Ls swap harness diy

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. Are you the Do it yourself kind of gear head? On a tight budget? We have a complete engine management fuse and relay panel ready to go for you with installation instructions! This has enough circuits to power a 4. All terminals are production crimped to meet Delphi standards for crimp height and width! It comes color coded and with a general guide for an easy, fool proof installation! The covers are also labeled on the inside with a legend of the location of each relay and fuse. General Installation Guide. This high temperature wire has maximum chemical resistance as well. Beware of many companies that use primary wire that has a much lower heat tolerance and will not last against chemicals. We supply the same materials that are found in OEM vehicles, not parts stores, especially when it comes to the wire-that the coating will melt when the wire is soldered! BP Automotive uses Rennsteig production hand tools and production presses that meet Delphi crimp height and crimp width standards. This is where most of our competitors differ from us. Many of them use Dephi repair tools that are only meant for repair use, and the crimp is supposed to be soldered once complete. With the Rennsteig production hand tools you get a perfect, solder-less crimp every time! BP Automotive generally ships the same business day for any items that are in stock if your order is placed before 2pm Central Standard Time. Our system emails tracking information when we ship your order. It is important to check your junk mail folder as it sometimes will land in your Junk or Spam folder. This email only confirms that it has been delivered to the Ebay Global Shipping Center. Please be aware of all national holidays, as most shipping carriers are closed on many national holidays and this may prevent your item from shipping the same or the next business day depending on the date and time

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All returns must be preapproved by BP Automotive and the RMA number must be clearly visible on the outside of the box. The original invoice and RMA number must also be provided inside the box. This must be done to ensure that your return is approved and that there are not any delays in processing your return. With decades of GM Fuel Injection experience, you can rely on BP Automotive to provide you with the highest quality fuel injection products possible. All of our products are hand built at our facility in Columbia, Kentucky. Our experience and attention to detail has enabled us to build standalone and direct fit GM fuel injection harnesses that are unsurpassed in quality and longevity. We offer a lifetime warranty on all of our products, which is 5 years or , miles-whichever comes first. This is as good or better than the warranty you will get with a brand-new vehicle! We achieve this confidence in our product by using the most up to date manufacturing methods and materials that are approved by the SAE and USCAR panels. This is the very same wire used in factory automobile harnesses. When a splice is made for the harness, we utilize splices that are Sonically Welded together, just like a harness for a factory vehicle. This welds the copper core from all wires together to create one solid splice of copper. Then we cover the splice with OEM grade Aptiv formerly Delphi heat shrink, not just some aftermarket adhesive heat shrink. The heat shrink we use adds support and superior resistance to chemicals and weather. When we assemble a harness, we utilize GM color codes for our harness. Many of our competitors are only using solid color wire and advertising that they are using GM color codes, we use even striped wire here at BP Automotive! When it comes to terminating a connection in an automotive fuel injection harness there are many standards and considerations that you must take to ensure that you are truly building a harness to GM, SAE, or USCAR standards. At BP Automotive we utilize production crimp tooling, some of which we had special made to ensure that we can crimp terminals to these standards. After a crimp is made with the tooling we use it is checked with a special digital dial caliper to ensure it meets crimp height and width standards. The tolerances for these standards are as small as a. We use all original connectors, terminals, and seals when we build harnesses. We only use OEM connectors on our harnesses, we will never sacrifice quality to save a few pennies. We cover all of our harnesses in OEM grade loom to ensure that the harness has the protection it needs to last and stand the test of time! With both of the looms that we use you can rest assured that not only is your harness protected, but that it also looks great! All circuits that are ran by a heat source, like the oxygen sensors are covered in a degree fiberglass braid that adds even more protection! Lastly, we install a high quality Aptiv grommet so that in the event you decide to mount the controller in the passenger compartment you can seal your firewall and have a clean, professional looking installation! This ensures that when you get your harness it is perfect! You can purchase from BP Automotive with confidence knowing that when you get your harness it will work and will continue to work for years to come! Copyright BP Automotive. All Rights Reserved. Skip to main content. Email to friends Share on Facebook - opens in a new window or tab Share on Twitter - opens in a new window or tab Share on Pinterest - opens in a new window or tab. Add to Watchlist. People who viewed this item also viewed. Showing Slide 1 of 1 - Carousel. Check if this part fits your vehicle. Contact the seller. Picture Information. Mouse over to Zoom - Click to enlarge. Get the item you ordered or get your money back. Learn more - eBay Money Back Guarantee - opens in new window or tab. Seller information bpautomotivellc Contact seller. Visit store. See other items More See all. Item Information Condition:. Sign in to check out Check out as guest. Add to Watchlist Remove from watch list. Watch list is full. May not ship to Ukraine - Read item description or contact seller for shipping options. See details. Item location:. Columbia, Kentucky, United States. Ships to:. This amount is subject to change until you make payment. For additional information, see the Global Shipping Program terms and conditions - opens in a new window or tab This amount includes applicable customs duties, taxes, brokerage and other fees. For additional information, see the Global Shipping Program terms and conditions - opens in a new window or tab. Any international shipping is paid in part to Pitney Bowes Inc. Learn More - opens in a new window or tab International shipping and import charges paid to Pitney Bowes Inc. Learn More - opens in a new window or tab Any

Description Are you the Do it yourself kind of gear head? Shipping BP Automotive generally ships the same business day for any items that are in stock if your order is placed before 2pm Central Standard Time. Returns BP Automotive will accept returns for uninstalled items only. In the event that you are wanting to return an uninstalled item BP Automotive will accept your return under the following circumstances- Item or items are uninstalled. The item is in new condition. The item being returned has been purchased in the past 30 days. If the original packaging is damaged the return will be subject to a restocking fee no matter the timeframe of your return. About us With decades of GM Fuel Injection experience, you can rely on BP Automotive to provide you with the highest quality fuel injection products possible. Payment info. Listing and template services provided by inkFrog. Shipping and handling. The seller has not specified a shipping method to Ukraine. Contact the seller - opens in a new window or tab and request shipping to your location. Shipping cost cannot be calculated. Please enter a valid ZIP Code. Shipping to: United States. No additional import charges at delivery! This item will be shipped through the Global Shipping Program and includes international tracking. Learn more - opens in a new window or tab. There are 5 items available. Please enter a number less than or equal to 5. Select a valid country. Please enter 5 or 9 numbers for the ZIP Code. Taxes may be applicable at checkout. Learn more. Return policy. Payment details. Payment methods. Feedback on bpautomotivellc from others who bought this item. Positive feedback. Exactly what I was wanting for my LS swap. Very good quality so far! Back to home page Return to top. Back to home page. Listed in category:. Email to friends Share on Facebook - opens in a new window or tab Share on Twitter - opens in a new window or tab Share on Pinterest - opens in a new window or tab Add to Watchlist. Image not available Photos not available for this variation. BP Automotive. All Rights Reserved Listing and template services provided by inkFrog. So you found that perfect gem of a low mileage 5. Luckily, you have some old parts laying around from the F-body you had in college. In this specific scenario, some significant changes need to take place to the wiring harness to make it work as a stand-alone. First and foremost, a power source needs to be created, as well as usable grounds and a key source. Outputs for fans, fuel pump, and a tachometer are also minimum requirements. From there, we know that the LS1 intake manifold will need different EV-1 plugs for its respective fuel injectors. Truck wiring harnesses travel over the top of the intake manifold, so do we want that massive bundle of wires loosely sitting on top of our pretty car intake? Oil level, oil pressure, and EVAP Evaporative Emission Control System wiring should likely be eliminated; also catalyst O2s and potentially the entire transmission harness, should you be running an older GM four-speed or aftermarket, manual transmission. A common problem with aftermarket headers, the coolant temperature sensor may need to be moved to the passenger side head. Now, where does the computer go? Is there a good place for it in the engine bay, or do you want it tucked away somewhere under your dash or center console? The most cost-effective is to download a schematic online and relocate your sensors where you want them, delete unnecessary wires, solder in the plugs you want, where you want them and add wire where it needs to be added. These guys are out there however, there are a ton of fly-by-night operations on eBay that may not deliver, so choose wisely. Last but certainly not least, many companies will construct custom wiring harnesses for a multitude of applications. In one of our custom builds, we chose to utilize a small operation out of Kentucky, who builds its harnesses from all-new equipment. We explained all of the modifications and they offered some great suggestions and handled the rest. Some of the changes were: forward-facing oxygen sensors, passenger-side coolant temperature sensor, EV-1 SD 80 injector plugs, and a 5-foot lead for the primary fuse block. The layout was flawless and the wires were neatly strung throughout their looms. Hopefully, you can find guidance, or at least some clarity in what options are available and make a decision that best fits your application and budget. We will safeguard your e-mail and only send content you request. We'll send you the most interesting LSX Magazine articles, news, car features, and videos every week. We promise not to use your email address for anything but exclusive updates from the Power Automedia Network. About Us Sponsors Advertising. News All News New Products. What is Pro Touring? There are numerous options to overcome this quandary. Latest News. More Stories. Corvette Racing C7. R On Bring A Trailer. Late Model LS Power In your inbox.

Subscribe Now. We think you might like No thanks. Classic Chevy Magazine. Drag Racing. Engine Tech. Here is some helpful information if you want to modify your stock truck wiring harness your self This junction block is part of the main engine harness, that screws into the bottom of under-hood fuse block. If you want to use the whole fuse block you can, but I like to keep it clean, and wire a lot of these together. There are a lot of wires here. Each injector has its own power wire all the way to this block. All 8 of them can be wired together into a single fuse to clean things up. This is what is done inside the fuse block. Be sure to look at the pictures of the harness at bottom of this page. That is all to get a much cleaner look, and to simplify things later on if you have to troubleshoot anything. Provide fuel pressure to the rails, turn engine over with starter, and it will run! This would be the most basic simple way to run. There are signals for brake switch, tow haul, all of which are found in the connectors near the fuse block connector. I don't recommend just combining all the pink wires into one and powering it. You are asking for issues if there is ever a short, including melted wires, fire, so on. Click for info. Oxygen Sensor types information - Page about the different o2 sensors used, differences in wiring, and function. Pinouts, Pictures, Video! You can also download this in a PDF printable file with all my notes. Thanks Paul C. Low Quality 3. Now adding videos to my YouTube channel. There will be more to come. If you want to run without the large under hood fuse block, following info might help to see which wires go where. This is C2 - Underhood Fuse Block connector. This connector is part of Engine Harness. If you look closely on you're harness, this plug has the letters and numbers printed on the plug. C, black, 3 wires. Click Year for Pinouts for Truck Harnesses. Some of the wires inside these links are made BOLD. This typically means this wire is needed or very useful in a stand alone harness setup. C2 information is in these links. Info is more complete for , Later years should be similar, use circuit 's to compair. Around , the engines no longer had EGR, so that does away with 5 wires. The differences in the 's don't matter a bit when making a harness stand alone. Very detailed info for what to remove, keep, etc is just a few lines down, I leave all this info so you can see changes year to year if you lik. All the grounds needed will be in the engine harness. Should be a few of them. Rear of engine behind intake, should be two grounds. For II This is all you need for stand alone. Pin 42 - empty - Fan 1 Control - This will be empty on harnesses. A pin can be added for electric fan control. Programming will enable the fan control. If you have two fans, keep reading, pin for fan 2 will be on the RED connector C2. You must wire your fans through a relay. Hot at all times. PCM will turn on the fuel pump for 2 seconds at initial key on. When the engine cranks or starts, the fuel pump will then continue to run, untill the engine stops, or you shut off the key. Stock programming of the PCM will output a 4 cylinder tach signal. This way you don't have to modify your tach. In an engine swap, programming can be changed to let this control a second cooling fan. The PCM takes the sensor signal, and calculates the tire size, gear ratio programmed into it, and makes a pulse per mile signal. This is useful if you want to use a cruise control box. Some speedometers will use this as an input, others, like Autometer's, will hook directly to one wire of the speed sensor in the trans. After pins are removed, AND some labeled, I start working into the harness to remove un-needed wires that are now removed from the PCM connectors. Some will pull right out, as they went to C, C, or C2 Underhood. Pull all the loose wires that go deeper into the harness back past where the original C, C were located. Tightly tape up the wire bundle at this location, as to not let there be too little or too much slack on the wires going to the PCM. Be sure to use masking tape to hold the basic shape of the engine harness. As you progress into the harness, you will find some ground wires that trace back to splice packs. Simply cut the wire up close to the splice pack. Keep 1 or 2 ground wires for when you add the relays and diagnostic port, you will need a ground. As I get up to where wires branch out, I will follow that branch out, remove any wires going into it, then tape that branch back up. Only doing one branch at a time. You can start to cut and label the pink wires from C2 Underhood. See this link and look for the wires highlighted in BLUE. You may find it easier to use a digital volt-ohm meter set to continuity beep mode, in finding where each pink wire goes. This is pretty standard across all Vortec 4. Only remove one color at a time. Red and Blue CAN be mixed up. Custom 5. Clean layout. I either shortened or lengthened almost every wire in the harness for this modification. Helpful tips for harness modification. Each wire is also removed from the harness. The above harness installed in the vehicle. PCM, Fuse Block, etc At shows and various events across the U. So the question is: should you buy a new engine swap harness, or build your own? Here is an example of a wiring job that we spotted at an event that needed some serious attention. And while it looked pretty bad, the car made passes the entire weekend without any problems. While there are a lot of excellent how-to videos on the web, precision is critical, and having a basic understanding of schematics, the tools used, and wiring processes are all invaluable. The DIY Process. When ordering or creating a standalone harness, you will need to identify your project needs. Questions like what generation engine are you using, automatic or

manual transmission, drive-by-wire, or drive-by-cable, will need to be answered. You also need to determine where to mount the ECU and have an idea for wire routing. After you figure out all of the details, you will be able to start the process, which is not a short one. When someone decides to create a DIY standalone harness, in most cases, they will start with an existing factory unit. In our experience, these harnesses are old and dirty. After all, the LS engines have been on the market for over 20 years now. As wiring harnesses age, some common problems that can develop are broken wires and melted connectors, and some are nasty. While this unit was uncut, it was filthy. Our first step was to remove the old factory wire loom and electrical tape. While this sounds easy enough, we spent over two hours wrestling with the harness trying to remove every last piece. Dirt and debris fell out the entire time we worked with the factory harness. After we had stripped down everything, some problems were unveiled. The first image is the factory harness stripped down and cleaned up. The second image is all of the conduit and tape that was removed. The wires going to the transmission had been pinched, and the copper was exposed from the insulation. We attached the wire ends together and then applied heat shrink with adhesive over the connector. The heat shrink will keep the moisture out and prevent corrosion. After we fixed this problem, we noticed that someone else had previously done the same thing we just did with two other wires. Instead of using a non-insulated connector with adhesive heat shrink, they used the standard type, which will allow for moisture, causing problems down the road. We then noticed that some of the OE connectors were broken on the harness and would need to be replaced. Our next step was to remove the unwanted wires and connectors. We disassembled the red and blue connectors, carefully removing each pin that was no longer required. One problem that we found is that after you remove the unused wires from the harness, it leaves an opening straight to the ECU pins. This makes the ECU susceptible to moisture and debris. We would highly recommend plugging these holes to keep these elements out of the pin area of the ECU. There is no easy or reliable way to fix this problem. Pulling the wires that we didn't need was not that time-consuming. Just make sure you are removing the correct wire and don't get in a hurry. From here you will have some work to do with the old fuse box, unless you plan on using it. Some of the wires need to be removed as they will tie back to relays, and others will need to be fused. After all of the above is done, you can then wrap your wires in tape, conduit, or leave them bare, even though we do not recommend the last option. The top left picture is everything we stripped out of the harness and didn't use, including the factory fuse box. The top right image shows you what wires will need to be hooked up to a fuse box or relay. Our efforts resulted in a harness that looked much better than when we started. However, even though the loom cleaned it up nicely, everything underneath was junk. It was so rough in fact, that for our purpose, this harness is a lost cause and will not be used. With so many broken wires and melted connectors, it would be hard to rely on it for any of our projects. The last thing that we want to deal with is wiring problems on the side of the road somewhere. Here is the harness after the conduit and loom were added. The unit still needs a fuse block and relays to function. Unfortunatly the harness was in such bad shape it would never make it onto one of our projects. When we called, they asked us about the vehicle, transmission, throttle body, and where we wanted to mount the ECU. People do it all of the time. At a glance, the Howell LS swap harness is already superior in the looks department when compared to our DIY factory harness. The company also uses a high-temperature shielding for wires that route around the exhaust. Our unit also included Bosch relays for the fuel pump and dual-fan control, pre-terminated weather pack connectors, fuse block, and an OBDII port with a built-in check engine light. With our DIY factory job, we will need to mount the ECU where the harness allowed us, which limits us to under the hood. Our package included the harness, ECU, new O2 sensors, weather-pack connector ends, instructions, and decals. For our 5. The beauty of this part is two-fold. First, we know that this ECU is in good working order because Howell tests them. Secondly, Howell turns off everything on the ECU that we are not going to use. The ECUs are not locked, so if you want to make adjustments to the engine down the road, just take it to your favorite tuner. If you decide to modify a factory harness, you can save yourself some money. If you do choose to count your time as labor, things get more interesting. When purchasing a new unit from Howell, you will talk with one of its experts. They will take all of the guesswork out of the process and eliminate any problems, giving you precisely what you need. Everything is new, including the connectors, wires, pins, and these units are built in the USA. The only downside to the new unit is that it will cost you more money. But, you will get a new unit that has been tested and is percent ready to install straight out of the box. We will pour our hearts and souls into our vehicles and count every penny spent to finish the task. But usually, the hours spent grinding away in the wee hours of the morning go unaccounted for. Either way, your time is worth something, and we doubt you like giving it away. We spent about 8 hours making our harness, and that was stopping a little short with the

process. We still need to add a fuse box and relays for it to be functional, which would add another hour or two of labor. If you did keep track of your hours and put a dollar amount with them, you could save a little but probably not as much as you think. Here is a picture of the Howell swap harness next to the year-old unit on the right. The Howell unit is brand new, terminated, and all of the wires are labeled out of the box. Which one would you trust on a cross-country road trip? In our opinion, A DIY harness is not worth the effort. Think about it: there are a ton of things that could be done in an 8 hour day on a vehicle. This is plenty of time to install an engine and transmission, fit the interior, weld up an exhaust system, and a lot of other things. We know that some of you out there are pros and have figured out how to make a standalone harness in a matter of hours. For those of you that can, then a DIY harness makes sense, if you start with a nice harness. We would much rather spend the additional money and get a new harness and use our time on other areas of a project. We will safeguard your e-mail and only send content you request. We'll send you the most interesting LSX Magazine articles, news, car features, and videos every week. We promise not to use your email address for anything but exclusive updates from the Power Automedia Network. About Us Sponsors Advertising. News All News New Products. What is Pro Touring? Article Sources. Howell Engine Developments. Latest News. More Stories. Corvette Racing C7. R On Bring A Trailer. Late Model LS Power in your inbox. Subscribe Now. We think you might like No thanks. Classic Chevy Magazine. Drag Racing. Engine Tech. Are you the Do it yourself kinda gear head? On a tight budget? Thats ok! We have a complete engine management fuse and relay panel ready to go for you with installation instructions! True oem quality TXL wire used along with Delphi components! This is everything you need to convert your factory harness to stand alone! This item is not meant for someone with little to no wiring experience. You need to have a fair amount of wiring experience to properly install this item and convert your harness to stand alone. As you can see it comes labeled and with a general guide for installation! The covers are also labeled on the inside with a legend of the location of each relay and fuse. This DIY Kit will work for converting a factory harness from the following engines for stand alone, it will work with other engines, however â€" these are the most common this is used for these LT1, 5. Only logged in customers who have purchased this product may leave a review. Add to Wishlist. Description Additional information Reviews 0 Are you the Do it yourself kinda gear head? The Fan Relays, are fused at 30amp and cannot be fused for a higher amperage. Please take this into consideration if you have already purchased your cooling fans. As an alternative you can purchase our Bare Essentials kit and our Sealed relay kits that are fused at 40 amp. Wiring Diagrams are NOT included! This is a DIY kit that is sold with the understanding that the purchaser has a working knowledge of GM fuel injection systems. Reviews There are no reviews yet. Related products. Quick View. Add to Cart. Select options. Search for:. 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 harness is 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. We hand build every harness to fit exactly what your project needs and they actually form fit on the engine to make your wiring look and perform perfectly. We use the highest quality wire, brand new OEM connectors, weatherproof fuse and relay box, and finish it off with a multitude of covering options. With the best Warranty, tech support, and quality be assured your wiring will offer to be one of the best investments for your project. Use the selections to build your custom harness, or feel free to give us a call and we would love to personally walk you through your build. Each Harness comes entirely labeled and full set of instructions for easy and quick installation. Have Questions? Call or Email us Now. Each GM LS harness comes with the following, you can also customize anything you would like-just give us a call! Le

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t the quality of your harness reflect the quality of your project. Please let us know if you have any questions, we would love to hear about your project and help in any way we can! At Swap we are driven by the enthusiast and the unique projects that fill our motorsports community. We strive to offer the best products for those projects at the best prices. We focus on the detail of every build making our products above market standard, you get more than you pay for, you get perfectionâ€¦â€¦. No Yes Tune Mine mail in. No Yes. Year of engine, type of vehicle its going into, anything you would like customized, ect This order is subject to all Terms and Conditions found here: swapspecialties. LS Gen3 24x Standalone Harness quantity. Category: Harnesses and PCM's. Description Description Each GM LS harness comes with the following, you can also customize anything you would like-just give us a call! Contact Swap Specialties. Follow Us. Useful Links. Our Mission. Call Us. Email Us. Scroll Up.