SHORT STACK TO GO!

by John Dianna

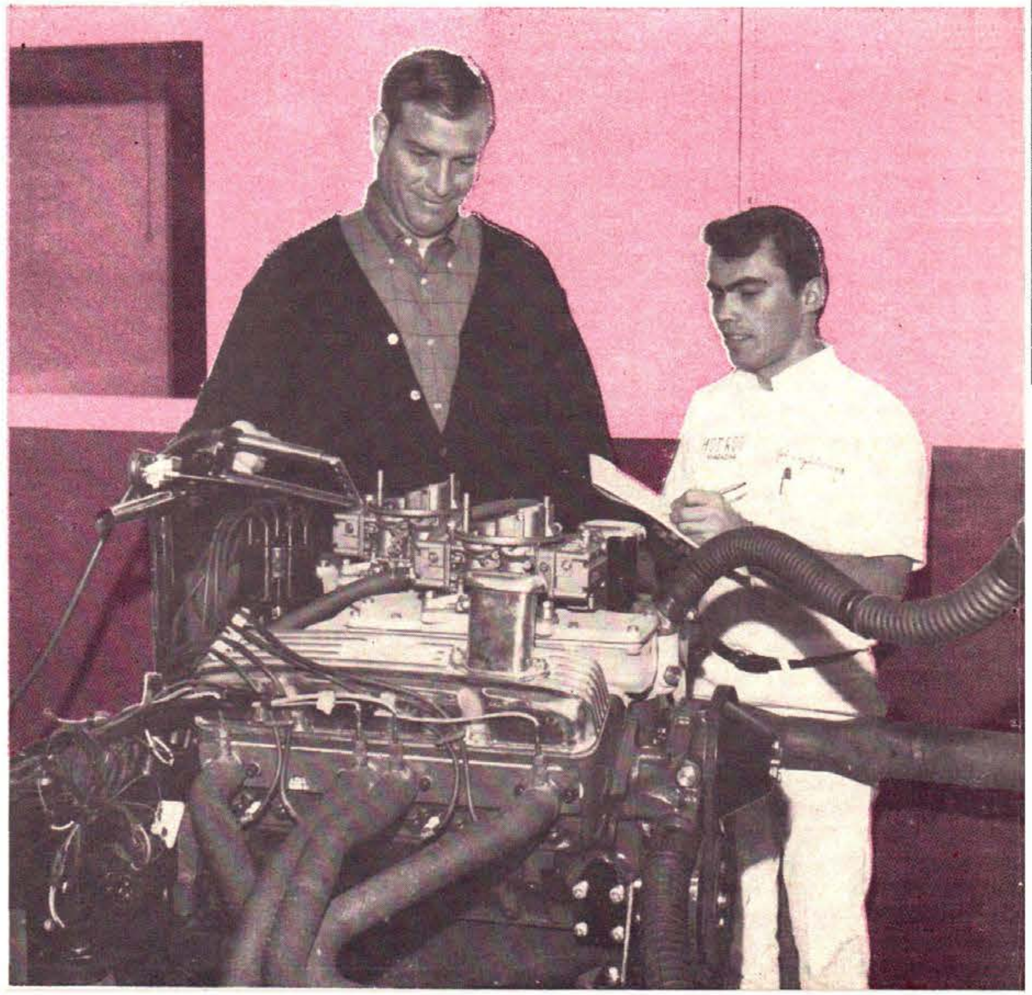
For those enthusiasts hungry for street performance, Edelbrock is adding a "short Tunnel Ram" to the menu

Ever wonder what Edelbrock would come up with for an encore to the Tunnel Ram? Why, the Street Tunnel Ram, naturally. This new manifold is designed for performance enthusiasts who crave the horsepower-gettin' characteristics of the Tunnel Ram for street use. By design, the new STR manifold will fit under the stock hood with no alterations. And speaking of simplicity, linkage kits and fuel kits are available to ease the already simple installation.

The first STR manifold was designed for the American Motors Trans-Am Javelins about a year ago. And due to Vic Edelbrock, Jr., and his uncanny way of zapping performance gains from aluminum stock, the second design of the new manifold was cast, flow-benched, dyno'd, and recast to add more zip to small-block Chevy engines such as the 265-, 283-, 327-, and 350-cubic-inch varieties. At this point, Edelbrock offers two models: the STR-11 (AM 290-, 343-, and 390-cubic-inch engines) and the STR-10 (small-block Chevy engines).

Wondering 'bout performance? We were too, so we just happened to get in on the development of the new manifold. That is, when Bobby Meeks (Edelbrock's top dyno and wrench man) was running dyno tests on a 350-cubic-inch Chevy engine. He compared various manifolds and carburetors against the new STR. Sure, we were surprised at the results the dyno produced. The STR pulled only a mere 84-horsepower gain over the stock Rochester Quadrajet carb and manifold. Think you could feel that in the seat of your pants? The dyno tests didn't stop here, for other Edelbrock manifolds (including the original Tunnel Ram) were stacked against the STR, along with a few Racer Brown cams and a set of those "trick" Bob Joehnck heads. But first, the 350 was disassembled and clearanced in the true racing fashion.

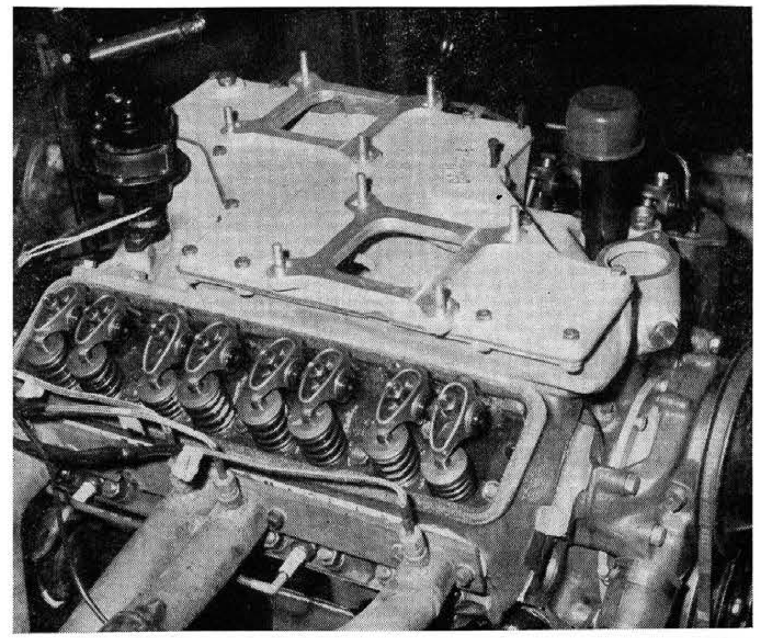
For openers, the crank clearance was bumped to .0025-inch for both mains and rods. Rod side clearance was increased to .020-inch, and piston-to-wall clearance was held to .004-inch. The stock rings were replaced with TRW Moly type, and the wrist pin holes in the pistons were honed in order to maintain a .001-inch pin-to-piston fit. Speaking of pistons, deeper valve reliefs were needed to ensure a .090-inch minimum air gap for the increased lift of the Racer Brown camshafts. A .070-inch cut on the intake side and a .050-inch cut for the exhausts were all that it took to obtain the desired piston-to-valve clearance, and of course the entire assembly was given the Edelbrock balancing treatment.



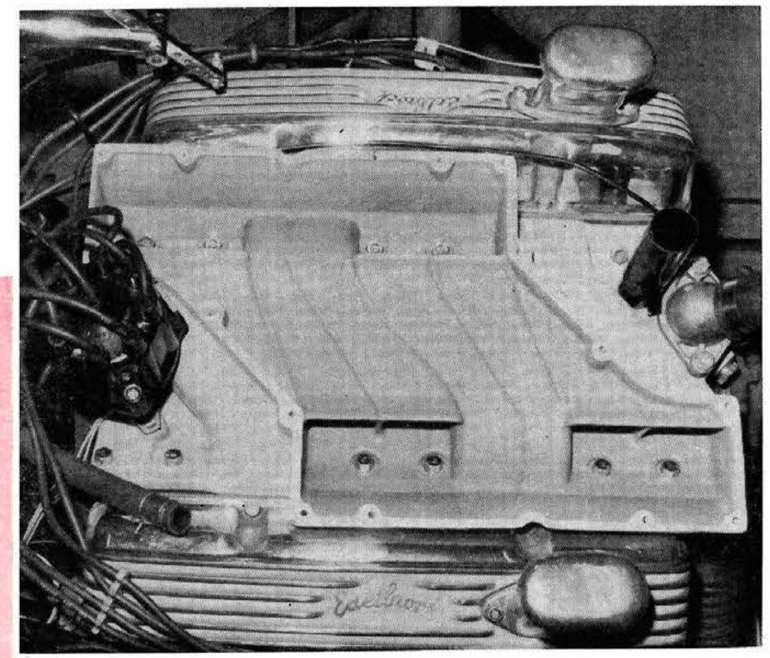
The first four dyno runs were made with the stock heads, which produced an 11.2:1 overall compression ratio. Next, the heads were sent to Bob Joehnck of Santa Barbara, California, for complete reworking. Bob re-engineered the "flowed" heads and cut an additional .030-inch off the head's surface to regain the compression ratio lost by grinding the combustion chambers. The end result, after flycutting, grinding, and milling, netted an 11.3:1 overall compression ratio.

Once the engine was assembled, utilizing a set of stock heads, it was subjected to a six-hour run-in. During this time, excessive blow-by was evident, and further evaluation indicated that the rocker arm balls were heating excessively. To eliminate this, needle-bearing rockers were installed. Then the break-in was continued. Throughout the tests, Delco's transistor-type stock ignition and Hedman H-CH15 headers were used, along with Pennzoil 30-wt. S.A.E. racing oil.

For test #1, an Edelbrock C-3B manifold and a #3310 Holley (780 cfm) carburetor (jetting #72 primary and #76 secondary), along with a Mk II X-104 Racer Brown roller cam and kit, were installed; total distributor advance was set at 38 degrees. This combination netted 354 hp at 6000 rpm. The engine remained the same for test #2, except for the addition of a new 1050 cfm Mk II 3-barrel (R-4604-AAS) Holley carb (#81 primary .093 secondary plate). This single addition netted a 22-hp gain at the same rpm (6000). At this point, a little manifold switching was in order, and this is where the first dyno test was performed on the new Street Ram manifold, using 650 cfm #4224 Holley carbs (#75 primaries, .076 secondary plates). Test #3 showed promise, as the STR pulled 398 hp at 6000 rpm. If nothing else, the new manifold alone produced a whopping 22 extra horses over the 3-barrel carb. For test #4, the cam was exchanged for a Racer Brown #43R roller cam and kit. The carbs were also leaned down somewhat (#73 primaries, .073 secondary plates). Actually the dyno showed an increase in power from the 4000-to-6000-rpm range (see chart), and at 6000 rpm, 21 additional ponies were found.



For the next series of tests, Bob Joehnck heads were installed, and with no other changes made, this alone picked up an extra 40 horsepower, due to the heads' breathing characteristics. "Upstairs" breathing of the 350 was greatly improved, and compared to test #4, a gain of 32 hp at 7000 rpm was evident. After this, carburetors were changed again, this time to Holley #1-14 (600 cfm) units, and reworked vacuum secondaries were fabricated in order to open the secondary throttle plates at 5000 rpm. Remember when using this manifold on the street that it is mandatory to use *vacuum*-controlled secondaries in place of the manual units. A good operating diaphragm for street application is the 3-barrel unit with the purple springs. This combination will give you wide-open secondaries at around 4000 rpm, which is more than adequate for the street. All the necessary parts to convert your present carbs to the STR manifold are available through Edelbrock.



Jetting for test #6 was #68 primary with the stock power valve system, and using the .076 secondary plates. However, this dyno run produced a slight decrease in power (minus 7 hp at 6500 rpm) due to the smaller carburetors. Holley's new #4543 (850 cfm) Centra-Flow carburetors (specially designed for use with TR-2 Tunnel Rams) were installed for the next run. Although the run netted a slight increase over the #1-14 carbs, it still fell short of the #4224 Holleys.

A little more manifold changing was next, this time to the C-3B with Mk II (#4604) 3-barrel carburetor (#81 primary .093 secondary plate). Test #8 showed an impressive 41-hp gain at 6500 rpm over test #2, which was the last time the 3-barrel was run. That's really saying something for those Joehnck "power-flowed" heads. Another dual-quad manifold was used

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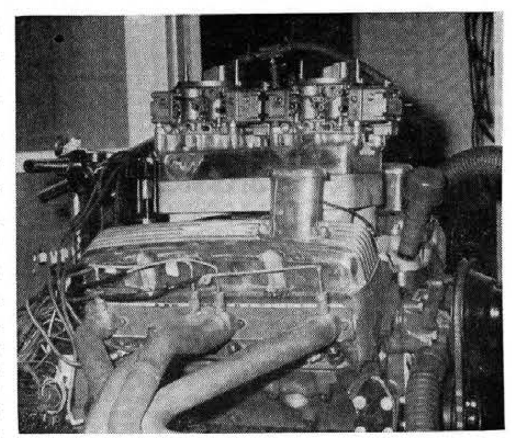
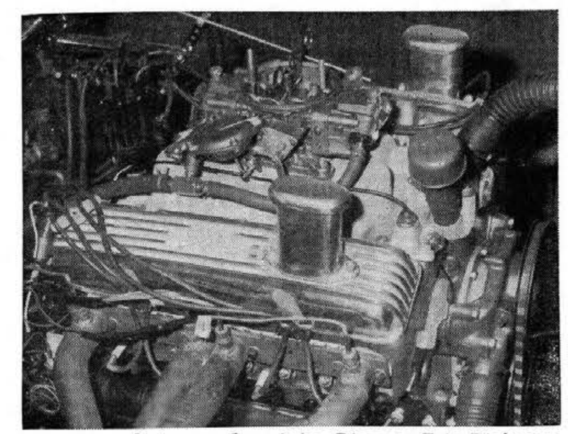




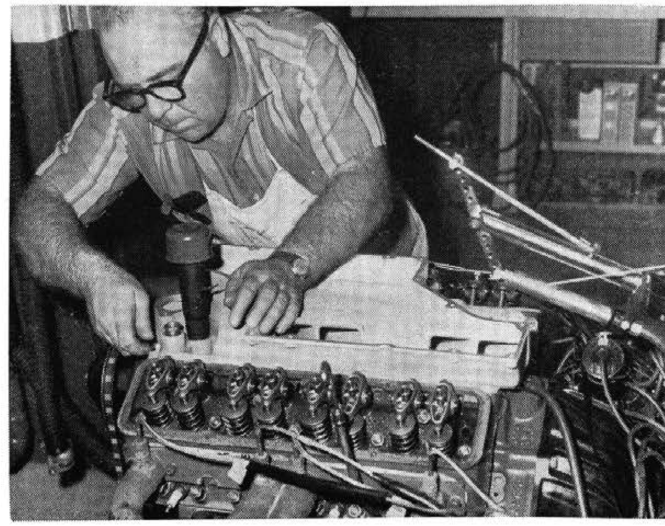
LEFT Vic Edelbrock, Jr., explains the basic linkage setup for the new Street Tunnel Ram to the author. Vic's new dyno room is one of the cleanest and best-equipped in the business. TOP The STR manifold is shown with plenum (air box) top installed. Note position of distributor in relation to the rear intake passage. At present, all stock ignitions will fit, and a special Mallory unit has been designed for the new manifold. Joe Hunt is currently working on an extended Vertex magneto to mate with the new STR manifold. ABOVE This view shows the ram-tube design within the air box. Many hours of flow-bench testing were required for final distribution rates to exceed Edelbrock's precise specs. ABOVE RIGHT Photos show two runs; both have different combos.

photography: John Dianna, Eric Rickman for test #9: the X-C8 Ram Log manifold with two #4224 (650 cfm) Holleys. This combination pulled 446 hp at 6000 rpm on the dyno scale. And in relation to test #5, the STR pulled 13 horses more than the Ram Log did, with the same basic engine combination. The TR-1 Tunnel Ram with two Holley #4224 carbs (#75 primaries, .076 secondary plates) was next on the agenda. With the switching of manifolds completed, test #10 got under way. Not to our surprise, the Tunnel Ram produced the highest horsepower reading in comparison to the previous tests: 462 hp at 6500 rpm is what the dyno read. The Tunnel Ram manifold was replaced with the STR and Holley #4224 carbs (#74 primaries, .076 secondary plates). Once again, a Racer Brown roller cam and kit were installed, but this time it was the #66R version. Performance jumped again, and 467 hp at 6500 was the dyno reading for test #11.

Getting back to the C-3B manifold and the #4604 Holley 3-barrel for dyno run #12, a five-horsepower gain was realized over test #8, with a power reading of 426 hp at 6500 rpm. The same combination was retained for test #13, except for replacing the C-3B with an X-C8 Ram Log manifold and two #4224 Holley carbs (#68 primaries, .070 secondary plates). As a result, the horsepower curve climbed to 459 at 6500 rpm. In test #14, a 477-hp figure was recorded, due to the addition of the Tunnel Ram and two #4224 (650 cfm) carbs. This was the highest horsepower reading by far during the tests, and as we expected, the original Tunnel Ram produced more ponies than the new Street Tunnel Ram. However, the STR does hold its own within its working rpm range.

The final test retained the same engine combination as in test #14, but for a factory stock manifold and a stock jetted Quadrajet carb. As a result, an 84-horsepower decrease was evident, in comparison to test #11 with the Street Ram. How'd you like 84 additional horses knocking the mud from under your rear wheel wells?

As a bonus, the engine was taken from the dyno room and quickly installed in Vic's personal to-and-from-work-type Camaro. We were offered a ride, and needless to say almost knocked each other over trying to get in the driver's seat. One of us made it (chuckle-chuckle), and it took no more than a few blocks of driving to fall in love with this "street package." Acceleration plus: That's the only way to describe the feeling. Surprisingly low-end throttle response felt great, and although much faster, the general attitude of this combination can be directly compared with that of a stock Z/28 package. By the way, the line forms to the right. ■ ■



DYNO TESTS CHART

RPM	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
3000	197	199	205*	202*											
3500	241	241	248*	237*	231*	233*	231*	234	250	233	237*	227	244	228	228
4000	264	275	282*	285*	273*	271*	275*	263	282	364	277*	260	276	258	258
4500	302	314	324*	349*	337*	333*	344*	322	353	341	341*	322	350	332	306
5000	330	347	362*	383*	400*	398*	398*	365	400	402	402*	370	400	400	342
5500	347	369	393*	418*	435*	432*	434*	404	431	436	439*	404	434	437	371
6000	354	376	398*	419*	459*	456*	458*	423	445	460	464*	423	451	468	387
6500	341	360	399*	417*	457*	450*	453*	421	446	462	467*	426	459	477+	383
7000				402*	434*	427*	433*	410	429	447	449*	417	441	457	371
7500									398	417	417*	394	408	432	
8000										371			371	404	

**Denotes all runs made with the Street Tunnel Ram*
+Denotes highest dyno reading during all tests

Test #1. Edelbrock C-3B manifold w/Holley #3310 carb. Racer Brown Mk II X-104 roller cam and kit. 38 degrees advance

Test #2. Same as #1 except carburetor changed to Holley Mk II 3-barrel (1050 cfm)

Test #3. Same as #2 except changed to Edelbrock STR-10 Street Tunnel Ram manifold. Holley 650 cfm #4224 carbs

Test #4. Same as #3 except changed to Racer Brown #43R roller cam and kit. Changed jetting on #4224 Holleys to #73 prim. & .073 sec. plate

Test #5. Same as #4 except changed cylinder heads to Bob Joehnck type with reworked intake and exhaust

Test #6. Same as #5 except changed carburetors to Holley #1-14 (600 cfm). Reworked vacuum secondaries so they would open full at 5000 rpm. Used 3-barrel diaphragms with purple springs

Test #7. Same as #6 except changed to Holley #4543 (850 cfm) Centra-Flow manual secondary type carbs

Test #8. Same as #7 except manifold changed to C-3B with Mk II 3-barrel (1050 cfm)

Test #9. Same as #8 except manifold changed to X-C8 Ram Log manifold with two #4224 (650 cfm) Holleys

Test #10. Same as #9 except manifold changed to TR-1 Tunnel Ram with two Holley #4224 carbs

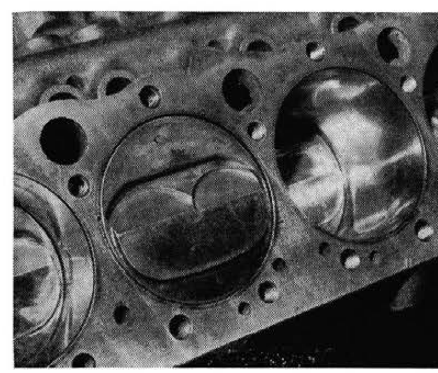
Test #11. Changed cam to Racer Brown #66R roller cam and kit. Manifold changed to Edelbrock STR-10 with Holley #4224 carbs

Test #12. Same as #11 except manifold changed to C-3B and Holley Mk II 3-barrel carb

Test #13. Same as #12 except manifold changed to X-C8 Ram Log manifold with two #4224 Holley carb

Test #14. Same as #13 except manifold changed to TR-1 Tunnel Ram manifold and two #4224 Holley carbs

Test #15. Same as #14 except used stock manifold and stock Rochester Quadrajet carb



TOP Bobby Meeks, Edelbrock's top wrench-and-dyno man, is caught in the act of installing the STR for another dyno test. Installation of the new manifold is surprisingly easy easier, in fact, than most dual-quad manifolds. ABOVE Additional piston-to-valve clearance was necessary due to the addition of the high-lift Racer Brown roller cams.