TurboTweak
FUEL SPARK

SD CHIP
Turbo Buick Speed Density

ECM Chip for '86/87 Turbo Buick or '89 Turbo TA
For converting from a MAF system to Speed Density

Please read before installing!

1. This chip must be used with a Powerlogger. Make sure the Powerlogger is updated with the latest software (see info near the end of this document). A 3-bar MAP sensor must be properly connected to the Powerlogger. Make sure the 3-bar MAP sensor gets its 5 volt supply from the ECM. You can splice into the 5 volt supply to the TPS sensor. The MAP signal wire connects to the Powerlogger.

2. This chip does not use the factory style O2 sensor, although it can be left connected if you want to monitor the readings. The chip will run in open loop all the time by default. A wideband O2 can be connected to the Powerlogger and used for fuel corrections if desired. The chip needs to be calibrated for specific wideband systems (Innovate, PLX, AEM, etc), so make sure that was specified when the chip was ordered.

3. The chip uses manifold air temperature for fuel corrections. You should move the factory air temp sensor to somewhere after the intercooler. You can mount it in the plenum or in the up-pipe. Just make sure it is mounted before any alcohol nozzle.

4. Before installing the chip, disconnect the power to the ECM by unplugging the orange wire with the black connector by the battery.

5. After gaining access to the ECM and removing the cover, remove the old chip, and carefully insert the new chip. Sometimes you may have to squeeze the sides of the chip slightly for it to fit into the socket. The chip will only go in one way. The notch on one end of the chip should be the same direction as the notch in the ECM socket.

6. Reconnect the ECM power wire. (**Important!** Always reset the ECM when changing chips, even from one TurboTweak chip to another TurboTweak chip.) The SD chip will remember all your settings using the Powerlogger's memory, so they will not be erased if the ECM loses power. If you want to reload the chip's default settings, see parameter #21.

7. Turn the key on. The "Service Engine Soon" light should come on, blink once and stay on. If, after installing the new chip and turning the key on, the "Service Engine Soon" light flashes on and off rapidly, do not start the car. Try to re-insert the chip, checking for bent pins. Also, check the ECM chip socket for any pins that are bent in too far, possibly making poor contact with the chip. The ECM socket pins can be carefully bent back out with a pin or needle. If the SES light still flashes, then the chip may be defective, or damaged during shipment, and will need to be replaced. Some post offices are using X-ray equipment that has damaged chips in the past.

8. Set the fuel pressure to 43psi (vacuum line off) to start with and tune from there. Some cars may need to have the fuel pressure higher or lower to run their best.

This product is intended for off-road use only. TurboTweak cannot be held responsible for any damage resulting from the use of this product.

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Readiness Checklist for SD Chip

- ✓ Powerlogger is installed and operating correctly, using the latest software (version 1.3.3 or newer). You can download this from my message board, www.turbotweak.com/forum. Look in the SD Chip section. Also the Powerlogger has been flashed with the latest file "PL024g.S19" or newer. This file will appear when you run the newest PLC.exe the first time.

- ✓ You have edited the PLC.INI file by adding the lines at the beginning. See the instructions near the end of this document. This is not critical for the car to run, just datalogging.

- ✓ The MAP sensor is connected properly to the Powerlogger's analog input block.
  There are 3 wires from the MAP sensor: 5v supply(grey), 0-5v signal(green), ground (black). The 0-5v signal (green) gets connected to the Powerlogger's I2 input.
  The original 5v supply came from the dash, which can be inconsistent. It is preferred that this is changed to the 5v supply from the ECM. This can be done by tapping into the TPS 5v supply, which is pin C14 at the ECM.
  See this link for more details: http://www.vortexbuicks-etc.com/PowerLogger.htm
  (you can cut and paste this link into your internet browser or try clicking on it).
  Thanks to Steve Wood for the info!

- ✓ Your wideband system is properly connected to the Powerlogger's analog input block (terminal I1 at the analog input block).

- ✓ Fuel pressure is set to 43psi (vac line off).

- ✓ No MAF (or MAF Translator) is connected (electrically).

- ✓ If you previously had an SD chip installed, you should reload the default settings before you start the car by going to parameter 21 and setting it to "1". This will reload the new default settings.

Reference Readings

Fuel pressure: Start at 43psi (vacuum line off). Normally drops about 5-8psi with line on. Adjust +/- 3-4psi to where car runs the best.
TPS: Idle .40 - .44 volts, WOT 4.2 - 4.8 volts, do not exceed 4.8 volts.
IAC: Car warmed up in park, around 10-15.
Oxygen sensor: Car warmed up at idle, .750-.850 is typical.
At WOT on pump gas, .780-.850 is typical.
At WOT on race fuel or alcohol injection, .750-.800 is typical.
Take WOT O2 readings in 3rd gear for consistency. The reading will generally be higher in the lower gears and drop some by the time you get to 3rd gear due to the O2 sensor heating up. These readings are typical for a Scanmaster and Powerlogger. Other scantools may read differently.
Wideband A/F: Typical idle warmed up should be in the 12.5 to 14.0 range. You can use the chip adjustments to go as lean as possible and still idle well. I usually end up around 13.0-13.5 for idle. At WOT, most cars end up in the 10.5 to 11.5 area.

Programmable Features

There are many areas of this chip that can be adjusted by the user. A wideband O2 system is recommended so you can monitor air/fuel ratios to get your car running its best.
Use Caution! The adjustments available to you with this chip have the capability to do serious harm to your engine if you do not monitor your fuel mixture and knock retard with some type of scanning device.

Param #	Name	Description
1	WOT Fuel	WOT fuel all gears, above 13psi
2	1st Gear Fuel	WOT fuel offset for under 35mph (1st gear)
3	WOT Spark Advance Low Gear	Spark advance adjustment for 1st/2nd gear (use an odd# for alky)
4	WOT Spark Advance High Gear	Spark advance adjustment for 3rd/4th gear (use an odd# for alky)
5	Mid Boost Fuel	Fuel in the 0 to 13psi boost range
6	Low Throttle Fuel	Normal driving around fuel, use even numbers only. If a wideband is attached to Powerlogger, use an odd# to enable C/L.
7	Overall System Fuel	Similar to adjusting fuel pressure
8	Highway Fuel	Fuel during highway cruising conditions
9	Idle Fuel	Fuel when RPM is under 1300
10	Cold Start Fuel	Fuel during cold startup
11	Spool Fuel	Adjust how fast fuel ramps in with RPM
12	TCC Forced Lock MPH	Force the converter to lock at this MPH (128 turns it off)
13	MPH Threshold for 1st gear fuel	Used with param #2. Signifies the end of 1st gear fueling
14	Mid/WOT Boost Threshold	Boost level that decides between Mid Boost and WOT
15	Target A/F at Mid Boost	Target A/F at Mid Boost, Closed Loop (99 turns off C/L) Use only if wideband is attached to Powerlogger.
16	Target A/F at WOT	Target A/F at WOT, Closed Loop (99 turns off C/L) Use only if wideband is attached to Powerlogger.
17	Knock Retard Ignore	Knock retard ignore threshold Odd numbers are time, even numbers are mph
18	SES Shift Light RPM	SES light comes on at this RPM
19	Target A/F at Idle	Target A/F at Idle if using closed loop
20	AE Fuel	Acceleration Enrichment Fuel
21	Reload Defaults	Setting to "1" reloads all original defaults

You can see where any parameter is currently set by turning the key on (engine off), set your selected parameter to the one you want to see (see next page on how to select a parameter), then look at BLM on your scan tool. On Powerlogger, the parameters will display on the BLM grid. The parameters are organized like the chart shown here (to the right). Parameters after #16 are not displayed on the BLM grid.

BLM cells on Powerlogger

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Parameter Adjustment Procedure

To adjust the programmable features, you will need a scantool that can display LV8 and BLM (L8 and BL on Scanmaster).

Select a parameter:

1. With key on/engine off, look at LV8 on your scantool. It will display the parameter you will be adjusting. It should display "0" to begin with.
2. Press the gas pedal fully and release 3 times, *except* on the 3rd press, hold it to the floor. Like this:
    1. Press/Release
    2. Press/Release
    3. Press/Hold -- don't let go!

    You must complete this sequence in under 3 seconds! If not, you'll have to turn the key off, then back on to start over.
3. Keep holding the gas pedal. After about 2 seconds, LV8 will start to cycle from 1 to 21, over and over again.
3. When you get to the parameter you want to adjust, release the gas pedal. Wait a couple seconds to make sure the number stopped on the parameter you wanted.

Adjust the parameter you just selected:

4. Switch your scantool over to BLM. This will show you what the current setting is of the parameter you selected.
5. If you want to change the setting, press the gas pedal a little bit (under half) and the number will decrease slowly. Press a little more (over half) and the number will increase slowly. Mash the pedal to the floor and the number will increase rapidly. When the number gets to its max or min, it will wrap around and keep going. When you get to the number you want, release the gas pedal.
6. Key off for at least 3 seconds and the process is complete. If you want to adjust another parameter, key off for 3 seconds and back on, and start the process over.

Notes:

This chip is designed to save all the user parameters into the Powerlogger's flash memory. So if the battery or ECM is disconnected, your settings should remain in the memory. I recommend periodically looking at the saved values to make sure they have been retained. If they are not being saved, make sure there is a good connection between the Powerlogger board and the ECM. Make sure the ECM connector is clean. Sometimes sliding the board on and off the ECM connector a few times will help it "dig in" to make a better connection.

Troubleshooting

If you can't get the adjustable parameters to work, then the TPS is probably not adjusted correctly. Make sure the TPS voltage reads .40-.46 in the throttle closed position and 4.20-4.80 when your foot is to the floor (engine off/key on). Make sure you are not using any type of "TPS Enhancer".

Descriptions of all Parameters

Parameter 1 – WOT Fuel

This adjustment affects fuel above 15psi by default. When first running the chip, start with the boost low (around 15-17psi) and work from there. Monitor your A/F ratio and add or subtract fuel as necessary. The chip will add fuel as the boost rises (all the way to the max of the MAP sensor), however engines have different volumetric efficiencies which may require you to adjust the fuel. If you're running in closed loop mode using a wideband, you can use this adjustment to get the correction closer to 128. For example, if your correction is running high, say 145, then increase this parameter to 145.

Parameter 2 – 1st gear WOT Fuel Offset

This adjustment affects fuel above 15psi when MPH is under 35. If you're running in closed loop mode using a wideband, I would leave this parameter at 128.

Parameter 3 – WOT Spark Advance, Low Gear

Adjusts WOT timing higher or lower than the default timing in 1st/2nd gear only. By default, the scantool will display 128, which is 0° change. Higher than 128 adds timing, less than 128 subtracts timing. Moving the number to 154 adds 9° timing. Moving it to 102 subtracts 9° timing. For this adjustment, 1 number = .35 degrees.

This parameter has a dual function. If you add timing, and use an odd number, the added timing will be delayed until about 1 second after full boost is reached. This is mainly for alcohol injection, where it's good to allow the alky to cool the combustion chamber before the higher timing is activated. If you use an even number, the timing will be applied immediately, blending in starting around 5-10psi.

Parameter 4 – WOT Spark Advance, High Gear

The same as parameter 3, except for 3rd/4th gear only.

Parameter 5 – Mid Boost Fuel

This adjustment affects fuel in the 0 to 15psi range by default. Usually this is adjusted to be as lean as possible without knock. If you go too lean, you will lose power and it may spool slowly. The same thing can happen if it's too rich. I typically try to achieve an A/F in the 12.0 area for mid boost. With alcohol injection, you may need to reduce fuel here so it doesn't get too rich.

Parameter 6 – Low Throttle Fuel

This adjustment affects fuel during normal driving (not under boost and not idle). Usually this is adjusted so that the A/F is in the 14.0-15.0 area most of the time. Don't worry if it's a little richer or leaner at times, as long as the car runs ok.

This parameter has a dual function. If you have a wideband O2 system connected to your Powerlogger, you can set this parameter to an odd number, which will enable closed loop control. This will turn on closed loop for idle and low throttle only. It is set to a default target A/F of 13.5 at idle, and 14.5 at low throttle.

If using closed loop, you can monitor how much correction is being applied on the Powerlogger by looking at "AFR Correction". On a Scanmaster you can look at "CC". There is a correction range of 115 to 170, with 128 meaning no correction. Below 128 means fuel is being subtracted, above 128 means fuel is being added.

Parameter 7 – Overall System Fuel

This is an overall fuel correction that is similar to adjusting fuel pressure. It affects everything from idle to WOT fuel. This is used to compensate for differences in engine displacement, fuel types, etc. To run E85 fuel, you can set this to +30% to start tuning.

Parameter 8 – Highway Fuel

Adjust this to achieve your desired A/F when cruising. This setting takes affect when load (LV8) is less than 100, and MPH is above 50. Note that if closed loop is enabled, this adjustment may not actually change the A/F ratio, but the correction factor may change.

Parameter 9 – Idle Fuel

This adjustment is very sensitive, so make changes in small increments. Don't go more than 2 numbers at a time. Adjustments to this parameter will also affect cold start. So if cold and hot idle both seem too rich or too lean, adjust this first.

Parameter 10 – Cold Start Fuel

This adjustment will allow you to add or reduce fuel during the cold start routine. Go as lean as possible without causing the car to stall when dropping it into gear.

Parameter 11 – Spool Fuel

When you hit the gas, as the boost and RPM's rise, the chip is programmed to richen the air/fuel mixture. This adjustment changes how quick the A/F gets richer as the RPM's rise. Decreasing this number will lean it out, or make the fuel come in *later* in the RPM range. Increasing the number will make the fuel come in *earlier* in the RPM range. This can be helpful with alcohol injection to lean out the fuel as the alky comes in.

Parameter 12 – TCC Forced Lock MPH

By default, this is set to 128, which turns OFF WOT locking of the converter. If you want the converter to lock at full throttle, set this to whatever MPH you want. Be careful! This can be hard on the converter and transmission.

Parameter 13 – 1st Gear Fuel MPH Threshold

Normally set to 35mph to signify the end of 1st gear. You can change this to whatever MPH you want in order to improve your tune. This tells parameter #2 (1st gear fuel) when to end. If you want to change parameter #2 into a 1st/2nd gear fuel, then set this MPH to the end of 2nd gear (usually around 60mph).

Parameter 14 – Mid/WOT Boost Threshold

This dictates at what boost level fueling switches from "Mid Boost" to "WOT" fueling. If you add WOT fuel, and you find the fuel is coming on too early, you can increase this to a higher boost level. This setting also applies to the closed loop Target A/F's by telling it when to switch from the Mid A/F to WOT A/F. See the chart below to convert the number to boost psi. For example, if you want to change the parameter to about 19psi, you would change the number to 180.

Conversion chart for parameter #14

BOOST psi	#
13	150
14	155
15	160
16	165
17	170
18	175
19	180
20	185
21	190
22	195
23	200
24	210
25	220

Parameter 15 – Target Air/Fuel Ratio at Mid Boost

If you have a wideband connected properly to the Powerlogger, you can set a target A/F ratio and the ECM will try to maintain that A/F. This is turned OFF by setting it to 99. Divide by 10 to get the A/F, so 115 is an A/F of 11.5, 105 is 10.5, etc.

You can monitor how much correction is being applied on the Powerlogger by looking at "AFR Correction". On a Scanmaster you can look at "CC". There is a correction range of 115 to 170 at WOT, with 128 meaning no correction. Below 128 means fuel is being subtracted, above 128 means fuel is being added.

The idea is get the correction close to 128, but it's not critical. You can change the base WOT fuel using parameter 1. So if your WOT correction is running around 145, change parameter 1 to 145 which will get the correction closer to 128.

Sometimes it is better to keep this at 9.9 (off). The boost can change very rapidly in the midrange which makes it difficult for the closed loop correction to keep up.

Parameter 16 – Target Air/Fuel Ratio at WOT

If you have a wideband connected properly to the Powerlogger, you can set a target A/F ratio and the ECM will try to maintain that A/F. This is turned OFF by setting it to 99. Divide by 10 to get the A/F, so 115 is an A/F of 11.5, 105 is 10.5, etc.

You can monitor how much correction is being applied on the Powerlogger by looking at "AFR Correction". On a Scanmaster you can look at "CC". There is a correction range of 115 to 170 at WOT, with 128 meaning no correction. Below 128 means fuel is being subtracted, above 128 means fuel is being added.

The idea is get the correction close to 128, but it's not critical. You can change the base WOT fuel using parameter 1. So if your WOT correction is running around 145, change parameter 1 to 145 which will get the correction closer to 128.

Parameter 17 – Knock Retard Ignore

Some cars exhibit a "false knock" condition which can be caused by hard launches, etc. This parameter allows you to set up conditions to ignore false knock, so that timing will not be retarded.

This parameter has a dual function. The range of adjustment is 0-125. When using an **EVEN** number, the numbers will represent **MPH**. So if you set it to 34, knock will be ignored up to 34 MPH. If you set it to an **ODD** number, the number will represent **TIME**. So if you set it to 35, knock will be ignored for 3.5 seconds after full throttle. For TIME, always divide the number by 10, so 25 is 2.5 seconds, etc.

Parameter 18 – Shift Light (Service Engine Soon light)

Turns on the SES light at a set RPM. The adjustment range is 0 to 255. Multiply the number by 25 to get RPM. If you set it to 200, multiply by 25 to get 5000rpm.

Parameter 19 - Target A/F at Idle

When using low throttle closed loop (see param #6) this setting will dictate the target A/F ratio under 1200 RPM. If you want to switch to open loop at idle only, set this to 9.9 (99 on your scantool).

Parameter 20 - Acceleration Enrichment Fuel

The adjustment modifies the AE fuel. AE fuel is only applied during "tip in", while the throttle is moving. So if you have a tip-in stumble right when you move the throttle, you can try adjusting this to improve response. Default is 128, higher is richer, lower is leaner. I would go at least 5 numbers at a time to see a difference.

Parameter 21

This is used to reload the default settings. Set it to "1", and turn the key off for at least 3 seconds, if you want to reload the original chip defaults.

Setting Up the Base Tune – Always start with Idle Fuel

1. Start the car and see how it idles, if it's idling ok, let it warm up. There is an "afterstart" fuel that applies every time you start the car. Afterstart is displayed on the data page of the Powerlogger software. Try not to do much idle tuning until afterstart is down around 3% or less, preferably 0%. This may be around 7-10 minutes after startup. If the car will not idle or surges badly, try adding 2 numbers to idle fuel and try again as it may be too lean.
2. Once warmed up, look at the idle fuel mixture on the wideband in Park. I usually target around 13.0 to 13.5 A/F for idle in Park. If it's too rich, say 11.5, then shut off the car and reduce the idle fuel adjustment by 1. If it's too lean, increase the idle by 1. Restart the car and after the afterstart fuel has decayed out, check the A/F again. Repeat adjustment if necessary.
3. Alternatively, if you have a wideband system connected, you can turn on closed loop control by setting parameter #6 to an odd number (use 129 to start with). This will enable closed loop at idle and cruising after the car is warmed up, and after 30 seconds of running. The chip will automatically target 13.4 at idle and 14.5 during cruising. Then you can monitor closed loop correction (AFR correction) in the Powerlogger software on the data page. Once the car is fully warm and afterstart has decayed out, you can watch AFR correction to see if it's staying in the -5% to +5% range most of the time. If not, adjust idle fuel to get it closer.
4. Once you have the idle fuel set up, the next time the car is cold, you can see if the cold start fuel is ok. If it seems to rich or too lean, adjust cold start fuel a couple numbers to fine tune it. You'll know it's too lean if it stalls when you drop it into gear.
5. Most of the other fuel adjustments can be made now that idle is set up.

WOT Fuel

When using closed loop, the chip will attempt to maintain the target WOT Air/Fuel ratio that you set in the chip parameters. However, the program can only add or subtract a certain amount of fuel. This is the "correction factor". On the Powerlogger, it is displayed in the AFR correction box on the data page. It is allowed to reduce fuel by up to 10%, and add fuel up to 33%. We'll call this the "correction window". Therefore, the correction window is -10% to +33%. We need to keep the correction factor within this window, preferably around 0% give or take, in order for the closed loop operation to work correctly. It's ok if it's not exactly at 0%, just somewhere in that area, maybe +/- 5%. It's best to monitor closed loop correction after the boost has stabilized. As long as the correction factor has not hit the upper and lower limit, then it should hold your air/fuel ratio pretty close to the target, typically +/- .2 once at full boost. You might see more variance during spoolup.

When at full boost (WOT), monitor closed loop correction and see where it ends up. If the correction is too far away from 0%, then you can change the Base WOT Fuel (parameter #1), to get the correction closer to 0%. For example, if the correction ends up around +13%, then increase the Base WOT Fuel to about 145. If the correction is too low, say -9%, then decrease the Base WOT Fuel to 117. If the correction is stuck at the upper or lower limit no matter what, then you'll need to stop

and figure out what's going on. Once you go through this process, you should not have to adjust the Base WOT Fuel much more, unless you make some type of radical change to the setup of the car.

You can also leave closed loop off if you prefer and tune the WOT manually. Just watch you're A/F on your wideband or Powerlogger and adjust fuel accordingly.

There is also a Mid Boost Air/Fuel setting in the chip. In general, I typically leave this OFF (set it to 9.9). The reason is the boost typically moves very rapidly through this area, and it makes it difficult to hold the target A/F. For some cars that are in that boost area for longer periods, then it might be beneficial to turn it on. It works better on some cars than others. I would experiment with it and see what works best for you. If you decide to use it, it works the same way as the WOT adjustments. You would use the Base Mid Boost Fuel (parameter #5) to keep the correction factor in the correction window.

Regarding target air/fuel ratios, I find that around 10.8-11.0 is a good place to start for WOT A/F in most situations whether it's street, race, or with alcohol injection. Start there and monitor for knock and performance. If the car is knocking at 10.8, then you may have to go richer, however you may want to evaluate your octane level or alcohol spray volume. Typically the idea is to go as lean as you can without knocking, but I wouldn't go much leaner than 11.5. Some cars can go leaner if running low boost, say 15-16psi, or on some race cars with very high octane.

If you are seeing a rich spike or lean spike when the boost first comes up and peaks, then you may need to adjust Spool Fuel (parameter #11). Especially with alcohol injection, you might see a rich spike as the boost first comes up. You should also consider experimenting with the settings on your alcohol system.

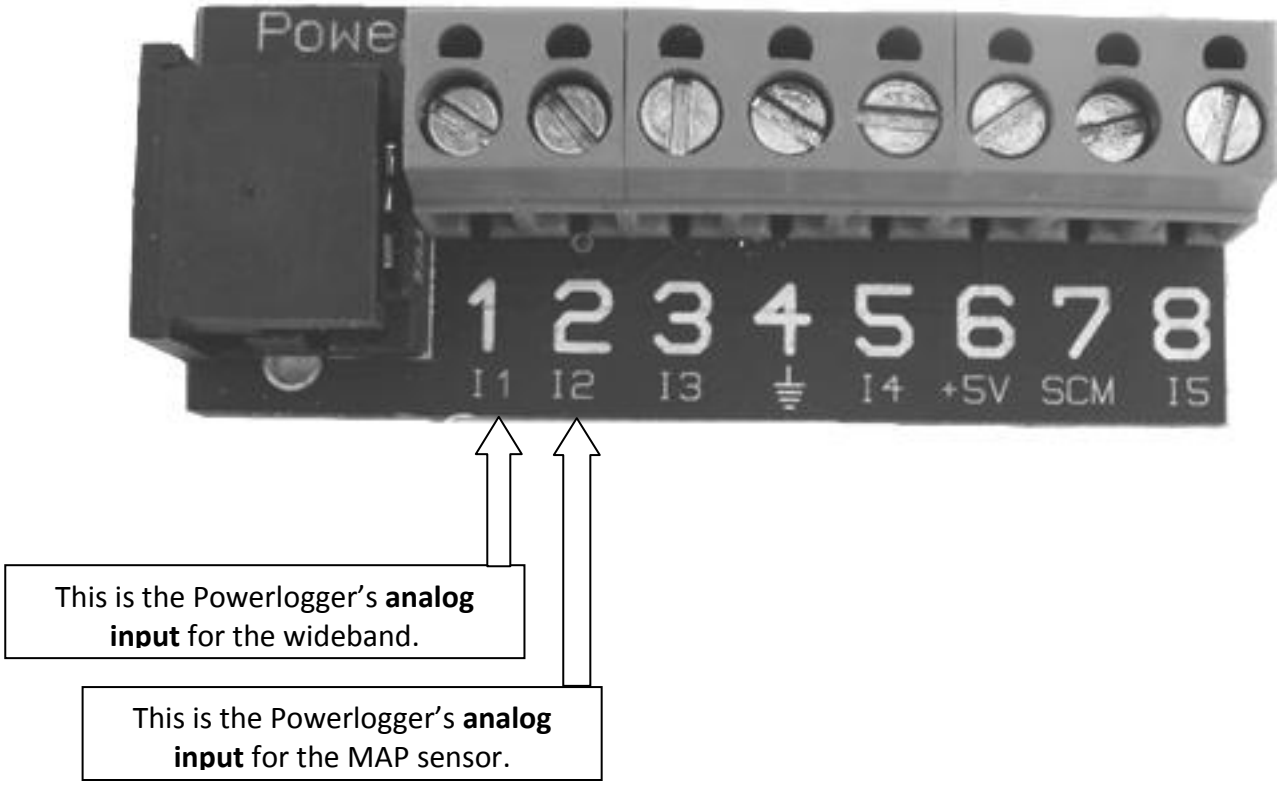
Quick Reference for User Adjustments

Fuel user adjustments (not idle fuel)	
Number on scantool	**Change to Fuel**
154	+20.3%
153	+19.5%
152	+18.8%
151	+18.0%
150	+17.2%
149	+16.4%
148	+15.6%
147	+14.8%
146	+14.1%
145	+13.3%
144	+12.5%
143	+11.7%
142	+10.9%
141	+10.2%
140	+9.4%
139	+8.6%
138	+7.8%
137	+7.0%
136	+6.3%
135	+5.5%
134	+4.7%
133	+3.9%
132	+3.1%
131	+2.3%
130	+1.6%
129	+0.8%
128	0.0%
127	-0.8%
126	-1.6%
125	-2.3%
124	-3.1%
123	-3.9%
122	-4.7%
121	-5.5%
120	-6.3%
119	-7.0%
118	-7.8%
117	-8.6%
116	-9.4%
115	-10.2%
114	-10.9%
113	-11.7%
112	-12.5%
111	-13.3%
110	-14.1%
109	-14.8%
108	-15.6%
107	-16.4%
106	-17.2%
105	-18.0%
104	-18.8%
103	-19.5%
102	-20.3%

Spark timing user adjustments	
Number on scantool	**Change to timing**
154	+9.1°
153	+8.8°
152	+8.4°
151	+8.1°
150	+7.7°
149	+7.4°
148	+7.0°
147	+6.7°
146	+6.3°
145	+6.0°
144	+5.6°
143	+5.3°
142	+4.9°
141	+4.6°
140	+4.2°
139	+3.9°
138	+3.5°
137	+3.2°
136	+2.8°
135	+2.5°
134	+2.1°
133	+1.8°
132	+1.4°
131	+1.1°
130	+0.7°
129	+0.4°
128	0.0°
127	-0.4°
126	-0.7°
125	-1.1°
124	-1.4°
123	-1.8°
122	-2.1°
121	-2.5°
120	-2.8°
119	-3.2°
118	-3.5°
117	-3.9°
116	-4.2°
115	-4.6°
114	-4.9°
113	-5.3°
112	-5.6°
111	-6.0°
110	-6.3°
109	-6.7°
108	-7.0°
107	-7.4°
106	-7.7°
105	-8.1°
104	-8.4°
103	-8.8°
102	-9.1°

Wideband and 3-BAR MAP Connection and Setup Notes

Powerlogger analog input block

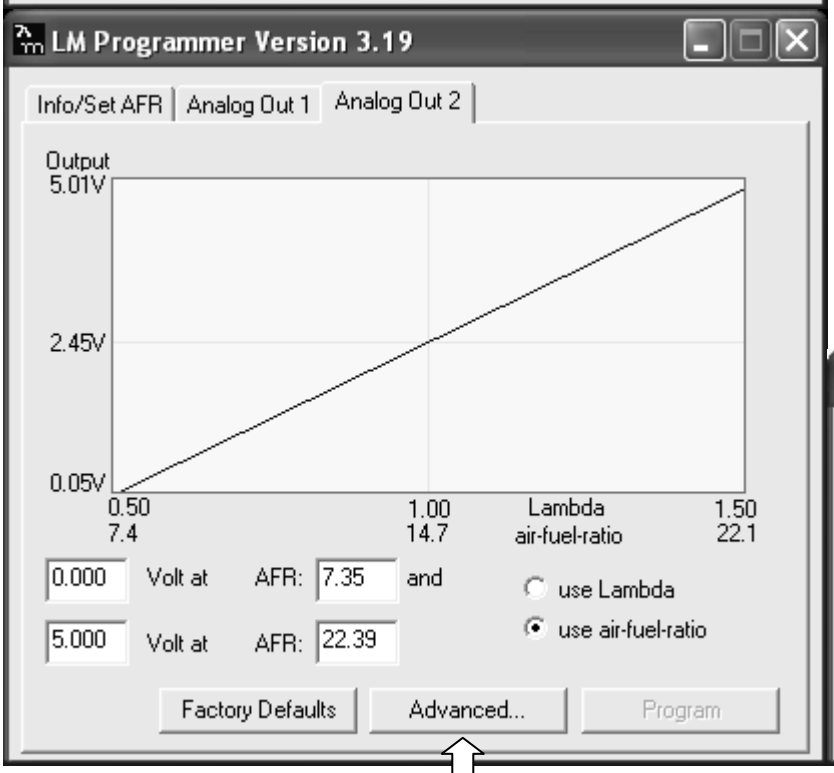


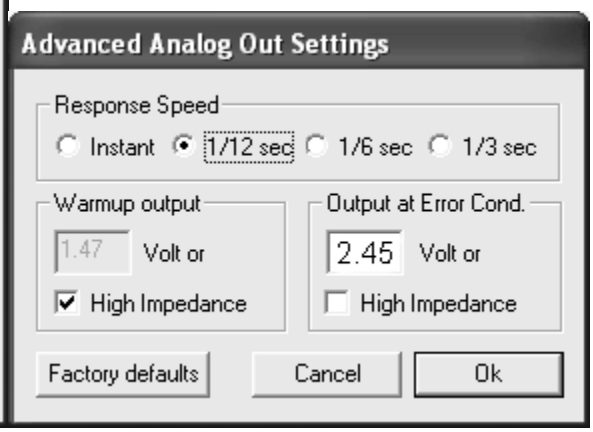
See the following pages for notes about your particular wideband system.

Innovate LM-1 or LC-1

Attention! Before you use the SD chip, make sure your LC-1 or LM-1 is programmed properly. For the LM-1, you will need to reprogram the analog output to match the LC-1 settings. For the LC-1 and LM-1, connect to your wideband using the LM Programmer software. Make sure the settings match the screens shown below. You will be using "Analog Out 2" to connect to your Powerlogger. If you have an LM-1, once you reprogram it, you will tell the Powerlogger software that you have an LC-1. Select "LC-1" for the wideband input in the Powerlogger software.

Set the "Output at Error Cond." to 2.45 volts. That will make the LC-1 show an air/fuel ratio of 14.7 if it throws an error code, which will make the chip add fuel instead of subtract (safer).





Press "Advanced" for next window

Autometer Widebands

See your Autometer instructions for setting the "BGD Range". You will need to set the LO to 10.0 and the HI to 18.0. In other words, 0 volts will equal an A/F reading 10.0, and 4 volts will equal an A/F reading of 18.0. In the Powerlogger software, you will select "PLX" for the wideband input.

You'll be connecting the blue wire from the Autometer gauge to the Powerlogger wideband input, and the blue/black wire to the Powerlogger ground input.

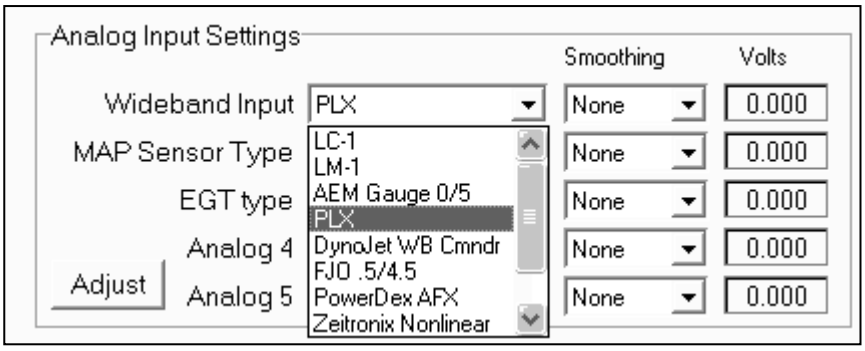
Be aware that the Autometer wideband is set up to require at least 13.5 volts before it will turn on the wideband sensor. If your car will not supply 13.5 volts, then you will have to change the "Heater Control Mode" on the wideband. See your Autometer instructions for this.

PLX Widebands

You will need to connect the 0-5v linear analog output wire to the Powerlogger wideband input. PLX supplies capacitors for the analog output to reduce electrical noise, but you **do not** need to use them. The Powerlogger has capacitors built in. Select "PLX" for the wideband input in the Powerlogger software.

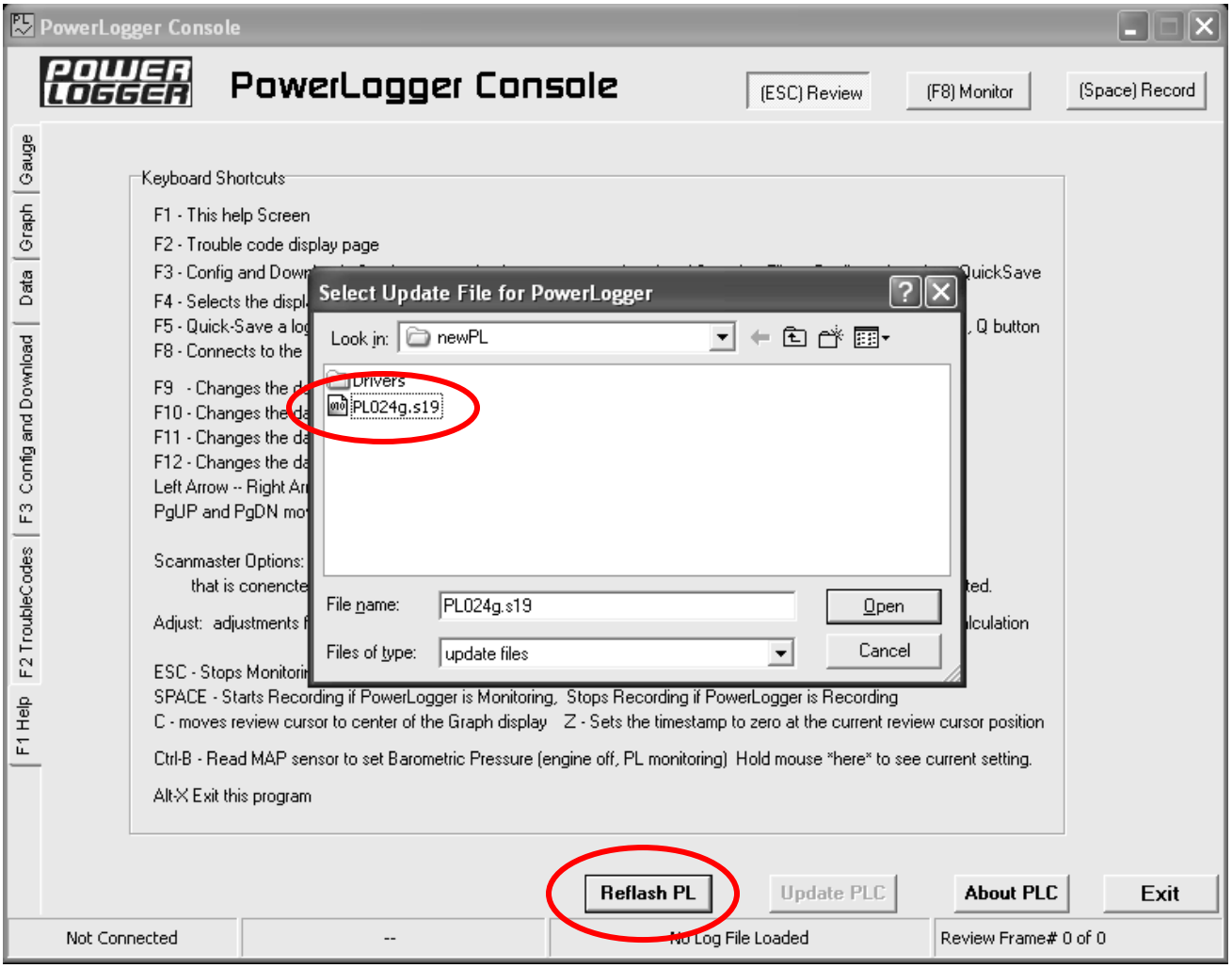
Wideband Input Selection

Here is where you select which wideband you have in the Powerlogger software.

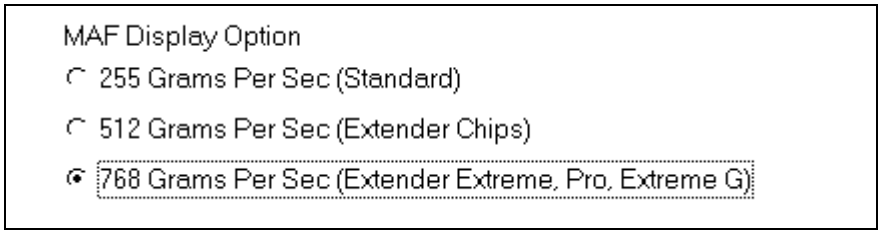


Powerlogger Update

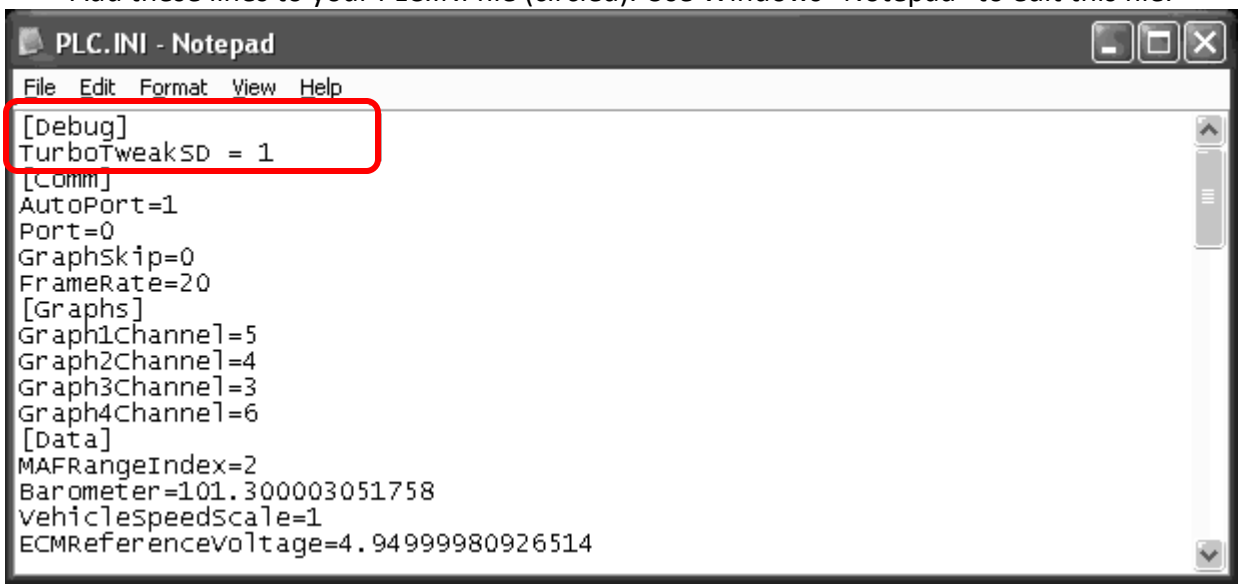
Make sure your Powerlogger is updated with the latest software (you can download the newest PLC.exe from the TurboTweak message board, www.turbotweak.com/forum). The Powerlogger unit must be flashed with the file "PL024g.s19" or higher (the 24g is the version). The chip will not work right with older versions! Make sure you have at least version 1.3.3 of PLC.exe.



On the Powerlogger Console "Config and Download page", set the MAF Display Option to 768. Even though there is no MAF, the SD chip will estimate the airflow.



Add these lines to your PLC.INI file (circled). Use Windows "Notepad" to edit this file.



These readouts will be added to the Powerlogger's data page (circled). You need to play back a recording for them to appear.