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FULL-TILT BUILD

DUNCAN RACING YFZ450R

What it takes to build a championship-level machine

By the staff of *Dirt Wheels*

Over the years we have tested many fully built machines that we have given rave reviews and some we haven't liked much at all. Since the new sport ATV world is stagnant at the moment, we have been building plenty of older machines that prove that they are still very worthy of competing. Our last build with Golden West Cycle and Duncan Racing turned out very well. The WORCS-style Honda 450R we built was great on the track, trail and in the dunes. Afterwards, we contacted Duncan to build us a full MX-style YFZ450R with a superstar motor—and they delivered.

Starting with a 2011 YFZ450R, Duncan stripped it down and began the build from just a frame, making sure all the parts and pieces that went into the final product were perfect. The YFZ450R is a great platform for racing, as it comes set up ergonomically for track use. Duncan employed many aftermarket companies in an effort to build a machine capable of winning an MX championship. Starting with the engine, Duncan stripped it down and gave it their National kit, which includes a high-compression custom piston, custom-ground cams, high-performance valve guides, a Serdi machine valve cut, oversize valves, a custom port and polish, job, and a complete Duncan Racing Fatboy 4 exhaust system. The engine breathes through a Fuel Customs intake, and fuel is controlled by the new Vortex X10 CDI/ECU unit.

The Vortex ECU replaces the stock unit, so it's not a piggyback-type fuel controller like most on the market today. It comes pre-programmed with 10 fuel and ignition maps, which are accessed by a dial on the ECU itself. It was developed on the dyno and in the dirt, so the mapping is as close to flaw-



Long, dry corners must be taken with precision, as too much throttle causes the back end of the machine to overtake the front.

less as we have ever seen. Three fuel-trim switches on the ECU allow you to tune the mapping by a range of 22.5 percent for low, mid and wide-open throttle. The adjustments are made via a small flathead screwdriver. The Vortex ECU also features what they call "V-Boost." This is a programmable voltage-boost circuit for maximizing the spark energy across the rev range, which also has been bumped up for a higher rev limit. The ECU is fully waterproof with O-ring-sealed switches. It is fully programmable via a PC USB connection, and Vortex even offers a handlebar switch that allows you to change maps on the fly.

The rest of the machine got the full treatment as well. Roll Design provided the A-arms, steering stem, nerf bars and pegs. Elka Stage 5 shocks grace the front and rear of the



DUNCAN YFZ



machine, and the ergonomics are topped off with Fasstco Flexx bars and a Works Connection Elite clutch perch. A Quad Tech seat cover replaces the stock one, offering more grip for fast-track play. The clutch was replaced with a Hinson billet clutch basket and a Duncan Racing high-performance clutch kit. The chain was replaced with an RK O-ring chain, and we ran 15/38 gearing for the track. With the smaller STI Tech 4 MX tires, we could have gone down two teeth or so on the rear sprocket to make the gearing a little taller, as it revved out a little too quickly for our liking.

The swingarm and linkage are stock in the rear, but the front is graced with Roll Design's MX Lobo II A-arm kit, which widens the front end to 50 inches. A GPR Ghost damper is used to keep the steering smooth and straight. For a final touch, Duncan installed their chrome front bumper and polished the stock rear grab bar.

THE RIDE

We tested the Duncan YFZ-R with both thumb and Motion Pro twist throttle configurations, and we personally liked the thumb throttle better. The machine sits low and produces very little body roll in the corners. The Elka Stage 5 shocks were sprung and valved very well and produced very little kick over small-track bumps, but

soaked up big hits and landings with ease. The Stage 5 shocks are dual-speed compression, rebound and preload adjustable, with a piggyback front and a remote reservoir rear configuration. We had ATV racing legend Doug Eichner on hand to help us test the machine, and he too liked the suspension setup. While Doug was flying over big doubles and tabletops, the machine stayed in control and didn't buck or shift around.

The engine was the shining star of the build, however. From idle to redline, the Duncan National motor was smooth, powerful and felt light. If you've ever ridden a high-performance 250cc four-stroke, the engine felt closer to that than a 450. It was deceptively fast and didn't seem to ever care what gear it was in. It didn't have massive amounts of arm-stretching torque, but the power ramped up into the higher revs so quickly that it didn't matter if you lugged it. Doug Eichner wished it was geared a little taller to carry the revs out further, as it bangs through the gears and hits the rev limiter with ferocity. Duncan dialed in the Vortex ECU before they brought it out, and we didn't have to touch a single dial during our testing time at Milestone MX Park in Riverside, California.

On the quad track at Milestone, we were able to keep the YFZ-R in third

The STI Tech 4 MX tires and beadlock wheels add some flair to the YFZ, but also quite a bit of grip. The lightweight tires have great side bite, so they work well on wide machines.



Up front, Roll Design Lobo II A-arms and Elka Stage 5 shocks upgrade the YFZ's handling. The shocks weren't too plush, but they handled track ruts, chop and hard landings very well.



You can barely see it, but the yellow Vortex CDI hides under the plastic here. You can adjust the fuel trims by turning these arrows with a small flathead screwdriver.



Under the seat, a Fuel Customs intake helps the YFZ make its power. This fire-breather makes a stock YFZ feel like a TRX400X.



GPR's Ghost damper sat under the front fairing and kept steering kickback in check. A steering stabilizer will improve your riding no matter what type of terrain you're in.



In the corners, the YFZ will always wheelie if there's traction. The power comes on lightning-quick and doesn't stop revving.



Atop the Roll Design +1 anti-vibe steering stem sits a set of CR Hi bend Fasstco Flexx bars and a Motion Pro Vortex twist throttle kit. Also gracing the bars are a set of TAG grips and a Works Connection Elite clutch perch.



Quad Tech's gripper seat cover looks great and keeps your butt on the seat.



Duncan Racing finished off their Fatboy 4 exhaust system with a custom-powdercoat finish. This costs \$99.



We had Doug Eichner on hand to test the YFZ with us. Doug has won just about all there is to win on an ATV, so he was the perfect test rider.



The YFZ feels light in the air, much more so than the stock machine thanks to its taller bars, lighter-rolling stock and a peppier motor.

gear the entire time, as the powerband is broad and useable enough to negate shifting in some instances. Through the corners, keeping the machine in third gear allowed us to use more throttle to propel the machine forward instead of just spinning the tires, seeing as how in second gear the YFZ-R had a tendency

to light up the rear meats in a flurry of wheelspin. The power was predictable, manageable and smooth, yet invigorating and exciting up in the top of the rev range. Loren Duncan of Duncan Racing said that the compression ratio of these motors can be pushed for even more power, but it decreases engine life. We

CONTACT

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MACHINE:

Quad2012 Yamaha YFZ 450R
Quad weight350 lb.
Built byDuncan Racing, International
Special thanksRoll Design, STI, Vortex,
Elka, GPR, RK, Fuel Customs,
Works Connection, Fasst

MOTOR:

Motor mods
Pipe/mufflerFat Boy 4 Complete
Stainless Exhaust w/ Custom
Blue Muffler
Porting/DRI Head Port (w/ SERDI valve seat
machining) included in HP4 Kit
PistonDRI 13.5:1 piston by JE Piston
Head/valves/camDRI HP4 Kit (Includes
DRI Head Port, SERDI Valve Seat
Machining, Billet Camshaft,
HD Valve Springs, HP Guides &
Big Valve Kit)
ECUVortex X10 ECU
*10 preprogrammed spark/fuel
maps, adjustable fuel trim

Spark plug/gapNGK
Airbox/filter/oilFuel Customs
FuelSonoco "The Standard"
4-stroke oilMaxima Premium 4 10w0

DRIVE SYSTEM:

Clutch basket/plates/springsHinson
Basket, DRI Clutch Kit
Transmission/oilMaxima Premium 4 10w0
Chain/lubeMaxima Chain Wax
Gearing: f/r15/38
ChainRK O-Ring

FRONT END:

A-arms/widthRoll Design MX Lobo II
A-Arms/50"
SpindlesOEM
Front shocks/wheel travelElka Stage 5
Steering stemRoll Design +1, w/ GPR
H-Mount
Steering stabilizerGPR "Ghost Dampner"

REAR END:

Swingarm/lengthOEM
Rear axle/width/carrierOEM
Rear shock/wheel travelElka Stage 5
Lock NutOEM
LinkageOEM

TIRES/WHEELS/HUBS:

Tires: f/rSTI TECH 4 MX

Tire pressure: f/r8 psi/6 psi
Wheels: f/rSTI Wheels
Hubs: f/rOEM

BRAKES:

Calipers: f/rOEM
Brake linesCrown Series Steel Braided
Brake fluidMaxima 550

HANDLEBARS/CONTROLS:

Handlebars/bendFlexx Bars CR Hi Bend
ThrottleVortex Motion Pro
Clutch leverWorks Connection

MISCELLANEOUS:

Nerf barsRoll Design
Front bumperDuncan Racing Chrome
Grab barStock Chrome
Skid platesN/A
SubframeSubframe Supports
SeatQuad Tech
TankOEM
Body plasticOEM
Footpegs/locationRoll Design/lower 1/2"

OTHER SPECIAL SETUPS:

DRI Custom Graphics
DRI/Hinson Quick Change Clutch Cover
DR Parking Brake Block Off
DR Chain Guard



The IMS-Roll nerf bars and pegs were comfortable and strong, but we missed the heel guards.

thought the motor was fantastic as it was. We can't see needing more power unless the tracks are in deep sand or we are pulling taller tires on wide-open sections. How it sat, this YFZ-R could be a top competitor in the Quadcross series.

The ergonomics of the YFZ-R were incredible, but we wished for heel guards on more than one occasion, as the bottoms of the rear fenders would lodge themselves in our boots on some hard corners. The Roll Design pegs sit a half-inch lower than stock, which opened up the peg seat height a bit and made the YFZ more comfortable when you're hanging off the side in a corner. The Roll Design steering stem raised the

DUNCAN YFZ

bar height by 1 inch, and the Fastco Flexx bars in their CR Hi bend broadened the cockpit for a more spacious feel. When standing up, we didn't have to hunch over as much as we do on a stock machine, so it took less effort to ride the machine hard. We've loved the Flexx bars since the first time we tested them. They feature a dual-pivoting design that allows the bar ends to pivot up and down to absorb shock and impacts through the bars, allowing you to hold on longer with less fatigue. They come with adjustable elastomers that allow you to change the stiffness of the bar.

Overall, the Duncan Racing YFZ450R was a hit in our book. Our only complaint was the lack of heel guards, but other than that, the machine was among the best of the built ATVs we have tested recently. The motor is downright phenomenal, and while it isn't the fastest motor we have tested, it was among the easiest to ride hard. If you have a YFZ-R, or any sport quad for that matter, give Duncan Racing a call and put some pep in its step! □



The Duncan Racing motor was well-loved in every aspect. From bottom to top, it pulled smooth and revved like a much lighter engine.