Lt1 swap com

There should be enough here to get you going in the right direction. Some of these I have pictures of completed harnesses I have modified for easy installation. I have a lot of pictures so please be patient and let them load. If you find this information useful, or have suggestion on something to add, let me know , I will try to get it done. My goal is to help the hobbyist to be able to complete a harness transformation by them self. I would only hope you send the PCM to me when it comes time for it. I do not charge for ANY information. Sample schematic similar to what you may see in the following pages. This may help you to learn how to read the schematics. New page on Air Conditioning Controls! For parts list for fuse block, obd2 diagnostic port, and wiring instructions, click here! Typical 'External' Connections This is so the PCM can remember learned information about the engine over time. This includes idle control, fuel trims, and transmission adapts. This is what 'powers up' the PCM. Even the COIL wire on some of those went dead when cranking. After cranking, power was restored to the coil through a resistor, lowering voltage to 6 volts. The signal is only present for two seconds at key on. Fuel pump operation resumes when cranking over. So, if there is a condition where there is a bad crank sensor, fuel pump will come on, turn off, and will not turn on when cranking. However, the signal needed is opposite how you're brake lights work. If you vehicle was equipped with a lockup trans to begin with, you probably already have the proper normally closed switch mounted by your brake light switch. If you do not, you can use a relay to perform the same thing. There are then a normally open leg and a normally closed leg on the relay and a supply, PCM can be programmed to match tire size and axle ratio for you're swap, so this signal is calibrated. The stock LS tach signal is 4 cylinder type signal. This can be programmed as 4, 6, or 8 cylinder signal. How to wire up a fan relay Relay coil draws less then 1 amp. Make sure the ground for the cooling fan is a good one, also ensure there is a good ground from the battery - side to the frame. This uses a 5 terminal relay for the on on the right in this schematic. When the HIGH speed kicks in, it removes power from the first relay. This prevents power from being applied to both wires of the fan at the same time. Here are some pictures of a typical automotive relay that can be found at most parts stores. Now fuel injection is all that comes from new vehicle factories and EFI engine swaps into older vehicles are very common. It seems for many people that the scariest part of the modern engine swap is the wiring harness. These are mainly battery voltage, switched ignition voltage, PCM output to control fuel pump, and a brake switch signal for electronic torque converter control if used. We have found LT1 Swap lt1swap, Brendan Patten runs the site and is an expert on programming many of the GM multiport injection systems. There are companies that outright sell new harnesses for LS engine swaps, and some vendors will also rework a used harness for a fee. However, with a dozen or so hours of work and your attention to detail, you should be able to rework your donor harness yourself with some basic tools. This story is meant to give you an idea what tools and techniques are involved as we show you some work from our Chevy Tahoe harness for a 5. The process for other GM engine harnesses is similar. While it is possible to reuse a fuse block from the donor vehicle, they are often much larger and more complicated than necessary just to serve for this engine harness. What are needed are typically four power fuses and two relays to complete the standalone harness. Understand that this harness is just for engine control and does not necessarily tie into the rest of your vehicle harness. Such outputs as the speed sensor can be used to drive an aftermarket electronic speedometer and an engine rpm signal that can run a tachometer. Plus, today there are tablet apps that can read the OBD-II port data and display some gauge information. The earlier LS engine models were all drive-by-cable; that is, they used a traditional mechanical throttle cable. Next came drive-by-wire DBW versions that use an electronic gas pedal assembly and a servo motor mounted to the throttle body that operates the throttle plate. DBW systems on third-generation engines require you to use the gas pedal assembly and a separate throttle actuator control TAC module in addition to the PCM. These components must be fairly closely matched by year to work properly. In most cases, it is most reliable to use components from the same year and type vehicle. In fact, pulling the engine and all related electronic components from a complete donor vehicle ensures that you have system-matching parts that will play well together. These engines can be reprogrammed to disable the sometimes problematic cylinder deactivation function, leaving all factory parts in the engine. Patten has worked with these engines and warns that if a camshaft is changed, you must ensure that the lifters, camshaft, and AFM solenoid plate all match. The wrong combination of parts can damage to the engine. There was also a flex-fuel version L59 of the 5. This engine used different fuel injectors and pump to flow more fuel. In addition, the PCM uses program code to read a fuel composition sensor that provides a digital pulsed signal based on the amount of ethanol in the fuel supply. This function can be turned off in the programming and the engine run on normal non-E85 gasoline without having to change any parts. Of particular interest to those doing a harness swap for a 4WD rig is dealing with the vehicle speed

sensor VSS. The PCM reads the speed of the vehicle to determine transmission shifting points. When using a computer-controlled transmission, such as a 4L60E or 4L80E automatic, you will need the VSS to properly shift the transmission. Another option is to use an aftermarket kit to place the VSS between the transmission and transfer case. You can find more specific information about VSS function for other drivetrain configurations on lt1swap. Close Ad.

Forums Photos Industry Videos. Jay Kopycinski Photographer, Writer, Share on Facebook Share on Twitter. How hard could it be? While there is certainly some truth to that, the differences can come back to bite you when you attempt to swap an LS of any sort into an LT1 Camaro. But it is certainly not impossible, and if you have already invested some money into your LT1 Camaro's chassis, it may be worth your while. I will let you be the judge as we cover the essentials of making this swap a reality. The first thing you need to be aware of is that the motor mounts are different from the traditional small-block to the LS1. The easiest solution is to source a stock K-member and engine stands from a wrecked '02 Camaro Z28 or SS, or to purchase an aftermarket tubular version. If you decide to purchase polyurethane motor mounts, remember that these typically do not include the metal clamshell that actually bolts to the block. The control arms, spindles, brakes, etc. The exception, though, is the steering rack and linkage. Even though the transmission options are the same T or 4L60E , there are some differences between the two that prevent a direct bolt up. However, according to Greg Lovell at AntiVenom, the easiest solution is to keep the unit you have and use a custom torque converter to match the LS1 flexplate and the early style input shaft. FTI and Circle D are two popular choices of custom converter suppliers that accommodate those needs. A good torque converter ups the fun factor and drop e. The T uses a much different clutch and hydraulic system on the LT1 version as well as a different bellhousing and mid-plate. It can be converted, but unless you have already invested some money into internal upgrades you might as well sell or exchange it for a rebuilt LS1 version. Crossmembers and driveshafts are virtually interchangeable between years so there should be no concern there. However, the weak steel driveshaft on the automatic should really be swapped out for an LS1 or aftermarket version. The accessory drive system is a major departure from the LT1. Pretty much nothing is reusable. And remember that the F-body uses a unique accessory drive arrangement. Only the '06 GTO shares it. Hawks Third Gen sells brand-new alternator brackets, idlers, and power steering reservoirs as well as complete take-out engines with accessories. It pretty much goes without saying, but of course I have to, that the exhaust system and air intake must also be considered. You can mate a set of LS1 headers or exhaust manifolds and Y-pipe up to the old cat-back exhaust. However, using a traditional LS1 air lid requires the lower part of the airbox that doubles as a radiator cover. While an LT1 fuel pump in perfect condition should provide enough output for a relatively stock LS1, despite the jump from around 42 psi to 58 psi fuel pressure, at this age it is not recommended. Racetronix offers drop-in solutions that will support over rwhp as well as a plug-and-play wiring harness that connects directly to the alternator for power. Not only is your wiring brittle by this point, but it can't properly support the electrical load of an aftermarket pump. The fuel lines themselves are another consideration. The LT1 fuel system is a standard return system with a regulator on the fuel rail, while nearly all LS engines are return-less. AntiVenom recommends using the '98 Corvette fuel rails with their built-in regulator to reconcile this. Of course, if you can't locate a used one for a reasonable price, aftermarket options might be a better course. The last major hurdle is the electronics. If you are handy with wiring diagrams and crimpers, you can certainly convert an LS1 engine harness yourself. However, the folks at Current Performance are one of a few companies out there that will take the headache out of the conversion. Having modified existing harnesses a cheaper option and built them from scratch for many years, Current knows exactly what to expect and how to handle the issues that can grind your project to a screeching halt. The one thing to keep in mind is that every swap is different. After having perused many Internet forums and spoken with a few people who have done them, there always seems to be a unique issue that didn't come up on othersâ€"whether it was getting the starter to crank, cruise control to work, etc. This is especially true as you start throwing aftermarket parts into the mix. Hopefully this story will at least give you the basic information to get started, and the awareness to help identify any potential issues. Happy swapping! You'll need to use an F-body oil pan, flexplate, water pump, and harmonic balancer. Make sure you choose the right one. The linkage can be purchased from a local parts store. Hawks Third Gen has also proven to be a good source for these pieces, including whole take-out engines with accessories. If you are using an aluminum block LS engine, it will be quite a bit lighter than the LT1 it replaced. Reusing the old springs can make the car feel "darty," so Greg Lovell at AntiVenom recommends swapping them for stock '02 Z28 or SS springs or even lowering springs. The easiest solution to the converter issue is to pick up a custom converter that will bolt up to the LS1 flexplate and slide onto the older 4L60E's input shaft. You could

swap out the converter and transmission if you wanted to use stock parts, but a custom converter will simplify the swap and up the fun factor. The LT1 clutch and front plate are not compatible with LS engines. Some transmission builders may let you exchange your LT1 unit for an LS1. Greg Lovell at AntiVenom suggests this, along with the water pump and balancer, as one of the areas where it is best to buy new to save headaches later. But don't forget to get a matching Y-pipe so it will bolt up to your cat-back exhaust. The "off-road" version can save you money if emissions compliance isn't an issue. Otherwise, you will need new fuel lines and a new tank. If you can't find a used Corvette fuel rail at a reasonable price, it will be cheaper to contact Racetronix for a full setup. It comes with a micron high-flow fuel sock and is built with today's ethanol-enhanced fuels in mind. The fuel pump wiring harness upgrade is a great idea since the brittle factory wiring can't handle the electrical load of an aftermarket pump. The harness needed to make your gauges, accessories, and old 4L60E function with an LS1 engine isn't that much different. EFI Connection is another source for custom wiring harnesses and the parts needed to make your own. Also note: if your LS engine is missing knock, water temp, IAT, MAP, and other sensors, you will need to source those as well to match the harness and computer. This is a crucial step because many sensors and functions of the chassis and interior are connected. Consult a reputable tuner for a calibration that will have your Camaro running like a top. We treat a small-block Chevy build to a host of modern upgrades to deliver LS reliability with old-school charm. Super Chevy. How To. View Full Gallery. Sources AntiVenom. Current Performance. Hawks Third Generation. View Full Image. Connect With Us. Get Latest News and Articles. Newsletter Sign Up. Related Articles. The wiring aspect of any LS swap is undoubtedly the most difficult. Most builders are familiar with fabrication techniques, trouble shooting, and parts swapping to make things work, but electronics rise to a much higher level of complexity. Wiring has carried an aura of mystery that can send a shiver down the spine of even the most seasoned builder, making them wish for a simple carburetor and distributor. This chapter has the answers you seek with easy-to-understand instructions for tackling the wiring of an LS swap. Retrofitting the stock harness requires knowledge of electrical circuits, soldering skills, and attention to detail. It is not a simple plug-and-play procedure, so make sure you are up to the task before hacking into the wiring harness. On many LS engines, even the throttle is computer controlled; the pedal is connected to a sensor box that tells the throttle how much to open. These systems can be overwhelming, but the key is to tackle one circuit at a time. Although the factory systems are certainly adequate, the aftermarket has fully embraced the LS platform and there is definitely more than one way to do it right. If you picked up an engine from a salvage yard or other used vehicle, you need all the electrical components to go with it. Let me repeat: it is imperative to get everything. This includes the computer, wiring harness, mass airflow sensor MAF , oxygen sensors, and if the engine is drive-by-wire, the gas pedal and throttle actuator control TAC module. Each engine requires the use of its own specific computer and harness, and keep in mind that there were changes made to each system year by year. In order to reuse as many of the factory components as possible, you need to get all of them with the engine. Keeping track of each wire can be a bit of a headache, though. Whether using a stock or an aftermarket harness, the cleaner the install, the better. This Painless Performance PowerBraid protects the wires from abrasions and heat while keeping a stock look. Friction tape at the ends secures the braid. Regular electrical tape works, but make sure it is good-quality stuff such as 3M Super The cheap stuff falls off. Each Painless Performance kit comes with all the basics: terminal pack, relays, and zip ties. You often need more terminals than what is included, so be sure to have plenty of assorted terminals on hand. Bulk terminals can be ordered directly from Painless. Here is the completed wire-diet LS1 harness install with the full loom. This takes some time to complete, but the results are worth it. Retrofitting a stock wiring harnessis seemingly complex and perhaps overwhelming. In fact, it is really not that difficult. With the proper diagrams and instructions, it can be modified to greatly simplify the process of wiring the engine. The majority of the wires in the stock harness are not needed in a retrofit application. Seriously, what Camaro needs an evaporative canister purge solenoid control? There are differing opinions on what to remove from the stock wiring harness, however. There are two main types of wiring projects: fixing an existing system or replacing it. With plus-year-old wires, often the best solution is total replacement, especially if the car is apart already. The crew at Red Dirt Rodz handled all of the wiring details for this Corvette roadster. Although the original harness was still there, most of the terminals were broken, the wires were cracked and corroded, and it simply was not worth trying to fix, especially considering the car was being fully rebuilt. Starting with a clean slate is always nice. One call to Painless Performance and the harness was on its way. They could have ordered a factory replacement harness, which is already terminated and bundled, just like the factory harness, and every-thing is where it should be for the stock components. This situation called for a new

plan with new routing for this complicated wiring system. The tools for wiring are critical. The most important tool in a wiring job is the crimpers. Crimp connections often get a bad reputation because of poor installation. A properly made crimp is just as good as a solder joint. The key is correctly sized terminals and quality crimpers. Those cheap combo crimp-n-strip tools are no good; throw them away. They are only good for emergency repairs. You need a set of good crimpers designed for insulated terminals. Klein Tools and KD Tools make excellent crimpers. The first step is to break down the harness and split up the groups of wires. Plan the layout of the harness before getting to the car. A speed stripper really speeds up the process and is a worthwhile investment. The key to a good crimp is quality crimpers. This pair works great for insulated terminals, the kind used on this car. They also work for non-insulated terminals. Select the correct size of terminal for the wire and insert it into the corresponding set of jaws in the tool. Using the wrong jaws can result in over-crimping which breaks the terminal or under-crimping which results in a loose connection. A properly applied crimp should look like this. The insulation is slightly bulged, but not squished. Always tug on the wire and terminal to ensure it is not loose. Next, locate where the engine side of the harness goes through the firewall. On the Corvette, we used the stock location. Be careful, as sometimes the chosen hole has another function. The fuse box mounts to the firewall with two bolts. It can be a real pain to install the fuse box; having a helper alleviates a lot of frustration here. The metal backup plate was trimmed to match up with the firewall. Inside the car, the bundles of wire were split into groups and routed to their locations. This is the Painless Phantom Key push-to-start system, which includes keyless entry. This system replaces the ignition key with a push button and includes all the relays, which were mounted under the center console in the Corvette. The neutral safety switch and backup light wires were routed to the shifter and terminated with spade terminals. This makes removing the shifter a no-cut proposition. You may not need to remove it, but if you do, this makes it easier. All the main ignition wires are gauge wire. These feed the majority of the electrical system. The key to safe wiring is using the proper-gauge wire for the amperage. The longer the wire, the larger the gauge needs to be. There are two main power feed wires, which are terminated to the large feed wire that connects to the battery. Terminate this with a single large gauge wire terminal. The two wires on one side are smaller than the main feed wire. Most Painless kits do not come with any ground circuits. Usually this is not an issue, but with Corvettes, locating a good ground can be a bear. Use a ground harness for the rear taillights; use ring terminals and gauge primary wire to provide grounds for each light. The key to a good ground is a solid connection. The paint should be removed from the metal surface of the ground location. Next, bolt the ground feed to the frame using the fuel pump mounting point as the ground point. By using the same bolt, the number of holes in the chassis is limited and it keeps everything neat and clean. Then route the ground harness to each light. The taillights ground on the mounting stud. When using speed-nuts, you have to be careful not to over-tighten them or they strip. Under the hood, separate each wire group just as it was inside the car. There are a lot of small groupings of wire here, so it is important to take each one separately. As each wire group is positioned on the engine, the harness starts to come together. Keeping each circuit group together can be tricky, so be patient. The hardest part of wiring is the planning. Selecting the correct wire size for the terminal is critical. Most terminals are color coded for size. Red is the smallest, fitting to gauge wire; blue is for to gauge wire, and yellow is for to gauge wire. Anything bigger is sold by the size, not color. Primary wire is typically an gauge wire and is the most common wire found in wiring harnesses. The larger wires that feed heavy-draw circuits are typically to gauge. The wire in Painless Performance kits runs a little larger than the standard; the primary wires are gauge, with gauge for heavy-draw items such as the headlights. Opening the box and seeing several thousand feet of wire can be scary. Fear not. It is not that bad; just be patient. The first step is to take it all out of the box and lay it out on the bench or floor. Separate all the bundles. Painless kits come pre-bundled in all the major groups: engine, dash, and tail. From there, they are divided into sub-categories. These are small pins that require special tools to crimp. They are used in every connector on a late-model engine. The components of MetriPack or Weather Pack terminals are a Molex or nylon housing, a silicone wire seal, and the terminals. The housings are shape-specific; you must make sure that you have the correct male and female components. The terminals can sometimes be specific to the housing as well. These are the crimpers used for the terminals. They are available in many configurations, and most have ratcheting locks for a completed crimp. The terminals must be crimped twice, once on the bare wire and once on the silicone insulation. Make sure you slide the wire through the silicone boot before crimping. Each terminal style has different pin types. All styles lock into the plug housing with spring locks built into the terminal itself. Unlocking these can be a pain; the trick is to use a small pick or unfolded paper clip to unlock it. Every terminal uses a different lock location. Make sure you

grab the wiring harness from the donor car. These are good for the typical project, but there may be a few wires that need to be moved to a different section. Now is the time to reroute any wires. Once inside the car, this becomes much more difficult. Go over each wire and its location and check the car. All Painless wiring kits provide only the power side of the circuit. Except for a couple of situations, you must provide all ground connections. Although this is typically a simple thing, Corvettes require some additional forethought, as fiberglass does not make a good ground. Pain-less Performance thought ahead on this one, and they offer a ground kit that comes with wire and several terminal strips to provide multiple ground circuits where you need them. Wiring an entire car requires planning, time, and lots of patience. If you find yourself getting frustrated with a particular section, get up and walk away for a minute. A novice builder should be able to complete a basic wire harness replacement in three to four days. The more circuits and the more complications, such as EFI, audio systems, etc. But if you take your time and plan out the locations of all the wires before cutting anything, your wiring project will look and function great. All of the connector and relay data pages 87â€"91 represent what can be done with an LS1 wiring harness. The pin-outs for the later models are included on pages 81â€"82, but each computer and engine has different requirements to make it operational. Drive-by-wire and displacement-on-demand engines make this more complicated. This puts all of the responsibility in the hands of technicians who have tested each harness and guarantee it is correct. A simple crossed wire can fry the stock computer, rendering it useless. In addition, purchasing an aftermarket wiring harness also affords the luxury of having access to trouble-shooting tech assistance. If you get into trouble with an aftermarket harness, simply call the tech line to get it going and save valuable time and money and potentially a dead computer. Everything in modern drivetrains is electronic, so proper grounds to the transmission are important. A simple braided ground strap to the frame will do. This also helps reduce electrolysis in the cooling system. The body needs to be grounded as well. Scrape the paint away from the metal at the grounding point or use a star washer for solid contact. Some LS wiring harnesses include the underhood fuse box. Bolt this down in a convenient location. If you are using an aftermarket harness without a fuse box, make sure that the power wires are properly fused. Anytime wiring is run through the body, a grommet is required. This protects the wiring from chaffing on the body, causing grounds and the possibility of fires. These wires are the stock ignition connectors for most GM cars. The big purple wires connect the relay to the starter. The plug-and-play nature of an aftermarket harness combined with its relative affordability makes it the best option, plus it generally looks better than a hacked-up stock harness. Another thing to consider is that many factory harnesses are fairly old. With age, wiring becomes brittle and corroded. An aftermarket harness is all new, so the swap gets more life out of the wires. Most aftermarket harnesses are similar in their connections; it is the finer points of the finish and overall look that separates them. Many after-market harnesses are left in loose form, that is, without any loom or wrap on the wires. Certain wires are grouped together for their placement on the engine, such as the fuel injector harnesses, but that is as far as it goes. This leaves it up to you to cover the harness for the final finish. Some aftermarket harnesses group each set of wires together as they are on an engine, and complete the job with wire loom or tape, making it a clean, out-of-the-box installation. If any of the stock components have been changed or moved to another location, the harness may have to be altered, so that is some-thing to think about before ordering. To make sure you get the correct aftermarket harness, there are a few things to consider before placing an order. Old-style automatics, such as the TH, and manuals such as the Muncie M22, are not electronically controlled, but the 4L60E automatic is electronically controlled. That is important because it must be connected to the computer. The MAF sensor is either a three- or five-pin make sure to get this information from the donor vehicle. Determining if the throttle body is drive-by-cable or drive-by-wire is also essential. The type of fuel injector is the last piece of component information you need. There are three types: the old-style STD injector which has a large metal bale clip , the T-style injector which uses a Delphi 45 plug , and the Flex Fuel injector which is also known as the Z-style. LS engines are plug-and-play, so installing the harness is quite simple. Once the engine is wired up there are still those pesky little accessories, such as gauges, that need to be connected. Since the original vehicles were so heavily dependent on the computer system, all the gauges were routed through the computer. Although this is fine for a Corvette, most older muscle cars require significant modification in order to retrofit late-model computer-controlled gauges. Each drive-by-wire engine requires its own specific pedal, throttle body, and possibly TAC module. The small box on the lower right is the transmission control module TCM. Most aftermarket harnesses are purely plug-and-play: just plug it in, make four wiring connections, and, theoretically, fire up the engine. Know the specifics of your engine and transmission before ordering, however, as there are a lot of options. An un-loomed harness allows rerouting of any

wires to components that may have been moved. There are three types of fuel injectors. Flex-fuel engines have the Z-style, and the other two were used across years, makes, and models. Even throttle-by-cable throttle bodies have wires. The throttle position sensor and MAF sensor must be plugged in. The MAF sensor mounts directly in front of the throttle body. It can be moved with elbows and other induction piping components. They are not interchangeable without ECM changes. Throttle-by-cable is the most compatible with older transmissions because the brackets are already there for the kickdown or TV cables. A cable-driven speedometer does not do much good with a VSS wire attached to it; neither does a stock tachometer. Special considerations that must be made in order to get the information from the engine to the driver. Tachometers are simple gauges that measure the revolutions per minute of the engine. Although not absolutely necessary they are particularly useful, especially in manual transmission cars. Their failure rate is very low. You would be hard pressed to find a dealer that has seen any failed coils. Getting the tach signal to an old stock tach requires an adapter. The signal is modulated at a different rate from that of a typical V-8 tach. The LS signal must be converted to a standard signal with a module. These modules are available from Dakota Digital. Their SGI-8 module converts the tach signal to different settings, such as 4- or 6-cylinder. The tach signal coming from the LS1 is representative of a 4-cylinder signal. Therefore, a factory 6- or 8-cylinder tach must use this module to read the correct signal and display the proper reading. Programmable tachometers such as an AutoMeter or VDO do not need this module, as they can be set to read a 4-cylinder tach signal. With an electronically controlled transmission, an electronic speedometer can receive the signal from the VSS system via the computer, or an aftermarket speedometer can receive a direct signal from the VSS system. If the stock cable-driven speedometer is being used with a late-model transmission, the transmission must be adapted to drive the cable. Most aftermarket transmissions already have a cable-drive provision. Oil-Sending Unit. The oil-sending unit also requires adapting. The oil cooler bypass fitting on the oil pan just above the oil filter is an ideal place to install an oil-pressure fitting for the sending unit. Depending on the specific engine, select one of three bypass fitting options: a drilled and tapped fitting; a blank boss fitting, which can be drilled and tapped; or a dome top fitting. Although not strictly a part of the wiring, you need sensor adapters such as these if you plan to have any kind of engine monitoring that is not wired to the ECM. From left to right: adapters for coolant temperature, oil pressure at the block, and oil bypass. The up engines have a domed cap with no boss. Any of these can be used. If you need to drill and tap the fitting, simply drill it and tap it to the thread size that the oil-sender fitting requires. The drive-by-wire system is a potentially confusing portion of the wiring conversion. Each engine that uses the drive-by-wire system requires a specific pedal, throttle body, and, in some cases, a TAC module. In most cases, the drive-by-wire components are not interchangeable. The pedal, TAC module, and throttle body must remain with the engine in order for it to work properly. The only interchangeable components are the Vortec truck modules, but the programming in the computer must be changed as well. There are several different component packages, which vary by vehicle. The â€" Corvette uses a pedal and separate TAC module to operate the specific throttle body. In , General Motors went to a drive-by-wire pedal that incorporated the TAC sensor in the pedal, so only the pedal and throttle body are needed for a swap. The Trailblazer uses a pedal only and is different from the rest of the trucks. These trucks use a drive-by-wire pedal mounted on a moving platform that adjusts to the height of the driver. Of course, you could simply swap to a cable-driven throttle body or a carbureted setup for one of these engines. Drive-by-wire was first avail-able in the trucks in , and there have been many different pedals with and without TAC modules. This is why it is so important to get all of the components from the donor vehicle beforehand. Photos courtesy Doug Strickler. He spent many years as an avid Volvo enthusiast. When Dale passed away in , the rest of the Strickler family decided to give the Volvo Turbo Wagon to Doug. Having been around Volvos for years, Doug started playing with the wagon, modifying the stock turbo 4-cylinder. The reliability, ease of use, and the obviously larger aftermarket were all a part of his decision. The build was on, and Doug certainly had his hands full. Mounting the LS1 in the Volvo chassis was the most difficult part of the entire swap. The trick to fabricating custom motor mounts is to suspend the engine over the frame where you want it to be. This can be done with the engine on a hoist and setting blocks under the engine to secure it. The hoist supports the bulk of the weight. Another option is to use a plastic engine block from Pay-R. These lightweight plastic engines are dimensionally accurate and are a great way to safely lay out motor mounts for custom installs. The engine needed to sit back as far as possible toward the firewall to allow room for the turbos to clear. As a turbo enthusiast, Doug figured if one is good, two is better, so he opted for a pair of trim Garret T4 turbos to straddle the LS1. Doug built everything on the Volvo, and Carolina Auto Masters tuned it. Currently, Doug drives the car daily and enjoys 30 mpg on the highway.

The Volvo makes hp at the rear wheels and has no drivability issues. To support the turbos, an Aeromotive A fuel pump feeds the pound fuel injectors. To eliminate accessory drive issues, Doug built his own system. Part of the turbo brackets double as the accessory drive mounting. This swap is about as custom as they get; very few aftermarket pieces were used and everything was custom made. The T56 is coupled to a performance-built Ford 8. Doug says he likes the deep gears because the power output is big enough to move the car as fast as he wants to go, and it lets him shift a little less. The Volvette has traveled the quarter-mile to the second mark. If you liked this article you will LOVE the full book. Click the button below and we will send you an exclusive deal on this book. LT1 Swap Pics Empty Here ya go!! I hope this is of help to those of you looking to do the swap, or to those of you already wrapped up in it. I whipped this up after receiving LOTS of requests for info regarding the swap and what all is required. Please remember that this is only an outline of how I did it, it is not the only way to do it. I'm sure that there's someone that's done something that I didn't, and I'm sure that I've done something that someone else hasn't. So please take it for what it's worth. I am more than willing to help or clairify something that you might not understand. So good luck to you! Eric - LT1Powered85Z. I'm not quite sure where to start. There are a lot of things that have to be changed or converted. I guess the first place to start, would be to get your hands on an LT1. If you've already got one, well then you're ahead of most people. So I guess it all depends on the knowledge of the seller. Low price most likely means uneducated seller and a high price is probably going to be asked by a knowledgeable seller. First we'll talk clearance. If you want to go with the Corvette LT1 and accessories, you won't have to move the passenger mount, but instead will have to change the exhaust slightly. Another thing that has to be changed, only if you choose Vette LT1, is the exhaust manifolds. The Vette ones dump in the center and on 3rd Gens. They're top notch, quality-wise and they work perfectly, regarding clearance with the LT1's D-port heads, etc. Speaking of exhaust, the flanges on the LT1 manifolds are a 3-hole configuration, and the ones on any other 3rd Gen. So, that means that the flanges on your y-pipe, which by the way lines up VERY close, have to be changed. The passenger side on your stock y-pipe comes up at a little too much of an angle to use safely. So I got a hold of a 4th Gen. I cut it up and bolted it on to the manifolds. I then brought it to an exhaust shop and had them custom make me a pipe, using my stock one and the flanges off of the 4th Gen. The stock 3rd Gen. It is not a possibility to use the 4th Gen. So it has to be cut and pasted, so to speak. But running a header like SLP's, allows you to ignore using a 4th Gen. The engine will not fit if this is not done. But now that I've done it again and have thought about the weight advantages of not having it, I have chosen to get rid of it and run the 1LE delete pulley. Once the engine is in the car, you'll notice that it sits considerably lower than the stock TPI set up does. The wiring harness is another topic. If you plan on using any other transmission electronically controlled, besides the 4L60E computer controlled, you'll have to get another wiring harness. I purchased their "Street Rod Harness". This harness allows you to use your stock R4 with the LT1. It also allows you to get rid of the emissions equipment if you choose Air Pump, etc. They're very well fabricated. Each connector is the same color as stock, and has a little tag on it telling what it is and where it goes. All of the wires are covered in a mesh like covering that is more flexible than the stock plastic tubing, making it very easy to work with. Also, once you get a hold of an engine with computer, you'll have to have the Vehicle Anti-Theft System removed from the computer. The V. One thing that you'll need, that I didn't know about when I tried installing the harness, is that you'll need the connector and wire extension for the DTIS Distributor to just about the passenger side manifold , sorry I forgot what exactly D. I just ended up taking it off the factory harness, I thought the harness was missing something, but I was wrong. As I said earlier, I chose to keep it the first time, but have since decided that it's not something that I have to have. After you figure out the lines and such, to match up with your existing canister, then you'll have to have the system overhauled to match up with the Ra, since you have the better, in my opinion, R The power steering is another piece that'll have to be dealt with. I installed the power steering resevoir on the passenger side inner fenderwell. It was nice and easy, and looks good there. It also allowed for some easy routing of the lines for it, which I made on my own. The fuel lines will have to be modified as well. The lines come up on the driver's side of both engines, in the rear, by the fuel pressure regulator, which happens to be another piece that I recommend you upgrade. To an adjustable one, that is. TPIS claims something like a 10hp increase, when adjusted correctly. It's a very easy install, 10 minutes or so. It makes it very easy to run your lines. The stock in-car lines follow the frame up on the driver's side, and aren't very flexible, and the LT1 lines are form shaped to aim towards the passenger side fender. So the use of braided or equivalent lines makes it a lot easier to hook them up. All you have to do is attach the fittings on the end of the lines, and one onto the end of the return line on the fuel rail, and then use a small adapter to connect one line to the fuel pressure regulator. The braided

lines look cool too! Along with changing the fuel lines, if you aren't starting with a TPI car you need to upgrade your fuel pump. It's an intank Bosch unit. The radiator is another thing that has to be converted. I got my hands on a '95 LT1 radiator and dual fan set up. The dual fans are a necessity, with the high cooling demands of the LT1. The radiator is needed because of the multitude of coolant lines that are needed to keep the reverse cooled LT1 cool. It happens to be skinner than the stock 3rd Gen. It looks as if it's supposed to be that way. You can't even see the cut, without staring at it or looking for it. I bought, again, TPIS's offering. But between the MAF and the throttle body, you'll need something. You can then connect the bellows with your stock air intake set-up. Another thing that you can do to increase performance is to install a Throttle Body Airfoil. They were the first to have it and have spent thousands of hours on the flowbench, perfecting it. They claim an Very easy install, just another 10 minutes Since first swapping my LT1 back in '99, I have changed a few things, over time. First thing that I changed was the ECU and harness. The '93's used a R4, so it naturally worked better with the auto that I had initially. The '93's had an electronic speedometer, and the 3rd Gens. The unit allows you to use the '93 ECU and a cable to drive the speedometer, very slick. With the '93 set-up, came the demise of my MAF, reason being that the '93's were a Speed Density system. They are longer, and consequently, more flexible. The flexibility allows you to bend it up to either your stock air cleaner set up. I also incorporated a 2. It's very slick, and doesn't cost any performance, and instead "adds" it. I have done quite a few more things to my car, some that aren't incorporated into this document. Fun times, I tell you A LOT better than running an auto, in my opinion. Well, that's about all I can think of right now. I hope this has been of help to you The opposite, as well. I hope none of what I said was over your head, if it was either way, let me know and I'll do my best to help 'ya out. If there is something that you'd like me to clarify, or if you have any questions, you can e-mail me at the link below and I'll try and answer it to the best of my ability. Good Luck! E-Mail me if you've got questions. Sign In Sign-Up. Would you like to make this site your homepage? It's fast and easy Yes, Please make this my home page! No Thanks. Don't show this to me again. This page contains a document that I wrote summarizing how I did my swap Our stock harnesses are 4 feet from the rear of engine passenger side. An engine management harness is pretty much what you will find from most wiring harness companies. Basically, it contains all of the necessary functions to make the engine start and run, while also supplying any necessary signals from the computer such as speedometer and tachometer. There are no main power feeds required for this harness, just a single switched ignition power will switch a relay in the harness that in turn, supplies 12V power to all of the required engine sensors and the ECU. These harnesses are designed for the hot rod, or project car that will be using aftermarket or mechanical gauges. There is no wiring for oil or temperature gauges since the aftermarket usually supplies sending units and wiring for these. All of our harnesses, whether it is a complete custom harness, or our engine management harness, come with an easily accessible DLC Data Link Connector that is usually long enough to be mounted in the passenger compartment. This allows for easy access to the ECU via a laptop or standard scan tool. Harnesses come covered in standard OE split loom. Optional braided loom available for an extra charge. All of the fuses and relays are labeled on the underside of the covers just like a factory vehicle. You must be logged in to post a review. Built From Scratch Stand Alone Engine Harness An engine management harness is pretty much what you will find from most wiring harness companies. Reviews There are no reviews yet. Select Your Options. Tags: engine harness , engine swap , harness , lt1 , lt1 harness , stand alone , swap , wiring , wiring harness. Choose an option None Manual 4L60E. Choose an option Yes No. Choose an option No Yes Clear. The LS is the king of the hill when it comes to high-performance engine swaps these days, but the next generation of GM small-block engines, the Gen V LT-series, is nipping at its heels. Where the LS took nearly 10 years to grab hold in the swap market, the LT has made serious headway in less than half that time. The aftermarket is working quickly to create a catalog of parts to help you satiate that craving for the latest in automotive technology. Much like the LS platform, there are some staples that you simply have to have in order to swap an LT into older vehicles, plus a few new ones. Unfortunately, very little from the LS platform swaps over to the LT, so leftover parts from another swap are not going to help. We have compiled a list of 15 must-haves for LT swaps, plus a few bits of critical information that you will need as well. We've broken these down in to four categories: Engine, Drivetrain, Fuel, and Electronics. LT crate engines are readily available from Chevrolet Performance dealers. These are LT1 engines for the most part, which is the hp naturally-aspirated 6. The L83 is a great engine that boasts horsepower and ft-lbs of torque, and can easily be boosted with tuning and go-fast parts. Keep in mind that the and-up Gen V engines have a different ECM and harness, so if you're buying that from the salvage, get it from the same vehicle if possible. Most of the time, the salvage motors do not come with the throttle body, starter, or accessories, and some don't

come with the coil packs either. Like the LS, the LT motor mounts are forward of the block center line, which is different from the typical SBC location, plus they use a four-bolt pad. The factory Gen V mounts are different than traditional mounts. In custom chassis applications, they could be used, but for the most part adapting SBC frame stands is easier and the aftermarket offers more solutions. There are two types of adapters: sliding and static. Static mounts work for most application, but sometimes you need a small placement adjustment, which is where the sliders come in. Sliding mounts are just as strong, but they are more complicated to install, and can get in the way of the accessory drive, depending on your particular use. Dirty Dingo sliding mounts work well, and were the first LT mounts on the market. Typical installations need the engine in the factory SBC location, which references the bellhousing mounting plane.

Accessory drive is a big one. In most applications, the factory accessory drive does not work. The water pump is offset to one side to the driver side on trucks, passenger side on car engines , and the AC is mounted low and tight to the block. A lot of the motor mount adapters don't clear the AC compressor, and the compressor hits the frame in most GM muscle cars. Besides that, the compressor is an "always on" type, which freezes up older style factory and aftermarket AC systems. The biggest issue, however, is the lack of power steering. Most of us want power steering, but the new cars and trucks all have electric assist, so no PS pump. This means you need a solution. There are several on the market, such as the Holley series, which converts the LT drive to an LS drive the water pump mounts are the same as the LS , and the ICT Billet design that uses the factory accessory drive and simply adds on a power steering pump. The ICT Billet design requires the truck accessories the crank pulley has three sets of ribs , and places the PS pump on the passenger side. The Holley accessory drives are really nice because they use LS-based placements, which work really well for most vehicles, and it is just a matter of adapting the water pump. The newest mid-mount series pulls the accessories tight to the block, so they fit in tighter applications. The mid-mount features a new water pump casting, as all the accessories bolt to the new water pump instead of the engine itself. The factory wet sump oil pan is not huge, but it sits very far forward and is generally only suitable for truck installations where there is more clearance. They simply do not fit GM muscle car applications without modifying the engine crossmember. This dictates using a new oil pan. Holley has two oil pans for the LT, essentially the same pan, but one has an internal baffle for racing. This pan clears most applications; it fits really well and looks great too. Headers are the most difficult part of an LT swap. At the moment, there are not many options for swap headers, so you have to rely on factory manifolds or headers for factory vehicles. The truck manifold actually fits some GM A-body cars, the Corvette LT manifolds are center dump, and they don't fit anything very well. Hooker's shorty truck headers are one of the best options. They don't fit the first-gen Camaro, but they do fit '72 A-bodies, and they fit third-gen F-bodies, which mean they are fairly versatile. The Gen V engine has several ports that you have to plug or use for sensors. The truck engines have a belt-driven vacuum pump that is fed by the oiling system. This pump is removed in all engine swaps, so those ports must be plugged with an M12x1. Depending on your engine and application, you may need a water drain plug on the driver side of the block, as well as an oil cooler bypass cover. Just like the LS engines, the crank hub requires an adapter when using an older GM automatic transmission. ICT Billet makes a really nice hub adapter ring that drops into the crank to keep things in place and centered as it must be. While you may be thinking of swapping a newer 6LXX or 8L80 transmission into your ride, most swappers opt for the 4LXX series of transmissions. You need a different flexplate on the LT engines in order to do that. This bad boy is forged steel, gas nitrided, lightened over 1. The Gen 5 cranks are 8-bolt, so your LS flex plate will not work. If you are opting for a manual transmission and an L83, then you have problems. The 6. This means that you can split the block if you try to bolt one up and don't realize it. You also need to use the large 1. This is where a lot of people are afraid of the LT engines: the fuel system is pulse-width modulation PWM controlled and that is scary to people who have not used it before. In reality, this is a really simple system that actually makes it easier to swap. The PWM pump is returnless, so you don't need a return line and the fuel module handles all the work. The Aeromotive Phantom Returnless pump system is PWM controllable and easily installs into just about any stock fuel tank. Just hook up the lines, connect two wires, and you are done. Don't try to use a regulated pump with a return line on a Gen V LT engine; it will run, but you will have problems. A fuel module needs to go with the above pump, but it is a factory piece. You need it for your swap, period. If you don't run the PWM system, the engine will be harder to start, it won't idle well, and you will have real performance issues, especially at WOT. The fuel module controls the fuel pump based on engine demands. If your regulated pump system can't fill the mechanical pump in the engine, it won't run well. Plus, your pump will overheat and die sooner than it should. This is somewhat of a point of contention in the aftermarket. There are folks who are well-versed in all things LS saying that 60 psi is good

enough with a regulator, but we've found it isn't that simple. GM spent millions developing this technology, so go PWM and don't look back. Even if you do go regulated please don't , you need the low pressure sensor in order for the ECM to properly control the engine. The trick is that the sensors are metric and the adapter is hard to find. Vaporworx sells the proper sensor and adapter, making it an easy solution. There are some guidelines for installation placement of the sensor, so make sure you follow them. An engine harness is one of those tricky areas where you need to be a little persistent. Most offer the PWM wiring as an option. Take that option. We have used several harnesses and they are all nice, but you need to make sure you get the PWM wiring. Speartech made us a custom harness for a Suburban, adding the PWM wiring and five extra feet for the main terminals so we could install the ECM in the passenger side kickpanel where the factory ECM is. The harness is super clean, well labeled, and a breeze to install. The ECM is essentially the same for all Gen V engines '16 they changed in , and needs to match the engine year. That said, the simplest way to get around all of the wiring and tuning issues is to use the Chevrolet Performance LT1 controller kit. Because GM builds the ECM, they can do things no one else can, like add an actual tach output there is no tach signal on any Ge

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 n V harness. You get OE-quality and fitment, with ease of installation that is unparalleled. The downside is the cost. It does come with all the sensors, harness, fuse box, ECM, and even comes with a throttle pedal which is another must-have. By the time you buy all that stuff separately, you can spend just as much, and still get less. One side note: the Gen V ECMs do not have a transmission controller built in, so if you use an electronically controlled transmission, you will need a separate controller. Gauges are tricky for LTs. You can install sensors for traditional gauges, but the tach signal gets tricky. There is a cam sensor wire that can provide a similar signal which is read as a four-cylinder on your tach, but this is not accurate at idle. Instead of fumbling around trying to get things to work, you can spend a hundred bucks and plug in the box which provides all the signals you need straight from the ECM. Close Ad. Jefferson Bryant Author. Share on Facebook Share on Twitter.