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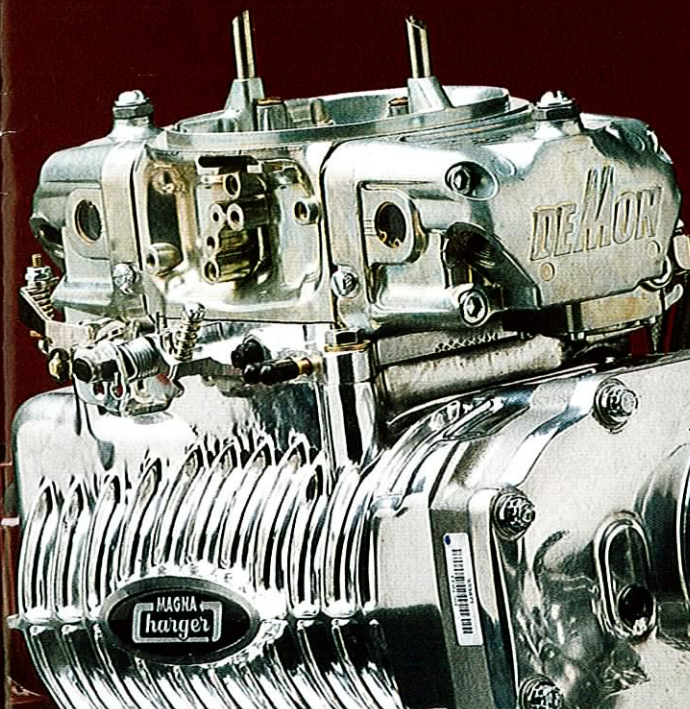
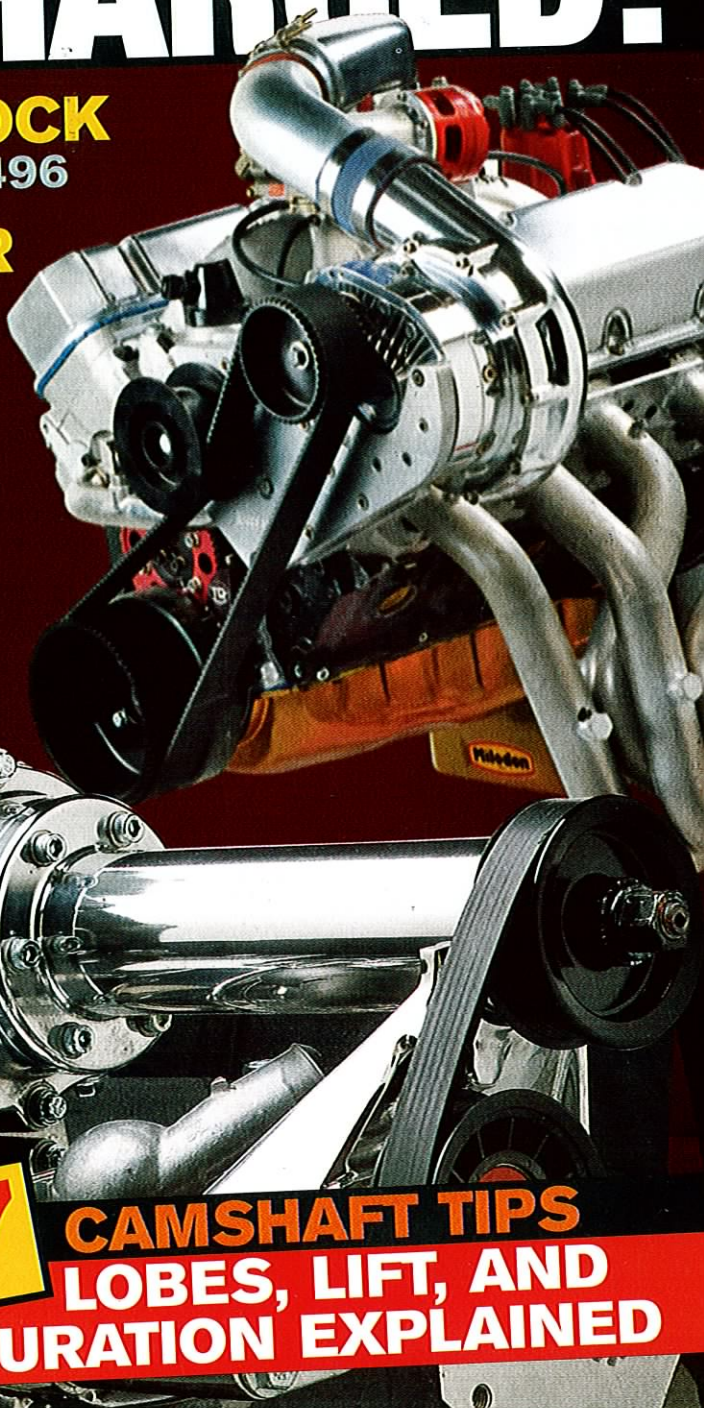
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# PART II

## THE AGILE A-BODY



### QUICK NOTES

#### WHAT WE DID

Outfit a Hotchkis TVS-equipped '69 El Camino with a Hotchkis B-body spindle conversion and front control arms and True Connections rear disc brakes

#### BOTTOM LINE

Follow-up testing showed even better handling and a phenomenal improvement in braking performance.

#### COST (APPROX)

\$2,500 (spindle conversion/lower control arms); \$740 (rear disc brake/proportioning valve)

In Part I of our quest to create an agile A-body (Sept. '07), we upgraded a big-block-powered '69 El Camino with Hotchkis' TVS (Total Vehicle System), then added in some modern rolling stock, all the while verifying the results on the test track. We came a long way but were still held back by the factory front spindles and control arms, which limit A-body alignment options and therefore handling ability. That's the area we'll address in Part II by adding Hotchkis' B-body spindle conversion and a set of brand-spankin'-new lower controls arms. We also bolted on a set of

True Connections' rear disc brakes to complement the 12-inch binders included with the new spindles.

To quickly recap, Hotchkis' TVS package includes Sport Springs all the way around, new Extreme rear and Sport front sway bars, heavy-duty tie-rod sleeves, and lower rear trailing arms teamed with a set of new double-adjustable upper trailing arms. We supplemented this setup with a pair of trailing arm mount braces, a set of HPS 100 shocks, and an airbag kit. Our modernized rolling stock consisted of a set of Oasis Wheels 17-inch IROC wheels fitted with BFGoodrich g-Force T/A KDW rubber, P245/45ZR17 all the way around. Our gains were impressive, and we actually improved this Elky's ride quality as well.

On the other hand, there was still more improvement to be had, so we posed the

question, How does installing a set of B-body spindles on an A-body improve its handling? "It's mostly geometry change," says Hotchkis Chief Engineer Aaron Ogawa. "You can only go so far with the TVS kit. That's just suspension, certain pieces and then the sway bars. That does help the overall balance, but the geometry is not changed." So what exactly needs to change?

Camber, primarily, which is the angle of the wheel, expressed in degrees, when viewed from the front of the vehicle. When the top of the tire tilts out from the center of the car, then the camber is positive; if it tilts in, the camber is negative. "Typically what we see on the A-bodies is a positive camber curve," Ogawa explains. "When the suspension is going into bump, or going upward, and when the car goes into a turn, the suspension moves up, and the angle of the wheel with respect to the

frame of the car tips to the outside." In the extreme, the tire runs on its edge rather than on its contact patch.

Negative camber is part of the answer, but you can only get so much of it with the factory spindles and control arms. Installing a set of taller B-body spindles—and the tubular upper A-arms that complement them—fundamentally changes the car's geometry. "You have a taller spindle with the necessary—i.e., negative—camber curve," explains John Hotchkis. "The upper A-arm ball joint is higher than the cross-shaft at ride height. Therefore, during bump travel, the upper ball joint pulls in toward the engine, giving negative camber." The top of the tire tilts in under load rather than out, allowing more tread to contact the pavement.

Of course, it's all well and good to talk about changing suspension geometry, but

what did it do on the test track? In short, we picked up 0.6 mph running through the slalom and also gained on the skidpad, registering 0.87g. With more of the front tires' contact patches on the pavement, front wheel traction was noticeably increased. Our subject Elky's front end felt much more planted; check out the sidebar to see how we took full advantage of our updated front-end setup.

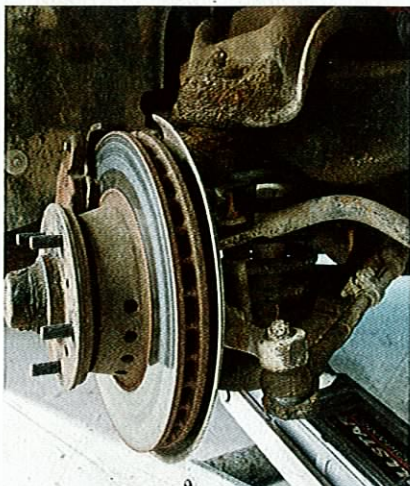
Mounting up one of Hotchkis' B-body spindle kits also allows A-body owners to employ a set of 12-inch B-body discs and their big, single-piston calipers. We went for this configuration, and also elected to ditch the factory rear drum brakes in favor of a True Connections rear disc brake kit and proportioning valve. Impressive as our handling gains were, the improvement in this El Camino's braking was amazing; our new setup chopped a staggering 36 feet

off our previous 60-0 best. Performance is improved, and this classic Chevy is now just plain safer to drive.

In the end analysis, we can tell you about improved suspension geometry, and we can report that this almost 30-year-old El Camino ran through our test track like a madman, but what's most important is what happens in the real world. We again turned to the '69's owner, Bernie DeMarkey, for a report: "First of all, the braking is so much surer, without the concern of locking up the rear that El Caminos are notorious for," he tells us. "With four-wheel discs, you get the full effort out of the front brakes, and it's a much more controlled stop; she squats rather than nosedives. And with the new front spindles in place, there's no sliding; the front end stays where you put it. It's a much more fun car to drive than it ever was." And isn't that what it's all about?



# THE AGILE A-BODY PART II



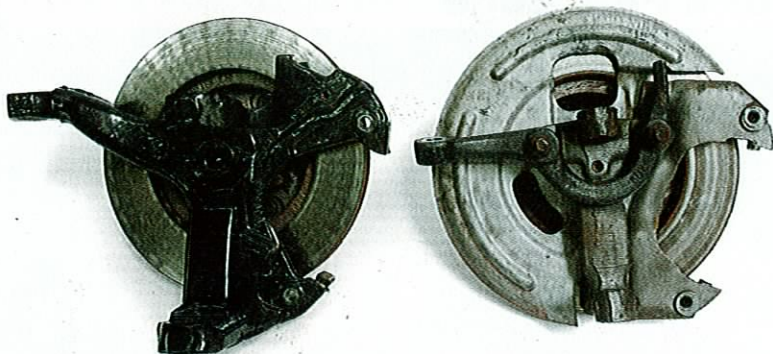
Here lies your garden-variety, untouched and bone-stock, nearly three-decade-old A-body front suspension setup. Changing the springs, shocks, and sway bar—all part of the TVS install we covered in Part I—greatly improves handling. Alignment options, however, and ultimate handling prowess, are limited with the stock spindles and upper control arms in place.

## ALL LINED UP

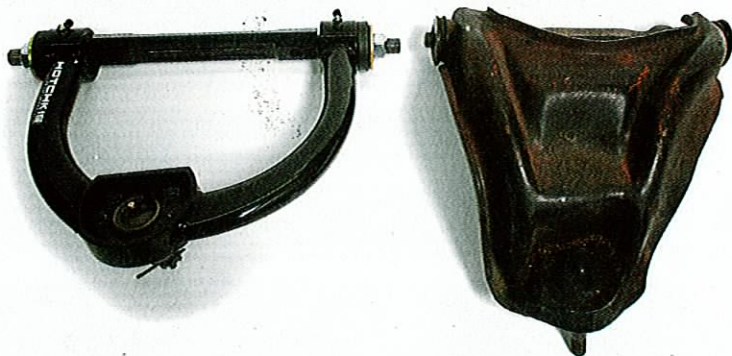
As we've discussed, installing Hotchkis' B-body spindles and revised upper control arms on an A-body actually changes the car's suspension geometry. This is crucial to improving handling, of course, but so is the fact that the new setup also



allows for a greater range of alignment options. "You want negative camber and positive caster," intones Corey Bedortha of the Hotchkis Installation Center. This the opposite of how the factory did things. That being said, here's how our El Camino alignment progressed. Factory toe-in was set at  $\frac{5}{16}$  inch; Bedortha set it to  $\frac{1}{16}$  inch with the TVS in place, and retained this figure. Factory caster was -1.5 degrees. Bedortha set it to +1.9 degrees post-TVS, but after installing the B-body spindles and control arms, he able to set it at +4.8 degrees, greatly enhancing the Elky's stability. And the camber specs we've made so much fuss about? The original specs checked in at 0 to +0.5 degree. Bedortha was able to obtain -0.7 degree with in Part I, but installing the new spindle setup allowed -2.0 degrees.



The foundation of this conversion is, of course, a set of B-body spindles. The replacement piece (left) is roughly 1.75 inch taller than the original A-body spindles. When combined with the appropriate upper control arm, this allows for a negative camber curve, improving front wheel traction. The new setup also allows for positive caster, which, put briefly, improves vehicle stability. Note the difference in the steering arms. The B-body spindles improve suspension geometry, but bumpsteer is a concern.



Hotchkis' tubular upper control arms for A-bodies look positively elegant when compared to the factory stamped pieces. Note that the new A-arms are shorter and have less of a downward curve than the factory piece to accommodate the taller B-body spindles. The result is that the upper arm actually pulls in as it travels upward, tilting the top of the tire in toward the car and creating negative camber. Offset cross-shafts help create static negative camber without a thick alignment shim stack; polyurethane bushings, which reduce flex and bind, are a given.



Hotchkis Performance has been hard at work on a plethora of new Chevelle parts, among them these trick tubular lower A-arms. According to Ogawa, all the forces that occur during suspension operation go "straight through" the lower control arm. Accordingly, this piece needs to be strong, and this one is. Again, poly bushings improve the situation.

## ON THE TEST TRACK

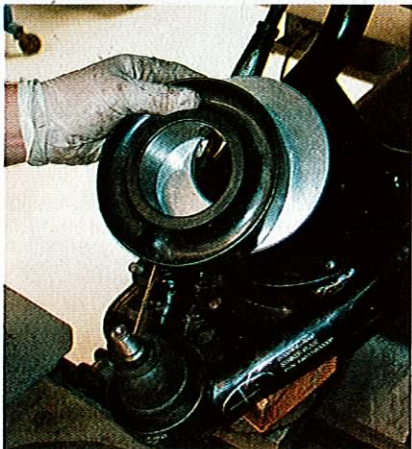
	400-FOOT SLALOM	SKIDPAD	BRAKING
	Before 40.6 mph	n/a	185 feet
TVS w/14-inch tires	42.7 mph	0.76g	n/a
TVS w/17-inch tires	44.1 mph	0.85g	177 feet
B-body spindles, rear discs	44.7 mph	0.87g	141 feet



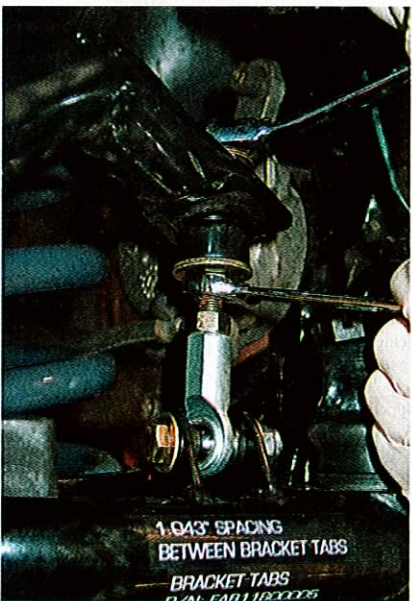
# THE AGILE A-BODY PART II



Installing the upper A-arms is fairly easy. Our talent for this project, Hotchkis Installation Center lead tech Corey Bedortha, actually reached the attachment points from the top of the car.



The new lower A-arms incorporate aluminum spacers for up to 1/2 inch of ride-height adjustment. "It's not gonna give you a whole big drop or raise," says Ogawa. "It's just for fine tuning."



Hotchkis' new lower control arm uses a Heim joint to mount the sway bar rather than the traditional hamburger-style mount. In addition to reducing bind, this setup allows the sway bar to be adjusted when ride-height changes are made. The sway bar should be parallel to the ground.

When you go into the B-body conversion, that's when you start changing the geometry, and that's when the interesting stuff starts happening with the cars.

—AARON OGAWA, HOTCHKIS PERFORMANCE

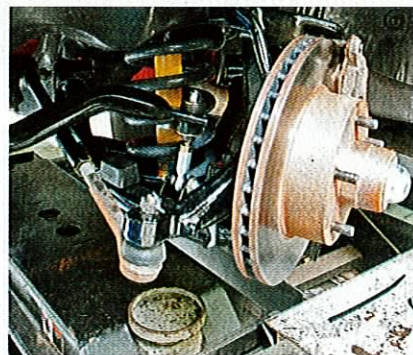
## OFF THE DRAWING BOARD

Traditionally, performing this conversion on an A-body has meant replacing the factory pieces with actual GM spindles from a '70-'76 B-body. We've covered the plusses, but there is a significant minus, as explained by John Hotchkis: "The drawback to the B-body spindle (when used on an A-body) is that steering arm is in the wrong place, so it causes bumpsteer. As it goes up and down in its travel, the wheels go toe-out and toe-in, making the car veer around. In road race cars and stock cars and so on, they work so hard making sure it doesn't have bumpsteer. Bumpsteer turns the car." We were lucky enough to get a look at the prototype of Hotchkis' solution to this problem, its new Sport Spindle. In short, these original pieces have the B-body spindle geometry but retain the A-body

steering geometry—the "best of both worlds," according to Ogawa. "By changing that steering arm, designing one just for these cars," Hotchkis continues, "We can make it so that it doesn't have bumpsteer. It goes up and down in its travel and the wheels stay straight." These new castings will also accommodate aftermarket big brake kits; Hotchkis is working on brackets for various setups. The dwindling supply of original B-body spindles is partly behind the development of this new piece, but in our book, Hotchkis had a more relevant reason: "People are getting more sophisticated about their suspension," he tells us. "They notice when things aren't right, so the timing is perfect for this piece." We'll agree, and you'll hear about it here when the final versions are available.



Another benefit of changing over to B-body spindles is that you get bigger B-body disc brakes and calipers as part of the package. When teamed with rear disc brakes and a properly dialed-in proportioning valve, the improvement in stopping ability is marked.



It looks good, yes? The spindles themselves provide a 0.75-inch drop compared to the A-body pieces; the total drop with all parts installed was 1.75 inches. "People know what state-of-the-art street cars handle like," says John Hotchkis, "so they want their musclecars to handle like that too, if possible. Adding the B-body spindles and new A-arms to our already installed TVS package created a vintage El Camino that does just that.



# THE AGILE A-BODY PART II

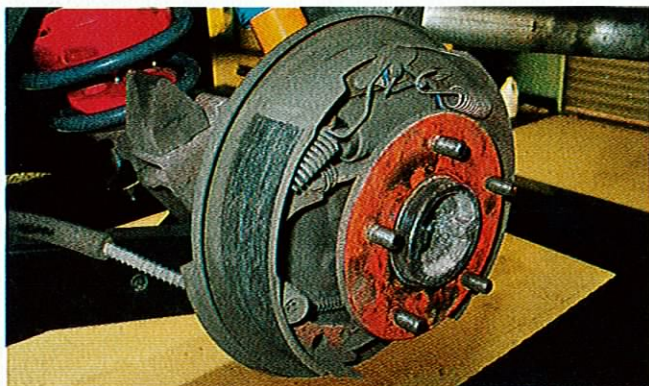
## JOHNNY ON THE SPOT

We look forward to our test sessions; given a choice between a day in the office and a day at the track, we'll take choice B any-time. It turns out we're not alone, as John Hotchkis himself brought our '69 El Camino test mule out for our most recent cone-bowling extravaganza. Given Hotchkis' extensive racing and testdriving experience, we insisted he take a turn at the wheel, and learned that it pays to have the man who made the parts on hand. Hotchkis' TVS package includes one of its new Extreme adjustable rear sway bars. The bar provides two levels of stiffness: 75 percent more than stock, and 100 percent more, which is where ours was set when we arrived at the track for our post B-body install testing. As we noted elsewhere, the improved alignment specs and negative camber curve provided by the B-body spindles increased front wheel traction—but decreased rear wheel traction. John Hotchkis quickly diagnosed the problem: "With that really quick, tight slalom, the cones are spaced quite close, so that the car is always moving; you're turning the steering wheel very quickly, and it was readily apparent that

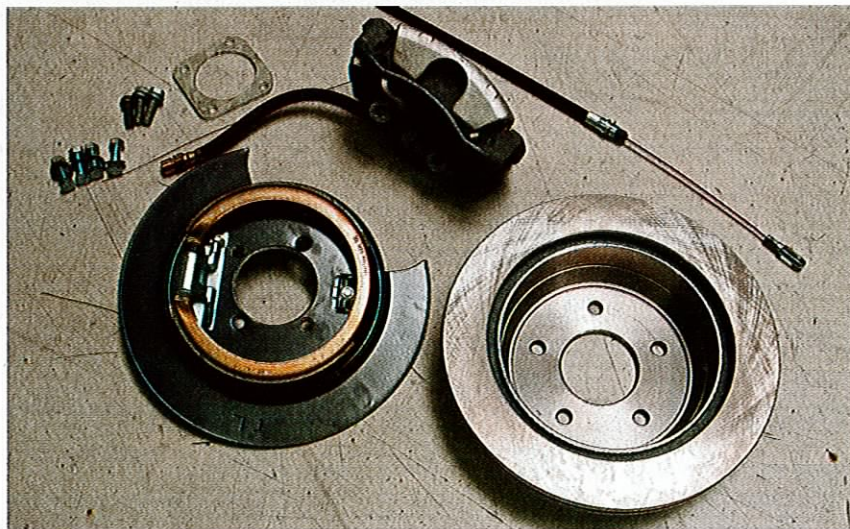
the car needed more rear grip." Hotchkis grabbed some tools, put the sway bar on the 75-percent setting, and voila, our slalom runs became more consistent—and quicker. "We had a loose car that needed more rear traction, so we softened the setup in order



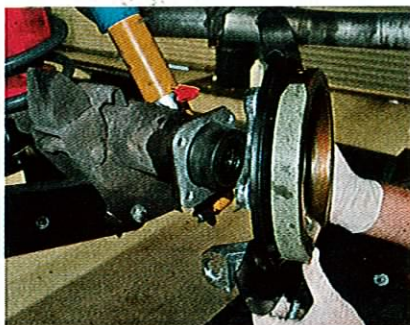
to gain that rear grip," Hotchkis explains. "If it was a Chevelle, possibly, or it had larger rear tires, we could have gone for the stiffer setup," he continued. "But with only 245s on this El Camino and the lighter weight in the back, this was just what it needed. That's why we made this bar."



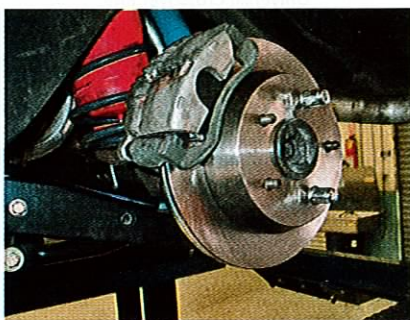
On the flip side, our subject A-body was still outfitted with its original rear drum brakes. Given that we'd just upgraded the Elky's front binders, we decided a back-end upgrade was also in order.



True Connections' rear disc brake kits for A-bodies are based on late-model GM components that have been massaged to work on the earlier cars. Except for a proportioning valve, if needed, the kits come complete.



This spacer goes in between the axle flange and the backing plate...



...otherwise, this is pretty much a simple, remove and replace job. Everything—including the new emergency brake cables—bolted right into place.



Depending on your application, a proportioning valve may be needed to regain proper brake bias when adding rear disc brakes. We retained the '69's original master cylinder, so a prop valve was needed. Hotchkis selected a Wilwood unit, which Bedortha mounted under the car. The Elky's previously mediocre braking ability now matches its impressive handling capabilities. **CHP**

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