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BARRY'S 8 TRACK REPAIR

Installing My Universal Adjustable Speed Motor

NOTE: Your motor and speed control board were fully tested before shipment. Thus, there are no returns and it is **REQUIRED** that the installer is experienced in electronics and has basic soldering skills. Most installations will require at least 3 holes to be drilled: Two for mounting the motor and one for the speed control board. The speed control board **MUST** be mounted to a metal surface for proper heat dissipation, and **MUST** be insulated from the unit chassis using the hardware provided.

Note that drilling holes causes tiny bits of metal to fly all over the place, and great care must be taken to ensure that no metal fragments land on your circuit boards or become lodged in your tuner, between terminals of components, etc. Keep in mind that even a momentary short circuit can permanently damage electronic components, making it very important to cover all electronics in your unit to keep tiny bits of metal from causing such damage. Installing my adjustable speed motor is completely at the installer's own risk, and the purchase price **DOES NOT INCLUDE** any advice or guidance beyond what is required to install and wire the motor and speed control board.

In many cases, installing your new motor will require knowledge of what else might be connected to your old speed control board, such as if your program change solenoid gets its voltage from the speed control board. Again, knowing this is the installer's responsibility and I cannot offer any help.

On some units, some creativity is required to figure out how to mount the motor in proper alignment with the flywheel. You might need to fabricate a mounting bracket if removing the old motor leaves nothing to mount the new motor to.

IS YOUR UNIT A DELCO ? LEARN HOW TO TRANSFER THE MOTOR PULLEY [HERE](#)

Preparation

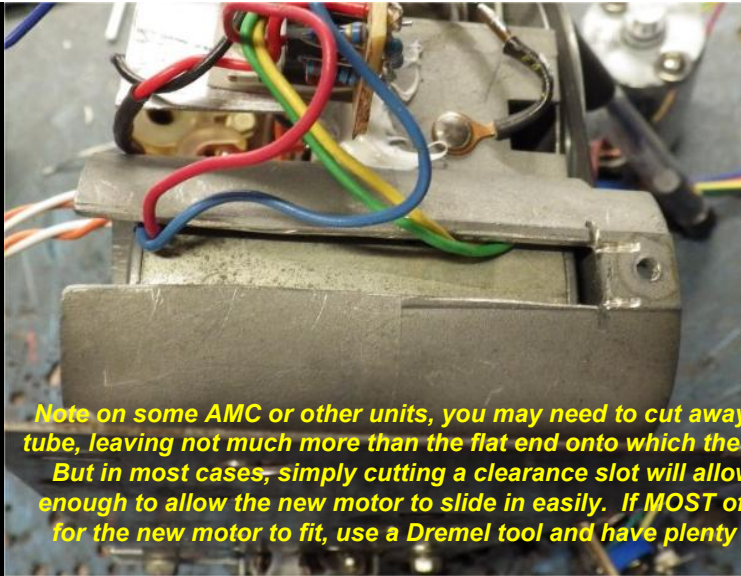
Find a place where there is enough room to mount the speed control board. On most classic car units, this will be where the old board was mounted. If there is any chance that the bottom of the new board can make contact with the unit chassis, fasten a square of thick paper or other insulating material to the chassis so that the bare solder joints on the bottom of the board cannot touch any steel parts.

Once you have decided where to mount the board, drill a small hole in the chassis where the mounting hole of the regulator transistor will be. After drilling this hole, it is **VERY** important to file away any burrs, so that the regulator transistor is being mounted to a perfectly flat surface. This regulator transistor **MUST** be insulated from the chassis, and any sharp edges or burrs will cause a short.

If the old motor was mounted inside a steel tube - **AND** if the tube is large enough in diameter to hold the new motor with plenty of spare room, drill two holes in the end of the tube for the new motor to screw into. Again, remove all burrs and sharp edges. To remove the burrs **INSIDE** the tube, a large drill bit twisted by hand works well. On most classic car units, two spacer washers (included) are needed to match the height of the motor pulley with the flywheel's height for proper alignment.

NOTE: If the mounting tube is small in diameter and the motor will not easily fit, **DO NOT TRY TO FORCE IT !!!** Forcing the motor into the tube will cause the motor's wires to short out against the wall of the tube. In this case, you **MUST** modify the mounting tube so that the motor fits easily and will not press the wires against the walls of the tube. Here is an example of how I cut a slot into a narrow mounting tube for the motor to fit more easily, without compressing the wires:

This clearance slot can be cut using a hacksaw, a Dremel tool with a cutoff wheel, etc. After cutting the slot, be sure to file away all burrs and sharp edges so that the wires

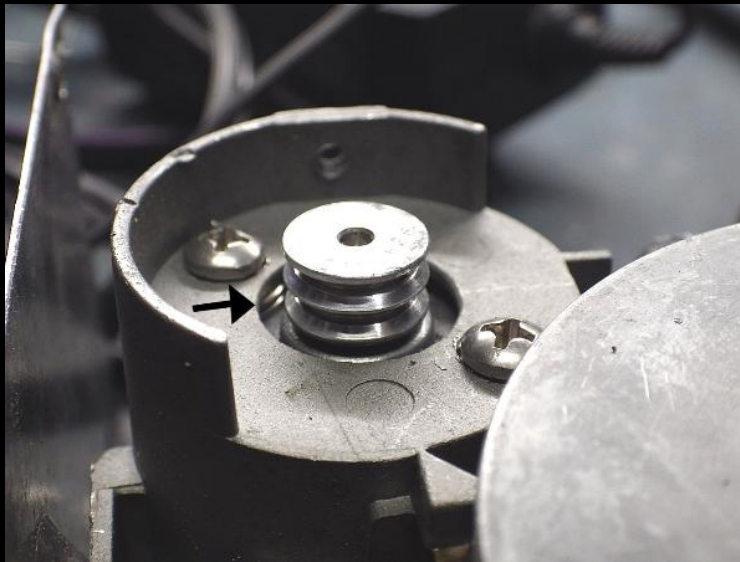


Note on some AMC or other units, you may need to cut away almost all of the mounting tube, leaving not much more than the flat end onto which the new motor can be mounted. But in most cases, simply cutting a clearance slot will allow the tube to be expanded enough to allow the new motor to slide in easily. If MOST of the tube must be removed for the new motor to fit, use a Dremel tool and have plenty of abrasive cutoff wheels.

will not be pierced or pinched. Note that the location of this clearance slot must be given careful consideration to prevent pinching of the wires between the slot and rear or side panels of the unit.

Cut the slot BEFORE drilling the motor mounting holes - this is important to make sure the holes match the motor position.

Once the new motor can slide easily into the mounting tube (if your machine has a mounting tube), you can then "eye up" the location of the two motor mounting holes and drill them. It's okay to drill the holes a bit larger than needed to make alignment with the motor's mounting holes easier. If possible, line the holes up with the pulley and flywheel as shown - this will ensure that the drive belt does not drag against the mounting screws:



Note the location of the two spacer washers on each side, shown by the black arrow. This is often required to match the height of the pulley with that of the flywheel.

If the tube is very narrow, you will need to file away enough of the washers to fit inside (or use a different spacer type).

Below is an easy way to keep the washers in place while lifting the motor into position:

Insert two short lengths of a Q-Tip into the motor mounting holes, slide the washers onto them.

When lifting the motor into place, poke the Q Tip pieces through the mounting holes.

Holding the motor in place firmly, remove the Q-Tips and insert the mounting screws.

Do one side at a time - tightening for first screw makes the second one easier to insert.



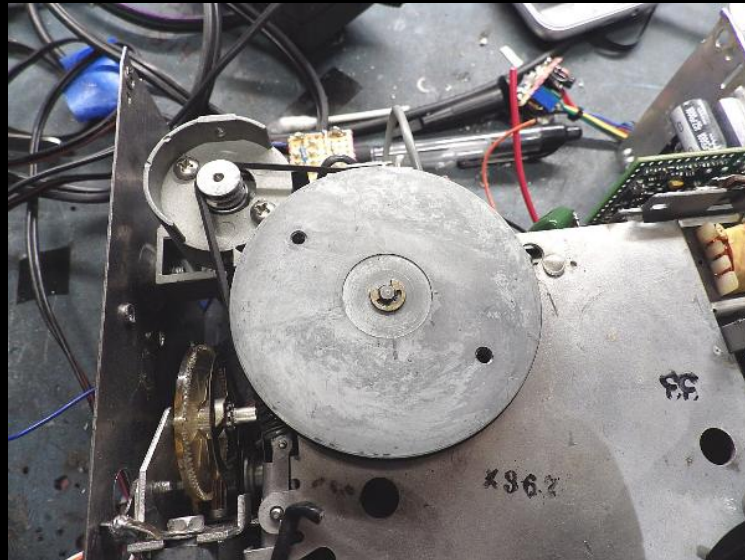
Next: Test-Fitting the Belt For Proper Alignment

DON'T DO ANY WIRING YET, because you might need to remove the motor again. We need to make sure the motor pulley and flywheel are properly aligned with each other before we do any wiring, which would make the motor much more difficult to remove. Install the drive belt, spin the flywheel by hand and make sure the belt is perfectly centered on the pulley. If not, it will come off in operation and you'll have to do it all over again.

A square belt can tolerate some misalignment, but a flat belt must be absolutely perfect or it will ride up onto the pulley's flange or come off altogether. Turn the flywheel in the **SAME DIRECTION** as it will be turning in actual use. If desired, it is safe to apply 12 volts directly to the motor's red and blue wires instead of turning the flywheel by hand.

If the belt rides up onto the pulley flange or comes off, you need to insert more (or fewer) spacers in order to give the motor a slight tilt. Tilting the motor **BACK** will make the belt ride **LOWER** on the pulley, while tilting it **FORWARD** will make the belt ride **HIGHER**.

If the mounting tube is thin steel, you can simply use a large screwdriver as a lever to wedge against the motor, causing the tube to bend slightly. **But if the mounting tube is CAST, DO NOT TRY TO BEND IT BECAUSE IT WILL BREAK!** If the mounting tube is cast, you **MUST** experiment with spacers until the belt is properly aligned.



Mounting and Connecting the Speed Control Board

The speed control board is generally mounted close to the motor, and **MUST** be mounted to a metal surface for proper heat dissipation. It must also be **FULLY INSULATED** from the surface it mounts to, using the mounting hardware provided. Below is a picture of how to mount the speed board.

Side View

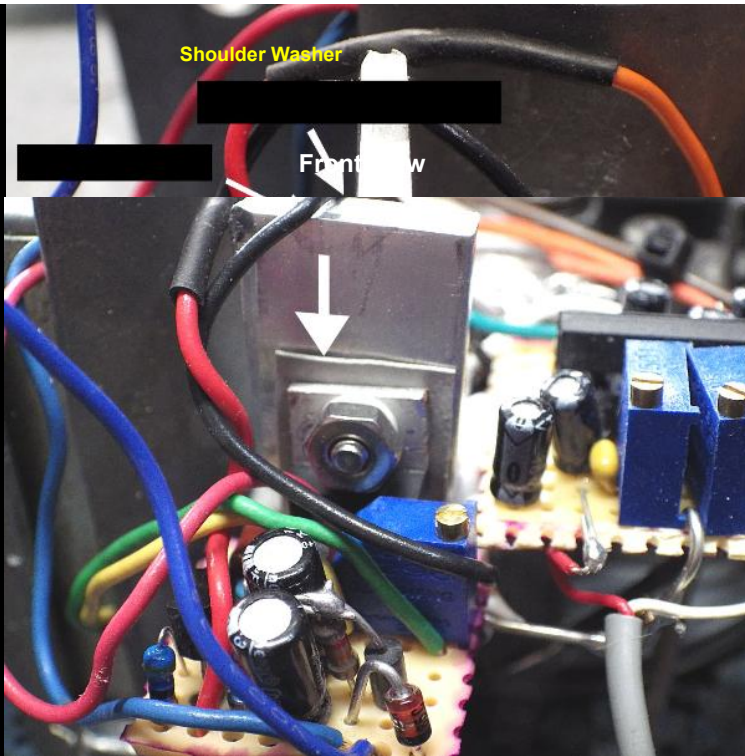
Rubber Insulator

Transistor Tab

Screw

Mounting Sequence

1. Insert screw through mounting surface.
2. Slide rubber insulator over the screw
3. Slide the transistor's mounting tab over the screw
4. **IMPORTANT:** Slide the plastic shoulder washer over the screw, with the shoulder going **INSIDE** the transistor mounting tab hole.
5. Install the nut just tight enough to push the shoulder of the plastic washer through the transistor.



6. Make sure you can see the rubber insulator on both sides of the transistor. A pair of tweezers is handy for moving the rubber insulator into place.

7. Tighten the nut snugly, but not too tight or it can short to the chassis through the transistor.

8. Use an ohm meter to make sure the TRANSISTOR is not shorted to the mounting surface. Note that the screw WILL show continuity to the chassis, but the transistor mounting tab MUST NOT.

Note how the rubber insulator can be seen hanging out on both sides of the transistor, shown by the white arrow.

This is important to ensure that the transistor's mounting tab is fully insulated from the mounting surface.

Time to Wire Everything Up

Below are 4 wiring diagrams. The one to use depends on which motor you purchased and in which direction it must rotate:

If your drive belt and flywheel are on **top**, you need **CCW** rotation.

If your drive belt and flywheel are on **bottom**, you need **CW** rotation.

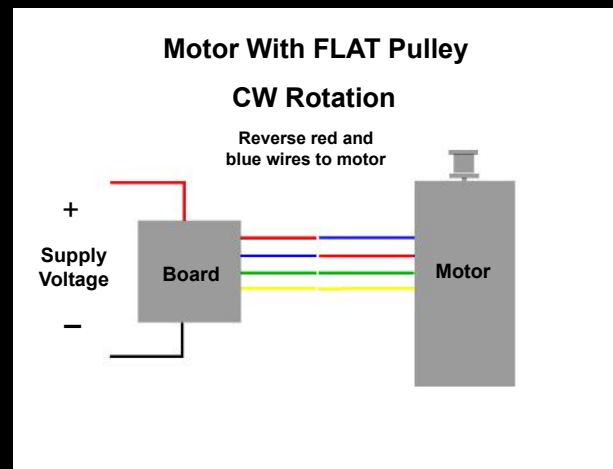
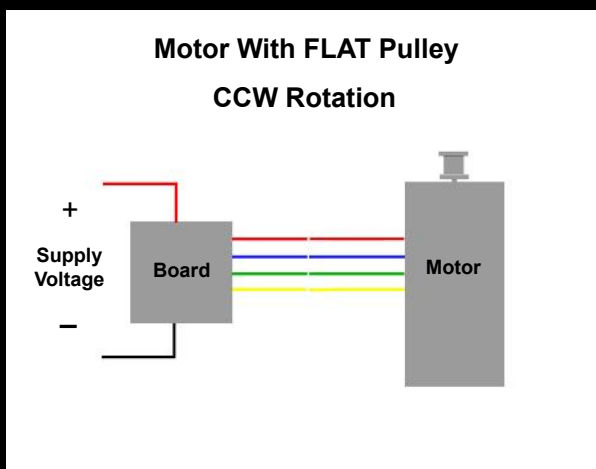
There are two types of motors. One has a permanently mounted pulley for a **FLAT** belt.

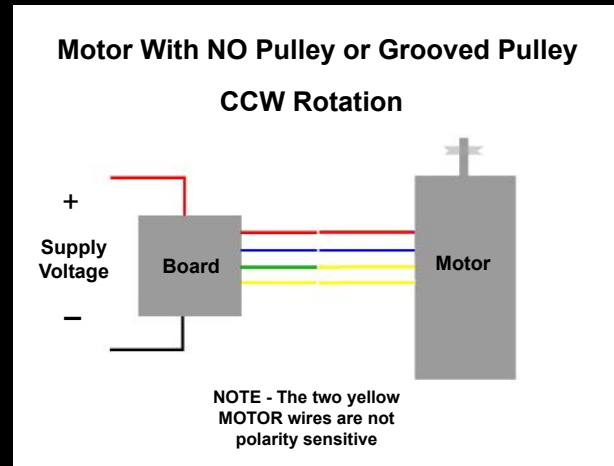
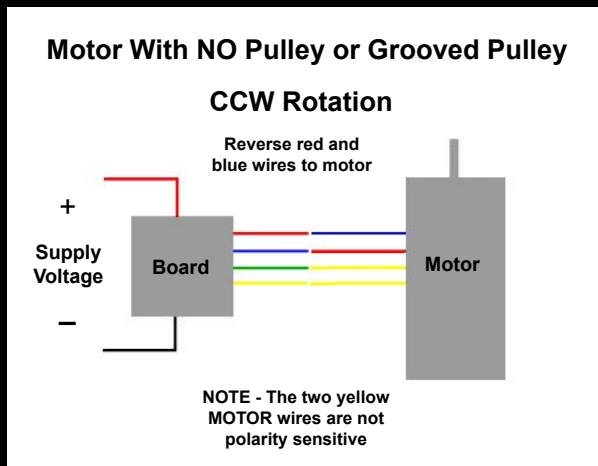
The other type has either **NO PULLEY**, or a **GROOVED** pulley if you paid to have one mounted on the shaft.

Once you find your motor and determine the direction of rotation, wire the motor as shown in the diagram.

Regardless of which motor used or the direction of rotation, supply voltage and polarity to the speed control board remain the same. The black wire is **ALWAYS** negative and the red wire is **ALWAYS** positive. If your old motor had only 2 wires, you can simply connect the speed control board to those wires for power. If your old motor had more than 2 wires, you must connect the **BLACK** wire from the board to chassis ground, and the **RED** wire to +12 volts. **REVERSING POWER SUPPLY POLARITY WILL DESTROY THE BOARD.** If there is any doubt concerning polarity, use a DC voltmeter to check it before wiring the board into the unit.

Click Inside an Image For Larger View





Testing Your Work and Finishing the Job

IMPORTANT: DO NOT USE A FAVORITE TAPE FOR THIS STEP. IF THE DIRECTION OF ROTATION IS INCORRECT, IT WILL CAUSE TAPE TO SPILL INTO THE UNIT, POSSIBLY RUINING IT. As the world's most respected and recommended 8 track technician, even I occasionally get the rotation wrong. Ideally, use an EMPTY cartridge until you know the direction of rotation is correct, then you are safe using an actual tape.

Double check your wiring, and make sure the regulator transistor's mounting tab is NOT grounded. You will need to get to the tiny speed adjustment. If necessary, turn the unit on its side so that you can turn the adjustment while playing a tape. **NEVER, EVER ALLOW AN 8 TRACK TAPE TO PLAY UPSIDE DOWN - THIS WILL INSTANTLY JAM THE TAPE AND PROBABLY RUIN IT !**

Apply power to the unit, turn it on and insert a known good tape. Note that the speed adjustment has a range of at least 10 full turns, allowing you to make precise adjustments. It may take a few full turns to hear a difference in speed. Simply adjust the speed screw for proper speed - that's it!

After letting the unit play long enough to make sure the belt is properly aligned and will not come off or ride up onto the pulley flange, you can then power the unit down and put it back together.

In Case of Trouble:

If the motor runs wide open and cannot be slowed down, the transistor mounting tab is probably shorted to the chassis.

If the motor does not run, the speed board is probably not getting power. Check the power source with a volt meter. Also check to make sure the board's ground connection is secure.

If the unit plays fine but suddenly speeds up and remains at high speed, the belt has probably ridden up onto the pulley's flange.

A minor amount of speed drift is normal until the new parts "break in" properly. Allow the unit to play for an hour, then come back to it with a fresh ear and perform final adjustment.

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