



**TECH
PREVIEW**

KING-AIR

APEX PROJECT BUILD

There continues to be an extraordinarily loyal following for the built in Japan Yamaha sleds, specifically the Vector and Apex models. Few would argue they have extremely durable motors, and they also have engineering and durability built into their chassis design as well.

So, it didn't surprise us when we started to hear from some riders that we were missing the boat by not telling our readers about what they felt was the best bang for the buck in snowmobiling. We had a group of riders that, instead of buying a brand new sled every year or two, was feeling pretty smart in what they believed to be the better solution. They knew how durable the Yamaha engines were and they knew how good the Japan-built Yamaha chassis. Maintained properly these machines have incredible life expectancy. What was lacking, in comparison to the newest sleds available, was their suspension performance.

These were groomed trail veterans, riders who were out logging big miles

each season, miles that would render a two-stroke engine due for service in a matter of a couple of years. They wanted the 4-stroke reliability and durability, but they also wanted suspension performance to match. And, they wanted something that would not break the bank.

Is the King-Air Apex one of the Best Buys in Snowmobiling?

Most of these high-mile riders were telling us the best bang for the buck in sledding is when you marry an Apex chassis to a King-Air rear suspension. They told us it produces the best on-trail combination of ride, handling and cost. To be that good, remember what we

are comparing to. Here the whole would definitely have to be more than the sum of the parts. One Apex/King owner said "even if I plop down \$25,000 at my dealer, I can't get close to the ride and handling I've gotten from my Apex with the King-Air."

Few will deny the Apex package as being one of the best trail sleds ever built, but could it really be made that much better with a new rear suspension? Could this transform the Apex into one of the greatest trail sled, ever? One that's as good as (or better) than anything currently offered? For us this indeed seemed a bit too good to be true. We decided to dig a little deeper.

With an itch to scratch we went online to see what we could pick up a used Apex for and saw they ranged \$3500-\$6500. Next, we got on the horn to TeamFAST, makers of the King-Air. We spoke with Gerard Karpik, long-time suspension designer (as well as creator of the BLADE snowmobile, famous cross country racer, innovator of the M-10





suspension, the list goes on and on). We asked whether they'd be interested in doing an Apex / King-Air project build to help prove out what our readers had been telling us. We proposed they acquire an Apex of their choice and install a King-Air suspension for an evaluation/ comparison against the best trail sleds the industry has to offer.

Karpik insisted the King-Air installation would be the greatest single upgrade one could ever make for an Apex and agreed to get back to us. A couple days later he got back and advised, he thought it would be a fairer comparison if we'd allow them to affordably even things up a bit in the old versus new proposition. He thought we should afford TeamFAST some of the tools the Big Four have when putting out their best trail sled. He pointed out that the front end of the Apex was a good package in its day, but that the industry had advanced a long ways in that area of tuning.

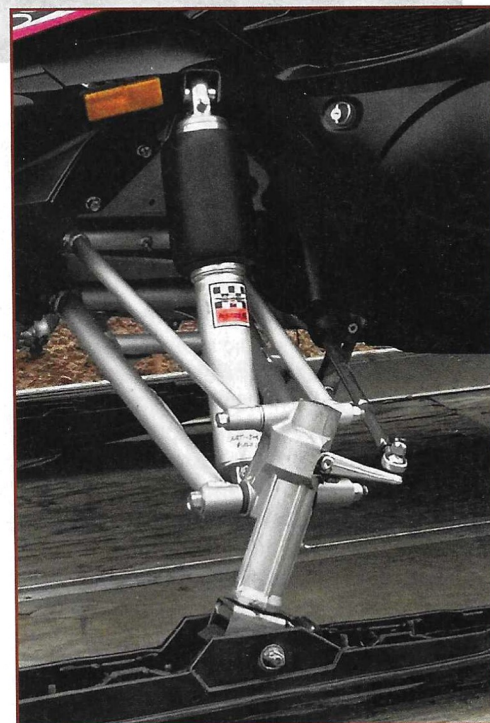
To that end we agreed they could work with upgrades that included shocks/springs, skis, carbides and swaybar, allowing them to tune each component to Apex specific calibrations. But, the upper threshold for the front

end upgrades would be no more than \$1,500.

For rough numbers the project looked like this: Apex \$3,500 + King-Air \$2,850 + front end upgrades \$1,500 = \$7,850 of hardware in total. Right about half the price of a brand new sled!

They agreed and got into the project right away to be ready for first snow, finding a 2011 Apex with EPS. They got started with field tests mid-November, packing in a 15-mile loop in early snow country near Finland, Minnesota. After putting some miles on the sled, they advised that the King-Air rode near expectation but the front end would benefit from upgrades.

The Apex 4-cylinder motor has a lot of mass and generates higher front shock/spring loading than most sleds. In early testing, they determined the preload of the stock ski spring could not be reduced enough to obtain their targeted feel as it would lose too much front end travel. Softer springs with more preload may have helped to improve the fluid feel but the end rate would have led to more big bump bottoming. So, they chose to replace the 16.5" coil over shocks with TeamFAST's longer 17.5" Assault Airshocks.



The stock Apex geometry accepted the longer shocks, giving the front suspension more travel and the desired fluid feel in the early portions of travel. The airshocks feature large volume rolling sleeve airsprings. These deliver a lower initial rate of progression and a final rate that ramps up quite rapidly from 1/2 of the stroke on up. The airshock change



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resulted in a well-rounded impression from the front end, with the desired feel on smaller to medium bumps while still affording strong resistance to bottoming in high impact bumps.

The beauty of the front-end upgrades showed up while riding the Apex on heavily-used trails like the hilly routes found throughout the states and provinces that surround Lake Superior. As on most trails the LH skis mostly share the center portion of the trail regardless of travel direction while the RH ski is on the outer portion of the trail and sees half the (ski) traffic. With the aggressiveness these trails are ridden they often gouge out in the corners. On RH corners this can generate uneven bumps shapes, bigger in the center lanes and less pronounced in the outside lanes. The difference in heights results in a cross-jacking force that's noticeable in RH turns. That force back feeds into the chassis and bars. Those forces can drum away at a rider's upper left bicep and shoulder promoting tiring in that area.

However, when you combine the greater sprung mass of the mighty four cylinder motor parked out over each corner and combine it with the Assault airshock's highly fluid motion, they provide a real bump eating while cornering advantage. Add to this the chassis flattening control that a slightly stiffer sway bar added to the package and a noticeably flat front end while cornering results - an impressive combination.

To generate the desired turning force from the Apex / King-Air they used a set of aggressive 6" staggered carbides on Yamaha's innovative Stryke skis. Team-FAST balanced out what was a lighter, yet pointy feel of the front end by inserting two tail shims between the rear of the skis and their novel adjuster pads. With that added preload under the rear of the ski rubbers the skis snapped right in line with a well-rounded feel of control and stability. The steering effort was noticeably lighter than the Tuner III skis they replaced and they did not dart around in any conditions, making it an enjoyable package to drive.

We asked Gerard to get into the whats, hows, and whys the Apex / King-Air work so well together.

SnowTech: Gerard, what qualities of the Apex stand out that help to set this package apart from other sleds?

1) *Well, the chassis is stiff. It's a great platform to tune around, it doesn't flex. It feels stiffer than even the most popular sleds sold today. The chassis doesn't wind up and unwind. If you make a change in the shocks or springs it all feeds back into the suspension.*

2) *It may be heavy but it's largely sprung weight. With the King-Air at roughly 50 pounds it makes for a favorable sprung versus unsprung weight ratio and this helps with ride.*

3) *The Apex is the great ergonomic compromise. When's the last time you saw a rider-forward sled in a cornering photo, where the rider didn't look like he's trying way too hard? On the Apex, it's not a true sit down or rider forward chassis. You can still get over the side cornering and still be in a reasonable attack position come bump time.*

4) *The Apex has a much better seat than anything the OEMs offer today. It's the right firmness, it's deep, has*

length and you can't pound it out. It's a great piece.

SnowTech: What does the King Air bring to the package?

We aren't claiming performance in Sno-X, Cross Country or even backwoods never groomed runs. If your focus is ripping along in those types of bumps get a Lynx RAVE or Xtterrain and go pound on it. No, the King-Air suspension's been designed and developed to maximize its bump eating qualities when groomed trails fall apart.

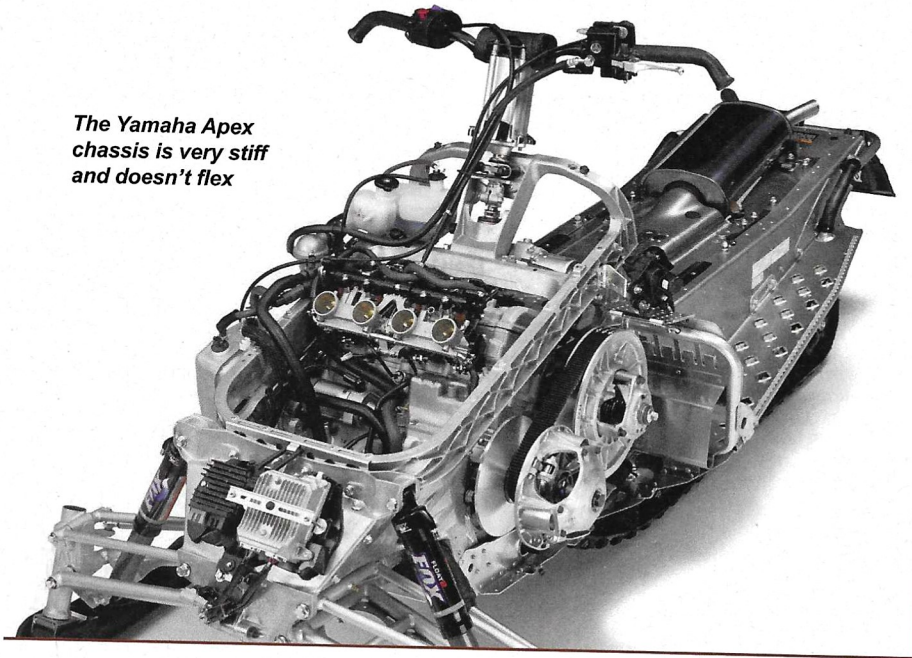
Who hasn't been trapped out on a trail that's turned big time rough with too many miles between us and the trailer? We're talking about those favorites that are so sweet when freshly groomed but by midday are often trashed.

You know the cherished runs, Munising's Trail 8 or Minnesota's CJ Ramstad Trail with those long bump-filled straights growing repetitive 6" to 18" stutters flowing into 12" to 24" bumps in many corners. Face it, those are the conditions that at the minimum kill your pace, shorten your rides, or even prematurely end a great weekend.

These are the exact conditions the King's been developed to improve pace and extend the day. The King starts slipping into its zone at around 30 mph,



The Yamaha Apex chassis is very stiff and doesn't flex



from there it's the rider's prerogative to how fast he wants to attack rough sections. The King-Air has unique isolating qualities that separate its riders from the harshness of bumps that routinely attack a rider's back, arms, and legs. In helping riders master rough trails every day, the King puts the joy back into the game.

These units aren't the offspring of Sno-X or XC skids. They're purpose-built trail suspensions that allow riders to continue their pace even as trails roughen. None of the OE suspensions will take its rider through mile after mile of stutter filled trails with the same smoothing finish the King-Air delivers.

SnowTech: Gerard, explain why TeamFAST's design and geometry provides these benefits the current suspensions do not.

Our King-Air differs greatly from any OEM suspensions, specifically the motion ratio. We are non-rising rate while they are rising-rate. Simply put, our damper forces taper as the rear shock compresses. In the OEM rising rate systems the damper forces rise sharply when the shock compresses. That sharp rise in force does provide anti-bottoming benefits when landing a big jump or smashing a heavily gouged road approach. But, when trails roughen and stutters accumulate, that sharp rise in force adds greatly to the bump energy fed back to the rider.

Trail riders don't normally do landings from big jumps or smash gouged out road approaches on trail. Their terrain often involves 4 to 18" bumps randomly scattered or rhythm bumps, with up to 24" corner bumps. Here the tapering of the compression forces in our non-

rising system reduces the amount of energy that's back-fed to the rider. That tapering delivers a totally different finish and much smoother feel during most common trail bumps. This is a large part of the difference that you feel when you compare the two systems.

When you add the fluid feel of our Assault airshocks and King-Air, their combined 20 pound weight saving, the advantages of wide-range parallelogram coupling, two more inches of (critical) front arm travel and our full range weight adjuster (FRA), it all adds up.

So, we now circle back to our big question: Is an Upgraded King-Air Apex really one of the Best Buys in Snowmobiling? With the added balance provided by the fully updated front end and the King-Air suspension, this sled has indeed risen to one of the very best trail sleds available. It does all the things a great trail sled needs to do. It combines legendary Yamaha durability, quality and reliability with a finely tuned suspension package front and rear that is calibrated specifically for the way most riders use their sled – on groomed trails that can and do get rough! The King-Air will improve your sled's ride quality in these conditions, and when we look at this package's cornering capability and the machine's durability along with the final sum of the all-important dollars invested this indeed could make it your Best Buy in Snowmobiling!

Visit www.TeamFAST.com to learn more, or contact them at 218-744-2101 to discuss options to bring your Yamaha dream sled to reality.

