THE DRAG-O-MATIC 427 FAIRLANE

The Ford in Drag Racing's Future

BY ALLEN HUNT

BRUTAL-LOOKING FAIRLANE specials are Ford's entries in the Super/Stock drag racing classes.

FORD HAS BEEN taking it on the chin in Super/Stock drag racing for two years now. Why? Its Galaxie was just too heavy to get the job done—especially under NHRA rules where stock engines are rigidly limited to 7 liters (427 cu. in.) piston displacement. The '63 lightweight Galaxie coupe, with all available fiberglass and aluminum components, weighed a shade over 3500 lb., ready to race. That was 200-300 lb. more than the pace-setting Dodge Ramcharger and Plymouth Super/Stock models with the same bhp and cubic inches.

But Ford's burden of overweight is now a thing of the past. Ford has given right down against the minimum 7.5 up on the Galaxie. Instead, the 1964 Ford Super/Stock package is based on the Fairlane line—with enough fiberglass body panels (hood, front fenders, front bumper) to bring the weight lb./cu. in. allowed by NHRA rules.

The production versions weigh about 3225 lb. with 5 gal. of gas, or 20-25 lb. over the minimum allowed with 427 cu. in. And—you guessed it—power is supplied by the well-tried Ford 427 High Performance block running the latest Mark II equipment that was introduced at the Daytona Firecracker races last July 4th. Ford engineers say this stuff gives 55-60 bhp more than the '63 427 engine—which should put the true output somewhere around 480 bhp at 6000 rpm. Combine this power and weight with a special chassis layout designed specifically for standing-start traction (including optional torque converter transmission) . . . and here's a package that may be hard to beat in S/S this season. Prototypes have turned quarters as fast as 11.53 sec., with elapsed time at 132 mph. Times in the high 11s, at 120-125 mph, should thus be routine by next June.

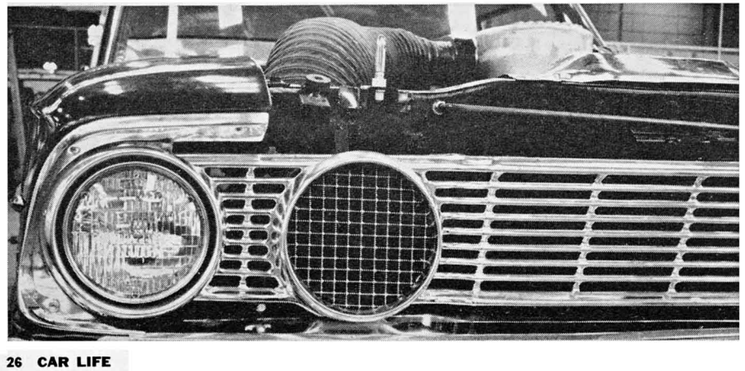
This new Fairlane S/S is a racing car from the ground up. The Galaxie rear axle and driveshaft are used for strength. Axle wind-up is controlled by welding hefty 31-in. fabricated torque arms to the axle and pivoting them to a special cross-member under the unit body. (This cross-member also drops under the driveshaft to form the required safety support.)

Ford engineers claim no weight-transferring properties for these arms. The arms do lift the sprung mass slightly on acceleration but the reaction to this upward acceleration is very small.

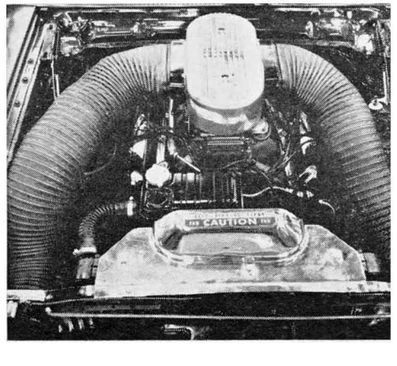
The right rear tire is pre-loaded by using a stiffer coil spring on the left front and a 3-leaf spring on the right rear, with two leaves on the left rear. This tends to even up the load on the two rear tires when engine torque acts to lift the right rear under acceleration, so maximum forward thrust is available. (A limited-slip differential does not eliminate the need to cancel lateral torque reaction.) Finally, the shock absorbers are calibrated to complement this unusual loading condition. This is more special chassis tuning than has ever been done before on a factory-built drag-strip machine.

Front-rear weight distribution is helped by taking the battery from the engine compartment and replacing it with a huge, 95 lb. bus battery in the trunk. A subtle form of ballast! Light 6.00-16 tires are used on the front. The weight saved by the fiberglass front body panels, light tires and light steel tubing exhaust headers, plus the heavy battery in the trunk, has resulted in pretty decent weight distribution, for such a big engine in such a light car. Plexiglass side and rear windows ▶

INNER HEADLIGHT units are replaced with flexible duct leading ram air to carburetor air chamber. Bumper bar is molded fiberglass, painted silver to look like real thing.

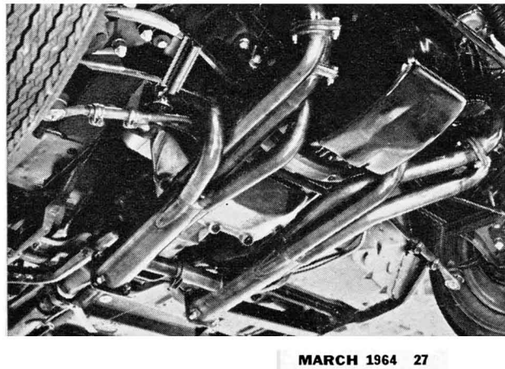


CAST aluminum chamber collects cold air from outside ducts to help generate horsepower.



HUGE TORQUE-reaction arms link rear axle to chassis, absorb all driving thrust. Welded solid to axle housing, they pivot at special cross-member.

EQUAL LENGTH header pipes collect into 14-in. cans, connected by a cross-over. Oil pan capacity is 10 qt.



FAIRLANE 427

further alleviate the weight situation.

Most readers are familiar with the new Mark II speed equipment for the 427 engine. Briefly, it includes new cylinder heads with larger ports and valves (2.20 in. head diameter on intakes and 1.73 in. on exhausts) and machined scallops around the valve edges in the combustion chambers to reduce shrouding. Compression ratio is about 12.7:1 with the piston domes used. A new aluminum intake manifold (no heat) has high risers to give a longer passage length between the head port and the plenum chamber under the carburetors. The idea is to get an inertia ram effect at high rpm by putting a heavier column of fuel-air mixture in motion on the suction stroke. A new 300° camshaft gives better breathing and a new forged steel crankshaft with strengthened rods, plus a 10 qt. oil pan, assure complete reliability with the extra power.

Two of the most significant power developments on the Mark II engine are exclusive on the Fairlane S/S package. One is the new system of getting cold ram air to the carburetors. Intake systems before have used hood scoops and air supplied from the plenum chamber at the base of the windshield. Ford has gone whole hog on the Fairlane and is ramming the air to the dual 4-barrel carburetors directly from the front of the grille. The two inner headlights are taken out and replaced with big round scoops, which feed air through two large flexible tubes to an air box over the carburetors. This system has proved to be the most efficient air supply system yet tested for Super/Stocks. Drag strip trap speeds are increased 2-3 mph consistently with the air tubes hooked up. That's equivalent to another 25 or 30 horsepower at the clutch.

Then there's a brand-new exhaust system. Sharp-eyed observers will note that the latest trend in home-made stock car exhausts is toward individual pipes from each head port clear down to the main collector with exactly equal lengths of pipe for all cylinders. This layout seems to give more tuning (acoustic wave suction) than the usual method of pairing two pipes into one, then joining the two secondary pipes from each bank into the collector can. This is what Ford has done with its new S/S exhaust system.

The individual pipes are 31 in. long, then dump into large 14-in. collector cans under the car. (A crossover pipe is tapped off from the left to right can and then to the required single street muffler.) According to our formulas these 31-in. primary pipes would give their major tuning boost at about 5500 to 6000 rpm—right in the middle of the usable rpm range on the strip, meaning a substantial performance boost.

And, just as important, the new headers are fabricated from steel tubing. This is a very expensive process in small quantities. But about 50 lb. of front-end weight is saved over the huge cast-iron headers used on the regular 427 engines (which wouldn't fit into the Fairlane chassis, anyway). You'll see more of these fabricated tubing headers from the factories—it's the only way to go for maximum efficiency and minimum weight.

Another important development on the new Fairlane S/S is that Ford will offer an optional torque converter transmission to supplement the usual Warner 4-speed. It has been painfully obvious to everyone in the last few months that Chrysler's 3-speed Torqueflite was giving the Dodge and Plymouth Super/Stocks a tremendous advantage in eliminations by giving quicker, more consistent starts. The driver could just lock the brakes, rev up a little torque on the rear wheels—and he'd be gone like a shot when he released the brakes. The human element is reduced to a minimum. The Ford people realized they'd have to match this feature to keep up. Fortunately the heavy-duty Lincoln 3-speed converter, with a little extra strengthening here and there (see full story below on this new transmission), proved fully capable of standing the gaff. Prototypes have been showing at least 0.2 sec. better elapsed time with the automatic. You'll be able to order it.

And for the die-hards who insist on a 4-speed manual, Ford will soon introduce a successor to the Warner T-10 which will have gear ratios of 2.32—1st, 1.69—2nd, 1.29—3rd. These should give a good start without that big rpm drop from third to fourth gear that was letting the opposition get away at the long end. An aluminum bell housing that doubles as a legal scatter-shield is used with the 4-speed; 4.44 rear-axle gears with the Detroit Automotive ratchet-type limited-slip are standard equipment.

A few other special touches set off the new Fairlane S/S: The cars come with an 8000 rpm Rotunda tachometer on the steering column, lightweight police bucket seats and 9.50-14 Firestone street-strip tires on wide 14 x 7 in. rims. Obviously, it's a racing car . . . and one calculated to put Ford right back in the front row on the drag strips this summer. ■

An Automatic for Consistency

BY JOHN R. BOND

As a relatively small, but still important, part of Ford's Total Performance concept, we have a new heavy-duty automatic transmission specifically designed for use on the drag strip. Rather harsh in action at light throttle openings, it is not recommended for street usage. For this reason only a few hundred will be built.

At the present time, and contrary to what appeared in *Car Life*'s January story on the Custom 500, Ford builds all its own automatic transmissions (Warner Gear built some Ford units a few years ago). There are presently four different automatic models: 1) the small 2-speed, 2) a small 3-speed for up to 289 cu. in. engines, 3) a medium 3-speed for up to 390 cu. in. engines, and 4) the big 3-speed used only on the 430 cu. in. Lincoln.

To get its new Drag-O-Matic (our name for it, not Ford's) for use with the high-output 427 V-8s, Ford's problem was relatively simple. Rather than trying to beef-up the 390 3-speed Cruise-O-Matic, they elected to use the big Lincoln unit. The development and test programs showed that very few changes or special parts were required although a weight penalty of 41 lb. was entailed. (The 390 3-speed weighs 182 lb. dry, with extension but no converter; the 430 unit weighs 223 lb.) Standard Lincoln production parts include all gears, clutches, oil pumps, front servo unit, regulator and extension.

Special parts include a stronger steel sleeve for the front pump stator support, a revised rear servo and a new output shaft with Ford-style splines having 31 teeth for the sliding universal joint connection. (The Lincoln uses two needle bearing key-type splines.) The maximum oil pressure has been raised from 90 psi to 200 psi for quicker shifts and more holding power in the multiple disc clutches. The reason is that the V-8 427/425 develops nearly 500 lb.-ft. of torque as compared with 465 lb.-ft. on the slower running Lincoln engine.

A new governor has been designed with thin steel washers bolted to it in such a way that the upshift speed (rpm) can be varied by adding or removing washers. The standard factory setting is for up-shifts at 6000 rpm at w.o.t. (wide-open throttle), this figure being optimum for best elapsed time in the ¼-mile with the 427/425 engine.

Originally, Ford engineers planned to use the Lincoln torque convertor, which has an effective internal diameter of 12.312 in. However, tests showed that the production 12-in. Galaxie unit could be used with almost no changes, despite the requirement of a bursting speed of over 10,000 rpm. The only change is a special welding operation around the enlarged base of each driving stud. A special aluminum housing was required for either convertor because the bolt pattern of the 427 block is quite different from that found on the 430 Lincoln block.

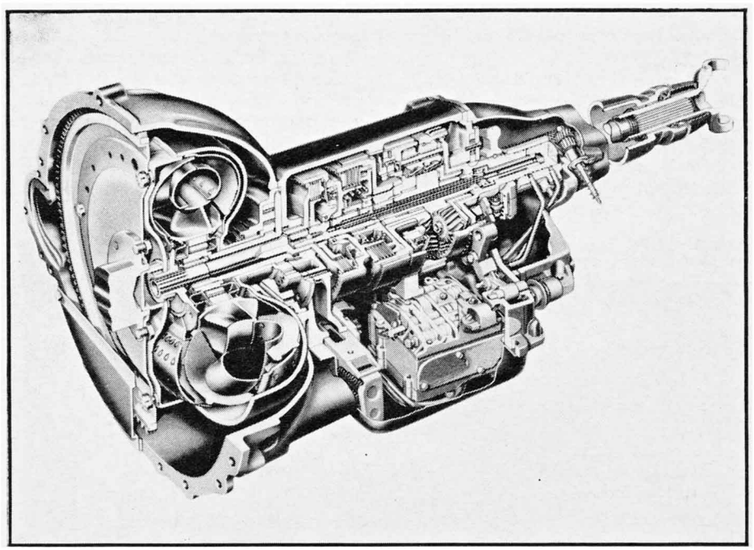
The actual performance in a car is just about equal to that of a well-driven, 4-speed manual box, with the advantage of consistency and little or no risk of engine blow-ups. The convertor stall speed is 2100 rpm and, at break-away, the torque multiplication is 2.10:1. This figure times the low gear ratio of 2.37 gives a starting ratio of 4.98:1 and it is noteworthy that the Drag-O-Matic gives better starts off the line, with little or no skill required of the driver, unlike the 4-speed.

However, convertor multiplication is virtually nil at 2100 rpm as it phases out with increasing speed and serves no purpose after the start. It does serve as a cushion for the 1-2 and 2-3 upshifts because it is (by then) merely a fluid coupling. In effect, the Drag-O-Matic is a 4-stage automatic.

The control system, by the way, is conventional $PRND_1D_2L$. This means that the driver cannot readily force his own shifts, but with 6000 rpm automatic upshifts, it shouldn't be necessary.

While Ford didn't mention it, it is obvious that a sharp transmission mechanic could build up a Drag-O-Matic from wrecking yard parts, with very little difficulty. The only purchased new parts required would be the convertor housing, assuming the governor of the stock Lincoln was reduced in weight and the Lincoln front universal joint used. Such a homemade job should be nearly as reliable as the factory components and would be easy to build. ■

	AUTOMATIC			MANUAL 4-SPEED			
	ratio	o. a. ratio	mph @ 6000	mph @ 6000	o. a. ratio	ratio	
1st x conv.	4.98	20.5	. . .	48.6	9.55	2.32	1st gear
1st gear	2.37	9.75	47.6	66.9	6.95	1.69	2nd gear
2nd gear	1.48	6.09	76.3	87.3	5.31	1.29	3rd gear
3rd gear	1.00	4.11	113	113	4.11	1.00	4th gear



FORD'S AUTOMATIC for drag racing will consist of Lincoln gearbox behind the Ford Cruise-O-Matic converter in a special aluminum housing. Converter stall is at 2100 rpm and multiplication is 2.1:1.