TRUGGY TARDIS

HOBAO HYPER 12 MINI ST TRUGGY

The popularity of 1/8th Truggy racing has exploded the world over, being so much more stable and forgiving than a 1/8th buggy, so this exciting development from HoBao brings you all the fun and excitement, performance and reliability we have come to expect from Truggies these days, but in a smaller package for use in more confined places and smaller 1/10th size race tracks. With a no compromise attitude to the design brief, the HoBao team set to work on a fully featured, pocket version of the extremely successful Hyper ST truggy, and the Mini ST was born. A tiny exterior that is packed full of all the features of larger models; truly a Tardis in Truggy form.

Supplied as a factory assembled Ready-To-Run package, complete with pre-painted shell all you have to do is fit the rear, angle adjustable, high-level buggy style wing. With an over square chassis with a 29 cm track width and yet only a 24 cm wheelbase means it is super stable in the corners, by the very fact it is wider than it is long and aided by the front and rear anti roll bars incorporated into both diff cases.

The chassis is already equipped with Futaba 2-channel 27 MHz radio and is powered by the very popular, powerful, yet easily maintained HoBao Turbo .12 pull start engine seen in previous on and off-road models over the years. Full of fuel and batteries, ready to race, the Mini Hyper ST weighs in at 2 kg, so straight away you feel this is one sturdy little package.

FIRE BREATHING

The Hyper 12 Turbo engine sits at a 20 degree angle to put more of its weight centrally on the chassis, and it breathes through a pre-oiled, twin layer, low profile, oval air filter and exits via a beautifully polished, EFRA 2645 spec, alloy silencer using the familiar triple spring joint between pipe and manifold to absorb vibration and maintain a better seal. In the usual RRCi style we stripped the Hyper Turbo engine to show you what's inside, and surprisingly we revealed a plain crank face, not turbo veined as expected. The turbo proclaimed on the engine label refers to the veined pull start adaptor, as it whizzes around at crank speeds. This turbo fan will pump the fuel air mixture along, as they transfer from crankcase to upper cylinder, aiding cylinder fill and boosting the power further up the rev range.

Although we chose to use the optional Fastrax Bump Box, I'd leave the pull start in place to keep the turbo vein in operation. We will keep the pull start fully functional, rather than fitting a plain blanking plate, for those instances when the starter box gets left behind on race day by mistake. Oh yes it happens! We fitted a 4200 mAh Intellect Stick pack, and once charged, it provided enough service to run the engine in, start the engine repeatedly on two test days while we got the engine dialled in and learnt the 4WD driving style, and also got us running throughout a full race day, qualifying and all, without ever missing a beat. And it's still nowhere near flat even now!

The cylinder cooling head has an integral head button, with a 0.3 mm shim between the two, lowering the compression ratio sufficiently to allow the use of higher Nitro content fuels. We went for the latest Byron Gen 2 RTR 20% fuel to give a little power boost over the more usual 16% used in RTR models these days. We got two 'Quart' (0.95 Litre) bottles, enough for 25 refills so we aim to use one bottle to run the engine in and set the carb up properly once it has leaned off, the other to use on a few race days to follow. Having a fuel tank we measured at just 70 ml might not sound like much, rising to 75 ml once the fuel line and filter were primed, but a run time of over 6 minutes at race pace shows just how frugal smaller capacity motors can be whilst still delivering the performance required to thrill the driver and win races. The fuel tank lid incorporates a handle with a finger tip grip for easy refills on the fly, so it's probably the first model I haven't had to add a cable tie to the lid in order to open the tank with the body on! The bodyshell is already pre-cut and trimmed to include a large orifice in the windscreen for fuel tank lid handle access through which cooling air can enter, and the side window is cut out to allow access with a fuel bottle. It's all geared around quick pit stops, this is a thoroughbred alright!

The alloy bodied, slide carburettor is designed to remain constant throughout the heat range of the engine, metering fuel accurately enough to hold its tune and deliver dependable power. With a 5.5 mm venturi the airflow is measured and restricted sufficiently to make the power delivery manageable and help improve fuel economy to extend run times.

Having no fail-safe in the radio nor return spring on the carb might cause concern at a race meeting so I'd fit one or the other before your first outing.

NEAT IDEAS

The twin post steering system uses a cross link so there's no Ackerman adjustment possible, but the servo saver adjuster nut is cleverly placed above the post so it's easy to get a finger to for simple adjustments. Another clever but simple piece of thinking is the location and angled anti roll bar bottom links, so you can easily get a hex driver to the bolts securing the drop link to the lower arm, without having to fight against the chassis plate or suspension arms. Being angled at almost 45 degrees makes access so simple you have to wonder why every truck doesn't do the same!

A composite clutch drives a steel 14T clutch bell and 42-tooth steel spur gear on the middle differential. Combined with the 10-tooth diff input pinion and 39-tooth diff rings, equates to an 11.7:1 overall drive ratio. The engine is capable of producing a claimed 1.4 hp at a crazy 37,500 rpm, so it will spin the 2.2" wheels and their 85 mm diameter tyres at 3,200 rpm, equating to around 51 kph (30 mph) so it's a good job the super soft HoBao Racing flat pin tyres are factory assembled to the deep dish, 6-spoke white composite wheels and properly glued on for you. Being standard sized 2.2" wheels means the current range of 1/10th rear hex drive truck wheels will fit so the

Left: Swept lower arms allow maximum droop and travel

Right: Pivot ball front suspension, threaded alloy shock bodies, shock boots and turnbuckle steering links

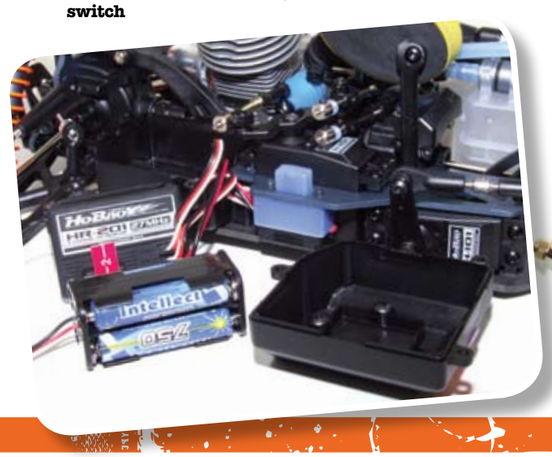
Left: Optional fastrax 'Bump Box' makes starting all 1/18th to 1/12th I/C models a breeze, and lasts for ages when fitted with 4200 mAh Intellect

Below: Essential equipment, but you'll also need a fuel bottle and glow start too

Below: Low profile air filter, easy grab fuel tank lid and in line fuel filter are all standard kit

Below: Twin post steering, easy finger access servo saver adjuster nut, additional alloy chassis plate and diff case braces

Below: Radio box has room for full size receiver and AAA battery pack. Note transponder mount in lid, rubber covered switch



Below: Plenty of steering lock, and a crash back front bumper mount!

Below: Superb kit tyres. CV joint captures pivot pin in bearing. PBS is super smooth and slop free

world is your oyster regarding tyre choice, including anything from the current Pro-Line range so you should be able to dial into your local track whether it be AstroTurf, mud or grass.

The centre brake assembly carriers twin steel brake discs are clamped between fibre lined pads, and the front to rear brake bias is fully adjustable thanks to the separate link rods to the throttle servo. Both brakes are shielded from fuel spills by a top cover, and the assembly sits on top of a centre chassis reinforcement plate, with struts front and rear from chassis plate to diff case for extra rigidity. The brake assembly and centre diff are slightly off centre on the hard anodised chassis plate, so the propshafts work at a slight angle, but this helps bring the engine further towards centre line, and the fact that the engine is tilted over by a whopping 20 degrees means the mass is central for better weight distribution and high speed cornering.

SEALED QUAD GEARED TRIPLETS

The three differentials feature both O-ring and gasket sealed cases, which are huge, accommodating the oversize planetary and main gears within. Having four planetary gears spreads the loads and keeps them very smooth, while a sealed diff case means you can tune their action with proper silicone diff oils, which begs the question, why are the diffs just filled with thin grease? I would suggest running the engine in as supplied, which will take all the high points off the diff gears as well as the engine internals, and then swapping all three diffs out to a sensible diff oil, probably following the usual practice in 1/8th Truggy/Buggy racing; 7K front, 10K centre and 3K rear diff oil weight. The easy access diff cases made the job a real breeze, so that's what we did for race day and it was spot on!

MY FAVOURITE THINGS

While the rear drive is distributed by good old dependable dog bones, the front drive shafts have to cope with steering angles as well as the range of suspension movement, so thankfully they feature CV joints whose pivot pin is held captive within the wheel bearings so there's no escape for the pin and the grub screw holding it in place is redundant. One of my favourite features on any vehicle, reliability built in by design. Another nice design idea I found on re-assembling the front and rear diffs (sadly not the centre diff as the output cups drive the brake discs) is that the bearings are of such a large diameter that they fit over the output cups, but why am I so excited? It means you can change the diff bearings without having to strip the diff completely and remove the output cups to exchange the bearings. When you have seen as many trucks and buggies as I have, it's the little things that impress the most.

The front suspension features pivot ball equipped upper and lower arms, captive in adjustable cover plates, so you can get perfectly free movement without any slop that would make the steering feel unpredictable. The swept lower arms and long travel shocks ensure that any hard landings make the chassis plate slap on the floor before the shocks top out, relieving any stress on the shock internals or their alloy mounting towers.

The alloy shock bodies are threaded for easy ride height adjustments, and wear a shock rod boot to keep dust and dirt out of the shaft seals for a longer more reliable working life. With multiple upper and lower mounting positions you can dial the chassis into any track or driving style required. With spacers on the front upper arm pivots to allow castor changes and turnbuckles on the steering links plus rear camber connectors you can really fine tune the chassis, bending it to your will. The upper rear arms have multiple inner and outer mounting locations for changing roll centres, while the lower arms even have droop screws incorporated into the design, pushing directly against the chassis plate to limit the down travel of front and rear arms, allowing you to dial in the handling on extra bumpy conditions, or hunker it down when the going gets fast and smooth.

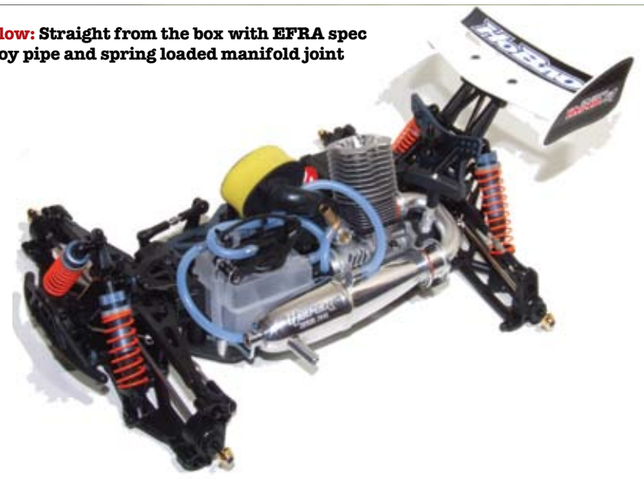
The lower arms are a ladder style for maximum strength, moulded in a material that is sufficiently pliable to absorb the knocks and keep on running. Reliability is most definitely the key to any successful race chassis. To finish first, first you have to finish!

The only tuning features I can see absent from its bigger brothers is the eccentric inserts used in the lower pivot link plates to allow quick rear toe changes, so I presume optional link plates will be available to allow this simple yet crucial tuning aid. More rear toe adds stability at high speed over bumpy ground at the cost of turning ability. Less rear toe makes for a sharper steering truck but it will be far more nervous on the high speed section of the track. Set at 3 degrees is a typical setting so perhaps HoBao have done all the sums and testing for you and set it that the optimum condition straight from the box. The front-end is set with a good degree of toe out to make it responsive to steering inputs, giving a good initial response, and putting the front suspension through its range there is negligible bump steer so it remains stable and accurate over even the roughest terrain.

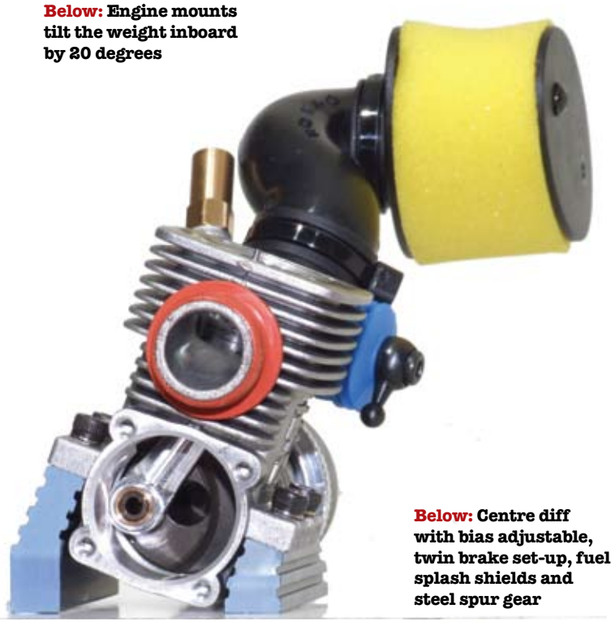
The blue anodised alloy radio tray holds two full size H-101 servos, so you can easily upgrade these at a later date if you find yourself needing better steering or throttle response. The radio box holds a 4 AAA battery case and a full size 27 MHz receiver, but it is cavernous, easily big enough to get a little Novak LiPo and regulator in there to speed up the servos. The radio switch lives on the side of the radio tray and wears a rubber cover to afford it some wet weather protection, and the radio box lid clamps all cables within grommets to help prevent moisture ingress. The radio box lid also incorporates a three-point mounting for the AMB PT (Personal Transponder) you will need on race day. It mounts from inside, face up so you can read your transponder number from the outside with the top face flush with the radio box lid, what a great touch. It's a shame the radio lid is retained by three screws instead of R-clips, as you will need to open it regularly if running 27 MHz to change crystals at a race meeting, and to recharge or swap the receiver batteries as there is no

Left: Four planetary gears share the load. O-ring and gasket sealed diff case means oils can be used to tune the action

Below: Straight from the box with EFRA spec alloy pipe and spring loaded manifold joint



Below: Engine mounts tilt the weight inboard by 20 degrees



Left: 3 large ports in ABC liner, large cooling head and turbo veined bearing case keep the power flowing

Below: Flush hard anodised alloy chassis has diff cases, spur gear, fly wheel and pull start recesses to get everything as low as possible

Below: Centre diff with bias adjustable, twin brake set-up, fuel splash shields and steel spur gear

remote lead incorporated into the switch. If you were to convert it to 2.4 GHz radio and install rechargeable batteries, simply swap the switch for one with a remote charge lead and you will never need to open the radio box lid again!

RACE DAY

After running in, and a successful test day round the full AstroTurf track at Baginton, where we cut some decent 30 second laps in impressive style, clearing the famous double jump repeatedly and coping brilliantly with the bumps, we did a few modifications before the Summer series on Coventry's mostly grass summer track. Installing a XP1015 servo gave us the steering speed and reliability I need for racing, while a LiPo receiver pack and regulator provided the power to speed up the standard throttle servo.

I fitted my PT into the radio box lid, and checked it all over for loose screws but there was nothing else to do, it was still box stock chassis geometry and I hadn't even twiddled the shock pre-load rings! It flew round the grass track, clearing the new improved triple jump with just a blip of the throttle to keep the nose up. The kit tyres worked beautifully on the short dry grass track and AstroTurf jump sections, offering plenty of steering response for sharp cornering without even a hint of grip roll thanks to the front and rear anti roll bars fitted as standard. I took the first two rounds of qualifying to give me Pole Position on the packed 1/12th Truggy A-Final grid and was in a comfortable lead until the engine cut, with a stone lodged between the chassis and flywheel. While I was stationary awaiting a sun-baked marshal to scoop me up, another truggy hit it full belt and pulled a pivot pin through the rear suspension arm. We had thrash tested it to destruction and not managed to break or bend anything so I was a little surprised, not to mention disappointed not to win the A-Final but hey, that's racing; always full of surprises! At least now we know what spare parts to stick in the pit box before the next race day!

After stripping and rebuilding the Hyper Mini ST I realised I hadn't seen a single C-clip, and that all fixings were proper hex drive screws and nyloc nuts, so no corners cut in the design and construction at all. I was well impressed, not a single fiddly circlip to wrestle with and not a single stripped screw head; Quality through and through. The Hyper 12 Mini ST had proved a competent and competitive package, and we still can't figure out how they build so many features, so much strength and performance into such a small package. Just like the Tardis!

This is no toy replica of the proper Truggy; it IS a proper Truggy, just 1/12th scale. One for the kids? If it's tough enough to handle a full race pace and some seriously fast tumbles, then maybe it will survive their best efforts, if they can wrestle it from my grip between race meetings! There is a race series planned later this year for just 1/12th Truggies and 1/10th Trucks, so keep your eyes on the CML website and RRCi news pages for further details. RRCi

Left: Wider than it is long, for stable high speed cornering

QUICK SPEC

Class: 1/12th 4WD Off Road Truggy
Type: RTR Nitro
Manufacturer: HoBao
Price: £175.00 RRP

REQUIRED AND RECOMMENDED

Receiver Batteries: Intellect AAA x 4
Radio Batteries: Intellect AA x 12
Fuel: Byron Gen 2 RTR 20%
Fuel Bottle: Fastrax
Glow Plug: Fastrax Platinum #4
Glow Starter: Fastrax FAST50

OPTIONS

Bump Box Start – FAST 562
Intellect 4200 mAh Stick Pack

DISLIKES

No quick access radio box, the lid is screwed on

LIKES

Full size Truggy Spec
Fully ballraced
Fully adjustable geometry
Full size radio gear
Turnbuckle adjusters
Anti-roll bars fitted F and R
Steel primary drive gears
Captive CV joint pins
Hardened metric Hex fixings
C-Clip free assembly

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