

Go with a 1X System and Ditch Your Front Derailleur

by Curtis Henry, Cannon Cyclery



If you have been in the shop lately and happened to hear or been a part of a discussion with me on SRAM's revolutionary idea of a single chain ring drive train, you likely got more than an earful. It's exciting, simple, and very cost effective and I tend to get really worked up about the benefits and features that a lack of front derailleur has. I am admittedly a SRAM guy, and preface my passionate discussion of all things SRAM by making that clear before going off the rails about how much I love the 1X (pronounced "One-By") system. That being said, the idea of ditching your front derailleur is brilliant for just about everyone. No really, unless you're a hardcore bike racer, it's a darn near perfect system and it has an amazing amount of upside to it. The 1X arrangement has been a mainstay in the mountain bike world for several years now and has revolutionized mountain bike drive systems. It's a very hot topic right now in the cycling world, and more cyclists, triathletes, and occasional riders are making the switch. Should you make the switch? Read on and let's discuss the idea from a practical, mathematical, and cost standpoint.

Benefits of a 1X System

Why 1X? Well, there are several benefits of the 1X system that solve a few common mechanical issues. From simplifying your shifting choices to a rock-solid chain retention the 1X design benefits from the historical decades of multi-chain ring problems that precede it.

First, the infamous dropped chain so common on double and triple chain rings systems is simply not possible with a 1X system, when properly built with the right parts. That's right, no more dropped chains ever, which I know is a bold statement.

Here's how that works; The SRAM X-Sync chainring design that is used with this system utilizes a narrow-wide-narrow-wide tooth pattern on the chain ring that holds the chain in place. The chain only fits into the teeth one way which gives the chain ring a firm grip on the chain while letting it roll smoothly when pedaling. The rear derailleur has a very tight and strong spring on the pulley cage with a clutch that slows the spring action and reduces chain bouncing while pulling the chain tight to the chain ring. The system is efficient and quiet and helps you get more watts to the pedals. Genius right? Because the system was originally designed as a mountain bike system and has been around for a while now, several other companies have created their own versions of the narrow-wide design and opened up dozens of chain ring size and fit options for both the mountain and road side. So let's say thanks to the smart fellas at SRAM for eliminating the chain drop issues and pioneering a now commonplace drivetrain miracle.

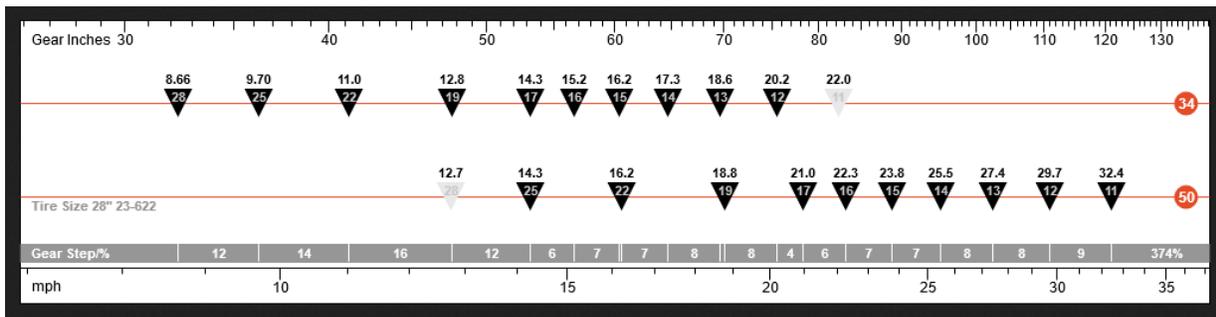
Second, without multiple chain ring options the choices are simple and easier to find the right gear. No more guess work on what gear to select when trying to find the perfect cadence. No more trying to remember when to shift and stressing over what chain ring you're in. The 1X

system utilizes an 11speed wide range cassette which covers all the range of a traditional system and has consistent changes between each gear. Want a harder gear, simply shift up; Easier gear, shift down with only one shifter to think about. This is a great option for new cyclists as well as experienced ones, both will appreciate the value of simplicity.

Speaking of finding the right gear, one of the most common questions I get about the system is almost always; “But, will I have enough gears?” Meaning, “But I *NEED* my small ring to climb hills, and I *NEED* my big ring for bombing downhills and I use *ALL* my gears?!?” Sure, you’ll still have all the gearing you need. I won’t get too Engineer-ey on you here but let’s dive into some of the numbers behind this idea.

You Will Have All the Gearing You Need

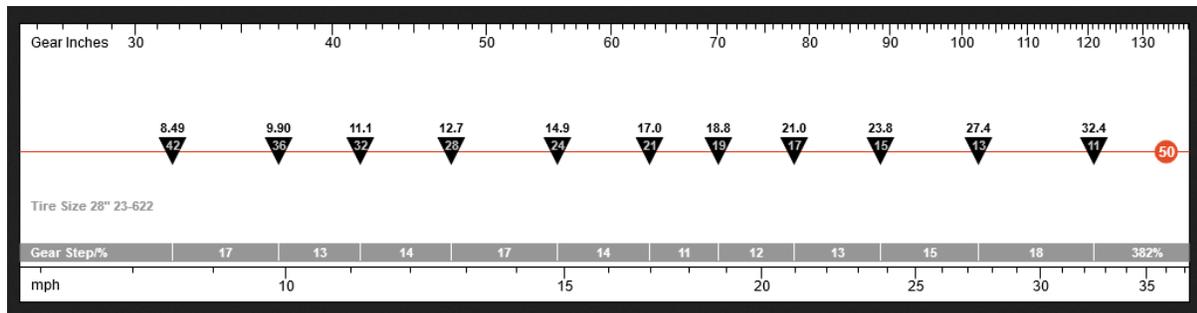
For the purpose of this exercise, let’s look at a very commonplace bike gear set combination for a tri or road bike here in Georgia. We have plenty of hills and varied terrain so we like a wide range of gearing on our rigs, and we like compact crank sets and bigger cassettes.



Pictured here is a 20 speed road compact 34/50 tooth chain ring set up with an 11/28 tooth cassette, which is very commonplace in our shop. The chart shows what speed you would be going at a 90 rpm cadence on a road or tri bike with standard 700c wheels. The numbers above the triangles are the output speed and the number in the triangle is the tooth count on the corresponding cog in the cassette. The red circle to the right is the chain ring size for the small and big ring. Basically, the slowest speed you would be going in the easiest gear is 8.66 mph, and the highest speed would be 32.4 mph, which is effectively the overall range of the system. Now let’s look a little deeper into the numbers. Oh numbers, love me some numbers and science...

The whited-out triangles under the 22 and 12.7 mph speed are essentially un-useable due to the chain angle created when those combinations are used. This is called cross-chaining and will cause excessive wear to the parts and is noisy in those combinations and not recommended. So, we will rule those out. There are also several combinations that have the same or very close to the same output speeds and are overlapping, called gear overlap. 14.3, 16.2, and 18.6/18.8 mph directly overlap and give you the same speed twice, so we will count them as the same gear. Additionally, the whited-out triangles overlap with the gear above and below, but were not counting them anyway. The important take-away from the graph is that a 20 speed road gearing system does not have 20 speeds! Depending on if your system is Shimano or SRAM, you only have 15 or 16 truly unique and useable gear combinations. And if your bike has a poorly aligned

chain line from the cassette to the chain rings, if could be even less. So, still think you need all those gears? The 1X idea simply eliminates the overlapping gear ratios and unusable gear combinations that a traditional gear system inherently has.



Conversely, let's take a look at one of the standard build options for a 1X system and compare. Pictured here is a 50 tooth chain ring with a standard 1X cassette with an 11-42 tooth spread.

First, the overall range is actually deeper than the double system above. This is not always the case, but generally it has a lower and a higher range. The range spread is 8.49 to 32.4 mph, which is only slightly lower than our compared system, but it does have an easier climbing gear. Notice that some of the output speeds are the same as the double system above, which is just a matter of having the same gear sizes when in the big ring of the double system. What is key about these numbers is the almost exact gap between each gear. This means that all the gear ratios are unique and that the changes between each gear happen at the same rate. No more surprising cadence changes or jumps when shifting which means your pedaling becomes more consistent and predictable. This is also the one downside to the system. The gaps between gears are big when compared to a traditional system, which means you may not have the finite cadence changes you would like. However, with the new-found simplicity and larger range of the 1X system you'll find a new favorite gear combination for that familiar stretch of road you ride regularly with some more speed.

Second, it is also very easy and affordable to make gear range adjustments for varied race and road conditions by changing the size of the chain ring. Heading to a flatter course for a big race and want some bigger gearing, no worries. The chain ring can be easily swapped to a larger size to make the overall gear range bigger. Need a lower climbing gear for a hilly event, no problem you can go smaller. There are also several cassette ranges available so the system is highly tunable without having to invest in big changes to get different gear combinations. The system is designed to meet the needs of varied terrains and riders.

Third, the system has some unique features that aid with some stuff that may plague other parts of your cycling experience. The unique design to the rear derailleur aids in wheel changes and flat tires as well. How, you ask, will a 1X derailleur help me with a flat tire? The derailleur has a pulley cage holding button that removes the chain tension from the chain and allows you to remove the rear wheel without fighting the derailleur. Almost everyone has a slight bit of anxiety when attempting to remove the rear wheel to change the rear wheel or a flat and this feature helps to take the rear derailleur complication out of the process. The derailleur also has a stiff clutch where the pulley wheel cage is attached which helps the narrow-wide chain ring hold

the chain on. It also reduces chain slap against the bike when you hit bumps and potholes, thus saving your paint from chips and nicks. The derailleur also uses a unique cable routing and pulley system that reduces the force needed to actuate the shifter, which means shifting is lighter and easier. Again, super genius and well thought out.

The shifting is superb and as effortless as any of the best mechanical systems on the market now. Some would say its shifts as well as any of the electronic systems, but that's just a bold statement and not really comparing similar products. Suffice to say, the shifting is great and shifts under more load and tougher conditions than any other mechanical system for a road bike. The system is light, consistent with higher end road systems so there is no weight penalty. It's more aero, yes I said more aero. With no front derailleur and a single chain ring, the parts that hang out in the wind are reduced and create less drag.

Pricing

The entire system is very cost effective as well and fits just about every bike on the market. Coming in at less than \$1000 to do a complete upgrade on a road or tri bike, this upgrade is easier on the wallet than most race wheelsets and certainly lower than a top end group set. The pricing is even better when utilizing some of your existing parts like the crankset and bottom bracket when it makes sense.

Ready to Learn More and Ditch Your Front Derailleur?

Want to know more about making the switch? The benefits of the system are fantastic and may help solve some issues you may have with your current set up. It may also help you with some issues you didn't know could be made easier!

First, I would suggest doing a bit of research on your current drivetrain system and look closely at the output speeds relative to your pedaling cadence, that way you will know exactly what your system is capable. There are several varieties of chain ring sizes and cassette sizes and your set up is going to be somewhat unique. [The webpage we use for the graphical calculations is here.](#)

Second, stop by and let's take a look at your set up and we can talk through the process, cost, and benefits of making the switch on your bike. We have done it for several clients and all have reported that it is a fantastic change. As always, we are happy to help keep you guys rolling!

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