

4L60E to T56 conversion instructions for 1998-2002 LS1 FBody

Modified by Jesse Mock (SSnakekiller), originally written by [Alex Afrashteh](#) for instructions on an LT1 Swap. Credits go to Alex Afrashteh for writing the bulk of this material. I have only modified/added to it to correct the slight differences from the LT1. Here are the original LT1 Instructions: [LT1 4L60 to T56 instructions](#)

This is a new guide as of 04/02/05, if there are any errors, let me know. I am "SSnakekiller" on LS1TECH.COM.

Please use your own judgment while doing the following procedure. The instructions here are only meant as a guide to help you during the install. If you feel something is not right, do some research before attempting to do it or ask someone first. The instructions are as accurate as they get for a free guide. Use at your own risk and feel free to let me know if there are any errors at all.

Converting from an auto to a manual is not actually that difficult. The factory parts do fit in place, and all the wiring is basically there. These instructions should be the most concise there is on the internet. I'll break it all up to make it easier for all to use.

Parts

This is actually 50% of the battle. I highly recommend you buy a complete conversion kit. Places to try are www.speedautomotive.com, www.billygrahamsfirebird.com, and www.lambertsalvage.com. Most kits go for \$1,500. Here is a list of necessary parts :

- T56 transmission, bellhousing, shifter, flywheel, pressure plate w/throwout bearing, clutch disk, clutch alignment tool.
- master cylinder with U-bolt, slave cylinder, reservoir
- new roller pilot bearing
- T56 tranny crossmember, tranny mount (can use A4 tranny mount but will need actual bracket)
- torque arm bracket, torque arm bushing (can use A4 TA bushing)
- pedal assembly with all the switches and clip for clutch pedal
- shifter console insert (replaces automatic shifter insert)
- lower shift boot
- bolts - bellhousing to tranny, flywheel, pressure plate to flywheel, master cylinder U-bolt nuts, lower shift boot screws. CAGs pigtail (not necessary), VSS pigtail ("Whiteboy" tells me the new part # is 88987978, the original is 12101899), reverse lockout pigtail (12101857), reverse light pigtail

(12085485). The pigtailed are expensive, but necessary. Connectors for the pedals are not necessary.

- 4 quarts of Dexron III
- brake fluid for master cylinder reservoir if necessary

NOTE: Steps marked with a star * are steps that may seem unnecessary but if you follow them it will make the objective work much easier!!!!

I highly recommend you get a new clutch and pressure plate. Deciding on a clutch and pressure plate combo really depends on your power levels. Clutches available are - GM stock, Centerforce, STAR, McLeod, Spec, Ram, SLP, and others. The most popular clutches right now are the Spec, McLeod, Ram. From what I have heard, Centerforce is junk. Do not forget, the flywheel must be resurfaced and balanced the same as your flexplate (or neutral balanced if you have an internally balanced/built motor).

Disassembly

First things first, the car must be jacked up. Get the car as high as you can, front and back. Remember, if you don't have the car high enough, you will not be able to get the automatic out from under the car! Be sure everything is very secure, you need to feel confident as you will be under the car a lot.

Inside :

- * Remove both seats.
- Remove the shift knob - there is a staple in the front that must be pulled to remove it.
- Remove all the bolts, and pull the entire console assembly. The parking brake should be pulled up hard and fast to make it point straight up.
- Remove the shifter assembly (disconnect park/neutral switch connector), disconnect the shift cable to the tranny.
- Remove knee bolster and plastic piece (disconnect rear defogger connector)
- * Remove steering knuckle and steering column. A bunch of wires need to be disconnected. There are three bolts in the frame and two big bolts that hold the column. There will be a plastic line with a metal wire in it that connects the shifter assembly to the steering column - this is the mechanism that prevents the key from being turned unless the car is in park - remove it.
- Remove the pedal assembly. There should be a couple electrical connections. The throttle cable is easy to get off. The brake pedal has a clip that holds the brake rod on, remove it and hold on to it.

Outside :

- **Disconnect your y-pipe and O2's if necessary, some may not need to do this, I did not.**
- **Unbolt and remove the torque arm. If you are finding it difficult to get it out of the TA bushing, put a bolt in the differential and one in the TA. Use them to pry it out of the bushing - works like a charm.**
- **Unbolt the drive shaft from the pinion yoke. If you have a tranny plug, plug the auto. If you do not, leave the drive shaft in the back of the tranny.**
- **Remove the dust shield and unbolt all the torque converter bolts. The flexplate has to be turned to do this, use the frame/starter/whatever to turn the wheel (and hold it in place) with a large screw driver or pry bar. Push the TC into the tranny as far as it will go.**
- **Get a hydraulic jack underneath the pan - be sure it is placed in such a way that the weight is evenly spread and the tranny will not fall when completely disconnected. The jack should be positioned from front to back. Jack it until it relieves pressure from the tranny mount. Don't lift the car. :)**
- **Unbolt the tranny mount and remove the tranny crossmember.**
- **Lower the tranny a couple inches and remove all the electrical connectors and wires. Also, pull the dipstick and the tranny cooler lines.**
- **Lower the tranny as much as you feel comfortable. Be sure you are not damaging anything - be aware of wiring, header interference, whatever. The point here is to have access to the top four tranny bolts.**
- **With very long extensions and swivel joints, remove all but the easiest tranny bolts (bottom two). They can be very difficult to break, I recommend you use a long metal tube to slide over the handle of your ratchet - it will provide excellent leverage.**
- **Once all the bolts (but the bottom ones) are out, raise the tranny so it is almost straight - remove the last two bolts. Do not worry about it just falling, there are guide pins that will hold it together. Gently pry the tranny off the engine while keeping everything balanced. You should also hold the TC. Drop the auto as far as you can on the jack and then remove the TC (be positioned correctly, it is heavy). At this point, you will need to take the auto off the jack and lay it on the floor. Of course, keeping it straight will help prevent loss of fluid. Having cardboard on the ground helps a lot to slide it from under the frame. Congrats, one of the hardest parts is done.**
- **Remove the flexplate bolts and pull the flexplate. The bolts are going to be on there good, so be prepared to hold the flexplate in place and use leverage to your advantage. If you are going to use an air tool, get a perfect fit 6 point socket and be sure to be on that bolt good when you hit it.**
- **Do not lose the crossmember bolts, tranny to engine bolts, or flywheel bolts, they are going to be reused. Of course, getting a nice set of ARP flywheel bolts wouldn't hurt.**

Assembly

Inside :

- **PEDAL INSTALL:** Get the manual pedals in. It is time to cut the holes for the master cylinder and the U-bolt. Bolt the pedals down so it sits like it will when you are done.
- **MOUNTING HOLES:** There is a template in the plastic (NOT the frame) that will help you place the pedal framing. Mine was slightly bent, so it had to be coaxed a little so the pedal framing metal would match up with the template. Once the pedal framing is lined up the way you like it and fits in the template, use it as a guide to drill holes for the U-bolt. Remove the pedal assembly.
- **MASTER CYLINDER HOLE (if you know how to do this, skip to MOUNTING THE MASTER CYLINDER):** Look at your master cylinder and draw where you want to drill your hole. Use a 1-5/8" hole saw or something close, but not smaller and not larger than 2" to cut the master cylinder hole. You can make a template out of thin cardboard or paper, but cardboard is more stiff and will help. Do this if you want to be very precise with lining up the hole. Cut out a square piece of cardboard, enough to fit over the master cylinder. In the center of the cardboard, drill the 1-5/8" hole. Slide the cardboard over the master cylinder through the 1-5/8" hole you drilled as if the cardboard is acting as the firewall. With a pencil, mark the holes on the cardboard where the ubolt will slide through the 2 master cylinder mounting holes. Then take the cardboard and cut it so it is about the size of the master cylinder bracket and is diamond shaped like it. Now place the cardboard template in the car and line it up with the bracket holes. Now you will have a nice large 1-5/8" template hole so you can mark exactly where you need to drill the 1-5/8" hole through the firewall. I don't recommend removing the rubber, cut straight through it. When the cutting is done, put the pedals back in. Bolt it up tight. From the motor bay, put the master cylinder near it's place. Position the reservoir so it sits properly without pinching or twisting the line. There is a mount for the reservoir already on your car.
- **MOUNTING THE MASTER CYLINDER:** OK, lining up the master cylinder is a PITA. The person inside should pull the master cylinder flush while the person on the otherside places the U-bolt. You may have some luck pushing the brake booster out some by loosening the four center bolts and pulling it. Once you've got the U-bolt in from the engine bay going in through to the inside of the car, screw the nuts in to hold it in place. The side with the nuts will be on the inside of the car. Take a look at it and make sure the master cylinder sits flush with the frame. The master cylinder rod should line up to the clutch pedal. If the hole was drilled correctly, there should be little gap between the master and the firewall. If there is, fill it with whatever you feel is appropriate (RTV, whatever). Attach the clutch rod - use the clip to secure it on the clutch pedal. Attach the brake rod (again, there is a clip) to the brake pedal and the throttle cable on the gas pedal.

- **CUT HOLE FOR SHIFTER:** It is time to cut the hole for the T56 tranny. There is a plate on the framing that needs to be partially removed. There are a 4 tack welds that need to be drilled out in order to bend the plate out of the way. You can cut it off where it starts to curve up toward the back. Put the bellhousing in with a couple of bolts. Get under the car, and dummy install the T56. Of course, the shifter should be removed. I recommend you use saran wrap or a towel to cover the opening in the tranny. Bolt up the tranny with a couple of the easy bolts and mount it up with the tranny mount and crossmember. At this point, you should trace a line around the shifter assembly. It does not need to be exact as the hole will need to be a bigger anyway. Once you've got the trace done, take the T56 out. From the bottom of the car, drill a couple of holes to help you guide where to make the cut - go about 1 - 1½ inches outside of the trace you made. Don't be too scared, there is quite a bit of room for error. The reason I say this is because you need to have room for the tranny to move and not hit the frame. Get inside the car and use a sawzall, cut off wheel, or dremel to cut the hole. Be careful not to let the carpet light on fire and wear protective eyewear and clothing. At this point, I would dummy up the T56 again to be sure the hole was cut right. Use a file to clean up the rough edges and excess metal.
- **STEERING COLUMN:** Install the steering column and steering knuckle. Attach all the electrical connectors. There are two connectors near the top of the steering column that are not easy to see when the column is in. This is the ignition box, don't forget to plug it in!

PICTURES OF INSTALL:

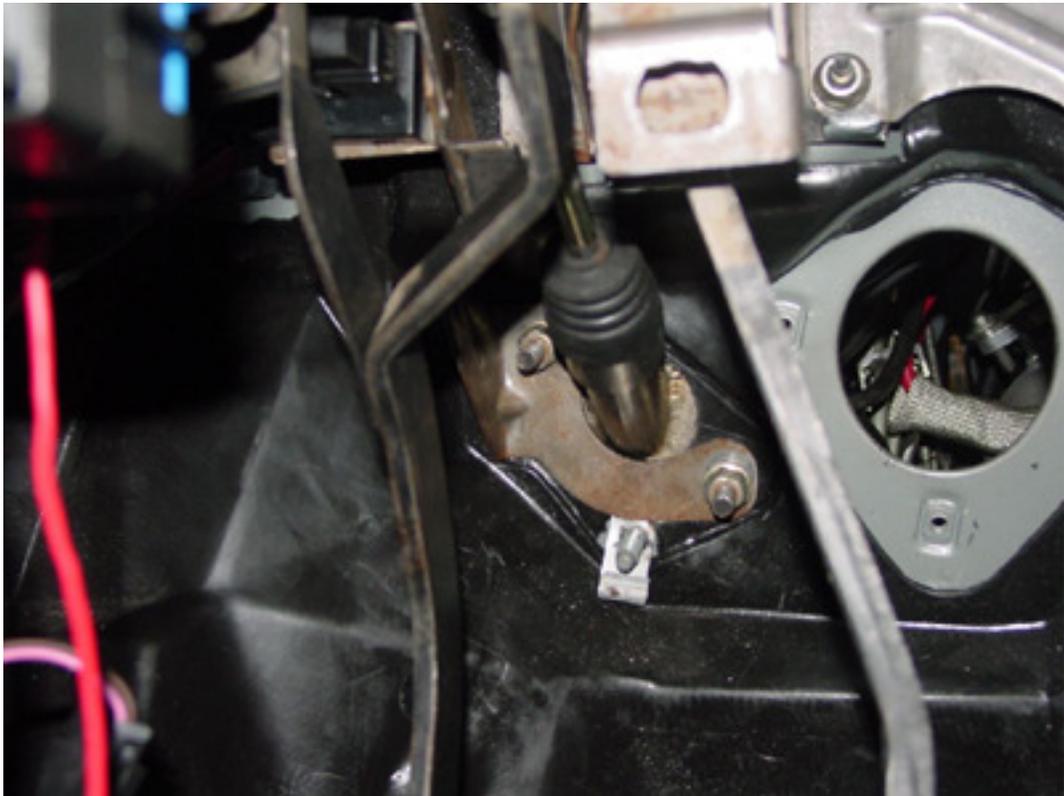
Cardboard Template (cut around the mount, it will be easier to fit inside):



Test Install:



Master Installed:



Outside :

- **CLUTCH INSTALL:** Install the flywheel, clutch, pressure plate and pilot bearing. With a rubber mallet and socket that fits right around the lip of the pilot bearing, install the bearing into the crank. Be sure the flat side goes into the crank and the beveled side is toward the tranny (a gentleman named Brian emailed me to let me know that he installed his backwards and it seized up). It should be flush with the crank when it is fully in. Try not to touch the inside, it has grease in it. My mechanic told me the amount that it comes with is not enough and more should be added. Line-up the flywheel and start all of the bolts by hand - get them in as far as you can with your fingers, then tighten them hand tight in star formation. While someone holds the flywheel with a pry bar, torque the bolts in a star formation to spec (74 lb/ft). Clean the flywheel and pressure plate surface with brake cleaner to remove residue and finger marks. The clutch disk has a flat side and a side that sticks out. The side that sticks out goes away from the engine. I found this part to be different from Alex's description. He says to put the clutch disk with flat side away from the engine. This was either an error or maybe that is how they go in the LT1 cars??? Either way, it will be obvious. The side that sticks out cannot go against the flywheel so it must face away from the flywheel. Hold the clutch disk in place, and put the pressure plate on. Line up the holes and put in all the pressure plate bolts finger tight. Use the clutch alignment tool to center the clutch. Tighten all the bolts hand tight in a star formation, then torque them to spec (22 lb/ft). The pressure plate fingers will look straight when you are done.
- **TRANSMISSION INSTALL:** Install the T56. Bolt the bellhousing up and tighten all the bellhousing bolts. Get the tranny on the jack and line things up. This part is a bit of a PITA. Get the tranny on the bellhousing. Pull the tranny together and put a couple of easy bolts in. Bolt up the T56, mount, crossmember. I would highly recommend you cut the inspection cover so you don't have to remove the starter to install it. If you need to use the tranny bolts to pull the tranny together, be sure to do this evenly. Note that the top bolts are difficult to get to (not nearly as difficult as the 4L60 though TG) and will require long extensions and swivel joints. Remove the fill plug and pour tranny fluid where the shifter would be. Make sure the rear of the tranny is plugged with either a plug or drive shaft otherwise it will leak out the back. It should take about 3.5 quarts to fill. When it's filled, install the fill plug and bolt the shifter up to protect the tranny. Congrats, that was the last major milestone.
- The tranny cooler line plugs need to be plugged in the radiator. What we did was cut the tranny lines and use them to plug the holes. Whatever will work. You could probably even leave them alone if you wanted to.

Inside :

- **WIRING:** Time to do the wiring. There should be 6 wires that went into a connector when you removed the 4L60 near the front of the console inside the car. Here are the basic wiring instruction for connecting those wires:
- **REWIRING instructions: (disconnect battery, should be anyway 😊)**

Hatch Release: Connect the orange w/ black stripe and the black wires together.

Clutch Switch (in order to start the car): connect the purple w/ white stripe and the dark green to the clutch switch (black switch in the back of the clutch pedal)

Reverse Lights: connect light green and brown into the reverse switch located on the passenger side of the T56. You can buy the pigtail, or engineer a way to get the wires to hold and be protected. I put the wires in and pinched them into place. The pigtail will run about \$50 of unnecessary spending, but you could go that route if you are uncomfortable.

Reverse Lockout: You will need to find out which wire on your PCM you need to tap into to operate the reverse lockout. Do a search and you may find this information. I was actually able to trade someone with my same year car my 4L60 PCM and harness for their T56 PCM and harness, so the reverse lockout wire connector was already there for me. Besides that, you are pretty much done.

If there is additional wiring that needs to be added to this guide, let me know and I will add them to the guide.

WATCH THE FOLLOWING FUSES: starter, gauges, Turn/BU lights.

- **Put the carpet back around the pedals, install the lower plastic piece and the knee bolster. The lower plastic piece has some perforated foam that needs to be removed for the clutch pedal.**
- **Drill holes and install the lower shift boot. Use short machine screws.**
- **Install the console, parking brake, shifter insert, and shift knob. When installing the console, there are two lights, the parking brake wire, and cig. lighter connector.**
- **Install the seats.**
- **Take it for a drive! Don't beat on the clutch as it needs to be broken in. If you have a kevlar clutch, do not be alarmed if it chatters. This will die down as the clutch disk, flywheel, and PP wear in. You may also hear your TO bearing when the clutch is out, this is normal.**
- **Note that you will throw a ton of codes and your speedo will be at least 50% low. This can be corrected by getting an M6 computer program. If you're PCM already has custom tuning for your engine combination, these variables need to be transferred to a M6 program. LS1Edit and HP Tuners can do the job. Modern Muscle car and Ed Wright can also do programming. Even**

your dealer can reflash your PCM. The PCM will still set a hidden SES code because of a missing CAG warning light. No need to worry, as this means it will not illuminate the SES light.

Questions/Comment/Errors???

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