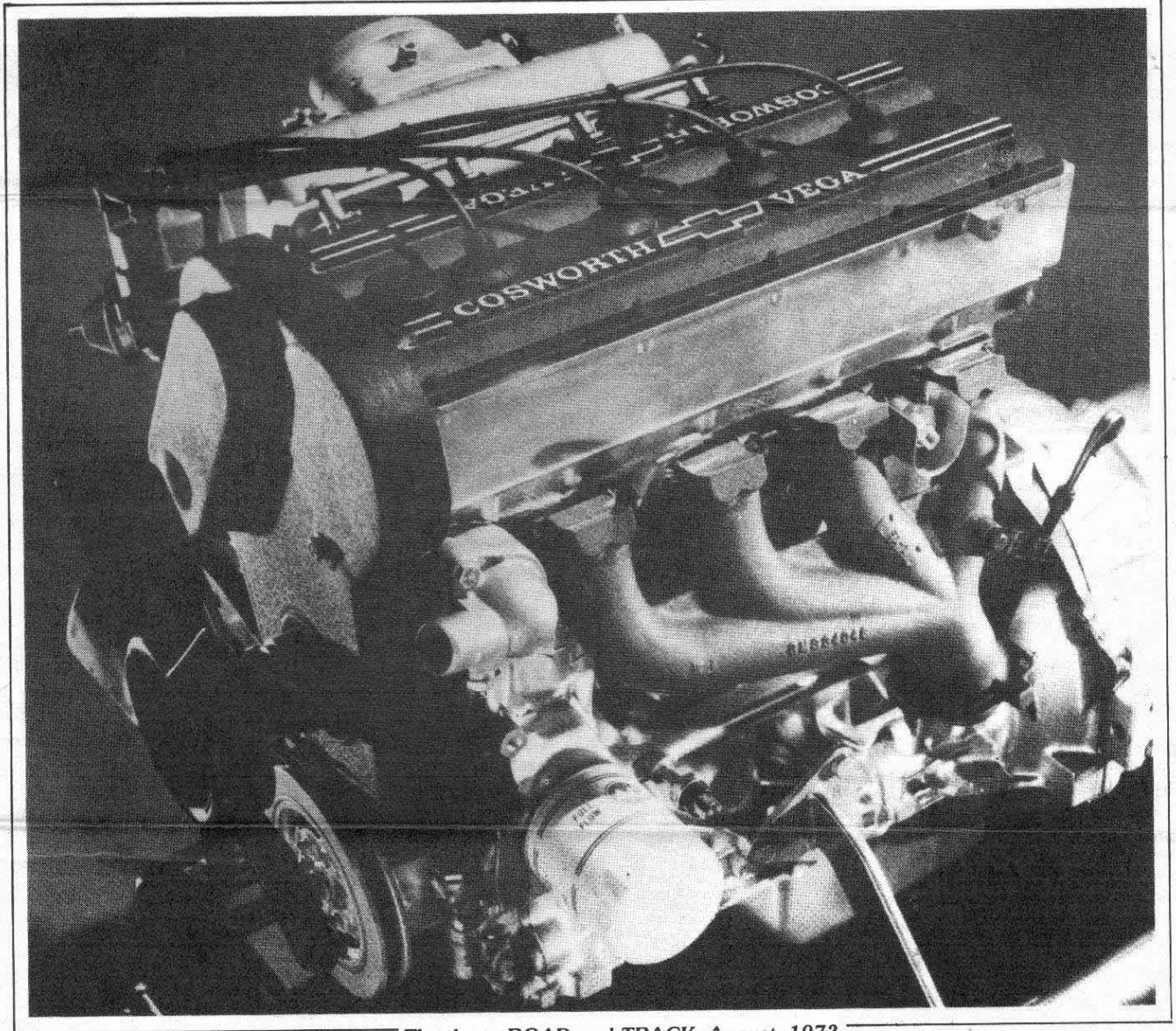
Cosworth Vega MAGAZINE
OFFICIAL PUBLICATION OF THE COSWORTH VEGA OWNERS ASSOCIATION

TEN YEARS LATER

STORY ON PAGE 3



Thanks to ROAD and TRACK, August, 1973

COSWORTH VEGA FOR THE ROAD

It's finally here—with twin cams, four valves per cylinder, electronic fuel injection & transistor ignition

BY JOHN DINKEL
Engineering Editor

Cosworth Vega MAGAZINE
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*****Technical Expert***

LETTER FROM THE EDITOR

We have had some changes in the CVOA organization since the August Roundup, which I will share with you. I have resigned as President of the organization and have been replaced by Phil Rust, Regional Director from Indiana and by Clark Kirby, Regional Director from Texas. Phil is the new President and Clark is the new Membership/Secretary-Treasurer, as elected by fellow Cosworth director/members in a specially called meeting at the Roundup in Texas. I will remain Editor of the newsletter. These are one year terms with elections to take place at each yearly Roundup. By expanding out from single person control and sharing the responsibilities for the club's success, the club should become more dynamic and vital to the needs of the club members across our country.

As you can see, the newsletter is not printed in living color as I had hoped, and yes, it is the first one since April. The club is now standing on its own two financial feet for the first time since its beginning and is having to pay out of receipts for all of the expenses. Therefore we are cutting expenses by reformatting the newsletter to be more condensed, but we do hope to be able to provide more meaningful service to members, partly with a more frequently published renewals and article submission for the newsletter, and additionally with support of your local regional activities.

Another effort is underway that will be OUTSTANDING! The 1984 Cosworth Roundup will be held the third weekend in August in Anaheim, CA, home of Disneyland and the 1984 Olympics. We are delaying the start to allow the over-inflated prices of the Olympics to disappear before we more in. You'll even have an opportunity to drive a REAL OPEN WHEEL sports racer on a geunine race track. Mark your calender, arrange your vacation, and BE THERE!

We are at the crossroads of a new surge of growth for the club. Cosworths are receiving more attention than ever, with much credit given to club activities. We are looking forward to a very successful 1984.

Bob Maloy

Introduction to Road & Track Story

(on page 3)

"It seems like only yesterday," as the old song goes, but it's been ten years since the first story was published on the Cosworth Vega as a "real" production automobile. The very first story was published in April, 1972, in CAR and DRIVER delineating the attempts by Cosworth Engineering to use the Chevy aluminum block and the Cosworth designed twin-cam cylinder heads in a Formula II engine to place in a Lola.

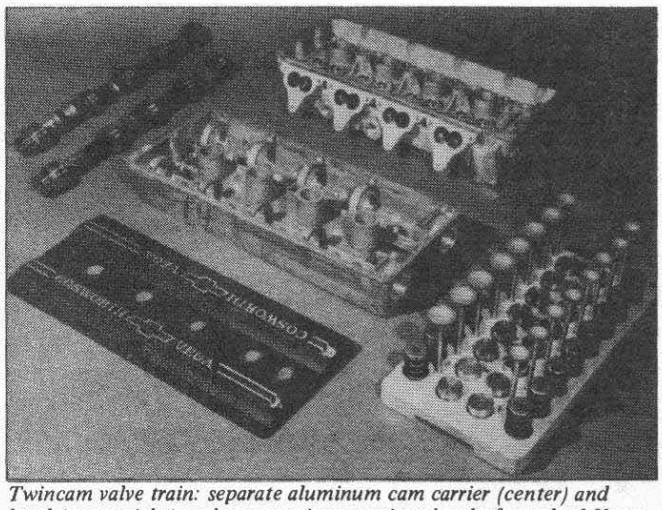
We will be taking looks over our shoulder from time to time to either refresh your memory or to enlighten those of you who were just nine years old at the time and were looking forward to learning how to drive.

COSWORTH VEGA FOR THE ROAD

(Reprint from Road and Track, Aug. '73)

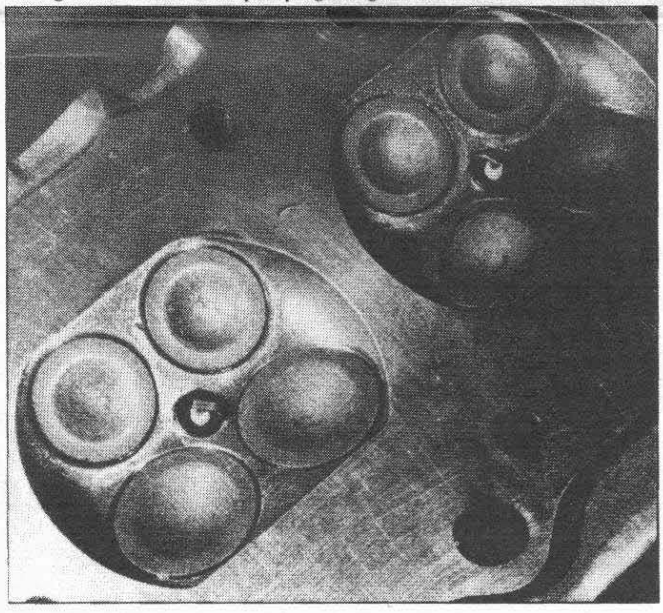
EVEN BEFORE THE Vega was introduced, rumors of a Cosworth-designed crossflow head for the engine traveled back and forth across the Atlantic. So the announcement of a Cosworth 2-liter racing engine based on the Vega block (see October 1972 R&T for details) wasn't unexpected. Nor was the eventual production of a road-going version, but its arrival on the market is exciting news to every enthusiast to whom the Cosworth name means great racing engines. With the Cosworth Vega, Chevrolet breaks new ground in American production engine design. It is the first twincam design and first 4-valve (per cylinder) design since the classic days, and the first to incorporate electronic fuel injection.

Though the twincam engine is the most intriguing aspect of Chevrolet's announcement, the Cosworth Vega is more than just an engine. It is a total package that should demonstrate the design depth of the Vega by bringing to the market a sophisticated sports coupe based upon it. The engine includes an electronic ignition system and the package also means a special clutch, gearbox and rear axle, cast aluminum wheels and revised suspension. Chevrolet is aiming for a slice of the lucrative sports-sedan and GT market now in the tight grip of cars like the Datsun 240Z, BMW 2002, Alfa GTV, etc—cars that are bought for their sporting qualities, compact size, performance and design innovation.



Twincam valve train: separate aluminum cam carrier (center) and head (upper right) replace one-piece cast iron head of standard Vega.

Combustion chamber is a pent-roof design to accommodate 4-valve arrangement and central sparkplug. Larger valves are the intakes.



In its earliest public comments about the Vega, General Motors said the powerplant would be a new and different engine made possible by important advances in technology. The new Cosworth Vega engine retains such technological breakthroughs as the all-aluminum diecast cylinder block, silicon bore surfaces and iron-plated aluminum pistons. But here the similarity ends. The Vega twincam is an *all*-aluminum structure from the block right up to the camshaft cover. Total weight is 305 lb ready to run. This is 40 lb less than the base Vega engine and 37 lb more than the aluminum 4-cyl, 4-valve twincam Lotus engine used in the Jensen-Healey. That means not much over 2 lb per net horsepower—with 1973 emission control.

The Cosworth Vega is an exciting engine to look at: the broad black-crackle cam cover, the fuel injectors and the crossflow breathing arrangement are all dramatic, especially considering the appliance appearance of the stock engine. But beauty is more than pretty cylinder heads, and the most significant feature—the 4-valve Cosworth-designed combustion chamber—is not discernible from the exterior.

Why a 4-valve design? Chevrolet has several reasons. Velocity of the incoming air-gas mixture is higher with siamesed dual intake ports than it would be with one large port. This in turn leads to very good swirl in the combustion chambers for more complete burning, higher efficiency and lower emissions. Lower inertia is another advantage: two small valves can be opened and closed more quickly and more precisely than one large valve and with less spring tension. This is important for controlling valve float at high engine speed. Higher valve-spring tension, another possible way of handling higher speeds, is not the most satisfactory answer to valve float as it puts additional stress on the entire valve train, particularly valve seats. Sintered iron valve-seat inserts are a necessity in the Cosworth Vega anyway, not only because the head is aluminum but as a precaution against seat pounding when no-lead fuels are burned.

Increase in total valve area over the standard Vega engine is considerable. Diameter of the standard Vega single intake valves is 1.625 in.; it's 1.40 in. per valve on the twincam, which means about 48% more area. Exhausts show a similar increase: 1.375 in. for the current Vega, 1.20 in. per valve for the twincam, an area increase of 52%. For improved valve control at high rotational speeds dual inner and outer valve springs are fitted in place of the mono-coil valve springs of the standard engine.

The upper portion of the combusion chamber is a pent-roof design to accommodate the 4-valve arrangement and central sparkplug. Intake and exhaust valves are inclined 20° from the vertical for smooth flow and to enhance charging and scavenging of the cylinders.

The chamber floor is formed by a deep-dish aluminum piston giving an 8.5:1 compression ratio, up a half-point from the standard engine. For extra strength and durability pistons are forged, not cast as in the current Vega. The top of the piston has large cutouts for valve clearance and a markedly chamfered edge to reduce exhaust emissions—a fuel-air mixture doesn't burn well in a narrow crevice volume formed between the top ring and the top of the piston.

In a departure from the current Vega design, a separate housing is cast for the cams and tappets. And because the cam carrier is aluminum no bearing inserts are necessary to support the cams as with the stock cast iron head. Aluminum is an excellent bearing material and the use of integral bearing supports is a particularly simple and neat solution.

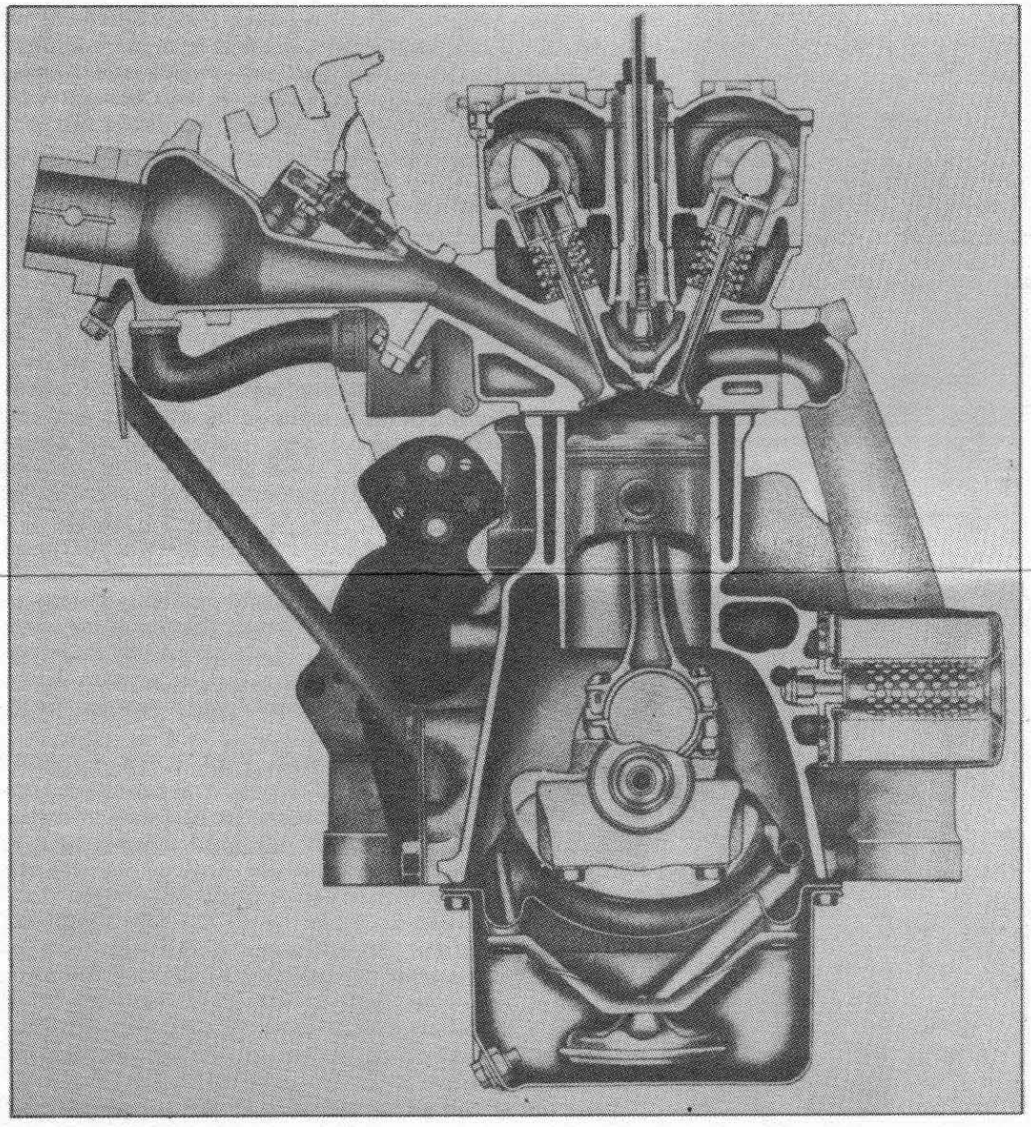
Bucket tappets with shims in the top for lash adjustment, similar to those of the Fiat 124, are positioned directly below the cams. This is another departure from the standard engine, which uses piston-type tappets exactly like those in the British Vauxhall Viva, with clearance adjustment by a special Allen-head screw. Lack of adjustment space with the two cams dictated the new design.

Valve timing and lift are definitely on the conservative side; Chevrolet Engineering says the emphasis was on good drivabil- ➜

ity and low emissions. The Cosworth's 77° of valve overlap practically splits the 70° and 83° of the low-and high-output current Vega engines right down the middle. Valve lift is similarly restrained—0.355 in. for intakes and 0.380 in. for exhausts (both at zero lash)—which is considerably less than the lift of even the base 1-barrel engine. But with the huge port areas, excellent breathing can be obtained without the "radical" lift of present Vega cams. A side benefit of this mild timing is a smooth idle and good low-speed torque.

Little cost was spared in designing and producing the Cosworth Vega to be as "bullet-proof" as possible. For instance, connecting rods are magnafluxed to detect cracks and then shot-peened to reduce surface stress, processes previously reserved for big high-output engines like the Z28. The crankshaft is forged (the standard one is cast) and the surface is hardened by a Tuftriding heat treatment for fatigue resistance. The crank is unique in another respect: a shortened throw compared to the current Vega engine, which reduces the stroke from 3.62 in. to 3.16 in. and the displacement from 140 cu in. (2.3 liters) to 122 cu in. (2 liters). Shortening the stroke offers several advantages. The oversquare design (3.50-in. bore with 3.16-in. stroke) gives the twincam higher rpm capability, but most importantly the decrease in displacement reduces secondary shaking forces and therefore engine vibration at high rpm. Unbalanced secondary forces are the bane of every inline 4-cyl engine—they are inherent in the design—and the 2.3-liter Vega, one of the largest inline 4-cyl engines, is more prone to vibration than most. The shape of the cylinder head played a major role in Chevrolet's freedom to destroke the twincam: the low-emission characteristics of the more ideal combustion chamber allowed a reduction in displacement without sacrificing performance.

Chevrolet has prior experience with mechanical fuel injection on Corvettes and electronic fuel injection is used on many European cars, but the electronic injection for the Vega twincam is the first in a U.S. car since the brief try Bendix and American Motors made with the 1957 Rambler Rebel. It's also the first application to a production 4-valve, 4-cyl design; the Lotus 4-valve has carburetors. The Cosworth EFI is a typical Bendix system, designed to meet specific engine air-fuel needs at any and all combinations of manifold pressure and engine speed. An electronic "brain" is continuously fed information on five operational conditions of the engine—manifold air temperature, coolant temperature, manifold pressure, throttle-body position and engine speed—by a variety of strategically located sensors. It also reads atmospheric pressure. Data fed into this black box is assimilated into a signal sent to the fuel nozzles in each port of the aluminum intake manifold. Opening of the nozzles (which inject as two pairs up to 6000 rpm, all at once above 6000) is fixed in the cycle and fuel is fed by an electric fuel pump at a constant 40 psi, but the closing of the nozzles is varied according to information supplied by the brain. Accuracy



Valves are inclined 20° to the vertical for smooth flow. Note the direct shot from the injector down to the intake valve.

Electronic injection is typical Bendix system. Its "brain" (center left) is continually fed information on engine operation and uses it to govern open time of the fuel injectors in the intake manifold.

of metering assures that only the minimum amount of fuel necessary to meet the engine's demand for a specific operational mode is used: during acceleration the nozzles are opened for a long duration, during deceleration a very short time, etc. Equal fuel distribution among cylinders plus precise metering (especially under light loads) permit lean operation with good fuel economy and drivability, as has been demonstrated repeatedly to us by electronic-injection-equipped imports. The success of Chevrolet and Bendix in this critical area is such that the Cosworth Vega engine complies with all 1974 exhaust emission requirements with none of the major add-on emission-control systems—air injection, exhaust-gas recirculation, carburetor hot air—necessary on most present engines. The only specific exhaust-emission systems used are positive crankcase ventilation and transmission-controlled spark advance.

Though primary emphasis was placed on low exhaust emissions throughout the injection development program, performance and fuel economy were important criteria also. Engines currently being tested are putting out about 130 bhp net at the 7000-rpm redline, an increase of 45 bhp over the high-output engine with 2-barrel carburetor. Torque is an impressive 125 lb-ft and the curve is unusually flat from 2000 to 7000 rpm. Development work is still being conducted to further improve mid-range torque without sacrificing top-end power so these numbers aren't final.

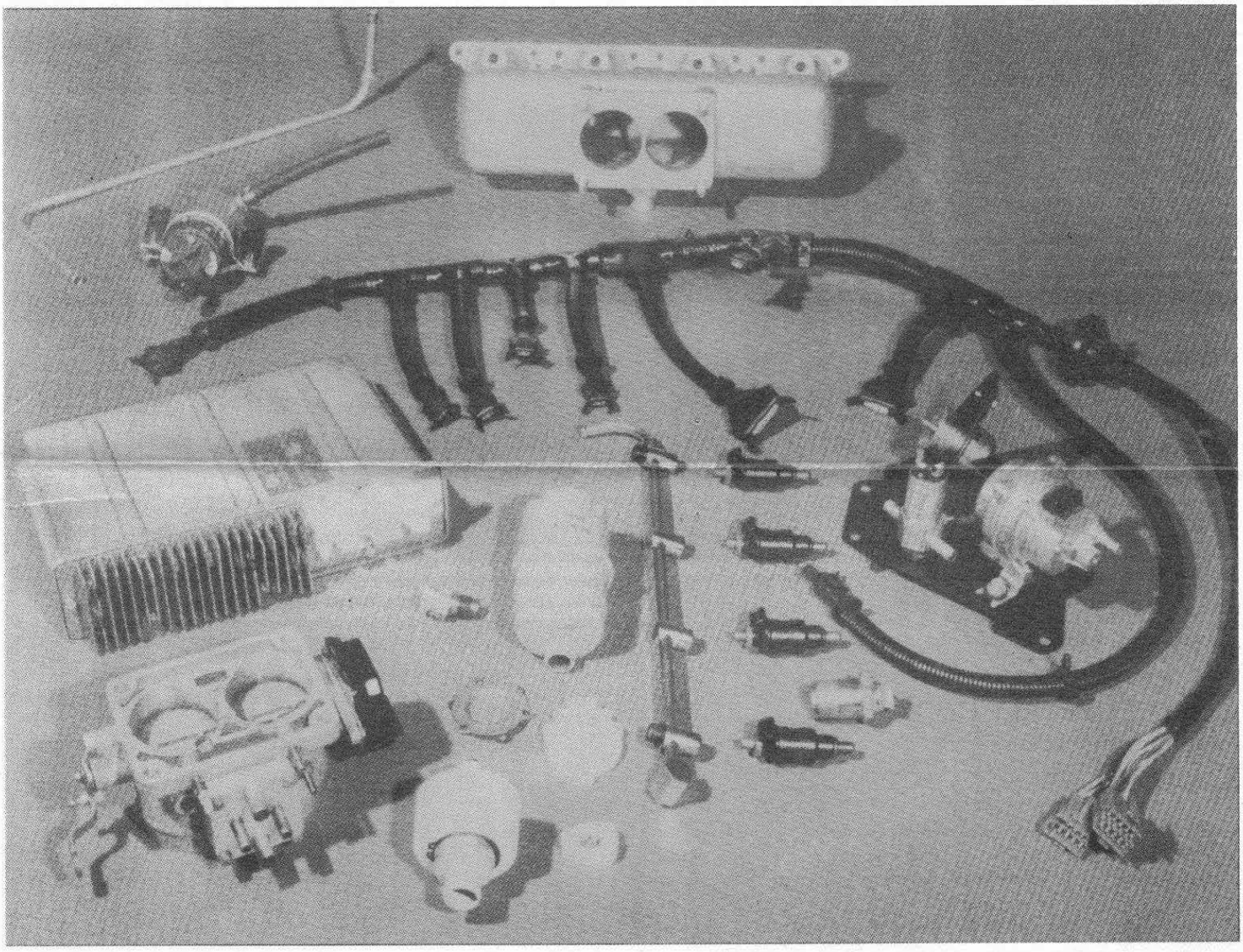
Those who worry about fuel shortages (all of us these days) will find the twincam almost as miserly with fuel as the current Vega. Most recent tests gave a respectable 23.5 mpg at a steady 70 mph; overall consumption should be in the neighborhood of 20–21 mpg.

In keeping with the overall performance concept an electronic ignition system without breaker points has been adopted for the Cosworth Vega. Basically, the system is the Delcotronic unit, incorporating the same transistorized amplifier unit previously used on the Corvette but a new pulse-type magnetic distributor. Benefits of this ignition include increased voltage available for cranking and high-speed operation plus more accurate engine timing for low emissions over extended mileage.

A 4-speed manual transmission is standard with the Cosworth Vega and is identical to the present 4-speed with the exception that 1st gear is 3.50:1 instead of 3.11:1. The higher numerical 1st gear compensates partially for the loss of torque resulting from the reduction in displacement at the lowest engine speeds.

The rear end also helps and is specific to the twincam: 3.73:1 ratio is standard. This is a substantial jump from the maximum currently offered—a 3.36:1. In addition, the ring-gear diameter has been increased from 6.50 in. to 7.125 in. for strength and durability. Positraction limited-slip will be an option.

The Vega's already good handling has been improved further. Anti-roll bars are fitted front and rear, not new as the Vega GT has these now, but on the Cosworth Vega the front-to-rear roll-couple distribution has been revised to reduce understeer. ➟



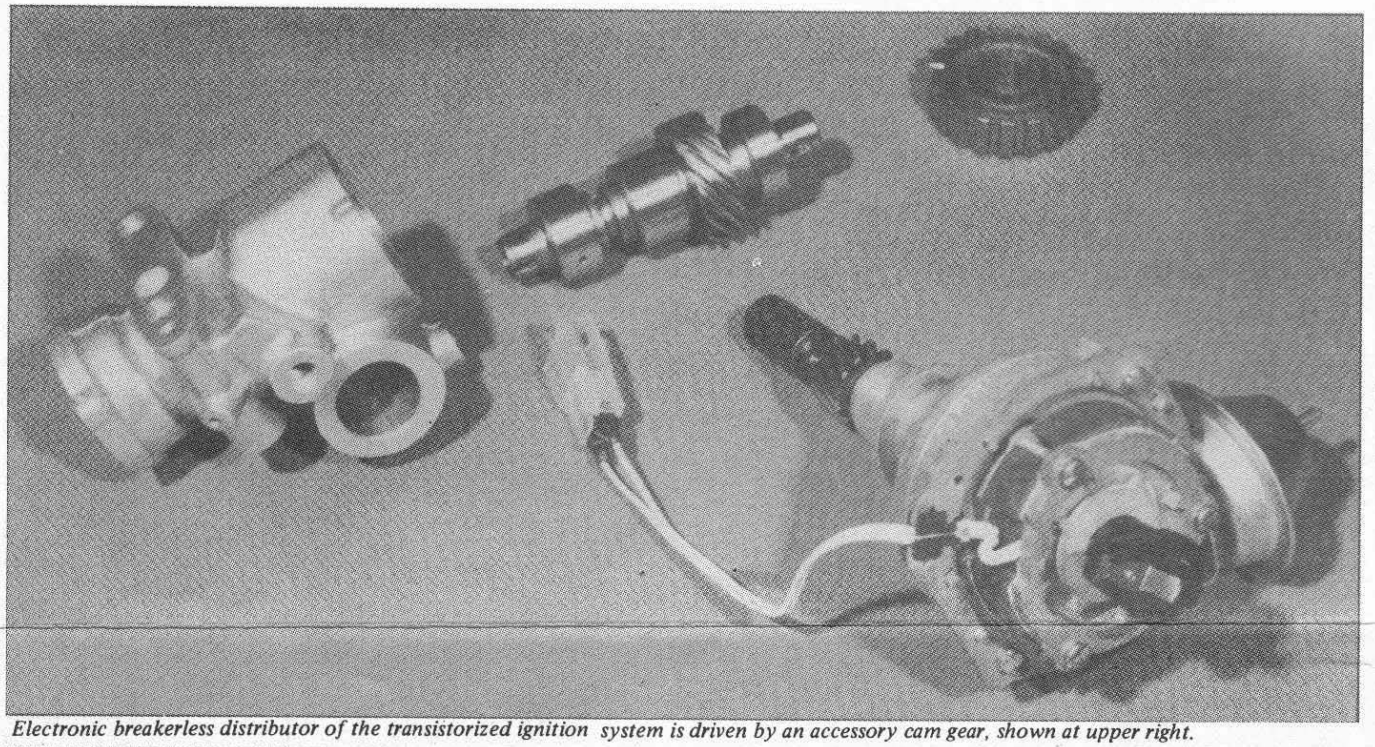
For quicker steering the overall ratio has been reduced from 22.5 to 16.1, even lower than the 16.6:1 optional power steering now offered in the Vega! And steering response should be helped by fat BR70-13 radials mounted on 6-in. aluminum wheels.

Axle control under acceleration and braking is not a Vega strong point, but it should be better with the twincam. A cable restraint with one end attached to the lower control arm and the other end to the axle housing snubs sharply in jounce and should reduce axle hop substantially.

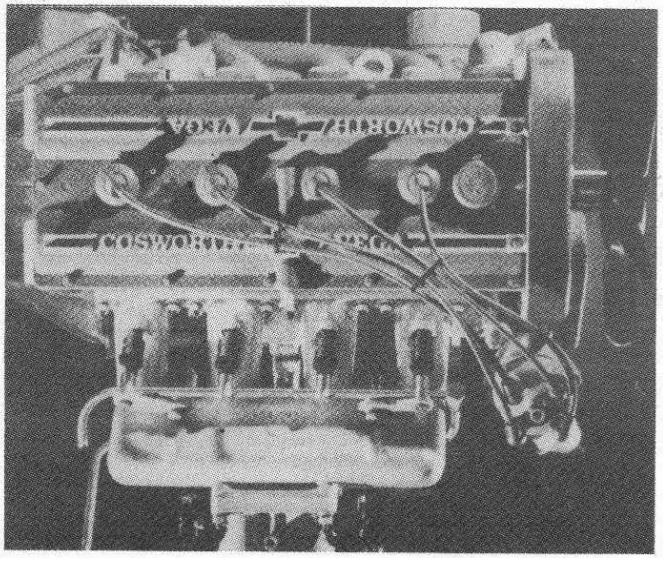
Chevrolet's intent was to make the Cosworth Vega a unique breed, starting with design and continuing through manufacturing, assembly and even servicing. Engines will be built by hand using production specialists in a special off-line room at Chevrolet's Tonawanda engine plant. Cars will be assembled off-line at the Lordstown plant by a select group of enthusiasts. Time will be no object—each engine and each car will be built right regardless of how long it takes, so say the Chevrolet people. Initially, cars will be produced at the rate of one per day but production will move toward a peak of about one per hour as assembly kinks are worked out. Typical Detroit production is about one car per minute.

But relatively painstaking production isn't the end of the Cosworth Vega story. The 5000 Cosworth Vegas built in 1974 will be identified by consecutively numbered identification medallions. Selected service personnel from across the country will be trained and a special telephone number in the owner's manual will be for Cosworth Vega service only. Glove-compartment information will carry full specifications and many service operations. A specific diagnostic unit has been tooled for Chevrolet dealers and the injection control unit will be exchanged rather than repaired if service is required.

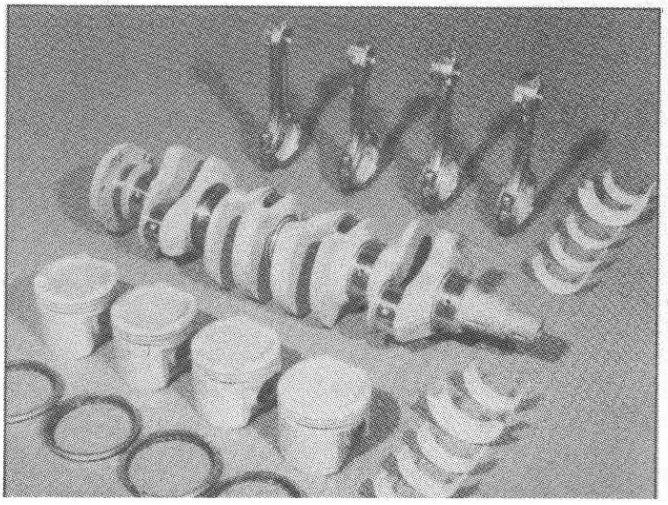
Some might question the logic of such a bold undertaking as the Cosworth Vega engine with rotaries, the Honda CVCC and 1975 emission standards looming ominously on the horizon. But it's obvious from my talks with Cal Wade (the engineer responsible for all engine development with the exception of the cylinder head) and Chevrolet management that the piston engine is far from dead. General Motors believes electronic injection and ignition are the next logical steps in the evolution of the conventional IC engine. The Cosworth Vega is a dramatic demonstration of GM's awareness of exhaust-emission and fuel-shortage problems and its ability to build engines with performance, economy and good drivability but above all low emissions. At the same time a low-volume car like the twincam Vega gives GM valuable production and service experience with electronic injection and ignition, know-how that is bound to be used in designing and producing future engines. If the Cosworth Vega is the wave of the future, things can't be all that bad for us.



Electronic breakerless distributor of the transistorized ignition system is driven by an accessory cam gear, shown at upper right.



Cosworth Vega crank has shortened throws to reduce displacement to 2 liters. Pistons' top edges are chamfered to reduce emissions.



ROUNDUP '83 GREAT SUCCESS!

If you missed Roundup '83, you missed a great time in Arlington, Texas "filled" with fun and challenging events shared with fellow Cosworth owners from across the country. It was a wonderful weekend spent participating in and/or observing well-planned events which will go down in Cosworthland history, thanks to our hosts for the Roundup, Clark and Jean Kirby. We borrowed some of the thoughts of John and Kathy Coswall as they expressed their account of the activities in their regional Cosworth newsletter this fall. The following are excerpts from their rendition.

Prior to the weekend CVOA activities, a few families arrived earlier in the week to take advantage of some of the activities that Clark and Jean Kirby had planned. They visited Shepler's Department Store, the world's largest store devoted to outfitting the "cowboy" in Western wear and gear, saw the Southeastern Historical Wax Museum, another world's largest, spent a day at Six Flags over Texas Amusement park, visited Water Park (a wet and wonderful set of splash pools, and visited the world renowned Billy Bobs Saloon, which actually houses a rodeo arena in the middle of it.

Formal activities for the CVOA Roundup began Friday evening with a delicious barbeque held in the Kirby backyard. It was great to see old friends from Roundups past and to swap tales of travels and the year's activities with our cars. The "Texas Hospitality" was overwhelming! Distant arrivals were registered, the rest of the weekend itinerary announced, the Cosworth event announcement watched on the 10PM network TV news with Clark being interviewed, and beautiful trophies were displayed for incentive.

On Saturday, all gathered at the Quality Inn in Arlington for the Concours judging, and many pictures were taken. Meanwhile, the swap meet, Goodyear tire seminar, Bob Maloy slides of his Formula 2 motor, and a rep from Chrysler showing a Shelby Charger occupied the curious. Then we drove a scenic leg to the 1/8 mile Dragstrip which was leased just for us. The drag racing event was new for CVOA Roundups and many found it to be a real challenge – partly just to understand the rules of dragracing, which to the surprise of some was not always to be the fastest driver.

After the drag racing event, we tackled a Pie Plate Road Rallye with equal competitive stride, There were paper plates tacked to posts, trees, bridges and lots of other places (nearing out of sight positioning to keep us alert) with scrambled letters which we unscrambled as we pursued written routing instructions and tried not to get lost. Two activity checkpoints gave us a reprieve from the heat and the mental activity – one had a watermelon seed spitting contest and the other had a wet sponge throwing match. The rallye ended at a fine Longhorn ranch with a pool, much beer, and a FINE Texas barbeque. The final event of the evening, however, was yet to come – the Mexican Field Trials! Jean Kirby had rented a four-door, automatic with air, slowest-car-they-could-find Chevette that we all took turns running flat-out around some pylons in a dark cow pasture. The radio was turned up full blast on a Mexican station. What fun! And they actually had trophies for this!

Techincal inspection took place early Sunday AM back in the Hotel parking lot. Then we caravaned to a large Mall parking lot where they had the autocross course set up, and everyone was given five runs. The fastest time of the day trophy went to Doc Dougherty "again", although Mark Gimm gave him a run for it in the Golden Eagle Racing car (on the cover of the April '83 CVOA magazine). Kathy Cowall finished as the fastest lady.

After the autocross, we caravaned back to the hotel, showered and dressed for the evening banquet. A Mexican-style banquet was prepared and many interesting door prizes were presented – donations from CV members and automobile-related companies – some from members who could not attend the Roundup this year such as Bill Hutton, Ren Rugerbrink, and D.J. Martin. The Rust and Cowall family made out like bandits and took home lots of loot. Bob Maloy was this years guest speaker. He spoke of the birth and growing pains of the CVOA and that, like every father, we had to let the child leave home so that it may grow on its own two feet. He felt that the best was yet to come. He was awarded the Cal Wade Memorial Award for his years of efforts in forming this organization. The awards for the competitive events of the weekend were distributed and are listed elsewhere in this newsletter. The most cherished trophy was a sterling silver and gold Western belt buckle won by Bob Chin of Indianapolis. He amassed the most points over the weekend by placing in all events he entered. John and Kathy Cowall tied for second place with only one point below Bob Chin.

Immediately after the banquet, the Regional director's meeting was held to elect a new National President and other officers. Phil Rust of Indiana was elected as President and Clark Kirby of Texas as Membership Secretary/Treasurer. Further, the club was divided into four "Super-Regions" or Zones. George Harrington of California was selected to be the Pacific Mountain Zone Director, Mark Grimm the Central Zone Director, Maurice Schechter for the Northeastern Zone, and Gene Von Guten to manage the Southeastern Zone. Bob Maloy volunteered to continue as Editor of the National Newsletter.

Overall, the Roundup was a tremendous success. They get better and better every year. A great deal of professional planning effort and coordination by Clark and Jean Kirby with support of their region will make Roundup '83 in Texas an event of warm remembrance for years to come.

A final word on Roundups. It looks as though the coming year's Roundup will be held in sunny Southern California (Los Angeles). If you have never visited Hollywood, Beverly Hills, Malibu "bikini" beach, Disneyland, or the Olympics, you're in for a treat. Start saving and planning now as this should also prove to be a very special Roundup.

THE FINAL RESULTS, AND WINNERS ARE:

1st Place, non-Cosworth Drag Racing ..... George Harrington, California (Buick)
2nd Place, Non-Cosworth Drag Racing..... Bob Maloy, California (Volvo)
1st Place, Non-Cosworth Rally..... Phil and Shirley Rust (Rented Van)
Highest Mileage Cosworth (144,000)..... Mark Rock, Cleveland, Ohio
1st Place, Non-Cosworth Autocross..... Fred Thomas (Rented Cougar)
Furthest Drive in a Cosworth..... Maurice Schechter, New York
Lowest Mileage Cosworth (2,100)..... Eldon Baker, Texas
First To Register for the Roundup..... Jerry and Leisa Bailey, Kansas
Lowest Dash Number (0022) ..... Leland Thomas, Texas
Highest Dash Number (3445) ..... Ted White, Texas
Fastest Lady Mexican Field Trials..... Kathy Cowall, Michigan
Most Enthusiastic Non-Participant..... Alissa Thomas, Iowa
Best Dressed in Black and Gold..... Claire Harrington, California
Best Attitude in Difficult Circumstances .... Lou and Harriet Marr, Michigan
Most Unusual Cosworth (Turbocharged) .... Pat Brogan, Colorado
Hard Luck Award ..... Fred, Deb & Alissia Thomas
(A new Cam Cover donated by HME)

AND NOW THE SERIOUS STUFF

Concours, Under 25,000 Miles
1st Place, Greg Burton
2nd Place, Jerry Bailey

Concours, Over 25,000 Miles
1st Place, Maurice Schechter
2nd Place, Bob Chin
3rd Place, Bill Wilson

AUTOCROSS RESULTS

Stock Cosworth Class
1st Place, Mark Rock
2nd Place, Clark Kirby
3rd Place, Bob Chin

Modified Cosworth Class
1st Place, Ted White
2nd Place, John Cowall
3rd Place, Dave Haskell

Unlimited Class
1st Place, Doc Dougherty (F.T.D.)
2nd Place, Mark Grimm
3rd Place, Pat Brogan

Ladies, Cosworth
1st Place, Kathy Cowall
2nd Place, Wilson
3rd Place, Harriet Marr

Ladies, Non-Cosworth
1st Place, Deb Thomas
2nd Place, Dani Maloy

Men's, Non-Cosworth
1st Place, Fred Thomas
2nd Place, George Harrington
3rd Place, Bob Maloy

cosworth vega
TECHNICAL BULLETIN

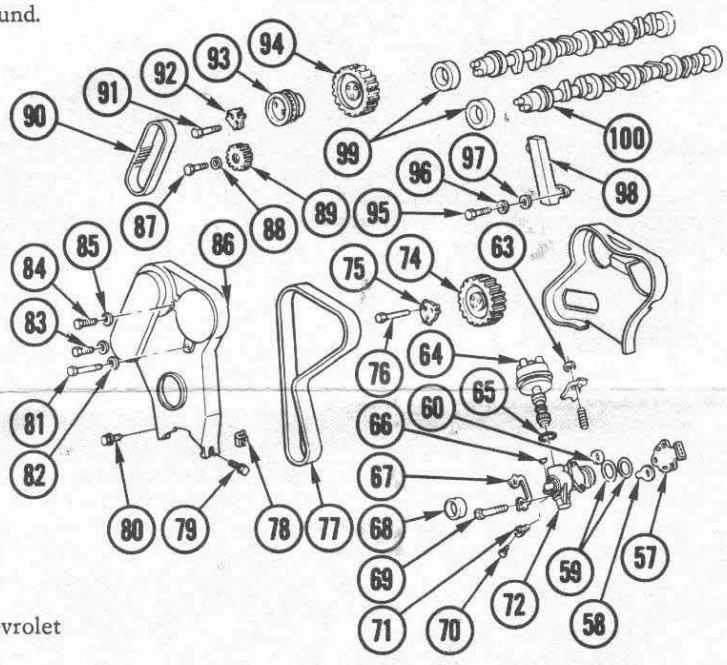
Date: 12-5-83
SUBJECT: Removal and replacement of the Cam Belt
PARTS COST: About $29.00
LABOR TIME: One hour, best done with two people

The factory shop manual spells out a method for replacing the cam belt that requires two torque wrenches and a trained monkey for an assistant.

We have discovered a very simple way to replace the belt WITHOUT moving the water pump and creating a problem where none may exist.

1. Remove the front fiberglass cover by removing the four (4) retaining bolts and the single sheet metal screw located at the lower right-hand corner of the cover. Be sure to mark the position of these so you will put the correct bolt in the correct hole in re-assembly. They are all different lengths.
2. Loosen alternator belt. Remove the torsional damper from crankshaft (3 hex bolts, 5/16 - 18 x 7/8"). Then remove the lower front cover (one 5/16 - 18 x 3/4" bolt). This will give you access to the crank pulley.
3. Carefully bend the anti-slip retainer (75) inside the EXHAUST CAM and remove the three retaining bolts. (1/4" - 20 x 7/8") (76)
4. Note that the cam gear is located on the camshaft by a small pin. Take a brass hammer and a brass drift (punch) and proceed to carefully drive off the exhaust cam gear from the camshaft. This will free up the belt and allow you to remove the belt from the front of the engine. Try not to move the camshaft if possible during this operation. Patience will pay off.
5. Replace the belt in the same position as the old belt around the intake cam, water pump and the crank pully. Be sure that the "long side" is held taut for the next step. Be sure that the timing marks are aligned, cams and crank.
6. Place the belt around the exhaust cam and while one person stands near the front of the car guiding the gear back on the camshaft locating pin, the second person will drive the gear on with the brass hammer. Replace the 1/4" - 20 x 7/8" bolts. You may wish to replace the factory bolts with hex-key high quality bolts at this time.
7. Bend lock ring around bolt heads.
8. Replace lower cover, bolt, then front torsion damper (crank pulley). Adjust alternator belt tension, check for loose or "extra" parts.
9. Start engine, check timing and timing marks all around.
10. Replace front cover, reversing instruction #1.

Bob Maloy
(714) 770-1305



cosworth vega
TECHNICAL BULLETIN

Date: 11-30-83
SUBJECT: Oil Drain Back Tube Leaks
PARTS COST: This part is no longer available from Chevrolet
LABOR TIME: 10-15 minutes

We have observed several cases of the oil drain-back tube that runs from the distributor housing down to the oil pump rubbing against the cam drive belt and wearing through, causing a severe leak.

Check your engine and observe the location of the tube as they can work loose over time from vibration. Be sure to use a "crow-foot" wrench on the brass fitting and DO NOT APPLY TOO MUCH PRESSURE when tightening as you will break the fittings. Be sure the tube is squarely in place and away from the cam drive belt. If you detect any signs of abrasion the tube may be removed and braized, and replated if necessary, or a replacement tube can be fabricated by any competent mechanic using the old tube as a pattern.

Ren Rugerbrink
Down-The-Road
(714) 630-7360

TREASURER'S REPORT

BALANCE FROM PREVIOUS REPORT $728.67

INCOME

Membership Fees	$340.00
Merchandise Sales	$ 22.59
SUBTOTAL:	$362.59

EXPENSES

Printing	$ 42.69
(500 membership cards - 39.85)	
(Merchandise Lists - 2.84)	
Postage	$ 11.89
Bank Account Charges	$ 4.46
Regional Fees	$ 30.00
(Cowall-Region VIII - 5.00)	
(Rumberger-Region XV - 15.00)	
(Harrington-Region XVI - 10.00)	
National CV News Postage	$200.00
SUBTOTAL:	$289.04

BALANCE TO DATE $802.22

Cosworth's Law

The Rule of Thumb says that when you are working on your car after all parts supply houses have closed for the weekend, you will develop a condition known as the dreaded "Cosworth multiple-digit disease" or as it's more commonly known . . . all thumbs. This usually leads to stripped threads, mis-matched nuts and bolts, lock washers, and the most dreaded of all, only one can of oil and it's automatic transmission fluid. There is no known cure for this condition except sitting quietly and thinking of Spring.

LETTERS TO EDITOR

Dear Bob,

My son Michael really likes his Cosworth Vega wagon since it looks just like "Daddy's zoom-zoom."

A 1950 Radial Flyer wagon, gold and black paint and some stencils made by my wife did the trick.

Best wishes,
Ken & Terry #0443

TECHNICAL ADVISORS

EAST
Bill Hutton
Hutton Motor Engineering
P.O. Box 3333, Clarksville, TN 37040
(615) 648-1119

CENTRAL STATES
Mark Grimm
Grimm Chevrolet
Morton, IL 61550
(309) 263-2241

WEST
Ren Rugerbrink
Down The Road Ent.
1061 Grove Street, Anaheim, CA 92802
(714) 630-7360

Carl Rumberger
Performance Dynamics
2346 Tower Ave., Sacramento, CA 95825
(916) 488-3114

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SEND APPLICATION TO: Clark Kirby, CVOA Secretary, Region XII, 5603 Edwards Drive, Arlington, Texas 76017

CUT OUT AND MAIL

MEMBERSHIP APPLICATION

☐ NEW. ☐ RENEWAL COSWORTH VEGA

NAME _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
PHONE (___) _____
MEMBERSHIP: ☐ ONE YEAR $25 ☐ THREE YEARS $60

ABOUT YOUR COSWORTH

YEAR _____ BODY COLOR _____
ENGINE # _____ UPHOLSTERY COLOR & TYPE _____
V.I.N. # _____
DASH # _____
MODS. _____

AMEX ☐ M/C ☐ VISA ☐ CARD NO. _____
EXP. DATE _____ SIGNATURE _____
OFFICE USE _____ DATE RECEIVED _____ EXPIRATION DATE: _____

CUT OUT AND MAIL

CONFESSIONS OF A SHADE TREE MECHANIC

by Ted White

Last February I was driving with a friend back from a weekend camping trip in the Texas Hill Country, extolling the virtues of my Cosworth Vega (76-3445). Suddenly it lost all power and, with a puff or smoke, died. We sat for several hours waiting for my father to bring a tow chain from Fort Worth. During the next three hours riding the chain, I tried to convince myself that this Cosworth Vega had any virtue.

DIAGNOSIS I (CVOA Convention 6 months away)

My parents generously donated a space in their garage to allow me a place to work. The car had fuel, had spark, and nothing had obviously broken. With the help of my father and brother Tim, we diagnosed the problem to be something in the fuel injection system. Since this was my only car, I did not want a long down time, so I spent the money on the Hutton Motor Engineering Weber Carburetor conversion. One week after it died, the Webers were in place, but still would not run.

DIAGNOSIS II (CVOA Convention 5 months away)

After a few weeks of tinkering, and the purchase of a temporary get around car, we were sure it must be a fundamental problem (fuel, electrical or mechanical). We replaced the fuel, the distributor cap, the rotor, the distributor's electronic module and the coil. I ran up my phone bill calling Bill Hutton in Tennessee. We rebuilt the Webers and checked the mechanical and ignition timing. But still it would not run.

DIAGNOSIS III (CVOA Convention 4 months away)

I was worried that maybe this was serious. My mother began to want the garage cleared out. I purchased a better compression guage. The numbers were high enough but had some variance. I remembered the dying gasp of white smoke. Maybe steam? I purchased the needed tools from HME, and in we went looking for a blown head gasket. Fortunately the last CVOA newsletter had an article on rebuilding the head. Here I found plenty of problems. When my Cosworth was new, the exhaust cam had seized up. It took Chevrolet 5 months to fix it under the warranty. I discovered that the cam carrier had been physically abused during those repairs. The tappets were bent and the carrier scored from improper shim removal. The intake cam apparently never had the brass end plugs that maintain oil pressure to the exhaust cam, so the cam bearings were badly scored. It's a wonder it hadn't happened again since then. I had to purchase more of HME's parts from Tennessee. While we were at it, we ground and polished the valves and seats by hand to clean them. Finally, with the new head gasket in place, it was time to reassemble, order adjustment shims from HME and try again. This time with EFI in place, it still didn't run. My pride and wallet were hurting.

DESPERATION TIME (CVOA Convention 1 month away)

We tried EFI diagnosis charts. We tried the Webers. We checked this, that, and everything in between. Nothing in the motor was wrong, but it just would not run. Neighbors and friends said I should concede defeat and take it to a mechanic. I could not afford to educate one, besides, I had evidence of the local Chevy dealer's ability.

CVOA CONVENTION August 1983

Finally, I resigned myself to the fact that I had to attend the CVOA Convention in Arlington without my Cosworth. Clark Kirby, the host, had designated me (he says I volunteered) the Publicity Chairman. How embarassing, an important sounding job like that, but NO COSWORTH. At the opening night party I described the problem to anyone who would stand still.

On Saturday morning, we towed the Cosworth to Arlington from Fort Worth. With tools, parts, manuals, and my father and brother to chase down parts and tools, we found a suitable handicapped parking place to work in. I was besieged with the most comprehensive Cosworth expertise available.

The hood was removed and cast aside. Timing was tested. Parts were swapped. Part numbers were compared. Every conveivable test, trick and form of voodoo magic was attempted. No sound advise was refused, but, it still would not run. The most common question and tests concerned timing, fuel, compression and belt alignment and tension. There was concern about reversion, (gas coming out the carburetor throats) but no one could decide why it did this. Most finally gave up and went to a tire seminar.

Along came Dave Von Gunten (brother of Gene Von Gunten the Cosworth used parts magnate from Maryland). He immediately sized up the situation, and located the most amazing analytical tool. A device that he alone knew how to use and properly interpret the results. Dave placed his hand over the exhaust pipe while someone was turning the motor, and casually suggested removing the catalytic converter.

The motor started as soon as the offensive part was removed. All those folks at the tire seminar came out to investigate the noise. (A Cosworth sounds good without any exhaust system.) I'm a bit embarrassed to admit I even left the thing on there this long (about 33,000 miles), but more embarassed that I never looked beyond the motor for the problem.

My father located a suitable "Test Tube" (Arlington is a Hot Rodder's Mecca) and I was able to drive the Cosworth at last.

John Cowall twisted my arm and forced me to autocross with the Modified Class. I really wanted to spend more time tuning and playing. I had only autocrossed once before, about 9 years ago in a Pinto Wagon, and was a bit concerned. Well Cinderella stories are true, 3445 won its class after only 4 of the 5 runs, then beat that fine time in the 5th. Maybe next year I'll rebuild it again, then tow it to California. I think the clean head and close tolerence in the valve train gave me the extra horsepower to muscle past the more experienced drivers.

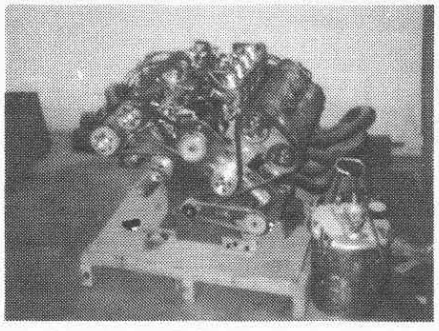
There are those who question whether I put over a carefully orchestrated snow job. But the truth is, after not turning a wheel for 6 months, my Cosworth wouldn't dare let me down. I made sure it overheard what Gene and Dave Von Gunten do to Cosworths that don't run.

COSWORTH QUIZ ANSWER

Oberdorfer Foundries built this EX V-8 prototype for Reynolds Aluminum, who intended to use it in an Indy car.

The first correct answer came from Bill Hutton, Clarksville, Tenn.

Congradulations Bill, we will extend your subscription to the Cosworth News for 1 year.



CLASSIFIED ADVERTISEMENTS

FOR SALE: 75CV - #1440, 202 miles, near mint condition. The car was purchased to hold by Howelett Chevrolet from General Motors in 1975. Was recently purchased at auction, and is for sale. Will be stored until sold. Black exterior, white interior. Contact Howard Grey, Rt #6, Franklin, KY 42134, (502) 586-8407.

FOR SALE: 75CV - #0238, 60,000 miles, original condition except for addition of Koni Shocks which gave it a more stable ride; paint like new, no cracking; rear opening windows, rear defogger, $3000 OBO, Call 4:30 - 5:30 P.M., George A. Planthaber, Sr., Clifton, NJ (201) 772-3139

FOR SALE; 75CV - #0204, new paint, fresh engine desmogged; Black on Black, 4 speed, sun roof, new Keber VI2GTs tires, excellent condition, $3750. Contact John Eli, Edna, KS, (316) 922-3888.

FOR SALE; 76VC - 35,000 miles, 4 speed, Firethorn, excellent condition - engine/body, air conditioner, $5,000. Contact Jack L. Evans, Bay St., Louis, Mississippi

FOR SALE: Two Cosworth Vegas - 75CV - #1676, 43,000 miles, Black on Black, no rust, above average condition; 75CV - #1779, 30,000 miles, Black on Black, no rust, above average condition; Both for $7600 OBO, Contact David A. Tisdale, Peterburg, IN (812) 789-2414

FOR SALE: 75CV - #1357, original owner, 46,000 miles, engine rebuilt by Hutton Motor Engineering, will sacrifice, $2500, Contact George Nagorski, Jr., South Range, Wis, (715) 398-3693

FOR SALE: 75CV - #0539, Black/Black interior, 9400 miles, AM-FM Radio, Pirelli CN36 tires, car cover, and some spare parts. In very good condition, $4100, Contact Jim Buckwalter, Apache Jct., Arizona, (602) 982-2621

FOR SALE: One set of wheels (4), good shape, $225 plus shipping; One engine, complete less intake manifold, 3400 miles, $1200 plus shipping; Kelly girl/IMSA radial challenge Cosworth Race Car; 76 Chassis, needs nothing; Cover car in the April '83 CV News; White, many, many extras, $6000 Firm; Contact Mark Grimm, Morton, Illinois, (309) 263-8828

FOR SALE; All CVOA News magazines from club beginning, including 1975 Cosworth Service and Overhaul manual from GM, excellent condition, $25.00; One Cam belt and one Alternator belt, new in box, $10.00 for both; Contact George Gillette, Malibu, CA (213) 457-7543

FOR SALE: 76CV - #2535, AM-FM Radio, Tilt Wheel, Rear Defrost, 45,000 miles, White with very clean black interior; Recent carpets, new fenders from Chevy; Needs minor body work and paint, no rust, Leaks oil from Cam box; Head gasket set and new timing belt included, new alternator, 5 original wheels, $3000 OBO, Contact Bob Caruso, (617) 628-5110

FOR SALE: 75CV - #0878, Black/white vinyl, 50035 miles, 4 speed, new laquer paint job, new Goodyear radials, rear window defroster, AM-FM Delco radio, Contact George Kelly/Dennis Easter, Lawton, OK (405) 355-1355, or 429-3499

FOR SALE: 76CV - #3525, 100% original, Including fuel injection, alloys, 5 speed, 40,000 original miles, black on black, in mint condition; Asking price is $4500; Contact Sean McCloskey, Los Angeles, CA (213) 476-4018

FOR SALE: 75CV - #2042, black/black Tetra, 30,000 miles, new paint, stripes, tires, DOBI, GM Rear Spoiler, very clean, beautiful example, make offer; Contact Steve Phillips, Bakersfield, CA (805) 366-0394

FOR SALE: 76CV; Winner of CV National Round-up Modified Class; Ported and polished head, COE intake valves, cams, 9.5:1, 42 DCOE Webers, electric cooling fan. High perf. clutch, DTR Sway Bars, shortened V-8 springs, 13" x 7" Gottis, P7's, 16:1 steering, 5 speed, Posi, VDO, Cibie, Ansa Muffler. Met. burgundy with black leather-like interior, 23,000 miles, exceptional condition. This car was 2 years in making and professionally done. Nothing but the best. Business venture forces sale, must find good home. Extreme sacrifice for this Porsche beater @ $6,000. Included entire fuel injection system and many spare parts, Contact Tom Dymant, Ivyland, PA (215) 322-1999

FOR SALE: Engine with Hutton Webers, 46,000 miles, $1350; 4 Speed Transmission, $300; 5 Wheels, $350; Sheet Metal (except driver's door, suspension parts, instruments, etc.) Prices negotiable; Write or call for prices that are unlisted; These parts are from a wrecked 75 Cosworth, #0688. Contact Garry Ford, Blue Ridge Smt., PA (717) 794-2203

FOR SALE: 75CV - #0314, Recent HME engine rebuild, excellent condition, Black/black cloth interior, aksing $5,800. Contact B. Rondinella, Shavertown, PA (717) 696-1466

FOR SALE: One set of Hutton 45 DCOE Weber Carbs and manifold, excellent condition, $400 with air cleaner and choke cable. Contact Dick Baumhauer, Clausen, MI, (313) 288-2126

FOR SALE: 76CV; T-50 Five Speed, Correct Ratios, Fresh rebuild with receipt $400 OBO; Also have all parts necessary to put the T-50 into a 75 Cosworth (or a 76 minus crossmenber). Contact Pat Brogan, Denver, CO (303) 278-4450 or (303) 985-7847.

FOR SALE: 75CV - #1795, excellent condition - original owner, 15,000 miles, black/black vinyl, pop-out windows; Asking $5500. Contact Bill Clayton, El Monte, CA (213) 443-9381

FOR SALE: 76CV; Black/white interior, good condition, 35,000 miles, AM/FM Seek/Scan with Cassette, manuals, Imron paint, spare steel sleeve block, 5 speed, console, Eagle NCT's, GM 3-piece rear spoiler, $3700 OBO. Contact Pete Dirisamer, Woodridge, IL (312) 985-9107 evenings or (312) 860-6491 days.

FOR SALE: One original BR70-13 Goodyear tire; Looks like new; Switched over to Eagles and this was an extra tire; Contact John Chidester, Bowie MD

FOR SALE: 76CV - #2572, black/black; Engine rebuilt with sleeves, new GM pistons, HME std. cylinder head, new radiator, 5 speed, 38000 miles. Body is fair to good, pop-out windows, $2700 in Houston, Texas, My dad's 76CV #2156, black/black, 4 speed positration, 30,000 miles, excellent condition with original window sticker, manuals, records, new extra dash panel, $5600 in Akron, Ohio. Contact Jeff Baldwin (513) 451-0458

FOR SALE: 75CV #2060, next to the last Cosworth built. Excellent condition, black on black, Monroe H.D. shocks, new factory wheels new tires, and DTR top end, new brakes all round, factory AM-FM. 34,000 miles. Asking $3500 O.B.O. Ted Berry, Irvine, CA (714) 838-7021

Continued on next page

George and Clair Harrington INVITE YOU TO

ROUND-UP '84
Anaheim, California

3rd week in August 1984

Classified Advertising Continued

FOR SALE: 76CV #3233. Firethorne, red vinyl with cloth inserts. 35,000 mi. New TA Radials, excellent condition, stored winters. 4-speed. $3,200 O.B.O. Also equipped with rear opening windows and factory rear window defogger. Dave Thrams, Mansfield, OH (419) 884-1593

76CV #3490. Firemist, red vinly, 40,000 careful one owner miles. All original and excellent. Air conditioning added. Asking $4,500 or best offer. J.L. Evans, 8930 Anahola, Bay St. Louis, MS 39520

75CV #0185. Black on black. 40,000 original miles. All stock except tires. Asking $3,500, but will accept a higher offer! Good condition, recent tune-up. Alex Baker, Newark, CA (415) 797-5323

76CV #1854. Black, black vinyl. One owner. 65,273 miles. Needs new steering box, repaint and general cleanup to be perfect. Car has been stored for two years. Jim Naughton, Pacifica, CA (415) 993-5373 (B) or (415) 341-4070 (R) Just $2,500 for this one owner car.

ALL TYPES OF USED PARTS, body, interior, engine, etc. Call me for the best deal!! I buy wrecked Cosworths. East Coast only. Call Gene Von Gunten, (301) 848-3899, 5-9 PM ONLY Please (E.S.T.) Virginia

STAINLESS STEEL EXHAUST SYSTEMS, specially made for your Cosworth. Lifetime guarantee. Complete replacement for either 75 or 76 just $400.00. Call Maurice Schechter, New York area, (516) 676-5467. The 75 has the correct twin-pipe exhaust set up.

COSWORTH VEGA FORGED PISTONS to run in sleeved motors, just $450.00 per set including new pins and rings. Manufactured to YOUR specifications, any compression ration to 14.0:1, any overbore to .060. Designed after the Cosworth of England Formula II piston, 90 grams lighter than Chevy stock pieces and made to my exacting specifications. THEY ARE PERFECT!! Call Bob Maloy, (714) 770-1305. Leave a message, I'll call you back on my dime!

75CV #1530 Black on Black. DTR cylinder head. C.O.E. valves. Fast and reliable. Disability forces sale. Asking $3,400 O.B.O. Must sell in December. Dave Goddard, Anaheim, CA (714) 527-3678 anytime. Car in good to excellent condition, one owner since new.

75VC #0403. Just 0018 original miles. Marriage forces sale. Call Steve Beatty, Leesville, S.C. Asking $6500 will consider any reasonable offer. (803) 786-8492 or (803) 486-0470 or 1-800-241-1675 (B).

75CV #1431. Just 17,000 careful miles. One owner. Always garage kept. Must sacrifice before end of January. A perfect car. I am asking $5,000, but will entertain any reasonable cash offer. Call Tom Scott, VA (804) 262-0658, call anytime.

cosworth vega
TECHNICAL BULLETIN

Date: 12-2-83
SUBJECT: Weber Carburettors Used in "Big Bore" Engines
PARTS REQUIRED: F-9 Emulsion Jets, (2) and #36 Choke tubes (2)
PARTS COST: About $50.00
LABOR TIME: 2 hours, if your experienced, otherwise let a professional do it

If you have a "big bore" 140 cu. in. car with a polished and ported head using Weber Carbs, you may wish to replace the existing emulsion jets and Choke tubes with the larger pieces listed above.

These will work well if you drive at near full throttle as this modification will allow for a greater air/fuel intake.

The DCOE 42's and especially the 45's can benefit from this modification but bear in mind that the acceleration will suffer for top end performance.

The parts can be obtained from Bill Hutton at H.M.E.

Bob Maloy
(714) 770-1305

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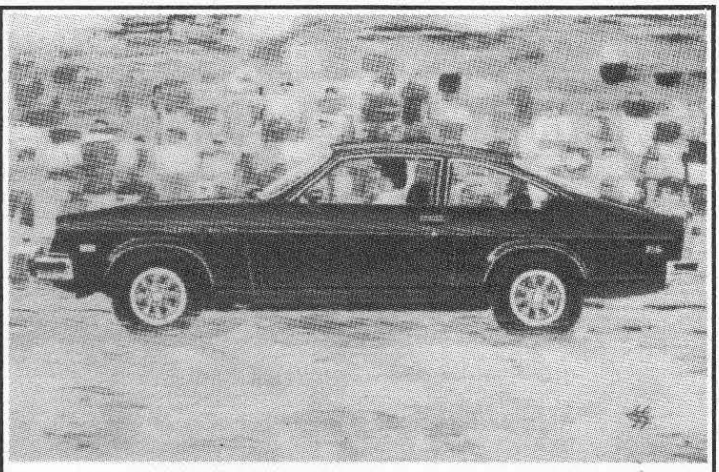

This beautiful reproduction of an original oil painting by Emanuel Schechter are now available as postcards with a short information panel about the car's history. All proceeds go to Region II. Available either as a postcard, 20 for $5.00, or as a beautifully framed and matted picture for your den or office at only $7.95 each.

IN FULL COLOR

Send Check or Money Order to:

Maurice Schechter
Regional Director, Region II
17 Driftwood Lane
Glen Cove, NY 11542

COSWORTH GOLD VEGA WHEEL PAINT KIT

Kit Includes:

- **2 — 16 oz. spray cans COSWORTH VEGA GOLD WHEEL PAINT**
- **1 — 16 oz. spray can clear (to use over gold)**
- **1 — 16 oz. spray can light gray lacquer primer-surfacer**
- **1 — Qt. water wash, non flammable paint remover**
- **1 — Qt. aluminum pre-finishing system cleaner***
- **1 — Qt. aluminum pre-finishing system conversion coating***
  ***(to be used following use of the paint remover and prior to use of the lacquer primer-surfacer)**
- **3 — sheets 9" x 11" assorted sandpaper**
- **1 — tack rag**
- **1 — minor auto body repair manual**
- **1 — auto body materials brochure**

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Our policy is to perform only first class work using the best parts available. We can build or overhaul any engine to stock or performance specifications.
We use only TRW, Chevrolet, FEL-PRO and other proven materials. All cylinder head polishing and porting is done by myself, personally, not farmed out. All of the installation of Cosworth of England valves is performed by me.
Our best references are our customers. We will be happy to provide names to you if you would like to check us out.

AVERAGE PRICES

Polish and port C-V head, cc chambers, includes bronze valve guides and teflon valve stem seals	$395.00
High performance 3 angle valve grind	275.00
Seal engine oil leaks (head, cam carrier gaskets, and adjust valves)	250.00
Overhaul to stock specifications includes valve grind and engine balance	425.00

ALL ABOVE FOR LABOR ONLY PARTS AND FREIGHT EXTRA

COSWORTH VEGA SUSPENSION

30 day money back guarantee

Suspension Kits

These springs and sway bars have been specially fabricated for us, for use on the Cosworth - Vega taking into account weight distribution and other factors.

Stage I	Front sway bar, 1¼", complete with all mounting hardware and hard bushings	$105.00
	Rear sway bar, 15/16", complete with all mounting hardware	$105.00
	Note: Stock is Front, 15/16", Rear 7/8".	
Stage II	Both bars listed above, plus specially wound springs, 15% increase, 1½ inch lower ride height	$595.00
Stage III	Sway bars, springs as above plus 16:1 fast steering box change over kit.	$695.00
Stage IV	Full competition rate springs and bars plus teflon suspension bushings, upper and lower control arms and rear control arms (Lowers ride height 2.5 inches). (Not recommended for street use).	$950.00
Stage V	Full NASCAR type adjustable suspension quotation on request - installed by DTR only.	

Prices subject to change

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Anaheim, CA 92802
(714) 630-7360
Ren Rugebrink

Installation extra on request

We recommend the use of gas pressure shocks such as Bilstein, or Koni Coil Over types with the above modifications. Be sure to obtain shocks that are for HIGH PERFORMANCE USE, not street calibration.

I have IN STOCK any and all COMPUTER or ENGINE SENSOR parts (All new) that you may require, all are at special low discount prices. We also have IN STOCK FOR IMMEDIATE SHIPMENT re-manufactured computers at just $375.00 exchange for your old computer, or $450.00 outright. I also have a good supply of excellent used parts. Call me with your needs. Bob Maloy (714) 770-1305. Please leave your name and number — I'll call you right back!

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TWIN CAM

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ROUND-UP '84
Anaheim, California

3rd week in August 1984