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DYNO WARS

RAPTOR EXHAUST SHOOTOUT

Alba vs. White Bros. vs Sparks vs. CT vs.
Trinity vs. Graydon vs. Big Gun vs. FMF vs.
Bills vs. Pro Circuit vs. Yoshimura

By the staff of Dirt Wheels



Trinity Stage IV



Ball's Pipes



White Bros. E Series



White Bros. R Series



CT Sonic



Alba

Here it is, the shootout all Raptor owners have been asking for. For the first time ever we have gathered up the viable contenders for the official *Dirt Wheels* Raptor Pipe Shootout. Which exhaust system makes the most power for Yamaha's new high performance Raptor 660? That is one of the most common questions we've been getting from our readers and we now have the answers. We also have the answers to other important concerns such as sound level, fit, quality of construction, weight and price.

THE RULES

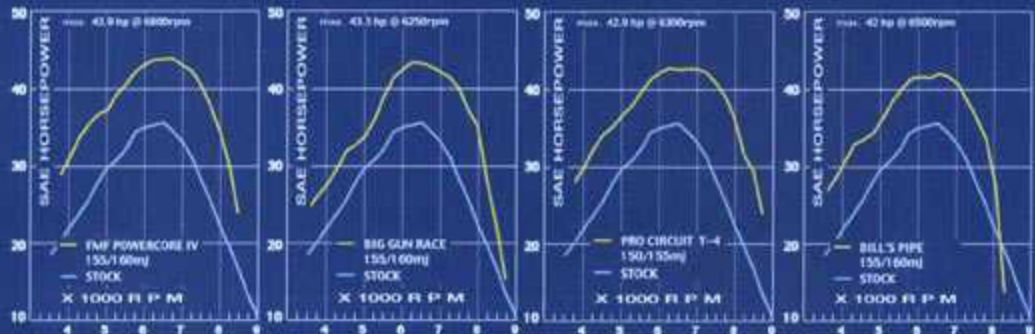
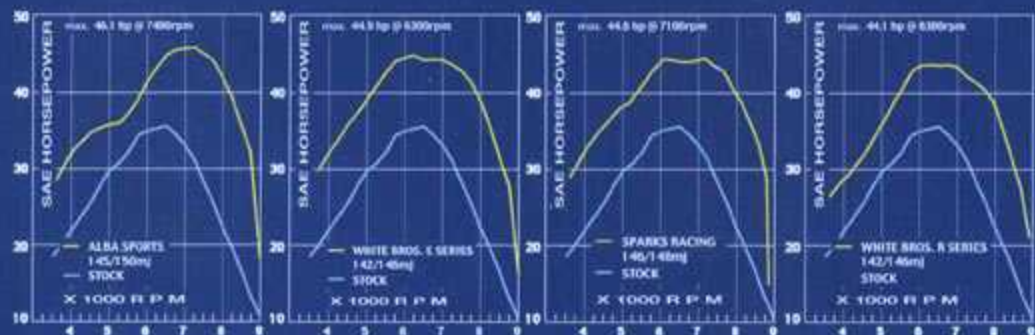
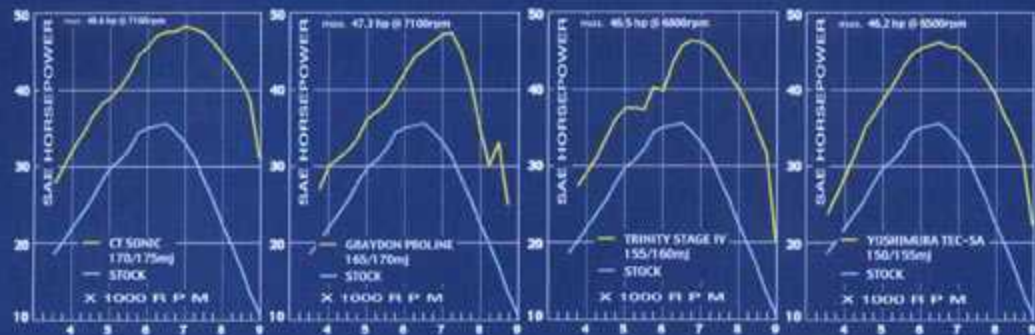
For this shootout, we wanted complete exhaust systems, meaning header pipes had to be included along with the muffler/silencer. Also, the exhaust system had to be of the spark arrester design. Each pipe would be run on the dyno using the airbox mode and letting specs that the particular company recommends.

We contacted every exhaust system manufacturer and asked them to loan us their pipe for this comparison. If they chose not to do so we let

them know that they would still be included. We would just go out and buy one, the same as any Raptor owner could.

THE CONTENDERS

The big hop-up companies, White Brothers, FMF and ProCircuit, eagerly wanted to be included in our shootout, which is a good sign that they have confidence in their products. Yoshimura and Big Gun do not handle quite the volume as the first three but they eagerly provided us with their pipes. Graydon, CT, Trinity and Sparks are hop-up



BRAND	HP @ 4000rpm	PEAK HP	SOUND LEVEL	WEIGHT	PRICE
Stock	22.1	35.6 @ 6500rpm	90db	1.5lb	\$250
Alba	26.3	40.1 @ 4500rpm	102db	12.71lb	\$249
Big Gun	27.6	43.5 @ 6500rpm	102db	9.2lb	\$299
Bill's Pipe	28.5	42.9 @ 6300rpm	101db	7.25lb	\$299
CT Banc	28.6	48.6 @ 7100rpm	103db	11.25lb	\$250
Sparks X-6	29.9	44.6 @ 7100rpm	102db	10lb	\$250
FMF Power Core IV	31.1	43.9 @ 6800rpm	102db	9.45lb	\$299
Graydon Proline	33.9	47.3 @ 7100rpm	103db	10.88lb	\$299
Pro Circuit T-4	30.1	42.9 @ 6300rpm	102db	7.15lb	\$250
Trinity Stage IV	32.2	46.5 @ 6000rpm	102db	10.95lb	\$250
White Bros. E	32.1	44.9 @ 6300rpm	102db	8.5lb	\$250
White Bros. R	32	44.1 @ 6300rpm	102db	8.11lb	\$249
Yoshimura Tec-SA	32	46.2 @ 6000rpm	103db	9.41lb	\$250

* Requires an additional \$100 Pro-Flow system

EXHAUST SHOOTOUT

shops specializing in ATVs and as expected they also wanted to be included in our pipe comparison. Rounding out the list of eager participants are two newcomers, Alba and Bill's Pipes.

THE NO-SHOWS

You may recall that in our 400EX pipe shootout, in the March '01 issue, DG was surprisingly absent. When we contacted them for this shootout they again claimed that they had no available pipes to send us. Based upon the numerous letters we received about DG's absence in our last pipe shootout, we felt that they should certainly be included in this one. After calling around to several accessory shops we learned that all of the Raptor pipes were on back order. This did indeed back up DG's original claim but, like you, we also wonder about a company of this size failing so far behind in supply and demand. SuperTrapp was another one that had no Raptor pipes in stock to provide us.

Duncan and LRD are missing from this shootout because their Raptor exhaust systems are for closed course racing only and do not have spark arresters. DMC, Speedworks and HMF are in the process of designing spark arrester exhaust systems for the Raptor but had none completed in time for our scheduled days on the dyno.

TYPE & CONSTRUCTION

All but one of the muffler/silencers are made of aluminum, whether they are brushed, polished or natural. Only the Alba unit is steel, which has a ceramic coating. For the header pipes, Pro Circuit, Yoshimura and White Bros. use stainless steel which requires very little maintenance. The FMF header pipe is made of unpainted mild steel. You will need to take extra care of this one to keep it from rusting.

Trinity is the only chrome-plated header pipe in the shootout. They



cater to a lot of sand dune riders who tend to appreciate the custom look. The rest of the header pipes are mild steel with an outside ceramic coating. This is not the same type of coating you will find inside some high performance racing engines. On the pipes, it's more similar to a high grade of heat resistant paint. Some people like the dull whitish/gray look. Others aren't too crazy about it. Whether or not the coating will eventually rub or burn off we can't really say at this point. This would be something to consider if low maintenance is a high priority to you.

Alba, CT, Sparks and the White Bros. E Series pipe use the disc style spark arrester. We tested them with the recommended number of discs that they supplied. With this system you do have the option, however, to add or subtract discs to affect power and sound levels. The rest of the contestants use the screen type of spark arrester.

All of the silencers use insulation material wrapped around a perforated inner pipe to deaden the noise level. This material will need to be replaced every 25 hours of riding time to maintain peak power and control sound output. To do so, the silencers will need to be taken apart. Bolt or Allen screws are used on all silencers except for the two White Bros. and the Sparks unit. These use pop rivets instead. If you have the right size drill bits, rivets and a rivet gun it may actually be

◀ The hottest performance tip for the Raptor includes modifying the airbox lid along with bolting on an accessory exhaust system.

quicker to drill out and re-rivet as opposed to twisting hard to turn bolts and screws. Both designs have their pros and cons.

SIZE & WEIGHT

One area that can affect horsepower is the inside diameter of the header pipes. The stock Raptor header pipe measures 1.1 inches. This is the same diameter as the header pipes on the Alba, White Bros., CT, Trinity, FMF, Bill's and the Pro Circuit units. The Graydon, Big Gun, Sparks and Yoshimura measured out to a 1.25-inch inside diameter.

The next measurement we checked out was the distance it took for the two header pipes to converge into the single mid-section pipe. The majority of the pipes made this connection within twelve inches from the engine exhaust ports. The FMF unit, however, traveled twenty inches before joining the midpipe and the Trinity header pipes traveled all the way to the muffler.

Another measurement we compared was the outside diameter of the midpipes. Trinity, Bill's, Pro Circuit and Yoshimura had the same 1.75-inch diameter as the stock Raptor mid pipe. Alba, CT, Sparks, Graydon, FMF and both White Bros. mid pipes were larger at two inches.

All of the pipes in this shootout weigh less than the stock Raptor unit, which tips the scales at 13 pounds. The lightest one of the bunch is the Pro Circuit at a feathery 7.6 pounds. The heaviest one is the CT unit at 11.25 pounds. The rest fall somewhere in between these two.

FIT & FINISH

All of the exhaust systems were fairly easy to install and fit well. The White Bros. E Series required the most time, though, and forced us to use more tools. Also, one of the brackets wasn't milled completely flush, which made the mounting

BRAND	MATERIAL header/pipe/muffler	SA TYPE	HARDWARE	JETTING	RECOM AIR-BOX MODS	PHONE
Stock	Steel/steel	Baffle	Bolts	140/145	Stock	Oxley
Alba	Coated mild steel/steel	Disc	Alens	145/150	Remove snorkle	(858) 495-4300
Big Gun	Out mild steel/blnd alum	Screen	Alens	155/160	Remove snorkle	(909) 948-7029
Bill's Pipe	Coated mild steel/alum	Screen	Alens	155/160	Remove snorkle	(909) 371-1329
CT Sonic	Coated mild steel/alum	Disc	Bolts	170/175	Remove lid	(562) 945-2453
Sparks X-8	Coated mild steel/alum	Disc	Alens	148/148	Trim snorkle	(801) 872-4343
FMF Power Core IV	Mild steel/alum	Screen	Alens	155/160	Remove snorkle	(313) 831-4956
Graydon Proline	Out mild steel/standard alum	Screen	Bolts	165/170	Remove lid	(562) 531-7142
Pro Circuit T-4	Stainless steel/alum	Screen	Alens	150/155	Stock	(909) 738-8050
Trinity Stage IV	Chrome mild steel/alum	Screen	Alens	155/160	4" sq hole, no snorkle	(714) 832-3434
White Bros. E	Stainless steel/alum	Disc	Rivets	142/148	Trim snorkle	(714) 892-3404
White Bros. R	Stainless steel/alum	Screen	Rivets	142/148	Trim snorkle	(714) 892-3404
Yoshimura Tec-GA	Stainless steel/alum	Screen	Alens	150/155	(21) .314" holes, no snorkle	(909) 673-1060

EXHAUST SHOOTOUT

less than perfect. The FMF's two-clamp system was more of a pain than others and its two-piece headers came closer to the clutch cable than we liked. The Pro Circuit pipe had a pipe spring that rested uncomfortably against the radiator hose.

As far as appearance goes, our crew of judges made these comments: "The Pro Circuit T-4 has really small and clean welds. It's the best looking headpipe/muffler combo of the bunch. The Trinity's dual chrome pipes fit good and look really trick. The FMF unit just has a certain good look to it. Those stainless steel header pipes on the WB pipes have a cool works look to them. You can't beat the trick custom look of the Yoshimura pipes. They even have those little tabs so you can install the stock heat shields. The Alba pipe somehow looks like it came from 1980. All of these pipes at least look trickier than the stock Raptor pipes."

GETTING READY FOR THE DYNO

To take advantage of the increased exhaust flow, all of the pipe makers recommended a change in the two carburetor jet sizes. They all gave



instructions on which size main jets, pilot jet and needle clip positions, except for the FMF. Our pipe came with no instructions at all. For that one we searched their website and found a recommendation.

CT actually provides the new main jets and their own design titanium needles with their pipe. They also include a K&N air filter and ProDesign Pro flow kit (that allows you to remove the airbox lid, making their kit the most expensive. Sparks and White Brothers recommend the use of a Dynojet kit for their pipes (for an additional charge) which includes main jets, needles, throttle springs and instructions on

◀ *Out of the box, the Raptor produces 35.6 horsepower. Every exhaust system we tested outperformed the stocker by a considerable margin. In addition, they look better and weigh much less than the stocker, too.*

how to modify the airbox snorkel for more air flow. Most of the pipes come with similar instructions on how to modify the intake snorkel or airbox lid. CT and Graydon recommend complete removal of the airbox lid which requires the \$100 Pro Design filter system. It is included in the CT kit.

ON THE DYNO

To get the most accurate power readings for each pipe we made sure that they were all run in the same conditions. We allowed the motor to cool down to the same temperature between runs and double checked the dyco calibrations. When all was said and done we had an accurate dyco chart for each pipe that you can look at yourself for comparison.

What you will notice right away is that all of the pipes produce significantly more power than the stock Raptor system. In our 400EX pipe shootout the best pipe made only one horsepower over stock. Check out the stock Raptor numbers. We're talking

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35.6 horsepower stock versus 40.6 for the CT pipe. Whew! That's a whopping 13-horsepower increase. This power increase travels from bottom to top as well. Even at 3500 rpm most of the pipes produce at least 7 or 8 more horses than the stock's 18.6. That is significant.

After studying the dyno charts further you will note that the pipes that produce the most peak power are also the ones that recommend complete removal of the airbox lid and run the largest main jets. One could conclude from this that getting more air and fuel into the engine is as important as getting the exhaust gases out. Depending upon what conditions you normally ride your Raptor in, it may not be practical to have an open airbox, but it is something to consider. The added risk is more dirt and water finding its way to your air filter and possibly into an expensive motor.

SILENCE!

In addition to measuring power, our shootout wouldn't be complete unless we compared noise levels as well. That is one of the functions of a muffler. In fact, in this day and age,

EXHAUST PIPE PERFORMANCE

Pipe Name	Peak Power (HP)	Peak RPM	Peak Torque (lb-ft)
Stock	18.6	3500	20.0
CT	40.6	3500	28.0
1-2-3	38.5	3500	27.0
4-5-6	37.5	3500	26.5
7-8-9	36.5	3500	26.0
10-11	35.5	3500	25.5
12-13	34.5	3500	25.0
14-15	33.5	3500	24.5
16-17	32.5	3500	24.0
18-19	31.5	3500	23.5
20-21	30.5	3500	23.0
22-23	29.5	3500	22.5
24-25	28.5	3500	22.0
26-27	27.5	3500	21.5
28-29	26.5	3500	21.0
30-31	25.5	3500	20.5
32-33	24.5	3500	20.0
34-35	23.5	3500	19.5
36-37	22.5	3500	19.0
38-39	21.5	3500	18.5
40-41	20.5	3500	18.0
42-43	19.5	3500	17.5
44-45	18.5	3500	17.0
46-47	17.5	3500	16.5
48-49	16.5	3500	16.0
50-51	15.5	3500	15.5
52-53	14.5	3500	15.0
54-55	13.5	3500	14.5
56-57	12.5	3500	14.0
58-59	11.5	3500	13.5
60-61	10.5	3500	13.0
62-63	9.5	3500	12.5
64-65	8.5	3500	12.0
66-67	7.5	3500	11.5
68-69	6.5	3500	11.0
70-71	5.5	3500	10.5
72-73	4.5	3500	10.0
74-75	3.5	3500	9.5
76-77	2.5	3500	9.0
78-79	1.5	3500	8.5
80-81	0.5	3500	8.0



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EXHAUST SHOOTOUT

keeping your quad relatively quiet is especially important. Your favorite riding area is more likely to remain open if the local residents don't have any reason to complain about excessive noise. Being socially responsible citizens of this great country, we understand that our fun should not come at the expense of others.

The stealth award goes to the Yoshimura pipe at 100db, which compares to 92db for the Raptor's stock exhaust. Bill's comes in second at 101db while most of the others came in at the 102db level. Big Gun and the White Bros. receive bonus points for offering a quiet core that should reduce decibels by 3 or 4 points.

CT, Trinity and Graydon get points deducted for blasting out at 103 db. Since the CT spark arrester uses discs, several could be removed to bring the sound level down. The Trinity and Graydon do not have this option, though.

AND THE WINNER IS...

Since some of the pipe manufacturers specified removal of the airbox lid to match their jetting recommendations, the maximum horsepower numbers vary in this comparison. For example, the Pro Circuit pipe was dynoed with the stock airbox lid in place, per their specs. One might conclude that it could obtain a higher peak horsepower figure, similar to the CT pipe, if it too ran fatter jetting with no airbox lid. In light of these variations, looking at the power curve is as important as maximum numbers. A good curve is one that builds power in the low end, carries it through the mid-range and maintains a wide spread of power on the top-end. The White Bros., Sparks, Pro Circuit and Bill's pipes show the type of top end curve where you could wind out your Raptor longer without having to shift. The type of powerband one might describe as peaky would have a dyno curve somewhat like Trinity's and Graydon's pipes.

Which pipe would we want? We like the peak power and curve of the CT pipe. However, it was the loudest pipe in the shootout and the heaviest. The Yoshimura pipe had the second best power and was the quietest to boot. The fact that it was one of the few stainless steel pipes is another plus. In our eyes, the Yoshimura pipe is the one we would choose. This doesn't mean that you can't choose a different winner, though. It is a tough call. ☐



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