

FTX 2.4 GHZ RTR 'PUNISHER'

BY DEZ CHAND

SPEC CHECK

SCALE: 1/5TH

DRIVE: 4WD

POWER: 23 CC 2-STROKE

FUEL: UNLEADED, PREMIXED

WHEELBASE: 520 MM

TRACK WIDTH: 460 MM

WEIGHT (INCL FUEL): 12 KG



Find a deserted area and turn it into your own private test track. 4WD really comes into play here!

TAKE YOUR PUNISHMENT LIKE A MAN!

FTX 2.4 GHZ RTR 'PUNISHER' 4X4 23 CC 1/5TH BUGGY

The FTX 1/5th Punisher is a go anywhere, easy to use, fun vehicle designed to tackle everything that a smaller vehicle would struggle to get around let alone over, at a price that makes it a viable alternative to electric or nitro power. Garage pump petrol is plentiful and easy to get, cheaper than nitro fuel, you can literally fill up on your way out for some fun, anytime day or night. FTX have brought some style to the 1/5th off road class with the Punisher, which looks as good with a choice of two custom pre-painted bodyshells fitted, as when removed to reveal the internal roll cage adds added strength and protection.

ALL HANDS TO THE PUMPS!

Petrol engines run cooler than you might expect; anyone used to running a nitro model will be used to temperatures up around 245 F, (120 degrees C), while a petrol engine running 2-stroke premix can see engine temps around 60 degrees rising only to 80 degrees when the engine cooling fins are clogged with mud or the going gets extremely slow, like in a boggy field when air flow over the cylinder is limited. Even so, the fan assisted engine manages to keep itself reasonably cool and within its optimum operating temperature range thanks to the premix oil content being drawn into the cylinder, and the crankshaft mounted impeller just behind the pull start that draws air from around the crankcase itself. The

exhaust will get hot for sure, as there is a flame path making an exit but as this is contained within the roll cage on the back of the engine it is relatively hard to access and with a rubber outlet hose poking from the rear of the bodyshell it is very unlikely to cause injury.

Check out the Punisher, with 2.4 GHz radio as standard this is one reliable, interference free vehicle that will remain in control and securely connected, and apply a user defined failsafe at the first sign of a weak signal from a flat transmitter or receiver battery pack. After setting up the end points and neutral positions for both channels perfectly, you simply use the failsafe setting button on the receiver to make sure it reverts to a brake position if the signal is lost.

As an RTR package it is pretty impressive, with just a receiver battery and relevant charger to buy, as well as a fuel can, some premix oil and of course the petrol to get it all going.

First options to look at, before even running a large buggy like this over typically hostile territory there are two things. I'd always suggest fitting a breathable cover to prevent dust and grit being drawn into the cooling fan and pull start mechanism, and also some shock shaft boots to keep the shafts from dragging fine grit into the seals and leaking prematurely by literally eating the O ring seals within. I'm sure both these items will be on the usually comprehensive options list for the FTX Punisher once it is released.

In this RTR kit you get your Punisher buggy, plus 2.4 GHz steer wheel



Above: Ready to run, complete with tools and 2.4 GHz radio system



Above: Despite 4WD system the Punisher design makes for easy maintenance thanks to simple construction



Above: Better looking than most large scale buggies with or without the body fitted

transmitter to match the 2.4 GHz receiver already factory installed, a large scale, high speed high torque steering servo and regular throttle servo already attached to all the linkages for both brake callipers and the carb throttle lever. You get a spark plug spanner that doubles up as a T bar screwdriver to make sure you get all your fixings properly done up. Also included is a multi spanner that allows you to adjust all the turnbuckles controlling the geometry settings, both camber front and rear as well as front toe in, just remember to turn them back very slightly so the ball joints at both ends are always working at the central position for sufficient clearance to work throughout the range without adding any drag into the system or prematurely wearing out.

4X4 BUT HOW?

The central differential is laid out just like a rallycross buggy, dead central with a brake disc in front and behind to allow brake bias balancing between the two axles. The radio includes adjuster dials to change both full throttle position and brake end point, as well as neutral point so you can dial it in exactly as you need it. Restricting full throttle can make it more drivable and extend run time, while limiting the brake action can help

maintain traction and direction by preventing the wheels from locking up. To accommodate the propshafts from the central drive housing to each differential, the engine is mounted only slightly off to the left hand side and the propshaft goes under the indentation within the crankcase just to the side of the crank centreline, while the 700 cc fuel tank spreads the weight of the fuel evenly across the chassis by incorporating a tunnel clearance to avoid interrupting the power transfer to the front gearbox. A straight front and rear propshaft angle is more efficient and wear will be reduced as a consequence. The centre of gravity is further improved by the low orientation of the jumbo steering servo that fits snugly just in front of the fuel tank.

The front and rear differentials contain all heavy duty metal gears and are fully sealed to allow tuning by virtue of different grade silicone oils, though they are simply packed with heavy duty grease as standard which is perfect for running the gears in. A stiffer diff set up will induce grip roll in high grip scenarios, and under steer in low grip surfaces, while a free spinning diff will limit acceleration on low grip surfaces and hence acceleration, and promote excessive steering responses on a high grip surface, so it's all about compromise and balance between the front and rear ends.

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Above: Lots of adjustments on the transmitter let you dial it in, literally



Above: 2.4 GHz radio receiver has an extra channel which could come in useful for a personal transponder when you go racing. Note fail-safe set-up button!



Above: Just add a large receiver battery to the radio box and you are away!

The massive driveshafts and propshafts all use heavy duty dog bone shafts and cups, which would benefit from some over boots if you are heading into deep sand or gravel, so another option part I would be looking into before heading out for the first real heavy session. To keep the driveshafts completely within their stub axle drive cups, the diff outputs are spring loaded which prevents the shafts dropping out when the long droop suspension is at full travel and steering lock. The propshafts can similarly suffer drop out if the chassis flexes too much when the going gets rough, so two huge 7 mm thick alloy braces connect the front and rear differential boxes to the central drive housing to limit chassis flex and maintain a constant distance from front to rear, while still allowing enough torsional flex to promote good mechanical grip from the chassis.

Talking of steering lock, the alloy front hubs really are a treat and so heavy duty that they can be recessed to give enough clearance around the C Hub to allow a 35 degree steering angle to overcome the usual under steer inherent in a 4WD system. A turning circle of 10 feet is pretty impressive for such a big 4WD buggy and the end points and steering rate can be fine – tuned by using the adjusters and Dual Rate dial on the transmitter. Be aware that adjusting the centre points will affect the end points of both throttle/brake and likewise steering left/right, but adjusting the end point adjust has no effect on the central position, so always set up the mid point before adjusting the full travel positions. Typically you aim to use as little steering angle to only just get you around the tightest corner on the course, and by limiting the working range of the steering system you effectively speed up the steering servo by reducing the angle it has to work through, and limit the wear on driveshafts by reducing the angle the dog bones have to work through against their drive cups. By restricting the steering range you also get a more compliant centre feel, because you have less response to your initial inputs and fine corrections on the long straights at high speed are possible without getting into a fish



Above: 23 cc of petrol power, with proper spark ignition and easy to clean twin layer air filter

tail situation that might occur if you over correct when the wheels are spinning with maximum gyroscopic energy. Even with a fresh engine that had done no more than sip a tank of extra oily premix to get it run in, we measured the Punisher at a top speed of 41 mph, so you can imagine that a wheel weighing nearly half a kilogram has a lot of energy stored in it at that speed!

Other beautiful alloy components include the extremely beefy inboard suspension pivot links, fitted to both ends of both gearboxes, to keep the suspension in line no matter how hard you jump or how wrong it all goes in mid air! Clipping a wheel at speed can put a lot of strain on these braces by virtue of the leverage applied by such a long swing arm, so these pivot braces need to be strong to improve reliability and longevity. People buy RTR models like these to enjoy them, while learning the skills required to maintain proper control over a given course, and the less maintenance or repairs required the more they enjoy it!

The alloy shock towers are 5 mm thick so they resist the temptation to bend when you land inverted or tumble end to end, which can last a very long time when a vehicle weighs this much and carries so much momentum. Many a time I've seen a large scale vehicle take off and I have literally let go of throttle and steering controls, watching it tumble end over end, just waiting for the carnage to cease before resuming control. Just like the real thing, when it all goes wrong you are literally a passenger and can do no more than stand and watch. Fortunately, the FTX is so bulletproof that you can dish out this sort of punishment time and again without suffering an early bath, so you are prepared to travel



Above: Cooling fan built into the pull start mechanism keeps things cool



Above: Large steering servo has alloy cooling case, and surprising good performance for such a big unit!

further a field to get you kicks safe in the knowledge that you won't have a wasted trip when you make your first mistake.

The shock towers have plenty of shock angle and height adjustment built – in, with two rows of three holes in both front and rear towers, complimented by the twin position lower shock mount in each lower arm, giving a total of twelve shock positions with a range of leverage and angles to allow you to get it completely dialled in.

The shocks themselves boast a massive 22 mm alloy body, with preload spacers for a quick and easy preload adjustment that makes it simple to set it the same side to side by just fitting the same size spacers, no measurements required. The heavy rated springs maintain a 60 mm ground clearance with the factory fitted spring spacers, and yet the long travel suspension still has 20 mm of droop front and rear to help the wheels stay in contact with the floor, maintaining proper steering and power transfer no matter how cut up or rutted it gets. The lower suspension arms all have droop limiter screws fitted, and as standard they are all backed right off for maximum droop, but if you feel the need, on a fast, smooth high grip surface, you can get the Punisher to squat down on its haunches by winding the droop screws in. Lowering the car and effectively stiffening the suspension by restricting the droop like this will help reduce the tendency to grip roll, but typically you will want as much ground clearance and droop as possible because let's face it, this is an off road buggy and should be enjoyed as such. A smooth grass track might be the only occasion where I would feel the need to limit the droop, to get a faster corner speed and make the buggy drift as it breaks traction, rather than digging in and lifting the inside wheels.

GAS, GAS, GAS

With a running in mixture of 25:1 (40 ml of premix 2-stroke oil per litre



Above: All steel gears in the primary drive

of unleaded petrol) getting the Punisher engine fired up takes no more than a couple of squeezes of the fuel primer on the carb, and a short, sharp tug on the pull start handle. The cord can extend to nearly 80 cm but you should never pull it so far that you reach the end as you risk damaging the return spring. There's never much need to pull it further than about 30 cm in short, fast, repetitive tugs until the engine bursts into life at a steady idle, don't touch the throttle during start up or you will drown the plug.

I let the engine idle through a whole tank full over the course of two hours to run the engine in, with the occasional blip to run it around the garden and give it a clear out, then it was time for a fresh can of fuel at the recommended 40:1 ratio (25 ml of oil to 1 litre of fuel) desired for a good running condition. The choke switch will promote a rich mixture when the red lever is in the vertical position to help the engine spark into life when it is cold, but I usually find two tugs with the choke on, followed by two tugs with the choke off is all it needs in even the worst weather! The pull start handle protrudes beyond the bodyshell so it's a simple task to fire it up and drive off without fiddling around with body clips.

Refuelling is a different matter as the fuel tank has a twist on cap to keep it sealed, so the bodyshell has to be removed for pit stops, but with a run time of 45 minutes per tank of fuel, you will rarely find the need to top up. Run time will be limited by the receiver battery, like the typical FTX 5-cell NiMH battery we have fitted here. With 4200 mAh on tap it can supply all the power the steering and throttle servos require whilst also feeding the radio receiver for well over an hour, because they will be pulling a lot less than a constant 4.2 Amp drain and the loads are only momentary, so perhaps recharge it every two tank refills just to be on the safe side. Big receiver packs like this can take a proper charge current, these bigger Sub-C packs can take a full charge at 4 Amps or more so you should be recharged in less than an hour even from a completely discharged state. The slower you charge the receiver pack, the happier the NiMH cells will be and extend their working life, with more cycles over their usable working life, so never rush it just for the sake of it and always use either a wall mounted slow charger or a proper peak detect fast charger to avoid damaging the battery.

The battery box has a screw down lid and with such a large battery as this it can be quite fiddly getting all the wiring back in, so I suggest running the charge lead of the battery out with the radio leads so it can

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Above: Transmission has a guard to keep it covered, while engine is protected by a close fitting roll cage



Above: Point the rubber exhaust exit rearwards to keep things clean under the body



Above: The ignition kill switch is easy to reach, and is the only way to stop the engine unless you run out of fuel



Above: Lots of roll centre adjustment with camber link positions inboard and outboard, plus shock angle choices means you can dial it in

be recharged without removing the lid. Also, as the lid is not fully sealed I would suggest drilling a small hole in a rear corner of the box base, so that any water that does enter the radio box has an easy exit, the last thing you want is an accumulation of water over time. The radio switch does not have a waterproof cover, but rubber switch covers are easy to find in model shops and quite easy to fit so I'd suggest you do, before you get it wet and test the fail-safe operation.

The huge steering servo has an alloy body which offers the internals a degree of heat sink capability which usually indicates a higher speed servo, and my first impressions were that it is very fast indeed, most unusual for servos of this size in an RTR large scale buggy, quite impressive in terms of both the time it takes to reach full deflection and the amount of torque on offer. This massive servo spec is just 0.2 sec to 60 degrees at 6 V, and 18.5 kg of torque, so it wears a servo horn that is backed up with a metal backing plate and spline reinforcing ring built – in. This is linked via a kinked turnbuckle to clear the central propshaft, to the servo saver which is mercifully very easy to access. I readjusted the length of this steering linkage so that the servo horn was 90 degrees to the linkage at straight ahead, as it came out of the box it was slightly too long so I had slightly more steering throw to the right than the left which made for quite odd handling, but was easily cured. A knurled adjuster ring is located at the top of the servo saver post so easy to reach and twist with your fingers until you get just enough protection for the servo gears with enough tension to keep the front wheels pointing in the desired direction without the terrain flicking the wheels back into a straight line and leading to under – steer.

The four massive wheels wear pre-glued 170 mm diameter tyres, with

a square peg tread pattern that will work on a range of surfaces, soft enough to dig into AstroTurf, dirt and grass, yet tough enough to suffer the occasional piece of tarmac or concrete without ripping the knobblies off. The tyre inserts feel nice and firm so the tyres will resist the squirm usually associated with heavy vehicles like this, and maintain a proper footprint with the ground to maximise control and acceleration. Growing at speed is the usual problem as the heavy tyre carcass will try to spread under centrifugal forces and the contact patch reduces, hence grip and predictable handling vanish in an instant, but thankfully such large diameter tyres do not need to rev so highly in order to reach 50 mph as a smaller tyre would, so gyroscopic forces are minimised. The wheel rims are vented to allow the tyre to deform and maximise grip, but if you are running in damp or wet conditions be sure to add a hole in the tyre tread pattern to allow any water that has spun into the insert through the breather hole, a chance to exit the tyre with the gyroscopic forces on offer. A tyre can soon fill up with water if there is no exit route provided and that makes it heavy, slow and increases the chance of the glue holding it to the rim giving up the ghost.

The wheels use a square drive adaptor, with two grub screws attaching each to its respective axle so there is no escape. Each wheel has a reinforcing ring around the square drive socket to prevent it spreading under load so you are never brought to a grinding halt by a stripped wheel hub.

The last thing you want to see is something this heavy and fast heading away from you faster than you can run, there's simply no way you'd catch it and only an impact with an unmovable object or physically running out of fuel will halt its progress. So when running a large scale vehicle it



Above: Pre-painted shell and pre-glued tyres means you have very little to do other than check it over before filling up



Above: Centre diff with brake assemblies means you can dial in front to rear bias perfectly

is always best to hedge my bets, so while the FTX 2.4 GHz radio system included in this RTR package has a proper fail-safe operation that positions the throttle servo to a user defined position, and kicks in nice and quick if the signal is lost, the carb butterfly valve also has a return spring so that it snaps shut if disconnected from everything.

BIG AND BIGGER

Disassembling the Punisher in usual RRCi fashion revealed a very simple construction, with very few screws to undo, with nothing more than a screwdriver before all the sub assemblies are in your hand. The engine for example bolts to a moulded carrier, which is simply screwed to the chassis so that it comes away in one large assembly with the transfer layshaft still attached. It couldn't be any easier for maintenance it really couldn't.



Above: Diffs arrive greased for running in but proper diff oils could be used to tune the driving style

I used my Dremel power driver and had the bare chassis plate, which weighs the best part of 1 kg, on the bench in less than 5 minutes.

As you might expect on a 12 kg buggy that can exceed 50 mph once the engine is run in and the carb settings perfected, everything about this buggy is huge; the primary drive gears are all heavy-duty hardened steel, thankfully with a protective cover to prevent enquiring fingers getting pinched. The 23 cc, 2-stroke engine weighs in at over 2.5 kg with its washable air filter and stubby exhaust can silencer fitted, and even the Lexan bodyshell is a heavy weight moulding to help it cope with the punishment it is going to have to cope with and as a consequence it weighs in at 250 g all by itself!

The brakes are very impressive, with push off springs ensuring the Ferodo style brake pads do not drag on the discs until they are needed, improving top speed and reducing wear at a single stroke. The main spur gear is a spiral design to take drive from the bevel gear on the transfer layshaft from the engine, a clever and efficient way of getting power around a 90 degree corner. I noticed the throttle servo has 'O' rings between each of its case joints, which leads me to suspect that it might well be water-resistant and that's a good sign.

The rear suspension has three inner and four outer roll centre locations for a total of twelve possible combinations for the anchor points of the camber control turnbuckle so you can adjust the chassis roll and camber control it generates, in conjunction with just two inner positions for the front roll centres, so you can decide whether the buggy under-steers as it enters a corner, or over-steers as the chassis starts to roll and grip is

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Above: How do you get drive forwards without splitting the fuel tank? Easy, go straight through!



Above: The wheel drives have two grub screws holding it to the stub axle for extra security

transferred rapidly to the wheels on the outside of the corner.

As supplied the buggy has the typical toe-out at the front and toe-in at the rear you'd expect on a 4WD chassis, with zero camber set all round as a starting point, but you get a turnbuckle spanner in the kit so there's no excuse for not doing a little experimentation until you find your ideal set-up.

EAT IT

We hit our favourite large scale test area, a deserted piece of industrial land, covered in scrub and gravel interspersed with occasional tarmac strips, so we could give it a really good thrash test. The tyres coped with every surface from wet grass, dry tarmac, gravel and heavy shrub land, while the suspension took it all in its stride, floating over virtually anything! While zooming around we did a range check, and once we got beyond 240 m we figured we'd best turn around, because we simply ran out of dry land! That's very impressive for an RTR radio, and this 2.4 GHz system from FTX has a very quick fail-safe action indeed, literally closing the throttle the instant I turned off the transmitter to simulate a lost signal.

After playing around at high speeds for 45 minutes the exhaust note changed to a distinctively dull 'wah, wah, wah' response to throttle actions indicating that we were finally out of fuel, and yet we still had enough power to return the buggy to our refuelling station which saved us a long walk and a hefty hike back. Topping the fuel tank up we completed the one-hour run time we were aiming at and then recharged the receiver pack, amazed to see that it took only 1500 mAh to re-peak, so we could run almost three tanks per charge if we wanted to push our luck a little, but I suspect two hours' constant run time would be enough fun for anyone!

Further investigation when we got home revealed we had lost a kingpin pivot screw and the layshaft idler gear had backed off its grub



Above: The front drive and steering assembly, is supported by a large alloy chassis brace. Alloy hub carrier, shock tower, turnbuckles and large volume shock absorbers make this a high spec kit



Above: Long travel suspension has droop to spare, note droop adjusting screw in lower arm

screw retainer, otherwise it was mechanically sound. A good strip and rebuild with generous amounts of thread lock on all stressed and moving components where threaded bolts screw into metal components is all it would take to make the Punisher bulletproof. We had lost the rubber exhaust deflector almost immediately as the exit spout it clamps to has no ridge for it to bite onto, so that's something else I have to find a solution for.

All up, we spent a very enjoyable day out yet used less fuel in the Punisher than we did in my Zafira dragging it there and back. Simon Fennell, Callum and I had a ball thrashing the Punisher around what would have been otherwise a derelict area, literally turning a dead space into a fun race track without upsetting or endangering anyone or anything, though we both got to eat a good deal of sand and gravel, typically laughing our heads off while the Punisher flew by scattering stones and sand in our faces! **RRCI**



Above: Suspension pivot braces are substantial. Servo saver is overlapping to prevent dust ingress



Above: Fully equipped and ready for anything. Can you handle it?



Above: FTX Punisher, ready to dish the dirt!

QUICK SPEC

Class: 1/5th 4WD Off Road Buggy
Type: 2.4 GHz RTR 23 cc Petrol Engine
Manufacturer: FTX
Price: £635.00 RRP

REQUIRED TO COMPLETE

Receiver battery and charger
 Radio batteries
 Unleaded petrol
 Premix oil
 Fuel can and spout/funnel

DISLIKES

No receiver battery included
 No wheel spanner supplied

LIKES

2.4 GHz radio in an RTR
 Transmitter dials for adjustability
 Tough alloy braces and shock towers
 Adjustability and tuning opportunities
 Turnbuckles on all camber links

Lay out a basic course
 on a grass area and get it
 spinning

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