Accumulators and how to “fix” shifts

What do accumulators do? They “cushion” a shift, or soften by slowing down the apply oil (main line pressure) to a clutch pack or a band. You could almost compare them to the shocks in your suspension. There’s basically two types of accumulators, ones that compress a spring with pressure during a shift and ones that release pressure and the accumulator spring returns the piston back in its bore. The spring tension is designed with shift comfort and quality in mind, you could have too soft of a shift or too hard of a shift, and a slide-bump shift if the wrong spring is used or if you have a leak in the accumulator such as worn seal, bore or worn centering pin.

Now comes the fun part: you can firm up the shifts in any automatic transmission that uses accumulators by either replacing the accumulator spring with a heavier or lighter one. You must know whether you have an applying accumulator or releasing one to know which way to go from your stock springs. A hydraulic diagram of each shift will be the key to knowing this answer. Take a look at diagram and see if pressure is pushing the spring with piston on shift or releasing the spring tension on the piston on shift.

If your accumulator spring is being compressed during a shift then a heavier spring will create a firmer shift. And lighter spring will create a softer shift.

If your accumulator spring has pressure holding it compressed before the shift and released during the shift then a weaker spring will create a firmer shift and a heavier spring will create a softer shift.

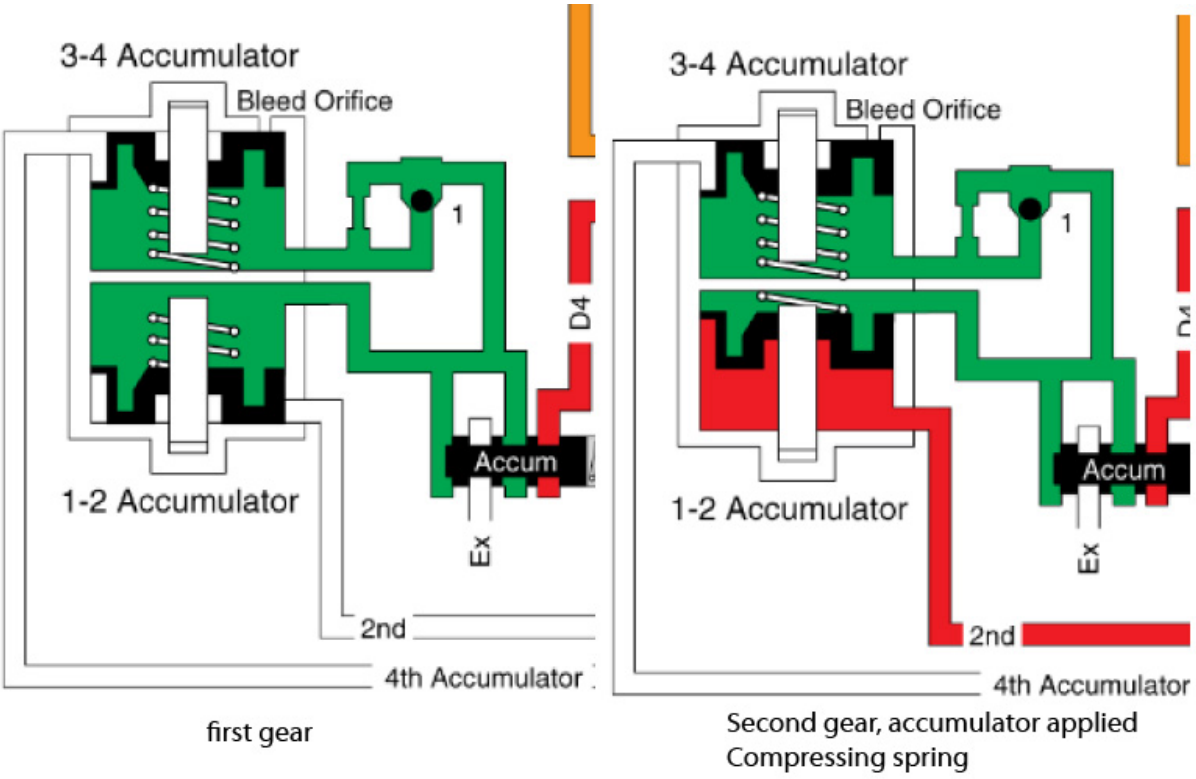
Too soft of a spring on an applying acc. can create a slide bump shift because the accumulator piston will bottom in the bore too fast and the oil pressure can spike at the end and create the slippy apply with whack at the end.

Some transmissions with a band such as the Chrysler Torqueflite transmissions use the band servo as an accumulator for the next shift, (2-3 in Torqueflites)

Point to know: the slower the accumulator piston strokes or bottoms is the firmer the shift will be and the faster it strokes the softer shift will be.

Block the piston travel such as with pin, sleeve or such a heavy spring it can't move will create a very harsh shift in most cases because you've taken out the ability to accumulate. (You cannot do this to band servo type accumulators) some units you can also simply block the feed holes into the accumulator, removing it from the shift. (Try this on 700R4/4L60E 3-4 accumulator, makes no significant difference and you'll wonder why it has an accumulator)

Sample of GM 700R4 1-2 accumulator



Note in the sample left diagram shows first gear with 1-2 accumulator piston held down in bottom of bore by acc. spring and accumulator oil pressure (green)

The on right side shows after the 1-2 shift the accumulator piston has been compressed with main line oil (red) which has been sent to the 2nd band. A firmer spring in this situation will create a harder shift, slowing down the time it takes to compress the spring, desirable for performance enhancements! Do make sure your piston bore is not scored up, seals are good and centering pin/piston bore are all tight and good if has one. You can play around with springs and see what's best.