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Photos by: Marty Hill

MWR CHRISTINI 2 X 2

Sometimes a passing thought turns into an idea which then occasionally makes it into reality. When Chris Walker saw the Christini 2 x 2 enduro bike his first thoughts were "that would make a pretty cool motard", and you know what? Chris didn't stop there and here is the results of his vivid imagination. We needed to swing a leg over this technical masterpiece and knew just the person. Christian 'Christini' Iddon may not be racing supermoto this season but he literally jumped at the chance of riding perhaps the trickiest supermoto race bike ever.



A photograph of a rider on an orange KTM Supermoto bike leaning into a turn on a track. The rider is wearing an orange and blue suit. The background shows a white barrier and some greenery. The title 'KTM SUPERMOTO' is in large, bold, orange letters with a white outline, and 'Two's Company' is in a white, cursive font below it.

KTM SUPERMOTO

Two's Company

This isn't the first time I've ridden a two-wheel drive bike. The last one was the Ohlins system installed on a WR450F. Back then, I thought that although cumbersome and not ideal in certain situations, it could still be a race winner but for some reason it never made it that far. Because of my previous experience I was pretty confident about the benefits of a two-wheel drive system and now, another few years down the line it would surely be even better. Certainly, visually that is the case and the Christini system was streets ahead of the Ohlins 2-trac styling. A very neat alloy casing concealed any internal goings on with the only real oddity being the two drive shafts running down the front forks.

So, the first test was passed but I knew the Christini system was about to face a tough challenge. AWD is a system that theoretically is going to excel in the wet, on the dirt and exiting from slow turns. So, pretty much anything other than the high grip, fast and flowing Three Sisters circuit, which is where we were testing this trick KTM. The bike itself is owned by top British supermoto runner Chris Walker and I was asked to ride the bike for two reasons. Firstly so I could report back to you all on how it performed but secondly because when he rode it, Chris was struggling to feel if the system was actually working but believe it or not, that is the beauty of it.

A few exploratory laps revealed nothing out of the ordinary. The two drive shafts were not in my line of sight and the large alloy chain casing running down my left leg felt non-existent as it is neatly tucked in flush with the rest of the bike meaning there's nothing to get in the way. As I pushed the bike harder I found the bike easy to back in and its capabilities in this area were within a fraction of what I would say is possible on any normal bike. The only real issues are a slightly vague feeling during the transition from backing in, to corner entry. I have no doubt the grip was there but the front end gave very little feel which doesn't inspire a flowing line into the turns.

Surprisingly though, the MW Racing Christini KTM exits the turns following a standard line which is something the Yamaha struggled with immensely as it only wanted to go straight once the throttle was cracked wide open. To be honest the Christini's feedback is pretty accurate. It was very hard to feel exactly what the system was actually doing and at first it didn't really seem to be much different to ride as a regular KTM. Time to push on a little harder I think.

Now, very rarely in my racing career have I felt anything that has truly made a significant difference to how a bike performs. The last time it happened was with a factory Aprilia and a device they called 'Spariglio'. Anyway as I increased the pace on the Christini 2 x 2 I had that same feeling and realised I was sat on a bike that is simply unbelievable. The harder I pushed the more it gave back. It was so difficult to get your head around how to ride the 2WD bike, but that vague feeling on corner entry was actually quite easy to eradicate. All that was required was to crack open the throttle. Yes, that's right! To save the front from folding you have to go even faster! As soon as the throttle is open the front wheel tracks around the corner and seemingly takes everything that you can throw at it. I didn't want to stop riding as the pace got faster and faster and I was desperate to find where the limit of this bike could be. I actually got to the point where I was trying to crash it on the front end but as my pace increased, the more it felt it could give back.

On the final part of the turns you could stand the bike up and go from mid to full throttle without any worries of being thrown from the bike. As the rear breaks traction you just know that the forward driving force would prevent the rear end from overtaking you and any slight slides were fixed by doing nothing more than keeping the throttle on the stop. Put simply it almost seems impossible to high-side the Christini. Even the added eight kilos of weight doesn't really hinder the handling. The bike is easy to change direction and there are no odd handling issues to deal with. Even the chatter around Lunar bend is no fault of the 2WD system as even in single drive mode (easily changed with a handlebar mounted lever) threw up the same problem which can only be put down to chassis and suspension set up

I'm so impressed with this system that I have even asked if there is any possibility of doing a 'Wild Card' ride at a World Championship event on it. Remember, this bike should not even work around a place like Three Sisters, it's not designed to but it does. Just imagine what it's like with a damp track or with a bit of off-road or at the very least a few slower turns. I am convinced that this bike will win British championship races this year in Chris' capable hands. Okay, it's an expensive addition that may not be for everyone but for those who can, you will be in for a real treat. It makes it easier to ride at slower speeds and for those who are really pushing the boundaries of what is possible there simply is no way to explain just how good it is.

This bike won't jump out and rip the front end from your arms, you probably won't even feel it's working but it is, there in the background holding the line in the turns and driving hard on the exit and finding grip on the slippery stuff that just isn't there with slicks. Awesome!



Phil Gee, Second Opinion

When I first saw a Christini 2 x 2 KTM, it was being used in the North American indoor enduro series, and with some success. I wondered then if it was the kind of thing that would find its way into supermoto, after the ill-received hydraulic system that Yamaha tried on its 450. Luckily we didn't have to wait long to find out thanks MW Racing and British Elite rider Chris Walker. We hooked up with the bike at the second round of the British Elite at Rowrah and sat on the bike, it's hard to see the difference between the modified 2 x 2 bike and a stocker, save for the large lever on the bars that engages and disengages the 2WD system. It's a nice bit of kit, and reflects the high build quality of the whole installation. Quality triple clamps and drive tubes on the forks, and the power take off on the front sprocket all have a well thought out look about them, and the kit itself is available for a wide variety of makes, not just KTM.

Having ridden the track all day, I was happy that I knew which way it went, and after a lap or two to acclimatise (read 'not crash while everyone was watching') I was surprised how different it didn't feel, my expectations of a heavy feeling front end, and torque steer was soon dispelled, and once I'd satisfied myself it wasn't going to throw me off, I set about finding a rhythm and putting some decent laps in.

As I said, the bike felt stable from the off, and thanks to some adjustments made earlier in the day, the bike coped well with the tight turns, feeling planted on entry and not sliding unless provoked turning in hard on the brakes. You almost get a feeling of 'is it working?'... until you hit the dirt. It would be fair to say that the dirt at Rowrah was as slippery as any I've ridden wet or dry in recent years, the loose chippings offering little or no grip if you strayed even an inch off the clean-ish line, and many riders came to grief through the day.

Without getting the bike into the groove, clearing the step up was a real hit and miss affair. On the Christini 2 x 2, it was like cheating. Even getting off line there is still enough drive to hit the jump and clear it with ease, and the speed I could carry on the way in meant that it was easy to get giddy and end up missing the groove.

Once you know it is actually working, then that's when the fun starts. I spent most of the day's racing goading myself into getting on the gas early and did the same here. Picking up the throttle deliberately early in the turns to see what would happen. The bike hooks up well and feels like it's being dragged out of the turns rather than pushed, which gives you confidence to get on it earlier and again earlier. The AWD bike never feels like it is going to light up the rear, but it still feels fast enough to be doing it, the 70% drive to the front just helps it hook up in a way that a perfectly set up bike on the world's best tyre will do 8/10 times, and sit you on your arse the other two.

Once I got some speed, I tested the turn in even more (plus the brakes) and it felt like I could keep pushing until I ran out of talent or petrol, luckily neither of which happened, but it was a bike that does make you feel at home and want to ride harder just to see what happens. I would have loved a run in the wet, but to be fair, it impressed enough in the dry. Like I said, Chris and his MWR team made some changes through the day and whilst the results didn't show it, the bike has improved a lot since the first round. With more track time and a few more tweak's I'm sure it will continue to improve. What is plain to see is that it is certainly a worthwhile project and SMI wish MW Racing and Chris Walker all the best with this. Thanks to them both for the chance to ride the bike, and also to Toby, the Nora crew and the Rowrah marshal's for making it happen



Dirt to tarmac transition is where the 2x2 really works well



Front AND rear spinning up how weird is that?

Conclusion.....

To sum up our collective thoughts on this unique and innovative AWD race bike, it has to be said it is certainly an impressive (not to mention expensive) tool that just needs a little further development to make it truly outstanding. The build quality and high spec of the MWR Christini KTM really are a credit to the American company and of course Mike Wright's undoubted talents. Basically though if you have to ask "how much?" you can bet your last £12-15K that you can't afford a similar spec bike. Viva la difference and just watch this bike go in the wet!



For

Excellent traction,
Easy to ride,
Exotic
High spec
Stunning looks
Almost cheating

Against

Erm! Not exactly cheap
Not available 'off the peg'
Still under development

MWR Christini 2 x 2 KTM Supermoto

| | |
|----------------|--|
| Motor: | Liquid cooled, four-valve, DOHC, electric-start single |
| Capacity: | 499 cc |
| Bore & Stroke: | 95 x 63.4mm |
| Carburettor: | Keihin FCR 41mm |
| Transmission: | Five-speed, hydraulic clutch, MWR Christini 2 x 2 conversion |
| Frame: | Chrome-Moly cradle |
| Front susp: | Ohlins 50mm USD forks |
| Rear susp: | Ohlins single shock, linkageless PDS |
| Front brake: | Beringer six-piston caliper, 310mm disc |
| Rear brake: | Brembo single piston sliding caliper, 240mm disc |
| Fuel capacity: | 10.2 litres (6 litre tank under development) |

Contact MW Racing on 01744 885035 and www.christini.com for further details on the Christini 2 x 2 conversion kits

SMI Rating

| | |
|--------------|---|
| Power | 8 |
| Vibes | 7 |
| Performance | 8 |
| Handling | 7 |
| Brakes | 8 |
| Equipment | 9 |
| Fit & finish | 9 |
| Comfort | 5 |
| Price | 4 |
| Warranty | 5 |

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Toby Taylor for their help with
this exclusive test.

How does that work then?

This tale began in mid-winter 2009. We'd had a call from Ben Kirkman who had some top-secret gossip for us. Ben, a close friend of Mike Wright of MW Racing had got wind of another one of Mike's projects, to build an AWD supermoto bike. Chris Walker who's bike was in at MWRs for a winter refresh was taken to the idea of a 2 x 2 conversion and this is where the ball began rolling.

You may say that you've seen this all before and of course you are quite right. Two wheel drive systems have been tried and some say failed in supermoto before. The system that Danny Muller used in the 2003 British Championship was a hydraulic drive set-up developed by Ohlins (then owned by Yamaha) for a WR450 enduro machine and this was proposed to be further developed on the R1 road bike. This system used hydraulics and the extra weight of the pump, motors, oil and braided hoses added extra weight. Despite some favourable comments by Iddo and Crasher who had tested the bike in the dirt as well as tarmac, the Ohlins/Yamaha system never really caught on. Mind you, Yamaha was never really a favourite in supermoto here in the UK anyway.

A few years later over in America, Christini finally rolled out their first 2 x 2 into competition. The bike entered into enduros produced some impressive results, as well as a few expected teething problems. Come 2007, Christini launched and sold their first production 2 x 2 frame, originally a Honda CRF250-X, then a year later they released a KTM variant. This gave the firm considerable media exposure with impressive results in high profile off-road events such as the Red Bull Romaniacs.

So how does the Christini mechanical system work?

The Christini AWD system works by transferring power from the transmission, to the front wheel through a series of chains and shafts. This system is considerably lighter in weight than the Ohlins hydraulic system, and works similar to AWD mechanical systems found on motor vehicles. This system powers the front wheel at a slightly slower rate than the rear wheel and can be adjusted to suit the conditions and so can the percentage of power going to the front. Under optimum traction, the rear wheel is driving faster than the front. Built into the front hub is a one-way clutch which allows the front wheel to freewheel when the system is at its most efficient. Although the front 2 x 2 system is



Twin drive shafts to the front hub eliminates torque-steer

Inside the Christini 2x2

tuning it is not actually transferring power to the front wheel. It is only when the rear wheel loses traction that the drive ratio (relative to your driving speed) changes and the system engages. This transfers power to the front wheel until traction is re-established at the rear wheel. The added benefit of the system is that the front wheel does not want to wash out or tuck. In a situation where the front wheel wants to tuck, the system transfers power to the front wheel, forcing the wheel to turn.

How is drive transferred to the front wheel?

A dual sprocket is mounted to gearbox output shaft, an additional chain transfers the power to a gearbox located into the main frame spar. A drive shaft then takes the power (via a small slipper clutch arrangement) up to the modified steering head, which houses what essentially is a small differential the same as a car. A drive shaft then connects to the lower triple clamp which houses a sprocket and chain system that drives two counter rotating drive shafts (one shaft clock-wise the other anti-clock wise) this prevents the driveshaft's fighting against the bike's natural attitude when leant over or turning (torque steer) The drive shafts are specially coated to prevent friction and are telescopic to work with the front suspension's movement. These fix to the bottom fork mounts, which house the AWD mechanical hub, which transmits drive to the front wheel. This system incorporates a one-way clutch, to allow the bike to freewheel. The Christini system can be adjusted by using different ratio sprockets, so in theory the system can be tailored to suit track type, weather conditions or rider preferences. Okay this set up isn't cheap and requires extensive frame mods that can only be carried out at Christini in the USA. Mike packaged the frame up and shipped it to the States to have

the top tube cut and the angle-drive gearbox mounted within the main tube. The frame is then modified at the head-stock to accept the bevel gear drive to the fork tube mounted drive shafts. It may sound a little complicated but the basic idea is a simple old-fashioned engineering concept. The problem really lies with the cost of shipping parts across the Atlantic (and back) and the current \$ to £ exchange rate which means that the Christini 2 x 2 conversion adds getting on for £5k to the price of your donor bike. However, the quality of the workmanship is first rate and when you sit down and add up what you are actually getting for your money it isn't really too bad at all. However Mike has ditched the bulky 10-litre plastic enduro tank in favour of a custom made carbon-fibre item, which has ramped up the cost of the kit even further. You don't have to have the six-litre carbon tank but it obviously helps when moving around on the bike.



Transfer gearbox requires substantial frame mods



Dual drive front hub