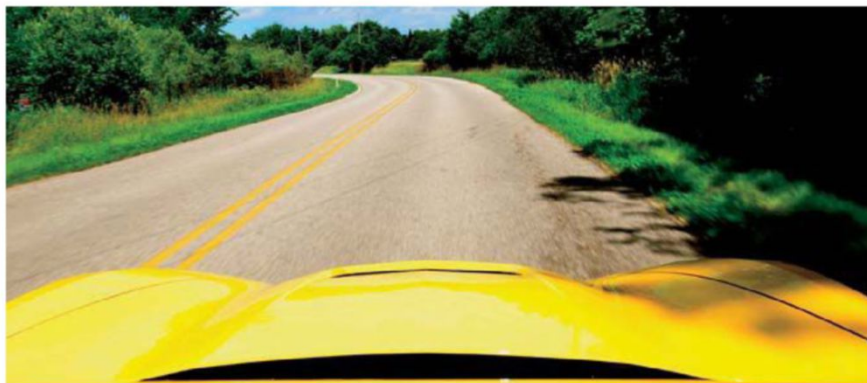
We met up with two local Corvette owners (Steve Church and Bill Palicka) and had a chance to compare notes about the differences between three generations of Corvettes. Both agreed that the C7 styling was a big leap forward and it looked more like a European exotic than an American muscle car.



The manual seven-speed gear lever is well placed on the left side of the driver command center. The gear selection is smooth and the spring-loaded shifter makes gear changes easy. Active rev matching comes with the seven-speed manual. Unlike the previous six-speed manual, reverse is to the right and down.




The instrument panel (IP) provides the driver with a wealth of information about the health of your Corvette. Manual transmission cars feature a large, bold shift light on the lower right to keep track of the multiple gear choices. Maintenance information like a "change oil" notice pops up in the center of the IP. A push of the right-hand selector button on the steering wheel turns the warning off until you restart the car.



Back on the road heading south, we found this great two-lane highway that the Z51 carved up with ease. For grins, we set the driving mode on Track (TR) that firmed everything up and provided very secure handling on these tight, twisty roads.

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EDITOR'S PICK

Scott Parker Apr 11, 2014


First Look: 2015 Corvette Z06 Convertible

Chevrolet has announced that it will be making the first convertible Corvette Z06 since 1963 (when they made exactly one). The 2015 Chevrolet Corvette Z06 ...




EDITOR'S PICK

The Custom Shop's 1965 Chevy El Camino - Way Low Elco



EDITOR'S PICK


1966 Chevy El Camino - Agile Elky



EDITOR'S PICK

1965 El Camino - Born With It

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RARE FINDS

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JERRY HEASLEY WORDS | PHOTOS



GASSER SURVIVOR

“I couldn’t believe it,” Kevin Mackay said of a C1 Vette he found parked on a dirt floor inside a garage in Merrick, New York.

Mackay is a Corvette historian and owner of Corvette Repair in Valley Stream, New York, and is one of the go-to guys in the area when a vintage Corvette comes up for sale. He knew he was not staring at just any old “Vette in a barn.” The straight-axle frontend, metalflake bronze and gold paint, narrowed front grille, and small front wheels and wide magnesium rear wheels gave away the formula of a vintage Corvette gasser.

Gary “The Brush,” a legend in the New York area, told Kevin about the old gasser. “He’s been around for over 40 years. He used to do work for Joel Rosen of Motion Performance. He does a lot of my pinstriping when I have a race car,” Kevin said.

“He [Gary The Brush] was telling me that a friend of his had this old gasser. It had been stored in a garage forever. It turned out the gasser was four blocks from where I live.” Mackay says he “walked right over” to look at the car. The meeting was cordial because he already knew the owner, Paul Levine. Levine opened the trunk and connected the battery



Kevin Mackay found this '60 Vette gasser in a garage just four blocks from his home.

cables. He crawled inside the cockpit and fired up the engine. The old gasser woke up the neighborhood, its fiberglass body vibrating as the big-block gulped fuel. “The 1965 inspection was still there,” Mackay said.

Mackay makes his living restoring Corvettes. He’s owned and restored more historic Corvette race cars than anybody on the planet. One Vette he never ran across was an

authentic gasser from a bygone era. Today, most of these old gasser Vettes have disappeared. He wanted to save this one “as is.” Modifying a vintage ‘60 Vette today into a gasser wouldn’t be the same because the car would have no history.

“I wouldn’t take a stock car and cut it up, but knowing this one was modified way back in its period of time, I plan to leave this



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'survivor gasser' just the way it is."

The way it is today is the way it was in the 1960s. That's what Mackay likes best and the main reason he will not restore this car as a factory stock fuelie—meaning as it left the St. Louis assembly plant.

Mackay traced the gasser's history, starting with previous owner Paul Levine, who bought the car from his friend Bill Sheridan in 2008. However, Levine's involvement with the Vette goes back to the 1960s when he helped paint the metalflake.

In 1966, Sheridan bought the C1 from Jessie Bird, who did the initial gasser build. Bird, from Freeport, New York, bought a stock fuel-injected '60 Corvette off a used car lot in 1962 on Springfield Boulevard in Queens, New York. The price was \$3,000.

Bird's gasser build followed rules for NHRA's C-Modified Sport class. Weekends might find Bird drag racing at nearby Hampton Dragway in Long Island, New York. He also blew off assorted Fords and Mopars on Connecting Highway, a very popular and now legendary thoroughfare for street racing.

Bird sold the '60 Corvette gasser in 1966 to Bill Sheridan. After tuning difficulties with the 283 fuelie (modified with a high-lift cam), Sheridan traded the stock fuel injection for a 425hp 396 out of a '68 Camaro.

Checking out original features is a trip back in time. For example, Mackay was intrigued to see "pretty crazy lights" inside the engine bay and underneath the car. "When the car would drag race, you would see lights in the wheelwells."

Checking out a stock '60 Vette, even a fuelie, is not an uncommon occurrence. But, running across a '60's gasser is.

"I brought it to Bloomington Gold two weeks ago, and they just went nuts when they saw the thing." **VETTE**

LEFT: Opening the door to this '60 Vette was like opening a door to a bygone time. **RIGHT:** In the 1960's a former owner traded the original fuel injection unit off the original 283 for a 425hp big-block 396.



ABOVE: The '60 gasser looks like a time traveler today. Viewers are not entering the Twilight Zone. **BELOW:** The interest in this '60 Vette has nothing to do with factory features and everything to do with its gasser build, unchanged from the 1960s.



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READERS' RIDES



FEELING BLUE

WHO: Ronald Acker
WHERE: Waunakee, Wisconsin
WHAT: '67 Coupe

Like so many of us car guys, Ronald Acker let one of his earliest rides get away, only to regret it years later. Ronald was once a proud owner of a Marina Blue '67 Corvette, which he bought new but ended up selling back in 1974.

It was 1996 when he bought this '67 as a replacement to his original. The car looked good as it had been repainted the correct color just a year prior. Unfortunately, there were other issues including missing, broken, and incorrect parts. "My brother, Vern, and I took on the long-term project and performed a frame-off restoration and rebuilt the engine, transmission, and rear axle," tells Ronald. "We replaced the springs and radiator, fixed the seats, clock, radio, odometer, and passenger-side window."

To top off the build, they added the side-mounted exhaust and whitewall tires to match Ronald's original car.

"It's great to drive and a lot of fun to take to car shows," said Ronald. "I was extremely lucky to find this exact match to my old '67."

RED ON RED

WHO: Orestes Diaz
WHERE: Pembroke Pines, Florida
WHAT: '08 Coupe

Orestes Diaz grew up admiring Corvettes of all generations, and last year he purchased this red on red '08 C6. It features the 3LT package, cross-drilled rotors with red Corvette calipers and polished Gumbly wheels. The interior features a two-tone red and black combination with the carbon-fiber radio trim leather package, but the heads-up display is one of Orestes' favorite options.

As of now there are no plans for performance upgrades, but he does plan to continue to cruise his Vette through the streets of his hometown of Pembroke Pines, Florida, for many years to come.



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NEWFOUND GLORY

WHO: Doug Lawson

WHERE: Cedar Bluff, Virginia

WHAT: '72 Corvette LT-1 Coupe

There's just something about the sound of a vintage ride roaring back to life after sitting stagnant in a garage for a good number of years. Doug Lawson got to experience this firsthand when he purchased a numbers-matching Mille Miglia red on black '72 LT-1, four-speed example that hadn't seen the light of day for decades. "This is my dream car," states Doug. "I had been pursuing this car for about 20 years before the original owner's family had finally decided to let it go. Knowing it had been sitting for a very long time, I changed the oil, filter, plugs, and wires, and went through the carburetor before turning the key. Once I cranked it over, it made the most beautiful noise ever. You just can't beat the sound of a solid-lifter small-block V-8 engine coming to life after sitting silent for so many years. It was truly amazing."

So far, Doug has kept the upgrades to a minimum, changing only the wire hubcaps for rally caps and replacing the Goodyear Polyglas tires in favor of BFGoodrich TA radials.



SEEING YELLOW

WHO: Pat and Carolyn Crowley

WHERE: West Palm Beach, Florida

WHAT: '74 Stingray Coupe, '14 Coupe

As the saying goes, "good things come to those who wait." Pat Crowley certainly experienced a huge gap in time between wanting a Corvette and actually owning one. "Ever since I was 16 years old I wanted a Corvette," said Pat. "Forty years later, I got married then bought my first Corvette – a black on black '05 C6 coupe."

With Pat's Corvette addiction in full swing, in 2011 he bought a yellow '74 Stingray. He bolted on a set of side pipes for some additional flavor and was happily cruising the streets of West Palm Beach, Florida, in a sweet C3.

Pat was content with his current two Vettes until he laid eyes on the new C7. He knew right then he had to have one. He wasted no



time in ordering up a Velocity Yellow '14 in which he jazzed up with a black stripe and yellow brake calipers. Unfortunately, that meant parting ways with his '05, but we're betting having these two yellow beauties parked in the garage eases the pain of having to let the black one go.

COOL COLLECTION

WHO: Charles Falter

WHERE: Indiana

WHAT: '72 Coupe, '89 Convertible, '07 Z06, '01 Convertible

Charles Falter got bitten by the Corvette bug years ago when he first had the

opportunity to drive a '66 convertible powered by a 327/350. That initial drive coaxed him into purchasing a Targa Blue '72 Vette. Although that's the only Corvette he's purchased brand new, the others he's acquired were purchased used and approximately five years old. The '89 and the '01 were bought from the original owners, while the '07 Z06 came from a Chevy dealer. "I drove the '89 to Effingham, the Corvette Nationals in Indy, and the National Corvette Museum several times," said Charles. "The '01 and '07 have less than 10k miles each and have not seen a drop of rain—at least since I've owned them."



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GREENWOOD'S SEBRING '75 – JOHN AND BURT TAKE THE “RACER KIT” OFF-PLANET

The L88 “racer kit” package was huge success for the Corvette and brought racing glory through the late '60s and into the '70s. Winning L88s included the “Owens Corning,” “Rebel,” and the Greenwoods’ “BFGoodrich Stars & Stripes” cars. After the Greenwoods’ sponsorship expired, John and Burt Greenwood took their Corvettes to a new level. Making power was easy but tires were so wide that the L88 factory flares weren’t big enough. Enter the final “racer kit,” the widebody.

Greenwood suggested to Zora Arkus-Duntov that a widebody kit could generate additional downforce and cover the widest tires. Duntov set Randy Whitten at GM Design to the project. The front fenders were wedge-shaped and fanned out to the front edge of the doors. The rear fenders were also wedge-shaped and ballooned into large pontoon shapes, large enough to cover 20-inch-wide tires. An adjustable wing was added to the back. With massive racing tires, the look was menacing. Diversified Glass Company made the prototype parts and the widebody kit was included in the Chevrolet Power Manual. Greenwood then contracted with Diversified and started selling body kits as part of his Corvette race car business. Thanks to IMSA’s loose rules, Greenwood’s widebody Corvettes prompted *Hot Rod* magazine writer C.J. Baker to speculate if Greenwood’s car was still a “Corvette.” Aside from the frame, engine, transmission, rear, and front suspension, everything else was fabricated.

The all-aluminum ZL1 was set back 12 inches, lowered 4 inches, and was moved 2 1/2 inches to the right for better weight distribution. The engine setback provided plenty of room for very smooth tube-header side pipes. The frame was acid-dipped and functioned as a platform for the rollcage, X-bracing, and gussets to create a solid structure. The interior was aluminum sheetwork with an array of gauges and toggle switches,



racing bucket seats, and a tilt steering wheel.

The torque-monster ZL1 received a fuel-injection throttle body that was Chevrolet designed, Greenwood modified, and cast in magnesium—it weighed just 7 pounds. With Lucas fuel-injection parts, the intake was worth 100 horsepower. The crankshaft was stock and used factory “off road” high-compression aluminum pistons, a General Dynamics cam, Isky roller-rockers, and GM heavy-duty valves and springs. The block was bored 0.060 over and the oil system was a Weaver dry-sump. The completed engine produced around 700 horsepower and the M22 transmission was

blueprinted and fitted with an oil cooler.

Greenwood’s solution to the Corvette’s dive/squat problems was brilliant. Koni coilovers replaced the stock front springs and shocks, and the steering geometry was modified to eliminate bumpsteer. The rear was “similar to stock,” but totally unique, including longer swing arms, triangulated upper arms, Koni coilovers, larger antisway bars, and twin camber-control rods. To stop the 2,900-pound racer, Greenwood used NASCAR-grade, Hurst-Airheart disc brakes with 12.1-inch cross-drilled rotors and large magnesium calipers. The gigantic tire/wheel set used to fill the fenders were Sterling mags, 11x15 front and 17x15 rear, shod with Goodyear Blue Streak slicks, 24.5x10-15 front and 28x17-15 rear.

The Greenwood Batmobile launched the Greenwoods’ race car business, and as new parts were developed, they were offered to customers. Within a year or so, almost all IMSA and Trans-Am Corvettes were Greenwood cars, or used Greenwood parts. In the 1974-1975 IMSA series, Greenwood won two races and qualified fastest 11 times. At the Daytona Speedway, the car was timed at 236 mph—a record that stood for decades.

The Greenwood Sebring '75 was bought and sold many times and is currently owned by Charles Gnadinger in Switzerland, but is maintained by former owner Lance Smith. Duntov’s “racer kit” concept went somewhere I’m sure he never dreamed and we’re still talking about it. **VETTE**



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