FIRST LOOK: HIGH-STALL LOCK-UP CONVERTER 700R4 & 4L60E

CHEVY RUMBLE

GM CRATE MOTORS
A BUYING GUIDE

99 CHEVY TIPS, REPAIRS & FIXES!

AMERICA'S FAVORITE '69 CAMARO PULLOUT POSTER

September 2002

$4.99US

SWAP
ENGINE MOUNT INSTALL

PROJECT MODIFIED STOCK: PART I

Basic Bolt-Ons

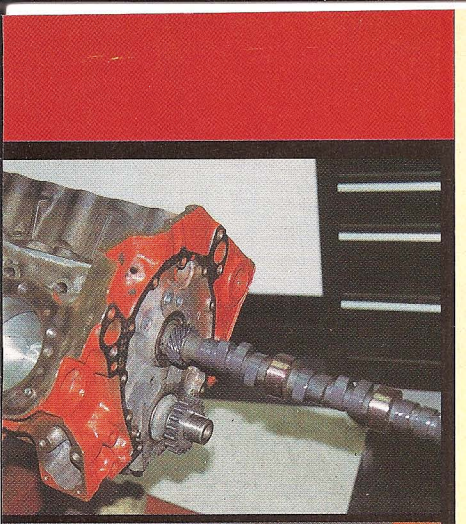
STORY BY RICHARD HOLDENER
PHOTOGRAPHY BY RICHARD HOLDENER

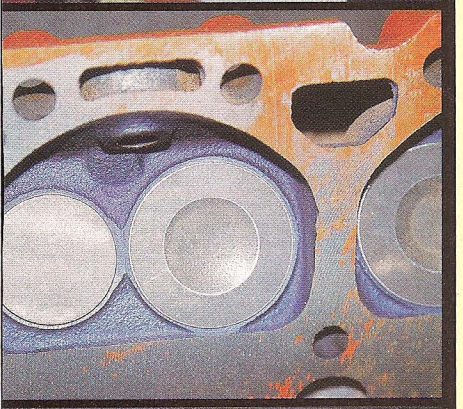
How do you add 300 hp to a small-block Chevy? Easy—throw nothing less than six intake manifolds, six carburetors, four cylinder heads and four camshafts at it and see what works.

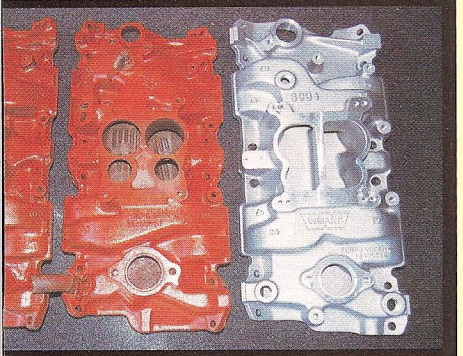
This project brought back a ton of memories for me. The first car I ever owned was a '70 split-bumper Camaro RS. Sure, it would have been nice to have the LT1 Z28, but that was well beyond my limited budget, and most certainly beyond my driving ability, given the fact that I had just turned 16. Even though this particular Camaro was quite an unattractive combination of lime green with a white vinyl top (later changed to red with a black top), I still look back fondly on those times I spent with that car.

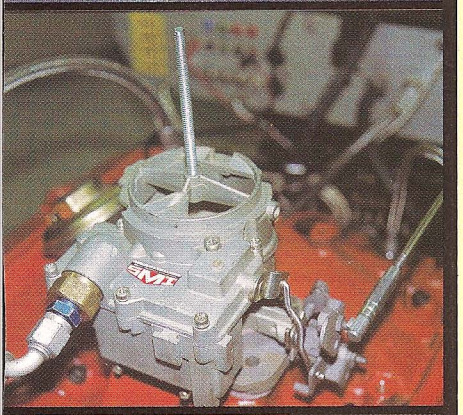
Equipped with nothing more sporting than a simple two-barrel 350, the Camaro wasn't the fastest thing on the block, but it ran pretty well for my liking. It is the two-barrel 350 in my old Rally Sport that was the impetus for Project Modified Stock. Dedicated engine buildups are a great way to demonstrate to readers how to extract power from a given combination. The problem is that the combina-

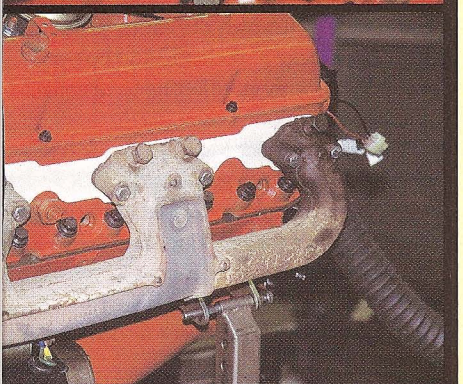
1. Our test mule started out life as a four-bolt 350 powering a Suburban. Thanks to Coast High Performance, it was rebuilt using forged pistons and rods. Our initial tests were run with the stock (180hp) camshaft. **2.** Our baseline numbers were generated with a set of stock Chevy 882 cylinder heads. The heads featured a 1.94/1.50 valve combination and 76cc combustion chambers. **3.** We ran a number of different manifolds in part one of Project Modified Stock, including the factory cast-iron two-barrel and Q-Jet, along with a Weiand 8004 aluminum intake. **4.** We began the tests with a 2G Rochester supplied by SMI. We wanted a bone-stock baseline, so we thought the two-barrel carb was a perfect starting point. **5.** There is nothing that screams stock like a set of cast-iron exhaust manifolds. Running the stock manifolds allowed us to test a set of 1-5/8-inch tubular headers.

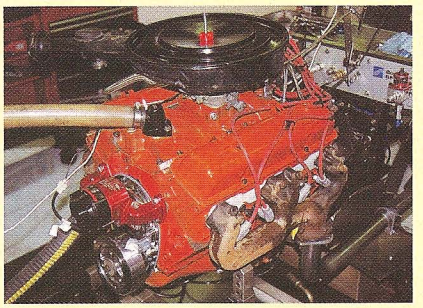












Project Modified Stock: Baseline

PEAK HP: 229 HP AT 4,600 RPM
PEAK TQ: 350 LB-FT AT 2,900 RPM

RPM	HP	TQ
2,200	148	353
2,400	158	347
2,600	171	345
2,800	186	349
3,000	197	345
3,200	208	341
3,400	217	335
3,600	225	329
3,800	225	311
4,000	222	291
4,200	226	283
4,400	228	272
4,600	229	261
4,800	228	249
5,000	218	229

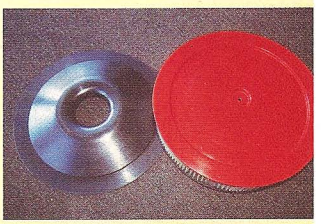
Project Modified Stock was assembled in "Stock" form and prepared for dyno-testing and the transition to "Modified Stock" form. Our game plan was to run the motor in bone-stock configuration with the stock air cleaner, two-barrel, 882 heads and cast-iron exhaust manifolds. Our original intention was to equip the motor with a single exhaust system before installing the dual exhaust system (for a '70-'81 Camaro) supplied by Hooker. The exhaust consisted of the necessary tubing to connect the dual pipes to the stock manifolds. Hooker also sells a similar system for use with headers. Hooker also supplied a set of 2.5-inch Aero Chamber mufflers to complete the dual exhaust. The available room in the dyno cell necessitated that we employ only a portion of the exhaust system. We had to leave off the over-the-axle section, leaving the 2.5-inch dual exhaust terminating at the muffler. In my haste, I also forgot to get a suitable air filter for the stock snorkel, so we made the baseline run with the stock snorkel sans filter. Valve float on the stock 882 heads (85 lbs of seat pressure) limited the maximum rpm to 5,000 rpm, but the motor was done making power well before that. The two-barrel 350 demonstrated its torque-producing nature and thumped out 350 lb-ft (disregard the initial reading of 352 lb-ft) on its way to a peak of 229 hp at just 4,600 rpm. Obviously, Chevy intended this combination to be a low-rpm piece—think truck or heavy passenger-car motor.

Project Modified Stock: Test 1 Comp Cams Air Filter

PEAK HP: 241 HP AT 4,500 RPM
PEAK TQ: 359 LB-FT AT 3,000 RPM
Largest Gains: 16 hp at 5,000 rpm and 20 lb-ft at 4,000 rpm

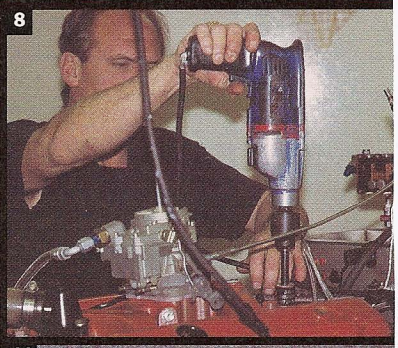
RPM	Stk HP	Filter HP	Gain	Stk TQ	Filter TQ	Gain
2,200	148	150	2	353	358	5
2,400	158	162	4	347	355	8
2,600	171	175	4	345	354	9
2,800	186	191	5	349	358	9
3,000	197	205	8	345	359	15
3,200	208	216	8	341	354	13
3,400	217	224	7	335	346	11
3,600	225	230	5	329	336	7
3,800	225	235	10	311	324	13
4,000	222	237	15	291	311	20
4,200	226	239	13	283	299	16
4,400	228	241	13	272	287	15
4,600	229	241	12	261	275	14
4,800	228	238	10	249	260	11
5,000	218	234	16	229	246	17

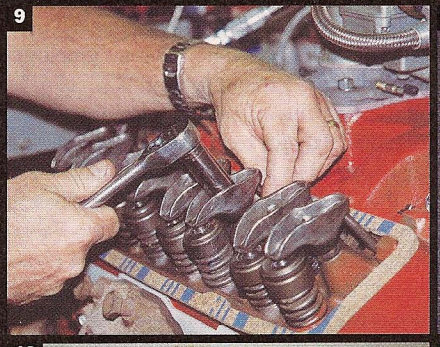
The first test involved removing the stock single-snorkel air cleaner housing and replacing it with an open-element filter from Comp Cams. The Composite air filter assembly was designed to mount on our 2G two-barrel and provided an unobstructed flow of air into the small two-barrel carburetor. We feel that the motor might have run better with a filter in the stock air cleaner housing, but we did not get a chance to test this theory. After installing the Comp Cams composite air filter assembly, we were rewarded with a sizable gain in power and a much smoother overall curve. The peak power jumped all the way to 241 hp at 4,500 rpm, while torque was up to 359 lb-ft. Naturally, the installation of the simple filter did not dramatically change the shape of the power curves—it simply improved the airflow into the motor. In comparing this new power curve with the previous stock air cleaner run, it seems that the lack of a filter element might have been causing some turbulence above the carb. Airflow theories aside, this simple filter installation netted a peak-to-peak power gain of 12 hp and 9 lb-ft of torque.

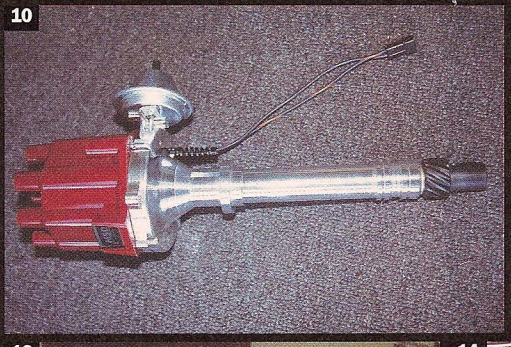



6

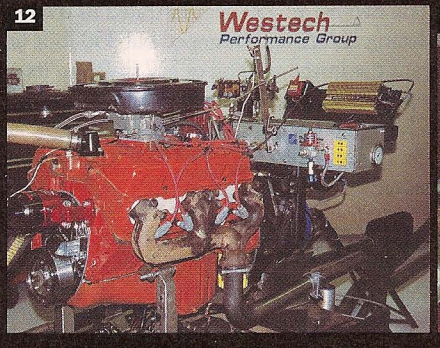
7


8


9

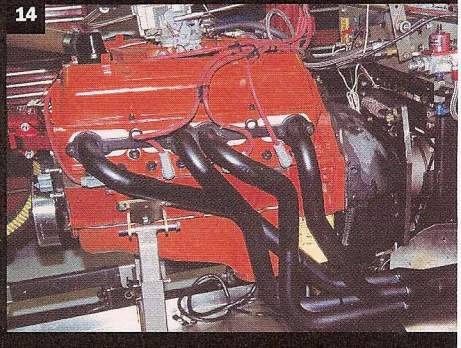

10

11



12


13


14

6. Hooker supplied a dedicated exhaust system for our dyno testing. The exhaust (designed for a '70-'81 Camaro) consisted of 2.5-inch tubing running from the stock manifolds to the tailpipe. Because of space constraints, we did not use the section of pipe aft of the mufflers. **7.** Hooker also supplied a set of Aero Chamber mufflers to complete our exhaust system. The exhaust note was throaty, even with the wimpy two-barrel and iron manifolds. **8.** Once on the dyno, the motor was pre-lubed using a drill and dedicated oil pump drive. This is important, because starting a dry motor is never a good idea. **9.** Once oil was present at the rocker arms, the valves were adjusted one half turn past 0 lash. **10.** MSD supplied a billet distributor for our test motor. The total timing was set for 36 degrees. **11.** To facilitate the many cam changes, we employed a CSI electric water pump. The high-flow pump ensured that our test motor was plenty cool during the hard dyno thrash. **12.** After a 25-minute break-in, the motor was run for this first time in anger. The two-barrel 350 produced 229 hp and 350 lb-ft of torque. **13.** The first modification was to install an open-element air filter in place of the stock single-snorkel air cleaner. The motor responded with a jump in power to 241 hp. Torque was up as well, to 359 lb-ft. **14.** Next on the list was to swap out the iron exhaust manifold in favor of a set of 1-5/8-inch FlowTech headers. The headers upped the peak power to 248 hp, but we felt the two-barrel carb and intake were now the limiting factor in terms of power.

tion is limited to the exact components used in the buildup. Every time I build, or even read about a specific buildup, I can't help but wonder what would happen to the power curve if we were to make select changes. What if we used a single-plane intake in place of the dual-plane, or what if we ran a cam with less duration? Or how about a different set of cylinder heads?

Knowing that a dedicated buildup can create as many questions as it answers, we decided to take a different approach for the readers of CHEVY RUMBLE. Rather than build a specific combination, we decided not only to build a number of different combinations, but also dyno-test a number of individual components along the way. While it is impossible to test every possible component or combination of components, the testing performed did answer a number of questions. The basic premise of Project Modified Stock was to take a bone-stock 350, from the single-snorkel air cleaner right down to the cast-iron exhaust manifolds, and proceed from there. In less than two days' (dyno) time, we added no less than six different intake manifolds, six carburetors, four cylinder heads and four cam profiles, along with various air filters, rocker arms, headers and exhaust systems. Along the way, we obviously performed the necessary jetting to optimize the air/fuel mixture and adjusted the total timing via the MSD distributor for maximum power. The tuning alone took considerable time, but the results were well worth the effort, as we were able to take a stock 350 and bolt on over 300 hp, without resorting to nitrous or forced induction!

Naturally, Project Modified Stock had to begin with a stock small-block 350. To that end, yours truly purchased a rebuildable 350 from a neighboring shop owner who had recently pulled it from its resting place between the fenders of an early Chevy Suburban. The motor turned out

to be quite a little diamond in the rough, as the block was of the more desirable four-bolt variety, and all the main and rod bearings were in excellent shape. Although we planned and eventually executed a complete rebuild (CHEVY RUMBLE, June/July '02, page 28), the main bearing condition was a good indication of the soundness of the crankshaft. The motor came with a set of 882 cylinder heads, a cast-iron Quadra-Jet intake manifold and the requisite cast-iron exhaust manifolds. We later sourced the necessary cast-iron two-barrel intake from a local wrecking yard. Sean Murphy Induction (SMI) supplied a rebuilt 2G two-barrel Rochester along with a rebuilt Q-Jet for our testing. While we were at the wrecking yard, we grabbed a matching (single-snorkel) air cleaner assembly to complete the ensemble. The final element was a stock cam, as the previous owner installed a mild RV-style cam in the 350 Suburban motor. A trip to a local Kragen auto parts store netted a hydraulic flat-tappet cam used in the 180hp Chevy V-8 (307 and 350) applications. Now we had all the hard parts to produce a stone-stock two-barrel 350, just like the one I used to have back in my '70 Camaro.

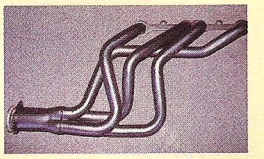
Why did we go to so much trouble to build a two-barrel 350, you ask? Project success requires two distinct elements, one of which is a definitive starting point. Believe it or not, there were a great many more two-barrel 350s produced than four-barrel versions. This means that a great many more performance buildups began (and continue to begin) with the more mundane two-barrel motors. The other reason for such humble beginnings it that doing so will answer a great many more questions. For instance, how much is a stock Q-Jet intake and carburetor worth over a two-barrel? Not all of us want to go hog wild and spend all the dough required to add aluminum heads, a roller cam and a big Holley carb. A number of enthusiasts are looking for a little more power but want all the reliability (and minimal cost) of a production component. Stock Q-Jet carbs and intakes are available at swap meets and local wrecking yards for next to nothing. Our testing showed that a stock Q-Jet and intake work very well on a mild combination. Of course, with aftermarket aluminum intakes available for around $100, not having to lift the extra heft of the stock

Project Modified Stock: Test 2 1-5/8-inch Flowtech Headers

PEAK HP: 248 HP AT 4,500 RPM
PEAK TQ: 366 LB-FT AT 3,000 RPM
Largest Gains: 7 hp at 4,800 rpm and 8 lb-ft at 4,400 rpm

RPM	Stk HP	Header HP	Gain	Stk TQ	Header TQ	Gain
2,200	150	152	2	358	363	5
2,400	162	165	3	355	361	6
2,600	175	178	3	354	360	6
2,800	191	194	3	358	363	5
3,000	205	209	4	359	366	7
3,200	216	220	4	354	360	6
3,400	224	228	4	346	353	7
3,600	230	235	5	336	343	7
3,800	235	240	5	324	331	7
4,000	237	242	5	311	318	7
4,200	239	244	5	299	305	6
4,400	241	247	6	287	295	8
4,600	241	245	4	275	280	5
4,800	238	245	7	260	268	8
5,000	234	238	4	246	250	5

We had high hopes while installing the Flowtech headers, as we knew the stock cast-iron exhaust manifolds left something to be desired both in terms of absolute flow and scavenging. Given the mild configuration of the motor, we selected a set of 1-5/8-inch long-tube headers from Flowtech. The primary diameter and length should provide a scavenging effect to further improve exhaust flow and, we hope, power. The headers were installed using the same Hooker 2.5-inch exhaust system, minus



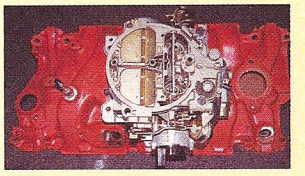
the 90-degree bends used with the stock manifolds. The installation of the Flowtech headers did result in a power increase, but not quite what we expected given previous testing. The headers improved the peak power output to 248 hp while upping the torque to 366 lb-ft. We feel that the headers might have shown better had we elected to install the Q-Jet and matching factory cast-iron intake before installing the headers. The motor was intake-limited due to the two-barrel carb and intake. The vacuum gauge indicated over 2 inches at wide-open throttle, a sure indication of an inlet restriction.

Project Modified Stock: Test 3 Factory Q-Jet Carb & Intake

PEAK HP: 278 HP AT 4,500 RPM
PEAK TQ: 385 LB-FT AT 3,300 RPM
Largest Gains: 33 hp at 4,600 rpm and 38 lb-ft at 4,000 rpm

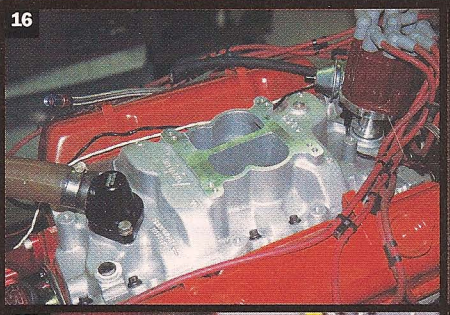
RPM	Stk HP	Q-Jet HP	Gain	Stk TQ	Q-Jet TQ	Gain
2,200	152	151	-1	363	361	-2
2,400	165	163	2	361	363	2
2,600	178	178	0	360	360	0
2,800	194	196	2	363	368	5
3,000	209	215	6	366	377	11
3,200	220	232	12	360	381	21
3,400	228	248	20	353	383	30
3,600	235	257	22	343	375	32
3,800	240	266	26	331	367	36
4,000	242	271	29	318	356	38
4,200	244	275	31	305	343	38
4,400	247	277	30	295	331	36
4,600	245	278	33	280	317	37
4,800	245	275	30	268	301	33
5,000	238	267	29	250	281	31

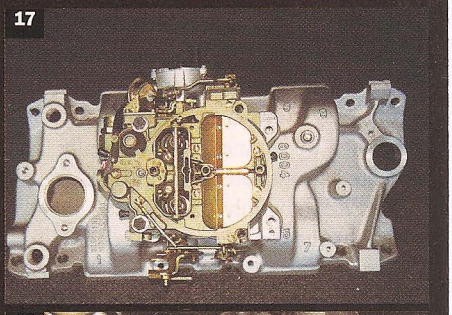
The installation of the factory cast-iron four-barrel intake and matching 750cfm Q-Jet (supplied by SMI) resulted in a huge jump in power. The peak power jumped from 248 hp to 278 hp. The peak torque was now up to 385 lb-ft (from 366

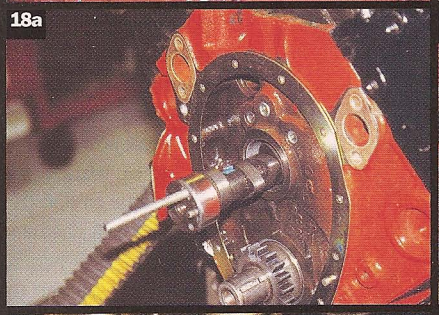


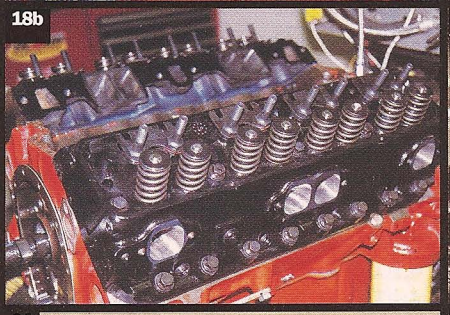
lb-ft). It stands to reason that a portion of this dramatic increase was due to the headers installed previously. Removing the restriction in the intake manifold naturally increased the exhaust flow. It would have been interesting to install the factory cast-iron manifolds back on to test the effectiveness of the headers with the Q-Jet, but time did not allow such backtracking. As it was, we had improved the power output of our mild little 350 by nearly 50 hp with the simple addition of headers, an intake and a four-barrel. No wonder the three performance components continue to be so popular among enthusiasts.

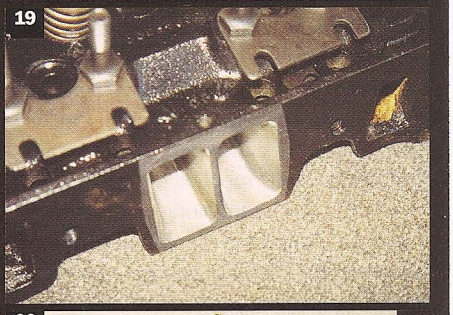

15

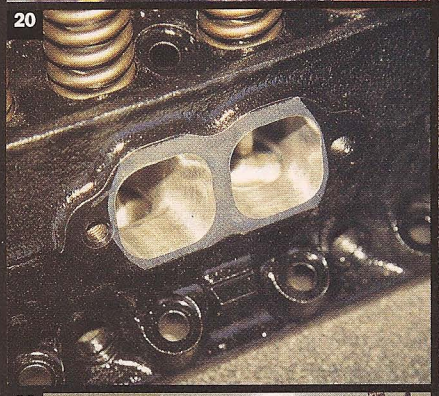

16

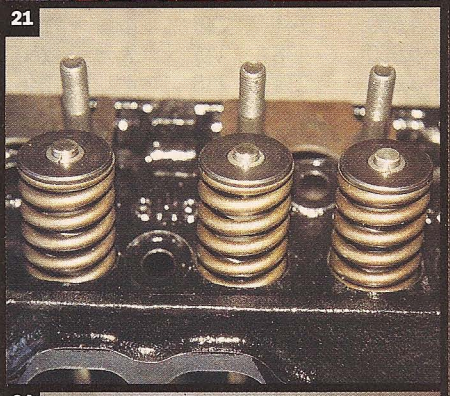

17


18a

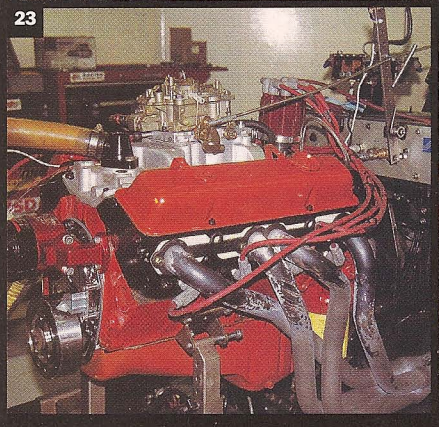

18b


19


20


21

22


23

24

15. To cure the intake restriction, we installed a factory Q-Jet manifold and carburetor. The Q-jet was rebuilt by SMI and performed flawlessly during the testing. The addition of the four-barrel carb improved power dramatically. The peak numbers were now up to 278 hp and 385 lb-ft of torque. **16.** We knew that the stock Q-Jet intake offered impressive low-speed power, but that there was a good bit more available from an aftermarket intake. Installing the Weiand 8004 and Holley Avenger carb resulted in our first power loss. We suspect that there was a problem with the carb, so we shipped it back to Holley for testing. **17.** Keeping the Weiand in place and substituting the SMI Q-Jet resulted in the power gain we were expecting from the aluminum intake. The peak power was now up to 287 hp, but there was a slight trade-off in low-speed power compared to the factory intake. **18a-b.** Our next adventure involved the installation of a Comp PE246 cam and a set of ported 882 castings from Power Heads in Fullerton, California. **19.** The Power Heads (882) heads featured full intake porting and gasket matching. **20.** The exhaust ports were also given the full treatment to improve the airflow potential. **21.** The spring package allowed the 350 to rev past 5,000 rpm for the first time. The rpm potential was important, as the motor made peak power at 5,200 rpm. **22.** Each head and/or intake change required new gaskets. Fel-Pro supplied the necessary head, intake and exhaust gaskets for all the testing. **23.** With the Weiand and Q-jet reinstalled on the Power Heads heads, the small-cam-and-head package really improved the power output of the little small block. The peak power was now up to 340 hp, while torque had climbed to an even 400 lb-ft. **24.** The final test involved the installation of an Edelbrock Performer RPM and 650cfm Speed Demon carburetor. The peak horsepower and torque numbers jumped once again, to 364 hp and 422 lb-ft.

cast-iron intake is reason enough to ante up for something like the Weiand 8004 we tested on the 350.

Our first order of business was to build a suitable test motor (see "How To Rebuild Your First Chevy Engine," CHEVY RUMBLE, June/July '02, page 28). The purchased four-bolt 350 was taken to Coast High Performance. The motor was given the full treatment, including being bored 0.040 over to accept a fresh set of forged aluminum flattop pistons. Coast also provided a set of forged I-beam connecting rods to replace our stock rods. The cast crank was measured and found to be within spec, so it was retained for the rebuild. Naturally, a fresh set of rings and bearings were included in the rebuild along with the installation of our stock (180hp) parts-store special camshaft. A Mellings standard-volume oil pump and pick-up were used, along with a hardened oil pump driveshaft. The heavy-duty oil pump shaft was only a few bucks more but well worth it when rebuilding any motor. A shaft failure means no oil pressure. No oil pressure means no more engine, or at least no more bearings. After liberal doses of assembly lube and a quick go-around with the torque wrench, the Coast professionals had the four-bolt 350 short block ready to go in double-quick time.

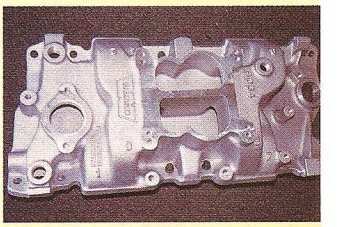
While the short block was being prepared, the stock 882 heads were taken to Power Heads in Fullerton, California. The heads were treated to a simple valve job, reamed guides and a fresh set of springs. During the freshening process, Power Heads discovered that one of the heads from the original 350 was cracked. The shop found a suitable replacement and swapped out the bad head. (Thanks, guys). In addition to our stock heads, Power Heads also prepared a set of ported 882 castings. We wanted to include a set of ported stock heads in our testing to demonstrate what was possible with an enthusiast's current heads. Again, many of us need to scrimp and save at every opportunity, and porting a set of stock heads is an affordable alternative to buying a new set of aftermarket performance heads. The 882 castings were treated to a full port job, larger 2.02 intake and 1.60 exhaust valves, and finished up with a fresh valve job. The heads were also milled slightly, but only to ensure the deck surface was straight. Not enough

Project Modified Stock: Test 4 Holley Avenger & Weiand 8004

PEAK HP: 277 HP AT 4,500 RPM
PEAK TQ: 369 LB-FT AT 3,300 RPM
Largest Gains: 7 hp at 2,600 rpm and 14 lb-ft at 2,600 rpm

RPM	Stk HP	H/Wei HP	Gain	Stk TQ	H/Wei TQ	Gain
2,200	151	ND		361	ND	
2,400	163	ND		363	ND	
2,600	178	185	7	360	374	14
2,800	196	197	1	368	370	2
3,000	215	211	-4	377	369	-8
3,200	232	225	-7	381	370	-11
3,400	248	239	-9	383	369	-14
3,600	257	252	-5	375	368	-7
3,800	266	260	-6	367	359	-8
4,000	271	266	-5	356	349	-6
4,200	275	270	-5	343	338	-5
4,400	277	274	-3	331	327	-4
4,600	278	277	-1	317	316	-1
4,800	275	274	-1	301	300	-1
5,000	267	270	3	281	283	2

The installation of the Weiand 8004 aluminum intake and Holley Avenger (670) carburetor actually resulted in a loss in peak power. Immediately, we suspected something was amiss, as we have always had excellent results by replacing a Q-Jet with a Holley. We did expect to trade some low-speed power compared to the Q-Jet and stock intake, but we knew the Weiand manifold would better the cast-iron stocker once the revs reach 3,500 rpm.



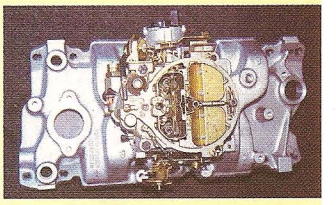
The fact that the motor made more power at 2,600 rpm with the Weiand/Holley combo was an anomaly that had more to do with the way the motor was loaded on the dyno than the actual output. We sent the Avenger back to Holley for testing on its own dyno and look forward to hearing its results. Chances are that it will find some shipping popcorn in one of the metering block, or other such nonsense. Until we hear back about the carb, we will reserve judgment about this test, especially after seeing the results of test No. 5.

Project Modified Stock: Test 5 Q-Jet & Weiand 8004

PEAK HP: 287 HP AT 4,600 RPM
PEAK TQ: 372 LB-FT AT 3,100 RPM
Largest Gains: 11 hp at 5,000 rpm & 11 lb-ft at 4,600 rpm

RPM	Stk HP	Q/Wei HP	Gain	Stk TQ	Q/Wei TQ	Gain
2,200	151	150	-1	361	358	-3
2,400	163	162	-1	363	354	-9
2,600	178	175	-3	360	354	-6
2,800	196	195	-1	368	365	-3
3,000	215	211	-4	377	370	-7
3,200	232	226	-6	381	371	-10
3,400	248	238	-10	383	368	-15
3,600	257	250	-7	375	365	-10
3,800	266	261	-5	367	361	-6
4,000	271	272	1	356	355	-1
4,200	275	277	2	343	346	3
4,400	277	284	7	331	339	8
4,600	278	287	9	317	328	11
4,800	275	283	8	301	310	9
5,000	267	278	11	281	292	11

After running this test, we were certain there was a problem with the previous Holley/Weiand test. After installing the Q-Jet on the Weiand 8004 intake, the peak power jumped to 287 hp, a power gain expected of the Weiand intake over the factory Q-Jet manifold. Again, as expected, the aftermarket intake traded power down low for additional power production up top. The factory cast-iron intake is actually tough to beat at very low revs. Note that the power comparison listed above is between the



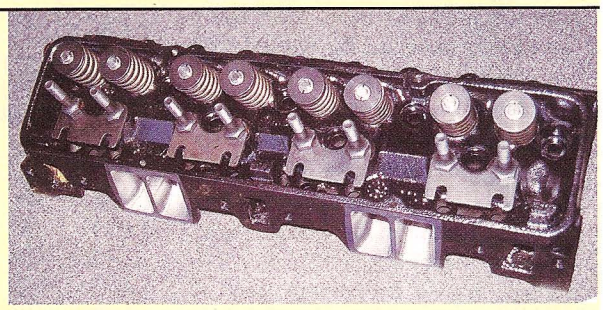
horsepower generated by the motor equipped with the stock Q-jet manifold and Q-Jet and the Weiand and Q-Jet. The Weiand 8004 intake is worth power compared to the factory Q-Jet intake, but there is a slight sacrifice in low-speed power. The Weiand would certainly be the better choice had the motor been equipped with anything but the factory camshaft. This trade-off in power is why we included all of the power numbers generated during each dyno run. Peak power numbers do not tell the whole story about the worth of a particular performance component.

Project Modified Stock: Test 6 Power Heads & Comp PE246 Cam

PEAK HP: 340 HP AT 5,200 RPM
PEAK TQ: 400 LB-FT AT 3,500 RPM
Largest Gains: 60 hp at 5,000 rpm and 63 lb-ft at 5,000 rpm

RPM	Stk HP	PH/246 HP	Gain	Stk TQ	PH/246 TQ	Gain
2,200	150	ND			358	ND
2,400	162	ND			354	ND
2,600	175	194	19	354	391	37
2,800	195	208	13	365	391	26
3,000	211	225	14	370	394	24
3,200	226	243	17	371	399	28
3,400	238	259	21	368	400	34
3,600	250	274	24	365	399	34
3,800	261	287	26	361	397	36
4,000	272	299	27	355	392	37
4,200	277	312	35	346	390	44
4,400	284	323	39	339	385	46
4,600	287	331	44	327	378	51
4,800	283	336	53	310	367	57
5,000	278	338	60	292	355	63
5,200	ND	340			ND	343
5,400		ND	335		ND	326
5,600		ND	332		ND	312

The limited amount of available dyno time (limited by expense) necessitated certain compromises. Case in point, test No. 6, where we installed a set of Power Head-ported 882 castings along with a Comp Cams Pure Energy



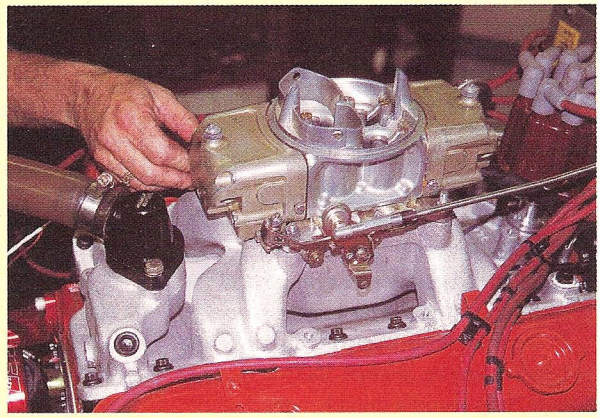
246 hydraulic flat-tappet cam. The ideal situation would have been to test each component separately, but there was insufficient time to tear down the motor twice to facilitate the head and then cam swap. Since we already had the stock 882s heads off to make way for the ported versions, we felt it prudent to install cam No. 2 (of four) used during this dyno thrash. Having only two days to run four cams, four heads, six intakes and six carburetors makes for a pair of busy afternoons (to go along with the busy mornings and evenings). Excuses aside, the installation of the Power Heads heads and small PE246 Comp Cam resulted in some serious power. Peak to peak, the maximum improved by 53 hp and 28 lb-ft, but gains were as high as 60 hp and 63 lb-ft of torque. The small dual-pattern PE246 cam offered a 0.420/0.436 lift split and a 203/212 duration split. This emissions-legal cam was basically one step above our stocker. The idle quality was nearly as good as the stock cam, but the power output of 340 hp and 400 lb-ft of torque let everyone know that was indeed a cam in this motor.

Project Modified Stock: Test 7 Performer RPM & 650 Demon

PEAK HP: 364 HP AT 5,100 RPM
PEAK TQ: 422 LB-FT AT 3,900 RPM
Largest Gains: 25 hp at 4,600 rpm and 28 lb-ft at 4,800 rpm

RPM	Stk HP	RPM HP	Gain	Stk TQ	RPM TQ	Gain
2,600	194	193	-1	391	390	-1
2,800	208	212	4	391	397	6
3,000	225	230	5	394	403	9
3,200	243	253	10	399	415	16
3,400	259	271	12	400	419	19
3,600	274	288	14	399	420	21
3,800	287	305	18	397	422	25
4,000	299	320	21	392	421	29
4,200	312	331	19	390	414	24
4,400	323	344	21	385	411	26
4,600	331	356	25	378	406	28
4,800	336	361	25	367	395	28
5,000	338	361	23	355	379	24
5,200	340	364	24	343	367	24
5,400	335	359	24	326	349	23
5,600	332	350	18	312	328	16

After the installation of the Power Heads heads and PE246 cam, we were curious about the intake/carburetor combination. The final test run in this part one of Project Modified Stock was to swap out the Weiand 8004 and SMI Q-Jet carb for an Edelbrock Performer RPM Air Gap and 650 Speed Demon carburetor. Although the Q-Jet was performing admirably in the



subsequent tests, we felt it was time to install an aftermarket performance carburetor. Our first choice was the 670 Avenger, but with the Holley acting up, we decided the 650 Speed Demon was a good alternative. As it turned out, the intake/carb combo was worth some serious power. The power gain was not quite on par with the installation of the Power Heads heads and PE 246 cam, but the RPM Air Gap and Speed Demon improved the peak power by 24 hp and 22 lb-ft of torque. The big plus was that there was no trade-off in low-speed power for the sizable peak power gains. Note that we were now beginning our dyno pulls at 2,500 rpm and running all the way to 5,600 rpm. The new spring package in the Power Heads heads eliminated the valve-float issue experienced with the stock heads. Check back with us next issue, as we continue Project Modified Stock with aluminum heads from Holley and AFR, a pair of new cams and even a duo of racy single-plane intake manifolds.

material was removed to increase the compression ratio versus the stock 882 castings.

With our short block and heads taken care of, it was time to address the pair of stock intake manifolds. Both the two-barrel and two-barrel cast-iron intakes had seen better days. Both were in need of some attention before we would even run them on our test motor. The intakes were taken to a local machine shop for bead blasting. Care should be taken after sand or bead blasting, because the stuff gets everywhere. You do not want blasting material of any kind in your new motor, so take care to clean it thoroughly. We also took the opportunity to grind the rivets securing the oil splash plate located on the underside of the intake. It was a good thing we did, as both bead-blasting material and years of carbon buildup had made a new home under the plate. After removing the rivets and plate, we used a screwdriver to knock off the accumulated sludge and carbon buildup. A good cleaning in the solvent tank was next, and the intakes were ready to go. Before installing the two-barrel intake on the waiting 882 heads, we installed a variety of different vacuum plugs. Since street driving was not in the cards, and the manifolds were going to be on only a short time, we simply plugged all the various vacuum fittings in preparation for the dyno service. No prep work was performed on the cast-iron exhaust manifolds, as they were the first to get the ax once on the dyno.

Speaking of dyno, all of the testing was performed on the Westech SuperFlow dyno in Ontario, California. The motor was installed on the dyno and filled with Union 76 10W-30 oil. After initial start-up, we quickly adjusted the distributor to achieve 36 degrees of total timing at wide-open throttle. The air/fuel meter indicated that the motor was idling a tad on the lean side with the 2G two-barrel, but the condition seemed to correct itself under throttle. The motor was run at a light load for 30 minutes to allow a break-in period for the cam and so that the rings could get properly acquainted with the cylinder bores. The oil pressure gauge indicated a steady 50 psi at any speed above 1,500 rpm. Our standard-volume oil pump did not create excessively high oil pressure as the engine speed climbed. After the break-in, our Project Modified Stock was ready to run. In this part one, we will cover the baseline dyno runs along with the modifications necessary to improve the peak output by more than 130 hp. In part two, we will get serious and try two different aluminum heads and a pair of hot cams. Stick around—this 350 won't stay stock for long. **CR**

PRODUCT PROFILES

ARP
Dept. CR
531 Spectrum Cir.
Oxnard, CA 93030
805/278-7223
www.arp-bolts.com

Coast High Performance
Dept. CR
1650 W. 228th St.
Torrance, CA 90501
310/784-2977
www.347streetfighter.com

Comp Cams
Dept. CR
3406 Democrat Rd.
Memphis, TN 38118
901/795-2400
www.compcams.com

Fel-Pro
Dept. CR
One Equation Blvd.
Ashland, MS 38603
662/224-8972
www.federal-mogul.com

Holley/Weiand/Hooker
Dept. CR
1801 Russellville Rd.
P.O. Box 10360
Bowling Green, KY 42102
270/781-9741
www.holley.com

MSD Ignition
Dept. CR
1490 Henry Brennan Dr.
El Paso, TX 79936
915/857-3344
www.msdignition.com

Power Heads
Dept. CR
621 W. Valencia Dr., #B
Fullerton, CA 92832
714/992-4909

Sean Murphy Induction (SMI)
Dept. CR
17662 Metzler Lane
Huntington Beach, CA 92647
714/842-1881