Jeep Liberty

en.wikibooks.org
On the 28th of April 2012 the contents of the English as well as German Wikibooks and Wikipedia projects were licensed under Creative Commons Attribution-ShareAlike 3.0 Unported license. A URI to this license is given in the list of figures on page 65. If this document is a derived work from the contents of one of these projects and the content was still licensed by the project under this license at the time of derivation this document has to be licensed under the same, a similar or a compatible license, as stated in section 4b of the license. The list of contributors is included in chapter Contributors on page 63. The licenses GPL, LGPL and GFDL are included in chapter Licenses on page 69, since this book and/or parts of it may or may not be licensed under one or more of these licenses, and thus require inclusion of these licenses. The licenses of the figures are given in the list of figures on page 65. This PDF was generated by the \LaTeX typesetting software. The \LaTeX source code is included as an attachment (source.7z.txt) in this PDF file. To extract the source from the PDF file, you can use the pdfdetach tool including in the poppler suite, or the http://www.pdflabs.com/tools/pdftk-the-pdf-toolkit/ utility. Some PDF viewers may also let you save the attachment to a file. After extracting it from the PDF file you have to rename it to source.7z. To uncompress the resulting archive we recommend the use of http://www.7-zip.org/. The \LaTeX source itself was generated by a program written by Dirk Hünniger, which is freely available under an open source license from http://de.wikibooks.org/wiki/ Benutzer:Dirk_Huenniger/wb2pdf.
Contents

1 Cover .......................................................... 3

2 Authors .......................................................... 5

3 History .......................................................... 7
  3.1 Sport .......................................................... 7
  3.2 Limited ....................................................... 7
  3.3 Renegade ..................................................... 7
  3.4 Rocky Mountain Edition .................................... 8

4 Suspension .......................................................... 9
  4.1 General ....................................................... 9
  4.2 Lift Kits ..................................................... 10

5 Drivetrain .......................................................... 13
  5.1 Engines ...................................................... 13
  5.2 2.4L PowerTech I4 .......................................... 13
  5.3 3.7L PowerTech V6 .......................................... 13
  5.4 2.8L VM Motori I4 .......................................... 14
  5.5 Specifications ............................................... 14
  5.6 Cooling ..................................................... 14
  5.7 Engine Swap ................................................ 15
  5.8 External Links ............................................. 15
  5.9 Transmissions ............................................. 15
  5.10 Automatics ................................................. 15
  5.11 Manuals ................................................... 16
  5.12 Cooling ................................................... 16
  5.13 Off-Roading ............................................... 18
  5.14 External Links ............................................. 18
  5.15 Transfer Cases ............................................ 18
  5.16 NV231J .................................................... 18
  5.17 NV241J .................................................... 19
  5.18 NV242 .................................................... 19
  5.19 Slip Yoke Eliminator ...................................... 19
  5.20 Tires & Rims ............................................... 20
  5.21 General Information ...................................... 20
  5.22 Stock Liberty Wheel Specs ................................ 20
  5.23 15"vs. 16"Wheels .......................................... 21
  5.24 Backspacing and Wheel Spacers .......................... 21
  5.25 Tire/Lift Chart ........................................... 22
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Abbreviations &amp; Terms</td>
<td>55</td>
</tr>
<tr>
<td>11 Resources</td>
<td>59</td>
</tr>
<tr>
<td>11.1 Information</td>
<td>59</td>
</tr>
<tr>
<td>11.2 Parts</td>
<td>59</td>
</tr>
<tr>
<td>12 GNU Free Documentation License</td>
<td>61</td>
</tr>
<tr>
<td>13 Contributors</td>
<td>63</td>
</tr>
<tr>
<td>List of Figures</td>
<td>65</td>
</tr>
<tr>
<td>14 Licenses</td>
<td>69</td>
</tr>
<tr>
<td>14.1 GNU GENERAL PUBLIC LICENSE</td>
<td>69</td>
</tr>
<tr>
<td>14.2 GNU Free Documentation License</td>
<td>70</td>
</tr>
<tr>
<td>14.3 GNU Lesser General Public License</td>
<td>71</td>
</tr>
</tbody>
</table>
1 Cover
2 Authors

• unixxx¹
• JeepKJ02²
• AdamIsAdam³
• Kevin⁴
• Tokyojoe⁵
• Kugellager⁶

Category:Jeep Liberty⁷

¹ http://en.wikibooks.org/wiki/User%3Aunixxx
² http://www.cardomain.com/ride/453391
³ http://www.cardomain.com/ride/325889/10
⁴ http://home.comcast.net/~corwyn/firewall-penetration.html
⁵ http://www.cardomain.com/ride/718416
3 History

The Jeep Liberty (KJ), or Jeep Cherokee (KJ) outside North America, was introduced in 2002 to replace its predecessor the Jeep Cherokee (XJ). The Liberty comes with Jeep’s distinctive 7-slot grille and round headlights. On April 12, 2002, the Liberty was lowered one inch. In 2003, the rear drum brakes were replaced with disc brakes. In mid-2003, the automatic transmission was changed from the 45RFE to the 42RLE. In 2005, Jeep redesigned the front end and added a diesel model (available for export outside the US since 2002). In 2004, a passenger seat airbag sensor was added. In 2006, ESP and VLP were added and ABS became standard. The Liberty has come in four trim levels: Sport, Latitude, Renegade, and Limited and two special models: CRD and Rocky Mountain Edition. The Sport, Latitude, and Limited are the only versions still in production.

3.1 Sport

The Sport edition Liberty is recognized by its gray fender flares and bumpers.

3.2 Limited

The Limited edition Liberty is recognized by its color-matched fender flares/bumper and chrome grille surround/side strips. A narrow-spoke 17” wheel and tire combination became the standard in 2005, with an optional 5-spoke chrome wheel available exclusively for the Limited models.

The interior has options for an in-dash navigation system, and is appointed with leather seats and a premium sound system.

3.3 Renegade

In 2005, Jeep redesigned the Renegade with the flat hood to give it the rugged look. Jeep also added bumper mounted fog lights. It still had all the features the 2002-2004 Renegade came with, such as the roof mounted lightbar, pocket-style flares, and Renegade emblems.
3.4 Rocky Mountain Edition

The Rocky Mountain Edition is a special edition Liberty based on the Renegade X package. Special features include painted exterior pieces, interior accents, a power sunroof, upgraded wheels, seats embroidered with the Jeep logo, and a Rocky Mountain Edition badge.

Category: Jeep Liberty

In 2004 Columbia Sportswear teamed up with Jeep and offered a Columbia Edition. This was offered prior to The Rocky Mountain Edition. A coupon for a free Columbia Bug A Boo parka came with the vehicle. 26,000 units were manufactured.

1 http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
4 Suspension

Figure 1  2005 Gasoline Jeep Liberty Rear Springs

4.1 General

The front suspension of the Jeep Liberty is an a-arm/wishbone\(^1\) IFS\(^2\). The rear is a live tri-link trailing arm\(^3\) solid axle\(^4\). Both the front and rear suspensions use coil springs.

- /Shocks & Struts/\(^5\)

---

1 \url{http://en.wikipedia.org/wiki/Wishbone_suspension}
2 \url{http://en.wikipedia.org/wiki/Suspension_%28vehicle%29#Independent_suspensions}
3 \url{http://en.wikipedia.org/wiki/Trailing_arm}
4 \url{http://en.wikipedia.org/wiki/Suspension_%28vehicle%29#Dependent_suspensions}
5 \url{http://en.wikibooks.org/wiki/%2FShocks%20%26%20Struts%2F}
4.1.1 Pre-Lowered vs. Lowered

On April 12, 2002, DaimlerChrysler lowered the ride height of the Jeep Liberty suspension by 22mm (7/8”) in the front and 19mm (3/4”) in the rear. This change was made to improve road handling and perceived safety concerns. Many speculate that this is in response to the Autoweek Magazine Slalom test in which a Liberty rolled. Libertys built prior to April 2, 2002 are considered "pre-lowered", because they were made previous to the time when DaimlerChrysler lowered the Liberty. Libertys built after April 2, 2002 is considered "lowered", because they have a lower ride height than the pre-lowered. While a spacer lift will maintain the difference between lowered and pre-lowered, a spring replacement lift will render whether the Jeep was lowered or pre-lowered from the factory irrelevant.

4.2 Lift Kits

4.2.1 OTT

OTT stands for "Over the Top" which means instead of placing the spacer underneath the coil/strut assembly it is placed on top of the assembly.

There are three OTT lifts on the aftermarket for the Jeep Liberty:

- Rocky’s® 2-1/8” Combo Lift  
- Rocky’s® 2.5” Budget Lift  
- Rusty’s® 2.5” Spacer Lift

While no spacer lift will give you a superior ride over a full coil lift, each of the spacer lifts listed above has its own pros and cons. Rocky’s budget lift has known problems, but their combo lift is of much higher quality. Rocky’s combo lift is not a full OTT lift. It combines the spacer lift and the OTT lift to give you the full 2-1/8” in the front. In the rear it’s a straight spacer lift. Rusty’s OTT lift is similar to Rocky’s budget lift, but is known to have fewer problems. The front is a full OTT lift and the rear a spacer lift. Rusty’s OTT lift will give you a total of 2.5 inches of lift. None of the Daystar lifts are OTT. Daystar’s lift product is superior to both Rusty and Rocky’s spacer lifts. Go cougars!

4.2.2 Spacer Lifts

- /Daystar/  
- /Rocky Road Outfitters/  
- /Rusty’s Offroad/  
- /Skyjacker/

---

6 http://en.wikibooks.org/wiki/Jeep%20Liberty%2FSuspension%2FRocky%20Road%20Outfitters  
7 http://en.wikibooks.org/wiki/Jeep%20Liberty%2FSuspension%2FRocky%20Road%20Outfitters  
8 http://en.wikibooks.org/wiki/Jeep%20Liberty%2FSuspension%2FRusty%27s%20Offroad  
10 http://en.wikibooks.org/wiki/%2FRocky%20Road%20Outfitters%2F  
11 http://en.wikibooks.org/wiki/%2FRusty%27s%20Offroad%2F  
12 http://en.wikibooks.org/wiki/%2FSkyjacker%2F
Saying that daystar is far superior to ott lifts is a very opinionated statement. daystar put extra undue stress on the already weak stock coils.

4.2.3 Full Coil Spring Lifts

- /BDS/\(^{13}\)
- /Frankenlift/\(^{14}\)
- /Rocky Road Outfitters/\(^{15}\)
- /Rusty’s Offroad/\(^{16}\)
- /Skyjacker/\(^{17}\)

4.2.4 Other Lifts

- /Clevis Lift/\(^{18}\)
- /Spring Isolator Lift/\(^{19}\)

Category:Jeep Liberty\(^{20}\)

\(^{13}\) http://en.wikibooks.org/wiki/%2FBDS%2F
\(^{14}\) http://en.wikibooks.org/wiki/%2FFrankenlift%2F
\(^{15}\) http://en.wikibooks.org/wiki/%2FRocky%20Road%20Outfitters%2F
\(^{16}\) http://en.wikibooks.org/wiki/%2FRusty%27s%20Offroad%2F
\(^{17}\) http://en.wikibooks.org/wiki/%2FSkyjacker%2F
\(^{18}\) http://en.wikibooks.org/wiki/%2FClevis%20Lift%2F
\(^{19}\) http://en.wikibooks.org/wiki/%2FSpring%20Isolator%20Lift%2F
5 Drivetrain

5.1 Engines

5.2 2.4L PowerTech I4

The 2.4L PowerTech\textsuperscript{1} I4 was available from 2002 to 2005. It was discontinued as a result of sluggish sales. It was only available on Sport, and only available from 2002-2004.

5.3 3.7L PowerTech V6

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{engine_photo.png}
\caption{2005 Jeep Liberty 3.7L PowerTech V6}
\end{figure}

\textsuperscript{1} http://en.wikipedia.org/wiki/Chrysler%20PowerTech%20engine
The 3.7L PowerTech V6 has been available in the Liberty from 2002 to present. It was optional on Sport from 2002-2004, and then standard on all models from 2005-2007. It was standard on Renegade and Limited Edition models from 2002-2004.

Two different PCMs (Powertrain Control Modules) have been coupled with the PowerTech. The JTEC was the older controller and the NGC is the newer controller. The JTEC PCM had three connectors on it and used a separate TCM (Transmission Control Module), while the NGC has four because it integrates the TCM. 2006-2007 Libertys use a hybrid bus system in which the PCM, gas TCM, and ABM (ABS and ESP) use the CAN Bus and everything else uses the PCI Bus. The BCM (Body Control Module) then acts as a bridge between the PCI Bus and CAN Bus.

5.4 2.8L VM Motori I4

The 2.8L VM Motori\(^2\) Turbodiesel was available in the CRD (Common-Rail Diesel) Liberty from 2005 to 2006. The CRD was eventually discontinued in the US as a result of stricter emissions regulations. The engine is still available overseas.

The CRD (Common-Rail Diesel) engine was available on the Sport and Limited Edition models from 2005-2006.

5.5 Specifications

<table>
<thead>
<tr>
<th></th>
<th>2.4L</th>
<th>3.7L</th>
<th>2.8L</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Style</strong></td>
<td>I4</td>
<td>V6</td>
<td>I4 Turbo Diesel</td>
</tr>
<tr>
<td><strong>Displacement</strong></td>
<td>2.4L (148ci)</td>
<td>3.7L (226ci)</td>
<td>2.8L (171ci)</td>
</tr>
<tr>
<td><strong>Horsepower</strong></td>
<td>150 HP @ 5,600 RPM</td>
<td>210 HP @ 5,200 RPM</td>
<td>160 HP @ 3,800 RPM</td>
</tr>
<tr>
<td><strong>Torque</strong></td>
<td>165 ft. lbs. of torque @ 4,000 RPM</td>
<td>235 ft. lbs. of torque @ 4,000 RPM</td>
<td>295 ft. lbs. of torque @ 1,800 RPM</td>
</tr>
<tr>
<td><strong>Cam</strong></td>
<td>Double Overhead Cam (DOHC)</td>
<td>Single Overhead Cam (SOHC)</td>
<td>Double Overhead Cam (DOHC)</td>
</tr>
<tr>
<td><strong>Fuel Injection</strong></td>
<td>Sequential Fuel Injection (SFI)</td>
<td>Sequential Fuel Injection (SFI)</td>
<td>Direct Fuel Injection (DFI)</td>
</tr>
<tr>
<td><strong>Bore</strong></td>
<td>3.44 inches - 87.5mm</td>
<td>3.66 inches - 93mm</td>
<td>3.70 inches - 94mm</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>3.98 inches - 101mm</td>
<td>3.57 inches - 90.8mm</td>
<td>3.94 inches - 100mm</td>
</tr>
<tr>
<td><strong>Compression Ratio</strong></td>
<td>9.5:1</td>
<td>9.6:1</td>
<td>17.5:1</td>
</tr>
</tbody>
</table>

5.6 Cooling

Jeep Liberty CRDs with the 2.8L diesel engine have an intercooler behind the combination transmission cooler & A/C condenser and before the engine radiator.

5.7 Engine Swap

The Chrysler 4.7L PowerTech V8, also known as the Dodge 4.7L Magnum V8, is the most compatible candidate for a larger displacement engine swap.


5.8 External Links

- The 2.4 liter four-cylinder Chrysler-Dodge engine
- Allpar presents the Dodge/Jeep 3.7 liter V-6
- Jeep Horizons Engine Specs

Category:Jeep Liberty

5.9 Transmissions

5.10 Automatics

The 42RLE is a 4-speed overdrive automatic transmission. The 42RLE comes in 2003.5+ Jeep Libertys. The 45RFE is a 4-speed overdrive automatic transmission, with an alternative 2nd gear ratio for downshifting. The 45RFE was replaced by the 42RLE in 2003.5+ Libertys. The 545RFE is a 5-speed overdrive automatic transmission. The 545RFE was the only transmission available in Liberty CRD (diesel engine) models. The Liberty’s maximum tow rating with an automatic transmission is Class III 5,000#. Mechanically, the 42RLE has 13 bolts and a straight crossmember, while the 45RFE and 545RFE have 15 bolts and a backwards angled crossmember. Electronically, vehicles equipped with the 42RLE have a 4 connector NGC PCM (Powertrain Control Module) with an integrated TCM (Transmission Control Module), while those equipped with the 45RFE have a 3 connector JTEC PCM and a separate TCM.

**Gear Ratio Table**

<table>
<thead>
<tr>
<th></th>
<th>42RLE</th>
<th>45RFE</th>
<th>545RFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>2.84</td>
<td>3.00</td>
<td>3.00</td>
</tr>
<tr>
<td>2nd Up</td>
<td>1.57</td>
<td>1.67</td>
<td>1.67</td>
</tr>
<tr>
<td>2nd Down</td>
<td>1.57</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>3rd</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>4th</td>
<td>0.69</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>5th</td>
<td>N/A</td>
<td>N/A</td>
<td>0.67</td>
</tr>
<tr>
<td>Rev</td>
<td>2.21</td>
<td>3.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

4 http://www.allpar.com/mopar/24.html
5 http://www.allpar.com/mopar/37.html
5.11 Manuals

The NSG370 is a 6-speed overdrive manual transmission. The NSG370 comes in 2005+ Jeep Libertys. The NV3500 is a 5-speed overdrive manual transmission. The NV3500 was replaced by the NSG370 in 2005+ Libertys. The NV1500 is 5-speed overdrive manual transmission with an unsynchronized first gear. The Liberty’s maximum tow rating with a manual transmission is Class II 3,500#. The clutch design of the manuals results in a lower tow rating than that of the automatics. A driver skilled in towing with manuals may be able to safely tow more than Class II.

Gear Ratio Table

<table>
<thead>
<tr>
<th></th>
<th>NSG370</th>
<th>NV1500</th>
<th>NV3500</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>4.46</td>
<td>3.96</td>
<td>4.01</td>
</tr>
<tr>
<td>2nd</td>
<td>2.61</td>
<td>2.37</td>
<td>2.32</td>
</tr>
<tr>
<td>3rd</td>
<td>1.72</td>
<td>1.49</td>
<td>1.40</td>
</tr>
<tr>
<td>4th</td>
<td>1.25</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>5th</td>
<td>1.00</td>
<td>0.83</td>
<td>0.73</td>
</tr>
<tr>
<td>6th</td>
<td>0.84</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Rev</td>
<td>4.06</td>
<td>3.54</td>
<td>3.55</td>
</tr>
</tbody>
</table>

5.12 Cooling

Jeep Libertys with the 42RLE transmission have an auxiliary transmission cooler in front of the engine radiator. Libertys with the 45RFE transmission have a cooler built into the engine radiator. Liberty CRDs with the 545RFE have a combination transmission cooler & A/C condenser in front of the intercooler and engine radiator. Libertys with the NSG370, NV1500, and NV3500 manual transmissions don’t have a cooler because manual transmissions lack a fluid pump.

Standard Coolers (3.7L Auto):
<table>
<thead>
<tr>
<th>Year</th>
<th>Auxiliary Transmission</th>
<th>Integrated Transmission</th>
<th>Power Steering</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2003</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes (Manual)</td>
</tr>
<tr>
<td>2004</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
5.13 Off-Roading

An automatic transmission is more popular than a manual for off-roading. It removes the distraction, water leakage, and clutch wear associated with off-road manual shifting. These benefits come at a price, as an automatic is always heavier than an equivalent manual.

5.14 External Links

- List of Chrysler Transmissions
- Chrysler 42RLE Transmission
- Chrysler 45RFE Transmission
- Chrysler 545RFE Transmission

Category: Jeep Liberty

5.15 Transfer Cases

Transfer cases for the Jeep Liberty are built by New Venture Gear, hence the NV prefix. New Venture inherited New Process Gear from Chrysler, therefore the older transfer cases are prefixed with NP. Whether prefixed with NV or NP, parts are interchangeable between the same transfer case model.

Full-time 4WD can be used on pavement because it utilizes the differential in the transfer case. Part-time 4WD Lo and 4WD Hi can’t be used on pavement because they lock the axles together in the transfer case. While the 2WD, full-time 4WD, and part-time 4WD Hi modes support the maximum vehicle speed, the part-time 4WD Lo mode does not. Part-time 4WD Hi should not be engaged over 55mph. Essentially, part-time 4WD should be used for off-road, full-time 4WD for maximum traction on-road, and 2WD for everything else.

5.16 NV231J

The NV231J, utilized in the Command-Trac system, is a mechanically shifted part-time transfer case. Its chain-driven aluminum construction makes it weaker than gear-driven iron transfer cases.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Gear Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2WD</td>
<td>1.00:1</td>
</tr>
</tbody>
</table>

9 http://en.wikipedia.org/wiki/Chrysler_42RLE_transmission
10 http://en.wikipedia.org/wiki/Chrysler_45RFE_transmission
11 http://en.wikipedia.org/wiki/Chrysler_545RFE_transmission
13 http://en.wikipedia.org/wiki/Transfer%20case
### Mode Gear Ratio

<table>
<thead>
<tr>
<th>Mode</th>
<th>Gear Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-HI Part Time</td>
<td>1.00:1</td>
</tr>
<tr>
<td>N</td>
<td>N/A</td>
</tr>
<tr>
<td>4-LO</td>
<td>2.72:1</td>
</tr>
</tbody>
</table>

### 5.17 NV241J

The NV241J, also known as Command-Trac HD, is sometimes incorrectly referred to as an "NV231J-HD". It was available in the 2005-2007 Jeep Liberty (KJ) with the 6-spd transmission in any package. The transfer case is tagged ”241J” in these applications and uses the same gear ratios as the NV231J. This is not the limited production NV241OR found in the Wrangler Rubicon models.

### 5.18 NV242

The NV242, also known as Select-Trac, is a mechanically shifted full time transfer case.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Gear Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2WD</td>
<td>1.00:1</td>
</tr>
<tr>
<td>4-HI Part Time</td>
<td>1.00:1</td>
</tr>
<tr>
<td>4-HI Full Time</td>
<td>1.00:1</td>
</tr>
<tr>
<td>N</td>
<td>N/A</td>
</tr>
<tr>
<td>4-LO</td>
<td>2.72:1</td>
</tr>
</tbody>
</table>

### 5.19 Slip Yoke Eliminator

A slip yoke eliminator replaces the slip yoke in the rear of the transfer case with a fixed yoke. Primarily this allows for the installation of double cardon joints and reduces the driveshaft angle by increasing the driveline length. These two changes help cut down on vibration caused by lifting the Jeep. As an added benefit, it prevents the transfer case from spilling fluid everywhere if the driveshaft gets pulled out. When installing a slip yoke eliminator, a drive shaft with an integrated slip yoke and double cardon joints must also be installed.

Category:Jeep Liberty

---

5.20 Tires & Rims

5.21 General Information

The Jeep Liberty has an Independent Front Suspension (IFS) which prevents installing a suspension lift greater than 2.5” without major and costly modifications. Without a major overhaul a lift of over 2.5” will cause your CV axles and ball joints to possibly fail. With the currently available lifts, the Jeep Liberty can be fitted with up to 265/75R16 (32”x10.5”) tires. Tires larger than 265/75R16 will require extensive modification of the vehicle and cause major rubbing which will detract from offroadability. The Liberty comes from the factory without locking lug nuts on the wheels, so many owners replace one lug on each wheel with a Mopar locking lug. 245/75R16 (30”x9.7”) is the most popular size used with a 2 1/2” lift; this size requires minimal trimming. 265/75R16 is the largest possible tire size; this size requires trimming the plastic wheel well insert and flattening the pinch weld.

5.22 Stock Liberty Wheel Specs

5.22.1 16x7

Figure 3  16” Jeep Liberty Renegade wheel
15” vs. 16” Wheels

Bolt Pattern: 5x4.5”
Backspacing: 5.5”
Offset: 38mm

5.22.2 17x7.5
Bolt Pattern: 5x4.5”
Backspacing:
Offset:

5.23 15” vs. 16” Wheels

With a 17” wheel there is a limited selection of all-terrain tires available. A popular upgrade for the lifted Liberty is stock 16x8” Jeep Wrangler Rubicon wheels (Moab Wheels) with 5” of backspacing and 245/75R16 Goodyear MTR Tires. The Liberty’s stock 16x7” wheel can fit a 10.5” wide tire with no problems. Only a few 15” wheels can fit on the Liberty without interfering with the brake caliper. Some other choices are the Rock Crawler Xtreme Steel Wheels with a backspacing of 4.5” or 3.75” or Cragar Wheels with 4-4.5” of backspacing. A backspacing of under 4” will work, but is not recommended because rubbing on suspension components may occur.

5.24 Backspacing and Wheel Spacers

Backspacing is a measurement of the distance from the mounting point on the wheel to the back of the rim. The greater the backspacing the closer the wheel to the Jeep and the more likely the wheel will rub on suspension components. The smaller the backspacing the more the wheel sticks out from the wheel well and the more likely the tires will throw mud up the side of the Jeep. A good rule of thumb is to keep the tires within the fender flares but far enough from the suspension components that they don’t rub. Putting larger tires on the Liberty will often require decreasing the backspacing in order to eliminate tire rub on the sway bar. This is where spacers come in. A smaller backspacing can be simulated by installing a wheel spacer to push the wheel out and away from the suspension components. Spidertrax is a reputable cast aluminum spacer manufacturer/dealer whose spacers are plenty safe to install on the Liberty. Just remember that in many states wheel spacers are illegal.

/List of States Where Wheel Spacers are Illegal/16

16 http://en.wikibooks.org/wiki/%2FList%20of%20States%20Where%20Wheel%20Spacers%20are%20Illegal
## 5.25 Tire/Lift Chart

![Tire Image](image)

*Figure 4*  Goodyear Wrangler SR-A 235/70R16 tire from Jeep Liberty Renegade

<table>
<thead>
<tr>
<th>Tire Diameter</th>
<th>Tire Width</th>
<th>Tire Size</th>
<th>Rubbing with 2.5” Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.7”</td>
<td>8.7”</td>
<td>215/75R16*</td>
<td>No Rubbing w/o Lift</td>
</tr>
<tr>
<td>29”</td>
<td>9.3”</td>
<td>235/65R17*</td>
<td>No Rubbing w/o Lift</td>
</tr>
<tr>
<td>29.3”</td>
<td>8.9”</td>
<td>225/75R16*</td>
<td>No Rubbing w/o Lift</td>
</tr>
<tr>
<td>29”</td>
<td>9.3”</td>
<td>235/70R16*</td>
<td>No Rubbing w/o Lift</td>
</tr>
<tr>
<td>30.3”</td>
<td>8.8”</td>
<td>225/75R17</td>
<td>Minor Rubbing w/o Lift</td>
</tr>
<tr>
<td>29.5”</td>
<td>9.7”</td>
<td>245/70R16</td>
<td>Minor Rubbing w/o Lift</td>
</tr>
<tr>
<td>29.9”</td>
<td>9.3”</td>
<td>235/75R16</td>
<td>Minor Rubbing w/o Lift</td>
</tr>
<tr>
<td>30.1”</td>
<td>10.2”</td>
<td>255/70R16</td>
<td>Minor Rubbing w/ Lift</td>
</tr>
<tr>
<td>30.5”</td>
<td>9.7”</td>
<td>245/75R16</td>
<td>Minor Rubbing w/ Lift</td>
</tr>
<tr>
<td>30.5”</td>
<td>10.5”</td>
<td>31x10.5x15</td>
<td>Minor Rubbing w/ Lift</td>
</tr>
<tr>
<td>30.6”</td>
<td>10.7”</td>
<td>265/70R16</td>
<td>Minor Rubbing w/ Lift</td>
</tr>
<tr>
<td>31.2”</td>
<td>11.0”</td>
<td>275/70R16</td>
<td>Moderate Rubbing w/ Lift</td>
</tr>
<tr>
<td>31.8”</td>
<td>9.3”</td>
<td>235/85R16</td>
<td>Moderate Rubbing w/ Lift</td>
</tr>
<tr>
<td>31.6”</td>
<td>10.5”</td>
<td>265/75R16</td>
<td>Moderate Rubbing w/ Lift</td>
</tr>
</tbody>
</table>

*Note: These tire sizes come standard or optional from the factory.*
5.26 Tire Load Ranges

Every letter increase indicates two additional plies.

- **P** - Passenger tire with little sidewall protection. The stock Goodyears that come on the Liberty from the factory fall into this load range. These tires are definitely not recommended for off road as they are street tires with no sidewall protection.

- **LT (C)** - 6 ply Light Truck tire with a good balance of sidewall protection and flex. These tires are recommended for off roading the Liberty because they are both moderately well armored and fit the ground better.

- **LT (D)** - 8 ply Light Truck tire that’s in between C and E. Many tires such as the Bridgestone Dueler A/T Revos don’t have this load range as an option

- **LT (E)** - 10 ply Light Truck tire with maximum sidewall protection and minimum flex. These tires are very heavy and don’t flex very much, as a result they will decrease your gas mileage and are less suited for off road use. The extra sidewall plies that cause the increase in stiffness also will increase the sidewall puncture resistance. Because of this higher resistance to puncture you may want to consider these tires if you spend a lot of time in rocky areas.

5.27 Common Tire Choices

- BFGoodrich All-Terrain T/A KO
- Goodyear Wrangler MT/R
- Bridgestone Dueler A/T Revo
- Firestone Destination M/T
- General Grabber AT
- Kumho Road Venture MT KL71
- Fuel Off-Road Tires

Tire Reviews

- On/Off-Road All-Terrain A/T Tire Comparison chart
- Off-Road Maximum Traction M/T Tire Comparison Chart

17 http://www.bfgoodrichtires.com/overview/all-terrain-t-a-k0/44.html
18 http://www.goodyeartires.com/goodyeartiresselector/display_tire.jsp?prodline=Wrangler+MT%2FR+%28P%29&mrktarea=Light%20Truck
21 http://www.generaltire.com/tires/T5/Grabber-ATsup2-sup
22 http://www.kumhousa.com/Tire.aspx?id=f8656bd8-0a87-4166-82b5-0df52d4ac17e&cat=25
23 http://4wheelonline.com/jeep/Fuel_Off-Road_Tires.219470.0
5.28 External Links

- Jeep KJ Country - Tires / Wheels
- L.O.S.T KJ - Tires, Tyres, Meats, Donuts
- HOW TO: Display 5 bolts on your full size spare tire
- How to Measure Wheel Backspace
- Tire & Speedometer Calculator
- DML Tire and Wheel Calculator
- Speedometer Check Calculator
- Gear Ratio & Tire Size Chart
- Gearing and Gearing Math for Jeeps
- Jeepin in Indiana forum for all Jeep related discussions

Category: Jeep Liberty

29 http://www.rsracing.com/tech-wheel.html#backspace
30 http://www.tacomaworld.com/forum/tirecalc.php
31 http://www.dakota-truck.net/TIRECALC/tirecalc.html
32 http://www.4lo.com/calc/gearspeedo.htm
33 http://www.4lo.com/calc/geartable.htm
34 http://www.novak-adapt.com/knowledge/gearing.htm
35 http://bbb.jeepininin.com
5.29 Performance

5.30 Computers

Computer modifications are needed to realize to full potential of any performance upgrades. The Jeep Liberty computer can be reprogrammed with a different flash image, tricked with a different intake temperature sensor, or tricked with a performance chip. The B&G Jeep Liberty Flash (JTEC-NGC) permanently changes the timing and fuel tables, raises the rev limit and speed limit, and removes torque management. A different intake temperature sensor tricks the engine into adjusting the fuel mixture. Performance chips make various changes, but all suffer from short-lived gains.

The 3.7L gas and 2.8L diesel are very different engines with very different computer modifications. SP Diesel makes a chip for the diesel engine. The ECU on the 2.8L CRD is made by Bosch, and at this time there are two companies offering a re-flash for the CRD ECU, Green Diesel Engineering\(^{37}\) and INMOTION TUNING\(^{38}\). Both vendors offer choices between ECO (economy) and Performance tuning programs.

\(^{37}\) http://www.greendieselengineering.com
\(^{38}\) http://www.inmotionusa.com
5.31 Mufflers and Headers

Many different companies manufacture cat-back exhaust systems\(^{39}\) for the Jeep Liberty. Borla makes a split pipe dual exhaust system. The Borla single side and Gibson Performance\(^{40}\) systems aren’t preferable for off-roading because their larger mufflers\(^{41}\) hang more vulnerably below the lower control arm mounts. Rusty’s Offroad offers a Flowmaster\(^{42}\) Delta Flow based system with a 2.5” clamped mandrel bent tail pipe.

A good off-road or muffler shop should be able to fabricate an off-road friendly exhaust system around a universal aftermarket muffler. Just remember, it’s illegal to remove the catalytic converter\(^{43}\). The Flowmaster 40 and 50 SUV mufflers are common choices, the latter being more quiet and durable. Flowmaster has also released a strengthened diamond plate off-road muffler. Generally, MagnaFlow mufflers offer more performance but less aggressive sound than Flowmasters. MagnaFlows are built from stainless steel while Flowmasters are built from rust susceptible aluminized steel. Aeroturbine and Gibson also manufacturer exhaust options. A 2.5” center in/side out muffler works well with the stock 2.5” mandrel bent tubing. A short restriction in the tubing, immediately upstream of the stock muffler flange, can be removed to increase flow. A new muffler can be welded in its place or, if disassembly is required, a DynoMax flange adapter. Increasing tail pipe diameter will deepen tone and most mufflers will get louder as they break-in. Exposed tail pipe tips should be avoided in off-road applications.

Contrary to popular belief, increasing backpressure will not increase low-end torque. On the other hand, decreasing pipe diameter will increase low-end torque. Decreasing pipe diameter increases velocity and thus the scavenging effect\(^{44}\). The scavenging effect is most pronounced at lower RPMs where it affects low-end torque, but is negligible when using forced induction. The goal is to eliminate as much backpressure as possible while still maintaining sufficient velocity.

JBA manufactures stainless steel short-tube headers\(^{45}\) for the Jeep Liberty. Ceramic coated stainless steel versions, colored silver or titanium, are also available. These headers only work with 2005-2007 Libertys because other years have a different catalytic converter connection. Short-tube headers don’t create as much scavenging effect because they don’t pulse as well as equal length long-tube headers. On the other hand, short-tube headers pass emissions testing, keep the catalytic converters, and are easier to install. The JBA short-tube headers include the "Firecone," which JBA claims increases scavenging. Regardless, all good aftermarket headers remove restrictions and increase efficiency.

\(^{39}\) http://en.wikipedia.org/wiki/Exhaust%20system
\(^{40}\) http://en.wikibooks.org/wiki/Gibson%20Performance
\(^{41}\) http://en.wikipedia.org/wiki/Muffler
\(^{42}\) http://en.wikipedia.org/wiki/Flowmaster%20Mufflers
\(^{43}\) http://en.wikipedia.org/wiki/Catalytic%20converter
\(^{44}\) http://en.wikipedia.org/wiki/Scavenging
\(^{45}\) http://en.wikipedia.org/wiki/Manifold%20%28automotive%20engineering%29
There are a number of different drop-in air filters and replacement intakes available for the Jeep Liberty. The most popular aftermarket filters are made by K&N, who makes both drop-ins and a FIPK replacement intake. AEM Induction Systems and aFe also make a replacement intakes and filters. Since the replacement intakes draw air from the engine compartment, their performance can be increased by installing a ram-air hood that forces cool air into the engine compartment. The CRD’s turbo charger makes performance intakes and filters less advantageous for it than its gas counterpart. There is currently no FIPK available for the CRD. While most aftermarket filters allow greater airflow, they also allow more dust and dirt to enter the engine. For this reason performance filters like the K&N aren’t recommended if the Liberty will be taken off road in dusty conditions. Another alternative is to install a snorkel, which by raising the air intake to roof height will keep dust out and allow for river crossings at the same time. At this time there are snorkels being manufactured for the Liberty.
5.33 Superchargers

Kenne Bell discontinued its supercharger for the Jeep Liberty’s 3.7L engine. The relatively high piston rings in the 3.7L caused piston land weakness and failure, a problem correctable with forged pistons. A 4.7L supercharger can be installed onto the 3.7L, without issue, if a new tube and upgraded pistons are installed.

5.34 Throttle Bodies

![Figure 7](stock(left) vs The Fastman (right) Throttle Body)

The Fastman ported throttle body allows better flow than the stock PowerTech throttle body. Simple throttle body spacers should be avoided as they provide absolutely no performance increase when installed on the Liberty.

---

5.35 Transmissions and Torque Converters

The TransGo Shift Kit causes the Jeep Liberty’s automatic transmission\(^{48}\) to shift more quickly. The same 45RFE PSK kit works with both 45RFE and 545RFE. The kit corrects the soft 1-2 and heavy throttle long 2-3 shifts and provides a firmer 4th and lockup.

The APS High Stall Torque Converter is an efficient torque converter\(^{49}\) that allows more power to be transferred from the engine to the transmission. It features additional stall, firmer lockup, increased torque multiplication, and 6% more efficiency than stock. It’s only available for the 45RFE and not the more common 42RLE.

Suncoast Converters also has a 1200 RPM stall heavy-duty torque converter for the 2.8L CRD. This converter improves fuel economy and power delivery.

---


5.36 See Also

- Engine tuning\(^{50}\)

5.37 External Links

- Advanced Engine Management (AEM Electronics)\(^{51}\)
- AEM Induction Systems (AEM Air Intakes)\(^{52}\)
- advanced FLOW engineering (aFe)\(^{53}\)
- APS Precision Mfg.\(^{54}\)
- B&G Chrysler Specialists\(^{55}\)
- Borla Performance Industries\(^{56}\)
- The Fastman\(^{57}\)
- Flowmaster\(^{58}\)
- Green Diesel Engineering\(^{59}\)
- INMotion Tuning USA\(^{60}\)
- JBA Headers\(^{61}\)
- K&N High Performance Filters\(^{62}\)
- MagnaFlow Performance Exhaust\(^{63}\)
- Rusty’s Offroad Products\(^{64}\)
- TransGo\(^{65}\)
- Gibson Performance Exhaust\(^{66}\)
- Exhaust system backpressure\(^{67}\)
- The straight scoop on backpressure\(^{68}\)
- Backpressure and the Flowmaster exhaust system\(^{69}\)

Category: Jeep Liberty\(^{70}\)

\(^{50}\) http://en.wikipedia.org/wiki/Engine%20tuning
\(^{51}\) http://www.aempower.com/
\(^{52}\) http://www.aemintakes.com/
\(^{53}\) http://www.afefilters.com/
\(^{54}\) http://www.apesprecision.com/
\(^{55}\) http://www.bgchrysler.com/index.html
\(^{56}\) http://www.borla.com/
\(^{57}\) http://www.thefastman.com/
\(^{58}\) http://www.flowmastermufflers.com/
\(^{59}\) http://www.greendieselengineering.com/
\(^{60}\) http://www.inmotiontuning.com/
\(^{61}\) http://www.jbaheaders.com/
\(^{62}\) http://www.knfilters.com/
\(^{63}\) http://www.magnaflo.com/
\(^{64}\) http://www.rustyoffroad.com/
\(^{65}\) http://www.transgoperformance.com/
\(^{66}\) http://www.gibsonperformance.com/
\(^{67}\) http://www.mustangforums.com/archive/threads/exhaust-system-backpressure-9765-1.html
\(^{68}\) http://www.dsmtuners.com/forum/showthread.php?t=168578
\(^{69}\) http://www.flowmastermufflers.com/backpressure.html
\(^{70}\) http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
5.38 Axles

5.38.1 Dana 30a

The 27 spline Dana 30a, also know by Chrysler as the 186FIA, has always been the only front axle available in the Jeep Liberty. It’s an IFS axle with an aluminum housing as indicated by the ‘FI’ and ‘A’/’a’ respectively. Essentially, it’s an aluminum version of the Dana 30 with a longer pinion shaft. Unfortunately, the light weight aluminum construction makes it weaker than the D30 and the longer pinion shaft means pinion related D30 parts won’t fit it. The D30a requires a 1-1/8” socket to remove and install the pinion nut.

CRD Libertys have a different front cradle that lowers and leftward shifts the differential to provide more clearance for the diesel engine. The lowering results in better half-shaft constant velocity joint angles but too little clearance for a differential collar. The leftward shift requires different length half-shafts than those used in the gas Liberty. Due to the shorter left side half shaft CRD models cannot be lifted as high before the CV joints begin to bind.
5.39 Traction Aiding Devices

The axle housing’s aluminum construction is weak and installing a locker in the front differential could cause it to crack. It is recommended that an LSD be installed in place of a locker. It should be noted that installing any traction aiding device in the front will make steering slightly stiffer and cause the steering wheel to spring back to center more quickly than usual.

5.40 Gear Lube

The gear lube in the Dana 30a should be changed every 12,000 miles. Off-roading and towing subject the differential to increased torque, dirt, and water. If the Liberty isn’t off-roaded, isn’t used for towing, and follows the Schedule A maintenance plan, it may be possible to stretch this interval. The differential housing requires 2.6 pints (1.24 liters) of lube. Since the Dana 30a doesn’t have a removable differential cover that could allow to clean it, 75W-140 synthetic lube should be used for either light duty applications or heavy duty off-roading.

5.41 Gearing

Mopar is the only manufacturer of the longer pinion gears required by the Dana 30a. As a result, there are only three sources of 4.10 gears for the Liberty’s front differential: wrecked I4 Libertys, online stores that sell discounted Mopar parts, and Jeep dealerships.

5.42 External Links

- AMSOIL\(^{71}\)
- Chrysler Parts Direct - Dana 30a Ring & Pinion Gears\(^{72}\)
- World Parts Express - Cheap Dana 30a Ring & Pinion Gears\(^{73}\)

Category: Jeep Liberty\(^{74}\)

\(^{71}\) http://www.amsoil.com/
\(^{72}\) http://www.chryslerpartsdirect.com/
\(^{73}\) http://www.worldpartsexpress.com/
\(^{74}\) http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
5.42.1 Chrysler 8.25”

The Chrysler 8.25”, also known as the Corporate 8.25”, is the 29 spline steel rear axle found in most Jeep Libertys. In 2003, the rear drum brakes were replaced with discs. Strength wise, the Chrysler 8.25” fits between the Dana 35 and Dana 44. The axle has two more splines than the Dana 35 and one less spline than the Dana 44. It also uses the larger 6508 bearings, while the Dana 35 uses smaller 5707 bearings. Unlike the Dana 44 and like the Dana 35 it has the weaker c-clips. The Chrysler 8.25” requires a Chrysler Bearing Preload Wrench, Miller# C-4164 or OTC# 6602, to set the carrier bearing preload. It also requires either a 1-1/8”, 1-1/4”, or 1-5/16” socket to remove and install the pinion nut.

Figure 11  2005 Jeep Liberty Chrysler 8.25” Rear Axle Housing and Differential Cover
5.43 Axle Shafts

The Chrysler 8.25” uses c-clips to hold the axle shafts into the differential side gears. Limited clearance between the axle shaft c-clip grooves and side gears can make c-clip installation and removal difficult. When c-clip installation is difficult, selecting thinner c-clips should allow easier future removal. ARB Air Lockers actually come with multiple c-clip thicknesses from which the installer can choose.

Removal of the c-clips is greatly eased by removing the spider gear pinion shaft. Rotate the carrier until the pinion shaft pin is exposed and remove the pin, pinion shaft, and small spider gears. The axle shafts can now be pushed in further to allow the c-clips to fall out with little effort. Re-install everything in the reverse order, being sure to retain the thrust washers on all four spider gears. Lock-Tite is used on the pinion shaft pin from factory and should also be used during re-assembly.

Yukon manufactures 30-7/8” 29-spline c-clip axle shafts, specifically designed for the Jeep Liberty’s Chrysler 8.25” rear axle. Made of 1541H steel, they are 25% stronger than the OEM shafts.

Superior also manufactured 30-7/8” 29-spline c-clip axle shafts, for the Jeep Liberty’s Chrysler 8.25” rear axle. They were made of 4340 chromoly steel and were advertised to be 35% stronger than OEM shafts. (Superior Gear is no longer in business.)
The majority of aftermarket shafts (if not all) for the Chrysler 8.25” 27 and 29 spline are 1541H shafts.

5.44 Differential Covers

The Ruff Stuff Specialties Chrysler 8.25” .375 One Piece Diff Cover is currently the only fabricated cover constructed of 3/8” plate steel with a 1/2” plate steel ring. It features a 1” fill plug. Many companies make 1/4” covers but Ruffstuff is the only company known for a 3/8” thick cover. This cover is welded inside and out and then machined flat.

The Blue Torch Fabworks 8.25” Differential Cover is constructed of 1/4” plate steel with a 3/8” plate steel ring. It’s built to resist peel up and features a protected fill plug.

Moe’s Metalworks 8.25” Differential Cover

The PML 8.25” Differential Cover is constructed of aluminum, features both a threaded fill plug and a threaded drain plug, and holds 3/4 quart more oil than stock. The cover also comes with heatsinking fins, but they must be ground off if the cover’s to be used in conjunction with a fuel tank skid plate.

5.45 Gear Lube

The gear lube in the Chrysler 8.25” should be changed every 12,000 miles. Off-roading and towing subject the differential to increased torque, dirt, and water. If the Liberty isn’t off-roaded, isn’t used for towing, and follows the Schedule A maintenance plan, it may be possible to stretch this interval. The differential housing requires 4.4 pints (2.08 liters) of lube and, if a limited slip is present, 4 ounces (118 milliliters) of limited slip additive. Aftermarket differential covers will change the required lube volume. 75W-90 dino lube should be used for light duty applications and 75W-140 synthetic for heavy duty off-roading and towing.
5.46 Ring & Pinion Gears

The following companies sell ring and pinion gear sets for the 8.25”:

- Genuine Gear - considered the worst among off-roaders
- Motive Gear
- Richmond
- Sierra Gear & Axle - re-branded by West Coast Differential
- Superior Axle & Gear
- US Gear - considered the best among off-roaders
- Yukon Gear & Axle - Best Warranty in the Industry

5.47 External Links

- Ruffstuff Specialties\textsuperscript{75}
- Blue Torch Fabworks\textsuperscript{76}

\textsuperscript{75} http://www.ruffstuffspecialties.com/
\textsuperscript{76} http://www.bluetorchfab.com/
• Crane Hi Clearance\(^77\)
• Motive Gear\(^78\)
• PML\(^79\)
• Randy’s Ring & Pinion - Yukon Gear & Axle\(^80\)
• Richmond\(^81\)
• Rusty’s Offroad - Superior Axle & Gear\(^82\)
• Sierra Gear & Axle\(^83\)
• Superior Axle & Gear\(^84\)
• US Gear\(^85\)
• West Coast Differentials - Sierra Gear & Axle\(^86\)
• Yukon Gear & Axle\(^87\)

Category: Jeep Liberty\(^88\)

### 5.47.1 Dana 35C

The Dana 35C is a steel rear axle found in some 2002 Jeep Libertys. Strength wise, it’s weaker than the more common Chrysler 8.25” rear axle. The Dana 35C is different from the Dana 35. The "C" in the model number refers to *custom*, not *complete*. It indicates that Dana Corporation ships their Dana 35 to DaimlerChrysler who then builds it.

Category: Jeep Liberty\(^89\)

---

77 [http://www.cranehicleclearance.com/]
78 [http://www.motivegear.com/]
79 [http://www.yourcovers.com/]
80 [http://www.ringpinion.com/]
81 [http://www.richmondgear.com/]
82 [http://www.rustysoffroad.com/]
83 [http://www.sierragear.com/]
84 [http://www.superioraxle.com/]
85 [http://www.usgear.com/]
86 [http://www.differentials.com/]
87 [http://www.yukongear.com/]
5.47.2 Gearing

**Figure 14**  Yukon 4.10 Chrysler 8.25” Ring & Pinion Drive Pattern
While larger tires give the Jeep Liberty more ground clearance they also regear it to a numerically lower gear. Therefore, it is often a good idea to eventually regear the differentials to a numerically higher gear in order to compensate for the increase in tire size. When changing gear ratios, both the front and rear differentials need to be regared simultaneously. Generally, as long as the front and rear ratios are within two tenths of each other there won’t be any problems. To break in the new gears the Liberty should be run at low speeds for five hundred miles and then the differential lube should be changed. See each axle’s specific page for more information on regearing it. To identify your rear axle and gear ratio check the ID tag on the driver’s side axle tube near the brake rotor.

**Stock Gear Ratio Table**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic</td>
<td>4.10</td>
<td>3.73</td>
<td>3.73</td>
<td>3.73</td>
</tr>
<tr>
<td>Manual</td>
<td>4.10</td>
<td>3.73</td>
<td>3.55</td>
<td>N/A*</td>
</tr>
</tbody>
</table>

*A manual transmission wasn’t available in North American 2.8L diesel models*
5.48 External Links

- Gear Ratio & Tire Size Chart\(^{90}\)
- Gearing and Gearing Math for Jeeps\(^{91}\)

Category: Jeep Liberty\(^{92}\)

5.48.1 Limited Slips

Limited Slip is a traction aiding differential that will supply a percentage of torque to the tire with the most traction. It works by binding the two side gears of the differential against the carrier when a set speed difference is reached between the two gears. Essentially, if one wheel starts spinning faster than the other by a substantial amount the clutches will step in and prevent any further spin. Unfortunately, the clutches in limited slips aren’t especially strong and are overcome if the slip becomes too great. For this reason, many people opt for a locker instead because it provides 100% lock up.

Posi is a slang term for the limited slip differential. Named after GM’ ”Posi-Traction” unit, which was built by Eaton.

5.49 Front Dana 30a

- /Detroit TrueTrac/\(^{93}\)

5.50 Rear Chrysler 8.25”

- /Trac-Loc LSD/\(^{94}\)
- /Auburn High Performance/\(^{95}\)
- /Detroit TrueTrac/\(^{96}\)

5.51 See also

- Limited Slip Differential\(^{97}\)

---

90 http://www.4lo.com/calc/geartable.htm
91 http://www.novak-adapt.com/knowledge/gearing.htm
96 http://en.wikibooks.org/wiki/%2FDetroit%20TrueTrac%2F
97 http://en.wikipedia.org/wiki/Limited_slip_differential
5.52 External Links

- Eaton (Detroit TrueTrac)\(^98\)
- Auburn\(^99\)
- Ring Pinion (Auburn and Dura Grip)\(^100\)

Category: Jeep Liberty\(^101\)

5.52.1 Lockers

A locker works by locking the two side gears of the differential to the carrier. In a manual selectable locker the two wheels are in 100% lock until the locker is disengaged. In an automatic locker the two wheels are always locked together until one needs to spin faster than the other, as is the case when cornering. Automatic lockers work in the reverse of limited slips in that they’re normally locked and only unlock during turns, rather than being normally unlocked and only resisting wheel speed difference during slip. A locker is better than a limited slip because it will give the driver 100% lock and won’t give out when a large amount of slip is encountered.

5.53 Front Dana 30a

- /ARB Air Locker/\(^102\)
- /Aussie Locker/\(^103\)

5.54 Rear Chrysler 8.25”

- /ARB Air Locker/\(^104\)
- /PowerTrax No-Slip/\(^105\)
- /Detroit Locker/\(^106\)

5.55 See also

- Locking Differential\(^107\)

---

\(^98\) http://www.detroitlocker.com
\(^99\) http://www.auburngear.com
\(^100\) http://www.ringpinion.com/b2c/PartCats.aspx?SearchMode=Brand&BrandID=3
\(^101\) http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
\(^102\) http://en.wikibooks.org/wiki/%2FARB%20Air%20Locker%2F
\(^103\) http://en.wikibooks.org/wiki/%2FAussie%20Locker%2F
\(^104\) http://en.wikibooks.org/wiki/%2FARB%20Air%20Locker%2F
\(^105\) http://en.wikibooks.org/wiki/%2FPowerTrax%20No%20Slip%2F
\(^106\) http://en.wikibooks.org/wiki/%2FDetroit%20Locker%2F
\(^107\) http://en.wikipedia.org/wiki/Locking_differential
5.56 External Links

- ARB 4x4 Accessories\textsuperscript{108}
- Eaton - Detroit Locker\textsuperscript{109}
- Richmond Gear - Powertrax\textsuperscript{110}
- Torq Masters Technology - Aussie Locker\textsuperscript{111}

Category: Jeep Liberty\textsuperscript{112}

\textsuperscript{108} http://www.arb.com.au/
\textsuperscript{109} http://www.eatonperformance.com/
\textsuperscript{110} http://www.richmondgear.com/
\textsuperscript{111} http://www.offroadlockers.com/
\textsuperscript{112} http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
6 Armor

6.1 Skid Plates

The skids should be installed in the following order: transfer case skid, transmission skid, engine skid. This rear to front ordering prevents the skid overlap from catching obstacles when driving forward.

6.1.1 Engine

The Jeep Liberty’s OEM engine skid plate is strong but scrapes up a lot of dirt when off roading. The Skid Row Front skid plate, constructed of 3/16” steel, is a good replacement. The Skid Row skid fits all 2002-present Libertys, including the CRD, and includes an engine oil filter drain hole.

6.1.2 Gas Tank

The Jeep Liberty’s OEM gas tank skid plate is strong, but sometimes bends, causing the gas tank to crack. The Skid Row Gas Tank skid plate, constructed of 3/16” steel, is a good replacement. The Skid Row skid is compatible with most hitch receivers and differential guards and includes a heat shield to protect the plastic gas tank from exhaust heat. The Skid Row skid fits all 2002-present Libertys. Rusty’s Offroad also makes a gas tank skid for the Liberty.

6.1.3 Transfer Case

The Jeep Liberty’s transfer case has an aluminum body and needs protection. Fortunately, the OEM transfer case skid plate is plenty strong enough and probably won’t need replacement. The Skid Row Front Skid Plate and Rusty’s Off Road Transfer Case Skid, both constructed of 3/16” steel, are possible replacements. The Skid Row skid fits all 2002-present Liberty’s, including those with the NV242 transfer case, and includes a transfer case oil drain hole.

6.1.4 Transmission

The OEM transmission skid plate is the weakest of the Jeep Liberty’s skids and should be replaced first. The All J Products Super Skid, constructed of 1/4” steel with formed sides, reinforcing ribs, and outriggers, is a very durable replacement. Currently, the Super
Skid comes in two different models: the Super Skid I fits 2002-2003 gas Libertys and all CRD Libertys, while the Super Skid II fits 2004-2006 Libertys. The Skid Row Engine & Transmission Skid Plate and Rusty’s Offroad Engine Tranny Skid, both constructed of 3/16” steel, are also good replacements. The Skid Row skid fits all 2002-present Libertys, including the CRD, and includes an engine oil drain hole.

6.2 Rock Rails

6.2.1 JCR Offroad Inc.

These sliders are designed for hardcore off-road abuse. The main tube is made with 3”x2” boxed tubing with a .188” wall. Side tubes are 1.75” x .125 wall (where applicable.) They bolt to the pinch seam with 5 bolts and the main legs off the sliders mount with 8 bolts to the uni-body. Giving you a total of 13 bolts PER SIDE! Some drilling required, but easily installed. These sliders are created by professional fabricators; therefore the welds, fitment, and attention to detail are second to none. - See more at: http://www.jcroffroad.com/product/KJ-SL3.html#sthash.F6wqmo7R.dpuf

6.2.2 All J Products Boulder Bars

6.2.3 Carolina Rock Shop Rock Rails

Carolina Rock Shop makes rock rails for the Jeep Liberty. The CRS rock rails bolt to the unibody in three separate places, but do not bolt to the pinchweld. For added strength and lower maintenance the rails can be welded rather than bolted directly to the unibody. There is some concern as to whether these rails could be easily torn off as they don’t have pinchweld bolts, but there is no evidence to confirm this.

6.2.4 Mopar Rock Rails

6.2.5 Rock Lizard Skink Sliders

Rock Lizard Fabrications produces the Standard Skink Slider and two different variations of it. The Standard Skink Slider is the base rock rail without any extra features. The Skink Step Slider extends three inches further from the body, thus allowing it to function as a step. The Skink Super Slider has an added tube to protect the doors from trees and rocks. The tube extends from the base rail to just past the plastic door trim. All the Sliders bolt to the Liberty with two dual-arm three-bolt unibody mounts and one large seven-bolt pinch weld mount. The arms extend from unibody mounts in a triangular fashion to reinforce the entire rail. The rails are shipped bare and should be painted with a rust preventer before installation. Powder coat is not recommended because it’s more expensive and will only chip off when the rails come into contact with obstacles off road.
6.2.6 Rocky Road Outfitters Rock Rails

6.2.7 Rusty’s Offroad - Rocker Panel Skids

6.3 Bumpers

6.3.1 ARB Bull Bar

ARB manufactures the most popular bull bar for the Jeep Liberty. It features air bag approval, ventilation, recessed lamp and Hi-Lift provisions, tow points, and a grey powdercoat. Inside, it supports a winch and factory foglights. Outside, it supports lights, antennas, and off-road flags via four pre-drilled holes. While the bull bar weighs less than 100 lbs, spacers or stiffer springs should be used in the front struts to counteract spring sag. There are two versions, one for 2002-2004 Libertys and one for 2005-2007 Libertys. The 2002-2004 model uses the factory turn signals, requires fender flare trimming, and supports the Warn HS9500, XD9000, M8000, and M6000 winches. The 2005-2007 model uses new turn signals, doesn’t require fender flare trimming, and supports the Warn XD9000, M8000, M6000, and 9.5XP winches.
6.3.2 Rock Lizard Monitor Lizard Front Bumper

6.3.3 Rock Lizard Komodo Dragon Rear Bumper

6.4 Differential Guards

- Poison Spyder - Rock Ring
- Four X Doctor - Diff Guard
- Rusty’s Offroad - Diff Guard
- Rocky Road Outfitters - Diff Guard

6.5 External Links

- All J Products\(^{1}\)
- ARB 4x4 Accessories\(^{2}\)
- Carolina Rock Shop\(^{3}\)
- Four X Doctor\(^{4}\)
- JParts.com\(^{5}\)
- Mopar\(^{6}\)
- Poison Spyder\(^{7}\)
- Rock Lizard Fabrications\(^{8}\)
- Rocky Road Outfitters\(^{9}\)
- Rusty’s Off-road Products\(^{10}\)
- Skid Row Offroad\(^{11}\)

Category: Jeep Liberty\(^{12}\)

---

7 Recovery

There is a factory recovery option available for the Jeep Liberty that includes three Mopar tow hooks; two front and one rear. A cheaper and more versatile option is a front or rear hitch receiver\(^1\) accompanied by a hitch clevis or winch. Yet another option is to replace the front tow hooks with a bumper or bullbar with integrated recovery provisions. All of these alternatives require removal of an existing hooks.

7.1 Mopar Hooks

![](image)

**Figure 17** OEM Front Tow Hook MY2005

\(^1\) [http://en.wikibooks.org/wiki/..%2FAccessories%2FTowing_Hitches](http://en.wikibooks.org/wiki/..%2FAccessories%2FTowing_Hitches)
Each front tow hook sandwiches the unibody bumper between the hook base and an m-bolt/clip-nut combination. The clip-nut on both the front and rear hooks is a common automotive fastener which may be available at well stocked hardware stores. The m-bolt used with the front tow hooks is not a common fastener and will need to be purchased from a dealer.

### 7.2 Electric Winches

The ARB bullbar for the Liberty KJ is designed to accommodate the Warn M8000 winch.
Electric Winches

Figure 19  Liberty (KJ) recovering itself with a Warn M8000 winch

Category: Jeep Liberty

8 Electrical

- /Auxiliary Lights/
- /Batteries/
- /CB Radio/
- /ESP/
- /Head Units/
- /Firewall Penetration/
- /Overhead Consoles/
- /PCI Bus/
- /Satellite Radios/

8.1 External Links

- L.O.S.T KJ - Electronics...Stereo...GPS...CBs
- Jeep KJ Country - Electronics
- Basic Car Audio Electronics

Category: Jeep Liberty
9 Accessories

9.0.1 Towing and Cargo

- /Rack Systems\(^1\)
- /Towing Hitches\(^2\)

9.0.2 Suspension

- /Control Arms\(^3\)
- /Sway Bar Disconnects\(^4\)
- /Ball Joints\(^5\)
- /Tie Rods\(^6\)

9.0.3 Other

- /Onboard Air\(^7\)

9.1 External Links

Category:Jeep Liberty\(^8\)

---

10 Abbreviations & Terms

0-9
- 2WD = Two Wheel Drive
- 4WD = Four Wheel Drive

A
- ABS = Anti-Lock Braking System
- A/T = Auto Transmission
- A/T = All-Terrain
- ATF = Automatic Transmission Fluid
- AWD = All Wheel Drive

B
- BCM = Body Control Module
- BFG = BF Goodrich
- BHP = Brake Horsepower
- BJ = Ball Joint
- BJC = Ball Joint Contact
- BS = Backspacing

C
- CA = Control Arm
- CEL = Check Engine Light
- CG = Center of Gravity
- CID = Cubic Inch Displacement
- COG = Center of Gravity
- CPS = Crankshaft Positioning Censor
- CRD = Common Rail Diesel
- CV = Constant Velocity

D
- DC (DCX) = Daimler-Chrysler Corporation
- DFI = Direct Fuel Injection
- DOHC = Double Overhead Cam

E
- ECM = Engine Control Module
- EFI = Electronic Fuel Injection
- EGR = Exhaust Gas Recirculation
- ESP = Electronic Stability Program
Abbreviations & Terms

• EJS = Easter Jeep Safari
• EVIC = Electronic Vehicle Information Center

F
• FWD = Front Wheel Drive
• FT. LBS. = Foot Pound
• FIPK = Fuel Injection Performance Kit (K&N’s Air Intake)
• FSM = Factory Service Manual

G
• GVW = Gross Vehicle Weight
• GVWR = Gross Vehicle Weight Rating

H
• HP = Horsepower

I
• IAC = Idle Air Control
• IAT = Intake Air Temperature
• IFS = Independent Front Suspension

J
• JK = Jeep Wrangler (2007+)
• JBA = Jeepin’ By Al

K
• KJ = Jeep Liberty (2002-2007)
• KK = Jeep Liberty (2008+)
• KS = Knock Sensor
• KPL = Kilometers per Liter
• KPH = Kilometers per Hour

L
• LWB = Long Wheel Base (SJ, XJ, ZJ, WJ, KJ)
• LCA = Lower Control Arm
• LBJ = Lower Ball Joint
• LSD = Limited Slip Differential
• LBS-FT = Pounds Foot of Torque

M
• MAP = Manifold Absolute Pressure
• MAT = Manifold Air Temperature
• MFI = Multi-Port Fuel Injection
• MIL = Malfunction Indicator Light
• M/T = Manual Transmission or Mud-Terrain
• MPFI = Multi Point Fuel Injection
• MPG = Miles Per Gallon
• MPH = Miles Per Hour
• MPI = Multi Port Injection
• MPV = Multi-Purpose Vehicle

N
• NP = New Process
• NV = New Venture
• NVG = New Venture Gear

O
• O2S (OS) = Oxygen Sensor
• OC = Open Circuit
• OEM = Original Equipment Manufacturer
• OME = Old Man Emu
• OBA = On Board Air
• OBD = On Board Diagnostic

P
• P/N (PN) = Part Number
• PCM = Powertrain Control Module
• PCV = Positive Crankcase Ventilation
• PSI = Pounds per Square Inch

Q

R
• RE = Rubicon Express
• RPM = Revolution Per Minute
• RWD = Rear Wheel Drive
• RWHP = Rear Wheel Horsepower

S
• SFI = Sequential Fuel Injection
• SFA = Solid Front Axle
• SRA = Solid Rear Axle
• SAS = Solid Axle Swap
• SOHC = Single Overhead Cam
• SRS = Supplemental Restraint System
• SWB = Short Wheel Base (CJ, YJ, TJ, JK)
• SS = Speed Sensor

T
• TB = Throttle Body
• TBI = Throttle Body Injection
• TC = Tire Carrier or Transfer Case
• TD = Turbo Diesel
• TDC = Top Dead Center
• TDI = Turbo Direct Injection
• TPS = Throttle Position Sensor
Abbreviations & Terms

- TPMS = Tire Pressure Monitoring System
- TSB = Technical Service Bulletin

U
- UCA = Upper Control Arm
- UBJ = Upper Ball Joint
- UBJC = Upper Ball Joint Contact

V
- VIN = Vehicle Identification Number

W
- WOT = Wide Open Throttle

X

Y

Z
11 Resources

This page contains a collection of links that the authors of this WikiBook have found to be useful for further information about the Jeep Liberty. Much of our own knowledge came from these sources, therefore we’d like to acknowledge them here and pass on their usefulness to the reader.

11.1 Information

- L.O.S.T. KJ
- Jeep KJ Country

11.2 Parts

- AutoTruckToys.com - Jeep Liberty Accessories and Jeep Liberty Parts
- Drivewire.com - Jeep Liberty Parts Catalog
- Junk Yard Dog - Used Auto Parts Junkyard Search
- Just For Jeeps - Mopar Jeep Accessories and Jeep Parts
- Mopar - Original Equipment Parts and Accessories
- NewMoparParts.com - New Original Equipment Parts
- PartsTrain.com - Hard to Find Auto Parts and Truck Parts
- CarId.com - Automotive Aftermarket Accessories
- Savage Jeep Parts - Original Equipment Parts
- Troy’s KJ Links and Parts
- World Parts Express - New OEM Parts
- Car Parts and Accessories - Info to buy and find the cheapest components

---

5. http://www.junkyarddog.com/cgi-bin/requester/requester.cgi
• Thread on L.O.S.T. listing even more places to buy parts\textsuperscript{15}

Category: Jeep Liberty\textsuperscript{16}

\textsuperscript{15} http://www.lostkjs.com/forum/phpBB2/viewtopic.php?t=6020
\textsuperscript{16} http://en.wikibooks.org/wiki/Category%3AJeep%20Liberty
12 GNU Free Documentation License

1. REDIRECT Wikibooks:GNU Free Documentation License\textsuperscript{1}

\textsuperscript{1} \url{http://en.wikibooks.org/wiki/GNU\%20Free\%20Documentation\%20License}
## 13 Contributors

<table>
<thead>
<tr>
<th>Edits</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Adrignola¹</td>
</tr>
<tr>
<td>1</td>
<td>Aya²</td>
</tr>
<tr>
<td>1</td>
<td>Darklama³</td>
</tr>
<tr>
<td>3</td>
<td>Derbeth⁴</td>
</tr>
<tr>
<td>1</td>
<td>Dirk Hünniger⁵</td>
</tr>
<tr>
<td>1</td>
<td>Guanaco⁶</td>
</tr>
<tr>
<td>9</td>
<td>Jguk⁷</td>
</tr>
<tr>
<td>1</td>
<td>Jomegat⁸</td>
</tr>
<tr>
<td>5</td>
<td>Maveric149⁹</td>
</tr>
<tr>
<td>1</td>
<td>Mike.lifeguard¹⁰</td>
</tr>
<tr>
<td>1</td>
<td>Reyk¹¹</td>
</tr>
<tr>
<td>2</td>
<td>Robert Horning¹²</td>
</tr>
<tr>
<td>1</td>
<td>SB Johnny¹³</td>
</tr>
<tr>
<td>345</td>
<td>Unixxx¹⁴</td>
</tr>
<tr>
<td>3</td>
<td>Van der Hoorn¹⁵</td>
</tr>
<tr>
<td>4</td>
<td>Whiteknight¹⁶</td>
</tr>
<tr>
<td>2</td>
<td>Withinfocus¹⁷</td>
</tr>
</tbody>
</table>

⁵ https://en.wikibooks.org/wiki/User:Dirk_H%C3%BCnniger
List of Figures

- cc-by-sa-3.0: Creative Commons Attribution ShareAlike 3.0 License.  http://creativecommons.org/licenses/by-sa/3.0/
- cc-by-sa-2.5: Creative Commons Attribution ShareAlike 2.5 License.  http://creativecommons.org/licenses/by-sa/2.5/
- cc-by-sa-2.0: Creative Commons Attribution ShareAlike 2.0 License.  http://creativecommons.org/licenses/by-sa/2.0/
- cc-by-sa-1.0: Creative Commons Attribution ShareAlike 1.0 License.  http://creativecommons.org/licenses/by-sa/1.0/
- cc-by-2.0: Creative Commons Attribution 2.0 License.  http://creativecommons.org/licenses/by/2.0/
- cc-by-2.0: Creative Commons Attribution 2.0 License.  http://creativecommons.org/licenses/by/2.0/deed.en
- cc-by-2.5: Creative Commons Attribution 2.5 License.  http://creativecommons.org/licenses/by/2.5/deed.en
- cc-by-3.0: Creative Commons Attribution 3.0 License.  http://creativecommons.org/licenses/by/3.0/deed.en
- PD: This image is in the public domain.
- ATTR: The copyright holder of this file allows anyone to use it for any purpose, provided that the copyright holder is properly attributed. Redistribution, derivative work, commercial use, and all other use is permitted.
- EURO: This is the common (reverse) face of a euro coin. The copyright on the design of the common face of the euro coins belongs to the European Commission. Authorised is reproduction in a format without relief (drawings, paintings, films) provided they are not detrimental to the image of the euro.
- CFR: Copyright free use.
List of Figures


Copies of the GPL, the LGPL as well as a GFDL are included in chapter Licenses\textsuperscript{18}. Please note that images in the public domain do not require attribution. You may click on the image numbers in the following table to open the webpage of the images in your web browser.

\textsuperscript{18} Chapter 14 on page 69
<table>
<thead>
<tr>
<th>Figure</th>
<th>Author</th>
<th>License</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>2</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>3</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>4</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>5</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>6</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>7</td>
<td>KY Liberty</td>
<td>CC-BY-SA-2.5</td>
</tr>
<tr>
<td>8</td>
<td>KY Liberty</td>
<td>CC-BY-SA-2.5</td>
</tr>
<tr>
<td>9</td>
<td>KY Liberty</td>
<td>CC-BY-SA-2.5</td>
</tr>
<tr>
<td>10</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>11</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>12</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>13</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>14</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>15</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>16</td>
<td>Unixxx</td>
<td>GFDL</td>
</tr>
<tr>
<td>17</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>18</td>
<td>Michael Robinson</td>
<td>GFDL</td>
</tr>
<tr>
<td>19</td>
<td>Unixxx</td>
<td>GFDL</td>
</tr>
</tbody>
</table>

19 http://commons.wikimedia.org/wiki/User:Unixxx
20 http://commons.wikimedia.org/wiki/User:Unixxx
21 http://commons.wikimedia.org/wiki/User:Unixxx
22 http://commons.wikimedia.org/wiki/User:Unixxx
23 http://commons.wikimedia.org/wiki/User:Unixxx
24 http://commons.wikimedia.org/wiki/User:Unixxx
26 http://commons.wikimedia.org/wiki/User:Unixxx
27 http://commons.wikimedia.org/wiki/User:Unixxx
29 http://commons.wikimedia.org/wiki/User:Unixxx
30 http://commons.wikimedia.org/wiki/User:Unixxx
31 http://commons.wikimedia.org/wiki/User:Unixxx
32 http://commons.wikimedia.org/wiki/User:Unixxx
33 http://commons.wikimedia.org/wiki/User:Unixxx
34 http://commons.wikimedia.org/wiki/User:Unixxx
35 http://commons.wikimedia.org/wiki/User:Unixxx
36 http://commons.wikimedia.org/wiki/User:Unixxx
37 http://commons.wikimedia.org/wiki/User:Unixxx
38 http://commons.wikimedia.org/wiki/User:Unixxx
40 http://commons.wikimedia.org/wiki/User:Unixxx
41 http://commons.wikimedia.org/wiki/User:Unixxx
42 http://commons.wikimedia.org/wiki/User:Unixxx
43 http://commons.wikimedia.org/wiki/User:Unixxx
44 http://commons.wikimedia.org/wiki/User:Unixxx
45 http://commons.wikimedia.org/wiki/User:Unixxx
46 http://commons.wikimedia.org/wiki/User:Unixxx
47 http://commons.wikimedia.org/wiki/User:Unixxx
The GNU General Public License is a free, copyleft license for software and other kind of works.

The licenses for most software and other practical works are designed to be unrestrictive and to encourage the use of shared resources to work together in building a common software infrastructure. Many of the ideas underlying the GNU General Public License are also described in the section "How to Use the GNU General Public License" in the next subsection.

The GNU General Public License is intended to make electronic software and other kind of works as available as possible; to allow you to copy, modify, and distribute them so that you can make use of them in the most useful way possible. A primary concern is to ensure that people have the right to use software that they themselves produce, such as a personal diary or a program to control a toy robot.

The "corresponding source code" for a work means the machine readable form of documentation comprising the program or works that can be read systemically by a computer, in their entirety, for the purpose of getting a working knowledge of the code. Corresponding source code may be in object code or source code form. This license expressly permits publication and distribution of the machine readable form of a corresponding source code along with the corresponding executable code. When published, a program, the corresponding source code must be made freely available to all those who want to link another's program with it for personal and community benefit. This license grants you the right to create corresponding source code for the corresponding executable. You may freely distribute and use the corresponding source code, and you may table, reproduce, distribute and communicate a work that is a derivative work of the licensed program where the correspondence between the derivative and the corresponding source code is required by the license of a derivative that is based on the corresponding source code.

The "GNU GPL" allows you and others to copy, distribute and modify a work as long as you distribute the corresponding source code, which makes it possible to share and to build upon each other's work. It is designed to ensure that you can use and redistribute software freely and that you receiveun of the source code. It is designed to allow you to make and distribute derivative works in any medium, provided that you do so under this License.

The "GPL" also allows you to build on others' work and to release it with your own. It is the most widely used copyleft license because its legal form has been proven in court many times to support widespread use of software in the public interest. Legal fees have been kept low to encourage litigation in favor of the GPL and the open-source community. The GNU GPL is copyleft in that any derivative work must include the GPL.

The "GPL" is a copyleft license. Copyleft is a way of using copyright law to promote free sharing and modification. This license is designed to make sure that copyright law cannot be used to prevent the free sharing of software. Copyright law can be used to prevent copying or distribution of software, but the GPL can be used to prevent the kind of anti-free-sharing use of copyright that has sometimes been carried out by companies that try to make the computer industry work for their profit. The GPL says that if you distribute a program, you must also give the source code so the person you deliver it to can see what you did and decide what to do with it. The GPL stops people from using copyright as a weapon against you.

The "GPL" is not a "share alike" license. It allows you to use a GPL program in any way that the GPL allows, including as a component of a product you sell. This means that you can use or sell the GPL software in any way you choose. However, the GPL does require that if you include the GPL program as a component of a product you sell, you must include the source code for that program. This requirement is called the "corresponding source code requirement." The GPL requires that you distribute the source code along with the compiled program so that users can see what you did and can modify the program if they want to. The GPL is called a "copyleft" license because it uses copyright law to ensure that users have the freedom to share and modify the program, just as the copyright law allows authors to use copyright law to ensure that users have the freedom to read, reproduce, and distribute their works.

The "GPL" is a "copyleft" license. Copyleft is a way of using copyright law to promote free sharing and modification. This license is designed to make sure that copyright law cannot be used to prevent the free sharing of software. Copyright law can be used to prevent copying or distribution of software, but the GPL can be used to prevent the kind of anti-free-sharing use of copyright that has sometimes been carried out by companies that try to make the computer industry work for their profit. The GPL says that if you distribute a program, you must also give the source code so the person you deliver it to can see what you did and decide what to do with it. The GPL stops people from using copyright as a weapon against you.

The "GPL" is not a "share alike" license. It allows you to use a GPL program in any way that the GPL allows, including as a component of a product you sell. This means that you can use or sell the GPL software in any way you choose. However, the GPL does require that if you include the GPL program as a component of a product you sell, you must include the source code for that program. This requirement is called the "corresponding source code requirement." The GPL requires that you distribute the source code along with the compiled program so that users can see what you did and can modify the program if they want to. The GPL is called a "copyleft" license because it uses copyright law to ensure that users have the freedom to share and modify the program, just as the copyright law allows authors to use copyright law to ensure that users have the freedom to read, reproduce, and distribute their works.

The "GPL" is a "copyleft" license. Copyleft is a way of using copyright law to promote free sharing and modification. This license is designed to make sure that copyright law cannot be used to prevent the free sharing of software. Copyright law can be used to prevent copying or distribution of software, but the GPL can be used to prevent the kind of anti-free-sharing use of copyright that has sometimes been carried out by companies that try to make the computer industry work for their profit. The GPL says that if you distribute a program, you must also give the source code so the person you deliver it to can see what you did and decide what to do with it. The GPL stops people from using copyright as a weapon against you.

The "GPL" is not a "share alike" license. It allows you to use a GPL program in any way that the GPL allows, including as a component of a product you sell. This means that you can use or sell the GPL software in any way you choose. However, the GPL does require that if you include the GPL program as a component of a product you sell, you must include the source code for that program. This requirement is called the "corresponding source code requirement." The GPL requires that you distribute the source code along with the compiled program so that users can see what you did and can modify the program if they want to. The GPL is called a "copyleft" license because it uses copyright law to ensure that users have the freedom to share and modify the program, just as the copyright law allows authors to use copyright law to ensure that users have the freedom to read, reproduce, and distribute their works.

The "GPL" is a "copyleft" license. Copyleft is a way of using copyright law to promote free sharing and modification. This license is designed to make sure that copyright law cannot be used to prevent the free sharing of software. Copyright law can be used to prevent copying or distribution of software, but the GPL can be used to prevent the kind of anti-free-sharing use of copyright that has sometimes been carried out by companies that try to make the computer industry work for their profit. The GPL says that if you distribute a program, you must also give the source code so the person you deliver it to can see what you did and decide what to do with it. The GPL stops people from using copyright as a weapon against you.

The "GPL" is not a "share alike" license. It allows you to use a GPL program in any way that the GPL allows, including as a component of a product you sell. This means that you can use or sell the GPL software in any way you choose. However, the GPL does require that if you include the GPL program as a component of a product you sell, you must include the source code for that program. This requirement is called the "corresponding source code requirement." The GPL requires that you distribute the source code along with the compiled program so that users can see what you did and can modify the program if they want to. The GPL is called a "copyleft" license because it uses copyright law to ensure that users have the freedom to share and modify the program, just as the copyright law allows authors to use copyright law to ensure that users have the freedom to read, reproduce, and distribute their works.
both these terms and this License would be to restrict entirely future developments of the Document. 13. Try to distribute modified versions of the GNU General Public License with the understanding that anyone who receives a copy is also responsible for ensuring that you, individually and in cooperation with others, can be sure to distribute it under the terms of this License. 14. Verify that the conditions in this License and the accompanying documents are satisfied before distributing any modified version of the Document; see section 4, “Requirements for Modified Versions.”

Notwithstanding any other provisions of this License, you have permission to create a derivative work based upon the Document if you publish it under this License or under any other circumstances in which you are permitted to distribute verbatim copies of the modified version of the Document along with the Code for a work that is derived from the Document. It is understood that any derived work will be based somewhat on the Document, but is not otherwise required to be based on the exact content and structure of the Document. It is understood that any derived work will be based somewhat on the Document, but is not otherwise required to be based on the exact content and structure of the Document.

However, any entity that includes a verbatim copy of the entire Document into another document is not required to be based on the exact content and structure of the Document, as long as the included copy of the Document is not modified.

You are free to write almost any kind of work based on the Document, verbatim or with modification, provided that you include an acknowledgment in whatever form you choose that states that the work is based on the Document. You should also state your new copyright notice in any other way you may wish to do so.

You may copy and distribute a derivative work based upon the Document in any medium, either in source code or “binary” form, provided that you conspicuously and appropriately publish on the Colophon or Withdrawn License notice giving the public permission to copy, modify, and distribute copies of the Source Code of the Derivative Work. You must also include a copy of this License in any other copy, including a copy distributed on a medium different from the medium from which you distributed the original Source Code. This License applies to the work as you receive it, subject to any exceptions that may be stated in writing in a license notice accompanying it or in another writing.

You may make a collection consisting of the Document and other documents released under this License, and distribute such a collection, for any purpose, provided that you agree to comply with the following license and copyright statements for all of the documents in inside the collection:

You must附上their titles, with the statements of acceptance of a version permanently authorizes you to choose that version for the Document.

If a section in the Document is Entitled "Acknowledgements", "Dedications", or "Introduction", the requirement (section 4) to Preserve its Title must be waived for that section.

If a section in the Document is Entitled "History", "Status", "Acknowledgements", or "Introduction", the requirement (section 4) to Preserve its Title must be waived for that section.

The Document may contain verbatim copies of portions of the Document, in any language, that are Copyrighted works, and such verbatim copies must either be enclosed in or accompanying the document itself in accordance with this License, or be included in a medium approved by the copyright holder as part of the official electronic distribution of the work in machine readable form. Such included copies should be marked "Verbatim Copy".

You may copy and distribute the Document in any medium, either in source code or "binary" form, provided that you conspicuously and appropriately publish on the Colophon or Withdrawn License notice giving the public permission to copy, modify, and distribute copies of the Source Code of the Derivative Work. You must also include a copy of this License in any other copy, including a copy distributed on a medium different from the medium from which you distributed the original Source Code. This License applies to the work as you receive it, subject to any exceptions that may be stated in writing in a license notice accompanying it or in another writing.

You may copy and distribute the Document in any medium, either in source code or "binary" form, provided that you conspicuously and appropriately publish on the Colophon or Withdrawn License notice giving the public permission to copy, modify, and distribute copies of the Source Code of the Derivative Work. You must also include a copy of this License in any other copy, including a copy distributed on a medium different from the medium from which you distributed the original Source Code. This License applies to the work as you receive it, subject to any exceptions that may be stated in writing in a license notice accompanying it or in another writing.

If a section in the Document is Entitled "History", "Status", "Acknowledgements", or "Introduction", the requirement (section 4) to Preserve its Title must be waived for that section.

You may copy and distribute a derivative work based upon the Document if you publish it under this License or under any other circumstances in which you are permitted to distribute a verbatim copy of the source code of the Derived Work. It is understood that any derived work will be based somewhat on the Document, but is not otherwise required to be based on the exact content and structure of the Document. It is understood that any derived work will be based somewhat on the Document, but is not otherwise required to be based on the exact content and structure of the Document.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.

The Free Software Foundation may publish new, revised versions of the GNU Free Documentation License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

You may use an "about box".

You must provide, in any copy that you distribute, source code for modified versions of the Document that you distribute.

You may not copy, modify, sublicense, or distribute the Document except as expressly permitted under this License.
The “Corresponding Application Code” for a Combined Work means the object code and/or source code for the Application, including any data and utility programs needed for reproducing the Combined Work from the Application, but excluding the System Libraries of the Combined Work. 1. Exception to Section 3 of the GNU GPL. You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and receive engineer- ing for debugging such modifications, if you also do each of the following:

* a) Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.  * b) Accompany the Combined Work with a copy of the GNU GPL and this license document.  * c) For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the copies of the GNU GPL and this license document.  * d) Do one of the following:  o 0) Convey the Combined Work so that they will receive theCorresponding Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with the Library, and explain how to do so.  o 1) Convey the Combined Work so that they will receive theCorresponding Application Code in a form suitable for, and under terms that permit, the user to modify or recombine or relink the Application with a modified version of the Library.  o 2) Convey the Combined Work so that they will receive theCorresponding Application Code in a form suitable for, and under terms that permit, the user to modify or recombine or relink the Application with a modified version of the Library, provided a modified version of the Library accompanied it.  * e) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, covered under the terms of this License.  * f) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

6. Revised Versions of the GNU Lesser General Public License. The Free Software Foundation may publish revised and/or new versions of the GNU Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library as you received it specifies that a proxy can decide which version of the GNU Lesser General Public License “or later versions” applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation.

If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy’s public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.