

# 3G Alternator Conversion

## “Uppin’ The Amps” – 3G Alternator Conversion

by Art Bailey

Our trusty 1G alternators have served us faithfully on numerous models of Ford products ranging from commercial chassis trucks & motor homes, to “tow package equipped” pickups, to our Mark VIIIs. The main thing that the 1G lacks, is low speed output. When idling in traffic with the AC, headlights, and perhaps an electric fan running, the 1G has a difficult time keeping up. In situations where the alternator is not outputting enough to supply power to the accessories, the battery must provide supplemental power. In theory, the battery should only be called upon to start the car. From there on, its main responsibility is to act as a capacitor to *smooth* the power from the alternator and provide brief surge power when something like the AC clutch engages or an electric fan kicks on.

When the alternator cannot supply adequate power to provide for the electrical load, the battery begins to drain. Once the engine speed increases again, the alternator will re-charge the depleted battery. Depending on your driving habits and use of accessories, the 1G may be just fine, but I decided to give the popular 3G a try. I wanted to keep the under hood of my 1990 Mark VII looking as stock as possible. I also wanted to be able to revert to the readily available 1G if I needed one “on the road” somewhere, as the modified 3G cannot be readily obtained “off the shelf” at your local chain parts store or a small town “Ma & Pa” parts store. Following are my efforts.

## Lincoln Mark VII 3G Alternator Conversion

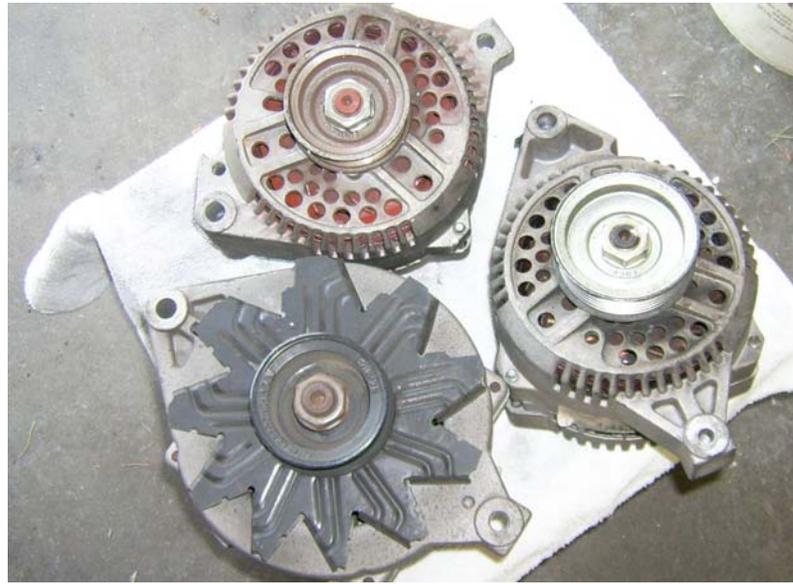


Typical “Stock” 1G installation

3G installed (note regulator in place)

The first step is to obtain a new or serviceable used 3G alternator. I selected a relatively new alternator at a U-Pick wrecking yard. I used a '96 Lincoln Continental as a donor car. 3Gs can be found on many other Ford products, however, care must be taken to ensure that the case configuration has the correct mounting boss center-to-center distance. Further, adequate amperage is the whole reason for this swap. Again the Continental was a good donor, however many other vehicles use the high output version. I also removed the alternator wiring harness running from the alternator to the starter solenoid. It runs in front of the core support and is very easy to remove.

## Lincoln Mark VII 3G Alternator Conversion



In the above illustration, the top 3G uses the wrong center to center. The 3G at right matches the OEM 1G at bottom. I selected the top 3G pulley for use on my application. Note: *The 1G and 3G pulleys are not interchangeable without proper shims or spacers.*

Beside the difference in electrical connections, the main obstacle is the threaded tab thickness. This must be modified. Numerous methods are acceptable, including cutting, grinding or machining. I chose machining. This requires dismantling the alternator, which I wanted to rebuild anyway. The tab must be narrowed to .565" from the front, meaning that metal must be removed from the rear of the tab. The top, threaded mounting bolt on the 3G is also metric. You can drill and re-thread it at this time to 3/8-18 if you wish.





Once the alternator is modified, mounting is easy.

Simply disconnect the battery, drive belt, remove the wiring from the old alternator, and remove the bolts that secure the 1G alternator. Install the 3G using the original lower (long) bolt and at the tab, either a metric bolt, or if you chose to re-thread the tab, the original 3/8"-18 bolt.

## Wiring

This seems to be the part where your installation can look like a hack job or a professional installation. The wiring must be upgraded to accommodate the increase of amperage and the use of the 3G's internal regulator. Aftermarket "one wire" 3G's are available, but I personally do not recommend them for our "computer heavy" Mark VII's as the three wire "stock" version has better voltage regulation for our "computer heavy" cars, than the "one wire" version.

There are many ways to upgrade the main power wire. I have seen everything from battery cable, to monster amp wire, to cut up jumper cables running from the alternator to the battery through some kind of aftermarket fuse bolted to the inner fender someplace. What is really needed is #6 or larger, fine strand wire, and two #12 fuse links connected in parallel. This should be carefully routed from the large threaded post at the alternator to the stud on the starter solenoid to which the positive battery cable is connected. The alternator is grounded through the case, as was your old 2G.

The control plug used at the 3G alternator needs two signals. The yellow wire must connect to the battery and monitors battery voltage. The green wire is connected to the ignition switch, through the "alt light" and can be connected at the old voltage regulator plug. (Shown later) The white wire plugs back into the alternator for "stator" voltage.

## Lincoln Mark VII 3G Alternator Conversion

I chose to use the harness removed from the Continental as it had everything I needed for the installation including the proper wire ends, fuse links and it looks completely stock once installed. It even turned out to be the proper length.

I started by connecting the harness to the alternator, leaving the green wire free. I then routed the harness behind the air cleaner and across the front of the radiator, using “Christmas tree” harness fasteners to secure the harness to existing holes.



The harness was routed back through the core support, under the battery tray and up under the solenoid, where it was connected to the solenoid from the bottom.



Here, the harness is connected and drops straight down under the solenoid.

## Lincoln Mark VII 3G Alternator Conversion

The final step is to connect the green wire at the alternator to the old voltage regulator plug. (shown here with red heat shrink tube over the wire & connector) This enables the “alt” light and powers the alternator. I used a ¼” spade connector (narrowed slightly) and plugged the green wire into the voltage regulator plug. I wanted to retain the plug for possible future use, but you can cut it off and tape up the remaining wires.



I then secured it with a zip tie.



Carefully cover the old alternator power wire with electrical tape and secure it out of the way. It is still hot. I tried to disconnect it at the starter relay, but other systems are connected to the same fuse link and your engine will not start.

Re-install fan belt, connect the battery and start the engine. Once the engine is running, do a voltage test to verify that all is working.

## Lincoln Mark VII 3G Alternator Conversion



At this point, you are done.

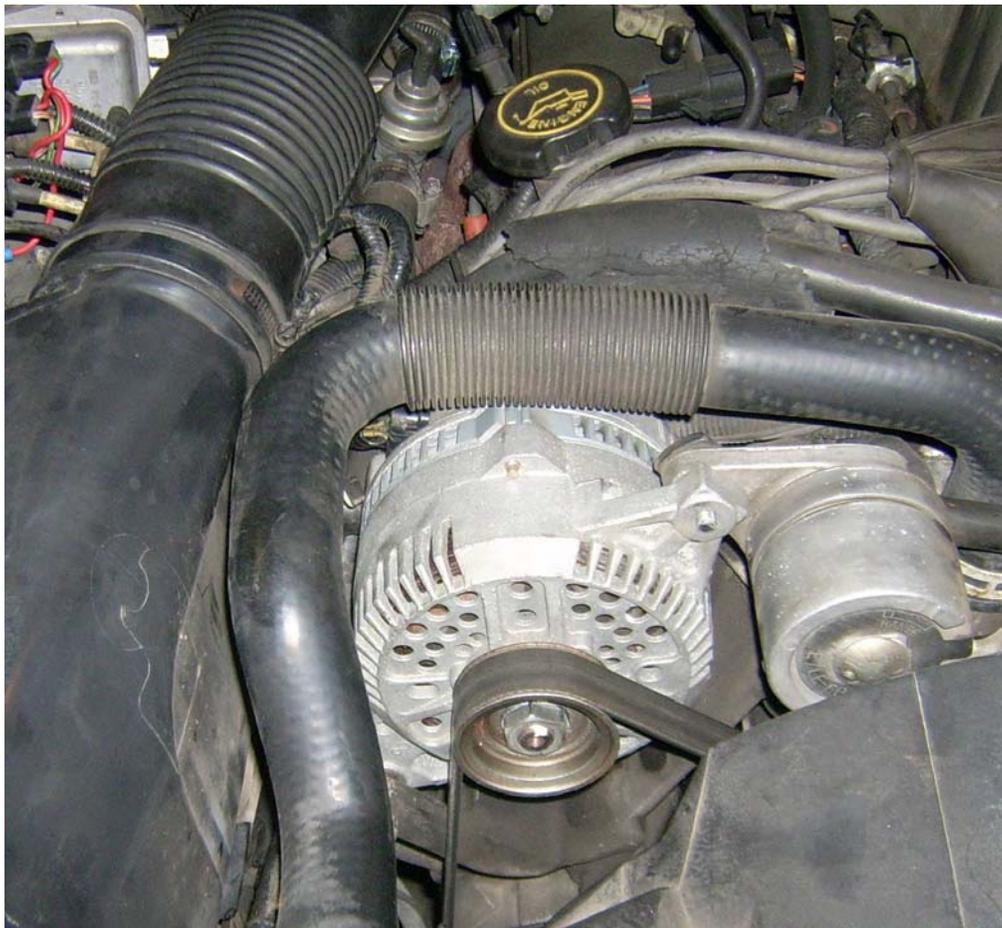
I went one step further. In as much as I wanted to be able to revert back to the 1G if I needed to on the road, I retained the original voltage regulator and installed a protective dummy plug on the old, unused, voltage regulator.



I simply attached a short piece of harness to a discarded voltage regulator plug, using electrical tape to secure the empty harness to the wires.

I plugged the dummy plug back into the voltage regulator and threaded the dummy harness down into the maze of hoses and wires, along with the old, intact alternator power wire and plug so they could simply be plugged in and used if needed.

## Lincoln Mark VII 3G Alternator Conversion



Final installation.

At idle, my A/C blower motor shows no evidence of slowing, and lights don't dim at all. The 3G swap works well, and it did make a difference.