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CANNONDALE DELTA V10000

A little bit old, but a whole lotta new!

We know that our friends at Cannondale won't really like hearing this, but we thought last year's EST bikes were very, uh . . . nice. As in, nice to ride but we weren't too sure we'd want to own one. Nice to let our friends try. And nice to look at (if you liked the attention-grabbing dayglow paint, that is). Hey, for a first attempt at a fully suspended bike, it was . . . nice.

What kept them in the realm of just "nice," and not "wonderful"? Well, they did have their share of teething problems. For one thing (and foremost in our minds), the rear end was whippy. It moved

around everywhere. Also, the rear suspension, combined with Cannondale's aluminum Pepperoni fork and a Flexstem for the front end, gave it a rocking-horse feel that some testers didn't really care for. And finally, some riders also complained of feeling cramped — like the bike was a bit on the short side.

The good news is, the engineers at Cannondale were listening intently to the opinions of their own test riders, and to the owners of the early ESTs. They listened to the gripes as well as the kudos. (And this is great news, since we've seen too many companies who only like to listen to the praise.) Their product en-



Pick a line, any line, and nail it! The predictability of the handling on the Delta V1000 is one of its stronger points.

gineers took lots of notes, formulated plans and, best of all, had a few radically new tricks up their sleeves for '92.

LIKE STARTING FROM SCRATCH — ALL OVER AGAIN

So what's left over from last year's ESTs? Not much, actually. The basic design and layout of the swingarm is relatively unchanged, as is the Force 40 braking system used on both ends. But other than that, there's little that's the same.

Take the front triangle of the frame, for example. The all-new Delta V design is reputed to be MUCH stronger (in regard to both torsional stiffness AND overall strength) than Cannondale's double diamond frames. In fact, they tell us that the Delta V design tested out as stronger than almost ANY other frame. Another benefit of the design is more-than-ample stand-over height. Then you move up front, where . . . holy smokes! Look at the size of that front end!

Yup, Cannondale has introduced their own brand of front end suspension, and it, more than anything else, is their big ace in the hole. Let's take a look at it in greater detail.

DELTA V FRONT SUSPENSION

There are some riders among our staff



The Delta V suspension fork works amazingly well. The silky-smooth travel and lack of independent leg movement are great features. The knob mounted on top of the fork is another hot item. It controls the damping, from ultra-plush to locked-out. And it's easily tunable while riding. Too bad it can't be bolted onto other frames. In this case, the frame is designed around the fork.

who have been less than captivated with Cannondale's Pepperoni fork. It was (and is) so stiff . . . and . . . so, well, aluminum, that they didn't care for it a great deal. Now for the good news. The legs that they previously didn't like have been mated to a suspension system of Cannondale's own design (with a nod in the direction of Action-Tec's similarity), and now these legs aren't just likeable, they're loveable! The same stiffness that they griped about makes for a great-tracking suspension fork. But wait, we're getting ahead of ourselves here.

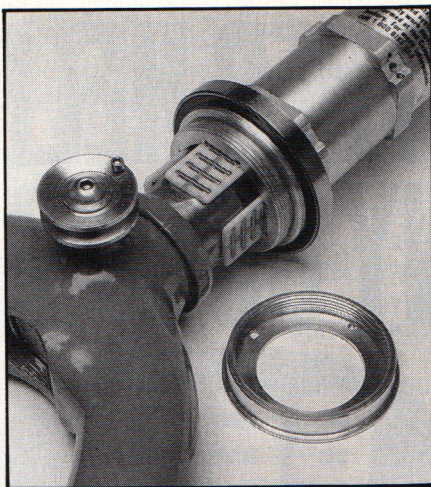
What makes this thing tick? Well, if you've looked at the photos, no doubt you've noted that the entire suspension unit is mounted inside the head tube. While this is a great place to stick the hardware, it causes a few design challenges that are unique to the Cannondale. Take, for example, the size of the head tube, and of the headset itself. Both have to be fairly massive to accommodate the suspension unit. Also unique is that the frame is designed around the fork and front end. This is not a fork that you can simply bolt onto an existing frame.

The guts of the fork are pretty interesting, too. First, a four-sided Nitralloy steerer is bonded into the fork crown. This tube has a nitride coating, which gives it a sur-



face hardness of 70 on the Rockwell scale, meaning it's pretty tough indeed. Why is the steerer four-sided? Well, each of these four sides has its own set of needle bearings, which are about four inches tall, and house a total of 22 bearings apiece. That gives you 88 bearings, which makes for a smooth-rolling — *not sliding* — suspension action. The choice of needle bearings over balls was simple. They help spread the loads over a far greater surface than that which would be supplied by the regular ball bearings.

The outer half of the suspension unit is an impact-extruded aluminum housing, that's been precision-broached to create a matching four-sided surface. Now here's where it gets a bit tricky. You've got four bearing surfaces that line up on the four sides of the outer housing, right? There are four bearing races that slide between the outer housing, and the bearings. Two of these races are rectangular, and two of them have a four-degree taper. These tapered bearing surfaces mate with corresponding angled surfaces in the housing — and a small batch of set screws, to provide the ability to fine-tune any play out of the fork's internals. No slop equals precise tracking and minimum stiction for the fork action. This setup also resists torsional rotation very well.



Here's a big chunk of why the fork works so smoothly. The precision-ground four-sided steerer rolls on needle bearings. Very slick. Check out the large economy-sized sealed headset bearing just above the needles. The suspension unit is so large they had to engineer their own headset and races. They're massive!

Now, while we've told you how they keep the fork sliding smoothly, we haven't even mentioned some of its best features yet! This fork falls into the air-sprung/oil-damped category, and has separate chambers for the air and oil to prevent foaming. Up on top of the fork, the stem is another integral part of the fork design. It

clamps (externally) to the upper end of the suspension unit itself, and feels almost impossibly light when removed. At this point, there are three different length stems available, and there may be more in the future. One nice thing about all the stems is that while you can't adjust their height in normal fashion, you can flip-flop them for height adjustment.

Finally, above the stem, you'll find the schraeder valve, surrounded by the cap that controls the damping adjustment. This damping adjuster is absolutely great. In 2-1/2 turns (which is easily operable from the saddle), you can go from super-plush to completely locked-out. Amazing!

The last thing worthy of mention here is the headset, which in itself is another unusual item. Want to make even an Evolution-size headset (1-1/4 inch) look tiny? Just roll the Delta V up next to it. Since the outside diameter of the whole suspension unit of the fork is decidedly huge, it requires the use of some very large sealed bearings (about three inches O.D.). The good news is, it didn't draw one complaint, even after plenty of riding.

We must admit, Cannondale has gone to an awful lot of time, effort, and expense to build a system that can be used only on their bikes. One of the most telling tales in this regard came when we asked how

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much the system would cost if it were available as an aftermarket item. They told us after all the normal markups, it'd have to go for around \$800! *Yow!*

REAR SUSPENSION

This setup is fundamentally the same as last year's. The aluminum swingarm pivots on a bottom bracket-style spindle, complete with bearings. One area that is significantly different is the shock itself, which is more of a strut style. What's the difference between it and a more conventional shock? Instead of the piston being mounted on the end of the shaft like a normal shock, this strut-style unit has a shaft which runs all the way through the top and bottom of the shock body. That means it's supported on both ends. This takes pressure off the piston, which is mounted at a mid-point of the shaft.

Another thing that's nice, is that the flex-inviting rubber bushings in last year's shock have been eliminated . . . well, sort of. The upper mount now uses a needle bearing arrangement, which is probably

a little overkill, but works good. The bottom shock eye still uses the urethane, but it appears to be a much harder durometer than used previously.

One other area that has been improved are the tabs used for the upper shock mounts. They've been beefed up, too.

For riders who want to fiddle with rear suspension fine-tuning, there are three shocks with different damping setups available, and a total of six different spring rates. We set up our bike with the number three spring, and standard shock, which was good for our hard-riding 190-pounders.

Our only grump with the rear suspension is in the form of heel clearance — there isn't much, especially if you switch from the stock pedals to Shimano's SPDs. Some riders griped endlessly about it, while others wondered what all the fuss was about. If you ride with your heels overly inboard, you may have trouble. If not, don't sweat it. Either way, check before you buy.

COMPONENTS AND OTHER RIGGING

This bike comes fully equipped with SunTour XC Comp MicroDrive gear,

Cannondale has introduced their own brand of front end suspension, and it, more than anything else, is their big ace in the hole."



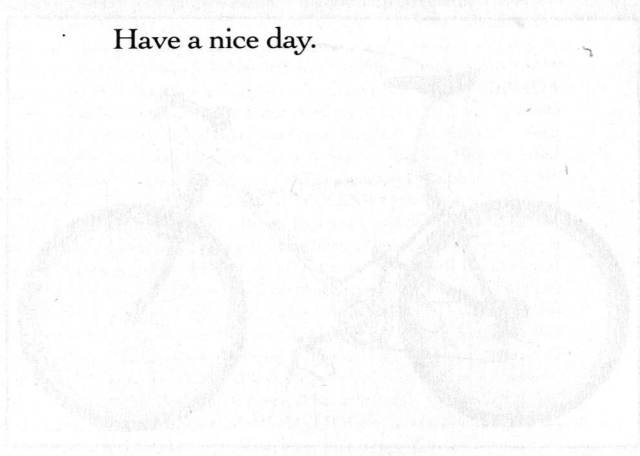
While lots of attention has been paid to the front end, the rear hasn't been forgotten. A new strut-style shock replaces the more conventional style found on last year's bike. The bushings in the shock eyes that were too soft last year (and which contributed to rear end flex) have been eliminated. The Force 40 brake routing system returns also.

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which lived up to its best-of-SunTour billing. Sure, the only thing lacking between it and the upper-echelon XC Pro is the Grease Guard, which would have been nice, but the dollar savings are worth it. The next bike up in the Delta V line, the V2000, is harnessed up with Shimano Deore XT pieces (and costs substantially more).

The XC Comp MD goodies include the drivetrain and shifters. (Keep the chain well-lubed. Since there are no stays to warn you of imminent chain suck, it's easy to wrap the chain around the chainring far enough that it starts going backward through the front derailleur!) We didn't have any problems with shifting, except for one episode which wasn't the fault of the components. On initial setup, our bike was equipped with a too-short piece of cable housing through the center of the bike. While standing and pedalling, as the swing-arm moved through its arc, it would cause the derailleur cable to shorten, and the derailleur to shift by itself. If you start to suffer from unexplained phantom shifts, this is the likely culprit.

The pedals are SR Low Fat Comps, and come equipped with Tioga clips and straps. The brakes are SunTour XC low-profile cantilevers, and they use the same

unique Force 40 cable routing setup as last year. Levers? They're Dia-Compe's SS-7 tri-digit models. Great levers — but maybe not the best available for the Force 40 setup. The initial cable pull the levers provide is very rapid. But as the power curve flattens off, we felt the brakes were a bit mushier than we'd like. We'll be experimenting with a set of Shimano two-finger levers to see if we can cure the feel.

Wheels include Sun Chinook CR16 rims, and 28 spokes up front and 32 in the rear (and they're all of the stainless steel WheelSmith double-butteted variety). Expect to see a debate raging in the future about how many spokes a fully suspended bike's wheel should have. One group

will claim that since the suspension is absorbing more bumps, the number of spokes can be reduced. The other will respond that since you can attain faster speeds with more control, they need to be beefed up. For the record, our test bike's wheels had nary a problem.

Both wheels were shod with 2.1 Smokes. No complaints there. (And yes, we're masochists, and enjoy the edgy feel of the Smoke's knobs up front.)

Other miscellaneous goodies? Well, there are Ritchey items, like the seatpost and saddle which both merit a thumbs-up. There's also a pair of Tioga goodies in the form of their Bio-grips, and a particularly slick little anodized aluminum seat clamp/collar. The last remaining item is a Cannondale private-label Easton Taperlite bar. Nothing but sweetness to be found.

ROCKING AND ROLLING

First things first. Make sure that the shock and fork are tuned for your weight. Just a very slight settling of the shock in the rear when you settle onto the seat is good. How do you pick a pressure up front? Our favorite method (though not for the meek) is to lightly nail the front brake

(Continued on page 117)

DELTA V900

Psst. Hey, buddy. Wanna hot tip? C'mere, and let me show you the merchandise in the corner of the shop. Yeah, this is it. The Cannondale Delta V900 frameset. The same Delta V fork found on the fully suspended bikes, but with a rigid, non-suspended rear end. Non-flexing Delta V frame design, too. And the price is right. Only \$875. That way you can build it up with your own components. Pretty sweet, huh? Oh, yeah, this price also includes the stem and headset. Don't let this one get away... there's not that many of 'em...



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COLORS AVAILABLE: White/black

SIZES AVAILABLE: 17", 19", 21"

SIZE TESTED: 19"

FRAMESET:

Head Angle 70 degrees
Seat Angle 73.5 degrees
Top Tube Length 23.25"
Chainstay Length 16.75"
Wheelbase Length 43.16"
Bottom Bracket Height 11.62"

Frame Material(s) Aluminum
Frame Construction TIG-welded
Fork Offset 1.75"
Fork Material(s)/Construction Aluminum/TIG-welded
Gross Bicycle Weight 28 lbs

DRIVETRAIN:

Front Derailleur SunTour XC Comp MD
Rear Derailleur SunTour XC Comp MD
Shifters SunTour XC Pro
Crank(s) SunTour XC Comp MicroDrive
Chainring(s) SunTour PowerRings
Freewheel/Freehub SunTour PowerFlo
Gearing 20/32/42t front, 11-24t rear
Chain SunTour AccuShift Plus II
Pedals SR Low Fat Comps

STEERING:

Handlebar Easton Taperlite, aluminum
Stem Cannondale, aluminum
Headset Cannondale cartridge
Grips Tioga

BRAKES:

Front and Rear Brake SunTour XC Pro, low-profile cantilevers
Levers Dia-Compe SS-7

SEATING:

Saddle Ritchey Logic
Seatpost Ritchey Force Directional
Seatpost Binder Tioga

WHEELS:

Rims Sun Chinook CR16
Hubs SunTour XC Comp
Spokes WheelSmith double-butteted, 28 front/32 rear
Tires Panaracer Smoke, 26x2.1

CANNONDALE

(Continued from page 60)

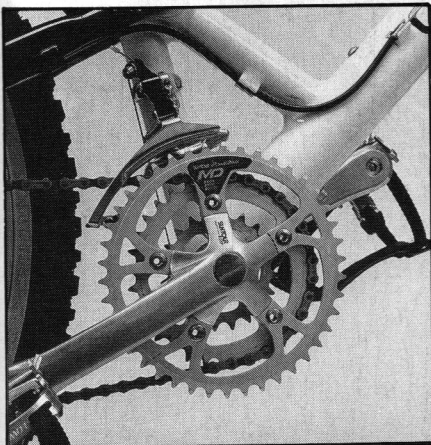
while turning. If the fork dives, you don't have enough pressure. Cannondale suggests 80-120 psi as a starting point.

Trying to figure a good way to get an effective measurement for the top tube length is pretty entertaining, considering the unique nature of the frame. We'll have to trust Cannondale's 23.25-inch measurement (on our 19-incher) . . . and the feeling that there's lots more room in the rider compartment than we're accustomed to on the Cannondales we've ridden previously. We're talking roomy. Riders who had grumped about the lack of spaciousness on previous models were pleasantly pleased.

The head tube angle is somewhat lax at 70 degrees, though we never had to fight the front end to get it where we wanted. Well, at least after we flopped the stem into its lower position. Fork offset is 1.75 inches. We didn't have any complaints about the Delta V's cornering abilities. In fact, after our normal settle-in period, we were railing corners with authority — and, well, it looks like this is where we get to talking about the suspension performance.

Cannondale claims that one of the biggest benefits to their suspension system is that the head tube internal design doesn't require the fork to use a brace like any dual-legged system needs, and that this provides a better-tracking fork. We can't argue with them. The Delta V front end was very predictable. You didn't have to guess whether you'd hit your intended line or not. And the action was, in a word, great.

At this point (with its performance over a long-term test being the only non-proven), we'd rate it among the very best



The V1000 is equipped with SunTour XC Comp MicroDrive, and a host of other cool goodies, like Smoke tires, Tioga clip grips, and seatpost clamp, and Ritchey tires and seat.

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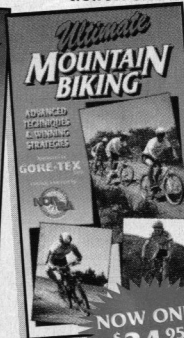
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(Continued from page 117)

of the suspension forks available. Top three for sure. We absolutely love the ability to lock out the fork at the touch of our fingertips. And the silky smooth action the two inches of travel provide is nothing to grump about either. Probably the only thing that keeps it from being at the very top of the heap, at least in our minds, is that it's **ONLY** available when you buy a Cannondale. That's not a knock against Cannondale, it's just that it leaves out anyone who'd like to just bolt one on. You can't do it with this fork. You're looking at a complete bike — or at the very least a frameset. (See the sidebar in this story for more info.)

The rear suspension is adequate. Not bad, not great, but it's definitely playing second fiddle to the front end. Actually, it felt pretty good, it's just that the front end outshines it. The combined effect of the two is pretty amazing. Floating down a particularly nasty little trail by our offices, we could ignore formerly kidney-rattling braking bumps and float over jagged rock sections. It also keeps traction more easily through sections of stream-smoothed rocks. It works.

We also liked the fact that the frame doesn't wiggle, contort, or do anything weird. A couple of the bikes that we've bolted suspension forks onto have done strange things, like show us how much torsional flex there **REALLY** is in the front triangle over nasty terrain. No such feelings were emanating from the Delta V.

Claimed weight for the Delta V frameset is eight pounds, which actually isn't too bad, considering that this also includes the Delta V fork and the stem (even if it **DOES** look a bit like an old swaybacked mare). Total weight of the bike is a svelte (well, for a fully suspended bike, anyway) 27 pounds. Did we feel the weight on climbs? Not really, though we've been riding more than our share of fully suspended bikes lately. A rider coming off a 23- or 24-pound bike might not be quite so forgiving. Besides, we could really feel the suspension hooking up on the climbs.

YEA OR NAY?

We have to give the guys at Cannondale a few attaboys for this one. They've answered many of the major grumps that we had about last year's ESTs, and given us something to cheer about with their fork design. While we know \$1700 isn't cheap, it's in the ball park of fully suspended bikes with similar features, and if it were our money, we wouldn't hesitate for very long to take the plunge. •

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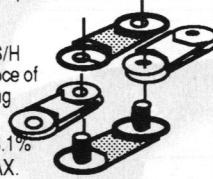
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