

**FIRST EVER! All-Wheel-Drive e-Bike**  
**CHRISTINI'S RADICAL FAT-E 5 ULTRA**

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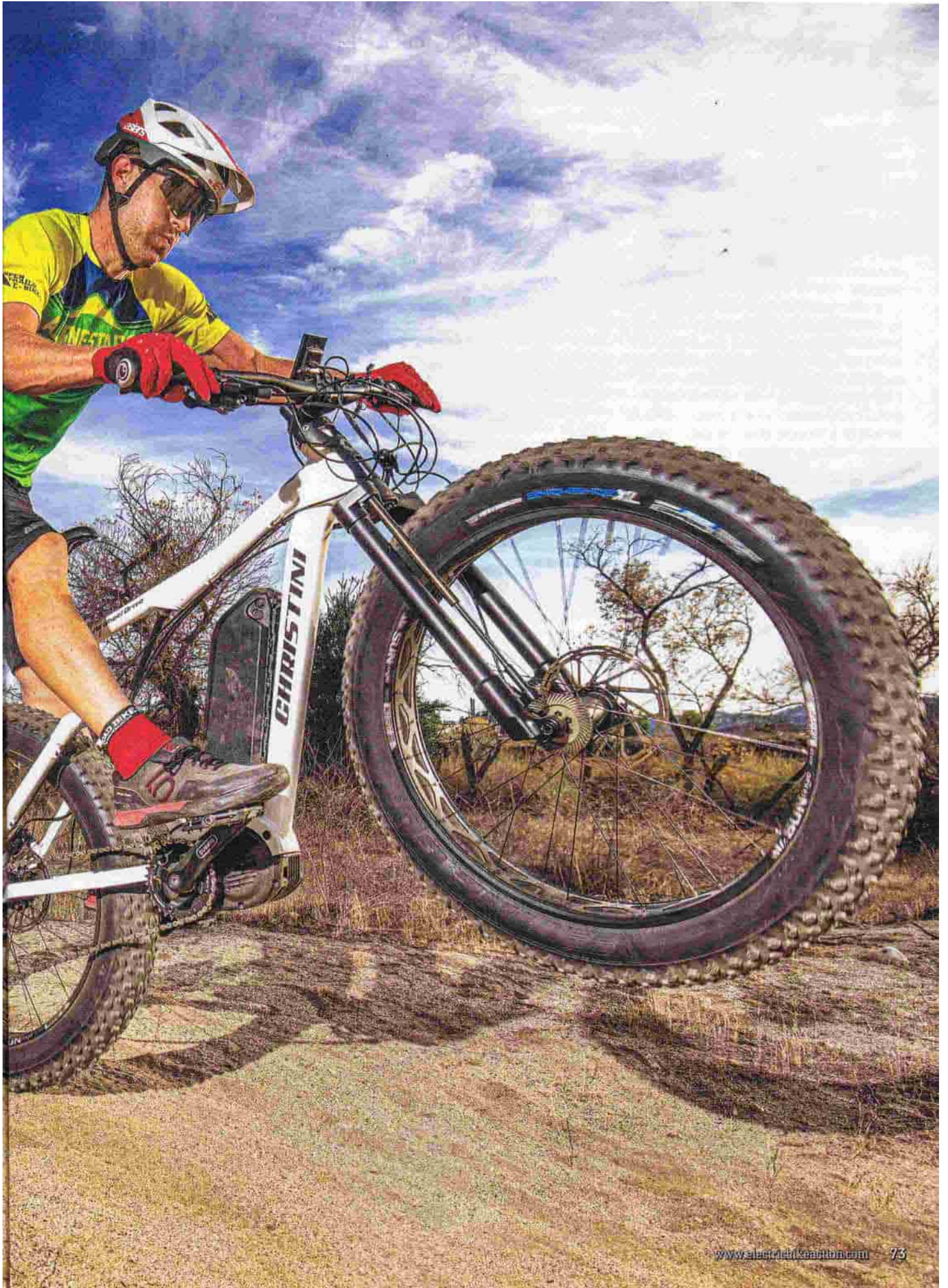
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{ BIKE TEST }

# CHRISTINI ALL- WHEEL-DRIVE FAT-E 5

You'll never lose your grip

**I**t was back in the 1990s when Steve Christini was riding his mountain bike on a trail that he'd ridden many times before that got the ball rolling. On this particular day it had rained, and the trail was a bit slippery, and as he climbed up a part of the trail he had previously always cleaned, the rear wheel slipped and he didn't make it. A normal person would have likely chalked it up to slippery conditions and moved on—not Steve.



# { CHRISTINI }

At the time, he was an engineering student at Villanova and working on a scale-model helicopter. The linkage from the main rotor to the tail rotor gave him an idea: he could make an all-wheel-drive bicycle with a one-way clutch, so if the rear wheel starts to slip, the front wheel would engage. It seemed like a simple idea, but it took a while to envision it before deciding to make it happen.

It took over the next seven years to develop the prototype and secure patents and investments, but it paid off when he was eventually contracted to build 50 AWD mountain bikes for Jeep. Two years later he built his first AWD motorcycle based on a Honda 450R and took it to a bicycle show to put in his booth. Honda engineers who happened

to be at the show saw the Christini and freaked out. They were so impressed that Christini started working with them, and suddenly he was in the motorcycle business.

In 2014 he got back into the bicycle business when Australian explorer/adventurer Kate Leeming was looking for a bike to ride across Antarctica. Upon his return to pedals, Steve decided to also start making AWD e-bikes. His bikes are hand-built, by him, in Philadelphia.

## THE BIKE

In size and weight (62 pounds), this is a big bike. At first sight, it looks like a pretty typical fat bike, but then you notice the exposed drive shaft and universal joint that exits the top tube, then re-enters the left-side seat stay, sitting right next to your left leg! It goes

all the way to the dropout, where it spins a spiral bevel gear that engages with its counterpart on the rear wheel. This can be engaged or disengaged manually via a lever on the handlebar, effectively mechanically engaging/disengaging the AWD system. When disengaged, power to the rear wheel is delivered as any other chain-driven mid-mount system.

The fork has a similar shaft and gearing, but what you don't

see is the magic that happens inside the head tube. The gears there are set up to only engage one way, and



they only engage when the rear tire loses traction. If the rear tire slips, the front wheel steps in and helps pull you through that soft/slick patch. It's a fully mechanical and passive traction-control system.

## THE PARTS

Christini has outfitted this bike with a list of good components from SRAM and Race Face. Shifting on the 1x11 (10-42T) drivetrain is accomplished with a SRAM GX derailleur and trigger shifter, and SRAM Level hydraulic brakes with cutoff switches in the levers to provide the stopping power. The 180mm rotors are enough

to stop this beast in its tracks, thanks to the outrageous grip of the massive Vee Rubber 26x4.8-inch tires.

Interestingly, even though the bevel gears at the axles are exposed, Steve says they have had thousands of miles put on them in all conditions with very little wear. The gears are user-replaceable.

The tubeless-ready wheels are the 80mm-wide Sun Ringlé Mulefut 80M rims, with a custom Christini front drive hub and a Sun Ringlé SRC 177mm thru-axle hub in the rear.

## THE MOTOR

Christini went with a Bafang Ultra mid-drive motor (sourced through Luna Cycles), which is tuned to a whopping 1500 watts (and can be tuned for even more power). It has a torque sensor and a throttle for on-demand power. There's no shortage of power to move this behemoth. The battery is big and sits atop the downtube. It's a 52-volt, 15-Ah (780-Ah) beast of a battery, which looks right at home on this bike. The full color display is bright and easy to read, mounted on a bracket above the stem, with the mode controls and on/off switch by the left grip.



“We took it easy the first time, but after a while, we thought we were driving Grave Digger, and we just let it go!”



The rear drive shaft and universal joint are exposed on the left side.



Here's the rear spiral bevel gears. Note the cable going in, which can connect/disconnect the AWD system via a lever on the handlebar.

## WHO IT'S MADE FOR

Christini hand-builds these bikes on-demand, so there's some room for customization. With that in mind, the price point for a nearly bespoke bike is impressive. As we found out, this thing is a monster capable of handling more than your average fat bike. If you regularly ride in sand, mud or snow, you will find this bike has some distinct advantages.

## THE RIDE

The bike is so big that it looks like it should be heavier than it is, especially with the extra AWD hardware on it. If you pick it up, as everyone does with a new e-bike, it seems like it should feel heavier.

Owing partly to the huge 4.8-inch tires mounted on really wide rims, the bike has an aggressive look, and there's also the steeper-than-you'd expect 73-degree head tube angle. That angle definitely comes into play in the handling, since the big tires and AWD system make turning the bike unusually hard. There's a slight torque-steer sensation that comes from the system, and that steep head angle would be twitchy if not for the big tires.

Once off-road, and once you get used to the different feeling of AWD and its effect on the steering, it turns into a monster truck and the world becomes your rally! We took it to a sand wash, full of loose sand and some jumps, and it rides across the dry sand like it's on pavement. The front wheel does come in handy when needed and makes turning

The cockpit is fairly clean, and the display is very bright, with information on speed, mode, power used and more at a glance.



This shows the fork driveshaft and spiral bevel gears. The real magic happens inside the head tube, with the one-way clutch that mechanically controls the power going to the front wheel.



Closeup of the front spiral bevel gears.

on dry sand similar to turning on pavement.

As proven in the past when we've taken rear-wheel-drive fat bikes to the beach, while they go across the sand just fine, it does take half the width of the beachfront to turn it around. Not so with the Christini. In short, it carves! As traction goes, this bike is like any other fat bike in that you have to match the tire pressure to the conditions. Lower pressure is far better for the soft stuff, like sand or snow, but higher pressure improves the rolling resistance and handling on pavement or harder ground.

From the beach we headed to the mountains and pointed the bike up the steepest hill we could find and started climbing. It didn't take long for the back wheel to start losing grip on the soft dirt, and lo and behold, the front wheel took over partially, and we went up a trail we likely couldn't have made it on a normal mid-driven e-MTB. It does require a bit more attention to the front wheel, because wherever you point it in those conditions,

it's going to go, and more-so than any bike with a non-driven front wheel.

Descending that same trail, we found the steering to be more stiff than normal, likely because of all the linkage involved and the steep head angle. There is an option for a suspension fork, and the front shaft telescopes with the suspension, but thanks to the high-floatation tires, we didn't have any problems with the rigid fork.

A couple of things that need improvement: The motor cuts for almost one full second when shifting gears. This is a lot more than the almost imperceptible drop on other mid-drives (e.g., Yamaha) when shifting. This really does make shifting while climbing inconvenient. The SRAM brakes aren't quite strong enough on this bike. It needs a stronger version and larger rotors to offer better stopping power on this beast. And, we'd love to see a better battery mount. On this big bike and all the forces it generates, the mount has a lot of flex.

## THE VERDICT

The Christini was no doubt a strange bike to get used to. The steering doesn't have as natural a feel as even most fat bikes we've ridden. But, it also climbed like nothing we've ridden, and it handles amazingly well on sand and snow. It's a solid choice if you ride on loose stuff, or just want something that fully feels like a monster truck when you ride it.

For a more in-depth deep dive into the Christini, be sure to check out our podcast interview with Steve Christini, where we go off into the deep end with more details about the bike and his philosophy. ■

## SPECS

### CHRISTINI ALL-WHEEL-DRIVE FAT-E 5

**Price:** \$5895

**Motor:** Bafang Ultra Drive, 1500W mid-drive

**Battery:** 52V, 15Ah

**Charge time:** 3-4 hours

**Top speed:** 20 mph

**Range:** 20-40 miles

**Drive:** SRAM GX 11-speed derailleur and trigger shifter

**Brakes:** SRAM Level

**Controls:** Bafang

**Fork:** Christini Fat

**Frame:** 6061 T6 aluminum with integrated direct AWD system

**Rims:** Sun Ringle Mulefut 80mm rim, tubeless

**Hubs:** Christini AWD one-way clutching (front) Sun Ringle SRC 177mm thru-axle XD drive

**Tires:** Vee Rubber Snowshoe XL 26x4.8" pure silica

**Weight:** 62 lb.

**Color choice:** White, blue, black, custom

**Size:** One size

[www.christinibicycles.com](http://www.christinibicycles.com)