

## Exhaust system modifications on the SkiDoo 4tec 1200

Here's CJ Motorsports' preproduction SkiDoo 4Tec, with Justin Fuller's "Full Power Performance" exhaust system upgrades.

Not everyone has the desire or the budget to add turbo or supercharger boost to make extra HP on the 4tec. A moderate power increase over stock is a desirable thing for many, if cost is similarly moderate. The Full Power turbo system being marketed by CJ Motorsports in Booneville, NY, has the potential to make very high HP but the cost of that big power equates to about 30% of the purchase price of the sled. Others who are fortunate to have a head start developing turbo systems with preproduction 4Tecs include our Swedish pals at MC Xpress. (Erik the owner of MC Xpress is a charter member of DTR who visited here several years ago).

But here is the first NA (Normally Aspirated) option to increase airflow and HP, a long-tube equal length stainless steel header. This Full Power tig welded SS header replaces the awful-looking stock, stamped SS 3-1 exhaust manifold and fits up to either the stock muffler or a higher-flowing and louder FP glasspack muffler. Also electronic fuel management is desirable and included here, to add fuel to compensate for added airflow. This header has long individual mandrel bent tubes, exactly the same length that merge into a collector just before the inlet of the stock muffler. Justin asked that photos and exact dimensions be left out for competitive reasons.

We tested the engine stock, then with stock header and FP muffler, FP header with stock muffler, and FP header with FP muffler. Each test, other than stock, has fuel added with Justin's fuel controller. This ensures that A/F ratio and BSFC is kept optimum.

This is the baseline stock HP for this 4Tec.

EngSpd	STPTrq	STPPwr	BSFA-B	FulA-B	TsTim2	AirTmp	BaroP	FuelP
RPM	Clb-ft	CHp	lb/hph	lb/hr	second	degF	in/Hg	psig
5900	84.8	95.2	0.42	36.9	0	81	29.07	58.1
6000	85.4	97.6	0.42	38.4	0.8	81	29.07	58.1
6100	84.7	98.4	0.41	37.6	1.5	82	29.07	58.2
6200	84.6	99.8	0.43	39.9	2.4	83	29.07	58.1
6300	84.6	101.5	0.43	40.7	3.1	83	29.07	58.1
6400	84.6	103.1	0.43	41.2	3.8	83	29.07	58.1
6500	84.6	104.7	0.43	41.1	4.2	83	29.07	58.1
6600	85.4	107.3	0.43	42.6	4.7	83	29.07	58.0
6700	88.2	112.5	0.42	43.3	5.5	82	29.07	58.0
6800	87.8	113.6	0.42	44.6	5.8	82	29.07	58.0
6900	88.4	116.2	0.42	44.9	6.2	82	29.07	58.0
7000	87.9	117.1	0.42	45.2	7.0	83	29.07	57.9
7100	86.9	117.5	0.43	46.2	7.6	82	29.07	57.9
7200	86.6	118.8	0.42	46.6	8.2	81	29.07	57.9
7300	87.0	120.9	0.44	48.9	8.8	81	29.07	57.9
7400	87.0	122.6	0.43	48.5	9.4	82	29.07	57.8
7500	87.2	124.5	0.45	51.4	10.1	83	29.07	57.8
7600	88.2	127.6	0.44	51.3	10.5	83	29.07	57.7

7700	89.3	130.9	0.42	50.2	11.1	82	29.07	57.7
7800	89.6	133.1	0.42	51.9	12.0	82	29.07	57.7
7900	89.3	134.3	0.42	52.2	12.6	81	29.07	57.7
8000	89.0	135.5	0.42	52.5	13.3	81	29.07	57.7
8100	87.5	135.0	0.42	52.8	14.0	80	29.07	57.6
8200	86.5	135.1	0.43	53.5	14.6	81	29.07	57.6
8300	85.1	134.4	0.44	54.6	15.2	81	29.07	57.6
8400	84.3	134.9	0.44	54.2	16.5	82	29.07	57.6

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That heavy stock muffler is whisper-quiet. The Full Power glasspack muffler (straight in, then a double outlet that exits out the twin holes in the bellypan), saves weight and adds some dB but also adds airflow and HP even with the stock stamped 3-1 header. Here is the 4tec with the FP muffler.

EngSpd	STPTrq	STPPwr	BSFA-B	FulA-B	FuelP	AirTmp
RPM	Clb-ft	CHp	lb/hph	lb/hr	psig	degF
5800	85.9	94.8	0.42	36.6	58.3	80
5900	86.2	96.8	0.39	34.8	58.3	81
6000	86.0	98.2	0.40	36.0	58.2	81
6100	86.1	100.0	0.39	36.4	58.2	80
6200	86.0	101.6	0.41	38.6	58.2	79
6300	86.0	103.2	0.40	38.2	58.1	79
6400	86.2	105.1	0.42	40.5	58.1	80
6500	86.4	106.9	0.38	38.1	58.1	79
6600	87.0	109.4	0.40	40.7	58.0	79
6700	87.3	111.3	0.40	40.9	58.0	79
6800	90.2	116.7	0.39	41.9	58.0	78
6900	90.6	119.0	0.40	44.1	58.0	80
7000	89.3	119.0	0.40	43.6	58.0	80
7100	88.7	119.9	0.40	44.7	57.9	80
7200	87.8	120.4	0.41	46.0	57.9	79
7300	89.1	123.9	0.41	47.5	57.9	78
7400	89.3	125.8	0.41	47.4	57.8	79
7500	90.9	129.8	0.42	50.7	57.8	79
7600	91.5	132.4	0.42	51.3	57.9	80
7700	91.7	134.5	0.41	50.6	57.8	81
7800	92.4	137.2	0.40	51.1	57.8	80
7900	92.4	139.0	0.41	53.3	57.7	80
8000	91.1	138.8	0.41	52.6	57.7	81
8100	90.4	139.4	0.41	52.5	57.8	81
8200	89.0	139.0	0.41	53.0	57.8	81
8300	88.3	139.5	0.42	54.1	57.7	81
8400	87.0	139.2	0.42	54.6	57.7	80

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Justin installed his new header on the CJ Motorsports 4Tec. After testing before and after it was obvious that fuel had to be added to compensate for the higher airflow created by Justin's 3-1 tubular header. Bolting on the new header, we picked up HP but the A/F ratio was much leaner than stock, even though air temps had climbed into the 90's. Adding some WOT fuel with Justin's header and fuel management system added even more HP

(see graph). Also note that with the tuned header, the freer breathing engine achieves lower than stock BSFC with 12/1 A/F ratio. Here is the FP header, with the stock quiet muffler. The header adds airflow and HP, and also looks like it belongs on the right bank of a Formula One Ferrari engine instead of a 59 Ford 292.

EngSpd	STPTrq	STPPwr	BSFA-B	FulA-B	AirTmp	BaroP	LAMAF1
RPM	Clb-ft	CHp	lb/hph	lb/hr	DegF	in/Hg	Ratio
5500	76.5	80.2	0.49	35.7	92	29.11	10.2
5600	78.1	83.3	0.45	34.1	92	29.11	9.9
5700	78.5	85.2	0.45	34.8	92	29.11	9.9
5800	82.7	91.3	0.43	35.7	92	29.11	10.0
5900	83.9	94.3	0.39	33.6	92	29.10	10.1
6000	87.1	99.5	0.35	31.8	92	29.10	10.9
6100	87.0	101.1	0.35	32.3	92	29.10	11.3
6200	86.9	102.6	0.35	32.8	91	29.10	11.6
6300	86.8	104.2	0.37	35.2	92	29.10	11.7
6400	86.5	105.4	0.34	32.6	92	29.10	11.7
6500	87.4	108.2	0.35	34.4	92	29.10	11.7
6600	87.2	109.6	0.38	37.5	93	29.10	11.6
6700	88.3	112.7	0.37	37.3	92	29.10	11.6
6800	90.1	116.6	0.37	39.3	92	29.10	11.6
6900	90.5	118.9	0.36	39.2	92	29.10	11.7
7000	90.2	120.2	0.37	39.8	91	29.10	11.9
7100	89.1	120.5	0.37	40.6	91	29.11	12.0
7200	88.3	121.0	0.36	39.7	91	29.11	12.0
7300	87.6	121.8	0.39	43.2	91	29.11	11.9
7400	87.5	123.3	0.39	43.6	92	29.11	11.9
7500	88.4	126.2	0.38	42.9	93	29.11	11.8
7600	89.2	129.0	0.38	44.9	92	29.11	11.8
7700	91.8	134.6	0.39	47.1	92	29.11	11.8
7800	91.7	136.2	0.37	45.0	91	29.11	11.9
7900	91.8	138.1	0.38	47.9	92	29.11	12.1
8000	91.8	139.9	0.37	46.8	92	29.11	12.2
8100	90.7	139.8	0.37	47.3	92	29.11	12.3
8200	89.7	140.1	0.38	48.2	91	29.11	12.4
8300	89.0	140.7	0.38	47.8	93	29.11	12.4
8400	87.4	139.8	0.38	48.0	93	29.11	12.4
8500	86.3	139.6	0.38	47.5	92	29.11	12.5

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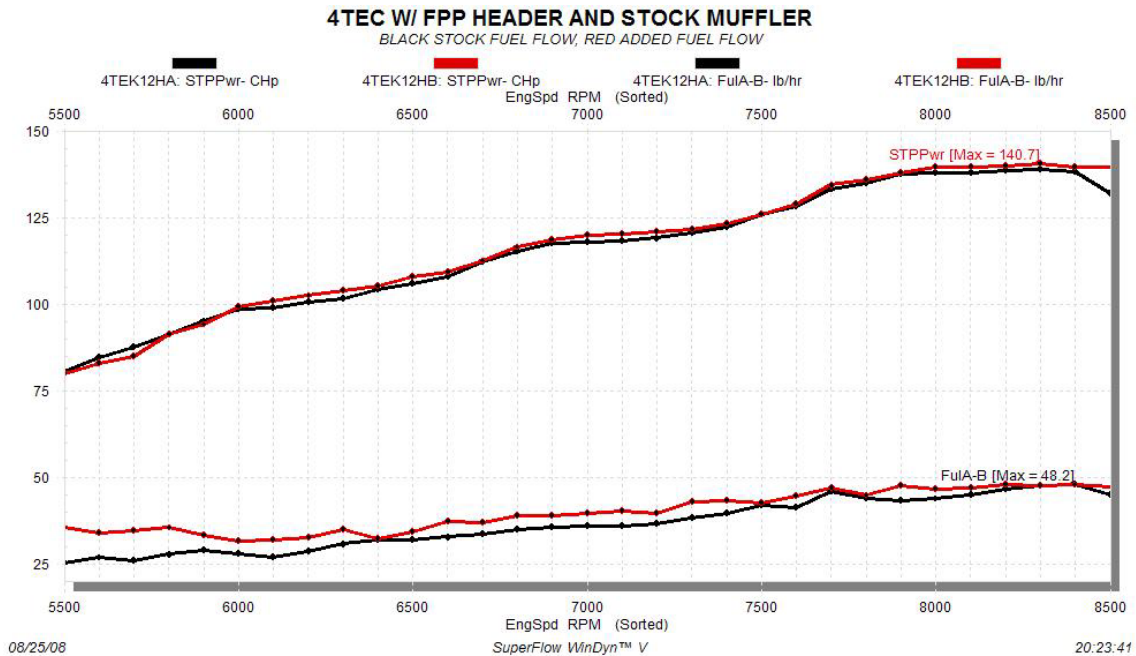
Combining the FP tuned header with the straight though muffler achieves an even greater airflow and HP, and requires even more fuel added to make max HP and be safe. Here's the bone stock 4Tec with FP header and FP glasspack muffler.

EngSpd	STPTrq	STPPwr	BSFA-B	FulA-B	TsTim2	BaroP	LAMAF1
RPM	Clb-ft	CHp	lb/hph	lb/hr	second	in/Hg	Ratio
5400	78.4	80.6	0.44	32.2	0	29.1	11.6
5500	78.0	81.7	0.44	32.5	0.7	29.1	10.8
5600	80.3	85.6	0.43	33.4	1.3	29.09	10.4
5700	81.4	88.3	0.43	34.3	1.8	29.09	10.3
5800	84.6	93.4	0.42	35.8	2.6	29.09	10.5

5900	87.3	98.1	0.41	36.4	3.7	29.09	10.7
6000	86.5	98.9	0.41	36.9	4.0	29.09	10.8
6100	87.7	101.8	0.38	34.7	4.5	29.09	10.9
6200	87.5	103.2	0.37	34.5	5.2	29.09	11.3
6300	87.7	105.2	0.37	34.7	5.7	29.09	11.6
6400	87.8	107.0	0.39	37.4	6.6	29.09	11.7
6500	88.8	109.9	0.38	37.5	7.5	29.09	11.7
6600	88.8	111.6	0.37	37.7	8.1	29.09	11.7
6700	90.9	116.0	0.39	40.7	8.8	29.09	11.7
6800	90.7	117.5	0.37	39.4	9.0	29.09	11.7
6900	93.0	122.2	0.36	40.2	10.0	29.09	11.9
7000	92.1	122.7	0.39	43.1	10.9	29.09	12.1
7100	90.9	122.8	0.39	43.0	11.3	29.09	12.1
7200	90.2	123.7	0.39	43.1	12.1	29.09	12.0
7300	90.0	125.1	0.38	42.5	12.7	29.09	11.9
7400	89.8	126.6	0.38	43.2	13.3	29.09	11.8
7500	90.1	128.6	0.38	43.8	13.6	29.09	11.8
7600	91.6	132.6	0.38	45.6	14.2	29.09	11.8
7700	92.8	136.1	0.38	46.4	14.8	29.09	11.9
7800	94.5	140.3	0.38	47.8	16.0	29.09	12.1
7900	94.3	141.8	0.38	48.4	16.3	29.09	12.2
8000	94.7	144.3	0.38	48.9	17.7	29.09	12.5
8100	93.5	144.2	0.37	48.2	18.4	29.09	12.6
8200	91.9	143.5	0.38	49.1	18.8	29.09	12.6
8300	91.5	144.6	0.38	49.1	19.5	29.09	12.6
8400	90.6	145.0	0.38	48.9	20.3	29.09	12.6

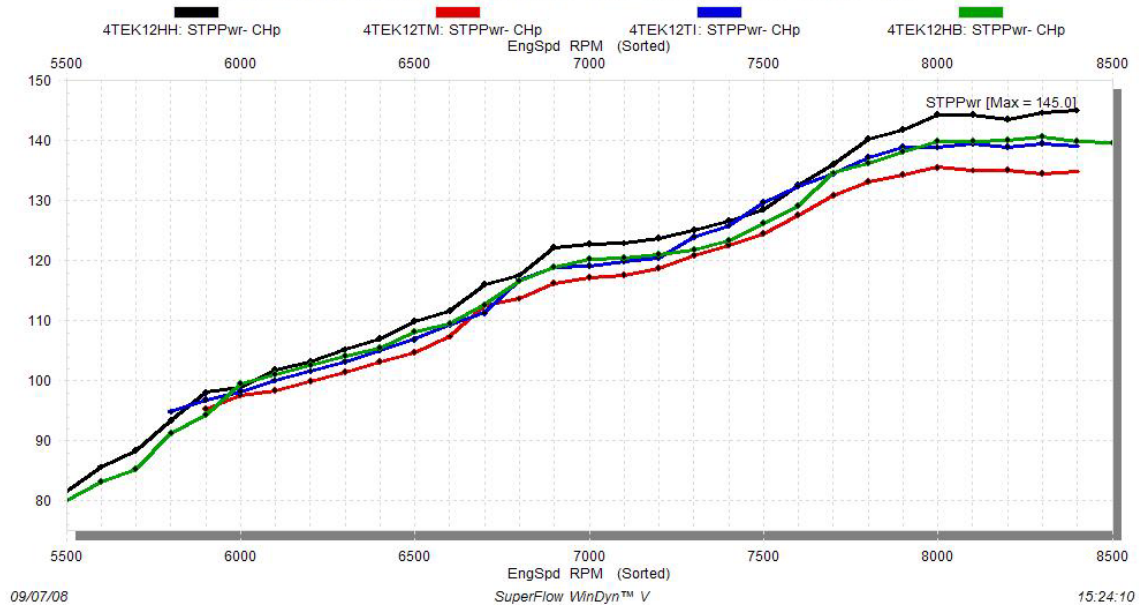
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Here's a graph of the 4Tec with FP tube header and stock muffler, showing how added fuel flow was beneficial:



### 4Tec exhaust comparisons

Red all stock Blue stock header FP muffler, Green FP header stock muffler, Black FP header FP muffler



09/07/08

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