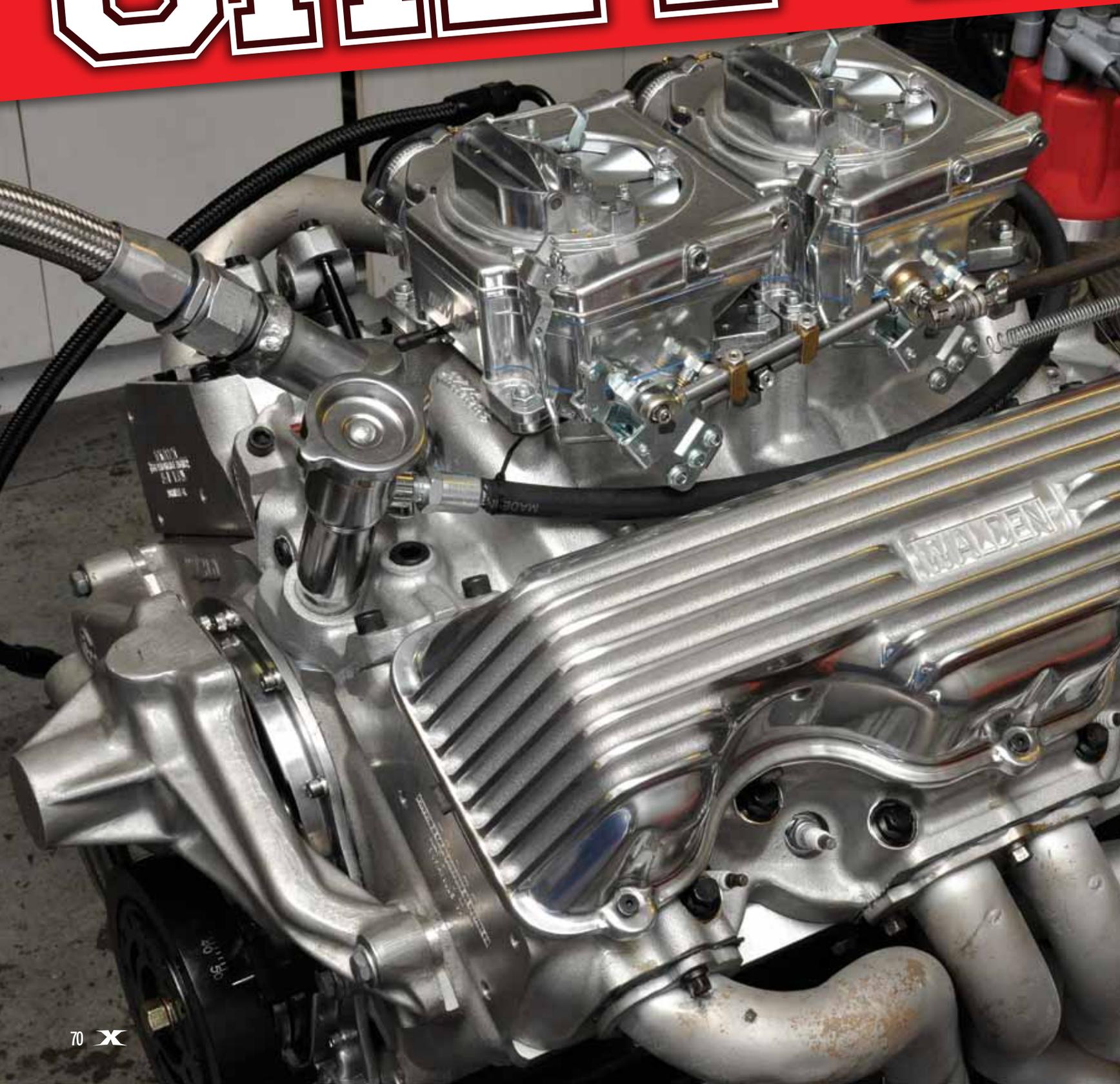


NEW

HOW TO SUCCEED IN TUNING THE FIRST TWIN STREET
DEMONS ON LAMAR WALDEN'S NEW CHEVY 409

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CHEVY



409CI



In the dyno room, Lamar Walden's first production road-going 409 fitted with twin 625 Street Demon carburetors revved with enthusiasm to 6,293rpm and generated 602.4 peak horsepower and 602lbs-ft torque at 4,600rpm. For some, the emergence of the new Street Demon and the re-emergence of a new 409 have been the biggest hot rodding news of 2012.

Earlier in a comparison test, twin Edelbrock AVS carburetors had generated a commendable 553hp @ 5,800rpm and 575lbs-ft torque @ 4,470rpm. Why had the Street Demons triumphed by 49hp and 27lbs-ft of torque? "I imagine," said Lamar, "its supremacy lies in the size of its secondary throttles." Unlike any conventional 4-barrel layout, the Street Demon is a three-barrel carburetor inhibited by few restrictions—the secondary throttle bore is one big opening.

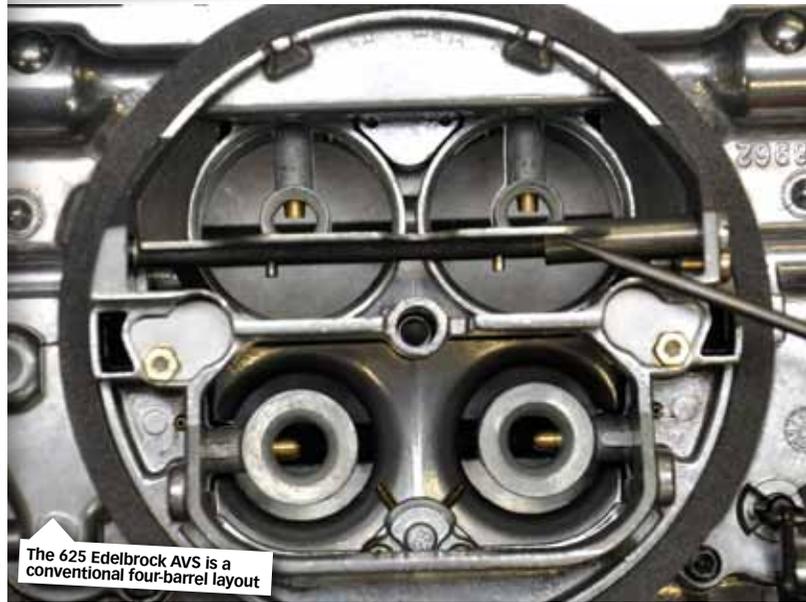
It's taken Demon a while to compose a convincing answer to the Edelbrock AVS. But once Larry Tipton, Demon's distinguished senior designer, focused his creative energy on the new design in 2010, we suspected a beacon of carburetor ingenuity could be in the works. And when it appeared on May 25, 2012, it not only looked the part in a market where appearance is of primary concern but also it proved to be a very strong performer.

Based entirely on a brand-new concept this innovative three-barrel 625 Street Demon has noticeably smooth contours especially around the air entries, unlike its Edelbrock counterpart. Though both carburetors have dual mounting points, accommodating square-bore or spread-bore manifold mounting without adapters, Tipton is particularly pleased with the effectiveness of his triple-stack boost venturii arrangement. Set in compact 1-3/8in primary throttle bores, selected to induce fast-moving airflow, "This layout," he says, "delivers superior air-fuel emulsification and as a result the acceleration will be crisp. The fuel economy for street performance will also be heartening." But for this first test of Lamar Walden's new LWA 409 high-performance hot engine, two Street Demons set in tandem were stipulated. To date twin Street Demons have never been run before.

Originally appearing in the Chevrolet Impalas of the early 1960s, the outward contours of these new cast aluminium 409 engines remain unchanged; their cylinder heads and valve covers exhibit the same alluring W shape. However, the internal



To encourage the secondary throttles to engage earlier, tension is reduced on its upper flap valve. Though the next dyno pull revealed an improvement, it was concluded that access to an additional air supply would be required.



The 625 Edelbrock AVS is a conventional four-barrel layout



Lamar Walden's new 409 blocks have just begun arriving from the foundry and already have attracted 50 orders. "The Street Demons," he says, "have great looks and they're easy to work on and simple to tune."



Larry Tipton, senior Demon designer, went all out to give the new Street Demon a clean look and a useful purpose. Equipped with 1-3/8in primaries with triple-stack boosters and secondary throttles over twice the size of the primaries, he also ensured it would easily replace any street four-barrel, either square bore or spread bore.

Primary Metering Jet (Pairs)		Metering Rods (Pairs)		Secondary Metering Jet (Pairs)	
Primary Jet Size - 2760 Jet # 1940 ID Stamp - 74	Primary Jet Size - 2760 Jet # 1940 ID Stamp - 75	Needle Size - 208 x 249 Part # - 1940 ID Stamp - 2643	Needle Size - 208 x 252 Part # - 1942 ID Stamp - 2650	Secondary Jet Size - 2770 Jet # 1940 ID Stamp - 85	Secondary Jet Size - 2770 Jet # 1940 ID Stamp - 85
Primary Jet Size - 2760 Jet # 1940 ID Stamp - 85	Primary Jet Size - 2760 Jet # 1940 ID Stamp - 85	Needle Size - 208 x 252 Part # - 1941 ID Stamp - 2647	Needle Size - 208 x 252 Part # - 1942 ID Stamp - 2650	Metering Rod Springs (Pairs)	
		Needle Size - 208 x 254 Part # - 1943 ID Stamp - 2654	Needle Size - 208 x 258 Part # - 1945 ID Stamp - 2658	Blue Spring #7 Hg	Yellow Spring #7 Hg
		Needle Size - 208 x 258 Part # - 1945 ID Stamp - 2658	Needle Size - 208 x 262 Part # - 1947 ID Stamp - 2662	Orange Spring #7 Hg	Silver Spring #7 Hg

DESIGN CALIBRATION 270-901-5346

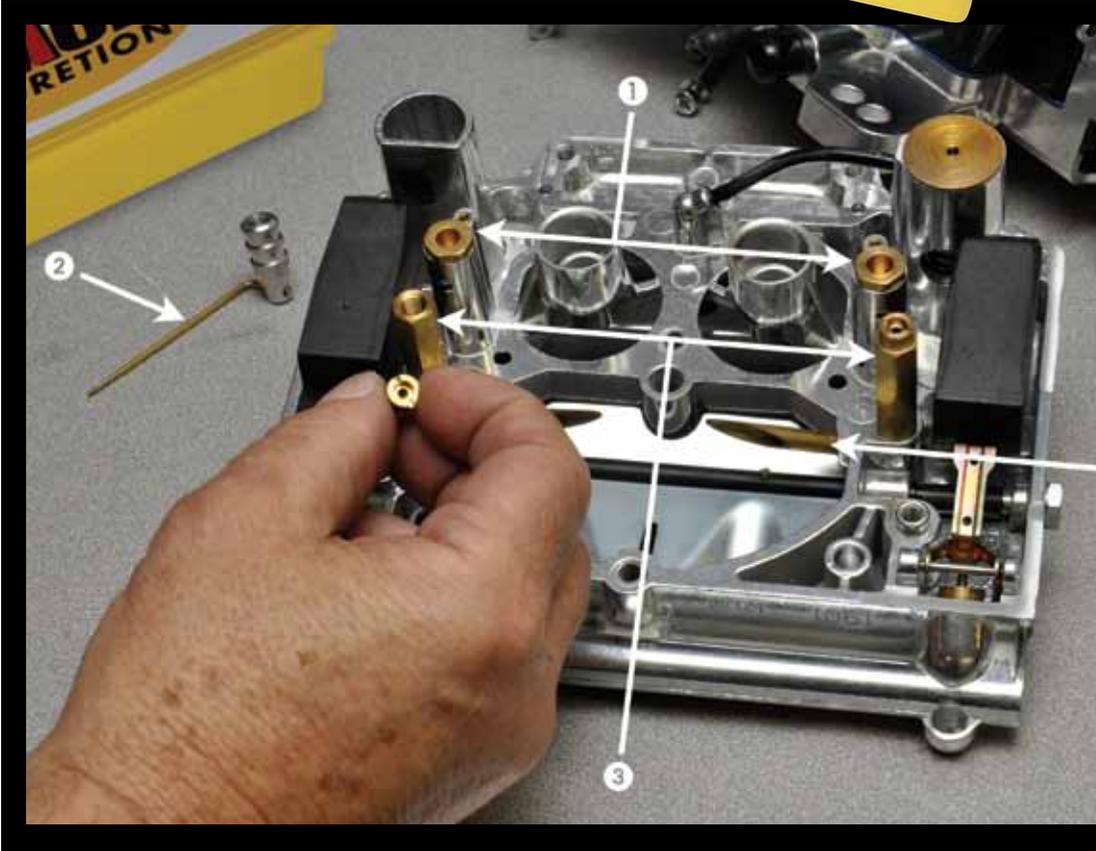
power-making capacity is entirely modern. Since this was the first occasion that twin Street Demons would be used in tandem, we were enthralled by the challenge. "Come on down to Doraville," was Walden's cry, "and let's make some noise!" Lamar, a warm, congenial man with fifty years of race-engine building experience, is currently receiving his first batch of 50 LWA 409 aluminum engine blocks—all of which, he reports, are sold.

This particular 409, which is endowed with a 4.375in bore and 4.000in stroke, thus a displacement of 481cu in, is destined to power an Impala on the streets. It will run 93-octane pump fuel with 10:1 compression ratio. Though the engine's 4in stroke permits ample time for cylinder-filling, a hydraulic roller camshaft was selected with a lobe separation angle of 111 degrees (lobe centerline angle) because this Impala requires at least 10in of vacuum to run its power-assisted brakes and other accessories. Hence its longish stroke length and modest valve-open overlap maintains a comfortable reservoir of vacuum.

Finally the engine is completed with LWA cylinder heads containing intake and exhaust valves of 2.250in and 1.740in respectively, valve lift of 0.650in and 0.680in, and an Edelbrock intake manifold. The Edelbrock is similar in design to the original. Though taller in dimension, LWA makes an alternative intake available that yields significantly higher performance for those with greater bonnet clearances.

Set in tandem atop the first production LWA409 we were

This calibration kit allows you to tune the air-fuel ratios for a specific engine. Often air-fuel ratios are affected by engines with high compression and camshafts beyond standard street motor tune and sometimes intake manifolds with distribution issues at various RPM. Under these circumstances having access to the calibration kit is a big advantage.





Following a couple of initial dynamometer pulls to bed-in valves and rings, leak-down tests are conducted on every cylinder. On a race motor the aim is to contain pressure leaks to under 10 percent. With 150psi of compressed air introduced to the combustion chambers this road-going 409 motor averaged a negligible 2 percent.

To confirm the dyno air-fuel ratios, spark plugs were removed. Though the heat mark on the ground strap is not clearly visible in this photo, the color change is almost mid-way, suggesting correct ignition timing. The porcelain also reveals healthy color and there is no evidence of soot deposits on the base ring, which indicates correct jetting. LWA aims for one to two blackened threads on a street engine; on a race motor that generates more heat they aim for two to three blackened threads and a slightly lighter color on the base ring.

With access to a Street Demon calibration kit, the fuel metering circuits can be easily tuned.

Arrow 1 shows the primary jets attached to the ends of the primary towers. The small circular brass components just visible above these jets are idle fuel restrictors installed in the ends of the idle fuel metering passages of the primary circuits.

Arrow 2 shows a two-step metering rod. One of two, these rods reside inside the primary towers. Each attached to an aluminum piston they are pulled downward into the primary jets when vacuum is high at idle and part throttle. As the engine vacuum fades, the springs under the pistons lift the two-step metering rods, allowing the smaller step diameters to meter more fuel through the primary jets. The point at which they rise can occur sooner or later in the throttle opening, based upon the spring load selection offered in the calibration kit.

Arrow 3 shows the brass hex extensions on which the secondary jets are attached. Inside each extension is an emulsion tube, which emulsifies the fuel in the secondary circuits.

Arrow 4 shows two horizontal brass nozzles with oval exit profiles from which the secondary air-fuel mixture is dispersed.



To introduce further air to the secondary throttles two holes 21/64th in diameter were drilled in the upper flap valves.



interested in not only the tuning procedures needed to get the two Street Demon carburetors to produce their peak power but also we wanted to know how they'd compare against the established Edelbrock AVS models.

So here we are: this is a tale of a test of the first twin 625 Street Demon carburetors on the first new 409 hot

rod engine. Clearly, these carburetors fared pretty well and there is reason to think the future is bright for this gutsy decision—a decision to create a brand new carburetor in 2010 that became a reality in 2012! Who'd have thought it? Here in this sequence of photographs and captions is how the engine tests unfolded. X

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