ON TEST

# RJX X-TREME 50

**Described as a purpose-built nitro-powered 50-size 3D helicopter, the X-Treme has a low parts count and even lower all up weight. It includes some innovative design features that have resulted in a very interesting machine. Richard Budd builds and flies it**

I first became aware of the X-Treme at the completion of the RJX Hurrican review. I was very impressed with the Hurrican and provided plenty of positive feedback to the importer. The only negatives I came across with the Hurrican were jumped on by the importer and the manufacturer with every effort made to replace parts that had caused problems. As a consequence of the feedback, I was asked whether I would be prepared to evaluate their new machine which would be called the X-Treme. In due course, this prototype arrived in the UK on a Friday afternoon.

This prototype flew 'x-tremely' well and was taken to the Vario fly-in and on my holiday to the RC Hotel and everyone who flew the machine was very impressed. The only negative comment I made was that the eCCPM control system shared the same layout as the Hurrican, which gave a small amount of interaction. Don't worry I was told, you have a development frame set, just wait for the final version. True to their word, I was handed a complete new production frame set at the 3D Masters. After converting the prototype to the production frame set, this machine has been my number one model ever since. So impressed was I that I sold some of my excess fleet and bought (yes that's right... bought) the silver carbon version that is the subject of this review.

## STARTING ASSEMBLY

The helicopter arrived in a nicely presented box, with all parts well packaged inside. The pre-painted orange to white fade glass fibre canopy (an option on the standard lime green/yellow to white fade canopy) was taking a large section of the box up, with the various sub-assemblies separately packaged taking up the rest of the space along with the long parts such as the boom and the supports.

The frames were found at the bottom of the box along with the canopy stickers and a CD. Try as I might, I failed to find an instruction booklet. For some reason I will never be happy with instructions being supplied on a disk, although I should be getting used to it by now, what is wrong with manufacturers supplying a printed booklet?

After the obligatory photo of the contents and the printing off of the 48-page A4 instructions which contain step-by-step computer generated pictures of each build step as well as a detailed set-up section, the assembly is started with the transmission and control components as these are required during main frame construction.

First up is the clutch bell. This requires the pre-cut clutch liner to be glued to the bell. As a precaution, I roughened the gluing surface with wet and dry and used a 24 hour epoxy. The top of the ten tooth pinion was then degreased and fitted inside the double ballraced aluminium clutch/starter shaft bearing block using red Loctite. The starter shaft was then inserted through the bottom of the clutch bell and secured with a 6mm hex start adaptor.

We move on to the tail output transmission assembly which is simply a steel tail drive gear pinion sandwiched between the two aluminium bearing blocks ensuring correct orientation as shown clearly on the instructions. The plastic (or in my case the optional metal) tail drive pulley is then fitted and secured with an M3 bolt and washer.

Moving on to the main gear assembly, the one-way bearing housing is bolted to the 85-tooth blue machined main gear and the 80-tooth moulded tail drive bolted to its hub via countersunk M3 bolts. After applying grease to the one-way bearing, which incidentally is supported by twin ballraces instead of the usual brass bushes, the auto shaft is slid in from the bottom and a stepped washer which will run on the lower main shaft bearing block is fitted to complete the assembly.

The main fuel tank comes ready assembled, however, I took the precaution of replacing the existing clunk tubing with some K and S

The X-Treme kit has quite a low part count with everything neatly packed in small plastic bags

All the SSG (Silver Surface Graphite) parts of the X-Treme laid out and ready for assembly

kinkless clunk tube as the tubing on the prototype machine started causing problems after only three flights. Attention then turns to the two eCCPM bell cranks. These are made from 2mm silver carbon and require gluing together with cyno and the fitting of the control balls and the two flanged bearings. A helpful hint here is to have all of the 2mm ball joint bolts ready to help ensure that the two pieces are joined exactly and use a medium cyno to give yourself enough time to ensure correct alignment. Failure to have the two ballraces aligned will result in the bell crank operation being compromised. The assembly of the rear swash control unit requires the fitting of an M4 ball joint to the metal elevator arm and two standard ball joints to the metal rear swash lever. The tail push rod bell crank is then assembled. This comprises of a moulded lever fitted with two ball joints connected to an aluminium lever block via an M3 bolt and twin ball races. A special washer sits between the bell crank and the mounting block to prevent binding. The 2mm silver carbon battery tray is then attached to the special 32mm cross member with M3 countersunk bolts.

## MAIN FRAMES

The 2mm silver carbon main frames can now be removed from the packet and after identifying which one is the left and which one is the right-hand frame they can be fitted with the four 32mm aluminium canopy stand offs and the four aluminium bottom plate/ undercarriage mounting blocks. The left-hand frame is then fitted with the previously assembled clutch bell system, tail output transmission unit, tail rotor bell crank and the three mainshaft bearing blocks ensuring correct orientation as shown in the instructions. The securing bolts are fitted with some nice M3 finishing caps. It is advisable at this stage not to use threadlock on any of these bolts as adjustment is required later on in the assembly for the gear alignment. With the addition of some 32mm cross members the right-hand side frame can now be attached. There are two silver carbon gyro trays supplied with the kit with the option of fitting one or both the first one located at the front of the helicopter and the second one behind the main shaft. These fit using a tongue and groove method which results in a very rigid structure once all the cross member bolts are tightened. I chose to fit only the front one.

The moulded tail boom holders can also be fitted at this stage, but the bolts left loose to aide the fitting of the boom. The battery tray can now be mounted to the front of the frame system. The moulded fan shroud is now attached via four silver carbon shroud mounts, self tapping screws, bolts and spacers. And the fuel tank can now be fitted. It is advisable to fit some fuel tubing to the top vent as access is limited once the tank has been fitted, don't ask me how I found this out! The tank is retained with two silver carbon plates which bolt via spacers to the main frames and locate onto four rubber bung which rest into the fuel tank. Thankfully this arrangement allows quick removal of the fuel tank if required. The header tank can now be fitted to its mount and secured to the main frame. It is now time to attach the eCCPM control system. The front bellcranks are simply attached to the frames with an M3 bolt, spacer, washer and nyloc nut. I did find that when the bolt was tightened, the bellcrank bearings became notchy. This was rectified by fitting a 0.5mm shim washer between the two bellcrank flange bearings.

The rear eCCPM control system requires two flange bearings fitting on the outside of the frames and the cross shaft fitting through the frames and control assembly which is secured on the shaft with M3 grub screws. The rear swash lever is now fitted, but not fastened to allow later adjustment, and two M4 nuts fitted to complete the unit.

## CARBON UNDERCARRIAGE

The undercarriage is a work of art and comprises 2mm silver carbon plates, aluminium cross struts, skid holders and a pair of 8mm skid tubes. All of these are simply bolted together. The whole undercarriage only weighs 128g and although strong, allows quick and easy replacement of individual carbon plates in the event of a heavy landing. The undercarriage is attached to the frames via four M3 bolts running through the carbon base plate. The 10mm hollow main shaft can now be fitted along with the main gear and secured with an M4 bottom shouldered Jesus bolt and a shaft collar above the top bearing block. The bearing housing bolt can now be threadlocked and secured and the tail pinion gear mesh and clutch pinion gear mesh can now be adjusted and bolts secured.

## ENGINE AND SWASHPLATE

It is now time to look at the engine. I chose an OS 50 Hyper, although other engines can be used if required. The moulded fan (or in my case a Quick UK Airskipper 30 ally fan) was attached to the fan hub. This assembly is then fastened to the engine via two tapered collets and secured with the engine prop nut. A quick check showed no noticeable run out so the clutch was

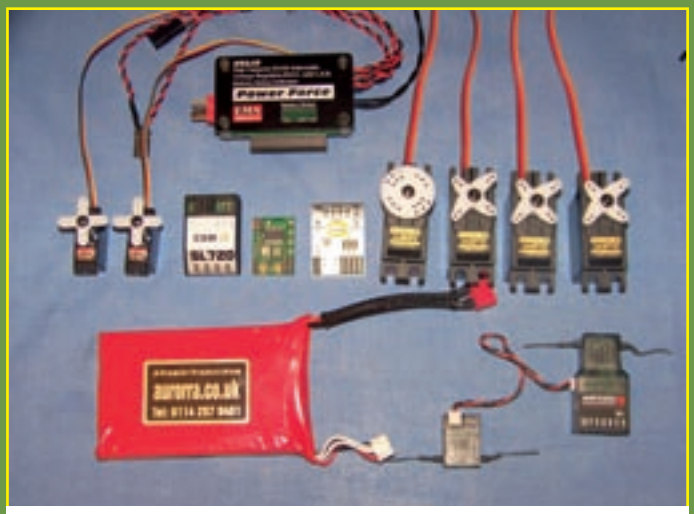
The X-Treme is also available in a standard black carbon fibre G10 version shown here

Forward flight was very fast (probably due to the small frontal cross section) and exhibited no pitchyness

The helicopter lifts off into a very stable hover at 1,750rpm requiring no trim or tracking adjustment

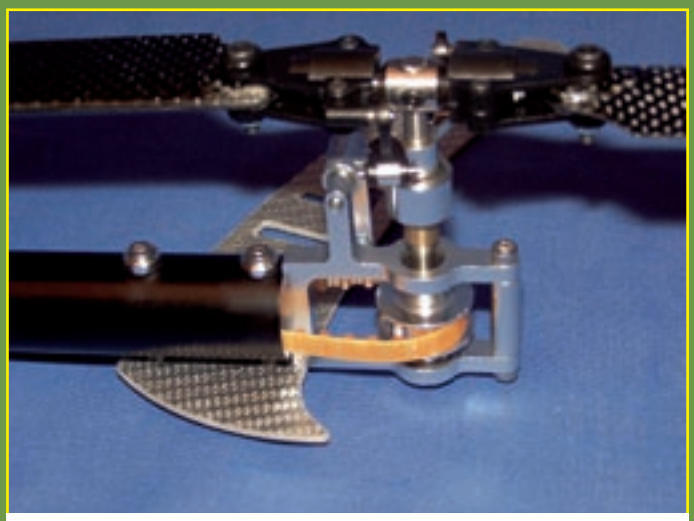
The X-Treme has been well designed with everything looking very neat and tidy under the canopy

The completed rotorhead installed on the X-Treme main frame




Radio gear comprises a mixture of JR and Hitec servos, CSM 720 gyro and Aurorra Revolution 4500 3c 2s LiPo battery pack

The silver carbon main frame built and ready to accept the rest of the components



The tail unit is another work of art and features a CNC alloy skeleton tail box

attached with two M3 bolts. The outer two parts of the three-piece engine mount is now attached to the engine, although not tightened yet as this would stop any fine adjustment. After fitting the centre part of the mount between the main frames, the engine can now be slid in from underneath and can now be aligned and all bolts secured.

The swashplate is next on the board. This is a quality ally affair and just requires the fitting of the control balls and the swash guide. I will point out at this point that the M2 countersunk screws provided with this kit use a non-standard Allen key. These can be purchased or if like me, you can raid your spares box and use more conventional cross headed screws. It might help if a appropriate Allen key is supplied with the kit. The wash out unit can now be completed and comprises of two ally double ballraced washout arms with 'A' links pre-fitted, an ally washout base, pre-fitted with brass bushes and a pair of control balls that have two mounting positions dependant on how much control power is required. No prizes for guessing that I used the outer hole for maximum control power!

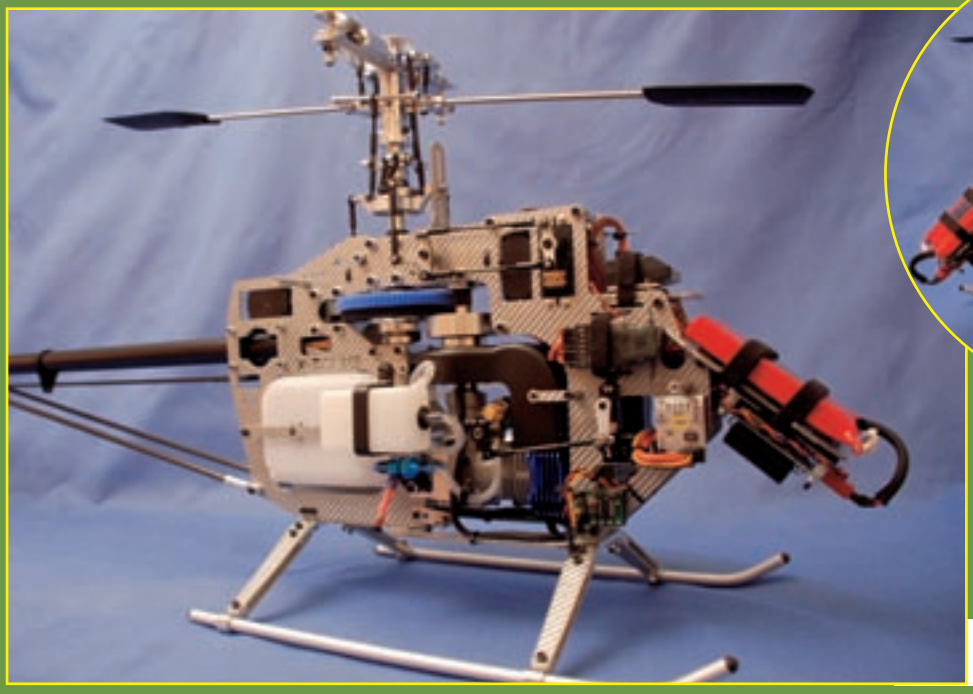
## ROTORHEAD ASSEMBLY

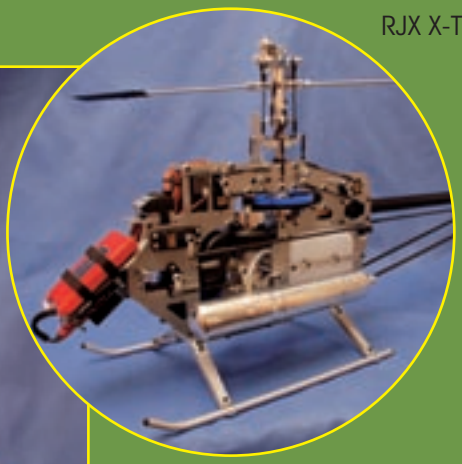
Next is the heart of any helicopter, the rotorhead. As with most bits on this helicopter, the rotorhead is a full CNC aluminium unit featuring some 54 different mix options which together with the washout gives you a staggering 108 possible settings to mess about with! The rotorhead also features an under slung 4mm flybar. The centre hub is first fitted with the double ballraced flybar seesaw and the ally head button. The double ballraced metal blade holders are then fitted with the pitch arms (which incidentally sacrificial parts in case of a crash) and after fitting the M4 control balls to the mixer arms, these are then fitted to the pitch arm with the aid of an M3 bolt and spacers. Here I had a problem as the bolt supplied in the kit was of insufficient length for this purpose when using the 1mm spacer. Further checks showed that the mixer arm had been fitted with flanged bearing instead of ballraces. This resulted in a greater width on the mixer arm and an internal bearing spacer being too short. The solution was to fit a longer bolt and a shim washer between the bearings. The damper rubbers were than fitted to the head block and the 6mm feathering spindle is then fitted and after installing the spindle collar (chamfer side toward the damper) the blade grips can now be installed along with the thrust washer and correctly orientated thrust race. The whole assembly is secured with two M4 bolts and washers.

The 4mm flybar is now installed along with the flybar cage. At this point, the linkages between the flybar cage and the washout base have to be made and installed. The instructions are clear, but fail to give a length for the head linkages as there are so many variables due to the number of mixing options, however my linkages were set to 43mm between centres. The supplied 21g paddles can now be fitted and checked for alignment and position. After fitting swashplate, washout assembly and the adjustable phase ring, the rotorhead can now be fitted to the mainshaft and secured with a shouldered M3 Jesus bolt. The silver carbon swash guide can now be fitted. The rest of the head links can now be made and fitted. Again the instructions show which 2.3mm rod to use but not the final linkage length. I ended up with the flybar seesaw to blade grip mixing arm being 30mm and the swashplate to mixing arm being 92m between centres. It should be remembered that the linkage between the swashplate and the mixing arm should form a 90-degree angle (which will result in the arm not being parallel) at zero degree pitch otherwise a non- linear pitch range will result. The blade holders accommodate up to a 14mm blade root, although I did find that the supplied blade retaining bolts to be a little on the short side.

## TAIL UNIT

The tail unit is another work of art and features a CNC alloy skeleton tail box. This unit comes assembled, but will need partial disassembly in order to fit the tail belt. I noted that although assembled, no threadlock had been applied, so I would





(above) **The finished model looks very neat and purposeful**

(Left) **The design of the X-Treme keeps all the major components tucked out of the way**

recommend checking. The 5mm tail output shaft is fitted with a 10-tooth metal tail pulley which is secured by a pin and grubscrew. The shaft is double ballrace supported and the whole assembly is secured to the inside of the 22mm aluminium tail boom with four bolts, two of which are also used to hold the vertical tail fin. Here I again used an option part and selected a silver carbon fin with X-Treme cut into it rather than the usual 3D cut out type.

Tail pitch control is via an ally double ballraced control lever which features a brass insert for friction and play free operation of the pitch slider. The pitch slider itself comes pre-assembled and features a brass bushed double ballraced unit with a metal yoke and plastic links to connect to the tail blade grip. The unit is completed with a steel tail hub and moulded plastic blade grips that are supported on twin ballraces. It was found that the supplied tail blade retaining bolts were M2.5 instead of M3. A minor packing discrepancy which I am sure will be rectified in future kit batches.

With the tail assembly complete it was just a matter of sliding the boom in to the boom holders and ensuring that the 90-degree twist in the belt was the correct way for the tail rotation. The 3D silver carbon horizontal fin was then mounted to the boom using a support bridge and the metal support. The twin carbon tail brace unit required the machined ends to be epoxyed in to place. On this kit I chose to replace the standard purple ends with some nice shiny silver ones which I believe give better 'bling' factor. The tail brace unit is then fitted to the helicopter between the horizontal fin clamp and the bottom of the main frames. Tail pitch control is via a 4mm carbon rod which requires the M 2.3 control rods to be glued in. To prevent this from flapping around the kit is supplied with two moulded rod guides, however, I chose to use only one of these as that is all I personally believe is required.

## RADIO INSTALLATION

Moving on to the radio installation the eCCPM servos, in this case JR8715's rated at 12kg at 0.09 seconds (4.8 volt) were fitted to the main frames using the supplied mounting hardware as was the JR 8900 tail servo.

The frames allow for the use of either a micro servo or a standard servo for throttle use. I chose to use the Hitec 65 servo for the throttle and used another one on the opposite side for the CSM CarbSmart. The CSM 720 gyro was mounted on the gyro plate and the receiver mounted on the right hand side of the side frame and held in place with some Quick UK double-sided foam tape and a Velcro strap using the supplied frame slots. Never one to use a standard set-up, the battery tray was filled with a FMA battery regulator and an Aurorra Revolution 4500 3c 2s LiPo battery. Despite all this equipment, the design of the helicopter allowed for one of my neatest installations yet.

All eCCPM push pull linkage 2.3mm pushrods were then made to suit along with the swashplate control pushrods and the throttle push rod. The tail rotor control was taken care of via a second 4mm carbon rod with 2.3mm rod ends. Heatshrink is supplied to cover the carbon rod to ball link joints The canopy required drilling at the attachment points (checking first that the markings are in the right place!) and fitting with the supplied rubber grommets. The canopy is attached to the helicopter with four M3 Allen headed bolts. However, these will be replaced with thumb screws to make removing the canopy less of a headache.

The exhaust chosen was the new RJX performance muffler, which is similar in looks to my usually favoured Hatori 522 unit and features a 'ribbed' finish and weighs in 166g not including the supplied neon exhaust deflector which to be fair was not to my liking! Even with my set-up which features the addition of an extra servo, a CarbSmart and a governor, the all up weight of this helicopter came out at 3.21kg (less blades) and the C of G bang on the mainshaft.

## TEST FLIGHT

After completing the obligatory range test, the engine was fired up and the helicopter carried out to the patch. The first thing that was noticed was that there was no clutch drag. The helicopter was then lifted off into a very stable hover at 1,750rpm requiring no trim or tracking adjustment (it's the way I build them!) The first tank was just spent in the hover and pirouetting around the patch. The machine felt very locked in and remarkably quiet. Visibility with the orange and white canopy was great. With the quick trim carried out on the gyro, four point pirouettes showed good tail power and sharp stops on the standard gyro settings. After putting a couple of tanks of Magnum 30 through the engine, it was time to select idle up and bring the head speed up to 2,100rpm. This gave the X-Treme the X-Tra factor and the machine positively came

## STOP PRESS...

- RJX use a CD for their instructions to allow alterations if required. The latest version of the manual is available on the RJX website for download.
- The minor discrepancies in the bolts/bearings noted in this review have been rectified and a 1mm Allen key will now be supplied with each kit.
- Also an optional helical gear system should be in stock by the time this magazine is out and RJX is working on a thrust raced tail unit.

**The RJX 3D blades seemed well suited to this machine**

alive. With such engine power and such light weight combined with the speed of the servos, the pitch response was nothing short of spectacular. Pitch pumping manoeuvres were now down to how fast you could move the stick and climb outs were akin to the Starship Enterprise at warp factor 9!

Fast forward flight was very fast (probably due to the small frontal cross section) and exhibited no pitchyness. The roll rate was phenomenal and the flip rate very impressive. Tick-tocks required me to change my technique as I found doing them without climbing very difficult where on previous machines I found it difficult not to loose height. I had the same trouble when attempting the Chaos which a kept starting at 30ft and stopping when it was getting to high for me to see what was happening. Autos with such a low weight machine were a piece of cake, and allow you to take liberties that would deck many lesser machines.

I found I started doing silly things like how many pirouettes can be done during the hang at the bottom of the hover and how fast can you come in backwards and still hit the spot! I would like to tell you how good this helicopter is at the new craze of stick shaking, but alas I am not good enough to do it. From those that are, I have been told that it is very good! The RJX 3D blades seemed well suited to this machine any were on par with the best of any of the blades I have tried. The RJX silencer went completely unnoticed, which can only mean that it was as good as my usual Hatori (although at a lesser cost). On the prototype machine I experimented in how much cyclic power could be achieved with this head and fitted some drilled out Raptor 50 light green paddles. I found the only limiting factor was my own ability. This is the first 50-size machine I have ever flown that when I land a put the helicopter back in the pits with a smile on my face not thinking about how I can improve this machine. With that said, the next step is to convert this heli with a CSM flybarless conversion... so watch this space!

## THE VERDICT...

One of my heroes, Jeremy Clarkson, once said whilst reviewing the Vauxhall VXR that some designer must have had a picture of him on his desk and said: "I'm going design that bloke his perfect car." Well I hope the picture on RJX's desk shows my best side! Is this heli perfect? Well not quite, although close enough for me to spend my money. I would still like the fan shroud to extend over the cylinder head, a metal fan, and I would still like to see a thrust raced tail unit (although with a bit of adaptation the Quick UK raptor tail unit can be used) and I would like to see the few minor niggles with the kit rectified, although to be fair this was one from the first batch of kits produced and RJX have a proven track record of rectifying these minor discrepancies. Although the X-Treme is not the cheapest 50 heli on the market, I feel that RJX have set a new standard that the other manufacturers will be struggling to achieve. The initial purchase price does not look to bad when you price up other manufacturers option parts to bring their machines up to a similar specification.

Richard Budd

## TECH SPEC

**RJX X-Treme 50**

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|---|---|
| **PRODUCT TYPE:** | 50-size 3D nitro helicopter |
| **ROTOR DIAMETER:** | 1339mm |
| **TAIL ROTOR DIA:** | 233mm |
| **GEAR RATIO:** | 8.5:1:4.7 |
| **Gross weight:** | 3200 - 3300g |
| **Overall length:** | 1260mm |
| **Price:** | £499.95 G10 frames;<br>£539.95 Silver Carbon Frames<br>£49.50 for RJX performance muffler<br>£15.70 for RJX 95mm Carbon Tail Blades<br>£53.20 for RJX 600mm High Carbon 3D Blades |
| **MANUFACTURER:** | RJX Hobby |
| **WEB:** | www.rjxhobby.com |
| **UK DISTRIBUTOR:** | King Cobra Distribution |
| **TEL:** | 01706 260503 |
| **WEB:** | www.kingcobra.co.uk |
| **AVAILABLE FROM:** | All good model shops |

**During test lights the roll rate of the X-Treme was phenomenal and the flip rate very impressive**