

## Fixing The 4th Gear Problem: Another Version

### The Problem:

I have an '01 LC which developed a nasty habit of jumping out of 4th gear when the bike was under a heavy load such as being in 4th gear, full throttle and over 3500 RPM. Although it wasn't all that bad at first it finally got to the point that passing a car on the highway meant staying out of 4th gear, either using 3rd or 5th.

Once I passed 20,000 on the odometer it got to the point I could pop the bike out of 4th gear at will. All I needed to do was accelerate even moderately hard in 4th gear and exceed 3500 to 3700 RPM. Under *any* acceleration, over 4,000 RPM the bike would come out of 4th every time.

There has been a lot of discussion about this on the [LC Forum](#) and it appears that this problem exists on some 2000, 2001 and 2002 models. The 1998 and 1999 models do not seem to be afflicted. Some still hold that this problem is caused by the manner of shifting and not a problem with the bike. I contend that is pure bunk. I can ride my brother's 99 LC and it never comes out of 4th and he can ride both mine and his wife's 01 and pop it out of 4th at will. It is a problem with some bikes.

I had done all the recommended things such as [lubing the shift linkage](#) raising the rear shifter and shifting by only using the toe shifter. While I thought, for a while, that this was the cure, the problem only got worse. It was about then that I started reading about quite a few other bikes that were having the same problem and included was a list of parts to replace. These parts included:

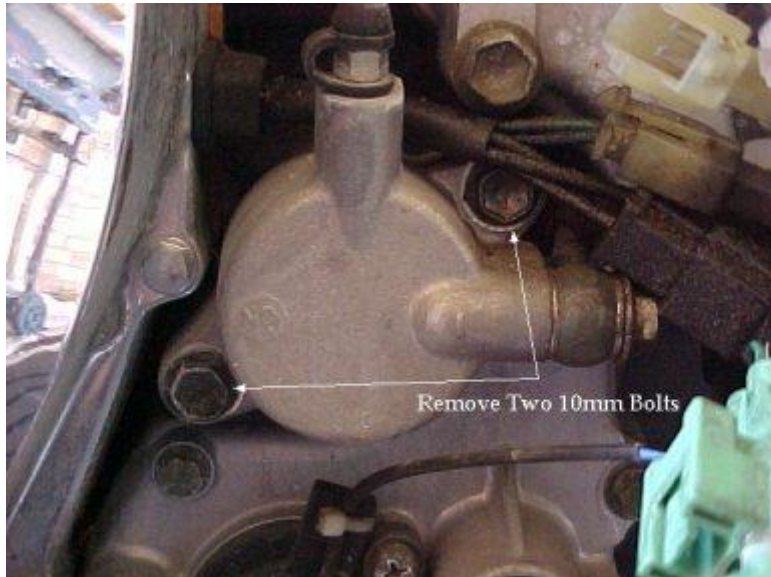
11485-10F10 Gasket, Gear Shift Cover  
25381-10F10 Plate, Gear Shift Cam  
25350-24B00 Stopper Comp, G  
25355-13E10 Spring, Shift C  
09280-35006 O-Ring, ID:35.5

So, I ordered those parts from [RonAyers.Com](#) after checking with several places and finding that Ron Ayers was significantly cheaper than any other quote (by about 40%). One day on my way to work I happened to notice a UPS box sitting in the corner of my porch. Have no idea how long it has been there but was happy to see it none-the-less.

The next Saturday I decided to 'do the fix'. I figured it would take about an hour. Like usual I figured wrong. Murphy hangs out at my house a lot.

Here is the basic steps you'll need to know to get to the parts: Drain the oil into a suitable container. Once that is done put the bike on a bike jack if you have one as this will make it much easier to work on. Make sure the bike is secure and that it won't crash to the ground. Once you have the bike secured and at a suitable working level remove the secondary cover on the left side of the bike (if you were sitting on it).

This is the cover that has the gear shift linkage running in to it. To remove this cover grab an 8mm socket and remove the 4 bolts, two at the top, one towards the front and one underneath. Once the cover is loose pull it away gently and unplug the large electrical plug found underneath.



Once you have the secondary cover removed you will need to remove the clutch slave cylinder which can be seen in the picture at left. Some people have removed the lines and fluid but I didn't. Once it was unbolted I simply bunged it over the side out of my way. You may also have to unplug a few of the electrical connectors to get them out of your way also. Once you have removed the clutch slave cylinder **do not squeeze the clutch lever**. If you do your going to get brake fluid all

over, push the piston out and just generally cause yourself a lot more work.

Remove the shift linkage rod from the shift shaft by removing the 10mm bolt in the linkage arm. You can let this hang free without removing the remainder of the shifter assembly.

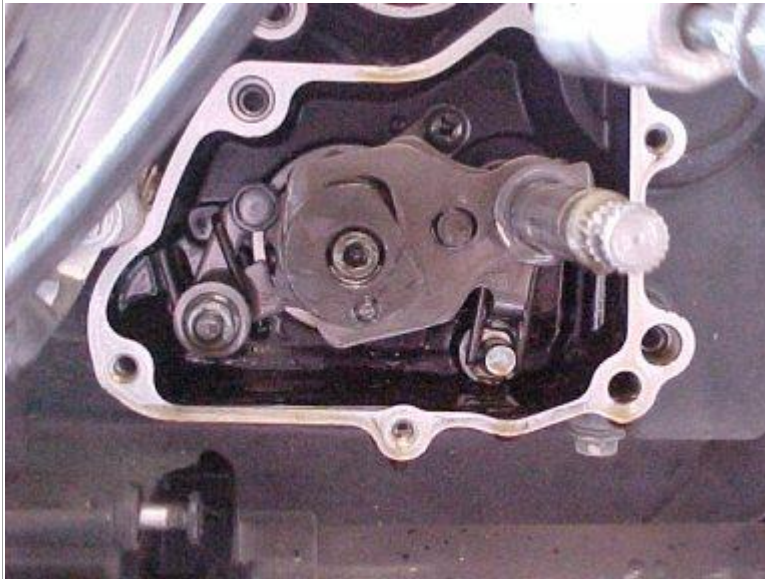


Now that you have the clutch slave cylinder out of the way you can actually get to the cover under which is the shifting parts. Unplug the single wire connector going to the center of this cover (the neutral light circuit) and move this wire out of the way.

Put something on the ground to catch some of the oil that is trapped in this section even though you drained the crankcase. Probably a cup of oil, give or take a little bit.

Using a suitable 8mm socket remove the 6 bolts holding this cover. Take note that not all of the bolts are the same length so you will need to pay attention to which one's are coming out of which

holes.

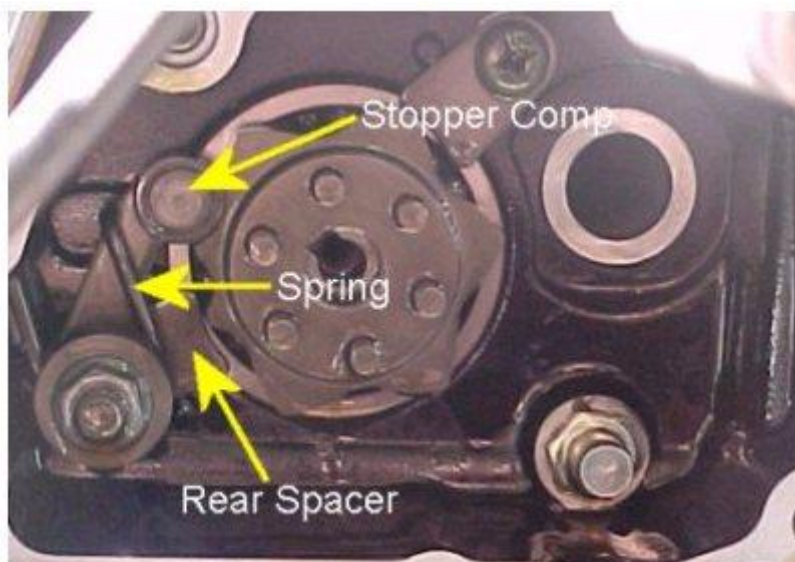


You should now be looking at something like this. There is a snap ring on the shaft that you do not need to remove unless you are going to replace the spring behind it. I removed it, turned out I didn't need to, but I didn't know any better. Snap ring pliers are a must if your planning on removing them (Autozone, \$11.99 and took me about 30 minutes to go to town and get them).

That big lug looking thing in the middle takes a #5 metric Allen wrench to remove. Once you take that center Allen bolt out you can now remove pretty much the whole assembly, shaft and all. Watch on the back of the shaft as it comes out of the crankcase hole, there is a small thin washer.

Okay, here is where we venture in a couple different directions. Originally I intended to replace the 4 parts previously mentioned, those being the gasket (11485-10F10), Plate (25381-10F10), Stopper Comp (25350-24B00) and Stopper Comp Spring (25355-13E10).

However I found something that I think is the problem and it has nothing to do with the parts being replaced. Here is the diagram of the component parts I'm going to start talking about, namely the Stopper Comp Assembly:



From this point on I am going to call the Stopper Comp the *arm* and I'm going to call the center Shift Gear Cam the *star*. I'm from Oklahoma, I like to keep things simple.

By the way, now is a good time to read the [disclaimer](#) for this site because I'm about to give a lot of personal opinion here.

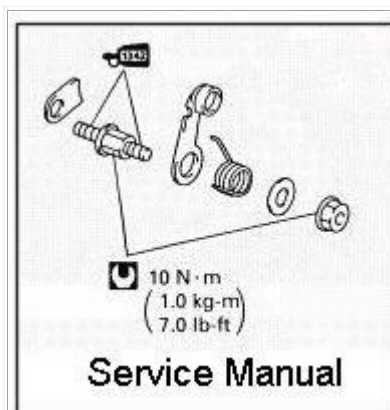
The Stopper Comp arm

appears to me to have one function in life, and that is to keep the shifting star from rotating on its own. In other words to hold the bike in gear after you've made a shift. I can see no other purpose that this device can have other than to apply resistance to the cam lobes on the shifting star.

The Stopper Comp arm has a small wheel on the end and this wheel rides up and down the peaks and valley's of the shifting star. The Stopper Comp arm has a spring attached to it, a rather stout spring, that forces the wheel of the Stopper Comp to ride up and down those peaks and valley's. At this point I came to the conclusion that is is most likely why my bike likes to pop out of 4th gear, because the spring is weak allowing the shifting star to turn.

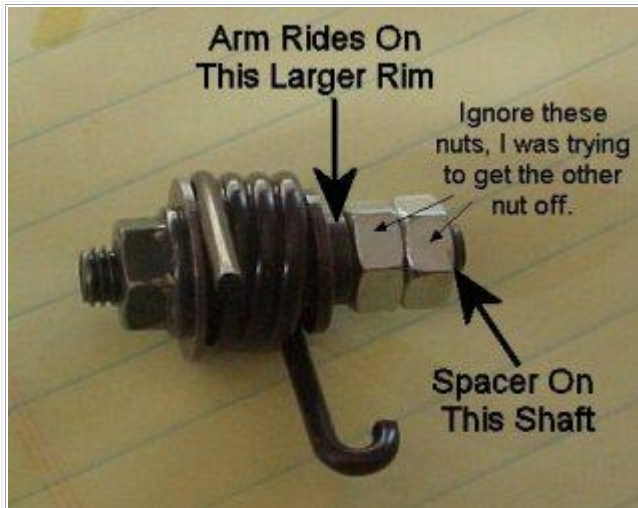


Here is how the peaks and valleys work on the shift cam. When you are in gear and cruising the Stopper Comp arm will be in a valley. It is up to the spring attached to the Stopper Comp arm to make sure that it does not come out of that valley short of you hitting the shifter. I was curious about the 6th lobe and then decided it wasn't used because I could see the trails that the Stopper Comp arm left on the shift cam...there wasn't one on that last lobe (6th gear?). This is probably the same shift cam used on other Suzuki bikes that actually do have a 6th gear.



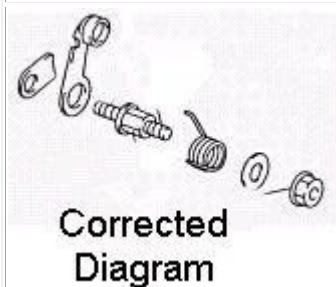
Here is the Service Manual diagram for the Stopper Comp assembly. There are two things worth noting here. First is that the torque specs for the Stopper Comp assembly which is listed as 7.0 lb-ft. The second thing to note is that the service manual is wrong.

This diagram shows the Stopper Comp arm as being between the spring and the shoulder to the rear of the assembly stud. When I took my bike apart I found that the Stopper Comp arm was behind the shoulder directly in front of the rear spacer. My bike was put together wrong... or that's what I thought at first.



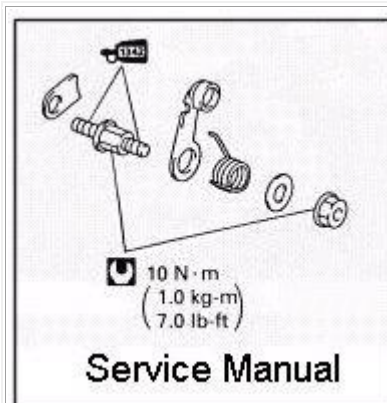
Here is what the Stopper Comp assembly looks like when you try to take the front nut off and rather than that happening the entire assembly (stud) comes out (I'll get to why that happened in a minute).

Ignore the two silver nuts on that stud, I put those on there trying to get the front nut off so I could replace the spring so don't pay any attention to that, but take a look at the raised shoulder between those nuts and the spring. That shoulder is what the Stopper Comp arm rides on and then a spacer goes behind it.



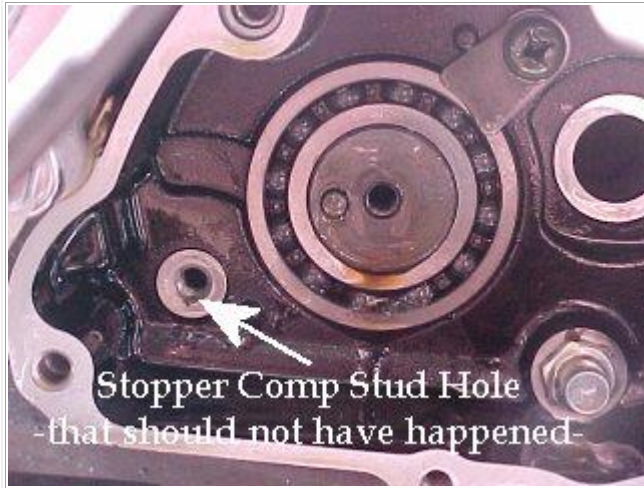
After looking at that, I came to the conclusion that my bike was put together right, but that the service manual is incorrect. The diagram at left shows how the service manual should show this assembly.

Under the spring there is a large 'hex' type shape built onto that stud, it is large enough that the Stopper Comp arm will not fit over it as indicated in the service manual. The way my bike was assembled, as reflected in the corrected version at left, is the only way that it can go. Okay, so the service manual is wrong.



Again I refer to the service manual which indicates that the nut holding the Stopper Comp spring should be torqued to 7.0 ft-lb. So armed with my trusty 1/4" ratchet I proceed to remove that nut. Not gonna happen. 7lbs with a 1/4" ratchet should be no problem.

I ended up getting a 3/8th ratchet and really had to put some torque on that nut, I'm guessing upwards of 20lbs or more. Enough I was getting concerned that I was going to break the stud off in the motor. Time for a cup of coffee to sit and think about this for a while.



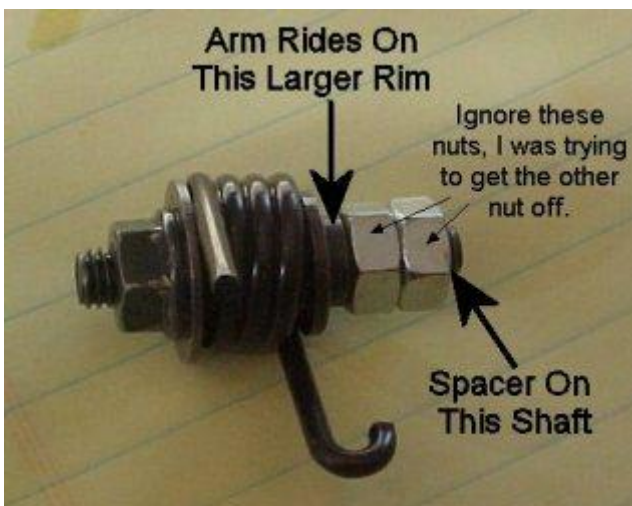
The coffee was good, so I decided to try one more time. I said a couple of quick prayers and started cranking on that nut again and it finally came loose although not the nut, but the entire stud came out. No big deal. I run to town to get a couple of metric nuts that I can put on the other side so I can use two wrenches to break the front nut.

Not gonna happen. I worked on it for about 20 minutes, tried pinging it with a hammer to break any locktite, tried bracing one wrench on the ground, tried pretty much everything. Break out the big tools. I got a long 10mm wrench and the trusty 3/8th ratchet and took another crack. It was about then that I came to the conclusion I was going to break the stud before that nut came off. 7lbs my ass.

Well now I'm not too happy because I came to the conclusion that I was not going to be able to get that nut off to replace that spring. A lot of work done, all for nothing. So I dejectedly started putting things back together.

I put the Stopper Comp assembly back on, put the shifting star back on and the shift cam plate and decided to work it a little bit to make sure it was right. It was about then that I discovered that the Stopper Comp arm was not going down in the shifting star valleys as it should. I started to loosen the Stopper Comp stud and I saw the arm fall in place.

Along about here I made the statement we Southern'rs do when we discover something... 'well I'll be damned' (that means 'hey I found something') ...the Stopper Comp arm is binding up. If I loosened the stud it would work fine, if I tightened it it wouldn't.



Referring back to a previous picture, the Stopper Comp arm rides on a shoulder and has a spacer behind it (where the chrome nuts are). This allows you to tighten the assembly but still allows the Stopper Comp arm to float freely, or in this case allows the spring to push the arm down into the valleys of the shift star.

I then took the entire assembly back apart, shift star, cam plate and Stopper Comp assembly. Once I had the Stopper Comp assembly out I unhooked the spring from the Stopper Comp arm and then bolted it back in place. Sure enough

it would not float, I could move it but it was definitely not free floating.

I took the entire assembly back apart and took the Stopper Comp arm over to my

grinder and did a quick 1-2 second slap to the grinding wheel taking a small amount off the side of the Stopper Comp arm (decreasing the width of the arm). I would then put it back on the bike and check for free floating movement. It took a couple of shots but I got it ground enough to free float.

I then used a polishing wheel to remove the grind marks and smooth it up on the side and re-assembled it with the spring still detached. It was definitely free floating now so I took the Stopper Comp assembly back off, put the spring back on the arm and put all the pieces back together.

Once I got the shift cover on and replaced the clutch slave cylinder along with the shift linkage, I tried out the shifter just sitting there on the floor using my hand. Crap...isn't right, shifts too easy, something isn't engaging. So using one hand I started moving the rear wheel... wait...it seems like it is engaging.

I put the large secondary cover on a bucket so that I could connect the rectifier, filled the bike back up with oil and then started it up. The rear wheel turns... outstanding...so I bolt the covers back on, lower the jack and head out for a test ride.

Almost instantly the first thing I noticed was the shifting was incredibly smooth and precise. You could definitely tell when it engaged a gear and it did it easily with much less force than I was used to. I head on out North of my house where there are some good hills. Pulled the first hill in 4th gear full throttle and up to 4500 RPM, bike stayed in gear (before it would have come out by 3700 at the most).

I did a couple of quick tests, everything seemed fine so I headed back home, cleaned up some and headed out for a long ride, namely because I know where there is a real nice long stretch of road... a field dyno-test. After 100 miles I'm convinced that my 4th gear popout is fixed. I was able to hit 5200 RPM in 4th gear and it stayed in gear and I did repeated 4th gear full throttle runs over 5000 and never once did it come out of gear.

### **My Conclusion...**

The stopper comp arm assembly was extremely tight on my bike, certainly way over the factory specified 7.0lbs. I believe that because this was so tight the stopper comp arm was binding enough that the spring did not exert enough force to hold the stopper comp arm down into the valley's enough to keep the star from turning... thus letting the bike come out of gear.

I also think that because this was put together and tightened so tight there was some compression of the raised portion of the shaft, enough that the arm would now bind with the rear spacer causing enough resistance that the force of the spring was being overcome and allowing the stopper comp arm to not fully seat in the 4th gear valley.

I could be totally wrong, I'm certainly up for anyone that see's something I didn't or thought of something I didn't. Right now I can't force my bike out of 4th gear, where before I couldn't keep it in 4th above 3500 RPM. I have also noticed that shifting now seems much more positive, and smoother, although that may be a figment of my imagination, but it sure feels like a much more positive engagement on the shifter.

If you are having the same 4th gear problem here is a somewhat easy way to test to see if you have the same problem. The good news is you can test this without buying parts, save gaskets and seals if you mess yours up (I used the originals and have no leaks). The bad news is your going to have to dis-assemble a lot of stuff to do the test...about an hours worth.

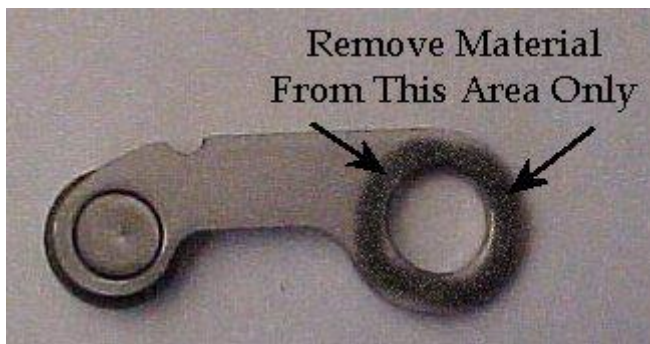
You can follow the instructions way back at the [beginning of this section](#) to get the bike

down to the shifting components. Once you have done that take out the center retainer (5mm Allen bolt) and pull the shift cam plate, shifting star and shifter shaft out and set them aside.

Take the nut off the Stopper Comp assembly (if it comes off) and unhook the spring from the Stopper Comp arm. Put the nut back on and tighten to spec (7.0 ft-lb) and see if the Stopper Comp arm will move freely.

If the nut doesn't come off, but rather the entire stud comes out like mine did you can still do the same test. Remove the spring from the Stopper Comp arm, re-tighten to spec and see if the arm moves freely.

If it does, then you got another problem and may need to order the parts previously mentioned. If the Stopper Comp arm does not float freely then you have the same problem I did. Take the assembly back apart and using a file or grinder (carefully) remove a small (think 100ths of an inch) amount off the side of the Stopper Comp arm, and do a test fit again, if the arm still does not move freely repeat the same procedure until it does.



You should not have to take off more than just a few 100ths of an inch to make the arm move freely. Once the assembled Stopper Comp arm moves freely re-assemble and see if that fixes your problem and drop me an [email](#) and let me know if it did or didn't fix the problem for you.

If you want to order any of the parts related to the Stopper Comp assembly [here is a diagram](#) with the part numbers and prices available from [RonAyers.com](#). The only reason I listed RonAyers is because they were significantly cheaper than anyone else that I got quotes from and I have ordered a lot of parts from them without an issue.

Happy Ridin'.