

TWO MUCH FUN

WE WENT TO PENNSYLVANIA TO RIDE THE **AWD CHRISTINI 450** AND FOUND TRACTION IN ALL THE WRONG PLACES

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PHOTOS BY JUSTIN DODD

With the front wheel digging for traction, the kitted two-wheel-drive Christini (a.k.a. Honda CRF450X) doesn't wince when it comes to log crossings.

SDE gold medalist Dave Bertram once described the Husqvarna 430 AE of the mid-1980s as being "...so good that's its almost cheating." He was talking more specifically about the 430's unique automatic transmission system. Today, the "almost cheating" expression is making a comeback because of Steve Christini's Christini AWD (all-wheel-drive) off-road motorcycles. I recently got the chance to fly out to Pennsylvania and ride one of Christini's creations, and I can tell you up front, I now understand how Bertram must have felt.

When Husky came out with its "auto," the shift-lever-less transmission wasn't really a new concept, but Husky was the first to figure out how to make it work well in a high-performance dirt bike, and Bertram proved it by winning multiple National enduros on the 430 auto. Ditto for Terry Cunningham, who won multiple Enduro Championships on the Husky. Unfortunately, there were maintenance, durability and setup issues associated with the tranny that ultimately killed the Husky auto. But on the trail, it ruled.

An all-wheel-drive motorcycle isn't a new concept, either. Rokon has been producing AWD utility dirt bikes for years, but it appears that Christini, like Husky, is the first to do it right when it comes to push-puller, high-performance dirt bikes. Hopefully, the Christini won't suffer the same fate as the Husky auto, but from what we can tell so far, that doesn't seem likely. After all, the bike has already been around long enough to prove itself when it comes to durability, ease of maintenance, and setup. The Christini's biggest hurdle, however, will no doubt be cost, but we'll get to that later.

Previous AWD systems pretty much accomplished what they set out to do, but had too many side effects for racing use. And that left prospective buyers saying, "Keep on designing." Overly complicated systems that were heavy and, perhaps worst of all, robbed horsepower were the main culprits. But what Christini learned from years of building AWD mountain bikes and working with radio-controlled helicopters has helped him figure out ways of eliminating most of these shortcomings—at least enough to make people start taking the idea of all-wheel-drive, competition-use motorcycles seriously for the first time. In 2002, he began patenting the Christini AWD system, and he has been fine-tuning it ever since.

In case you're not familiar with the Philadelphia-based company Christini Technologies Inc., its number-one priority now is building all-wheel drive kits for motorcycles, though they still produce Christini AWD mountain bikes. The key word is "kit," as they do not build complete motorcycles. Currently, Christini offers AWD kits for just the Honda CRF250R and 250X, as well as the CRF450X (which was

just recently added), but Christini is currently developing kits for certain 2008 KTMs. If all goes well, they'll have kits for many more brands and bikes down the road. These guys are just getting started.

HOW IT WORKS

Prior to Christini, you might've heard about the Ohlins AWD system that the suspension company, in conjunction with Yamaha, designed for the WR. It works pretty well, too, but stole significant horsepower from the engine (up to 4 hp, we've heard), which you can blame mostly on hydraulics. Christini's AWD system, however, is purely mechanical and, according to Mr. Christini, only saps one-tenth of a horsepower. He also says the entire system is lighter as well.

"The Christini AWD system is the world's first true mechanical all-wheel-drive system for two-wheel vehicles," says Steve Christini. "There have been many attempts in the past, both mechanical and hydraulic, all of which had various shortcomings. Christini solved many of those issues by designing the system to mimic the all-wheel-drive systems in automobiles. In other words, the system doesn't transfer equal amounts of power to each wheel;

instead, it efficiently transfers the power from the rear to the front by sensing when the rear wheel slips, thus placing the power of the bike into the ground rather than losing it in wheelspin, which wastes energy; traction and, ultimately, that precious speed."

In a nutshell, this transfer of power to the front wheel is accomplished through a series of gears, chains and shafts that start from the countershaft sprocket and then travels up through the frame into the head tube and down to the front wheel, where there are two independent one-way clutches in the front hub. These are critical to the system, as they allow for the telescopic drive shafts to move slightly slower than the front wheel - like freewheeling on a bicycle but still pedaling.

However, once the rear wheel slips, it moves the drive system faster than the front wheel and, at that instant, transfers that slip of the rear wheel into front-wheel power. In other words, the front wheel is just along for the ride until the back wheel starts to spin, and that's when the front wheel snaps into action.

"If you imagine how often your rear wheel slips, think about how much power is

wasted," Christini said. "And if that power can be transferred into the front wheel, the cornering and acceleration benefits gained become a huge advantage to any motorcycle, especially an off-road bike. This concept of only transferring power when there is real wheelslip is why the system is so efficient. In fact, it was tested on a dyno to be a mere one-tenth-of-a-horsepower loss on a standard 250 machine."

TRAIL-TESTED

Riding the Christini for the first time down a simple trail felt no different than any other stock CRF450X that I've ridden. About the only difference that I could detect was maybe a bit extra weight and the added noise of the chain that runs from the countershaft sprocket up to the gearbox on the frame, and I only noticed it when I was standing up. Evidently while sitting, my left leg blocked most of the chatter. Otherwise, it was just a CRF450X. At speed, cruising down the trail, you could hop over rocks, bounce off stuff and do all of the things you'd normally do on a regular rear-wheel-drive bike without noticing anything different. Even power seemed normal. But when things suddenly got ugly, that's when I felt weird stuff start to happen.

It's "weird" in that you're not used to the front end helping you out. My first real AWD test was a short but steep and sandy hillclimb. I purposefully stopped at the bottom and then dumped the clutch, anticipating I'd dig a big hole and bury the bike in just a few feet. As expected, the bike did slow and start to sink - but it never completely stopped! With both wheels digging for traction

(and roosting, I might add, which certainly adds to the "weird factor"), the Christini kept working and chugging all the way to the top, with only a fair amount of assistance from my paddling legs. I was impressed. Again and again, the bike clawed and scratched its way to the top with each attempt.

Via a lever on the handlebars, I disconnected the AWD drive system and tried climbing the same hill again, only this time in rear-wheel-drive-only mode. I still got to the top, but I had to work much harder and it took me longer. Advantage - Christini.

As mentioned, there's a lever on the left handlebar that quickly engages and disengages the AWD system. Steve discourages operating the lever on the fly, especially engaging. That's a no-no. I could damage the system. He says you should always come to a complete stop before switching modes. (Sometimes you have to rock the bike back and forth a little bit to get it to disengage.) The lever probably wouldn't even be there if you could roll the bike backward while in AWD mode. Actually you can, but because of the one-way clutch, not very easily, so the lever's there to disengage the system in case you do get stuck and have to roll the bike backward to free yourself. Advantage - normal bike (but not by much).

Next stop was a mammoth hillclimb, the kind where you have to relet when you get to the top. I attempted the hill, the first time opting to take the easy way out near the top that bypassed the last few feet, which resembled more of a bedroom wall than a hill. But, now fully confident in the Christini's climbing ability, I went for it - the big one. No problem.



Sandy climbs are a piece of cake.



On the Christini, you will no longer be afraid of mud.

At the moment, the Christini AWD kit is only available for Hondas, but a KTM 300 kit is right around the corner.



But the key was keeping your body well forward and over the front wheel to keep it on the ground so it can bite; otherwise the Christini is just another rear-wheel-drive motorcycle. I didn't even want to attempt the hill in normal mode. Advantage—Christini.

We soon found mud—the real nasty black stuff that is more goop than water and has stuff growing in it, mostly tall grass. It was the kind of mud that looks harmless at first, but within the first few feet you realize that you just made a big mistake. It was the kind of mud you would normally avoid like the plague. But the Christini is immune to mud.

You know that a motorcycle company's spokesman is completely confident in his product when he's happily encouraging you to attempt a mud crossing such as this on his bike. I'm thinking, "Are you nuts? Well, okay. Hey, it's not my bike."

Pinning the throttle with mud shooting 15 feet into the air from both wheels, the Christini sailed right through the ade-deep mud bog like it was a soft brownie. The bike was now completely packed with the shiny-black, goopy stuff, but the Christini folks are saying, "Do it again!" And again, and again. Even with the mud getting softer, looser and deeper (not to mention harder) with each pass, the Christini got me through every time. At times, though, the bike did bury itself, but with a little pushing and shoving, I was, single-handedly, always able to get the bike to dry ground. Rear-wheel-drive bikes? No friggin' way! Big advantage—Christini.

On to the tight stuff. The Christini folks then led me around the Pennsylvania woods on a rather lengthy trail of mostly rocks and tight single-track. Roots and logs were mixed in for good measure. The local trail guide left me like I was the plague, but that had nothing to do with the bike—just my lack of woods-riding experience. (He, too, was on a Christini.) It was here that the bike started feeling a bit heavy to me, which no doubt had a lot to do with the added 15 pounds of the AWD system and a bunch of mud that was left over on the bike from our earlier shenanigans in the mud bog. For the most part, the front wheel was just along for the ride, since the trail was so tight and I couldn't get the rear wheel to spin much. So, a good deal of the time, the Christini felt like a "normal" bike in the woods but a little heavier. Advantage—rear-wheel drive.

But when I did get stuck between a rock

and a hard place, I did feel that the AWD helped me get out of the sticky situations a little quicker. Advantage—Christini.

Sometimes, though, the back wheel would spin while the front wheel was cock-eyed, which would knock me off my balance a little bit. Advantage—rear-wheel drive (though again, just barely).

Speaking of getting stuck, here's an interesting scenario unique to the Christini motorcycle: Let's say you were in a race and you did somehow get hopelessly stuck while riding the Christini. One thing you don't want is a spectator coming out of the woods to help you by pulling on your forks, because they'll most likely grab a handful of spinning drive shafts. Ouch!

The Christini works extremely well while turning on flat surfaces, mainly because the front wheel is reluctant to wash, because once the front wheel starts to slide out, the AWD system reacts as though the back wheel is spinning faster and gives the front wheel the go-ahead to start driving, and it finds traction, thus nipping the wash out in the bud. Advantage—Christini.

Laid over in a soft berm, the Christini works well, but if the back wheel starts to spin when you wick the throttle, you can feel the bike wanting to rise a bit. No big deal, really. Advantage—neither.

Back at camp at the end of the day, the Christini I rode looked completely hammered. (I was so glad I didn't have to wash it.) And it did take a lot of abuse on this day, but you would not have known that from the saddle. Nothing broke, cracked, ripped, snapped or got bent or smashed, or needed readjustment throughout our daylong ride. A lot of this has to do with most of the AWD components being well hidden and mounted out of harm's way. Overall, the AWD system seems to be quite durable, and Steve Christini swears that it requires little maintenance and is simple to work on and doesn't require any extra-special skills. We believe him, because everything else he has said so far has been right on the money. Also, the bike has already proved itself in a few National Enduros so far; not to mention the Last Man Standing event.

I came away extremely impressed with the Christini. What struck me most, however, wasn't so much what it could do, but what it didn't do. With something as radical

The muddier, the better.



as AWD, you'd expect a whole bunch of side effects, but with the Christini, there really aren't any. The bike feels like any other bike, even at speed and jumping, until things get downright brutal, and that's when the Christini truly shines, when all of its advantages of being all-wheel-drive kick in.

Bottom line: The uglier, the tougher and the grarlier the conditions, the better the Christini works. It's too bad the Blackwater 100 isn't still around, because riding that race on the Christini would most certainly have been like cheating. And could you imagine the Christini with an automatic transmission? That wouldn't be cheating, that would be downright criminal.

WANT ONE?

If you do, start wrenching. You must first tear down your bike and ship Christini your frame, forks, hubs and other parts that they must modify, and they'll send them back to you. You will, however, get someone else's frame that has already been modified and, down the road, someone else will get yours. Some of the stuff that you'll receive in the kit includes an aluminum billet triple clamp, a Tallion front hub, and a complete Christini graphics kit, which includes white UFO-made plastic, decals and seat cover. All of it looks extremely well-built.

Christini is also working directly with a growing network of Honda (and, soon, KTM) dealers, so hopefully you can let them do all of the shipping and wrench-turning for you. You might even save a buck or two if you buy the bike new and have the parts shipped before the bike is assembled.

But here's the nutcracker: The Christini AWD kit is not cheap. The kit alone sells for over six grand (yes, that's right), and when you combine that with, say, a new Honda CRF450X like the one I rode, you're well into the 12-grand range! So, obviously, the Christini is not for everyone. But for those of you who made good real-estate investments and have some cash burning holes in your pockets, and you like dirt bikes—exotic bikes, ones that actually work and will even give you a one-up on the competition—then the Christini is definitely right up your muddy, rocky and root-infested alley. **CN**



Designer Steve Christini says that his concept inspiration came from helicopters.



The frame, headpipe and front hub are heavily modified.



These aren't your average, everyday triple clamps.



The countershaft sprocket pulls double-duty.