# Front Derailers for Touring

## *Simple, but Fussy*

By Sheldon Brown

Although front derailers are less complex mechanically than rears, they are a lot fussier. The rear derailer does its shifting with the lower section of chain, which is not under tension. The front derailer must work with the part of the chain that is under tension from the drive forces of the pedals. Add the fact that the front derailer is commonly dealing with size differences, of 10 teeth or more, and you'll understand why front shifting has always been more troublesome than rear shifting.

PHOTOS BY MARK GORSETH

**As the rear derailer shifts the chain on the cluster, the angle of the chain will vary as it runs through the front derailer.**

### Trim

As the rear derailer moves the chain back and forth on the cluster, the angle of the chain will vary as it runs through the front derailer. As a result, shifting the rear derailer may cause the chain to rub on one side of the front derailer cage. This is commonly cured by using the front shift control to move the cage just a little bit — just enough to let the chain run clear, called "trimming" the front derailer.

Indexing front shifters, pioneered by Shimano, can make it impossible to trim the front derailer cage. Some indexed front shifters have an extra click or two for trim; others don't. If everything is adjusted just right, and you're using the chainwheels the front derailer was designed to work with, you can manage without trim, but if you have customized your chainwheel sizes, you may have to give up some gear combinations.

**Handlebar-end shifters will work with any front derailer.**

### Matching Curvature

Getting good performance from a front derailer requires setting the cage as close to the chainwheels as possible without rubbing on the chainwheel teeth. Ideally, the curvature of the bottom of the outer cage plate should exactly match the curvature of the large chainring. If you use a chainring larger than the derailer cage was designed for, the lower (rear) end of the cage will come close to the large chainring's teeth while there's still a gap farther forward. This gap will reduce shifting precision.

If you use a large chainring smaller than the derailer cage was designed for, the front end of the cage will almost hit the teeth, while the rear end of the cage is far away from the ring. This will increase the need for trimming the front as you shift gears in back.

### Double vs. Triple Front Derailers

Front derailers come in double and triple styles. If you have a typical modern triple setup, with, say, a 10-tooth difference between the two larger chainrings, you really need a triple-type front derailer.

If you are into half-step-plus-granny style of triple crank, where there's only a small difference in size between the middle and large chainring, you're better off with a so-called double-type front derailer.

### Cable Travel

Shimano rear derailers all index the same. For a given amount of cable travel, they all move the same amount sideways. As long as the shifter matches the number of sprockets in the cluster, any Shimano-compatible rear derailer will index with any Shimano-compatible shifters/cluster.

Unfortunately, this is not the case for front derailers. Shifters made for upright handlebars pull more cable per shift than drop-bar STI units. This causes a problem if you

want to use upright handlebars on a bike with a road drive train, or drop handlebars on a mountain bike.

**Upright Bars on Road/Touring Bikes**

If you wish to install upright (mountain) handlebars on a bike with a road drivetrain, you'll need to replace the front derailer. There's only one Shimano model that is designed to work with the combination of mountain shifters and road (52-53 teeth max) chainrings. This is a little-known model called the R440, which you may well need to special-order.

If you are willing to forego front indexing, you can use SRAM GripShift controls. The GripShift front shifters commonly sold for aftermarket installation are not indexed. Shimano does not currently manufacture any non-indexed shifters for straight bars.

**Drop Bars; MTB/Hybrid Drive Trains**

If you wish to install drop handlebars with STI shifting on a bike with typical microdrive (42-46 teeth max) chainwheels, you won't find a front derailer to do the job. The alternative is to use handlebar-end shifters, a.k.a. "barcons," which are readily available. The rear shifters are indexed, (with a friction option) but the fronts are pure friction controls, so they'll work with any front derailer.

**Three Front Derailer Adjustments**

1) Clamp Position. The most critical front derailer adjustment is its position on the bicycle frame. This must be set correctly before you attempt to adjust the limit stops. There are two variables, angle and height.

Th angle of the front derailer is judged by looking down on the cage. The centerline of the cage should be parallel to the centerline of the frame, but modern front derailers have very subtly shaped cages, which can make it difficult to tell when you've got it just right.

Rotating the derailer so that the back of the cage is farther out will sometimes improve shifting to the small ring of a triple by preventing overshifting, but may increase the need for trimming on the larger rings. It may also cause the crank to strike the cage.

Rotating the derailer so that the front of the cage is farther out will help reduce the need for trimming on the large chainwheel, and will provide crisper downshifting, but with a greater tendency to overshift on the inside. This may be appropriate on bicycles equipped with an anti-derailment device.

The height of the front derailer is a principal factor in how well it will shift. Manufacturers commonly recommend 2mm clearance between the bottom of the outer cage plate and the teeth of the large chainwheel. This is a bit of an oversimplification. The best performance will usually result from the very lowest position for the derailer that still just barely keeps the cage from hitting the chainwheel teeth.

2) Low-gear limit stop. The low-gear limit stop, adjusted via a screw, prevents the derailer from shifting past the smallest chainwheel and throwing the chain onto the bottom bracket shell. If it is adjusted too loosely, the chain will fall off when you try to downshift to the small chainwheel. If it is adjusted too tightly, it will be difficult or impossible to shift to the small chainweel.

**Position the front derailer cage as close to the chainwheels as possible for good performance.**

On older front derailers, the low-gear stop screw is the one closer to the frame. Many newer designs reverse this position for reasons relating to the mechanism used.

The basic adjustment for the low-gear stop is to set it so that the chain just barely clears the inner plate of the cage when the lowest gear (small front, large rear) is selected. This will usually be the best position for double-chainwheel setups, and will permit the use of most or all of the rear sprockets with a minimum of trimming.

For triple chainweels, it will sometimes be necessary to adjust the low-gear stop a bit looser, so that the outer plate of the derailer can travel far enough to knock the chain off of the middle ring.

3) High-gear limit stop. The high-gear limit stop should be set so that the chain almost rubs on the outside plate of the front derailer cage when the bicycle is in its highest gear (large front/ small rear). This will reduce trimming.

If the shift to the large chainwheel is slow, make sure that you aren't pedaling too hard. If the shift is unreliable even when you are pedaling lightly, you may be able to improve it by loosening the high-gear stop a bit. If you do so, make sure the derailer cage won't be struck by the crank as it goes by.

---

*Visit Sheldon Brown's website at* www.sheldon-brown.com /harris