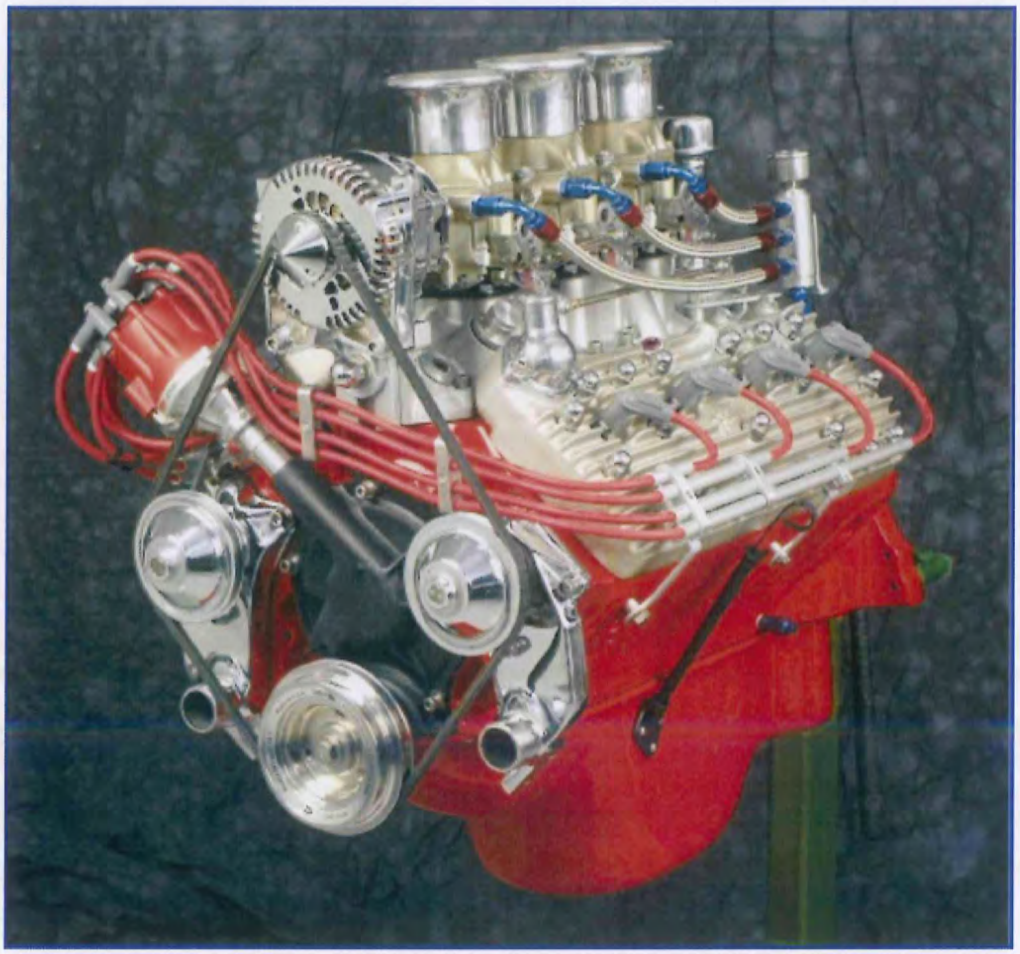
PROJECT FLATHEAD, PART 6

Posted By Mike Mavrigian, December 14, 2010 in Project Engine Builds Tech Update



The twin water pumps have been chromed and the Tuff Stuff alternator is in it's final home.

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THE ALTERNATOR SETUP

Build, text and photos by Mike Mavrigian

One of the final additions to this build concerns the alternator and the belt drive. The original engine featured a large generator that was mounted to the front of the intake manifold (the manifold features a vertical recessed channel up front that accepts a 9/16"x12 bolt). I decided to mount a modern alternator at this original location, which proved to present more of a challenge than I first thought. A popular choice is a GM alternator, but that only works with a single or dual carb setup (the issue is clearance between the alternator and the carb). Since my triple deuce setup features the Demon 98 (which is a fairly fat carb), the GM unit simply would not work. I'll detail the parts selections and installation in this article.

ALTERNATOR

Because of the depth of the Demon 98 carbs (and because I'm using three of them), there simply isn't much clearance in front of the front-mounted carb for an OE-location alternator installation. In fact, it's ***way-tight***, to the tune of about 1 ¾" from the manifold's alternator mounting bracket surface to the front of the Demon carb fuel bowl.

Granted, I could install an alternator offset (mounting it to the LH cylinder head), but I preferred to locate the alternator in the original generator position in terms of appearance.

I initially tried a GM SI type alternator, but there was simply no way to mount this in the high central original location and achieve pulley alignment (due to the depth of the Demon front carb, the GM alternator was *way* too deep front-to-rear).

I then tried an old style Chrysler alternator (1960-1988), which was thinner, but still placed the pulley almost an inch too far forward for belt alignment. If I was running a slimmer carb (Stromberg, etc.), Luke's Custom Machine makes a special mounting bracket to mount the Chrysler alternator. But there simply was not enough room between pulley groove locations and the front carb.

Left-to-right: GM, Chrysler and an OE Ford Bullit alternator. The 4.6L Bullit alternator body is the most slim, at a mere 4″ in front-to-rear depth.

Remembering that the late-model Mustang GT "Bullit" edition featured a very shallow alternator, I gave this a whirl. I borrowed a 2001 Ford Mustang Bullit alternator from my local parts store (part numbered for the 4.6L SOHC Bullit engine). This little guy features a body that's only about 4" deep (front to rear). As a reference, the GM alternator body (including fan) is about 5 3/8" deep and the Chrysler unit is about 4 ¾" deep.

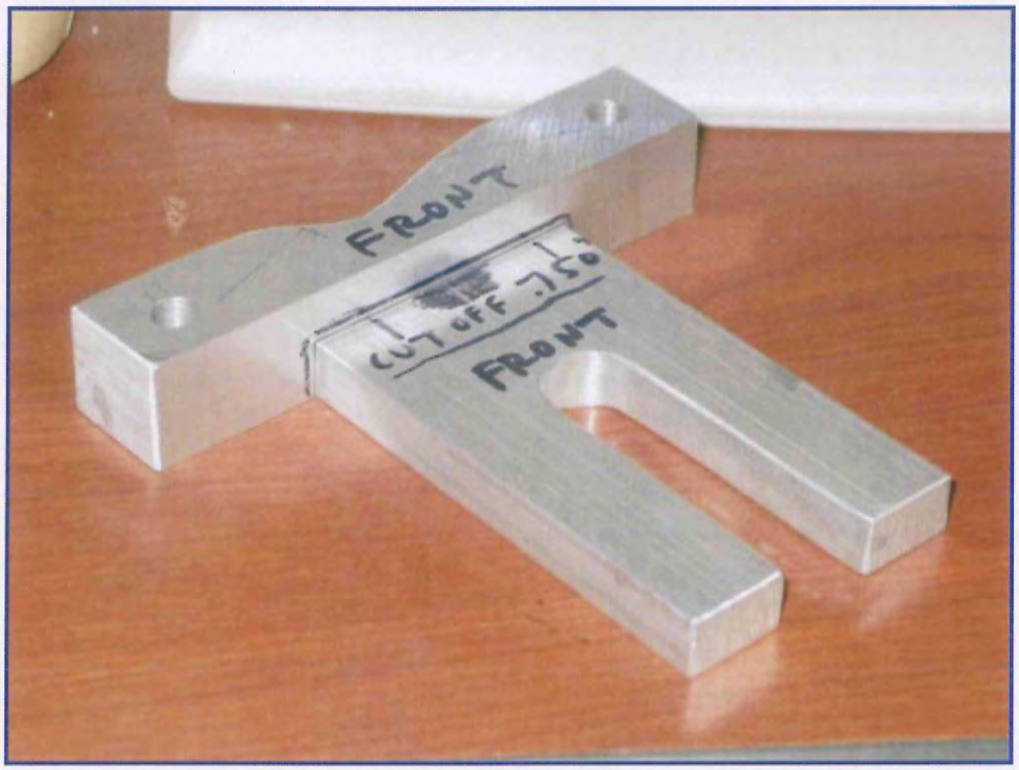
Once I confirmed that the Bullit alternator would fit, I obtained a *gorgeous* triple-chrome-plated unit from Tuff Stuff (their P/N 7781A). Tuff Stuff's alternators are available in chrome, polished or black powdercoat. Since it's going to sit out front for all the world to see, I decided to go for the chrome for a dressed appearance, coordinating with the overall theme of this engine. Although originally fitted with a serpentine type pulley, Tuff Stuff swapped this out for a double V-groove pulley.

NOTE: If you elect to use the same type of alternator, this is the Ford 4G. The P/N 7781 that I used originally fit 4.6L 1996-2002 DOHC and Mustang Bullit GT applications. Tuff Stuff's P/N 8436 was original on 4.6L 2003-2004 Cobra Supercharged and Mach 1 applications. The model 7781 is available in 150 or 200 amp versions, while the 8436 is offered in 135 or 200 amp versions. Both Tuff Stuff models feature internal regulators and accept OE Ford connection (or Tuff Stuff can supply you with a 1-wire connection).

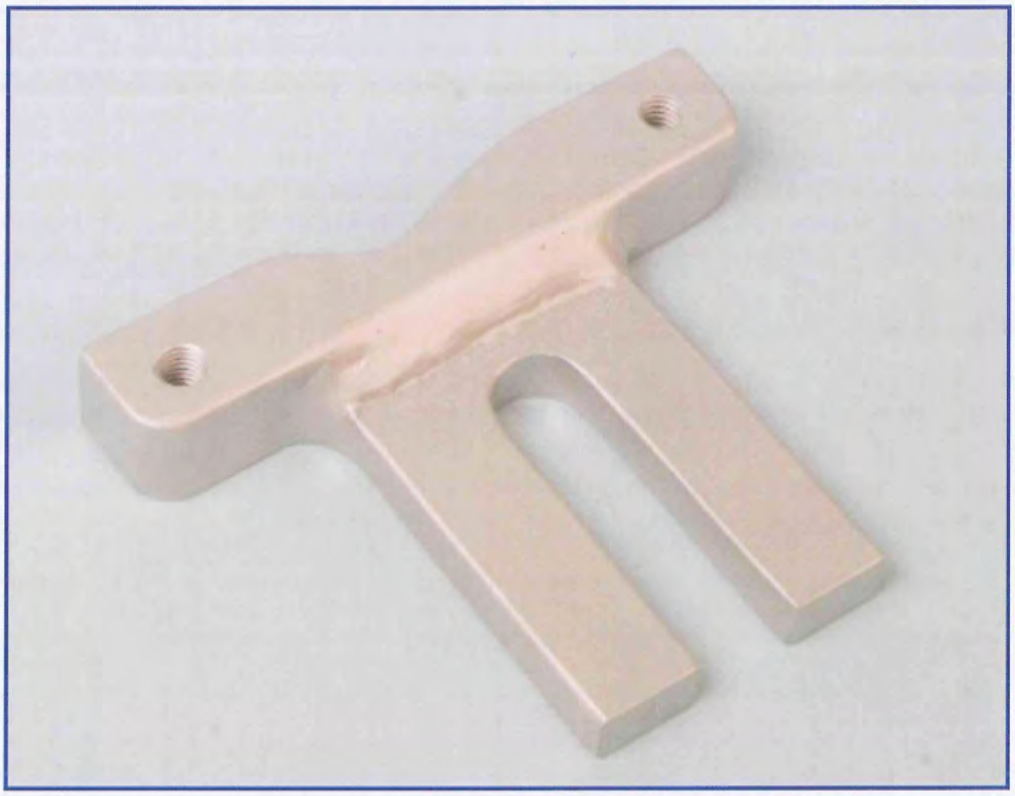
If you're building a flathead and plan to use triple carbs, and decide to mount an alternator in the original generator location, I *highly* advise choosing the Mustang GT Bullit alternator. It's the thinnest (front to rear) unit that I found, and it looks great, especially using Tuff Stuff's drop-dead-gorgeous chrome version (instead of using a boring OE unit, definitely go with Tuff Stuff's P/N 7781A chrome unit).

I then mocked the alternator in place and designed a mounting bracket assembly that would allow me to mount the new alternator in the OE generator location. The bracket base (that mates to the intake manifold's mounting location) consists of a 2.5"-wide x 0.500" thick slab of aluminum flat stock. I machined a 0.625"-wide vertical slot to provide a vertical adjustment range for the alternator and belts

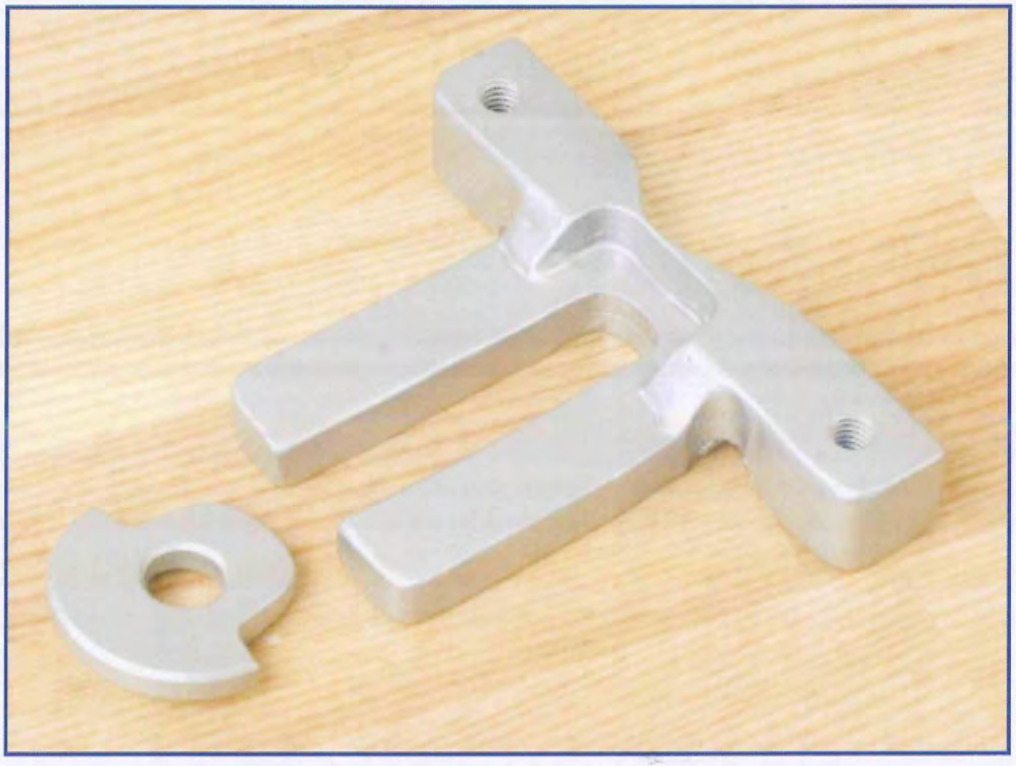
(the vertical slot accommodates the 9/16" diameter bolt (9/16x12x2) that threads into the front generator bracket wall on the intake manifold).



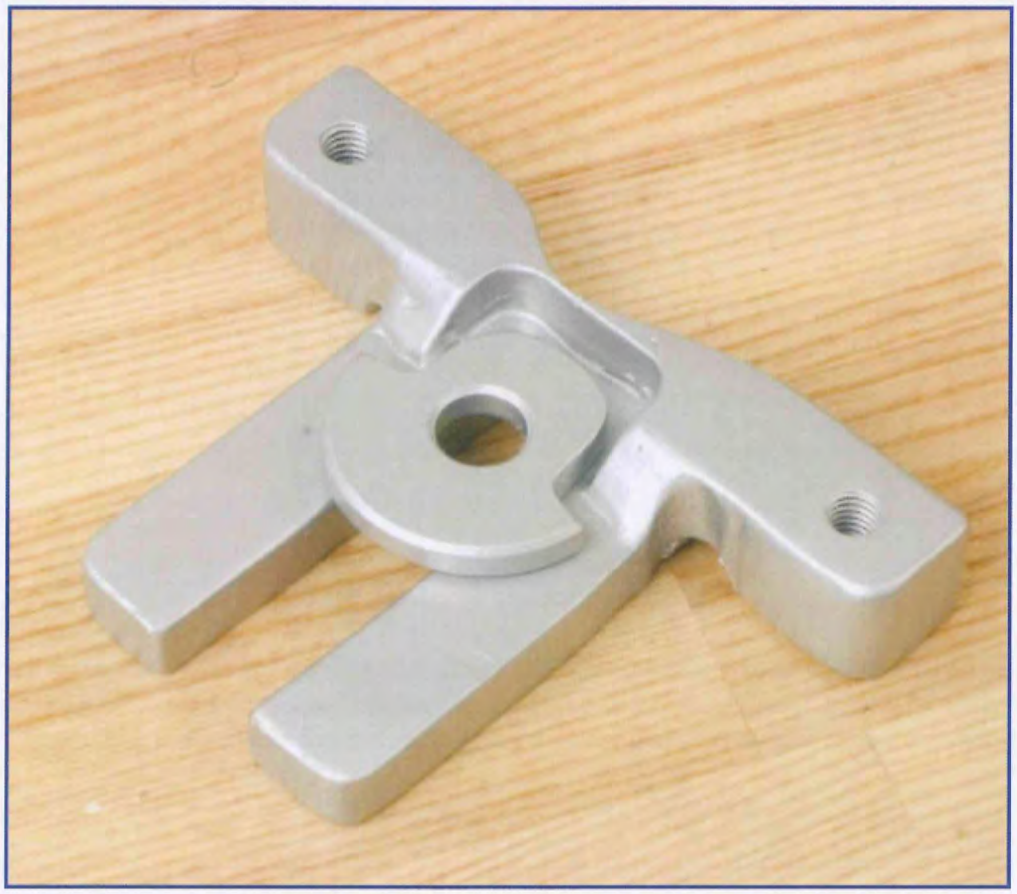
I began making the alternator bracket with two pieces of aluminum bar stock.



With the two sections welded together, I test fit the bracket and the alternator. This version was functional, but I felt that the alternator was positioned too high, so further bracket mods were needed. Excuse the weld and surface details seen here. This was during the prototype work-up.



In order to drop the alternator to an appealing height, I relieved a pocket into the upper horizontal bar section. Since a round flat washer would not fit properly, I made a washer (starting with an ARPO crank damper bolt washer), trimming the upper half of the washer to nestle into the upper relief.



This photo shows how the washer engages into the upper relief. This allows dropping the alternator down for belt installation, and provides washer fit when the alternator is raised slightly for belt tensioning.

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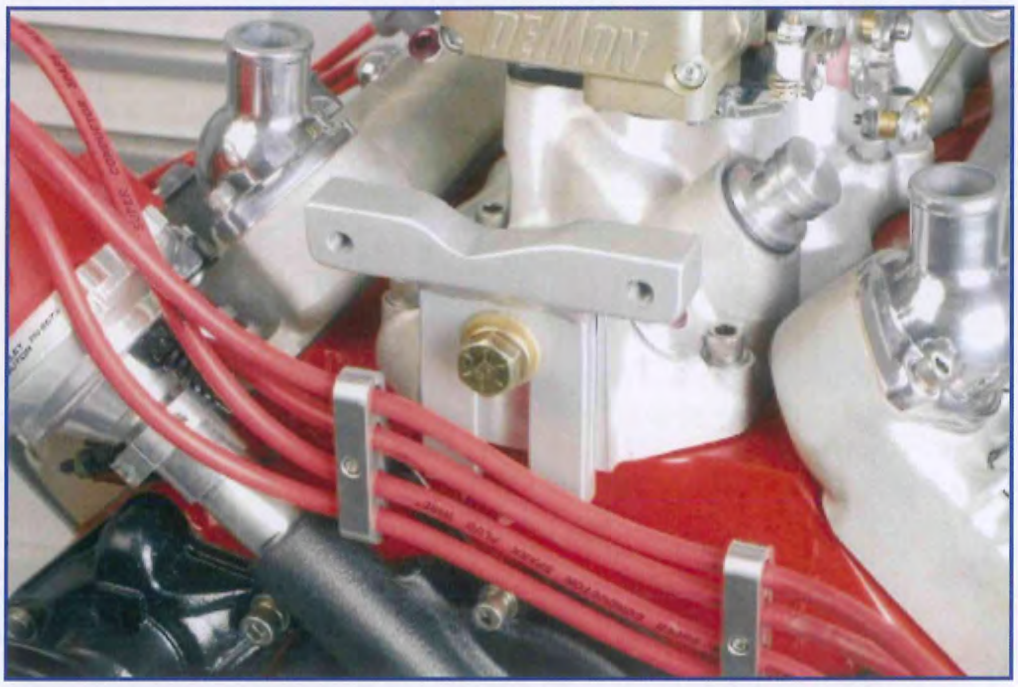
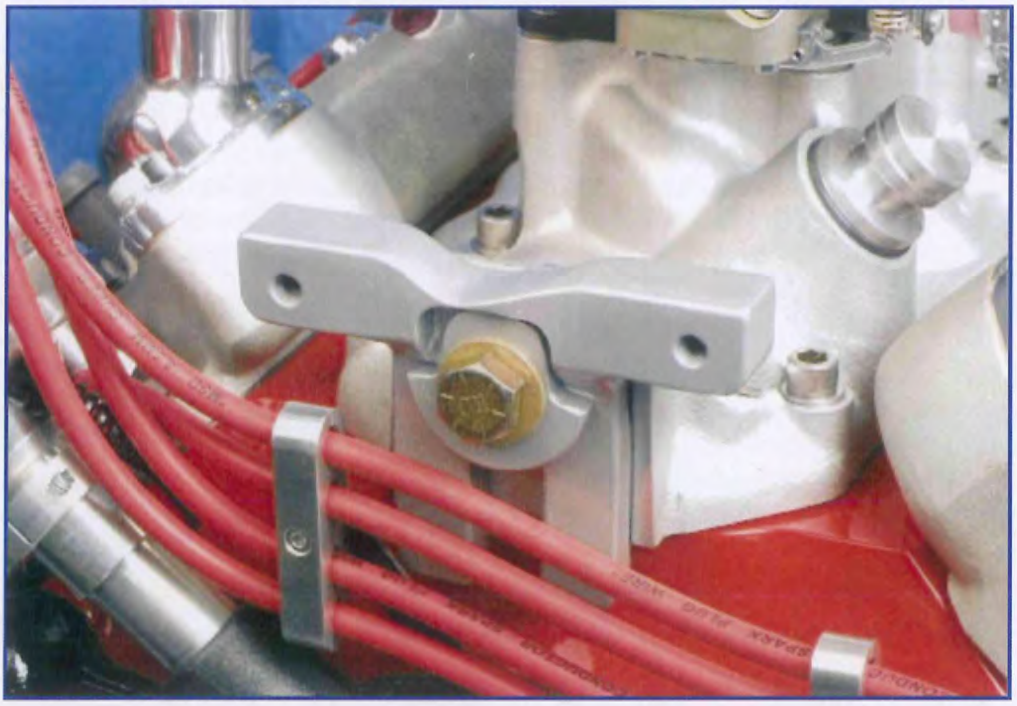


Here we see the bracket test installed prior to relieving the upper section.

Here the alternator is mocked up with the early bracket version. In this photo, the alternator is positioned as low as the bracket allows. Once the belt is installed and the alternator is raised for belt tensioning, I felt that the alternator sat too high from an appearance standpoint.



As you can see here, recessing the top horizontal bar allowed dropping the bracket further down, reducing the installed height of the alternator.

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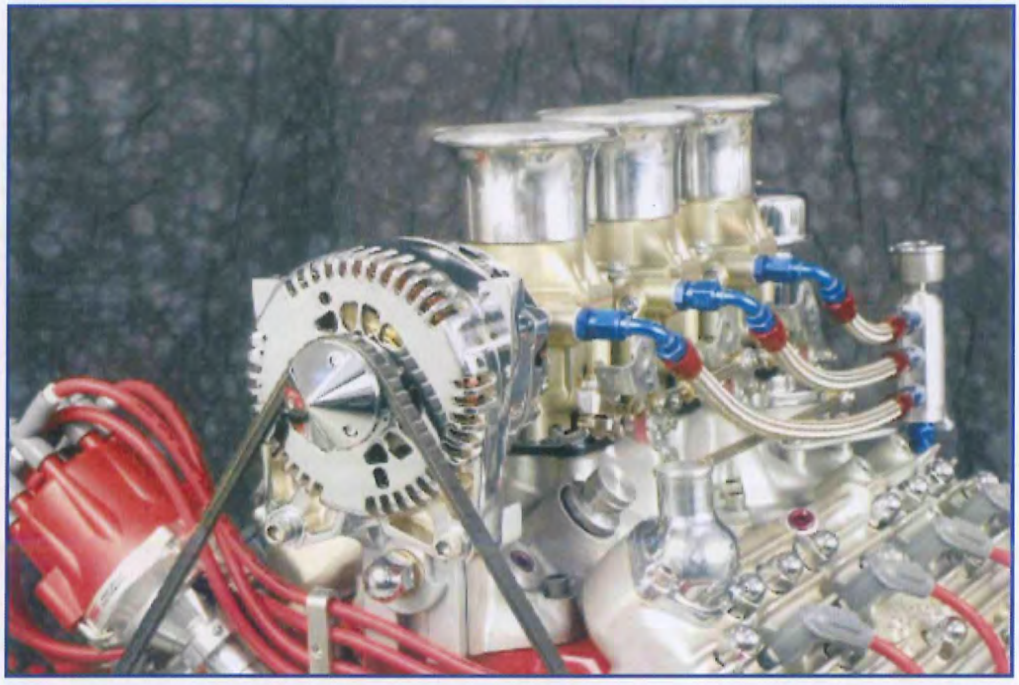

With the alternator bracket modified (to lower position), the top of the alternator, with the belt tensioned, is roughly aligned with the top of the carb body. This provides a visually appealing stance. Any higher, and the alternator would be too conspicuous. Call me crazy (nothing new

there), but the design and the location of this alternator almost hints at providing a "blower" look to the overall scheme. I like it.

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With the alternator mocked in position, the distance from the face of the slotted aluminum bracket to the rear of the alternator's mounting feet was measured at 0.500". The solution was to Tig weld the vertical aluminum slotted bracket to the underside of a piece of 1"-square aluminum bar stock (with the rear of the slotted flat stock flush with the rear of the horizontal bar stock. This allows the face of the bar stock to protrude 0.500" forward of the face of the slotted plate). The bar stock was drilled and tapped with two 3/8"x16 threaded holes to attach to the alternator (spaced 4.315" on-center). The center top of the bar was also notch-relieved to clear the underside of the alternator body.

This setup worked out just peachy. The alternator sits at an attractive height (even with the belt tension adjusted), placing the alternator body somewhat in-line with the Demon 98 fuel bowls, and belt line-up is near-perfect.

Note: In order to create a single-belt setup to drive the alternator and both water pumps, I eliminated the RH water pump pulley and replaced it with a LH pump pulley, making both pump pulleys the same diameter and offset (remember: the original pump pulleys differed in diameter and offset). This allows me to run one belt, driven from the crank pulley's rear groove.

Belt tension adjustment is the same as with the OE setup. Loosen the 9/16"x12 bolt that secures the bracket to the intake manifold, pull upwards on the alternator and tighten the bolt.

Note: In order to use my bracket and a 56" belt, the alternator's two 3/8" mounting bolts must be backed off to allow you to slightly tilt the alternator, in order to engage the belt to the rear alternator pulley groove. You can use a longer belt (56.5" or even 57"), but that means that when the belt tension is adjusted, the alternator will sit higher. For my build, I preferred the finished height of the alternator with the 56" belt.

Note: I provided details of my water pump pulley setup earlier in the water pump section of this build series.

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MY ALTERNATOR BRACKET DIMENSIONS

TOP HORIZONTAL BAR

5.400" W X 1" HIGH X 1" DEEP

TWO ALTERNATOR MOUNTING BOLT HOLES ON TOP BAR

3/8" x 16, spaced 4.315" apart on-center

VERTICAL PLATE (WELDED TO TOP BAR)

2.500" W X 2.65" H X 0.500" THICK

VERTICAL ADJUSTING SLOT MACHINED INTO VERTICAL PLATE

0.625" W X 3.00" H

ALTERNATOR-TO-BRACKET MOUNTING BOLTS

3/8" x 16 x 2.125" stainless steel, SHCS (socket head cap screws), w/stainless washers

BRACKET TO INTAKE MANIFOLD ADJUSTER BOLT

9/16" x 12 x 2" (grade 8, hex head)

(with washer made by modifying ARP SBC crankshaft balancer bolt washer)

ADJUSTER BOLT WASHER

The single threaded hole (for the OE generator bracket) in the intake manifold's front vertical mounting boss surface is size 9/16" x 12. Shank length is will vary depending on your bracket thickness. The threaded boss on the intake manifold is about 1.125" deep. In my setup, **a** single 9/16"x12x2" grade-8 bolt is used to secure the bracket to the front of the intake manifold. Instead of using a plain thick round flat washer at this bolt, I fabricated a custom washer (I actually started with an ARP crank bolt washer). The finished washer measures 2.00" O.D. x 0.563" I.D. x 0.280" thick. I radius-relieved the top half of the washer that would allow the washer to fit into the top of the milled pocket in the upper section of the custom bracket. In order to prevent this washer from rotating during bolt tightening, I welded a small tab onto the rear of the washer (0.250"-thick x 0.635" wide) that registers into the adjuster slot on the vertical portion of the bracket.

Each Tuff Stuff alternator is built with 100% new heavy-duty components and features heavy-duty wound copper coil and spike-resistant diodes, low idle cut-in internal voltage regulator and external cooling fan. They offer either OE or 1-wire connection, black powder coat, triple-chrome plating or polished aluminum finishes, 6-groove or V-belt pulleys, and are available in 80 or 100 amp versions. In addition, their Silver Bullet models (choice of 100 or 140 amps) feature a smooth back, special fan and bullet nose and 1-wire connection.

Actually, Tuff Stuff's lineup includes not only alternators, but AC compressors, starters, water pumps, brake hydraulics and power steering pumps. Each and every item (for Chevy, Ford and Mopar applications) is not only quality engineered and offered in stunning chrome or polished finishes (some units are available in black as well), but everything is 100% made in the USA. Basically, everything they carry is show-quality and intended for the street rod/hot rod market....drop-dead gorgeous stuff that *works*. I've used their alternators, starters and power steering pumps in previous customer builds, and they never disappoint. Tuff Stuff's motto is "Our Chrome Will Get You Home," and they're not lying. This is quality stuff that looks great.

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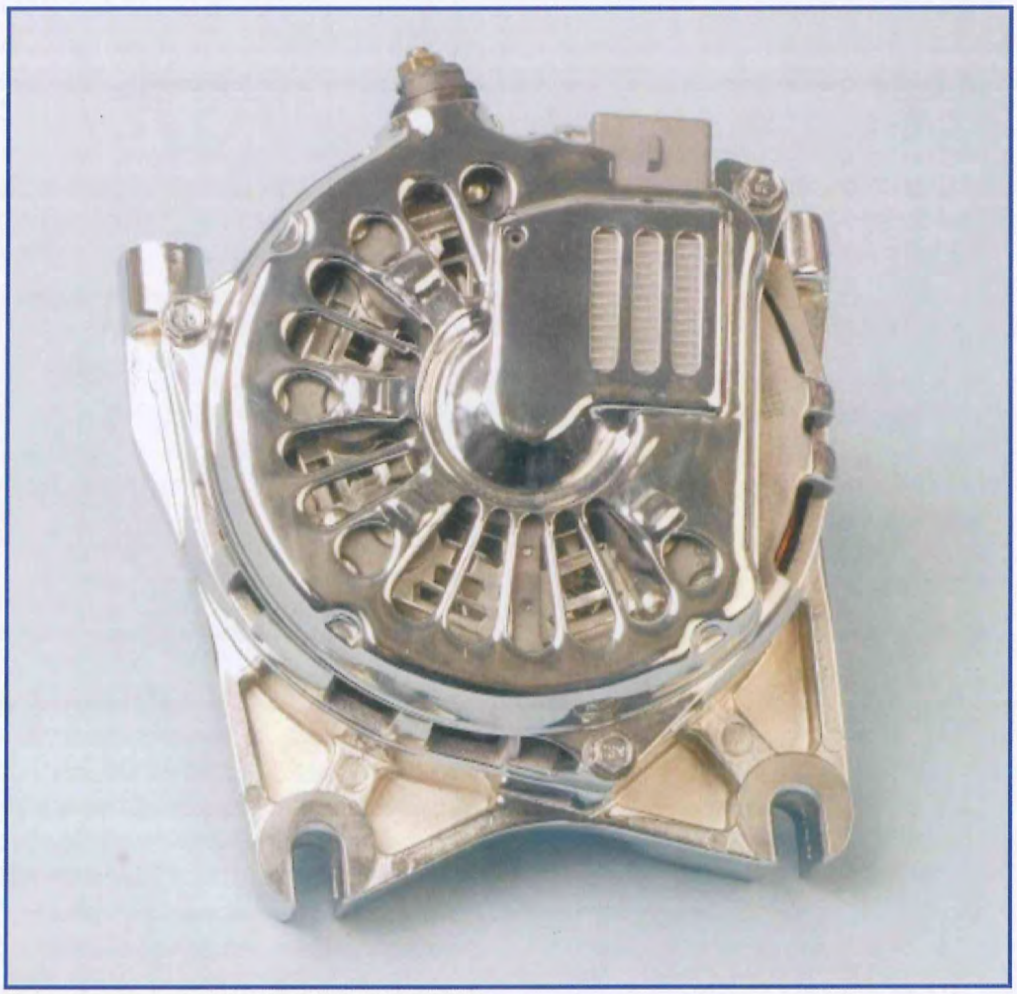
TUFF STUFF
OUR CHROME WILL GET YOU HOME!
ALTERNATOR
7781A

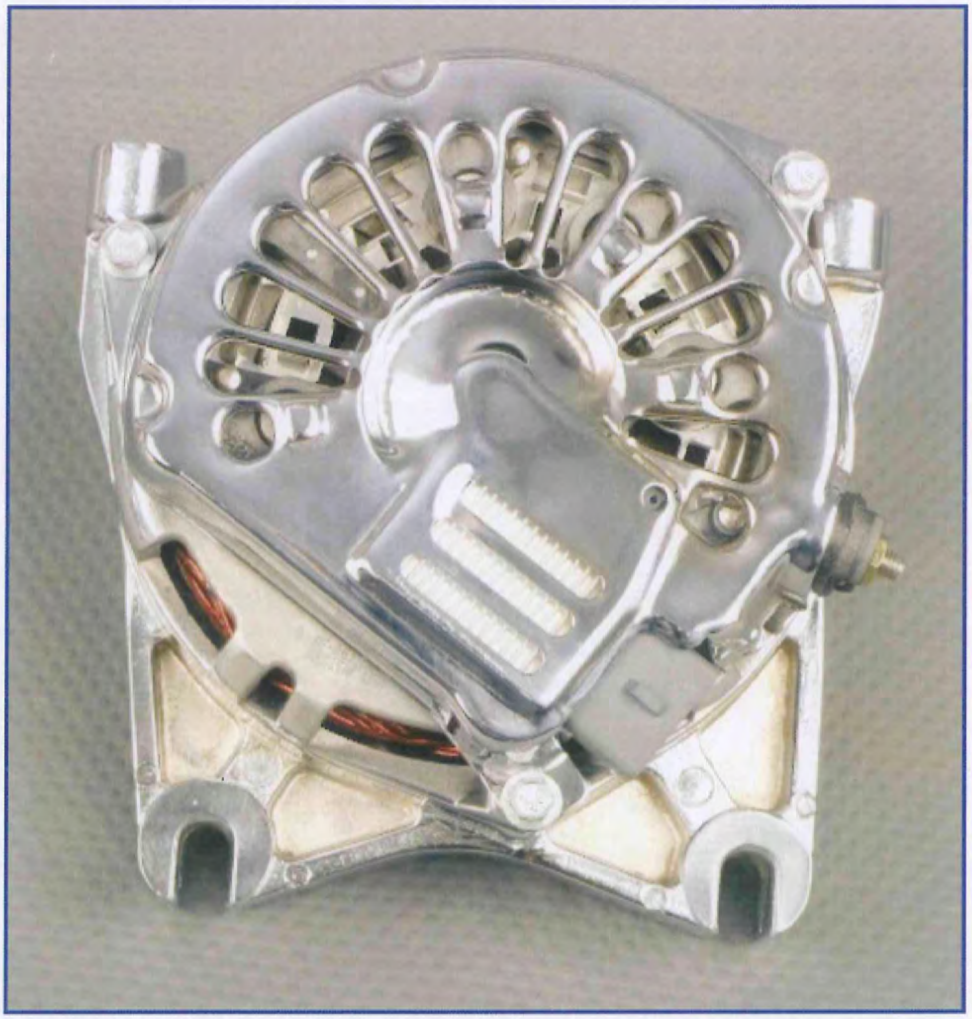
Tuff Stuff's P/N 7781A is a chrome plated direct replacement for the Ford Bullit 4.6L. Tuff Stuff offers their alternators in chrome, polished or powdercoated. The chrome version lends a nice bit of sparkle to the flathead.

I originally went with a twin-groove pulley on the alternator (Tuff Stuff installed this for me in place of the OE type serpentine pulley).

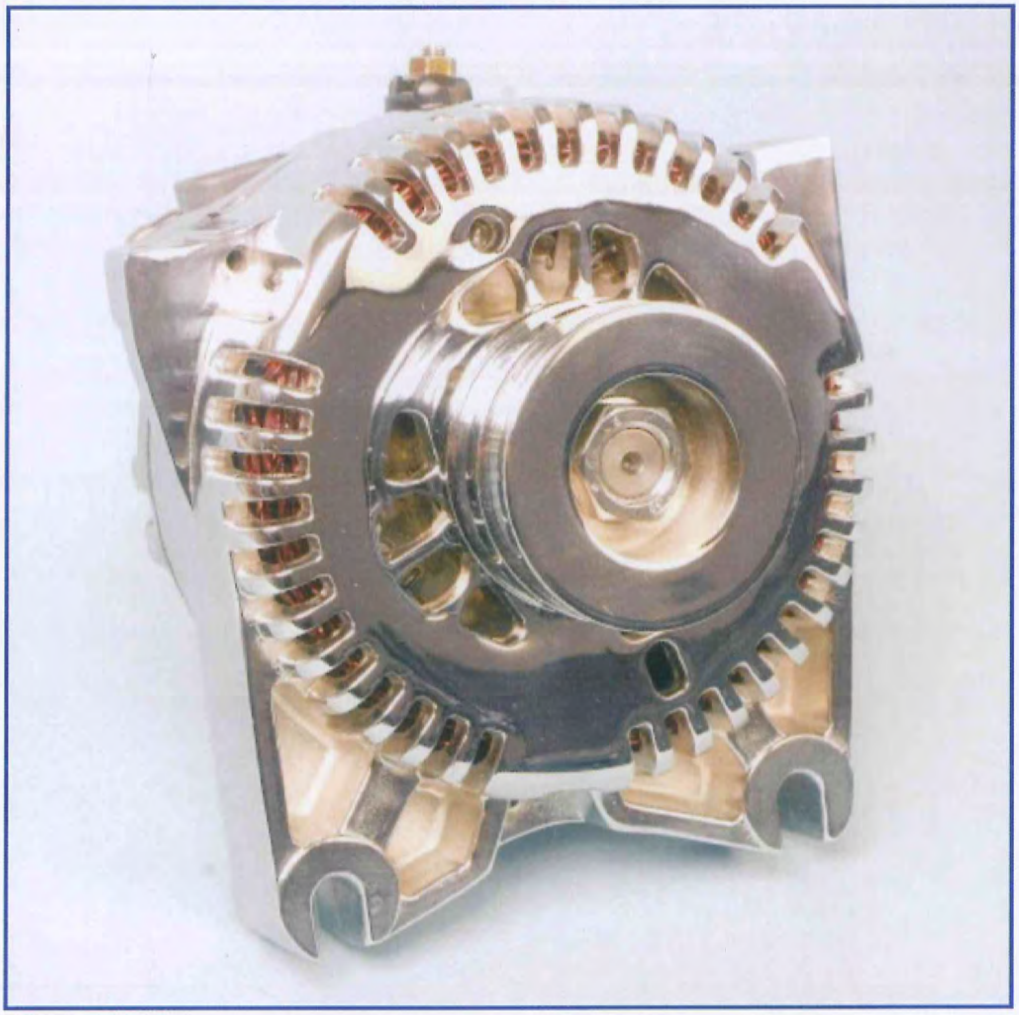


The off-the-shelf Bullit unit originally featured the electrical connections positioned at the top of the alternator body (rear view seen here).

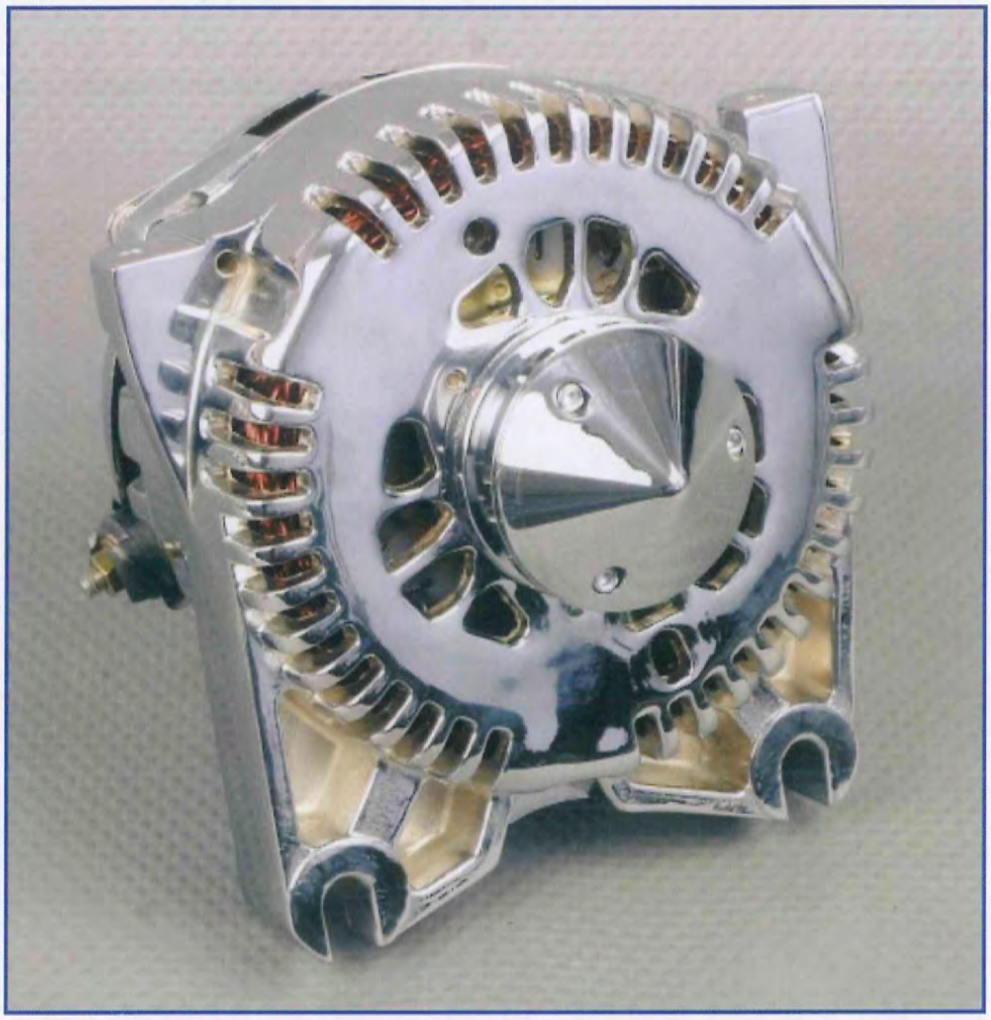
Once I determined that I would use only the rear pulley groove, Tuff Stuff swapped out the double-groove pulley for this single-groove unit, and added an aluminum billet nose piece to hide the pulley nut.



In order to eliminate the otherwise unsightly wiring connections at the top of the alternator, Tuff Stuff was able to re-clock the rear to position the connections at the lower right (rear view seen here).



Here's a view of the Bullit alternator with the double-groove pulley and the electrical connections at top (OE position).



This view shows the same alternator with the single-groove pulley (with nosepiece) and with the electrical connectors relocated. This really cleaned up the upper appearance. With the connectors relocated (lower, adjacent to the distributor), no wire harnesses will be visible at the top.

The decorative pulley nosepiece provides a nice finishing touch. The cover is attached via three socket-head cap screws to the drilled/tapped face of the pulley.

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ALTERNATOR CHOICES

As long as I spent the time to check fitment of three different alternators, I've listed dimensional info here to help you in deciding which is the best fit for your flathead build.

ALTERNATOR	CENTER OF REAR PULLEY GROOVE TO REAR OF ALT (approx.)
GM SI type	5 ¾"
Early Chrysler	5 5/16"
Mustang Bullit	**4 3/8" (Tuff Stuff P/N 7781A)**

With my setup, I'm only using the rear groove on the alternator pulley. However, with a double-groove pulley fitted to the alternator, you then have a choice (depending on your individual setup) to drive the LH water pump using the rear groove, and the front alternator groove belt to drive the RH

water pump, if you maintain an OE-type mechanical fan pulley; or to simply run one belt, providing you installed a LH pump pulley to the RH pump).

Note: The belt grooves in the crank pulley are different diameters (larger diameter for the rear groove). If you keep the original water pump pulleys (smaller diameter on the RH pump) and don't run the OE fan pulley, you'll run into a belt ratio problem, where the two belts are running at different speeds, which will likely result in squealing or belt burnout. By running the same diameter pulley on both pumps and a single belt, I avoided this issue. I don't care about the mechanical fan, since I assume that this type of engine would likely be installed in a vehicle equipped with an electric fan anyway. Besides, eliminating the mechanical fan and its associated spindle/hub/bearing/bracket assembly provides a much cleaner engine appearance. Unless you're building a flattie for a 100-point true-to-original restoration, get rid of the OE fan assembly.

MY DRIVE BELT

(to drive alternator and both water pumps)

3/8" W X 56" L

For this particular setup, I used a **Dayco Top Cog belt, P/N 15560.** Given the crank pulley rear groove diameter, the use of LH OE water pump pulleys on both pumps, and the location of my alternator, this length was ideal. If you opt to use a different pulley setup, you'll need to determine correct belt length for your application.

With my fabricated alternator bracket setup, a healthy 1/2"-plus clearance was achieved between the alternator and the front carb's fuel bowl. This worked out beautifully.

WATER PUMPS

The boys at Tuff Stuff were kind enough to polish and chrome-plate my two new OE style Egge water pumps. I removed the black-painted pumps from the block and delivered them to Tuff Stuff's Cleveland, Ohio facility. They removed the pulleys and impellers, polished the cast iron surfaces and triple-chrome plated the pump bodies and pulleys, then re-assembled the pumps. I was somewhat surprised to find that Tuff Stuff actually owns and operates their own plating shop (adjacent to their manufacturing plant), so they maintain total in-house control of their products from start to finish.

I re-installed the water pumps, using new gaskets (treated to a fine bead of Permatex Right Stuff RTV). The 3/8"x16 stainless steel socket-head cap screws (from Totally Stainless) were installed (with medium strength thread locker) and snugged to 24 ft-lbs (the spec is 23 to 28 ft-lbs). The change to chrome plated pumps definitely makes a big improvement in the front-end appearance, providing some much-needed dazzle. The chrome contrasts nicely against the red block and the black powdercoated distributor housing.

As shown here, in original form, the RH (passenger side) pump pulley is offset forward to align with the front crank pulley groove. The LH (driver side) pulley is offset rearward to align with the front crank pulley groove. In my build, I was able to install a LH pulley on the RH pump

and achieve belt alignment using the rear crank pulley groove and the single-groove alternator pulley.

The original Egge water pumps are exact-to-original reproductions. However, the cast iron surfaces, although as original, bothered me, so I opted to have the pumps polished and chrome plated at Tuff Stuff.

Here are the finished water pumps. I installed a LH pulley to the RH pump (both pumps now feature the same pulley), and Tuff Stuff chrome plated the bodies and pulleys.

On my build, I ran the belt along the rear groove of my Fluidampr chromed crank pulley. Using LH water pump pulleys on both pumps and the alternator adjusted, my belt length was 56.0″. If you need to utilize the front crank pulley (and using RH pulleys on both pumps), the belt would need to be shorter. My guess would be 55.0″ or 55.5″, due to the smaller diameter of the RH pump pulleys and the smaller groove diameter of the crank pulley front groove.

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As mentioned earlier, during a meeting with Tuff Stuff's staff, we agreed that the electrical connectors (originally positioned at the top of the alternator per Ford design to accommodate the fit and connections on a Bullit Mustang 4.6L) were unsightly in this OE location, considering the installation position on the flathead engine. To remedy this, the Tuff Stuff guys were able to relocate the rear of the alternator (changing the clock position), to locate the connectors down low toward the passenger side (at about the 7 o'clock position when viewed from the front). This places the connectors and the subsequent wire harness low and adjacent to the distributor. This greatly enhanced the appearance in our flathead application.

In another move to improve appearance in our flathead build, Tuff Stuff swapped out the original double-groove pulley to a single-groove unit (since I'm only using the single rear pulley groove) and topped it off with a billet aluminum nose piece that covers the pulley bolt.

One item I plan to install is a "shroud" that will bolt onto the top of the alternator. The top of the alternator body features two bosses (one at each side), threaded for 6mmx1.0. These threaded holes are used for part of the OE mounting braces. On our application, we don't need to use these holes. Simply in order to further dress the appearance (and to hide these holes), I plan to fabricate a chrome "visor" shroud (similar to a chrome headlight visor that might be used on a customized motorcycle headlight). Again, this is strictly for the sake of appearance. An option would be to grind off the bosses, polish the surfaces and then have the body chrome plated. But since our Tuff Stuff alternator already features an extremely nice chrome plating, I'd rather not disturb the finish.

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MY FINAL ALTERNATOR SETUP SUMMARY

Alternator: Tuff Stuff P/N 7781A with single-3/8"-groove pulley

Water pump pulleys: OE type LH pulleys on each pump (P/N BOAZ-8509)

Crank pulley: Fluidampr P/N 600203

Drive belt: Dayco Top Cog P/N 15560 (56.0" x 3/8")

Alternator mounting bracket: Custom fabricated

Alternator-to-bracket bolts (2): 3/8" x 16 x 2.125: SS SHCS

Alternator-to-bracket bolt washers (2): SS 3/8" I.D. x 0.813" O.D. x 0.780" thick

Alternator bracket to intake manifold bolt: 9/16" x 12 x 2"

Alternator bracket to intake bolt washer: Custom fabricated

NOTE: If you're using a distributor equipped with vacuum advance, you'll need to space the belt further forward for distributor clearance. Use the front groove on the crank pulley, and install OE style RH pulleys on both water pumps, and use a double-groove alternator pulley (using the forward groove).

If using a distributor without vacuum advance (as in my build example with the MSD distributor), install OE type LH pulleys on both water pumps, a single-groove alternator pulley and the rear groove on the crank pulley. Note: the OE type RH and LH water pump pulleys have an offset difference of about 0.665" (the OE LH pulley is closer to the block, and the OE type RH pulley is further from the block).

At this point, all that's left to do for this build is to obtain exhaust headers and run the engine on the dyno. I'll keep you updated on the progress.

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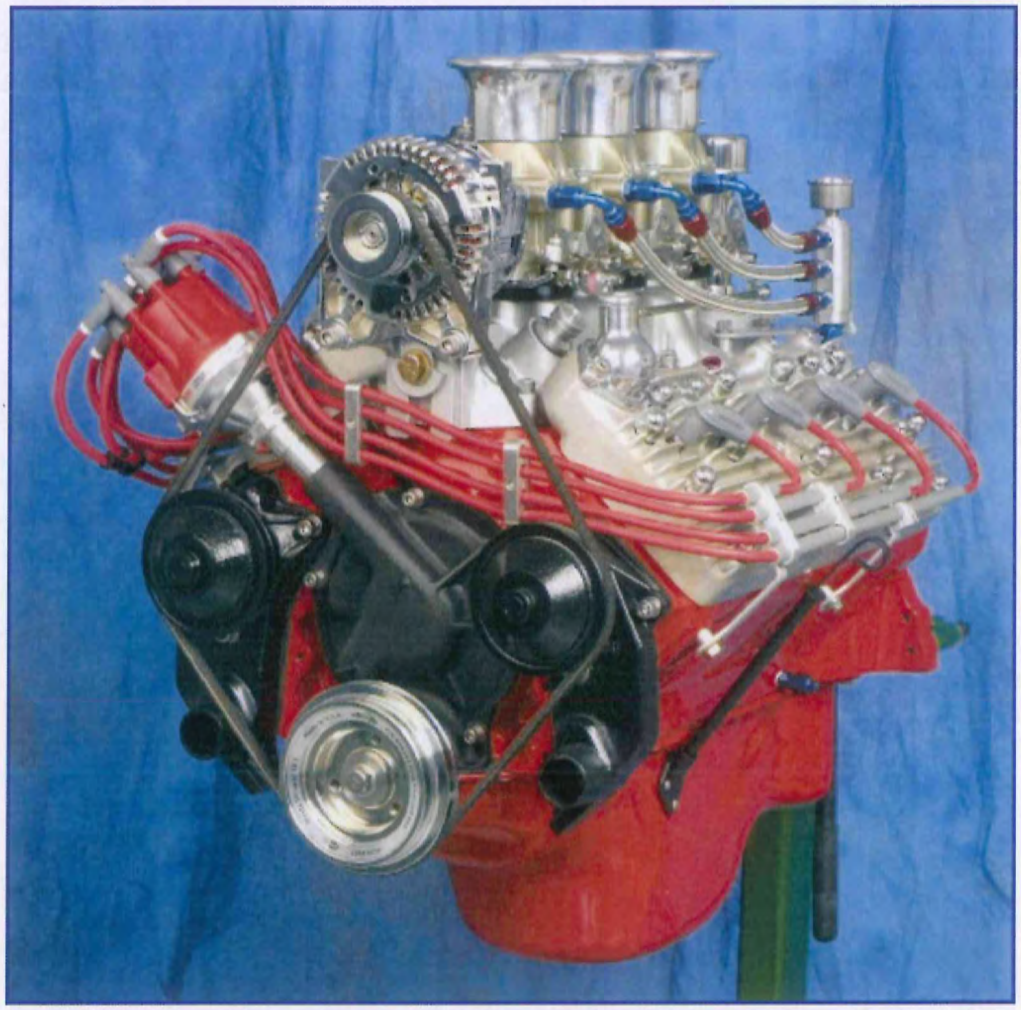
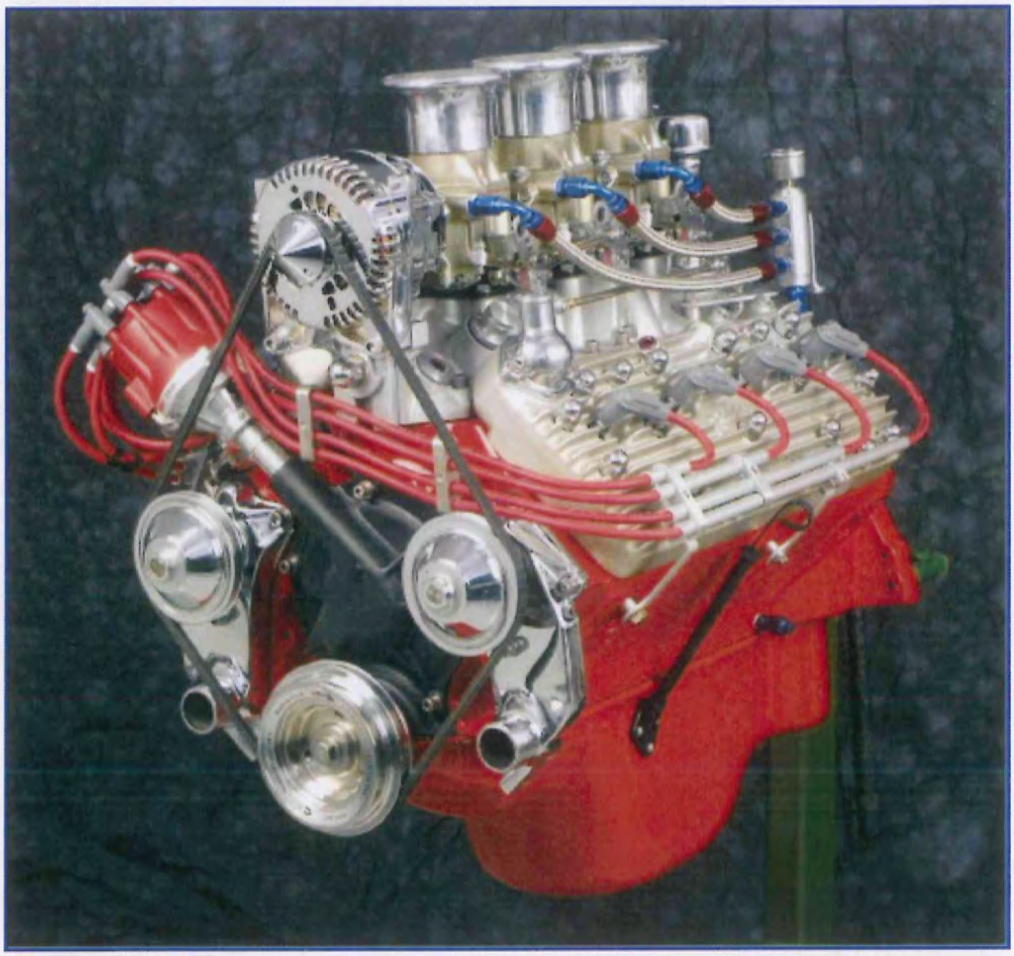
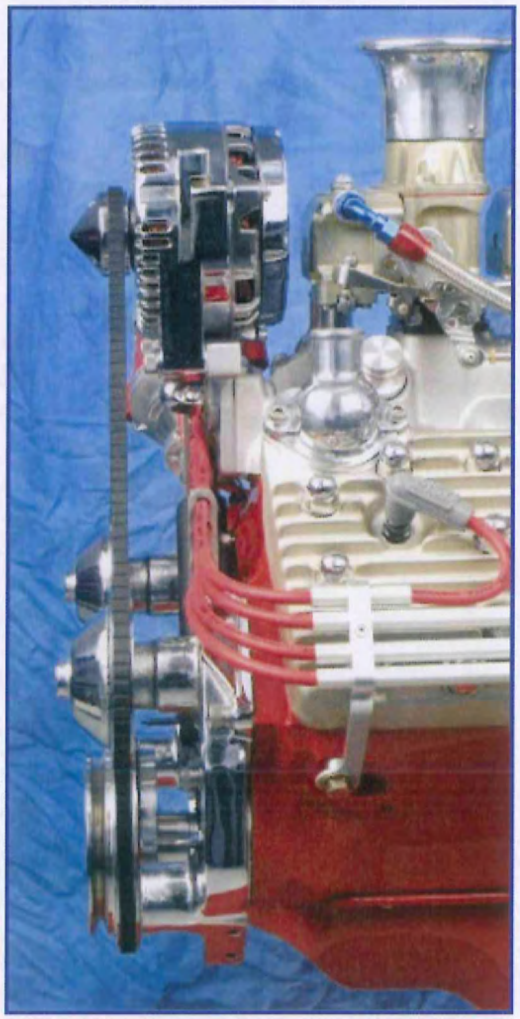


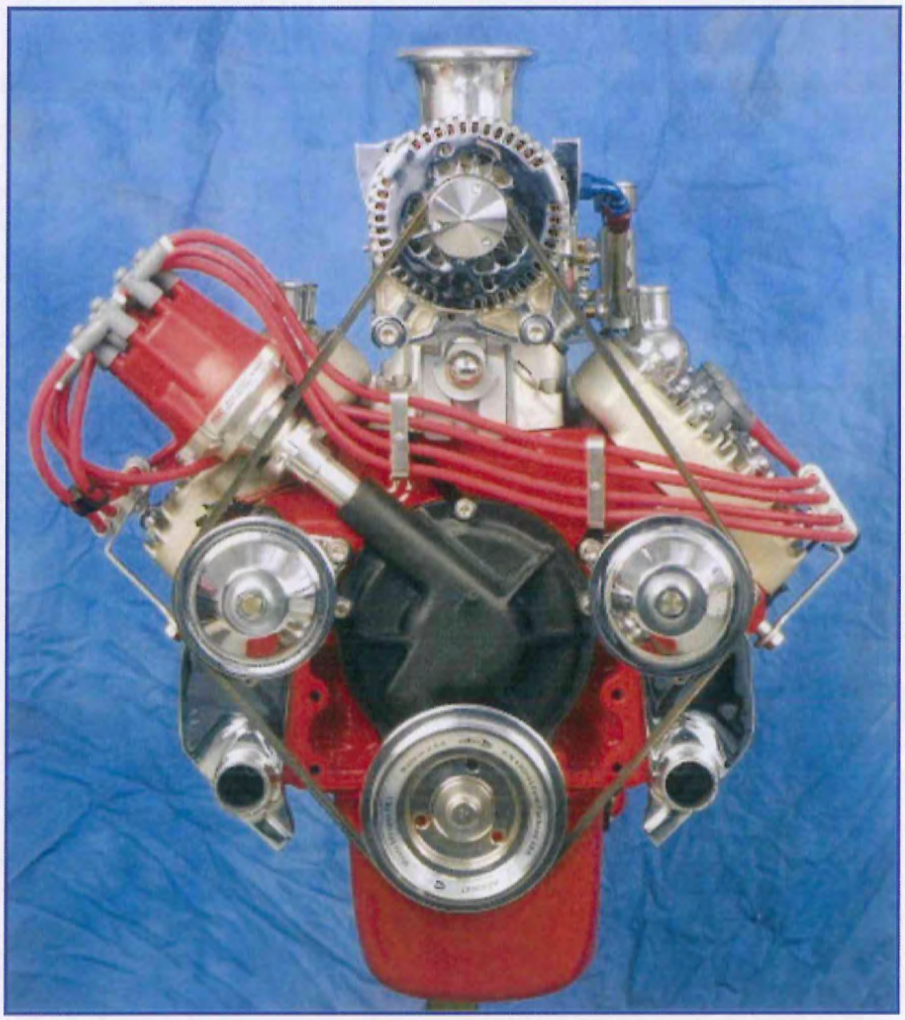
Here's a view of an early mock-up, with black-painted water pumps.



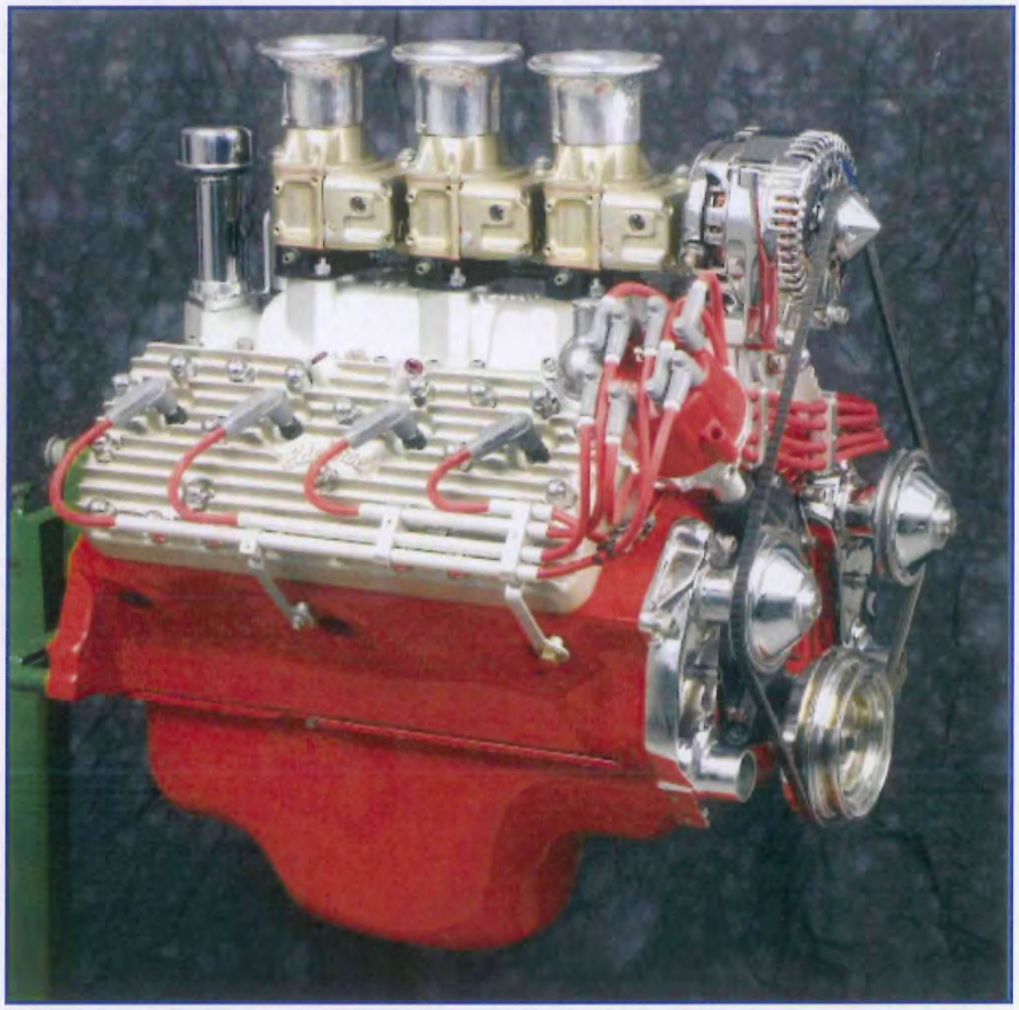
A view of the final product, now equipped with chromed water pumps and a dressed alternator (re-clocked connectors and pulley nose piece). The chromed pumps definitely add to the visual statement.



In case you wondered about belt alignment, here's proof. This setup worked out just peachy.



Frontal view.



Right side view.

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NOTE: All of the engine project builds that have appeared over the years in Precision Engine magazine and on this website have been built by Mike Mavrigian in his Birchwood Automotive facility in Creston, Ohio. In addition to preparing engines for publications, Mike also offers highly-detailed build services for retail customers. If you're interested in discussing a custom engine build for a street rod, muscle car, show car, restoration, etc., feel free to contact Mike at 330-435-6347, or e-mail him at birchwdag@frontier.com.

MY PARTS AND PART NUMBERS

Block.....Original 1949-1953 8BA

Crankshaft……Scat 286-9-239-4125-2000 (4.125" stroke)

Connecting rods……..Scat 2-239-7000-2000 (7.000")

Piston/pin set…… Egge EP994-8.125

Ring set (Total Seal)…….. Egge SRTCR6276-8

Valves (16) …… Egge S1821

(note: intake and exhaust valves are identical)

Valve springs (16) ……..…Egge VS651

Valve guides (16) ……..…Egge G614

Adjustable lifters (16) ……..…Egge VL36

Connecting rod bearings……..Egge CB610.000 (STD)

Main bearings (King) ……..Egge MBS3351SI.000 (STD)

Cam bearings……Egge F-1

Cam gear (Republic Gear Co.) Egge TG2700

Crank gear (S.A. Gear)…… Egge TG2701

Oil pump (Melling) ……Egge P-307 NEW

Gasket set (Best Gaskets) ……Egge RS521C

RH water pump ……Egge WP-1231 NEW

LH water pump…..……Egge WP-1232 NEW

Camshaft ……..……Isky 818800

Cylinder heads…….. Edelbrock 1115

Intake manifold…… Edelbrock 1109

Primary carburetor..…….. BG Demon 98 9801

Secondary carburetors……..BG Demon 98 9802

3-carb stainless linkage…….BG 9903

Distributor…… MSD 8573 (billet, ready-to-run)

Crank pulley……Fluidampr 600203

Alternator……Tuff Stuff 7781A

Spark plug wires……MSD 31229 (8.5mm, universal w/90-deg plug boots)

Spark plug wire tubes……Fabricated using 0.500" I.D. aluminum tubing

Velocity stacks……..Eelco 6430

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OUR SOURCES FOR THIS FLATHEAD PROJECT

BEST GASKETS

(cyl. head gaskets)

11558 E. Washington Blvd., Suite F

Whittier, CA 90606

888-333-2378

www.bestgasket.com

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BG FUEL SYSTEMS/BARRY GRANT

(Demon 98 carburetors)

1450 McDonald Rd.

Dahlonega, GA 30533

706-864-8544

www.barrygrant.com

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BIRCHWOOD AUTOMOTIVE GROUP

(the author's engine build & fabrication facility)

10205 Wooster Pike Rd.

Creston, OH 44217

330-435-6347

www.birchwoodautomotive.com

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BOSCH MOTORSPORTS

(spark plugs)

2800 S. 25th Ave.

Broadview, IL 60155

919-846-2115

www.boschusa.com

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CWT INDUSTRIES

(cyl. head checking workstation)

4708 S. Old Peachtree Rd., Unit 300

Norcross, GA 30071

800-449-1849

www.cwtindustries.com

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EDELBROCK CORP.

(P/N 1115 cylinder heads and P/N 1109 intake manifold)

2700 California St.

Torrance, CA 90503

800-416-8628

www.edelbrock.com

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EGGE MACHINE CO.

(pistons, main bearings, rod bearings, cam bearings, gaskets, valves, valve guides, valve guide seals, valve springs, retainers, keepers, Melling oil pump, Isky cam and lifters, cam gear, crank gear)

11707 Slauson

Sante Fe Springs, CA 90670

800-866-3443

www.egge.com

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FLATHEAD JACK

(breather tube)

1561 Third Ave.

Walnut Creek, CA 94597

888-993-2233

www.flatheadjack.com

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FLUIDAMPR

(crank damper/pulley)

180 Zoar Valley Rd.

Springville, NY 14141

716-592-1000

www.fluidampr.com

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FRAGOLA PERFORMANCE SYSTEMS

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Southington, CT 06489

866-337-2739

www.fragolaperformancesystems.com

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GEARHEAD TOOLS (TM Machine Products)

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800-733-4463

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Whitehouse, OH 43571

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156 Galewski Dr.

Winona, MN 55987

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www.goodson.com

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GRESSMAN POWERSPORTS

(crankshaft balancing)

904 Lime St.

Fremont, OH 43420

419-355-8980

www.gressmanpowersports.com

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H&H FLATHEADS

(cylinder head bolts, distributor clamp)

4451 Ramsdell Ave.

La Cresenta, CA 91214

818-248-2371

www.flatheads-forever.com

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LENOVO

(engine room computer monitor)

1009 Think Place

Morrisville, NC 27560

866-426-4008

www.lenovo.com

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LISTA INTERNATIONAL

(pro-level engine room cabinets and workbenches)

106 Lowland St.

Holliston, MA 01746

800-722-3020

www.listaintl.com

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LUKE'S CUSTOM MACHINE & DESIGN

(crankshaft snout spacer, compatible with 1-pc front seal)

1457 Charlotte Rd.

North Vancouver, BC V7J1H1

604-980-8617

www.lukescustommachine.com

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MAC TOOLS

(assorted hand tools)

505 N. Cleveland Ave.

Westerville, OH 43082

800-622-8665

www.mactools.com

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MEDINA MOUNTAIN MOTORS

(block jet wash, flaw detection, align honing, cylinder boring/honing, decking)

199 Factory St.

P.O. Box 192

Creston, OH 44217

330-435-6236; 866-218-7467

www.medinamountainmotors.com

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MELLING SELECT PERFORMANCE

(oil pump)

P.O. Box 1188

Jackson, MI 49204

517-787-8172

www.melling.com

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MSD IGNITION

(ready-to-install billet distributor, spark plug wires)

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El Paso, TX 79936-6805

915-857-5200

www.msdignition.com

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PRW INDUSTRIES

(crank damper tool)

193 West Orangethorpe Ave.

Placentia, CA 92870

714-792-1000

www.prw-usa.com

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PUROLATOR FILTERS

(canister type oil filter cartridge)

3200 Natal St.

Fayetteville, NC 28306

800-526-4250

www.pureoil.com

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ROYAL PURPLE LTD.

(Max Tuff assembly lubricant)

1 Royal Purple Ln.

Porter, TX 77365

888-382-6300

www.royalpurple.com

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SCAT ENTERPRISES

(stroker crankshaft and forged rods)

1400 Kingsdale Ave.

Redondo Beach, CA 90278-3983

310-370-5501

www.scatcrankshafts.com

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TOTALLY STAINLESS

(stainless steel fastener selection)

P.O. Box 3249

Gettysburg, PA 17325

800-767-4781

www.totallystainless.com

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TUFF STUFF PERFORMANCE ACCESSORIES

(chrome alternator)

9004 Madison Ave.

Cleveland, OH 44102

800-331-6562

www.tuffstuffperformance.com

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I'd like to once again thank the shop equipment suppliers whose products make all of our engine build projects more efficient and more enjoyable whenever I work in my engine assembly clean-room: Lista's cabinets/drawer system and workbenches, Goodson engine carts, Mac Tools hand-tools, Summit Racing's piston ring filer and ring squaring tools, Gearhead Tool's connecting rod vise, bore gauge and rod cap separator, CWT's cylinder head center cabinet, Goodson micrometers, Fragola aluminum –AN wrenches, PRW's balancer puller/installer tool, ARP piston ring compressors and the Lenovo flat-screen wall-mounted computer monitor.

Tags: ALTERNATOR, BARRY GRANT, BEST GASKETS, CHROME, CWT, Demon 98, EDELBROCK, EGGE, FLATHEAD, FORD, FRAGOLA, GOODSON, ISKY, King, LISTA, MSD, ROYAL PURPLE, SCAT, TUFF STUFF

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