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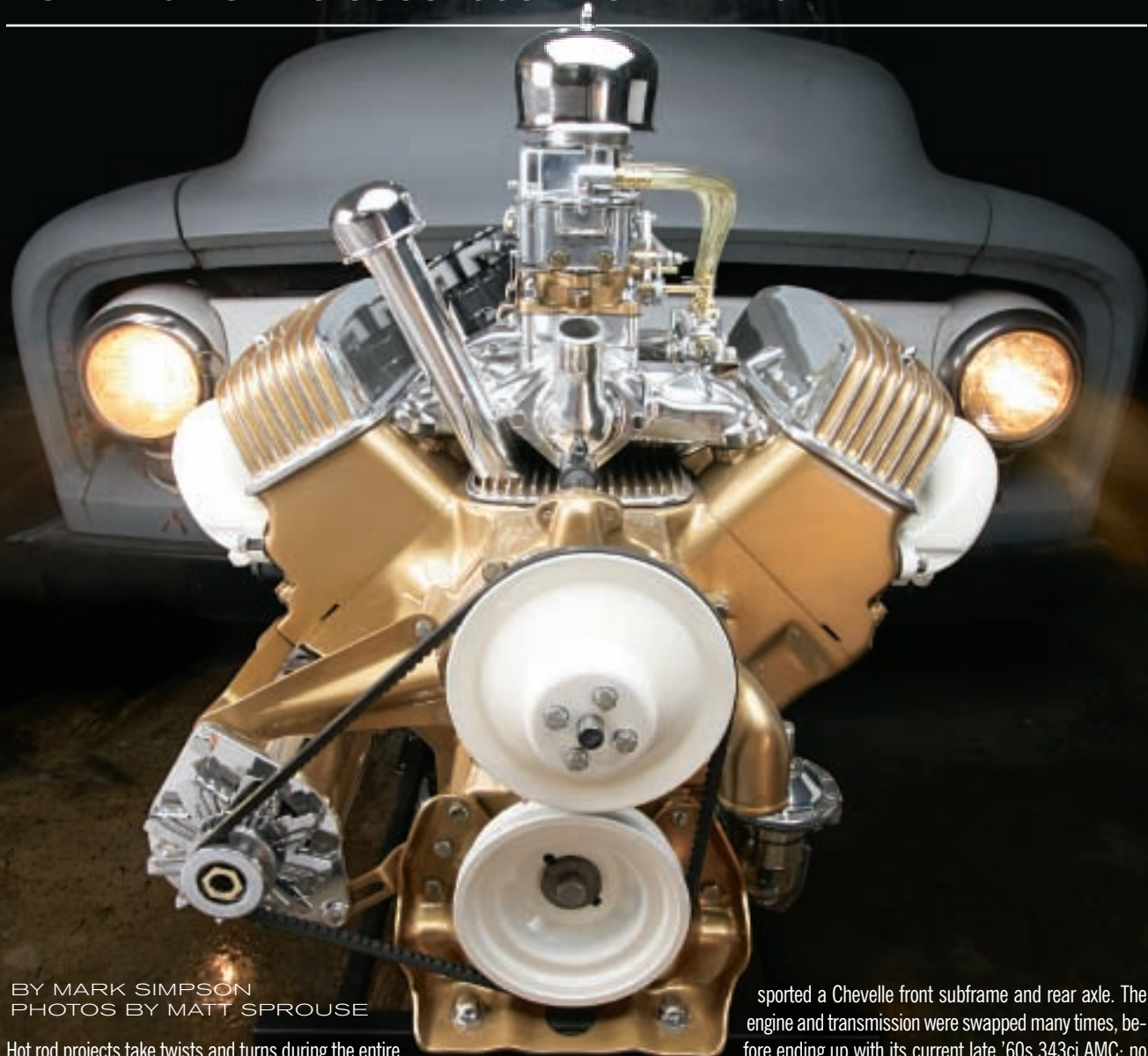
JULY/AUGUST, 2009



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# Y-NOT

## BUILDING FORD'S SUCCESSOR TO THE LEGENDARY FLATHEAD



BY MARK SIMPSON  
PHOTOS BY MATT SPROUSE

Hot rod projects take twists and turns during the entire buildup process. Our project '54 Ford F100 is no exception. Known to the *Street Thunder* staff as the "Toaster," it gained its name one mid-summer day when the lack of interior insulation quickly elevated its inside-cab temperature to well above the outside air. This prompted the exclamation, "I feel like I've been for a ride in a toaster!" And the name just stuck.

The Toaster had been a hot rod for as long as I can remember, and has seen its share of fixes and alterations. The chassis was modified many times and

sported a Chevelle front subframe and rear axle. The engine and transmission were swapped many times, before ending up with its current late '60s 343ci AMC; no doubt the result of a budget-minded transplant by its previous owner. We decided the time has come to reconsider this project as a whole rather than the jumble of mismatched pieces it has become.

Working with Gary at Outcast Kustoms of Eagan, MN, we began by considering an array of options and build themes.

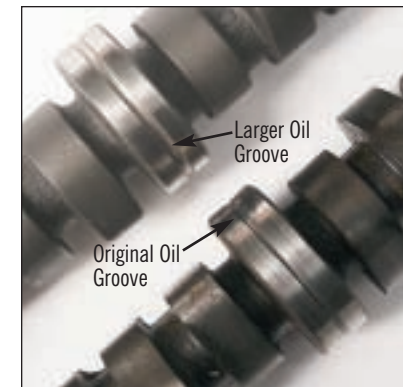
Together we focused on building the Toaster into a '50s show-truck flavored custom. Bold colors, tuck and roll interior, and of course a period-correct

vintage engine with a blend of modern equipment and choice vintage speed parts. Gary convinced us the only good choice was keeping the old Ford Ford-powered. As we debated the merits of Flatheads, Y-Blocks, and FE's, it became evident each of our choices would be a great fit, but their could be only one.

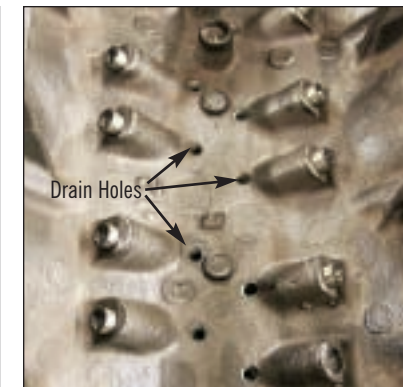
### HISTORY OF PERFORMANCE

Few argue the legendary status of the Ford Flathead. First introduced in 1932, it became the instant hot rod engine of choice, as Chevrolet was still committed to the overhead valve inline six, and Chrysler to the inline flathead sixes and eights. While not the fastest engine of its day, compared to supercharged Auburns, Cords, and Duesenbergs, it was affordable and plentiful, making it an instant favorite for the early hot rodders and propelling the '32 Ford to iconic status.

After World War II, the American public clamored for bigger engines and more power. Detroit responded. In the late '40s, GM released its first overhead valve V-8 engines in Oldsmobile and Cadillac, making them instant stars on the track and in the showrooms. Then came similar fame for Chrysler in '51 with the introduction



Poor top end lubrication plagued the Y-Block. All top end oil must pass through the oil groove in the center of the camshaft. We suggest machining a larger groove to prevent clogging.



The valley area of the Y-Block is only open to drain back in the rear of the casting. To assist in cam lubrication and drain back, we drilled drain holes near the base of the lifter bosses.

of the Hemi. The Ford Flathead's days were numbered, and by '53 it was retired in favor of Ford's newest engine, the Y-Block, introduced in the '54 models.

The Y-Block was designed to maintain the simplicity of engine design its buyers expected. A short stroke, overhead valves, and the greatest amount of structural rigidity ensured the engine would last and hold up to future compression upgrades.

Introduced at 239ci, the displacement soon grew to 256, 272, 292, and ultimately 312ci in the Thunderbirds, Mer-

curys, and Thunderbird-engine-optional Fairlanes. The Y-Block's lifespan was short in comparison to that of the Flathead, which lasted 22-plus years. The Y-Block was soon eclipsed by the FE engine (big-block) when Ford once again responded to America's quest for more power and bigger displacement.

After a short life as Ford's premier engine, it was soon relegated to trucks where its tremendous low-end torque served well. With the arrival of the Ford Windsor engine (small-block) in the early

### 01 AUTOMOTIVE RACING PRODUCTS MAIN/HEAD/ROD BOLTS, & OIL PUMP DRIVESHAFT

For over 40 years ARP has set the standard by which performance bolts are measured. For our project Y-Block, we made certain they were used everywhere they counted and then some. ARP also makes a great oil pump driveshaft for our engine that is heat treated to 220,000psi.

### 02 CLAY SMITH CAMS CAMSHAFT

Clay Smith Cams has been grinding performance cams since the birth of hot rodding with their iconic cigar smoking woodpecker logo "Mr. Horsepower." We selected a rather mild cam with 224 degrees of duration at .050-inch and .446 inches of lift with 108 degrees of lobe separation.

### 03 FEDERAL-MOGUL COMPLETE REBUILD GASKET SET

The Fel-Pro complete rebuild gasket set came complete with all of the gaskets we needed to assemble the Y-Block.

### 04 EGGE MACHINE COMPANY ROD/CAM/MAIN BEARINGS, INTAKE/ EXHAUST VALVES & LIFTERS, PUSHRODS, CAST ALUMINUM PISTONS, TIMING CHAIN, CAM & CRANK GEARS, & VALVE SPRINGS

If this list looks long, it is. But when the time comes to build a vintage engine Egge has become our first stop. They are the guys that have the parts nobody else does. Established in 1915, Egge Machine Company is known worldwide as a vintage engine piston manufacturer, supplier of internal engine components, complete engine rebuild kits, and nostalgic performance products. We knew we could count on them for a great set of cast aluminum pistons and the stainless exhaust valves when no one else had them.

### 05 FORD-Y-BLOCK.COM BLOCK PLUGS, FREEZE PLUGS, & EXTENDED VALVE COVER STUDS

The parts John Mummert offers made assembly a snap, but more importantly, there is a wealth of great information on his website, from casting numbers to buildup tips and tricks.



INTERNAL ENGINE COMPONENTS



The head casting numbers are located under the lip of the intake ports. ECZ-G and 113 heads are the most sought after.

'60s, the Y-Block was phased out only 10 years after its introduction.

While the FEs were introduced in the late '50s, they continued in service in passenger cars into the early '70s. Although intrigued by the performance possibilities of these giant powerhouses, we focused to maintain our theme of building a '50s flavored show-truck. A Y-Block build was our future.

### RESEARCH AND THE HUNT

We aspired to build a 292ci or 312ci engine simply because they came later in the production run and have greater displacement. As so many have said before, "There's no replacement for displacement." Though we're

simply looking to build a solid street performer that would run well on regular gas, we don't want to leave any horsepower on the table, considering the cost of building a 272ci is similar to building a 312ci.

As we began our research and hunt for the perfect engine core, we soon developed a list of simple Y-Block truths:

1. Even though the Y-Block was only produced in four displacements during its life cycle, Ford still managed to cast nearly 40 different heads for the engine, with different intake runners, valves, and combustion chamber sizes. Don't count on the head being the right one for the engine to which it is mounted. Head castings of ECZ-G and 113 are the most popular for their large valve size and small combustion chamber.

2. Anyone with a Y-Block engine sitting in the back corner of their garage or under a tarp is convinced it's a 312ci. The fact is, 312s are scarce. Be prepared to shell out a few hundred extra if your heart is set on one. 312s and 292s share block

casting numbers and the only sure way to tell them apart is to pop the oil pan and check the casting numbers on the main caps (ECZ main caps on 312ci only).

3. Do not assume the rocker arms are the correct ones for the engine. Ford offered two rocker ratios for the Y-Block (1.43:1 and 1.54:1). The higher ratio rockers are most sought after and are still reproduced. The Y-Block's Achilles' Heel is loss of oil flow to the top end. All oil to the top end passes through the center cam bearing. The groove in the camshaft is narrow, so simple cam wear and sludge in the oil can leave the rockers starved. We disassembled half a dozen salvage engines and found numerous mismatched head and rocker arm configurations.

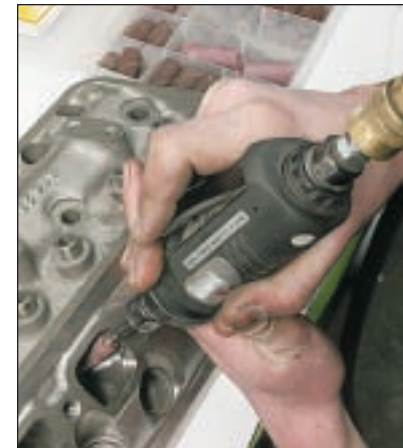
After searching online and through local sources and friends for weeks, we discovered a 292ci in a nearby town. Though the engine was stuck, there was little corrosion as it was stored indoors from the time it was pulled.

At home, the Y-Block shortly became

a bare block. Our gamble had paid off. The inside was fairly clean with only a little corrosion in a couple cylinders and one worn rod bearing journal. Although the heads were low compression small-valve early '60s castings, the block casting number indicated a 1958 engine. A few weeks later, we discovered a set of 113 heads at a local vintage salvage yard. After having our new combination checked by the folks at TPIS, we were finally ready to build.

### BEGINNING THE BUILD

With a solid engine core in hand and a good idea of what we wanted to achieve, we contacted John Mummert in El Cajon, CA. John's built a strong business servicing the needs of vintage Ford performance. John's advice and the parts he builds help keep these early Ford engines viable and competitive today. We set a plan using some of the parts John sells, including a specially prepped Clay Smith cam with a larger center oil groove and

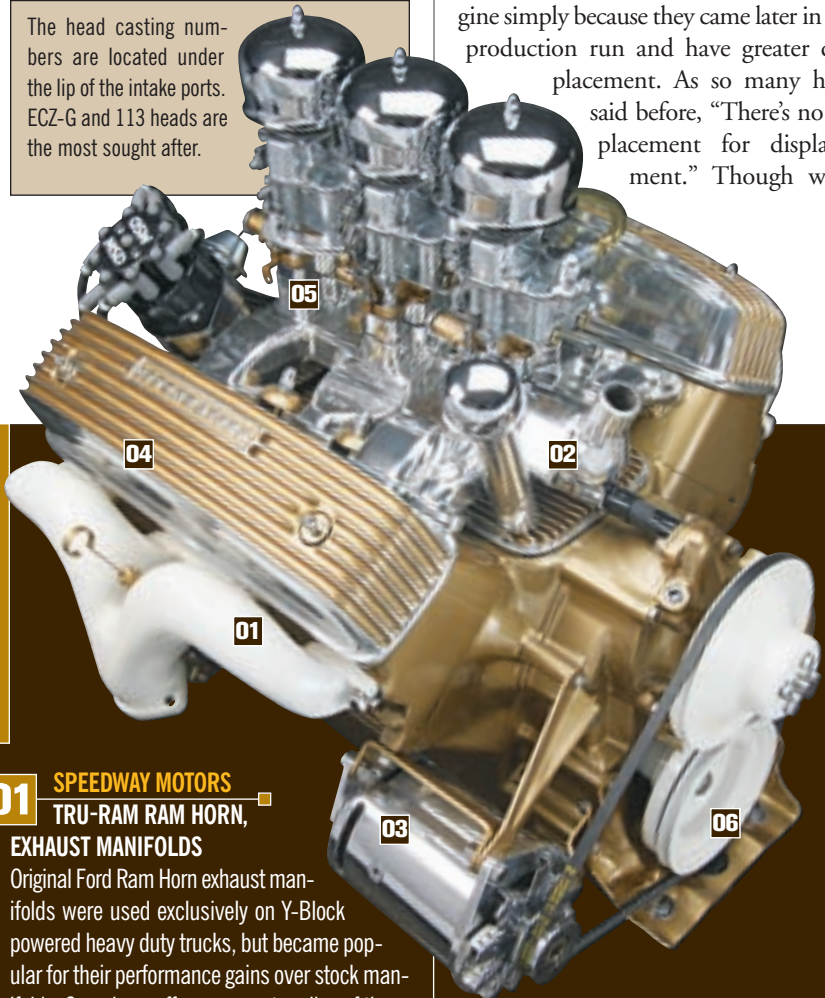


Using a Standard Abrasives deluxe head porting kit from Eastwood Company, we gasket match ported the heads. The intake side required little work, although the center two ports on the exhaust side have some restriction.

ARP bolts for the heads, mains, and rods.

Armed with the measurements from the engine shop, we prepared to order the cam, rod, and main bearings as well as the valves and lifters. The main bearing jour-

## ENGINE COMPONENTS



### 01 SPEEDWAY MOTORS TRU-RAM RAM HORN, EXHAUST MANIFOLDS

Original Ford Ram Horn exhaust manifolds were used exclusively on Y-Block powered heavy duty trucks, but became popular for their performance gains over stock manifolds. Speedway offers an exact replica of these famed manifolds. We chose to smooth ours out to match the engine block and heads.

### 02 RED'S HEADERS THERMOSTAT HOUSING

We located this housing at Red's Headers. It's a reproduction of the original truck type only cast in aluminum. It was then ground and matched to the vintage 573 Edelbrock intake manifold, before receiving its show quality polishing.

### 03 POWERMASTER POWERGEN ALTERNATOR

Building a vintage-style engine requires attention to all of the details. The PowerGEN alternator looks like it belongs here. It is dimensionally the same as the original generator and the fully polished aluminum case gave us the show-car look we were after. Its simple one-wire hookup and 75-amp output will give our Y-Block all the power it needs for years to come.

### 04 EGGE MACHINE COMPANY OFFENHAUSER VALVE COVERS

We have come to expect Egge to deliver great internal engine components for early vintage engines. But, they are an excellent source for vintage reproduction speed parts too. We picked up this great set of vintage styled finned aluminum Offenhauser valve covers that complemented the look of our engine build.

### 05 MARSHALL SINCE '62 ONE-INCH ALUMINUM CARB SPACERS

These high quality billet aluminum carburetor spacers helped improve our overall performance and low-end torque. Marshall since '62 offers a complete line of custom and stock CNC machined parts, and the kind folks there have offered a discount to all NSMC Members on any of their products or services.

### 06 FORD-Y-BLOCK.COM HARMONIC BALANCER

The folks at Ford-Y-Block.com are committed to keeping the Y-Block alive with product offerings like this new harmonic balancer. Manufactured to exacting tolerances using materials far superior to the originals, the choice seems easy when deciding between a 50-year-old part or new.

### 07 MSD IGNITION DISTRIBUTOR, COIL, & WIRES

Their proven quality and performance made them an easy choice for our build. Their Ready-to-Run distributors are a breeze to install, simply connect three wires and you're ready run. Inside the housing is a high-output ignition module, and it delivers a full 7.5 amps to the coil. Working together, the MSD Heli-Core wires and Blaster 2 coil delivered real firepower to our Y-Block.

### 08 BENDTSEN'S TRANSMISSION CENTER TRANSMISSION ADAPTER

Bob Bendtsen and the rest of the crew at Bendtsen's Transmission Center are dedicated to developing adapter solutions for nearly any engine/transmission you can think of. We plan to backup the Y-Block with a GM 4L60 transmission, for better fuel economy and greater reliability, and of course they had an adapter for that. It came complete with flex plate, hardware, and high-torque starter.

### 09 EDELBROCK 573 INTAKE MANIFOLD

Vintage multi-carb intake manifolds are plentiful for the Y-Block. The 573 Edelbrock is one of the best available for a three-deuce setup.

### 10 SPEEDWAY MOTORS TRU-HELMET AIR CLEANER

To enhance the engine's smooth and curved look we choose a set of these great Tru-Helmet air cleaners. They included replaceable air filters and enhanced the overall look of our engine.

### 11 EASTWOOD COMPANY INTAKE POLISHING KIT

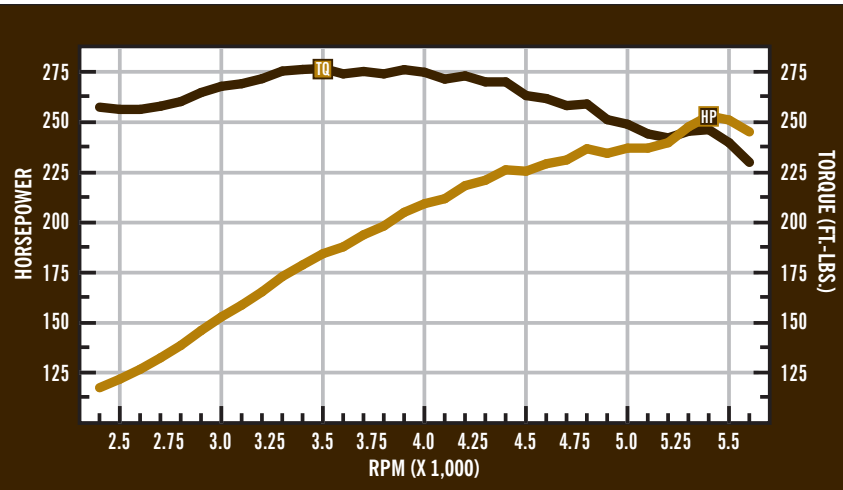
To give our vintage manifold the look of a true '50s show-car engine, we polished the intake using Eastwood's manifold polishing kit. After a fair amount of sanding to smooth things out, their kit made short work of achieving a show quality shine.

### 12 VINTAGE SPEED MULTI-CARBURETOR LINKAGE

Charlie Price at Vintage Speed has been dedicated to keeping the old Strombergs and Holleys a viable option for today's builders. We picked up our multi-carb linkage, fuel block, and countless carb rebuild parts.



Torque is what you feel and horsepower is what you brag about. Our Y-Block lived up to its reputation for being a torquey little engine, posting 258 ft.-lbs. at only 2,400 rpm with a max torque of 277 ft.-lbs. at 3,500 rpm. Our horsepower improved over stock and came in at a respectable 253 at 5,400 rpm.



We modified our finned aluminum valley pan to accept a factory style aluminum oil fill and breather tube, then TIG welded it in place.



Zinc dithiophosphate levels in current "SM" certified oils have been dramatically reduced over concerns they would clog catalytic converters. Unfortunately, this increases the wear in older flat-tappet engines and can even lead to premature engine failure, especially in newly rebuilt engines. Royal Purple has responded with their new Engine Break-In Oil, specially formulated with highly refined mineral oil and advanced additives containing high levels of zinc and phosphorus to optimize protection in flat-tappet and roller engines. This oil allows optimal ring seal and protects rotating assembly components such as the camshaft and valve-train from initial start up wear, and during the first 2,500 miles of engine break-in.

nals cleaned up with a .010-inch grind, while the rod journals required a .020-inch grind. All of the valves were candidates for replacement, and combatting the effects of unleaded gas required stainless steel exhaust valves.

We wanted to keep our compression below 9.25:1. With our head selection and .060 over-bore we stayed just below using a set of Egge's flat top cast pistons. Egge Machine Company had everything we needed to get the job done. Egge also has a great line of reproduction speed parts, so we couldn't resist ordering up a set of Offenhauser finned aluminum valve covers.

Every vintage engine has its diehard fans preaching the virtues of their beloved mill. The Y-Block is no exception, and we were at no shortage of advice during the build. One part most could agree on was the MSD Pro Billet distributor specifically designed for the Y-Block. It's a testament to the staying power of this motor.

To further enhance the vintage look we selected a set of Speedway's new reproduction Ram Horn exhaust. These faithful reproductions of the original ram horns used on Ford trucks share the reputation among early hot rodders for added performance. We also picked up a finned valley pan, then modified it to accept an original style oil fill tube. Completing our Speedway order was a set of new 9Super7 carburetors. Yes, we had a set of Holley 2100s in hand and ready to be mounted to our vintage Edelbrock 573 intake, but we couldn't resist ordering a set of these new carbs and putting them through dyno testing. (Check out the sidebar and see full test results on the Club website.) A set of Speedway Tru-Helmet air cleaners tops off the engine.

### COMPLETING THE BUILD

Gary prepped the engine for machine work and claims he spent nearly 40 hours smoothing all the casting marks from the block, heads, and ram horns. Using a head porting kit from Eastwood Company, he also gasket matched and smoothed out the exhaust ports as necessary.

A set of "Marshall Since '62" one-inch spacer blocks added beneath the carburetors improved performance and low-end torque. They came to us precision CNC milled from billet aluminum and match the Holley carb bases.

A late-model alternator on this engine would distract from its style. Fortunately, the folks at Powermaster Motorsports recognized this. Their PowerGEN alternators are fashioned with the look of an early generator, but house a modern one-wire alternator.

Plans call for a lot of street miles on this engine, so backing up the Y-Block will be a GM automatic overdrive transmission connected using a Bendtsen Transmission adapter kit. Bendtsen wisely engineered this adapter to accept a common small-block Chevrolet high torque starter motor and includes the starter in the kit.

### ALL FIRED UP

It was finally time to breathe life back into the Y-Block. The silence was broken when the starter engaged. In a moment, the Holleys teamed up to awaken the vintage Blue Oval. The rumble of the exhaust filled the room with a song not heard in years.

After testing a few jet sizes, the mo-



Gary at Outcast Kustoms insisted our Y-Block needed to be baby butt smooth, to achieve the '50s show-car look. He painstakingly smoothed out the block and heads before laying down several coats of Eastwood's new engine paint.



ment arrived to truly determine the capacity of our Y-Block. Builder Clay Witt at TPIS pulled back the dyno throttle and all three Holleys stood wide open. The engine pulsed life, and the power numbers rolled up the screen. Our meager modifications paid off in horsepower gain over stock performance numbers. The old Ford made 253-horsepower at 5,400 rpm and 277 ft.-lbs. of torque at 3,500 rpm.

There's little doubt more power could be squeezed from the Ford. Higher-compression pistons, a more aggressive cam, and improved intake manifold and carburetor would all contribute to higher power numbers. But, we accomplished what we set out to do; the power and efficiency of the engine were improved while maintaining excellent street characteristics. The Ford's reliability and serviceability had also been upgraded with the addition of modern components, while staying true to '50s show-car flavor.

The exhaust barely cooled before we had the engine back to the shop to get dressed up in a new coat of Eastwood's Oldsmobile gold engine paint and VHT flameproof white accessories.

With the engine built we look forward to finishing up the rest of the Toaster, knowing our vintage engine will deliver many trouble-free miles then turn some heads when it gets there.

### WEB EXCLUSIVE

## TESTING 1-2-3

WE PUT SEVERAL MULTI-CARB SETUPS THROUGH A WORKOUT ON DYNO

BY MARK SIMPSON

In preparation for our Y-Block story, we discovered a great deal of conflicting information in regards to using Holley 94 series carburetors in multi-carb setups. Some believed the Holleys were a poor choice for these setups while others proclaimed their superiority over the more commonly used Stromberg 97s.

We decided to put the Holleys through their paces and accurately test them to determine what tuning needed to be done to optimize their performance. Different primary and secondary bases, progressive linkage, straight



linkage, staggered jets sizes, even jet sizes, different power valve sizes, and block offs all would be tested.

As soon as we finalized our plans and started rebuilding several cores, Speedway Motors released their new take on the old familiar Stromberg 97 in a carb they dubbed the "9Super7."

The 9Super7 listed for under \$300 and we had nearly racked up that much each into rebuilding our Holleys with all the options we wanted to test. We were skeptical of how they would perform for the price and couldn't resist ordering a set, after all we were going to be on dyno anyway. What we discovered surprised even us. For the complete story of our carb testing visit [streetmachineclub.com](http://streetmachineclub.com).



### SOURCES

**American Racing Products**  
arp-bolts.com  
(800) 826-3045

**Bendtsen Transmission Adapters**  
transmissionadapters.com  
(763) 767-4480

**Clay Smith Cams**  
claysmithcams.com  
(800) 454-7999

**Eastwood Company**  
eastwoodco.com  
(800) 343-9353

**Egge Machine Company**  
egge.com  
(562) 945-3419

**Fel-Pro Gaskets**  
federalmogul.com  
(248) 354-7700

**John Mummert's Ford-Y-Block**  
ford-y-block.com  
(336) 352-4866

**Marshall Since '62**  
marshallsince62.com  
E-mail: [info@marshallsince62.com](mailto:info@marshallsince62.com)

**MSD Ignition**  
msdignition.com  
(915) 857-5200

**Outcast Kustoms**  
outcastkustoms.net  
(651) 492-9565

**Powermaster Motorsports**  
powermastermotorsports.com  
(865) 688-5953

**Red's Headers**  
reds-headers.com  
(760) 343-2590

**Royal Purple**  
royalpurple.com  
(281) 354-8600

**Speedway Motors**  
speedwaymotors.com  
(800) 979-0122

**TPIS-TPI Specialties**  
tpis.com  
(952) 448-7988

**Vintage Speed**  
vintagespeed.com  
(772) 778-0809