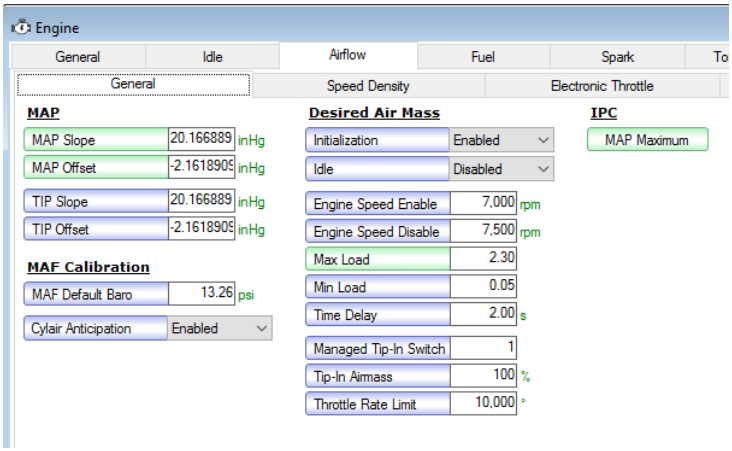
HP Tuners for EcoBoost Tuning Guide V1.6 (Engine/Turbo guide)
Last Revised: 1/21/2017 17:47:00
By: metroplex

This is directly applicable to 2013-up Taurus SHO, but may work for the Explorer/MKS/Flex/MKT. The core table changes might even be applicable to other EcoBoost models. This guide is intended to help other DIY tuners with their EcoBoost engines since there's not a whole lot of information being directly shared within the community. I'm going to focus mainly on increasing airflow and boost on a stock SHO (no changes to air intake, exhaust, turbochargers, etc…) and not really delve too deep into the transmission settings. The transmission settings shown below are only suggestions and what I've been using, and are not necessarily proper settings. The following advice/information is only provided for educational purposes. Use it at your own risk. You will want to run 93 octane fuel since the factory tune will even hit the 7.5 degrees limit of knock retard with 87 octane. I was more interested in seeing how the EcoBoost tuning worked than trying to compete with aftermarket tunes. With 93 octane, I found that there's 0 knock retard up to about 3 degrees knock retard depending on fuel quality and environmental conditions using these settings. At about 100F ambient, my ECT stays around 193F and my trans fluid temp peaks out around 188F. My stock airbox helps keep the IAT reasonable.

Note that any time AD counts are mentioned, it's an Analog-Digital conversion factor for analog voltage to digital counts. For instance, my accelerator pedal maxes out at around 3.99 VDC (let's just say 4.00 VDC) which is multiplied by 204.8 to get AD counts, or roughly 817-819. I knew the exact reason for the 204.8 at one time, but I forgot and that was about 13-14 years ago when someone in the know was helping out the tuning community.

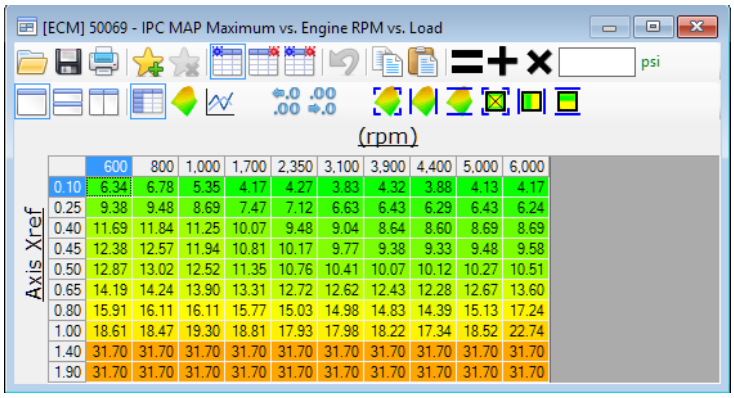
Engine -> Airflow -> General



The MAP sensor settings are only changed when a 3-bar sensor is installed. For the Taurus, the factory equipped TIP sensor is a 3-bar sensor, and you can buy one from Rockauto or another vendor (Motorcraft CX-2231) to install onto the intake manifold (torque to 10 N-m) replacing the factory 2-bar sensor. The only reason to do this is if you plan to run more than 15.5 psi of boost at the intake manifold, because that is where the 2-bar sensor stops reading. As you can see, I simply copied the TIP sensor slope and offset over to the MAP.

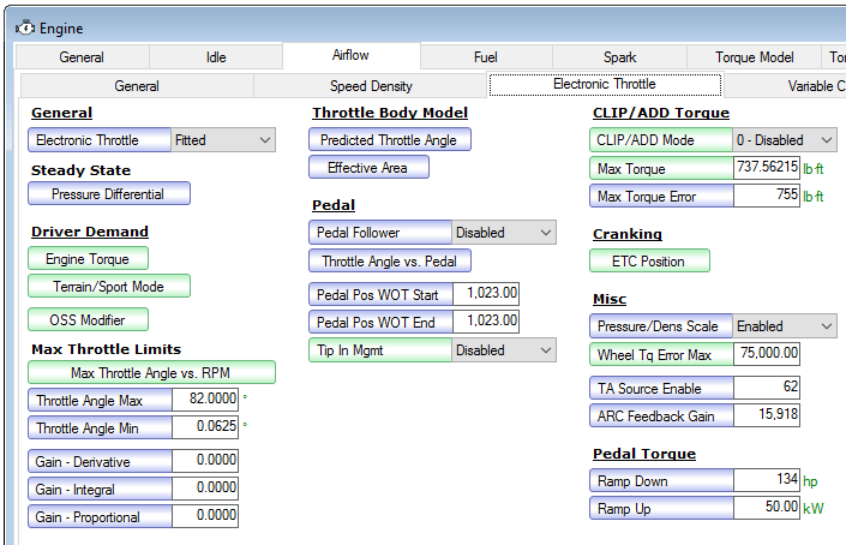
The IPC (Independent Plausibility Check) MAP Maximum table should be changed to avoid any limitations. I'm not exactly sure what this table impacts. I basically increased the values in the last 2 rows. I believe these values are absolute, so you have to factor in/subtract atmosphere barometric pressure (about 14.3-14.7 psi). My values could stand some refining, so they're not to be taken as gospel. I set it for 31.7 psi or roughly 17 psi but actual MAP pressure has gone over this value. I suspect it is just part of a calculation.

Max Load should be raised above what you expect for maximum airload. For the 3.5L EcoBoost, airload typically maxes at 1.80 so I chose 2.30

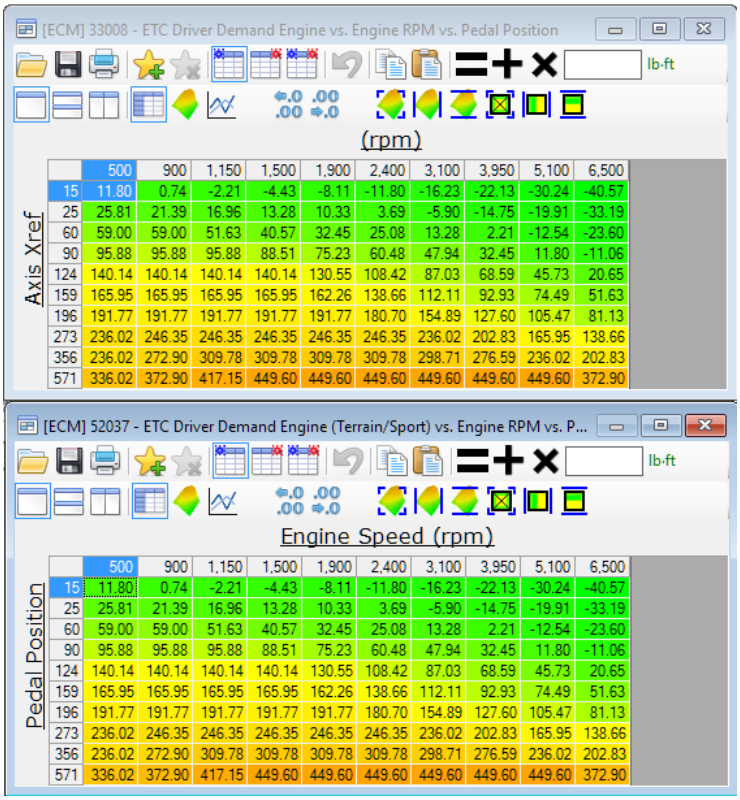


	600	800	1,000	1,700	2,350	3,100	3,900	4,400	5,000	6,000
0.10	6.34	6.78	5.35	4.17	4.27	3.83	4.32	3.88	4.13	4.17
0.25	9.38	9.48	8.69	7.47	7.12	6.63	6.43	6.29	6.43	6.24
0.40	11.69	11.84	11.25	10.07	9.48	9.04	8.64	8.60	8.69	8.69
0.45	12.38	12.57	11.94	10.81	10.17	9.77	9.38	9.33	9.48	9.58
0.50	12.87	13.02	12.52	11.35	10.76	10.41	10.07	10.12	10.27	10.51
0.65	14.19	14.24	13.90	13.31	12.72	12.62	12.43	12.28	12.67	13.60
0.80	15.91	16.11	16.11	15.77	15.03	14.98	14.83	14.39	15.13	17.24
1.00	18.61	18.47	19.30	18.81	17.93	17.98	18.22	17.34	18.52	22.74
1.40	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70
1.90	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70

Engine -> Airflow -> Electronic Throttle



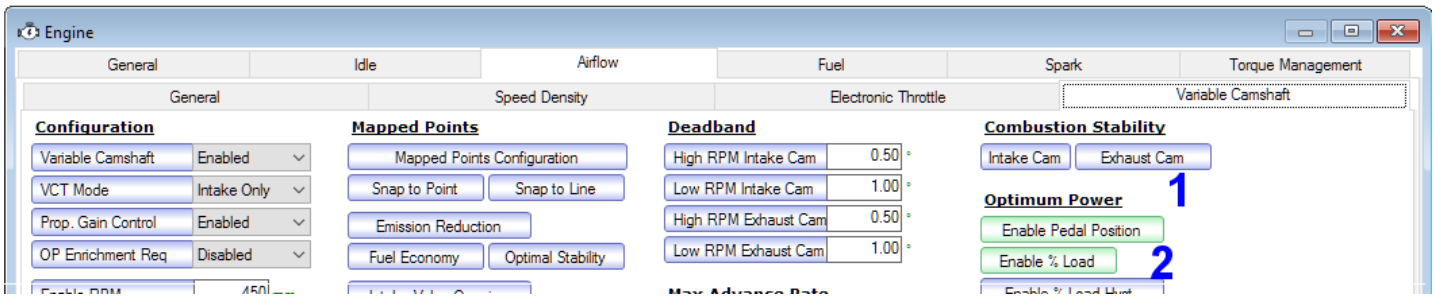
You can cause some issues with the drive by wire system if you make drastic changes to the low throttle position values of the Driver Demand Engine Torque table, so exercise extreme caution. I only increased the values for the last row on both the Engine Torque and Terrain/Sport Mode tables (#1 and #2). HPTuners added the Terrain/Sport Mode table as of VCM 3.20.53



Terrain Driver Demand is the table for Sport Mode. Modifying Terrain Driver Demand will impact the requested torque/boost in Sport mode. The above tables impact how the ECU handles your torque request via the throttle. If you change Pedal Pos WOT Start/End, it supposedly causes the ECU to ignore the Driver Demand table and will try to make as much torque as possible/limited. From experimentation, I found that this does force the throttle plate open even during shifts, but the ECU starts lowering your desired TIP and reduces WGDC causing your boost to peak fast, but dips back to stock. This is not very good as your peak mass flow is essentially stock at near 38 lb/min. If you keep the WOT Start/End settings stock (1023 AD counts as shown above), this allows the ECU to handle the WGDC and Desired TIP calculations. As long as the proper torque limiters, inverse clip torque, inverse exhaust flange temp, and other load/torque limiters are raised, the ECU will keep the throttle open except during shifts. From experimentation, it looks like the OSS Modifier table has multipliers which are multiplied with the Driver Demand values to yield “Desired Brake Torque”, while “Scheduled Torque” is approximately 12% more than “Desired Brake Torque”. These are PIDs that can be logged in VCM Scanner. I haven’t found a correlation between the DD values and actual boost, but it just needs to be increased above stock.

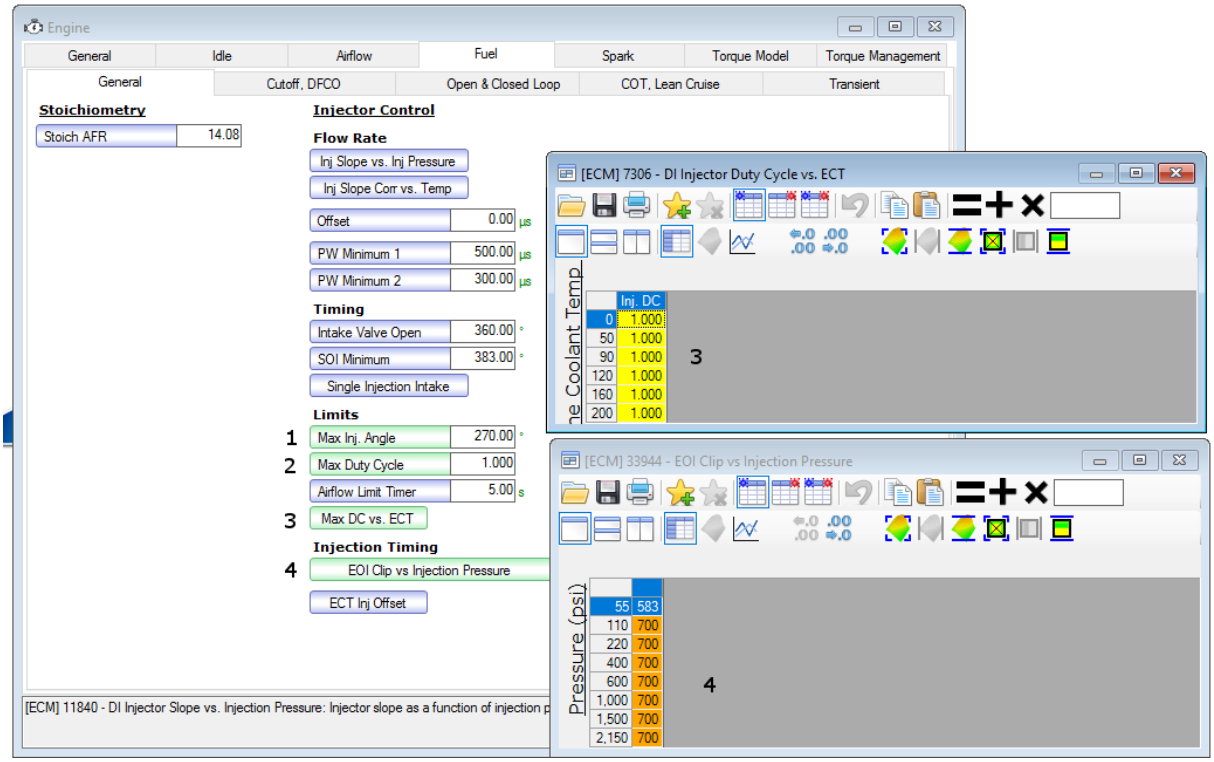
I disabled Tip-In Mgmt as well as CLIP/ADD mode.

Engine -> Airflow -> Variable Camshaft



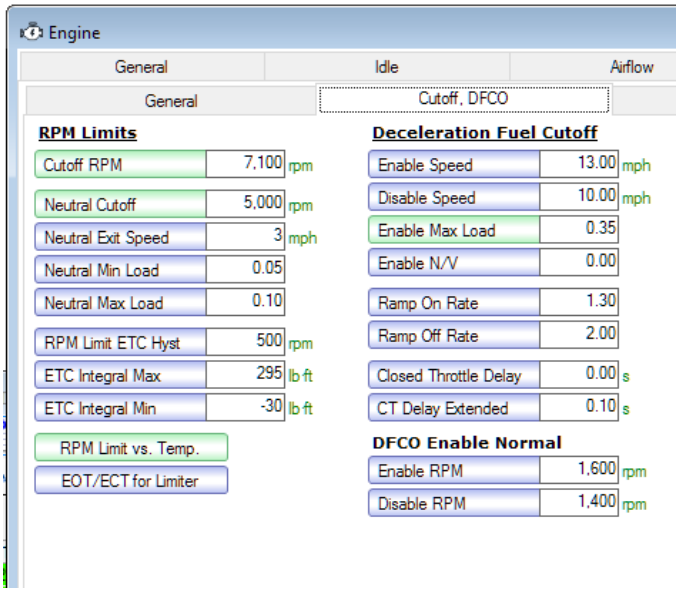
For these 2 tables, I don't feel they are very important. On other Ford OS/calibrations, there are Optimum Power spark tables, but for the Taurus SHO, the OP spark table is completely zeroed out. Someone might have a set of values to use for optimum power, but I enabled OP mode by changing #1 to all 70's and #2 to all 1.60's

Engine -> Fuel -> General



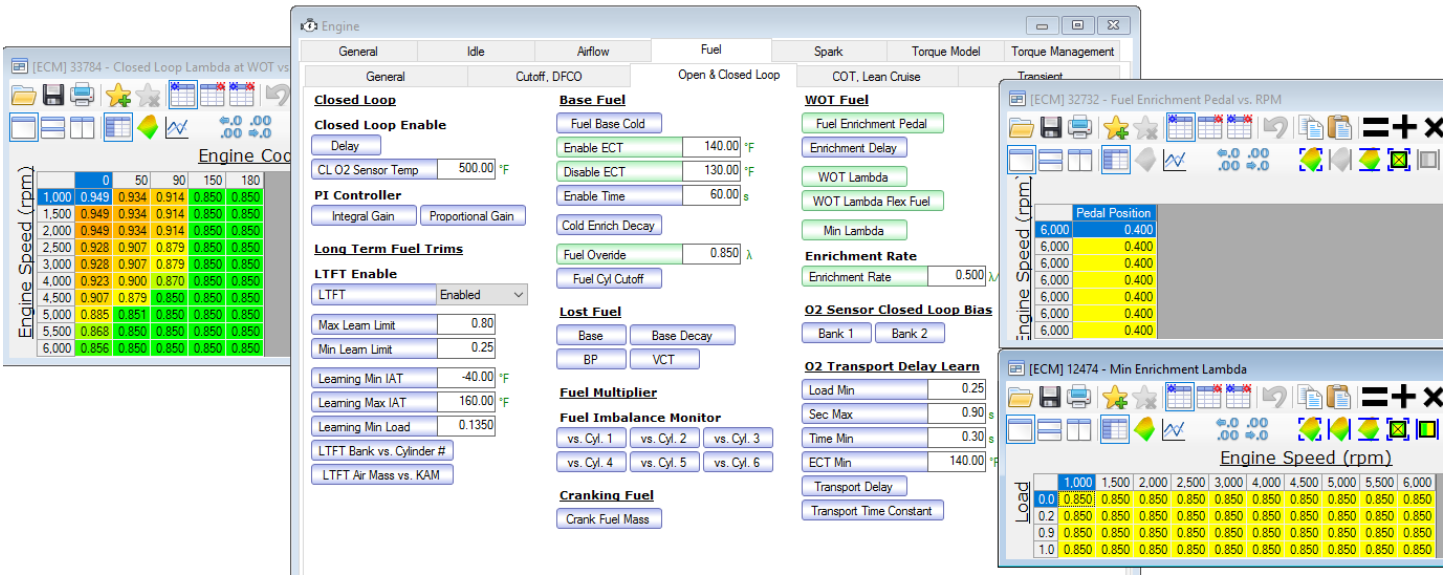
I can't take credit for these changes, I normally don't mess with injector settings but the person that helped me out suggested I change Max Inj Angle from 220* to 270* for extra fueling. Injector Duty Cycle is also increased to 100% (1.00), some others have recommended using 110% (1.10)

Engine -> Fuel -> Cutoff. DFCO



I made these changes mainly to increase the breathing room of the RPM range if necessary, but don't worry, it doesn't mean you are revving to 7100 RPM right away. I changed the max load of the DFCO so I can try to get better fuel economy when I'm off the throttle – that said, I found that deceleration loads are mostly under 30% but the stock 14% is cutting it close. The RPM Limit vs Temp table can be changed to all 7100. Again, it doesn't mean you are hitting 7100 RPM. That setting comes later.

Engine -> Fuel -> Open & Closed Loop

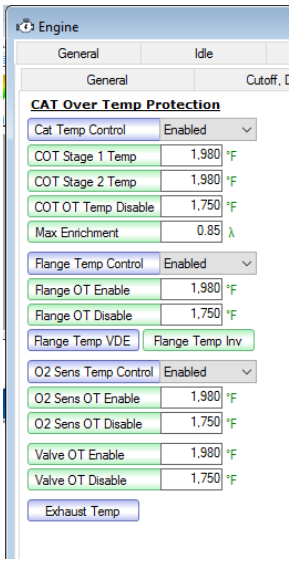


For Fuel Enrichment Pedal, I changed it to 40%, so when the actual throttle plate is at 40% or higher, WOT lamba is used (Or rather, Open Loop Power Enrichment mode). WOT Lambda is tricky with the EcoBoost. GTDI engines seem to perform better being more lean than normal. There's a new table just recently added (26 DEC 2016) that shows the Lambda Torque Multiplier (Engine -> Torque Management) table. This table indicates the greatest torque is produced with a lambda between 0.82 and 0.89. IMSA published the 2017 specs for some of the Balance of Power restrictions imposed on various cars for the classes, and the Ford GT in the GTLM class is running E20 fuel (stoich is about 13.53:1) with a minimum lambda of 0.90, or roughly 12.16:1 AFR for that EcoBoost 3.5L race engine. So a lambda of 0.85 here is about 11.97:1. I copied the WOT Lambda table over to WOT Lambda Flex Fuel. I made the Min Lambda table all 0.850, and then increased the Enrichment Rate scalar to 0.500 lambda/sec, which is unrealistic but ensures you are able to hit the commanded lambda very quickly.

The fuel pressure is almost factory-stock with lambda at 0.85 and I'm not seeing any more knock than with 0.82 or 0.79 WOT lambda. The stock stoich setting is 14.08, so multiply 14.08 by lambda to get the equivalent air to fuel ratio. I've experimented with 0.76 but ran into very low fuel pressure (below 1100 psi) causing insufficient fuel flow messages. Anything below 0.85 caused the insufficient fuel flow error to pop up. I've seen some dyno charts for EcoBoost 3.5L V6 F-150s that ran 87 and 93 octane with 0.85 lambda (about 12:1 AFR) so it is possible to run it even leaner. GTDI engines seem to be fine with leaner mixtures and make good power as well. Even Ford at the factory has set 0.85 for some vehicles (2.7L EcoBoost GTDI as an example).

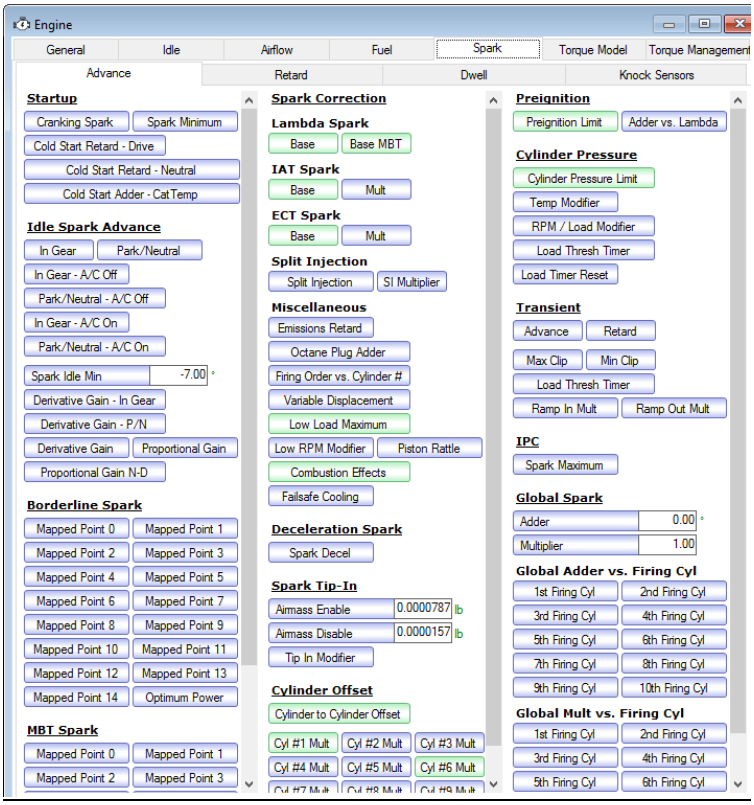
Fuel Override is set to 0.850 in the event something happens (stock was 1.00), or if some other parameter wants to override WOT lambda.

Engine -> Fuel -> COT. Lean Cruise



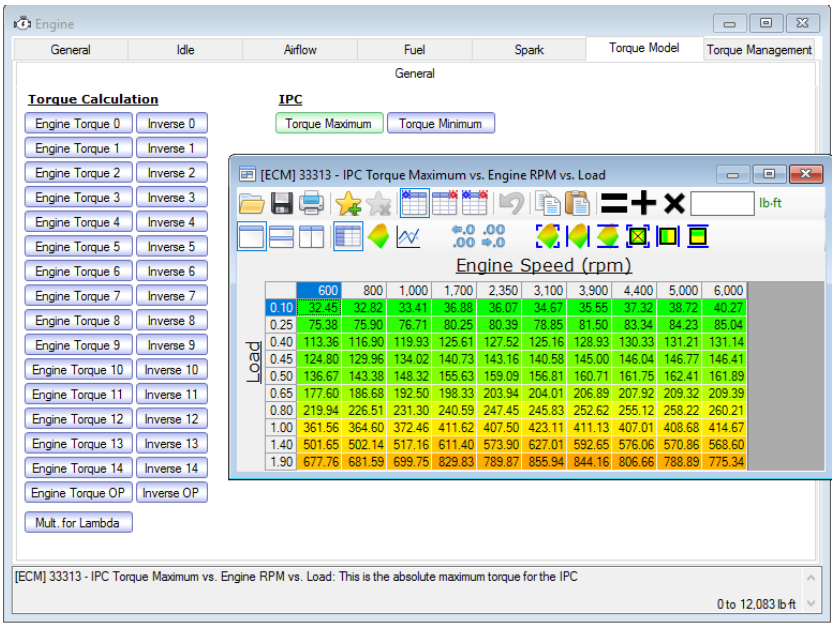
Changing these values prevents the ECU from dumping fuel to cool the cats too early. I changed Flange Temp Inverse to all 2.300 but you can just change it to anything above 2.0 to prevent the exhaust temperature limiter from kicking in for the EcoBoost 3.5 V6. With smaller engines, like the EcoBoost 2.0 or 2.3, you will need to raise this depending on your maximum air load. My Cobalt's GTDI 2.0 will easily see airloads over 2.3 (just as an example) so you will want to base this table for your particular engine. The EcoBoost 3.5L will typically peak at around 1.80 with the stock turbos.

Spark -> Advance



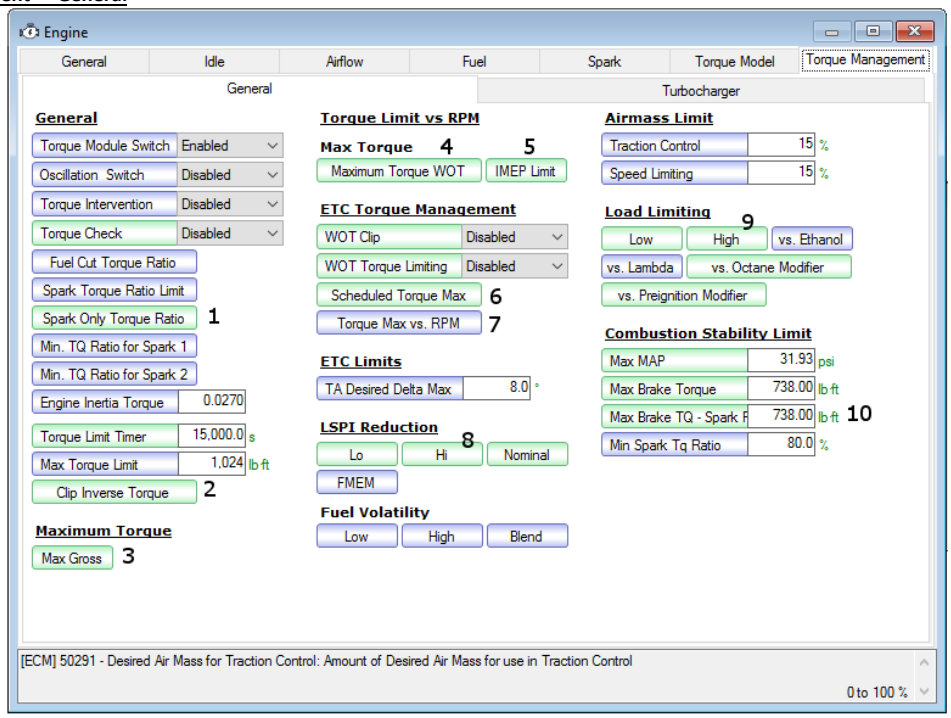
In my earlier guides, I never touched this tab. But I found out that at WOT, my Spark Source always read "Base" instead of Borderline. I couldn't raise the spark, and adjusting the Borderline Knock Table (BKT) did nothing. After much experimentation, I found that table 32396 Spark Retard for Combustion Effects (Combustion Effects) should be all 0's (I found this from the stock F-150 EB tune). For table 50227 Spark Low Load Max (Low Load Maximum), the entire column should be "55". The tables for Cyl #1 Mult and Cyl #6 Mult were all made 0. Under table 38053 Spark Cyl to Cyl (Cylinder to Cylinder Offset), I changed the "-2" values all to "-1". The PreIgnition Limit and Cylinder Pressure Limit tables were all set to 63.5. Now, you can add/pull spark values to the Borderline Spark tables for each Mapped Point (SHO has MP0-5). I made minor changes to Lambda Spark, IAT spark, and ECT spark that I feel aren't mandatory or noteworthy, feel free to experiment/tailor. Spark Tip-In / Tip In Modifier (32373) should be set to 0 to help prevent any spark retard during throttle tip-in.

Engine -> Torque Model

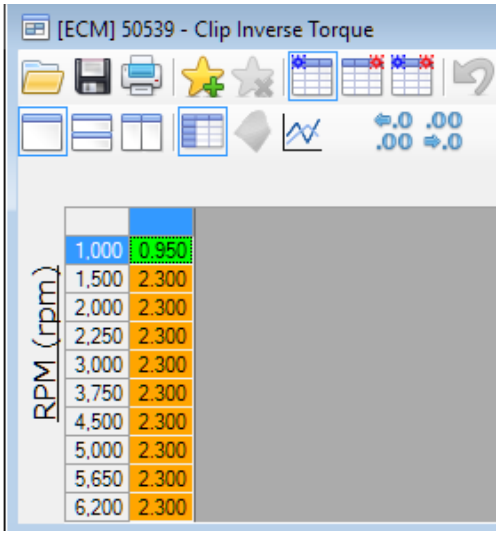


With the latest VCM Suite 3.40.xx, Eric added the table “Mult. For Lambda” which shows the lambda torque multiplier and gives a good idea at which lambda the engine makes the most torque. The Torque tables don’t need to be tweaked unless you change the volumetric efficiency model. IPC Torque Max should be changed, and I mainly tweaked the bottom 2 rows.

Engine -> Torque Management -> General

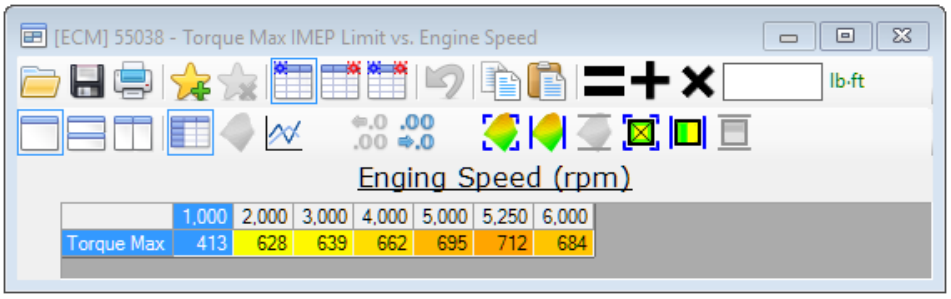


These are another set of very important settings, mainly torque limiters and load limiters. For #1, keep it stock. I found out if you set everything to 1.00 to disable it, the car tends to lurch in gear while off-idle. I only made TCS “0” from the stock “0.75”. So if you were in slow traffic, the car had a tendency to want to stall and then suddenly surge a bit. I kept it stock and did a WOT run and didn’t observe any torque reduction or limiting.

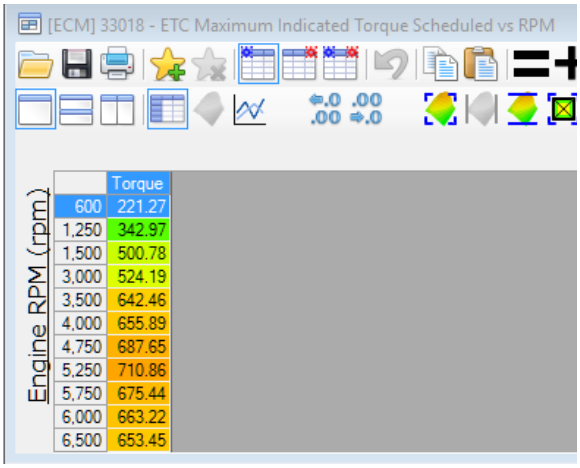


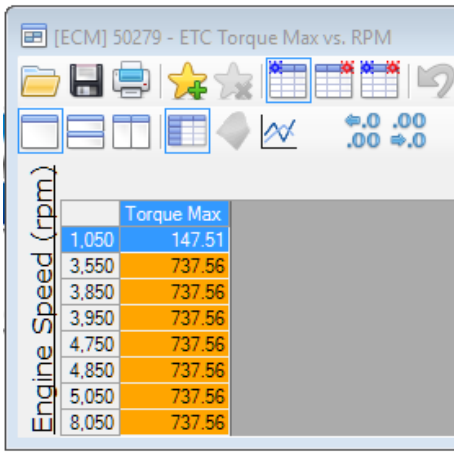
For #2, you can set these between 1.9 to 2.3 depending on your engine size. Go higher if you have a 2.0L or 2.3L EcoBoost (up to 3.00)
For #3-7, set all of the values to something high, like 600-800 ft-lb.
Note that #7 is actually for Park/Neutral. I found that if you keep the stock values (some are negative at high RPMs) you can't really blip the throttle to a high RPM in neutral/park. There's really no benefit to doing that, but I just found this out through experimentation. I ended up keeping it stock.
For #8, I set all of the LSPI tables to 3.00
For #9, I made all of the columns "2.30" for 1500+ RPM under High and Low Load Limit. I zero'd out the tables for Octane Modifier and Preignition Modifier.

IMEP Limit:

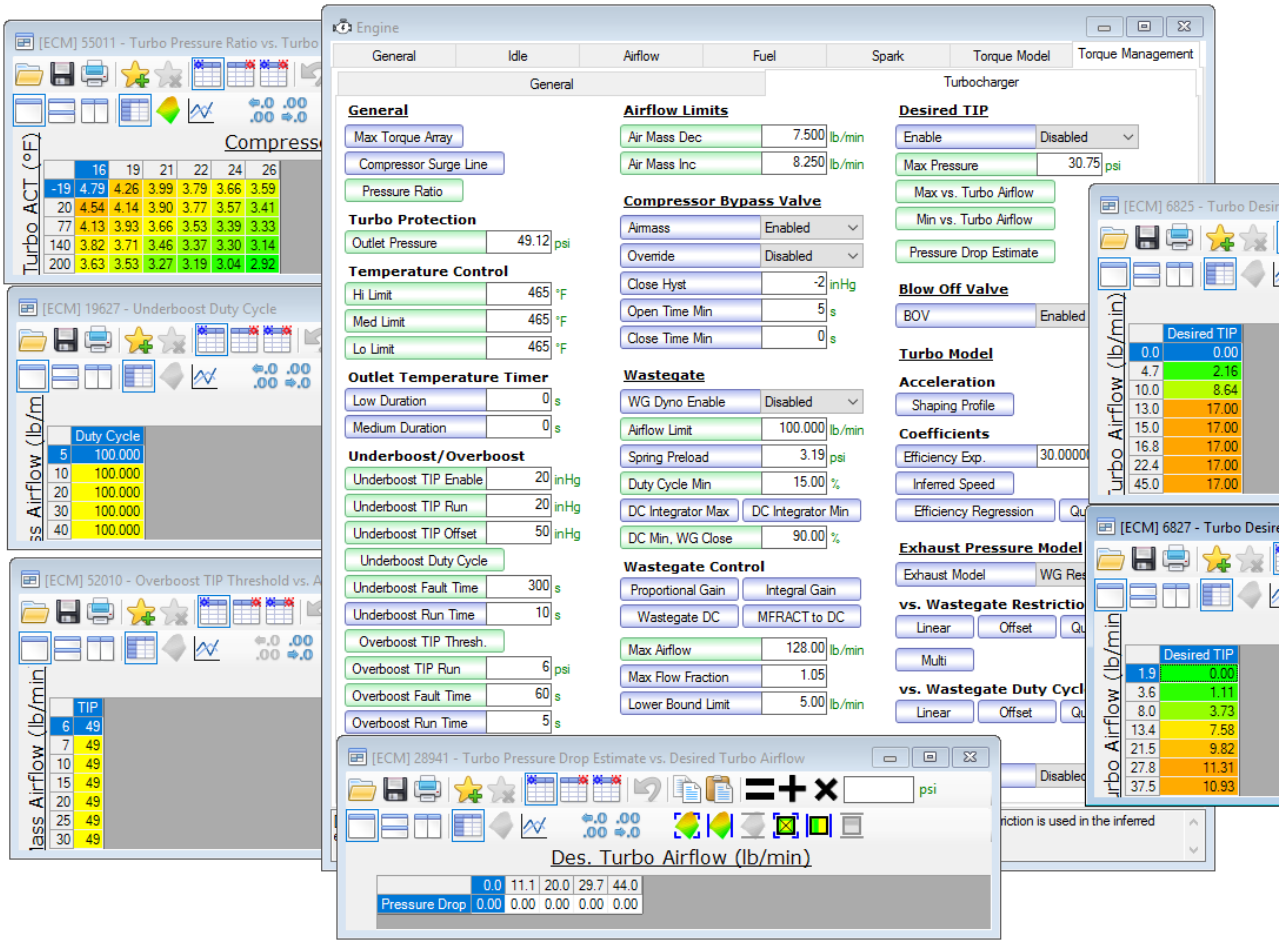


Scheduled Torque Max:





Engine -> Torque Management -> Turbocharger

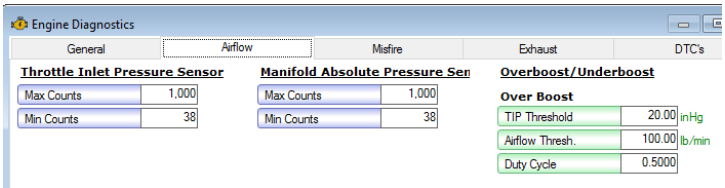


The pressure ratio table didn't make a whole lot of sense. The datalogged pressure ratios didn't match up because they kept changing. I ended up just using the values above. For the rest of the values, my old guide numbered each of the sections. This time around, I opened up the tables and left the scalar values visible so you can see everything all at once. The ones marked are green indicate they've been changed from stock, just in case you didn't notice this earlier in the guide.

I was told the Desired TIP values are relative to atmosphere, so what you input is what you're expecting (19 psi = 19 psi TIP, and not 4.6 psi), but what's confusing is that the stock settings call for very high numbers. I didn't find any difference between 16, 17, and 19.0 mainly because #2, the Max Pressure (or rather Max Desired TIP), overrides it all and is absolute. So if you set it to 32.40 psi, it will limit desired TIP to around 18 psi. I've experimented with values from 32.40 down to 30.75 psi. As this controls max desired TIP (Throttle Inlet Pressure), your Manifold Absolute Pressure (MAP) or aka actual boost, will be slightly lower. 30.75 psi Max TIP translates to roughly 16 psi boost. The problem is the stock GT1549L turbochargers and our small intercoolers aren't very efficient above 16 psi – they just pump out a lot of heat and you'll be pulling spark as well shortening the life of the turbos.

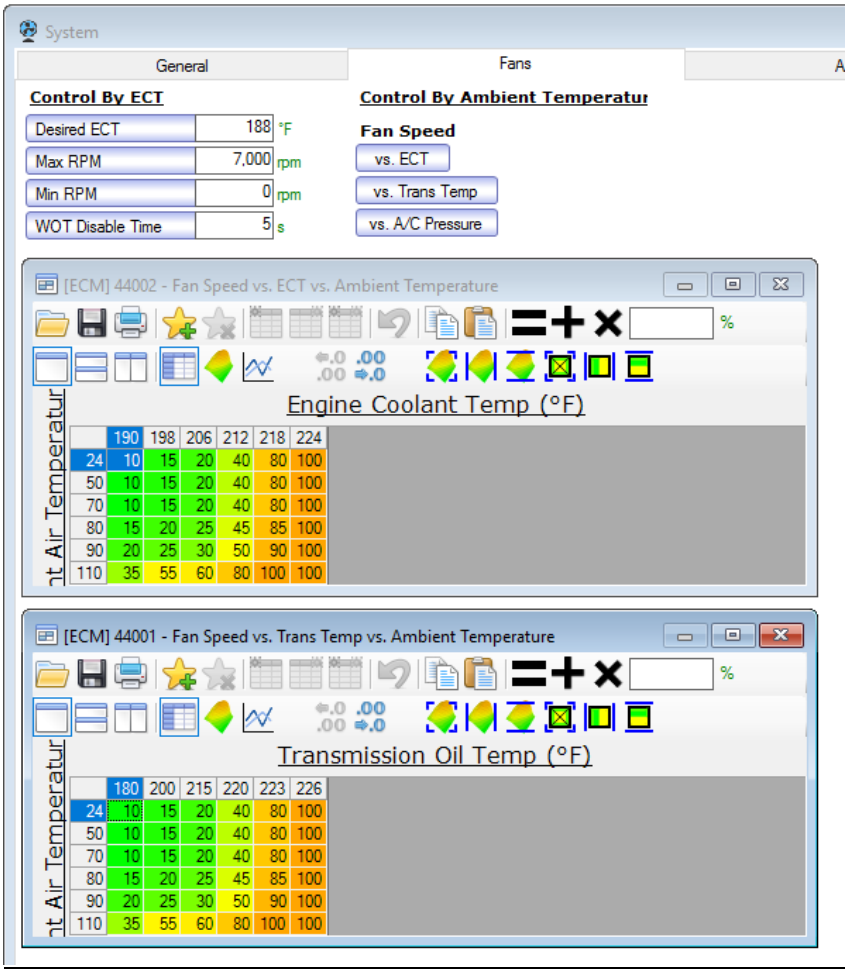
I also increased the values in Compressor Surge Line by 50% to help increase the airflow limits a bit more.

Engine Diagnostics -> Airflow



Set the TIP threshold to 20 inHg (9.82 psi) to avoid setting an overboost error, and increase the airflow threshold and duty cycle as extra measures.

System -> Fans



Here are some changes I made that I've been experimenting with my Reische Ford-4D 170F thermostat. Reische doesn't have any recommended settings for the newer EcoBoost and Coyote Fords because the settings are different from what were used on the older modular engines (High Fan On/Off and Low Fan On/Off).

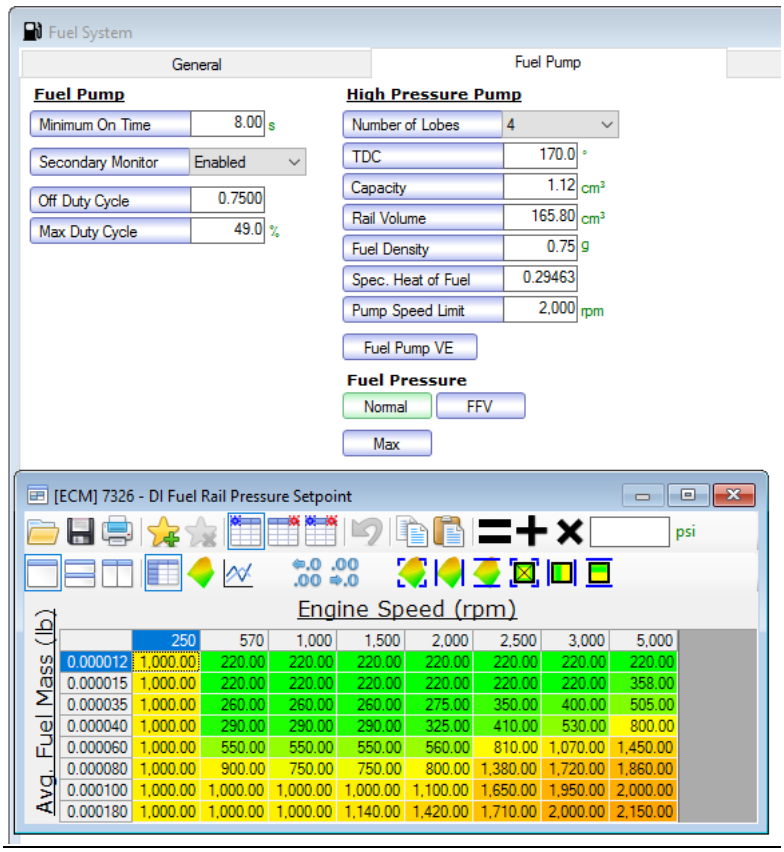
I did some datalogging last summer when the ambient temperatures were 95F-100F with the stock 180F t-stat. The stock desired ECT is 212F, but I had already changed it to 205F before the summer and then to 200F mid-way. I found the peak ECT temperature was 208F (right after a WOT run) and the peak CHT temperature was 232F. The average ECT/CHT delta is 18 degrees, but the peak delta is 24 degrees. In normal cruising as well as driving in the winter time, I found the ECT to typically stay around 190F even in the summer at an ambient of 100F with the stock fan settings, but this could be from the A/C running causing the fan to turn on. Either way, whenever I wasn't WOT on the freeway, the ECT would drop down fairly rapidly staying around the 190F mark. As a result, I believe the above settings should work out well without causing the fan to turn on all the time even in the summer.

With the 170F t-stat, on average the ECT/CHT temperatures were about 10 degrees cooler and tended to stay cooler in general. I used Reische's SCT X-Cal recommended fan settings as a baseline for the above settings.

The transmission fluid temperature had peaked out to 200F, during the summer, which is technically still OK, but I prefer it being a bit cooler to prolong the life of the transmission. Locking the torque converter has helped reduce the TFT by up to 30F, but the fan can be set to turn on at certain TFT readings to help out. Keep in mind any time the fan runs, it also helps try to reduce the intercooler temperatures.

Fuel System -> Fuel Pump

I kept the Normal Fuel Pressure table mostly stock, except for the 2500+ RPM and 0.00060+ lb range (lower right quadrant). I just added a few hundred psi.

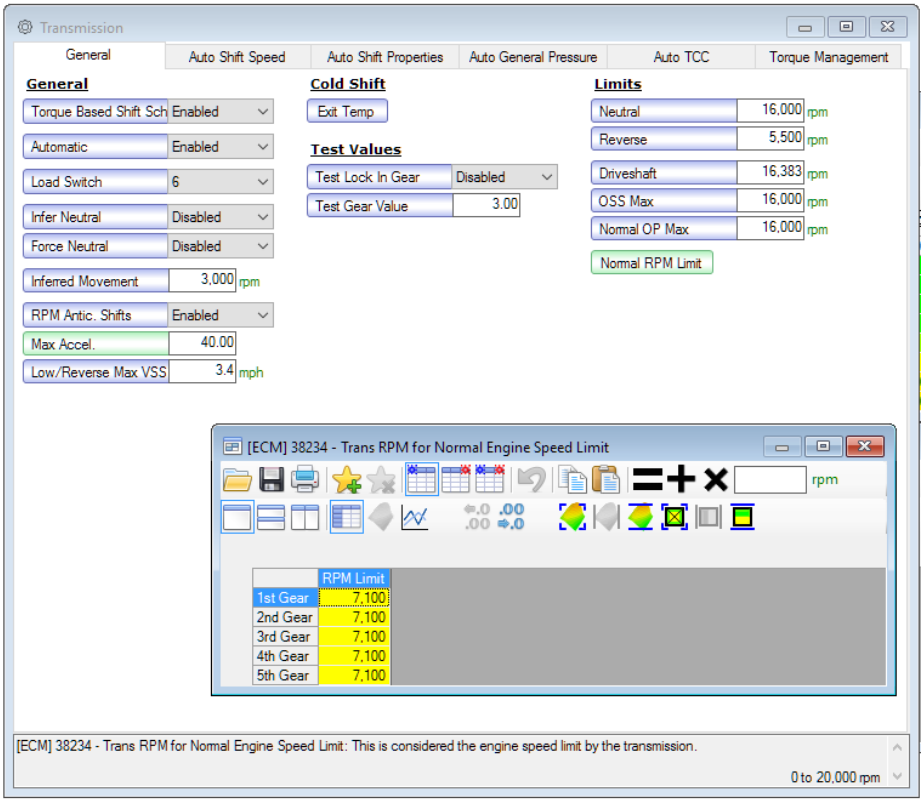


	250	570	1,000	1,500	2,000	2,500	3,000	5,000
0.000012	1,000.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00
0.000015	1,000.00	220.00	220.00	220.00	220.00	220.00	220.00	358.00
0.000035	1,000.00	260.00	260.00	260.00	275.00	350.00	400.00	505.00
0.000040	1,000.00	290.00	290.00	290.00	325.00	410.00	530.00	800.00
0.000060	1,000.00	550.00	550.00	550.00	560.00	810.00	1,070.00	1,450.00
0.000080	1,000.00	900.00	750.00	750.00	800.00	1,380.00	1,720.00	1,860.00
0.000100	1,000.00	1,000.00	1,000.00	1,000.00	1,100.00	1,650.00	1,950.00	2,000.00
0.000180	1,000.00	1,000.00	1,000.00	1,140.00	1,420.00	1,710.00	2,000.00	2,150.00

Transmission

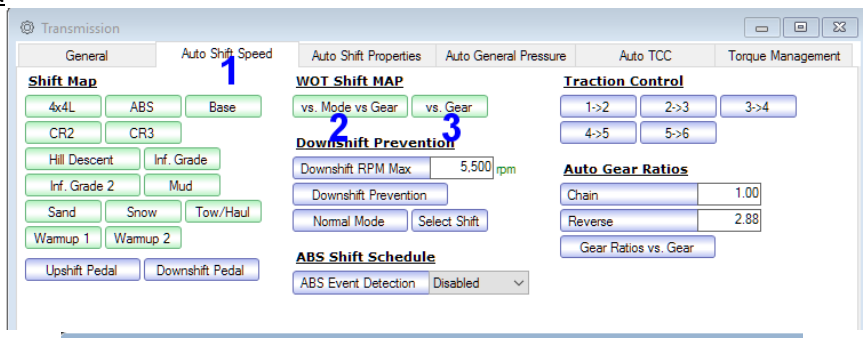
I've been using these settings on the street and track with decent results. Use these at your own peril. Of course, if you come up with something better, please do share with everyone.If your EcoBoost car has a manual gearbox, then you don't have to mess around with any of these settings!

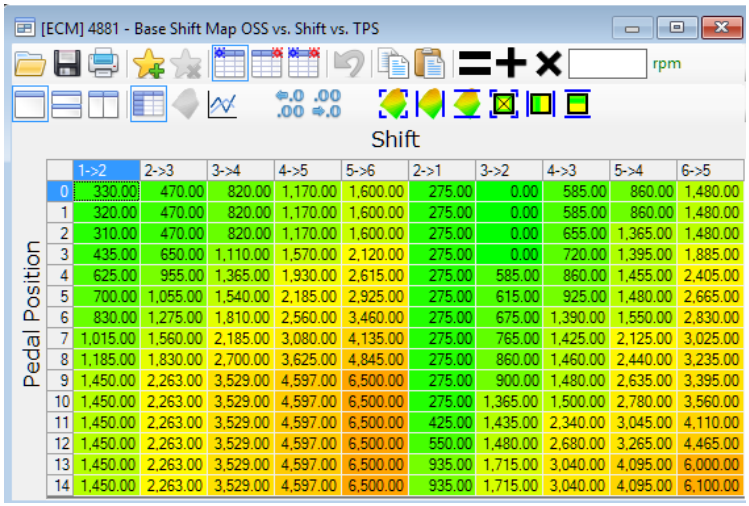
Transmission -> General



Max Accel should be increased. I raised Normal RPM Limit to 7100. Again, this doesn't mean you are going to be able to hit 7100 RPM right, nor do you really want to go that high. Notice there are 2 switches above for Torque Based Shift Schedule and RPM Anticipated Shifts. I've never experimented with disabling them, as my 6F55 seems to shift just fine, even at the track at WOT.

Transmission -> Auto Shift Speed



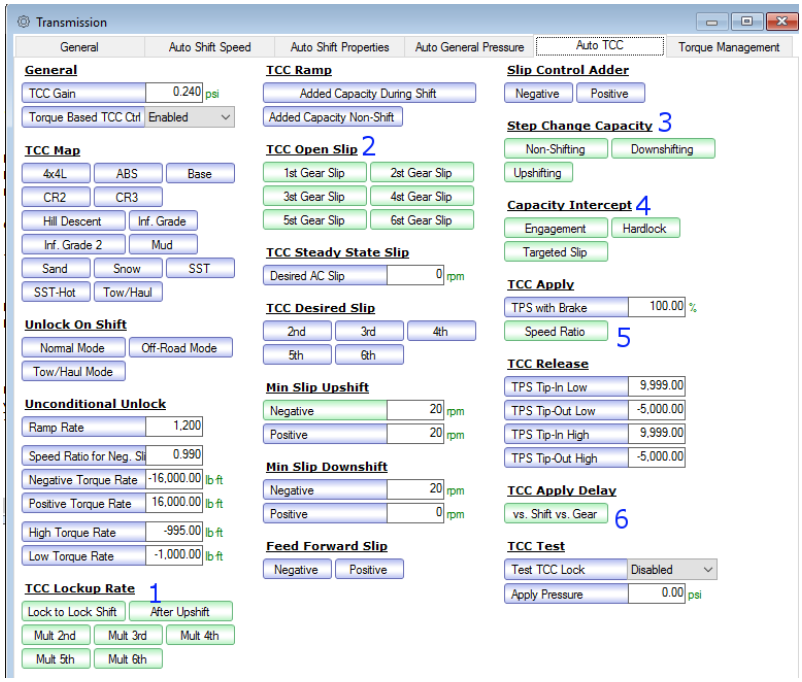


	1->2	2->3	3->4	4->5	5->6	2->1	3->2	4->3	5->4	6->5
0	330.00	470.00	820.00	1,170.00	1,600.00	275.00	0.00	585.00	860.00	1,480.00
1	320.00	470.00	820.00	1,170.00	1,600.00	275.00	0.00	585.00	860.00	1,480.00
2	310.00	470.00	820.00	1,170.00	1,600.00	275.00	0.00	655.00	1,365.00	1,480.00
3	435.00	650.00	1,110.00	1,570.00	2,120.00	275.00	0.00	720.00	1,395.00	1,885.00
4	625.00	955.00	1,365.00	1,930.00	2,615.00	275.00	585.00	860.00	1,455.00	2,405.00
5	700.00	1,055.00	1,540.00	2,185.00	2,925.00	275.00	615.00	925.00	1,480.00	2,665.00
6	830.00	1,275.00	1,810.00	2,560.00	3,460.00	275.00	675.00	1,390.00	1,550.00	2,830.00
7	1,015.00	1,560.00	2,185.00	3,080.00	4,135.00	275.00	765.00	1,425.00	2,125.00	3,025.00
8	1,185.00	1,830.00	2,700.00	3,625.00	4,845.00	275.00	860.00	1,460.00	2,440.00	3,235.00
9	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	275.00	900.00	1,480.00	2,635.00	3,395.00
10	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	275.00	1,365.00	1,500.00	2,780.00	3,560.00
11	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	425.00	1,435.00	2,340.00	3,045.00	4,110.00
12	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	550.00	1,480.00	2,680.00	3,265.00	4,465.00
13	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	935.00	1,715.00	3,040.00	4,095.00	6,000.00
14	1,450.00	2,263.00	3,529.00	4,597.00	6,500.00	935.00	1,715.00	3,040.00	4,095.00	6,100.00

Basically rows 9 and higher is at WOT. The downshift mapping seemed confusing at first, but basically the highest values (the last 2 rows) seem to be the limit at which you can manually downshift into that gear. I don't recommend changing these values other than perhaps raising the upshift values at rows 9 and above. You can calculate OSS based on gearing, tire size, etc… I have a spreadsheet that does this, but I found that this table has little impact on WOT shift RPMs.

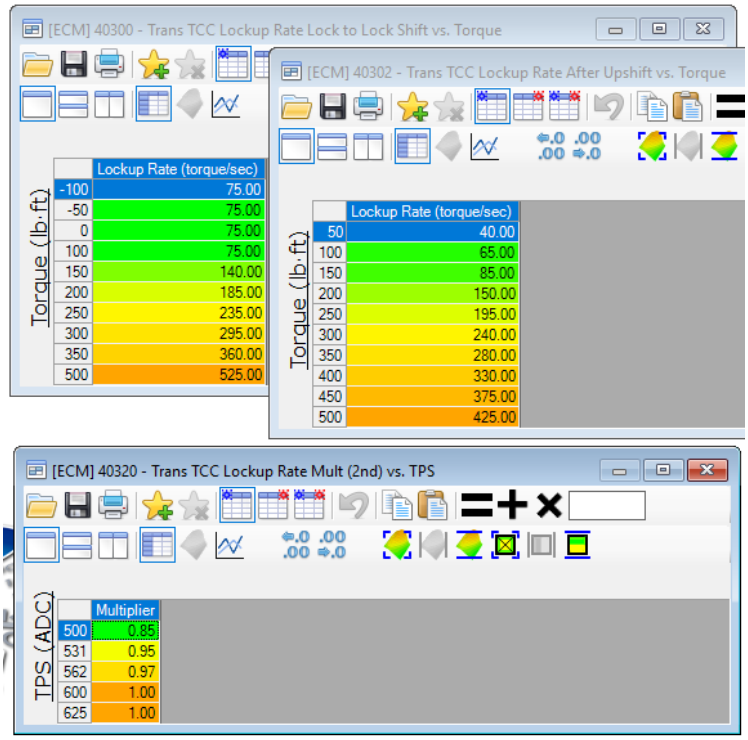
#2 and #3 are the tables that really have a huge impact. Changing these values will change the WOT shift RPM. Note that the number you put in won't be the exact RPM at which it shifts. It will be anywhere from 100-200 RPM below this figure. You will want to experiment to find the best setting. I will advise that the EcoBoost engine may physically be able to rev higher than the stock 6200 RPM, you will not want it that high because the engine's not doing much at that speed. The turbo efficiency goes down the tube and the engine isn't making much power or torque there.

Transmission -> Auto TCC



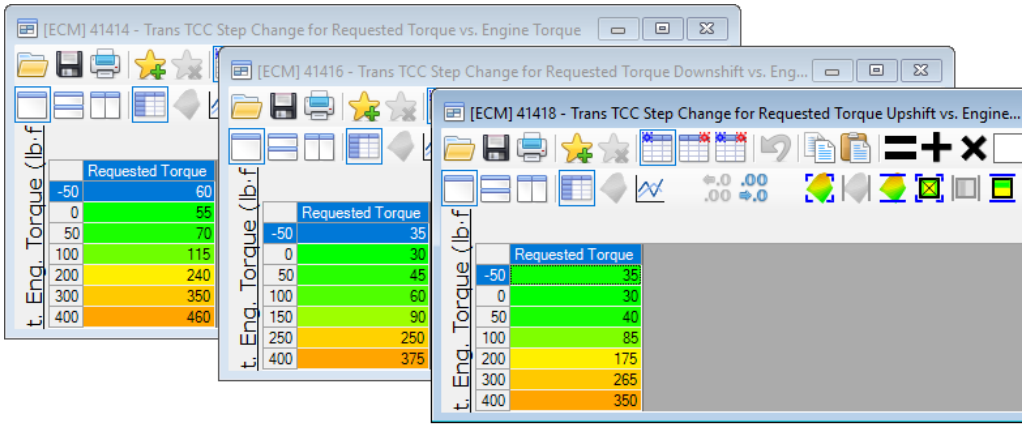
I noticed that my trans fluid temperature is about 10 degrees cooler with these settings. I looked at areas where I could reduce the amount of slipping from the torque converter clutch. For some reason the factory TCC schedule doesn't seem to have it lock all the time. It never locks up in 1st or 2nd gear, and in the real world the TCC locks up in 3rd gear and above during WOT although there is some slippage (up to about 300 RPM) initially.

For #1, change the Lock to Lock Shift and After Upshift values to the following, as well as the table for Mult 2nd which is the same for 3-6. You will need to change the Y-axis parameters as well (click on the "Torque (lb-ft)" text or "TPS (ADC)" text).

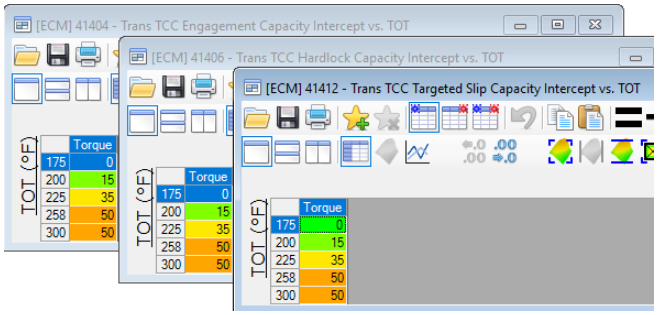


For #2, set all of the cells in the tables to 0 for each of the gears. The same goes for Min Slip Upshift / Downshift.

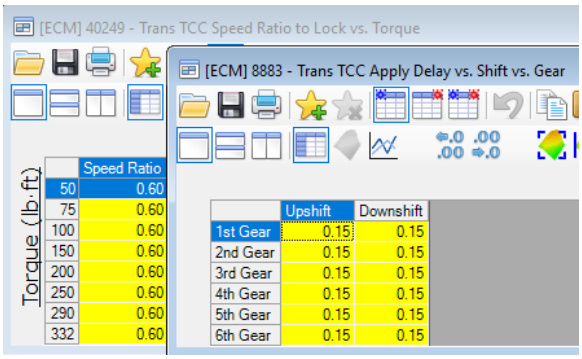
For #3, try these:



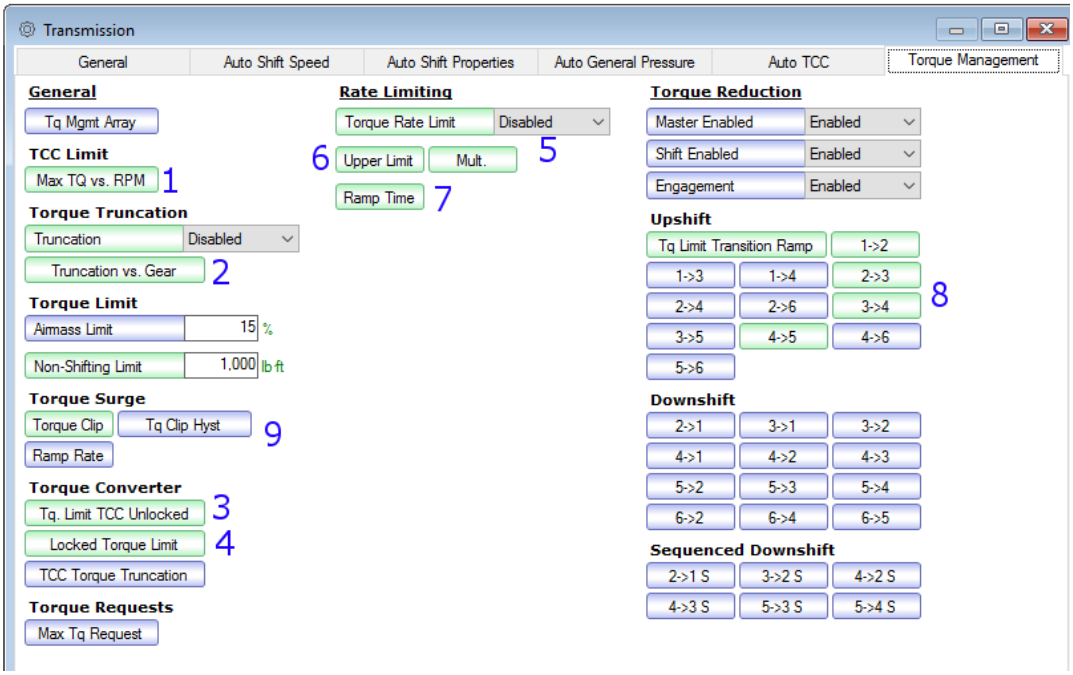
For #4:



For #5 and #6:

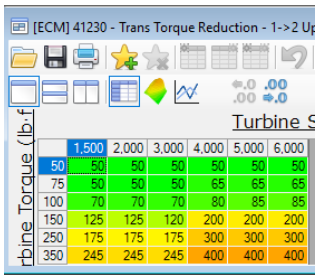


Transmission -> Torque Management



This is another very important set of tables. This one had me hitting a roadblock for about 2 weeks before someone was willing to share knowledge and I found out #5-7 was the root cause for me hitting a torque limiter.

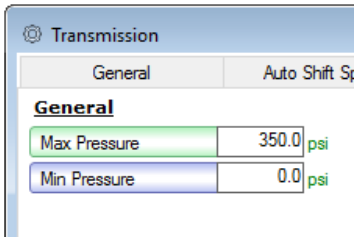
Set #1 to high values, like 1000 ft-lb
Disable torque truncation in #2, and set Truncation vs Gear to all high values like 1024 ft-lb
Set #3 and #4 to high values like 1000 ft-lb.
Disable Torque Rate Limit, and set #6 to all high values like 10,000 ft-lb.
My gut feeling is that the Torque Rate limit is a limiter for how much torque you can build up per second. So if you're running more boost, your torque is going to increase a lot in a short amount of time.
For #8, I read that some of the Coyote users and other Fords had shift quality issues with Torque Reduction disabled. I kept it enabled, and just increased the high input torque values at 4000 RPM and above. Keep the sub-4000 RPM values stock for maximum transmission longevity.



I used essentially these values for the 1-2, 2-3, and 3-4 tables. 5-6 should max out at 300 since you won't really shift into those gears at WOT and I believe the 6F55 might have physical torque limitations for those gears.

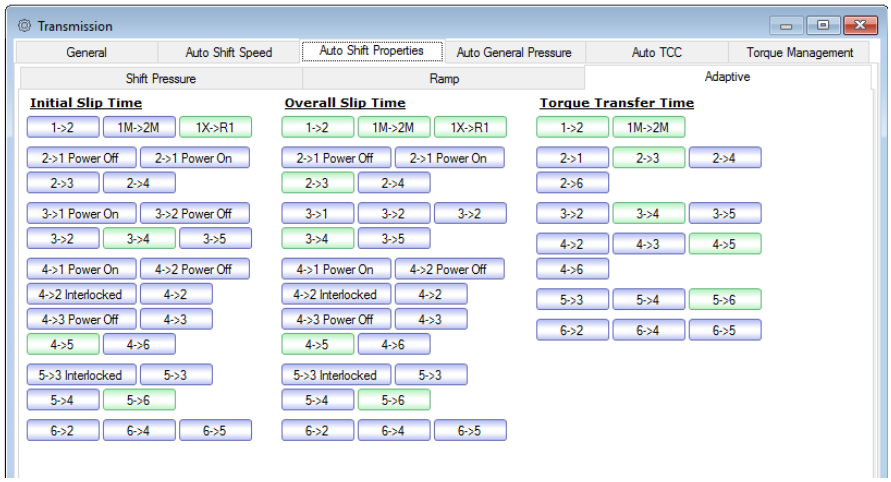
For #9, Torque Clip should be set to high values like all 1,024. I believe this is a Torque Reduction clip based on how much torque demand is being requested and ramped via the pedal. If there is a sudden throttle opening, it might hit a torque limiter and cause the throttle body to stay closed resulting in hesitation.

Transmission -> Auto General Pressure



Raise the stock value from 250 to 350 psi. I went into the Auto Shift Properties -> Shift Pressure tables and noticed that Ford actually calls out 300-400+ psi for a lot of the upshift and downshift cells at WOT. Since the stock max pressure is set to 250 psi, that limits all of those values to 250 psi. Since the 6F55 is known to have a weak wave spring for the 3-5-R drum (that supposedly has been beefed up for 2009-up 6F55/6T75 Ford or GM transmissions), I noticed that Ford allows for more slip/torque transfer time for the 2-3 and 3-5 shifts and that the pressures are a bit different for those shifts as well. I opted to try 350 psi as that provides almost max factory pressure for most of the shifts. I did not modify any of the shift pressure tables.

Transmission -> Auto Shift Properties -> Adaptive



For each of these tables highlighted in green, I multiplied the values by 0.80 (20% reduction in desired slip time or torque transfer time). I'm not sure what these alone (without changing the max pressure) will do, but combined with the 350 psi max pressure setting, the light and part throttle shifts feel seamless. At WOT, there's no drama either. I'm not a big fan of harsh shifting or tires barking after a WOT upshift. Again, the 6F55 supposedly has the weak wave spring for the 3-5-R drum, so you will see more time allowed for the 2-3 and 4-5 shifts. I checked the Explorer Sport trans settings, and they are identical to the SHO which is odd given the Explorer is a slightly heavier vehicle operated in different conditions.

Speedometer Correction

If your speedometer reading is different from GPS, you may want to consider calibrating it. Understanding smartphone GPS units (and most fitness/commercial GPS units) only refresh at 1 Hz, if you find a steady enough section of road you can use it perfectly fine. Although if you have a 10 Hz GPS unit, which are suited for lap/track recording, it would be even better. I found that the formula works well at around 70 MPH:

(GPS / speedometer) * tire circumference = corrected

To enable the calibration, go to Speedo -> Calibration -> Gear Ratio & Tire Size. Enable "Use Tire Circ." One route to do this is to go out and drive, maintain a steady speed anywhere from 50-70 MPH observing traffic rules/regulations with a GPS attached to the dashboard or preferably with a partner reading the speed. Take note of the GPS and speedometer speeds, apply the correction, reflash, and verify.