



## Hooker G-Body LS Swap Tech Data

1978-87 GM G-body vehicles are a popular vehicle platform on which to base an LS engine swap project. Hooker/Holley has expended considerable effort and resources (i.e. CAD modeling/FEA analysis) to design a new system of LS swap components for these vehicles, which allow the user/installer to achieve better final geometric/performance results than has previously been possible in this LS swap application.

Due to the comprehensive nature of this system of parts, the following information has been compiled as a guide to help potential users determine how they may benefit from the use of these components in achieving the goals of their G-body LS swap project.

### Hooker/Holley Component Data

#### 12643HKR Engine mounting brackets-

The Hooker 12643HKR engine mounting brackets were designed to take advantage of the low-profile geometry of the Holley 302-2 oil pan to install an LS engine into a G-body chassis at a lower height (approximate 1/8" lower front crankshaft center height than stock SB engine had) than is possible when using a swap plate style engine mounts. The engine positioning achieved with these mounting brackets will provide your vehicle with a lower center of mass and more optimized engine inclination/ U-joint working angles than is available from any other type of mounting brackets for this application.

As an additional benefit, transmission-to-tunnel clearances (especially those regarding GM 4L80/4L85 transmissions) are greatly improved by the use of these mounts and the supporting Hooker 12644HKR transmission crossmember discussed later in this document.

The installed engine set-back incorporated into the the design of these mounting brackets (3/4") was configured to provide compatibility with GM 4<sup>th</sup>-gen F-body/GTO and GM Vortec truck accessory drives, (depending on the steering box used; read page 5) and enable their installation without the need to modify the stock A/C evaporator case in most cases; build tolerances across these vehicles is very wide and some users may find it necessary to clearance the A/C box and/or relocate the rear passenger side coil.

The installed height of the engine will permit the truck intake manifold and alternator to clear the underside of the stock hood without modifications.

The stock truck A/C compressor can be installed with these mounting brackets by notching the vehicle frame crossmember and the aluminum compressor mounting bracket that is attached to the engine; the 4<sup>th</sup>-gen F-body/GTO A/C compressors are not compatible for installation with these engine mounting brackets. Use of Holley 20-140(R4) or 20-134 (Sanden) compressor brackets are recommended for providing simplified top-mount A/C compressor installations in this LS swap application.

The Holley 302-2 oil pan is bolt-in installable with these engine brackets and is compatible with all LS engines that do not exceed crankshaft strokes greater than 3.62". The 302-2 pan can be modified with a pop-out section below the front crank throw to accommodate crankshaft strokes up to 4" without affecting the ability of the pan to be installed into a G-body with these mounting brackets.



The Holley 302-1 oil pan is not compatible for installation with these Hooker engine mounting brackets as interference with the steering center link and inner tie rod ends will be experienced.

Installation of these mounting brackets requires the use of OE replacement 2292 clamshell mounts (Anchor, Westar or equivalent brand) or aftermarket poly clamshell inserts available from Energy Suspension or Prothane.

#### **12644HKR Transmission crossmember-**

The Hooker 12644HKR G-body crossmember has been CAD/FEA designed to work in conjunction with the Hooker 12643HKR engine brackets to provide bolt-in installation of a TH400\*, 2004R\*, T56, T56 Magnum, 4L60 or 4L80 transmission behind any LS engine installed using the Hooker 12643HKR LS swap engine mounting brackets. This key component has been designed to provide a strong, stiff and relatively low-weight transmission mounting foundation while providing dual arch passages for routing dual exhaust systems such as the Hooker 2.5" and 3" systems in development.

The Hooker 12644HKR crossmember is designed to be bolt-in installed into all 1982-87 G-body vehicles equipped with the factory 2004R frame extension and is adaptable for installation into 1978-82 non-2004R frame vehicles using the included adapter brackets.

Installed weight of the crossmember is 22-24 lbs. depending on the final bracket configuration required for installation of each particular transmission mentioned above. Installation of this crossmember requires the use of a Prothane 7-1604 poly mount or one of equivalent geometry.

Installation of all mentioned automatic transmissions may require the use of aftermarket (Lokar or similar) or modified factory column shift/back-drive linkage to retain proper shift indicator and/or neutral safety switch functionality.

\*Installation of a TH400 or 2004R transmission requires the additional use of a Hooker 12650HKR spacer kit for installed transmission geometry to be achieved as intended.

#### **2480HKR/2481HKR mid-length headers-**

Hooker mid-length headers for this application have been designed to provide maximum available ground clearance and are available with 1-3/4" primaries/2.5" collectors(2480HKR), or 1-7/8" primaries/3" collectors (2481HKR).

Adapters are being developed that will provide bolt-in attachment of the 2480HKR headers to the Hooker 2.5" exhaust systems, or the 2481HKR headers to the Hooker 3" exhaust systems being developed for all G-body vehicles.

These headers are constructed with laser cut 3/8" thick, TIG welded, flat-finished flanges/ports. For the purpose of optimizing O2 sensor location, O2 bungs are included in the adapter pipes available for these headers and not the headers themselves.

Minor trimming of the 4L80/4L85 transmission case bellhousing will be required to install these headers; all other transmissions supported by the Hooker 12644HKR crossmember will allow installation of these headers without requiring any such trimming.



Use of aftermarket (Lokar or similar) or modified factory column shift/back-drive linkage will be required to clear the driver side header assembly and provide proper gear selector (column shift applications) and/or shift indicator and neutral safety switch functionality on all installations.

**2332HKR/2333HKR long-tube headers-**

Hooker long-tube headers for this application have been designed to provide the best possible ground clearance available with long-tube headers for this application and are available with 1-3/4" primaries/3" collectors(2332HKR), or 1-7/8" primaries/3" collectors (2333HKR). Due to the designed close tolerance of the driver side collector vehicle floor, body bushings will need to be inspected, and replaced if necessary, to ensure proper clearance is provided for installation/operation of these headers. The collectors of these headers attach directly to the Hooker 3" exhaust systems being developed for G-body vehicles. If it is desired to install these headers with the Hooker 2.5" exhaust system being developed for G-body vehicles then the use of a Hooker 42107HKR reducing adapter kit will have to be utilized to execute such an installation.

These headers are constructed with laser cut 3/8" thick, TIG welded, flat-finished flanges/ports. O2 bungs are included in the collectors and indexed 10 degrees past horizontal to ensure extended wide-band O2 sensor functionality.

Installation of these headers with any of the transmissions supported by the Hooker 12644HKR crossmember is possible without any trimming required to the transmission case/bellhousing.

Use of aftermarket (Lokar or similar) or modified factory column shift/back-drive linkage will be required to clear the driver side header assembly and provide proper gear selector (column shift applications) and/or shift indicator and neutral safety switch functionality on all installations.

**8501HKR LS swap exhaust manifolds-**

Hooker LS swap cast iron manifolds have been verified to be compatible with the Hooker 12643HKR engine mounting brackets. Due to high tolerances used to build these vehicles, minor grinding/relieving may need to be performed on the passenger side manifold outlet to ensure adequate clearance between the manifold and the vehicle frame.

Specific adapters are being developed to provide direct connection of these manifolds to the Hooker 2.5" exhaust systems also in development for this application.

**Exhaust Systems-** Development of 2.5" and 3" exhaust systems that are bolt-in compatible with the herein mentioned Hooker /Holley LS swap components for this application are in process and due for release in the near future.

## **Vehicle Variances**

Users/installers should be aware of the following known production variances of 1978-87 G-body vehicles covered in this application:



The frame crossmember engine mounting surfaces of 1978 vehicles are drilled slightly differently than those of 1979-up vehicles.

1982-87 vehicle frames that were built to accommodate the installation of 2004R transmissions were equipped with a driver side frame extension that is non-existent on vehicles built to accommodate the installation of TH200 and TH350 transmissions.

G-body vehicle were equipped with two different sized power brake boosters and steering shafts that have their cylindrical rubber isolation damper located at two different distances from the firewall.

The above mentioned build variances are accounted for in the design of all Hooker components for this LS swap application and their installation instructions.

The routing location of brake and fuel lines varies between the different year models of these vehicles and care must be taken by the installer to ensure such lines are positioned to provide adequate clearance between them and any Hooker headers installed during the engine swap process.

## **Transmission and Vehicle Component Compatibility**

### **Transmissions/shifters/linkage-**

All GM automatic transmissions supported by the Hooker 12644HKR crossmember can be installed without having to cut or dent the vehicle floor and/or tunnel.

Installation of T56/T56 Magnum transmissions will require cutting and possibly sheet metal fabrication to be performed to the tunnel.

2004R floor shifters can be utilized to operate the gear selection of 4L60-4L75 transmissions and vice versa.

2004R or 4L60 floor shifters can be used to operate the gear selection of a 4L80/4L85 transmission by means of the following modifications:

1.) Shorten (cut and re-weld) the stock 4L80/4L85 selector shaft lever so as to match its arc sweep length to the shorter stroke of the 2004R/4L60 floor shifter assemblies and cables.

2.) Reduce the diameter of the cable attachment pin on the 4L80/4L85 selector shaft lever to match the I.D. of the hole in the 2004R/4L60 shifter cable eye. This is a tedious process that was accomplished on the Holley Monte Carlo SS swap vehicle by using the edge of a cut-off wheel to patiently grind evenly around the circumference of the pin until the desired diameter was achieved.

3.) Elongate the rear hole of the 2004R or 4L60 shifter cable anchor bracket so that it can be attached to the pan rail of the 4L80/4L85 transmission case.



Attempting to use a 2004R or 4L60 shifter to operate the gear selector of a 4L80/4L85 transmission without performing the above modifications will result in not being able to shift the transmission into the manual low 1<sup>st</sup> gear position.

4L80/4L85 transmissions represent the worst-case scenario for providing suitable shifter cable/linkage connections due to the location of the shift selector shaft, which is positioned 2-1/4" further rearward than that of the other GM automatics; a fore/aft selector shaft position that deviates by no more than 1/2" is used on the other GM automatics. If you are intent on re-using the stock G-body 2004R floor shifter, you may need to drill a new cable routing hole in the floor closer to the shifter to lessen the bend angle of the cable to permit it to be connected to the shifter lever on the 4L80/4L85 transmission and to operate smoothly.

Use of aftermarket (Lokar or similar) or modified factory column shift/back-drive linkage will be required to provide proper gear selector (column shift applications), and/or shift indicator and neutral safety switch functionality on all installations.

#### **Steering boxes-**

The vast majority of G-body vehicles were factory equipped with Saginaw 605 power steering boxes. Compatibility of LS/Vortec accessory drive systems with the 605 steering box is limited to the truck accessory drive set-up when using the Hooker 12643HKR engine mounting brackets in this application.

Saginaw 700 quick ratio power steering boxes were factory installed on Monte Carlo SS, Turbo Regal and Grand National G-body vehicles. Compatibility of LS/Vortec accessory drive systems with this steering box is expanded to include the truck, F-body and GTO accessory drive set-ups. Retrofitting one of these boxes (factory or aftermarket rebuild) into any G-body vehicle is highly recommended due to the improved steering performance it provides.

The newer design Delphi 600 power steering boxes are bolt-in compatible with the truck accessory drive system only.

Due to major steering box interference, the CTS-V, Corvette and Holley accessory drives are not compatible with any steering boxes mentioned above, with the exception of the Holley 20-140(R4) or 20-134 (Sanden) A/C compressor brackets that can be configured for use with the truck, F-body and GTO accessory drive systems.

#### **Air conditioning-**

The easiest (and usually cheapest) method of providing A/C system functionality is to use a Holley 20-140(R4) compressor bracket to mount an R4 compressor to the swap engine and acquire and install the accumulator, condenser and refrigerant hoses from an 80's G-body that was factory equipped with the R4 compressor.



For those who prefer using Sanden compressors, the Holley 20-134 bracket can be utilized in lieu of the R4 style bracket.

As a final option, the fixed-displacement OE truck A/C compressor can be installed and utilized to create a functioning A/C system mounting by notching the vehicle frame crossmember and the aluminum compressor mounting bracket that is attached to the engine.

## **OE LS Engine Component Compatibility**

The design geometry of the Hooker headers and engine mounting brackets provide installation compatibility of the following stock OE LS engine components with a G-body swap vehicle.

Intake manifold (truck, LS1, LS2, LS3 and LS6)  
Valve covers  
Ignition coils and brackets  
Spark plug wires  
Starter motor  
Gen IV block mounted knock sensors  
Oil cooler lines

## **Holley LS Engine Component Compatibility**

A multitude of LS engine performance and appearance upgrade products are available from the Holley family of brands, which enable the user to achieve their G-body LS swap project goals. Included in this list of components are:

Holley carburetors, EFI systems, fuel pumps/regulators, injectors, ignition coils, valve covers and A/C compressor brackets

Weiand Intake manifolds

Earl's plumbing fittings/hoses

NOS nitrous oxide kits