



3 PURPOSE-BUILT ROCK CRAWLERS

WORDS THE RC CAR ACTION TEAM PHOTOS HOPE McCALL

In a hobby that's universally obsessed with going fast, guess what's the latest craze in RC? Pardon the pun, but you would have to have been living under a rock not to notice how over-the-top popular rock crawling has become. Technically, this segment has been around as long as there've been rocks and monster trucks to drive over them, but the crawling we see now mirrors the full-size rock crawling that has also seen huge gains in popularity. Rock-crawling rigs are highly specialized, purpose-built trucks that excel at pulling off the seemingly impossible. Over the last four years or so, we've been treated to a growing number of custom chassis designs that all essentially convert existing platforms into real rock crawlers. Now, rock crawling is officially mainstream, and ready-made crawlers are starting to hit hobby-store shelves. Leading the charge are the Axial AX10 Scorpion, Gmade Stealth and PTI Goliath Rock Crawler RTR. We put all three through their paces to see what each could do on the rocks.



ROCK READY



Car action

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GOLIATH
Car action

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AXIAL AX10 SCORPION

■ 2.2 ■ KIT ■ \$250 (varies with dealer)

We expect to see many more brands launching dedicated rock-crawling kits in the months ahead, but the Axial AX10 Scorpion gets credit for being the first competition-ready crawler kit. Axial was the first to offer a truck that was designed strictly for crawling from day one. With the AX10, there's no scrounging up your own axles, shocks, hardware, or linkages, and it's comp-ready as is. This would all be just a footnote if the AX10 didn't perform, but perform it does; just put it together and get to the rocks, and the Scorpion will make you look like you know what you're doing.

SPECS

- Wheelbase** 12.6 in. (320mm)
- Width** 10.2 in. (259mm)
- Motor(s)** Not included
- Primary gear ratio** (pinion/spur) 6.2:1
- Transmission ratio** 2.6:1
- Axle ratio** 2.9:1
- Final drive ratio** 46.7:1
- Differentials** Locked
- Bearing type** Metal-shielded and rubber-sealed ball
- Suspension type** 3-link, angled upper arms
- Shocks** Plastic body with ti-nitride shafts
- Wheel interface** 12mm hex
- Tires** Axial rock Lizard, 4.7x2.5 in.
- Body** Axial B-17 Betty, .060 Lexan
- Weight (as tested)** 4 lb., 1.7 oz (1,863g)

TEST GEAR

- » Novak Rooster Crawler speed control
- » Novak Fifty-Five motor
- » Spektrum DX2 2.4GHz transmitter
- » Spektrum SR3500 micro receiver
- » Peak Racing 3200mAh carbon LiPo battery



TURNING FIFTY-FIVE

The Scorpion build also gave us a chance to try out Novak's new Rooster Crawler and 55-turn "Fifty-Five" motor combo. The motor is designed strictly for torque at low rpm, and the Rooster has been re-mapped for crawling with a strong brake input at neutral to help your crawler hold its position on the rocks. It also has a robust 6V/5A BEC to handle high-power servos, zero reverse delay for quick reflexes on the rocks and built-in low-voltage-cutoff circuitry for safe use with LiPos. We had plenty of climbing power, and the strong hold-brake prevented unwanted roll-back. The Novak setup let us concentrate on driving instead of throttle management.



CRAWLING

The Scorpion AX10 is likely to be built box-stock by many first-time crawlers. With that in mind, we built our tester exactly as the manual suggests, with the exception of the speed-control location (which we changed mostly for easier setup-button access). We didn't bother with all the tricks an in-the-know crawler would add to the build such as star-cut foam inserts, wheel weights, axle-mounted battery, etc. And yet, even with its high-mounted battery, the AX10 proved impressively agile from the get-go. The suspension is quite supple despite what feels like a stiff setup on the workbench, and the truck can get near vertical before Newtonian physics takes over. There is a significant amount of

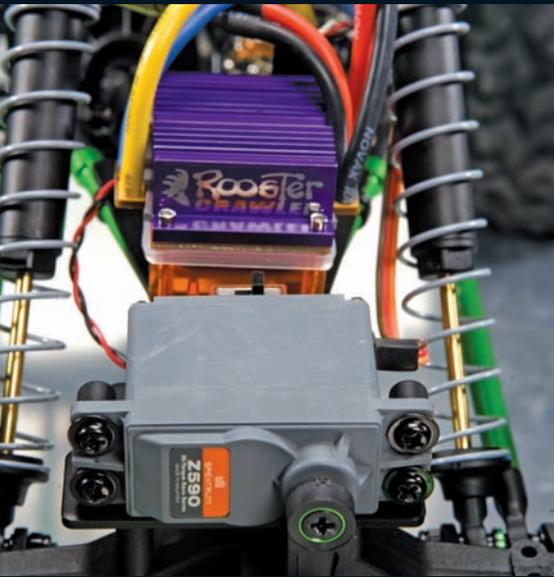
torque-twist (as revealed by the truck's tendency to lift its front right wheel under load), but adding a preload spacer to the left rear shocks helped reduce this. The stock tires are pretty good all-rounders and will only improve if you decide to "star-cut" the foams or swap them for AirSoft pellets, which is easy to do, since the Scorpion's bead-lock wheels allow you to remove and reinstall the tires.



Axial saves a few bucks with plastic shock bodies. Since shaft speeds are low in crawling, there's no real disadvantage. Low friction is what's really important, so the Scorpion includes titanium-nitride-coated shock shafts for super plush action.



The axle housings have smooth bottoms to help them slide over rocks, and the cast ring and pinion gears are tough. Telescoping universal-joint driveshafts transfer power from the transmission to the axles.



Servo mounts are provided for both axles, so four-wheel steering can be added later. Axial's manual calls for the speed control to be mounted under the battery tray, but we mounted it on the upper links with a zip-tied piece of scrap plastic.



The aluminum hex hubs can handle high torque, and setscrews secure them so the wheels won't pull off the hexes when you swap wheels. Tubular aluminum steering linkages are extra tough.



The AX10's transmission is a 3-gear design that would be right at home in a 2WD buggy or truck, but since it's in a crawler, there's no diff or slipper clutch.

GMMADE STEALTH

■ SUPER ■ KIT ■ \$455 (varies with dealer)

Gmade may be a new name for you, but we bet that it will not soon be forgotten as more and more of its trucks hit the U.S. market. Based in Korea, Gmade designs and manufactures high-quality, super-durable trucks such as the ultra-unique Stealth rock crawler. This truck is available in kit form and requires you to add the electronics, shocks and body. Curiously, diff lockers, a must for rock crawling, are an option part. Although the kit includes body mounts, we left them off because the scale truck-like chassis was just too cool-looking to cover it up with a body.

SPECS

- Wheelbase** 16.5 in. (420mm)
- Width** 16.5 in. (420mm)
- Motor(s)** Not included
- Primary gear ratio** (pinion/spur) 4:1
- Axle ratio** 7.7:1
- Final drive ratio** 30.8:1
- Differentials** Bevel gear
- Bearing type** Metal-shielded
- Suspension type** 4-link
- Shocks** Not included
- Wheel interface** 12 & 14mm hex included
- Tires** Gmade Ultrac 6.25x4.25 in.
- Body** Not included
- Weight (as tested)** 9.4 lb. (3,357g)

TEST GEAR (not included)

- » Airtronics RD8000 8-channel stick radio
- » Castle Creations CC BEC 10A
- » Castle Creations Mamba Max speed controls
- » Deans Ultra Plugs Wet noodle wire & solder
- » Gmade aluminum diff lockers
- » Hitec Heavy Duty metal horns
- » Hobbico CS-170 digital ultra-torque servos
- » Holmes Hobbies Crawlmaster Sport 3014 outrunner brushless motors
- » MaxAmps.com 3S 2100HV 11.1V LiPo battery pack
- » Traxxas aluminum big-bore shock kit



UNLOCKING PERFORMANCE WITH A STICK RADIO

To unlock the full potential of this super crawler, we enlisted the help of Craig Kaplan of Global Hobby Distributors, who hooked us up with the Airtronics RD8000 8-channel stick radio. The multiple channels and easy programming of this radio made it easy to set up the Gmade Stealth with front and rear steering that can be used independent of each other, or simultaneously for tighter turning or even crabbing. Additionally, you can control the two Castle Creations Mamba Max speed controls. The Holmes Hobbies Crawlmaster motors can work in sync with each other or separately, with just a flip of a switch. The truck can have front or rear dig and be able to climb steep inclines without easily flipping over backwards by feeding in more power to the front motor and less power to the rear motor. This truck is dialed!

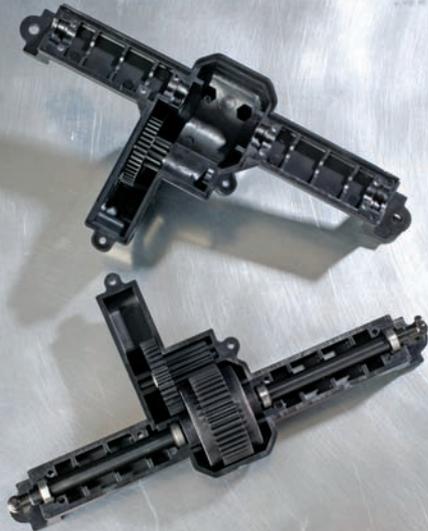
CRAWLING

The Gmade Stealth went together beautifully with clear instructions and excellent parts fit and finish. This Super class crawler needed to be outfitted with electronics so it would perform as great as it looks. We worked with John Robert Holmes of Holmes Hobbies. Not only can he get your truck ready to run, but he is also a fantastic source for rock-crawling know-how. The Stealth was set up with two Holmes Hobbies Crawlmaster Sport outrunner motors with two Mamba Max speed controls and Hobbico CS-170 steering servos (one for each end) that produce an awesome 333 oz.-in. of torque. MaxAmps.com came to the rescue with its 3S 2100HV 11.1V LiPo battery pack that is compact but has the juice to power all the electronics effortlessly. We also added a Castle Creations CC BEC to ensure that our high-torque servos were properly powered. The completed truck with its lightweight duralumin chassis is much lighter than it looks, weighing in at 9.4 lb. On the rocks, the 4-link suspension allows it to climb over rocks easily, and it can maneuver around tight obstacles with its front and rear steering. Depending on how rough or mild the terrain is, the truck can be adjusted with several positions for the shock mounts and suspension links.

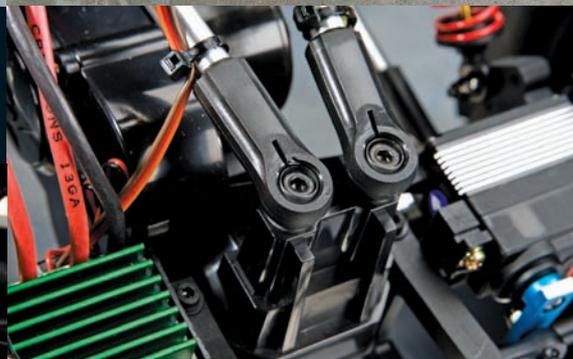
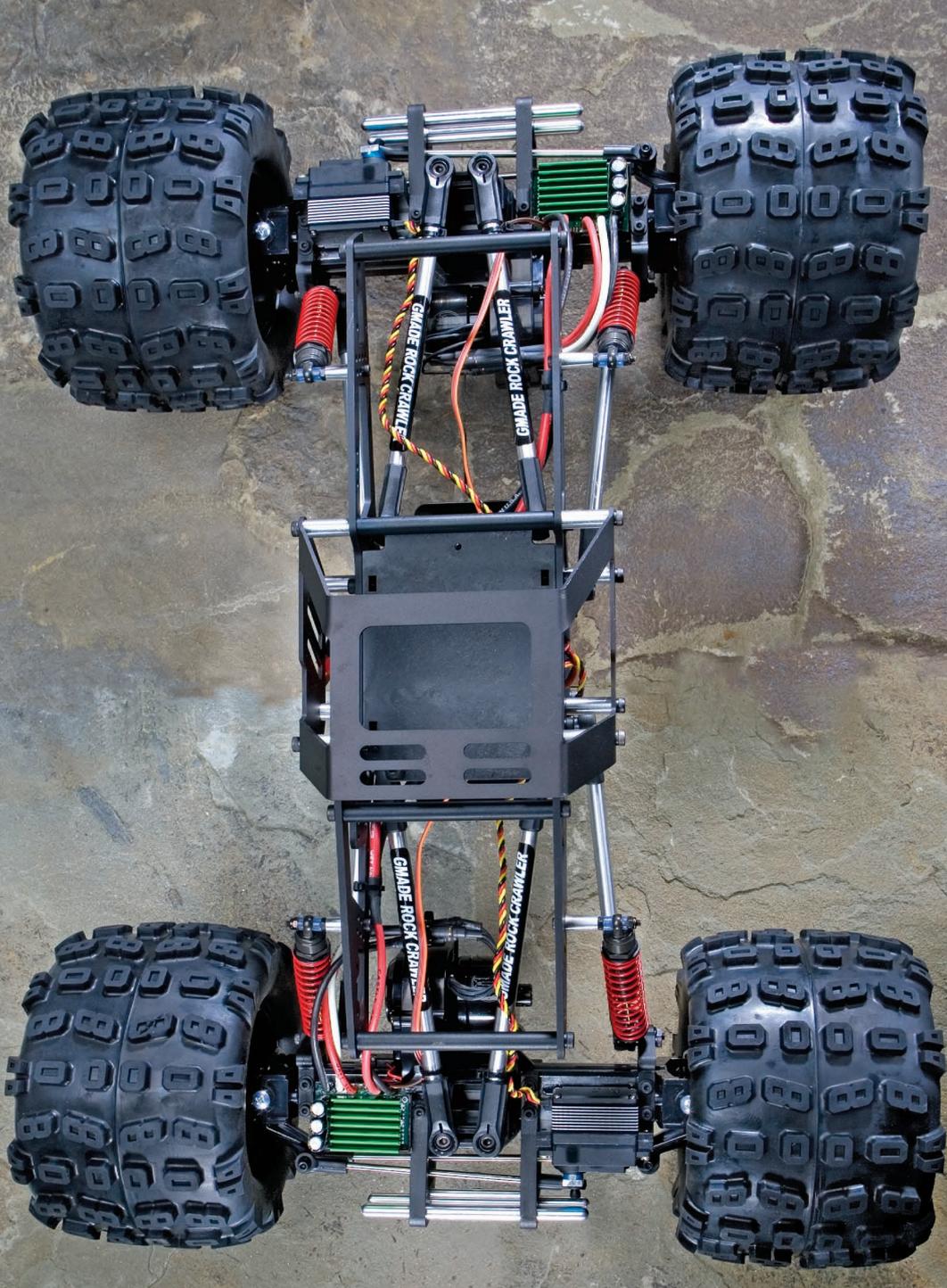
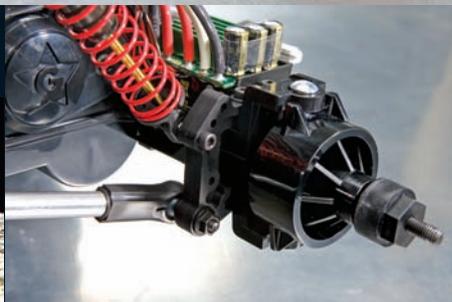




Above and below: bevel gear diffs come stock in the Stealth, but since this would be a full-time crawler, I added the Gmade aluminum diff lockers. The gearbox is built for durability with over-size gears that will stand up to abuse, and the axles key into each other for added durability in the drivetrain.



The steering knuckles are quite stout, but full steering throw is limited by the plastic stops on the top and bottom. The axle mount is made of Hytrel nylon that stands up to abuse, and it has multiple mounting holes for the shocks.



The Stealth uses massive 10mm ball ends that offer a larger range of suspension movement compared with smaller ball ends. The balls are held securely in place with a cap-head screw backed by a nylon locknut inside the gearbox.



The lower chassis tray is a perfect mounting spot for the battery to keep the CG as low as possible, and it sits 86mm above the ground for clearance over obstacles.

Left: unlike other trucks that use pins or splines to key the hex onto the axle, the end of the axles on the Stealth has large flat spots for the hex to slide onto. The chrome part in the foreground is the nut that holds wheel on and gives the truck a scale look.

ROCK
READY

PTI GOLIATH ROCK CRAWLER

■ 2.2 ■ Kit & RTR ■ \$200/\$350 RTR (varies with dealer)

We reviewed the Goliath Rock Crawler in the August 2007 issue, and we were impressed with its performance and potential. At the time, it was the only purpose-built rock crawler available—everything else was a conversion. PTI now offers the Goliath Rock Crawler as a ready-to-run. That makes it officially the only RTR rock crawler—another first for PTI. Besides including high-quality electronics from Hitec, PTI outfits the truck with its 12-inch Extension kit, which brings it up to spec with other 2.2 crawlers. The end result is a truck that any newcomer to rock crawling, or RC for that matter, will be more than pleased with.

SPECS

Wheelbase 12 in.

Width 11 in.

Motor(s) Single sealed-endbell

Primary gear ratio 7:1 (pinion/spur)

Axle ratio 2.5:1

Final drive ratio 17.75:1

Differentials Locked

Bearing type Metal and rubber sealed

Suspension type 4-link

Shocks Threaded aluminum, oil-filled

Wheel interface Pin

Tires Imex Red Rock 5.5x2.8 in.

Body PTI Goliath

Weight (as tested with wheel weights) 5.4 lb.

TEST GEAR

- » Hitec EZX-R Pro
- » Sealed-endbell motor
- » Hitec Aggressor AM transmitter
- » Hitec HS-645MG servo
- » Hitec HAS-2MB AM receiver
- » Team Orion Rocket Pack 4500mAh NiMH battery



Reliable Radio

PTI went with an all Hitec electronics package. The transmitter is Hitec's popular and affordable Aggressor AM unit. This radio not only looks good, but it's also comfortable, high quality and has proven to be very reliable. The Aggressor includes dual rate and the standard features such as servo-reversing and trim adjustments. In addition to the Aggressor system, Hitec's ESX-R Pro speed control is installed in the Goliath. This speed control can handle 7 cells (8.4 volts) and features one-touch programming. For steering, the Hitec HS-645MG is a good choice. Its metal gears mean it can take a beating, and 133 oz.-in. of torque ensure it has enough power for most rock-crawling situations.

CRAWLING

We used the Goliath Rock Crawler RTR as one of the test trucks in our 2.2 tire comparo in this issue, but before we did, we tested it with the stock meats. The tall Imex Red Rock tires don't have the stickiest compound, but the tire is still extremely flexible. Overall, the stock tires grip well and allow the Goliath RTR to climb strongly. Since we had previously tested the original Goliath Rock Crawler kit, we immediately appreciated how the new, longer wheelbase improved performance. The difference is simply like night and day. If you own a Goliath Rock Crawler or plan to go with the kit instead of the RTR, we'd say the optional 12-inch Extension kit isn't an option. After we used up one battery, we swapped on a hacked-up body and a set of more comp-worthy tires. Even hardcore crawlers had to admit the Goliath was a capable machine. More than one of us exclaimed, "This thing can climb." Because the Goliath uses threaded aluminum shocks, adding preload to the left rear shock was easy. Losing the front bumper improved the truck's approach angle, and before long, we had the PTI dialed in.



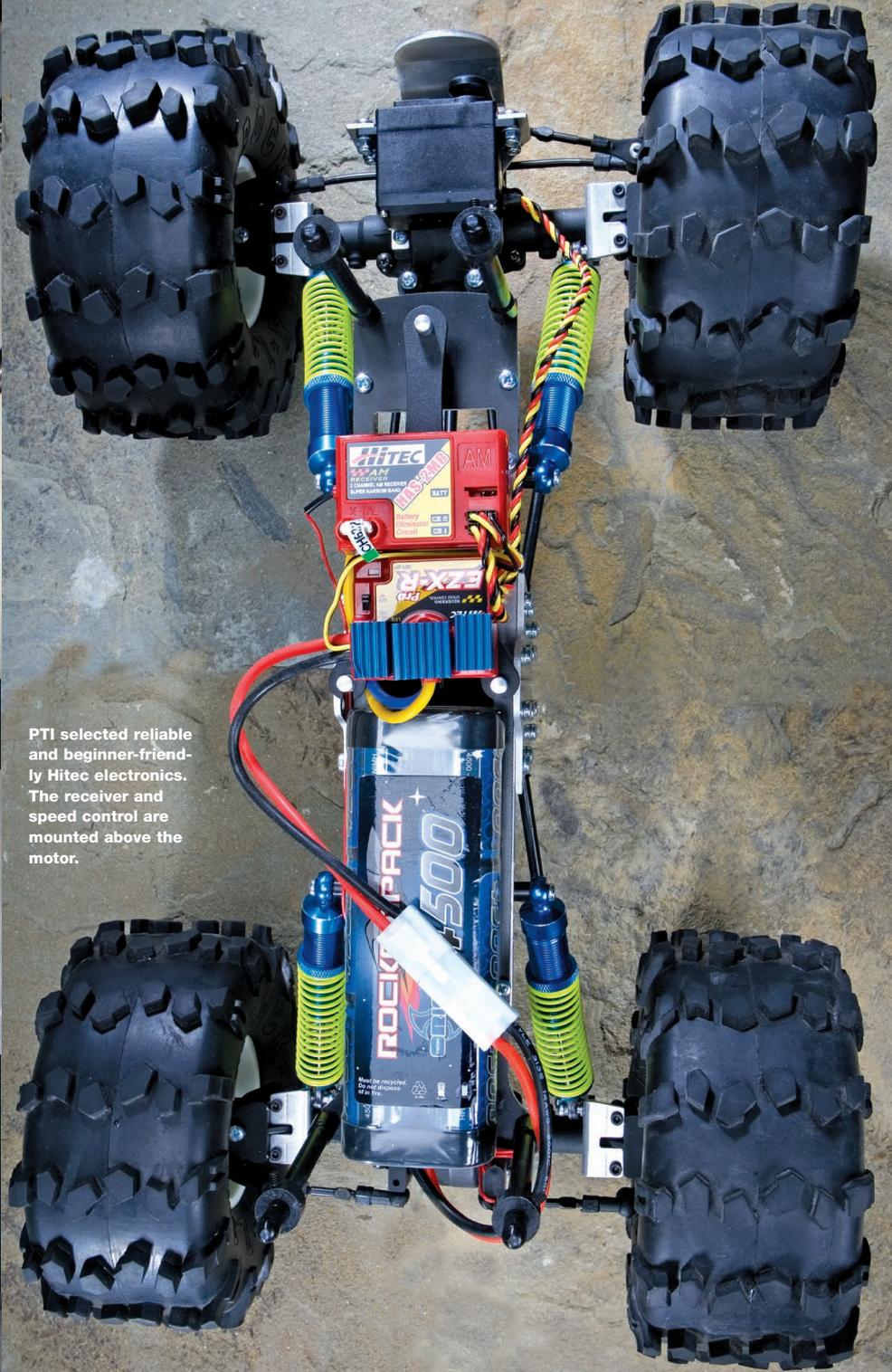


The shocks are mounted on new chasis rails that feature four mounting-location options. This, in addition to the threaded shock bodies, makes the Goliath Rock Crawler quite adjustable.



Since the RTR includes the 12-inch wheelbase upgrade, some of the parts are a little different. New lower shock mounts and lower link mounts are used since the shocks are now mounted directly on the axles.

The Goliath uses a simple direct-drive setup. The aluminum motor plate positions the motor so it directly spins a centrally mounted spur gear. Metal universal driveshafts connect to the axles.



PTI selected reliable and beginner-friendly Hitec electronics. The receiver and speed control are mounted above the motor.



The rear axle can be converted to rear-wheel steering. If you don't intend to enter competitions, rear steer is highly recommended and an easy modification of the Goliath.

GET DIALED IN

Rock crawling must be easy, right? It's so slow, after all. Think again, turbo. Rock crawling takes just as much concentration and technique as go-fast racing. It also requires just as much, if not more, attention to setup. Here are some tuning tips to make you more successful on the rocks:

LOW CG. Get the center of gravity as low as possible. The first thing you should do to achieve this is get the battery low. Many top crawlers mount the batteries on the front axle. Move everything low; the speed control and receiver should also be mounted as low as possible.

WEIGHT BIAS. Not only do you need the CG to be nice and low, but you'll want to have more weight up front than in back. Most crawlers add weight to the front axle and tires.

TORQUE TWIST. Many crawlers are plagued with torque twist. That's when a front tire reaches for the sky when climbing. The first step is to add some shock preload to the opposite rear tire (usually the left rear). Experimenting with link position will also help.

LOSE THE SERVO-SAVER. Invest in the strongest, highest-quality servo you can afford. To ensure your steering works as it should and the servo's output force isn't absorbed in the servo-saver, run just a servo horn.

SPRINGS. Go with stiffer rear springs than front springs. You'll generally want to run fairly light front springs (not too mushy) and stiffer rear springs.

ARTICULATION. Don't get caught up in the search for articulation. Massive amounts of articulation only works well in photos. In the real world, too much articulation allows trucks to get twisted and bound up.



Austin Dunn
National Champion

CRAWL LIKE A PRO

If you polled the rock-crawling community on who the best driver is, the vast majority would undoubtedly cast their vote for

current 2.2 National champ Austin Dunn. He simply makes it look easy. Here are his top five tips on driving like a pro:

1 PLAN AHEAD. Dunn advises that you always focus one gate ahead. Don't clear a gate only to put yourself in an impossible position for the next gate.

2 EXIT STRATEGY. When attempting a difficult obstacle, have a backup plan just in case your first plan doesn't work. The most obvious path might not work, so examine an obstacle for multiple lines.

3 IT'S ALL IN THE DETAILS. Before moving forward, Dunn states that you need to really study your line. "Tire placement is everything." Look for cracks, outcroppings, etc., that will either provide grip or set your truck off balance. Even the smallest ledge can provide the traction needed to summit a steep climb.

4 MAKE THE MOST OF IT. Using reverse is a small penalty but a common one that can add up. "If you reverse, make it count," states the champ. Don't waste a reverse penalty on a short backup. Make the most of it and back up until you're in the exact position you want to be. A 10-foot reverse counts no more against you than a 10-inch reverse.

5 STAY COOL. Dunn advises, "Don't get bent out of shape if you mess up; stay calm." Rock crawling is largely mental. When you make a mistake, let it go, and stay focused. Don't let frustration do the driving. That's a sure way to make more mistakes.



**ACTION VIDEO
ONLINE
RCCARACTION.COM**

SOURCES

- Airtronics;** distributed by Global Hobby Distributors airtronics.net
- Axial** axialracing.com
- Castle Creations** castlecreations.com
- Gmade** gmade.net; junfac.com
- Hitec** RCD Inc. hitecrod.com
- Hobbico;** distributed by Great Planes Model Distributors hobbico.com
- Holmes Hobbies** holmeshobbies.com
- MaxAmps.com** maxamps.com
- Novak** teamnovak.com
- Peak Racing** peakmotors.com
- PTI** ptiracing.net
- Spektrum** spektrumrc.com
- Tamiya** tamiyaamerica.com
- Team Orion** teamorion.com
- Traxxas** traxxas.com
- W.S. Deans Co.** wsdeans.com

HIT THE TRAIL

Think you might like rock crawling but you aren't completely sold on the idea of only going slow? You might want to check out a scale or trail truck. A scale truck is just what the name implies. Many scale trucks are built on classic Tamiya Bruiser frames, but there

are a variety of new chassis to choose from. A trail truck is the unofficial designation for a semi-scale truck. These are often built on Tamiya chassis such as the CC-01. These vehicles are not as capable as the hardcore competition rock crawlers, they can be equipped for faster speeds, so they're just as much fun in the driveway as they are bashing down a rocky pass.

