Most early cars and trucks with 6 volt electrical systems convert to 12 volts

or

Gauge voltage reducer link

Before we get into how to convert your Ford V8 or any auto for that matter, from 6 volts to 12 volts, let's discuss some basic electricity. Electricity works the same as water, the battery or electricity source acts like a reservoir and provides the pressure and volume, the wiring is the hose and the nozzle is the resistance. The way electricity works is when you double the voltage or increase the capacity of the water tank you decrease the pressure or amperage needed to drive a device. In the case of taking a 6 volt system to 12 volts, by doubling the voltage you decrease the amperage in half, that is why you can use the same size wiring in a 12 volt system as you had in a 6 volt system. This means that you don't need to rewire your vehicle. As long as you're wiring harness is in good shape you can leave it along. If it is badly frayed then you should re-wire with a new harness. Bet you are glad you don't need to re-wire!

Electrical Terms: DC Direct Current
AC Alternating Current

Series Wiring: Like a sting of old Christmas tree lights, one goes out they all go out or a fuse in a fuse box is wired in series.

Parallel : Wired like your home lighting system each light is powered individually.

Volts: Pressure of electricity

Amps: Volume of electricity (this is what does the heavy lifting)

Watts: Amount of electricity used or needed to power a device

Resistor: Device that controls the volume, acts like a hose nozzle

Capacitor: Device that stores electricity for short periods of time

Those that are interested:
Ohm's Law defines the relationships between (P) power, (E) voltage, (I) current, and (R) resistance. One ohm is the resistance value through which one volt will maintain a current of one ampere.

Now I want to talk about safety, your safety. You can become badly injured working around electricity; you may not think that 6 volts or 12 volts can hurt you. I am here to tell you that is not true. A Battery can pull a lot of amps if you get in between the positive and negative and the situation is right, you can get badly burned or even worse. Anytime you work around your vehicle electrical system always un-hook the battery terminals and be careful when removing the terminals, one time when loosing the terminals on the battery I melted a 9/16 wrench when the wrench shorted across the terminal and the frame, I still have the wrench in my tool box to remind me just how 12 volts can do real damage.

Positive ground electrical systems versus negative ground systems: For some reason Henry Ford wired his earlier automobiles with the positive from the battery to the ground or frame and the negative went to the ignition switch and the starter. This seems backwards from today, and it is. I read that Thomas Edison who had done a lot of work with DC (direct current) said that current actually ran from negative to positive and that is probably why Henry Ford wired his automobiles this way. In any event, all automobiles manufactured after1950 or so are wired with the negative to the chassis and the positive to the starter. When doing your conversion from 6 volt to 12 volt you will switch the terminals on the battery, the negative is going to the chassis, and or engine, and the positive is going direct to the starter post and ignition switch. Remember all modern auto electrical systems are negative ground systems and all radios and other solid state accessories are designed with negative ground systems. You will toast a solid state radio if you run positive ground.

Your starter will not turn backwards with changing polarity. Trust me on this your starter will work just fine on 12 volts and reversed polarity and will start your hot, or cold engine every time. In fact the starter will turn much faster with 12 volts.

Let's get started

Start by un-hooking the 6 volt battery and removing from the vehicle, remove the 6 volt voltage regulator, ignition coil and generator. In this conversion we are going to convert the generator to 12 volts as this will keep the original look under your hood.

You can use an alternator in this conversion; the advantage of an alternator is that it will generate voltage at lower RPM's than a generator. An alternator is also smaller and weights less. If you want to keep your restoration and conversion to look original then converting the generator to 12 volts is a nice touch. If you decide on an alternator there are good conversion kits on the market, and remember that an alternator is a solid state devise and must run on a negative ground system.

Generator: To convert the generator you will need to disassemble the generator and change the field coils to 12 volt coils. Disassembly of the generator is straight forward; the most difficult area is the removal of the square headed screws (2 of them) that hold the field coils. You will need a special wrench to remove these, if hard to remove carefully heat the area around the screws; this will loosen the 65 years of dirt and varnish that has built up. After you get the coils out you will need to clean and paint the housing. Now install the new 12 volt coils the same way you removed the old ones. You can also take generator to your local machine shop to remove the screws. Don't screw up these square headed screws, they are hard to find!

Next use 500m grit paper to clean the commentator segments. These are the copper segments that the brushes ride on. Also clean between the segments, us a square file or a small hack saw blade to clean in between the segments. To check that your generator armature is not shorted, use an ohm meter to check from the commentator to the armature, touch the copper segments to the end of the bearing shaft, you should <u>not</u> get a reading. If you do, there may be a short in the armature and you will need to replace it. If your generator worked when removed, then it should work after you convert the field coils.

The next tricky area is replacing the bushing on the back of the housing. This is the bushing that the armature shaft bearing rides in. If it looks good go ahead and reuse. If worn, take the housing to a generator shop to have this replaced. Check the front armature ball bearing, if this needs replacing you can have this done at a generator shop as well. If the armature was not dragging on the field coil segments then chances are the bearing are still good. Clean them up and when assembling use as small amount of white grease on the rear bearing. Replace the graphite brushes and reassemble the generator rear housing.

You will need to hold the brushes back carefully while installing the rear housing, be careful not to get any grease or oil in the area where the brushes ride on the armature. Your generator is now ready to go.

A word of caution, don't change the front pulley size on the generator to try and make it run faster at idle. Here is what will happen if you do this; you will over turn the generator RPM at freeway speeds and will damage the generator. A generator turning too fast will actually overheats the generator and will cause the solder to melt. Then your generator will be toast! If you don't want to tackle any of this generator conversion you can take to a generator shop and have them convert and overhaul for you.

Coil: Replacing the ignition coil, recommend you install a 12 volt coil with the ballast resistor already built into the coil itself. If you have an external ballast resistor installed, you will need to jumper across as you only need the one in the coil. (The resistor on original cars is located up under the dash) If your distributor and coil is all one, I recommend you replace the distributor with one that does not have an ignition coil attached. You can mount your new coil in a close proximity to the distributor. Switch the wires on the coil, positive to the positive side of the battery. If you don't reverse the terminals your coil will still work, it just will not give you the maximum spark to the plugs.
COIL POLARITY: When a coil is connected wrong, the coil's output will be decreased 14% at idle. As rpms are increased, this decreases to 30%. It often results in hard starting and poor engine performance. Some coils are marked + and - instead of bat. and dist.
If you're running a positive ground system (like our 6V flatheads came with), the ignition switch to coil wire connects to the – (negative) terminal on the coil.
If you're running a negative ground system (like 12V Fords came with), the ignition switch to coil wire connects to the + (positive)terminal on the coil.

Regulator: Next install the new 12 volt voltage regulator. Leave the field wire loose, as I will tell you what to do latter on this to energize the generator field coils.

Gauges: You are now ready to tackle the conversion of the Oil, Gas and Temp gauges. Remember the gauges were meant to work on 6 volts. If you apply 12 volts to them they will burn up! I recommend the use of a solid state voltage regulator as these work the best and protect your gauges. Here is another reason to convert from positive ground to negative ground as these voltage regulators only work on a negative ground system. Remove the gauge cluster and install the voltage regulator in series with the battery or hot lead. **voltage reducer link**

Heater blower motors: that are 6 volts will need a 02415HR voltage reducer or you can rewind your blower motor to 12 volts, or go to the wrecking yard and find a 12 volt motor that will fit your heater. Frankly this is the best option.

Radio: No problem with this conversion and your radio. The radio uses a vibrator to turn DC to AC and the vibrator does not care about polarity of your car electric system. (Except read below) The tube heater elements do not care which way the electricity come into the radio either, as they operate just like a light bulb. The rest of the radio operates on the electricity that comes out of the vibrator and the step-up transformer.
On some pre-war radio they use a synchronous vibrator, these will **not** work when you change the

polarity of your electrical system. If your radio uses this type of vibrator you can **damage your radio!** If your vibrator has 4 pins, you can sometimes remove and rotate 180 degrees, keep track which way the pins are lined up when you remove. If the vibrator has more than 4 pins your radio has a rectifier tube and is ok with reverse polarity. Another fix for the old 4 pin vibrators is to install a solid state vibrator with correct polarity.

The voltage does matter going to your radio as 12V will toast a 6V radio, read this next section: Different model radios 6, 7 or 8 tubes draw different amperages, find a basic 1-ohm, 100 watt wire wound resistor and hook between the battery line and the radio, probably after the key switch, this should work fine for most radios and reduce the 12V to 6V. Mount the dropping resistor where it will be safe and not accidentally short-circuited, and where the resistor can dissipate the heat of a 40 watt bulb. I would recommend somewhere on the firewall or fender well. After you install the resistor, double check the output voltage coming out of the resistor and into your radio, may want to check your work before you hook up the radio by taking one lead of your volt meter from the radio end of the resistor and the other lead of the voltmeter to ground. You will need to load the resistor with a similar load of your radio to check this, as without a load you can't get a true voltage reading. It should read 6Volts to 8Volts. If the voltage is not within these values, **don't hook up the radio**, you have done something wrong and don't want you to damage your radio.

Light Bulbs: Replace all the light bulbs, start from the front to the rear, see list below.

6 volt number	**12 volt replacement**	
Headlamp----------6006 sealed beam	6014 or 6015	2ea
Park Lamp----------63	67 or 1155	2ea
Tail and Stop----------1154	1157 or 198	2ea
Tail Light----------63	67 or 1155	2ea
Clock----------63	67	1ea
Glove Box ----------55	57	1ea
Dome Light----------88	90 or 94	2ea
Dash Light----------1129 or 55	57	2ea
Hi beam----------51	53	1ea

Battery: Install your new 12 volt battery. I would recommend that you replace the battery cables and extend the ground cable to a bolt on the starter motor or direct to the engine, originals are connected to the frame.

Generator: You will need to POLARIZE your generator, (most fords use a B circuit) and (most GM cars use an A circuit). This is for a B circuit. Disconnect the field wire from the regulator and strike it to the battery terminal of the regulator until you see a spark. Do not try to use a jumper wire for this, you need to actually remove the wire to do this correctly. Once you see a spark, reconnect the field wire to the regulator and you have completed this step.

Final Check: Check the voltage coming from your generator, connect a volt meter to the regulator, Battery connection and Ground connection or engine, low RPM will read around 12 volts, at higher engine speeds will reach 15 volts and the regulator will kick in, this is the voltage required to charge the battery. And is also why your old 6 volt lights will burn out in a hurry!