

2010-11 Arctic Cat Crossfire/ M 800 pipe shootout Jim Czekala

“Dead 1 Dave” Craiglow brought his stock 2010 Crossfire 800 to test single exhaust systems from D&D, Bikeman, Speedwerx and SLP compared to the stock exhaust. We would test those four manufacturers’ Y pipes and tuned pipes—individually and combined—all with the stock muffler. But unfortunately on test day we discovered that SLP had sent me a Crossfire/ M1000 exhaust system instead of the 800. So that one will have to wait for another day. For now here is a comparison of stock vs BMP, D&D and Speedwerx exhausts.

We used the new refrigerated air intake system to create very dry winter temperature air for the engine intake even though outside air temp reached over 60 degrees F by day’s end.

Since the vast majority of sledders run quietly to avoid problems with landowners and police, we opted to stay with the stock muffler. Historically, it has been difficult by those with instrumented dyno systems who design loud lightweight cans to just match most stock mufflers if they exactly match the stock muffler’s backpressure. Often, those many loud can manufacturers who create lightweight mufflers without measuring airflow, backpressure and most importantly horsepower wind up losing HP. Excessive backpressure will choke the engine, and with fixed fuel flow you have a double whammy effect of richer mixture and less of it to horribly rob the engine. Insufficient backpressure will lower HP by reducing the supercharging effect of the tuned pipe—just like turning the boost down on a turbo. Sometimes, if an engine is overfueled, that HP loss from a too-loose can may be compensated for by improved, leaner A/F ratio with fixed fuel injection. But a too-loose can will always hurt a properly tuned stock engine/ muffler combo. Sled owners are too often fooled by noise, just like I used to be as a 16 year old when I often removed the aircleaner from my Dad’s ‘66 273 Plymouth 2 barrel when he wasn’t around. What a dandy howl! My high school pals who rode with me in that Plymouth at least pretended to be equally impressed by what seemed like better acceleration.

Those who buy non-stock mufflers to save weight should use their sled’s digital tachs to see if power is either maintained or lost. Your clutches can act like a mini dynamometer. Always baseline with the stock muffler in an area where you can run at max HP while observing RPM (being sure you’re at your HP peak RPM as indicated on this website). Then switch mufflers, and if you maintain RPM you’re in good shape. But if you lose revs you are very likely losing HP. Then you must weigh the advantages of lighter weight vs lost HP.

For this day, here are the three manufacturers’ exhausts with Dave’s stock muffler. First we installed each Ypipe with the stock single pipe to compare airflow and HP improvement. Then we tested each manufacturer’s Y pipe with its own tuned single pipe.

During testing, Dave monitored closely the engine coolant and pipe center section exhaust temperature with our Arctic Cat computer ECU monitoring system for

consistency and repeatability. Each test was run at 120 degree F peak coolant temp and 1080+ degrees F pipe center section temp. Dave also noted deto sensor voltage readings, which corresponded to the lightest clicks audible on our copper tube detometer. With all four Y pipes, there was ample stock fuel in these controlled conditions to avoid knock. But with the aftermarket Y pipe/ tuned pipe combos, as we approached 110 lb/ft of torque in the cold dense air we experienced light midrange clicking that was eliminated by adding fuel—in this case by creating full throttle maps for each pipe with a Power Commander V tuner. The engine was always happy with BSFC around .60 lb/hphr on 93 octane ethanol fuel (7% on this day).

Here is the stock baseline in cold dry refrigerated air—repeating within less than ½% over four tests.

EngSpd	STPPwr	STPTRq	BSFCAB	FulAB	Air_1c	Baro_P	AirInT	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	InHga	degF	psig
6000	98.4	86.1	0.565	54.8	165	28.95	35.1	42.4
6100	99.8	85.9	0.560	55.2	166	28.95	34.8	42.5
6200	101.3	85.8	0.549	55.0	167	28.95	34.7	42.4
6300	102.9	85.8	0.554	56.3	169	28.95	34.6	42.4
6400	104.7	86.0	0.556	57.5	171	28.95	34.5	42.4
6500	107.4	86.8	0.551	58.4	174	28.95	34.3	42.4
6600	109.5	87.2	0.564	61.0	178	28.95	34.3	42.3
6700	111.8	87.6	0.578	63.8	182	28.95	34.2	42.3
6800	115.2	89.0	0.584	66.4	186	28.95	34.0	42.2
6900	119.0	90.6	0.585	68.8	190	28.95	33.9	42.2
7000	125.1	93.9	0.579	71.6	194	28.95	33.8	42.2
7100	129.4	95.7	0.586	75.0	197	28.95	33.6	42.1
7200	134.2	97.9	0.592	78.7	202	28.95	33.5	42.0
7300	140.0	100.7	0.583	80.7	206	28.95	33.3	42.0
7400	144.1	102.3	0.574	81.9	210	28.95	33.1	42.0
7500	146.8	102.8	0.592	86.0	213	28.95	33.0	41.9
7600	149.6	103.4	0.611	90.5	218	28.95	32.9	41.7
7700	153.5	104.7	0.616	93.7	223	28.95	32.8	41.7
7800	156.8	105.6	0.616	95.7	224	28.95	32.7	41.7
7900	158.9	105.6	0.621	97.7	225	28.95	32.6	41.7
8000	159.7	104.8	0.625	98.8	226	28.95	32.4	41.7
8100	159.1	103.1	0.632	99.6	225	28.95	32.3	41.6
8200	156.7	100.4	0.644	100.0	225	28.95	32.1	41.6
8300	150.9	95.5	0.665	99.4	222	28.95	32.0	41.6
8400	136.8	85.5	0.724	98.1	219	28.95	31.8	41.6

Here are the three aftermarket Ypipes in alphabetical order fitted to the stock pipe/ muffler. Note that, oddly, the BMP Ypipe had less impact than the others, but when combined with the BMP single pipe worked well. In all cases, the airflow increase resulted in HP increase—part of which is due to slightly leaner and more powerful A/F ratio. Note in the graphic comparison how HP production mirrors the airflow CFM. A great bang for less than two hundred bucks!

STOCK CROSSFIRE/ M800 WITH BMP Y-PIPE

EngSpd	STPPwr	STPTRq	BSFCAB	FulAB	Air_1c	LamAF1	AirInT	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	Ratio	degF	Psig
6000	99.1	86.7	0.568	55.2	163	17.0	40.1	42.4
6100	99.7	85.9	0.566	55.4	162	16.9	39.6	42.4
6200	100.9	85.5	0.562	55.7	164	16.8	39.4	42.5
6300	102.9	85.8	0.562	56.8	166	16.7	39.2	42.4
6400	105.9	86.9	0.555	57.7	169	16.6	39.0	42.4
6500	108.2	87.4	0.554	58.9	171	16.5	38.9	42.4
6600	110.3	87.8	0.568	61.5	175	16.4	38.8	42.3
6700	113.4	88.9	0.581	64.8	181	16.1	38.6	42.2
6800	117.9	91.1	0.576	66.8	186	15.7	38.4	42.2
6900	122.0	92.9	0.572	68.6	190	15.5	38.3	42.2
7000	127.6	95.7	0.573	71.9	195	15.2	38.1	42.1
7100	132.3	97.9	0.579	75.3	198	14.9	37.9	42.1
7200	137.3	100.2	0.583	78.7	202	14.6	37.7	42.0
7300	142.3	102.4	0.578	80.8	205	14.3	37.4	42.0
7400	145.6	103.4	0.581	83.3	208	14.2	37.3	42.0
7500	148.6	104.1	0.606	88.6	215	14.0	37.0	41.9
7600	151.8	104.9	0.611	91.2	219	13.7	36.9	41.8
7700	154.7	105.5	0.612	93.2	222	13.5	36.7	41.8
7800	157.3	105.9	0.614	95.1	224	13.3	36.6	41.7
7900	159.2	105.8	0.620	97.2	225	13.1	36.4	41.7
8000	160.2	105.2	0.633	99.8	226	13.0	36.2	41.7
8100	160.5	104.1	0.636	100.5	226	12.8	36.0	41.6
8200	159.6	102.2	0.640	100.6	226	12.7	35.8	41.7
8300	157.1	99.4	0.644	99.7	225	12.7	35.6	41.7
8400	139.0	86.9	0.721	98.8	219	12.8	35.3	41.7

STOCK CROSSFIRE/ M800 WITH D&D Y-PIPE

EngSpd	STPPwr	STPTRq	BSFCAB	FulAB	Air_1c	Baro_P	AirInT	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	InHga	degF	Psig
6100	100.4	86.4	0.561	55.6	166	28.94	35.2	42.4
6200	102.0	86.4	0.554	55.7	167	28.94	35.0	42.4
6300	103.6	86.3	0.554	56.6	170	28.94	34.9	42.4
6400	105.9	86.9	0.550	57.5	172	28.94	34.7	42.4
6500	108.3	87.5	0.538	57.5	175	28.94	34.6	42.4
6600	110.3	87.8	0.557	60.7	179	28.94	34.5	42.4
6700	112.5	88.2	0.572	63.5	183	28.94	34.4	42.3
6800	115.2	89.0	0.575	65.4	186	28.94	34.3	42.3
6900	121.1	92.2	0.576	68.9	192	28.94	34.1	42.2
7000	127.6	95.7	0.563	71.0	195	28.94	33.9	42.2
7100	132.1	97.7	0.571	74.5	199	28.94	33.8	42.1
7200	138.7	101.2	0.578	79.3	204	28.94	33.6	42.0
7300	144.8	104.2	0.568	81.4	208	28.94	33.4	42.0
7400	149.3	106.0	0.563	83.1	212	28.94	33.2	42.0

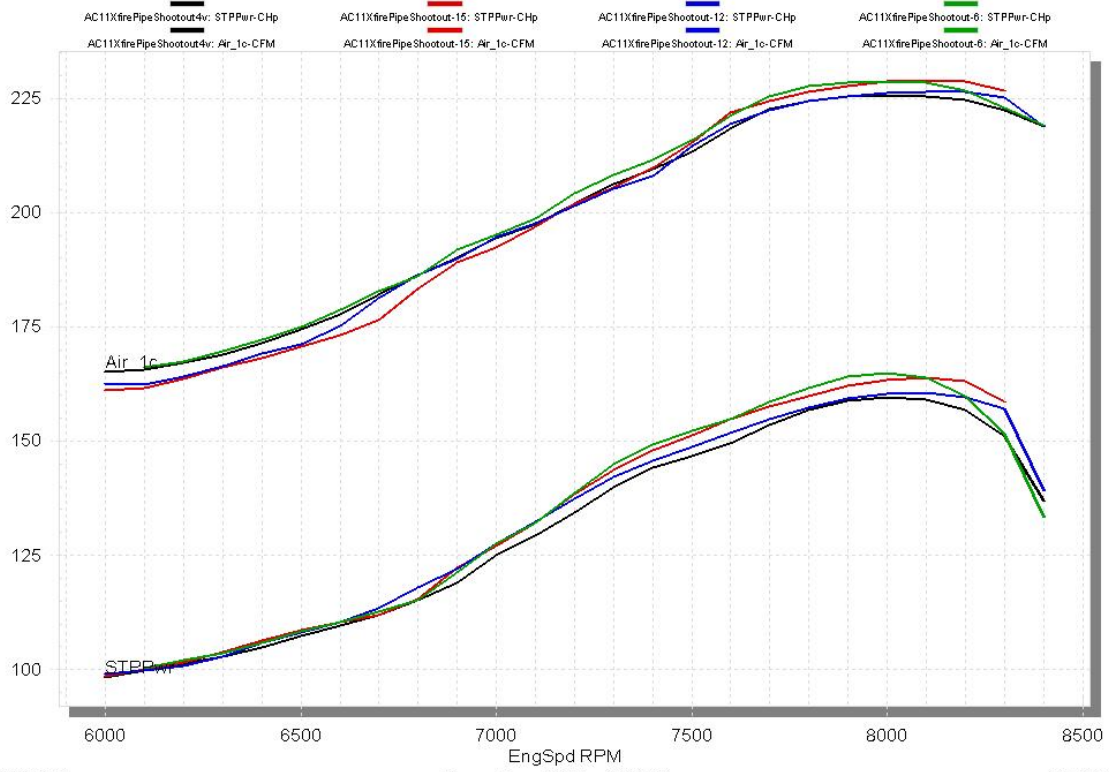
7500	152.2	106.6	0.58	87.4	216	28.94	33.1	41.9
7600	154.9	107.0	0.595	91.1	221	28.94	33.0	41.8
7700	158.5	108.1	0.598	93.8	225	28.94	32.8	41.7
7800	161.7	108.8	0.600	95.9	228	28.94	32.6	41.7
7900	164.0	109.0	0.599	97.2	228	28.94	32.5	41.7
8000	164.9	108.2	0.606	98.9	229	28.94	32.4	41.7
8100	163.8	106.2	0.618	100.2	228	28.94	32.2	41.6
8200	159.9	102.4	0.639	101.1	227	28.94	32.1	41.6
8300	151.4	95.8	0.675	101.2	223	28.94	31.9	41.7
8400	133.2	83.3	0.756	99.7	219	28.94	31.7	41.7

STOCK CROSSFIRE/ M800 WITH SPEEDWERX Y-PIPE

EngSpd	STPPwr	STPTrq	BSFCAB	FulAB	Air_1c	LamAF1	AirInT
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	Ratio	degF
6000	98.6	86.3	0.562	54.6	161	16.8	36.0
6100	100.1	86.1	0.555	54.7	162	16.7	35.6
6200	101.4	85.9	0.561	56.1	164	16.7	35.4
6300	103.9	86.6	0.555	56.8	166	16.5	35.2
6400	106.4	87.3	0.550	57.7	168	16.5	35.1
6500	108.6	87.7	0.539	57.7	171	16.4	34.9
6600	110.3	87.8	0.547	59.5	173	16.4	34.8
6700	112.0	87.8	0.559	61.8	176	16.4	34.8
6800	115.5	89.2	0.578	65.8	183	16.0	34.6
6900	122.4	93.1	0.567	68.4	189	15.4	34.4
7000	127.0	95.3	0.568	71.2	192	15.2	34.3
7100	132.0	97.6	0.583	76.0	197	15.0	34.1
7200	138.3	100.9	0.583	79.7	202	14.6	33.9
7300	143.8	103.4	0.570	80.9	206	14.3	33.7
7400	148.0	105.0	0.569	83.2	210	14.2	33.5
7500	151.2	105.9	0.588	87.9	215	14.1	33.3
7600	154.7	106.9	0.596	91.1	222	13.7	33.1
7700	157.5	107.4	0.599	93.3	224	13.5	33.0
7800	159.9	107.7	0.608	96.1	227	13.3	32.9
7900	162.2	107.8	0.610	97.8	228	13.2	32.7
8000	163.4	107.3	0.614	99.2	229	13.1	32.5
8100	163.9	106.2	0.614	99.5	229	12.9	32.4
8200	163.0	104.4	0.626	100.9	229	12.8	32.2
8300	158.7	100.4	0.645	101.3	227	12.8	32.0

XF/M800 Y pipe comparison of airflow SCFM and Horsepower

BLACK STOCK, BLUE BMP, GREEN D&D, RED SPEEDWERX



11/15/10

SuperFlow WinDyn™ V3.2

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Here are the dyno tests of the combination of each manufacturer’s Y pipe and tuned pipe with the stock muffler. As shown on the graph, we have very similar HP curves with similar HP but differing HP peak RPM. Those who favor big midrange torque out of the corners will like the BMP combination. High speed sledders might opt for the Speedwerx setup with big power at the highest RPM for possibly the best top end speed without expensive gear changes. Plus the Speedwerx’ reduced peak torque might make running fast on low octane gas more feasible. Then the D&D pipe/ Y pipe splits the difference and gives you lots of both. In retrospect it’s similar to the F1000 shootout we did previously—lots of power gained at vastly different RPM. It’s all about choices.

STOCK CROSSFIRE/ M800 WITH BMP YPIPE AND BMP SINGLE PIPE

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFCAB lb/hph	FulAB lbs/hr	Air_1c CFM	LamAF1 Ratio	AirInT degF	FulPrA Psig
6100	106.6	91.8	0.553	57.9	165	16.1	37.5	42.4
6200	107.8	91.3	0.547	58.0	166	16.1	37.3	42.5
6300	109.6	91.3	0.539	58.0	169	16.0	37.2	42.4
6400	111.5	91.5	0.528	57.9	171	16.0	37.1	42.4
6500	113.3	91.6	0.524	58.4	174	16.1	37.1	42.4
6600	115.9	92.2	0.540	61.5	181	16.1	37.0	42.4
6700	119.2	93.4	0.553	64.9	186	16.0	36.9	42.3
6800	122.9	94.9	0.563	68.1	190	15.8	36.8	42.2
6900	127.7	97.2	0.566	71.0	195	15.3	36.7	42.1
7000	134.5	100.9	0.558	73.9	200	14.9	36.6	42.1

7100	140.0	103.5	0.563	77.5	204	14.7	36.4	42.0
7200	143.7	104.8	0.574	81.2	208	14.6	36.3	42.0
7300	147.5	106.1	0.572	83.0	211	14.3	36.2	42.0
7400	151.2	107.3	0.580	86.3	214	14.2	36.1	41.9
7500	154.6	108.3	0.593	90.3	219	14.0	36.0	41.8
7600	159.3	110.1	0.601	94.3	225	13.7	35.9	41.8
7700	164.9	112.5	0.596	96.8	230	13.2	35.7	41.7
7800	168.1	113.2	0.598	99.0	231	12.9	35.6	41.7
7900	169.5	112.7	0.605	101.0	231	12.8	35.5	41.6
8000	151.1	99.2	0.690	102.8	223	13.0	35.2	41.6

STOCK CROSSFIRE/ M800 WITH D&D YPIPE AND D&D SINGLE PIPE

EngSpd	STPPwr	STPTRq	BSFCAB	FulAB	Air_1c	Vap_P	AirInT	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	InHg	degF	psig
6000	106.8	93.5	0.551	57.9	163	0.07	37.6	42.4
6100	108.4	93.3	0.547	58.4	163	0.07	37.1	42.4
6200	109.7	92.9	0.539	58.3	165	0.07	36.8	42.4
6300	111.3	92.8	0.532	58.4	166	0.07	36.7	42.4
6400	112.6	92.4	0.534	59.3	168	0.06	36.5	42.4
6500	114.0	92.1	0.545	61.2	170	0.06	36.3	42.4
6600	115.9	92.2	0.563	64.3	173	0.06	36.2	42.3
6700	118.4	92.8	0.576	67.2	177	0.06	36.1	42.3
6800	121.9	94.2	0.579	69.6	181	0.06	35.9	42.2
6900	125.2	95.3	0.580	71.7	184	0.06	35.7	42.1
7000	129.3	97.0	0.588	75.0	188	0.06	35.6	42.1
7100	134.0	99.1	0.596	78.8	193	0.06	35.4	42.0
7200	138.3	100.9	0.596	81.3	198	0.06	35.2	42.0
7300	143.0	102.9	0.591	83.4	204	0.06	34.9	42.0
7400	147.6	104.7	0.602	87.7	209	0.06	34.7	41.9
7500	152.0	106.4	0.616	92.5	216	0.06	34.5	41.8
7600	157.2	108.6	0.617	95.9	223	0.06	34.2	41.7
7700	162.1	110.6	0.612	98.1	227	0.06	34.1	41.7
7800	166.4	112.0	0.608	100.0	229	0.06	33.8	41.7
7900	169.6	112.7	0.606	101.7	230	0.06	33.7	41.6
8000	171.5	112.6	0.607	103.0	232	0.06	33.5	41.6
8100	171.6	111.2	0.606	102.9	233	0.06	33.3	41.6
8200	164.9	105.6	0.636	103.8	231	0.06	33.0	41.6

STOCK CROSSFIRE/ M800 WITH SPEEDWERX YPIPE AND SPEEDWERX SINGLE PIPE

EngSpd	STPPwr	STPTRq	BSFCAB	FulAB	Air_1c	LamAF1	AirInT	FulPrA
RPM	CHp	Clb-ft	lb/hph	lbs/hr	CFM	Ratio	degF	psig
6100	104.3	89.8	0.563	57.8	160	15.6	35.3	42.4
6200	105.8	89.6	0.557	58.1	161	15.5	35.2	42.4
6300	107.5	89.6	0.551	58.3	163	15.4	35.1	42.4
6400	109.8	90.1	0.538	58.3	166	15.4	35.0	42.4
6500	112.3	90.7	0.526	58.3	168	15.6	34.9	42.4
6600	114.1	90.8	0.537	60.4	172	15.8	34.8	42.4
6700	115.7	90.7	0.556	63.4	175	15.8	34.8	42.3

6800	117.4	90.7	0.575	66.6	179	15.7	34.7	42.2
6900	123.6	94.1	0.584	71.1	186	14.5	34.5	42.1
7000	128.5	96.4	0.576	73.0	189	14.3	34.4	42.1
7100	131.9	97.5	0.585	76.1	192	14.3	34.4	42.1
7200	137.0	99.9	0.597	80.7	199	14.0	34.2	41.9
7300	143.9	103.5	0.588	83.5	204	13.7	34.1	41.9
7400	148.2	105.2	0.599	87.6	209	13.6	34.0	41.7
7500	151.3	106.0	0.618	92.3	216	13.4	33.8	41.7
7600	153.4	106.0	0.629	95.4	220	13.2	33.7	41.7
7700	155.7	106.2	0.640	98.3	224	13.1	33.6	41.7
7800	158.5	106.7	0.640	100.1	226	12.9	33.5	41.6
7900	161.7	107.5	0.642	102.6	229	12.7	33.4	41.7
8000	165.1	108.4	0.637	103.9	230	12.6	33.3	41.6
8100	168.8	109.5	0.631	105.2	232	12.4	33.2	41.6
8200	171.3	109.7	0.627	106.0	233	12.3	33.1	41.5
8300	168.2	106.5	0.635	105.6	232	12.3	32.9	41.6

XF/M800 compare Ypipes/ tuned pipes combined

BLACK STOCK, BLUE BMP, GREEN D&D, RED SPEEDWERX

