New D&D "High Port" Cat 800 Riot Kit, tested/ tuned at DTR by a consumer.

Pete Nixon of Syracuse, NY had D&D do a full "High Port" Riot Kit on his 2016 ZR8000, and brought it to DTR this past spring to optimize the fuel/ timing tuning on his PCV. The economical standard Riot Kit was tested here last fall, and posted on this website on 11/22/15.

I often suggest to people who have their engines modded that they tell the modifier that they are testing/ tuning at and independent dyno testing facility like DTR--even if they aren't planning to do that! This should make it more likely that they would get the best possible porting--perhaps done by their best porting guy--not done by a rookie just promoted from the shipping department. In this case, Pete said that he never told D&D that he was coming here for fine tuning--so it very likely that what you see here is what you'll get.

The "High Port Riot Kit" includes a LTS head, high RPM porting that works best with the D&D Monster single pipe (the standard Riot porting is better than the High Port with the stock pipe), Monster single pipe, Y pipe and that very quiet higher-than-stock HP XPR silencer. The standard Riot porting raises only the small secondary exhaust booster ports, whereas the High Port tuning includes raising the main exhaust port as well. Note in the graph comparing Standard to High Port how HP is increased through the entire power band--especially on overrev. For those who wish to flaunt, Pete said that there's also an optional "180HP" wrap for the cowl of the sled.

Here are the two maps that we created and loaded in the ECU--one at 12.6ish/1 and one at 13/1 A/F ratio as measured by the dyno Innovate wide band meter (the Dynojet PCV can be fitted with a toggle switch that allows the use of two different maps in the field). I continue to suggest to people to measure their A/F ratio as a means to optimize performance. When I constructed this facility in 1986, a good Horiba wide band A/F meter was @\$4000--today you can buy an Innovate (same brand as I use on our motorcycle and sled dynos) digital wideband for your sled for \$160 including O2 sensor! EGT gauges are not very useful for tuning--especially on EFI sleds that retard timing when pipes are cool, causing EGTemp to climb even with unchanging A/F ratio, in order to quickly optimize pipe temperature. Once the pipes are hot (the Cat ECU likes 900F) then timing is advanced which puts heat back in the engine to make more HP, thus lowering EGT.

ZR8000 engines make max HP at 13.2-13.4/1 on volatile fuel (like winter pump gas that has RVP of 10 psi). The excellent design cooling system (both chassis and reverse "top down" cooled engine with high velocity low volume coolant passages) allow for near maximum HP tuning on pump gas. Field tuning A/.F ratio for max HP with lower (or zero) RVP race gas requires leaning out gradually from, say, 11.5/1, watching revs and MPH climb with horsepower. Low RVP fuel will require richer indicated A/F to achieve optimal combustion chamber mixture. Remember--severely lean combustion chamber

mixtures from poorly vaporizing fuel can damage/ seize pistons without detonation! You can't be saved by knock protection if there's no knock. The Silent Killer!

But if you're running too lean at max HP for the air/ field conditions or the octane you have, and the ECU detects light deto, it will quietly retard timing and reduce HP. That's one reason to carry two maps in the PCV. If the 13/1 map is creating a few clicks on the gas you just bought at the bar, then the richer map may be faster in the field. Here are the two tunes Pete is running with this season:

EngSpd	STPPwr	STPTrq	BSFA	FuelA	LamAF1	LM1Air	Air_1c	FulPrA
RPM	СНр	Clb-ft	lb/hph	lbs/hr	Ratio	SCFM	CFM	psig
650	00 110).3 89.	1 0.626	65.9	14.49	213	205.2	44.2
660	00 112	2.3 89.	4 0.629	9 67.3	14.34	215	208.4	44.2
670	00 114	.6 89.	8 0.634	4 69.2	14.28	220	212.0	44.1
680	00 117	' .6 90.	9 0.64	5 72.3	14.12	228	219.5	44.1
690	00 121	.1 92.	2 0.644	4 74.4	14.00	232	226.9	44.1
70	00 125	5.4 94.	1 0.640) 76.5	13.87	237	236.0	44.0
710	00 130).2 96.	3 0.643	3 79.8	13.72	244	245.1	43.9
720	00 134	.5 98.	1 0.652	2 83.6	13.64	254	252.3	43.9
730	00 139	9.9 100.	7 0.66 [°]	1 88.2	13.51	266	262.5	43.8
740	00 145	5.0 102.	9 0.654	4 90.5	13.39	270	270.5	43.8
750	00 149	9.1 104.	4 0.644	4 91.6	13.28	271	275.3	43.7
76	00 156	6.0 107.	8 0.634	4 94.3	13.05	274	284.4	43.7
77(00 160).6 109.	6 0.626	6 95.8	12.97	277	288.3	43.7
780	00 166	6.3 112.	0 0.614	4 97.4	12.84	279	293.2	43.7
790	00 171	.8 114.	2 0.600) 98.2	12.85	281	296.4	43.7
800	00 176	6.0 115.	6 0.587	7 98.5	12.92	284	298.6	43.7
810	00 179	9.3 116.	3 0.58 [°]	1 99.3	12.92	286	300.9	43.6
820	00 180).4 115.	5 0.587	7 101.0	12.69	286	303.1	43.5
830	00 176	6.4 111.	6 0.610) 102.5	12.66	289	304.2	43.5
840	00 158	8.7 99.	2 0.649	9 98.0	12.96	283	290.2	43.7

EngSpd	STPPwr	STPTrq	BSFA	FuelA	LamAF1	LM1Air	AirInT	FulPrA
RPM	СНр	Clb-ft	lb/hph	lbs/hr	Ratio	SCFM	degF	psig
6500	110.4	89.2	0.628	66.2	14.53	214	47.6	44.1
6600	111.9	89.0	0.629	67.2	14.32	214	47.5	44.1
6700	114.1	89.5	0.641	69.8	14.25	221	47.5	44.0
6800	117.0	90.3	0.649	72.5	14.10	227	47.5	44.0
6900	121.0	92.1	0.646	74.6	13.93	231	47.5	43.9
7000	125.0	93.8	0.643	76.8	13.84	237	47.6	43.9
7100	129.2	95.6	0.648	80.0	13.72	244	47.6	43.8
7200	135.5	98.9	0.664	85.9	13.59	260	47.6	43.7
7300	139.4	100.3	0.659	87.7	13.54	264	47.6	43.7
7400	145.8	103.5	0.650	90.6	13.42	270	47.6	43.7
7500	150.6	105.5	0.639	91.9	13.39	274	47.6	43.7

7600	155.7	107.6	0.629	93.5	13.27	276	47.6	43.6
7700	161.5	110.2	0.612	94.4	13.14	276	47.6	43.6
7800	168.2	113.3	0.588	94.5	13.15	276	47.6	43.7
7900	172.5	114.7	0.572	94.1	13.23	277	47.6	43.7
8000	175.7	115.4	0.563	94.4	13.33	280	47.6	43.7
8100	178.2	115.6	0.563	95.9	13.27	283	47.7	43.6
8200	180.3	115.5	0.565	97.3	13.07	283	47.7	43.6
8300	180.6	114.3	0.571	98.4	12.90	283	47.7	43.6
8400	178.3	111.5	0.582	99.0	12.87	284	47.7	43.5
8500	166.4	102.8	0.615	97.6	13.09	284	47.7	43.6

