MINNESOTA'S '64 – '87 CHEVELLE AND EL CAMINO CLUB

President: Stan Shinker **Vice President: Chris Reid**
Webmaster: John Delke **Treasurer: Bryan Flattem**

Is it October already? Let's hope the weather holds out through the month. There are still some events left and I think most of us still aren't quite ready to wrap it up for the year yet. One of the big things we do focus on at this point is starting to look ahead to next year. Our October meeting is your opportunity to voice any interest you may have in holding an officer position or any of the other supporting roles our club has. Our club officer positions are listed at the top of this newsletter, and also include a secretary position which was filled this year by Bryan F. Other supporting roles for the club are: Merchandise coordinator, Event planner/coordinator, and Newsletter publisher. Bryan has indicated that he will not be returning as an officer or producing the newsletters, but he has offered to help with content.

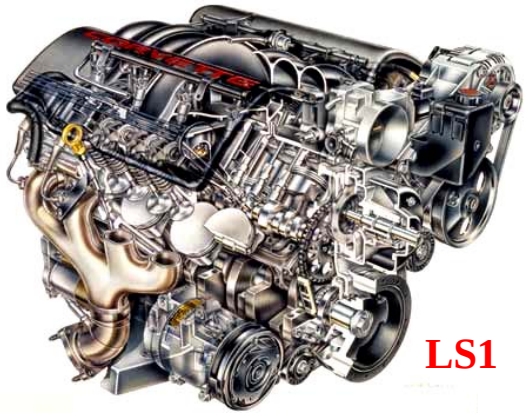
There are still some good events coming up this fall. By the time you get this, our fall cruise will have just been completed. Rock Falls still has some events, and the Frankensteiner's show is coming up. If you have not been to the Frankensteiner's show or heard of their club, you're missing out. The Frankensteiners are a club mostly dedicated to the Rat Rod scene. Their annual show has grown exponentially in the past few years. It started out in a small mini mall parking lot, and after 4 years they have now almost maxxed out the Anoka County Fairgrounds. The show itself is scheduled mid to late October and has a Halloween theme. Kids can trick or treat at the cars and there's a few features not normally seen: pipe rapping and flame throwing. Most entries will be regular drivers or cars with more character and patina than shine.

Some shots from last year. It's a very kid friendly show and you get to see some unusual cars.

NORTHSTAR CHEVELLE CLUB FALL CRUISE:

The weather was perfect. The sun was out. Skies were clear with only a wisp of cloud to break up the blue. 10 cars with drivers and navigators started out at the dam in Hastings, took a nice drive up to River Falls Wisconsin, then down to Red Wing and back to Hastings for the last cruise night of the year. Those 90 miles could have easily been covered in 2 hours, but this was a cruise. No hurry. No agenda. Just people out enjoying their cars and the drive. In an unusual occurance, there wasn't any construction and the roads were in good shape. Add to that the fall colors, and I'll just let some of the pictures show the story:

THE MODERN SMALL BLOCK CHEVY: LS SERIES ENGINES



LS1

The small block Chevrolet engine changed very little over the better part of 30 years. In the mid-1980s, GM engineers started playing with the design and looking for something that could keep up with the modern technology and dare we say fuel and emissions requirements necessary for mass production vehicles. In 1997, GM introduced the C5 Corvette and the all-new aluminum 5.7 liter Gen III small block engine called the LS1. For the next model year, the LS1 replaced the Camaro and Firebird LT1 engines. In 1999, with the introduction of the new Silverado and Sierra pickup trucks, GM rolled out the iron block truck version of the LS engine. These truck versions measure in at 4.8L, 5.3L and the powerful 6.0L. 1999 also saw the new Corvette Z06 and the higher performance LS6 engine which came in at 405hp. Things cooled off a little until GM unveiled the Gen IV branch of the LS engine family in 2005. Many features stayed the same, but now they were being built for performance as much as production. Cylinder deactivation, larger displacements, and improved camshaft sensing were factored in and soon the family grew to include the LS2, LS3, the awesome supercharged LS9 and it's detuned Cadillac cousin the LSA, and the largest LS engine yet: the 7.0L LS7.

All LS engines have these things in common:

- ***4.40 inch bore**
- ***6 bolt, cross bolted main caps**
- ***center main thrust bearing**
- ***9.24" deck height**
- ***4-bolt-per-cylinder head bolt pattern**
- ***0.842 inch lifter bores**
- ***distributor-less coil near plug ignition**

LS7

Here's some LS engine series highlights:

LS1-5.7L produced 1997-2004, found in the Corvette, Camaro/Firebird, and GTO.

LS2-6.0L debut of the Gen IV. Offered is the Corvette, GTO, SSR, and Pontiac G8 GT.

LS3-6.2L 430 hp, introduced in the 2008 Corvette, also in the G8 GXP, 2010 Camaro SS.

LS4-5.3L 303hp, front wheel applications, has unique low profile drive accessories

LS6-5.7L used in 01-05 Z06 Corvette and CTS-V, stronger block, unique heads, intake, and cam

LS7-7.0L 505hp, Siamese-bore, titanium rods, dry sump

LS9-6.2L 638hp, supercharged/intercooled, dry sump oiling. Found in the ZR1 Corvette

LSA-6.2L 556hp, supercharged/intercooled detuned version of the LS9 found in 09 CTS-V

L99-6.2L with active fuel management, found in 2010 Camaro with automatic transmission

LS9

There are also the Gen III and Gen IV truck series engines that have been named "Vortec". The name came from the previous design cylinder heads, but was carried over and became the designation for the engine even though it is a completely new design.

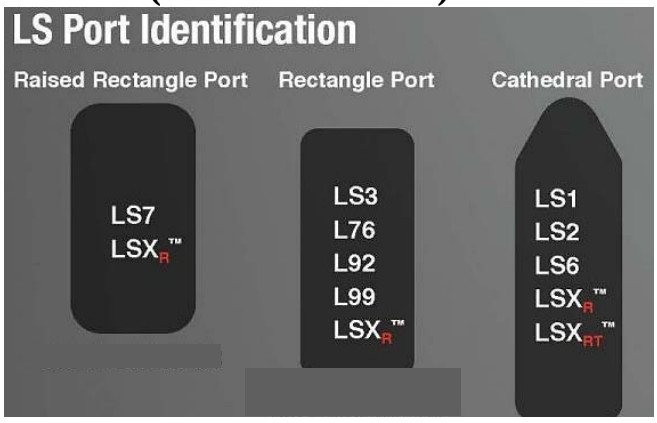
The truck engines each received an RPO code like the cars, but those codes aren't used like names in the aftermarket world. A 5.7L Vortec LS engine was never offered.

Here's the truck engine lineup:
4.8L-iron block, 3.78" bore, aluminum head
5.3L-iron block, 3.78" bore, aluminum head, 3.62" longer stroke crank. Later designs had aluminum blocks and active fuel management
6.0L-iron block (LY6 code), aluminum block (L76 code), used mostly in ¾ and 1-ton trucks. Later designs had active fuel management
6.2L-aluminum block, L92 engine code. Variable valve timing. Found as high performance engine used in Cadillac Escalade and Yukon Denali

There also are non-production and aftermarket engine blocks like the C5R and LSX. There's also growing aftermarket support for all the other internal and external engine parts which we can't even come close to addressing here.

Some tricky parts that need special attention:
***Generally, the LS crankshafts are similar in design. All but the high-performance forged steel versions are cast iron. Early LS engines used 24 tooth crankshaft sensing reluctor wheels, later ones switched to 58 tooth (58X). The hi-perf LS7/LS9 cranks are @ 1" longer to accommodate the dry sump oil pump, and would need some modifications to swap in.**

***Cylinder heads-They must be matched with compatible intake manifold. There are 3 types of ports: Cathedral (LS1, LS2, LS6, Vortec), Rectangular (LS7), Rectangular (L92, LS3, LS9, LSA, and <u>some</u> 6.0L Vortec) similar to LS7, but taller and narrower. Also, LS1 & LS6 blocks (3.89" bore) can only use LS1, LS2, or LS6 heads. LS2 (4.00" bore blocks) can also use LS3, LS9, LSA heads as those all interchange. 6.2L engines can use any head but the LS7. 7.0L LS7 can use any head, but <u>should be matched</u> to 4.10 or bigger heads. Most LS blocks share the same head bolt pattern and bolts: 4-11mm per cylinder (10 total) and 5-8mm in upper row. Early LS1/LS6s used different length bolts, but after 2004 all were the same. LS9s use 12mm bolts.**



All of the above info *might* be thrown out the window when you start mixing in the aftermarket blocks, heads, intakes, and other parts. Be advised that the nature of these engines wasn't designed for interchangeability as much as a continuing pyramid for design and engineering. This has been a very brief overview of what these engines are. For even more information, check out these websites and these books:

LS1tech.com
LS1howto.com
LS1tuningguide.com
Fuelairspark.com
LS1.com
Thirdgen.com
S10forum.com
Plus magazines like GMHitechPerformance, Car Craft, Hot Rod, Popular Hot Rodding, etc.