A Bolt-In Engine Solution for Your Early Bronco

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When I acquired my 1974 Bronco almost 5 years ago, along with the rust laden cancerous body came a mostly worn out stock 302 V-8 engine. As I drove the Bronco around town for 2 years, it became obvious that the original engine was tired and in need of attention. When the 302 finally began to consume about as much oil as it did fuel, I began to weigh my engine options. The decision I had to make was between a performance rebuild on the 302 or an upgrade to its big brother, the 351W. As I did the research and price analysis between the 2 engines, and after gentle prodding from fellow co-workers (also Bronco owners), the only logical choice for me was the 351W. Not only does the 351W offer more cubic inches and more strength, my research showed that it was an almost bolt-in conversion.

the parts

- 351W Engine 1969-Present
- Rear sump oil Pan and pickup
- Intake manifold
- Accessory drop brackets
- Accelerator linkage bellcrank
- Appropriate harmonic balancer and flywheel/flexplate (28.2 oz. balance)
- 351W Ignition distributor or drive gear

WHY THE CONVERSION WORKS

The 351W has been taking the place of tired 302's in Early Broncos for many years because of its ease of installation . The 351W engine can also be heavily modified to meet the needs of most Bronco owners because performance parts for these engines are becoming more readily available. For those who want the ultimate small- block powerplant in their Early Bronco, stroker kits for the 351W are becoming increasingly popular and affordable, which allows the 351W to be stroked reliably to well over 400 cubic inches. An easy and fairly inexpensive way to stroke the 351W is to purchase a SCAT 3.85" stroker crank and use stock length 351W connecting rods and stock 302 pistons. With a .030" overbore, this combination yields about 393 cubic inches.

This conversion works because the 351W engine is almost identical to the 289-302 engines on the outside. While Ford made minor changes to the inside of the engine during the years that the 289-302 engines were in production, the basic long block remained virtually unchanged. When Ford introduced the 351W in 1969, it was built on the same platform as the earlier engines, but in order to accommodate the longer stroke necessary to obtain 351cubic inches, Ford engineers raised the deck height about 1/2 inch. Because of the longer stroke and higher deck height, the lifter valley on the 351W is significantly wider than that of the 289-302 engines. This means that the intake manifolds are NOT interchangeable between the two engines. The bottom end of the 351W is also slightly wider because of the larger crank journals on the 351W. This makes the oil pans not interchangeable between the two engines.

This conversion also works because the 351W has the common Small Block Ford (SBF) bellhousing pattern which allows it to be mated to most Ford transmissions with ease, including the C-4, C-5, C-6 AOD, AODE, stock EB 3-speed, NP435, T-5, ZF and others. The motor mounts bolt to the 351W block in the same place as the 302 which allows the engine to be mounted in the engine compartment in the same location without modification. Additionally, the engine bay in the Early Bronco is large enough to accommodate the bigger engine and the 351W installation looks like it could have come from the factory in an EB. Clearance between the fan and radiator is identical to that of the 302 because the two engines are the same length.

SOURCES FOR THE 351W ENGINE

The 351W engine was first introduced in 1969 and this is the most sought after of all 351W's because of its higher flowing factory head castings. The basic 351W long block remained virtually unchanged over the years with only minor

changes being made to external accessories. A one-piece rear main seal took the place of the earlier two- piece design in the early to mid-eighties engines which helped to eliminate pesky oil leaks. A major weak link in most SBF engines is their restricted cylinder heads, so it is recommended to upgrade from the stock heads to a set of better flowing aftermarket heads if the budget allows. Good aluminum heads are available through Trick Flow Specialties (TFS), Edelbrock and Ford Racing and others. Additionally, excellent cast iron replacement heads are also available through World Industries, which are infinitely better than the "smog era" heads found on most 351W engines. All factory 351W's were only available in a 2-bolt main bearing configuration, but the increase in the size of the main and rod journals over the 289-302 makes it a much stronger and durable engine choice for an EB. These engines, depending on what area of the country you live in, should be available in trucks, vans, station wagons etc. in wrecking yards and are identifiable on the outside by their wider intake manifold and longer bypass hose from the water pump to the thermostat housing.

MODIFICATIONS TO MAKE IT FIT

While the 351W bolts into the Early Bronco with only minor modifications, a few things need to be done to address the minor differences between the two engines. First, a 4-Wheel Drive oil pan with a rear sump and pickup will have to be used in order to clear the crossmember in the Bronco. Although quite pricey, these oil pans are readily available through most of the Early Bronco parts houses. Some people are also using a double sump pan/pickup that was made for the installation of a 351W into Fox Body Mustangs.

Second, while the ignition distributors are physically interchangeable between the 302 and 351W, the drive gears are different. The 302 uses a 5/16 oil pump drive shaft and the 351W uses a 3/8 oil pump drive shaft. DO NOT attempt to drop your 302 distributor into your new 351W because it will not fit without the correct drive gear installed. This problem is easily solved by installing a 351W drive gear onto your existing 302 distributor or by purchasing a new 351W distributor.

The third modification involves the belt driven accessories on the front of the engine. Because the heads are located about 1" higher on the 351W than they are on the 289-302, the alternator and power steering pump need to be moved back down to their original locations. This is easily done with some special brackets from the Early Bronco specialty parts houses (Wild Horses Part #'s 8048 & 8055). These brackets move the accessories back down into their original location on the new engine which allows the stock belts and pulleys to be used. When doing this conversion, it is also necessary to use the front cover and water pump from your old 302 to ensure that the water pump outlet is on the correct side for your radiator. These are both bolt on items to the 351W. I highly recommend installing a new waterpump and a new balanced 180 degree thermostat (Robert Shaw Part # 300) to aid in cooling your new engine.

The fourth item that requires special attention is the harmonic balancer. All Early Bronco 302's came with a 3 bolt harmonic balancer/lower pulley from the factory. The only 351W engine that came with a 3 bolt balancer was in 1969, which makes it a difficult part to locate. After patient hunting, I found mine on Ebay for $40.00. The pulley mounting surface on the 4-bolt balancer protrudes out about 1 inch farther than that of the 3-bolt which makes it difficult to get the correct lower pulley and make the belts line up. There are a few ways to deal with this issue. First, you can find a pulley system at the boneyard and rig up a system that will work in your application. Second, you can convert the new engine to a serpentine belt setup. Third, you can locate a 1969 3-bolt harmonic balancer. Fourth, due to the fact that the early 302 (1981 and older) and all 351W's share the same 28oz. engine balance, you CAN use your 302 3-bolt harmonic balancer after re-marking it with the correct 351W timing marks.

The fifth modification that might need attention is the exhaust system. Because the 351W is a taller engine, the exhaust manifolds or headers may not line up with the heads of the new engine without modification. This is an easy and fairly inexpensive modification that any competent muffler shop should be able to take care of if it becomes an issue. There was enough slack in my exhaust system that my stock manifolds bolted right up to the new heads without modification.

The sixth modification that might be necessary is to modify the throttle bellcrank that is mounted to the firewall. Once again, because the 351W is taller than the 302, the stock bell crank sits too low and needs to be modified. I cut about 1 inch out of each finger on the bellcrank and then welded the ends back on. (See photo 1) The other option is to buy a reproduction bellcrank with shorter fingers that is available through James Duff Enterprises (Part # 3162) for this purpose.


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The seventh modification that may be necessary when converting to the 351W is the stock clutch linkage. If you have a stock 3 speed or if you are still using the stock clutch linkage with a different trans-



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mission, you will notice that a piece of the clutch bellcrank bracketry mounts to a boss on the lower driver's side of the engine that is cast into the block. On my 1984 351W block, the boss was there, but it was not drilled and tapped. I marked, drilled and tapped a hole in this boss to accept the bracket for my stock clutch linkage. The block actually drilled and tapped much easier than I had expected. (See photo 2)

The last modification that may be necessary is to modify the hood of your EB to accommodate the air cleaner. Because the 351W sits higher in the engine compartment, an aftermarket 3" air cleaner assembly will not fit without cutting a hole in the hood and installing some kind of a hood bubble or scoop. The stock air cleaner can be used, but the clearance between it and the hood is very tight. The other alternative is to invest in a Fiberglass Pro-Flow hood which slants up from front to back, making the necessary air cleaner clearance available. This modification also allows hot air to escape the engine compartment easier, allowing the engine to run slightly cooler.



Using any engine manual available on the market today, assembling the engine is very straight forward. If you have never done it before, it might be worth your while to recruit the help of someone who has engine building experience to assist and give pointers. One point that I want to stress is to never assume that all of your expensive machine work is correct. When I was assembling my engine, I found way too much piston-to-wall clearance, which seemed out of the ordinary. I checked the piston ring gap and had WAY too much clearance. Further investigation showed that the machine shop had accidentally bored my standard 351W block .030" over and had given me .020" over pistons. This is only one example of why it is very important to check all clearances as you go through the rebuilding process, including crankshaft oil clearances, thrust bearing clearance, piston ring gap and piston-to-valve clearance (on modified engines).

Overall, this is a straight forward conversion that any mechanically inclined person can perform. I wish there had been an article like this printed when I did my conversion because it would have saved me a few hours of trial and error work. While this article only covered the basic modification steps to install a carbureted 351W into an EB, because there are many combinations of parts and many ways to accomplish the end result, how you do the conversion may be different than what you have read in this article. Many 351W equipped EB owners have installed multi-port fuel injection, serpentine belt systems and other mods which add to the performance qualities of this fantastic engine. The 351W in my Bronco runs fantastic and is, in my opinion, the best overall choice of an engine in the Early Bronco. I noticed a big difference in low end torque, especially off-road and climbing hills. The only thing I cannot figure out is why Ford never offered the 351W as an optional engine in the Early Bronco.