

# AMP RESEARCH B-3

*How one AMP sparked a revolution*



■ As with most famous people, much of what mountain bikers know of Horst Leitner is a collage of remarks, an occasional photo and a smattering of vague references pieced together into a stylized portrait. Horst is a quiet man who loves mechanical things. He is an accomplished motorcycle racer, designer, engineer and businessman. What motivated Horst to design bicycles had more to do with his boyish curiosity than anything else. Horst's motorcycle accessory business, AMP Research, is located smack in the middle of some of the best mountain bike country in Southern California. He became interested in mountain bicycles after his two sons took up the sport. Initially, Horst thought mountain bikes were ill-handling, underpowered and too fragile. He was right—especially considering the level of sophistication of the motorcycles he designs, builds and modifies in his Laguna Beach design house.

Unfortunately for the Austrian-born designer, Horst had been infected with incurable mountain bike *bacillus*. It was only a matter of time until he was spending late nights at the drafting table, abandoning his motorized customers in favor of fiddling with bicycle designs. Before fabricating his first suspension bicycle, Horst made full-sized models of his suspension concepts using his "CAD" (cardboard-aided design) system. Using strips of cardboard and pins, he could assess exactly how each suspension concept reacted to chain tension and braking torque. He developed the now ubiquitous "Horst Link," because he firmly believed that any good suspension should be active full-time. Soon a steady trickle of ever-improving Horst suspension bicycles were being sighted in the coastal hills above the AMP factory (with his sons on board).

As one of the few active, independent motorcycle designers, Horst came loaded for bear into the bicycle field. His AMP

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linkage fork was easy for him to design. Horst had built some prototype long-travel versions for full-sized motocrossers: very trick, very light and very difficult for his friends to believe in. Horst simply scaled down the motorcycle fork to postage-stamp size and *voila!*—a two-inch-travel mountain bike fork was born. Horst was shocked to discover that his new mountain biker friends didn't believe in his concept, either. Horst persuaded his sons to be his test riders until his fork was ready to sell to the public. At that point, Horst proclaimed to one and all that he didn't like bicycles and had no plans to enter the bicycle industry. "Motorcycles are my only interest," he insisted.

Horst was hindered by the fact that he knew absolutely zip about bicycles (and almost everything about suspension). His turning point came when Mongoose got wind of his efforts and asked him to design a full-suspension frame for its brand. Mongoose added some bicycle know-how to the project and placed orders. Oddly, at this time Horst still maintained that he wasn't going to manufacture any bicycle stuff. Madness doesn't happen overnight; it occurs over time in tiny steps. Two years later, AMP would double in size in order to accommodate its frame and fork manufacturing operation. (By the way, Horst races bicycles now.)

If you have any doubts as to why Horst Leitner's name comes up in bicycle conversations more than any other, it is because his design concepts or products ap-

pear on Specialized, Mongoose, Rocky Mountain, Funk, Dean, KTM, Fat Chance and, of course, his own bikes—the AMP Research B-3s.

## FIRST LOOK

AMP's latest version carries the designation B-3. The uninitiated viewer would be hard-pressed to distinguish the improvements between the '94 B-3 and previous models. The B-3 has a shorter MacPherson strut and shorter shock body to add rigidity to the rear end. A minuscule bolt-on alloy brake bridge further stiffens the rear stays. A new-style saddle gusset reinforces the lower top/head tube junction, and welding quality has improved overall construction noticeably (nice touch).

Retained on the '94 AMP B-3 is the signature double-downtube design that AMP developed for the Mongoose Amplifier version of the frameset. The frame's top tube slopes dramatically to give the bike plentiful standover height. An oversized seat tube extends well above the top tube junction to support the seatpost. A formed-sheet aluminum gusset keeps the seat/top tube junction from becoming overstressed. Both the front and rear sections are TIG-welded, 6061 T-6 aluminum alloy. The frames are ball-burnished after final heat-treating to a near-polished luster.

Our 17-inch B-3 was outfitted with a no-nonsense combination of Shimano and Control Tech components that gave the AMP the look of a military fighter jet—all silver and all business. Front and rear

*Stripped-down and ready for action: The now familiar Horst Leitner suspension frame mirrors its designer's minimalist philosophy: no paint, nothing extra whatsoever. The AMP only wears what's required to go to the dance . . . lightweight performance.*

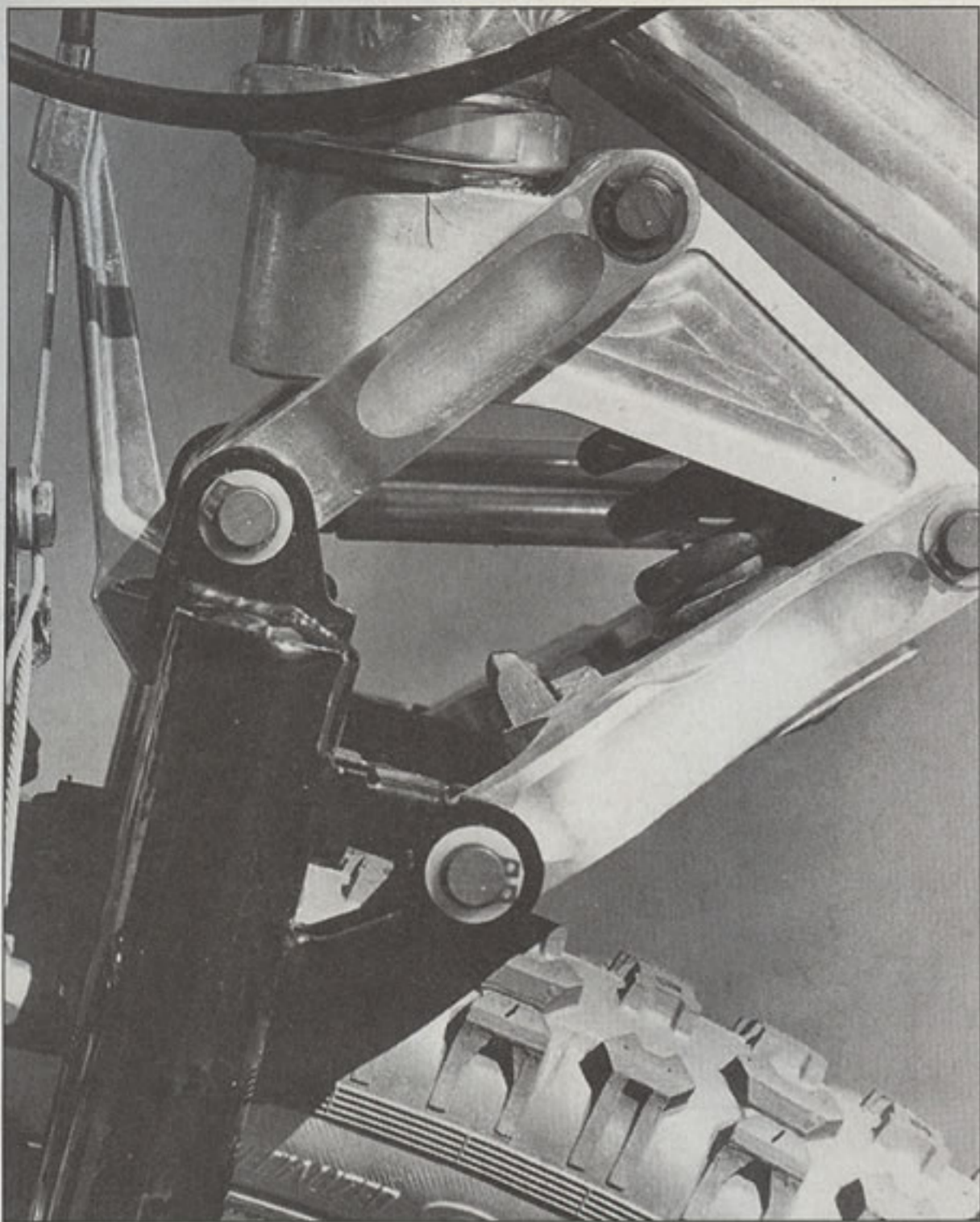
suspension featured the newest versions of AMP trickery. Currently, AMP sells only frames and forks, but plans are in the works for complete bicycles.

## THE NUMBERS GAME

AMP Research offers small, medium and large frame sizing. MBA's medium-size test bike was effectively a 17-inch frame with a 23-inch top tube. Chainstays on all sizes run 16.75 inches. The B-3's bottom bracket was 12.5 inches high; wheelbase worked out to a longish 42.625 inches, while frame angles were a conservative 71-degree head and 72-degree seat. Frame weight hovered at 4.3 pounds, including shock. The complete bicycle weighed in at 25 pounds. Our AMP thru-shock was outfitted with a titanium spring, which should be available in the near future. Until then, eat your heart out! The cost for a frame and AMP fork will run \$1350. For info contact AMP Research, 1855 Laguna Canyon Rd., Laguna Beach, CA 92651; (714) 497-7525.

## COMPONENT PICKS

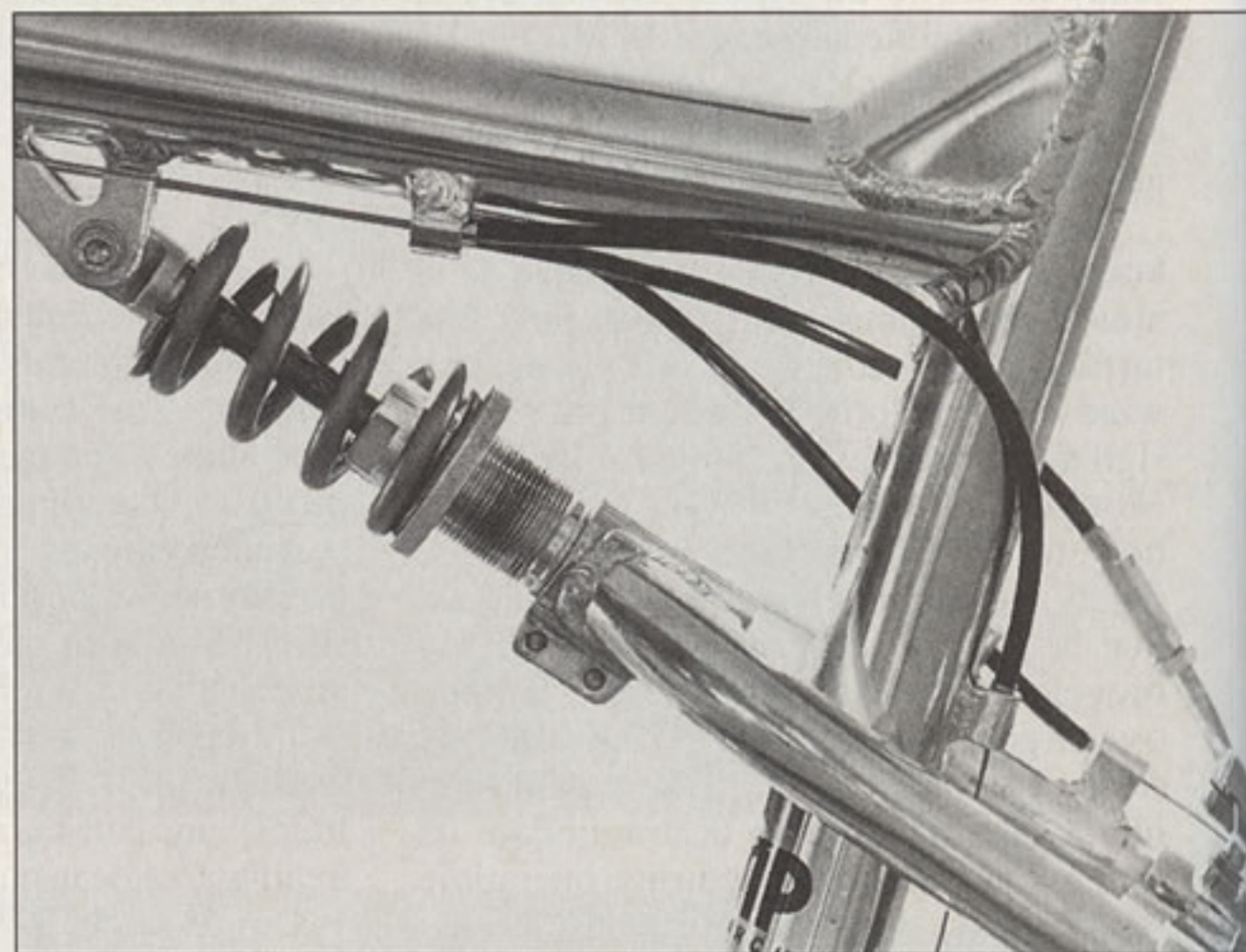
The AMP B-3 was set up with an XTR/Control Tech ensemble. The control room was attached to a Control Tech five-degree-rise/125mm-reach stem,



*It's what's up front that counts: Two small but important developments on the AMP parallel-link fork are only visible to the trained eye. Note the tiny urethane bottom-out cushion just ahead of the spring. Also new is the investment-cast cable hanger.*



*What it's all about: Nothing could phase the AMP on speedy singletrack. The AMP turned twisty, rocky sections into a full-factor magic carpet ride. Damping was a tad harsh, but the front and rear suspension were well balanced.*



*Short and sweet: The '94 AMPs have a lighter and shorter shock body which stiffens up the rear end noticeably. Its titanium spring can be recognized because it has fewer coils and the distinctive Ti color.*

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Answer Hyperlite bars and your basic Shimano XTR shift/brake combo levers. Rear seating was a true-to-life Flite titanium saddle perched atop an oversized (31.6mm) Control Tech seatpost. The entire drivetrain was Shimano XTR; rear cog ratios were 12 to 32. The front and rear hubs were 32-spoke Shimano units laced up to Araya RM400 Pro hoops. The rubber for both front and rear were Specialized Ground Control-S Umma-Gummas. Front stops belonged to XTR cants, while the rear duties were delegated to a Marinovator Stoplite direct-pull brake. That's it. Nothing fancy, just pure, low-weight performance; how refreshing.

## ON THE DIRT

The MBA crew looked forward to throwing a leg over the AMP. The geometry had an interesting mix of steep head angle and slack seat. It had a workable feel to it the minute you climbed on board. The front center was long. The stem was low and medium-length, which keeps the bike on line in the rough stuff. AMP Research recommends setting the suspension up soft enough to keep the wheels working full-time. This is easily handled by front and rear spring preload adjusters. The component mix was standard-issue XTR group. We typically like the predictable performance of a straight gruppo (well, we don't like the XTR brake pads).

On fast and furious fire roads, both steering and suspension were at one with the rider. The bicycle remained neutral in the turns, sliding or carving. In sand, the front stayed on line due to the AMP fork's generous offset. This same feature tended to add a heavy feel to the front end as the speeds dropped and we started carving slow singletrack. Both front and rear suspension performed well throughout a wide range of conditions, although it worked best in the midranges of its stroke (falling short on the biggest and smallest bumps). The B-3 front forks bounced around at low speed in chatter bumps and gave a rough ride through deep ruts and half-buried rocks. Apart from a low-amplitude chatter, the AMP was one of those bikes that anyone could ride well from the moment he hit the dirt. Fast or slow, the B-3 was confidence-inspiring.

Unless one is acclimated to riding a fully active rear-suspension bicycle, climbing is best done in the saddle as much as possible. Hammering out of the saddle is best done by staying roadie-smooth until you get your power strokes retimed to suit rear suspension. It takes a little time, but hammering becomes natural-feeling again.

Where the AMP really excels is on long, rough, sit-down fire road stuff, steep climbs and technical anything.

MacPherson strut bicycles have brake

performance that sounds like a skipping record: Good front brake, mushy rear brake. The non-telescopic AMP linkage fork does a good job of supporting the front cantilevers. AMP's use of the Marinovative rear brake was creative. The Marinovative brakes pull from the side, generate incredible power and work exceptionally well (mechanically) on a rear-suspension system. The rear stoppers could skid the rear tire with ease but suffered from the typical, flex-induced, mushy-lever feel common to this type of rear end. Non-Servowave levers would firm things up a bit. Of all the nitpicks fielded from the test staff, the rear brake feel was the only consistent beef among them.

## SUSPENSION SPECIFICS

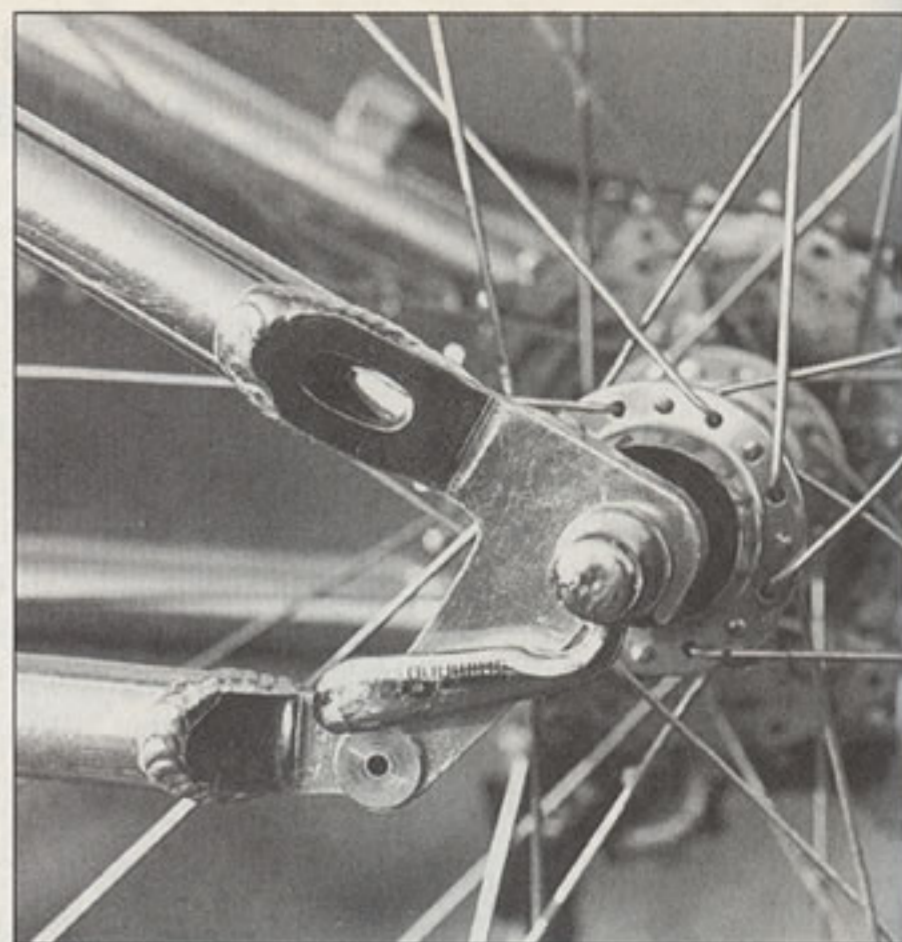
Horst Leitner is a devotee of simplicity and his thru-shaft shock is an ode to that credo. Consistent damping requires total immersion of the shock valving in fluid. Most shock manufacturers go to great lengths to eliminate air in the fluid chamber because the damping piston quickly turns the mixture to foam, causing the shock to fade and the damping to speed up dramatically. Piggyback chambers, nitrogen chambers and separator pistons are all methods shock makers utilize to adjust for the slight change in oil volume that occurs when the shock shaft is plunged into the reservoir. Ever the engineer, Horst didn't mess with all the compensator stuff. He simply ran the shock shaft through both ends. No volume change. No need for nitrogen. No compensation required. No fuss. Rebuilding the AMP shock is as simple as unscrewing one end, replacing some O-rings and oil, then threading the end cap back in place. Most elastomer units aren't that simple.

Leitner's design isn't all rainbows. Hard use causes the shock units to suck minute amounts of air past the O-rings—not enough to cause fading, just an annoying hiss on big hits.

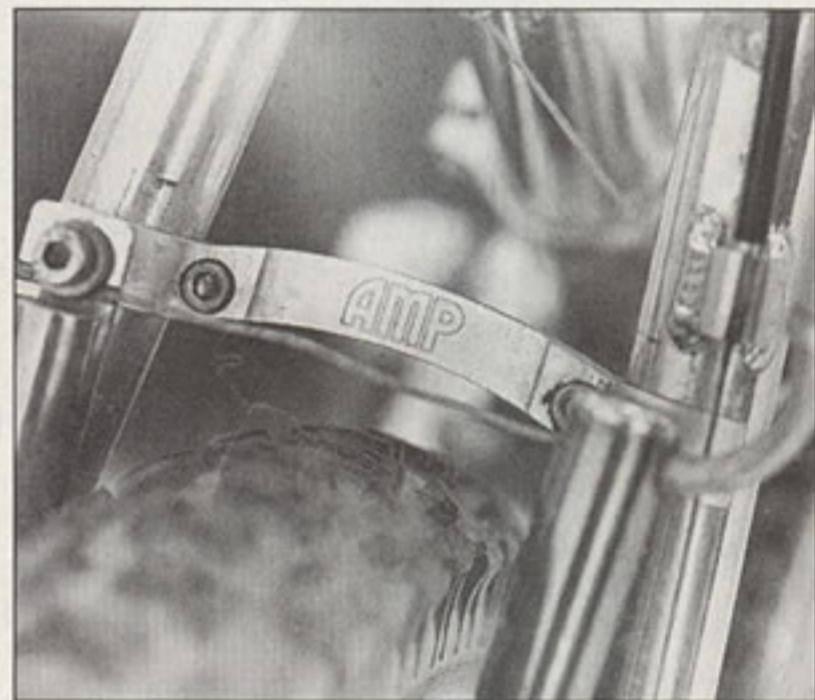
Wheel travel up front is two inches and rear-wheel travel is 2.5 inches. A wide variety of spring rates is available for both ends from AMP Research: Fork springs run in 900-, 1050-, 1150- and 1220-pound increments, while shock springs are available in 450-, 490- and 520-pound ratings.

## SUGGESTION BOX

We would only change a few minor points to tweak the AMP B-3 to our satisfaction: (1) The shock could use a bit less compression damping and more rebound. This would smooth out the chatter bumps and extend the shock performance to handle larger hits. (2) The forks are harsh over the chatter bumps, but still tend to blow through the travel on hard impacts. Either a stiffer coil spring with less preload or a softer coil spring and more efficient bottom-out bumper would remedy the situation. AMP forks all seem to be a tad harsh on the slow-speed, ripply bumps regardless of setup. (3) As usual



*The heart of the matter: Whoomp . . . there it is! This is the authentic Horst Link. The wheel is attached to the seat stay. The dropout pivots below center and the swingarm is a short, straight link to the bottom bracket pivot.*



*Mister minimal: In an effort to reduce brake-induced chainstay flex, Horst installed a diminutive clamp-on bridge to his '94 AMPs. Also visible is the right-hand cable routing atop the Marinovator brakes.*

with MacPherson rear ends, the rear brake action is sub-good. The Marinovator brake is better than most. Adding an extra brake booster and removing the Servowave function from the XTR lever would firm up the rear brake significantly.

## WHAT DO WE THINK?

AMP Research's latest and greatest still sets the high-water mark for the other MacPherson dudes to match. The B-3 is way light, handles throughout a wide speed range and doesn't have any bad habits now. Cross-country racers don't have an excuse to avoid full suspension. This is the most active suspension bike on the market, lighter than most rigid bikes and, without a doubt, the origin of the MacPherson species. If you feel ready to step up to active suspension, you will be hard-pressed to find a better reason than the AMP to go for it. □