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Photography by Alistair Wilson (feature) & Wade Wallace

Shimano XTR Di2 Groupset Review

I would argue that mountain bike technology is more advanced and progressive than what we typically see on road bikes. The many variations of disciplines, relaxed UCI technical rules, and perhaps a tendency for riders to let go of traditions make the mountain bike an open slate for innovation and experimentation. However, the first bit of technology we've seen make the leap from road bikes to mountain biking in a long time is electronic shifting. I attended a media camp held by Shimano in the Margaret River area of Western Australia during the Cape to Cape mountain bike race and I got to experience for myself what XTR Di2 shifting was all about.

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We don't normally cover mountain biking but since I have experience with Dura-Ace Di2 electronic shifting since day dot and much of its technology has been leveraged to the XTR Di2, I felt that this made for an interesting product for review. And even though many of you *act* like you're too cool for mountain biking, I know deep down under those shaved legs and lycra that you love getting dirty as much as I do.

When Shimano's Di2 electronic shifting hit the road bike scene in 2009 it was tagged by many as a solution to a problem that didn't need solving. This might be the first impression for many mountain bikers but after using both generations of Di2 on my road bike for the past five years I can attest to its brilliance.

That's not to say that electronic is necessarily better than mechanical shifting; the mechanical equivalent I have on my other bikes works wonderfully. But when I get on that Di2 and feel its consistent and flawless shifting, it's one less thing that I need to worry about on my ride and has taken shifting performance to another level.

By the way, does anyone know what Di2 stands for? Digital Intelligence Integrated.

EXPERIENCE

This is by no means a long-term comprehensive review, but I did get to experience XTR Di2 under race conditions. What *seemed* like six hours was actually 2.5 hours, but I think I got a pretty good feel for its performance during this time.

I don't get to push many products to their limits like this, so I feel like I have a pretty good understanding of XTR Di2's capabilities. With my experience with Dura-Ace Di2 on the road, I would expect nothing less from Shimano with regards to its reliability.



However, mountain biking throws extra variables into the equation and I can't speak for the longevity of XTR Di2 *yet*.

That said, I've got a groupset for a longterm test, so I'll follow up after a few months of bashing it around.

SET UP

For riders who are considering upgrading their existing groupset to Di2, it's not guaranteed that you'll have an elegant cabling solution for your existing frame. I was fortunate that my Specialized Epic had internal cable routing which made the Di2 shifter cables easy to wire. If you need to get the external wiring kit that Shimano offers, you might be using a few zip ties to keep everything in place.

For new frame owners, more and more manufacturers will be coming to the party and making Di2-friendly cable routing (right now only a handful of manufacturers are making frames that have proper cable routing for Di2). Other than the shifter wires, the routing for the brakes should be the same as anything else that's relatively modern.



For those of you who are unfamiliar with Di2, it makes packing and unpacking a bike quite simple. If you

want to remove your rear derailleur, simply unplug the cable. No need to worry about adjustments when plugging it back in. Plug and play, set and forget, as they say.

THE RIDE

It took a while for me to get used to the shifter setup as the factory set-up was the opposite of what I'm accustomed to. However, the beauty of Di2 using buttons and wires instead of mechanical mechanisms for shifting is that they're completely customisable. It's easy to make whatever button do what you want to do.

You can even use the left-side shifters to control the rear derailleur and vice versa if you chose. It's all settable using Shimano's e-Tube software which connects a laptop to the groupset and allows you to change settings, run diagnostics, and upgrade the firmware. Mac users will be disappointed that only PC is supported at this time, but hopefully we're not too far away from having a simple app on your smartphone to do everything you need (only my wish, not a subtle suggestion this is in the works).





An added feature that XTR Di2 has over and above Dura-Ace Di2 is a mode called “Synchro Shift”. This allows you to configure your shifting so that the front derailleur shifts automatically depending on where the chain is on your rear cassette. This reduces cross-chaining which wears down your drivetrain and stretches the rear derailleur (more of an issue on a MTB than a road bike because of the large rear cassette). Above all, Synchro Shift lets the rider completely forget about shifting the front derailleur.

I admit, I was very skeptical about this feature. The last thing I wanted was someone else doing the thinking for me about when the front derailleur was to be shifted. What if it shifted during a hard pedal stroke? What if it shifted when I didn’t want it to shift? I had a lot of what if’s ☒

As it turned out, Synchro Shift was brilliant. In fact, I didn’t touch the left shifter to

shift the front derailleur once during my race. It wasn't long before I trusted it 100% and knew exactly what it was going to do, and would have done the same if it were manual.

One shift before the system wants to change chainrings there is an audible beep that lets you know that the next shift in that direction will be activating the front derailleur. There are two modes of Synchro Shift available depending on how you want to program it (i.e. when the shifts occur, how much the rear derailleur shifts after the front shift, etc). They're easily set by pressing a button on the display unit on the handlebars. I can't think of a scenario where you'd want to do this mid-ride, but having two modes depending on what type of trail you're riding is something I could envision. If you're not open to the thought of Synchro Shift altogether, or it just isn't what you want on a particular ride, simply enable "manual mode" which puts you in full control of the front derailleur.

The front derailleur motor is very powerful – according to Shimano, 25% more powerful and quicker than mechanical shifting. The key to reliable front shifting is speed and power, and while at first I was very careful with my pedal stroke as the system was in control of my front shifting, I later had the confidence to completely forget about it and pedal as normal as it was shifting. It didn't miss a beat.

BATTERY LIFE

Mountain biking requires more intensive shifting than road riding so naturally the battery life will be reduced. On a mountain bike you might be shifting every 5 to 10 seconds on varying terrain whereas on the road it might be a few minutes in between shifts.

Shimano states that their testing shows battery life lasting 300km in the worst-case scenario (with Fox ICTD electronic suspension, lots of shifting, three chainrings, internal battery, etc.) but during my 2.5 hour (~60km) race as well as a afternoon of

riding (~20km) the battery indicator didn't drop a single bar. The battery life would be dramatically improved if there were no front derailleur (i.e. on a 1x system) and no Fox ICTD suspension.



The shifting indicator shows the battery life so you won't forget about it. During 80km of riding, the

indicator didn't drop.

In the event that the battery is running low, the system has a clever and practical way of letting you know about it. With ~25% battery life remaining the system will start shutting components down in following sequence:

- Fox ICTD rear suspension lockout would turn off (allows rider to lock once more)
- Front lockout would turn off
- Front derailleur shuts down (allows you to shift once more)
- Rear derailleur shuts down. If you've made it to this point, you should have made it home already.

The battery can be either installed in the seatpost or as part of the bottle cage. Just like all the rechargeable devices in our lives these days, you'll need to be diligent about making sure your battery is charged after every dozen or so rides. However, it only takes ~90 minutes to charge the lithium-ion battery. With the battery warnings, indicators and shutdown procedure, you'd have to be pretty negligent to let your battery run completely flat. Recharging your battery is something that people will need to get used to, but not a drama after you get used to it.

The battery life could potentially affect 24-hour racers, and it's a consideration if you fit into this ultra-endurance category of riding.

What happens when the bike gets wet or even submerged in water? We're currently waiting to see if the system has an IP rating (which might be tough considering the removable plugs for the wiring, but they do have special boots for water resistance). During the testing we did cross numerous heavy streams which got the bike quite wet and there were no problems, however I didn't take this to the extreme and verify its limits.

If you're in the market for XTR, you're probably someone who wants to know the weight of their components. You can look up the individual weights of each part [here](#), but you'll be pleased to know that as a total system the XTR Di2 version saves about 12g with 2x11 setup over the mechanical version.

When committed to the Synchro Shift option (i.e. removing left shifter) the overall weight is around 50g less than mechanical XTR groupset. Even though there is a battery (51g) and more mass in some of the individual components, the weight reduction primarily come from savings in the shifters and cables.

CRANKSET



XTR M9050 cranks are a mix of aluminium, carbon and alloy and employ Shimano's Hollowtech design

which was leveraged from their road groupsets. It comes in 1×11, 2×11 and 3×11 gearing configurations and one crankset is adaptable for each set-up.

CASSETTE & CHAIN

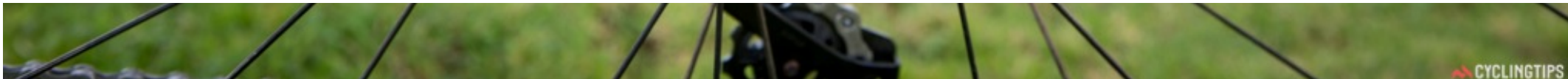


The new XTR M9050 cassette is built with a carbon spider, aluminium, titanium and steel cogs mix, and

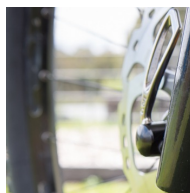
has a very even progression through the gears. The new 11-speed cassette is compatible with existing 10-speed freehub bodies. The new XTR M9050 chain is directional, meaning that there's an inner side and outer side. It will work either way, but if it's installed backward it won't shift as nicely. There is a common chain between XTR and Dura-Ace. Ultegra and 105 chains can also be used if you're looking for a cost effective solution.

BRAKES





The XTR M9050 brakes use a similar “ICE” heat management technology as the Shimano road discs. The brake handles are very adjustable and the shifter and brake levers are integrated with new rotation and side-to-side adjustability for better ergonomics. The piston construction has changed and gone away from a ceramic piston to new insulated glass phenolic for better heat management.



Discs are center lock rotors (versus 6 bolt patters, which mine have)

PEDALS



The new XTR pedals come in both race (shown here) and trail options. Not much has changed from the

previous iteration except for slightly more shoe/pedal interaction with no changes in the cleat. The axle diameter is the same however the weight has been reduced. Shimano also says that the known problem of the nut on the spindle sometimes coming loose has now been fixed.

REAR DERAILLEUR





The rear derailleur has the ability to communicate with the front derailleur to deliver the Synchro Shift functionality. When in manual mode, there is also some intelligence built in: the system won't let you cross-chain and ride in little/little rings (because of too much chain slack). It will let you go big/big though. Also, the system allows you to adjust the rear shifting while riding in case the rear hanger was bent and tuning is required. 1x, 2x and 3x compatible with GS and SGS cage options.



FRONT DERAILLEUR





The Di2 front derailleur has been completely redesigned. The electronic shifting means that only a tap of a button is required to manually shift into another chainring. The exact same input is required every time. The system has an auto-trim functionality which adjusts the front derailleur automatically so there's no chain rub. With the Synchro Shift mode enabled, you don't even need to touch the front shifting and still get reliable, consistent front shifting. The Di2 front derailleur shifts with 25% more force than its mechanical equivalent, which translates to more reliable shifting even under load. The front derailleur mechanical equivalent has a new side swing design which allows more clearance for large wheels and better cable routing for light shifting operation. The XTR derailleur body is in a similar position as in the mechanical side swing design (but not the same side swing design), so you don't lose that tyre clearance advantage. Shimano states a 20% less shift effort compared to the previous mechanical generation.

SHIFTERS



The XTR Di2 front shifting has five different shifting speed settings, adjustable button ergonomics for range of positions, Synchro shifting allows you to remove the left shifter if you want to exclusively use the feature. In manual mode, there is still intelligence built in. For example, it won't let you cross-chain and ride in little/little rings (because too much chain slack). It will let you go big/big though. The shifting indicator is required only for Synchro Shift functionality, but you don't need to use the Display Unit (which is where the brains are located) if you want to run manual mode only.



WHEELS





There are two new versions of the XTR carbon rims. There is a carbon tubular model for XC race (retail for \$5k!) and the rim is over 150g lighter rim (1,323g per set) than the carbon/alloy model. The new carbon laminated/alloy option (alloy rim with carbon wrap over top) is tubless (1,650g per set). Options come in both 29 and 27.5 sizes.



CRITICISMS

At this stage there's nothing that jumps out at me as needing more attention or improvement with the XTR Di2 groupset, however those may come out after many more hours on the trails. The only criticism I have is that when compared to the XTR mechanical shifting, it still lacks a nice mechanical "feel".

The XTR mechanical shifting is extremely crisp and accurate with a nice firm “chunk” sound when you shift — a sound I still have a soft spot for. The Di2 shifters feel a little less solid and slightly more “plastic-y” than the mechanical version. However, unlike the Dura-Ace road shifting, there is a definite movement and “click” when you make a shift so that there are no accidental shifts and you’re certain when you’ve engaged the button. With all the bumping around and vibrations this is much more important on a mountain bike than on a road bike and I’m glad Shimano has considered this.

For most consumers, XTR Di2 will be out of their price range. If a part gets broken, there is no option to replace with less expensive equivalent (e.g. XT or SLX) to get you by. That should change in time, however XTR Di2 will be something you should be prepared to be able to maintain as well as purchase.

WRAP-UP

EVOLUTIONARY

We don't often give ratings this high and as hard as I'm trying to stay away from superlatives, Shimano deserves a top score for their ability to leverage an already outstanding product on the road (Dura-Ace Di2) and bring it across to mountain biking while incorporating their new Synchro-Shift technology. My five years experience with Dura-Ace Di2 has been nothing but brilliant and while it's too soon to determine long-term reliability on XTR, a standard has been set on Shimano's road groupsets. Should you wait for version 2? If Dura-Ace Di2 is anything to go by, there were very few significant upgrades or fixes after the first generation. The price is set at a premium and damaging parts such as the rear derailleur is always a concern, but if you've got the money to afford it in the first place, then it shouldn't be an issue.

GOOD STUFF

- No more cable contamination
- Vastly reduced maintenance
- Precise, effortless shifting
- Programable for individual shifting preferences
- Synchro-Shift
- 1x, 2x, 3x front chainset options
- Groupset has been improved in every regard

BAD STUFF

- Price premium over XTR mechanical
- Replacement parts are expensive
- Complexity of servicing (for those unfamiliar), but reduced servicing
- Retrofitting old frames can be tricky and external wiring kits not ideal

CTECH RATING

