JD Powersports' Z1/ F1100T tuning upgrades/ components

JD Powersports (www.jdpracing.com) partners Jeff and Dave have been boosting/ tuning Cat turbo sleds since 2005. They were among the first to hotrod the T660 after building their own dyno facility with a SuperFlow SF902 engine dyno, developing high power components and tunes using "standalone" controllers. When the normally aspirated 1100 Jag was released in calendar year 2006, JDP converted them to boosted operation for trail riding and lakeracing with their standalone ECUs, custom pistons, rods, custom turbo exhaust manifolds and high capacity intercoolers.

Now, with the advent of factory turbocharged Z1's and F1100T's, JDP has been tuning the new turbo sleds by altering the stock ECU programming. They have a four-map program that is controlled by a four-position rotary switch that they have been dyno and field testing since 2009.

Turbo engine tuning is done by adjusting fuel flow, timing, and boost pressure to create optimal combustion chamber pressure at just the right time, to make max knock-free power with the octane of the fuel being used. There's no magic—just three tuning parameters to deal with. Higher boost and retarded timing, or reduced boost and advanced timing? Or higher boost *and* advanced timing, but richer fuel flow? Etc, etc. Tuning the three parameters nine different ways can make about the same HP. But which one runs knock-free with the most HP on pump gas? And do it without turning the exhaust cherry red right down to the muffler oulet? And how about changing the tune as revs climb to beyond 8300 RPM where factory knock sensors are useless? In testing high boost Z1's and F1100T's we've often heard clicks of detonation above 8300 RPM with no reaction from the factory ECU indicated on the Arctic Cat diagnostic software which shows timing pulled every time we hear "clicks" below 8300. When deto occurs below 8300 the ECU will gradually retard timing in one degree increments until it subsides—then eventually goes into full protect-me mode, dumping fuel and dropping boost if deto continues unabated. I asked AC engineering about this and the email I got came from a top engineer on Z1/ F1100T engines—**"The knock control system is not active above the stock rev limiter due to the inability of the hardware filter to isolate "normal" engine noise from knock at high RPM. The AC diagnostic tool will not show knock there because the ECU is not looking for it".**

So, operating above 8300 we're on our own, and detonation must be carefully avoided to prevent long term engine damage including stretching stock head studs/ lifting the head and leaking compression gas into coolant passages pushing out coolant, pounding ring lands down onto the second compression ring, breaking compression rings and pistons, bending con rods, or even worse! Typically, only extensive dyno testing, followed up with extensive field testing can determine what "tunes" are best programmed into the four switch selections. JDP has been dyno and field testing this reflash program since 2009, and the "tune" they're using for each of the four switch positions are tested here, with various exhaust components that they manufacture and sell.

Today, we tested JDP's new zero mile F1100T on WNY 93 octane gas, measured at .745 specific gravity and 8% ethanol. And today, power was good with zero clicks of detonation indicating good quality pump gas. But what about those times when you get cheated at the gas pump? The NYS Bureau of Weights and Measures who's responsible for verifying gas pump volume and octane at gas stations reports that @10% of the time you purchase high octane gas, you get hosed with low octane gas! Car and Driver magazine reported similar results in the state of Michigan—217 of the 2816 samples of the 92-93 octane gas by the MI Bureau of Weights and Measures actually tested at 87 octane! And how about the Dateline NBC expose of California Exxon stations whose high octane gas tested bad even more often than NY or MI—one in eight were substandard, the worst testing at 75 octane! Try running 75 octane gas in your turbo sled! So if you have a boosted engine tuned optimally on, say, 91 octane what happens WHEN (not IF) you get ripped off at the pump? Factory deto protection is your friend. But above 8300 RPM you're on your own!

With JDP's past physical field experience prior to finalizing switch tuning—which includes plenty of weeping headgaskets allowing coolant to be pushed out by compression and even one slightly bent connecting rod from running pump gas at high boost well above 8300 RPM—combined with the detailed information from Arctic Cat engineering, Jeff and Dave have opted to create very gradually declining boost curves beyond 8300 RPM on switch settings 1, 2 and 3. Maximum power is thus generated where knock protection works. But when running race fuel and/ or water/ methanol injection they are happy to recommend letting revs climb for maximum top end speed or acceleration.

JDP has opted to have switch selection 1 to be the stock ECU map with a higher rev limit. There is plenty of fuel flow with the stock map to allow JDP's higher flowing mufflers—a stainless steel hand fabricated trail muffler and a large 3" diameter hand fabricated lakerace muffler (which is fed by a 3" ID cast/ s.s. tube turbine outlet pipe). Both can operate powerfully and safely with switch selection 1. With free flowing mufflers, airflow is increased greatly with fixed boost—the turbo is programmed to create X boost regardless of backpressure, so airflow CFM skyrockets as backpressure drops. This factor combined with fixed fuel flow (= leaner more powerful A/F ratio) results in extraordinary gains for turbo-boosted engines with high flowing mufflers.

Switch selection 2 is the same as a $199 fixed-boost reflash of the stock ECU. It will deliver extra boost and HP with either the stock factory muffler or any of JDP's higher flowing mufflers. Also note that when we tested the JDP quiet muffler in switch selection two, we inadvertently had an early over-rich program installed—creating way too safe fuel flow dropping HP and CFM a bit compared with the proper switch 2 selection we used with stock muffler and 3" ID lakerace muffler.

Switch selection 3 is good with any of the free-flowing JDP mufflers but marginal for pump gas with the stock muffler (unless H2O/ methanol injection is used). The higher boost levels with the tighter quiet stock muffler may create higher backpressure and thus prevent some of those deto-producing active radicals from escaping from the combustion

chambers. But since max power is produced below 8300 RPM, the factory deto protection will very likely help protect your engine if your octane is sub-standard.

Switch selection 4 is reserved for 100+ octane gas, or pump gas with water/ methanol injection system even with free-flowing mufflers. We might make that power on real 93 octane gas for 5 seconds on the dyno with 160 degree coolant and stock intercooler blasted with 80 MPH cold dyno air, but is very likely asking for problems in the field, hence JDP's recommendation for race gas or water/ methanol injection when using Switch setting 4. And the test data from the 3" Lakerace exhaust is still with a stock (unshimmed) wastegate. And since Jeff's new 2012 has not been fitted with Water/ Methanol yet, race gas was added for realistic assessment.

Here is Jeff's bone stock, brand new 2012 F1100T with stock intercooler. This is tested with Hess brand 8% ethanol .745 specific gravity 93 octane pump gas. As shown in the first test, each dyno test was done at 160 degree F+ coolant temp to ensure max boost/ timing from the stock ECU.

2012 F1100T bone stock (same as JDP Switch position 1)

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	Air_1c	BoostP	FulPrA	CoolOt
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	CFM	psig	psig	deg F
6600	150.4	119.7	0.479	70.0	12.74	194.7	9.3	53.1	162
6700	151.1	118.4	0.482	70.8	12.70	196.3	9.3	53.1	161
6800	152.1	117.5	0.490	72.4	12.62	199.4	9.3	53.1	161
6900	155.6	118.4	0.508	76.9	12.28	206.0	9.8	53.5	161
7000	159.4	119.6	0.513	79.5	12.11	210.2	9.9	53.6	161
7100	162.1	119.9	0.521	82.1	12.01	215.0	10.1	53.7	162
7200	170.7	124.5	0.527	87.4	11.79	224.9	11.0	54.5	161
7300	174.8	125.7	0.522	88.7	11.79	228.0	10.8	54.4	162
7400	177.2	125.7	0.525	90.4	11.76	231.9	10.9	54.4	162
7500	178.9	125.3	0.528	91.9	11.61	232.8	11.2	54.5	163
7600	178.7	123.5	0.539	93.7	11.47	234.4	11.3	54.5	163
7700	178.7	121.9	0.545	94.6	11.35	234.2	10.9	54.3	165
7800	178.6	120.2	0.545	94.6	11.30	233.3	10.6	54.0	165
7900	177.6	118.1	0.551	95.1	11.21	232.7	10.3	53.8	166
8000	175.8	115.4	0.564	96.3	10.98	230.9	10.1	53.5	166
8100	174.0	112.8	0.566	95.6	10.93	228.2	9.7	53.1	166

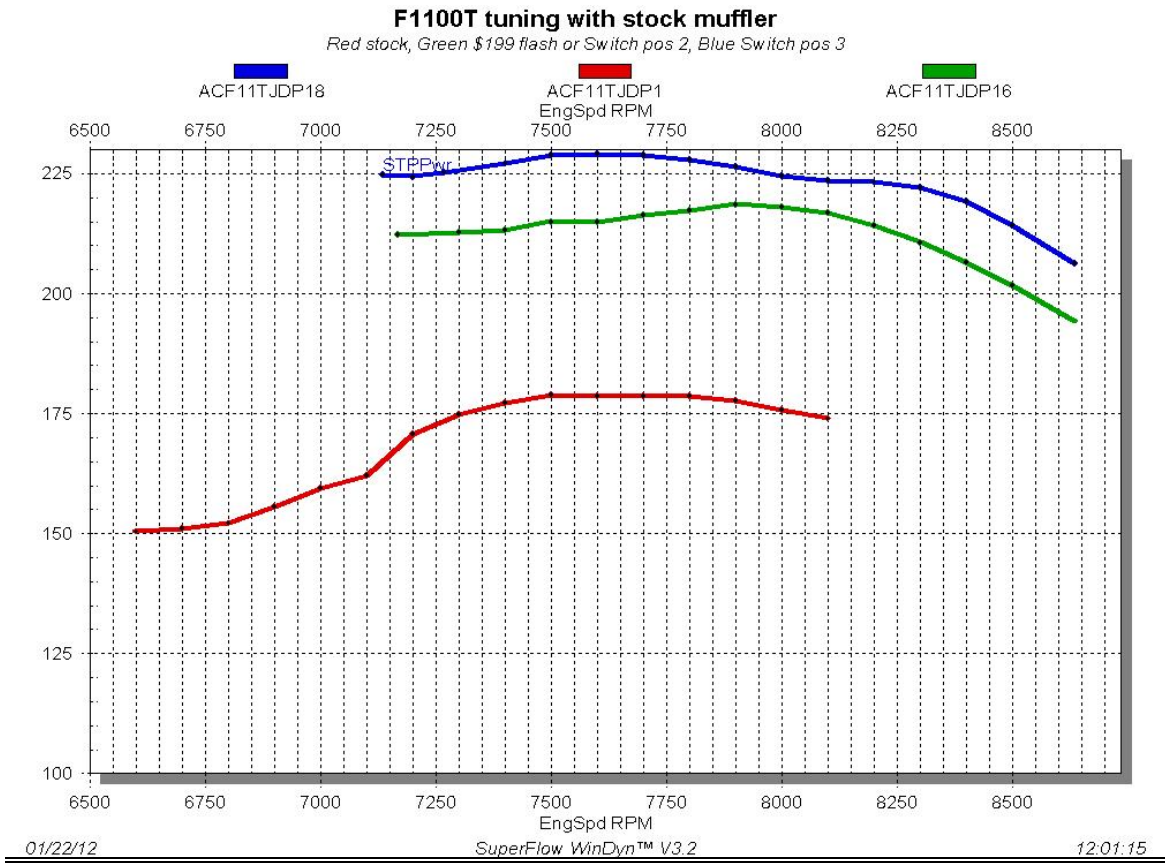
Stock muffler with Switch position 2, same as the $199 single flash

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7200	212.2	155.5	0.551	113.7	10.97	11.77	16.3	59.3	272.3
7300	212.7	153.1	0.551	113.9	11.02	11.81	16.2	59.2	274.2
7400	213.1	151.3	0.552	114.4	11.04	11.82	16.1	59.1	275.8
7500	215.0	150.6	0.548	114.6	11.08	11.79	16.0	59.1	277.2
7600	214.8	148.5	0.556	116.1	10.99	11.74	15.9	59.0	278.6
7700	216.3	147.5	0.559	117.6	10.93	11.72	15.9	59.0	280.7
7800	217.3	146.3	0.563	119.0	10.88	11.71	16.1	59.1	282.8
7900	218.6	145.3	0.566	120.3	10.84	11.71	16.3	59.2	285.0

8000	218.0	143.1	0.578	122.3	10.67	11.63	16.3	59.1	285.1
8100	216.7	140.5	0.585	123.1	10.53	11.54	16.1	58.9	283.1
8200	214.2	137.2	0.586	121.9	10.52	11.45	15.6	58.5	280.3
8300	210.7	133.3	0.586	119.8	10.59	11.42	15.2	58.0	277.3
8400	206.6	129.1	0.594	119.0	10.56	11.37	14.7	57.6	274.6
8500	201.7	124.7	0.606	118.7	10.39	11.30	14.2	57.0	269.6
8600	194.3	118.2	0.625	117.8	10.13	11.19	13.4	56.0	260.8

Stock muffler with Switch position 3

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7100	224.7	165.4	0.533	116.3	11.05	12.16	17.5	60.4	281.4
7200	224.4	163.7	0.539	117.4	11.11	12.01	17.7	60.6	285.3
7267	225.3	162.8	0.537	117.5	11.20	11.97	17.8	60.7	288.1
7400	227.0	161.1	0.534	117.7	11.30	11.92	17.8	60.7	291.2
7500	228.9	160.3	0.529	117.5	11.36	11.94	17.8	60.7	292.5
7600	229.1	158.3	0.532	118.4	11.33	11.89	17.7	60.7	293.6
7700	228.8	156.0	0.537	119.2	11.30	11.83	17.7	60.7	294.9
7800	227.9	153.4	0.548	121.2	11.14	11.71	17.7	60.6	295.7
7900	226.5	150.6	0.560	123.0	10.98	11.57	17.6	60.4	295.6
8000	224.5	147.4	0.576	125.4	10.75	11.43	17.4	60.2	295.4
8100	223.5	144.9	0.591	128.2	10.54	11.31	17.2	59.9	295.9
8200	223.2	143.0	0.604	130.8	10.33	11.21	17.1	59.7	296.0
8300	222.2	140.6	0.613	132.1	10.18	11.14	16.9	59.4	294.4
8400	219.2	137.1	0.616	130.9	10.13	11.09	16.6	59.1	290.6
8500	214.2	132.3	0.621	128.9	10.08	11.06	16	58.5	284.6
8600	206.3	125.5	0.63	125.9	9.99	11.02	15	57.6	275.8



JDP S.S. quiet trail muffler, Switch position 1 (= stock ECU)

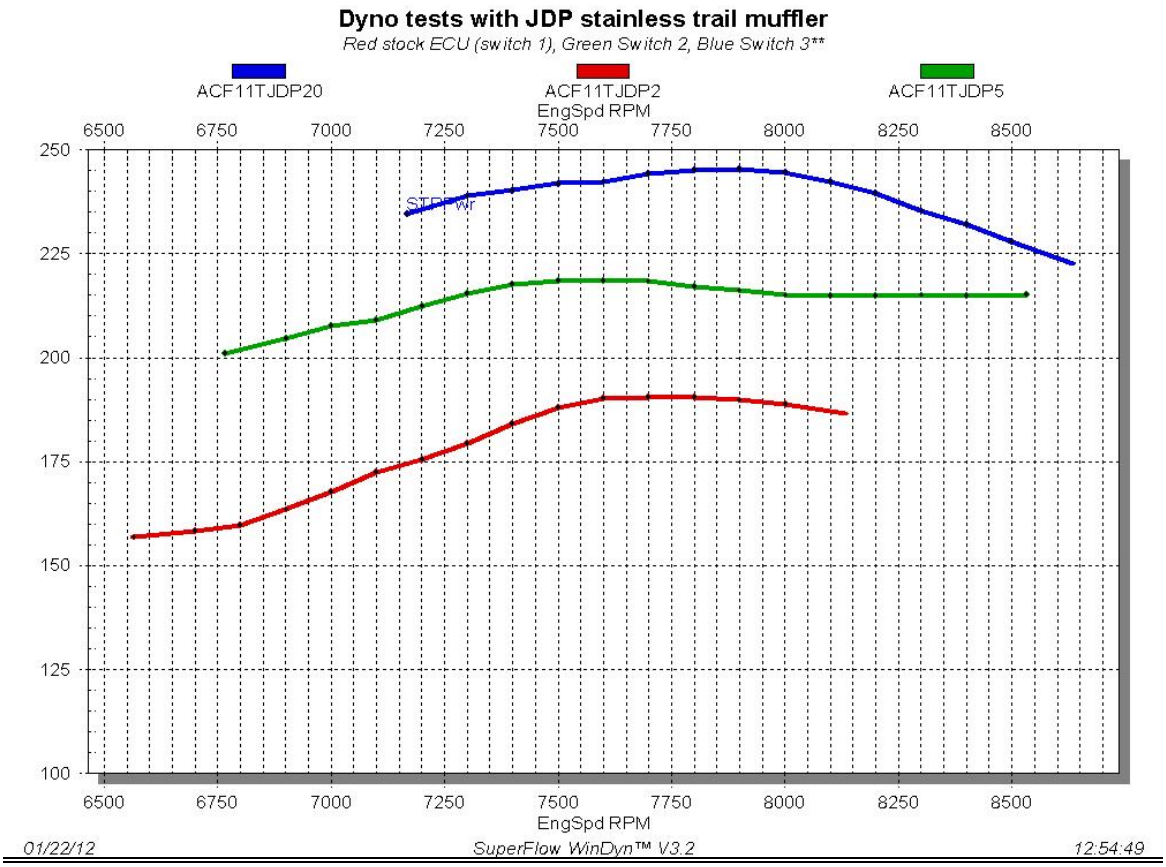
EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA_B lb/hph	FulA_B lbs/hr	AFRA_B Ratio	Air_1c CFM	BoostP psig	FulPrA psig	Air_1c CFM
6600	156.8	125.4	0.469	71.4	12.66	198.0	9.5	53.2	198.0
6700	158.4	124.2	0.471	72.4	12.71	201.6	9.6	53.2	201.6
6800	159.6	123.3	0.474	73.5	12.72	204.7	9.6	53.2	204.7
6900	163.5	124.4	0.478	75.9	12.61	209.5	9.9	53.5	209.5
7000	167.7	125.8	0.483	78.5	12.49	214.8	10.1	53.7	214.8
7100	172.4	127.5	0.491	82.2	12.31	221.6	10.6	54.1	221.6
7200	175.5	128.0	0.497	84.6	12.23	226.7	10.8	54.2	226.7
7300	179.4	129.1	0.504	87.7	12.07	232.0	11.2	54.5	232.0
7400	184.2	130.7	0.503	89.8	11.98	235.8	11.2	54.6	235.8
7500	188.0	131.6	0.504	92.0	11.86	239.1	11.3	54.7	239.1
7600	190.2	131.4	0.507	93.6	11.75	241.1	11.2	54.7	241.1
7700	190.4	129.9	0.513	94.6	11.65	241.7	11.3	54.6	241.7
7800	190.5	128.3	0.517	95.4	11.55	241.5	11.2	54.4	241.5
7900	189.8	126.2	0.520	95.6	11.47	240.5	10.9	54.1	240.5
8000	188.8	123.9	0.527	96.4	11.31	239.0	10.6	53.8	239.0
8100	186.4	120.4	0.539	97.3	11.07	236.1	10.1	53.2	236.1

JDP S.S. quiet trail muffler, Switch position 2

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA_B lb/hph	FulA_B lbs/hr	AFRA_B Ratio	Air_1s SCFM	BoostP psig	FulPrA psig	Air_1c CFM
6800	201.0	156.0	0.521	102.0	11.30	251.8	14.5	57.7	251.9
6900	204.7	155.8	0.515	102.7	11.41	255.8	14.9	58.1	255.8
7000	207.7	155.8	0.511	103.2	11.48	258.7	15.1	58.3	258.8
7100	209.0	154.6	0.518	105.3	11.41	262.4	15.2	58.4	262.4
7200	212.5	155.0	0.538	110.2	11.32	265.9	15.3	58.5	265.9
7300	215.4	155.0	0.541	112.1	11.22	269.0	15.4	58.5	268.9
7400	217.5	154.4	0.546	114.6	10.99	271.6	15.5	58.5	271.4
7500	218.4	153.0	0.555	115.0	11.05	273.6	15.6	58.5	273.4
7600	218.5	151.0	0.538	113.9	11.16	275.6	15.6	58.4	275.2
7700	218.3	148.9	0.562	117.0	10.91	277.2	15.5	58.2	276.9
7800	217.1	146.2	0.560	117.1	10.97	278.9	15.2	58.0	278.7
7900	216.1	143.7	0.575	120.2	10.73	280.5	15.2	57.9	280.4
8000	215.0	141.1	0.576	120.7	10.75	282.1	15.1	57.6	282.0
8100	214.8	139.3	0.577	121.7	10.71	283.5	14.9	57.4	283.5
8200	214.8	137.6	0.585	123.4	10.59	285.2	14.6	57.2	285.3
8300	215.0	136.0	0.591	124.2	10.58	287.0	14.3	57.1	287.2
8400	214.9	134.4	0.612	127.7	10.33	287.6	14.2	57.1	287.9
8500	215.1	132.4	0.628	130.5	10.11	287.2	14.1	57.0	287.7

JDP S.S. quiet trail muffler, Switch position 3

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA_B lb/hph	FulA_B lbs/hr	AFRA_B Ratio	LamAF1 Ratio	BoostP psig	FulPrA psig	Air_1c CFM
7200	234.5	171.9	0.499	113.8	11.70	12.04	18.4	61.3	291.1
7300	238.8	171.8	0.500	115.9	11.59	12.07	18.4	61.3	294.0
7400	240.2	170.5	0.506	118.0	11.48	12.09	18.6	61.3	296.2
7500	241.9	169.4	0.511	120.1	11.37	12.08	18.8	61.3	298.7
7600	242.2	167.3	0.518	121.8	11.29	12.04	18.9	61.2	300.7
7700	244.1	166.5	0.519	123.1	11.22	11.96	18.8	61.1	302.1
7800	245.0	164.9	0.526	125.2	11.07	11.87	18.5	60.9	303.2
7900	245.3	163.1	0.536	127.7	10.89	11.77	18.2	60.8	304.1
8000	244.5	160.5	0.547	130.0	10.72	11.66	18.1	60.6	304.8
8100	242.3	157.1	0.553	130.2	10.66	11.52	17.8	60.3	303.3
8200	239.4	153.3	0.558	129.8	10.63	11.40	17.5	60.0	301.4
8300	235.2	148.8	0.568	129.8	10.54	11.32	17.0	59.5	299.0
8400	232.1	145.1	0.572	128.9	10.50	11.30	16.6	59.0	295.7
8500	227.8	140.8	0.575	127.2	10.46	11.28	16.1	58.5	290.7
8600	222.4	135.3	0.566	122.3	10.54	11.22	15.3	57.7	281.6



JDP 3” turbine outlet/ 3” Lakerace muffler, Switch position 1

EngSpd RPM	STPPwr CHp	STPTrq Clb-ft	BSFA_B lb/hph	FulA_B lbs/hr	AFRA_B Ratio	LamAF1 Ratio	BoostP psig	FulPrA psig	Air_1c CFM
7300	193.6	139.3	0.505	95.0	11.61	12.15	12.3	55.5	241.3
7400	193.7	137.4	0.520	97.8	11.39	12.14	12.1	55.2	243.6
7500	195.2	136.7	0.530	100.4	11.23	12.13	12.1	55.1	246.6
7600	198.3	137.1	0.526	101.3	11.27	12.12	12.2	55.2	249.7
7700	200.1	136.5	0.522	101.4	11.41	12.11	12.3	55.2	252.9
7800	201.7	135.8	0.525	102.9	11.41	12.10	12.3	55.3	256.6
7900	204.1	135.7	0.533	105.7	11.28	12.10	12.4	55.4	260.6
8000	206.5	135.6	0.540	108.3	11.18	12.10	12.6	55.5	264.7
8100	210.3	136.4	0.541	110.6	11.11	12.09	12.8	55.6	268.6
8200	213.4	136.7	0.537	111.3	11.17	12.08	13.0	55.7	271.7
8300	215.6	136.4	0.540	113.0	11.11	12.03	13.1	55.8	274.7
8400	216.0	135.1	0.544	114.0	11.12	11.99	13.2	55.8	277.0
8500	215.9	133.4	0.555	116.3	11.01	11.92	13.3	55.7	280.0
8600	216.2	132.0	0.573	120.3	10.75	11.82	13.5	55.7	282.7
8700	215.8	129.7	0.610	127.7	10.27	11.65	13.7	55.7	286.8

JDP 3" turbine outlet/ 3" Lakerace muffler, Switch position 2

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7200	237.7	173.4	0.492	113.7	11.25	12.24	17.7	60.6	279.7
7300	233.5	168.0	0.494	112.1	11.30	12.20	17.0	60.0	277.2
7400	223.2	158.4	0.509	110.4	11.45	12.14	16.1	59.0	276.3
7500	227.9	159.6	0.508	112.4	11.46	12.27	15.5	58.5	281.6
7600	230.7	159.4	0.508	113.8	11.44	12.30	15.8	58.7	284.6
7700	230.9	157.5	0.511	114.7	11.52	12.29	16.0	58.8	288.9
7800	235.2	158.4	0.519	118.5	11.49	12.22	16.5	59.0	297.8
7900	244.5	162.6	0.514	122.0	11.39	12.24	17.0	59.4	304.0
8000	246.1	161.6	0.532	127.1	11.03	12.09	17.2	59.6	306.6
8100	247.7	160.6	0.528	126.9	11.01	11.90	17.2	59.5	305.6
8200	243.8	156.2	0.530	125.5	11.06	11.83	16.9	59.1	303.5
8300	237.4	150.2	0.537	123.9	10.88	11.83	16.0	58.3	294.7
8400	236.0	147.6	0.530	121.4	11.02	11.85	15.7	58.0	292.6
8500	230.5	142.4	0.544	121.7	10.95	11.84	15.3	57.6	291.4
8600	225.5	137.7	0.563	123.4	10.76	11.79	15.0	57.2	290.3
8700	222.4	134.3	0.581	125.4	10.56	11.62	14.7	56.7	289.5

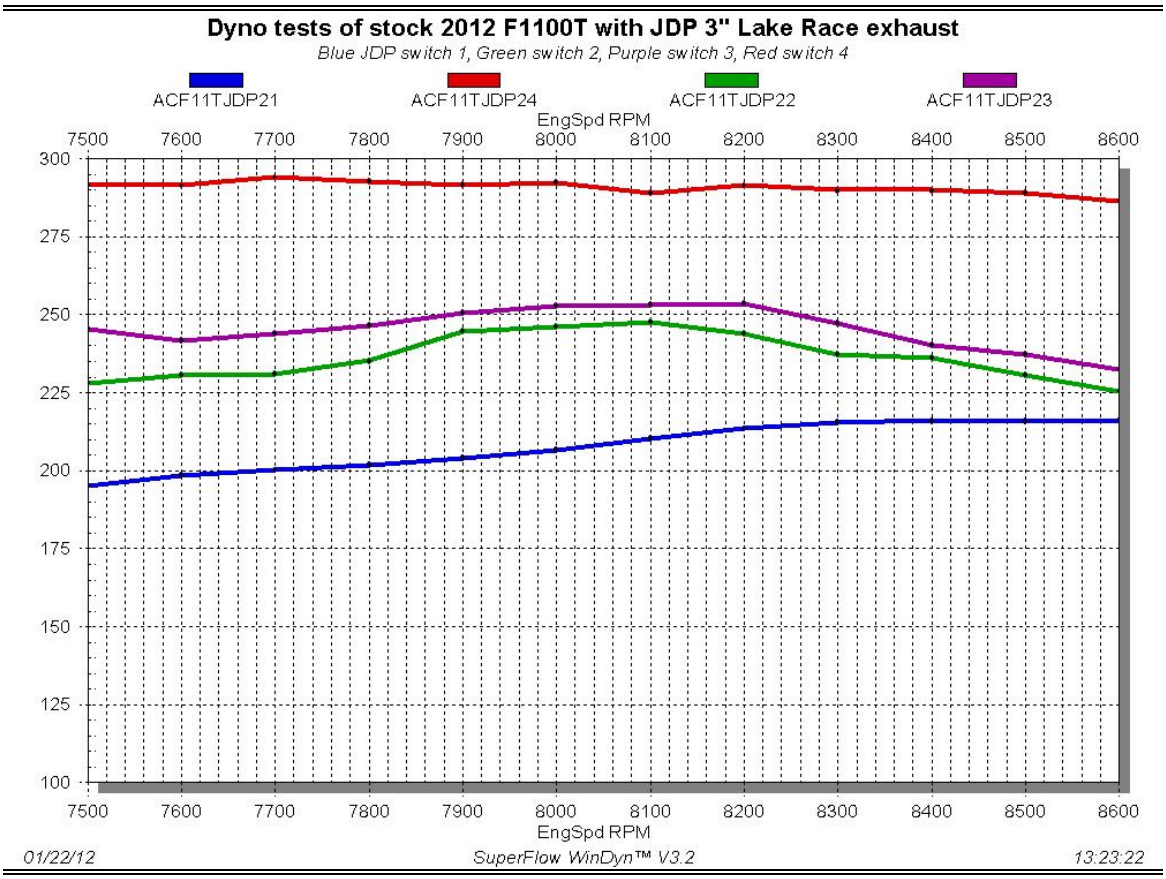
JDP 3" turbine outlet/ 3" Lakerace muffler, Switch position 3

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7400	251.3	178.3	0.488	119.0	11.44	12.37	18.6	61.4	298.3
7500	245.4	171.9	0.501	119.4	11.43	12.32	17.9	60.9	298.6
7600	241.5	166.9	0.517	121.3	11.37	12.26	17.3	60.3	302.1
7700	244.0	166.4	0.513	121.5	11.47	12.24	17.4	60.2	305.0
7800	246.4	165.9	0.523	125.1	11.28	12.16	17.8	60.2	309.0
7900	250.6	166.6	0.540	131.3	10.87	11.95	18.1	60.4	312.6
8000	252.9	166.0	0.542	133.1	10.80	11.84	18.2	60.4	314.6
8100	253.2	164.2	0.557	136.9	10.52	11.65	18.3	60.2	315.3
8200	253.6	162.4	0.546	134.5	10.69	11.65	18.2	60.0	314.9
8300	247.3	156.5	0.569	136.4	10.41	11.56	17.7	59.5	311.0
8400	240.3	150.3	0.578	134.7	10.38	11.50	17.0	58.9	306.2
8500	237.2	146.6	0.562	129.2	10.63	11.51	16.5	58.5	300.8
8600	232.4	141.9	0.569	128.2	10.60	11.52	16.0	58.0	297.6
8700	226.0	136.5	0.592	129.7	10.32	11.41	15.4	57.3	293.1

JDP 3" turbine outlet/ 3" Lakerace muffler, Switch position 4, race fuel added

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7400	292.0	207.2	0.488	138.5	11.66	12.62	23.8	65.5	353.1
7500	291.6	204.2	0.491	139.4	11.62	12.55	23.9	65.7	354.1
7600	291.4	201.4	0.489	138.5	11.72	12.52	23.6	65.5	354.8
7700	294.0	200.5	0.479	137.1	11.87	12.53	23.2	65.3	355.6
7800	292.7	197.1	0.488	138.9	11.75	12.55	23.4	65.2	356.4
7900	291.4	193.7	0.484	137.2	11.94	12.57	23.4	65.0	357.8

8000	292.1	191.8	0.485	137.8	11.89	12.58	23.3	64.8	358.1
8100	288.9	187.3	0.494	138.8	11.87	12.58	23.1	64.6	359.8
8200	291.4	186.6	0.491	139.0	11.88	12.57	23.0	64.5	360.9
8300	289.8	183.4	0.492	138.7	11.95	12.59	22.9	64.4	361.9
8400	289.8	181.2	0.492	138.8	12.00	12.64	22.8	64.3	363.6
8500	289.0	178.6	0.499	140.3	11.90	12.66	22.8	64.2	364.5
8600	286.5	174.9	0.506	141.0	11.87	12.71	22.8	64.1	365.5
8700	283.6	171.2	0.507	139.7	12.00	12.73	22.6	63.9	366.3



Finally, Jeff and Dave were just a bit miffed that their stock 2012 F1100T was just below 300HP at 294HP with less than 24psi boost with the stock wastegate so they pulled the hose off the wastegate—creating max boost of about 25 psi. Just a whisper away from 300HP, but here it is at 297 HP! We have shown in other Z1/ F1100T tests that shimming the stock wastegate closed and adding lots of supplemental methanol injection and/ or pinching off the bypass fuel line with a pair of vicegrip pliers to raise fuel pressure to over 80psi can make well over 300HP on the dyno, taking the stock turbo to the edge of death. But it's not practical to do that in the field. So here is JDP's tune, with no artificial override of the wastegate, and fuel flow absolutely maxed out at 25 psi boost. If this sled had water/ methanol injection, it surely could have been shimmed/ overboosted to make

more HP—another JDP Z1 sled recently made over 300 HP here easily with the added fuel provided by the blast of 50/50 water/ methanol used to cool the compressed charge and add fuel to the fire! Jeff and Dave are planning to return soon with Jeff's 2012 fitted with custom cast iron T25 flange exhaust manifolds that they currently make and sell, Garrett GT28RS ball bearing turbo, large cast turbine outlet pipe for the Garrett turbo (revised 2012 castings coming shortly), large intercooler, and H2O/ Methanol injection. The bigger Garret turbo is much better suited for operating in the 300-400 HP range while retaining good throttle response and trail manners. Stay tuned for more fun.

JDP 3" turbine outlet/ 3" lakerace muffler, Switch position 4, race fuel added, boost hose pulled off the controller (not shown on graph)

EngSpd	STPPwr	STPTrq	BSFA_B	FulA_B	AFRA_B	LamAF1	BoostP	FulPrA	Air_1c
RPM	CHp	Clb-ft	lb/hph	lbs/hr	Ratio	Ratio	psig	psig	CFM
7400	295.7	209.8	0.485	139.6	11.75	12.67	25.2	66.8	358.5
7500	294.5	206.2	0.485	138.9	11.82	12.69	25.6	66.7	358.8
7600	297.2	205.4	0.472	136.5	12.08	12.63	24.8	66.5	359.9
7700	296.7	202.3	0.477	137.8	12.02	12.67	24.6	66.3	361.4
7800	294.8	198.5	0.484	138.8	11.96	12.68	24.7	66.1	362.3
7900	295.3	196.3	0.484	139.0	11.97	12.69	24.6	66.0	363.4
8000	295.3	193.9	0.479	137.8	12.10	12.70	24.5	65.9	364.0
8100	293.7	190.4	0.479	136.9	12.21	12.69	24.2	65.7	364.8
8200	294.2	188.4	0.480	137.5	12.17	12.68	24.1	65.6	365.2
8300	293.4	185.7	0.486	138.9	12.08	12.70	23.9	65.4	366.2
8400	292.6	182.9	0.485	138.2	12.20	12.75	23.8	65.3	367.8
8500	291.4	180.1	0.484	137.1	12.32	12.75	23.7	65.2	368.7
8600	288.8	176.4	0.488	137.2	12.35	12.76	23.6	65.0	369.9

JDP selector switch, nestled in between the digital boost gauge and A/F ratio gauge

JDP quiet trail stainless steel (inside and out) muffler

JDP 3” ID Lakerace muffler