TunerPro Tuning

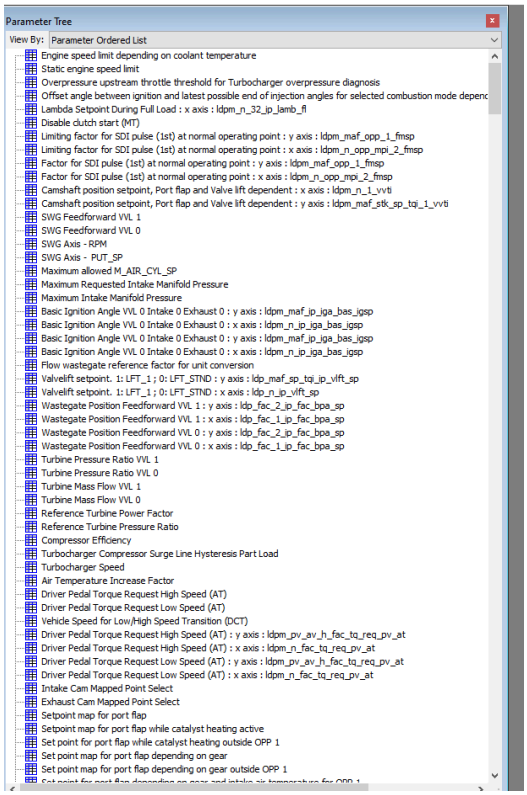
Tools Required:

- PC
- TunerPro software (free, google it)
- .bin file relevant to your car (see bin folder on google drive). This is your tune and what you will flash to the car. PLEASE READ THE GETTING STARTED DOCUMENT TO UNDERSTAND WHAT WE ARE DOING. Get the correct bin.
- .xdf file relevant to your car (see xdf folder on google drive). This file allows you to see the tables in the bin which we wish to modify. This guide uses S50 as a basis for examples but A05 tuning won't differ much. IT IS CRITICAL THAT YOU USE THE CORRECT XDF FOR YOUR BIN TYPE OR YOU WILL FUCK SHIT UP. YOU CANNOT USE AN A05 XDF ON A S50 BIN OR VICE VERSA.

With that out of the way, let's get TunerPro setup.

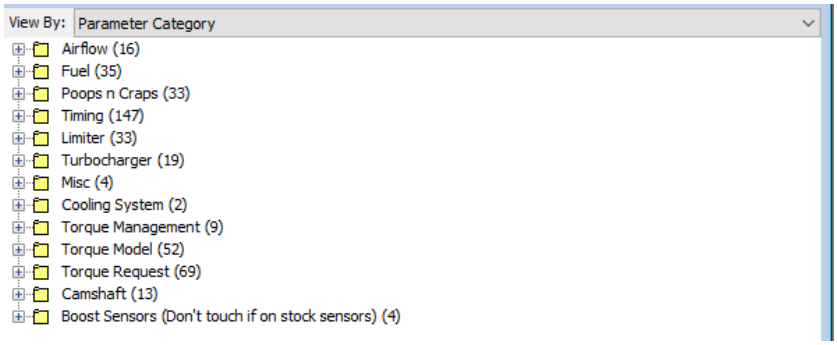
File—>open bin—>select your bin
XDF—>select XDF—>select your xdf

It will look horrible and like this:

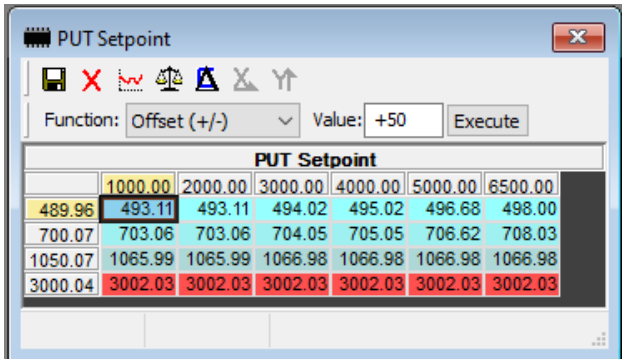


See that View By dropdown?

Change it to Parameter Category. Ah, much better. Should look similar to this with folders:

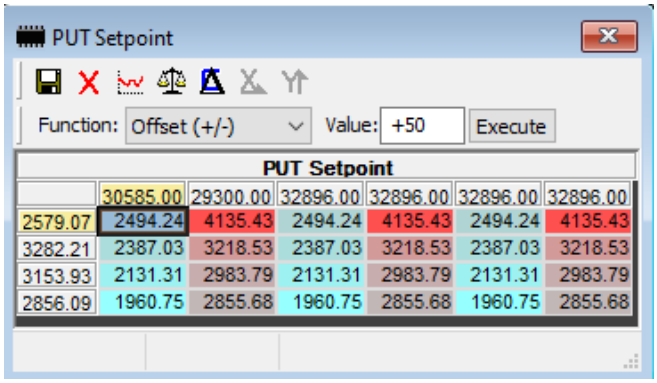


Pretty straight forward from here, but let's confirm we have the right xdf. Click on Airflow and open the PUT setpoint table. Should look nice and orderly like this:



If it looks like a unicorn took a rainbow-striped shit you have a problem. Check your XDF.

Rainbow unicorn shit (BAD)



GETTING STARTED

There are lots of tables in the ECU. You won't touch 99.9% of them. "What does this table do?" Nothing important for us, don't touch it. If it isn't addressed in this guide you don't touch it. The ECU uses lots of inputs as part of a Volumetric Efficiency (VE) model. We are breaking that model. If you follow the guide and update your bin accordingly it will all work out in the end. Promise.

OK, with that out of the way….

How does it all work? Well, first you take your foot and start pushing the gas pedal. The ECU looks at how far you are pushing the pedal and requests the percentage of torque that correlates to the pedal position. Depending on transmission type (DCT/DSG, AT/slushbox or MT/manual transmission), there are two sets of folders under Torque Request, high speed and low speed table (AKA how fast you are going). Probably unnecessary to need to have different tables set up that way and not uncommon to make them the same. Here are two DSG (DCT) tables that have been modified for better pedal feel (your stock tables may look different):

Driver Pedal Torque Request High Speed (DCT)

Function: Offset (+/-) Value: +50 Execute

Driver Pedal Torque Request High Speed (DCT)

	500.00	750.00	1000.00	1500.00	2000.00	3000.00	4000.00	4500.00	5000.00	5500.00	6000.00	7000.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.08	0.11	0.11	0.12	0.14	0.14	0.12	0.12	0.12	0.14	0.16	0.18	0.24
18.07	0.23	0.23	0.24	0.24	0.24	0.18	0.17	0.16	0.18	0.20	0.22	0.28
27.25	0.45	0.45	0.46	0.40	0.36	0.29	0.26	0.24	0.26	0.28	0.30	0.36
36.33	0.60	0.60	0.60	0.55	0.51	0.44	0.38	0.35	0.37	0.39	0.40	0.47
45.41	0.73	0.74	0.74	0.67	0.65	0.59	0.51	0.46	0.48	0.49	0.50	0.58
54.49	0.90	0.90	0.90	0.81	0.77	0.74	0.63	0.57	0.59	0.60	0.61	0.70
63.57	1.00	1.00	1.00	1.00	0.85	0.85	0.76	0.69	0.71	0.72	0.72	0.82
72.66	1.00	1.00	1.00	1.00	0.95	0.95	0.86	0.77	0.79	0.80	0.80	0.91
81.84	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.86	0.88	0.89	0.88	0.99
90.92	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.92	0.94	0.95	0.94	1.00
99.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Driver Pedal Torque Request High Speed (DCT) (Sport)

Function: Offset (+/-) Value: +50 Execute

Driver Pedal Torque Request High Speed (DCT) (Sport)

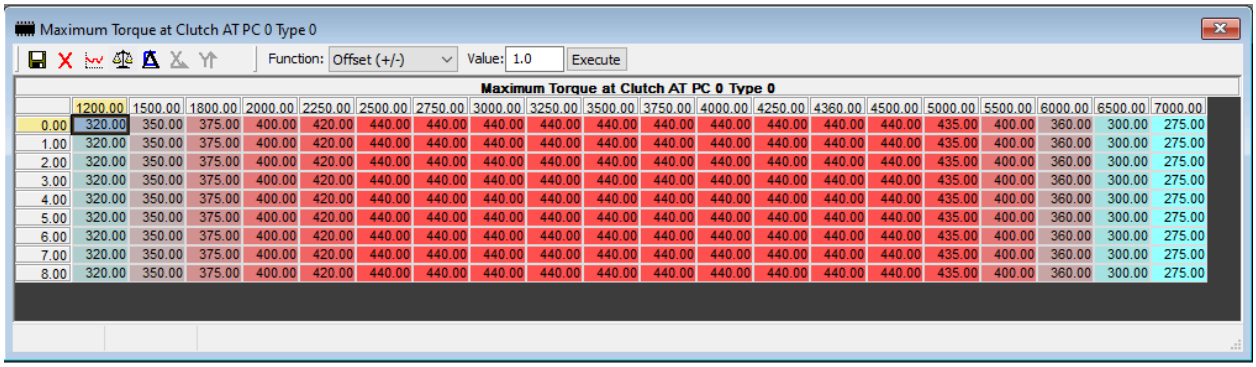
	500.00	750.00	1000.00	1500.00	2000.00	3000.00	4000.00	4500.00	5000.00	5500.00	6000.00	7000.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9.08	0.12	0.12	0.13	0.15	0.15	0.13	0.13	0.13	0.15	0.16	0.18	0.24
18.07	0.25	0.25	0.26	0.26	0.26	0.20	0.18	0.17	0.19	0.21	0.23	0.29
27.25	0.49	0.49	0.50	0.44	0.39	0.31	0.28	0.26	0.28	0.30	0.31	0.38
36.33	0.66	0.66	0.66	0.60	0.56	0.48	0.41	0.38	0.40	0.41	0.43	0.50
45.41	0.81	0.81	0.81	0.73	0.71	0.65	0.55	0.50	0.52	0.53	0.54	0.62
54.49	0.98	0.98	0.98	0.88	0.87	0.80	0.68	0.62	0.64	0.65	0.65	0.75
63.57	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.75	0.77	0.78	0.78	0.88
72.66	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.84	0.86	0.87	0.87	0.98
81.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.94	0.95	0.94	1.00
90.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
99.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

As an example, if I push the pedal ~55% of the way to the floor at 4000rpm it will request 63% of maximum torque. Maximum torque is defined under the Maximum Torque at Clutch Tables which are also located within the Torque Request folder with each transmission type (Auto vs manual) having their own sets of tables:

- Maximum Torque at Clutch AT PC 0 Type 0
- Maximum Torque at Clutch AT PC 0 Type 1
- Maximum Torque at Clutch AT PC 0 Type 2
- Maximum Torque at Clutch AT PC 1 Type 0
- Maximum Torque at Clutch AT PC 1 Type 1
- Maximum Torque at Clutch AT PC 1 Type 2
- Maximum Torque at Clutch AT PC 2 Type 0
- Maximum Torque at Clutch AT PC 2 Type 1
- Maximum Torque at Clutch AT PC 2 Type 2
- Maximum Torque at Clutch AT PC 3 Type 0
- Maximum Torque at Clutch AT PC 3 Type 1
- Maximum Torque at Clutch AT PC 3 Type 2
- Maximum Torque at Clutch AT PC 4 Type 0
- Maximum Torque at Clutch AT PC 4 Type 1
- Maximum Torque at Clutch AT PC 4 Type 2

There are many different VAG cars with many different power outputs or Power Classes (PC). Don't know which one is yours? Me neither! Change them ***all*** to the same values to make sure.

Your typical IS20 turbo will spool up and make peak torque at low rpm, then slowly lose steam as rpms climb. Might look something like this (HINT, make these changes below):



	1200.00	1500.00	1800.00	2000.00	2250.00	2500.00	2750.00	3000.00	3250.00	3500.00	3750.00	4000.00	4250.00	4360.00	4500.00	5000.00	5500.00	6000.00	6500.00	7000.00
0.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
1.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
2.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
3.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
4.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
5.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
6.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
7.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00
8.00	320.00	350.00	375.00	400.00	420.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	440.00	435.00	400.00	360.00	300.00	275.00

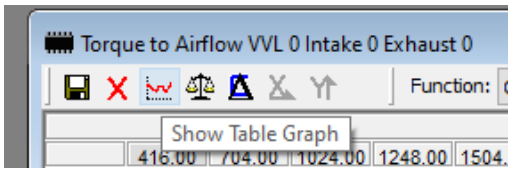
The axis are pretty self-explanatory, RPM along the X-Axis on top and gear is the Y-axis. In our example above and say I was in 3rd gear it would request (the 0.63*440)=277nm of torque be produced (ECU uses newton meters, not ft-lbs). Modifying your tables as per the above we are moving maximum TQ up so that it does not interfere with requested boost. The stock ECU uses these tables to determine how much boost is required. We are going to tune by boost instead going forward. Go ahead and move the auto or manual tables all up as per the above.

You can use these tables to curtail power in certain gears if needed. Say you find 2nd gear spins too much. Reducing boost in a certain RPM would reduce it in all gears, which you don't want. With this table you can lower max torque in that gear at specific RPM ranges so it will no longer blow your tires off when you hammer it. For a basic first time setup I'd suggest making all gears the same, similar to the example above. Or part out and get AWD.

Torque to Airflow

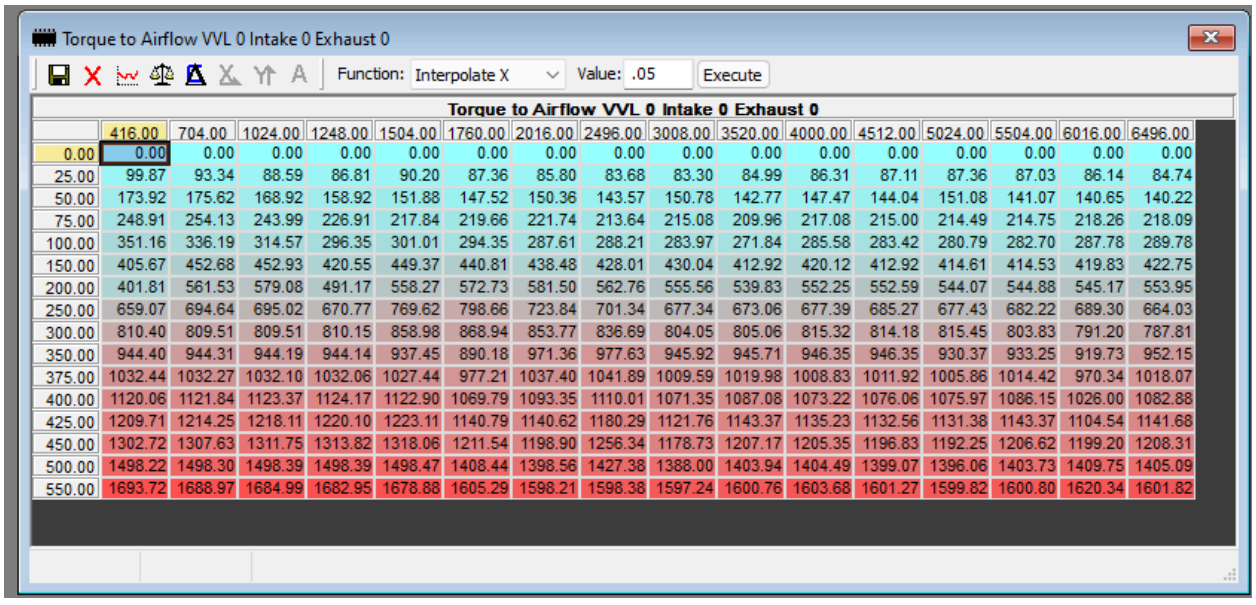
Eventually your torque request will get converted to a target boost pressure. There are a few steps to this process; the next step the ECU performs is to convert torque to airflow (or airmass) in units of milligrams per stroke (mg/stk). This airflow/airmass (mg/stk) is an important value in the ECU logic and is used in many tables such as the spark timing tables or lambda target tables.

The ECU has a series of Torque to Airflow (TTA) tables to model this, depending on port flap (the flappies in the intake manifold) and VVL position (on the exhaust cam, should your car be equipped with VVL). If you look at the table in a 3D view, you'll see the relationship between torque and airmass is pretty linear. The red squiggly line is a 3D viewer:



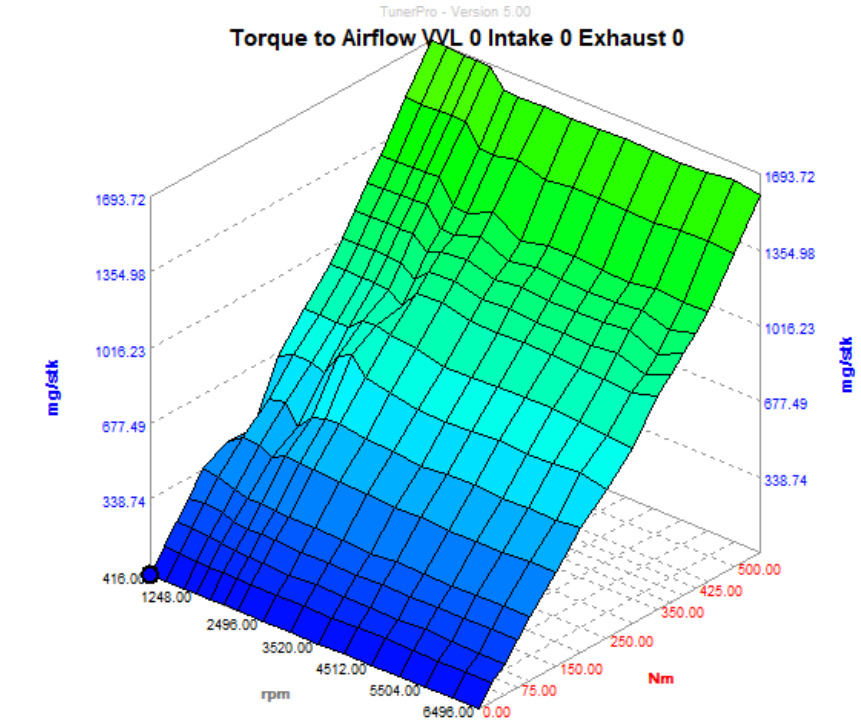
You may need to "build out" the tables a bit more so that you have reasonable airmass for a given torque. For whatever your max torque request is– you want that row (and a little bit beyond) to have reasonable airmass values set.

You could artificially inflate the airmass values in the table to increase boost, but a much better way to go about it is to simply increase your torque request and ensure the TTA tables are built out appropriately. Example GTI 259L table below:

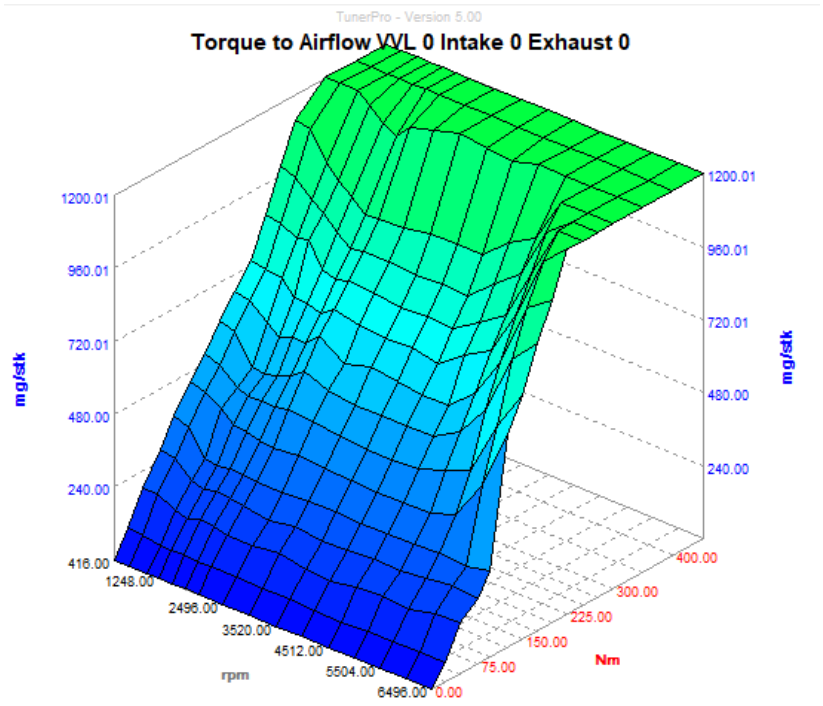


	416.00	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2496.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6496.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	99.87	93.34	88.59	86.81	90.20	87.36	85.80	83.68	83.30	84.99	86.31	87.11	87.36	87.03	86.14	84.74
50.00	173.92	175.62	168.92	158.92	151.88	147.52	150.36	143.57	150.78	142.77	147.47	144.04	151.08	141.07	140.65	140.22
75.00	248.91	254.13	243.99	226.91	217.84	219.66	221.74	213.64	215.08	209.96	217.08	215.00	214.49	214.75	218.26	218.09
100.00	351.16	336.19	314.57	296.35	301.01	294.35	287.61	288.21	283.97	271.84	285.58	283.42	280.79	282.70	287.78	289.78
150.00	405.67	452.68	452.93	420.55	449.37	440.81	438.48	428.01	430.04	412.92	420.12	412.92	414.61	414.53	419.83	422.75
200.00	401.81	561.53	579.08	491.17	558.27	572.73	581.50	562.76	555.56	539.83	552.25	552.59	544.07	544.88	545.17	553.95
250.00	659.07	694.64	695.02	670.77	769.62	798.66	723.84	701.34	677.34	673.06	677.39	685.27	677.43	682.22	689.30	664.03
300.00	810.40	809.51	809.51	810.15	858.98	868.94	853.77	836.69	804.05	805.06	815.32	814.18	815.45	803.83	791.20	787.81
350.00	944.40	944.31	944.19	944.14	937.45	890.18	971.36	977.63	945.92	945.71	946.35	946.35	930.37	933.25	919.73	952.15
375.00	1032.44	1032.27	1032.10	1032.06	1027.44	977.21	1037.40	1041.89	1009.59	1019.98	1008.83	1011.92	1005.86	1014.42	970.34	1018.07
400.00	1120.06	1121.84	1123.37	1124.17	1122.90	1069.79	1093.35	1110.01	1071.35	1087.08	1073.22	1076.06	1075.97	1086.15	1026.00	1082.88
425.00	1209.71	1214.25	1218.11	1220.10	1223.11	1140.79	1140.62	1180.29	1121.76	1143.37	1135.23	1132.56	1131.38	1143.37	1104.54	1141.68
450.00	1302.72	1307.63	1311.75	1313.82	1318.06	1211.54	1198.90	1256.34	1178.73	1207.17	1205.35	1196.83	1192.25	1206.62	1199.20	1208.31
500.00	1498.22	1498.30	1498.39	1498.39	1498.47	1408.44	1398.56	1427.38	1388.00	1403.94	1404.49	1399.07	1396.06	1403.73	1409.75	1405.09
550.00	1693.72	1688.97	1684.99	1682.95	1678.88	1605.29	1598.21	1598.38	1597.24	1600.76	1603.68	1601.27	1599.82	1600.80	1620.34	1601.82

And here’s what it looks like in 3D view.



Some people’s base files might even look like this:

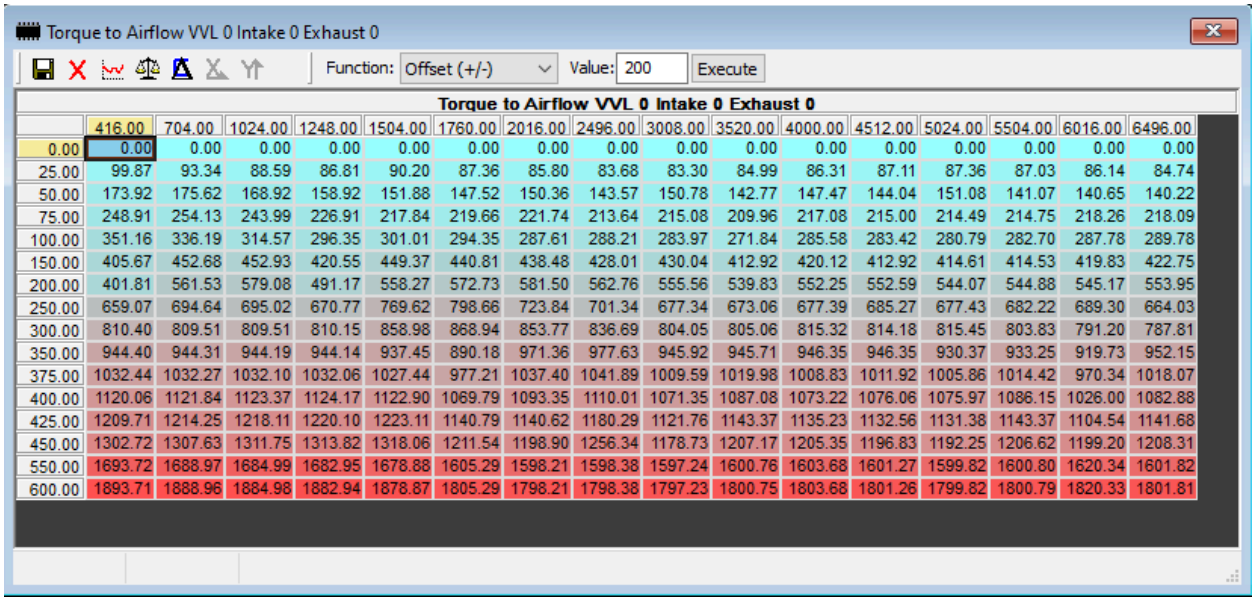


Both of these would need some work, the second one more so. If you look closely you will see that the graphs look very similar 400nm and lower. They both run around 1000-1100 mg/stk at that point, it's the top end (>400nm) that they start to differ. It's up here that you need to be modifying. Don't be messing with anything down in say the 200nm range, it is not needed. I have yet to see ANY boxcode need manipulation below 400nm so just don't touch anything below there.

To work through an example, let's say you're at 4000rpm and requesting 500nm. Your target airmass would be 1404.49 mg/stk. It's important to note that this assumes MBT timing. The ECU models "spark-efficiency" as well to account for power/torque loss due to spark timing less than MBT. Let's say you're running 10* less spark timing vs MBT at that same operating point and the ECU says that your spark efficiency as a result is 90%.

1404 mg/stk / 0.90 = 1560 mg/stk airmass target. Think about it; you are running MBT timing and 1404 mg/stk airmass to make 500nm of torque. But you're actually running less timing, so you need more airmass (and thus more boost) to make that target of 500nm of torque. All this to say, don't be surprised when you're looking at a datalog and airmass doesn't line up exactly with the cell from the TTA tables. And that is perfectly fine.

Here is an example of a fleshed out table (HINT). We moved 550 up one row (eliminating 500nm) and made a new row for 600nm with 200+ airmass added to each cell. You'll note that 400nm is still around 1000-1100mg/stk, as it should be.



Torque to Airflow VVL 0 Intake 0 Exhaust 0

	416.00	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2496.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6496.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25.00	99.87	93.34	88.59	86.81	90.20	87.36	85.80	83.68	83.30	84.99	86.31	87.11	87.36	87.03	86.14	84.74
50.00	173.92	175.62	168.92	158.92	151.88	147.52	150.36	143.57	150.78	142.77	147.47	144.04	151.08	141.07	140.65	140.22
75.00	248.91	254.13	243.99	226.91	217.84	219.66	221.74	213.64	215.08	209.96	217.08	215.00	214.49	214.75	218.26	218.09
100.00	351.16	336.19	314.57	296.35	301.01	294.35	287.61	288.21	283.97	271.84	285.58	283.42	280.79	282.70	287.78	289.78
150.00	405.67	452.68	452.93	420.55	449.37	440.81	438.48	428.01	430.04	412.92	420.12	412.92	414.61	414.53	419.83	422.75
200.00	401.81	561.53	579.08	491.17	558.27	572.73	581.50	562.76	555.56	539.83	552.25	552.59	544.07	544.88	545.17	553.95
250.00	659.07	694.64	695.02	670.77	769.62	798.66	723.84	701.34	677.34	673.06	677.39	685.27	677.43	682.22	689.30	664.03
300.00	810.40	809.51	809.51	810.15	858.98	868.94	853.77	836.69	804.05	805.06	815.32	814.18	815.45	803.83	791.20	787.81
350.00	944.40	944.31	944.19	944.14	937.45	890.18	971.36	977.63	945.92	945.71	946.35	946.35	930.37	933.25	919.73	952.15
375.00	1032.44	1032.27	1032.10	1032.06	1027.44	977.21	1037.40	1041.89	1009.59	1019.98	1008.83	1011.92	1005.86	1014.42	970.34	1018.07
400.00	1120.06	1121.84	1123.37	1124.17	1122.90	1069.79	1093.35	1110.01	1071.35	1087.08	1073.22	1076.06	1075.97	1086.15	1026.00	1082.88
425.00	1209.71	1214.25	1218.11	1220.10	1223.11	1140.79	1140.62	1180.29	1121.76	1143.37	1135.23	1132.56	1131.38	1143.37	1104.54	1141.68
450.00	1302.72	1307.63	1311.75	1313.82	1318.06	1211.54	1198.90	1256.34	1178.73	1207.17	1205.35	1196.83	1192.25	1206.62	1199.20	1208.31
550.00	1693.72	1688.97	1684.99	1682.95	1678.88	1605.29	1598.21	1598.38	1597.24	1600.76	1603.68	1601.27	1599.82	1600.80	1620.34	1601.82
600.00	1893.71	1888.96	1884.98	1882.94	1878.87	1805.29	1798.21	1798.38	1797.23	1800.75	1803.68	1801.26	1799.82	1800.79	1820.33	1801.81

Make similar changes to all TTA tables.

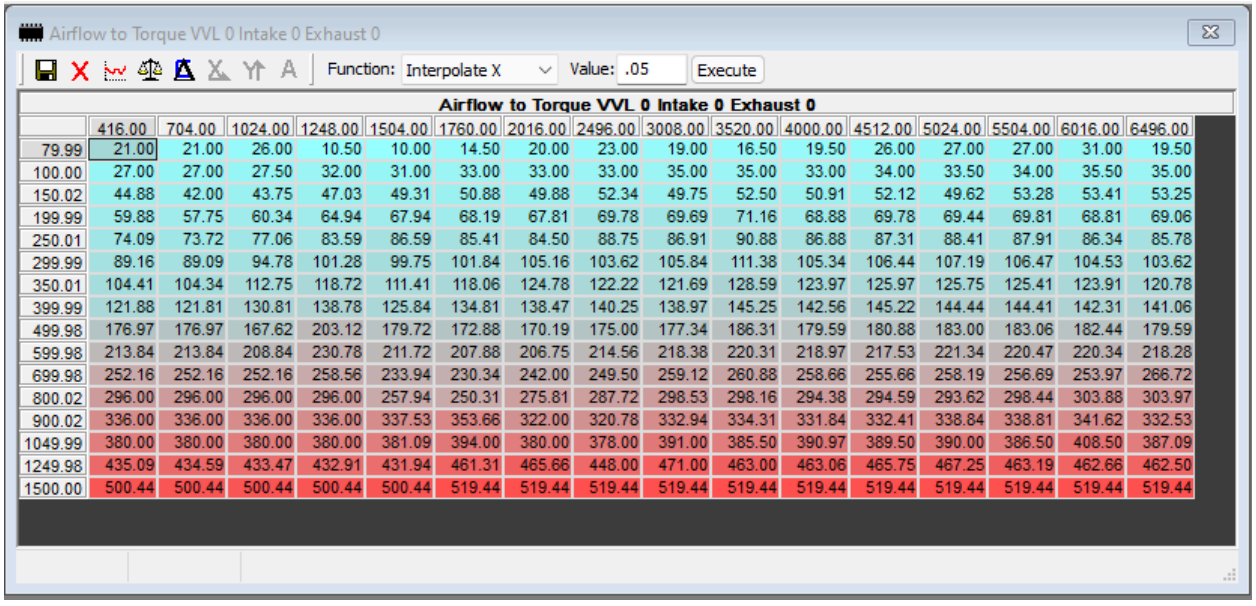
Airflow to Torque

Similar to the previously discussed TTA tables, there are also the Airflow to Torque (ATT) tables. While these aren't directly used in the torque request to final boost target process, they instead model how actual torque is reported to the ECU and logged. Like the TTA tables, you may need to "build out" these tables a bit, depending on how much power you are making, but they are also very linear and predictable in nature.

Continuing the previous example, the ECU will see 1404 mg/stk actual airmass being reported. It will then convert "actual airmass" into an "actual torque" value. Looking at the table below, we have to interpolate a little bit, but at 4000rpm and 1404 mg/stk, it's *about* 500nm. This actual reported torque value is used to compare to the requested torque value and also feeds into the TCU to set an initial clutch clamping pressure value. Did you read that carefully?

Between the TTA and ATT tables, it's important to keep a consistent and relatively accurate or realistic airflow – torque model. For a DSG car, it's even more important to send the TCU reasonable information so it's able to proactively set appropriate clutch clamping pressure. You often see tunes that under-report torque to the TCU and then the TCU is relying on its real-time microslip detection functionality to instead increase clamping pressure so it doesn't slip or to catch a slip. It's much better to get ahead of the issue than trying to bring back a clutch that's already slipping.

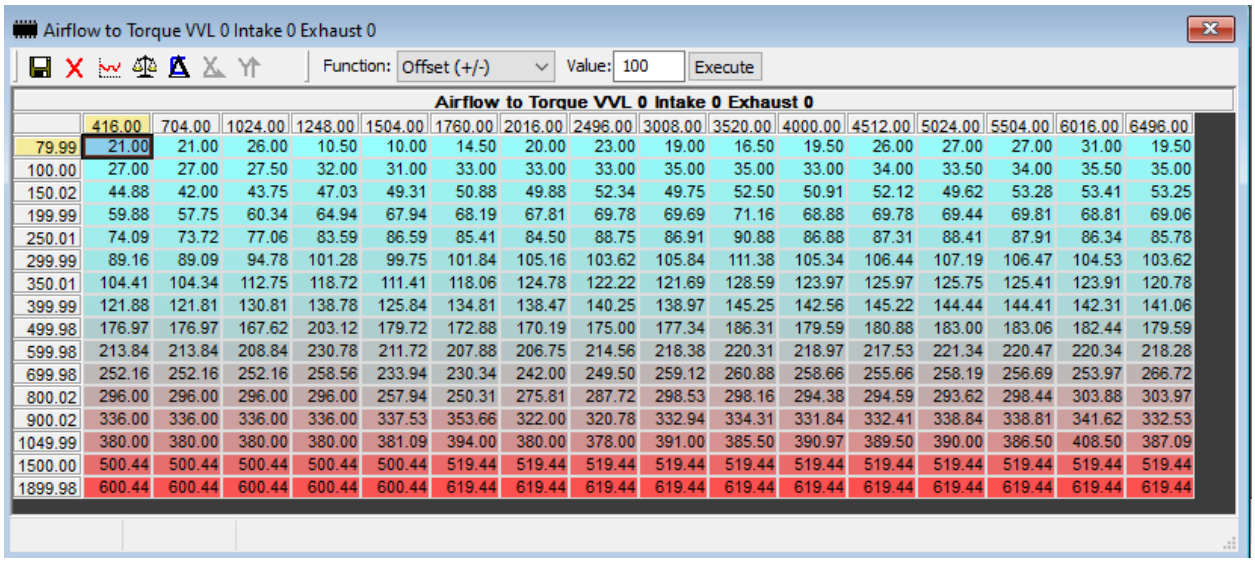
Example stock ATT table:



Airflow to Torque VVL 0 Intake 0 Exhaust 0

	416.00	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2496.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6496.00
79.99	21.00	21.00	26.00	10.50	10.00	14.50	20.00	23.00	19.00	16.50	19.50	26.00	27.00	27.00	31.00	19.50
100.00	27.00	27.00	27.50	32.00	31.00	33.00	33.00	33.00	35.00	35.00	33.00	34.00	33.50	34.00	35.50	35.00
150.02	44.88	42.00	43.75	47.03	49.31	50.88	49.88	52.34	49.75	52.50	50.91	52.12	49.62	53.28	53.41	53.25
199.99	59.88	57.75	60.34	64.94	67.94	68.19	67.81	69.78	69.69	71.16	68.88	69.78	69.44	69.81	68.81	69.06
250.01	74.09	73.72	77.06	83.59	86.59	85.41	84.50	88.75	86.91	90.88	86.88	87.31	88.41	87.91	86.34	85.78
299.99	89.16	89.09	94.78	101.28	99.75	101.84	105.16	103.62	105.84	111.38	105.34	106.44	107.19	106.47	104.53	103.62
350.01	104.41	104.34	112.75	118.72	111.41	118.06	124.78	122.22	121.69	128.59	123.97	125.97	125.75	125.41	123.91	120.78
399.99	121.88	121.81	130.81	138.78	125.84	134.81	138.47	140.25	138.97	145.25	142.56	145.22	144.44	144.41	142.31	141.06
499.98	176.97	176.97	167.62	203.12	179.72	172.88	170.19	175.00	177.34	186.31	179.59	180.88	183.00	183.06	182.44	179.59
599.98	213.84	213.84	208.84	230.78	211.72	207.88	206.75	214.56	218.38	220.31	218.97	217.53	221.34	220.47	220.34	218.28
699.98	252.16	252.16	252.16	258.56	233.94	230.34	242.00	249.50	259.12	260.88	258.66	255.66	258.19	256.69	253.97	266.72
800.02	296.00	296.00	296.00	296.00	257.94	250.31	275.81	287.72	298.53	298.16	294.38	294.59	293.62	298.44	303.88	303.97
900.02	336.00	336.00	336.00	336.00	337.53	353.66	322.00	320.78	332.94	334.31	331.84	332.41	338.84	338.81	341.62	332.53
1049.99	380.00	380.00	380.00	380.00	381.09	394.00	380.00	378.00	391.00	385.50	390.97	389.50	390.00	386.50	408.50	387.09
1249.98	435.09	434.59	433.47	432.91	431.94	461.31	465.66	448.00	471.00	463.00	463.06	465.75	467.25	463.19	462.66	462.50
1500.00	500.44	500.44	500.44	500.44	500.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44

Using our example above we also need to flesh out these tables (HINT). Get rid of the 1249 row and replace with existing 1500 row. Add in a new row that corresponds to the same TTA table we used in the above TTA section.



Airflow to Torque VVL 0 Intake 0 Exhaust 0

	416.00	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2496.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6496.00
79.99	21.00	21.00	26.00	10.50	10.00	14.50	20.00	23.00	19.00	16.50	19.50	26.00	27.00	27.00	31.00	19.50
100.00	27.00	27.00	27.50	32.00	31.00	33.00	33.00	33.00	35.00	35.00	33.00	34.00	33.50	34.00	35.50	35.00
150.02	44.88	42.00	43.75	47.03	49.31	50.88	49.88	52.34	49.75	52.50	50.91	52.12	49.62	53.28	53.41	53.25
199.99	59.88	57.75	60.34	64.94	67.94	68.19	67.81	69.78	69.69	71.16	68.88	69.78	69.44	69.81	68.81	69.06
250.01	74.09	73.72	77.06	83.59	86.59	85.41	84.50	88.75	86.91	90.88	86.88	87.31	88.41	87.91	86.34	85.78
299.99	89.16	89.09	94.78	101.28	99.75	101.84	105.16	103.62	105.84	111.38	105.34	106.44	107.19	106.47	104.53	103.62
350.01	104.41	104.34	112.75	118.72	111.41	118.06	124.78	122.22	121.69	128.59	123.97	125.97	125.75	125.41	123.91	120.78
399.99	121.88	121.81	130.81	138.78	125.84	134.81	138.47	140.25	138.97	145.25	142.56	145.22	144.44	144.41	142.31	141.06
499.98	176.97	176.97	167.62	203.12	179.72	172.88	170.19	175.00	177.34	186.31	179.59	180.88	183.00	183.06	182.44	179.59
599.98	213.84	213.84	208.84	230.78	211.72	207.88	206.75	214.56	218.38	220.31	218.97	217.53	221.34	220.47	220.34	218.28
699.98	252.16	252.16	252.16	258.56	233.94	230.34	242.00	249.50	259.12	260.88	258.66	255.66	258.19	256.69	253.97	266.72
800.02	296.00	296.00	296.00	296.00	257.94	250.31	275.81	287.72	298.53	298.16	294.38	294.59	293.62	298.44	303.88	303.97
900.02	336.00	336.00	336.00	336.00	337.53	353.66	322.00	320.78	332.94	334.31	331.84	332.41	338.84	338.81	341.62	332.53
1049.99	380.00	380.00	380.00	380.00	381.09	394.00	380.00	378.00	391.00	385.50	390.97	389.50	390.00	386.50	408.50	387.09
1500.00	500.44	500.44	500.44	500.44	500.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44	519.44
1899.98	600.44	600.44	600.44	600.44	600.44	619.44	619.44	619.44	619.44	619.44	619.44	619.44	619.44	619.44	619.44	619.44

If you look up in the TTA section 550nm=~1600-1700mg/stk. Look right above us here at this ATT table. 1600-1700 would be roughly 550nm. 600nm is roughly 1900mg/stk. Go ahead, scroll back up to the TTA section and see what 600nm corresponds to for airmass mg/stk (I bet it's around 1800-1900…spoiler…it is).

Make similar changes to all ATT tables. As you work through find the corresponding TTA table to each ATT table. They should flow well together, reporting similar airmass and torque values. Lather, rinse, repeat.

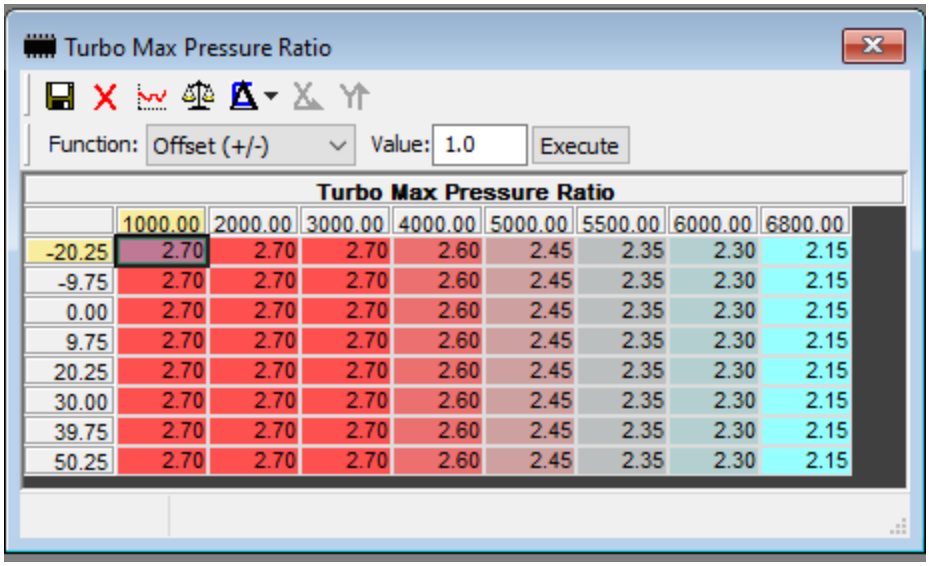
Nice job. Your TTA and ATT tables should allow you to start adding boost without any negative effects. Let's add some BEWWWST.

Boost

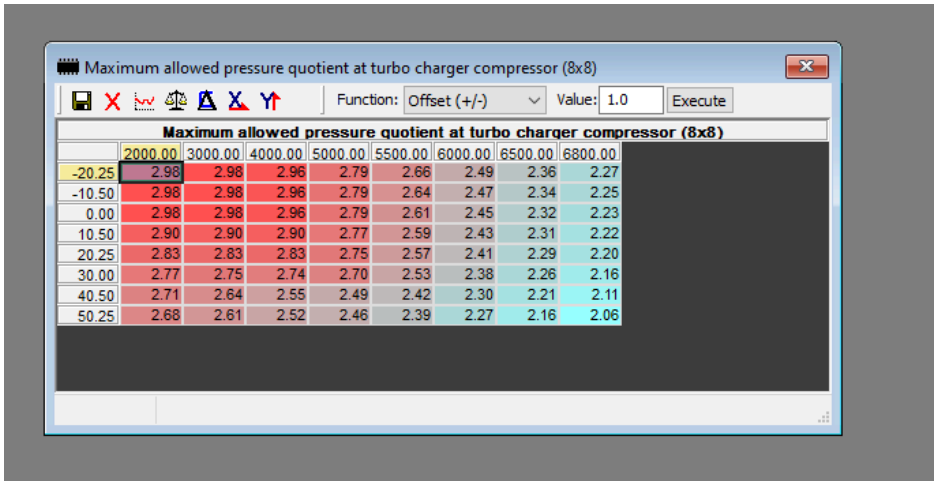
There are several ways you can control boost.

OPTION 1 (works fine, not the best way)

The first way is to set a boost target using the Turbo Max Pressure Ratio table. The x-axis along the top is RPM, the Y-axis along the side is ambient temp celsius (if you felt so inclined to adjust boost lower as the temp falls, you could. Not necessary). In the below example we are going to attempt to hit a PR of 2.7 by 2000 rpm and run it down to 2.15 at redline.

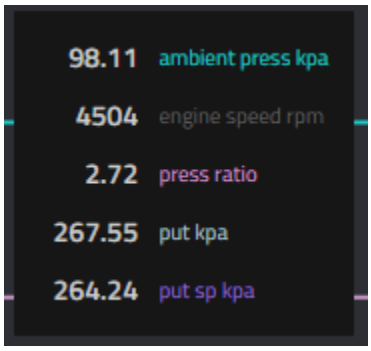


If you are on LB6 the table will look like this:



Turbo Pressure Ratio is simply PUT (this is the boost reading at the charge pipe sensor) divided by ambient pressure. Reversing the equation it is also Turbo Pressure Ratio*ambient pressure=PUT.

Diggs' example with maths:



PR times ambient pressure=PUT
*2.72*98.11=266kpa*

Convert to PSI
*266kpa*0.145038=38.58psi*

Subtract out ambient pressure
*98.11kpa*0.145038=14.22psi*

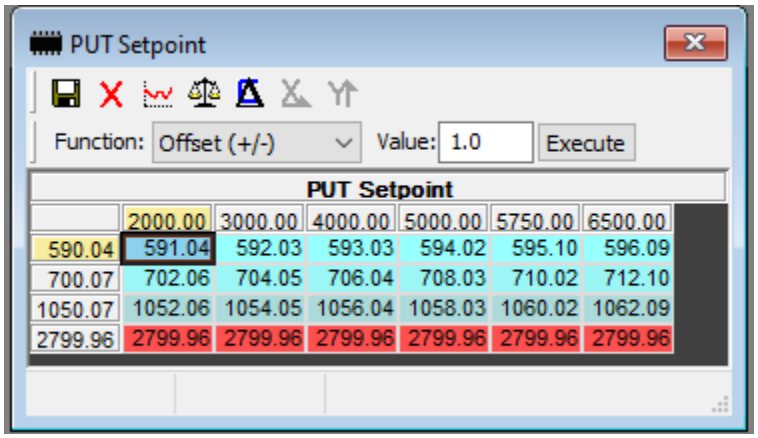
PUTpsi-Ambientpsi=Boost Pressure
38.58-14.22=24.3psi

How did we do, Mathman? Looks good.

Targeting a PR of 2.8 at my Kansass elevation equals targeting ~24psi of boost. There is some background modeling of pressure loss at the intake being done so ECU tends to target just a bit short of the table because 2.8PR would really be closer to just over 25psi of boost.

If you plan to use this boost control method you will need to move the PUT setpoint table up and out of the way. Set the last row equal or above the highest number in your Turbo Max Pressure

Ratio table. This table reads in hpa so it is 10x higher than PUT. We set our PR table to 2.7 so we will move this up to 2800 so it is just a touch higher than the PR table. Set the last cell in the Y-axis to the highest boost level you will target (in this case 2800):

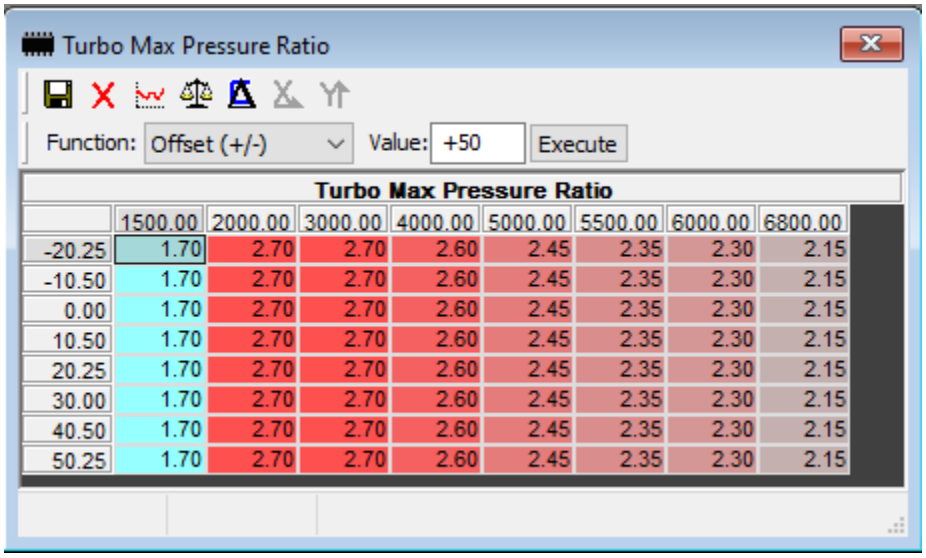


PUT Setpoint

	2000.00	3000.00	4000.00	5000.00	5750.00	6500.00
590.04	591.04	592.03	593.03	594.02	595.10	596.09
700.07	702.06	704.05	706.04	708.03	710.02	712.10
1050.07	1052.06	1054.05	1056.04	1058.03	1060.02	1062.09
2799.96	2799.96	2799.96	2799.96	2799.96	2799.96	2799.96

The ECU will not go above 280kpa/2800hpa with the table set as above.

Going back to our original table:



Turbo Max Pressure Ratio

	1500.00	2000.00	3000.00	4000.00	5000.00	5500.00	6000.00	6800.00
-20.25	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
-10.50	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
0.00	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
10.50	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
20.25	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
30.00	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
40.50	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15
50.25	1.70	2.70	2.70	2.60	2.45	2.35	2.30	2.15

1500=doesn’t matter
2000=24psi
3000=24psi
4000=22.5psi
5000=20.5psi
5500=19psi
6000=18psi
6800=16psi

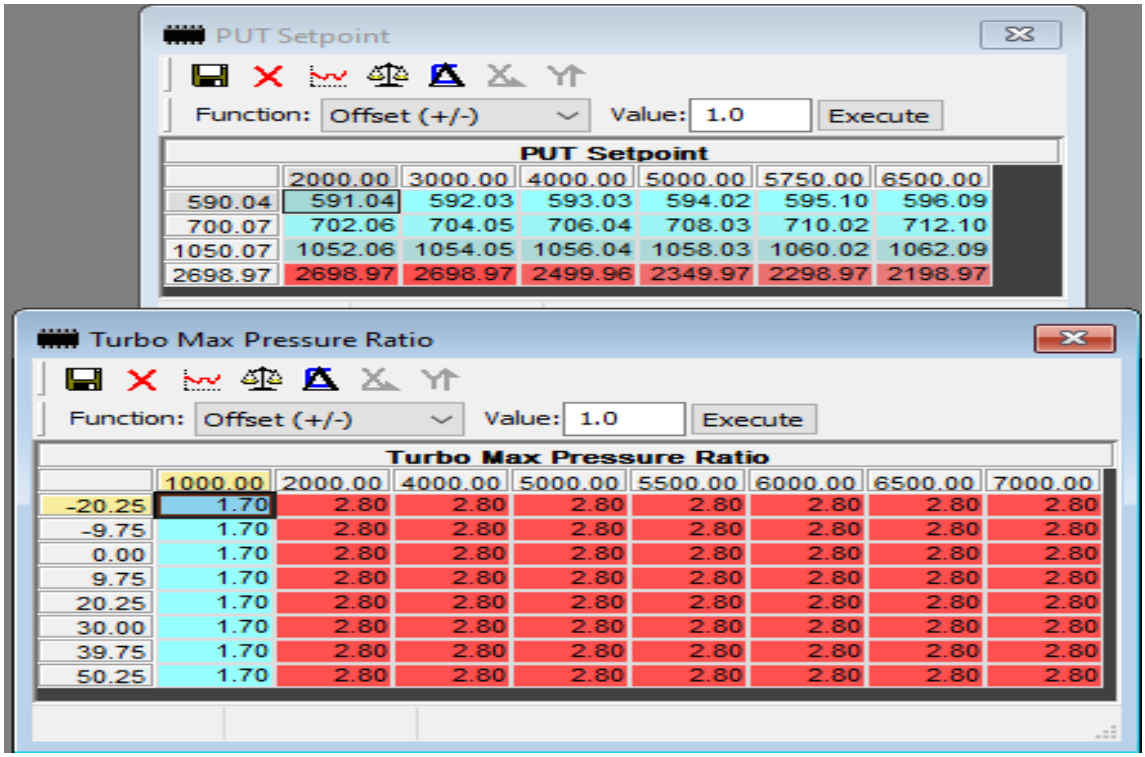
Nice healthy IS20/IS38 starting boost curve for you as you get started tuning (HINT). You're welcome.

BUT, there is a better way to target boost.

OPTION 2 (preferred option)

Alternatively, you can do the opposite; use the PUT setpoint table to set up your boost curve using the last row and just move the Max PR table up out of the way. Set the axis to equal your maximum boost level. In this example the maximum boost level we want to achieve is 2698hpa so the axis is set to 2698hpa.

Leave all the other cells and the axis in the 3 rows above alone. Feel free to modify the rpm x=axis along the top to your heart's content to set desired boost at specific rpm.



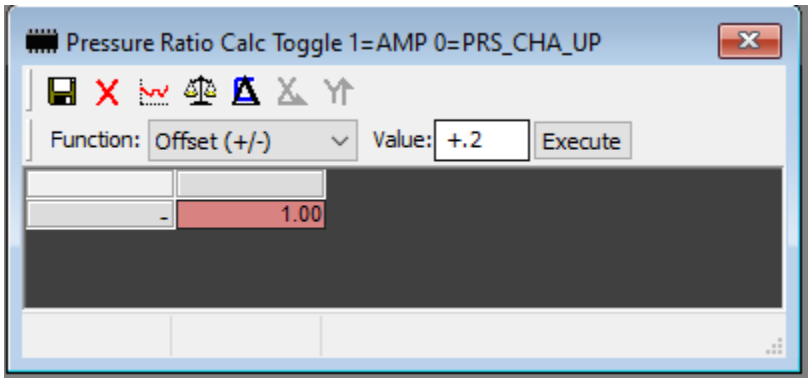
I'm not going to do the math for this one too, you can figure it out. No? Fine. 2700hpa=39psi. 39psi-ambient pressure=24.75psi. PR table at 2.8 will probably cap you around 24psi anyways. YOU'RE WELCOME.

OPTION 3

TORQUE TOON

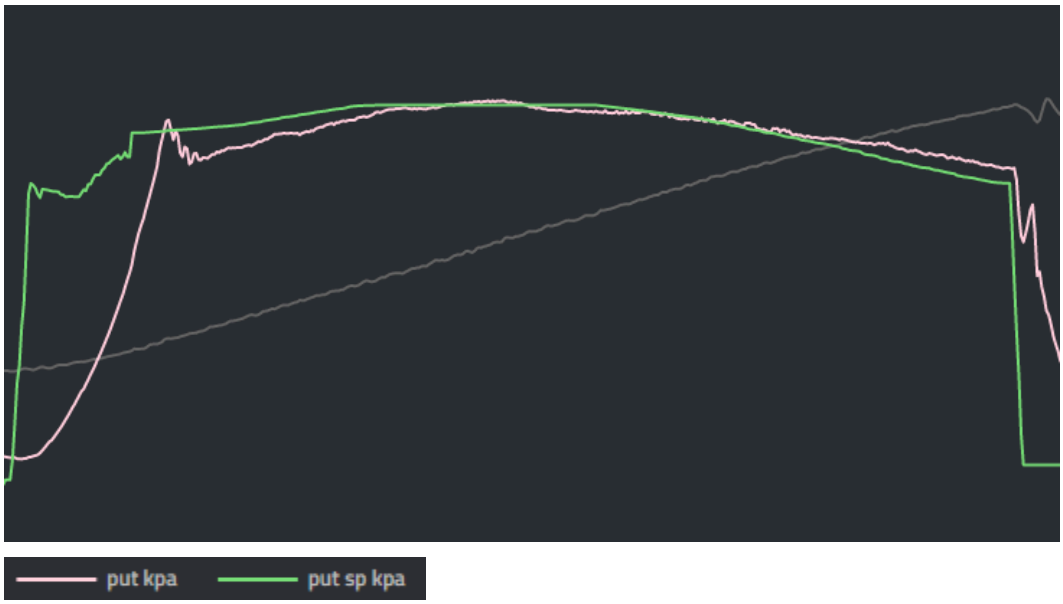
Nah, no point. Controlling power with boost works just fine.

After you have set your boost curve set this to 1:

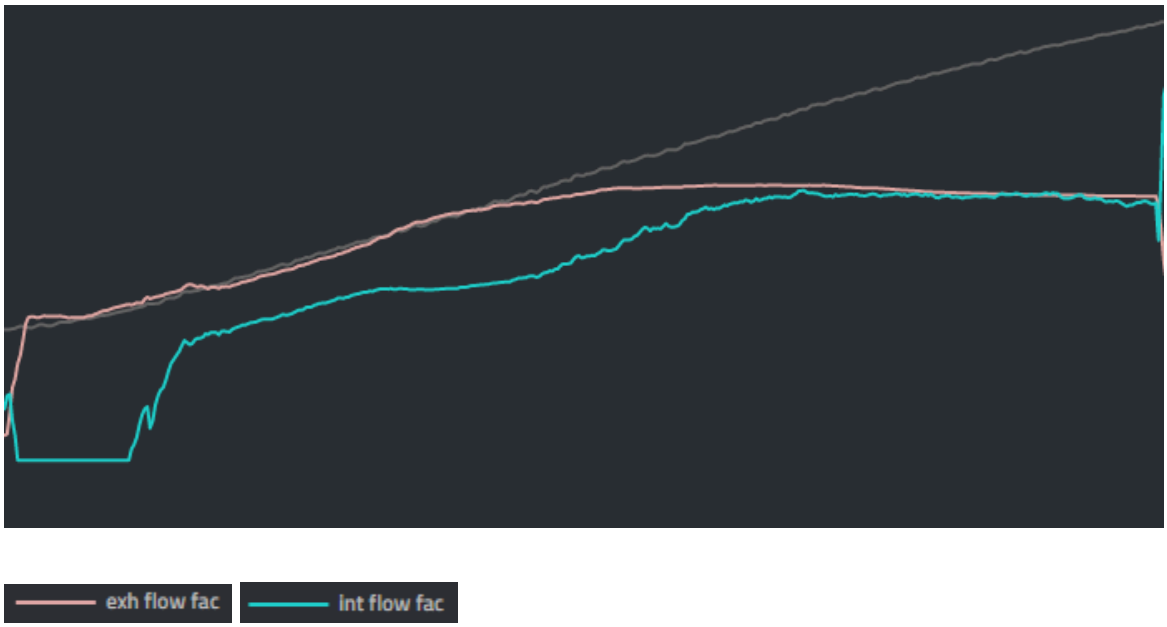


Wastegate

The way the ECU calculates flow factors is not simple to understand so I won't even try (because I don't even understand it). Some crazy-ass convoluted math is involved that we don't need to know how it's performed. As you start adding boost to your tune you will find that PUT is not meeting PUT setpoint. It's either too high or too low (most common). Wastegate tuning takes a bit of effort but is not difficult for the most part. There are 4 key parameters to look at when modifying your wastegate setpoint. First off, are we hitting boost target? In this example we are below just after the wastegate starts opening, pretty spot on for a bit, then starts to overboost as we approach redline:

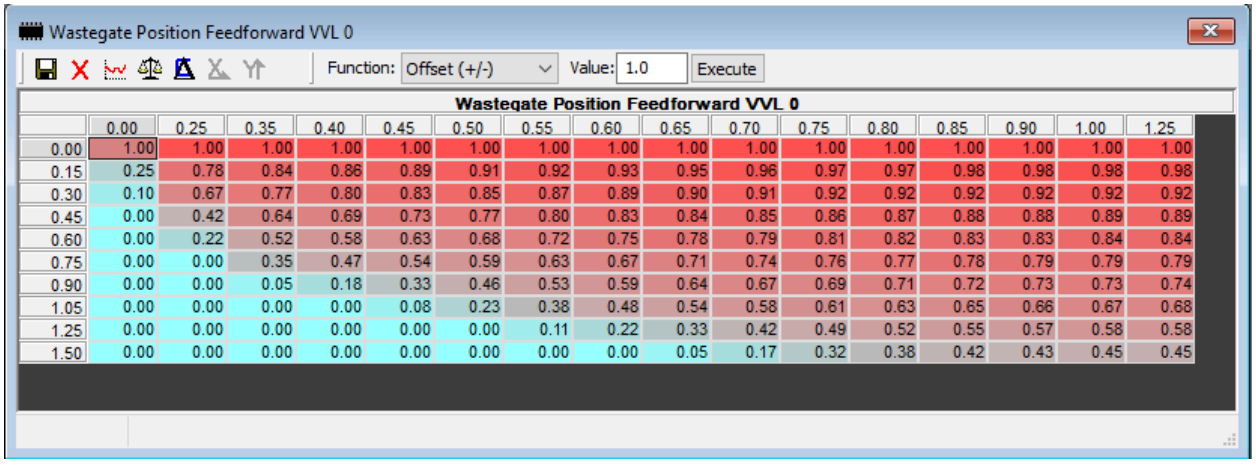


The next thing we want to do is look at the intake and exhaust flow factors:



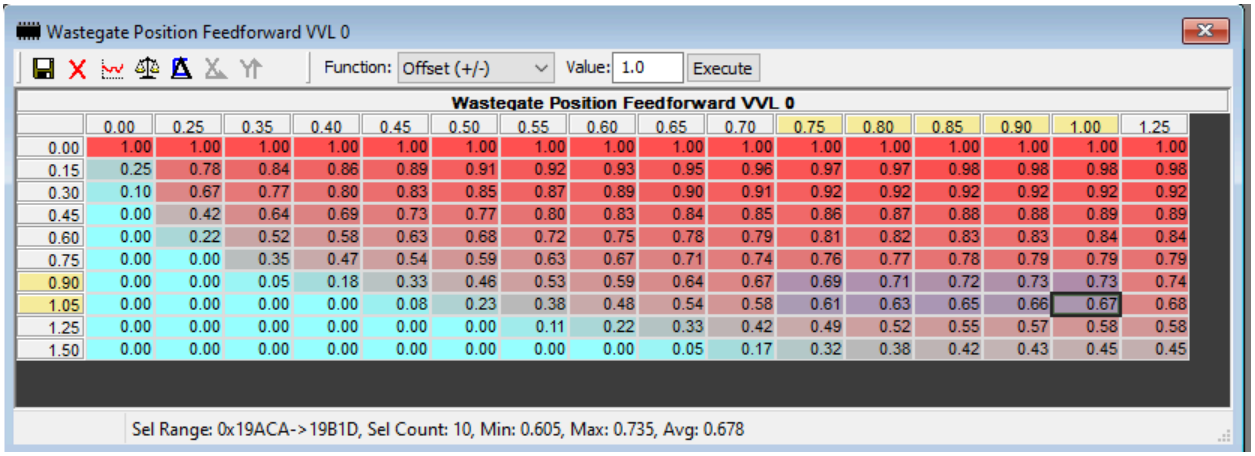
Now pull up one of your two wastegate tables in TunerPro. Doesn't matter which one as they are very close to one another. We'll just apply our changes to both.

EXAMPLE stock 259L table

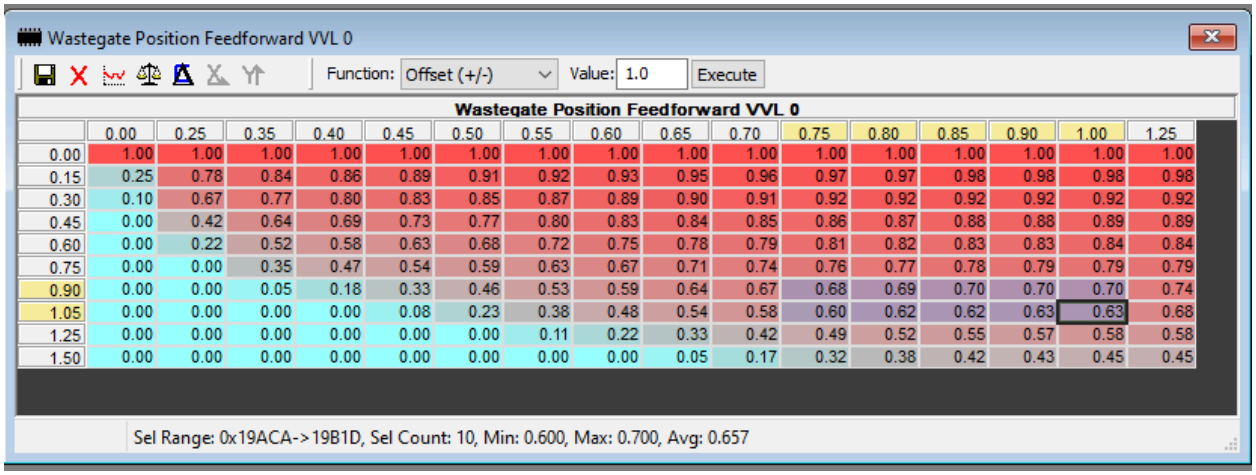


	0.00	0.25	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	1.00	1.25
0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
0.15	0.25	0.78	0.84	0.86	0.89	0.91	0.92	0.93	0.95	0.96	0.97	0.97	0.98	0.98	0.98	0.98
0.30	0.10	0.67	0.77	0.80	0.83	0.85	0.87	0.89	0.90	0.91	0.92	0.92	0.92	0.92	0.92	0.92
0.45	0.00	0.42	0.64	0.69	0.73	0.77	0.80	0.83	0.84	0.85	0.86	0.87	0.88	0.88	0.89	0.89
0.60	0.00	0.22	0.52	0.58	0.63	0.68	0.72	0.75	0.78	0.79	0.81	0.82	0.83	0.83	0.84	0.84
0.75	0.00	0.00	0.35	0.47	0.54	0.59	0.63	0.67	0.71	0.74	0.76	0.77	0.78	0.79	0.79	0.79
0.90	0.00	0.00	0.05	0.18	0.33	0.46	0.53	0.59	0.64	0.67	0.69	0.71	0.72	0.73	0.73	0.74
1.05	0.00	0.00	0.00	0.00	0.08	0.23	0.38	0.48	0.54	0.58	0.61	0.63	0.65	0.66	0.67	0.68
1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.22	0.33	0.42	0.49	0.52	0.55	0.57	0.58	0.58
1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.17	0.32	0.38	0.42	0.43	0.45	0.45

Now going back to your log let's focus on a section that is overboosting or underboosting. Find where PUT starts to deviate from PUT SP. At that part of the log you will have values for "exh flow fac" and "int flow fac". The X axis along the top of your Wastegate table is Exh flow fac (0 to 1.25 above). The y axis down the side is Int flow fac (0 to 1.5 above). The table cells are the wastegate position; 1 is closed and 0 is open. Using our example above let's say we want to resolve the overboosting up top. We find that the Exh flow fac where it starts to deviate is 0.75 and increases to 0.98 over that period and the Int flow fac area is 0.91 increasing to 1.03. That means we are going to be adjusting our table in this purple area highlighted below:



Since it is overboosting we need to lower these values to open the wastegate a bit. You shouldn't need to get too drastic here. For every 1psi it is off target I'd adjust by 0.05, with smaller adjustments for smaller psi deltas. As our overboost wasn't too bad (<1psi) we made some minor changes to this area, heavier towards the end because the overboost was getting larger:

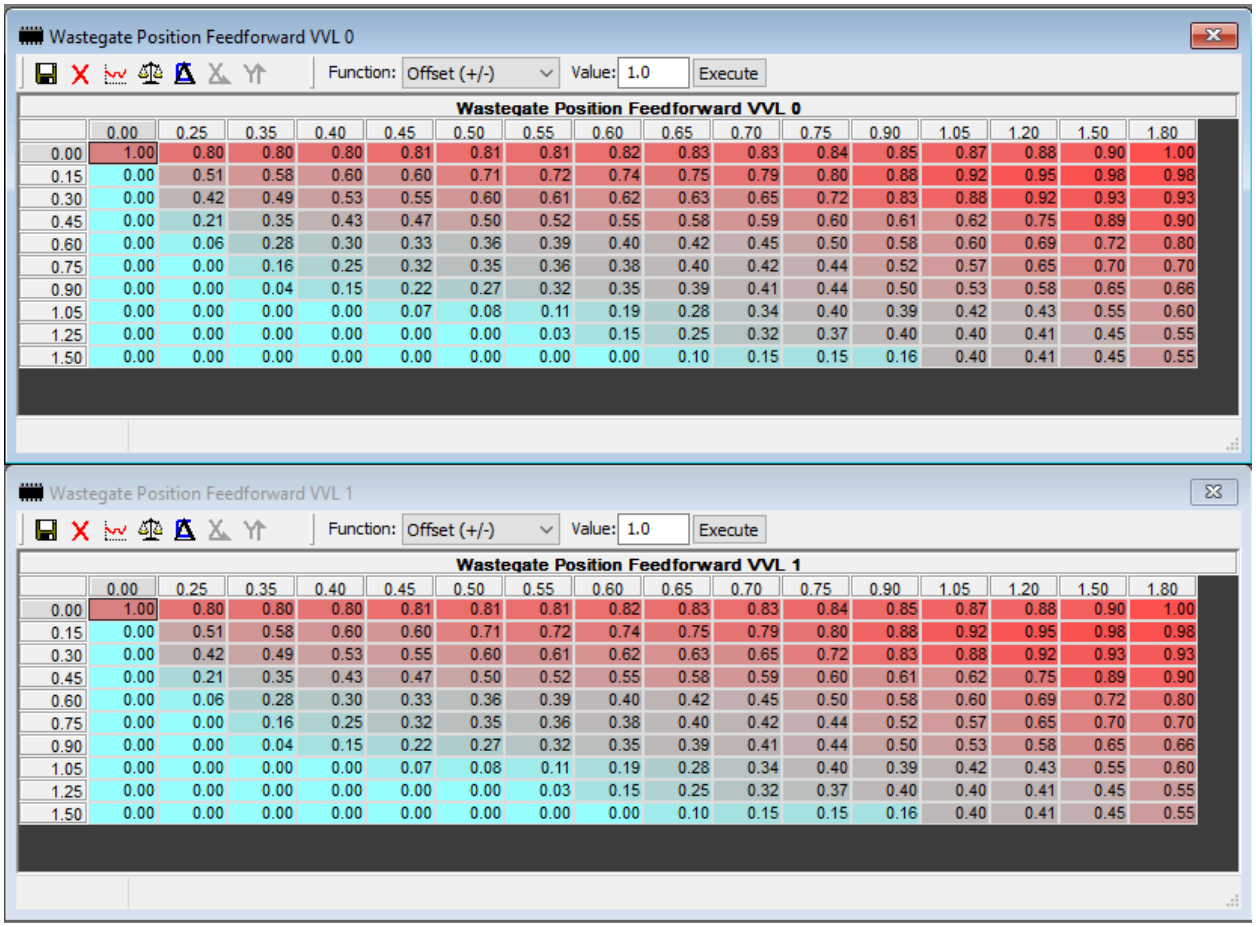


Take it out and relog to see how it did.

<u>You can always modify the axis as well</u>. Let's say you are having a hard time dialing in boost where the Int flow fac is between 0.75 and 0.9, your adjustments seem to make it overboost and then underboost. Also your car never even comes close to hitting Int flow fac 1.5. In that case, you can completely get rid of that entire 1.5 row. Move Int Flow fac 1.25 and 1.05 row data down the table, modify the axis accordingly, thus creating a new row in between 0.75 and 0.9….make it say….0.83? Split the difference between the cells above and below then get to your fine tuning at the Exh flow fac region to dial it in.
Now you have an entirely new row to adjust without making so much of an impact on 0.75 and 0.9 rows. Fine tuning! BAM! MATHED THE FUCK OUT OF THAT TABLE!

IS38 Upgrades

As for IS20 to IS38 upgrades here is a good starting point for your new IS38 turbo. For these, yes you will need to get a bit drastic from the stock IS20 tables because it is an entirely different turbo.



	0.00	0.25	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.90	1.05	1.20	1.50	1.80
0.00	1.00	0.80	0.80	0.80	0.81	0.81	0.81	0.82	0.83	0.83	0.84	0.85	0.87	0.88	0.90	1.00
0.15	0.00	0.51	0.58	0.60	0.60	0.71	0.72	0.74	0.75	0.79	0.80	0.88	0.92	0.95	0.98	0.98
0.30	0.00	0.42	0.49	0.53	0.55	0.60	0.61	0.62	0.63	0.65	0.72	0.83	0.88	0.92	0.93	0.93
0.45	0.00	0.21	0.35	0.43	0.47	0.50	0.52	0.55	0.58	0.59	0.60	0.61	0.62	0.75	0.89	0.90
0.60	0.00	0.06	0.28	0.30	0.33	0.36	0.39	0.40	0.42	0.45	0.50	0.58	0.60	0.69	0.72	0.80
0.75	0.00	0.00	0.16	0.25	0.32	0.35	0.36	0.38	0.40	0.42	0.44	0.52	0.57	0.65	0.70	0.70
0.90	0.00	0.00	0.04	0.15	0.22	0.27	0.32	0.35	0.39	0.41	0.44	0.50	0.53	0.58	0.65	0.66
1.05	0.00	0.00	0.00	0.00	0.07	0.08	0.11	0.19	0.28	0.34	0.40	0.39	0.42	0.43	0.55	0.60
1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.15	0.25	0.32	0.37	0.40	0.40	0.41	0.45	0.55
1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15	0.15	0.16	0.40	0.41	0.45	0.55

	0.00	0.25	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.90	1.05	1.20	1.50	1.80
0.00	1.00	0.80	0.80	0.80	0.81	0.81	0.81	0.82	0.83	0.83	0.84	0.85	0.87	0.88	0.90	1.00
0.15	0.00	0.51	0.58	0.60	0.60	0.71	0.72	0.74	0.75	0.79	0.80	0.88	0.92	0.95	0.98	0.98
0.30	0.00	0.42	0.49	0.53	0.55	0.60	0.61	0.62	0.63	0.65	0.72	0.83	0.88	0.92	0.93	0.93
0.45	0.00	0.21	0.35	0.43	0.47	0.50	0.52	0.55	0.58	0.59	0.60	0.61	0.62	0.75	0.89	0.90
0.60	0.00	0.06	0.28	0.30	0.33	0.36	0.39	0.40	0.42	0.45	0.50	0.58	0.60	0.69	0.72	0.80
0.75	0.00	0.00	0.16	0.25	0.32	0.35	0.36	0.38	0.40	0.42	0.44	0.52	0.57	0.65	0.70	0.70
0.90	0.00	0.00	0.04	0.15	0.22	0.27	0.32	0.35	0.39	0.41	0.44	0.50	0.53	0.58	0.65	0.66
1.05	0.00	0.00	0.00	0.00	0.07	0.08	0.11	0.19	0.28	0.34	0.40	0.39	0.42	0.43	0.55	0.60
1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.15	0.25	0.32	0.37	0.40	0.40	0.41	0.45	0.55
1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.15	0.15	0.16	0.40	0.41	0.45	0.55

NOTE THE X-AXIS HAS BEEN CHANGED FROM STOCK TO ACCOMMODATE THE HIGHER FLOW FACTORS . MAKE SURE YOU CHANGE THOSE.

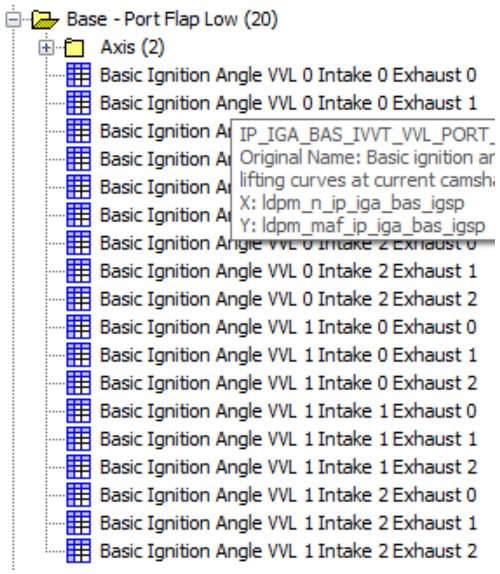
If you are running a non-OEM turbo you should be using the NOT BASICS guide and using Simple Wastegate (SWG). Flow factor tuning a non-OEM turbo will make you lose your mind.

Timing

There are three main components to timing;

- Minimum timing

    - Don’t touch these tables at all.
- MBT timing
    - Don’t touch these tables at all.
- Base timing
    - These are the tables we will alter for timing. Within base timing you will find two sets of 18 tables. Port Flap High is for low speed timing, AKA light cruising (Port flap=1 in your logs). Port Flap Low is for WOT (Port flap=0 in your logs). For each port flap setting there are tables referenced depending on the position of the VVL actuators (VTEC yo), intake cam, and exhaust cam. You probably do not need to touch any of the port flap high tables. These 18 tables are the only tables you need to touch:

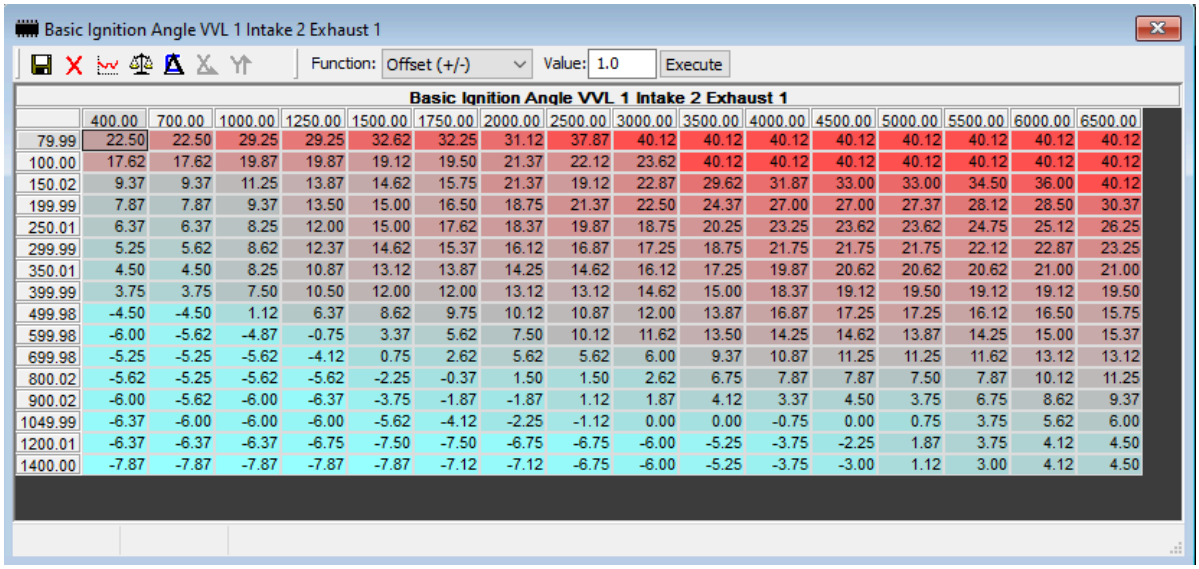


Oh no, 18 tables!?! AKKKKSHUALLY, we only really care about 9 of them. When you go WOT you are almost instantly at the point where the VVL switchover occurs (VVL=0) so we really only need to focus on the 9 tables that have “VVL 0”.

Timing Tables Explained

The X-axis along the top is pretty self explanatory, it’s RPM. The Y-axis along the left hand side is Air Mass (mg/stroke). Using the airmass that we defined way up above allows the ECU to pick a timing target from these tables. NOTE I just grabbed a random table for my example, you will be wanting to modify “VVL 0” tables as discussed above.

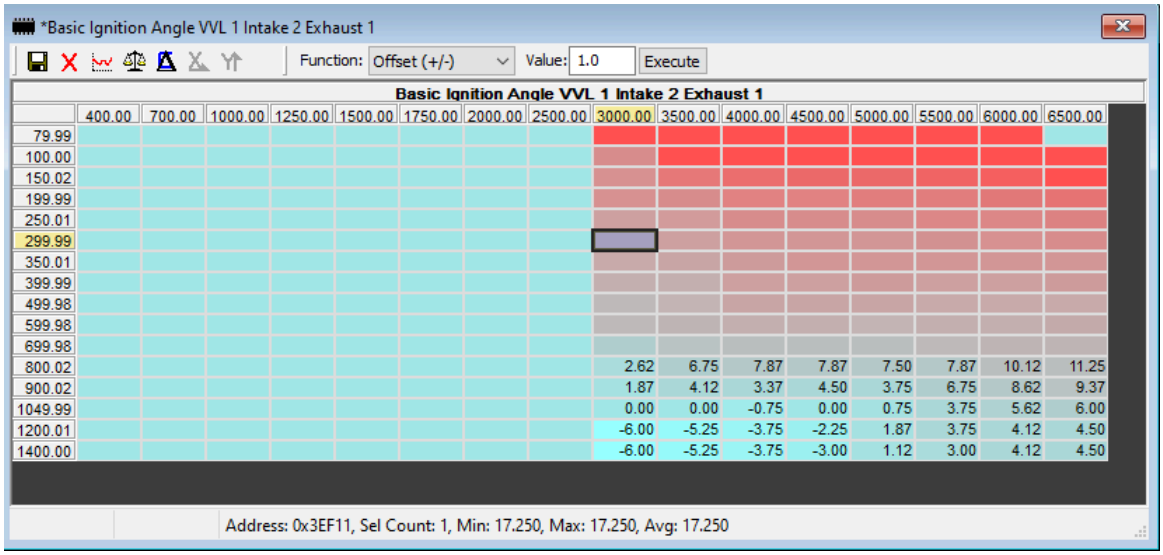
Example RANDOM Timing Table



Basic Ignition Angle VVL 1 Intake 2 Exhaust 1

	400.00	700.00	1000.00	1250.00	1500.00	1750.00	2000.00	2500.00	3000.00	3500.00	4000.00	4500.00	5000.00	5500.00	6000.00	6500.00
79.99	22.50	22.50	29.25	29.25	32.62	32.25	31.12	37.87	40.12	40.12	40.12	40.12	40.12	40.12	40.12	40.12
100.00	17.62	17.62	19.87	19.87	19.12	19.50	21.37	22.12	23.62	40.12	40.12	40.12	40.12	40.12	40.12	40.12
150.02	9.37	9.37	11.25	13.87	14.62	15.75	21.37	19.12	22.87	29.62	31.87	33.00	33.00	34.50	36.00	40.12
199.99	7.87	7.87	9.37	13.50	15.00	16.50	18.75	21.37	22.50	24.37	27.00	27.00	27.37	28.12	28.50	30.37
250.01	6.37	6.37	8.25	12.00	15.00	17.62	18.37	19.87	18.75	20.25	23.25	23.62	23.62	24.75	25.12	26.25
299.99	5.25	5.62	8.62	12.37	14.62	15.37	16.12	16.87	17.25	18.75	21.75	21.75	21.75	22.12	22.87	23.25
350.01	4.50	4.50	8.25	10.87	13.12	13.87	14.25	14.62	16.12	17.25	19.87	20.62	20.62	20.62	21.00	21.00
399.99	3.75	3.75	7.50	10.50	12.00	12.00	13.12	13.12	14.62	15.00	18.37	19.12	19.50	19.12	19.12	19.50
499.98	-4.50	-4.50	1.12	6.37	8.62	9.75	10.12	10.87	12.00	13.87	16.87	17.25	17.25	16.12	16.50	15.75
599.98	-6.00	-5.62	-4.87	-0.75	3.37	5.62	7.50	10.12	11.62	13.50	14.25	14.62	13.87	14.25	15.00	15.37
699.98	-5.25	-5.25	-5.62	-4.12	0.75	2.62	5.62	5.62	6.00	9.37	10.87	11.25	11.25	11.62	13.12	13.12
800.02	-5.62	-5.25	-5.62	-5.62	-2.25	-0.37	1.50	1.50	2.62	6.75	7.87	7.87	7.50	7.87	10.12	11.25
900.02	-6.00	-5.62	-6.00	-6.37	-3.75	-1.87	-1.87	1.12	1.87	4.12	3.37	4.50	3.75	6.75	8.62	9.37
1049.99	-6.37	-6.00	-6.00	-6.00	-5.62	-4.12	-2.25	-1.12	0.00	0.00	-0.75	0.00	0.75	3.75	5.62	6.00
1200.01	-6.37	-6.37	-6.37	-6.75	-7.50	-7.50	-6.75	-6.75	-6.00	-5.25	-3.75	-2.25	1.87	3.75	4.12	4.50
1400.00	-7.87	-7.87	-7.87	-7.87	-7.87	-7.12	-7.12	-6.75	-6.00	-5.25	-3.75	-3.00	1.12	3.00	4.12	4.50

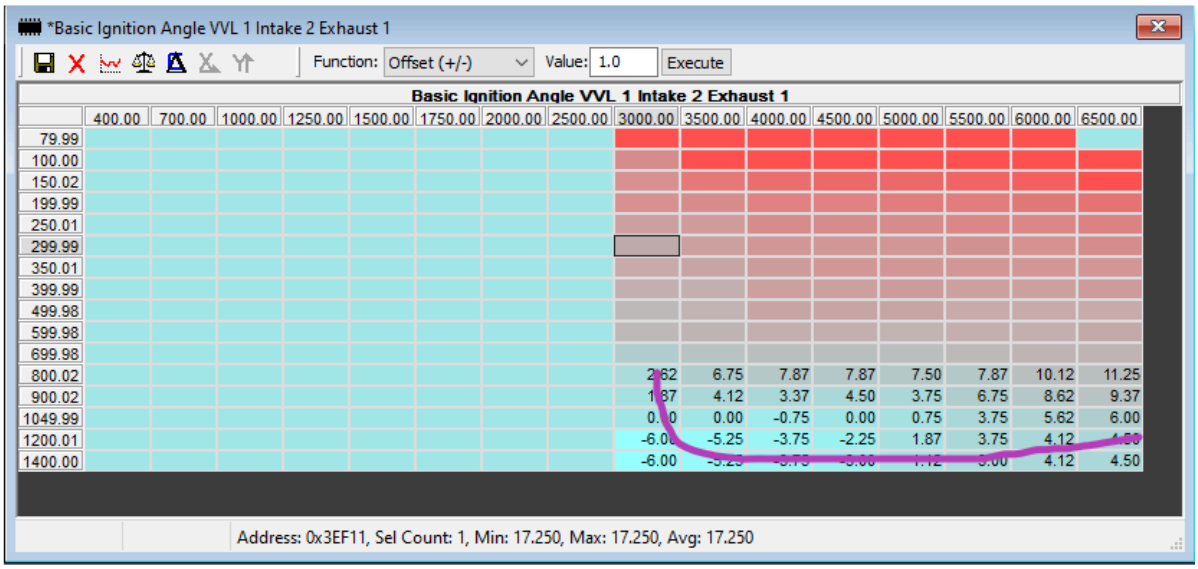
Every airmass row from 79 up to 699 you can leave alone. This will be your low speed cruising around town/light throttle timing, I have blanked it out in the table below. Where one typically goes WOT is where you should focus your efforts. Most people typically try to be above 3k when they go WOT (all the manual guys just nodded) so really your focus should be on this area:



Basic Ignition Angle VVL 1 Intake 2 Exhaust 1

	400.00	700.00	1000.00	1250.00	1500.00	1750.00	2000.00	2500.00	3000.00	3500.00	4000.00	4500.00	5000.00	5500.00	6000.00	6500.00
79.99																
100.00																
150.02																
199.99																
250.01																
299.99																
350.01																
399.99																
499.98																
599.98																
699.98																
800.02									2.62	6.75	7.87	7.87	7.50	7.87	10.12	11.25
900.02									1.87	4.12	3.37	4.50	3.75	6.75	8.62	9.37
1049.99									0.00	0.00	-0.75	0.00	0.75	3.75	5.62	6.00
1200.01									-6.00	-5.25	-3.75	-2.25	1.87	3.75	4.12	4.50
1400.00									-6.00	-5.25	-3.75	-3.00	1.12	3.00	4.12	4.50

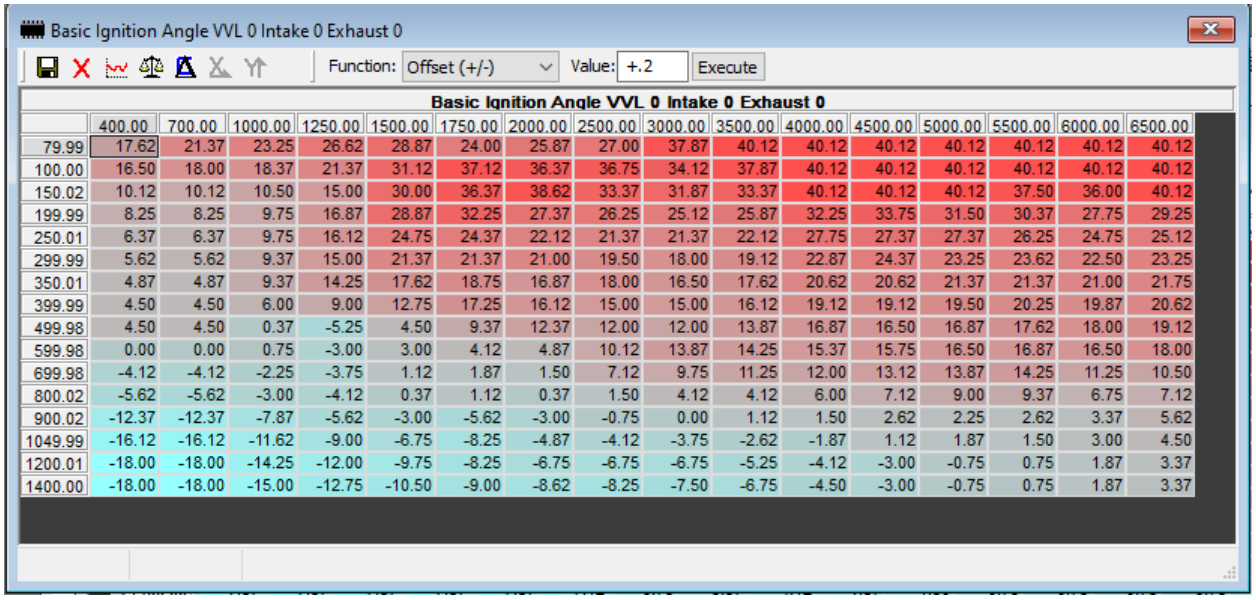
Flooring your typical DSG equipped GTI with an IS20 turbo in 3rd gear from 3000rpm will spool to maximum boost at about 3500rpm (manual cars will be fairly similar…it spools quickly). Within a few hundred rpm (3100-3200) you will already be into this area of the timing table (~800mg/stk) and should be running around 3-4 degrees of timing. For the sake of argument we'll say it hits a healthy 1600mg/stk at 3500rpm tapering to about 1200mg/stk by 6000rpm. Assuming you have your airflow and torque tables setup correctly you will be in the bottom row of your timing table by 3500rpm. It would follow this path:



As you begin to fine-tune your WOT timing be sure to also do some medium throttle tuning as well to ensure the areas above the purple line get some love. If you are pulling or adding more than a few degrees in a cell you might look to the cells surrounding it to see how they are setup and if they might need tweaking too. If you look at any one cell in the above highlighted area you will notice that for the most part (outside heavily load/low rpm situations) every cell that touches it is within at most 3 degrees. If you are needing to pull a degree of timing consider easing the surrounding cells by half a degree as well. Unless you can identify exactly what cam position is being referenced (good luck) make the same +/- adjustments to the same rpm/airmass cells in each table.

While timing is an important part of making power, boost is the more critical component. If you have to choose between 1 degree of timing or 1psi of boost, choose boost (assuming your turbo will flow more air). Most stock turbo pump gas tunes follow a similar timing curve as above. Negative timing until about 4500 where it slowly meanders up to about 5 degrees up top. Depending on gas quality you may find you need to run a degree or 2 lower or maybe you have good gas and can add a degree or 2 here and there. Your logging runs will tell you where it is unhappy. If you consistently see timing corrections in multiple cylinders at a specific airmass at a specific RPM then you should look to pull some timing in that area.

If you are looking for a good starting point for timing I'd suggest making the 9 port flap low tables look similar to this (Thanks Exley!):



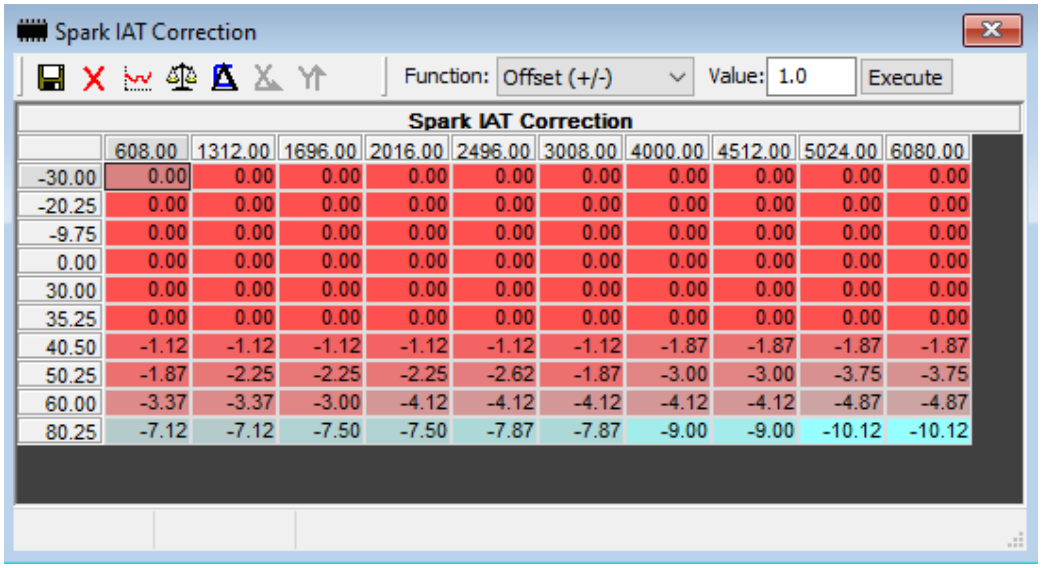
Basic Ignition Angle VVL 0 Intake 0 Exhaust 0

	400.00	700.00	1000.00	1250.00	1500.00	1750.00	2000.00	2500.00	3000.00	3500.00	4000.00	4500.00	5000.00	5500.00	6000.00	6500.00
79.99	17.62	21.37	23.25	26.62	28.87	24.00	25.87	27.00	37.87	40.12	40.12	40.12	40.12	40.12	40.12	40.12
100.00	16.50	18.00	18.37	21.37	31.12	37.12	36.37	36.75	34.12	37.87	40.12	40.12	40.12	40.12	40.12	40.12
150.02	10.12	10.12	10.50	15.00	30.00	36.37	38.62	33.37	31.87	33.37	40.12	40.12	40.12	37.50	36.00	40.12
199.99	8.25	8.25	9.75	16.87	28.87	32.25	27.37	26.25	25.12	25.87	32.25	33.75	31.50	30.37	27.75	29.25
250.01	6.37	6.37	9.75	16.12	24.75	24.37	22.12	21.37	21.37	22.12	27.75	27.37	27.37	26.25	24.75	25.12
299.99	5.62	5.62	9.37	15.00	21.37	21.37	21.00	19.50	18.00	19.12	22.87	24.37	23.25	23.62	22.50	23.25
350.01	4.87	4.87	9.37	14.25	17.62	18.75	16.87	18.00	16.50	17.62	20.62	20.62	21.37	21.37	21.00	21.75
399.99	4.50	4.50	6.00	9.00	12.75	17.25	16.12	15.00	15.00	16.12	19.12	19.12	19.50	20.25	19.87	20.62
499.98	4.50	4.50	0.37	-5.25	4.50	9.37	12.37	12.00	12.00	13.87	16.87	16.50	16.87	17.62	18.00	19.12
599.98	0.00	0.00	0.75	-3.00	3.00	4.12	4.87	10.12	13.87	14.25	15.37	15.75	16.50	16.87	16.50	18.00
699.98	-4.12	-4.12	-2.25	-3.75	1.12	1.87	1.50	7.12	9.75	11.25	12.00	13.12	13.87	14.25	11.25	10.50
800.02	-5.62	-5.62	-3.00	-4.12	0.37	1.12	0.37	1.50	4.12	4.12	6.00	7.12	9.00	9.37	6.75	7.12
900.02	-12.37	-12.37	-7.87	-5.62	-3.00	-5.62	-3.00	-0.75	0.00	1.12	1.50	2.62	2.25	2.62	3.37	5.62
1049.99	-16.12	-16.12	-11.62	-9.00	-6.75	-8.25	-4.87	-4.12	-3.75	-2.62	-1.87	1.12	1.87	1.50	3.00	4.50
1200.01	-18.00	-18.00	-14.25	-12.00	-9.75	-8.25	-6.75	-6.75	-6.75	-5.25	-4.12	-3.00	-0.75	0.75	1.87	3.37
1400.00	-18.00	-18.00	-15.00	-12.75	-10.50	-9.00	-8.62	-8.25	-7.50	-6.75	-4.50	-3.00	-0.75	0.75	1.87	3.37

This is a nice, safe timing curve to start with as you dial in your boost curve. Don't try and tune boost and timing at the same time. Get boost dialed in then work on timing.

Spark IAT Correction

The ECU will either add or subtract timing based on IATs. The stock table is fairly conservative as things heat up but also more aggressive as things cool down. It will add timing when it is very cold out (sub zero Celsius) but also pull timing when it sees IATs go above 30 Celsius/86F (!!). I personally don't care for it to add timing to the table that I've worked hard to refine so I do not add any timing at low temps. You'll tend to find most gas stations are using "winter blends" during the colder months that have less knock resistance anyways. On the other end of the spectrum, I also feel 30C is a bit conservative because you have an aftermarket IC (RIGHT!?!) so don't let it pull timing until 40C. Do whatever feels comfortable to you. Here is my IAT correction table:



Spark IAT Correction

	608.00	1312.00	1696.00	2016.00	2496.00	3008.00	4000.00	4512.00	5024.00	6080.00
-30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-20.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-9.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
40.50	-1.12	-1.12	-1.12	-1.12	-1.12	-1.12	-1.87	-1.87	-1.87	-1.87
50.25	-1.87	-2.25	-2.25	-2.25	-2.62	-1.87	-3.00	-3.00	-3.75	-3.75
60.00	-3.37	-3.37	-3.00	-4.12	-4.12	-4.12	-4.12	-4.12	-4.87	-4.87
80.25	-7.12	-7.12	-7.50	-7.50	-7.87	-7.87	-9.00	-9.00	-10.12	-10.12

IAT isn't the only variable that can affect timing. There are also compensations for different combustion modes, and probably a slew of other variables. No reason to adjust these tables, just leave them alone.

Knock

Do not adjust any knock tables. Once you get comfortable with tuning and have moved to beyond the basics you can start messing with the knock tables.

Camshaft Timing

This is more advanced stuff. Would suggest not messing with these tables on the stock turbo. There isn't any hidden power on stock turbo setups in these maps.

Fueling

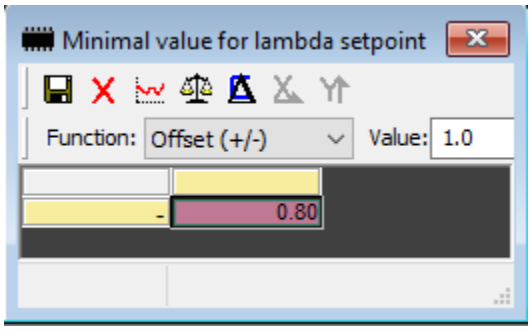
LPFP
You don't need to touch anything in here if you are on the stock LPFP.

HPFP
Don't touch anything in here either.

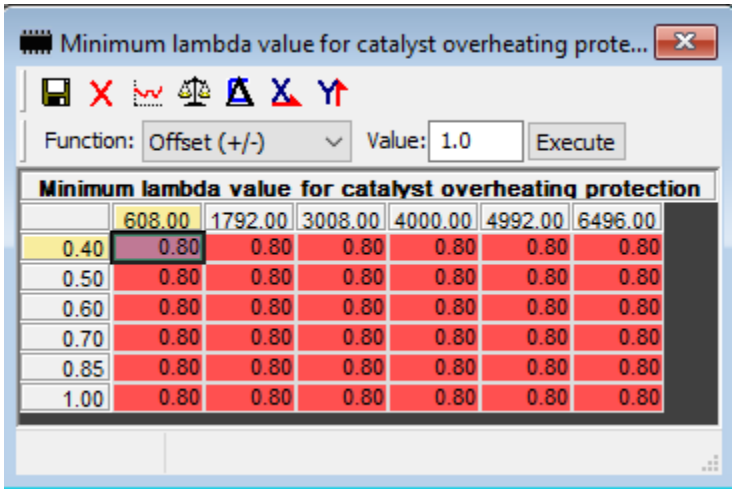
Lambda
Yeah, we need to fatten this thing up.

Pump gas cars will need to run it pretty fat, the fuel will help cool the cylinders and prevent heat related knock. First off we are going to reduce the tables impacting fueling down.

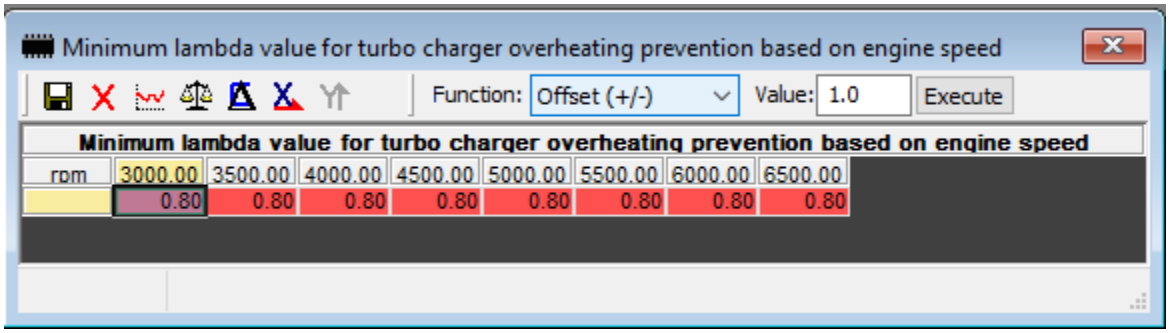
Make this 0.80:



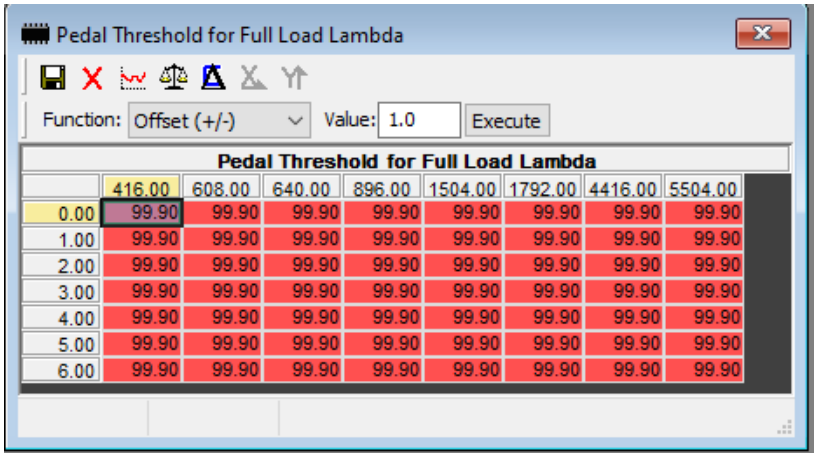
This too:



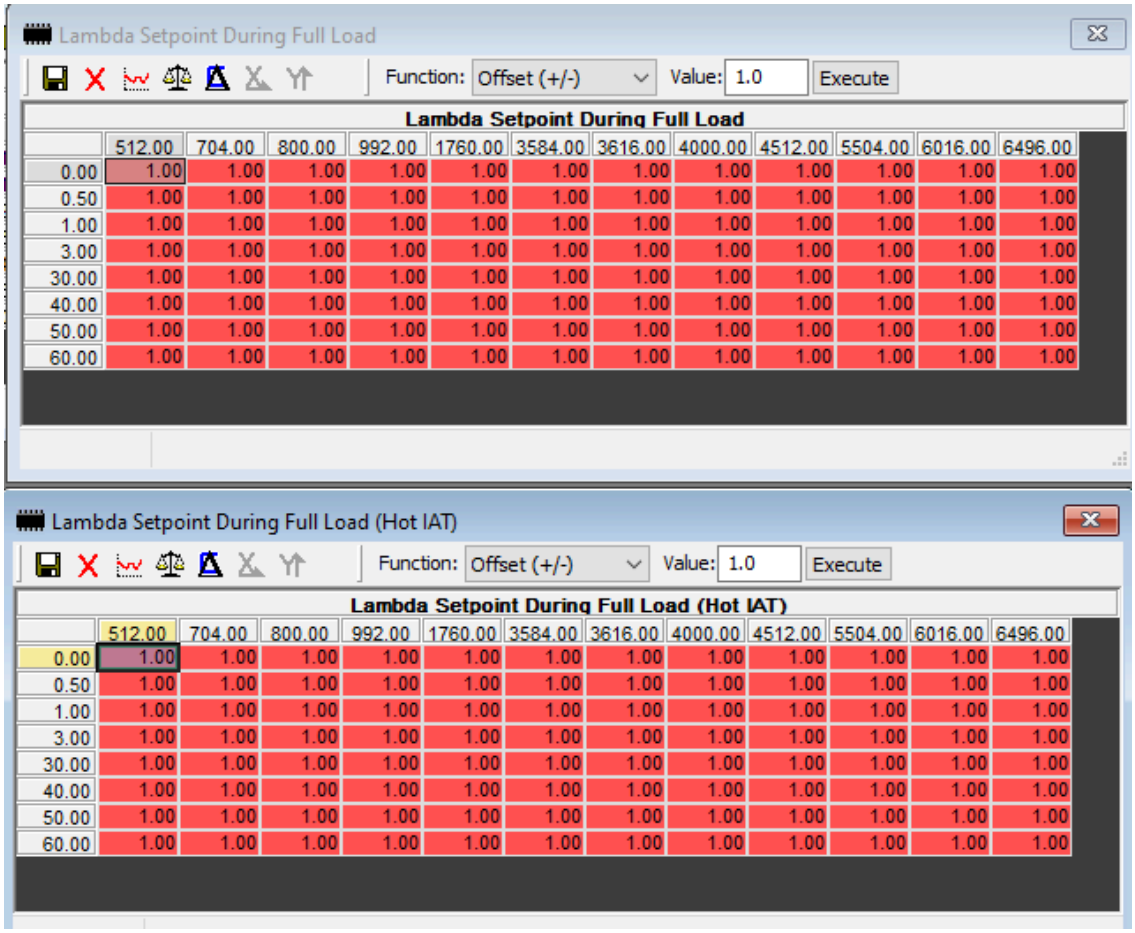
And lastly this one:



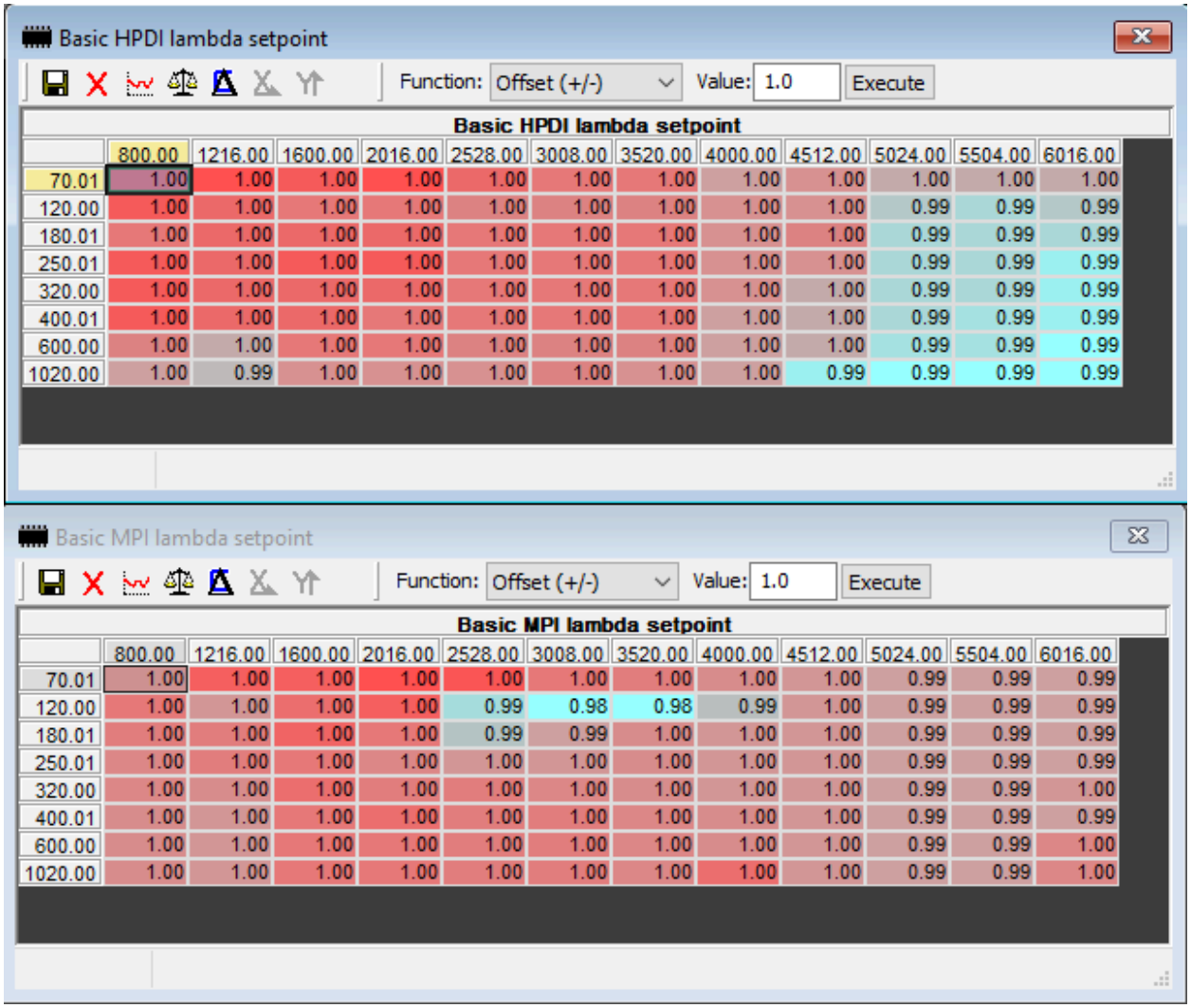
We also want it to fatten up at heavy throttle, not just WOT (99%). So make this table something like 70 or 75 across the board:



These tables should both be entirely 1. If not, make them both entirely 1.



Ok, so we are down to the last 2 tables to modify. These are going to be used for our lambda curves. We are going to make them both the same. They will look something like this:



Basic HPDI lambda setpoint

Function: Offset (+/-) Value: 1.0 Execute

Basic HPDI lambda setpoint

	800.00	1216.00	1600.00	2016.00	2528.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00
70.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
120.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
180.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
250.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
320.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
400.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
600.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
1020.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99

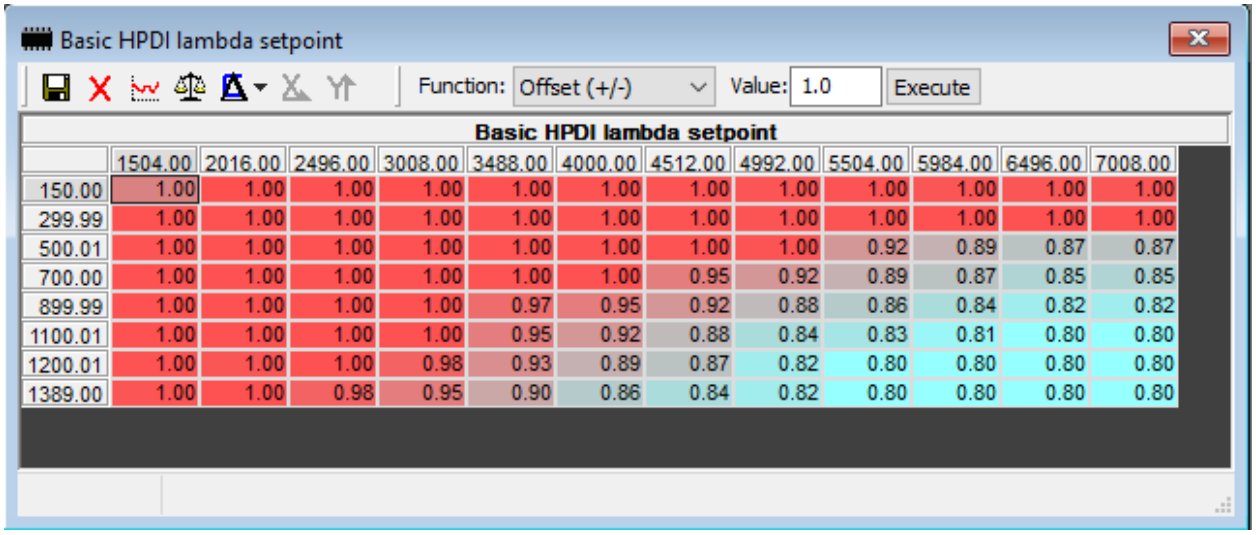
Basic MPI lambda setpoint

Function: Offset (+/-) Value: 1.0 Execute

Basic MPI lambda setpoint

	800.00	1216.00	1600.00	2016.00	2528.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00
70.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
120.00	1.00	1.00	1.00	1.00	0.99	0.98	0.98	0.99	1.00	0.99	0.99	0.99
180.01	1.00	1.00	1.00	1.00	0.99	0.99	1.00	1.00	1.00	0.99	0.99	0.99
250.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
320.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00
400.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99
600.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00
1020.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	1.00

It's rpm along the x-axis and airmass mg/stk along the y axis. Fueling is everyone's personal preference but try and keep it a little lean during spool and fat(ish) at full load. This is a good starting point for IS20 cars:



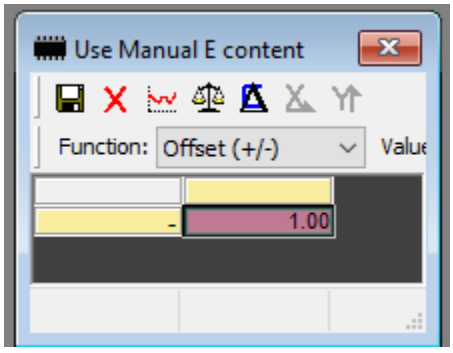
	1504.00	2016.00	2496.00	3008.00	3488.00	4000.00	4512.00	4992.00	5504.00	5984.00	6496.00	7008.00
150.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
299.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
500.01	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.89	0.87	0.87
700.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.92	0.89	0.87	0.85	0.85
899.99	1.00	1.00	1.00	1.00	0.97	0.95	0.92	0.88	0.86	0.84	0.82	0.82
1100.01	1.00	1.00	1.00	1.00	0.95	0.92	0.88	0.84	0.83	0.81	0.80	0.80
1200.01	1.00	1.00	1.00	0.98	0.93	0.89	0.87	0.82	0.80	0.80	0.80	0.80
1389.00	1.00	1.00	0.98	0.95	0.90	0.86	0.84	0.82	0.80	0.80	0.80	0.80

Note both axis have been modified. Make MPI table the same.

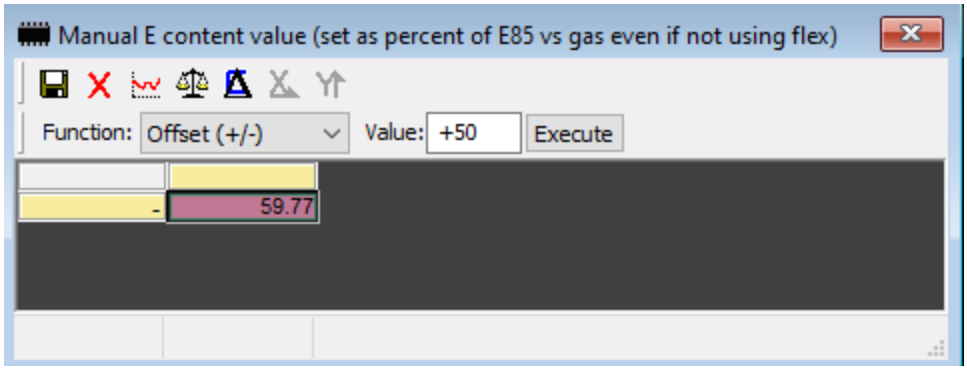
Running Ethanol (no sensor)

You need to tell the ECU you are running ethanol and what percent. Go into the Flex Fuel folder.

Set this to 1:

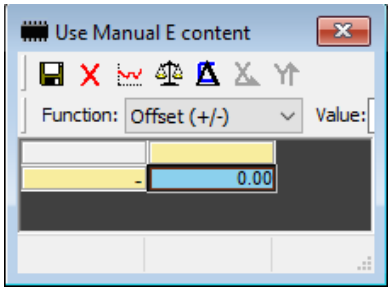


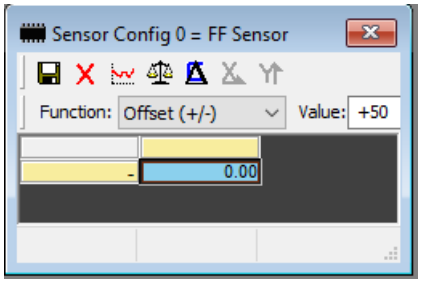
Set this to the amount of ethanol you are running. I run around E60.

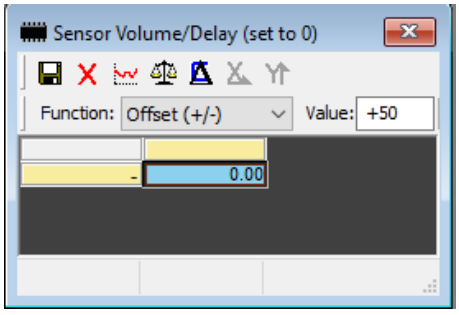


Ethanol Sensor

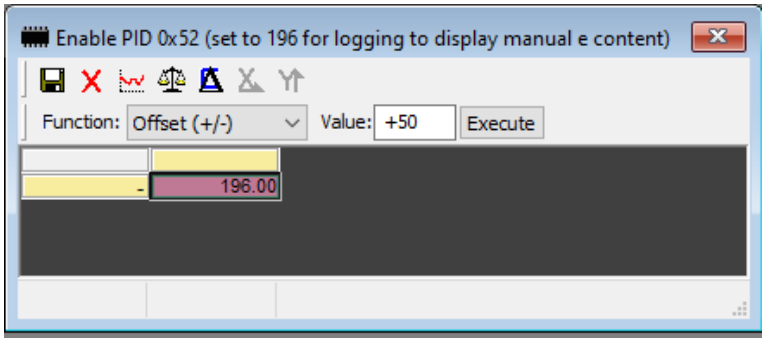
Got one all wired up to the ECU? Great!! You can see ethanol content with SimosTools with 4 easy steps. Go into Flex Fuel and set all of these to 0:





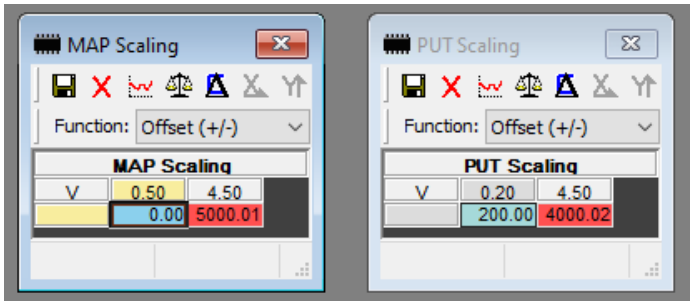


Make sure this is set to 196 (it usually is by default):



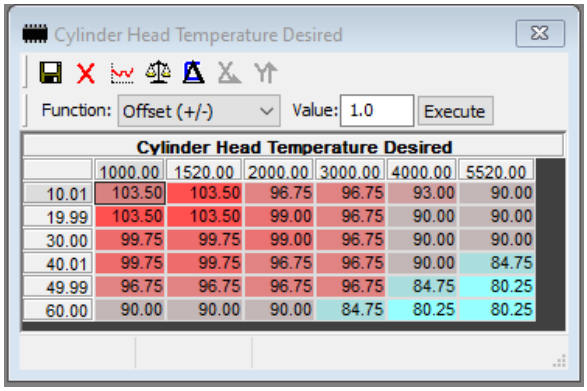
MAP and PUT Sensor Scaling

The stock car comes with 3bar sensors in each spot. Don't touch these tables unless you have changed out one or both of your sensors. If you have upgraded either sensor here is the scaling to use. Your xdf should also have the axis defined to change the voltage as well, so make sure you change the axis as well.



Cooling

Wanna know the secret to all those tuners claiming "LOOK WE LOWERED TEH OIL TEMPS!" Child's play. Here you go. Just lower the cylinder head temp setpoint.



Cut 5 out of everything over 90. Done.

LIMITERS

Lastly we need to move some limiters out of the way so the tune will do what you ask it to do without unwanted intervention.

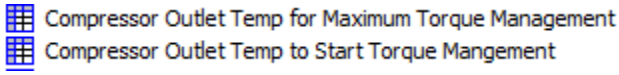
Your logging list might have something called “Torque Lim”. These are limiters placed in the ECU to save you from yourself. Some will not intervene, some will. If you are running into issues when you are tuning, have a gander at this PID and it might shed some light into what is causing your issue.

Torque / Airflow Limiters

Torque Limit Source is loggable if you have access to 3E memory logging. The output value is broken down by limiters below.

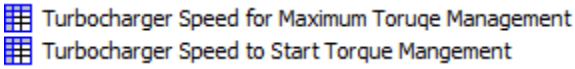
- **16384 = Permanent torque limitation because of too high exhaust gas temperature**
- **8192 = Permanent torque limitation because of boost pressure actuator related error**
- **2048 = Permanent torque limitation because of too high charger speed**
- **1024 = Permanent torque limitation because of error via FARM**
- **512 = Permanent torque limitation because of too high intake air temperature**
- **256 = Temporary torque limitation because of high charger speed**
- **128 = Temporary torque limitation because of operation at maximum charge pressure ratio (Max Pressure ratio table)**
- **64 = Temporary torque limitation because of operation at maximum absolute charge air pressure setpoint**
- **32 = Temporary torque limitation because of high intake air temperature (Modeled compressor outlet temp)**
- **0 = None (Driver demand)**

These compressor temp maps will limit you once you start pushing some boost.



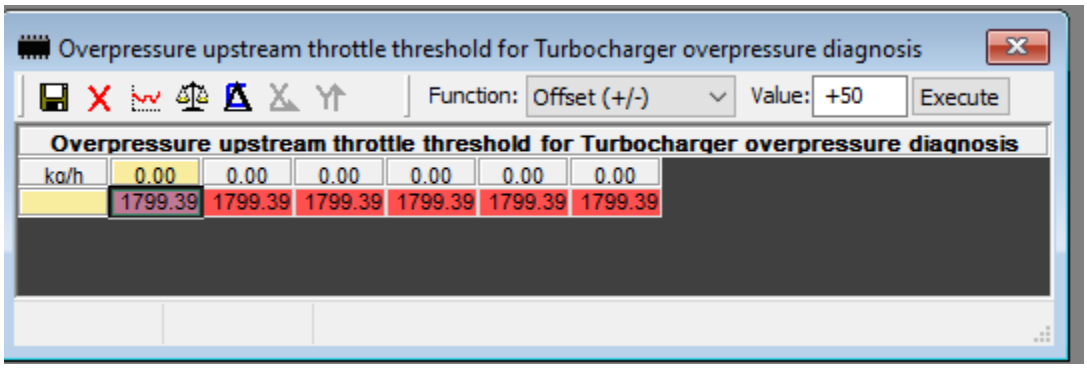
Move them out of the way, **300** should work.

You might start bumping into the turbo shaft speed limiter as well once you start pushing heavy boost. Move these both up to **220k**.

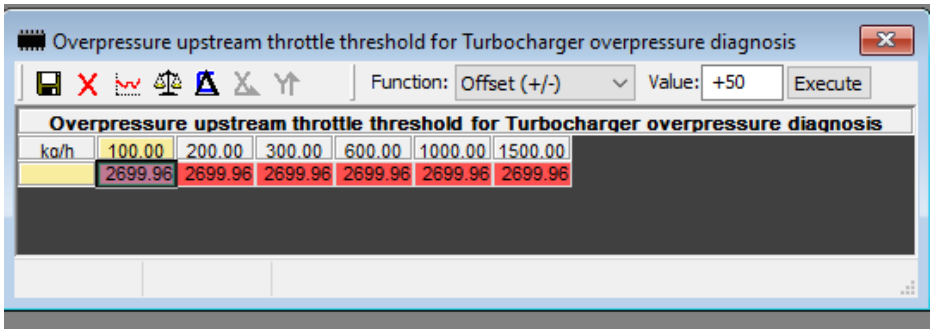


Your boxcode might have an overboost limit in place that will trigger P0234 when you go past 26psi. You can bump this up to 2700 so as not to trigger the code. Some boxcodes already have this above 2700 so you can ignore, otherwise go ahead and move it up out of the way. DO NOT EXCEED THE UPPER LIMIT. YOUR CAR WILL NOT MAKE ANY BOOST. IF YOU SAVE VALUES OVER THE UPPER LIMIT THE TABLE BREAKS AND YOU CANNOT FIX IT. LOWERING THE VALUES BACK DOWN DOES NOT FIX IT. IT'S A TUNERPRO BUG SO JUST….DON'T. 2700 is plenty!

Yours might look like this:

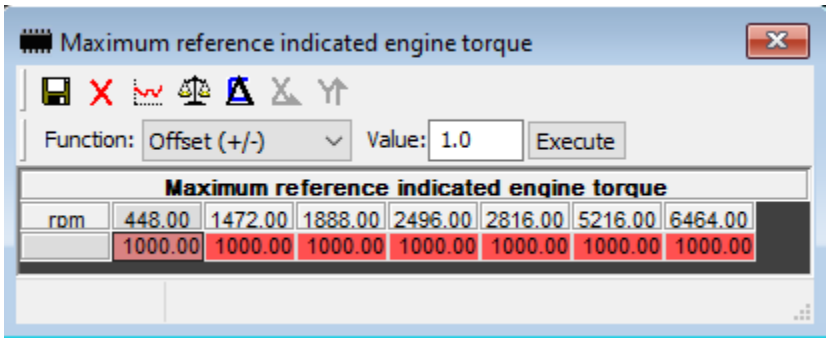


Increase to this:

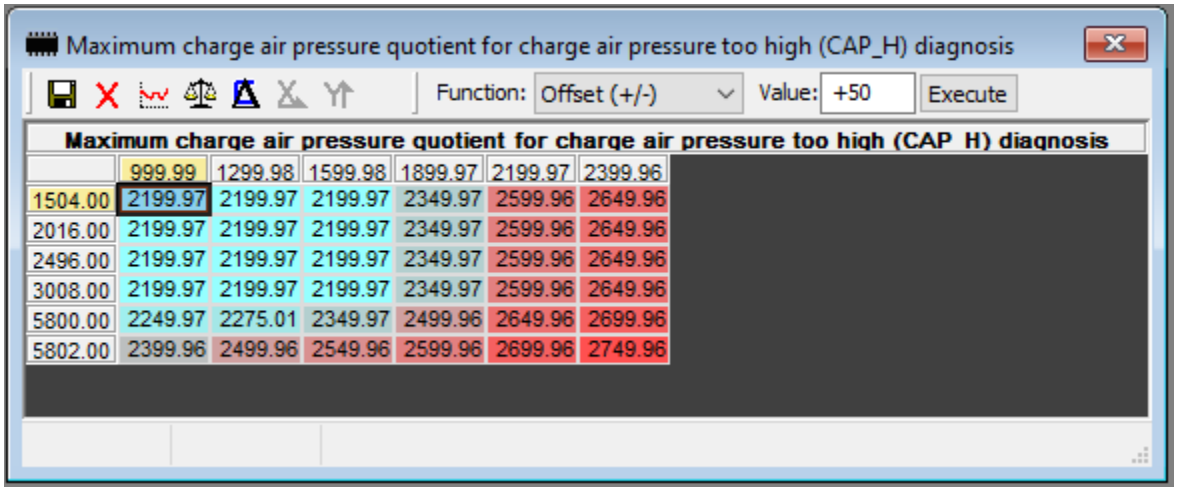


IF YOURS IS ALREADY OVER 2700 DO NOT TOUCH THIS TABLE.

Move Maximum reference indicated engine torque out of the way:

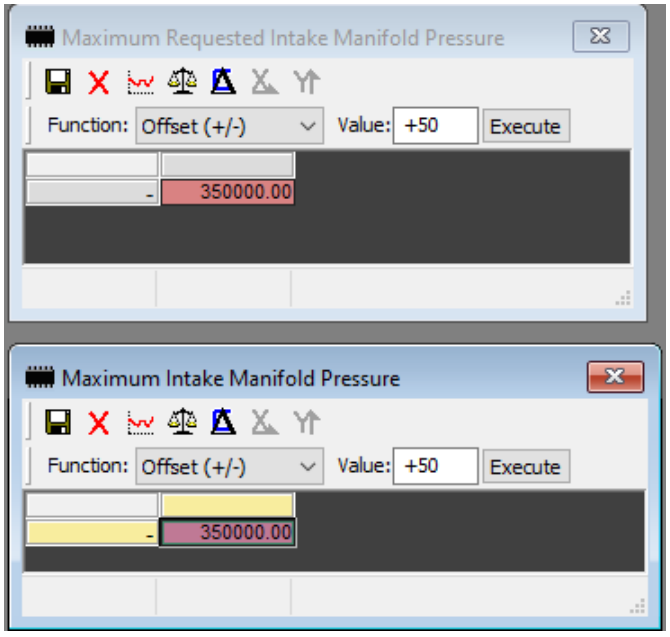


Move charge air pressure too high out of the way. Make this entire table 3000:

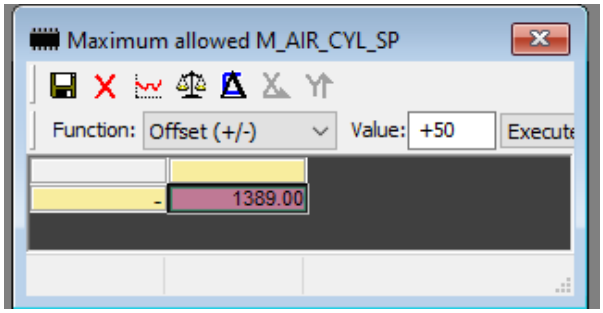


TunerPro has an odd issue with floats. These next items you need to save and reopen the table to confirm accuracy.

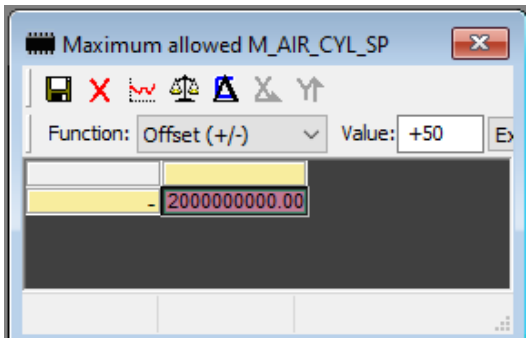
Move maximum requested pressure out of the way. 350000 is fine.



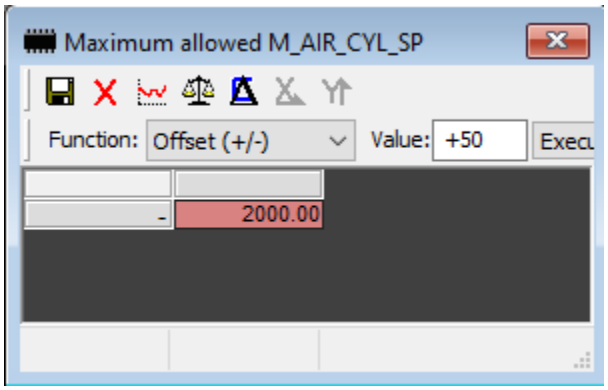
Maximum allowed airmass needs pushed up. 2000 is fine.



If you input 2000 it will probably look like this:

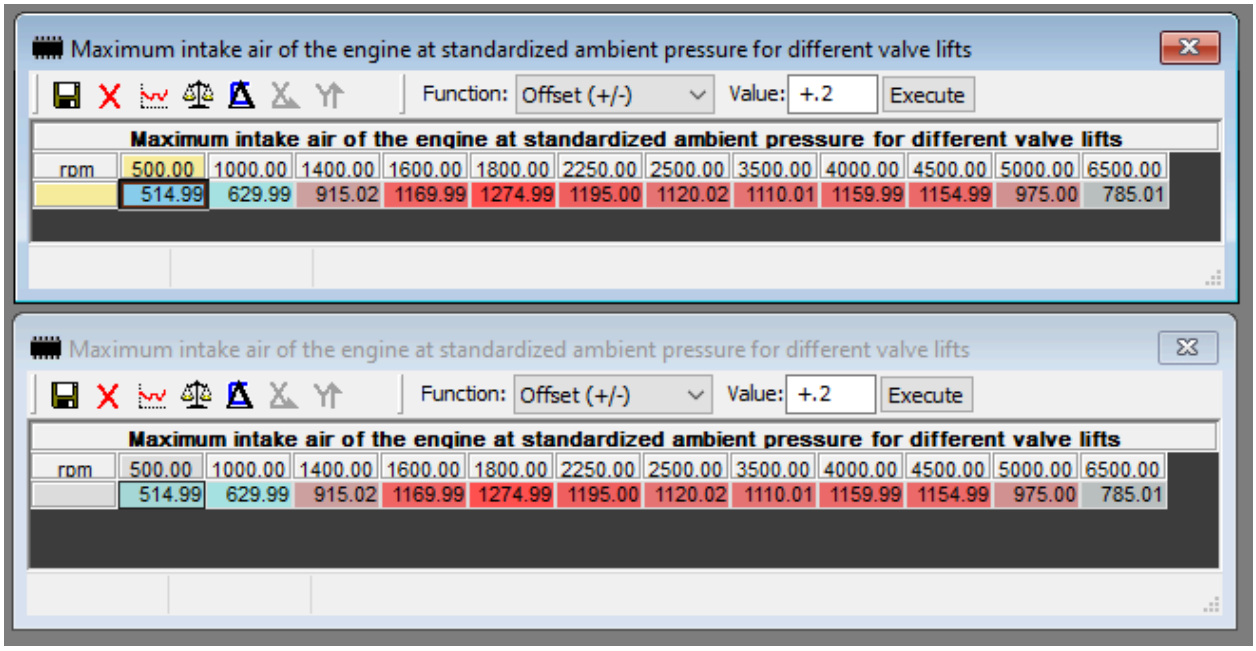


That's ok. Instead type in 0.002. Wallah:

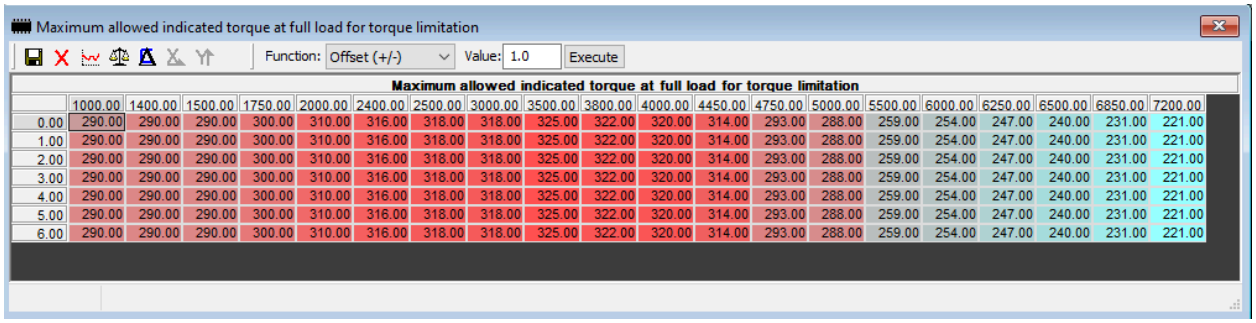


You can play around with the formula editor to fix this but you're never going to change it again so why bother.

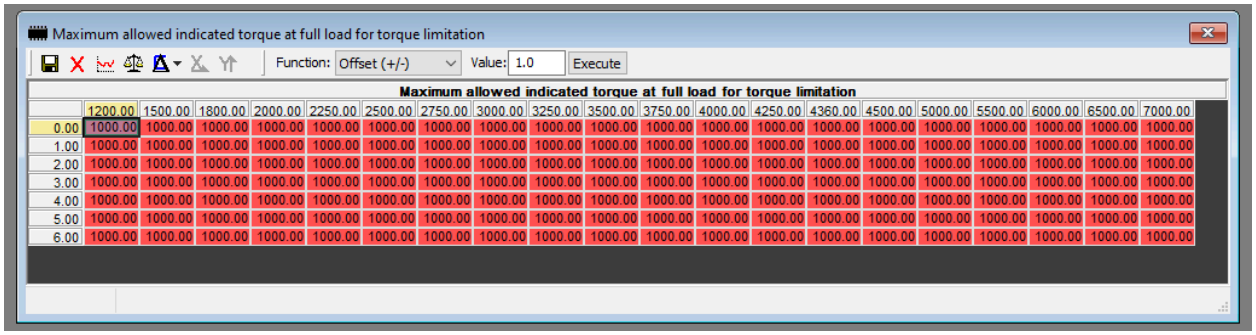
Go ahead and set these 2 maximum intake air tables to 2000 across the whole rev range



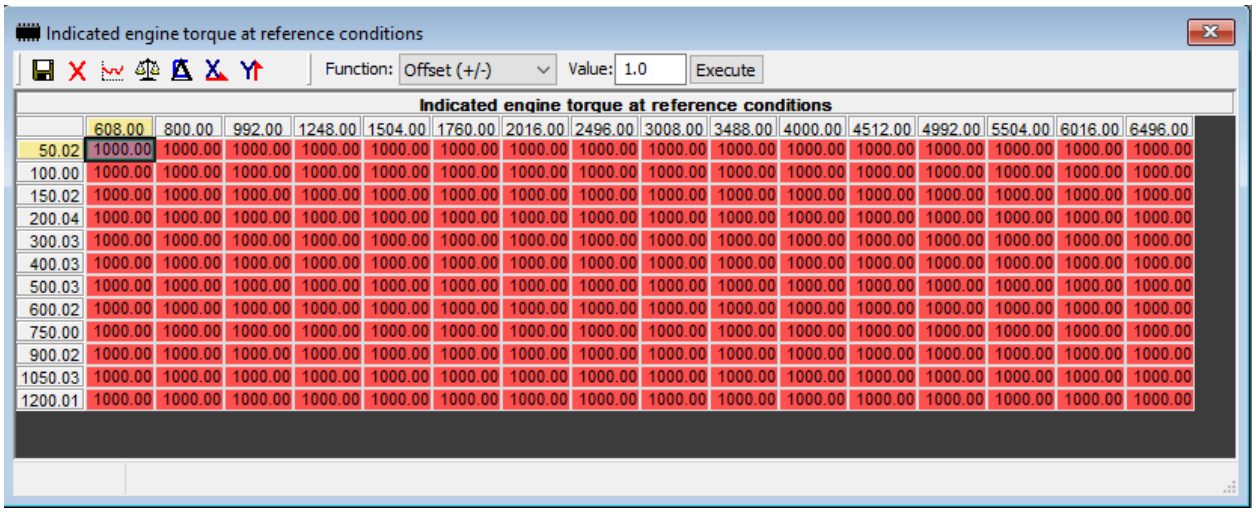
Move this table out of the way if it isn't already over 1000. 1000 is fine…just out of the way is all that's needed. Yours might appear similar to this:



Make it this:



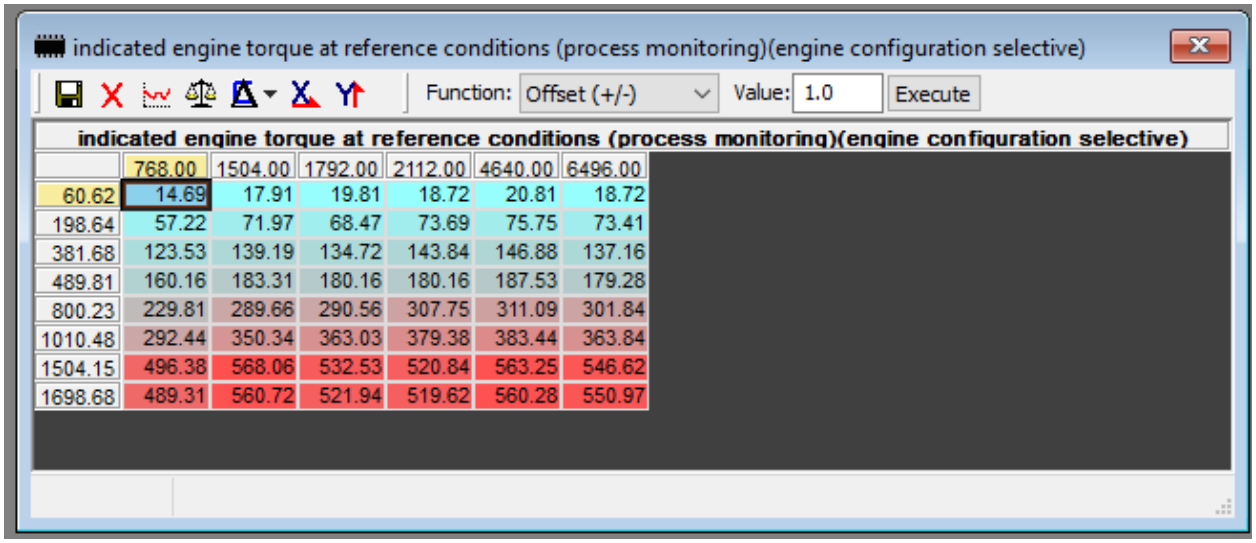
Move this one up to 1000:



Indicated engine torque at reference conditions

	608.00	800.00	992.00	1248.00	1504.00	1760.00	2016.00	2496.00	3008.00	3488.00	4000.00	4512.00	4992.00	5504.00	6016.00	6496.00
50.02	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
100.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
150.02	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
200.04	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
300.03	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
400.03	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
500.03	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
600.02	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
750.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
900.02	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
1050.03	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
1200.01	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00

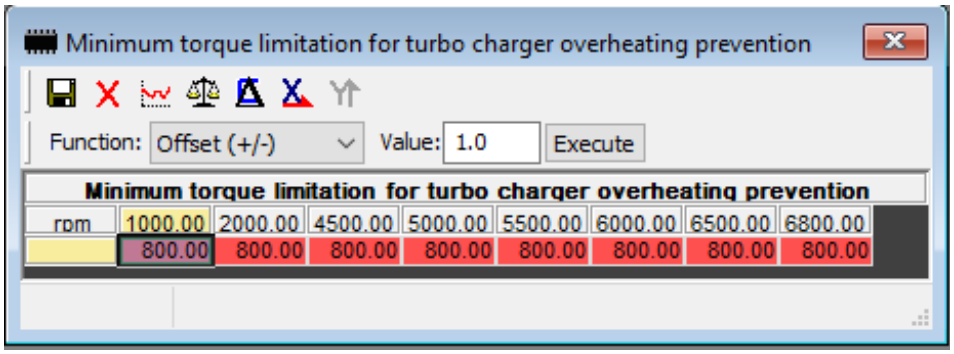
You might also come across a similarly named table for process monitoring. DO NOT adjust this one. Leave it stock:



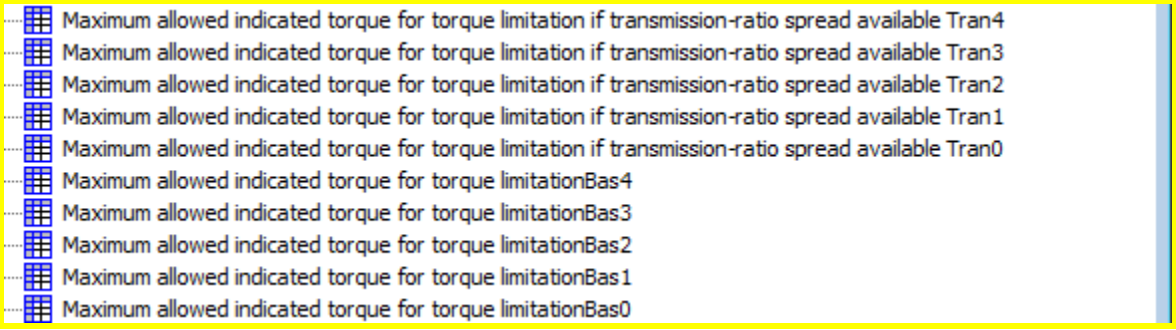
indicated engine torque at reference conditions (process monitoring)(engine configuration selective)

	768.00	1504.00	1792.00	2112.00	4640.00	6496.00
60.62	14.69	17.91	19.81	18.72	20.81	18.72
198.64	57.22	71.97	68.47	73.69	75.75	73.41
381.68	123.53	139.19	134.72	143.84	146.88	137.16
489.81	160.16	183.31	180.16	180.16	187.53	179.28
800.23	229.81	289.66	290.56	307.75	311.09	301.84
1010.48	292.44	350.34	363.03	379.38	383.44	363.84
1504.15	496.38	568.06	532.53	520.84	563.25	546.62
1698.68	489.31	560.72	521.94	519.62	560.28	550.97

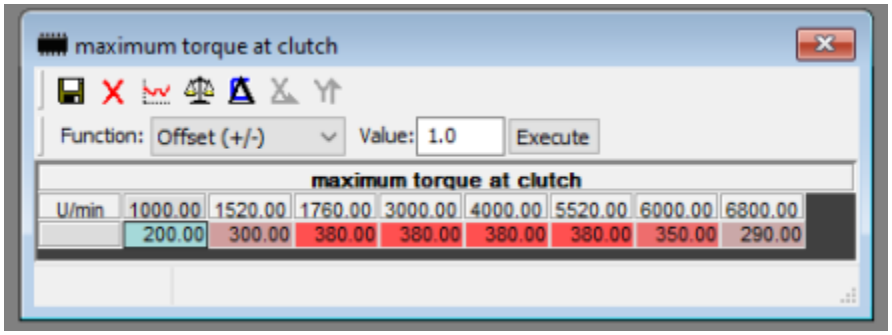
Move this out of the way. 800 is fine.



For those on V30 (18.2 architecture) move all 10 of these tables up out of the way (1000 is fine):

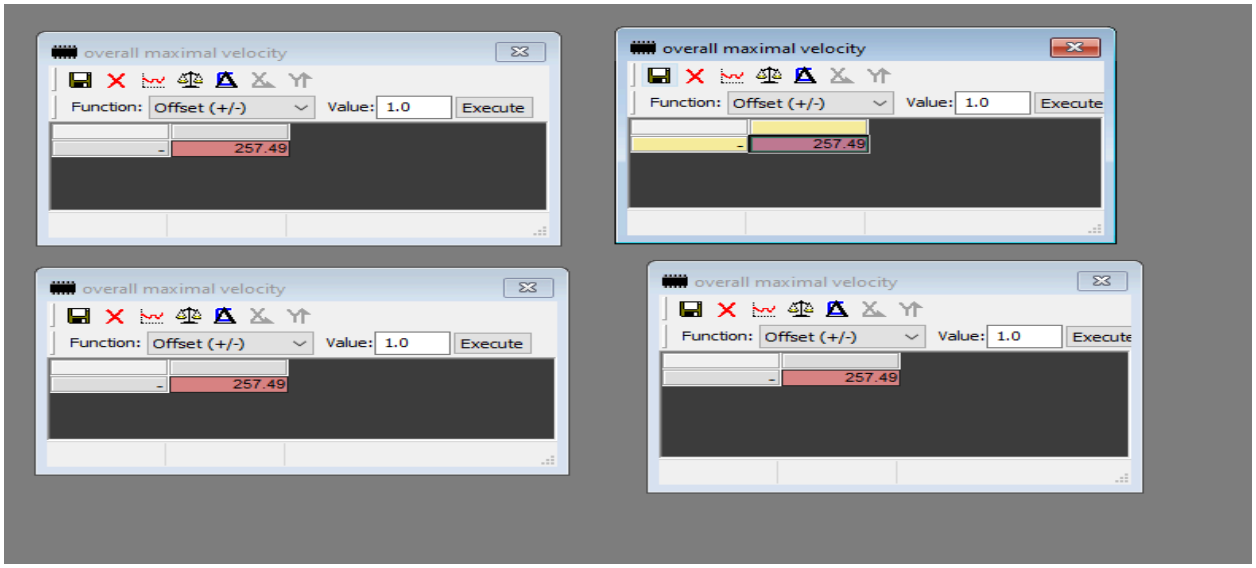


For those on LB6 move all this table up out of the way (600 is fine):



Removing the Speed Limiter

Under the Limiter folder and under Speed you will find 4 tables called overall maximal velocity. These will be set to 200kph. Increase to whatever speed you think you need to achieve. Set all 4 the same. I have set mine to 257.49 (160m ph).



DSG Sharts

The ECU cuts timing at the shift to create the fart noise. The table Min Spark Added During Gearshift works in union with the Minimum Timing tables to effectively reduce torque during the gearshift. These will determine the loudness and when it will fart. Some BINs have lower Minimum Timing tables and require less (lower negative values) Spark Adder. This is a stock 259L Min Spark table:

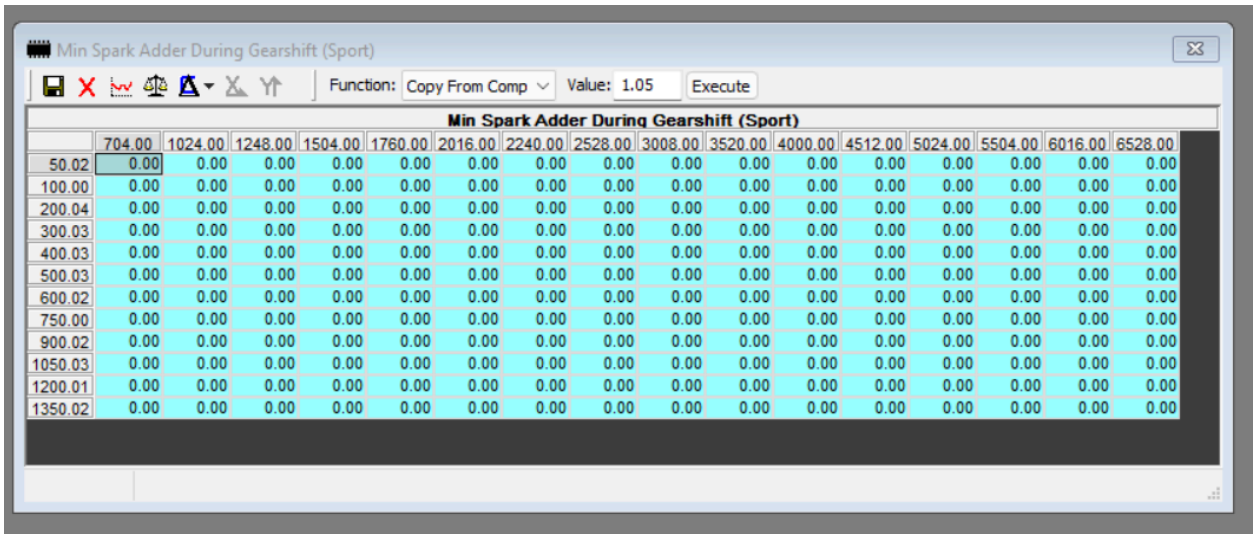
Min Spark Adder During Gearshift

Function: Offset (+/-) Value: 1.0 Execute

Min Spark Adder During Gearshift

	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2240.00	2528.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6528.00
50.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.03	-4.87	-4.87	-4.87	-4.87	-4.87	-4.87	-4.87	-4.87	-4.87	-4.87	-3.75	-2.62	-2.62	-2.62	-2.62	-2.62
500.03	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-8.62	-6.75	-6.75	-6.75	-6.75	-6.75
600.02	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-9.37	-8.25	-8.25	-8.25	-8.25	-8.25
750.00	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-9.75	-9.37	-9.37	-9.37	-9.37	-9.37
900.02	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.87	-10.87	-10.87	-10.87	-10.87	-10.87
1050.03	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00
1200.01	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00
1350.02	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-10.12	-12.00	-12.00	-12.00	-12.00	-12.00	-12.00

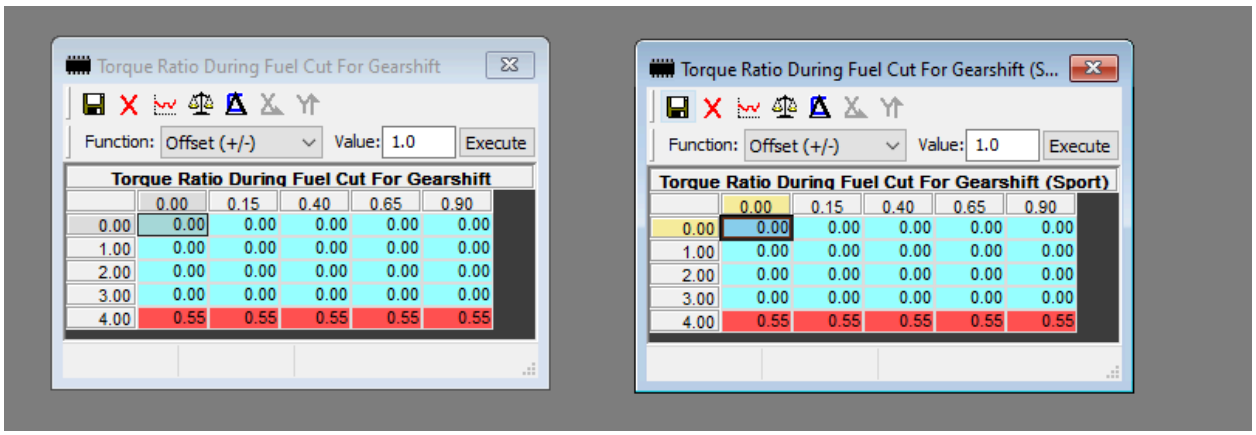
For example, this is what a R table looks like:



	704.00	1024.00	1248.00	1504.00	1760.00	2016.00	2240.00	2528.00	3008.00	3520.00	4000.00	4512.00	5024.00	5504.00	6016.00	6528.00
50.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
750.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1050.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1200.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1350.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

As usual, RPM vs airmass. Take a drive in your car and log. Roll down the windows and listen as you drive noting the fart noises you emanate. Vary throttle as you bang through the gears with your sweet floppy paddles. Want it to fart louder? Lower the timing. Too quiet at very light throttle and you want it to ALWAYS FART. Make some of those zeros in the 200-300mg/stk tables into negative numbers. Try not to get too heavy you want that cat to last for awhile, they aren't cheap anymore.

This is Torque Ratio During Fuel Cut for Gearshift table. The values in row 4 reference a cylinder count in the "SCC Pattern depending on SCC efficiency" table. On this 259L BIN, 0.55 Torque Ratio refers to 1 cylinder shut down during the gearshift.

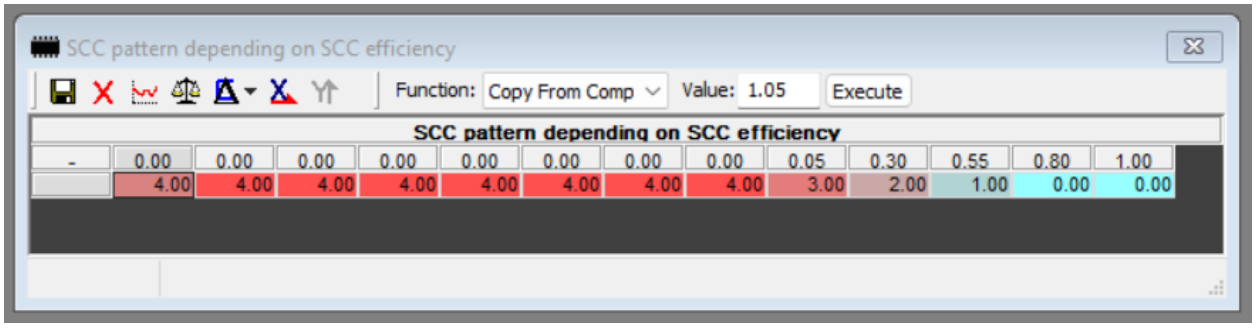


	0.00	0.15	0.40	0.65	0.90
0.00	0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00	0.00	0.00
4.00	0.55	0.55	0.55	0.55	0.55

The combination of different amounts of cylinders being shut down and different spark adder values can drastically change the feeling of the gearshift and the noise being produced. If you want that famous, obnoxious, violent diarrhea sounding DSG fart, keep Spark Adder in the -18

to -30 range and cut only 1 cylinder. I'd suggest trying 1 to 3 cylinders cut with reasonable Spark Adder values.

Note: Keep an eye on boost during shift, as these tables can make it spike or cut too much power on shift.



POPS N BANGS

Pops and bangs sounds like ass on these cars. Don't.

But….
If you're an idiot (like me) do the following things

Enable Switch for Impulse Combustion
(Original Name: Enable the activation of the impulse combustion mode)
Set this to 1.00

Impulse Combustion Drive Mode Bitmask
(Original Name: Bitmask to configure impulse combustion for different driving modes)
Set this to 63 for all modes, including Neutral

Min RPM for Impulse Combustion
(Original Name: Minimum engine speed threshold to activate impulse combustion)
This is the RPM threshold for activating impulse combustion

Clutch States That Allow Impulse Combustion
(Original Name: Map to state of converter clutch with active impulse combustion)
Set this to 1.00 across

Impuse Combustion Config During Gearshift (Bitmask)
(Original Name: Bitmask to configure impulse combustion for different gearbox interventions)
Set this to 2.00

Torque Difference to Enable Impulse Combustion
(Original Name: Minimum Threshold value for TQ_REQ_DIF_TRA for impulse combustion to be active)
Further research needed, but setting this to 5.00 activated burbles after downshift without any throttle input for me. Set to 15.00 if this is not something you want

Enable Impulse Combustion Ouside of Fuel Cutoff State
(Original Name: Enables impulse combustion out of PUC state)
Set this to 1.00

Max Time Allowed in Impulse Combustion
(Original Name: Maximum time after begin of PU during which LV_IMP_COMB_ENG can be set)
This caps the amount of time the engine will be in impulse combustion so set this to your liking (2 to 6 is good enough). RPM is x-axis.

Impulse Comb Time by Gear (DCT) (Sport)
(Original Name: Activation time for impulse combustion dependent on engine state for sport mode)
Now there are 8 maps in total, Drive and Sport maps for all transmission types, so you can adjust the duration for each gear (y-axis) and RPM (x-axis) depending on mode.

Impulse Comb Time After Gear Shift
(Original Name: Activation time for impulse combustion during gear shift)
Again, same deal as the previous tables. I find 2.00 works well across the whole spectrum.

Spark During Impulse 0 Exh Flaps Closed
(Original Name: Late ignition angle for impulse combustion active - sound flap active)
There are 4 maps for this, depending on opened/closed flaps. This is the degree of IGN retard that will make the combustion incomplete and then kaboom in your exhaust.
Depending on your downpipe and exhaust this will vary a lot. You can start with -18 but I wouldn't go beyond something like -22 on stock cat. If you want to make your catted downpipe catless, make this whole map something like -35. Try different values and refine after.

Limiters
There are a bunch of oil and coolant related limiters, just set to like 60 or 70 deg as you wish. Also move all muffler and cat temperature limiters out of the way (make Mins. 0 and Maxs. 2000)

Factor to reduce impulse combustion duration dependent on dynamic catalyst temperature
Set this to 1.00 across

Delay time for new activation of impulse combustion when catalyst is hot
Set this to 0.00

Max Torque Impulse Combustion is Allowed
(Original Name: Torque threshold below which impulse combustion gets active)
Set this to 250 across

In addition to N_CTL, impulse combustion due to gear shift can be activated also with torque intervention
Set this to 1.00

Enable impulse combustion independent of torque request is below TQI_BOL_IGA
Set this to 1.00

Fuel shut-off pattern index for IMP_COMB
You can try different combinations for different sounds, personally 0.00 across the whole table works well, you can try 1.00 and also 2.00. Some different OEM files have this at a variation so you could emulate that also.

NOTE: lots of parameters in here you can modify and adjust to your liking, but you could run these and it should do the trick.