LS NEXT PROJECT

ENGINE BUILD, TEXT AND PHOTOS BY **MIKE MAVRIGIAN**

PROJECT LS NEXT, PART 3

Final assembly and dyno…she pulls 665 HP and gobs of torque!

In this third and final series installment, we finish assembly and run the engine on dyno, achieving 665.2 HP at 6000 RPM and 627.3 lb-ft of torque at 4900 RPM. We'll begin this article with cylinder head information and installation.

CYLINDER HEADS

- Trick Flow GenX, P/N TFS-3261T004-C01
- 255cc intake volume
- CNC competition ported
- 69cc CNC combustion chambers
- 448 lb springs
- Titanium retainers
- 6-bolt
- LS3 style with rectangular intake ports

CYLINDER HEAD STUD KIT

ARP offers a cylinder head stud kit specific to the 23-bolt LS Next application. Each head utilizes the following studs:

QTY	LOWER THREAD	UPPER THREAD	O/A LENGTH	WRENCH SIZE	LOCATION
4	3/8-16	3/8-24	2 ¼"	1/2"	OUTBOARD
5	8X1.25mm	5/16-24	65mm	3/8"	INBOARD
4	8X1.25mm	5/16-24	70mm	3/8"	EXTRA*
2	7/16-14	7/16-20	3 ¾"	5/8"	LOWER CORNERS
8	7/16-14	7/16-20	3 ½"	5/8"	PRIMARY

MALE HEX WRENCH SIZES TO DRIVE STUDS

3/8 STUDS	5/32"
8mm/5/16 STUDS	3mm
7/16 STUDS	3/16"

*The four (per head) "extra" 8mm x 1.25 x 70mm studs thread into the bottom of the head and pass through bosses in the block, secured with 5/16x24 nuts and special shouldered flange washers. A 3mm hex wrench is required to drive (install/remove) these studs.

These top-of-the-line Trick Flow heads are fully CNC machined, including decks, chambers, intake and exhaust ports, valve locations and seats. The Trick Flow heads were supplied fully assembled, with stainless steel valves and titanium spring retainers.

Install all studs only finger-tight. Dart suggests applying Loctite 241 to the course threads, although this isn't necessary (although not a bad idea for the five 8mm studs that screw into the cylinder head deck).

NOTE: When test fitting the Trick Flow LS3 heads, I discovered that the four outboard bolt holes on the heads were originally drilled to 0.350" in diameter, likely to accommodate OE size 8mm bolts on a GM factory LSX block. In order to use the required 3/8"-16 ARP studs for the Dart block, I enlarged these four holes on the outboard side of each head to 0.390", which was no big deal. This provided a comfy fit for the 3/8" studs that the Dart block requires. Once the holes were drilled to

Our Fel Pro cylinder head gaskets are MLS (multi-layer steel), featuring a gasket bore diameter of 4.200" and a compressed thickness of 0.051".

Trick Flow heads include aluminum rocker stands if OE type rockers are planned. Our Harland Sharp rockers did not require these, as they are designed to bolt directly to the rocker platforms.

The LS3 style 23-bolt heads feature "extra" 8mm studs that secure to the underside of the head prior to head installation to the block. These studs pass through existing bosses in the block.

the larger diameter, the upper and lower edge of each hole was lightly chamfered using a deburring tool.

CYLINDER HEAD INSTALLATION

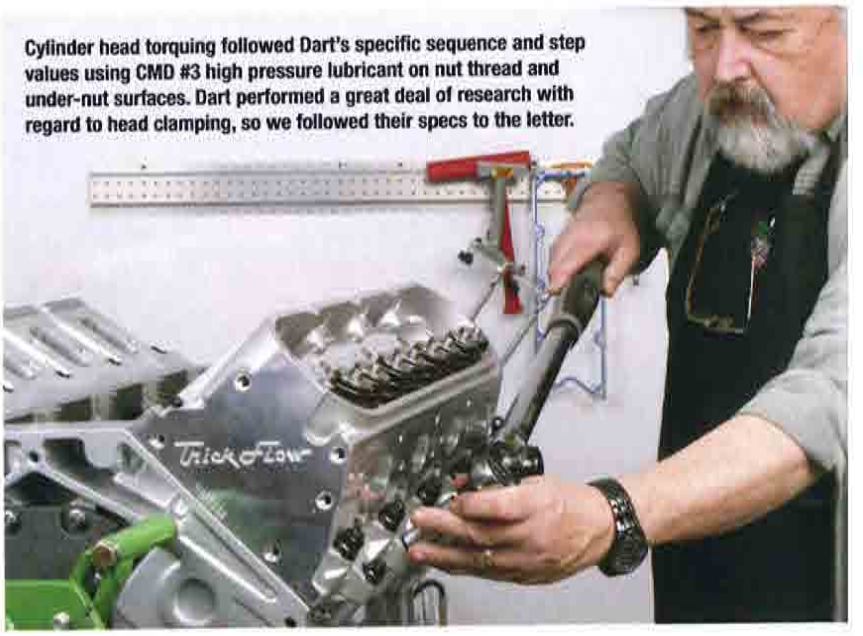
Dart's Dick Maskin recommends the following procedure:

Test-fit all 7/16" head studs to check thread depth engagement. If the upper portion of the 7/16-14 threads disappear below deck, and the unthread portion of the studs meet the deck surface, this may subject the deck to excess stress as the unthread portion of the studs are forced into the deck threads. In this case, the stud depth in the block needs to be adjusted by dropping a ball bearing into the blind hole and reinstalling the stud. Required ball diameter can range from 1/16" to 3/16". This is only necessary is your studs feature flat bottom tips. If the studs feature a tip extension (bullnose, etc.) this shouldn't be necessary . The goal is to make sure that the upper area of the stud's lower threaded in-block section doesn't engage at or deeper than the block deck surface. If the 7/16-14 threads disappear below deck, even though the studs will be installed finger-tight, when tightening the nuts you stand a chance that the unthreaded shank area can dig into the top female threads in the block.

Also, Dick recommends using only CMD #3 high pressure lubricant for nut-to-stud lubrication. In addition, Dick suggests soaking the upper fine threads of the 7/16" studs in muriatic acid (HCI... hydrochloric acid) to eliminate the black coating. As a result of his extensive research, Dick told me that he feels the coating has a variable effect on torque value.

He also recommends, when using MLS cylinder head gaskets, to apply a thin coat of Loctite 30544 spray adhesive to both sides of the gaskets. Dick notes that this will serve to fill any tiny voids or surface imperfections to prevent leakage (of course this depends on the Ra finish of the block and head decks).

Once the 8mm studs have been installed to the underside of the head, position the head gasket onto the block deck. Note that the gaskets are directional (our Fel-Pro MLS gaskets are clearly labeled "FRONT"). Position each gasket so that the "FRONT" label is facing upwards and is visible, with this end facing the front of the block.



Cylinder head torquing followed Dart's specific sequence and step values using CMD #3 high pressure lubricant on nut thread and under-nut surfaces. Dart performed a great deal of research with regard to head clamping, so we followed their specs to the letter.

Once the head is positioned onto the deck, install ALL studs finger-tight with a slight nudge. This includes the primary 7/16" studs, the outboard 3/8" studs and the inboard 8mm studs. Also, install the shouldered washers and nuts to the "extra" four studs that you previously installed to the deck of the head. Install these nuts finger tight and make sure that the shouldered washers are fully seated. This insures that all fasteners align with their holes. Do this before you start to torque anything.

Dick's cylinder head torquing procedure is as follows:

CYLINDER HEAD TORQUE

Dart specifies torque values for head installation to their block as follows:

FASTENER THREAD SIZE	TORQUE VALUE (FT-LB)
7/16"	75
3/8"	35
8mm	22

Per Dick Maskin's advice, I followed a very specific torque procedure for the 7/16" nuts:

1. Torque 7/16" nuts to 40 ft-lb, then 50 ft-lb, then 75 ft-lb. (in proper sequence)
2. Wait 5 minutes.
3. Crack all nuts loose (to zero ft-lb)
4. Torque all 7/16" nuts directly to 75 ft-lbs (in same sequence pattern)
5. Crack nuts loose again to zero
6. Final torque 7/16" nuts directly to 75 ft-lb

NOTE: After cracking all 7/16" loose to zero, I then re-snugged all studs to make sure they hadn't loos in the block.

Next, torque the outboard 3/8" to 35 ft-lbs and the 8mm stud nuts the "between lifter" locations and t inboard locations to 22 ft-lbs, alwa following the tightening sequence a follows:

CYLINDER HEAD FASTENER TORQUE SEQUENCE

Order	Fastener Location and Size
1	Center, above cyl bore 7/16
2	Center, below cyl bore 7/16
3	Second from left, above cyl bore
4	Second from right, below cyl bor
5	Second from right, above cyl bor
6	Second from left, below cyl bore
7	Far left, below cyl bore 7/16
8	Far right, below cyl bore 7/16
9	Far right, above cyl bore 7/16
10	Far left, above cyl bore 7/16
11	Second from left, between lifters
12	Second from right, outboard 3/8
13	Second from left, outboard 3/8
14	Second from right, between lifte
15	Far right, outboard 3/8
16	Far left, between lifters 8mm
17	Far left, outboard 3/8
18	Far right, between lifters 8mm
19	Center, inboard 8mm
20	Second from right, inboard 8mm
21	Second from left, inboard 8mm
22	Far right, inboard 8mm
23	Far left, inboard 8mm

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NOTE: Installing the four special shouldered washers and torquing the 8mm nuts onto the "extra" four stud locations (where these studs have been pre-installed to the head deck) takes a bit of patience to due limited finger access in the lifter valley windows. I used a hemostat to slip the shouldered washers onto the studs, making sure that the shoulder registers into the hole. I also used a hemostat to locate the nut, and gingerly began to rotate the nut onto each stud with one finger. This was done with the engine block rotated to orient the head deck perpendicular to the floor, with the lifters parallel to the floor. This makes access a bit easier. If you rotate too far, towards the floor, the lifters can slide out of their bores.

Once all four of these nuts are threaded onto their studs. I used a ¼"-drive Mac Tools digital torque wrench and a 3/8" torque wrench extension that adds 2" to the effective length of the torque wrench. The 8mm nuts require a value of 22 ft-lbs. Because of the added length of the extension, I set the torque wrench at 19.06 ft-lbs in order to achieve an actual 22 ft-lbs.

ROCKERS

Rocker arm whiz Randy Becker from Harland Sharp visited my shop with rockers and pedestals and shims to determine the optimum setup for the Trick Flow L92/LS3 heads. After a bit of test fitting, he determined that the SL927 rockers (intakes feature an offset) require a rocker pedestal height of 0.0700" in order to obtain proper sweep contact between the rocker roller tip and the valve tips. Randy then machined a set of pedestals to our required height. The machined billet rocker arms feature a 1.7:1 ratio. The supplied 8mm socket head cap screws are torqued to 22 ft-lbs.

Note: Whenever installing LS rocker arm bolts, be aware that all intake rocker arm bolt threads must be coated with a sealing compound such as Teflon thread paste, since the threaded holes in the heads are open to intake ports.

PUSHRODS

During test fitting, I swapped out the left cylinder head's number 1 intake and exhaust springs for light checking springs. After bringing number one piston to TDC and with number one intake and exhaust cam lobes on their base circles, I installed the head with an MLS head gasket, installed an adjustable checking pushrod and a pair of our Harland Sharp roller rockers. At zero lash, pushrod length measured 7.649". Morel recommends a lifter preload of 0.045-0.050", so maximum pushrod length would be 7.699". Since pushrods are available in increments of 0.025", I ordered a set of 5/16" chromoly pushrods with 0.080" wall thickness at a length of 7.700" from Trend Performance. Trick Flow actually recommends a length of 7.700" with their 255cc LS3 heads, but we always measure to verify length. By the way, I also ordered a few pushrod cleaning brushes, which are handy when cleaning new pushrods to eliminate any manufacturing particles that may be present inside the oil passage.

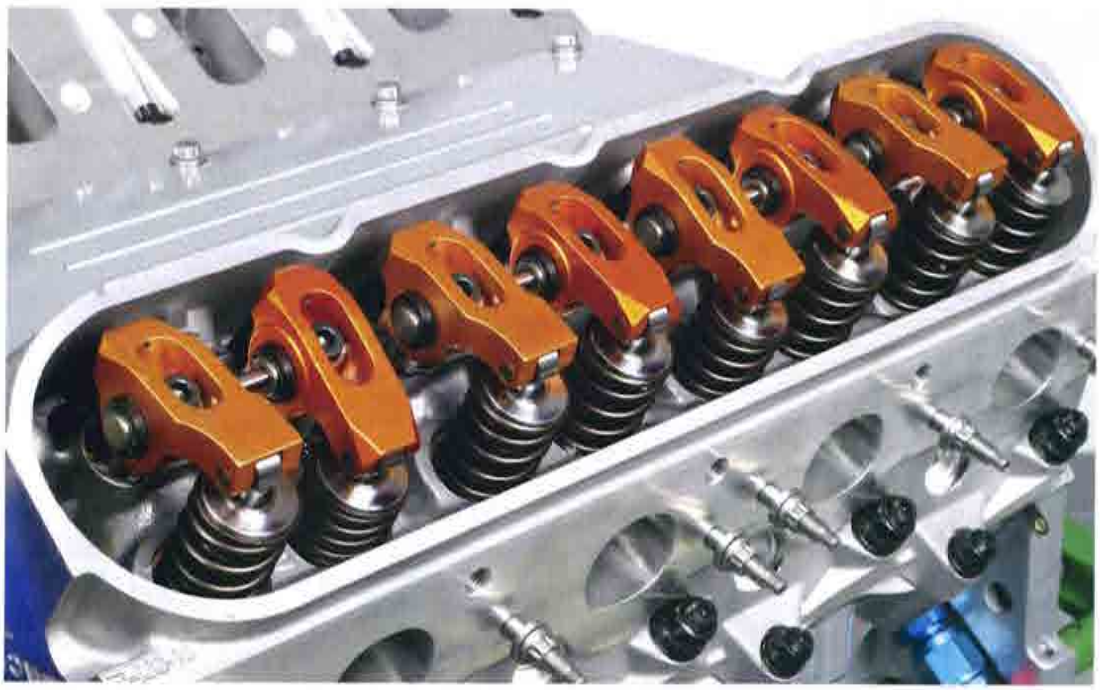
INTAKE SYSTEM

For this build, I opted to go with a carbureted setup, incorporating Holley's 300-131 single plane intake manifold designed to accommodate the LS3 style cylinder head. The carb is Holley's 850cfm Ultra double pumper, featuring a bright finish with blue anodized base and metering blocks.

The 850 Ultra features lightweight aluminum construction, an electric choke, mechanical secondary operation, 4-corner idle, clear fuel bowl sight glasses, and optimized street/strip calibration, 100% wet-flow tested, in a ready-to-run state.

The single plane intake is designed for LS3/L92 applications, featuring a port height of 2.50" and port width of 1.15". Manifold height, from the block's valley cover to the carb mounting flange is 5.42". The intake is designed for an optimum operating range of 2500 to 7000 rpm. Note: The same manifold is also offered for EFI applications, with machined injector ports. Weight is a mere 11.5 lbs.

Rather than using OE intake gaskets, the manifold intake ports feature O-ring



Notice the pushrod oil passage. All oil holes are flawlessly finished, with no burrs to impede oil flow.

Once pushrod lengths were determined and with pushrods installed, all rocker bolts were tightened to 22 ft-lb. Note that LS cylinder head intake rocker bolt holes are open to intake runners, so thread sealant is highly recommended on all intake rocker bolt threads.

groove around each port. Using Holley's O-ring seal kit P/N 508-22, each O-ring seal was carefully installed into the manifold flange grooves. A light coat of lithium grease or Vaseline helps to retain the seals during installation.

The manifold includes six 6mm x 1.0 x 50mm hex head bolts and four 6mm x 1.0 x 90 mm hex head bolts and flat washers. Although the included bolts and washers are perfectly acceptable, I opted to use ARP polished stainless fasteners. I obtained two 5-packs of the 6x1.0x50 bolts P/N 760-1007; and one 5-pack of the 6x1.0x90 bolts P/N 760-1014 (each pack includes washers).

The intake mounting bolts, with threads lightly coated with ARP moly, were initially torqued to 10 in-lb, then 30 in-lb, 50 in-lb, then to 106 in-lb, following Holley's recommended tightening pattern.

Note: The bolt hole spacing on the intake manifold aligned perfectly with the threaded holes in the Trick Flow heads. During earlier test fitting, I checked for port matching between the heads and manifold. While I was perfectly willing to spend grinding time, the port alignment was so nearly perfect that I saw no need to remove any material from either the manifold or head ports. It was as though Holley and Trick Flow talked to each other when designing and machining the intake ports. The match-up was that good.

VALVE COVERS

Since I decided to mount the MSD coils to the valve covers, but have always hated the look of coil brackets, I chose Holley's new cast aluminum valve covers that feature mounting bosses that allow the coils to directly mount to the covers, eliminating the need for coil brackets.

The Holley valve cover coil mounts are spaced 72mm apart for each coil, requiring the use of coils applicable to LS2/LS3/LS7 designs. The appropriate MSD coils are P/N 82878 (OE vehicle applications 2006-2009). The earlier LS1/LS6 style coils feature a bolt spacing of 64mm, which won't mount to the Holley valve covers (Holley states up front that 72mm coil bolt spacing is needed).

The only problem I ran into was, since the Holley covers feature a stock height, and since our Harland Sharp roller rockers are healthy in size, the rockers kissed the valve covers. Rather than going to taller valve covers that have no coil mounts or require coil brackets, I decided to install spacers. I only needed an additional 3/16" or so of clearance to feel comfortable, but I opted for a pair of ¾"-tall billet spacers from ICT Billet. While ½" tall spacers are available, the ¾" height adds a bit more "beef" to the appearance. These feature an O-ring groove for spacer-to-cylinder head mating and will accept either a stock type gasket or RTV for the spacer-to-valve cover seal.

Two sets of valve cover seals are required: one OE-type seal is installed to the O-ring groove side of the spacer and another OE type seal is installed to the O-ring groove in the valve cover. I chose a Victor Reinz kit VS50250A (pair of

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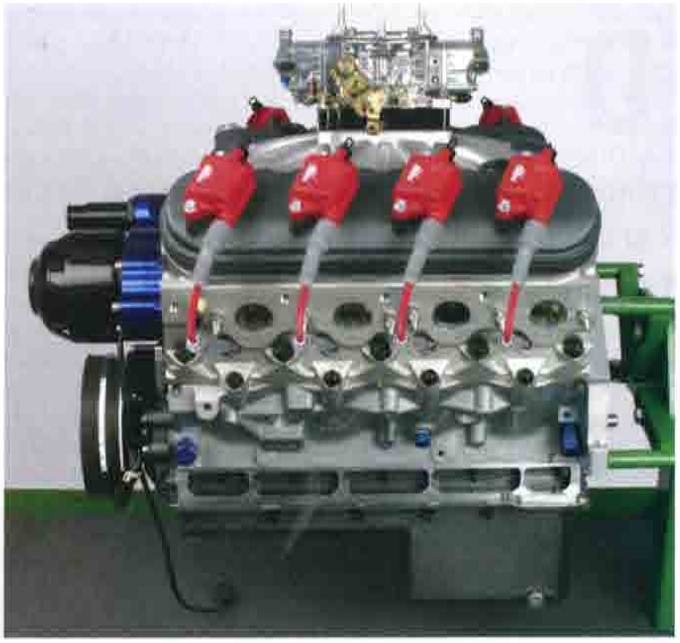
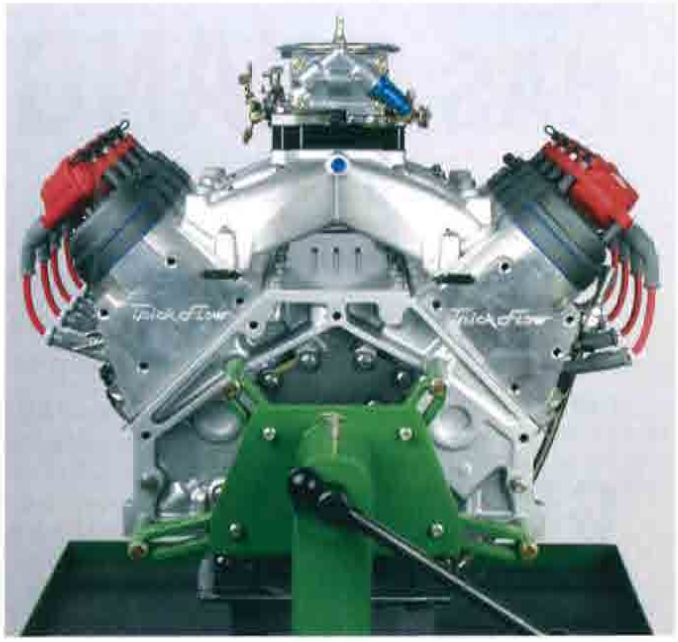


Left side view. Notice that the "windows" of the Moroso oil pan spacer were painted black. I chose this in order to create somewhat of a "skeletonized" look.



Rear view. Note that the Dart block does not feature the oil pressure sender location at the top rear of the lifter valley. An oil pressure port is provided on the lower rear of the left side, above the remote oil return port.

seals and full set of grommets, along with an additional pair of seals P/N VS50250).

In order to secure the valve covers along with the ¾" spacers, we used stainless steel socket head cap screws with a length of 3.500", OE type bolt hole grommets and 6mm stainless flat washers that feature an 18mm outer diameter (this O.D. provides a good footprint on the rubber grommets). While Holley instructions spec a bolt torque of 106 in-lb, I didn't feel comfortable with that value, only because the spacers did not include support stand-offs (the OE valve cover bolts feature metal sleeves that provide a solid stop between the covers and the heads). Rather than pulling the valve cover roofs down and distorting them, I applied a drop of medium strength thread locker to the screw threads, and temporarily tightened the 6mm screws to 40 in-lbs, alternating from screw to screw to evenly draw the covers down. The spacers are machined nicely and fit well, but only included the 6mm screws and loc washers. They should have included length-appropriate sleeves to provide a solid "stop" during tightening, eliminating potential valve cover distortion. Prior to running the engine, I'll carefully measure and fabricate tube standoffs.

Since I decided to have the Holley valve covers powdercoated in a charcoal wrinkle finish anyway (same as on our front and rear engine covers and oil pan), I also had the outer walls of the valve cover spacers powdercoated, to visually blend into the valve covers.

IGNITION COILS

The Holley valve covers allow securing the coils without the need for mounting brackets, which provides a much cleaner appearance. Coils are secured with 6mm x 1.0 x 25mm screws. MSD provides these screws with the coils, featuring a zinc plated hex head design. An upgrade to ARP 12-point polished stainless screws would provide a distinguished appearance. The Holley valve cover mounting posts are spaced 72mm apart, requiring MSD coils P/N 82878 (this is the bolt spacing used on factory LS2/LS7 OE models). Torque the 6mm bolts to 106 in-lb.

Our spark plugs, per Trick Flow's recommendation, are NGKs, P/N 4177. I gapped these at 0.045".

Since this build features a carburetor for fuel management, the only electronic control system needed is for the ignition system. An MSD 6LS2 ignition control module (and harness kit) connects to the coil harness, water temperature sensor, cam sensor and crank sensor. The controller features a selection of six pre-programmed ignition curves (simply plug & play), or you can use the included software disc on any PC or laptop computer to tailor your own curve. When converting any LS engine to use a carburetor, all you need is the MSD ignition controller kit and you're good to go.

COMPRESSION RATIO

NO. CYLS	8
CYL. BORE	4.185"
STROKE	4.000"
ROD CTR-TO-CTR	6.125"
GASKET BORE DIA.	4.200"
COMPRESSED GASKET THICK.	0.051"
BLOCK DECK HEIGHT	9.2370"
COMB. CHAMBER VOLUME	69cc
PISTON DOME VOLUME	+14.6cc
PISTON-TO-DECK	0.003"
TOTAL VOLUME	996.19cc
CYL. VOLUME	901.69cc
CLEARANCE VOLUME	94.5cc
GASKET VOLUME	11.57cc
DECK VOLUME	– 0.68cc
PISTON TOP LAND	4.147cc
½ STROKE	2.000"
PISTON COMPRESSION HEIGHT	1.115"
DISPLACEMENT	440.18 CID

STATIC COMPRESSION RATIO: 10.54:1

OUR DYNO SESSION

Whenever we need to dyno an LS engine, our shop of choice is Gressman Powersports in Fremont, Ohio. Scott Gressman maintains a beautiful update dyno cell equipped with the latest

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The LS Next mounted to Gressman's Superflow engine dyno cell. After a slight richening of the carb's primary and secondary jets, the engine pulled 665.2 HP at 6000 RPM. Peak torque was 627.3 lb-ft at 4900 RPM.

Superflow engine dyno. The Moroso oil pan specifies a 7 qt sump capacity. We added 7 qts of Brad Penn 30W break-in oil to the sump and another quart for the remote filter and –10 plumbing.

Scott plotted a custom ignition curve (using the program CD supplied with the MSD 6LS2 controller kit). Timing at idle as 15 degrees, ramped up to 27 degrees by 2500 rpm.

The Holley 850 cfm double pumper carb was originally fitted with No. 80 jets in both primary and secondary metering blocks. While approaching our peak power levels, the Superflow air/fuel monitor indicated a slightly lean condition, so Scott swapped out the jets for 90s. While this was a tad on the rich side, our power and torque numbers increased. We then settled on No. 88 jets for both primary and secondary circuits.

Our brief dyno session noted a peak of 665.2 HP at 6,000 RPM and 627.3 lb-ft of torque at 4900 RPM. Throttle response was extremely quick and viciously snappy. A real barker. Frankly, I was surprised that our peak numbers didn't occur at slightly higher engine speeds, but given more dyno time, toying with the carb and ignition timing would likely result in incremental increases. Even given the brief session, we were happy. She should be a nice little stump puller. Final numbers only provide a clue regarding output, since an any given day, on different dynos, numbers can vary widely with some dynos showing higher or lower numbers. I've seen the same engine on different engine dynamometers reading as much as 40 or 50 horsepower differences (some dynos are simply stingier or more generous).■

DYNO RESULTS

RPM	HP	TORQUE
3700	391.7	550.7
3800	410.8	562.6
3900	433.2	577.9
4000	455.3	592.3
4100	475.2	603.1
4200	491.8	609.3
4300	507.9	614.5
4400	523.4	618.9
4500	537.5	621.4
4600	550.4	622.5
4700	564.3	624.7
4800	577.6	626.1
4900	590.8	627.3
5000	602.1	626.6
5100	611.1	623.4
5200	620.0	620.4
5300	625.6	614.1
5400	631.3	608.3
5500	636.1	567.7
5600	642.1	601.7
5700	648.0	591.5
5800	655.2	587.7
5900	659.9	582.0
6000	665.2	576.8
6100	662.4	564.9
6200	660.7	554.4

TORQUE SPECIFICATIONS

MAIN CAP BOLTS	65 ft-lbs w/CMD #3 high pressure lube
ARP HEAD STUD NUTS 7/16"	75 ft-lbs w/CMD #3 (*note procedure!)
ARP HEAD STUD NUTS 3/8"	35 ft-lbs w/CMD #3
ARP HEAD STUD NUTS 8mm	22 ft-lbs w/CMD #3
ARP OIL PUMP TO BLOCK BOLTS	18 ft-lb
CAM RETAINER PLATE SCREWS	86 in-lb
ARP CAM GEAR BOLTS	25 ft-lb w/Loctite
TIMING CHAIN DAMPER TO BLOCK	18 ft-lb
ARP CRANK DAMPER BOLT	235 ft-lb
OIL PICKUP TO OIL PUMP BOLT	106 in-lb
OIL PICKUP SUPPORT BRACKET NUT	35 ft-lb
FRONT COVER BOLTS	18 ft-lb
REAR COVER BOLTS	18 ft-lb
ROD BOLTS	64 ft-lb w/moly (not to exceed 0.0046" stretch)
OIL PAN RAILS TO BLOCK	18 ft-lb
OIL PAN TO RAILS (5/16 stud nuts)	25 ft-lb
OIL PAN TO FRONT COVER (8mm stud nuts)	18 ft-lb
OIL PAN TO REAR COVER (6mm stud nuts)	96 in-lb
MEZIERE WATER PUMP BOLTS	22 ft-lb

Mike Mavrigian has written thousands of technical articles for a variety of automotive publications and many books for CarTech and HP Books. Contact him at Birchwood Automotive Group, Creston, OH. Call (330) 435-6347, email: birchwdag@frontier.com or go to birchwoodautomotive.com.

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PARTS LIST

DART LS NEXT IRON BLOCK 4.125" BORE....P/N 31837211
(IRON BLOCK WITH RAW 4.000" BORE ALSO AVAILABLE)
- ORIGINAL CYL BORE....4.125"
- FINAL BORE SIZE....4.185"
- BLOCK DECK HEIGHT....9.240"
- APPROX. LIFTER BORE DIA....0.842"

DART CAM BEARINGS (coated)....32210101-5 (specific to LS Next block)
DART CAMSHAFT RETAINER PLATE....32226000
BLOCK PARTS KIT....32000016
(1.5" freeze plugs, NPT plugs, head and bellhousing dowels)
CRANKSHAFT....SCAT 4.000" STROKE / 4-LS1-1-4000-6125-58
CONNECTING RODS....SCAT 6.125" H-BEAM / 2-350-6125-2100-S
PISTONS....JE P/N 324072
- LS ASYMMETRICAL FSR DISH/INVERTED DOME
- 4.185 BORE, 1.115 CD, DOME VOL. –14.6

OIL PUMP....MELLING 10295
TIMING SET....CLOYES 9-3172AZ
TIMING CHAIN DAMPER....GM 12588670
CRANK DAMPER....FLUIDAMPR 740111
MAHLE CLEVITE MAIN BRGS....MS2321H
(Note: main bearings are specific to LS Next block)
UPPER ROD BRGS....MAHLE CLEVITE CB-663HNK
LOWER ROD BRGS....MAHLE CLEVITE CB-633HXK
GASKET SET....VICTOR CS5975
CYLINDER HEADS....TRICK FLOW P/N TFS-3261T004-C01
CYL. HEAD GASKETS....FEL PRO 26473L / 26473R
(4.200" GASKET BORE; 0.051" THICK, MLS)
FRONT COVER....COMP CAMS P/N 5496 (powdercoated wrinkle)
REAR COVER....GM 12639250 (powdercoated wrinkle)
VALLEY COVER....BIRCHWOOD AUTOMOTIVE
(fabricated aluminum 0.250" x 6.00" x 20 3/8"; with O-ring groove seal)
VALVE COVERS....HOLLEY P/N 241-89 (powdercoated wrinkle)
VALVE COVERS SPACERS (3/4")....ICT BILLET P/N 641-7
(powdercoated wrinkle)
VALVE COVER GASKETS W/GROMMETS....VICTOR VS50250A
EXTRA GASKETS FOR VALVE COVER SPACERS....VS50250
REMOTE OIL FILTER BLOCK FITTINGS (2)....SUMMIT RACING
P/N SUM-220164B (-10 AN MALE TO –10 AN STRAIGHT W/O-RING)
WATER TEMP. SENSOR....STANDARD, P/N TX89 (or GM 12608814)
WATER TEMP SENSOR HOLE PLUG FOR RH HEAD .. 12m X 1.5 X 16mm BOLT
(with 12mm aluminum crush washer and Teflon thread sealant)
CRANK POSITION SENSOR (FOR 58 TOOTH)....GM, P/N 12585546
CAM SENSOR...(2005 & LATER LS)....GM, P/N 12591720
CAM SENSOR WIRE HARNESS....GM, P/N 12627501
CAMSHAFT....COMP CAMS P/N 54-462-11
LIFTERS (HYD ROLLER)....MOREL/JOHN CALLIES MP 5294
(.842" w/V-tie-bars)
ROCKER ARMS....HARLAND SHARP SL927
PUSHRODS....TREND (7.700" X 5/16" w/ 0.080" wall)
CRANK BOLT....ARP 234-2503
REAR COVER BOLTS....ARP 434-1504
TIMING COVER BOLTS....ARP 434-1502
CAM BOLT KIT....ARP 134-1003
CARB STUDS, NO SPACER....ARP 400-2401
CARB STUDS W/ 1" SPACER....ARP 400-2402
OIL PUMP TO BLOCK 8X1.25X30 5-PACK....ARP 661-1003
TOP COVER BOLTS....ARP M10AF20-12
TOP COVER WASHERS....ARP AN25-C516
INT. MANIFOLD....ARP 760-1007 & 760-1014
CYL. HEAD STUD KIT....ARP 234-4341
(head stud kit specific to LS Next block; 23-bolt head application)
CRANKSHAFT TIMING GEAR KEY....GM 12561513
INTAKE MANIFOLD....HOLLEY 300-131
CARBURETOR....HOLLEY 850cfm HP P/N 82851
CARB 1" SPACER....SUMMIT SUM-G1408
DIPSTICK ASSEMBLY....LOKAR
WATER PUMP....MEZIERE WP319B
THERMO NECK....MEZIERE WN0019B
OIL PAN KIT....MOROSO 20144 (specific to LS Next block.
Includes billet spacers and hardware; powdercoated wrinkle)
OIL PUMP PICKUP....MOROSO 24144
OIL PAN GASKET....VICTOR (in Victor gasket set)
DIPSTICK TUBE WELD-IN BUNG, PAN SUMP....MOROSO 25970
(featuring ¼" NPT female thread)
REMOTE OIL FILTER FITTINGS....SUMMIT RACING SUM-220164
(-10 straight to –10 w/ O-ring, Qty 2)
TIMING POINTER....TCI P/N 871005
BELT TENSIONER....COMP CAMS 54021
ENGINE OIL....5W-40 (specified by Morel lifters)
IGNITION CONTROLLER (for 58-tooth tone wheel)....MSD 6LS-2
COILS (w/ 72mm bolt spacing; LS2/LS3 style)....MSD 82878
SPARK PLUG WIRES....MSD 32079 (require cutting to length)
SPARK PLUGS (gapped 0.045")....NGK 4177
OIL PUMP TO BLOCK BOLTS....8mm x 1.25 x 25mm flange head
WATER PUMP TO BLOCK....8mm x 1.25 x 75mm SHCS
BLOCK PAINT....Valspar Silver/Sunshades 333S439 basecoat/clear

ACKNOWLEDGEMENTS

BLOCK CNC MACHINING....GRESSMAN POWERSPORTS
BLOCK PREP/PAINT....BIRCHWOOD AUTOMOTIVE
POWDER COATING....ACE POWDER COATING
(front cover, rear cover, valley cover, oil pan. Silver Splatter wrinkle)
ENGINE DESIGN/PRE-FITTING/ASSEMBLY....BIRCHWOOD AUTOMOTIVE
(article text and photos)
ENGINE DYNO....GRESSMAN POWERSPORTS

SOURCE LIST

ACE POWDER COATING....330-896-6365 / acepowdercoating.com
ARP....800-826-3045 / arp-bolts.com
BIRCHWOOD AUTOMOTIVE....330-435-6347 / birchwoodautomotive.com
CLOYES....248-365-0363 / cloyes.com
COMP CAMS....800-999-0853 / compcams.com
DART MACHINERY....248-362-1188 / dartheads.com
FEL-PRO/FEDERAL-MOGUL....248-354-9282 / federal-mogul.com
FLUIDAMPR/VIBRATECH....716-592-1000 / vibratechtvd.com
GOODSON....800-533-8010 / goodson.com
GRESSMAN POWERSPORTS....419-355-8980 / gressmanpowersports.com
HOLLEY....270-782-2900 / holley.com
JE PISTONS....714-898-9763 / jepistons.com
LISTA INTERNATIONAL....800-722-3020 / listaintl.com
MAC TOOLS....800-MACTOOL / mactools.com
MAHLE CLEVITE....800-338-8786 / mahleclevite.com
MELLING....517-787-8172 / melling.com
MEZIERE....800-208-1755 / meziere.com
MOREL LIFTERS....John Callies / johncalliesinc.com
MOROSO....203-453-6571 / moroso.com
MSD IGNITION....915-857-5200 / msdignition.com
SCAT ENTERPRISES....310-370-5501 / scatcrankshafts.com
SCOGGIN-DICKEY (SDPC)....806-798-4108 / sdpc2000.com
SUMMIT RACING....800-230-3030 / summitracing.com
TRICK FLOW SPECIALTIES....330-630-1555 / trickflow.com