Toyota

Land Cruisers

conversion guide

ISSUE # 15

V6 & V8 engine swaps

- Bellhousing & T/C Adapters
- NV4500 Retrofits
- Saginaw Steering
- Instructions & Tech Info

ORION transfer cases

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This **Sixteenth** edition of the Advance Adapters Toyota Land Cruiser Conversion manual is an accumulation of our experiences and knowledge in performing various types of conversions. The information and photos are directly related to the products offered by our company. We have put this manual together for your reference in either performing the actual conversion or trying to establish an estimate on tools required for your specific type of conversion. There are several major sections covered in this manual along with several reprint articles that have been supplied to us through the courtesy of various magazines. The information in this guide is constantly being updated and we ask that you verify any information that may be critical to your application. We highly recommend that you acquire the individual shop manuals for your particular vehicle as support for torque, gasketing, and assembly specifications which pertain to your vehicles requirements.

SPECIAL NOTE: Catalog Contents
This manual has been put together with the best possible information available to us. Advance Adapters cannot accept the responsibility for vehicles and applications that are not standard. The contents of this brochure have been proofread before printing to minimize errors. We cannot be held responsible for errors overlooked. Please feel free to contact us with any suggestions or comments you may have regarding any portion of this manual. The information that you provide us could be useful in assisting other customers.

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REPRINT ARTICLES

Featured vehicle on front cover and page 3: David Gaebe's 1972 Toyota Land Cruiser

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Closed for Lunch from 12:00 p.m. to 12:40 p.m.
Closed Saturday & Sunday

INTRODUCTION

Almost everyone would agree that a Toyota Land Cruiser is a very tough and durable vehicle - but it won't last forever. When age, abuse, or expensive replacement parts reach their limits, and the need for a new engine approaches, that's where we can assist you. Whatever your engine, transmission or adapting requirements may be, you can be assured that Advance Adapters has the answer for you. We offer a full line of engine & transmission conversion parts. We also manufacture components for steering upgrades, overdrives, and transmission retrofits.

When deciding to do a conversion, the first step is to select the *type* and *size* of engine you would require. You should consider things such as *dependability, power, economy, speed, price range, adaptability,* and *availability* of equipment and parts. If you need the knowledge to perform the ordinary to the extreme, this manual is your source for parts and information. We have kits for new V6 & V8 engines, or the original Toyota 6 cylinder engine. We have adapters for use with the original 3 or 4 speed transmissions, or optional truck-type manual or automatics. This manual deals with several types of conversions, so you must be selective in determining what information and parts will be applicable for your specific conversion. Although the information covers each phase of the installation, a separate instruction sheet will come with your shipment illustrating how the parts are to be assembled.

With reference to engine conversion kits, we have found that the Chevy V8 is the most popular. We offer a complete line of products for both the Chevy V6/V8 and Ford V8 conversions. Depending on the year of the vehicle and the equipment that is being used, you may or may not require driveline modifications.

In recent years, one of the more popular conversions for the Land Cruisers has been the use of the Ranger Torque Splitter. The Ranger is a fully synchronized gear splitter that is used between the bellhousing and transmission assembly. When using the Ranger Torque Splitter, you will be able to avoid the cost of special bellhousing adapters and the expense of driveline modifications. Most Land Cruisers are equipped with 4:11 axle ratios which are not the most comfortable highway gears. When equipped with the Ranger 27% overdrive, the ratio is then reduced to a rear axle ratio equivalent of 3.03. We offer the two speed in a multitude of combinations. The gear box can be purchased to fit a Chevy or Ford bellhousing on the front side, and either the Toyota 3 or 4 speed transmission on the back side. We do not offer the Ranger to fit with the stock 6 cylinder because of the overall length. This added length causes problems with the fuel tank and transfer case linkage location.

We also offer several optional transmission-to-transfer case adapter kits. If you find your original 3 or 4 speed transmission to be in marginal condition, you can select from the various GM and Ford transmissions that can be adapted to your original Land Cruiser transfer case. Ford and Chevy transmissions can offer you several advantages such as added strength, the elimination of bellhousing adapter plates, and the need for stock transmission repairs.

In 1995, we began developing adapters to retrofit the NV4500 transmission into the Land Cruisers. This transmission has proven to be a very popular application. The overall length of this 5 speed makes it ideal for V8 conversions, since it positions the engine further forward for valve cover and distributor cap clearance. We have also performed this same conversion using the stock Toyota 6 cylinder engine. This transmission offers a super low first gear ratio of 5.61, and an overdrive ratio of 27%.

Even though most of our Land Cruiser product line is designed around V6 & V8s, our adapters will also work on the GM 6 cylinders. The original Toyota 6 cylinder was very similar in design to this GM engine. For those wishing to retain a domestic 6 cylinder engine, they can easily install this GM engine. The same adapters required for a V8 installation would be used on this 6 cylinder, except for the engine mounts which will need to be fabricated. Another consideration for the GM 6 cylinder is the starter location. When using one of our conversion bellhousings, you must make sure that the starter bolts to the engine and not the bellhousing since our bellhousings do not have starter mounting provisions. When using a GM 6 cylinder with a stock Land Cruiser 3 speed transmission, a body lift must be installed for bellhousing clearance.

Mark's 4WD Adaptors: In 1993, we were assigned to be the exclusive U.S. distributor for Mark's 4WD Adaptors of Victoria, Australia. This company manufactures a Toyota Land Cruiser product line very similar to the Advance Adapter product line. The Land Cruisers in Australia have some variations from the models that we have. The most notable difference is the steering gear box, which is located on the opposite side (our passenger side). Because of variations such as this, we stock their products on a limited basis; however, any of their product line can be special ordered.

Currently, the most popular items that we are importing are their bellhousing adapters for all model Land Cruisers. Their special bellhousing assembly, specifically for Ford and Chevy V8 Land Cruiser conversions, bolts directly onto the front of the original Land Cruiser bellhousing assem-

bly. This new housing provides a new engine location that simplifies the drivetrain positioning for the popular V8 conversion. This new design incorporates the use of a stock Chevy 168 tooth flywheel, Chevy pressure plate, clutch disc, original Toyota release bearing, throw out arm, and slave cylinder. This kit is a little more expensive than the our bellhousing design, but offers some distinct advantages which makes it a good option for a V8 conversion. We supply the necessary components to adjust the engine position to accommodate the North American steering configuration.

When using the Mark's bellhousing, you will be able to retain the bellhousing support on the driver's side by simply spacing it away from the original bellhousing. The passenger side mount has been re-manufactured and will offer an ideal engine location without driveline modifications.

No matter what your drivetrain or conversion needs may be, we are fully capable of supplying the necessary components for your Toyota Land Cruiser. This manual will help you to identify your stock drivetrain components and give you your conversion options. It also supplies information of steering upgrades, as well as reprint articles about converted vehicles. If you should have any questions or need clarification on your specific application, please feel free to contact our trained technical sales staff.

TOOLS REQUIRED:

Toyota Land Cruisers are put together with all metric fasteners. If you do not have a good selection of metric and standard wrenches, then we would suggest that you purchase the appropriate wrenches *before* you start your conversion. Along with these tools, it is advised that you have an engine hoist and a torque wrench to complete the conversion properly. Some conversions require some welding or cutting for mounting of the engine. Please refer to your specific vehicle application listed in this manual for further information concerning modifications. For electrical wiring diagrams and Toyota torque specifications, you will need a Toyota Land Cruiser service manual.

ENGINE SELECTION

The next step is to define the use of the vehicle and then select a motor which best fits those needs. We manufacture motor mounts, headers, and bellhousing adapters for most Chevy and Ford engines. Depending on what motor you choose, every practical need can be met. The overall size of your Land Cruiser provides you an easy installation with a minimum amount of modifications.

Small Block Chevy V8:

There are many different Chevy small blocks. The 283, 305, 350, 383, T.B.I., T.P.I., LT1, LT4, LS1, and the Vortec V8 are all examples. When it comes to the usage of these engines *most* of them can be treated the same.

The bellhousing bolt patterns on these block are all identical. (This is known as the 90 degree bolt pattern). These engines use a dowel pin alignment. The stock starter bolts to the bottom of the block except on some early blocks like the 265. *(Note: These early blocks, in which the starter bolts to the bellhousing, should not be used for conversions).* The flywheel can either be 153 tooth measuring 12-3/4" in diameter, or 168 tooth measuring 14" in diameter. The 1985 & earlier flywheels are not interchangeable with the 1986 & later flywheels due to a change on the flywheel crank bolt pattern and balancing. The Chevy Vortec Generation III blocks used yet another crank bolt pattern and balance different than any of the other GM blocks.

The Chevy starters have two different bolt patterns on the bottom of the block. The straight bolt pattern is normally used with the 153T flywheel, and the offset or staggered starter bolt pattern is normally used with the 168T flywheel. Many Chevy blocks today offer both starter bolt patterns on the block. Some of our conversion bellhousings require a special GM starter nose cone. If your stock starter is interfering with our bellhousing, you may need to grind on the bellhousing a bit or purchase a hi-torque starter which does not have a nose cone: GM# 1968122 (for use with a 153T flywheel). The Vortec Gen. III blocks had their own unique starter bolt pattern. WARNING: Do not use one of our full bellhousings with a diesel engine. The starter will not fit the bellhousing pocket on our bellhousing.

The oil pans on Chevy blocks have gone through a few changes. Blocks 1985 & earlier are all the same, except the dipstick access is either on the driver's side or passenger side. In 1986, GM changed their gasket design to a one piece rear main seal. The earlier style oil pans will not fit the newer blocks. The Vortec engines use an aluminum oil pan.

Most of the Chevy blocks used a triangular motor mount bolt pattern (shown right). Our conversion mounts all utilize this most common

Vortec oil pan

LS1 mount P/N 713088 installed

mounting configuration. In the late '90s, and with the introduction of the LS1 and the Vortec Gen. III V8 blocks, we've seen a variation from this triangular pattern. If you plan on using a LS1 or Gen. III Vortec blocks, we offer a universal mount to fit this new rectangular mount pattern. If you're using a Vortec block, you'll need to check the block to see which mount bolt pattern you have. The early Chevy Vortec was triangular while the Gen. III Vortec was rectangular. GM also changed the crank flange stickout location on the LS1 and Gen III Vortec blocks. This crank is recessed .400" than any other stock Chevy block. When this block is used in a conversion, the torque converter or the clutch components will need to be adjusted.

NOTE: The LT1, LT4, ZZ4 or LS1 blocks all use angle port heads which are not compatible with most of our headers. These blocks also require a steam release port on the radiator. The radiators we offer do not have this steam release provision.

The Chevy V8 is an excellent choice for an engine upgrade into a Toyota Land Cruiser. The benefit of a Chevy engine conversion is that a large number of parts are readily available. One disadvantage is that the rear mounted distributor will sometimes create firewall clearance problems.

Chevy 292 In-line 6 Cylinder:

If you are not looking for the power increase of a Chevy V8 but want the availability of Chevy components, the installation of a Chevy in-line 292 cubic inch 6 cylinder engine is a good choice. When using this engine, costs can be minimized since the location is identical to that of the original 6 cylinder. We do not offer any type of motor mounts to install this engine, so some fabrication will be required.

NOTE: When acquiring a Chevy 292, make sure that the engine has starter provisions located directly on the block.

Chevy V6 Blocks:

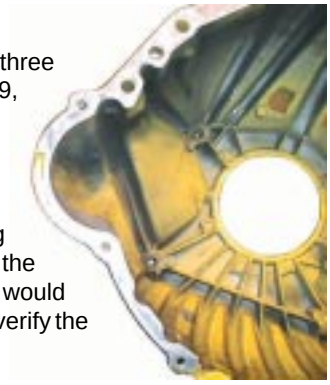
This block can either be the 3.8 (229) or 4.3 V6. These engines are identical to the Chevy V8 application with reference to the bellhousing, starter, and flywheel. The oil pan has the same year differences like the Chevy V8. The 1996 & newer 4.3 blocks use an aluminum oil pan.

The motor mounts are also the same as the Chevy V8 with the exception of the location of the triangular bolt pattern in reference to the back of the block. The motor mount location on the V6 is approximately 4-1/2" closer to the backside of the block than on the V8.

Ford V8 Blocks:

Ford conversions are becoming more popular. The Ford V8s have a front mounted distributor and are eighty pounds lighter than the Chevy V8. The oil pan sump on the Ford engine is normally in the front. When using a Ford engine, you will be required to change to a rear sump design similar to the early Bronco V8 vehicles.

When selecting a Ford block, take the following information into consideration: Ford blocks used three different block bolt patterns. We only offer motor mounts and adapters for the small block Ford 289, 302, and 351W; the Ford 302 being the most commonly used block for conversions.



Small block Fords had the option of utilizing two different flywheel diameters. These flywheels can be identified by a tooth count of 157 or 164 tooth. It is critical that you match the flywheel diameter with the proper bellhousing and dust cover shield. For example: A bellhousing designed for a 164 tooth flywheel cannot use a 157 tooth flywheel. Since the starter bolts and indexes directly onto the stock bellhousing, the starter would not properly engage the incorrect flywheel. Therefore, make sure you verify the compatibility of these components.

When obtaining your flywheel, you must also verify that the flywheel has the proper balance. Blocks 1982 & newer use a different weight for balancing than the earlier blocks. Some applications may require the flywheel to be rebalanced for the block.

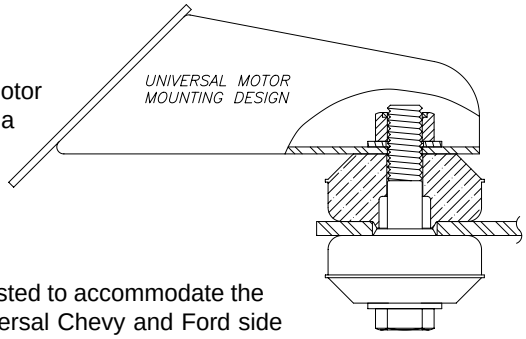
ENGINE CONVERSION

General Information

Once the selection of your engine has been made, there are now a number of items that you must consider. The information listed in this section will cover most of your conversion considerations.

MOTOR MOUNTS:

Your next requirement will be to purchase the proper engine mounts. The motor mounts we offer are for the Chevy V6/V8 and Ford V8. The V6/V8 mounts are a complete frame-to-block mounting system that uses a dual rubber donut design fastened together with a hardened bolt. This combination offers a positive means of securing the engine for the most severe offroad conditions.



Scab plate

Our universal motor mounts can be adjusted to accommodate the best possible engine location. Our universal Chevy and Ford side mounts are your best choice for Land Cruisers. The universal mounts are designed to be welded into position. When you position your engine (with the weld-in mounts), you must take into consideration such things as oil pan, steering box, and firewall clearances. Our Chevy V6/V8 mounts include new scab plates that should be welded to the inner frame rails. This will allow a better weld for the engine support bracket to the frame. On Ford V8 universal mounts and LS1 mounts, the frame enclosures can be ordered under **P/N 713124-PLT**.

Our engine mounts are provided with multiple hole locations for assembly between the block mount and frame support bracket. The holes on the engine mount will not always line up perfectly over the "L" support bracket. When your engine is lined up in the desired location, it may be necessary to elongate one of the holes on the engine mount.

P/N 713124 - Chevy V6/V8 motor mounts

P/N 713088 - Chevy LS1 & Vortec Gen. III motor mounts

P/N 713002 - Ford V8 motor mounts

ENGINE LOCATION:

Depending on your engine selection and transmission type, you will find that the Toyota Land Cruiser chassis has ample room. We have established some guidelines for the most popular conversions, but due to the various combinations we suggest that you consider all of the options before final drivetrain location is established. Keep in mind that the original driveshaft length can be maintained - *provided the transfer case is kept in the original location*. Many times customers will sacrifice engine location to eliminate driveshaft modifications. We highly recommend that you position the engine in a location similar to the measurements to follow. Driveline modifications are cheaper in the long run than improper engine placement.

The correct engine location on a FJ40 is easily determined by measuring from the rear edge of the shock tower. The placement of the “L” bracket will vary because there are several drivetrain combinations. An ideal location for the “L” bracket is between 8” to 12” from the rear of the stock tower to the center of the “L” bracket. When placing the engine between the frame rails, it should be offset 1/2” to 1” (depending on which transmission is being used) toward the driver’s side to allow for proper front driveshaft clearance. When positioning the engine, the height of the “L” bracket should be either flush and/or up to 1/2” above the frame rail. This varies due to the lateral location of the “L” brackets. Ideally, the engine should have a 3 to 5 degree tilt towards the rear once the engine and transmission are installed. *NOTE:* These are only guidelines to assist you. Not all engine conversions are the same.

Measuring from the rear of the stock tower to determine the “L” bracket location

Engine placement offset toward driver’s side

When retaining the stock 4 speed, driveline modifications are normally required. It is critical not to place the engine too far forward since this will cause problems with the 4 speed shifter handle location and the heater vent. One way to alleviate these problems is to utilize the Mark's 4WD bellhousing adapter or the Ranger Torque Splitter. Either one of these options can result in eliminating driveshaft modifications as well as other clearance problems. Using either one of these options will allow you to leave the 4 speed in the stock location and build forward, thus allowing the engine placement to be determined.

On 3 speed conversions, the same rules apply with regard to the Mark's adapter or Ranger Torque Splitter. The 3 speed can also be retained by reversing the front and rear drivelines and then locating the engine placement accordingly. However, you will have floorboard modifications, and the engine placement may not always be in the ideal location.

When converting to a new engine and transmission, it is impossible for us to determine whether or not driveline modifications will be required on your application. By using the engine placement suggestions, place the engine in a location that best suits your needs. As a reminder, driveline modifications will sometimes simplify a conversion verses an incorrect engine placement, which could cause other problems and expenses. Whatever engine is being installed (Ford or Chevy V8), we highly recommend that the frame rails have a scab plate welded into position. This material is 1/8" thick flat steel and should be positioned directly between the frame rail and our support mount. To make sure that you select and position your Land Cruiser drivetrain in a suitable location, you should consider the following:

Radiator Clearance
Oil Filter Accessibility
Transmission Adapter
Steering Box Clearance
Exhaust System Allowance
Transmission Shifter Location
Transfer Case Shifter Location
Hood Clearance for Air Cleaner
Firewall Clearance for Distributor
Front Axle Clearance for Balancer
Driveshaft Angles for Starter Motor
Optional Ranger 2 Speed Installation
Optional Saginaw Steering Conversions
Optional Headers for Strg. Box Clearance
Heater Clearance around Transmission Shifter

DISTRIBUTOR CLEARANCE:

A V8 engine fits well into the Land Cruiser engine compartment. Most applications do not require any firewall modifications. When positioning the engine in the most rearward location and using a large H.E.I. distributor cap, firewall modifications may be required on this type of Chevy application.

BATTERY LOCATION:

The battery mounting plate and support will need to be relocated behind the passenger side headlight or the passenger side firewall if the heater is not going to be used. The stock battery tray can be used, or some companies offer an aftermarket battery mounting tray that could be used as an alternative.

RADIATOR:

Most applications can retain the stock radiator for cooling the new V8 engine; however, for the ultimate cooling option we offer our own band of aluminum Rad-A-Kool radiators. Our 2 core radiator can be ordered with or without a transmission cooler (**P/N 716697-AA** for automatics or **P/N 716697-AB** for manuals). These radiators fit the 1960 to 1983 FJ40 and FJ45 Land Cruisers. The radiators measure 20-1/2" tall, 20-1/4 wide, and 3" thick. *NOTE:* These radiators will not fit later model FJ40s with factory air conditioning. Please specify if your vehicle was *equipped* with factory air conditioning. A special radiator measuring 19" tall, 22-1/2" wide, and 3" thick can be ordered to fit your application at no additional charge.

P/N 716697-AA

Aluminum Radiator Features:

*1" wide core tubes
*18 Fins per inch
*Billet Filler Neck
*No Epoxies,100% TIG Welded
*Temperature Sensor Provision
*Cross Flow Design
*Air Pressure Tested
*.083" Mounting Flanges
*LT1 or LS1/Vortec order option

Our billet filler neck requires a standard GM overflow system style cap (3/4" depth). We recommend a 15 lbs. to 22 lbs. cap pressure. A higher pressure cap increases the boiling point. A higher pressure cap keeps the fluid in the cooling system, not the recovery tank. We offer a new 22 lbs. radiator pressure cap. This cap, **P/N 716679**, fits our Aluminum radiators. Our Toyota radiator can be ordered with or without a transmission cooler. The radiator has two 1/4" NPT fittings welded into the tank. We also

include two 1/4" Male NPT x 5/16" inverted flare fittings. A benefit of the transmission cooler in the radiator is the heat exchange between the radiator and the tranny cooler. The radiator brings the transmission fluid up to a safe and constant operating temperature.

Our radiators are designed to fit standard GM engines. Newer blocks such as the LT1, LS1, and Vortec Gen. III blocks will require some additional features to be added to the radiator. A steam return option and smaller water inlets and outlets must be incorporated to our radiator when using it to a newer block. When ordering, please add LT1 to our part number when using a LT1 block, and add LS1 to our part number when using a LS1 or Vortec Gen. III block.

When using the stock Land Cruiser radiator in a Chevy application, a lower hose from a 1973 V8 Chevy pickup can be used. For the upper hose, DAYCO P/N 7672 works well. The thermostat housing must be a straight design. For a Ford engine swap, a trip to your local auto parts store will be necessary since we do not have any suggestions for these applications.

FANS:

On most conversions, you will be able to use a stock engine-driven fan. Most custom Land Cruiser aftermarket companies offer fan shrouds that work well with the engine-driven fan. We have seen a few engine-driven clutch fans that are too large in diameter to allow access for the radiator hoses. These can be switched out for either a flex fan or electric fan. Electric fans have become a popular addition to aid in cooling most engine swaps. Electric fans can be positioned in front or behind the radiator and offer efficient engine cooling.

The Spal fans we offer are the high performance straight bladed pusher or puller fans. These 16" fans are 16.3" tall, 15.75" wide, and 3.39" deep at the fan's motor. The fans are rated at 2360 CFM and, being that they are pre-shrouded, they are ideal for cooling larger engines. The only down side of these fans is the noise they generate that can be heard from the driver's seat (worse on a pusher than a puller). Our fan kits come complete with the needed wiring harness which is compatible with both positive and negative ground vehicles. The 3/8" pipe thread sending unit is designed to turn the fan on at 185 degrees and off at 170 degrees. The kit comes with a 40 amp relay, a fuse holder, and all other necessary hardware. In addition, our kit also includes mounting brackets for the fan to the radiator. The mounting brackets are designed for our aluminum radiators, however; we can supply you with brackets to fit our copper/brass radiators upon request. **Part No. 716670** is our puller fan kit and **Part No. 716671** is our pusher fan kit.

TEMPERATURE BUSHING:

When installing a Chevy engine, **P/N 716023** will allow you to retain your stock sending unit. With this bushing you can reinstall the original Land Cruiser temperature probe back into the intake manifold or head of most Chevy blocks. This special bushing has a metric female thread for use with the original probe. The outside diameter of this bushing is 1/2" with a pipe thread. Ford engines, Chevy LT1, LT4, LS1, Vortec engines have a smaller diameter hole in the block for the sending unit. These blocks will require the bushing listed above plus an in-line temperature sensor adapters. These adapters fit on the radiator hose and allows you to retain your vehicle stock temperature sending unit and stock gauge. These units are offered in either 1-3/8" or 1-1/2" hose diameter.

P/N 716673A - 1-3/8" with 1/2" sensor hole.
P/N 716674 - 1-1/2" with 1/2" sensor hole.

WATER PUMPS & THERMOSTATS:

We offer a high performance line of water pumps that will aid in V8 cooling. Chevy engine installations have the option of either a long or short water pump. The long style water pump is most commonly used on Chevy blocks. The stock bracketry on most V6 & V8s is designed to be used with a long style water pump. A short water pump will give additional radiator clearance; however, accessory brackets are sometimes hard to come by. We offer a high performance brand of water pumps and thermostats for Chevy V6 & V8 conversions.

Chevy & Ford blocks can usually retain a stock serpentine belt system. They will normally provide sufficient clearance for your radiator. Be careful if you replace the water pump on a Serpentine system since they usually rotate in the opposite direction.

FLOWKOOLER Pumps:

P/N 25-1668 - GM short water pump (1955-91 Chevy). This water pump is 5-11/16" long.
(GM short water pump has limited accessory mounting bracket options)
P/N 25-1759 - GM long water pump (1955-91 Chevy). This water pump is 6-15/16" long.

P/N 25-1759

FLOWKOOLER Thermostats:

P/N 25-1600 - 160 degree high flow thermostat
P/N 25-1800 - 180 degree high flow thermostat
(All brass and copper construction with a "balanced sleeve")

EXHAUST HEADERS / STOCK MANIFOLDS:

On most conversions, you will have the option of using a custom exhaust header or stock manifold. If headers are to be used, you will need to verify your State's emission requirements since the headers we supply are not smog legal. The Chevy headers are offered in both a "fender well" or "inside-the-frame rail" design. Due to vehicle variations, some modifications may be required when using our exhaust header systems. For example: Part No. 717006 headers can be used, requiring slight modifications to the lower fender skirting. The headers go up and over the stock Land Cruiser steering system and directly downward on a slight slope to the rear. Our headers are designed around conversions using our motor mounts. These headers are available in chrome or non-plated. When ordering specify (NP) for non-plated after the part number.

P/N 717011

P/N 717006 - Fender well Chevy V8 headers
P/N 717011 - Ram horn style Chevy V8 headers (inside-the-frame rail)
P/N 717015 - Ram horn style Chevy V8 (std port head w/ angle plugs)
P/N 717016 - Ram horn style Chevy V8 (D-port head w/ angle plugs)
P/N 717012 - Inside-the-frame rail Ford V8 header

P/N 717006

For smog legal conversions, stock manifolds will be required. For Chevy applications, most late model manifolds are a rear dump. Fitting these rear dump manifolds into a Land Cruiser can sometimes be a tight fit when using the original Land Cruiser steering box. You will find that the clearance between the two will be very limited. When selecting stock manifolds, we suggest a Chevy passenger car-style which will allow a bit more clearance. If you are not required to be smog legal but wish to use a stock manifold, we recommend the use of the Centerdump or Rams horn style (GM Rams Horn centerdump manifold #372243). Select manifolds that have alternator mounting bracket holes.

On Ford applications, the exhaust manifolds off a Mustang or Explorer V8 should provide ample clearance for the stock steering and frame rails. Smog exempt vehicles could use manifolds off of an early Maverick or Comet. These manifolds, however, are rear dump and can cause some clearance problems with the stock Land Cruiser steering box.

OIL PRESSURE GAUGE:

The original oil pressure gauge can be retained and the sending unit reinstalled back onto the new engine. On Chevy V8 conversions, you will need to use a 1/8" NPT x 1-1/2" pipe nipple and a 45 degree elbow for installation behind the V8 distributor. Use a thread sealant tape to compensate for the metric thread installation into the 1/8" pipe size.

EMERGENCY BRAKE:

Some Land Cruisers are equipped with an emergency brake drum on the back side of the transfer case. When installing a V8 engine with the original transmission, the drivetrain will either remain in the same location or extend forward. Modifications to the brake cable in either case will not be required. On conversions using a longer transmission combination than stock (such as an automatic), you will be required to reroute this cable, and/or possibly extend it.

SPEEDOMETER CABLES:

The speedometer is connected to the backside of the transfer case. When installing a V8 engine with the original transmission, the drivetrain will either remain in the same location or extend forward. On conversions using a longer transmission combination than stock (such as an automatic), you may be required to reroute the speedometer cable. If the cable is still too short, we offer a 12" extended cable, **P/N 716186-C**.

THROTTLE REQUIREMENTS:

Your stock throttle pedal can easily be connected to a universal cable linkage. We offer a few custom cable linkages to aid in this connection. These cut-to-fit assemblies work great with most conversions.

P/N 23-0010 - 24" SS Hi-Tech throttle cable
P/N 23-0011 - 24" Universal black throttle cable
P/N 23-0012 - Tuned Port SS throttle cable
P/N 23-0015 - Stainless Steel carburetor bracket.

We also offer a new custom throttle pedal for Land Cruisers, **P/N 23-0013**. This new adjustable pedal can be offset to either side of the pivot mount. The pedal can be installed into a 1974-84 Land Cruiser with the use of our bracket (**P/N 715565**), or it can also be mounted to the stock bracket with a few small modifications. Land Cruisers 1973 & earlier must fabricate a mounting bracket.

STEERING:

The early model Land Cruisers were equipped with a steering gear box that was located at the base of the steering column. The stock Land Cruiser steering system often had excessive play and backlash. You have the option of utilizing your stock steering or upgrading to a Saginaw steering system. The Saginaw system is a proven advantage for these vehicles. Both manual and power steering kits are available. For more information, refer to the Saginaw Steering section in this manual.

CROSSMEMBERS:

Land Cruisers (1963 to August 1980) supported the stock transmission & transfer case by using a set of bellhousing mounts. Most engine conversions will require the removal of these stock bellhousing mounts. To properly support the drivetrain, a new crossmember is normally required. We offer two types of crossmember designs.

Transfer case crossmember: This popular design bolts on the back of the stock transfer case. For most conversions, crossmember **P/N 716022** works well. This crossmember replaces the 6 bolt cover on the rear of your stock transfer case. By removing the stock cover, our new crossmember bolts in its place. This crossmember kit comes with a gasket and 6 stud bolts. These new studs will provide a much stronger connection between the new crossmember and the back of the transfer case. The crossmember support has a special welded cup that allows for clearance of the transfer case output shaft. Position the crossmember onto the back of the transfer case and secure it using the nuts provided. This crossmember extends outward to each frame rail. It is supported by "L" brackets that must be welded to the frame rail (similar to the motor mount installation). The frame rails should be scabbed-in using the scab plates provided with the kit. These components are insulated on rubber cushions. This crossmember is recommended with all transfer case adapters except when using a TH350, 700R & TH400.

FJ55 & longer tranny assemblies: On FJ55 wagons and longer transmission assemblies such as the TH400 or NV4500, you will need to use a different crossmember assembly, **P/N 716022-TSW**. The frame rails start to taper outward, so it is necessary that you have longer frame brackets on these particular applications.

TH350, 700R & TH400 automatics: When installing an automatic transmission to your transfer case, we recommend the use of a new crossmember, **P/N 716004**, underneath the adapter housing. All of the Advance Adapter tailhousings have two tapped holes for this standard rubber support. This provides an excellent support, although it does take away some of the ground clearance necessary for 4-wheeling. This crossmember kit comes complete with frame brackets and the crossmember support mount necessary for the adapter connection. The crossmember for the TH350 & 700R bolts to the bottom of the adapter housing using a stock GM rubber mount. This tubular crossmember extends to the inner frame rails. It is supported by "L" brackets that must be welded to the frame rail.

1981-1990: Vehicles with the split-style 19 spline transfer case used a crossmember that was located underneath the stock transmission. Some of our transfer case adapters will allow you to retain this stock crossmember; however, it will need to be relocated on the frame rails. Some of our other transfer case adapters for applications like the NV4500 & TH400 require you to fabricate a new crossmember.

A conversion crossmember for the FJ60 and FJ62 Land Cruisers is also available. Although the adapter for the GM 700R or 4L60E transmission allows you to retain the stock rubber crossmember mount, it still requires you to modify it to fit the stock crossmember to fit the transmission mount in the new location in the frame rails. The new crossmember mount, **P/N 716183**, is a weld-in kit that will increase your ground clearance. This mount reuses the factory rubber mount and is adjustable to fit the frame rails with the newly installed transmission.

P/N 716022 installed

FJ60 retaining the 4 speed: On FJ60 engine conversions retaining the original 4 speed transmission, you will need to keep the original transmission support that runs directly underneath the 4 speed transmission. To alleviate the relocation of this stock crossmember, we highly recommend the use of the Mark's 4WD adapter or the Ranger Torque Splitter. Both these applications will allow you to retain your stock 4 speed and crossmember in its original location.

FJ60 with stock automatic: On FJ60 engine conversions retaining the original automatic transmission, you will retain the original transmission support that runs directly underneath the stock adapter housing. On vehicles replacing this automatic (depending on the transmission application you chose), you may need to fabricate a new crossmember to fit your transmission choice.

FJ62, FJ80, FZJ80, and 100 Series with stock automatic: On all of these engine conversions retaining the original automatic transmission, you will retain the original transmission support that runs directly underneath the stock adapter housing. On vehicles replacing this automatic (depending on the transmission application you chose), you may need to fabricate a new crossmember to fit your transmission choice.

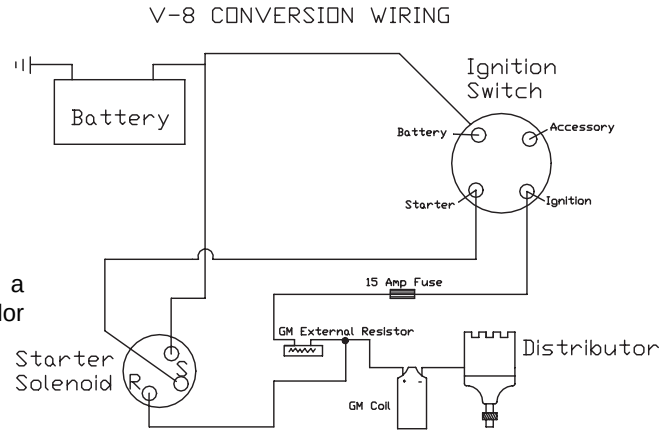
SUSPENSION & BODY LIFT:

No major suspension modifications are required when installing a new V8 engine. A Chevy or Ford V8 is approximately 250 lbs. less than a stock 2F engine. A Chevy or Ford V8 engine can normally be installed without your vehicle having a body lift; however, body lifts on any Land Cruiser conversion will provide additional drivetrain clearance. Chevy 292 in-line 6 cylinder engine conversions retaining the stock 3 speed will require a 1" body lift for bellhousing clearance.

ELECTRICAL SYSTEM:

If using a "points" type distributor, you will need to install the GM coil and resister (listed below) and wire as illustrated.

GM Coil	GM# 1115202
GM External Resistor	GM# 1957145



When using an "H.E.I." pointless distributor, you will need to couple the wire that was originally attached to the positive side of your stock coil directly to the "H.E.I." distributor. This wire attaches to the ignition post on your ignition switch. It is routed through a 15 amp fuse at the stock fuse holder panel and then to the positive side of the stock coil.

For computer controlled blocks, we recommend that you purchase a wiring schematic from your local dealer that identifies the correct color codes of the wires. When doing in-house conversions using the later model blocks, we have found it easier to purchase a custom wiring harness from the following companies:

Howell Engineering	*(810) 765-5100 (GM harnesses)*
BTB Products	*(702) 568-1511 (GM Vortec harnesses)*
Street & Performance	*(501) 394-5711 (GM & Ford harnesses)*

STOCK AUTOMATIC TRANSMISSION (A440F & A440L) ELECTRICAL SYSTEM REQUIREMENTS:

This transmission is electronically shifted. For this transmission to operate properly when coupled to a GM engine, it will require two readings. The first is a reading from the tachometer and the second is a throttle position sensor. The throttle position sensor from the Land Cruiser engine must be fabricated to fit onto the new GM engine. The tachometer reading can be obtained by the tachometer interface kit offered by Mark's 4WD.

TACHOMETER INTERFACE:

Mark's 4WD Adaptors offers a new interface kit designed to calibrate you existing Toyota 6 cylinder gas engine tachometer. This kit works with the GM V8 engine and eliminates the inconvenience of removing your tachometer from your dashboard to have it re-calibrated. The unit is easy to install and only requires a couple of wire connections.
This kit can be ordered under **P/N 716242**.

Photos courtesy of Ralph Kleinschmit II of Oregon

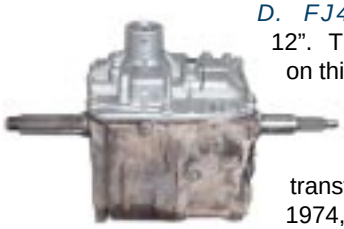
IDENTIFYING VEHICLE AND STOCK TRANSMISSION:

Land Cruiser vehicles were manufactured in numerous configurations, having thousands of different model classifications. These numerous classifications came about from the various countries that the Land Cruiser was exported to. This section of the manual mainly deals with Land Cruisers found here is the United States and some vehicle found in Canada. Some of the major differences between the different model classifications are the body types and stock engine options. For instant, the stock drivetrain on a FJ40 and a BJ40 are basically the same with reference to the transmission and transfer case; however, the F in FJ designates a gas in-line 6 cylinder engine and the B in BJ designates a diesel 4 cylinder engine. The information listed below was put together as accurate as possible. We recommend that you verify your drivetrain components and vehicle type before ordering conversion components. There are a couple of models that we have left out due to the low production number of these vehicles or if the vehicle model has not been a popular application for doing a conversion.

A. FJ25 (1958-59): This early Land Cruiser came equipped with a 4 speed transmission and a single speed transfer case. There are no adapters available for this model transmission or transfer case. The engine found in the FJ25 is the in-line 6 cylinder "F" motor. This vehicle looks like a FJ40 but it had no front turn signals on the fenders.

B. FJ40 (1960-63) (J30) 3 Speed Transmission: This transmission is very similar to the 3 speed found in the 1964-73 vehicles. This 3 speed transmission was normally shifted by a column shifter and was coupled to a 2 speed, 10 spline transfer case. This transmission is considered light duty. You should consider changing transmissions for added strength. If you wish to retain this 3 speed transmission, the column shift linkage must be changed out to a floor shift. The engine found in this FJ40 is an in-line 6 cylinder "F" motor.

C. FJ40 (1964-73) (J30) 3 Speed Transmission: This 3 speed transmission is 8-1/2" long and easy to adapt to both the Chevy and Ford V8 conversions. The input shaft size on this transmission is a metric 10 spline that will interchange with a standard Chevy 1-1/8" 10 spline clutch. The stock bellhousing indexed to the transmission by utilizing the front bearing retainer. The 1st gear ratio on this transmission is 2.7:1; 2nd 1.65:1, and a 3rd gear ratio of 1:1. The transmission output shaft coupled to a 10 spline, 2 speed transfer case. The engine found in this FJ40 is an in-line 6 cylinder "F" motor.



D. FJ40 (July,1974-80) (H42) 4 Speed Transmission: This transmission has a case length of 12". This heavy-duty 4 speed transmission is capable of handling most V8 engines. The 1st gear ratio on this transmission is 3.5:1; 2nd 2.3.1; 3rd 1.4:1, and a 4th gear ratio of 1:1. The input shaft size on this transmission is a metric 10 spline that will interchange with a standard Chevy 1-1/8" 10 spline clutch. The stock bellhousing used two dowel pins for alignment to the stock transmission. This Toyota transmission is equipped with a 16 spline output shaft which coupled to a 2 speed transfer case with a 16 spline input. The engine found in this FJ40 is an in-line 6 cylinder "F" motor in 1974, and then switched to a 2F in-line 6 cylinder from late 1974 to 1980.

E. FJ40 (August 1980-83/84) (H42) 4 Speed Transmission: This transmission is very similar to the previous 4 speed transmission listed above except that a 19 spline output shaft was used in the transfer case. The Land Cruiser got an upgraded heavy-duty transfer case which was nicknamed the split-case. The gear ratios remained the same as the previous 4 speed. This transmission/transfer case combination did not use bellhousing mounts, but now used a crossmember support that bolted to the transmission case. The engine found in this FJ40 is an in-line 6 cylinder 2F engine.

F. FJ45 (1963-67) J30 3 Speed Transmission: This 3 speed transmission is 8-1/2" long and easily adapted to both the Chevy and Ford V8 conversions. The input shaft size on this transmission is a metric 10 spline that will interchange with a standard Chevy 1-1/8" 10 spline clutch. The stock bellhousing indexed to the transmission by utilizing the front bearing retainer. The 1st gear ratio on this transmission is 2.7:1; 2nd 1.65:1, and a 3rd gear ratio of 1:1. The transmission output shaft coupled to a 10 spline, 2 speed transfer case. The engine found in this FJ40 is an in-line 6 cylinder "F" motor. The FJ45 is the pickup version on the Land Cruiser. There were various truck bed lengths on the FJ45 which were designated by a letter after the "5" in this vehicle. These various models of the FJ45 can all be treated the same with reference to the drivetrain.

G. FJ55 (1968-73) J30 3 Speed Transmission: This 3 speed transmission is 8-1/2" long and easily adapted to both the Chevy and Ford V8 conversions. The input shaft size on this transmission is a metric 10 spline that will interchange with a standard Chevy 1-1/8" 10 spline clutch. The stock bellhousing indexed to the transmission by utilizing the front bearing retainer. The 1st gear ratio on this transmission is 2.7:1; 2nd 1.65:1, and a 3rd gear ratio of 1:1. The transmission output shaft coupled to a 10 spline, 2 speed transfer case. The engine found in this FJ55 is a in-line 6 cylinder "F" motor. The FJ55 is the early station wagon version on the Land Cruiser.

H. FJ55 (July,1974-80) (H42) 4 Speed Transmission: This transmission has a case length of 12". This heavy-duty 4 speed transmission is capable of handling most V8 engines. The 1st gear ratio on this transmission is 3.5:1; 2nd 2.3.1; 3rd 1.4:1, and a 4th gear ratio of 1:1. The input shaft size on this transmission is a metric 10 spline that will interchange with a standard Chevy 1-1/8" 10 spline clutch. The stock bellhousing used two dowel pins for alignment to the stock transmission. This Toyota transmission is equipped with a 16 spline output shaft which coupled to a 2 speed transfer case with a 16 spline input. The engine found in this FJ55 is an in-line 6 cylinder "F" motor in 1974, and then switched to a 2F in-line 6 cylinder from late 1974 to 1980. The FJ55 is the early station wagon version on the Land Cruiser.

I. FJ60 (1980-84) (H42) 4 Speed Transmission: This transmission is identical to the 1980-84 FJ40 4 speed transmission listed previously. This transmission has a 19 spline output shaft to the transfer case. The Land Cruiser got an upgraded heavy-duty transfer case which was nicknamed the split-case. The gear ratios remained the same as the previous 4 speeds. This transmission/transfer case combination did not use bellhousing mounts, but now used a crossmember support that bolted to the transmission case. The engine found in this FJ60 is an in-line 6 cylinder 2F engine. The FJ60 has a square body with 2 pair of round headlights.

J. FJ60 (1985-87) (H42 Long) 4 Speed Transmission: This transmission is identical to the 1980-84 FJ60 4 speed transmission listed previously. This transmission has a 19 spline output shaft to the transfer case. This 4 speed used a 3-1/2" factory spacer adapter housing between the transmission and transfer case. This was to simplify the production, keeping the 4 speed the same length as the 5 speed transmission found in the FJ60s overseas. The transmission gear ratios are the same as the shorter version H42 transmission. This split transfer case had the cluster pin diameter upgraded to 38mm. This transmission/transfer case combination did not use bellhousing mounts, but used a crossmember support that bolted to the transmission case. The engine found in this FJ60 is an in-line 6 cylinder 3F engine. The FJ60 has a square body with 2 pair of round headlights.

K. FJ60 (1985-87) (A440F & A440L) 4 Speed Automatic Transmission: This transmission was the first automatic used in Land Cruisers. The transfer case that coupled to this transmission was still the split-case 19 spline unit. This split transfer case also had the cluster pin diameter upgraded to 38mm. This transmission/transfer case combination did not use bellhousing mounts, but used a crossmember support that bolted to the transmission case. The engine found in this FJ60 is an in-line 6 cylinder 3F engine. To convert this vehicle and retain the automatic, the stock engine must be the 3F. The transfer case adapters we offer for the split transfer case all fit this transfer case; however, be aware of crossmember support considerations. The stock crossmember may have to be modified or a new one fabricated to support your new transmission. The FJ60 has a square body with 2 pair of round headlights.

L. FJ62 (1988-89) (A440F & A440L) 4 Speed Automatic Transmission: This is the same transmission used in the FJ60s. The transfer case that coupled to this transmission was still the split-case 19 spline unit. This transmission/transfer case combination did not use bellhousing mounts, but used a crossmember support that bolted to the transmission case. The engine found in this FJ62 is an in-line 6 cylinder 3F-EFI (electronic fuel injected) engine. To convert this vehicle and retain the automatic, the stock engine must have been the 3F with or without the EFI. The transfer case adapters we offer for the split transfer case all fit this transfer case; however, be aware of your crossmember support. The stock crossmember may have to be modified or a new one fabricated to support your new transmission. The FJ62 has a square body with 2 pair of rectangular headlights.

M. Imported 5 Speeds 1983 & up (H55F): These transmissions are only used in Australia and Japan, but we've also seen a few come out of Canada. Some of the specialty Land Cruiser companies also import these 5 speeds. This transmission is found in both the FJ60 and FJ62 Land Cruisers. This transmission looks identical to the long H42 transmission. This transmission has a good 1st gear ratio of 4.84:1, and an overdrive ratio of 16 percent. These transmissions are a great upgrade for FJ60s originally equipped with a long H42 4 speed transmission. The adapters we manufacture for the 4 speed will also work the same on this H55F 5 speed.

NOTE: Land Cruisers that were originally equipped with a diesel engine have a longer input shaft. These vehicles were called BJs (if the Land Cruiser had a 4 cylinder diesel) and HJs (if the Land Cruiser had a 6 cylinder diesel). Transmissions that were previously equipped to a diesel engine will require the installation of a new input shaft. The input shaft from a gas version transmission with the same tranny code is your best choice. We can also special order bellhousing adapters from Mark's 4WD that are designed for the diesel engine replacements and would not require an input shaft swap. The BJ and HJ transfer case applications match the FJs for the most part.

SPECIAL NOTE: Vehicles (Nov. 1984 & Up) equipped with a 3F engine had a transmission bolt pattern that was rotated clockwise 7 degrees. This was done to improve front driveshaft clearance. The stock transfer case was also rotated accordingly and was usually fitted with a vacuum operated shift linkage. When using one of our bellhousing adapters or Ranger Torque Splitter on vehicles originally equipped with a 3F engine, this rotation will cause installation difficulties.

N. FJ80 (1990-92) 4 Speed Automatic Transmission (A440F or A440L): This transmission was found coupled to the 3F-EFI engine. The transfer case in this vehicle was changed to a full time 4WD model (HF2A). The FJ80 had an option of a 5 speed transfer case and a part time transfer case; however, these were only found in **non**-U.S. vehicles. The bellhousing adapter for this automatic is available from us through Mark's 4WD of Australia. This adapter couples the automatic to the Chevy V8 and retains the transmission in the stock location. The only consideration is that this transmission is computer controlled. Besides the bellhousing adapter, you will also require a tachometer interface kit and also retain the throttle position sensor from the stock engine.

If you plan on replacing the stock automatic transmission with one of the GM transmission adapters, we only offer the adapter to replace the stock automatic transmission. This adapter allows the transfer case to remain in the stock location and the crossmember is the same position. If you have a FJ80 replacing a 5 speed, driveshaft modifications will be required because this transmission was a different length than that of the automatic. We can also special order adapters with the correct adapter length for vehicles replacing the 5 speeds. Toyota updated the square body style to a rounded body with the FJ80 models.

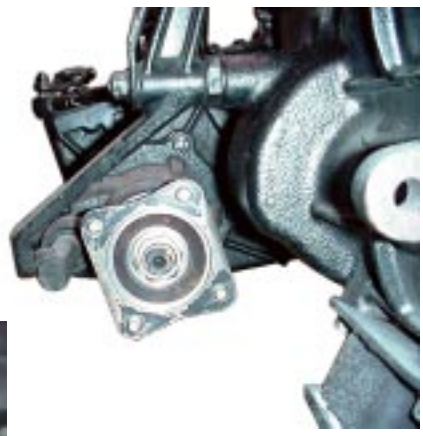
O. FZJ80 (1993-97) 4 Speed Automatic Transmission (A442F): This transmission was found coupled to the new 4.5L 6 cylinder engine. The automatic transmission in these vehicles was still coupled to the new full time transfer case (HF2A). The FZJ80 had an option of a 5 speed transfer case and a part time transfer case; however, these were only found in **non**-U.S. vehicles. There is no bellhousing adapter for this automatic as of yet.

To convert this vehicle, you must replace the stock automatic transmission with one of the GM transmission adapters. We only offer the adapter replacing the stock automatic transmission. This adapter allows for the transfer case to remain in the stock location and the crossmember is the same position. If you have a FJ80 replacing a 5 speed, driveshaft modifications will be required because this transmission was a different length than that of the automatic. We can also special order adapters with the correct adapter length for vehicles replacing the 5 speeds. The FZJ80 was still the rounded body style.

P. 100 SERIES (1998-02) 4 Speed Automatic Transmission (A442F): This transmission was found coupled to the new 4.5L 6 cylinder engine. The automatic transmission in these vehicles is still coupled to the new full-time transfer case (HF2A). The Series 100 Land Cruiser had an option of a 5 speed transfer case and a part time transfer case; however, these were only found in **non**-U.S. vehicles. There is no bellhousing adapter for this automatic as of yet.

To convert this vehicle, you must replace the stock automatic transmission with one of the GM transmission adapters. We only offer the adapter replacing the stock automatic transmission. This adapter allows the transfer case to remain in the stock location and the crossmember is the same position. If you have a Series 100 replacing a 5 speed, driveshaft modifications will be required because this transmission was a different length than that of the automatic. We can also special order adapters with the correct adapter length for vehicles replacing the 5 speeds.

These photos are of an imported Land Cruiser 5 speed. The transmission was coupled to a cast iron, early style transfer case. The linkage used is basically the same as found on U.S. vehicles.



BELLHOUSING ADAPTERS
(Retaining your Stock Transmission)

Land Cruiser V8 engine conversions are extremely popular due to the cost and availability of stock GM & Ford engine parts. The components covered in this section are for retaining the stock transmission. These components are offered individually or as a conversion kit. To properly select the adapters for your conversion, make sure you have identified the stock transmission in your vehicle.

RETAINING THE STOCK 3 SPEED TRANSMISSION:

The original 3 speed transmission is 8-1/2" in length. With very little difficulty, this transmission can be adapted. The kits work in conjunction with a stock GM or Ford bellhousing. The Chevy bellhousing should have a small index diameter of 4.686" in the back of the bellhousing to achieve proper alignment to the Toyota 3 speed. For a Ford engine swap, the bellhousing should have a 4.848" index diameter. The adapter plates for this 3 speed should not be used with the larger 5-1/8" index diameter bore bellhousing. If the smaller bellhousing indexes are not available, you can purchase a reducer ring (**P/N 716041**) that will reduce a Chevy or Ford large indexed bellhousing to the proper index diameter.

These transmissions were offered in both column and floor shifted models. In order to use the original 3 speed transmission, you must have a floor shifter because the column shift mechanism will not have sufficient clearance between the new engine and firewall. The floor shifter stick will need to be slightly modified for clearance beneath the heater. If your transmission is column shifted, you will need to change the transmission top cover over to a floor shifter style. Conversions using the GM 292 in-line 6 cylinder engine will not require a new floor shifter.

The floor shifter modified to provide heater clearance

To obtain the proper firewall clearance, the transmission and transfer case assembly will need to be relocated a minimum of 3-1/2" forward. On many of these applications, you have the option of reversing the driveshafts (front to rear, rear to front); however, the Chevy V8 distributor will be forced into the firewall and modifications will be required. On Ford V8 conversions, this can be accomplished with very little difficulty because the distributor is on the front of the engine.

The adapter kits for both the Chevy & Ford conversions come complete with an adapter spacer plate, custom retainer, pilot bushing, oil seal, and necessary hardware.

ADVANCE ADAPTERS
Chevy V8 conversion kit 713028-EK:
(These kits consist of the following items which are also available individually.)

- **P/N 712523** - Bhsg. adapter plate
- **P/N 713124** - Motor mounts
- **P/N 716022** - Crossmember
- **P/N 716023** - Temperature bushing
- **P/N 716024** - T/C pivot shifter
- **P/N 716176** - GM release arm
- **P/N 716287** - Slave cylinder brkt.
- **P/N 716316** - Release bearing

(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

ADVANCE ADAPTERS
Ford V8 conversion kit 713023-EK:
(These kits consist of the following items which are also available individually.)

- **P/N 712524** - Bhsg. adapter plate
- **P/N 713002** - Motor mounts
- **P/N 716022** - Crossmember
- **P/N 716023** - Temperature bushing
- **P/N 716024** - T/C pivot shifter
- **P/N 716177** - Ford release arm

We also carry the Mark's 4WD bellhousing adapter that can be used against the original Land Cruiser 3 speed bellhousing. Their bellhousing adapter will permit the original 3 speed and transfer case to remain in their original location, eliminating the need for the 3 speed floor shifter conversion. The Mark's bellhousing adapters for both the Ford and Chevy applications consist of a new adapter housing that is approximately 4-7/8" thick, and bolts directly to the front side of the original Land Cruiser bellhousing. This added length provides an ideal engine location and only requires engine mounts for the side of the new V8 engine. The rear crossmember support is eliminated, since the original Land Cruiser bellhousing supports are maintained.

NOTE: Due to the short length of the 3 speed transmission along with the new bellhousing mount supplied in the kit, we have had a couple of instances where interference occurred between the front driveshaft and bellhousing mount. A modification to the bellhousing mount was required to achieve proper clearance. Other considerations included, a longer slave cylinder hose to mount the slave cylinder to the passengers side of the bellhousing, removal or modifications to the transfer case linkage gating, and slight floorboard modifications.

MARK'S 4WD ADAPTORS
Chevy V8 conversion kit 713025-EK*:
P/N 712525 - Bhsg. adapter
P/N 713124 - Motor mounts
P/N 713038 - Bhsg. mount

MARK'S 4WD ADAPTORS
Ford V8 conversion bellhousing:
P/N 712526 - Ford bellhousing adapter
P/N 713002 - Motor mounts
P/N 713038 - Bhsg. mount

*The 713025-EK kit consists of the following items which are also available individually.
(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

The Ranger Torque Splitter can also be used when retaining the stock Land Cruiser 3 speed. This unit acts as the adapter between the 3 speed and the GM or Ford bellhousing. The Ranger will allow the 3 speed and stock transfer case to remain in their stock location. It also provides the additional length for an excellent engine location. The unit is available in either a 27% overdrive or 17% underdrive. When using this unit, the input shaft may need to be slightly shortened.

Ranger Torque Splitter
Chevy V8 conversion:
P/N 760001M-27 - 27% Overdrive
P/N 760001M-UD 17% Underdrive
P/N 713124 - Motor mounts
P/N 716022 - Rear Crossmember
P/N 716222 - Special Retainer

Ranger Torque Splitter
Ford V8 conversion:
P/N SPECIAL - Ford O.D. case with a Chevy rear plate
P/N 713002 - Motor mounts
P/N 716022 - Rear Crossmember
P/N 716222 - Special Retainer

(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

RETAINING THE STOCK 4 SPEED TRANSMISSION:

The first Toyota 4 speed transmission was introduced in 1974, with a transmission length of 12". The design of this transmission was such that an adapter plate would not be compatible to mate the transmission to a stock GM or Ford bellhousing. This particular transmission requires two dowel pins for alignment between the 4 speed and stock Toyota bellhousing. The input shaft length was not long enough to allow for any type of adapter plate.

In order to assemble the 4 speed transmission to a Chevy or Ford V8, it was necessary to manufacture a completely new bellhousing. Since Ford V8 conversions are not as popular as the Chevy V8, we only manufacture a full bellhousing for the Chevy V8 engine. The bellhousing we manufacture is specially machined to accept the Land Cruiser 4 speed dowel pin alignment to assemble it directly to a Chevy V8 or GM 292 in-line 6 cylinder engine. This bellhousing can only be used with the later model Chevy engines that have the starter motor mounted directly to the engine block. The bellhousing is not compatible with the 265 model GM V8 engine.

When using this bellhousing, all of the original clutch controls can be retained. The original ball pivot, release arm, release bearing collar, and slave cylinder are all remounted to the conversion bellhousing. The new bellhousing will permit the use of a 168 tooth GM flywheel, along with an 11" pressure plate assembly. In order to make sure that the slave cylinder has the proper clutch throw, we recommend only the Centerforce 11" clutch pressure plate, **P/N CF165473S**. With each new bellhousing kit, we include a new release bearing that is identical to the late model Land Cruiser 4 speed release bearing. By using this large release bearing with the Centerforce pressure plate, the slave cylinder will have sufficient travel for proper clutch disengagement.

Our bellhousing will require the transfer case to be relocated forward a minimum distance of 3-1/2". This relocation is required for clearance necessary around the Chevy V8 distributor. This kit also requires driveshaft & floorboard modifications. Be aware that placing the engine too far forward can cause excessive clearance issues with the 4 speed shifter and heater vent. Also, most shifter handles will need to be modified to provide heater vent clearance.

Be sure that the original dowel pins from the stock Land Cruiser bellhousing are reused with our new housing. *FAILURE TO USE THESE DOWEL PINS WILL CAUSE SEVERE TRANSMISSION AND CLUTCH MISALIGNMENT PROBLEMS.*

Chevy V8 conversion kit 713024-EK: *(This kit should not be used on FJ60 vehicles)*
(This kit consists of the following items which are also available individually.)
P/N 712532 - Bhsg. adapter
P/N 713124 - Motor mounts
P/N 716022 - Crossmember
P/N 716023 - Temperature bushing
(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

To retain the stock 4 speed, another option is to use a *Mark's 4WD* adapter kit. They offer conversion bellhousings for both the Chevy and Ford engines. Their bellhousing adapter is 4-7/8" thick and mounts directly onto the engine side of the original Land Cruiser bellhousing. Although the Mark's kits are slightly more expensive than our design, their special housings provide a very distinct advantage:

The biggest advantage of their kit is that it retains the drivetrain in the stock location, eliminating any relocation of the transfer case. The original driveshafts, transmission, and transfer case location all remain unchanged. The kit is supplied with a new bellhousing mount for the passenger side and three spacers that must be used between the bellhousing and the original bellhousing support on the driver's side. By using these components, you are able to move the engine centerline back to 12". Both of the Mark's 4WD kits retain the stock clutch linkage & slave cylinder and includes a new release bearing.

MARK'S 4WD ADAPTORS

Chevy V8 conversion kit 713025-EK*:

P/N 712525 - Bhsg. adapter
P/N 713124 - Motor mounts
P/N 713038 - Bhsg. mount

MARK'S 4WD ADAPTORS

Ford V8 conversion bellhousing:

P/N 712526 - Ford bellhousing adapter (shown above)
P/N 713002 - Motor mounts
P/N 713038 - Bhsg. mount

*The 713025-EK kit consists of the following items which are also available individually.
(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

The Ranger Torque Splitter can also be used when retaining the stock Land Cruiser 4 speed. This unit acts as the adapter between the 4 speed and the GM or Ford bellhousing. The Ranger will allow the 4 speed and stock transfer case to remain in their stock location. It also provides the additional length for an excellent engine location. The unit is available in either a 27% overdrive or Rock Crawler 2:1 reduction. The rear plate on this unit bolts directly to the 4 speed and uses the front input shaft bearing for proper alignment.

NOTE: On some Land Cruisers (1987 & newer), we've found that Toyota had used a few odd size input shaft bearings. Since our rear plate requires proper indexing over this front bearing, a special rear plate may be necessary. If your vehicle is within this year series, you will need to measure the diameter of the front input shaft bearing. The measurement that our rear plate is machined at is 3.544". If your bearing measures larger than this (3.625" - most common), a special rear plate can be machined for your application.

Ranger Torque Splitter

Chevy V8 conversion:

P/N 760024M-27 - 27% Overdrive
P/N 760024M-UD- 17% Underdrive
P/N 713124 - Motor mounts
P/N 716022 - Rear Crossmember

Ranger Torque Splitter

Ford V8 conversion:

P/N SPECIAL - Ford O.D. case with a Toyota rear plate
P/N 713002 - Motor mounts
P/N 716022 - Rear Crossmember

(For the recommended clutch requirements, refer to the Clutch Components section of this manual)

LAND CRUISER 5 SPEED TRANSMISSIONS:

These transmissions are only used in Australia and Japan, but we've also seen a few come out of Canada. Some of the specialty Land Cruiser companies also import these 5 speeds. This transmission is identical to the 1984 & Up FJ60 4 speeds seen here in the U.S. The factory spacer adapter actually was designed to hold the 5th gear assembly. These transmissions are a great upgrade for FJ60s originally equipped with a 4 speed. The adapters we manufacture for the 4 speed will also work on this application.

NOTE: Vehicles (Nov. 1984 & Up) equipped with a 3F engine had a transmission bolt pattern that was rotated clockwise 7 degrees. This was done to improve front driveshaft clearance. When using one of our bellhousing adapters or the Ranger Torque Splitter on vehicles originally equipped with a 3F engine, this rotation will cause some installation difficulties.

LAND CRUISER AUTOMATICS (A44OF & A44OL):

These transmissions were found in both the FJ60, 62, 80 & 100 series Land Cruisers. They were found coupled to either a 3F or Diesel engine. Mark's 4WD offers kits to fit either an early or late model Chevy V8 directly to these transmissions.

The Land Cruiser automatic transmission is quite capable of handling the torque of most V8 engines. The adapter housing for the automatic is similar to that of the 4 speed housing. The new adapter housing will space the engine away from the firewall, eliminating any need to modify the firewall or reposition the original automatic transmission. The only area that we are not familiar with is the computer control requirements of these automatics when coupling to a Chevy block. The early automatic found in the FJ60 were non-computer controlled transmissions. The FJ62 may or may not be computer controlled, and the FJ80 had a stand along computer control system. The two input readings that the FJ80 transmission computer requires are the throttle position sensor reading and the tachometer output reading. We offer an interface tachometer kit which is listed on **Page 12**.

This kit uses a GM standard 168 tooth flywheel, as well as a standard GM starter motor. A GM flexplate (used for most GM automatics) is not sufficient for this conversion. The kit comes with a specially machined crank adapter that bolts to the rear of the GM flywheel. This crank adapter changes the rear crank shaft bolt pattern from the GM configuration to a standard Land Cruiser pattern. This allows the custom flexplate to be bolted to the rear of the Chevy engine and uses the original Toyota torque converter. *NOTE:* When ordering one of these kits, be sure to specify the year of the block since there are two Chevy crank patterns (depending on the year of the block). The FJ80 & 100 series also requires a tachometer interface kit, **P/N 716242**.

These kits can be ordered under:

P/N 712535-A - Land Cruiser FJ60 & 62 Automatic to GM V8 1985 & earlier
P/N 712535-B - Land Cruiser FJ60 & 62 Automatic to GM V8 1986 & up
P/N 712535-C - Land Cruiser FJ80 & 100 series Automatic to GM V8 1985 & earlier
P/N 712535-D - Land Cruiser FJ80 & 100 series Automatic to GM V8 1986 & up

Kits come complete with an adapter housing, crank adapter, custom flexplate, dust cover plate, oil & temperature sending adapters, and necessary hardware.

LAND CRUISER AUTOMATICS (A442F):

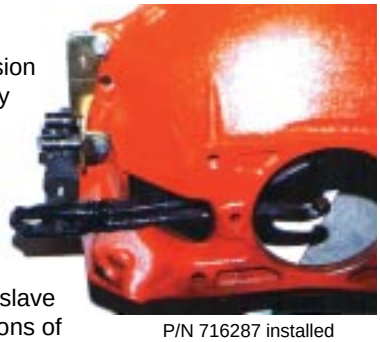
These transmissions were found in both the FJ80 and the 100 series Land Cruisers. They were coupled to a 4.5L 6 cylinder. At this time there are no bellhousing adapters offered for this automatic. We offer a few transfer case adapters to couple the GM automatics to the transfer case found in these vehicles.

CLUTCH COMPONENTS

Whether you are retaining your stock transmission (3 speed, 4 speed or 5 speed), or upgrading to a new GM or Ford manual transmission, clutch considerations will need to be addressed.

SLAVE CYLINDER BRACKETS:

We highly recommend that you retain the stock Land Cruiser slave cylinder. Many of our conversion bellhousings have provisions for this stock slave cylinder. Some of our conversion kits supply a bracket to retain this slave cylinder. The stock Ford bellhousing is the only application that we do not offer any components for to remount this slave cylinder.



P/N 716287 installed

When retaining the stock 3 speed or installing a new Chevy transmission and/or using the Ranger Torque Splitter, the use of a stock GM bellhousing is required. GM bellhousings have been produced in both cast iron and aluminum. Our bracket, **P/N 716287**, will fit either bellhousing. This bracket positions the stock Land Cruiser slave cylinder to line up with the GM release arm. Due to the variations of GM bellhousings, this bracket may require some modifications to obtain proper fit. It may also be necessary to modify the length of the stock slave cylinder push rod.

P/N 716288

P/N 716287 - Chevy bellhousing to Land Cruiser slave cylinder bracket
P/N 716176 - Chevy release arm

When using either our 4 speed conversion bellhousing or the Mark's 4WD bellhousing adapter, provisions have been provided to retain the stock Land Cruiser slave cylinder. No additional brackets should be necessary.

When installing a NV4500 transmission, a conversion bellhousing to adapt the NV4500 to a Chevy engine may be required. The bellhousings we manufacture do not have provisions to mount the stock Land Cruiser slave cylinder. These bellhousings will require the following slave cylinder bracket:

P/N 716288 - Conversion bellhousing to Land Cruiser slave cylinder bracket
P/N 716286 - Vortec V8 conv. bellhousing to Land Cruiser slave cylinder bracket

SLAVE CYLINDER:

We offer a new replacement Land Cruiser slave cylinder, **Part No. 716119**. This stock Land Cruiser component comes with both the slave cylinder and the hose. The slave cylinder and hose can also be purchased separately.

P/N 716119 - L/C Slave cylinder and hose assembly
P/N 716119S - L/C slave cylinder only
P/N 716119H - L/C slave cylinder hose only

Slave cylinder installed on P/N 712532 bhsg.

When using the Toyota slave cylinder with a GM clutch release arm, we've found that the GM clutch wedge, **P/N 716139** (GM# 3765322), works excellent for keeping the push rod in its proper location. The hole in the clutch wedge will need to be enlarged slightly for the Toyota push rod.

Slave cylinder installed on P/N 712525 bhsg.

CLUTCH RELEASE BEARINGS:

The release bearing used in your conversion will depend on the type of transmission that you are using. It will also depend on the clutch assembly that you have chosen. The release bearings listed in this section are all recommended to be used with the Centerforce clutches listed on the following pages. *If clutch components of other manufacturers are used, we cannot guarantee proper clutch operation.*

On Chevy engine conversions using a *stock Chevy bellhousing or NV4500 conversion bellhousing*, we recommend release bearing **P/N 716316**. This bearing is a 2-piece assembly which uses a large diameter, radius face bearing resembling the stock Land Cruiser bearing. We prefer to use this assembly, since the stock Land Cruiser slave cylinder has a short release. This bearing

allows for a quicker release than a standard GM bearing. This bearing is designed to fit the stock GM release arm.

On Chevy engine conversions retaining your *stock Toyota 4 speed*, the stock release bearing is a 2-piece setup - a collar that connects to the release arm and the bearing. The stock bearing must be removed from the collar and **Part No. 716314** installed in its place. This bearing diameter has a radius face and is similar to the stock Land Cruiser bearing. This bearing is supplied in our kit as well as the Mark's 4WD adapter kit. On the inside of the bearing collar, you will find a small cavity that must be packed with grease to ensure smooth clutch operation.

On *Ford engine conversions* retaining the stock Toyota 3 speed transmission or upgrading to a Ford transmission, release bearing **P/N 716311** will be required. When retaining your stock Toyota 4 speed with a Ford engine conversion using the Mark's 4WD adapter kit, the kit will be supplied with release bearing **P/N 716313**. Both these bearings are flat-face and are designed to work with the Centerforce high diaphragm pressure plate.

Stock Land Cruiser 4 Speed Conversions:

1974 model Land Cruiser owners will be required to purchase a new release bearing collar. The original collar is too small to be used with the new release bearing that is being provided in the 4 speed conversion kits. On these early 4 speed applications, you will need to purchase the two Toyota part numbers listed below.

Toyota# 31231-60070 - Bearing Collar (2.062" Dia.)
Toyota# 31232-60010 - Bearing Collar Clips (2 Required)

CLUTCH RELEASE LEVERS:

When using a standard GM bellhousing, we recommend the stock GM cast iron release arm, **P/N 716176** (GM# 15687296). On Ford applications, the stock release lever from your Ford bellhousing should be used. Applications retaining the stock 4 speed using our bellhousing or Mark's 4WD bellhousing will retain the stock Land Cruiser release arm. On a Land Cruiser 4 speed conversion, the lever will protrude on the passenger side. When using a GM or Ford bellhousing, the release lever will protrude on the driver's side.

In order for the Toyota slave cylinder to properly disengage the GM release arm, you must fit the Toyota push rod into the inner slot of the release arm. This will provide additional movement of the clutch release lever.

Replacement Parts for a Land Cruiser stock 4 Speed:

Toyota# 31204-60030 - Release Arm
Toyota# 31236-60020 - Ball Pivot
Toyota# 31126-60021 - Rubber Boot

PILOT BUSHINGS:

The pilot bushing that supports the tip of the transmission shaft should be inspected for excessive wear. On Chevy V8 conversions, the original GM pilot bushing diameter will require no changes since it is compatible with the Toyota 3 & 4 speed transmissions. On Ford V8 conversions to the stock Toyota 3 & 4 speed transmissions, you will need to install the new pilot bushing supplied with your kit. When using a GM 4 speed transmission with the stock Land Cruiser 6 cylinder engine, you will need to install our special pilot bushing into the 6 cylinder crankshaft.

P/N 716170 - Pilot Bearing (GM engine to Toyota 3 & 4 speed transmissions)
P/N 716153 - Pilot Bearing (Ford engine to Toyota 3 & 4 speed transmissions)
P/N 716157 - Pilot Bearing (Toyota 6 cylinder to GM transmission)

CLUTCHES & RELATED COMPONENTS:

When converting to a V8 engine and using an aftermarket clutch assembly, you may have difficulty attempting to get your clutch to release properly. On Toyota Land Cruiser conversions, you must use a specific pressure plate and clutch disc. With the help of Centerforce Clutches, we have developed a clutch assembly that operates perfectly with the original Land Cruiser slave cylinder and master cylinder. This pressure plate is a short throw, quick ratio, diaphragm-type pressure plate that requires very little slave cylinder movement. We stock the Centerforce clutches as standard items and they can be obtained from us directly. If the correct clutch is not used, you may experience inadequate clutch disengagement.

Under no circumstances should you *EVER* reuse the original Toyota clutch disc with these recommended pressure plates. Be sure to align the clutch disc with the pilot bearing prior to assembling the pressure plate to the flywheel. A clutch alignment tool is available for this procedure from most auto part stores. In the 20 plus years that we have been performing V8 engine conversions into Toyota Land Cruisers, the most common problem that we encounter is that the customer does not select the proper clutch assembly for use with the Toyota slave cylinder. For your clutch to operate properly, please verify that the correct clutch components have been selected.

We highly recommend using the Centerforce clutch components listed below. This combination is proven to work with the Land Cruiser hydraulic clutch system. *If clutch components of other manufacturers are used, we cannot guarantee proper clutch operation.*

Chevy engines:
P/N CF165473S - Centerforce 11" low profile pressure plate
P/N 383735 - Centerforce 11" clutch disc
P/N CF700120 - Centerforce 168 tooth flywheel (up to 1985 blocks)
P/N CF700160 - Centerforce 168 tooth flywheel (1986 & up blocks)



Chevy Vortec engines:
P/N 712500T - 11" Flywheel and clutch assembly kit

Ford engines:
P/N CF260000 - Centerforce 11" pressure plate (3 sets of 2 bolt pattern)
P/N CF360049 - Centerforce 11" pressure plate (6 bolts evenly spaced)
P/N 281226 - Centerforce 11" clutch disc

L/C 6 cylinder:
P/N CF043518 - Stock L/C 6 cylinder clutch assembly for Chevy transmissions
P/N CF315518 - Stock L/C 6 cylinder clutch assembly for Dodge H.D. NV4500 transmissions
(These stock L/C clutches fit the stock flywheels from the years of August 1974 through 1987). On earlier applications, you must change the flywheel and clutch fork to use these clutch assemblies.

Photo courtesy of William Leaman and taken at Guardrail hill in Tellico, TN.
Application using our NP435 adapter kit & Ford motor mounts.

LAND CRUISER TRANSFER CASES

We offer conversion components for the 1963 to 2002 Land Cruiser models. Between these years, several different style transfer cases have been designed for use in Toyota Land Cruisers. It is extremely important that you know which model you have before switching transmissions. The Transfer Case Adapter Selection Chart in this section highlights the various transmission-to-transfer case options. Some of the newer Land Cruiser transfer case adapters are not listed on the adapter chart, but the adapters are listed under the transmission options that follow.

Pre-1963 Transfer Cases: Early Land Cruisers produced before 1963 used a small cast iron single speed transfer case. There are no adapters available for these early models. We suggest that you purchase a transfer case from a later model Land Cruiser.

1963 to 1973 Transfer Cases: Between the years 1963-73, Toyota began equipping Land Cruisers with a 3 speed transmission and a one-piece aluminum transfer case. This transfer case has a low ratio of 2.12:1. The input side of this transfer case has two gears: a main drive gear and a P.T.O. gear. Both of these gears have 10 internal splines and a diameter of 1.375". These cases are equipped with a vacuum style shifter for operating the transfer case controls. Later on, this transfer case was switched to a mechanical-type shifter linkage, which eventually evolved into the later model 4 speed linkage design.

Stock 3 speed & vacuum contolled transfer case

When using one of our transfer case adapters, our output/spud shaft is shorter than your original output shaft. The spacer and tab washer will not be reused with our adapter kits. The photo (right) shows the proper assembly on one of our shafts.

When replacing the stock 3 speed transmission, you will lose the stock bellhousing mounts that supports your drivetrain. Refer to the Crossmember subheading in the Engine Conversion section for your options.

1974 to July 1980: Beginning in 1974, Toyota started using a 4 speed manual transmission. The transfer case still had two gears on the input, but the input gear was changed to 16 splines and was 1.259" in diameter. The transfer case low gear ratio was a 1.95:1. This transfer case was only available with a mechanical linkage. The transfer case bolt pattern was the same as the earlier 3 speed aluminum models.

When using one of our transfer case adapters, our output/spud shaft is exactly the same length as your original output. The gears and spacer will all be reused, but the old rear nut and washer will need to be replaced (items provided in kits).

When replacing the stock 4 speed transmission, you will lose the stock bellhousing mounts that supports your drivetrain. Refer to the Crossmember subheading in the Engine Conversion section for your options.

1963 to July 1980 Transfer Case Upgrade: Advance Adapters is proud to introduce the Orion transfer case. This new 4.0:1 or 3.0:1 ratio and cast iron case design is sure to capture the attention of the Land Cruiser enthusiast. Advance Adapters is not the manufacturer of this new transfer case; however, we are the exclusive distributor.

The Orion kits come with a new cast iron case, four new gears, a new larger cluster pin, and a complete gasket bearing and seal kit. This transfer case, however, is not a complete 'ready-to-bolt-in' unit like the Atlas. The transfer case does require the use of your stock front and rear output shafts and housing. The new unit also requires the use of the stock P.T.O. and inspection covers.

The unit can be used to replace either the stock 3 or 4 speed transfer case. The new case is exactly the same size and bolt pattern as the stock Land Cruiser transfer case, so no driveline modifications are required. It will fit to any transmission that a stock transfer case was coupled too. For additional details on the Orion see **Pages 37-41**.

August 1980 to 1989: In August of 1980, major drivetrain changes occurred in both the FJ40 and FJ60 models. The transfer case design was changed to a split-case configuration with a 19 tooth internal spline on the input gear. The low gear ratio was 2.27:1 in these transfer cases. There are three different models of this transfer case; however, the differences are very minor. The transfer case adapters we offer will work with all three models. See **Page 27** for low gear options for this transfer case.

When using one of our transfer case adapters, our output/spud shaft is exactly the same length as your original output shaft. The gears and spacer will all be reused, but the old rear nut and washer will need to be replaced (items provided in kits). The photos below show the proper assembly.

REPLACING THE STOCK 4 or 5 SPEED MANUAL TRANSMISSION: The crossmember is located under the transmission. When installing a different transmission, this mount may need to be relocated or replaced. This depends on the transfer case adapter. Some of our adapters have provisions to retain the stock mount while others require a custom one to be fabricated.

REPLACING THE STOCK AUTOMATIC TRANSMISSION: The stock crossmember was bolted under the stock adapter housing. None of our adapters have the provisions to use this crossmember without modifications. We have not seen a great deal of these transmissions being replaced and, therefore, cannot offer much assistance in this area.

NOTE: Our rear transfer case support, P/N 716022, will not work on a 19 spline split transfer case.

1990 to 2002: In 1990, a new transfer case model was introduced, the HF2A. This transfer case is a full time 4WD unit. We import a few transmission adapter housings from Mark's 4WD Adaptors that retain this transfer case. Most applications do not require driveshaft modifications, nor do they require crossmember modifications. The adapters we carry for this transfer case are designed around replacing the A442F automatic transmission only.

TRANSFER CASE CONSIDERATIONS:

Optional transfer case equipment such as overdrives (Fairy Overdrive) and/or P.T.O. winches *WILL NOT* be compatible with any of our transfer case kits. The one exception to this would be the P.T.O. winch that bolts on the driver's side of the transfer case.

SEALED BEARING (Early 10 spline & 16 spline transfer cases only): Most of the adapters on the Transfer Case Selection Chart come with a new 307 sealed bearing. On some of the manual transmission adapters, this bearing is not provided because the two gear boxes use the same type of lubrication. If you would rather isolate your gear box fluids, a sealed bearing can be purchased under **P/N 716301**.

BOLTS FOR TRANSFER CASES: The stock Land Cruiser transfer case bolts are metric. Most of the transfer case adapter housings we manufacture are drilled and tapped for 7/16"-14 fasteners. These bolts are a little smaller in diameter than the stock metric bolts; however this will not cause any problems when fastening the units together. We also produce a few adapter housings that retain the stock metric fasteners.

NYLON LOCKNUT: We supply a new 7/8"-16 nylon lock nut and flat washer for your conversion. When installing one of our transfer case adapters, this nut secures the drive gear and P.T.O. gear onto the transmission output shaft or our spud shaft. This nut is a standard item that is used on most Jeep transfer cases. It does not require the use of a cotter pin to lock the nut in position. The nut must be replaced every time it is removed from the shaft. Nuts that are reused could possibly loosen up after continual use. This nut must be used with the new flat washer. The nut must be torqued to a maximum of 75 ft./lbs. in order to prevent bearing pre-load. This nut replaces the bushing, tabbed washer, and lock nut used on the original transmission and transfer case assembly. On some of the newer transfer cases, the adapter kit will sometime reuse the stock locknut that was originally equipped on the transfer case.

TRANSFER CASE LINKAGES

The *3 speed* transfer case vacuum shift linkage rod will need to be repositioned so that the pivot point will be on the inside of the frame rail and directly below the firewall linkage rod. The metric threaded bracket (supplied with the 3 speed kits) will permit you to bolt the two rods together and then locate the bracket in a neutral position to the two rods. We do not recommend the pivot location be installed on the engine. This pivot bracket, **P/N 716024**, is only required on vacuum controlled transfer cases. We have found that most customers prefer to update their transfer case to the mechanical shift linkage.

3 & 4 Speed Mechanical Linkages:

The stock Land Cruiser 3 & 4 speed transfer case linkages used a pivot stud that mounted to the stock 3 or 4 speed transmission. When changing to a new transmission, we offer many brackets that allow the mounting of this pivot stud. Due to the various widths of conversion transmissions, there may be some modifications necessary to the shifter linkage to obtain proper shifting. Most of the brackets we manufacture do not allow you to retain the stock sheet metal gating shift guide.

The mechanical linkages on late model 3 speed and 4 speed transfer cases are all in a relative location from the front of the transfer case. If you are using an adapter that requires the relocation of your transfer case, a new hole through the floorboard will be required for your transfer case linkage. On some transmission retrofits (such as TH400 or 700R), we have had customers bend the transfer case shift handle to fit back through the original hole in the floorboard to alleviate this floorboard modification (photo right).

On some engine conversions, we have seen the mechanical shift linkage location end up being directly beneath the passenger side seat. This is usually caused by the engine location, which is sitting too tight against the firewall. The only remedy is to modify the shift handle of the transfer case control lever so that it comes forward of the seating area. Before final engine and drivetrain locations are set, we recommend test fitting your transfer case linkage.

The 1975-80 FJ40 vehicles used a different type of mechanical transfer case linkage than the earlier Land Cruisers. The early mechanical linkage used a bellcrank system to operate the high/low shift lever. The 1975-80 linkage simplified the shifter by eliminating the bellcrank and having a rod fasten directly to the High/Low lever, thus making this linkage easier to install and better suited for the transfer case. Whenever possible, we recommend using this later model designed mechanism for an easier installation.

Early model stock 3 & 4 speed Land Cruiser transfer case linkage

In August 1980, the transfer case linkage on the FJ40s and the newer FJ60 vehicles (equipped with the split-case aluminum transfer case design) used a pivot pin similar to the 1975-80 four speed design. Most of our transfer case linkage brackets were not designed for the split-style transfer case; however, most of our brackets can be modified to accommodate this linkage. Before installing the drivetrain back into the vehicle, you should test fit your transfer case linkage and make the necessary modifications. Make sure that your linkage properly shifts into all ratios and that the installation into the vehicle permits the transfer case lever to properly engage and disengage 4WD.

GM automatic to Split-case transfer case linkage pivot bracket

Land Cruisers originally equipped with an automatic were also equipped with a vacuum actuator for the stock transfer case. This transfer case should not require any additional linkage.

Split transfer case linkage

3 & 4 Speed Mechanical Linkages Brackets:

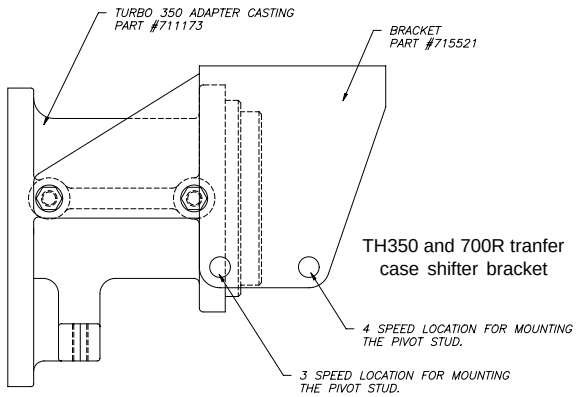
The pivot shaft for these mechanical transfer case linkages was located on the side of the stock transmission. This pivot shaft location is roughly 2" different between the 3 speed transmissions and the 4 speed transmissions. The 3 speed linkage pivot was closer to the front of the transfer case than that of the 4 speed. The brackets listed below are mainly designed around the 4 speed pivot position. When using one of our brackets listed below on a vehicle previous equipped with a 3 speed, the transfer case bracket may require some modifications to fit your linkage.

The 10 spline (3 speed transmission) transfer case used either a vacuum or mechanical linkage. On the transfer case adapter kits replacing the stock 3 speed transmission, a shifter bracket for both of these types of linkages is not supplied in our adapter kits. *On 10 spline transfer cases that are a mechanical linkage, you can call and receive a bracket at no charge. (Note: These brackets are designed around the 4 speed applications. Some modifications to your stock linkage may still be necessary).* On vacuum operated linkages, we offer pivot bracket **P/N 716024**.

The 16 spline (4 speed transmission) and the 19 spline (split-case) transfer cases are both mechanical linkages. Most kits for these transfer cases include a transfer case shifter bracket to retain the mechanical linkages. Some problems retaining these linkages do occur. The most common problem is the mode lever (2WD to 4WD shifter). Due to the various transmission widths, this portion of the shifter sometimes requires modifications to fit properly into the transfer case Mode shifter shaft.

To simplify the transfer case shifter mechanism we have designed a new adjustable twin stick Land Cruiser transfer case shifter. Our new linkage kits still require the pivot brackets listed below, but allow you a cleaner installation with a few additional options. The following page describes these new twin stick shifter kits.

P/N 715520 - TH400 linkage bracket
P/N 715521 - TH350/700R linkage bracket
P/N 715527 - SM420 linkage bracket
P/N 715530 - SM465 linkage bracket
P/N 715532 - NV4500 linkage bracket
P/N 715539 - NV4500 linkage bracket (19 spline T/C)




TH400 transfer case shifter bracket


SM465 transfer case shifter bracket


SM465 transfer case shifter bracket


SM420 transfer case shifter bracket


Grinding required on an SM420 case for shifter linkage clearance


NV4500 transfer case shifter linkage

Toyota Land Cruiser Transfer Case Twin Stick Shifters:

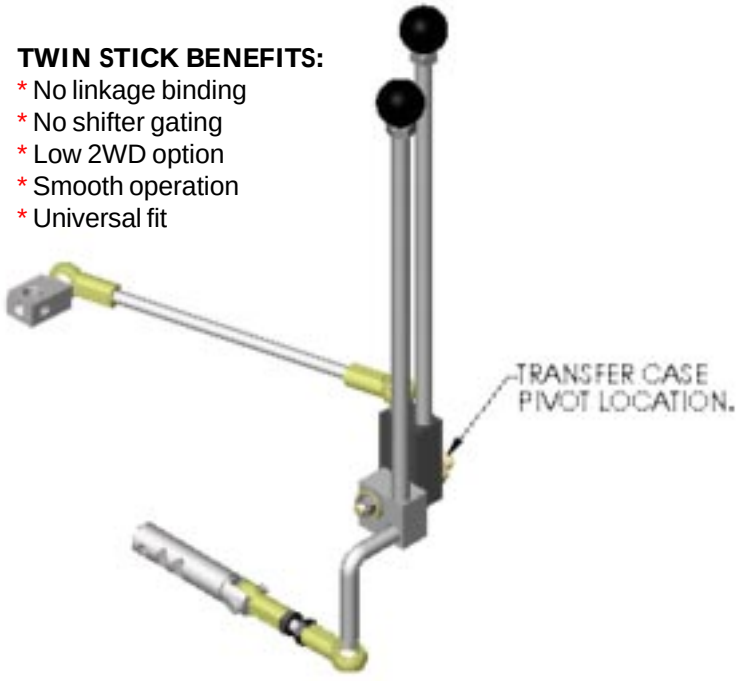
The twin stick shifter was primarily developed to reconnect the transfer case linkage after installing one of our automatic adapter kits. The transfer case gets relocated further back which required shifter modifications. This is where the development of the twin stick originated. Once the concept and the first linkages were manufactured, the integration of the twin stick to our entire Land Cruiser product line along with a stock vehicle was initiated. As we started looking into the various applications, we soon realized the numerous configurations the twin stick kits would have to have. We currently produce five different versions of our twin stick kit. Kits exist to fit various drivetrain combinations. The differences in these kits are mainly the shift handle configuration and the rod lengths that shift the Mode and Range levers on the transfer case. Even though we produce five different kits, some kits will still require some bending of the shift handles for a proper fit into the vehicle; and once these handles are bent they will also require some welding. Other kits may also require some shortening of the Mode rod and Range rod. The kits listed below fit both 3 speed and 4 speed transfer cases. Note that when replacing a vacuum operated shift mechanism with our twin stick linkage, you will be required to purchase some additional stock components. The following are the most popular conversion applications:

KIT NUMBER	Applications	Welding req'd.
P/N 715571	1) Chevy V8 with a SM420 or SM465 transmission and our transfer case adapter 2) Chevy V8 with the stock 4 speed	YES
P/N 715572	1) Stock 6 cylinder with stock 4 speed	NO
P/N 715573	1) Chevy V8 with TH350, 700R, & NV4500 transmission using our transfer case adapter	YES
P/N 715573B	1) Chevy V8 with a TH400 transmission using our transfer case adapter	YES
P/N 715574	1) Stock 6 cylinder with a SM420 or SM465 transmission.	NO

Each kit requires the installation of a new Mode shaft which is part of the kit. These kits include a new pivot shaft and all new linkage components. The shift handles are not painted to allow you the option to do slight modifications or welding if your kit requires such.

TWIN STICK BENEFITS:

* No linkage binding
* No shifter gating
* Low 2WD option
* Smooth operation
* Universal fit



The Toyota twin stick kits come with a set of black knobs that are not labled. We do offer aluminum shifter knobs for the Toyota twin stick kits. These knobs are sold separately under Part No. 715584 for plain Aluminum or P/N 715584-AA for Black Anodized.

FRONT DRIVESHAFT CLEARANCE: Front driveline clearance should be considered when installing a GM automatic, a NV4500 or a SM420 transmission. Normally, proper clearance can be achieved by offsetting the engine and drivetrain 1/2" to 1" towards the driver's side. When using a transmission such as a 700R, this offset may still not provide enough clearance. We offer a front output transfer case yoke assembly that will take the standard 4-1/4" to 4-1/2" diameter flange yoke and reduce it to 3-1/2". This kit comes with a new flange yoke, companion yoke, bearing cross, slip shaft assembly, and dust cap. Using this kit will provide the additional clearance necessary for your conversion.

Land Cruiser transfer cases have used three different front output spline over the years. The early transfer case used a coarse 10 spline, the 1978 to 1980 transfer case used and 27 fine spline front output, and the late model used a 19 spline front output. The kits and descriptions below will help identify the correct kit for your application. We recommend that you verify your spline count.

P/N 716370 - Coarse spline yoke (10T) for June 1977 & earlier Land Cruisers
P/N 716371 - Fine spline yoke (27T) for July 1978 to July 1980 Land Cruisers
P/N 716369 - Split style transfer case (19 spline yoke) for August 1980 to 1989 Land Cruisers

STOCK TUBULAR CROSSMEMBER: When installing some of the longer transmission assemblies, the transfer case must be moved rearward. The stock emergency brake housing located on the back of the transfer case will likely interfere with the stock tubular crossmember. In most cases, this crossmember must be relocated. We recommend that you cut this tubular crossmember as close to the inner frame rail as possible. This will allow the crossmember to be relocated further back and then rewelded to retain the structural integrity of the frame rails.

TRANSFER CASE REBUILD KITS: We offer transfer case rebuild kits that include the necessary seals, gaskets, and bearings for both 3 & 4 speed transfer cases. When performing an engine or transmission swap, it is usually a good time to inspect and replace possible wear items. These kits can be ordered under **P/N 401310** (3 speed kit) & **P/N 401416** (4 speed kit).

TRANSFER CASE OUTPUT SHAFTS: We offer new transfer case output shafts. We carry these shafts for both the Orion transfer cases and for worn out stock units. We have found that most stock transfer case output shafts have excess wear on the gear journals. These new shafts provide a closer tolerance install for the Orion gears. **P/N O40500** (T/Cs up to 4/1975) & **P/N O40501** (T/Cs 4/1975 to 7/1980)

TRANSFER CASE STEPPED THRUST WASHERS: The thrust washers are an important and critical area when installing transfer case gears on your Toyota shaft. The first step is to inspect the transfer case output shaft for excessive wear and to make sure the gears fit the shaft. If your shaft is worn excessively, the gear will be a loose fit and/or will be able to wobble. If this is the case with your shaft, replace it. The end play of the gear on the shaft must be set. The shaft and gears should be set at .008"-.012" of end play. These thrust washer are stepped. One side has a recess of .015" - .017" and the other side of the washer has a .008" - .010" recess. By using one side of the washer or the other or by using your stock washers, you should be able to get close to the required tolerance. On some stock applications, the end play ends up to be close to .030". **P/N O60080**

FJ60 & FJ62 TRANSFER CASE LOW GEARS: We offer several gearing options for the 19 spline split transfer case. We still offer the gear sets from Marks 4wd in Australia. They make two ratios of gear sets for the FJ60 transfer cases August 1980 to January 1990. The first set has an 8% overdrive and a 2.81:1 low range, and the second has an 8% underdrive and 3.05:1 low range. We now offer a third gear set that is a 4.0:1 low ratio and retains the 1.1:1 high range. All gear sets require a small amount of internal case modifications to clear the new gear diameters; however, the installation of any gear set *does not* require any floorboard, driveshaft, or crossmember modifications.

The FJ60 & FJ62 used two different cluster pin diameters on the idler gears: 34mm cluster pin transfer cases were used from August 1980 to October 1985, and 38mm cluster pin transfer cases were used from October 1985 to January 1990.

716920 - 8% overdrive and a 2.81:1 low range FJ60s with the 34mm cluster pin
716920UD - 8% underdrive and 3.05:1 low range FJ60s with the 34mm cluster pin
716921 - 8% overdrive and a 2.81:1 low range FJ60s with the 38mm cluster pin
716921UD - 8% underdrive and 3.05:1 low range FJ60s with the 38mm cluster pin
716934A - Idler pin kit for 4:1 low range FJ60s with the 34mm cluster pin(must use 716938 kit also)
716938 - 4.0:1 low range FJ60s with the 38mm cluster pin
401419 - T/C REBUILD KIT

TOYOTA L/C SELECTION CHART GM AND FORD	TOYOTA 3 SPEED TRANSFER CASE 10 SPLINE *1963-1973*	TOYOTA 4 SPEED TRANSFER CASE 16 SPLINE *1974- JULY 1980*	TOYOTA 4 SPEED T/Case 19 SPLINE *AUG. 1980 to 1990 SPLIT-CASE DESIGN*	TOYOTA L/C HF2A T/C *1990-2002 REPLACING AUTO*
MANUAL TRANSMISSIONS				
GM SM420 4 SPEED 10" CASE LENGTH	50-2601 (3) 4.5" ADAPTER	50-2602 (3) 4.5" ADAPTER	50-2603 (3) 5.00" ADAP.	
GM SM465 4WD 10 SPL. 12.0" CASE LENGTH	50-4601 (3) 4.625" ADAPTER	50-4602 (3) 4.625" ADAPTER		
GM SM465 2WD 35 SPL. 12.0" CASE LENGTH	50-4901 (3) 4.625" ADAPTER	50-4902 (3) 4.625" ADAPTER	50-4903 (3) 5.125" ADAPTER	
FORD T18 4 SPEED 11.87" CASE LENGTH		50-8000 3.75" ADAPTER		
FORD NP435 4 SPEED 10.87" CASE LENGTH	50-6201 (3) 3.325" ADAP.	50-6202 (3) 3.325" ADAP.		
GM NV4500 4WD 31 SPL. 12.375" CASE LENGTH	50-0211 (2,3) 5.87" ADAP.	50-0213 (2,3,5) 5.87" ADAP.	50-0214 (2,3,5) 5.87" ADAP.	
DODGE NV4500 4WD 23 SPL. 12.375 CASE LENGTH	50-0225 (3) 6.375" ADAP.	50-0226 (3,5) 6.375" ADAP.	50-0227 (3,5) 6.375" ADAP.	
DODGE NV4500 4WD 29 SPL. 12.375" CASE LENGTH	50-0222 (3) 6.375" ADAP.	50-0223 (3,5) 6.375" ADAP.	50-0224 (3,5) 6.375" ADAP.	
GM MUNCIE 4 SPEED 10" CASE LENGTH NOTE 6	50-0300 4.5" ADAPTER			
WARNER SUPER T10 4 SP. 9.5" CASE LENGTH (THIN HUB) NOTE 6	50-9501 5.75" ADAPTER	50-9601 5.75" ADAPTER		
WARNER SUPER T10 4 SP. 9.5" CASE LENGTH (THICK HUB) NOTE 6	50-9502 5.75" ADAPTER	50-9602 5.75" ADAPTER		
WARNER SUPER T10 4SP. 9.5" CASE LENGTH NOTE 6	50-9503 5.75" ADAPTER	50-9603 5.75" ADAPTER		
FORD T & C 4 SPEED 10.25" CASE LENGTH NOTE 6	50-2800 1.20" ADAPTER	50-2801 1.20" ADAPTER		
FORD T&C 4 SPEED O.D. 10.25" CASE LENGTH (CAR TRANS)	50-5500 1.20" ADAPTER			
LANDCRUISER 4 SPEED (These kits allow a 3SP T/C to bolt to the 4SP tranny)	50-8800 or 716107			
AUTOMATIC TRANSMISSIONS				
GM TH350 2 & 4WD TRANS. 21.5" CASE LENGTH NOTE 7	50-7300 (1,3) 5.25" ADAP.	50-7400 (1,3,5) 5.25" ADAP.	50-7401 (1,3,5) 6.75" ADAP.	
GM TH400 2 & 4WD TRANS. 24.25" CASE LENGTH(THICK HUB) NOTE 7	50-1500 (3,5) 2.68" ADAP.	50-1600 (3,5) 2.68" ADAP.	50-1700 (3) 3.187" ADAP.	
GM 700R / 4L60 O/D 4 SPEED 23.375" CASE LENGTH NOTE 7	50-8901 (1,3) 6.75" ADAP.	50-8902 (1,3,5) 6.75" ADAP.	50-8903 (1,3,5) 6.75" ADAP.	50-8904A (1,2) 9.17" ADAP.
GM 4L60E TRANS. 23.375" CASE LENGTH NOTE 1, 7	50-0406 (3,5) 6.75" ADAP.	50-0407 (3,5) 6.75" ADAP.	50-0408 (3,5) 6.75" ADAP.	50-0409 (1,2) 9.17" ADAP.
GM 4L60E TRANS. W/REMOVABLE BELLHOUSING NOTE 7	50-0406A 8.25"ADAP.	50-0407A 8.25"ADAP.	50-0408A 8.25" ADAP.	50-0420 (1,2) COMPLETE KIT
GM 4L80E 4WD TRANS. 26.000" CASE LENGTH	50-1501 (3,5) 2.68" ADAP.	50-1601 (3,5) 2.68" ADAP.	50-1701 (3,5) 3.187" ADAP.	50-1702 5.24" ADAP.
FORD C4 3 SP. TRANS. 11.180" CASE LENGTH	50-8200 (3) 7.25" ADAP.	50-8300 (3) 7.25" ADAP.		
NP203 REDUCTION BOX 5.50" CASE LENGTH	50-8801 1.59" ADAP.	50-8802 1.59" ADAP.		

NOTES:

(1) THIS KIT USES A 2WD OUTPUT SHAFT (6" STICKOUT)
(2) THE STOCK OUTPUT SHAFT MUST BE SHORTEND
(3) THESE ADAPTERS COME WITH A NEW SEALED BEARING
(4) THIS KIT REQUIRES THE USE OF A 4L60E KIT ALSO
(5) THESE ADAPTERS ARE SUPPLIED WITH A TRANSFER CASE BRKT.
(6) THESE TRANSMISSIONS ARE SIDE SHIFTED. (con't next column)

(6) BELOW ARE THE SHIFTER BRACKETS,ROD KITS & HURST SHIFTER WE OFFER.

715501	*MUNCIE BRACKET*	*715625*	*MUNCIE ROD KIT(MS)*
715600	*HURST SHIFTER*	*715502-NS*	*SUPER T-10 SHFT.BRKT.*
715626	*MUNCIE ROD KIT(FS)*	*715644*	*OFFSET HANDLE*
715627-NS	*SUPER T-10*		

(7) TO ALLOW ADDITIONAL FRONT DRIVESHAFT CLEARNANCE, WE OFFER 3 YOKE KITS: P/N 716370 (Corse spline), P/N 716371 (Fine spline), P/N 716369 (19 spl.)

TRANSMISSION-to-TRANSFER CASE OPTIONS

When considering an aftermarket transmission, it is important to determine what type of transmission you require. We have listed these options to be use as a guide in making your decision. We suggest that you make your choice depending on the way you drive and the age of your vehicle. We have listed only the transmissions that we offer adapters for. The standard modifications and gear ratios are also included in this section.

AUTOMATIC TRANSMISSIONS:

Both GM & Ford offer many automatic transmissions to choose from. The GM transmissions you can use are the TH350, TH400, 700R, 4L60, 4L60E & 4L80E. The Ford transmission that you can use is the C4 automatic. Automatic transmissions are excellent for 4WD conversions since they eliminate the need for clutch linkage modifications. The added length of the transmission can sometimes be limiting and, at other times, is an asset towards the elimination of driveshaft modifications. The automatics usually are equipped with only a 1st gear ratio of around 2.5 to 3.0-to-1, which does not provide the gear reduction holdback that a manual truck transmission provides. Some of the transfer case adapters will require a new transmission output shaft to be installed.

A cable operated shifter for the automatics is usually recommended. We carry the B & M sport shifter, which can be purchased under **P/N 715680**. We also carry the Lokar automatic shifter which is a rod type linkage. These shifters can be purchased under **P/N 23-T350** (TH350 transmissions), **P/N 23-T400** (TH400 transmissions), **P/N 23-R700** (700R transmissions), **P/N 23-4L60** (4 bolt 4L60E transmissions), **P/N 23-4L60E** (6 bolt 4L60E transmissions) and **P/N 23-4L80E** (4L80E transmissions).

On certain installations, transmission pan modifications may be required for front driveshaft clearance. If these modifications are too extensive, refer to the Front Driveshaft Clearance subheading in the Transfer Case section of this manual.

TH350:

This GM automatic was commonly found stock in vehicles from 1969 to 1981. It was used in both the 4WD pickups and 2WD applications. These transmissions are identical except when it comes to the output shaft stickout length. The 4WD transmission used an adapter to bolt this transmission to its stock transfer case. With this adapter removed, the stock output shaft protrudes from the back of the transmission case approximately 1". On 2WD vehicles, these transmissions used 3 different tailhousings. The lengths of these tailhousings are 6", 9", and 12". The output shafts lengths correspond with these tailhousing lengths.

This transmission is one of the most popular choices for engine and transmission conversions due to the overall length of 21-1/2". The 1st gear ratio is 2.52:1; 2nd 1.52:1, and a 3rd gear ratio of 1:1.

TH350 Adapter Kits: Because of the various output shaft lengths, we have designed our kits around the 2WD TH350 output shaft stickout of 6". If you obtained a TH350 with a longer output shaft or a 4WD version, you will be required to install a new output shaft. If you have the correct stickout on your transmission, you will only be required to shorten the shaft as illustrated on your instruction sheet; however, the adapter kits we offer are also supplied with a modified TH350 output shaft, cut to the proper length. This shaft is provided as a convenience item only and has a limited value of $10 if returned for credit.

P/N 50-7300 - TH350 replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 5.250"
P/N 50-7400 - TH350 replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 5.250"
***P/N 50-7401** - TH350 replacing FJ40/FJ60 Land Cruiser 4 speed (19 spline split-case) Adapter length of 6.750"

*This kit comes with a shifter bracket to connect the transfer case shifter linkage. The housing has provisions to retain the stock transmission crossmember. Relocation of this crossmember on the frame rails may be required.

700R:

This is the first automatic overdrive that GM produced. Introduced in 1982, this transmission is offered in two different bellhousing / case designs (60 & 90 degree bolt patterns). All 4.3 V6 & GM V8 installations will require the 90 degree version. The internal components of these 700Rs can be interchanged if necessary. When this transmission was first introduced, it quickly developed a bad reputation for certain weaknesses. In 1987, GM resolved all of the problems that previously existed.

In the 1990s, the name of the 700R transmission changed to *4L60*. These transmissions are ideal for many conversions

because of the 30% overdrive. The overall length of this transmission is 23-3/8". It has a 1st gear ratio of 3.06:1; 2nd 1.62:1, and 3rd gear ratio of 1:1. This transmission has a computer lockup for the torque converter. We offer a 700R lockup bypass kit, **Part No. 24-700R**.

The *700R & 4L60* are similar to the TH350 with reference to the bolt pattern and the various output shaft lengths. The adapters we offer for these transmissions work in conjunction with the 2WD version output shaft length which has an approximate stickout of 8". If the proper transmission is obtained having this stickout, you will be required to shorten the stock output shaft to work with our adapter housing. The kits for these transmissions also come with a pre-modified shaft that can be installed in your transmission if necessary. This shaft is provided as a convenience item only and has a limited value of $10 if returned for credit.

P/N 50-8901 - 700R / 4L60 replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 6.750"

P/N 50-8902 - 700R / 4L60 replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 6.750"

***P/N 50-8903** - 700R / 4L60 replacing FJ40/FJ60 Land Cruiser 4 spd. (19 spline split-case) Adapter length of 6.750"

*This kit comes with a shifter bracket to connect the transfer case shifter linkage. The housing has provisions to retain the stock transmission crossmember. Relocation of this crossmember on the frame rails may be required.

****P/N 50-8904** - 700R / 4L60 replacing Land Cruiser automatic FJ80 HF2A transfer case. Adapter length of 9.170"

**This kit is machined to accept the FJ80 transmission mounting rubber. The crossmember mounting holes may need to be slotted to allow it to be moved rearward slightly. The transfer case shifter mounts to the top of the adapter housing. The bracket provided in the kit allows for the HI/LOW lever to come though the original hole.

4L60E:

This transmission is identical to the 700R / 4L60 except that it is an electronically controlled transmission. GM manufactures this transmission in two versions. Both of these transmissions use a reluctor ring connected to the GM engine computer for proper shifting points.

The first version of this transmission is a mirror image of the 700R, but it requires a reluctor ring. For these kits we adapt around the 2WD version of this transmission. The kits require the use of a stock 2WD output shaft with the stock reluctor ring. You will be required to shorten this shaft as indicated on the instruction sheet provided in your kit.

This housing is drilled and tapped for the stock reluctor ring pickup. The GM sensor for this housing is included in this kit and allows the proper signal to operate your transmission. These kits provide the bracket necessary for the mechanical transfer case linkage. For the early style 3 & 4 speed transfer cases, rear transfer case mount **P/N 716022** is the only rear support option. The early transfer cases will also require an additional 10mm x 1.5 hole to be drilled and tapped into the adapter housing. This hole has been started on the housing, but is not completed due to the various applications this housing fits. On the later model split transfer case, the adapter has provisions to retain the stock crossmember; however, relocation on the frame rails may be required.

4L60E Integral Design:

P/N 50-0406 - 4L60E replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 6.750"

P/N 50-0407 - 4L60E replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 6.750"

P/N 50-0408 - 4L60E replacing FJ40/FJ60 Land Cruiser 4 spd. (19 spline split-case) Adapter length of 6.750"

***P/N 50-0409**- 4L60E replacing Land Cruiser automatic FJ80 HF2A transfer case. Adapter length of 9.170"

*This kit is machined to accept the FJ80 transmission mounting rubber. The crossmember mounting holes may need to be slotted to allow it to be moved rearward slightly. The transfer case shifter mounts to the top of the adapter housing. The bracket provided in the kit allows for the HI/LOW lever to come though the original hole.

The second version of the 4L60E is found mostly in 1997 & newer GM vehicles. The transmission main case and bellhousing on this version are no longer cast together (now a removable bellhousing design), and no longer had the square bolt pattern on the output side. This version of the 4L60E is now equipped with a hex bolt pattern similar to a TH400. This transmission is 21-7/8" long and is used in both 2WD & 4WD vehicles. We manufacture an adapter plate that bolts to the output side of this transmission, giving you the same overall length as the 4L60E that is listed above.

This kit uses a stock 2WD 4L60E output shaft with a 11" stickout that needs to be shortened. We then take our 51-0405 adapter housing and bolt it to the transmission. This adapter takes the hex bolt pattern on the 4L60E and converts it to a square bolt pattern to make the 4L60E look just like an earlier GM automatic. The stock main shaft should have a reluctor on the shaft which will line up with the sensor hole on our main adapter housing.

(The cut off length on the main shaft is measured with the 51-0405 installed.)

4L60E with Removable Bellhousing:

P/N 50-0406A - 700R / 4L60E replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 8.250"

P/N 50-0407A - 700R / 4L60E replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 8.250"

***P/N 50-0408A** - 700R / 4L60E replacing FJ40/FJ60 Land Cruiser 4 spd. (19 spline split-case) Adapter length of 8.250"

***This kit comes with a shifter bracket to connect the transfer case shifter linkage. The housing has provisions to retain the stock transmission crossmember. Relocation of this crossmember on the frame rails may be required.

****P/N 50-0420** - 4L60E replacing Land Cruiser automatic FJ80 HF2A transfer case.

****This kit is machined to accept the FJ80 transmission mounting rubber. The crossmember mounting holes may need to be slotted to allow it to be moved rearward slightly. The transfer case shifter mounts to the top of the adapter housing. The bracket provided in the kit allows for the HI/LOW lever to come though the original hole. Note: This is a complete kit, so P/N 50-0405 is not required.

TH400:

This transmission is known as the heavy duty version of the TH350. We manufacture a full line of adapters to utilize this transmission. The O.A.L. is 24-1/4" long. It has a 1st gear ratio of 2.48:1; 2nd 1.48:1, and a 3rd gear ratio of 1:1. When installing this transmission into a Land Cruiser, driveline modifications are always required. The transfer case shifter handle will normally require additional modifications to position it in a usable location on your floorboard. Front driveshaft clearance will also be an area of concern due to the width of the TH400 transmission pan assembly.

P/N 50-1500 - TH400 replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 2.680"

P/N 50-1600 - TH400 replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 2.680"

***P/N 50-1700** - TH400 replacing FJ40/FJ60 Land Cruiser 4 speed (19 spline split-case) Adapter length of 3.187"

***This is a two piece adapter that does not have provisions to retain the stock transmission crossmember. When using this TH400 adapter, a custom crossmember will need to be fabricated and the transfer case linkage will require modifications.

4L80E:

This transmission is similar to the TH400 except that it is electronically controlled and has an overdrive. This transmission does not use a reluctor ring like the 4L60E. The 4L80E transmission is normally equipped with an internal reluctor ring on both the transmission input shaft and output shaft. The computer takes both of these readings in for the proper shifting and operation of this transmission. We have always ignored the reluctor ring requirement for this transmission since it is internally regulated. We have now learned that the rear reluctor ring is not always installed into the transmission. The basic rule of thumb is 4WD transmissions up to 1996 should have a rear reluctor ring in the main transmission case. All 2WD transmission should have the rear reluctor in the main transmission case, and the 1997 & newer 4WD 4L80E transmissions have a sensor provision; however, the reluctor ring in the transmission is left out. The tailhousing bolt pattern is the same as the TH400, but indexed with a different diameter. There are several lengths of the stock 2WD transmission output shaft and only one length of the 4WD. When designing our kit, we standardized off of the 4WD output shaft. The 1st gear ratio is 2.482; 2nd 1.482; 3rd 1.1, and a 4th gear ratio of .75. Before installing your transmission make sure it is equipped with the rear reluctor ring.

P/N 50-1501 - 4L80E replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 2.680"

P/N 50-1601 - 4L80E replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 2.680"

***P/N 50-1701** - 4L80E replacing FJ40/FJ60 Land Cruiser 4 speed (19 spline split-case) Adapter length of 3.187"

***This is a two piece adapter that does not have provisions to retain the stock transmission crossmember. When using this TH400 adapter, a custom crossmember will need to be fabricated and the transfer case linkage will require modifications.

****P/N 50-1702** - 4L80E replacing Land Cruiser automatic FJ80 HF2A transfer case. Adapter length of 5.240"

****This kit is machined to accept the FJ80 transmission mounting rubber. The crossmember mounting holes may need to be slotted to allow it to be moved rearward slightly. The transfer case shifter mounts to the top of the adapter housing. The bracket provided in the kit allows for the HI/LOW lever to come though the original hole.

FORD C4:

This 3 speed transmission was used in Ford cars & trucks from 1964 to 1981. We recommend obtaining a 1970 & newer transmission for conversions. The transmission case length is 11.180", and with the bellhousing measures 17.00". This transmission was used up against small block Ford engines. The adapters we manufacture will normally require the installation of a new output shaft. This is the most popular transmission when converting to a Ford engine. The 1st gear ratio is 2.46:1; 2nd 1.46:1, and a 1:1 3rd gear ratio. We only offer adapters for the 10 & 16 spline Land Cruiser transfer cases. Both these kits come with two adapter housings: a main output shaft, and a spud shaft. Neither one of these kits have provisions for the transfer case linkage pivot stud, nor do we offer any bracketry to assist you in this area.

P/N 50-8200 - C4 replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 7.250"

P/N 50-8300 - C4 replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 7.250"

FORD AOD:

This Ford automatic overdrive was introduced in 1980, and found in the F-series pickups behind small blocks. Although we do not list any adapters on the Transfer Selection Chart for this transmission, we are capable of adapting the AOD to both the 10 & 16 spline Land Cruiser transfer cases. Please call us directly for more information.

MANUAL (Truck-style) TRANSMISSIONS:

Truck transmissions can easily be adapted to the Land Cruiser transfer cases. The GM truck transmissions can be the Muncie SM420, SM465, and NV4500. The Ford truck transmissions include the Ford T18 or the NP435. These transmissions offer a super low 1st gear ratio which is excellent for offroad use when rocky terrain is involved. For normal everyday driving, the 1st gear is very seldom used. The disadvantages of these types of transmissions is the weight along with stiff shifting. Some of the transfer case adapters will require new main shafts, while other kits use a spud shaft that simply slips over the original output shaft.

SM420:

This transmission works great in Land Cruisers. The overall length is 10-1/2". It has the lowest 1st gear available of 7.05:1; 2nd 3.57:1; 3rd 1.7:1, and a 4th gear ratio of 1:1. The transmission was used in GM trucks from 1947 to 1968. This transmission has a 10 spline output shaft which we couple to using a new spud shaft. (Note: We have seen a few SM420 transmissions with a 32 spline output which we can also adapt to). The cast iron case of this transmission will sometimes require modifications due to interference with the front driveshaft or transfer case shifter linkage. A transfer case shifter linkage bracket is not included in any of these kits. As the years progress, it is getting harder to find this transmission and parts.

P/N 50-2601 - SM420 replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 4.500"
P/N 50-2602 - SM420 replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 4.500"
***P/N 50-2603** - SM420 replacing FJ40/FJ60 Land Cruiser 4 speed (19 spline split-case) Adapter length of 4.500"

*This is a two piece adapter that does not have provisions to retain the stock transmission crossmember. When using this SM420 adapter, a custom crossmember will need to be fabricated.

SM465:

Used from 1968 to 1988, this transmission replaced the SM420. It has an overall length of 12". The 1st gear ratio is 6.58:1; 2nd 3.58:1; 3rd 1.57:1, and 4th gear ratio of 1:1. This transmission was used in both the 2WD & 4WD vehicles. Throughout its 20 years, the transmission case never changed; however, we have seen three different output shafts. The 1968-79 4WD transmission used a 10 spline output shaft, which is easy to adapt. The 1968-88 2WD version used a 35 spline output shaft, which is also easily adapted; however, the output shaft length in this version requires it to be shortened. The 1980-88 4WD tranny used a long 32 spline output shaft. We do not offer any adapters that couple to this output shaft because of its length. If you have this SM465 version, you can change the output shaft to the 10 or 35 spline output. As mentioned, we only offer SM465 adapter kits for the 10 or 35 spline output shafts. These kits come with both a spud shaft and adapter housing which measures 4.625". The shifter bracket for the transfer case shift linkage must be purchased separately.

SM465 4WD 10 Spline Transmission:

P/N 50-4601 - 4WD SM465 replacing FJ40 Land Cruiser 3 speed (10 spline)
P/N 50-4602 - 4WD SM465 replacing FJ40 Land Cruiser 4 speed (16 spline)

SM465 2WD 35 Spline Transmission:

P/N 50-4901 - 2WD SM465 replacing FJ40 Land Cruiser 3 speed (10 spline)
P/N 50-4902 - 2WD SM465 replacing FJ40 Land Cruiser 4 speed (16 spline)
***P/N 50-4903** - 2WD SM465 replacing FJ40/FJ60 Land Cruiser 4 speed (19 spline split-case)

*This is a two piece adapter that does not have provisions to retain the stock transmission crossmember. When using this SM465 adapter, a custom crossmember will need to be fabricated.

Stock L/C 6 cylinder to the SM465: Some customers prefer not to replace the stock Land Cruiser engine. For these applications, we offer a transmission retrofit option, **P/N 712519**. By using a 1963-73 Land Cruiser 3 speed bellhousing, we are able to adapt the popular SM465 to your stock engine. The kit includes a new front retainer, pilot bushing, and transfer case shifter bracket. One of the transfer case adapters listed above will be required.

NV4500:

In 1993, General Motors and Chrysler teamed together to manufacture a transmission referred to as the NV4500 transmission. The Model NV4500 was used in both the GM & Dodge truck applications. This transmission is probably one of the finest options available for Land Cruiser conversions. We have developed kits for both the GM & Dodge transmission - for all three Land Cruiser transfer cases. We also offer adapter kits to couple the NV4500 directly to the Land Cruiser straight 6 cylinder engine. The section that follows will highlight both the transfer case and bellhousing adapters we offer.

GM 4WD NV4500 (1993-94): During the first two years of the NV4500, Chevy offered this 5 speed with a 6.34:1 1st gear; 2nd 3.44:1; 3rd 1.71:1; 4th 1:1 ratio, and a 27% overdrive. It was also the first year that Chevy changed the bellhousing-to-transmission bolt pattern. This transmission is ideal when converting your vehicle, providing an ultra-low 1st gear. GM, however, only produced this particular ratio during these years. The major complaint of this 5 speed was stiff shifting and noise in 3rd gear.

GM 4WD NV4500 (1995): This transmission is identical to the 1993-94 transmission, except the 1st gear ratio had been changed to 5.61:1; 2nd 3.04:1; 3rd 1.67:1; 4th 1:1 ratio, and a 27% overdrive. The noise and shifting problems had been corrected.

GM 4WD NV4500 (1996-2006): This transmission has the same gear ratio as the 1995 version. Chevy once again changed the bellhousing-to-transmission bolt pattern and went to a larger bellhousing index diameter. This Chevy NV4500 has the same bellhousing-to-transmission bolt pattern as the Dodge NV4500. These transmissions use a GM internal release bearing.

All of the Chevy version NV4500s listed above have a 1-1/8 " 10 spline input shaft with a pilot tip of .590. The input shaft protrudes from the front of the transmission approximately 6-5/8". We only offer adapters for the 4WD version of the Chevy NV4500. The stock output shaft on this transmission must be shortened as illustrated on the instruction sheet included with each kit.

Dodge 4WD NV4500 (1993-2000): This transmission is the same as the 1996-99 Chevy version; however, the only difference is the transmission input shaft which is 7-1/2" long with a pilot tip of .750". The output shaft on this transmission is 23 spline. To couple to this output shaft, you will be required to shorten the stickout length to avoid pre-loading the bearings in the transmission.

Dodge 4WD NV4500 (2001-2006): This transmission is the same as the 1993-00 Dodge version; however, The 2001 & newer Dodge transmission was changed to a 29 spline output shaft.

Dodge 4WD Heavy-Duty (Diesel) NV4500 (1993-2006): This transmission is normally used up to the Cummins Diesel. This transmission is similar to the standard duty version in reference to the bolt pattern. The input shaft is the same (7-1/2" long & .750" pilot tip), but the clutch spline is 1-1/4" 10 spline. The output shaft on this transmission is also larger in diameter, which has 29 splines. To couple to this output shaft, you will be required to shorten the stickout length.

All NV4500 transmissions have a 12.375" case length.

We designed adapter kits around all three versions of the NV4500 4WD transmission, accommodating whichever transmission you acquire. Ideally, if you are doing a Chevy or Ford engine swap, the GM or Standard Duty Dodge NV4500s are the easiest to adapt to. The Dodge Heavy-Duty NV4500 should only be used when retaining the stock 6 cylinder. Any 2WD versions of the NV4500 will require the main output shaft to be changed. Each of these adapter kits come with a new tailhousing adapter which replaces the stock tailhousing adapter. These kits also use a spud shaft to couple to the stock NV4500 output shaft. In all the following kits, this output shaft must be shortened as illustrated on your instruction sheet.

P/N 50-0211 - GM 4WD NV4500 replacing FJ40 3 speed (10 spline) Adapter length of 5.875"
P/N 50-0213 - GM 4WD NV4500 replacing FJ40 4 speed (16 spline) Adapter length of 5.875"
***P/N 50-0214** - GM 4WD NV4500 replacing FJ40/FJ60 4 speed (19 spline split-case) Adapter length of 5.875"

P/N 50-0225 - Dodge 23 Spline NV4500 replacing FJ40 3 speed (10 spline) Adapter length of 6.375"
P/N 50-0226 - Dodge 23 Spline NV4500 replacing FJ40 4 speed (16 spline) Adapter length of 6.375"
***P/N 50-0227** - Dodge 23 Spline NV4500 replacing FJ40/FJ60 4 spd. (19 spline split-case) Adapter length of 6.375"

P/N 50-0222 - Dodge 29 Spline NV4500 replacing FJ40 3 speed (10 spline) Adapter length of 6.375"
P/N 50-0223 - Dodge 29 Spline NV4500 replacing FJ40 4 speed (16 spline) Adapter length of 6.375"
***P/N 50-0224** - Dodge 29 Spline NV4500 replacing FJ40/FJ60 4 speed (19 spline split-case) Adapter length of 6.375"

***** This adapter does not have provisions to retain the stock transmission crossmember. When using this NV4500 adapter, a custom crossmember will need to be fabricated.

NV4500 BELLHOUSINGS:

Besides the transfer case adapters necessary for the NV4500 transmissions, each installation will require some type of bellhousing adapter to complete the conversion. Since the NV4500 has become a popular transmission when installing a Chevy or Ford engine, or even retaining the stock Land Cruiser engine, we offer a full line of bellhousing adapters to assist you.

When using one of our full bellhousings, we recommend that you use an 11" flywheel and clutch assembly. A Centerforce clutch and our large diameter release bearing (listed in the clutch portion of this manual) are recommended in order to achieve proper disengagement with the Toyota Land Cruiser slave cylinder. The full bellhousing kits come complete with a pilot bushing and stock GM clutch release arm. On most V8 engine installations replacing the stock Land Cruiser 4 speed, the added length of the NV4500 will normally position the engine in an ideal location to eliminate driveline modifications.

P/N 712577 - GM NV4500 (1993-95) to GM block, full bellhousing **(11" clutch recommended)**
P/N 712576 - GM NV4500 (1996 & up) to GM block, full bellhousing **(11" clutch recommended)**
(Dodge NV4500s can use bellhousing P/N 712576 by installing a new input shaft, **P/N 52-0221**, and modifying the bearing retainer)

The adapter plates are designed to fit a standard Ford or Chevy bellhousing. The adapter plate provides a mounting surface identical to a Ford or Chevy transmission. These kits are designed around the Dodge Standard Duty 4WD transmission and compensate for the 1" longer Dodge input shaft. These kits come complete with a pilot bushing and necessary hardware. On most V8 engine installations replacing the stock Land Cruiser 4 speed, the added length of the NV4500 will normally position the engine in an ideal location to eliminate driveline modifications.

P/N 712550 - Dodge Gas NV4500 to GM 5.125" indexed adapter plate
P/N 712551 - Dodge Gas NV4500 to Ford 4.848" indexed adapter plate
(See the Clutch Component section for the recommended pressure plate, clutch disc, release bearing, and slave cylinder mount)

For a NV4500 installation retaining the Land Cruiser 6 cylinder, we offer two kit designs. The first kit listed is designed to utilize a GM NV4500. This kit come complete with a full bellhousing, steel adapter plate, clutch release arm, and slave cylinder bracket. This kit fits the late Chevy NV4500 bolt patterns. The second kit listed is specifically designed for the Dodge Heavy-Duty (diesel) NV4500. This kit uses an adapter plate that bolts to the front of the Dodge NV4500 and then accepts a standard Land Cruiser 4 speed bellhousing. This kit requires the front retainer of the transmission to be turn down in diameter and also a special Centerforce clutch assembly, **P/N CF315518**. This kit, however, retains all of the stock clutch linkage and the slave cylinder. *(This stock L/C clutch fits the stock flywheels from the years of August 1974 through 1987). On earlier applications, you must change the flywheel and clutch fork to use this clutch assembly.)*

When using this new transmission with the original Toyota 6 cylinder, you will normally require driveline modifications of approximately 5". This will position the transfer case further back requiring removal of the original tubular crossmember. A new crossmember will be needed to support the transfer case.

P/N 712578-L 1996 & newer Chevy NV4500 to Land Cruiser 6 cylinder
P/N 712579 - Dodge H.D. NV4500 to Land Cruiser 6 cylinder

COMPLETE NV4500 ASSEMBLY KITS:

Chevy V8 installations: These assemblies are designed for a Chevy V8 installation. These packages include a transfer case adapter, full bellhousing, slave cylinder bracket, GM 1-1/8" 10 spline input shaft, release bearing, and shifter handle assembly. These kits do not include motor mounts, a rear crossmember, or clutch components. These kits are designed to be used with both spline counts of the Dodge NV4500 and the GM NV4500.

We offer the 29 spline Dodge transmission under **P/N 26-0029R**, the 29 spline Dodge H.D. Diesel transmission with the 1-1/4" input under **P/N 26-0020R**, and the GM transmission under **P/N 26-0007R**.

The transmission assembly length on the Dodge transmission will be 25.375", and 24.875" on a GM transmission. When replacing a 3 speed transmission, driveline modifications will be required. When replacing the stock 4 speed, the added length of the NV4500 will normally position the engine in an ideal location to eliminate driveline modifications.

P/N 27-0020D - Dodge 23 Spline NV4500 to Land Cruiser 10 spline T/C - full bellhousing design
P/N 27-0021D - Dodge 23 Spline NV4500 to Land Cruiser 16 spline T/C - full bellhousing design
P/N 27-0022D - Dodge 23 Spline NV4500 to Land Cruiser 19 spline T/C - full bellhousing design

P/N 27-0020G - GM 4WD NV4500 to Land Cruiser 10 spline T/C - full bellhousing design
P/N 27-0021G - GM 4WD NV4500 to Land Cruiser 16 spline T/C - full bellhousing design
P/N 27-0022G - GM 4WD NV4500 to Land Cruiser 19 spline T/C - full bellhousing design

P/N 27-0020T- Dodge 29 Spline NV4500 to Land Cruiser 10 spline T/C - full bellhousing design

P/N 27-0020T - Dodge 29 Spline NV4500 to Land Cruiser 16 spline T/C - full bellhousing design
P/N 27-0022T - Dodge 29 Spline NV4500 to Land Cruiser 19 spline T/C - full bellhousing design

Ford T18:

This transmission, found in 1965 to 1985 Ford pickups, is identified by a case length of 11.875". The 1st gear ratio is 6.32:1; 2nd 3.09:1; 3rd 1.69:1, and a 1:1 4th gear ratio. The adapters we manufacture for this transmission come with a new main shaft. Ford was not the only manufacturer who used the T18 transmission. When searching for a T18 in salvage yards, make sure the bellhousing bolt pattern has a dimension of approximately 8-1/2" across the top, and 6-1/4" top-to-bottom. The input shaft stickout should be approximately 6-1/2". Our adapters will only work for the Ford T18. When using this transmission, you will have to fabricate the necessary bracketry to connect the transfer case shifter linkage. We do not offer an adapter kit for the 10 or 19 spline Land Cruiser transfer case.

P/N 50-8000 - Ford T18 replacing FJ40 Land Cruiser 4 speed (Adapter length of 3.750")

Ford NP435:

We manufacture many adapters for the Ford version of the NP435. These adapters do not work on the Chevy or Dodge NP435. This transmission has a case length of 10.875". The 1st gear ratio is 6.69:1; 2nd 3.34:1; 3rd 1.66:1, and a 1:1 4th gear ratio. This transmission was used in Ford pickups from 1969 to 1979. It is easily identified by an aluminum shift cover. This transmission is available with two front input shaft lengths. The 6-1/2" input shaft stickout length is the ideal version to look for. When using this transmission, you will have to fabricate the necessary bracketry to connect the transfer case shifter linkage. We do not offer an adapter kit for the 19 spline split-case.

P/N 50-6201 - NP435 replacing FJ40 Land Cruiser 3 speed (Adapter length of 3.325")
P/N 50-6202 - NP435 replacing FJ40 Land Cruiser 4 speed (Adapter length of 3.325")

MANUAL (Car-style) TRANSMISSIONS:

The car-type transmissions can be easily adapted into Land Cruisers. The GM car-type transmissions would be the Muncie M21-M22 or Borg Warner T10. The Ford transmissions would be the 4 speed Top Loader and the Ford Overdrive Toploader, which has a 10-bolt top cover. While these transmissions provide the added strength and easy adaptability, they are not recommended for rugged offroad driving. The first gear ratio on these car-type transmissions are normally 2.2 to 2.5-to-1. This particular ratio, when used in conjunction with your 4WD transfer case, will still create some difficult situations when faced with rocky terrain. These transmissions are excellent for someone that is spending 95% of their time on the highway and 5% of their time off the road. The lack of good low gears for rock crawling can be overcome by slipping the clutch and having a good braking system. This type of transmission is usually expensive, since the demand is exceptionally high for good Muncie and T10 transmissions. These transmissions will require the use of a Hurst shifter. The shifter must be mounted with a special bracket that is compatible with the new transfer case adapter. All of the car-style transfer case adapter kits use a new main output shaft that must be installed in your transmission.

Muncie (Car) 4 speed (M21/M22):

Used in cars 1964 to 1974, this aluminum case transmission measures 10-1/2" long. The 1st gear ratio is 2.54:1; 2nd 1.88:1; 3rd 1.46:1, and a 4th gear ratio of 1:1. This is an externally shifted transmission. Any adapters using this transmission will require new shifter components (listed in *Note 6* under the Transfer Case Selection Chart). If your transfer case has a mechanical linkage, we do not offer any bracketry to assistance you in this area.

P/N 50-0300 - Muncie Car 4 speed replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 4.500"

Borg Warner Super T10:

This transmission was produced in 4 different versions There was a Borg Warner T10, a Super T10 (thin hub), a Super T10 (thick hub), and a Super T10 (2nd design). We only offer kits for the Super T10 thin hub, thick hub & 2nd design. Before you purchase an adapter, you should identify which transmission you have. The kits that we offer will only fit the 10 & 16 spline transfer cases. We do not offer any bracketry to assist you with the transfer case linkage. Please refer to the Transfer Selection Chart for both adapter part numbers and transmission shifter linkage brackets.

T & C 4 Speed:

This transmission is mainly found in cars from 1967 to 1982. The case length is 10-1/4". The 1st gear ratio is 2.78:1; 2nd 2.92:1; 3rd 1.35:1, and a 1:1 4th gear ratio. The shifting mechanism is external, so a shifter bracket and a shifter rod kit are normally required.

This transmission is sometimes referred to as a T & C or 10 bolt top cover. We only offer kits for the 10 & 16 spline transfer cases. We do not offer any bracketry to assist you with the transfer case linkage.

P/N 50-2800 - T & C 4 speed replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 1.200"
P/N 50-2801 - T & C 4 speed replacing FJ40 Land Cruiser 4 speed (16 spline) Adapter length of 1.200"

T & C 4 Speed O.D.:

This transmission is used in both car and truck applications. The case length on this transmission is 10-1/4". The 1st gear ratio is 3.29:1; 2nd 1.84:1; 3rd 1:1, with an 20% overdrive. Ford used this transmission from 1978 to 1989. When used in a car application, this transmission resembled the standard T & C 4 speed. The shifting mechanism is external, and a shifter bracket and rods will be required. When used in a truck application, this transmission used a larger rear output shaft bearing and was top shifted. The kit we offer is only designed for the car-style transmission. If your transfer case has a mechanical linkage, we do not offer any bracketry to assistance you in this area.

P/N 50-5501 - T & C 4 speed O.D. replacing FJ40 Land Cruiser 3 speed (10 spline) Adapter length of 1.200"

NP203 CRAWLER BOX:

By using the 2:1 reduction portion of the NP203 GM transfer case, we have designed an adapter kit to put this reduction portion in front of both the 10 & 16 spline Land Cruiser transfer cases. This kit will only work with GM transmissions that were originally coupled to a NP203. These transmissions would include the TH350, TH400, SM465, or a 700R when using our P/N 50-6900 (with the modified 700R output shaft).

The assembly length of the crawler box is approximately 7" long. A normal installation will require crossmember and floorboard modifications. Due to the length of this low gear box, your engine location may need to be adjusted further forward than normal. We have had some customers adjust their rear axle location to compensate for this extra length. The kit comes with an adapter housing that couples the NP203 gear box to the Land Cruiser transfer case, and a special output shaft. The shifter linkage for both the transfer case and the NP203 gear box will need to be fabricated.

P/N 50-8801 - NP203 gear box to Land Cruiser 3 speed (10 spline)
P/N 50-8802 - NP203 gear box to Land Cruiser 4 speed (16 spline)

TRANSFER CASE SWAPS:

The Land Cruiser transfer case has undergone many exterior design changes; however, the bolt pattern has always remained the same. One of the biggest differences in these cases was the input gear spline. The availability of replacement transfer cases is slim, so if you break or crack your case, it is sometimes difficult to find a replacement. The 3 speed transfer case seems to be the most available. We offer two kits that will allow a stock 4 speed transmission to couple to the 3 speed transfer case.

P/N 50-8800 - A new 4 speed output shaft equipped with a 10 spline output to fit a 3 speed transfer case
P/N 716107 - A new drive gear, bearing, and spacers to fit the 4 speed output shaft in a 3 speed transfer case

Orion 4-to-1 and 3-to-1 Transfer Cases: For years Toyota Land Cruiser enthusiasts have dreamed of finding a durable, low-geared transfer case able to withstand rugged conditions. With the introduction of the Advance Adapters Orion case, their dreams just became a reality. The Orion offers the strength of cast iron coupled with the rock crawling capability of either a 4:1 or 3:1 gear set.

Besides the cast iron case and lower gear set, the Orion has other additional benefits over a stock transfer case. Benefits include a larger 34mm idler gear shaft, wider needle roller bearings for improved load distribution, and a fully gusseted idler shaft area on the case. This revolutionary transfer case will eliminate any downtime due to case failures. There is no need to modify either driveshafts for the installation since the length and dimensions of Orion STD-duty are nearly identical to the stock case.

The Orion replaces stock transfer cases in Toyota Land Cruisers built between 1963 and July of 1980. Stock transfer cases built during this 18 year span are either a 10-spline case coupled with a 3-speed tranny or a 16-spline case coupled with a 4-speed tranny. Prior adaptations of other transmissions using Advance Adapters conversion products will also be compatible with either Orion series transfer case.

This case replacement has the same external width, eliminating driveline modifications. The casting contours that outline the low speed output gear will position the drain plug approximately .500" lower on average. The new low ratio gear set supplied replaces existing gear sets except for the PTO gear or PTO spacer sleeve.

Orion Low Range Transfer Case: The Orion kits come with a new cast iron case, four new gears, a new 34mm cluster pin, and a complete gasket bearing and seal kit. This transfer case, however, is not a complete "ready-to-bolt-in" unit like the Atlas. The transfer case does require the use of your stock front and rear output shafts and housing. The new unit also requires the use of the stock P.T.O. gear and inspection covers.

The Orion transfer case requires the complete removal and disassembly of your stock Toyota transfer case. Once the stock transfer case is removed from the vehicle it becomes a donor for the new Orion case. This kit requires that you reuse your stock fasteners, front & rear housings, retainers, shafts, shift fork, clutch sleeves, and cover plates from your original transfer case. You are supplied a full rebuild kit to replace all bearings, races, O-rings, seals, and gaskets. Shims for the rear output shaft retainer are also supplied to set the bearing pre-load. *Do not discard shims, washers, sleeves, and spacers from your stock yokes and shafts.* Although the instruction sheet provided with your new transfer case will initiate the steps to install the Orion, it is advised that you also obtain a shop or repair manual that covers your specific application.

Ordering an Orion Transfer Case:

ORION4 **4.0:1 fits vehicles with 10 or 16 spline inputs**

ORION3 **3.0:1 fits vehicles with 10 or 16 spline inputs**

When ordering an Orion we also need to know the following information:

Orion Gear Ratio - **3.0:1 / Orion3** or **4.0:1 / Orion4**

Input spline needed - **10 spline P/N O70010** OR **16 spline P/N O70016**

Twin Stick - **See page 26**

Hardware needed - **O10220** stock 3 speed, **O10221** stock 4 speed, **O10222** when using our one of our adapter kits

Note: When using either Orion transfer case with a Toy Box, the Orion will require modifications to the top of the case for the Toy Box shifter rail.

Transfer Case Shafts - We do carry stock replacement output shafts for the Orion transfer case. We have found that most stock transfer case output shafts have excess wear on the gear journals. These new shafts will provide a closer tolerance installation for the Orion gears.

P/N O40500 - T/Cs up to April 1975 **P/N O40501** - T/Cs April 1975 to July 1980

Orion Standard Duty Transfer Case Points of Concern:

The success of an Orion Transfer case installation is dependant on the condition of the necessary components that are to be reused from your stock case. Some of the most critical components that require your attention to detail are as follows:

HI/LOW CLUTCH SLEEVE - Inspect for excessive or worn splines. The splines should not be tapered throughout the sleeve width. *You will notice the "V" looking tapers or "boat tails" only at the last .070" to the contact sides of the sleeve towards each gear.* If you need a new sleeve, **P/N O50010**

SHIFT FORK LOCK BALL AND COMPRESSION SPRING - We have provided a new ball, spring, and brass set screw to be used for your installation. The ball provided measures 10mm and will tighten up the tolerance in the shift fork bore. We have also provided a new spring which has a greater holding capacity than an older worn out spring. The new brass set screw will take the guess work out of setting the tension on the spring and ball inside the new shift fork. The brass set screw should be installed with a bit of Loctite to retain it, and the hex should be seated completely to the shift fork.

P/N O60050 - 10mm Ball **P/N O60051** - Shift Fork Spring,
P/N O60052 - Set Screw **P/N O60040** - New Shift Rail
P/N O60041 - O-RINGS

THRUST WASHERS - The thrust washers are an important and critical area when installing the Orion gears on your Toyota shaft. The first step is to inspect the transfer case output shaft for excessive wear and to make sure the gears fits the shaft. If your shaft is worn excessively, the gear will be a loose fit or will be able to wobble. If this is the case with your shaft, replace it. We do offer replacement shafts.

If the shaft is in good shape, then proceed. The end play of the gear on the shaft must be set. The new Orion gears are the same width as a stock gear set. Gear end play should be set at .008"-.012". We now include two new thrust washers to help set up the transfer case with the correct end play. These thrust washer are stepped. One side has a recess of .015" - .017" and the other side of the washer has a .008" - .010" recess. So by using one side or the other of the washer or using your stock washers, you should be able to get close to the required tolerance. **P/N O60080** (2 required)

Orion Standard Duty Installation Basics

Tools required: Metric & standard drive sockets, Metric & standard wrenches, #10 hex bit, Foot Pound Torque Wrench (Torque Range of 10-125 ft./lbs.), Drift Punch for both HI & LOW shift rail and the 4 speed TC stake nut, Dead Blow Hammer, Pliers, Hand press, Universal Puller for stock 3 and 4 speed transmissions, and a Flat Head Screw Driver.

Stock T/C coupled to a SM420 still in the vehicle.

Once the stock transfer case is removed, you can start the disassembly process. The stock transfer case shifter linkage can be retained and reinstalled back onto the Orion. We also manufacture a new twin stick linkage that offers a nicer shifting alternative to the stock linkage.

Removal of the stock front housing

Removal of the stock rear housing

Removal of the shifter cover.

Removal of the rear output shaft

Output shaft assembly.

The stock componets shown above should be cleaned and retained for re-assembly into the new Orion case.

Comparison of the Cast Iron Orion vs. the Stock aluminum case.

The Orion comes with a complete set of gears, bearings, gaskets, seals, and most fasteners.

Since the Orion is a new assembly, we highly recommend a factory service manual for setting the proper torque loads on bolts and setting the proper end play on the tapped roller bearings.

Most fasteners are metric with a few exception to the bolts that couple the Orion to one of our adapter kits. The shifter rail and cluster pin require a light tapping from a dead blow hammer during installation. This is because of the close tolerances of machining on the Orion case.

The Orion comes with two new bolts and requires the reuse of the other three that fasten the transfer case to the transmission. These two new bolts are modified for clearance on the new larger gear set. Due to the various transmission applications, the bolt length and thread pitch may vary.

SAGINAW STEERING CONVERSIONS

A Saginaw steering conversion for these vehicles is a proven advantage simply because they allow you to have better control of your vehicle both on and off the highway. The problem with stock steering on these vehicles is excessive play or backlash. In addition to offering a sound positive means of controlling your vehicle, it can be performed at a reasonable cost. Additional advantages include exhaust clearance, engine positioning, and custom steering columns. *These kits are designed for the FJ40 Land Cruiser vehicles only.*

Before you consider this conversion, we recommend that you thoroughly read and understand the complete installation procedure. *Do not take shortcuts on steering installations.* We recommend that these conversions be installed by a qualified technician. The control of your vehicle depends on your steering performance. Failure of your steering system can result in severe damage and possible injury.

SAGINAW STEERING KITS:

All of the Toyota FJ40 Land Cruisers had basically the same stock steering configuration. It is simply a gear box at the base of the steering column which controls a drag link towards the front of the vehicle. A bellcrank is mounted on the front crossmember and uses a push-pull affect for steering. This assembly uses six tie rod ends which, in many cases, allows excessive free play and backlash.

The Saginaw steering system requires the elimination of the stock gear box and bellcrank. The new steering box is mounted on the inside of the left front frame rail, just behind the bumper. Although this sounds simple, there are several things that must be considered before the installation can be completed. Such things include:

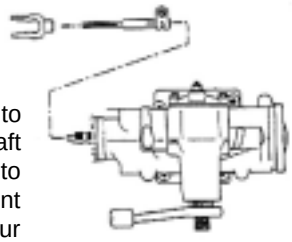
Power or manual steering
Motor mount clearance on steering shaft
Steering column type
Tie rod size & length
Steering box location
Winch clearance

We offer four (4) steering conversion kits. These kits are either power or manual steering conversions, and either a Borgeson/Flaming River or Spicer yoke design. None of these kits supply the steering box (manual or power), or steering pump and hoses (power applications).

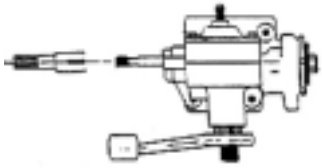
Both the manual and power steering conversions can be performed with the original 6 cylinder engine or a new Chevy V8. There may be slight modifications required to the driver's side engine mount to provide proper clearance for the steering driveshaft. On 3 speed Land Cruisers equipped with a column shifted transmission, you will need to change your 3 speed linkage to a floor shifter. The power steering conversions retaining the stock 6 cylinder will also require a custom power steering pump mounting bracket, **Part No 716842**. To help identify the kit necessary for your conversion, please consider the following information.

POWER & MANUAL STEERING BOX SELECTION:

The Saginaw steering box gets mounted just behind the front bumper. This requires a clearance hole to be cut in the stock support located under the radiator for the steering shaft. Since the Saginaw steering shaft has a short stickout from the box, a spud shaft (or extension shaft) must be added to the steering box to extend the steering shaft into the engine compartment. There are three different spline sizes on the different Saginaw power and manual boxes. Both Power and Manual boxes have two spline sizes that mate to our spud shaft.



Power Steering Box



Manual Steering Box

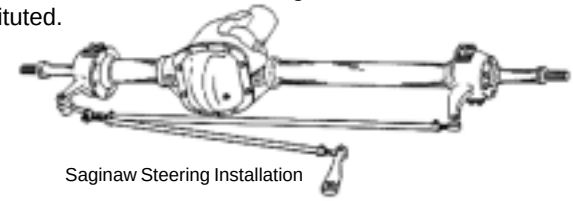
Both Power & Manual boxes can be found in the 1960s & early 1970 GM cars, or Jeep vehicles 1972 & newer. The manual steering box must have a shaft stickout length of approximately 3" long, and the spline on the shaft approximately 1" long. When using power steering, we recommend obtaining the pump and hoses off of the same vehicle. We now offer boxes & pumps listed at the end of the Steering section.

Both Power and Manual boxes have two spline sizes that mate to our spud shaft. Our manual steering kits are supplied with a .730" dia. 30 spline spud shaft. If your steering box has .730" dia. 36 spline, **Part No. 716834-36** can be substituted. On power steering kits, we supply the most common spud shaft which is a .800" dia. 36 spline. On some of the newer Saginaw boxes, we have found them to have a .730" dia. 30 spline. **Part No. 716834-30** can be substituted.

P/N 716834-30 - Spud shaft .730" dia. 30sp. female x .730" dia. 36sp. male (power & manual boxes)

P/N 716834-36 - Spud shaft .730" dia. 36sp. female x .730" dia. 36sp. male (manual boxes only)

P/N 716835 - Spud shaft .800" dia. 36sp. female x .730" dia. 36sp. male (power boxes only)

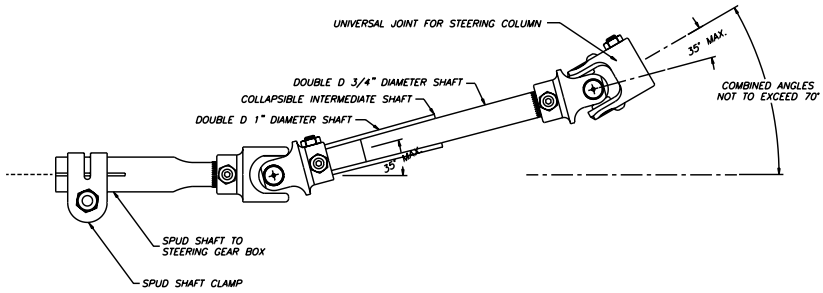


Saginaw Steering Installation

BORGESON / FLAMING RIVER KITS:

These kits are the newest and most recommended style that we manufacture. The steering shaft assembly connects directly to our steering spud shaft. This collapsible slip steering shaft extends to the firewall and can be adjusted to any length. The 3/4" DD connection (round shaft having 2 flat surfaces) couples easily to any of the yokes supplied in the kit or listed under the Custom Steering Column subheading. These kits require welding on the steering box mounting plate, frame enclosures, and firewall mounting plate.

P/N 716807 - Land Cruiser conversion kit, Manual Saginaw box
P/N 716808 - Land Cruiser conversion kit, Power Saginaw box (shown)
(These kits do not include boxes or pumps)



SPICER KITS:

These kits utilize Spicer yokes and crosses. We have used this design for many years and it works well for these vehicles. The yokes use a setscrew or spline connection from the steering shaft to the yoke. On these applications, the steering column yoke must be cross-drilled and possibly welded. Welding is required on the steering box mounting plate, frame enclosures, and firewall mounting plate.

P/N 716803-NS - Land Cruiser conversion kit, Manual Saginaw box
P/N 716804-NS - Land Cruiser conversion kit, Power Saginaw box
(The kits do not include boxes or pumps)

STEERING COLUMNS:

The stock steering column is the easiest option when installing the Saginaw steering. If you are planning to use a custom steering column, some fabrication will be necessary for mounting.

The stock steering column protrudes through the firewall and into the engine compartment. There are two basic steering column configurations. Vehicles prior to September 1972 were one style, and vehicles after this date were another. The biggest difference between these steering columns is the anchoring of the column to the firewall.

Steering Columns September 1972 & Earlier: These earlier models are equipped with a steering mechanism that clamps directly onto the Toyota gear box. The firewall mounting plate bolts through the firewall with either four bolts or six bolts, depending on the actual year. In order to install the Saginaw steering, you must install a Universal yoke on the end of the steering column. We suggest that you follow this step-by-step procedure:

Step 1: Using a hacksaw or torch, remove the steering column and shaft from the original steering box. Make the cut as close as possible to the steering box so that an adequate amount of the steering column shaft will be available.
Step 2: Remove the original Land Cruiser gear box, Pitman arm, drag link, bellcrank, stock stabilizer, and front tie rod.
Step 3: Remove the turn signal switch.
Step 4: Remove the firewall dust boot and retainer plate.
Step 5: In order to relocate the steering column after it has been removed, we suggest that you wrap a piece of masking tape around the column as a guide to the original location. This will provide a means of relocating the column back to the original location.
Step 6: Using the column mounting plate provided, you can now slip the plate onto the column, making sure that it can be adjusted to the proper angle for reassembly onto the firewall.
Step 7: Slip the column and the plate back into the vehicle to the original location. Tack weld the column and column mounting plate into position. Using the nut plate on the engine compartment side of the firewall, you can now locate the hole locations required for bolting the mounting plate into position.
Step 8: Once again, remove the column and finish welding the mounting plate to the column tube. Drill the mounting holes out to a larger size for use with the original bolts.
Step 9: Determine the length of the column tube and the 3/4" column shaft and cut to the necessary length. We recommend that the column protrude 2" from the face of the firewall, and the shaft protrude 2" beyond the end of the tube. On various installations, this length may vary to allow for engine mount and steering driveshaft clearances.
Step 10: Install the brass/teflon bushing provided with the steering kit into the bottom of the steering column tube. Make sure the clearance between the bushing and the shaft is sufficient. You may need to sand the column to obtain the proper fit. In our experience with the stock Land Cruiser column shaft, we found the size to be approximately .007" larger than the 3/4" yoke.
Step 11: In order to retain the brass bushing in the end of the column, you will need to weld a flat washer or use a set collar on the steering column shaft. This washer or set collar must be flush with the bushing. If a washer is used, weld it 360 degrees around the shaft.

Step 12: On the Flaming River kit, a 3/4" Double "D" yoke has been provided for this application. The 3/4" column shaft will need to be modified to fit the Double "D" yoke. With a disk grinder, grind 2 flats about .100" deep on each side of your stock column shaft. There are two set screws in the new Universal yoke assembly. Mark the location on the steering shaft where these two set screws are located. Remove the Universal yoke and spot drill two recesses for the set screw installation, approximately 3/16" deep. Reinstall the universal yoke and set both of the two set screws and lock nuts. Loctite should be used on both set screw installations. On Spicer Yoke kits, a keyway yoke is supplied. We recommend using an 1/4" end mill to slot your steering shaft. This yoke also uses a set collar to secure the yoke in place. Only on the Spicer yoke kit should you weld this yoke to the steering column shaft.

Step 13: Reinstall the column back into the vehicle and bolt the mounting plate into position.

Steering Columns October 1972 & 1979: These later models are equipped with a steering column that uses a 4-bolt mounting plate to the firewall, and a special coupler for connecting to the stock steering box. Vehicles equipped with this particular model will be able to leave the column in the vehicle while making the necessary modifications. We suggest that you follow this step-by-step procedure as listed below.

Step 1: Using a hacksaw, remove the special coupler from the end of the shaft. Make the cut as close as possible to the coupler.

Step 2: Remove the 4 nuts that hold the column mounting plate in position and install the new Advance Adapters bearing assembly. New bolts have been provided for use with our new support bearing.

Step 3: Check to make sure that the bearing and shaft have sufficient clearance for a smooth operation. You may need to clean and sand the steering column shaft to obtain the proper fit. At this point, you should lock the bearing onto the shaft using the set screw provided.

Step 4: Determine the length of the steering column shaft that is best suited for your engine location. Cut the shaft to the appropriate length and, once again, debur and clean for a slip fit of the 3/4" Universal yoke.

Step 5: On the Flaming River kit, a 3/4" Double "D" yoke has been provided for this application. The 3/4" column shaft will need to be modified to fit the Double "D" yoke. With a disk grinder, grind 2 flats about .100" deep on each side of your stock column shaft. There are two set screws in the new Universal yoke assembly. Mark the location on the steering shaft where these two set screws are located. Remove the Universal yoke and spot drill two recesses for the set screw installation, approximately 3/16" deep. Reinstall the universal yoke and set both of the two set screws and lock nuts. Loctite should be used on both set screw installations. On Spicer Yoke kits, a keyway yoke is supplied. We recommend using an 1/4" end mill to slot your steering shaft. This yoke also uses a set collar to secure the yoke in place. Only on the Spicer yoke kit should you weld this yoke to the steering column shaft.

CUSTOM STEERING COLUMNS:

Custom columns offer several distinct advantages. The advantages include locks, tilts, flashers, and custom vehicle appearance. When upgrading to the Saginaw steering, it's easiest to retain the stock steering column; however, we now offer a clean and easy way of mounting a GM column to your floorboard. This mounting bracket provides a clamping support for either a 2" or 2-1/4" new steering column.

P/N 716865 - 2" steering column support
P/N 716866 - 2-1/4" steering column support

Flaming River / Borgeson: Universal joints are available to match nearly every style steering column available. The special spline size on some of the custom columns will require a different U-joint than supplied in our kits. We offer a selection of the various sizes. The new universal joint is supplied with a mating connection that will fit the new 3/4" DD steering shaft. If a custom column is being used and you have already purchased the stock Toyota 3/4" diameter column yoke, you will then need to exchange your universal joint for the one that will be required on your installation. The special yoke assemblies to connect a custom steering column to our Saginaw steering components are as follows.

P/N 716848 - 1" 48 spline Universal yoke (GM columns)
P/N 716849 - 1" DD Universal yoke (GM and Ford)
P/N 716850 - 3/4" x 36 spline Universal yoke (GM and Ford)
(The dimensions represent the column side of these yokes only. The opposite side of these yokes is a 3/4" DD)

Spicer Kits: We do not recommend the use of custom columns with these kits unless the proper connection can be made. *You must make sure that the yoke connection to the bottom of the custom steering column be equipped with a special output yoke that can be attached securely in position.* We recommend that you do not weld on custom steering column installations. If the proper yoke connection cannot be made, then you should not use a custom column with this kit.

STEERING DRIVESHAFT:

The control shaft between the end of the column and the steering box spud shaft is defined as the steering driveshaft.

Flaming River / Borgeson: With each kit, we have provided a 3/4" DD shaft that has a length of 36", and a special U-joint is included to fit the bottom of the shaft. The shaft will have to be shortened to the necessary length for your installation. The new shaft assembly has a 3/4" DD end that will need to fit into the steering column universal joint. Use the same procedure to spot drill both of the set screws, and Loctite the connections with the two lock nuts.

This steering driveshaft is a collapsible assembly. The lower portion of this driveshaft assembly is supplied with a 36 tooth fine spline connector that will fit directly onto the steering box or AA spud shaft. Always use Loctite on the double set screws and lock nuts for all universal yoke connections.

Spicer Kits: With each kit, we have provided a shaft with a standard length that will work for various installations. Each end is splined. The shaft can be shortened to the necessary length for your installation. One end of the shaft has already been machined to couple to the new universal yoke. A groove has been machined so that the yoke bolt can prevent the universal yoke from slipping off the shaft. Since various installations have different length requirements, we have provided 4" of splines at the opposite end of the driveshaft without a groove. Once the length of this shaft has been determined and cut to proper length, this end of the driveshaft will need to have a groove ground or machined so that the yoke can be secured into position. (If a shorter steering shaft is needed, please call with the necessary measurements and we can make a custom length).

To connect the yokes to the driveshaft, you must use the special bolts provided in this kit. Never reuse an old bolt, and torque all bolts to 70 ft./lbs. Be sure to check that the head of the bolt has ample clearance when making a 360 degree turn. *NOTE:* The groove on both the spud shaft and steering shaft may need a slight modification for the bolt clearance on **Part No. 716403** yoke.

On both kits, the set screw bolts should be check and, if necessary, re-torque at every oil change.

ROUTING THE STEERING DRIVESHAFT:

Routing the steering driveshaft may seem simple, but care should be taken as to the actual routing. On some Land Cruiser installations, it may be necessary to go directly through the motor mount; however, most will have the steering shaft well above the engine mounts. Routes may be adjusted by changing the angle of the steering box slightly, or by extending the universal yoke from the column bushing with a spacer. Before any final route is decided, be sure to allow for suspension travel and engine movement. Be sure that your angles do not exceed a total of 30 degrees, or 15 degrees per universal. If more severe angles are used, the universal yokes will bind, causing major steering difficulties. On some conversions, a third universal yoke might be considered along with a bearing pillow block.

FRONT CROSSMEMBER:

When installing the Saginaw conversion, the front crossmember will require an access hole that is roughly 3" in diameter to provide clearance for the steering spud shaft clamp. This access hole allows the steering spud shaft to extend through and into the engine compartment. In most cases, the front crossmember must be reinforced on both the top & bottom because of the diameter of the access hole.

STEERING BOX LOCATION:

The power steering box will require every bit of space between the bumper and front crossmember. The actual positioning of the steering box should be accomplished by bolting the box to the plate provided, and then temporarily clamping the plate and box to the inner frame rail until an ideal position is achieved. Make sure this position allows the steering spud shaft to extend through the front crossmember and into the engine compartment. Once in position, the plate must be completely welded to the frame. Since this plate encounters extreme forces from the steering system, the welding of this plate should be done by a certified welder.

The steering box mounting plate must have a solid surface for welding and positioning. We have provided a extra 3/16" thick steel frame enclosures to box the passenger side of your frame rail. The extra plate is simply supplied for boxing of the passenger side frame rail. On vehicles equipped with winches, it may be necessary to offset the winch bumper to allow for the steering box clearance.

Before the box can be mounted to the frame rails, you will need to torch or drill two large clearance holes into the front crossmember. These holes will provide clearance for the steering box spud shaft to go beneath the radiator and enter into the engine compartment area. The hole on the front side should be at least 3" in diameter, while the backside hole can be 1-1/2" in diameter. If you have moved your radiator from the original location, you may require radiator modifications. The upper bumper gusset may need to be sectioned for the mounting of the steering box plate.

When using the mounting plate and frame enclosures **(P/N 716839)**, you will be required to have these components welded onto your frame rails. These welds should be made only by a qualified welder. Do not short change your installation with a poor quality weld of these mounting plates to your frame rail. The plates should be welded along the complete perimeter.

SAGINAW STEERING BOXES:

Power and Manual steering gear boxes are very similar. We have already illustrated what the two boxes should look like. Normal applications were on GM cars, but a few other vehicles also used the same boxes. The steering box must be able to mount on the inside frame rail of your vehicle, with the input shaft extending horizontally toward the firewall. This input shaft is normally not long enough to extend fully into the engine compartment to couple with the steering driveshaft. This is why we offer steering spud shafts to extend these steering box input shafts.

Power: On power steering boxes, you will be required to use four bolts when using our mounting plate, **P/N 716839**. The 4 bolts must be installed from the bracket side into the steering box. Some of the newer Chevy boxes come only with a 3 bolt mounting flange. This is similar to the manual steering boxes. P/N 716839 will still work on these boxes. DO NOT drill out the threads in the power steering box assembly.

Manual: The manual steering box mounts to the mounting plate with only three bolts. These bolts come through the mounting plate and fasten to the steering box. We use the same mounting plate, **P/N 716839**, as we do for the power box.

Saginaw Steering Box: We offer a custom rebuilt heavy-duty power steering box. This box offers you a variable 16-13 to 1 ratio which produces better steering characteristics for both on and off road. This box offers a 3-3/8" turn lock-to-lock ratio, a heavier torsion shaft for a better feel of the road, a 30 spline input, and uses the o-ring style hose fittings. This box can be ordered under **P/N 716882**.

TIE RODS:

Each of our kits include the necessary short tie rod for your conversion. This tie rod has a special left hand metric thread and one right hand American thread. The tie rod connects to the Saginaw pitman arm and then to the stock Land Cruiser tie rod end located on the passenger side. Care should be taken for the proper fit of the tie rod end's taper and threads when installing into the Pitman arm. In some cases, it may be necessary to use two or three washers on the top side of the Pitman Arm so that the threads on the tie rod end will secure the proper taper fit. All tie rod ends must be secured with a castle nut and cotter pin. All tie rod-to-tie rod end connections must have a tie rod clamp installed with a bolt, lock washer, and nut. We DO NOT find it acceptable to cut and weld the tie rods.

PITMAN ARMS:

The steering box Pitman arms vary from power to manual, and are not interchangeable. *The Pitman arm supplied in each kit is for use on vehicles that are not equipped with a suspension lift.* If your vehicle requires a dropped Pitman Arm, then we suggest that you contact a suspension lift company. We DO NOT find it acceptable to cut or bend our Pitman arms.

POWER STEERING PUMPS:

There are only a few pumps available and most are interchangeable. We recommend the purchase of the power steering pump and steering box as a pair if possible. For proper installation, special hoses will probably have to be made. The hardware for mounting the pump to the engine can be standard parts from Chevy & Ford engines. Stock 6 cylinder applications require a special pump mounting bracket. We offer this mounting bracket under **P/N 716842** which fits 1975-81 vehicles. The power steering pully for the Saginaw pump can be purchased from Man-A-Free.

TURNING ANGLE ADJUSTMENT:

To avoid damage to the outer axle U-joints, it is advisable that you check the turning angle. To adjust the turning angle stops, loosen the lock nut and turn the adjustment screw. The adjusting screw is located on the axle tube near the knuckle housing. For further detailed information, refer to your vehicle service manual.

CASTER ADJUSTMENT:

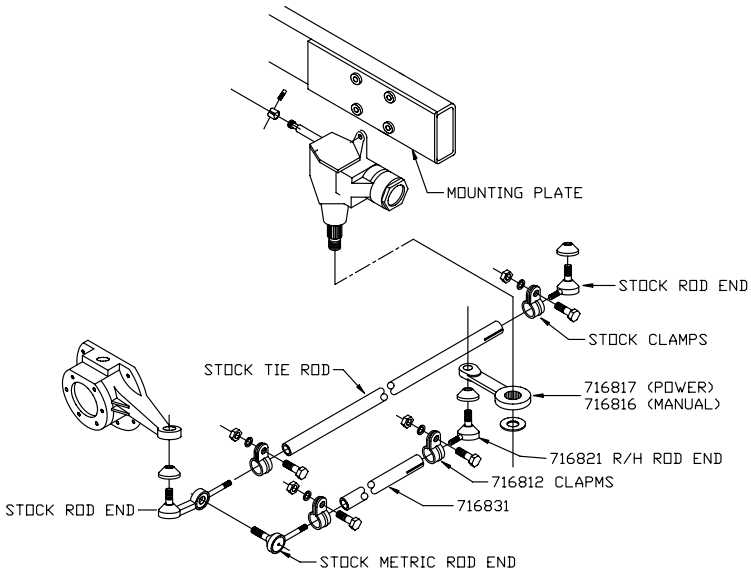
The purpose of the caster adjustment is to provide steering stability, which will keep the front wheels in a straight ahead position. It also assists in straightening the wheels after making a turn. If the angle of the caster is found to be incorrect, correct it to the specifications given in your service manual. The correct angle is obtained by installing caster shims between the axle pad and the springs. If the camber and the toe-in are correct and it is known that the axle is not twisted, a check may be made by testing the vehicle

on the road. Before road testing, make sure that the tires are properly inflated at the same pressure. If the vehicle turns easy to either side, but is hard to straighten out, insufficient caster for ease of handling is indicated. If correction is necessary, it can be accomplished by changing the shims between the spring and axle pads.

TOE-IN ADJUSTMENT:

Lift the front of the vehicle to raise the front tires off of the ground. Turn the wheels to the straight ahead position. Using a pencil or chalk, scribe a line in the center of each tire tread. The mark should circle the entire diameter of the tire. Measure the distance between the scribe lines at the front and rear of the wheels, using care that both measurements are made at an equal distance from the floor level. The distance between the lines should be greater at the rear then at the front by 3/64" to 3/32". To adjust, loosen the clamp bolts and turn the long tie rod with a small pipe wrench. The tie rod is threaded with right hand and left hand threads to provide equal adjustment at both wheels. Do not overlook the retightening of the two clamp bolts. It is a common practice to measure between the wheel rims. This is satisfactory providing the wheels run true. By scribing a line on the tire thread, a measurement is taken between the road contact points reducing error caused by wheel rim run out.

It is recommended to have the alignment done by a qualified technician.



Saginaw steering installed on an FJ55.

Although our kits are not designed for the FJ55 Land Cruiser, Saginaw steering can be installed using our kits; however, major modifications to fit the Saginaw box are normally required.

STEERING COMPONENTS:

Although we manufacture and sell complete kits for Saginaw steering conversions, we do offer the individual components.

- **P/N 716811** - Stock Land Cruiser column bushing (up to 1972)
- **P/N 716812** - Tie rod clamp
- **P/N 716814** - Spud shaft clamp
- **P/N 716816** - Manual pitman arm
- **P/N 716817** - Power pitman arm
- **P/N 716821** - Right hand thread tie rod end
- **P/N 716822** - Land Cruiser column mounting plate
- **P/N 716831** - Land Cruiser tie rod 25-1/2"
- **P/N 716833** - Land Cruiser column bushing (1972 &1979)
- **P/N 716834-30** - Spud shaft .730" dia. x 30T (manual & power)
- **P/N 716834-36** - Spud shaft .730" dia. x 36T (manual)
- **P/N 716835** - Spud shaft .800" dia. x 36T (power)
- **P/N 716836** - Land Cruiser (Spicer) steering shaft 29"
- **P/N 716839** - Power and Manual steering box mounting plate (with passenger side frame enclosure)
- **P/N 716840** - Land Cruiser (Spicer) steering shaft 26-1/2"
- **P/N 716842** - Land Cruiser 6 cylinder power steering pump bracket
- **P/N 716851** - Land Cruiser column yoke with a 3/4" DD
- **P/N 716860** - Steering shaft support bushing (for a pillow block assembly.)
- **P/N 716862** - Collapsible steering shaft and yoke assembly
- **P/N 716863** - Collapsible steering shaft
- **P/N 716881** - Saginaw power steering box After 1980 with o-ring fittings .800 dia., 36 spline input shaft
- **P/N 716882** - Saginaw power steering box After 1980 with o-ring fittings .730 dia., 30 spline input shaft
- **P/N 716884** - Power steering pump Pre-1980 with flare fittings, press on pulley & SAE mounting holes
- **P/N 716885** - Power steering pump After 1980 with o-ring fitting, press on pulley & metric mounting holes