2010 Arctic Cat M8 w/ D&D 901 big bore kit

When Dale, Scott & Glenn brought their Z1 w/ turbo upgrade and H2O injection to test, they also brought along their new 2010 Crossfire 800 with a 901cc big bore kit for demonstration. The 901 kit shown here consist of:

- Stock cylinders overbored and ported.
- Stock head w/ combustion chambers remachined for larger bore.
- VForce 3 reed cages.
- Machined from billet intake adaptors to perfectly match throttle body boots to VForce cages.
- .033" offset timing key
- Higher flowing Y pipe.
- Stamped single pipe (fit into the stock muffler for this test).
- Boondocker for fuel tuning.

The 2010 Cat 800 engine has a much lighter "pork-chop cut" crankshaft. The material removed from the crankshaft reduces rotating weight an incredible *four pounds*. The lighter rotating mass is said to greatly improve field throttle response. And since less power is consumed accelerating its own mass, the lighter crankshaft also will improve transient (acceleration test) dyno results by some percentage depending on acceleration rate.

According to D&D, their comparison of the 2009 and 2010 crankshafts showed the lighter crank created better midrange HP but less peak steady-state HP due to the effective increase in effective crankcase volume. This required a redesign of D&D's F and Crossfire (and M8) single pipes to bring the 2010 901's peak HP back to 2009 levels.

When we dyno tested this engine, Scott locked the exhaust valves open, and used a Supreme Tool plug-in device to fool the ECU into thinking the valves were functioning properly. In the field, valves open instantly as throttle is opened. On the dyno, for some reason, the slow acceleration rate results in the new 800 Cat exhaust valves opening at a very late 7500 RPM, preventing meaningful midrange data from being obtained (something I plan to try on other late model EFI Cats being tuned here).

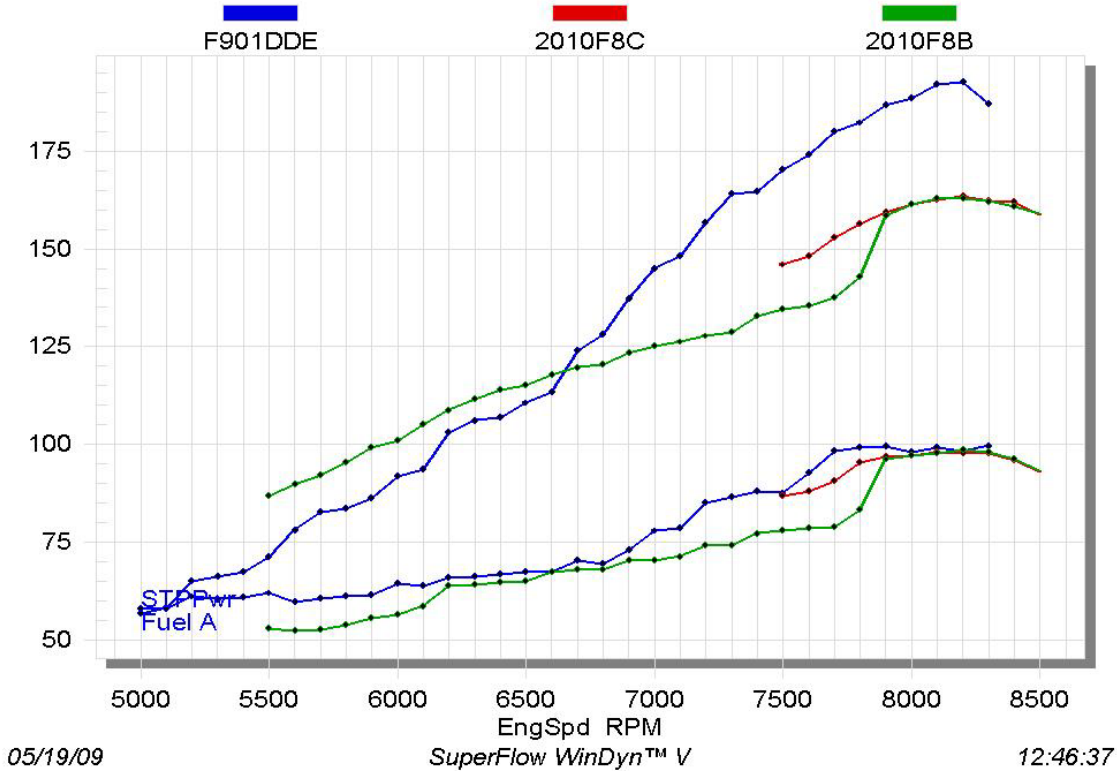
While dyno testing, Glenn Hall monitored the engine data with Arctic Cat's EFI diagnostic software. Using 93 octane E10 gas (10% ethanol) we gradually leaned the A/F ratio down to 12/1 and got knock-free operation all the way down below .55 lb/hphr! *We expect maximum HP to occur at 13/1 if there is no detonation.* Note that our mechanical airflow and fuel flow meters registered A/F ratios identical to the LM-1 readings at peak RPM, but quite different at low revs WOT. There may be some outside air reversion in the exhaust outlet at low revs which could explain the low RPM WOT difference in A/F readings.

Here is our final 901 dyno test #5, with coolant temp just below 100 degrees F. We also have included a graphic comparison with the D&D 901 big bore, valves open, to the 2010 F8 preproduction stocker with valves opening late at 7500 RPM.

EngSpd RPM	STPTrq Clb-ft	STPPwr CHp	Fuel A lb/hr	BSFC A lb/hph	A/F A Ratio	LAMAF1 Ratio	Air 2 scfm	AirTmp degF
5000	59.5	56.7	58.0	1.05	10.97	16.2	139	59
5100	60.0	58.3	58.0	1.02	11.15	16.2	141	59
5200	65.6	64.9	61.0	0.96	11.59	16.1	154	59
5300	65.6	66.2	60.4	0.94	12.04	15.8	159	59
5400	65.6	67.4	60.8	0.92	12.16	15.7	161	59
5500	67.9	71.1	61.9	0.89	12.30	15.5	166	59
5600	73.2	78.1	59.7	0.78	13.79	14.8	180	58
5700	76.3	82.8	60.6	0.75	13.98	14.6	185	59
5800	75.7	83.6	61.2	0.75	13.98	14.5	187	60
5900	76.8	86.2	61.5	0.73	14.11	14.4	190	60
6000	80.3	91.7	64.3	0.72	13.80	14.3	194	60
6100	80.6	93.6	63.7	0.70	14.06	14.3	196	60
6200	87.2	102.9	65.8	0.65	13.66	14.2	196	60
6300	88.5	106.1	66.2	0.64	13.37	14.1	193	60
6400	87.6	106.8	66.7	0.64	13.29	14.1	194	60
6500	89.4	110.6	67.3	0.62	13.22	14.1	194	58
6600	90.3	113.4	67.3	0.61	13.41	14.1	197	57
6700	97.1	123.9	70.2	0.58	13.21	14.0	202	59
6800	98.9	128.0	69.5	0.56	13.36	13.9	203	60
6900	104.5	137.3	72.9	0.54	13.21	13.9	210	61
7000	108.8	145.0	77.8	0.55	12.61	13.6	214	61
7100	109.7	148.2	78.6	0.54	12.71	13.6	218	61
7200	114.4	156.8	85.0	0.56	12.15	13.4	226	61
7300	118.1	164.2	86.6	0.54	12.38	13.2	234	60
7400	116.9	164.7	88.0	0.55	12.39	13.1	238	60
7500	119.3	170.3	87.5	0.53	12.64	12.9	241	60
7600	120.3	174.1	92.8	0.55	12.12	12.8	246	60
7700	122.9	180.1	98.2	0.56	11.65	12.6	250	61
7800	122.7	182.3	99.3	0.56	11.61	12.6	252	61
7900	124.2	186.9	99.4	0.54	11.82	12.4	257	60
8000	123.8	188.6	97.9	0.53	12.09	12.2	259	60
8100	124.6	192.1	99.3	0.53	12.01	12.1	260	61
8200	123.4	192.6	98.4	0.52	12.18	12.1	262	61
8300	118.4	187.1	99.6	0.55	12.01	12.2	261	61

Compare 2010 Cat F8 to D&D 901 big bore

Green F8 full run/ surge at vlave opening, Red F8 test begin at valve opening, Green 901cc with dyno tune



05/19/09 *SuperFlow WinDyn™ V* *12:46:37*